Nr. 743D

Myford

ML 10 LATHE

NOTES ON

INSTALLATION

OPERATION

MAINTENANCE

ALSO

PICTORIAL PARTS LIST

MYFORD LIMITED

BEESTON · NOTTINGHAM NG9 1ER · ENGLAND

Telephone: Nottingham (0602) 254222 (5 lines) Telegrams: Myford, Beeston, Nottingham

3¼" CENTRE LATHE

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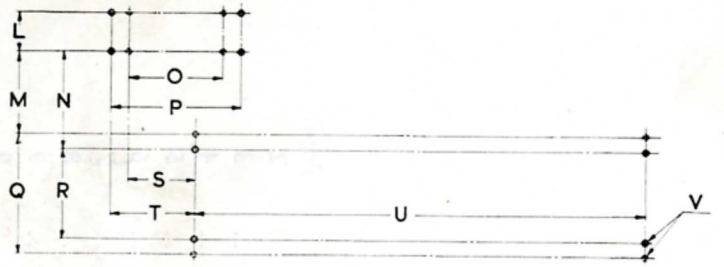
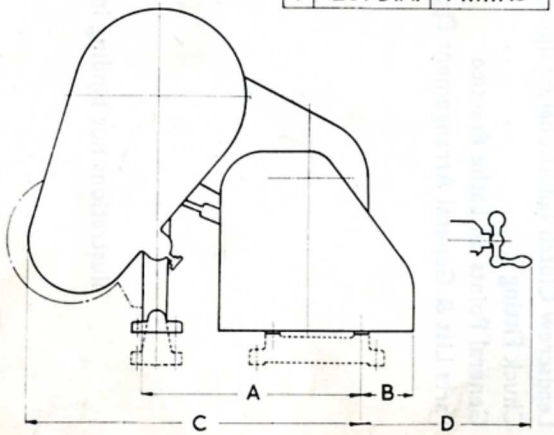
Illustrations not binding in detail.

A	10·812"	275 mm
B	2·562"	65 mm
C	16·437"	418 mm
D	8·281"	210 mm
E	1·500"	38 mm
F	15·812"	402 mm
G	7·125"	181 mm
H	35·750"	908 mm
J	3·250"	83 mm
K	13·000"	330 mm

L	1·875"	48 mm
M	4·000"	102 mm
N	4·750"	121 mm
O	4·625"	117 mm
P	6·375"	162 mm
Q	5·875"	149 mm
R	4·375"	111 mm
S	3·312"	84 mm
T	4·187"	106 mm
U	22·125"	562 mm
V	·281" DIA.	7 mm Ø





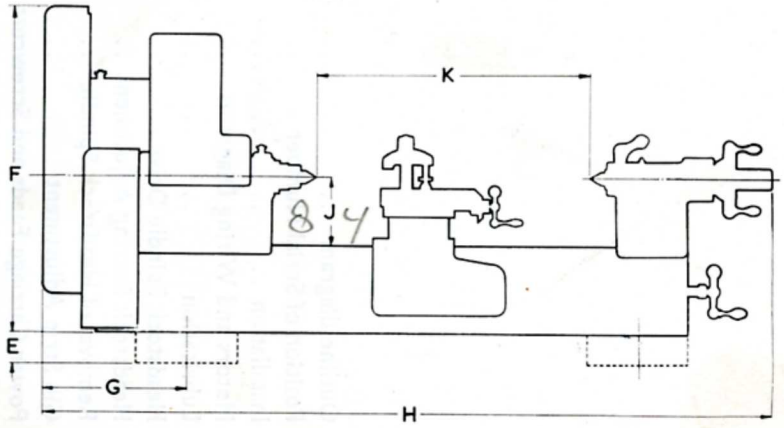


Fig. 1 Showing overall dimensions for installation purposes

OUR LATHES pass rigid inspection tests before shipment, and in order to maintain this built-in accuracy, they must be properly installed.

DO NOT OPERATE THE LATHE UNTIL . . . .

* **The machine has been correctly installed and thoroughly cleaned and lubricated.**
* **The instructions have been carefully read, and the controls and adjustments are understood.**

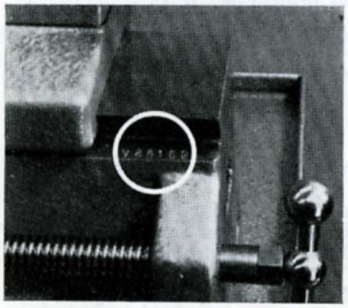


Fig. 2

V 131298

MACHINE SERIAL No.

In the event of queries, or orders for spares, please state the number of the machine, as shown on the front of the Lathe bed, at the tailstock end of the machine. Fig. 2 showing typical serial number.

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.

STANDARD EQUIPMENT

The standard equipment includes thread dial indicator, 15 changewheels, guards, vee belts, motor pulley, a faceplate with driver peg so that the faceplate can be used as a catchplate, a No. 2 M.T. hard centre for the tailstock, a No. 2 M.T. soft centre for the headstock, two double ended spanners, $\frac{7}{16}$" x $\frac{3}{8}$" and $\frac{5}{16}$" x $\frac{1}{4}$" B.S.F., square mouth spanner, three hexagon keys for socket cap screws and socket grub screws, 0·187", 0·156" and 0·125" A/F and an oil gun.

Cleaning

Machines are shipped with all parts protected by a rust preventative; all traces of this should be removed with either petrol or paraffin.

DO NOT MOVE ANY PART OF THE MACHINE UNTIL ALL OF THESE SURFACES HAVE BEEN THOROUGHLY CLEANED AND OILED

INSTALLATION

Foundation

It is essential that the lathe be placed on a solid foundation.

If the machine is to be located on an upper floor it should be placed directly over a beam or girder near a wall, or at some other spot where displacement of the floor will be at a minimum.

Lathe Height

A bench height of 33"–34" is suitable for the man of average height. Alternatively a comfortable working height can be gauged by arranging the lathe so that the upper surface of the topslide is at elbow height.

Floor Stand

A floor stand specially designed for this machine makes the ideal support. Before mounting the lathe on it, packings should be placed under its feet until the top surface is roughly level and the feet bear evenly on the floor. The top plate is ready drilled to receive the lathe when the latter is mounted on the accessory raising blocks. If the accessory chip tray is to be used, it is preferable that strips of jointing material be placed underneath the feet in such manner as to prevent coolant from working down through the bolting holes. Shims should be used underneath the feet which should be supported evenly, so that the lathe bed is not strained when the bolts are tightened down.

Installation without Distortion

Place the Lathe on the bench or floor stand with the holding down bolts loosely in position.

Grip a piece of 1" diameter material in the chuck with approximately 8" protruding, and clamp a dial indicator in the tool post with the plunger located at the extreme end of the test bar and on the horizontal centre line, the saddle being as far from the headstock as possible. Set the dial indicator to zero.

So long as the lathe bed is not strained the dial indicator will continue to register zero when the holding down bolts are tightened, but any distortion due to bolting down on to an uneven surface will be shown immediately by the dial indicator.

The lathe feet should be shimmed, so that, when the holding down bolts are finally tight, the dial indicator still reads zero.

If a dial indicator is not available, mount a tool in the topslide. With feeler gauges set the tool around ·010" clear of the test bar, but determine the exact amount. After finally tightening, the gap between tool and bar should be exactly the same. Any variation represents distortion.

If after clamping the gap is LARGER, packing should be increased under the FRONT of the foot at the tailstock end, or under the BACK of the foot if SMALLER.

Bench Mounted Lathe

If it is decided to use the chip tray, it is essential also to use the raising blocks, in order to give adequate space for removal of changewheel guard, etc. The lathe must be supported evenly as described under the heading "floor stand" above. The chip tray may be used as a template for drilling the bench, not only for the four holes for the lathe itself, but also for the four holes for the mounting bracket for the countershaft arm.

If the lathe is being used without the chip tray and raising blocks, it is essential to ensure that packing strips about 1" wide and of adequate thickness are placed transversely underneath the bed so that their centre lines coincide with the holding down bolts. The thickness of these strips must be sufficient to ensure that the underside of the lathe bed is clear of the bench, excepting at the bolting points. Packing shims must be used as described above to ensure that the lathe is rested evenly on the bench.

The bench top should be marked out for the securing holes in accordance with the diagram on page 2. The holes for the lathe being in accordance with dimensions U & R and those for the bracket for the countershaft arm with P & L, the latter being set back distance N. The holes in it are countersunk so that if required number 12 wood screws may be used for securing it.

CAUTION—When bolting down the lathe bed ensure that the counter pinion, 119, in the apron is clear of the stud, nut and washer or bolt head at the tailstock end of the bed.

Electric Motors and Switch Wiring

The lathe is designed for use with a 1425 RPM Motor of ⅓ H.P. Suitable single phase and three phase motors complete with drum type reversing switch are available.

Primary belt tension is obtained by moving the motor up or down on the countershaft arm which is drilled for the mounting of motors having slotted feet. It is also provided with slots so that motors in IEC frame 71 having holes in the feet can be readily accommodated. Any other motor having holes in the feet must be mounted on strips provided with studs suitably disposed to pass through the slots in the countershaft arm.

The stand is drilled for the reception of the drum type switch which is supplied with the motors. Packing pieces ensure the correct positioning of the switch relative to the chip tray. Where the lathe is mounted on a wooden bench the drum type switch may if required be mounted in a position similar to that used on the stand.

Single phase motors, purchased independently but intended for use in conjunction with a reversing switch, must have four terminals for the separate connections to the starting and running windings. **Any bridge pieces connecting starting to running windings must be removed before connecting motor to reversing switch.**

Wiring Diagrams for motors used in conjunction with Dewhurst Drum Type Reversing Switch.

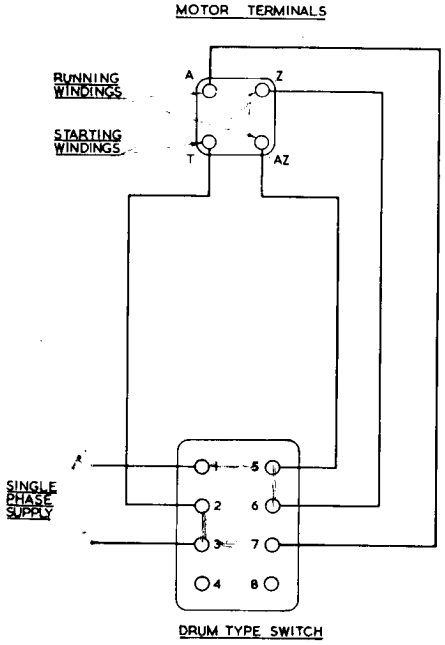


Fig. 3 Single Phase

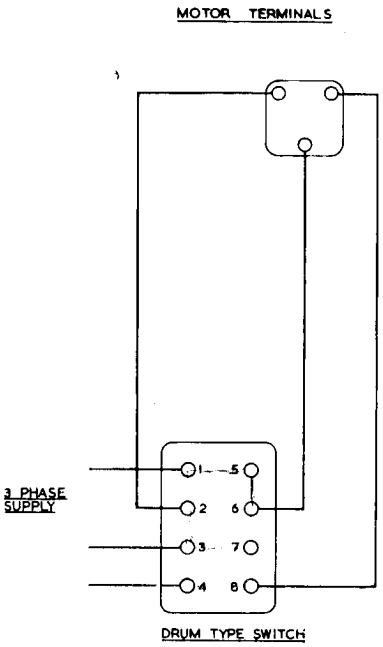


Fig. 4 Three Phase

MOTOR	STARTING WINDING	RUNNING WINDING	RUNNING WINDING	STARTING WINDING
CROMPTON	Z	A	AZ	T
AEI	A1	T2	T3	A2
ENGLISH ELECTRIC	1	2	3	4
BROOK	Z1	A1	A2	Z2

Terminal markings of alternative makes of motors

Fig. 5

Earthing

It is important to make sure that the stand and the Lathe are electrically connected to a satisfactory earthing point. Should any difficulty be found in wiring and running the motor the advice of an electrician, who is competent in motor wiring, should be sought.

LUBRICATION

After installing the lathe treat all points with the recommended lubricant. An oil gun is supplied for use with the pressure nipples fitted to the machine. Careful attention should be paid to the lubrication of the headstock bearings particularly during the first few hours of running.

Important: Whenever the headstock reduction gear is used ensure that the headstock pulley bearing is well lubricated by the oil nipple at the large end of the pulley.

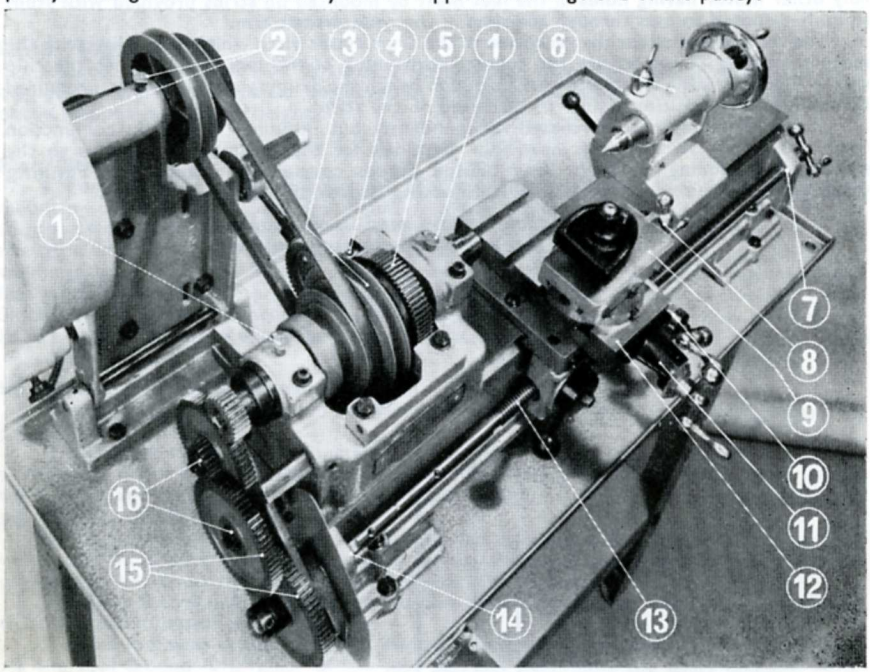


Fig. 6

Lubrication chart—use Shell Vitrea 27 or Esso Nuto H32 oil (under I.S.O. specification 3448/1975(E), Nuto H32 replaces Nuto H44) except where otherwise stated.

1. Headstock bearings front and rear. Fill oil cups before commencing work and every 4 hours. Due to the fact that the rear bearing is closed at each end, whereas the front bearing is open at each end, the oil cup for the front bearing will empty more quickly than that for the rear bearing. The journal itself will however remain lubricated for an appreciable period.
2. Countershaft. Fill oil cup before commencing work and every 4 hours (1 only).
3. Headstock pulley (see also "A", Fig. 7, page 8). Lubricate with oil gun every 4 hours when backgear is in use.
4. Backgear shaft (see also "B", Fig. 7, page 8). Lubricate every 4 hours when backgear is in use.
5. Backgearing—gear teeth. Lubricate with Rocol Molytone grease if available, otherwise use oil of viscosity No. SAE 30.
6. Tailstock barrel. Lubricate with oil gun weekly.
7. Leadscrew bracket, R.H. Lubricate weekly.
8. Topslide feedscrew. Lubricate weekly, with Rocol Molytone grease if available, otherwise use oil of viscosity SAE 30.
9. Top slide ways. Clean weekly and lubricate with oil of viscosity SAE 30.
10. Hand traverse pinion shaft and counter pinion shaft. Oil weekly.
11. Cross slide feedscrew. See No. 8, top slide feed screw.
12. Cross slide ways. See No. 9, top slide ways.
13. Leadscrew. Clean regularly with a stiff brush and lubricate with oil of viscosity SAE 30.
14. Leadscrew bracket, L.H. Lubricate weekly.
15. Changewheels, teeth. See No. 5, Backgearing.
16. Changewheel studs. Lubricate daily.

N.B.—The frequency of lubrication given above is intended as a guide only. Under certain conditions, e.g. continuous use of fastest speeds, particularly when using a two speed motor, the countershaft, headstock bearings, changewheel studs, etc. will require more frequent lubrication.

General

Daily cleaning and correct lubrication of the machine will greatly increase its working life. Excess oil should be wiped from oiling points as oil and dirt form an abrasive compound which can easily damage precision bearing surfaces.

Wipe the bed and other sliding surfaces with a clean oily rag at frequent intervals. Use a brush to clean spindle nose threads, gear teeth, leadscrew threads etc.

At regular intervals the leadscrew should be thoroughly cleaned with a stiff brush and paraffin and oiled freely along its entire length.

Keep the lathe completely covered between working periods.

CONTROLS & ADJUSTMENTS

DO NOT OPERATE THE LATHE until all of the following instructions have been carefully read and the controls and adjustments are fully understood.

Mounting the Motor

Not only must the axis of the motor shaft be parallel with the axis of the countershaft but the motor pulley must be in line with the countershaft pulley. A straight edge rested against the face of both pulleys will enable both conditions to be checked simultaneously but an additional check for the alignment of the motor should be made by placing the straight edge firmly against the motor pulley but clear of the countershaft pulley and then rotating the motor pulley and the straight edge towards the countershaft pulley to determine that the alignment is correct.

The second test is essential to ensure the correct alignment of the axis of the motor and the countershaft but can only be made when the first test appears to indicate that the pulleys are in line. A further slight adjustment of the motor pulley may be necessary if the second test has shown that it is necessary to make an adjustment of the motor on its motor base in order to correct the alignments.

When assembling the primary drive, before fitting the motor pulley and the 7" diameter pulley, 161, the countershaft arm must be fixed in position, the motor must be mounted on the countershaft arm and the primary drive guard backplate, 171 must be fitted.

Headstock Spindle Drive

Standard motor pulley is 2½" (63·5 mm) diameter for use in conjunction with a 1,425 r.p.m. (1,750 r.p.m. on 60 cycles) motor. A two speed motor having 1,425/2,850 r.p.m. (50 cycles A.C. only) may be fitted but in this case the motor pulley must be 1⅞" (47·5 mm) diameter.

As the motor is mounted directly onto the countershaft arm the adjustment of the primary belt is obtained by sliding the motor up or down on it. Adjustment of the secondary belt from countershaft to headstock is obtained by means of the turnbuckle item 157, in the linkage for the belt tension release. Both belts should be tensioned only just sufficiently to give a positive drive without slip at the full rating of the motor.

Access to the headstock belt for speed changing is attained by pivoting the belt guard forwards towards the operator. The belt tension must be released by means of the lever item 149 when changing the belt from one step of the pulleys to another.

The backgearing is engaged by first releasing the cap screw item 52 and then sliding the key item 51 out of engagement. The cone pulley will then be free on the spindle. Next release the hexagon nut item 69 and slide the backgear cluster assembly on its shaft into engagement. This assembly consists of items 67, 68, 70, 71 and 72. With the hexagon nut item 69 finger tight in order to prevent the backgear shaft from twisting sideways the assembly should be moved inwards as far as possible until its movement is arrested by the socket set screw item 68 (see Fig. 7 overleaf) which serves as an adjusting screw to ensure correct depth of engagement. The hexagon nut item 69 should then be tightened securely.

When direct drive is next required the backgear cluster assembly should be slid out of engagement and the hexagon nut item 69 tightened in order to hold the assembly firmly in the free position. The backgear key item 51 should be slid back into engagement ensuring that it is moved inwards as far as possible so that the teeth on it engage firmly with the teeth on the bronze gear without backlash. The cap screw item 52 should then be securely tightened.

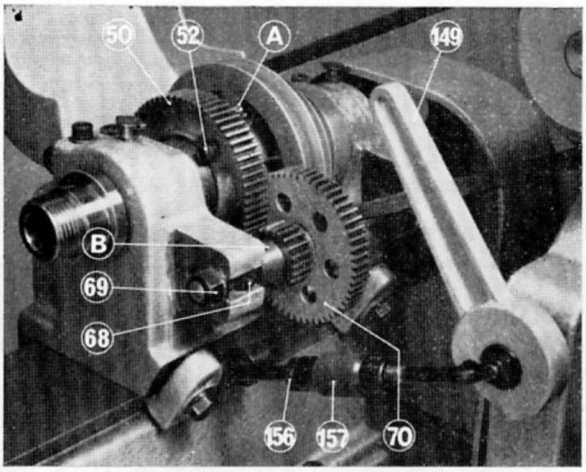


Fig. 7. Headstock and belt tension controls.
(N.B. For greater convenience, the hexagon nut 156 is now on the other side of the turnbuckle 157.)

HEADSTOCK SPINDLE SPEEDS (R.P.M.)

Direct drive			With backgearing		
On 50 cycles A.C. with 2½" dia. (standard) motor pulley.			Motor 1420/1450 R.P.M.		
840	490	280	145	85	48
On 60 cycles A.C. with 2½" dia. (standard) motor pulley.			Motor 1700/1750 R.P.M.		
1000	588	336	174	102	58
On 50 cycles A.C. with 1⅞" dia. pulley.			Motor, 2 speed 2850/1425 R.P.M.		
1280 & 640	714 & 357	400 & 200	220 & 110	124 & 62	70 & 35

N.B.—The maximum countershaft speed must not exceed 714 R.P.M. (1280 R.P.M. spindle speed)

Headstock Bearing Adjustment

The case hardened spindle runs direct in the cast iron of the headstock, an arrangement which, with careful attention to lubrication, will give several thousand hours of running before adjustment becomes necessary. The headstock casting is split through the front sides of the bearings only, the gaps being filled with accurately fitted shims items 40 and 42. These are each in two "layers". When it does eventually become necessary to adjust the bearing clearance the shims should be removed and the overall thickness of them must be carefully reduced by only a minimal amount at any one time. Do not attempt to hold them in a vice since they will readily be distorted, but place them on a wooden board locating them, one at a time, by nails in suitable locations to prevent them moving and then thin them. They should be tapered by removing very slightly more from the outer edge than from the inner edge. When replacing them the spindle must be in the headstock because the bores are machined with the shims in position, the edges of the shims being machined during the final finishing of the bore. When the shims have been replaced the cap screws items 38 and 41 should be locked tight. Next remove the spindle, see "removal of headstock spindle" (Page 9,) clean it and the bores carefully then with marking blue take readings in the bores and carefully remove the high spots with a scraper. Repeat the process if necessary.

End thrust on the spindle is taken care of by a ball thrust bearing item 57 which abuts on one side against thrust washer item 58 and on the other side against a shoulder on the spindle. End float is taken care of by the locking collar item 61 which is screwed on to the spindle and bears on the thrust washer item 60 which abuts against the rear face of the headstock casting and is "keyed" to the spindle by the pin item 59. When adjusting the spindle for end float it is necessary to release the socket set screw item 63 and to rotate the locking collar item 61. The adjustment must be carefully carried out so that end float is removed, but without causing friction.

REPLACEMENT OF HEADSTOCK VEE BELT

Removal of Headstock Spindle

In order to replace the vee belt for the drive to the headstock spindle it is necessary to dismantle the spindle.

Remove the grub screw 65 and withdraw the 25T gear item 64 off the end of the spindle, release socket set screw item 63 and unscrew the locking collar item 61 noting that below screw 63 there is a copper pad 62. Remove thrust collar 60 and withdraw the pin 59. Release socket screw 54 in the 65T backgear assembly. The spindle may now be withdrawn from the bearings in the direction towards the tailstock. Whilst the spindle is being withdrawn, the pulley assembly should be held so that, upon completion of the withdrawale this assembly together with the 65T backgear assembly and the ball thrust bearing can be removed. Remove the old vee belt and substitute the new one. Before replacing the v e. cone pulley and 65T backgear assemblies in position remove the socket set screw 54 and copper pad 62 from the 65T backgear.

When placing the vee cone pulley and 65T backgear assemblies into position ensure that the three members of the ball thrust bearing 57 are correctly located in the recess in the rear end of the vee cone pulley and that the thrust washer 58 is correctly located in the recess in the headstock casting. Before inserting the spindle back into the headstock ensure that the woodruff key 12 is seated correctly. When the rear end of the spindle reaches the ball thrust bearing it will be necessary to rotate the vee cone pulley in order to centralize the ball thrust to permit the spindle to pass through it. It will be necessary to repeat this when the threaded portion at the rear end of the spindle reaches the ball thrust and it will then be necessary to rotate the spindle so that it will pass through the thrust washer 58. When the spindle is within roughly ⅜" of its working position it will be necessary to rotate it relative to the 65T backgear so that the key in the spindle will enter the keyway in the gear.

Replace the pin 59 in the rear of the spindle and the thrust washer 60 onto the spindle. Screw on the locking collar 61 and adjust the spindle for end float, ensuring that all end play is removed but without causing friction. Ensuring that the copper pad 62 is in position tighten the socket set screw 63 in this locking collar. Next replace the 25T gear 64 and secure it with the grub screw 65. The 65T backgear 50 must now be positioned to give minimal end float to the vee cone pulley assembly after which the copper pad 62 and the socket set screw 54 must be replaced and the latter tightened to lock the 65T gear on the spindle.

Saddle and Slide Rests

All slides are provided with normal gib adjustment and in addition the saddle is provided with a clamp screw item 85 to facilitate parting off and grooving operations etc. The cross slide is also provided with a clamp which takes the form of a cap head screw item 201.

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 readjust the slides without the feed screws, testing the slides by hand motion, reassembling the feed screw units as the last operation. By the very fact that the slides are built on 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 overhang and is flat on its clamping surface.

Should there be any deflection of the leadscrew due to the reaction from the rack pinion, this can be eliminated by adjustment of the lower pinion on its eccentric, 122. The latter is locked in position by a socket set screw, 124. When adjusting the setting of this pinion, the saddle must be close to the tailstock end of the bed and the clasp nut must be engaged.

A tapping hole is provided in the left hand side of the saddle to secure the travelling steady. Whenever the steady is not in use this hole must be plugged, by means of the grub screw provided, in order to prevent swarf entering the hole and damaging the bed.

Swivelling Top Slide

The top slide, which is arranged to swivel 360°, is clamped by two thrust screws, 198 and thrust pads 195 and 196, which can be seen on Section MM at the top of the general arrangement drawing. The action of tightening the screws draws the top slide base down on to the cross slide.

Removal of Top Slide Unit

When it is required to remove the top slide and base unit, so that the cross slide can be used as a boring table, release the two square head screws, 198, and withdraw them approximately ¼". By rotating the top slide unit backwards and forwards whilst drawing it upwards, the thrust pads, 195 and 196, will be pushed outwards, enabling the unit to be removed.

When replacing the unit, care must be taken to ensure that the thrust pads, which are right and left hand, are in their correct bores.

The Tailstock

The tailstock also is provided with a gib strip item 126 and this should be maintained in adjustment to ensure that the alignment of the tailstock is maintained whilst it is being slid along the bed. An adjusting screw item 45 is provided in the tailstock body clamp item 43 so that the face on the latter will be at right angles to the clamping stud thus avoiding any possibility of bending the stud.

The tailstock body is clamped to the base by means of the hexagon nut 173 which must be released only when it is necessary to set over the tailstock for taper turning or for subsequent re-alignment. Set over is achieved by two thrust screws 131 which can best be seen on section CC at the bottom right hand corner of the drawing. To move the tailstock body towards the front, release the rear screw and tighten the front one and vice versa.

A barrel clamp item 216 is also provided.

Power Carriage Feeds and Screw Cutting

The 15 changewheels included in the standard equipment with the machine enable all the threads and the fine feeds under the heading "inch pitches" on the screw cutting chart item 174 which is mounted inside the changewheel guard to be obtained. All the trains of gears shown on the chart will give right hand threads and feeds, i.e. towards the headstock. When left hand threads or feeds, i.e. towards the tailstock are required an additional changewheel must be mounted on stud item 73 which will in turn be mounted in the fork provided on the headstock. The gear quadrant item 10 must be swung downwards to disengage the driven wheel on the first stud from the driver on the spindle and the gear on the reverse spindle brought into engagement with the 25T gear on the end of the spindle. The gear quadrant may then be swung upwards to give correct meshing of the driven gear on the first stud with this idling intermediate gear.

Wherever there is an idle wheel on the second stud, the driver on the first stud, the idling intermediate on the second stud and the gear on the leadscrew will be in the outer position, that is, further from the headstock, and it will be necessary to place the spacing collar on the leadscrew before mounting the appropriate gear on it. Any small changewheel which is not already in use in the gear train may be mounted on the second stud on the inside position, that is, nearer to the headstock as a spacer. However, in those instances where there are not only two gears on the first stud but also two gears on the second stud, the driven gear on the first stud plus the driving gear on the second stud and the gear on the leadscrew will be in the inner position so that the gear on the leadscrew will be mounted first and then the spacing collar subsequently. The driving gear on the first stud and the driven gear on the second stud will be in the outer position.

When setting up the gear train, sufficient backlash between each pair of meshing gears should be allowed. When the lathe is in operation the play in the gears is automatically taken up according to the direction of travel. The amount of gear clearance does not influence the accuracy of thread cutting. Gear noise can be reduced by the application of grease, preferably graphited.

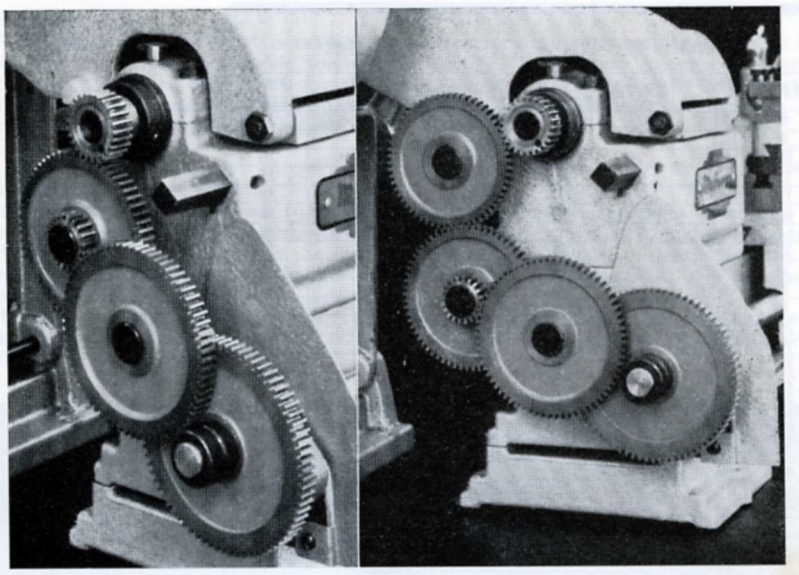


Fig. 8

Fine feed towards the headstock

Fine feed towards the tailstock, showing idler gear on reverse stud.

Thread Dial Indicator

The thread dial indicator item 181 is mounted on the spindle for the hand traverse pinion to the carriage and is provided as part of the standard equipment with each machine.

It is adjustable on its spindle so that it can be correctly aligned with the zero line on the apron. Once the indicator has been correctly set the clasp nut will engage when any line on the dial is opposite the zero line. The indicator may therefore also be conveniently used to indicate the leadscrew nut engagement position when using the self-act for fine feed.

It operates as follows:

(1) For even number threads the clasp nut can be engaged at any numbered 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 at the same number.

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

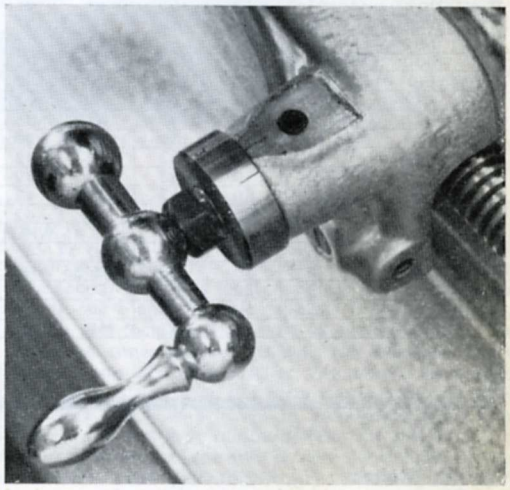


Fig. 9. Thread dial indicator

Note—Threads that are exact multiples of the lead screw pitch (8 t.p.i.) do not require the use of an indicator.

INCH PITCHES

T.P.I.	FEED PER REV.	DRIVER	1ST STUD		2ND STUD		LEAD-SCREW
			DRIVEN	DRIVER	DRIVEN	DRIVER	
8	·125	25	IDLE 55 WHEEL		IDLE 60 WHEEL		25
9	·1111	25	45	40	" 70 "		25
10	·100	25	50	40	" 70 "		25
11	·0909	25	55	40	" 70 "		25
12	·0833	25	60	40	" 70 "		25
13	·0769	25	65	40	" 70 "		25
14	·0714	25	70	40	" 60 "		25
15	·0667	25	75	40	" 65 "		25
16	·0625	25	60	30	" 65 "		25
18	·0556	25	45	40	" 60 "		50
19	·0526	25	38	32	" 60 "		50
20	·050	25	75	60	" 45 "		50
22	·0455	25	55	40	" 60 "		50
24	·0417	25	60	40	" 55 "		50
26	·0385	25	65	40	" 55 "		50
28	·0357	25	70	40	" 55 "		50
30	·0334	25	50	40	" 45 "		75
32	·0313	25	60	30	" 55 "		50
36	·0278	25	45	30	" 50 "		75
40	·0250	25	50	30	" 55 "		75
	·0103	25	65	40	50	20	75
	·0082	25	65	35	55	20	75
	·0064	25	65	30	60	20	75
	·0055	25	65	30	70	20	75
	·0037	25	65	20	70	20	75

METRIC PITCHES.

ADDITIONAL GEARS ARE REQUIRED.

FEED PER REV. MILLIMETERS	DRIVER	1ST STUD		2ND STUD		LEAD-SCREW
		DRIVEN	DRIVER	DRIVEN	DRIVER	
0·20	25	50	27	60	21	75
0·25	25	50	39	65	21	80
0·30	25	50	36	50	21	80
0·35	25	50	42	50	21	80
0·40	25	50	45	50	21	75
0·45	25	50	42	50	27	80
0·50	25	50	63	60	21	70
0·60	25	50	63	50	21	70
0·70	25	50	63	50	21	60
0·75	25	50	63	40	21	70
0·80	25	50	63	45	27	75
0·90	25	50	63	40	27	75
1·00	25	50	63	50	30	60
1·10	25	50	63	40	33	75
1·20	25	50	63	55	33	50
1·25	25	50	63	40	35	70
1·30	25	50	63	40	39	75
1·40	25	50	63	50	42	60
1·50	25	50	63	40	39	65
1·60	25	50	63	35	42	75
1·75	25	50	63	40	42	60
2·00	25	50	63	IDLE 45 WHEEL		50
2·25	25	50	63	40	45	50
2·50	25	50	63	IDLE 55 WHEEL		40
2·75	25	50	63	50	55	40
3·00	25	50	63	50	48	32
3·50	25	50	63	60	63	30

Fig. 10

For metric pitches the following extra change-wheels are required:— 1 each 21, 27, 33, 36, 39, 42, 48, 50 and 80, and two 63 tooth.

Metric Pitches

The screwcutting chart also shows a comprehensive range of metric pitches from 0·20 to 3·50 mm. To cut these threads a set of eleven additional changewheels is required. Again the chart shows in each instance the train for a right hand thread, but if a left hand thread is required an idling intermediate must be inserted in the train as described above.

Leadscrew Clutch

The leadscrew clutch which is available as an accessory can quite easily be fitted to any Lathe. It is an extremely valuable adjunct particularly, for example, when a number of components have to be turned and screwcut, since the changewheels for the screw cutting train can be left permanently set up and the turning operations carried out using the leadscrew via the ball handle on the end of it.

Fitting the Leadscrew Clutch

Remove from the leadscrew the retaining collar 19, any changewheel which may be mounted on the leadscrew, the distance collar 18, the distance washer 17 and the woodruff key 12. Measure the projection of the leadscrew beyond the face of the gear quadrant 10. From the right hand end of the leadscrew remove the ball handle 9 and the locknut 8. Withdraw the leadscrew from the machine.

Remove hexagon nut, washer and stud securing lathe bed at front left hand end, i.e. below clutch. Attach lever bracket, using original washer and hexagon head screw supplied with clutch parts.

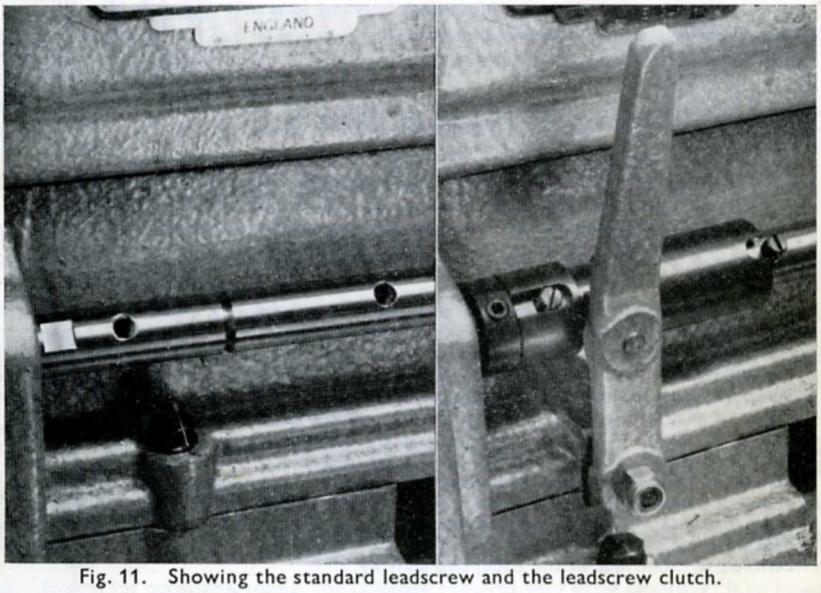


Fig. 11. Showing the standard leadscrew and the leadscrew clutch.

Using a hack-saw cut the leadscrew at the position indicated by the groove which is machined in it. With a file, trim the ends of the two portions.

Replace the main portion of the leadscrew, threading it through the left hand leadscrew bracket and then place the sleeve in position on the leadscrew, ensuring that it is the correct way round. The leadscrew may now be passed through the leadscrew nut and through the right hand end bracket after which the lock nut 8 and the ball handle 9 may be replaced. With the clasp nut engaged the ball handle and locknut should be adjusted to eliminate end play in the leadscrew, but, at the same time without causing any friction. Next pass the short piece of the leadscrew through the left hand bracket and mount the thrust collar provided with the clutch parts onto it ensuring that the plain face on the collar is towards the clutch. Next position the short piece lengthwise in accordance with the dimension which was taken before the leadscrew was first removed from the machine and then rotate the short piece and the thrust collar so that the socket set screw in the latter will match up with the flat on the former. Now push the collar firmly to the left until the projecting flange is in contact with the oilite bush 4, in the left hand bracket and secure the collar in this position. Next insert the driving pegs into the long and short members of the leadscrew and check for freedom of movement of the clutch member and freedom of rotation of the leadscrew at the same time ensuring that there is no end float in the latter.

The lever with its toggle shoe may now be mounted in position and secured with the Simmonds nut provided, adjusting the latter to permit of free movement of the lever but at the same time eliminating any "play".

Adjust the lever bracket so that, not only is it square, but also, the face of the toggle shoe is a few thousandths of an inch clear of the groove provided for it in the clutch sleeve.

Whenever changewheels etc. are being mounted on the leadscrew the clutch should be disengaged and the lever moved to the left as far as possible to ensure the correct positioning of the short portion of the leadscrew.

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. 12.
With four-jaw independent chucks, contact is made with the inner face of the chuck body, see Fig. 13.

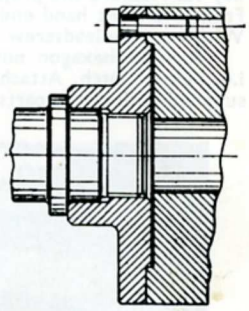


Fig. 12

(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.

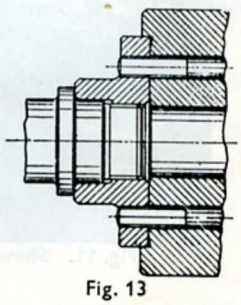


Fig. 13

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

CHUCK BACKPLATES & THREADED BODY CHUCKS

Backplate register bores are held to very close limits. When backplates are supplied either as separate units or fitted to chucks after the machine has left these works, the backplate bore may need very light scraping or polishing with fine emery cloth.

Do not screw any spindle mountings on the spindle nose without ensuring that the spindle register diameter is very lightly smeared with fine oil.

The above remarks apply equally to chucks with threaded bodies.

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 face-plate 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 clearance 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, faceplates, etc.

(11) When removing a chuck (or faceplate), 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) 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 tailstock troubles:—
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 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 regrinding, and often the hardened particles of steel become embedded in the work being turned, causing unlimited complications unless removed.

(16) When setting gear trains, do not mesh the changewheels too tightly.

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