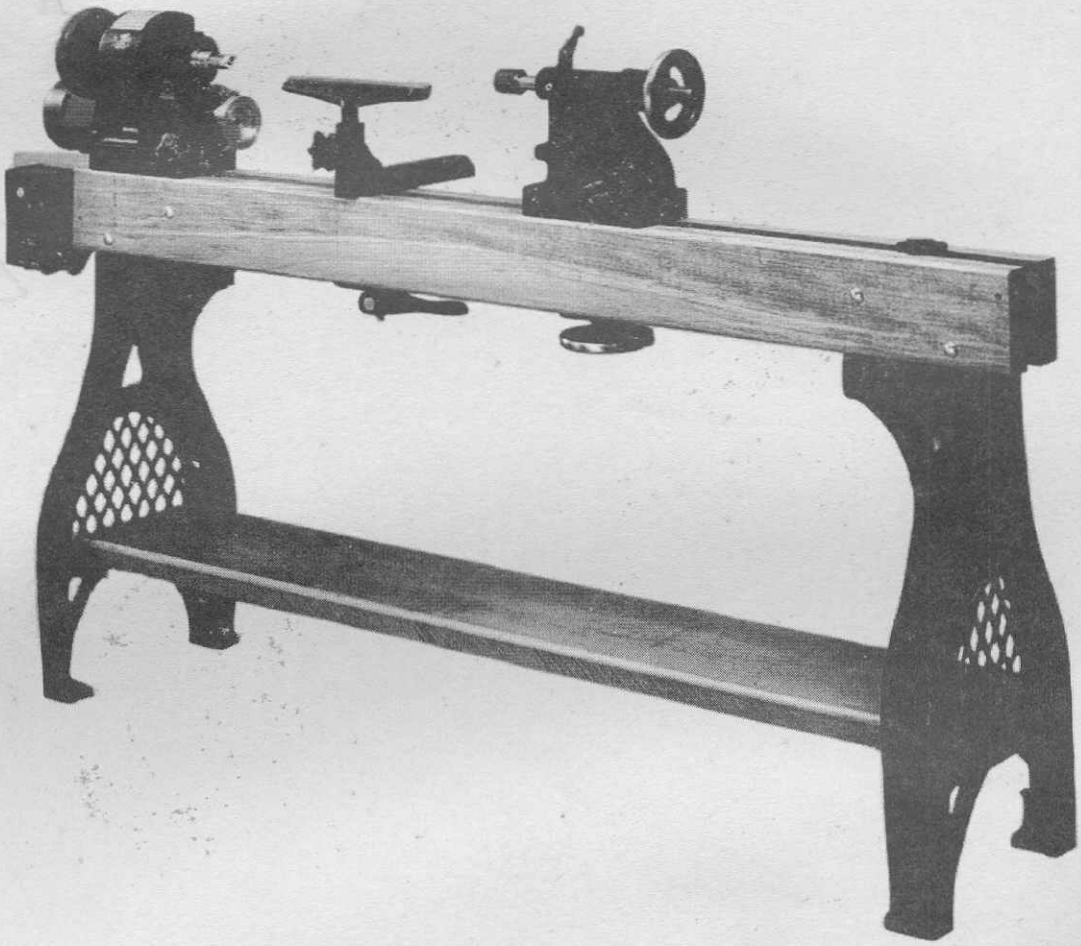
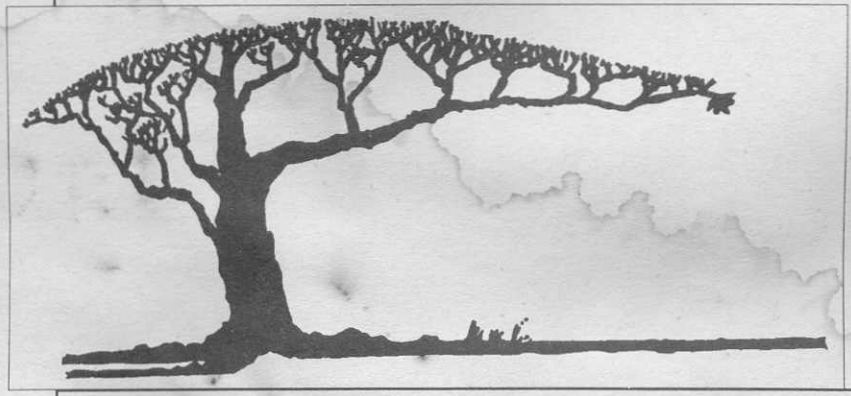


OWNER'S MANUAL



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OUR
area code will
change to **440** on
August 16, 1997

CONOVER OWNER'S MANUAL

Instruction Manual
Conover 16" Lathe

Third Edition
Ernie Conover 1985, 1987, 1989, 1991

SAFE OPERATION OF YOUR CONOVER LATHE

Insure the motor is properly wired and meets local electrical codes.

Unplug the motor when carrying out lathe maintenance, repairs, or when moving the machine.

Always start work at a slow speed. A frequent accident is work flying out of the lathe due to excessive speed. Form the habit early of setting the lathe to a low speed before mounting work, double checking the speed once work is mounted and standing out of the line of fire when the machine is first started.

Always allow the spindle to come to a complete stop before moving into reverse. Failure to do this may result in damage to the switch itself. Reversing the direction of the work could spin a faceplate, or chuck, off the spindle.

Never run the lathe without the belt cover and the belt guard in place.

Never touch or move the belt while the machine is running.

Never stick your fingers in the spindle while the machine is running. This is especially true of the outboard end of the headstock spindle which has a left-hand thread that will suck fingers in.

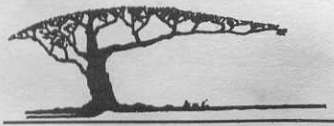
Make sure the work is mounted securely in the lathe. This includes proper centers for spindle work and correct screws for faceplate work. Check for defects in the wood.

Never use drywall screws to mount faceplate work. Use a minimum of #12 x 1" wood screws. For heavy work use longer screws and drill the 3" faceplate for additional screws.

Always turn the spindle several revolutions by hand to make sure you have clearance of the billet.

Use sharp tools and proper turning techniques. Do not substitute excessive speed for the correct, sharp tools and skill.

Wear proper safety equipment and work safely. This includes face shield/safety glasses, dust respirators, rolling up and securing long sleeves and hair, proper clothing and footwear, and removing jewelry and neckwear.



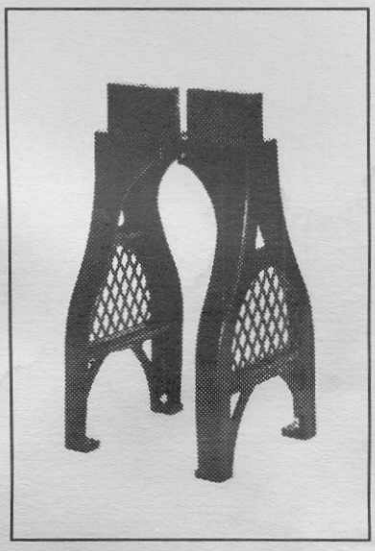
WISE PURCHASE

Congratulations on your purchase of a Conover 16" Lathe . Your lathe set has been manufactured to exacting standards using the finest of materials. With reasonable care it should give generations of service. We ask that you take a few minutes to study this manual so that your lathe can have a good start in life and you will be able to nurture a tradition of fine care for your lathe.
Your lathe has been shipped in a strong crate designed to take the rigors of our modern transportation system. Inspect the crate carefully upon arrival and do not sign the bill of lading unless it is intact. If there is external damage evident, open the crate in front of the driver and note any damage on the bill of lading. You have seven to ten days to file a formal damage claim and you should save all packing materials. It is best to get a damage inspector to view the machine immediately if damage is extensive. Freight companies can be cantankerous to work with, so a reasonable, but very firm, attitude would be necessary. The good news is that our rigorous program of secure wood crating and packing has made damage during shipment the exception.

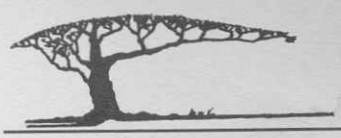
UNPACKING: Remove the top of the crate by unscrewing the drywall screws with a Phillips screwdriver. First remove the accessories. The headstock and tailstock are bolted to the bottom of the crate. By removing the nuts inside the crate each can be lifted out. The bolts are strictly for packing purposes and will not be used in the assembly.

The unpainted metal parts have been given a light coat of rust preventive oil. The first order of business is to remove this protective coating using a small amount of kerosene or safety solvent and a paint brush. Wash all the bright metal parts down with solvent and wipe everything dry with a clean rag. It is important to use common sense with cleaning solvent. It goes without saying that it should be used in an adequately ventilated area away from open flames. Be careful not to use excess solvent around the headstock spindle at either side of the drive pulley. Set the lathe components on the workbench while you go about the next order of business- building a bed.

BUILDING A BED WITH CAST IRON LEGS: We highly recommend the Cast Iron Leg Set (CL16-535). These legs greatly simplify bed building and yield a rock solid lathe of classic beauty. The set weighs in at 146 pounds, which makes for a lathe which does not jump around. There are provisions for two shelves, or a box section of sand. Two bed rails and a shelf add a minimum of 55 pounds, so a lathe base in excess of 200 pounds is quickly obtained. A hole cored down through the top tenon allows bolting the headstock directly over the leg for inboard or outboard turning. Each leg is drilled and tapped for a leveling screw and holes are provided for lagging to the floor. All hardware is provided, so that all you need is two bed rails.



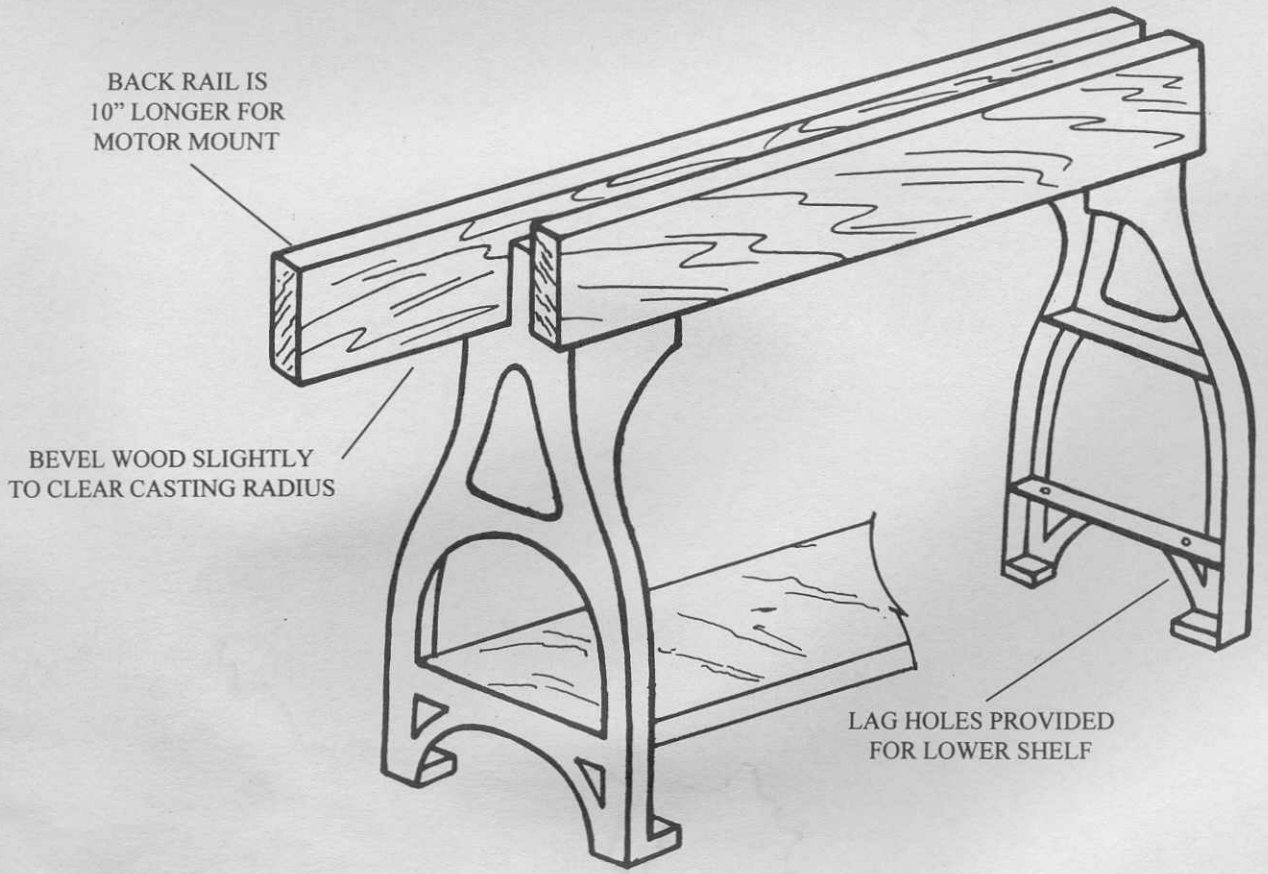
When fashioning the rails we suggest making the back rail about 10 inches longer than the front. Extend the extra 10" beyond the left of the headstock leg to allow extra length to mount the motor and any switches. You may have to bevel the bottom inside corners where they mate with the casting. Drill the rails to the bolt hole pattern and secure them with the 3/8" carriage bolts provided. Adding a shelf or two will add appreciably to the strength of the setup, but is not necessary. Adding sand bags to the shelf increases the stability of your lathe.



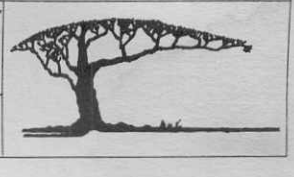
BUILDING YOUR OWN BASE: If cast iron legs are not part of your purchase, we have provided plans for legs which are currently in use throughout the country. This design incorporates box sections that can be filled with sand to add weight, absorb vibration and gives the ability to mount the headstock directly over the leg. The height of your bed should be based on your physique and taste, so do not be afraid to alter the height. A good rule of thumb is that the headstock spindle should be at elbow height.

All this leads to the fact that although we have included a set of plans for leg construction, as a woodworker you may have a better idea you would like to try. Feel free to make your legs to your own style.

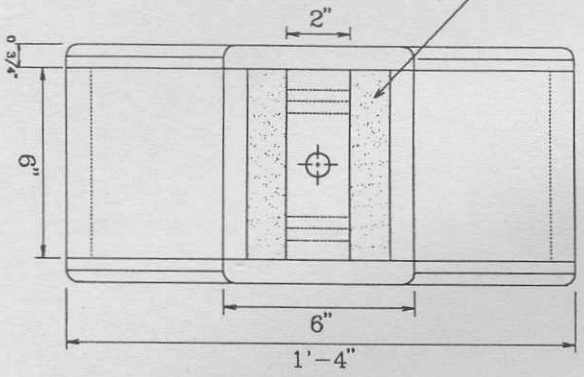
BED RAILS: Although standard lumber 2 x 6s may be used, laminated plywood or milled hardwood timbers make a more serviceable lathe. The most important factor in building a bed is that the two bed rails be made from sound, straight timbers free of cup and wind. They should measure as close to 2" thick by 6" wide as possible. Choice of timber will largely depend on local availability. English turners of old always liked "British Columbian Pine" (which is in fact Douglas Fir) for is springiness and shock absorbing characteristics. We like a widely available hardwood, Yellow Poplar, which grows like a weed in Ohio. Although technically a hardwood it closely matches characteristics of Douglas Fir.



Plywood Leg for Conover 16" Lathe

Drawn by: E.R.C.	Decimals: .XX ±.010" .XXX ±.005"	
Checked by:	Angles: ±30' Fractions: ±.015"	
Material: 3/4" A-C Fir Plywood	Scale: 1/6 Date: May 21, 1991	

Fill with sand, approximately 100 lbs. per leg.

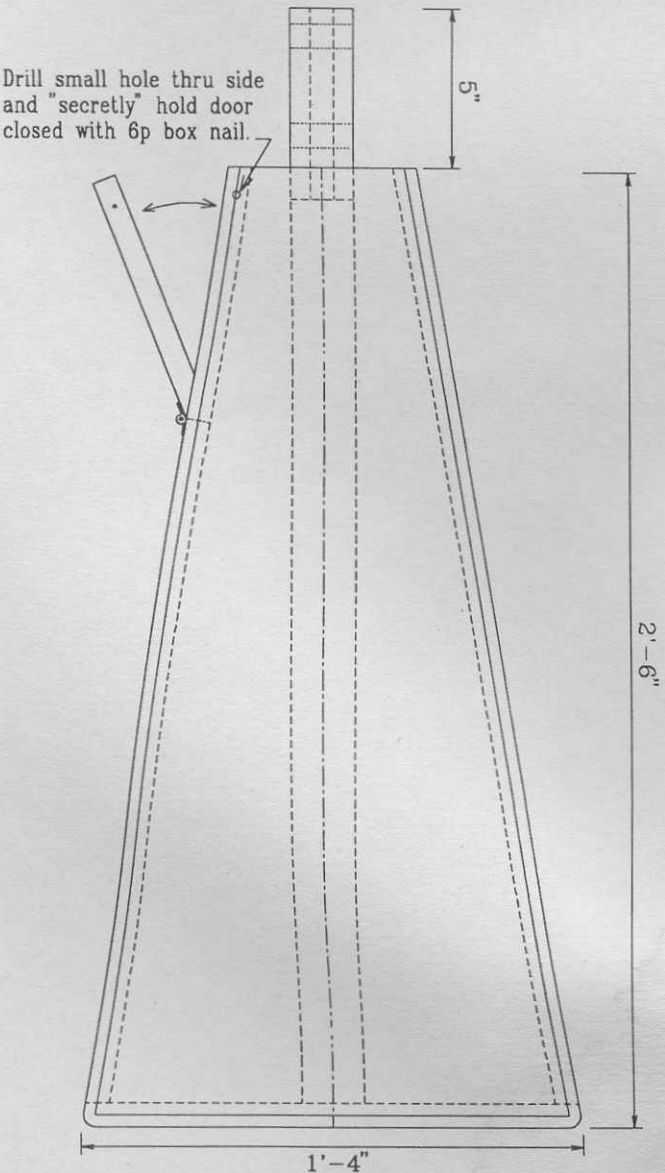


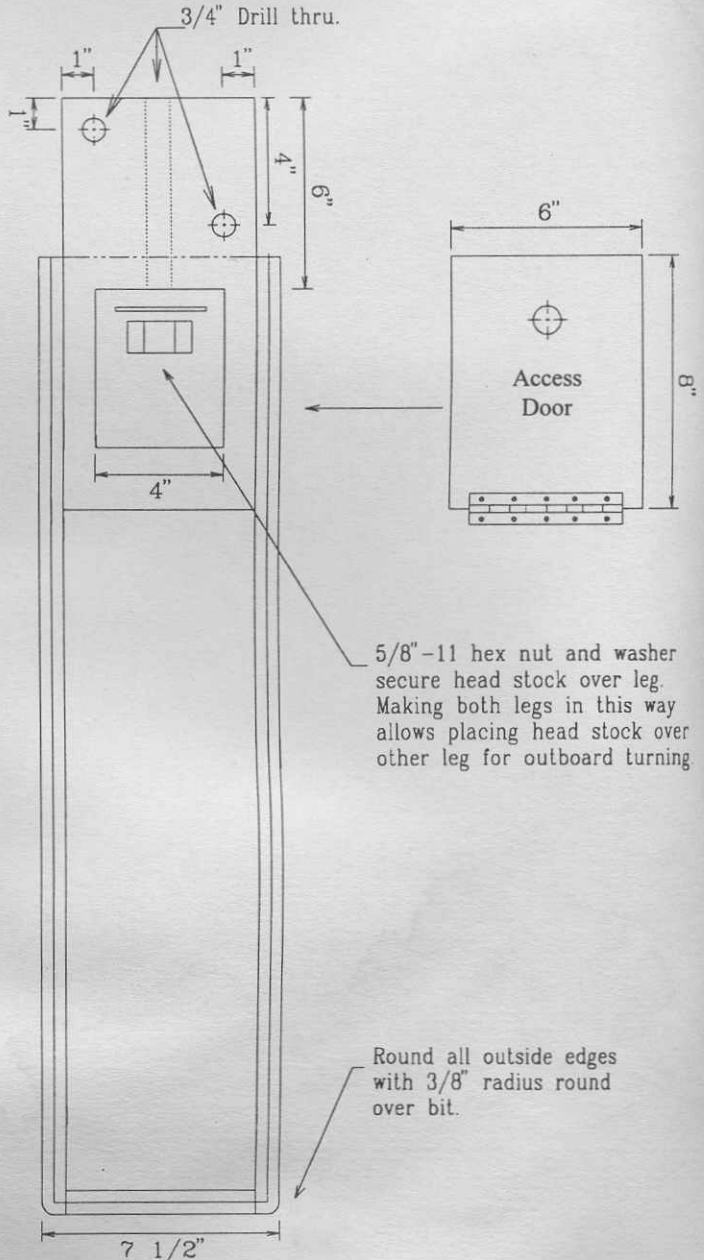
NOTES: 2'-6" heighth dimension yields a lathe with a center height 44" which is optimum for one Ernie Conover. Elbow point is optimum center height for most turners. Vary 2'-6" height to suit your needs.

Center upright is designed to be the same material as used in bed rails. Run extra for this purpose.

Glue all contacting surfaces and nail with finish nails.

If you own a plate joiner, plate joinery is highly recommended!





Probably the most widely used timber is maple. While woods like oak will work fine, they tend to be a bit too rigid and do not absorb shock and vibration as well as softer woods. Timbers are particularly good if a large long bed jointer and thickness planer are available to obtain the desired trueness. If only four quarter planks are available, laminating to obtain large timbers is fine and even adds strength.

LUMBER YARD PLANKS: In a pinch the machine can be mounted on standard lumber yard 2 x 6s which measure approximately 1-3/4" by 5-3/4" (and getting smaller every day). This material will yield a very serviceable lathe bed and is especially useful if you have to put a bed together somewhere on site quickly and want to discard it once the project is finished. More than one lathe bed has become floor joists for a front porch.

PLYWOOD: If all else fails a satisfactory bed can be produced from 3/4" veneer core plywood. By ripping six inch wide strips and laminating three pieces together, a satisfactory bed timber is obtained. Use of dowels or plate joinery to maintain registration during gluing is helpful and yellow carpenter glue is satisfactory. By staggering the sheets in the lamination stack, a bed of any length can be obtained in multiples of the plywood sheet size. Just remember not to have any two joints in a lamination stack opposite each other. Planing the top and bottom is important to provide catch-free surfaces.

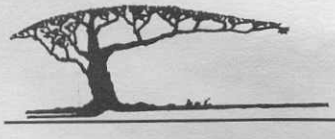
Understandably, we highly discourage the user from building the bed from angle or channel iron as this material has a poor modulus of vibration and transmits energy like crazy.

When making the rails, whatever the material, the back rail should be about 10 inches longer than the front. This provides ample room for the motor mount. It should go without saying that the two bed rails be the same height.

DISTANCE BETWEEN RAILS: The distance between rails must be at least 1-9/16". Placing the rails further apart at 2" can have some advantages if your work calls for offsetting the tailstock. The distance between the rails does not effect the alignment of your lathe, as the alignment is gained by the inside edge of the front bed rail. For this reason, you should form the habit of always pulling the tailstock forward against the front rail before setting it.

ADDING WEAR STRIPS: Although wood beds wear, they can easily be re-trued with simple hand planing. Those accustomed to twentieth century space age materials may find is psychologically impossible to resist adding wear strips to the tops and/or bottoms of the rails. We strongly recommend against this urge. We found a build up of finish and glue near the headstock is more of a problem than wood wearing. However, if you must, wear resistant ways can be created by capping the rails with plastic laminates, brass or steel strips. Please keep these materials thin so that the shock absorbing characteristic of the wood timbers is not totally lost! Brass or steel plate no thicker than 1/16" can provide ample wear resistance without completely losing the dampening effect of the wood. Remember wood has worked well on its own for centuries and will give you several lifetimes of hard service.

USING WIDER BED TIMBERS: For most spindle turning on beds up to eight feet between centers, 2" by 6" planks work fine. For longer spans, or for very heavy turning, the use of wider material in the 3" range is desirable. With wider timbers, the back bed rail may have to be notched out for proper spacing of the motor mount.



GETTING MORE SWING: Many of our owners have wanted even more capacity out of the Conover Lathe. Through much owner feedback we now have some clear-cut guidelines to give. By putting up to 2" riser blocks under the headstock and tailstock, the swing can be increased to 20" with little or no effect on performance. We should warn that a 20" swing is what is practical: the higher the blocks, the higher the center of gravity for your lathe and the more likely it is to tip over. To be forewarned is to be forearmed.

The blocks should be made from a hardwood such as poplar and carefully milled so they are the same height. If possible make them from the same plank with generous cutoff at the ends to eliminate planer snipe. Cut a 1-1/2" wide x 13/16" deep key on the top. Glue a 1-1/2" wide by 1/2" hardwood key on the bottom of the blocks and finally, drill 11/16" holes to accommodate the holddown bolts. The tool rest can accommodate up to two extra inches without a riser block under it.

LONGER HOLD DOWN BOLTS: Longer or special hold down bolts can be fabricated from 5/8"-11 threaded rod, available at most hardware stores. Saw to the desired length and make a head by brazing or welding a square nut on the end. To fit the toolbase, the nut will have to be ground thinner once brazed.

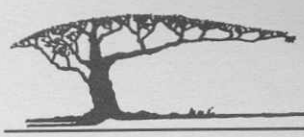
EXTRA TOOL REST SUPPORT: Bowl turners tend to use the full reach of the toolbase to get behind the faceplate. When utilizing the full capacity of the lathe, or with the headstock blocked up with riser blocks, reach can be a problem. A solution is to laminate extra wood to the front rail in the area of the headstock. The idea is to make an extra shelf on which the toolbase can rest. An 11/16" hole or two can be drilled down through this area for the toolbase bolt.

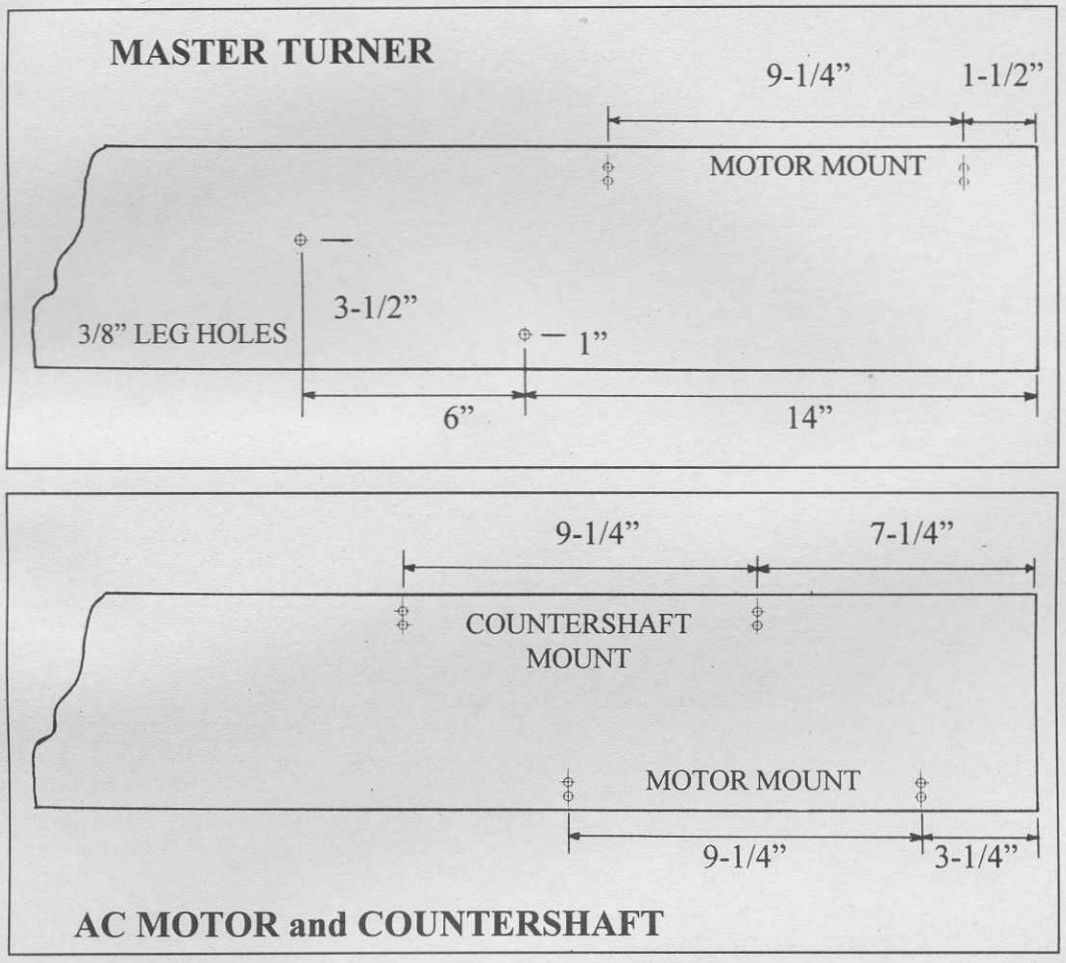
BOWL LATHE: Many owners have set up special short beds for bowl turning. In England such short bed lathes, often without a tailstock, have been sold from time immemorial and are called "bowl lathes." The Conover Lathe can be easily made into a bowl lathe. In designing a good bowl lathe you want no more than about 18" in front of the head stock and plenty of weight, because green bowl blanks can often weigh forty pounds or more.

Our cast iron legs are ideal for a bowl lathe because they give rigidity and weight in a small area. In bowl turning it is often nice to have a tailstock in place during roughing to make things more secure. Again, cast iron legs allow the tailstock to be placed directly over the leg making a shorter distance in front of the headstock. Another good trick is to start with 2" x 8" bed timbers and notch them down to 6" at the front edge of the headstock. Then only the tailstock need be put on a riser block and you have a 20" bowl lathe.

SETTING UP THE CONOVER 16" LATHE

MOTOR: Placement of the lathe on the bed is simplicity itself. The motor feet are mounted on the backside of the back bed rail using the accompanying drawing. They should be flush with the top of the back bed rail and placed with the flanges to the outside. (For those running a countershaft, a second set of motor feet are mounted lower down.) Bolt the motor to the motor rail with the two 5/16-18 x 1" carriage bolts and install the assembly in the motor feet with the two pins provided.

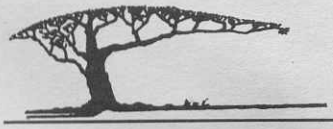




WIRING - AC MOTOR: Electrical codes vary greatly from place to place and the user should be sure that the motor wiring meets local code. The motor must be wired for counterclockwise rotation and a wiring diagram is found on the nameplate of most motors. We recommend wiring the motor for 230 volt operation rather than 115, because a more efficient operation is achieved. For a line cord use #14 SJ or SJO cable and obtain a switch of adequate amperage rating. The motor itself is rated at 7.6 amps. Magnetic switches offer the advantage, that should there be a power interruption, the motor will not restart until intentionally done so by the operator. They are code in industrial and school environments. We recommend placing the switch where it can easily be reached during turning, but where it is unlikely to be accidently bumped.

WIRING - DC MOTOR: The DC motor arrives already wired to the solid state controller, and if you ordered the reversing switch, that is also installed. This motor draws 7.6 amps, and need not necessarily be placed on its own circuit. We have wired a 220 volt, 20 amp plug, so all you need is the equivalent receptacle. The controller is mounted to the front side of the back bed timber.

HEADSTOCK: The headstock is held on the bed by a 5/8-11 x 9" bolt, cast washer and square nut. The nut is held captive between cast flanges as the bolt comes up from under the bed. Be sure to pull the headstock casting against the inside edge of the front rail before tightening so that alignment can be maintained with the tailstock. For those using the Cast Iron Leg Set, the cast washer will not be needed for the headstock, as the bolt goes directly through the cored hole in the leg.



TAILSTOCK AND TOOLBASE: Next drop the 5/8-11 x 10" bolt through the cored hole in the recess of the tailstock, place the assembly on the bed and secure it with a cast washer and flat wheel. The remaining 5/8-11 x 9" bolt, cast washer and quick release lever are used to secure the toolbase. The square head goes into the machined tee in the toolbase. A flat washer and the quick release lever go on the bottom. Fine tuning the lever throw can be achieved by turning the square bolt head 90° one way or the other in the toolbase slot.

Once adjusted, the toolbase and toolrest can be quickly removed by pulling them straight forward after lifting the quick release lever. The bolt, flat washer and release lever drop out through the bed rails. This allows the user to remove the toolbase for extra safety during sanding or auxiliary operations.

USE TWO HANDS: Movement of the tailstock and toolrest will be smoother if a two handed operation is used. Place one hand on the tailstock or toolbase and the other on the flat wheel/ quickrelease lever, and move in parallel motions. This will prevent the cast washer from camming backwards and binding the movement.

USE OF THE CONOVER LATHE

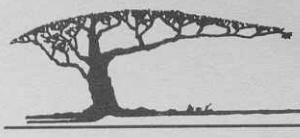
COLD START: Although not absolutely necessary, it is a good practice to turn on your lathe at 600 rpm for three to five minutes before starting work. This allows the bearings to warm up, the grease to form a proper lubrication film and the preload (the amount of play in the bearings) to become correct. This practice is all the more important during cold weather, especially if the machine itself is cold.

SPEED: We would like to preface this section with some notes about speed. While plenty of power is desirable in any lathe, many users try to use excessive speed to replace skill and sharp tools. High speeds are not necessary in wood turning. Sharp tools, properly presented, will perform the job. The higher speeds above 1800 rpm are meant for sanding and it could be argued that a maximum speed of 1100 rpm is all that is necessary for actual turning. In reality an accomplished turner will find, once things are round, 1100 rpm works out well for bowl and larger spindle turning, while 1725 rpm is good for smaller spindle work.

START SLOW: Particular care should be taken during the initial roughing stages of a billet. Since the work is always out of round and therefore out of balance at this stage, speed should be used cautiously. A slow speed of 220 to 600 rpm is about right for bringing work into round. You can work safely and with a minimum of effort at this point. The actual speed used should be a function of the diameter of the piece, the material being turned, and the type of work being performed. Once the piece is round you can safely increase the speed.

SPEED KILLS: The user should form the habit of adjusting the lathe to a low speed before mounting the work. The most common serious lathe accident is caused by a flying billet, due to poor chucking and/or excessive speed. We recommend a three point program: 1. Set the lathe to its slowest speed whenever you finish a turning session. 2. Check that the lathe is set to an appropriate speed for the job before mounting work. 3. Finally, stand clear of the line of fire when first starting the lathe. If the billet flies, it will not hit you. One need only be hit by one billet to be dead- or a true believer in low speed and correct mounting.

SPEED SELECTION: With an AC motor, the Conover Lathe has four easily adjustable speeds of 600,



1100, 1725 and 2600 rpm. The handy chart on the cast iron belt cover, which also includes your serial number, is a self explanatory quick reference for speed.

For AC motors, a countershaft kit (CL16-540) may be necessary for low speeds. The countershaft kit gives an additional range of lower speeds for large diameter work. The countershaft fits between the motor and the headstock. In normal range speeds are unchanged, while in low range all speeds are reduced by a factor of three. This yields a low speed of 200 rpm.

CARE AND FEEDING OF MORSE TAPERS:

The Morse taper is an American innovation which dates from the time of the Industrial Revolution. It is still used commonly in machinery produced worldwide and is a sure, trouble free method of mounting accessories in machine spindles. One of the most frequent causes of injuring a Morse taper socket is dirt. The user should form the habit of cleaning the Morse taper socket before each use. This is best accomplished by simply wiping the socket out with your finger, but ensure that the machine is turned off. Likewise the taper should be cleaned before insertion in the socket. Again, simply wiping the taper with your hand is the simplest and quickest method. This simple act can do more to insure long life for both taper and socket than any other factor.

EASY DOES IT: A Morse taper should never be pounded into a socket. It is not necessary to pound a Morse taper to make it hold. Slippage can almost always be traced to grease, dirt or scoring of the taper or socket. Proper mounting is accomplished by aligning the taper in the socket and driving it home with a snap of the wrist. The socket should be kept dry and free of oil. While some light oil can be tolerated for rust prevention, grease and heavy oil will cause slippage and collect dirt.

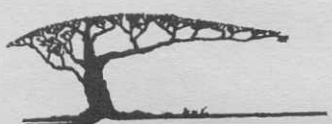
REMOVAL: To remove a Morse taper, insert the 3/8" knockout bar through the back of the spindle and drive it out with a snap of the wrist. Have your other hand ready to catch the taper so it does not fall to the floor.

REPAIR AT HOME: If a Morse taper itself becomes scored or bugged, it should be dressed with an oil stone and fine emery cloth. Likewise, a bugged socket can be dressed with fine emery cloth on a piece of dowel. Insert the emery in a slot cut in the end of the dowel and wrap until the appropriate diameter is achieved. This improvised tool can then be used to polish the scratch out of the socket. In the headstock this can be done by actually powering up the spindle at a moderate speed. In the tailstock the dowel can be powered by an electric drill. Just remember not to work on any one spot too long or else the integrity of the taper will not be maintained. You can check the fit of the socket by drawing a chalk line on a good taper. Insert the taper gently into the socket and twist it. Inspection of the way in which the chalk mark smears will show the quality of the fit.

WE CAN FIX IT: Finally, if a socket becomes badly scored we can usually correct the problem by reaming it. Simply return the offending spindle to us, detailing the problem.

SPINDLE TURNING

TYPES OF CENTERS: Most spindle turning is done with a combination of a spur center in the headstock and a cup center in the tailstock. The cup center can take two forms: the traditional dead center, or a more practical live center. The live center has many advantages. Less power is necessary



to spin the work, more pressure can be applied with the tailstock ram, and burning is eliminated. When using a dead center, remember to lubricate the cup with a small amount of heavy grease or tallow before mounting the work.

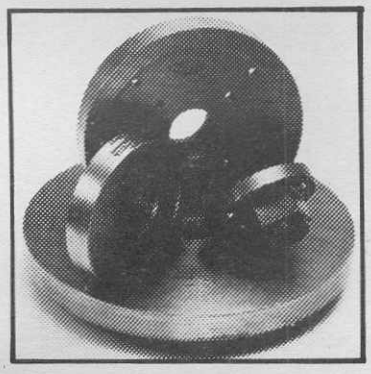
MOUNTING THE WORK: For most spindle turning, simply placing the billet to be turned between centers and tightening the tailstock ram is sufficient. If you want to pound the spur center into the work, it is best not to do so while it is mounted in the lathe. Rather, drive the spur center into the work with a soft faced hammer before mounting in the lathe. This will mark or indent the work to the center and provide a positive drive.
The accomplished turner should find that simply placing the work between center and using pressure of the tailstock ram is sufficient. Once the work is mounted, lock the tailstock ram with the locking lever. The ram will probably have to be tightened several times during the turning process because the spurs tend to dig deeper into the work during the shock of roughing. You probably can hear when the work is not as tightly held. Be sure to loosen the locking lever before applying this additional pressure.

FINALLY! TURNING: Position the toolrest to suit your taste then turn the spindle several revolutions by hand to make sure you have clearance of the billet. Having previously switched the lathe to a low speed appropriate for the job, stand clear of the line of fire, switch on the lathe and commence work.

FACE PLATE TURNING

PROPER SCREWS: A faceplate, properly called a chuck, is a tried and true method of mounting faceplate turning (that is the plank grain of the wood runs across the bed of the lathe and not parallel or between centers). Such useful objects as bowls, knobs and architectural accouterments are made this way. Great caution should be exercised in the mounting of work on faceplates as the shear weight of such things as large bowl blanks make their leaving the lathe a dangerous proposition. Use of high quality screws with sufficient length to properly secure the work, combined with appropriate speeds is imperative. All Conover faceplates are drilled with a 15/64" countersink to accept a #12 flat head screw.
Many turners today prefer sheet metal screws because they have a constant body diameter and hold better, especially in green wood. Additionally, they are heat treated which makes them tougher. Hex head or Phillips head #12 sheet metal screws facilitate the use of power driving equipment. In no case should drywall screws be used as they are prone to snapping.

Our 3" faceplate is indented at three additional positions for user drilling of additional holes. Using six screws adds to the security of the hold. At a minimum #12 x 1" screws should be used, moving to longer screws for heavier work.



REMOVING FACEPLATES: Do not use the indexing mechanism as a spindle lock for faceplate installation or removal. A cross hole has been machined in the headstock spindle which easily accepts the 3/8" knockout bar. It is good to form the habit of never letting go of the knockout bar so it is inadvertently left in the spindle. It can be thrown, much like a chuck key left in a drill press chuck, if the lathe is accidentally started.

REVERSING SWITCH: If you equip your DC powered lathe with the forward-brake-reverse switch (CL16-427) be most careful with heavily laden faceplates because of the possibility of unscrewing during reverse operations. Our switch is separate from the on/off power switch so that reverse operation is intentional. Listen for a difference in sound as a clue that the faceplate is not snug.

LOW SPEED: Finally, if you turn large diameter objects, especially outboard, the use of our DC motor or the AC motor with a countershaft is necessary. A 36" diameter outboard turning has an outer surface of 9.42' per revolution. At 200 rpm that multiplies to 1884 surface feet per minute, or 21.41 mph, on the peripheral. As contrast, a 3" diameter turning, spinning at 1725 rpm yields 1355 surface feet per minute or 15.39 mph. We hope this convinces you to use a DC motor (or with an AC motor to install a countershaft) for large diameter work.

INDEXING: Your Conover lathe is equipped with a 24 position indexing mechanism facilitating such jobs as reeding and fluting. To use the indexing mechanism simply insert the 1/4" steel pin through the hole in the boss at the back of the headstock. The taper of the pin will engage the taper of holes drilled in the pulley and can be locked with the 1/4"-20 brass knurled thumb nut supplied. It is suggested that the index pin and thumb nut be left out of the lathe during normal operation; especially if a handwheel is used. This will prevent accidental spindle locking or injuring the handwheel.

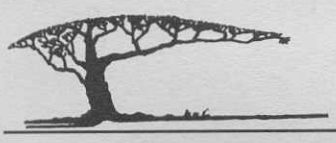
OTHER METHODS OF HOLDING WORK

SCREW CHUCK: A handy method of holding small pieces of work (such as chess pieces) is a screw center. The screw center is essentially a wood screw projection from the center of a faceplate. A small hole is drilled in the workpiece and the work is simply screwed onto the wood screw. Although the hold is only secure enough for light work, the screw center has the advantage of maintaining centering with repeated mounting and unmounting. The Conover screw center (CL16-514) is built on our 3" faceplate. The threaded back gives a positive drive and by removing the front plate, it becomes a 3" faceplate. The screw is specially milled to a constant body diameter with a 45° profile for better holding. A 7/32" drill should be used on the work. The screw center is matched to its mating faceplate during the production and cannot be retrofitted to existing faceplates.

SCROLL CHUCKS: There is an array of scroll chucks on the market. While we do not manufacture one ourselves, we are the distributor for one which we particularly recommend. When ordering any chuck from a third party vendor, be sure to specify that the spindle is 1-1/2"-8 tpi, and additionally supply them with the information that you are fitting to a Conover lathe.

LIVE CENTER: The Conover live center (CL16-520) allows high speed turning without burning. Ours is equipped with double row ball bearings and is supplied with four points. The core point is inserted into a 3/8" drilled hole in the work and provides secure holding for heavy turnings such as architectural columns. The 60° point is utilized in smaller, more delicate turnings. The cup point is used for the majority of spindle turning tasks. The extended cup point is used for turning tool handles. The ferrule can be slipped over the point before mounting the stock. The ferrule is thus available for checking the fit without having to remove the work from the lathe. Finally the body itself can be used with a piece of leather for metal spinning.

FULL LENGTH TOOLREST: The Conover full length toolrest (CL16-209) is most useful for spindle turning. It allows the user to fabricate a wood rest of almost unlimited length. Screw the right angle pin into the tapped hole in the boss at the front of the tailstock, and lock it with the nut provided. Next,



mount the stepped pin in the toolbase. Fabricate a toolrest of the desired length. Adjust the height by raising and lowering the stepped pin in the toolbase, and by raising and lowering the collar on the right angle pin. Distance from the work is adjusted by screwing the right angle pin in and out.
It is suggested that the user use a hardwood such as hard maple or oak to fabricate the toolrest and that holes be drilled at frequent, regular intervals. A wood rest can be marked with layout lines for the piece being turned, which will greatly facilitate production work.

DRILLING IN THE LATHE

DRILLING: The lathe is useful in a wide variety of drilling applications, and can double as a horizontal drill press in many general woodworking situations. The most common way to drill work mounted on a faceplate is using the #2 MT 1/2" drill chuck (CL16-521). The drill chuck is held in the tailstock spindle socket. The appropriate drill is mounted in the chuck and advanced into the revolving work with the tailstock ram. Only moderate speeds should be used for such drilling, especially with larger bits, and the ram must be reversed periodically to clear chips from the workpiece.

CHUCK IN THE HEADSTOCK: Alternately, the drill chuck can be mounted in the headstock spindle socket by using a #2-3 MT sleeve adaptor (CL16-526). In this situation use of a moderate speed is imperative (600 rpm or less). The work is advanced against the rotating drill with the tailstock ram. This method is especially useful for drilling spindle turnings, like tool handles and such. One center mark is placed against the point of the drill and the other is caught by a cup center in the tailstock. The lathe is switched on and the work is held with the left hand while the tailstock ram is advanced with the right. This is easier than it sounds and safe as long as speeds are kept slow. Drills of 1" diameter or less should be used and common sense must be used about the possibility of the drill following the grain and coming out the side of the work.

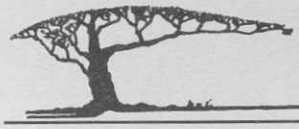
DRILL PAD: The Conover drill pad (CL16-522) is used in conjunction with a drill chuck mounted in the headstock to turn your lathe into a horizontal drill press. When mounted in the tailstock, the drill pad is like a small drill press table. Work is simply placed on the flat of the drill pad and advanced against the drill with the tailstock ram.

GUN DRILLING: Our hollow tailstock spindle in conjunction with the Conover #2 MT cup center (CL16-513) allows gun drilling long holes. The piece is turned as normal, using the cup center. Then the work is temporarily taken out of the lathe while the cup center point is removed. The work is remounted and up a to 5/16" auger is inserted though the rear of the tailstock spindle into the revolving work. Just remember to back the auger out frequently to clear chips.

MAINTENANCE

CORROSION PREVENTION AND LUBRICATION: Corrosion is a frequent and chronic problem with lathes. Fine wood dust is a fantastic degreasing agent that effectively removes all traces of oil and/ or grease from all surfaces. When green wood is turned sap rusts parts quickly. Your Conover lathe, wherever possible has been painted with a heavy duty machinery enamel. All painted surfaces need only be wiped down with a rag occasionally for cosmetic purposes.

One of the best treatments for bright metal surfaces is paste wax. Use paste wax for furniture and not a cleaning type automobile paste wax. Simply apply a thin film of wax with a soft rag. This should



always be done after turning green wood. Applying candle wax to the threads of the 5/8-11 holddown bolts promotes free travel of the handwheel or quick release lever.

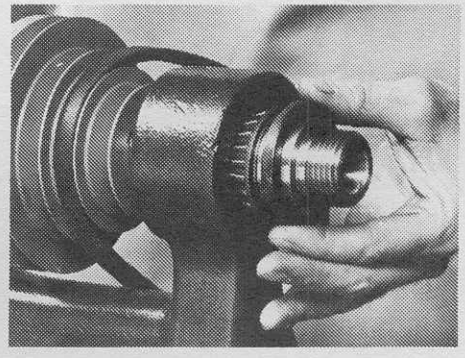
The acme threads in the tailstock spindle should be lubricated with light machine oil through the oil hole just ahead of the handwheel. Also applying a few drops of oil to the outside of the tailstock spindle just behind the Morse taper socket and the acme threads insures that it slides well. The acme threads should be cleaned periodically with a rag to prevent wood dust build-up. Any turning session should end with a wiping down of the spindle threads and oiling the spindle.

The Timken® tapered roller bearings are lubricated and sealed at the factory and should give long service without repacking. For normal service, bearings should be repacked annually. An absolute minimum under any service condition (even sitting idle) is every two years.

TOOLREST CARE: The toolrest fits in a cored hole in the toolbase sating. By tightening the star knob, the rest is forced against the two triangular sides and held secure. The star knob is fitted with a brass screw thread so as to hold fast without injuring the toolrest. Occasionally, the toolrest surface may need redressing due to wear. This is best accomplished with a single-cut mill file held at a slight angle. Next smooth the surface with a fine sandpaper or emery cloth.

CARE OF CENTERS: Conover spur, cup and live centers are designed for long service under tough conditions. Corrosion, however, is a constant problem, and most noticeable when cutting green wood. Wiping with a light oil after each use is a good habit to form. The center point of the spur and cup centers is removable, which allows for easy sharpening and adjustment to suit the turner's needs.

HEAD STOCK SPINDLE



REMOVAL: To remove the headstock spindle, start by loosening the set screw in the headstock pulley and unlocking the tongued washer from the preload nut. Slide the pulley to one side and remove the 1/4" key under it. Unscrew the preload nut to push the spindle out through the front of the lathe. Since the front seal must come out with the spindle, it may be necessary to place a block of wood against the back of the spindle and smack it sharply with a hammer to start it moving. Once started it should push out by hand. You will be left with the back bearing and spacing washer in the back bearing cup which can then easily be removed once the back seal is removed. While the front seal will have come out with the spindle you will have to carefully remove the back seal with a screw driver. By inserting a large screwdriver under the edge of the seal and gently twisting at multiple points, it is possible to remove the seal intact. If the seals are worn, or harmed in the removal process, obtain a new set befoe reinstalling the bearings. It is not necessary to remove the front bearing from the headstock spindle during repacking.

Wash the bearings and the cups with kerosene or safety solvent. Do this operation in a well ventilated area away from open flames. Dry all parts thoroughly with a soft clean cloth. Do not blow bearings with compressed air, as this can injure them. Repack each bearing with 1/2 tablespoon of wheel

bearing greases which is obtainable at any automotive supply store. It is imperative to only use 1/2 tablespoon, as a frequent cause of bearing failure is overpacking. Place the grease in the palm of your hand and roll the bearing race into the grease and thoroughly pack it into the rollers. Replace the spindle and pulley in the headstock and install the back bearing and spacer. Finally, install the seals and preload nut.

Run the preload nut up slowly, while turning the headstock spindle over by hand. Keep feeling for play and when resistance is felt and play ceases, lock the tongued washer. Now, power up the headstock spindle for about five minutes, unplug the lathe and recheck the spindle for play. If play is found, unlock the tongued washer and tighten the preload washer until the play is removed. If the spindle is excessively hot, back the preload off one tab. By using the using different slots in the preload nut in conjunction with the tabs, the nut can be turned a very small amount to the next locking position.

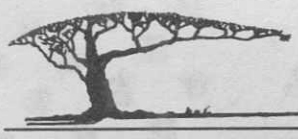
Note: *Never stick your fingers into the spindle while it is running. The left-hand thread at the back of the spindle will pull fingers in with painful consequences. Always unplug the lathe before doing any maintenance.*

After running at idle for twenty or thirty minutes, the spindle should be warm but not too hot to touch. As the grease works its way out of the races, some change in the preload setting is natural and a little more heat is frequently presented during the running in period. If in doubt, shut the lathe down for an hour, then run it for five minutes to see if excessive heat is generated. It is common for the bearings to be quite warm after heavy service such as turning large bowls and heavy spindle work. This is a natural state of affairs and should not be a source of concern. The bearings, however, should never get hot enough that they would burn you, smell, or cause oil or water to evaporate.

A howling noise is a sign of insufficient preload and would require tightening the preload a notch or two. Keep tightening one notch at a time until the howling goes away. Properly tightened, you should be able to move the preload nut by hand the amount allowed by the tongued washer in the keyway. Be sure the lathe is unplugged, grab the nut with a rag and hold the headstock pulley. if you can turn the nut back and forth a bit, things are fine. If it is locked solid you are too tight. Loosen the nut and have a break while things cool off.

Should you wish to return your headstock to the factory for a belt change and repacking of the bearings, feel free to do so. Carefully box the headstock and return it to us freight prepaid, with a description of the problem. We will inspect the headstock, repack the bearings, replace the belt and return it to you. The charge for this service is nominal, and we can apprise you of the cost and delivery before starting work.

REPLACEMENT PARTS: Should you need replacement parts at any time, please consult the exploded diagram. Simply phone or write and we will give you the current price of the items. We can generally ship within twenty-four hours on a VISA or Mastercard. When ordering parts, it always wise to provide the serial number of your lathe which can be found on the pulley cover.



TOOL SELECTION

At this writing, we are not making nor selling turning tools. Nonethe less, we are often asked which tools should be purchased by a turning newcomer. The tools you will need are the function of the work you will be doing, and the materials you will be turning. The following list covers general turning:

Roughing gouge	1" or 3/4"
Parting tool	1/4" diamond
Spindle gouges	3/8" and 1/2"
Skews	1" oval and 1/2"
Bowl gouge	3/8"
Square nose scraper	1"
Round nose scraper	3/4"
Dome scraper	1-1/2"

High speed steel (HSS) is reputed to last six times as long as carbon steel equivalent. Born in the metal working industry, HSS is designed to withstand high working temperatures. The careless grinding that can result in ruin of a carbon steel tool would not have the same effect on HSS. However, it should be noted that you can also damage a HSS tool. Grinding techniques are an acquired skill, but a rewarding one. Nothing cuts like a sharp tool.

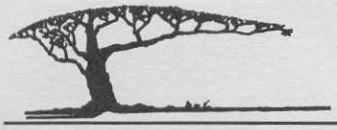
SOURCES OF ADDITIONAL INFORMATION

Conover, Ernie, *The Lathe Book,* Newton, Connecticut: The Taunton Press Inc., © 1993.

Conover, Ernie, *Turning for Furniture,* Newton, Connecticut: The Taunton Press Inc., © 1996

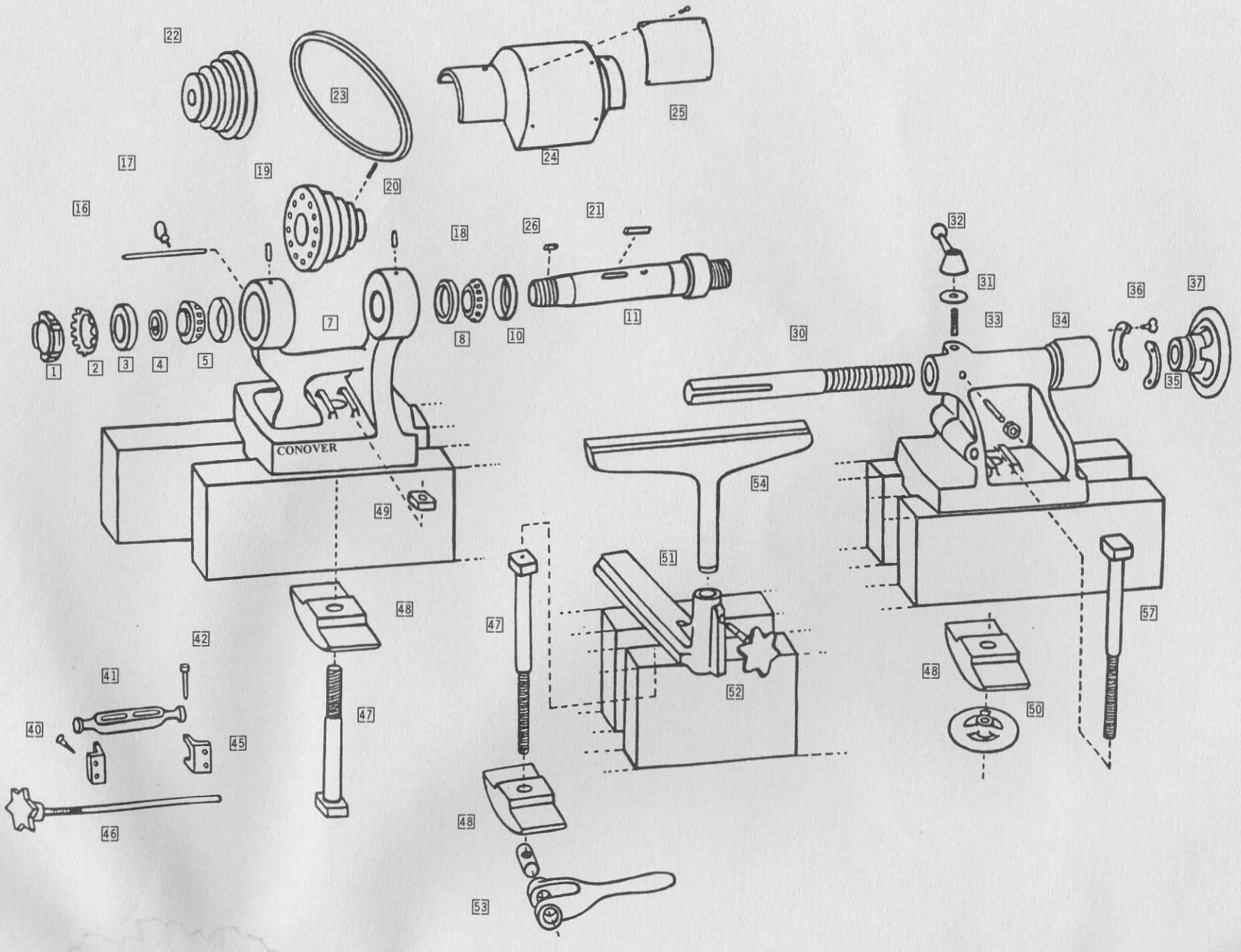
Dunbar, Michael, *Woodturning for Cabinetmakers,* New York: Sterling Publishing Co., © 1990.

Raffin, Richard, *Turning Wood,* Newton, Connecticut: The Taunton Press Inc., © 1985.



Parts List

1	Tongued nut	CL16-111
2	Tongued washer	CL16-110
3	Rear seal	CL16-107
4	Collar	CL16-109
5	Rear bearing	CL16-105
7	Headstock	CL16-101
8	Front bearing	CL16-104
10	Front seal	CL16-106
11	Spindle	CL16-102
16	Index pin	CL16-112
17	Thumb screw	CL16-113
18	Cover pin	-
19	Headstock pulley	CL16-103P
20	Set screw, 1/4-20 x 3/8	-
21	Key, 1/4 x 1	-
22	Motor pulley	CL16-416P
23	Belt	CL16-420
24	Belt cover	CL16-114
25	Nameplate	CL16-115
26	Key, 3/16 x 3/8	-
30	Tailstock spindle	CL16-202
31	Washer (if required)	-
32	Clamp handle	CL16-207
33	Clamp stud	CL16-208
34	Tailstock	CL16-201
35	Retainer	CL16-205
36	10-24 x 1/2 flat head screw	-
37	Tail wheel	CL16-203
38	1/4-20 x 3/4 dog point set screw	-
39	1/4-20 nut	-
40	#12 x 1-1/2 wood screw	-
41	Motor rail	CL16-410
42	Drop pin	CL16-412
45	Motor foot	CL16-411
46	Knockout bar	CL16-407
47	5/8-11 x 9" bolt	-
48	Flat washer	CL16-405
49	5/8-11 square nut	-
50	Flat wheel	CL16-404
51	Toolbase	CL16-305
52	Star knob	CL16-302
53	Quick release	CL16-406
54	12" toolrest	CL16-306-12
57	5/8-11 x 10" bolt	-


CONOVER

CONOVER LIMITED WARRANTY

CONOVER warrants that the product manufactured by it to be commercially free from any defects in material and workmanship for an eighteen month period after the original date of purchase. This warranty does not extend to any product that has been affected by wear or damage resulting from misuse, abrasion, corrosion, negligence, accident, tampering, faulty installation, inadequate maintenance, damage or casualty, or to any product that has been improperly repaired or altered in any way that affects the condition or operation of the equipment. In the case of accessories or components furnished, but not manufactured by CONOVER, Conover assigns to the buyer, to the extent permitted, the warranty of the manufacturer.

If the product should become defective within the warranty period, we will elect to repair or replace it free of charge, including return transportation, provided it is delivered prepaid to:

CONOVER
9361 HAMILTON DRIVE
MENTOR, OHIO 44060

Any questions regarding warranty service can be directed to CONOVER at the address shown above.

CONOVER shall not be liable for any damage or loss, including, but not limited to, incidental or consequential damage for injury to persons, products, buildings, contents of buildings or other property, or any other direct , incidental or consequential loss. The buyer's exclusive remedy against CONOVER for breach of any obligation under this sales contract, whether derived from warranty or otherwise, shall be limited , as specified herein, to repair or replacement.

The Leeson DC motor is a special case. Leeson allows certain local motor repair shops to analyze and repair their motors. You may obtain the name of a local repair shop by calling

Leeson Electric Corporation (800) 331-2911

If the product should become defective within their twelve month warranty period, Leeson will elect to repair or replace it free of charge. Inspection and transportation costs are paid by the owner.