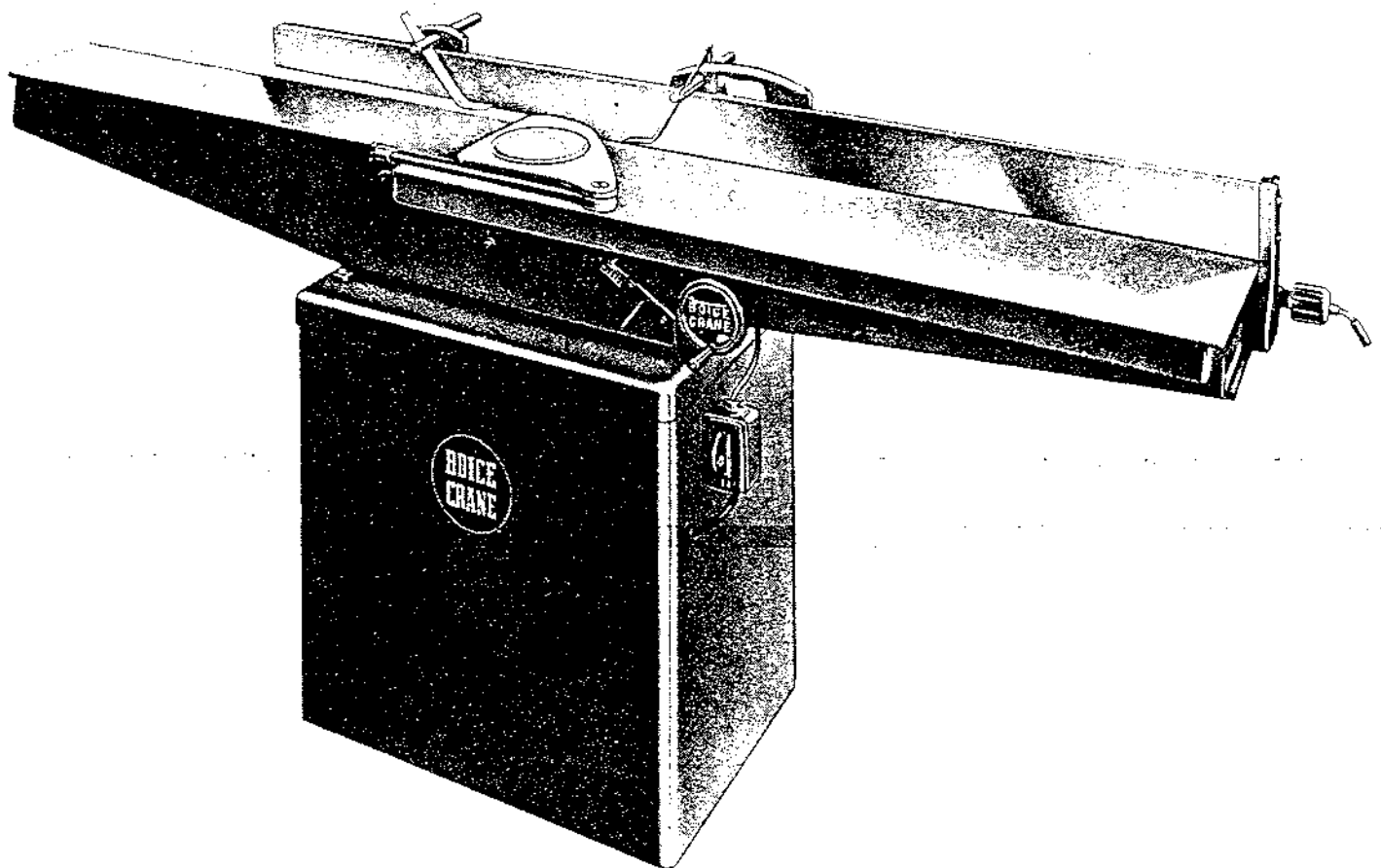


MAINTENANCE AND OPERATING INSTRUCTIONS

REPAIR PARTS LIST

BOICE-CRANE®

Series 2450 and 3450
6 inch & 8 inch
Adjustomatic Jointers



**BOICE CRANE PARTS
TOLEDO, OHIO**

MAINTENANCE AND OPERATING INSTRUCTIONS REPLACEMENT PARTS LIST

for

BOICE-CRANE®

No. 2450-6 and No. 3450-8 inch LONG TABLE JOINTERS

PLEASE READ BEFORE OPERATING!

Experience has proven that highlighting of the following points covered elsewhere in this manual, serves to guarantee perfect satisfaction from this jointer from the very first piece run, to purchasers who put it to work without first fully reading the instructions for its use.

By repeating them here, we do not infer that these are the **only important** facts to know regarding the operation of your new Boice-Crane Jointer, however.

On the contrary we urge you to carefully study this entire booklet!

1. With your jointer you received a precision knife setting bar for setting of knives.



2. Your Adjustomatic Jointer is equipped with micrometer-accurate knife setting system for each knife, plus, the new adjustable head finish-control feature.
3. When it left the factory, the knives were set .004" above the outfeed table (normal operating position) in the following manner and you will do well to review the procedure before operating.
 - a. Using the plain end of the knife gauge, each knife was installed exactly level with the outfeed table to a measurement of half a thousandth (.0005), with the adjustomatic dial set at "0"
 - b. The adjustomatic dial was then set at "4" which is the normal operating position, and translated means that the knives are precisely .004" above the table.

For if the jointer knives of any jointer are set as little as .001" **below** the outfeed table or honed to such a point, the machine will plane a taper, in fact, nicked knives will leave a ridge on the work that will produce a taper defect, increasing with the depth of the nick.

This is precisely where Adjustomatic Head simplifies jointer operation. For when the honing down occurs, simply raise the entire head to the next highest index number.

4. The Infeed Table Gibs are properly adjusted when they are snugged up as much as possible, permitting just enough freedom so the table can be easily raised or lowered.

But, in order to forestall any possibility that the condition of the gibs would permit any end sag of the table, the best operating precaution is to keep those locks tight when operating the machine.

However, be sure to loosen them again, when it is necessary to adjust the table up or down by use of the hand wheel.

DESCRIPTION OF MACHINE

General Construction

The Boice-Crane No. 2450 6-inch and 3450 8-inch Long Table Jointers are all-welded-steel machines designed to increase rigidity and reduce weight. To obtain extreme accuracy and strength of construction without excessive weight the outfeed table is an integral part of the rigid base weldment. The infeed table is adjustable on ways up or down for depth of cut and is operated by a convenient hand-wheel at the side of the machine.

The fence is supported entirely on the infeed table and extends well beyond the cutterhead for better work support. It is slideable across the table, and may be tilted 45 deg. either way in any position on the table. Stop screws to locate 90 deg. and both 45 deg. positions rest on the table, assuring positive adjustment for the extra long fence. This precision feature, making such a long fence feasible for the first time, is exclusive with Boice-Crane and covered by Patent 2,479,224.

The cutterhead has a body diameter of $3\frac{1}{4}$ " and a cutting-circle diameter of $3\frac{3}{8}$ ". Cutterheads have four knives. The knives are very easily adjustable to the outfeed table by fine-pitch screw lifters.

A cutterhead guard is provided to serve as a protective device during all jointer operations except rabbeting, when the guard can be swung back and pivoted to rest below and alongside the outfeed table.

Dimensions and Capacity

The No. 2450 and 3450 Jointers are intended to make it easier for you to joint and plane long work.

The No. 2450 6-inch jointer has an overall table length of 60 inches with both infeed and outfeed table being 30 inches long. The infeed table is 9 inches wide thus providing a 3-inch wide rabbet arm full length of table.

The No. 3450 8-inch jointer is 84 inches long overall table length, each table being 42 inches long. The infeed table on this model is 11 inches wide thus providing a 3-inch rabbet arm full length.

Both the No. 2450 and No. 3450 Boice-Crane Jointers have a 4-inch high fence which is 48 inches long on the 6-inch machine and 66 inches long on the 8-inch model. Both machines will cut a maximum depth of $\frac{5}{8}$ " on ordinary cuts where the work does not pass over the bearing cap. Rabbeting capacity, where work must pass over the bearing cap, is $\frac{1}{2}$ inch.

POWER AND SPEED REQUIREMENTS

General

It is not necessary to run the Boice-Crane Long-table Jointers at very high speeds to obtain smooth cuts, because all of the knives in the cutterhead can be set concentric with one another to within a couple thousandths of an inch — an exclusive Boice-Crane feature. When all knives are evenly adjusted, as smooth a cut will be obtained at 3500 r.p.m. as will be obtained at 10,000 r.p.m. with unevenly set knives. Likewise, work can be passed over the knives much faster.

Pulley Sizes

The pulley on the cutterhead of both the 6-inch and 8-inch jointer is $2\frac{7}{8}$ " outside diameter ($2\frac{3}{4}$ " pitch dia.) and is grooved for dual A-section V-belts.

Following is a tabulation of cutterhead speeds obtainable with various motor and pulley combinations.

Motor Speed	Motor Pulley O.D.	Cutterhead Speed
3450	3	3690
3450	$3\frac{1}{2}$	4060
3450	4	4680
1750	6	3630
1750	7	4250

The length of belt required depends upon the motor installation to be used. Belt length can be determined by measuring around the outside diameters of the pulleys, or it can be calculated, knowing center distance of the shafts and pitch diameters of the pulleys.

Size of Motor

The size of motor required to drive the 6-inch and 8-inch Long Table Jointers varies and depends on the work to be done. Following is a tabulation of motor sizes recommended for use on these machines.

	Motor Horsepower	
	No. 2400 6-inch	No. 3400 8-inch
Light duty	1/2	3/4
Medium duty	3/4	3/4 or 1
Heavy duty (wide, deep cuts: high speeds)	1	1 or 1 1/2

OPERATING CONTROLS

Depth-of-Cut Adjustment

The depth of cut is set by raising or lowering the infeed table and is indicated by a scale and pointer on the side of the machine. The table slides up and down on dovetail slideways and is operated by the handwheel at side of the machine. The slideway gib is locked by tightening the two bent-handle gib locking screws adjacent to the handwheel after setting the depth-of-cut.

CAUTION

Always loosen the gib locking screws before turning handwheel to adjust table. Do not force the handwheel.

If the handwheel turns too hard, investigate — something is out of adjustment or clogged with chips. Refer to paragraph on gib adjustment.

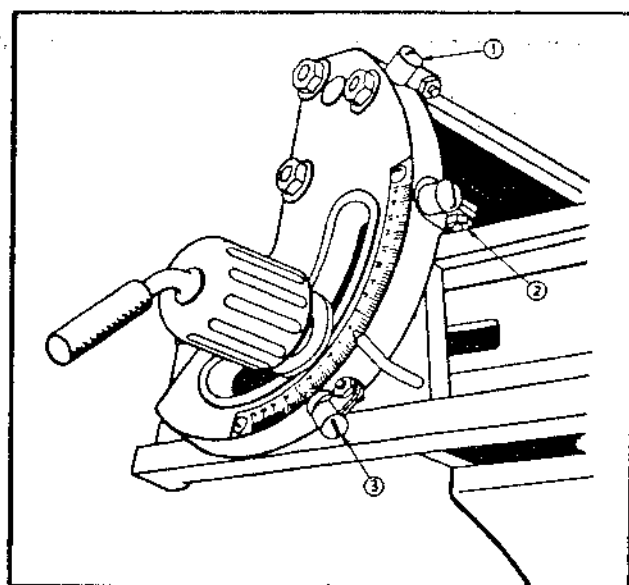
Note: One turn of handwheel raises table .050" on 6-inch jointer and .025 on 8-inch jointer.

Fence Adjustment (See Figure 2)

The Jointer Fence is controlled and locked at three different points. The hand-knob (4) at the front of the machine locks the tilt or angular setting of the fence and also lines the fence up with the edge of the table. The knurled, bent handle (5) protruding from the hand-knob locks the transverse sliding action of the fence. The vise-handle lock-screw and sliding arm device (6) near the middle of the fence locks the fence rigidly in position after a setting has been made. This is known as the Fence Rear Lock.

CAUTION

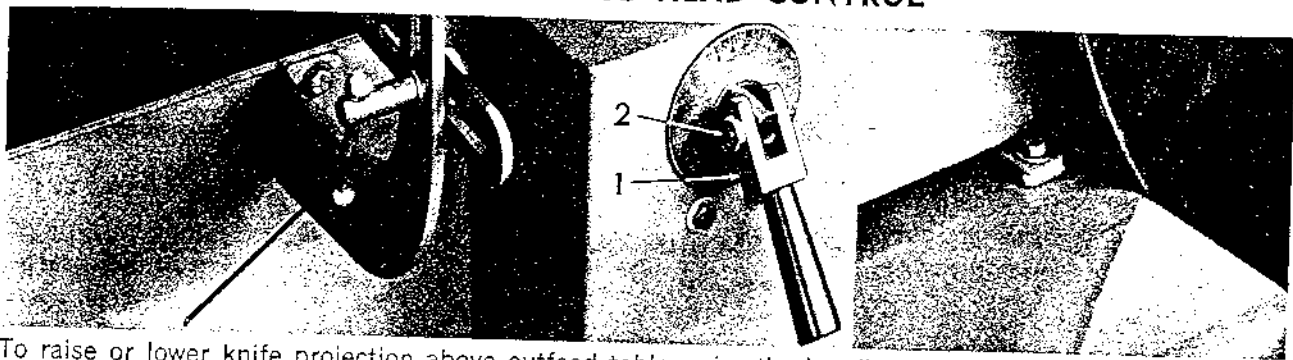
Always loosen the Fence Rear Lock (6) before moving or re-positioning the fence.



1. (45 deg.) Rigid stop rests on top of table when fence is tilted 45 deg. clockwise.
2. (90 deg.) Swivel stop rests on top of table at 90 deg. setting and swings out of way when tilting fence to 45 deg. clockwise.
3. (45 deg.) Swivel stop rotates to engage underside of slot for fence plate when fence is tilted 45 deg. counterclockwise.

Figure 2. Stops for Positioning Fence

ADJUSTOMATIC HEAD CONTROL



To raise or lower knife projection above outfeed table, raise the handle (1) until the cam lock is out of contact. Then, using the same handle, raise or lower the knives. The higher the number, the higher the setting — and vice-versa.

Generally speaking, when knives are level with outfeed table with control set at "0", "1" on the scale is .001" above, 2 is .002", etc.

After knives become honed down a thousandth through use it must be noted that knife projection would be .001" less than the index setting.

In practice, the lower settings work best and improve finish on hard woods, and the higher ones on soft. Experience with the materials customarily encountered in your work will determine the most satisfactory finish-control settings.

NOTE: With cam-lock handle "up", jointer head will have a slight amount of intentional endplay, roughly 1/16". Lock handle "down" removes the endplay. If it doesn't, inspect the cam for total clamping action. The amount of cam action is varied by rotating the eccentric pin (2) R or L for more or less, as needed.

OPERATION OF THE JOINTER

Operating Precautions

The following safety precautions should be observed in order to prevent injury to the operator when using the jointer.

1. Avoid jointing or surfacing against the grain of the wood whenever possible. (See figure 3.)
2. Keep jointer knives sharp and in proper adjustment.
3. Do not attempt to plane stock that is unusually short or thin without special holders.
4. When planing, do not hold the hands too close to the leading-end of the stock as they might slip off due to vibration.
5. Do not attempt to take too heavy a cut, especially with smaller pieces of wood. This may cause a kickback and thus cause possible injury to the operator.
6. Use the cutterhead guard at all times, except when rabbeting.

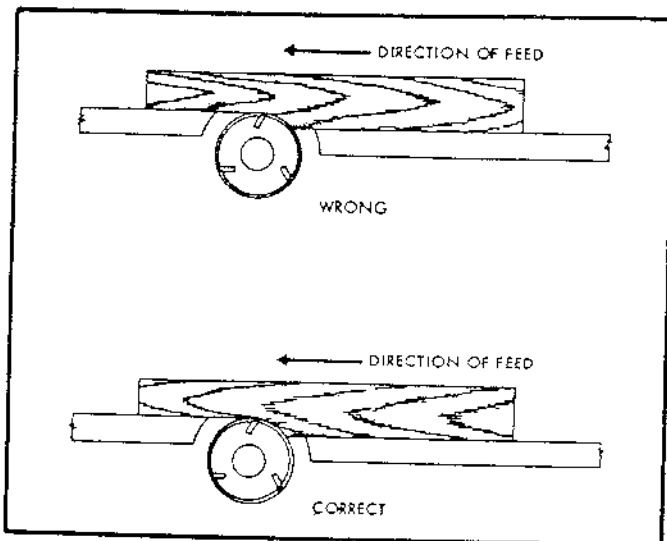


Figure 3. Jointing with the Grain

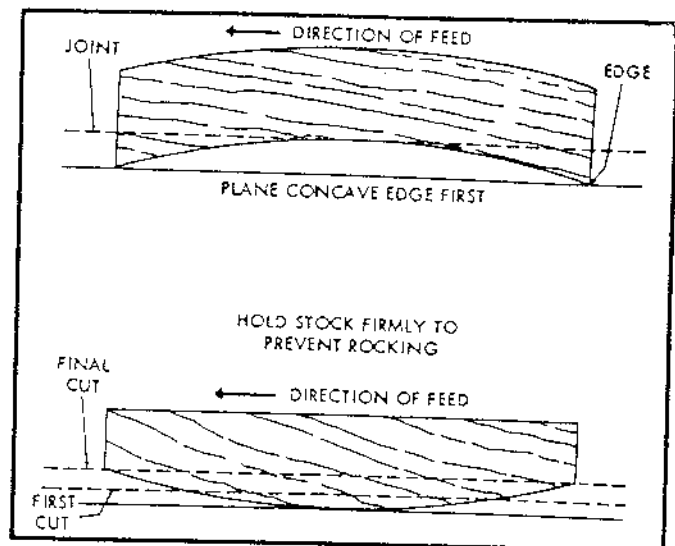


Figure 4. Jointing Warped Stock

Jointing Warped Stock (See figure 4.)

If the stock is warped so that one edge is concave and the other edge convex, it is advisable to joint the concave edge first. Begin by taking a few cuts from the concave edge at both ends; then joint the entire length of the edge. Turn the stock over and joint the convex side by making a series of light cuts until that edge is planed true.

Jointing Thin Stock

Edges on very thin stock, such as veneer, can best be planed by clamping the stock between two heavier pieces of wood in order to hold it firmly.

When the work schedule calls for mass-planing of thin boards (such as T-square blades or venetian blind slats), it is advisable to prepare a jig similar to the one illustrated in figure 5. Such a jig will increase the work output and help eliminate possible injury to the hands.

When planing thin stock, to avoid having the stock slide under the clearance space of the outfeed end of the fence — attach two smooth, flat facer boards to the fence, using the tapped holes already provided. By providing recessed slots instead of just recessed holes in the outfeed end facer, it can be adjusted vertically and therefore become universally adaptable to varying stock and cut thicknesses. See Fig. 6.

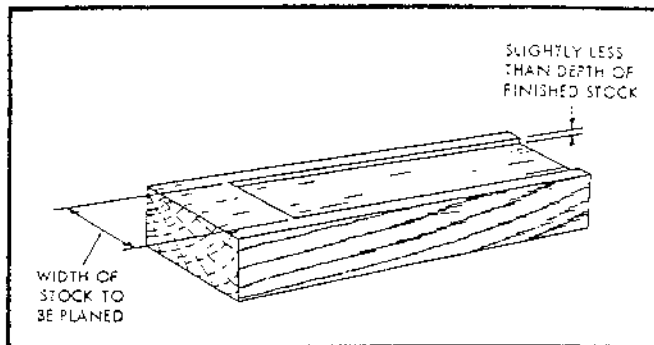


Figure 5. Recessed Block for Jointing Thin Stock in Production Work

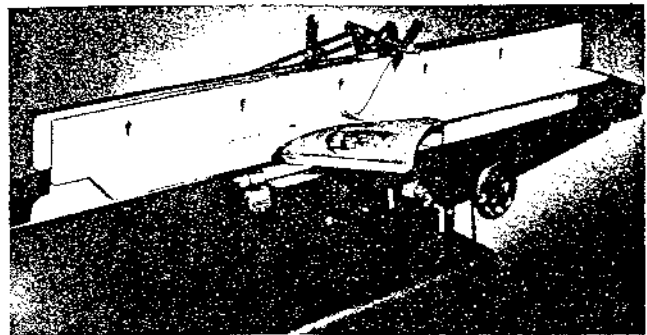


Fig. 6

Planing A Taper

For all practical purposes, stock to be tapered can be placed in two classes — short stock (18 inches or less in length) and long stock (greater than 18 inches in length). The tapering operation will vary depending upon which class the stock falls in.

Tapering short stock.

1. Carefully mark the taper on the stock with a straightedge. In the case of squared stock which must be tapered on all four sides (such as table legs), square a line completely around the stock where the taper will begin.
2. Lower the infeed table until the depth-of-cut scale registers the exact amount of taper.
3. Rest the line which indicates the beginning of the taper on the lip of the outfeed table. If a group of pieces of stock are to be tapered, clamp a stop block to the infeed table against which the ends of the legs can be butted. This will assure a perfect register of each piece of stock with a minimum of delay.
4. Move the stock carefully over the cutterhead, thus planing the taper. The knives will begin to cut a bit below the penciled line. The taper then must be finished off with a hand plane and carefully sandpapered.

Tapering long stock. (See figure 7.)

1. If the proposed taper is longer than 30" on the 6" Jointer, or 42" on the 8" Jointer, it must be divided into two or more equal parts because a taper which projects beyond the end of the infeed table can not be accurately planed in one cut. For example, if the total taper is 50" long and $\frac{1}{4}$ " deep, divide the taper into two 25-inch divisions, each to be planed $\frac{1}{8}$ " deep.

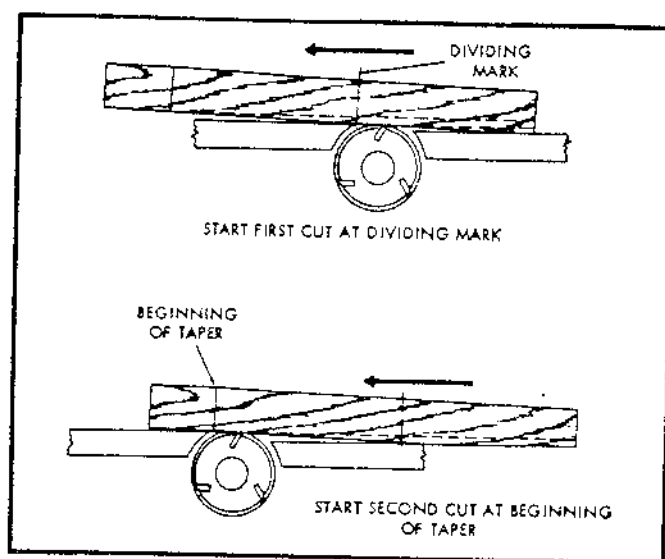


Figure 7. Tapering Long Stock

2. Set the infeed table to the proper depth of cut (one-half the total taper of the combined lengths). If the total taper is $\frac{1}{4}$ -inch, set the depth of cut at $\frac{1}{8}$ -inch; if the total taper is $\frac{3}{8}$ -inch, set the depth of cut at $\frac{3}{16}$ -inch.
3. Carefully mark the taper on the stock with a straightedge. Divide the taper in two equal parts by placing a pencil mark at the exact center of the proposed taper.
4. Position stock so that the dividing mark is resting on the lip of the outfeed table as shown at the top of figure 7, and plane the deep end of the taper first.
5. Now rest the mark indicating the beginning of the taper on the lip of the outfeed table (fig. 7) and plane the total length of the taper in the second cut.

MAINTENANCE INSTRUCTIONS

Preventive Maintenance

The primary function of preventive maintenance is to prevent breakdowns and the need for repair. In general, preventive maintenance consists of the following:

1. Keep machine clean. Brush off chips and dust after using. Once every six months of average use the table raising screw and mechanism should be cleaned to insure easy operation. To do so, the jointer should be unbolted from bench or stand, turned on its side and cleaned by brushing or with compressed air.
2. Inspect the fence and cutterhead-guard occasionally for loose screws. Keep all screws tightened.
3. Inspect the cutterhead knives for sharpness frequently. Sharpen or replace knives according to instructions which follow.
4. Lubricate the jointer according to instructions which follow.

Lubrication

The Long-Table Jointers are designed for simplicity and long life and require only minor lubrication as follows:

1. **Cutterhead bearings.** The cutterhead bearings are greased and sealed for life of the bearing and require no lubrication.
2. **Table raising mechanism.** Once every six months clean and regrease the raising screw and nut and the gears with ordinary automobile gun grease. Apply oil to the thrust bearings and shaft bearing points.

3. **Table slideways.** Once every month or two apply oil to the table slideways. A long-necked oil can is useful to reach the dovetail ways.
4. **Fence slide parts.** For ease of operation occasionally clean and oil the fence slide parts.
5. **Bright-surfaces.** Always wipe off the table and fence ground-surfaces with an oil rag at the end of each day to prevent rust and discoloration.

MAINTENANCE OF CUTTERHEAD KNIVES

General

When removing, installing or readjusting knives — three tools are required, all of which are furnished. The three tools for knife setting are:

1. A hexagon wrench for the socket set screws in the knife lifters, fitted with a knurled brass handle for tapping knives without damaging them.
2. A hardened open-end wrench for the knife-wedge jack screws.
3. A rectangular setting gauge. One of its uses is to test the concentricity of the knives as explained below, by placing it on the outfeed table so the plain end projects over the head. See figure 8, page 8.
A second use with the deeper step end is to gauge the left-hand projection of the knives beyond the head. See figure 9, page 8.

When sharpening knives, it is important to keep the cutting edge straight. If bottom edge is not parallel to cutting edge, the knife lifters will still bring cutting edge to proper height. The width need not be the same for all knives, but if they vary too much (say $\frac{1}{8}$ ") after repeated sharpening, the unbalance will cause vibration.

Sharpening Knives in Machine.

It is possible, although time consuming, to sharpen the cutterhead knives without removing them from the jointer. To do so, it is first necessary to whet the bevel of each knife. Follow this with a sharpening of the knife edge. Proceed as follows:

1. Use a square or rectangular carborundum stone about 1" x 1" x 6" long, which will be large enough to let you get a firm grip, and keep your hand away from the knives. Use a fine grit, 120 or finer. Wrap the stone with a firm thin paper to keep from scratching the table, leaving $\frac{1}{2}$ " of one end exposed.
2. Turn cutterhead by hand until bevel on one knife lies parallel to the tables. Lower front table until stone is resting flat on the bevel.
3. With one hand, keep the cutterhead from revolving and with the other hand whet down the bevel of the knife by sliding the stone back and forth laterally across the knife. Repeat this operation on each knife, doing the same amount of whetting on each knife bevel.
4. Now sharpen the knife edges. (Be sure to whet the bevels first.) Use the same carborundum stone, and round or bevel the edge across one end, so the knives will not strike a sharp corner. Raise front table till it is as high as rear table. Put the stone on front table, with bevel edge down and over knives. Wrap with several turns of the same paper, leaving an inch or so at the sharpening end of stone exposed. Lower front table till flat surface of stone just touches the cutting edge. Pull stone back away from cutterhead, tighten gib locks, and turn the jointer on.
5. Now take a firm grip on the stone with fingers well away from knives, and move bevel edge over knives till the flat surface of stone is over knives. Move stone back and forth across entire length of cutting knives. Be sure stone is held firmly, and kept flat on table at all times. If stone does not touch knives at all points, pull stone back, remove one thickness of paper from under stone, and repeat the process until knives are sharp along the entire edge. Thickness of paper will probably be .002" - .004", and this will be a quicker way to make a fine adjustment than trying to lower table.
6. If the sharpening process has been done with care, the cutter knives will again cut very smoothly.

Removing Knives

Loosen three jack screws in the knife wedge with the open end wrench provided and remove the knife and the wedge from the cutterhead. Remove the two knife lifters, otherwise they will fall out and down into chip hole when you revolve head to remove other knives.

Installing Knives

First, set "adjustomatic" dial to "0", and lock by depressing handle on the combination swivel and cam-lock.

Move fence to back of machine, and tilt out 45 deg. Back out lifter screws several turns, and push two lifter blocks for one knife down to bottoms of holes. Put wedge in place. Put knife in place, gauging its projection beyond the head on the rabbet arm side by using the 1/16" step end of the gauge shown in figure 9 below.

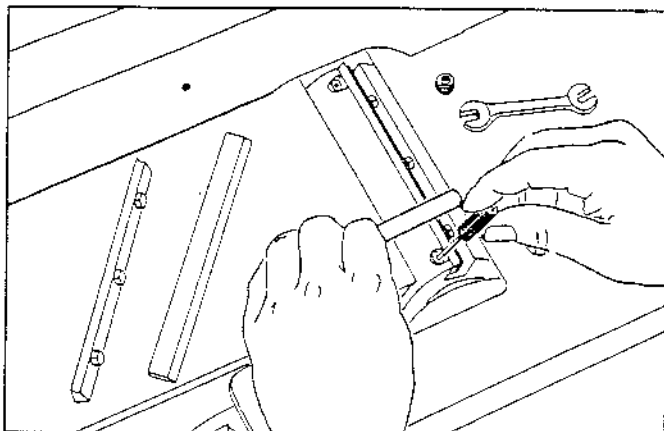


Figure 8

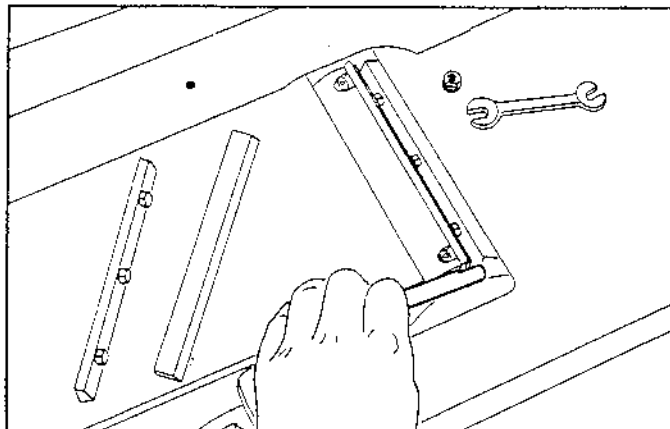


Figure 9

Tighten the outer screws in knife wedge slightly, so knife can be moved with a little pressure. Set knife crosswise in head: so rabbeting side projects a little beyond the head. Use the 1/16" step end of the setting gauge.

With setting-gauge on rear table close to hex wrench (be sure table is free of chips), turn lifter screw in. While doing so rock head back and forth with hex wrench, so knife will touch setting gauge on plain end at highest point of arc. Repeat at other end of head. The knife will probably be too high now, so back screws out one turn. With brass end of adjusting wrench tap knife down against lifting block. You are now ready for the fine adjustment. Repeat the above operations, turning screw slowly, and rocking head after every adjustment. When knife lightly scrapes the setting gauge, your adjustment is reached. If it scrapes harder on some end, that end is higher. If knife does not touch setting gauge at all, it is too low.

When knife lightly touches setting gauge on plain end, it will be exactly flush with rear table. Lifting screw has 36 threads per inch. One turn of lifting screw increases cutting radius of knife .024". Turning screw 90 deg. (1/4 turn) increases cutting radius .006". Turning screw 45 deg. (1/8 turn) increases cutting radius .003". Turning screw fifteen approximate degrees increases cutting radius .001".

It is easier to reach your final adjustment by turning the lifter screw IN, thus raising the block and knife. If you want to lower the knife, the lifter screw can be turned out the desired amount, and brass head of hex wrench used to tap knife and elevating block down. There are several factors involved which make this method less accurate than raising knife to proper height.

After all knives are properly set, tighten all jack screws in knife wedges.

Finally, reset the Adjustomatic Head to "4" as explained on page 1, paragraph 3.b, and page 4, section on "Adjustomatic Head Control."

ADJUSTMENTS

Infeed Table Gibs

A loose Gib extends the full length of the dovetail ways, and is held by screws at each end which seat in countersunk holes.

These adjusting screws are tightened only slightly so table may be easily cranked up and down. They should be tight enough to eliminate nearly all looseness in the gibs. With the lock screws loose, put your finger over the joint between table and base. Shake the table with the other hand. If gib is adjusted too loosely, you will feel the motion with your finger. A slight motion is satisfactory, but if there is no motion, gibs may be tight enough to cause hand crank to turn too hard. When tightening lock nut, hold adjusting screw so it does not turn in again.

Depth-of-Cut Scale

The depth-of-cut scale is graduated in increments of 1/32-inch. When the front table is set at the same height as the knife cutting circle, the depth-of-cut pointer should indicate zero. If necessary, loosen the pointer attaching screw and shift the pointer to agree with this adjustment.

TROUBLE SHOOTING

Front Table Out of Plane

Cause

Loose slideway gib.
Dirt in slideways.
Excessive wear in slideways.

Remedy

Adjust gib screws according to instructions.
Clean slideways and readjust gib.
Remachine ways to original accuracy.

Lost Motion in Handwheel. (More than $\frac{1}{2}$ revolution)

Cause

Thrust collar or gear may have slipped on screw permitting end play.
Loose anchor bolt which holds nut carrier.
Miter gears loose on shaft.
Raising screw or nut worm.

Remedy

Readjust collars on gear and tighten set-screw securely.
Tighten securely.
Remesh gears and tighten set screws securely.
Replace with new parts.

Handwheel Turns Hard

Cause

Slideways gibs too tight.

Remedy

Readjust according to instructions.