

16" Variable Speed Wood Lathe

(Model 46-756 and 46-755X)



U.S. DESIGN PATENT # D450333111301
U.S. UTILITY PATENT # 6561062B2

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To learn more about DELTA MACHINERY
visit our website at: www.deltamachinery.com.

For Parts, Service, Warranty or other Assistance,

please call 1-800-223-7278 (In Canada call 1-800-463-3582).

SAFETY GUIDELINES - DEFINITIONS

This manual contains information that is important for you to know and understand. This information relates to protecting YOUR SAFETY and PREVENTING EQUIPMENT PROBLEMS. To help you recognize this information, we use the symbols to the right. Please read the manual and pay attention to these sections.

▲ DANGER Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

▲ WARNING Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

▲ CAUTION Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

CAUTION Used without the safety alert symbol indicates potentially hazardous situation which, if not avoided, may result in property damage.

▲ WARNING **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 paints,
- crystalline silica from bricks and cement and other masonry products, and
- 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, always wear **MSHA/NIOSH** approved, properly fitting face mask or respirator when using such tools.

GENERAL SAFETY RULES



▲ WARNING **READ AND UNDERSTAND ALL WARNINGS AND OPERATING INSTRUCTIONS BEFORE USING THIS EQUIPMENT.** Failure to follow all instructions listed below, may result in electric shock, fire, and/or serious personal injury or property damage.

IMPORTANT SAFETY INSTRUCTIONS

Woodworking can be dangerous if safe and proper operating procedures are not followed. As with all machinery, there are certain hazards involved with the operation of the product. Using the machine with respect and caution will considerably lessen the possibility of personal injury. However, if normal safety precautions are overlooked or ignored, personal injury to the operator may result. Safety equipment such as guards, push sticks, hold-downs, featherboards, goggles, dust masks and hearing protection can reduce your potential for injury. But even the best guard won't make up for poor judgment, carelessness or inattention. Always use common sense and exercise caution in the workshop. If a procedure feels dangerous, don't try it. Figure out an alternative procedure that feels safer. **REMEMBER:** Your personal safety is your responsibility. For additional information please visit our website www.deltamachinery.com.

▲ WARNING This machine was designed for certain applications only. Delta Machinery strongly recommends that this machine not be modified and/or used for any application other than that for which it was designed. If you have any questions relative to a particular application, **DO NOT** use the machine until you have first contacted Delta to determine if it can or should be performed on the product.

Technical Service Manager
Delta Machinery
4825 Highway 45 North
Jackson, TN 38305
(IN CANADA: 505 SOUTHGATE DRIVE, GUELPH, ONTARIO N1H 6M7)

⚠ WARNING FAILURE TO FOLLOW THESE RULES MAY RESULT IN SERIOUS INJURY.

- 1. FOR YOUR OWN SAFETY, READ THE INSTRUCTION MANUAL BEFORE OPERATING THE MACHINE.** Learning the machine's application, limitations, and specific hazards will greatly minimize the possibility of accidents and injury.
- 2. WEAR EYE PROTECTION. ALWAYS USE SAFETY GLASSES.** Also use face or dust mask if cutting operation is dusty. Everyday eyeglasses are NOT safety glasses. **USE CERTIFIED SAFETY EQUIPMENT.** Eye protection equipment should comply with ANSI Z87.1 standards, hearing equipment should comply with ANSI S3.19 standards, and dust mask protection should comply with MSHA/NIOSH certified respirator standards. Splinters, air-borne debris, and dust can cause irritation, injury, and/or illness.
- 3. WEAR PROPER APPAREL.** Do not wear loose clothing, gloves, neckties, rings, bracelets, or other jewelry which may get caught in moving parts. Nonslip footwear is recommended. Wear protective hair covering to contain long hair.
- 4. DO NOT USE THE MACHINE IN A DANGEROUS ENVIRONMENT.** The use of power tools in damp or wet locations or in rain can cause shock or electrocution. Keep your work area well-lit to prevent tripping or placing arms, hands, and fingers in danger.
- 5. MAINTAIN ALL TOOLS AND MACHINES IN PEAK CONDITION.** Keep tools sharp and clean for best and safest performance. Follow instructions for lubricating and changing accessories. Poorly maintained tools and machines can further damage the tool or machine and/or cause injury.
- 6. CHECK FOR DAMAGED PARTS.** Before using the machine, check for any damaged parts. Check for alignment of moving parts, binding of moving parts, breakage of parts, and any other conditions that may affect its operation. A guard or any other part that is damaged **should be properly repaired or replaced.** Damaged parts can cause further damage to the machine and/or injury.
- 7. KEEP THE WORK AREA CLEAN.** Cluttered areas and benches invite accidents.
- 8. KEEP CHILDREN AND VISITORS AWAY.** Your shop is a potentially dangerous environment. Children and visitors can be injured.
- 9. REDUCE THE RISK OF UNINTENTIONAL STARTING.** Make sure that the switch is in the "OFF" position before plugging in the power cord. In the event of a power failure, move the switch to the "OFF" position. An accidental start-up can cause injury.
- 10. USE THE GUARDS.** Check to see that all guards are in place, secured, and working correctly to prevent injury.
- 11. REMOVE ADJUSTING KEYS AND WRENCHES BEFORE STARTING THE MACHINE.** Tools, scrap pieces, and other debris can be thrown at high speed, causing injury.
- 12. USE THE RIGHT MACHINE.** Don't force a machine or an attachment to do a job for which it was not designed. Damage to the machine and/or injury may result.
- 13. USE RECOMMENDED ACCESSORIES.** The use of accessories and attachments not recommended by Delta may cause damage to the machine or injury to the user.
- 14. USE THE PROPER EXTENSION CORD.** Make sure your extension cord is in good condition. When using an extension cord, be sure to use one heavy enough to carry the current your product will draw. An undersized cord will cause a drop in line voltage, resulting in loss of power and overheating. See the Extension Cord Chart for the correct size depending on the cord length and nameplate ampere rating. If in doubt, use the next heavier gauge. The smaller the gauge number, the heavier the cord.
- 15. SECURE THE WORKPIECE.** Use clamps or a vise to hold the workpiece when practical. Loss of control of a workpiece can cause injury.
- 16. FEED THE WORKPIECE AGAINST THE DIRECTION OF THE ROTATION OF THE BLADE, CUTTER, OR ABRASIVE SURFACE.** Feeding it from the other direction will cause the workpiece to be thrown out at high speed.
- 17. DON'T FORCE THE WORKPIECE ON THE MACHINE.** Damage to the machine and/or injury may result.
- 18. DON'T OVERREACH.** Loss of balance can make you fall into a working machine, causing injury.
- 19. NEVER STAND ON THE MACHINE.** Injury could occur if the tool tips, or if you accidentally contact the cutting tool.
- 20. NEVER LEAVE THE MACHINE RUNNING UNATTENDED. TURN THE POWER OFF.** Don't leave the machine until it comes to a complete stop. A child or visitor could be injured.
- 21. TURN THE MACHINE "OFF", AND DISCONNECT THE MACHINE FROM THE POWER SOURCE** before installing or removing accessories, before adjusting or changing set-ups, or when making repairs. An accidental start-up can cause injury.
- 22. MAKE YOUR WORKSHOP CHILDPROOF WITH PADLOCKS, MASTER SWITCHES, OR BY REMOVING STARTER KEYS.** The accidental start-up of a machine by a child or visitor could cause injury.
- 23. STAY ALERT, WATCH WHAT YOU ARE DOING, AND USE COMMON SENSE. DO NOT USE THE MACHINE WHEN YOU ARE TIRED OR UNDER THE INFLUENCE OF DRUGS, ALCOHOL, OR MEDICATION.** A moment of inattention while operating power tools may result in injury.
- 24. TAKE PRECAUTIONS AGAINST DUST INHALATION.** The dust generated by certain woods and wood products can be injurious to your health. Always operate machinery in well-ventilated areas, and provide for proper dust removal. Use wood dust collection systems whenever possible.

ADDITIONAL SAFETY RULES FOR WOOD LATHES

▲ WARNING FAILURE TO FOLLOW THESE RULES MAY RESULT IN SERIOUS INJURY.

1. **DO NOT OPERATE THIS MACHINE UNTIL** it is **assembled** and **installed** according to the instructions.
2. **OBTAIN ADVICE** from your supervisor, instructor, or another qualified person if you are not familiar with the operation of this machine.
3. **FOLLOW ALL WIRING CODES** and recommended electrical connections.
4. **ROUGH CUT THE WORKPIECE** as close as possible to the finished shape before installing it on the faceplate.
5. **EXAMINE THE WORKPIECE FOR FLAWS** and test glue joints before mounting the workpiece on machine. **DO NOT** mount a split workpiece or one containing a knot.
6. **SECURELY FASTEN THE WORKPIECE** to the faceplate prior to faceplate turning. Use the appropriate size faceplate to properly support the workpiece. Do not let the screw fasteners interfere with the turning tool at the finished dimension of the workpiece.
7. **NEVER DRIVE THE WORKPIECE** into the drive center while the drive center is in the headstock. Set the drive center into the workpiece with a soft mallet prior to installing it on the headstock.
8. **SNUG THE TAILSTOCK CENTER** against the workpiece and lock it. Lubricate the tailstock center if it is not a ball bearing center.
9. **PROPERLY ADJUST THE TOOL REST HEIGHT.**
10. **ADJUST THE TOOL REST** so it is as close to the workpiece as possible.
11. **TIGHTEN ALL CLAMP LOCKING HANDLES** before operating.
12. **ROTATE THE WORKPIECE BY HAND** to check clearance before turning the machine "ON".
13. **CLEAR THE LATHE BED OF ALL OBJECTS** (tools, scraps of wood, etc.) before turning the machine "ON".
14. **EXAMINE THE SET-UP CAREFULLY** before turning the machine "ON".
15. **STAND CLEAR, AND KEEP ALL OBSERVERS AND PASSERSBY** clear of rotating path of workpiece to avoid injury from flying debris.
16. **USE THE LOWEST SPEED** when starting a new workpiece. **NEVER EXCEED** recommended speeds.
17. **NEVER ADJUST THE TOOL REST** while the workpiece is turning.
18. **NEVER LOOSEN THE TAILSTOCK SPINDLE** or the tailstock while workpiece is turning.
19. **MOVE THE CUTTING TOOL INTO THE WORKPIECE SLOWLY**, and cut small amounts when roughing.
20. **REMOVE THE TOOL REST** before sanding or polishing.
21. **NEVER PERFORM LAYOUT**, assembly, or set-up work on the table/work area when the machine is running.
22. **TURN THE MACHINE "OFF" AND DISCONNECT THE MACHINE** from the power source before installing or removing accessories, before adjusting or changing set-ups, or when making repairs.
23. **TURN THE MACHINE "OFF"**, disconnect the machine from the power source, and clean the table/work area before leaving the machine. **LOCK THE SWITCH IN THE "OFF" POSITION** to prevent unauthorized use.
24. **ADDITIONAL INFORMATION** regarding the safe and proper operation of power tools (i.e. a safety video) is available from the Power Tool Institute, 1300 Sumner Avenue, Cleveland, OH 44115-2851 (www.powertoolinstitute.com). Information is also available from the National Safety Council, 1121 Spring Lake Drive, Itasca, IL 60143-3201. Please refer to the American National Standards Institute ANSI 01.1 Safety Requirements for Woodworking Machines and the U.S. Department of Labor OSHA 1910.213 Regulations.

SAVE THESE INSTRUCTIONS.

Refer to them often
and use them to instruct others.

POWER CONNECTIONS

A separate electrical circuit should be used for your machines. This circuit should not be less than #12 wire and should be protected with a 20 Amp time lag fuse. If an extension cord is used, use only 3-wire extension cords which have 3-prong grounding type plugs and matching receptacle which will accept the machine's plug. Before connecting the machine to the power line, make sure the switch (s) is in the "OFF" position and be sure that the electric current is of the same characteristics as indicated on the machine. All line connections should make good contact. Running on low voltage will damage the machine.

⚠ DANGER DO NOT EXPOSE THE MACHINE TO RAIN OR OPERATE THE MACHINE IN DAMP LOCATIONS.

MOTOR SPECIFICATIONS

Delta Model 46-745 (115 volt) and Delta Models 46-746 and 46-765X (230 volt) operate on 50/60 HZ alternating current and provide a no-load spindle speed of 0-3200 RPM. Before connecting your tool to the power source, place the switch in the "OFF" position. **NOTE:** The specifications on the motor will read "230 volt-3 phase". This is correct and is accomplished with a high frequency inverter. **IMPORTANT:** The motor cannot be run without the inverter.

CAUTION Do not change input voltage. To do so will cause severe damage to the inverter.

GROUNDING INSTRUCTIONS

⚠ DANGER THIS MACHINE MUST BE GROUNDED WHILE IN USE TO PROTECT THE OPERATOR FROM ELECTRIC SHOCK.

1. All grounded, cord-connected machines:

In the event of a malfunction or breakdown, grounding provides a path of least resistance for electric current to reduce the risk of electric shock. This machine is equipped with an electric cord having an equipment-grounding conductor and a grounding plug. The plug must be plugged into a matching outlet that is properly installed and grounded in accordance with all local codes and ordinances.

Do not modify the plug provided - if it will not fit the outlet, have the proper outlet installed by a qualified electrician.

Improper connection of the equipment-grounding conductor can result in risk of electric shock. The conductor with insulation having an outer surface that is green with or without yellow stripes is the equipment-grounding conductor. If repair or replacement of the electric cord or plug is necessary, do not connect the equipment-grounding conductor to a live terminal.

Check with a qualified electrician or service personnel if the grounding instructions are not completely understood, or if in doubt as to whether the machine is properly grounded.

Use only 3-wire extension cords that have 3-prong grounding type plugs and matching 3-conductor receptacles that accept the machine's plug, as shown in Fig. A.

Repair or replace damaged or worn cord immediately.

2. Grounded, cord-connected machines intended for use on a supply circuit having a nominal rating less than 150 volts:

If the machine is intended for use on a circuit that has an outlet that looks like the one illustrated in Fig. A, the machine will have a grounding plug that looks like the plug illustrated in Fig. A. A temporary adapter, which looks like the adapter illustrated in Fig. B, may be used to connect this plug to a matching 2-conductor receptacle as shown in Fig. B if a properly grounded outlet is not available. The temporary adapter should be used only until a properly grounded outlet can be installed by a qualified electrician. The green-colored rigid ear, lug, and the like, extending from the adapter must be connected to a permanent ground such as a properly grounded outlet box. Whenever the adapter is used, it must be held in place with a metal screw.

NOTE: In Canada, the use of a temporary adapter is not permitted by the Canadian Electric Code.

⚠ DANGER IN ALL CASES, MAKE CERTAIN THE RECEPTACLE IN QUESTION IS PROPERLY GROUNDED. IF YOU ARE NOT SURE, HAVE A QUALIFIED ELECTRICIAN CHECK THE RECEPTACLE.

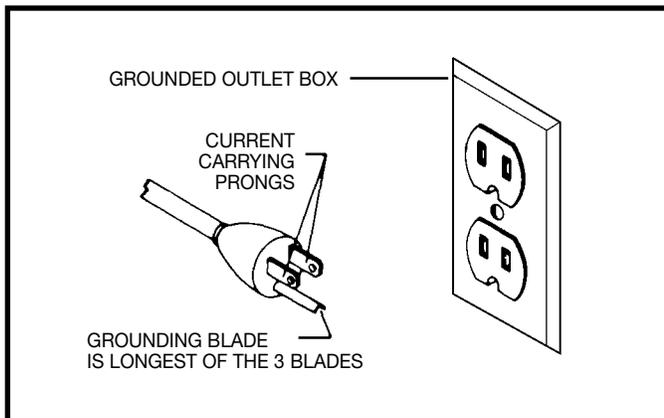


Fig. A

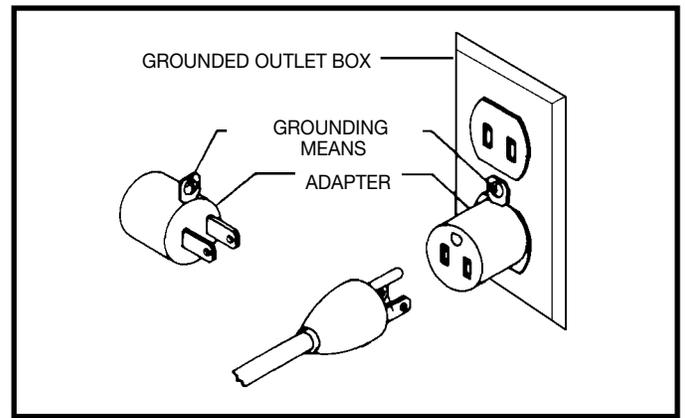


Fig. B

3. Grounded, cord-connected machines intended for use on a supply circuit having a nominal rating between 150 - 250 volts, inclusive:

If the machine is intended for use on a circuit that has an outlet that looks like the one illustrated in Fig. C, the machine will have a grounding plug that looks like the plug illustrated in Fig. C. Make sure the machine is connected to an outlet having the same configuration as the plug. No adapter is available or should be used with this machine. If the machine must be re-connected for use on a different type of electric circuit, the re-connection should be made by qualified service personnel; and after re-connection, the machine should comply with all local codes and ordinances.

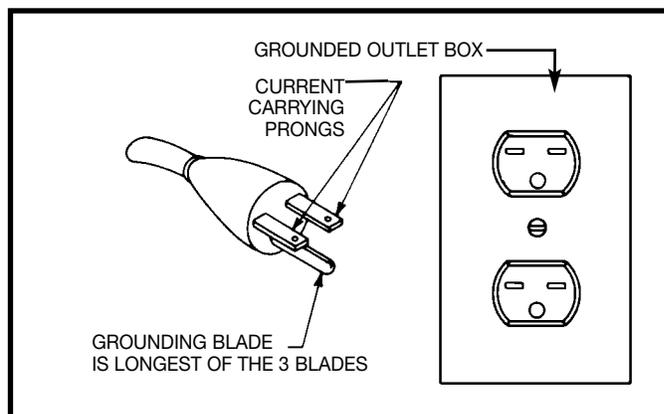


Fig. C

EXTENSION CORDS

CAUTION

Use proper extension cords. Make sure your extension cord is in good condition and is a 3-wire extension cord which has a 3-prong grounding type plug and matching receptacle which will accept the machine's plug. When using an extension cord, be sure to use one heavy enough to carry the current of the machine. An undersized cord will cause a drop in line voltage, resulting in loss of power and over-heating. Fig. D shows the correct gauge to use depending on the cord length. If in doubt, use the next heavier gauge. The smaller the gauge number, the heavier the cord.

MINIMUM GAUGE EXTENSION CORD			
<small>RECOMMENDED SIZES FOR USE WITH STATIONARY ELECTRIC MACHINES</small>			
Ampere Rating	Volts	Total Length of Cord in Feet	Gauge of Extension Cord
0-6	120	up to 25	18 AWG
0-6	120	25-50	16 AWG
0-6	120	50-100	16 AWG
0-6	120	100-150	14 AWG
6-10	120	up to 25	18 AWG
6-10	120	25-50	16 AWG
6-10	120	50-100	14 AWG
6-10	120	100-150	12 AWG
10-12	120	up to 25	16 AWG
10-12	120	25-50	16 AWG
10-12	120	50-100	14 AWG
10-12	120	100-150	12 AWG
12-16	120	up to 25	14 AWG
12-16	120	25-50	12 AWG
12-16	120	GREATER THAN 50 FEET NOT RECOMMENDED	

Fig. D

MINIMUM GAUGE EXTENSION CORD			
<small>RECOMMENDED SIZES FOR USE WITH STATIONARY ELECTRIC MACHINES</small>			
Ampere Rating	Volts	Total Length of Cord in Feet	Gauge of Extension Cord
0-6	240	up to 50	18 AWG
0-6	240	50-100	16 AWG
0-6	240	100-200	16 AWG
0-6	240	200-300	14 AWG
6-10	240	up to 50	18 AWG
6-10	240	50-100	16 AWG
6-10	240	100-200	14 AWG
6-10	240	200-300	12 AWG
10-12	240	up to 50	16 AWG
10-12	240	50-100	16 AWG
10-12	240	100-200	14 AWG
10-12	240	200-300	12 AWG
12-16	240	up to 50	14 AWG
12-16	240	50-100	12 AWG
12-16	240	GREATER THAN 100 FEET NOT RECOMMENDED	

Fig. D

FUNCTIONAL DESCRIPTION

FOREWORD

The Delta 46-756 16" adjustable speed wood lathes is a big capacity machine, designed for industry, commercial shops, and schools, or wherever a demand exists for continued accuracy and long life through safe, heavy-duty operation.

UNPACKING AND CLEANING

Carefully unpack the tool and all loose items from the shipping container(s). Remove the protective coating from all unpainted surfaces, especially on the bottom side of the bedways, the clamp plates under the headstock, the tool rest base, and the tailstock. This coating may be removed with a soft cloth moistened with kerosene (do not use acetone, gasoline or lacquer thinner for this purpose). After cleaning, cover the top surface of the bed with a good quality paste wax.

⚠ WARNING FOR YOUR OWN SAFETY, DO NOT CONNECT THE TOOL TO THE POWER SOURCE UNTIL THE TOOL IS COMPLETELY ASSEMBLED, AND YOU READ AND UNDERSTAND THE ENTIRE OWNER'S MANUAL.

CARTON CONTENTS

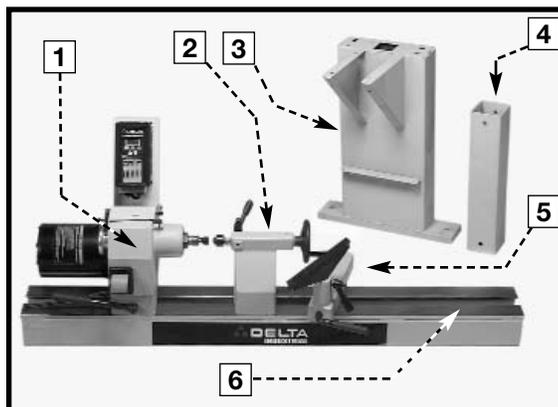


Fig. 4A

1. Headstock
2. Tailstock
3. Pedestal
4. Pedestal Base
5. Drive Center
6. Lathe Bed

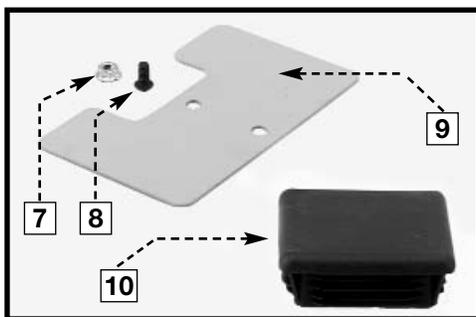


Fig. 4B

7. Flange Nut (4)
8. Button Head Screw (4)
9. End Cap (2)
10. Leg Insert (4)
11. 3/8x16 Carriage Bolt (4)
12. 3/8 Washer (8)
13. 3/8 Nut (4)
14. Knockout Bar
15. 3/8-16 x 3/4" Hex Head Bolt (16)
16. 3/8" Lock Washer (12)
17. 3/8" Flat Washer (12)
18. 5/32" Hex Wrench
19. Spindle Wrench

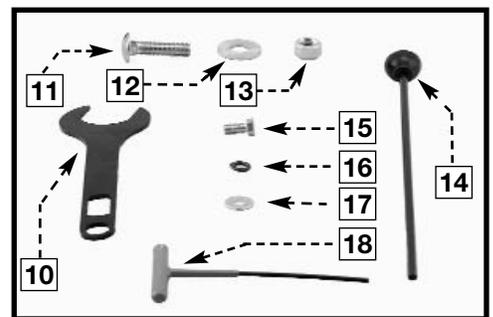


Fig. 4C

ASSEMBLY

ATTACHING LATHE BED TO PEDESTALS

1. Remove the tailstock, headstock, and tool rest from the lathe bed.

NOTE: See “ADJUSTING HEADSTOCK AND TAILSTOCK” and “TOOL REST” for removal/installation instructions.

2. Set the pedestals exactly 58” apart (Fig. 5).
3. Because of the weight, use an assistant to place the lathe bed on top of the pedestals. Align the holes in the lathe bed with the holes in the tops of the pedestals (A) Fig. 6C.
4. Use the twelve 3/8-16 x 3/4” Hex Head bolts and lock-washers to attach the lathe bed to the pedestals.

NOTE: Level the machine by loosening the jam nut (A) Fig. 6C and turning the adjusting nut (B). When leveling is complete, tighten the jam nut (A).

To increase the height of the machine, place a 4” wide hardwood board (A) Fig. 6A between the pedestal (A) Fig. 6B and the pedestal base (B) Fig. 6B.

NOTE: Place the 4” board under the pedestal, mark where the holes are located, and drill the holes to allow longer carriage bolts (not supplied) to come through.

The hole in the pedestal (C) Fig. 6D can be used to fill the pedestal with sand or concrete to provide more ballast.

Fold the metal flap (C) Fig. 6D down and out of the way to fill the pedestal.

NOTE: If sand is used, pour a small amount of concrete or similar material in the pedestal to prevent sand leakage through the seams.

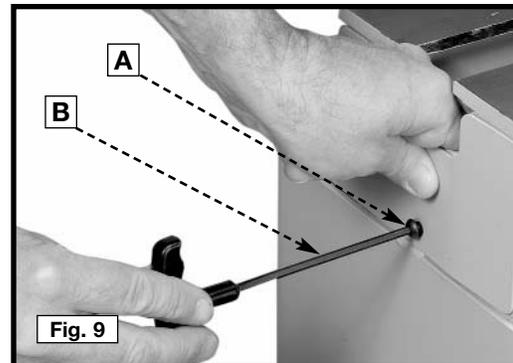
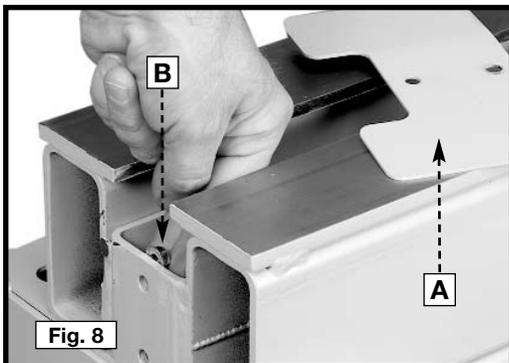
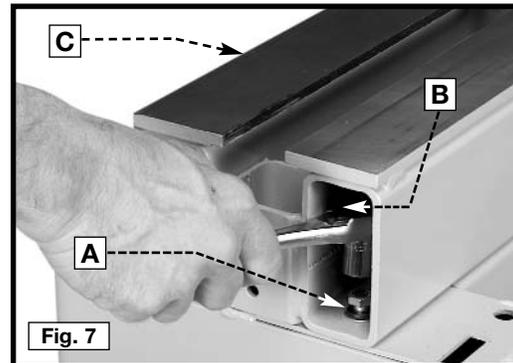
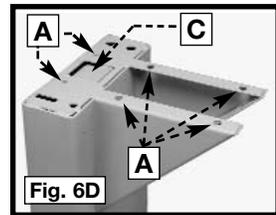
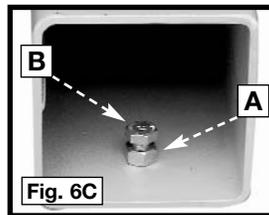
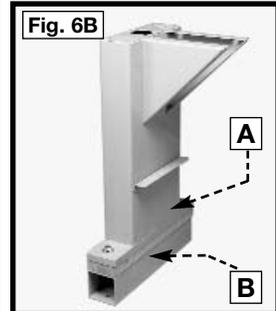
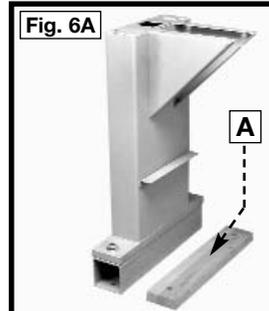
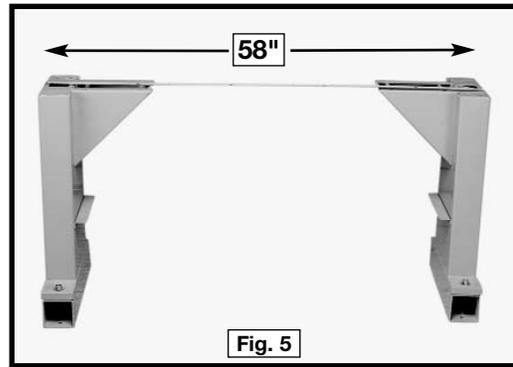
In addition to showing the location of the bolts (A and B), Fig. 7 also shows that additional ballast can be added in the lathe bed (C). Steel bars or other heavy material can be inserted into the lathe bed to provide more weight.

NOTE: Use a good quality furniture wax on the lathe bed (C) Fig. 7 to allow for smoother movement of the headstock, tool rest, and tailstock, and to prevent rust.

ATTACHING END CAPS

Use the supplied hex wrench (B) Fig. 9 to attach the end caps (A) Fig. 8 to both ends of the lathe with button head screws (A) Fig. 9. Insert these through the end cap, then the lathe bed. Secure with a flange nut (B) Fig. 8 .

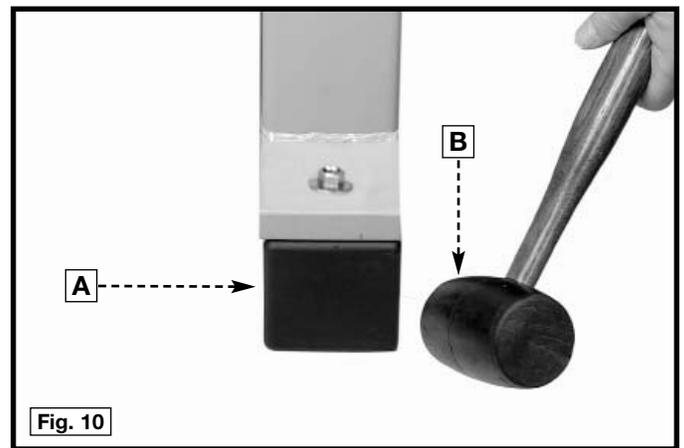
NOTE: The flange nut can easily be dropped while attaching the endcap. A metal flap (C) Fig. 6 will catch any fallen flange nuts. However, if you folded the flap down to insert more ballast, use a piece of cardboard or other material to cover the hole during assembly.



ATTACHING LEG INSERTS

The lathe is supplied with four leg inserts, one of which is shown (A) Fig. 10.

To attach the leg inserts to the pedestals, place one side in the hole provided and gently tap the other side, top, and bottom with a rubber mallet (B) Fig. 10.

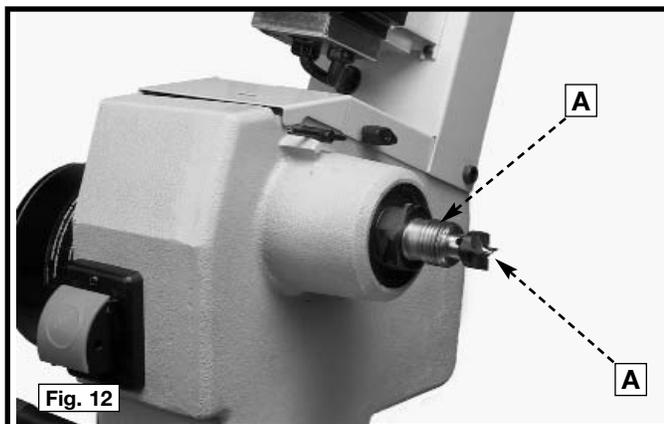
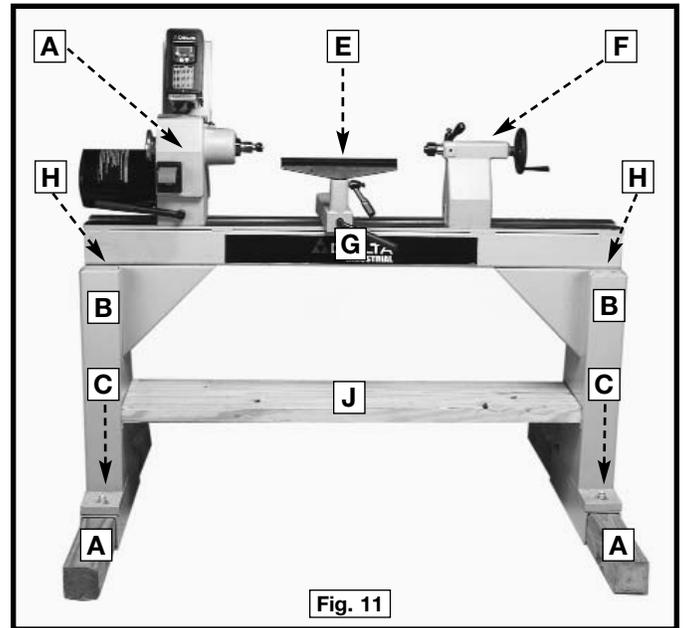


Attach the Headstock (D) Fig. 11, Tool Rest (E), and Tailstock (F) to the lathe bed (G). Notice the tool and centers storage areas located at (H), and brackets on the pedestals to accept a 2 x 12" shelf (not supplied) (J) Fig. 11.

If additional stability is desired, insert a 4 x 4 (A) Fig. 11 into the pedestal base (B) Fig. 11.

NOTE: You may have to cut a groove in the 4x4's to allow the lumber to pass underneath the head of the carriage bolt.

Fasten the 4 x 4's to the floor.



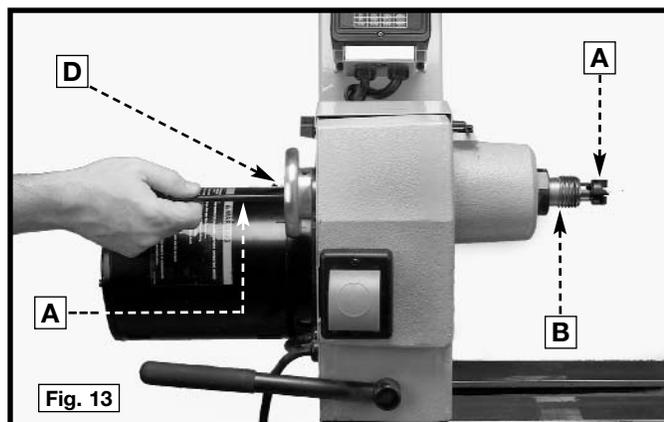
HEADSTOCK SPUR CENTER

The spur center (A) Fig.12 is equipped with a No. 2 Morse Taper shank. Insert this shank into the headstock spindle (B).

NOTE: Before inserting the spur center (A), clean both the shank of the spur center and the inside of the headstock spindle to remove any grease or debris. To remove the tapered shank spur center (A) Fig. 13 from the headstock spindle (B) Fig. 13, use the knockout bar (C) Fig. 13 (supplied) through the hole (D) in the opposite end of the spindle.

IMPORTANT: NEVER DRIVE THE WORKPIECE INTO THE SPUR CENTER WHEN IT IS MOUNTED IN THE HEADSTOCK.

See the instructions on setting the spur center into the workpiece in the "OPERATION" section of this manual under "CENTERING THE WORK."



TAILSTOCK LIVE CENTER

The tailstock live center (A) Fig. 14, supplied with your lathe, is equipped with a No. 2 Morse Taper shank.

NOTE: Before inserting the live center, clean both the shank and the inside of the tailstock to remove any grease or debris. To remove the live center (A) from the tailstock spindle (B), use the knockout bar (C) Fig. 14 (supplied) through the hole (D) in the opposite end of the spindle.

ADJUSTING CLAMPS ON THE HEADSTOCK AND TAILSTOCK

The headstock and tailstock can be moved along the lathe bed. A downward push on the handle (A) Fig. 15 (tailstock shown) locks the mechanism, while an upward movement of the handle releases the securing action. The clamps are pre-set at the factory. However, should either need adjusting, use an 11/16" wrench (B) Fig. 15 to slightly loosen or tighten the two nuts (C) Fig. 15 shown here on the tailstock.

NOTE: Tighten or loosen both nuts equally.

NOTE: Clamp the headstock and tailstock firmly while operating the lathe.

TOOL REST

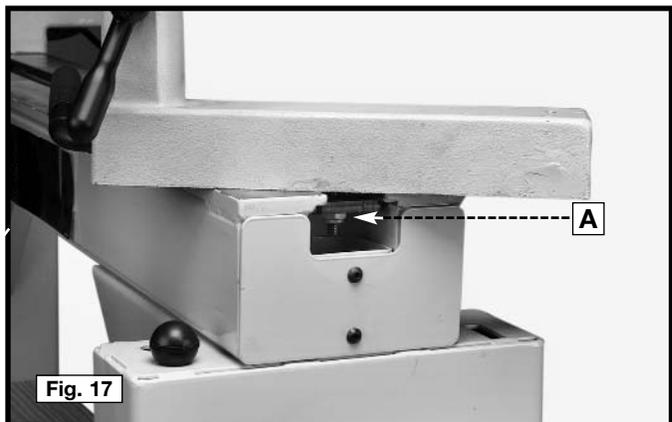
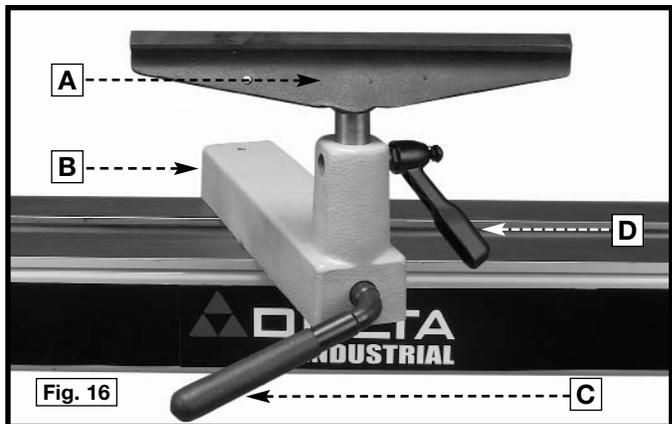
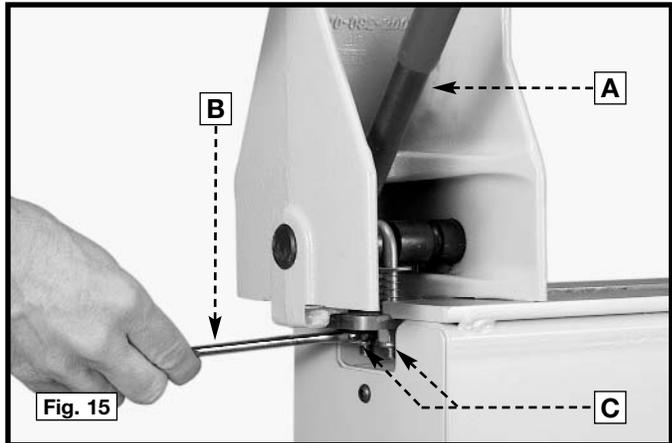
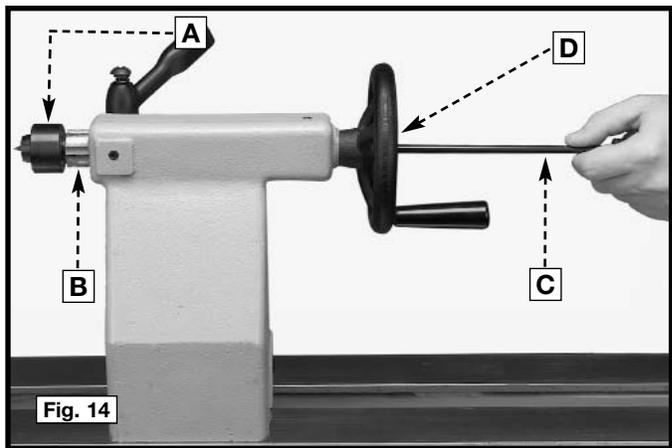
The tool rest (A) and tool rest base (B) are shown in Fig. 16. To position the tool rest on the lathe bed, lift the clamp handle (C), move the tool rest base and lock it in place by pushing down on the handle (C). To adjust the tool rest (A) for the correct height, loosen the locking lever (D), move the tool rest (A) up or down and tighten the locking lever (D).

NOTE: The locking lever (D) Fig. 16 can be positioned on the left or right side of the tool rest base (B). To reposition the tool rest locking lever (D), unscrew the lever counterclockwise. A threaded hole is provided in the left side of tool rest base (B) to accept the locking lever (D) if desired.

NOTE: Clamp the tool rest firmly while operating the lathe.

ADJUSTING CLAMP ON TOOL REST

To adjust the tool rest clamping action, use a 11/16" wrench to loosen or tighten the single nut (A) Fig. 17.



STARTING AND STOPPING THE TOOL

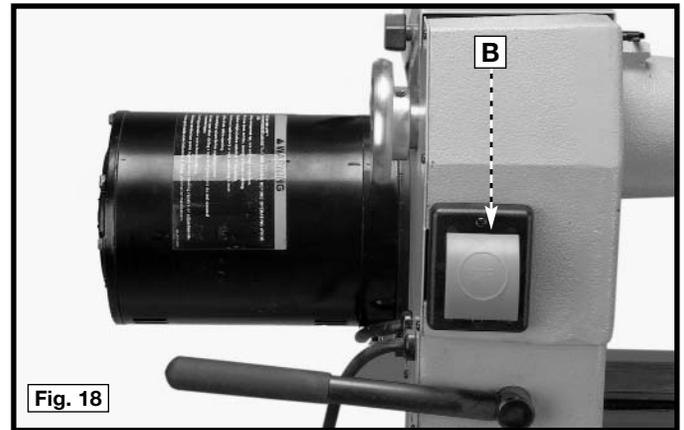
The power switch, located under the safety cover (B) Fig. 18 provides electrical power to the adjustable speed drive. Lift the safety cover (B) and move the switch up to the “ON” position. To turn the power off, push the safety cover (B) down.

Fig. 18 shows the switch with safety cover down in the “OFF” position. Fig. 19 shows the lathe in the “ON” position (switch cover (A) up and switch (B) up).

NOTE: In case of emergency, immediately push the safety cover (B) down to shut off power.

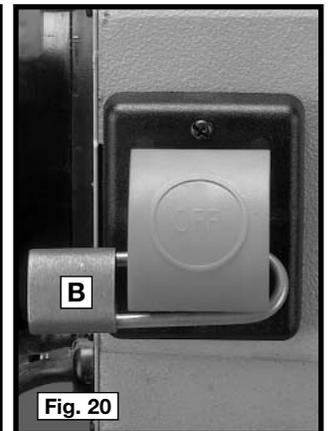
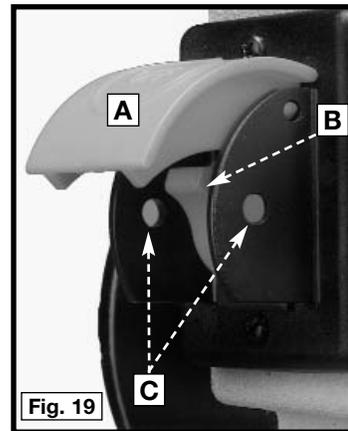
⚠ WARNING

These machines have a circuit that automatically decelerates the spindle once you push the stop button (C) Fig. 22 on the control panel. Although an optional dynamic brake is mentioned in the manual provided with the Baldor Adjustable Speed Controller, Delta does not recommend the use of any optional brake systems on the lathe. Further, DO NOT CHANGE OR ADJUST the controller settings that have been pre-set at the factory.



LOCKING SWITCH IN THE “OFF” POSITION

IMPORTANT: When the tool is not in use, the switch should be locked in the “OFF” position to prevent unauthorized use, using a padlock (A) Fig. 20 with a 3/16” diameter shackle inserted through the holes in the switch plate (C) Fig. 19.



ACTIVATING THE SPINDLE

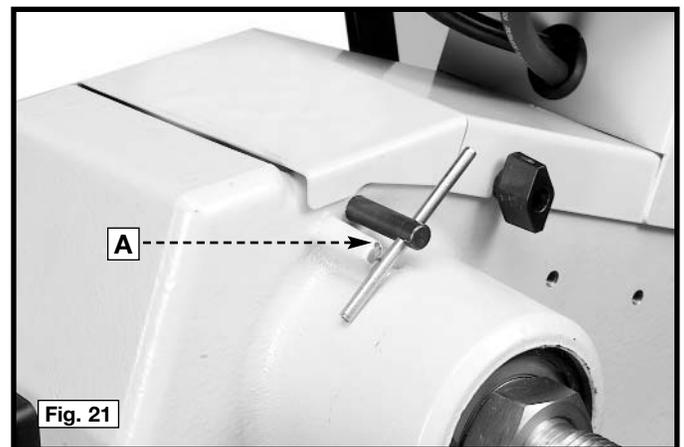
Even though power may be going to the adjustable speed drive, the spindle will not turn until you activate it.

1. Before activating the spindle, tighten and clear all clamps, bolts, etc. Turn the workpiece by hand to see that it clears the tool rest and to make sure that the spindle lock is in the **UNLOCKED** position (A) Fig. 21.
2. Prior to activating the spindle, set the speed control knob (A) Fig. 22 to the “zero” position.

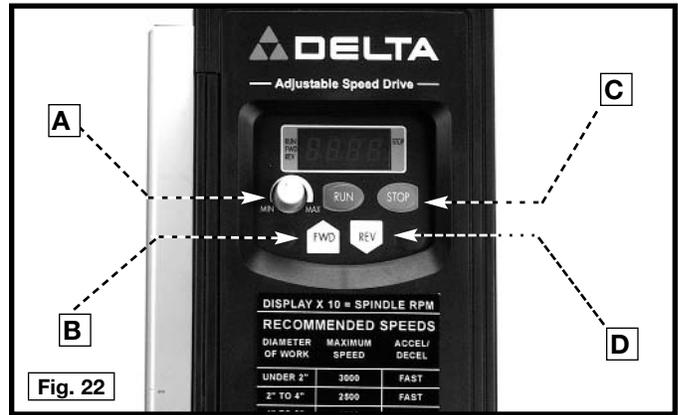
CAUTION Input voltage must be 200 to 240 single phase. Other voltage will cause severe damage to the inverter.

3. After turning the power switch on, push the “run” button (B) Fig. 22. Then slowly turn the knob (A) clockwise to the desired speed.

NOTE: The numbers in the display multiplied by 10 will indicate the spindle speed.



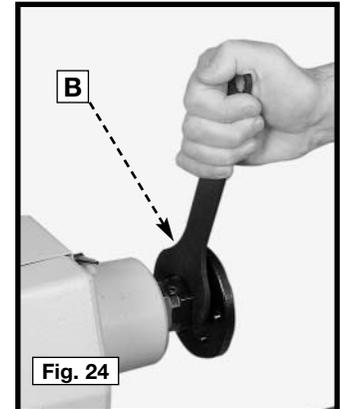
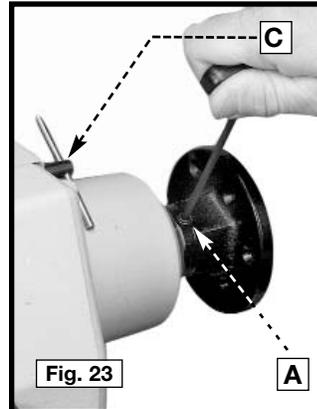
4. To stop the spindle without turning the power off, press the stop button (C) Fig. 22 on the control panel.
5. To restart, press the FWD button (B). The spindle will gradually return to the speed at which it was stopped.
6. The REVERSE (REV) button (D) Fig. 22 will reverse the spindle rotation.



NOTE: When using the faceplate, tighten the faceplate locking screw (A) Fig. 23.

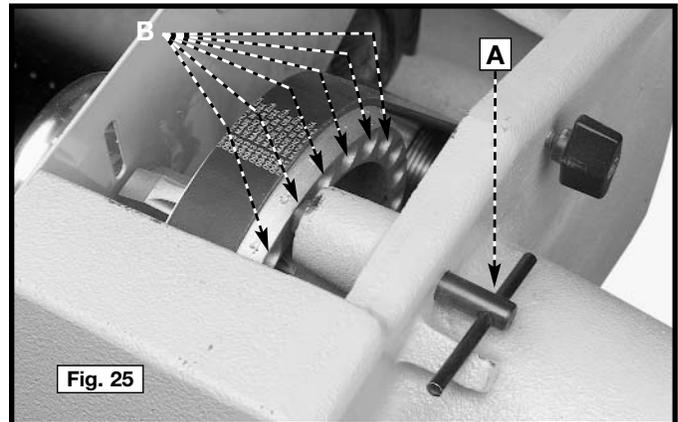
NOTE: To remove the faceplate, loosen the set screw (A) Fig. 23 two full turns. Engage the spindle lock (C) and use the supplied wrench (B) Fig. 24 to loosen the faceplate. Remove the face plate from the spindle.

NOTE: Use the chart (B) Fig. 25A on the front of the door for safe operation.



IMPORTANT: For emergencies, use **ONLY** the safety cover to stop the machine. Also, when leaving the machine, lower the safety cover, and cut the power to the adjustable speed drive. The control is still energized as long as the power switch is on.

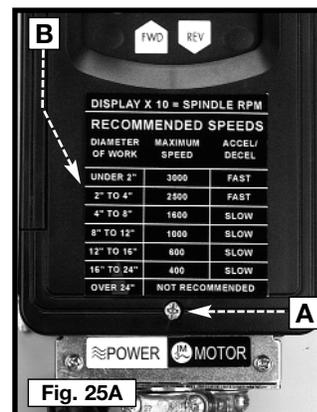
NOTE: To lock the spindle or to utilize the indexing feature, pull the spindle lock pin (A) Fig. 25 out and rotate the pin clockwise. Re-engage it in the pulley holes (B) Fig. 25, some of which are shown. The spindle pulley has 24 holes accurately spaced around the rim of the pulley. This feature makes it possible to make evenly spaced divisions on turnings which could be fluted, grooved, or to mark places to be drilled.



CHANGING ACCELERATION/DECELERATION

To change the acceleration/deceleration rate, loosen the screw (A) Fig. 25A and open the door.

This machine has two different start-up speeds. For larger workpieces, move the switch (A) Fig. 25 B to the "up" position. For smaller workpieces, move the switch to the "down" position.

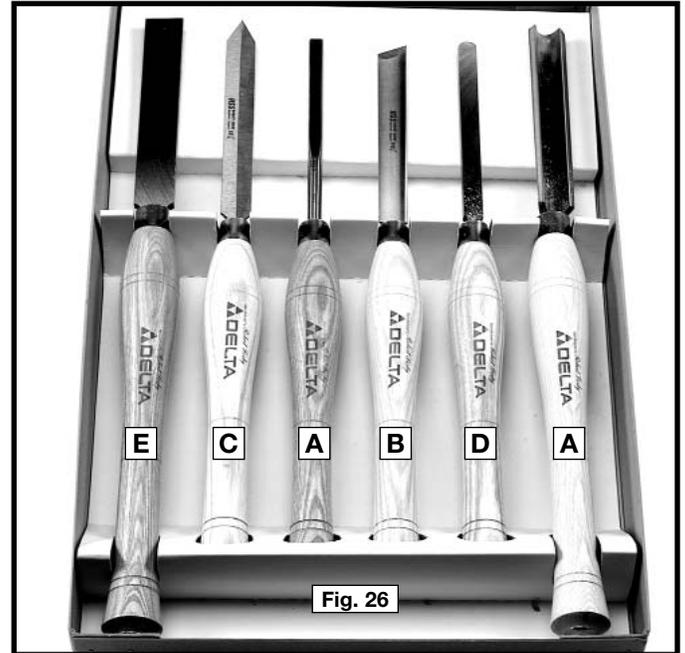


OPERATION

The following directions will give the inexperienced operator a beginning point for common lathe operations. Practice on scrap material before attempting serious work.

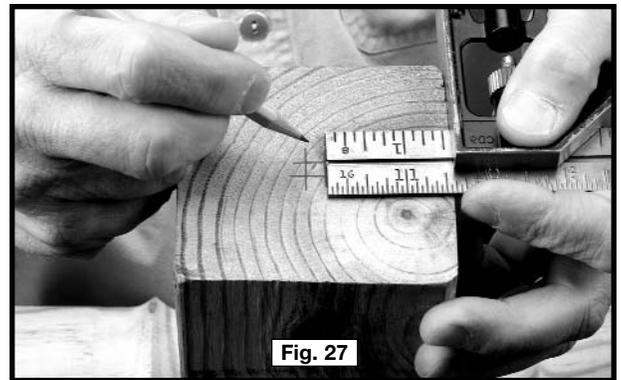
LATHE TOOLS

Standard wood turning tools come in several different configurations (Fig. 26). The majority of turnings will require the gouge tool (A) Fig. 26. This round nosed hollow chisel is used for roughing cuts, cove cuts and other operations. The skew chisel (B) is a double-ground flat chisel, with an angled end. This tool is used for smoothing cylinders, for cutting shoulders, beads, vee-grooves, etc. The parting tool (C) is a double-ground chisel, used for cutting-off, or for making straight incisions or sizing cuts to any required diameter. The round nose scraper (D) is used for mostly hollowing work, while the square-end scraper is mainly used for the outside of bowls.



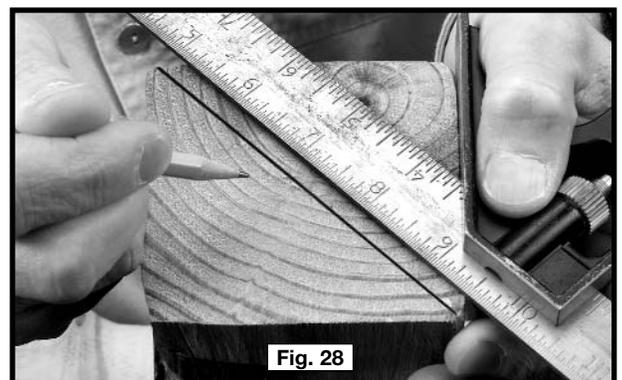
HOW TO TURN SPINDLES

Working with any material that is attached to the lathe centers is called a spindle turning. This is the principal type of wood turning (chair and table legs, lamp stems, etc.) The turning of spindles can be done with either a scraping or cutting technique. The cutting technique, by virtue of faster wood removal and a cleaner surface, is the preferred method.

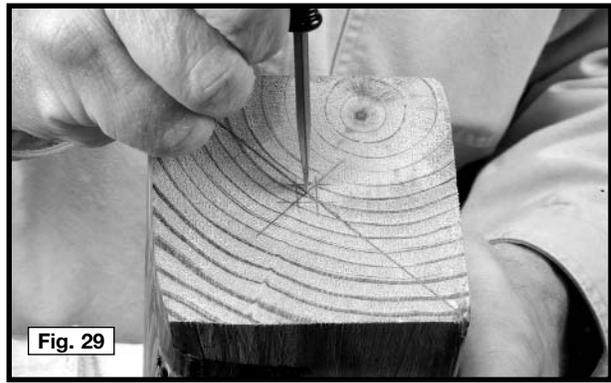


CENTERING THE WORK

Wood stock for any spindle turning should be approximately square, and the ends should be square with the sides. Two common methods of determining the center are shown in Figs. 27 and 28. In Fig. 27, a distance a little more or a little less than one-half the width of the stock is set off from each of the four sides. The small square set off in the center can then be used in marking the true center. The diagonal method, Fig. 28, consists of drawing lines from corner to corner, with the intersection marking the center of the work.



After marking each end, mark the true center with a punch awl or dividers (Fig. 29). If the stock is hardwood, the centers should be drilled to a depth of about 1/8". The spur or live center is then placed against one end of the work and seated by striking with a mallet (Fig. 30). In hardwood, make a starting seat for the spur center by sawing on the diagonal lines, and drilling a small hole at the intersection. After driving the center, hold the center and the work together and fit both immediately to headstock spindle. If you are not using a ball bearing center, the end of work at tailstock center should be oiled. Place the lubricant on the wood either before or after it is put on the lathe. Many turners use beeswax, tallow, or a wax-and-oil mixture as a lubricant. A ball bearing center is ideal because it eliminates lubricating. If the work is to be removed from the lathe before completion, an index mark should be made as a guide for re-centering (Fig. 31). A permanent indexer can be made by grinding off one corner of one of the spurs.

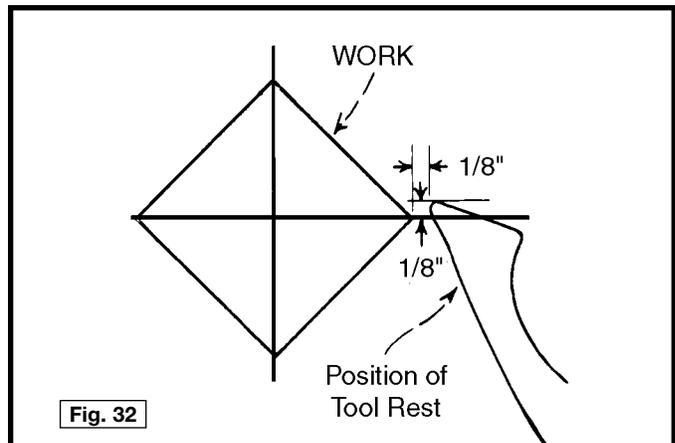


MOUNTING THE WORK

Mount the work by moving the tailstock to a position about 1" or 1-1/2" from the end of the workpiece, and locking it in this position. Advance the tailstock center by turning the feed handle until the center cup makes contact with the work. Do not support the work on the center pin alone. Always have the rim of the center cup imbedded at least 1/8" into the work. Continue to advance the center while slowly rotating the work by hand. After it becomes difficult to turn the work, slack off on the feed about one-quarter turn and lock the tailstock spindle.

TOOL REST POSITION

Mount the tool rest in place about 1/8" away from the work and 1/8" above the work centerline (Fig. 32.) This position may be varied to suit the work and the operator. Place a guide mark on the tool rest shank as an aid to quick and accurate resetting.



ROUGHING A CYLINDER

The large gouge is used in the first turning operation by smoothing the sharp corners of the work. Run the lathe at low speed and hold the gouge in the manner shown in Fig. 33. The cut starts about 2 inches from the tailstock end and continues from this point to the end of the tailstock. Make the second pass beginning about 2" or 3" to the left of the first cut. Advance again toward the tailstock, and merge with the previous cut. Toward the end of the live center, roll the gouge in the opposite direction (Fig. 34) to carry the final cut off the live center end of the work. The roughing cut should not be carried out with one continuous movement, because this would tear long slivers from the corners of the work. Neither should the cut be started directly at the end of the stock for the same reason. The cut can be safely carried from the center of the stock toward and off either end once the first roughing cuts have been made.

The position of the gouge involves two or three important angles. (1) The tool may be advanced along the work either from right to left or from left to right. Left to right (from headstock to tailstock) is preferred since this action throws chips clear of the operator. (2) The gouge is rolled over slightly in the same direction it is advancing. (3) The tool is held well up on the work, with the bevel or grind tangent to the revolving surface (Fig. 35). This position will give a clean shearing cut. When pushed straight into the work (Fig. 35), the gouge has a scraping action, (normally a poor practice in spindle turning). The roughing cut is continued until the work approaches 1/8" of the required diameter. Once a cylindrical form has been obtained, the turning speed can be moved to the second or third speed setting. **NOTE:** Continue to move the tool rest inward toward the work piece to keep the safe distance between the two.

POSITION OF HANDS

While turning, the hand that holds the tool handle should be in a natural position. This hand provides the leverage for the tool by either moving in toward the chisel or moving out. The position of the tool rest hand is more a matter of individual preference, rather than a "set" or "proper" position. However, a palm-up grip (Fig. 36) is generally considered best. In this position, the first finger acts as a guide, sliding along the tool rest as the cut is made. The alternate position is a palm-down grip (Fig. 37). In this position, the heel of the hand or the little finger serves as a guide. The palm-down position is solid and positive – excellent for roughing or heavy cutting. Most beginners start with the palm-down grip, switching later to the palm-up position for better manipulation of the chisel.



Fig. 33



Fig. 34

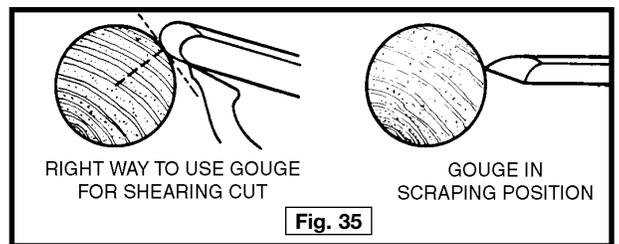


Fig. 35

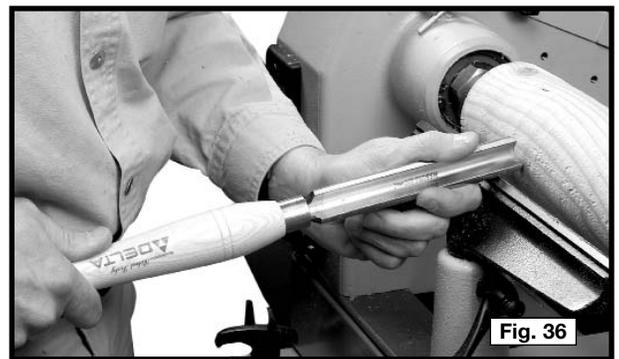


Fig. 36



Fig. 37

SMOOTHING A CYLINDER

To smooth a cylinder, use a large skew chisel. This requires practice, but experience with this tool is very important. Place the cutting point near the center of chisel and high on the work (Fig. 38). Sometimes, in striving for a certain position in relation to the work, the beginner will often overlook this all-important point. Raising the handle will increase the depth of cut while lowering the handle, of course, does the opposite. As with the gouge, the skew can be advanced in either direction. The center of the skew toward the heel does the actual cutting. The back portion of the grind or bevel supports the tool, while the handle-hand controls the depth of cut by rocking the chisel on this pivot point. Because of this, keep the skew bevel perfectly flat.



Fig. 38



Fig. 39

USING THE PARTING TOOL

The parting tool is perhaps the easiest turning chisel to handle. Simply push this scraping tool into the work Fig. 39. A somewhat better cutting action is obtained if the handle is held low. This tool is, in many cases, held with one hand while the other hand holds the calipers in the cutting groove. When parting tool cuts are deep, a clearance cut should be made alongside the first cut (Fig. 40) to prevent burning the tool point.



Fig. 40

SQUARING AN END

The parting tool can be used to quickly square an end. Since the parting tool is a rough cutter, the cut can then be smoothed by the use the skew. However, the whole operation can be done with the skew. In using the skew, make your first cut a nicking cut with the toe of the skew (Fig. 41). A deep cut here could burn the chisel, so a clearance cut is made by inclining the skew away from the first cut and pushing the tool into the work. This procedure of side cut and clearance cut is continued as often as needed. **NOTE:** While the skew can be pushed into the wood in any direction, the cutting edge itself must be inclined a little away from this plane. If the full cutting edge of skew bears against the cut surface, the tool will have a tendency to run. See Fig. 42 for the proper way to make the cut. Push the chisel straight into the work, and incline the cutting edge away from the cut surface. Use only the extreme end of the toe for this cut. This important principle in skew handling will be used repeatedly in making shoulders, beads and vee cuts.



Fig. 41

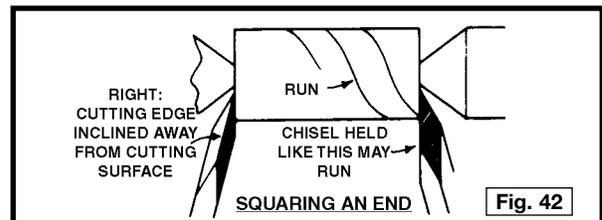


Fig. 42

CUTTING A SHOULDER

Use the parting tool first to reduce the wood to within 1/16" of the required shoulder and diameter (Fig. 43). Clean the waste stock out with the gouge (Fig. 44), then use the skew for the actual cutting of the shoulder (Figs. 45A and 45B), which is a duplication of squaring an end. The skew then makes the horizontal cut, but in a different manner from plain cylinder work. If the shoulder is long, use the ordinary skew position for the outer portion of the cut. At the angle between the horizontal and vertical cuts, the heel of the chisel moves into a position tangent between the skew and the cylinder (Fig. 46). In this position, raise the handle of the chisel slightly to allow it to cut while the tool moves along the rest. Use a very light cut to produce smooth work. The heel of the skew can be used for making the entire cut, if desired, but the cut, whether in this position or any other position, should not be picked up directly at the end of the stock. Horizontal cuts started directly from the end of the work will have a tendency to bite into the wood, often ruining the entire piece. Always run off the end and not into it. Where a very short shoulder makes this impossible, use the skew in a flat scraping position. If the cutting technique is used, engage only with the heel of skew in a very light cut.



Fig. 43

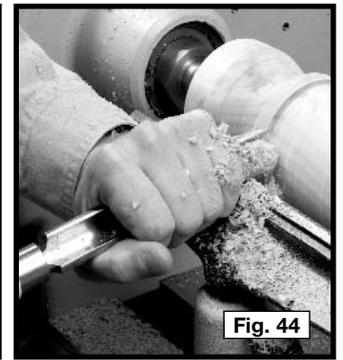


Fig. 44

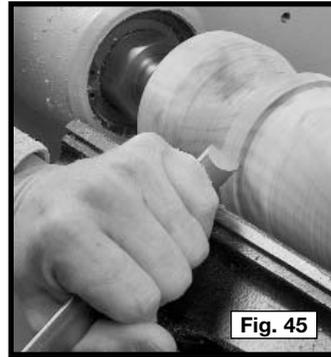


Fig. 45

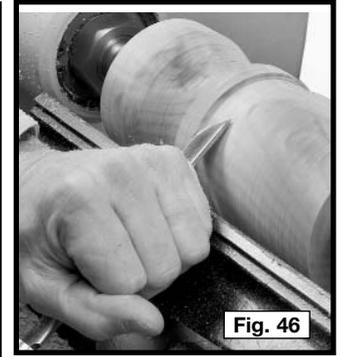
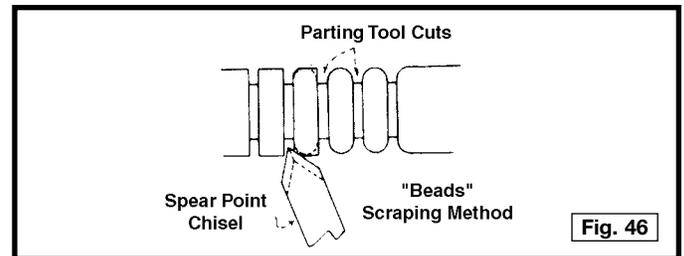


Fig. 46



CUTTING SMALL BEADS

Beads can be scraped or cut. Using the spear chisel is the easiest method of scraping, and works to best advantage on beads separated by parting tool cuts (Fig. 46). Scraping is slower than cutting and is not as clean, but it has the advantage of protecting the work from long gashes.

Cutting beads quickly and accurately with the small skew is one of the most difficult lathe operations. Various working methods can be used. The first cut is a vertical incision at the point where the two curved surfaces will eventually come together. Make this cut with either heel or toe of skew. Fig. 47 shows the use of the toe. Place the skew at right angles to the work. The chisel is flat on its side at the start, and is evenly rotated through the successive stages of the cut (Figs. 48, 49 and 50). At the same time, the chisel is pulled slightly backward to maintain the cutting point. The entire cut is made with the heel of chisel. The opposite side of the bead is cut in the same manner, one cut serving to produce the full shape in each instance. This action produces beads that are beautifully smooth and polished, and the technique is well worth mastering.

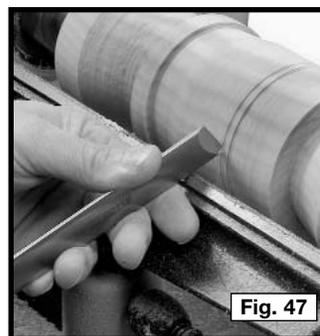


Fig. 47

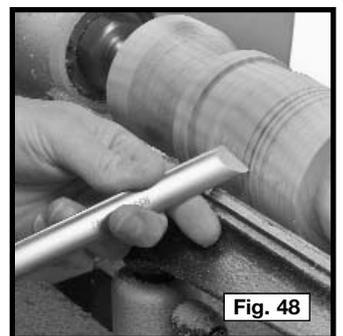


Fig. 48

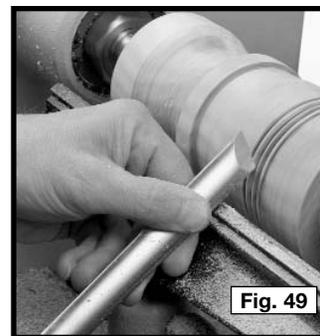


Fig. 49

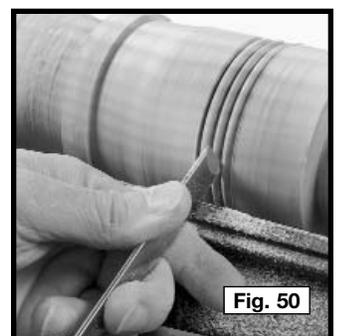


Fig. 50

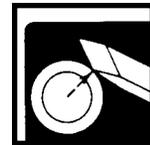
VEE GROOVES

Cutting the vee groove demands much the same technique as the bead, except the skew is hinged straight into the work without rotation (Fig. 51). Only one-half of the vee is made at a time, and one, two, or more cuts may be needed on each side to obtain the desired shape. As in all cutting with the skew, the bevel next to the cut must be used as a fulcrum. Be careful not to allow full edge of the chisel to catch and cause a run. Vee grooves can also be made with the toe of the skew, in the same manner as squaring an end.



LONG CUTS

Long cuts are usually either convex or straight-tapered surfaces. With a convex surface, the method used in making the finishing cut is shown in Figs. 52. The gouge is turned on the tool rest so that it will be inclined in the direction that it will move. The grind is tangent to the work, and the center point of the cutting edge is the contact point with the wood. As the cut progresses toward and around the end of the curve, the handle is gradually raised and swiveled to the right (Fig. 53) in order to maintain the tangency between the grind and the surface being cut .



Figs. 54 and 55 show the cutting of a long taper with a skew. The operation differs from smoothing a cylinder only at the start of the cut. The starting cut should be made with the heel (Fig. 54) to prevent the tool from digging into the work. As the tool moves down the work, the chisel can be pulled back to allow the center point of the cutting edge to cut. However, the full taper can be made with the heel. Be careful not to cut too deeply at the center of the taper. The direction of cutting is always downhill.



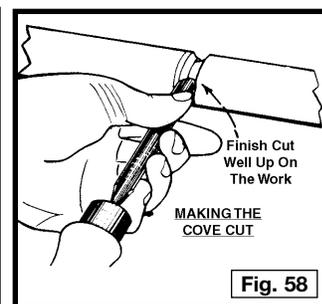
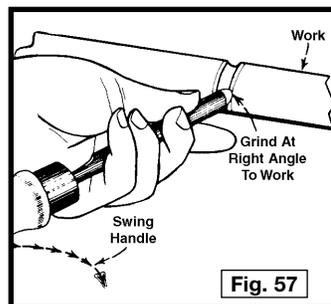
COVE CUTS

Second to forming a perfect bead, the cove or concave cut is the most difficult to master. This cut is made with the gouge, where the size of the tool depends on the size of the cut. Push the gouge directly into the work to remove the surplus stock (Fig.56).



The gouge is placed on edge on the tool rest so that the grind of the chisel forms an approximate right angle with the work (Figs. 57). The chisel contacts the work at the center of the cutting edge. Hold the tool so that the centerline of the gouge is pointing directly toward the center of the revolving stock. This starting position is important to prevent the gouge from running along the surface of the work.

From the starting position, push the gouge into the revolving stock, and roll the tool on the rest. A triple action takes place here. (1) The chisel will roll to follow the shape of the cut, (2) the handle will drop slightly so that the portion already cut will force the lip of the chisel sideways and, (3) the chisel will be pushed forward so that at the end of the cut, Fig. 58, it will be well up on the work and tangent with the cut surface. Make only one-half of the cut at a time, then reverse the chisel to cut the other half. The occasional turner should make cove cuts with a scraping technique, using either the small gouge or round nose chisel.



SQUARE SECTIONS

When the turning has a square section, joint the stock before turning. Good centering is essential since any error will show at the shoulder where the round meets the square. Turning of the shoulder from square to round can be done in various ways. If the parting tool is sharp, the nicking cut with skew (Fig. 59) can be omitted. The final trimming operation (Fig. 62) can be done with either the skew, spear chisel, or gouge, and is a scraping operation. While the shoulder can be cut with the same technique used for cutting a bead, the simpler scraping method pictured does clean work and is easier to do.

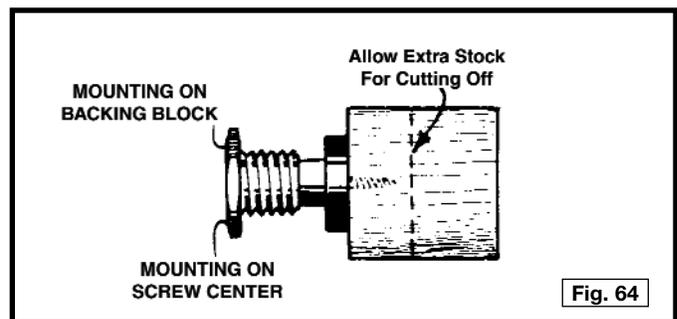
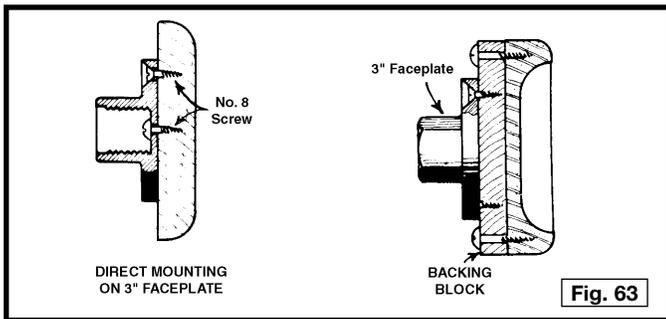


FACEPLATE TURNING

Mount turnings that cannot be worked between centers on a faceplate. The greater part of this type of turning is done with the faceplate mounting, although there are a number of jobs which require special chucks. All cutting in faceplate work is done by scraping. Any attempt to use a cutting technique on the edge grain of large work will result in a hogging, gouging cut which may jerk the chisel out of the hands of the operator. Use a band saw on all work to roughly cut the turning area slightly oversized to eliminate heavy roughing cuts in turning.

MOUNTING WORK TO FACEPLATE

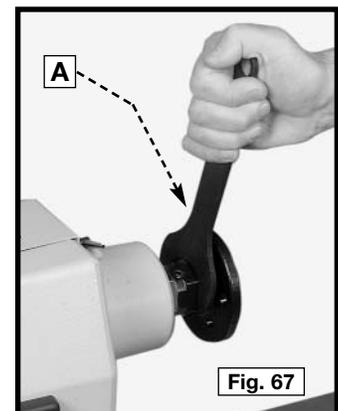
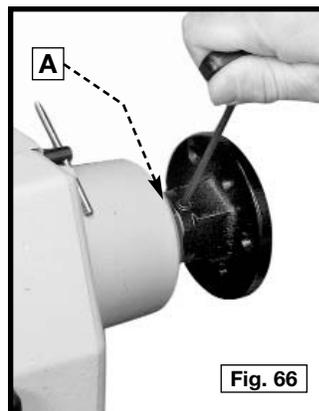
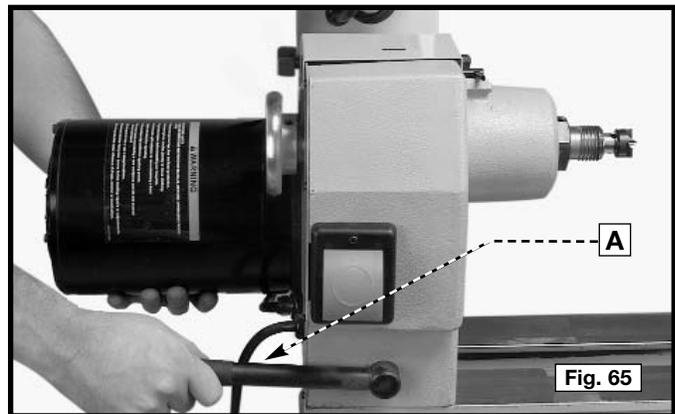
Fig. 63 shows direct mounting to the 4" faceplate along with attaching to the backing block. Because of the ease of setting up, use this mounting whenever the work permits. Hold larger pieces in the same way by using the 8" faceplate. When normal screw-fastenings interfere, mount the work on a backing block (Fig. 63). When screws are not permissible at all, glue the work to the backing block by fitting a sheet of paper at the joint to allow later separation without damaging the wood. Some work can be screwed or nailed from the face side into backing block. Mount work less than 4" in diameter on the single screw center (Fig. 64).

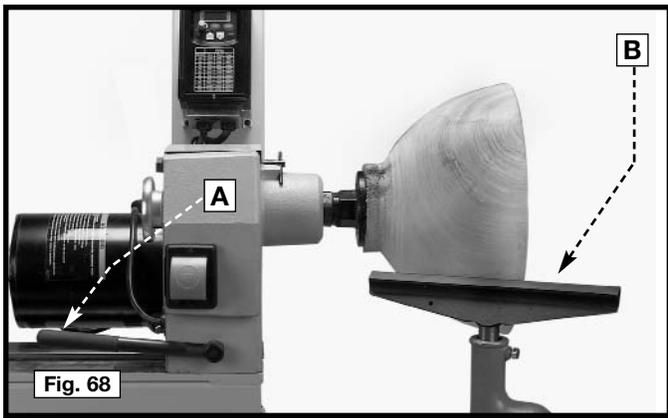


OUTBOARD TURNING

For workpieces that require additional space for turning, or for the turning of bowls, etc., outboard turning is the answer. To make outboard turnings:

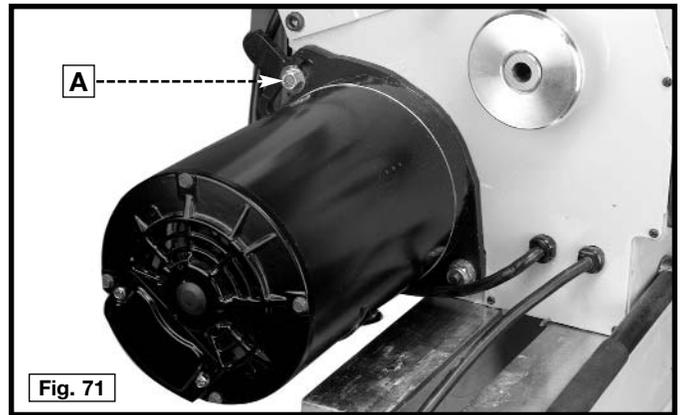
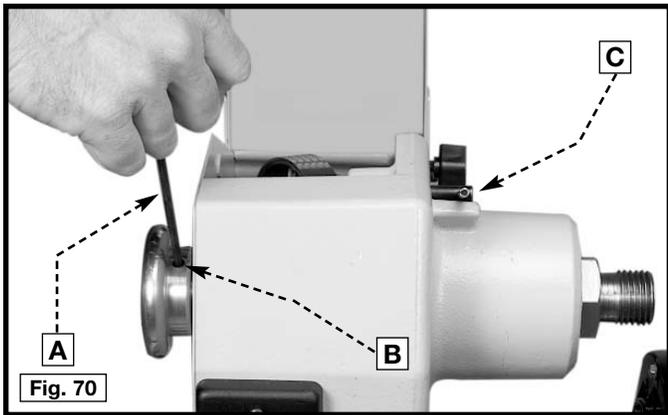
1. Remove the tool rest base and the tailstock from the lathe bed.
2. On the headstock, raise the handle (A) Fig. 65 to loosen the tension of the headstock on the lathe bed.
3. Lift the motor slightly and slide the headstock to the end of the lathe bed. (See also Fig. 69)
4. Lower the handle (A) Fig. 69 to lock the headstock in place.
5. Loosen the set screw on the faceplate (A) Fig. 67 two full turns. Use the supplied wrench (B) Fig. 68 to loosen the face plate, then remove the faceplate from the spindle.





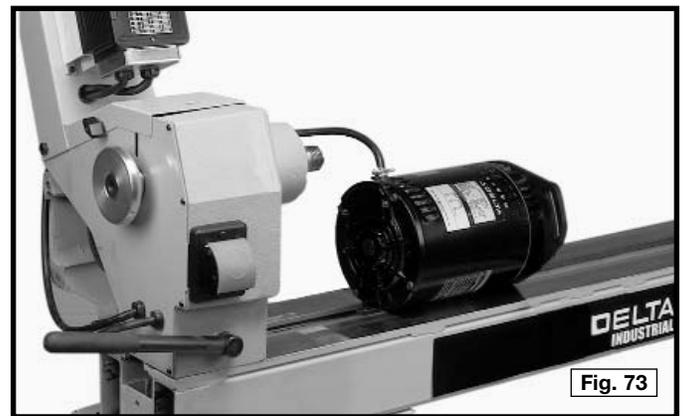
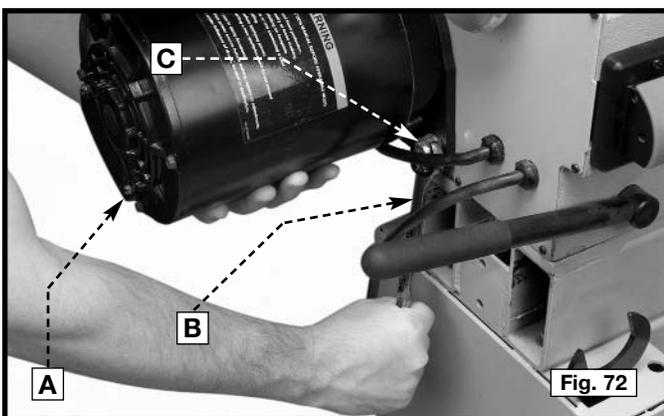
6. Use an outboard tool rest (B) Fig. 68 for all outboard turnings.
7. Fig. 69 illustrates the correct method for outboard turnings.

MAINTENANCE

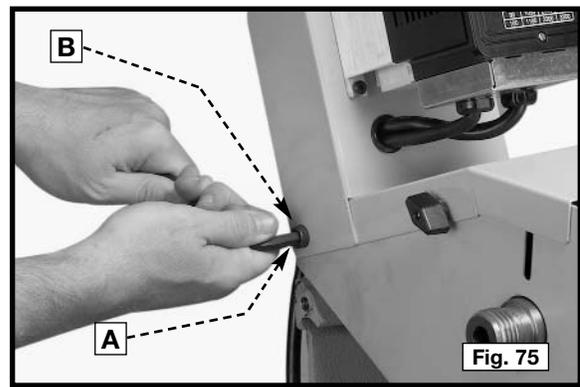
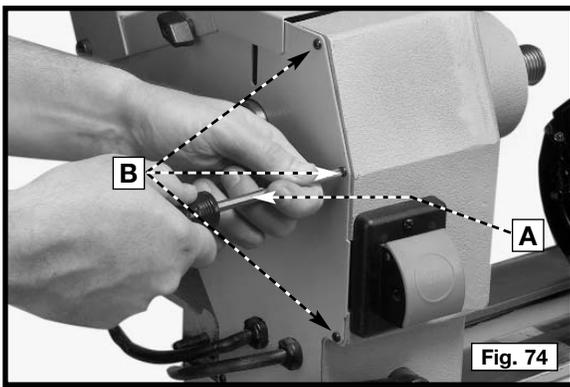


REPLACING DRIVE BELT

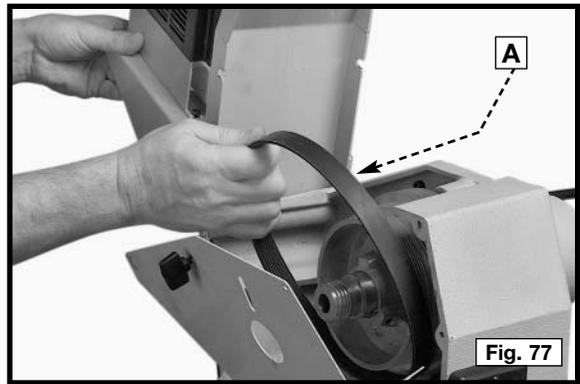
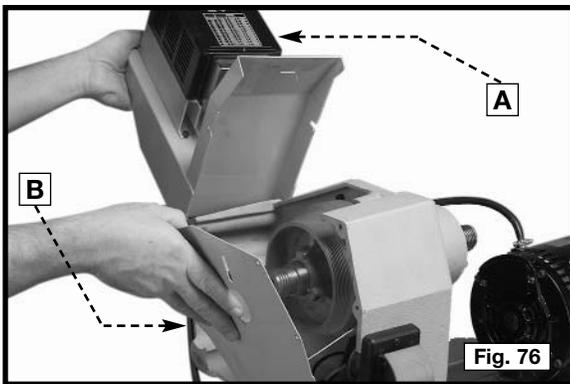
1. Use the supplied hex wrench (A) Fig. 70 to loosen the set screw in the handwheel (B) Fig. 70. Engage the spindle lock (C) and rotate the handwheel clockwise to remove.
2. Use an 11/16" wrench to remove the bolt (A) Fig. 71 from the motor yoke.



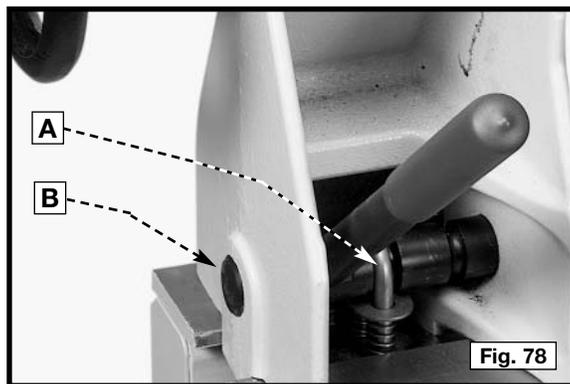
3. While holding the motor (A) Fig. 72 with one hand, use an 11/16" wrench (B) to remove the bolt (C). Lift the motor (A) and remove the belt from the motor pulley.
4. Pull the motor (A) Fig. 72 out, take it to the back of the lathe, and place it on the lathe bed (Fig. 73).



5. Use a Phillips screwdriver (A) Fig. 74 to remove the five cover screws (B) (three of which are shown). The other two screws are located under the power cords.
6. With a 5/16" hex wrench (A) Fig 75, remove the hex screw (B) Fig. 75. **NOTE:** When re-assembling, pass the screw completely through the pivoting control bracket and into the headstock, allowing the headstock cover to pivot.



7. While holding the control panel (A) Fig. 76 with one hand, remove the cover (B) Fig. 76. To prevent the control panel (A) from falling, loosely re-attach the hex screw (B) Fig. 75 to the control panel.
8. Replace the belt (A) Fig. 77.
9. To assemble, reverse the procedure.



LUBRICATION

Use a light oil to lubricate eccentric (A) Fig. 78, and pivot points (B) on both the headstock and the tailstock. (Tailstock illustrated).

Use the tip of a screwdriver (A) Fig. 79 to press on the opening, and drop light oil into the handwheel cover (B) of the tailstock.

KEEP MACHINE CLEAN

Periodically blow out all air passages with dry compressed air. All plastic parts should be cleaned with a soft damp cloth. NEVER use solvents to clean plastic parts. They could possibly dissolve or otherwise damage the material.

▲WARNING Wear ANSI Z87.1 safety glasses while using compressed air.

FAILURE TO START

Should your machine fail to start, check to make sure the prongs on the cord plug are making good contact in the outlet. Also, check for blown fuses or open circuit breakers in the line.

LUBRICATION

Apply household floor paste wax to the machine table and extension table or other work surface weekly.

PROTECTING CAST IRON FROM RUST

To clean and protect cast iron tables from rust, you will need the following materials: 1 pushblock from a jointer, 1 sheet of medium Scotch-Brite™ Blending Hand Pad, 1 can of WD-40®, 1 can of degreaser, 1 can of TopCote® Aerosol. Apply the WD-40 and polish the table surface with the Scotch-Brite pad using the pushblock as a hold-down. Degrease the table, then apply the TopCote® accordingly.

ACCESSORIES

A complete line of accessories is available from your Delta Supplier, Porter-Cable • Delta Factory Service Centers, and Delta Authorized Service Stations. Please visit our Web Site www.deltamachinery.com for a catalog or for the name of your nearest supplier.

▲WARNING Since accessories other than those offered by Delta have not been tested with this product, use Of such accessories could be hazardous. For safest operation, only Delta recommended accessories should be used with this product.



PARTS, SERVICE OR WARRANTY ASSISTANCE

All Delta Machines and accessories are manufactured to high quality standards and are serviced by a network of Porter-Cable • Delta Factory Service Centers and Delta Authorized Service Stations. To obtain additional information regarding your Delta quality product or to obtain parts, service, warranty assistance, or the location of the nearest service outlet, please call 1-800-223-7278 (In Canada call 1-800-463-3582).



Two Year Limited New Product Warranty

Delta will repair or replace, at its expense and at its option, any new Delta machine, machine part, or machine accessory which in normal use has proven to be defective in workmanship or material, provided that the customer returns the product prepaid to a Delta factory service center or authorized service station with proof of purchase of the product within two years and provides Delta with reasonable opportunity to verify the alleged defect by inspection. For all refurbished Delta product, the warranty period is 180 days. Delta may require that electric motors be returned prepaid to a motor manufacturer's authorized station for inspection and repair or replacement. Delta will not be responsible for any asserted defect which has resulted from normal wear, misuse, abuse or repair or alteration made or specifically authorized by anyone other than an authorized Delta service facility or representative. Under no circumstances will Delta be liable for incidental or consequential damages resulting from defective products. This warranty is Delta's sole warranty and sets forth the customer's exclusive remedy, with respect to defective products; all other warranties, express or implied, whether of merchantability, fitness for purpose, or otherwise, are expressly disclaimed by Delta.

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Fax: (909) 390-5554

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Fax: (303) 487-1868

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Fax: (954) 321-6638

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Fax: (763) 561-0653

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Fax: (314) 968-2790

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Fax: (704) 708-4625

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Fax: (614) 263-1238

Cleveland 44125
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Fax: (216) 447-3097

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Fax: (503) 252-2123

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