CLAUSING COLCHESTER

CLAUSING SERVICE CENTER
811 EISENHOWER DR., SO.
P.O. BOX 877
GOSHEN, IN 46526

SERVICE & PARTS MANUAL

MODEL NO. 8014

SERIAL NO. 5/0013/10630

Phone 219-533-0371 Telex 258439

13"C

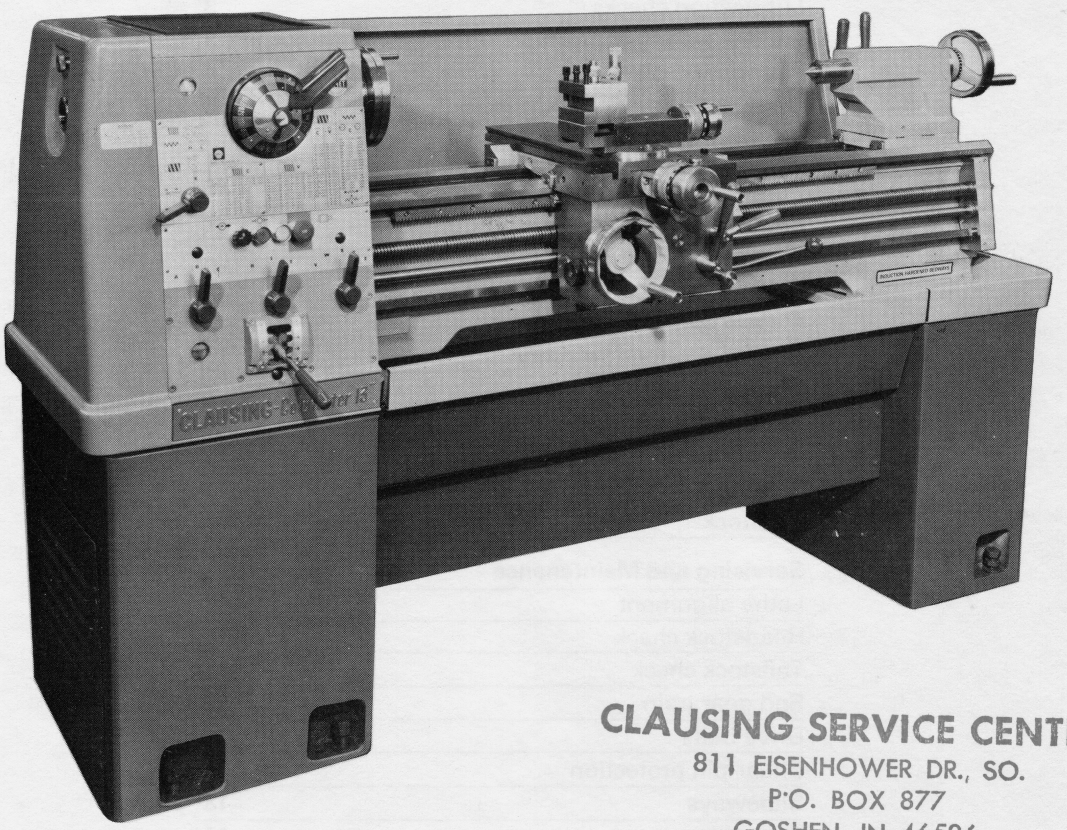
8000 – SERIES LATHES
GEARED HEAD ENGINE LATHES
INSTRUCTION & PARTS MANUAL

CLAUSING MACHINE TOOLS : ELGIN : ILL : U.S.A.

Manufactured by

THE COLCHESTER LATHE COMPANY LTD : COLCHESTER : ENGLAND

CLAUSING – COLCHESTER 13" LATHES



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This manual applies only to the machine having the serial number shown; this is stamped on the front of the lathe bed at the tailstock end and MUST be quoted in all communications.

Machine Serial Number .....

CLAUSING MACHINE TOOLS
690 CHURCH ROAD
ELGIN ILL 60120 U.S.A.

Printed in England

CLC/5221/683/5C

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MACHINE SPECIFICATION

Centres	
Height	165 mm (6.5 in)
Admits between	635 or 1015 mm (25 or 40 in)

Swing	
Over bed (saddle wings)	335 mm (13.25 in)
Over cross-slide	210 mm (8.25 in)
In gap	480 mm (19 in)
Length in front of spindle nose	115 mm (4.5 in)

Spindle	
Bored to pass	40 mm (1.625 in)
Nose type	4 in. D.1 camlock
Morse tape in bush	3 MT

Spindle speeds				
No. off				16
Selected in four ranges of four speeds in each range				
	30	40	54	72
	98	130	175	235
	320	425	570	770
	1030	1380	1860	2500

Motor (main)	
1800 r.p.m. (60Hz)	3.7Kw (5 HP) Cont.
	L184T Frame size

Bed	
Width of ways	230 mm (9.125 in)
Type of ways	Vee and flat

Cross-slide	
Width and length	149 mm x 486 mm (5.875 in x 19.125 in)
Travel	210 mm (8.25 in)

Top slide	
Width	89 mm (3.5 in)
Travel	95 mm (3.75 in)
Tool section	25 x 25 mm (1 x 1 in)
Quick change tooling	Dickson No. 2

Tailstock	
Quill diameter (nominal)	50.8 mm (2 in)
travel	145 mm (5.75 in)
Morse taper	3 MT
Set over	(0.250 in)

Leadscrew	
Diameter	28.58 mm (1.125 in)
Thread	6 mm pitch or 4 T.P.I.

Threads	
Metric pitches	0.2–14 mm (39)
Imperial T.P.I.	2–72 TPI (45)
Module pitches	0.3–3.5 MOD (18)
Diametral pitches	8–44 D.P. (21)

Feeds	
Metric (R10 Series)	0.03 mm – 1.0 mm
Imperial (R10 Series)	0.001 in x 0.040 in
Cross feeds = half longitudinal (approx) values	

Height of machine	
Floor to spindle centre	1061 mm (41.75 in)

Overall length	
635 mm (25 in) machine	1605 mm (63 in)
1000 mm (40 in) machine	1985 mm (78 in)

Weight	
635 mm (25 in) machine	840 kg (approx)
1000 mm (40 in) machine	890 kg (approx)

For other dimensions see foundation plan

Coolant pump unit	
Type AQ3 50/60Hz	1/20 h.p.

INSTALLATION

CLEANING

Before operating any controls, remove the anti-corrosion coating from all slideways, the leadscrew and feedshaft and from the end-gear train, see Fig. 1; using only white spirit or Kerosene.

DO NOT USE UNAPPROVED SOLVENTS FOR CLEANING AS THEY WILL DAMAGE THE PAINT FINISH.

Oil all bright, machined surfaces immediately after cleaning; use heavy oil or grease on the end-train gears and oil the intermediate gear (idler) spindle through the oilers furnished.

Operate the slideways lubrication pump, mounted on the front of the apron, several times to ensure that the last traces of anti-corrosion coating are removed from under the bedway wipers and slide edges.

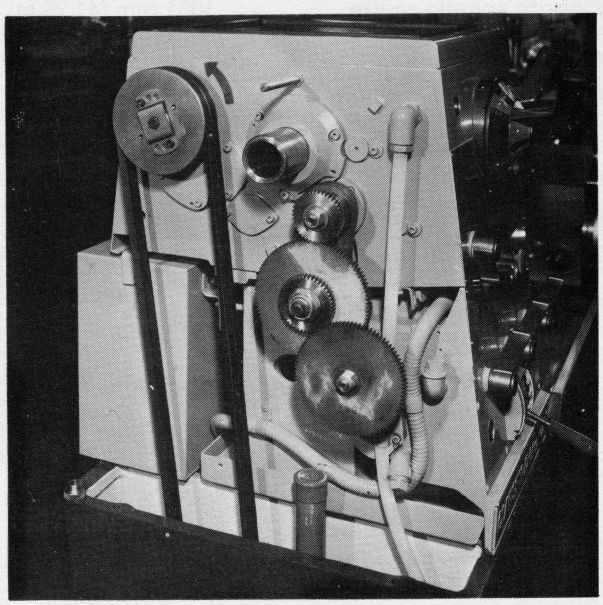


Fig. 1

LIFTING

A) Preparation and Safety Checks

1. Remove all items of loose equipment.
2. Carefully clean bedways and the underside of the lifting tackle.
3. Clamp the tailstock securely at the tailend of the bed.
4. Ensure eyebolts, shackle pins and securing screws are correctly tightened.
5. Always place thick paper between top plates and the bedway to protect the bed surface.
6. USE ONLY THE CORRECT EQUIPMENT – DO NOT SLING AROUND THE LATHE BED – LEADSCREW AND SHAFTS MAY BECOME BENT AND DAMAGED.

B) Lifting

1a. Position the bed-clamping plate and eyebolt as in Fig. 2. ensuring that the bottom clamp does not straddle the joint between gap piece (A) and bed.

2a. Firmly tighten bolts to clamp tackle to the bedway.

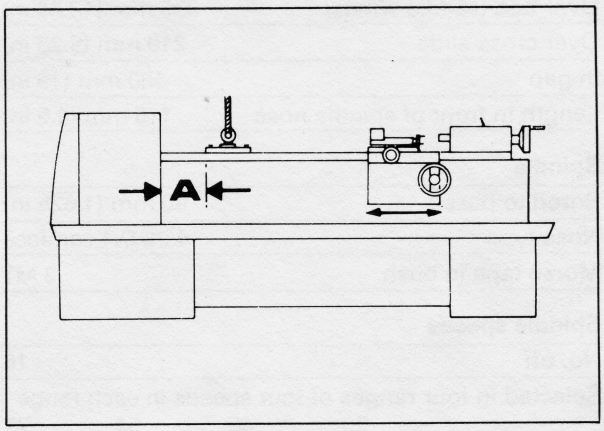


Fig. 2

3a. Carefully lift the lathe just clear of the ground, then reposition the saddle (carriage) to achieve balance before lifting further.

Store all lifting tackle in dry locations and protect from corrosion and damage.

INSTALLATION

Locate the machine on a solid foundation, allowing sufficient area for easy working and maintenance (see Fig. 5). The lathe may be used when free-standing, but for maximum performance it should be bolted to the foundation.

Free-standing: Position lathe on foundation and adjust each of the six mounting feet to take an equal share of the load. Then using an engineer's precision level on the bedways (as in Fig. 3) adjust the feet to level the machine. Periodically check bed level to assure continued lathe accuracy.

Fixed installation: Position lathe over six bolts (½ in. or 12 mm dia.) set into the foundation to correspond with mounting feet; dimensions are shown in Fig. 5. Accurately level the machine as in Fig. 3, then tighten the holding-down bolts and re-check bed level.

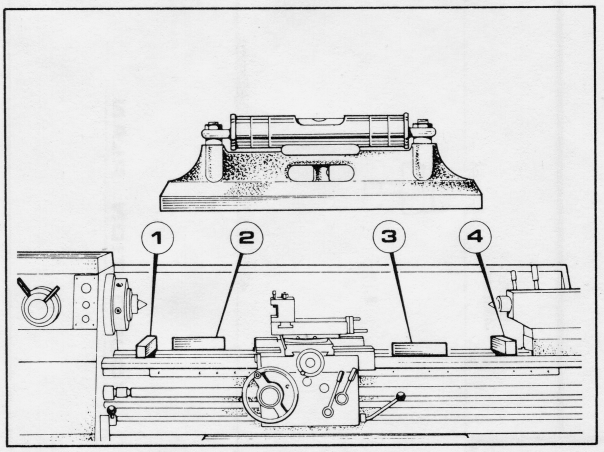


Fig. 3

ELECTRIC SUPPLY CONNECTION

Power should be supplied through a separate isolator, the input wires being connected to mains terminals of the electrical panel at the back of the headstock.

Main motor rotation must be anti-clockwise, viewed from the pulley end. Should the motor run in the wrong direction, interchange any two of the three phase-lines; a wiring diagram is included in the Servicing and Maintenance Section.

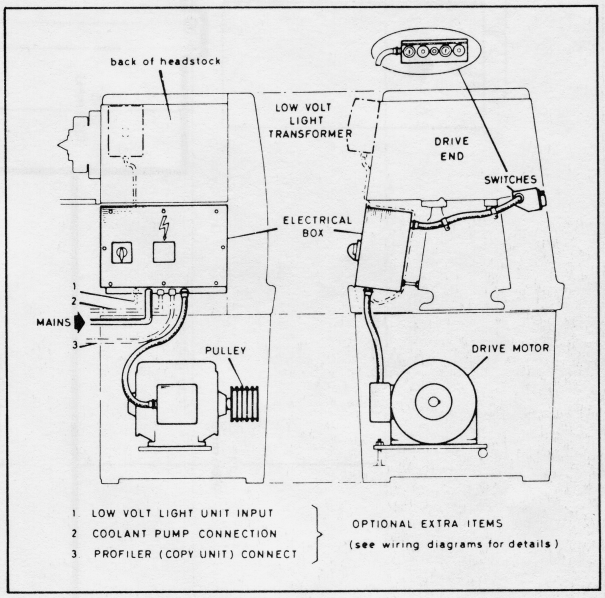


Fig. 4

LUBRICATION CHECKS

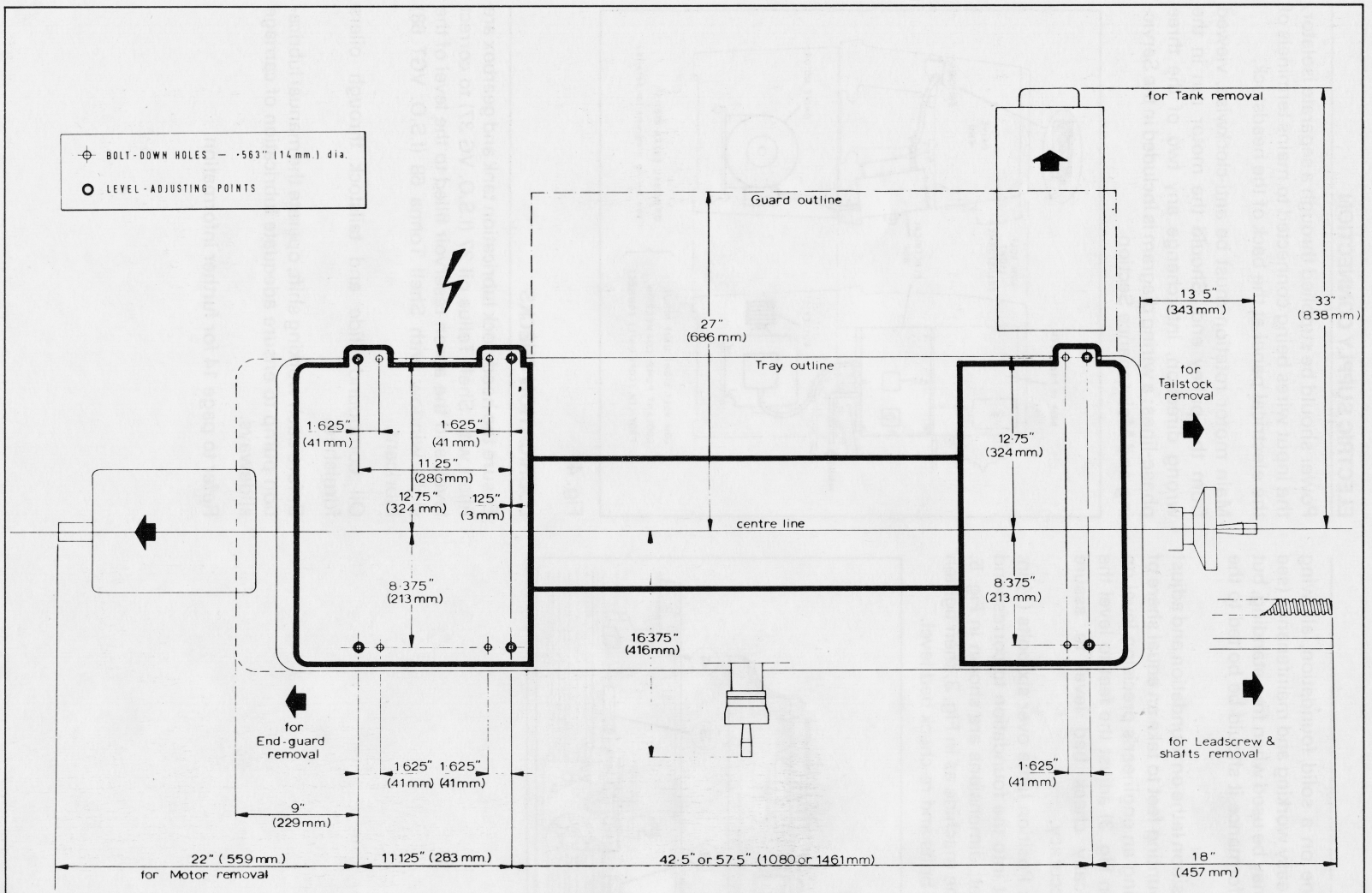
Ensure the headstock lubrication tank and gearbox are filled with Shell Tellus oil 37 (I.S.O. VG 37) to correct level, and the apron reservoir filled to the level of the sight window with Shell Tonna 68 (I.S.O. VGT 68) lubricant.

Oil compound slide and tailstock through oilers furnished.

Before each working shift, operate the manual lubrication pump to ensure adequate lubrication of carriage slideways.

Refer to page 14 for further information.

Fig. 5



FOUNDATION PLAN

CHUCKS AND CHUCK MOUNTING – Fig. 6

When fitting chucks or faceplates, first ensure that spindle and chuck tapers are scrupulously clean and that all cams lock in the correct position. It may be necessary when mounting a new chuck to re-set the camlock studs (A). To do this, remove the cap-head locking screws (B) and set each stud so that the scribed ring (C) is flush with the rear face of the chuck – with the slot lining up with the locking screw hole (see inset).

Now mount the chuck or faceplate on the spindle nose and tighten the six cams in turn. When fully tightened, the cam lock line on each cam should be between the two V marks on the spindle nose.

If any of the cams do not tighten fully within these limit marks, remove the chuck or faceplate and re-adjust the stud as indicated in the illustration.

WARNING: USE ONLY HIGH-SPEED CHUCKS WITH THESE MACHINES.

Fit and tighten the locking screw (B) at each stud before mounting the chuck for work.

A reference mark should be made on each correctly fitted chuck or faceplate to coincide with the reference mark scribed on the spindle nose. This will assist subsequent remounting. DO NOT INTERCHANGE CHUCKS OR FACE PLATES BETWEEN LATHES WITHOUT CHECKING FOR CORRECT CAM LOCKING.

IMPORTANT

Take careful note of speed limitations when using faceplates: 12 in. faceplates should not be run at more than 1400 rev/min and 18 in. faceplates at not more than 1050 rev/min.

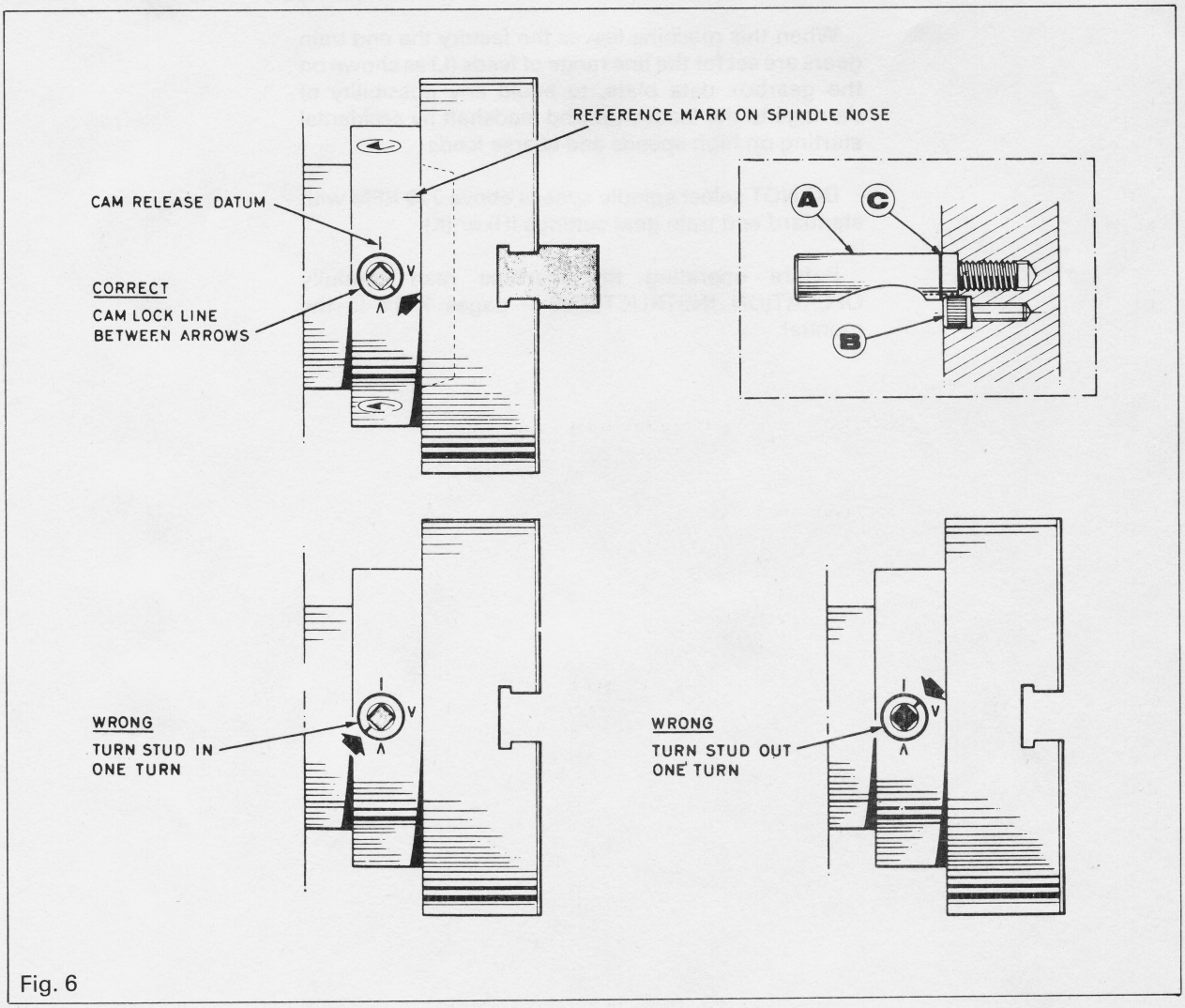


Fig. 6

IMPORTANT

Please read before starting machine

When this machine leaves the factory the end train gears are set for the fine range of feeds (L) as shown on the gearbox data plate, to avoid any possibility of damage to the leadscrew and feedshaft by accidental starting on high speeds and coarse feeds.

DO NOT select spindle speeds above 770 RPM with standard end train gear settings (H) or (K).

Before operating the machine read carefully OPERATION INSTRUCTIONS – pages 7–11 in the manual.

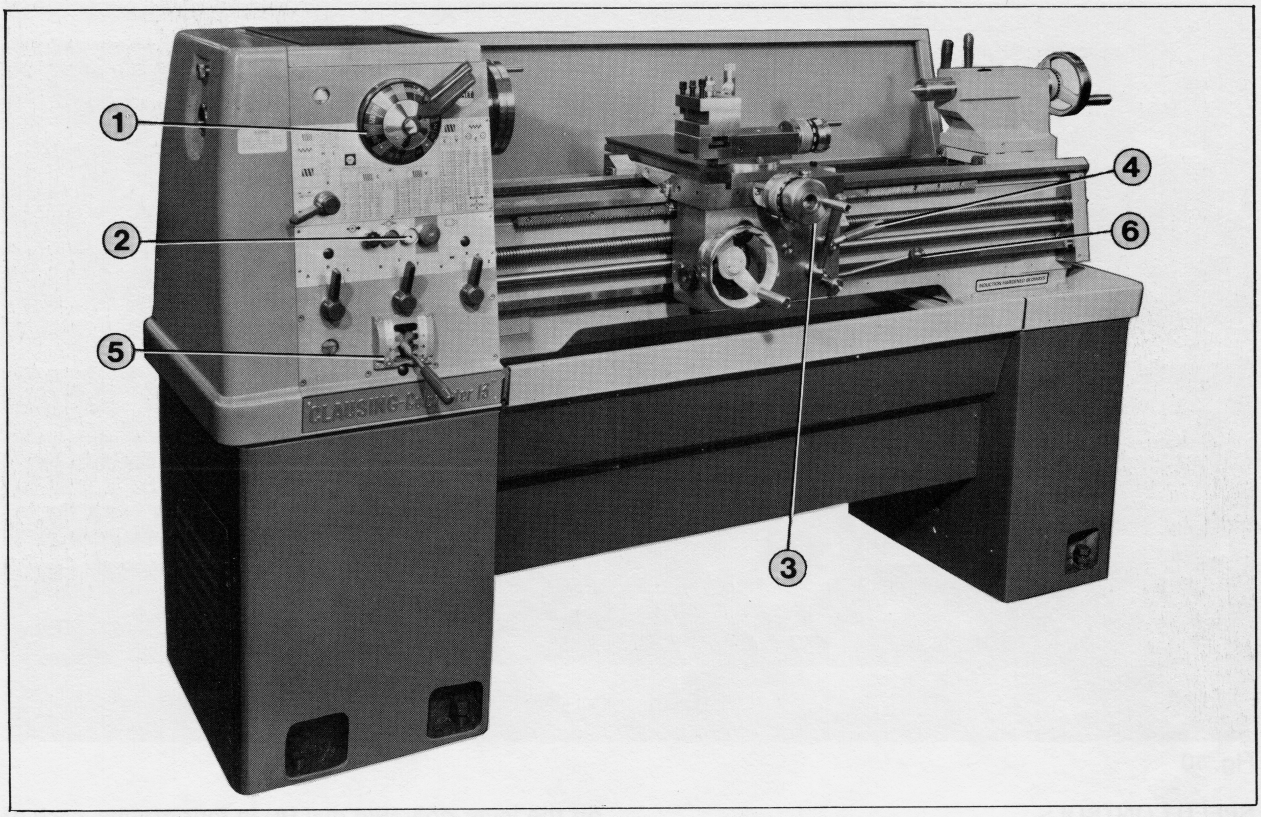


Fig. 8

LATHE CONTROLS – Fig. 8

1. Spindle speed selector.
2. Electrical push-buttons.
3. Apron, surfacing or sliding feeds.
4. Apron, leadnut engagement lever.
5. Gearbox, threads and feeds.
6. Spindle rotation (forward, brake and reverse).

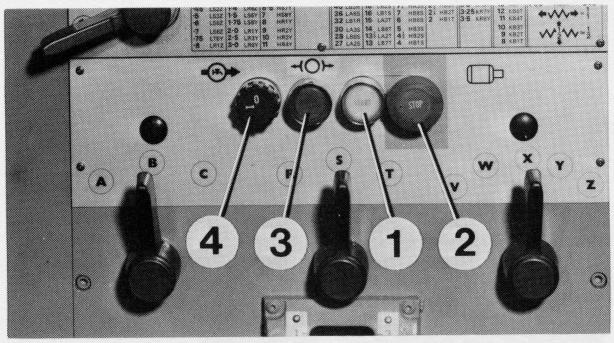


Fig. 9

ELECTRICAL CONTROLS – Fig. 9

With the exception of the Disconnect Switch all lathe electrical controls are fitted in the front face of the headstock.

1. Press the button to start the main drive motor. The indicator lamp glows whilst the motor is running.
2. Press the RED button to stop the main motor and also shut down electrical supply to ancillary services. Reset to allow restart by normal sequence.
3. Press the BRAKE RELEASE button to free main spindle for hand rotation during chuck or faceplate adjustment.
4. Coolant pump STOP/START button.

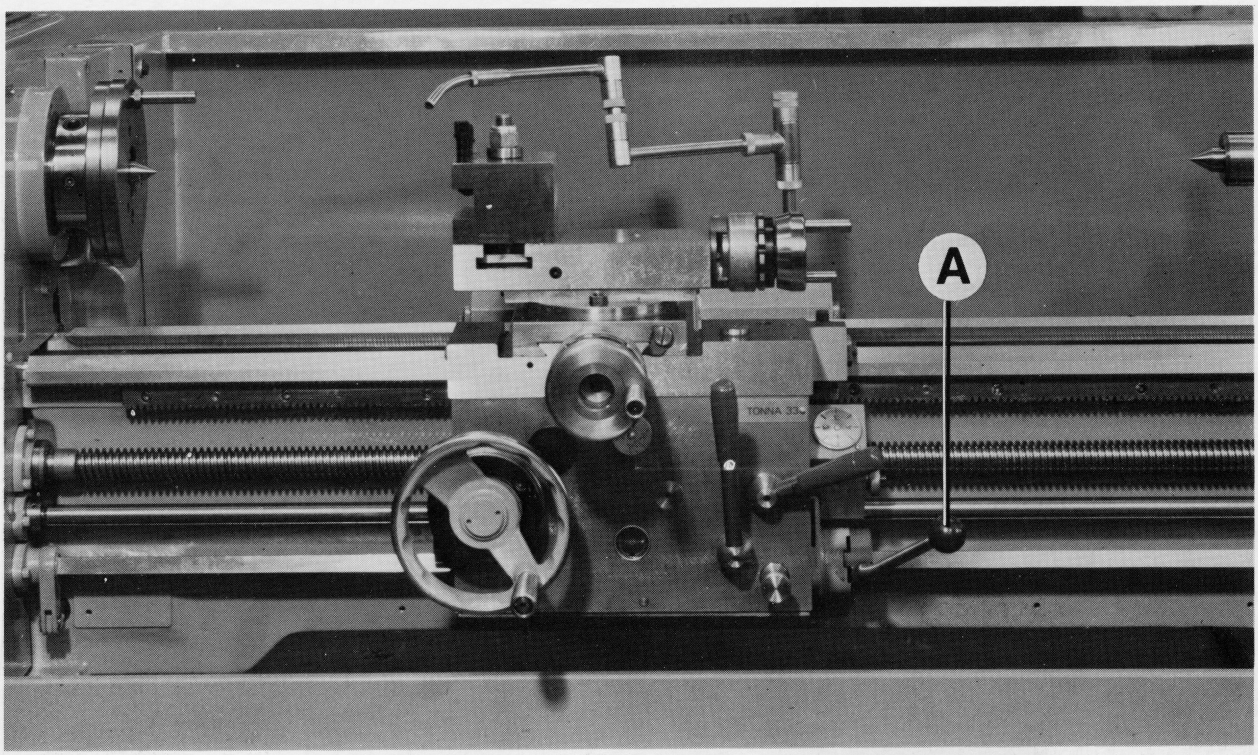


Fig. 10

SPEED CONTROLS

Spindle Rotation – Fig. 10

Selected by the apron lever (A).

With the main motor running, move lever (A) out, then upward for forward rotation. Return it to the central position for spindle braking. When spindle is stopped move the lever out and down for reverse rotation.

Safety-gate location of the apron lever in the braking position prevents inadvertant operation.

Spindle brake

An electro-magnetic brake is mounted on the inter-shaft. It is of the fail-safe type where braking automatically occurs when the lever control is returned to the braking position.

A push button (3 of Fig. 9) is provided to release the main spindle for hand rotation whilst manually depressed.

SPINDLE SPEEDS – Fig. 11

Selected by the grouped dial controls on the head-stock, the sixteen available speeds are shown directly on the lever-operated dial (A) in four groups, each of which is divided into four spindle speeds. Rotate this dial to bring the required speed group uppermost and opposite the fixed section (B). Now rotate lever (C) until the appropriate coloured arrow is aligned with the required speed on dial (A).

CAUTION: DO NOT MOVE SPEED SELECTOR CONTROLS WHILST THE SPINDLE IS ROTATING.

To free the spindle for hand rotation set any one of the blank spaces of dial (A) to the mid-position of the fixed section (B).

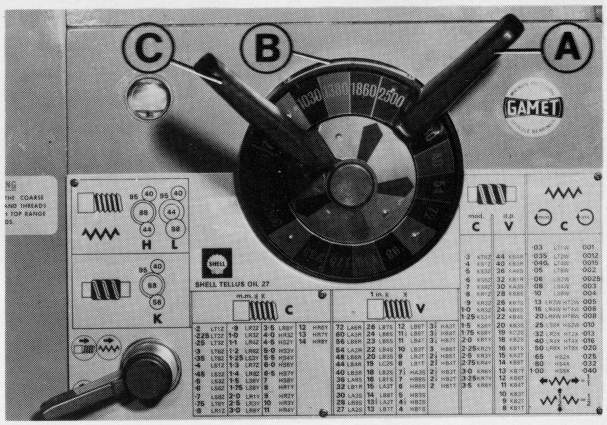


Fig. 11

THREAD AND FEED SELECTION – Fig. 12

All threads and feeds directly available from the gearbox are given on the data plate fitted at the front of the headstock, with the settings of control levers shown in Fig. 12.

The end gear train should be arranged as in the diagrams (H, L or K) shown on the data plate for either English or Metric pitches.

CAUTION: DO NOT SELECT COARSE RANGE (H or K) AT SPINDLE SPEEDS ABOVE 745 REV/MIN.

For any special threads not covered by the data plate, our Technical Department is available to specify the most convenient change gearing required.

Feeds: Sliding feeds per spindle revolution range from 0.001 to 0.040 in. (0.03 to 1.0 mm).

Surfacing feeds are approximately half sliding feeds (0.452 actual).

Lever (A) is provided for left-hand thread-cutting, and reversal of feeds.

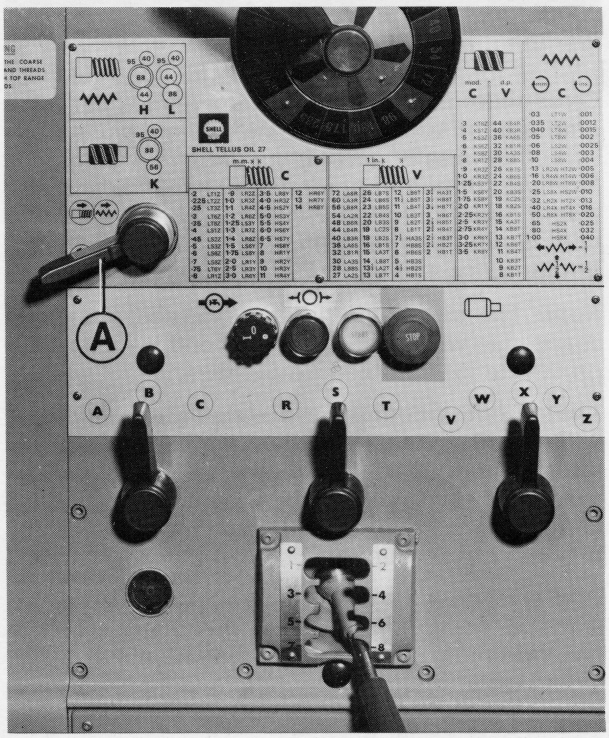


Fig. 12

Threading dial indicator – Inch (Fig. 13): To cut threads of even number per inch, close the lead-screw nut at any line on the dial; to cut threads of odd number per inch, close the leadscrew nut at any numbered line. Ensure that the appropriate dial line coincides exactly with the fixed point (A) on each pass.

For metric thread cutting (and certain fractional English threads) the dial cannot be used. The leadscrew nut must be closed and the machine reversed by the apron control lever (A of Fig. 10) after each pass and tool withdrawal.

For D.P. and module pitches, keep leadscrew nut closed and operate machine as for metric threads.

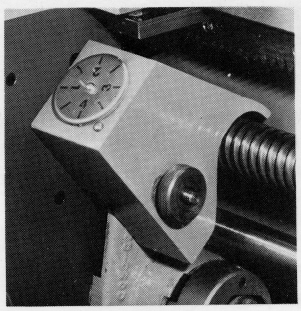


Fig. 13

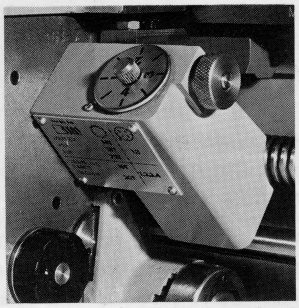


Fig. 14

Threading dial indicator – Metric (Fig. 14): Supplied with lathes incorporating a metric leadscrew. This combination unit enables the majority of metric pitches shown on the data plate to be cut in a similar manner to that employed to cut English threads on lathes fitted with an English leadscrew, releasing the leadnut after each pass.

The correct pinion must be engaged with the leadscrew to suit the pitch to be cut. For clarity, all pitches available through the gearbox have not been shown on the indicator plate, but any pitch may be cut providing it is divisible into the pinion selected, e.g. 0.4 mm is divisible into 16T.

Using the 14, 18 or 22T pinion the leadscrew nut may be closed as dial line 1 or 3 passes the datum mark. Using the 16 or 20T pinion the leadscrew nut may be closed as any numbered line is passing the datum.

Unnumbered lines on the dial are not used.

Metric pitches not divisible into the pinions supplied, D.P., module and English threads can only be cut with the leadnut closed throughout.

MULTI-START THREADS

Multi-start threads can be cut on a lathe in three ways:

1. By repositioning the compound (top) slide one pitch forward for each start. Note that the slide is normally set at 90° to the axis of the machine cross-slide. The accuracy of this method depends upon the skill of the operator.
2. By using an accurately-divided driver plate and turning the workpiece one division forward for each start.
3. By advancing the driver gear a calculated number of teeth to advance the spindle by one pitch of the thread to be cut. The accuracy of this method is that of the machine.

The ratio between the spindle and driver gear is 1 : 1.

In order to use this method, the number of teeth on the driver gear must be divisible by the number of starts being cut. The driver gear is then advanced by this number of teeth, i.e. 40T ÷ 4 starts = 10.

The limitation of this method depends upon whether the number of starts required can be divided equally into the number of teeth on the driver gear without a remainder.

On the standard English end gear train for this machine the driver gear has 40 teeth; so that two, or four start threads can readily be cut. For other odd numbers of starts a choice must be made of methods 1 or 2.

APRON AND SLIDE CONTROLS – Fig. 15

In addition to manual operation of the saddle by rotating apron handwheel (A), of the cross-slide by handwheel (B) and of the topslide by handwheel (C), power feed is available to the saddle and cross-slide.

1. Push-pull knob (D) selects power surfacing or sliding feeds; push in for sliding, pull out for surfacing operation.
2. Lever (E) is moved to left for power feed engagement, to right for manual operation.
3. Lever (F) is pressed down to engage leadscrew nut for screw cutting.

Use headstock lever (A) of Fig. 12 for reversing feed; and, left-hand screw cutting.

Feed trip adjustment: A trip mechanism is incorporated in the apron, enabling saddle and/or cross-slide to be fed up to fixed stops. Trip loads can be set high or low by adjustment of the knurled handwheel on the side of the apron.

The apron handwheel may be disengaged from its gear train during power operation or when screw-cutting, by pulling the handwheel outwards to another spring-ball detent.

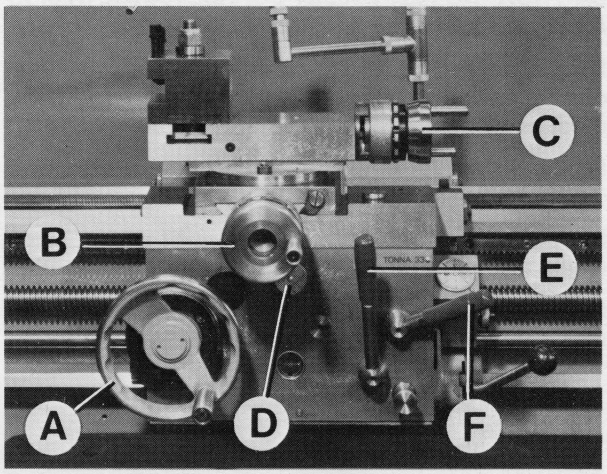


Fig. 15

Cross-slide and Topslide handwheels carry dials graduated in both inch and metric dimensions. Rotation of the sleeve carrying the datum marks through 180° will reveal the appropriate scale. A thumb wheel lock is fitted to the cross-slide dial, which should be released when adjusting the scale and relocked before further cuts are taken.

Note: The cross-slide dial is graduated to indicate changes in workpiece DIAMETER and the topslide is graduated to indicate tool movement.

The topslide is mounted on a rotatable base graduated 0–90–0–90 degrees. The fixed datum is located on the cross-slide at 90° to the front edge. Care should be exercised when rotating the base ensuring that the correct spanner is used to slacken the lock nuts and that they are adequately tightened after adjustment.

Whenever possible the topslide should be positioned with the toolblock located over the rotatable base to give maximum support, particularly when using parting off tools.

Saddle Lock Screw (H)
This locks the saddle to the bed for facing or cut off operations.

BE SURE TO RELEASE BEFORE ATTEMPTING TO MOVE THE SADDLE.

TAILSTOCK – Fig. 16

Is freed for movement along the bed by unlocking the clamp lever (A).

The tailstock barrel is locked by lever (B).

Can be set over for the production of shallow tapers, or for re-alignment by adjustment of the screws (S) at each side of the base – see Fig. 16. Release the clamping lever and loosen screws (C) beneath the tailstock which hold base to main casting, then retighten and check after adjustment of set-over.

An indication of the set-over is given by the datum mark (D) at the tailstock end face.

The barrel is graduated in inch and metric dimensions.

Standard tang drills with 3 M.T. shank can be used, but barrel travel will be reduced by the difference in length of the Standard 3 M.T. shank and the tang length.

A datum line is stamped on the front face of the barrel nose chamfer to assist in setting tools to centre height.

Safety Stop

Stop pin (E) is fitted to prevent the tailstock inadvertently sliding off the end of the bed.

Always ensure that the pin is secure and replaced after removal.

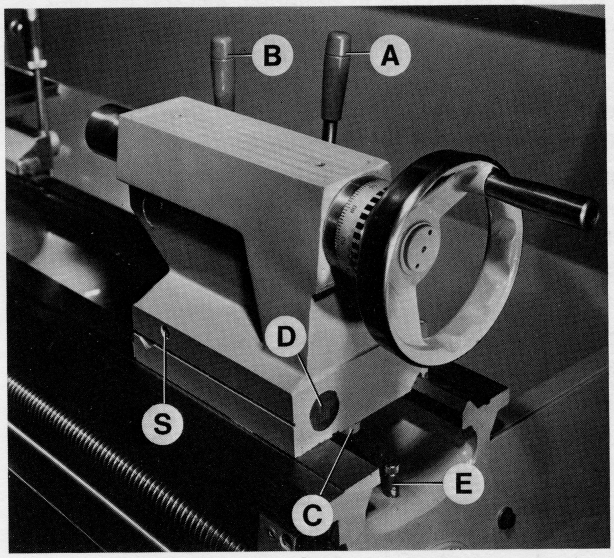


Fig. 16

LATHE ALIGNMENT – Figs. 17/18

With the lathe installed and running, we recommend a check on machine alignment before commencing work. Check alignment and levelling at regular periods to assure continued accuracy.

Headstock check: Take a light cut over a 6 in. (150 mm) length of 2 in. dia. (50 mm) steel bar held in the chuck (but not supported at the free end). Micrometer readings at each end of the turned bar at A and B should be the same.

To correct a difference in readings, slacken the four headstock screws (A) shown in Fig. 18 then adjust the set-over pad (C) to pivot the headstock about the dowel (B). Tighten all securing screws after each adjustment and repeat the test cut and alignment check until the micrometer readings are identical.

Tailstock check: Using a 12 in. (305 mm) ground steel bar between centres, check alignment by fitting a dial test-indicator to the topslide and traversing the centre-line of the bar.

To correct error, release the tailstock clamp lever (A) and adjust the two screws (S) shown in Fig. 16 after releasing the screws beneath the tailstock base.

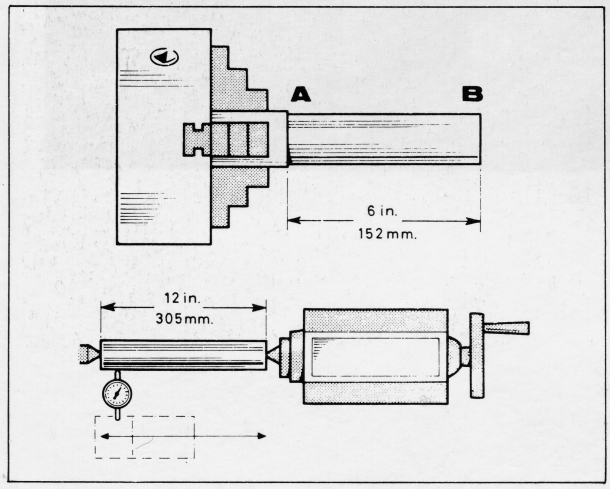


Fig. 17

END-GEAR TRAIN – Fig. 19

Drive from headstock to gearbox is transmitted through a gear train enclosed by the headstock end-guard. Intermediate gears are carried on the adjustable swing-frame (A).

Gears must be thoroughly cleaned before fitting and backlash should be maintained at 0.005 in. (0.127 mm) for correct mesh.

Lubricate gears regularly with thick machine oil or grease, and apply oil can to the intermediate gear spindle.

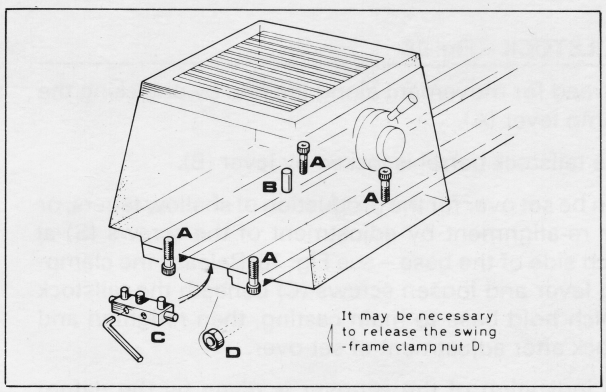


Fig. 18

DRIVING BELTS – Figs. 19/20

To alter belt tension, remove the cover plate behind the headstock plinth and adjust the two screws (A) on the hinged motor platform. Ensure that the motor axis is kept level.

Light finger-pressure at a point mid-way between motor and headstock pulleys should produce approximately ¾ in. (19 mm) movement of each belt when under correct tension.

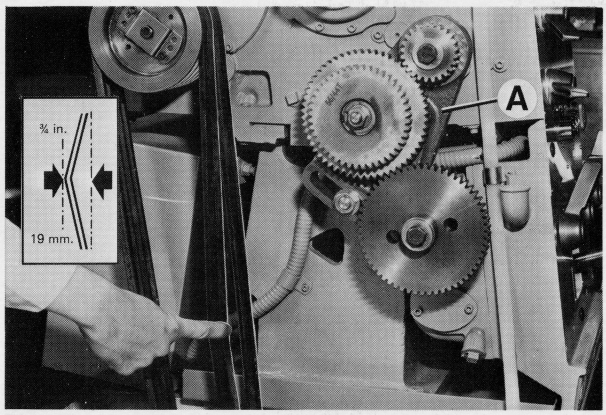


Fig. 19

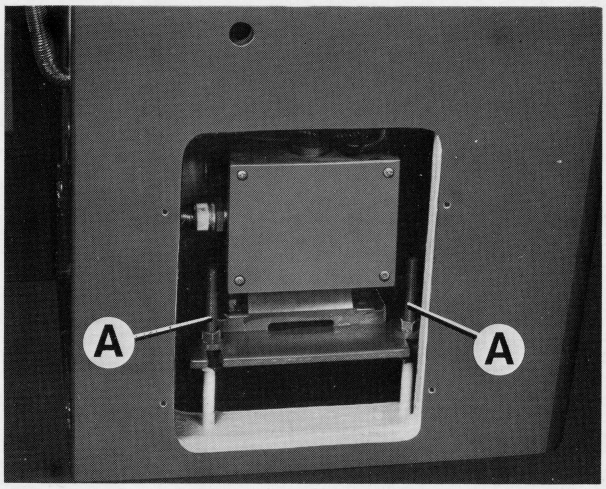


Fig. 20

OVERLOAD PROTECTION – Fig. 21

The transmission is protected against severe overload by shearpins fitted into the gearbox and leadscrew drive shafts.

SHEARPIN REPLACEMENT

Gearbox Drive Shaft (Fig. 21A). Isolate electrical supply and remove endguard. Remove driven gear (A) and spacer (B) exposing bush (C). Withdraw sheared pin head from bush and remove bush. Push rest of shear pin through the locating hole (E) in drive shaft.

Replace bush (C) aligning holes in bush and driveshaft. Insert new pin and refit spacer (B) and change gear (A).

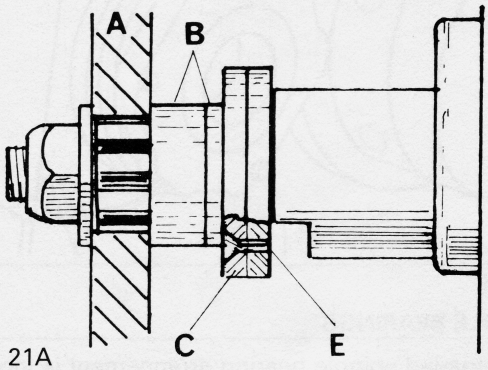


Fig. 21A

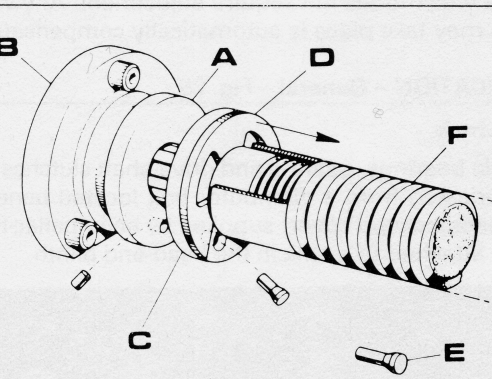


Fig. 21B

LEADSCREW DRIVE SHAFT (Fig. 21B)

Disengage drive to the leadscrew (F) by setting the right-hand lever of the gearbox to position R. Then rotate the flanged shaft (A) carrying the broken pin to the slot at the bottom of the gearbox housing (B). Press the springloaded collar (C) to the right and push the pin into the slot. Rotate the shroud washer (D) to expose the pin head for removal from the leadscrew collar (C).

Align the holes in flanged-shaft (A) and collar (C) then insert a new pin (E) and rotate the shroud washer to cover and retain the new shearpin.

CAUTION: USE ONLY CORRECT REPLACEMENT SHEARPINS OF ⅛ in. (3.175 mm) DIAMETER STEEL, 30 TON TENSILE STRENGTH.

SLIDWAYS – Fig. 22

Tapered gib-strips are fitted to slideways of cross and compound slides and any slackness which may develop can be rectified by resetting the gibs with the adjusting screws provided.

To adjust the cross-slide slacken the rear screw (A) and tighten the front screw (B), making only a slight alteration with constant checking for smooth action. The top-slide is adjusted by the single screw (S).

Tapered gibs are fitted to each wing of the saddle and may be adjusted by the single screws (C).

Ensure that slideways are thoroughly cleaned and lubricated before making any adjustment. Avoid over-adjustment which will only result in stiff, jerky action of the slide concerned.

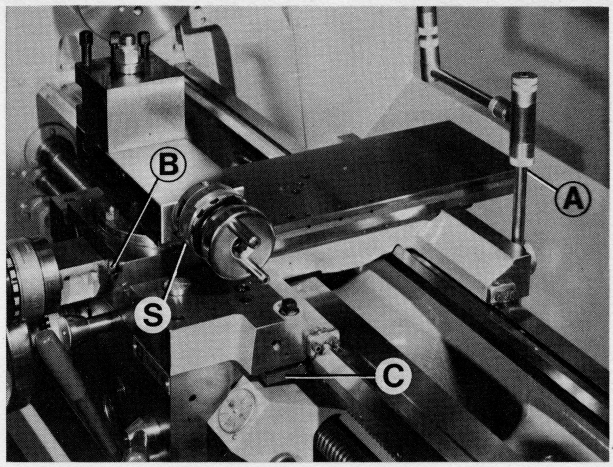


Fig. 22

CROSS-SLIDE NUT – Fig. 23

This is adjustable for elimination of slackness which may develop in service. Reduce backlash by loosening the rear caphead screw (A), then carefully screw in the centre screw (B) to adjust a wedge within the split nut. Make only a slight alteration at a time and operate the cross-slide repeatedly through full travel to be sure of smooth action.

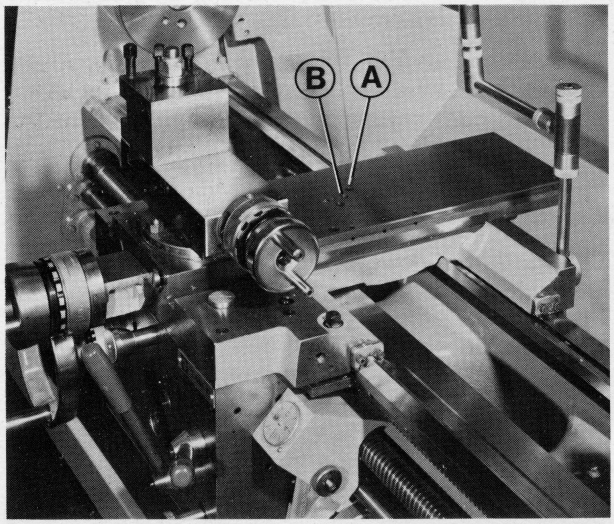


Fig. 23

DRIVE CLUTCHES

Two multi-plate clutches on the headstock clutch shaft provide drive for forward or reverse spindle rotation.

Clutches are Matrix or Ortlinghaus wet-type multiplate pattern which are matched to power requirements under Standard operating conditions. Initial bedding-in of friction surfaces, however, may necessitate some adjustment to avoid overheating due to slip.

Before adjusting the clutches, first isolate the lathe from the mains power supply at the switch on the electrical panel in rear of the headstock.

READ CAREFULLY THE INSTRUCTIONS GIVEN ON THE ACCESS COVER PLATE – instructions for precise adjustment vary according to the types of clutch fitted to individual machines.

SPINDLE BRAKE – Fig. 24

The spindle brake is of the spring-applied type requiring practically no maintenance apart from ensuring that the friction disc and its mating faces are clean and free from oil and grease at all times. After many thousands of operations, however, adjustment of the air gap may be needed. The gap 'A' should be measured with feeler gauges at three points around the circumference and should be between a minimum of 0.016 in. (0.4 mm) and a maximum of 0.08 in. (2 mm).

When, due to normal wear on the friction disc, the maximum allowable air gap is exceeded, the bolts holding the magnet assembly to the machine should be removed and the spacer sleeves on these bolts reduced in length by the appropriate amount to restore the air gap to its normal minimum dimension and the unit re-assembled and tested.

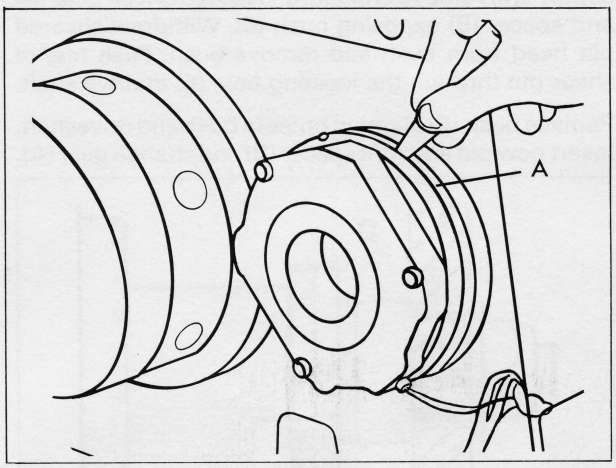


Fig. 24

SPINDLE BEARINGS

A pre-loaded spindle bearing arrangement is incorporated which does not require adjustment. Any wear which may take place is automatically compensated.

LUBRICATION – General – Fig. 25

Headstock

Spindle bearings, gearing and drive-shaft clutches are jet-lubricated from a distributor box located beneath the headstock top cover; supplied by an impeller-type pump attached to a tank in the head-end plinth.

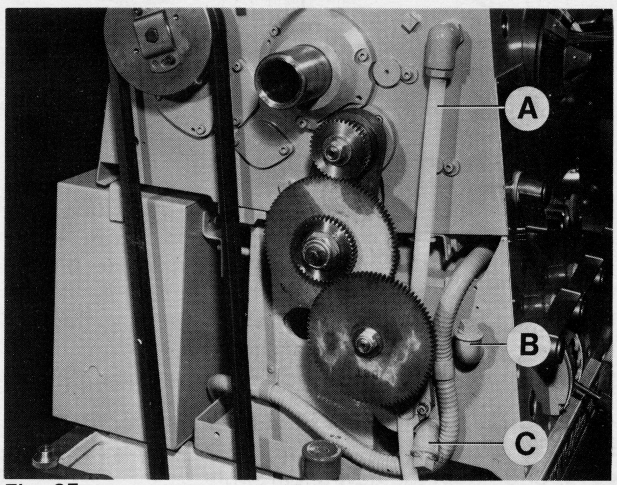


Fig. 25

The oil pump is driven by a belt from the main motor pulley, ensuring a continuous supply of lubricant to the headstock whilst the main motor is running. Evidence of supply is shown in an oil-sight glass in the headstock front face.
A large-bore pipe returns oil from the bottom of the headstock into the tank. Ensure that the oil level in the tank is kept topped up to the mark on the filler-cap dip-stick. Check oil level weekly and change the oil every year using Shell Tellus oil 37 (I.S.O. VG 37).

Tank capacity is 2½ gallons (11.4 litres).

To empty the tank, set apron control lever to central position and stop the main motor. Detach the delivery pipe (A) at the headstock, remove pipe cleats and with the pipe directed into a suitable container restart the main motor so causing the pump to empty the tank contents. The small quantity of oil left in the tank below the level of the pump intake can then be drained off through the drain plug projecting from the tank through the plinth wall.

Gearbox

All gears are splash lubricated from an integral oil bath. An oil level sight window is furnished in the end face of the gearbox. Top up or refill gearbox with Shell Tellus oil 37 (I.S.O. VG 37) through filler elbow (B).

Approximate quantity of oil required is 2 pints (1.14 litres).

NOTE: Use only clean containers for refilling or topping up oil level.

To drain gear box, unscrew drain plug (C) in the end of gearbox casting.

Where the specified lubricant is unobtainable, a grade with the following characteristics can be used:

Viscosity	40°C	36.2
Centistokes	100°C	6.10
Viscosity Index		115
Density 15°C kg/1		0.875
Flash point closed		210°C
Pour point		–30°C

APRON AND SLIDEWAY LUBRICATION – Fig. 26

A manually-operated pump (A) is incorporated in the apron; drawing oil from the apron reservoir, it enables the operator to ensure that the slideways and cross-slide nut are kept adequately lubricated.

Operate the pump until oil flows from the hole (B) to ensure that the system is primed.

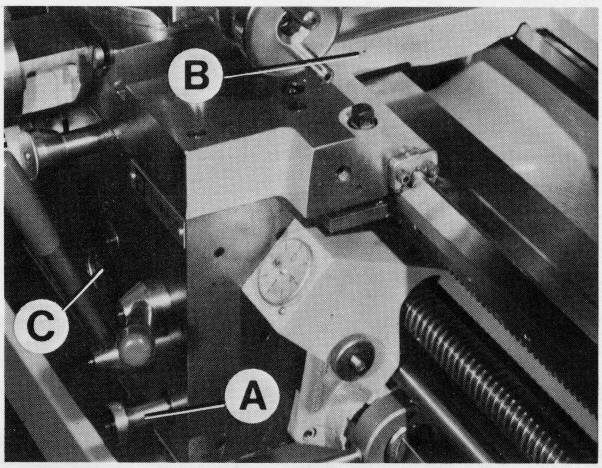


Fig. 26

When the oil level of the apron reservoir falls below the mark on the sight-glass (C) the system should be topped up through the filler hole in the saddle with Shell Tonna T68 oil (I.S.O. VG T68). When the specified lubricant is unobtainable a grade with the following characteristics can be used:

Viscosity	40°C	36.2
Centistokes	100-C	9.30
Viscosity Index		114
Density 15°C kg/1		0.882
Flash point closed		219°C
Pour point		–27°C

Reservoir capacity is 2 pints (1.14 litres approximately).

A drain plug is provided on the under surface of the apron casting.

DO NOT MIX LUBRICANTS. When alternative lubricants are to be used, the system or reservoir should be drained and flushed out before refilling with the equivalent grade.

REGULAR ATTENTION – Fig. 27

For trouble-free operation keep the lathe clean and regularly lubricated. The chart shows the recommended attention and frequency.

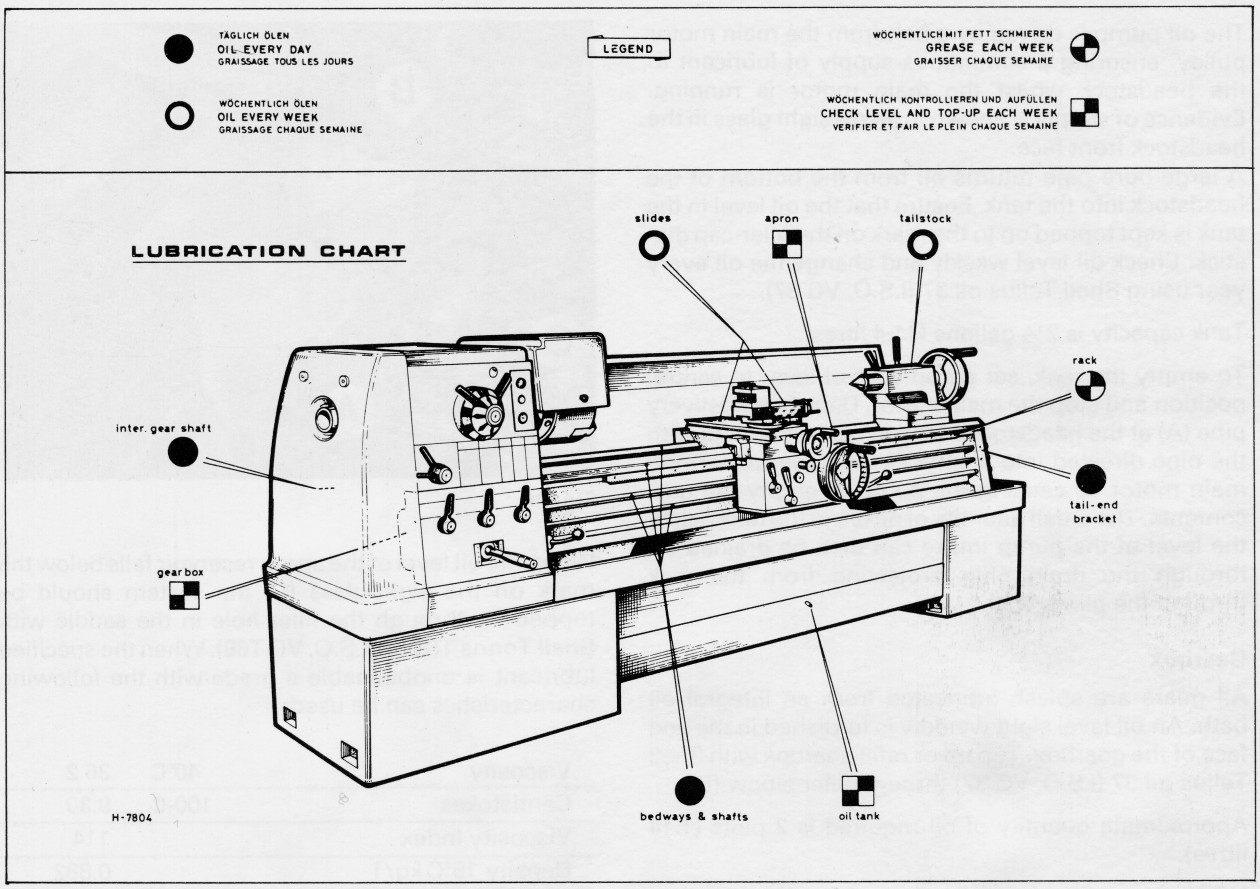
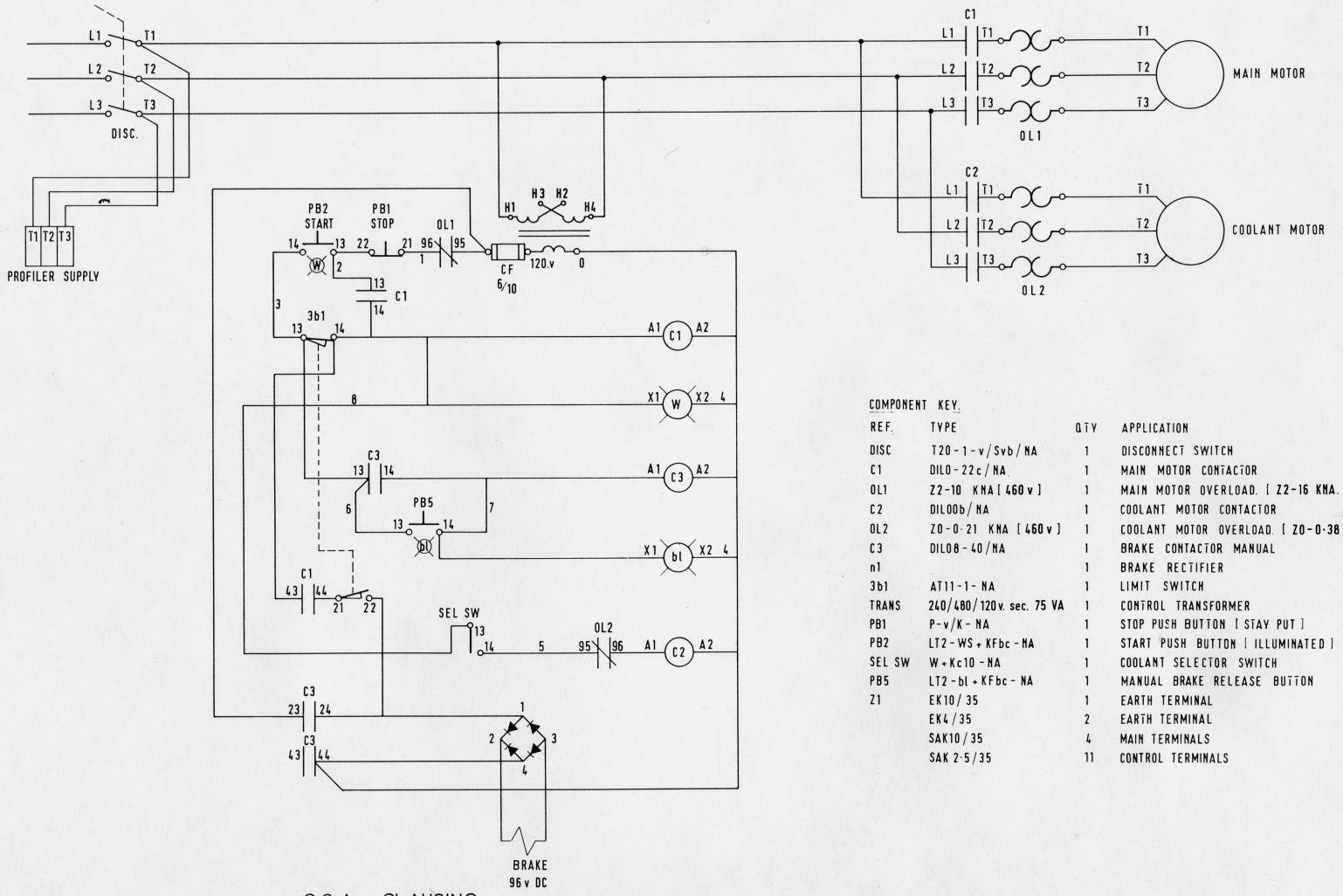

TÄGLICH ÖLEN
OIL EVERY DAY
GRAISSAGE TOUS LES JOURS
WÖCHENTLICH ÖLEN
OIL EVERY WEEK
GRAISSAGE CHAQUE SEMAINE
LEGEND
WÖCHENTLICH MIT FETT SCHMIEREN
GREASE EACH WEEK
GRAISSER CHAQUE SEMAINE
WÖCHENTLICH KONTROLLIEREN UND AUFÜLLEN
CHECK LEVEL AND TOP-UP EACH WEEK
VERIFIER ET FAIR LE PLEIN CHAQUE SEMAINE
LUBRICATION CHART
slides
apron
tailstock
rack
inter. gear shaft
tail-end bracket
gear box
bedways & shafts
oil tank
H-7804

Fig. 27



C.S.A. CLAUSING

208/230/460 v. 3ph 60 hz. 120.v Control.

COMPONENT KEY.

REF.	TYPE	QTY	APPLICATION
DISC	T20-1-v/Svb/NA	1	DISCONNECT SWITCH
C1	DIL0-22c/NA	1	MAIN MOTOR CONTACTOR
OL1	Z2-10 KNA [460 v]	1	MAIN MOTOR OVERLOAD. [Z2-16 KNA. 230 v]
C2	DIL00b/NA	1	COOLANT MOTOR CONTACTOR
OL2	Z0-0·21 KNA [460 v]	1	COOLANT MOTOR OVERLOAD. [Z0-0·38 KNA. 230 v]
C3	DIL08-40/NA	1	BRAKE CONTACTOR MANUAL
n1		1	BRAKE RECTIFIER
3b1	AT11-1-NA	1	LIMIT SWITCH
TRANS	240/480/120 v. sec. 75 VA	1	CONTROL TRANSFORMER
PB1	P-v/K-NA	1	STOP PUSH BUTTON [STAY PUT]
PB2	LT2-WS+KFbc-NA	1	START PUSH BUTTON [ILLUMINATED]
SEL SW	W+Kc10-NA	1	COOLANT SELECTOR SWITCH
PB5	LT2-bl+KFbc-NA	1	MANUAL BRAKE RELEASE BUTTON
Z1	EK10/35	1	EARTH TERMINAL
	EK4/35	2	EARTH TERMINAL
	SAK10/35	4	MAIN TERMINALS
	SAK 2·5/35	11	CONTROL TERMINALS