

SPINDLE SHAPER

Model TS29

Instruction Manual & Parts List

M-0460270



POWERMATIC[®]

(800) 274-6848
www.wmhtoolgroup.com

This manual has been prepared for the owner and operators of a Powermatic Model TS29 Spindle Shaper. Its purpose, aside from machine operation, is to promote safety through the use of accepted correct operating and maintenance procedures. Completely read the safety and maintenance instructions before operating or servicing the machine. To obtain maximum life and efficiency from your shaper and to aid in using the machine safely, read this manual thoroughly and follow all instructions carefully.

Warranty & Service

WMH Tool Group warrants every product it sells. If one of our tools needs service or repair, one of our Authorized Repair Stations located throughout the United States can give you quick service.

In most cases, any one of these WMH Tool Group Repair Stations can authorize warranty repair, assist you in obtaining parts, or perform routine maintenance and major repair on your JET, Powermatic, Performax, or Wilton tools.

For the name of an Authorized Repair Station in your area, call 1-800-274-6848.

More Information

WMH Tool Group is consistently adding new products to the line. For complete, up-to-date product information, check with your local WMH Tool Group distributor or visit wmhtoolgroup.com.

WMH Tool Group Warranty

WMH Tool Group makes every effort to assure that its products meet high quality and durability standards and warrants to the original retail consumer/purchaser of our products that each product be free from defects in materials and workmanship as follows: 1 YEAR LIMITED WARRANTY ON ALL PRODUCTS UNLESS SPECIFIED OTHERWISE. This warranty does not apply to defects due directly or indirectly to misuse, abuse, negligence or accidents, normal wear-and-tear, repair or alterations outside our facilities, or to a lack of maintenance.

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To take advantage of this warranty, the product or part must be returned for examination, postage prepaid, to an Authorized Repair Station designated by our office. Proof of purchase date and an explanation of the complaint must accompany the merchandise. If our inspection discloses a defect, WMH Tool Group will either repair or replace the product, or refund the purchase price if we cannot readily and quickly provide a repair or replacement, if you are willing to accept a refund. WMH Tool Group will return repaired product or replacement at our expense, but if it is determined there is no defect, or that the defect resulted from causes not within the scope of our warranty, then the user must bear the cost of storing and returning the product. This warranty gives you specific legal rights, you may also have other rights which vary from state to state.

WMH Tool Group sells through distributors only. WMH Tool Group reserves the right to effect at any time, without prior notice, those alterations to parts, fittings, and accessory equipment which they may deem necessary for any reason whatsoever.

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SAFETY RULES

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. When normal safety precautions are overlooked or ignored, personal injury to the operator can result.

Read, understand and follow the safety and operating instructions found in this manual. Know the limitations and hazards associated with this machine.

Electrical grounding. Make certain that the machine frame is electrically grounded and that a ground lead is included in the incoming electrical service. In cases where a cord and plug are used, make certain that the grounding plug connects to a suitable ground. Follow the grounding procedure indicated in the National Electrical Code.

Eye safety. Wear an approved safety shield, goggles, or glasses to protect eyes. (NOTE: Common eyeglasses are only impact-resistant, they are *not* safety glasses.)

Personal protection. Before operating the machine, remove tie, rings, watch and other jewelry and roll up sleeves above the elbows. Remove all loose outer clothing and confine long hair. Protective type footwear should be used. Where the noise exceeds the level of exposure allowed in Section 1910.95 of the OSHA Regulations, use hearing protective devices. Do not wear gloves.

Guards. Keep the machine guards in place for every operation for which they can be used. If any guards are removed for maintenance, DO NOT OPERATE the machine until the guards are reinstalled.

Work area. Keep the floor around the machine clean and free of scrap material, saw dust, oil and other liquids to minimize the danger of tripping or slipping. Be sure the table is free of all scrap, foreign material and tools before starting to cut. Make certain the work area is well lighted and that a proper exhaust system is used to minimize dust. Powermatic recommends the use of anti-skid floor strips on the floor area where the operator normally stands and that each machine's work area be marked off. Provide adequate work space around the machine.

Operator position. Maintain a balanced stance and keep your body under control at all times. Do not overreach. Do not stand in line with the work piece and do not allow anyone else to do so. Never climb on or near the machine.

Housekeeping. Before turning on machine, remove all extra equipment such as keys, wrenches, scrap, and cleaning rags away from the saw.

Tool maintenance. Clean and sharp tools give better and safer performance. Dull tools can cause kickback and excessive chatter. Before making a cut, always check the condition and adjustment of the tools. Never use a tool that is not balanced and rated for the selected RPM.

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.

Disconnect machine before performing any service or maintenance or when changing cutters. A machine under repair should be RED TAGGED to show it should not be used until the maintenance is complete.

Hand safety. Keep hands clear of the cutter area. Do not reach past the blade to clear parts or scrap with the saw blade running. Never saw free hand. Avoid awkward operations and hand positions where a sudden slip could cause your hand to contact the blade.

Job completion. If the operator leaves the machine area for any reason, he should turn "off" the power to the machine and wait until the cutter comes to a complete stop before his departure. In addition, if the operation is complete, he should clean the table and cutter area. Never clean off the machine with power "on" and never use the hands to clear sawdust and debris; use a brush.

Short stock. Never shape stock less than 12 inches in length without special fixtures. Where practical, shape longer stock and cut to size.

12 inch rule. When shaping, never allow your hands to come closer than 12 inches to the cutters.

Hand safety. Never pass the hands directly over or in front of the cutters. As one hand approaches the 12 inch radius point, remove it (or the push stick) in an arc motion and reposition hands 12 inches beyond the cutters. See Figure 1.

Collars. When shaping with collars, the collar must have sufficient bearing surface (see page 18). The work must also be fairly heavy in proportion to the cut being made. Do not use short, lightweight stock when shaping against collars.

The opening between the fence plates should be only just enough to clear the cutter.

Edge shaping. Always use the mitre gauge and clamp attachment when edge shaping stock less than 6" wide. The fence should be removed during this operation.

Feed stock opposite to the direction of the cutter rotation. Never back stock out of the cutter once the cut has been started. Instead, pull the stock straight back away from cutter and begin the cut again. See Figure 2.

Make sure the spindle and the draw bar are tightened on the arbor.

Safety lock washer. Never operate the shaper without the safety locking keyed washer located immediately under the spindle nut. See Figure 3. This prevents the nut from coming loose when the spindle is run in a counterclockwise direction. Do not substitute any other type washer in place of the safety lock washer.

Replacement parts. Use only Powermatic or factory authorized replacement parts and accessories; otherwise the shaper warranty and guarantee is null and void.

Misuse. Do not use this Powermatic shaper for other than its intended use. If used for other purposes, Powermatic disclaims any real or implied warranty and holds itself harmless for any injury or damage which may result from that use.

If you are not thoroughly familiar with the operation of spindle shapers, obtain advice from your supervisor, instructor or other qualified person.

Drugs, alcohol, medication. Do not operate this machine while under the influence of drugs, alcohol, or any medication.

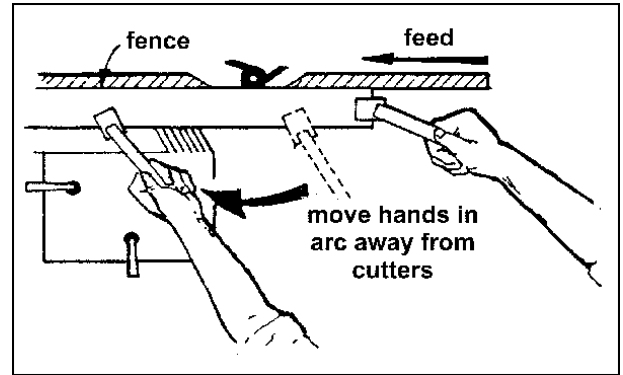


FIGURE 1

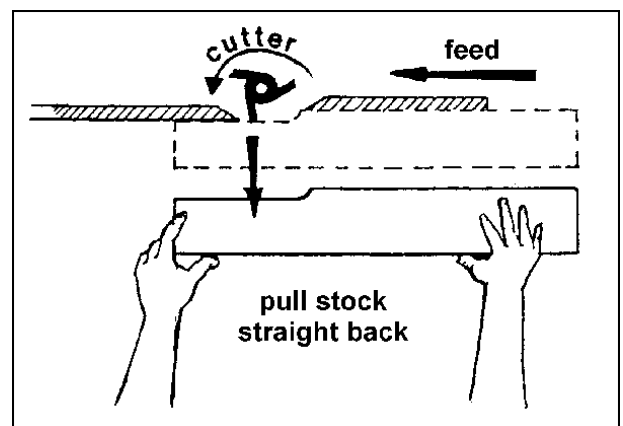


FIGURE 2

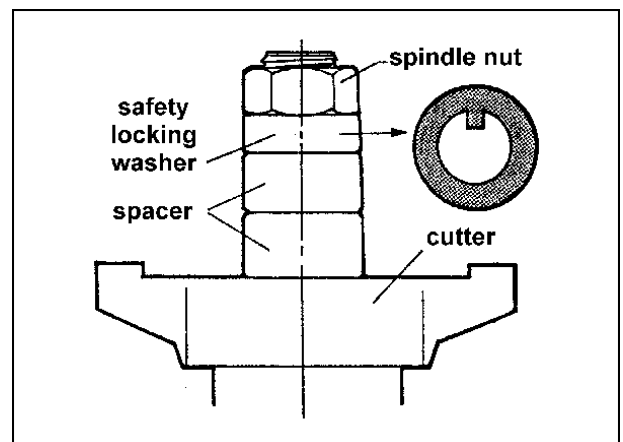


FIGURE 3

Health hazards. Some dust created by power sanding, sawing, grinding, drilling and other construction activities contains chemicals known to cause cancer, birth defects or other reproductive harm. Some examples of these chemicals are:

- * Lead from lead-based paint.
- * Crystalline silica from bricks and cement and other masonry products.
- * Arsenic and chromium from chemically-treated lumber.

Your risk from these exposures varies, depending on how often you do this type of work. To reduce your exposure to these chemicals, work in a well-ventilated area, and work with approved safety equipment, such as those dust masks that are specifically designed to filter out microscopic particles.

Familiarize yourself with the following safety notices used in this manual:



CAUTION: (This means that if precautions are not heeded, it may result in minor or moderate injury and/or possible machine damage)



WARNING: (This means that if precautions are not heeded, it could result in serious injury or possibly even death).

 **SAFETY**

Familiarize yourself with the location and content of these safety decals on your shaper.

FIGURE 4

WARNING

**DO NOT ENGAGE
SPINDLE LOCK WHILE
MACHINE IS RUNNING**

 **WARNING**

1. Read and understand instruction manual before operating machine.
2. Do not operate without all guards and covers properly installed.
3. Remove or fasten loose articles of clothing such as neckties, etc. Contain long hair and remove all jewelry.
4. Always use approved safety glasses and/or face shields.
5. Disconnect machine from power source before performing any maintenance, adjustments, or cleaning.
6. Keep work area clean. Clutter invites accidents.
7. Do not operate this machine while under the influence of alcohol or drugs.
8. Failure to comply with these warnings may result in serious personal injury.

**DO NOT REMOVE OR
OBSCURE THIS LABEL**

6293077

SPECIFICATIONS: Model TS29 Spindle Shaper

Motor	TEFC 7.5HP, 3Ph, 230/460V, 60Hz
Starter	230/460V Magnetic w/ 24V low voltage control circuit
Overall dimensions	51-1/4" L x 44" W x 53" H
Table size	51-1/4" L x 33-1/2" W
Sliding table size	51-1/4" L x 11-1/4" W
Sliding table travel	49-1/4"
Tilting spindle	5 degree back, 45 degree forward
Spindle travel	7"
Spindle speed	3000-4000-6000-8000-10000
Spindles	interchangeable: 1-1/4" x 6"; 1" x 6"; 3/4" x 3-1/4"; and 1/2" collet chuck with 1/4" bushing
Table inserts (three)	2-1/2" I.D.; 5-1/2" I.D.; Oval slotted
Dust outlet	(two) 5"
Net weight	1183 lbs.

NOTE: The above specifications were current at the time this manual was published, but because of our policy of continuous improvement, Powermatic reserves the right to change specifications without notice and without incurring obligations.

Standard Accessories
(Figure 5)

- A. Spindle Nut Wrench
- B. Spindle Wrenches
- C. Open-end Wrenches
- D. Hex Wrenches
- E. Spindle Collet
- F. Spindle Nut
- G. Lock Nut
- H. Draw Bar
- J. Grease Gun
- K. Table Inserts
- L. Interchangeable Spindles

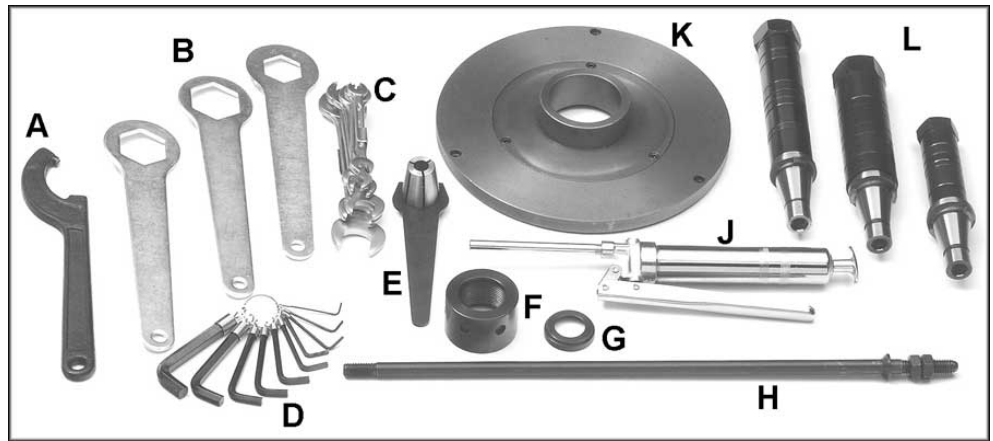


FIGURE 5

UNPACKING

Open shipping container and all separate cartons containing accessories. Report any damage immediately to your distributor. Read the instruction manual thoroughly for assembly, alignment, maintenance and safety instructions.

Crate contents:

- 1 shaper
- 1 fence assembly
- 1 dust chute
- 1 mitre gauge and clamp assembly
- 1 aluminum fence
- 1 box of standard accessories (see above)

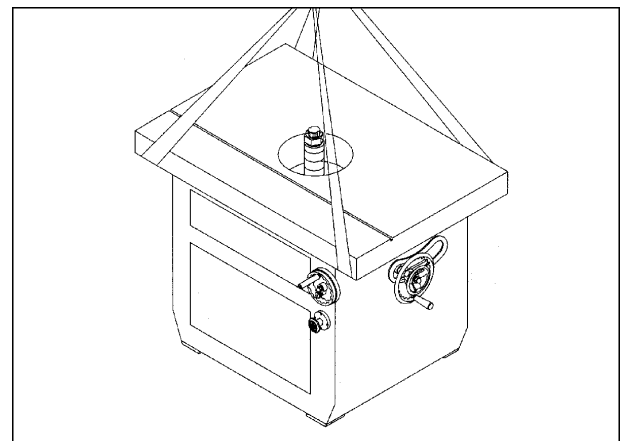


FIGURE 6

INSTALLATION AND ASSEMBLY

Tools required
crane with hoist; or forklift 9/16", 7/16" and 1/2" wrenches

1. Remove all wood crating from around the shaper.
2. Remove the bolts securing the machine to the skid.
3. The shaper can be lifted by a crane with hoist (Figure 6), or by a forklift (Figure 7), either of which should be capable of lifting one ton. Remove the skid from under the shaper.
4. The shaper should be mounted to a solid, level foundation, preferably a concrete floor. With machine in position, check table surface left to right and front to back with a machinist's level. If necessary, place metal shims under the corners of the machine to ensure it is level.

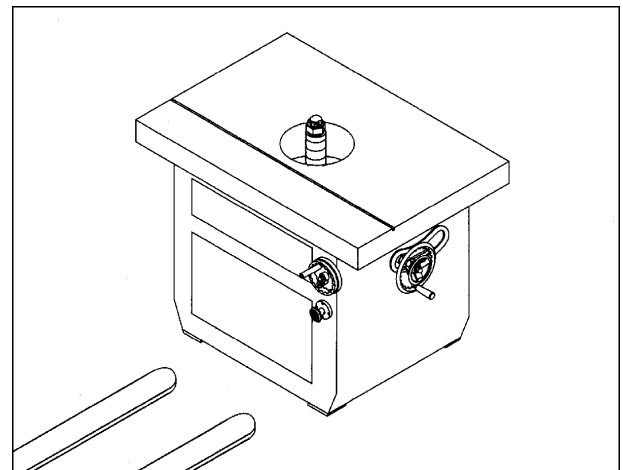


FIGURE 7

5. Secure the machine to the floor with good quality lag screws through the holes in the bottom of the cabinet.

6. Exposed metal parts such as the table top have been given a protective coating at the factory. This should be removed with a soft cloth and solvent (such as mineral spirits). Do not use an abrasive pad.

ELECTRICAL CONNECTIONS

WARNING: Electrical connections must be made by a qualified electrician. The machine must be properly grounded to help prevent electrical shock and possible death.

Before connecting power, make sure the electrical current of your power source matches the electrical system on the shaper.

To connect power, proceed as follows:

1. Remove two screws (A) and remove terminal strip cover (B). See Figure 8.
2. Remove clear plastic insulator (C) that covers the terminals. See Figure 9.
3. Insert power line through opening (D) of terminal strip box, shown in Figure 8.
4. Connect the three power lines to terminals L1, L2 and L3, as shown at (E) Figure 10. Also connect the green ground wire to terminal (F).
5. Reassemble the clear plastic insulator (C) and the terminal strip cover (B).

CAUTION: Make sure the incoming power matches the voltage on the motor plate.

6. When wiring is completed, tape all power box joints to keep out dust.

7. Turn the machine on and make sure the direction of the shaft rotation is correct. Looking down on the top of the spindle, the spindle should be turning counterclockwise as shown in Figure 11. If it is not, reverse any two incoming power leads.

WARNING: After connecting this machine to the power source, the terminal box is still electrified even while the power switch is shut off.

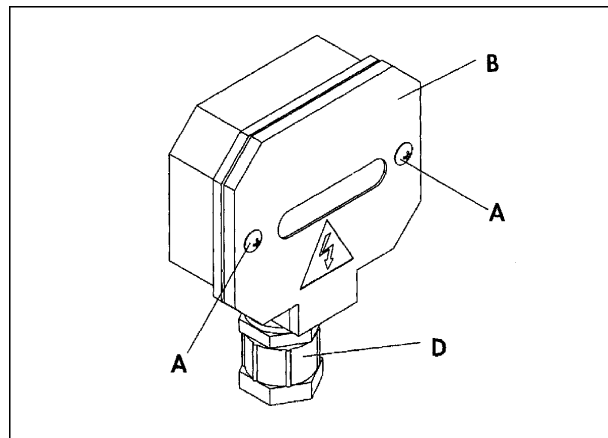


FIGURE 8

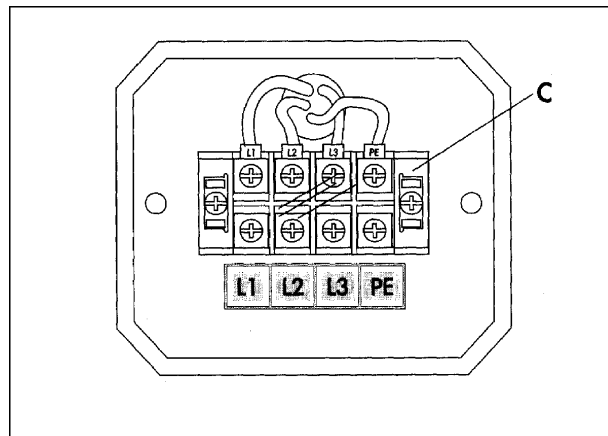


FIGURE 9

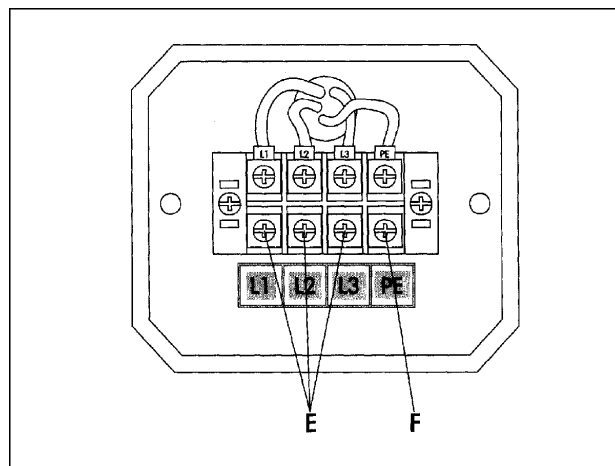


FIGURE 10

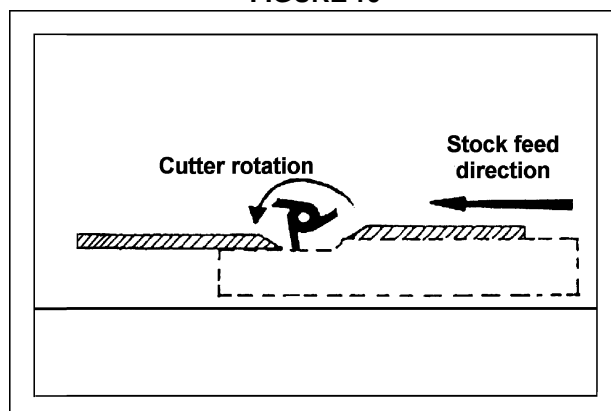


FIGURE 11

INTERCHANGEABLE SPINDLE INSTALLATION

One of the features of this machine is that it will accept interchangeable spindles with a drawbar or without a draw bar. Router bits can also be used on this shaper.

INTERCHANGEABLE SPINDLE WITH DRAWBAR

1. Disconnect the machine from the power source and remove the table inserts (NOTE: Removing the tilting insert is not necessary).
2. Raise the spindle shaft all the way up.
3. Thoroughly clean the taper of the interchangeable spindle and the internal taper of the shaft with a soft cloth moistened with kerosene or mineral spirits (do not use gasoline or lacquer thinner).
4. Thread the short threaded end of the draw bar (B) into the threaded hole in the bottom of the interchangeable spindle (A). See Figure 12. Remove the two lock nuts and the special bevel washer from the other end of the draw bar (B).
5. Carefully insert the draw bar (B) and spindle (A) down through the shaft as shown in Figure 12. Make sure the tang (C) on the spindle is engaged with the notch (D), and thread spindle nut (E) onto threads (F).
6. Engage spindle lock [refer to "Spindle Lock" on page 16].
7. Use the supplied spanner wrench (G), to tighten the spindle nut (E), shown in Figure 13.
8. Open the cabinet door and assemble the special bevel washer (H) to the bottom of the draw bar (B) as shown in Figure 14.
9. Assemble and securely tighten the two lock nuts (I) with a 19mm wrench. See Figure 14.
10. Disengage the spindle lock.

INSTALLING CUTTERS

1. Disconnect machine from power source and engage spindle lock.
2. Place cutter (A) and desired spindle collars (B) on the spindle as shown in Figure 15.
3. Install keyed washer (C) and tighten nut (D) using the supplied wrench.

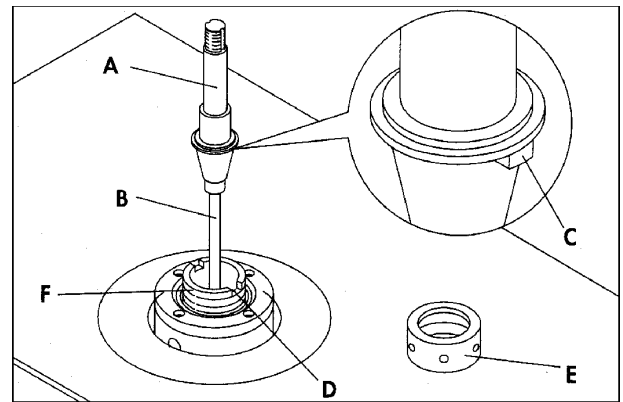


FIGURE 12

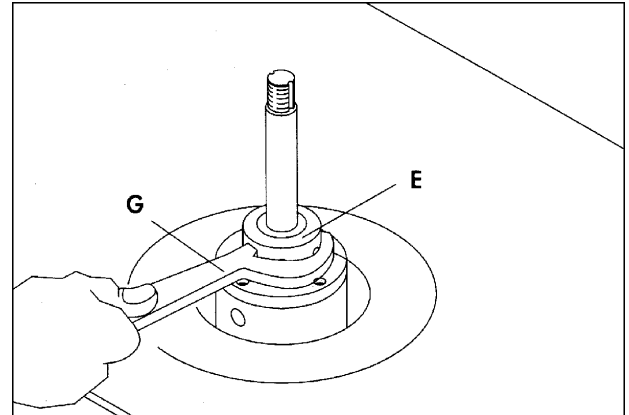


FIGURE 13

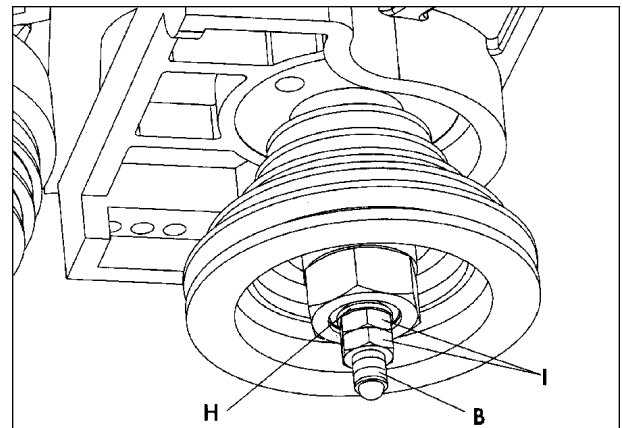


FIGURE 14

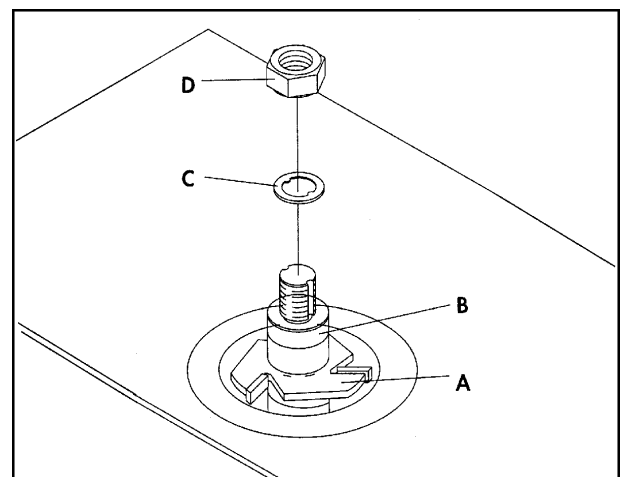


FIGURE 15

4. Disengage spindle lock before operating.

NOTE: Whenever possible, the cutter should be positioned on the spindle in such a way that the cut is being performed under the surface of the workpiece.

WARNING: Always place the "keyed" washer (C) on the spindle before threading the nut.

FENCE ASSEMBLY

1. Place fence body (A), shown in Figure 16, on the table. Mount the two fence locking handles (E) with washers, and secure fence to table using one of the two sets of holes on the table.

2. Fasten bar (B) to the front of the fence half using the locking lever (C) and washer, shown in Figure 17. Slide an aluminum fence (D) onto the bar. (NOTE: Right hand and left hand fences are slightly different.) Repeat for other side.

NOTE: Locking levers (C) are spring loaded and can be repositioned by pulling out the handle and rotating it on the nut.

3. Mount the cover plate (K) using the two locking knobs and flat washers, shown in Figure 16.

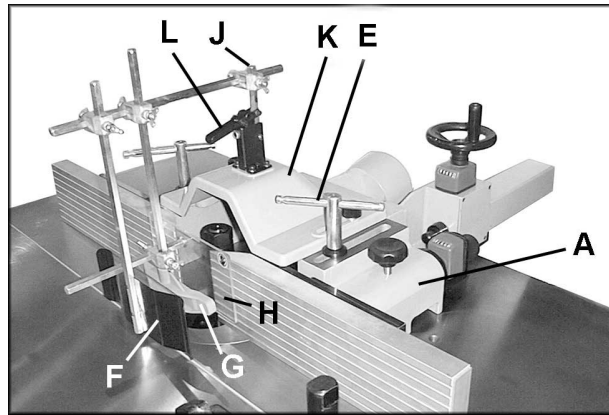


FIGURE 16

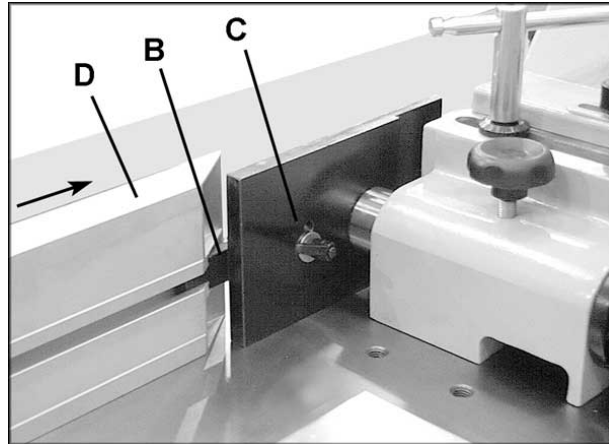


FIGURE 17

GUARD ASSEMBLY

The guard assembly can be mounted in various configurations, depending upon the type of work being done. Figure 16 shows one such configuration.

1. Mount the spring guard (F), hold-down (G) and clear plastic guard (H) to mounting rod (J) located on top of fence cover (K), using rod and clamps. The latch on the mounting rod (L) can be pushed down to help secure the guards in place.

2. The spring guard (F), hold-down (G) and clear plastic guard (H) can be flipped up out of the way when not in use or when making adjustments. Simply pull up the latch (L) and flip the entire assembly to the back.

DUST CHUTE

Mount the dust chute to rear edge of table using the two M5 x 10 screws and M5 flat washers. See Figure 18.

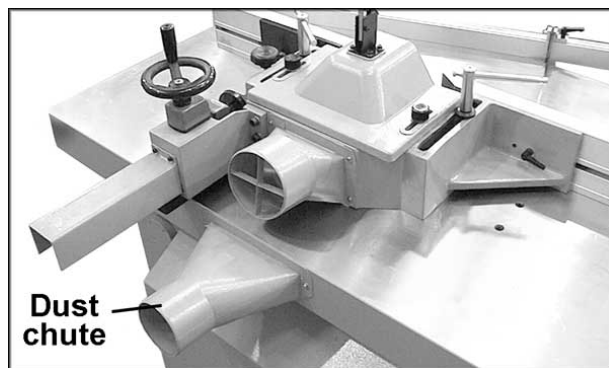


FIGURE 18

MITRE GAUGE & CLAMP

Mount mitre gauge and clamp to the sliding table as follows (Figure 19):

1. Insert post (A) of the clamp assembly down through hole (B) of the mitre gauge body (C), and thread post (A) into hole (D) of sliding table.
2. Insert shaft of locking handle (E) down through opening (F) of mitre gauge and thread shaft into hole (G) of sliding table.
3. The clamp (H), shown in Figure 20, is supplied with the mitre gauge to securely hold the workpiece when shaping small pieces across the grain. The clamp should be mounted as shown, and can be adjusted by loosening the screws (J).

MITRE FENCE

1. Slide the mitre fence (A) on to the two square nuts (B) that are attached to the threaded part of the locking levers (C). See Figure 21.
2. To slide mitre fence (A) to the left or right, loosen locking levers (C), slide fence (A) to the desired position and tighten locking levers (C). To change the angle of the fence loosen locking handle (D). A scale (E) is provided to indicate the mitre angle of the fence.
3. Loosen locking screw (I) and insert nut (J) of stock stop assembly into channel on end of fence as shown. See Figure 22.
4. Slide workstop (K) to desired position on fence and tighten locking screw (I), as shown in Figure 23.

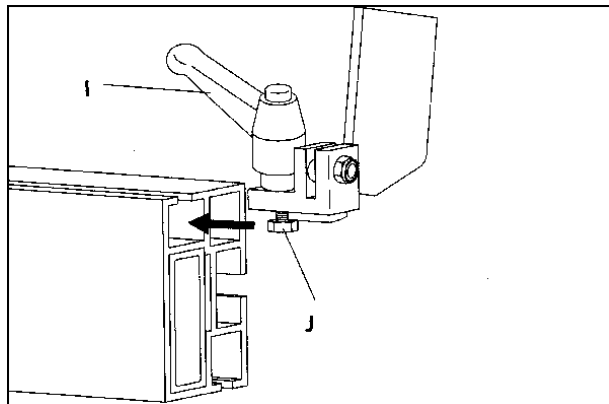


FIGURE 22

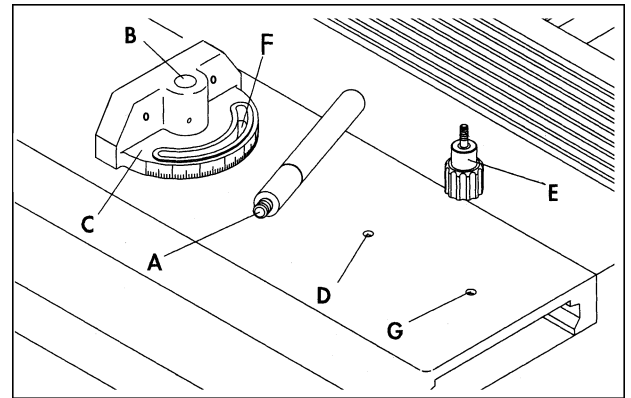


FIGURE 19

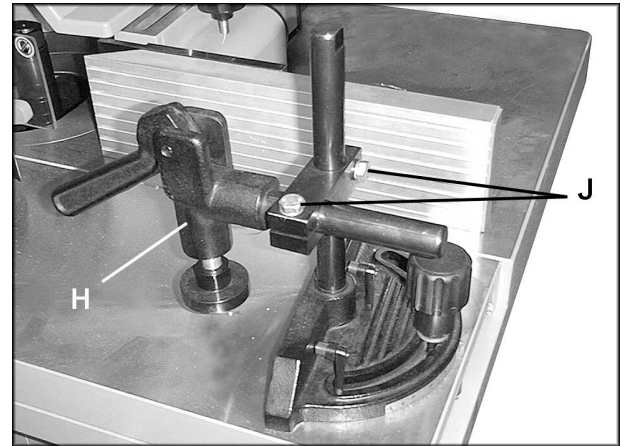


FIGURE 20

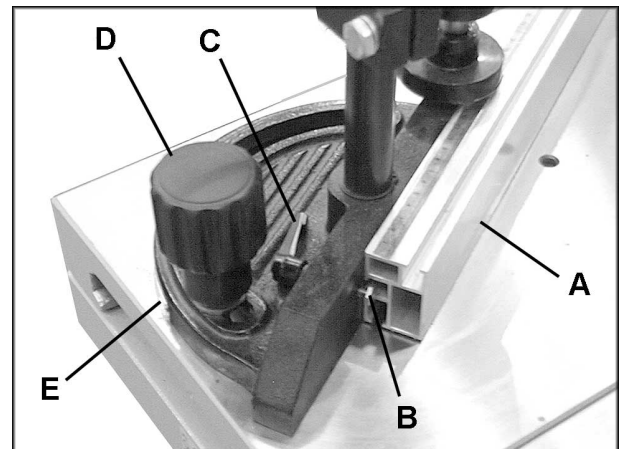


FIGURE 21

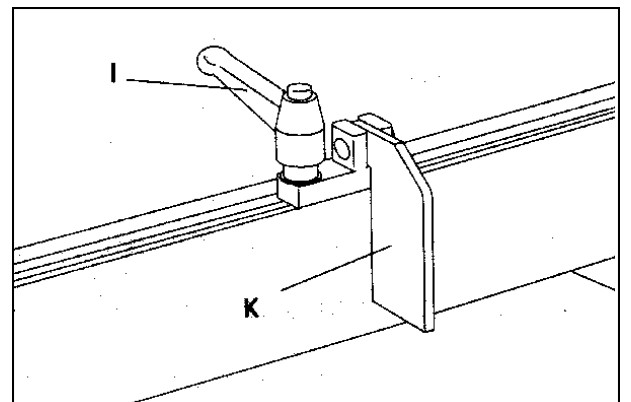


FIGURE 23

ADJUSTMENTS

Control Panel Instructions

The elements of the control panel are as follows:
(See Figure 24).

- A. power indicator
- B. on-off switch
- C. forward/reverse switch
- D. start indicator
- E. emergency stop

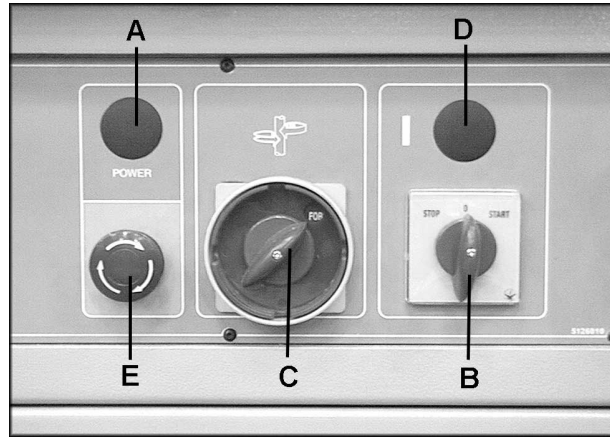


FIGURE 24

1. Make certain the spindle lock is disengaged as explained in the section "Spindle Lock" and that the cabinet door is closed. Be sure there is no conflict with the cutterhead, and that any bystanders are clear of moving parts.

2. Rotate the forward/reverse switch (C) to the desired setting. Rotate the start switch (B) to the right to start the machine. The start switch is magnetic; as soon as the machine is started, the switch will return to the center position as shown.

WARNING: Never attempt to reverse the rotation of the spindle while the motor/spindle is running.

3. To stop the machine, push the mushroom shaped stop button (E) or turn the start/stop switch (B) to the left.

CAUTION: Do not use the forward/reverse switch to stop the machine or damage to the electrical controls will occur.

WARNING: Open the electrical cabinet door only while the power is disconnected, or it may result in electrical shock.

SPEED CHANGE

Your machine is supplied with a 5-step motor pulley and a 5-step spindle pulley that provide spindle speeds of 3000, 4000, 6000, 8000 and 10000 RPM.

A speed chart, shown in Figure 25, is located on the inside of the front cabinet door for easy reference of the belt position on the pulleys for the five speeds available.

Check machine speed setting before operating. Make sure cutter meets or exceeds speed rating of tool. Figure 26 shows a chart for finding optimum speed range in relation to the cutter size. A similar chart can be seen on the front of the shaper, with indicator lights showing the current speed of rotation.

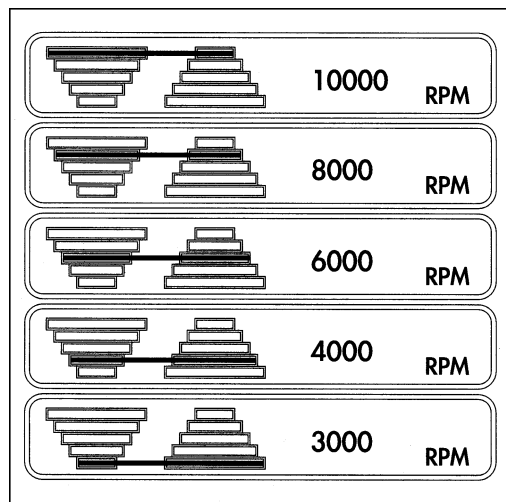


FIGURE 25

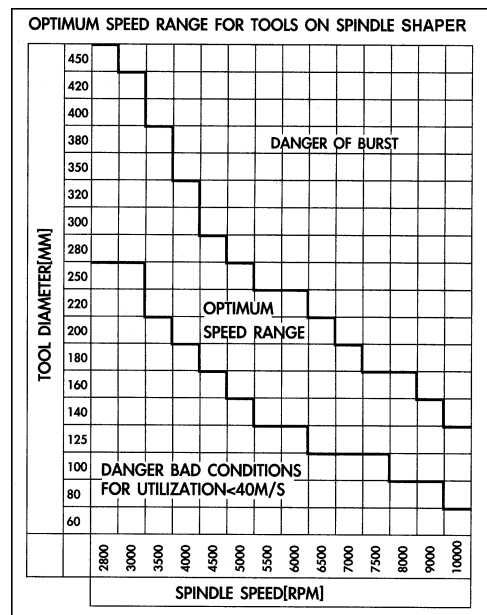


FIGURE 26

The cutting speed should always exceed 40 m/s to lessen risk of kickback but should not exceed 70 m/s to lessen the risk of tool damage.

To change the speed and adjust the proper belt tension, proceed as follows:

1. Disconnect machine from power source.
2. Open front cabinet door and move belt tension lever (A) to the right to loosen belt tension. See Figure 27.
3. Move the belt (B) to the desired position on the pulleys, while at the same time rotate the knob (C) on the speed indicator so that the belt will remain positioned in the cut-out in the speed bar.
4. When the belt is positioned properly, move the tension lever (A) to the left.

NOTE: During the first use after speed adjustment, the belt will settle and produce a slight decrease in tension. To obtain best tension, turn the two nuts (E & F - Figure 27).

Proper belt tension is achieved when the belt midway between the pulleys can be deflected using moderate finger pressure.

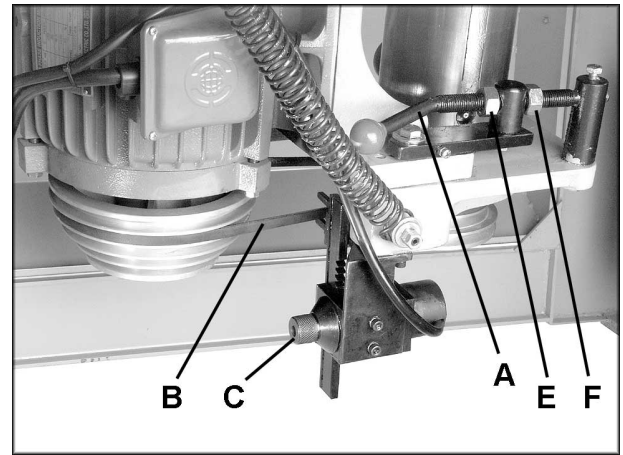


FIGURE 27

SPINDLE LOCK

The spindle lock will assist you in replacing the spindle or installing and removing cutters.

NOTE: The spindle lock can be engaged only when the machine has stopped completely.

Open rear cabinet door and rotate lock knob (A), shown in Figure 28, until the hole on the knob engages the pin. Turn pulley until the lock pin engages the spindle.

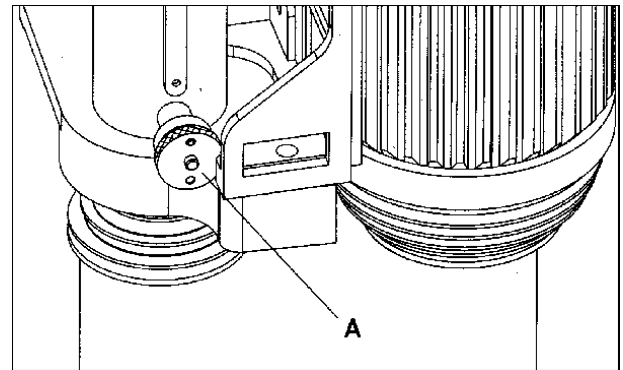


FIGURE 28

CAUTION: Make sure the spindle is unlocked before turning on the machine.

SPINDLE VERTICAL TRAVEL

1. Loosen handwheel lock (A), shown in Figure 29, and turn handwheel (B) counterclockwise to raise the spindle; clockwise to lower the spindle.

NOTE: One complete revolution of the handwheel moves the spindle up or down by .1" (2.5mm), as shown in the label beside the handwheel.

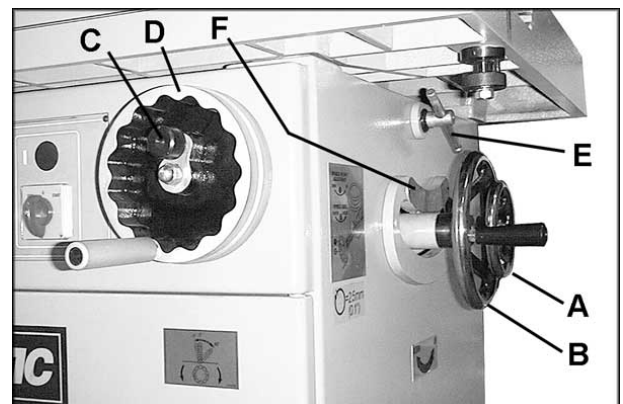


FIGURE 29

2. Re-tighten lock (A).

SPINDLE TILTING

The machine should come to a complete stop before the spindle is tilted, and the insert with the oval slot should be placed into the table. Make sure the cutter does not touch the table or the fence when in tilted position.

1. Loosen the knob (C) on the front handwheel (D). See Figure 29.
2. Loosen the two locking handles (E) on both sides of the machine.
3. Turn the handwheel (D) to the required tilting angle shown on the indicator (F).
4. Tighten the knob (C) and locking handles (E).

FENCE ADJUSTMENT

1. To adjust the aluminum fence halves endwise, loosen the two fence locking levers (C-Figure 17), slide the fence halves to the required positions and tighten locking levers.

CAUTION: The aluminum fence halves should be adjusted inward so that the opening at the spindle is just enough to clear the cutter.

2. The right fence half (infeed) can be moved independently, in or out, depending on the type of shaping operation that is being performed. See Figure 30. To move the right fence half in or out, loosen the locking knob (A) and turn the adjusting knob (B). Precise movements are possible by using the dial indicator beneath the knob. When finished, re-tighten locking knob (A).

3. The complete fence assembly can be rapidly positioned on the table by loosening two locking handles (C) and moving the fence assembly to desired position by rotating the handwheel (D). Use the dial indicator for more precise measurement. Re-tighten the handles (C) when finished.

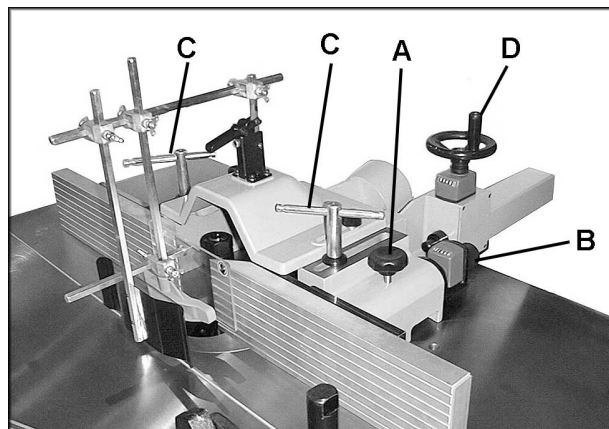


FIGURE 30

SLIDING TABLE ADJUSTMENT

There are six adjustable eccentric rollers (A) on the sliding table, shown in Figure 31. Whenever the table is unstable or not traveling in line, adjust the sliding table as follows:

1. Use open end wrench (B) to adjust the rollers.
2. Lock the rollers by using the hex wrench (C).

To operate the sliding table (F) pull out and rotate knob (D) until it stays in the out position as shown. The sliding table can then be moved back and forth.

To lock the sliding table, preventing it from moving, simply rotate knob (D) until the pin on the knob engages the hole underneath the table.

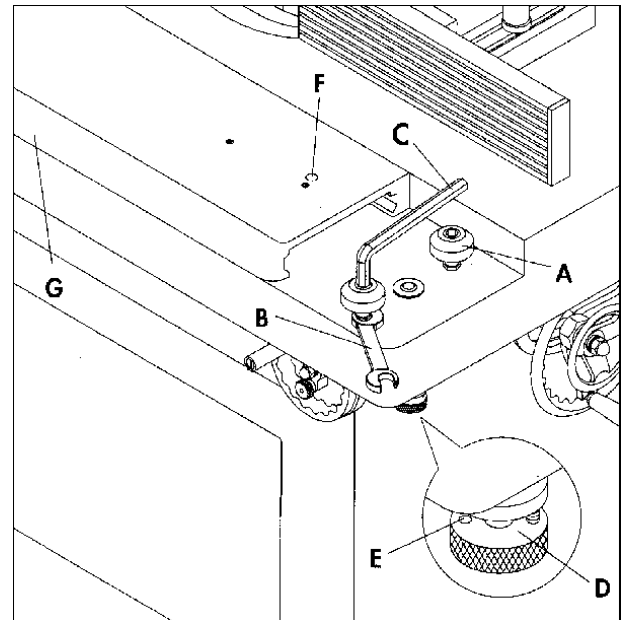


FIGURE 31

OPERATION

Using the fence is the safest and most satisfactory method of shaping, and it should always be used when the work permits. Almost all straight work can be done with the fence.

1. For normal work, where a portion of the original edge of the stock is not touched by the cutter, both the infeed and outfeed fences are in a straight line, as shown in Figure 32.

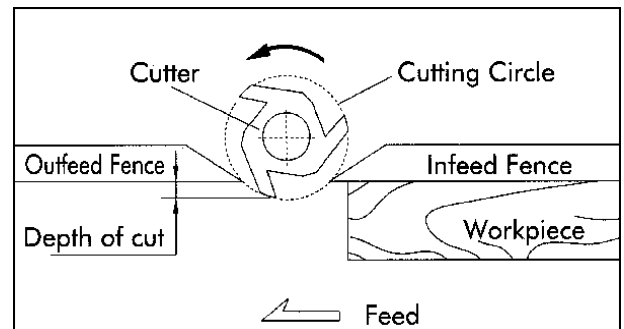


FIGURE 32

2. When the shaping operation removes the entire edge of the stock, e.g. in jointing or making a full bead, the shaped edge will not be supported by the outfeed fence when both fences are in line, as shown in Figure 33. In this case, the stock should be advanced to the position shown in Figure 33 and stopped. The outfeed fence should then be moved forward to contact the work, as shown in Figure 34. The outfeed fence will then be in line with the cutting circle, and the operation can continue.

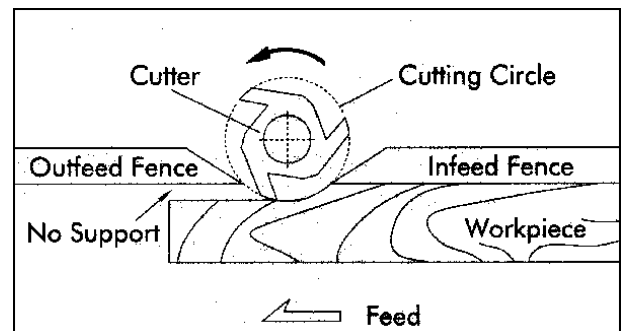


FIGURE 33

WARNING: Keep guards in place and in working order. Always use fence assembly when the work permits.

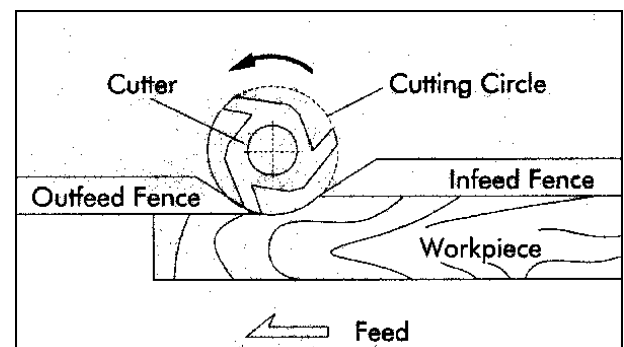


FIGURE 34

POSITION OF COLLARS

When shaping with collars, the collar must have sufficient bearing surface, as shown in Figure 35. Also the work must be fairly heavy relative to the cut being made. Under no circumstances should a short, light workpiece be shaped against the collars, as shown in Figure 36.

The collars may be used in any of the following positions: above, below, or between the cutters.

1. When the collar is used below the cutter, as shown in Figure 37, the progress of the cut can be seen throughout the operation. However, any accidental lifting of the work will gouge the wood and ruin the workpiece.

2. When the collar is used above the cutter, as shown in Figure 38, the cut can not be seen, but this method offers an advantage in that the cut is not affected by slight variations in the thickness of the stock. Also, accidental lifting of the workpiece will not gouge the workpiece; simply repeat the operation to correct the mistake.

3. Using the collar between two cutters has the advantages and disadvantages of the first two procedures, and is frequently used where both edges of the work are to be molded. See Figure 39.

NOTE: It is advisable to place the cutter as low as possible on the spindle to reduce spindle deflection and ensure the best possible finish. Also make sure that the contacting surfaces of the cutter are smooth, sharp, clean and without dents.

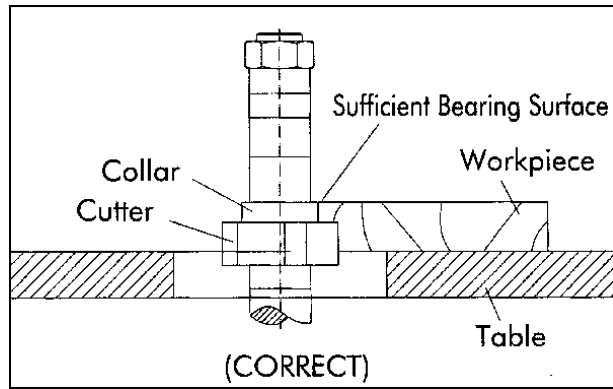


FIGURE 35

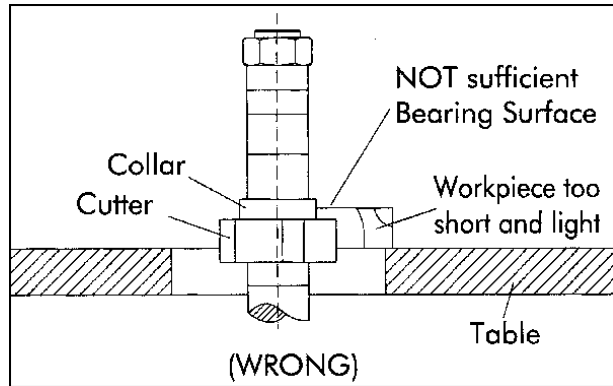


FIGURE 36

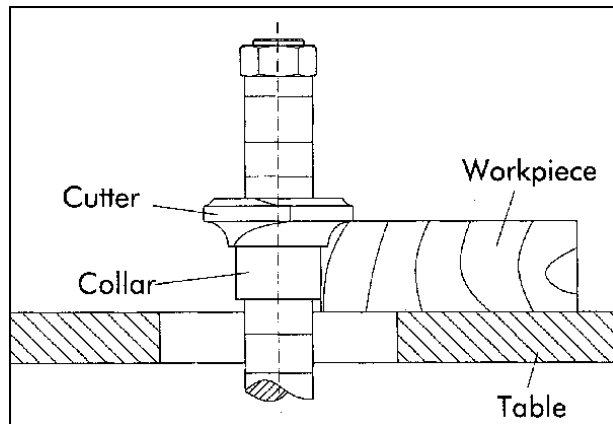


FIGURE 37

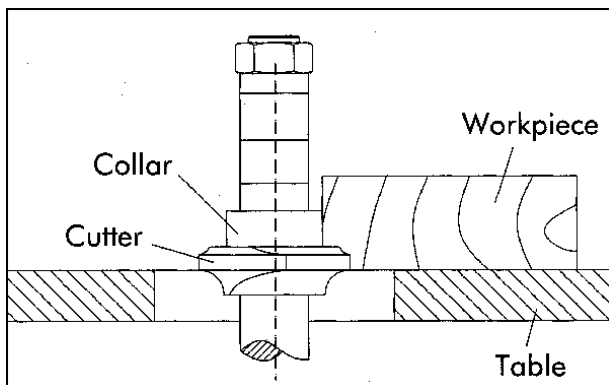


FIGURE 38

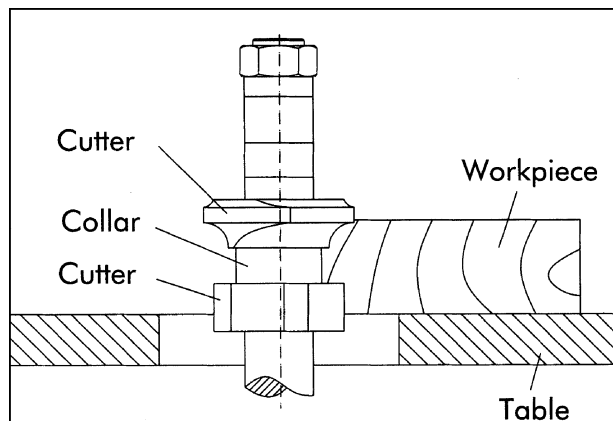


FIGURE 39

COPYING (MACHINING WITH A JIG)

When using the same procedure on multiple workpieces, a jig or template can be made to facilitate the operation:

1. Prepare the jig (A) to accommodate your original workpiece. See Figure 40.
2. Place the jig (A) against the table ring guide shoulder (B).
3. Fasten the new workpiece (C) on the jig (A) with the clamp (D) and push the assembly past the cutter.

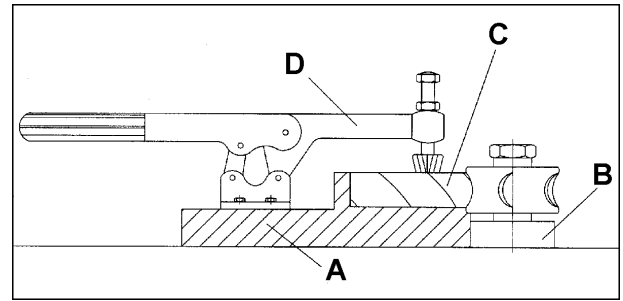


FIGURE 40

FEEDING STOCK

Stock feeders are available from Powermatic. These units mount to the shaper table, and will help ensure smooth, consistent feed of material, as well as keep hands safely away from the cutterhead.

- 1790800 3-Wheel Powerfeeder, 1HP, 3Ph, 230V
- 1790810 3-Wheel Powerfeeder, 1HP, 3Ph, 460V
- 1790811 4-Wheel Powerfeeder, 1HP, 3Ph, 230V

MAINTENANCE

Periodically clean the inside of the machine of shavings and dust. This will increase machine performance and extend its life.

Clean the spindle with compressed air.

Do not get oil on the pulleys and belts. If they are dirty, use paper or a soft rag to clean and dry them. Never place the v-belt under excessive strain, as this can overload the motor and damage the bearings, spindle or belt.

The table surface must be kept clean and free of rust for best results. Some users prefer a paste wax coating. Another option is talcum powder applied with a blackboard eraser rubbed in vigorously once a week; this will fill casting pores and form a moisture barrier. This method provides a table top that is slick and allows rust rings to be easily wiped from the surface. Important also is the fact that talcum powder will not stain wood or mar finishes as wax pickup does.

Lubrication

Apply a drop of light machine oil occasionally on the ledge and wall of the table opening to facilitate the changing of table inserts.

The bearings in the motor are sealed for life and do not require lubrication.

The spindle bearing should be lubricated every 200 hours of use by using the grease gun (A) supplied. See Figure 41. Two grease fittings, one of which (B) is shown, are supplied on the spindle housing for this purpose. The other grease fitting is directly opposite fitting (B). Before lubricating, clean grease fittings (B) thoroughly and then lubricate the spindle bearings with two pumps of a good quality, non-hardening grease.

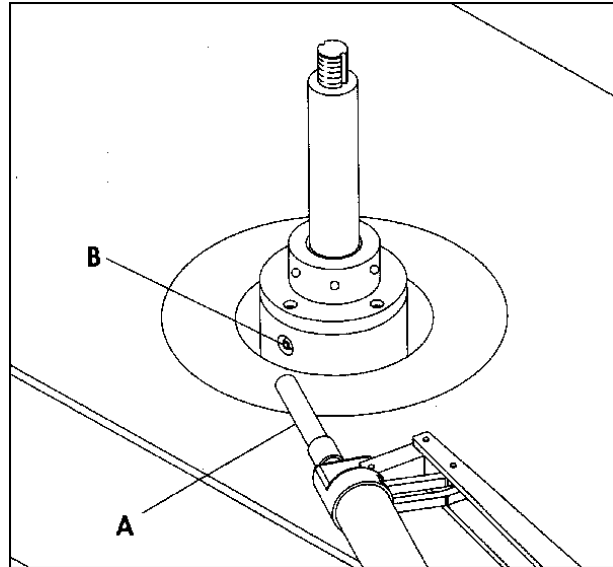


FIGURE 41

Trouble-Shooting for Model TS29 Shaper

PROBLEM	POSSIBLE CAUSE	SOLUTION [with page #]
Machine will not start.	<ol style="list-style-type: none"> 1. Faulty switch. 2. Cord damaged. 3. Not connected to power source. 4. Connected to wrong voltage. 5. Fuse blown or circuit breaker tripped at incoming power source. 	<ol style="list-style-type: none"> 1. Replace switch. 2. Have cord replaced by authorized service person. 3. Check connection. 4. Check voltage. 5. Replace fuse, reset breaker.
Overload kicks out frequently.	<ol style="list-style-type: none"> 1. Extension cord too light or too long. 2. Feeding stock too fast. 3. Cutter is dull or has gum on it. 	<ol style="list-style-type: none"> 1. Replace with adequate size cord. 2. Feed stock more slowly. 3. Clean or replace cutter.
Tool does not come up to speed.	<ol style="list-style-type: none"> 1. Extension cord too light or too long. 2. Low current. 3. Motor not wired for correct voltage. 4. Spindle is locked. 	<ol style="list-style-type: none"> 1. Replace with adequate size cord. 2. Contact local electric company. 3. Refer to motor nameplate for correct wiring. 4. Release spindle lock knob.
Machine makes unsatisfactory cuts.	<ol style="list-style-type: none"> 1. Dull cutter. 2. Gum or pitch on cutter. 3. Gum or pitch on table causing erratic feed. 4. Feeding work in wrong direction. 	<ol style="list-style-type: none"> 1. Replace cutter. [11] 2. Remove cutter and clean with turpentine and steel wool. 3. Clean table with turpentine and steel wool. 4. Feed work against cutter rotation. [5]
Stock burns.	<ol style="list-style-type: none"> 1. Dull cutter. 2. Cutter too deep. 3. Forcing work. 	<ol style="list-style-type: none"> 1. Sharpen by honing on flat side. 2. On hardwoods take light cuts; attain full depth of cut with several passes. 3. Feed slowly and steadily.
Machine vibrates excessively.	<ol style="list-style-type: none"> 1. Damaged tool. 2. Stand or bench on uneven floor. 3. Bad v-belt. 4. V-belt not tensioned correctly. 5. Bent pulley. 6. Improper motor mounting. 	<ol style="list-style-type: none"> 1. Replace tool. 2. Reposition on flat, level surface. 3. Replace belt. 4. Adjust belt tension. [15] 5. Replace pulley. 6. Check and adjust motor mounting.
Edge splits off on cross-grain cut.	Characteristic of cut.	<ol style="list-style-type: none"> 1. Make cross-grain cuts first then finish with grain. 2. Use scrap block to support at end of cut.
Raised areas on shaped edge.	Variation in pressure which holds work against cutter.	<ol style="list-style-type: none"> 1. Keep work firmly against fence or collars throughout pass. 2. Use hold-downs or stock feeder. [13]
Work pulled from hand of cut	No support.	<ol style="list-style-type: none"> 1. Use mitre gauge with clamp or hold-down to start cut when shaping free-hand; hold work firmly against fence. 2. Adjust the tension of spring plate.

Trouble-Shooting for Model TS29 Shaper

PROBLEM	POSSIBLE CAUSE	SOLUTION [with page #]
Depth of cut not uniform.	<ol style="list-style-type: none">1. Misalignment.2. Side pressure not uniform.	<ol style="list-style-type: none">1. Adjust outfeed fence.2. Use hold-downs or stock feeder; keep pressure against fence or collars consistent.
Variation in height of cut.	<ol style="list-style-type: none">1. Variation in pressure which holds work down on table.2. Vertical lock not engaged.	<ol style="list-style-type: none">1. Keep pressure firm throughout pass, use hold-downs; make pass slowly and steadily. Whenever possible, keep cutter under stock. [19]2. Engage spindle lock. [18]
Cuts not smooth.	<ol style="list-style-type: none">1. Wrong R.P.M.2. Feeding too fast.3. Working against grain.4. Cutting too deep.	<ol style="list-style-type: none">1. Use faster speed.2. Pass stock more slowly.3. Work with grain whenever possible.4. On very deep cuts make several passes.
Spindle does not raise freely.	Sawdust and dirt in raising mechanisms.	Brush or blow out loose dust and dirt.

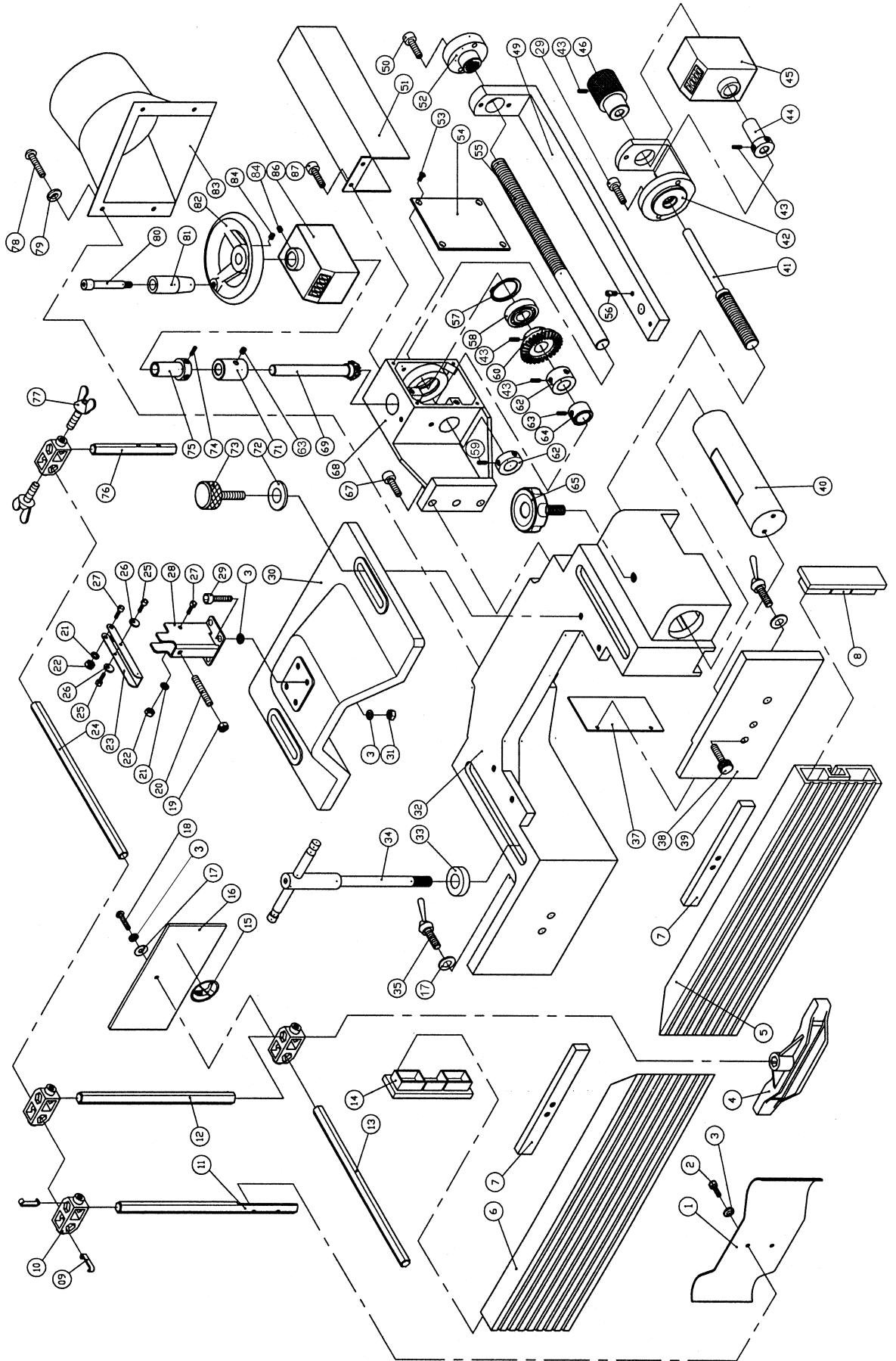
Parts List: Fence Assembly (TS29 Shaper)

No.	Part No.	Description	Quantity
1	TS29-001	Spring Guard	1
2	TS-1503021	Socket Head Cap Screw, M6 x 10	1
3	TS-236106	Lock Washer, M6	9
4	TS29-002	Hold-down	1
5	TS29-003	Fence R.H.	1
6	TS29-004	Fence L.H.	1
7	TS29-005	Slide Bar	2
8	TS29-006	Fence End Cap R.H.	1
9	TS29-007	Clip	8
10	TS29-008	Post Clamp Block	4
11	TS29-009	Vertical Hex Post	1
12	TS29-010	Vertical Hex Post	1
13	TS29-011	Horizontal Hex Post - Short	1
14	TS29-012	Fence Cap L.H.	1
15	TS29-013	Warning Label, for TS29 shield	1
16	TS29-014	Clear Shield	1
17	TS-1550061	Flat Washer, M8	5
18	TS-1534052	Pan Head Phillips Machine Screw, M6 x 20	1
19	TS-1540061	Hex Nut, M8	1
20	TS29-195	Hex Socket Set Screw, M8 x 35	1
21	TS-236105	Lock Washer, M5	2
22	TS-1541011	Lock Nut, M5	2
23	TS29-015	Latch Handle	1
24	TS29-016	Horizontal Hex Post - Long	1
25	TS-1502021	Socket Head Cap Screw, M5 x 10	2
26	TS29-017	Cam Washer	2
27	TS-1502061	Socket Head Cap Screw, M5 x 25	2
28	TS29-018	Guard Support Bracket	1
29	TS-1503051	Socket Head Cap Screw, M6 x 20	6
30	TS29-019	Fence Cover Plate	1
31	TS-1540041	Hex Nut, M6	2
32	TS29-020	Fence Body Casting	1
33	TS29-021	Beveled Flat Washer, M14	2
34	TS29-022	Lock Handle	2
35	TS29-023	Lock Lever, M10 x 35	2
37	TS29-024	Cover Plate	1
38	TS-1503071	Socket Head Cap Screw, M6 x 30	2
39	TS29-025	Fence Back Plate	1
40	TS29-026	Fence Ram	1
41	TS29-027	Fence Adjustment Screw	1
42	TS29-028	Housing	1
43	TS-1524011	Socket Set Screw, M8 x 8	7
44	TS29-029	Bushing	1
45	TS29-030	Lower Dial Indicator	1
46	TS29-031	Adjustment Knob	1
49	TS29-032	Fence Guide	1
50	TS-1503061	Socket Head Cap Screw, M6 x 25	2
51	TS29-033	Worm Cover	1
52	TS29-034	Worm Guide	1
53	TS-1512011	Socket Head Flat Screw, M4 x 10	4
54	TS29-035	Worm Base Cover	1
55	TS29-036	Worm Shaft	1
56	TS29-199	Fence Locating Pin	2

Parts List: **Fence Assembly (TS29 Shaper)** continued

No.	Part No.	Description	Quantity
57	TS29-037	Retaining Ring	1
58	BB-6204	Ball Bearing 6204	1
60	TS29-038	Bevel Gear	1
62	TS29-039	Retainer	1
63	TS-1524041	Socket Set Screw, M8 x 16	2
64	TS29-040	Retainer, R42	1
65	TS29-041	Lock Knob, M12	1
67	TS-1505041	Socket Head Cap Screw, M10 x 30	3
68	TS29-042	Worm Base	1
69	TS29-043	Bevel Gear	1
71	TS29-044	Collar	1
73	TS29-045	M8 Knob w/Stud	2
74	TS29-196	Socket Set Screw, M5 x 4	1
75	TS29-046	Bushing	1
76	TS29-047	Vertical Hex Post	1
77	TS29-048	Thumb Screw, M8 x 17	8
78	TS-1533042	Pan Head Phillips Machine Screw, M5 x 12	4
79	TS-1550031	Flat Washer, M5	4
80	TS29-049	Bolt	1
81	TS29-050	Swivel Handle	1
82	TS29-051	Handwheel	1
83	TS29-052	Dust Port	1
84	TS-1523011	Socket Set Screw, M6 x 6	2
86	TS29-053	Upper Dial Indicator	1
87	TS-1502031	Socket Head Cap Screw, M5 x 12	2

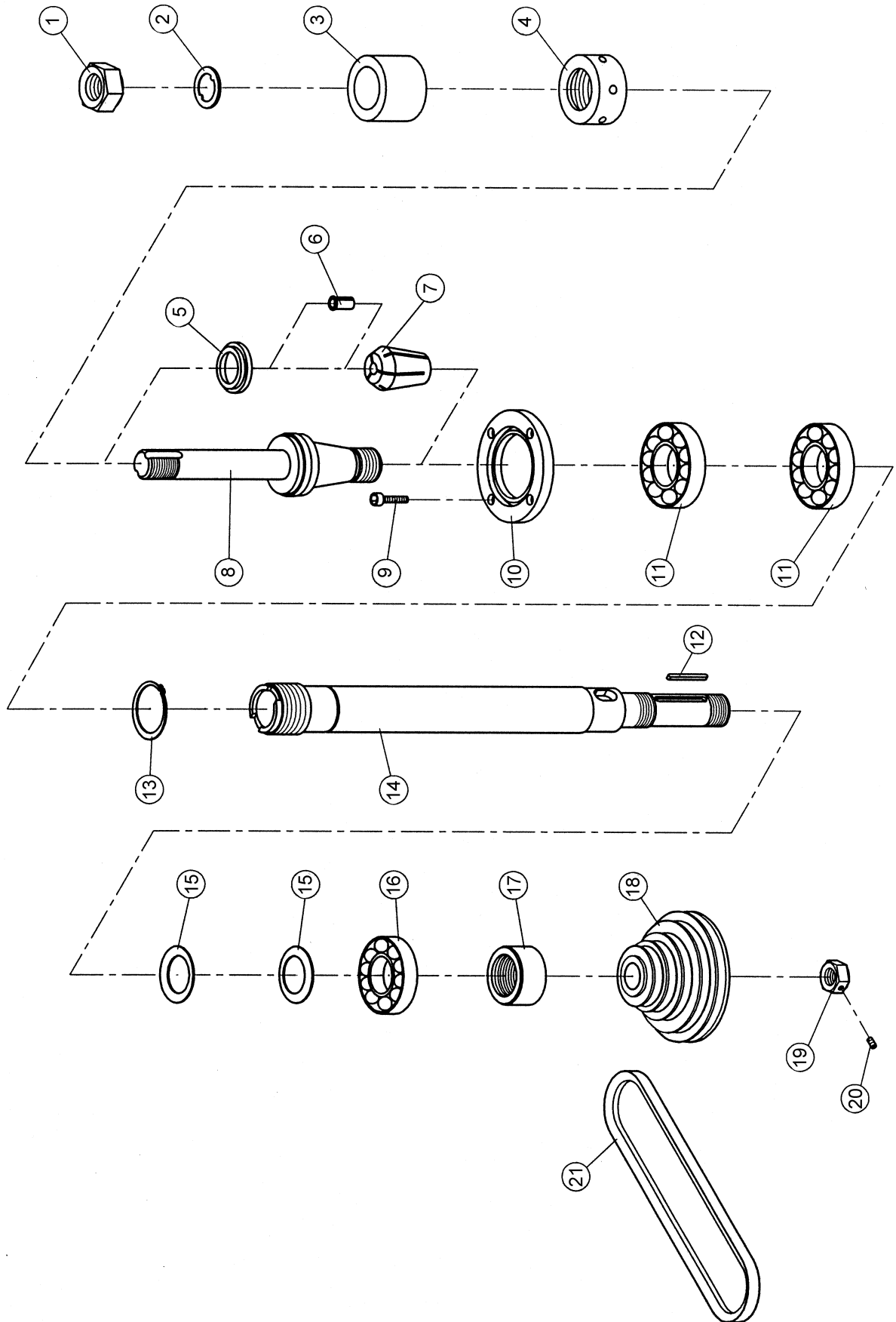
Fence Assembly (TS29 Shaper)



Parts List: Spindle Assembly (TS29 Shaper)

No.	Part No.	Description	Quantity
1	6293033	Spindle Nut, 3/4	1
	6293034	Spindle Nut, 1	1
	6293035	Spindle Nut, 1-1/4	1
2	TS29-054	Keyed Washer, 3/4	1
	TS29-055	Keyed Washer, 1	1
	TS29-056	Keyed Washer, 1-1/4	1
3	TS29-057	Spacer, 3/4 (Set of 8 pcs.)	1
	TS29-058	Spacer, 1 (Set of 8 pcs.)	1
	TS29-059	Spacer, 1-1/4 (Set of 8 pcs.)	1
4	6293040	Retainer Nut, 1-1/4	1
5	6293041	Collet Nut, 1-1/4	1
6	6293042	Bushing, 1/4	1
7	6293043	Collet Chuck, 1/2	1
8	TS29-060	Interchangeable Spindle, 3/4	1
	TS29-061	Interchangeable Spindle, 1	1
	TS29-062	Interchangeable Spindle, 1-1/4	1
9	TS-1502041	Socket Head Cap Screw, M5 x 16	4
10	TS29-063	Plate	1
11	BB-6008Z	Bearing 6008Z	2
12	TS29-064	Key, M6 x 54	1
13	TS29-065	Retaining Ring, S40	1
14	TS29-066	Spindle	1
15	TS29-067	Spring Disk, 61.5 x 40.5 x 0.7	2
16	BB-6206Z	Bearing 6206Z	1
17	TS29-068	Spacer	1
18	TS29-069	Spindle Pulley	1
19	TS29-070	Pulley Nut	1
20	TS-1523011	Socket Set Screw, M6 x 6	1
21	TS29-200	Belt, 3V x 375	1
	TS29-071	3/4" Interchangeable Spindle Assembly (Items 1, 2, 3, 8)	
	TS29-072	1" Interchangeable Spindle Assembly (Items 1, 2, 3, 8)	
	TS29-073	1-1/4" Interchangeable Spindle Assembly (Items 1, 2, 3, 8)	
	TS29-074	Collet Chuck w/Bushing Assembly (Items 5 thru 7)	

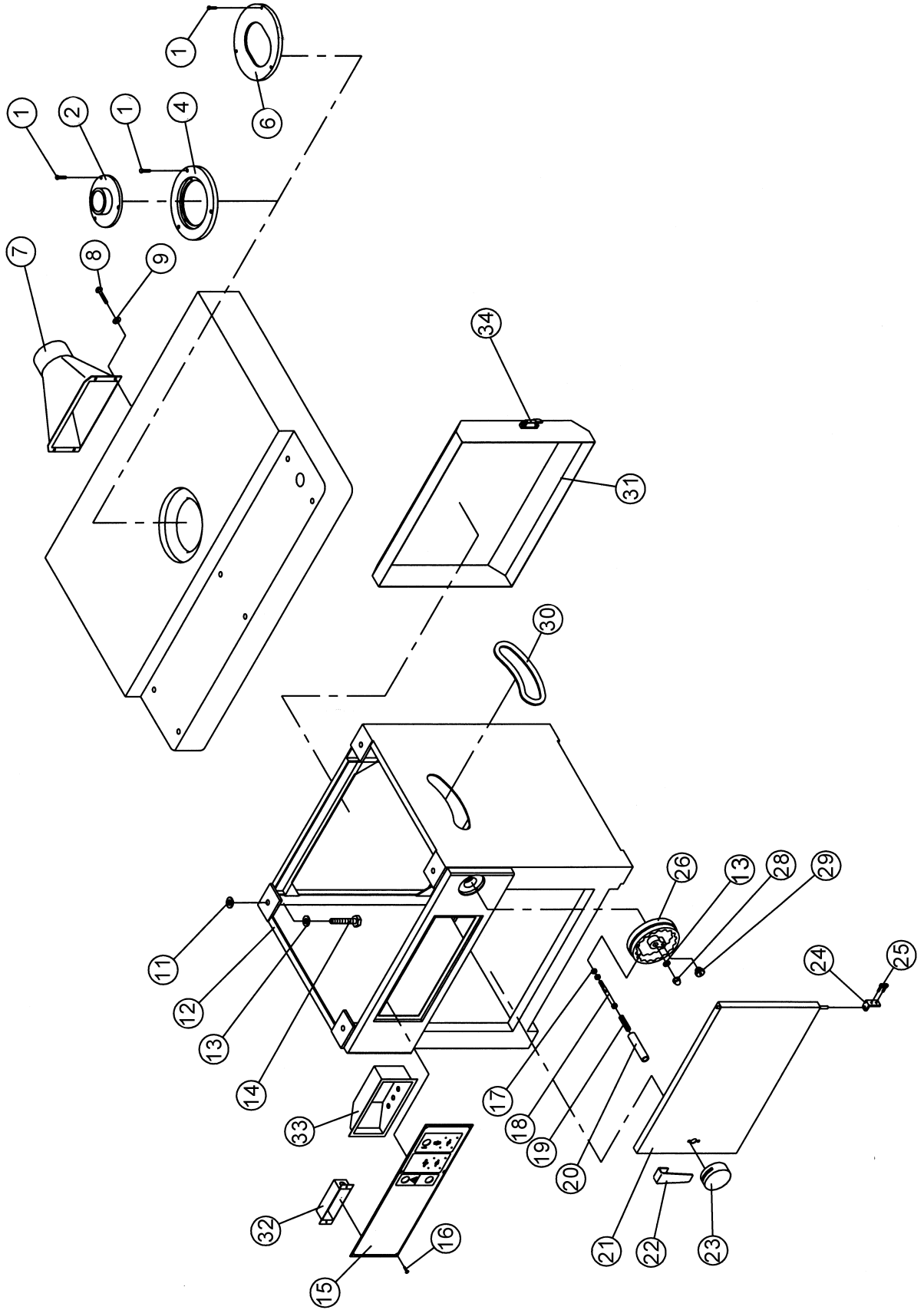
Spindle Assembly (TS29 Shaper)



Parts List: **Cabinet Assembly** (TS29 Shaper)

No.	Part No.	Description	Quantity
1	TS-1502041	Socket Head Cap Screw, M5 x 16	9
2	TS29-075	Table Insert, 2-1/2" I.D.	1
4	TS29-076	Table Insert, 5-1/2" I.D.	1
6	TS29-077	Table Insert (Tilting)	1
7	TS29-078	Dust Chute	1
8	TS-1533032	Pan Head Phillips Machine Screw, M5 x 10	4
9	TS-1550031	Flat Washer, M5	4
11	TS-2360121	Flat Washer, M12	4
12	TS29-079	Cabinet	1
13	TS-236112	Lock Washer, M12	5
14	TS-2211451	Hex Cap Screw, M12 x 45	4
15	TS29-080	Control Panel	1
16	TS-2244102	Pan Head Phillips Machine Screw, M4 x 10	3
17	TS-154007	Hex Nut, M10	2
18	TS29-081	Fixed Screw	1
19	TS29-082	Spring	1
20	TS29-083	Knob	1
21	TS29-084	Front Cabinet Door	1
22	TS29-085	Front Door Handle	1
23	TS29-086	Latch Assembly	1
24	TS29-087	Hinge Bracket	1
25	TS-1502021	Socket Head Cap Screw, M5 x 10	2
26	TS29-088	Handwheel	1
28	TS-231121	Cap Nut, M12	1
29	TS29-089	Knob w/Stud	1
30	TS29-090	Tilting Scale Base	1
31	TS29-091	Rear Cabinet Door	1
32	TS29-092	Plastic Switch Cover	1
33	TS29-093	Speed Indicator Cover	1
34	TS29-094	Rear Door Latch Assembly	1

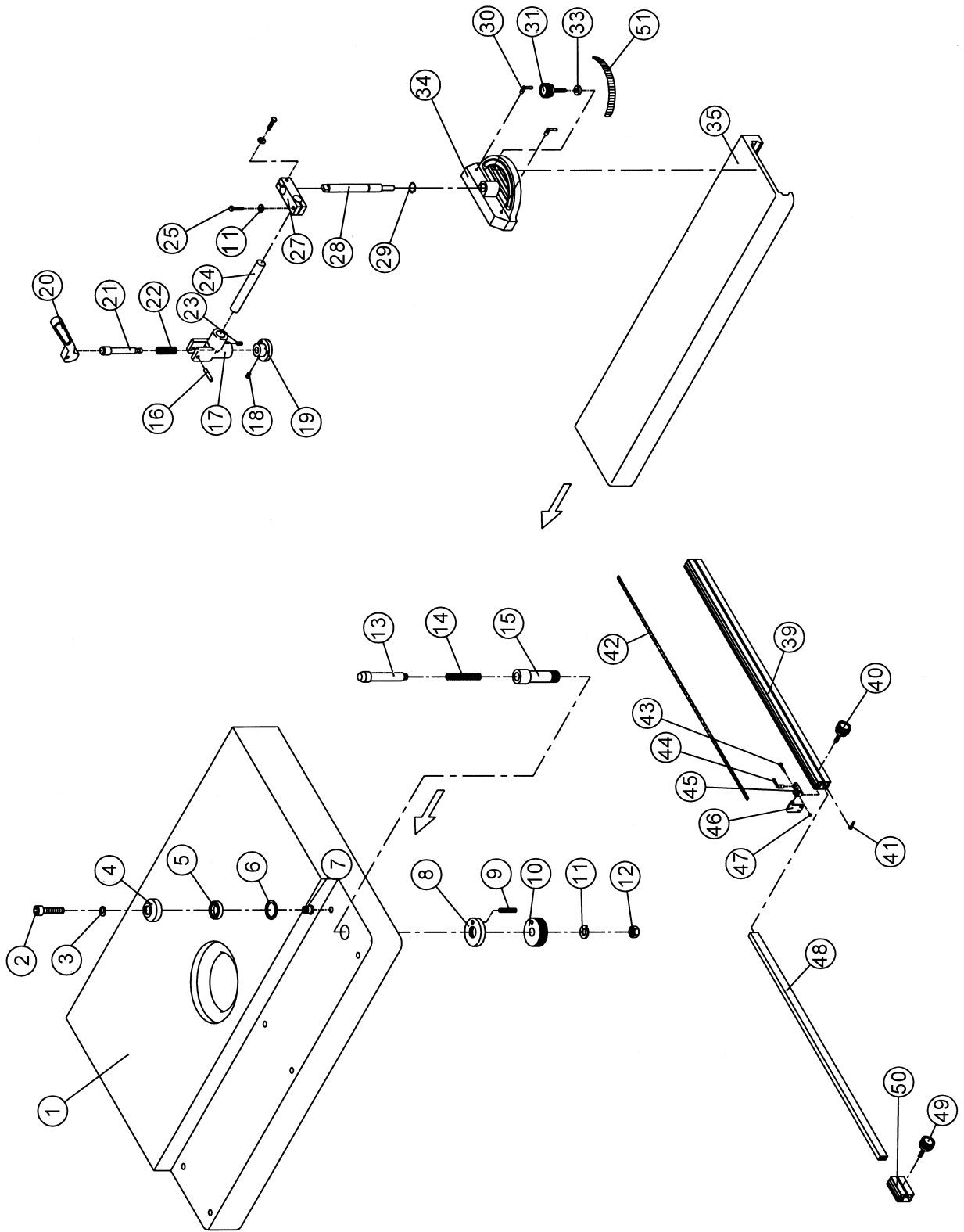
Cabinet Assembly (TS29 Shaper)



Parts List: **Sliding Table Assembly** (TS29 Shaper)

No.	Part No.	Description	Quantity
1	TS29-095	Main Table	1
2	TS-1504101	Socket Head Cap Screw, M8 x 50	6
3	TS29-096	Ring Nut	6
4	TS29-097	Bearing Race	6
5	BB-6004ZZ	Ball Bearing 6004ZZ	6
6	TS29-098	Retaining Ring, R42	6
7	TS29-099	Bushing	6
8	TS29-100	Nut	1
9	TS29-197	Socket Set Screw, M5 x 30	1
10	TS29-101	Lock Ring	1
11	TS-236110	Lock Washer, M10	3
12	TS-1540072	Hex Nut, M10	1
13	TS29-102	Table Lock Pin	1
14	TS29-103	Spring	1
15	TS29-104	Housing	1
16	TS29-105	Roll Pin	1
17	TS29-106	Clamp Casting	1
18	TS-1523041	Socket Set Screw, M6 x 12	1
19	TS29-107	Plunger Pad	1
20	TS29-108	Locking Arm	1
21	TS29-109	Plunger	1
22	TS29-110	Spring	1
23	TS-1524031	Socket Set Screw, M8 x 12	1
24	TS29-111	Horizontal Post	1
25	TS-149105	Hex Cap Screw, M10 x 35	2
27	TS29-112	Post Clamp	1
28	TS29-113	Vertical Post	1
29	TS29-114	Retaining Ring, S25	1
30	TS29-115	Lock Lever, M6	2
31	TS29-116	Knob, M10	1
33	TS-1550071	Flat Washer, M10	1
34	TS29-117	Mitre Gauge Body	1
35	TS29-118	Sliding Table	1
39	TS29-119	Aluminum Fence	1
40	TS29-120	Knob w/ Stud	1
41	TS-1482071	Hex Cap Screw, M6 x 35	1
42	TS29-121	Scale	1
43	TS-1481061	Hex Cap Screw, M5 x 25	1
44	TS29-122	Lock Lever	1
45	TS29-123	Sliding Block	1
46	TS29-124	Stop Plate	1
47	TS-1540031	Hex Nut, M5	1
48	TS29-125	Extension Bar	1
49	TS29-126	Knob w/ Stud	1
50	TS29-127	Support Fence	1
51	TS29-128	Scale	1

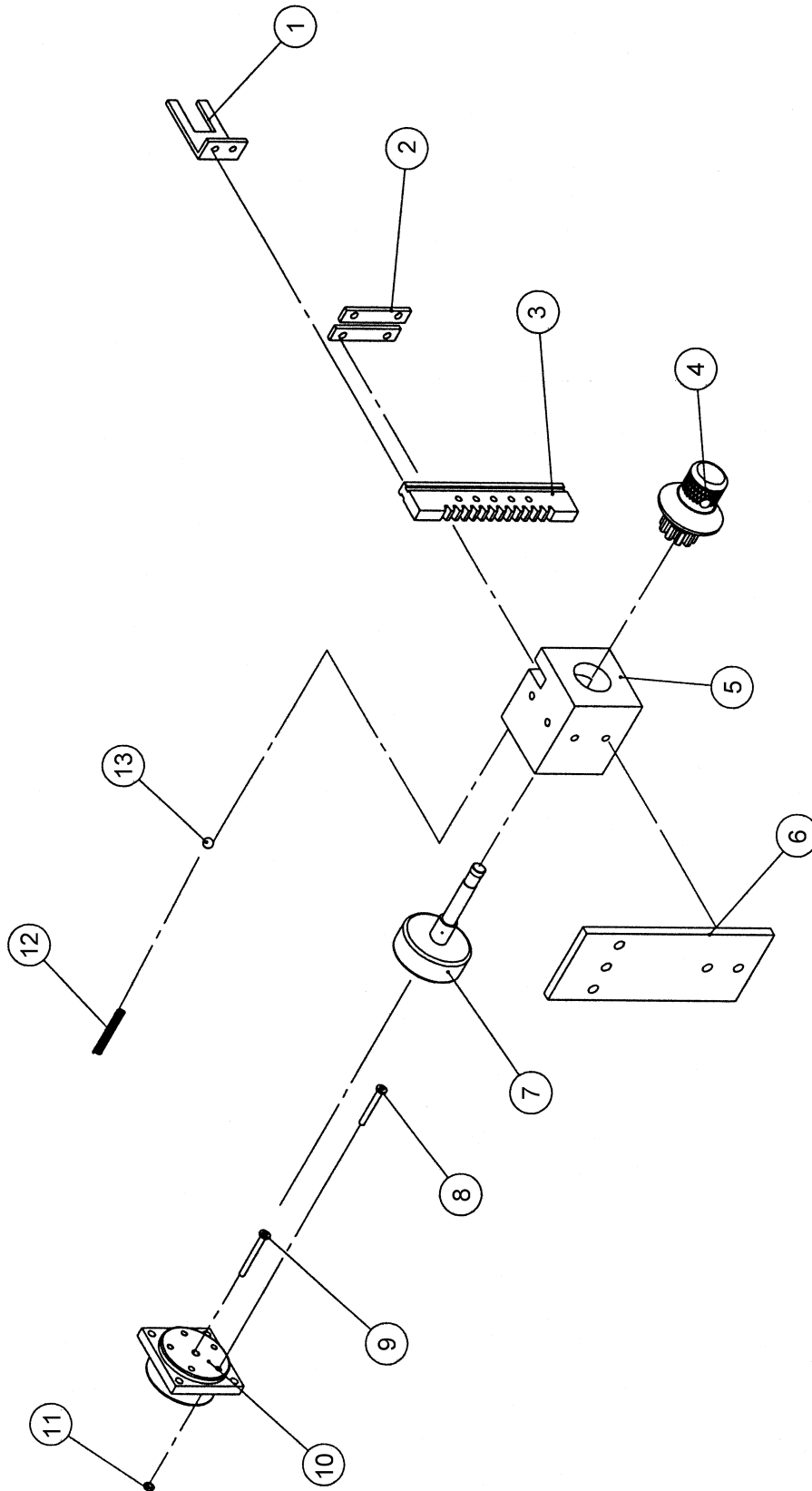
Sliding Table Assembly (TS29 Shaper)



Parts List: **Speed Indicator (TS29 Shaper)**

No.	Part No.	Description	Quantity
1	TS29-129	Belt Fork	1
2	TS29-130	Fork Slide	2
3	TS29-131	Rack	1
4	TS29-132	Gear	1
5	TS29-133	Block	1
6	TS29-134	Mount Bracket	1
7	TS29-135	Sensor	1
8	TS29-201	Pan Head Machine Screw, 5/32 x 1-1/4 Lg	5
9	TS29-202	Pan Head Machine Screw, 5/32 x 1-1/2 Lg	1
10	TS29-136	Terminal	1
11	TS29-203	Hex Nut, 5/32	13
12	TS29-137	Spring	1
13	TS29-138	Steel Ball, 1/4	1

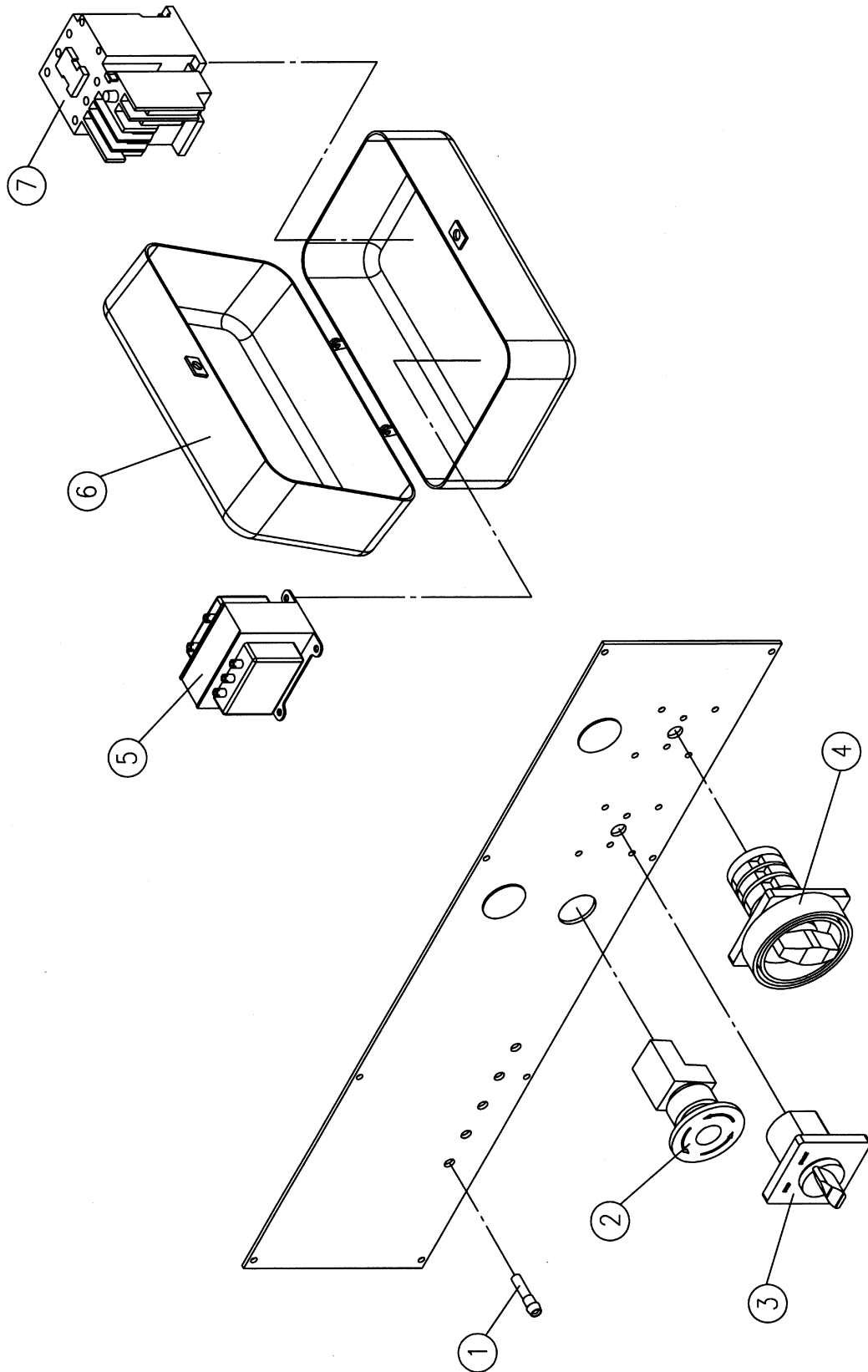
Speed Indicator (TS29 Shaper)



Parts List: **Electrical Components** (TS29 Shaper)

No.	Part No.	Description	Quantity
1	TS29-139	Speed Indicator Light.....	5
2	TS29-140	Stop Button	1
3	TS29-141	Start Switch	1
4	TS29-142	Forward/Reverse Switch	1
5	TS29-143	Transformer	1
6	TS29-144	Control Box	1
7	TS29-145	Magnetic Starter w/Overload Relay	1

Electrical Components (TS29 Shaper)



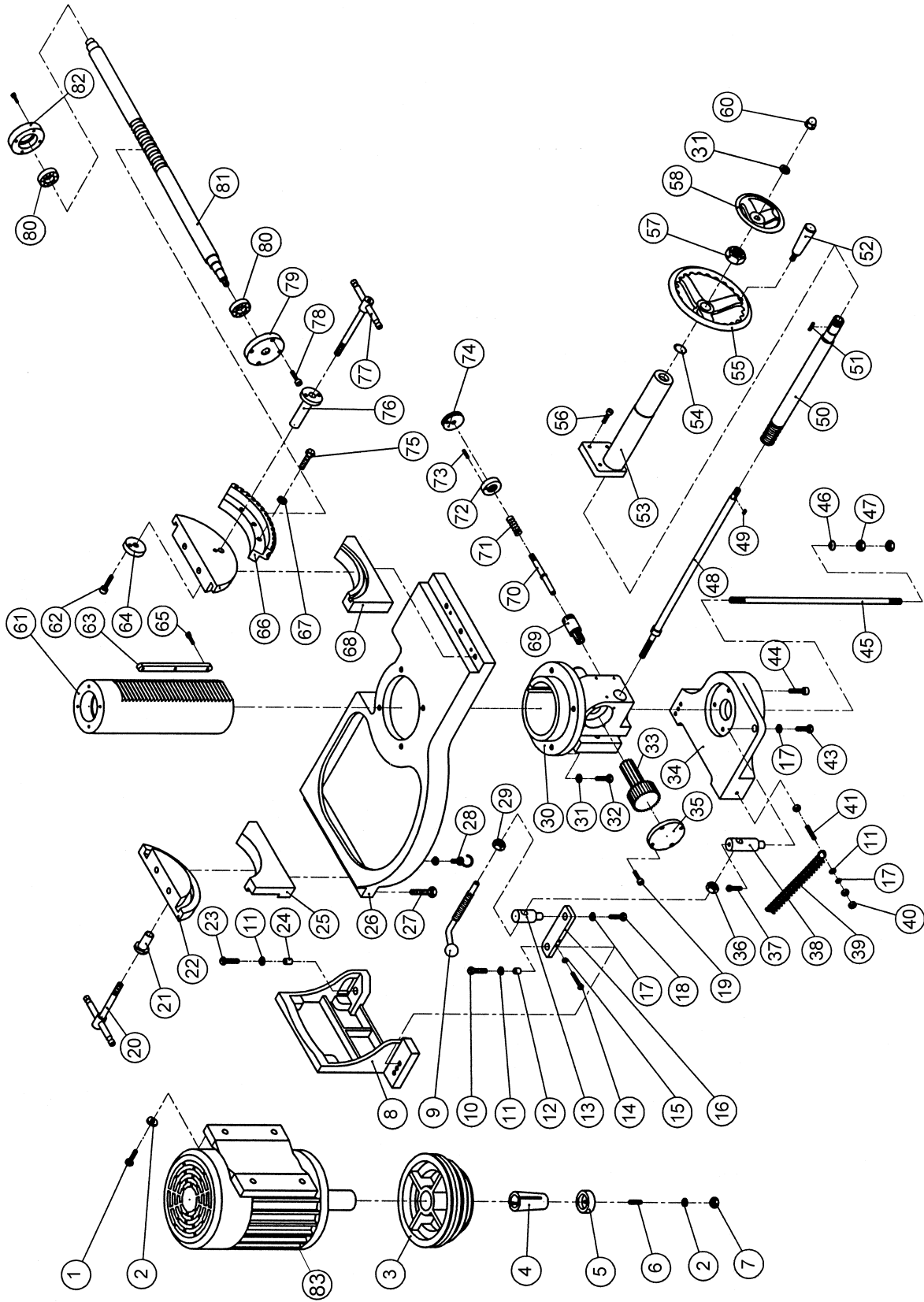
Parts List: Quill Assembly (TS29 Shaper)

No.	Part No.	Description	Quantity
1	TS-149105	Hex Cap Screw, M10 x 35	4
2	TS-236110	Lock Washer, M10	4
3	TS29-146	Motor Pulley	2
4	TS29-147	Motor Shaft Sleeve	1
5	TS29-148	Retainer	1
6	TS-2279351	Socket Set Screw, M10 x 35	1
7	TS-1540071	Hex Nut, M10	1
8	TS29-149	Motor Mount	1
9	TS29-150	Belt Release Handle	1
10	TS-1491041	Hex Cap Screw, M10 x 30	1
11	TS-1550071	Flat Washer, M10	3
12	TS29-151	Spacer	1
13	TS29-152	Stud	1
14*	TS-2288202	Pan Head Phillips Machine Screw, M8 x 20	1
15	TS-1540061	Hex Nut, M8	1
16	TS29-153	Linkage	1
17	TS-1550061	Flat Washer, M8	2
18	TS-1491031	Hex Cap Screw, M8 x 25	1
19	TS-1502051	Socket Head Cap Screw, M5 x 20	4
20	TS29-154	Handle L.H.	1
21	TS29-155	Bushing L.H.	1
22	TS29-156	Top Trunnion L.H.	1
23	TS-1491081	Hex Cap Screw, M10 x 50	1
24	TS29-157	Spacer	1
25	TS29-158	Bottom Trunnion L.H.	1
26	TS29-159	Trunnion Main Frame	1
27	TS-1491031	Hex Cap Screw, M10 x 25	6
28	TS29-160	Spring Hook	1
29	TS-154010	Hex Nut, M16	1
30	TS29-161	Quill Housing	1
31	TS-2360121	Flat Washer, M12	5
32	TS-2211451	Hex Head Bolt, M12 x 45	4
33	TS29-162	Raising Gear	1
34	TS29-163	Base Plate	1
35	TS29-164	End Cap	1
36	TS-2310162	Hex Nut, M16	1
37	TS29-165	Hex Head Bolt, M8 x 10	1
38	TS29-166	Stud	1
39	TS29-167	Spring	1
40	TS-1540061	Hex Nut, M8	3
41	TS29-198	Socket Set Screw, M8 x 50	1
43	TS-1490021	Hex Cap Screw, M8 x 16	1
44	TS-1502071	Socket Head Cap Screw, M5 x 30	4
45	TS29-168	Draw Bar	1
46	TS29-169	Bevel Washer	1
47	TS-0561051	Hex Nut, 1/2-13	2
48	TS29-170	Locking Post	1
49	TS29-171	Key, 4 x 12mm	1
50	TS29-172	Raising Shaft	1
51	TS29-173	Key, 4 x 24mm	1
52	TS29-174	Swivel Handle	1
53	TS29-175	Outer Casing	1
54	TS29-176	Retaining Ring	1

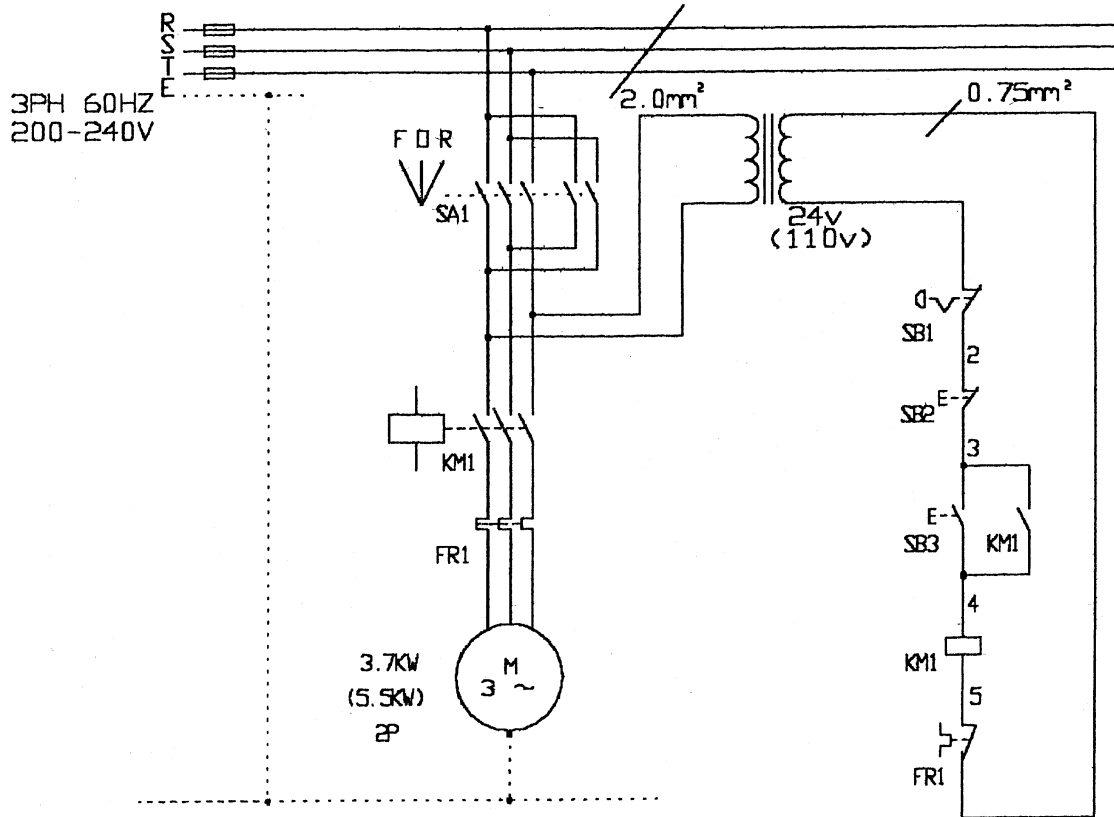
Parts List: **Quill Assembly (TS29 Shaper)** continued

No.	Part No.	Description	Quantity
55	TS29-177	Handwheel	1
56	TS-1503071	Socket Head Cap Screw, M6 x 30	4
57	TS-1540081	Hex Nut, M12	1
58	TS29-178	Handwheel	1
60	TS-2331121	Cap Nut, M12	1
61	TS29-179	Quill	1
62	TS-1503041	Socket Head Cap Screw, M6 x 16	1
63	TS29-180	Key	1
64	TS29-181	Fixed Nut	1
65	TS-1502041	Socket Head Cap Screw, M5 x 16	3
66	TS29-182	Segment Gear	1
67	TS-1550061	Flat Washer, M8	3
68	TS29-183	Inner Trunnion R.H.	1
69	TS29-184	Locking Post	1
70	TS29-185	Locking Pin	1
71	TS29-186	Spring	1
72	TS29-187	Spring Retainer	1
73	TS-1523071	Socket Set Screw, M6 x 25	1
74	TS29-188	Lock Knob	1
75	TS-1490071	Hex Cap Screw, M8 x 40	3
76	TS29-189	Sleeve	1
77	TS29-190	Handle R.H.	1
78	TS-1502051	Socket Head Cap Screw, M5 x 20	8
79	TS29-191	Tilt Shaft End Plate	1
80	TS29-204	Bearing	2
81	TS29-192	Tilt Shaft	1
82	TS29-193	Bearing Block	1
83	TS29-194	Motor, 7.5HP, 3Ph, 230/460V, 60Hz, TEFC	1

Quill Assembly (TS29 Shaper)



Electrical Schematic (TS29 Shaper)



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WMH TOOLGROUP

2420 Vantage Drive

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