

OPERATING PROCEDURE FOR:

Powermatic Model 2700 Shaper

INTRODUCTION:

The shaper is a very versatile tool. It can be used to cut a molding profile, cut workpieces to match the shape of a pattern and cut a molding profile at the same time, make raised panels, cut cope and stick joints for rail and stile joinery, cut tenons and many other operations. It is similar to a router table, but is more robust and has additional capabilities: it can make most cuts in a single pass; it has the ability to cut profiles that are much higher and deeper; multiple cutters can be stacked on the spindle to make complex shapes; the direction of rotation is reversible allowing cuts on curved objects to be made always with the grain; the cutter diameters are larger and thus produce a smoother cuts.

SAFETY RULES:

Warning: Willful violations of these safety rules, disruptive actions or horseplay may result in loss of the privilege to use the tools and machinery in the workshop. As with all machines, there is a certain amount of hazard involved with the use of this shaper. Use the machine with the respect and caution demanded where safety precautions are concerned.

You are responsible for your own safety.

Read and understand the operating procedures for this machine before attempting operation.

Personal Protective Equipment. At a minimum eye protection and hearing protection must be worn when operating this machine. Eye protection must be safety glasses with side shields, goggles, or face shield, which meet ANSI Z87.1.

Remove tie and loose jewelry. Button sleeves or roll up sleeves above the elbow. Remove loose outer clothing and confine long hair.

Do not wear loose fitting gloves. If gloves are worn, they must fit tightly to the hand.

Use the appropriate NIOSH approved respirator in dusty work conditions (N95, N100, P95 or P100). Wood dust has been listed as a known carcinogen by the U.S. government.

Guards. Keep the machine guards in place for every operation for which they can be used.

Ensure that base cabinet door is closed when the shaper is in operation. It is interlocked with the starting circuit and the machine will not run if it is open.

Work Area. Keep the floor around the machine clean to minimize the danger of tripping or slipping. Be sure the table is free of scrap or foreign material. Make sure the dust collector is hooked up and operating.

Operator Position. Maintain a balanced stance and keep your body under control at all times, so that you do not fall or lean against the cutter or moving parts. Do not overreach or use excessive force to perform any machine operation.

Careless Acts. Give the work you are doing your undivided attention. Looking around, carrying on a conversation and “horseplay” are careless acts that can result in serious injury and loss of work shop privileges.

Disconnect machine before performing any service or maintenance. A machine under repair or when changing cutters must be Locked Out following the Club Lockout Procedure until the maintenance is complete.

Maintain Tools In Top Condition. Do not operate the shaper with a dull or badly worn cutter. Use a sharp and clean cutters for safe and best performance.

Hand Safety. Follow the 3” rule. Keep hands clear of the cutter area. Do not place you hands within 3” of the cutting circle of the cutter. Use push blocks, push sticks or jigs as needed to maintain this clearance. Do not reach past the cutter to clear parts or scrap with the shaper running. Avoid awkward operations and hand positions where a sudden slip could cause your hand to contact the cutter.

Material Condition. Reclaimed or pressure treated wood is not to be cut on this machine. Do not attempt to shape boards with loose knots. The knots can come loose and become projectiles. Do not attempt to shape twisted, warped, bowed or “in wind” stock. Do not attempt to shape long or wide boards unless adequate supports are used to support the “off-table” portions of the workpiece. Do not attempt to shape man made materials like MDF, particle board or OSB. Plywood can be shaped, but only if a carbide cutter is used. The yellow cutters are not carbide and can only be used for shaping hardwoods.

Stock Length. Never shape stock less than 12” in length unless it is secured in a Shop Leader approved jig or fixture. When possible, shape long stock and then cut it to length.

Machine Adjustments. Cutter replacement and, fence adjustments are only to be made under the direction of the Shop Leader.

Table Inserts. Use the smallest size table insert that the cutter will be able to pass through. This maximizes support of the workpiece and helps to prevent hang-ups.

Cutters. Use only cutters that are designed for use on a shaper and that are rated for the speed to be used. Check the cutter for cracks or missing carbide. Do not use a cutter if it is cracked or has missing carbide. Make sure that the cutter is installed on the spindle so that the blades on the cutter point towards the direction that the workpiece will be fed from. Make sure that the cutter is securely attached to the spindle. Ensure that the Allen wrench is removed from the spindle bolt before starting the shaper.

Spindle Rotation. Ensure that the direction of rotation of the spindle is such that the cutter rotates toward the direction that the workpiece will be fed from. Do not try to climb cut unless a stock feeder is used. Climb cutting can grab the workpiece and launch it into the air causing possible serious injury or death.

Cutter Position. When possible, position the cutter(s) so that the cutter will be buried under the workpiece and not exposed. That is: cut the profile on the bottom of the board and not on the top. This will allow the workpiece to act as a guard and minimize the potential for your hand contacting the cutter.

Spindle Speed. Ensure that the spindle speed is correct for the diameter cutter that is being used. For cutters up to and including 3" in diameter, the spindle speed can be as high as 10,000 rpm. Use a rotation speed of 7500 rpm for cutters larger than 3" diameter.

Fence. Adjust the fence halves so that the cutter passes within 1/16" to 1/8" of each half. This maximizes the support of the workpiece and minimizes the open area around the cutter that your hand could get caught in. Always hold the workpiece against the fence when shaping straight stock.

Hold-downs. Whenever possible use feather boards or the stock feeder to hold the workpiece against the table. This is especially important when using large cutters or when making deep cuts. The hold downs should be placed at both the infeed and the outfeed sides of the spindle. At times you may also want to use feather boards to hold the workpiece against the fence.

Pattern Shaping. When shaping irregular stock, arches, or curves, stock must be held securely to a jig or pattern that bears against a rub bearing. A starting pin must be used if the jig or pattern does not include a section that rubs against the rub bearing prior to the cutter contacting the work. No free-hand shaping is to be done.

Narrow Boards. Shaping narrow boards can be hazardous. Always use fixtures, feather boards, push blocks and or other jigs to hold down the workpiece and keep it against the fence.

Job Completion. If the operator leaves the machine area for any reason, the shaper should be turned "off" and the cutter should come to a complete stop before his departure. In addition, if the operation is complete, the operator should clean the shaper and the work area. Never clean the shaper with the power "on" and never use the hands to clear sawdust and debris; use a brush.

If you are not thoroughly familiar with the operation of the shaper, obtain advice from the Shop Leader.

Drugs, Alcohol, Medication. Do not operate this machine while under the influence of drugs, alcohol, or any medication. Do not operate this machine if you are tired, sick, or distracted. Familiarize yourself with all caution and warning decals used on this machine.

Capacities: Interchangeable Spindle diameters	3/4" and 1-1/4"
Spindle capacity under the nut:	3/4" spindle 3-3/4"
.....	1-1/4" spindle 5-3/4"
Spindle travel.....	4"
Spindle speeds	7500 & 10,000 rpm, reversing
Table opening diameters	2.55", 4.16", 5.75", 7.33"
Horsepower	3

ADJUSTMENTS:

Fence Adjustment. In many shaper operations, the workpiece is guided past the cutter by using the fence. The fence has two halves, and infeed half and an outfeed half. The infeed fence controls the depth of cut (just like a jointer) and the outfeed fence supports the workpiece as it leaves the cutter (just like a jointer). The fence assembly is secured to the shaper table by two Fence Assemble Lock Knobs (A) (refer to Figure 1). During operation, these knobs must be tight; however, to make gross adjustments to the fence they must be loosened. To move the fence assembly forward or backward, rotate Fence Adjustment Knob (B). This will move both halves of the fence. Then re-tighten knob (A).

Each half of the fence can also be adjusted separately. These adjustments are used to control the relative positions of the fence halves to set the depth of cut and the support of the outfeed portion of the workpiece. The fence halves are secured to the fence body by Lock Knobs (C). The movement of each fence half is controlled by a micrometer style Infeed/Outfeed Adjustment

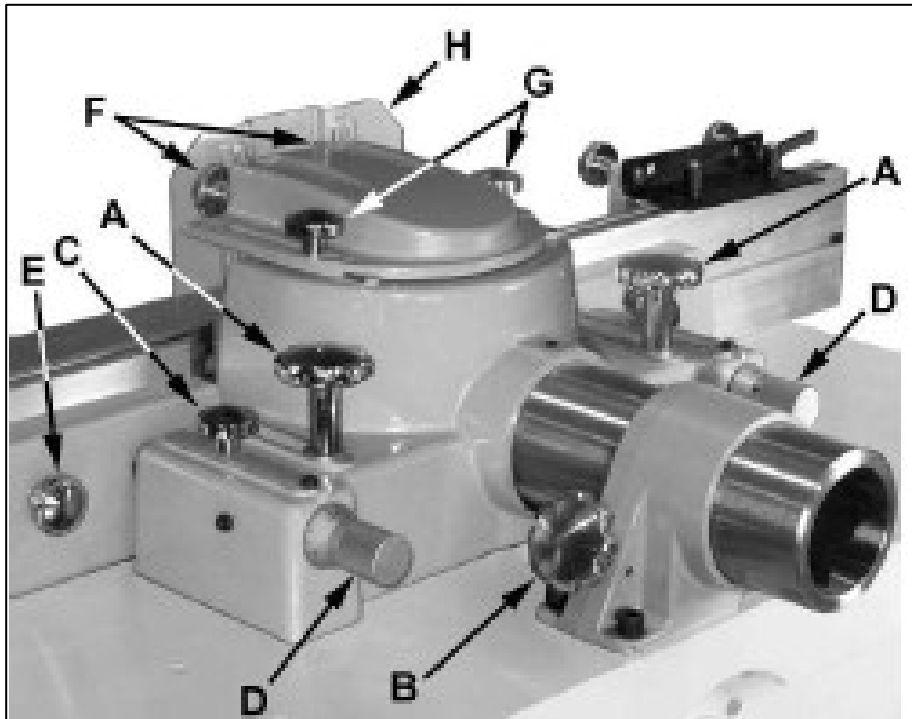


Figure 1 – Fence Assembly

Knob (D). These knobs are calibrated and indicate the movement of the fence half in thousands of an inch. After positioning the fence halves in the desired position, retighten the fence Lock Knobs (C). Each fence half is attached to the fence assembly with Lock Knob (B). By loosening this knob, the fence half can be moved toward or away from the cutter. After positioning the fence halves the desired distance from the cutter (1/16" to 1/8") retighten the Lock Knobs (E). With the direction switch in the "Off" position, rotate the spindle by hand to ensure that the cutter does not touch the fence. When rotating the spindle only use the tips of your fingers and only touch the spacers at the top of the spindle.

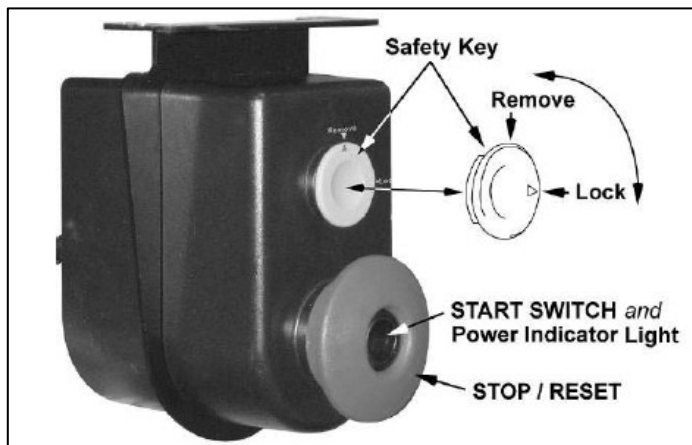


Figure 2 - Start-Stop Switch

Cutter Adjustment. The height of the cutter above the table is adjusted by rotating the handwheel at the front of the shaper. Rotating it clockwise raises the cutter; rotating it counterclockwise lowers the cutter. After setting the desired cutter height, retighten the knob in the center of the handwheel.

OPERATING CONTROLS:

Start – Stop Switch. The Start-Stop switch (refer to Figure 2) is located on the front of the base cabinet. The Start pushbutton is located in the center of the red Stop ring, and is recessed. When there is power to the shaper, this button illuminates and is green. Therefore, this light should be out when the shaper is Locked Out. Push this button to start the machine. To stop the shaper, push the red Stop ring.

Digital Readout. The digital readout is located on the front of the base cabinet. It indicates the relative height of the cutter to a thousandth of an inch. To use the Digital Height Gauge, set the cutter at the desired height, or any reference height, and depress the “0” set button (refer to Figure 3) for about 2 seconds. Any changes in the height from this reference point will be shown as positive for raising the height, or negative for lowering the height below this reference point.

This readout can be used to raise the cutter by a precise amount, or to return to a previous height that you have recorded. For maximum accuracy, always raise the cutter to the desired height, even if you must lower the cutter first. The switch for controlling the direction of rotation is also located on the Digital Readout. When the Shaper is not in use, or is Locked Out, the switch

should be placed in the “Off” position. When the switch is placed in the “Forward” position, the cutter will rotate counter-clockwise when viewed from above. This is the position that should be used when feeding the workpiece from the right-hand side of the machine. Place the switch in the “Reverse” position when the cutter is to turn clockwise, and fed from the left-hand side of the machine.

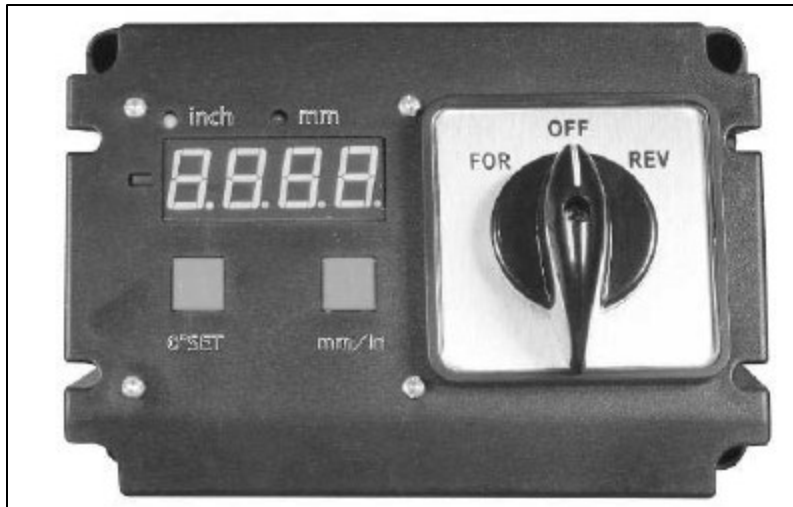


Figure 3 - Digital Height Indicator

SETUP and OPERATION:

Cutter Installation. When installing, removing, or changing the cutter(s) the machine must be Locked Out following the Club Lockout Procedure. The cutter is attached to the spindle with an 8mm hex head cap screw (F) (refer to Figure 4). In order to loosen or tighten this screw, the spindle must be locked so that it can not rotate. The spindle lock (F) is located inside the base, towards the top of the cabinet (refer to Figure 5). To lock the spindle, pull the Spindle Lock

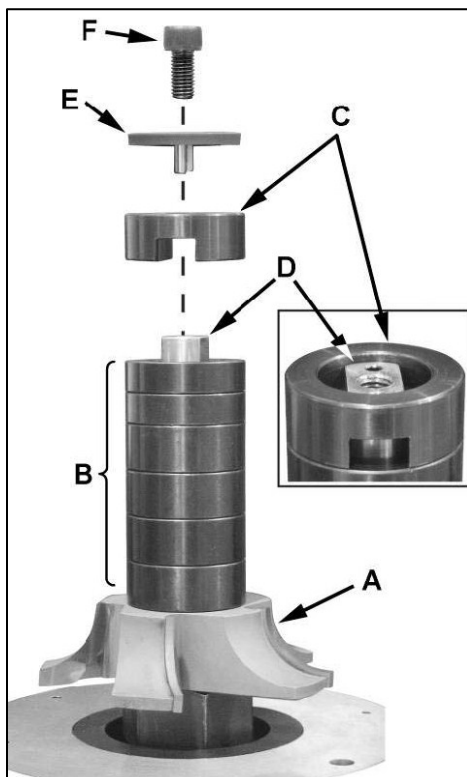


Figure 4 - Cutter Installation

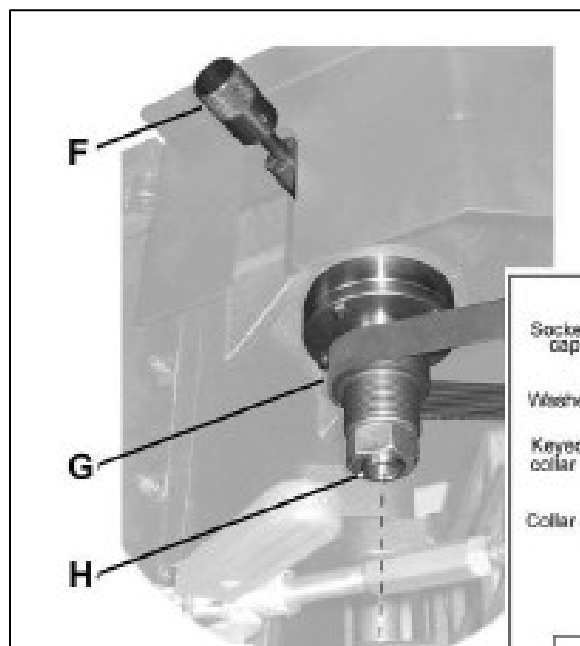


Figure 5 - Spindle Lock and Speed Change Pulleys

Knob out and rotate it 90° clockwise or counterclockwise from its center position, and release it. Then rotate the spindle by hand until it locks. To unlock the spindle, pull the Spindle Lock Knob out and rotate it back to the center position. Rotate the spindle by hand several revolutions to verify that the spindle is unlocked. There are detents in both lock positions and the central unlocked position that the Spindle Lock Knob will drop into. Place the cutters on the spindle so that the cutters are facing toward the direction the workpiece will be fed from. If possible, position the cutter(s) so that the cutter will be cutting the underside of the workpiece. This may require flipping the cutter over, reversing the direction of rotation of the spindle and feeding the workpiece from the other direction. If a rub bearing is to be used below the cutter, a spacer or machined flat washer will need to be installed on the spindle first because the bottom shoulder of the spindle that aligns the cutter is only flat on its perimeter. The rub bearing inner race is too small to reach this shoulder and must be supported by another flat surface. A machined washer may also be required between the rub bearing and the cutter if the cutter does not have a hub (note that Freeborn cutters have a hub). When the cutter is tightened, the outer race of the bearing must rotate freely.

Add spacers as needed so that the top of the Keyed Spacer (C), when installed, is slightly above the top of the spindle. The spacers are of differing heights and if selected properly, this distance can be achieved. This will ensure sufficient pressure to hold the cutter in place when the 8mm hex head bolt (F in figure 4) is tightened. Install the pronged washer (E) so the prong is projecting down into the space between the keyed collar and the spindle. Install and tighten the 8mm hex head bolt (F). Ensure that the cutter is secured to the spindle by trying to rotate the spacers. If they rotate, the spacers must be readjusted. When finished with the installation, unlock the spindle by pulling the Spindle Lock Knob (F in Figure 5) out, rotate it back to the center position, and release it. Rotate the spindle several revolutions to verify that the spindle is unlocked. If no further adjustments are to be made, remove the Lockout lock and restore power to the machine following the Clubs Lockout Procedure.

Position the Fence. Stop the machine and turn the direction switch to the “Off” position. Position the fence so that the infeed fence removes the desired depth of cut, and lock it in position. Set the outfeed fence so that it is inline (coplanar) with the infeed fence. This can be checked with a long straightedge or a board that has been jointed and determined to be straight.

Raise the cutter to the desired height. With the direction switch still in the “Off” position, rotate the spindle by hand to ensure that the cutter does not touch the fence. When rotating the spindle only use the tips of your fingers and only touch the spacers at the top of the spindle.

SHAPING STRAIGHT BOARDS OR PANELS. This setup requires some trial and error. It is suggested that the setup be completed using a piece of scrap that is the same thickness as the workpiece. The scrap must be joined on one face and edge, be planned flat, and be at least 18” long (longer is better). Install the desired cutter(s) and position the fence as described above. Use feather boards, push blocks and push sticks as needed to keep your hands away from the cutter. Start the machine and verify that the cutter is rotating in the correct direction. Make a test cut by feeding a piece of scrap into the cutter while holding it tight against the table and fence. Stop feeding when the scrap is about 6-8” onto the outfeed fence. Pull the scrap away from the fence and stop the machine. Inspect the profile and determine if the cutter should be raised or lowered, or if the depth of cut needs to be changed by moving the infeed fence to obtain the desired shape. If changes are needed, place the direction switch in the

“Off” position and make the changes. Turn the direction switch to the proper direction and repeat the test on a fresh edge of the scrap. Continue this test procedure until the desired profile is obtained.

Make a test cut where the piece of scrap is fed about 6-8” past the cutter. If the cutter did not remove the entire edge of the scrap, it should be tight against the outfeed fence. If this is the case, proceed to cut the entire edge of the board or panel. If the entire edge was shaped, or if the outfeed fence is back too far, there will be a gap between the scrap and the outfeed fence. If this is the case, stop the machine, place the direction switch to the “Off” position and adjust the outfeed fence so that it just touches the scrap (refer to Figure 6). Make another test cut on a fresh edge. The cut should be continuous and smooth. If the scrap hits the leading edge the outfeed fence, the outfeed fence needs to be adjusted backward. If there is snipe on the end of the board,

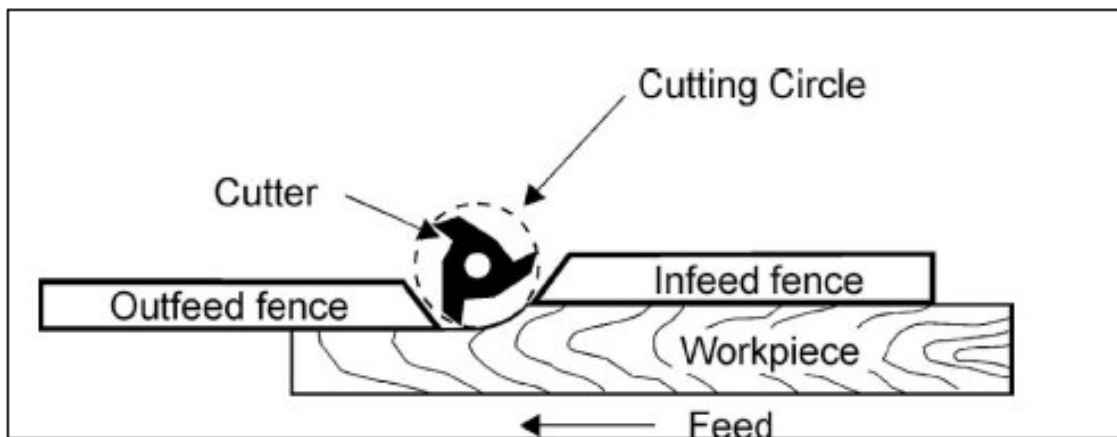


Figure 6 - Position of outfeed fence relative to the infeed fence

the outfeed fence needs to be adjusted forward by the depth of the snipe. Once the adjustments have been completed, prepare to shape the workpieces. Use feather boards, push blocks and push sticks as needed to keep your hands away from the cutter.

PATTERN SHAPING. Pattern shaping is used to shape the edge of irregular workpieces, like the rockers on doll cradles, and curves, like the headboards and footboards of doll cradles. The use of a jig allows the entire edge of the workpiece to be shaped, but they are also used when only part of the edge is shaped. In these operations, the workpiece is typically cut to the approximate shape using a band saw, and about 1/16” to 1/8” oversize. The workpiece is then secured in a jig, typically with toggle clamps, but screws or bolts can also be used. If the cuts are light, double sided tape may be adequate. Refer to Figure 7.

The purpose of the jig is to secure the workpiece and allow it to start and finish the cut in a controlled manner. If a workpiece is fed into the cutter without a jig or other control device, the workpiece will probably be grabbed by the cutter and thrown with great energy. The jig is prepared so that the bottom, or pattern, rides on the shaper table and has the desired shape of the finished workpiece. The pattern is held against a rub bearing on the spindle as the workpiece is fed past the cutter. This operation can only be performed with the fence removed from the shaper. It is desirable to construct the jig so that the pattern extends past the workpiece. With this type of jig, the extended portion of the pattern is brought up to the rub bearing, and full contact is made before the workpiece is fed into the cutter. Care must be taken

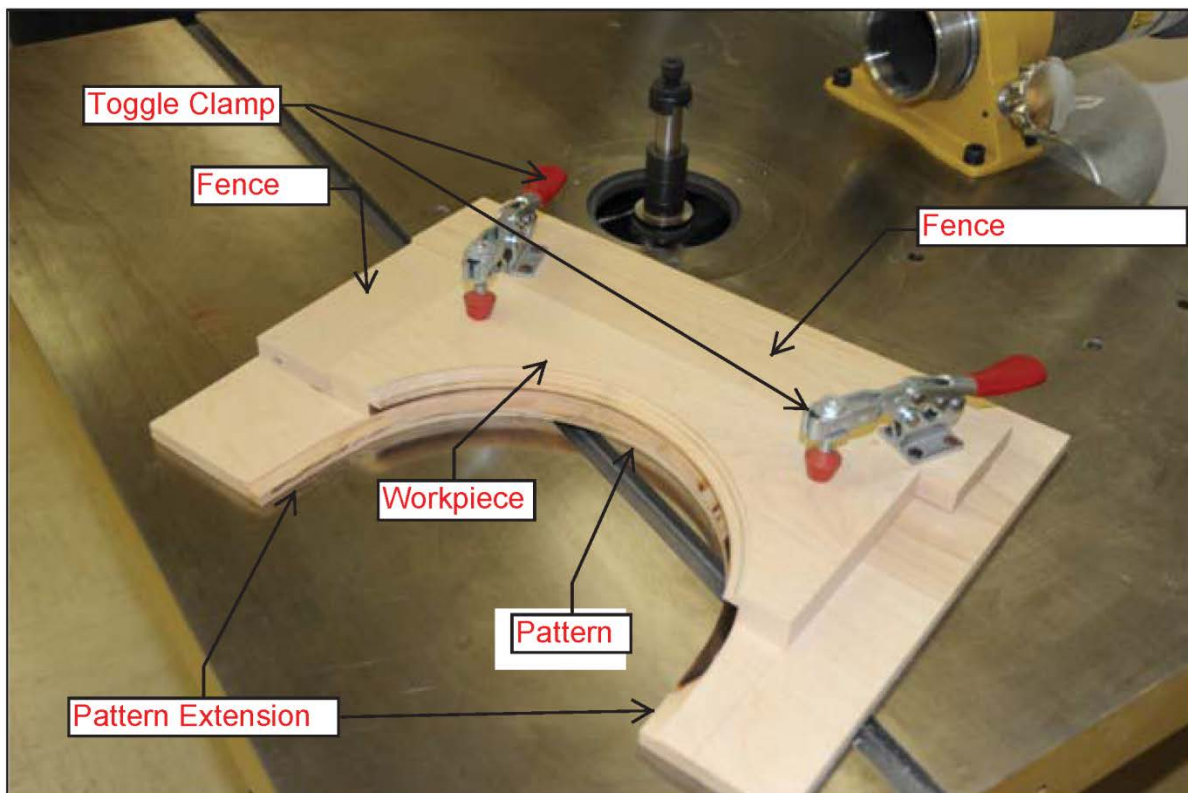


Figure 7 – Pattern Shaping Jig

to ensure that the cut is started from the side of the jig that allows the workpiece to be fed into the blades of the rotating cutter. If fed into the cutter as in a climb cut, with the cutter blades rotating away from the workpiece, the workpiece may be grabbed and propelled away from the cutter with significant energy, possibly causing serious injury to the operator or others. The pattern must be in full contact with the rub bearing at all times as the workpiece is fed past the cutter. The pattern must also extend past the end of the workpiece so that the cutter completes the shaping of the workpiece before the pattern loses contact with the rub bearing.

If the pattern does not have extensions that can rub against the rub bearing before and after the shaping of the workpiece, another method must be used to start the cut. In this case, a starting pin must be used. A starting pin is a metal rod that protrudes from the table a few inches and is

located near the cutter radius. In this case, the pattern is brought into contact with the starting pin and then rotated into the cutter. This must be done with the starting pin located “in-front” of the cutter, so that the workpiece will be fed into the cutter with the blades rotating towards the workpiece. Place the starting pin in the right-hand hole if the cutter is rotating clockwise and in the left-hand hole if the cutter is rotating counterclockwise. Refer to Figure 8. If fed into the cutter as in a climb cut, the workpiece may be grabbed and propelled away from the cutter with significant energy. Once the pattern makes contact with the rub bearing, the jig is rotated away from the starting pin and the workpiece is fed past the cutter while maintaining full contact between the pattern and the rub bearing. Once the entire edge is shaped, the jig is pulled away from the cutter.

The pattern should be made from solid core plywood that is flat and stable. If the bottom surface is not flat, the profile cut will not be uniform. The plywood should also be thick enough that tightening the clamps does not cause the bottom to bow or deform. One-half inch thick plywood will work fine for most jigs handling small workpieces. Three-quarters inch thick should be considered for larger workpieces. MDF is a poor choice for the pattern. If it comes into contact with the cutter, it will dull it quickly. Care should be taken in preparing the edge of the pattern that rubs against the rub bearing. Any abnormalities present will also be present in the shaped workpiece. The jig should also be handled carefully so that the pattern edge does not get damaged.

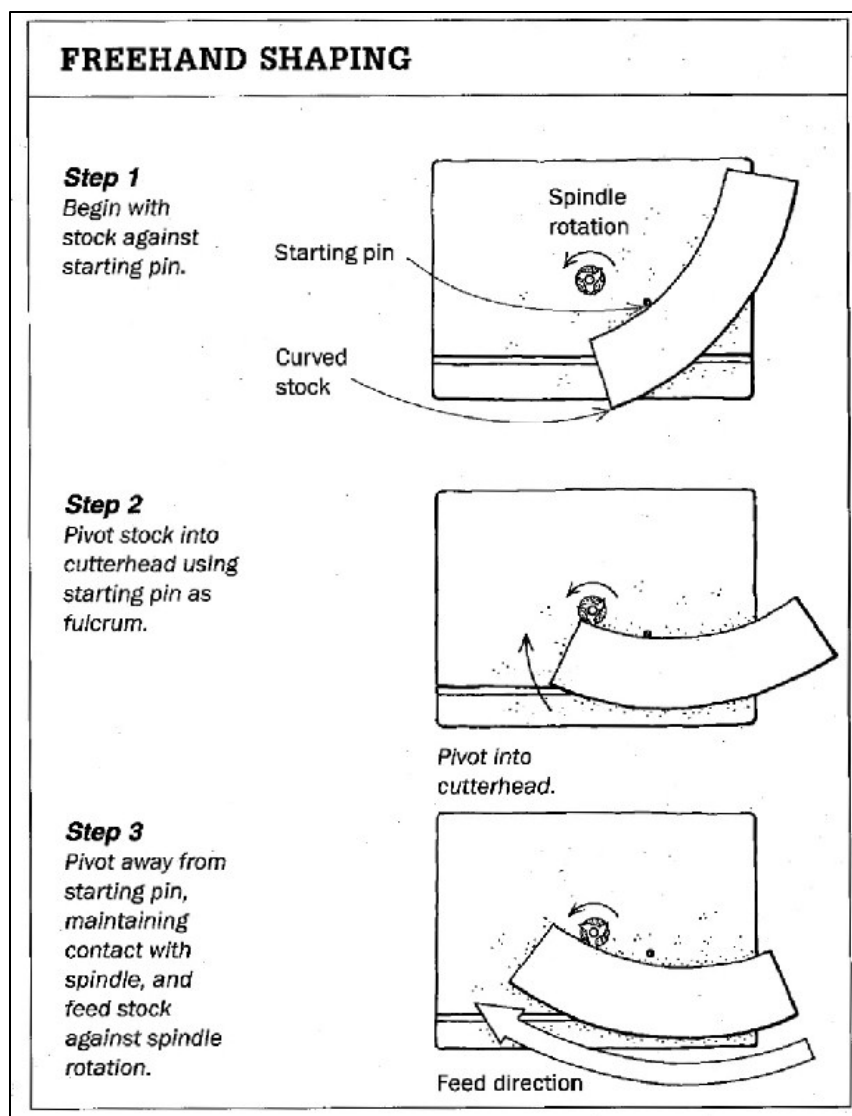


Figure 6 - Shaping Irregular Pieces without a Pattern

SHAPING IRREGULAR PIECES, CURVES AND ARCHES WITHOUT A PATTERN. If the workpiece is to be shaped such that only a portion of the edge is to be profiled, it may not be necessary to use a pattern. If a sufficient height of the edge is not profiled, the workpiece itself can act as a pattern. With this method, the un-profiled portion of the edge rubs against the rub bearing instead of a pattern. The amount of un-profiled edge required is dependent on the depth of cut. For 3/4" to 1" thick stock, 1/8" is usually sufficient. If this method is to be used, the workpiece must be brought to final size and shape prior to cutting the profile on the shaper. All edges must be faired so that they are smooth and free of abnormalities. If the amount of the edge to be profiled is more than one-half the thickness of the workpiece, the first pass should remove no more than one-half the thickness. The cutter can then be raised to no more than three-quarters of the thickness of the workpiece and another cut made. If additional material is to be removed, raise the cutter as needed and make another pass to complete the profile; ensuring that at least 1/8" of the edge remains uncut. The method of operation is the same as for pattern shaping when there are no extensions on

the pattern to rub against the rub bearing when starting the cut. The workpiece is brought into contact with the starting pin and then rotated into the cutter. This must be done with the starting pin located “in-front” of the cutter, so that the workpiece will be fed into the cutter with the blades rotating towards the workpiece.

Place the starting pin in the right-hand hole if the cutter is rotating counter-clockwise and in the left-hand hole if the cutter is rotating clockwise. Refer to Figure 8. If fed into the cutter as in a climb cut, the workpiece may be grabbed and propelled away from the cutter with significant energy. Once the pattern makes contact with the rub bearing, the jig is rotated away from the starting pin and the workpiece is fed past the cutter while maintaining full contact between the pattern and the rub bearing. Once the entire edge is shaped, the jig is pulled away from the cutter.

SHAPING THE ENDS OF NARROW STOCK. Workpieces that are narrow or long often need to be shaped when cutting tenons, cutting slots for splines or when making the coping cut on rails for frame and panel door and cabinets. These workpieces can not be cut by using the fence to guide the stock, or by using a miter gauge. Unless the workpiece is at least 12” wide, the fence will not provide adequate support. Even if the workpiece is 12” wide, if the board is long, it will be difficult to control the movement of the workpiece as it is pushed into and through the cutter. A shaper cutter also tries to force the work away from the cutter in a lateral direction. This makes it difficult to hold the workpiece steady as it is being cut. The best way to shape the ends of narrow or long boards is to use a coping sled (refer to Figure 9).

The coping sled has a 1/2” thick phenolic plastic base with a miter gauge bar on the bottom that rides in the shaper's miter gauge slot. This ensures that the base moves in a straight line and does not move laterally. An aluminum bar is attached to the back of the base, and is perpendicular to the miter gauge bar. A wood fence is attached to the front of an aluminum bar and is attached using Tee Track bolts that allow it to be repositioned laterally. The workpiece is secured to the base using Toggle clamps.

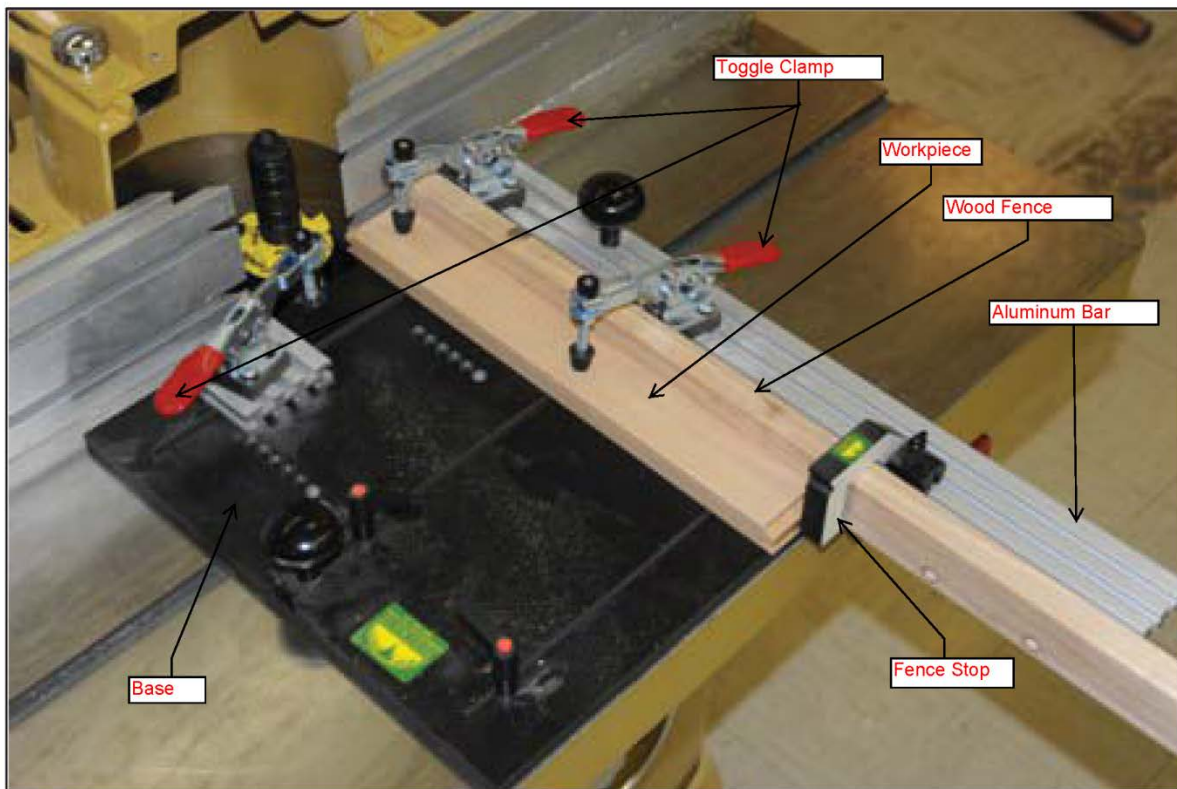


Figure 9 - Woodhaven Model 525 Large Coping Sled

Example: How to cope the ends of a rail. This method produces any number of exactly the same length rails. This is essential if square doors or panels are to be produced. This method cuts the coping cuts on the rails first and then the coped rail is used to position the height of the cutter to make the matching pattern cuts on the stiles.

1. Cut the rail 1/8" to 3/16" longer than desired;
2. Stop the machine and turn the direction switch to the "Off" position. Lockout the shaper following the Club Lockout Procedure;
3. Place the coping sled on the shaper table with its miter bar in the table's miter slot. Place the base of a square in the miter slot and ensure that the aluminum bar is perpendicular to the miter gauge slot. Loosen the screws under the base, adjust the fence as needed and retighten the screws. Double checks for square after the screws are tightened;
4. Install the coping cutters on the spindle;
5. Adjust the position of the infeed fence so that it is even with the outside diameter of the middle cutter (the smallest diameter cutter) between the top and bottom cutters, and then move it back about 1/8";
6. Position the outfeed fence so that it is about 1/8" further back than the infeed fence;

7. Adjust the aluminum bar so that it is flush with the edge of the base;
8. Adjust the wood fence on the coping sled so that it is about 1/32" away from the infeed fence;
9. Insert the workpiece on the base and position it so that it is tight against the wood fence and clamp it in place;
10. Raise or lower the spindle as needed to position the cutters so that the desired profile will be cut. A fillet depth of 1/16" to 3/32" usually looks good;
11. Remove the workpiece from the base;
12. Unlock the shaper, power it on and push the coping sled through the cutters until the wood fence has been cut through. This fence will support the cut and prevent tearout ;
13. Position the fence stop at the desired rail length, measured from the coped end of the wood fence. This must be measured accurately;
14. Raise the fence stop;
15. With the face side of the workpiece down, place the workpiece on the coping sled with the end projecting past the coped end of the wood fence 1/32" to 1/16" and clamp it in place;
16. Start the shaper and push the workpiece through the cutters to make the first coping cut. Stop the machine. Do not pull the workpiece back through the cutters with the cutters still rotating;
17. Unclamp the workpiece and turn it end-for-end with the face side still down. Lower the fence stop and position the workpiece against both the fence and the fence stop. Clamp the workpiece in place;
18. Start the machine and push the workpiece past the cutters to make the second coping cut. Stop the machine;
19. Follow steps 14 to 18 for each rail. It is recommended that you do not make coping cut 1 on all rails followed by coping cut 2 on all rails. It is too easy to get the rails mixed up or get confused on the work process and end up with some rails that are shorter than others, or the copes rotated 90 degrees.
20. The pattern cuts are made using the pattern cutters and the fence. Adjust the height of the cutters to correspond with the cuts made with the coping cutter. This means that the center pattern cutter elevation should match the elevation of the groove made by the coping cutter. The fence should be adjusted so that the top cutter removes about 1/32" of material. This will require the outfeed fence to be brought about 1/32" forward of the infeed fence.

STOCK FEEDER

A stock feeder is used to feed the workpiece past the cutter in a controlled manner. It has four motor driven spring mounted rubber wheels that press down on the workpiece, keeping it tight against the table. If the board has a slight bow to it, the wheels may have sufficient strength to overcome this bow and still hold the workpiece tight against the table. Properly adjusted, the feeder also holds the work piece tight against the fence.

The stock feeder should be positioned so that it is laterally centered on the spindle and an inch or so from the fence. In this position, it acts as a guard to prevent your hand from contacting the

cutter. Vertically, it should be positioned so that the spring loaded wheels are compressed about 1/8" to 1/4". In order to ensure that the feeder holds the workpiece tight against the fence, the infeed side of the feeder should be about 3/16 to 1/4" further from the fence than the outfeed side of the feeder. This will cause the feeder to try to push the workpiece into the fence. The feeder can feed in either direction and has two speeds in each direction for each of two gearbox settings, for a total of four speeds in each direction. Changes to the gearbox will only be made under the direction of the Shop Leader. For most operations, the gearbox will be in the high speed mode and the motor operated at low or "Turtle" speed of 33 feet/minute.

The stock feeder grips the workpiece tightly with its rubber wheels. This permits stock to be fed in a climb-cut direction. This may be helpful if the grain in the workpiece changes direction or the board must be cut against the grain.

The feeder is supported by two universal joints connected to the Over Arm, which is supported by the Column. With this arrangement, the feeder can be placed in almost any position. Refer to Figure 10.

WARNING! Never place your hand close to the infeed side of the stock feeder. Your hand might be drawn in by the rollers causing severe injury including amputation or death.

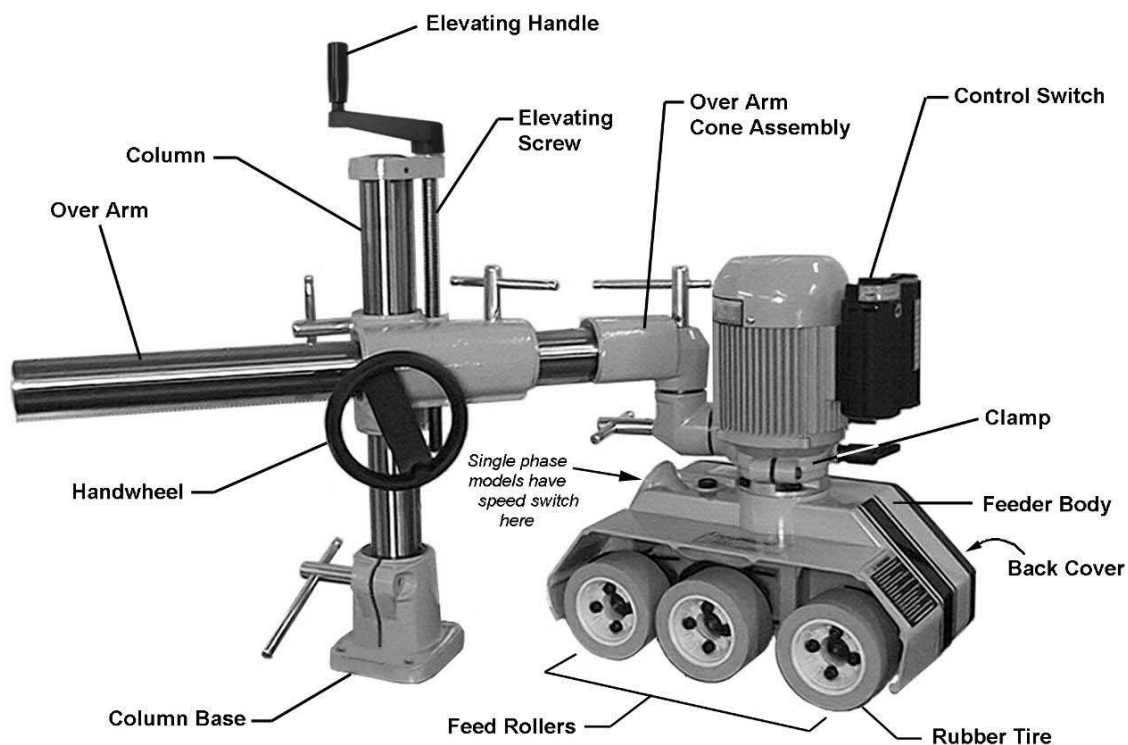


Figure 10 - Stock Feeder

Basic Feeder Position Adjustments

The position controls are shown in to Figure11. To raise or lower the over arm, loosen handle (A) and rotate elevating handle (B). When adjustment is complete, re-tighten handle (A). To move the over arm forward or back, loosen handle (C) and rotate handwheel (D). When adjustment is complete, re-tighten handle (C). To swing the over arm across the table, loosen handle (E) and swing the over arm to desired position. Re-tighten handle (E) before operating the stock feeder. To rotate the cones to help position the feeder, loosen handles (F). Tighten handles

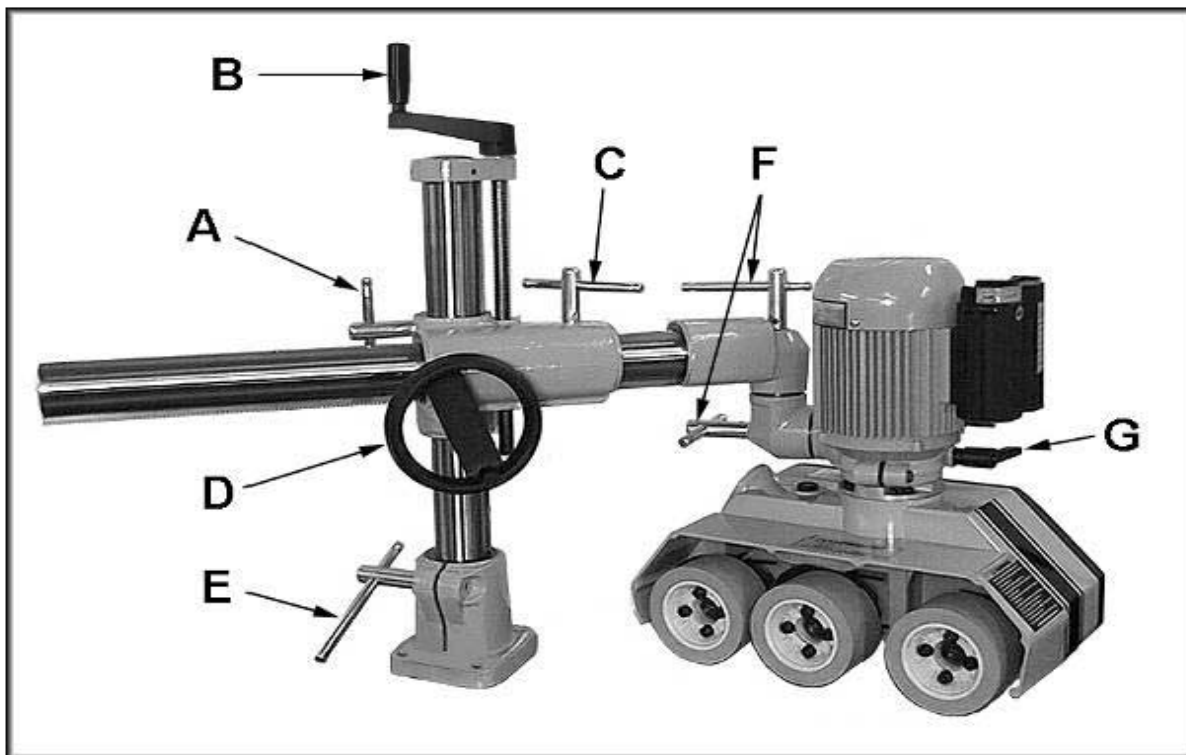


Figure 11 – Position Adjustment

when adjustment is complete. To rotate the stock feeder on its vertical axis, loosen handle (G) just enough that the stock feeder will freely rotate. Re-tighten handle (G) before operating the stock feeder

Operating Controls

The control switch is shown in Figure 12; Speeds are indicated by the universal symbols of Rabbit (high speed) and Turtle (low speed). The switch can be turned for either forward or reverse direction.

WARNING! If a jam should occur while feeding a workpiece, DO NOT turn the stock feeder to reverse while the auxiliary machine is still running in forward direction.

If a workpiece becomes jammed, turn off the stock feeder, and then turn off the shaper. Raise the stock feeder in order to clear the workpiece. Then re-set the feeder height, turn on the shaper and stock feeder, and begin the feed over again.

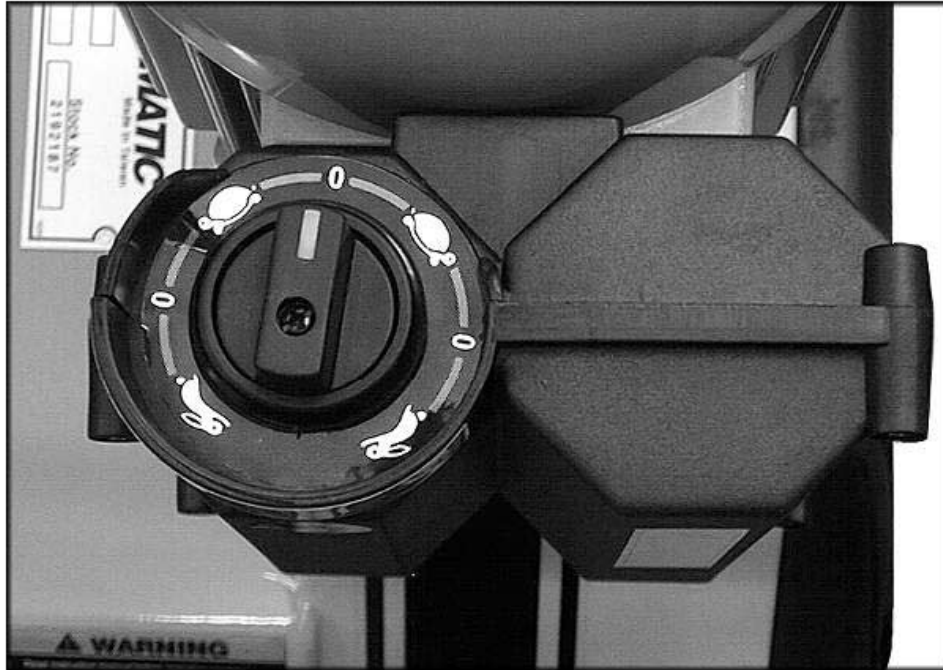


Figure 12 - Speed and Direction of Feed Control

Operation

CAUTION! Before operating the stock feeder, you should be thoroughly familiar with the safety and operating instructions that accompanied the auxiliary machine.

Keep hands away from rollers and cutting tool during operation. Failure to comply may cause severe injury.

1. Make sure all handles on the stock feeder and the feeder mounting assembly are tight before operating.
2. The stock feeder should be used in conjunction with the fence on the shaper. The fence should be securely fixed.
3. The rollers must grip the offcut, as well as the part of the workpiece still being fed. Also, the rollers should be set parallel to the table or fence for proper feed.
4. On some machines, such as a shaper or jointer, the stock feeder can be mounted so that the rollers exert pressure from the top, or mounted edgewise so that the rollers exert pressure from the side, or mounted at an intermediate angle for beveled workpieces.
5. The feed rollers have a spring suspension which will exert the necessary pressure against the workpiece. This pressure increases automatically with feed resistance, so that a workpiece of varying thickness can be fed through the stock feeder without adjustments.
6. When used in horizontal position, the stock feeder should be adjusted for height so that the distance between the table and the feed rollers is approximately 1/8" to 1/4" less than the thickness of the workpiece. See Figure 13.

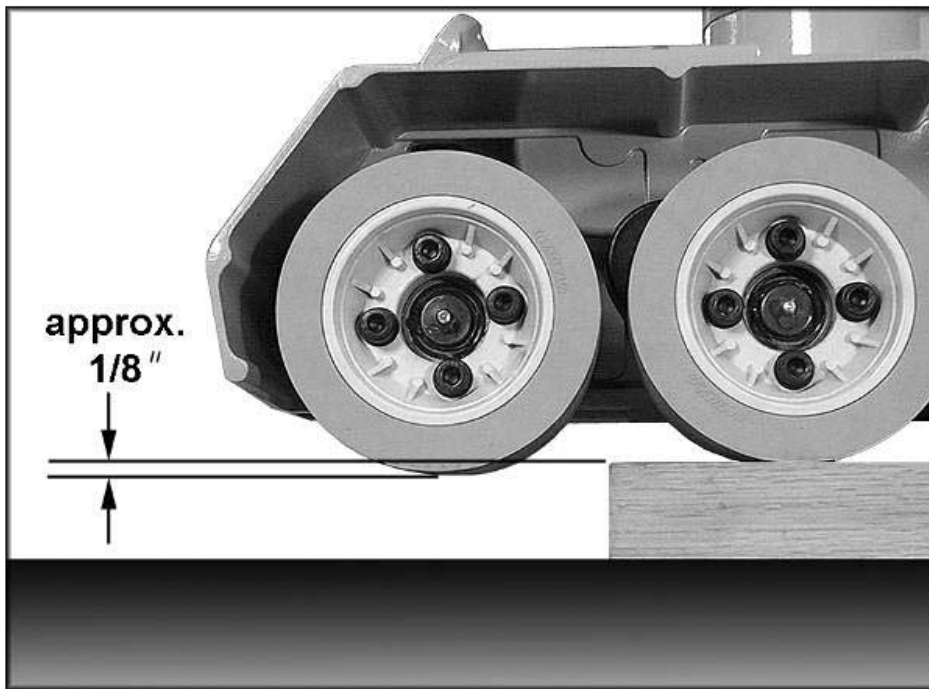


Figure 13 - Vertical Position of Feeder

7. Shaping hardwood with the stock feeder may increase the friction between workpiece and table. Keep the work table rust-free and smooth, by using paste wax or other necessary means.

Although the stock feeder when properly used will greatly reduce the chance of workpiece kickback, there is still a potential for kickback. Never stand directly in the path of the workpiece as it passes under the stock feeder rollers.

8. The gap between the fences and the cutter should be as small as possible, typically 1/16" to 1/8".

9. To ensure that the workpiece is held firmly against the fence, set the stock feeder at a slight angle toward the fence in the direction of feed. In other words, the outfeed roller should be approximately 3/16" to 1/4" closer to the fence than the infeed roller. See Figure 14.

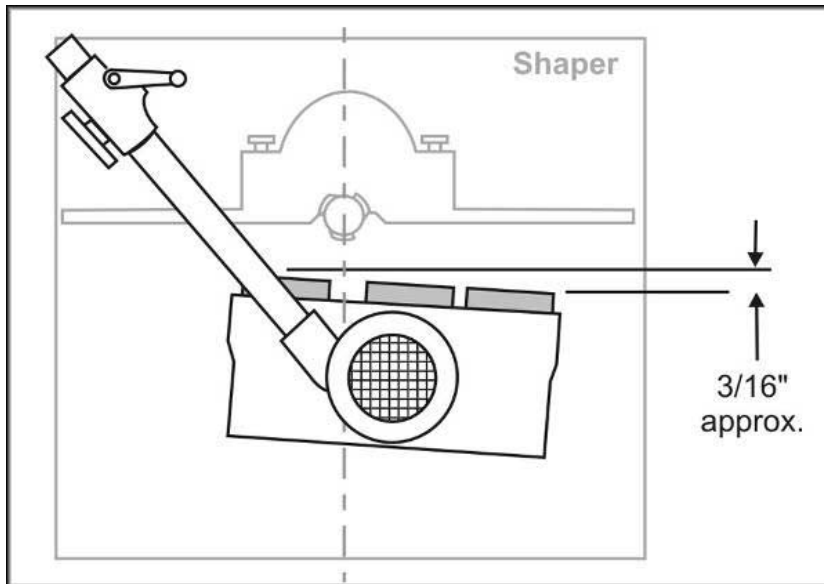


Figure 14 - Stock Feeder Position for Horizontal Shaping

10. When the Stock Feeder is on its side so that the workpiece is held tight against the fence, as in creating molding, it must be inclined slightly towards the work table in the direction of feed, to ensure the workpiece remains forced down against the table. In other words, the outfeed roller should be approximately 3/16" closer to the work table than the infeed roller. See Figure 15.

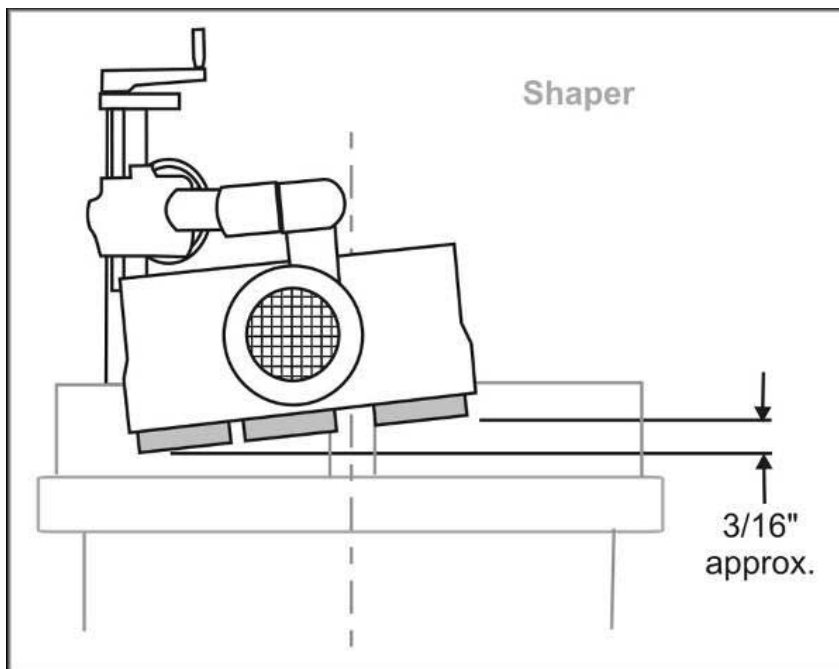


Figure 15 - Stock Feeder Position for Vertical Shaping

11. Regardless of whether the stock feeder is in the vertical or horizontal position, the stock feeder must always be positioned so that the shaper spindle is centered between the two middle rollers of the feeder.

12. WARNING! Do not stand directly behind or in front of the workpiece. If the stock feeder were to lose its grip, the stock could be ejected energetically and cause serious injury.