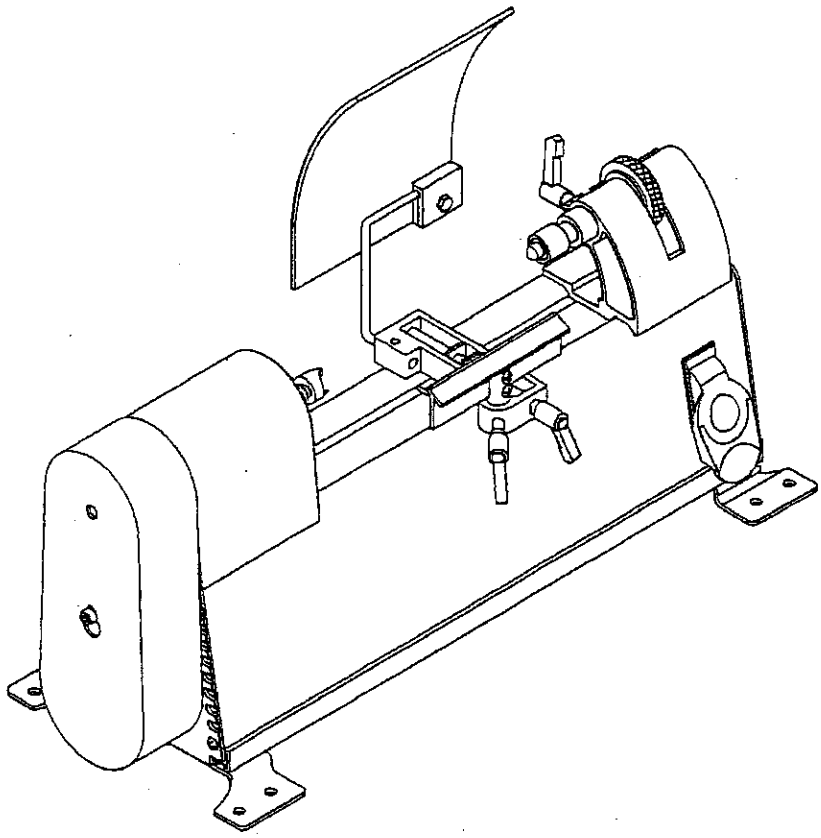
Operator's Manual

CRAFTSMAN®

12"
MINI LATHE

Model No.
351.221060



CAUTION:
Read and follow all Safety Rules and Operating Instructions before First Use of this Product. Keep this Manual with Tool.

Sears, Roebuck and Co., Hoffman Estates, IL 60179 U.S.A.
www.sears.com/craftsman
23139.00 Draft (01/03/05)

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WARRANTY

FULL ONE YEAR WARRANTY

If this product fails due to a defect in material or workmanship within one year from the date of purchase, Sears will at its option repair or replace it free of charge. Contact your nearest Sears Service Center (1-800-4-MY-HOME) to arrange for product repair, or return this product to place of purchase for replacement.

If this product is used for commercial or rental purposes, this warranty will apply for 90 days from the date of purchase.

This warranty applies only while this product is used in the United States.

This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

Sears, Roebuck and Co., Dept. 817WA, Hoffman Estates, IL 60179

SAFETY RULES

WARNING: For your own safety, read all of the instructions and precautions before operating tool.

CAUTION: Always follow proper operating procedures as defined in this manual — even if you are familiar with use of this or similar tools. Remember that being careless for even a fraction of a second can result in severe personal injury.

BE PREPARED FOR JOB

- Wear proper apparel. Do not wear loose clothing, gloves, neckties, rings, bracelets or other jewelry which may get caught in moving parts of machine.
- Wear protective hair covering to contain long hair.
- Wear safety shoes with non-slip soles.
- Wear safety glasses complying with United States ANSI Z87.1. Everyday glasses have only impact resistant lenses. They are **NOT** safety glasses.
- Wear face mask or dust mask if operation is dusty.
- Be alert and think clearly. Never operate power tools when tired, intoxicated or when taking medications that cause drowsiness.

PREPARE WORK AREA FOR JOB

- Keep work area clean. Cluttered work areas invite accidents.
- Do not use power tools in dangerous environments. Do not use power tools in damp or wet locations. Do not expose power tools to rain.
- Work area should be properly lighted.
- Keep visitors at a safe distance from work area.
- Keep children out of workplace. Make workshop childproof. Use padlocks, master switches or remove switch keys to prevent any unintentional use of power tools.
- Keep power cords from coming in contact with sharp objects, oil, grease, and hot surfaces.

TOOL SHOULD BE MAINTAINED

- Always unplug tool prior to inspection.
- Consult manual for specific maintaining and adjusting procedures.
- Keep tool lubricated and clean for safest operation.
- Keep all parts in working order. Check to determine that the guard or other parts will operate properly and perform their intended function.
- Check for damaged parts. Check for alignment of moving parts, binding, breakage, mounting and any other condition that may affect a tool's operation.
- A guard or other part that is damaged should be properly repaired or replaced. Do not perform makeshift repairs. (Use parts list provided to order replacement parts.)
- Never adjust attachments while running. Disconnect power to avoid accidental start-up.
- Have damaged or worn power cords replaced immediately.
- Keep cutting tools sharp for efficient and safest operation.

KNOW HOW TO USE TOOL

- Use right tool for job. Do not force tool or attachment to do a job for which it was not designed.
- Disconnect tool when changing attachments.
- Avoid accidental start-up. Make sure that the tool is in the "off" position before plugging in, turning on safety disconnect or activating breakers.
- Do not force tool. It will work most efficiently at the rate for which it was designed.
- Keep hands away from chuck, centers and other moving parts.
- Never leave tool running unattended. Turn the power off and do not leave tool until it comes to a complete stop.
- Do not overreach. Keep proper footing and balance.
- Never stand on tool. Serious injury could occur if tool is tipped or if centers are unintentionally contacted.
- Know your tool. Learn the tool's operation, application and specific limitations.
- Handle workpiece correctly. Mount firmly in holding devices. Protect hands from possible injury.
- Turn machine off if workpiece splits or becomes loose.
- Use cutting tools as recommended in "Operation."

WARNING: For your own safety, do not operate your wood lathe until it is completely assembled and installed according to instructions.

PROTECTION: EYES, HANDS, FACE, BODY, EARS

- If any part of your lathe is missing, malfunctioning , or has been damaged or broken, cease operating immediately until the particular part is properly repaired or replaced.
- Wear safety goggles that comply with United States ANSI Z87.1 and a face shield or dust mask if operation is dusty. Wear ear plugs or muffs during extended periods of operation.
- Small loose pieces of wood or other objects that contact a spinning workpiece can be propelled at very high speed. This can be avoided by keeping the lathe clean.

- Never turn the lathe ON before clearing the bed, head and tailstock of all tools, wood scraps, etc., except the workpiece and related support devices for the operation planned.
- Never place your face or body in line with the chuck or faceplate.
- Never place your fingers or hands in path of cutting tools.
- Never reach in back of the workpiece with either hand to support the piece, remove wood scraps, or for any other reason. Avoid awkward operations and hand positions where a sudden slip could cause fingers or hand to move into a spinning workpiece.
- Shut the lathe OFF and disconnect power source when removing the faceplate, changing the center, adding or removing an auxiliary device, or making adjustments.
- Turn key lock switch to "off" and remove key when tool is not in use.
- If the workpiece splits or is damaged in any way, turn lathe OFF and remove the workpiece from the holders. Discard damaged workpiece and start with a new piece of wood.
- Use extra care when turning wood with twisted grain or wood that is twisted or bowed — it may cut unevenly or wobble excessively.

KNOW YOUR CUTTING TOOLS

- Dull, gummy, improperly sharpened or set cutting tools can cause vibration and chatter during cutting operations. Minimize potential injury by proper care of tools and regular machine maintenance.

THINK SAFETY

Safety is a combination of operator common sense and alertness at all times when the lathe is being used.

- For your own safety, read all rules and precautions in the operator's manual before using this tool.
- For eye protection, wear safety glasses complying with United States ANSI Z87.1.
- Do not wear loose clothing, gloves, neckties, rings, bracelets or other jewelry that could get caught in moving parts of machine or workpiece. Wear protective hair covering to contain long hair.
- Tighten all clamps, fixtures and tailstock before applying power. Check to make sure that all tools and wrenches have been removed.
- With switch off, rotate workpiece by hand to make sure that there is adequate clearance. Start the machine on lowest speed setting to verify that the workpiece is secure.
- For large pieces, create a rough shape on another piece of equipment before installing on faceplate.
- Do not mount any workpieces that have splits or knots.
- **Never** attempt to remount a faceplate turning to the faceplate for any reason.
- **Never** attempt to remount a between-centers turning if the original centers on the turning have been altered or removed.
- When remounting a between-centers turning that has non-altered original centers, make sure that the speed is at the lowest setting for start-up.
- Use extra caution when mounting a between-centers turning to the faceplate, or a faceplate turning to between-centers, for secondary operations. Make sure that the speed is at the lowest setting for start-up.
- **Never** perform any operation with this lathe where the workpiece is hand-held. Do not mount a reamer, milling cutter, drill bit, wire wheel or buffing wheel to the headstock spindle.
- When hand-sanding faceplate or between-centers mounted workpieces, complete all sanding BEFORE removing the workpiece from the lathe.
- **Never** run the spindle in the wrong direction. The cutting tool could be pulled from your hands. The workpiece should always turn towards the operator.
- For spindle turning, ALWAYS position the tool rest above the centerline of the workpiece and spindle (approximately 1/8").

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.
- Arsenic and chromium from chemically-treated lumber.

Your risk from these exposures vary, 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.

UNPACKING

Check for shipping damage. If damage has occurred, a claim must be filed with carrier. Check for completeness. Immediately report missing parts to dealer.

Your wood lathe is shipped complete in one carton. Additional parts which need to be assembled to lathe, should be located and accounted for before assembly. Refer to Figure 42.

Mounting Plate (2), Key No. 26
M6 Square Nut (4), Key No. 27
M6 Flat Washer (4), Key No. 9
M6 x 12 Socket Head Bolt (4), Key No. 25
Support Rod (1), Key No. 45
Guard Assembly (1), Key Nos. 8, 48 and 49
Pen Mandrel System (1), Key No. 50

If any parts are missing, do not attempt to assemble the lathe, plug in the power cord, or turn the switch on until the missing parts are obtained and properly installed.

ASSEMBLY

Refer to Figure 42.

- Slide a square nut (Key No. 27) into the front and rear channels of the lathe bed (Key No. 28).
- Place two M6 x 12 socket head bolts and flat washers (Key Nos. 9 and 25) into a mounting plate (Key No. 26).
- Thread bolts into the square nuts securely.
- Repeat for other mounting plate.
- Insert guard support (Key No. 45) into tool rest base (Key No. 39). Secure in position with set screw (Key No. 36).
- Attach guard assembly to support. Secure in position with wing nut (Key No. 49). Position guard over work.

INSTALLATION

LOCATION OF WOOD LATHE

The lathe should be positioned so that neither the operator nor a casual observer is forced to stand in line with the spinning chuck or workpiece.

WARNING: The lathe must be clamped or bolted securely to work bench. An unbalanced workpiece will cause the lathe to shake and tip over.

MOUNTING LATHE TO BENCH

- Drill four ¼" holes through the top of the bench as shown in the following illustration:
- Position lathe over the holes and feed ⅜" flat head screws (not supplied) through holes in lathe bed.
- Secure from underneath with flat washers, lock washers and hex nuts (not supplied).

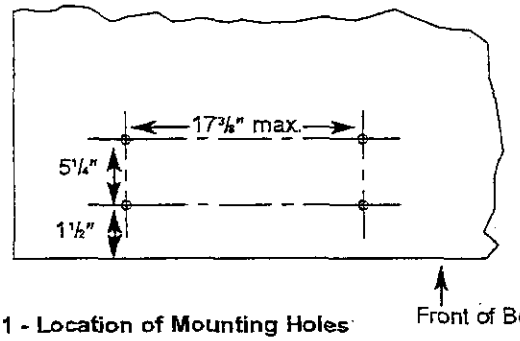


Figure 1 - Location of Mounting Holes

REMOVAL OF SPUR CENTER FROM SPINDLE

- To remove spur center from spindle, insert a ¼" wood dowel or brass rod through the hole in the spindle. Hold the center with one hand and tap the dowel or rod with a hammer.

REMOVAL OF BEARING CENTER FROM QUILL

Refer to Figure 42.

- To remove bearing center from tail stock quill, loosen handle (Key No. 34) and turn adjustment nut (Key No. 44) towards front of lathe bed.

POWER SOURCE

WARNING: Do not connect wood lathe to the power source until all assembly steps have been completed.

The motor is designed for operation on the voltage and frequency specified. Normal loads will be handled safely on voltages not more than 10% above or below specified voltage. Running the unit on voltages which are not within range may cause overheating and motor burn-out. Heavy loads require that voltage at motor terminals be no less than the voltage specified on nameplate.

- Power supply to the motor is controlled by a single pole locking rocker switch. Remove the key to prevent unauthorized use.

GROUNDING INSTRUCTIONS

WARNING: Improper connection of equipment grounding conductor can result in the risk of electrical shock. Equipment should be grounded while in use to protect operator from electrical shock.

- Check with a qualified electrician if grounding instructions are not understood or if in doubt as to whether the tool is properly grounded.
- This tool is equipped with an approved 3-conductor cord rated at 150V and a 3-prong grounding type plug (see Figure 2) for your protection against shock hazards.
- Grounding plug should be plugged directly into a properly installed and grounded 3-prong grounding-type receptacle, as shown (Figure 2).

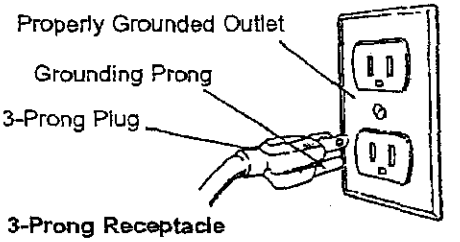


Figure 2 - 3-Prong Receptacle

- Do not remove or alter grounding prong in any manner. In the event of a malfunction or breakdown, grounding provides a path of least resistance for electrical shock.

WARNING: Do not permit fingers to touch the terminals of plug when installing or removing from outlet.

- Plug must be plugged into matching outlet that is properly installed and grounded in accordance with all local codes and ordinances. Do not modify plug provided. If it will not fit in outlet, have proper outlet installed by a qualified electrician.
- Inspect tool cords periodically and if damaged, have them repaired by an authorized service facility.
- Green (or green and yellow) conductor in cord is the grounding wire. If repair or replacement of the electric cord or plug is necessary, do not connect the green (or green and yellow) wire to a live terminal.
- Where a 2-prong wall receptacle is encountered, it must be replaced with a properly grounded 3-prong receptacle installed in accordance with National Electric Code and local codes and ordinances.

WARNING: This work should be performed by a qualified electrician.

A temporary 3-prong to 2-prong grounding adapter (see Figure 3) is available for connecting plugs to a two pole outlet if it is properly grounded.

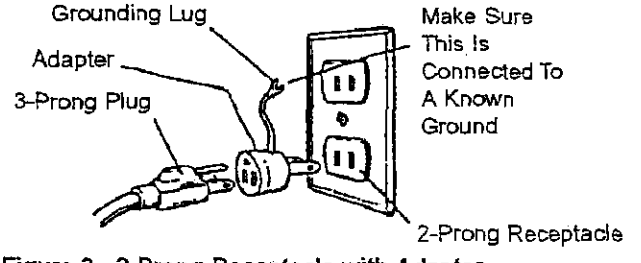


Figure 3 - 2-Prong Receptacle with Adapter

- Do not use a 3-prong to 2-prong grounding adapter unless permitted by local and national codes and ordinances.
- (A 3-prong to 2-prong grounding adapter is not permitted in Canada.) Where permitted, the rigid green tab or terminal on the side of the adapter must be securely connected to a permanent electrical ground such as a properly grounded water pipe, a properly grounded outlet box or a properly grounded wire system.
- Many cover plate screws, water pipes and outlet boxes are not properly grounded. To ensure proper ground, grounding means must be tested by a qualified electrician.

EXTENSION CORDS

- The use of any extension cord will cause some drop in voltage and loss of power.
- Wires of the extension cord must be of sufficient size to carry the current and maintain adequate voltage.
- Use the table to determine the minimum wire size (A.W.G.) extension cord.
- Use only 3-wire extension cords having 3-prong grounding type plugs and 3-pole receptacles which accept the tool plug.
- If the extension cord is worn, cut, or damaged in any way, replace it immediately.

Extension Cord Length

	Wire Size A.W.G.
Up to 25 ft.	18

NOTE: Using extension cords over 25 ft. long is not recommended.

MOTOR

The wood lathe is assembled with motor and wiring installed as an integral part of the tool. The electrical wiring schematic is shown in Figure 4 below.

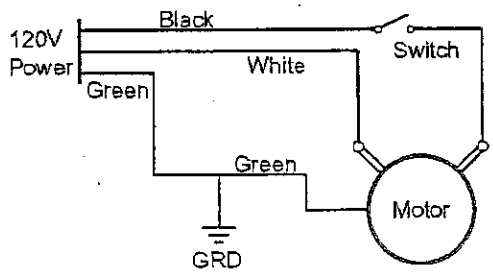


Figure 4 - Wiring Schematic

The 120 Volt AC motor has the following specifications:

Horsepower (Maximum Developed)	⅛
Voltage	120
Amperes	1.2
Hertz	60
Phase	Single
RPM	3450
Rotation (viewed from left side)	Clockwise

ELECTRICAL CONNECTIONS

WARNING: Make sure unit is off and disconnected from power source before inspecting any wiring.

The motor is installed and wiring connected as illustrated in the wiring schematic (see Figure 4).

The motor is assembled with an approved three conductor cord to be used on 120 volts as indicated. The power supply to the motor is controlled by a single pole rocker switch.

The power lines are inserted directly onto the switch. The green ground line must remain securely fastened to the frame to properly protect against electrical shock.

OPERATION

Refer to Figures 5 - 42.

DESCRIPTION

Craftsman 12" 3-speed wood lathe provides capability to turn wooden workpieces up to 12" long and 4" diameter. The motor rotates at 3450 RPM and the spindle speeds range from 1350 to 3500 RPM.

Lathe includes 2½" face plate, spur and bearing centers, safety guard and pen mandrel system.

SPECIFICATIONS

Turning length (max.)	12"
Swing over bed	4"
Swing over toolrest base	2½"
Length	23⅝"
Width	5⅛"
Height	8⅝"
Spindle speed	1350 to 3500 RPM
Spindle thread	¾"-16
Spindle taper	#1MT
Tailstock taper	#1MT
Tailstock quill travel	1⅛"
Switch	120V, SP
Motor	3450 RPM, 1.2 AMPS
Weight	14 lbs

WARNING: Operation of any power tool can result in foreign objects being thrown into the eyes, which can result in severe eye damage. Always wear safety goggles complying with Unites States ANSI Z87.1 (shown on package) before commencing power tool operation. Safety goggles are available at Sears retail stores or catalog.

CAUTION: Always observe the following safety precautions:

SAFETY PRECAUTIONS

- Whenever adjusting or replacing any parts on the tool, turn switch OFF and remove the plug from power source.
- Recheck all locking handles. They must be tightened securely.
- Make sure all guards are properly attached. All guards should be securely fastened.
- Make sure all moving parts are free and clear of any interference.
- Make sure all fasteners are tight and have not vibrated loose.
- With power disconnected, test operation by hand for clearance and adjust if necessary.
- Always wear eye protection or face shield.
- After turning switch on, always allow the spindle to come up to full speed before turning.
- Be sure motor runs clockwise when viewing spindle extension from the left end (outboard side of headstock).
- Keep hands clear of spindle, centers, pulleys and other moving parts of machine.
- For optimum performance, do not stall motor or reduce speed. Do not force the tool into the work.

CHANGING SPEEDS

Refer to Figures 5 and 42.

CAUTION: Make sure the power cord is removed from the outlet before attempting to change the belt position.

- Remove socket head bolt and open pulley cover (Fig. 42, Key Nos. 15 and 16).
- Refer to Figure 5 for desired spindle speed. Lift belt to required pulley step on the spindle pulley.
- Lift belt to required pulley step on the motor pulley.
- Close pulley cover and secure with bolt.

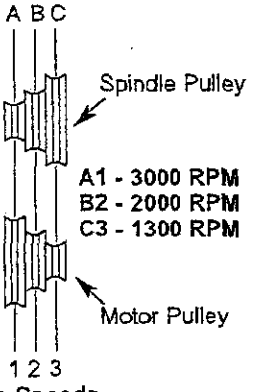


Figure 5 - Spindle Speeds

ON/OFF SWITCH

Refer to Figure 42.

- The ON/OFF switch (Key No. 29) is located on the front of the lathe bed. To turn lathe ON, pull switch to the up position. To turn lathe OFF, push switch to the down position.

The lathe can be locked from unauthorized use by locking the switch. To lock the switch:

- Turn the switch to OFF position and disconnect lathe from power source.
- Pull the key out. The switch cannot be turned on with the key removed.

NOTE: Should the key be removed from the switch at the ON position, the switch can be turned to OFF position, but cannot be turned to ON position.

- To replace key, slide key into the slot on switch until it snaps.

SPINDLE TURNING

If you have never done any amount of wood turning, we suggest that you practice using the various wood turning tools. Start with a small spindle turning.

Be sure to study the following pages of this manual. They explain and illustrate the correct use of the turning tools, the positioning of the tool rest, and other information to help you gain experience.

1. Select a piece of wood ½" x ½" x 4".
2. Draw diagonal lines on each end to locate the centers.

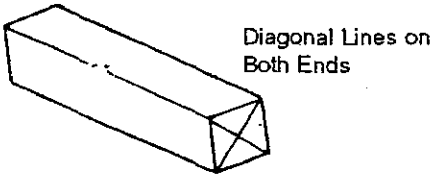


Figure 6

3. On one end, make a saw cut approximately 1/16" deep on each diagonal line. This is for the spur center.
4. The other end uses the bearing center. Place the point of the bearing center on the wood where the diagonal lines cross.
5. Drive the bearing center into the wood. Use a wooden mallet or a plastic hammer, but put a piece of wood on the end of the bearing center to protect it from harm.

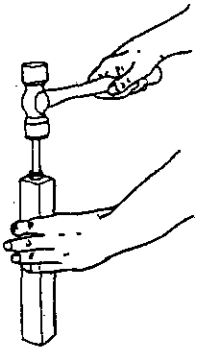


Figure 7

6. Remove the bearing center and drive the spur center into the other end of the wood. Make sure the spurs are in the saw cuts. Remove the spur center.
7. Make sure the centers and the hole in the spindle and the tailstock quill are clean. Insert the spur center into the headstock and the bearing center into the tailstock. Tap them in lightly with a piece of wood. Do not drive them in.
8. Place the wood between the centers and lock the tailstock.
9. Move the bearing center into the wood by turning the hand wheel. Make sure that the bearing center and spur center are "seated" into the wood in the holes made in steps 5 and 6. Rotate the wood by hand while turning the hand wheel.
10. Adjust the tool rest approximately ⅛" away from the corners of the wood and ⅛" above the center line. Note the angled position of the tool rest base. Lock the tool rest base and the tool rest.

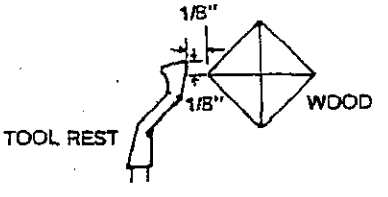


Figure 8

11. Observe the speed chart. Move the V-belt on the pulleys to the slowest speed. Rotate the wood by hand to make sure that the corners do not strike the tool rest.

SQUARE	LENGTH	ROUGH RPM	FINISH RPM	SAND RPM
up to 1"	1 to 12"	1350	2250	3500
1" to 3"	1 to 12"	2250	3500	3500

USING WOODWORKING CHISELS

SELECTION OF CHISELS

Sharp tools are essential for clean, easy work. Select tools that will take and hold keen edges.

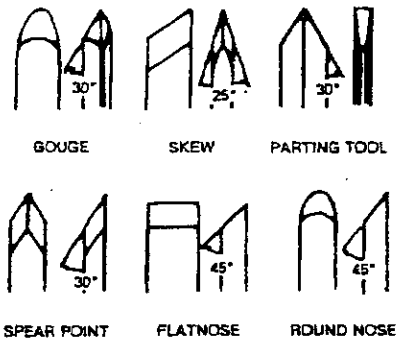
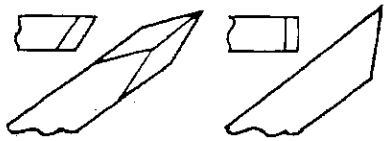


Figure 9 - The Six Commonly Used Chisel Types

THEORY OF TURNING

The two classes of chisels are those intended primarily for cutting, and chisels used only for scraping.

- The cutting chisels are the gouge, skew and parting tool. These are the most used. They are commonly sharpened to a razor edge by honing on both sides.
- The scraping chisels are the flat nose, round nose and spear point. These are not honed on the flat sides – the wire edges produced by grinding are left on to aid in the scraping process.

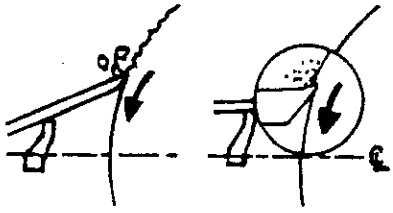


Cutting Chisel Scraping Chisel

Figure 10

Cutting and Scraping

- To cut, the chisel is held so that the sharp edge actually digs into the revolving work to peel off shavings.
- To scrape, the chisel is held at a right angle to the work surface. This tool removes fine particles instead of shavings.



Cutting Scraping

Figure 11

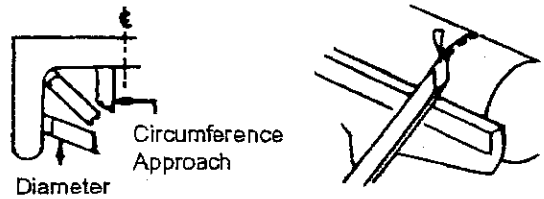
Many operations require that the cutting chisels be used for scraping, but scraping chisels are practically never used for cutting. Scraping dulls a chisel much faster, especially the razor sharp cutting chisels.

Cutting is faster than scraping and produces a smoother finish which requires less sanding. However, it is far more difficult to master. Scraping, on the other hand, is far more precise and easier to control.

When You Can Cut and When You Must Scrape

There are two different approaches:

- One approach is toward a circumference of the workpiece (for example turning down the outer surface of a cylinder or the inner wall of a hollow round box). In this approach, the surface being turned travels under the chisel edge like an endless belt.
- The second approach is toward the diameter of a workpiece (as when turning the face of a faceplate turning, or the side of a large shoulder on a spindle turning). In this approach, the surface being turned rotates like a disc under the chisel edge.
- Sometimes the optimum approach will be a combination of both methods.



Circumference Approach

Diameter Approach

Figure 12

Either a cutting or scraping action can be used when the approach is toward a circumference – the shaving is removed like a peeling from a potato. Scraping can only be used when the approach is toward a diameter. The reason is obvious when you consider that faceplate turning practically always requires removal of wood across the grain. Wood does not peel easily across the grain and attempts to use any inappropriate cutting methods will likely result in damage to the workpiece. There is also danger that the tool could be pulled from the hands of the operator.

In general, a cutting action is used for the majority of spindle turning operations while faceplate turning is usually accomplished by the scraping method. When a combination approach is to be used, the operator will have to judge, by the feel of the work, when to stop cutting and start scraping. **Never** try to cut when it becomes difficult to hold the chisel against the roughness of the wood grain.

How to Position Tool Rest for Circumference Cutting

When cutting, the object is to pierce the outer skin of wood to a certain desired depth and then to hold the chisel steady with the bevel edge parallel to the work circumference so that it will peel off a shaving at this desired depth.

- The only sure method of holding the chisel steady is to rest the bevel against the work (Figure 13A). When the tool rest is at the proper height, the chisel can be held with the bevel pressed against the work, and the tool rest will act as a fulcrum to support the chisel against the downward force of the revolving work.
- If the rest is placed too low, so that the chisel is held with the bevel out from the work (Figure 13B), the cutting edge will continue to dig deeper into the work. It will dig in until the "bite" becomes so deep that your hands have difficulty holding the chisel – then the improperly supported chisel will begin to bounce or chatter against the workpiece.
- If the rest is placed too low, the chisel must be held extremely high to position the bevel against the work (Figure 13C). Then the rest loses most of its value as a fulcrum and the downward force of the revolving workpiece tends to kick the chisel back out of your hands.

- If the rest is placed too high (Figure 13D) and the chisel is correctly positioned for cutting, it strikes the workpiece near the top where the direction of force exerted by the workpiece is nearly horizontal – and kickback will again result.
- If the rest is placed too far out from the work surface (Figure 13E), then, when correctly held, the chisel is again too high on the work. Also, you have less leverage on your side of the tool rest and it is even more difficult to hold the chisel. With large diameter work (Figure 13F), the tool rest can be above the workpiece centerline, and somewhat out from the work surface. With small diameter work (Figure 13G), the rest should be closer to the work surface. As work grows smaller, the rest should be repositioned.

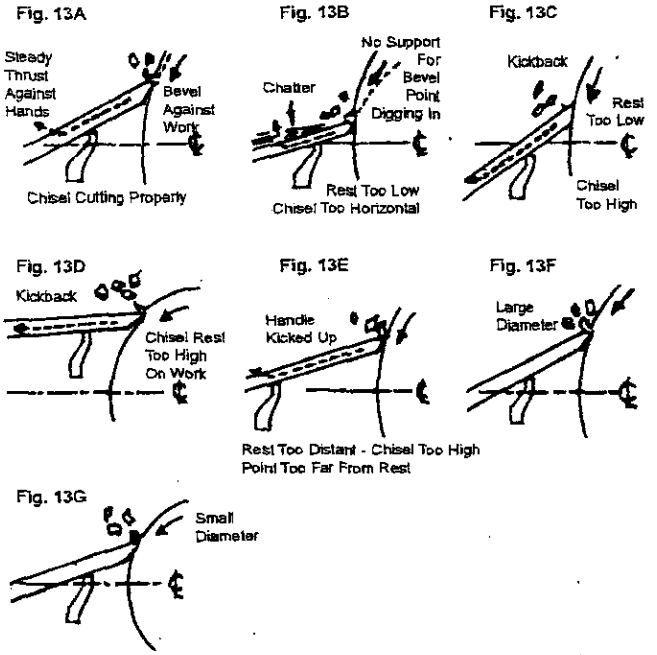


Figure 13

How to Position Tool Rest for Circumference Scraping

In scraping operations, the tool rest position is not as critical as it is for cutting operations.

- The chisel generally is held horizontally, though it can be held at an angle to reach into tight places. Considering that the wire edge of the chisel does the scraping, Figures 14B and 14C show the results of too low or too high a position for the rest.
- Figure 14A shows the chisel action with the rest correctly positioned.

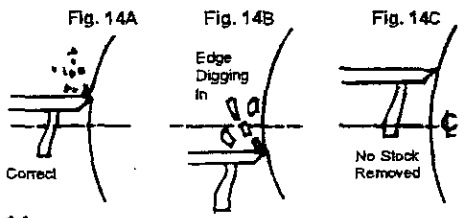


Figure 14

How to Position Chisel and Rest for Diameter Scraping

When scraping on the diameter, that portion of surface to the right of center is moving upward (Figure 15A). If a chisel is placed in this area, it will simply be carried up off the rest and out of your hands.

- All diameter approach operations must be done at the left of center.

Three different chisel contact points are shown in Figure 15B. It will be noted that when a chisel is above the workpiece center (or below it) the work surface sweeps past the chisel edge at an angle and tends to carry the chisel in one direction or the other along the rest.

- Only when the chisel contacts the work on the centerline, does the work surface pass squarely under the chisel edge. This, then, is the position in which it is easiest to hold the chisel steady. To obtain this position, place the rest approximately ⅛" (thickness of chisel) below center.

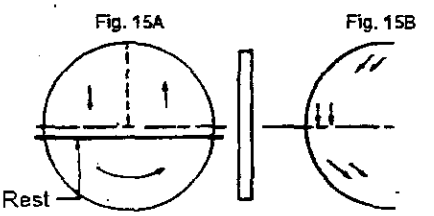


Figure 15

USING THE GOUGE

Three gouges, the ¼, ½ and ¾" sizes, are adequate for general homeshop turning. Other sizes from ⅛ to 2" can be purchased to provide more flexibility.

The chief use of the gouge is for rough circumference cutting of raw stock down to a cylinder of working size. It is best to use this tool for rapid cutting away of large areas of the workpiece. When the tool is used this way, it does not produce a smooth surface. With practice, the gouge can be used for cutting coves and the shaping of long cuts.

- When used for cutting, the gouge is always held with the convex side down. It should be rolled approximately 30° to 45° in the direction in which it is being advanced along the rest and the cutting edge should be slightly ahead of the handle.

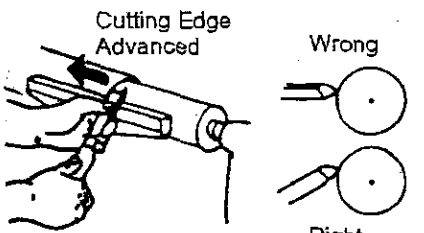


Figure 16

USING THE SKEW

- Two skews, the ½ and 1" sizes, are all that are needed for general use. Other sizes are available.

This tool is nearly always used to make finished cuts, to cut vees and beads, and to square shoulders. Properly used, it produces the best finish that can be obtained with a chisel. It is not recommended for scraping because the edge tends to dull more quickly.

- For finish cutting, the skew is held with the cutting edge considerably in advance of the handle, bevel side down. Keep the base of the bevel against the work. It is good practice is to place the skew well over the work, pull it back until the edge begins to cut, then swing the handle into position to advance the cut.

Both the toe and the heel of the skew can be used for taking light cuts, but do not penetrate the wood too deeply without cutting clearances. There is danger of burning the tip of the tool.

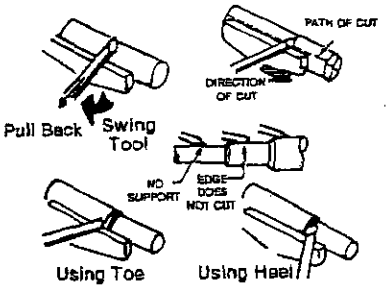


Figure 17

USING THE PARTING TOOL

The parting tool has just one primary purpose: to cut into the workpiece as deeply as desired, or all the way through to make a cut-off. It is, therefore, a very narrow tool (⅛" wide) and shaped to cut its own clearance so that the edge will not be burned. When used for scraping, however, the parting tool should be backed off regularly to prevent overheating.

Unlike the gouge and skew, the parting tool is seldom held with the bevel against the work. Since the amount of stock removal is small, a support for the bevel is not necessary.

The tool is simply fed into the work at an angle (for cutting), or pointed at the workpiece center (for scraping). It can be held easily in one hand.

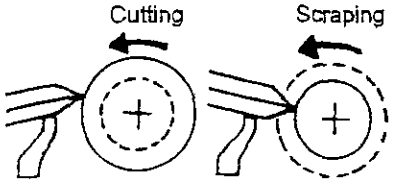


Figure 18

USING THE SCRAPING CHISELS

- A ½" wide spear point chisel, a ½" wide round nose chisel, and a 1" wide flat nose chisel complete the list of tools ordinarily used by craftsmen and hobbyists.

Each of these scraping chisels can be purchased in various other sizes for special purposes. All are very useful for diameter scraping operations and for circumference scraping when cutting methods cannot be employed.

- The spear point is used for fine scraping and delicate operations such as the forming of beads, parallel grooves and shallow vees.
- Edges and bowl contours can be rounded with the round nose chisel.
- Any flat surface can be scraped with the flat nose chisel.

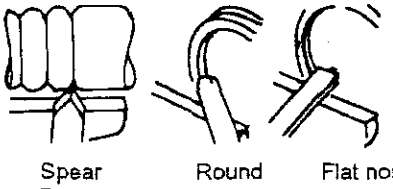


Figure 19

USING SHAPER OR MOULDING KNIVES

- An old chisel can be made to serve as a holder for shaper or moulding knives.

Such knives make it possible to scrape many interesting shapes into the workpiece surface using one or two operations instead of the many operations required with standard chisels. It is generally not practical to use cutting methods with special shape tools. Scraping methods should be used instead.

- The holder should provide a shoulder against which the butt end of the knife can be firmly seated.The knife must be securely mounted, either by means of a screw threaded into the holder, or by compressing it between two prongs bolted together.

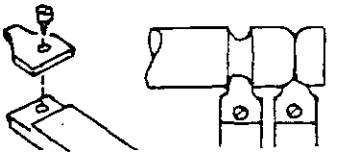


Figure 20

USING A BLOCK PLANE

Clear, glass-smooth finishes (especially on softwoods) can be obtained by using a block plane set to take a fine shaving.

- The tool rest should be raised up approximately to the top of the workpiece – and the plane should be horizontal, but turned slightly in the direction of travel so that it will take a shearing cut.
- Two tool rests, one in front and the other behind the work, can be used to advantage in positioning the plane so as to exactly limit the depth of cut (and finished size of the workpiece).

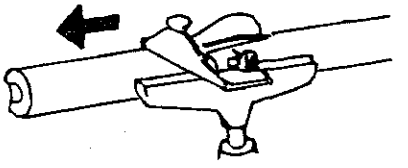


Figure 21

USING WOOD RASPS AND FILES

- A wood rasp will remove stock quickly when held against the revolving workpiece. Care should be taken to support the rasp firmly against the tool rest. An improperly held rasp, when used on a rough surface, can kick back and cause operator injury.
- The rasp will leave a very rough finish.
- Finer finishes (similar to those produced by scraping) can be obtained by using files in the same manner. Various types of files can be used for shaping vees, beads, coves, etc. If pressed too hard into the wood, some files can burn the workpiece.
- Keep the file clean to keep it cutting uniformly. Files work best on hardwoods.

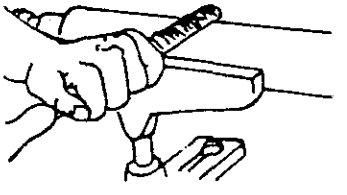


Figure 22

HAND POSITIONS

When using any of the chisels, the hand takes a natural position on the tool handle.This position may be near the middle of the handle or towards the end, depending upon the amount of leverage required. The position of the hand near the tool rest is a matter of individual preference, but there are three generally accepted positions, each best for certain types of operations.

Roughing Off

Roughing off and other heavy work requires a firm grip and solid positioning of the chisel against the rest. This is best obtained by the tool-rest hand positioned illustrated. The wrist is dropped down so that the heel of the hand below the little finger acts as a sliding guide against the rest. The handle hand controls chisel position.

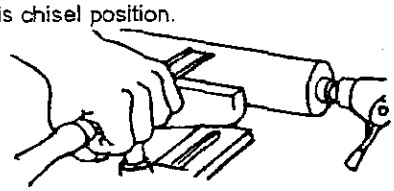


Figure 23

Finish Cutting

Finish cutting requires more control – with less force. Finish cutting is better done with the palm of the tool-rest hand turned up. The wrist is still held down, and the side of the index finger acts as a guide along the rest. In this position, control of the chisel is shared by both hands. The fingers of the tool-rest hand are free to assist in positioning the tool.

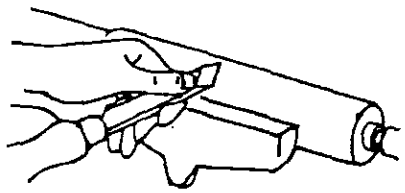


Figure 24

Intricate Cutting

Intricate, delicate cutting requires extreme control with practically no force. This is best accomplished by guiding the chisel with the fingers of the tool-rest hand. The hand is held palm up with the wrist high. The little finger is placed against the rest to steady the hand. The chisel does not touch the rest and the handle hand is completely secondary to the tool-rest hand.

NOTE: The first and second positions are equally good for scraping operations, but the third position is practically never used for scraping.

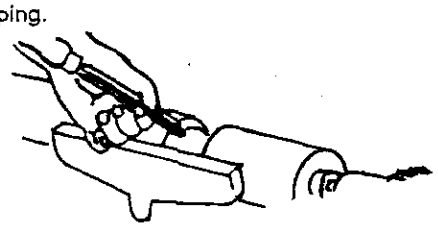


Figure 25

Cutting to Depth

Many scraping operations and cutting to depth with the parting tool can be easily accomplished with the one hand. The chisel is grasped firmly with the index finger on top to press it down against the rest. It is thrust straight into the work. Holding the tool in this manner leaves the other hand free to hold a pattern or calipers, etc., to check work in progress.

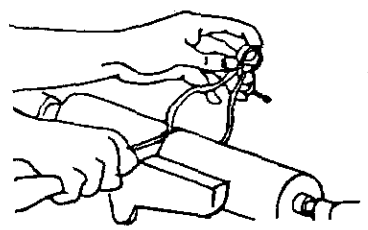


Figure 26

MAKING STANDARD CUTS

THE ROUGHING OFF-CUT

Reducing a square or odd shaped workpiece down to a cylinder of approximate size for finish turning is called "roughing off". Faceplate turnings and large diameter spindles should first be partly reduced by sawing, but small spindles are easily turned down entirely with the large (¾") gouge.

- Start the first cut about 1" from tailstock end – then run it toward the tailstock and off the end of the workpiece.
- Next, start another cut 1" nearer the headstock – and run it back towards the tailstock, to merge with the first cut.
- Continue cutting in this manner until 1 to 2" from the headstock is left uncut. Reverse the direction of tool travel and work one or two cuts in succession toward the headstock and off this end of the workpiece.
- Never start a cut directly at the end – if the chisel catches the end, it will damage the workpiece.
- Never take long cuts while corners remain on the work, as this tends to tear long slivers from the corners.
- The first series of cuts should not be too deep. It is better to partially reduce the work to a cylinder all along its length. After that, start a second series of cuts to complete reducing it to a cylinder.
- Once a cylinder has been formed, step lathe up to next faster speed. Further reductions in size can now be accomplished by cutting as deeply as desired at any spot along the work. At this stage, long cuts can be made from the center to either end.
- Generally, roughing off is continued until the cylinder is approximately ⅛" larger than the desired finished size.
- Roundness can be tested by laying the gouge on top of the work – it will not ride up and down when cylinder is perfectly round.

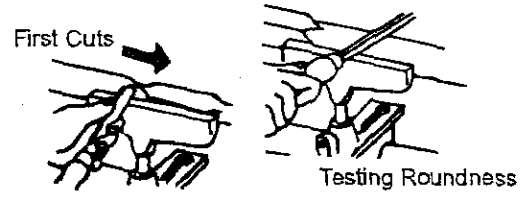


Figure 27

ROUGH-CUTTING TO SIZE

The roughing-off cut can be made to accurately size the cylinder to a given diameter.

Another method is to make a number of sizing cuts at intervals along the work, then use the gouge to reduce the whole cylinder down to the diameter indicated by these cuts.

MAKING SIZING CUTS

Sizing cuts are useful to establish approximate finished size diameters at various points along a workpiece. The work can then be turned down to the diameters indicated and be ready for finishing.

- Diameters for sizing cuts should be planned to be about ⅛" greater than the desired finish diameters. A sizing cut is made with the parting tool.
- Hold the tool in one hand, and use the other hand to hold an outside caliper preset to the desired sizing-cut diameter.
- As the cut nears completion, lower the chisel point more and more into a scraping position.

- When the calipers slip over the workpiece at the bottom of the groove, then the cut is finished.

Figure 28

SMOOTHING A CYLINDER

The final 1/8" can be removed in two ways. Either use the 1" skew, working from the center toward both ends and taking lighter and lighter cuts until finished, or use a block plane as illustrated in Figure 21.

CUTTING A SHOULDER

A shoulder can be the side of a square portion left in the workpiece, the side of a turned section, or the end of the workpiece. Most shoulders are perpendicular to the work axis, but a shoulder can be at any angle.

- First, mark position of the shoulder with a pencil held to the revolving workpiece.
- Second, make a sizing cut with the parting tool, placing this cut about 1/16" outside the shoulder position and cutting to within about 1/8" of the depth desired for the area outside of the shoulder.
- If shoulder is shallow, the toe of the skew can be used to make the sizing cut. Do not go in deeper than 1/8" with the skew unless wider and wider vees are cut to provide clearance for this tool.

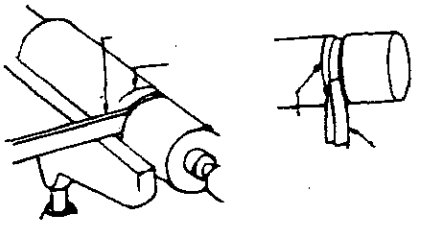


Figure 29

- Use the gouge to remove any waste stock outside of shoulder. Smooth this section, up to within 1/8" of shoulder, in the usual manner. Finishing of the shoulder, unless it is more than 1" high, is best done with the 1/2" skew.
- The toe of the skew is used to remove the shavings from the side of the shoulder – down to finished size.
- Hold skew so the bottom edge of bevel next to the shoulder will be very nearly parallel to side of shoulder – but with cutting edge turned away at the top so that only the extreme toe will do the cutting. If cutting edge is flat against shoulder, the chisel will run.
- Start with handle low, and raise handle to advance toe into the work.
- Cut down to finished diameter of outside area. Then, clean out the corner by advancing heel of the skew into it along the surface of the outside area.
- Tilt the cutting edge, with handle raised up so that only the extreme heel does this cutting.
- If shoulder is at end of work, the process is called squaring the end. In this case, reduce outer portion to a diameter about 1/4" larger than tool center diameter.Then, later, saw off the waste stock.

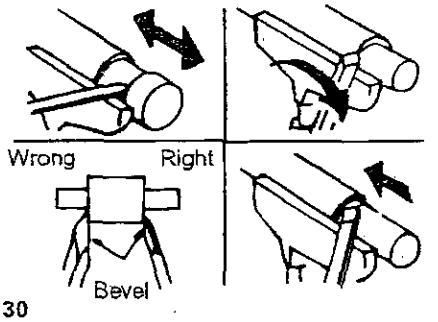


Figure 30

CUTTING VEES

Vee grooves can be cut with either the toe or heel of the skew.

- When the toe is used, the cutting action is exactly the same as when trimming a shoulder except that the skew is tilted to cut at the required bevel. Light cuts should be taken on first one side and then the other, gradually enlarging the vee to the required depth and width.
- When the heel is used, the skew is rotated down into the work, using the rest as a pivot. Otherwise, cutting position and sequence of cuts are the same. As when using the toe, it is important that cutting be done only by extreme end of cutting edge.
- If deep vees are planned, it is quicker to start them by making a sizing cut at the center of each vee.
- Vees can also be scraped with the spear point chisel or a three-sided file.

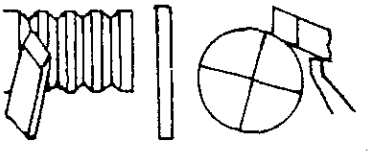


Figure 31

CUTTING BEADS

This operation requires considerable practice.

- First, make a pencil line to locate the tops (highest points) of two or more adjoining beads.
- Then, make a vee groove at the exact center between two lines and down to the desired depth of the separation between the beads. Be careful not to make the groove too wide or you will remove portions of the desired beads. The sides of the two adjoining beads are now cut with the heel of the skew. Use a 1/2" skew, unless beads are very large.
- Place skew at right angles with the work axis, flat against the surface, and well up near the top. The extreme heel should be just inside the pencil line that marks the top of the bead.
- Now, draw skew straight back while raising handle slowly – until edge of the heel at the pencil line starts to cut.
- As edge begins to cut, roll skew in the direction of the vee so that the exact portion of the edge which started cutting will travel in a 90° arc down to bottom of the vee.
- Upon reaching bottom of the vee, the skew should be on edge.
- Reverse the movements to cut side of the adjacent bead.

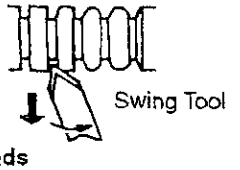


Figure 32 - Cutting Beads

t is important that only the extreme heel should do the cutting. This means that the bottom edge of the bevel next to the vee must at all times be tangent to the arc of the bead being formed.

Easier beads can be shaped with the spear point chisel.

- Use pencil marks and sizing cuts as before.
- Push the chisel straight into each cut and rotate horizontally to round off the adjacent edges. It must be moved slightly in the direction of rotation at the same time to keep the point from digging into the adjacent bead.

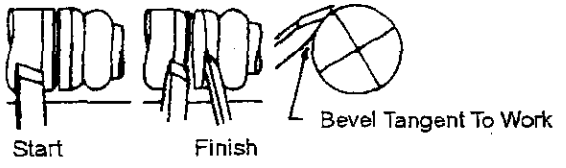


Figure 33

CUTTING COVES (CONCAVES)

This is the most difficult single cut to master – but one of the most important in good wood turning.

- First, use pencil marks to indicate the edges.
- Then, rough out the cove, to within about ⅛" of the desired finished surface, by scraping with the gouge or round nose chisel. If the cove is to be very wide, sizing cuts can be made to plot the roughing out. Once it is roughed out, the cove can be finished in two cuts, one from each side to the bottom center.
- At the start of either cut, gouge is held with handle high and the two sides of blade held between the thumb and forefinger of tool rest hand, just behind the bevel.
- Position the fingers so that they are ready to roll the blade into cove.
- Hold blades so that bevel is at 90° angle to the work axis with point touching the pencil line and pointed into work axis.
- From this start, depress point slightly to start cut, then continue to move point down in an arc toward the bottom center cove – at the same time rolling chisel uniformly so that, at the end of the cut, it will be flat at the bottom of the cove. The object is to keep the extreme point of gouge doing the cutting from start to finish. Reverse these movements to cut the opposite side.

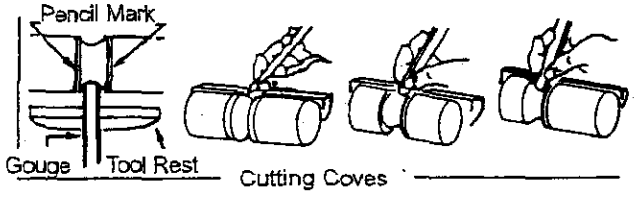


Figure 34

Coves also can be scraped to finish using the round nose chisel or a rattail file. These methods do not generally produce perfectly curved coves.

MAKING LONG CONVEX CUTS

- First, turn work down to approximate size, using sizing cuts (as required) to determine various diameters. Finish cuts can then be made with either skew or gouge.
- If the skew is used, the principles of the operation are the same as those employed in cutting a bead – except that the curve is longer and may be irregular. Use the extreme heel throughout – start at longer end of curve (if curve is irregular) and progress toward steeper end.

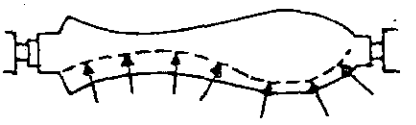


Figure 35 - Chisel Inclined in Direction of Cut

- If gouge is used, make cut in the same direction. Start with the handle well back of point – swinging handle in the direction of tool travel to overtake the point, if necessary, when the steep part of the curve is reached. Object is to have the extreme point doing the cutting throughout with the bevel as tangent to curve as possible.

MAKING LONG TAPER CUTS

Long taper cuts are made like long convex cuts, with the skew or gouge. However, the angle between the cutting edge and handle is kept constant during the entire cut. The handle is not swung around.

- Always cut downhill. Do not cut too deeply at the center of the taper.

SPINDLE TURNINGS

PLOTTING THE SHAPE

Once the basic cuts have been mastered, you are ready to turn out finished work.

- The first step is to prepare a plan for the proposed turning. This can be laid out on a suitable sheet of paper. The layout should be to full size.
- Next, prepare the turning stock by squaring it up to the size of the largest square or round section in your plan. The stock can be cut to the exact length of the proposed turning. However, in most cases, it is best to leave the stock a little long at one or both ends to allow for trimming.
- Mount the stock in the lathe and rough it off to a maximum-size cylinder.
- Now, project your plan onto the turning by pencil marking the various critical dimensions along the length of the spindle. These dimensions can be laid out with an ordinary ruler or by using a template. Make the pencil marks about ½" long so they will be visible when the work is revolved under power. The lines can be quickly traced around the spindle by touching each line with the pencil.

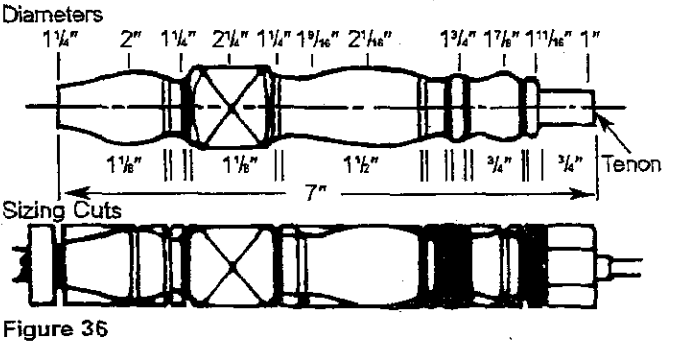


Figure 36

- After marking, use the parting tool to make sizing cuts at all of the important shoulders. When learning, you will find it best to make sizing cuts to accurately plot the various diameters. Experienced wood workers can manage with fewer such cuts at the important shoulders.
- Plan each sizing cut so that it is in waste stock and make each cut deep enough so that there will be just enough wood left under the cut for the finishing process.

- Once the sizing cuts have been completed, rough-out the excess wood with a gouge. Then, proceed with the finishing process by making the various types of cuts required.

FACEPLATE AND CHUCK TURNINGS

PLANNING THE WORK

Make a layout first, to provide a visual pattern to follow while working the turning. Pattern can be laid out in the same manner as spindle patterns – or templates can be made which can be held against the work for visual comparison. Circles to locate the various critical points (at which the contours of the faceplate take distinct form) can be quickly scribed on the rotating work by using the dividers.

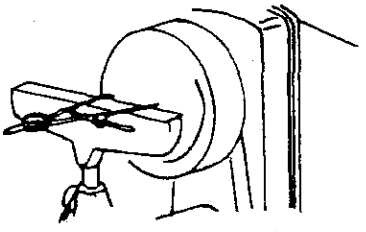


Figure 37

PLANNING VARIOUS CUTS

The circumference of a faceplate turning is roughed-out and finished in the same manner that a spindle is worked. Practically all of the balance of the operations, however, are done by using scraping methods. A few of the standard contours which must often be tuned are illustrated in the accompanying sketch which also shows the proper chisels for shaping these contours. Any roughing out to depth is generally accomplished with the gouge held in the scraping position.

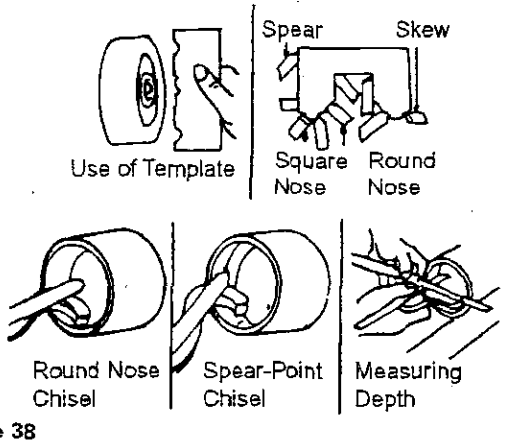


Figure 38

SANDING, BUFFING AND POLISHING

USING THE LATHE TO SAND TURNINGS

- Turnings should be sanded with the lathe running in highest speed.
- A large sheet of sandpaper is useful for smoothing cylinders.
- All other sanding operations are done with a narrow strip of abrasive paper. The best finishing grit is 3/0 for softwood, 4/0 for hardwoods. Worn 2/0 paper is often used, and is the equivalent of 3/0 or 4/0 new paper.

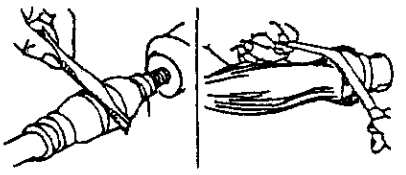


Figure 39

The application of the sandpaper strip is shown in the illustrations.

- Care must be exercised in order to prevent dubbing the corners of beads, shoulders, etc.
- It is good practice to finish sanding with the work in reverse rotation (remount work exchanging end for end). This is particularly true when sanding basswood, white pine and mahogany. These woods are hard to sand clean since sanding packs the surface fuzz down to the wood.
- Sanding very lightly, and not too long, with the lathe reversed, will lift the fibers and cut them off clean.

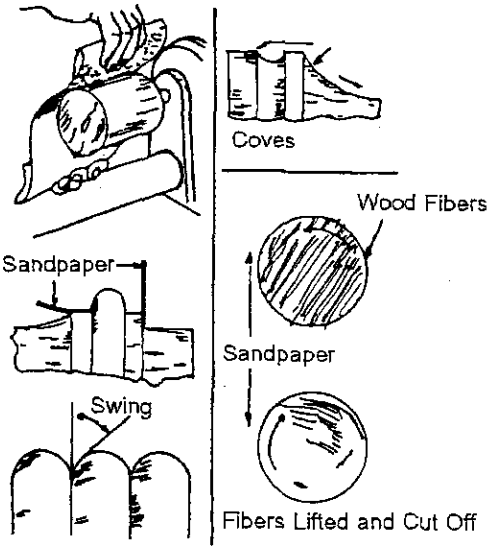


Figure 40

INSTALLING THE PEN MANDREL

Refer to Figures 41 and 42.

- Remove spur center (Fig. 42, Key No. 2) from spindle (Fig. 42, Key No. 3).
- Thread shaft (B) securely into tapered sleeve (A).
- Slide workpiece and bushings (C) onto the shaft. Use an appropriate number of bushings so that workpiece will be held securely.
- Secure workpiece and bushings using knurled nut (D).
- Insert the tapered sleeve of the mandrel firmly into the spindle.
- Use bearing center (Fig. 42, Key No. 41) to support shaft end of the mandrel.

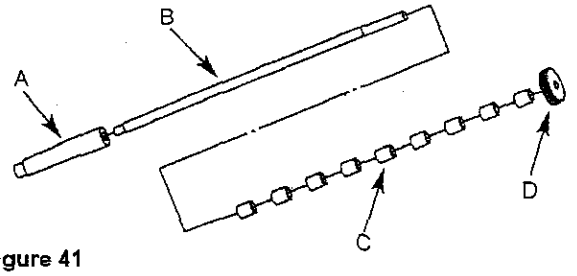


Figure 41

MAINTENANCE

WARNING: Make certain that the unit is disconnected from power source before attempting to service or remove any component.

CLEANING

Keep machine and workshop clean. Do not allow sawdust to accumulate on the tool. Keep centers clean. Check inside belt guard to make sure that saw dust has not accumulated.

Be certain motor is kept clean and is frequently vacuumed free of dust.

Use soap and water to clean painted parts, rubber parts and plastic guards.

LUBRICATION

The shielded ball bearings in this tool are permanently lubricated at the factory. They require no further lubrication.

KEEP TOOL IN REPAIR

- If power cord is worn, cut, or damaged in any way, have it replaced immediately.
- Replace any damaged or missing parts. Use parts list to order parts.

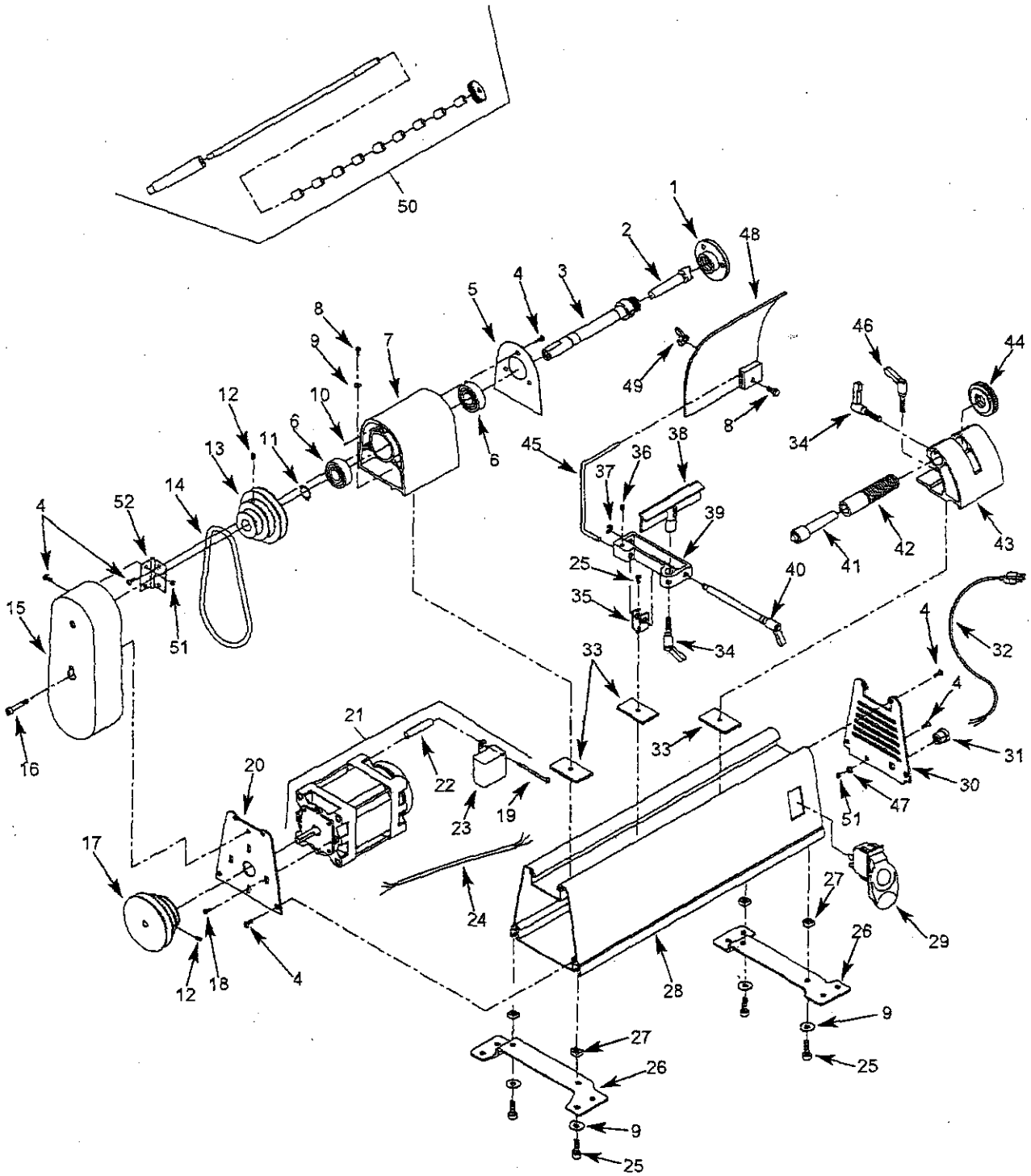
Any attempt to repair motor may create a hazard unless repair is done by a qualified service technician. Repair service is available at your nearest Sears store.

TROUBLESHOOTING

SYMPTOM	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
Motor will not start	1. Low voltage 2. Open circuit in motor or loose connections	1. Check power line for proper voltage 2. Inspect all lead connections on motor for loose or open connection
Motor will not start; fuses blown or circuit breakers are tripped	1. Short circuit in line cord or plug 2. Short circuit in motor or loose connections 3. Incorrect fuses or circuit breakers in power line	1. Inspect line cord or plug for damaged insulation and shorted wires 2. Inspect all lead connections on motor for loose or shorted terminals or worn insulation on wires 3. Install correct fuses or circuit breakers
Motor fails to develop full power (power output of motor decreases rapidly with decrease in voltage at motor terminals)	1. Power line overloaded with lights, applicances and other motors 2. Undersize wires or circuits too long 3. General overloading of power company's facilities	1. Reduce the load on the power line 2. Increase wire sizes or reduce length of wiring 3. Request a voltage check from the power company
Motor overheats	Motor overloaded	Reduce load on motor
Motor stalls (resulting in blown fuses or tripped circuit breakers	1. Short circuit in motor or loose connections 2. Low voltage 3. Incorrect fuses or circuit breakers in power line 4. Motor overloaded	1. Inspect connections in motor for loose or shorted terminals or worn insulation on lead wires 2. Correct the low line voltage conditions 3. Install correct fuses or circuit breakers 4. Reduce load on motor
Machine slows down while operating	Applying too much pressure to workpiece	Ease up on pressure
Tool "chatters" during turning operation	1. Workpiece is too far out-of-round 2. Workpiece has too much wobble 3. Operator using bad technique 4. Cutting motion is against the grain of the workpiece 5. Workpiece is too long and thin – workpiece is deflected by tool pressure	1 True up the roundness of the workpiece before turning operation 2. Establish new center marks on ends to reduce wobble 3. Read instructions and take lighter cuts to minimize chatter 4. Use cutting motion that is with the grain 5. Install a steady rest in the middle, behind the workpiece
Workpiece splits or "breaks up" during turning operation	Workpiece contained defects before mounting	Select or assemble a workpiece that is free of defects

Model 351.221060

Figure 42 - Replacement Parts Illustration for Mini Lathe



REPLACEMENT PARTS LIST FOR MINI LATHE

KEY NO.	PART NO.	DESCRIPTION	QTY.
1	22984.00	Face Plate	1
2	23018.00	#1MT Spur Center	1
3	22983.00	Spindle	1
4	STD863508	5-0.8 x 8mm Pan Head Screw*	16
5	22982.00	Headstock Cover	1
6	STD315225	6202zz Ball Bearing*	2
7	22981.00	Headstock	1
8	STD833020	6-1.0 x 20mm Hex Head Bolt*	2
9	STD851006	6mm Flat Washer*	5
10	06369.00	3 x 10mm Spring Pin	1
11	00533.00	3AMI-Retaining Ring	1
12	01210.00	5-0.8 x 5mm Set Screw	2
13	22980.00	Spindle Pulley	1
14	22977.00	Drive Belt	1
15	22978.00	Pulley Cover	1
16	21834.00	6-1.0 x 55mm Socket Head Bolt	1
17	22976.00	Motor Pulley	1
18	STD863510	5-0.8 x 10mm Pan Head Screw*	4
19	23157.00	4-0.7 x 130mm Pan Head Screw	1
20	23002.00	Motor Bracket	1
21	22975.00	Motor Assembly (incl. Key Nos. 4, 22 and 23)	1
22	22994.00	Capacitor Mount	1
23	22993.00	Capacitor	1
24	23003.00	Switch Cord	1
25	STD863612	6-1.0 x 12mm Hex Head Bolt*	5
26	22974.00	Mounting Plate	2

KEY NO.	PART NO.	DESCRIPTION	QTY.
27	22996.00	6-1.0mm Square Nut	4
28	N/A	Bed	1
29	16080.00	Switch	1
30	22999.00	Bed Cover	1
31	23000.00	Strain Relief	1
32	23001.00	Line Cord	1
33	22979.00	Plate	3
34	22985.00	6-1.0 x 10mm Handle	2
35	22992.00	Clamping Bracket	1
36	00964.00	6-1.0 x 6mm Set Screw	1
37	09845.00	3CMI-6 E-Ring	1
38	22987.00	Tool Rest Assembly	1
39	22986.00	Tool Rest Base	1
40	22991.00	Locking Bar	1
41	23019.00	#1MT Bearing Center	1
42	22989.00	Quill	1
43	22988.00	Tailstock	1
44	22995.00	Adjustment Nut	1
45	22997.00	Guard Support	1
46	22990.00	6-1.0 x 15mm Handle	1
47	STD851005	5mm Flat Washer*	1
48	22998.00	Guard	1
49	STD844610	6-1.0mm Wing Nut*	1
50	23133.00	Pen Mandrel Assembly	1
51	STD840508	5-0.8mm Hex Nut*	3
52	23173.00	Hinge	1
Δ	23139.00	Operator's Manual	1

* Standard hardware item available locally

N/A Not available as replacement part

Δ Not Shown

Recommended Accessories		Model No.
Δ	Turning Tools - 3 Piece Set	9-29818

PARTS LIST

NOTES

NOTES

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