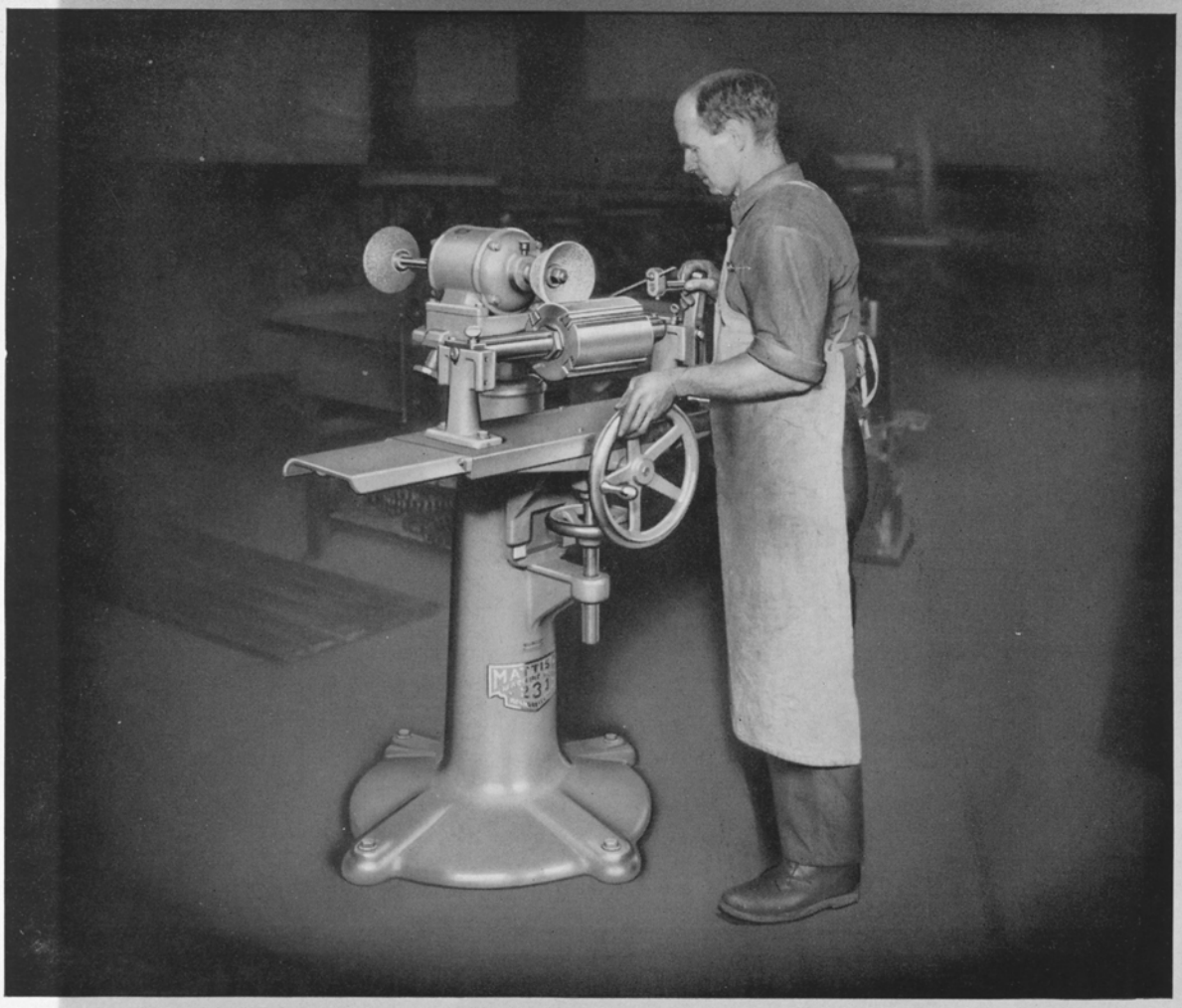
MATTISON
No. 231
PEDESTAL GRINDER



MATTISON MACHINE WORKS, - ROCKFORD, ILLINOIS, U. S. A.

Mattison No. 231 Pedestal Grinder

THE Mattison No. 231, Motor-Driven Pedestal Knife Grinder is a valuable accessory for use with Mattison Electric Moulders or other machines using similar cutterheads. It will handle practically any type of head within the range of 10″ in diameter and 20″ in length. It is equipped with a ball-bearing motor which is totally enclosed to exclude all foreign matter from motor windings and bearings. It is mounted on a swivel head which can be set at any angle.

Motor and table slides are of unique construction, being so designed that all lost motion and wear is automatically taken up without the use of gibs or adjusting screws. The head is carried in a perfectly straight line past the wheel, eliminating snipped corners and producing an accurately ground knife. The slides are protected from dust and dirt by a metal cover fastened to each end of table.

Index pointer operates automatically and may be used on various types of heads.

Mattison No. 231 Knife Grinder, showing swivel support for grinding short heads and adjustable stop for holding heads in proper position, the position of stop being determined by type of cutterhead.

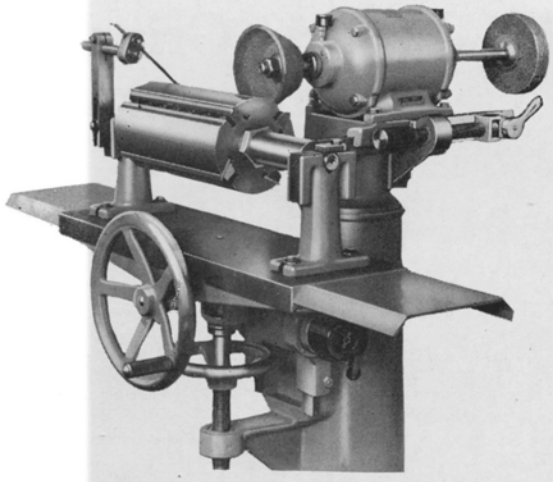
Construction Features

THE BASE OR COLUMN is heavily cast in one piece with large floor base at the bottom. This provides a solid and rigid support for the working parts.

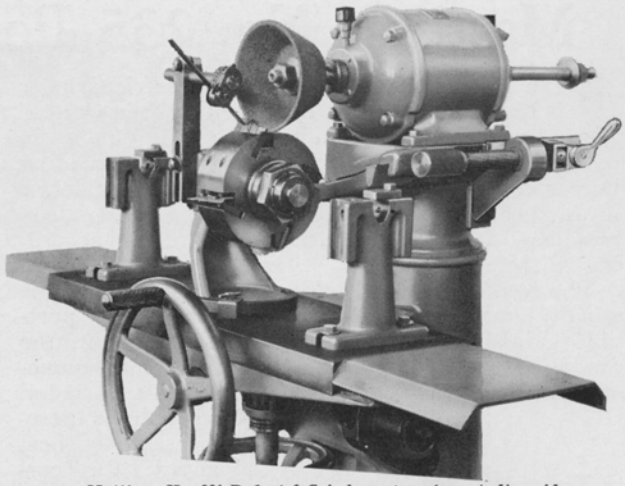
MOTOR is ball-bearing equipped, eliminating all side or end play. It is totally enclosed to exclude all steel and emery dust from motor windings and bearings.

SPINDLE has an extended shaft at either end of motor, one being 1⅝″ in length, the other 5⅝″. This adapts the machine to various styles of heads and permits free-hand, as well as index grinding.

MOTOR SLIDE can be instantly moved back or forth to the approximate operating position by loosening the locking hand-wheel and disengaging adjusting screw. The final precise adjustment is obtained by engaging adjusting screw, which accurately regulates the cut of wheel. Due to the angular construction of the slide, all wear is automatically taken up by means of gravity. This provides a free and easy moving carriage with no possibility of lost motion. It will never require attention as there are no loose gibs to fuss with.



In the illustration above the Mattison No. 231 Grinder is shown grinding a top head with straight knives. The head is being supported between the two fixed cutterhead supports and held in proper position by index pointer.



Mattison No. 231 Pedestal Grinder set up for grinding side cutterhead knife. The head is held by the adjustable swivel support with index pointer in position against the knife being ground. Note the quick-acting adjusting screw.

THE SWIVEL HEAD supports the motor slide upon which it operates. This swivel rests on the main base or column and can be turned or swiveled in any desired direction and locked in any of these positions. Straight or concave bevels as desired are obtained by grinding across the face of wheel or swiveling it to any angle to give the desired amount of concave.

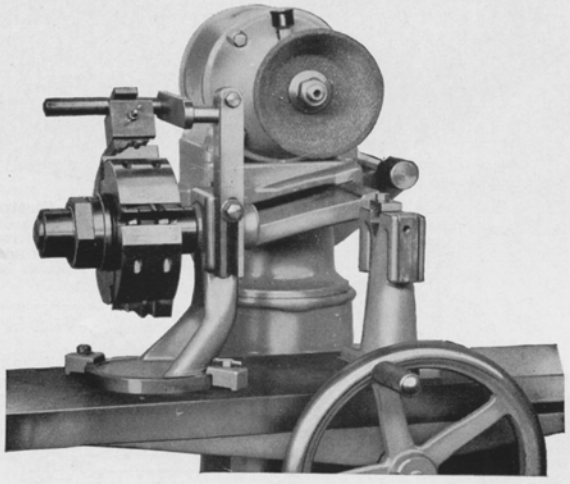
THE ELEVATING SCREW is placed in such a position that the weight of the table is centralized, thus eliminating all cramping action on the slides. It is provided with ball-thrust bearings, which further add to the ease of operation.

THE TABLE rests on ways similar to those of the motor. A great deal of time and attention was given to the construction of the table in order to overcome the snipping or heavy grinding on the corners of knives as they enter and leave the wheel. This is caused by two things, first, by the knife springing away from the wheel during the heavy cut, and coming back into position at the corners of the knives. This is overcome in the Mattison Grinder by making all working parts exceptionally rigid, particularly the motor mountings and head supports. The other cause, lost motion, is probably more important and undoubtedly the cause of most snipping. Where carriage is mounted on dovetail or gibbed ways, it is almost impossible to take up all of the lost motion, and still have carriage operate freely, which is of course necessary. The Mattison Grinder has specially designed ways which automatically take up all lost motion by means of gravity. The angle is such that the carriage works perfectly free at all times, yet there is no possibility of lost motion. The head is carried in a perfectly straight line past the wheel, eliminating snipped corners and producing an accurately ground knife. These slides are protected from dust and dirt by a metal cover fastened to each end of the table.

THE TABLE SUPPORT slides vertically on planed, dovetailed ways which are cast integral with the base. It is adjusted vertically by means of a conveniently located hand wheel.

CUTTERHEAD SUPPORTS. There are two fixed supports, as shown in illustration at top of page, one at each end of table with an arbor between them, for use in grinding heads up to 20″ long and a cutting circle up to 10″ in diameter. Heads are tightened onto the arbor in the same manner as on a moulder cutterhead spindle. For grinding short heads, or side heads where one side is blind, an adjustable swivel rest containing an extended arbor is provided, as shown in illustration above. This support may be turned or swiveled to any desired angle.

INDEX POINTER. This may be used on cutters having cutting or clearance bevels, or a combination of both. It can also be used on round or square heads of various diameters. The index pointer is hinged and a spring causes it to automatically drop into position as the head is turned. As the pointer is always in the same position, all knives are ground exactly alike.



Knife Setting Devices

There are two devices used for this purpose. One is a small disc wheel which is generally used for making duplicate knife set-ups, such as are necessary when two or more moulding cutters of the same shape or contour are to be placed in a cutterhead and afterwards ground. The other holder is intended to hold a short piece of moulding in proper relation to the cutterhead, so that ground or milled to pattern cutters may be set up on the head correctly and the whole head slipped onto the moulder spindle, placed in proper relation to the guide, and fastened.

Mattison No. 235 Portable Electric Grinder

THE Mattison No. 235 Portable Electric Grinder is built of aluminum, making it light in weight. It can be used on the moulder for grinding knives in operating position or in the tool room for grinding knives in setting-up box. When used on moulder, it is attached to the jointer slide, provided on Mattison moulders. It can be swiveled in any direction according to style of head.

The tool is provided with a larger motor than is usually found on portable grinders, but as any portable grinder must be made light in weight, the amount of grinding that can be done with it is somewhat limited, when compared to the pedestal grinder. This grinder is therefore used to best advantage for correcting any inaccuracies in the original setting of the knives after they have been jointed in the machine.

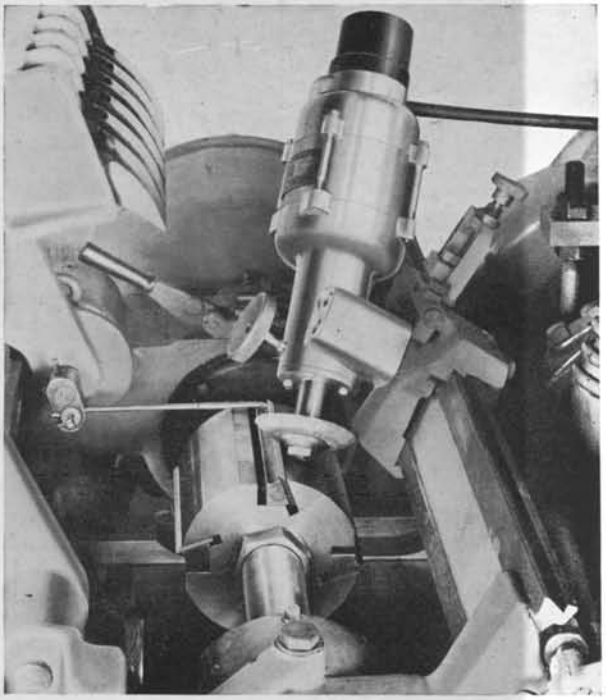
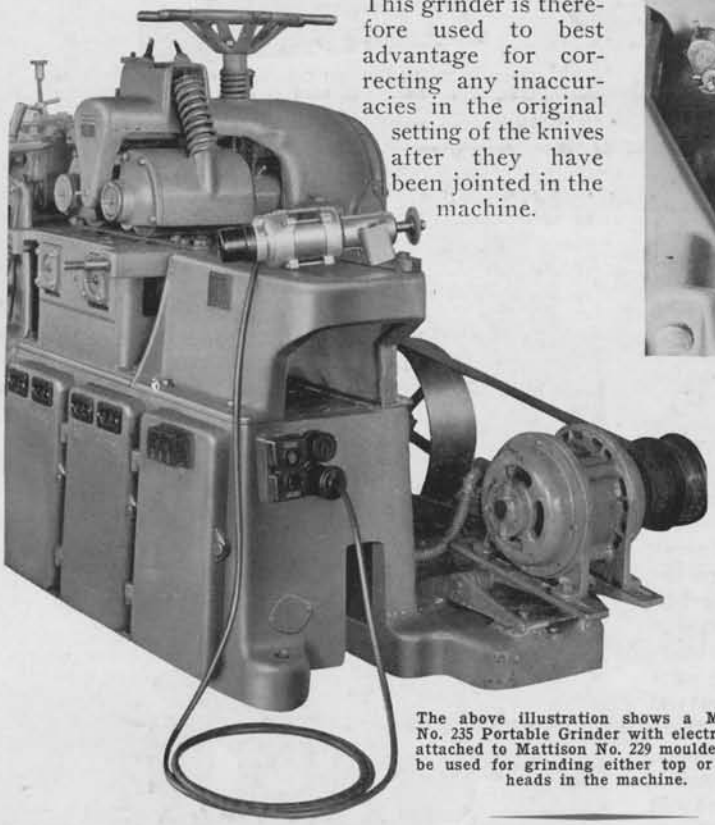
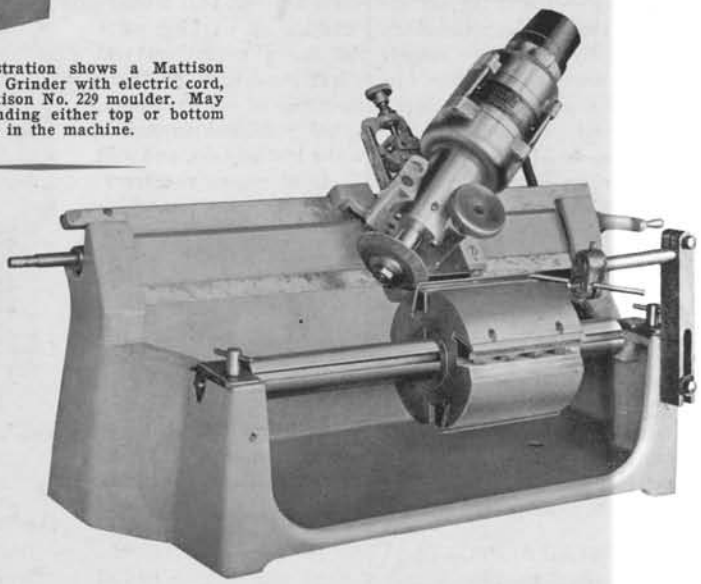


Illustration above shows a Mattison No. 235 Portable Grinder attached to a Mattison Moulder and used for grinding round top head.



The above illustration shows a Mattison No. 235 Portable Grinder with electric cord, attached to Mattison No. 229 moulder. May be used for grinding either top or bottom heads in the machine.

The illustration below shows a No. 235 Portable Grinder sharpening the knives of a cutterhead in set-up box. This set-up box can be conveniently placed on any regular work bench and used in the tool room for sharpening knives, while moulder is operating with other heads. It is a time-saving device worth using.



SPECIFICATIONS

No. 231 Electric Grinder

Saucer Wheel Diameter	6" O. D.
Cup Wheel Diameter	6" O. D.
Speed of Spindle	3600 R.P.M.
Bore of Wheel	¾"
Weight	900 lbs.
Floor Space	37½"x74"
Motor	1½ H.P., ½ hr. 55°C, totally enclosed
Code Word	BOBTA

No. 235 Portable Electric Grinder

Wheel Diameter	Cup	3" O. D.
	Straight	4" O. D.
Bore of Wheel	Cup	½"
	Straight	½"
Speed of Spindle		3600 R.P.M.
Weight		
	No. 235	22 lbs.
	Portable Set-Up-Box	128 lbs.
Motor—½ H.P., ½ hr. 55°C, totally enclosed		
Code Word		BOATH

MATTISON MACHINE WORKS, ROCKFORD, ILLINOIS, U. S. A.

PRINTED IN UNITED STATES OF AMERICA

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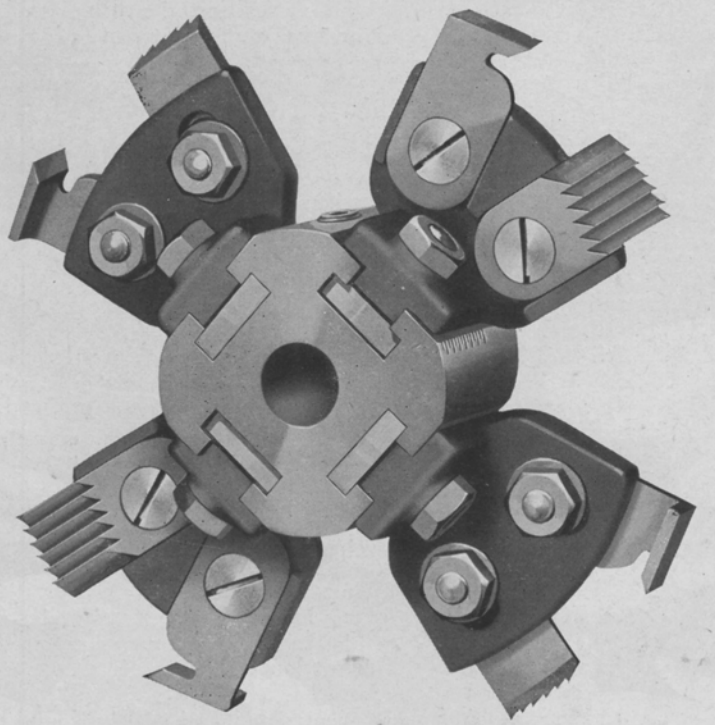
MATTISON "EVERLASTING" DADO-HEADS



Style A-T

THE style shown above is our most efficient Dado and Grooving Head and is strongly recommended where the cutting is hard and difficult, and where the maximum capacity is demanded. This head is so built that all parts are interchangeable. The knife holders rest on a smooth, flat surface, and have a carefully machined tongue which extends into the T-slot of the cylinder or hub. Holders are fastened to the hub by means of planer bolts. The four spur knives used are more than equal to the task of doing a perfectly clean and smooth job of side cutting in any kind of wood; while the groovers, which, of course, get the most work, are guaranteed to cut faster and cleaner than those of any other head on the market.

The arbor is protected from the set screw which fastens the hub, by a feather or spline fitted flush to the inside of the hole and fastened.

The head is made in the following standard sizes:

Style A-T 4 Slot	Cutting from
No. 2.	3/8" to 5/8"
No. 3.	1/2" to 7/8"
No. 4.	5/8" to 1 1/8"
No. 5.	3/4" to 1 3/8"
No. 6.	1" to 1 1/2"
No. 7.	1" to 1 7/8"

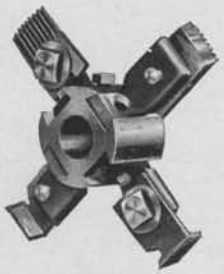
Style A-T 6 Slot	Cutting from
No. 2.	3/8" to 7/8"
No. 3.	1/2" to 1 1/4"
No. 4.	5/8" to 1 5/8"
No. 5.	3/4" to 2"
No. 6.	7/8" to 2 3/8"
No. 7.	1" to 2 3/4"
No. 8.	1 1/8" to 3"

If it is desired to increase the range of adjustment on these heads, they can be furnished with an extra or additional set of grooving knives, as for instance on the 4 slot head, No. 2 cutting 3/8" to 5/8" can be provided with a set of the No. 7 groovers, making it adjustable from 3/8" to 1 7/8".

Standard diameter of cutting circle on 4 slot head, 9 1/2"; on 6 slot head, 10". Minimum diameter of cutting circle with bore of 1 1/2" or less on 4 slot head, 9"; on 6 slot head, 9 1/2". Maximum diameter of cutting circle, 10" with standard cylinder. By using special cylinders of large diameter, cutting circle can be increased up to 13". Length of hub, 2 3/4".

In ordering be sure to give exact size of arbor and state diameter of cutting circle and depth of groove. Also specify whether 4 slot or 6 slot.

Mattison "Everlasting" Dado Heads



Style B

THE Style B is recommended where a Head is to be provided for the general use of the men about the shop. One of the first requisites of a tool that is to be used by "any one and every one" is that it be easy to handle and take care of. It must also be substantially made and free from small and delicate parts so that it will not easily get out of order.

While none of the Dado-Heads we make are complicated or hard to take care of, still the picture will readily tell you that for the above purpose our Style B Head is ideal; not only because it is so simple in construction and easy to take care of, but because it combines with these qualities, the other essential advantages of our Everlasting Dado-Heads described fully at the bottom of this page.

It is made in the following standard sizes:

No. 12. Cutting from 3/8" to 5/8"
No. 13. Cutting from 1/2" to 7/8"
No. 14. Cutting from 5/8" to 1 1/8"
No. 15. Cutting from 3/4" to 1 3/8"
No. 16. Cutting from 13/16" to 1 1/2"
No. 17. Cutting from 7/8" to 1 5/8"
No. 18. Cutting from 1" to 1 7/8"

Diameter of cutting circle 8 1/2" as usually furnished but can be made from 8" to 9". In ordering give exact size of arbor to avoid delays or mistakes.

Style C

THIS is a stationary head, made to cut grooves 3" and wider. It is without an equal for cutting wide Dadoes and Grooves and is made especially strong and durable to do accurate work.

The Shear Cutting Grooving Knives leave the bottom of the groove perfectly flat and smooth, a thing that is almost impossible to do with the majority of other dado heads.

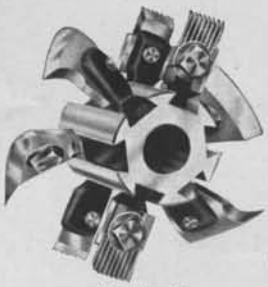
All the side cutting is done with Spurs or Saw Knives insuring a perfectly smooth edge.

It is not an adjustable head but it is apparent from picture that the size of the groove can be changed to some extent.

It can be furnished to cut special grooves of any width from 3" up to 12" or even wider.

The diameter of the cutting circle runs between 9" and 10".

In ordering give exact size of arbor to avoid delays or mistakes.



Style D

THIS is an adjustable head, made to cut grooves 2 1/2" and wider. As regularly furnished it can be expanded to double its closed width, as for instance: a head cutting as narrow as 3" can be expanded to cut as wide as 6".

Like all our other styles it has Shear Cutting Groovers for removing the bottom of the groove, and Spurs for doing the side cutting.

It is thoroughly well constructed and will be found very strong and durable.

Where the narrowest cut to be made is 4" or wider, two bolt Knife Holders are used, the same as those shown in cut of Style C Head.

This head is made entirely in special sizes to suit any requirement within its range. They are not usually made with the maximum cut larger than 12".

The diameter of cutting circle runs about 10".

In ordering give exact size of arbor to avoid delays or mistakes.

The "How and Why" of the Mattison "Everlasting" Dado Heads

PRINCIPLE. As shown by the cuts, these heads are composed of Saw or Spur Knives to do the side cutting and Shear Cutting Grooving Knives to take out the body of the groove. There can be no question but what a combination of this kind will cut faster, easier and with less power than anything on the principle of a saw, because the groovers remove the stock in the form of thin shavings instead of chopping it out in chips.

NO LOSS OF EFFICIENCY FROM WEAR. One great trouble with most Dado Heads is that as they wear, they grow smaller in diameter and thereby lose their efficiency. On our Heads it is the Knives which do the work and get the wear, and they are adjustable in and out so that the diameter can always be kept the same until they are used up. This feature is also very important where it is necessary on account of any special machine or where several heads are run on one arbor, for the diameter to be kept the same.

ADJUSTMENT. The adjustable Heads can be set to the smallest fraction to cut a groove to exactly fit any odd size of lumber, and when once set will cut without variation.

INDEX. An index is provided on the hub so that accurate adjustment can be made without removal from machine.

EVERLASTING. They are renewable where the wear comes, that is, on the knives. These can be replaced by any mechanic or secured from us at a trifling cost. Consequently they are the most economical of all Heads.

SIMPLE IN CONSTRUCTION. There are no complicated parts to wear or get out of order; everything about their construction is plain, simple and easy to take care of. The Slotted Hub is machined from a solid piece of steel and the knife holders milled to fit. The knives are fastened to the holders by bolts and there is absolutely no danger of their coming out while the head is in motion.

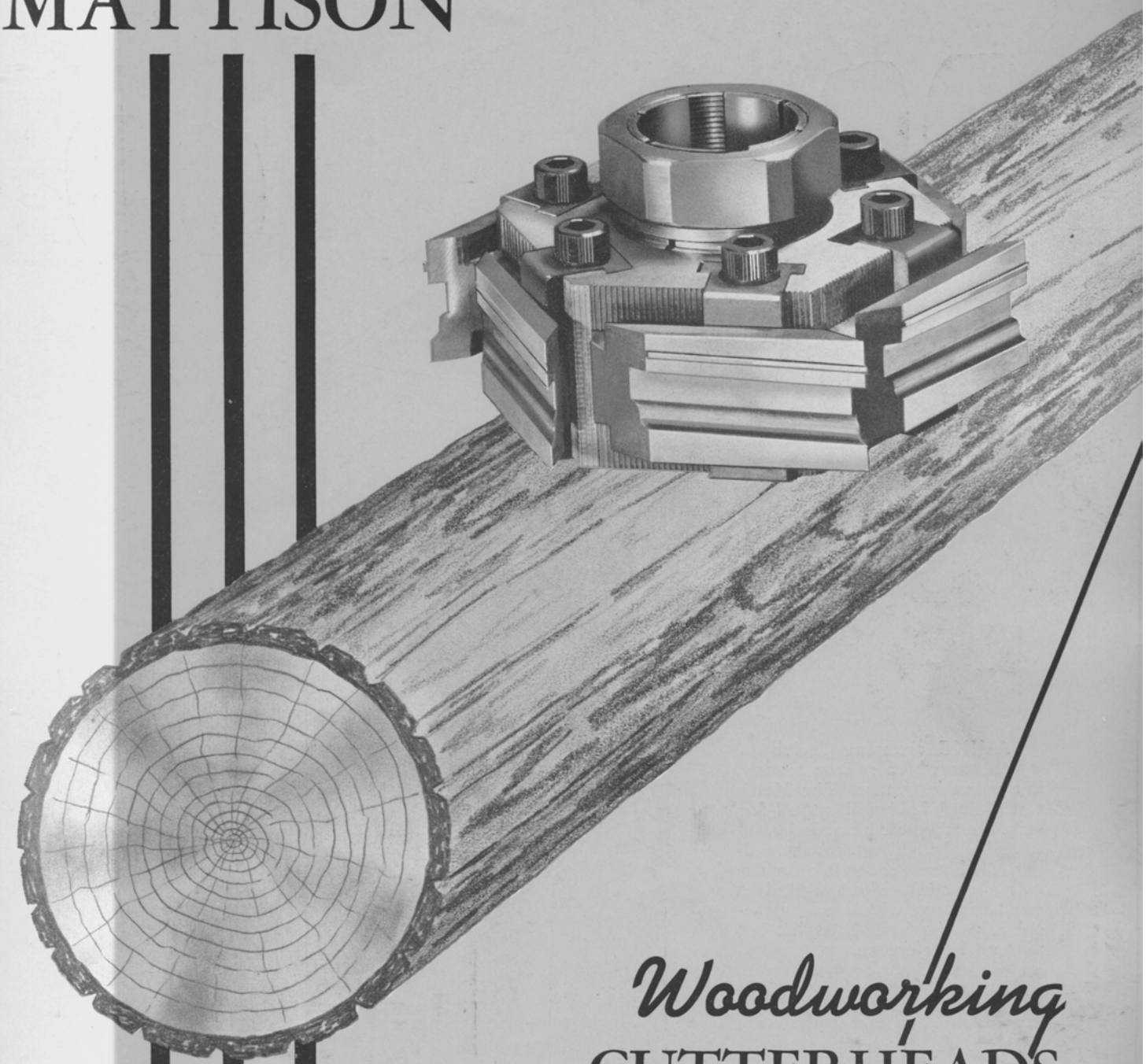
RELIABILITY. When set at a certain width they will cut that exact size until entirely worn down. The strength of the knives themselves, together with the rigid support given by the holders, allows of no giving or bending to change the size of the groove as is sometimes the case with thin, yielding saw blades.

THE HEADS are fastened to the arbor by a set screw so that no collars or nuts are needed, although they can be used if preferred.

MATTISON MACHINE WOKRS, ROCKFORD, ILLINOIS, U. S. A.

RINTED IN UNITED STATES OF AMERICA 6-48-3M BP

MATTISON



Woodworking
CUTTERHEADS
and
KNIVES

Self-Centering Devices for Top, Bottom and Side Heads

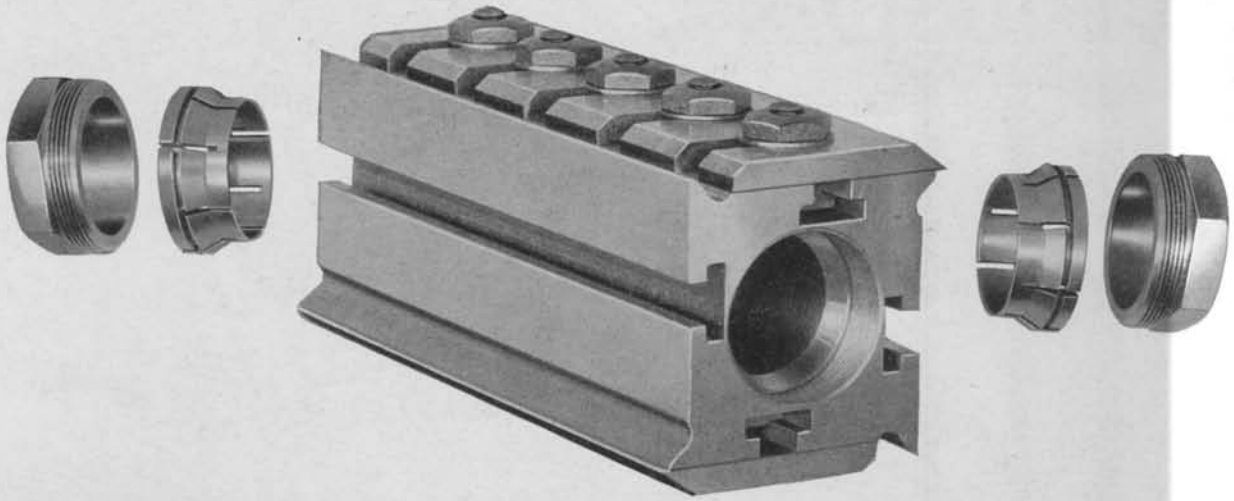


Fig. 17

SELF-CENTERING Clamp-Rings and Nuts used in top and bottom heads. Chamfers in head are ground absolutely true from center of head. Slotted knives of solid high-speed steel are standard equipment on new heads. Backs are soft tempered to give strength and toughness.

HAVING clamping device for heads which release readily, is a valuable feature. The Mattison Clamps hold with a bull-dog grip, but when the nut is loosened, they lift off readily without pounding. Heads are reversible for use on right or left. Moulding knives can be put on with head on machine, as the knife-bolts lift out without interference.

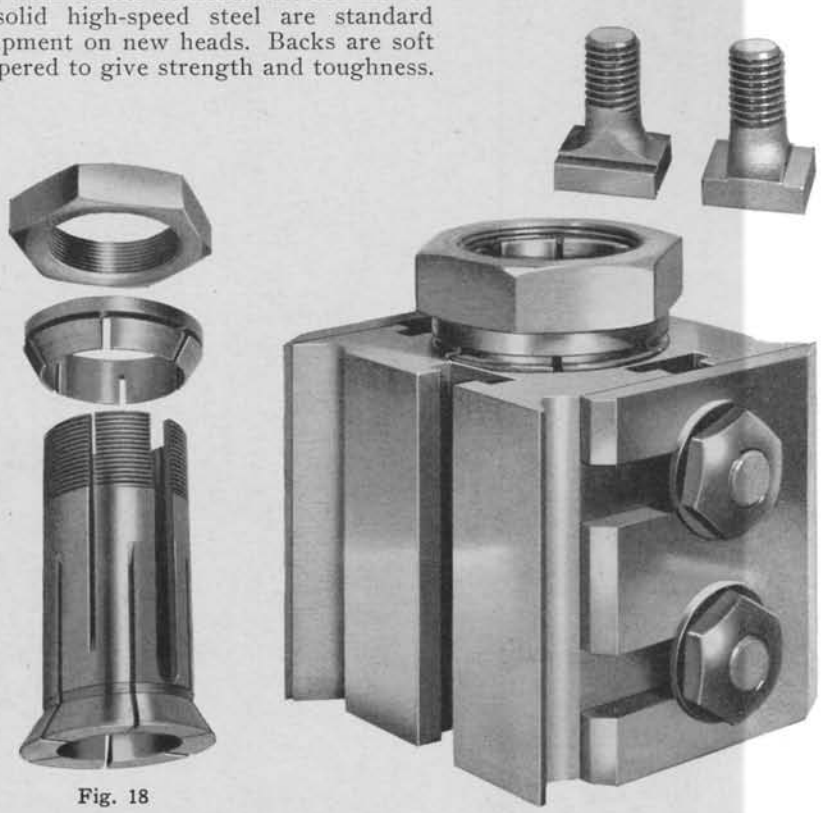


Fig. 18

Square Side Heads with Fill-in Collars

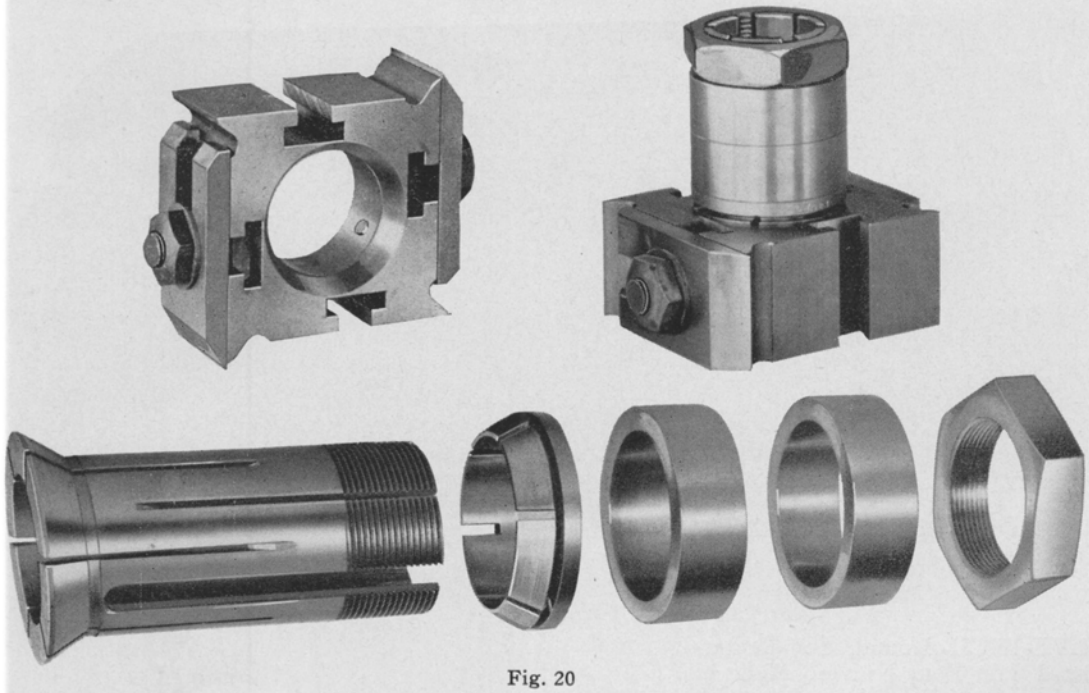
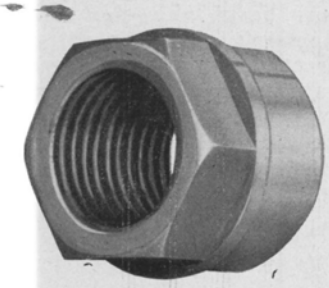


Fig. 20

SELF-CENTERING Sleeve Assembly with filling collars.

Straight Bore, Square, Slip-on Heads

STRAIGHT-BORE, Square Head for use on spindles fitted with clamp nuts. Made in 5½", 6", and 6½" diameter cutting circles, and 2" to 12" long.



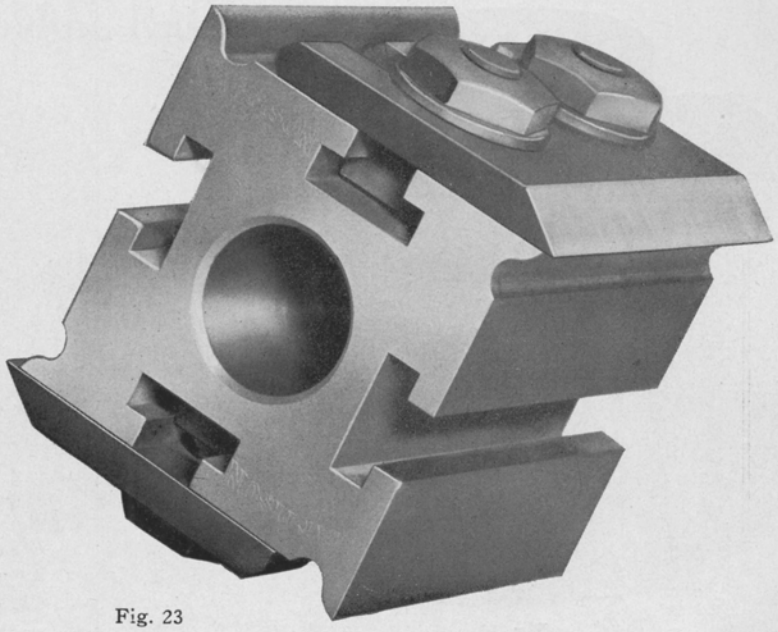


Fig. 23

Round Top, Bottom and Side Heads

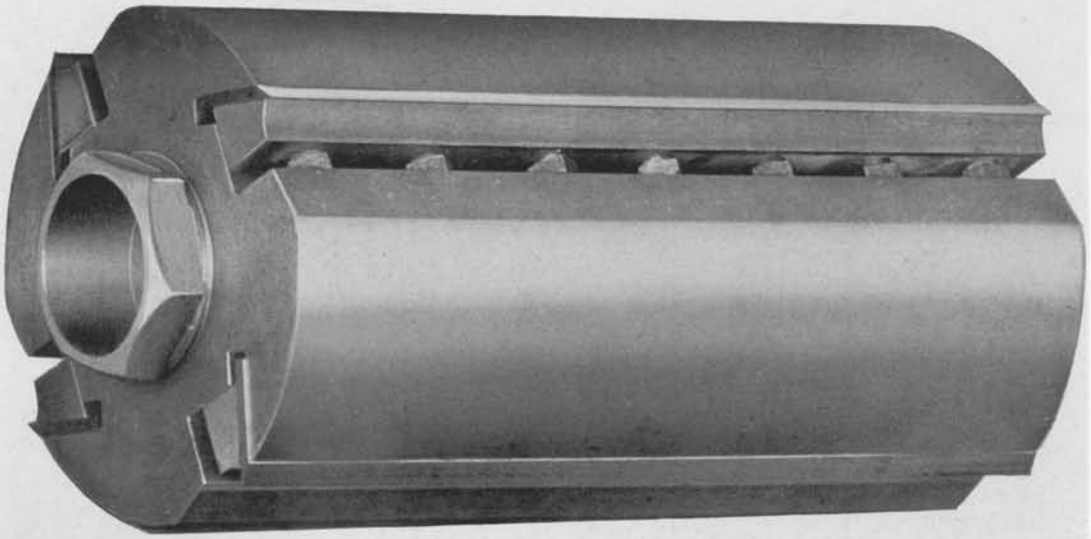


Fig. 9

TWELVE-INCH Round, Self-Centering head with Four Knives. Made in any length up to 16", and for four, six, eight or more knives, according to diameter of head. Also furnished corrugated for using corrugated moulding knives, or in combination.

Fig. 10

KNIFE Gibs are made of steel. The jack screws are threaded into the gib and screw back with the screw-head against the body of the cutterhead. This gives direct pressure, pushing the gib straight against the knife. Gibs are heavy and are wider at the bottom so screws or gibs cannot fly out. The head is heavy back of the slot and cannot spring when knives are clamped.

8 Knife Round Top, Bottom and Side Heads

8 Knife Top and Bottom Heads

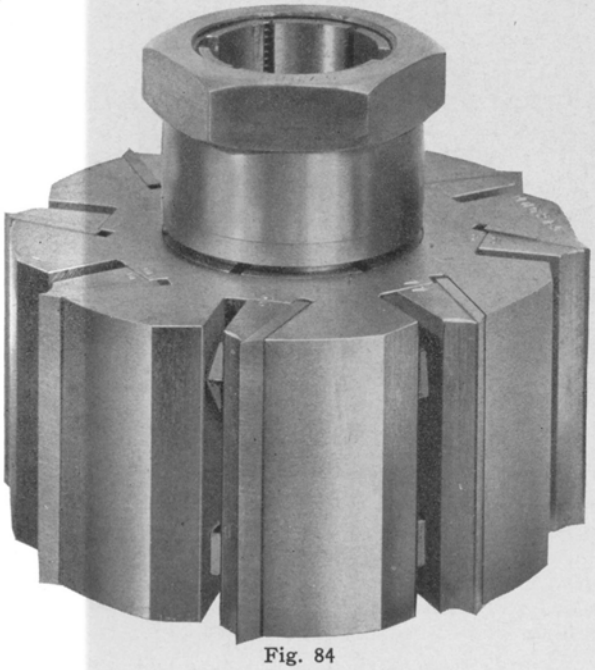


Fig. 84

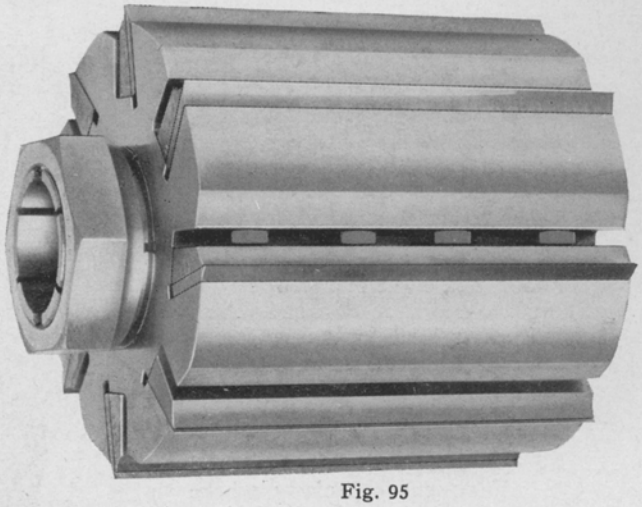


Fig. 95

8 Knife Side Head

Method of Holding Knives in Round Heads

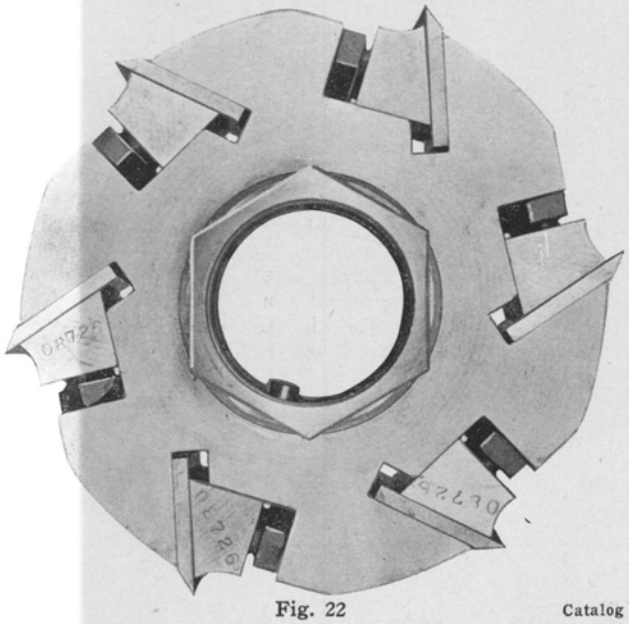


Fig. 22

SIX-KNIFE Round head for thin, high-speed steel knives. Knives back up against heavy head section. Jack screws exert straight-line pressure directly toward face of knife.

6 Knife Outside Gib Screw Pocket Type Round Head

Round, Self-Centering head with Six Knives. Made in any length up to 16", and for four, six, eight or more knives, according to diameter of head. Also furnished corrugated for using corrugated moulding knives, or in combination.

The outside pocket type gib screw head affords a more convenient method of knife adjustment especially where short knives or grooving spike knives are used. With this method the gib screws are threaded in the head, clamping the gib with a direct pressure.

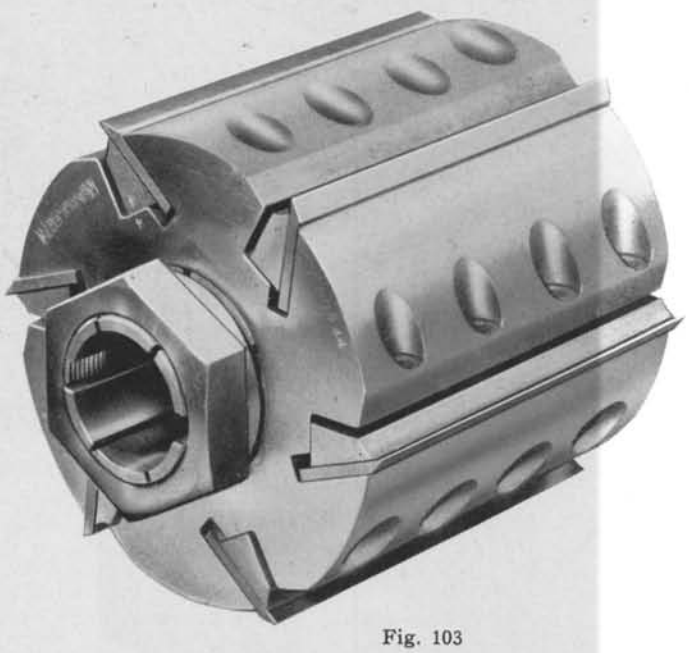


Fig. 103

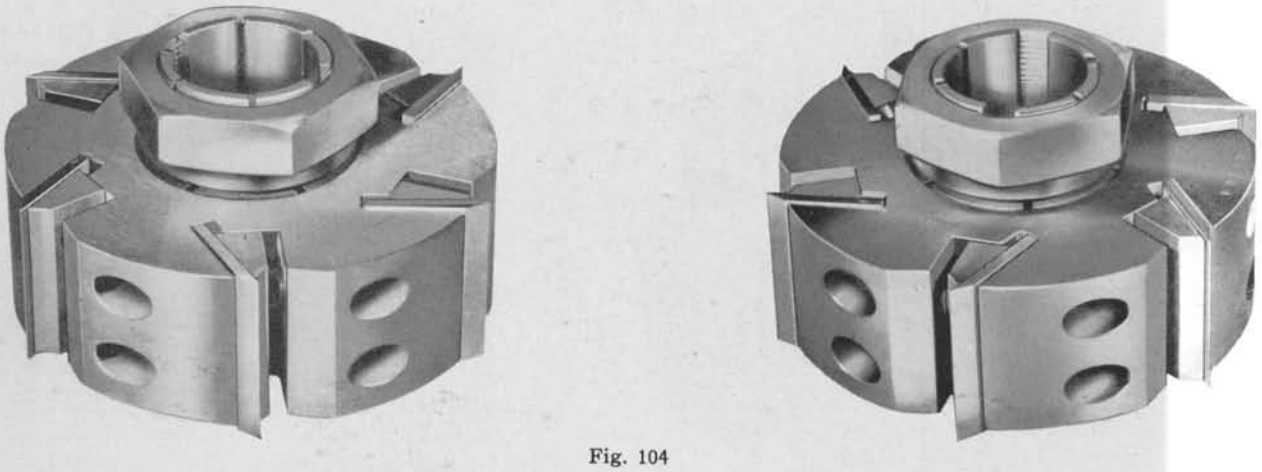


Fig. 104

Top, Bottom and Side Heads with Plug Cutters

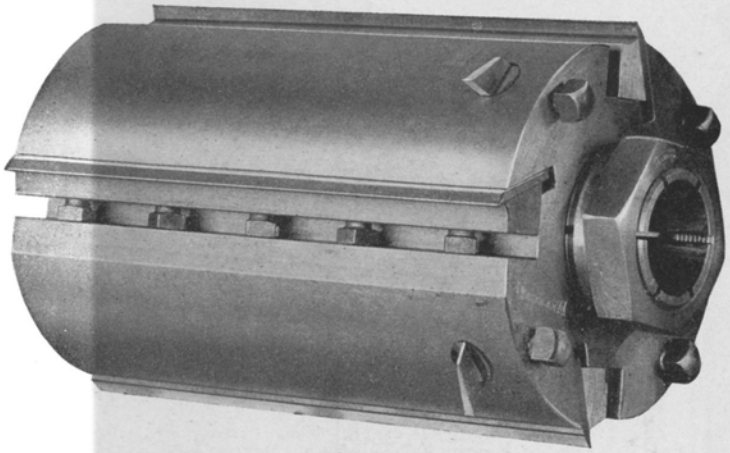


Fig. 13

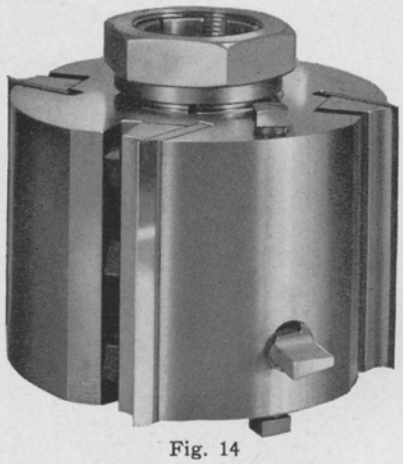


Fig. 14

ROUND Heads and Discs, showing application of plug cutters. A head with plug cutters on top or bottom spindle, provides an efficient method for running drawer sides and fronts, etc., also for wide work having small beads or members on the face. If knives are jointed, the plugs are removed and then replaced after straight knives are jointed. By manipulating the clamping screws, the plug cutters can be adjusted for varying the width of cut. Only one screw is shown. On heads up to and including 4″ long plug set screws project on both sides for easier adjustments of plugs. On heads over 4 inches the one on the opposite side of the plug is reached by removing the outer screw and plug and passing a screw driver through the outer screw hole. The serrations in the plug are for convenience in removing from head. Set screw in end of plug for accurate replacement. The minimum distance from edge of head to center line of plug hole is ⅞″. Plug cutters are solid body type ¾″ diameter which limits the width of standard plug cutting edge to a maximum of ¾″. Special width plugs can be made for wider grooves. When ordering plug type heads be sure to give information as outlined under 9 on page 21. When plug cutters are desired in a six knife head the minimum cutting circle of head will be 6½″. Solid type plugs are adjustable for wear and also for very slight variation in width of groove.

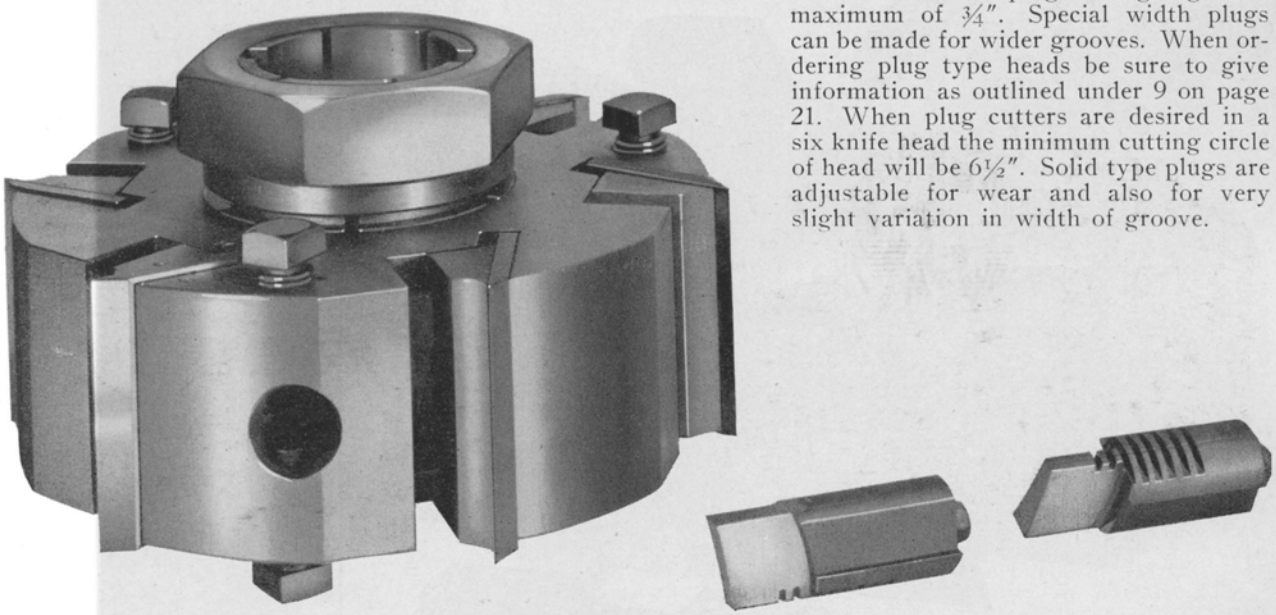


Fig. 109

Universal Side-Clamp Heads with Milled to Pattern Knives

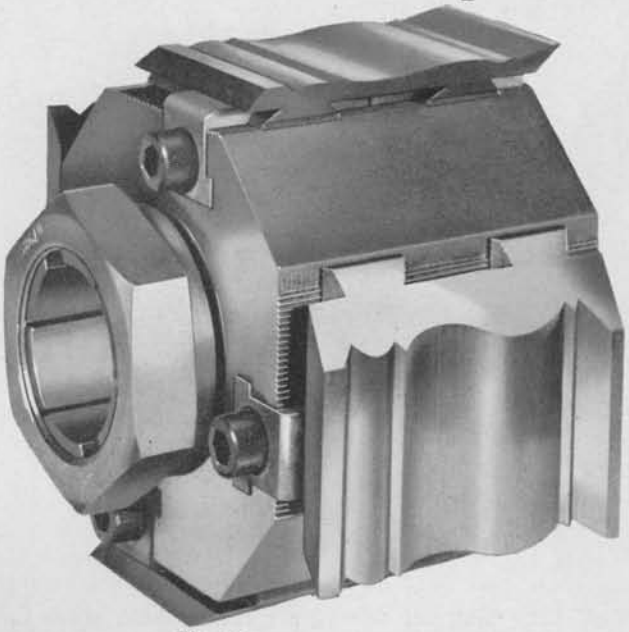


Fig. 24

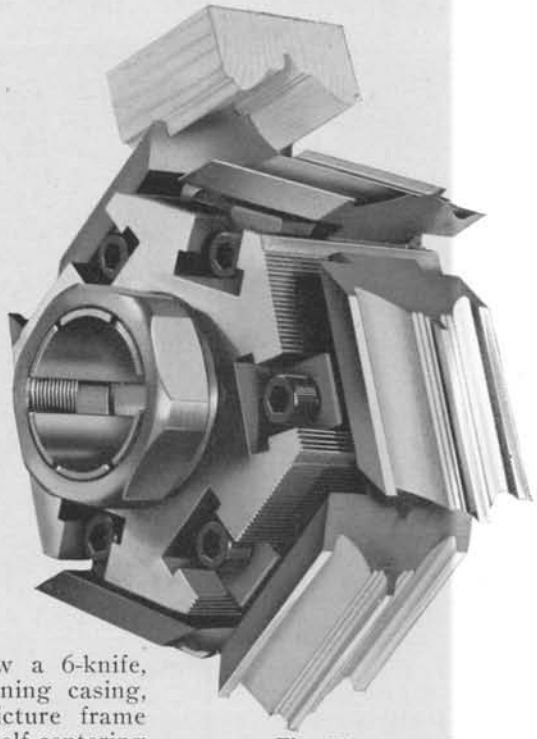


Fig. 25

THESE illustrations show a 6-knife, side-clamp head for running casing, and a 6-knife head for picture frame moulding. Both are the self-centering type with milled-to-pattern knives. Note that wide knives in Fig. 24 have two sets of clamps to each knife. This prevents any vibration or springing in the heaviest cuts.

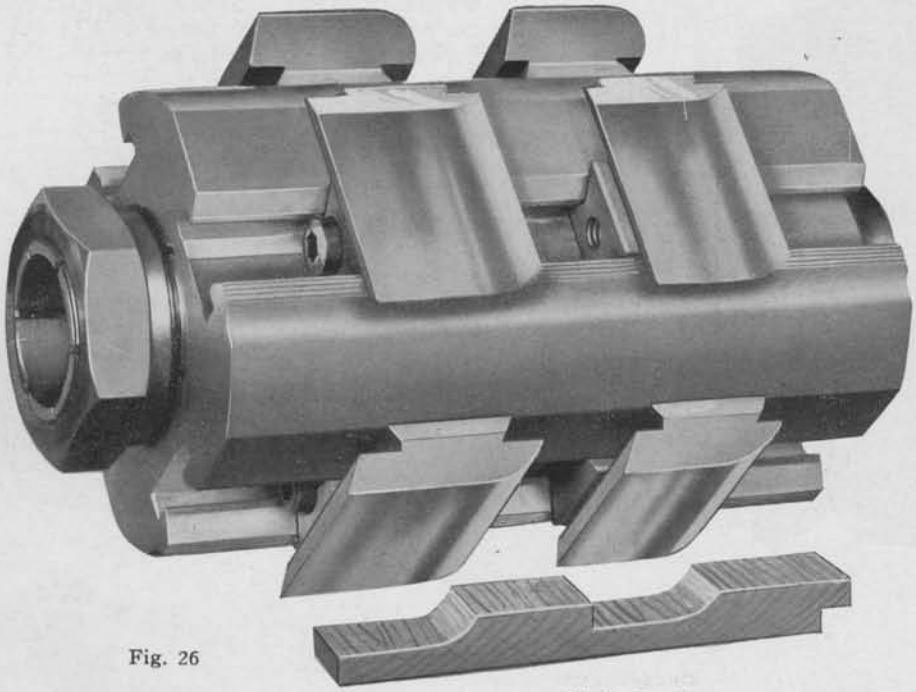


Fig. 26

THIS illustrates how more than one set of knives can be placed on the same head. Any individual knife is adjustable in or out or crossways without disturbing any other knife. This is an ideal head for profile spindle of 5-head machine.

Universal Side-Clamp Heads
With Milled to Pattern Knives

Fourteen Important Points

1. Solid, one piece body, similar to an ordinary head.
2. Clamps work in T-slots.
3. Use wide or narrow knives on the same head.
4. Clamps and knives movable anywhere across head.
5. Thick body to knife, giving stability.
6. Knives clamped solid against head. Wide knives cannot vibrate in the center.
7. Corrugations in head and knives, prevent knives slipping.
8. Corrugations make setting of knives easy.
9. Two or more sets of knives used on same head.
10. Movable clamp permits lining or staggering knives to perfect setup.
11. Accommodates knives of any bevel for hard or soft wood.
12. Wide knives have more than one clamp. No springing of knives.
13. Straight bore or self-centering.
14. No chance for packing or wedging of shavings.

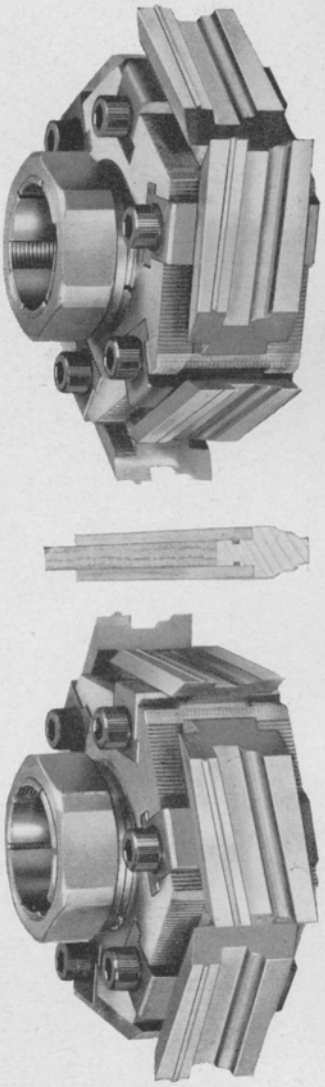


Fig. 110

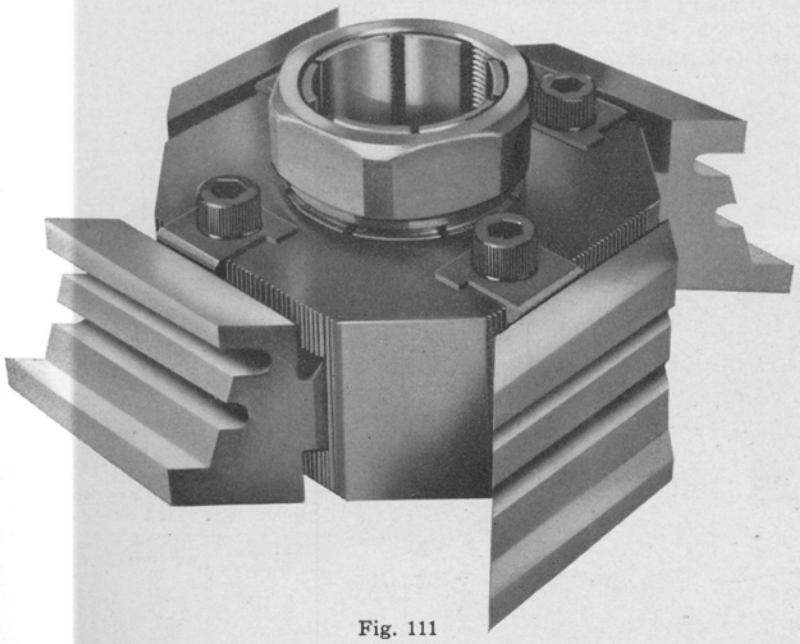


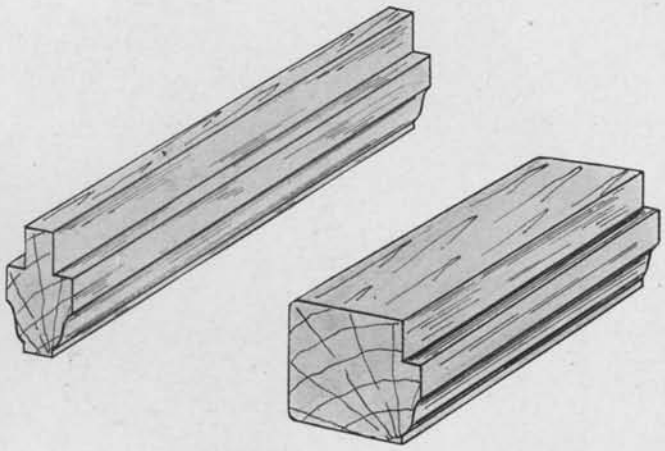
Fig. 111

ILLUSTRATED above is a pair of top and bottom, 6-knife, side-clamp heads for running sash mullion at high speed. Left: a 4-knife head for use on side spindles.

Mattison side-clamp heads are made from nickel alloy, hammered steel. The load-carrying strength is very high and the stresses of high-frequency operation are safely carried. Slots and corrugations are standardized and accurate. The ease of setting knives, full adjustability of each knife, using different sets of knives on the same head, place the Mattison Universal Side-Clamp Head far in advance of similar type heads heretofore available.

Sash and Door Universal Side Clamp Heads

With Milled to Pattern Knives



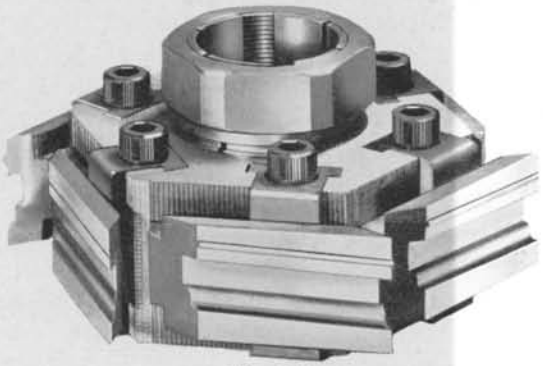


Fig. 112

6 Knife Sash Head for Rails, Stiles and Bars

Door sticking heads as shown below with milled to pattern knives for the form and plug cutters for the groove are made in either the four or six knife type with self centering device. Four knife head can be made 6½" cutting circle. Six knife heads must be made 7½" cutting circle.

4 or 6 Knife Door Sticking Head. With Self Centering Sleeve

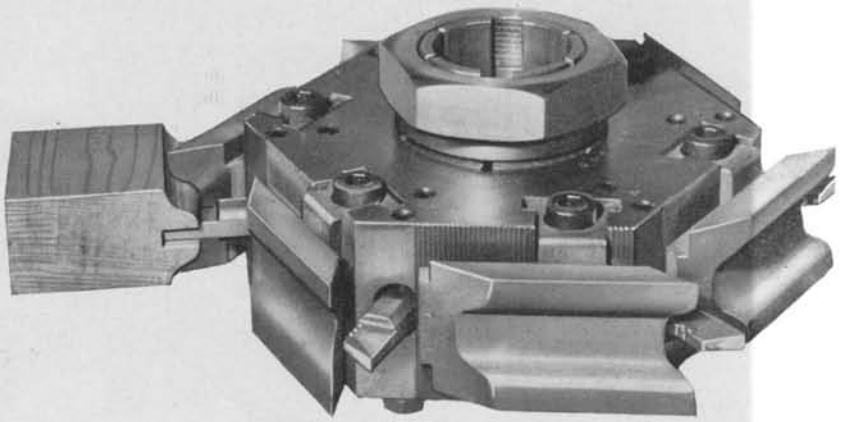
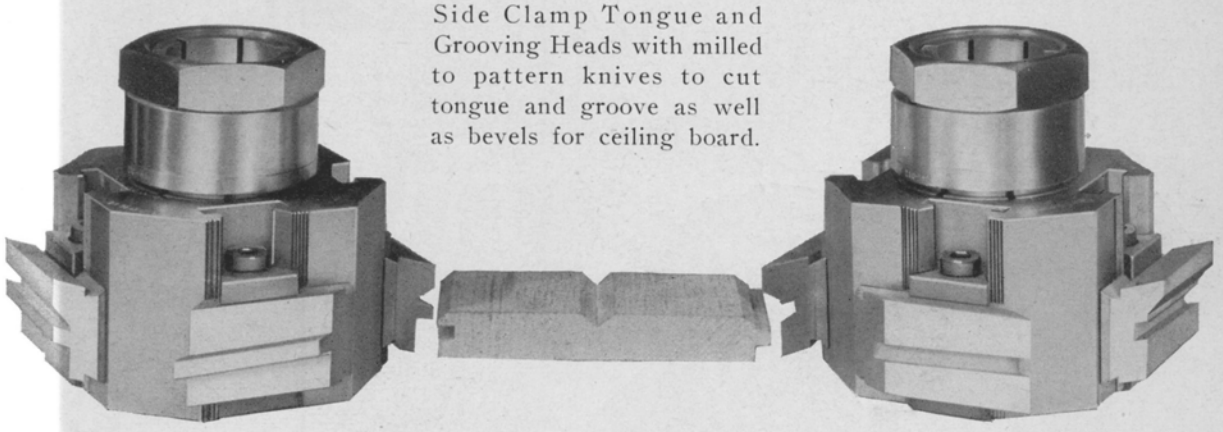


Fig. 113

Universal Side-Clamp Heads

Fig. 89

Side Clamp Tongue and Grooving Heads with milled to pattern knives to cut tongue and groove as well as bevels for ceiling board.



UNIVERSAL SIDE CLAMP HEAD WITH MILLED TO PATTERN KNIVES

Used for various types of tongue and groove work.

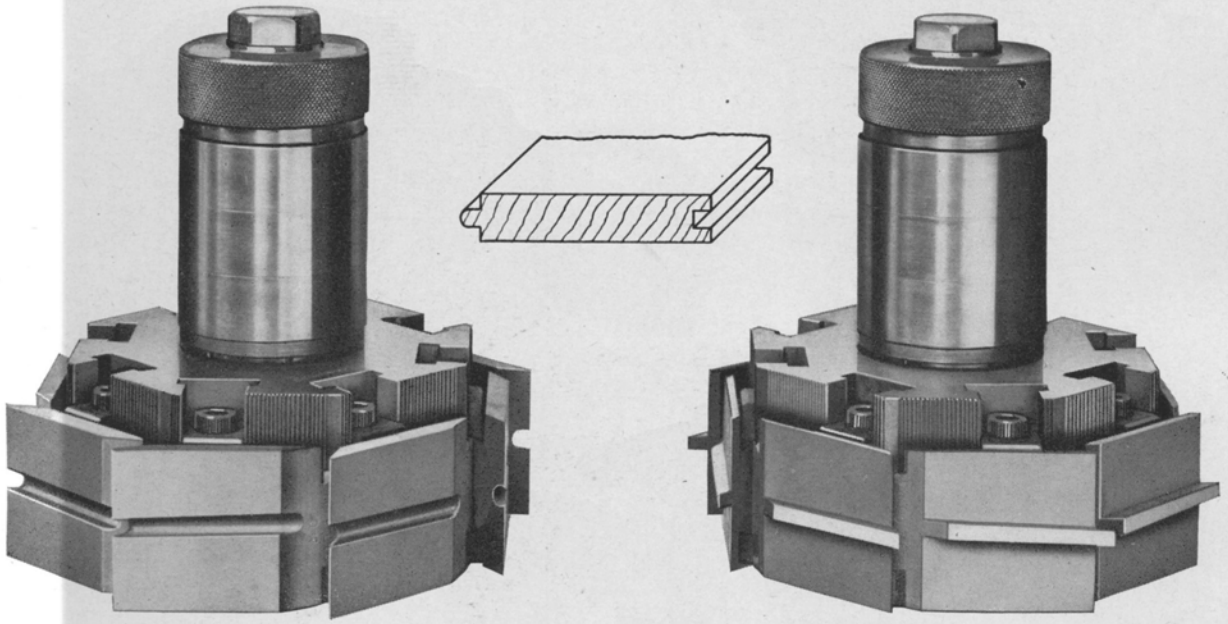
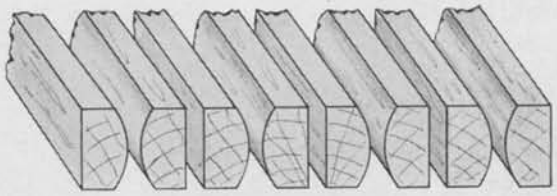
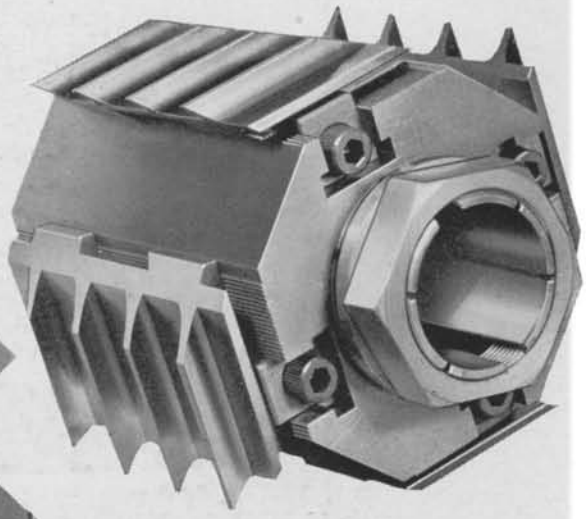


Fig. 105

Universal Side-Clamp Heads





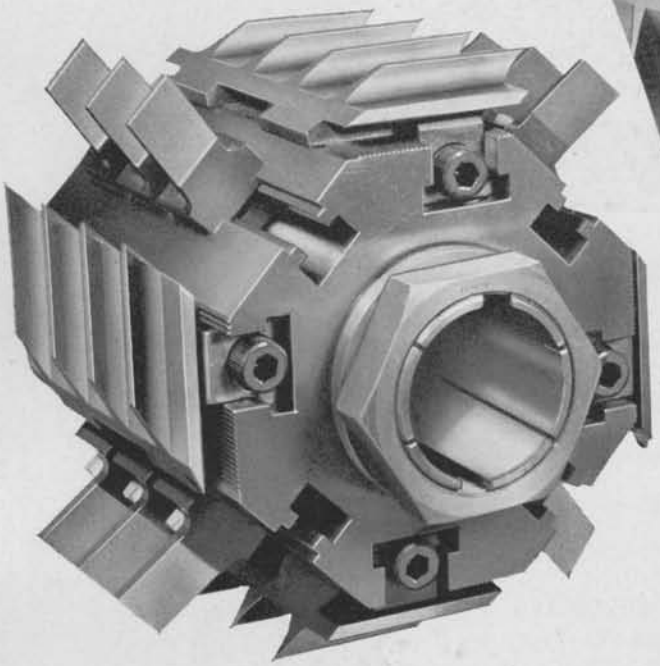


Fig. 114

Shown above and at left, set up for cutting binder slats in multiples of eight pieces

8 Knife Blind Slat Head with Knives having 4 stations →

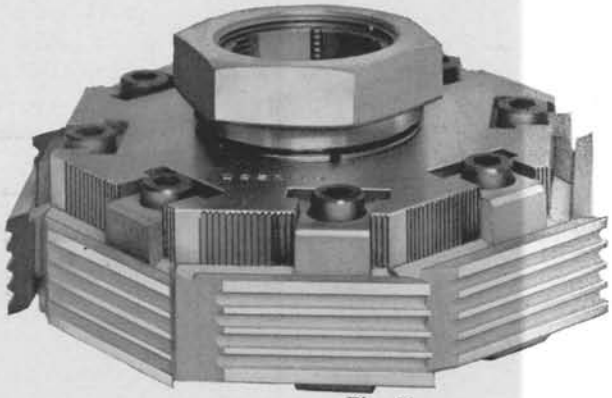
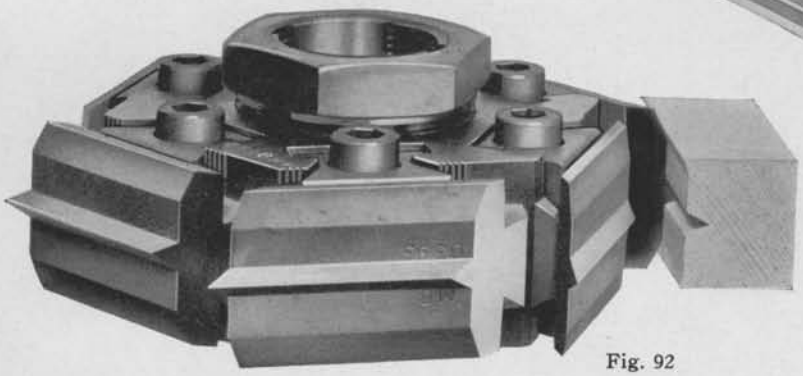


Fig. 91



← 6 Knife Side Clamp Head for all Spindles

Fig. 92

Catalog No. 103

Universal Side-Clamp Heads

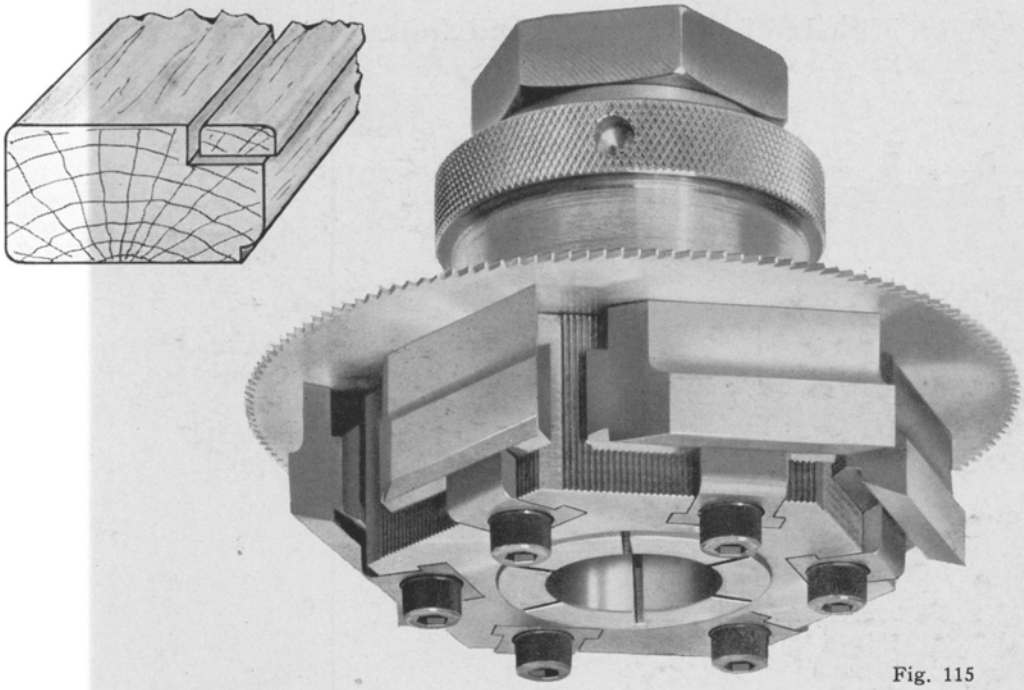
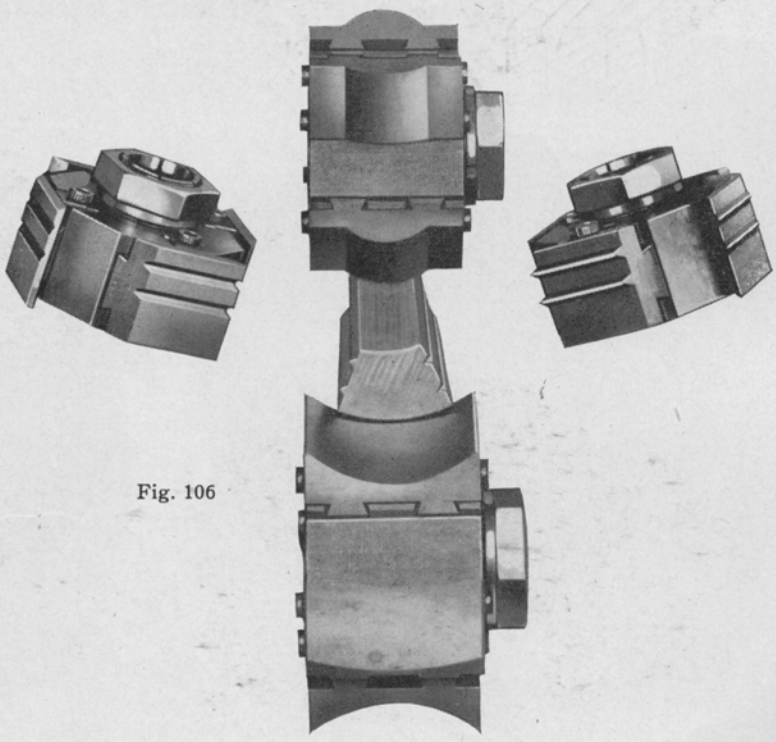


Fig. 115

Figure 115 shows Universal Side Clamp Head with Milled to Pattern Knives, cutting moulding stile. Has saw attached for removing screen mould in one operation and is used on inside spindle.

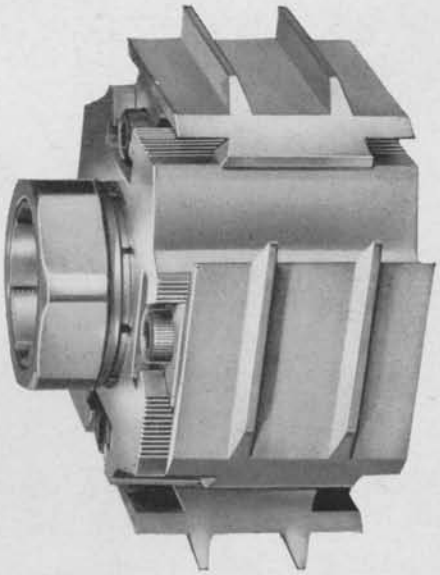


Universal Side Clamp Head with milled to pattern Knives for running wooden water pipe sections.

Fig. 106

Universal Side-Clamp Heads

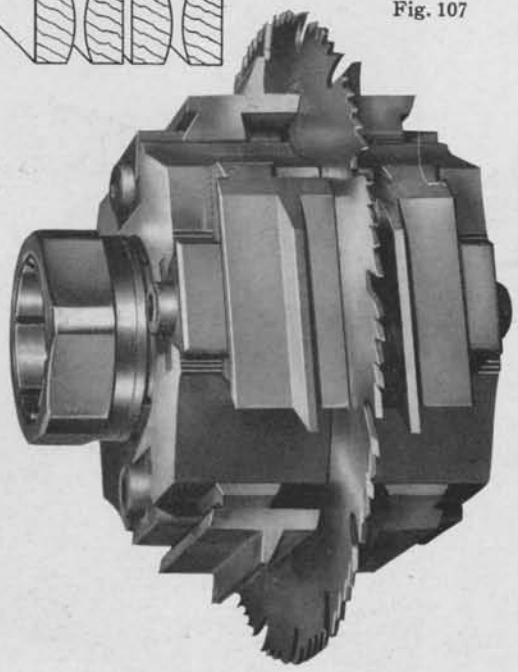
With Milled to Pattern Knives and Splitter Saw



Illustrated to the left is a top and bottom Universal Side Clamp Head for running binder strips four at a time as indicated by drawing. Fig. 107.

Fig. 107

Special Vise Grip Head with Milled to Pattern Knives for running window sill. Fig. 108.



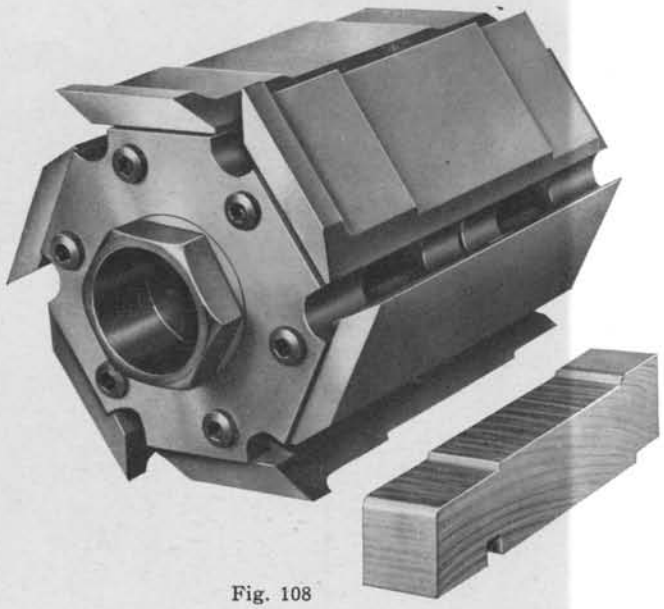
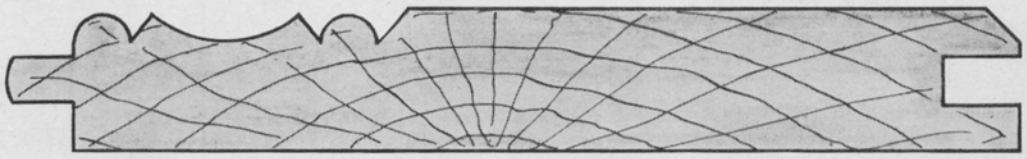
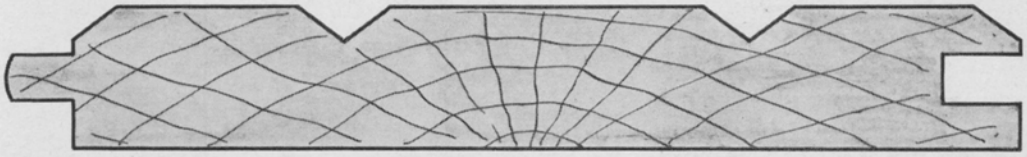
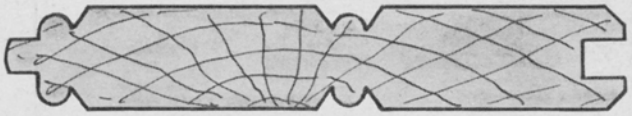


Fig. 108







Special-Purpose Moulder Cutterheads

Shown below are eight knife combination heads with four straight dresser knives and spike knives for cutting forms in the patterns shown above. Heads are also made in the six knife type.

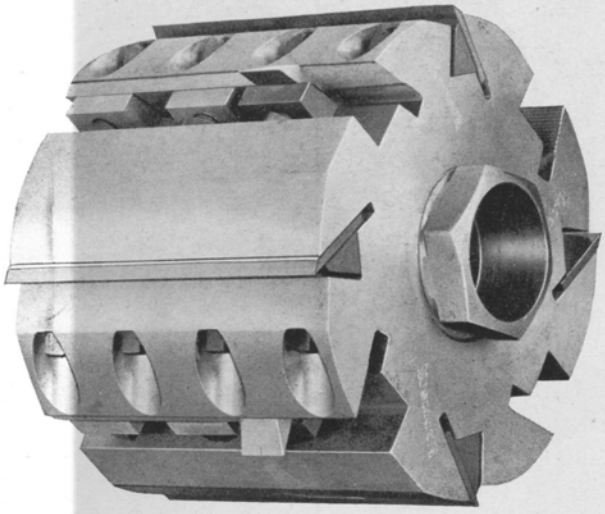


Fig. 35

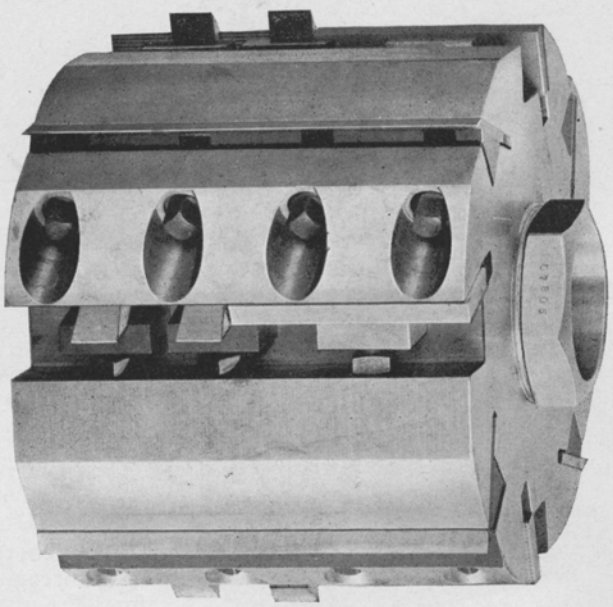


Fig. 36

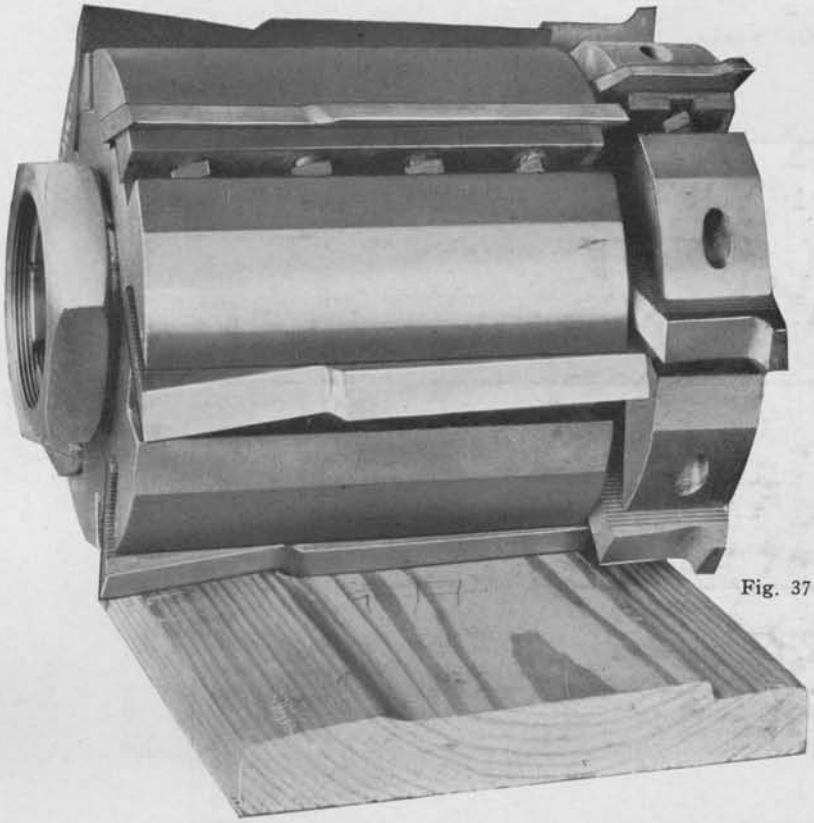


Fig. 37

Special-Purpose Moulder Cutterheads

HEAD and Disc Combination mounted on same sleeve, with corrugated, ground-to-pattern knives. The disc is larger in diameter on account of the recessed cut, and gives support to the knives nearer to the point of cut.

Special-Purpose Rabbetting Heads

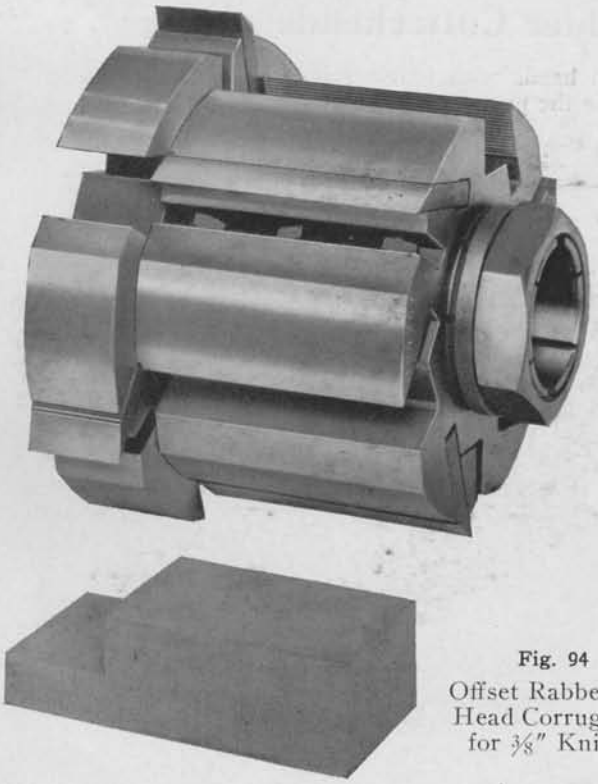


Fig. 94
Offset Rabbetting Head Corrugated for 3/8" Knives

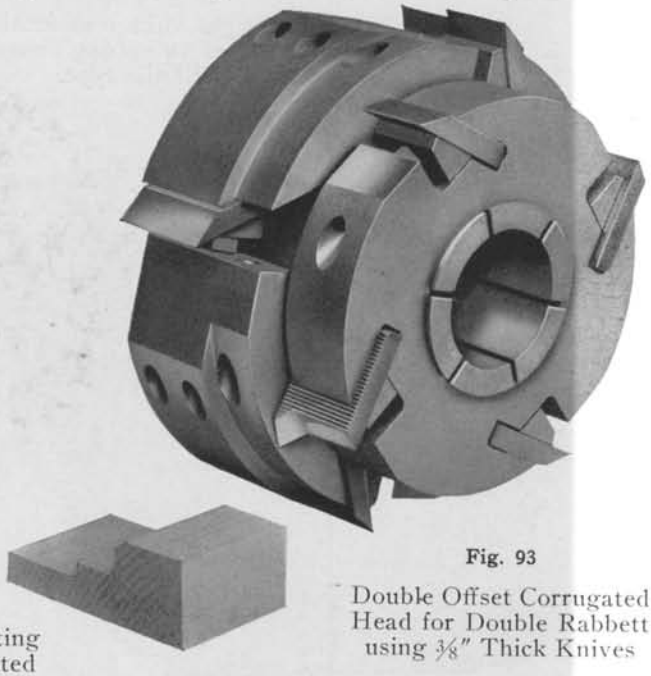


Fig. 93
Double Offset Corrugated Head for Double Rabbett using 3/8" Thick Knives

Six Knife Side Clamp Cutterheads

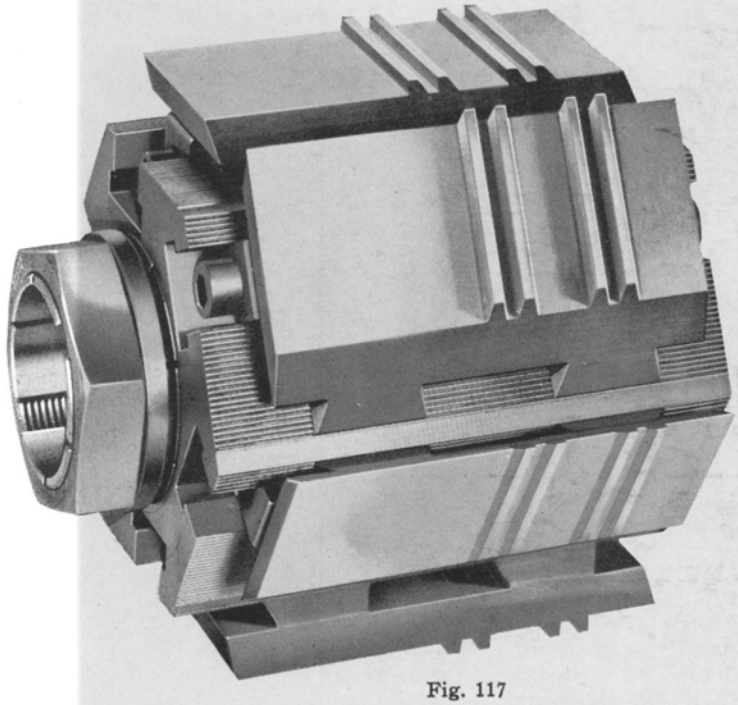


Fig. 117

Fig. 117 shows a top or bottom six knife side clamp head with wide milled to pattern knives and self centering sleeve for either 2⅛" diameter spindle or $1\frac{13}{16}$" diameter spindle. Head can be bored for interchangeable self centering sleeves so that same head may be used on both spindle sizes.

Fig. 118 shows a top or bottom eight knife side clamp head of 8, 10 or 12 inch length using four slots for straight cutting and four slots for milled to pattern knives cutting a form in only a small portion of the pattern.

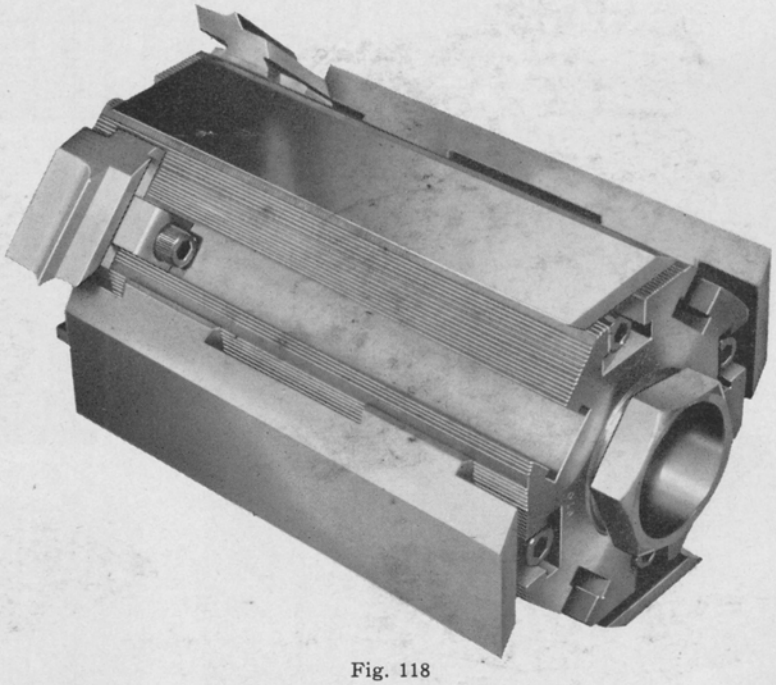


Fig. 118

Multiple Ripping Heads

For use on bottom spindle where stock is dressed and is to be ripped only.

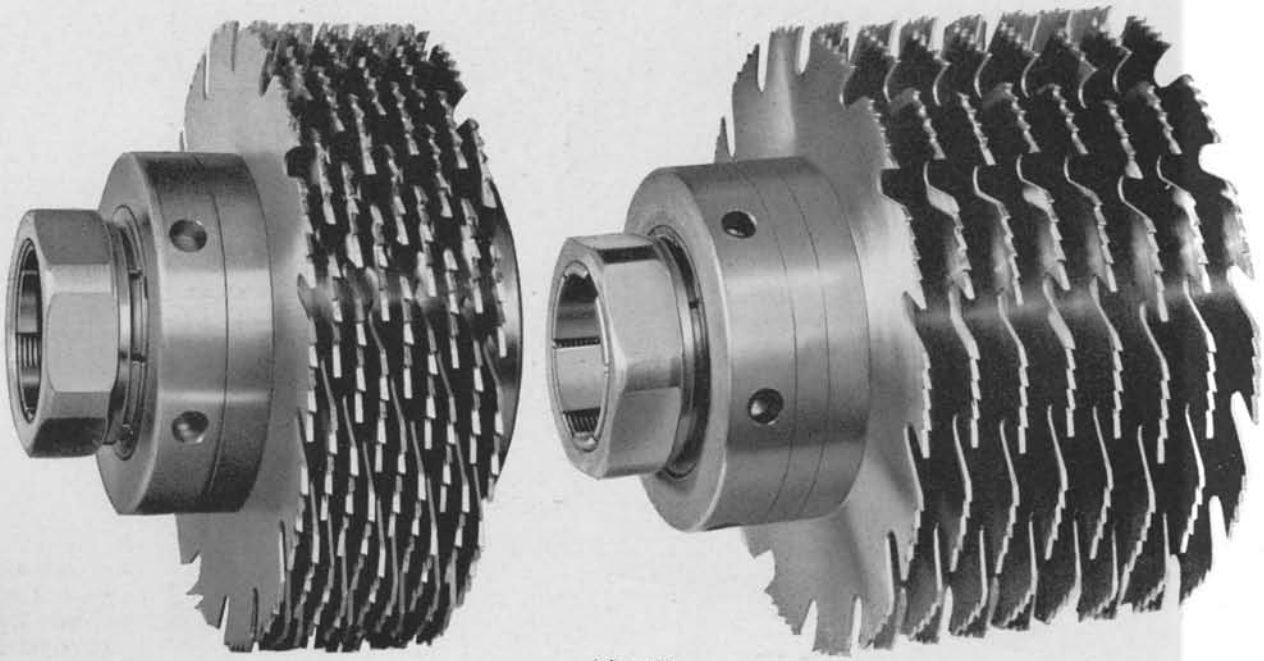
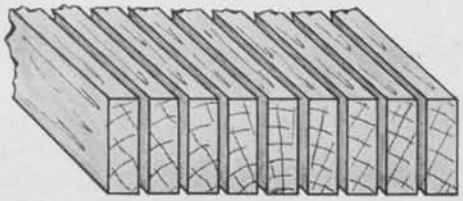


Fig. 119



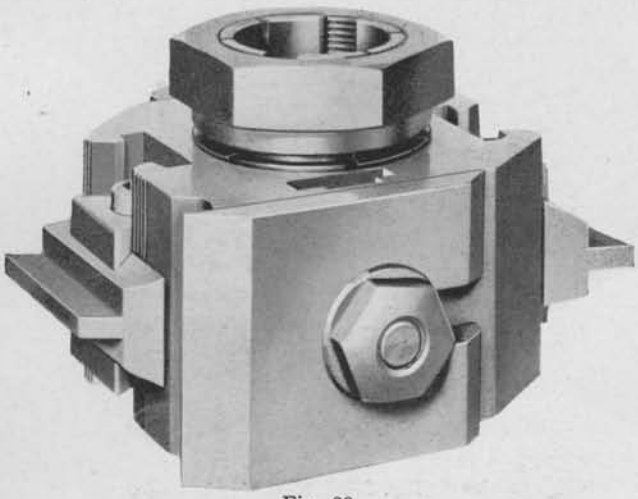


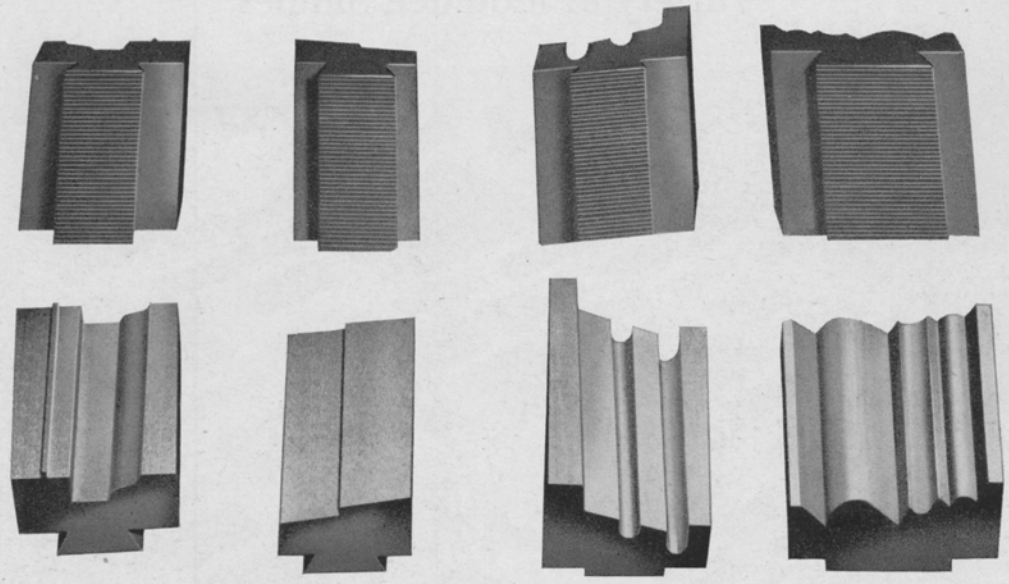
Fig. 88

Utility Head for Short Runs, Etc.

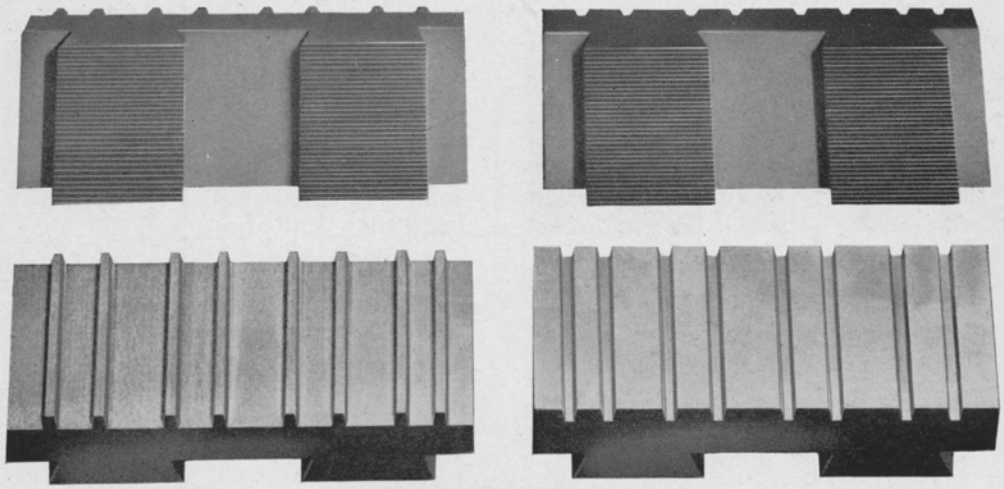
Combination Square and Side Clamp Head

This head can be used where depression cuts are used in combination with a dressed surface, making an economical set-up.

Milled-to-Pattern Side Clamp Knives



SHOWN on this page are various Milled to Pattern Knives for use on Side Clamp Heads. As is shown by the illustrations, the milled form runs the entire length of the knife, which insures the same pattern for the life of the knife, providing the original knife bevel is maintained at each sharpening. Milled knives may readily be jointed with a formed jointing stone used in the jointing devices on the machine. Knives may be jointed several times between sharpenings thus eliminating excessive down time for sharpening. Jointed knives on a six or four knife head will increase by four or six times the output over the one knife finish procured when not jointed. As an example: On a six knife head which has not been jointed, a feed speed of 23 feet per minute will produce 14 knife marks to the inch. If the six knives were jointed the same finish could be procured at a feed speed of 123 feet per minute. On stock patterns produced in large quantities, milled jointed knives provide the means for greatly increasing the output of uniform work at a corresponding saving in cost. On stock patterns where there are short runs, Milled to Pattern Knives for square heads can be furnished. Two knives on the head and not jointed would require slow feed speed, but being a Milled to Pattern Knife, the form would always be maintained regardless of the span of time between runs. All Milled to Pattern Knives are made of the finest grade of High Speed Steel and tempered to a Rockwell hardness of 60, to insure longer life and a keener cutting edge. The milled form in the knives is ground and the knives made in sets of four, six or eight so that the form is alike on all knives in the set. When ordering Milled to Pattern Knives always send wood sample or dimensional sketch for accurate reproductions.



Mattison Cutterheads Have Been Applied to a Numberless Variety of Moulded Shapes

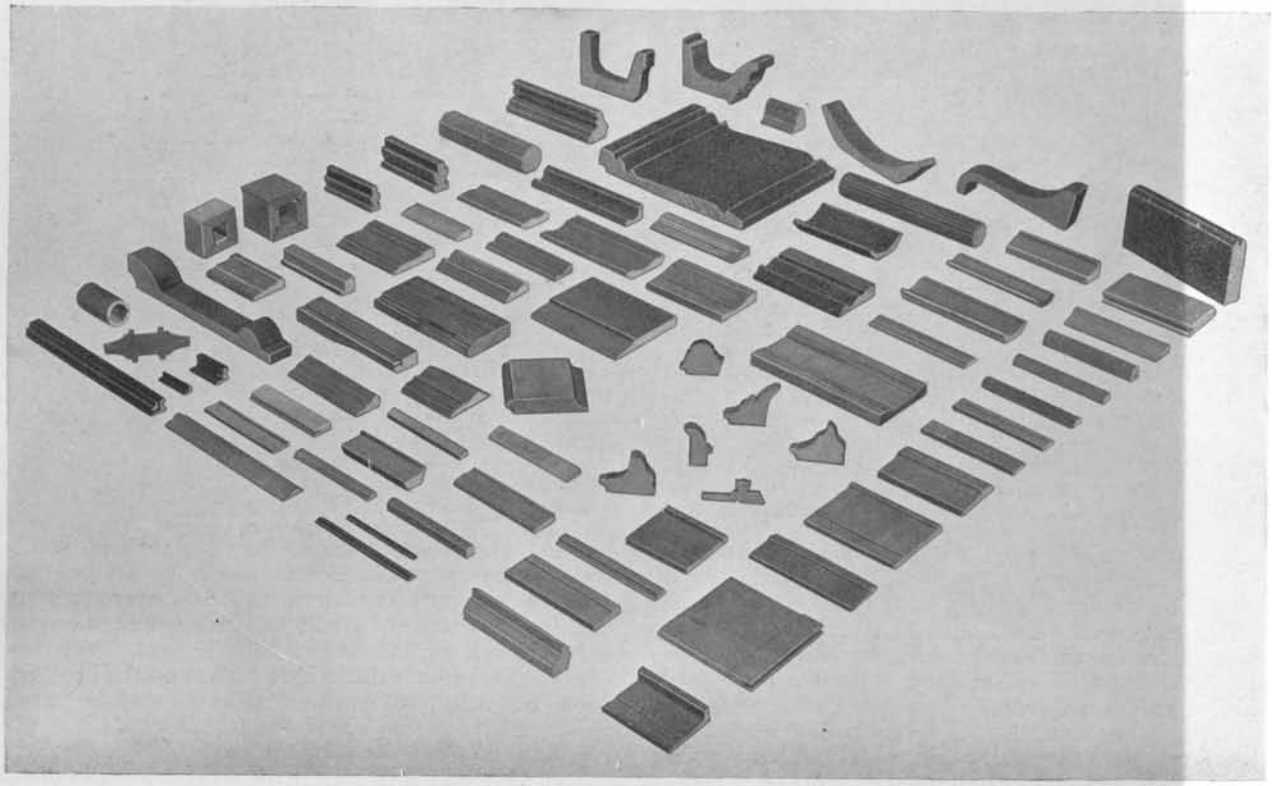


Fig. 42

A FEW samples of work done with Mattison Cutterheads. The first eight samples in right hand row, the second, third, fourth and fifth in the second, are rock maple and run directly across the grain. These mouldings are cross-cut into the small parts for piano actions. The variation in any dimension of any piece, must not be greater than three thousandths of an inch. The eavestrough at the top represents a cut 7″ wide and 3¾″ deep. The casket side section is 14″ wide.

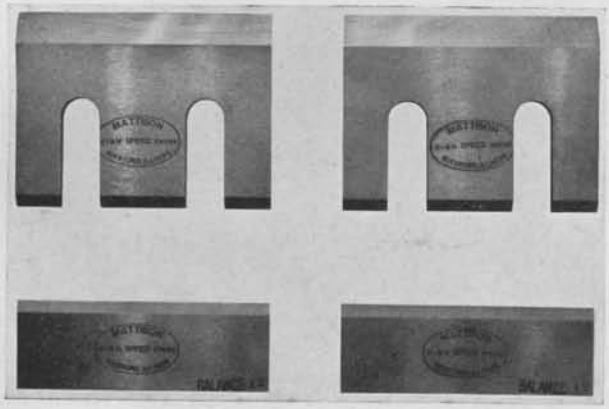


Fig. 43

Straight Knives for Square and Round Heads

THICK, slotted knives for square heads any length, width and thickness, in carbon steel or solid high-speed steel. Untempered carbon moulding blanks in all sizes.

Thin, high-speed steel knives for Moulder, Planer and Jointer Heads, for use in plain heads or corrugated backs for use in corrugated heads. All knives ground to exact dimensions, heat-treated and tempered by the most recent approved methods. See instructions for ordering on page 21.

Instructions for Ordering New Heads

1. Give name, model number, serial number, and type of machine.
2. Are heads to be used on top, bottom, right (guide) or left-hand spindles?
3. Specify type head required according to figure number of head shown in catalog.
4. Give diameter cutting circle and length of head. (See figures Nos. 44 and 45 below.)

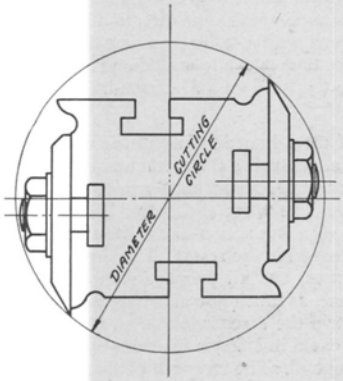


Fig. 44

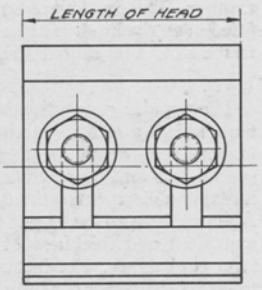


Fig. 45

5. State diameter of spindle, also if head is to have straight bore or be fitted with self centering sleeve.
6. Specify the number of knives in each head.
7. Give distance from shoulder on spindle to face of guide on machine on top and bottom spindles. From shoulder to bed line on side spindles.
8. If spindle has grooves for key in head, give depth and width, and if round, the radius.
9. In ordering plug heads for top or bottom—specify location of plug from guide side of head to center line of plug hole—on side heads give dimension for location of plug from bottom of head to center line of plug hole, also stating which side head it is to be used on.

Milled Knives

1. Send exact sample of work; also, if possible, an old knife. If impossible to send samples, send an exact dimensioned drawing of work. Give maximum thickness and depth of slot in head. Press a piece of blotting paper firmly against the corrugations to make a print of the corrugations and send with order.
2. Specify kinds of woods to be run.
3. Give figure number of head; or if heads of other make, make sketch of end of head and give dimensions of slots and corrugations as in No. 1.
4. State if knives for top, bottom, right (guide) or left side head.
5. What is RPM of spindles? What rate of feed?
6. Are knives to be jointed?
7. Mark sample showing direction in which run and cuts to be made by top, bottom, right and left side heads.
8. State exact number of knives wanted instead of ordering a "set."
9. Mattison Milled Knives are stamped with a symbol. Give this number when re-ordering to insure knives being an exact duplicate of the originals.

NOTE: All milled knives will be made of High-Speed Steel. Milled carbon knives not recommended or furnished.

Thick and Thin Knives For Moulders, Planers, Shapers

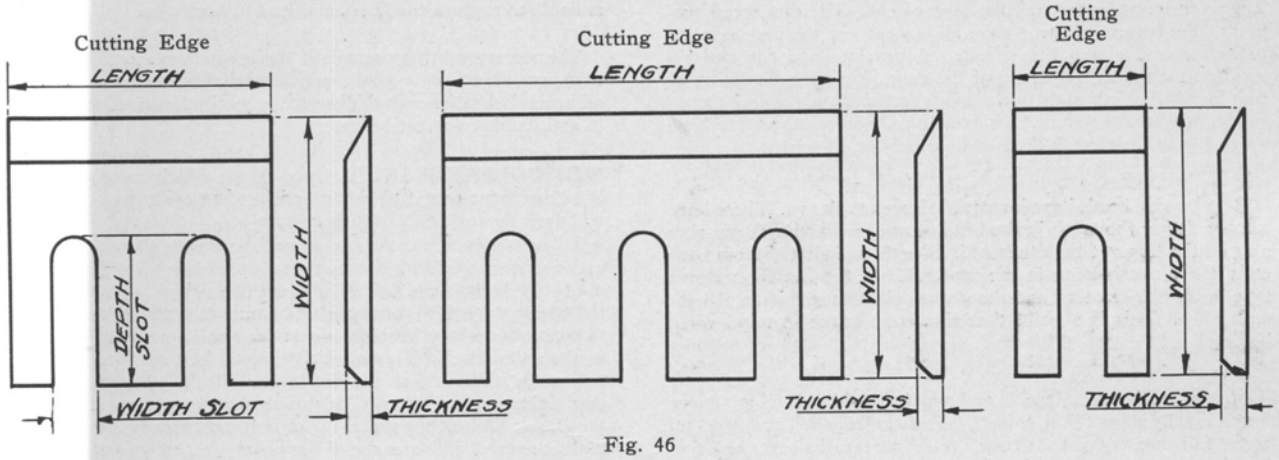


Fig. 46

1. Give name, number and type of machine on which knives are to be used.
2. Order by sizes, giving, first, length of cutting edge; second, width; third, thickness; the number of slots, width and depth of slots. Lay an old knife on paper and mark around it to show slots and on end to show bevels.
3. If knives are to be used on heads having bolt holes tapped in head, send exact drawing or sketch of knife.

NOTE: The above information is requested so we will be better able to furnish cutterhead equipment exactly according to specifications.

General Cutterhead Information

The improvements embodied in modern moulders place much greater demand on cutterheads than was formerly the case. High-frequency operation and fast feeds mean the heads must be capable of withstanding the increased stress of centrifugal force due to running at high speed, also the additional stress of faster feeds. As centrifugal stress increases four times when doubling the speed, this factor is one of importance.

Mattison Cutterheads are engineered to meet these conditions. Mattison machines represent the most advanced engineering and mechanical practice. This same character of modern advancement has been brought to the cutterheads also, to provide auxiliary equipment that is on a par with the machines.

MATERIAL. In the days of slow speeds and slow feed, soft machinery steel had sufficient strength for most cutterhead requirements. Now, better material is necessary. Mattison Heads are made of alloy steel. All steel is bought to formula and is carefully tested to assure its being up to specifications. Machining is done on the most modern tools. Each operation is inspected for accuracy. On square heads the faces are milled slightly concave to insure knives having a firm contact at the lip. Lips are scientifically determined to give the greatest protection against packing of shavings, yet to break the shavings up and clear them from the head and knife. Bores are reamed true and straight, and all faces and lips are equal distance from the bore. Heads are accurately balanced both as a whole and as regards to each end. Tee-slots are ample, and plenty of metal is provided where the greatest strain comes.

SELF-CENTERING DEVICES. Regular top and bottom heads over 6" long have self-centering clamp-rings and nuts in each end. The tapers in the head are ground to a high degree of accuracy and finish. The angle is such that there is no sticking of the ring in the head. When the nuts are released on a Mattison head, it slips off easily. An important feature is the slots in the rings. Just above the taper, a groove is cut around the ring. Four slots are cut lengthwise entirely through the tapered end. The thin metal section at the bottom of the groove allows each of the four sections to spring and clamp the spindle. Four slots are cut entirely through the top or outer end of the ring, providing flexibility in that member. Four slots in the taper section insure equal clamping all around the spindle. Rings with only one slot, tend to bend unequally and not grasp the spindle evenly at all points.

Regular side heads have improved sleeves as shown. These have a taper fitting the taper in the head at one end, and a clamp-ring acts on the taper at the other end. Sleeves are slotted from both ends, these overlapping in the center. Thus the Mattison sleeve type heads are centered and the sleeves clamp the spindle at both ends alike. This is a point that should be borne in mind when buying heads.

Sleeves are interchangeable and may be used in round or square heads, and by using filling collars, take discs from the narrowest up to the full capacity of the sleeve. With one set of sleeves and collars for each spindle, additional heads and discs may be purchased without the self-centering devices, whereby a substantial saving can be effected in your cutterhead equipment. We, however, recommend heads complete with sleeves as each head can then be conditioned in grinding room ready to place on machine.

BOLTS FOR SQUARE HEADS. Cutterhead bolts are a most vital factor as bolt failure may result in serious consequences. Mattison bolts are made on the best bolt-making machinery available. The steel is a special nickel alloy and is tested for uniformity and quality. You have probably seen bolts where the head strips off clear from the shank. Straight-grained steel is liable to do this. The steel in Mattison bolts cannot strip in one direction more than another. The shanks are turned with a radius, leaving the corners filled in on the head. They are then straddle-milled on two sides to fit the slot. You cannot strip the head on a Mattison bolt.

The popular conception of thread cutting is with a die or lathe tool. This is a scraping action, rupturing the metal and often tearing out sections of the thread. Mattison bolts are threaded on special hob-milling machines. The work and cutter both revolve insuring a clean cut without scraping action of a lathe tool or die. An even, true and stronger thread is the result. The thread depth and pitch and thickness of nut, are all proportioned to give a strength balance. For instance, as much power would be required to pull a shank apart as to strip the threads, or vice-versa. Bolts, nuts and washers are heat-treated in electric furnaces under accurate temperature and time control. The strength of these units is thousands of pounds greater than is ordinarily considered necessary.

NUTS AND WASHERS. When a tap is passed into a hole to cut a thread, it will never be at exactly right angle to the face. When the nut is screwed down, it does not clamp evenly all around. One side will come down first. When it is fully set down, it is apparent the bolt must bend to allow the nut to seat flat.

After the threads are cut in the nuts on Mattison Cutterhead bolts, they are again machined on the face at right angle to the threaded hole, to insure the face being square with the threads. The nuts set down evenly all around, preventing any bending of the bolt. A little bending in a bolt which is once clamped and left in place, may not be serious, but on a cutterhead bolt which is clamped over and over again, this continued bending of the bolt is liable to rupture the fibers and lead to breakage.

The same condition prevails if the washers are not of an even thickness. Mattison washers are faced and are of even thickness all around. Due to even thickness, the weight is the same and aids in maintaining correct balance.

WHY BOLTS BREAK. The two things which cause most bolt breakage, are: over-tightening and bending of knives.

In over-tightening, the breakage is brought about by a progressive fracture. This causes the bolt to break in service and yet not be the fault of the bolt. The cause of a progressive fracture is tightening the bolt beyond its elastic limit. When metal is clamped to metal, there is no cushion except the small amount of elasticity in the metal itself. This elasticity in the bolt is what causes it to remain tight. When the nut is brought down snug, any further tightening stretches it. If this stretching does not go beyond the elastic limit of the metal in the bolt, no harm is done. If this limit is exceeded, then some of the fibers are ruptured and a fracture begins. At succeeding tightenings, more fibers are ruptured and the fracture spreads. When the bolt finally gives away, only a part of it shows to be a fresh break. The part which is often looked on as a defect, is simply the old fracture which has been built up and present for some time.

To avoid this, stop when the bolt is tight. Do not put a piece of pipe on the wrench handle, or use a wrench longer than furnished by the manufacturer for the purpose. Use precaution and do not continue to pull after the nut is tight.

Bending of knives is often the cause of bolt breakage. Knives, particularly of long projection, may begin to bend in the cut, then suddenly give still further and dig into the wood or catch against the chipbreaker or other part of the machine. In such cases, something must give way. If the bolt did not break, the head itself might tear out or split. The knives being bent back when bolts break, shows the weakness to be in the knife. Knives of long projection for heavy cuts, should be provided with brace bolts. Send us any problem of this nature you have for suggestions for handling.

ROUND HEADS. Mattison Round Heads are regularly made in all lengths up to 16", and for four, six or eight knives, either for $\frac{5}{32}$" plain high-speed knives or $\frac{5}{16}$" thick corrugated knives. Slots are accurately located and cut. Standard diameters: 6", and 6½" cutting circle. Any diameter and type and location of slots, and all types of special and combination heads can be made to order.

SIDE- CLAMP HEADS. Heads of the side-clamp type, made in various ways, have been offered heretofore. These have all had their limitations and drawbacks.

To supply the need for a universal side-clamp head, Mattison engineers have produced a unit which overcomes all these drawbacks. See cuts on pages 8, 9, 10, 11, 12, 13, 14, and 17). The body being in one piece, is much stronger than a bolted head. It can be had in ample length so that knives of different widths can be used. The expense of different heads is eliminated as knives only need be purchased for different patterns. Knives are thick in the center and are clamped solidly against the face of head. They are actually more rigid than the knives on square heads because the side-clamp grip extends nearer to the cutting edge. Two or more sets of knives can be used on the same head at the same time. Any knife or set of knives may be adjusted sideways anywhere on the head. This is important on such work as grooving, where adjustability is an advantage in securing an exact fit.

The corrugations on head and knife, determine the location, and each knife can instantly be set out the same distance by simply moving all of them one notch. No gauges or fixtures are required for making this adjustment. The corrugations also provide a positive lock to prevent knives creeping on the head.

These heads are made of nickel alloy steel, normalized, heat-treated, and tested by the Brinnel Method to determine the state of uniformity and hardness in the metal. Side clamps and bolts are of special alloy steel and heat-treated. They are manufactured on a scientific basis, and as accurately and uniformly as the best equipment, skill and sincere interest can achieve. Made in 5½", 6", 6½" and 7½" cutting circle. 5½" are straight bore. 6" and 6½" are either straight bore or self-centering as ordered, except 6" cannot be furnished with self-centering device for spindles over $1\frac{3}{8}$" diameter.

Install these heads with milled-to-pattern knives for your standard patterns and you will have the most efficient equipment it is possible to procure.

SIDE-CLAMP OR ROUND HEADS. Different kinds of woods call for different degrees of bevel on the front and back of knife. Tearing is controlled by the cutting bevel or angle at which the knife strikes the work. As a rule, the harder the wood, the less the angle of the cutting side from the radial. For soft wood, a greater angle is necessary, otherwise the grain will be compressed and good work will not result.

When milled knives are used in round heads, or thick milled knives are used on square heads, the grinding bevel is on the cutting side, and the back is straight. This gives practically a radial angle to the cutting edge. This will work on hard woods, although most of them require some cutting bevel. On standard round heads, the angle at which the slots are milled, can vary to some degree, but cannot be varied to the extent necessary to give the cutting bevel that is suitable for soft woods with a milled knife having the bevel in front. The slots would be at such a flat angle that there would not be enough metal left on the back to avoid springing when the knife is clamped.

The side-clamp head provides a cutting angle on milled knives suitable for soft wood. It is an ideal head for that purpose and should be used instead of the regular type of round head. At the same time, any angle required for hard wood is obtainable in the milling and bevel of the knife. It is therefore a Universal Head. In ordering, specify kind of wood so the knives can be milled and beveled accordingly.

KNIVES FOR SQUARE AND ROUND HEADS. Standard knife equipment for square heads, consists of 2—⅜" thick, solid, high-speed knives. On account of the advantages of greater production and longer service between grinds, solid knives are superior to laminated stock. In tempering, the solid knives are drawn and softened on the back, while the cutting edge is hard. High-speed steel gives five to ten times the service of carbon steel.

Knives for round heads, are hardened the full length. They are firmly clamped on both sides, so the working stress beyond the small projection of the cutting edge is carried by the head.

MILLED KNIVES. Thick, slotted knives can be milled on the outside for use on square heads. This is not generally considered the best of practice and we do not recommend them. When so used, the bevel must be on the front or head side of the knife, which, in effect, produces a radial cutting angle. That is, the knife has a scraping action. A great deal more stress is thrown on the knife. The stress from the cutting edge to the point where the knife is braced by the bolt, must be carried by the knife itself. The nature of high-speed steel is such that breakage is likely to occur. For soft wood, the angle or cutting bevel is too straight. This tends to compress the wood instead of cutting it clean.

Milled knives for round heads and discs, are corrugated for use in corrugated heads. The shape being milled into the knife, prevents variation in the shape of the finished cut. Mattison High-Speed Milled Knives are manufactured in the most exacting manner and are without superior. An important factor is the precaution taken for securing the exact shape on every knife of a set. Instead of whittling out each one individually, a master die is made and all knives of a set are finish-shaped by this die. Each set of knives is given a number and the die numbered the same. When duplicate orders are received, the same die is used for shaping the replacement knives. Thus the standard shape of your work is maintained no matter how many replacements are made. When given the number on a knife, we can immediately identify and duplicate it exactly.

If milled knives are ordered for use in heads of other than our own make, the head or a sample knife should be sent to us as a guide to work to. Also state kind of wood on which used and

whether or not knives are to be jointed. All milled knives are heat-treated, tempered, and the form ground.

GROUND-TO-PATTERN KNIVES. Moulding knives for square heads are ground to shape to make the desired cut. High-speed knives for corrugated round heads, are also furnished ground to shape. In this type of knife, care must be taken to maintain the same shape in grinding to sharpen. Milled-to-pattern knives are ground straight across the face without disturbance to the shape.

KIND OF KNIVES TO USE. In factories where variety work is done on short runs, the general practice is square heads with ground-to-shape moulding knives. Where the same pattern is run at intervals over a period of time, the benefits of high-speed steel knives can be secured by using a round corrugated head with ground-to-pattern corrugated knives. Where runs are long, or the same pattern is frequently run, milled knives are a time and money saver. Having a head always set up, a great saving in time is effected in setting up the machine. The next best method is the Mattison Side-Clamp Head with different sets of knives for use on the same head. Changes can be quickly made on this head. The pattern is always the same, so work run at a former time members with the last run. The high-speed steel knives save time in grinding and upkeep. There is the opportunity in many mills for big savings through the installation of improved cutterhead equipment. A modern machine may not produce any more than an old one because of being held back by inefficient cutterheads. Mattison Side-Clamp Heads with milled knives offer the best there is in modern and efficient cutterhead equipment.

SETTING AND GRINDING SQUARE HEADS: As a rule, straight knives on square heads are set with $\frac{1}{16}$" projection, although this varies with conditions. For fine planing and for hard, close-grained woods, less is sometimes used, while for soft woods, heavy cuts and fast feeds, the projection is more. Tearing and chipping of the grain can be remedied to some extent by small knife projection, but the knife bevels should be brought in conformity with the nature of the wood as a permanent remedy. For all heavy cuts, more projection is required to give chip clearance, reduce strain on heads, knives and bolts, and save power. The kind of wood being run, amount of cut, rate of feed, and finish desired, are the best guides for determining the matter of projection.

PLAIN ROUND HEADS: On round heads having plain knives, a gauge should be used to set all knives accurately to the same circle.

CORRUGATED: Setting is determined by the corrugations and is a simple matter. When knives are worn, set out one or two corrugations.

GRINDING. No phase of head upkeep is more important than grinding. With improved steel as now used, wheels adapted to it are necessary. Wheels that are free-cutting and which do not glaze, are necessary for high-speed steel. A wheel that glazes, creates heat, spoiling the temper. Glazing comes from wheels being too hard, too fine, or running too fast. Do not allow the knife to blue in grinding. The temper will be disturbed and minute cracks are apt to form, causing the knife to crumble or chip out. Cracking is the greatest danger. The thin edge of the knife heats more rapidly than the body and expands more. The unequal expansion causes minute cracks to form. These are so small as to be invisible, but grow larger with repeated grindings. They can only be removed by slow grinding square across the edge, then rebeveling.

Knives should be ground in the head. An accurate, dependable grinder that indexes accurately and grinds true, is essential. Indexing should be done from the knife being ground, not from some other knife. The index finger should be set at a 90° angle against the surface of the bit so that there can be no variation in indexing because of side slip or slight movement of the index finger.

If knives are to be jointed, grinding becomes doubly important. Unless accurately ground, some knives will require too much jointing and a heavy heel will result. To get perfect work, all knives must joint the same. Many mills do not have a tool room grinder that meets present-day requirements. The Mattison No. 231 has been developed to do this work quickly and accurately. If you have no similar machine, write us about the No. 231.

Grinding on pedestal grinders is done dry. It must be done slowly to avoid heating. In finishing, go around all knives several times adjusting the wheel, and continue until no cut is taken, to insure all knives being exactly the same.

All bits should be checked before removed from the grinder to determine that all cutting edges are exactly equal in projection. A good tool for this is a dial type of indicator held in place by a heavy base or clamped securely to the grinder bed. Rotate head slowly and note that all bits register the same dial reading. A less accurate method is a setting point or brass tip held so the bits can be checked closely as each passes the point. A still better method is to rotate the head making a sample full width profile cut in a wood test block. Then turning each bit slowly past the wood block with a light on the back side one can easily tell by light shining through just which are the short bits. Proceed to grind the long bits slightly more till all check alike.

BALANCE. Balance all knives carefully before placing on head. Long knives should be end-balanced and be the same width at both ends. Moulding knives placed on opposite sides of a head, in addition to being balanced, should be approximately the same shape and set out the same distance from the lip. If one knife projects farther from the center than the other, the leverage is greater and acts the same as more weight. Moulding knives should never be set staggered, but be opposite each other. A head with staggered knives may show a static or standing balance, but will be out of dynamic or running balance. Because centrifugal forces are not opposite each other it will cause "shimmying."

Where bits are frequently removed from a head and set up again, it is especially important to keep them in proper balance. A very good practice is to number the faces on the head and also the corresponding bits. Mark the numbers from one to four for 4 bits and one to six for 6 bits, etc. Each time put the bits back on the correspondingly numbered faces.

In this procedure be sure to balance opposite knives exactly with each other. On 4-knife heads balance bits No. 1 with No. 3, and No. 2 with No. 4. On 6-knife heads the pairs will be 1 and 4, 2 and 5, and 3 and 6. If this procedure is followed, it will save much time in grinding. Even with the most accurate workmanship, there may be very slight variations which may make one bit show up with longer projection than the rest if they are mixed up in assembly. Then extra grinding on that bit will disturb the balance again. Best results always follow the most careful procedure. Perfect balance is essential for good work at higher rotative speeds.

Another splendid procedure is to place the bare head on the moulder arbor and run it alternately with the key in each of the two grooves of the arbor. Note carefully in which position it runs the smoothest, especially at high frequency; then mark the groove which corresponds with the key on the head and always put the head on the arbor in this position after the carefully balanced bits have been put in place. Always remember that you are dealing with a number of almost immeasurable variations and that if they are shuffled around, they may add up to a disturbing balance at one time and they may cancel out to perfect operation at other times. We advise following a certain procedure each time in setting up each head, once a good balance is determined.

For high-frequency operation, balance is four times as important. Centrifugal stress multiplies four to one in relation to speed. If the speed is doubled, the strain is four times as great. Heads which run passably well at 3600 R. P. M., may show badly out of balance at 7200 R. P. M.

A milled-to-pattern bit 2" face weighs around 10 oz. Run on a 6" cutting circle head at 3600 R. P. M., it will exert a centrifugal force of 690 lbs. At 5400 R. P. M. it is 1552 lbs., and at 7200 R. P. M., 2760 lbs. This gives us an idea of the stresses on a cutterhead. A 30 oz. bit would exert a pull of more than 3½ tons when operated at 7200 R. P. M. Now we can see that an unbalance of as little as one-tenth ounce would cause an unbalanced force of 27 lbs. at 7200 R. P. M. This should emphasize the need of being very careful in balancing bits or knives in pairs and putting them back carefully in the same position. Never run a bit which is out of balance because of a broken-out chip. Always balance the bolts and clamps in pairs, or better yet, keep them all the same weight. On heads double the diameter, the centrifugal force is doubled.

No head can do good work if it is out of balance. It will most certainly act as though only one bit is cutting even if it is carefully ground and jointed.

JOINTING. With correct knife bevels, the grade of finish is determined by the frequency of knife marks, or in other words, the number of knife marks or cuts to the inch. With a head revolving at a certain rate with one knife cutting, one cut per revolution will show on the work. The feed must be at a rate which will allow the number of knife cuts per inch that are required to produce the grade of work desired.

No matter how carefully knives are set and ground, unless jointed, only one in a set will make a finishing cut. This can be shown by counting the knife marks, and figuring the rate of feed and revolutions of head. There are only two means by which the same grade of work can be done at faster feed. Revolve the head faster, or cause more than one knife to show a finish cut.

The object of jointing is to make all knives cut alike. A four-knife head properly jointed, will show four times the number of knife marks. Hence the feed can be four times as fast and produce the same number of knife marks per inch on the work. A six-knife head, six times as fast, etc.

Jointing must be accurately done or it will not be successful. Accurate balancing, setting and grinding, are the first requisites. Spindle and bearings must be true and without play. Jointing devices must be accurate, and the jointing done slowly and carefully. Thin, high-speed straight knives and milled-to-pattern moulding knives are suitable for jointing. Good results are not obtained from jointing knives on square heads, ground-to-pattern moulding knives or carbon steel knives.

WHEN TO JOINT. Where runs are long on the same pattern. On variety work and short runs, the saving in running time is not enough to justify the jointing operation. In flooring mills, production moulding factories, dimension mills, etc., where long runs are the rule, jointing has been more extensively applied than in the cabinet plants. There are, however, many cases where this could be done to good advantage. Knives are not usually jointed where the speed is higher than 3600 R. P. M. The vibration caused by higher speeds makes it somewhat uncertain.

JOINTING STRAIGHT KNIVES. Most modern moulders and flooring machines are fitted with jointing devices or arranged so they can be applied. Straight knives are jointed by passing the stone across the knives parallel to their cutting edge. The jointing bar must be rigidly held and mounted parallel with the bed. Jointing must be done lightly. All knives must joint the same. If some have heavier heels than others, they will pound. Wide heels should be ground down after jointing to bring them the same as lightly jointed knives.

If all operations are properly done, several jointings can be made before it is necessary to remove the head for grinding. Running the jointer over lightly after knives have begun to dull, renews the cutting edge, causing them to cut free.

Milled moulding knives are jointed with formed stones. One stone is enough for narrow knives, but for wide ones, the stones are made in sections. In such cases, more than one operation is required to joint the knife. The stone is ground or shaped with a coarse file to as near the shape of the knife as possible. The jointing carriage is locked to prevent cross-movement, with the stone in place in line with the knives. Then with head standing, bring the stone down lightly against the knives, and turn the head slowly by hand to cause the knives to shape the stone to an exact fit. When this is done, back up the stone slightly, start up the head, and bring the stone down very slowly until all knives are jointed. If more than one stone is required, repeat the operation for each knife section. On knife edges extending parallel, or nearly parallel with side of stone, such as a shoulder or half round moulding, be careful not to over-joint. The stone can be relieved slightly with a file at these points.

Always joint lightly, and see that all heels are the same.

RATES OF FEED. Rate of feed is determined by the grade of work desired, kind and condition of wood, number of knives making a finishing cut, and speed of revolution of the head.

First, see that knife bevels are proper to avoid tearing out of the kind of wood being worked. Then determine the number of knife cuts per inch necessary to give the desired finish. With the number of knives making a finishing cut (only one knife is finishing on heads not jointed) and speed of revolution known, it is only a matter of arithmetic to determine the rate at which stock can be fed. The following formula is a quick way of figuring this:

On heads not jointed, multiply number of knife marks wanted by 12, and divide into revolutions of head, and you get rate of feed in feet. With four knives jointed, multiply knife marks by 3, and divide into revolutions of head.

With six knives jointed, multiply by 2, and divide into revolutions of head.

This holds true on any machine using a revolving cutterhead.

It is apparent that four knives jointed and all finishing alike, permits a feed four times as fast as one knife, yet produces the same number of knife cuts per inch.

It must be borne in mind that the rate of feed must be faster when knives are jointed, to prevent burning. If the feed is as slow for four jointed knives as for one knife, the knives will not stand up. The wood will be milled or ground away by the knives rubbing instead of cutting. The stock must advance between each knife a sufficient distance to permit the knife to get under the fibers and make a cut into fresh material.

No steel made will withstand the grinding action of too slow feed speed. The heat generated will draw the temper and knives will dull rapidly. If you find your knives failing at slow feed speeds, look into the conditions before concluding the steel is to blame.

Following is shown a chart giving number of knife cuts which give a good grade of work on different woods. Cutting and clearance bevels for preventing tearing, are also given. If feed speeds and knife cuts are kept within the range shown, knives will not burn.

How to Determine Rate of Feed to Produce Given Number of Knife Cuts

Spindle Speed	Knife Cuts per Inch	Number of Knives Cutting 1	2	4	6	8	10	Spindle Speed	Knife Cuts Per Inch	1 Knife	Spindle Speed	Knife Cuts Per Inch	1 Knife	Spindle Speed	Knife Cuts Per Inch	1 Knife
	8	ft. 36	ft. 72	ft. 144	ft. 216	ft. 300	ft. 375		8	ft.		8	ft. 61		8	ft. 73
	10	30	60	120	180	240	300		10	45		10	50		10	59
3600 R.P.M.	12	25	50	100	150	200	250	5400 R.P.M.	12	37	6000 R.P.M.	12	41	7200 R.P.M.	12	49
	14	21	43	82	123	164	215		14	32		14	35		14	42
	16	18	37	73	112	150	187		16	28		16	31		16	36
	18	16	33	66	100	133	166		18	25		18	37		18	32
	20	15	30	60	90	120	150		20	22		20	25		20	29

Fig. 47

Rate of feed to produce given number of knife cuts per inch with 1, 2, 4, 6, 8 and 10 knives at 3600 R. P. M. and 1 knife at 5400, 6000, and 7200 R. P. M. (figure as one knife for any head not jointed regardless of number of knives in it).

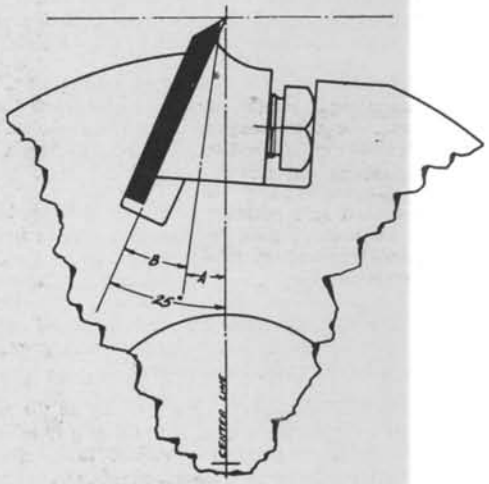
The figures given at left are factors to be used according to number of knives. Multiply number of knife cuts wanted, by figure shown for number of knives and divide into revolutions of head, which will give rate of feed in feet. 1 knife, 12; 2 knives, 6; 4 knives, 3; 6 knives, 2.

Recommended Knife Bevels

Knife Bevels Recommended for Various Woods When Cutting Angle of Head is 25°

Kind of Wood	Green		Air Dried		Kiln Dried	
	A	B	A	B	A	B
Ash (plain)	25	0	20	5	15	10
Basswood	25	0	25	0	20	5
Beech	25	0	20	5	15	10
Birch (curley)	20	5	15	10	10	15
Birch (plain)	25	0	20	5	15	10
Cedar	25	0	25	0	20	5
Chestnut	25	0	25	0	20	5
Cypress	25	0	25	0	20	5
Elm (Hard)	25	0	20	5	15	10
Elm (Soft)	25	0	25	0	20	5
Fir	25	0	20	5	15	10
Gum	25	0	20	5	15	10
Hemlock	25	0	25	0	20	5
Hickory	20	5	15	10	10	15
Mahogany	25	0	20	5	15	10
Maple (plain)	25	0	20	5	15	10
Maple (birdseye)	15	10	10	15	5	20
Oak (plain)	25	0	20	5	15	10
Oak (quartered)	20	5	15	10	10	15
Pine (yellow)	25	0	20	5	15	10
Pine (white)	25	0	25	0	20	5
Poplar	25	0	20	5	15	10
Redwood	25	0	25	0	20	5
Spruce	25	0	25	0	20	5
Walnut	25	0	20	5	15	10

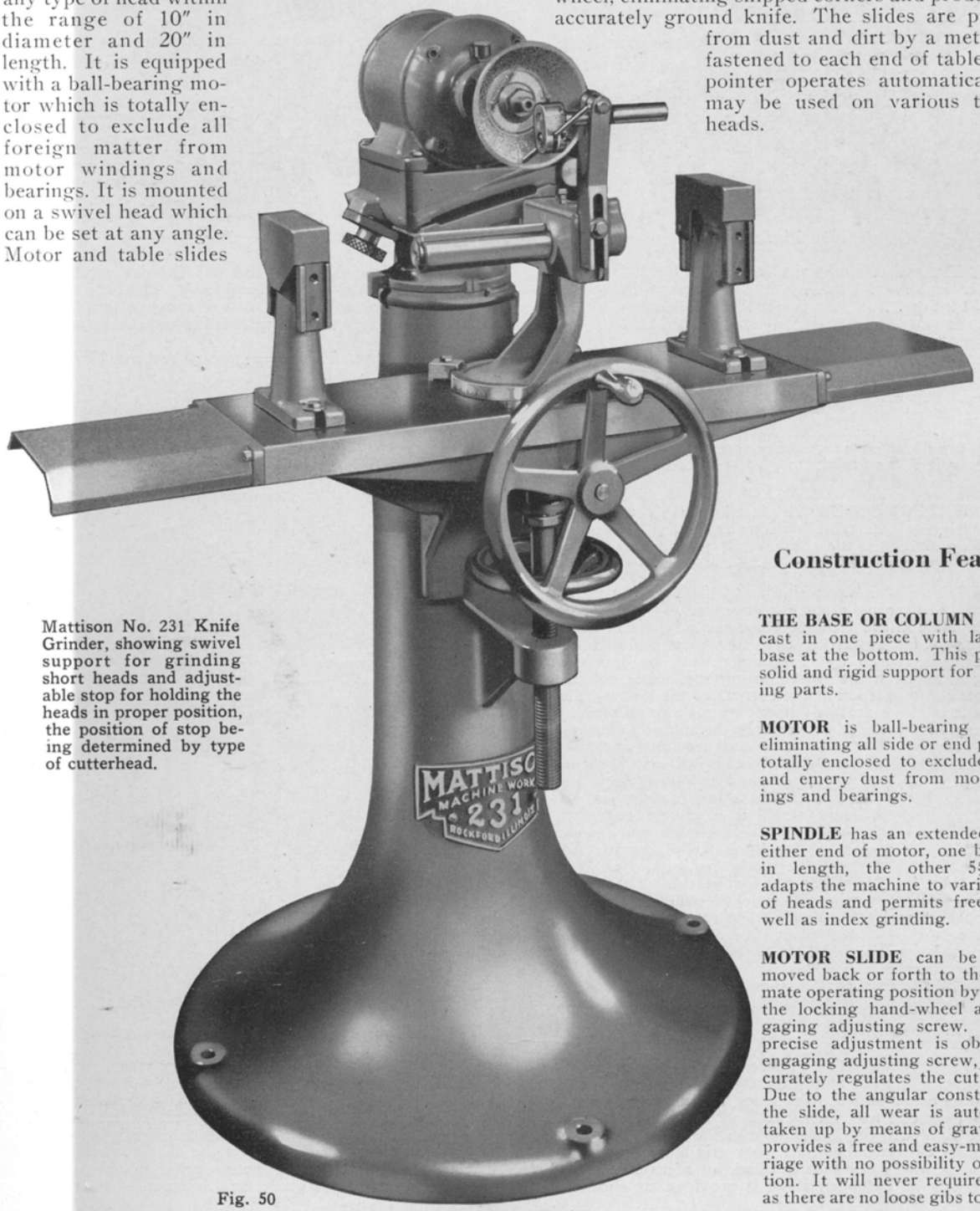
(UNLESS HEADS ARE JOINTED ON MACHINE YOU WILL GET ONE KNIFE WORK)



If all stock used is such that it is necessary to have a 5, 10, or 15 degree angle, it is more economical to have heads with slots at these angles, than it is to back bevel knives. This should be thoroughly checked when heads are ordered.

Mattison No. 231 Pedestal Grinder

THE Mattison No. 231, Motor-Driven, Pedestal Knife Grinder is a valuable accessory for use with Mattison Electric Moulders or other machines using similar cutterheads. It will handle practically any type of head within the range of 10″ in diameter and 20″ in length. It is equipped with a ball-bearing motor which is totally enclosed to exclude all foreign matter from motor windings and bearings. It is mounted on a swivel head which can be set at any angle. Motor and table slides are of unique construction, being so designed that all lost motion and wear is automatically taken up without the use of gibs or adjusting screws. The head is carried in a perfectly straight line past the wheel, eliminating snipped corners and producing an accurately ground knife. The slides are protected from dust and dirt by a metal cover fastened to each end of table. Index pointer operates automatically and may be used on various types of heads.



Mattison No. 231 Knife Grinder, showing swivel support for grinding short heads and adjustable stop for holding the heads in proper position, the position of stop being determined by type of cutterhead.

Fig. 50

Construction Features

THE BASE OR COLUMN is heavily cast in one piece with large floor base at the bottom. This provides a solid and rigid support for the working parts.

MOTOR is ball-bearing equipped, eliminating all side or end play. It is totally enclosed to exclude all steel and emery dust from motor windings and bearings.

SPINDLE has an extended shaft at either end of motor, one being 1⅝″ in length, the other 5⅝″. This adapts the machine to various styles of heads and permits free-hand, as well as index grinding.

MOTOR SLIDE can be instantly moved back or forth to the approximate operating position by loosening the locking hand-wheel and disengaging adjusting screw. The final precise adjustment is obtained by engaging adjusting screw, which accurately regulates the cut of wheel. Due to the angular construction of the slide, all wear is automatically taken up by means of gravity. This provides a free and easy-moving carriage with no possibility of lost motion. It will never require attention as there are no loose gibs to fuss with.

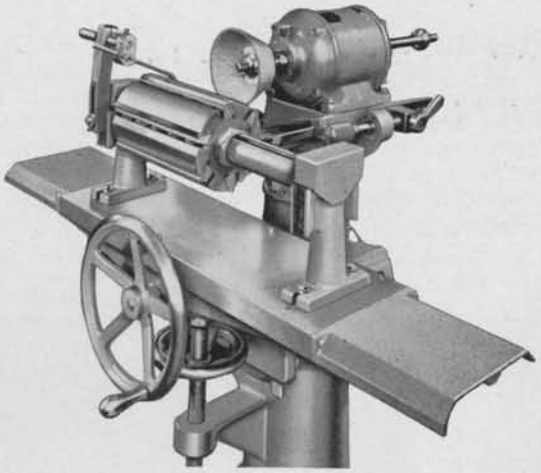


Fig. 51

In the illustration above the Mattison No. 231 Grinder is shown grinding a top head with straight knives. The head is being supported between the two fixed cutterhead supports and held in proper position by index pointer.

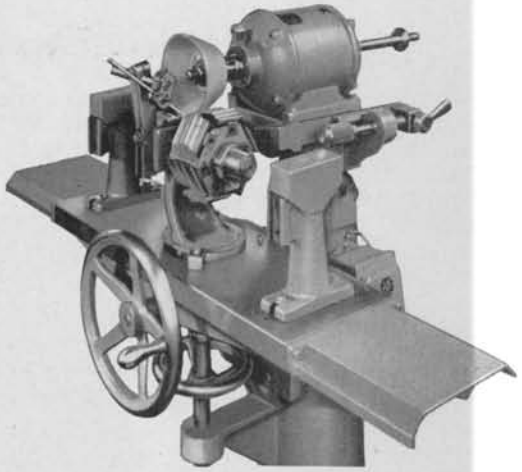


Fig. 52

Mattison No. 231 Pedestal Grinder set up for grinding side cutterhead knife. The head is held by the adjustable swivel support with index pointer in position against the knife being ground.

THE SWIVEL HEAD supports the motor slide upon which it operates. This swivel rests on the main base or column and can be turned or swiveled in any desired direction and locked in any of these positions. Straight or concave bevels as desired are obtained by grinding across the face of wheel or swiveling it to any angle to give the desired amount of concave.

THE ELEVATING SCREW is placed in such a position that the weight of the table is centralized, thus eliminating all cramping action on the slides. It is provided with ball-thrust bearings, which further add to the ease of operation.

THE TABLE rests on ways similar to those of the motor. A great deal of time and attention was given to the construction of the table in order to overcome the snipping or heavy grinding on the corners of knives as they enter and leave the wheel. This is caused by two things, first, by the knife springing away from the wheel during the heavy cut, and coming back into position at the corners of the knives. This is overcome in the Mattison Grinder by making all working parts exceptionally rigid, particularly the motor mountings and head supports. The other cause, lost motion, is probably more important and undoubtedly the cause of most snipping. Where carriage is mounted on dovetail or gibbed ways, it is almost impossible to take up all of the lost motion, and still have carriage operate freely, which is, of course, necessary. The Mattison Grinder has specially designed ways which automatically take up lost motion by means of gravity. The angle is such that the carriage works perfectly free at all times, yet there is no possibility of lost motion. The head is carried in a perfectly straight line past the wheel, eliminating snipped corners and producing an accurately ground knife. These slides are protected from dust and dirt by a metal cover fastened to each end of the table.

THE TABLE SUPPORT slides vertically on planed, dovetailed ways which are cast integral with the base. It is adjusted vertically by means of a conveniently located hand wheel.

CUTTERHEAD SUPPORTS. There are two fixed supports, as shown in illustration at top of page, one at each end of table with an arbor between them, for use in grinding heads up to 20″ long and a cutting circle up to 10″ in diameter. Heads are tightened onto the arbor in the same manner as on a moulder cutterhead spindle. For grinding short heads, or side heads where one side is blind, an adjustable swivel rest containing an extended arbor is provided, as shown in illustration above. This support may be turned or swiveled to any desired angle.

INDEX POINTER. This may be used on cutters having cutting or clearance bevels, or a combination of both. It can also be used on round or square heads of various diameters. The index pointer is hinged and a spring causes it to automatically drop into position as the head is turned. As the pointer is always in the same position, all knives are ground exactly alike.

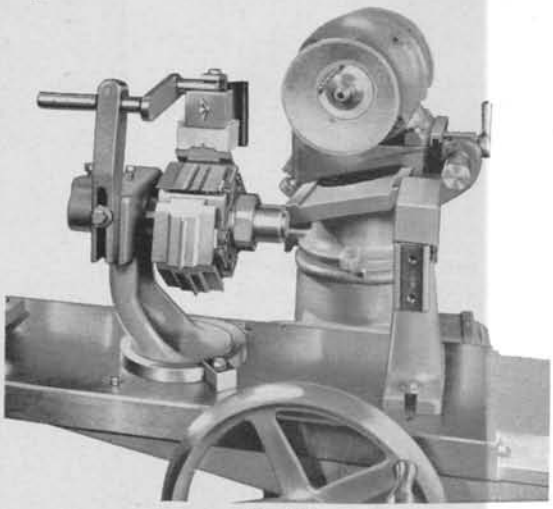


Fig. 53

Knife Setting Device

There are two devices used for this purpose. One is a small disc wheel which is generally used for making duplicate knife set-ups, such as are necessary when two or more moulding cutters of the same shape or contour are to be placed in a cutterhead and afterwards ground. The other holder is intended to hold a short piece of moulding in proper relation to the cutterhead, so that the ordinary slotted carbon cutters may be set up on the head correctly and the whole head slipped onto the moulder spindle, placed in proper relation to the guide, and fastened.

Bars for Jointing Knives in Cutterheads for Mattison No. 276 Moulder

IN order to cause all knives on a head to make a finishing cut on the stock, jointing while running on the machine is necessary. This practice is highly efficient on long runs of one pattern. Unless jointed, only one knife on a head will make a finishing cut. The feed must be regulated accordingly to secure the desired grade of work. A four-knife head jointed so all knives cut alike, will produce the same grade of work at a feed four times as fast as a head not jointed running at the same speed. Spindles are usually run on high frequency for one-knife work, and 3600 RPM for jointing.

Efficient jointing devices can be furnished for use on Mattison Moulders for jointing both straight and profile knives.

Figure 122 shows jointer set for jointing bottom head on No. 276 Moulder. Figure 123 shows it in place for jointing the side head. Fig. 124 top head jointer. Fig. 125 form jointing.

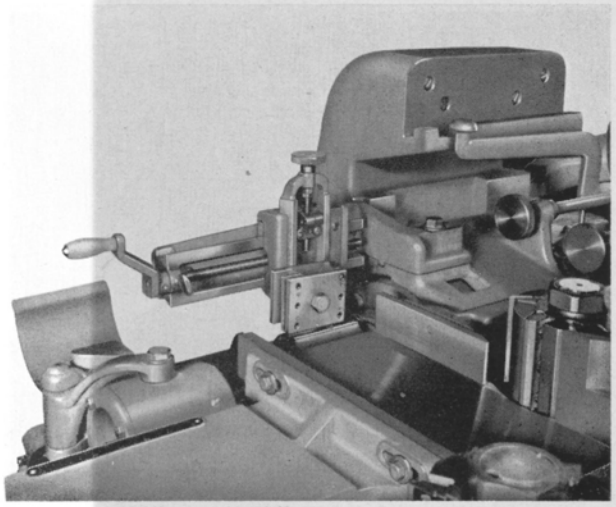


Fig. 122

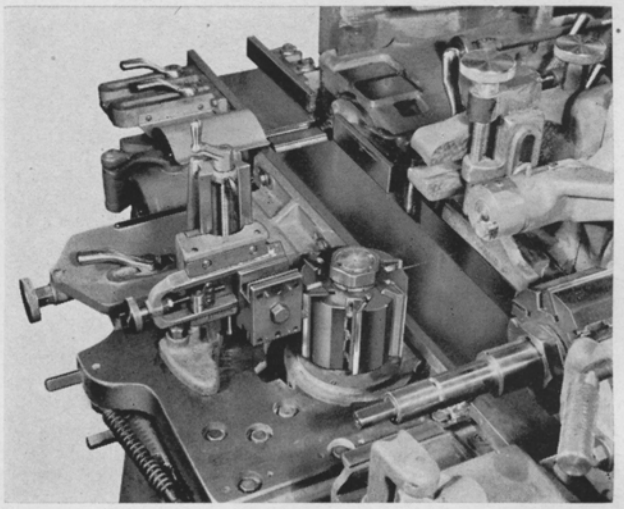


Fig. 123

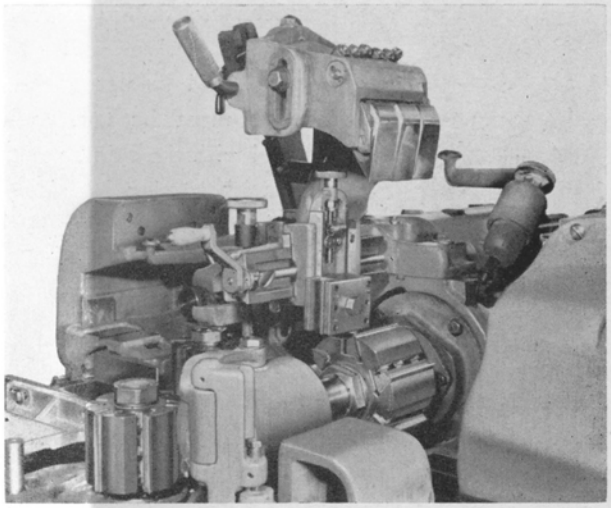


Fig. 124

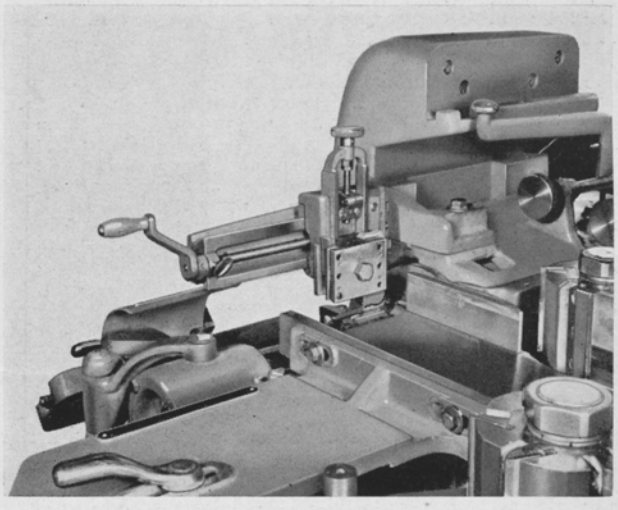


Fig. 125

Bars for Jointing Knives in Cutterheads of Mattison Nos. 226, 228 and 229 Moulders

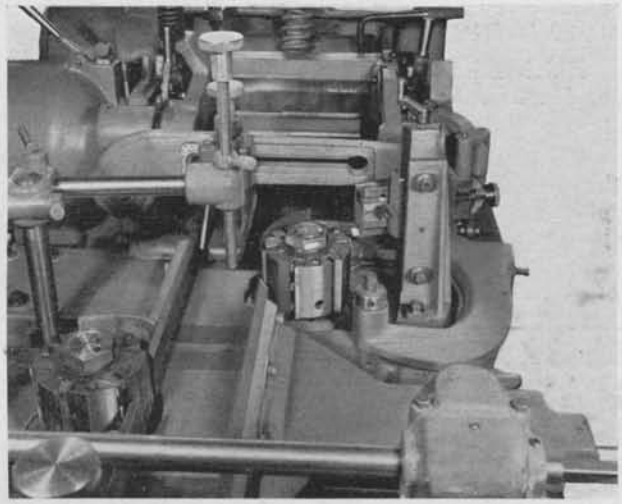


Fig. 126

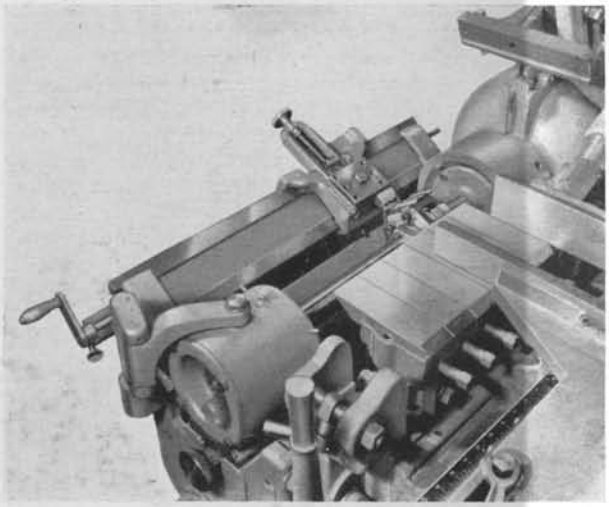


Fig. 127

CUTS on this page show jointers in place on a Mattison No. 229 Moulder. The same devices are also used on the Nos. 226 and 228 Models. Figure 126 shows the set-up for jointing the outside head. Figure 127, jointing a profile knife on the bottom head, and in figure 128, the bottom head is being jointed.

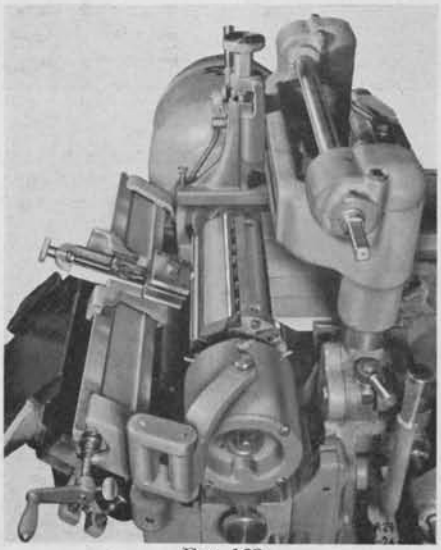


Fig. 128

The support bar is rigid and substantial, and is quickly set in place on the brackets provided on the machine. The traveling carriage is closely fitted, with adjustment for taking up play. The stone-holder head has fine and accurate adjustment. For jointing straight knives, a square-end stone is used, and the carriage is moved back and forth by revolving the screw crank. When profile knives are jointed, the carriage is locked stationary. A stone shaped to conform to the shape of the knife, is clamped in the head and fed down by turning the adjusting screw.

For jointing, spindles and bearings must run perfectly true, heads be carefully balanced and knives accurately ground in the head. For this purpose, a modern type pedestal grinder which will index and grind all knives exactly alike, should be used. The jointers must be true and parallel with the spindle and work without play. Mattison moulders with jointing devices, fitted with Mattison Cutterheads and Knives set up and ground on the Mattison No. 231 Pedestal Grinder, make a combination without equal for the efficient production of high grade work at fast feed.

T-Slot Type Radial Cutterheads

WORKING PRINCIPLE. The action of this head is identical with the principle of hand turning, as the cut on each member begins at the top or highest point and shears downward to the low point. The cut is just as much with the grain as across it. An easy, clean cut is the result. Having six faces on the cylinder, and with the cylinder made in as many short sections as necessary, it is possible to set knives on the different faces so the cut is staggered around the circle, thus all the knives are not cutting at once. Through the action of different knives coming into play, the cut is continuous however. Three parts comprise the head; cylinder, knife holders and knives.

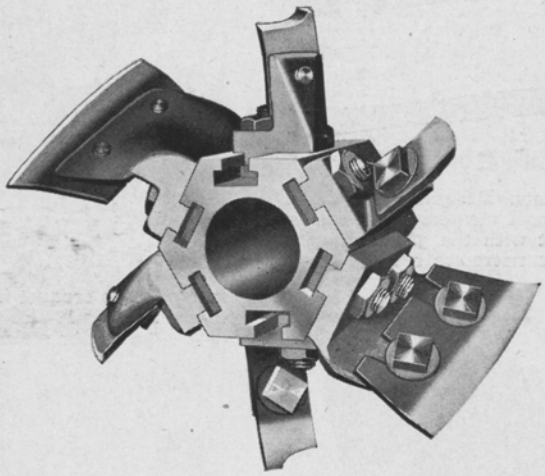


Fig. 65

CYLINDER is accurately machined from solid steel to exactly fit on the arbor. Close limits are held so cylinder sections member perfectly. Cylinder sections are of varying lengths to better allow for interchangeability and for using on different patterns. By rearranging in different groups, many patterns can be made with the same heads.

KNIFE HOLDERS. These also come in standard sizes and styles and as many can be placed on the cylinder as the turning calls for. We use one-piece holders made of steel. A large planer bolt, heat treated, holds the knife holder securely to the cylinder at any point along its length. A tongue on the holders fits into the slot in the cylinder, preventing twisting, also bracing the holder against shocks. Any holder can be removed from the cylinder without interference with any other holder.

KNIVES. The Mattison Machine Works are and have been for over forty years, the world's largest manufacturer of Automatic Shaping Lathes. With nearly four thousand Mattison Lathes put out in service, the range of work has included every conceivable class of turning and kind of material. This accumulated experience has led to the higher improvement of the machines and the accessories which belongs with them. Research and experience have resulted in the best steels for knives and the best processes for making and treating them. Three classes of knives are provided to cover the various requirements.

CARBON STEEL. That furnished by Mattison is a highly refined tool steel, and is not to be compared with the ordinary carbon steel usually offered in the open market. It is of special formula which takes a hard temper, holding the edge, without being as brittle as ordinary carbon steel. It has strength and toughness, and carries a long-lasting cutting edge. It comes to us in bars, is cut, slotted, bent and shaped complete in our plant. Chemical analysis insures its running true to the formula set up.

CARBON BLANKS are furnished NOT TEMPERED. It is of little value to order them tempered, as it will be disturbed in grinding, making re-tempering necessary to insure a good edge. They are furnished bent unless otherwise ordered. Experience has shown that a forward bend at the proper angle makes a cleaner shearing cut, avoiding the scraping action of a straight knife. Straight blanks will be furnished on special order, but bent are recommended.

PLATED BLANKS. These have semi-High-Speed steel welded onto a carbon steel back. They are furnished bent, tempered and with the cutting edge straight beveled. If carefully handled in grinding, they will not require re-tempering.

WOODWORKING HIGH-SPEED STEEL. The edg-holding qualities and long wear of High-Speed steel have long been recognized. The drawback for lathe knives has been the brittleness and lack of strength to carry the shocks coming from contact with the work. Lathe knives cannot be backed up near the cutting point as is the case with moulder and similar knives, but must bear the load through the strength of the knife itself. The extreme brittleness of standard High-Speed steel, results in breakage. Mattison engineers have worked on this problem for years in the effort to develop a steel which would have the edge-holding qualities of High-Speed steel, yet have sufficient strength to carry the load. Many tests of different kinds of High-Speed steel have been made and the results noted. This research has led to the development of a special steel, designated as our Woodworking High-Speed which meets these requirements to a higher degree than any other. It is much harder than standard High-Speed, enabling it to carry a greater load with less breakage, yet give the keen, long-lasting cutting edge so desired in High-Speed steel. They come bent, with cutting edge straight beveled, tempered, heat treated and sand blastd.

Special Purpose Cutterhheads for Mattison Lathes

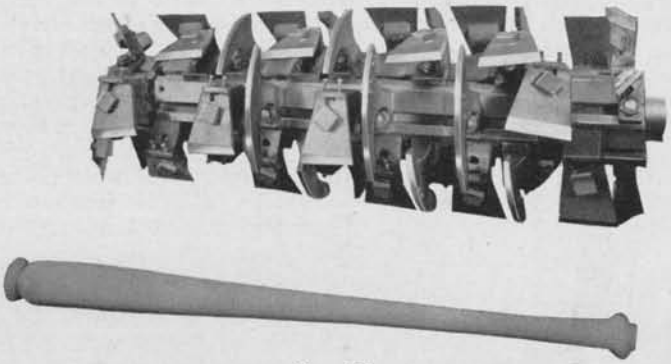


Fig. 129

"BB" type heads with segments. Designed to make a fast cut on work without small members and where the cut is practically straight with the grain. Large, heavy cylinders and carriers are used.

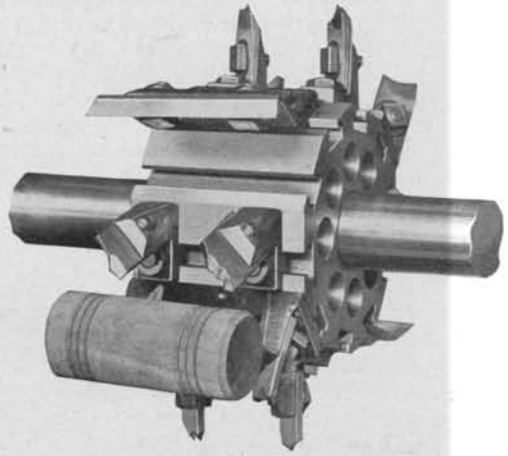


Fig. 69

Three croquet mallets are handled in multiples. Head is 10-slot to accommodate the carriers required for making the straight cut and beaded members.

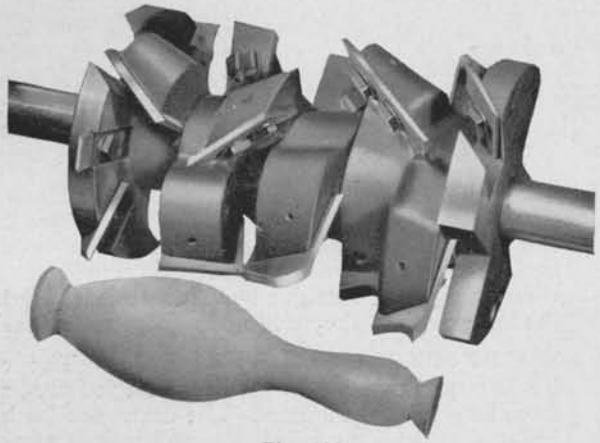


Fig. 130

Cast-steel, disc-type finishing head for heavy production work on ten pins. Same type of head also available for roughing operation.

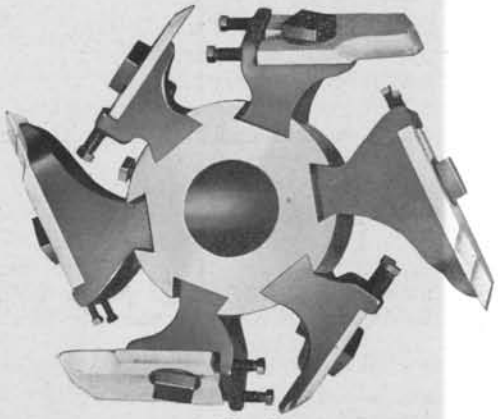


Fig. 70

Special "BB" head for making base turnings.

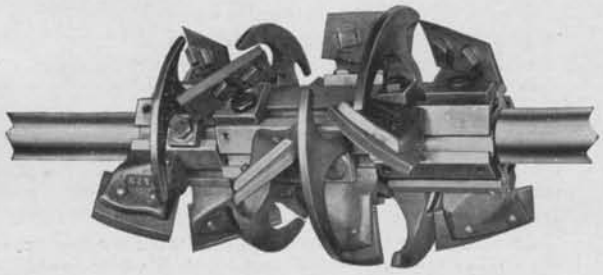


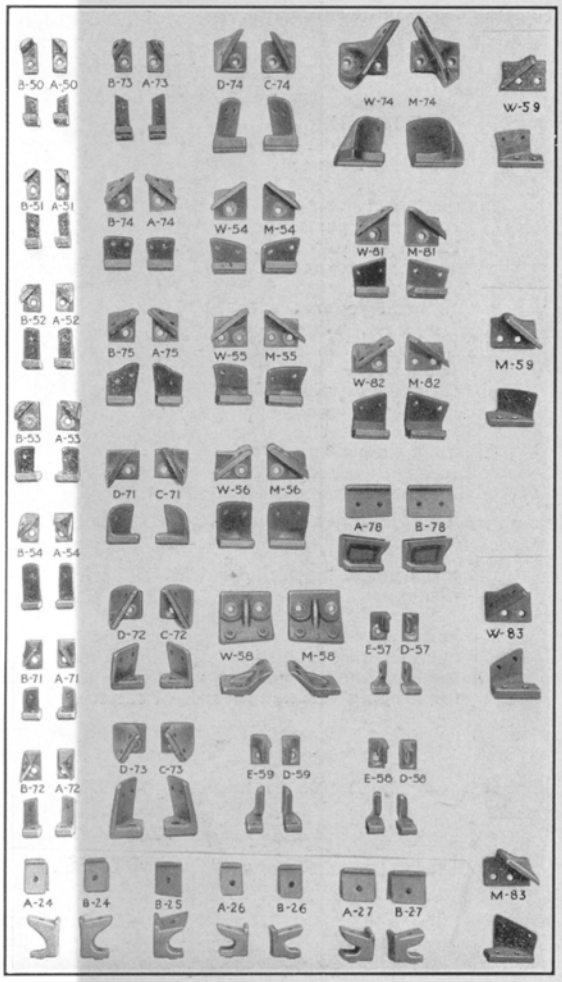
Fig. 68

Complete cutterhead with segments, which permit crowding even the most delicate turnings and at the same time prevent them from being pulled into the knives.

Fig. 71

Base turnings made on the Mattison Lathe. The cut is made directly across and against the grain. Mattison Equipment successfully solves this problem.

Knife Holders and Segments for T-Slot Heads



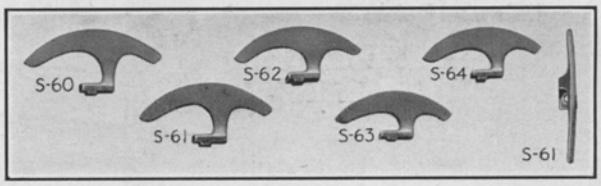
A & B 71-72-73 Holders are for soft and spongy woods such as tupelo and fir. D and C 71-72-73-74 and W & M 74 Holders are for Queen Anne and other similar shapes. One side of these carriers being higher than the other, supports the long reach of the knife of tapered cuts.

SYMBOL		Height Over-all Above Cylinder Face	Width Across Knife Seat	Width of Base	Center to Center of Knife Bolts	Degree of Angle	Center to Center of Cyl. Bolts
Right-Hand Shear	Left-Hand Shear						
B-24	A-24	3½"	2"	2"	.....	5°	.....
B-25	.....	3⅞"	2⅝"	2 7/16"	.....	23°	.....
B-26	A-26	2¾"	2"	1⅞"	.....	5°	.....
B-27	A-27	2¾"	3"	2⅞"	.....	5°	.....
B-50	A-50	2½"	1½"	1¼"	.....	45°	.....
B-51	A-51	3"	1½"	1¼"	.....	45°	.....
B-52	A-52	3½"	1⅞"	1½"	.....	45°	.....
B-53	A-53	3"	2¼"	2"	.....	45°	.....
B-54	A-54	4"	1⅞"	1½"	.....	45°	.....
B-71	A-71	2½"	1⅞"	1½"	.....	55°	.....
B-72	A-72	3"	1⅞"	1½"	.....	55°	.....
B-73	A-73	3½"	1⅞"	1½"	.....	55°	.....
B-74	A-74	2⅝"	3¼"	2¼"	1½"	40°	.....
B-75	A-75	2 11/16 & 3¾"	3¼"	2¼"	1½"	40°	.....
B-78	A-78	3⅛"	4⅛"	2½"	2"	5°	1⅞"
D-71	C-71	2¾ & 3⅜"	3⅝"	3"	2"	60°	.....
D-72	C-72	3⅜"	4"	3"	2¼"	60°	.....
D-73	C-73	4⅝"	2⅞"	3"	1½"	60°	.....
D-74	C-74	3⅜ & 4⅝"	3¼"	3"	1½"	60°	.....
E-57	D-57	2½"	1¼"	1½"	.....	90°	.....
E-58	D-58	3"	1¼"	1½"	.....	90°	.....
E-59	D-59	3½"	1½"	1½"	.....	90°	.....
W-54	M-54	2¾"	4"	3"	2¼"	40°	.....
W-55	M-55	3¼"	4"	3¼"	2¼"	40°	1⅝"
W-56	M-56	3¾"	4¼"	3¼"	2¼"	40°	1⅝"
W-58	M-58	2¼"	5"	4¾"	3"	7°	3"
W-59	M-59	2 9/16"	4⅛"	3⅞"	2¼"	40°	1⅝"
W-74	M-74	3½ & 4"	6"	4¼"	3½"	60°	2¾"
W-81	M-81	2½ & 3½"	4"	3"	2¼"	40°	.....
W-82	M-82	3 & 4"	4"	3"	2¼"	40°	1⅝"
W-83	M-83	2½ & 3½"	4"	4"	2¼"	40°	1½"

T-Slot Type Hexagon Cylinder

Diam. Face to Face	Bore	Shortest Length	Longest Length
4⅝"	2⅝"	1¼"	12½"

T-Slot Segments



Symbol	Height above Cylinder Face	Diameter Cutting Circle	Width of Base
S-60	4 15/16"	14½"	1½"
S-61	4 11/16"	14"	1½"
S-62	4 7/16"	13½"	1½"
S-63	3 15/16"	12½"	1½"
S-64	4 3/16"	13"	1½"

Instructions for Ordering Lathe Heads and Knives

Send sample or drawing showing exact shape and full size of turning. Give full length of stock including part not turned. Mark sample showing the drive end—the one which is to the operator's left when facing machine. State if work is to be handled with or without chucks. Give make and model of lathe on which used, and size mandrel where heads work.

State if heads complete with cylinders, knife holders and knives ground to shape, are wanted, or ground knives mounted on holders without cylinders, or ground knives only. When knives only are ordered, they are set up and fitted accurately to the pattern. When setting up again on other holders, some touching up may be required, as it is hard to reset them exactly as they were before.

When ordering blanks, give the width of cutting edge as the first dimension, length from edge to back next, and thickness last. Specify whether carbon steel, plated steel or woodworking high-speed steel is wanted.

NOTE: Unless otherwise ordered, all blanks are furnished bent; carbon steel blanks, not tempered; woodworking high-speed steel blanks are furnished tempered with cutting edge beveled.

Accessories which Simplify the Mattison Turning Method

WE not only study to make efficient Shaping Lathes, but we also study the features that will help to make these machines into a complete and thoroughly efficient system. The attachments and accessories shown on this page, aid in making the Mattison Method exceedingly simple. And the simplicity with which a system is operated is what makes it most successful.

No. 5001 Knife-Marking Machine

BELOW is a Knife-Marking Machine and Setting-Up Box combined. Duplicate pattern boards of the profile of the turning to be made are clamped in the machine as shown in the illustration. Knife blanks are placed in the holders and coated with whiting. Operator places guide pin against shaped edge of upper pattern board and moves the marking device along the board, at the same time turning the arbor to bring the face of the blank in contact with the marking pointer, as illustrated in the small picture. The blank is then ground to this line, which brings its shape to a perfect fit with the setting-up pattern board in front of the arbor. This device permits the inexperienced knife maker to form lathe knives as perfectly as the expert.

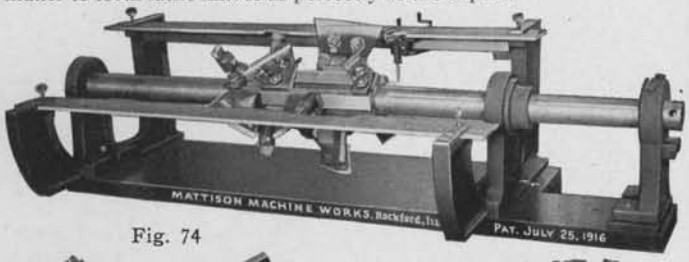


Fig. 74

Even Balance Scales
Fig. 75

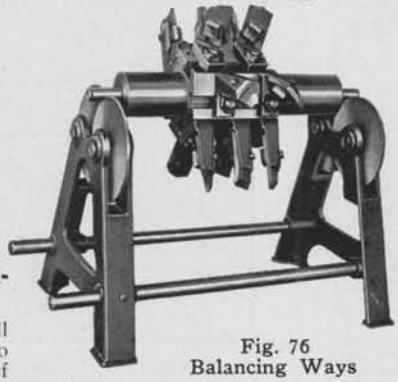


Fig. 76
Balancing Ways

Balancing Ways and Even-Balance Scales

IT IS very necessary to have all cutterheads properly balanced to insure good work. Each pair of knives and knife-holders must be of equal weight, and the completed cutterhead must be carefully balanced. The balancing ways above have hardened and ground discs which run on ball bearings. This tool is always level, no matter how or where placed. The well-made, even-balance scales will last indefinitely.

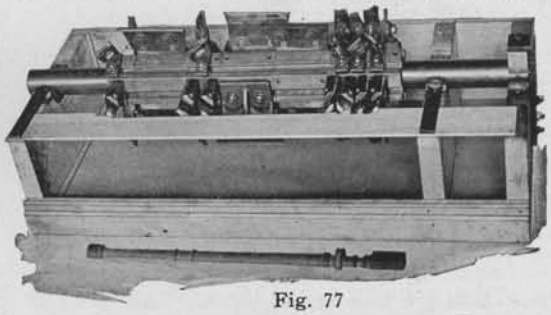
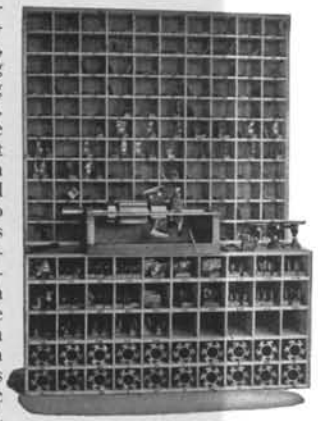


Fig. 77

Triple-Bearing Setting-up Box

THE practical setting-up box above can be easily constructed of wood. The arbor is supported by three blocks or bearings, one of which is left free to move in and out. With such a box, your knife maker can handle the cutterheads much easier and faster than where only two stationary end-bearings are used. Metal fittings together with blue print giving sizes, are furnished with regular equipment on new machines.

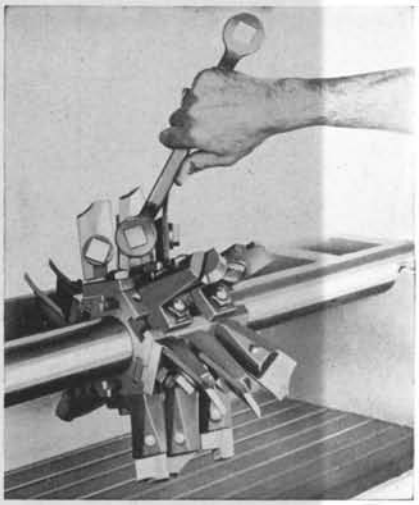
Storage Cabinet for Cutterhead Supplies



THIS illustrates a convenient, labor-saving method of storing cutterhead parts. Each space in the wooden cabinet is large enough to hold several knives, also knife-holders with knives attached. The indexing of each section of the cabinet, in connection with numbered knives and the graphic pattern boards, enable the operator to make his set-up quickly and without confusion.

Fig. 78

Spaces below the shelf may be used for storing knife holders, segments, and different lengths of cylinder. We furnish blue-print with instructions for building this cabinet, as well as suggestions for keeping accurate records of cutterhead parts.



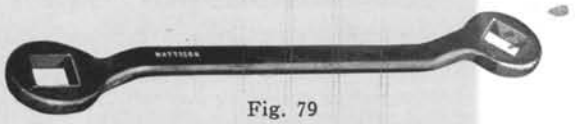
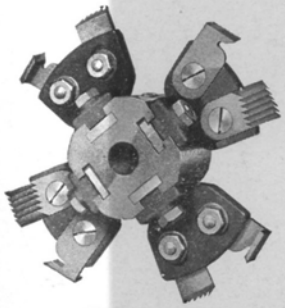


Fig. 79

Closed-End Safety Wrench

THESE pictures illustrate the utility and convenience of this closed-end safety wrench. The opening fits over the bolt head so there is no danger of its slipping off when fastening the knife to the holder. It is shaped just right for easy handling and powerful leverage.

Accessories which Simplify the Mattison Turning Method

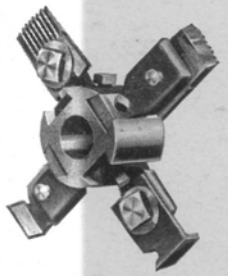


Style A-T
Fig. 80

MATTISON Dado Heads are designed on a new principle, to provide a head that will effect an improvement in the following points:

1. Make a clean cut across the grain without tearing.
2. Cut free with a minimum of effort and not tend to cause the stock to bounce.
3. Adjustable in width, covering considerable range and making it possible to secure a slip fit or drive fit on any given cut being made.
4. Always remain the same diameter.
5. "Everlasting," so the major portion of the head does not have to be thrown away. When worn, the knives and spurs only are replaced, just as is done on moulder or planer heads.

Style "A-T" is the best head for the usual run of dado operations. It has an equal number of spurs and groovers, and is very fast cutting. Hub is of the "T-slot" type and is graduated for adjusting to size. Carriers are adjustable on the hub and any given size head will cut from the minimum size to within ⅛" of double that width.



Style B
Fig. 81

The head is made in the following standard sizes:

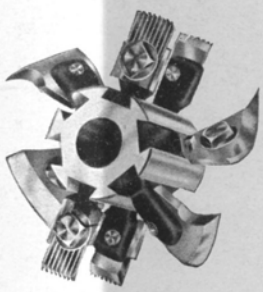
	Style A-T 4 Slot	Style A-T 6 Slot
	Cutting from	Cutting from
No. 2.	⅜" to ⅝"	⅜" to ⅞"
No. 3.	½" to ⅞"	½" to 1¼"
No. 4.	⅝" to 1⅛"	⅝" to 1⅝"
No. 5.	¾" to 1⅜"	¾" to 2"
No. 6.	13/16" to 1½"	⅞" to 2⅜"
No. 7.	1" to 1⅞"	1" to 2¾"
No. 8.		1⅛" to 3"

Style C
Fig. 82

If it is desired to increase the range of adjustment on these heads, they can be furnished with an extra or additional set of grooving knives, as for instance on the 4 slot head, No. 2 cutting ⅜" to ⅝" can be provided with a set of the No. 7 groovers, making it adjustable from ⅜" to 1⅞".

Standard diameter of cutting circle on 4 slot head, 9½"; on 6 slot head, 10". Minimum diameter of cutting circle with bore of 1½" or less on 4 slot head, 9"; on 6 slot head, 9½". Maximum diameter of cutting circle, 10" with standard cylinder. By using special cylinders of large diameter, cutting circle can be increased up to 13". Length of hub, 2¾".

In ordering be sure to give exact size of arbor and state diameter of cutting circle and depth of groove. Also specify whether 4 slot or 6 slot.



Style D
Fig. 83

The "B" style has two knives and two spurs of the dovetail type. It is suitable for the mill having less work, where high production is not so important. Having less cutters, it is not as fast as the "A-T". It is adjustable to within ⅛" of double the width of minimum cut.

The style "B" head is made in the following standard sizes:

No. 12.	Cutting from ⅜" to ⅝"
No. 13.	Cutting from ½" to ⅞"
No. 14.	Cutting from ⅝" to 1⅛"
No. 15.	Cutting from ¾" to 1⅜"
No. 16.	Cutting from 13/16" to 1½"
No. 17.	Cutting from ⅞" to 1⅝"
No. 18.	Cutting from 1" to 1⅞"

Diameter of cutting circle 8½" as usually furnished, but can be made from 8" to 10".

Styles "A-T" and "B" are usually used on Variety Saws. Hubs are provided with set screws for clamping to mandrel, operating against brass plugs to prevent marring. The spindle nut is not required for holding the head on.

Style "C" is made for gains and dado cuts, 3" and wider, up to 12", where the width is fixed. It is of the shear-cutting type and cuts rapidly and clean. This head is not adjustable. Standard cutting circle—approximately 9½". Larger sizes on special order.

Style "D" is a shear-cutting head, made for wide cuts and is adjustable. It will expand to make a cut within ⅛" of double the minimum width. Can be furnished in any minimum width from 2½" up to 12". When the narrowest cut to be made is 4" or wider, two-bolt knife holders are used, the same as those shown in cut of the style "C" head. Standard cutting circle about 10". Larger sizes on special order.

INFORMATION REQUIRED FOR FILLING ORDERS: diameter of mandrel; minimum width of cut desired; depth of cut; length of mandrel from face of fixed collar to end of mandrel (including threaded portion); cutting diameter required to swing on your machine to make the depth of cut required.

Examples of Turnings Regularly Produced by Mattison Lathes

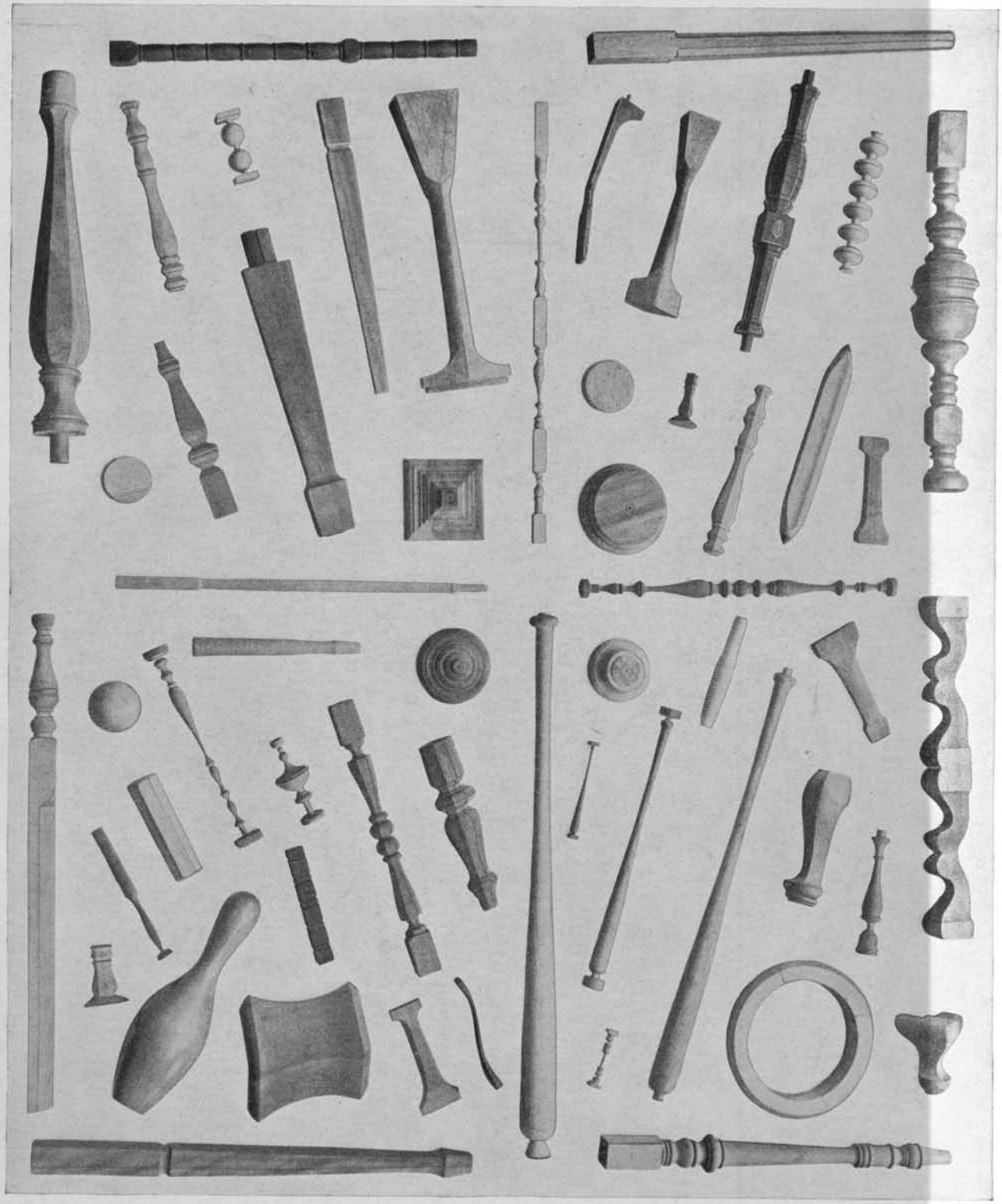


Fig. 101

MATTISON MACHINE WORKS
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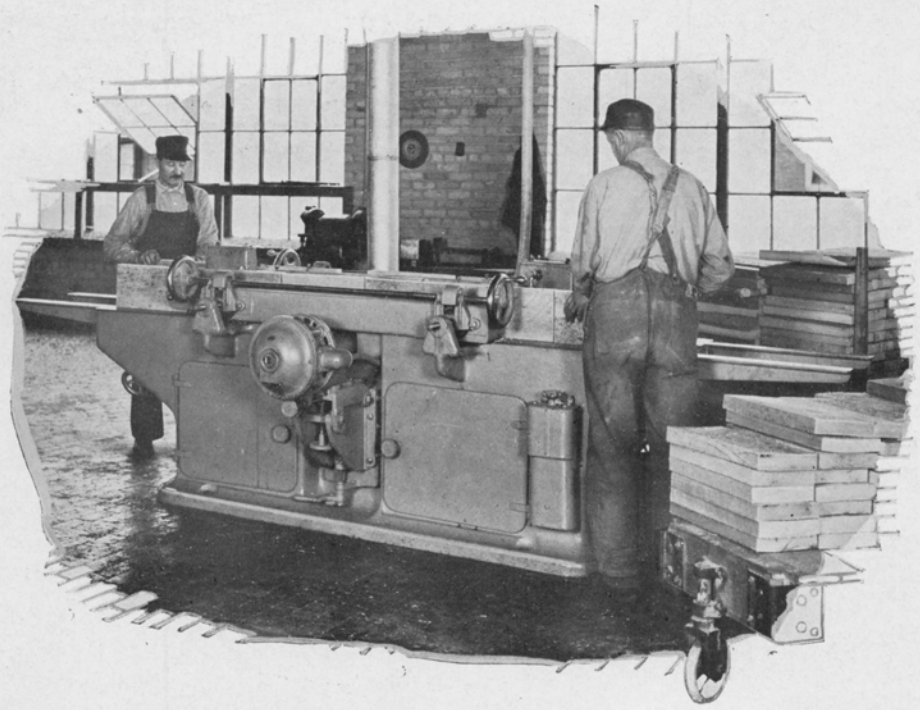
ELECTRIC BALL BEARING

Continuous Feed

GLUE JOINTER

D-618



MATTISON-GREENLEE SERVICE CORPORATION
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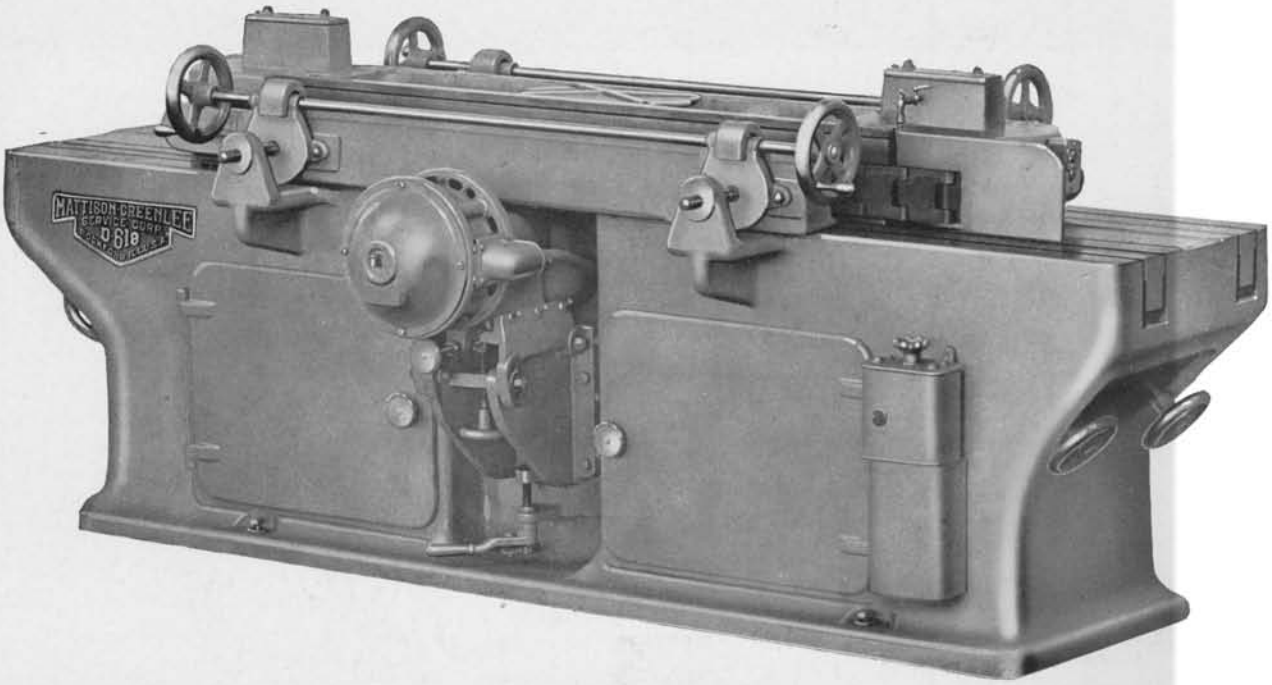
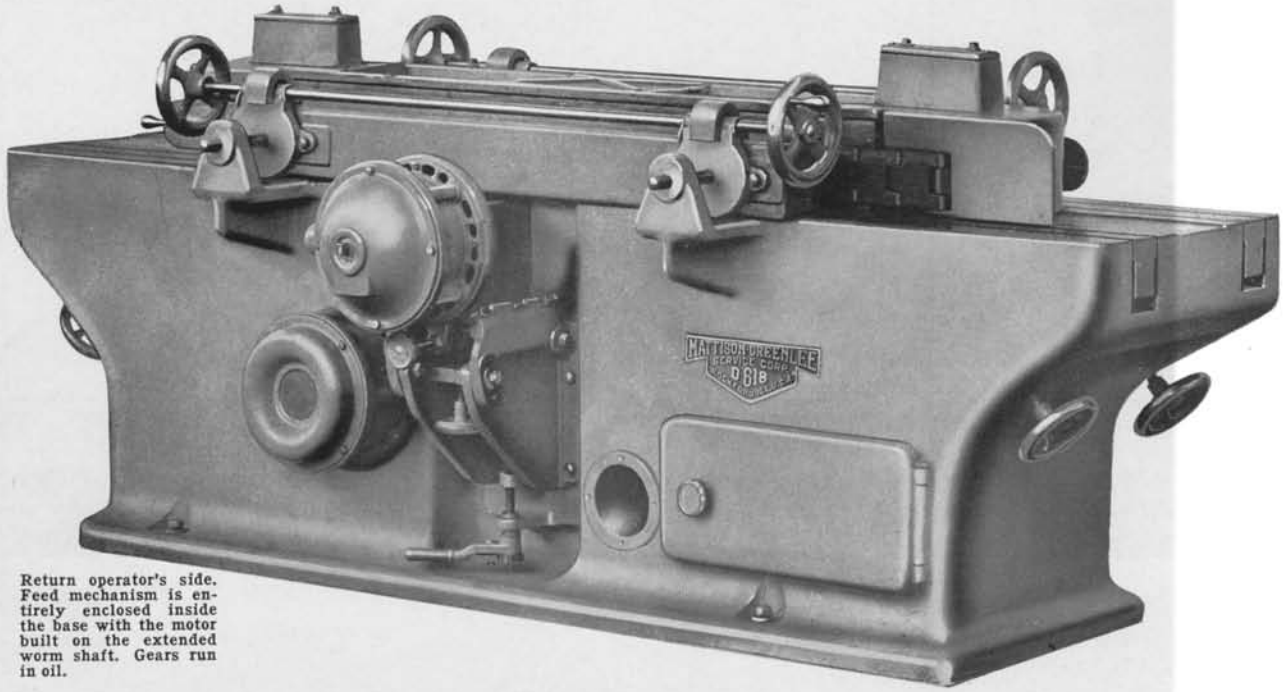


Electric Ball-Bearing Continuous-Feed Glue Jointer

THE D-618 Glue Jointer is designed to take advantage of the well-known and successful principles previously used in this type of machine together with the latest improvements in built-in motor drive, ball bearings, rigid construction, etc.

It is a specialized machine for making fine glue joints for furniture, cabinets, pianos, sash and doors, etc. Cutters of any shape may be used. This broadens the range to include grooving, matching, rabbetting, or edge moulding.

The accuracy of construction throughout together with a chain drive which is even and positive with no slippage or vibration insure perfect work at high speed continuously.



Return operator's side. Feed mechanism is entirely enclosed inside the base with the motor built on the extended worm shaft. Gears run in oil.

Accessibility of the D-618 is an Outstanding feature among Glue Jointers

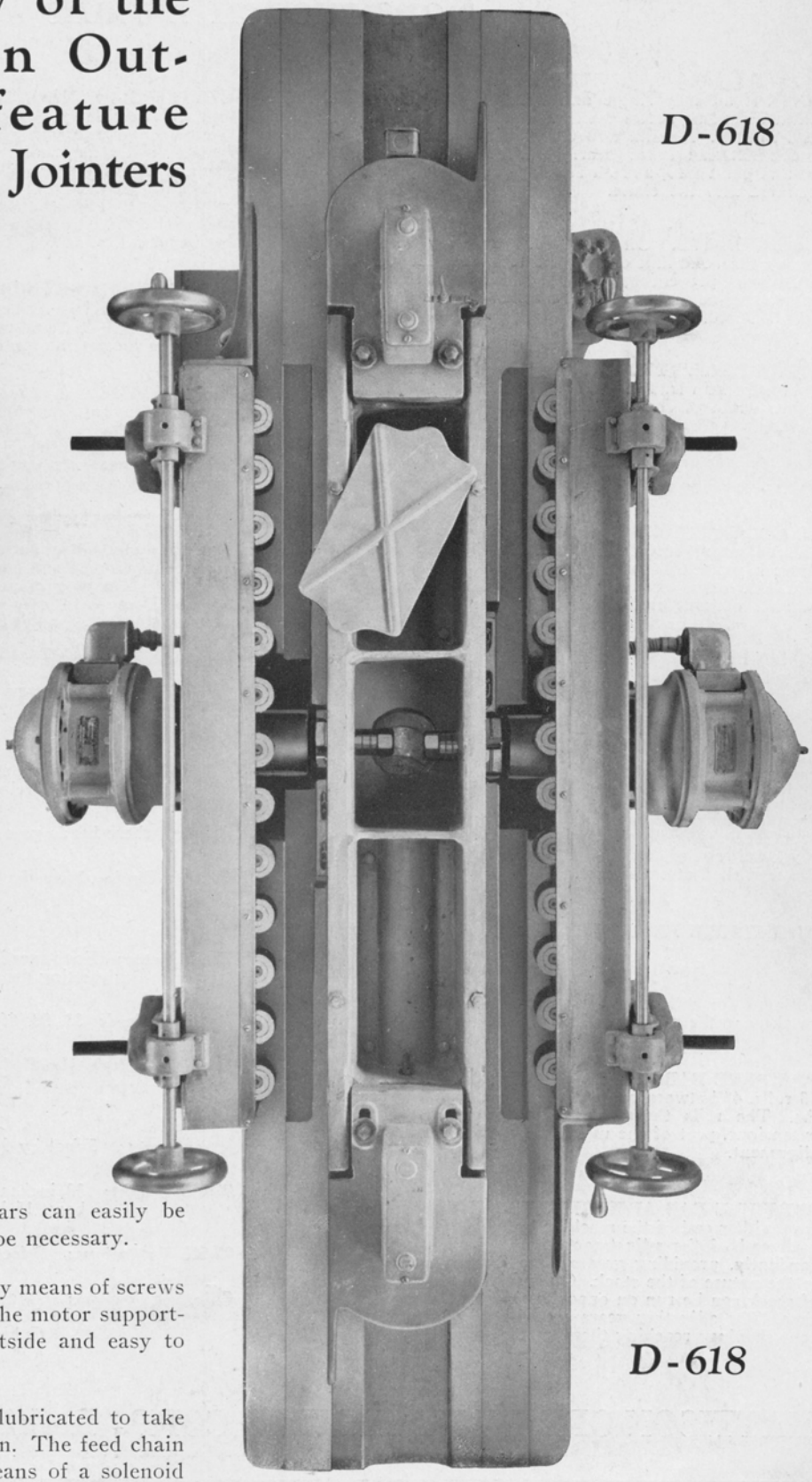
THIS aeroplane view of the D-618 shows the convenience with which cutterheads are placed on the arbors. All adjustments are outside the base and easy to get at. Pressure bars are both adjustable from either end of machine, a feature appreciated by the operators. Note how chain covers at either end extend out beyond the chain and down to the table to provide a gauge against which to guide the stock as it enters between chain and pressure rolls. This is a safety feature which prevents pinched fingers.

Adjustable tables are of ample length for ordinary work. Extensions may be obtained for running extra long stock. Throat plates are provided so that work can be well supported close to the point of cut. These plates are adjustable for varying diameters of cutters.

On master operator's side of machine large doors are placed for easy access to interior of base. The driving mechanism is enclosed in an oil tight gear box inside the base. It is arranged so gears can easily be lifted out, should that ever be necessary.

Cutterheads are adjusted by means of screws and hand wheels located in the motor supporting brackets. These are outside and easy to get at.

The machine is properly lubricated to take care of heavy, fast production. The feed chain is automatically oiled by means of a solenoid valve, which is open only while machine is running.



D-618

D-618

Construction Details

BASE is a heavy single unit with the double-wall shaving chute extending across the inside. This feature adds strength and rigidity. A solid web closes the usual opening around the cutterhead arbor bearing. Base is thus strengthened at this point also, and all shavings are closely confined and directed into the chute.

CHAIN DRIVE. On the D-618 a heavy steel sprocket drives the solid-link chain. Its teeth project well between the blocks, preventing all slippage even when chain is slack. A dependable long-lived drive which is even and positive is thus assured.

CHAIN RACE. This is a heavy one-piece casting securely bolted to main frame. It has longitudinal grooves across the entire width of chain bearing. The back of the chain links have corresponding grooves which member with the grooves in the chain plate. These interlocking grooves prevent any possible side slippage of the chain on the chain plate, and insure its running in a positively straight line.

CHAIN ADJUSTMENT. Slack in chain is taken up by the one adjusting screw at idle end. Housing carrying idle drum is mounted in a slide on the base with bearings above and below the drum. In adjusting, both bearings move parallel without binding or twisting.

CHAIN LUBRICATION. The machine is properly lubricated to take care of heavy, fast production. The feed chain is automatically oiled by means of a solenoid valve, which is open only while machine is running.

TABLES. The tables on both sides of the cutters are of steel. They are adjustable on inclines by hand wheels at each end of machine. Table is instantly adjusted to allow for a heavier cut on crooked stock, when desired. Extensions two feet long for bolting to ends of table for supporting long stock are regular equipment. Extensons for extra long stock are furnished at extra cost.

ADJUSTABLE THROAT PLATES. An improved feature is embodied in the steel, adjustable throat plates or chip-breakers in front of the cutterheads. These are adjusted to support the stock near the point of cut and can be adjusted for different diameters of heads. Supporting the stock near the cutting point prevents tearing out.

PRESSURE BARS are rugged. Each bar is equipped with 13 rolls, 4" between centers and with a spring pressure of 80 lbs. The rolls themselves are 2½" in diameter. Sturdy extensions, part of the main frame, hold the bars in perfect alignment.

PRESSURE BAR ADJUSTMENTS. Each bar is adjustable from either end of the machine by means of hand wheels on each end of the adjustment shaft. Each bar adjusts independently, providing greatest facility for setting according to the nature of the stock. On special work, different widths of stock can be run on opposite sides of the machine at one time. The adjusting gears are of steel, with covers to prevent shavings reaching them.

CUTTERHEAD ARBORS are of alloy steel accurately turned and ground. They run on ball bearings mounted in the one-piece yoke carrying the arbor and motor. Heads 4 inches thick can be used. Filling collars are provided when using thin heads. Heads are quickly removed through center of machine from the top without disturbing the arbor adjustments. The arbor brackets are adjustable horizontally and vertically. Provision is also made for tilting up to 15° for bevel cut.

CUTTERHEAD MOTORS are 5 H. P., 3600 R. P. M. They operate on specially selected high-speed ball bearings. Internal wiring is in metal conduit. Start and stop push button station is located at master operator's end of machine.

FEED MOTOR is four speed, geared direct to gear box with worm and worm gear running in oil. Vertical drive shaft is driven by steel sprockets and steel hardened roller chain running in oil. Entire gear box is easily removable from machine. Speed setting drum for feed motor is located at master operator's position.

EQUIPMENT. With the D-618, necessary machine wrenches, cutterhead wrench and cutter gauge are regularly furnished. Two table extensions, each two feet long come with machine, for attaching to tables. These take care of all ordinary work, but longer extensions can be had at extra cost if required.

SPECIFICATIONS

Cutterhead Motors: Two 5 H. P., A. C., 3600 R. P. M., controlled by push button station and relay switch.

Arbors, where heads go on: 1 $\frac{3}{16}$" dia.

Cutting Circle of Heads: Standard, 5½"
Minimum, 4"
Maximum, 9"

Feed Motor: Four-speed, 5 H. P., equipped with speed setting drum.

Rates of Feed: 33, 50, 66, or 100 feet per minute.

Range of Stock Handled: Thick, ⅛ inch to 4½ inches.
Wide, ½ inch and wider.
Long, 6 inches and longer.

Floor Space: 5 feet by 9 feet.

Table Height: 30 inches. Tables extend beyond pressure bars, 15 inches.

Table Extensions: 2 feet long, regular.

Shipping Weight: Domestic, 5,500 pounds.
Boxed for export, 6,300 pounds.
Cubic Measurement, 185 cubic feet.

MATTISON-GREENLEE SERVICE CORP., Rockford, Illinois, U. S. A.

1-54-1500-BP

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