Saw Mill Machinery

Manufactured by

R. R. Howell & Co.,

Minneapolis, Minn.

Catalog B.

To the Trade.

The Saw Mills, Engines and other Machinery described in this catalog are manufactured by us from the crude iron, steel and lumber to the complete machine, from the ground up, ready for work. Our patrons will observe that we continue our practice of adding to our machines from time to time such improvements as the best mechanics and users have endorsed, and as our own obversation and wide experience justify.

The manufacture of this class of machinery has been one of the principal brances of our business for the past thirty years, and we shall continue to spare no pains or expense to keep our machines the leading one in the market. Our works are among the oldest and most extensive in the state, and contain every facility for economically manufacturing our class of machinery.

Our trade has rapidly increased from year to year under our system of doing business directly by letter and circulars, selling machinery exclusively upon its merits, without the help of traveling agents, giving our customers in better quality of work and discounts the advantage of what other manufacturers spend on the road.

To our friends and customers all over the country, we have only to add that we were never in better condition to offer them first-class machinery than we are today, and shall in the future as in the past aim to merit their confidence, by furnishing them the very best machinery at close prices.

R. R. HOWELL & CO.,
Minneapolis, Minnesota.

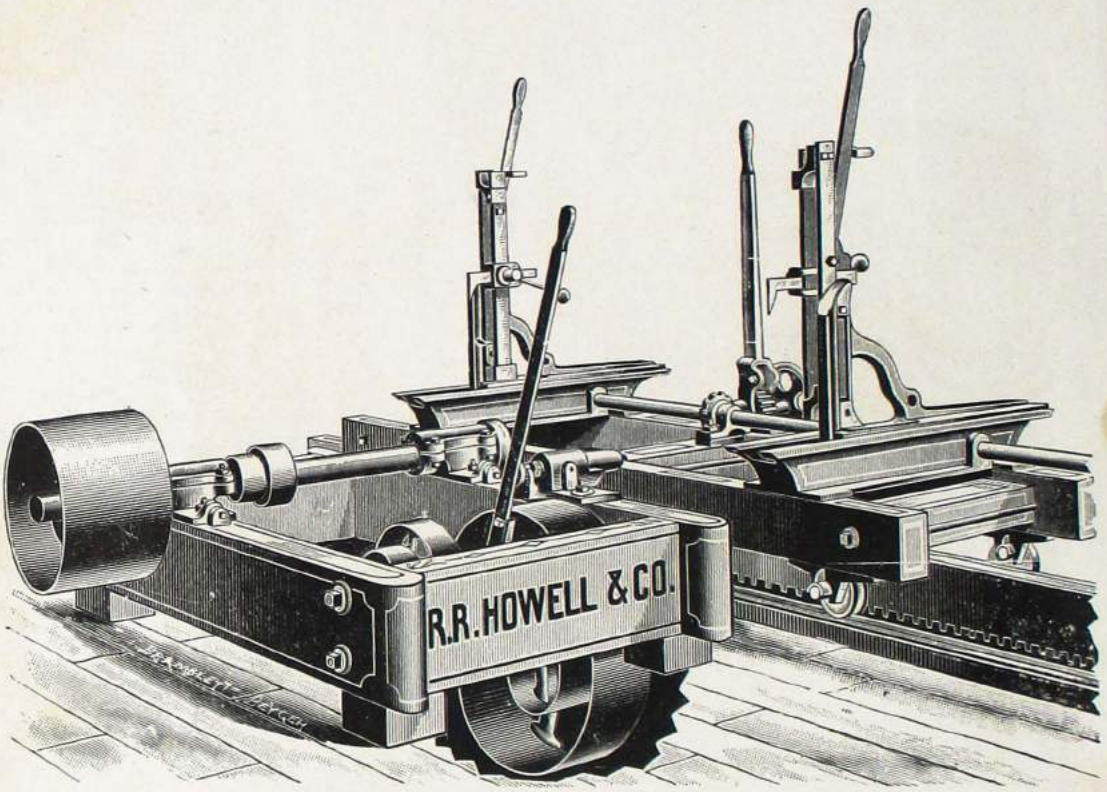
March 10th, 1909.

ESTABLISHED IN 1878.

INDEX

No. 1 Saw Mill.

Cut Showing Mill as Made for Special Short Work and with Self-Setter.

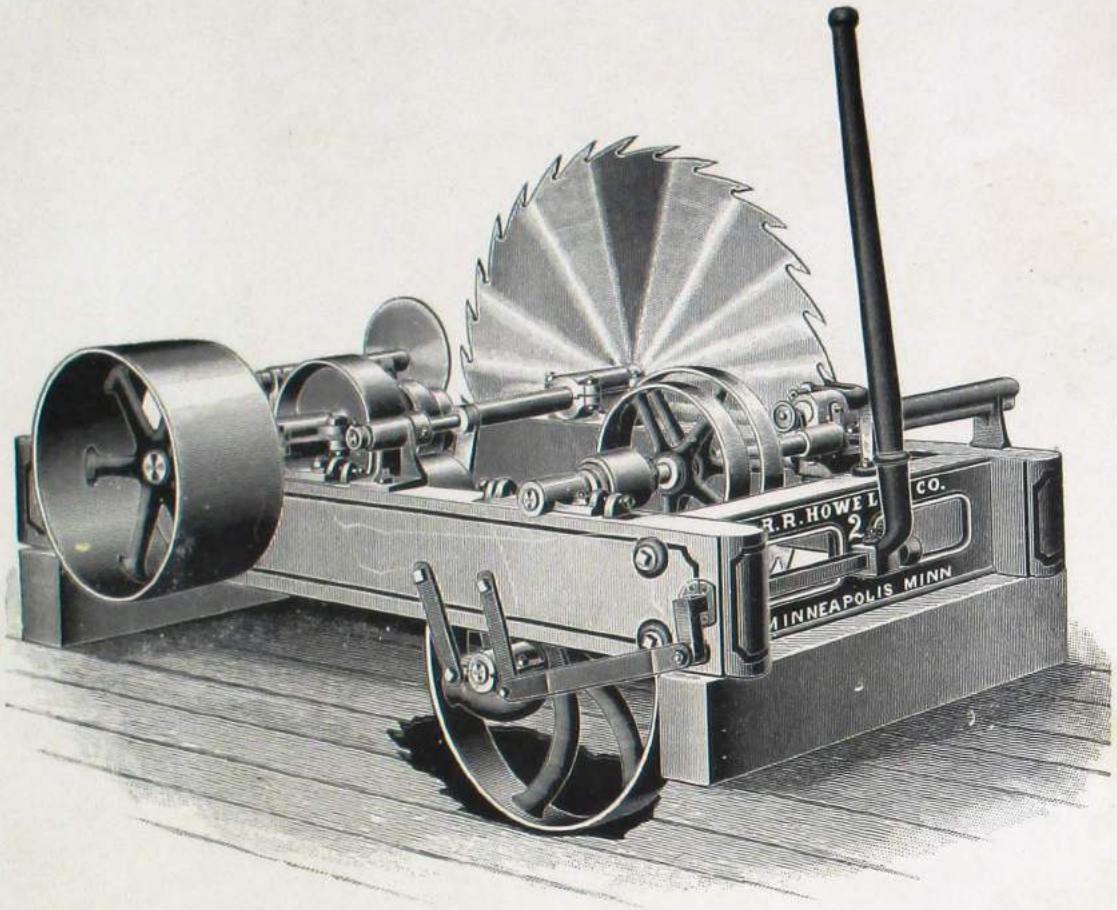


The Accompanying Engraving represent our No. 1 Short Log Saw Mill, designed for rapidly sawing logs into planks suitable for ripping into spoke and handle squares and preparing them for the turning lathe, or for cutting rim, shaft, pole, and other wagon and carriage stock from the log, and as a mill for getting out railroad ties it has no equal.

It will take a saw 44 inches in diameter, and will be found of advantage in cutting up short stock. The frame and attachments are of the same design as in our No. 3 Saw Mill. The arbor is made of 2⅜ inch steel, and runs in adjustable boxes. The frictions are 4-inch face. The carriage is 12 feet long and takes logs from 5 to 12 feet long, and does its work with accuracy, rapidity and convenience.

We also make this mill with 18-foot Carriage, hand set, for sawing regular lumber, but this size mill is not recommended to handle heavy logs. The Patented Dogs No. 1 on this mill are light pattern, made special for light work, and are not included in price of mill but are charged extra, $10.00 each.

The Howell No. 2 Saw Mill.



The demand for a mill that can be sold for less money than our standard No. 3 Mill and of less capacity, has induced us to place on the market this No. 2 Mill, which is adapted for engines of from 10 to 20 horse power, and to carry saws from 44 to 52 inches.

This mill is of the same design and construction as our standard class of circular saw mills, which are described and illustrated further on, and have nearly all of the latest improvements belonging to those mills, including the same Feed and Gig arrangement, the Lever Set, etc. The proportions are somewhat reduced. They are made in the same good manner, same quality of material and workmanship being used, and nothing is slighted to make them the best made.

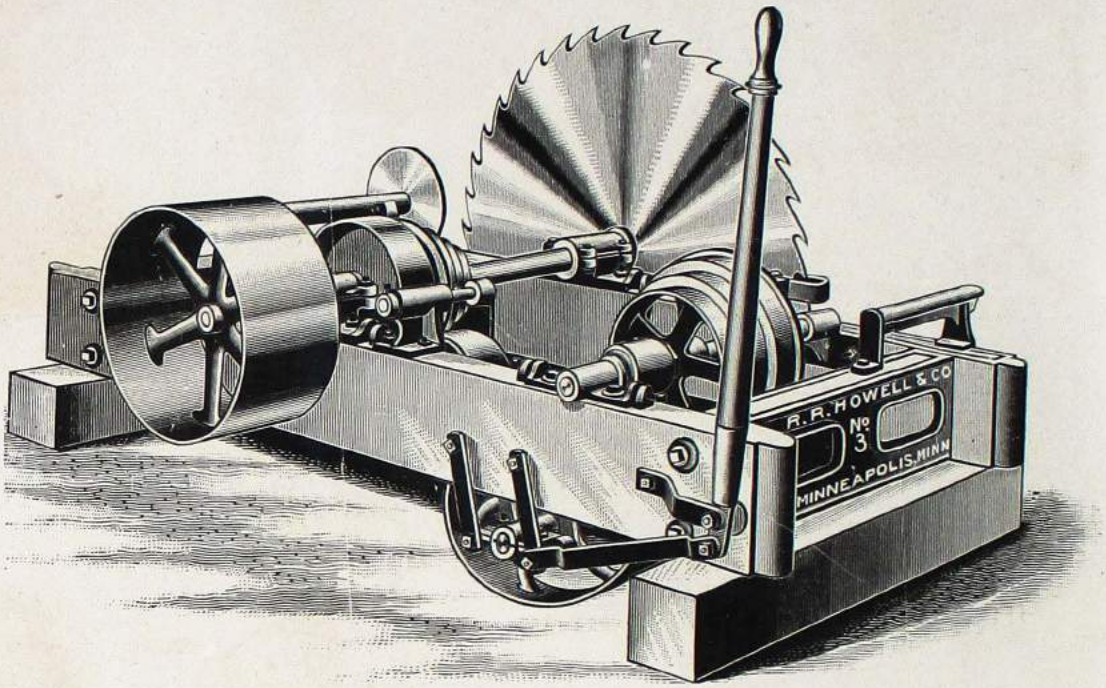
The carriage regularly furnished with our Nos. 1, 2 Mills is furnished with rollers and Chairs. If carriages should be wanted with flanged or grooved and plain rollers, with axles extending across carriage running in our improved self-oiling babbitted boxes, same as used on our large sized mills, we can furnish same at additional price.

For all our mills we furnish sufficient "V" and flat track with screws for the ways. The ways or lower track we do not furnish as they can always be made on the ground at less than the freight.

If your engine is not strong enough to successfully operate any of our mills two or more engines may be attached; for this purpose we furnish an extension mandrel at moderate cost.

All our mills are built expressly for loading in a box car, thereby reducing freight charges and protecting them from damage by the weather.

The Howell No. 3 Saw Mill.



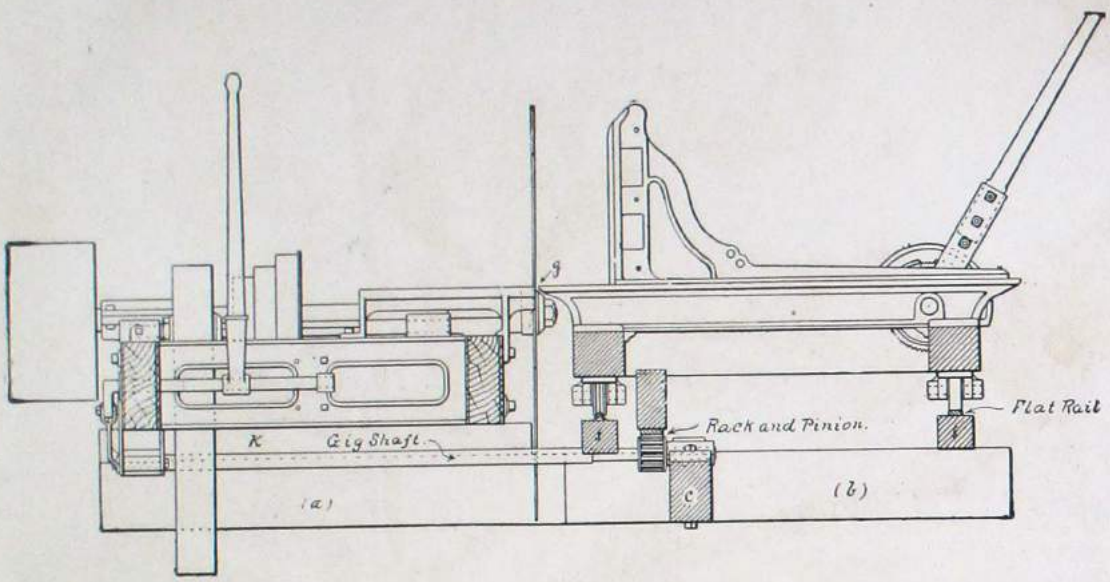
The above cut shows the Husk of our No. 3 Saw Mill, of which a detailed description, including the carriage and other parts, will be found on the following pages. This mill is built with a view of obtaining the greatest possible efficiency and economy in operation, and will last for years. It is fitted with all the latest labor saving improvements, and is equipped with many devices for the quick handling of the mill and the rapid sawing of lumber.

Our No. 3 Mill is by far the most popular of any which we manufacture. It is heavy enough to be strong and substantial, its capacity being nearly double that of the portable mills commonly in use, and yet is light enough to be conveniently moved, if necessary. With 20 to 40 Horse Power its capacity should be from 10 to 18 thousand feet of boards per day when skillfully handled.

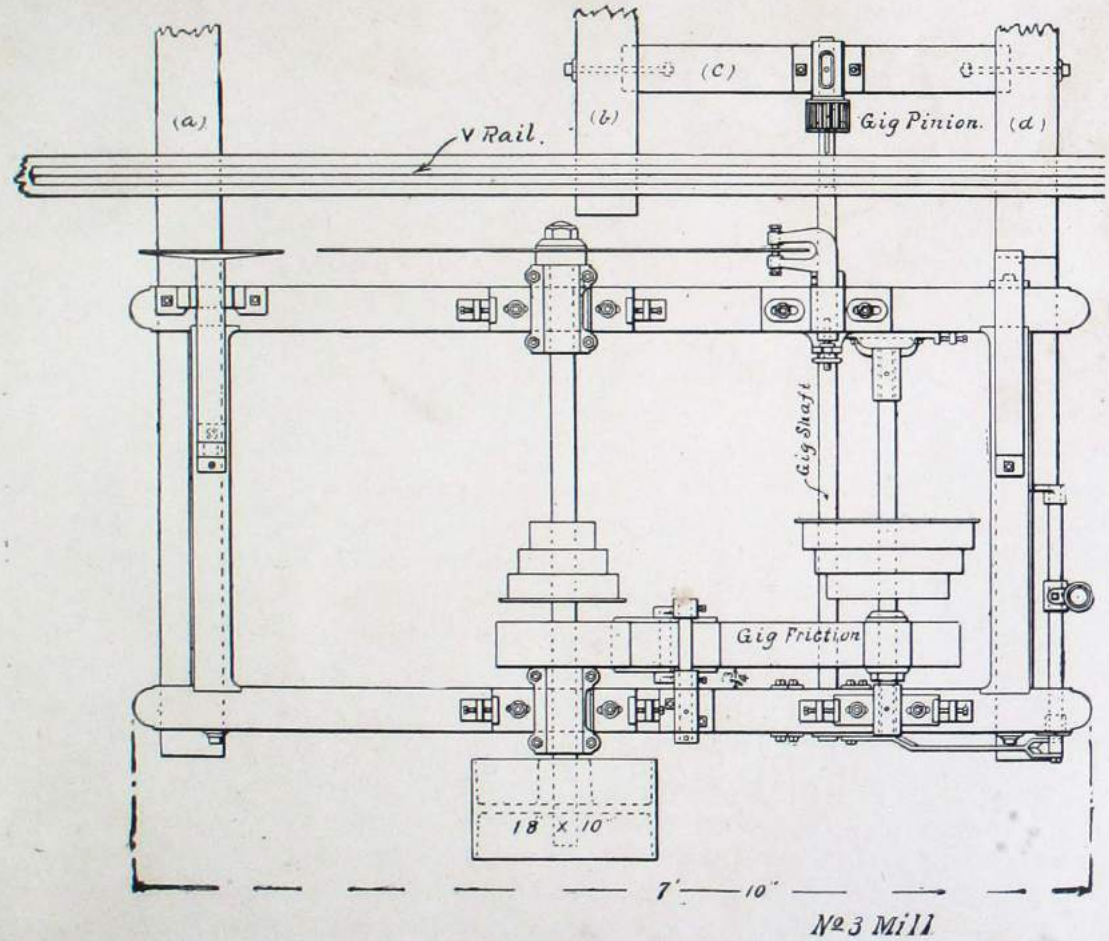
As will be seen by reference to the specifications on following pages, this mill is of rigid construction, has a large Mandrel, running in adjustable self-oiling boxes, and large wide faced pulleys admitting of ample power being transmitted to them. The side timbers of the Husk are made of best Washington fir and the ends of iron, heavily ribbed, this being the strongest and best combination known. The complete carriage is designed with special reference to strength, durability, and completeness, enabling the sawyer to cut accurate and perfect lumber that is not subject to dockage.

The mill is of good proportion, great strength and very accurate in sawing, and the general details and arrangement of the whole outfit, we believe, constitute as complete and substantial a mill as any lumber man could wish for the capacity named. Our extensive manufacturing experience, exceptional productive facilities, and intimate knowledge of saw mill requirements, enable us to make saw mill machinery of such superior merit as to justify your thorough investigation and to meet your highest expectations.

No. 3 Saw Mill

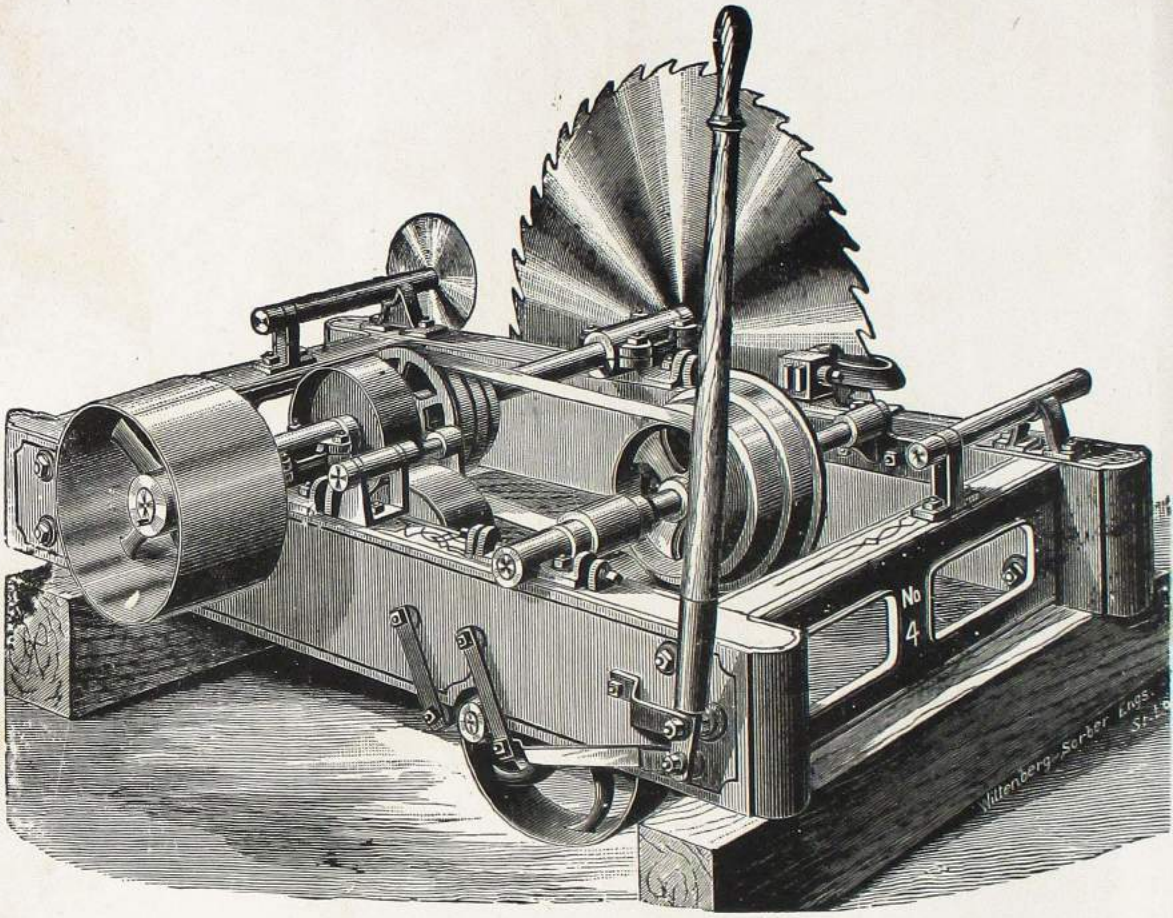


End View of our No. 3 Saw Mill with Rack and Pinion Feed.



Top View of our No. 3 Saw Mill with part of Carriage Track.

The Howell No. 4 Saw Mill.

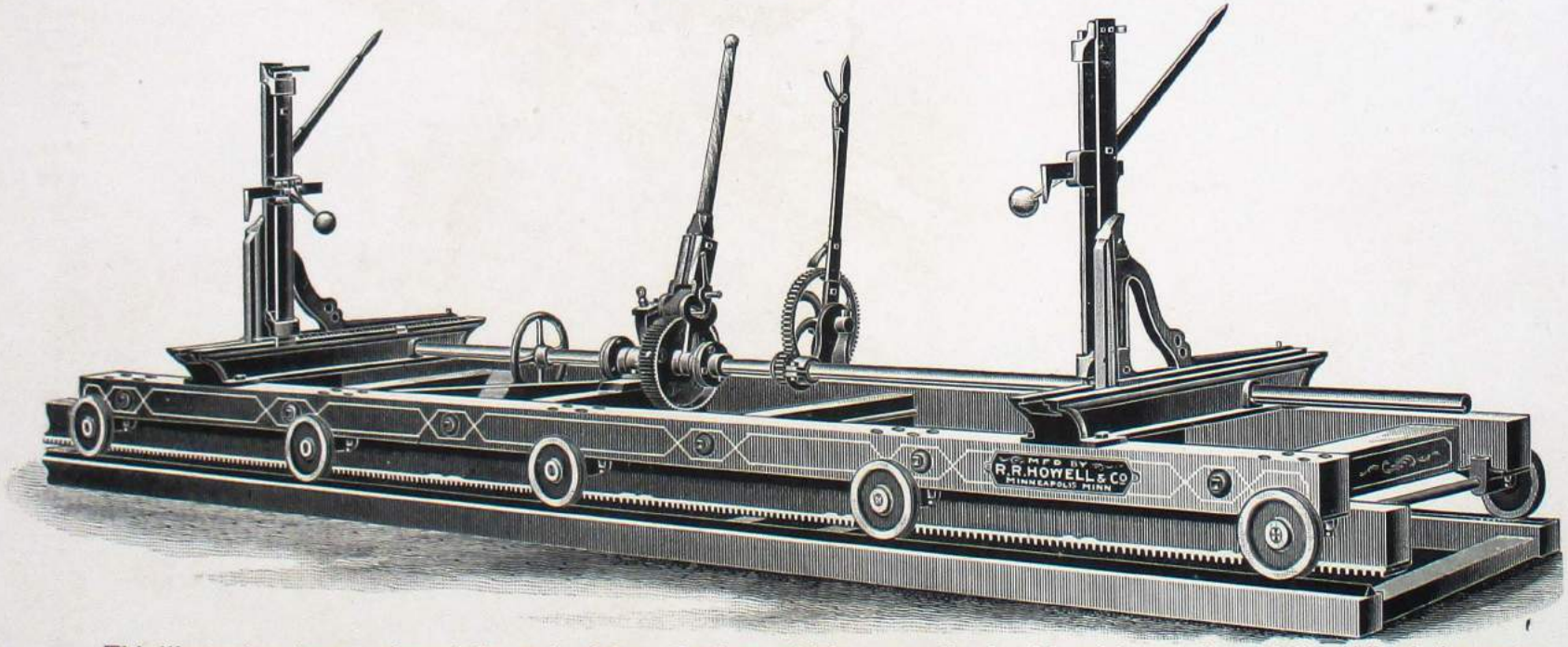


In getting up this mill we aimed to furnish one that would prove itself superior to any in this line, and of such dimensions and weight as to enable parties owning 25 to 40 horse power engines to run a 54, 56 or even a 60-inch saw. The substantial manner in which it is constructed, gives it the necessary strength to withstand all strain that a mill may be incidental to when driven by engines of that size. Many mills in the market of this dimension prove themselves entirely worthless when subject to such service.

It has three changes of feed, and the feed belt is 2½ inches wide. The friction feed has 5½ inch face. All pulleys are heavy, and the intermediate and feed pulleys are made of the best rag paper. The Carriage Trucks on our No. 4 and larger mills have steel axels, run clear through under the carriage, turned true and run in babbitt metal boxes. It will be seen by referring to dimension list of this mill, on another page, that this mill is one of strength and durability, and that it has unusual advantages. It is built in the most thorough and substantial manner, combining **lasting accuracy, rapidity of movement, great strength for heavy duty.**

This mill is furnished with or without top saw attachment as ordered. Two No. 4 head blocks furnished unless otherwise ordered, opening 36 inches from the saw.

Saw Mill Carriage. Used on our No. 4 Saw Mill.

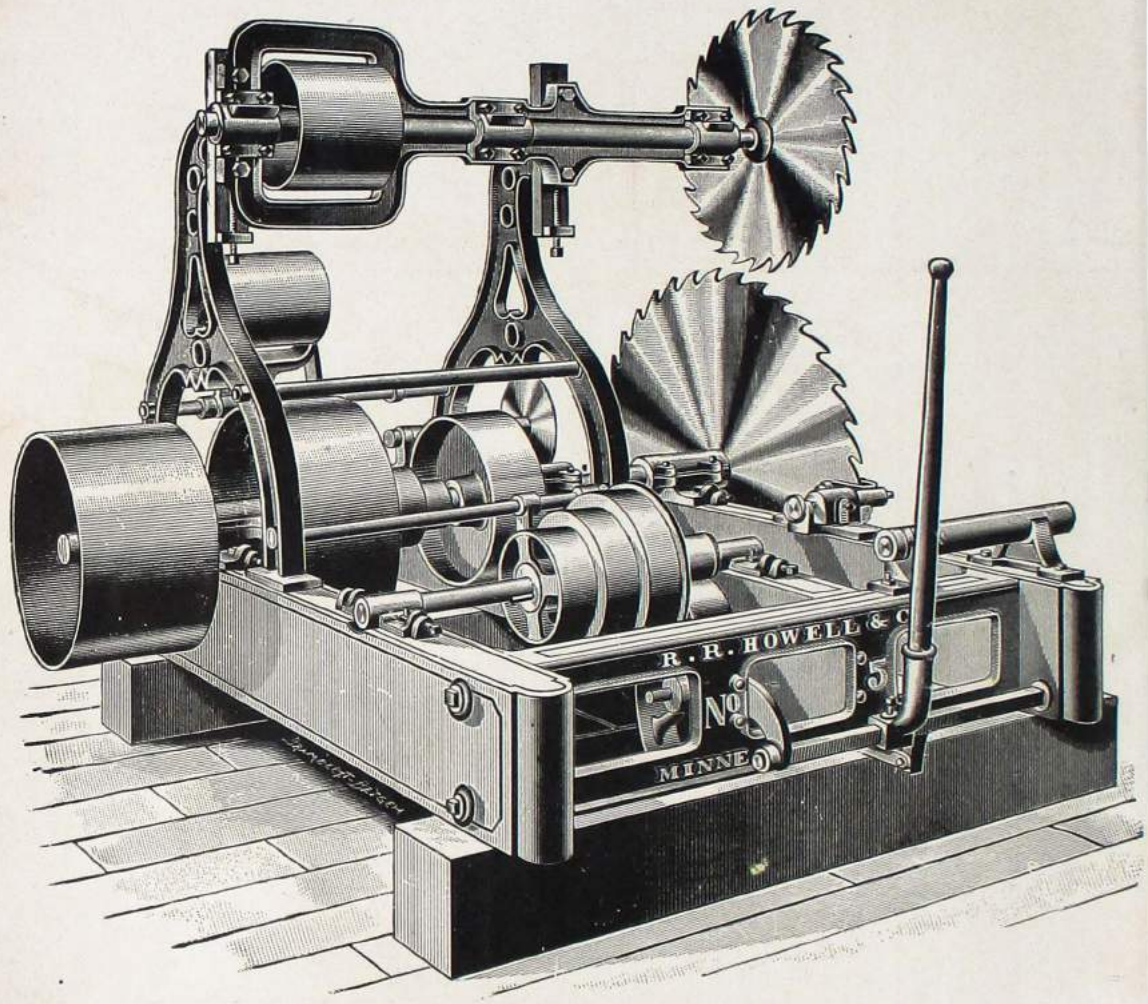


This illustration shows a view of the style of Saw Carriage which we usually furnish with our No. 4 Mill. All of the parts are strong, well made and composed of nothing but first-class material. Our Carriages are made of selected, well seasoned timber, thoroughly braced and bolted, and further strengthened by bolts extending through both sides. All practical mill men know to how great an extent their success depends upon the machinery they use. No part of the saw milling machinery requires such accurate adjustment and perfect mechanical construction as the Carriage, Head, Block and Set Works. It is impossible to make good lumber without good and perfect carriage equipment. The best mill will fail if they are deficient. With inaccurate setting and slow motion enough lumber and time will soon be lost to pay for several sets of first class carriage equipment. This has two Head Blocks which open back from saw 36 inches, and equipped with our Patent Single Dogs. The set shaft is $1\frac{15}{16}$ inches in diameter, the truck wheels are 9 inches in diameter with $1\frac{1}{2}$ inch axles extending across the carriage running in self-oiling boxes. The carriage frame is made of 6x6 timber, and as here shown is 18 feet long, and may be driven by a pinion and rack, or by a geared iron drum with wire rope.

We call special attention to our quick receding knee attachment as shown in above cut. By this device, the knees can be moved back sixteen inches to one stroke of the sawyer's arm, we have overcome the great delay that saw mill men have in ordinary Portable Mills, thus saving valuable time. The large hand wheel on the set shaft allows the knees to be thrown back without the use of the lever, when desired.

The Howell No. 5 Saw Mill

WITH TOP SAW ATTACHMENT.



The above cut represents our No. 5 Mill, which we build **with or without top saw attachment** as our customer may order. This is a large, heavy, strong and substantial Mill, built expressly for large engines, from 35 to 50 horse power, or two or more threshing engines may be attached. and for this purpose we furnish an extension mandrel at moderate cost. These mills have been used by our customers for many years, and never fail to give entire satisfaction, and are built after the latest plans, with many points of excellence. They are made strong and durable, of the best material, and by skilled workmen.

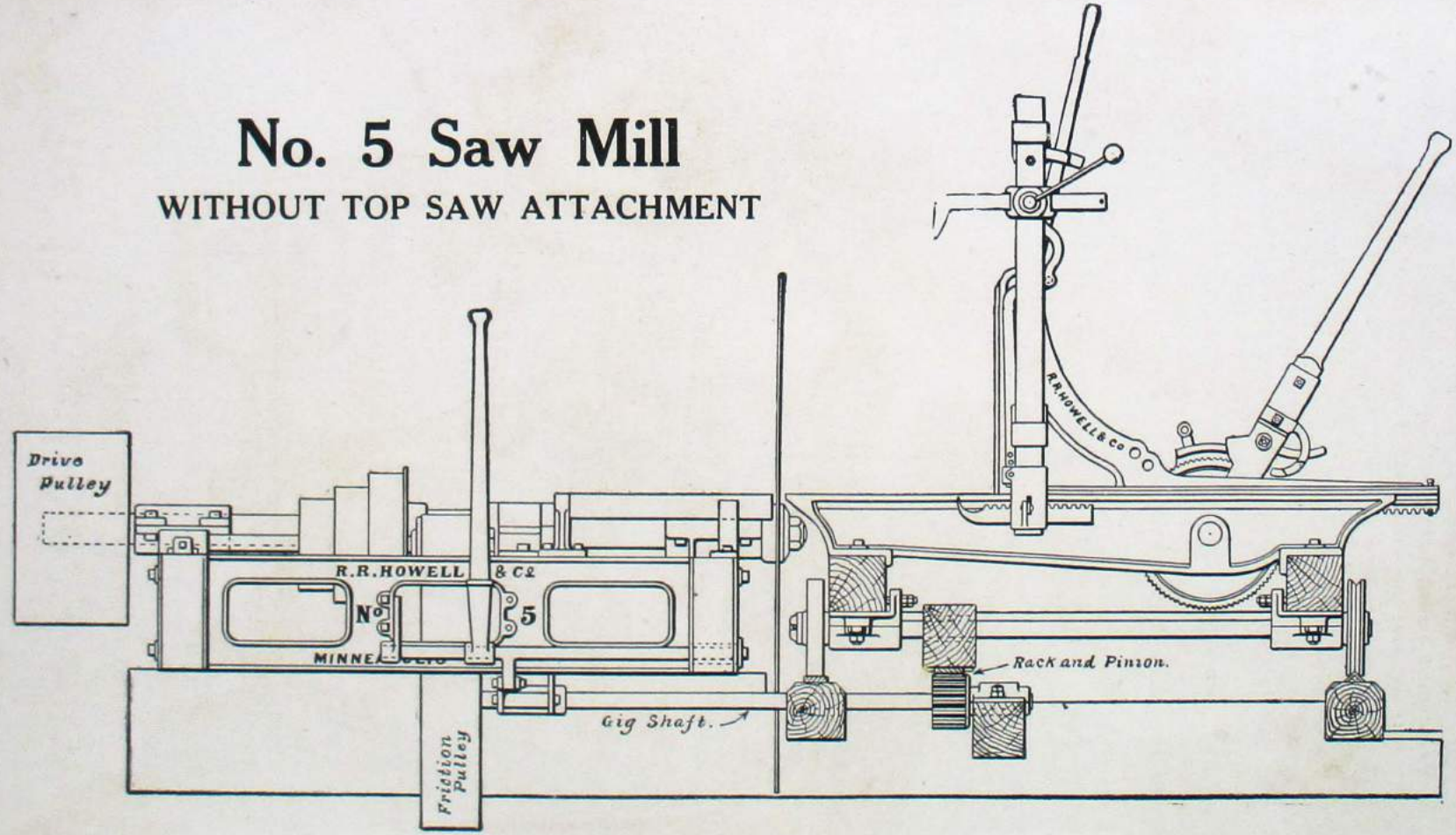
Each arbor has three bearings or journals, one on each side of the belt pulley, to take the strain off the belt, and one directly back of the saw collar to take the pressure of log on the saw plate and avoid the springing of arbors and forcing saws out of line.

There is scarcely any limit to the amount of lumber that can be cut by this machine. We will only say that the capacity of the mill is varied by the manner it is handled, the character of the logs to be sawed, the conveniences and facilities of its location, the amount of power employed and the energy and vim of those having control of it.

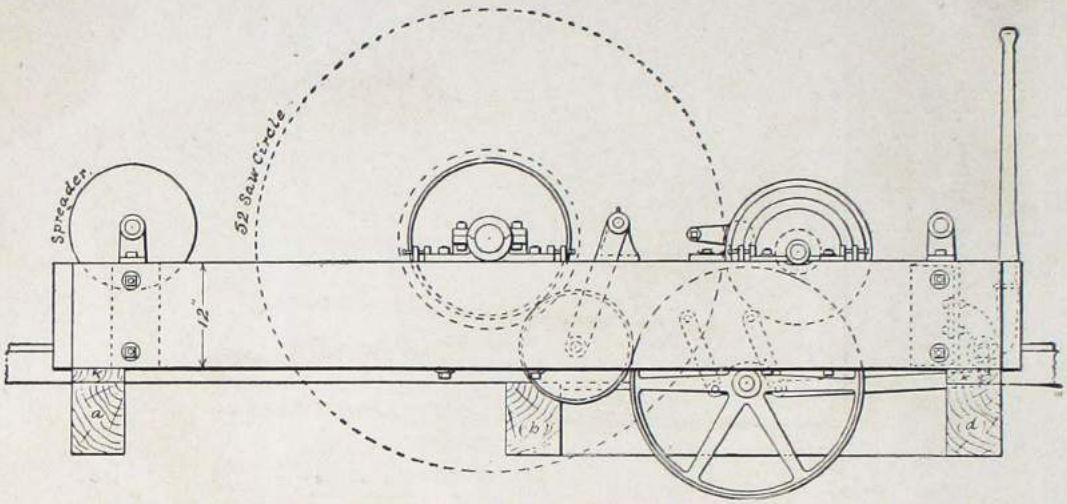
Furnished with two No. 5 head blocks, recede 42 inches from saw.

No. 5 Saw Mill

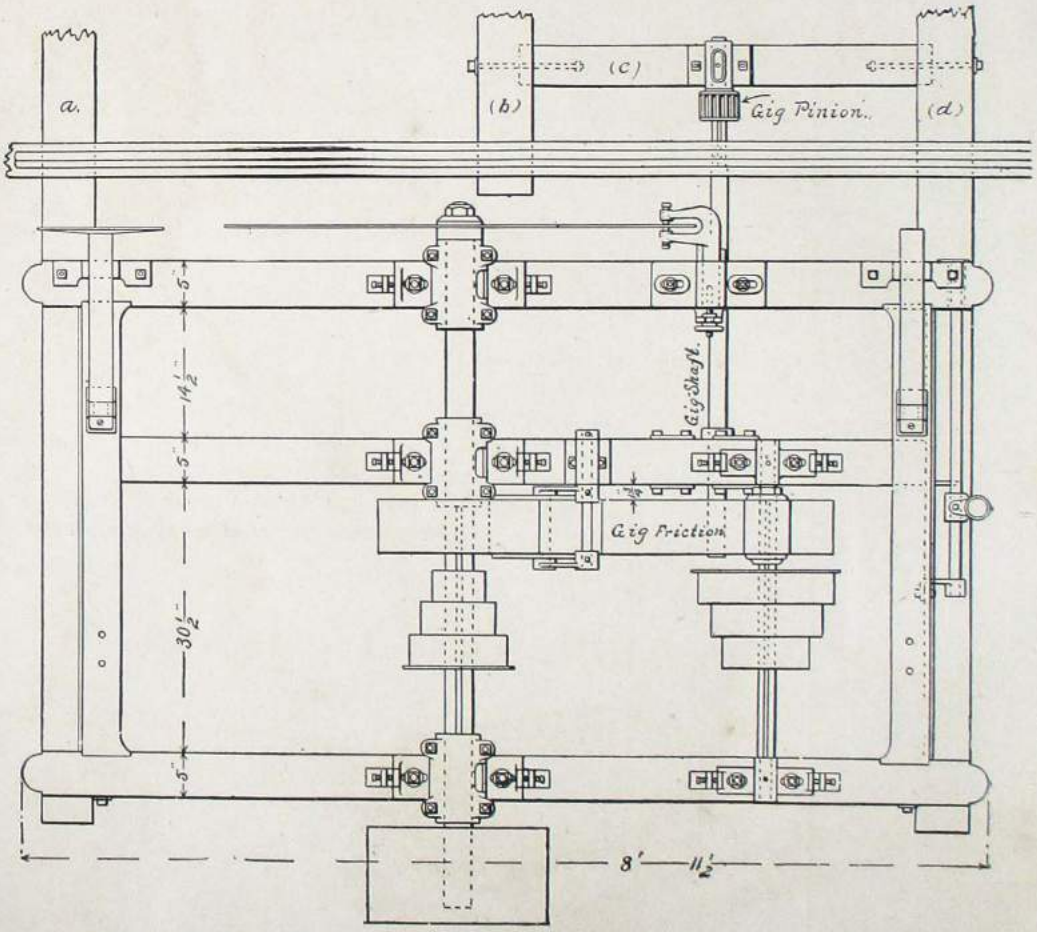
WITHOUT TOP SAW ATTACHMENT



This engraving represents end view of No. 5 Saw Mill with our heavy Head Blocks and Set Works, Rack Feed, Patent Duplex Dogs without Top Saw Attachment. It embraces all the improvements necessary to make it in every respect a first-class saw mill. Our facilities are such that, for quality of material, workmanship and prices, we can give entire satisfaction. We use none but the best material, and the construction is most thorough, and in point of excellence cannot be surpassed. Our work is warranted; if any part fails on account of defective material or workmanship, we will replace it free of charge at our works. We claim to make the best practical saw mill machinery of any one in the United States. We invite the most critical examination of our machines.

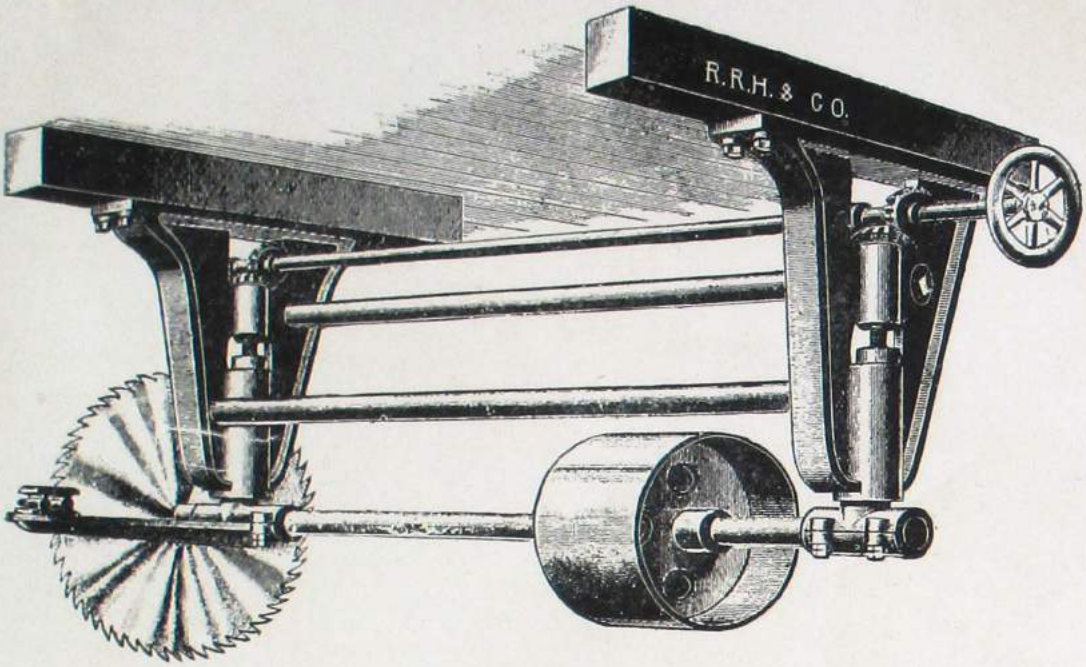


Side view of our No. 5 Saw Mill without Top Saw attachment.



Top view of our No. 5 Saw Mill with part of Carriage Track.

Inverted Top Saw Hanging.



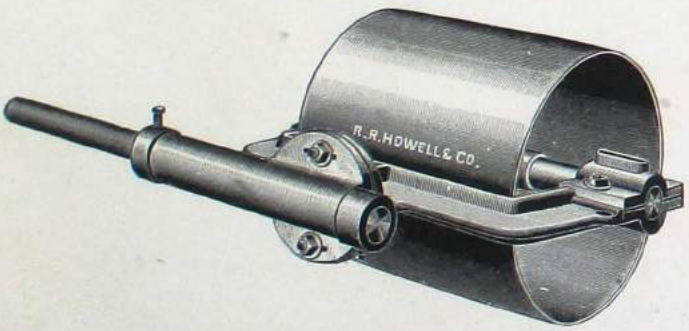
The independent top saw rigging shown in the above cut is made for suspension from the mill timbers and allows a clear view of the sawyer. It is adjustable for large or small saws. By turning the hand wheel the raising screws are revolved and both ends of the hanger raised or lowered together, and the arbor always kept level and parallel with the lower one. This is a very important improvement over all other mills, which provide no means of adjustment except screws at each side, which are turned independently of one another, with great liability of turning one more than the other, thus throwing the arbor out of line, and making the saw do imperfect work.

A simple practical saw guide is provided, mounted on an extension arm of unusual strength. The arbor is of steel, with long bearings, lined with a fine grade of anti-friction metal, and the pulley is made of any suitable size called for. When so ordered, we send with the machine two idler pulleys with cast iron brackets, over which the belt is run to reverse the motion of the saw. It is simple, solid and strong, therefore not liable to get out of order.

We advise our customers to get double mills—**unless all their logs are small**—and use smaller and thinner saws on account of their **greater capacity, efficiency and economy.**

Price, complete.....$200.00

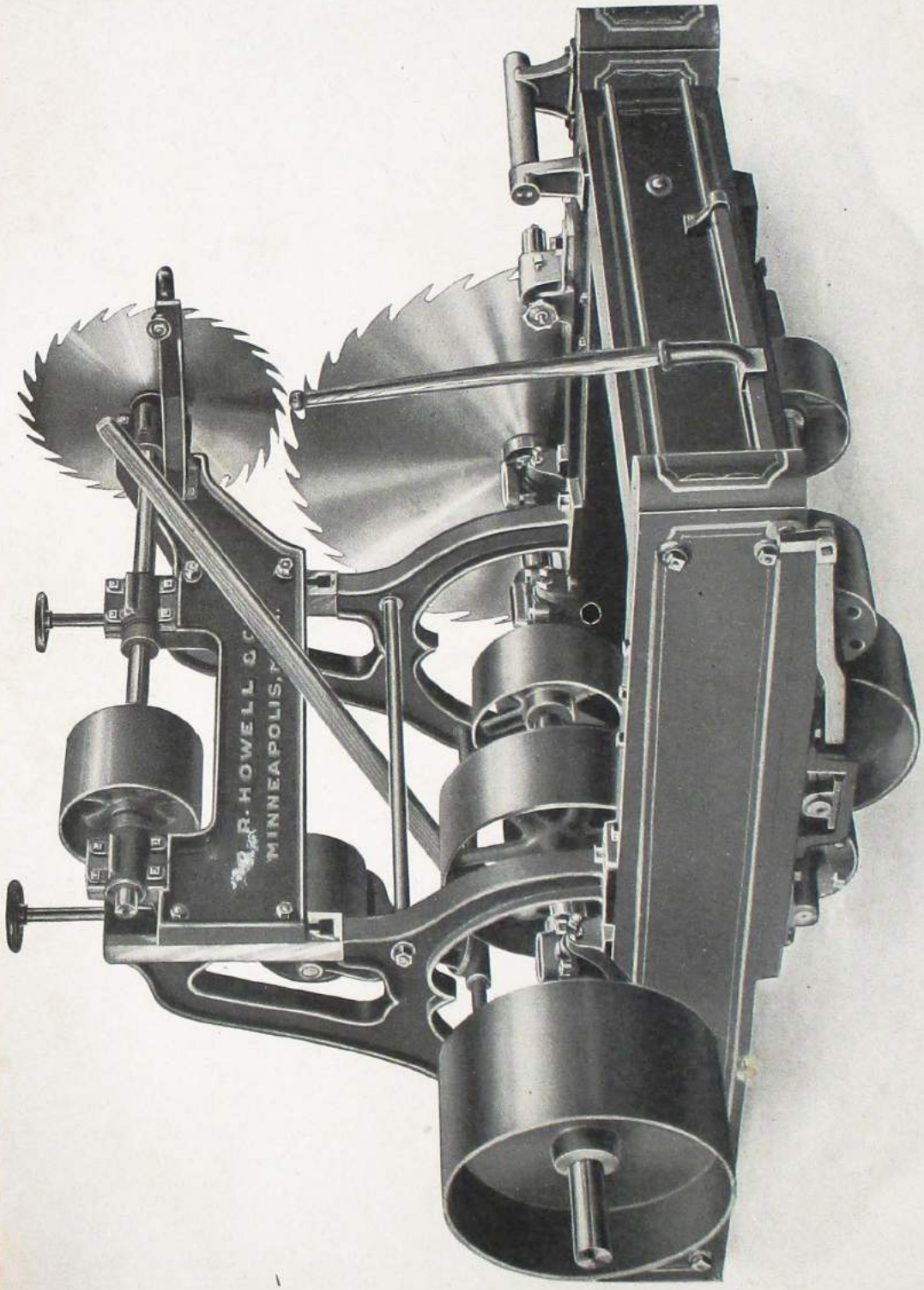
Adjustable Belt Tightener.



Our **Main Belt Tightener** can be attached to the husk frame of the mill, or to an independent post or frame; and it is swiveled and adjustable so the belt can easily be guided to run true on the main pulley, and can be weighted to produce the proper tension of the belt.

Price.....$15.00

No. 6 Mill



The Howell No. 6 Saw Mill.

The cut on opposite page shows our No. 6 Saw Mill, which we claim is superior to any Portable Circular Mill ever placed on the market, in capacity, durability and easy management. It is very massive and heavy. The illustration is so plain that very little description is necessary. It is built for medium-sized plants and does rapid and accurate work. The sills are of best Southern pine, with a third piece through the center, handsomely painted and thoroughly bolted together. The mandrel is of steel with solid steel forged collars, and runs in large and long self-oiling journals, which are self-adjusting, and so proportioned that heating is practically impossible.

The cut shows the mill with Top Saw Frame mounted upon the Husk, forming a Double Mill. We also furnish this mill without Top Saw, to be used as a Single Mill, or if desired, we can furnish this single mill in connection with our top saw supported by an inverted hanging frame attached to the mill timbers overhead. This style is sometimes preferable when the mill is used stationary inside of a building. The top saw mandrels are easily raised or lowered by means of screws at each side of the frame to accommodate different sizes of saws. The top saw, as will be seen from the cut, can be stopped and started instantly by a lever placed conveniently to the sawyer and connected to a Belt Tightener. This will obviate running the top saw except when needed. The pulleys are all large and heavy and perfectly balanced, so that the driving is done easily and there is no slipping nor unusual heating of bearings.

The Saw Guide is our No. 2 improved, adjustable and reversible style, and is perfect in all its adjustments.

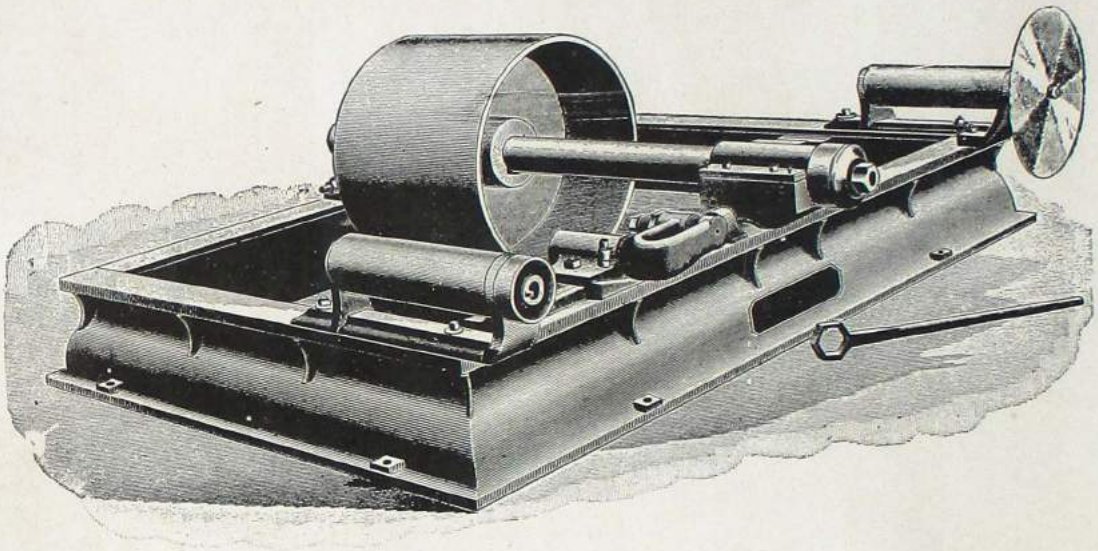
Special attention has been given to the Feed Works, which are such an important part of a mill. The capacity of a mill depends largely upon the feed and gig back mechanism. The Feed should accommodate itself to the power of the engine and be easily and quickly regulated to any desired speed within its limit. We use an Eccentric Box for Feed and Gig Back Mechanism, which is quick, powerful and simple. This materially increases the daily output of the mill by reducing the time required in gigging. Our New Howell Variable Friction Feed Works, which we use on our No. 6 Mill, we believe, surpasses any other make. This is simple, positive, durable and fast. A full description of this Feed will be found on another page of this catalog.

The Carriage for this mill is made very heavy, of well seasoned yellow pine timbers of suitable dimensions, framed in a workmanlike manner, with large Truck Wheels and Axles, and self-oiling boxes, equipped with our No. 7 Head Blocks opening 48 inches from the blade, and our No. 6 Set Works, but when most accurate work is desired we would advise using our No. 10 Double Acting Set Works and in connection with either of these, hand lever, coil spring or Power Friction Receding devices for receding the knee, which makes one of the best carriage equipments desired by the most exacting.

Weight, No. 6 Husk, 2,200 pounds; Top Saw Attachment, 1,200 pounds; 18-foot Carriage, complete, 3,800. Total weight, complete outfit, 7,200 pounds.

Price No. 6 Saw Mill, complete with Carriage..... $700.00
Extra for Top Saw Attachment..... 175.00

No. 10 Heavy Rotary Saw Mill.



Above cut represents our Iron Frame Rotary Mill without top-saw made especially for large plants and for doing heavy and extensive work. We have spared neither time nor expense in perfecting this machine, and have studied the wants of mechanics very closely, and for simplicity of construction, excellency of workmanship and design, and for durability, it is unsurpassed by any.

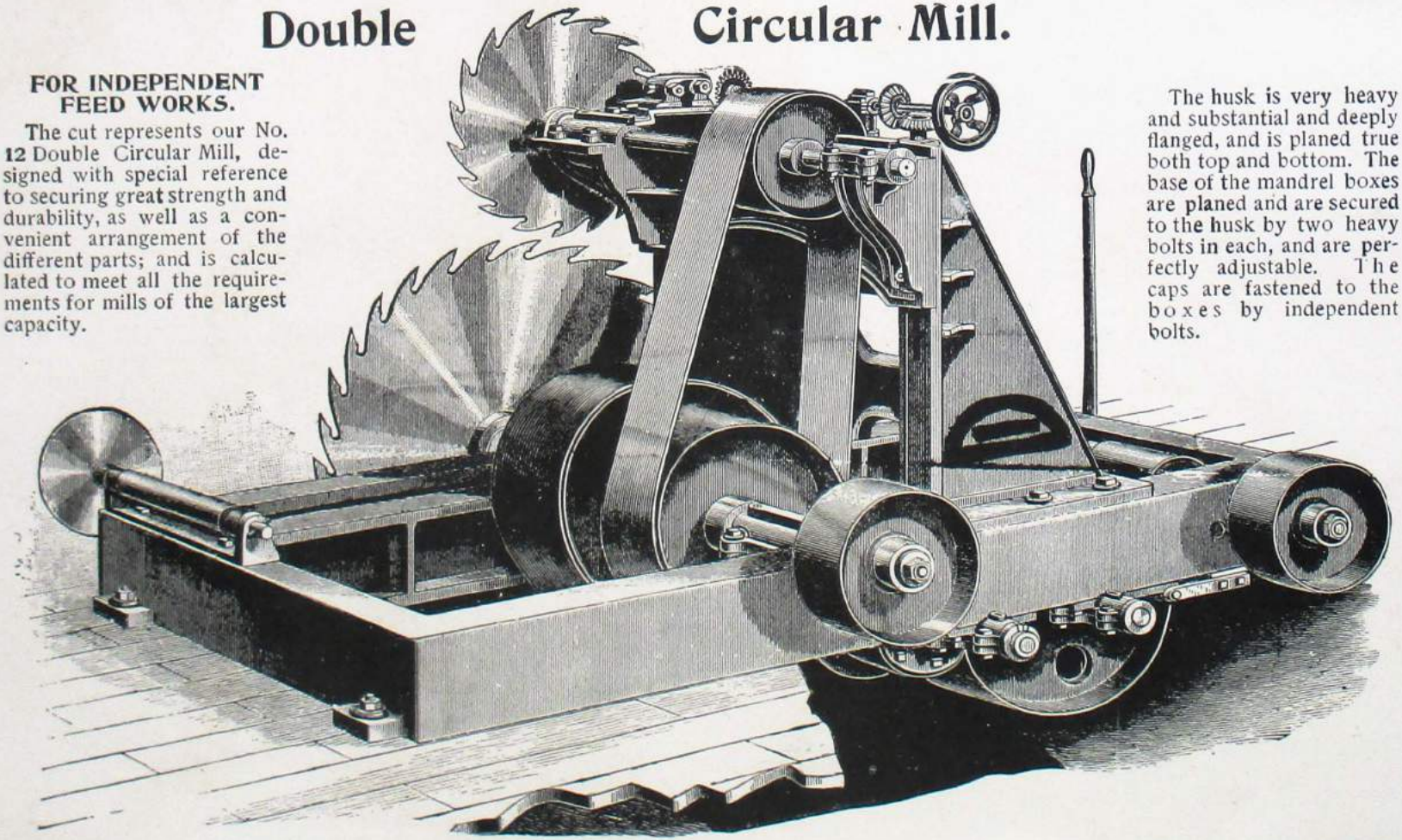
Has heavy frame with metal so distributed as to be in line of greatest strains. The saw guide is adjustable by a lever convenient to the sawyer. Arbors are of best hammered steel with solid forged collars. All pulleys are made with web centers, extra heavy, and turned all over. Main arbor boxes are 12 inches long, self-oiling, and cored for water. A lumber roller and steel spreader are furnisned with each mill. We claim for this mill a greater capacity with less expense than any other mill made. It has all of the latest adjustments and is first-class in every particular, and guaranteed to cut absolutely straight lumber. With this husk we use blocks and carriage shown on another page as "Carriage for Large Mills." This husk is well adapted to be used in connection with either the rack and pinion, rope friction feed works or steam feed.

Price, No. 10 husk, complete, size arbor 3⅞ in., no feed works or carriage, weight 4000 lbs. $400.00
Price, No. 11 husk, complete, size arbor 4⅜ in., no feed works or carriage, weight 4000 lbs. 500.00

Double Circular Mill.

FOR INDEPENDENT FEED WORKS.

The cut represents our No. 12 Double Circular Mill, designed with special reference to securing great strength and durability, as well as a convenient arrangement of the different parts; and is calculated to meet all the requirements for mills of the largest capacity.



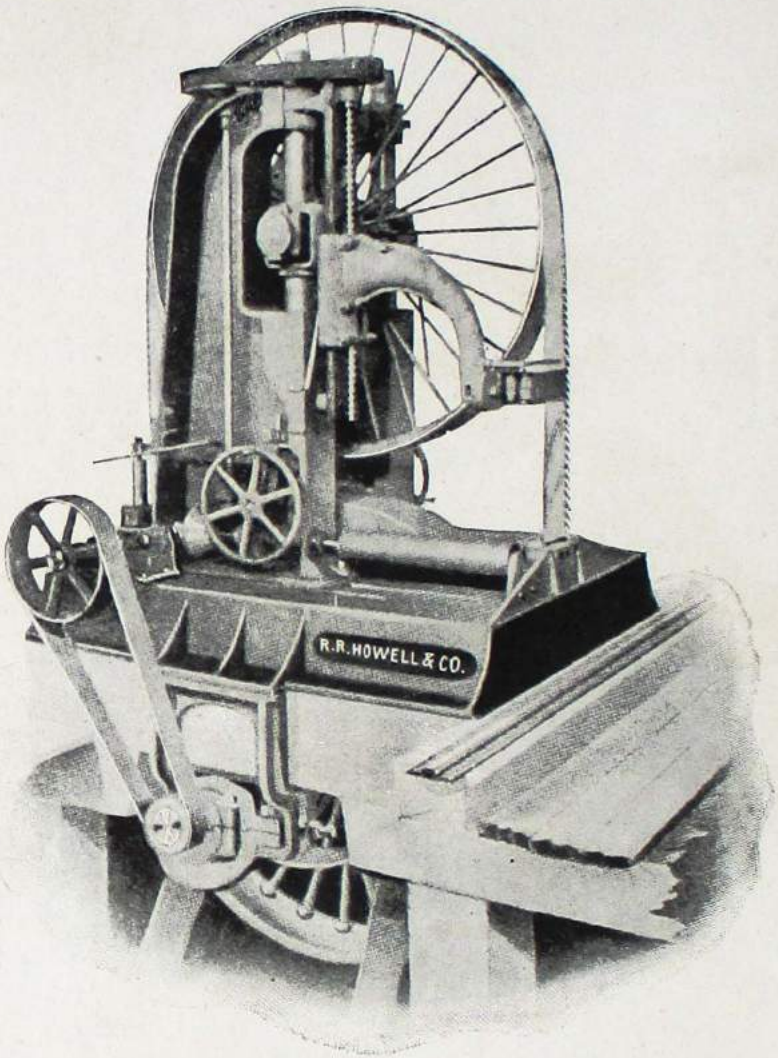
The husk is very heavy and substantial and deeply flanged, and is planed true both top and bottom. The base of the mandrel boxes are planed and are secured to the husk by two heavy bolts in each, and are perfectly adjustable. The caps are fastened to the boxes by independent bolts.

The mandrels are made of a high grade of hammered steel and both mandrel and collar are forged from one piece. The top saw works are of a new and improved design and are built in a most substantial manner, and secured to the lower husk. The top mandrel is carried by three self-oiling boxes. The tightener frame is operated by a lever within convenient reach of the sawyer, and with it the top saw may be stopped or started at will. Some mill men prefer the inverted style of top saw machinery shown on another page. Either style will be furnished as preferred.

Price, No. 12 Mill with top saw attachment; lower arbor, 3⅞ inches; top arbor, 2⅞ inches..... $700 00

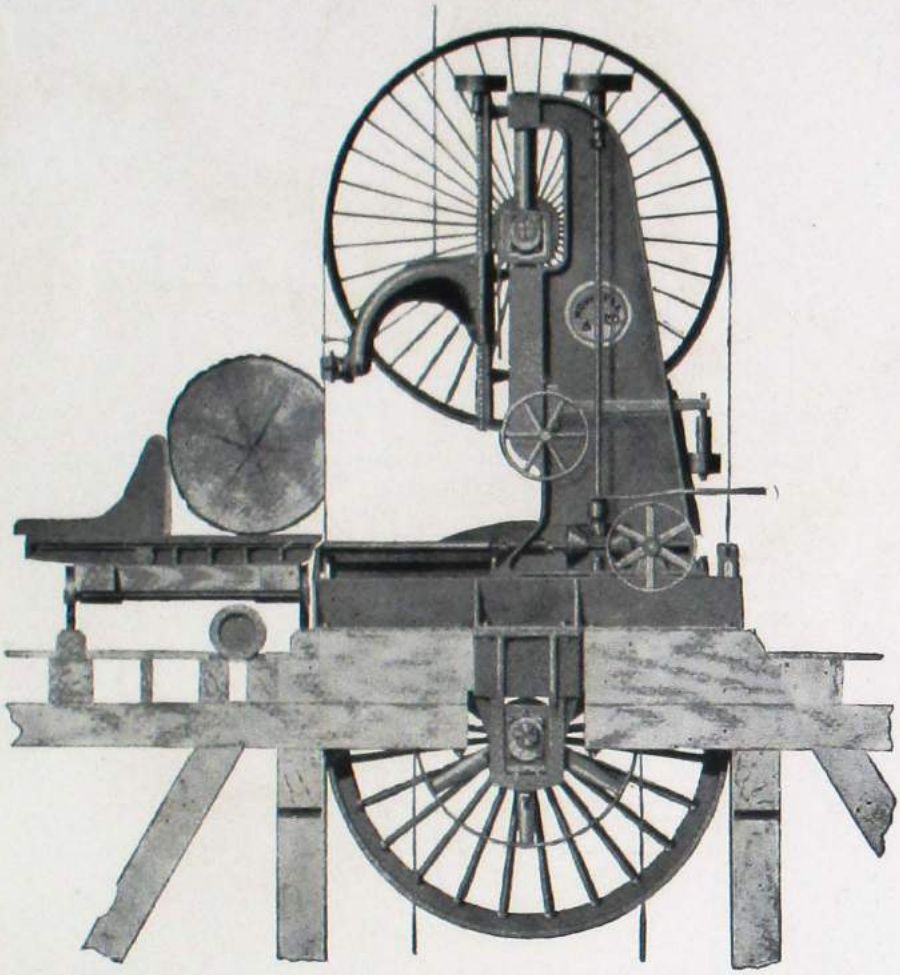
Price, No. 13 Mill with top saw attachment; lower arbor, 4⅜ inches; top arbor, 3⅛ inches..... 850 00

The Howell Band Mill.



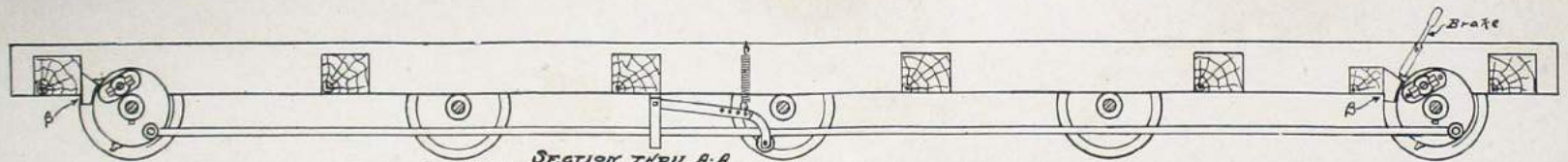
Our band mills are made in six, seven, eight, nine and ten-foot. The lower wheel is made extra heavy and serves as a balance in order to impart steady or uniform motion. The top wheel is made as light as is consistent with due regard for strength in order to avoid as much as possible unnecessary momentum and to diminish the load upon the straining system. The distance between the wheels is short as possible and the wheels themselves no larger in diameter than are absolutely necessary to employ saws that are as short as can be used, for the reason that a short saw is naturally stiffer and requires less strain to do good work, while long saws require more care and are far more easily deflected from a true line and consequently more liable to make imperfect lumber. Scrapers are provided to work against the faces of the upper and lower wheels to keep them clear of saw dust or any other accumulation which might interfere with the saw blades.

The Howell Band Mill.

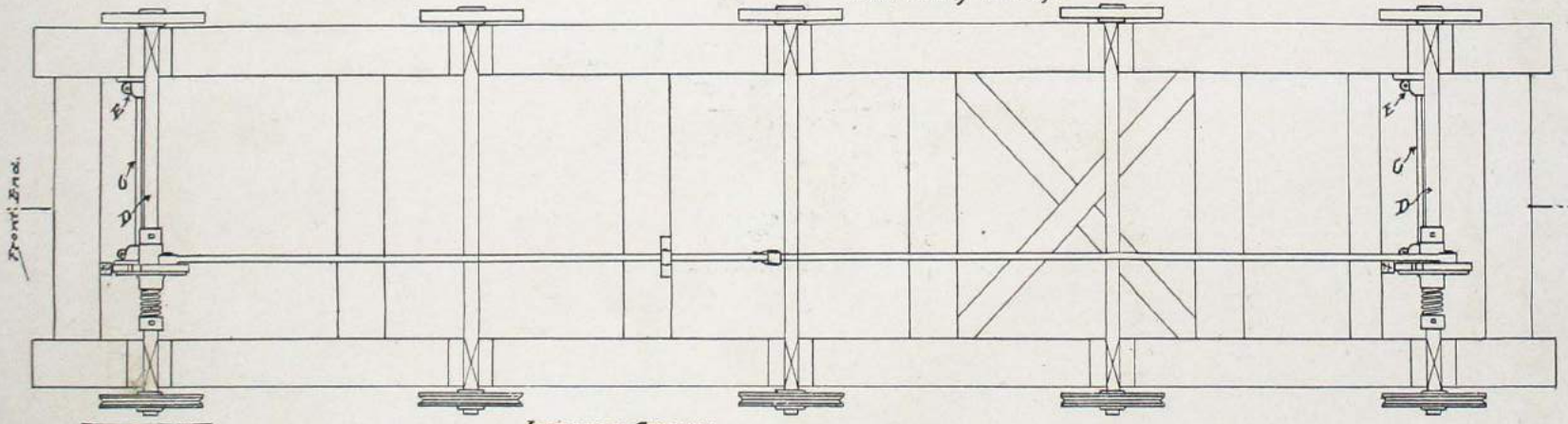


Our mills have the wide spread of hub, wide bearings, large shafts, central location of saw, fine proportions of base, simplicity, and when once adjusted they will stay where set so that perfectly manufactured lumber is assured. We can guarantee results second to none. We are also prepared to run double edged saws on our mills when so desired, without extra cost.

Our Band Saw Mills equipped with our No. 30 Carriage and with Automatic Offset, Boss Dogs, Steam Feed, Nigger, and complete Steam Log Way, makes one of the best and most modern equipments of this kind made by any sawmill manufacturer.



SECTION THRU A-A.
Showing Center Support, Stops &c.



Carriage Sill.

INVERTED CARRIAGE
Showing Connecting Rod between Offsets.
Right Hand.

HOWELL'S BAND SAW
CARRIAGE OFFSET

R. R. Howell & Co
Minneapolis
May, 1906

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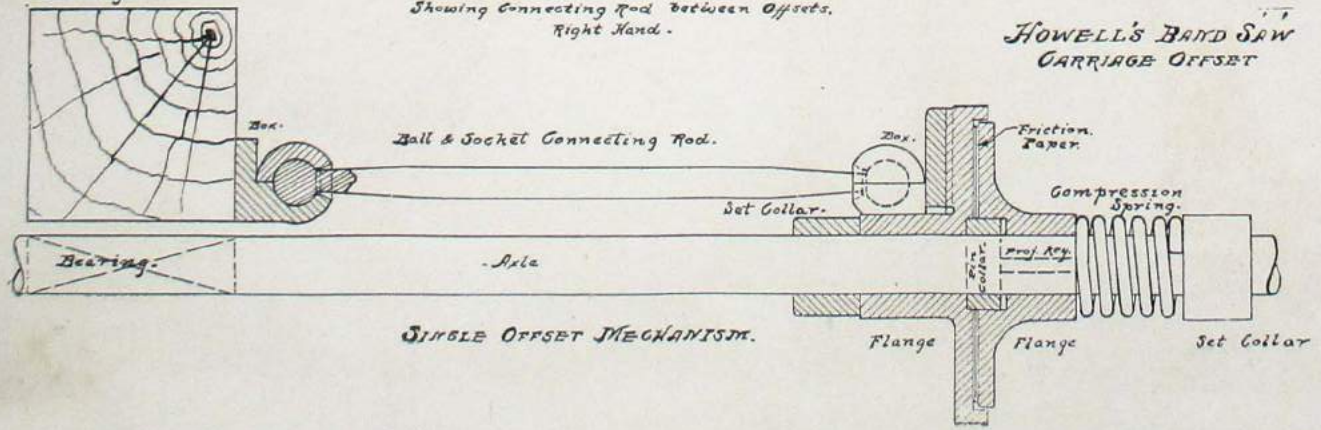


SINGLE OFFSET MECHANISM.

AUTOMATIC OFFSET

For Band Saw Mill Carriages.

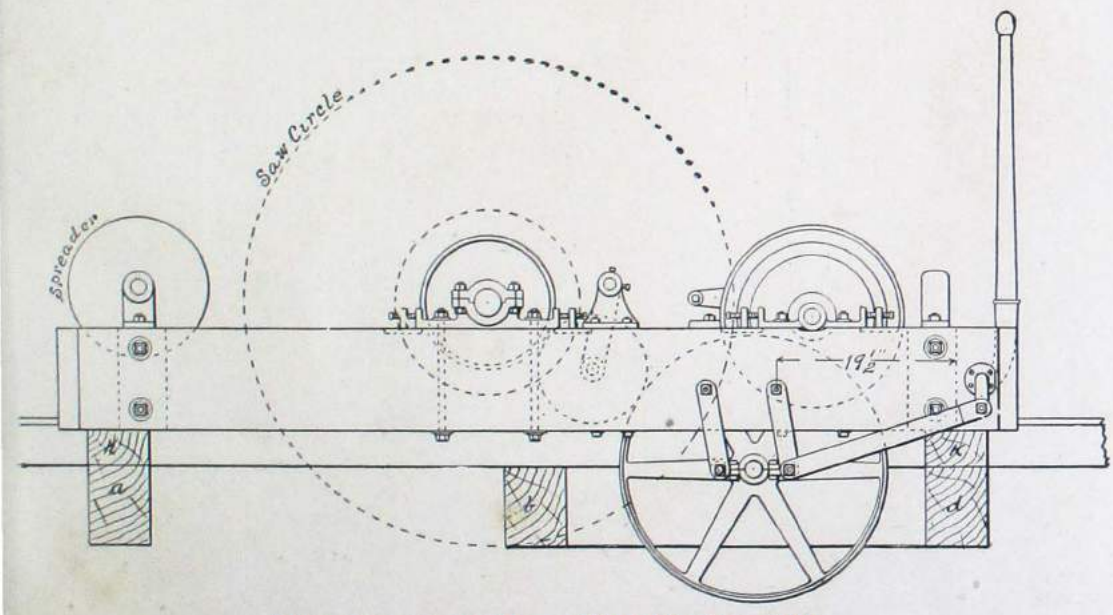
Our Automatic Offset, as shown on opposite page, is by far the best, simplest, longest-lived, most accurate and positive working and easiest-adjusted offset ever built, one that will, when once adjusted, run for a long time without further attention. It acts automatically at the points of reversal in direction of travel, and moves the carriage and log 5/8 of an inch away from the saw line when the carriage is giged back, and returns it when started forward. A locking device is provided to prevent the offset from working when it is desired to back out of the log before completing the cut. The friction, which has two large flat bearing areas, can be adjusted sufficient to drive the offset positively, but not sufficient to prevent the wheels from turning or retard the motion of the carriage. This adjustment, together with the simplicity of action, gives this Automatic Offset an economy in power attained by none other.

The advantage of this offset is that by the use of a single steel lever arm working three certain restricted lines of action, we obtain a **direct, positive** resultant **motion,** without the aid of the complicated "cam" which other builders of offsets depend upon. This resultant motion is a graceful curve; beginning from "0," or a standstill, it gradually acquires speed and is fastest near the center point of motion, gradually slackening as it began to "0." This motion is all accomplished in a very short space of time, before the carriage has acquired any material momentum. Thus we have been able to do entirely away with the objectionable violent oscillations of the ordinary make of offset.

The entire device is very strong and simple, its action is infallible, and not at all liable to get out of order.

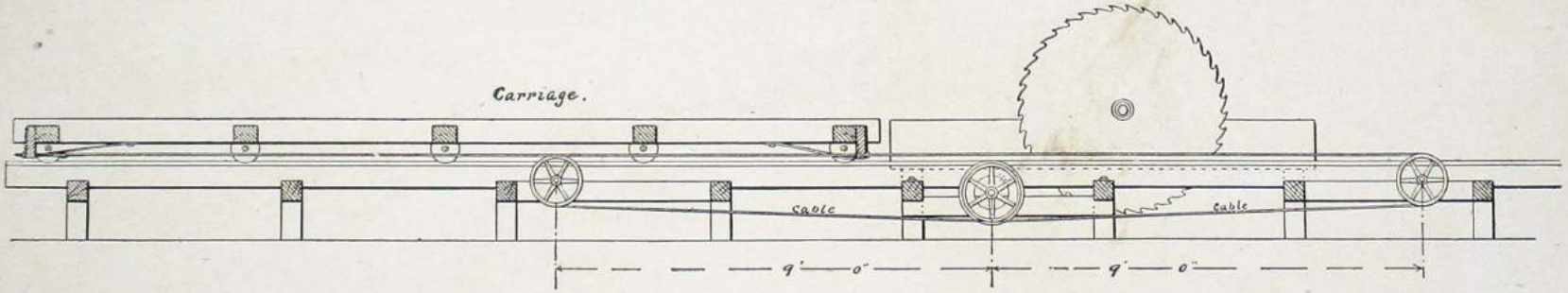
In inquiring for price of our offset, when required to be placed on other carriages than our make, state hand of mill, exact diameter of axles, and distance from center to center of axles on which the offsets are to be placed.

No. 3 Saw Mill.



Side view of our **No. 3 Portable Saw Mill.**

WIRE ROPE OUTFIT FOR SAW MILL CARRIAGES.



THE HOWELL CABLE FEED.

MAN F'D BY R.R.HOWELL & CO.
MINNEAPOLIS MINN

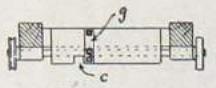
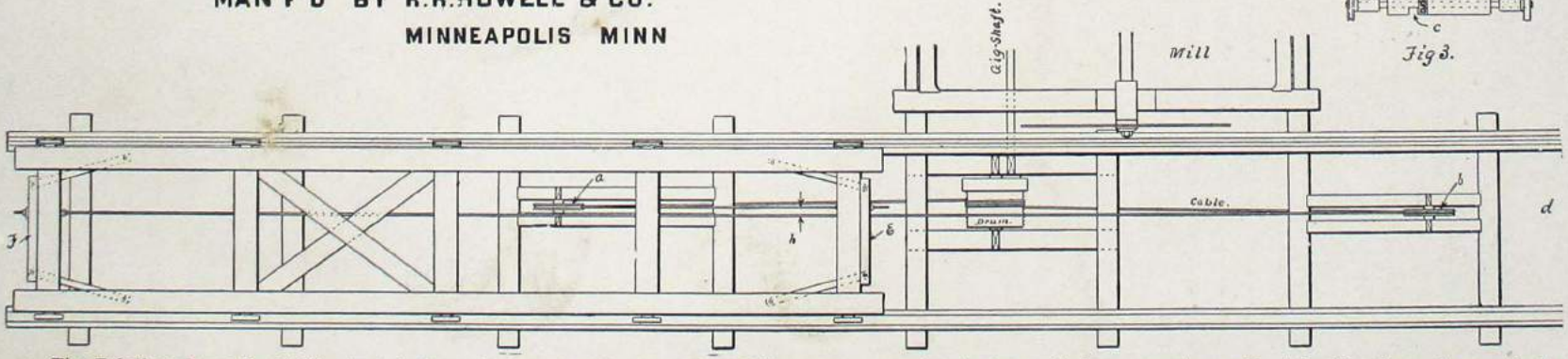


Fig 3.



The Friction Rope Feed, illustrated above, is intended for Portable Mills, a very popular design. Makes a most excellent feed for long, heavy timber, and is appliable to any length of carriage that is likely to be required. The carriage can be stopped and reversed much quicker than by use of rack and pinion without any danger whatever to the machinery. The grooves in the drum are turned on a lathe, and made to fit the rope perfectly, which gives the greatest possible friction for power transmission and at the same time increases the life of the rope. The rope is wound around this drum or sheave four times, after which it is passed over sheave pulleys, and connects to cross pieces underneath carriage by means of eye-bolts. These eye-bolts are provided with threads and nuts for taking up the slack of the rope. The drum has also an **internal gear,** and is revolved by the feed-pinion and gives a very even motion to the carriage. The value of a rope feed is appreciated by every user of a mill who has suffered annoyance occasioned by the racks and pinions, and will pay for itself in less than a month.

SAW MILL MACHINERY.

We would call special attention the specifications given of each mill compared with those of other manufacturers, as without them no just judgment can be reached. The fact that a saw mill can be furnished at a given figure is one thing, completeness or what constitutes such a mill is another.

Persons contemplating putting in Saw Mill Machinery will find it to their interest to investigate the merits of our machines. We know our machines will give entire satisfaction, and to be superior to any mill made, either as to quality or quantity of work done, strength and simplicity of construction, and convenience, ease, and facility of operation. They are made by experienced workmen, from selected material, are very neat in design and nicely painted.

In purchasing of us you need not fear you are risking an experiment. Our mills have been thoroughly tested, as they have been more generally used in the Northwest than any in the market.

SIZES OF MILLS.

We manufacture five sizes of these portable mills. We, however, build portable mills of the largest size and heaviest class to order. We also build large and **heavy Stationary Saw Mill Plants,** We do not deem it necessary to give a minute or separate description of each, as the features of these mills are similar, the main difference being in size, weight and length.

THE HUSKS OR MAIN FRAME.

They are of combined iron and wood, securely bolted together. Side timbers are made of best seasoned long leaf timber with heavy iron ends, forming a solid and firm foundation for all the working parts of the mill, are well adapted to be used in connection with either the rack and pinion, or rope feed works.

SAW ARBOR.

Made of high grade, selected steel, finished from the solid bar, which is vastly superior to an arbor made of patent cold or hot-rolled shafting, of sufficient diameter and strength to stand double the work required of the sized mills to which they belong. They have solid forged collars, 5 inches diameter, and of ample thickness. The inside collar welded (not shrunk) on, are turned true and in balance, with no possibility of collar coming loose or of shaft springing. Heavy turned Set Collars are used to prevent end motion of arbor.

Saw bearing 2 inch diameter, with two steel lug pins $\frac{5}{8}$ inch diameter, 3 inches center to center, with steel nut to hold the saws.

ARBOR BOXES.

These are unusually large, lined with best Babbitt, **faced off** on ends, and are secured to the husk by bolts independent of the bolts which go through the caps, held in place by set-screws which can be adjusted to change the lead of the saw, and are self-oiling. The oil groves are so arranged in the liners that the bearings are lubricated their entire length.

PULLEYS.

The Drive Pulley is intended for heavy duty, carefully turned, balanced, bored and keyed to saw arbor; is placed outside of the frame, relieving the mandrel from the weight and strain of the main belt, and placing the belt farther from the saw, giving ample room to handle the lumber. If speed of the engine is given us and diameter of the fly wheel, we will furnish pulley on mill of proper size to give correct speed. Otherwise our standard size will be shipped.

NO. 6 SAW MILL

A cut this Mill is shown in this Catalogue, will be seen by dimentions given in price list that the Mill is built for very heavy work and of large capacity.

KNEES.

The knees are double ribbed, made extra heavy and face planed up true; bearings are large, corresponding with ways in blocks, and is arranged for our make of Drive Dogs and Patent Dogs.

Each knee is furnished with the extension hook drive dogs, when Patented Cog is not ordered.

THE FRICTION FEED.

This device is a new arrangement of paper and iron friction. The feed and gig frictions are hung in two tilting arms (connected with rock shaft, and in turn with sawyer's lever) that move on the same centers, have the same travel, and consequently strike the face of the rag friction square and parallel.

We furnish all our largest mills with friction paper intermediate and friction paper feed pulleys, instead of wood. These pulleys are so constructed that it only requires a few minutes to take out the paper and replace a new paper filler in its place at very little cost. The flanges always remain good.

The carriage is moved backwards and forwards by means of this friction gearing. It is steady and strong in feeding, and very rapid and positive in giging back the log, and for these reasons saves much valuable time.

Variable feed, as per description on another page, will be substituted when so ordered at an additional price

CARRIAGE.

The carriage is subject to the greatest hardships and roughest handling, and every care should be exercised in its manufacture. Our carriage is made of seasoned yellow pine, tenoned, mortised, braced and bolted throughout with heavy steel rods.

Our Standard Size Carriage is 18 feet long, but can be furnished any additional length desired. The rack beam, 4x6 inches, 23 feet long, firmly bolted to the cross-ties of the carriage. The rack is securely fastened to the beam with bolts and nuts, not with spikes or lag screws, as is usually done in low priced mills, and are provided with **five wheels** and **axels,** with babbitted boxes, or wheels and chairs, according to style machine ordered. Segment is made strong and has pinion to match. **48** feet of "V" and **48** feet of flat track, with the necessary screws complete. Extra length of carriage furnished when so ordered. See list price.

THE CARRIAGE WHEELS AND AXELS.

These are made of suitable dimensions to suit the various size mills. The wheels are large and are on the outside of the carriage beam; not flanged, but truly turned in a lathe. The outside wheels have a flat face, and run on a flat steel rail. The inside ones have a "V" groove turned in their face, fitting the "V" or inside steel rail.

The axels upon which the truck wheels of the carriage are fastened are made of steel, and turned off true at their bearings, and pass under the carriage from one beam to the other, and run in long anti-friction boxes which in combination with the central draft of carriage insures the running of the carriage of our mills much lighter than any other mill made.

FEED AND BACKING.

A pinion in the feed shaft engages the rack, and a lever so arranged that a motion in one direction feeds the log up to the saw, while a motion in the opposite direction give a rapid return to the carriage, and can be varied in a moment at will; is powerful and accurate and is always under the control of the sawyer.

The two Friction Pulleys on all our mills, except the smallest sizes, are made of best quality of friction paper glued and are put together under heavy pressure. This greatly enhances their durability and effectiveness.

The feed is from 4 to 6 inches, and the backing speed from 7 to 9 inches per revolution of the saw; this varies according to the size of the mill. Owing to the arrangement of the frictions the backing speed is more than usually rapid, and increases the capacity of the mill

ROPE FEED.

If preferred, we furnish rope connection to carriage, which takes the place of the rack and pinion for moving the carriage. The wire rope is wound around the iron spool four times and the ends of the rope are secured to eye-bolts that run through cross pieces beyond ends of carriage, and are provided with long threads so slack or stretch of rope can be taken up, as shown in accompanying cut. When Rope Feed is substituted in place of Rack Feed an extra charge is made

LUMBER ROLLERS AND SPLITTER.

These are turned all over on a lathe, the rollers being secured in iron stands which are bolted to husk frame. They revolve freely on the bearing, and avoid all liability to drag or slip the log on the head blocks, as is the case when stationary stands are used. On the shaft of the rear roll is placed a wedge wheel, or splitter, 14 inches diameter, which prevents the lumber clamping and heating the saw. The wedge wheel revolves with the log and board.

THE TOP SAW FRAME.

This frame is made entirely of iron, with planed surface, is strong and substantial, and capable of heavy work, is firmly bolted to the frame or husk of the mill. The mandrel is steel, 2 3-16 inches diameter. The extreme distance between centers of mandrels is 40 inches, the minimum 33½ inches, adjustment 6½ inches.

The mandrel boxes, **three in number,** are connected by a strong cast iron arch, and can not get out of line. The top saw is raised and lowered by conveniently arranged screws at each side of the frame. The saw can be put in line and proper position quickly. Top saw belt tightener, to regulate tension of the belt, is furnished of latest design. The main saw arbor is provided with an extra pulley to run top saw arbor. Saw bearing is 1⅝ inches diameter, no lug pins. This top rig can be added to No. 4 or No. 5 single mill at any time making double mill.

All double mills are equipped with top saw belt tightener without extra charge.

DURABILITY.

Having heavy side timbers for husk or frame, with heavy cast iron ends, heavy steel mandrel and boxes, and heavy timbers well seasoned and framed, they are long lived, remain true and do not get out of shape. They are made by skilled mechanics who have been in our employ for years, and thoroughly understand the necessity of accurate workmanship. The parts of each machine are properly proportioned with regard to each other, and our long experience in the manufactnre of Saw Mills has enabled us to model them so as to evenly distribute any undue or excessive strain they may be subjected to over the entire machine, and make them strong and complete as a whole.

CAPACITY OF OUR VARIOUS SIZE MILLS.

The capacity is varied by the manner they are handled, the character of the logs to be sawed, the conveniences and facilities of its location, the amount of power employed, and the energy and vim of those having control of it.

To get the largest amount of work out, the motion of the saw may be largely increased as well as the feed, and more power furnished, so that one of our Pony Mills may be made to cut anywhere from 2,000 to 20,000 feet of lumber per day, owing to power, speed and services applied.

MILL DOGS.

The Mill Dogs furnished with our mills are the standard extension Drive Dogs. Our Patented Single and Duplex Dogs substituted when so ordered at an additional price.

REPAIRS.

All parts of our mills are made to fit gauges and templetes. This makes the parts strictly interchangeable, enabling the owner of a mill to quickly and cheaply replace any part that may be broken, by sending or telegraphing the number cast on each piece, while it further insured accuracy in fitting. In workmanship we challenge comparison with any mill.

SAWS.

We furnish any size or style of saw, either solid or inserted tooth, at manufacturer's prices, and usually keep large stock on hand. Prices of saw mills in this catalogue do not include saw blade. They are extra in all cases.

EXTRAS.

The following parts are not included in the regular price of our saw mills, but will be furnished when ordered at the lowest prices: Saw Blade, Main Belt, Patented Mill Dogs, Variable Feed, Rope Feed, Wood Track or Sills under the steel rails.

OUR MILL CONSISTS

Of husk frame and fittings, two head blocks complete with pinions and two drive dogs, 18 feet of mill carriage, 5 pairs trucks, 23 feet of rack stick, with segment and pinion to match, 1 oil can, 1 monkey wrench 1 arbor wrench, 1 belt punch, 1 file, feed belt, 1 set works, set work shafts (2 pieces with couplings attached), 1 wedge roll, 48 feet of "V" steel track, and 48 feet of flat steel track, with necessary screws and bolts complete. When we furnish a mill with solid saw blade a saw swedge is furnished free.

TAPER ATTACHMENT.

For any of our Head Blocks we can furnish parallel knee or taper attachment when order so specifies at slight additional cost. A valuable and convenient attachment to any mill and is used to throw out the small end of log, to steady light or crooked logs, and for sawing tapering timber.

LONG CARRIAGE IN TWO PARTS.

Our standard length of carriage on our No. 2 to 6 Mills is 18 feet. Longer or shorter carriage or more head blocks can be furnished if so ordered, at additional price. When a carriage longer than 22 feet is desired, we would advise furnishing same in two parts. When in use for cutting full lengths, they are coupled together, but when shorter lumber is to be cut, it will be found very advantageous, less power required, and much more convenient to disconnect them and use but one part, leaving the part not in use at the furthest end of the track ready at any time to connect to the main carriage when desired.

HEAD BLOCKS.

The base of the Head Blocks in our mills are in one piece, with solid knee, they are strongly ribbed and will stand hard usage, made of the very best material, and none but our best workmen are employed in their construction. They are neatly and nicely fitted to template, the different parts working together without lost motion. Upon them depend the accuracy of the lumber sawed, and many a saw mill that is otherwise good, is made worthless by a set of cheaply constructed head blocks with which it is furnished. The knee has two large and deep accurately machined grooves on each side, to fit corresponding tongues on the base, providing a generous wearing surface. A set screw is placed at rear end of knee. This feature prevents the knee from ever being thrown forward in contact with the saw. The Head Block has a scale attached to the base of the knee showing the distance between the knee and the saw and serves as a guide in slabbing and setting for different thicknesses. Two Head Blocks are regularly furnished with each mill, although a greater number may be used if desired. Extra Head Blocks, shafts and couplings furnished when so ordered at additional price.

SET SHAFT.

The set shaft is fitted with adjusting coupling between each two blocks, providing easy means of removing blocks from shaft, and for aligning the knees. This set shaft is key seated full length and head block pinions are fitted with "feather keys," so that blocks can be moved to any desired place on carriage.

SET WORKS.

Our Set Works are simple, yet strong, accurate and durable and connected direct with Set Shaft, so avoiding lost motion, as is the case when intermediate gears are used, so that the lumber cut has a uniform and exact thickness, also the ease with which a setter can vary from one thickness to another, without any calculation or figuring on his part, and eventually coming out with the last board on the knees as perfect as the first, is a feature that recommends them. The ratchet wheel is cast in an iron mould in which the teeth have been accurately cut, insuring a durable tooth on account of the chill, and one that is perfectly spaced. The pawls are of tempered tool steel. Are raised from ratchet wheel by means of a spring lever which locks itself and there is no liability of them dropping into gear when blocks are being receded. The Set Works may also be operated by the sawyer when equipped with set rod which is quite a desirable arrangement for small Saw Mills and saves one man. By a twist of the set rod the pawls are reversed to change the direction of the knees and the receding is accomplished with the same lever as the setting. The stop may be set at any point on the quadrant, and at whatever point it is set, there the lever will be arrested in its throw. This stop has four sides, each side of which is at a different distance from the center pin, and is used to enable the operator to saw lumber full or scant as desired. All parts are made to template and are interchangeable.

CAPACITY OF SAW MILLS TO THE HORSE POWER.

In a large mill of thirty horse-power capacity ought to manufacture 1,000 feet of lumber per hour; but in smaller mills, proportionately less. Mills of larger power overrun 1,000 feet.

The estimates given below of the amount of lumber that our mills can produce with the power named are based upon ordinarily favorable circumstances:

10-horse.... 300 to 400 feet per hour.....Size of Saw, from 48 to 50 inch.
15-horse.... 450 to 550 feet per hour.....Size of Saw. from 50 to 52 inch.
18-horse.... 700 to 900 feet per hour.....Size of Saw, from 52 to 54 inch.
25-horse....1000 to 1200 feet per hour.....Size of Saw, from 54 to 56 inch.
30-horse.....1200 feet and upward.....Size of Saw, from 56 to 58 inch.
40-horse.....1800 feet and upward.....Size of Saw, from 58 to 60 inch.
50-horse.....2500 feet and upward.....Size of Saw, from 60 to 62 inah.

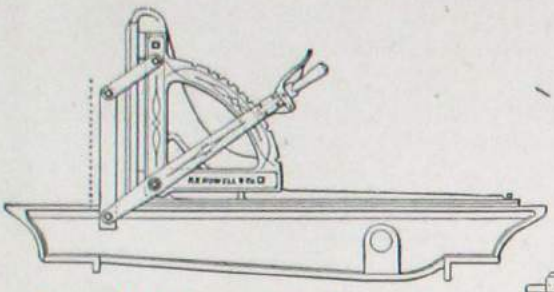
PRICES, DIMENSIONS AND WEIGHTS OF OUR SAW MILLS.

Number of Mill.....	Diameter of Mandrel....	Length of Mandrel.....	Length of Boxes.....	Size of Drive Pulley.....	Diameter of Cone Shaft..	No. Steps on Feed Cone..	Width of Cone Belt.....	Length of Husk Frame Outside.....	Width of Husk Frame Outside.....	Size of Husk Timbers....	Size of Iron Friction Pulley.....	Size of Paper Friction Feed Pulley.....
No.	In.	ft in	In.	in. in.	In.		In.	ft. in.	ft. in.	ft. in.	in. in.	in. in
1	2⅜	4—3	8	18 x 8	1 11-16	2	2	7— 6	3—2½	4¼ x 10	13¾ x 4¼	4½ x 4¼
2	2⅜	4—6	8½	18 x 10	1 11-16	2	2	7— 8	3—4½	4½ x 10	13¾ x 4½	4½ x 4½
3	2⅝	5—1	9	18 x 10	1 11-16	3	2½	7—10	3—6½	4½ x 10	13¾ x 4½	4½ x 4½
4	2⅞	5—4	9½	20 x 12	1 11-16	3	3	9— 0	3—9	5 x 12	13¾ x 5½	4½ x 5½
5	3⅛	6—3	10	22 x 12	1 11-16	3	3½	9— 0	5—0	5 x 12	18 x 6	5 x 6
6	3⅜	7—6	10	24 x 14	1 15-16	4	4	10— 0	6—0	5¾ x 14	18 x 7	6 x 7

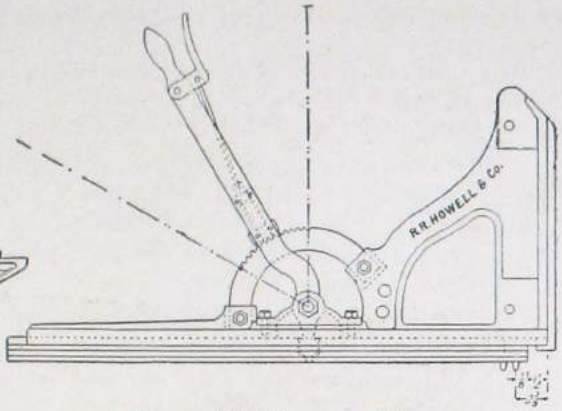
PRICES, DIMENSIONS AND WEIGHTS—Continued.

Diameter Gig Shaft.....	H'd blocks open from Saw	Width of Carriage Outside.....	Size of Carriage Sills.....	Diam. of Chair Wheels...	Size of Chair Wheel Spindles.....	Diameter of Axel Wheels	Diameter of Axels.....	Diameter of Set Shaft...	Will take Saw up to.....	Horse Power Required..	Capacity in 10 Hours....	Weight.....	PRICE.	Price of Top Attachment	Price Extra Head Block.	Price Extra Carriage per foot, with all irons.....	Price Extra for Portable Track Stringers per ft.
in.	in.	in.	in. in.	in.	in.	in	in.	in.	in	h. p.	M.	lbs.	$	$	$	$ c.	$ c.
1½	24	27½	4 x5	4¾	1x6			1 7-16	48	6 to 12	2 to 5	2400				2.50	.50
1½	28	36½	4x5½	4¾	1x6			1½	52	10 to 20	3 to 7	2800				2 75	.60
1¾	32	36½	4x5½	4¾	1x6			1½	54	12 to 25	6 to 10	3200				3.00	.75
1¾	36	40	5¾x5¾			8	1½	1 11-16	58	25 to 50	10 to 25	4000				3.50	1.00
1 15-16	42	46	5¾x5¾			9	1¾	1 15-16	60	40 to 75	25 to 45	5500				4.00	1.25
2 3-16	48	52	7½x7½			12	2¾	2 3-16	62	50to100	40 to 60	7000				6.00	1.50

Taper Attachment.



Parallel Knee Attachment.
Fig. 1.



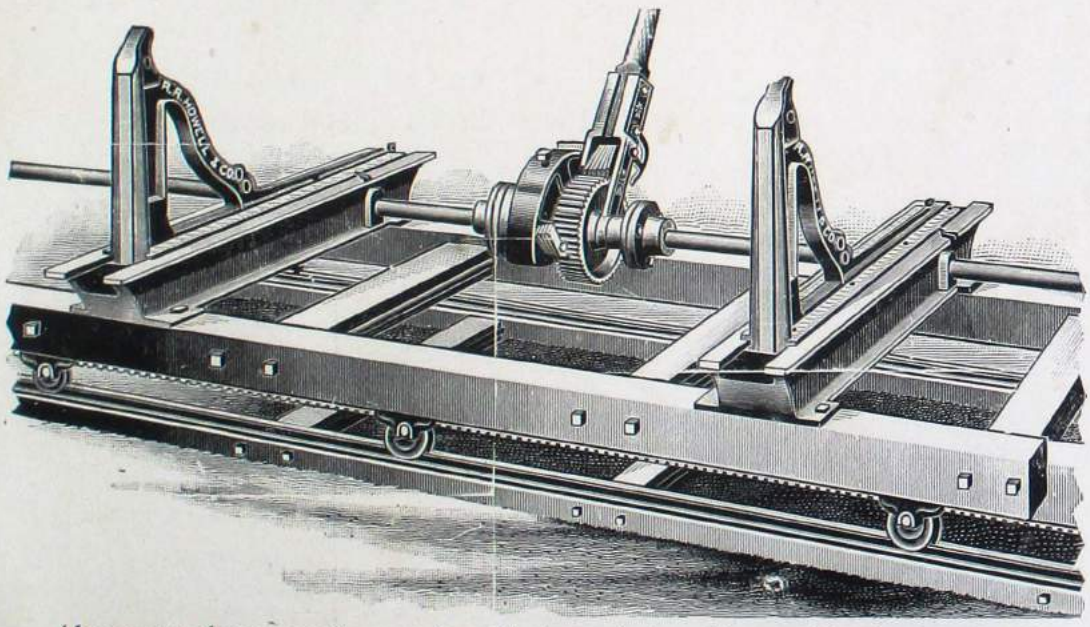
Adjustable Knee. Fig. 2.

For some purposes tapering lumber is desired, and in such cases we provide an attachment of the character shown above, and is very nicely adapted for sawing wedge-shaped or tapered lumber; controlled by a substantial lever and quadrant, which is graduated by inches up to a limit of 3 inches throw, giving ample adjustment of the knee for tapering logs, or even for sawing tapering lumber, or whenever one end of the log is to be set in advance of the other, and when three or more head blocks are used, are very useful in straightening a log of cant that has sprung in sawing.

The Parallel Knee, Fig. 1, can be attached to any make or style of head blocks at any time, while our Adjustable Knee, Fig. 2, must be ordered with the knee and for our make only of head blocks.

Attached to Head Blocks	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7
Price, Fig. 1	$10.00	$12.00	$15.00	$18.00	$20.00	$22.00	$25.00
Price, Fig. 2	15.00	18.00	22.00	26.00	30.00	35.00	40.00

Carriage Equipment for No. 1 and 2 Mill Only.



Above cut shows carriage as furnished regularly with our No. 1; also No. 2 saw mill with wheels and chairs under the carriage. The wood-work or frame under the steel track is furnished only when so ordered and at an extra charge.

Carriage Wheels, Track and Boxes.

FOR PORTABLE SAW MILLS.

We regularly furnish grooved and flat face carriage rollers with chairs on our Nos. 1, 2 Saw Mills. The carriage for Nos. 4, 5 and 6 Mills we regularly provide with "V" and Flat Rollers with axles extending across carriage, running in our improved self-oiling babbitted boxes. While the above is our standard manner of arranging our carriage, we can, however, supply any of our carriages with axles extending across same and with grooved and plain rollers, or flanged rollers, if preferred. Charge is of course made according to the manner in which the carriages are equipped.

Fig 1.

Fig. 2.

Fig. 3.

This engraving represents our Carriage Trucks with steel axles and self-oiling truck boxes, which are bolted to the carriage and are provided with bolts (not shown in the above cut) for adjusting carriage on the axles as well as taking up the literal play consequent upon wear; a very valuable and important improvement. The wheels are turned true after being shrunk on the axles. We can groove the rollers to suit our regular "V" steel track, or to suit "T" steel rail.

The axles upon which the truck wheels of the carriage are fastened pass through under the carriage from one beam to another, and run in boxes made in halves; the upper half, against which is the pressure, is babbitted, and the lower half has large cellar underneath the bearing and contains wool and oil, securing constant lubrication of the axles.

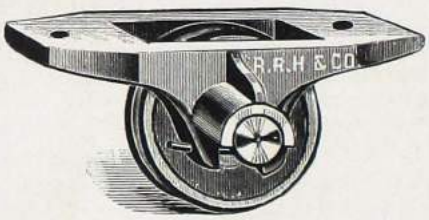


Fig. 4.

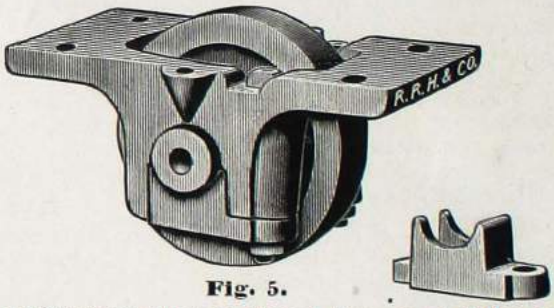


Fig. 5.

The Fig. 4 Roller with Chair has steel axle, long bearings which is turned true on a lathe as well as the outside of the roller after the roller is shrunk on the axle.

Fig. 5, the lower half of box for roller has cellars underneath the bearings for oil and waste, insuring thorough lubrication of the axles; an arrangement similar to railroad car bearings. This Chair is superior to any that has ever come under our notice.

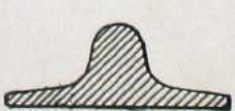
PRICE AND SIZES FIG. 1.
A Set of one Axle, two Wheels and two Boxes.

ROLLERS WITH CHAIRS.
A Set of one Flat and one Grooved Wheel with Chairs.

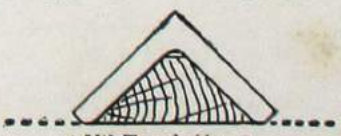
USED ON	Wheels, Dameter, Inches.	Size Axle, Inches.	Track, Inches. C to C	PRICE, PER SET. With Fig. 3 Box	PRICE, PER SET. With Fig. 2 Box
No. 4 Mill	8	1½	48½	$ 7.50	$ 8.00
" 5 " (Medium,)	9	1⅝	54½	8.50	9.00
No. 5 Mill (Heavy.)	10	1¾	55½	10.00	11.00
No. 6 Mill	12	2	62½	13.00	15.00

USED ON	Diameter of Wheel.	PRICE, PER SET. Fig. 4.	PRICE, PER SET. Fig. 5.
No. 1 Mill	4½ inch	$3.50	$4.00
No. 2 Mill	5 inch	4.00	4.50
No. 3 Mill	7 inch	5.00	5.50

Steel Track for Portable Mills.



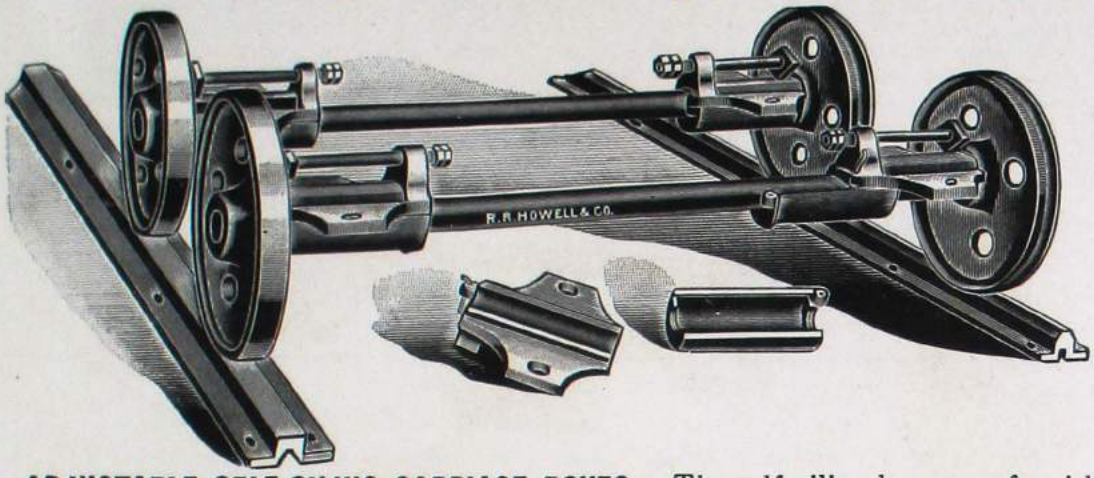
Tee Track No. 1.
Price per ft., No. 1....25c



"V" Track No. 2.
Price per ft., No. 2....20c

Flat Track No. 3
Price per ft., No. 3.....15c

Heavy Stationary Saw Mill Carriage Trucks and Track.



ADJUSTABLE SELF-OILING CARRIAGE BOXES. The self-oiling boxes we furnish with our axles have large receptacles which are to be filled with waste, cork or sponge, and oil. They keep the journals lubricated thoroughly. The caps of these boxes may be drawn out for inspection or filling and replaced without loss of time. The boxes are bolted to the under side of the carriage and are provided with a bolt, shown in cut of boxes, with a large square head which is let into the carriage frame, with two jam nuts on the flange of the box for adjusting the carriage on the axle or taking up any wear or side play caused by loading or turning heavy logs.

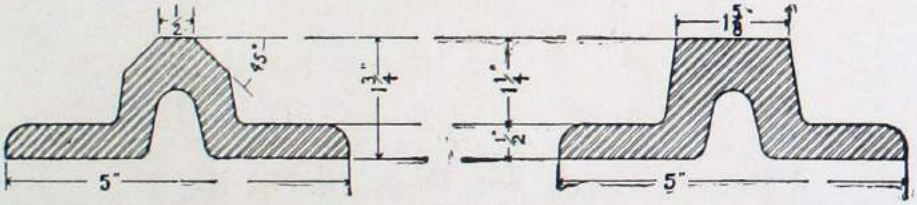
TRUCK WHEELS. We make these wheels in sizes of 10, 12, 14, 16, 18 and 20 inches diameter, and they are made of either cast steel, hard chilled iron, or cast iron as may be preferred. Both trucks are keyed and pinned to the axle. The trucks are generally furnished with one V and one flat face. However, we are prepared to furnish both V or flanged, if so desired. The trnck weels are provided with dirt fenders.

STEEL AXLES. The axles are made of steel, either 2, 2½ or 3 inches diameter, ac cording to the size of mill they are furnished with and timber to be handled, and pass through un der the carriage from one beam to the other.

Prices, per set of one Axle, 2 Wheels and 2 Boxes:

Size of Wheel	Size of Axle	Price	Size of Wheel	Size of Axle	Price
10 inch	2 inch	$20.00	16 inch	2½ inch	$35.00
12 inch	2 inch	25.00	18 inch	3 inch	40.00
14 inch	2½ inch	30.00	20 inch	3 inch	45.00

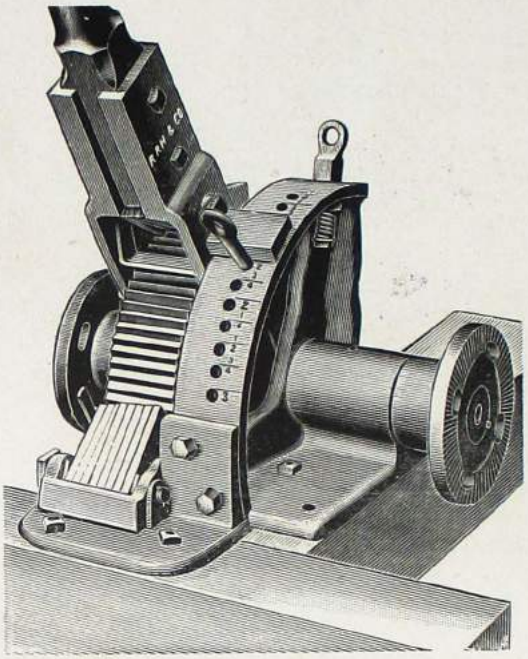
ROLLED STEEL CARRIAGE TRACK.

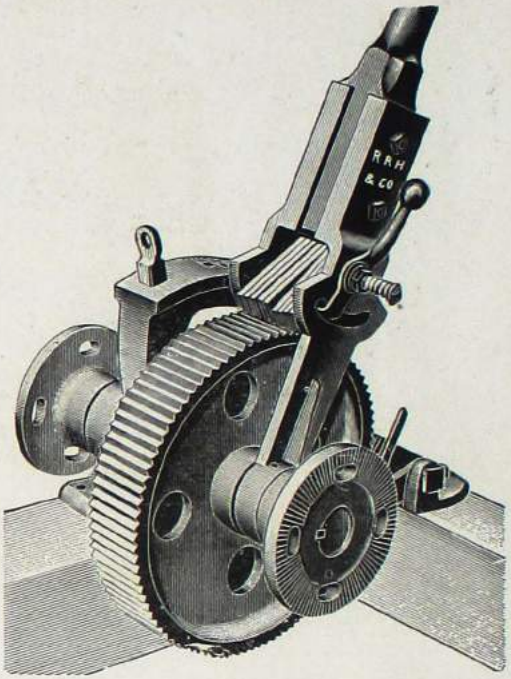


This track is made of heavy rolled steel, expressly for Saw Mill Carriages, and warranted the best and most durable track in the market. The flat and V track are both made the same height so that the track sills may be set on a level. The track is accurately planed and drilled, insuring a perfectly smooth and even track when laid, and is furnished in lengths of from 10 to 14 feet.

Price, per foot, Steel Flat Track. $1.30
" " " " V " 1.50

Our No. 6 Heavy Set Works.





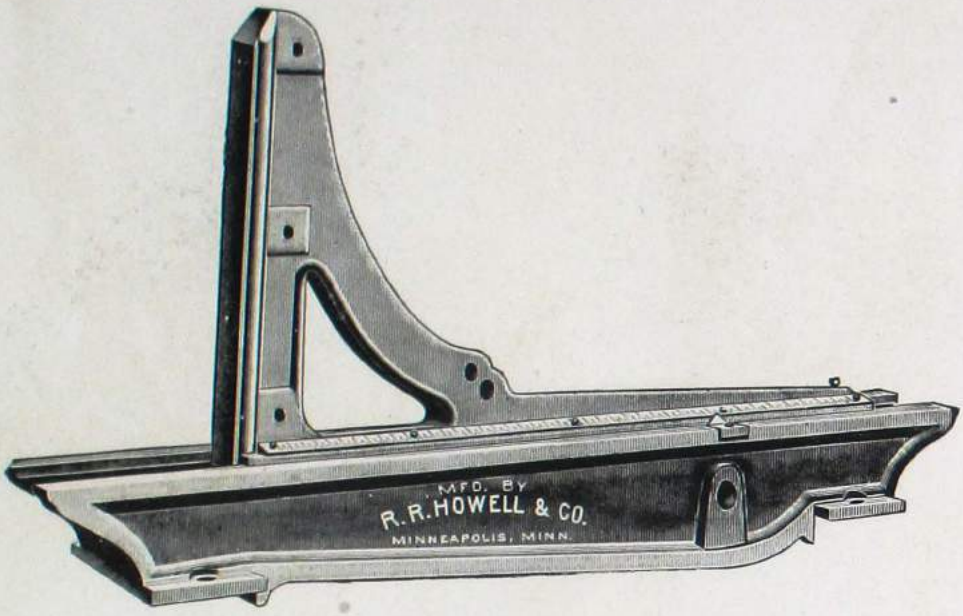
Our No. 6 Lever Set Works are made from entire new patterns, and are made extra strong adapted to go with our heavy Nos. 6 and 7 Head Blocks for our No. 5 and No. 6 Saw Mill, for which they are designed, and we believe is the most simple and effective set works in existence for mills of this size. The lever movement being across the carriage make them convenient to operate by either sawyer or setter. The base of the set works is firmly bolted to the carriage timbers, which forms a substantial base upon which the set works proper are secured. The arrangement of the quadrant places it in a convenient position directly under the eye of the setter, and it entirely **obviates inaccuracies,** is plainly marked upon its polished face, so that the operator can see at a glance which hole to put the pin into to get the required set.

The Rachet Set Works are provided with a setting lever forked at the lower end to secure the rachet wheel, the face of this wheel is chilled which gives them a very hard, smooth and true surface, the lever is provided with 10 setting pawls, bearing on the upper side of the wheel, and reversing pawl on the lower side. Ten check pawls, opposite the setting pawls, take up and hold the slightest movement imparted to the rachet wheel by the setting lever and prevent all lost motion. A single throw of the up-right reversing lever trips the setting and check prawls and engages the reversing dog with the rachet wheel. The lever comes to a positive stop at the completion of its forward and backward movement, there a positive and instantaneous engagement of the setting wheel with the lever at the commencement of its throw, so accuracy in all the varying thickness is positive. The set rod couplings have slotted holes, which allow the knees to be adjusted an equal distance from the saw. It is necessary to properly adjust the knees when starting a new saw mill. The above set works are same as those used on our smaller mills, except that they are larger and heavier.

PRICES AND SIZES.

Set Works No.	Used with Head Blocks No.	Used on Mill No.	Size of Ratchet Wheel		No. of Steel Dogs			Price
			Diam.	Face	Forward	Check	Back	
1	1	1	8 in.	2⅛ in.	9	9	1	$40.00
3	2 and 3	2 and 3	10 "	3 "	9	9	1	50.00
4	4 and 5	4 and 5 medium.	13 "	3⅜ "	9	9	1	60.00
6	6 and 7	5 and 6 heavy.	16 "	3⅝ "	10	10	1	80.00

Heavy Head Block and Knee.



The above cut represents our latest improved cast iron base and knee, heavy Head Blocks made in two sizes, namely: No. 6 opening 42 inches from saw for **heavy** No. 5 Mill, and No. 7 opening 48 inches from saw for No. 6 Saw Mill. These Blocks are the very best, strongest and most reliable Blocks built. Every part is made heavy and strong to meet with the most exacting requirements; making a very rigid construction and one we would especially recommend to withstand severe usage, and can be placed on carriage at any desired distance apart to accomodate short or long timber, and is adapted to any of our improved patent dogs.

The Base is very heavy, reinforced on both sides by a deep web. All wearing surfaces are broad and carefully planned with the ends nearest the saw connected so as to give them additional strength at the point where all head blocks are weakest. This feature also prevents the rack and knee from ever being thrown in contact with the saw. The Knees which are also planned to fit are very heavy, and are also reinforced on the back by a deep web or rib, and are provided with extra heavy bearings, in combination with corresponding ways in the head blocks, all of which are accurately planned to templets.

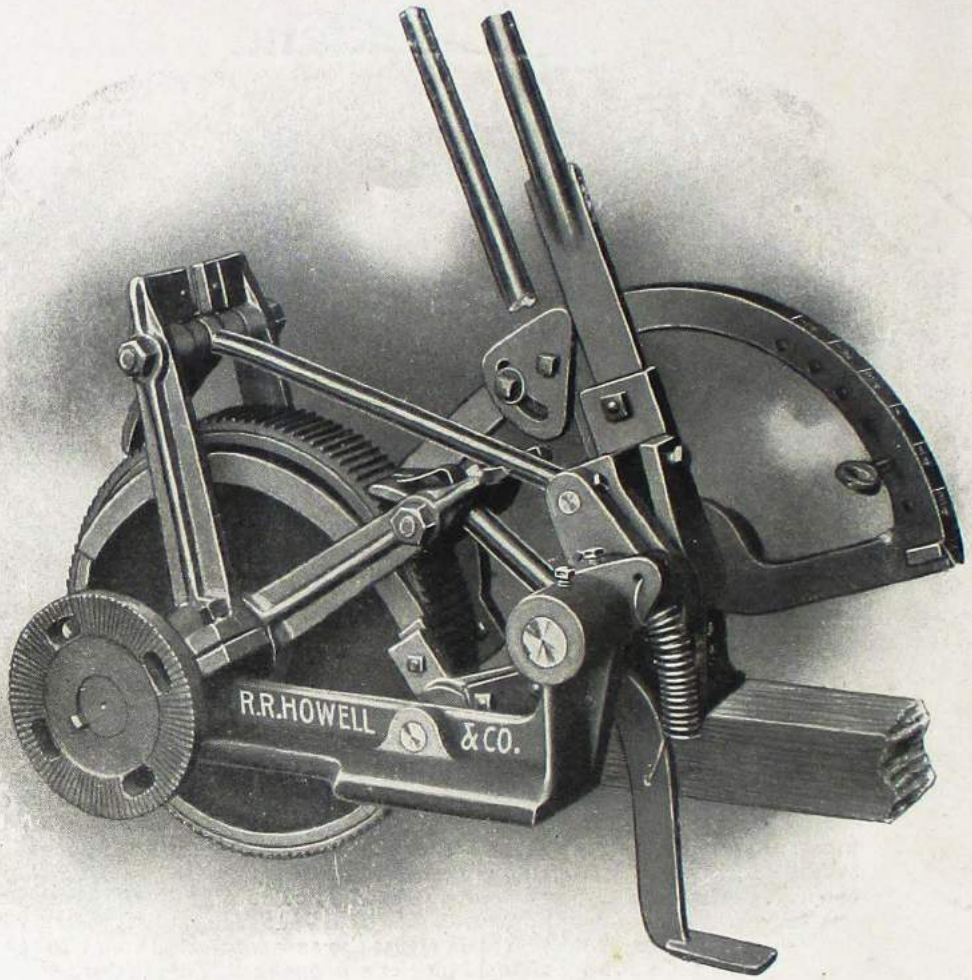
A Steel Polished Rule with large and distinct figures is placed on the side of the blocks, next the setter, and which can be readily seen from a distance.

The Knees are adapted to recede by a very simple and effective arrangement placed on the carriage, operated by a lever whereby the Knee is drawn back 16 inches at each movement of the lever, also with self-receding arrangement operated by friction or with spiral spring on the set shaft, as purchaser may desire.

PRICE AND SIZES.

Head Blocks	Used on Mill	Open from Saws	Price.
No. 1	No. 1	24 inches	$25.00
" 2	" 2	28 "	30.00
" 3	" 3	32 "	35.00
" 4	" 4	36 "	40.00
" 5	" 5 medium	42 "	50.00
" 6	" 5 heavy	42 "	65.00
" 7	" 6	48 "	80.00

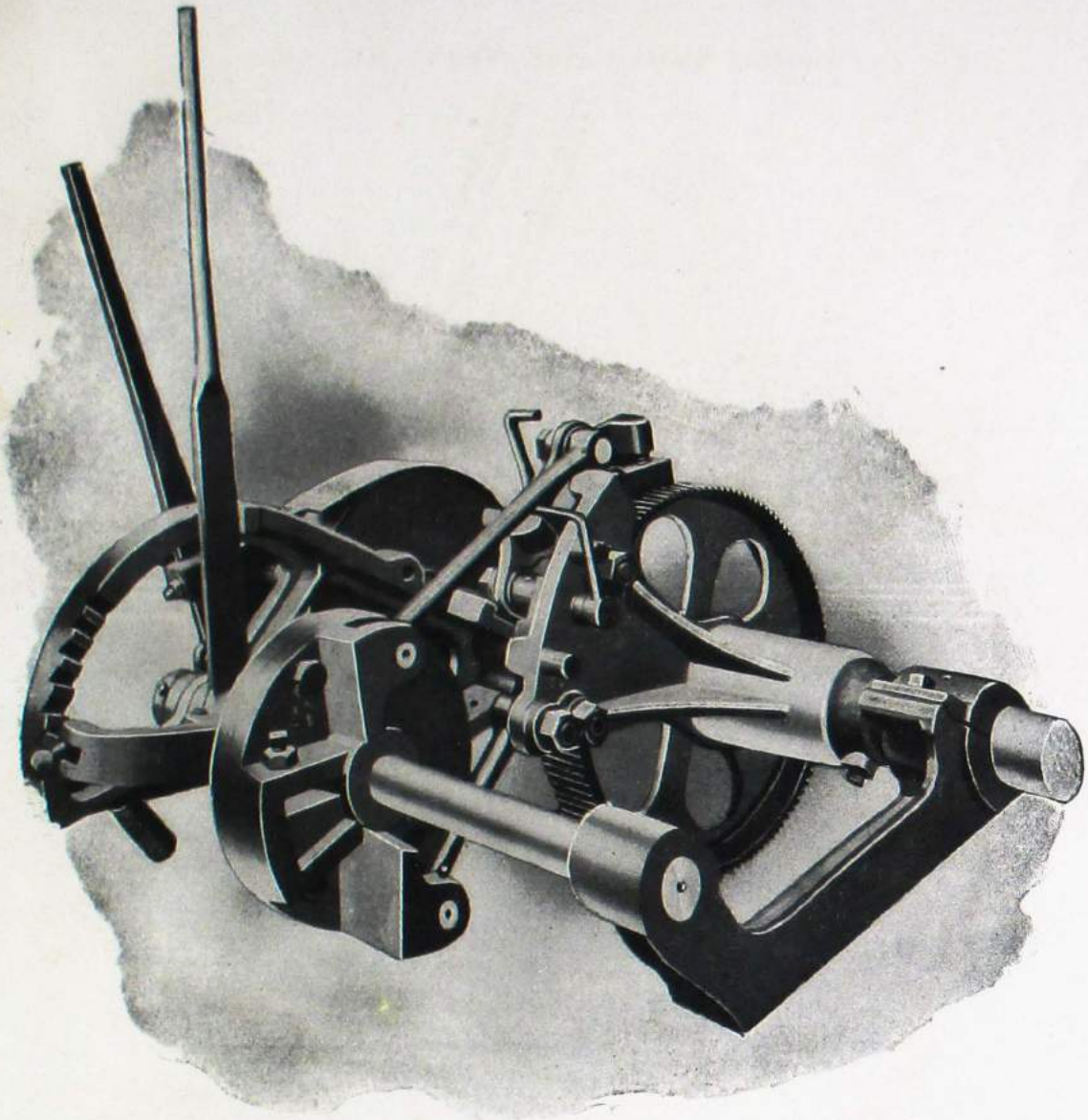
Double Acting Set Works No. 10.



Our No. 10 Double Acting Set Works is composed of one solid cast iron frame, which is securely bolted to the carriage and connected direct to the set shaft with special adjustable coupling, making it very rigid. The knees move toward the saw by both the forward and the backward strokes of the lever. The ratchet wheel is 16 inches in diameter, 3-inch face with 119 machine cut teeth, assuring accuracy. The wheel is operated by four steel pawls, each of which has 1½-inch bearing on the face. The pawls are held on face of wheel by steel springs, which obviates any lost motion by the slipping of the pawls, and are so spaced that one is always in contact with the bottom of the ratchet wheel teeth and the others are engaged in regular rotation. They are released from the ratchet wheel by a spring foot lever, while the knees are being receded, and are engaged again when the foot is removed. The quadrant which carries the stop pin is part of the main frame and all casted in one piece, and is scaled and figured for cutting boards from ½-inch to 2 inches, graduated by quarters, while by the arrangement of the pawls, an advancement of less than one thirty-second of an inch can be obtained. The figures being on top, they are easily read by the setter. The set lever travels between two fixed stops, setting every board and plank exactly the same every time. For cutting different thicknesses, it is only necessary to change the stop pin.

Our No. 10 Set Works we have brought out to supply a demand for a good and accurate, double acting set works for medium size mills, such as our No. 5 and No. 6 mills, and especially adapted to go with our No. 6 and 7 head blocks, and where it does not require as heavy and as expensive set works as our No. 15. They can be depended on to turn out accurately sawed and well manufactured lumber.

Price, No. 10 Double-Acting Set Works (Weight, 310 pounds).....**$100.00**



Double Acting Set Works No. 15.

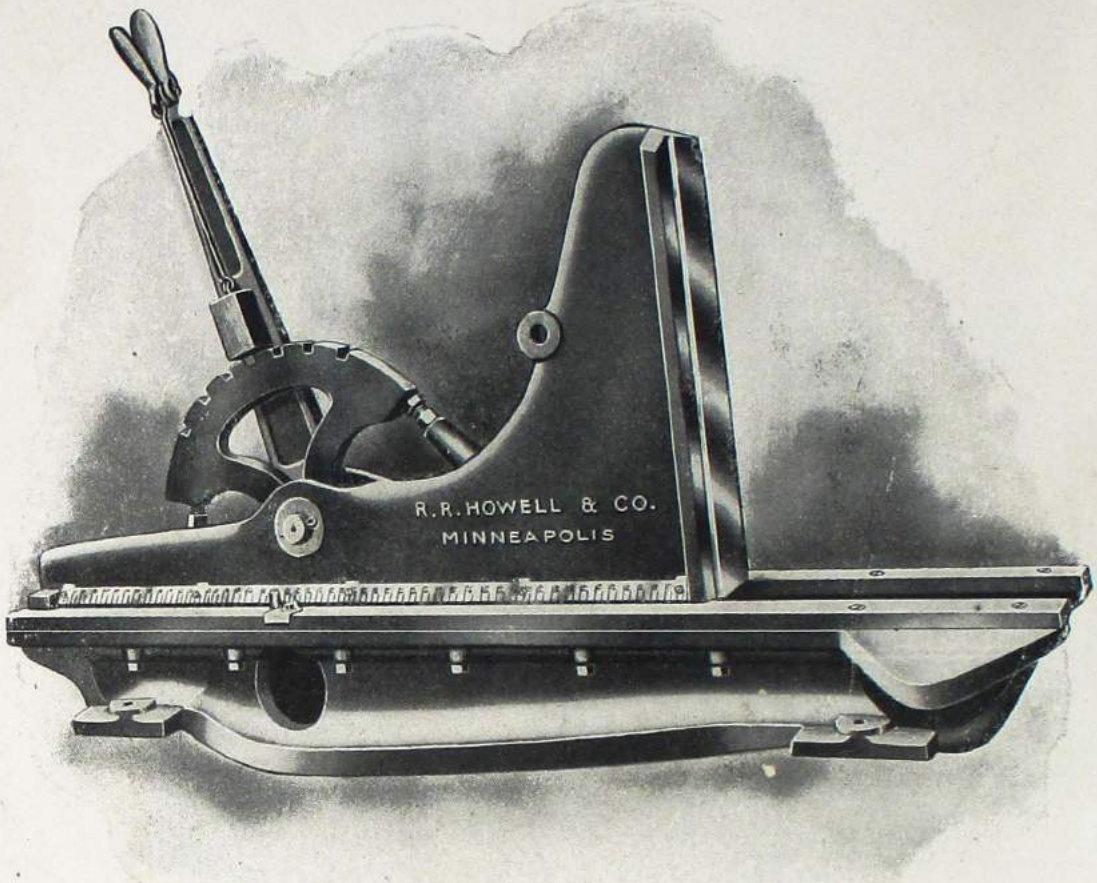
Our No. 15 set works are of the well known double acting ratchet pattern, the wheel being of cast steel, 18 inches in diameter, 3-inch face and having 128 teeth cut from the solid on a milling machine, which ensures perfect accuracy. The setting for varying thickness of lumber is done by using the latch stop shown at the extreme left in cut, the catch of which is dropped into the proper notch on the quadrant which is plainly figured and then move the lever back to the home stop.

The Pawls, four in number, are made of Tool Steel, are carefully fitted, and each is held in gear by heavy steel springs. The Set Lever is controlled by a quadrant, which is graduated so as to set from one-sixteenth to two and one-half inches at each forward and return throw of the lever. The lever advances the ratchet wheel when moved in either direction, and as the movement of the ratchet wheel is continuous, they are absolutely free from lost motion, which, taken in connection with the cut gear of the ratchet wheel, makes them perfectly accurate and beyond question the most reliable set of works in the market.

By raising a lever the pawls are thrown out of gear, when the blocks may be run back as desired or held by the brake.

This is the final result of years of experience, and of practical sawmill business, and we believe it is not excelled by anything of its class in the market.

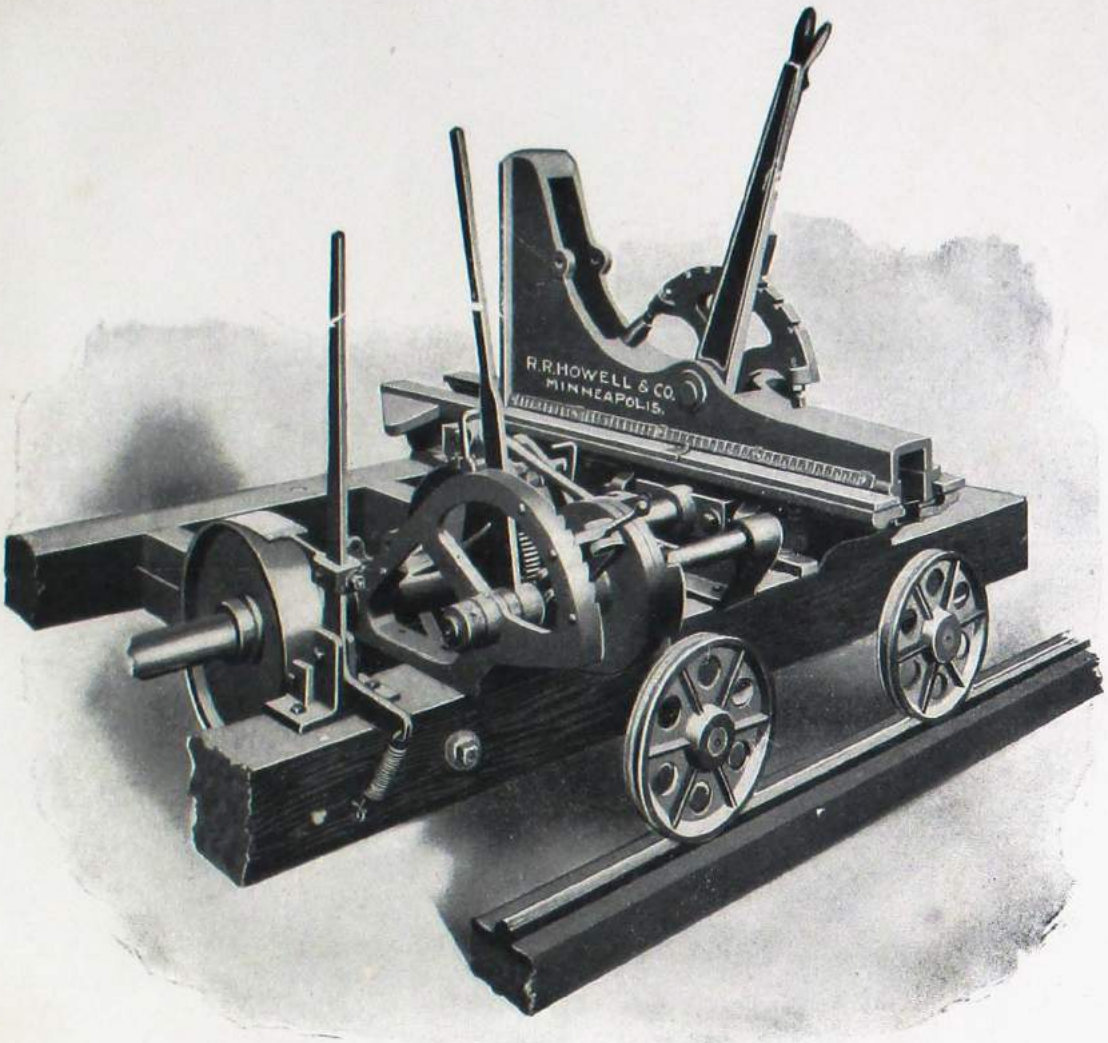
Price No. 15 Double Acting Set Works, $180. Weight, 450 Pounds.



Head Blocks No. 13—With Taper Movement.

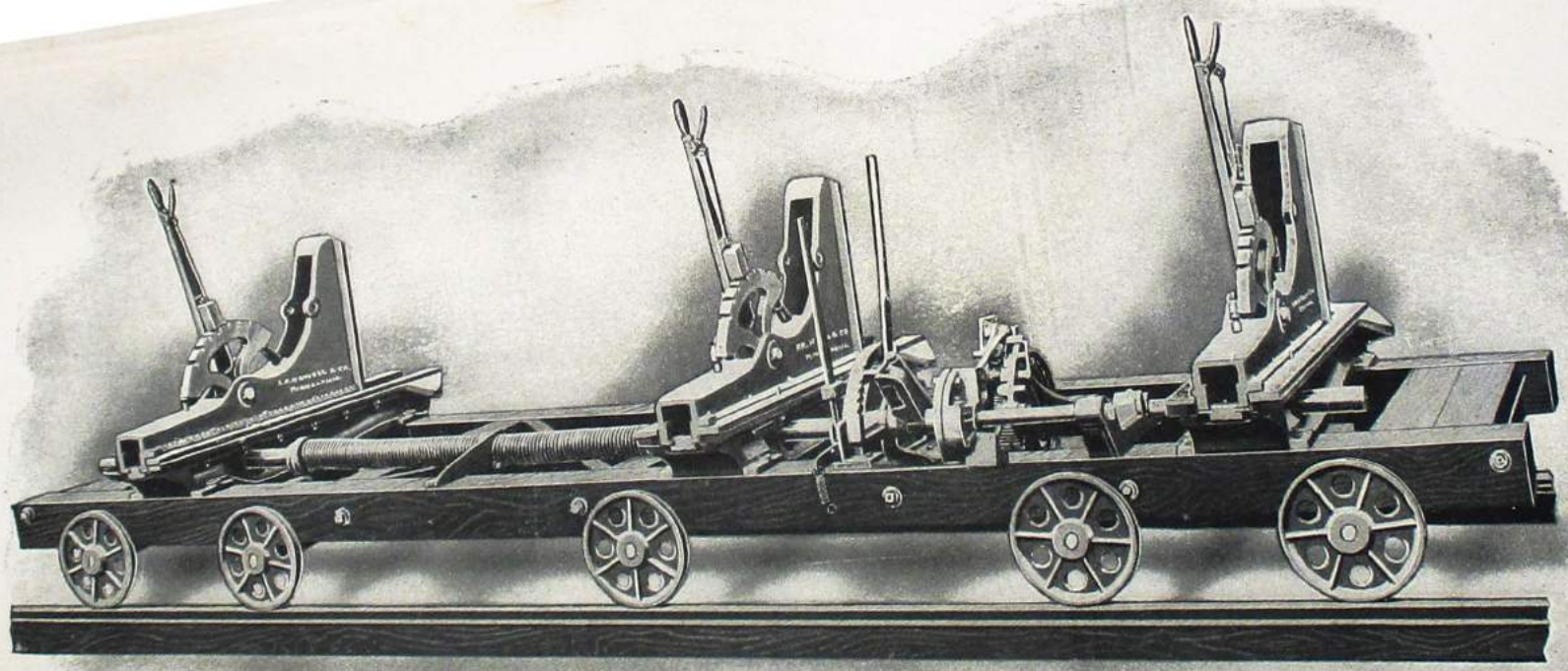
The Knees and Blocks are the heaviest manufactured, of the same opening, and are ribbed, stiffened and strengthened in the most modern way, material being freely used to produce the very best that could be made. Their simplicity and strength, which will be observed at a glance, enable them to stand the heaviest and fastest work, and to resist with safety, rolling, turning or loading the heaviest logs or timber. The Knees are heavy, and of Box form, so that dogs of the "Boss" pattern can be placed inside, also Drop tooth dogs of any type or style can be bolted on either side in the usual manner, and are provided with taper movement device to set either knee in advance of the other, when desired, and allows each knee a movement of three inches forward and the same distance backward—a total of six inches—independent of others. This is of great advantage in sawing tapering or crooked logs. At each end of arch or quadrant is placed set screws with jam nut, the adjustment of all knees into perfect line is accomplished by slacking the nut on one end of the arch, and screwing up the nut on the opposite end, thus drawing the arch over and carrying the knee either forward or back only so far as wanted. The knees are receded either by friction or springs as ordered. The tops of the base are fitted with thick steel bars, which are so bolted on that they may be reversed and the rear ends brought into service when the front ends become worn. The Knee is also faced with steel. The Pinion and Rack under the Knee is made from solid refined steel, with machine-milled cogs, securing accurate, and affording absolutely no lost motion.

Head Blocks	Open from Saws	Total Opening with Taper Movement	Price each Complete with Taper Movem't	Weight Each, Lbs.
No. 12	44 inches	47 inches	$150.00	1450
No. 13	48 inches	51 inches	180.00	1600
No. 14	52 inches	55 inches	210.00	1800
No. 15	56 inches	59 inches	240.00	2100



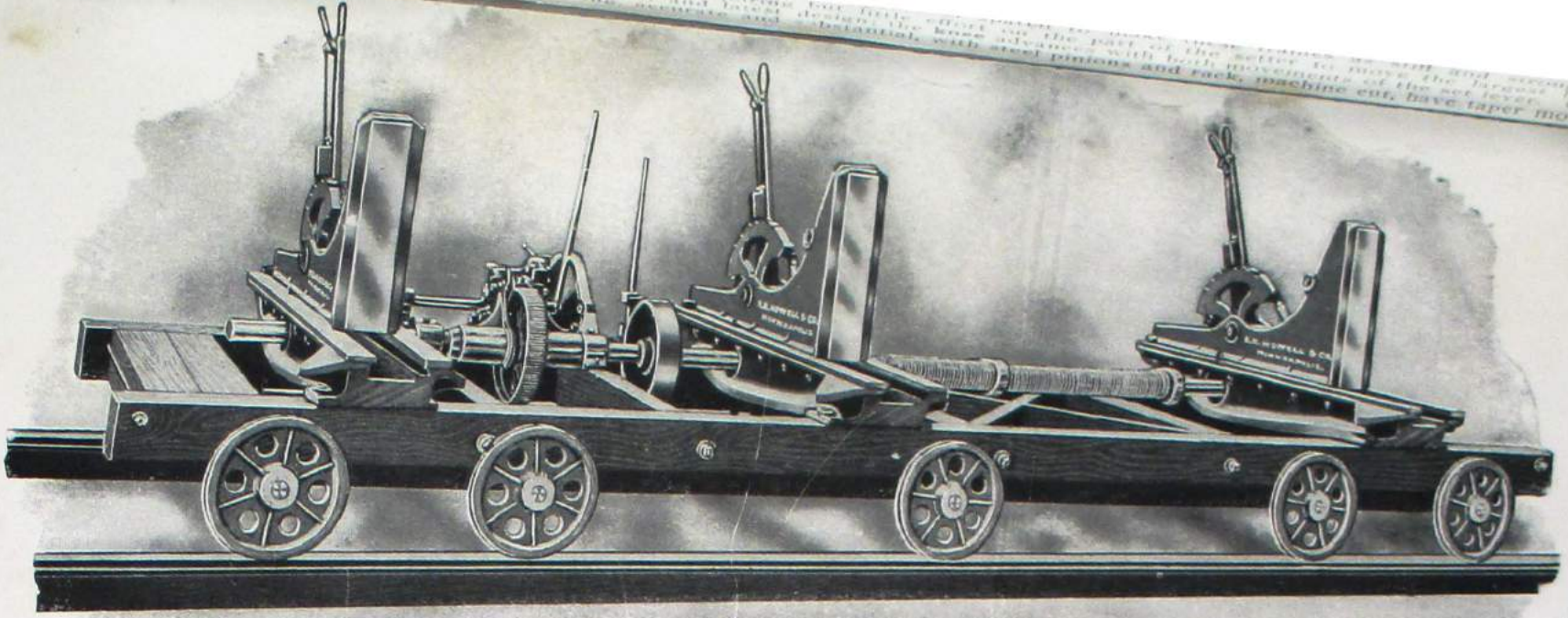
Head End of Carriage.

Showing head part of Carriage. The Set Works are double acting, setting on forward and return stroke; unequaled for accuracy, and adjustment by any other Set Works yet produced; the lumber cut has a uniform and exact thickness. The Head Blocks are of extra strength and accurately fitted; the blocks and knees are steel faced —no part subject to wear is left unprotected. The knees are receded or thrown back by coil springs which encircle the setting shaft and are instantly stopped at any desired point by a friction brake which is also shown in the cut, this method of receding having been found most satisfactory and far superior to any track friction receder now in use, the latter only being in service when the Carriage is in motion, while the former is quicker and can be used at any time with the Carriage either in motion or standing. In addition to this the springs by their constant tension at all times take up all wear that may occur and hold the knee up firm to the work, making them perfectly accurate until worn out. This friction brake also serves to ease heavy logs from falling violently and also relieves the pinions and racks from severe shocks, incident to the rolling of heavy logs against the knees. The double toothed dog is usually placed in the opening at center of knee, and auxiliary dogs for quarter sawing or holding large logs are readily applied to the outside of the knee. The axles and wheels on our Carriage are made extra heavy so as to carry without vibration or springing, the great weight and strains imposed upon them. The boxes are self-oiling and have extra long bearings. The caps are dovetailed on the box, so that it is impossible for them to become loosened and shake off while Carriage is in motion. Track we use is the standard sawmill track, one side flat and the other V shape, dressed perfectly true on a Planer.



Three Block Howell Carriage No. 30. Rear View—Right Hand.

The above cut shows our **No. 30 Three Block Carriage** with **Head Blocks** opening 48 inches from saw. Our aim has been to make this absolutely the best complete carriage of the most modern design and construction in every way that can be produced from entirely new patterns. It is designed for the heaviest and most severe service, and is so constructed as to work with the greatest accuracy. To make good lumber and a proper quantity of it daily requires a good **carriage**. The **frame** is made from 7½-inch by 7½-inch **setting Head Blocks.** No part of the sawmill is of more importance than the **Carriage.** yellow pine timbers, when desired, the front stick, end and steam feed girts are made of oak. The inside corners of the braced with heavy iron angle brackets. No expense is spared to make these frames as stiff and strong as is of great power, requiring but little effort on the part of the setter to move the largest logs, and latest design; the **knee** advances with both movements of the set lever. Our



Front View of Carriage.

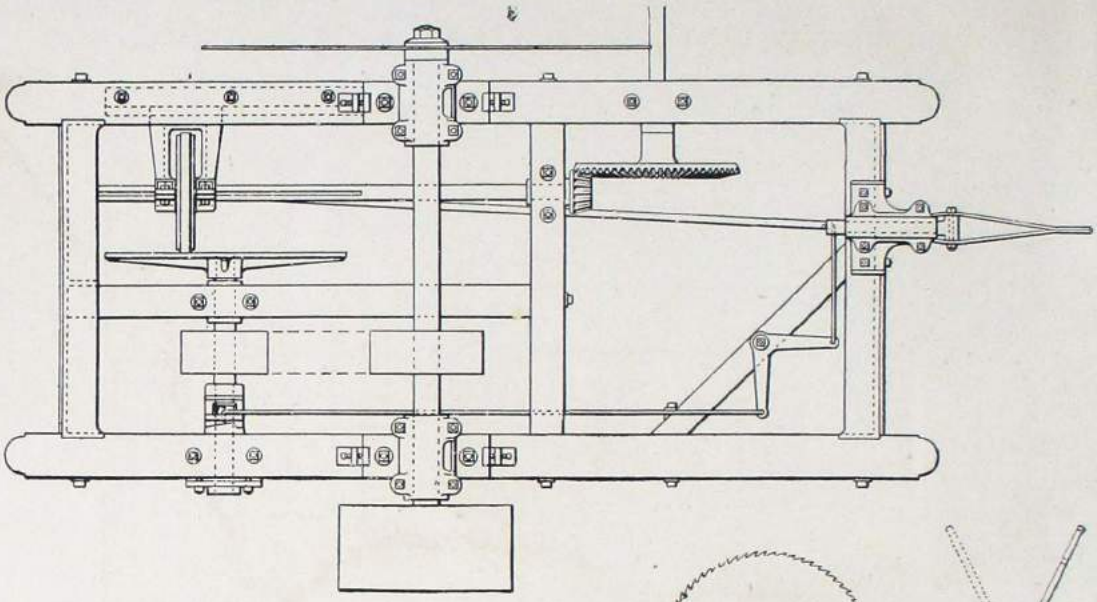
ment whereby any knee can be set forward or back out of line independently of the others 6 inches, for the purpose of straightening long timber or to accommodate taper logs, etc. All knees are **self-receding** and brought back as far **as wanted, by spring-receding device,** and controlled and stopped at any point required by a **Friction Brake.** It works as well when the carriage is in motion as at rest. Or, if desired, we will furnish with Friction Receder.

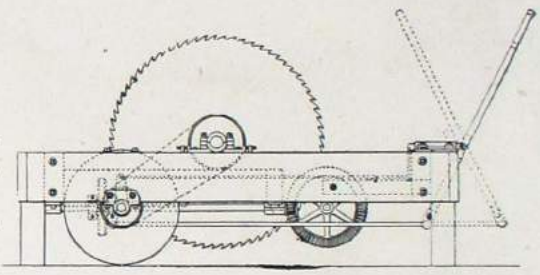
The **Set Shaft** is made of 2 15-16-inch refined steel. The **Truck wheels** of neat design, 16 inches in diameter, shrunk **solid** on 2¼-inch steel axles extending across the carriage, with heavy **self oiling boxes.** All **track** is planed to templet and to an accurate fit with the wheels, one rail being flat and the other V-shape as shown in cut.

A full detailed description of the **Set Works, Head Blocks, Taper Movement Receder** and **Trucks,** which form part of our No. 30 Carriage, will be found in the pages following.

Price, No. 30 Carriage, 18 ft., complete as above, with 3-44-inch Head Blocks, weight 9,000 pounds.....
Price, No. 30 Carriage, 18 ft., complete as above, with 3-48-inch Head Blocks, weight 10,000 pounds.....$1,100
Price, No. 30 Carriage, 18 ft., complete as above, with 3-52-inch Head Blocks, weight 11,500 pounds..... 1,200
Price, No. 30 Carriage, 18 ft., complete as above, with 3-56-inch Head Blocks, weight 13,000 pounds..... 1,350

OUR PATENTED VARIBLE FRICTION FEED.





The main points are:

First. All parts of friction and thrust anchorages are independent of the saw arbor and cannot spring or shift the arbor.

Second. The feed is controled by one lever only.

Third. The iron friction disk is held to or away from the paper friction wheel by a simple end-thrust cam and self-oiling collar with take up for wear.

Fourth. All side-thrust on the shaft passing through the paper friction wheel is entirely avoided by wheel being journaled in an iron slide bracket.

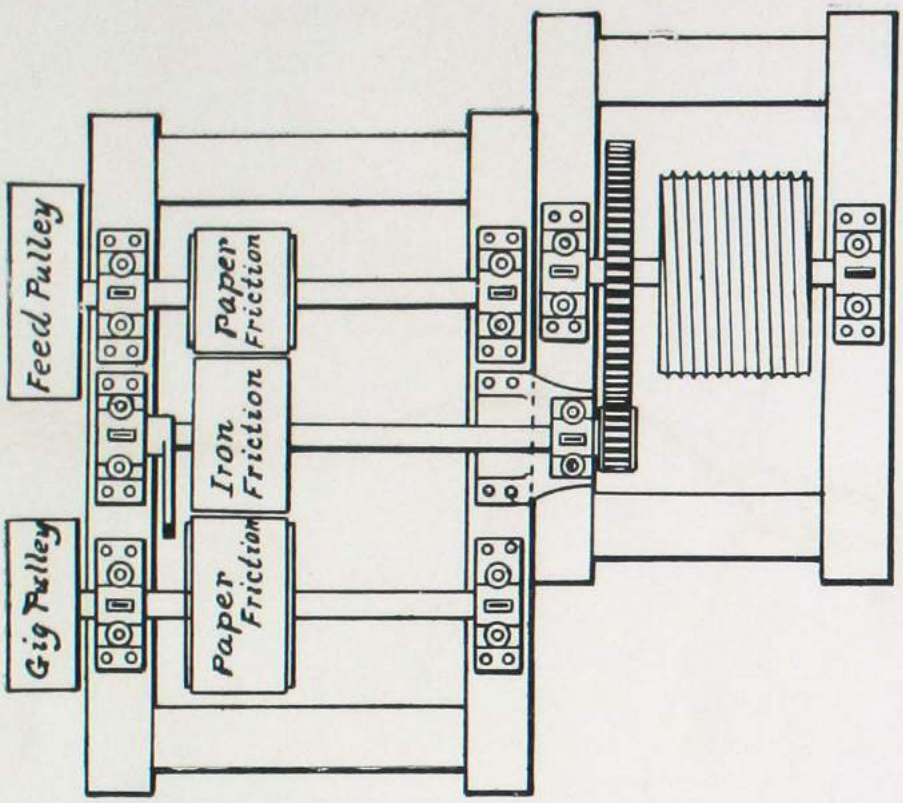
Fifth. Friction pulls the same at all points of contact.

This is, without exception, the simplest and very best device of its kind yet invented, dispenses entirely with all feed belts, and adds greatly to the capacity of the mill, at least **20 to 30 per cent,** thereby more than doubling the profits, and with very much less wear and strain on the machinery. It admits of an engine being worked to its fullest capacity on the smallest timber and prevents it being unduly strained on the largest timber. It can be changed instantly from the least to the greatest feed, and vice versa, or the change may be gradual. The motion of the carriage carrying the log is at all times under perfect control of the sawyer, and he can feed the log against the saw fast or slow, and if the log has a knot or large butt, he can have the advantage of a fast feed until this point is reached, when he can instantly reduce the feed the necessary amount, and after the saw passes this the feed can be quickly increased. This gives the sawyer every advantage possible in cutting his logs; also by the use of this feed there is greater safety to the machinery and saw. The little conveniences about a saw mill, by which time and labor are economized, exert a large influence upon its output and profits.

Beyond a doubt this is the most effective variable feed now on the market, except the independent steam feed, and for light or medium size mills it is fully as effectual as the steam feed. We urge all who purchase a mill to order our Patented Variable Friction Feed. It will soon save enough to pay for itself. This is charged extra, and is not included in our regular price of mill. When ordered on our Mills in place of Belt and Friction Feed add $30.00 to price of Mill.

Price Variable Feed.....$60.00

Independent Friction Rope Feed.



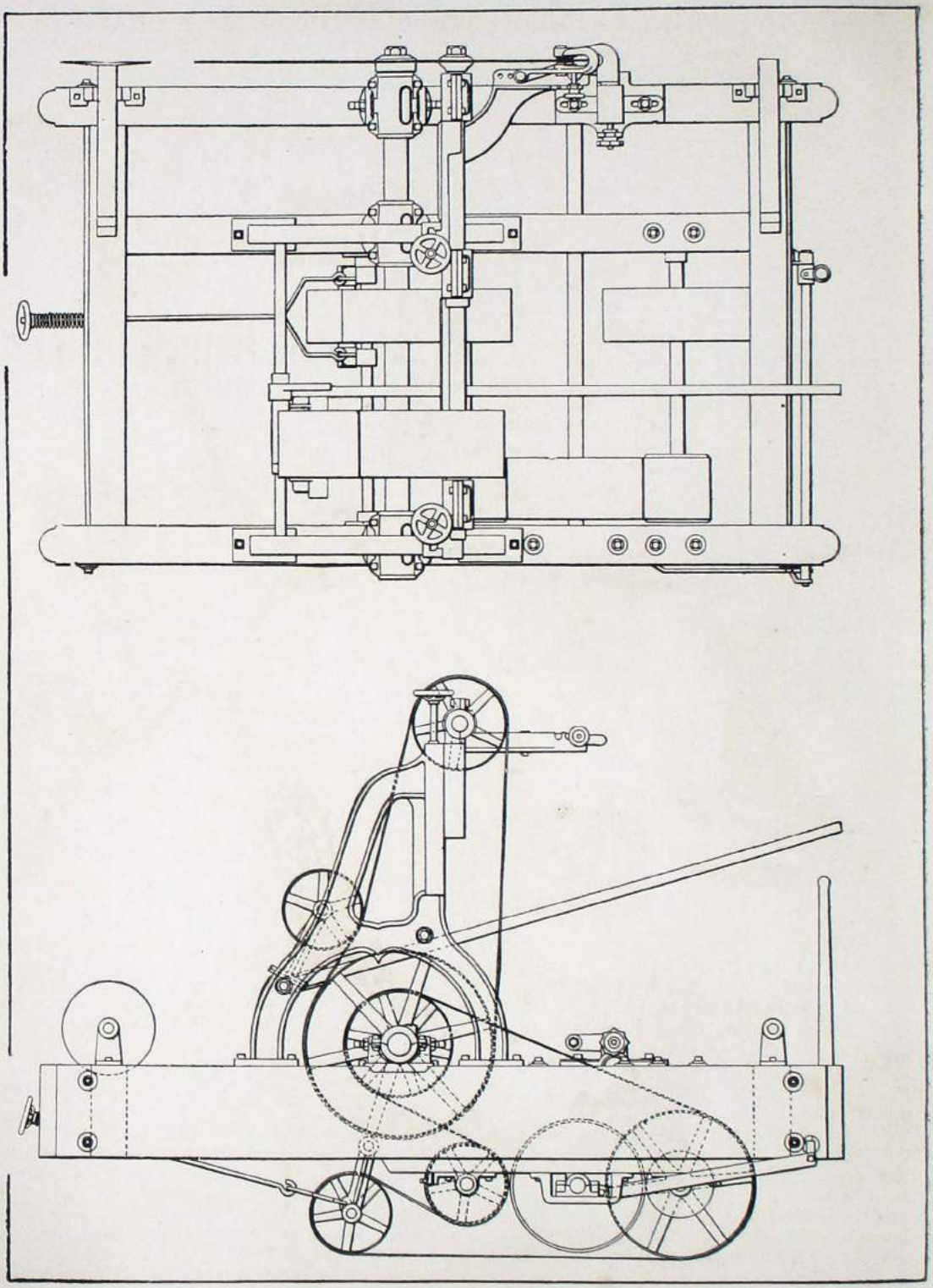
The Independent Feed, illustrated in our cut, is of a form that has been in use for years in mills cutting all classes of timber. It is built in four sizes, and for either wire or manila rope or rack and pinion. In many cases friction feeds are to be preferred to any other tpye, as they require less boiler capacity and are not affected by cold. By the use of the gearing the size and speed of the paper frictions is reduced and a reduction in the size of the iron friction is also made, thus saving a vast amount of wear and expense. All users of the old style of friction feed works will appreciate any new arrangement which saves the burning of the paper frictions and the breaking of the iron one, as such accidents have always been a source of constant annoyance and delay.

Ratio of gearing, four to one; ratio of gig and feed speeds, four to one.

As regularly built, we furnish one idle rope sheave for either manila or wire rope, the rope drum on machine being used at the opposite end of the span. Extra sheaves will be furnished at an additional price, and the proportions of gearing and pulleys are subject to reasonable changes.

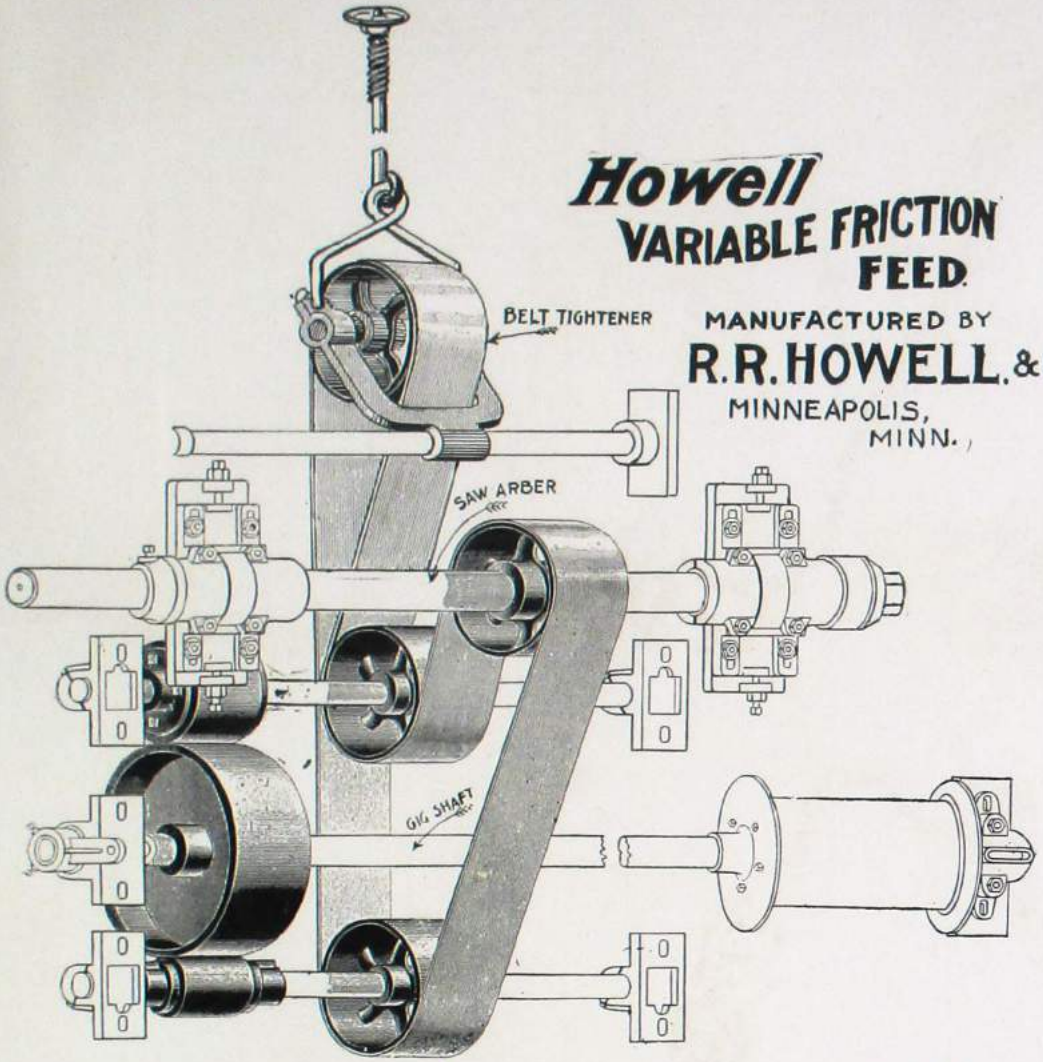
SPECIFICATIONS AND PRICES.

No. 1. Frictions 9-in. face, for mills cutting 25,000 feet per day.....$200.00
No. 2. Frictions 12-in. face, for mills cutting 35,000 feet per day..... 250.00
No. 3. Frictions 14-in. face, for mills cutting 50,000 feet per day..... 300.00
No. 4. Frictions 16-in. face, for mills cutting 60,000 feet per day..... 350.00



The above cut shows our No. 6 Saw Mill with the Howell Friction Variable Feed. Without any doubt this is the most powerful and quick in action of any yet invented. This is fully as good a feed for a medium sized sawmill as a steam feed is for a large plant, and increases the capacity of the mill fully one-third.

THE HOWELL VARIABLE FRICTION FEED



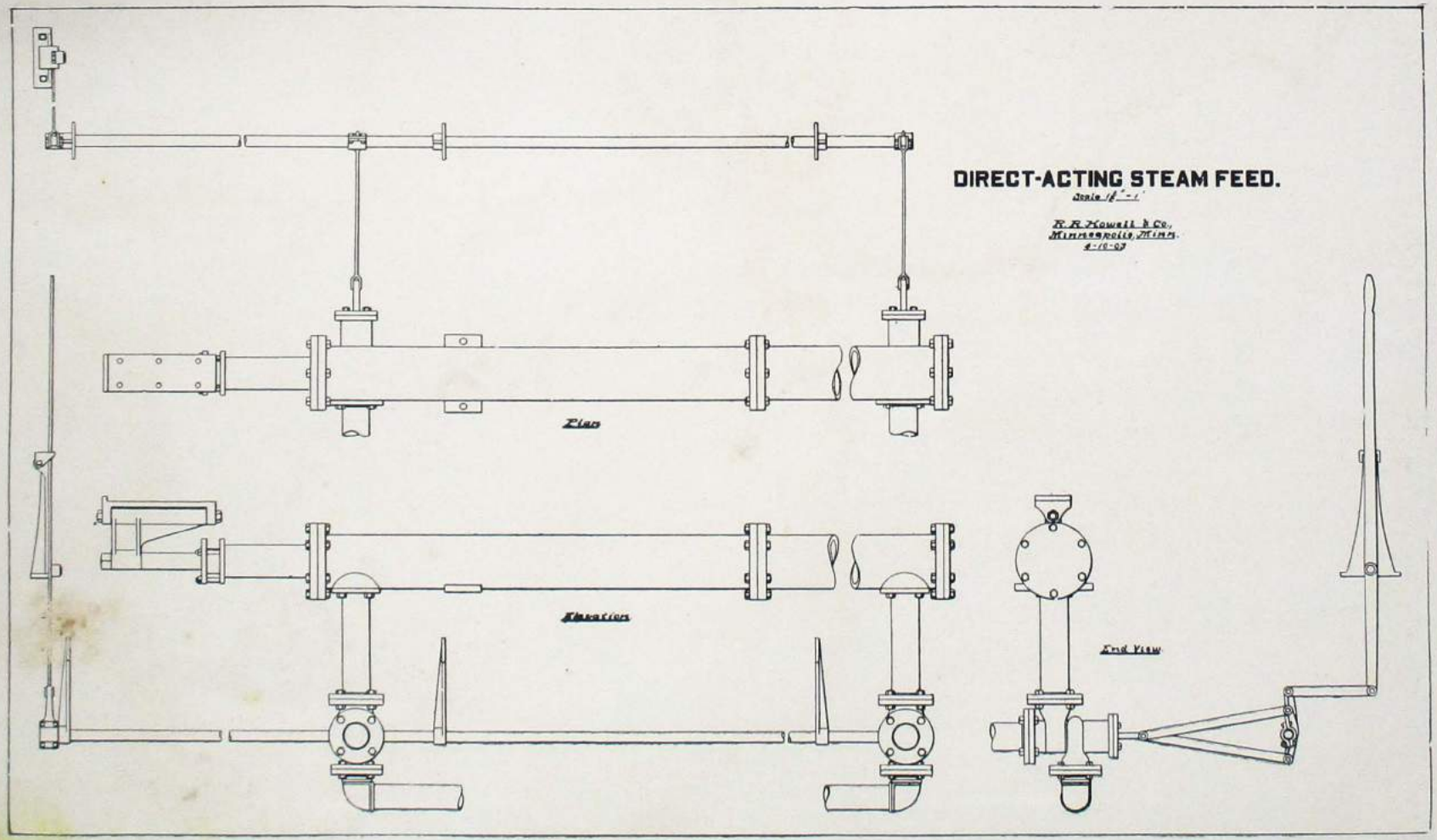
The above cut represents our Improved Friction and Belt Feed, which is the best possible Variable Feed used in connection with Carriage, Rack and Pinion, or Drum and Rope, and for mills having from 10 to 50 horse power capacity, makes a lively mill and one of maximum capacity for the power applied. The sawyer has complete control over the mill and can slow up through knotty timber or cut rapidly through clear logs, and enables the sawyer to regulate the feed of log into the saw absolutely and immediately, permitting the saw to run at a uniform speed, which is requisite in order to cut good lumber. It also enables the sawyer to vary speed of return carriage to suit requirements.

The superiority of this Feed over patent or cheap steam feeds must be conceded for the following reasons: Its use does not require increased boiler capacity; no lost time changing feeds or lacing short feed belts, or expenditure of money to repair or replace broken or worn out gears or leaky steam fittings. The feed is strong and well made and very simple in operation, and sufficiently powerful to handle heavy logs. This Feed for medium sized mills, is equal to steam feed for large mills; is so powerful that the carriage can be immediately returned at the highest rate of feed.

Particular attention is called to our method of keeping the Feed Belt in proper tension with our swinging Adjustable Belt Tightener, a very valuable feature.

The Feed Work, as below priced, consists of all parts shown in the above cut, with belt, except the saw arbor with its boxes and the Drum on end of gig shaft, and includes in addition, lever, lever socket, and bracket.

No. 3, suited for our No. 3 Saw Mill, has 6-inch face, Frictions..... **$75.00**
No. 4, suited for our No. 4 Saw Mill, has 8-inch face, Frictions..... 85.00
No. 5, suited for our No. 5 Saw Mill, has 10-inch face, Frictions..... 100.00
No. 6, suited for our No. 6 Saw Mill, has 12-inch face, Frictions..... 120.00



The above cut shows a double valve machine and is too well known to need much of an explanation. The cylinder is bolted to the floor timbers of the mill, between the tracks, and is set just low enough to permit the carriage to pass freely over it. The valve is operated by the sawyer, by means of a lever and suitable connections leading to the valve. The lever and valve are so adjusted that when the lever stands plumb, or in an upright position, then the valve is on its center, the carriage will be at rest, and all water will run freely out of the cylinder, should there be any. Where great power quickness is desired, a steam feed fitted with end valves cannot be beaten.

Price List of Direct-Acting Steam Feed.

Length of Cylinders.	Price of 7⅛-in.	Price of 8-in.	Price of 8½-in.	Price of 9-in.	Price of 9½-in.	Price of 10-in.	Price of 12-in.
18 ft.	$300 00	$330 00	$345 00	$360 00	$375 00	$390 00	$450 00
20 ft.	306 00	336 60	351 90	367 20	382 50	397 80	459 00
22 ft.	312 00	343 20	358 80	374 40	390 00	405 60	468 00
24 ft.	318 00	349 80	365 70	381 60	397 50	413 40	477 00
26 ft.	324 00	356 40	372 60	388 80	405 00	421 20	486 00
28 ft.	330 00	363 00	379 50	396 00	412 50	429 00	495 00
30 ft.	336 00	369 60	386 40	403 20	420 00	436 80	504 00
32 ft.	342 00	376 20	393 30	410 40	427 50	444 60	513 00
34 ft.	348 00	382 80	400 20	417 60	435 00	452 40	522 00
36 ft.	354 00	389 40	407 10	424 80	442 50	460 20	531 00
38 ft.	360 00	396 00	414 00	432 00	450 00	468 00	540 00
40 ft.	366 00	402 60	420 90	439 20	457 50	475 80	549 00
42 ft.	372 00	409 20	427 80	446 40	465 00	483 60	558 00
44 ft.	378 00	415 80	437 70	453 60	472 50	491 40	567 00
46 ft.	384 00	422 40	441 60	460 80	480 00	499 20	576 00
48 ft.	390 00	429 00	448 50	468 00	487 50	507 00	585 00
50 ft.	393 00	432 30	451 95	471 60	491 25	510 90	589 50
52 ft.	396 00	435 60	455 40	475 20	495 00	514 80	594 00
54 ft.	399 00	438 90	458 85	478 80	498 75	518 70	598 50
56 ft.	402 00	442 20	462 30	482 40	502 50	522 60	603 00
58 ft.	405 00	445 50	465 75	486 00	506 25	526 50	607 50
60 ft.	408 00	448 80	469 20	489 60	510 00	530 40	612 00
62 ft.	411 00	452 10	472 65	493 20	513 75	534 30	616 50
64 ft.	414 00	455 40	476 10	496 80	517 50	538 20	621 00
66 ft.	417 00	458 70	479 55	500 40	521 75	542 10	625 50
68 ft.	420 00	462 00	483 00	504 00	525 00	546 00	630 00
70 ft.	423 00	465 30	486 45	507 60	528 75	549 90	634 50
72 ft.	426 00	468 60	489 90	511 20	532 50	553 80	639 00
74 ft.	429 00	471 90	493 35	514 80	536 25	557 70	643 50
76 ft.	432 00	475 20	496 80	518 40	540 00	561 60	648 00
78 ft.	435 00	478 50	500 25	522 00	543 75	565 50	652 50
80 ft.	438 00	481 80	503 70	525 60	547 50	569 40	657 00

Each feed is furnished complete with bolts, two valves with port pipes, rockshafts with arms and connections, sawyer's lever and bracket, also carrying sheaves.

Steam piping and the small pipe to connect valve to sawyer's lever not furnished.

All our steam feeds are built with end valves as shown on opposite page. This gives a steam delivery at short range directly into the cylinder, insuring a prompt action of the carriage, besides saving very considerable steam, otherwise lost by exhaustion from the long port pipes required by the single central valve as furnished by many other manufacturers. This is important and of great benefit.

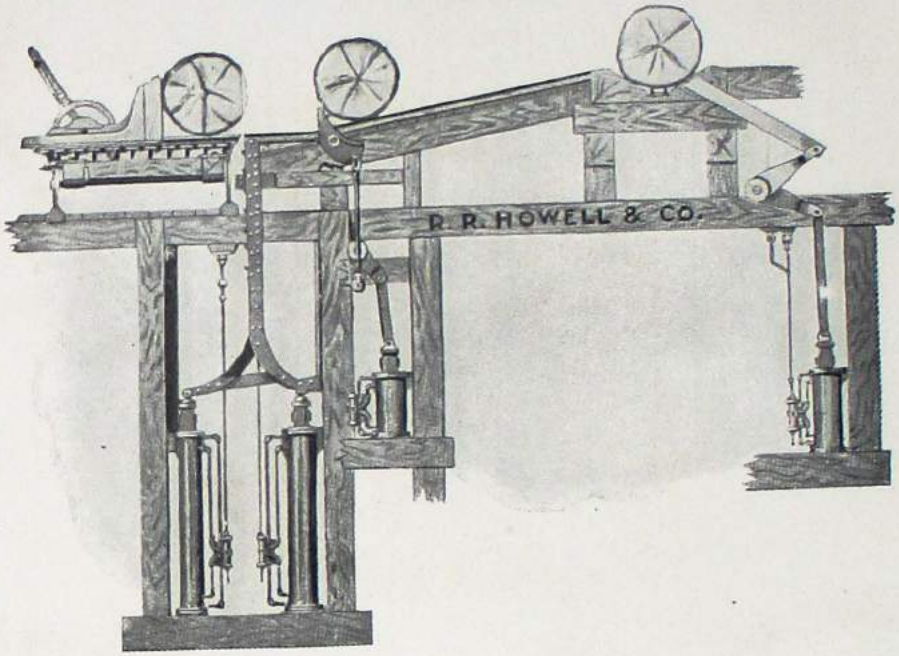
TO ASCERTAIN LENGTH OF CYLINDER REQUIRED.

To the length of the longest log to be sawed, add 10 feet for band mill, and 15 feet for circular mill, and 2 feet more for clearance. The result is the length of cylinder required.

PRICE OF EXTRA CYLINDERS, VALVES AND PISTON RODS.

Size	7½ in.	8 in.	8½ in.	9 in.	9½ in.	10 in.	12 in.
Cut-off Valve, each	$50.00	$50.00	$60.00	$60.00	$60.00	$60.00	$75.00
Extra lengths of Cylinders (per ft.)	6.00	6.50	7.00	7.50	8.00	8.50	9.00
Piston Rods (per ft.)	3.00	3.00	4.00	4.00	4.00	4.00	5.00

Log Deck Machinery.



The above cut represents a modern, up-to-date, Single Log Way. The machinery represented is Steam Nigger, Log Stop and Center Deck or Kicker.

Log Stop and Loader.

This machine has proved to be the best in the market for holding the logs on the skids when not wanted, with no possible chance of their rolling down and endangering the carriage to accident, and for instantly placing them on the carriage when wanted.

The loading of a log on the carriage is done instantly, the log placed where wanted on the carriage, to be fastened by the dogs or turned by the steam nigger. An indispensable machine in the equipment of a first class mill.

Log stop and loader is made with two, three or four arms, spaced to suit log deck and cylinder, 8 or 10 inches diameter, according to size of logs.

Double Cylinder Steam Nigger.

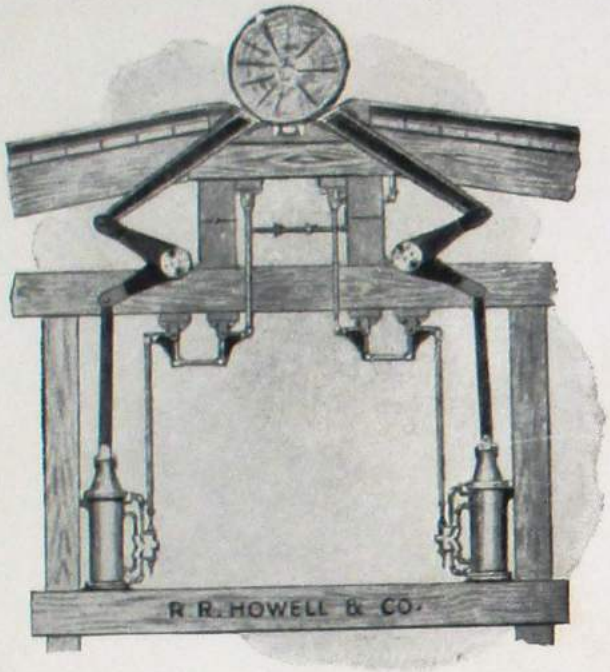
This machine is a great labor-saving device for turning logs on sawmill carriages.

This machine is too well known to require much of a description. It is not only a log turner, but a log loader, a hand spiker and a straightener of long timber. It will take the log from the log deck, load it on the carriage, straighten it if crooked, and press it against the knees for dogging; then, after a slab is taken off, to turn the log as many times and in such manner as may be necessary to get it in shape for profitable cutting. All operations are controlled by a single lever in the hands of the sawyer, and are performed with a celerity and perfection not approached by any other device ever designed for the purpose.

These machines are manufactured in various sizes adapted to all sizes of timber.

In ordering or writing for price, state class of timber, diameter and length of logs to be handled.

Steam Center-Deck Log Kicker.



This cut represents our appliance for the lifting or throwing of logs from haul-up chain on to log-deck. The machine can be used either singly, as shown in cut of complete deck on opposite page, or double, as shown in this cut. The machine can be operated by a lever or by means of foot tread.

This machine is simple, compact and complete, and is giving the very best of satisfaction and makes a valuable addition to the equipment of a sawmill. They are manufactured in various sizes, other than that listed below, and made with any number of arms to suit conditions.

When ordering a machine or asking for quotations, please give approximate diameter of logs, also shortest and longest logs to be handled, also advise whether for double or single deck.

If for single deck, give hand of carriage.

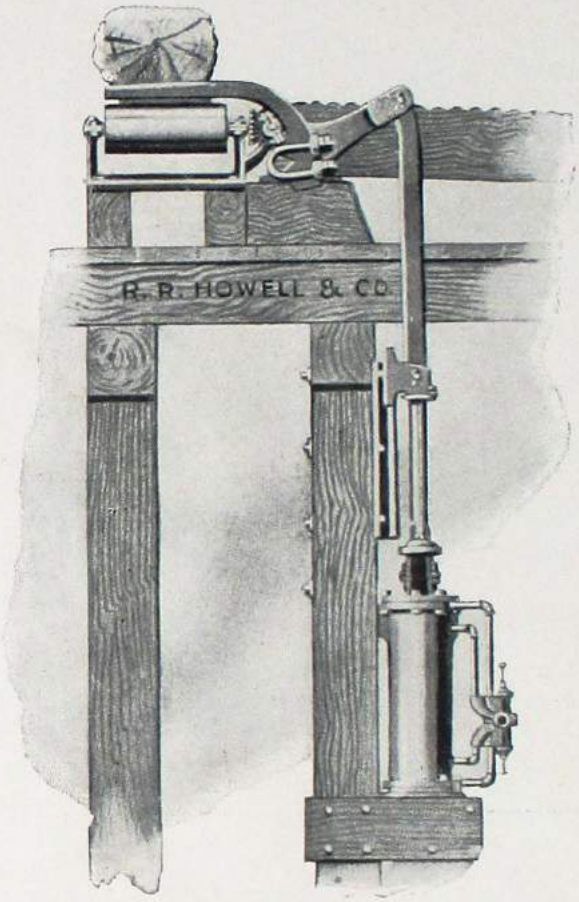
If for double deck, and long logs are cut one side and short the other, give hand of carriage short logs are cut on, and, as each side is independent, the one handling the longer and heavier logs can be made longer, heavier and stronger.

When used for single deck it can be set to automatically throw the logs out by end of log striking bumper.

Standard Size.

No.	No. of Arms	Arms Apart	Diameter of Cylinder	Length of Cylinder	Weight, Single or one side	Price, Single or one side
1.	2	8ft.	10	30	2,400 lbs.	$200.00
2.	3	8ft. 7in.	10	30	3,300 lbs.	240.00
3.	2	8ft.	12	36	2,800 lbs.	230.00
4.	3	8ft. 7in.	12	36	3,600 lbs.	250.00
5.	2	8ft.	14	36	3,500 lbs.	280.00
6.	3	8ft. 7in.	14	36	4,200 lbs.	300.00
7.	2	8ft.	16	36	4,500 lbs.	360.00
8.	3	8ft. 7in.	16	36	5,200 lbs.	390.00

Steam Cant Trip.



This machine is used to move cants, timber or lumber, from live rollers to gangs, band resaw mills or elsewhere. They are the best and cheapest machines that can be put into a mill for this purpose and are giving splendid satisfaction.

The timber is discharged upon transfer chains, as shown, or upon skid rollers.

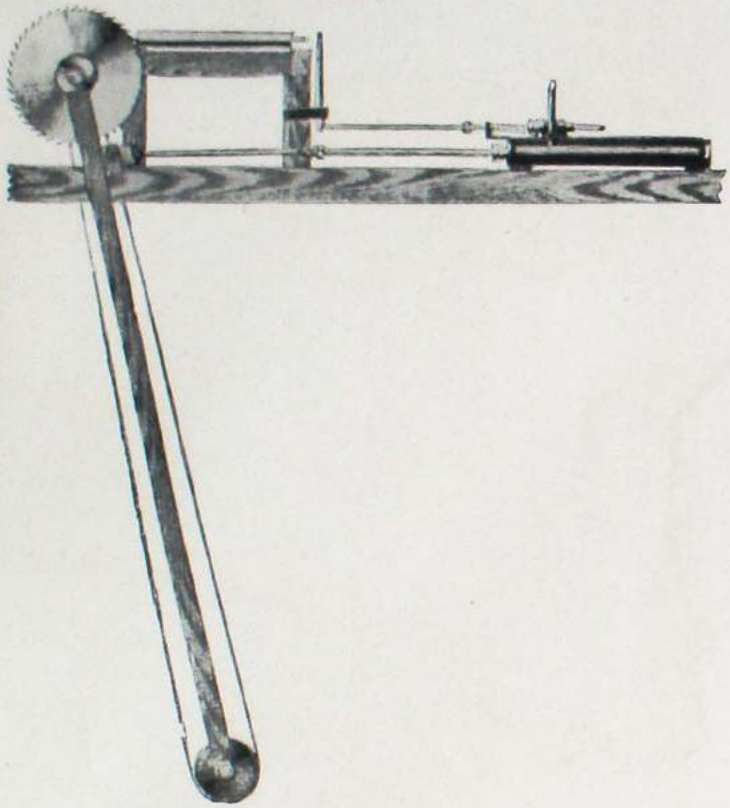
These machines are made in different sizes, and with two or more arms, according to length and size of timber to be moved.

Prices and Sizes.

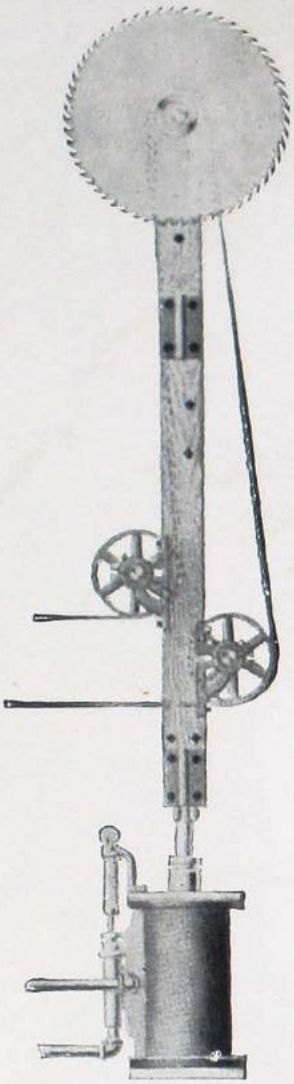
No.	No. of Arms	Length of Shaft	Diam. of Cyl.	Weight	Price
1.	2	9	8	1,500 lbs.	$210.00
2.	3	16	8	2,000 lbs.	235.00
3.	4	24	8	2,400 lbs.	275.00
4.	2	9	10	1,800 lbs.	230.00
5.	3	16	10	2,400 lbs.	260.00
6.	4	24	10	2,700 lbs.	300.00

Steam Cut-off Saw.

Swing Style



Jump Style



The above cuts represent our Jump, and also Swing Style Steam Cut-Off Saws, as they are set up in the mill. This machine is the best and quickest for cutting slabs into short lengths or for squaring the ends of timbers, and for stave or shingle mills. Like the "Steam Nigger" and the "Steam Feed," they are only to be known to be appreciated. The valve is operated by a foot treadle, and the saw is driven by a belt from the line shaft.

The machine is under perfect control of the operator, and can be stopped at any point of the stroke, and the speed can be controlled perfectly.

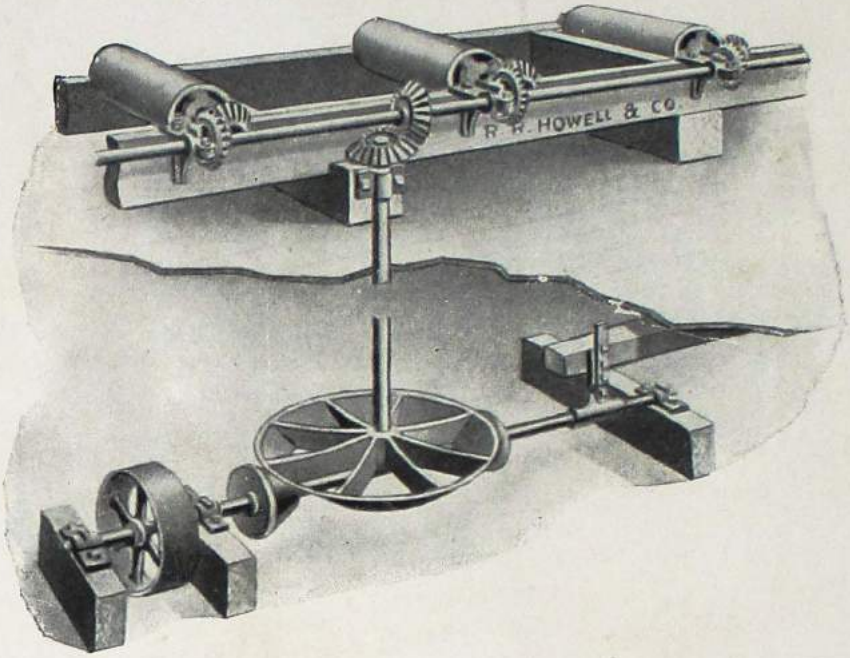
In ordering, please state whether arbor is to have right or left hand thread, and the stroke desired. Always rotate the saw away from the operator.

Prices of Jump and Swing Saw are the same, and include the iron work only—saw, belt and bolts are extra in all cases.

Prices and Sizes.

No.	Diam of Cyl.	Length of Cyl.	Size of Arbor.	Size of Pulley.	ForSaw	Weight.	Price.
1.	5	10 to 12	1 11-16	7x 8	20 to 30	700	$90.00
2.	6	12 to 15	1 15-16	8x 9	24 to 36	800	110.00
3.	8	14 to 18	2 3-16	10x12	36 to 48	1,000	150.00
4.	8	18 to 24	2 7-16	12x14	48 to 60	1,200	180.00

Live Roll Drive.



When it is desired to have stock pass under the rolls to the slasher, the sills or frame is made of two 10-inch steel channels, which are put together firmly and strongly trussed to prevent sagging of the rolls. Unless otherwise ordered, we generally speed the rolls so that the lumber will be carried at 220 feet per minute. In ordering, state how many rolls wanted, spacing from center to center, diameter, length, reversible or single drive, and hand of mill.

A complete set consists of ten (10) rolls, 45 feet shafting, eleven (11) pair gears, eleven (11) double box and bracket combined, single or double friction driving gear with shifting device, with three boxes and one pulley.

Prices and Sizes.

Set No.	Size of Roll inches	Weight Per Set	Price Per Set	Extra Roll and all attachments	Extra Roll only
1.	8x18	3,000	$180.00	$17.00	$8.00
2.	8x24	3,300	200.00	19.00	9.00
3.	8x28	3,600	220.00	20.00	10.00
4.	10x20	3,900	235.00	21.00	13.00
5.	10x24	4,300	260.00	23.00	15.00
6.	10x30	5,000	300.00	27.00	20.00
7.	12x24	5,100	310.00	29.00	18.00
8.	12x30	6,000	360.00	33.00	22.00
9.	12x36	6,700	400.00	37.00	28.00

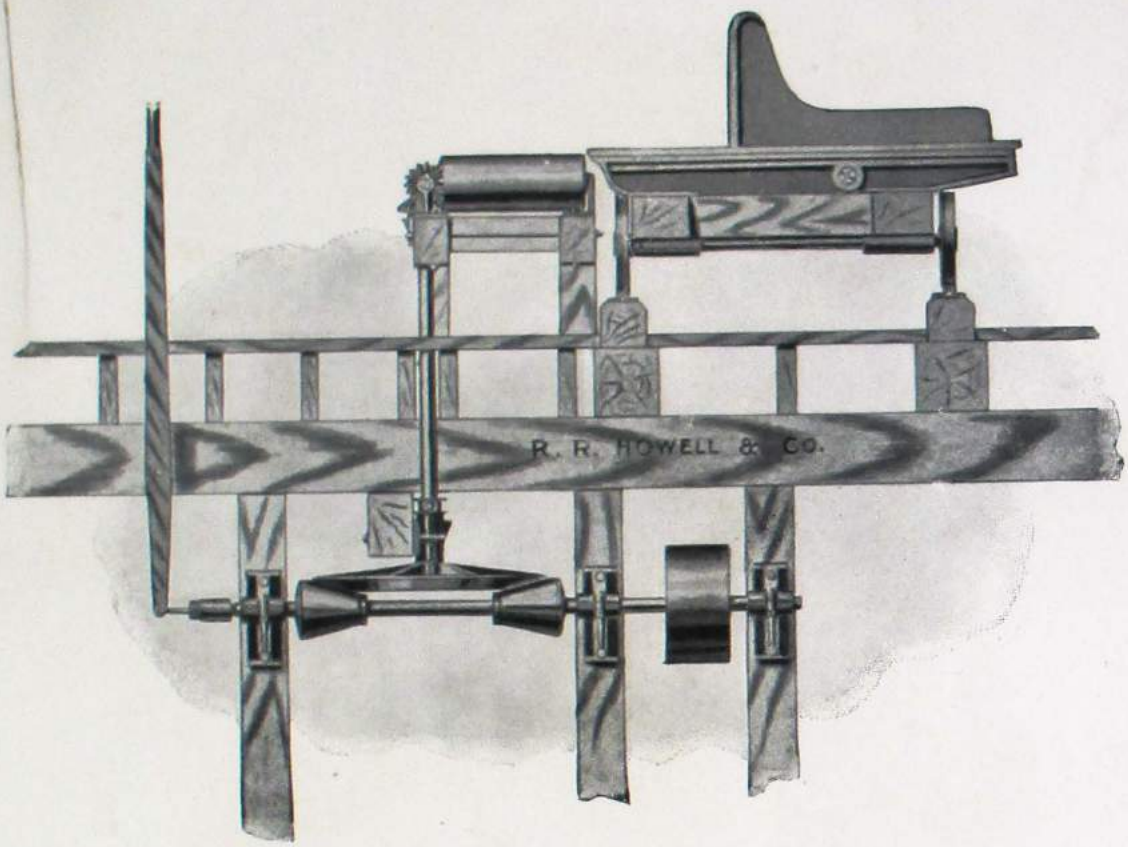
Price, set, single drive roll, 10 per cent less than reversible.

For a set of ten hard wood live rollers, take two-thirds the price of same size of smooth iron rollers.

If cast iron screw rolls are wanted, add 10 per cent; steel pipe rolls, same price as smooth cast iron rolls.

Hardwood rollers, only, half the price of iron.

Live Rolls, with Reversible Drive Rig.



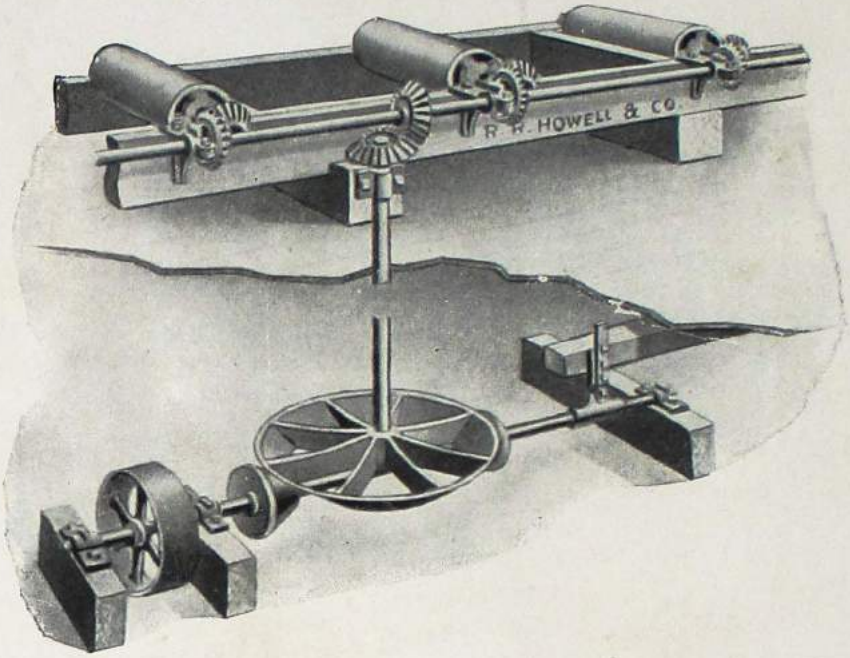
Above we show our live roll drive rigs complet as erected in the mill. This arrangement shows a good way to construct the woodwork to support the rollers along the mill floor, as well as the friction drive which operates them.

This drive is made in sizes adapted to run any number of rollers. The driving cones are composed of best paper board. The driven friction pulley is polished iron. They can be run in either direction or stopped at the will of the operator.

These rollers are arranged in line along the floor back of a band mill or circular, and receive the lumber as it falls therefrom. They are usually placed four feet apart from center to center. They save labor, and lumber is moved rapidly away.

Cut on opposite page shows a section of reversible Live Rolls, and the best and most popular rig for driving them, also the manner of erecting them in the mill, a very complete and substantial rig for quickly and easily moving the slabs and lumber, and is very essential in mills handling any quantity of lumber. They are made in sizes to suit the work to be done, and with single frictions one way drive, or reversible, as shown in cut. The rolls are made of cast iron, any diameter and length desired. They are turned true on the face, and are prepared to furnish rolls with internal box on saw line side the full distance of the carriage travel back of a band saw or circular. This permits the noses of the head blocks to pass along close to the ends of the rollers. The operating lever is extended up through the floor to the side of the operator, and he may start stop or reverse the rolls at pleasure. The single or one way drive is the same as the reversible, except that only one small bevel friction is supplied instead of two.

Live Roll Drive.



When it is desired to have stock pass under the rolls to the slasher, the sills or frame is made of two 10-inch steel channels, which are put together firmly and strongly trussed to prevent sagging of the rolls. Unless otherwise ordered, we generally speed the rolls so that the lumber will be carried at 220 feet per minute. In ordering, state how many rolls wanted, spacing from center to center, diameter, length, reversible or single drive, and hand of mill.

A complete set consists of ten (10) rolls, 45 feet shafting, eleven (11) pair gears, eleven (11) double box and bracket combined, single or double friction driving gear with shifting device, with three boxes and one pulley.

Prices and Sizes.

Set No.	Size of Roll inches	Weight Per Set	Price Per Set	Extra Roll and all attachments	Extra Roll only
1.	8x18	3,000	$180.00	$17.00	$8.00
2.	8x24	3,300	200.00	19.00	9.00
3.	8x28	3,600	220.00	20.00	10.00
4.	10x20	3,900	235.00	21.00	13.00
5.	10x24	4,300	260.00	23.00	15.00
6.	10x30	5,000	300.00	27.00	20.00
7.	12x24	5,100	310.00	29.00	18.00
8.	12x30	6,000	360.00	33.00	22.00
9.	12x36	6,700	400.00	37.00	28.00

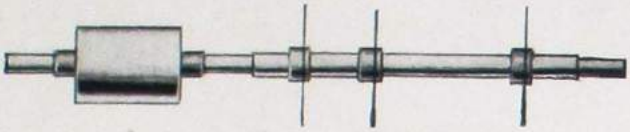
Price, set, single drive roll, 10 per cent less than reversible.

For a set of ten hard wood live rollers, take two-thirds the price of same size of smooth iron rollers.

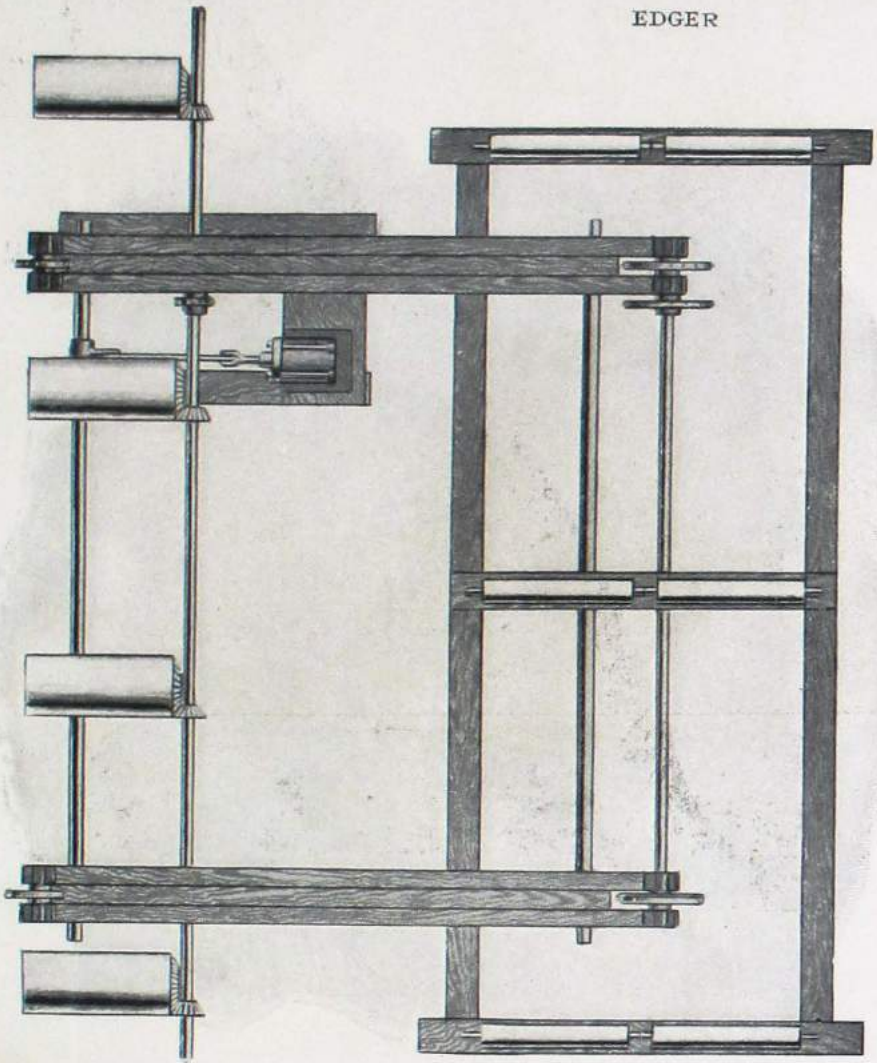
If cast iron screw rolls are wanted, add 10 per cent; steel pipe rolls, same price as smooth cast iron rolls.

Hardwood rollers, only, half the price of iron.

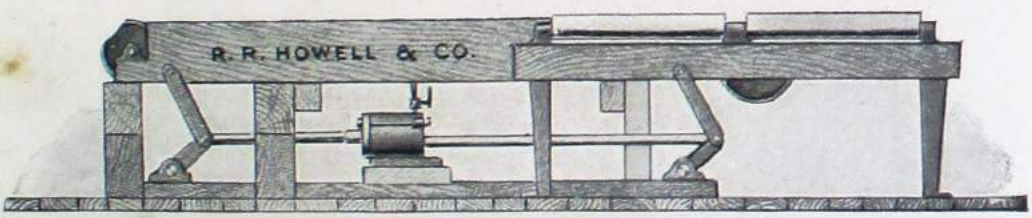
Automatic Skid Transfer.



EDGER



PLAN VIEW FROM FRONT END OF EDGER.

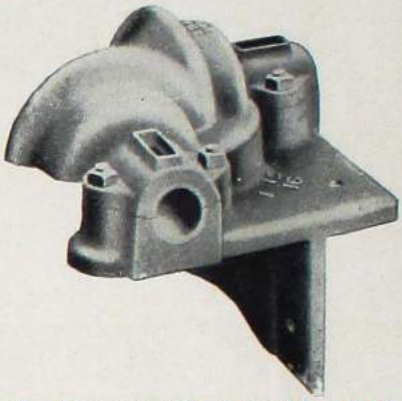


FRONT VIEW

Cast Iron, Steel and Wood Rolls.

LIVE ROLLLS are a labor-saving and money-making means of conveying lumber and no sawmill is complete without them.

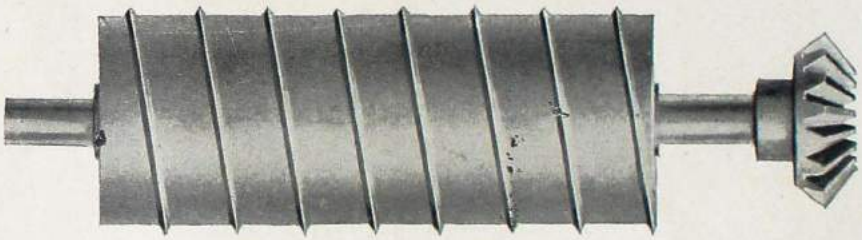
Live Cast Iron Rolls



Yoke Box with Hood for Live Roll

We make our live rolls of any diameter and length desired. The standard size is 10 or 12-inch by 24-inch. They are fitted with cast iron or steel gears or chain wheel drive, with case and angle boxes, as desired.

The cut at the right hand shows method of connecting the line shaft along the ends of live rollers; also hood to prevent accidents to operators. In connection with this at other end of roll we use a flat bottom box.



LIVE CAST IRON SCREW ROLLS.

We build the screw rolls with either right or left hand screws as desired. These rolls make a very effective as well as cheap method of removing lumber from the rolls on to skids.

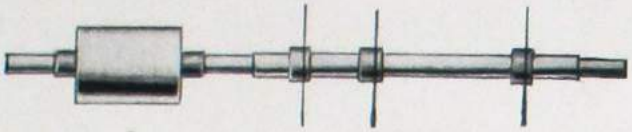
STEEL PIPE ROLLS—PLAIN.

Made of steel pipe with iron heads pressed in. Light, strong and perfect running, generally used as dead rolls.

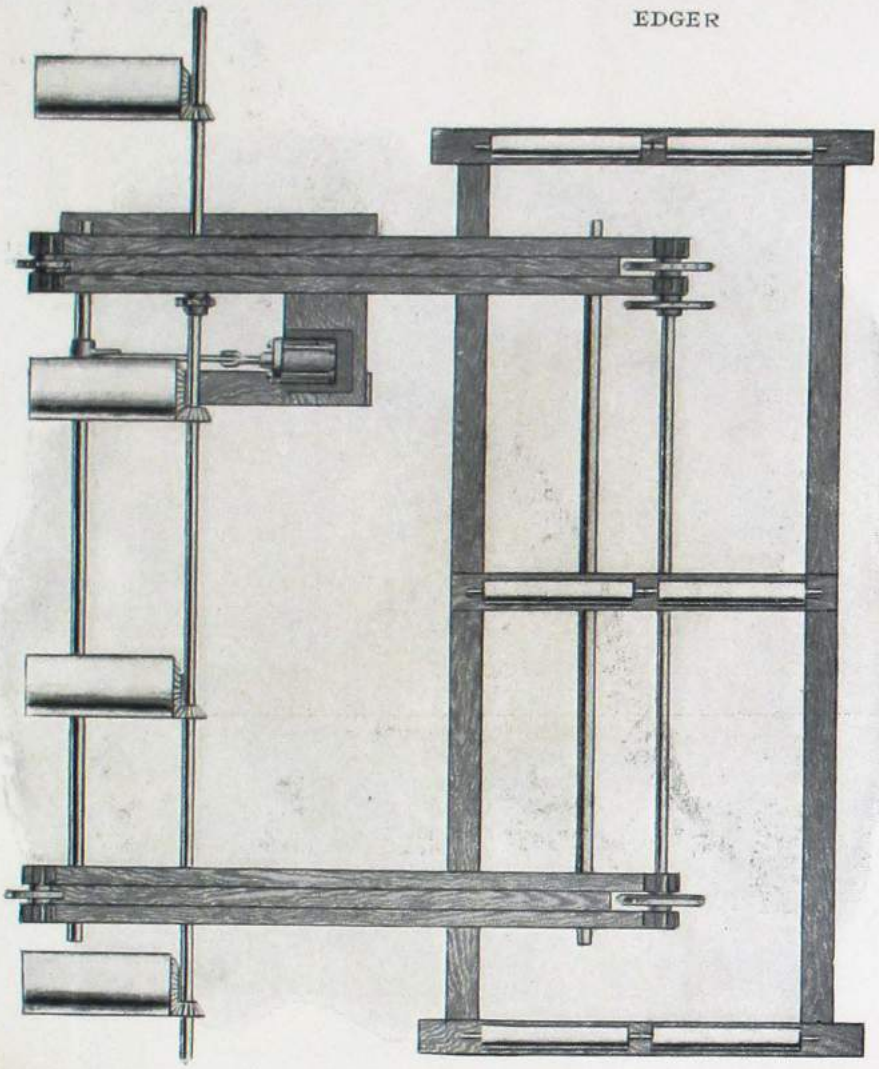
WOOD ROLLS—PLAIN.

The roll is of hard wood with a steel shaft extending through same and has collars to prevent splitting. They are both durable and cheap.

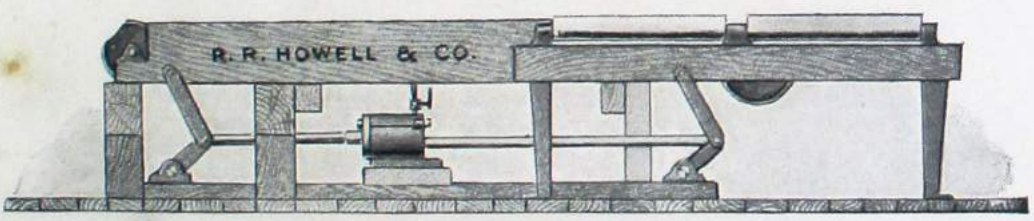
Automatic Skid Transfer.



EDGER

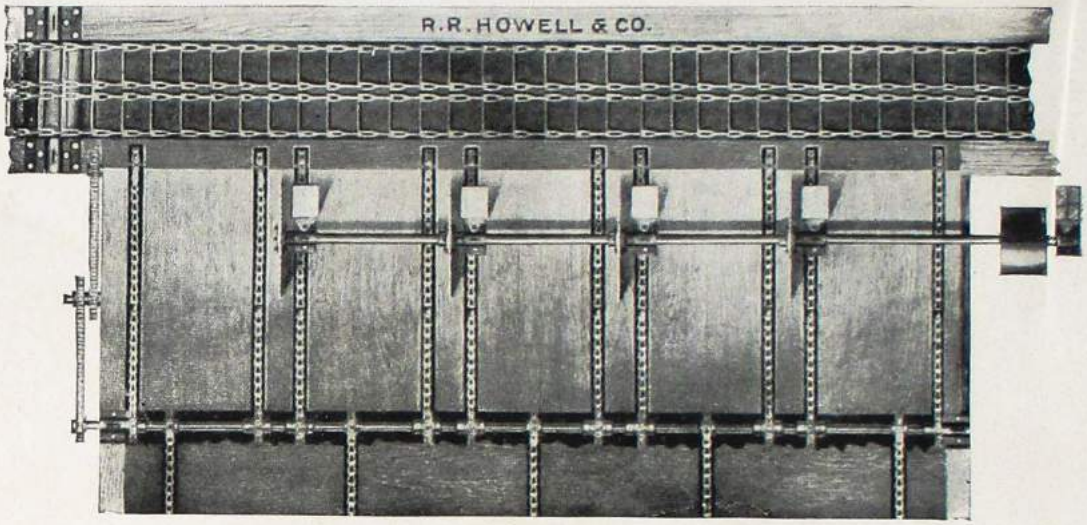


PLAN VIEW FROM FRONT END OF EDGER.

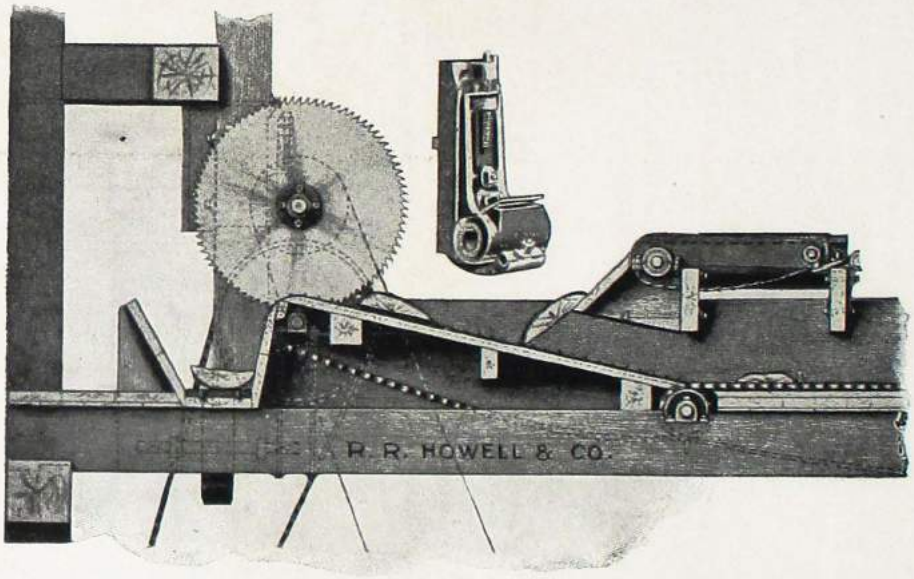


FRONT VIEW

Overhead Slab Slasher.



TOP VIEW



END VIEW

The above cuts give two views of our Overhead Slab Slasher as adapted to a double mill, showing the usual construction of table and transfer chains taking slabs and edgings from the live rollers and under back edger table.

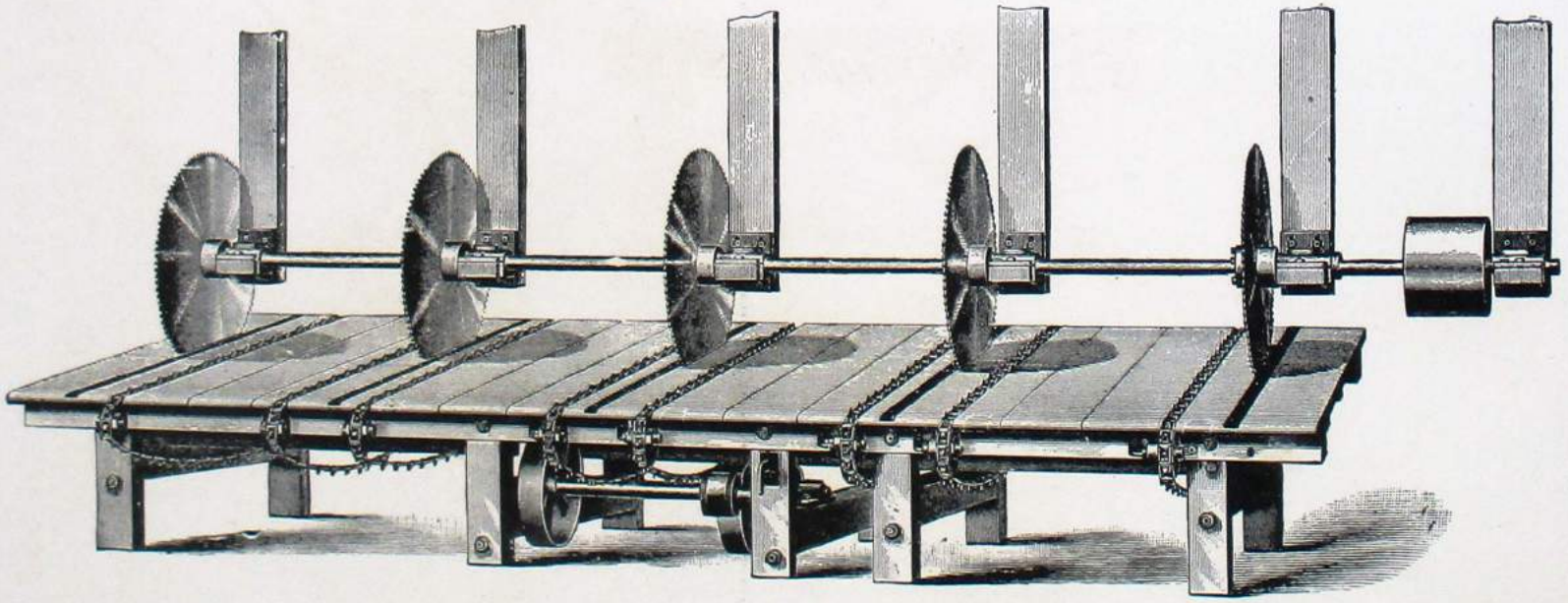
It also shows an iron skid for transferring slabs from live rolls and the shaft for raising same, or, if desired, we can furnish screw rolls to convey slabs across. Also shows the discharge conveyor at the rear, from which selections are made for lath, pickets or shingles. Both the arbor and feed works are driven from below, which is considered the best plan but, when desired, the arbor can be driven from above and the feed can be driven direct from the arbor.

The feed works are strong and heavy, and the arbor boxes are of our very latest improved adjustable type, and can be lowered to allow for wear of saws.

We build these slashers with any number of saws, and can increase or decrease the distance between the saws as desired.

As a general rule we furnish only the iron work for this appliance, the frame work, etc., being built at the sawmill.

Gang Slab Slasher.



The cut herewith represents our over-cut five saw, sixteen foot Slasher, but we make them with any number of saws, with wide or narrow stables, and with top of table either inclined or level, to suit the varying conditions in different mills.

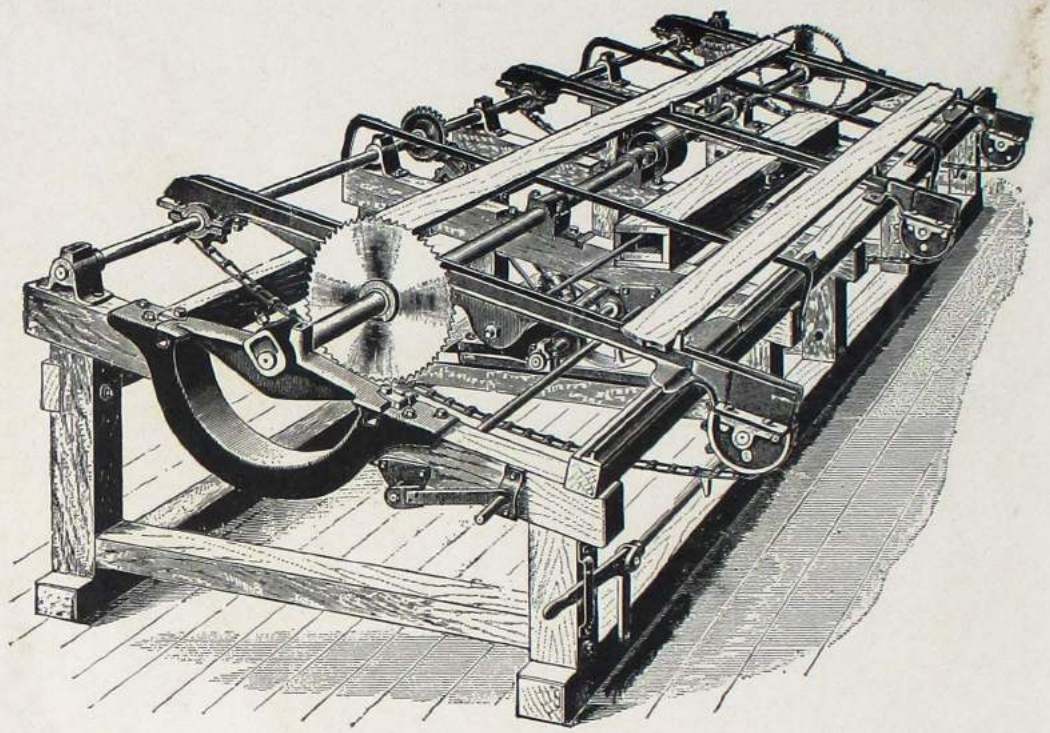
With this style of slasher there is no tendency to throw the slabs, as the motion of the saws holds them firmly down to the bed. The feed gear is so arranged that the carrying chains may be stopped and started at the will of the operator. These chains run in guides same as in our Trimmer and are provided with two chains which are used between each pair of saws, and also with sharp spurs and lugs which hold the labs and carry them by the saws.

The saw mandrels are of steel and accurately finished, made in sections, the saw collar forming the coupling, and by removing the coupling bolts the saw can be easily removed from the arbor. The slasher occupies a space of 8 feet crosswise of the mill, the length depending upon the length to be cut and the number of saws, with extra space for clearance, drive belts and feed-works.

Price 5, 30-inch saw slasher, to cut 16-ft. slabs with saws, no belts $400.00
Price 6, 30-inch saw slasher, to cut 20-ft. slabs with saws, no belts 450.00
Price 7, 30-inch saw slasher, to cut 24-ft. slabs with saws, no belts 500.00

Special prices on machines arranged to cut 16-inch and other length less than four feet.

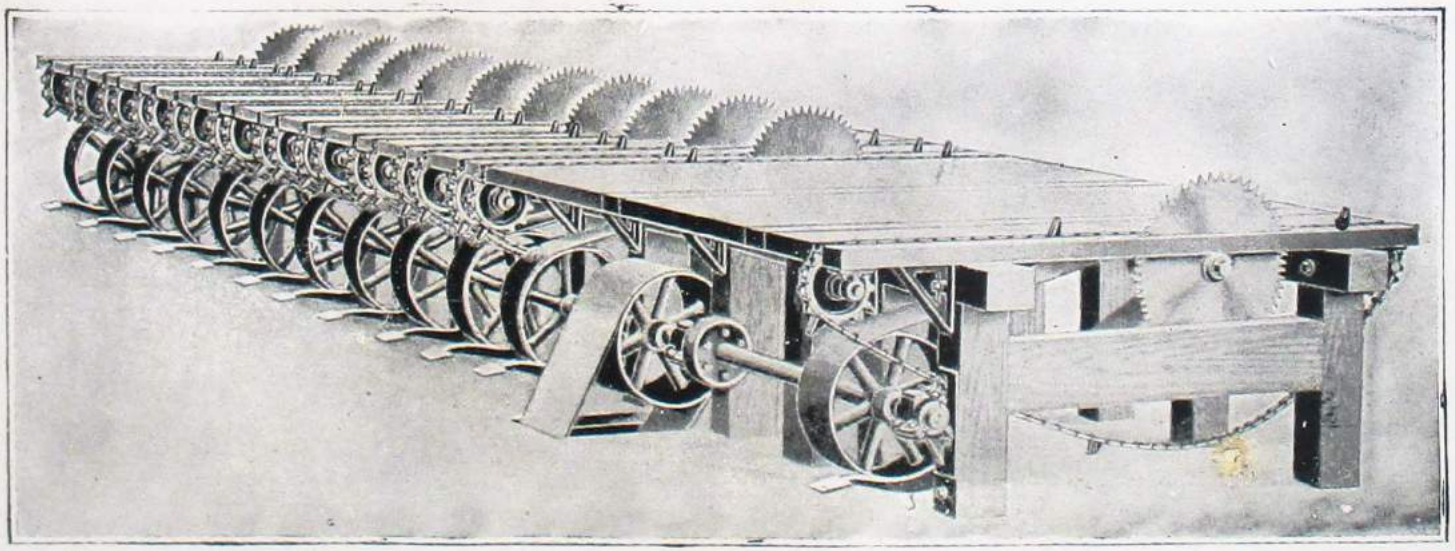
Two-Saw Lumber Trimmer.



We claim it to be the best saw trimmer in the market. The value of this machine in cutting off defective ends is of great importance to all mill men, as neatly trimmed boards are always in demand, and are much more convenient to load in cars. We sell this machine at a price within the easy reach of every mill man. It is simple in construction and easy in operation. The transfer beams are of iron, with the guides so placed as to be well braced and yet move freely. The arbor is key seated the entire distance the saws travel; it is well fitted with boxes having large oil chambers. The saws are held in sliding collars (same as edger saws), and held in position by a guide, which is bolted to the sliding chain-way; this chain-way is made of iron and is channeled out to receive the feed chain, avoiding any danger of the chain sliding sideways upon the saws. The chain-way slides on ways or tracks, bolted to each side of the trimmer frame, both front and back, and is moved by chains working on sprocket wheels, keyed to the shafts shown at each end of the frame of the machine. The removeable bridge-tree which has helped to make our Edgers famous is used on our Trimmers, and allows the saws to be changed quickly without affecting the allignment of the arbor. The chain has a knee link every three feet, extending above the surface of the head, and engages the lumber and pulls it up through the saws and delivers it clear of the machine ready for shipment. A glance at the cut will show a center bearing which holds the lumber up in the center. This will be appreciated when trimming long lumber. The feed is controlled by a tightener, operated by a treadle at the end of machine. Both saws are moveable, and are arranged to cut boards from 10 to 18 feet or 10 to 20 feet. Each revolution of hand-wheel the saws are driven together or thrown apart 2 feet, as the operator may desire, and may be used as either right or left hand. Driving pulleys 7 inch diameter by 8 inch face, and should make 1,800 revolutions. Two 20 inch saws furnished with each machine.

Price No. 1, cut from 10 to 18 feet, medium.....$250.00 Weight, 2,480 lbs.
Price No. 2, cut from 10 to 20 feet, heavy.....$280.00 Weight, 3,000 lbs.

Automatic Gang Lumber Trimmer.



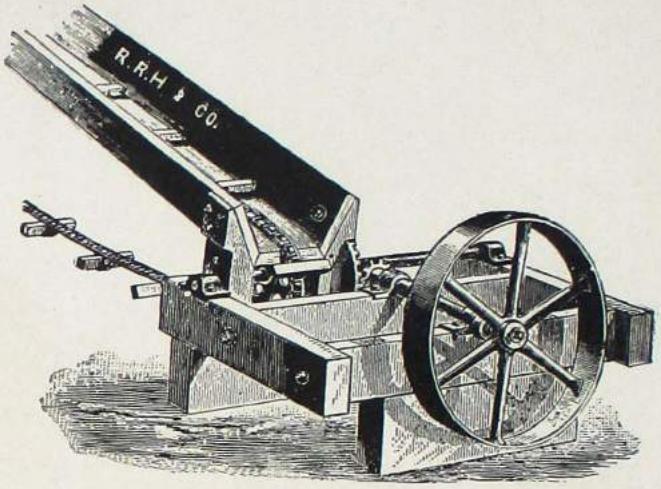
Above we illustrate our Automatic Treadle Trip Lumber Trimmer. Each inside saw is connected with a foot treadle, the same being located at either end of machine most convenient for the operator. By pressing the foot on either of the pedals the saw connected therewith will rise and lock, at the same time any saw that has previously been in use will fall. All the saws remain below the table except the two in use. The end saws can also be lowered below the table to allow long stuff to pass over. Hand pedals may be substituted for the foot pedals if desired and their location changed. There are two lines of chain to each saw, which keep the table always clear. We determine the hand of machine by the first long space between saws. The cut shows the long space at the right, and we, therefore, designate it a right-hand machine. In ordering, give hand of machine wanted and distance between saws in long space, also number of saws. To trim from 10 to 20 feet, requires seven saws, and to trim from 12 to 20 feet, six saws. The common practice is to make this machine with inclining top, having a height of 28 inches in front and 39 inches at back; however, both sides of top may be on same level if desired. The width of Trimmer is 7 feet 6 inches, and the length of frame is 2 feet longer than the length it will trim, thus the floor space for a 20-foot Trimmer would be 7 feet 6 inches by 22 feet. Saws carried, 22 inches in diameter. In a single circular mill the trimmer may be placed beside the edger, so that the man who takes from the edger can do all the trimming and adjust the saws. With this arrangement the cost of trimming the lumber is only the first cost of the trimmer.

PRICE LIST OF TRIMMERS.

To trim 12, 14 and 16 feet	$450.00
To trim 12, 14, 16 and 18 feet	500.00
To trim 12, 14, 16, 18 and 20 feet	550.00
To trim 10, 12, 14 and 16 feet	$500.00
To trim 10, 12, 14, 16 and 18 feet	550.00
To trim 10, 12, 14, 16, 18 and 20 feet	

Sawdust Carrier.

For medium size mills.



The above cut shows a very convenient and durable carrier for sawdust. The jack can be placed in the pit under the saw and driven by belt from saw mandrel. The conveyor can be made any length desired, one end of which rests on shaft of jack over the sproket wheel. The conveyor or elevator can be run out under the carriage of saw mill or reversed and out on the opposite side and given the required elevation, as it is pivoted to shaft of jack. Link Belt Chain, with wood slats, is used to convey the dust.

Price, Sawdust Carrier, complete, with 16-foot conveyor.....$35.00
Longer Conveyor furnished at additional, per foot..... 1.25

Hand Feed Edger—One Saw.

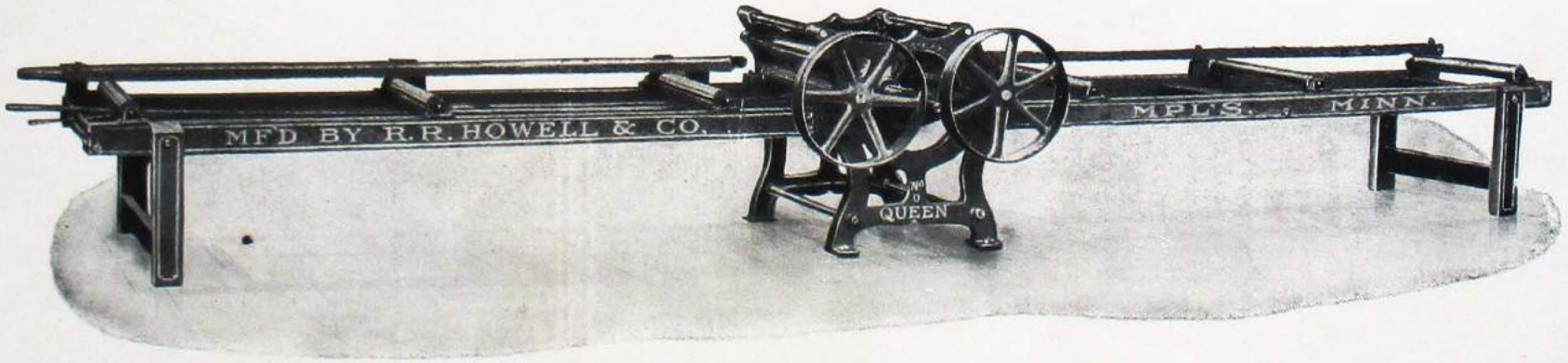
The legs are all heavy cast iron, and the two that support the saw table are extended to support the track timbers, thus giving great solidity and strength where the power is applied and the edging done. The Track Iron is made heavy and strong. The rollers have flanges to keep the carriage in its proper position.

This Edger is made with special reference to strength and ease of operation. They are exactly suited to the wants of those desiring a cheap and yet first-class hand edger. The pulley driving the saw mandrel is placed inside of a strong iron frame which connects the two arbor boxes, thus giving great strength to the arbor. Size of Driving Pulley, 7 x 7. Size of mandrel 1 7-16 inch with 1⅜ bearing for saw. Speed, 1,800 revolutions per minute.

Full length of machine, 32 feet; length of carriage, 16 feet; size of saw, 16 inches; weight, 750 lbs. Price, with one 16-inch blade.....$75.00

Extra carriage only, with ways (no legs) per foot..... 2.00

The "Queen" Three Saw Gang Edger.



This Edger is designed to meet the demand for edgers in small sized mills, cutting from 8,000 to 15,000 feet of lumber per day. It is strong and well built throughout. There is no machine of greater importance in the manufacture of lumber, aside from the Saw Mill itself, than an efficient edger, and no lumber plant is up-to-date or complete without one. A good edger will not only considerably increase the capacity of the plant, but will reduce the cost of manufacture, saving both time and lumber, and the least possible part of the timber is wasted in the slabs. Also lumber manufacturers, in many cases, stand a large discount on their bills because of some bad places which lower the grading and which a good Edger would have removed. The gain will pay for the machine in a short time.

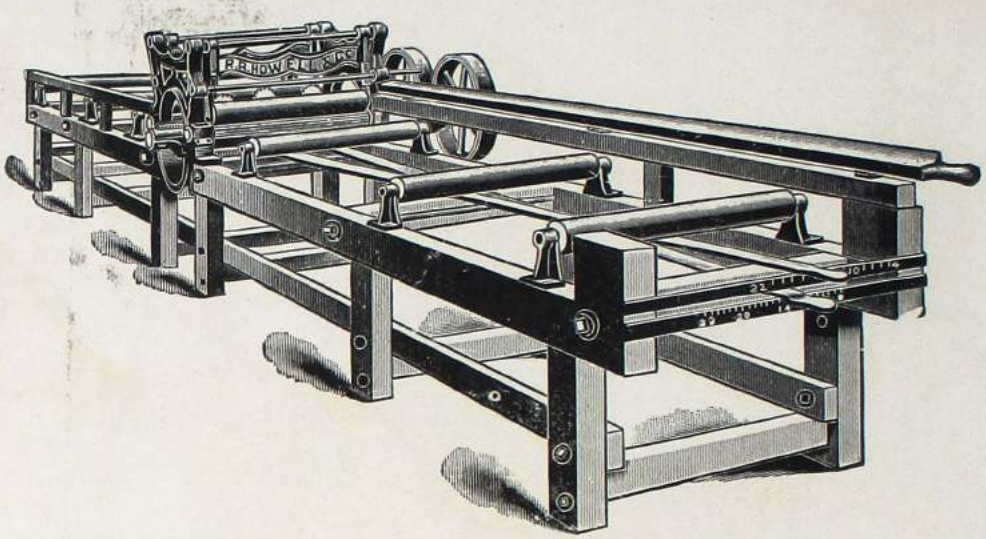
The "Queen" Edger is made in three sections and, therefore, is very easy to handle and set up. The main frame is made entirely of iron and steel, independent of the front and rear wood frame, designed for strength, rigidly connected, sufficiently heavy and stiff to keep all parts absolutely in line and making a self-contained machine. The mandrel is supported by a strong iron stand, or frame, each side has a movable bridgetree, so that the saws can be easily removed from the mandrel. The arbor is 2 3-16 inches in diameter, with long bearings, it fitted with an 8x8-inch drive pulley, speed1,800 revolutions, and carries three 14-inch saws, two movable and one stationary. This machine has two fluted power feed rolls, one in front and one in rear of saws, also heavy pressure rolls above each feed roll, thus making the feed very positive. The rolls are made adjustable, enabling the operator to adjust any wear which may result from long use, so that the machine can be relied on to always edge accurately. Both front and back pressure rolls are attached to a swinging frame, so arranged that they are self-raising, adjusting themselves to different thicknesses of lumber, also are self-locking against lumber being thrown back, which insures safety to operator. The saws are shifted by hand levers, which is a very accurate and rapid device. The index is on the front end of machine, thereby placing it convenient to the operator. The guide rail for stationary saw has a simple device, by movement of the handle at front end, for cutting 4-inch width and will edge stock up to 4 inches thick.

The edger is often expected to saw cants or flitches into scantling or small dimensions and flooring, and for this purpose we can furnish a gang of saws fitted to a sleeve with space collars of proper thickness, which can be used in place of the regular saws or in connection with them. The price of collar and saws for this purpose will be quoted on receipt of specifications.

The above cut shows a left hand machine, the drive pulley being on the left hand side. We can furnish either a right or left-hand machine as desired.

Queen Gang Edger, 3 Saws, 30 inches wide. Weight, 1,400 pounds. Price..... .....$175.00

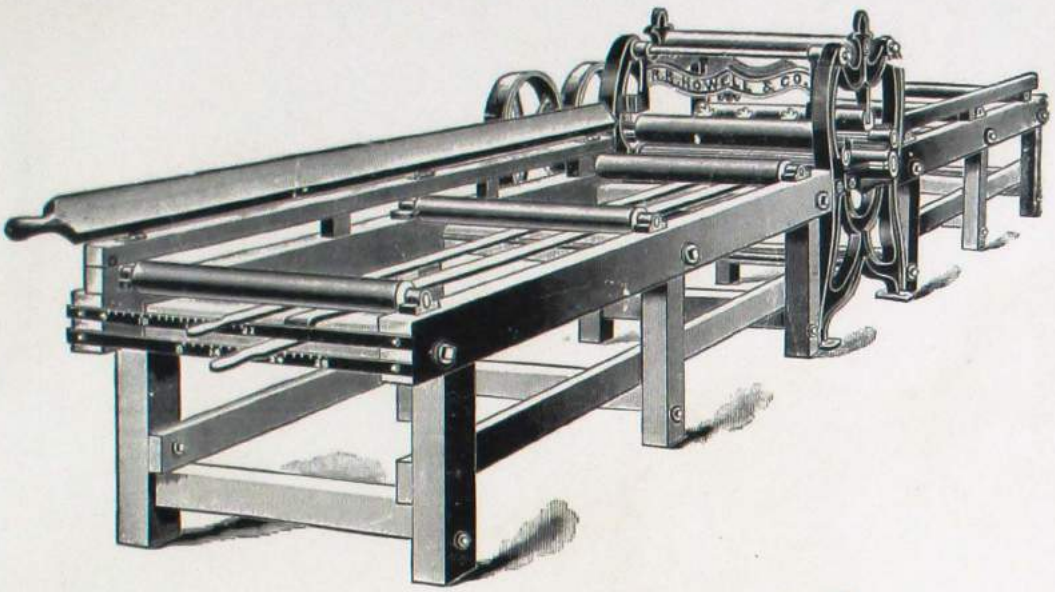
FLOUR CITY NO. 1 GANG EDGER.

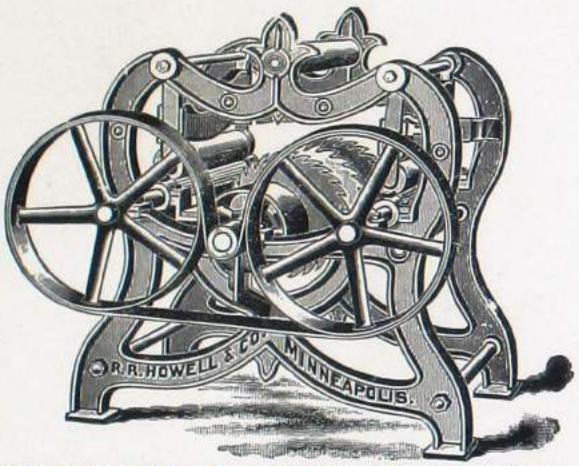


The necessity of light Gang Edgers for mills of moderate size has been a want long felt by mill men, a machine especially adapted to mills having a capacity of from fifteen to sixty thousand feet of lumber per day. The above Edger is compact, strong and very effective in its operation, manufacturing lumber just as accurately as our larger machines made for larger mills, but is not intended to have an equal capacity. The feed Rollers, Saw Arbor and Press Rollers are all hung in a solid iron frame, thus avoiding any of those parts getting out of line with each other. The Saws as regularly furnished with this machine are three in number, two being movable and one stationery, so that any width of lumber can be made, from 2 to 28 inches. The Saws used are sixteen inches in diameter, to fit upon the saw collars, which are finely finished and close together, with a right or left handed thread according to the direction the saws run. The Feed Rollers are of steel, 2½ inches in diameter, two in number, one being in front and one back of the saws, grooved lengthwise and carry the lumber through the machine very rapidly, yet without marring it in the least. The rollers are driven by a belt wrapping around small pulley upon end of saw arbor and over the large feed pulleys shown in cut. The Arbor is made of steel, two and one-half inches diameter, and runs in long bearings. There are three bearings for the arbor, one on each side of the driving pulley and one at the end. The Press Rolls are automatic and do not have to be handled in any way by the operator. By the use of these improvements the operator, without moving out of position, has full control of the Edger, while he is in the proper position to feed the lumber. We wish to call special attention to End Bar with box for changing saws. This is an improvement of unusual importance, and is constructed with special reference to easy access and quick change of saws. All operators will appreciate this point as the saw can be taken off the arbor without removing a single bolt or screw, it being only necessary to loosen two set screws, which hold the end bar in place, and you have free access to change saws. A Scale at the front end of the machine indicates the exact distance saws are apart, enabling them to be set instantaneously and accurately. The operator has full control of the shifting saw thus enabling him to rip stock to different widths or all the same width, leaving it optional with him and allowing him to saw each board to the best advantage.

No. 1 Gang Edger saws up to 30 ..... $300 00
1 " " " " " 40 ..... 350 00

FLOUR CITY NO. 2 GANG EDGER.



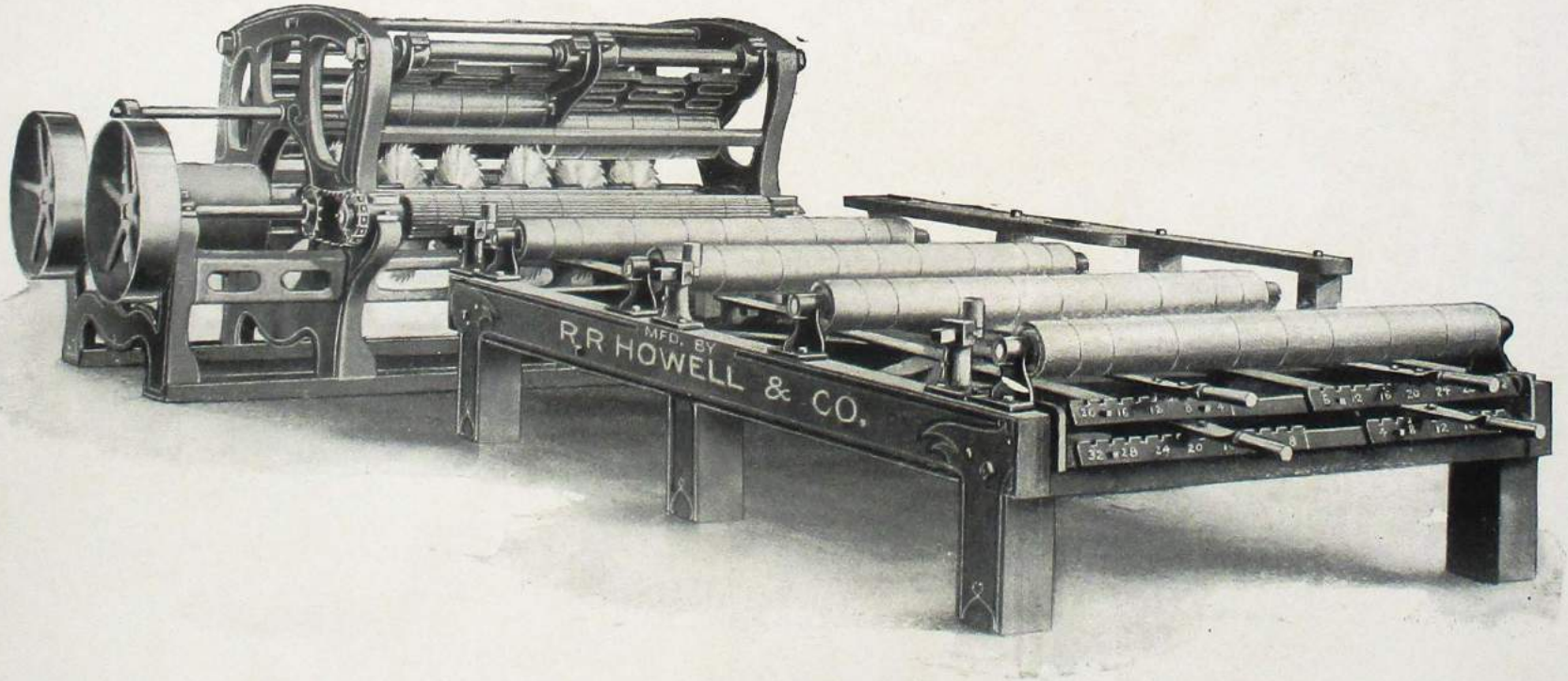


Enlarged Side View of No. 2 Gang Edger, showing working part only.

This represents the Flour City No. 2 Gang Edger, complete and ready for operation. This machine is made on the same principle as our No. 1 Edger, but is adapted for heavier work and larger capacity. We present this to mill men with the fullest confidence, believing it to be superior, for edging or sawing lumber to width, of any machine ever brought before the public; and have no hesitation in saying that it will give perfect satisfaction in every way. It is built entirely of iron, independent of the two wood frames, and is made in the most substantial manner. The mandrel is of steel. There are three bearings for the arbor, one on each side of the driving pulley and one at the end. On this machine are two driven fluted feed rolls, one in front of and one back of saws. There is also a heavy, solid iron binder roll over each fluted roll. The rolls are made in such a way that it is impossible for the lumber, after it is started, to run crooked. The Feed is absolutely reliable, and by a new application, the old-fashioned, inconvenient method of raising and lowering the heavy rolls is done away with. *A Lever shifts the Saws to any position on the mandrel*, each saw moving independently of the other, and can be set all within four inches of each other or any width. Its capacity is unlimited up to one hundred thousand feet per day. We furnish wooden approaches, or tables, and six iron rolls, three in front of the saws and three back of them. We furnish a machine that is in all its parts as strong as any necessity will require.

No.	2	Gang	Edger	Saws	up	to	30	inches	wide, 3 saws ..... $ 350.00
"	2	"	"	"	"	"	40	"	wide, 4 saws 450.00
"	2	"	"	"	"	"	50	"	wide, 5 saws 600.00
"	2	"		"	"	"	60	"	wide, 6 saws 800.00
"	2			"	"	"	70	"	wide, 7 saws 1000.00

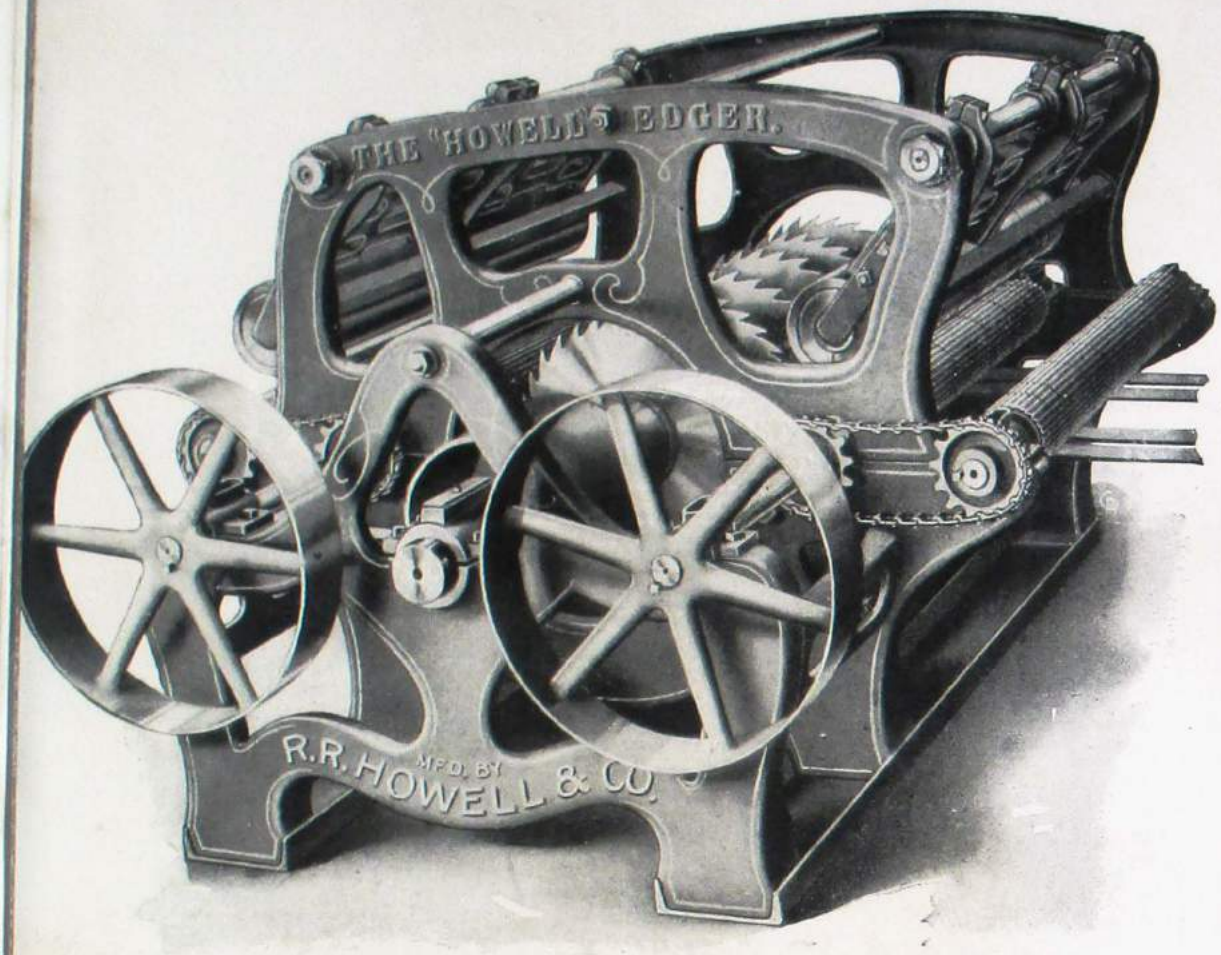
The Howell Gang Edger



Showing Complete Machine Without Rear Table.

The above cut represents our No. 5 60-inch Gang Edger with six 22-inch Saws. Weight of Main Edger part 6,500 lbs., weight of machine complete with front and rear tables 10,000 lbs. This Edger is made in either right or left hand in four sizes, Nos. 4, 5, 6 and 7, each number representing the working width of the Edger in feet which would be the length of the feed rolls. All sizes are exactly the same except as to width and proportion of working parts.

The Howell Gang Edger.



Showing Main Working Frame.

The **Howell Edger is entirely modern** and was designed for the heavy saw mill trade along the most practical lines. In designing this machine we have examined many of the heavy Edgers built by similar firms and have solicited and **obtained the advice of many of America's most practical saw mill men.** This coupled with our own saw mill experience and the fact that we have spared no expense has produced an Edger that is heavy, simple and of excellent proportions; one whose capacity is almost unlimited. We have overcome all of the defects and inconveniences of other edgers and strengthened ours where theirs are weak. All Saw Mill Machinery being constantly subject to rough usage necessitates extra strength in construction, and we have followed this idea faithfully. We will enumerate and describe in detail a number of the main parts of the Howell Edger.

THE MAIN FRAME

The center or main frame which supports the arbor is made entirely of iron, being cast with heavy ribs on the inside and braced by heavy steel bars and locked by heavy nuts. The Arbor Pulley is between the extension frame and the main frame, and these frames besides being bound by steel bars are fitted into and bound underneath by two heavy channels which form a very substantial and level base, **doing entirely away with any skids** and making the handling and installing of so large a machine very simple.

THE ARBOR.

The Arbor is of the best turned steel, 4⅜ inches in diameter and is fitted with two projecting keys on opposite sides, it is turned down for shoulders at the bearings and **runs perfectly true without** end **weave.**

COLLARS.

In the saw Collars we claim a very noticeable and distinct advantage. First, because they have a **much larger grip on the saw.** The collars are 8½ inches outside diameter and have a grip of more than 31¾ square inches on each side of each saw,

thus doing entirely away with even the possibility of a saw slipping and heating of the collars.

Second, the collars have a bearing of nearly four inches, which will prevent any looseness or wobbling.

THE SAWS.

Any desired saw, either solid or inserted tooth, can be used. The standard size for this machine being 22 inches in diameter, but it will carry any size up to and including 24 inches without alterations.

THE BEARINGS.

The arbor Bearings are three in number, two of these being in bridgetrees, the end bridgetree when removed **allowing quick access to the saws.** The bearings are long, large and each is self oiling, adapted either for the ring or chain method.

FEED ROLLS.

The Feed Rolls are heavy cast corrugated rolls and are driven either by a belt from the line shaft or from the projecting end of the arbor. The Edger has **four live feed rolls,** two in front and two behind. They are of large diameter and machine corrugated. This makes a very powerful feed, one that will meet every demand made upon it.

PRESSURE ROLLS.

The Pressure Rolls are **automatic** and do not have to be handled in any way by the operator, and are of much **larger diameter** than usual. They are of cast iron and supported by heavy ribbed swing frames, two rolls being in front in line and two in the rear. The size of these rolls and the design of the swing frame amply protect the operator from lumber kicked back by the saws.

THE LEVERS.

The Levers are of flat steel with turned handles and each lever is fitted with new design adjustable fulcrum screws so that every particle of play can be easily taken up and the adjustment retained. This is something much to be desired. A careful Edger sawyer will appreciate a set of levers with no play, for it enables him to hold the saw from running, which is necessary to saw straight lumber. The levers are also adjustable in the notches, enabling one to saw full, scant, or exact width lumber. Every two inch movement at the lever will give a corresponding two inch movement of the saw no matter whether the saw is in the center or on one end.

FRONT FRAME.

The Front Frame is made of heavy Washington Fir timbers, rigidly braced. It is supported by six heavy legs and sets away from the iron edger frame so that the **machine is more accessible.** The frame sets low with the rolls supported on bracket bearings.

REAR TABLE.

The Rear Table is separate from the main machine and is built with live rolls to the customer's order.

DEAD ROLLS.

The Front Dead Rolls are divided each into two rolls revolving separately upon a shaft, which shaft also revolves freely in bracket bearings. This adapts the Edger for more than one sawyer. All of the dead rolls, the feed rolls and the pressure rolls on the front end of the Edger are machine grooved at regular intervals. These markings are to assist the sawyer in placing his lumber and setting his levers so that in a very short time he will not need to look at the figures to set the saws nor to spend any time guiding the lumber by hand. This is a new innovation and **bound to increase the amount of output without extra labor.**

SAW GUIDES.

The Saw Guides are the **most modern in use,** being made either of cast steel or brass and are accurately fitted by a sliding joint to the lever castings. The guides come nearly up to the lumber line and are arranged so that they can **each, individually,** be turned back, freeing the saws. The saw guides with the levers are the most vital and sensitive part of the Edger, for upon them largely depend the success of the machine and we have a perfect combination in this respect.

LUMBER GUIDES.

One side of the front frame is fitted with a regular steel bound displaced four inch follow guide, while the other side has **adjustable guide rollers,** which can be set any amount up to ten inches.

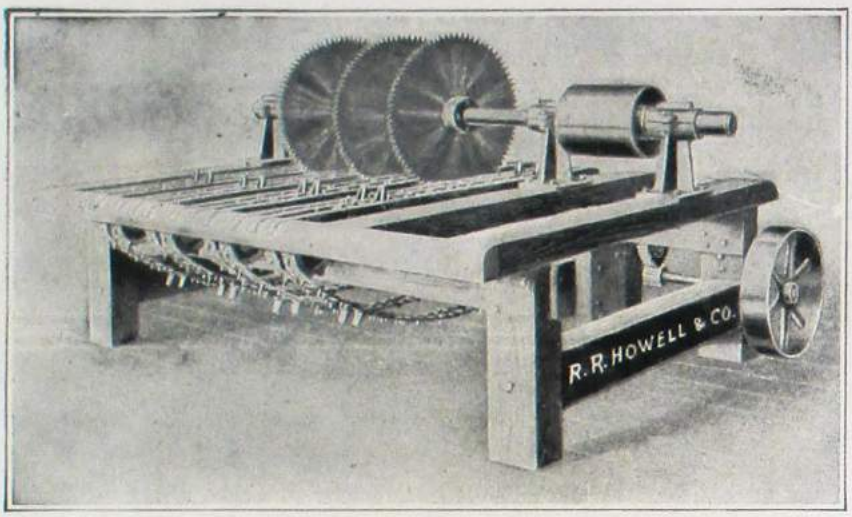
FEED.

The Feed Pulleys are built to give the customer whatever speed of feed he desires, his choice, of course, depending upon the nature and thickness of his average stock. Each succeeding feed roll runs a trifle faster than the preceding one, which tends to **keep the lumber straight.**

DRIVE PULLEY.

The Edger is driven by a **solid webbed drive pulley,** which is 14 inches diameter, 14½ inch face, well balanced, and machine finished inside and outside.

Slab Slasher or Wood Cutter No. 7.



This cut represents our No. 7 Slab Slasher, built to carry three saws, making four 15-inch pieces from 5-foot slabs, is used principally for cutting slabs and timber for stove wood.

Our No. 6 Machine is of the same general style, and carries two saws, and is used to cut 16-inch wood from 4-foot slabs. With this style of slasher there is no tendency to throw the slabs, as the motion of the saws holds them firmly down to the bed. The saw collars are a sliding fit on the mandrel and held in proper space by the overhead guides, to accommodate themselves to the side pressure caused by a wedging slab, thus avoiding breakage of saws. These guides are not shown in the above cut.

The table on which the wood is fed to the saws, has six spur chains, thereby supplying two chains for each piece of wood after it is cut. Made with top of table either level or inclined to suit the varying conditions in different mills. The feed gear is so arranged that the carrying chains may be stopped or started at the will of the operator. These chains run in guides same as in our Trimmer and are provided with sharp spurs and lugs which hold the slabs and carry them by the saws. The saw mandrels are of steel and accurately finished.

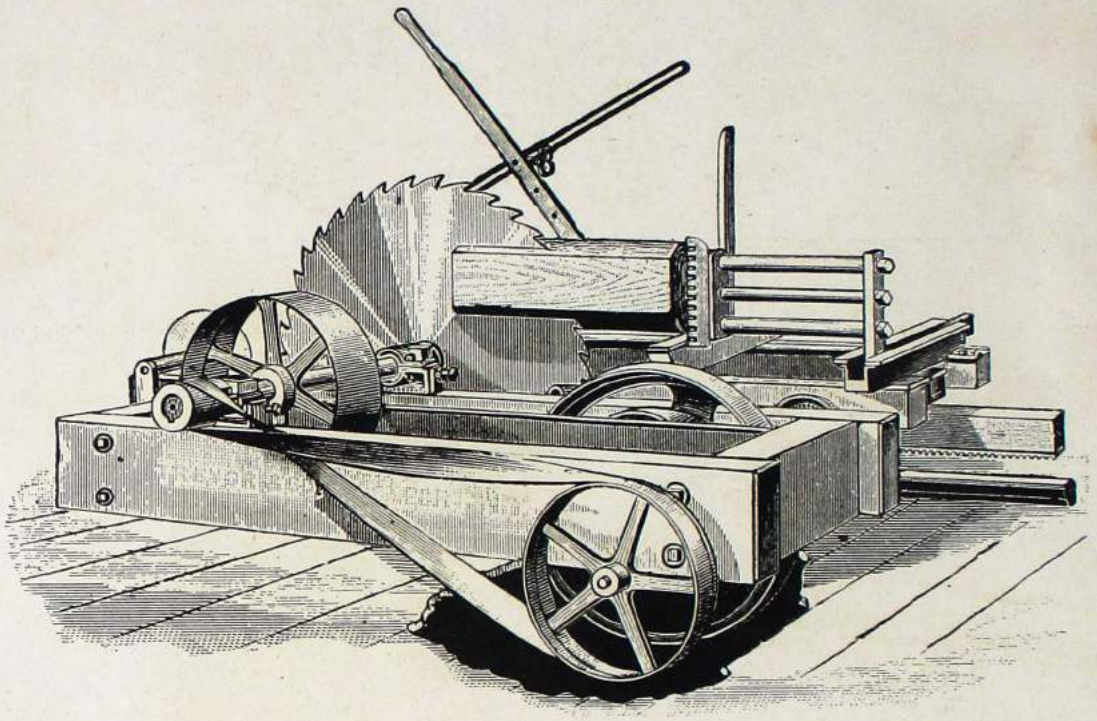
The saws are 30 inches in diameter, 9 gauge, with V cut teeth. The saw mandrel is $2\frac{15}{16}$ inches steel, witn three boxes to support it. These boxes may be let down into the frame as the saws wear down. The arbor pulley is 12 inches diameter, 14 inch face; speed 1200 revolutions per minute. Space occupied, from front to rear, 7 feet; width of 5-ft. machine, 9 ft. 2 in., of 4-ft. machine, 8 ft. 2 in.

Price.

No. 6, 2-saw machine. 4-ft. slabs, weighs 2,000 lbs..... $200.00

No. 7, 3-saw machine, 5-ft. slabs, weighs 2,400 lbs..... 250.00

No. 20 Short Log Saw Mill.



Above cut represents our Short Log Saw Mill, mostly used for sawing short sections of logs into bolts for staves or heading.

The saw mandrels are made of steel, with forged collars accurately fitted to templet, and amply large for work intended; extra long journal-boxes are furnished, babbitted with best anti-friction metal, consequently run without heating or cutting.

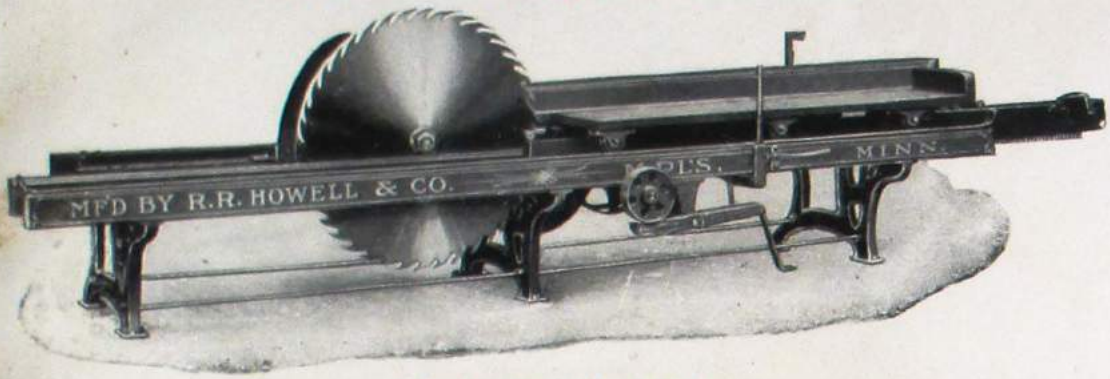
The improved friction-feed employed is the very best in use, the carriage can be instantly stopped or started, and the speed can be varied. All feed-cones are very large and extra wide face, giving ample strength to handle logs within the capacity of each mill.

Mounted upon the frame at the cutting end of saw is an adjustable guide having wood wear pins, by which the saw is steadied in its motion, and "guided" in the cut. A standard is placed in front of the saw, and the dividing wedge at back. It has two connected head blocks with lever set, and rack and pinion feed, similar to our regular saw mill. The movement of the carriage forward and back is controlled by means of a lever placed in a very convenient position for the sawyer and accomplished by means of a double friction. The dogs are so arranged that the logs are held by dogging the ends. The logs may be sawed with this machine into lumber, timber or any shape desired. With added improvements in principle and workmanship, we are in front with the best mill for this purpose. A very handy machine for a variety of purposes. A sawyer and an assistant to take away the stuff are sufficient to operate the machine.

The saw should be from 40 to 60 inches in diameter, according to the size of the logs to be sawed. Pulley, standard size, on saw arbor, 20 inches diameter and 10 inches face. However, if speed of the engine is given us, and diameter of the fly wheel, we will furnish pulley on mill of proper size to give correct speed, without extra charge. The proper speeds depends on the size of the saw used.

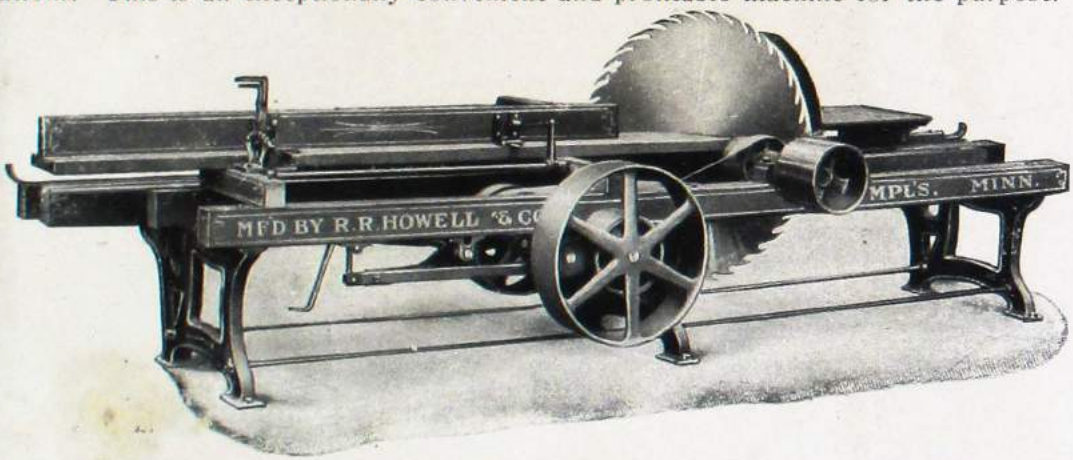
Price	No. 20	Short Log Mill,	to saw	4	feet	long,	weight	2,200	pounds.	.....	$260.00
"	"	21	"	"	"	6	"	"	2,400	"	..... 275.00
"	"	22	"	"	"	8	"	"	2,800	"	..... 295.00
"	"	23	"	"	"	10	"	"	3,200	"	..... 315.00

Automatic Bolting and Slat Saw.



Showing Left Hand Side.

This machine is self-contained, designed and adapted for slitting Bolts or small short logs into slats, pickets, felloe, handle, spoke, chair, furniture stock, boards or other small dimension stuff. Also it is a great lumber-saving device, as slabs, broken lumber and timber can be easily worked into box boards, staves, heading, lath and all kinds of merchantable lumber of this class. This machine is provided wtih substantial iron frame, heavy steel arbor, adjustable saw guide, iron track, power rack feed, with automatic return feed, an adjustable fence gauge, and will carry a saw up to 42 inches. A 36-inch saw is furnished with each machine unless otherwise ordered. A knife spreader is provided just back of the saw which also prevents accidents by throwing the lumber over. The carriage advances and recedes automatically, by means of a self-trip, adjustable to cut any length up to length of carriage, and keeps the carriage in motion and requires no attention from the operator, leaving him all his time and hands to feed and take away the stuff. The laborious part of the operator's work is dispensed with; only one man is required to operate the machine. When desired, the operator can start or reverse the carriage by simply moving the lever forward or backward, and the carriage acts immediately. On placing lever at center point the carriage will remain stationary. The carriage is also provided with a foot brake so it can be stopped instantly. Fitted with 10x8 drive pulley. Speed with 36-inch saw, 900 revolutions. This is an exceptionally convenient and profitable machine for the purpose.



Showing Right Hand Side.

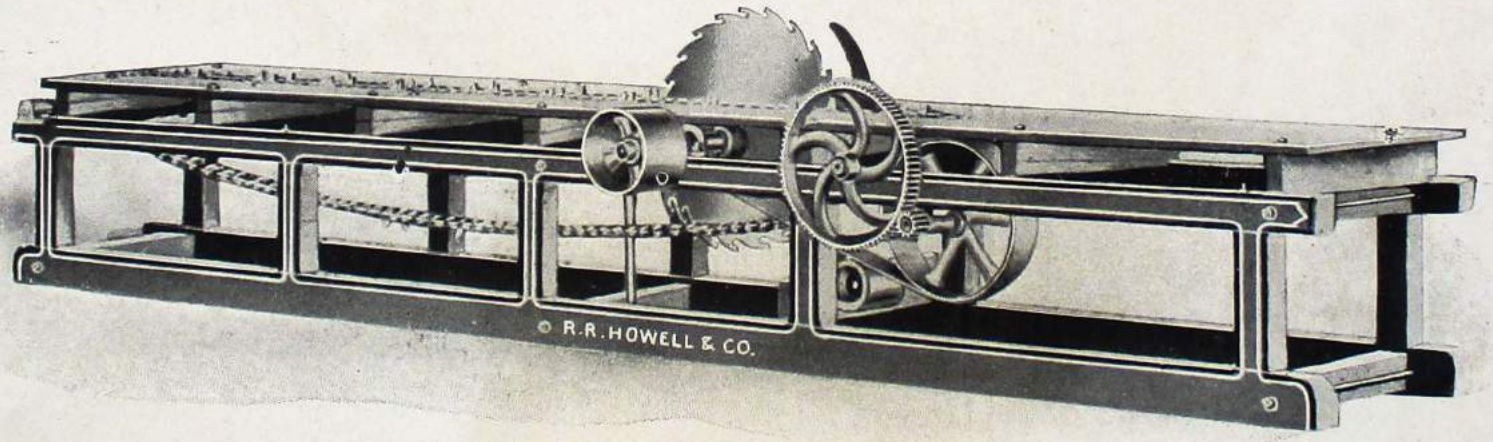
We can furnish with this machine a trough-shaped splitting attachment to be used only when cutting through the center of posts and small logs, and only furnished on special order and at an extra charge.

The power required is 6 to 15 horse, according to size of saw and logs. The capacity of the machine depends on the kind of work done, material and power used, and skill of operator.

	Size Saw.	Length of Carriage.	Weight.	Price.	Splitting Attachment Extra.
No. 1	36-in.	4-ft.	1,500 lbs.	$190.00	$30.00
No. 2	36-in.	6-ft.	1,600 lbs.	200.00	40.00
No. 3	36-in.	8-ft.	1,700 lbs.	220.00	50.00

Can furnish this machine with any other length of carriage that may be desired.

Post Splitter Machine With Endless Continuous Chain.



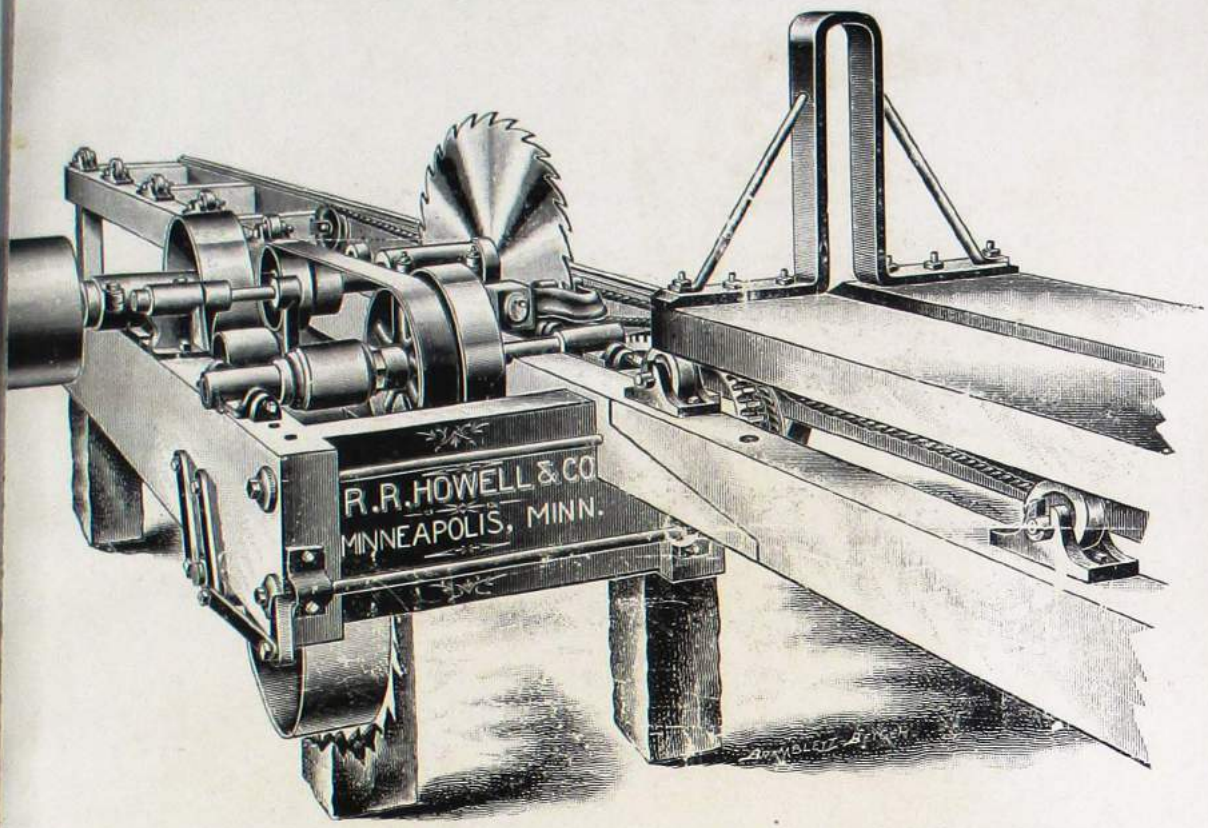
This machine is all self-contained and consists of a very heavy frame, well mortised and bound together by rods and bolts. Intended for splitting posts, bolts, cord wood or any other work where it is desired to split up rough stock with great speed and with minimum expense. Two steel slides run lengthwise the frame on either side of the saw, being laid flat on timbers and securely fastened. These slides each carry an endless chain with special sharp spur attachments, which convey the posts in rapid succession through the saw in a continuous stream. This special shaped chain forms its own trough and prevents the wood from pinching the saw. This entirely does away with a carriage with its customary return motion, which means wasting of valuable time.

When logs require to be re-split, we can furnish with this machine when required, at an extra charge, a return conveyor so the stock can be returned to front of machine to be further reduced.

The shafting and bearings are heavy. The boxes supporting the arbor are united by a yoke, making it impossible to have them get out of line. A 30-inch inserted tooth saw, made specially for this work, is used on this machine, and is guided by adjustable saw guide. A saw up to 50 inches can be used on this machine if required. The feed works being driven by a belt, and a chain of gearing from a pulley on the arbor, advances the stock ¾ inch at each revolution of the saw. A tightener pulley on the feed belt is controlled a lever convenient to the sawyer, and, by use of this, the feed can be diminished or instantly stopped. A knife spreader or guard is placed back of the saw and prevents the post from pinching on to the saw and any accident by throwing the material over. A hardwood adjustable table allows access to the saw and covers all of the frame work not necessarily exposed. Saw extra.

Speed of Saw, 30-inch, 1,000 to 1,200 R. P. M. Size of Drive Pulley, 10 inches Diameter, 8 inches Face. Floor Space, 18 feet 2 inches by 3 feet 1 inch. Capacity, from 40 to 60 cords per day. Weight, 2,000 lbs. Price, $350.00.

Combined Post Splitter and Bolter.

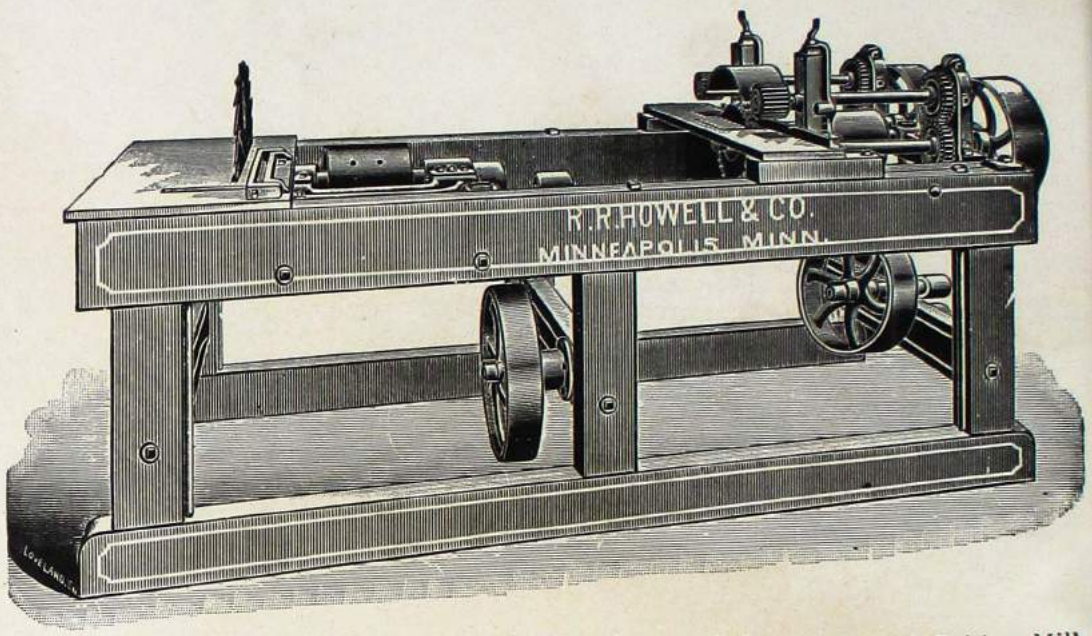


This machine is capable of doing the same work, in many cases, where more expensive sawmill is used and doing much faster work with more satisfactory results, and the operating expenses much less. Designed especially for splitting poles for fence posts, and other purposes and general ripping about a mill or factory. With this machine posts can be split to any size, or to as many parts as desired; a very valuable machine for sawing railroad ties, also for cutting material, such as spoke and rim work where it is necessary to saw according to the grain, the log should first be split through the center, reduce the halves to quarters, the quarters cut into slabs by the outside circle of the log, cutting the slabs to strips of desired width. By this arrangement, bastard sawing can be avoided.

This machine has power feed. By moving the lever from the right to left, the frictions are engaged or disengaged, thus causing the table to start INSTANTLY in either direction or to STOP at any point desired. The table has a return motion three times greater than the feed, thus it returns with very little loss of time. We are prepared to furnish, with this machine, when desired, dogs for holding various material to the table, also adjustable fence or small head blocks with set works to regulate the width of the cut. A 40-inch saw usually answers every purpose for which this machine is intended, although a 50 inch saw can be used if desired. The Driving Pulley is 18x 10 inches, and should run 800 revolutions per minute, providing a 40 inch saw is used. Saw extra.

Price, No. 1, with 4 foot table	$250.00.	Weight	2,400 lbs.
Price, No. 2, with 6 foot table	275.00.	Weight	2,600 lbs.
Price, No. 3, with 8 foot table	300.00.	Weight	2,800 lbs.
Price, No. 4, with 10 foot table	325.00	Weight	3,000 lbs.
Price, No. 5, with 12 foot table	350.00.	Weight	3,200 lbs.

NO. 1 COMBINED LATH AND BOLTING MACHINE.



The above illustration represents an improved form of Gang Lath and Bolting Mill, built from recent designs and embodying all the valuable points that skill and experience could suggest. Several new and important improvements will be found in this machine not to be found in any other in use. The framing is massive, of best **hardwood timbers,** firmly supporting the working parts and enabling them to perform their functions with accuracy and withstand the hard usage to which such machines are subjected. It is conveniently arranged so as to change saws in the least possible space of time, has free access to the saws and are separated by collars 7-16 inch thick. Collars of any desired thickness can be used.

We have endeavored to construct this mill so that it will do as good word and as accurate work as our No. 2 Machine, the larger mill shown on opposite page, but it is not intended for as heavy work.

The saw arbor is of steel, supported in long babbitted boxes. The feed works on Lath Mill consist of four live fluted feed rollers, two above and two below the works, are strong and positive in their action, carrying the bolts through the machine very rapidly; the two upper rollers have spring pressure, adjustable, and driven by gears, the rate of speed 150 to 175 feet per minute. The working parts are compact and finished with care and precision. The tables are of cast iron, planed smooth and true on top, and can be readily moved for changing saws. The Guides are adjustable.

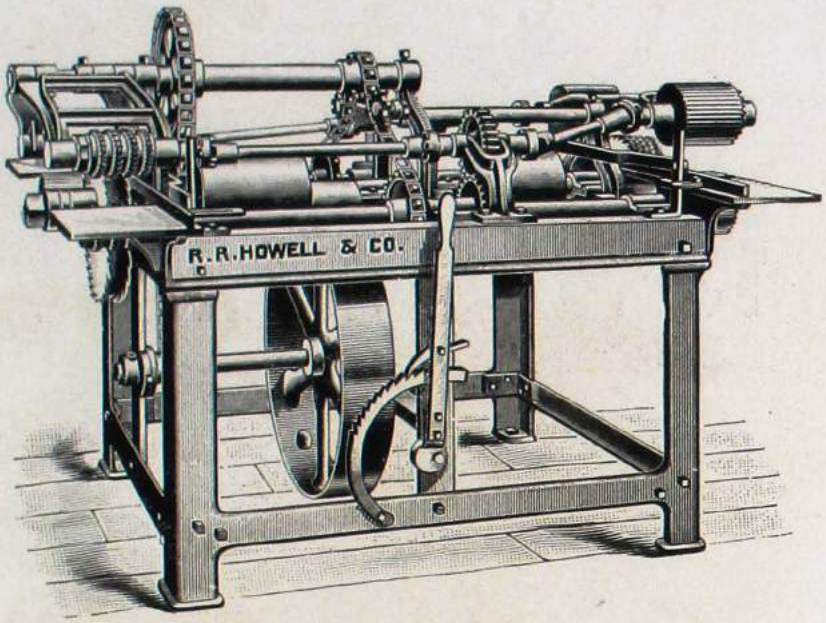
It will convert your slabs and other mill refuse into lath at a small cost. Lath cut from slabs is usually of upper grades, and much being clear, the amount that can be taken from a cord of ordinary slab would possibly surprise you, and the profits derived therefrom. The great problem with the lumber manufacturers is, first, how little waste can be made, and, second, how it can best be disposed of. Lath and shingle system provides a most profitable method of rescuing from the burner and the firewood pile much lumber that is valuable.

Three 10-inch saws and 2 collars are furnished with Lath Machine, size of pulley 8 inch diameter by 9 inch face, speed 3000. And one 24-inch saw furnished with the bolter, size of pulley 7 inch diameter by 8 inch face, speed 1800. The Bolter is made to carry saws up to 28 inch.

If counter shaft is wanted attached to rear end of machine all complete (except two belts to arbors which are extra) add to above price $25.00.

Weight, 1,150 pounds. Price, with 4 belts and 4 saws.....$180.00

No. 2 Combined Bolter and Lath Mill.



This is a strong, powerful and well-built self-contained machine, made entirely of iron and steel; a useful and money-saving machine. By it, the refuse and waste lumber about a saw mill can be bolted and cut into lath or slats upon the same machine.

This machine, on lath part, has five 10-inch saws, and two 18-inch saws on bolting part, and has eight powerful driven fluted rolls that draw in and discharge the material. The upper front roll on bolter end is also spiked to insure positive force feed of material through the machine.

All the feed rolls are connected together by Link Belts, making the feed positive and alike on all Rollers, and doing away entirely with all short feed belts. All the feed mechanism is driven by friction wheel connected direct to the main arbor and can be stopped instantly or speed decreased at will of the operator.

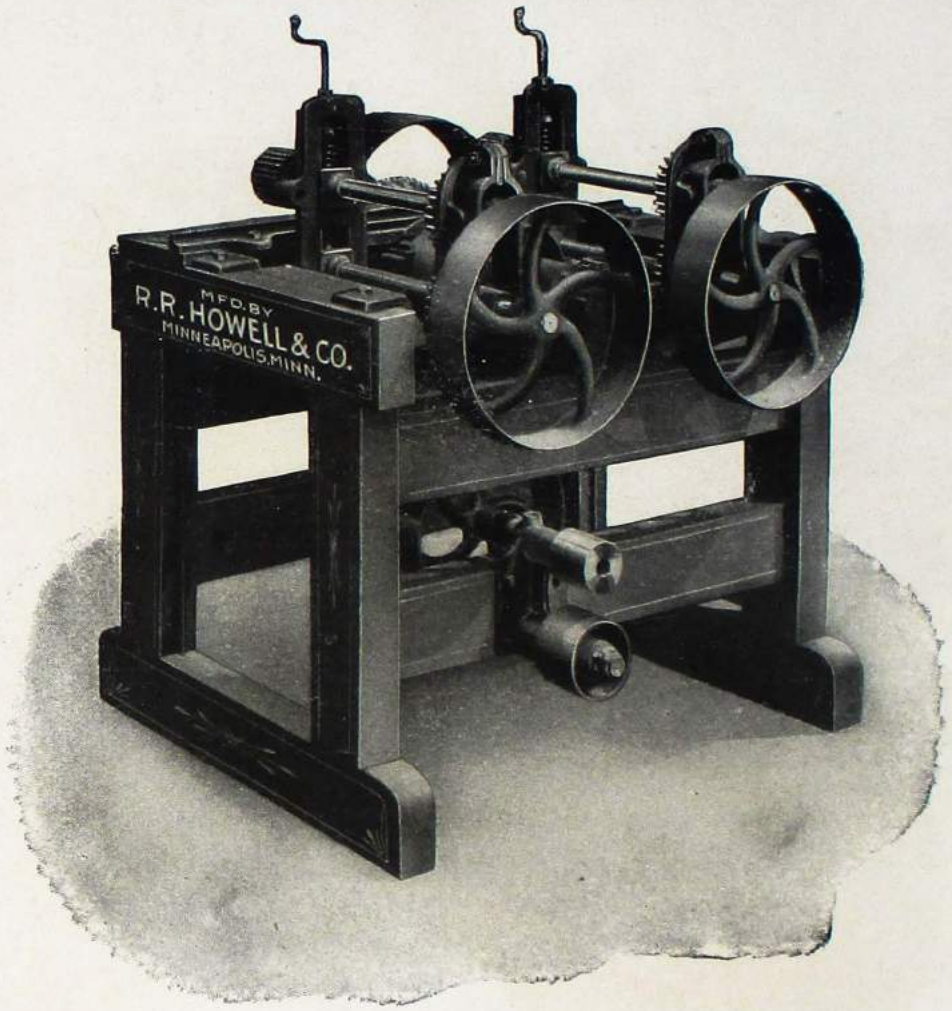
The upper, also rear top feed rolls on Bolting part are provided with levers to raise the Rolls, and allow the stock to be drawn back and prevent burning of the saws.

Both front and rear press roll are hung in an improved swinging arm and connected to driving shaft with universal joint, so that it will never bind or refuse to drop back to its place to receive the next bolt after a lath, picket or bolt has passed. through, and works automatically by its own weight.

Price and Sizes.

Machine	Saws on Lath Part	Saws on Bolting Part	Speed of Lath Saw	Speed of Bolting Saws	Size Pulley on Lath Arbor	Size Pulley on Bolting Arbor	Capac'y Lath per day	Weight	Price with Saws
No.2	5–10 in.	2–18 in.	2600 to 3000	1800	7x9	10x11	30,000 to 50,000	2000	$300

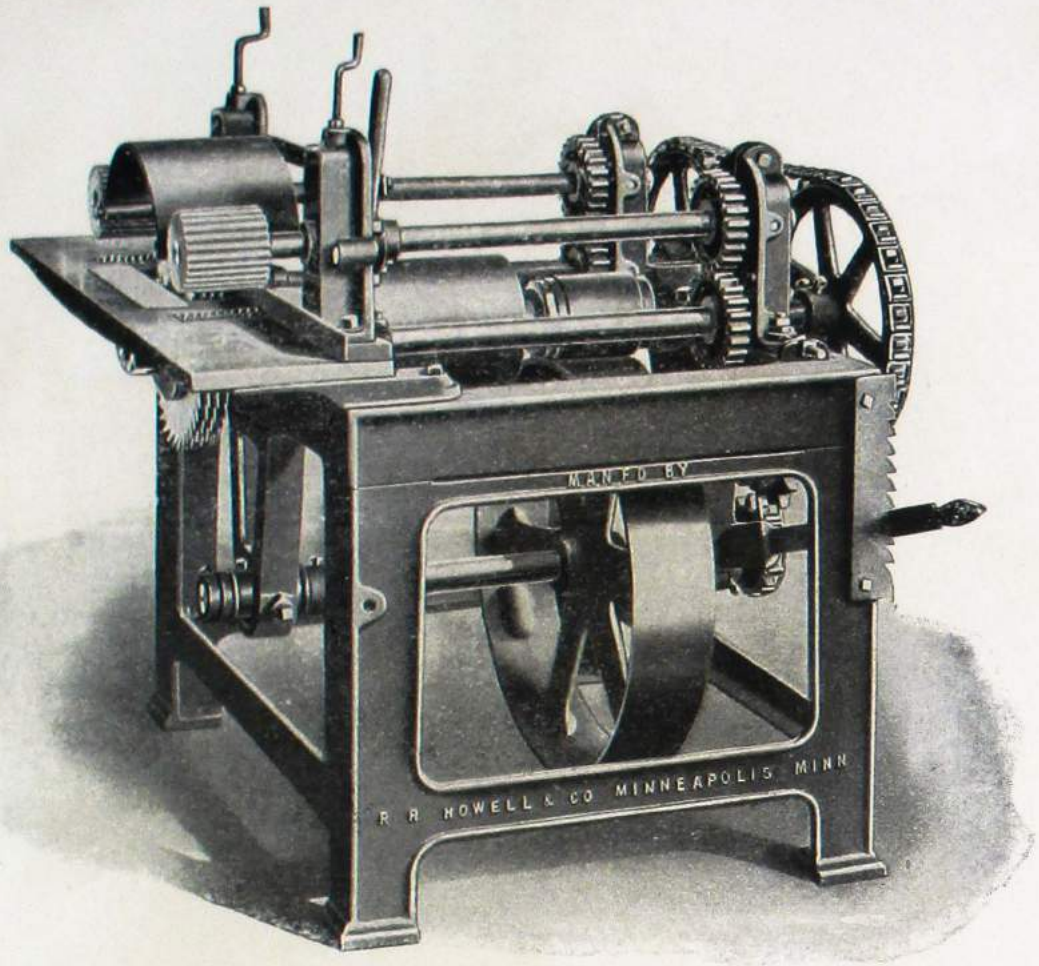
Three-Saw Lath Mill No. 3.



Where it is preferable to have the Lath Mill separate from the bolter, our Improved Three-Saw Lath Mill meets all requirements in mills of ordinary size, for the working of refuse into lath, pickets, slats, etc. It will produce, from reasonably good slabs, from 30,000 to 40,000 laths per day. The rolls are corrugated and adjustable for stock from ⅞-inch to 3-inch in thickness. This machine has 4 power feed rolls, two in front and two back of saws; both upper and lower rolls are driven by power directly from the main arbor. The upper feed rolls are held by spiral springs and can be raised to stop the feed. A steel guard protects the operator from flying dust and splinters. Pickets, slats and other forms, both square and flat, can be cut by the use of saw collars of suitable thickness. The machine carries three 10-inch saws, which are furnished with each machine—this machine can be arranged when so ordered to carry 12-inch saws, also to have four saws instead of three, and requires a floor space of 3 feet by 3½ feet. Pulley, 7x8 inches. Speed, 3,000. Weight, 640 pounds.

Price..... $120.00

NO. 4 GANG LATH MACHINE.



This cut represents our four-saw Gang Lath Machine, especially adapted to large mills. It is very solid and well built, and has many new points of advantage and convenience found in no other machine of its class.

This machine is built entirely of iron and steel. The frame is heavy and rigid, which holds the working parts true and in place. Every part of the machine is made of the best material and is proportionately strong and durable. Adapted for rapid sawing of lath, pickets, curtain roll stock, blind slats, chair and other work.

The stock is fed to the Lath Saws by means of four feed rollers, geared together by sprocket-chain and pinions.

The top rolls are of large diameter, grooved, and are held down by a spring tension, which is adjustable. They can be raised, by a convenient lever, clear of the bolt which can then be withdrawn should it be necessary. Another lever on the right enables the operator to start, stop or ease the feed instantly. The lower rolls are fitted with steel saw teeth or spurs, insuring a powerful positive feed.

The collars are lined well up to the table and the table encloses the saw gap very closely, thereby firmly supporting the stock.

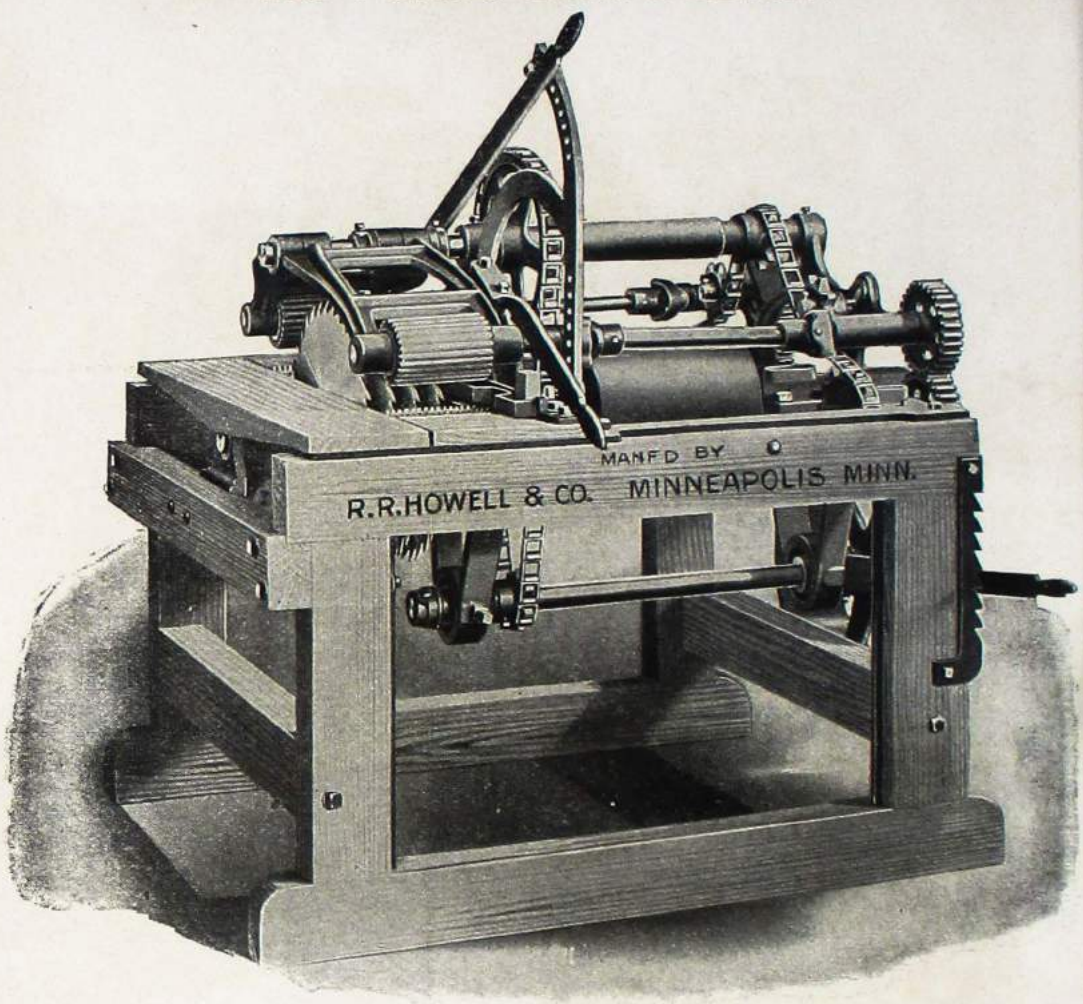
The machine is one of the most easily operated, fastest sawing, and has one of the most powerful feeds of any of the modern lath mills. It has a capacity of 65,000 to 80,000 lath per day, but it will also run economically on any smaller amount.

The machine is provided with four 12-inch saws, fitted with collars of large diameter, enabling the saws to run longer, cooler, and to cut better lath than would be possible with the smaller collars.

Arbor, $2\frac{3}{16}$; Driven Pulley, 7-inch diameter, 8-inch face; Speed, about 2,700 revolutions per minute.

No. 4 Gang Lath Machine. Weight, 1,100 pounds. Price, $225.00.

NO. 4 GANG LATH BOLTER.



This machine is built with a solid cast iron frame in one piece, mounted on substantial wood frame, and contains the steel Saw Arbor, Feed Rolls and all working parts.

It has four live Power Feed Rolls, two on top and two below. The two top Feed Rolls are of solid iron, heavily fluted, all geared together, making the strongest possible feed. They can be instantly opened to stop the feed, if a stick should wedge between the saws.

The arms carrying both these feed rolls swing from a common center with the drive gear, and no matter how thick the stock being fed through the machine is, all drive gears are always in mesh, the shafting being self-aligning.

The lower feed has two power rolls fitted with steel saw teeth or spurs, which project above the top of the table.

The table is of cast iron, planed on top, and one section made so that it may readily be removed when saws are to be taken off.

The Arbor is made of steel, is $2\frac{7}{16}$ inches in diameter, and runs in large babbitted boxes; the pulley is 10 inches in diameter, 10-inch face, and furnished with saws 18 inches in diameter. This machine is made so as to take 20-inch saws, if required.

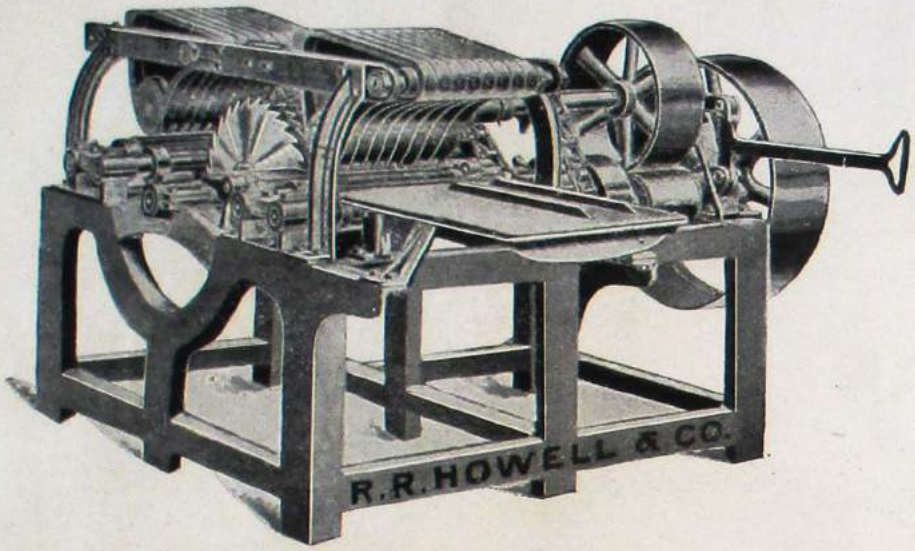
Any of our Bolters can be easily converted into special gang stock machines by only small changes.

The No. 4 Bolter has a bearing support, as shown in cut on both sides of the saws, while the No. 3 Saw Mill has not.

No. 3 Bolter, with three saws; weight, 1,350 pounds. Price, $275.

No. 4 Bolter, with four saws; weight, 1,400 pounds. Price, $300.

NO. 7 SAFETY GANG LATH BOLTER.



Will carry Battery of seven 20-inch saws.

This machine is especially adapted to large mills, to make lath bolts from stock on a large and most extensive scale. It possesses many features that are striking in their originality and merit and has many new points of advantage and convenience found in no other machine of its class. Built with great care, all parts are very heavy, of neat design, strong and durable. Capable of doing a great amount of work and without question the best and most powerful machine for the purpose on the market.

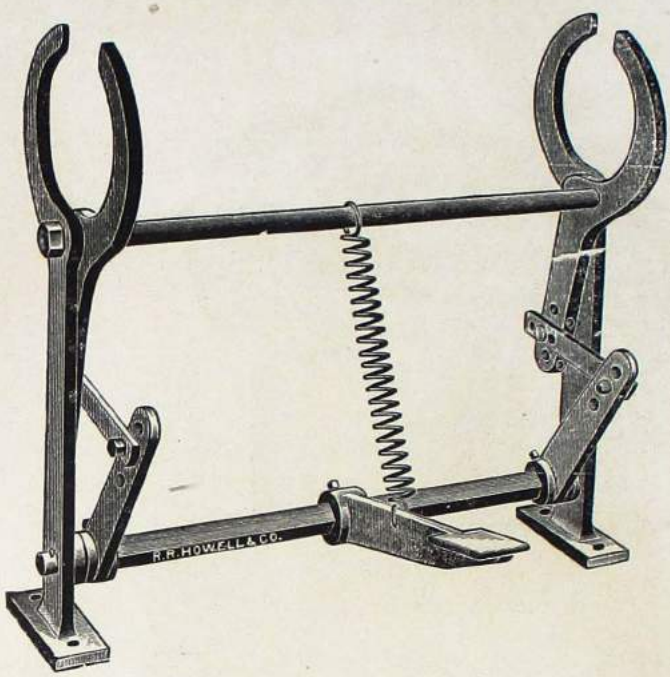
The top Feed Rolls in this machine is a new device, operating as a press roller and guard for each bolt, while, and after, being sawed and until carried entirely away from the machine. These press rolls are each a ribbed roller ten inches in diameter. They operate independently, easily rising over an inequality or round surface of slab, which materially aids the lower roller in feeding.

Everything presented to this machine must pass through and nothing can throw back to endanger the operators, as two separate sets of safety fingers, one in front and another behind the saws, protect the workmen constantly. The feed is strong and positive. The arbor runs in three boxes, two on the inside or pulley side and one on the outside, where a movable journal bridge-tree is so arranged that the saws can readily be removed without disarranging any other part of the machine.

A disappearing guide in the front table, in connection with the regular adjustable guide, broadens the range of work, capacity, and quality of output. Steel fingers, project in between the teeth, preventing short pieces of the stock from being thrown by the saws.

This machine is provided with four lower power-driven spiked Feed Roll. It will take stock up to and including 7 inches thick and of any width. Size driven pulley, 16x15 inches. Saws should run 1,500 revolutions per minute.

No. 7 Safety Gang Lath Bolter; weight, 3,500 pounds. Price, $550.



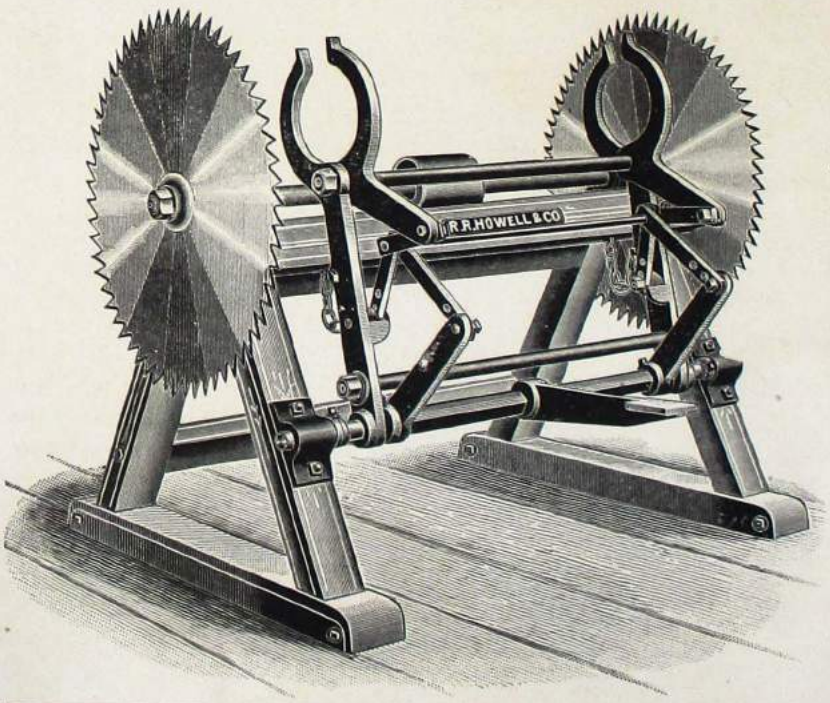
Lath Binder.

This machine has a powerful leverage, making each bundle tight and exactly same size and holding the bundle while its being tied. It is made all of iron and steel with jaws suitable size for standard lath. A coil spring is placed from the frame to the lever so when the foot is off the lever the jaws open for another bundle; does its work nicely, it is also used to put up broom handles, slats, hoops, edgings for fuel, etc.

PRICE AND SIZES.

No.	Capacity.	Weight.	Price.
1	50 Lath	130	$20.00
2	100 "	180	25.00

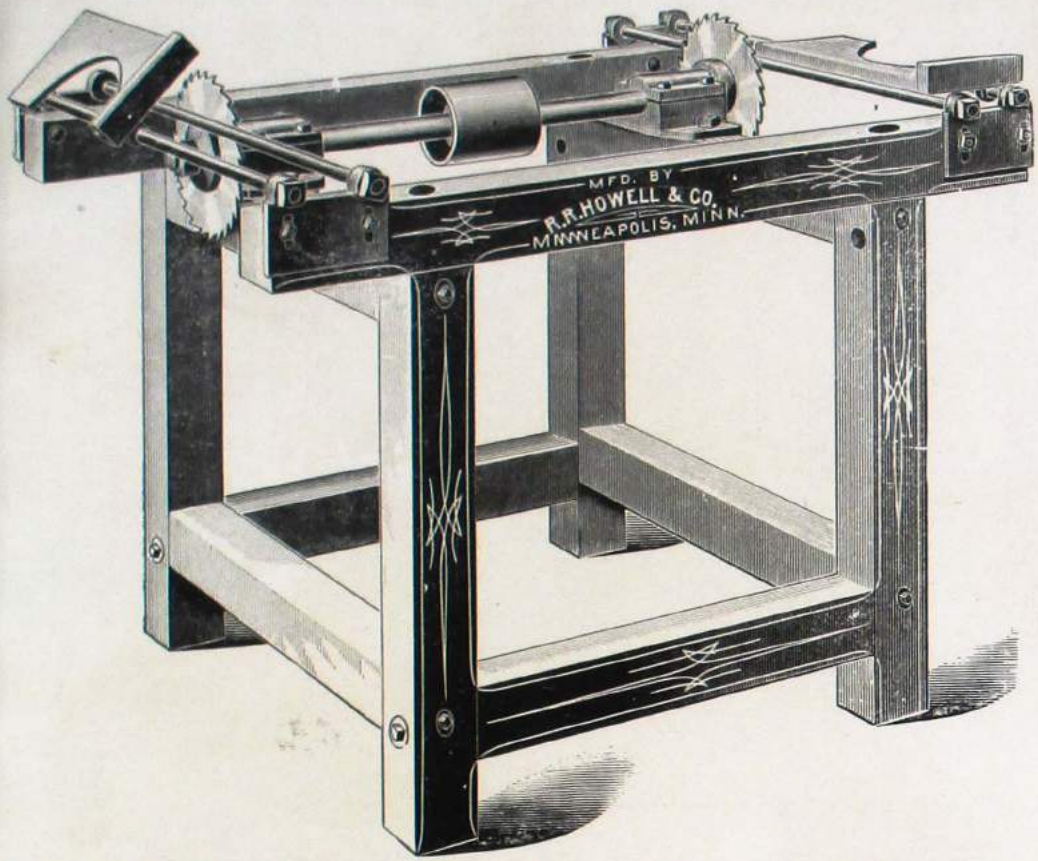
Combined Lath Binder and Trimmer.



This lath binder and trimmer is entirely new in design, very simple in construction, strong and durable. The lath binder is hinged at the bottom to tilt the lath back to the saws, giving a nice appearance to ends of each bundle of lath, and does its work with precision. The bundle is first clamped under great pressure, and tied, then rocked toward the saws and trimmed to exact length, and does not have to be removed from the binder until after it is trimmed, thereby saving time.

No.	Size of Bundle.	Size Saws	Size Arbor	Size Pulley	Speed	Weight	Price
3	50 lath	22 inch.	1--11-16	5 x 8	1200	300 lbs.	$60.00
4	100 "	28 inch.	1—11-16	5 8	1000	340 lbs.	$70.00

Double Knot Saw and Shingle Jointer.

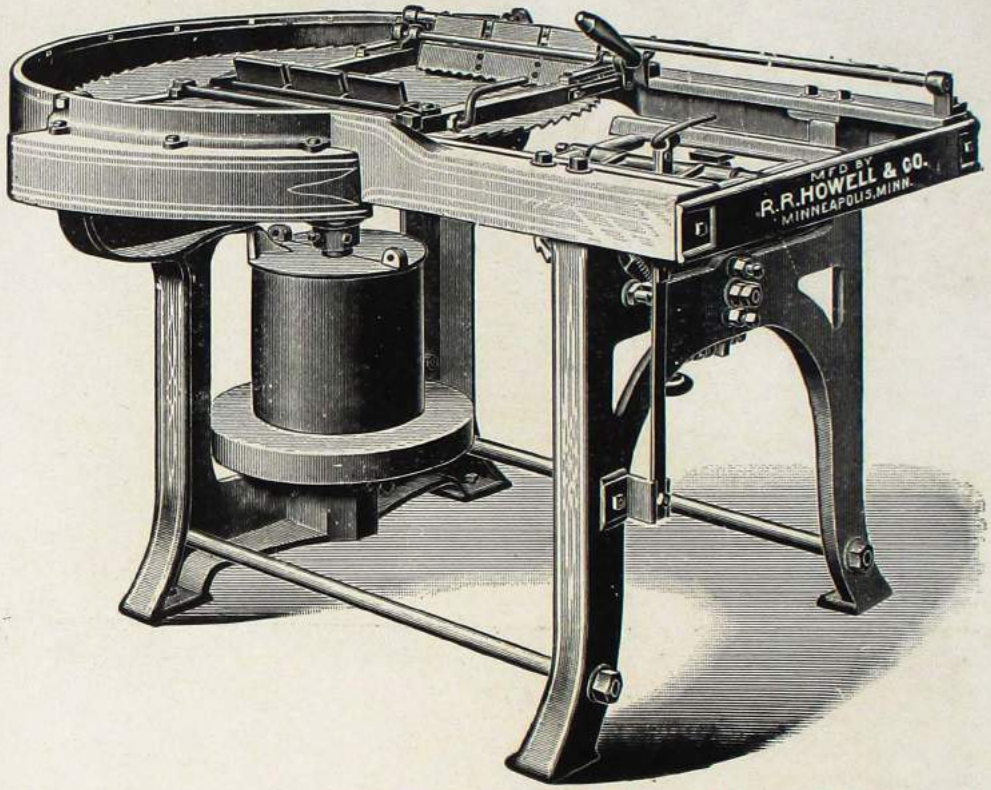


It is especially adapted for edging or jointing shingles made from knotty timber, cutting out knots, sap or other imperfections; and with slight change to sawing slate for vegetable and fruit boxes to even widths. The cut represents a Double Knot Machine arranged with double table and saws to be operated by two persons at the same time. We also make a Single Knot Machine which is narrower and has only one head and table. Its capacity is limited only by the quickness of movement of the operator. It is very **simple** in construction, light in operation and very effective and durable. The shingle carriers are of wood, plated upon the under side with metal so as not to wear in sliding on the track. The ways upon which the shingle carriers slide are two pieces of round steel rod. The carriers being hinged on the rod fartherest from the saw so that they cannot get off the track, yet can be swung up, as shown in cut, to brush off the sawdust or clean the table in an instant as desired. The slides for the tables are adjustable up or down to compensate for wear and the use of different size of saws.

Knot Saw Machines are now being used largely for jointing as well as sawing "knots and rots" out of shingles. There is a saving in stock over the wheel jointer; also securing parallel shingles, forcing many to exchange or set to one side their wheel jointers and use knot saws exclusively.

SIZE.	Size Saws.	Size Arbors.	Size Pulleys.	Speed.	Weight.	PRICE.
Single Machine.....	10 in.	1 7-16	5 x 6	2000 to 3000	160 lbs.	$35.00
Double Machine....	10 in.	1 7-16	5 x 6	2000 to 3000	220 lbs.	50.00

The "Minneapolis" Shingle Machine.



The above cut represents our new "Minneapolis" Shingle Machine, entirely new in design, contained so many improvements over other machines that it was a great favorite from the start, regarded as the best and most desirable single block machine in the market.

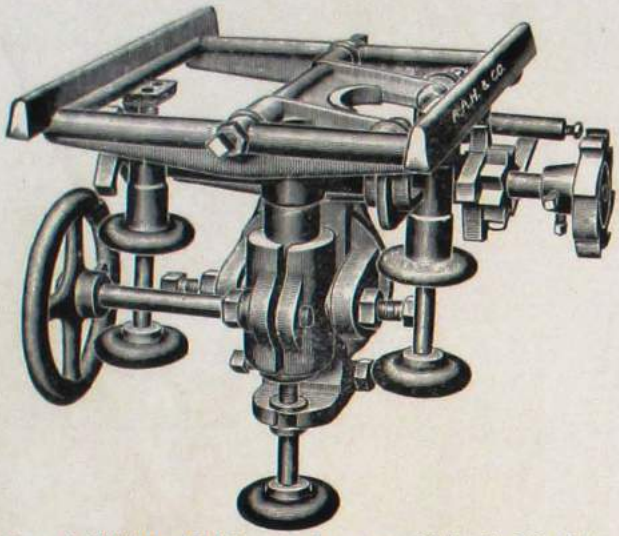
Being fed by hand the operator has complete control, and can regulate the feed according to the timber he is sawing, thus avoiding forcing the saw through curls, knots, etc., and lost time made up in the clear portions.

The bolt and carriage travel away from the saw only enough to just clear it, making the travel considerably less when the bolt is narrow:—a self feed carriage generally travels the whole distance necessary for the wildest bolt, whether the one being sawed be narrow or wide, and this lost time amounts to many pieces in a day. The result is a better average and smoother work. If the saw is properly filed it will almost feed itself, thus making very easy work for the sawyer. The timber is "dogged" very close to the saw, by this means reducing the waste to the smallest possible amount, and rendering a spalt machine unnecessary. In making shingles from cants, slabs, ends of boards, etc., the first cut is a perfect shingle.

This machine is constructed of iron and steel, very heavy and rigid, strongly bolted and braced. It stands complete within itself and requires no effort to put it up, having only to be placed upon its foundation, and it is ready for use. The carriage slides on planed iron ways, which are adjustable to compensate for the wear. The saw is covered with an iron case to prevent the shavings from flying and liability of injury to the operator.

To do perfect work the saw should be filed perfectly straight and square across the tooth, so that both corners of the tooth will cut square through the block. Saw should be perfectly round so that every tooth will do its share of the work. Back of the tooth not higher than the point, a free and ample chamber for the dust. A few minutes filing three or four times a day will save a large amount of time, power and labor expended in running an imperfect and dull saw. Very few saws thus treated fail to give satisfaction.

The COLLAR or FLANGE is 22 or 24 inches in diameter, and is most carefully fitted and finished. They are drilled to correspond with a steel pattern, so that duplicate collars or saws can be furnished at any time.



Cut of **Tilting Table,** used on our Shingle Machine.

The Tilt is entirely automatic, but can be stopped by a simple movement of the left hand handle, which raises the tilt hook, enabling the operator to cut as many butts from one end as desired. The angle of tilt, or thickness at butt or end of shingle, can be readily changed or adjusted. The table of tilt, which regulates the thickness, can be raised and lowered by turning hand wheel, which gives a vertical adjustment of one inch.

These pivots consist of cone pointed cap screws, the points of which enter cone sockets on the adjustable member. No matter how much your machine is used, the lost motion, if any occurs, can be quickly taken up by simply turning one cone pointed cap screw and tightening the jamb nut to hold rigidly in place.

Its pivotal adjustments are perfect and after being set never admit of any lost motion. We can therefore cut more perfect shingles and boards than other makes.

Our tilting table is very positive and free in its action; and the bracket that holds it is **adjustable in every direction,** so the table can be inclined to right or left, to front or rear; and raised or lowered in the bracket; can also be rotated right or left by adjusting screws. All these adjustments are extremely simple and easily made. You do not have to stop your saw to make them and when made they can not work loose.

Three level-headed screws fasten saw with collar to the arbor, thus permitting saws to be quickly changed and always run true. A perfectly balanced fly-wheel and pulley on the arbor insures steady motion.

The machine is simple in construction, easily adjusted, will do a large amount of work can be operated by any one, will saw bevel or straight, as desired, has self-tilting table operated by the movement of the carriage, and is not liable to get out of order. The butts of all shingles are absolutely the same thickness. There is no variation. We aim in our Shingle Mill to combine a reasonable price with excellent work. We invite the closest investigation and will set them beside any machine made.

This machine is a great improvement over all other Shingle Machines.

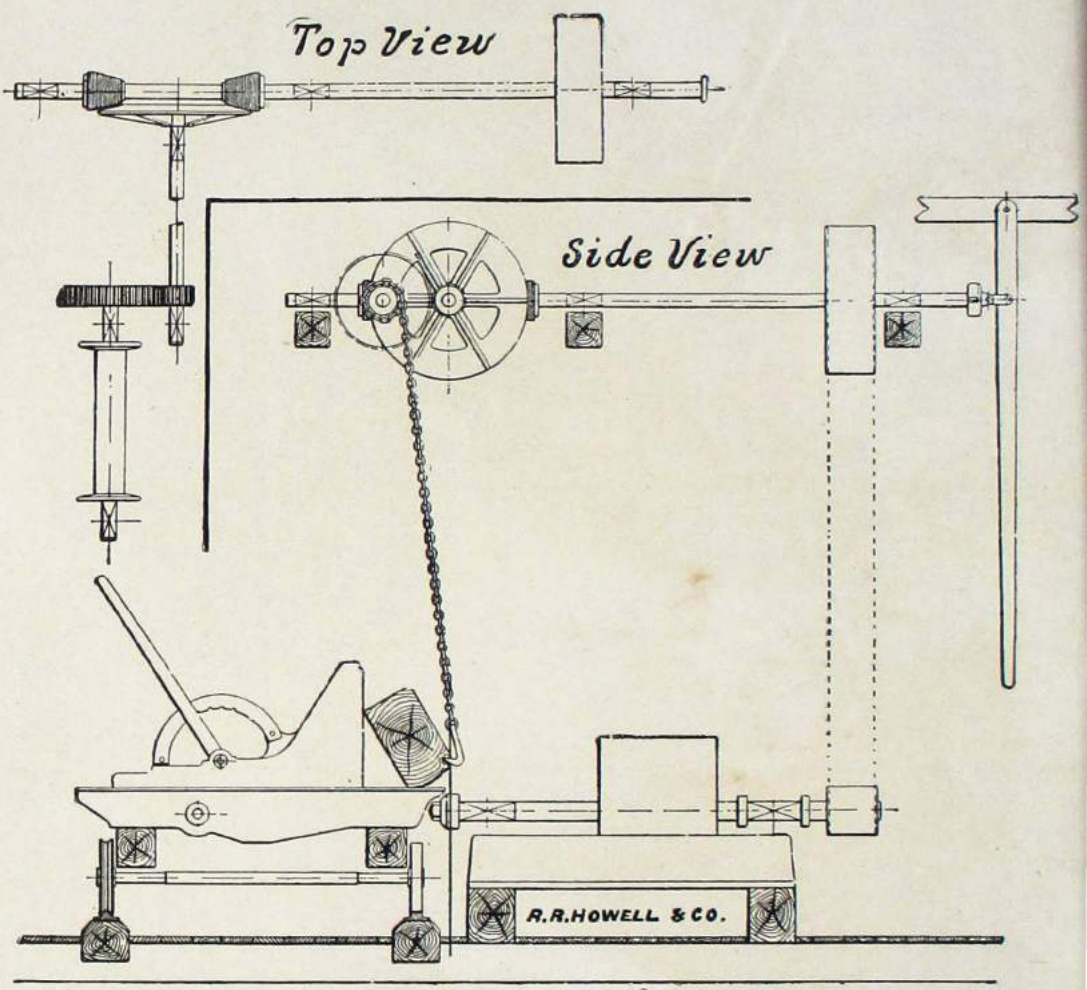
We can furnish special carriage, to saw 20-inch shingles, at additional price of $10.00.

PRICES AND SIZES.

Capacity per Hour.	Size of Shingle.	Size of Pulley.	Speed.	Weight.	Price of Machine with		Price of Saws	
					36 inch Saw	38 inch Saw	36 inch Saw with 22 inch Collar.	38 inch Saw with 24 inch Collar
4 to 5 M.	16 to 18 inch.	12x10½ inch.	1500 to 1600.	900	$200.00	$210.00	$45.00	$50.00

OVERHEAD LOG TURNER.

Doubled Geared Reversible Friction.



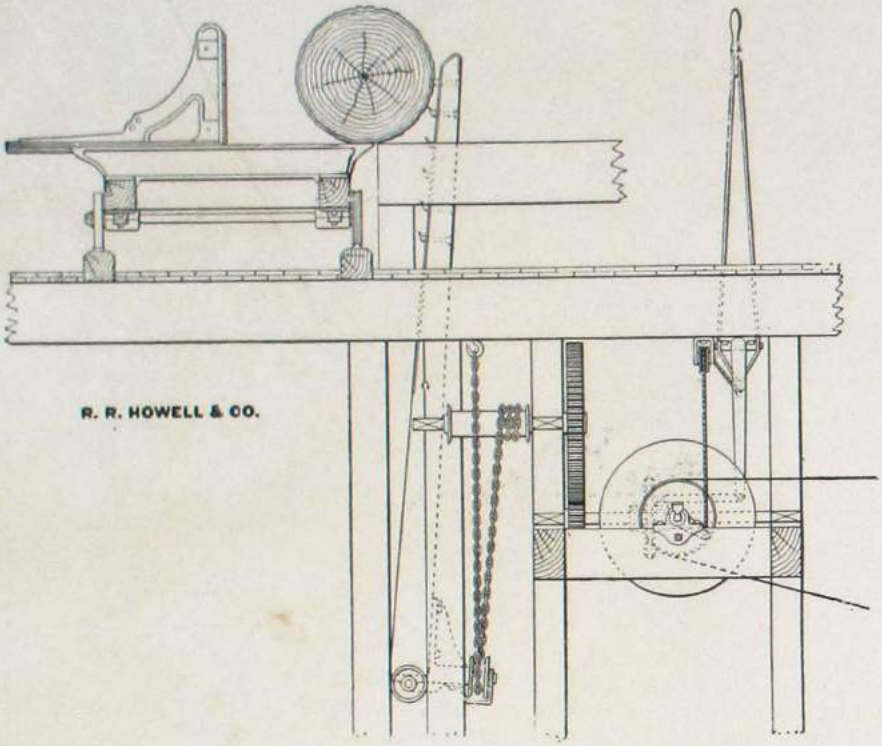
The above engraving represents a strong and simple arrangement for rolling heavy logs unto the saw-mill carriage, and for turning them when slabbing, and one that may also be used for drawing logs onto the mill. In almost every saw mill it is desirable to provide some arrangement for turning the log on the head-blocks quickly and easily in order that the proportionate time during which the saw is out of the log may be reduced to as small an amount as possible. This is a very desirable device, and for medium stationary mills it is indispensable, and no man who would operate his mill profitably can afford to do without. This device acts promptly, is powerful, and is under the instant control of the operator. It is built with spur gears as shown in cut, or bevel gears to suit location. A motion of the lever to the right engage the bevel friction wheels, and causes the chain to descend rapidly. A slight motion to the left will stop the chain instantly. A still further motion to the left engages the friction, puts the gears in motion and winds up the chain. By allowing the friction wheels to slip slightly, the log can be turned as slowly as desired, or it may be canted over nearly as rapidly as would be done by a "nigger."

SINGLE GEARED REVERSIBLE FRICTION OVERHEAD LOG TURNER.

We build a single friction turner in which we dispense with the gears, and place the iron friction directly on the end of the spool shaft. These machines are nicely adapted to small mills where medium logs are cut.

Price, Double Geared Overhead Log Turner.....$100.00
" Single " " " " 75.00

Friction Nigger Log Turner.



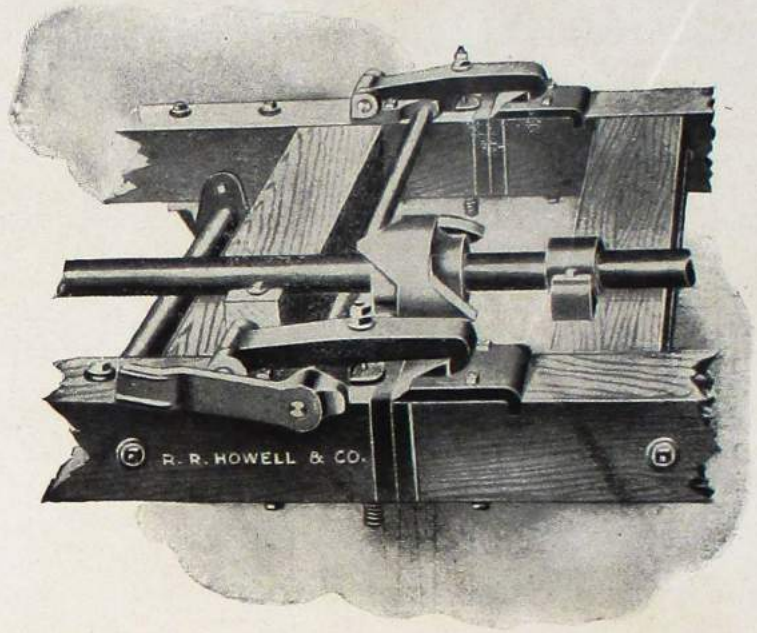
We present a sketch of our Friction Nigger Log Turner which has become so popular in medium sized stationary saw mills and where the timber is too heavy to be handled by hand or overhead turners. No Turner has earned its way before the people or is so well adapted for the rapid and safe handling of large timbers. It is the only Friction Nigger built which one can turn, handspike and straighten timber. It has all the functions of the steam machine, but being driven by friction instead of steam is especially adapted for mills driven by water, or where mill is not large enough to warrant the heavy expense of a steam nigger. With it the largest logs can be handled with ease and perfect safety to the carriage and the head-blocks, while otherwise they could not have been handled with any degree of satisfaction.

This Turner presents the advantages of a Steam Nigger, being nearly as rapid, while at the same time it costs much less and is deprived of the spring-like action of the Steam Nigger and which results in the log being thrown hard against the knees, especially when the log does not start to turn freely but sticks in the blocks. The power used may either be sufficient to turn the very heaviest logs in a twinkling, or merely hold an ordinary log against the uprights until dogged. This machine can be readily attached to any mill and is easily operated; is simple and powerful and will soon pay for itself.

A good Log Turner not only does away with the most severe drudgery about the mill, but will save a man's wages every day the mill runs. With it, three men can do more work than four can do without it.

Size of Pulley. 30 inches diameter, 6 inch face, and should make 100 revolutions. Price of Friction Nigger Log Turner, with beam, complete **$130,00**

Automatic Carriage Coupling.



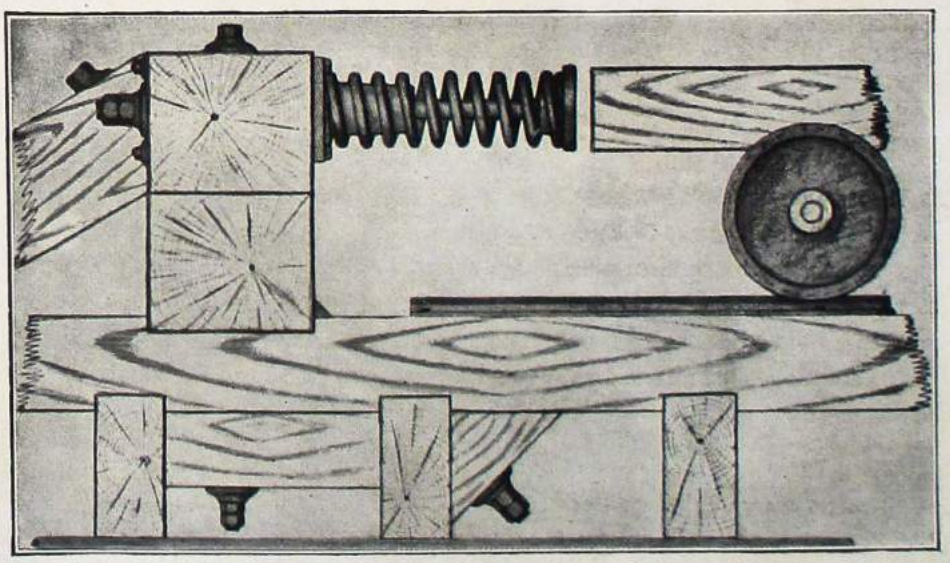
Our Automatic Coupling, for sawmill carriages, is so clearly illustrated by the accompanying cut that little explanation is necessary.

The sections are coupled by simply bringing them together, the hooks being self-acting and the set shafts self-adjusting, so that the two parts will connect when brought together, provided the knees on the different sections are not more than six inches out of line. To uncouple, the rider merely presses upon the lever shown, with his foot, thus raising both hooks and severing all connections.

For light carriages up to our No. 10 mill, we use a plate coupling. For heavy carriages, we use the automatic coupling shown above.

Price, Automatic Coupler for heavy carriages.....$100.00

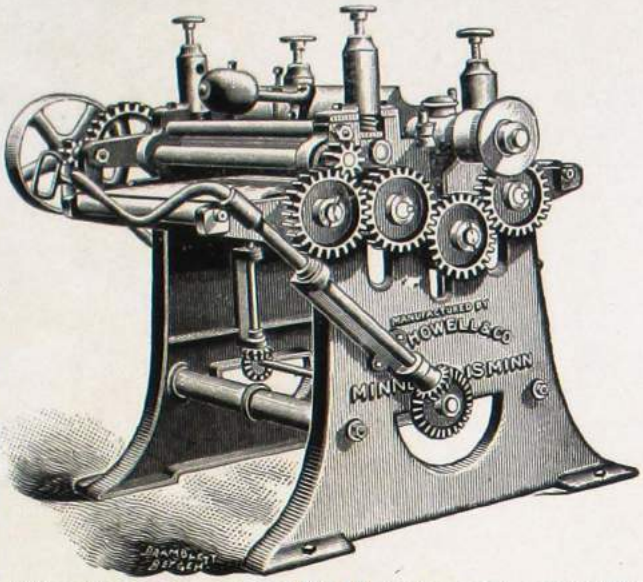
Spring Cushion For Saw Mill Carriage.



The spring cushion is inexpensive, very simple, and not liable to get out of order, yet very satisfactory and effective for medium size mills. It consists of four oil-tempered car springs, eight circular cast ends and four rods, the wood frame work being done at the mill.

Price, complete set $30.00

THE HOWELL PLANER.

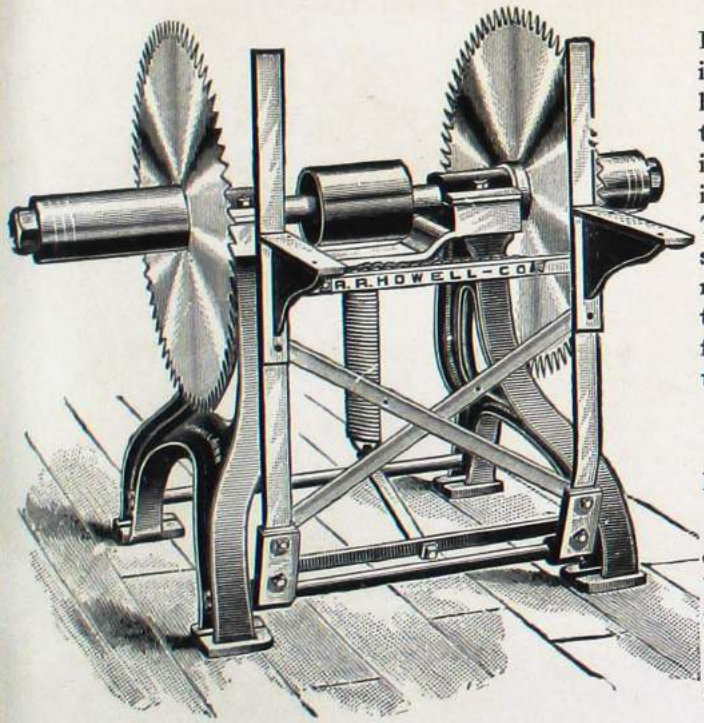


Our Planer is designed to combine the best points of modern machines in such a manner as to insure perfect and rapid work with the greatest durability of the working parts. Constructed wholly of iron and steel, and is heavier than any other machine of its class in the market. The construction of the planer is such that the operator raises and lowers the bed and stops or starts the feed without moving from the position occupied in feeding; has two sets of feed-rolls, one for feeding in, and one for feeding out. The upper and lower rolls are connected by strong gearing, working the whole range of the machine without change. Each top roll is held by two cold-drawn steel wire springs, which may be adjusted to exert as strong a pressure as desired upon the lower rolls. The cylinder is driven by belts at each end of the arbor, thus securing a steady and strong motion, without tremor,—even at the highest speed—and at the same time equalizing the wear upon the boxes. The cylinder—with its bearings—is forged from steel in one solid piece, and carries two knives. We offer our machines with entire confidence, as the best in the market. This machine planes 24 inches wide and 1-16 up to 6 inches thick, and should make 4,000 revolutions per minute. Weight 1,800 pounds.

Price. 20-inch Planer.....$250 | Price, 24-inch Planer.....$275

Counter Shaft if wanted extra, $30.

Stave Bolt Equalizer.



This cut represents our Bolt Equalizer, for the purpose of equalizing the length of Stave Bolts. It has self-oiling boxes, steel arbor, two 30 in. saws; arbor is made so it can be set for 28 in. stave, varying ⅜ in. up to 34 in. Speed, 1,200. The above cut shows the machine so perfectly that we deem it unnecessary to give any further detailed description. Any size saw from 30 to 36 ins. can be used with this machine.

Pulley, 6 in. diam. by 9 in. face.
Weight, 600 lbs.

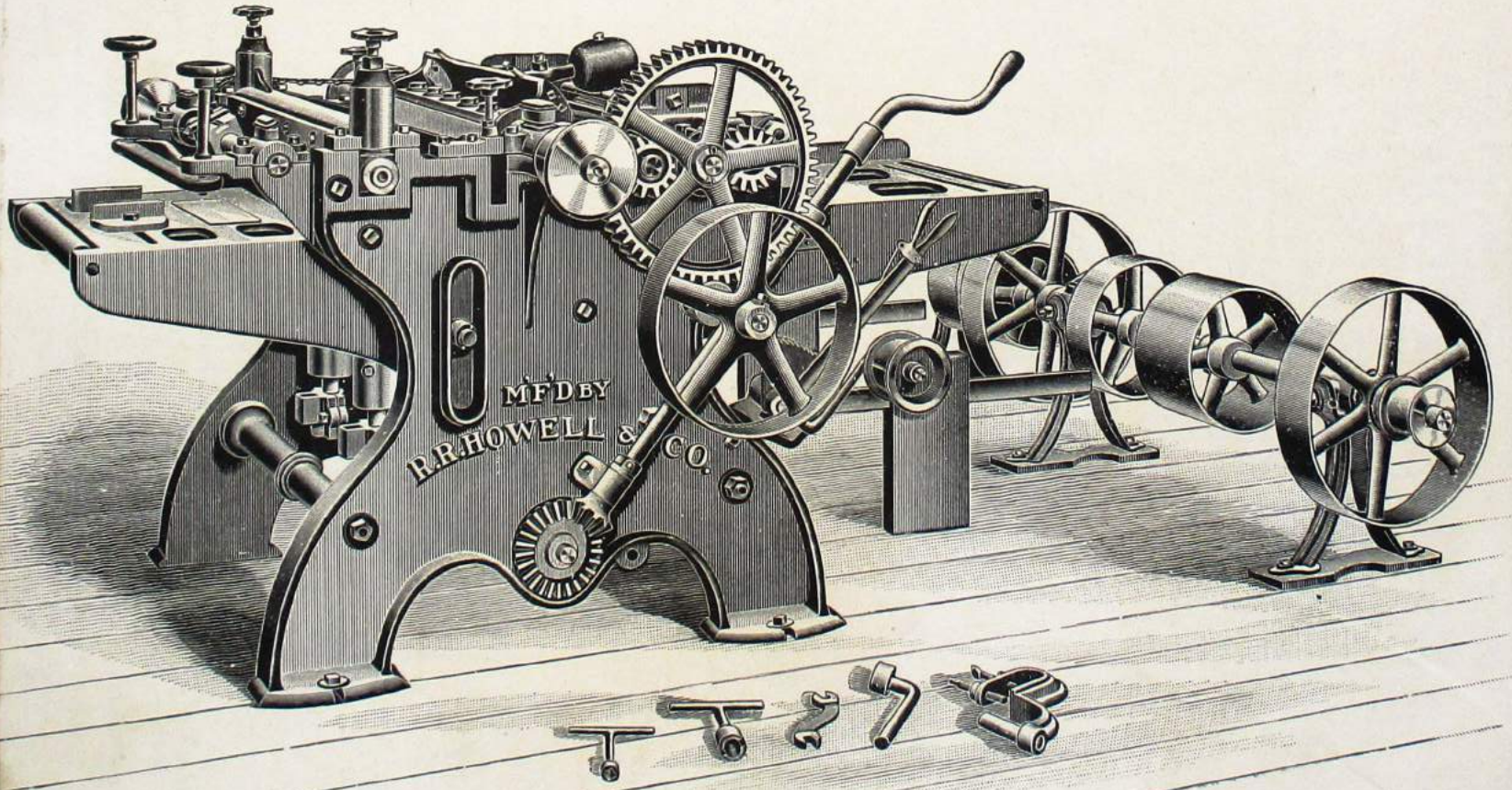
Price, with two 30 in. saws $130.00

We also make Bolting Saw for cross-cutting, heading and shingle bolts. The carriage is suspended from above the machine.

Weight, 700 lbs. Speed, 900.

Price with 40 in. saw.....$110.00

The Howell Planer and Matcher



The Howell Planer and Matcher.

(See Illustration on preceding page.)

Our Planer and Matcher is built to meet a demand for a medium-priced machine to do planing, matching and moulding for custom work in factories and carpenter shops where a good, reliable machine is wanted. We put these planers on the market on their merits, and our great experience in building machinery enables us to guarantee them in the highest terms.

The frame of planer is especially designed for strength and strain, and is so constructed that the belts clear each other, so that all friction and wearing out of belts, heating of boxes, etc., are overcome There is also plenty of room to get at various parts of the machine.

The cylinder is driven by belts at each end of the arbor, thus securing a steady and strong motion without tremor, and at the same time equalizing the wear upon the boxes. The cylinder—with its bearings—is forged from steel in one solid piece, and carries two knives. The journals are $1\frac{9}{16}$ inches in diameter, and 8 inches long. The boxes are well lined with the best genuine babbitt metal.

It planes 24 inches wide and from ⅛ inch to 6 inches in thickness; and tongues and grooves flooring, ceiling, etc., 12 inches wide or less, and is well suited for working drop or patent siding, matching moulding, beading, etc. The bed is 6 feet 4 inches long; 24 inches wide, cast in one solid piece, making it very strong. Fitted between long, heavy guides. The changing of the machine to cut different thicknesses is quick and simple. The entire bed with matcher heads is raised and lowered simultaneously by a single hand-wheel, and the cylinder being in stationery boxes, when once set, are always the same. The advantage of having the side heads rise and lower with the table is obvious, as every time the table is raised and lowered it does not interfere in any way with the cut of the side heads, but raises and lowers them with it. A glance at an index on side shows the thickness to be planed and requires no further setting. The chip breakers are well arranged and are convenient to adjust. The feed work consists of three adjustable solid feed rollers, 3½ inches in diameter; the three rollers being driven, two of which are weighted. The pressure bar is very close to the cylinder, thus keeping the boards perfectly steady and not admitting the slightest tremble.

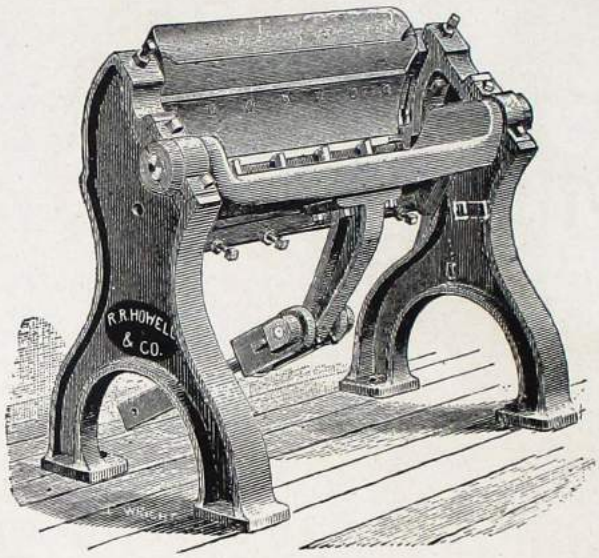
The matcher spindles, $1\frac{3}{16}$ inches diameter, are of the best grade of steel, absolutely true, and run in independent frames, with 4¼ inch self-oiling boxes. The heads are carefully fitted, adjustable and accurately balanced; may be entirely removed from the spindles for wide surfacing by loosening two set screws. The spring which holds the lumber to the guide is adjustable to and from the guide and may be removed to the side and out of the way when using the machine full width for surfacing only.

Has moulding head, 6 inches long, swings bits 3½ to 5 inches wide and ⅜ inch thick, independent steel spindle, $1\frac{7}{16}$ inches, is placed just behind the feeding-out rolls; runs in 5½ inch boxes, well lined with superior babbitt, and is belted from the same driving pulley on the counter shaft as the cylinder. The head is adjustable the entire width of the bed and cutters may be set any depth. The head has two sides slotted and the entire moulding attachment, including head, boxes and spindles, can be adjusted vertically, and cuts ⅛ to ⅞ inches deep. Cut shows our machine with molding attachment, which is attached directly back of the regular cylinder head. This is furnished with the machine only when so ordered, and at an additional price of $25.00.

Single Surface Planer and Matcher	18	inches	wide,	no belts,	weight	2620	lbs.	.....	$300.00
" " " " "	24	"	"	"	"	3200	"	.....	350.00
Double " " " "	24	"	"	"	"	3500	"	.....	450.00

Stave Cutting Machine.

This machine is built exceedingly heavy, compact and substantial; especially adapted to perform heavy duty required of a stave cutter; contains all the latest improvements and guaranteed superior to any other make. Our No. 1 Machine is the usual size sold, 36 inch knife, 20 inch circle, for Flour and Fruit Barrel staves; the rib gauges are faced with steel, or if preferred, with brass or copper to prevent discoloring of the staves. The counter shaft commonly used with this machine consists of a shaft with crank, crank pin, journal boxes, pulleys, and a 600 lb. fly wheel.



Capacity, 18,000 to 30,000 staves per day, varying with the timber and skill of operator—one cord of good stave bolts should yield 1,000 to 1,200 slack barrel staves. Speed, 100 to 120.

Power required, about 4-horse.

PRICE:

No. 1 Stave Cutter,	36	in.	knife,			$175.00
" 2 "	"	30	"	"		140.00
" 3 "	"	24	"	"		115.00
Counter shaft with fly wheel.....						90.00

Howell Heading Jointers.

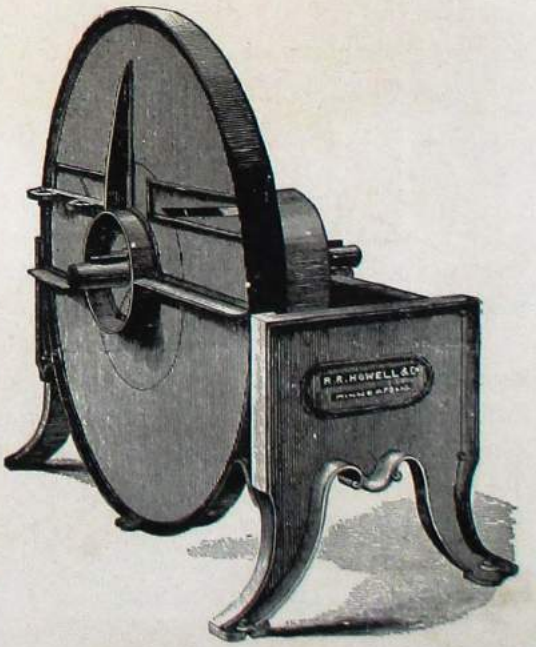
This cut shows our Iron Frame Heading Jointer, for jointing Barrel or Keg Heads, Tub Bottoms, Shingles, &c., and is admirably adapted to the purpose, and excels all other makes. The knives are so arranged as to secure uniform draw cut from the point to the heel; this causes the knife to wear away alike over its entire length, so they do not require grinding oftener than once every six to seven days. The wheel is solid and has a wrought iron band tightly shrunk on the rim, tight and loose pulley, and contains all the latest improvements.

We also make this machine with the wheel cased, thus acting as a blower to remove the shavings by spout and keeping clean and clear about the machine.

PRICE:

36 Inch Wheel.....			$ 80.00
48 "	"	.....	140.00
60 "	"	.....	210.00

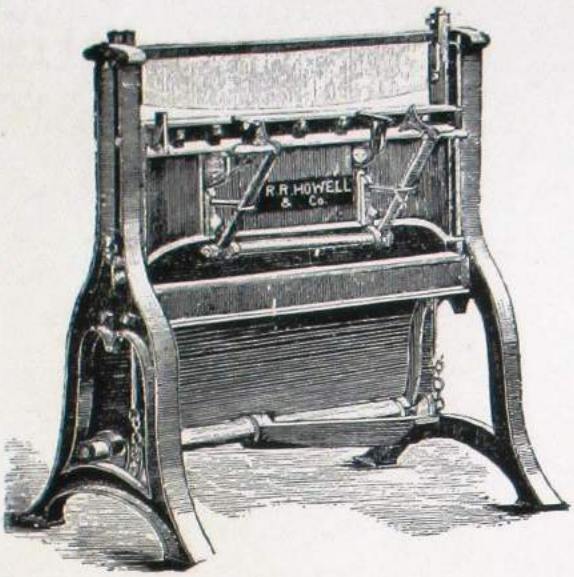
Blower Case extra.



FIVE FEET, SIX KNIFE WHEEL JOINTER.

Howell Stave Jointer.

STATIONARY KNIFE.

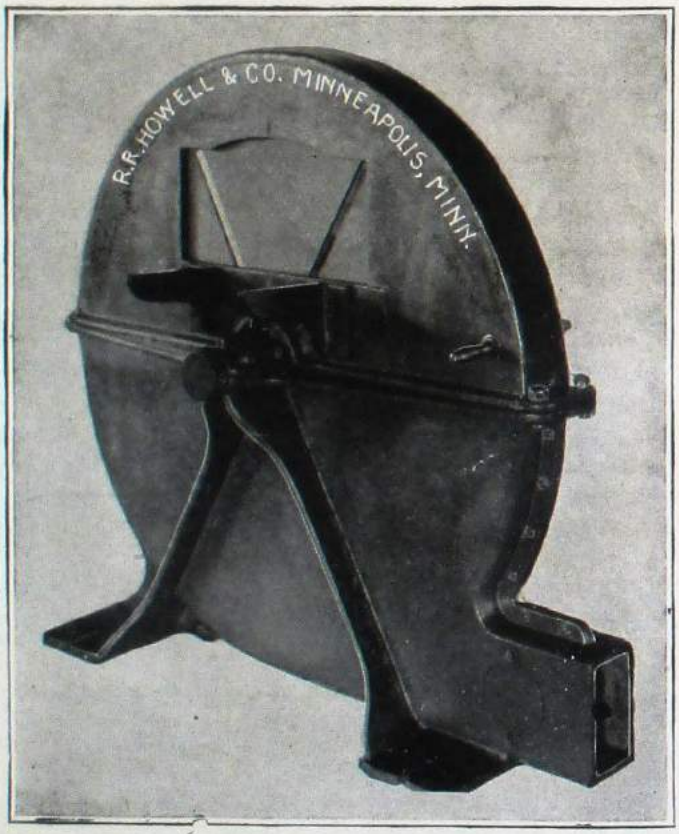


This Jointer is used for jointing to the desired bilge flour and other slack and barrel staves. The cut shows the machine so plain and it is so well known, that it is unnecessary for any further description. They will joint fro n 4,000 to 6,000 staves per day.

No. 1 Stave Jointer, 36 in. knife, for Slack Barrel Staves	$ 80.00
No. 2 Stave Jointer, 32 in. knife, for Slack Barrel Staves	72.00
No. 3 Stave Jointer, 24 in. knife, for Keg Staves	65.00

Heading Jointer and Barker.

WITH BLOWER CASE.



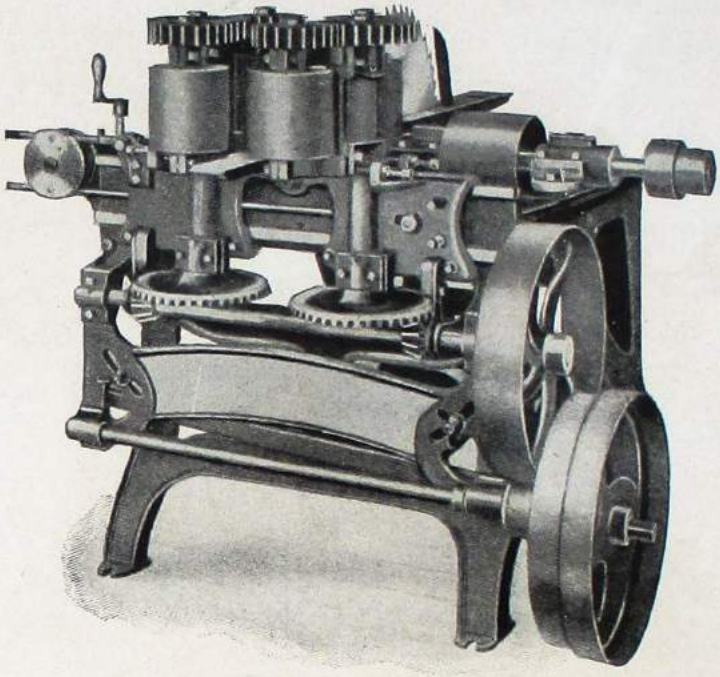
This is an excellent machine for dressing the edges of cheese-box bottoms and tops, and tub bottoms, also for taking bark off from short logs and a large variety of similar work. The new design of its frame and wheel case makes it an excellent blower to carry away its shavings, and it will also draw the shavings and dust from the planer and turner if pipes are led to it from them. It is fast proving itself to be the coming jointer. It will joint about 8,000 pieces per day of ten hours. The wheel is solid, and has a wrought-iron band tightly shrunk The upper half of the case is hinged to the lower part, and by loosening one bolt at the right-hand end of the machine the top can be swung over, allowing the wheel to be removed with ease. There is a door on the back side of the upper case through which the knives are easily removed for grinding, etc. Knives are 20 inches long, and are so placed in the wheel as to have an even draw cut over the entire length of the knife from heel to point, and at such an angle to the grain as to make a perfect joint even in poor timber.

This machine has been thoroughly tested and pronounced to be the best in the market.

Price, 36 inch Heading Jointer and Barker, weight 1,600 pounds $110.00
Price, 48-inch Heading Jointer and Barker, weight 2,000 pounds..... 175.00

Circular Resawing Machine.

4 Roller Power Feed.



The above cut shows our Re-Saw Machine, carrying 20 to 26 inch solid Saw Blade for sawing siding, weather-boards or thin lumber, fruit boxes, etc. It has four 6-inch diameter by 9¼-inch long feed rolls, all strongly geared, and held to their work by a heavy weight. All take hold of the board at the same time, and consantly press the board in its course through the machine, even though its surface be very irregular. This is the most simple and effective machine of the class in the market. For nearly all classes of resawing it is the equal of the larger and more expensive machines.

It will center any thickness of stock up to 9-inch automatically, and do it accurately. Or, the feed works may be made rigid on one side so as to take off any thickness required, leaving the opposite rolls yielding and quickly adjustable to whatever thickness of stock is run. The rolls are so arranged that they can be set for any bevel required, as in the case of making bevel siding, etc., and still work perfectly free and easy. The feed rolls are all power driven, and can be instantly stopped, started or reversed, without operator's changing his position. The arbor is held in heavy boxes which may be adjusted toward the feed mechanism as the saw wears down, or to use a smaller saw if the work requires it.

The rolls and feed works are carried on a swinging frame, turning on a saddle, held in place by hand wheel, shown at bottom of cut and adjustable by hand wheel and screw, thus enabling the operator to run siding or any bevel work.

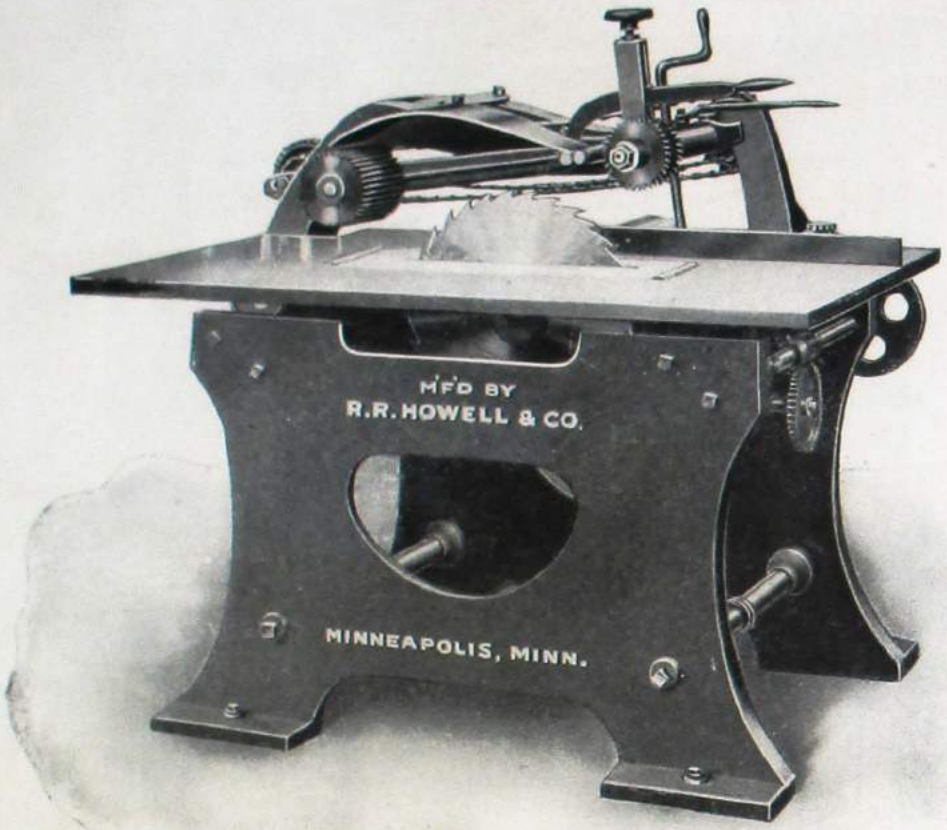
One first quality taper saw, ground thin on the rim to take out as little kerf as possible; 24-inch diameter splits 9-inch wide is supplied with each machine. The machine may be belted either from above or below.

Countershaft, if supplied, charged extra.

A capacity of from 50 to 100 lineal feet per minute.

Machine	Wt.	Drive Pulley	Speed	Power	Floor Space	Price
24 in. Resaw	1100 lbs.	10 in. dia. 8 in. face	1500	3 to 5 H. P.	4x3½ ft.	$250.

Power Feeding Rip Saw Table.



Our Self-Feed Rip Saw Machine is constructed entirely of iron and steel in the most substantial manner. A heavy, well proportioned, durable machine, designed for ripping any kind of lumber, hard or soft wood, up to 16 inches wide by 6½ inches thick. For rapidity in cutting lumber, this is a machine that has no equal. The limit is simply in the ability of the saw to cut. Parties using these machines claim a great saving in time and material, also doing better work.

THE MANDREL is of steel, 2 inches in diameter, grooved to prevent end motion, running in three long, self-oiling boxes, one of them outside the driving pulley, and is arranged for sectional collars of different widths, so that two or more saws can be used at one time.

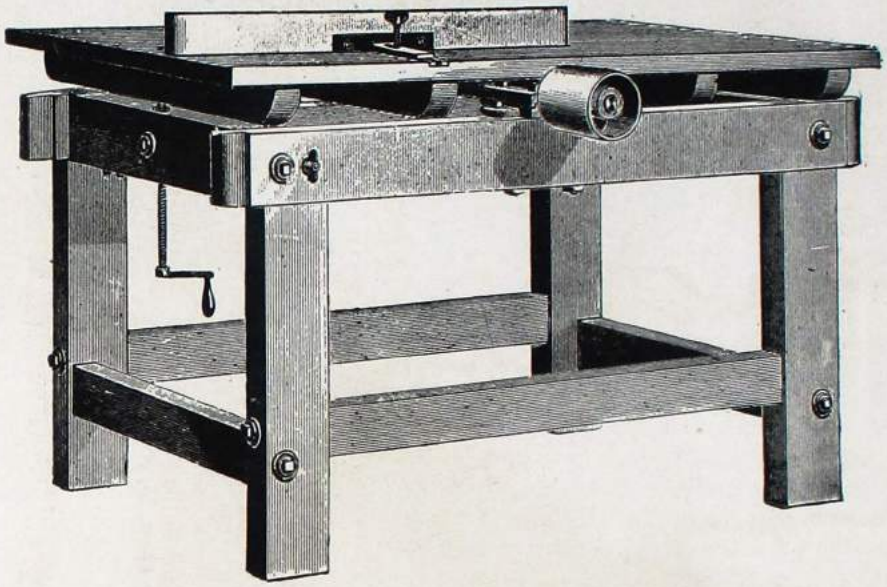
THE FEED MECHANISM is particularly powerful and simple, and most convenient and satisfactory in operation. Two feeds, 120 and 72 feet per minute, are obtained by cone pulleys, while a lever at the front controls a clutch by which the feed may be instantly stopped and started. The whole may be easily taken from the table if desired for general use. The Steel Spur Feed Wheel is placed in front of the saw and readily adjusts itself for any inequalities in thickness of stock from ¼ inch up to 6½ inches; and at the rear of the saw is a 5-inch corrugated power drive roll, which helps to feed the stock, and prevents the material from flying back, and insures absolute safety to the operator.

THE TABLE is iron, has a true machined surface, and opening into which a hardwood plate is accurately fitted to admit of changing the saws and to avoid raising the table, and is provided with idle rolls in front of the saw and at the rear which prevents friction and wear. The table is raised and lowered vertically very quickly by means of a hand wheel and worm placed in front under the table, and always maintains a parallel position.

Saws as large as 20 inches in diameter can be used on this machine. We furnish with each machine one 16-inch rip saw, feed spurs and necessary wrenches. Countershaft extra when desired.

Diameter pulley on arbor, 7x7 inches. Revolutions per minute, 2,600 to 3,000. Average horse power, 3 to 5. Weight, 1,650. Price.....$225.00

Saw Tables--Rip and Cut-Off.



A simple, substantial machine, well proportioned and thoroughly well made throughout. The frame is of hard wood, securely mortised and bolted together, making it very rigid. The table is also of hard wood perfectly true and hinged at the rear-end, and a raising screw in front for elevating the top to accommodate the stock to be sawed and for changing depth of cut. The Ripping Gauge is placed to the right of the saw and is adjustable to and from the saw. To the left of the saw is placed (if ordered and at extra price), a Cut-Off Gauge, fitted in an iron, dove-tailed slide, and is, therefore, always perfectly parallel with the saw line, arranged to cut at any angle up to 45 degrees. The arbor is steel with heavy boxes, and lined with the best quality of babbitt metal. The journal next to the collar has several grooves in it, with corresponding rings in the box lining, which prevents all lateral or end motion, and keeps the saw always in its place. One 16-inch Rip Saw is supplied with each No. 1 machine, also a 14-inch Cross Cut with No. 2 machine.

Speed.—Run the periphery of the saw 9,000 feet per minute. Power required to drive above, 1 to 6 horse.

No. 1 Saw Table Ripping only; Weight 425 lbs.....Price $75.00
No. 2 Saw Table with Cut-off; Weight 450 lbs.....Price $85.00

Wood Turning Lathes.

They are built in a substantial and workmanlike manner, of good materials, made heavy and strong in all their parts, adapted to all kinds of wood-turning usually done in the mill and shop.

The spindle in tail-stock is operated by hand wheel and screw, which admits of the stock being placed or removed instantly.

This lathe is made to be used on wood or iron frame, either of which we furnish when desired, and at an extra charge. It has three step pulleys to change the speed and takes 2½-inch belt. They are arranged to take a back face plate if desired, and are furnished with one rest stand, two T rests, face plate, one spur and one screw center, cup center for tailstock, also fastening bolt and clamps. Made in two sizes, 16-inch and 20-inch swing. We can furnish countershaft if wanted at an extra price.

Price, 16-inch Swing Wood Lathe—Irons only $30.00
Price, 20-inch Swing Wood Lathe—Irons only 35.00

THE "MINNEAPOLIS" DOUBLE HEAD EXCELSIOR CUTTING MACHINE.

TWO CUTTERS CUT TWICE AS MUCH AS ONE.

The Minneapolis Excelsior Cutter operates on the down stroke, curling and separating the excelsior as it is made. It has two cutter-heads, driven by a single shaft, cutting the product from two blocks at the same time and motion, thus producing a double quantity of excelsior.

This is the most substantial, durable and economical machine, one that is capable of making a finer and better quality of excelsior than any machine on the market.

The excelsior of commerce is made in three distinct grades, according to its width and thickness. The "fine" is 1-26th inch wide; the "medium," 5-32nd inch wide and the "coarse," 3-16th inch wide. It is all, approximately, 16 inches in length, that being the average cut of the machines. In thickness it varies from 1-50th to 1-100th inch; the coarser grade, used for packing, is generally either 1-50th or 1-60th inch thick, and the finer grades run form 1-80th to 1-100th inch.

It is the most economical machine on the market, because of the minimum amount of labor required to operate it. One man can readily operate three machines, keeping six blocks before the cutters all the while.

No special skill is required to operate this machine. A man of ordinary intelligence can become proficient in a day.

Power Required.—Two to three horse power per machine, operating a double cutter.

Floor Space Occupied.—Width, 3 ft. 4 ins.; depth, 3 ft. 6 ins.; height, 11 ft. 6 ins.

Pulleys.—24 in. diameter, 6 in. face; making 200 revolutions per minute.

Frame is of selected oak and iron, weighing 1,400 pounds.

Treadle operations of fhe feed roll leaves the operator's both hands free.

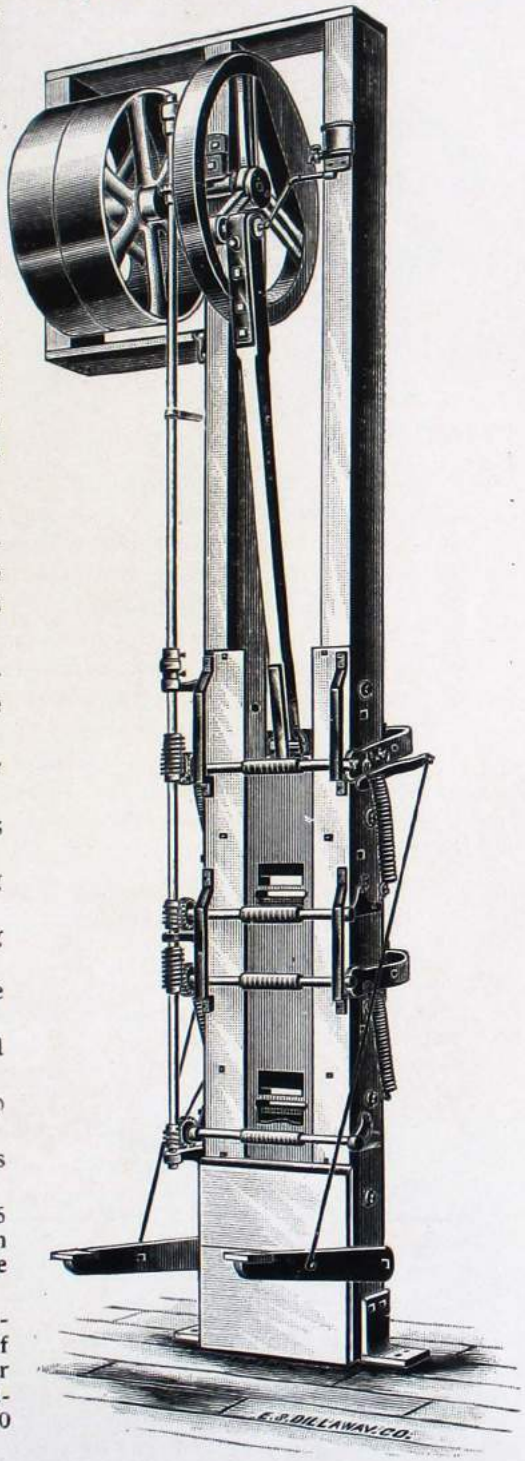
Adjustable bolts take up the wear and avoid sawdust and excessively fine shavings.

Self-oiling equipment throughout—an oil-cup for each bearing. One oiling a day is sufficient.

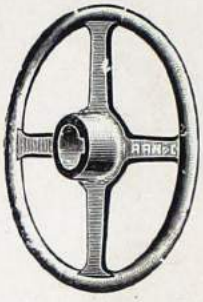
Economy is secured by having two cutter heads on one cutter, saving space and power.

Capacity, per hour, 225 pounds coarse, 215 pounds medium and 175 pounds fine excelsior from good quality of wood. A cord of wood will make nearly a ton of excelsior.

The Price of the Minneapolis Double Head Excelsior-Cutting Machine including two sets (four) of knives, four sets of spur boxes filled with spurs for making either fine, medium or coarse excelsior, according to the orders, with oilers and wrenches, $220.00

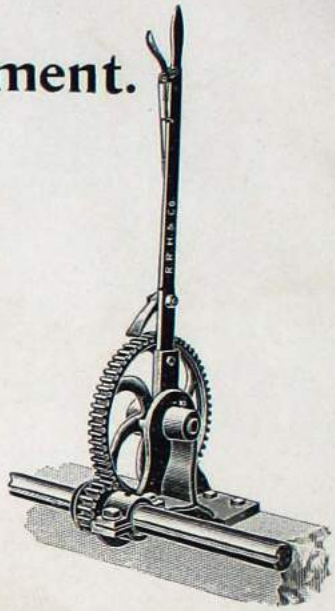


Receding Knee Attachment.



Hand Wheel. Fig. 1.

Gearing Receding. Fig. 2.



Lever Receding. Fig. 3.

We call your **special attention** to our various method quick receding knee attachments by which we have overcome the slow way of working back the knees. In most all other mills, the knee is thrown back with the same set works as used in sawing, which is very slow. Our method in a very short time will pay for itself by increased capicity of mill.

Fig. 1 represents **Hand Wheel** which is placed on the set shaft for quick movement of the knee which will be found very convenient and inexpensive, adapted for all size mills.

Fig. 2 represents our Geared and Crank method by means of which the knees can be brought back with rapidity. Mostly adapted to be used on small sized mills.

Fig. 3 represents our Lever Quick Receding Knee Attachment. This is a great improvement, it will throw the knee 16 inches at each movement of the lever and requires only about two movements of the lever to throw the knees back the full length of the head block. In many cases where logs are not large, or in turning the log, **one movement** of the lever is sufficient to throw the head block back far enough It is a great saving of time and adds very largely to the value of the mill. This is adapted to our medium size mills.

We manufacture **The Self-Receding Movement** by which the knees are receded by coil springs which incircle the setting shaft and are instantly stopped at any desired point by a friction brake; this method for large saw mills is most satisfactory, and can be used at any time with the carriage either in motion or standing. The springs, by their constant tension take up all lost motion that may occur from wear, making them perfectly accurate until worn out.

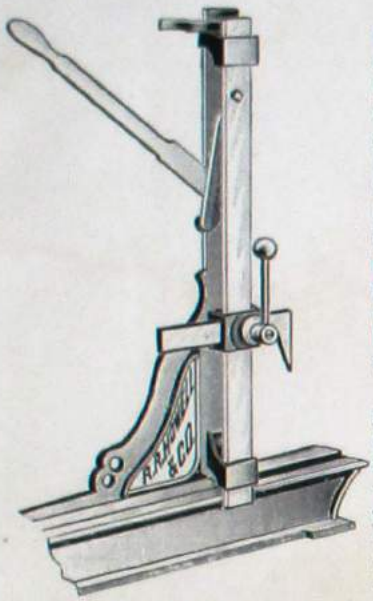
We also manufacture our Self-Receding Knee Attachment, operated by friction and is positive in its movements. It runs the knee back while the carriage is being gigged back, and can be stopped at any desired point. We furnish this only on large stationary saw mills.

PRICES AND SIZES.

Style	Adapted for	Price.
Hand Wheel, Fig. 1	All Sizes of Mills	$ 2.00
Geared with Crank, Fig. 2	No. 1, 2 and 3 Mills	10.00
Lever Quick Receding, Fig. 3	No. 3, 4 and 5 Mills	20.00
Automatic Coil Spring with Brake	No. 5 and 6 Mills	40.00
Friction Self Receding	No. 6 Mills	50.00

The Howell Sawmill Dog.

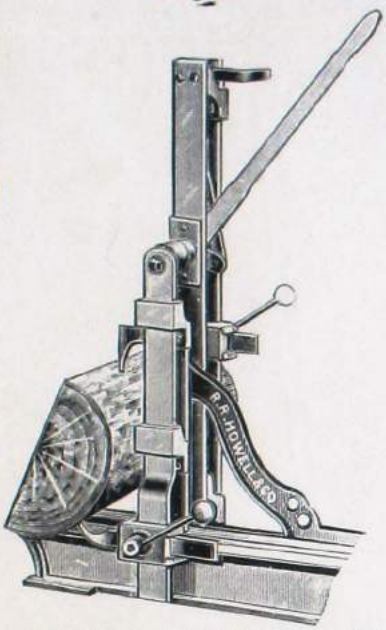
Single.



The advantages gained by use of our mill dogs are: Great saving of time; every revolution the saw makes when not cutting is a loss of time. With our Dogs the sawyer never needs to wait a moment for the log to be fastened, no difference how frosty the weather or how hard timber is frozen. By their use you can make the last board on the log as good as the first one.

The Duplex Dog is used principally in sawing quarter stock or other irregular piece stuff, and will hold the log in any position in which you may want it. If the lower bit is not in use it can be withdrawn until needed.

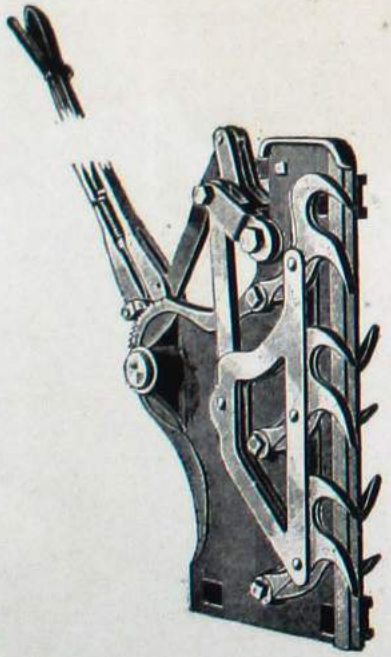
Duplex.



The upright bars and all working parts are of steel; adjustable head carries the dog bit and is secured at any point on a sliding bar, and held in position by a weighted friction locking lever. The bit is forced into the timber by a lever. They are put up in the most substantial and workmanlike manner. They will last the lifetime of a mill with little or no repair. The mechanical principles involved in the construction of our Dogs combine in the most complete and perfect manner simplicity, strength, durability and economy, and an adaptation to the largest range and variety of work.

Price No. 1 Single Dog, adapted for No. 1 Saw Mill $10.00
Price No. 2 Single Dog, adapted for No. 2, 3 and 4 Saw Mill..... 12.00
Price No. 3 Single Dog, adapted for No. 5 and 6 Saw Mill..... 14.00
Price No. 5 Duplex Dog, adapted for any size Saw Mill..... 25.00

Boss Dog.

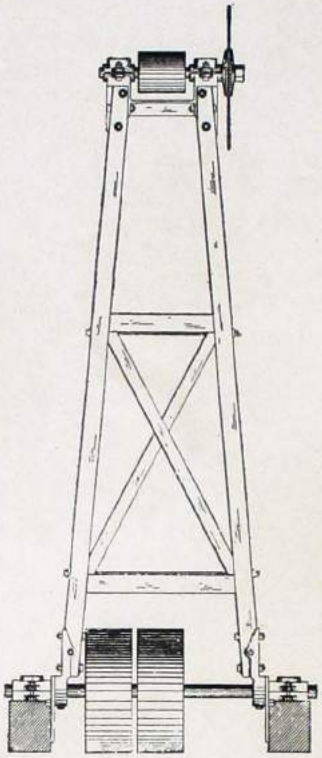


This dog is best known among operators of large circular and band mills, and all mills engaged in rapid handling of timbers. Their strong points being the rapidity with which they can be operated, also the security it cants or even the last board can be held to the blocks. The teeth are so shaped that they draw the log up to the upright. They are double acting, one set of bits being thrown upwards and the other downwards with the same movement of the lever. They can be applied to any of the standard head-blocks now in use, winged or otherwise. Bolted on either the right or left side or within a knee.

Price, each $45.00

RIGHT AND LEFT HAND DOG.

Mill dogs are made right or left-hand. For a right-hand mill a right hand dog is used on the front head-block, and a left-hand on the rear blocks. On a left-hand mill a left-hand dog is used on the front head-block, and a right-hand on the rear.



Ladder Saw.

This cut shows our ladder saw to swing from below. We also make this outfit to swing from overhead when desired.

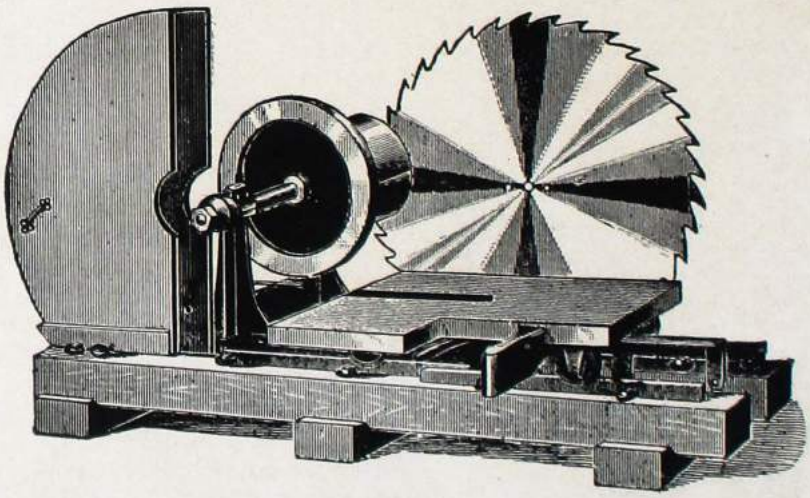
In ordering state which kind is wanted and whether the thread on end of arbor is to be right or left hand.

The wooden frame and saw is not included in the prices below.

No.	Size of Saw	Size of Arbor	Size of Pulley	Speed	Price
1	24 and 26 in.	1 7/8 in.	7x7 in.	1500	$25.00
2	28 and 30 in.	1 15/16 in.	8x9 in.	1300	30.00
3	32 and 34 in.	2 in.	8x9 in.	1100	35.00
4	36 and 38 in.	2 3/8 in.	8x11 in.	1000	40.00
5	40 and 44 in.	2 11/16 in.	9x11 in.	875	45.00

Knee Feed Bolter

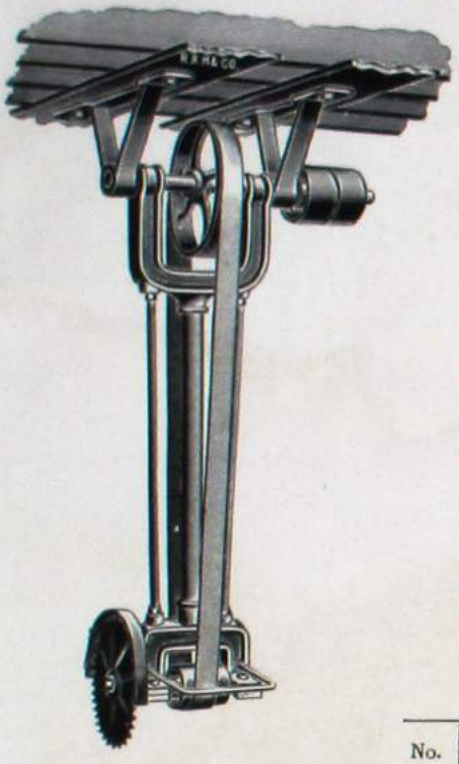
FOR SHINGLES AND HEADING



This Bolter is designed for quartering and splitting bolts, as they come from the drag saw, and preparing them for the shingle or heading machine. The use of the bolter, instead of splitting the bolts with axes, effects a great saving of timber, as the shingles come off with less ragged edges, and therefore require less jointing. The use of the bolter also enables the shingle machine to make a perfect shingle at the first cut, thereby saving both timber and time to a very considerable degree. As the motion of the sawyer's body governs the feed, his hands are free at all times to handle the bolt. Our bolter is of simple construction with well bolted frame and heavy arbor and stands. The carriage runs on heavy planed track and has turned wheels; it is also provided with a holding down roller to prevent tipping. Arbor is 2 7/8 inches diameter, carrying a pulley 16 inches diameter, 10 inches face, also a heavy balance wheel. Carries 48 or 50-inch saw, which should be run about 800 revolutions per minute. Floor space, 7 ft. 6 in. by 4 ft. 6 in. Weight, 950 lbs.

Price, without saw blade $150.00

SWING CUT-OFF SAW.



To work above (as shown in cut) or under the bench. This machine is made all of iron and steel, very strong and braced perfectly.

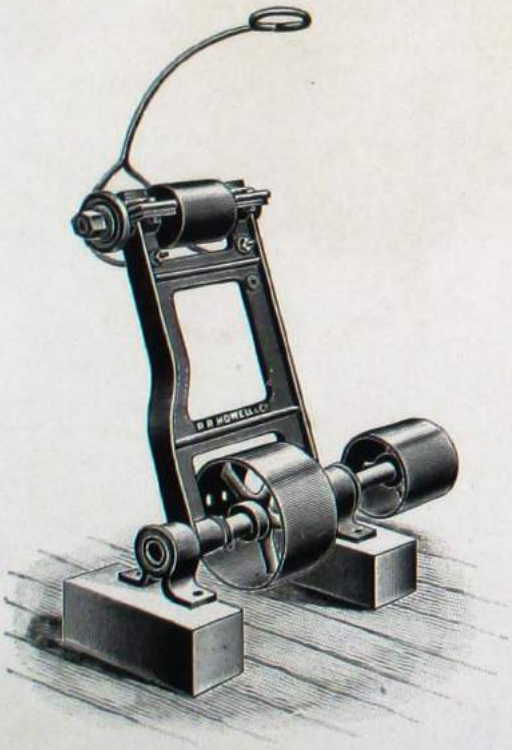
The hinges are perfect; the frame swings on the outside of the turned sleeve boxes, and the counter shaft runs inside of these boxes, making it impossible to get out of line. The mandrel is of steel, has a large pulley and self-oiling boxes. These machines are made to work under or above the bench, and guaranteed to do the work equally as well either way. In ordering, please state if you want the machine to work above or under the bench, and if not otherwise mentioned will furnish the machine to swing above. Regular length of machine, from base of hanger to center of arbor is 6 feet, but can make drop any length required when ordered. Will take saw from 14 inches to 30 inches.

The shield covering the saw prevents any possible accident to the operator. We do not furnish the table, as the freight would amount to more than the cost of lumber to purchaser.

PRICE, SIZES, ETC.

Price does not include Belt; this is extra in all cases.

No.	Size of Saw	Size, Tight and Loose pulley	Size of Large Pulley	Size of Arbor Pulley	Speed of Tight and loose Pulley	Weight	Price
1	20 in.	8 x 6	20 x 6 in	5 x 6	400	375 lbs.	$50.00
2	24 in.	8 x 6	20 x 6 in	5 x 6	400	415 lbs.	$65 00



Slab Saw, No. 12--Under Cut.

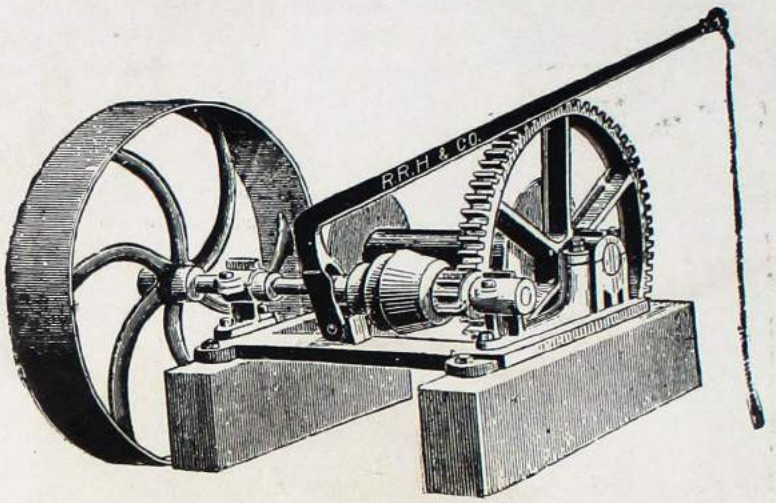
The engravings herewith illustrate our Slab Saw, No. 12 arranged to swing from underneath the work. For use in cutting timber slabs and all kinds of lumber. A very convenient machine for many purposes. The frame is cast solid with wide yoke and broad arms, both of which are deeply webbed, making an absolute rigid frame, very strong and stiff, hence, it can be operated very rapidly and will do accurate work. The construction of the hangers is such that the weight of the frame does not hang on the counter shaft and the consequent wear of the fast movement of the shaft is avoided by the use of ring joints, or boxes cast with a circular projection and the hangers are bored out to swing thereon.

The machine is self-contained, having countershafts, steel shaft and boxes lined with best babbitt. Made in 3 Sizes to accommodate different work or requirements, longer the machine better draft it will give the belt.

Prices and Sizes No. 12 Swing Saw.

Size	Distance Counter Shaft to Arbor	Size of Arbor Pulley	Large counter Shaft Pulley	Small counter Shaft Pulley	Speed counter Shaft Pulley	Weight	Price
A	24 in.	5 x 6	10 x 6	7 x 7¼	500	160 lbs	$25 00
B	36 in.	6 x 6	16 x 6	10 x 8	500	200 lbs	$30.00
C	48 in.	6 x 6½	18 x 6½	10 x 8	500	275 lbs	$40 00

Log Jack, No. 1.



This machine is used for drawing in logs from river, yard or other purposes in the manipulation of the logs where hoisting or pulling is required. With a snatch block logs can be shifted on the skidway or in the yard. The main frame is cast solid in one piece, which saves time in attaching it to the building, and also prevents the boxes from getting out of line after it is put in place. It is controlled by a rope attached to a shifting lever which engages friction attached to the spur pinion connecting with the gear on the rope spool. When lever is relieved a steel spring disengages the friction, and the spool stops immediately.

All the parts are strong and durable. Journal boxes lined with good babbitt.

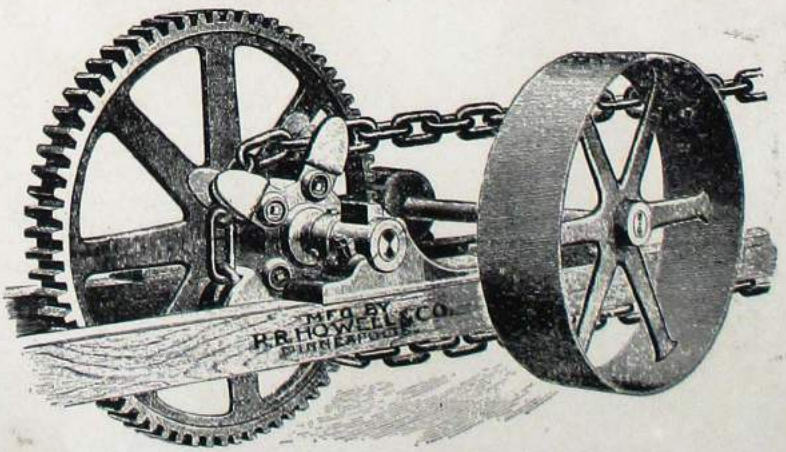
The spool is 5 inches diameter, 19 inches between flanges, which are 12 inches in diameter, and will hold 100 feet 1¼ inch rope, or 90 feet 1½ inch rope. The pulley is 30 inches diameter, with face for 6 inch belt. The spool is placed at right angles with the carriage track. When miter gears are used the spool is placed in line with the track.

It saves time, saves labor and hard lifting. Is easily managed and reliable.

There are many places besides saw mills where this power can be used to great advantage

Weight, 1,220 ..... $125.00

Log Jack No. 2, Single Gear.



Above we present a cut of our Single Gear Log Haul Up or Heavy Conveyor Gear. This machine we make in two sizes, Nos. 2 and 3. The No. 2 is designed especially for

½, ⅝ and ¾-inch chain, and as a haul up for light mill, or as a conveyor for heavy mills.

The No. 3 machine is of the same pattern and construction, but heavier, and is built for ⅞, 1 and 1⅛-inch chain for hauling heavy logs or for use as a conveyor where the distance is great and more than ordinary power is required to do the work.

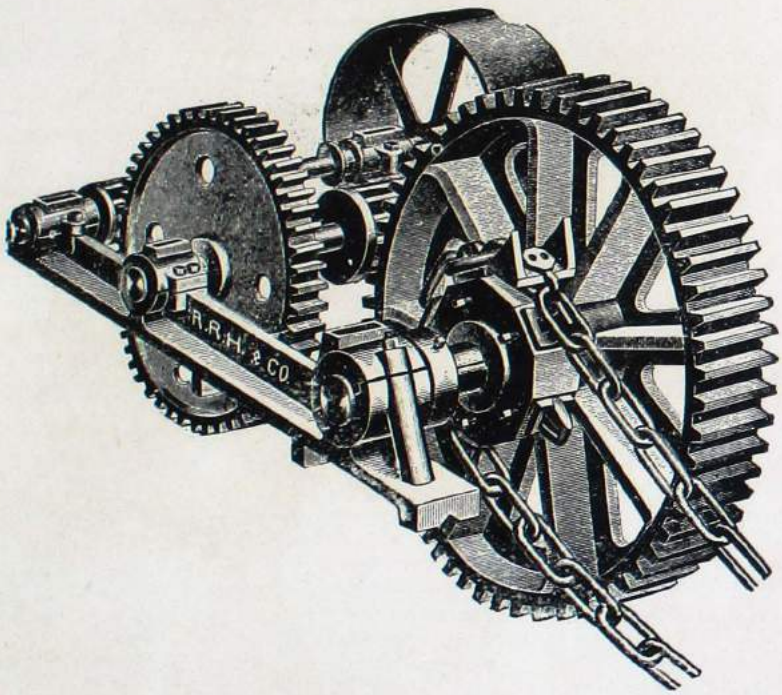
Our Machines are built very strong and especially adapted for link chain, our No. 530 to No. 535, with log spur to send the log forward, which is carried on two sprocket wheels for drawing the logs with endless chain.

We are also prepared to furnish any style of chain, sprocket, idler or drum desired, other than shown in this catalog.

The main boxes are connected by a solid casting and the bearings are so inclined that the main strain comes against the bottom of the bearings. We offer them as the very best and most reliable Log Jacks or Conveyors ever placed in a mill.

Price, No. 2, Log Jack, single gear, complete, less chain.....$150.00
Price, No. 3, Log Jack, single gear, complete, less chain..... 200.00

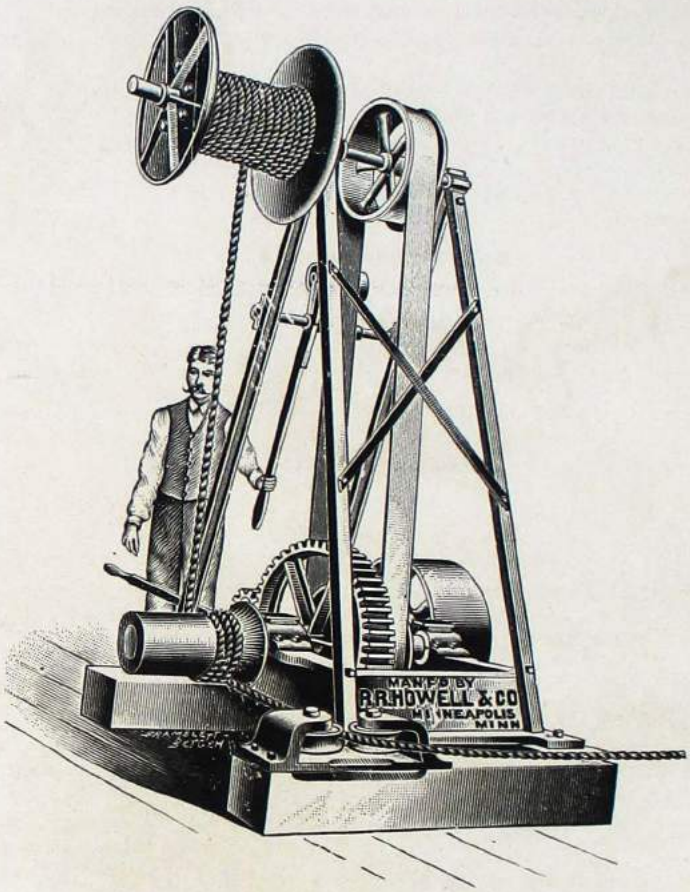
No. 4 Double Gear Log Jack.



The above cut shows our Double Geared Log Jack for extra heavy work, and where the heaviest logs are sawed. It is mounted on continuous cast iron frame, with boxes cast on, making it self-contained and very convenient and rigid, designed for 1¼-inch, 1⅜-inch, and 1½-inch link chains, Nos. 536 to 538, or our No. 1025 Mammoth Chain. This Jack is also provided with our Expansible Chain Wheels, with adjustable teeth. After being worn, they can be reversed, thus presenting a new surface to the chain. Should one of the teeth break it can be duplicated, thus giving the wheel several times the life of one of the style wheels with solid teeth. A foot sheave with shaft and boxes is furnished with each Jack.

Price, No. 4 Double Gear Log Jack, complete, less chain.....$300.00

"Jumbo" Power Car Puller.



This machine is made to stand the heaviest work and will handle from 10 to 25 loaded cars at a time, according to the condition of side track, and at a speed of about 150 feet per minute, or as much slower as desired.

It can be located at almost any place, and by means of sheaves or guide blocks the pulling rope can be run in any direction, and the cars moved to or from the buildings in which the machine is place'

It is very easily operated, one man having it under complete control. The entire working parts are within the cast iron bed, and the only work required to set it up is to put up the frame that holds the spool shaft and to fasten the machine down.

The pinion on the drive shaft engages with a gear on the capstan shaft five times its size; thus the machine is back geared five to one, and five times the amount of power on drive pulley is transmitted to the capstan shaft.

When desired, the spool can be hung from the floor above, and the frame that usually supports it is dispensed with.

The machine is always under full control of the operator, by whom the draught on the pulling rope can be started suddenly or as gradually as desired, or instantly stopped by means of the belt tightener: or the whole machine can be started or stopped in a second's time by means of a lever which operates a strong clutch connected with the pinion on drive shaft.

DIMENSIONS AND PRICES.

Drain of Capstan Shaft.	Length of Capstan.	Floor Space.	Height.	Size of Drive Pulley.	Speed of Pulley.	Weight.	Price.
4 inches.	20 inches.	42x66 in.	9 feet.	28x13 in.	180	3200 lbs.	$200.00

Power Boiler Feed Pump.

This cut represents our Power Boiler Feed Pump for supplying steam boilers with water against any pressure. They are also extensively used in paper mills, distilleries, tanneries, starch factories, etc., for pumping thick material. For this purpose we furnish this pump with special check valves allowing free opening for material to pass through. It will pump water or liquid of any temperature and is unsurpassed for efficiency, durability and cheapness.

The check valves are made of brass and screwed into the body of the pump and can therefore be removed when worn out and other new ones inserted. The stuffing-box, top of piston and stub end are finished bright and polished.

The pump should not be placed more than 20 feet above water. Hot water must flow to pump.

SIZES AND PRICES.

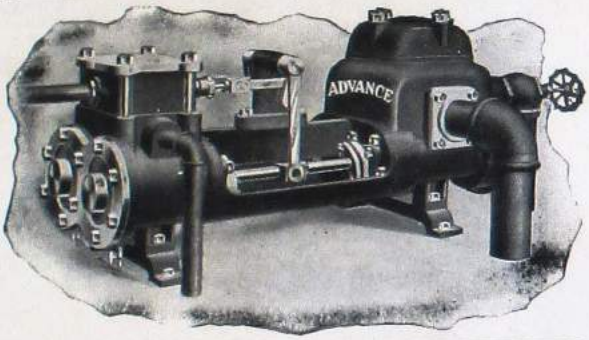
No.	Diameter Plunger. inches	Stroke. inches	Size Pipe. inches	Capacity per hour. gallons	Revolutions per Minute	Horsepower Boiler	Price
1	1¼	6	¾	64	40	8	$10.00
2	1½	6	1	90	40	10	15.00
3	2	6	1	180	40	20	22.00
4	2½	6	1¼	280	40	30	30.00
5	3	6	1½	420	40	50	40 00
6	4	10	2	1050	20	140	60.00
7	5	10	2½	2160	20	250	90 00

The required supply has been calculated on the basis of one cubic foot, or 7½ gallons for each horse power per hour. We can furnish if desired all appliances for attaching power, such as counter shafts, hangers, post-boxes, pulleys or gears, crank plate. wrist pin and stub ends.

Advance Duplex Steam Pumps

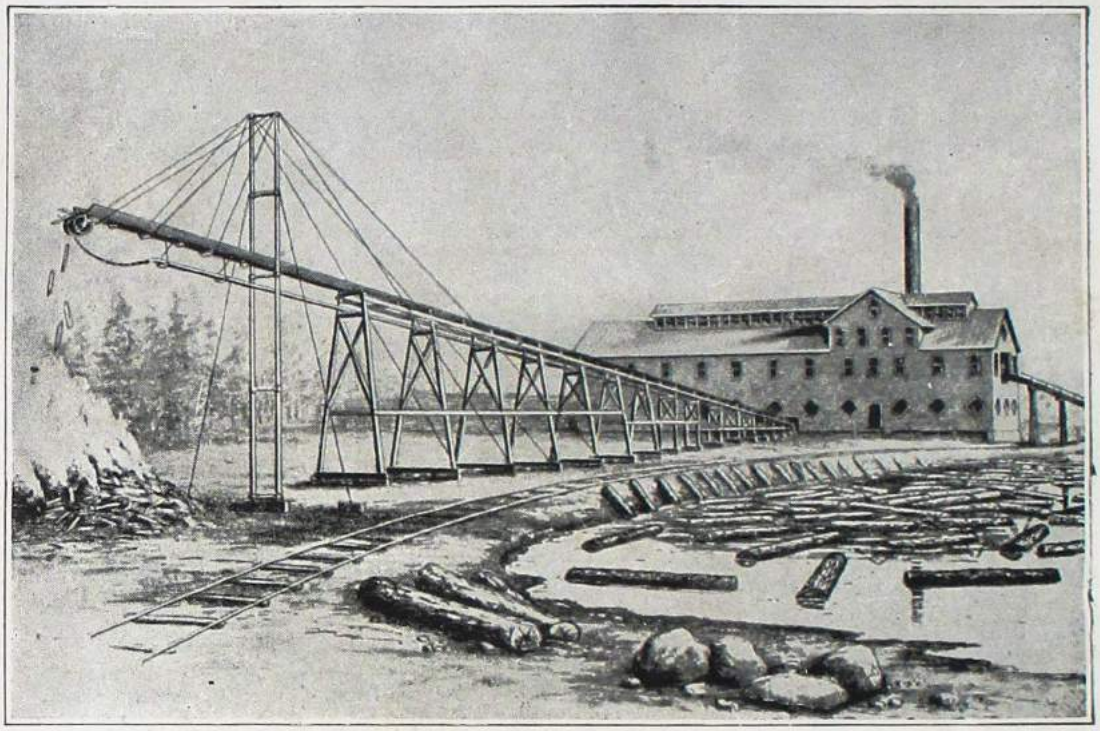
"The Best Duplex Pump in the World"

For general service where working pressures do not exceed 150 lbs. per sq. inch.



Diameter Steam Cylinder.	Diameter Water Cylinder.	Length of Stroke.	Proper strokes per minute of one plunger, varying with work and pressure.	Gallons delivered per minute by both plungers at stated number of strokes.	Diam. required by single pump to do same work at same speed.	Size of pipe for short lengths. Increase size as length increases. Size of steam pipe.	Exhaust pipe.	Suction pipe.	Discharge pipe.	PRICE
3	2	3	100 to 250	8 to 20	2⅞	⅜	½	1¼	1	$ 60.00
4½	2¾	4	100 to 200	20 to 40	4	½	¾	2	1½	90.00
5¼	3½	5	100 to 200	40 to 80	5	1	1¼	2½	1½	120.00
6	4	6	100 to 150	70 to 100	5⅝	1	1½	3	2	140.00
7	4½	8	100 to 150	95 to 160	6⅜	1¼	1½	4	3	220.00
8	5	10	75 to 125	130 to 220	7⅛	1½	2	5	4	350.00
10	6	10	75 to 125	180 to 300	8½	2	2½	5	4	440.00
12	7	12	75 to 125	295 to 490	9⅞	2½	3	6	5	550.00
12	8½	12	75 to 125	435 to 730	12	2½	3	6	5	725.00
14	7	12	75 to 125	295 to 490	9⅞	2½	3	6	5	675.00
14	8½	12	75 to 125	435 to 730	12	2½	3	6	5	800.00
16	8½	12	75 to 125	435 to 730	12	2½	3	8	5	900.00
16	10	12	75 to 125	610 to 1015	14⅛	2½	3	8	7	1000.00
16	12	12	75 to 125	875 to 1460	17	2½	3	10	8	1125.00

Slab Conveyor.



The illustration above shows the millwright work from mill to fire pit of our Slab Conveyor. All of the driving gear is placed inside the mill and nothing but an idle chain sheave is required at the end where the slabs are emptied into the fire.

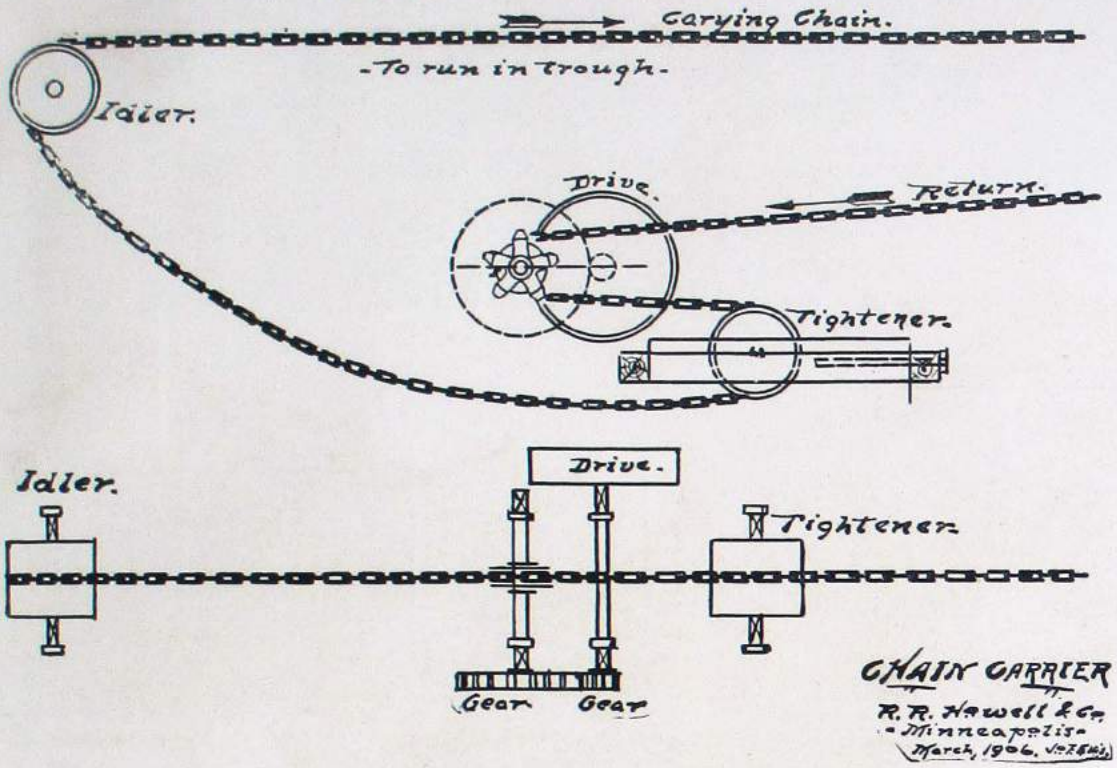
At this end a wrought iron trough is placed, varying in length from sixteen to forty feet to suit conditions. The sides of this trough are made of iron channels, the bottom of heavy tank iron, trough is secured to the last bent of the trestle work and is held in place by heavy guys which are provided with turnbuckles to equalize the tension. The chain varies in size from ¾ inch to 1¼ inch diameter, according to the duty it has to perform. It is driven by a sproket wheel with steel teeth and these teeth are capable of being adjusted to accommodate the wear of the chain links Hardwood cleats are attached to the chain at intervals of from four to eight feet, thus keeping the trough free from debris while the chain is in motion.

We shall be pleased to correspond with parties contemplating the erection of slab conveyors and will build them to suit any location or requirement.

Conveyors.

We are also prepared to supply conveyors, for any purposes, of all sizes and kinds. Write us stating just what work you want done, and we will submit plans and estimates.

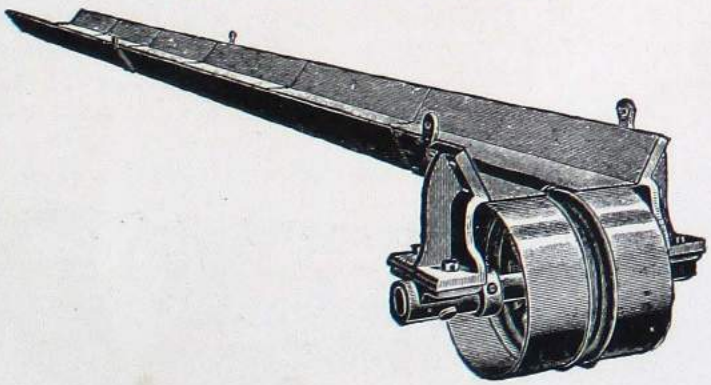
Slab or Refuse Conveyor.



The above cut shows the working parts of our Slab or Refuse Conveyor, which consists of the driving rig, the fire trough, with chain wheel and boxes and the chain, of various dimensions and weights, depending upon the length of conveyor and weight of material to be conveyed. The sprocket wheel is solid in the standard conveyor, but if desired we can furnish an expansible, inserted tooth wheel, with either cast iron or steel teeth.

Steel Trough-Discharge Ends.

Made in Sizes to Suit the Work.



This fire trough is made entirely of heavy sheet steel in 12 to 20-foot sections. The shape of the trough prevents clogging and overflowing. The wheel on end of trough is directly over fire, and grooved to suit chain, and has a wide face to carry the flights straight. Made in various weights and dimensions, depending upon the size of chain, length of conveyor, etc.

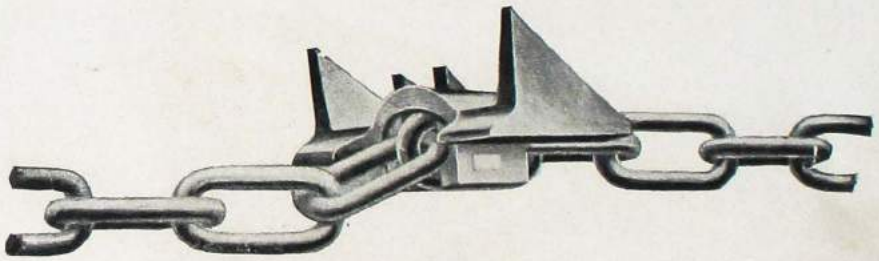
Prices given upon application.

Long Link Cable Chain for Conveyors and Log Chain.

These chains are **hand made** and of the best refined iron or open hearth steel, of high tensile strength. The links are accurately spaced and have long welds. The inside lengths and widths of our links are considered standard, and in proportion to the diameter of the metal; they also correspond with our Sprocket Wheels.

No. of Chain	Size of Chain in inches	Length of Links Inside	Breaking Strain in lbs.	Price per Foot
530	½	4 inches	15000	$0.25
531	⅝	5 inches	24000	.30
532	¾	6 inches	34000	.40
533	⅞	7 inches	46000	.50
534	1	7 inches	58000	.60
535	1⅛	8 inches	72000	.75
536	1¼	8 inches	88000	.95
537	1⅜	8 inches	104000	1.20
538	1½	8 inches	124000	1.50

Log Spurs.

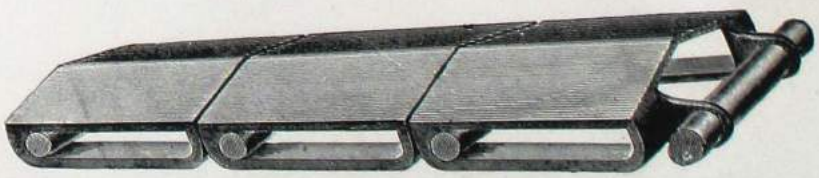


Our Log Spurs are of good weight and chilled on the base, of proper width for each size chain, and are attached to the chain about every eight feet.

No. 530— ½-inch Chain, each..... $1.25
No. 531— ⅝-inch Chain, each..... 1.50
No. 532— ¾-inch Chain, each..... 1.75
No. 533— ⅞-inch, Chain, each..... 2.00
No. 534—1 -inch Chain, each..... 2.50

No. 535—1⅛-inch Chain, each..... 2.75
No. 536—1¼-inch Chain, each..... 3.00
No. 537—1⅜-inch Chain, each..... 3.25
No. 538—1½-inch Chain, each..... 3.50

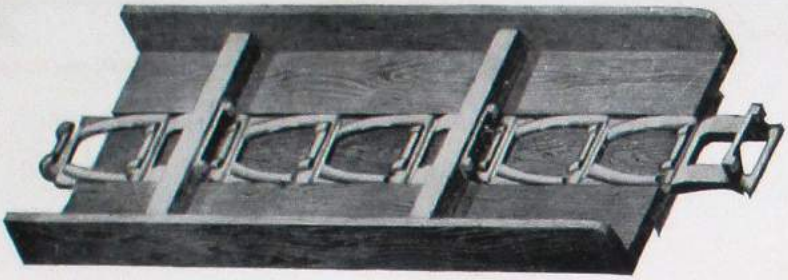
Transfer Chain No. 500



This Transfer Chain has proven of great advantage to mill men in transferring from edger to trimmer, and other purposes. It presents an unbroken surface for the lumber to ride upon, and there is no opportunity for clogging or catching. For sprockets to fit this chain see list No. 500 sprockets.

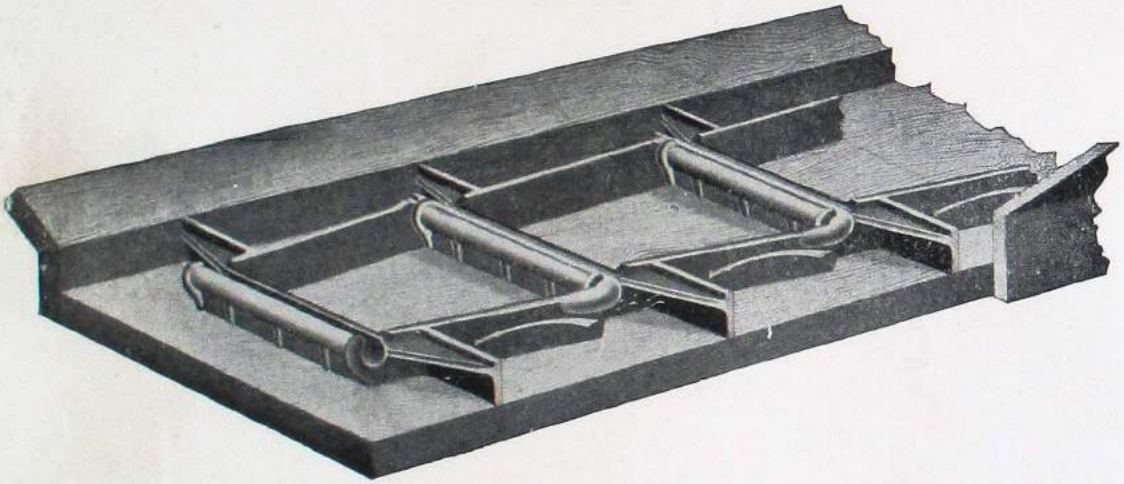
Working strain, 2,000 pounds; 3 links to the foot. Price, per foot..... .....65c

Standard Link Belt Conveyor.



This cut shows a durable and an inexpensive Conveyor using Standard Link Belt Chain and F2 attachments with hardwood cleats attached. If extra strength is needed two lines of chain can be used.

No. 530 Detachable Chain, as Applied Ready for Operation.



One of the best and most economical Chains on the market for conveying sawdust, tan-bark, etc. Each link is a pocket. The side lugs are made in different lengths for troughs of 7, 10 and 12-inch widths. Chain is 6 inches pitch and has a working strain of 4,000 pounds. The No. 530, 535 and 550 run on the same sprocket wheels.

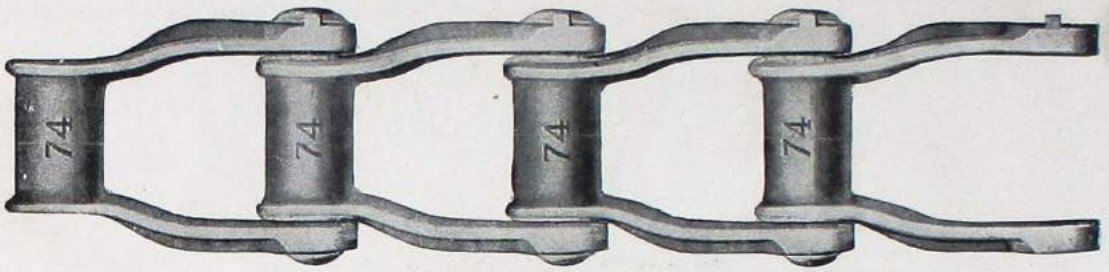
Price List No. 530 Chain

Width Inches	Price per Foot
7	$0.60
10	.75
12	1.00

List of No. 530 Sprocket Wheels

Diameter Inches	Number of Teeth	Price
17	9	$12.00
21½	11	13.50

Riveted Drive Chain.



This chain is of a superior design and workmanship and is made of the best grade of malleable iron and steel. It has superseded all others where strength and durability are required.

IT IS DUST-PROOF; consequently it wears longer than any other make and always meshes properly on the sprocket; does not lengthen appreciably with use, necessitating over-hauling and it consumes much less power in driving.

The plain chains are reversible and can be run in either direction, or turned upside down to make up for wear. Chains with attachments will be riveted to order.

Revised Price List of Riveted Drive Chain.

No.	Links in 10 feet	Width of Link inches	Height inches	Diam. of steel Rivet	Working strain pounds	Working strain of D. L. B. pounds	Matches and Works on Sprockets of Detachable Link Belting No.	Approximate Weight per 10 feet including Rivets pounds	Price per Foot
60	52	2 3/8	3/4	5/16	1500	700	67	21.1	$0.25
62	73	2 1/8	7/8	5/16	1500	650	62	23.8	.25
73	52	3 1/8	1 1/8	7/16	3000	800	77	40.8	.35
74	46	2 1/2	1 5/16	3/8	2500	750	75	27.9	.27
75	46	2 1/2	3/4	5/16	1500	750	75	20.9	.25
78	46	3 1/4	1 1/4	1/2	4000	1200	78–88	41.8	.37
82	40	3 1/2	1 5/16	9/16	5000	1800	103	56.2	.50
85	30	3 1/2	1	7/16	3000	1300	85	33.2	.33
87	30	4 1/4	1 3/8	5/8	6000	2250	124	69.6	.65
95	30	4 1/4	1 1/4	1/2	4000	1600	95	50.8	.45
108	25 1/2	4 3/4	1 5/16	9/16	5000	2000	108	58.1	.50
124	30	5	1 1/2	3/4	12000	2250	124	84.4	.75

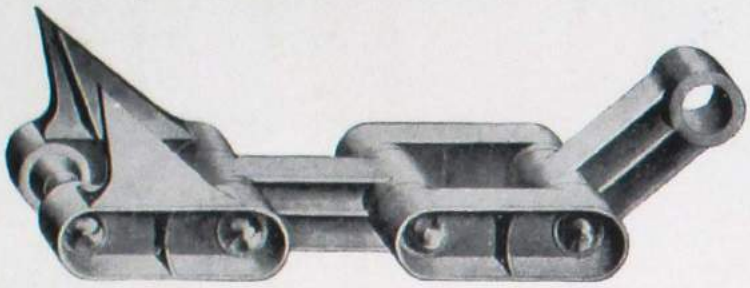
Price List of Attachments for Riveted Drive Chain.

	Price per ft.
60 A	$0.40
A¹	.30
B	.45
F¹	.35
N. N	.35
62 A¹²	.30
73 A	.65
B	.45
F¹	.50
N. N	.45
N	.45
74 A	.45
B	.55
F¹	.35
N. N	.35
N	.35
75 A	.40
75 B	.40
F¹	.35
N. N	.30
N	.30
78 A	.60
B	.65
F¹	.50
G¹	.50
G Swivel	.55
G⁶	.55
G¹⁹	.60
H¹	.55
K¹A	.50
M³	.60
N. N	.45
N	.45
N. N. 1½	.50
78 N. 1½	.50
82 A	.70
A¹	.60
B	.75
F¹	.65
F²	.70
G⁶	.70
N. N	.60
N	.60
85 A	.55
B	.60
F²	.50
87 A	.85
B	.90
F¹	.80
F²	.85
N. N	.80
87 N	.80
Log Haul	1.20
95 A	.70
B	.75
F²	.60
N. N	.60
108 A	.80
B	.80
F²	.70
124 A	1.00
B	1.00
F¹	1.00
M³	1.00
N. N	.90
Log Haul	1.50

No. 1025 Mammoth Chain Belt,

For Log Haul, Ice Elevators and Heavy Conveying and Transmitting.

Detachable at every link. Large wearing joints. The sections are held securely together by strong rivets. Can be coupled together tight around the sprocket wheels without slack.



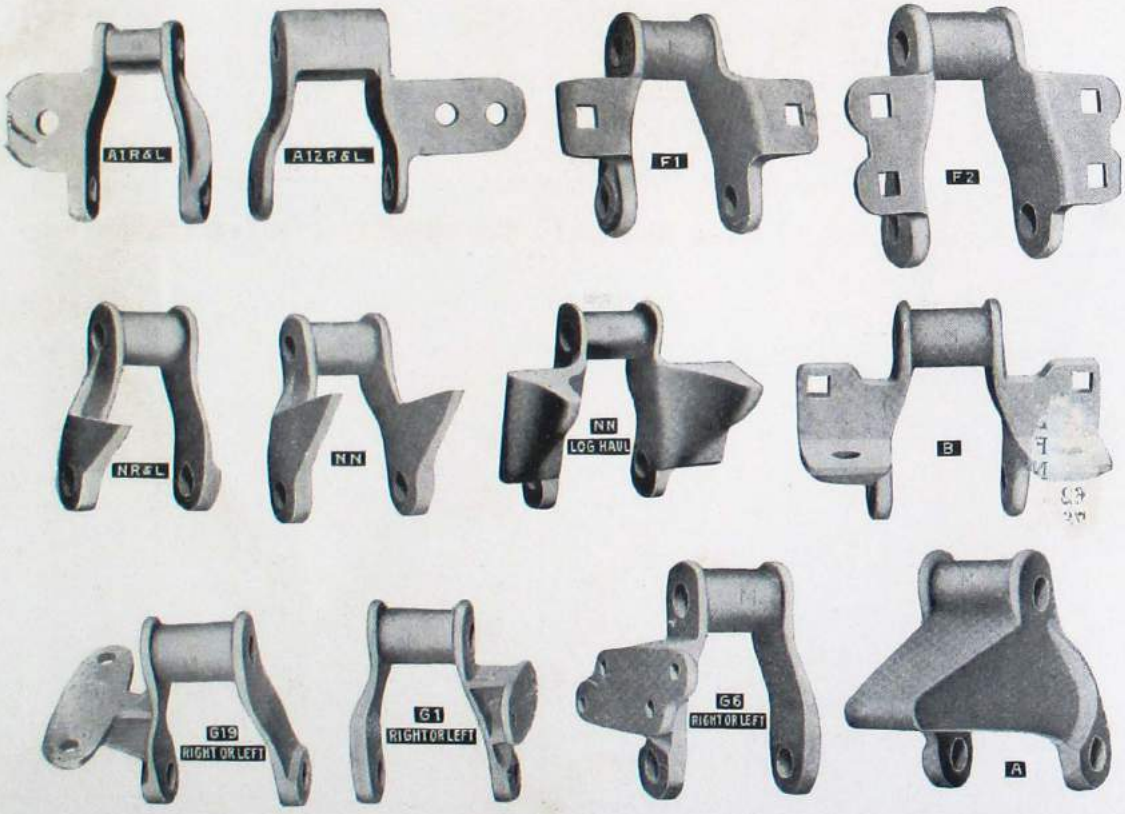
List price per foot.....$1.40

List of Wheels No. 1025.

Pitch Diameter Ins.	No. of Teeth	Price	Pitch Diameter Ins.	No. of Teeth	Price
17	5	$14.10	25	8	$24.80
20	6	16.00	36	11	32.00
22¾	7	20.00			

Riveted Drive Chain.

Attachments as Made for the Various Sizes.



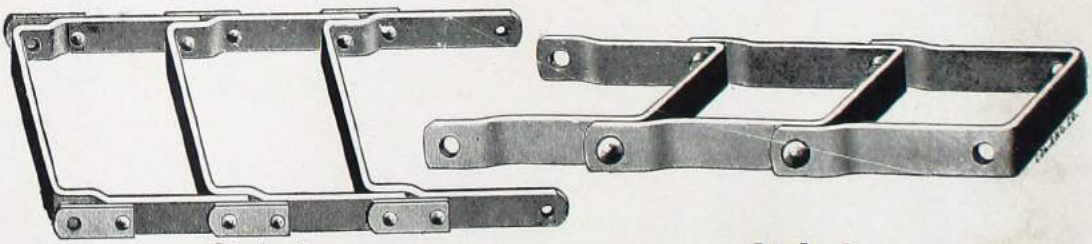
Sprocket Wheels for Steel Drag Chain, Style A and B.

Both for Driving Conveyors and for Idlers.

No. 560			No. 562			No. 566, 575		
Pitch Diam. Inches	No. of Teeth	Price	Pitch Diam. Inches	No. of Teeth	Price	Pitch Diam. Inches	No. of Teeth	Price
12	6	$ 6.00	12	6	$ 9.00	14½	5	$ 9.00
19	10	10.00	17⅝	8	11.00	16½	6	9.75
24	12	14.00	19	10	13.00	19¾	7	11.00
12	Idler	6.00	24	12	16 00	21¾	8	12.00
19	"	10.00	**No. 563, 565**			23¼	9	16.50
			14½	5	8.00	**No. 580**		
			16½	6	9.00			
			21¼	8	11.00	22	5	18.00
			23¼	9	15.00			

Steel Drag Chain--Style A and B.

For Handling Slabs, Refuse, Saw Dust, Etc.



Style B. **Style A.**

No. of Chain.	Pitch Inches.	Outside Width, Inches.	Size of Steel, Style A.	Size of Steel, Style B.	Size of Rivets.	Price, Style A.	Price, Reinforced, Style B.
560	6	8	⅜x1½	¼x1½	½	$0.90	$1.25
562	6	12	⅜x1½	¼x1½	½	1.20	1.55
563	8	8	⅜x1½	¼x1½	½	.80	1.15
565	8	9	⅜x1½	¼x1½	½	.90	1.25
566	8	10	⅜x1¾	5/16x1¾	⅝	1.00	1.35
575	8	12	⅜x1¾	5/16x1¾	⅝	1.20	1 55
580	12	12	½x1¾	⅜x1¾	⅝	1.50	1.90

Link Chain Belting

For use in sawmills, flour mills, mines, brick yards, grain elevators, warehouses and on mowers, binders, corn and wheat drills, corn shellers, feed cutters, traction engines, etc.

Number	Plain Links Per Foot	Couplers Price Per Pair	Approximate Links in 10 ft.	Maximum Power in Pounds	Takes Sprockets No.
25	$0.11	$0.11	133	75	25
31	.15	.....	132	100	25
32	.11	.14	104	150	32
33	.11	.13	86	200	33
34	.11	.13	86	225	34
35	.11	.16	74	250	35
042	.16	.....	88	300	42
42	.12	.16	88	300	42
45	.11	.16	74	350	45
47	.14	.....	74	400	45
50	.16	.16	87	350	50
51	.17	.16	104	375	51
052	.21	.18	80	525	52
52	.18	.16	80	500	52
52½	.24	.19	79	550	52
055	.18	.....	74	450	55
55	.16	.16	74	450	55
55½	.18	.....	74	...	55
056	.24	.....	80	600	52
057	.18	.....	74	450	55
57	.18	.19	52	600	57
62	.22	.22	73	650	62
62½	.23	.....	73	650	62½
063	.25	.....	80	575	063
66	.23	.22	60	700	66
67	.23	.22	52	700	67
71	.32	.....	72	925	62
071½	.32	.....	57½	1000	071¼
072	.35	.31	72	900	62
72	.29	.....	59	850	66
072½	.34	.....	72	925	62
72½	.37	.32	72	925	62
75	.24	.19	46	750	75
77	.25	.22	52	800	77
78	.34	.25	46	1000	78
83	.35	.32	30	1200	83
85	.44	.44	30	1300	85
88	.43	.28	46	1200	88
94	.72	.....	30	1800	94
95	.53	.54	30	1600	95
103	.67	.58	39	1800	103
105	.49	.....	20	1500	105
108	.63	.79	25½	2000	108
110	.74	.92	25½	2000	108
114	.85	.84	36½	2000	114
116	1.05	.....	37	1800	116
122	1.13	1.58	20	2200	122
123	1.16	.....	36½	2100	123
124	1.03	1.19	30	2250	124
146	1.02	.....	20	2800	146
160	1.25	.....	12	4000	160
500	.65	.....	30	2000	500
550	.50	.....	20	5000	550

For **Attachments at Intervals** add 10 per cent to proportional list.

Price List of Attachment Links.

For Standard Detachable Link Belting.

For Attachments at intervals, add 10 per cent. to proportional list.

No. 25.

A1.	$0.21
A3.	.22
A4.	.19
A39	.20
A50	.60
A399	.18
C¼	.21
C½	.23
C1	.29
C26	.43
10-C-66	.25
D3	.26
D8	.72
D28	.17
D34	.24
D46	.25
E1	.21
E3	.36
E16	.28
G1	.28
G13	.59
H2	.28
H16	.41
H22	.24
HO2	.42
HO5	.34
HHH	.23
I3	.34
IK	.25
K1	.26
K5	.23
K6	.29
L1	.21
L2	.20
M1	.27
O1	.23
O2	.27
R4	.26
R16	.30
R26	.18
R27	.22
R28	.28
R29	.22
S1	.27
S9	.62
U	.20
U1	.23
W3	.24
W30	.19
Hookless	.09

No. 32.

A1	$0.24
A2	.25
A3	.21
A12	.27
A12½	.37
C1	.32
C5	.38
D3	.27
D46	.16
E1	.21
G1	.25
I3	.30
K0	.43
K1	.30
K3	.39
K5	.23
K6	.38
K36	.32
K40	.62
L1	.27
L2	.23
M1	.32
O1	.21
O2	.25
O3	.28
R9	.34
S9	.41
U	.18
U1	.19
Hookless	.09

No. 33.

A1	$0.17
A3	.20
A6	.22
A13	.22
A14	.27
A29	.26
C1	.26
D3	.39
D5	.20
D16	.72
D33	.25
E1	.18
G1	.21
I3	.33
K1	.25
K3	.39
K5	.25
K6	.35
K11	.41
K12	.25
L2	.23
M1	.29
S1	.25

No. 34.

A1	$0.21
A2	.27
C1	.33
C2	.37
C21	.46
E0	.43
E1	.24
K1	.29
K6	.39
K37	.49
K37½	.49
K38½	.53
L1	.24

No 35.

A1	$0.23
A13	.27
A14	.27
A29	.27
AM	.33
C1	.32
DK Roller	1.65
E1	.25
K1	.32
K3¼	.39
K5	.30
S1	.25

Scraper No. 1 9c each

No. 42.

A1	$0.21
A1 C'pler pr	.26
A3	.32
A3 C'pler pr	.32
A6	.21
A14	.34
A15	.29
A29	.25
C1	.29
DK Roller.	1.39
D3	.42
E1	.20
I13	.22
K1	.26
K3	.37
K3½	.70
K5	.24
K6	.37
K6½	.88
K10	.22
L6	.71
R9	.32
S1	.25
S3½	.71

Scrap. No. 2 6c each.
Scrap. No. 6 5c each.

No. 45.

A1	$0.20
A2	.25
A3	.28
A10	.20
A12	.25
A13	.25
A14	.31
A15	.26
A29	.22
A33	.39
A37-LA	.31
Strap	.18
C1	.27
C15	.34
C20	.38
C22	.52
C27	.38
C28	.42
D3	.34
D5	.32
D6	.32
D17	.43
D42	.25
D43	.30
D45	.18
DK with Roller	1.20
E1	.21
E2	.24
E4	.18
E12	.14
F2	.27
FK	.39
G1	.23
G27	.32
H1	.32
H2	.35
I3	.30
I12	.28
I15	.28
I16	.25
K1	.26
K3	.34
K5	.25
K34	.26
K40	.43
K40½	.45
K44	$0.27
K45½	.80
K48	.34
L2	.22
L3	.24
L4	.19
M0	.26
M1	.25
M5	.35
P4	.39
P4¼	.35
R18	.25
S1	.23
S5	.21
S6	.21

Scraper	Each
No. 1	$0.08
No. 2, 4 in,	.07
No. 2, 5 in,	.08
No. 2, 6 in.,	.09
No. 2, 6½,	.10
No. 3	.06
No. 4	.10
No. 6	.11
Picker	.44
K1 C'pr pr,	.31
Tube	5c each

No. 47.

L2	$0.25
L3	.24
L4	.37

No. 51.

A1	$0.25
C14	.52
D4	.69
I5	.42
I6	.32
K1	.32
K5	.33
K7	.43
R18	.32
S1	.28

No. 52.

AA	$0.33
A1	.28
A3	.34
A14	.59
C1	.33
D3	.39
D4	.63
D5	.45
D12	.37
D13	.40
DK Roller,	1.13
E1	.33
E3	.31
F2	.43
G1	.32
I20	.33
K½	.33
K1	.35
K5	.32
K50	1.27
R20	.31
S1	.32
S2½	.43

Scraper 18c each
Scraper, 1½x7⅞ 26c each

No. 55.

A1	$0.25
A2	.32
A3	.32
A12½	.45
A14	.35
A15	.29
A41	.42
AD5	.45
C1	.31
C5	.43
C8	.45
C17	.57
C18	.42
C20	.56
CH	.32
D3	.53
D5	.35
D41	.66
DK Roller,	1.07
E1	.25
ES	.34
F2	.35
G27	.35
G Double	.88
I51	.39

Price List of Attachment Links—Continued.

No. 55—Con.

K1 ..... .28
K5 ..... .30
K40 4½ ... .52
K40 5¾ ... .56
K52 ..... .32
L2 ..... .25
L2½ ..... .28
M0 ..... .30
M1 ..... .28
M5 ..... .55
S1 ..... .25
S5 ..... .30
Scraper 11c each
Hookless . .11
A3 Hookless..... .28

No. 57.

A1 .....$0.30
A3 ..... .33
C1 ..... .30
C4 ..... .21
D5 ..... .37
D25 ..... .25
EA1 ..... .39
EA2 ..... .33
E1 ..... .27
E2 ..... .27
F1 ..... .44
F2 ..... .43
H1 ..... .41
H2 ..... .44
K1 ..... .35
K1 C'pr pr. .44
M3 ..... .41
M5 ..... .41
S2 ..... .32
Tube....5c each

No. 62.

A½ $0.34
A1 ..... .32
A2 ..... .33
A3 ..... .34
A12 ..... .39
A33 ..... .38
C1 ..... .39
D5 ..... .45
I3 ..... .43
K½ ..... .35
K1 ..... .35
K5 ..... .33
K40 ..... .42
L4½ ..... .43
S1 ..... .32
S2½ ..... .48
Loop....6c each

No. 66.

C1 .....$0.40
K1 ..... .42

No. 67.

A1 .....$0.32
A7 ..... .37
A7 C'pr. pr. .48
A11 ..... .34
A72 ..... .51
D5 ..... .43
D26 ..... .45
E1 ..... .37
EM ..... .41
F1 ..... .39
F2 ..... .48
FF ..... .49
FF½ ..... .50
G1 ..... .50
H1 ..... .50
K1 ..... .40
K3 ..... .53
S2 ..... .35
Tube....6c each
Scraper, 2x7⅞..27c each

No. 75.

C4 .....$0.29
E1 ..... .36
F2 ..... .52
G1 ..... .52
H1 ..... .45
H1 3¼..... .54
H2 ..... .45
H3 ..... .51
H4 ..... .62
H4½ 1.13
H4¾ 1.32
K1 ..... .39
KB1 ..... .67
R1 ..... .29
R2 ..... .29
R8 ..... .34

No. 77.

A1 .....$0.37
A12 ..... .55
A23 ..... .49
D5¾ ..... .54
DK Roller, .84
E1 ..... .38
E2 ..... .33
F1 ..... .50
F2 ..... .64
G1 ..... .48
G6 ..... .51
G19 ..... .51
H1 ..... .48
H9 ..... .58
K1 ..... .42
K1 C'pr pr. .44
K3 ..... .54
K8 ..... .45
M1 ..... .68
M3 ..... .54
R1 ..... .32
R3 ..... .36
S2 ..... .39

No. 78.

A1 .....$0.46
A3 ..... .59
A11 ..... .50
A11½ .... .56
A16 ..... .85
A33 ..... .62
A63 ..... .61
C4½ ..... .39
D5 ..... .65
D12 ..... .87
E1 ..... .47
F2 ..... .70
F4 ..... .71
F8 ..... .67
FF ..... .73
G1 ..... .59
G6 ..... .68
G19 ..... .66
G60 ..... .60
H1 ..... .66
H2 ..... .70
H6 ..... 1.01
H22 ..... 1.03
K1 ..... .47
K3 ..... .65
K111 ..... .86
M3 ..... .70
R1 ..... .42
R1½ ..... .44
R3 ..... .50
R8 ..... .45
R20 ..... .62
R30 ..... .46
RR ..... .61
S2 ..... .52

No. 83.

A11 .....$0.55
D5 ..... .67
E1 ..... .57
E2 ..... .57
FF ..... .88
F2 ..... .92
F15 ..... .66
G1 ..... .74
G24 ..... .74
K1 ..... .63
M3 ..... .75
M4 ..... .83
M11 ..... .76

No. 85.

EO $0.96
E1 ..... .69
E2 ..... .72
F1 ..... .98
F2 ..... .92
F5 ..... .92
FF ..... .81
FF½ ..... .89
F8 ..... 1.06
G6 ..... .71
H1 ..... .72
H2 ..... .78
K2 ..... .72
K3 ..... .85
K4 ..... .80
K7 ..... .73
M3 ..... .78
S1 ..... .89
S2 ..... .64
S5 ..... .90
K2 C'pr pr. .70

No. 88.

A1 .....$0.70
A3 ..... .70
A7 ..... .63
A11 ..... .60
C1 ..... .77
D5 ..... .67
DH 1.30
DF12 Roller..... 1.45
DF14 Roller..... 1.37
DK Roller. 1.38
E1 ..... .64
F1 ..... .60
F2 ..... .80
F4 ..... .71
F8 ..... .89
F12 ..... .87
F14 ..... .77
GX ..... .90
G1 ..... .66
G6 ..... .73
G8 ..... .72
G10 ..... 1.23
G19 ..... .81
H1 ..... .76
H2 ..... .78
H5 ..... .92
H6 ..... 1.13
H9 ..... .64
H14 ..... .83
H15 ..... 1.17
H16 ..... .72
K1 ..... .61
K1 C'pr. pr. .61
K5 ..... .91
K8 ..... .75
M3 ..... .86
R1 ..... .51
R2 ..... .51
R8 ..... .54
R30 ..... .53
S2 ..... .62
S2½ ..... .59
Scraper 32c each

No. 95.

F2 .....$1.10
H1 ..... .86
H2 ..... .96
K2 ..... .84

No. 103.

A1 .....$0.91
A4 ..... .94
A4 C'pr pr. .97
A11 ..... .91
A11½ 1.11
A24 ..... .98
D5 ..... 1.02
D26 ..... 1.10
DD 1.40
DDM3 .... 1.72
E1 ..... .94
F2 ..... 1.11
F3 ..... 1.42
F8 ..... 1.26
F20 ..... 1.28
G6 ..... 1.13
G10 ..... 1.13
G19 ..... 1.09
G22 ..... 1.67
H1 ..... .95
H2 ..... 1.02
H3 ..... 1.23
H14 ..... 1.35
K1 ..... .95
K1 C'pr pr. .97
K8 ..... .96
L2 ..... 1.26
M3 ..... 1.16
M11 ..... .97
R1 ..... .82
W1 ..... 1.10
W2 ..... 1.10
Scraper 61c each

No. 105.

F1 .....$0.69
H4—8-in. . 1.55
H22 ..... 1.72
H24 ..... 1.52
K2 ..... .97
M3 ..... 1.14
R1 ..... .87

No. 108.

F2 .....$1.18
FF 1.12
G1 ..... .97
H2 ..... .95
K2 ..... 1.02
K2 C'pr pr. 1.32
K5 ..... 1.40
R2 ..... .83

No. 114.

A2 .....$1.20
A11 ..... 1.06
DD 1.55
F2 ..... 1.35
F8 ..... 1.33
F12 ..... 1.66
G6 ..... 1.66
K1 ..... 1.21
L2 ..... 1.47
M1 ..... 1.41
N1 ..... 1.28

No. 122.

F2 .....$1.58
K2 ..... 1.66

No. 124.

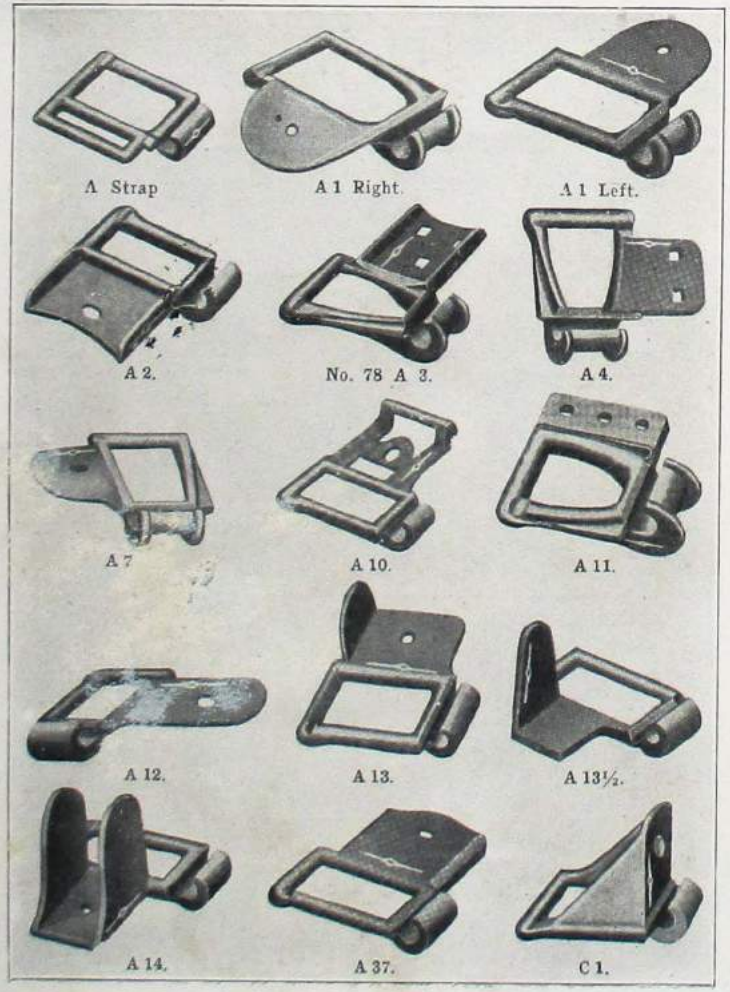
A4 .....$1.40
A4 C'pr. pr. 1.58
A11 ..... 1.45
D5 ..... 1.73
F2 ..... 1.54
F8 ..... 1.84
G1 ..... 1.47
G6 ..... 1.58
K1 ..... 1.56
KM3 ..... 2.05
M3 ..... 1.59
R1 ..... 1.21

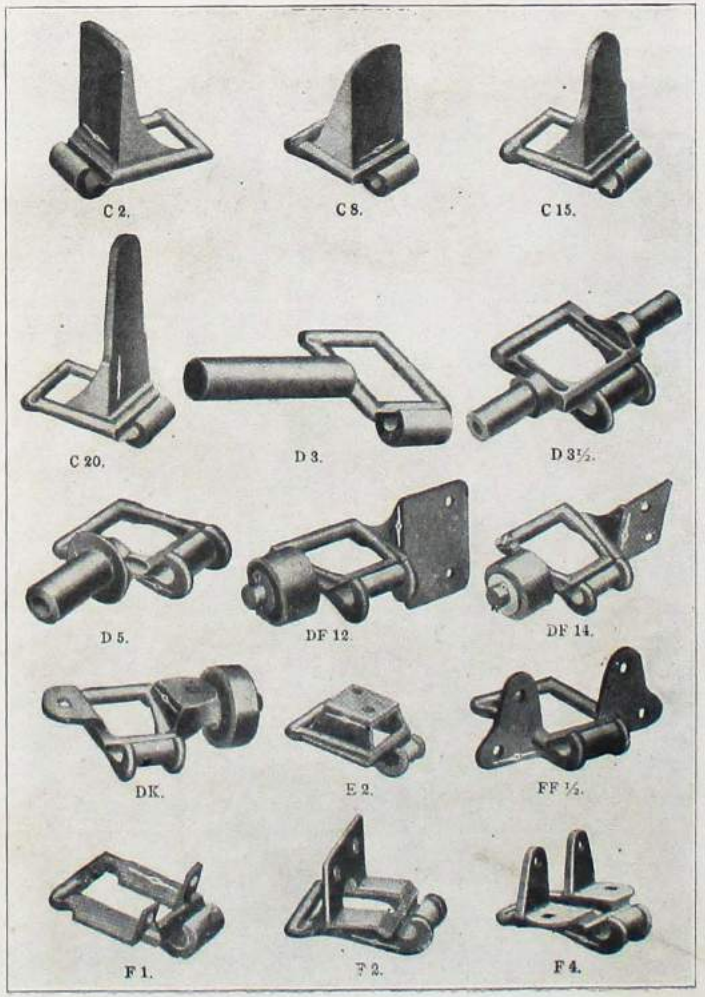
No. 146.

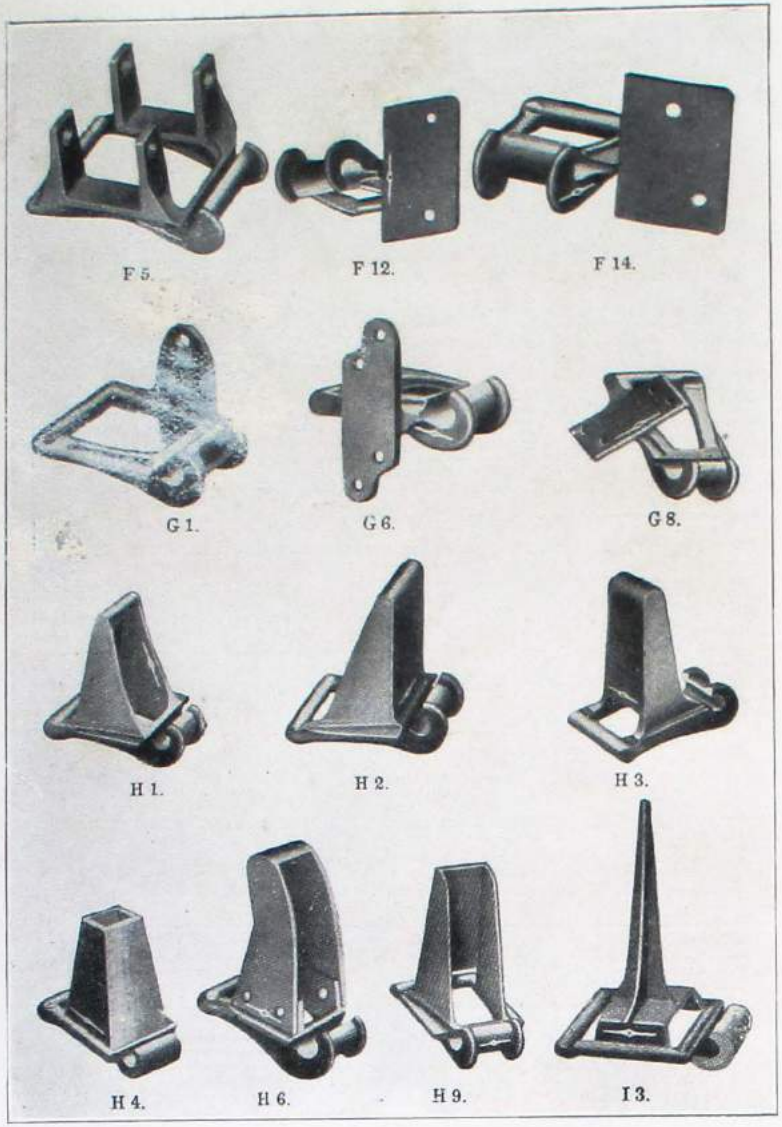
E2 .....$1.37
F2 ..... 1.49
F5 ..... 1.46
K2 ..... 1.76
K4 ..... 1.46

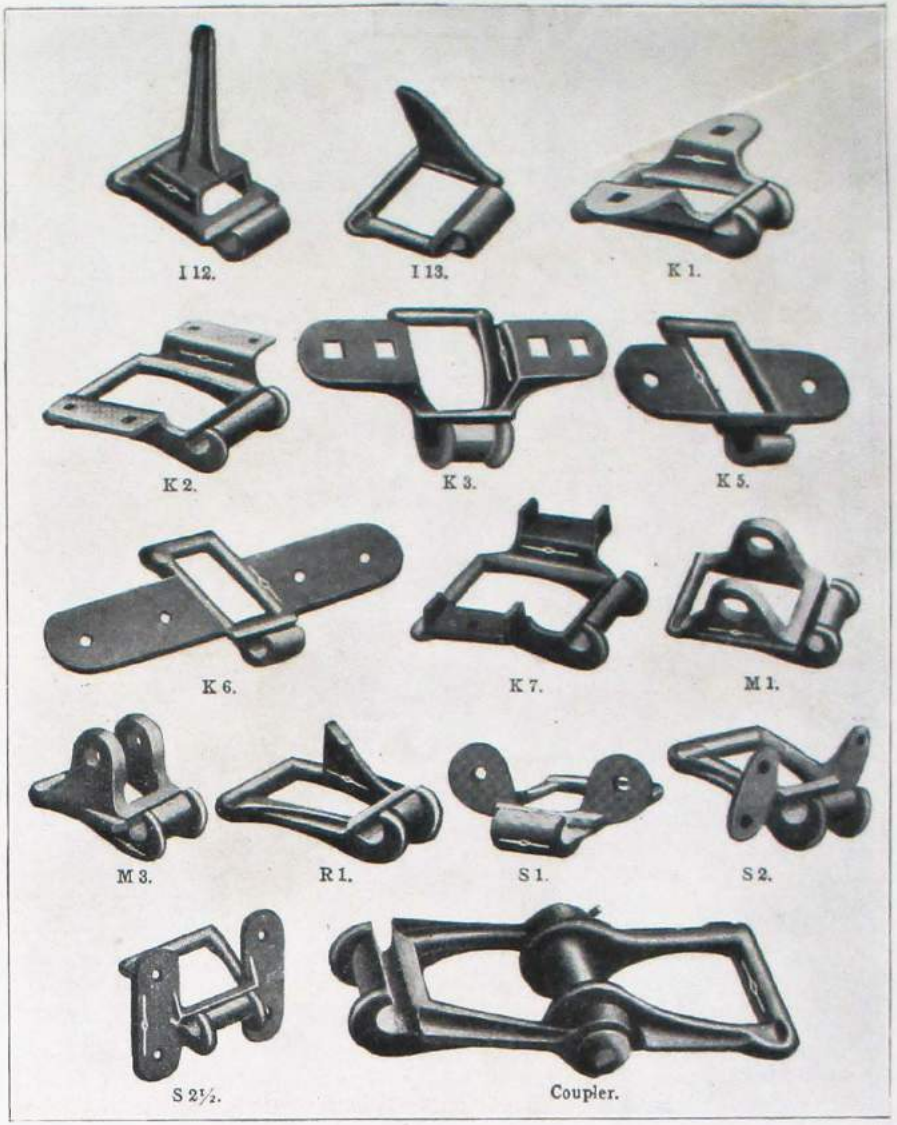
Attachment Links For Detachable Link Belting.

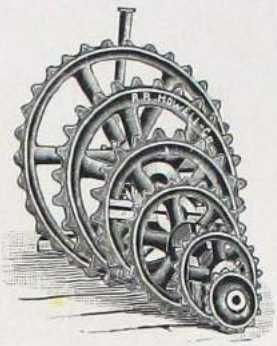
The following cuts show in a reduced size various styles of Attachment Links. Other styles than these shown can be furnished and prices quoted on application.






F 5.
F 12.
F 14.
G 1.
G 6.
G 8.
H 1.
H 2.
H 3.
H 4.
H 6.
H 9.
I 3.


I 12.
I 13.
K 1.
K 2.
K 3.
K 5.
K 6.
K 7.
M 1.
M 3.
R 1.
S 1.
S 2.
S 2½.
Coupler.



SPROCKET WHEELS FOR LINK-BELTING.

Bored and Set Screwed or Key Seated

NOTE —In some instances several numbers of Link Belting run on same Wheels, as in case of Nos. 57, 67 and 77.

These prices cover wheels with bores as specified.

Wheels can be bored to almost any size, and can be made to order with shorter or longer hub on one side, or both sides, or can be made with a clutch of any preferred pattern at a special price. An extra charge is made where both Set Screws and Key Seat are ordered.

PRICE LIST.

No. 024
Bore, $1\frac{7}{16}$ in. and less

Pitch Diam. Ins	No. of Teeth	Price
2	7	$1.10
3	10	1.25
5	17	1.55

Nos. 25, 31
Bore, $1\frac{7}{16}$ in. and less

$1\frac{1}{2}$	5	$1.10
$1\frac{3}{4}$	6	1.15
2	7	1.15
$2\frac{1}{4}$	8	1.20
$2\frac{1}{2}$	9	1.20
3	10	1.25
$3\frac{1}{4}$	11	1.30
$3\frac{1}{2}$	12	1.35
$3\frac{3}{4}$	13	1.40
4	14	1.45
$4\frac{1}{4}$	15	1.50
$4\frac{1}{2}$	16	1.50
5	17	1.55
$5\frac{1}{4}$	18	1.55
$5\frac{1}{2}$	19	1.60
$5\frac{3}{4}$	20	1.65
6	21	1.70
$6\frac{1}{4}$	22	1.70
$6\frac{1}{2}$	23	1.75
7	24	1.75
$7\frac{1}{4}$	25	1.80
$7\frac{1}{2}$	26	1.80
$7\frac{3}{4}$	27	1.80
8	28	1.85
$8\frac{1}{2}$	30	1.90
9	32	1.95
$9\frac{1}{4}$	33	2.00
$9\frac{1}{2}$	34	2.05
10	35	2.10
$10\frac{1}{4}$	36	2.15
$10\frac{1}{2}$	37	2.15
$11\frac{1}{2}$	40	2.30
12	42	2.40
$12\frac{1}{4}$	43	2.45
$12\frac{1}{2}$	44	2.55
13	45	2.55
$13\frac{1}{2}$	48	2.60
$14\frac{1}{2}$	50	2.70
15	52	2.80
$15\frac{1}{2}$	54	2.90
16	56	3.00
$17\frac{1}{4}$	60	3.25
$18\frac{1}{4}$	64	3.50
20	70	3.80
24	84	5.00

No. 32
Bore, $1\frac{7}{16}$ in. and less

Pitch Diam. Ins.	No. of Teeth	Price
2	5	$1.15
$2\frac{1}{4}$	6	1.20
$2\frac{3}{4}$	7	1.25
3	8	1.30
$3\frac{1}{4}$	9	1.35
$3\frac{3}{4}$	10	1.40
$4\frac{1}{4}$	11	1.45
$4\frac{3}{4}$	12	1.55
$4\frac{3}{4}$	13	1.65
$5\frac{1}{4}$	14	1.70
$5\frac{3}{4}$	15	1.80
6	16	1.85
$7\frac{1}{4}$	20	2.05
$8\frac{1}{4}$	22	2.15
$8\frac{1}{2}$	23	2.20
9	24	2.25
$9\frac{1}{4}$	25	2.30
$9\frac{1}{2}$	26	2.35
10	27	2.40
$10\frac{1}{4}$	28	2.45
$11\frac{3}{4}$	32	2.70
12	33	2.80
$12\frac{3}{4}$	34	2.85
$13\frac{1}{4}$	36	2.90
14	38	3.00
$14\frac{3}{4}$	40	3.10
15	41	3.20
16	44	3.35
$16\frac{1}{2}$	45	3.40

No. 33, 34
Bore, $1\frac{7}{16}$ in. and less

$2\frac{3}{4}$	6	$1.30
3	7	1.35
$3\frac{1}{2}$	8	1.40
4	9	1.45
$4\frac{1}{2}$	10	1.50
5	11	1.60
$5\frac{1}{2}$	12	1.70
$6\frac{1}{4}$	14	1.80
$6\frac{1}{2}$	15	1.90
7	16	2.00
8	18	2.10
$8\frac{1}{2}$	19	2.20
9	20	2.30
$9\frac{3}{4}$	22	2.40
$10\frac{3}{4}$	24	2.50
11	25	2.60
12	27	2.70
$12\frac{1}{2}$	28	2.75
13	29	2.80
$13\frac{1}{2}$	30	2.90
$14\frac{1}{4}$	32	3.00
$15\frac{1}{4}$	34	3.20
16	36	3.30
$18\frac{1}{4}$	41	3.65
$18\frac{3}{4}$	42	3.70
24	54	4.90
$28\frac{1}{2}$	64	5.90

Nos. 35, 45, 55, 151—R. P.
Bore, $1\frac{15}{16}$ in. and less

Pitch Diam. Ins.	No. of Teeth	Price
$2\frac{1}{2}$	5	$1.50
3	6	1.60
$3\frac{3}{4}$	7	1.70
$4\frac{1}{4}$	8	1.80
$4\frac{3}{4}$	9	1.90
$5\frac{1}{4}$	10	2.00
$5\frac{3}{4}$	11	2.10
6	12	2.20
7	13	2.30
$7\frac{1}{4}$	14	2.40
$7\frac{3}{4}$	15	2.50
$8\frac{1}{2}$	16	2.60
$8\frac{3}{4}$	17	2.70
$9\frac{1}{2}$	18	2.80
10	19	2.90
$10\frac{1}{2}$	20	3.00
11	21	3.10
$11\frac{1}{2}$	22	3.20
12	23	3.30
$12\frac{1}{2}$	24	3.40
13	25	3.50
$14\frac{1}{4}$	27	3.70
$14\frac{1}{2}$	28	3.80
15	29	3.90
$15\frac{1}{2}$	30	4.00
16	31	4.10
$16\frac{1}{2}$	32	4.20
$17\frac{1}{4}$	33	4.30
$18\frac{1}{4}$	35	4.60
$18\frac{1}{2}$	36	4.70
$20\frac{1}{2}$	39	5.10
$20\frac{3}{4}$	40	5.20
$21\frac{3}{4}$	42	5.40
$22\frac{3}{4}$	44	5.80
$23\frac{1}{2}$	45	6.00
$23\frac{3}{4}$	46	6.20
$24\frac{3}{4}$	48	6.50
$25\frac{1}{4}$	49	6.60
$25\frac{3}{4}$	50	6.80
28	54	7.50
30	58	8.30
$31\frac{1}{4}$	60	8.70
36	69	11.00
42	82	14.00

Nos. 42, 042, 142 R. P.
Bore, $1\frac{11}{16}$ in. and less

Pitch Diam. Ins.	No. of Teeth	Price
2	5	$1.50
$2\frac{3}{4}$	6	1.60
3	7	1.70
$3\frac{3}{4}$	8	1.80
$4\frac{1}{4}$	9	1.90
$4\frac{3}{4}$	11	1.95
$5\frac{1}{4}$	12	2.00
$5\frac{3}{4}$	13	2.05
$6\frac{1}{4}$	14	2.10
7	16	2.20
$7\frac{1}{2}$	17	2.25
8	18	2.30
$8\frac{1}{4}$	19	2.35
$8\frac{3}{4}$	20	2.40
$9\frac{1}{4}$	21	2.45
$9\frac{3}{4}$	22	2.50
$10\frac{1}{2}$	24	2.60
$11\frac{1}{2}$	26	2.75
$11\frac{3}{4}$	27	2.80
$12\frac{1}{4}$	28	2.90
14	32	3.20
$15\frac{1}{2}$	36	3.60
18	41	4.00
20	46	4.50
24	55	5.50

No. 43
Double Wheel
Bore, $1\frac{15}{16}$ in. and less

$12\frac{1}{2}$	26	$6.00

No. 48
Bore, $1\frac{15}{16}$ in. and less

$4\frac{1}{2}$	7	$1.45
$5\frac{3}{4}$	9	1.60
$6\frac{1}{2}$	10	1.65
8	12	1.95
$8\frac{1}{2}$	13	2.25
$11\frac{3}{4}$	18	2.45

No. 65
Bore, $2\frac{7}{16}$ in. and less

6	9	$1.70
8	12	2.20
14	21	4.10

SPROCKET WHEELS—Continued

Nos. 52, 052, 52½
Bore, 1 5/16 in. and less

Pitch Diam. Ins.	No. of Teeth	Price
2⅜	6	$1.50
3	7	1.60
4	8	1.70
4¼	9	1.80
5	10	1.90
5¼	11	2.00
5½	12	2.10
6	13	2.20
6½	14	2.30
7	15	2.40
7½	16	2.50
8	17	2.60
8½	18	2.70
9	19	2.75
9½	20	2.80
10	21	2.90
10½	22	3.00
11	23	3.10
11½	24	3.15
12	25	3.20
12½	26	3.30
13	27	3.40
14¼	30	3.60
14¾	31	3.70
15¼	32	3.80
15¾	33	3.90
16¾	34	4.00
16¾	35	4.10
17¼	36	4.15
17¾	37	4.20
18	38	4.30
19¼	40	4.60
20	42	4.80
21	44	5.00
22	46	5.20
23¾	49	5.60
24½	51	5.80
25	52	6.00
26½	55	6.40
30½	64	8.00
36	75	12.50

No. 51
Bore, 1 5/16 in. and less

1¾	5	$1.40
2¼	6	1.45
2½	7	1.50
3	8	1.55
3¼	9	1.60
4	11	1.70
4½	12	1.75
5	14	1.85
6	16	1.95
6¼	17	2.00
8	22	2.25
10	27	2.50
12	33	2.90
13¼	36	3.05
14	39	3.20
15½	42	3.40
16½	45	3.70
18¼	50	4.10

No. 57, 67, 77, 73, 75½, 77½, 60 R. D.
Bore, 2 7/16 in. and less

Pitch Diam. Ins.	No. of Teeth	Price
4½	5	$1.80
4¾	6	1.90
5½	7	2.20
6	8	2.40
6¾	9	2.60
7½	10	2.80
8	11	2.90
8¾	12	3.10
9½	13	3.25
10¼	14	3.40
11	15	3.55
11¾	16	3.70
12½	17	3.85
13¼	18	4.00
14	19	4.20
14¾	20	4.40
15½	21	4.60
16½	22	4.80
17	23	5.00
17½	24	5.20
18¼	25	5.40
19	26	5.60
19¾	27	5.85
20	28	6.10
22	30	6.50
23½	32	7.00
24¼	33	7.25
25	34	7.50
25½	35	7.75
26	36	8.00
28	38	8.60
29¼	40	9.20
30	41	9.50
31½	43	10.10
32½	44	10.40
35¼	48	11.80
36	49	12.20
38½	52	13.20
39¾	54	13.90
41½	56	14.60
43	59	15.80
44½	60	16.50
47½	64	18.50
54	74	30.00

Nos. 66, 72
Bore, 2 7/16 in. and less

5	8	$1.90
5¾	9	2.00
7	11	2.20
7½	12	2.30
8½	13	2.50
9	14	2.60
10¼	16	2.80
11½	18	3.00
12½	19	3.20
16¼	25	4.00

No. 62, 71, 072, 072½, 72½, 2 R. P. K303, R. P., 62 R. D.
Bore, 2 7/16 in. and less

Pitch Diam. Ins.	No. of Teeth	Price
3¾	7	$1.85
4¼	8	1.95
5	9	2.05
5¼	10	2.15
5¾	11	2.25
6¼	12	2.40
6¾	13	2.55
7¼	14	2.70
8	15	2.85
8¼	16	3.00
9¼	18	3.20
10	19	3.35
10½	20	3.50
11	21	3.60
11½	22	3.80
12	23	4.00
12¾	24	4.15
13¾	26	4.45
14¾	28	4.70
16	30	5.10
18	34	5.60
20	38	6.20
21	39	6.35
21½	41	6.60
22¼	42	6.80
23	43	7.00
24	45	7.40
25¼	48	8.10
26	49	8.30
30½	58	10.20

Nos. 83, 93
Bore, 2 5/16 in. and less
Double Teeth

12	18	$4.80
14¼	22	5.50
15½	24	6.30
16	26	6.90
17¾	28	7.40
20	32	8.30
24	38	10.20
25½	40	10.90
28½	44	12.50
30	48	14.20
34	54	16.50
41	64	21.50
50	80	30.30
54	84	35.20

Nos. 75, 78, 88, 88½, 74 R. D. 75 R. D., 78 R. D. 188 Special Comb.
Bore, 2 15/16 in. and less

Pitch Diam. Ins.	No. of Teeth	Price
4¼	5	$2.40
5	6	2.60
6	7	2.80
6½	8	3.00
7½	9	3.20
8¼	10	3.45
9	11	3.70
10	12	3.95
10¾	13	4.20
11½	14	4.50
12½	15	4.80
13¼	16	5.10
14½	17	5.50
15	18	5.80
16	19	6.20
16½	20	6.60
17½	21	6.95
18½	22	7.30
19¼	23	7.65
20	24	8.00
21	25	8.30
21¾	26	8.60
22½	27	8.90
23¼	28	9.20
24	29	9.50
24¾	30	9.80
26¼	32	10.10
27½	33	10.70
28½	34	11.10
29½	35	11.50
30	36	11.90
30½	37	12.40
32½	39	13.40
33½	40	13.90
35	42	14.90
37	44	15.90
38	46	17.10
39¾	48	18.30
41	49	19.00
41¾	50	19.70
45	54	22.50
48	58	24.80
50	60	26.00
54	65	27.00
64	77	33.50

No. 76½
Bore, 2 15/16 in. and less

4¾	7	$1.55
8	13	2.15
12	18	3.10

SPROCKET WHEELS—Continued.

Nos. 85, 94, 95 85 R. D., 95 R. D., and 102 and 102½ Special Comb.

Bore, $2\frac{15}{16}$ in. and less

Pitch Diam. Ins.	No. of Teeth	Price
7¾	6	$4.00
10	8	5.00
11¾	9	5.50
12½	10	6.05
13½	11	6.50
15	12	6.95
16	13	7.40
17½	14	7.85
19	15	8.00
20	16	8.80
22½	18	10.25
24	19	11.00
25¼	20	11.90
27¾	22	13.60
30	24	15.40
31½	25	16.25
33	26	17.15
34	27	18.25
35½	28	20.40
41	32	24.50
48¼	38	30.00
60	47	45.00

No. 97

Riveted Saw Dust
Face 3⅜ inches
Pitch, 5 inches

Bore, $3\frac{11}{16}$ in. and less

9⅞	6	$6.25
11⅞	7	6.90
13	8	7.50
16⅜	10	10.00
19¾	12	11.50

No. 98

Riveted Saw Dust
Face, 4¼ inches
Pitch, 5 inches

Bore, $4\frac{7}{16}$ in. and less

9⅞	6	$7.00
11⅞	7	7.50
13	8	8.00
16⅜	10	10.70
19¾	12	12.25

Nos. 100, 102

Riveted Saw Dust
Face, 6¼ inches
Pitch, 5 inches

Bore, $4\frac{15}{16}$ in. and less

9⅞	6	$8.25
11⅞	7	9.00
13	8	9.75
16⅜	10	11.50
19¾	12	13.50
21½	13	15.00

No. 101

Bore, $3\frac{7}{16}$ in. and less

6	7	$4.00
7	8	4.40

Nos. 103 82, R. D. 131 Special Comb.

Bore, $3\frac{7}{16}$ in. and less

Pitch Diam. Ins.	No. of Teeth	Price
6	6	$3.60
7	7	4.00
7⅞	8	4.40
8⅝	9	4.80
9⅝	10	5.25
10¾	11	5.65
11⅞	12	6.05
12½	13	6.45
13½	14	6.85
14½	15	7.25
15½	16	7.65
16½	17	8.05
17½	18	8.45
18	19	8.90
19½	20	9.40
21¼	22	10.35
22½	23	10.80
23½	24	11.20
25½	26	12.25
26½	27	12.75
27½	28	13.30
29¾	30	14.40
30	31	15.20
31½	32	16.00
32	33	16.80
33¼	34	17.60
34	35	18.20
35¼	36	19.25
37	38	21.20
39¼	40	23.10
41	42	24.80
43¼	44	26.50
45	46	28.20
47	48	29.90
48	49	30.75
53	54	34.90
53¾	55	35.50
58¾	60	40.00
60	61	42.00
64½	66	45.50
71½	73	60.00
79	81	70.00

No. 104

Riveted Saw Dust
Face, 4⅜ inches
Pitch, 6 inches

Bore, $4\frac{15}{16}$ in. and less

15½	8	$9.25
17½	9	10.20
19½	10	11.30
21	11	12.25

No. 104½

Bore, $3\frac{7}{16}$ in. and less

10	7	$5.50
13	9	7.50
15⅞	11	8.75
20	14	12.00
21⅜	15	13.75
24⅝	17	14.50
30¼	21	18.75
36	25	24.50
47⅞	33	38.00

Nos. 105, 107

Bore, $3\frac{7}{16}$ in. and less

Pitch Diam. Ins.	No. of Teeth	Price
11⅝	6	$5.00
15¾	8	6.00
19½	10	8.00
23	12	9.00
25½	13	10.50
27½	14	12.00
31	16	14.00
36⅝	19	18.50
48½	25	27.00

Nos. 108, 110 108 R. D., 110 and 111 Spec. Comb.

Bore, $3\frac{7}{16}$ in. and less

9½	6	$5.20
10¾	7	5.50
12	8	6.20
13½	9	7.25
15	10	8.50
16½	11	9.00
18	12	9.90
19	13	10.90
20	14	11.80
24	16	14.00
27¼	18	16.25
30	20	18.50
36	24	24.00
42	28	29.30
45	30	32.00
48	32	37.00

No. 110, 120

Riveted Saw Dust
Face, 9¼ inches
Pitch, 6 inches

Bore, $4\frac{15}{16}$ in. and less

15½	8	$13.50
17½	9	15.00
21	11	19.50

No. 114

Bore, $3\frac{7}{16}$ in. and less

7	7	$4.15
8	8	4.50
9½	9	4.85
10	10	5.20
11½	11	5.65
12⅝	12	6.10
13¼	13	6.55
14¼	14	7.00
16⅛	16	8.00
17⅝	17	8.60
18⅝	18	9.20
19¼	19	9.80
20¾	20	10.40
22	21	11.10
22⅝	22	11.80
24	23	12.45
24½	24	13.10
27	26	14.60
31	30	17.50
33	32	19.30
35	34	21.10
36	35	22.00
37½	36	23.00
42	41	28.10
47⅝	46	33.10
48⅝	47	34.90
49⅝	48	36.00

No. 116, 118

Riveted Saw Dust
Face, 12 inches
Pitch, 8 inches

Bore, $4\frac{15}{16}$ in. and less

Pitch Diam. Ins.	No. of Teeth	Price
18	7	$19.25
20½	8	24.00
23	9	25.50
26	10	30.50

Nos. 124 87 R. D., 124 R. D.

Bore, $3\frac{15}{16}$ in. and less

9½	7	$5.50
10½	8	6.20
11½	9	6.90
12½	10	7.70
14⅜	11	8.50
15¼	12	9.40
16½	13	10.20
18¼	14	11.00
19½	15	12.00
20¾	16	13.00
21½	17	14.20
23½	18	15.20
24	19	16.20
26	20	17.30
28½	22	19.50
29¾	23	20.60
31	24	21.70
32½	25	22.80
35	27	25.00
36	28	26.10
38⅜	30	28.50
41½	32	30.80
44	34	33.00
46½	36	35.30
48	38	38.00
62	48	52.00
72½	56	66.00
85¼	66	85.00

Nos. 122 132 Spec. Comb.

Bore, $3\frac{15}{16}$ in. and less

16	8	$9.75
17½	9	10.80
19	10	12.80
21¾	11	14.60
23	12	16.50
26	13	18.50
27½	14	20.00
29½	15	21.80
31¼	16	23.60
36⅜	18	27.80
37	19	30.00
40⅜	21	34.00
42½	22	36.00

No. 146

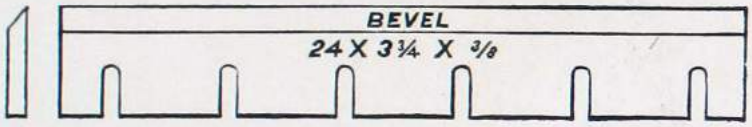
Bore, $3\frac{15}{16}$ in. and less

16	8	$12.00
18	9	12.65
20	10	13.70
24	12	18.50
32	16	20.00
36	18	24.00

Additional Price to be added to the List Price for Split Sprocket Wheels.

No. of Chain	NUMBER OF TEETH															
	4 7	8 10	11 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 80
25	$	$1 15	$1 15	$1 20	$1 20	$1 25	$1 25	$1 30	$1 35	$1 40	$1 45	$1 50	$1 55	$1 60	$1 70	$1 75
32		1 20	1 25	1 30	1 40	1 45	1 50	1 55	1 65	1 70	1 80	1 90	2 00	2 05	2 15	2 25
33 34-42		1 30	1 35	1 40	1 50	1 55	1 65	1 75	1 85	1 95	2 05	2 20	2 35	2 50	2 65	2 80
35 45 55		1 40	1 50	1 60	1 75	1 90	2 00	2 15	2 35	2 60	2 85	3 10	3 35	3 60	3 85	4 15
51		1 20	1 25	1 30	1 40	1 45	1 50	1 55	1 65	1 75	1 90	2 00	2 10	2 25	2 40	2 50
52		1 40	1 50	1 60	1 70	1 80	1 90	2 00	2 10	2 25	2 45	2 60	2 80	3 00	3 20	3 40
57-67-77		1 55	1 70	1 95	2 20	2 45	2 75	3 10	3 50	3 90	4 30	4 75	5 15	5 60	6 00	6 45
62		1 50	1 60	1 75	1 90	2 10	2 25	2 45	2 65	2 85	3 25	3 55	3 85	4 15	4 45	4 75
66		1 45	1 55	1 65	1 80	1 95	2 10	2 30	2 50	2 75	3 05	3 35	3 60	3 90	4 20	4 50
75 78 88		1 70	2 00	2 45	2 90	3 40	3 90	4 40	4 95	5 50	6 05	6 60	7 15	7 70	8 25	8 80
83	1 65	2 05	2 70	3 50	4 30	5 10	5 90	6 80								
85 95	2 05	2 35	3 05	3 90	4 80	5 70	6 60	7 50	8 40	9 35						
103	1 90	2 20	2 70	3 30	4 00	4 70	5 40	6 10	6 75	7 45	8 10	8 75	9 40	10 05	10 70	11 40
108	2 20	3 00	3 85	5 10	6 40	7 70	9 00	10 35								
114	1 65	2 05	2 70	3 50	4 30	5 15	6 05	6 95	7 90							
122	3 50	4 50	5 70	7 25	8 80											
124	2 10	2 70	3 50	4 40	5 40	6 40	7 40	8 40	9 45	10 45	11 50	12 55	13 60	14 70		
146	3 50	4 20	5 00	6 00												

Planer Knives



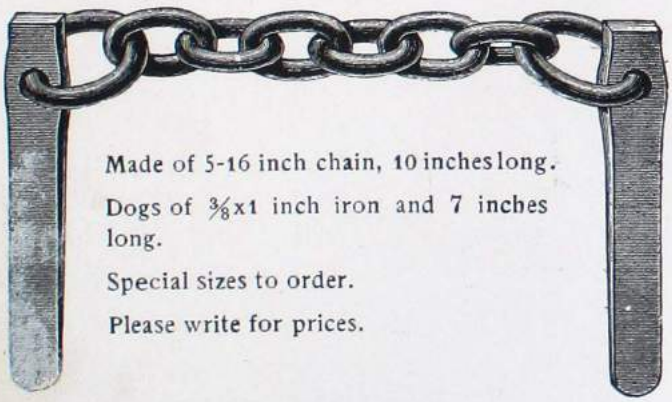
24 Inches Long, 3¾ Inches Wide, ⅜ Inch Thick.

We keep in stock a full assortment of knives and cutters for our Planers, and can furnish special knives for Planers of other makes.

In ordering planing knives, etc., place the knife down on a piece of blank paper, mark around to show the length of knife and size and position of slots, and be sure to state the width and thickness (as shown in diagram above), and number of knives in a set.

Ring Dogs.

Log Rafting Dogs.—Chain Dogs.



Made of 5-16 inch chain, 10 inches long.

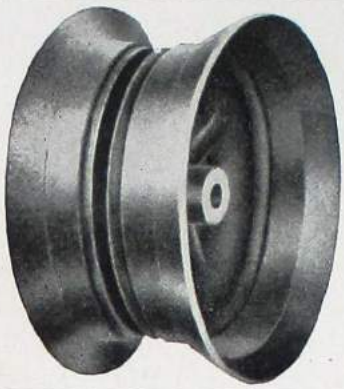
Dogs of ⅜x1 inch iron and 7 inches long.

Special sizes to order.

Please write for prices.

One inch square iron, 7 inches long. Ring of ½ inch iron, 3 inches inside diameter. Special sizes to order.

Owing to frequent fluctuations in prices, we give estimates on application.

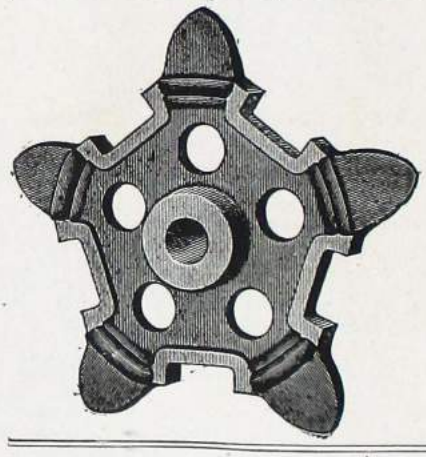


Double Flanged Grooved Drums or Idlers

For Foot and Knuckle of Log Haul-ups.

This wheel has no projections to catch bark or logs and the wide sloping flanges effectually prevent dislodgement of the chain.

Diam.	For Chain No.	Size	Price	Diam.	For Chain No.	Size	PRICE
16 in.	530	½x4	$12.00	24 in.	533	⅞x7	$40.00
16 in.	531	⅝x5	19.00	24 in.	534	1 x7	45 00
20 in.	531	⅝x5	23.00	26 in.	535	1⅛x8	50.00
24 in.	532	¾x6	38.00	26 in.	536	1¼x8	60 00



Chain Sprockets with Solid Tooth For Cable Chain.

The Solid Tooth Pattern is made with Special Long Teeth and of a design to insurelong life and smooth running, and very satisfactory for light and medium size plants for Log Jacks—and various conveyors, to fit either cable crane chain or anyof theimproved detachable chains.

No. 530.

4 x ½ inch Link.

Pitch Diam. Ins.	No. of Teeth.	Price
13	5	$ 4 50
15¾	6	5 00
20½	8	8 50
23¼	9	10 00

No. 531

5 x ⅝ inch Link,

Pitch Diam Ins.	No. of Teeth.	Price
13	4	$ 5 50
16¼	5	7 55
19½	6	9 50
22½	7	12 00
26	8	18 00
29½	9	20 00

No. 532.

6 x ¾ inch Link.

Pitch Diam. Ins.	No. of Teeth.	Price.
19½	5	$ 11 00
23½	6	14 00
31	8	21 00

No. 533.

7 x ⅞ inch Link.

Pitch Diam. Ins.	No. of Teeth.	Price.
18½	4	$ 14 00
23	5	18 00
31¾	7	32 00

No. 534.

7 x 1 inch Link.

Pitch Diam. Ins.	No. of Teeth.	Price
23	5	$ 20 00
31¾	7	26 00

No. 535.

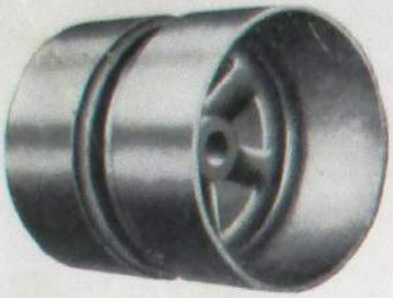
8 x 1⅛ inch Link.

Pitch Diam. Ins.	No, of Teeth.	Price.
26	5	$ 25 00
30	6	30 00

No. 536.

8 x 1¼ inch Link,

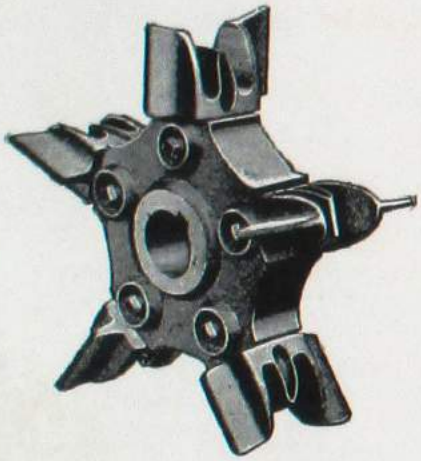
Pitch Diam. Ins.	No of Teeth.	Price.
26	5	$ 26 50
30	6	32 00



Drum Wheels with Center Groove

For Tail Delivery End of Cable Chain Conveyor.

Diameter inches	Face inches	For No. Chain.	Size inches.	PRICE
12	12 to 16	530	½x4	$12.00
16	16 to 20	530	½x4	15.00
20	20 to 24	531	⅝x5	24.00
20	20 to 24	532	¾x6	29.00
24	20 to 24	532	¾x6	40.00
24	20 to 24	533	⅞x7	42.00
20	20 to 24	533	⅞x7	35.00
24	20 to 24	534	1 x7	45.00



Flanged Sprocket for Cable Chain

With Adjustable Forged Steel Teeth.

The opposiie cuts show the very latest Improved Expansible Sprocket Wheels, for use on heavy log jacks and slab and dust conveyors used in connection with our plain link cable cran chain, or any other improved detachable chains.

These wheels are fitted with adjustable steel points or teeth, and are held in place by key with set screw so the teeth can be set out to suit the wear of the chain, and they are interchangeable, so that the same size teeth will fit any of our wheels for that size chain; the teeth can also be reversed, giving the wheels several times the life of one with cast teeth. They are also provided with flanges, which render it utterly impossible for the chain to be thrown from the wheel on account of trash, blocks or other obstructions getting lodged in the links. The advantage and satisfaction derived from the use of these wheels far more than offset their additional cost, and we offer them as the very best and most reliable wheels that has ever been placed in the market.

No. Chain.	Dimensions of Chain	Diameter Inches	Teeth	Price
530	½ x 4	15¾	6	$ 22 00
531	⅝ x 5	19½	6	29 00
532	¾ x 6	24	6	44 00
533	⅞ x 7	23	5	47 50
534	1 x 7	23	5	54 00
535	1⅛ x 8	26	5	60 00
536	1¼ x 8	26	5	70 00

Circular Wood Saw Machines.

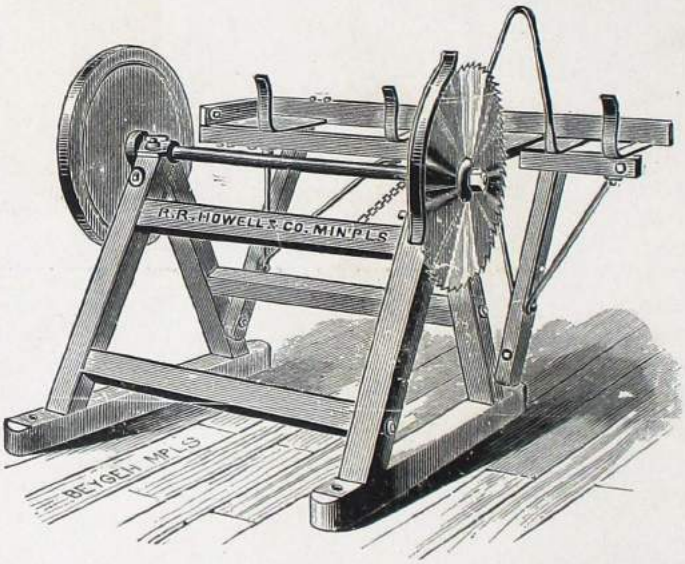
The following cuts represent our leading styles of Circular Wood Saw Machines, as built by us. By this assortment our customers will be able to select a machine that will be adapted to their requirements. We aim to make our Wood Saws the best in the market. The frames are well made, heavy and strongly bolted; the shafts are made of 1½ inch steel, four feet long.

All Arbor Boxes are pivoted, self-adjusting to line of shaft, thus obviating cramping and binding, a very valuable improvement.

They are put up with the saw at the **left hand,** unless otherwise ordered. Size of Pulley, 5 inch diameter by 6 inch face; speed from 1200 to 1800 revolutions per minute, according to size of saw used and power applied. We ship all our Wood Saw Machines knocked-down, packed up in bundles which makes a very low rate of freight.

Prices on machines are made with 24-inch extra quality saw blade, **set and sharpened:** We also carry in stock, and can furnish with our machines when so ordered at proportionate prices, 22, 26, 28, 30 and 32 inch blades.

HOWELL No. 1 WOOD SAW.



The table is just balanced, swinging on centres, or cast iron socket hinge that will not wear loose. It is very easy for the operator. The table is heavily ironed and made throughout in the very best possible manner. Intended for cutting 4-foot wood into short lengths.

We recommend this style best for general work.

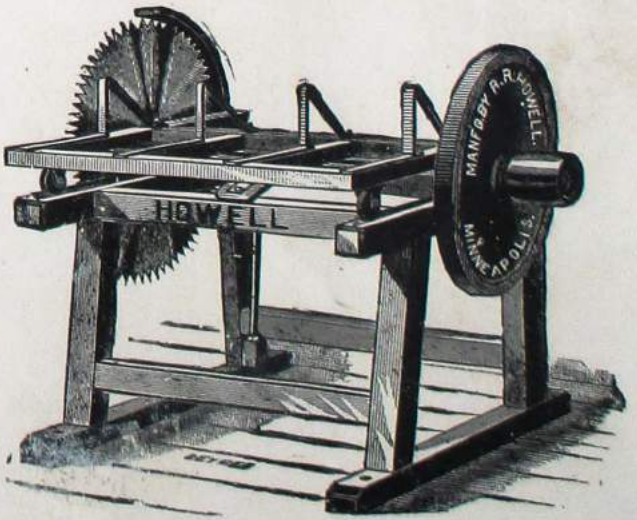
Weight, 265 lbs. Price.....$40.00

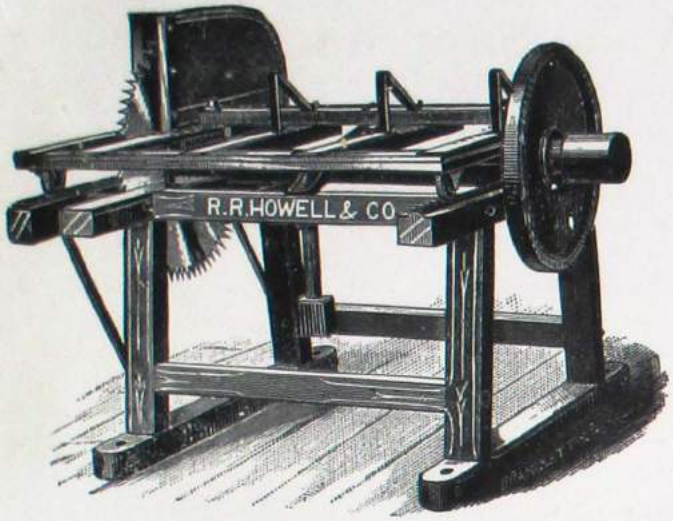
HOWELL NO. 2 WOOD SAW.

The table runs on iron rollers so arranged with our patented slide guide placed under the table as to render it impossible to displace the table when the machine is in motion. They are made with automatic return table, so that when stick of wood is cut off the table drops back into position for the next cut.

Our Square Frame Roller Table is an excellent Machine, light running and easily handled; intended for a run-about jobbing mill and for cutting 4-foot wood into short lengths.

Weight 320 lbs. Price.....$40.00





Howell No. 3 Wood Saw.

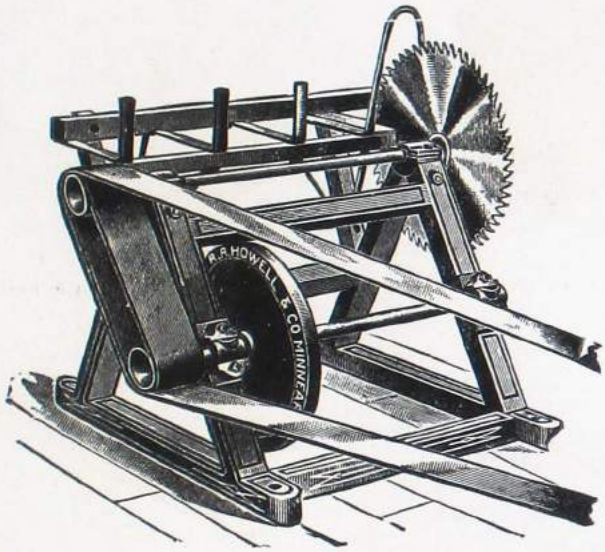
This machine is same style as our No. 2, only it has in addition an extension of the table outside the saw which enables the users to saw poles. The saw is protected by a guard which prevents injury to the operator, and makes a very desirable machine for this work. Weight, 350 lbs.

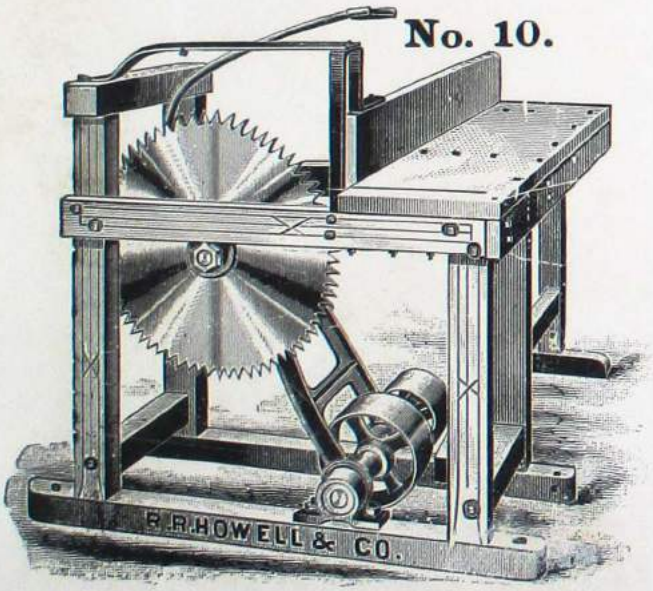
Price.....$50.00

Howell No. 4 Wood Saw.

This machine is the same in general style as our No. 1, only the fly wheel is placed out of the way and below the arbor as shown in cut, making it especially adapted for sawing long poles into short lengths, and perfectly serves the purpose. It is a profitable machine for this work and only has to be seen to be admired. The table, as in our No. 1, swings on centers, so the force of the cut of the saw makes it very easy for the operator. Weight, 315 lbs.

Price.....$50.00



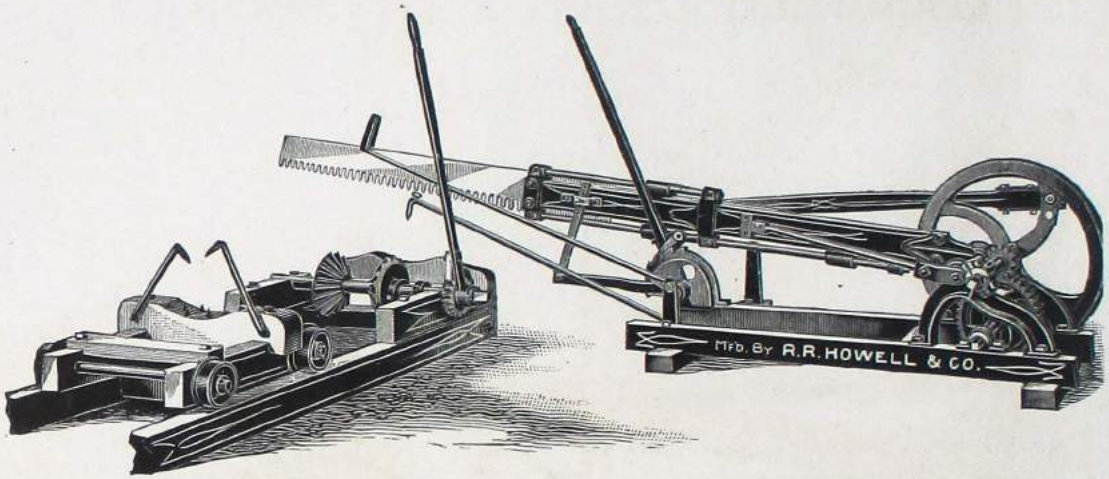


SWING SAW.

This is an excellent machine, designed for sawing slabs and poles, and is in extensive use in box factories, railway and car shops, etc. It has substantial hard wood frame, with iron arm, **Steel Arbor** and is complete in itself. The arrangement for drawing the saw to the work is very convenient and admits of rapid, correct work.

Price with 24-inch saw blade, $60.00

No. 1 Drag Saw Machine



Frequent inquiries and a growing demand for a light, simple and effective Drag Saw to be driven by two to four horse power led us to design the above machine, which we believe meets the wants of most farmers who desire a good, light and convenient machine that requires small power and at a price within the reach of all. Its use will be found extremely profitable and a great saving of labor for the accommodation of a class of farmers who want a saw and power for their own use, and a very complete and desirable machine for the purpose intended. The construction of this machine is by far the simplest for a light machine, and most compact of any made, and occupies very little space.

The operator moves the logs with a lever in either direction as required. This obviates the necessity of either moving the power or the machine, which is necessary with most other makes of light machines. This saves much labor and time.

The stroke can be lengthened or shortened to suit the power by moving the wrist pin of the balance wheel to or from the center.

Furnished with Dog for holding the log, to prevent rolling under the saw, rigidly holding the material to be sawed, also suitable guide which prevents the saw from whipping when out of the log. Has babbitted cross-head running in steel slide bars, and every requisite to make it complete, durable and easy to operate.

When wanted as a Four Horse outfit we furnish with No. 1 Drag Saw our Four Horse American Power and connect to the lower shaft, which will increase the speed three times.

With a Two Horse Outfit we furnish our Two Horse Western Power and connect to the lower shaft. With four good horses, a man and a boy can cut from thirty to forty cords a day and will do equally as well as with two, only will turn out proportionally less work.

SPECIAL NOTICE.

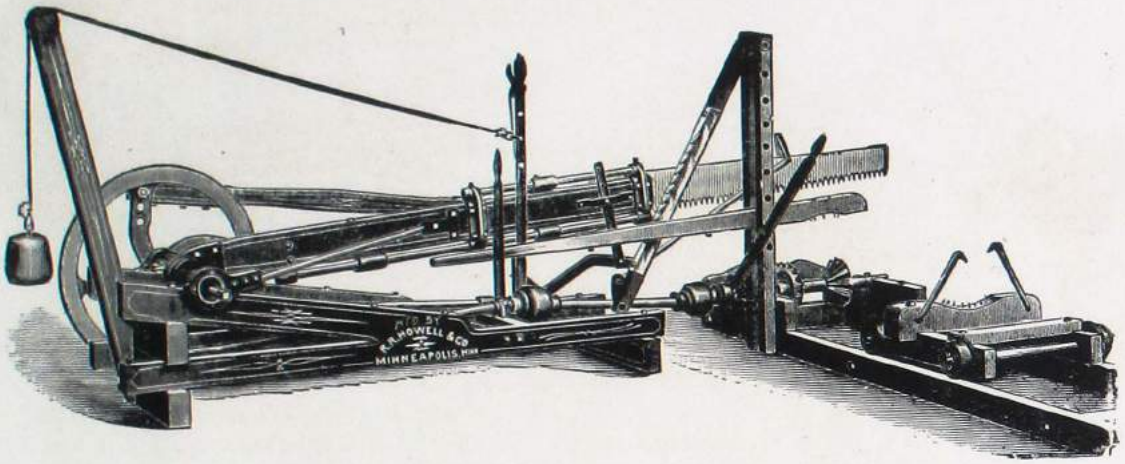
When you order any of our Drag Saw Machines state whether you want our No. 1, 2 or 3 machine, and also if you want one of our Horse Powers. If not, state what power it is to be run with, and give the number of revolutions the Tumbling Rod has to one of the horses, and whether the Tumbling Rod turns over with the horses or under and against them. If it is to be run with a belt, give size of Driving Pulley and the number of revolutions it has per minute.

No. 1 Drag Saw Machine complete with one blade, weight 750 lbs. Price..... $50.00

Same with 4-horse American Power and necessary rods and couplings, weight 1600 lbs. Price..... 90.00

Same with 2-horse Western Power and necessary rods and couplings, weight 1450 lbs. Price..... 85.00

THE HOWELL No. 2
PORTABLE DRAG SAW MACHINE
Self Feed

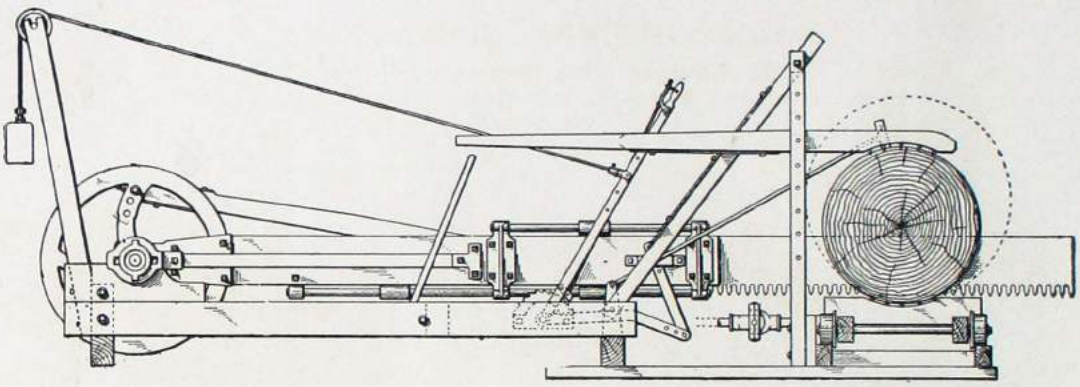


This engraving represents **our self-feed** portable Drag Saw Machine, used for reducing large timbers, logs of any size, poles, rails, etc., into stove length, or any length desired; also used to prepare the material for hub, spoke, stave, shingle and heading factories.

For doing rapid work in heavy timber no portable machine made by any manufacturer equals it, and needs only to be seen at work to convince anyone of its superiority over all other makes. It is a good investment and will pay for itself in a few weeks on any timber farm in the country. It has a simple arrangement for drawing the log forward after each cut. No stopping of team or slowing of motion is required, as the operator with one hand throws self-feed in gear, and with the other hand the saw is raised instantly, after finishing a cut, by means of a lever, and the same lever is made to counterbalance the saw-arm, and thus regulate the cut of the saw in different sized logs. One man attends to raising the saw, drawing the log forward, and holding the log in its place, which is a gteat saving of labor, and reduces the expense of running a machine materially. With good management it will easily cut 100 cords per day, and with suitable power. The stroke can be adjusted to either 16, 20 or 24 inches, to suit the power used. The longer the stroke the more power required and work accomplish. We use large heavy fly wheel and weighted so as to balance, to perfectly offset weight of Saw Pitman. We furnish Blade to cut one way when machine is used with power up to 4-horse, and Blade cutting both ways when used with power 6-horse and over. If wanted to be driven by Belt, an extra charge is made for pulley, size 18 inches diameter by 6 inch face, unless otherwise ordered. Blade should make from 100 to 150 revolutions per minute. Weight 1,150 pounds.

Price No. 2 Self-Feed Drag Saw Machine, with 5½-foot Blade, 20 feet of log carriage, trucks and dogs, complete..... $75.00
Price. with 6-horse "Climax" power and necessary rods and couplings..$130.00

HOWELL NO. 3 STATIONARY DRAG SAW MACHINE.



This machine is shown by the accompanying engraving, is used as stationary machine operated by steam power, for cutting off logs of small and large diameters, either hard or soft wood, performs the work at a large saving, and its use will be found extremely profitable to hub, spoke, shaft, pole, rim, hoop, stave, heading, and other manufacturers who purchase their material in the log.

The frame is constructed of heavy timbers, bolted together and well braced to stand the heavy labor expected of it. The machine, all over, including the saw, occupies 24x5 feet floor space. All the bearings have adjustments to take up the wear. The cross-head and other working parts are very durable.

The saw used is long, wide, and heavy, having 24-inch stroke, and is clamped between two steel plates attached to the arm. It can be quickly connected or disconnected. The lever, as shown by the engraving, is used to move the saw up or down, to or from its work. It can be handled by this arrangement while in motion and lock when elevated to its highest position.

The dog for holding the log is provided with spurs on either side of the saw, rigidly holding the material to be sawed, the dog following the saw when lifted from the cut. It will cut off a 24 inch diameter hickory log in one-half minute, with an average capacity of at least twelve men with hand saws. We furnish with the machine log trucks by which to carry the logs to and from the saw.

The stroke of the saw can lengthened or shortened to suit the power, by moving the wrist pin of the balance wheel to or from the center. It will be found a very complete, powerful and desirable machine or the purpose intended. Size of pulley 20 inches diameter by 8 inch face, unless otherwise ordered. Speed, 140 rotations per minute. Each machine is furnished with one saw cutting both ways.

Weight, 1,600 pounds. Price.....$150.00

Take-up Boxes.

For use where it is necessary to take up slack in belts, as in Elevators or Conveyors Made to pull and push.

PRICE LIST AND DIMENSIONS.

In ordering, give Diameter of Shaft.

Length of Adjustment.	Diameter of Shaft.	Length of Bearing.	Price "A"	Price "B"	Length of Adjustment.	Diameter of Shaft.	Length of Bearing.	Price "A"	Price "B"
4	1 1/16	2	$2.30	$2.60	9	1 15/16	4 5/8	$ 6.50	$ 7.15
4	1 3/16	2	2.40	2.70	9	2 3/16	4 5/8	7.00	7.70
4	1 5/16	2	2.50	2.80	12	2 5/16	5	9.00	9.90
5	1 3/16	3	3.10	3.40	12	2 7/16	5	9.75	10.75
5	1 5/16	3	3.25	3.60	20	2 9/16	6 1/8	11.00	12.10
7	1 7/16	4	4.50	4.95	20	2 11/16	6 1/8	11.75	13.00
7	1 9/16	4	4.75	5.25	20	2 13/16	6 1/8	13.00	14.40
7	1 11/16	4	5.00	5.50	20	2 15/16	6 1/8	14.50	16.00

Patent Adjustable and Reversible Saw Guide.

Our Patent Adjustable Saw Guide is complete in itself, and is so constructed that both guiding arms are moved laterally at the same time by one screw, rotated by hand wheel, placed convenient to the sawyer, so that the adjustment can be made with perfect safety while the saw is in motion. The arms are turned back out of the way, when changing saws, and dropped in position again precisely as before, without touching or altering the adjustment and the space between the saw pins. The guide pins are wood, with end grain to the saw, and held in brass sockets or thimbles, and when worn out they are easily removed.

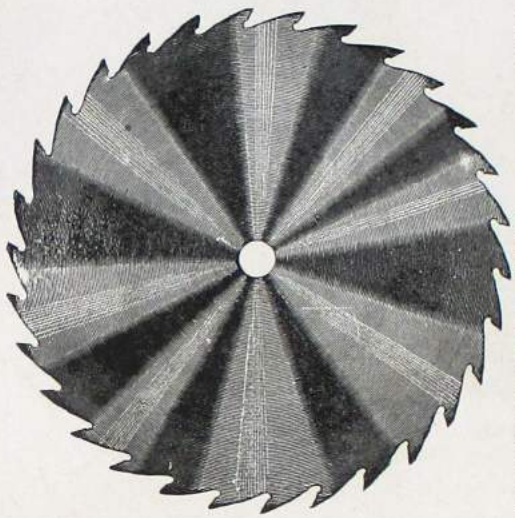
Being reversible, our guide may be used on a right or left-hand mill. The frame has slotted hole to permit adjustment required for different size saws used. We manufacture them in three sizes.

No. 1 adapted for our No. 1 Saw Mill; No. 20, Short Log Mill, Post Splitters, Bolters, etc.; while the No. 2 and 3 are for larger mills.

No. 1 for our No. 1 Saw Mill and Bolters.....$ 7.00
No. 2 for our No. 2, 3, 4 and 5 Saw Mills..... 8.00
No. 3 for our No. 6 and larger Saw Mills..... 12.00

The Celebrated "Champion" Circular Saws.

EXTRA QUALITY. SUPERIOR WORKMANSHIP.



GUARANTEED.

Diam inches.	Thickness Gauge.	Size of hole, inch.	PRICE, each.	Diam. inches.	Thickness Gauge.	Size of hole, inch.	PRICE each.
4	19	3/4	$1.10	38	9	1 5/8	**31 00**
5	19	3/4	1.30	40	9	2	**36 00**
6	18	3/4	1.55	42	8	2	42 00
7	18	3/4	1.85	44	8	2	50 00
8	18	7/8	2.20	46	8	2	60 00
9	17	7/8	2.75	48	8	2	70 00
10	16	1	3.30	50	7	2	80 00
11	16	1	3.80	52	7	2	90 00
12	15	1	4.13	54	7	2	100 00
14	15	1 1/8	5.00	56	7	2	115 00
16	14	1 1/8	6.00	58	7	2	130 00
18	13	1 1/4	7.50	60	6	2	145 00
20	13	1 5/16	9.00	62	6	2	160 00
22	12	1 5/16	11.00	64	6	2	180 00
24	11	1 3/8	13.00	66	6	2	200 00
26	11	1 3/8	15.00	68	5	2	225 00
28	10	1 1/2	17.00	70	5	2	255 00
30	10	1 1/2	19.00	72	5	2	290 00
32	10	1 5/8	22.00	74	5	2	330 00
34	9	1 5/8	25.00	76	5	2	375 00
36	9	1 5/8	28.00				

Solid Top Saws for Double Mills—10 Gauge.

Diameter ...	24 inches	26 inches	28 inches	30 inches	32 inches	34 inches	36 inches
Price	$13 00	$15 00	$17 00	$19 00	$22 00	$25 00	$28 00

Gang Edger Saws—Solid tooth.

Diameter.....	14 inches	16 inches	18 inches	20 inches	22 inches	24 inches
8 gauge.....	$6 25	$7 25	$8 70	$10 40	$12 35	$14 10
9 gauge.....	6 05	7 00	8 40	10 05	11 90	13 55
10 gauge.....	5 85	6 75	8 10	9 70	11 45	13 00
11 gauge.....	5 65	6 50	7 80	9 35	11 00	13 00
12 gauge.....	5 45	6 25	7 50	9 00	11 00	13 00

Inserted-Tooth Edger Saws—11 Gauge.

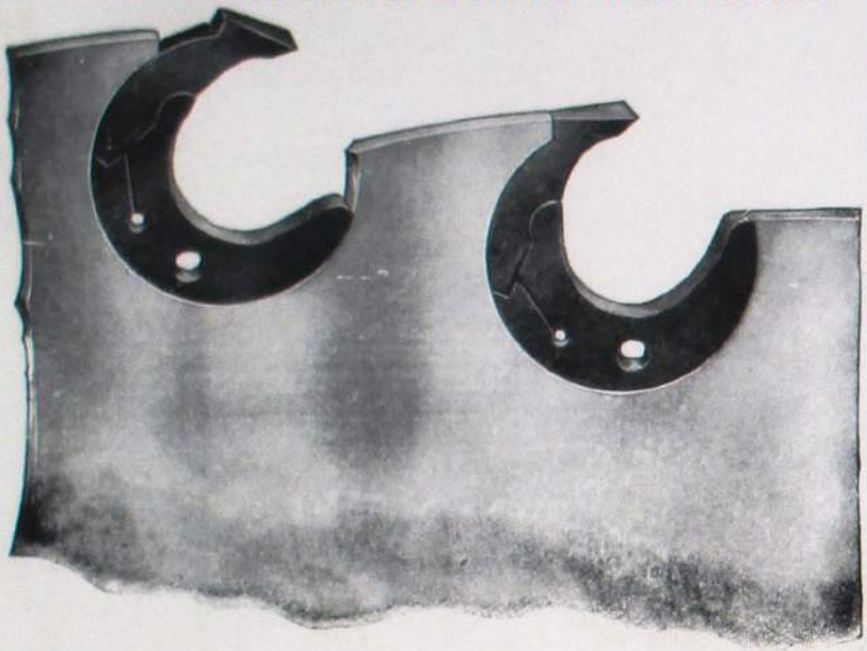
Diameter.....	14 inches	16 inches	18 inches	20 inches	22 inches	24 inches
Price, each.....	$21 00	$24 00	$27 00	$31 00	$35 00	$39 00
Extra for each additional gauge (heavier).....	21	25	30	35	45	55

Solid Shingle Saws.

Diameter, inches.....	30	32	34	36	38	40	42	44	46	48
Price, each.....	$32 00	$35 00	$38 00	$42 00	$47 00	$53 00	$65 00	$72 00	$85 00	$100 00

When ordering, give diameter of saw, gauge of saw at the rim and center, number of teeth, size of mandrel hole and size of collar. Give log side of the saw, also name of manufacturer of machine on which saw is run. Send paper templet or draft of holes to be drilled.

Inserted Tooth Circular Saws.



Made in four styles or sizes of chisel tooth.

No. 1, adapted mostly for Bolting and Gang Edger Saws.

No. 2, designed for heavy feeds.

No. 3, mostly used in hardwoods and is a good saw when both hard and soft woods are cut. This size is always shipped unless otherwise ordered.

No. 4 is adapted to soft pitchy lumber or where a large amount of throat room is desired.

These saws are fully guaranteed and cannot be excelled.

Price List.

Diameter.	Gauge.	Size of Hole.	Price, each.	Diameter.	Gauge.	Size of Hole.	Price, each.
20 inch	10	1 5/8 inch	$ 30 00	48 inch	8	2 inch	$115 00
22 inch	10	1 5/8 inch	35 00	50 inch	7	2 inch	130 00
24 inch	10	1 3/8 inch	40 00	52 inch	7	2 inch	150 00
26 inch	10	1 3/8 inch	45 00	54 inch	7	2 inch	175 00
28 inch	10	1 1/2 inch	50 00	56 inch	7	2 inch	200 00
30 inch	10	1 1/2 inch	55 00	58 inch	7	2 inch	225 00
32 inch	9	1 5/8 inch	60 00	60 inch	7	2 inch	255 00
34 inch	9	1 5/8 inch	66 00	62 inch	7	2 inch	290 00
36 inch	8	1 5/8 inch	72 00	64 inch	7	2 inch	325 00
38 inch	8	1 5/8 inch	78 00	66 inch	7	2 inch	360 00
40 inch	8	2 inch	84 00	68 inch	7	2 inch	400 00
42 inch	8	2 inch	90 00	70 inch	7	2 inch	450 00
44 inch	8	2 inch	97 00	72 inch	7	2 inch	500 00
46 inch	8	2 inch	105 00				

Prices Net for Repairing Saws.

Diameter, inches	Hammering only	Gumming and Hammering	Cutting Down, Re-toothing and Hammering	Setting and Sharpening Cross-Cut Circular Saws	Diameter, inches	Hammering only	Gumming and Hammering	Cutting Down, Re-toothing and Hammering	Setting and Sharpening Cross-Cut Circular Saws
4	$0 20	$0 25	$0 35	$0 36	36	$2 35	$3 45	$ 4 35	$2 35
5	25	35	40	40	38	2 45	3 65	4 55	2 55
6	30	40	50	45	40	2 60	3 85	4 80	2 75
7	35	45	55	50	42	3 40	5 05	6 30	2 95
8	40	55	65	55	44	3 55	5 30	6 60	3 15
9	45	60	75	60	46	3 70	5 55	6 95	3 35
10	50	65	80	65	48	4 00	6 00	7 75	3 60
12	55	75	95	70	50	4 75	7 00	8 75	3 85
14	60	90	1 20	75	52	5 50	8 25	10 00	4 10
16	75	1 05	1 30	85	54	5 80	8 65	10 80	4 40
18	80	1 20	1 45	95	56	6 00	8 95	11 20	4 70
20	90	1 30	1 60	1 05	58	6 20	9 30	11 60	5 00
22	1 20	1 80	2 20	1 15	60	6 40	9 60	12 00	5 30
24	1 30	1 95	2 40	1 30	62	8 30	12 40	15 50	5 60
26	1 40	2 10	2 60	1 45	64	8 60	12 80	16 00	5 90
28	1 55	2 25	2 80	1 60	66	8 80	13 20	16 50	6 20
30	1 60	2 40	3 00	1 75	68	9 10	13 60	17 00	6 50
32	2 05	3 10	3 85	1 95	70	9 35	14 00	17 50	6 80
34	2 20	3 30	4 10	2 15	72	9 60	14 40	18 00	7 10
									7 40

This charge is calculated on size of Saw after cutting down.

Setting and Sharpening Rip Saws, two-thirds price of Cross-Cut.

This charge is calculated on size of Saw after cutting down.

Setting and Sharpening Rip Saws, two-thirds price of Cross-Cut.

Bar Swages and Hammer

Hammer, net, each, ¾ inch.....$1.00
⅞ inch..... 1.25
1 inch..... 1.50
No. 1, 8 or 6-sided, 11x1 x½-inch, net, each...$2.50
No. 2, 8 or 6-sided, 11x1¼x⅝-inch, net, each... 3.00
No. 3, 8 or 6-sided, 11x1½x¾-inch, net, each... 3.50
No. 4, 8 or 6-sided, 11x1¾x⅞-inch, net, each... 4.00

Upset Swages

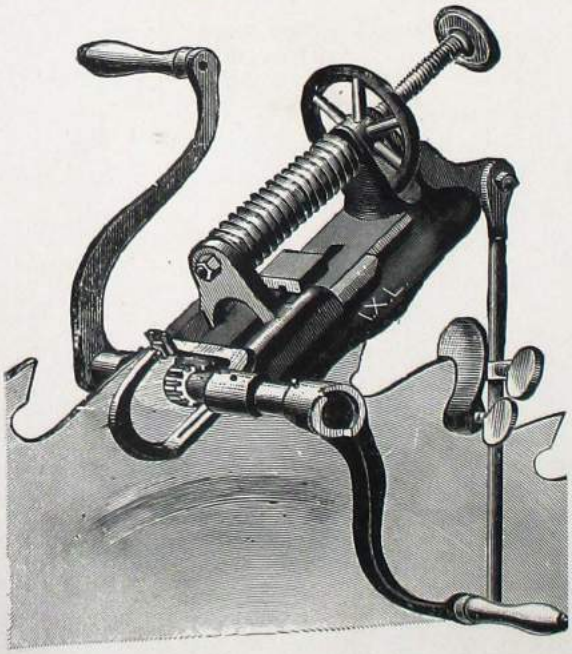
No. 0, for large Circular Saws.....$3.00
No. 1, for large Circular Saws..... 2.75
No. 2 Swage, for Band Saws 2.25
No. 2, for small Circular and Mill Saws..... 2.25
No. 3, for small Circular Saws 1.75

Mixter's Patent Swages

No. 3 Duplex Swage, largest size, for saws of from 5 to 10 gauge.....$7.00
No. 2 Duplex Swage, medium size, for saws of from 8 to 12 gauge..... 6.00
No. 1 Duplex Swage, for all thinner gauges..... 5.00
No. 0, Duplex Swage, for small, thin saws..... 4.00

The "I X L" Saw Gummer

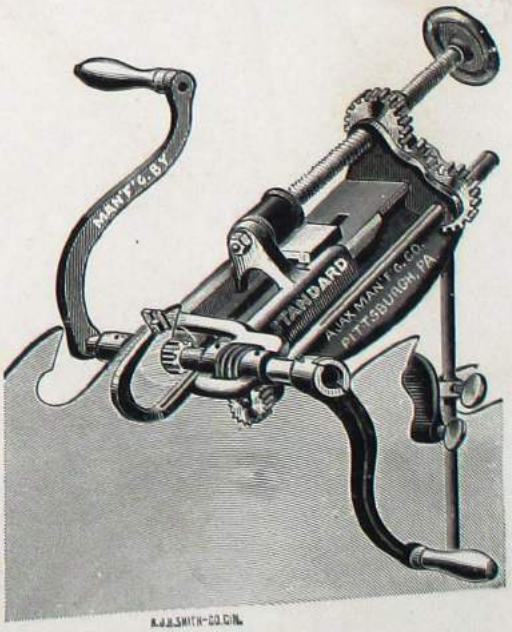
Changeable Self Feed, but is not Automatic



"I X L" Saw Gummer complete, with three arbors, two cranks and wrench, with three solid cutters and one cutter grinder $15.00

The "Standard" Saw Gummer

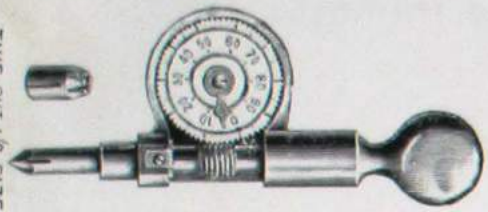
Automatic Changenble Self Feed



"Standard" Saw Gummer, complete, with three arbors, two cranks and wrench, with four solid cutters and grinder $20.00

Price of cutters, ¾, ⅞ and 5/6, 50c each; ¾ inch, 60c; ⅞ inch, 70c; 1 inch, 80c.

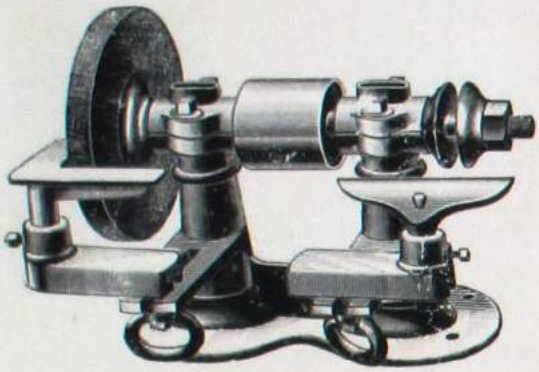
THIS CUT 1/2 SIZE



Improved Speed Indicator.

For testing speed of engine, saw mill shafting, etc.

Price, $1.00 each.

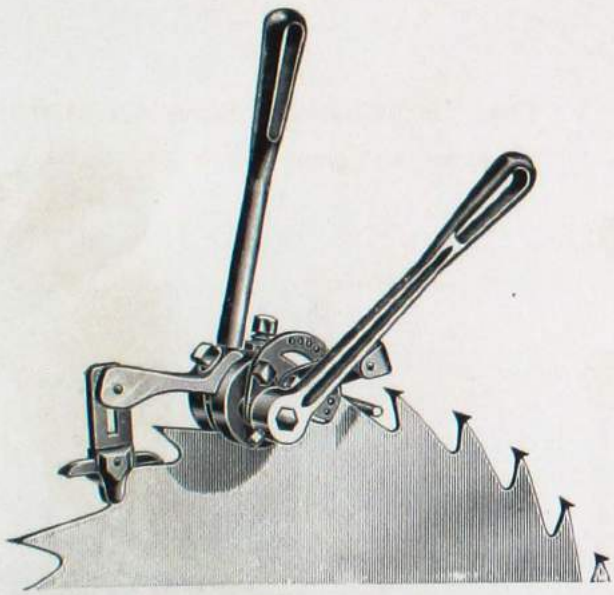


Grinding Machine.

This machine was designed more especially for Gumming Saws, sharpening and forming knives, tool grinding and for general shop work where the amount of work does not justify the use of a more expensive machine. It will take wheel up to 12 inches diameter, weight, 60 lbs.

Price Double Head Machine, - $12.00
Price Counter Shaft, if wanted, - $10.00

Crowell Saw Swages



Will work on either Band or Circular Saws, with the addition of an extra front guard if to be used on both Saws. Saws sharpened with the Crowell Swage enable the tooth to cut clean and not scrape, therefore taking less consumption of power.

Price List for Band, Gang, and Circular Saws

No.	Gauge for Saws	Distance of teeth apart	Price
0	18 to 22	⅞ in. and further	$20 00
1	16 to 20	1 in. and further	20 00
2	12 to 16	1¼ in. and further	25 00
3	8 to 12	1½ in. and further	28 00
4	6 to 12	2 in. and further	30 00

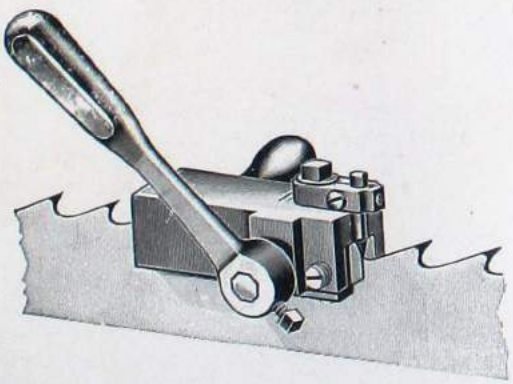
The Crowell Swage Shaper

Remarkable for its simplicity of construction, perfect adjustment, great speed and ease of operation and the excellent work which it does.

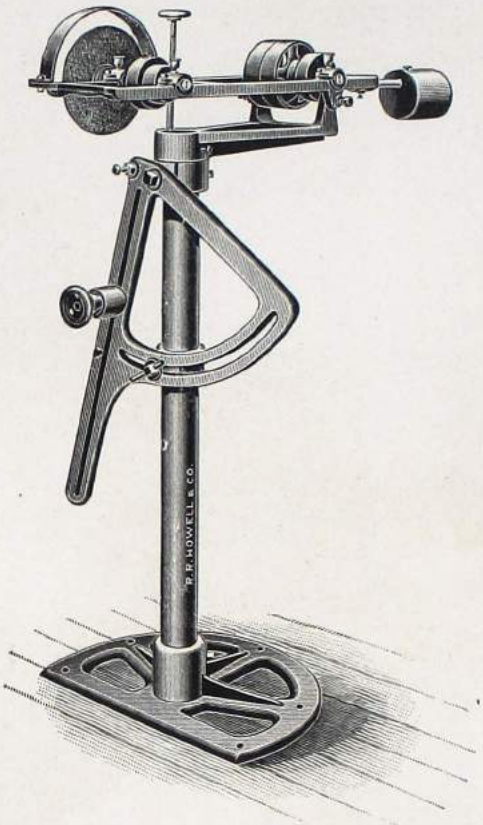
The die presses both sides of the tooth at once and makes a uniform point to saw teeth.

No. 1 Weight, 4 lbs. For Band Re-Saws. Price, $15 00

No. 2 Weight, 6 lbs. For Saws 10 to 16 Gauge. Price, $20 00



Saw Gummer and Sharpener.



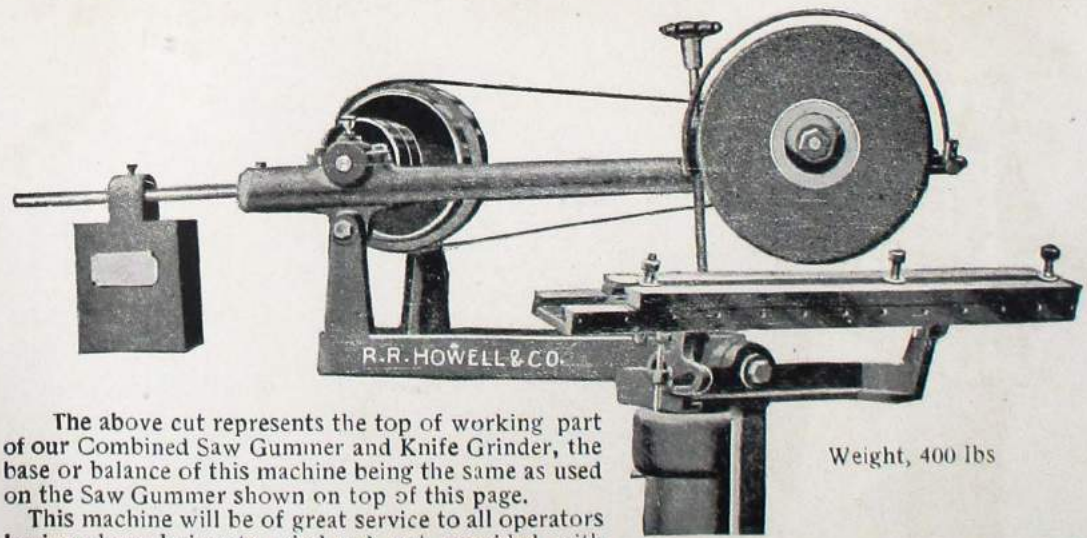
This Saw Gummer is an article of merit which no Saw Mill Plant should or can afford to be without for gumming and sharpening Circular Saws from 6 to 60 inches in diameter. An adjustable stop regulates the depth of cut and the various movements of the machine permit any desired adjustment of the saw for gumming square or bevel teeth. This machine is very compact and simple in construction, with just the necessary parts to do the work; built very heavy, strong and substantial, and is not to be classed with the light, cheap machines made by most other manufacturers.

A few dollars expended in getting a good, substantial Saw Gummer, with suitable emery wheel, will enable any man to gum and keep in order any size or style of saw. They will, with skillful handling, give any desired shape to the throat, edge or point of the saw, while they do away with the use of files entirely and save an immense amount of time, and furnish one of the best means of gumming saws which has yet been discovered.

The machine is complete as shown in cut, with Counter Shaft, Tight and Loose Pulleys, one Belt and one 12 x 5/8 inch Emery Wheel. Speed of tight and loose pulleys, 800 revolutions. Size 7 inch diameter and 2 inch face.

Weight 300 lbs. Price.....$35.00

Combined Saw Gummer and Knife Grinder.

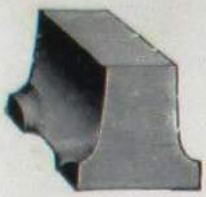


Weight, 400 lbs

The above cut represents the top of working part of our Combined Saw Gummer and Knife Grinder, the base or balance of this machine being the same as used on the Saw Gummer shown on top of this page.

This machine will be of great service to all operators having planer knives to grind and not provided with an automatic knife grinder. The table has an adjustable slotted fastening by which any required bevel can be given the knife, and will grind knives up to 26 inches long, true to any flat or concaved bevel. This machine, and each part, is made in the simplest manner possible to do the work required of it. We have not only obtained a very simple gummer and grinder, but a most efficient one, and one that will stand hard wear and give no trouble whatever. These grinders are offered with full warranty and guaranteed the best of their kind in the market, and quite equal in efficiency to machines costing very much more. Price, Combined Saw Gummer and Knife Grinder $50 00

Saw Makers Tools.



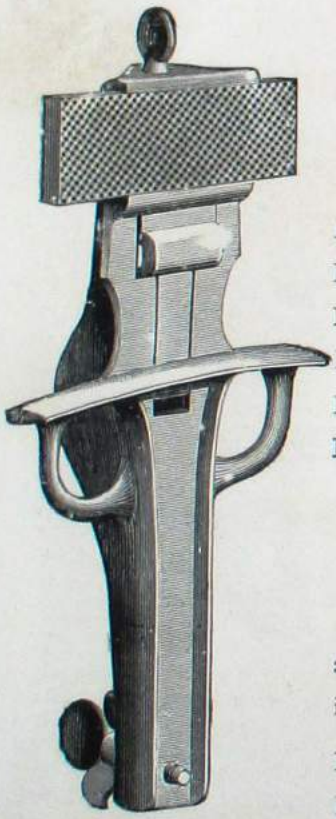
ANVILS, STEEL FACED.

Anvils weighing less than 180 pounds. Price, per pound..... $0.12
Anvils weighing 180 pounds or over. Price, per pound..... 13½
We keep in stock Anvils, 10x6 face, 86, 110, 145 pounds; 12x6 face, 250 pounds.

SAW MAKERS' HAMMERS.

Square Face Round Face

2½ to 3 lbs. Each..... $1.20
3½ to 4 lbs. Each..... 1.60
4½ to 6 lbs. Each..... 2.40



STRAIGHT EDGES.

Length, inches	12	14	16	18	20	24
Price, each	$0.65	$0.75	$0.87	$0.95	$1.05	$1.36
Length, inches	28	30	36	40	44	48
Price, each	$1.56	$1.65	$1.95	$2.10	$2.30	$3.00
Length, inches	52	54	56	60	66	72
Price, each	$3.50	$3.70	$4.00	$4.60	$5.00	$5.50

SIDE FILES.

By the use of this Side File all the teeth are made even, and a saw thus regulated will run twice as long without sharpening, and do better work.

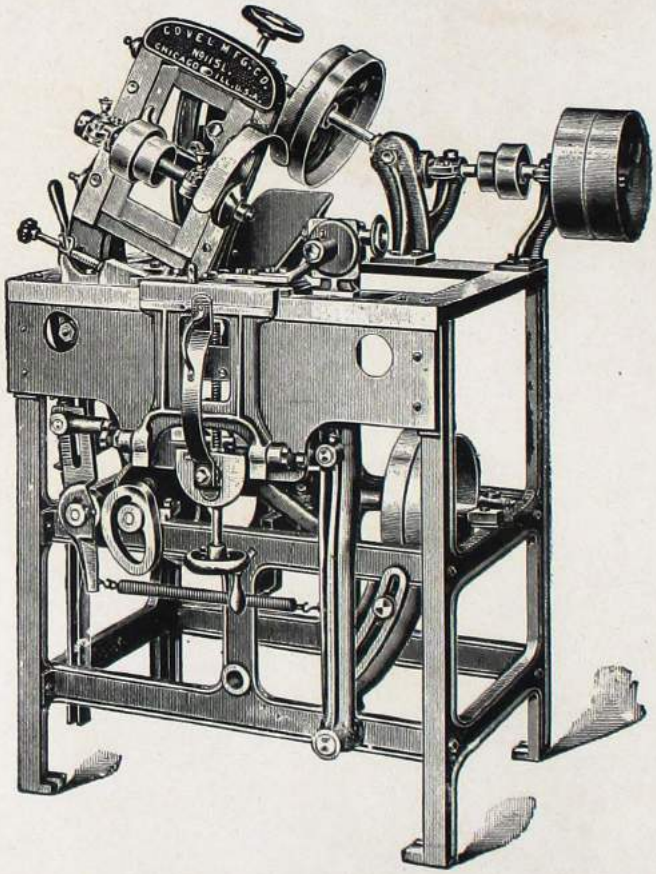
Price, each $1.00
Extra Files, per dozen..... 1.50

Leveling Block.

12 inches wide, 2	inches thick.	Per lineal foot	$4.00
12 inches wide, 2½	inches thick.	Per lineal foot	5.00
12 inches wide, 3	inches thick.	Per lineal foot	6.00
12 inches wide, 3½	inches thick.	Per lineal foot	7.00
12 inches wide, 4	inches thick.	Per lineal foot	8.00

Other widths at proportionate prices.

The "Covel" Automatic Band Saw Sharpener.

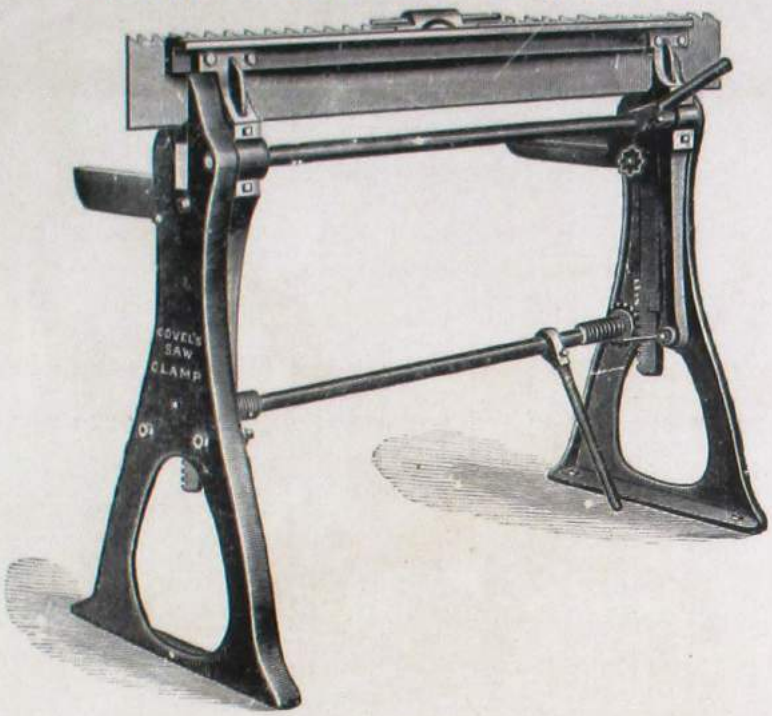


This cut shows a left hand machine. It is also made right hand. When ordering, always state whether right or left hand is wanted. It will sharpen saws 4 to 10 inches in width, all shapes and sizes of teeth from 1 to 2½ inches from point to point. The head can be set in any angle to 45 degrees, according to the amount of hook desired.

We send five-cam forms with each machine. If additional cam forms are required, we can furnish them, price, each, $1.00. Pulleys on countershaft 10 x 2¼ inch belt, speed about 580 revolutions per minute, which will sharpen about 25 teeth on the slow speed, and about 35 on the fast speed. Size of emery wheel used, 10 inches in diameter, 15-16-inch hole. Thickness to suit size of saw teeth. Floor space, 4 ft. x 3 ft.

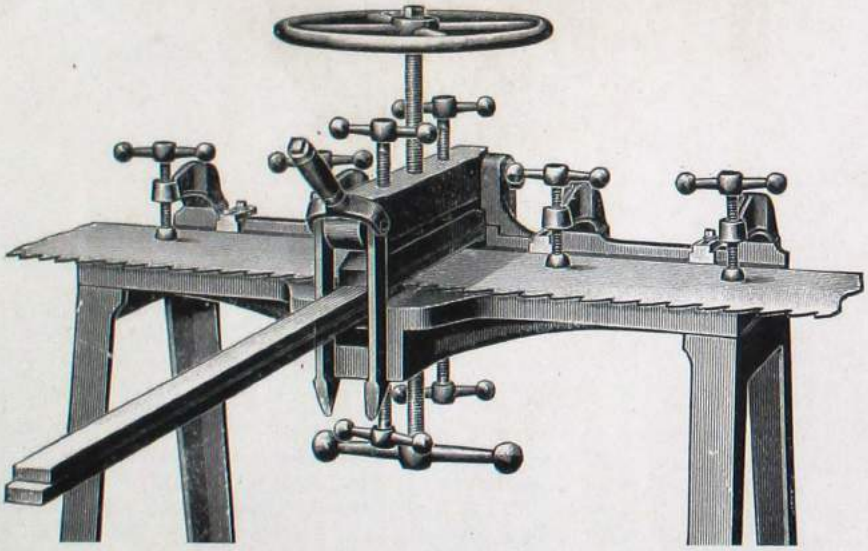
Weight, 900 pounds. Price, with Back Feed and Post Brackets	$150.00
Weight, 1,000 pounds. Same as above. Price, for both right and left hand saws	160.00
Weight, 1,000. Price, with Pulleys and Stands	175.00

Clamp for Band and Gang Saws.



We furnish with this clamp one face joiner (Top Dresser) and one side file.
Weight, 275 pounds. Price.....$50.00

Brazing Tables.



These Brazing Tables have been designed from practical experience and have proved to be most effective and satisfactory.

No. 1, without legs, for brazing Band Saws up to 12 inches wide.....$35.00
No. 3, without legs, for brazing Band Saws up to 14 inches wide..... 50.00
No. 2, with legs, otherwise same as No. 1..... 45.00
No. 4, with legs, otherwise same as No. 3..... 65.00

Files.

LIST OF NOVEMBER 1, 1899.

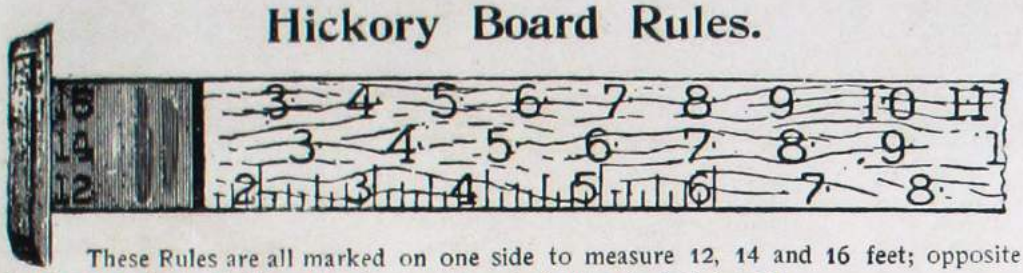
INCH.	MILL AND ROUND.			FLAT.			INCH.	TAPERS.		SLIM TAPERS		Planer Knife.	Inserted Tooth or Chisel Tooth
	Bastard.	2d Cut.	Smooth.	Bastard.	2d Cut.	Smooth.		Single Cut.	Double Cut.	Single Cut.	Double Cut.	Single Cut.	
4	$3 00	$3 50	$3 90	$3 70	$4 30	$4 70							
5	3 20	3 80	4 10	3 90	4 60	4 90							
6	3 50	4 00	4 50	4 30	4 80	5 30	3	$2 10	$2 50	$2 10	$2 50	.....	.....
7	3 90	4 60	4 90	4 80	5 50	6 10	3½	2 10	2 50	2 10	2 50	.....	.....
8	4 30	4 90	5 40	5 30	6 10	6 60	4	2 20	2 90	2 20	2 60	.....	... .
9	4 90	5 80	6 30	6 30	7 20	7 90	4½	2 40	3 10	2 30	3 00	.....	.....
10	5 60	6 40	7 00	7 00	8 10	8 70	5	2 60	3 50	2 50	3 20	$ 6 40	$ 8 30
11	6 70	7 80	8 50	8 60	9 80	10 70	5½	3 00	4 00	2 90	3 50	....	9 40
12	7 50	8 60	9 40	9 70	11 00	12 10	6	3 40	4 70	3 10	3 90	8 60	10 10
13	9 40	10 70	11 70	11 80	13 60	14 70	7	4 30	5 60	3 80	4 50	.....	.....
14	10 70	12 20	13 10	13 30	15 30	16 70	8	5 40	6 70	4 50	5 30	12 10	.....
15	13 10	15 00	16 10	16 00	18 30	20 00	9	6 60	8 10	5 40	6 30	.....	.....
16	14 70	16 80	17 90	17 80	20 10	22 30	10	8 10	9 70	6 40	7 50	.....	.....
17	18 20	20 20	21 70	21 50	24 20	26 50	11	10 70	12 10	8 30	9 10	.....	.....
18	20 20	22 70	24 30	23 90	26 80	29 20	12	12 50	14 70	9 50	11 00	....	....
19	24 60	27 50	29 40	28 40	31 60	34 60	13	15 90	17 50	12 10	13 10	.....	.....
20	27 40	30 70	32 90	31 50	35 30	38 30	14	18 20	20 60	13 80	15 40	.....	.....

Emery

Wheels.

Diameter of Wheels, In Inches.	Revol's Per Min.	THICKNESS OF WHEELS, IN INCHES.													
		¼	⅜	½	⅝	¾	⅞	1	1¼	1½	1¾	2	2¼	2½	2¾
2½	8,640	$0.66	.....	$0.70	.....	$0.78	.....	$0.85	$0.93	$1.00	$1.08	$1.15	$1.22	$1.30	$1.38
3	7,200	.79	.....	.85	.....	.97	.....	1.10	1.22	1.35	1.48	1.60	1.72	1.85	1.98
4	5.400	.96	1.03	1.10	1.24	1.38	1.51	1.65	1.93	2.20	2.48	2.75	3.03	3.30	3 58
5	4,320	1.20	1.30	1.40	1.60	1.80	2.00	2.20	2.60	3.00	3.40	3.80	4.20	4.60	5.00
6	3,600	1.43	1.59	1.75	2.08	2.40	2.73	3.05	3.70	4.35	5.00	5.65	6.30	6.95	7.60
7	3,086	1.89	2.10	2.30	2 71	3.12	3.54	3.95	4.78	6.60	6.43	7.25	8.08	8.95	9.77
7½	2,880	2.00	2.22	2.45	2.89	3.33	3.76	4.20	5.08	5.95	6 83	7.70	8.58	9.45	10.33
8	2,700	2.12	2.36	2.60	3.08	3.55	4.03	4.50	5.45	6.40	7.35	8.30	9.25	10.20	11.15
9	2,100	2.27	2.71	3.15	3.77	4.38	5 00	5.60	6.83	8.05	9.28	10.50	11.73	12.95	14.18
10	2,160	2.85	3.27	3.70	4.43	5.15	5.88	6.60	8.05	9.50	10.95	12.40	13.85	15.30	16.75
12	1,800	3.00	3.50	4.00	4 84	5 68	6.51	7.35	9.03	10.70	12.38	14.05	15.73	17.40	19.08
14	1,57·	4.67	5.42	6.20	7.33	8.45	9.57	10.70	12.95	15.20	17.45	19.70	21.95	24.20	26.45
16	1,350	6.00	7.00	8.00	9.43	10.85	12.27	13.70	16.55	19.40	22.25	25.10	27.95	30.80	33.65
18	1,222	.....	.....	.....	11.37	13.25	15.12	17 00	20.75	24.50	28.25	32.00	35.75	39.50	43.25
20	1,080	....	.....	.....	13.50	.....	18.00	20.00	24.50	29.00	33.50	38.00	42.50	47.00	51.50
22	1,000	.....	.....	.....	.....	.....	.....	24.25	29.87	35.50	41.12	46.75	52.37	58.00	63.62
24	917	.....	.....	.....	.....	.....	.....	29.00	36.00	43.00	50.00	57.00	64.00	71.00	78.00

Hickory Board Rules.



These Rules are all marked on one side to measure 12, 14 and 16 feet; opposite side, 8, 10 and 18 feet. Full length of rules given, including six inch handle.

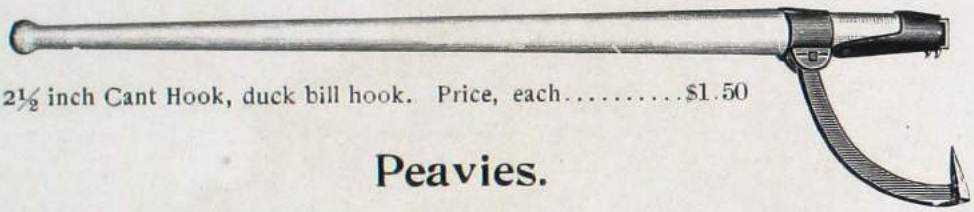
Price, 3-foot rule, brazed head, each..... $2 00

Hickory Log Rules.

Hickory Log Rules are marked to scale from 8 to 20 feet logs every two feet.

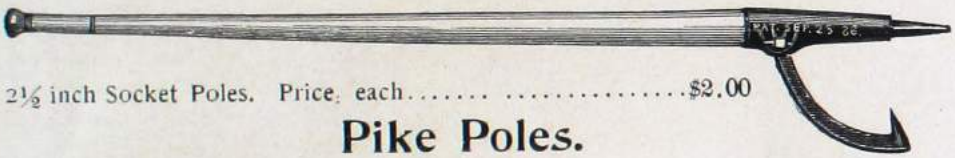
Price. square head log rule, figured 48 in , with 8 in. handle; full length, 4 ft. 8 in. Each. ...$2.25

Cant Hook.



2½ inch Cant Hook, duck bill hook. Price, each.....$1.50

Peavies.



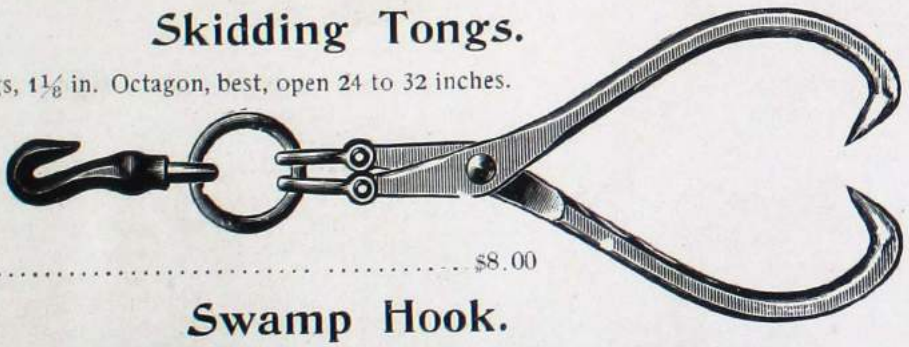
2½ inch Socket Poles. Price, each..... .....$2.00

Pike Poles.

12 foot Straight Screw Pikes, $1.50 each; 14 ft., $1.75; 16 ft., $2.00; 18 ft., $2.50; 20 ft $3.50

Skidding Tongs.

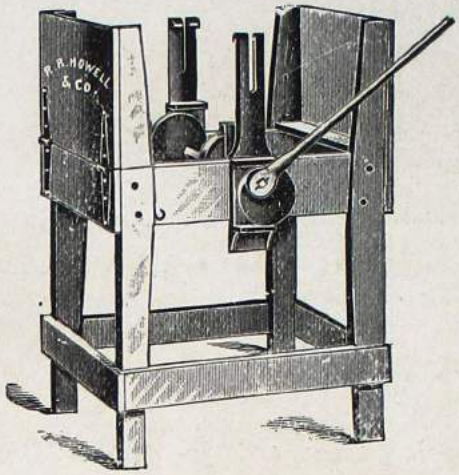
Skidding Tongs, 1⅛ in. Octagon, best, open 24 to 32 inches.



Price, each..... .....$8.00

Swamp Hook.

Swamp Hook, 1 inch octagon steel. Price, each.....$2 50



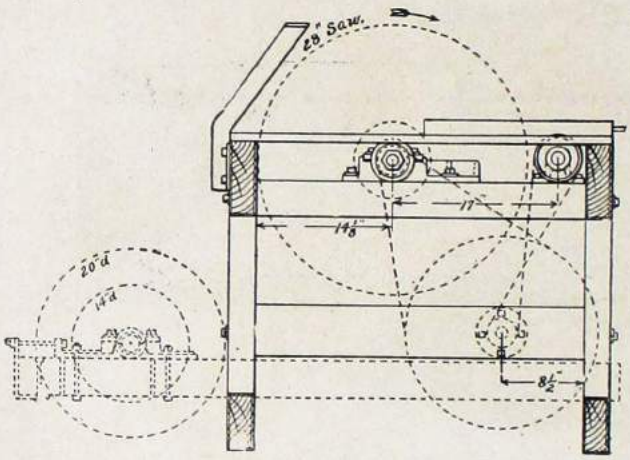
Shingle Press and Buncher.

Adjoining cut represents our Shingle Press so clear as to need but little explanation.

As will be seen it is double acting, pressing the shingles from both top and bottom of bunch, thus giving the bunches a much better appearance than if pressed from one side only.

The frame is of hard wood, firmly bound and bolted at every corner, and all parts of machine are made durable and combines all the advantages of the best machine in use, and will be found to be just what is wanted.

Price.....$20.00

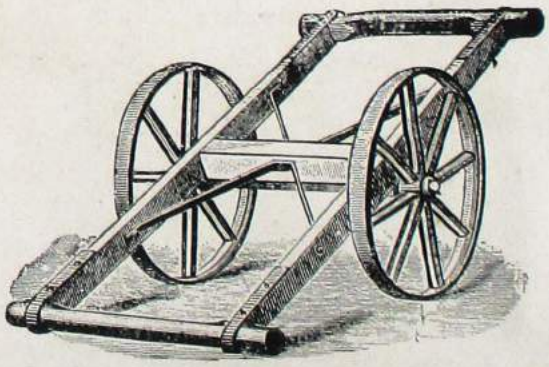


Counter Shaft Attachment.

The accompaning cut represents end view of our No. 1 Combined Lath and Bolting Machine, showing our method of attaching Counter Shaft when required and ordered with the machine.

Price, Counter Shaft Attachment, Complete, no belts.....$25.00

Lumber Buggy.



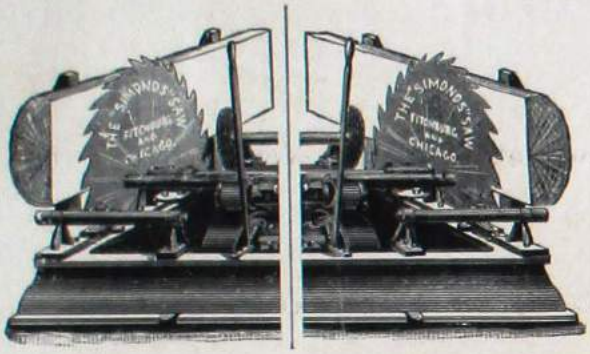
This cut represents our Lumber Buggy with iron wheels, which we make in a good and substantial manner, all complete, with frame of hardwood, well ironed and painted. Distance between wheels, 30 inches.

No. 1. Wheels 24 inches in diameter; axles, 1½ inch square iron. Price.....$16.00
No. 2. Wheels 28 inches in diameter; axles, 1½ inch square iron. Price 18.00
No. 3. Wheels 32 inches in diameter; axles, 1¾ inch square iron. Price 20.00

BABBITT METAL.

Genuine, per lb.....
No. 1, per lb.....
No. 2, per lb.....
No. 3, per lb.....
No. 4, per lb.....

Right or Left Hand Mill.



Left-Hand Mill. Right-Hand Mill.

We make our Mills right or left-hand as ordered. Cuts in this catalogue show right-hand mills only.

As you stand facing the saw, the saw running toward you, the hand the carriage and log are on indicates the kind of mill, as shown in cut. All right-hand mills have a right-hand nut, and all left-hand mills have a left-hand nut, to tighten saw to arbor.

CAR LOADER.

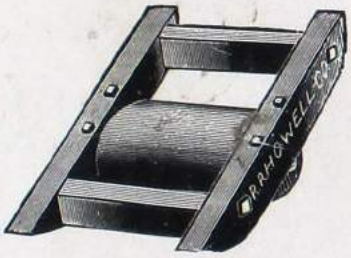
Made of wrought iron with pipe roll, for loading or unloading lumber.

Price..... $6.00.

Lumber Roller or Dolly.

Are made strong and serviceable, lumbers, bridge builders and carpenters will find them very desirable.

Wrought iron frame, with pipe roll.....$10.00
Oak frame, with pipe roll..... 8-00

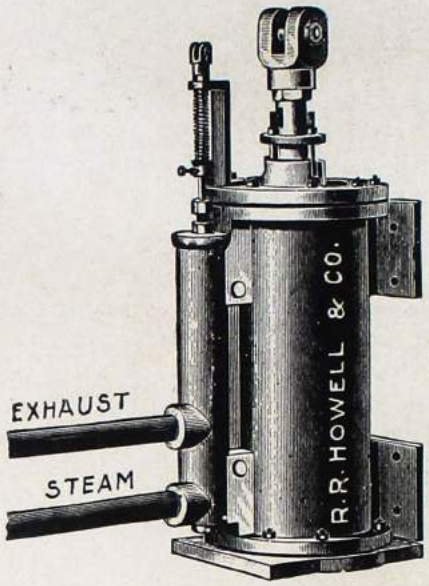


Weights of Lumber.

The following weights have been obtained, from average weights of car-load lots, and may be relied upon as being nearly correct. The figures are the pounds per 1,000 feet, board measure.

	Green.	Dry.		Green.	Dry.
Ash	5,200	3,500	Cypress	4,500	2,750
Apple	5,000	4,000	Cedar	4,000	3,000
Beech	6,000	4,500	Elm	5,000	3,500
Birch	4,250	3,500	Hickory	6,000	4,250
Basswood	4,000	2,500	Oak	5,750	4,250
Butternut	5,000	3,000	Poplar	4,500	2,800
Chestnut	5,250	3,250	Sycamore	5,500	4,250
Cherry	5,000	3,600	Sweet Gum	4,000	3,000
Cottonwood	5,250	2,600	Walnut	5,600	4,000

Steam Lifting Cylinders.

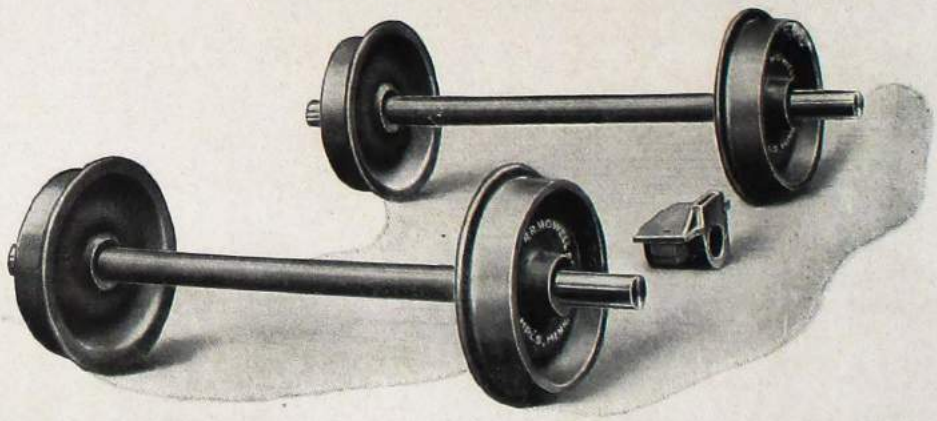


This cut shows our improved Steam Cylinders used on cant flippers, center decks, jump saws, etc. They will be found convenient around the mill for various uses. They have steam cushioned ends, and a balanced valve, which is receded by a spring, thus allowing the connections to be made with either hand or foot movement. Are made to lift from 3½ to 6 inches, unless otherwise ordered.

PRICE STEAM LIFTING CYLINDERS.

7	x 14 inches		$ 80.00
8	x 16	"	90.00
10½	x 15	"	100.00
10½	x 20	"	110.00
10½	x 24	"	120.00
10½	x 30	"	130.00
10½	x 36	"	140.00
10½	x 42	"	150.00
14	x 36	"	220.00

Car Trucks—With Chilled Iron Wheels.



The above cut represents our Car Trucks for mining, log, lumber and various other purposes where good, strong, well made trucks, with high grade cast chilled wheel (to avoid any possibility of wheel wearing flat at any point), same as is used on Rail Road Car Wheels, are wanted for heavy constant work to run on iron or steel rails. The above cut shows our standard style with heavy webbed chilled wheel shrunk solid on round steel shaft, with journal on outside of wheel and with self-oiling boxes (Fig. 1). We also can furnish them, if desired, with the following changes: Box Journal on inside of wheel, wheel to revolve on shaft, bored with tool or with chilled bearing, cast iron or steel spoke wheel, Journal Box Fig. 1, as shown in cut with our Fig. 2 car Journal Box. The upper half of Fig. 2 Box is made of brass.

In ordering be sure to give the number as listed below of truck wanted, gauge of track, style of box and all other information necessary, so as to be able to fill your order correctly for your requirements.

We will make to specifications any desired kind, shape, capacity, weight and style of car trucks desired. Send specifications of your needs and write for prices.

No.	Diam. Wheel	Size Axle	Gauge	Price per set with Fig. 1 boxes	Extra for box Fig. 2 per set	No.	Diam. Wheel	Size Axle	Gauge	Price per set with Fig. 1 boxes	Extra for box Fig. 2 per set
20	10 in.	1½	30 in.	$16.00	$4.00	24	18 in.	2	32 in.	$27.00	$8.00
21	12 in.	1⅝	30 in.	18.00	5.00	25	20 in.	2¼	36 in.	30.00	9.00
22	14 in.	1¾	30 in.	20.00	6.00	26	24 in.	2½	36 in.	36.00	12.00
23	16 in.	2	32 in.	24.00	7.00						

SAW ARBORS.

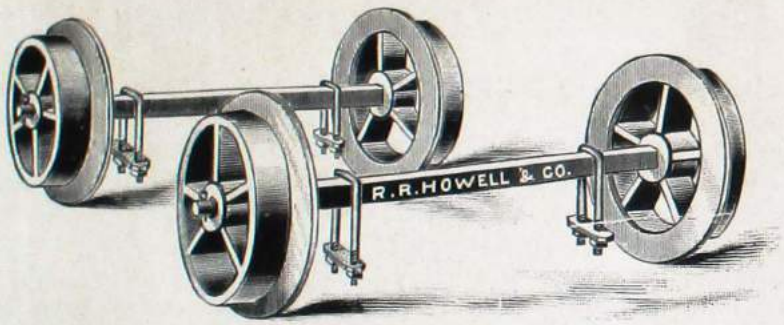
STYLE "B."

STYLE "A."

In ordering state whether Style "A" or Style "B" is wanted.

No.	From saw to outside box.	Diameter of pulleys	Face of pulleys.	Diameter of collar.	Diameter of Arbors.	Hole in saw.	Price.
1	15	3½	4	3	⅞	¾	$7.00
2	17	4	4	3¼	1	⅞	8.00
5	21	4¼	5	3½	1⅛	1	9.50
8	25	5	5	4	1⅛	1⅛	11.00
11	27	6	6	5	1⅛	1⅜	15.00
12	29	7	7	5½	1½	1½	18.50

LUMBER AND LOG TRUCKS.



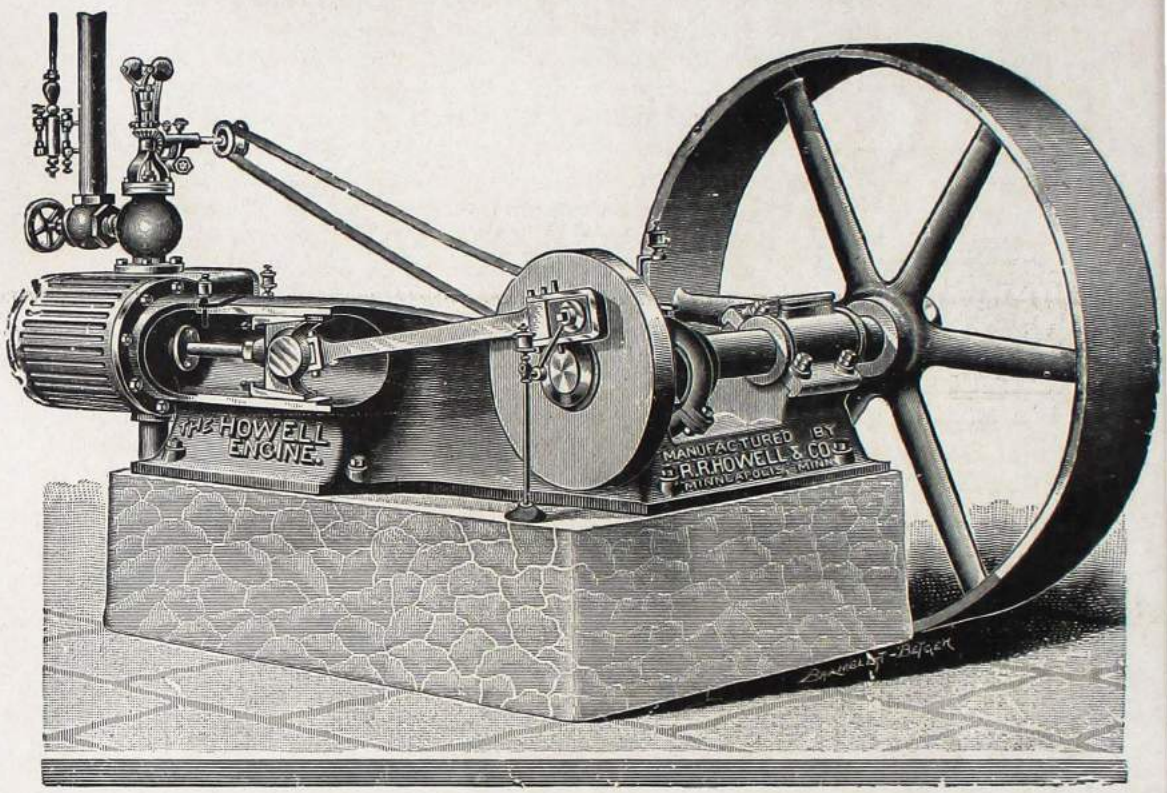
The wheels are run loose on the axle and are made with wide face to run on wood track, or wood track faced with iron plate. Round steel axle furnished at same price as square, if desired.

Tracks are made of gauge specified below, unless otherwise ordered. Will make any changes desired from specifications given below to suit any requirements.

No.	Diameter, Inches	Size Square Axle, Inches	Guage, Inches	Price, Per Set	No.	Diameter, Inches	Size Square Axle, Inches	Guage, Inches	Price Per Set
1	10	1½	30	$12.00	7	16	2	30	$27.00
2	12	1½	30	15.00	8	18	1¾	30	32.00
3	12	1¾	30	16.00	9	18	3	30	35.00
4	14	1¾	30	20.00	10	20	2	36	38.00
5	14	2	30	22.00	11	20	2¼	36	40.00
6	16	1¾	30	25.00	12	24	2½	36	45.00

The above prices are for a set consisting of 4 wheels, 2 axles and 4 stirup.

THE HOWELL SELF CONTAINED STATIONARY ENGINE.



When we determined to begin the building of economical steam engines we looked into the field thoroughly before choosing upon an engine, and our deliberate determination was that the above style engine was the best in every sense of the word. We might have selected engines which could have been built cheaper, or that would be lighter, or that might possibly run at a higher rotative speed, but in so doing we would have been compelled to make sacrifices of the very thing we sought after, namely: the highest economy and the greatest reliability. The consequence of our selection is, that we are enabled to offer to engine buyers that type of engine which the longest experience has shown to possess the greatest degree of merit. **SAVING OF FUEL, ADDITIONAL POWER,** ample strength in all parts requiring it, and correctly proportioned throughout. Large bearing and wearing surface, possesses the elements of substantial reliability to a greater extent than any other. The main frame or bed of engine, including bearings for crank shaft and guides for cross head, is cast in one solid piece, being perfectly self-contained, and so designed with regard to form and proper distribution of metal as to afford greatest strength and firmness. The cylinder end of frame is accurately faced off in lathe with counterbore turned to receive cylinder, and the cylinder is firmly bolted in against a secondary head provided by our construction of main bed, thus affording most rigid and substantial construction. The cylindrically shaped guides for cross head are bored out in exact line with cylinder, and the concave surface to the guides insures the connecting rod from twisting and avoids all possible binding or heating of cross head on sides. The piston-head is made in one piece, cast hollow and ribbed, giving the required strength, with one-half the weight of other pistons, thus reducing the wear on bottom of cylinders, and from the same cause is not so liable to cut in case it should get dry. It is packed by two rings

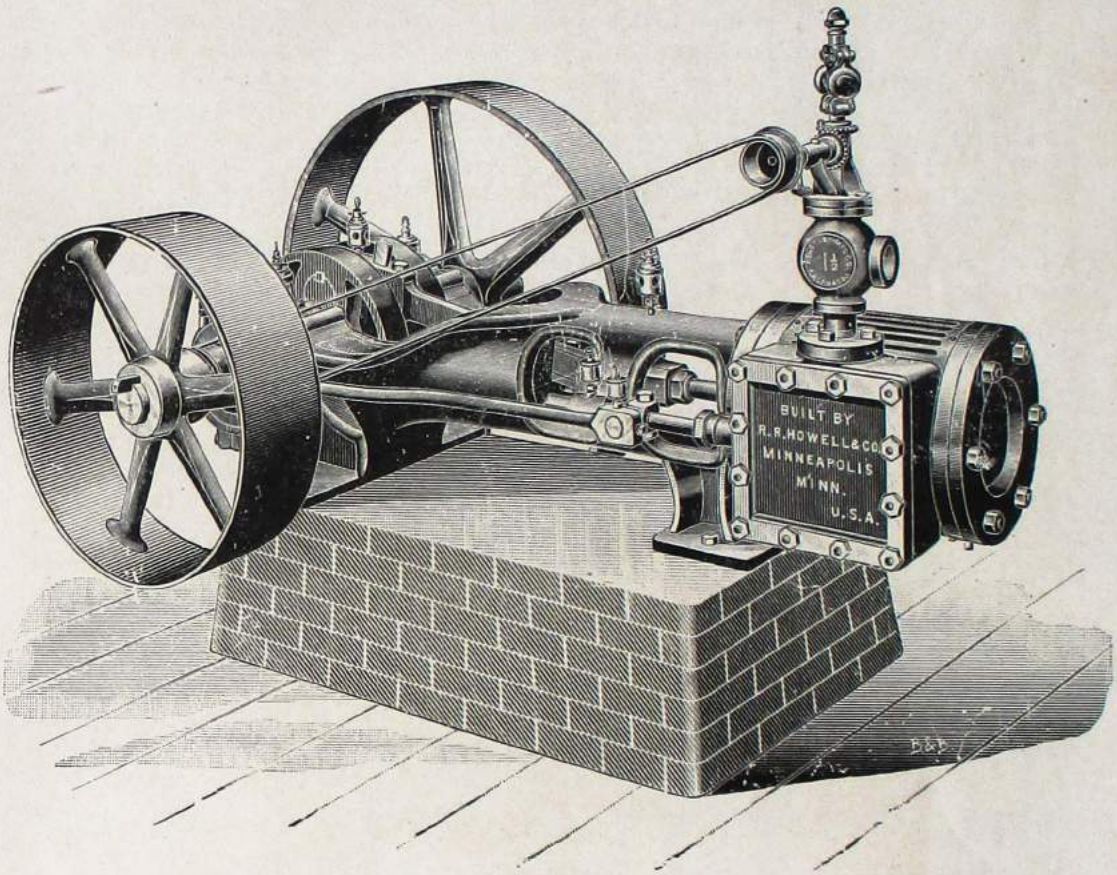
sprung into grooves, and readily renewable when worn out. Our cross head is of superior mechanical design, strong and substantial, with its simple and practically convenient arrangement for adjustment of wear and keeping piston rod in line The connecting rods are of best quality selected steel, accurately fitted at each end, with polished straps of refined iron, adjustable square cornered brass boxes and self-oilers. To meet the requirements of the most advanced practice of modern steam engineering, of having as nearly as possible the full boiler pressure to act on the piston at the beginning of stroke, we have made the **STEAM-PORTS LARGE AND DIRECT,** with large exhaust openings to insure a free exhaust without back pressure, the clearances being reduced to the smallest possible amount consistant with safe working. This arrangement of valve and steam passages are of vital importance to the proper performance of the steam engine. The arrangement of the **STEAM VALVE AND STEAM PORTS** are entirely original, so that after the cylinder is one-third full of steam, the valve will shut and let no more steam enter. During the balance of the stroke the entire power comes from the gradual expansion of the steam shut up in the cylinder, and it will be readily seen that whatever power we succeed in getting out of the expansion of the steam is pure gain. The lower the pressure of the steam is when it has been exhausted into the air, the more it has been expanded, the more power we have got out of it, and the more we have gained.

In the arrangement of our steam ports, cut-off valves and passages lays the secret of our engine, producing the largest amount of motive power with the least expenditure of everything that enters into the cost of creating and maintaining it, and the very embodiment of practical steam engine economy. The material and workmanship used in their construction are throughout of the very first-class, and the finish is unrivalled. Every practical improvement is used for the economizing of the consumption of fuel and for increasing the durability, efficiency and strength of working. All engines are furnished with governor, governor belt, throttle valve, all necessary oil cups, including sight feed lubricator, and drip cocks, and are tested under steam until known to be perfect in every way

Specifications of Howell Self Contained Engines.

Number of Size.	Horse Power.	Revolutions per Minute.	Diameter of Cylinder.	Length Stroke.	Diameter Crank-Shaft, Steel.	Diameter for Steam Pipe.	Diameter for Exhaust Pipe.	Size of Governor.	Diameter Band Fly Wheel.	Face Band Fly Wheel.	Length of Space Occupied.	Width of Space Occupied.	Weight of Engine and Fixtures.
			in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	
1	20	260	7	10	2⅜	2	2	2	40	8½	79	53	2200
2	25	260	8	10	3⅜	2	3	2	44	8½	81	53	2400
3	35	250	9	12	3⅞	2½	3	2½	48	12½	94	64	3500
4	40	240	10	12	3⅞	2½	3½	2½	48	12½	97	64	3700
5	50	220	10	14	4⅝	3	3½	3	54	12½	112	70	4700
6	55	220	11	14	4⅝	3	4	3	60	14½	115	70	5000
7	60	220	12	14	4⅝	3	4	3	66	14½	118	70	5400
8	70	210	12	16	5⅛	3½	4	3½	72	14½	128	77	6000
9	85	210	13	16	5⅛	3½	4½	3½	78	16½	131	77	6300
10	120	200	14	18	5⅞	4	5	4	84	16½	147	88	9000
11	140	200	15	18	5⅞	4	5	4	88	18½	150	88	10000
12	160	180	16	20	6⅞	4½	6	4½	90	20½	164	100	13000
13	200	180	17	20	6⅞	4½	6	4½	96	22½	167	100	14200

The Howell Center Crank Engine.



This is one of the best known and most popular small size engines up to 40 H. P. on the market. Its simplicity of construction and excellent design has made it a favorite. It will be noticed that the line of strain is straight through the center of the frame, having as much strength above as below it, thus avoiding all inclination to spring. It is heavy and well proportioned, and is constructed to meet the most severe duty imposed upon an engine of this type and size. The bed is heavy with the metal so distributed as to secure the greatest possible strength and rigidity. The main bearings have unusually large wearing surfaces, lined with anti-friction babbitt metal.

The cylinder is cast of selected iron of very close texture and great tensility, having excellent wearing properties. The ports are exceptionally large, giving the fullest possible pressure of steam direct on the piston and a free, quick discharge of steam, the loss due to friction and back pressure being reduced to a minimum.

The cylinder is bolted solid to the main frame or bed, and bored out with the greatest accuracy, and the cylindrically shaped guides for cross head are bored out in exact line with the cylinder, insuring perfect alignment.

Crank Shaft, Connecting Rod, Piston Rod, Valve Rod and Wrist Pin are made of forged steel.

Special attention has been paid to make all parts plain, strong and durable; all the wearing surfaces are usually large. The material throughout is the best, and they are well made with the latest improved machinery, thereby securing accuracy and durability.

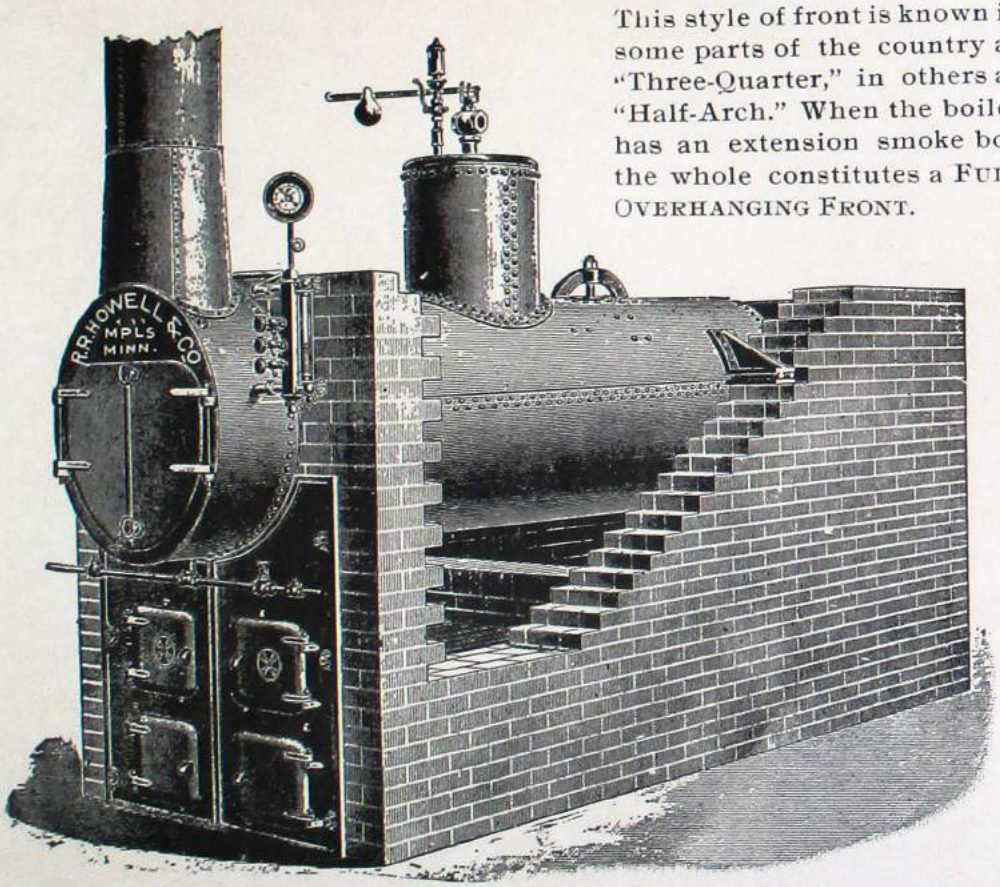
They can be used either as a right or left-hand engine, as the power can be transmitted from either side, and affords the convenience of driving two machines with different speeds at the same time without counter shaft. Fixtures comprise governor, governor belt, throttle valve, sight-feed lubricator, 2 cylinder cocks, 7 oil cups, elbow and nipple for exhaust. Foundation bolts, steam and exhaust pipes, and fittings are furnished when desired at the ruling market prices.

We list below size of **Smaller** Pulley as regularly furnished, but this can be changed to suit any requirements.

Specifications of Howell Center Crank Engines.

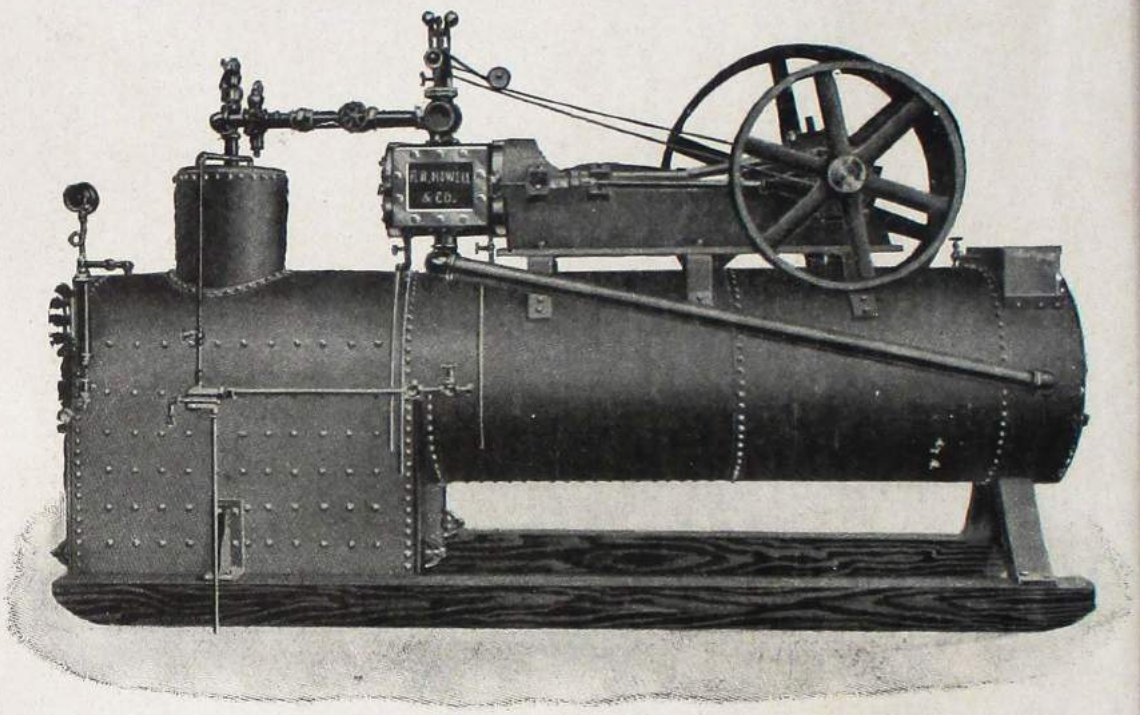
Numuer of Size.	Horse Power.	Revolutions per Minute.	Diameter of Cylinder. Ins.	Length of Stroke. Ins.	Diameter Crank-Shaft, Steel. Ins.	Diameter for Steam Pipe. Ins.	Diameter for Exhaust Pipe. Ins.	Size of Govenor. Ins.	Diameter Band Fly Wheel. Ins.	Face Band Fly Wheel. Ins.	Size of Small Pulley. Ins.	Weight of Engine and Fixtures.
1	12	300	6	7	2 7/16	1¼	2	1¼	34	6½	16x 8½	1400
2	14	300	7	7	2 7/16	1¼	2	1¼	36	6½	18x 8½	1500
3	16	280	7	8	2⅞	1½	2	1½	36	8½	18x10½	1700
4	18	280	8	8	2⅞	1½	2	1½	38	8½	20x10½	1800
5	20	260	7	10	3⅜	2	3	2	40	8½	24x10½	2000
6	25	260	8	10	3⅜	2	3	2	44	10½	26x10½	2200
7	30	260	9	10	3⅜	2	3	2	44	10½	30x10½	2400
8	35	250	9	12	3⅞	2½	3½	2½	48	12½	30x12½	3200
9	40	240	10	12	3⅞	2½	3½	2½	48	12½	32x12½	3400

Stationary Boiler With Half Arch Front



This style of front is known in some parts of the country as "Three-Quarter," in others as "Half-Arch." When the boiler has an extension smoke box the whole constitutes a FULL OVERHANGING FRONT.

Locomotive Boiler and Engine.



This style of mounting engine on top of boiler is particularly adapted for portable work and found very desirable in small size outfits, to 25 horse power and in some special cases larger outfits up to 35-horse power when the outfit is to be moved frequently, as no further expense or permanent foundation is required, the outfit being complete and ready for use when leaving our works. When outfit is not moved frequently, then we advise in all cases the engine mounted on separate base and not mounted on the boiler.

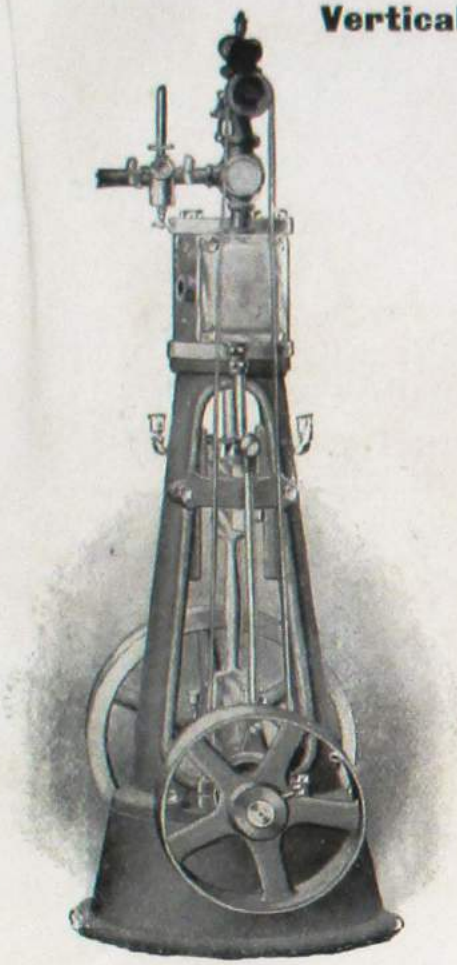
These Engines, complete, have the necessary Oil Cups, Sight Feed Lubricator, Steam Gauge, Water Gauge, Whistle, Gauge Cocks, Throttle, Blow-off, Check, Stop and Safety Valves, Smoke Stack and Guy Rods, Grates, Governor with Belt, Pulleys, Injector fitted.

Cylinder drainage piped; all Steam and Exhaust connections furnished and fitted.

A full description and specification of engine, also of the boiler, will be found on another page.

In ordering, or writing for prices, state size or horse power of engine and boiler wanted.

Vertical Engines and Boilers.

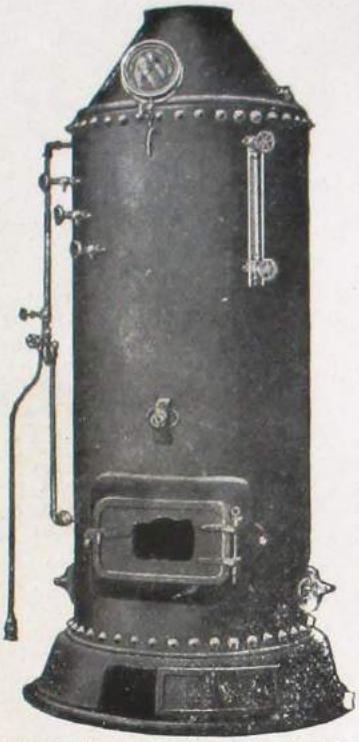


Our Engines are of new design, thoroughly built and of the best materials.

Every point that could add to their durability has been carefully considered.

With each Engine we furnish Governor complete, Oil Cups, Throttle Valve, Cylinder Lubricator, Belt Wheel, and Balance Wheel, ready for starting.

These Boilers are made of Homogeneous Steel Plate, having a tensile strain of 60,000 lbs. to the square inch. The best lap welded Wrought-Iron Flues are used. Fixtures comprise Base, Hood, Door, Grates, Safety-Valve, Check and Blow-off Valves, Steam and Water-Gauges, three Dry-Cocks and Injector. Complete except stack and pipe to carry steam to engine. We furnish our Engines and Boilers on Combined Base, or on Independent Bases, as desired, at same prices.



DIMENSIONS OF PLAIN BOILERS

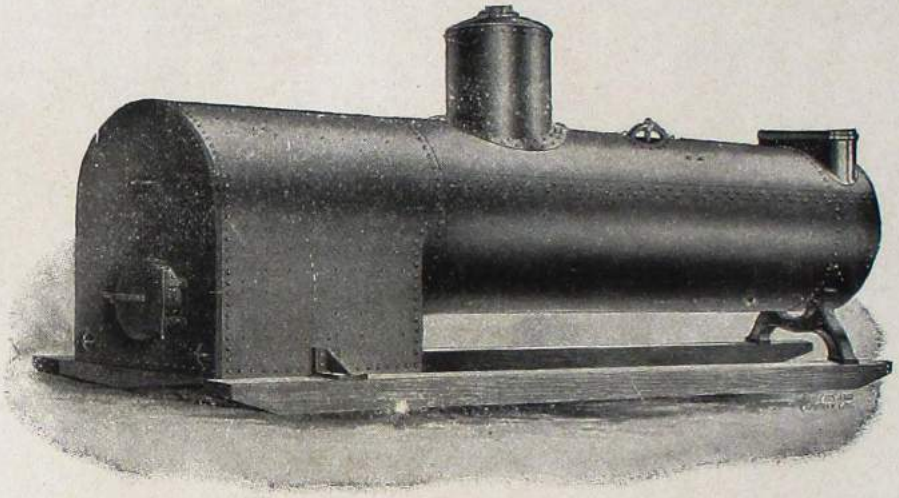
Horse Power	SHELL		FLUES			FIRE BOX		Height from Floor to Top of Hood		Shipping Weight
	Diameter	Height above base	No.	Diam.	Length	Height	Diam.			
1¾	20 in.	36 in.	19	2 in.	18	18 in.	16 in.	4 ft.	2 in.	475
2	20	43	19	2	25	18	16	4	6	560
3	20	50	19	2	32	18	16	5	0	620
4	24	50	31	2	32	18	20	5	6	890
5	24	60	31	2	38	22	20	6	4	1060
6	26	60	37	2	38	22	22	6	4	1300
8	30	60	43	2	36	24	26	6	4	1550
10	30	72	43	2	48	26	26	7	10	1650
12	36	72	55	2	48	26	31	8	2	2350
14	36	84	55	2	56	32	31	9	0	2546
16	36	96	55	2	64	32	31	10	0	3000
20	42	96	79	2	64	32	37	10	0	4000
25	42	108	85	2	76	32	37	11	0	4400
30	42	120	91	2	86	34	37	12	0	4700
35	48	96	138	2	64	32	42	10	0	5700

DIMENSIONS OF ENGINES

Horse Power	2	3	4	5	6	7	8	10	12	15	18	20	25	30
Diam. of Cylinder	3	3½	4	4½	5	5½	6	7	7	8	9	9	10	11
Length of Stroke	4½	4½	5	5	6½	6½	8	8	10	10	10	12	12	12
Diam. Belt Pulley	10	10	12	12	14	14	16	18	18	20	20	20	20	24
Face of Pulley	4½	4½	4½	4½	6½	7½	6½	7½	8½	10½	10½	10½	10½	10½
Diam. Fly Wheel	16	16	17	18	20	24	26	30	35	35	35	35	35	40
Face of Fly Wheel	4½	4½	4½	4½	6	6	6¾	6¾	6¾	6¾	6¾	6¾	6¾	10½
Revolutions	350	350	325	325	250	250	200	200	175	175	175	150	150	150
Ht. to top of Cylinder	3 ft. 4	3-4	3-10	3-10	4-8	4-8	5-5	5-5	5-10	5-10	7	7	7	7
Weight	325	3:0	500	550	750	825	1250	1325	1700	1800	1900	2400	2600	3000

Portable Locomotive Boiler.

Water Front. Open Bottom.



Made of Flange Steel throughout. The fire door is made without a ring by flangeing the fire box plate outward, the same as in a railroad locomotive.

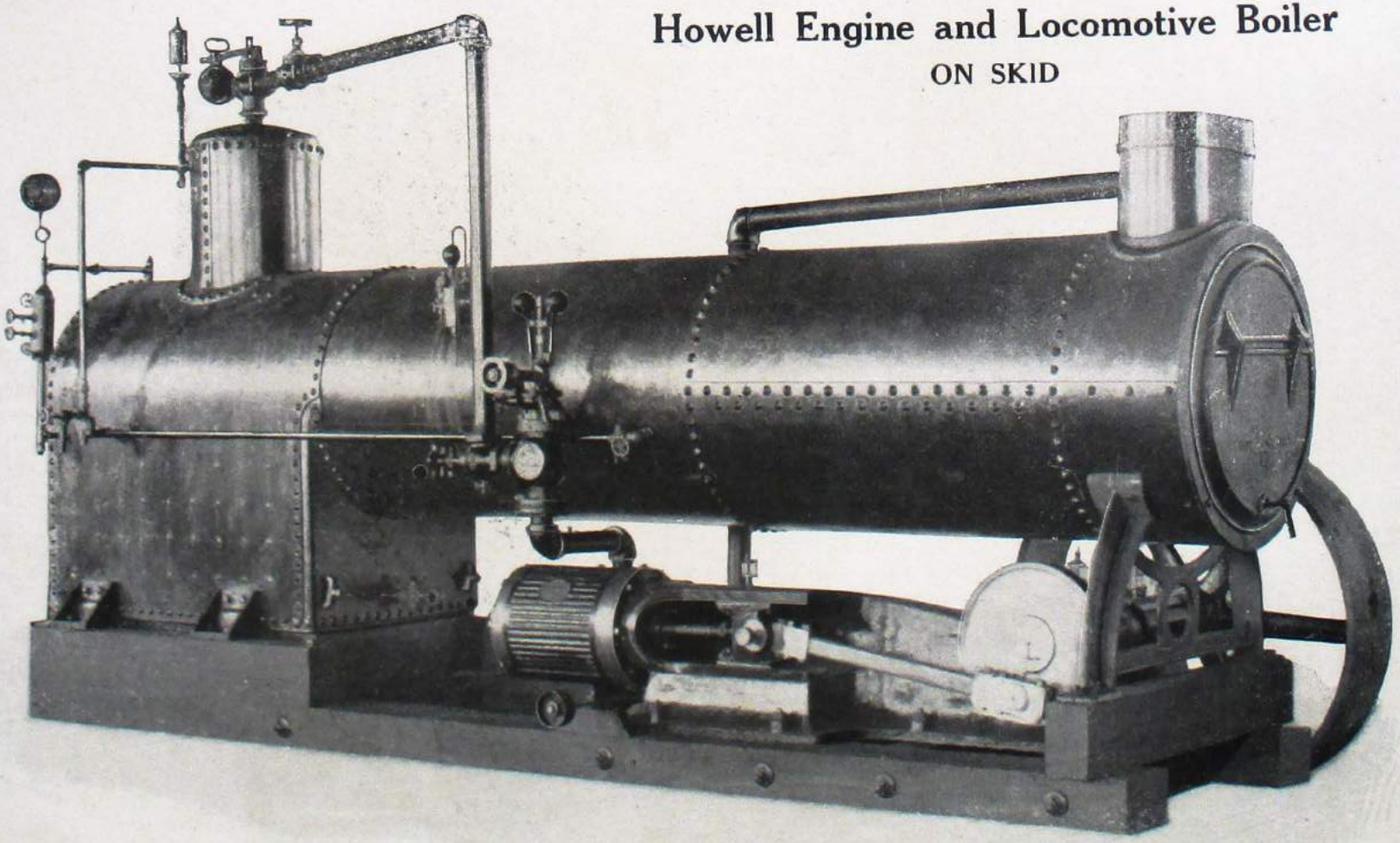
Made with water bottom at an increased price. Boilers tested to 150 pounds pressure.

Number	200	201	202	203	204	205	206
Horse Power	20	25	30	35	45	60	70
Diameter Boiler, inches	30	36	36	42	42	48	54
Length Fire Box, inches	38	44	44	50	50	56	62
Height Fire Box, inches	31	36	36	41	41	45	46
Width Fire Box, inches	24	30	30	36	36	42	48
Number Tubes, three-inch	20	29	29	38	38	48	60
Length Tubes, inches	79	79	96	96	120	132	132
Thickness Shell, inches	¼	¼	¼	¼	¼	5–16	5–16
Thickness Fire Box, inches	5–16	5–16	5–16	5–16	5–16	⅜	⅜
Thickness Heads, inches	⅜	⅜	⅜	⅜	⅜	⅜	⅜
Size Dome, inches	16x20	18x20	18x20	20x24	20x24	24x24	27x30
Safety Valve, inches	1½	1½	2	2½	3	3	3½
Blow-off Cock, inches	1¼	1¼	1¼	1¼	1½	1½	2
Check and Stop Valves, inches	¾	¾	¾	1	1	1	1¼
Whistle, inches	2½	2½	2½	2½	3	3	4
Diameter Stack, inches	14	18	18	20	20	24	26
Length Stack, feet	20	20	25	25	30	35	35
Thickness Stack, number	16	16	16	16	16	16	16
Boiler mounted on skids, shipping weights	3400	4500	4850	6000	6500	9100	10900
Castings, Trimmings and Stack, shipping weights	600	800	900	1100	1200	1750	2150
Complete Outfit, shipping weights	4000	5300	5750	7100	7700	10850	13050

When "Complete Outfits" are ordered we furnish boiler mounted on skids, fire door, cast-iron head and flue doors for back end, common grate bars, stack with guy wire four times the length of stack, and trimmings, consisting of water gauge, three gauge cocks, steam gauge, safety valve, check and stop valves, blow-off cock, and whistle with valve, fire hoe and poker. Tupper grate bars furnished without extra charge if specified.

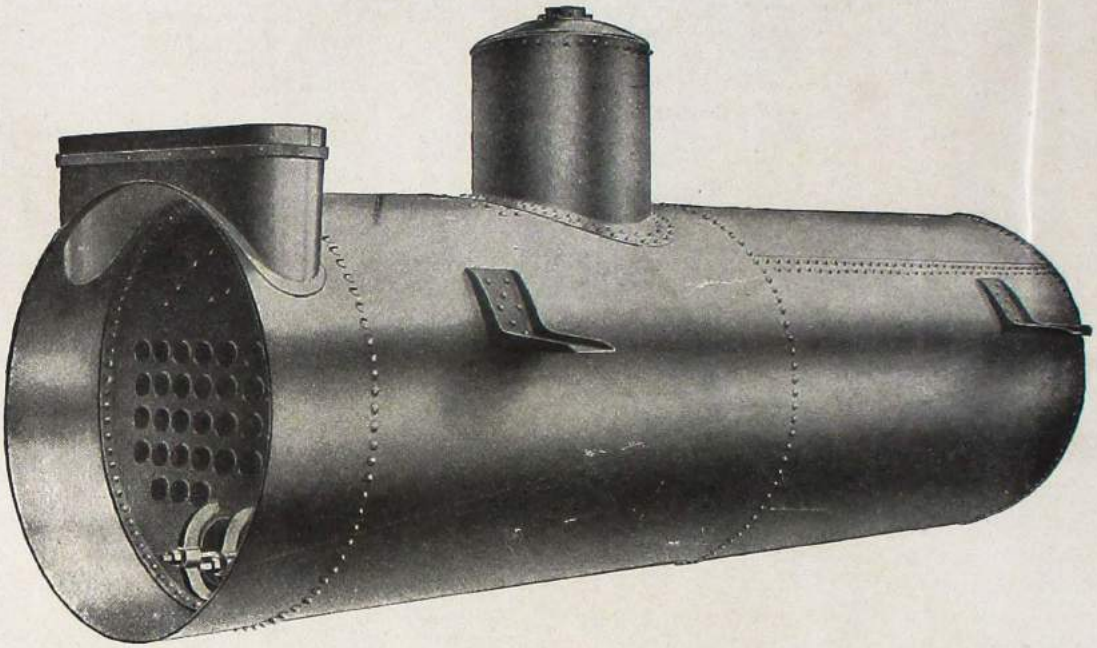
Howell Engine and Locomotive Boiler

ON SKID



Standard Horizontal Tubular Boiler.

With Smoke Box End for Arch Front with Dome



Quality.—We have only one quality of boilers and that the best that can be produced. We will not furnish poor boilers at any price.

Steel.—Our Standard Horizontal Tubular Boilers are made of flange steel, 60,000 pounds tensile strength throughout.

Shells.—All shells up to and including 16 feet in length are made in two plates, and over 16 feet in length, three plates, each plate forming the entire circumference of the boiler with only one horizontal seam.

Riveting.—All horizontal seams or boilers over 30 inches diameter are double riveted. Circular seams are single riveted. All riveting except around dome is done by hydraulic pressure.

Braces.—All braces above tubes are McGregor or Lukens, pressed from solid steel without welds. Boilers with manholes below tubes have through braces extending from head to head below tubes.

Man and Hand Holes.—All boilers have Eclipse manhole in front head below tubes and in back head above tubes. Cast-iron manhole in shell may be substituted for Eclipse manhole in back head at same price.

Lugs.—Each boiler, whether for full or half front, is provided with four pressed steel lugs.

Loops, columns and channels for suspending boilers will be substituted for lugs at an increased price.

Flanges.—The safety valve flanges on all boilers are of forged steel, not cast iron, threaded for wrought iron.

Test.—All our boilers are tested to 150 pounds pressure by an official boiler inspector.

Fixtures.—When "Complete Outfit" is ordered, we ship boiler, full or half front, with doors, liners, buck bars and long rods, fire-door arches and wall plates and rollers, fire hoe and poker, short anchor rods, common grate bars and grate rests, back arch bars or plates, soot door and frame, stack with guy wire four times the length of stack, and trimmings, consisting of water column, water gauge, three gauge cocks, steam gauge, safety valve, check and stop valves, blow-off cock and whistle with valve.

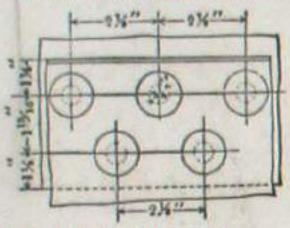
Tupper grate bars furnished without extra charge if specified.

Double Riveted Lap and Girth Joints.

The following drawings and specifications, which are based on a tensile strength of 60,000 pounds for plate and a shearing strength of 38,000 pounds for rivets, have been taken from blue prints of official diagrams designed and recommended by the Hartford Steam Boiler Inspection and Insurance Company of Hartford, Conn. Every diagram represents work that has been rigidly and scientifically tested by the Hartford Company, and adopted by us on all our Boilers.

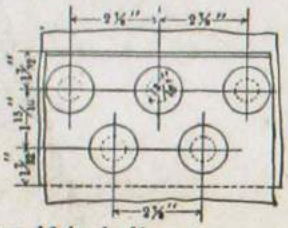
LONGITUDINAL RIVETED JOINTS.

1-4 IN. PLATES.



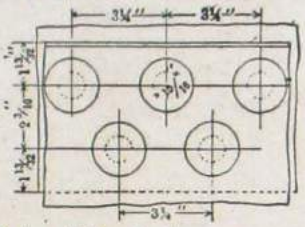
Holes $\frac{3}{4}$ inch diameter.
Rivets $\frac{11}{16}$ inch diameter.
Efficiency—$\frac{74}{100}$ of solid plate.

5-16 IN. PLATES.



Holes $\frac{13}{16}$ inch diameter.
Rivets $\frac{3}{4}$ inch diameter.
Efficiency—$\frac{72}{100}$ of solid plate.

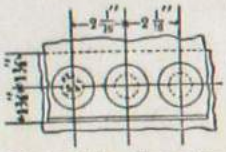
3-8 IN. PLATES.



Holes $\frac{15}{16}$ inch diameter.
Rivets $\frac{7}{8}$ inch diameter.
Efficiency—$\frac{70}{100}$ of solid plate.

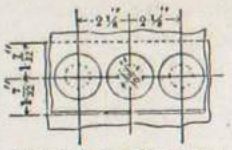
GIRTH RIVETED JOINTS.

1-4 IN. PLATES.



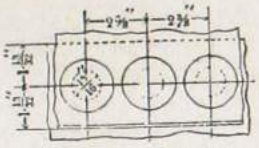
Rivets $\frac{11}{16}$ in. diameter.

5-16 IN. PLATES.



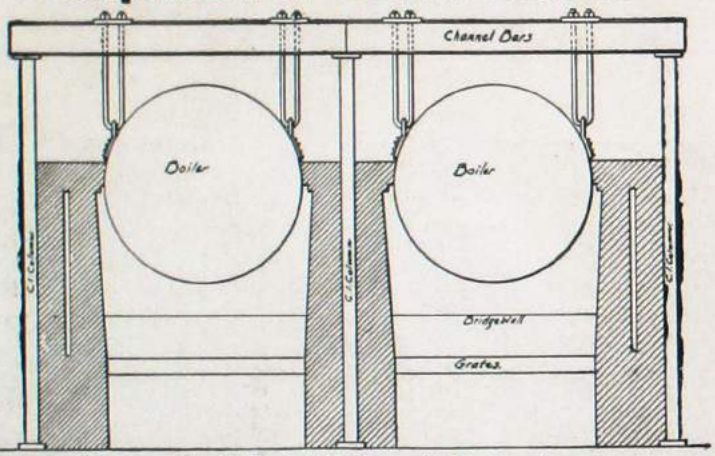
Rivets $\frac{3}{4}$ in. diameter.

3-8 IN. PLATE.



Rivets $\frac{7}{8}$ in. diameter.

Suspension of Tubular Boilers.



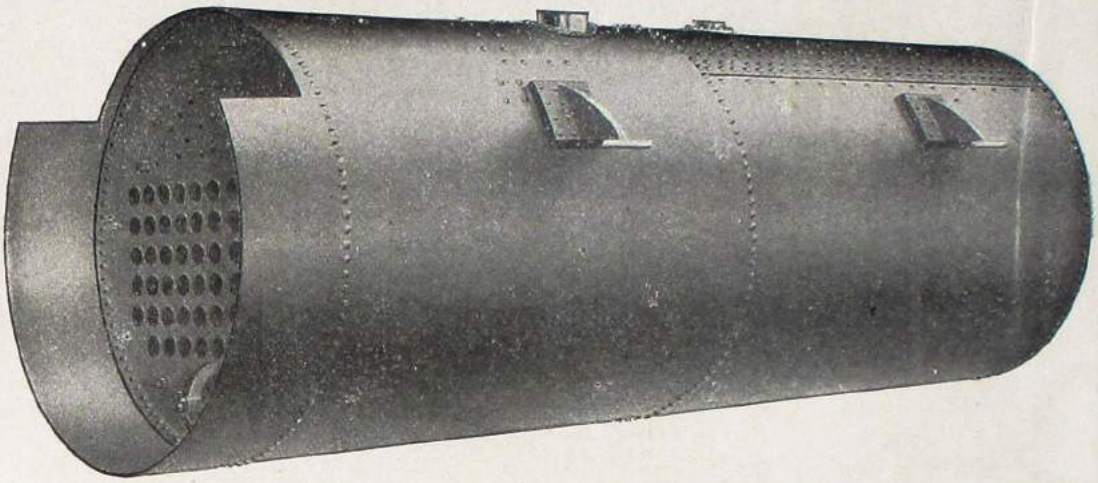
We illustrate a plan of suspending Tubular Boilers which sometimes recommends itself. The upright posts are cast iron—the horizontal beams are made of two steel channels, back to back, bolted together, with separators between. The suspension bolts are round, with nuts and washers at the top, allowing the taking up of any settling of foundations. The brick work around boiler can be entirely removed without disturbing boilers or connections. The usual lugs on boilers are replaced with forged loops as shown. This is only furnished at an extra cost.

Shipping weights to be added to weights for regular setting.

Diameter Boiler, inches.....	48	54	60	66	72
One Boiler, weight lbs.....	2300	2500	2800	2900	3200
Each Additional Boiler, weight lbs..	1400	1600	1700	1800	1900

High Pressure Horizontal Tubular Boiler.

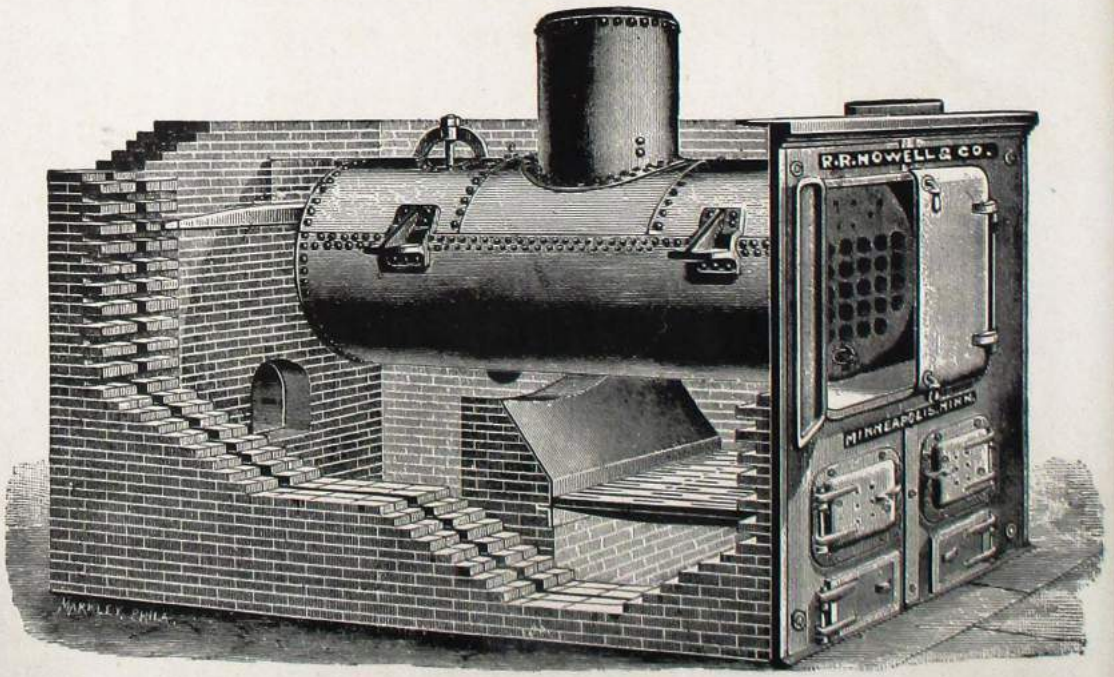
For Full Front Without Dome.



These Boilers are adapted for use with Compound and High Speed Engines and wherever a high working pressure is required. They are double butt strapped and triple riveted, the heads braced with crowfoot braces, ample in number and size for the pressure required. Prices and specifications furnished on application. No standard sizes are adopted, as the conditions of use vary so much that it is difficult to adopt a standard list meeting all requirements.

Stationary Tubular Boiler.

With Full Front and Door.



The above engraving shows the setting of a Full Front Stationary Tubular Boiler, with one of the side walls removed to exhibit the relation of the parts.

Specifications Standard Horizontal Tubular Boilers.

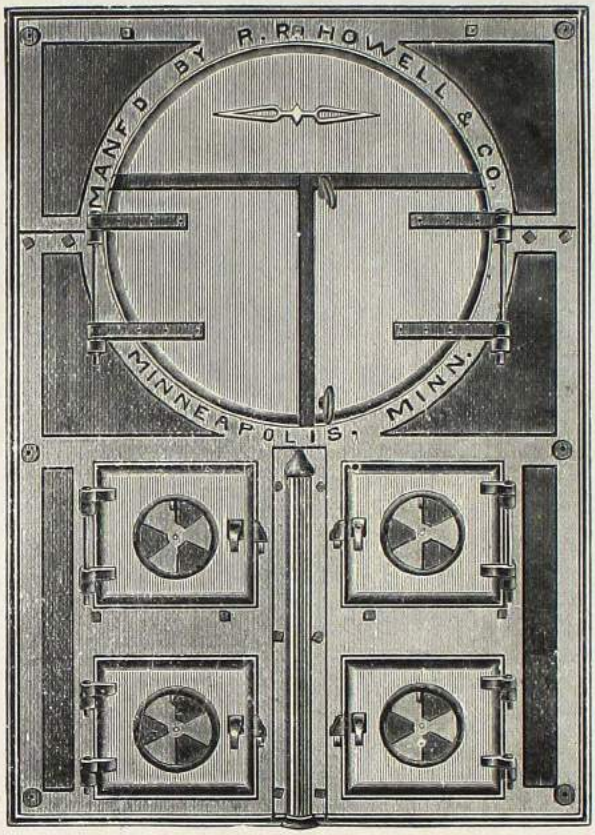
No. Boiler	300	301	302	303	304	305	306	370	351	352	353	401	402	403	404	405	416
Horse Power	12	15	20	25	30	34	40	45	50	55	60	70	85	100	115	125	150
Diameter, inches	30	36	36	40	40	42	42	48	48	48	54	54	60	66	66	72	72
Length Tubes, feet	8	8	10	10	12	12	14	12	14	16	14	16	16	16	18	16	18
Number Tubes	20	26	26	32	32	39	39	32	32	32	46	36	44	54	54	58	58
Diameter of Tubes in inches	3	3	3	3	3	3	3	3½	3½	3½	3½	4	4	4	4	4	4
Thickness Shell, inches	¼	¼	¼	¼	¼	¼	¼	5-16	5-16	5-16	5-16	5-16	5-16	⅜	⅜	⅜	⅜
Thickness Heads, inches	⅜	⅜	⅜	⅜	⅜	⅜	⅜	7-16	7-16	7-16	7-16	7-16	½	½	½	½	½
Size Dome, inches	16x20	18x20	18x20	20x20	20x20	20x24	20x24	24x24	24x24	24x24	27x30	27x30	30x30	32x32	32x32	36x36	36x36
Length Grate, inches	30	36	36	36	36	42	48	42	48	54	48	54	54	54	60	54	60
Width Grate, inches	30	36	36	40	40	42	42	48	48	48	54	54	60	66	66	72	72
Safety Valve, inches	1½	2	2	2	2½	2½	3	3	3	3	3½	3½	4	5	5	5	5
Check and Stop Valves, inches	¾	¾	¾	¾	¾	1	1	1	1	1	1¼	1¼	1¼	1½	1½	1½	1½
Blow-off Cock, inches	1¼	1¼	1¼	1¼	1¼	1½	1½	1½	1½	1½	2	2	2	2	2	2	2
Whistle	3	3	3	3	3	3½	3½	4	4	4	4	4	4	4	4	4	4
Diameter Stack, inches	14	16	16	18	18	20	20	24	24	24	26	26	28	32	32	36	36
Length Stack, inches	28	28	30	30	35	35	35	40	45	50	45	50	50	50	55	50	55
Thickness Stack, number	16	16	16	16	16	16	16	16	16	16	16	16	16	14	14	12x14	12x14

SHIPPING WEIGHTS WITH FULL FRONTS.

Boiler only	1900	2500	2800	3200	3700	4000	4700	5300	6000	6600	7600	8400	10000	12600	13900	15400	17000
Full Front, Castings, Trimmings and Stack	2470	2670	2690	3390	3610	3740	3870	4360	4630	5050	5450	5860	6540	7240	7560	8590	9110
Complete Outfit with Full Front	4370	5170	5490	6590	7310	7740	8570	9660	10630	11650	13050	14260	16540	19840	21460	23990	26110

SHIPPING WEIGHTS WITH HALF FRONTS.

Boiler with Smoke Doors	2000	2700	3000	3400	3900	4200	4900	5600	6300	6900	8000	8800	10600	13300	14600	16200	17800
Half Front, Castings, Trimmings and Stack	1970	2220	2290	2790	2910	3140	3370	3610	3930	4350	4400	4860	5240	6240	6460	7090	7610
Complete Outfit with Half Front	3970	4920	5290	6190	6810	7340	8270	9210	10230	11250	12400	13660	15840	19540	21060	23290	25410



Boiler Fire Fronts.

PRICE AND SIZES.

Size Diameter of Boiler Inches.	½ Front Fitted up Complete.	Full Front Fitted up Complete.
30	45	$ 50.00
36	45	50.00
40	60	66.00
42	65	72.00
44	80	88.00
48	90	100.00
54	110	120.00
60	135	150.00
66	150	166.00
72	185	200.00

We present to boiler manufacturers and steam users our list of Boiler Fronts from our newly designed and up-to-date patterns, of which we have a full and complete line both in full front and half arch front for boilers from 30 to 72 inches. They are heavy and substantially made, are well fitted together, superior in style and construction, and they will not crack if properly set up.

OUR FULL FRONT FITTED UP COMPLETE CONSISTS OF:

2 Side Front Plates.	1 Top Front Plate.	1 Column.
2 Top Doors.	2 Fire Doors.	2 Ash Doors.
2 Door Liners.	2 Door Arches.	1 Front Grate Rest.
1 Rear Grate Rest.	1 Ash Pit Door and Frame.	1 Smoke Stack **Damper and Frame.**
4 Buck Staves.	1 Flame Sheet.	1 Set of Grate Bars.

OUR HALF ARCH FRONT FITTED UP COMPLETE CONSISTS OF:

2 Side Front Plates.	1 Column.	2 Fire Doors.
2 Ash Doors.	2 Door Liners.	2 Door Arches.
1 Front Grate Rest.	1 Rear Grate Rest.	1 Ash Pit Door and Frame.
4 Buck Staves.	1 Flame Sheet.	1 Set of Grate Bars.

Front Extension Ring with Door furnished when ordered at extra charge.

Our net prices given on appllcation for either front, complete with all settings as enumerated, or in parts as may be required.

Sheet Iron Smoke Stacks.

Diameter Inches	Thickness of Iron	Price per Foot	Diameter Inches	Thickness of Iron	Price per Foot	Diameter Inches	Thickness of Iron	Price per Foot
8	20	$ .40	16	18	$ .78	26	14	$1.60
10	18	.52	16	16	.85	28	14	1.75
10	16	.58	18	16	95	30	14	1.90
12	18	.60	20	16	1.05	$2	14	2.00
12	16	.65	22	16	1.15	34	14	2.15
14	18	.67	24	16	1.25	36	14	2.20
14	16	.77	24	14	1.50	36	12	3.00

Grate Bars.

Standard Grate Bar.

NO. 1.

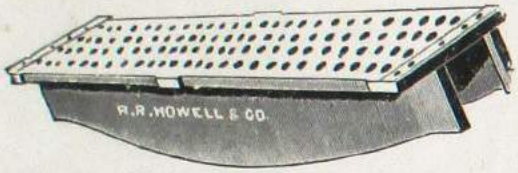
The Tuper Grates.

NO. 2.

The Standard Grate Bars are so favorably known, their durability and adaptability covering the requirements of the first-class grate, have made them very popular.

The Tuper Grates being made in this shape, the air readily passes through the coal and is equally distributed over the entire grate surface and makes a good combustion, thereby saving fuel.

Saw-Dust Grates.



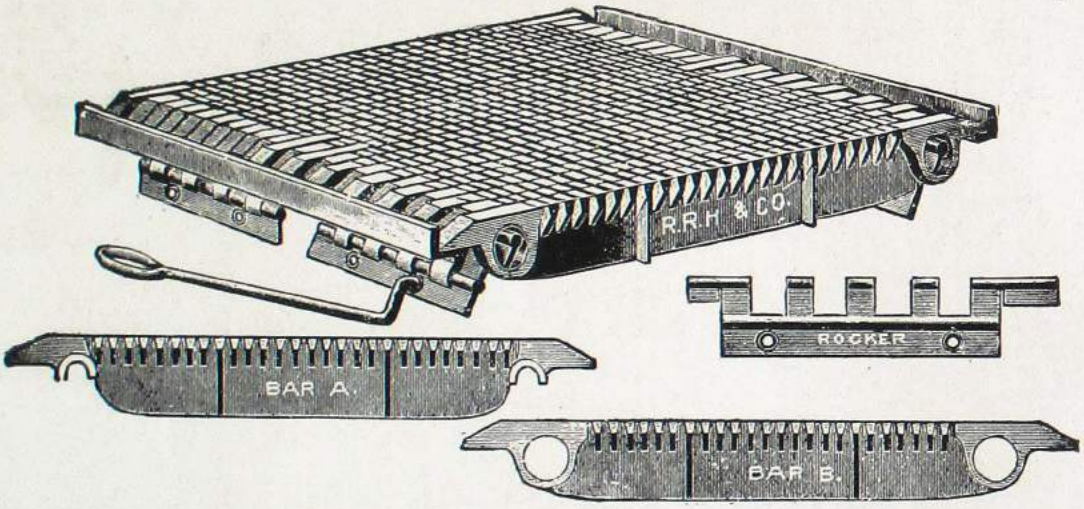
FLAT FACE NO 3.

CONE FACE NO 4.

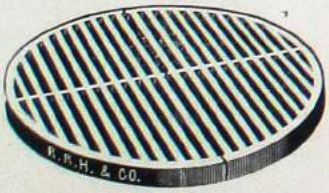
In the Flat Face Saw-Dust Grate the air admitted into the furnace is equally distributed over the **entire grate** surface, effecting **uniform** temperature and combustion throughout.

We are prepared to furnish perforated Cone Grates, for burning saw-dust or tan-bark, for those desiring this style Grate. Being made in this peculiar shape prevents them from warping.

Aetna Shaking Grate No. 5.



With the Aetna Grates the difficulties met with in burning the lower grades of fuel, are overcome and it has many advantages in burning higher grades. The bars are so arranged that one movement of the handle produces an upward and downward motion of the bars, thus thoroughly loosening the bottom of the bed of coals; breaking up any clinker that may have formed and causing the ashes to drop through. This is done without opening the fire-doors and admitting a volume of cold air above the grates.



No. 6.

Round Grates for Upright Boilers.

This is about the only style Grate used on upright boilers. We have patterns for all leading Sizes. In ordering, give diameter of fire box.

If none of the above patterns suit you, we can make special bars of any design at reasonable prices. In ordering state style wanted, and give width and length of bars required.

Finished Shafting, Couplings and Collars.

Iron Set Collar

FINISHED SHAFTING. Diameter of Shaft.	Price per Foot.	Keyseats per ft. other than for couplings furnished.	Flanged Face Couplings Price per pair.	Compression Couplings	Iron set Collars. Price each.
1 1/16	$ 0 70	$0 30	$ 7 50	$ 5 00	$ 0 70
1 1/8	75	35	7 75	5 50	80
1 3/16	80	40	8 00	6 00	1 00
1 1/4	87	45	8 50	7 00	1 20
1 5/16	1 05	50	9 00	8 00	1 40
1 3/8	1 25	55	10 50	9 00	1 60
1 7/16	1 50	60	12 50	10 75	1 80
1 1/2	1 80	65	15 25	13 00	2 10
1 9/16	2 15	70	18 25	16 50	2 40
1 5/8	2 60	80	21 75	20 00	2 70
1 11/16	2 95	90	25 25	.....	3 00
1 3/4	3 45	1 00	29 25	.....	3 30
1 13/16	4 00	1 20	33 25	.....	3 60
1 7/8	5 30	1 45	43 25	.....	4 70
1 15/16	6 90	1 75	54 75	.....	5 90
2	8 75	2 10	67 00	.....	7 20
2 1/16	10 85	2 50	81 00	.....	8 60
2 1/8	13 20	3 00	95 50	.....	10 10
2 3/16	15 90	3 50	110 00	.....	11 70

Flanged Face Coupling

Compression Coupling.

BALL AND SOCKET DROP HANGERS.

Size of Box	DROP IN INCHES 10	12	14	16	18	20	24	30
1 3-16	$4.40	$4.60	$4.90	$.....	$.....	$.....	$.....	$.....
1 7-16	4.60	4.90	5.20	5.80	6.40	7.00	.....	.....
1 11-16	5.10	5.50	5.90	6.25	6.50	6.90	.....	.....
1 15-16	6.00	6.50	7.00	7.50	7.70	8.15	9.50	10.85
2 3-16	7.30	7.90	8.45	9.00	9.30	9.85	11.40	12.80
2 7-16	9.00	9.70	10.30	11.00	11.30	12.00	13 70	15.30
2 11-16	11.10	11.90	12.60	13.20	13.70	14.40	16.40	18.20
2 15-16	13.60	14.50	15.25	16.00	16.50	17.30	19.50	21.50
3 3-16	.....	17.50	18.30	19.00	19.70	20.50	23.00	25.20
3 7-16	.....	20.90	21.90	23.00	23.30	24.25	26.90	29.30
3 11-16	.....	24.70	25.75	26.75	27.30	28.25	31.20	33.80
3 15-16	.....	.....	30.00	31.00	31.70	32.75	35.90	38.70
4 7-16	.....	.....	39.60	40.60	41.70	42.75	46.50	49.70
4 15-16	.....	.....	.....	.....	53.30	55.75	58.70	62.30

Ball and Socket Inverted Hanger or Floor Stand, same price as Drop Hanger. Counter Shaft Hanger, add 50 cents net for Shipper Arm.

PILLOW BLOCK AND ECCENTRIC BOXES.

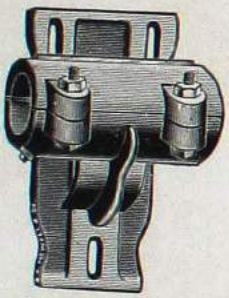
PILLOW BLOCK BOX.

ECCENTRIC BOX,

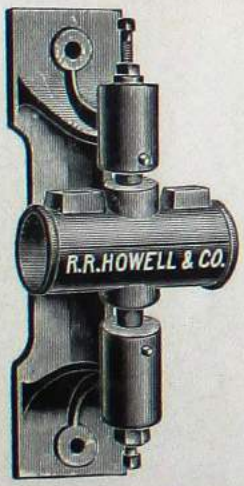
Used for engaging and disengaging Spur Friction Gearing.

SIZE	Pillow Blocks	Eccentric Box
15–16	$1 30	$7 00
1 3–16	1 60	8 25
1 7–16	2 00	9 50
1 11–16	2 50	11 00
1 15–16	3 10	12 90
2 3–16	3 80	14 50
2 7–16	4 60	16 60
2 11–16	5 50	18 75
2 15–16	6 50	21 15
3 3–16	7 60	23 50
3 7–16	8 80	
3 11–16	10 80	
3 15–16	11 50	
4 3–16	13 00	
4 7–16	15 00	
4 11–16	17 00	
4 15–16	19 00	
5 3–16	21 00	
5 7–16	23 50	
5 11–16	26 00	
5 15–16	28 50	

Rigid and Ball and Socket Post Hangers.



RIGID POST HANGER.



BALL AND SOCKET POST HANGER.

SIZE	Rigid Post Boxes	B. and S. Post Hangers
15–16	$1 50	.....
1 3–16	1 80	$4 50
1 7–16	2 20	4 80
1 11–16	2 80	5 20
1 15–16	3 40	6 00
2 3–16	4 20	7 30
2 7–16	5 00	8 90
2 11–16	6 00	10 90
2 15–16	7 00	13 30
3 3–16	8 20	16 20
3 7–16	9 50	19 40
3 11–16	10 90	23 00
3 15–16	12 40	27 00
4 3–16	14 10	31 50
4 7–16	16 10	36 30
4 11–16	18 00	41 50
4 15–16	20 30	47 10
5 3–16		
5 7–16		
5 11–16		
5 15–16		

Clutch Couplings.

Spiral Clutches made right and left hand. A right-hand Clutch drives when turning to the right as you face the smooth end.

Spiral Clutch Coupling.

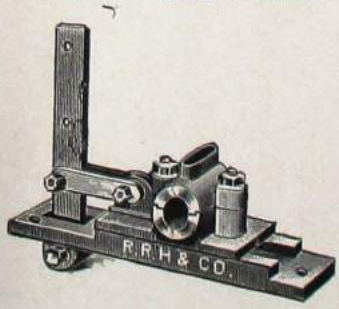
Square Clutch Coupling.

When ordering Clutches to be used with Sproket Wheels, Pulleys or Gears, be careful to state whether the clutch connects with right or left hand side of wheel when top of same is turning from you; also whether wheel or clutch is to drive; and send rough sketch showing arrangement of clutch and direction shaft revolves.

Size	Clutch Price.	Clutch Couplings.	Lever, including Band.
15-16	$ 2.25	$ 4.30	$ 2.70
1 3-16	2.85	5.50	3.10
1 7-16	3.50	6.60	3.50
1 11-16	4.20	8.10	4.10
1 15-16	4.95	9.60	4.75
2 3-16	5.75	11.10	5.50
2 7-16	6.60	12.80	6.20
2 11-16	7.50	14.50	7.00
2 15-16	8.45	16.30	8.00
3 3-16	9.45	18.20	9.00
3 7-16	10.50	20.20	10.20
3 11-16	11.60	22.30	11.40
3 15-16	12.75	24.50	13.75
4 7-16	15.20	29.30	15.25
4 15-16	17.85	34.50	17.00
5 7-16	20.70	40.00	10.00
5 15-16	23.75	46.00	21.50

Solid Journal Box.

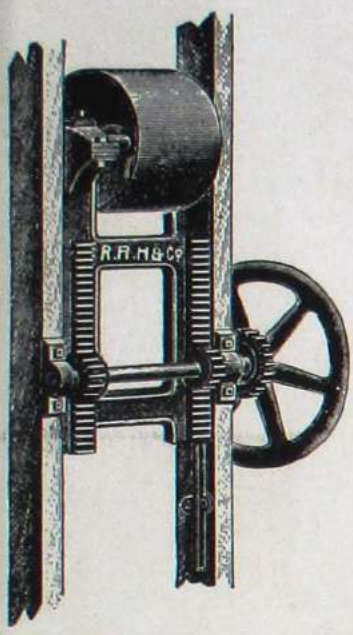
Step for Upright Shaft.



Slide Box.

Solid Journal, Upright and Slide Boxes.

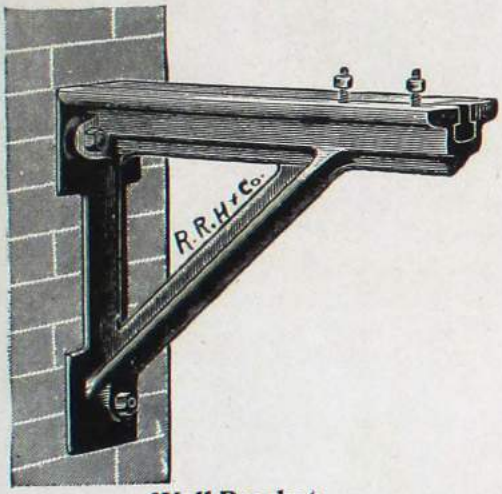
Size.	Solid Journal Boxes Bored.	Solid Journal Boxes Babbitted.	Stop for Shaft.	Slide Box.
15-16	$ .75	$ .85	$.....	$.....
1 3-16	.90	1.00	3.75	7.25
1 7-16	1.25	1.35	4.00	8.50
1 11-16	1.60	1.75	4.25	9.75
1 15-16	2.00	2.20	4.50	11.25
2 3-16	2.60	2.90	5.00	12.15
2 7-16	3.25	3.60	5.75	14.75
2 11-16	4.00	4.40	6.30	16.80
2 15-16	5.00	5,50	7.70	18.90
3 3-16	6.00	6.60	8.50	21.50
3 7-16	7.25	8.00	9.85	.....
3 11-16	8.50	9.50	12.30	.....
3 15-16	10.00	11.00	15.75	.....



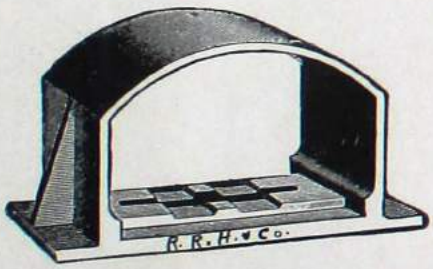
Belt Tightener.

To go on Wooden Frames.

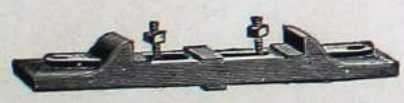
No.	Length of Adjustment.	Size of Pulley Diam.	Face.	Diameter of Shaft.	Price.
00	1½ ft.	12 x	9	1 11/16	$ 30.00
0	1⅔ ft.	18 x	12	1 11/16	40.00
1	2 ft.	24 x	14	1 15/16	56.00
2	3½ ft.	28 x	20	2 7/16	82.00
3	4 ft.	30 x	26	2 11/16	120.00
4	5 ft.	42 x	38	2 15/16	250.00



Wall Bracket.



Wall Box Frame.



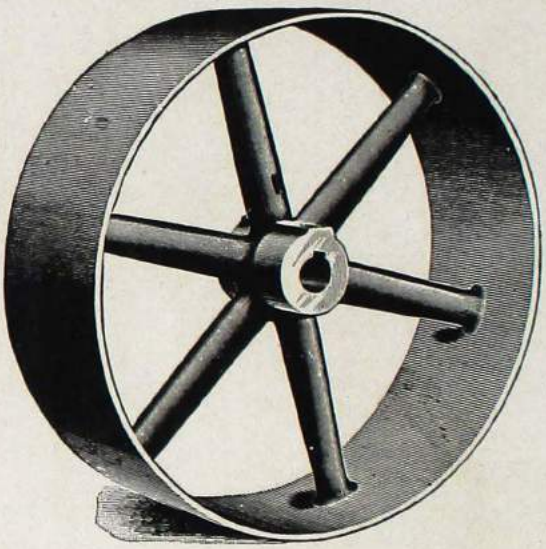
Base Plate.

Wall Bracket, Frame and Base

For Pillow Blocks.

Size of Shaft.	Wall Bracket without Box.	Wall Box Frame without Box.	Base Plate.
1 7-16	$ 4.00	$ 6 60	$.....
1 11-16	4.10	6.60	4.20
1 15-16	4.40	6.60	4.40
2 3-16	4.75	8.00	4.70
2 7-16	5.40	8.00	5.25
2 11-16	6.10	12.00	6.00
2 15-16	7.00	12.00	7.00
3 3-16	7.75	16.00	8.10
3 7-16	8.60	16.00	9.20
3 11-16	9.50	20.00	10.30
3 15-16	10.50	20.00	11.40
4 3-8	12 50	34.00	13.60
4 7-8	14.25	34.00	15.80

Standard Cast-Iron Pulley List.



Our pulleys are machine-molded from neat patterns and are well proportioned. Are cast from strong irons, and carefully machined and balanced.

We have, we believe, the largest variety of patterns for cast-iron pulleys in the Northwest. For hard and continuous service there is nothing to equal a well-made cast-iron pulley.

We turn and bore the pulleys in lathes specially designed for the purpose. Our pulleys are balanced, painted and provided with set screws or key seats, as may be desired. An extra charge will be made for pulleys having both set screws and key seats.

Drive pulleys for belts which do not shift should have crowning faces. For shifting belts the driving pulleys should have straight face. Each pulley of a pair of tight and loose pulleys should have a crowning faces.

Pulleys will be sent with crowning faces unless otherwise ordered.

In ordering pulleys be careful to state diameter, width of face, size of bore and whether for single belt, double belt, or double arm double belt.

Whether set-screwed or key-seated. If key-seated, other than standard size, give width and depth of key-seat.

Where pulleys run at unusually high speed, state speed.

Pulleys with bores disproportionate to their diamaters or with special hubs, are subject to extra charges.

Intermediate widths of face or fractional diameters, at next highest list price.

At the end of the pulley list will be found the additional prices to be added to the list price for split pulleys, tight and loose pulleys and flanged pulleys.

Iron Pulleys.

BORED, TURNED AND BALANCED, WITH SET SCREWS OR KEY SEATS.

Diam. in Inches.	Face in Inches.	Single Belt.	Double Belt.
6	3	$1 95	$2 55
	4	2 10	2 80
	5	2 30	3 10
	6	2 55	3 45
	7	2 80	3 80
	8	3 05	4 15
	9	3 30	4 50
	10	3 60	4 85
	11	3 90	5 25
	12	4 20	5 65
7	3	2 10	2 75
	4	2 25	3 00
	5	2 50	3 35
	6	2 75	3 70
	7	3 00	4 05
	8	3 25	4 45
	9	3 55	4 85
	10	3 85	5 25
	11	4 20	5 70
	12	4 50	6 10
8	3	2 25	2 95
	4	2 45	3 20
	5	2 70	3 55
	6	2 95	3 95
	7	3 20	4 35
	8	3 45	4 75
	9	3 80	5 20
	10	4 15	5 70
	11	4 50	6 15
	12	4 80	6 60
	14	5 60	7 75
9	3	2 40	3 15
	4	2 60	3 45
	5	2 85	3 80
	6	3 15	4 25
	7	3 45	4 65
	8	3 75	5 10
	9	4 10	5 60
	10	4 45	6 10
	11	4 80	6 60
	12	5 15	7 10
	14	5 90	8 30
10	3	2 55	3 35
	4	2 75	3 70
	5	3 05	4 10
	6	3 40	4 55
	7	3 70	5 00
	8	4 05	5 50
	9	4 40	6 00
10	10	$4 75	$6 55
	11	5 10	7 10
	12	5 50	7 65
	14	6 35	8 90
	16	7 50	10 05
11	3	2 70	3 55
	4	2 95	3 95
	5	3 25	4 40
	6	3 60	4 90
	7	3 95	5 40
	8	4 35	5 95
	9	4 65	6 45
	10	5 05	7 05
	11	5 40	7 65
	12	5 85	8 20
	14	6 80	9 50
	16	7 85	10 75
12	3	2 85	3 75
	4	3 15	4 20
	5	3 50	4 70
	6	3 85	5 25
	7	4 20	5 80
	8	4 55	6 35
	9	4 95	6 95
	10	5 35	7 55
	11	5 75	8 15
	12	6 20	8 75
	14	7 25	10 10
	16	8 40	11 50
	13	9 60	13 00
13	3	3 05	3 95
	4	3 35	4 45
	5	3 70	5 00
	6	4 10	5 60
	7	4 45	6 20
	8	4 90	6 80
	9	5 25	7 45
	10	5 70	8 10
	11	6 15	8 75
	12	6 60	9 40
	14	7 75	10 85
	16	8 95	12 40
	18	10 25	14 00
	20	11 60	15 70
14	3	3 25	4 20
	4	3 55	4 70
	5	3 90	5 30
	6	4 35	5 95
	7	4 70	6 55
14	8	$5 20	$7 20
	9	5 60	7 90
	10	6 10	8 60
	11	6 55	9 30
	12	7 05	10 00
	14	8 25	11 60
	16	9 50	13 25
	18	10 90	15 00
	20	12 40	16 80
15	3	3 40	4 40
	4	3 75	5 00
	5	4 15	5 75
	6	4 60	6 30
	7	5 05	6 95
	8	5 50	7 65
	9	5 95	8 40
	10	6 45	9 15
	11	6 95	9 90
	12	7 50	10 70
	14	8 75	12 35
	16	10 10	14 15
	18	11 60	16 00
	20	13 20	17 90
16	3	3 60	4 70
	4	3 95	5 30
	5	4 40	6 00
	6	4 90	6 70
	7	5 35	7 45
	8	5 85	8 20
	9	6 30	9 00
	10	6 85	9 90
	11	7 40	10 60
	12	8 00	11 45
	14	9 40	13 25
	16	10 90	15 15
	18	12 55	17 15
	20	14 30	19 15
17	3	3 80	5 00
	4	4 20	5 65
	5	4 70	6 40
	6	5 20	7 15
	7	5 70	7 90
	8	6 20	8 75
	9	6 75	9 60
	10	7 30	10 45
	11	7 90	11 30
	12	8 50	12 25
	14	10 05	14 15
	16	11 70	16 15
	18	13 50	18 25
	20	15 40	20 40
18	3	$4 00	$5 25
	4	4 45	5 95
	5	4 95	6 75
	6	5 50	7 60
	7	6 05	8 45
	8	6 60	9 30
	9	7 15	10 20
	10	7 75	11 10
	11	8 40	12 05
	12	9 10	13 05
	14	10 80	15 10
	16	12 60	17 20
	18	14 50	19 40
	20	16 50	21 70
19	3	4 25	5 55
	4	4 70	6 30
	5	5 25	7 15
	6	5 85	8 10
	7	6 45	9 00
	8	7 05	9 95
	9	7 65	10 95
	10	8 30	11 95
	11	9 00	12 95
	12	9 75	14 00
	14	11 60	16 25
	16	12 55	18 50
	18	15 55	20 90
	20	17 70	23 35
	22	20 70	25 80
	24	23 40	28 50
	26	26 00	31 30
	28	28 65	34 20
	30	31 30	37 30
20	3	4 45	5 85
	4	4 95	6 65
	5	5 55	7 55
	6	6 20	8 60
	7	6 85	9 60
	8	7 50	10 60
	9	8 15	11 70
	10	8 85	12 80
	11	9 60	13 90
	12	10 40	15 00
	14	12 40	17 40
	16	14 50	19 80
	18	16 60	22 40
	20	18 90	25 00
	22	21 95	27 70
	24	24 50	30 60
	26	27 25	33 55
	28	29 90	36 65
	30	32 60	40 95

Diam. in Inches.	Face in Inches.	Single Belt.	Double Belt.	Double Arm Double Belt.
20	22	$26 85	$29 65	$32 77
	24	29 65	32 77	36 00
	26	32 77	36 00	39 35
	28	36 00	39 35	42 90
	30	39 35	42 90	47 10

Iron Pulleys—Continued.

BORED, TURNED AND BALANCED, WITH SET SCREWS OR KEY SEATS.

Diam. in Inches.	Face in Inches.	Single Belt.	Double Belt.	Double Arm Double Belt.
21	3	$4 70	$6 15	
	4	5 25	7 00	
	5	5 85	8 00	
	6	6 55	9 10	
	7	7 25	10 20	
	8	7 95	11 30	
	9	8 65	12 45	
	10	9 40	13 65	
	11	10 20	15 85	
	12	11 05	16 00	
	14	13 20	18 55	
	16	15 45	21 10	
	18	17 60	23 90	
	20	20 10	26 65	$30 65
	22	23 10	29 60	34 05
	24	25 70	32 70	37 60
	26	28 50	35 80	41 15
	28	31 30	39 10	44 95
	30	33 95	42 65	49 05
22	3	4 90	6 45	
	4	5 55	7 40	
	5	6 15	8 45	
	6	6 90	9 60	
	7	7 65	10 80	
	8	8 40	12 00	
	9	9 15	13 20	
	10	9 95	14 50	
	11	10 80	15 75	
	12	11 70	17 00	
	14	14 05	19 70	
	16	16 40	22 40	
	18	18 75	25 40	
	20	21 30	28 30	32 55
	22	24 25	31 50	36 25
	24	27 00	34 80	40 00
	26	29 75	38 10	43 85
	28	32 60	41 60	47 85
	30	35 30	45 20	52 00
23	3	5 15	6 70	
	4	5 80	7 75	
	5	6 50	8 90	
	6	7 25	10 10	
	7	8 05	11 40	
	8	8 85	12 70	
	9	9 65	14 00	
	10	10 50	15 35	
	11	11 45	16 65	
	12	12 40	18 00	
	14	14 85	20 85	
	16	17 85	23 75	
	18	19 85	26 90	

Diam. in Inches.	Face in Inches.	Single Belt.	Double Belt.	Double Arm Double Belt.
23	20	$22 50	$29 95	$34 45
	22	25 40	33 45	38 45
	24	28 20	36 90	42 45
	26	31 00	40 40	46 45
	28	33 90	44 10	50 70
	30	36 65	48 00	55 20
24	3	5 40	7 00	
	4	6 10	8 15	
	5	6 85	9 35	
	6	7 65	10 65	
	7	8 45	12 00	
	8	9 30	13 40	
	9	10 20	14 80	
	10	11 10	16 20	
	11	12 10	17 65	
	12	13 15	19 00	
	14	15 70	22 00	
	16	18 30	25 10	
	18	21 00	28 40	
	20	23 75	31 70	36 45
	22	26 55	35 40	40 70
	24	29 50	39 00	44 95
	26	32 30	42 70	49 10
	28	35 10	46 60	53 60
	30	38 00	50 70	58 35
25	3	5 70	7 40	
	4	6 50	8 65	
	5	7 25	9 90	
	6	8 10	11 25	
	7	8 95	12 70	
	8	9 90	14 15	
	9	10 85	15 60	
	10	11 85	17 10	
	11	12 90	18 60	
	12	14 05	20 05	
	14	16 65	23 25	
	16	19 35	26 60	
	18	22 15	30 10	
	20	25 00	33 60	38 65
	22	28 05	37 45	43 05
	24	30 95	41 20	47 40
	26	33 85	45 05	51 80
	28	37 75	49 10	56 95
	30	39 70	53 25	61 10
26	3	6 00	7 80	
	4	6 90	9 15	
	5	7 65	10 45	
	6	8 60	11 90	
	7	9 45	13 40	
	8	10 55	14 90	

Diam. in Inches.	Face in Inches.	Single Belt.	Double Belt.	Double Arm Double Belt.
26	9	$11 50	$16 40	
	10	12 60	18 00	
	11	13 75	19 60	
	12	15 00	21 10	
	14	17 65	24 55	
	16	20 40	28 10	
	18	23 30	31 80	
	20	26 30	35 55	$40 85
	22	29 40	39 75	45 70
	24	32 40	43 45	50 00
	26	35 40	47 40	54 50
	28	38 40	51 55	59 25
	30	41 45	55 80	63 85
27	3	6 35	8 25	
	4	7 30	9 60	
	5	8 15	11 00	
	6	9 05	12 50	
	7	10 00	14 10	
	8	11 10	15 65	
	9	12 50	17 25	
	10	13 32	18 90	
	11	14 60	20 60	
	12	15 90	22 20	
	14	18 60	25 80	
	16	21 45	29 60	
	18	24 50	33 55	
	20	27 55	37 50	43 10
	22	30 70	41 70	47 95
	24	33 85	45 70	52 55
	26	36 95	50 75	58 35
	28	40 05	54 00	62 10
	30	43 10	58 40	67 20
28	3	6 75	8 70	
	4	7 70	10 10	
	5	8 50	11 55	
	6	9 50	13 15	
	7	10 60	14 80	
	8	11 70	16 40	
	3	12 90	18 05	
	10	13 10	19 80	
	11	15 45	21 60	
	12	16 85	23 30	
	14	19 55	27 10	
	16	22 50	31 10	
	18	25 65	35 25	
	20	28 80	39 45	45 35
	22	32 00	43 75	50 30
	24	35 25	47 90	55 10
	26	38 50	52 15	60 00
	28	41 70	56 50	65 00
	30	44 85	60 90	70 05

Iron Pulleys—Continued.

BORED, TURNED AND BALANCED, WITH SET SCREWS OR KEY SEATS.

Diam. in Inches.	Face in Inches.	Single Belt.	Double Belt.	Double Arm Double Belt.
29	3	$7 25	$9 15	
	4	8 10	10 60	
	5	9 00	12 15	
	6	10 00	13 85	
	7	11 15	15 50	
	8	12 35	17 15	
	9	13 60	18 85	
	10	14 90	20 70	
	11	16 30	22 60	
	12	17 70	24 40	
	14	20 55	28 40	
	16	23 60	32 60	
	18	26 80	37 00	
	20	30 10	41 40	$47 60
	22	33 40	45 80	52 65
	24	36 70	50 15	57 70
	26	40 05	54 60	62 80
	28	43 35	59 00	67 85
	30	46 55	63 45	73 00
30	3	7 60	9 60	
	4	8 55	11 10	
	5	9 45	12 70	
	6	10 55	14 55	
	7	11 75	16 20	
	8	13 00	18 00	
	9	14 30	19 80	
	10	15 75	21 60	
	11	17 15	23 50	
	12	18 60	25 50	
	14	21 55	29 70	
	16	24 70	34 20	
	18	28 00	38 70	
	20	31 40	43 25	49 75
	22	34 80	47 80	54 95
	24	38 20	52 40	60 25
	26	41 60	56 95	65 45
	28	45 00	61 50	70 70
	30	48 45	66 10	76 00
31	3	8 05	10 00	
	4	8 95	11 65	
	5	9 95	13 40	
	6	11 10	15 30	
	7	12 35	17 10	
	8	13 70	19 00	
	9	15 10	21 50	
	10	16 55	22 70	
	11	18 05	24 70	
	12	19 55	26 75	
	14	22 60	31 15	
	16	25 85	35 80	
	18	29 25	40 50	
31	20	$32 75	$45 35	$52 15
	22	36 10	49 90	57 40
	24	39 75	54 60	62 80
	26	43 25	59 30	68 20
	28	46 80	64 05	73 65
	30	50 35	68 00	78 20
32	3	8 45	10 45	
	4	9 40	12 20	
	5	10 45	14 10	
	6	11 65	16 05	
	7	12 95	17 90	
	8	14 40	19 85	
	9	15 90	22 20	
	10	17 40	23 85	
	11	19 00	25 00	
	12	20 55	28 00	
	14	23 70	32 65	
	16	27 05	37 45	
	18	30 55	42 30	
	20	34 15	47 45	54 50
	22	38 40	52 00	59 80
	24	41 35	56 85	65 35
	26	44 95	61 70	70 90
	28	48 60	66 65	76 65
	30	52 25	70 90	81 55
33	3	8 90	11 00	
	4	9 90	12 80	
	5	11 00	14 80	
	6	12 25	16 80	
	7	13 60	18 80	
	8	15 05	20 80	
	9	16 70	22 85	
	10	18 25	24 95	
	11	19 90	27 10	
	12	21 50	29 25	
	14	24 80	34 10	
	16	28 25	39 05	
	18	31 80	44 10	
	20	35 50	49 55	56 95
	22	39 70	54 10	62 30
	24	42 90	59 05	67 90
	26	46 65	64 10	73 70
	28	50 40	69 20	79 60
	30	54 15	73 80	84 85
34	3	9 40	11 60	
	4	10 40	13 50	
	5	11 50	15 50	
	6	12 90	17 60	
	7	14 35	19 70	
	8	15 85	21 75	
34	9	$17 55	$23 85	
	10	19 10	26 10	
	11	20 85	28 30	
	12	22 50	30 50	
	14	25 90	35 60	
	16	29 45	40 70	
	18	33 10	45 90	
	20	36 95	51 65	$59 40
	22	41 05	56 20	64 60
	24	44 50	61 30	70 50
	26	48 35	66 50	76 45
	28	52 20	71 80	82 55
	30	56 05	76 70	88 20
35	3	9 90	12 30	
	4	10 90	14 10	
	5	12 10	16 20	
	6	13 50	18 40	
	7	15 00	20 60	
	8	16 60	22 75	
	9	18 25	24 90	
	10	19 95	27 20	
	11	21 75	29 50	
	12	23 50	31 80	
	14	27 00	37 05	
	16	30 65	42 35	
	18	34 40	47 70	
	20	38 30	53 75	61 80
	22	42 35	58 30	66 95
	24	46 10	63 65	73 20
	26	50 40	68 90	79 25
	28	54 00	74 40	85 55
	30	57 95	79 60	91 55
36	3	10 40	12 75	
	4	11 40	14 75	
	5	12 65	16 95	
	6	14 10	19 20	
	7	15 70	21 45	
	8	17 35	23 70	
	9	19 10	26 00	
	10	20 85	28 30	
	11	22 70	30 70	
	12	24 50	33 10	
	14	28 10	38 55	
	16	31 85	44 00	
	18	35 70	49 50	
	20	39 70	55 90	64 30
	22	43 70	60 40	69 45
	24	47 70	65 80	75 70
	26	51 75	71 30	82 00
	28	55 80	76 90	88 45
	30	59 85	82 55	94 95

Iron Pulleys—Continued.

BORED, TURNED AND BALANCED, WITH SET SCREWS OR KEY SEATS.

Diam. in Inches.	Face in Inches.	Single Belt.	Double Belt.	Double Arm Double Belt.
38	4	$12 55	$16 25	
	5	13 95	17 15	
	6	15 60	21 05	
	7	17 95	23 45	
	8	19 05	25 90	
	9	20 90	28 35	
	10	22 80	30 80	
	11	24 75	33 35	
	12	26 65	35 95	
	14	30 50	41 65	
	16	34 45	49 15	
	18	38 50	58 50	
	20	42 80	59 80	$68 75
	22	47 10	65 05	74 80
	24	51 45	70 85	81 45
	26	55 80	76 75	88 25
	28	60 20	82 75	95 15
	30	64 55	88 75	102 05
	32	68 95	94 80	109 00
	34		100 85	115 95
	36		106 95	123 00
	38		113 10	130 05
	40		119 20	137 10
40	4	13 70	17 75	
	5	15 30	19 60	
	6	17 10	22 90	
	7	18 90	25 45	
	8	20 80	28 10	
	9	22 75	30 70	
	10	24 75	33 30	
	11	26 80	36 05	
	12	28 80	38 75	
	14	32 90	44 80	
	16	37 10	52 65	
	18	41 35	57 50	
	20	45 90	63 70	73 25
	22	50 55	69 70	80 15
	24	55 25	75 90	87 30
	26	59 90	82 20	94 55
	28	64 60	88 60	101 90
	30	69 25	94 95	109 10
	32	73 95	101 40	116 60
	34		107 80	124 00
	36		114 20	131 35
	38		120 70	138 80
	40		127 15	146 20
42	4	14 90	19 30	
	5	16 70	22 05	
	6	18 60	24 80	
	7	20 55	27 55	
	8	22 55	30 30	

Diam. in Inches.	Face in Inches.	Single Belt.	Double Belt.	Double Arm Double Belt.
42	9	$24 60	$33 05	
	10	26 70	35 85	
	11	28 85	38 75	
	12	31 00	41 60	
	14	35 30	47 95	
	16	39 70	54 40	
	18	44 20	61 00	
	20	49 00	67 60	$77 75
	22	54 00	74 30	85 45
	24	59 00	81 00	93 15
	26	64 00	87 70	100 85
	28	69 00	92 45	108 60
	30	74 00	101 20	116 40
	32	79 00	108 00	124 20
	34		114 75	131 95
	36		121 50	139 70
	38		128 25	147 50
	40		135 00	155 30
44	4	16 25	21 00	
	5	18 20	23 90	
	6	20 25	26 85	
	7	22 30	29 75	
	8	24 45	32 70	
	9	26 60	35 65	
	10	28 80	38 65	
	11	31 10	41 80	
	12	33 40	44 90	
	14	37 90	51 60	
	16	42 70	58 50	
	18	47 55	65 50	
	20	52 60	72 50	83 45
	22	58 00	79 50	91 40
	24	63 30	86 65	99 65
	26	68 60	93 80	107 85
	28	74 00	100 95	115 10
	30	79 30	108 20	124 45
	32	84 70	115 50	132 80
	34		122 70	141 10
	36		129 90	149 40
	38		137 20	157 80
	40		144 50	166 15
46	4	17 65	22 75	
	5	19 70	25 80	
	6	21 85	28 90	
	7	24 05	32 00	
	8	26 35	35 15	
	9	28 60	38 35	
	10	30 95	41 55	
	11	33 40	44 90	
	12	35 80	48 20	
	14	40 60	55 30	

Diam. in Inches.	Face in Inches.	Single Belt.	Double Belt.	Double Arm Double Belt.
46	16	$45 70	$62 6[illegible]	
	18	50 90	70 0[illegible]	
	20	56 30	77 40	89 00
	22	62 00	84 80	97 50
	24	67 60	92 30	106 15
	26	73 30	99 90	114 90
	28	79 00	107 55	123 70
	30	84 60	115 20	132 50
	32	90 30	123 00	141 45
	34		130 70	150 30
	36		138 40	159 15
	38		146 20	168 10
	40		154 00	177 00
48	4	19 00	24 50	
	5	21 20	27 70	
	6	23 50	31 00	
	7	25 85	34 30	
	8	28 25	37 65	
	9	30 65	41 05	
	10	33 15	44 45	
	11	35 70	48 00	
	12	38 20	51 50	
	14	43 30	59 00	
	16	48 70	66 70	
	18	54 20	74 50	
	20	60 00	82 30	94 65
	22	66 00	90 10	103 60
	24	72 00	98 00	112 70
	26	78 00	106 00	121 90
	28	84 00	114 15	131 25
	30	90 00	122 30	140 65
	32	96 00	130 50	150 05
	34		138 70	159 50
	36		146 90	168 95
	38		155 10	178 35
	40		163 30	187 80
50	5	22 80	29 75	
	6	25 30	33 30	
	7	27 75	36 80	
	8	30 25	40 30	
	9	32 80	43 85	
	10	35 45	47 45	
	11	38 10	51 15	
	12	40 80	54 80	
	14	46 20	62 70	
	16	52 00	70 85	
	18	57 95	79 15	
	20	64 00	87 40	100 50
	22	70 40	95 70	110 50
	24	76 85	104 10	119 70
	26	83 20	112 60	129 50

Iron Pulleys—Continued.

BORED, TURNED AND BALANCED, WITH SET SCREWS OR KEY SEATS.

Diam. in Inches.	Face in Inches.	Single Belt.	Double Belt.	Double Arm Double Belt.
50	28	$89 60	$121 25	$139 45
	30	96 00	129 90	149 40
	32	102 50	138 60	158 80
	34		147 40	169 50
	36		156 10	179 50
	38		164 90	189 65
	40		173 80	199 85
52	5	24 50	31 85	
	6	27 10	35 65	
	7	29 65	39 30	
	8	32 30	43 00	
	9	35 00	46 75	
	10	37 75	50 50	
	11	40 50	54 35	
	12	43 40	58 15	
	14	49 20	66 45	
	16	55 30	75 05	
	18	61 75	83 80	
	20	68 10	92 50	106 45
	22	74 80	101 30	116 50
	24	81 70	110 30	126 85
	26	88 40	119 30	137 20
	28	95 20	128 40	147 65
	30	102 05	137 65	158 20
	32	109 00	146 80	168 80
	34		156 10	179 50
	36		165 30	190 10
	38		174 70	200 90
	40		184 10	211 70
54	5	26 20	33 95	
	6	28 90	37 90	
	7	31 65	41 80	
	8	34 40	45 70	
	9	37 20	49 65	
	10	40 05	53 60	
	11	43 00	57 55	
	12	46 00	61 50	
	14	52 20	70 25	
	16	58 70	79 25	
	18	65 50	88 50	
	20	72 20	97 70	112 35
	22	79 30	107 00	123 05
	24	86 50	116 50	133 95
	26	93 60	126 00	144 90
	28	100 85	135 60	155 95
	30	108 15	145 30	167 10
	32	115 50	155 00	178 25
	34		167 00	189 40
	36		174 50	200 65
	38		184 30	212 95
	40		194 20	223 35
56	6	$30 85	$40 65	
	7	33 55	44 50	
	8	36 30	48 50	
	9	39 25	52 55	
	10	42 25	56 60	
	11	45 45	60 75	
	12	48 75	65 00	
	14	55 40	74 35	
	16	62 30	83 55	
	18	69 50	93 50	
	20	76 60	103 25	$119 75
	22	84 15	113 10	130 05
	24	91 80	123 15	141 60
	26	99 40	133 20	153 20
	28	107 05	143 20	164 70
	30	114 80	153 50	176 50
	32	122 50	163 70	188 25
	34		173 80	199 85
	36		184 00	211 60
	38		194 30	233 45
	40		204 60	235 30
58	6	32 80	43 25	
	7	35 50	47 20	
	8	38 35	51 30	
	9	41 35	55 45	
	10	44 55	59 65	
	11	47 95	64 00	
	12	51 50	68 50	
	14	58 60	78 45	
	16	65 90	87 85	
	18	73 50	98 50	
	20	81 00	108 85	125 20
	22	89 05	119 25	137 15
	24	97 15	129 80	149 25
	26	105 20	140 40	161 45
	28	113 25	150 90	173 55
	30	121 50	161 70	185 95
	32	129 50	172 40	198 25
	34		182 90	210 35
	36		193 50	222 50
	38		204 30	234 95
	40		215 00	247 25
60	6	34 80	46 00	
	7	37 50	50 00	
	8	40 35	54 10	
	9	43 45	58 35	
	10	46 85	62 75	
	11	50 45	67 30	
	12	54 20	72 00	
	14	61 80	82 55	
	16	69 60	92 15	
60	18	$77 50	$103 50	
	20	85 50	114 45	$131 60
	22	93 95	125 45	144 25
	24	102 50	136 50	157 00
	26	111 00	147 65	169 80
	28	119 50	158 80	182 60
	30	128 20	169 90	195 40
	32	137 00	181 00	208 15
	34		192 10	220 90
	36		203 20	233 60
	38		214 30	246 55
	40		225 40	259 20
62	6	36 70	48 30	
	7	39 75	52 65	
	8	42 85	57 10	
	9	45 85	61 65	
	10	49 75	66 30	
	11	53 55	71 10	
	12	57 40	76 00	
	14	65 40	86 95	
	16	73 50	97 25	
	18	81 60	108 70	
	20	90 30	120 35	138 40
	22	99 05	131 85	150 60
	24	108 00	143 20	164 70
	26	116 80	155 15	178 40
	28	125 70	166 85	191 85
	30	134 70	178 50	205 30
	32	143 80	190 00	218 50
	34		201 80	232 00
	36		213 50	245 50
	38		225 10	258 55
	40		236 80	272 30
64	6	38 60	50 60	
	7	41 90	55 35	
	8	45 35	60 10	
	9	48 30	64 95	
	10	52 75	69 90	
	11	56 65	74 90	
	12	60 70	80 00	
	14	69 10	91 35	
	16	77 50	102 35	
	18	85 80	113 85	
	20	95 10	126 25	145 20
	22	104 25	138 30	159 05
	24	113 50	150 90	173 55
	26	122 70	162 65	187 05
	28	131 90	174 90	201 15
	30	141 85	187 10	215 20
	32	150 60	199 00	228 55
	34		211 50	243 25

Iron Pulleys—Continued.

BORED, TURNED AND BALANCED, WITH SET SCREWS OR KEY SEATS.

Diam. in Inches.	Face in Inches.	Single Belt.	Double Belt.	Double Arm Double Belt.
64	36		$223 80	$257 35
	38		235 95	271 30
	40		248 25	285 30
66	6	$40 50	53 00	
	7	44 20	58 05	
	8	47 95	63 15	
	9	51 80	68 30	
	10	55 75	73 50	
	11	59 80	78 75	
	12	64 00	84 00	
	14	72 70	95 75	
	16	81 50	107 55	
	18	90 50	119 50	
	20	99 95	132 15	152 05
	22	109 45	144 80	166 50
	24	119 00	157 50	181 10
	26	128 60	170 20	195 70
	28	138 20	182 95	210 40
	30	147 85	195 70	225 05
	32	157 50	208 50	239 80
	34		221 30	254 50
	36		234 10	269 20
	38		246 90	283 95
	40		259 70	298 65
68	6	42 80	55 70	
	7	46 70	60 95	
	8	50 60	66 25	
	9	54 60	71 60	
	10	58 70	77 10	
	11	62 90	82 55	
	12	67 30	88 20	
	14	76 30	100 25	
	16	85 50	112 55	
	18	95 00	125 10	
	20	105 15	138 35	159 10
	22	115 10	151 50	174 25
	24	124 90	165 00	189 75
	26	134 90	178 05	204 75
	28	145 00	191 35	220 05
	30	155 15	204 60	235 30
	32	165 40	218 00	250 70
	34		231 30	266 00
	36		244 60	281 30
	38		258 00	296 70
	40		271 30	312 00
70	6	45 10	58 40	
	7	49 20	63 85	
	8	53 30	69 25	
	9	57 40	75 00	
	10	61 70	80 70	

Diam. in Inches.	Face in Inches.	Single Belt.	Double Belt.	Double Arm Double Belt.
70	11	$66 05	$86 40	
	12	70 60	92 40	
	14	80 05	104 85	
	16	89 60	117 65	
	18	99 50	130 80	
	20	110 40	144 55	$166 25
	22	120 80	158 25	182 00
	24	130 70	172 50	198 40
	26	141 20	185 95	213 85
	28	151 80	199 75	239 70
	30	162 45	213 60	245 65
	32	173 20	227 50	261 60
	34		241 30	277 50
	36		255 15	293 40
	38		269 10	309 45
	40		282 90	325 35
72	6	47 50	61 00	
	7	51 75	66 75	
	8	56 00	72 55	
	9	60 30	78 40	
	10	64 70	84 30	
	11	69 25	90 30	
	12	74 00	96 50	
	14	83 75	109 45	
	16	93 70	122 75	
	18	104 00	136 50	
	20	115 70	150 60	173 20
	22	126 50	165 00	189 75
	24	136 50	179 50	207 40
	26	147 55	193 85	222 90
	28	158 65	208 20	239 45
	30	169 80	222 60	256 00
	32	181 00	237 00	272 55
	34		251 40	289 10
	36		265 80	305 65
	38		280 20	322 25
	40		294 60	338 80
74	8	58 90	75 75	
	9	63 40	81 90	
	10	68 00	88 50	
	11	72 75	94 80	
	12	77 60	101 00	
	14	87 65	114 45	
	16	98 00	128 25	
	18	108 60	142 50	
	20	120 50	157 10	180 65
	22	131 85	172 00	197 80
	24	143 00	187 00	215 05
	26	154 15	201 85	232 10
	28	165 75	216 75	249 25
	30	177 30	231 70	266 45

Diam. in Inches.	Face in Inches.	Single Belt.	Double Belt.	Double Arm Double Belt.
74	32	$189 00	$246 60	$283 60
	34		261 60	300 85
	36		276 50	317 95
	38		291 40	335 10
	40		306 40	352 30
76	8	61 80	79 05	
	9	66 50	85 50	
	10	71 30	92 70	
	11	76 25	99 30	
	12	81 30	105 50	
	14	91 60	119 45	
	16	102 30	133 75	
	18	113 30	148 45	
	20	125 40	163 70	188 25
	22	137 25	179 00	205 85
	24	149 50	194 50	223 70
	26	160 75	209 85	241 30
	28	172 85	225 35	259 15
	30	184 85	240 80	276 90
	32	197 00	256 30	294 75
	34		271 80	312 55
	36		287 20	330 30
	38		302 60	348 00
	40		318 20	366 00
78	8	64 75	82 35	
	9	69 70	89 10	
	10	74 70	95 90	
	11	79 80	102 85	
	12	85 00	110 00	
	14	95 65	124 50	
	16	106 65	139 25	
	18	118 00	154 50	
	20	130 30	170 30	195 85
	22	142 65	186 10	214 00
	24	155 00	202 00	232 30
	26	167 45	217 95	250 65
	28	179 95	233 95	269 05
	30	192 45	249 95	287 45
	32	205 00	266 00	305 90
	34		282 00	324 30
	36		298 00	342 70
	38		314 00	361 10
	40		330 00	379 50
80	8	67 65	85 95	
	9	72 80	92 90	
	10	78 00	99 85	
	11	83 30	106 95	
	12	88 60	114 30	
	14	99 85	129 50	
	16	111 40	144 95	

Iron Pulleys—Continued.

BORED, TURNED AND BALANCED, WITH SET SCREWS OR KEY SEATS.

Diam. in Inches.	Face in Inches.	Single Belt.	Double Belt.	Double Arm Double Belt.
80	18	$123 30	$160 80	
	20	136 00	177 10	$203 65
	22	148 75	193 40	222 40
	24	161 50	210 00	241 50
	26	174 25	226 25	260 20
	28	187 15	242 85	279 30
	30	200 05	259 35	298 25
	32	213 00	276 00	317 40
	34		292 80	336 35
	36		309 10	355 45
	38		325 70	374 55
	40		342 20	383 55
82	8	70 65	89 55	
	9	75 90	96 70	
	10	81 30	103 85	
	11	86 80	111 15	
	12	92 30	118 65	
	14	104 05	134 50	
	16	116 20	150 65	
	18	128 60	167 10	
	20	141 70	183 90	211 50
	22	154 85	200 70	230 80
	24	168 00	218 00	250 70
	26	181 15	234 65	269 85
	28	194 45	251 75	289 50
	30	207 65	268 80	309 10
	32	221 00	286 00	328 90
	34		303 10	348 55
	36		320 20	368 20
	38		337 40	388 00
	40		354 50	407 65
84	8	73 65	93 25	
	9	79 10	100 50	
	10	84 65	107 85	
	11	90 30	115 35	
	12	96 00	123 00	
	14	108 35	139 60	
	16	121 00	156 40	
	18	134 00	173 50	
	20	147 45	190 75	219 35
	22	160 95	208 10	239 30
	24	174 50	225 50	259 30
	26	188 05	243 05	279 50
	28	201 65	260 65	299 75
	30	215 30	278 30	320 05
	32	229 00	296 00	340 40
	34		313 70	360 75
	36		331 40	381 10
	38		349 10	401 45
	40		366 80	421 80

Diam. in Inches.	Face in Inches.	Single Belt.	Double Belt.	Double Arm Double Belt.
90	8		$104 75	
	9		112 80	
	10		121 00	
	11		129 40	
	12		138 00	
	14		155 60	
	16		173 40	
	18		191 50	
	20		210 70	$242 30
	22		230 05	264 55
	24		249 50	286 95
	26		268 95	309 30
	28		288 45	331 70
	30		307 95	354 15
	32		327 50	376 65
	34		347 00	389 05
	36		366 50	421 50
	38		386 00	443 90
	40		405 50	466 30
96	8		117 10	
	9		125 85	
	10		134 75	
	11		143 85	
	12		153 00	
	14		172 10	
	16		191 75	
	18		212 50	
	20		233 00	267 95
	22		254 50	292 70
	24		276 00	317 40
	26		297 00	341 55
	28		318 00	365 70
	30		339 50	390 45
	32		361 00	415 15
	34		382 30	439 65
	36		403 60	464 15
	38		424 90	488 65
	40		446 25	513 15
102	8		130 75	
	9		140 70	
	10		150 75	
	11		160 85	
	12		171 00	
	14		192 00	
	16		213 40	
	18		233 50	
	20		256 25	294 70
	22		279 05	320 90
	24		302 00	347 30
	26		324 95	373 70
	28		347 95	400 15

Diam. in Inches.	Face in Inches.	Single Belt.	Double Belt.	Double Arm Double Belt.
102	30		$370 95	$426 60
	32		394 00	453 10
	34		417 10	479 65
	36		440 20	506 25
	38		463 30	532 80
	40		486 40	559 35
108	8		144 35	
	9		154 75	
	10		165 35	
	11		176 10	
	12		187 00	
	14		209 50	
	16		232 50	
	18		256 00	
	20		280 20	322 25
	22		304 55	350 25
	24		329 00	378 35
	26		355 35	406 35
	28		377 80	434 45
	30		402 35	462 70
	32		427 00	491 05
	34		451 60	519 35
	36		476 20	547 65
	38		500 80	575 90
	40		525 40	604 20
114	8		159 45	
	9		170 75	
	10		182 10	
	11		193 50	
	12		205 00	
	14		228 40	
	16		252 45	
	18		277 00	
	20		303 00	348 50
	22		329 50	379 40
	24		356 00	409 40
	26		382 30	439 60
	28		408 70	470 00
	30		435 30	500 60
	32		462 00	531 30
	34		488 60	562 00
	36		515 20	592 50
	38		541 80	653 10
	40		568 40	653 70
120	8		172 85	
	9		184 60	
	10		196 55	
	11		208 65	
	12		221 00	
	14		246 10	

Finished Split Pulleys.

Additional Price to be Added to List Prices of Common Pulleys.

Diameter in Inches.	Face in Inches.	PRICE.	Diameter in Inches.	Face in Inches.	PRICE.	Diameter in Inches.	Face in Inches.	PRICE.
6 to 10	2 to 3	$ 1 30	24 to 30	5 to 6	$ 4 40	37 to 47	31 to 40	$37 00
	4 to 6	1 75		7 to 10	5 40			
	7 to 10	2 15		11 to 14	7 25	48 to 60	5 to 6	10 00
	11 to 14	3 10		15 to 20	10 00		7 to 10	13 00
	15 to 20	4 00		21 to 30	14 00		11 to 14	18 00
							15 to 20	25 00
11 to 18	2 to 3	1 50	31 to 36	3 to 4	4 50		21 to 30	34 50
	4 to 6	2 20		5 to 6	5 60		31 to 40	48 00
	7 to 10	2 85		7 to 10	6 75			
	11 to 14	4 00		11 to 14	9 80	61 to 84	7 to 10	20 00
	15 to 20	5 25		15 to 20	13 00		11 to 14	26 00
				21 to 30	19 00		15 to 20	35 00
19 to 23	3 to 4	2 65					21 to 30	48 00
	5 to 6	3 40	37 to 47	3 to 4	6 50		31 to 40	64 00
	7 to 10	4 05		5 to 6	7 50			
	11 to 14	5 60		7 to 10	9 90	85 to 120	11 to 14	38 00
	15 to 20	7 30		11 to 14	13 50		15 to 20	53 50
	21 to 30	11 00		15 to 20	18 00		21 to 30	70 00
24 to 30	3 to 4	3 60		21 to 30	27 00		31 to 40	90 00

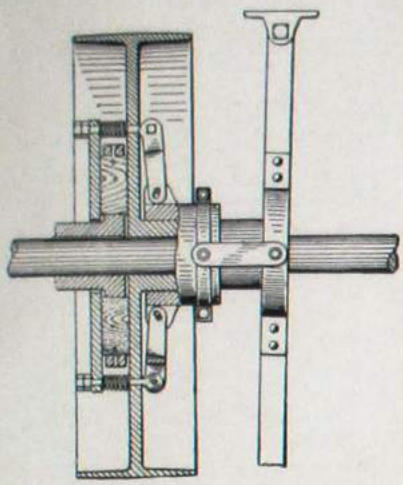
Tight and Loose Pulleys, Finished Flange Pulleys.

Additional Price to be Added to List Price of Common Pulleys.

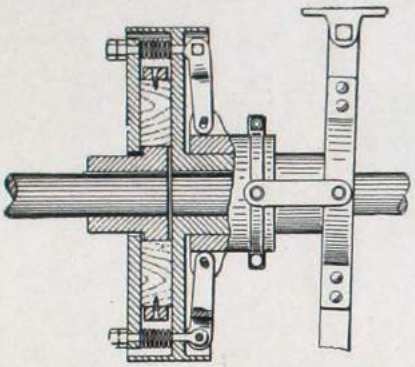
Diameter in Inches.	PRICE, Tight and Loose Pulleys, Per Pair.	PRICE, Double Flanged Pulleys, Each.	Diameter in Inches.	PRICE, Tight and Loose Pulleys, Per pair.	PRICE, Double Flanged Pulleys, Each.
6 to 8	$1 60	$ 4 65	49 to 52	$ 9 30	$ 33 00
9 to 10	1 95	5 20	53 to 56	10 00	36 30
11 to 12	2 30	5 75	57 to 60	10 70	40 70
13 to 14	2 65	6 30	61 to 66	11 70	46 20
15 to 16	3 00	7 15	67 to 72	12 70	51 70
17 to 18	3 30	8 00	73 to 78	13 70	57 20
19 to 20	3 70	8 80	79 to 84	14 70	62 70
21 to 22	4 05	9 90	85 to 90	15 70	68 20
23 to 24	4 40	11 00	91 to 96	16 70	73 70
25 to 26	4 75	12 10	97 to 102	17 70	79 70
27 to 28	5 10	13 75	103 to 108	18 70	85 80
29 to 30	5 45	15 40	109 to 114	19 70	91 30
31 to 32	5 80	17 05	115 to 120	20 70	96 80
33 to 34	6 15	18 70	121 to 126	21 70	102 30
35 to 36	6 50	20 35	127 to 132	22 70	107 80
37 to 40	7 20	23 10	133 to 138	23 70	113 80
41 to 44	7 90	26 40	139 to 144	24 70	119 80
45 to 48	8 60	29 70			

For Pulleys with one flange, add only one-half of price given above.
For Pulleys with three flanges add one-half more than price given above.

Friction Clutch Pulleys and Couplings.



Friction Clutch Pulley.



Friction Clutch.

This Friction Clutch is not complicated, having but few parts. Is neat and compact· easy to adjust or repair. The friction surfaces are extra large, making the clutch very powerful. When the friction surface is worn, it can be easily replaced at a nominal expense. The pressure is applied not to the outer periphery, but to the sides of the surface. In this way we avoid the tendency of the friction surface to fly apart, as is the case with clutches which have their friction surface on the extreme periphery of the circle, the centrifugal force always having a tendency, when clutches are run at a high speed, to pull the friction surfaces apart.

When applied to a pulley, add the cost of the pulley to the price of the clutch.

PRICES—Without Pulleys.

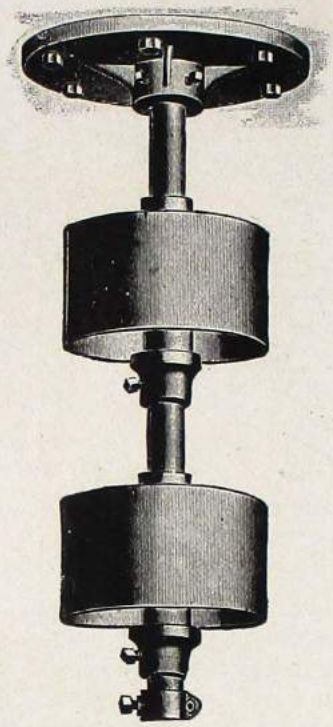
No.	Shaft.	Horse Power to 100 Revolutions.	Price as Clutch Coupling Only.	Price, made for Pulley.
1	$1\frac{7}{16}$ inches to $2\frac{3}{16}$ inches.	20	$ 60 00	$ 75 00
2	$2\frac{3}{16}$ inches to $2\frac{15}{16}$ inches.	25	75 00	100 00
3	$2\frac{15}{16}$ inches to $3\frac{11}{16}$ inches.	50	125 00	150 00
4	$3\frac{11}{16}$ inches to $3\frac{7}{8}$ inches.	75	150 00	200 00
5	$3\frac{7}{16}$ inches to 5 inches.	125	200 00	275 00
6	$3\frac{15}{16}$ inches to 7 inches.	175	250 00	400 00

This Clutch can be attached to sp'ocket wheels and rope sheaves as well as pulleys.

Pulley Flanges for Wood Pulleys.

Bored, Set-Screwed or Key Seated.

Diameter.	Price Each.	Diameter.	Price Each.
4	$1.00	14	$3.50
6	1.50	16	4.00
8	2.00	18	4.50
10	2.50	20	5.00
12	3.00	24	6.50



Plain Mule Pulley Stand.

FOR CARRYING POWER AROUND CORNERS.

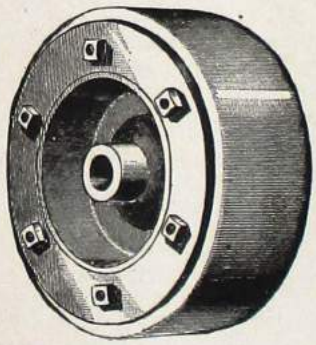
We furnish stand complete with one shaft, two pulleys, two sleeves, two set collars, top and bottom plates and two guy rods with turn buckles.

We can furnish them with either wood-split or iron pulleys, any length of shaft and size of pulleys desired.

PRICE LIST.

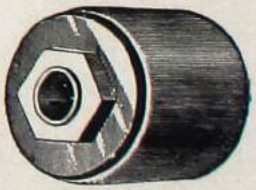
Width of Belt.	Diameter of Shaft.	Size of Pulleys.	PRICE.
3-inch	$1\frac{3}{16}$-inch	10-inch x 4-inch	$19.25
4-inch	$1\frac{7}{16}$-inch	10-inch x 5-inch	21.50
5-inch	$1\frac{11}{16}$-inch	12-inch x 6-inch	25.50
6-inch	$1\frac{11}{16}$-inch	14-inch x 7-inch	29.00
7-inch	$1\frac{11}{16}$-inch	14-inch x 8-inch	30.00
8-inch	$1\frac{15}{16}$-inch	16 inch x 9-inch	34.50
9-inch	$1\frac{15}{16}$-inch	16-inch x 10-inch	36.00
10-inch	$2\frac{3}{16}$-inch	18-inch x 11-inch	41.50
12-inch	$2\frac{15}{16}$-inch	20-inch x 13-inch	54.00

Spur, Bevel and Mitre Paper Frictions.



Spur Paper Friction (with flanges).

Bevel (with flanges).



Nut-Flange.

Our Paper Frictions are made solid, bored, and turned perfectly true to any desired size or shape, spur, bevel or mitre face.

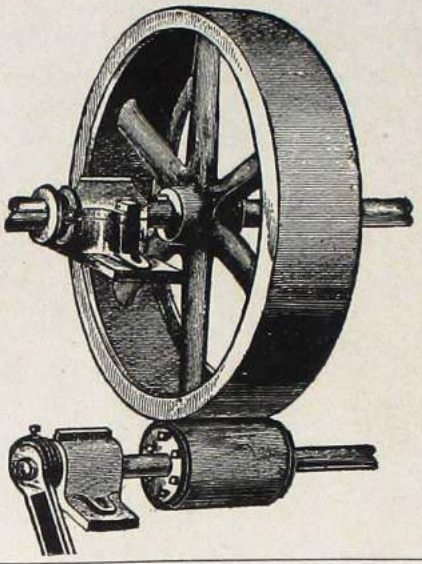
When ordering Spur Paper Frictions with flanges, state diameter and face of paper, bore of hub and size of key seat. For bevel or mitres state large diameter, width of face and degree of angle of paper, bore of hub and size of key seat. The angle to be measured is that formed by the large diameter and face of the paper filler,

When inconvenient to measure the angle, give also the small diameter and thickness of paper between the flanges.

When ordering Fillers, it is better to send flanges, but patterns cut from stiff paper showing bolt holes, with diameter, face and bore, given in inches, will answer. For bevels give largest diameter and degree of angle.

Price List Spur, Bevel or Miter Paper Frictions.

Diameter.	Face.	Friction Pulley Complete.	Paper Filler for Friction Pulley.	Diameter.	Face.	Friction Pulley Complete.	Paper Filler for Friction Pulley.	Diameter.	Face	Friction Pulley Complete.	Paper Filler for Friction Pulley.
4	4	$4 00	$1 80	**12**	4	$8 28	$4 46	**18**	5	$17 96	$10 70
	5	4 62	2 22		5	9 50	5 42		6	20 30	12 68
	6	5 28	2 64		6	10 72	6 38		7	22 64	14 66
	7	5 90	3 06		7	11 96	7 34		8	24 98	16 64
	8	1 58	3 48		8	13 20	8 30		9	27 44	18 62
					9	14 52	9 26		10	29 78	20 60
5	4	4 58	2 14		10	15 74	10 22		12	34 46	24 56
	5	5 28	2 64		12	18 20	12 14				
	6	6 04	3 16					**20**	5	22 86	12 72
	7	6 76	3 66						6	25 60	15 10
	8	7 52	4 18	**13**	4	9 48	5 10		7	28 32	17 46
					5	10 88	6 20		8	31 04	19 82
6	4	5 00	2 50		6	12 34	7 32		9	33 90	22 20
	5	5 75	3 00		7	13 74	8 42		10	36 62	24 56
	6	6 50	3 50		8	15 18	9 54		12	42 08	29 30
	7	7 25	4 00		9	16 68	0 64		14	47 56	34 06
	8	8 00	4 75		10	18 12	11 76				
					12	20 98	13 98	**22**	5	28 74	15 04
7	4	5 40	2 70						6	31 92	17 84
	5	6 26	3 30	**14**	4	10 62	$5 84		7	35 12	20 68
	6	7 06	3 90		5	12 22	7 14		8	38 30	23 50
	7	7 80	4 50		6	13 82	8 42		9	41 68	26 32
	8	8 74	5 10		7	15 42	9 72		10	44 86	29 14
					8	17 04	11 00		12	51 22	34 78
8	4	5 75	3 00		9	18 72	12 30		14	57 58	40 42
	5	6 75	3 75		10	20 34	13 58				
	6	7 50	4 25		12	23 54	16 16	**24**	5	33 52	17 64
	7	8 25	5 00						6	37 18	20 98
	8	9 00	5 50	**15**	4	11 68	6 48		7	40 84	24 30
					5	13 42	7 92		8	44 50	27 64
9	4	6 00	3 25		6	15 18	9 36		9	48 36	30 96
	5	7 00	4 00		7	16 92	10 80		10	52 02	34 30
	6	7 75	4 50		8	18 70	12 24		12	59 34	40 96
	7	8 50	5 50		9	20 52	13 68		14	66 66	47 62
	8	9 50	6 25		10	22 30	15 12				
	9	10 50	7 50		13	25 80	18 00				
								26	5	38 56	20 56
10	4	6 62	3 46	**16**	4	13 12	7 22		6	42 80	24 46
	5	7 60	4 18		5	15 08	8 84		7	47 02	28 36
	6	8 60	4 90		6	17 06	10 46		8	51 26	32 26
	7	9 58	5 62		7	19 04	12 08		9	55 70	36 16
	8	10 58	6 34		8	21 02	13 70		10	59 92	40 06
	9	11 66	7 06		9	23 12	15 32		12	68 38	47 86
	10	12 64	7 78		10	25 10	16 94		14	76 84	55 66
	12	14 62	9 22		12	29 06	20 18				
								28	5	43 94	23 62
11	4	7 44	3 96						6	48 76	28 12
	5	8 56	4 80	**17**	5	16 54	9 78		7	53 60	32 62
	6	9 66	5 64		6	18 70	11 58		8	58 42	37 12
	7	10 78	6 48		7	20 86	13 38		9	63 46	41 62
	8	11 88	7 32		8	23 02	15 18		10	68 30	46 12
	9	13 08	8 16		9	25 30	16 98		12	77 92	55 12
	10	17 20	9 00		10	27 46	18 78		14	87 66	64 12
	12	11 42	10 68		12	31 78	21 38				



Spur and Beveled Iron Friction Gearing.

BORED, TURNED AND KEYSEATED.

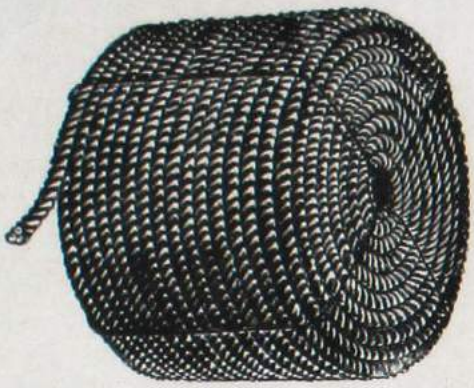
Friction Gearing is especially desirable where machinery is frequently thrown in and out of gear, and for reverse motions, is noiseless in operation, and may be made to transmit any amount of power required, from the lightest to the heaviest, and although more expensive in first cost, is, for a long continued service, much cheaper than toothed gearing, as when properly adjusted there is virtually no wear upon them.

They are extensively used in saw mills, factories, grain elevators, etc.

DIAMETER INCHES.	Face in Inches.											
	4	5	6	8	10	12	14	16	18	20	24	30
12	$3 50	$4 00	$4 50	$6 00	$7 50	.....	.....	.....	.....	.....	.....	.....
14	4 75	5 50	6 25	7 75	9 25	$10 75	.....	.....	.....	.....	.....	.....
16	5 50	6 25	7 00	8 50	10 00	11 50	.....	.....	.....	.....	.....	.....
18	6 00	7 00	8 00	9 50	11 50	13 00	$15 00	$17 00	.....	.....	.....	.....
20	6 50	7 50	8 50	10 50	12 00	13 50	16 00	19 00	.....	.....	.....	.....
22	7 00	8 00	9 00	11 25	13 25	15 50	18 25	21 50	$25 00	.....	.....	.....
24	7 50	8 50	9 50	12 00	14 50	17 50	20 50	24 00	28 00	$32 00	$40 00	.....
26	.....	9 00	10 50	13 00	16 00	19 00	22 00	26 00	30 00	34 00	45 00	.....
28	.....	10 00	11 25	14 00	17 00	20 50	24 00	28 00	32 50	37 00	50 00	.....
30	.....	.....	12 00	15 00	18 00	22 00	26 00	30 00	35 00	40 00	54 00	.....
32	.....	.....	13 00	16 00	19 50	23 50	28 00	32 00	38 00	44 00	58 00	.....
34	.....	.....	14 00	17 50	21 00	25 00	30 00	35 00	41 00	48 00	62 00	.....
36	.....	.....	15 00	19 00	23 00	27 00	32 00	38 00	45 00	52 00	66 00	84 00
38	.....	.....	16 00	20 00	24 50	29 00	34 00	40 00	46 50	54 50	70 00	93 00
40	.....	.....	17 00	21 50	26 00	31 00	36 00	42 00	48 00	57 00	75 00	102 00
42	.....	.....	18 00	23 00	28 00	33 00	38 00	44 00	50 00	60 00	80 00	110 00
44	.....	.....	19 00	24 50	29 50	34 50	40 00	48 00	53 00	63 00	83 00	115 00
46	.....	.....	20 00	26 00	31 00	36 00	42 50	50 00	56 50	66 50	86 50	120 00
48	.....	.....	.....	27 00	32 00	37 00	45 00	52 00	60 00	70 00	90 00	125 00
50	.....	.....	.....	28 50	34 00	39 00	46 50	53 50	61 50	71 50	95 00	128 00
52	.....	.....	.....	30 00	36 00	41 00	48 00	54 00	63 00	73 00	100 00	132 00
54	.....	.....	.....	32 00	38 00	44 00	50 00	56 00	64 00	74 00	105 00	135 00
56	.....	.....	.....	35 00	42 00	49 00	55 00	62 00	72 00	82 00	115 00	148 00
58	.....	.....	.....	38 00	46 00	54 00	60 00	69 00	80 00	90 00	125 00	162 00
60	.....	.....	.....	42 00	50 00	58 00	66 00	76 00	88 00	100 00	135 00	175 00
62	.....	.....	.....	45 00	54 00	63 00	72 00	83 00	95 00	108 00	140 00	180 00
64	.....	.....	.....	48 00	58 00	68 00	79 00	90 00	102 00	116 00	145 00	185 00
66	.....	.....	.....	50 00	62 00	74 00	86 00	98 00	110 00	125 00	150 00	190 00
68	.....	.....	.....	52 00	63 00	76 00	89 00	102 00	115 00	130 00	157 00	200 00
70	.....	.....	.....	54 00	64 00	78 00	92 00	106 00	120 00	135 00	164 00	210 00
72	.....	.....	.....	.....	65 00	80 00	95 00	110 00	125 00	140 00	170 00	220 00
76	.....	.....	.....	.....	74 00	90 00	105 00	125 00	140 00	160 00	190 00	245 00
80	.....	.....	.....	.....	83 00	100 00	125 00	140 00	155 00	175 00	220 00	270 00
84	.....	.....	.....	.....	.....	110 00	130 00	150 00	170 00	190 00	230 00	290 00
90	.....	.....	.....	.....	.....	125 00	150 00	175 00	200 00	230 00	275 00	335 00
96	.....	.....	.....	.....	.....	135 00	165 00	195 00	225 00	255 00	315 00	375 00
100	.....	.....	.....	.....	.....	145 00	180 00	200 00	235 00	275 00	340 00	420 00
108	.....	.....	.....	.....	.....	.....	.....	210 00	240 00	290 00	360 00	460 00
114	.....	.....	.....	.....	.....	.....	.....	245 00	285 00	335 00	420 00	510 00
120	.....	.....	.....	.....	.....	.....	.....	275 00	325 00	375 00	475 00	550 00

Tallow-Laid Manila Rope.

FOR TRANSMISSION OF POWER.



We carry in stock a special long fibre transmission rope which we can recommend as being first-class, as it is made of clean, long, Manila fibre, carefully laid up in a lubricant which prevents wearing and chafing of the rope and keeps it in good condition. This rope we warrant will give excellent satisfaction and is guaranteed to be the best.

Diameter, inches.....	⅝	¾	⅞	1	1¼	1½	1¾
Strength, lbs.....	4,000	5,000	7,500	9,000	14,000	20,250	30,250
Price, per foot.....	6c	8c	11c	13c	18c	23c	28c

Rope Dressing.

This Dressing forms an elastic coating on the surface of the rope, which prevents wear on the rope to a great extent and secures better adhesion in the grooves. Used on exposed rope it affords excellent protection against weather. Put up in 5 and 10 pound tin cans.

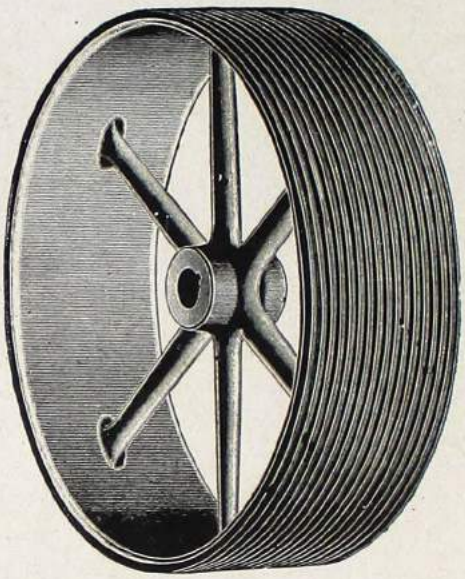
Price, per pound..... .....$0.50

Transmission and WIRE ROPE Hoisting Rope.

6 Strands of 19 Wires each **Price per foot, cents** **6 Strands of 7 Wires each**

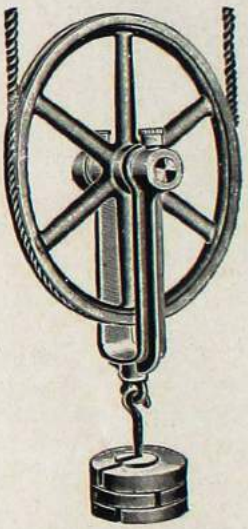
Diam. in. Inches	LIST PER FOOT			Diam. in. Inches	LIST PER FOOT		
	Swedish Iron	Crucible Steel	Plough Steel		Swedish Iron	Crucible Steel	Plough Steel
¼	6½			9/32	3¼	4	
5/16	6¾			5/16	3¾	4½	
⅜	7	9½		⅜	4½	5½	
7/16	7½	10		7/16	5½	6½	
½	8	11	14	½	6½	7½	11
9/16	10	12		9/16	8	9	14
5/8	12	14	19	5/8	10	11	17
¾	16	18	26	11/16	12	13½	
⅞	20	23	34	¾	14	16	25
1	26	30	43	⅞	17½	22	32
1⅛	33	38	52	1	23	28	41
1¼	40	46	63	1⅛	29	36	51
1⅜	48	56	77	1¼	36	43	61
1½	57	66	93	1⅜	43	51	
1⅝	63	74		1½	51	60	
1¾	80	93	$1 35				
2	92	$1 11	1 56				
2¼	$1 17	1 42	2 00				

Manila Rope Transmission.



Rope Transmission is recognized as the best of modern methods for transmitting power. It is especially adapted for carrying power long distances, around corners and in places where it wouldnot be practical to use belts. This system is positive, economical and flexible.

The equipment consists of the rope (we furnish best tallow-laid), the driving and driven sheaves, proper idler wheels, and a tension carriage to maintain a uniform tension upon the rope when it is affected by stretching or changes in temperature or humidity. Our tension carriages are of the most approved design and our sheave wheels are correctly grooved to insure proper running of the rope.



Plain Swinging Tension.

Plain Swinging Tensions.

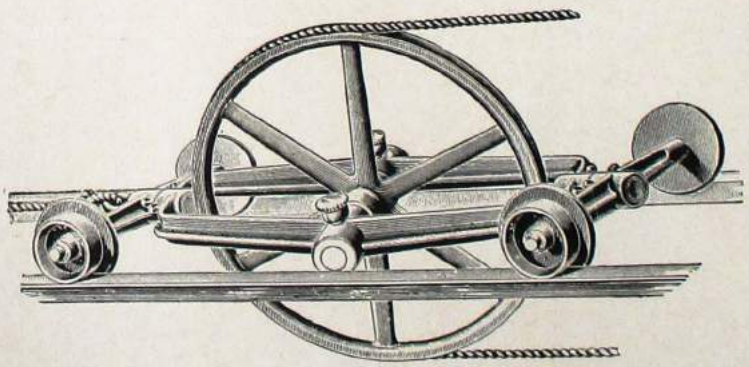
PRICE LIST.

Diam. of Sheave...	18	24	30	36	42	48 inches.
Price.....	$20.00	$25.00	$30.00	$35.00	$42.00	$55.00

The above prices include yokes, sheaves and 100 pounds of weights.

Horizontal Tension Carriages.

FOR DOUBLE TRACK.



This style of Tension Carriage is intended for horizontal service. The yoke is adjustable permitting the sheave to be set at any angle.

PRICE LIST.

(For ¾ to 1⅛-inch rope.)

Diam. of Sheave. Inches.	Price.
24	$50.00
30	55.00
36	60.00
42	65.00
48	70.00
60	75.00

The above prices include 100 pounds of weights. Prices do not include track. Either I beam track or 2x8 timer may be used for track of length desired.

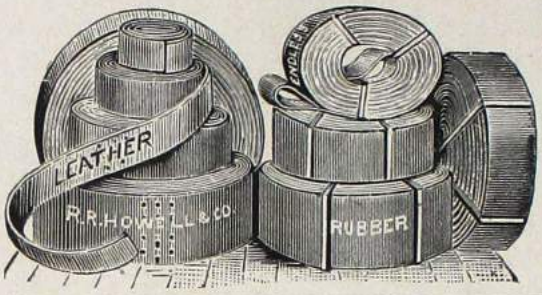
Price List of Cast Iron Sheaves for Manila Rope Transmission.

With Turned Grooves. For 3-4, 7-8, 1 and 1 1-8 Inch Rope.

DIAMETER IN INCHES	NUMBER OF GROOVES																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
12	$ 9 00	$12 00	$15 00	$21 75	$25 50	$28 75	$32 00	$36 00	$40 50	$45 50	$50 00	$55 00	.....	.....	.....	.....	.....	.....	.....	.....
14	9 50	13 00	17 50	22 50	26 50	30 00	33 50	37 50	41 50	47 00	52 00	57 00	.....	.....	.....	.....	.....	.....	.....	.....
16	10 00	14 00	20 50	23 50	27 50	31 00	35 00	89 00	43 00	49 00	54 00	59 00	.....	.....	.....	.....	.....	.....	.....	.....
18	11 75	15 00	21 00	27 00	32 00	37 00	41 00	45 00	50 00	56 00	61 00	66 00	.....	.....	.....	.....	.....	.....	.....	.....
20	12 70	17 00	26 50	30 50	36 75	42 00	47 00	52 00	58 00	64 00	70 00	76 00	$81 00	$86 00	$91 00	$97 00	$103 00	$109 00	$115 00	$121 00
22	13 00	18 50	27 00	35 00	41 50	47 00	53 00	59 00	66 00	71 00	76 00	82 00	87 00	91 00	96 00	102 00	108 00	114 00	121 00	127 00
24	14 75	20 50	29 00	37 00	44 00	50 00	56 00	62 00	69 00	75 00	80 00	86 00	91 00	96 00	101 00	107 00	114 00	120 00	127 00	133 00
26	15 75	22 50	31 50	41 00	48 00	55 00	63 00	69 00	77 00	84 00	89 00	96 00	102 00	107 00	114 00	121 00	128 00	136 00	143 00	150 00
28	16 50	23 50	32 50	42 00	49 00	57 00	65 00	71 00	79 00	86 00	92 00	98 00	104 00	110 00	117 00	124 00	132 00	139 00	147 00	154 00
30	18 00	25 50	34 00	43 00	51 00	58 00	67 00	73 00	82 00	89 00	94 00	101 00	108 00	114 00	120 00	128 00	136 00	143 00	151 00	159 00
32	20 50	29 50	38 00	48 00	58 00	64 00	72 00	80 00	89 00	97 00	104 00	111 00	117 00	124 00	131 00	139 00	147 00	156 00	164 00	172 00
34	22 50	30 00	39 00	49 00	59 00	65 00	74 00	82 00	91 00	100 00	107 00	114 00	120 00	127 00	134 00	143 00	151 00	159 00	168 00	176 00
36	23 00	31 00	41 00	51 00	61 00	68 00	77 00	86 00	95 00	105 00	112 00	119 00	126 00	134 00	142 00	150 00	159 00	168 00	177 00	186 00
40	26 50	35 00	46 00	57 00	70 00	85 00	96 00	103 00	111 00	119 00	127 00	135 00	144 70	151 00	162 00	172 00	182 00	192 00	202 00	212 00
44	29 00	38 00	49 00	61 00	74 00	89 00	100 00	108 00	116 00	125 00	133 00	142 00	151 00	159 00	169 00	180 00	190 00	201 00	211 00	221 00
48	33 00	46 00	54 00	70 00	85 00	96 00	110 00	120 00	128 00	137 00	146 00	158 00	171 00	184 00	196 00	208 00	220 00	233 00	245 00	257 00
52	41 00	54 00	68 00	79 00	93 00	107 00	119 00	129 00	137 00	146 00	155 00	168 00	181 00	194 00	206 00	218 00	231 00	243 00	255 00	267 00
56	44 00	57 00	71 00	83 00	98 00	112 00	124 00	134 00	143 00	152 00	162 00	175 00	188 00	202 00	214 00	227 00	239 00	252 00	264 00	277 00
60	50 00	63 00	76 00	98 00	111 00	128 00	144 00	155 00	172 00	185 00	197 00	216 00	230 00	244 00	256 00	272 00	287 00	303 00	318 00	334 00
64	55 00	67 00	87 00	102 00	115 00	133 00	150 00	161 00	179 00	193 00	205 00	224 00	239 00	253 00	266 00	282 00	298 00	314 00	330 00	346 00
68	64 00	77 00	98 00	113 00	127 00	144 00	161 00	173 00	190 00	205 00	218 00	237 00	252 00	266 00	280 00	296 00	312 00	328 00	344 00	360 00
72	74 00	87 00	104 00	121 00	135 00	154 00	172 00	185 00	203 00	219 00	233 00	253 00	269 00	284 00	299 00	316 00	334 00	351 00	368 00	385 00
76	77 00	91 00	118 00	132 00	149 00	170 00	189 00	205 00	220 00	237 00	251 00	267 00	283 00	298 00	319 00	337 00	356 00	374 00	393 00	411 00
80	83 00	103 00	121 00	136 00	154 00	175 00	195 00	211 00	227 00	244 00	259 00	275 00	292 00	307 00	328 00	347 00	366 00	385 00	404 00	423 00
84	90 00	111 00	130 00	146 00	165 00	187 00	208 00	225 00	242 00	260 00	276 00	293 00	311 00	327 00	350 00	370 00	389 00	409 00	429 00	449 00
88	94 00	118 00	140 00	159 00	180 00	203 00	225 00	244 00	262 00	279 00	296 00	314 00	332 00	351 00	372 00	393 00	414 00	435 00	456 00	477 00
92	113 00	133 00	156 00	175 00	196 00	220 00	242 00	262 00	281 00	298 00	316 00	334 00	353 00	372 00	394 00	416 00	437 00	459 00	480 00	502 00
96 (Split Sheaves)	118 00	139 00	162 00	228 00	255 00	287 00	315 00	341 00	365 00	383 00	411 00	434 00	459 00	484 00	512 00	540 00	568 00	599 00	624 00	652 00
102 (Split Sheaves)	135 00	164 00	236 00	262 00	297 00	335 00	368 00	400 00	427 00	472 00	480 00	507 00	536 00	564 00	596 00	630 00	662 00	695 00	727 00	760 00
108 (Split Sheaves)	151 00	176 00	252 00	280 00	315 00	355 00	389 00	422 00	450 00	476 00	505 00	533 00	564 00	592 00	626 00	660 00	694 00	728 00	762 00	795 00
114 (Split Sheaves)	171 00	196 00	281 00	312 00	347 00	389 00	442 00	475 00	506 00	533 00	566 00	596 00	630 00	667 00	711 00	751 00	788 00	826 00	858 00	902 00
120 (Split Sheaves)	189 00	216 00	308 00	349 00	391 00	438 00	481 00	520 00	566 00	604 00	642 00	677 00	721 00	759 00	802 00	846 00	889 00	925 00	967 00	1011 00

For List Price of Split Sheaves under 96 inches diameter add 30 per cent. to the above list. Prices of Sheaves for Ropes of larger diameter furnished upon receipt of specifications. All Sheaves 96 inches and over are made split unless otherwise specified

Oak-Tanned Leather Belting.



For prices of double belt, double the list below.

Leather belting is made in three qualities, viz: "Agricultural." "Standard," and "Extra." In ordering state which quality.

ADOPTED NOV. 21, 1906.

PRICE PER LINEAL FOOT, SINGLE THICKNESS.

Width inches	Single per foot	Width, inches	Single per foot	Width, inches	Single per foot	Width, inches	Single per foot	Width, inches	Single per foot	Width, inches	Single per foot
1	$ 24	4½	$1 08	15	$3 60	28	$6 72	52	$ 12 48		
1¼	30	5	1 20	16	3 84	29	6 96	54	12 96		
1½	36	5½	1 32	17	4 08	30	7 20	56	13 44		
1¾	42	6	1 44	18	4 32	32	7 68	60	14 40		
2	48	6½	1 56	19	4 56	34	8 16	64	15 36		
2¼	54	7	1 68	20	4 80	36	8 64	68	16 32		
2½	60	8	1 92	21	5 04	38	9 12	72	17 28		
2¾	66	9	2 16	22	5 28	40	9 60	76	18 24		
3	72	10	2 40	23	5 52	42	10 08	80	19 20		
3¼	78	11	2 64	24	5 76	44	10 56				
3½	84	12	2 88	25	6 00	46	11 04				
3¾	90	13	3 12	26	6 24	48	11 52				
4	96	14	3 36	27	6 48	50	12 00				

RUBBER BELTING.

Width.	2-Ply	3-Ply	4-Ply	5-Ply	Width.	2-Ply	3-Ply	4-Ply	5-Ply
1 inch	$0 07				15 inch	$1 16	1 38	1 66	2 08
1¼ "	09				16 "	1 25	1 50	1 78	2 22
1½ "	11	15			18 "	1 41	1 70	2 02	2 53
2 "	15	17	21		20 "	1 58	1 90	2 26	2 83
2½ "	18	22	26		22 "	1 76	2 12	2 52	3 15
3 "	22	26	31		24 "	I 96	2 36	2 80	3 50
3½ "	26	30	37		26 "		2 60	3 08	3 85
4 "	30	34	42		28 "		2 84	3 36	4 20
4½ "	33	39	47		30 "			3 64	4 55
5 "	36	43	52		32 "			3 92	4 90
6 "	43	52	62	78	34 "			4 20	5 25
7 "	51	60	73	92	36 "			4 48	5 60
8 "	59	70	84	1 05	38 "			4 76	5 95
9 "	67	80	95	1 19	40 "			5 04	6 30
10 "	75	90	1 07	1 34	42 "			5 32	6 65
11 "	83	1 00	1 18	1 48	44 "			5 60	7 05
12 "	91	1 08	1 30	1 63	46 "			5 88	7 30
13 "	1 00	1 18	1 42	1 78	48 "			6 16	7 70
14 "	1 08	1 28	1 54	1 93					

Made in three grades, viz: "Standard," "Extra" and "High" grade. In ordering state quality wanted.

PACKING.

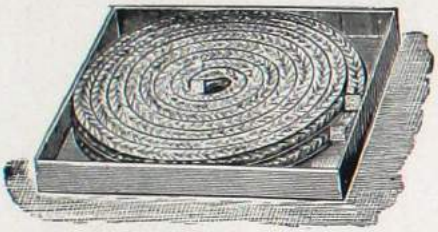
ASBESTOS ROPE, ¼ to 1 in. diam., per lb.....75c
ASBESTOS WICK, in balls, per lb.....75c
ASBESTOS SHEET, $\frac{1}{16}$ to ¼ in. thick, per lb.....30c
EMPIRE ROPE, ¼ to 1 in. diam., per lb.....60c
SOAPSTONE ROPE, ¼ to 1 in. diam., per lb.....40c
ITALIAN HEMP.....30c

GARLOCK RING PACKING.

Self-lubricating, steam and water tight; never grows hard, but will remain as soft and flexible as when first adjusted in stuffing box.

Carried in stock in the following sizes: 3-16, 1-4, 5-16, 3-8, 7-16, 1-2, 9-16, 3-4, 7-8, 15-16 and 1.

Put up in Spiral form in boxes containing 12 feet. Price, per lb.....$1.20



SQUARE FLAX PACKING.

It is made from selected and bleached long-fibred Italian flax. It is thoroughly lubricated with the best lubricants. It will stand great heat and is not affected by steam or water as are inferior packings. Made in all sizes from ¼ to 1 inch square.

Price per lb.....85c

SHEET RUBBER PACKING.

Cloth Insertion, and Cloth Both Sides.

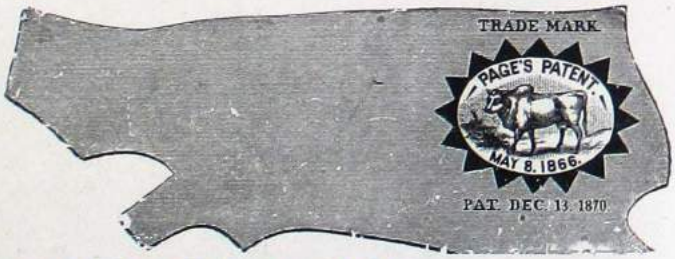
THICKNESS	2-Ply	3-Ply	4-Ply
1-64 in., per lb			
1-32 " "			
1-16 " "	$ 63	$ 66	
3-32 " "	58	61	
1- 8 " "	55	58	$ 61
3-16 " "		55	58
1- 4 " "			55

Each cloth, whether inserted or on outside, to count as one ply. In ordering state if cloth inside or outside is wanted.

RAWHIDE LACE LEATHER

In sides from 12 to 20 square feet

Price, per square foot 35c



RAWHIDE CUT BELT LACING.

¼ inch, per 100 feet.....$1 00 | ⅜ inch, per 100 feet.....$2 00
½ inch, per 100 feet ..... 1 50 | ⅝ inch, per 100 feet..... 2.70

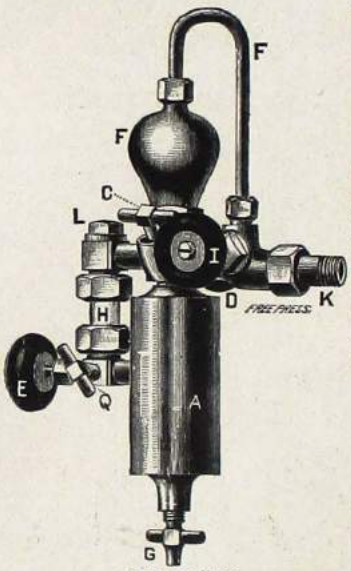
The Detroit Standard Lubricator.

Double Connection. For Stationary Engines.

This Lubricator is intended for the best classes of engines and represents the very highest development in its line.

PRICE LIST.

Size ..... For Cylinder.....	⅓ Pint Under 10 in.	½ Pint 10 to 12 In.	1 Pint 12 to 18 in.	1 Quart 18 to 30 in.	½ Gal. 30 in. & over
Brass Finish.....	$17.00	$22.00	$30.00	$45.00	$60.00
Nickel Finish.....	20.00	25.00	35.00	50.00	65.00



STYLE "C"

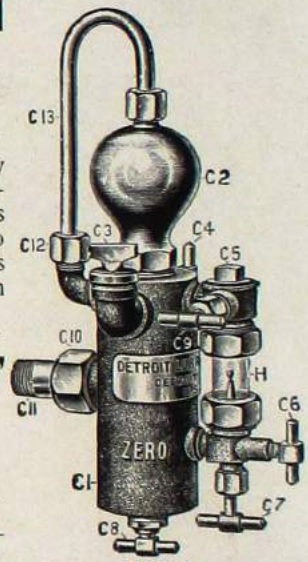
The "Detroit" Zero and Style "C" Single Connection Lubricators

OUR ZERO LUBRICATOR possesses every feature necessary or desirable for traction engine service, or for engines working in exposed places, subject to sudden changes of temperature. It is also used quite extensively on steam pumps.

Style "C" for Traction Engines, Portable Engines, Steam Pumps, etc

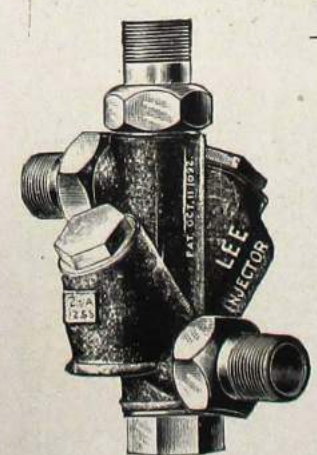
PRICE L'ST ZERO AND STYLE "C"

¼ Pint	⅓Pint	½ Pint	Pint	Quart
$15.00	$17.00	$20.00	$28.00	$42.00



ZERO

The "Lee" Ball Valve Automatic Injector.



SIZE	Horse Power	PRICE	Pipe Connections	Capacity per hour, 2 to 4 Ft. Lift. Minimum 80 lbs. Steam	Maximum 80 lbs. Steam
O	1 to 3	$15 00	¼ Inch	25 Gal.	55 Gal.
1-O	3 to 5	15 00	⅜ "	35 "	70 "
2-O	4 to 8	16 00	⅜ "	50 "	100 "
1-A	8 to 10	18 00	½ "	75 "	150 "
2-A	10 to 15	20 00	½ "	95 "	190 "
1-B	15 to 25	25 00	¾ "	125 "	250 "
2-B	25 to 35	30 00	¾ "	180 "	360 "
1-C	35 to 50	40 00	1 "	245 "	485 "
2-C	50 to 60	45 00	1 "	315 "	630 "
1-D	60 to 95	55 00	1¼ "	415 "	830 "
2-D	95 to 120	60 00	1¼ "	500 "	990 "
1-E	120 to 165	75 00	1½ "	700 "	1500 "
2-E	165 to 230	90 00	1½ "	920 "	1830 "
1-F	230 to 290	110 00	2 "	150 "	2300 "
2-F	290 to 365	125 00	2 "	1500 "	3000 "
1-G	365 to 500	175 00	2½ "	1825 "	3650 "
2-G	500 to 650	200 00	2½ "	2100 "	4250 "

Price List Pipe Fittings, Valves, etc.

GLOBE

ANGLE

CROSS

HORIZONTAL CHECK

SIZE, INCHES	⅛ and ¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4
Air Cock Tee Handle ..... Each	.40	.50	.60									
Pipe—Black and Galvanized..... Each	.05½	.05½	.08½	.11½	.16½	.22½	.27	.36	.57½	.75½	.95	1.08
Elbows, Malleable, R. H..... Each	.04	.06	$0.10	$0.15	$0.22	$0.25	$0.35	$0.50	$0.80	$1.50	$2.25	$3.00
Elbows, Malleable, Galv..... Each	.05	.08	.14	.20	.32	.40	.60	.90	1.35	2.60	3.75	5.00
Elbows, Cast Iron, R. H..... Each	.05	.05	.06	.08	.10½	.16	.20	.28	.50	.75	1.05	1.20
Elbows, Cast Iron, R. & L..... Each	.06	.06	.07	.09	.12	.18	.23	.32	.60	.85		
Elbows, Cast Iron, Reducing..... Each		.06	.07	.09	.12	.18	.23	.32	.60	.85	1.20	1.40
Elbows, Cast Iron, 45 degrees..... Each	.06	.06	.07	.10	.12	.19	.24	.34	.60	.90	1.25	1.45
Elbows, Cast Iron, No. 1 Water..... Each					.32	.40	.55	.80	1.20	2.25	3.25	3.50
Elbows, Double Branch, No. 2 Water.. Each					.64	.80	1.10	1.60	2.40	4.50	6.50	7.00
Tees, Malleable, R. H..... Each	.07	.08	.11	.15	.25	.30	.45	.60	1.05	1.70	2.50	3.40
Tees, Malleable, Galv. ..... Each	.09	.10	.16	.20	.38	.50	.70	1.00	1.90	3.00	4.25	5.75
Tees, Cast Iron..... Each	.08	.08	.09	.12	.15	.23	.29	.41	.73	1.10	1.50	1.75
Tees, Cast Iron, Reducing..... Each		.09	.10	.14	.17	.27	.33	.47	.83	1.25	1.75	2.00
Tees, Cast Iron, No. 3 Water..... Each					.48	.60	.82	1.20	1.80	3.40	4.90	5.25
Crosses, Cast Iron..... Each		.15	.16	.22	.27	.42	.53	.75	1.30	2.00	2.70	3.15
Crosses, Cast Iron, Reducing..... Each			.18	.25	.30	.46	.60	.83	1.45	2.20	3.00	3.50
Plugs, Cast Iron..... Each	.02	.02	.02	.03	.04	.05	.07	.10	.18	.25	.38	.42
Bushings ..... Each	.04	.04	.04	.05	.06	.07	.09	.14	.21	.30	.40	.50
Caps, Malleable ..... Each	.03	.04	.05	.08	.12	.16	.24	.32	.45	.85	1.00	1.20
Lock Nuts ..... Each	.02	.03	.04	.05	.07	.09	.11	.18	.27	.34	.47	.64
Reducers ..... Each		.03	.05	.10	.16	.20	.28	.45	.70	1.00	1.50	1.85
Unions ..... Each	.18	.20	.22	.27	.33	.46	.58	.75	1.55	2.10	3.65	4.35
Flange Unions, Cast Iron..... Each			.40	.46	.52	.64	.78	1.00	1.25	1.50	1.80	2.10
Return Bends, Cast Iron, C. P..... Each			.18	.20	.22	.28	.40	.57	1.20	1.70		
Return Bends, Cast Iron, O. P..... Each				.26	.30	.40	.55	.80	1.35	2.20		
Nipples, Short ..... Each	.04	.04	.05	.06	.08	.11	.13	.18	.39	.48	.75	.85
Nipples, Long ..... Each	.06	.06	.07	.08	.13	.17	.20	.27	.59	.72	1.05	1.20
Couplings, Wrought Iron ..... Each	.05	.06	.07	.10	.13	.17	.21	.28	.40	.60	.80	1.00
Expansion Ring Hangers..... Each				.10	.18	.19	.25	.29	.36	.44	.55	.63
Ceiling Plates, Common..... Each			.11	.13	.16	.18	.23	.27	.36	.50	.55	.68
Floor Plates ..... Each			.06	.06	.08	.11	.14	.16	.24	.30	.35	.42
Globe and Angle Valves, Brass.. .... Each	.72	.77	1.00	1.26	1.80	2.52	3.50	5.30	10.00	14.40	26.50	36.00
Globe and Angle Valves, Jenkins Dis. Each	1.10	1.25	1.60	2.20	2.80	4.00	5.50	8.00	15.75	22.00		
Check Valves, Brass, Horiz..... Each	.65	.70	.90	1.15	1.60	2.25	3.15	4.75	9.00	13.00		
Safety Valves, Brass..... Each	2.20	2.50	3.25	3.90	4.70	7.15	9.00	12.50	22.50	33.50		
Gate Valves, Brass ..... Each	1.25	1.25	1.30	1.75	2.50	3.50	5.00	7.50	14.00	20.00		
Steam Cocks, Brass ..... Each	.85	1.00	1.25	1.70	2.35	3.70	4.85	7.30	14.50	22.50	38.50	50.00
Gas Service Cocks, Brass ..... Each	.75	.85	.95	1.15	1.50	2.25	3.10	5.00	11.00	16.00		
Gas Meter Cocks, Brass ..... Each			1.30	1.40	1.95	3.00	4.25	6.00				
Globe and Angle Valves, Iron Screwed Each								5.40	7.35	9.80		
Globe and Angle Valves, Iron Flanged Each								7.00	9.00	12.50		
Globe and Angle Valves, Iron, Yoke Sc Each								7.00	9.00	12.50	15.25	19.00
Globe and Angle Valves, Iron, Yoke Fl Each								8.60	10.75	15.00	18.50	22.50
Check Valves, Iron, Screwed..... Each								3.00	6.50	8.90	12.25	14.25
Check Valves, Iron, Flanged..... Each								5.25	8.25	11.50	15.50	18.00
Safety Valves, Iron Screwed ..... Each						5.00	5.80	7.80	13.25	17.25	23.00	28.75
Safety Valves, Iron, Flanged..... Each								10.25	16.00	21.50	27.50	34.00
Gate Valves, Iron, Screwed or Flanged Each								10.00	12.00	15.00	18.00	20.00
All Iron Cocks ..... Each		.85	.90	1.05	1.30	1.60	1.95	2.70	4.40	6.75	12.00	15.50
Iron Cocks, Brass Plug..... Each		1.25	1.30	1.60	1.90	2.65	3.75	5.25	8.75	13.00	27.50	36.50

PRACTICAL SUGGESTIONS, STANDARD RULES ETC., CONCERNING THE USE AND CARE OF CIRCULAR SAWS.

Hanging the Saw.

Saws, unless they are put up straight, are marked near the center with the words "Log Side." Before placing the new saw on the mandrel, be sure that the side so marked comes next to the log on your mill; if it does not, it should be sent to the factory to be hammered, so as to suit your mill.

Be sure that the mandrel is level and that the saw when placed on it and the flanges screwed up, is perfectly plumb. The holes in the saw should be an easy fit on the mandrel and lug pins.

Be sure that it does not bind on the mandrel or the pins. If it does, the least warmth of the mandrel will be sure to cause it to expand, bind and spring the saw.

It should slip on readily, neither tight nor loose.

Saws are often pronounced crooked when the fault is in the collars.

If the position or "dish" of the saw is changed in the least by tightening the collars for work, the defect should be remedied ot once. Put a straight edge on the log side of the saw, and ascertain whether the fault is in the saw or in the collars.

When hung upon the mandrel and the collars tightened, the saw should be perfectly round, so that every tooth will do its proper work. Should the saw be too crowning or too dishing on the log side, the difficulty may be overcome by papering between the saw and the collars. If the saw is dished on the log side, put a ring of paper of the size of the collar and about three-fourths inch wide; wet it with oil and lay on the loose collar.

Cut a smaller ring of paper of the same width to fit the mandrel, and place it on the mandrel against the fast collar. If one thickness of paper is not sufficient, add another ring, and so on until the saw, when clamped between the flanges, is brought to the proper position.

Should the saw be too crowning on the log side, reverse the position of the paper rings, placing the large one next the fast collar and the smaller one next the loose collar. Letter paper for making the rings is preferable, being solid and firm.

Lining the Saw with the Track.

Take all the empty play out of the mandrel. Run the carriage up past the saw so that one of the head-blocks will be opposite the center of the saw. Fasten a square piece of board on the head block and let the end of the board touch the face of the saw at its center. Then run the carriage back from the front of the saw 20 feet. Draw a line from the end of the board past the saw parallel with the track. The line where it passes the center of the saw should be from one-eighth inch to one fourth inch from the face of the saw. This would show the track at 20 feet from the center of the saw on a line with the saw, and that the track at the center of the saw, if put down right, is one-eighth inch to one-quarter inch further off from the saw than at 20 feet distance.

Some saws require more inclination towards the track than others, and the track being adjusted properly, any small variation required may be accomplished by means of the set screws on the box.

The track should be solid, level and perfectly straight, and the saw frame firmly anchored. Trouble is often caused by a neglect to keep the track in order and it should be examined frequently.

Lead.

We have shown that the lead of the saw may be adjusted by its position to the track. It may be held to its work in the log by beveled filing on the back of the tooth. The teeth, if properly filed, should always be perfectly square on the front side, but if the saw tends to lead in or out of the log, it may be held to the proper position by beveling the back side of the tooth at the point. If the front of the tooth is filed perfectly square and the teeth are beveled on the back, on the board side, this will lead your saw into the log, or, if you bevel on the log side, it will lead the saw out of the log.

Should the saw lead in and out, or what is called "snaky," it is evident that it needs hammering, that the rim is too large for the center and the saw needs opening out at the center. Such a saw may be run warm at the center and the difficulty overcome at this way; otherwise it will require hammering.

Points to be Observed.

See that the track is solid, level and straight; that saw shaft is level and the saw hangs plumb; that it goes on the mandrel easy, is a close fit, and that the lug pins have a bearing; that the tight collar is a little concave and the loose one perfectly flat; that the saw is straight on the log side when the collars are screwed up and the saw run up to required speed; that it is in line with the carriage and a little incline toward the log; that the saw is perfectly round and has throat room sufficient for the dust; that the teeth are not too high on the back side; that the teeth are filed perfectly square on the front side and swaged sufficient to give clearance for the body of the saw, that there is very little, if any, end play to the mandrel; that the guides are perfectly adjusted when the saw is standing still.

Do not try to lead the saw with the guide pins, but lead the saw by adjusting it properly to the track and by proper filing. If you wish the saw to run warm at the center, you can create friction by reducing the set or spread of the teeth. If the saw heats too much at the center, give it a little more set. If the saw heats on the rim, it is because the teeth have not sufficient throat-room for clearance of the dust, or the backs of the teeth are too high. If the saw is too tight on the rim, increase the motion if possible, and be sure to keep it cool in the center.

The saw should be run at uniform speed both in and out of the cut.

If the guide pins are run too close, the saw will heat at the rim and run snaky. If gum is allowed to collect on the sides of the saw, the rim will heat from friction.

Trueing Saw on the Mandrel.

If the saw is in proper tension and does not run true, take all the end play out of the mandrel; rest a small piece of board, with one end sharped, upon the saw frame; hold the sharpened end against the board side of the saw near the rim. Mark with chalk the high places or those that touch, and on the opposite side the hollow places, or those which do not touch the board. Turn the saw so as to bring the high points directly over the arbor, and, with a sharp pull, bend the points which are high on the board side towards you, and with a sharp push bend the parts which are high on the log side from you. By testing and bending in this way you may make a saw run perfectly true on the mandrel which has been sprung or does not from any cause run true.

Causes for Heating on the Rim.

Guide pins set too close.
Backs of the teeth too high.
Accumulation of gum on the teeth.
Teeth have not enough set or spread.
Not throat-room enough for saw dust.
Saw not open enough in the body for the speed.

Causes of Heating at the Center.

Teeth have not enough spread or set.
Mandrel runs too warm.
Speed not sufficient to expand the rim.
Saw lined too much out of log.
Saw too open in the body or center for the speed.
Saw dished too much to or from the log.

THE MANNER OF FITTING OR DRESSING SAWS.

A saw tooth should have the proper spread and pitch for the wood which it is to cut. Soft wood requires more spread or "set," and less pitch; hard wood the reverse. A saw swaged full on both corners with square dress will do the fastest cutting, but requires the most power. In swaging use oil on point of tooth.

By careless dressing we have seen saw teeth higher back of the cutting point than at the point itself, therehy causing the saw to bind and heat on the rim.

The greater the feed the lower the back of the tooth should be, giving easier clearance and great dust room.

In spreading the points of teeth it is almost impossible to make them all of equal width, but they may be reduced to a uniform width by the use of a side file. By this treatment the corners are stronger and less liable to break off in hard cuts.

The Emery Wheel.

Emery wheels, as employed in gumming and sharpening saws, accomplish a great saving of time and labor, but when improperly used, as they often are, cause irreparable injury to saws. When the points of teeth become heated or "blued" by the use of an emery wheel, the steel loses its toughness and tenacity in some degree, and is liable to split and crumble off in the process of spreading the points afterward.

Bad Filing.

No saws are so liable to crack in using as circular cut-off saws, for the reason that they are generally filed so as to leave a square corner at the base of the teeth, and the bevel of the face being carried down into this corner, still further weakens it. Saws broken in this condition cannot be considered subject to any warranty.

A few strokes with a round file at the base of the tooth after beveling the front, will keep it in good shape by preventing the formation of the square corners from which the crack starts. The saw will clear better if the bevel is carried down only half the depth of the tooth.

Causes of Complaint.

Good saws are frequently ruined by crowding them beyond their limit of endurance and by unskillful use. There are other causes which tend to produce dissatisfaction with good saws, among them may be mentioned: Saw too thin; teeth too coarse; saw not properly hung; saw not properly fitted or dressed; saw not properly balanced on mandrel; a badly running carriage; collars not true, etc.

Procure Good Saws.

In justice to saw mill men, we have to say that they sometimes have good reasons for complaint on account of bad saws, which leads us to remark that it is the duty of every saw mill man to procure a good and reliable saw. Too many are governed by prejudice in the selection of a saw, while others allow themselves to be influenced in the purchase by the matter of a few dollars in the price. Purchasers should consider only the character of the saws offered them, based on the reputation of the manufacturer.

POINTS TO BE OBSERVED IN ORDERING SAWS.

In ordering a circular saw, the kind of work to be done and the power at hand to drive it should always be taken into account.

Guage of Saw.

For mills of ordinary capacity, doing general work, we recommend saws seven gauge at the center and eight on the rim. If the timber is valuable and sawyer skillful, an eight by nine gauge may be used, and in special cases an eight by ten. Any lighter gauge than eight at the center and ten at the rim we consider impractical for use in ordinary mills. A trial of very thin saws as an economical means, will in most cases, be followed by dissapointment, for greater than ordinary skill is necessary to successfully manage thin saws, and the lumber saved by the reduced thickness of the saw is more than offset by the waste of bad cuts, where the sawyer is not an expert.

The greater the speed and feed used, the heavier the saw should be to stand up to the work hence it is that for large mills, where the saving of time more than lumber is desired, saws of six and seven gauge are mostly in demand.

Number of Teeth.

With a high motion more teeth are required, for high feed follows great speed, and the saw having more work to do, should have more teeth with which to do it, in order that the strain may be evenly distributed. The number of teeth, therefore, should depend not alone on the thickness of the saw, but on the kind of timber to be sawed, and the speed and feed of the mill.

FRENCH SOLID OIL.

A PURE SOLIDIFIED OIL LUBRICANT.

For crank pins on thresher engines, and for use in compression and copper rod cups or open boxes, lubricating shafting, rolls, wood-working machinery, and all places where solidified form of lubricant can be applied either by cups or in open boxes. The very best ingredients are used in the manufacture of this lubricant, and nothing is allowed to enter into its composition that will injure the most delicate machinery. Put up in 3, 5 and 10 pound cans and in half barrels and barrels. Price, per pound, 30c.

Capitol Cylinder Oil.

This is an oil of amber color, is very high fire test and of a heavy viscid character and great lasting properties, which are not affected in any way by the heaviest stream pressure. It will prevent corrosion or gumming up of cylinders, thus keeping them clean and in perfect condition. Price, per gallon.....75c.

Atlantic Red.

A high colored oil of a rich, heavy character, for engines and quick running machinery. Price, per gallon.....60c.

Eldorado Engines.

A light colored oil of a rich, heavy and viscid character, of extremely high fire test and low cold test, being the result of a long series of trials.
Price, per gallon.....60c

Eldorado Castor.

A heavier bodied oil than Eldorado Engine.
Price, per gallon.....60c.

Golden Machinery.

A light, bright colored, active oil for quick running machinery.
Price, per gallon.....50c.

West Virginia or Black Oils.

Summer, congeals at 50 deg. above zero, per gal.....25c
Medium, " 15 deg. " " 30c
Zero, " zero.....40c

These are all good, clean oils, of good body, free from B. S., tar, or residuum.

THE ENGINEER'S FAVORITE BOILER COMPOUND.

FOR REMOVING AND PREVENTING SCALE IN BOILERS—GUARANTEED NOT TO INJURE IRON, BRASS, STEEL OR STEAM FITTING.

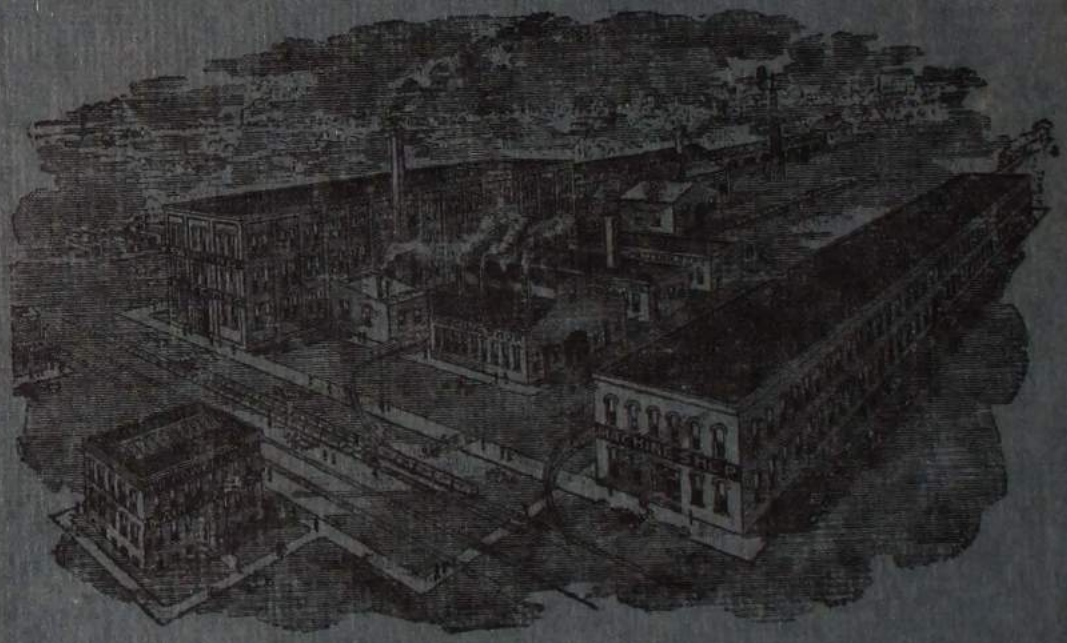
This compound will pay for itself in the saving of fuel and the expense attached to cleaning, and at the same time you avoid the danger of burning your boiler from the scale adhering to it. It is readily seen that the presence of scale renders slower and more difficult, the raising, maintaining and lowering of steam.

Directions for use.

Introduce into your boilers a pint to a pint and a half of the liquid compound (for every 10-horse power) once in ten days. After the scale has been removed, a much smaller quantity will keep the boilers in excellent condition.

PRICE.

In barrels and half barrels, per gal.....$0 90
In 5 and 10 gallon cans, per gal.....1 00



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