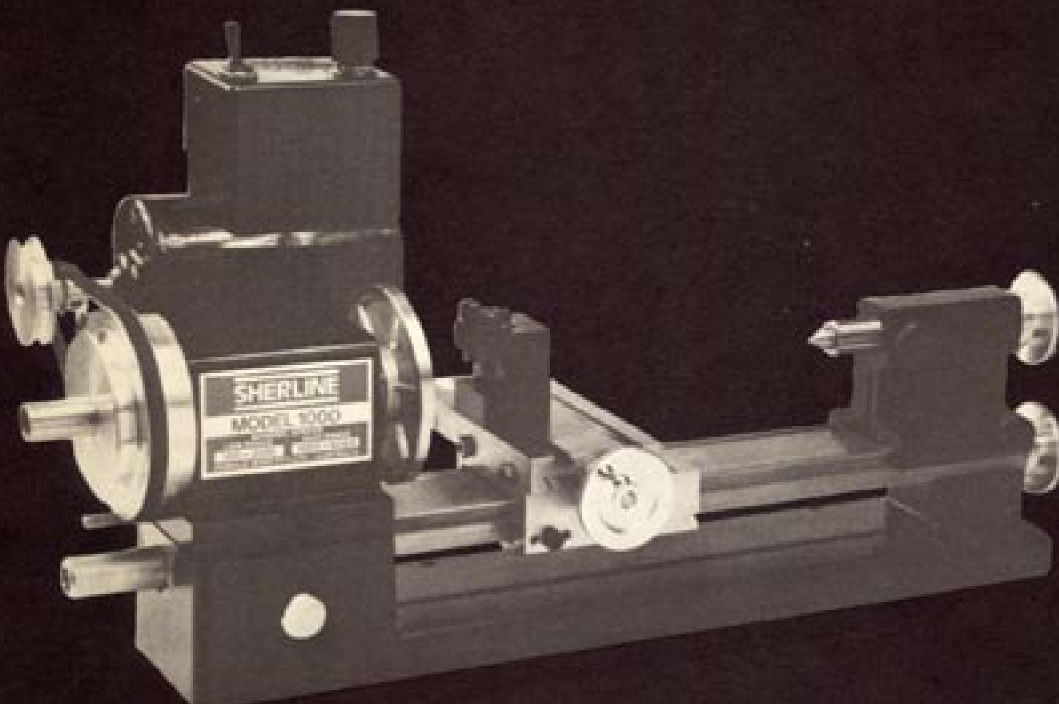
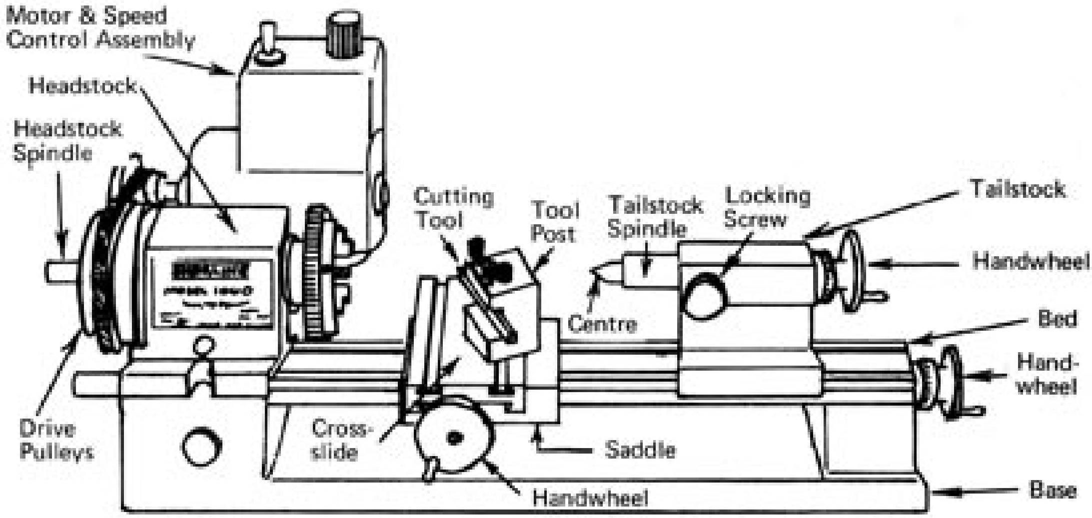
SHERLINE

Ronald Sher Pty Ltd

OWNER MANUAL



MODELS 1000 and 1100 SHERLINE LATHES



THE SHERLINE LATHE

The Sherline Lathe has been built for versatility, reliability and accuracy. It has been designed to give a complete range of speeds for all materials without numerous belt changes. A comprehensive range of attachments is available for the lathe, allowing jobs such as screw cutting, drilling, milling and turning, using a 3 Jaw Chuck, 4 Jaw Chuck or Collets. The motor supplied with the lathe runs on domestic voltage. It is a heavy duty motor with a built-in cooling fan. There are two steps on the pulley system and variable speed control for adjusting the spindle speed. The electronic speed control is located on top of the motor.

SAFETY RULES

1. Read the manual carefully.
   A proper understanding of the result of turning each handwheel is essential.

2. Always wear safety glasses made of impact resistant material.

3. Remove loose clothing such as ties and jewellery, and roll up or fasten sleeves.

4. Connect cord to an earthed socket. Make sure the cord is clear of any moving parts.

5. Remove all loose articles from the lathe.

6. Keep the work area and immediate surround clean.

7. Keep hands away from revolving parts such as workpieces, gears and cutting tools.

8. Switch motor to 'OFF' before inserting or removing work pieces or tools and before measuring the work.

9. Disconnect motor before servicing the lathe or changing accessories.

10. Have motor switched to 'OFF' before connecting cord to socket.

11. Always turn the main spindle by hand before switching motor on. This ensures that the workpiece or chuck jaws will not hit the lathe bed, saddle or crosslide, and also ensures that they clear the cutting tool.

12. Check that all holding, locking and driving devices are firmly tightened.

13. Always use the recommended attachments.

GUARANTEE

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Sherline Lathes are unconditionally guaranteed for [redacted] months to give complete satisfaction or tool will be repaired free of charge.

CUSTOMER'S RESPONSIBILITIES

Always use care when operating the lathe. Follow the safety rulés. Turn off motor and disconnect motor cord before attempting adjustments to lathe.

SET UP INSTRUCTIONS

Read the instructions for cleaning, installing, lubricating and operating before attempting to install or operate the lathe.

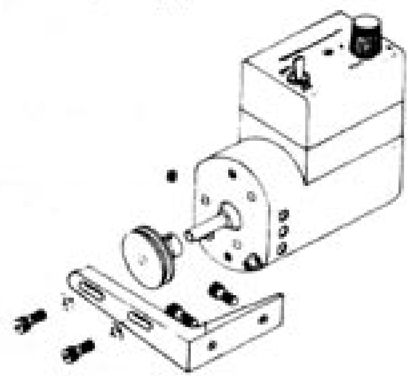
Setting Up Your Lathe

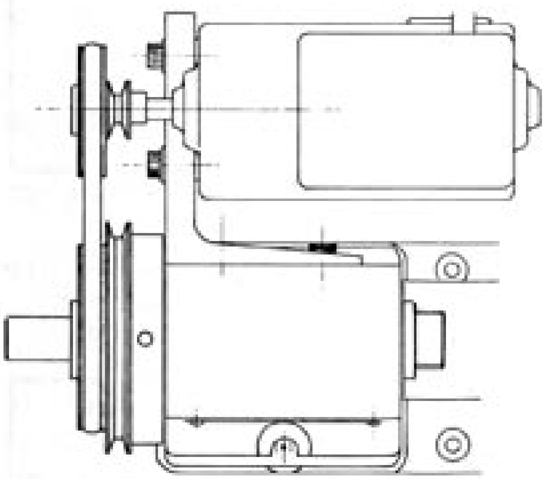
With the exception of the motor and speed control, and the motor bracket, the lathe is completely assembled.

Remove the rust preventative from all surfaces by wiping with a cloth moistened with mineral spirits.

For stationary use, screw the lathe to a workbench through the holes in the base. For portable use, fasten the lathe to a suitable board.

To fit the motor bracket, remove the two screws from the rear of the headstock, insert them through the holes in the bracket and screw them back into the rear of the headstock. Tighten them with the hexagon key provided.





To fit the motor to the bracket, first remove the screws from the two mounting lugs on the motor. Now fit the motor lugs into the bracket slots, place screws with washers through the bracket slots and into the motor lugs. Tighten these by hand so that you can still move the motor along the slots.

Make sure that the headstock pulley and the motor pulley are lined up so that the drive belt will run straight. This can be adjusted by loosening the motor pulley grub screw with the small hexagon key provided, and sliding the pulley along the motor shaft. Plug the cable socket into the terminal on the rear of the motor control. FOR SAFETY, REMOVE THE CORD FROM THE LATHE WHEN UNATTENDED.

Lubrication

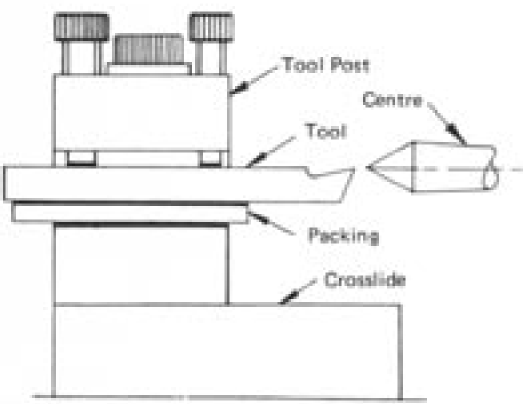
Bed Saddle Crosslide	Use a light oil such as sewing machine oil on all points where there is a sliding contact. This should be done immediately after each clean-down.
Lead Screw Tailstock Screw Crosslide Screw	Sewing machine oil should be placed along all threads regularly. At the same time check that the threads are free of any metal chips.
Tailstock Spindle	Wind out the spindle as far as it can go, and lightly oil it with sewing machine oil.
Handwheels	A few drops of light oil or grease behind the handwheel will reduce friction between the surfaces and make operation easier and smoother.
Headstock Bearings	The ball bearings are lubricated during assembly. Repack with bearing grease every 50 hours of use. For access to Headstock Bearings see "ADJUSTMENTS".
Motor	Every 50 hours of running 5 drops of sewing machine oil should be placed onto the bearing at each end of the motor.

Operating Instructions

The lathe is supplied with an electronic speed control, as well as a two speed pulley system. Slow speed on the pulley system is obtained by setting the belt on the small step of the motor pulley and the large step of the headstock pulley. Most metal turning should be done using the slow speed. For work on other materials, or for turning small diameter metal, set the lathe onto high speed by running the drive belt from the large step of the motor pulley to the small step of the headstock pulley. The electronic speed control gives spindle speed variation without continual belt changes. This feature allows increase in speed to compensate for decrease in diameter during work, and also allows increase in motor power if the cutting load affects the motor speed. The speed range using the small motor pulley is 100 - 2000 r.p.m. and on the large motor pulley is 1000 - 6000 r.p.m.

To operate the motor, turn the speed control knob clockwise as far as it will go to 'S'. Then turn switch to 'ON' and select the speed by turning the speed control knob anti-clockwise towards 'F'. To reach maximum speed, turn the knob to 'MAX'. This requires additional pressure to actuate the switch mechanism — a click can be heard.

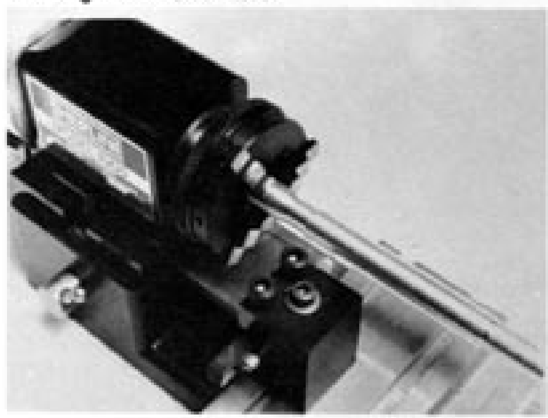
Each type of turning work requires the correct tool for the job. It is important that the cutting tool is sharp and correctly set up in the toolpost. The cutting edge of the tool should be exactly level with the centre height of the lathe. Check this against either the headstock centre or tailstock centre.

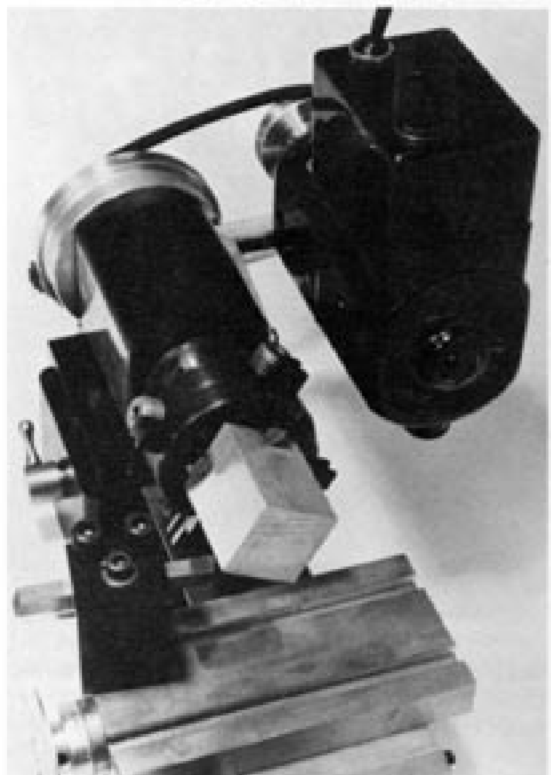


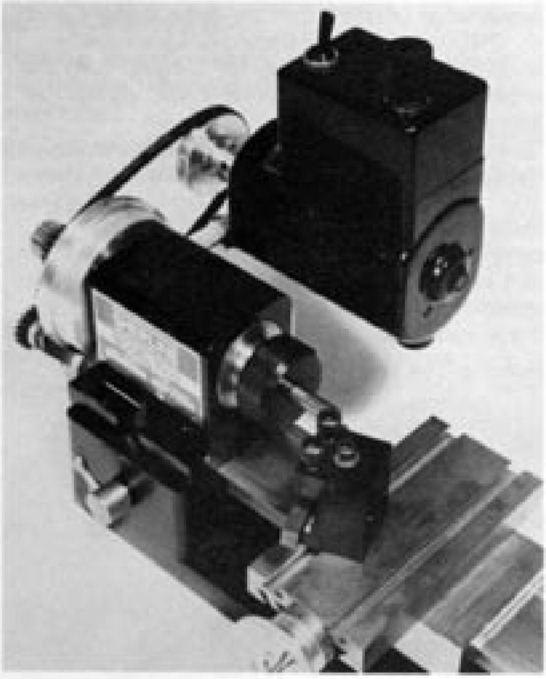
In order to get the tool near the centre, loosen tee bolt and slide the toolpost as close to the centre as possible. If the tip of the tool is low, raise it by sliding a spacer underneath it. Keep a number of spacer strips of different thicknesses and use as few of them as possible under the tool. The tool bit must be on centre or just below centre (0.1mm or 0.004" max.). Ensure that the tool is fixed tightly in position by firmly tightening the socket head screws. Try not to have the tool cutting edge protruding more than 10mm or 3/8" from the toolpost. When the tool is correctly set and the speed range selected, turn the lathe motor switch to 'ON' and adjust the electronic speed control knob to give the best speed for the job. Turn the crosslide and saddle handwheels to bring the tool into position.

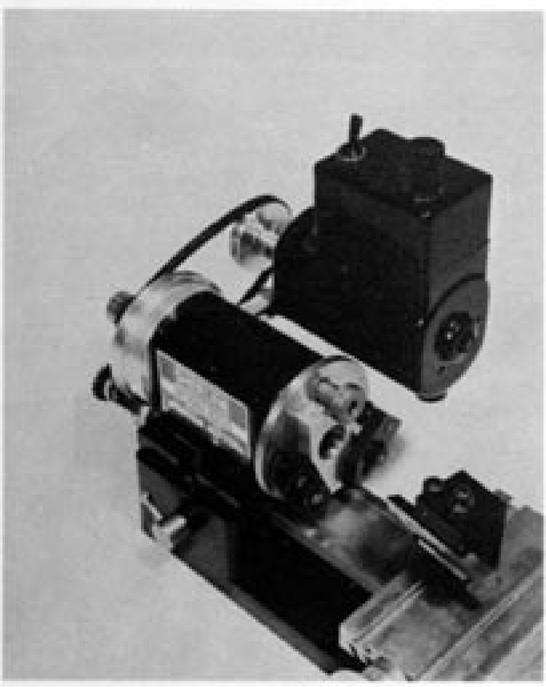
Turning the appropriate handwheel moves the saddle, crosslide and tailstock spindle. For Model 1000, one complete turn of the handwheel gives a movement of 0.050". For Model 1100, one complete turn of the handwheel gives a movement of 1 mm. Handwheels are calibrated in 0.001" for Model 1000 and 0.01 mm for Model 1100. Keep the screws clean and oiled.

Holding The Work Piece







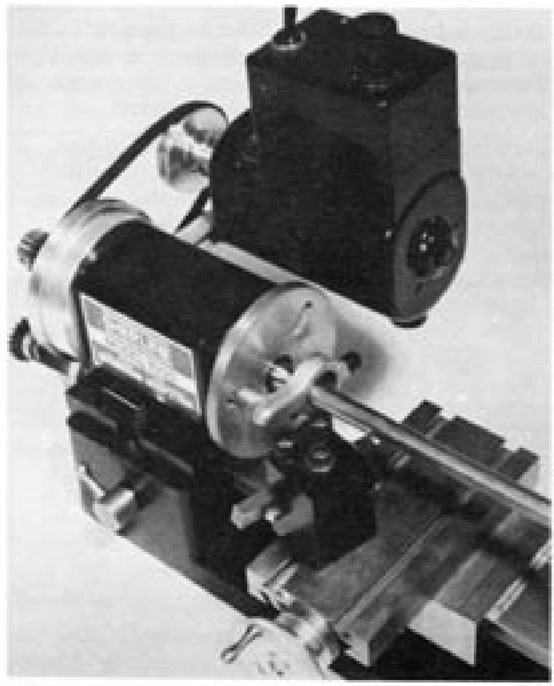


Work can be held between centres, in a 3 or 4 Jaw Chuck, on the Faceplate, or with a Collet. Sometimes it is necessary to use a chuck and centre, and if the work is spinning fast, a Live Centre should be used.

Live Centre

Turning Between Centres

This is done by fitting the carrier assembly to the bar which is to be turned and fitting the bar with the carrier between the centres in the headstock and the tailstock.



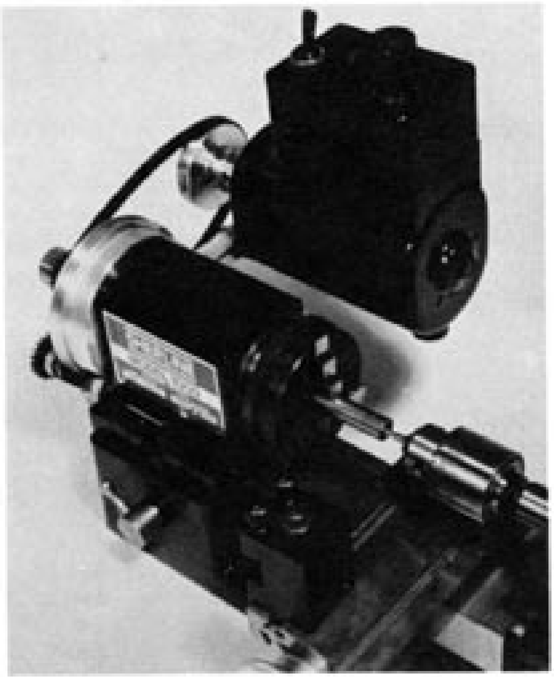
The carrier is driven by fitting it into one of the faceplate holes. This method of turning is ideal for bar work or turning of steps on bar. The centre must be greased to prevent over-heating.

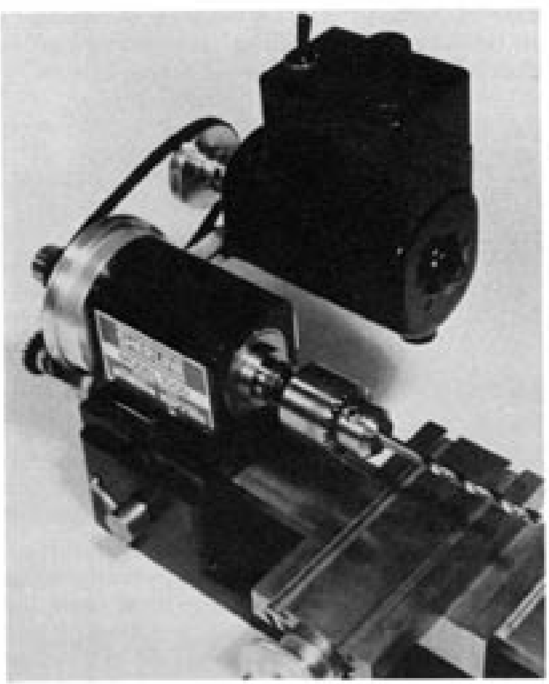
Centre Drilling

In order to hold the work between centres or using a chuck and centre, it is necessary to drill a centre hole into the work. To drill a centre hole, first scribe the position of the centre on to the end of the bar and use a centre punch and hammer to mark it. Into the mark made by the centre punch, drill the centre hole using a centre drill.

There are several other methods of drilling a centre.

1. Hold the work in a 3 Jaw Chuck and fit the Drill Chuck to the tailstock with a centre drill in it and the 3 Jaw Chuck to the main spindle. Bring the tailstock close to the work and lock it in position.





Turn the tailstock handwheel to bring the drill forward. The drill will automatically centre. Keep drilling. In this case, the work turns and the drill does not. Make sure the drill does not become hot as it may break.

2. Fit Drill Chuck into headstock using the No. 1 Morse Arbour. Punch a centre (with a centre punch). Hold the work in the toolpost or on the crosslide.

   Wind the crosslide and saddle into position so that the centre drill is in line with the centre punch hole. Wind saddle towards the Drill Chuck to drill the hole.

3. Hold the work in the 3 Jaw Chuck and place the centre drill in the chuck of a drilling machine and drill the centre hole.

Initial Test Cutting

As the tool bites in, it should cut smoothly if the speed is correct. If the tool is fed into the work too quickly, the main spindle will slow down considerably. Too much pressure may cause the motor to stall, but this will not do any damage if the tool is backed off immediately. If the tool jams in the work, turn off the motor and back off the tool. As long as a soft metal is used, there is little danger of damaging the cutting edge of the tool. If the swarf (removed metal) is smoking and the tool is getting very hot, then the speed is too fast or cooling compound should be used. Kerosine or water are ideal cooling compounds.

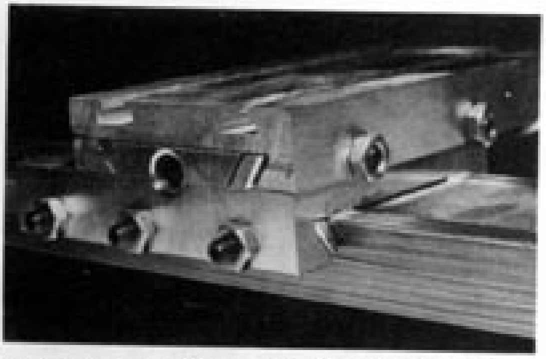
With a little practice on scrap brass or aluminium, you will soon be able to judge correct motor speed and feed rates. If the tool is cutting the material efficiently, then you are operating the machine properly.

If powdery materials such as cast iron are being worked on, or a grinding wheel is fitted in the chuck for tool sharpening, the lathe bed and the screw must be protected by covering it with paper or aluminium foil.

After work has been completed, remove all shavings from feed screws and slides, and clean all over and re-oil. The lathe will maintain precision if it is looked after.

Adjustments

Gibs are fitted at the rear of the saddle and on the left hand side of the crosslide. Correct adjustment of the gibs will ensure smooth and steady operation of the slides. Three grub screws with lock nuts are set into the body of each slide alongside the gib, and these can be tightened or loosened with the small hexagon key and wrench, to adjust the slack.



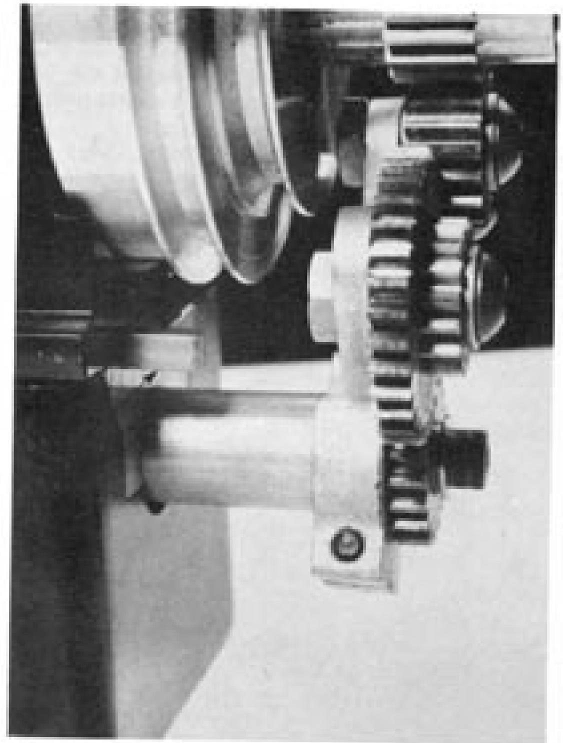
Adjust each screw until there is a smooth sliding action without rocking, along the complete length of travel of the slide. If an operation is being done where no movement is required in one of the slides, it can be locked by firmly tightening the centre grub screw.

Any excess backlash that may develop in the slide feed screws can be taken up by relocating the handwheels. To adjust the crosslide feed screw, loosen the handwheel grubscrew with the small hexagon key and rotate the handwheel about a quarter of a turn. Push the crosslide assembly as far as it will go towards the rear of the lathe and at the same time, push the handwheel hard flush against the thrust collar, and retighten the grub-screw. Adjust leadscrew slack in the same way, only this time pull the crosslide assembly towards the tailstock end of the lathe. Tailstock screw backlash is also taken up in the same way by pushing the tailstock spindle into the tailstock while rotating and retightening the handwheel.

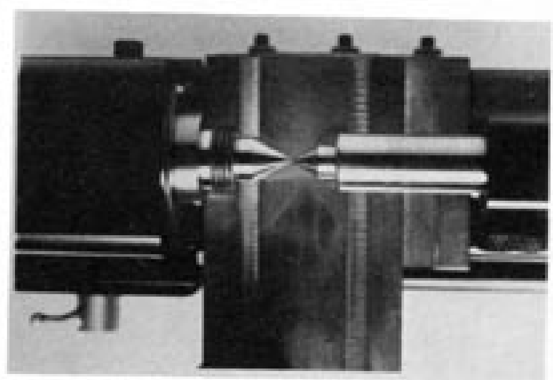
The headstock bearings are carefully adjusted at the factory and usually need only be adjusted when the bearings need regreasing. Loosen the grub-screw on the headstock pulley and remove the pulley from the main spindle. Loading on the magneto bearings used in the headstock is done by two locknuts which will now be accessible.

To remove the main spindle from the headstock, undo the locknuts and gently tap the main spindle forward. After reassembly, if the spindle is running too freely, tighten both nuts in a clockwise direction. If the spindle is running too tight, loosen the nuts in an anti-clockwise direction. When the spindle is rotating freely, but with no lateral play, tighten one nut against the other so that they are locked firmly in position.

There is an aligning key which protrudes from between the base of the headstock and the bed.



Before swivelling the headstock, this key must be removed. When the key is replaced, the centre to centre alignment is approximate only. Before tightening the headstock locking screw (located under the nameplate), ensure centre to centre accuracy by bringing up the tailstock as close to the headstock as possible and lining up the tail-stock centre with the centre in the main spindle.



When this is done, tighten the headstock locking screw with the hexagon key.

Use of Accessories and Attachments

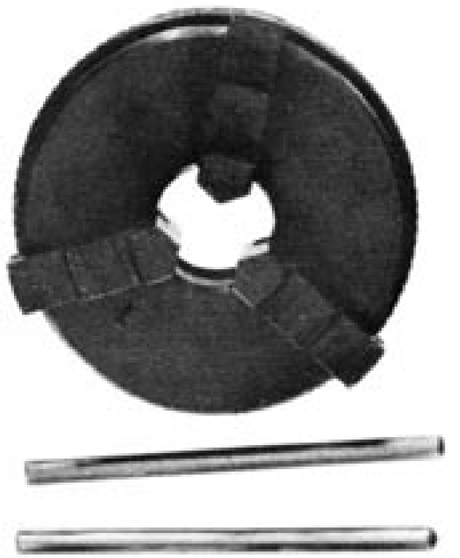
Your lathe is made more versatile with the addition of suitable attachments and accessories. These include various chucks, a screw-cutting attachment, a vertical slide, a milling column, collets, a live centre and many others. Some of the most popular ones and their uses are listed here.

Remember that accessories and attachments must be cared for in the same way as the lathe. Always make sure that threads are free from metal chips and dirt. Chucks should be lightly oiled frequently so that they continue to function smoothly and accurately. Gears in the screw-cutting attachment should be lightly greased when in operation.

Some attachments have moving slides and these should be lubricated in the same way as the slides in your lathe (see "LUBRICATION").

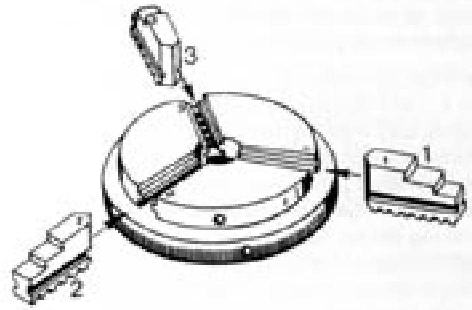
Three Jaw Chuck

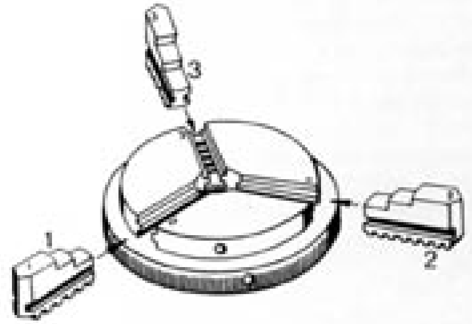
The three jaw self centering chuck is the most popular of all lathe attachments. This chuck will grip round or hexagonal work quickly since the jaws move simultaneously to automatically centre the work being held.



The jaws on the chuck are reversible so that the one chuck can be used for both internal and external gripping.

To reverse the chuck jaws, rotate the knurled scroll until they disengage. Now reverse the jaws and insert them in the following order. Jaw 2 into Slot 1, Jaw 1 into Slot 2, Jaw 3 into Slot 3. The numbers of the jaws and slots are stamped into the metal. The jaws are picked up on the scroll ring.





Before inserting the jaw, rotate the scroll until the start of the thread appears just before the jaw. This is done for each slot in turn.

Four Jaw Chuck

Each of the four reversible jaws on the four jaw chuck can be adjusted independently of the others.

It is used widely because of its capacity to hold almost any shape of material in a centered, concentric or eccentric position and can be adjusted to whatever degree of accuracy is required.

The most convenient way of offsetting work is with a dial indicator. The work is first centered roughly and then by revolving the chuck by hand to determine in which direction the work must be moved. Adjustments may require loosening and tightening of two or more jaws at a time. The final centering shows on the dial indicator, which indicates movement under the tip in micrometer measurements. Another way of centering is to use a thin feeler gauge or paper as a centre finder. Mount a blunt ended bar in the toolpost. Place the feeler or paper strip between the bar and the workpiece and advance the crosslide until the tension just holds the paper in place. Then rotate the chuck by hand, and if the tension increases or decreases, it indicates if the work is not centered. Another very useful and precise method is to coat the work with layout stain. Rotate the work by hand and a lathe toolbit will mark the high spot on the work.

Drill Chuck

The Drill Chuck is also one of the more popular attachments. It is used for mainly drilling from the tailstock. When the lathe is to be used for drilling, the work can usually be mounted in one of the other lathe chucks, or clamped to the faceplate for attaching to the main spindle. It is important to remember that when drilling, a centre drill is used to start the hole. Then the hole will be drilled concentric with the outside diameter of the work. This is particularly important when drilling deep holes with small diameter drill bits.

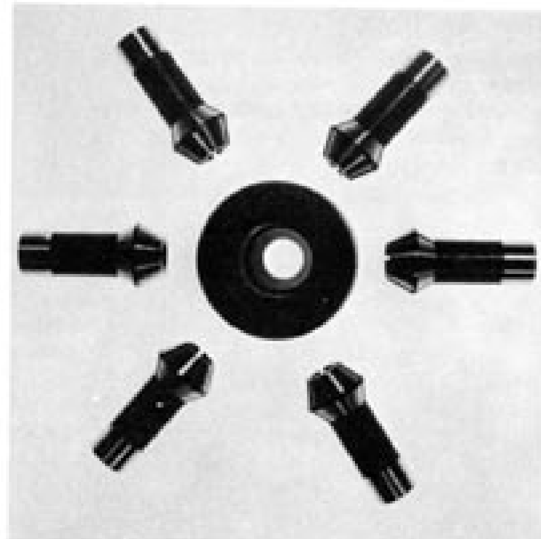
Make sure that the headstock and tailstock centres are properly aligned. It is sometimes useful to set the toolpost just touching the side of the drill, to prevent the bit from bending and to make it start approximately true in the centre of the work.

A No. 1 Morse Arbour is available for the Drill Chuck so that it can be fitted into the main spindle.

All chucks must be kept clean. The three and four jaw chucks should be washed in solvent and oiled lightly when new and after use. The Drill Chuck should be washed in solvent and oiled occasionally.

Collet Attachment and Collets

A collet is essentially another type of chuck used when greater precision is required with smaller diameter round bars than is possible to obtain with the three jaw chuck.



Never grip anything but the rated size in the collet, otherwise it could be damaged. A full range of collets is available for your lathe.

Because collets are accurate holding devices, they must be kept very clean. The smallest amount of grit will not only cause the work to run out of true, but the accuracy of the collet may be permanently impaired.

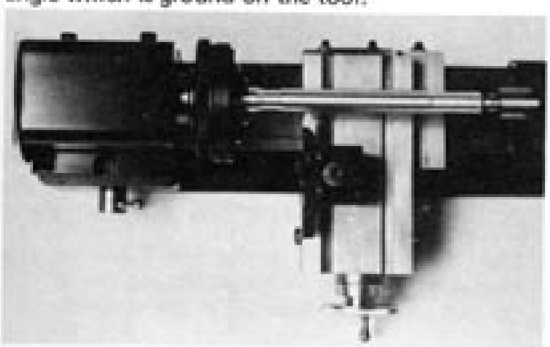
3 Point Steady Rest

A Steady Rest is needed to prevent whipping or wobble when turning slender or fragile bars, or drilling into the end of long cylindrical pieces.

The quickest way to set up the rest is to support the work between centres or between chuck and tailstock. Loosen the three set screws with the correct hexagon key and push the brass bearings inward until they contact the work lightly. Lock in position and lubricate the bearings with oil or grease. Never run them dry. At the point of contact, the work must be smooth. Brass bearings are used because they cause minimum marring of the work.

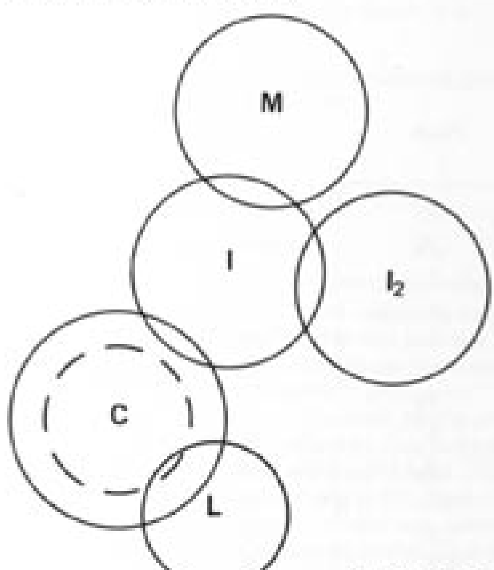
Threadcutting

Three ways of cutting threads on the lathe are with taps, dies or the Screw Cutting Attachment. Taps and dies are more economical when only two or three thread sizes are required. Full instructions for screw cutting with the attachment come with the kit. The Screw Cutting Attachment works on the principle of coupling the main spindle to the lead screw with a gear train. Threads are cut by having the saddle moved at a fixed rate to the main spindle. Internal and external threads can be cut. Various thread shapes can be cut depending on the angle which is ground on the tool.



To cut internal threads with a tap, first prepare the correct size hole for the desired thread. Drill manufacturers supply charts of drill sizes which will give this information. The tap is wound into the rotating work by hand, with plenty of oil lubricating the cutting edges. External threads are cut with a die. Gently turn the work by hand and use a liberal amount of oil on the die. If the die starts to bind, back off, brush the chips away and take up again.

Screw Cutting Gear Layout



See Charts 1 and 2

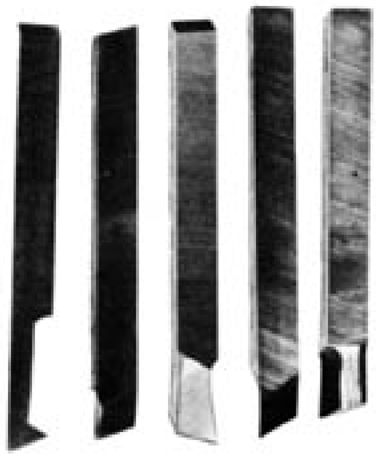
Chart 1 – For Model 1000, threads per inch available using the screw cutting attachment.

Threads Per Inch	Main Spindle Gear M	Lead Screw Gear L	Meshing With Cluster Gear C
16	20 Tooth	16 Tooth	32 Tooth
18	20 "	18 "	32 "
20	20 "	20 "	32 "
22	20 "	22 "	32 "
24	20 "	24 "	32 "
26	26 "	26 "	32 "
28	20 "	28 "	32 "
30	20 "	30 "	32 "
32	20 "	32 "	32 "
36	20 "	18 "	16 "
40	20 "	20 "	16 "
44	20 "	22 "	16 "
48	20 "	24 "	16 "
52	20 "	26 "	16 "
56	20 "	28 "	16 "
60	20 "	30 "	16 "
64	20 "	32 "	16 "

Chart 2 – For Model 1100, pitch of threads available using the screw cutting attachment.

Pitch	Main Spindle Gear M	Lead Screw Gear L	Meshing With Cluster Gear C
.25	20 Tooth	40 Tooth	16 Tooth
.35	28 "	40 "	16 "
.4	20 "	25 "	16 "
.5	20 "	20 "	16 "
.6	30 "	25 "	16 "
.7	28 "	20 "	16 "
.75	30 "	20 "	16 "
.8	20 "	25 "	32 "
.9	36 "	20 "	16 "
1.0	30 "	15 "	16 "
1.25	20 "	16 "	32 "
1.5	30 "	20 "	32 "

Tool Bits



Two terms frequently used are 'Feed' and 'Cut'. Reference to the diagrams will show what is meant by these terms. Normal turning, when used to reduce the diameter of a work piece, involves advancing the cutting tool *across* the lathe bed by an appropriate amount (depth of *cut*) and then *feeding* the tool along parallel to the lathe bed to remove material the desired length (see diagram 1).

In this case the depth of cut is set by the crosslide handwheel, and the feed is provided by the hand-wheel on the end of the bed. When facing off a work piece held in a chuck or faceplate, the depth of cut is set by the handwheel on the end of the bed, and the feed is provided by the crosslide handwheel (see diagram 2).

Diagram 1

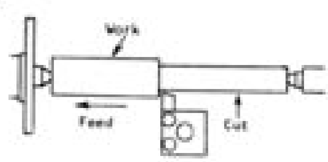
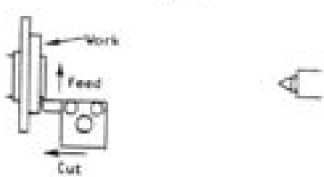


Diagram 2



Cutting tools are ground to various shapes according to their usage. If you purchase a set of cutting tools with your lathe, it will contain:

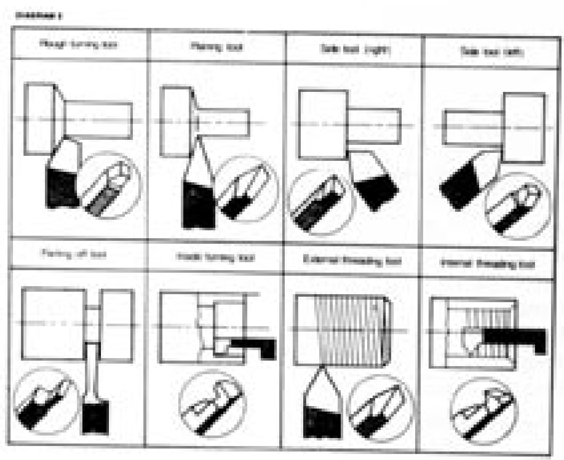
(a) Normal Turning Tool: This feeds from right to left, is used to reduce work to the desired diameter and is the most frequently used of all tools.

(b) Side Tools: These are used to face off the ends of shoulders and may also be used as normal turning tools. Note that one of these is then fed from LEFT to RIGHT and is called a LEFT side tool.

(c) Parting Tool: This is shaped like a dove-tail when viewed from above and is used to cut off work pieces by feeding the end of the tool across the lathe bed and through the work piece. Note that feed and cut become synonymous with this tool.

(d) Boring Tool: Used to enlarge holes in a work piece gripped in a chuck.

These tools are illustrated



The clearances ground behind the cutting edges indicate the type of material for which the tool may be used and the direction in which it is fed along the work.

When grinding tool bits, correct clearances are essential or "rubbing" can occur.

Turning Tools (left and right)

Reference to Diagram 3 will illustrate the lateral positioning of this tool. Note the clearance behind the point between the end of the tool and the work. Insufficient clearance will cause the tool to "rub" and excessive clearance will produce a ridged or wavy finish due to the small length of tool edge in contact with the work. This ridging becomes more pronounced with rapid feed. To provide a smooth finish the sharp cutting point may be slightly rounded with an oilstone, taking care to preserve the side clearance underneath this corner. (See Diagram 4.)

Diagram 3

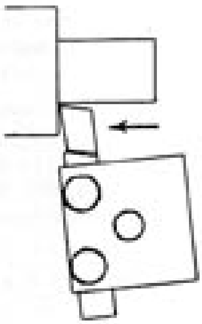
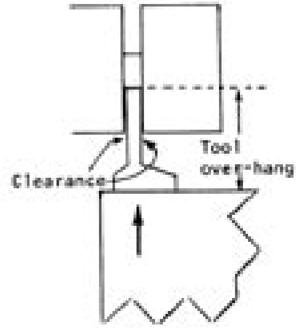


Diagram 4

Diagram 5



This tool should not be advanced directly endways into the work, the depth of cut being set whilst the tool is clear of the end of the work. The starting procedure is to advance the tool until the point just touches the work, note the reading on the crosslide handwheel, withdraw tool slightly and move along until clear of the end of work. Now advance the crosslide to the above reading, add desired depth of cut and then feed the tool along the work piece the desired distance. Withdraw the tool clear of the work, having noted the reading on the crosslide handwheel, mentally note the reading on the lead screw handwheel, return tool to starting position and advance to the previous reading plus the desired cut.

The second feed is now commenced, ceasing at the same previous reading of the lead screw handwheel, after the appropriate number of complete turns of this handwheel. This procedure enables turning to accurate length.

Repeat the procedure until the work has been reduced to within about 0.010" or 0.25 mm of desired diameter, noting that each 0.015" or 0.4 mm increase in depth of cut will reduce the work diameter by twice this amount, i.e. 0.030" or 0.8 mm. For the finishing pass, advance the tool by required amount (say 0.005" or 0.13 mm) and feed along the work just far enough to gauge the finished diameter. Adjust depth of cut if necessary and complete the final pass using a SLOW feed to obtain a smooth finish and exact size. Filing in the lathe can be a dangerous operation if not carried out correctly.

Parting Tool

This tool will cause no end of trouble if it is not correctly ground, set and used. Setting to exact centre height is essential and exact lateral setting requires that the sides behind the broad cutting edge will clear the sides of the groove in the work as the tool advances. (See Diagram 5.)

The tool should be clamped in the tool post with the minimum of overhand to avoid "spring" and consequent tool chatter and digging in. The cutting off operation should be carried out with the tool positioned as close to the chuck or centre as possible to avoid "spring" of the work. Maximum rigidity and slow speed are essential. A small square held against the work will assist in locating the tool squarely. If the tool chatters or produces noise as it is fed into the work, try reducing the turning speed, as a parting tool has a much greater length of cutting edge in contact with the work than most other tools. An alteration in the rate of feed will also assist.

Feed the tool positively and evenly into the work so that it neither digs in nor begins to rub. Watch that the sides of the tool clear the sides of the work as it advances. NEVER attempt to completely cut off a work piece when held between centres as this is positively dangerous. Stop while there is still a reasonable connecting piece, remove the material from the lathe and break off or saw off. The work may be chucked to turn off any projection left on the end.

Very small work may be completely cut off when held in a chuck, and allowed to fall on to the crosslide as it is too small and light to cause any damage. Hollow articles, e.g. rings, may be caught on a piece of wire whose end is held in a suitable position.

Side Tools

Diagram 6

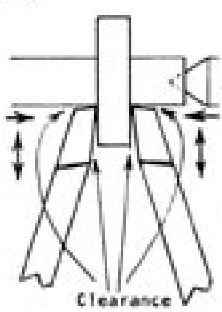
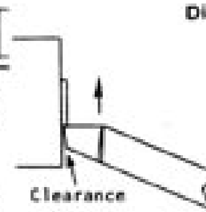
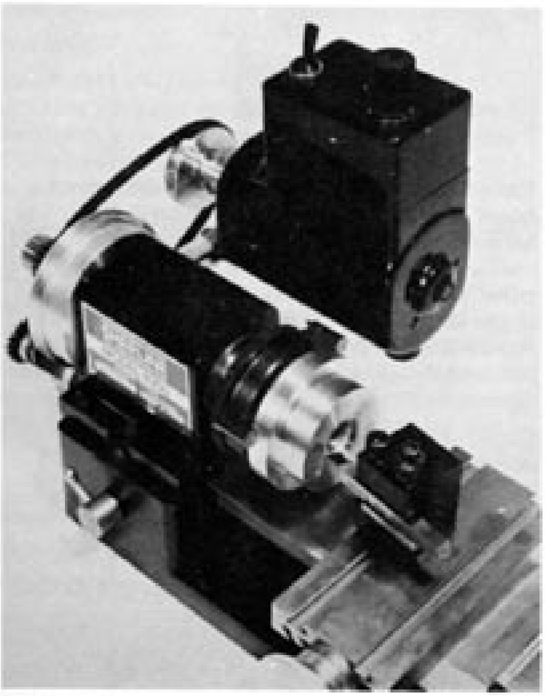


Diagram 7



Whilst these may be, and often are, used as general purpose turning tools, their specific use is for facing the sides of collars and shoulders (i.e. finishing these to correct dimensions and smooth flat surface), and for facing work held on a face-plate or in a chuck. The facing of work in this manner is very useful for the production of truly flat surfaces and for producing articles to an exact thickness. The two uses of the side tools are illustrated in Diagrams 6 and 7. The sharp corner at the cutting point should *not* be slightly rounded, as may be done with the normal turning tool, as knife tools may be required to produce sharp corners.



Boring Tool

The use of this tool requires the existence of a drilled or cored hole, or it may be used to enlarge the bore of a tube. The work must be mounted in a chuck or on a faceplate and the boring tool set as shown in Diagram 8, noting the clearance behind the cutting point.

Diagram 8

A slow rate of feed should be used as the turnings are not able to escape freely from the hole. Frequent withdrawal of the tool to allow turnings to escape may be necessary. Care should be taken not to feed the tool beyond the depth required, or to feed so deeply as to catch the chuck or face-plate. Where a hole must be bored right through the work, it should be packed out from the face-plate to provide clearance for the tool to feed through. The lead screw handwheel graduations may be used to indicate the correct depth at which to stop the feed. Notice that with boring, the depth of cut is increased by moving the tool and crosslide towards the operator and not away as with normal turning.
The boring of holes often necessitates greater than normal over-hang of the tool from the tool post, so the depth of cut and rate of feed should be reduced from normal.

Tool Cutting Angles

The shaping of cutting tools to suitable angles for the type of material and nature of work being performed can be very important to satisfactory work.
When tools become dull, gently re-grind and preserve the original angles and shapes. Better cutting and longer life will be obtained from cutting edges if they are finished with a small oilstone to obtain a really keen smooth edge. *Do not grind the top face* of the tools, but confine sharpening to the end and/or sides.

Remember that heavy depth of cut and rapid feed will throw greater strain on the chuck and lathe, may induce "spring" or bending of work and tools, and also produce a poor finish.

Turning Speeds

The chart below provides a guide to approximate speeds at which work of differing materials should be rotated. Note that the turning speed is inversely in proportion to the diameter of the work. Material often varies in its hardness, so these figures may have to be varied. The harder the material, the slower the turning speed should be. The larger the diameter, the slower the speed.

Guide to Approximate Turning Speeds

	¼" (6mm) Diam.	½" (13mm) Diam.	1" (25mm) Diam.
Annealed carbon steel	800 R.P.M.	400 R.P.M.	200 R.P.M.
Cast iron	900 R.P.M.	450 R.P.M.	225 R.P.M.
Mild steel	1500 R.P.M.	750 R.P.M.	375 R.P.M.
Brass	2300 R.P.M.	1150 R.P.M.	575 R.P.M.
Aluminium alloy	3000 R.P.M.	1500 R.P.M.	750 R.P.M.

However, apart from possible production of excessive heat (which will cause the work to expand) and the fact that excessive speed may damage the cutting edge or cause it to "rub" instead of cutting, turning speeds are not at all critical. Slower speeds than normal cause no harm, except by increasing the time involved. Aluminium, however, usually gives a better finish turned at high speed and lubricated.

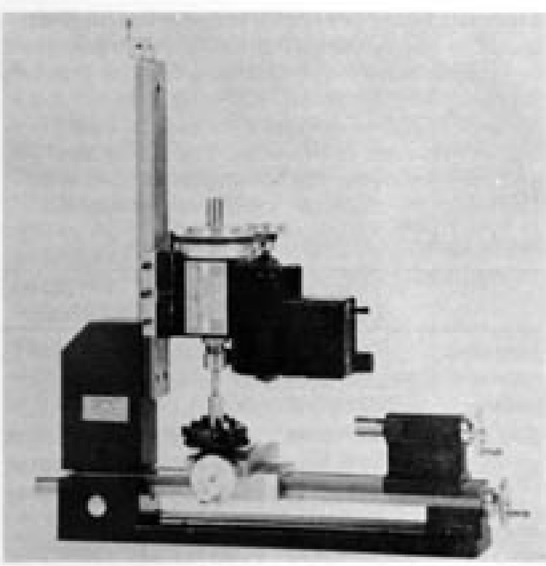
Lubricants

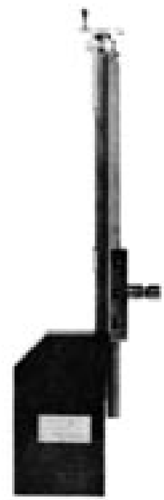
Much can be written about the use of lubricants, but where production rates are not very important, they may usually be dispensed with. Aluminium and its alloys may require the use of turpentine or paraffin oil or kerosine to prevent the chips from welding to the point of the tool. If desired, a mixture of one part soluble oil to six parts of water may be used on steel to assist in producing a smoother finish and reduce tool chatter when parting off. Brass and cast iron are almost always turned dry. Lubricants should be removed from the lathe after use.

The main purpose of using lubricants is to remove heat from the tool and the work. Modern high speed tool bits are not likely to be affected by heat on our type of work.

Vertical Milling Attachment

The Milling Attachment is made with a solid aluminium base and dovetailed vertical column.



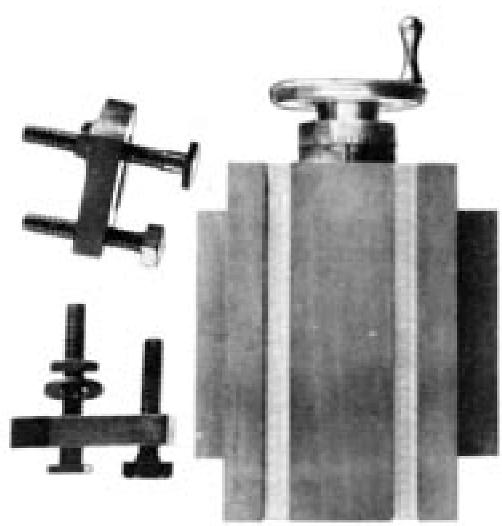


The column has a saddle with gibs which can be raised or lowered by rotating the handwheel. The lathe headstock is fitted to this saddle in the same manner as it was fitted to the left hand side of the lathe. The milling column is fitted to the left side of the lathe where the headstock originally was attached. Work is usually fitted to the crosslide and held in a chuck, or directly on the slide with clamps, or in a vice.

Cutters are held in the headstock by a chuck or collet or special cutter holder.

Grooving, keyway cutting and flycutting are some of the different types of milling operations possible.

For basic grooving and keyway cutting, a vertical slide can be fitted to the crosslide.



Reaming

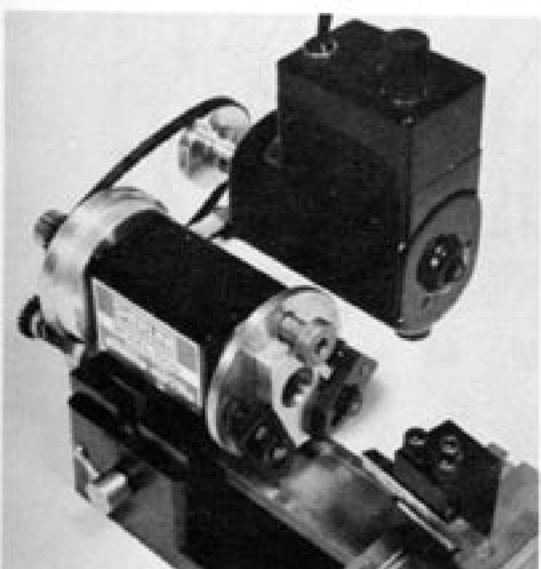
Twist drills will generally not drill perfectly accurate sizes and very small boring tools are not satisfactory on deep holes due to their flexibility. Therefore reaming is used for holes requiring accuracy within 0.0005" or 0.013 mm.

Reamers are available in any standard sizes. They should only be used to "clean up" the hole. To make an accurate hole, the work is drilled one size under the reamer size.

The work should be slowly rotated and the reamer slowly fed into the hole, with plenty of cutting oil applied. The reamer should be frequently removed and cleared of chips. Never rotate a reamer backwards in work as this can dull the cutting edges.

Faceplate Turning

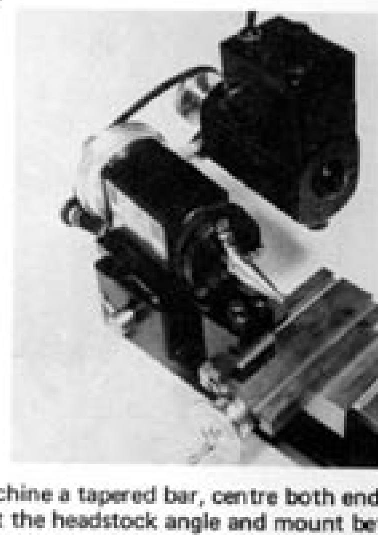
The faceplate has three slots which fit standard metal threads.



Flat work can be screwed directly to the faceplate. Extra holes can be drilled to suit odd shaped work unsuitable for a chuck. If work is mounted off centre, be sure to counter balance the faceplate.

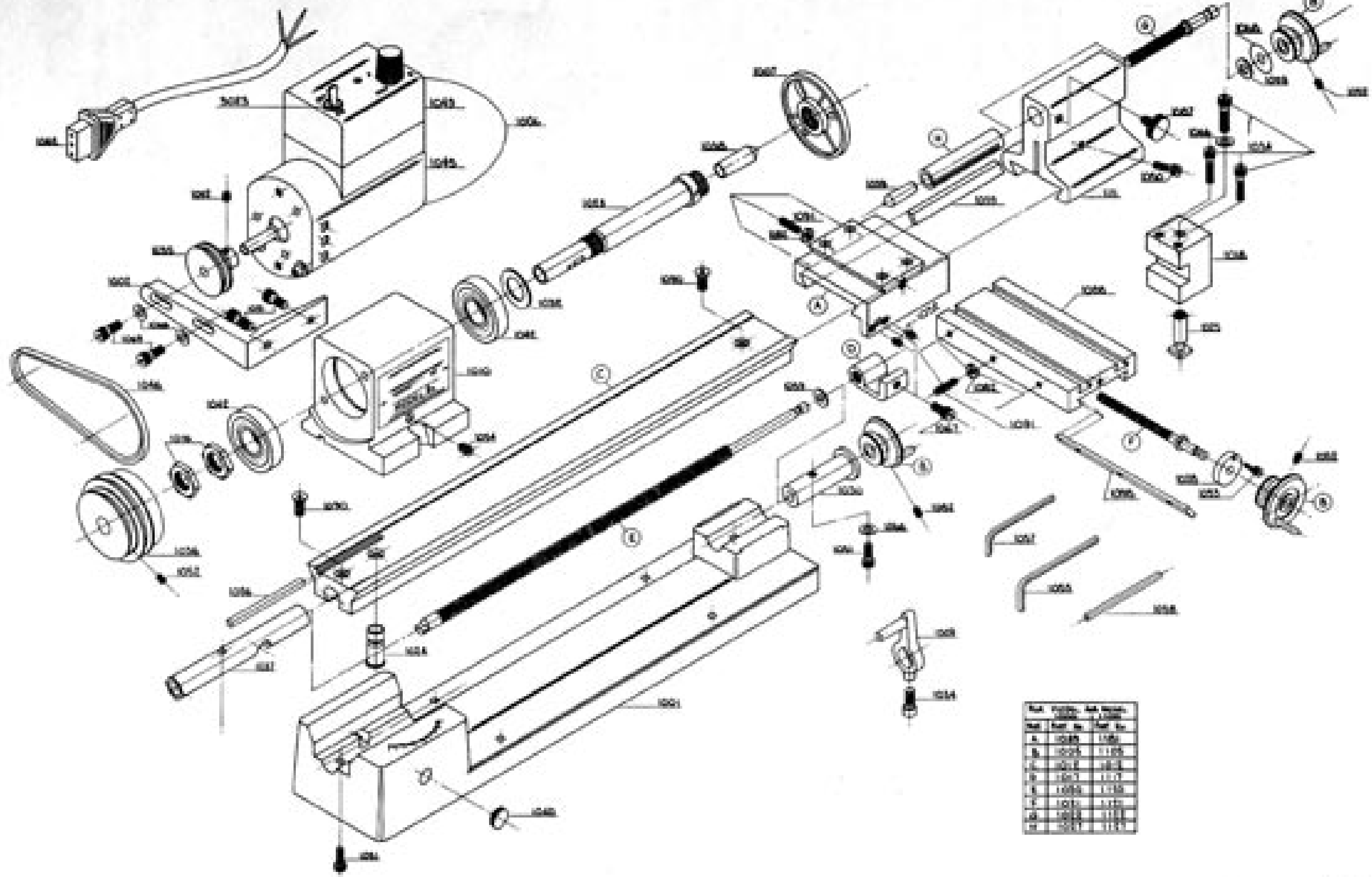
Taper Turning

On most lathes a taper can be cut by offsetting the tailstock. On the SHERLINE it is done by turning the headstock at any angle away from dead centre. To adjust the headstock angle, loosen the screw on the front of the headstock and slide out the square key just protruding on the left hand side below the headstock. The headstock can now be set at the angle of the required taper by lining the headstock mark to the required angle and tightening the screw. The base has been calibrated in 5° increments up to 45° both left and right of dead centre.



To machine a tapered bar, centre both ends of the bar, set the headstock angle and mount between centres. If the headstock is angled towards the rear of the lathe, the taper will cut smaller at the headstock end. If the headstock is angled towards the lathe front, the taper will cut small at the right.

Tapers can also be bored in work held in the 3 or 4 jaw chuck.



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SPARE PARTS — MODEL 1000 and 1100 LATHE

MODEL No. 1000	MODEL No. 1100	DESCRIPTION
1001		Base
1002		Motor Bracket
1005	1105	Hand Wheel Assembly
1006		Motor and Speed Control Assembly
1010		Headstock Casing
1012		Bed
1016		Locknut
1017	1117	Saddle Nut
1018		Tool Post
1020	1120	Lead Screw
1021	1121	Slide Screw
1022	1122	Feed Screw
1023		Headstock Spindle
1024		Head Pivot
1025		Tee Nut
1026		Head Key
1027	1127	Tailstock Spindle
1028		Thrust Collar
1030		Lead Screw Thrust
1032		Bearing Washer
1034		Skt. Hd. Screw 10 - 32 x 7/8"
1035		Motor Pulley
1036		Main Spindle Pulley
1037		Lead Screw Support
1038		No. 1 Morse Centre
1039		No. 0 Morse Centre
1040		Plug Button
1042		Magneto Bearing E19
1045		Motor

MODEL No. 1000	MODEL No. 1100	DESCRIPTION
1046		Drive Belt
1049		Speed Control Assembly
1050		Skt. Hd. Screw 10 - 32 x 5/8"
1051		Skt. Hd. Screw 10 - 32 x 3/8"
1052		Cup Point Grub Screw 10 - 32 x 3/16"
1053		Skt. Hd. Screw 5 - 40 x 3/8"
1054		Cone Point Grub Screw 5/16" UNC x 3/4"
1055		Hex. Key 5/32" A.F.
1057		Hex. Key 7/32" A.F.
1058		Tommy Bar
1059		Washer 1/4" I.D.
1062		Cable Assembly
1066		Washer 3/16" I.D.
1067		Skt. Hd. Screw 10 - 32 x 1/2"
1068		Shim Washer
1069		Skt. Hd. Screw 3/16" B.S.W. x 1/2"
1075		C'sk. Hd. Screw 5/32" B.S.W. x 1.1/4"
1082		Pressed Nut 3/16" UNF
1086		Carrier Assembly
1087		Tailstock Spindle Locking Screw
1088		Crosslide
1089	1181	Saddle Assembly
1090		C'sk. Hd. Screw 3/16" B.S.F. x 3/8"
1091		Grub Screw 10 - 32 x 5/8" Lg.
1098		Crosslide Gib
1099		Saddle Gib
1111		Tailstock Casing
3023		Toggle Switch

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