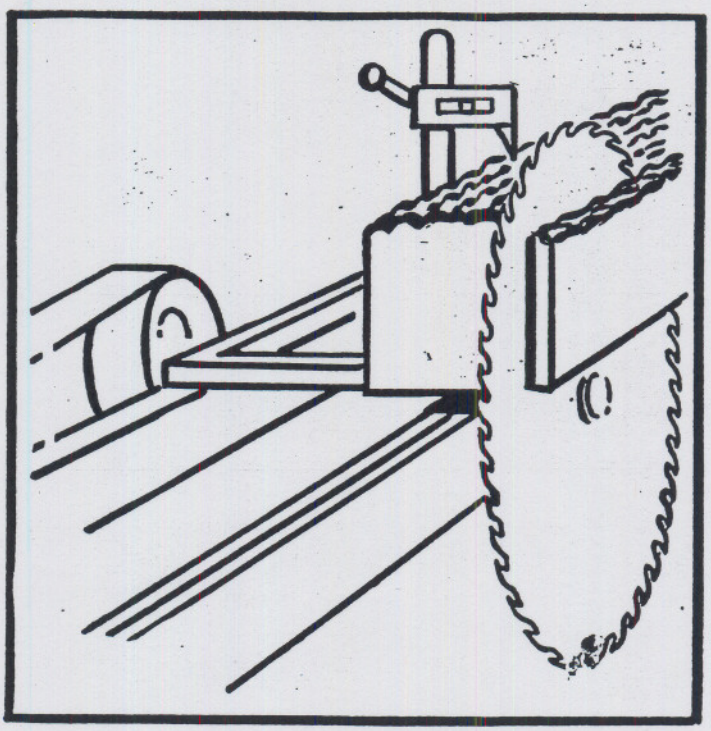
MAKE LUMBER FROM YOUR TIMBER



INSTRUCTIONS AND PARTS LIST

BELSAW

SAWMILL & WOODWORKING MACHINES

BELSAW

FROM	BELSAW MACHINERY CO. KANSAS CITY 2, MO. RETURN POSTAGE Guaranteed	

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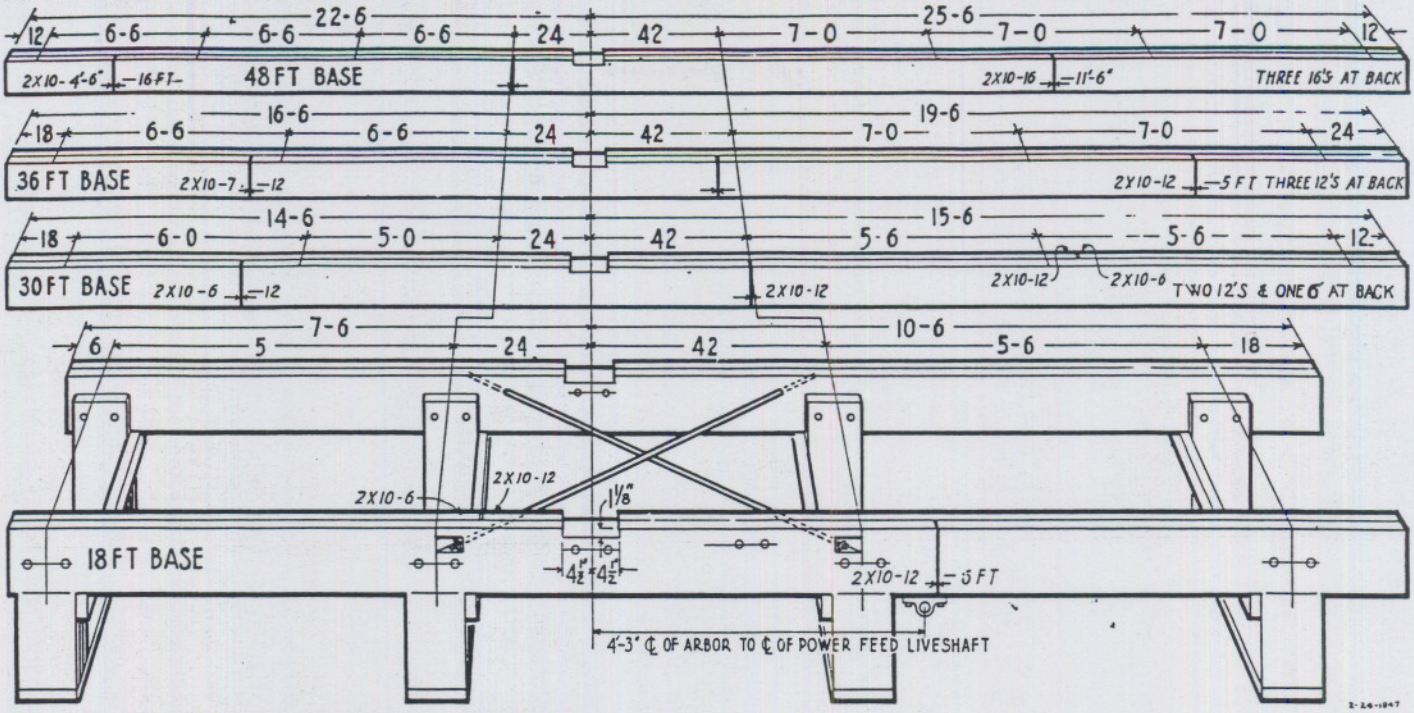
SAWMILL BASE MATERIALS - CONSTRUCTION - FITTINGS

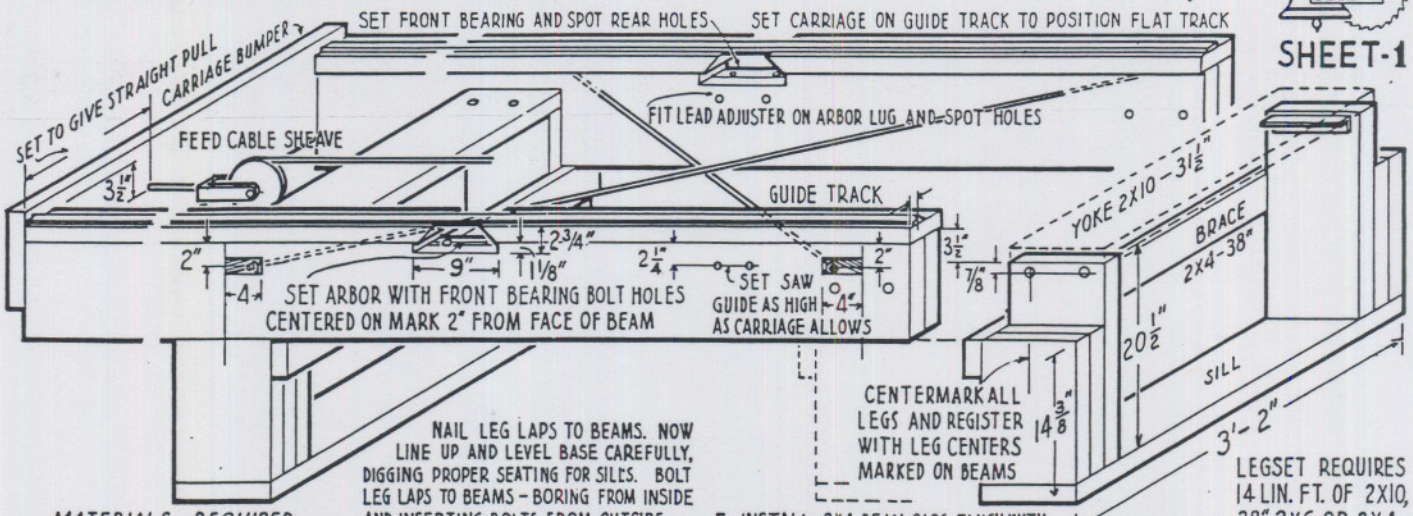
BEAM LAYOUT: *CUT PCS. AND SPLICE AS SHOWN ON FACE.* MARK LEGS AND ARBOR CENTERS TO DIMENSIONS GIVEN AT TOP



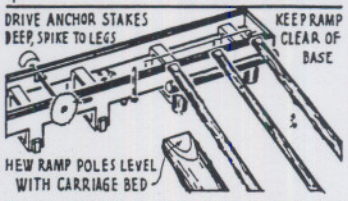
BASE COMPLETED - LESS YOKES, CAPS, & FITTINGS

BELSAW

SHEET-1



LEGSET REQUIRES 14 LIN. FT. OF 2X10, 38" 2X6 OR 2X4.



BASE, GUIDE TRACK, ARBOR & SAW GUIDE & LEAD ADJUSTERS *MUST BE AND REMAIN RIGID!*

MATERIALS REQUIRED

LUMBER:	BEAMS	LEGSETS	CAPS
FOR 18 FT	6 PCS 2X10-12	4 PCS 2X10-14	50 FT 2X4
30	10 "	6 "	80 "
36	12 "	6 "	100 "
48	12 PCS 2X10-16	8 "	120 "

LEGSET BRACES INCLUDED WITH CAPS

NAILS: 12d COMMON (3¼" - ABOUT 60 TO LB)
SPECIAL TOOLS: 9/16" AUGUR, 12" OR LONGER

OPERATIONS

A - BEAMS: STRING PCS STRAIGHT AND FLUSH AT ONE SIDE - FOR BEAM TOP. LAY BEAMS TOP TO TOP AND USING STEEL SQUARE - MARK BOTH BEAMS WITH CENTERS FOR LEGS, ARBOR, AND FEED LIVESHAFT.

B - LEGSETS: MAKE AS SHOWN - BUT DO NOT NAIL BRACE OR YOKE UNTIL LATER. IF USING LBR THICKER THAN 1⅝" BE SURE TO SPACE BEAMS 38" OUTSIDE TO OUTSIDE.

C - SETTING UP: SET BEAMS ON LEGS - WITH CENTER MARKS IN *EXACT* LINE - BLOCKING UNDER LOW SILLS TO BRING LEVEL. NAIL LEG LAPS TO BEAMS. NOW LINE UP AND LEVEL BASE CAREFULLY, DIGGING PROPER SEATING FOR SILLS. BOLT LEG LAPS TO BEAMS - BORING FROM INSIDE AND INSERTING BOLTS FROM OUTSIDE. INSTALL BRACES - NAIL FIRMLY

D - X-RODS: CHISEL ANGLE RECESSES AS SHOWN. LAY RODS ON BEAMS AS GUIDE FOR BORING HOLES TO CORRECT ANGLE. INSTALL YOKES - WITH BOLTS IF ANGLE IRON BRACKETS ARE USED.

E - ARBOR: CUT NOTCHES 9" WIDE BY 2¾" DEEP, AND SMOOTH BOTTOMS. MARK LINE FOR CENTERING FRONT BEARING 2" FROM FACE. SPOT HOLES, BORE, AND RUN BOLTS FROM BELOW. BOLTS MUST CENTER!

F - INSTALL 2X4 BEAM CAPS FLUSH WITH OUTER FACES. PROJECT OVER NOTCHES. HANG SAW, PLACE CARRIAGE TO CLEAR ABOUT ½", AND WITH SECTION OF GUIDE TRACK UNDER - TO GIVE TRACK POSITION, MARK. REMOVE CARRIAGE AND SAW. RUN TAUT LINE OVER TRACK CENTER. GUIDE TRACK MUST BE *STRAIGHT & LEVEL*

G - INSTALL LEAD ADJUSTERS STRADDLING ARBOR BEARINGS LUGS, AND CENTERED. INSTALL SAW GUIDE WITH PEGS JUST BEHIND TOOTH GULLETS - *AS HIGH AS POSSIBLE.*

WITH YOUR *BELSAW* WE INCLUDE:

- h-27 FLAT AND h-28 GUIDE TRACK — FOR BASE LENGTH ORDERED
- WOOD SCREWS #9 — ENOUGH FOR 18" CENTERS GUIDE TRACK, 24" FLAT TRACK
- h-29 ANGLE BRACKET — 1 FOR EACH LEG
- CARRIAGE BOLT ⅜" x 6" — 2 FOR EACH LEG
- CARRIAGE BOLT ⅜" x 2½" — 2 FOR EACH LEG
- NUTS — ⅜" FOR BOLTS SUPPLIED
- h-31 X RODS — 1 PAIR

EXTRA OR REPLACEMENT WOOD SCREWS, CARRIAGE BOLTS AND NUTS MAY BE SECURED FROM LOCAL SUPPLIERS. ORDER EXTRA OR REPLACEMENT TRACK, ANGLES AND CROSS RODS AS SHOWN IN PARTS LIST.

PARTS LIST

Part No.	Description	Shipping Wt. in lb.	Price
h-27	Flat Track, Per Foot	1	.24
h-28	Guide Track, Per Foot	1	.36
h-29	Angle Bracket (Including Bolts and Nuts) Each	2	1.00
h-31	X Rods, Threaded Each End with Washers and Nuts, Pair	11	7.68
109-b	Wood Augur 9/16" x 12"	2	1.95

BELSAW MACHINERY CO
KANSAS CITY 2, MO.

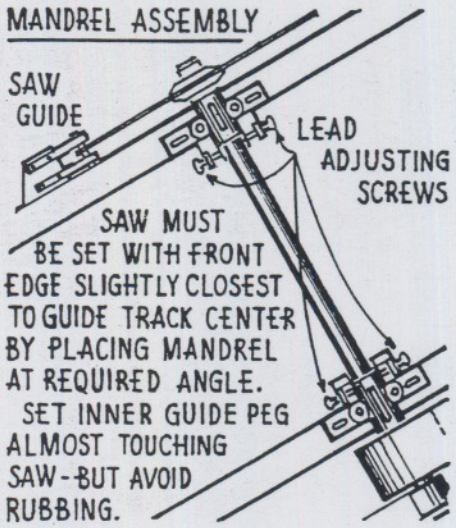
BELSAW MANDREL ASSEMBLY

INSTALLATION:

Mandrel assembly is installed on sawmill base, bearings held in place by 7/16" x 10" machine bolts provided. Run bolts up from bottom of beam. Install lead adjusters on inside of beam positioned so lead adjusting screws will run against edges of bearing lugs.

Install saw blade, tighten n-54 loose saw collar securely.

With bolts holding bearings slightly loosened, adjust saw lead, then re-tighten bolts.



Saw "lead" refers to placing front edge slightly closest to guide track center.

The kerf back of saw is wider than cutting edge of teeth, and the clearance is greater outside: The saw should be given only enough slant to equalize clearance so any drag will be same at both sides.

The correct lead can be found only from tests: trial lead is usually about 1/32". To check, clamp a sharp pointed stick on carriage, with point against front edge; run carriage to bring point opposite the rear edge; alter position of mandrel until there is a 1/32" gap at rear.

Saw guide functions only to bring a saw back into lead when thrown out by knot—must not be used to control lead itself.

Mandrel must be level and saw plumb.

Too much arbor end play may be cause of saw failing to hold lead, and too little is a cause of bearings getting hot.

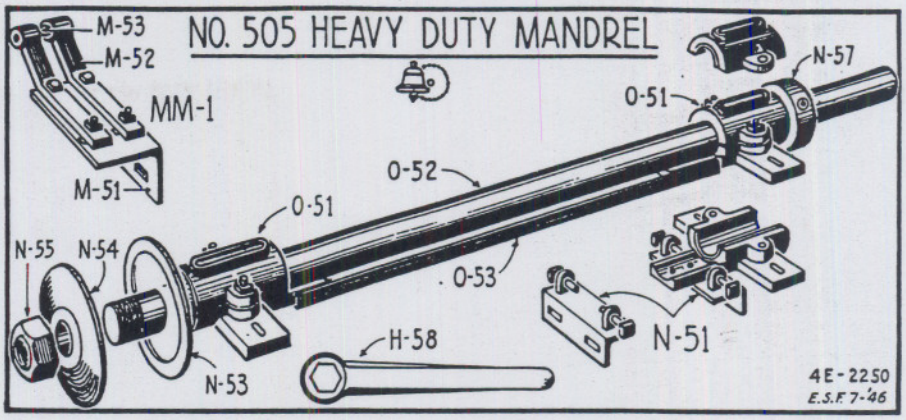
If too tight on arbor saw will "collar-bind"; too loose will wear out of round.

Do not use flywheel or direct connected power. Use large diameter pulleys—with arbor pulley close to bearing.

MANDREL DRIVE PULLEY:

The saw blade must revolve at its hammered speed in the cut. The diameter of the mandrel pulley required is figured by multiplying the diameter of your motor pulley by its RPM, and dividing the resulting figure by the RPM of the saw.

See Belsaw price sheet condensed catalog for pulley prices.



To qualify as a sawyer one must know the principles governing saw behavior, so he can find the cause of inefficiency or of the troubles that commonly occur, and be prepared to apply the proper remedy.

Rim speed: Suppose the small saw had to be ⅛" thick to take the strain of slow rim speed—as indicated by hand crank—then the large one would need to be ¾" thick for action on same principle. But its principle is different; it relies on centrifugal force in place of thickness, to avoid the waste of wide cut slot.

The saw body stiffness is in proportion to saw rim velocity: the thinner the saw the faster it must be run and the thicker it is the slower it may be run.

If saw is permitted to lose speed while cutting it also loses stiffness.

Saw teeth are "flying cutters," similar to that of the indicated adze, about the only difference being that the adze gets intermittent power impulses, while those of saw are continuous—as visualized by the indicated flywheel.

The similarity applies also to the adze handle and saw body. Just as there is a maximum efficiency adze handle length so is there a maximum stiffness efficiency, or rim speed for the saw. This speed is translated into RPM in table below.

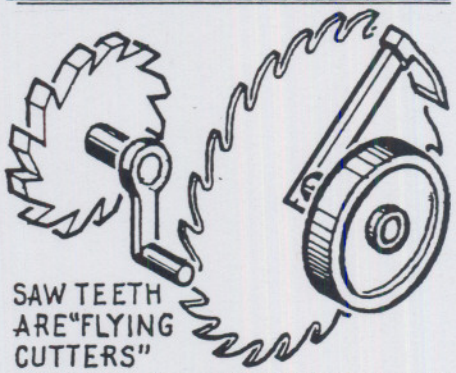
REV. PER MIN. GIVING LISTED RIM SPEEDS

SAW DIA.	RIM SPEED IN FT. PER MINUTE 6500	7000	8000	9000	10,000
6				5730	6370
12	2070	2200	2550	2865	3185
30	825	890	1020	1145	1275
36	690	745	850	955	1060
40	620	670	765	860	955
48	515	560	635	715	

Column at right shows speed for highest efficiency—maximum production—with a standard thickness saw. This high speed, however, requires great power—since it must be maintained even in thickest cut: therefore, lesser speeds that may safely be used are also shown, the reduction in efficiency being indicated by rim speed.

Parts List

Order Part No.	Description	Price
MM-1	No. 500 Mandrell Assembly, Standard	$21.25
MM-1	No. 505 Mandrel Assembly, Heavy Duty	26.25
M-1	Saw guide	6.60
m-51	Base	3.75
m-52	Arm, each	1.50
m-53	Pegs, pair	.30
n-51	Lead Adjuster, each	1.40
n-52	Bearing, Standard, each	3.30
o-51	Bearing, Heavy Duty, each	4.50
n-54	Loose saw collar	2.20
n-55	Hex nut	1.40
n-56	Shaft with n-53 fixed collar, Standard	8.25
o-52	Shaft with n-53 fixed collar, Heavy duty	12.00
o-53	Yoke	3.50
n-57	Set collar	2.20
n-58	Wrench	1.75



Power is the controlling factor: do not gear saws to higher speed than the motor can maintain in thick cut, keeping within the minimum the thickness will take.

Feed: An expert sawyer keeps one eye on saw speed and one on feed speed: if saw slows down, then feed must be reduced or log drawn back until saw recovers speed: never allow log to stand still while saw is revolving in it—or saw will burn.

Bump caused by small burn may be reduced by hammering flat, but a serious burn will require re-tensioning by sawsmith.

If power is weak do not use power feed.

Both slow saw speed and fast feed speed throw excessive load on sawmill carriage and can severely damage light sawmill.

BELSAW MACHINERY CO.
KANSAS CITY 2, MISSOURI

BELSAW GUMMER INSTRUCTIONS

ASSEMBLY:

The Belsaw Gummer is shipped assembled so that the customer has only to attach the saw arbor channel p-69 to the base casting p-51 at "A" as shown in the illustration.

INSTALLATION:

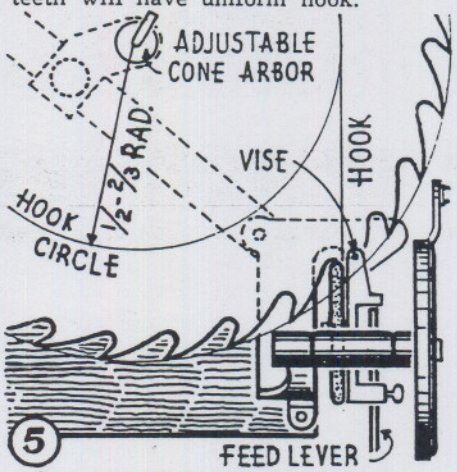
Attach base casting p-51 securely to solid table having sufficient face and clearance to accommodate the largest size saw you intend to recondition. Place the gummer on the edge of the table so crank p-57 will have clearance.

Upon receiving a new saw, clamp a piece of sheet metal beside 3 or 4 teeth; mark their outline exactly with sharp pointed scriber; cut out, file—and use it as a guide when gumming and finish-filing.

The machine shown above simplifies gumming and jointing—very difficult to do properly by hand.

Position saw to bring right side of the grinding wheel tangent to hook circle as shown, halfway from center to rim if for hard cutting stock, ⅔ if for soft.

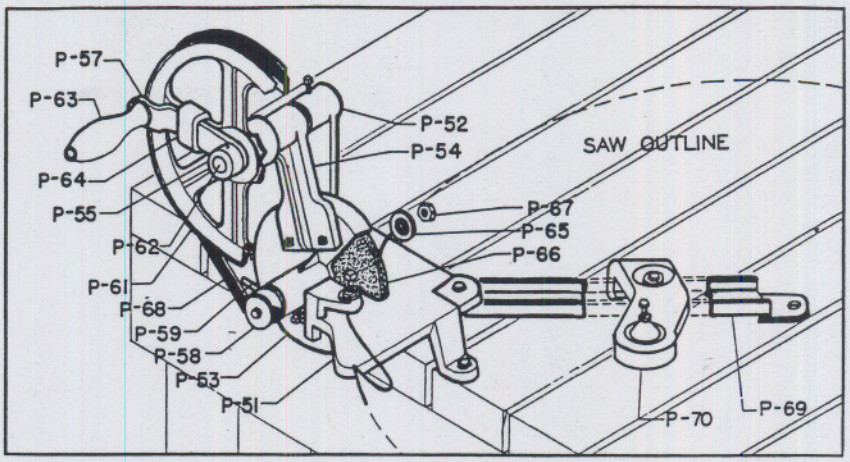
Fix arbor channel in position so all teeth will have uniform hook.



Saw arbor P-70 is designed with cone for various size arbor holes. Lift cone from saw arbor and center saw by placing correct size cone in saw arbor hole. Large diameter cone centers saws from 2" hole to 1¼", the reverse cone from 1¼" to ⅝". Most saws are placed on offset position of arbor bracket as shown in fig. 5. If this does not allow desired tangent position, change arbor cone to center position over saw channel.

Fix arbor channel in position so all teeth will have uniform hook.

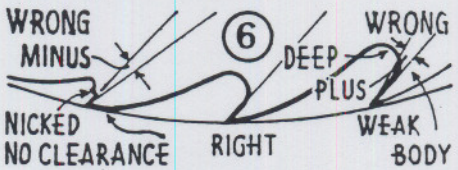
Now position gummer wheel locking handle P-59 to base P-51 in yoke on underside of base. An extra nut is provided to hold position tightly. Adjust gummer wheel so it just touches top of shortest saw tooth, then with gummer wheel in that fixed position each tooth can be ground into true cutting circle as saw is turned. This operation—jointing—is necessary and requires mechanical precision.

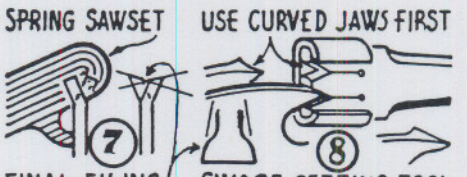


After jointing, loosen the nut and allow the gummer wheel to move freely in its grinding arc. Position saw as specified above with tooth in proper tangent position, shown in fig. 5. Adjust depth of gullet grind using nut on handle as a stop nut against base yoke. Care is taken to grind gullet without touching face of tooth. Finish grinding operation with light grind on face of each tooth to bring corner at rim to sharp angle but do not remove enough face to shorten tooth below true circle.

After gumming and jointing, remove saw; file clearance behind top of teeth, never file top, and file out any nicks etc., doing all filing square across, to shape tooth as shown at Fig. 6 center.

After setting, Figs. 7-8, file sides of teeth to uniform projection—for smooth cut, and sloping slightly back from cutting edge—for clearance.





Use no more set width than necessary as extra kerf takes extra power: woods that are stringy require widest set; hard and frozen wood take least set.

Teeth should be given touch-up sharpening every few hundred feet of sawing, by filing face to make corner angle keen.

One swaged tooth equals two spring set, therefore consumes more power: if swaged or IP saw is inadequately powered it may help to cut out every other tooth—only by dubbing off top with file.

PARTS LIST

Order Part No.	Description	Price
p-51	Base casting, tooth vise	$4.37
p-52	Main shaft support	2.00
p-53	Wheel housing	5.00
p-54	Housing shaft support	1.50
p-55	Collar	.50
p-57	Crank (with p-63 handle)	1.25
p-58	V-Sheave 1½"	1.25
p-59	Hand lever	.50
p-60	Wheel arbor	2.50
p-61	V-Sheave 10"	4.37
p-62	Support arbor	1.00
p-63	Crank handle	.25
p-64	Crank clamp	.62
p-65	Grinding wheel collars (pr.)	1.25
p-66	Grinding wheel	1.00
p-67	Nut	.12
p-68	V-belt	1.30
p-69	Saw arbor channel	1.77
p-70	Saw arbor	2.50

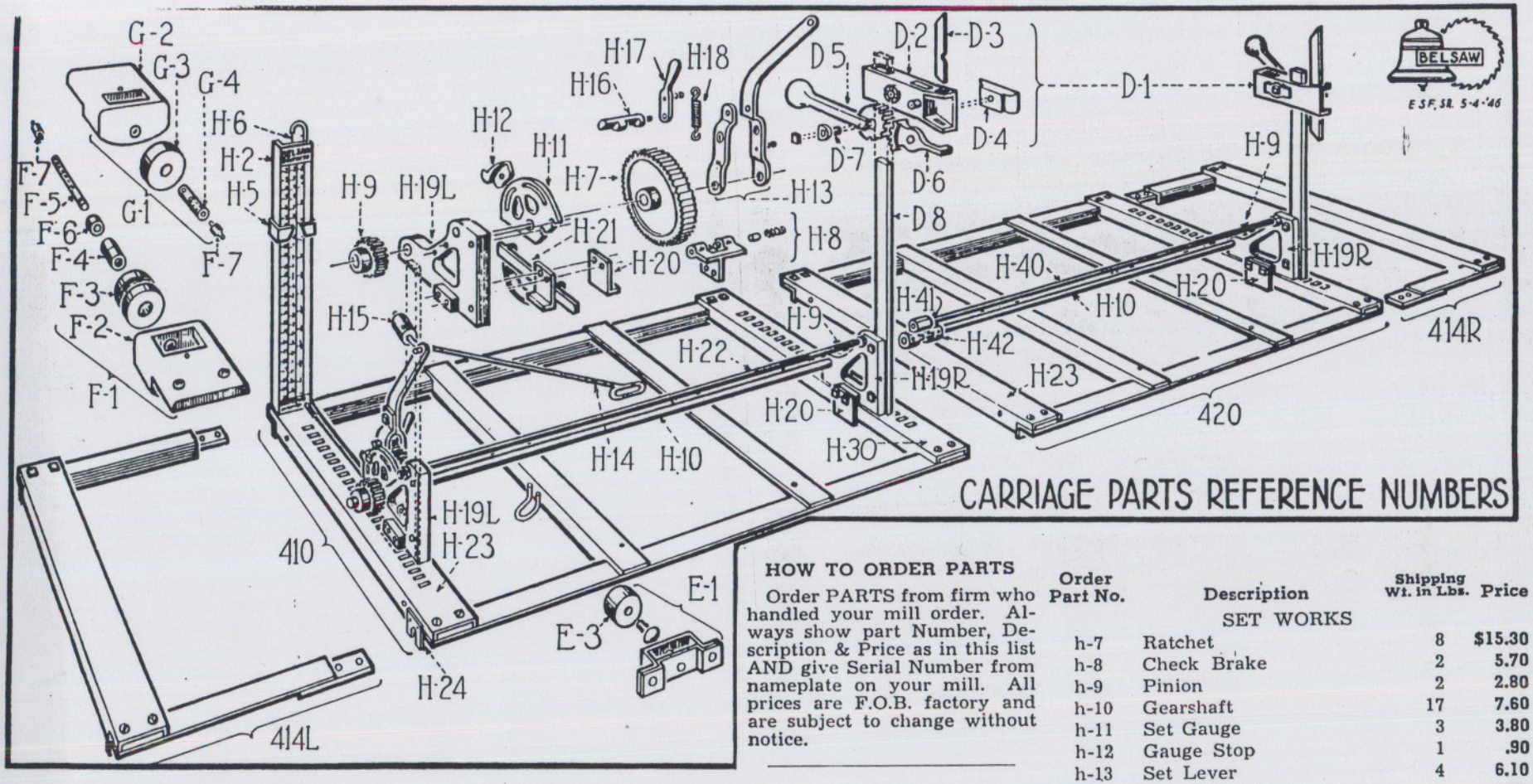
SHARPENING CIRCULAR SAWS

Keep your Circular Saws round and sharp. To obtain maximum performance and to avoid possible damage, the saws must be kept both round and sharp. When a saw does not cut easily, it is usually dull or has lost its set or swage. If you force the feed in this condition, you will heat the saw on the rim and it will expand and cause cracks. It also may cause the saw to lose its tension and bend or break over the collar. If the saw wobbles and does not cut straight it should be re-tensioned and re-sharpened.

Watch the corners of the swage or set. They may seem fairly sharp to the touch, but upon close examination it will be found that there is a slight roundness on the corners, which will make the saw feed hard and not cut properly. Although the set or swage may seem to be full, the saw will feed hard on account of binding just back of the points. To overcome this, the saw must be rounded or jointed below the rounded corners and then filed.

Do not allow your saws to accumulate gum or pitch on the sides. This may cause them to run warm and snake. The best method of removing hardwood gum from the sides of a saw is to soak the saw in hot water for a few minutes, then wipe with a rag.

BELSAW MACHINERY COMPANY
KANSAS CITY 2, MISSOURI



PARTS LIST
MODEL A

Serial Nos.: 12,500; 31,050; 51,050 and higher

Order Part No.	Description	Shipping Wt. in Lbs.	Price
	ROLLER TRUCKS		
F-1	Guide Truck Assembly	4	$8.10
f-2	Guide Truck Boxing	2	1.90
f-3	Dual Guide Roller	1	2.80
f-4	Roller Bearing & (Bushing f-6)	1	1.90
f-5	Axle & (Grease Fitting f-7)	1	1.30
E-1	Sub-Guide Truck Assembly	2	2.10
e-3	Sub-Guide Roller	1	.70
G-1	Back Truck Assembly	4	4.20
g-2	Back Truck Boxing	2	1.90
g-3	Back Truck Roller	1	.90
g-4	Axle & (Grease Fitting f-7)	1	1.30
	TOP DOGS		
D-1	HD Top Dog Assembly	17	$9.60
d-2	Head Box	6	5.70
d-3	Spike	1	.70
d-4	Grip Shoe	1	1.30
d-5	Lever	2	1.90
d-6	Pawl	1	1.30
d-7	Bushing	1	2.50
d-8	Post	6	1.90
	UPRIGHT SCALE		
H-1	Upright Scale Assembly	6	7.00
h-2	Scale	4	5.80
h-5	Indicator	1	.80
h-6	Cord	½	.40
	SET WORKS		
h-7	Ratchet	8	$15.30
h-8	Check Brake	2	5.70
h-9	Pinion	2	2.80
h-10	Gearshaft	17	7.60
h-11	Set Gauge	3	3.80
h-12	Gauge Stop	1	.90
h-13	Set Lever	4	6.10
h-14	Extension Handle	2	1.90
h-15	Counterweight	3	1.00
h-16	Rotary Pawl	1	5.70
h-17	Trip Arm	1	1.00
h-18	Coil Spring	½	.60
h-19	Head Block (Specify L or R)	10	6.60
h-20	Holddown	2	2.80
h-21	Holddown, Stop & Shield	2	3.80
h-22	Yoke Rod	11	4.80
h-23	Knee, head	20	15.30
h-24	Track Brush	½	.40
h-30	Knee, tail	20	15.30
	EXTENSION CARRIAGE		
h-40	Yoke Rod, Extension	11	4.80
h-41	Yoke Coupler Nut	2	1.30
h-42	Gearshaft · Coupling	3	4.80
h-23	Knee	20	15.30

HOW TO ORDER PARTS

Order PARTS from firm who handled your mill order. Always show part Number, Description & Price as in this list AND give Serial Number from nameplate on your mill. All prices are F.O.B. factory and are subject to change without notice.

CARRIAGE OPERATION AND MAINTENANCE

HOW LIGHT MILL DIFFERS FROM HEAVY

Light sawmills differ from heavy in two important details. When operated with proper regard to these differences the light mill can be expected to give the same results as costly heavy mill. But if disregarded, then good results may not be expected.

Amateurs usually obtain better results with light mill than do sawyers having heavy mill experience. This is because the amateur observes our instructions — which apply to light mill, while the former mill operator follows his experience — which fails to apply successfully to light mill.

Experienced sawyers should therefore give particular attention to these two points.

A LIGHT SAWMILL REQUIRES HIGH SAW SPEED. When saw is run at slow speed it exerts excessive thrust on carriage. If you need proof of this place a cornstalk with one end projecting over end of carriage same as log, a light weight on other end — corresponding to pressure of top dog: note that if knife is given quick enough stroke the stalk can be severed at a point some distance out from support, in proof of practicability of log overhang when speed of saw is sufficient. Note that if knife stroke is slow it will have to be made close to support, and counterweight will be dislodged, proving excessive thrust on carriage bed and dogs.

A LIGHT SAWMILL CANNOT TAKE SHOCK LOADS. When log is rolled gently on carriage from beams level with bed a light mill can take tremendous loads without damage. But repeated shock of even very light logs dropped on it can soon cause serious damage.

If you need evidence of difference between applying loads smoothly and roughly, try placing a load on your toes slowly — then drop same load on them.

The illustrations given are crude but the purpose is to show you that a mill not intended for shocks should not be subjected to them. No more labor or time is required for easy handling than for rough; and it brings rich reward.

In short — light mill is not intended to take the abuse given heavy mill as a matter of course.

THE MODEL A IS OUR HEAVIEST DUTY CARRIAGE, stands up longest under heavy loads and rapid production: it is our oldest model, includes refinements based on over a quarter century of practical experience, our own and that of many thousands of customers.

You have in the Model A sawmill equipment of which you may well be proud, and from which you may expect highest efficiency.

GUIDE ROLLERS: Carriage rollers nearest saw have a groove fitting over rib of guide track, so the cut will be straight — if guide track is straight. And for track to be and remain straight the base must retain rigidity despite load, belt pull, or ground changes from rain or drought or freezing.

Model A type guide rollers have rim traction, the track flanges instead of rib taking load. Heads of screws in flanges must be flush. Unsupported span across mandrel notch must be reduced to minimum by bracketing the cap boards out over bearings as far as possible.

Roller bearings must be kept well lubricated: dry axle will wear rapidly even under light loads.

LOG LOADING: The importance of rolling log on carriage bed without shock has been explained. Always recede headblocks full back before loading log. Do not advance before log has been positioned by hand for first slab cut: if log is large chuck in place with chips instead of using top dogs, particularly if the log is inclined to teeter or roll.

HEADBLOCKS: Never use set works of a light mill to advance a log before it is turned on slabbed sawed surface. The set gearing is not made heavy enough to slide log resting on bark surface, nor is there enough frame clearance for knots, bumps, etc.

It is best to employ set works only after the log is squared on 2 sides: with a sawed side down, and another against headblocks advance by set works to remove 3rd slab, so cut will be parallel with 1st, giving pre-edged 3-squared flitch.

If 4th side is turned toward headblocks unslabbed there will be no waste on final cut.

Do not rig up home-made taper adjustment on headblocks for tapered logs: instead, move the smaller end out from block, chuck chip under it, and place top dog with spike in extended position.

Keep holddowns adjusted to prevent blocks lifting too much when dogs are used, but leave sufficient clearance to prevent making headblocks drag.

TOP DOGS: The less competent a sawyer is the more dogs he needs, and the tighter he sets them. Able sawyers, those who keep their saw and mill in good shape, don't use over one or two dogs, set lightly: when the log is heavy and rests on wide sawed surface they use none until towards last cuts.

DO NOT CLAMP DOWN HARD ON THE TOP DOGS. It is not necessary, and interferes with proper operation of set works by making load on it excessive, and will greatly shorten the life of the equipment.

When tight dogging is required it means something is seriously wrong. Saw may not have right lead or enough speed, guide track may be bowed, etc. Find the cause and correct it, instead of ruining mill.

Our patented top dog is highly efficient. With a single stroke of operating lever its head is fixed tightly on post and spike is driven: by reversing stroke, spike is withdrawn and head released so it may be freely moved to any desired position.

Post gripping is thru cams: 4 knobs on inner surface of hand lever press on raised portion of head for gripping, and sink into indents for releasing: adjustment for proper pressure is provided by nuts on bolt thru shoe, head, and lever hub.

In view of the considerable friction the cam surfaces must be kept lubricated or they will quickly lose adjustment, due to wear.

SET WORKS: This mechanism is for advancing the log towards saw required distance to give thickness of cut desired, and for returning the headblocks.

Thickness of cut is determined by travel distance of headblocks, which in turn is regulated by lever stroke. This regulation is by means of adjustable stop block on the automatic gauge for repeat sets.

The ratchet and pinions are geared to advance the headblocks exactly 1/16" to each tooth escapement. For maximum accuracy, set stop block to stop lever just as pawl clicks on last tooth on return stroke after having been drawn full forward against yoke.

When correct setting has been located register it by filing mark on segment at front of block, which will save time on same setting thereafter.

Adjust pegs in check brake tightly enough so that ratchet won't be turned by return strokes of lever; grease ratchet rim sides to save wear on pegs.

Friction check is used on light mills to cushion shock of log rolled against headblocks, which will slide back as far as gauge stop permits. If positive check, as used on heavy mills, is required it can be obtained by returning set lever full stroke after advancing headblocks.

UP-RIGHT SCALE BOARD: Latest outstanding improvement on the carriage is a large up-right scale board and a permanent name plate on the frame which replace the former overhead scale and cast tool box assembly.

Large easy-to-read board tells exact distance remaining between saw and headblocks. Shows number of 2", 1-1/4", and 1" boards that can be made from log still on carriage. Markings include allowance of 3/8" saw kerf and planer shave. Extra column left blank for marking special cuts. This replaces overhead rule and adds great convenience for sawyer.

Attach scale to carriage at setworks knee with two bolts that hold rear truck assembly. Tie cord to set gauge, run through the bottom tubing, along the back of the scale, through the top tube and tie to the sliding marker. Marker then set at bottom number when headblocks are receded full travel. Grease sliding marker and add weight if necessary so it will slide easily and remain sensitive.

HELPFUL SAWING SUGGESTIONS

For sawing oversize log do not use top dogs until reduced to flitch: position by hand and chuck with chips to prevent rolling forward. Full stroke saw is not necessary: slabs may be removed by undercut followed by splitting unsawed part, or by opposite undercut after turning log end for end. Some sawyers prefer "gunbarreling" their oversize logs: in this process the log is turned just enough following an undercut for next cut to saw thru to former one. This produces a polygon shaped cant that must then be squared.

For edging boards on mill, place flat on carriage bed with bark edge clearing line of saw cut; after this cut turn sawed edge against headblocks, which should have dog posts adjusted in line.

For sawing strips such at lath, etc. first rip to largest dimension from flitch, then place several of these thick cuts in layers and rip to the small dimension with small thin saw. Such work should be trimmed to length only after sawed full length.

BELSAW HEAVY DUTY POWER FEED

INSTALLATION AND OPERATION

This heavy duty and high speed feed is intended for mills having ample power. Keep always in mind that the saw comes first; do not make the mistake of adding power load that may prevent saw holding full speed in deepest cuts. Gear feed to maximum feed speed consuming power within the margin over that required for saw. When feed is geared too fast it can not be held to consistently smooth slow rate required for difficult cuts.

Standard equipment 4" drive pulley on arbor gives maximum rate of 1½" per saw revolution; if this is found to be more than there is power for, change the standard equipment 12" pulley on liveshaft to 16", the only means of reducing rate. If faster feed is found practical, increase the diameter of pulley on arbor; 5" will give 1¾" maximum rate; 6" 2 and 8" 3" per rev. Gigback speed is in each case slightly over twice the rate of feed maximum.

INSTALLATION is clearly shown in Fig. 1. Attach shaft bearings to bottom of beams with lag screws, and center to dimensions given; bolt holes are slotted for final lining up and adjustment. Cross drive belt and place take-up just in front of bottom of liveshaft pulley.

Primary drive pulley must be placed outside main mandrel pulley, which must always be placed next to arbor bearing.

OPERATION: To feed, move control lever to bring take-up pulley up against bottom of long looped feed belt, which will then engage and turn drumshaft. To gig back, shift lever to release feed belt and press gig pulley up against bottom of gigback belt, which will then reverse drumshaft. Feed is in neutral when lever is shifted to release pressure on both belts. Shaft bearings are babbitt lined and equipped with grease fittings; keep well lubricated.

If mill is not under cover, always shut down if pulleys become moistened by rain or snow; belts can not get traction unless pulleys are dry. In case of excessive pressure being required on shift lever, check up for cable drag; end sheaves should be so located as to prevent cable rubbing on base cross members, on arbor, or elsewhere. See Fig. 2, reverse side.

Speed of both feed and gigback is regulated by the amount of pressure on shift lever. If cut is heavy and saw shows signs of losing speed, release pressure enough to let belt slip slightly. Practice carefully until you can avoid sudden grips and checks and can keep log moving at uniform reduced speed; this is very important. Log must never be permitted to stop moving while saw is revolving in cut—or saw will burn and become damaged; if will not feed forward, then gig it back—and move forward again if and when saw regains full speed.

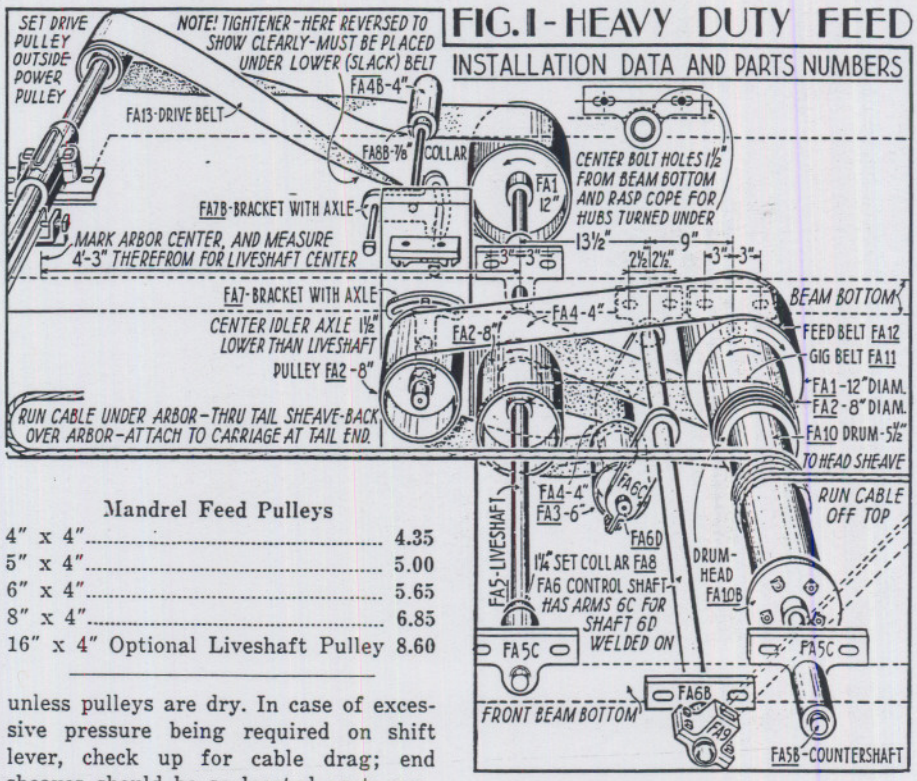
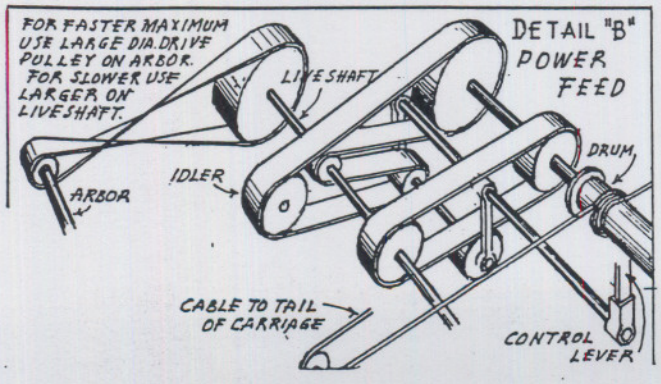


FIG. 1 - HEAVY DUTY FEED
INSTALLATION DATA AND PARTS NUMBERS

Mandrel Feed Pulleys

4" x 4"	4.35
5" x 4"	5.00
6" x 4"	5.65
8" x 4"	6.85
16" x 4" Optional Liveshaft Pulley	8.60



Measure feed belts threaded as shown in Detail "B" with control lever in position shown. Be sure belts are cut square.

PARTS LIST

MODELS 736 and 748

Key	Description	Order Part No.	Price
FA 1	—Live & Countershaft Pls. 12"x4"	h-51 each	6.25
FA 2	—Live & Countershaft Pls. 8"	h-52 each	4.50
FA 2	—Idler Pulley, 8"	f-53	4.50
FA 3	—Gig Pulley, 6"	d-55	4.25
FA 4	—Take-up Pul., 4"	d-56	3.25
FA 4	—Liveshaft Pulley, 4"	h-56	3.25
FA 4B	—Belt Tightener Pulley, 4"	g-53	3.25
FA 5	—Liveshaft	h-53	4.00
FA 5B	—Countershaft	h-54	4.00
FA 5C	—Bearings, babbit.	h-55 each	3.00
FA 6	—Control Shaft Assembly	d-51-2-3	8.00
FA 6B	—Control Shaft Bearings	d-57 each	.65
FA 6D	—Take-up Pulley Shaft	d-54	
FA 7	—Idler Bracket and Axle	f-51-2	4.50
FA 7B	—Tightener Brack. with Axle	g-51-2	4.50
FA 8	—Set Collars, 1¼"	x-16 each	.75
FA 8B	—Set Collars, ⅞"	g-54 each	.75
FA 9	—Control Lever Socket	EE-1	3.00
FA 10	—Drum Assembly	CC-1	10.50
FA 11	—Gig Belt	h-57	2.35
FA 12	—Feed Belt	h-58	4.62
FA 13	—Drive Belt	h-59	4.62
Cable Sheaves		u-13 u-14 each	3.11

CABLE AND TAKE-UP

ASSEMBLY AND OPERATION: The cable should be given three turns around drum and should run off top to end sheaves. The sheaves should be placed as to give straight-line pull on carriage; if pull is at an angle excessive power is required, and tracks and carriage rollers will become badly worn. Sheaves should also be placed at height giving clearance of base cross members and of arbor. If the cable drags at any place the feed will consume excessive power.

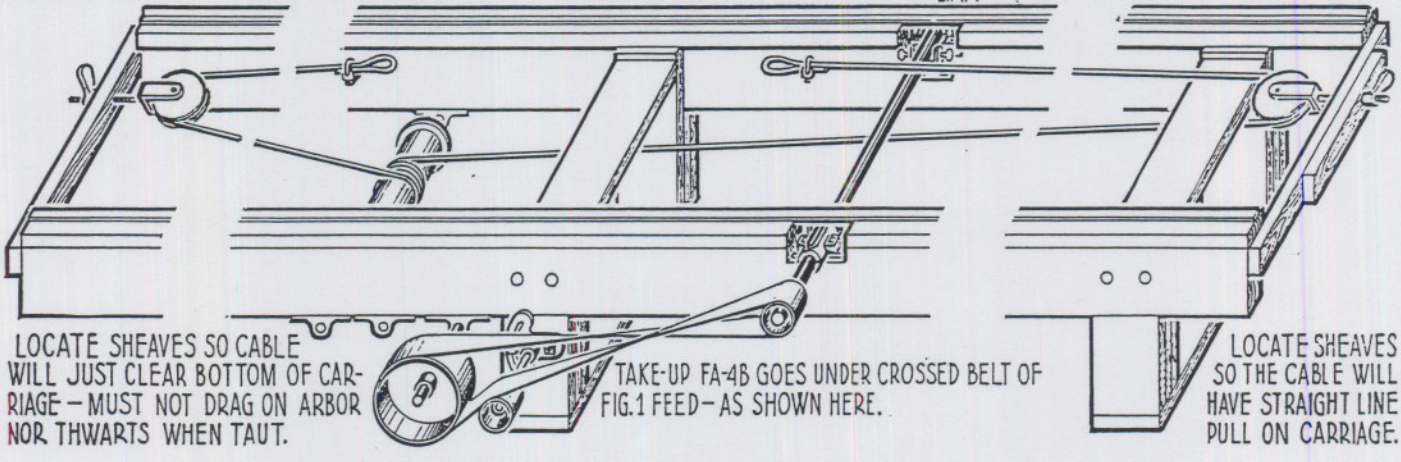
In some cases the tail cable tends to hang upon shield under set ratchet, due to variations in installations. This can be remedied by the following procedure, which serves to give maximum efficiency in any case: Place a steel or wood bar under the two carriage crosspieces on which cable eyes are welded, projecting some 6" past each eye, and bolt to the eyes; attach cable to ends of this bar—which drops the connection below level of welded eyes. Besides the advantage of placing cable connections lower, this provision distributes the cable pull over two carriage members. Avoid dropping connections low enough to foul arbor.

The belt tightener must be installed to press on belt at slack side of pulley, never at taut side. Check adjustment each day mill is in operation—to make sure belt has no slippage. When shutting down mill always release belt tightener—or remove belt. Moisture causes belt to shrink, thereby causing maladjustment of fixed type take-ups.

IMPORTANT! Never let log stand still while saw is revolving in cut—or saw will burn and may be seriously damaged; if you can not continue to feed forward, then gig back. Keep your eye on the saw: if it shows signs of slowing down, either reduce the rate of feed or gig the log back—but keep the log moving—one way or the other. To feed the log faster then the saw can take is to invite trouble and expense.

SAFETY FIRST! There is always danger of saw hurling sliver or bit of bark forward with bullet-like force, and many sawyers have thus lost an eye or suffered other injury. This may easily be guarded against, as follows: from an inclined pole suspend a square of hardware cloth—or even fly screen—in front of saw and just high enough to clear top of saw log. This will stop small objects and break the force of larger ones.

FIG. 2 - HOW TO INSTALL DRIVE BELT & TAKE-UP, AND END SHEAVES & CABLE



SAWMILL POWER REQUIREMENTS

AMOUNT: Sawmill power consumption can not be given by manufacturer, because of several factors:

A—Cut depth and feed speed: Very thick cuts can be taken with very light power—if log is fed slowly enough; very fast feed may be used with very light power—if cut is thin enough. Thick cut fed fast requires tremendous amount of power.

Cut increased 100% increases power load 125%.

Feed 100% faster increases power load 225%.

B—Wood Species: Hardwoods such as oak take 250% more power than soft woods such as white pine.

C—Saw Condition: Insufficient clearance of back of teeth increases power load tremendously; insufficient hook, insufficient set, and incorrect lead also appreciably increase power load.

SPEED: Motor must be run at correct speed—which must be constant under load; governor is therefore required for all forms of power except electric. Pulley at motor must be large enough diameter and face to transmit sufficient power; pulley at arbor must be correct size to run saw at speed for which it is tensioned, with drive pulley correct speed.

Note: Use of speed indicator not advised—unless reading is taken when saw is making maximum cut so belt slippage and motor slow-down will figure. The only dependable guide is saw behavior.

HOOK-UP: Power must be belt connected only, never direct connected; belt serves same purpose as wood pitman on mowing machine. Avoid driving thru gears when possible. Tractor power take-offs use gearing and the intermediate gear of car motor may be used when making extra heavy cut with light motor; governor will step up motor speed but should be used only in emergencies—with rest periods.

Never use flywheel on mandrel, as this would destroy safety factor of belting. Never use flywheel unless it is in perfect static and dynamic balance. Such a flywheel when on motor crankshaft, or drive pulley shaft, will serve to keep motor from being slowed down by knots and such. Most efficient belt speed (drive pulley perimeter times r.p.m.) is 4,000 to 4,500 feet per min. Most tractors use 2,600. An 8" pulley at 1,500 gives a speed of 3,150; a 12" gives 4,700. with 6" belting an 8" pulley can transmit only up to 25 h.p.; a 12" pulley can transmit up to 35 h.p. with 6" belting, and up to 50 h.p. with belting 8" wide.

BELSAW FEED FOR LIGHT SAWMILLS

DUO-SPEED POWER FEED

(See Fig. 2 and 4)

This moderate priced power feed has somewhat less capacity range than the Heavy Duty; not having looped type feed belt, its speed can not be reduced by belt slippage to more than 25% less than maximum. But when the logs are of fairly uniform size, do not run from very small diam. to very large, it gives adequate results. Feed is by short direct slip belt, gigback by friction wheels.

DUO-SPEED POWER FEED

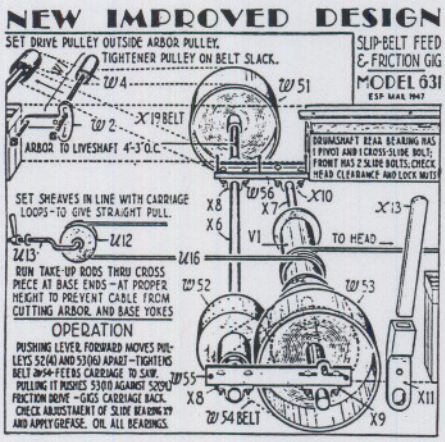


FIG. 2

Care must be observed in its operation at first—until the slip belt is well broken in. Before using it for sawing, run carriage back and forth several times—and keep your hand on the shift lever; when the belt has stretched sufficiently to permit the friction wheels to move far enough apart to remain in neutral it may then be safely used for sawing.

This characteristic is due to shift of swing shaft being limited by belt—which also will stretch slightly during the breaking-in period.

Standard equipment arbor pulley is 3" diam., which gives about ¾" feed per saw revolution. If power is not sufficient to permit full feed speed in a cut of three-fourths maximum run, change liveshaft pulley to larger size.

When plenty of power is available, feed speed can be stepped up. With 4" arbor pulley the maximum feed speed is about 1" per saw revolution; with 5" it is 1¼"; 6"-1¼"; and 8"-2", the gig-back in each case being about 3 to 1.

With pulleys properly proportioned for amount of power and size of logs, and after broken in, this feed is highly efficient and most satisfactory. It is our most popular type, many thousands being in service.

Keep bearings well lubricated. Do not run mill when pulleys are moist and give reduced traction, and cause belt shrinkage. Do not use slippage in gigging back, or the lagging on friction wheel will be damaged. See that the cable does not drag on base framing, on arbor, or elsewhere. See Fig. 4, reverse side.

PARTS LIST

MODEL 631

Order No.	Description	Price
m-38	—Set collar	.75
u-12	—Cable sheave	1.55
u-13	—Axle bolt	1.55
u-16	—Cable—¼" plow steel per foot	.09
V-1	—Drum assembly	19.50
W-1	—Belt tightener assembly	8.50
w-2 & 3	—Tightener bracket & axle	4.50
w-4	—Belt tightener pulley 3"x3"	3.25
w-4	—Mandrel pulley 3"x3"	3.25
w-51	—Liveshaft pulley 20"x3"	10.80
w-52	—Liveshaft step pulley 4"-9"	12.50
w-53	—Swingshaft step pulley 11"-16"	17.00
w-54	—Belt 3"x56"—3 ply	Purchased locally
w-55	—Front frame angle	1.50
w-56	—Rear frame channel	3.00
x-6	—Liveshaft	4.50
x-7	—Swingshaft	4.50
x-8	—Liveshaft bearing	2.25
x-9	—Shift bearing	3.00
x-10	—Pivot bearing	2.50
x-11	—Control bracket	2.25
x-13	—Control lever	1.10
x-19	—Feed drive belt 3"x151" 3 ply	Purchased locally

MANDREL FEED PULLEYS

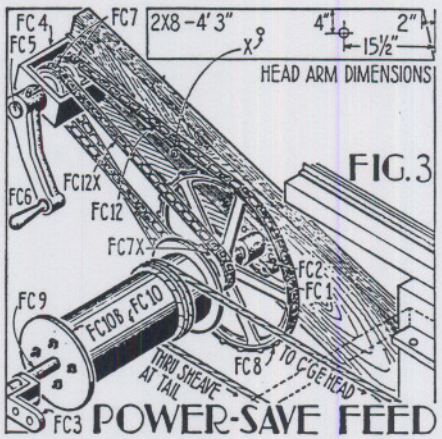
3" x 3"	3.25
4" x 4"	4.35
5" x 4"	5.00
6" x 4"	5.65
8" x 4"	6.85

POWER-SAVE FEED

(See Figs. 3 and 4)

This hand-operated mechanical feed is the product of scientific design and mature development; it is far more efficient than home-rigged winch principle affairs devised to resemble it.

Geared to give feed rate of about 1/16" to the saw revolution when crank is turned at normal speed, that which is least tiring. On heavy cuts its speed may be reduced to suit amount of power at saw by turning crank slowly. For gigging back rapidly, provision is made for shifting crank spindle to engage small drumshaft sprocket, and this gear may be used for sawing light cuts rapidly. Keep bearings well lubricated, and avoid cable drag. Se Fig. 4, reverse side.



PARTS LIST

MODELS 518 and 530

Key	Description	Order Part No.	Price
FC 1	—Frame Angle	u-2	3.00
FC 2	—Shaft Pivot Bear.	u-3	1.50
FC 3	—Shaft Bracket	u-4	1.50
FC 4	—Spindle Sprockets Boxing	u-5	2.25
FC 5	—Spindle (crkshft.)	u-6	1.50
FC 6	—Crank	u-7	2.25
FC 7	—Crankshaft Sprockets	u-8	each 3.50
FC 7X	—Drumshaft Sprocket	u-9	3.50
FC 8	—Drumshaft Sprocket	t-5	5.00
FC 9	—Drumshaft	u-10	3.00
FC 10	—Drum Assembly	T-1	7.50
FC 12	—No. 32 Chain, Low Speed	u-15	4.40
FC 12X	—No. 32 Chain, High Speed	u-16	3.20
F 23	—Cable Sheave	u-13	1.55
F 25	—Axle Bolt	u-14	1.55

CABLE AND TAKE-UP

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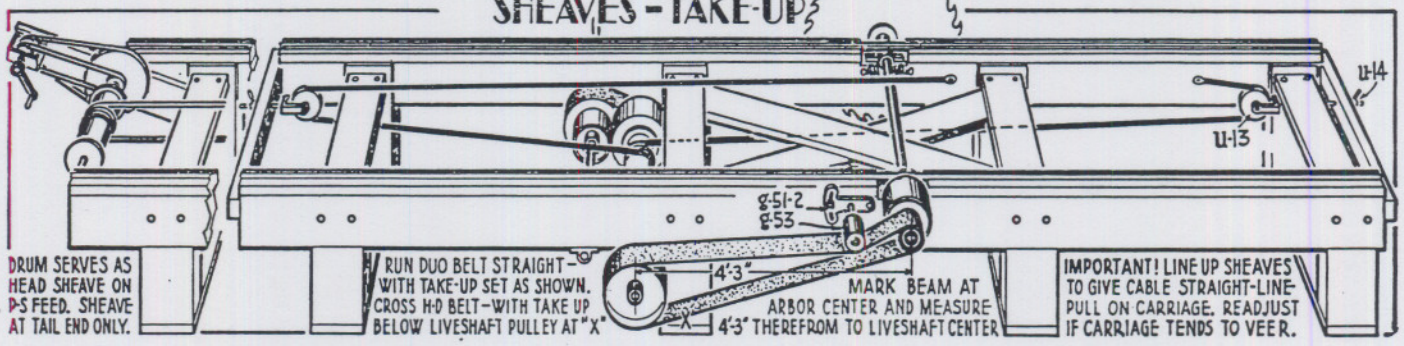
FIG. 4 — CABLE AND SHEAVES - TAKE-UP



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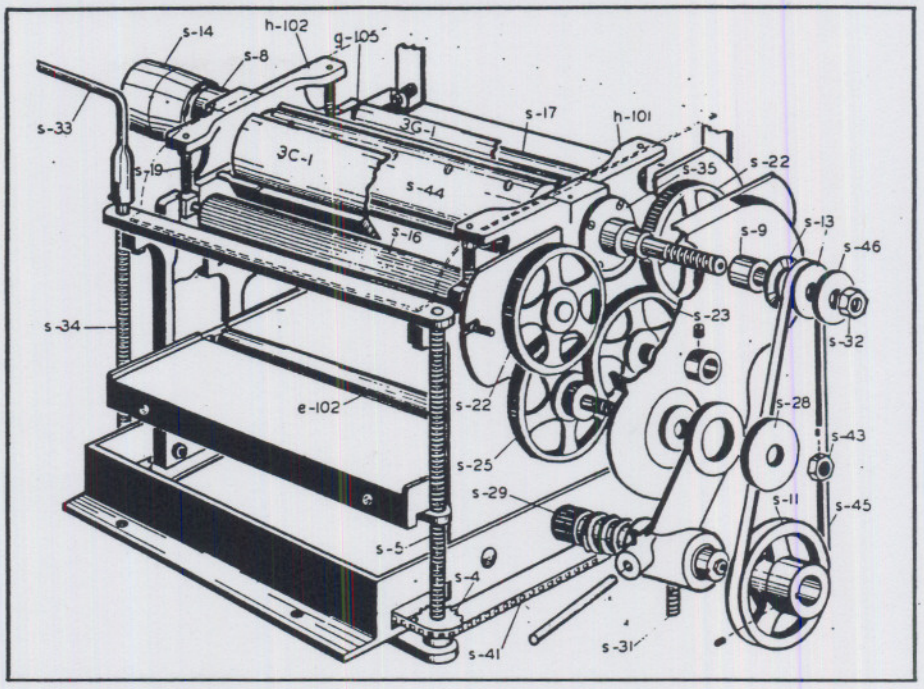
BELSAW MULTI-DUTY PLANER



SETTING UP:

Support bench must be heavy and solid, approximately 24" high with bed bolts on 12" centers across and 14" lengthwise—leveled true. Bolt machine solidly. Check level of cutterhead.

If you have ordered the 2S-5 Extension Tables, bolt to each end of bed. If these factory extensions are not available it is advisable to support stock both at infeed and outfeed ends with flat boards or rollers to keep it same level as bed over its full length.

Table rolls are factory set approximately 1/128" above bed which is best for light cuts of dry lumber. For surfacing green, rough timber the bed rolls should be raised to 1/32".

Be sure the cutterhead and the table are level, check them with a spirit level. They are correctly set at factory but may become altered in shipment handling. If planer table requires adjustment, release synchronizing chain at master link on roller chain models or release idler on detachable link chain machines. Turn pillar screw as needed. Cutterhead may then be leveled with table, using board between for pad. Ball bearing housing has slotted holes for height adjustment.

OPERATION:

Cutterhead speed range is 3500 to 4500 rpm. Maximum efficiency is at 4000 rpm, giving 42 knife cuts per inch and outfeed of 24 lineal feet per minute.

Planer requires 2 horse-power for light duty, 3 horse-power for heavy duty in harder woods.

Maximum depth cut ⅛". (Two full turns of crank.) Do not exceed. For deeper cuts make re-runs.

Near-cabinet finish on light cuts in dry, seasoned stock may be obtained by dropping table rolls to bed surface (or removing them) and by changing the 4.4" diameter v-sheave to larger size—which reduces rate of feed and gives more knife cuts per inch.

To prevent "sniping" on end of stock and for short stock, follow with pusher stock of similar thickness.

If stock does not feed straight, check feed roll spring tension, also clearance at table ends.

MAINTENANCE:

KEEP MACHINE WELL LUBRICATED, use gear grease on gear train —first grade gun viscosity in bearings —machine oil in bed needle bearings and feed roll bearings.

Plain outfeed and fluted infeed rollers have spring tensioned thrust bearings for self-aligning pressure on stock, slot adjustment on holddown casting. Offset extensions of these shafts carry power driven gears and support gear train that rises and falls with feed rolls.

There is no scraper on outfeed roll, it should be hand cleaned with sandpaper and kerosene when packed or rusted. Infeed fluted roll protected from chips by baffle design chip breaker. If this roll becomes filled with chips, clean it for positive material feed. Chip breaker has stop which is adjustable by bending bar. Limit the drop; it should remain as set in factory because excess drags feed.

Pressure bar directly behind cutterhead rides on newly planed surface and holds stock firmly on bed. This assures a perfectly smooth board free from all unevenness as it prevents waves, chattering and irregular cutting. Set level with knife cutting circle, tension and also maximum drop of the pressure bar may be adjusted if pressure becomes excessive.

Thin knives 12½x15/16x⅛" are held in cutterhead by ½" socket set screws that press on heavy gib. Knife extends 5/32" past gib for proper cutting action. Gib flush with cutterhead to curl chips and throw them out exhaust hood.

Joint knives in planer frequently using jointing tool to keep sharp until heel becomes 1/32" then regrind using Knife Grinder. An extra set of knives is advisable.

Make certain that knife bolts are always tight.

30° bevel best for most work. Regrind knives to keep them sharp with knife grinding attachment, adjustable for bevel desired.

PARTS LIST

Model 905

THREE KNIFE HEAD—CAST TABLE

Order Part No.	Description	Shipping Wt. in Lbs.	Price Each
3C-1	Chipbreaker Assembly	7	$12.20
e-102	Table Roller	7	2.80
e-103	Table Roll Bearing Boss	1	2.00
3G-1	Pressure Bar Assembly	7	23.60
g-105	Pivot Bushing	1	1.20
q-5	Bed Roll Bearing	1	1.90
s-4	Sprocket	1	1.90
s-41	Roller Chain–Diamond #65, buy locally		
s-5	Corner screw (3)	2	1.90
h-101	Left bearing housing	7	11.70
h-102	Right bearing housing	7	11.70
s-8	Left bearing housing cap	1	.90
s-9	Sleeve	1	1.30
s-11	V sheave 4.4	3	3.80
s-12	Ball bearing cutterhead	2	9.60
s-13	V pulley, 2 pieces	1	2.80
s-14	Drive pulley 4"x4"	6	5.70
s-16	Infeed roll, 1½" fluted	8	11.40
s-17	Outfeed roll, 1½" plain	8	5.70
s-18	Feed roll bearing	1	1.90
s-19	Feed roll tension spring	1	.40
s-20	Feed hanger	4	7.60
s-21	Feed housing	6	11.40
s-22	Feed gear, 80T	2	5.70
s-23	Idler gear, 80T	2	5.70
s-24	Axle for S-23	1	.90
s-25	Compound gear 124T - 21T	5	11.40
s-26	Axle for s-25	1	.90
s-27	Feed sheave arm	4	5.70
s-28	Feed sheave arm plate	1	.50
s-29	Feed pinion, with axle 21T	2	3.80
s-30	Roller bearing for s-29	1	3.80
s-31	Feed belt tension spring	1	.40
s-32	Arbor nut	1	1.30
s-33	Crank	3	3.80
s-34	Corner crank screw (1)	2	2.20
s-35	Right bearing housing cap	1	1.40
s-39	Planer head gib (3)	2	2.90
s-44	Planer cutterhead, 3 blade	37	95.10
s-50	Drive sheave 3.8 2 groove	5	4.50
951	Planer knife 12½x15/16x⅛" (set of 3)	2	12.00
952	Planer knife—Super High speed steel for continuous planing of hard woods and for fine cabinet finish on thin cuts — extra quality — 12 1/2 x 15/16 x 1/8 (set of 3)	2	14.40

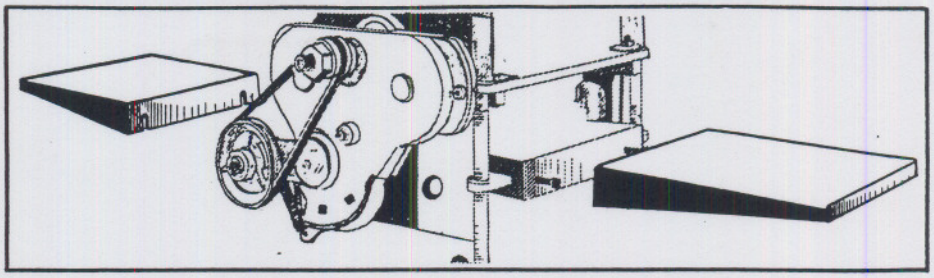
When ordering parts always give both MODEL No. and SERIAL No. shown on your machine's nameplate. Include allowance for postage; we will prepay and refund unused portion.

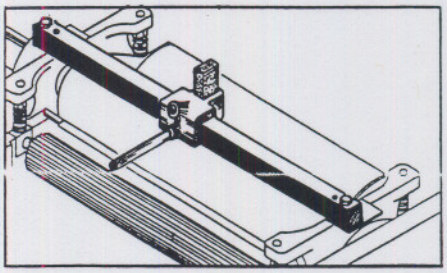
BELSAW PLANER ACCESSORIES

Metal plates 12" long bolt to each end of cast bed, increasing total table length to 42"—longer than many far costlier surfacers. This extra support minimizes usual end snipe cuts on long boards, and the longer surface provides extra working space needed for continuous and multiple feeding of shorter pieces. Quickly attached to any BELSAW Planer.

No. 2S-5 **EXTENSION TABLES,** pair Wt. 10 lbs. **$16.25**

EXTENSION TABLES INCREASE CAPACITY AND EFFICIENCY





The BELSAW is the only bench planer with provision for jointing knives in the cutterhead and for grinding its own knives. The special Belsaw Jointing tool rests on bearing housing and is fitted with highest grade India stone running against knives to bring their cutting edges into exact parallel with bed—an essential operation to insure true clean surfacing. The Knife Grinding Attachment consists of cup-type abrasive wheel mounting on offset arbor and adjustable table for holding knives (see Fig. 5, Page 10). Every Belsaw owner should have these accessories:

No. 960 **KNIFE GRINDING ATTACHMENT** Wt. 35 lbs. **12.50**

No. 955 **KNIFE JOINTING TOOL** Wt. 5 lbs. **$12.50**

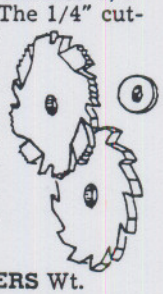
Multi-Duty Attachments Make Your Surfacer A Versatile Woodworker

A SAW TABLE attachment makes the Belsaw Planer the most indispensable machine in the woodworking shop. Angle brackets bolt to ends of bed to support easily made wood table (see Figs. 1 and 2 on Page 10). Serves for jointing, trimming, edging, milling, etc., with saws or flying bits on cutterhead extension arbor.

No. 965 **SAW TABLE METAL PARTS** Wt. 12 lbs. **$5.50**

MILLING AND GROOVING SAWS

Matcher Cutters for milling tongue in 13/16" flocring consist of two 6" diameter Patent Type solid plate cutters—one 3/8" thick and another 1/4" thick, with 7/32" spacer. The 1/4" cutter is used for producing the matching groove. Can be used separately for other grooving and in combinatcn with regular dado chippers for variety cf molding cuts. Easily mounted on planer's extension arbor for use with saw table.

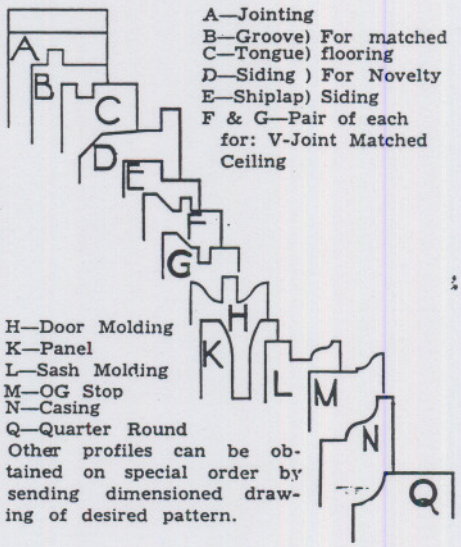


No. 970 **MATCHER CUTTERS** Wt. 7 lbs. **$27.50**

PATTERN CUTTERS FOR WORKED LUMBER AND MOLDINGS

Following are illustrations and descriptions of flying bits for use with No. 972 Molding Cutter Head. One PAIR is required for each pattern—Wt. 2 lbs. per pair—priced at $8.50 per pair except for "A" Jointing Knives, which are $7.50 per pair. Order by letter and pattern as follows:

"No. 975 (fill in letter) **KNIVES** for (fill in pattern)"

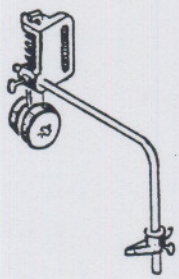


A—Jointing
B—Groove) For matched
C—Tongue) flooring
D—Siding) For Novelty
E—Shiplap) Siding
F & G—Pair of each for: V-Joint Matched Ceiling

H—Door Molding
K—Panel
L—Sash Molding
M—OG Stop
N—Casing
Q—Quarter Round

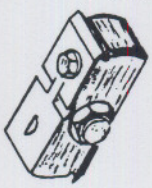
Other profiles can be obtained on special order by sending dimensioned drawing of desired pattern.

BELSAW Two - Way HOLDDOWN for use with saw table supplies roller spring pressure on both width-guide and bed. Mounts in either vertical or horizontal position.



No. 968 **HOLDDOWN** Wt. 5 lbs. **$4.50**

MOLDING CUTTER HEAD attaches to planer extension arbor to take flying bit type knives up to 2" wide for jointing, milling and other molding cuts on saw table. While boards up to 6" width may be edge-jointed on regular Planer bed, the flying bits in attachment molding head permit jointing wider boards up to 2" thickness.



No. 972 **MOLDING CUTTER HEAD** Wt. 4 lbs. **$15.00**

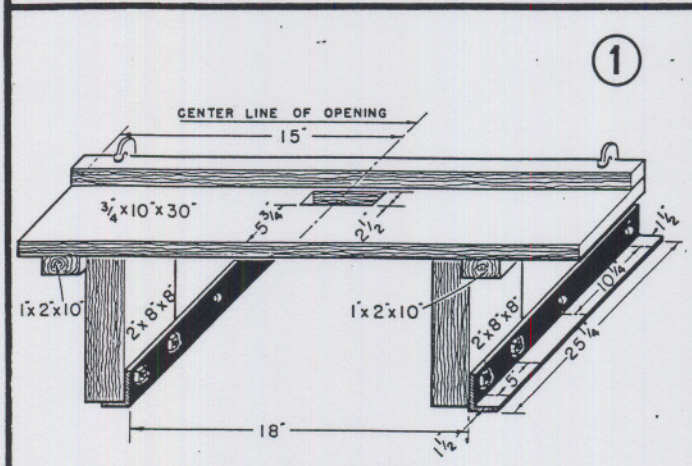
BELSAW MACHINERY CO.

KANSAS CITY 2, MISSOURI

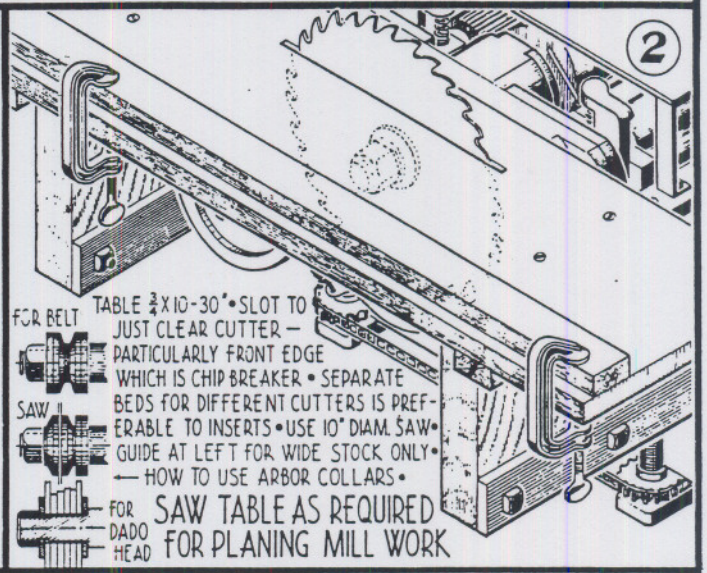
"MULTI-DUTY" ATTACHMENTS

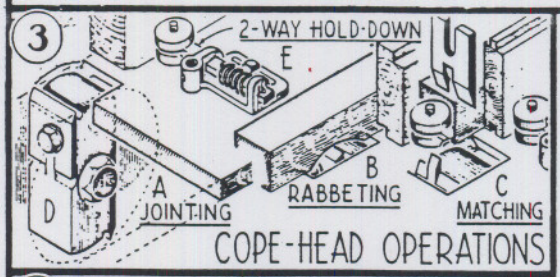
FOR SUPPLEMENTARY OPERATIONS ON BELSAW PLANER

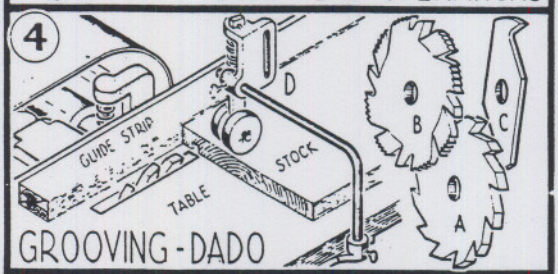
JOINTING·RABBETING·GROOVING·MATCHING-KNIFE GRINDING

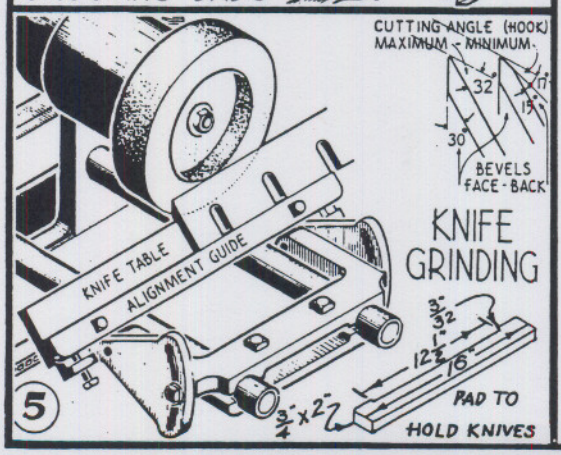


SAW TABLE SUPPORTS SET-UP









SAW TABLE SUPPORTS, Figure 1: Saw table metal parts are supplied as shown, wood parts made by customer. Table top should be smooth and can be cut out for tools you expect to use. Guide should be smooth and straight—generally tacked in place or held with C clamps. Table height is adjustable with planer bed to control depth of cuts.

TRIMMING, Figure 2: Stock for most millwork must first be edged to uniform correct width. By carefully side-dressing saw to give a smooth cut, jointing that edge may be eliminated. Lay straightedge alongside saw and mark cutting line at each end of bed—to measure from for quick alignment when setting guide strip.

JOINTING, Figure 3A: Jointing feature permits S4S work not possible on other planers. Replace two piece belt drive pulley with cope head (972 moulding cutterhead), attach jointing knives and adjust table height for light cut. This same set-up is used for rabbeting (3B); also for matching (3C) and other milling with special shaped knives on same head.

GROOVING, Figure 4: Most millwork operations are various forms of grooving (matching, etc.) and rabbeting (shiplap, etc.). Grooving is usually done with solid plate type cutters. Having numerous cutting edges, they remain sharp longer. Figure 4A shows "common" type grooving saw, for cutting with the grain only; 4B shows "patent" type, for both with and across grain—also has the advantage of smoother side cutting, important in matching, etc. Both types are manufactured in thicknesses from 1/8" to 1/2" by 16ths. The patent type is used as "outside cutters" of a dado head, spaced for wide cuts with "inside cutters" (4C) between.

HOLDDOWN, Figures 3E & 4D: With undercutters there must be uniform pressure of stock against bed so depth of cut will not vary, and against guide so line of cut will be true. This is best provided by the special BELSAW 2-way holddown shown. Its 2-way action is through roller set obliquely and having spring compression.

KNIFE GRINDING, Figure 5: Attachment includes 1) bed tubes, to run through planer body holes; 2) knife table, to clamp on tubes—with adjustment for any angle, and 3) abrasive wheel 5" P D and arbor to go in socket in end of planer cutterhead.

Our planer and jointing knives are regularly furnished with 30° bevel—suitable for most woods. For extra hard wood the planer knives should be back beveled to reduce hook. With the 30° face bevel the hook is 32°; with 15° back bevel it is 17°; the proper hook for hard wood may be anywhere between the two extremes.

Cope head has only 15° hook, so do not backbevel its knives. Keep sliding knife back and forth while grinding, and avoid too much pressure—to prevent overheating metal. Make a wood pad as shown to hold 951 high speed steel knives while grinding; it gives better control and protects your hands. Dub off razor edge after replacing in cutterhead, and resharpen frequently by jointing—until heel becomes 1/32" wide, when must be reground. See instruction with knife jointing tool for full details.

BELSAW MACHINERY CO

KANSAS CITY 2 MISSOURI

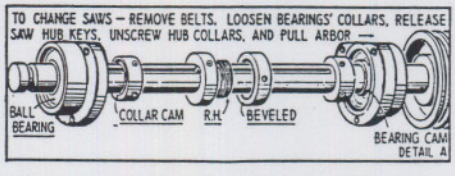
BELSAW EDGER INSTRUCTIONS

SPECIFICATIONS AND DIRECTIONS

FRAME: To be furnished by customer and made per drawings on next page. It includes (a) bed for support of edger; (b) infeed section with ball-bearing rollers and lever for shifting saw; (c) outfeed table with tail outfeed roll.

EDGER CONSTRUCTION: Body is formed and welded steel plate, outfeed and pressure rolls and infeed spurs of machined steel, bearings boxes of cast iron with machined spherical socket for shafts self alignment. Feed primary drive is V-groove at end of arbor, with final sheave on bracket having adjustable take-up arm, and step pulley to drive flat belt running around feed roll pulleys. Formed steel hood carrying cantilevered pressure roll is pivoted on shaft having cams with lever for setting pressure roll to predetermined level. Anti-kickback prong is provided on shaft located on hood.

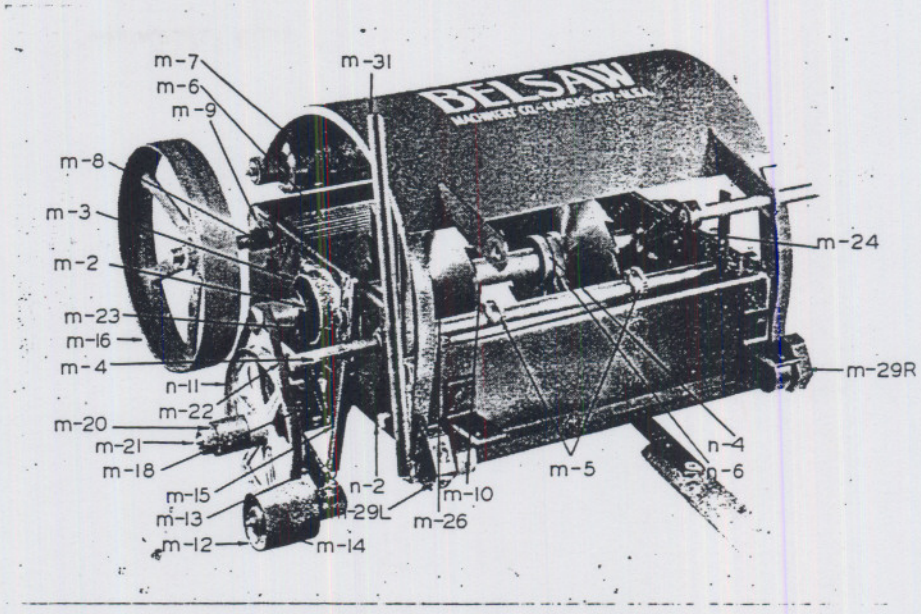
FEED WORKS: Infeed bed rolls are positive spur type, that at left to be aligned exactly with fixed saw and that at right placed to support whatever is the narrowest cut to be handled by shift saw. The two spurs will be found ample for all ordinary needs: extra spur is advisable only when extra narrow cuts are to be made with shift saw or fixed saw is to be set for extra wide cuts. Outfeed roll is full width, corrugated, and is given thrust backing by heavy gravity pressure roll (thrust backing of spur roll is given by saw impact).



ARBOR: Alloy steel 1½" diameter with keyways for drive pulley and saw hub keys, mounted in self-aligning ball bearings with eccentric rings for affixing. To affix or release locking ring, place snub end of BALL POINTED punch obliquely in spanner socket and rap sharply with light hammer whichever direction is required. Both rings must be released to permit arbor to slide thru (toward drive pulley) for changing saws.

SPEEDS: Arbor should run at 2,800 r.p.m. Drive pulley is 5" diameter. Motor should have pulley of proper diameter to give required arbor speed. For example; if motor runs 1,500 r.p.m. its pulley diameter will need to be 9". Feed speed is in fixed ratio to saw (arbor) speed and is the most practical rate for general use.

Slower rate of feed can be obtained by using larger diameter V-sheave E53, Saw speed may also be adjusted between maximum of 3600 r.p.m. (on ball-bearing arbor) and minimum of 2000 (with thick saw) resulting in corresponding feed rate variations. Fast saw speed and feed are most efficient when power is adequate, and stock is free cutting.



SAW SHIFTER: See drawing on next page. This is a 1x4 bolted on top of bracket extending out from bottom of shift saw fork, equipped with index loop at handle end engaging notches in scale (regular equipment), and is pivoted exactly half-way between shift saw and scale. For adjusting amount of shift, move shifter pivot: if scant widths are desired, move pivot toward edger. The ends of shifter are intended to clear top of frame main beams, to provide full width shift; travel may be increased by tapering ends of 1x4. If shift saw tends to "run"—fails to hold its setting—bolt heavy piece of iron to bottom of shifter, to make index loop remain in scale notches.

SAWS: Standard equipment saws are 12" diameter, 10 gauge thick, and with 24 spring set teeth, which consumes minimum power. Other type saws may be used, provided both are exactly the same. In case of excessive splintering at bottom of cut, insufficient saw speed is indicated.

SAWS MUST BE KEPT PROPERLY SHARPENED. Touch up the cutting edges frequently with a fine file applied only on face of tooth, taking off only enough metal to remove rounded or "wire-edged" corner, and taking care to maintain original slant of face of tooth. File top of tooth only when rubbing is indicated by gloss, and avoid cutting down top of cutting edge itself. When repeated filings have reduced gullet depth the saw must be "gummed," and when kerf clearance becomes insufficient the teeth must be given new set.

Principal things to remember are that saws must be sharp, all teeth must be in true circle, gullets must be kept open for sawdust, teeth must have back clearance and enough set to cut freely.

PARTS LIST
MODEL 802 EDGER

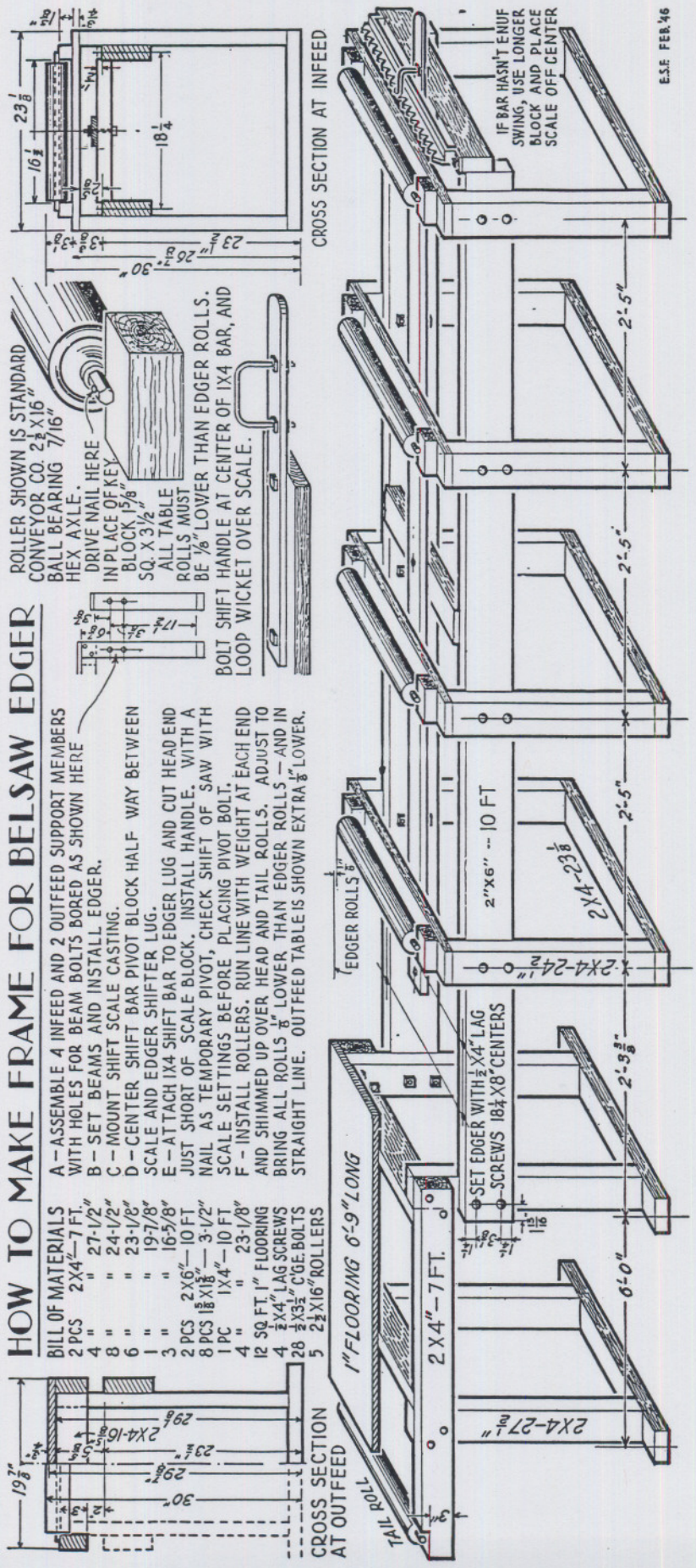
Order Part No.	Description	Shipping Wt. in lbs.	Price
m-2	Arbor Ball Bearing	2	$ 6.33
m-3	Socket Box	3	9.33
m-4	Infeed Shaft	6	5.50
m-5	Feed Spur	1	5.75
m-6	Outfeed Roll	14	9.33
m-7	Press Roll	46	11.55
m-8	Feed Roll Bearing	1	2.18
m-9	Split Socket Box	1	.90
m-10	Arbor, 1½" diam.	21	13.20
m-26	Gang Saw Hub	2	4.25
n-4	Shift Saw Hub	3	6.22
m-11	Collar for Hub	1	1.65
n-6	Shifter	3	6.22
n-2	Shifter Shaft	3	.78
m-12	Take-Up Pulley	4	2.33
m-13	Idler-Arm	4	2.33
m-14	Axle	1	1.56
m-15	Spring	1	.47
m-16	Pulley, 12"	8	4.12
m-17	Flat Belt, 2"	2	2.00
m-18	Swing Arm Spider	4	3 11
m-19	Anchor Stud	1	1.56
n-11	Pulley and Step Hub	3	3.00
m-21	Feed Axle Shaft	1	1.56
m-22	Feed V-Belt	1	.72
m-23	Tightener	3	2.33
m-24	Anti-Kickback Prong	1	1.56
m-31	Setting Lever	6	4.50
m-29	Cam (specify R or L)	1	2.25

*Model 8011 Edger takes same parts as above except Arbor Bearings and Boxes. (Specify Right or Left)

n-9	Split Socket Cap	2	3 00
n-10	Split Socket Box	4	4.50
814	Edgar Saw, Inserted Tooth, 12", 10 ga.	6	25.43
880	Edger Saw, 10", 12 ga.	5	5.82
888	Edger Saw, 12", 10 ga.	4	7.70

Rollers for frame shown on next page are 2½" diam., 16" long, steel with ball bearing ⅞" hex shaft. Wt. 4½ lbs.
No. 231F, each $2.25

Five rollers mounted in 10' long, 3x2x ⅛" angle frame, wt. 97 lbs.
No. 232S, each $18.20



SETTING UP: Before operating edger see that all bolts are tight, that collars on saw hubs are turned with taper side toward saw and that saw keys are properly set; see that all rolls are perfectly level across (shaft bearing boxes have provision for slight adjustment by loosening attachment bolts and shifting); make sure that the top of rollers are at proper levels. The outboard infeed rollers should be from 1/16" to 1/8" lower than edger feed rolls; outfeed table should be 1/8" lower than edger feed rolls and edge next to edger should be beveled to prevent stock snagging; tail outfeed roller should be about level with edger feed rolls. Adjust stay rods at sides of hood to bring pressure roller level. Lubricate all moving parts except ball bearings, which have sealed lubrication.

OPERATION: Positive feed depends on alignment of rollers. If thrust of infeed spurs shows excessive, raise outboard infeed rollers slightly; if edger outfeed roller shows excessive pressure, raise tail outfeed roller. Straightness of feed depends on cross alignment of rollers; raising end of roller at side toward which stock trends should bring stock into line. If necessary to rip stock so heavy as to stall saws, remove main feed belt and feed the stock by hand: be sure to keep the stock moving—one direction or the other; if stock stands still even momentarily the saws will burn.

FRAME CONSTRUCTION: Under no circumstances take a chance on temporary or makeshift frame set-up, or serious damage may result to saws and machine. The construction of frame shown in drawing requires minimum materials and gives best assurance of satisfactory results. If you are unfamiliar with following drawings, start with the outfeed table separately: when you have completed this one simple section you will find it easy to construct the rest.

STOCK GUIDE: Not ordinarily used with edger can be added to frame if desired for aligning boards with one straight edge. Simply add two 2x4 frame legs to support 2x6 just clear of top of rollers. Do not use guide over 4' long and do not bring it closer than 2" to saw. Guide must be carefully aligned with lead of saws: if when stock is started against guide it veers out from it at tail end when being ripped, then align guide accordingly.

If using such stock guide make it removable to provide clearance for raising the hood. This can best be done by boring hole for bolt from top of leg, then chiseling out a slot so bolt can be inserted and run up from below.

If frame is placed on ground a 2x4 stake should be driven below frost depth and staked to each leg. In any case precaution should be observed to prevent the frame shifting after being properly set. If further information is required write direct — giving serial number of your edger—to

BELSAW MACHINERY CO.
315 Westport Road
KANSAS CITY 2, MO.

GOVERNED CAR POWER TAKE-OFF

(ADAPTOR GOVERNOR)

THE FACTORS OF POWER ORIGIN

Car motor popularity for powering farm sawmill is due to low first cost—not to power efficiency.

There are two motor power ratings: Brake Horsepower which means the horsepower presented at the brake applied through the automotive gearing, generally based on new motor running at top speed, higher than is practical for sustained run—particularly for old motor. This is the high rating.

The rating used in sawmill application is called "Actual Horsepower," Belt Horsepower or Taxable horsepower. This is the power directly available from the crankshaft.

Original power rating of the motor when new is available from motor manufacturer. When motors are old, their original rating is of little guide. Fundamentally a 6 cylinder motor capable of developing 25-35 belt horsepower would require at least 3¼" bore x 4¼" stroke, these motors generally develop their most efficient stationary power when governed around 1500-1800 R.P.M. Four (4) cylinder motors for the same power should have a 4" bore by 4½" stroke, they run around 1500 R.P.M. V-8 motors minimum would be 3¼" bore x 3¾" stroke, they are governed around 2000 R.P.M.

Used gasoline motor is the least efficient of all forms of sawmill power; no other form loses original capacity so rapidily or trom so many causes.

Results are satisfactory only if motor is restored to reasonably good condition, and if conversion for stationary power is properly handled.

Smooth running is no indication of motor's power: cut off ignition and crank motor by hand, to check compression; if turns easily piston rings are worn and new ones must be installed.

Remove carbon and grind valves; install new plugs and wiring; clean sludge out of crankcase. Without these attentions do not expect satisfactory power.

Never overestimate the power of a used motor; rely only on actual check by starting with light cut and following with successively heavier ones. From this you can tell what depth cut at normal rate of feed represents motor's maximum power. Thereafter, reduce feed rate for cuts over that thickness—or in woods harder to saw.

Conversion from automotive to stationary form, if for heavy duty, requires a) splined shaft fitting into universal socket of transmission, b) bearings at each side of pulley, c) proper size pulley, and d) automatic governor with idling device.

The adaptor shown herewith embodies these essentials in practical form. It includes provision too for extension, for powering additional machine not lined up with main adaptor. The outboard extension of main adaptor shaft takes pulley offset 12"; the extension unit takes pulley offset either 20" or 34" centers—suitable for Butting Saw or Edger.

Never use direct connected power for sawmill, or power applied thru gears, except such as are built into tractor. Car motor transmission intermediate gear may be used if governor is on adaptor instead of motor, provided motor will stand high speed. If emergency requires its use, for occasional extra hard cut, let the motor idle in the completed cut every few minutes—while moving log to and fro.

FACTORS OF POWER TRANSMISSION

Two things a sawmill MUST HAVE: sufficient **power**, sufficient **speed**. It matters not how much power or speed the motor develops if it doesn't reach saw.

Proper provision must be made for getting both to saw with the least possible loss, and this demands efficient transmission; proper pulleys and belt.

The power transmission capacity of pulley depends on its belt contact area, and may be found approximately by following formula;

Dia x rpm x belt width divided by 1000 x .35 = hp.

Example: 8" pulley at 1500 rpm, 6" belting;

$$\frac{8 \times 1500 \times 6}{1000} = 72. \times .35 = 25 \text{ hp}$$

Similarly, a 12" pulley with 6" belt can transmit 38 hp—and with 8" belt can transmit 50 hp.

From this it can be seen that the larger the diameter of the pulley the better. Sawmill trouble is often due to undersize pulley, with its consequent waste of power from belt slippage.

Speed of driven pulley depends on the ratio of its diameter to that of driving pulley and is found by the following formula:

Drive pulley dia x rpm divided by saw rpm = dia driven ply.

Example: 8" pulley at 1500 rpm, saw speed 1000;

8 x 1500 = 12,000 divided by 1000 = 12" dia ply on arbor.

If dia and rpm of driving pulley and dia of driven pulley are known, to find saw speed:

8 x 1500 = 12,000 divided by 12 = 1000 rpm of saw.

Where the motor is low, the driver pulley should be ⅓ the size of the driven pulley—adjusting the speed of the motor to obtain proper saw speed if possible.

The accuracy of such calculations depends on belt traction efficiency of 100%. This is not the case; there is not less than 3% belt slippage loss under most favorable conditions; the average is 5%, more if pulleys are undersize, belt too slack, etc.

Therefore, allowing for average loss 5% should be added to motor speed. If calculations are based on motor speed of 1500 it should run about 1575.

Belt efficiency depends on area of pulley contact and other factors such as quality of belting, tension, smoothness of joints, belt travel, etc.

Speed of belt travel is found by multiplying pulley circumference by rpm and reducing to feet.

Most efficient travel is about 5000 feet per min. At 1500 rpm an 8" pulley gives 3150, 12" 4700; the faster rate of larger than 12" is inadvisable. The average belt speed of tractors is about 2600.

Tension is an important factor often disregarded. Belts stretch as they become warmed up in use, and as they dry after having become wet. If a belt is taut when dry, its shrinkage when rained on may be enough to alter adjustments or cause breakage.

Therefore, a belt tightener is advisable, preferably of gravity type, one that will either take up slack or allow more slack. Idler pulley must be at belt slack side of pulley, never at taut side.

Crossed belt is more efficient than straight, because its greater wrap on pulley gives more grip.

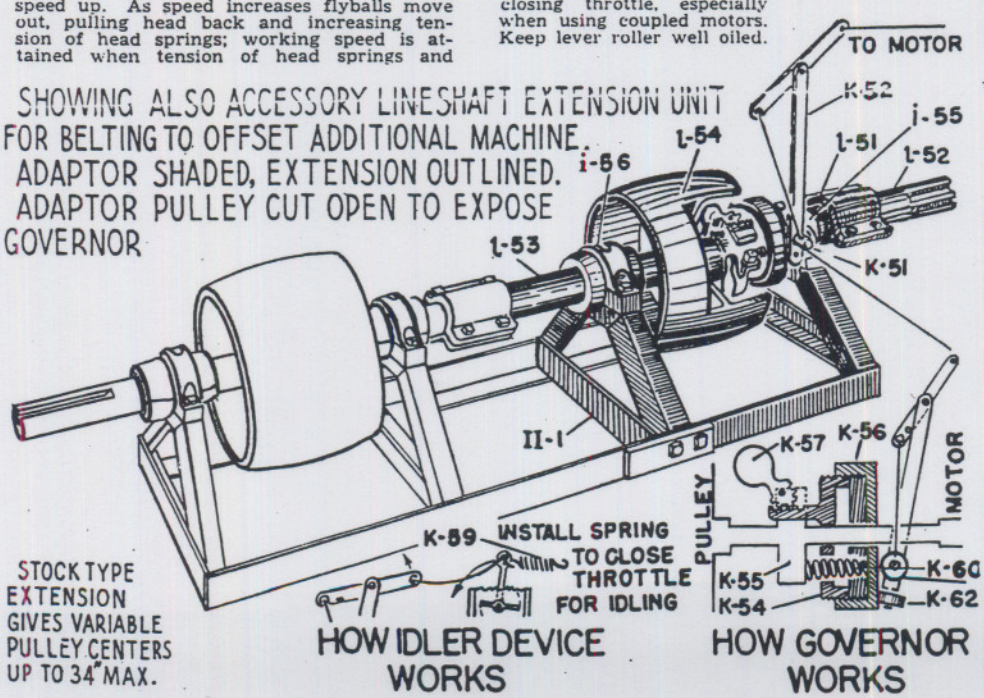
Endless belt is more efficient than laced because its joint doesn't cause skips on pulleys.

Pulleys for high speed must be true round concentric with axis, in proper balance, and crowned.

LEARN HOW GOVERNOR FUNCTIONS

For those who desire a knowledge of its operation a diagram of how the governor works is shown. With shaft revolving slowly flyballs lie parallel, ball pinion driving rack and head out, moving lever top back and opening throttle so motor will speed up. As speed increases flyballs move out, pulling head back and increasing tension of head springs; working speed is attained when tension of head springs and centrifugal force of flyballs balance. Turning the head collar regulates tension of springs, thus determining the point of balance.

For maximum sensitivity keep gearing and pivot of flyballs well lubricated. Avoid excessive tension on spring closing throttle, especially when using coupled motors. Keep lever roller well oiled.



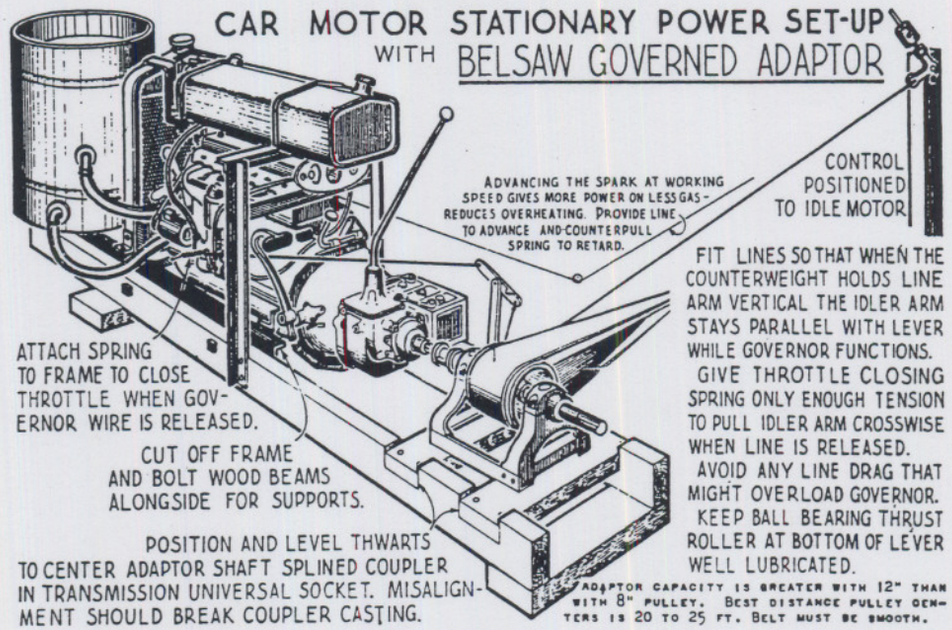
PARTS LIST

Order Part No.	Description	Shipping Wt. in lb.	Price
1-51	Coupling	2	$5.70
1-52	Stub shaft	5	4.80
1-53	Main shaft	12	8.60
i-54-55	Front babbitted bearing complete with arm ratchet	9	12.40
i-54-56	Rear babbitted bearing	8	11.60
1-54	8 x 6 pulley	11	8.60
1-55	12 x 6 pulley	16	14.40
1-56	12 x 8 pulley	19	18.20

Ggovernor parts

	Description		
k-51	Arm pivot bolt	1	.90
k-52	Arm (with idler control)	2	.90
k-53	Arm roller bolt	1	.90
k-54	Sliding rack segment	3	8.60
k-55	Governor body	3	8.60
k-56	Adjusting collar	2	5.70
k-57	Flyball	1	1.90
k-58	Throttle reversing arm (attaches to carburetor)	1	.90
k-59	Throttle spring	1	.70
k-60	Compression spring	1	.50
k-61	Compression spring button	1	1.00
k-62	Arm roller bearing	1	2.80

INSTALLATION AND OPERATION SUGGESTIONS



1) Block up securely under motor: cut off chassis behind rear motor supports, also body behind cowl.

2) Bolt heavy beams alongside remaining frame and run strong sills under: beams must be long enough to take adaptor, with allowance for extension. Remove motor blocking; level the supporting beams.

3) Place cross-pieces temporarily with adaptor on them, and measure for positioning. If notches are cut too deep shim them up to bring pulley shaft in true line with transmission universal socket which coupler spud fits into.

4) Extra coil spring supplied with governor is to be connected to carbureter throttle arm, therefrom to convenient anchorage. If arm is not in vertical position when motor idles re-set it. Run line from arm to top hole in governor upper arm placed cross ways to lower arm. With governor idle, top of its main arm stands about 1½" out of vertical and from motor. If obstruction prevents free line run, install furnace pulley at bend to prevent drag.

5) Run line from lower hole of governor upper arm thru eye in arm pivot stud, thence to the control.

The type control indicated above employs counterweight supplied by customer: — when thrown back of pivot center it holds line taut: line may be jerked at any point to cut down motor speed: counterweight is pulled forward of pivot center, against a stop, and releases line tension. A slight degree of braking action at governor pivot is permissible: however, it is well to keep line greased at this point so throttle closer spring will not have to be given too much tension, which would reduce governor's sensitivity.

6) Provision should be made for 2 spark settings, low for idling and high for working speed. Spring same as on carburetor may be used to retard spark, and line may be run to advance it to a stop placed so motor will neither overheat nor knock. Line may be connected with that to governor, in which case use furnace pulleys at turns to prevent drag.

7) Even with spark properly advanced, a car motor may overheat when used for stationary power: it is usually necessary to provide additional water supply for radiator. The larger the tank the better. Run hose from bottom to motor intake, and from six inches higher to radiator outflow. Leave top hose as originally. Outlet to motor from bottom of reservoir should be screened with wire gauze.

8) Attend to lubrication every morning during operation: fill oil cups on adaptor bearings and oil ball bearing wheel at bottom of governor lever. If motor is gummed and valves stick try adding one of the advertised solvents to gasoline and oil. In an emergency, to avoid shut-down because of dead battery, use dry cells and crank motor by hand.

9) Motor slow-down is never fault of governor, if governor functions right when load is light: it is due to overloading motor. The remedy is to reduce the rate of feed of log to saw.

If a tachometer is used to check speed, depend on it only when reading is taken at saw while in cut: other readings are very apt to be misleading.

10) To couple auxiliary motor, mount same as main motor but with extension type adaptor (no governor) and use same size pulleys on this adaptor and outboard shaft extension of main adaptor. Run line to throttle from governor same, use sheave at bend.

SAVE FUEL

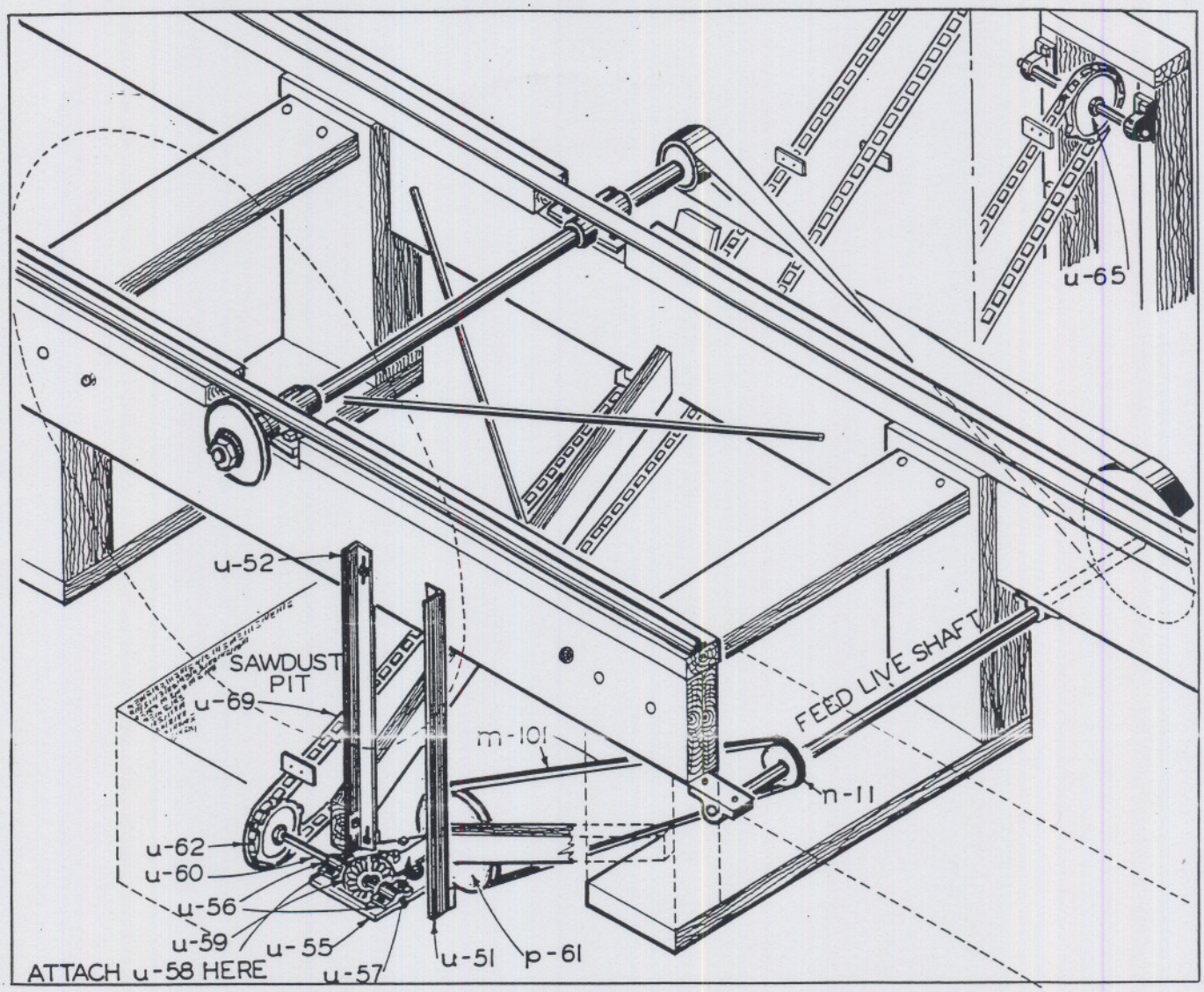
A governor is supposed to keep a motor running at same speed whether load is heavy or light. Sawmill requires volume of power that car motor can supply only at high speed. Therefore, when motor is idle it still runs at high speed and consumes fuel proportionately. To economize fuel by cutting governor out is the purpose of the idling device — which is simply a provision for elbowing governor lever.

The throttle closing spring has a safety feature: it automatically prevents motor racing in case of breakages of governor or line.

The governor may be set to give any working speed from 1000 rpm minimum to 2000 rpm maximum. Setting is regulated by turning the collar on which roller at bottom of lever turns. Turning clockwise gives higher speed; anti-clockwise reduces speed.

BELSAW MACHINERY CO
KANSAS CITY 2, MISSOURI

BELSAW SAWDUST REMOVER



PACKING LIST:

Sawdust Remover includes 4" sheave for feed liveshaft, v-belt, bevel gear drive unit with 10" sheave and 5" chain sprocket, crown sprocket, shaft and bearings; 30 feet detachable link chain and 12 paddle links.

INSTALLATION:

Dig pit 16" deep by 48" wide as shown in drawing with sloped sides.

Place drive sheave on feed liveshaft with v-belt in place. Bolt support angles to base so as to bring gear shaft approximately 22" below bottom of beam. Center these supports from mandrel as follows:

For Heavy Duty Feed—19½" with v-belt crossed.

For Standard Power Feed—18" with v-belt straight Nail 2x4 to inside of rear beam and bolt to u-52 angle. Nail 2x2 to inside of leg nearest feed liveshaft and bolt to u-51 angle.

Set crown sprocket 5 ft. high and about 5½ ft. from mill. Nail board to bottom of rear beam at angle to keep paddles from snagging.

MAINTENANCE:

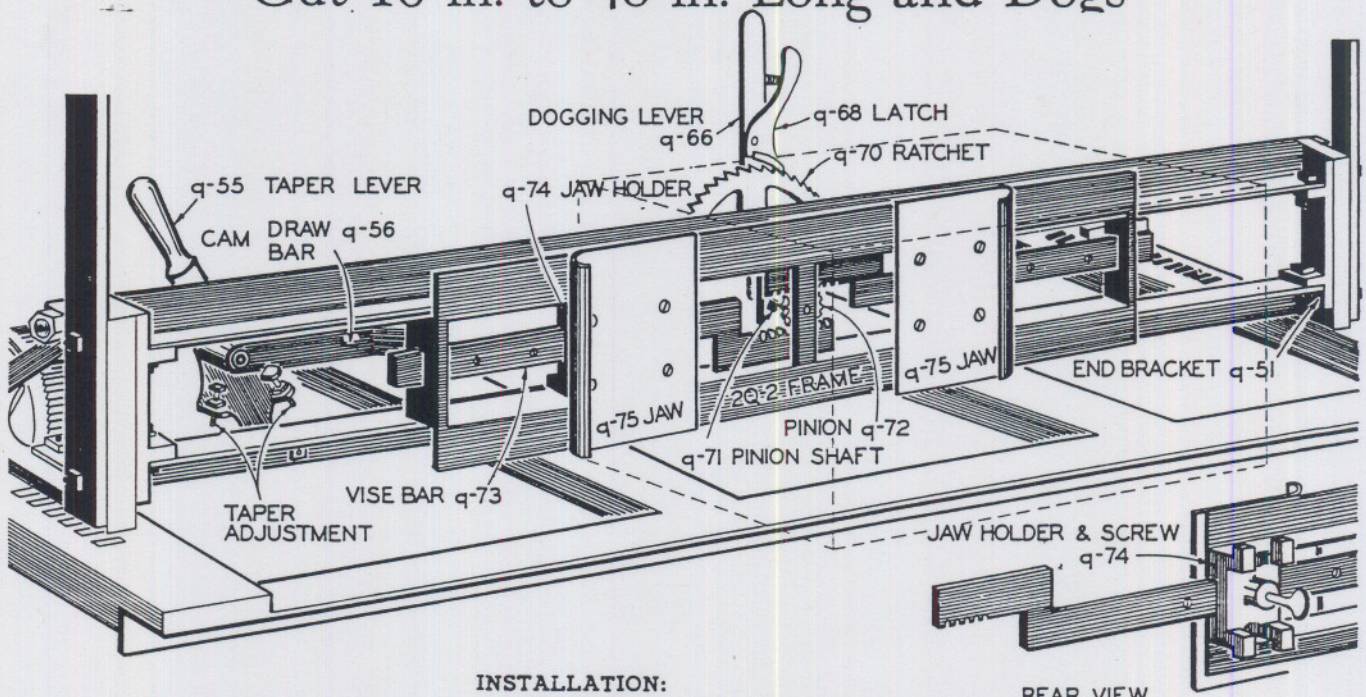
Keep bevel gears well greased and gear cover tight to minimize sawdust. Oil shaft bearings regularly. Do NOT increase chain speed. Always free chain before starting up and watch for any binding or stoppage so as to correct trouble before breaking chain.

PARTS LIST

Part No.	Description	Shipping Wt. in lb.	List Price
m-101	V-Belt 98"	1	$5.70
n-11	4.4" V-Sheave	2	4.80
p-61	10" V-Sheave	4	7.60
u-55	Gear case	10	8.80
u-56	Short bearing cap	2	1.70
u-57	Long bearing cap	3	2.00
u-58	Gear case cover	3	2.00
u-59	Miter Gear 3" OD x ¾" bore	2	2.80
u-60	Sprocket Shaft	3	1.80
u-62	Sprocket 5" OD x ¾" bore ID-6 tooth	3	1.90
u-68	Drags each	1	.60
u-69	#32 Chain 30'	-12	21.90

BELSAW SHINGLE & SHAKE MAKER

Makes Shingles, Shakes and Any Taper or Straight Cut 16 in. to 48 in. Long and Dogs



PARTS LIST

Shingle and Shake Maker

Part No.	Description	Shipping Weight in Lbs.	Price
2Q-2	Oscillator cradle	25	$9.60
q-51	End brackets	2	1.90
q-55	Taper lever and screws	2	.90
q-56	Cam draw-bar and 2 cams	5	2.50
q-57	Cam only, adjustable each	1	.57
q-66	Dogging lever	2	3.80
q-68	Latch and spring—q-69	1	1.30
q-70	Latch ratchet	2	.90
q-71	Pinion shaft	1	1.00
q-72	Pinion	1	2.20
q-73	Jaw draw-bar	2	2.80
q-74	Jaw holder and set screw	3	1.90
q-75	Jaw, 2-way adjustment, steel	3	1.90

Shingle and Shake Maker is an attachment for the carriage of your Belsaw Model "A" Sawmills. It is used to end dog blocks or flitches for making either straight or taper cuts up to 48" long.

INSTALLATION:

Bolt shingle and shake maker to sawmill carriage headblocks in top dog post holes.

OPERATION:

Jaws q-75 have 2½" draw, fast positive vise action with latch. Bars are punched for spacing and centering standard shingle lengths; jaws can also be set at any desired point for short dimension lengths as shown in Rear View illustration.

Oscillation is by balance wedge type cams on sliding bar operated by lever with adjustment for taper up to maximum required for shingles and shakes.

Keep cams balanced to prevent lost motion and keep jar bar racks and pinion lubricated.

After block (or flitch) is tightly dogged, set taper to desired degree with adjustment bolts on taper lever q-55. Thickness of cut is determined by set works of mill itself which advances headblocks number of 1/16" for which repeat gauge is adjusted.

HOW TO MAKE SHINGLES:

The illustration below outlines principal steps in sawing a log into shingles. No special wood is required, the preference for cedar by big mills being due to its durability combined with low weight making extra thinness possible with freight savings.

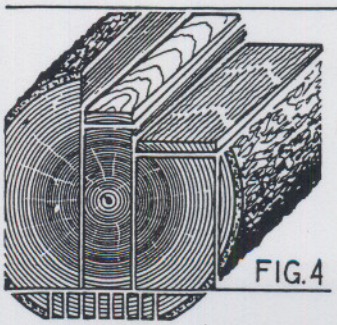


FIG. 4

1: SLAB LOG ON 1 SIDE, RIPPING OFF FLITCH ABOUT 2" THICK FOR SLAT STOCK, TO GIVE FLITCH SEATING.
2: TURN LOG ON THIS SAWED SURFACE AND RIP FLITCHES TO SHINGLE WIDTHS: HEART FLITCH SHOULD BE THIN, AS IT PRODUCES INFERIOR FLAT GRAIN SHINGLES. THE OUTER FLITCHES MAY BE WIDER, AS THEY PRODUCE EDGE GRAIN SHINGLES - THE HIGHEST QUALITY.
3: CROSS-CUT SHINGLE FLITCHES TO PROPER LENGTH AND SQUARELY ACROSS: USE POWER SAW ONLY.
4: CROSS-CUT SLAT FLITCH TO LENGTHS OF 19½".
5: DOG SLAT LENGTHS IN LAYERS IN SHINGLE MAKER AND RIP FINISH SLATS 3/4" THICK - STRAIGHT CUT.
6: NAIL SHINGLE BANDS ON ENDS OF HALF THE SLATS.
7: DOG SHINGLE BLOCKS IN LAYERS, SET STROKE BLOCK OF AUTOMATIC GAUGE FOR THICKNESS, AND SCREWS IN OSCILLATOR LEVER FOR TAPER: MAKE SHINGLES.

Shingles are commercially classed in three lengths and butt thickness. 16" lengths must be thick enough at the butt that five shingles when green measure two full inches. 18" lengths are thicker, five butts measuring 2¼". On 24" lengths the minimum butt must be ½", 4 shingles measuring the 2" thickness. All are accepted in random width. Shakes are really long, heavy shingles 32" and 36" long, and correspondingly heavier at the butt end. 3,000 shakes are considered equivalent to 10,000 shingles.

Life of shingle depends on thickness, a thick one of common wood lasting longer than thinner one of cedar. Since freight is seldom a factor "native shingles" should be thicker if made of less durable wood.

SIMPLIFIED ROUTINE:

Shingle making involves numerous motions necessarily, because the unit is small. To obtain high production it is necessary to reduce the number of motions to minimum.

"With taper lever in forward position make first saw cut and gig back. Reverse position of taper lever—advance headblocks with automatic set work and make next saw cut—gig back. Repeat till block is completed. Remember one extra motion per shingle amounts to several thousand unnecessary motions per day."

The BELSAW Shingle Maker has high efficiency, but its full efficiency is realized only when the operator also is efficient. Expert shingle "weavers" report production with it from 40 to 50 per minute, 25M per day, and over!

Many operators report higher output with hand feed—carriage power feed disconnected.

BELSAW SHINGLE PACKER

SHINGLE PACKER:

Bunching is essential for keeping shingles in good condition—free from deterioration; for quick handling—to prevent breakage; for appearance appealing to buyers and for accepted commercial count system. Packaged in this manner shingles are easily dried or seasoned remaining perfectly flat in the process.

Sale is by the "square" 10' x 10'. Recommended exposure of 16" shingles is 5" to weather, 18"-5½", 24"-7½". Following this 16" shingles are packed 20" wide 20 courses to the bundle, 18"-20" wide 18 course, and 24"-20" wide x 13 courses high. Four bunches are required to the square.

Buncher operation is shown at bottom of page: 3D, Close gate, open clamps, place bottom slat with bands brought up thru slot in top clamps. 3E, Load required number of courses, place top slat, compress — holding clamp lever with knee while nailing bands to top slat. 3F, open gate and remove bunch at that end.

Buncher shown gives highest compression, with shingles remaining tight after shrinkage; neat flush sides; and fastest operation.

LAYING SHINGLES:

For rafter length, multiply width of building over plates by .56 if pitch is ¼ (6" to ft.), by .6 for ⅓ pitch (8" to ft.), by .63 for ⅜ pitch (9" to ft.) by .71 for ½ pitch (12" to ft.) and by .8 for ⅝ pitch (15" to ft.).

For roof area multiply twice rafter length by building length. Divide this product by 102.8 to determine number of "squares" of shingles required.

The steeper the roof pitch the greater length of shingle that can be exposed; the flatter, the roof, the less. Average exposure on 16" shingles is 5" to weather, 18"-5½", 24"-7½". For side walls allow approximately 50% more or where shingles are double coursed 16" shingles may have 12" weather exposure, 18"-14", 24"-16".

Shakes with their greater size and thickness may be exposed proportionately more to the weather. These recommendations are made with maximum protection life in view, heavier thickness adds more life.

Starting at eaves lay 1st course 2-ply with 1¼" projection over cornice, 1" at gables. Use straight-edge to insure straight courses. Give at least 1½" sidelaps—with no break directly over another in any 3 courses. This places three layers of durable wood on the roof at every point. If the shingles are comparatively wide and have heart centers, these centers should never be placed on top of each other due to the danger of splitting and leaking. Similarly, joints should not break over heart centers. Shingles may be wet before laying. to prevent splitting and for expansion: space only one-eighth inch apart. Use nails that are heavily zinc coated, 2 to a shingle, ¾" from the sides, 6" from the butt on 16" shingles, 7" on 18", and 9" on 24".

SHINGLE SAW:

High speed saws with teeth closely spaced and uniformly set (or side dressed) produce the smoothest and best sawed shingles. In commercial production a thin saw pays for itself from the extra shingles it yields.

Two efficient 30" diameter shingle saws are: Straight 10 gauge with 36 swaged teeth—1200 RPM; Taper ground resaw 9 x 14 gauge with spring set teeth—1500 RPM.

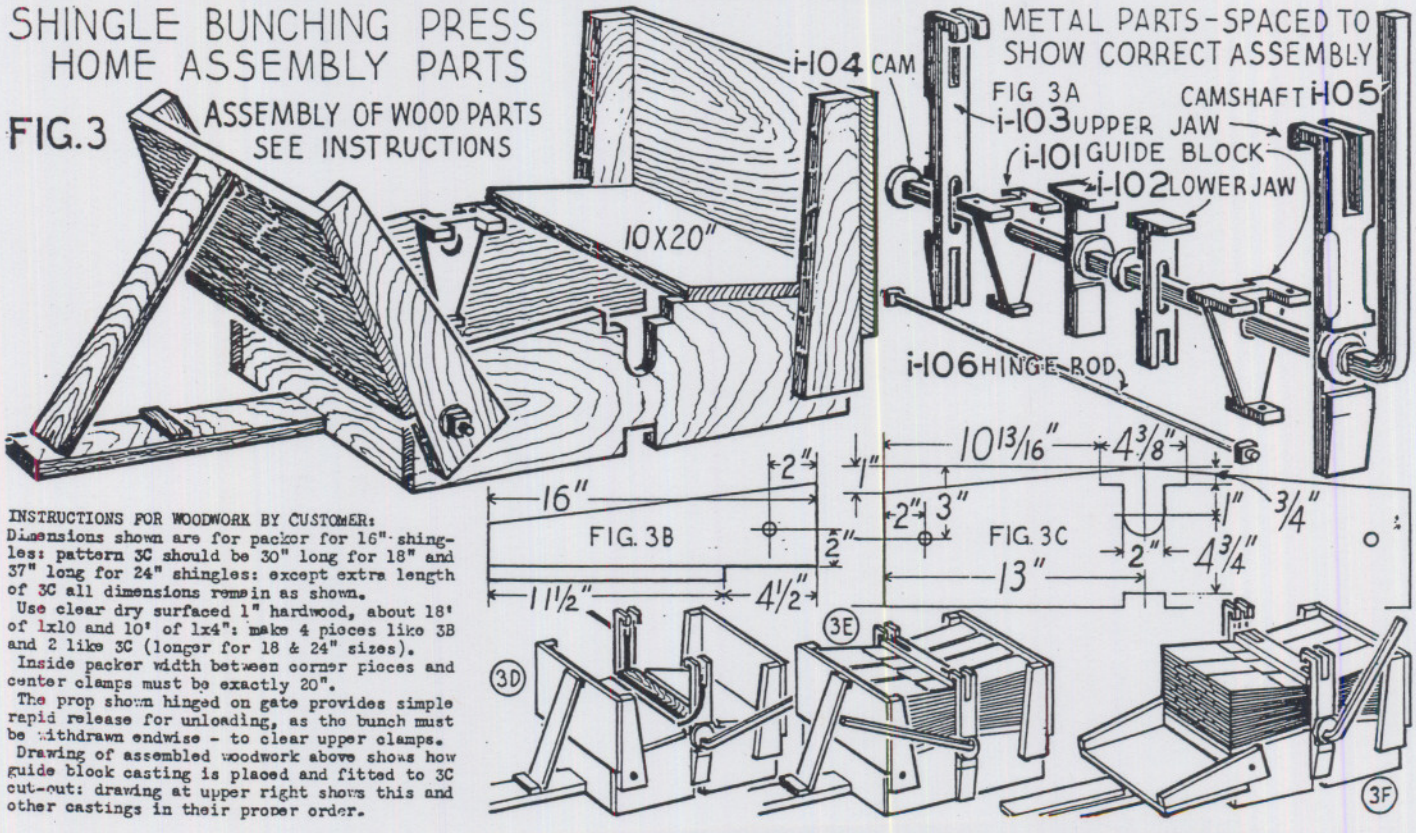
PARTS LIST

Shingle Packer

Part No.	Description	Quantity	Shipping Weight in Lbs. Each	Selling Price Each
i-101	Guide Blocks	2	3	$3.80
i-102	Bottom Press Jaw	2	5	1.90
i-103	Top Press Jaw	2	11	1.90
i-104	Cam	4	3	.70
i-105	Steel Lever	1	7	1.50
i-106	Hinge Rod	1	2	1.70

SHINGLE BUNCHING PRESS
HOME ASSEMBLY PARTS

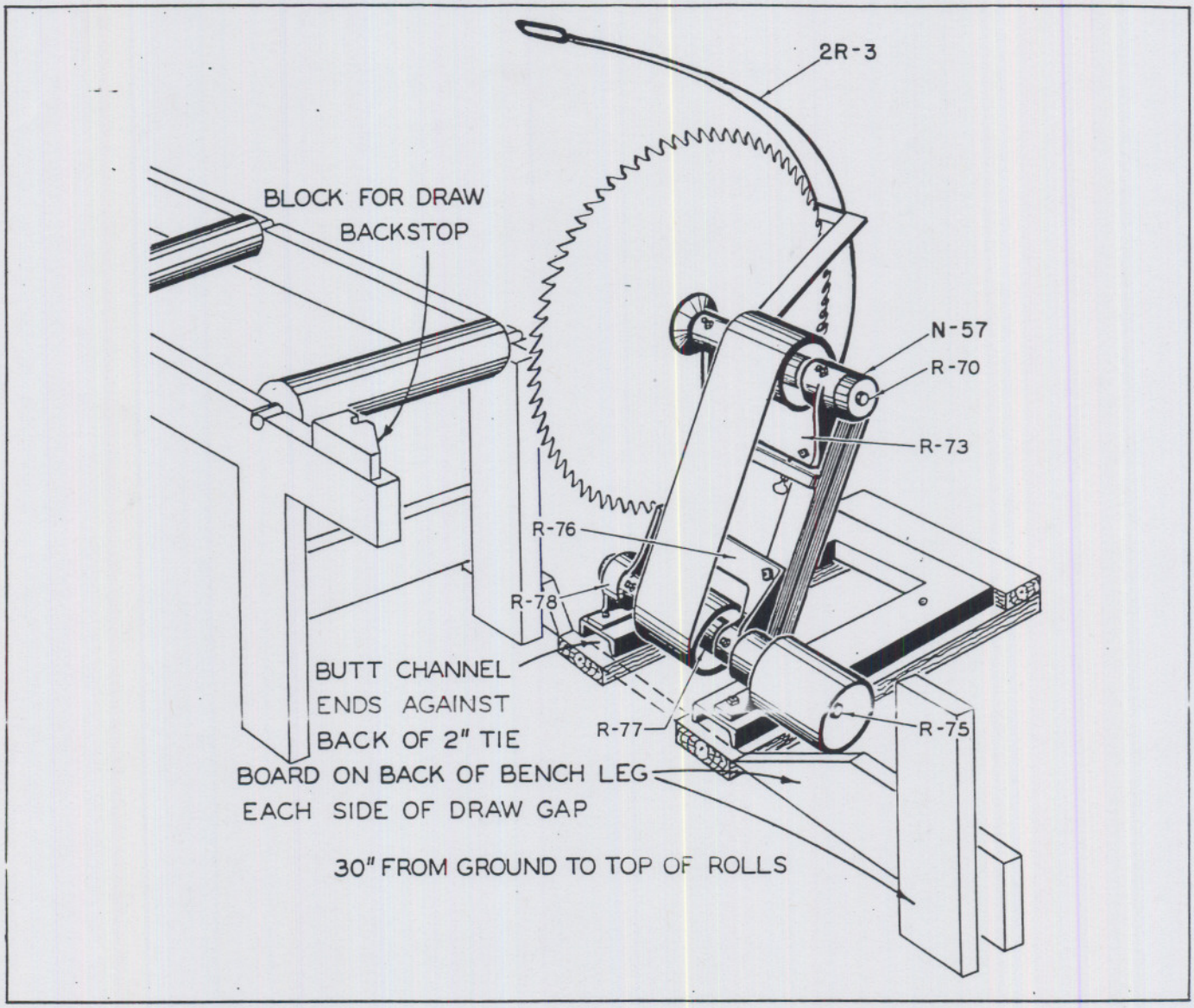
FIG. 3 ASSEMBLY OF WOOD PARTS SEE INSTRUCTIONS



INSTRUCTIONS FOR WOODWORK BY CUSTOMER:
Dimensions shown are for packer for 16" shingles: pattern 3C should be 30" long for 18" and 37" long for 24" shingles: except extra length of 3C all dimensions remain as shown.
Use clear dry surfaced 1" hardwood, about 18' of 1x10 and 10' of 1x4": make 4 pieces like 3B and 2 like 3C (longer for 18 & 24" sizes).
Inside packer width between corner pieces and center clamps must be exactly 20".
The prop shown hinged on gate provides simple rapid release for unloading, as the bunch must be withdrawn endwise - to clear upper clamps.
Drawing of assembled woodwork above shows how guide block casting is placed and fitted to 3C cut-out: drawing at upper right shows this and other castings in their proper order.

BELSAW MACHINERY CO.
KANSAS CITY 2, MISSOURI

BELSAW UNDERSWING BUTTING SAW



The Belsaw Butting Saw is designed for trimming boards to length, removing ends which are ragged or defective—for trimming flitches into bolts for making shingles, shakes, lath, box or crate stock—for cutting slabs to stovewood length, etc.

INSTALLATION:

When used in combination with sawmill, the Butting Saw should be placed behind mill and with saw swinging across outfeed bench as indicated in this drawing.

Four bolt holes are provided in steel channels of base for bolting to wood sills, which should be set to proper level and staked securely as a precaution against machine's tilting. Butt channel ends against back of 2" tie board on back of bench leg each side of draw gap as shown.

OPERATION:

The swing at arbor center is about 8" forward, 9" back of trunnion arbor vertical axis. When installed as shown, with front of base channels back about 4" from bench bed, it will cut a 16" width 1" thick—less as thickness increases.

Use only 30" cut-off type saw with driver pulley proportioned to give the 5" diameter arbor pulley speed of 1200 R.P.M.

PARTS LIST

Order Part Number	Description	Shipping Wt. in lb.	Net Price
f 7	⅛" pressure grease fitting (4)	purchase locally	
n 7	Belt Pulley 5" x 6½"	10	$5.70
n 55	Arbor nut 1⅜" LH	1	1.90
n 57	Set collar	2	1.00
RR-3	Saw guard assembly	15	5.80
r 70	Arbor, 1½" with tight collar	15	9.60
r 72	Arbor loose collar	3	1.00
r 73	Top Yoke bearing	15	11.40
r 75	Lower pulley shaft, 1½"	12	3.80
r 76	Lower yoke bearing	15	11.40
r 77	Spacing collar	5	1.31
r 78	Trunnion bearing	5	4.80
r 80	Belt, 6" x 54" - 3 ply	purchase locally	
r 81	Pull-back spring	1	.80
r 82	Swing stop	3	3.80

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