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MYFORD

ML7 LATHE

NOTES ON INSTALLATION AND MAINTENANCE

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INTRODUCTION

The ML7 Lathe is a fine tool, well worthy of careful installation and good maintenance. This short booklet has been devised to assist our user friends to become familiar with the working parts of the ML7 Lathe, thus enabling personal maintenance to be ensured, so obtaining the very best service from this accurate Machine Tool.

The main catalogue of the ML7 Lathe, No. 704, gives much useful information, and also contains several interesting illustrations of an actual ML7 Lathe in section; these, although not completely up to date, due to minor modifications having been made, will be of practical assistance in showing the construction of the Lathe. This catalogue also illustrates and describes the wide range of accessories designed for use with the Lathe.

INSTALLATION

The dimensioned drawing, Fig. 8, on inside back cover of this booklet, shows the space required for installation; and Fig. 3 on pages 6 and 7 illustrates the construction of the ML7 Motorising Unit.

The first important point is to ensure that the foundation on which the Lathe is to be fixed is soundly constructed and able to support the machine under working conditions. Take care that the bed is not strained or twisted by bolting down on uneven surfaces. The underside of the bed is accurately machined and forms a sound surface for seating to bench or stand. Any inequalities in the bench surface or floor should be corrected by packing of a permanent nature. The lathe bed should be checked with a good engineer's level, when packing has been inserted, and rechecked as the bolts for clamping are tightened. To obtain the best results with the level, check along and across the bed surface.

ELECTRICAL INSTALLATION

When a Cabinet Stand is supplied complete, this unit will include two cork mats fitted to the shelves, a screw-cutting panel fitted with a switch, and a terminal block at the back of the stand. The switch is already wired to the terminal block, the connections being as shown on the Wiring Diagram, Fig. 1, which illustrates alternative connections for various motors.

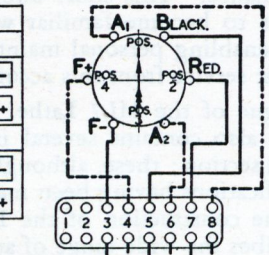
When rotary switches, as fitted to the cabinet stand, are supplied for bench machines, sufficient length of plastic covered wire is fitted to the terminals on the switch and these should be connected in accordance with the Wiring Diagram. Terminal blocks for connections between motor and switch can be supplied as an extra.

WIRING DIAGRAM

SINGLE PHASE MOTORS USED IN CONJUNCTION WITH SANTON REVERSING SWITCH. TYPE SR.127.MK.

BEFORE WIRING, ANY BRIDGE LINKS MUST BE REMOVED.

SWITCH SEQUENCE.	
POS. 1	OFF
POS. 2	BLACK — A_1 — F− RED — A_2 — F+
POS. 3	OFF
POS. 4	BLACK — A_2 — F− RED — A_1 — F+



SINGLE PHASE MAINS SUPPLY.

STARTING WINDINGS. Z_1 A_1 MOTOR TERMINALS. A_2 Z_2 RUNNING WINDINGS.

TERMINALS MARKED Z_1, Z_2 ON DIAGRAM ARE THOSE WHICH ARE NORMALLY CHANGED OVER TO REVERSE ROTATION OF MOTOR.

SWITCH TERMINAL MARKINGS SHOWN LOOKING ON FRONT OF SWITCH.

TERMINAL BLOCK AND WIRE COLOURS SHOWN AS WIRED AT WORKS.
---- DENOTES RED WIRE.
—— DENOTES BLACK WIRE.

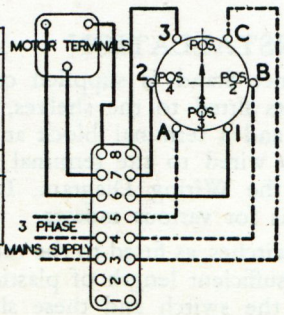
NOTE:— WHERE MOTOR TERMINAL NUMBERS DIFFER FROM THOSE SHOWN ON DIAGRAM, EQUIVALENT NUMBERS MAY BE OBTAINED BY REFERENCE TO CHART.

TERMINAL CHART FOR MOTORS WITH TERMINAL NUMBERS DIFFERENT TO THOSE SHOWN ON DIAGRAM.

MAKE.	EQUIVALENT NUMBERS. (TERMINAL NUMBERS AS SHOWN ON DIAGRAM.)			
	A_1	A_2	Z_1	Z_2
G.E.C.	A_1	4	Z_1	A_2
CROMPTON PARKINSON.	1	3	2	4
HOPKINSON.	Z_1	Z_2	A_1	A_2
METROPOLITAN-VICKERS.	T_2	T_3	A_1	A_2
ENGLISH ELECTRIC.	3	2	1	4
NEWMAN IMP.	B_1	2	A_1	A_2

THREE PHASE MOTORS USED IN CONJUNCTION WITH SANTON REVERSING SWITCH. TYPE SR.137.K.

SWITCH SEQUENCE	
POS. 1	OFF
POS. 2	A — 1 — B — 2 C — 3
POS. 3	OFF
POS. 4	A — 3 — B — 2 C — 1



NOTE:— THE THREE BLACK LEADS FROM MOTOR TO SWITCH MAY BE CONNECTED TO ANY OF THE THREE MOTOR TERMINALS.

FIG. 1

Addition:—
Terminal Chart for certain Crompton Parkinson motors reads ... ... A Z AZ (4th Terminal not marked)

SWITCHES

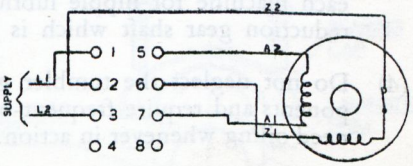
Reversing switches are supplied for single or for three-phase supply, according to the particulars given at the time of ordering. Where standard single-phase motors are fitted at our Works they will normally have four terminals for the connections to the reversing switch. If the motor has been fitted after the Lathe left the Works it is advisable to check the motor terminals, for should only two terminals be provided it will not be possible to use the motor for reversing duty.

All motors that leave these works are tested and run for reversing duty. When supplied with bench machines without switch gear, the terminals are bridged for on and off starting. These bridge pieces must be removed when a reversing switch is used.

NOTE. It should be noted that when machines on cabinet stands are supplied from the Works less motor, a reversing switch for single phase motors is fitted unless otherwise specified.

The chart on page 2 refers only to the rotary switches. The connections for drum type reversing switches are as follows:—

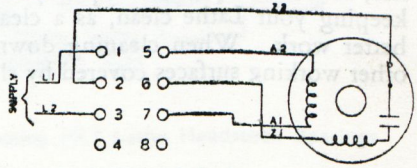
1. CONNECTIONS FOR SPLIT PHASE MOTORS WITH INTEGRAL STARTING SWITCH.



To achieve reversal of rotation it is essential that four wires are brought out from the motor. If the motor is provided with only two terminals it will be found that a wire from the motor windings is brought to the top of each terminal. These wires feed the starting winding and should be removed from the motor terminals and extended so as to connect to terminals 2 and 6 respectively of the reversing switch.

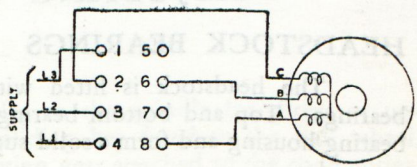
To relate the correct direction of rotation with the position of the reversing switch handle it may be necessary to interchange the wires on terminals 2 and 6.

2. CONNECTIONS FOR CAPACITOR MOTORS



The connections required are usually identical with those for split phase motors and the remarks made for split phase apply to the majority of capacitor motors.

3. FOR USE WITH 3-PHASE INDUCTION MOTORS.



LUBRICATION

After installing the Lathe, check all the oiling points and oil with a good quality machine oil (we recommend SHELL VITREA OIL 27 "J.Y.3" for all oiling purposes) running the machine at slow speed for some hours before attempting any production work; this will enable the spindle and bearings to bed together in the best possible manner.

(1) Oil all bearings whenever you use your machine, and in cold weather run a little slower until the coldness of the bearings has been overcome.

(2) Never work with the headstock bearing caps loose or slackened; if the bearings are on the tight side the Lathe should be run for a few hours at low speed without load, giving extra attention to the lubrication during this period.

IMPORTANT.—

(3) When running in back gear, ensure that the headstock pulley bearing is well lubricated *via* the oil-nipple arrangement fitted at the back gear end of the pulley. A special oil-gun is supplied with each machine for nipple lubrication. Do not forget to oil the reduction gear shaft which is situated below the main spindle.

(4) Do not neglect the tumbler gears; these are fast running components and require frequent oiling; similarly the change wheels need oiling whenever in action.

(5) Remember to oil all the sliding surfaces and feed screws.

(6) The leadscrew brackets, countershaft bushes and apron reduction gears, are fitted with "self-oiling" bushes. Oil-nipples are fitted for occasional lubrication.

Keeping your Lathe well lubricated will do much to increase its life, and will improve the quality of work produced. Take a pride in keeping your Lathe clean, as a clean machine will enable you to do better work. When cleaning down do not forget the leadscrew and other working surfaces covered by sliding members.

ADJUSTING THE LATHE

HEADSTOCK BEARINGS

The headstock is fitted with Glacier T.1 Alloy antifriction bearings. Top and bottom bearing halves are fitted accurately in the bearing housing and form a solid support against spindle journal loads.

Every care is taken to ensure correct bearing adjustment before the machine leaves the Works, and bearings should not be interfered with unless necessary. For the purpose of bearing adjustment, a pad comprised of brass shims is fitted between the two housing faces. This shim pad has a solid appearance but is made of .002" laminations, and by inserting a penknife blade it is an easy matter to peel off the desired thickness to allow the bearings closer contact with the spindle. After removing a .002" shim it will be necessary to scrape or file some proportional amount from the bearing half contact faces, giving a good seating to bearing halves and housing cap; in effect a solid condition with running clearance only between spindle and bearing. Whenever bearings need adjustment use marking blue for contact check, carefully scraping any high spots with a half round bearing scraper.

Spindle end thrust adjustment is made by the screwed collar at the end of the spindle, and care should be taken to ensure the elimination of end float without undue friction by over tightening.

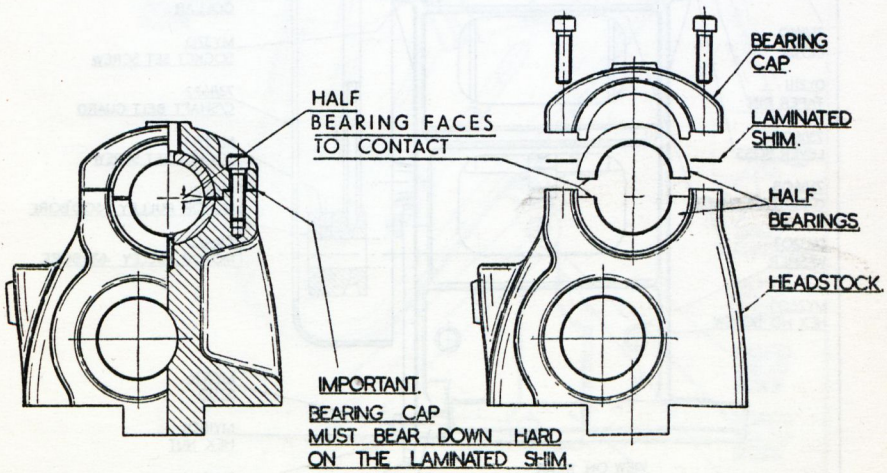


FIG. 2—Showing Method of Adjusting ML7 Lathe Headstock Bearings.

BACK GEAR

The coupling of the pulley to the spindle for direct or ungeared driving is achieved by a sliding key fitted to the bull wheel, which engages with the small driving gear attached to the cone pulley.

MYFORD ML7 3½in. CENTRE LATHE

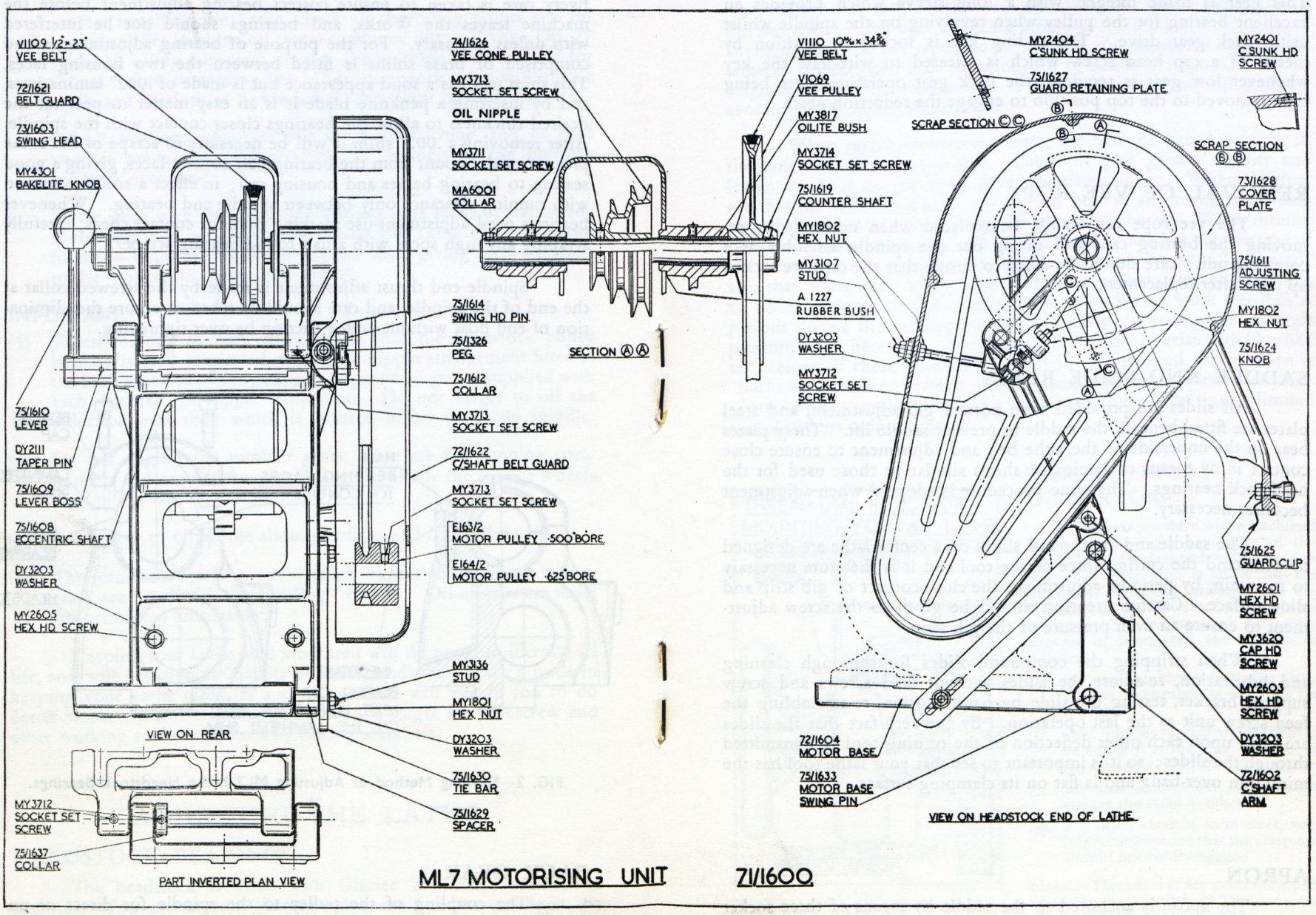


FIG 3.—Showing the construction of the ML7 Lathe Motorising Unit.

This gear is made integral with a long sleeve which provides an excellent bearing for the pulley when revolving on the spindle whilst using back gear drive. The sliding key is locked in position by means of a cap head screw which is released to withdraw the key whenever low gear is required, the back gear operating lever being then removed to the top position to engage the reduction gears.

REMOVAL OF VEE ROPE

The vee rope can readily be replaced when necessary by removing the bearing caps and lifting out the spindle assembly as a complete unit; care should be taken to ensure that the caps are locked up tight after replacement.

SADDLE AND SLIDE RESTS

All slides are provided with normal gib adjustment, and steel plates are fitted beneath the saddle to prevent saddle lift. These plates bear on the underside of the lathe bed and adjustment to ensure close contact is by means of laminated shims similar to those used for the headstock bearings. The same procedure is adopted when adjustment becomes necessary.

The saddle and compound slides on a centre lathe are designed to withstand the cutting force of the tool and it is therefore necessary to maintain, by periodic adjustment, the close contact of gib strip and slide surface. Careful attention should be given to the screw adjustment to ensure an even pressure of the gib strip.

When stripping the compound slides for thorough cleaning and lubrication, re-adjust the slides without feed screws and screw support bracket, testing the slide by hand motion, re-assembling the feed screw unit as the last operation. By the very fact that the slides are built upon each other deflection of the turning tool is transmitted through the slides; so it is important to see that your lathe tool has the minimum over-hang and is flat on its clamping surface.

APRON

The apron is anchored to the saddle by means of three socket head screws, and a periodic check should be made to ensure that these screws are tight.

TAILSTOCK

This unit is provided with an adjustable gib at the front of the rear shears. Set over adjusting screws at the front and rear control lateral movement for taper work. Except for occasional oiling, the tailstock requires very little attention. It is, however, important that its original accuracy is maintained. The following points will assist in avoiding unnecessary breakdowns :—

When turning between centres, see that the barrel is as far in the tailstock body as possible. This will give greater rigidity and lessen the load on the body bore when machining. When drilling, see that the drill starts in a truly centred hole as any swing on a fairly large drill causes unnecessary wear on the sliding barrel. When turning between centres, remember that the tailstock centre has the friction of the rotating work piece to withstand and must be kept lubricated; also that when work being turned becomes heated, it expands, giving an added pressure to the contact faces. Check your work freedom at periods during the turning operation, slightly slackening the tailstock pressure when necessary. Very little trouble should arise with "burned up" centres if these points are watched. A hardened centre when it "burns up" needs accurate re-grinding, and often the hardened particles of steel become embedded in the work being turned, causing unlimited complications unless removed.

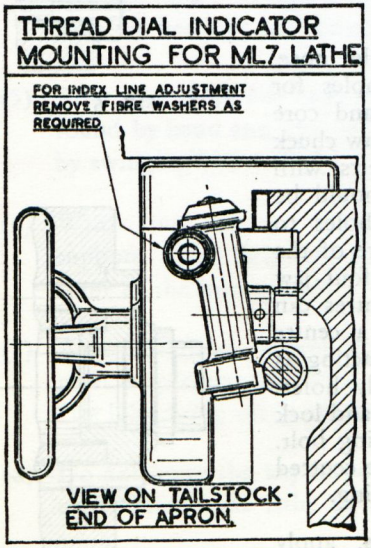


FIG. 4

THREAD DIAL INDICATOR.

Every lathe is provided with a machined facing on the right hand side of the saddle, drilled and tapped ready to receive this unit. Provision is made for the alignment of the dial markings with the zero mark on the indicator body as shown in Fig. 4. The indicator can be readily engaged or disengaged, and operates as follows :—

(1) For even number threads the clasp nut can be engaged at any mark on the dial.

(2) Odd number threads should always be engaged at the same number or any alternate number.

(3) For half threads per inch, always engage the same number.

(4) For other threads, m/m sizes, etc., it is recommended that the clasp nut should not be disengaged.

Note.—Threads that are exact multiples of the leadscrew pitch (8 T.P.I.) do not require the use of an indicator.

CHUCK FITTING

(1) Before screwing backplate on to spindle nose, ensure the cleanliness of spindle nose, backplate register faces and thread.

(2) Screw backplate firmly on spindle nose.

(3) Machine register diameter to light tap fit in chuck body.

Note.—With three-jaw gear scroll chucks, contact is made with the outer face of the chuck body and clearance with the inner face, see Fig. 5.

With four-jaw independent chucks, contact is made with the inner face of the chuck body, see Fig. 6.

With 6" four-jaw independent chucks contact is also made with the inner face of the chuck body but the threaded portion of the backplate is housed in the chuck body to eliminate chuck overhang, see Fig. 7.

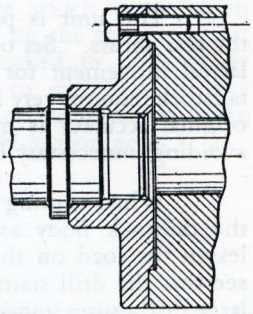


FIG. 5

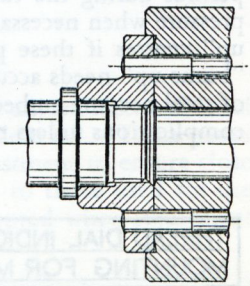


FIG. 6

(4) Remove backplate from spindle nose. Mark out and drill clearance holes for three-jaw chuck locking bolts, and core diameter tapping holes for four-jaw chuck locking bolts. Remove all burrs with countersink or scraper. Care should be taken when marking out the holes to ensure clearance between the bore of the hole and bolt stem. With the four-jaw chuck backplate, the drilling centres can easily be marked by means of a centre punch with the shank diameter acting as a guide through the chuck body holes. After centring one hole, drill, tap and lock the backplate lightly with a locking bolt. The other three holes can then be centred without fear of the backplate shifting.

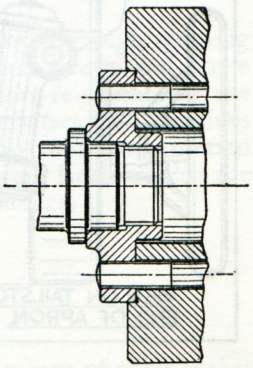


FIG. 7

(5) When tightening locking bolts, apply pressure evenly and gradually to all four in rotation.

GENERAL POINTS ON CENTRE LATHE PRACTICE

(1) Clean and oil your machine after use.

(2) When holding work in a chuck, grip as much of the material as possible. If thin flanged work is to be held, give support to the tool thrust by inserting a ring or collar between chuck body and work piece. The pressure on the jaws can be eased and so prevent straining of the chuck to avoid what is commonly known as "Bell Mouth Jaws."

(3) Do not grip irregular shaped material in a three-jaw chuck. Use a four-jaw chuck for rough material.

(4) Do not swing offset jobs on the faceplate without balancing by counterweight. A piece of shaped lead clamped to the faceplate opposite the offset material will give the necessary balance to most jobs. Swinging unbalanced work places an unnecessary load on bearings and causes ovality on work being turned.

(5) After your work has been clamped to faceplate, pull the machine round by hand and test tool and slide clearances to avoid damage by swinging bolts, etc.

(6) When roughing out heavy stock, use the tailstock centre for support. This helps the chuck's life of accuracy and takes away some of the load applied to spindle and bearings.

(7) When knurling, do not force knurling tool into work with too great a pressure as strain is placed upon feedscrew and nut. Use lubricating oil freely during knurling operation.

(8) Do not leave the key in your headstock chuck. Nasty accidents occur should the lathe be switched on accidentally.

(9) See that the spindle thrust is correctly adjusted. Any end float causes chatter.

(10) Always wipe spindle nose and chuck register faces clean before mounting chucks, face plates, etc.

(11) When removing a chuck (or face plate), do not "yank" the chuck off with the headstock locked with the back-gear, but set the headstock for normal back-gear drive, and after placing a piece of hard wood on the lathe bed, pull the spindle round by means of the belt so that one jaw of the chuck or slot in the faceplate strikes the wood sharply. The most obstinate chuck is released in this way, and a great deal of the load is taken from the back gear teeth.

(12) Always clean out the spindle taper before inserting centres.

(13) A small mark on the headstock centre with a corresponding mark on the front face of the spindle nose enables the position of location for trueness to be maintained.

(14) Do not forget that the headstock centre (live centre) must run true and should be turned in position when correction is necessary.

(15) When setting gear trains, do not mesh the change wheels too tightly.

(16) Always remember that your ML7 Lathe is a valuable Machine Tool, and no effort should be spared to maintain its quality and accuracy.

We are always pleased to answer any technical question in connection with our Products. When writing to the Works be sure to state the Serial letter and number of your Lathe. This will be found on the end of the Lathe bed (tailstock end).

CAPACITY CHART

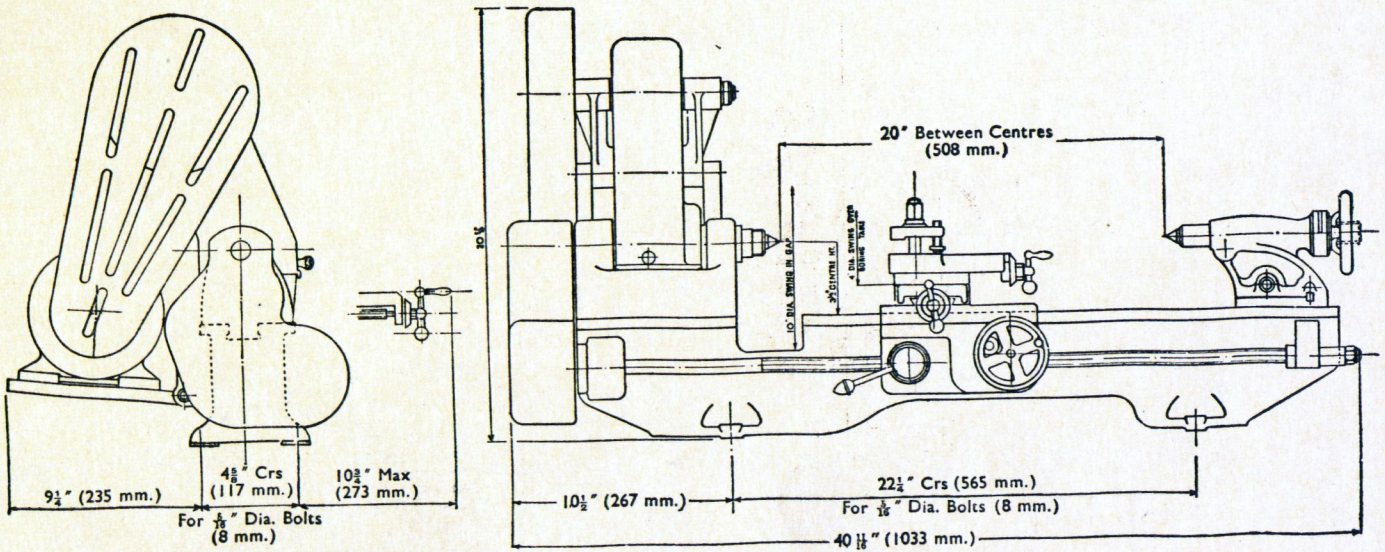


FIG. 8 Showing overall Measurements for Installation purposes.

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Lathes

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