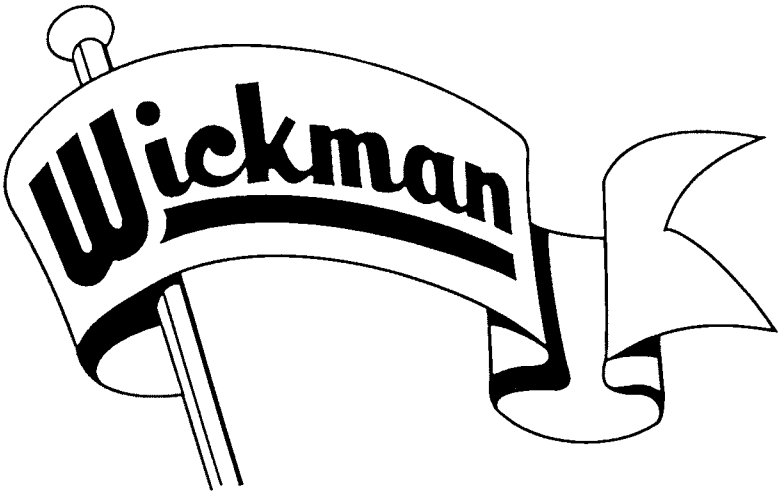

OPERATORS HANDBOOK
FOR
WICKMAN 1" - 6 SPINDLE
AND
WICKMAN 30MM - 6 SPINDLE
BAR AUTOMATIC LATHES

IMPORTANT

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Our designs are continuously being developed and we reserve the right to incorporate modifications when necessary and without notice.

Whilst every effort has been made to ensure the accuracy of information herein, Wickman Coventry Limited do not accept liability for omissions and errors.

In all communications please quote the NUMBER of the machine as well as the size. This is most important.

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SUMMARY CONTENTS LISTING

PREFACE

This handbook provides the basic information and instructions necessary for the operation, and tooling of the Wickman 1"-6, 1"-6S (arranged for Spindle Stopping), 1"-6DBF (arranged with Double Bar Feed), 1"-6LBF (arranged with Long Bar Feed) and 30mm-6 Spindle Bar Automatic Lathes with Relay Logic Control Equipment.

The contents will familiarize the reader with the machine and control specifications, installation procedure, the functions of the Operator's controls, operating procedures, safety at work and all the relevant aspects of the machine.

The handbook should be read thoroughly. It will enable the Operator to gain the knowledge required for the correct and efficient operation of the machine.

A Maintenance Manual and Parts List is also available for this range of machines.

HEALTH AND SAFETY

Health and Safety at Work Act, 1974 - U.K. users only.

In accordance with the requirements of the Health and Safety at Work Act 1974, this manual embodies the necessary information to ensure that the machine tool can be operated properly and with safety. It should be clearly understood that the operator must be properly trained, have the required skills and be authorised to operate the machine.

If it should arise that the person authorised to operate the machine is undergoing training, he must be under the close supervision of another skilled and authorised person.

Adequate information is provided to enable the machine to be serviced and maintained in a satisfactory condition by engineers and electricians who have the necessary skills and authority. We recommend that a 'Permit to Work' system as detailed in BS5304,1988 entitled "Safety of Machinery", should be operated.

It is important that the various statutory regulations which are applicable, eg, 'The Protection of Eyes Regulations' are complied with.

Operating Discipline

(I) A clean, neat and well ordered machine and working area is the first essential of safety at work.

(II) All guards, cover plates, cabinet doors and the tooling area guards must be in place or closed before any production run commences.

(III) Never leave articles lying on any working surface where there is a danger that they may be dislodged by: any moving part of the machine, vibration, etc.

(IV) Never wear rings, watches, neck-ties or loose-sleeved clothing when working on the machine.

(V) Never operate the machine in excess of its rated capacity.

(VI) Know where the EMERGENCY STOP BUTTON is.

(VII) Never reach across a moving or rotating part of the machine.

(VIII) Never enter the tooling area or any other working part of the machine when the machine is running on production.

(IX) When tool setting, changing tools or making adjustments, never enter the tooling area until the machine has been shut down.

(X) When carrying out maintenance work, never enter any part of the machine, either mechanical or electrical, until the machine has been shut down and the isolator on the electrical control panel is in its "off" position, disconnecting the power supply.

(XI) When working with lubrication oils and cutting oils of the soluble and straight cutting oil types, cleanliness is essential. Precautions must be taken to avoid all unnecessary contact with oil by ensuring that the machine's protective devices against coolant and oil spray are correctly closed and that protective clothing is worn. Never wear oil soaked clothes or place oily rags or tooling in the pockets of wearing apparel. Always wash oil from the body as soon as possible after contamination.

The Safe Operation Of Work Holding Devices

Collet equipment and collet operating mechanisms must always be kept in first class condition, in order to ensure that the bar is securely gripped to withstand all the applied cutting forces. Tooling area guards must always be closed when the machine is in the "run" condition.

MACHINE SIZE / MODEL RANGE

WICKMAN 1"-6 SPINDLE BAR AUTOMATIC LATHE *
WICKMAN 1"-6 SPINDLE BAR AUTOMATIC LATHE WITH SPINDLE STOPPING *
WICKMAN 1"-6 SPINDLE BAR AUTOMATIC LATHE WITH DOUBLE BAR FEED *
WICKMAN 1"-6 SPINDLE BAR AUTOMATIC LATHE WITH LONG BAR FEED *
WICKMAN 1"-6 SPINDLE BAR AUTOMATIC LATHE HIGH SPEED DOUBLE BAR FEED *
WICKMAN 1"-6 SPINDLE BAR AUTOMATIC LATHE WITH SPINDLE STOPPING AND LONG BAR FEED *
WICKMAN 30mm-6 SPINDLE BAR AUTOMATIC LATHE *

This Handbook applies only to all the machines listed.

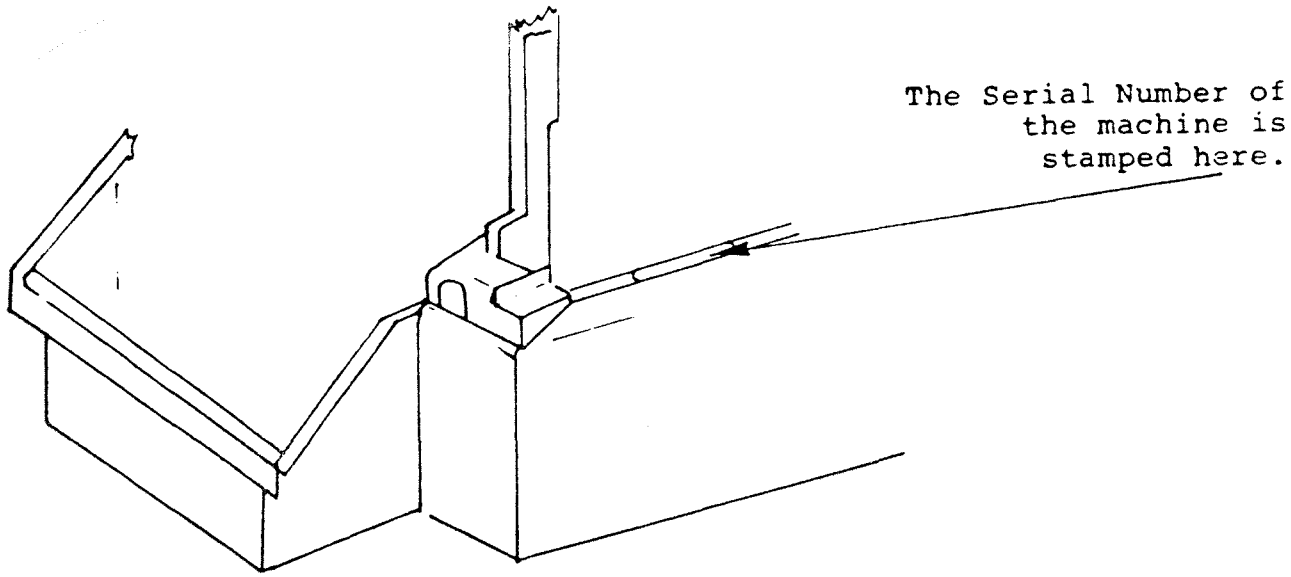
MACHINE SERIAL / INSPECTION NUMBER

In the event that queries arise with regard to the operation of the machine, it is important to note that the following details need to be given to Wickman Bennett in all correspondence, ie:

Machine Inspection/Serial number, Machine size and Model.

The machine Inspection/Serial Number must always be quoted and is stamped on the machined-rim of the Tray of the machine, on the left hand side, close to the Operators position. Additionally the number is also engraved on the machine Manufacturing Plate (WSP500) which is affixed to the Main Drive Housing casting at the rear of the machine.

Reference to this number will facilitate any service that may be required.



DETAILED CONTENTS LIST

SECTION ONE - SPECIFICATIONS

1.1 Machine Specifications 1"-6 ,1"-6DBF & 30mm-6

Description	Unit	Specification	Remarks
CAPACITY		1"-6 30mm-6	
Bar capacity:			
Round	mm	25.4 30.0	Solid Collet
Hexagon A/flats	mm	22.0 26.0	Solid Collet
Square A/flats	mm	18.0 21.2	Solid Collet
Round	mm	25.4 30.0	Master Collet/Pads
Hexagon A/flats	mm	22.0 26.0	Master Collet/Pads
Square A/flats	mm	18.0 21.2	Master Collet/Pads
Bar feed stroke:	mm	101.6	
Approach strokes: Centre block and Independent Slide	mm	50.8	
Feed strokes:			
Main Tool block	mm	0 to 63.5	
Independent slides	mm	0 to 63.5	
Cross slides:			
Stn.1	mm	0 to 12.7	
Stn.2	mm	0 to 12.7	
Stn.3	mm	0.8 to 12.7	
Stn.4	mm	0 to 12.7	
Stn.5	mm	0 to 12.7	
Stn.6	mm	0.8 to 12.7	
Spindle speed range:	r/min	268 to 4014	
Number of steps:		28	
Cycle time range:	Secs	1.9 to 123	
Idle time	Secs	1.04	
Main Motor Power	kW	15.28	
GENERAL			
Required Floor Space:	mm	1257 x 3346	O/all length excludes the stock carriage.
	mm	1257 x 6254	O/all length includes the stock carriage.
Shipping Weight (Net)	kg	6313	

1.1 Machine Specifications 1"-6 Spindle Stopping Machine

Description	Unit	Specification	Remarks
CAPACITY			
Bar capacity:			
Round	mm	25.4	Solid Collet
Hexagon A/flats	mm	22.0	Solid Collet
Square A/flats	mm	18.0	Solid Collet
Round	mm	25.4	Master Collet/Pads
Hexagon A/flats	mm	22.0	Master Collet/Pads
Square A/flats	mm	18.0	Master Collet/Pads
Bar feed stroke:	mm	127.0	
Approach strokes: Centre block and Indepenent Slides	mm	63.5	
Feed strokes:			
Centre block	mm	63.5	
Independent slides	mm	63.5	
Cross slides:			
Stn.1	mm	0 to 12.7	
Stn.2	mm	0 to 12.7	
Stn.3	mm	0.8 to 12.7	
Stn.4	mm	0 to 12.7	
Stn.5	mm	0 to 12.7	
Stn.6	mm	0.8 to 12.7	
Spindle speed range:	r/min	220 to 2694	
Number of steps:		24	
Cycle time range:	Secs	2.4 to 129	
Idle time	Secs	1.3	
Main Motor Power	kW	15.28	
GENERAL			
Required Floor Space:	mm	1257 x 3346	O/all length excludes the stock carriage.
	mm	1257 x 6254	O/all length includes the stock carriage.
Shipping Weight (Net)	kg	6313	

1.1 Machine Specifications 1"-6 Long Bar Feed Machine

Description	Unit	Specification	Remarks
CAPACITY			
Bar capacity:			
Round	mm	25.4	Solid Collet
Hexagon A/flats	mm	22.0	Solid Collet
Square A/flats	mm	18.0	Solid Collet
Round	mm	25.4	Master Collet/Pads
Hexagon A/flats	mm	22.0	Master Collet/Pads
Square A/flats	mm	18.0	Master Collet/Pads
Bar feed stroke:	mm	12 to 203	
Approach strokes:			
Centre block and	mm	63.5	Standard Cams
Independent Slides	mm	50.8	Special Cam
Feed strokes:			
Centre block	mm	63.5	
Independent slides	mm	63.5	
Cross slides:			
Stn.1	mm	0 to 12.7	
Stn.2	mm	0 to 12.7	
Stn.3	mm	0.8 to 12.7	
Stn.4	mm	0 to 12.7	
Stn.5	mm	0 to 12.7	
Stn.6	mm	0.8 to 12.7	
Spindle speed range:	r/min	247 to 3030	
Number of steps:		24	
Cycle time range:	Secs	2.4 to 129	
Idle time	Secs	1.92	
Main Motor Power	kW	15.28	
GENERAL			
Required Floor Space:	mm	1257 x 3346	O/all length excludes the stock carriage.
	mm	1257 x 6254	O/all length includes the stock carriage.
Shipping Weight (Net)	kg	6313	

1.1 Machine Specifications - General

Description	Unit	Specification	Remarks
GENERAL			
Coolant Tank Capacity	Litres	455	
Jacking Screws	4 off		
Service Tool Kit	1 off		Toolbox, spanners, wrenches,tool height setting gauge
LUBRICATION			
Main Spindle Bearings			See Section on Lubrication
Main Drive Housing			Splash lubrication
All Electric Motors			Sealed for life - maintenance free

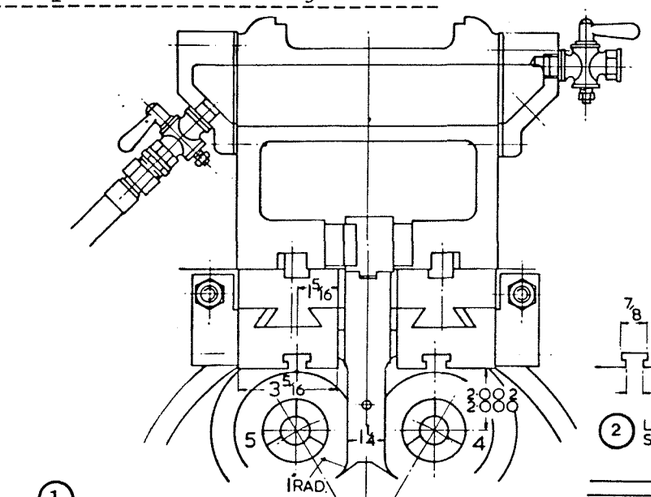
1.2 Electrical Specifications

Description	Unit	Specification	Remarks
MAINS SUPPLY CONDITIONS:			
Line Voltage	Volts	220 to 575	Customer to advise.
Allowable variation in V	%	+/-10	About nominal
Frequency	Hz	50 or 60	Customer to advise.
Allowable variation in Hz	%	+/-1	About nominal
Total power requirements	kW	Variable	Dependent upon Customer's Mains Supply
MAIN SPINDLE MOTOR: Foot mounted, totally enclosed, fan cooled	kW	15.28	Standard
	r/min	1450	At 50Hz
	r/min	1750	At 60Hz
SWARF CONVEYOR MOTOR: Flange Mounted, totally enclosed fan cooled motor	kW	0.18	Applicable to Wickman Bennett standard screw type swarf conveyor.

Power to the equipment is supplied through the Electrical Control Enclosure.

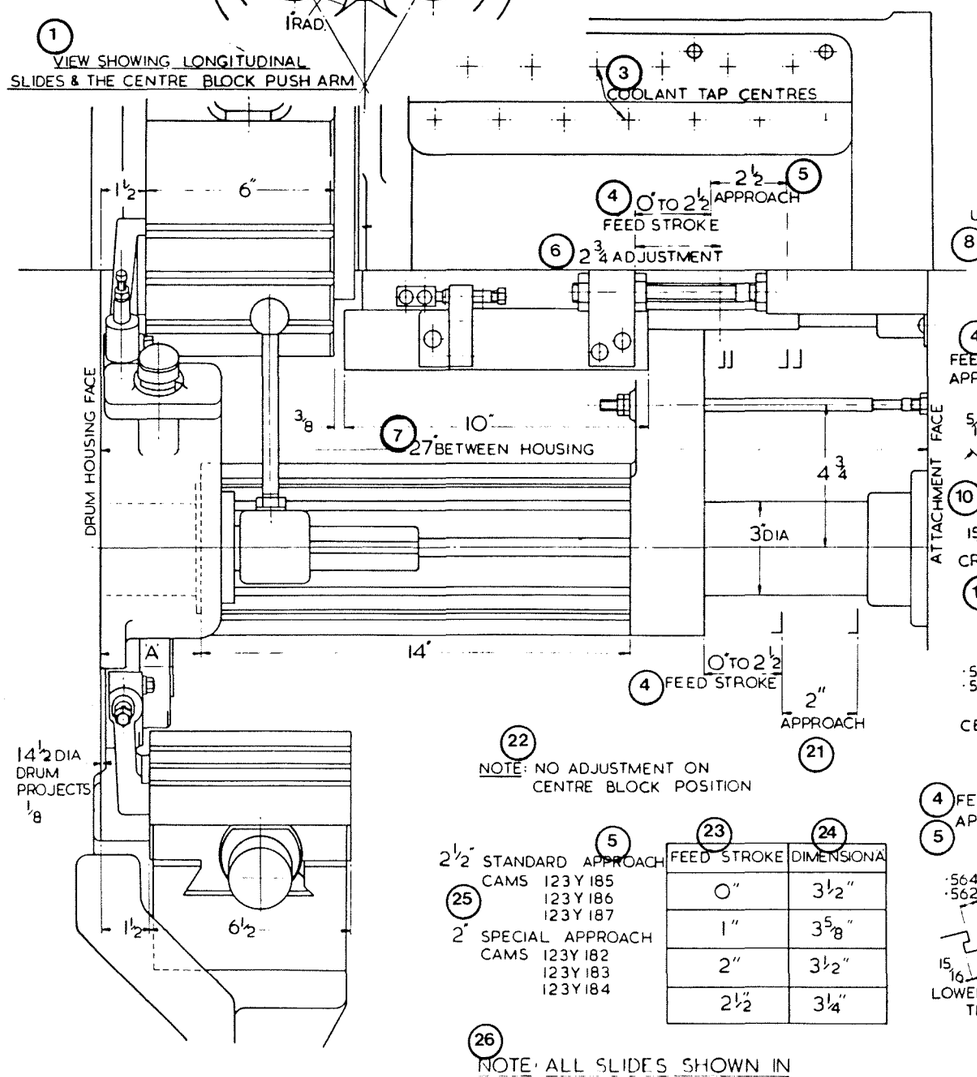
1.3 Capacity Charts

Capacity Chart 1"-6 Drg.100Z21C



1 VIEW SHOWING LONGITUDINAL SLIDES & THE CENTRE BLOCK PUSH ARM

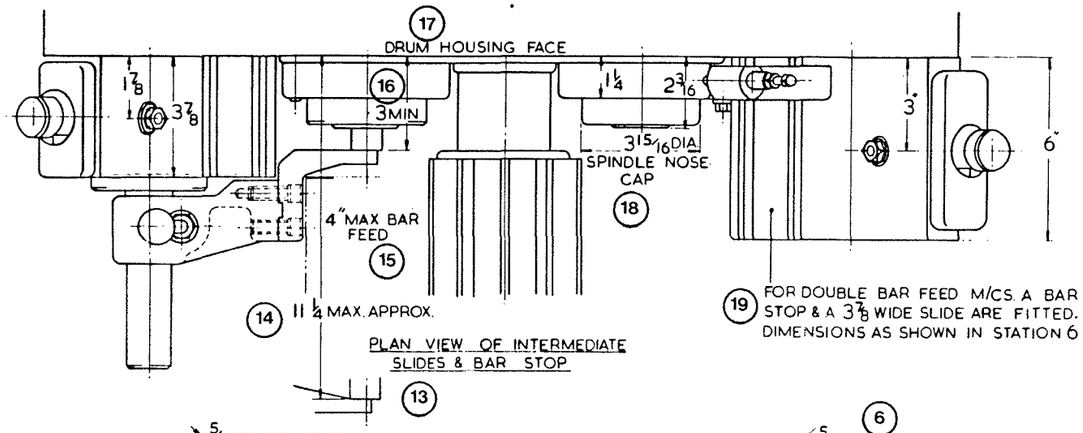
2 LONGITUDINAL SLIDES TEE SLOT



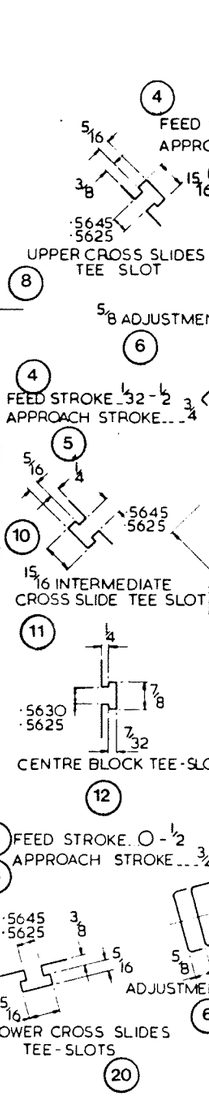
22 NOTE: NO ADJUSTMENT ON CENTRE BLOCK POSITION

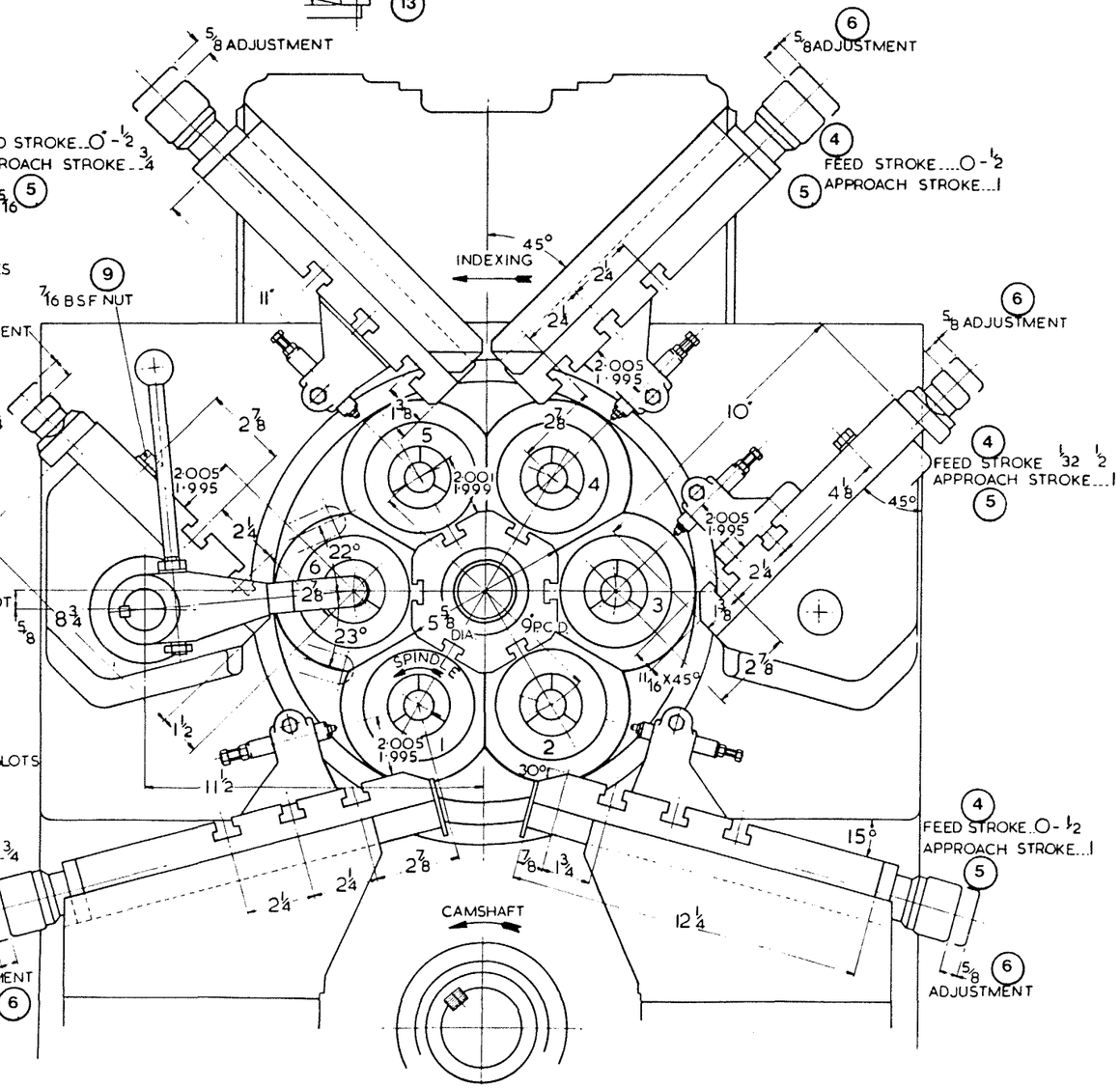
5	23 FEED STROKE	24 DIMENSIONA
2 1/2" STANDARD APPROACH CAMS 123Y185 123Y186 123Y187	0"	3 1/2"
	1"	3 5/8"
25 2" SPECIAL APPROACH CAMS 123Y182 123Y183 123Y184	2"	3 1/2"
	2 1/2"	3 1/4"

26 NOTE: ALL SLIDES SHOWN IN FULLY FORWARD POSITION



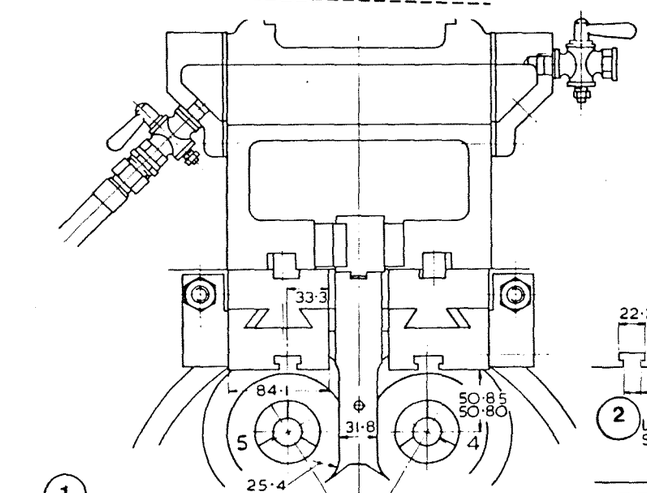
19 FOR DOUBLE BAR FEED M/CS A BAR STOP & A 3 7/8 WIDE SLIDE ARE FITTED. DIMENSIONS AS SHOWN IN STATION 6

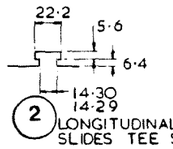




COMMENCING ON MACHINE No. 9633

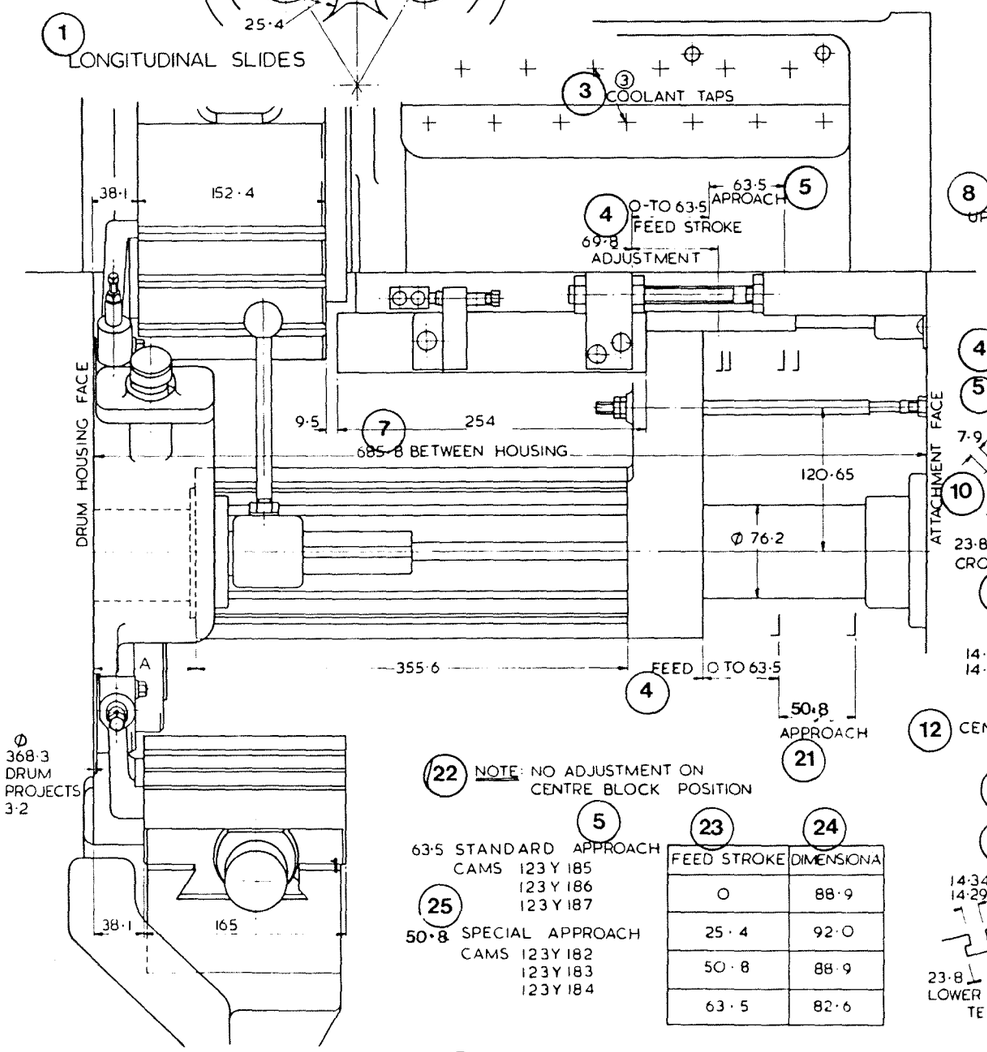
100Z.21C.





(2) LONGITUDINAL SLIDES TEE SLOT

(1) LONGITUDINAL SLIDES



(22) NOTE: NO ADJUSTMENT ON CENTRE BLOCK POSITION

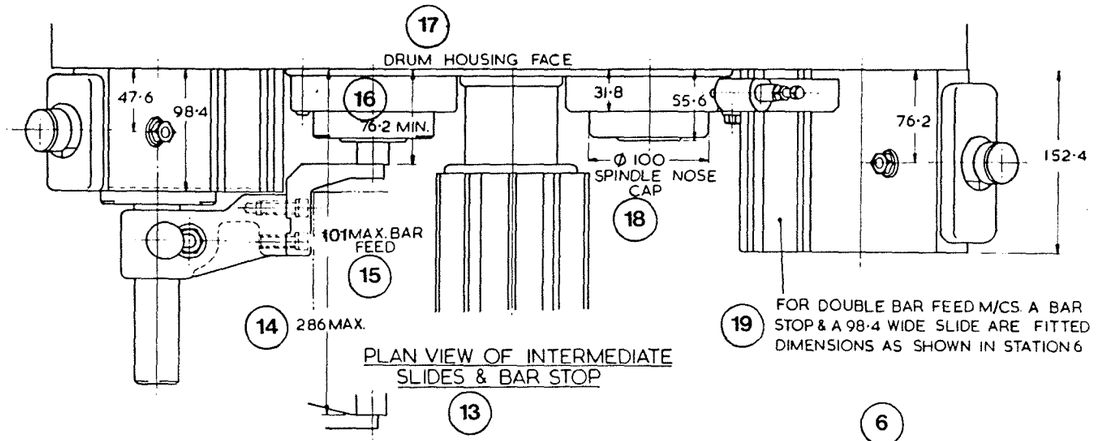
(5) (23) (24)

63·5 STANDARD APPROACH CAMS 123Y185 123Y186 123Y187

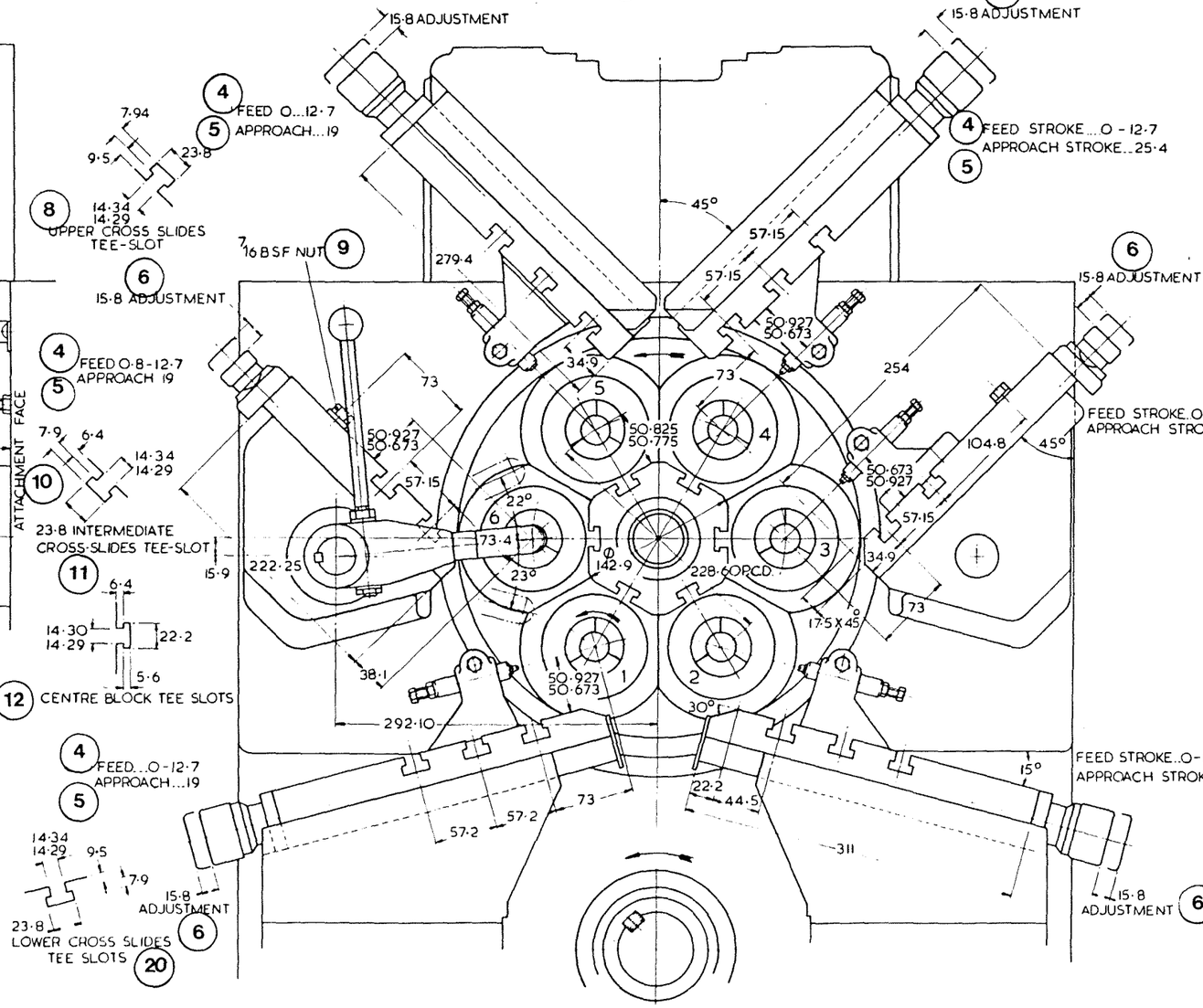
(25) 50·8 SPECIAL APPROACH CAMS 123Y182 123Y183 123Y184

FEED STROKE	DIMENSION A
0	88·9
25·4	92·0
50·8	88·9
63·5	82·6

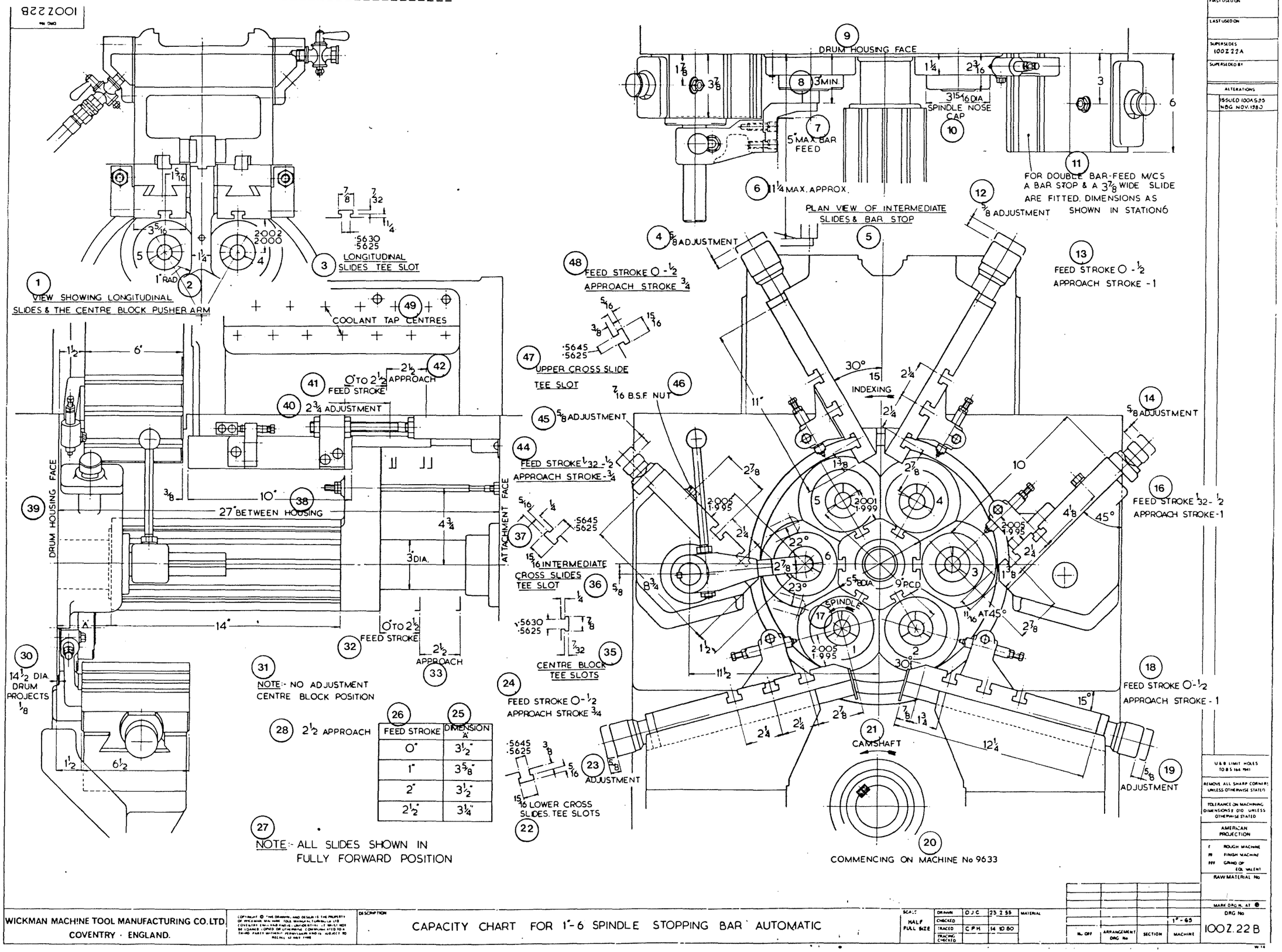
(26) NOTE ALL SLIDES SHOWN IN FULLY FORWARD POSITION



PLAN VIEW OF INTERMEDIATE SLIDES & BAR STOP (13)



100Z.21C.
METRIC


100Z22B
1 VIEW SHOWING LONGITUDINAL SLIDES & THE CENTRE BLOCK PUSHER ARM
2 1" RAD
3 LONGITUDINAL SLIDES TEE SLOT
4 5/8 ADJUSTMENT
5
6 1 1/4 MAX. APPROX.
7 5" MAX. BAR FEED
8 3 MIN.
9 DRUM HOUSING FACE
10 3 15/16 DIA SPINDLE NOSE CAP
11 FOR DOUBLE BAR-FEED M/CS A BAR STOP & A 3 7/8 WIDE SLIDE ARE FITTED. DIMENSIONS AS SHOWN IN STATION 6
12 5/8 ADJUSTMENT
13 FEED STROKE 0 - 1/2 APPROACH STROKE - 1
14 5/8 ADJUSTMENT
15 INDEXING
16 FEED STROKE 1/32 - 1/2 APPROACH STROKE - 1
17 SPINDLE
18 FEED STROKE 0 - 1/2 APPROACH STROKE - 1
19 5/8 ADJUSTMENT
20 COMMENCING ON MACHINE No 9633
21 CAMSHAFT
22 5/16 LOWER CROSS SLIDES. TEE SLOTS
23 5/8 ADJUSTMENT
24 FEED STROKE 0 - 1/2 APPROACH STROKE 3/4
25 DIMENSION A
26 FEED STROKE
0" 3 1/2"
1" 3 5/8"
2" 3 1/2"
2 1/2" 3 1/4"
27 NOTE:- ALL SLIDES SHOWN IN FULLY FORWARD POSITION
28 2 1/2 APPROACH
30 14 1/2 DIA DRUM PROJECTS 1/8
31 NOTE:- NO ADJUSTMENT CENTRE BLOCK POSITION
32 0 TO 2 1/2 FEED STROKE
33 2 1/2 APPROACH
35 CENTRE BLOCK TEE SLOTS
36 5/8
37 5/16 INTERMEDIATE CROSS SLIDES TEE SLOT
38 10"
39 DRUM HOUSING FACE
40 2 3/4 ADJUSTMENT
41 0 TO 2 1/2 FEED STROKE
42 2 1/2 APPROACH
44 FEED STROKE 1/32 - 1/2 APPROACH STROKE - 3/4
45 5/8 ADJUSTMENT
46 7/16 B.S.F. NUT
47 UPPER CROSS SLIDE TEE SLOT
48 FEED STROKE 0 - 1/2 APPROACH STROKE 3/4
49 COOLANT TAP CENTRES
ATTACHMENT FACE
PLAN VIEW OF INTERMEDIATE SLIDES & BAR STOP
FIRST USED ON
LAST USED ON
SUPERSEDES 100Z22A
SUPERSEDED BY
ALTERATIONS
ISSUED 100A535 NBG NOV. 1980
U & B LIMIT HOLES TO BS 164 1961
REMOVE ALL SHARP CORNERS UNLESS OTHERWISE STATED
TOLERANCE ON MACHINING DIMENSIONS ±.010 UNLESS OTHERWISE STATED
AMERICAN PROJECTION
R ROUGH MACHINE
FR FINISH MACHINE
FFF GRIND OR EQUIVALENT
RAW MATERIAL No
MARK DRG. No AT
DRG No 100Z.22B
WICKMAN MACHINE TOOL MANUFACTURING CO. LTD. COVENTRY · ENGLAND.
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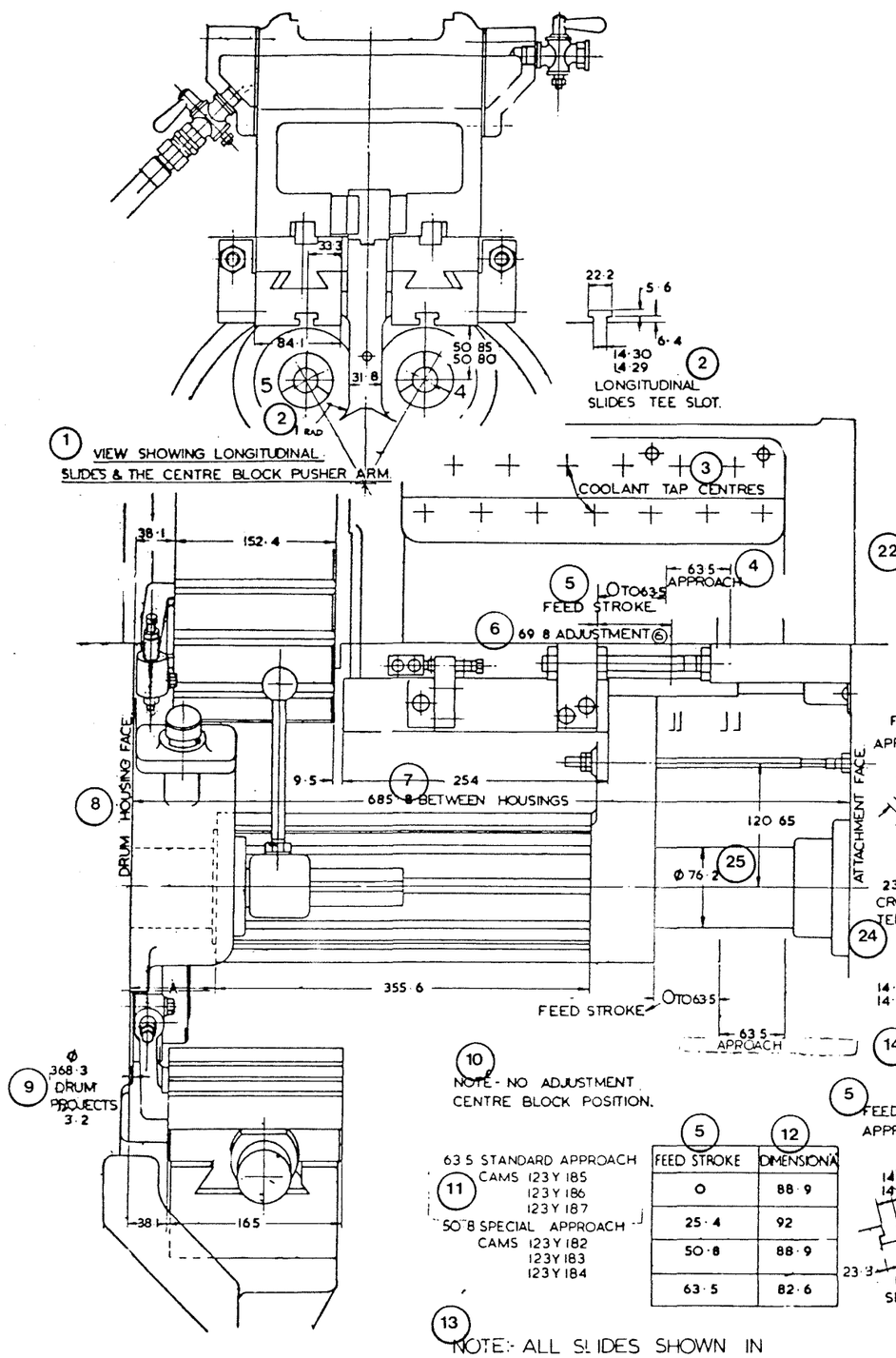
DESCRIPTION CAPACITY CHART FOR 1"-6 SPINDLE STOPPING BAR AUTOMATIC
SCALE HALF FULL SIZE
DRAWN D.J.C 23.2.88
CHECKED
TRACED C.P.M 14.10.80
TRACING CHECKED
MATERIAL
No. OFF
ARRANGEMENT DRG No
SECTION
MACHINE 1"-6S
100Z.22B

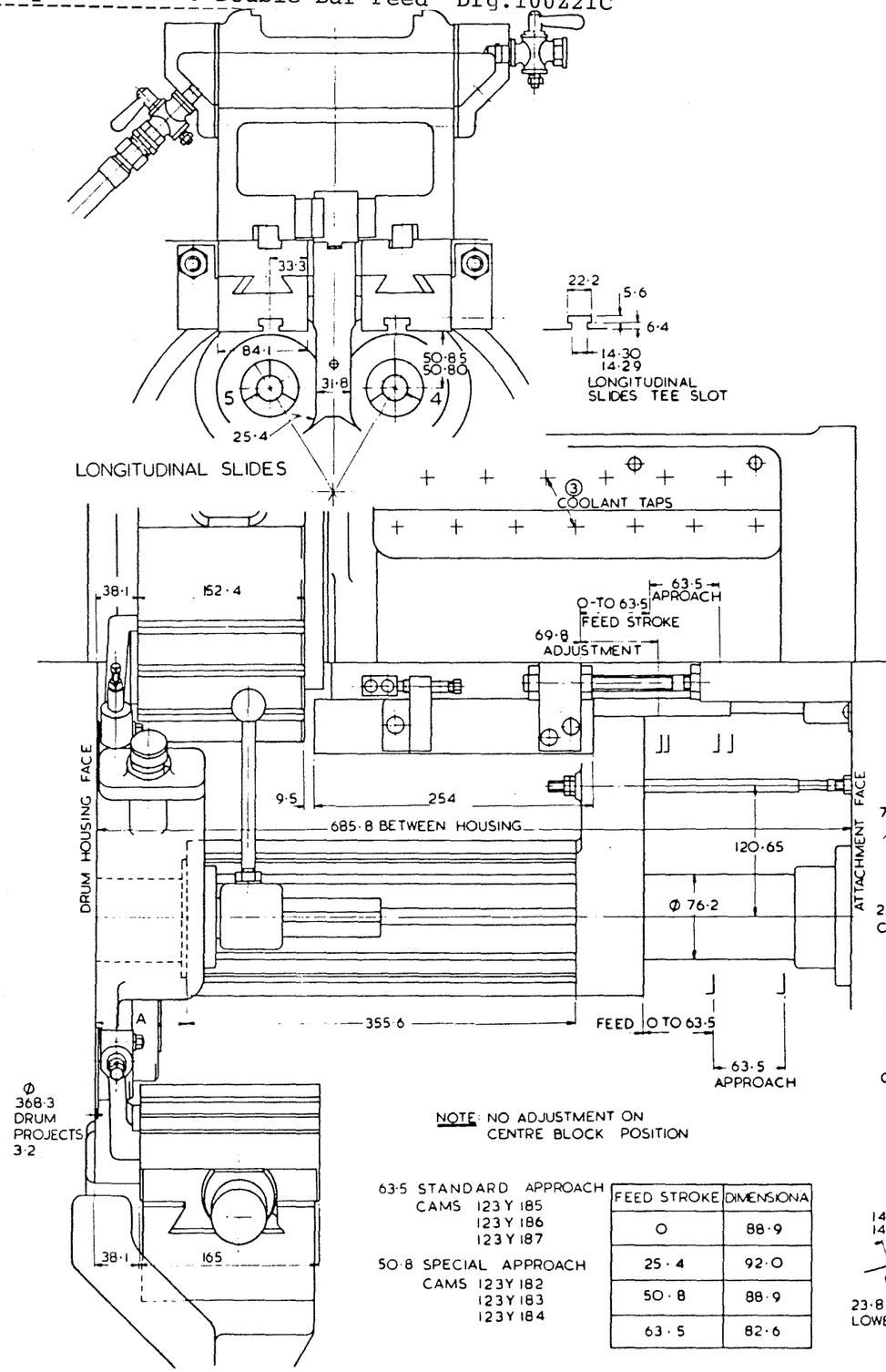
FIRST USED ON BATCH
LAST USED ON BATCH
SUPERSEDES 100Z 22A.
SUPERSEDED BY
ALTERATIONS



FEED STROKE	DIMENSION A
0	88·9
25·4	92
50·8	88·9
63·5	82·6

100Z22B
METRIC

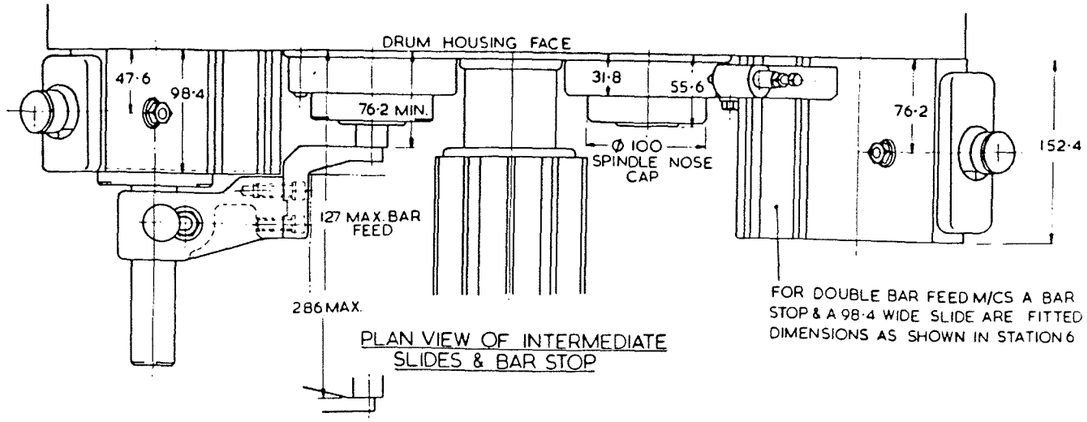
Capacity Chart 1"-6 Double Bar Feed Drg.100Z21C



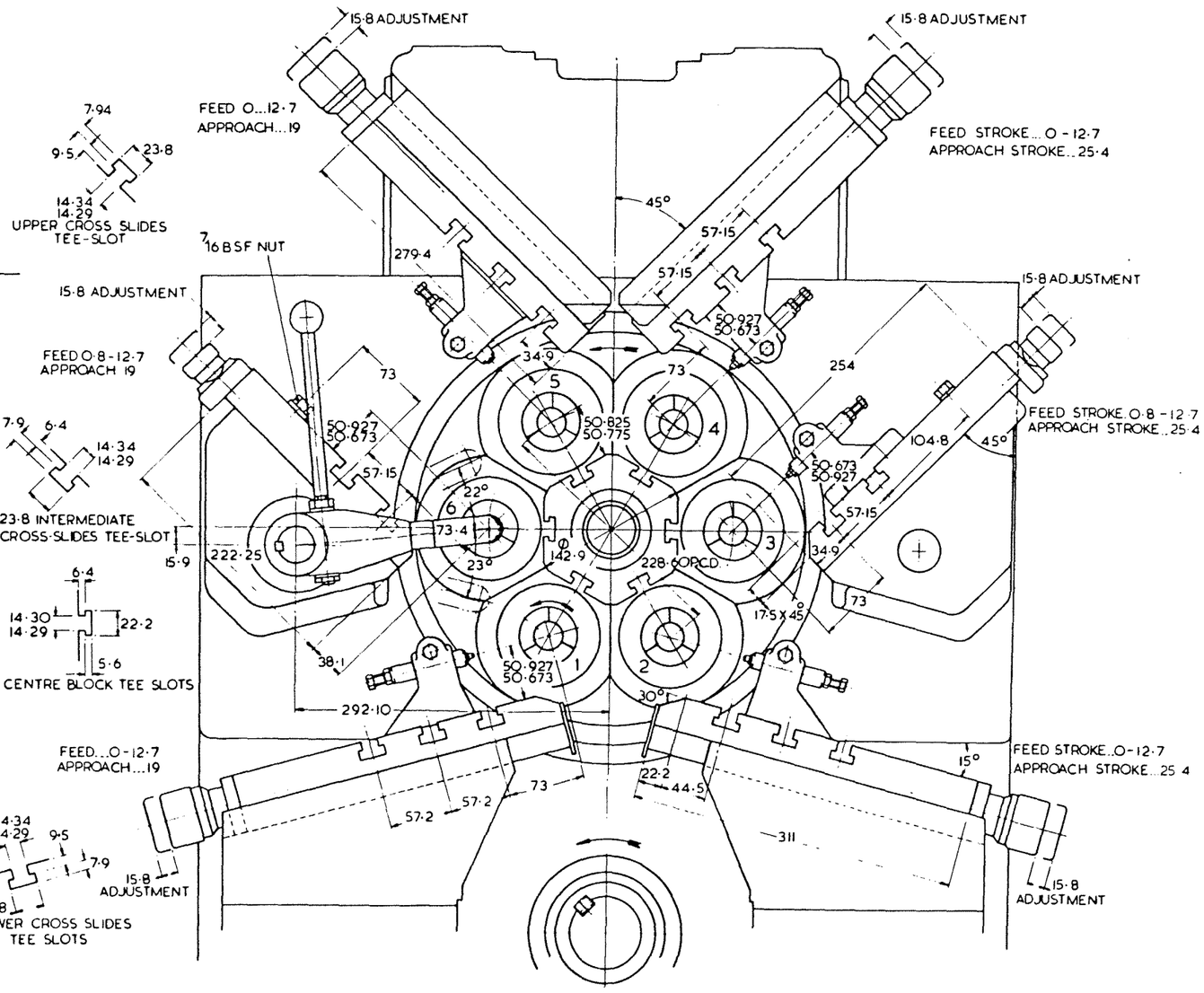
NOTE: NO ADJUSTMENT ON CENTRE BLOCK POSITION

63·5 STANDARD APPROACH CAMS 123Y185 123Y186 123Y187	FEED STROKE	DIMENSIONA
	0	88·9
50·8 SPECIAL APPROACH CAMS 123Y182 123Y183 123Y184	25·4	92·0
	50·8	88·9
	63·5	82·6

NOTE ALL SLIDES SHOWN IN FULLY FORWARD POSITION



PLAN VIEW OF INTERMEDIATE SLIDES & BAR STOP



100Z.21C.
METRIC

Capacity Chart 30mm-6

For details of the capacities for the 30mm-6 machine, refer to the full size drawings supplied with this size machine.

SECTION TWO - INSTALLATION AND PRELIMINARY CHECKS

2.1 Installation and Lifting

In planning the siting of a machine, consideration should be given to the space required for chip removal, bar loading and servicing, ie, centre-shaft removal. Dimensions of suitable lifting bars for use with a crane are shown on Drawing No.100Y50E, for use with a lifting frame shown on Drawing No.100Y579. The lifting bars are fed through the holes provided in the machine tray and collars assembled & clamped to the bars in order to prevent the ropes used with the lifting frame from slipping. Care must be taken to ensure that the lifting frame ropes do not damage the machine during hoisting. Examine the position of the lifting frame with the tension on the ropes before the full weight of the machine is lifted.

Where a crane is not available, the machine may be moved by "wedge", truck or rollers and continuous machined surfaces are provided on the underside of the machine tray to facilitate the operation. Rollers must be longer than the machine tray width.

Careful handling of the machine will ensure accurate alignment.

2.2 Machine Foundation

The machine should be installed on a level and stable foundation in order to ensure accurate alignment is maintained. A concrete base is recommended, it provides the most suitable foundation because of its stability and because it is less prone to distortion when laid down in adverse soil conditions.

The actual depth of concrete base must be determined to suit the prevailing soil conditions, which must be capable of supporting the machine, ancillary equipment, tooling and the concrete base itself. The soil should be consolidated with crushed rock, pebbles and stones.

2.3 Levelling the Machine and Sundry Requirements

With the machine in position on the factory floor, adjust its level using the jacking screws provided in the machine tray. It is recommended that steel plates be placed between the floor and the screws. Longitudinal and lateral alignment levels can be checked with a precision spirit level on the facings provided at both ends of the machine tray, see Drawing No. 100Y50E. Wedges should be placed at the positions shown.

Foundation bolt holes are also provided for use where required, the bolts being embedded in the floor approximately 5ins (125mm).

Where not bolted-down, machines can be grouted or cemented by any shop approved method.

The stock carriage tube assembly (weight: 450lbs/205kg) should be lifted into position and made ready for mating with the machine.

When the machine has been laid down and levelled, the stock carriage and stand should be fitted, the stock tubes being correctly aligned with the machine spindles. A good alignment check is to view the collet openings through the stock tubes. Adjusting screws in the base of the stock carriage stand are provided for alignment purposes and it is recommended that a steel plate be placed beneath each levelling screw before the adjustment takes place. When correctly aligned, the stock carriage stand should be bolted down and grouted in position.

DRG. No. 100 Y 50E

OUTLINE STOCK CARRIAGE COVER

152" 3865MM OVER END DOOR

102 7/8" 2613MM

30 4" 769MM

4 WEDGES

48 1/2" 1232MM TRAY.

1 66" 1680MM OVER OPEN DOORS

54 1/4" 1378MM OVER OPEN DOORS

52 3/4" 1340MM

86 3/4" 2205MM OVER OPEN DOOR.

130" 3300MM STOCK CARRIAGE COVER (OPTIONAL)

6 LEVEL THE MACHINE WITH SCREWS PROVIDED.
USE WEDGES WHERE SHOWN.
GROUT OR BOLT IN POSITION
LEVELLING SURFACES SHOWN THUS *
MACHINE SHOULD REST ON CONCRETE NOT LESS THAN 6" - 152MM THICK

11 WEIGHTS :-
MACHINE INCLUDING MOTOR, PANEL AND GUARDS = 13440 lbs (6101 Kg)
STOCK CARRIAGE & STAND = 450lbs (205Kg)
SWARF CONVEYOR = 558 lbs (251 Kg)

7 66" - 1676MM OVER OPEN BAR FEED COVERS

8 53" - 1350MM OVER GUARDS

91 1/4" 2320MM

2 150" - 3810MM CLEARANCE FOR LOADING BARS.

114 1/2" - 2908MM

3 117 7/8" - 2994MM STOCK CARRIAGE ASSEMBLY.

106" 2692MM

20 SWARF CONVEYOR -OPTIONAL.

CONTROL ENCLOSURE 0.8 KW

5

25 1/2" 1295MM

85 3/4" 2180MM

55" 1397MM

47" 1194MM

26" - 660MM

15 KW MOTOR

13 HOLES FOR LIFTING BARS

19 CONVEYOR MOTOR 0.25KW

43 1/4" 1100MM.

40 3/4" 1035MM

27 1/8" 690 MM

36" 915MM

18 13" 330MM

7" 178MM

15 4 - 3/4 DIA (ϕ20) HOLDING DOWN BOLTS NUTS AND WASHERS. TO BE SUPPLIED BY CUSTOMER.

1" BS FINE

14 1 1/4" (ϕ31.7) FOR 1" (ϕ25) BOLTS

80" - 2032MM

14 1/2" - 366

ϕ75

12 2 COLLARS EACH END. ϕ150 SECURED BY SET SCREWS.

8" 203MM

51" - 1295MM

9 44 7/16" -1129MM

10 2 1/16" - 52.5 = 48 9/16" OVER LIPS OF TRAY

17 VIEWS OF STOCK CARRIAGE BASE SCALE 1 : 10

16 IT IS RECOMMENDED THAT PLATES BE FITTED UNDER THE LEVELLING SCREWS. PLATES TO BE SUPPLIED BY CUSTOMER.

21 2-OFF LIFTING BAR. TO BE SUPPLIED BY CUSTOMER.

FIRST USED ON
LAST USED ON
SUPERSEDES
SUPERSEDED BY
ALTERATIONS.

'D' & 'B' LIMIT HOLES TO B.S. 164: 1941

REMOVE ALL SHARP CORNERS UNLESS OTHERWISE STATED

TOLERANCE ON MACHINING DIMENSIONS ± 0.010 UNLESS OTHERWISE STATED

AMERICAN PROJECTION

F = ROUGH MACHINE
FF = FINISH MACHINE
FFF = GRIND OR EQUIVALENT

RAW MATERIAL No.

MARK DRG. No. AT 4

DRG. No. 100 Y 50 E

WICKMAN BENNETT MACHINE TOOL CO. LTD.
COVENTRY ENGLAND

DESCRIPTION: FOUNDATION DRAWING.

SCALE:- 1:20

	DRAWN	PW	FEB 87
	CHECKED		
	TRACED		
	TRACING CHECKED		

MATERIAL

No. OFF	ARRGT. DRG. No.	SECTION	MACHINE
			1"-6

28" x 30" / W. 2278 B

DRG. No. 100Y579

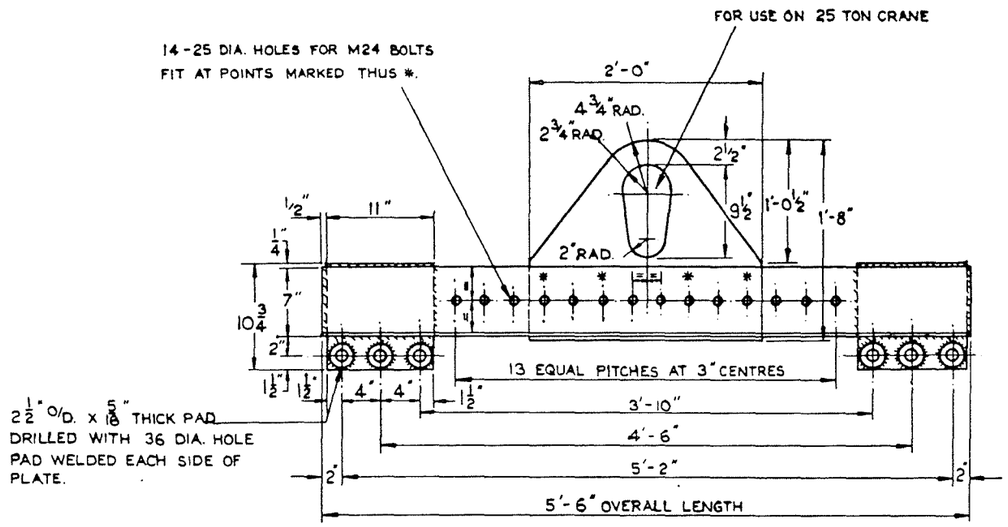
FIRST USED ON

LAST USED ON

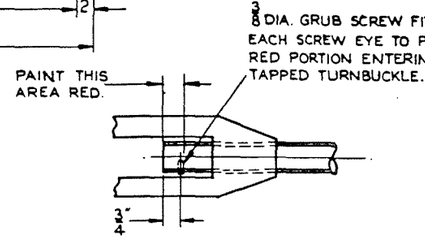
SUPERSEDES

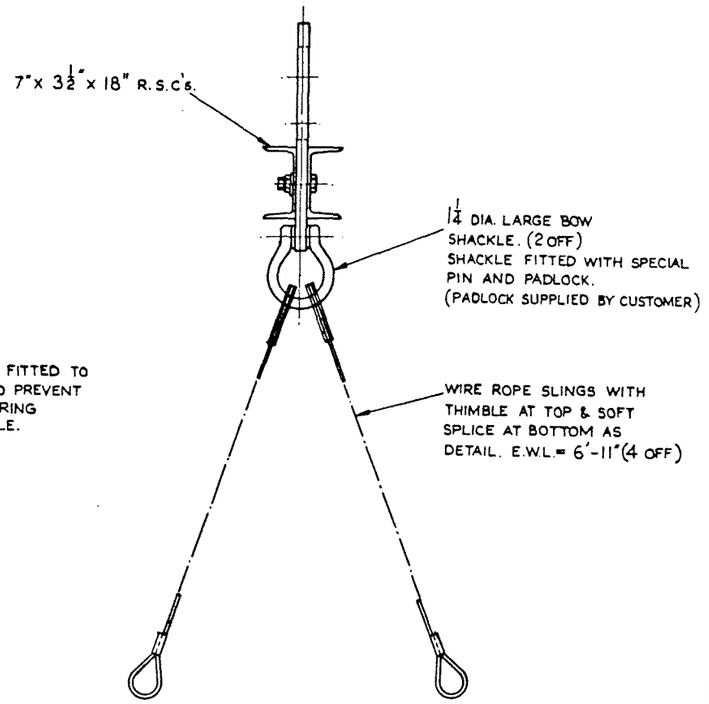
SUPERSEDED BY

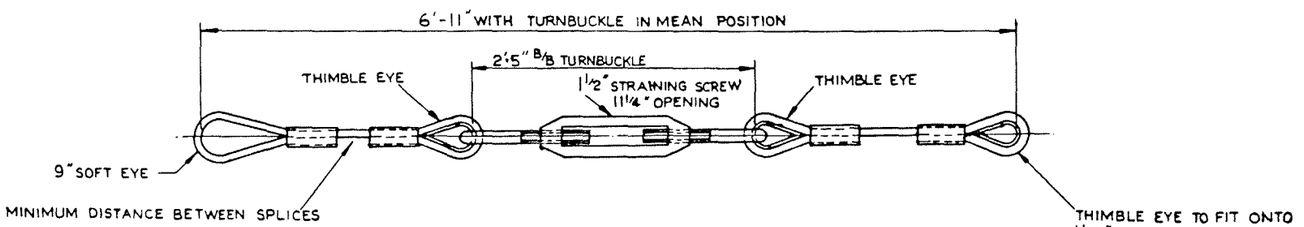
ALTERATIONS



DETAIL OF LIFTING BEAM
ONE REQUIRED AS DRAWN
S.W.L. 10 TONS
APPROX. WEIGHT COMPLETE: 7 CWT.







DETAIL OF 18 MM. DIA. WIRE ROPE SLING
4 REQ'D. AS DRAWN

'U' & 'B' LIMIT HOLES TO B.S. 164. 1841.

REMOVE ALL SHARP CORNERS UNLESS OTHERWISE STATED

TOLERANCE ON MACHINING DIMENSIONS ± .010 UNLESS OTHERWISE STATED.

AMERICAN PROJECTION

F = ROUGH MACHINE
FF = FINISH MACHINE
FFF = GRIND OR EQUIVALENT

RAW MATERIAL No.

MARK DRG. No. AT

CRANE AID SERVICES LTD. DRG. No. 22 - A9 - 2024C.

No. Off	ARR.T DRG. No	SECTION	MACHINE

WICKMAN MACHINE TOOL MANUFACTURING CO. LTD.
COVENTRY — ENGLAND

DESCRIPTION

DETAIL OF 10 TON LIFTING BEAM

SCALE - 1 1/2" : 1 FOOT

DRAWN		7.12.78	MATERIAL
CHECKED			
TRACED	D.E.L.	11.11.80	
RAISING			

DRG. No. 100Y 579

All protective grease should then be removed from internal and external parts with paraffin or white spirit, taking care not to contaminate lubrication oil with protective grease and cleaning fluid residue.

WARNING

When using paraffin or white spirit ensure that no naked flames are present. Do not smoke. Store cans/drums containing paraffin or white spirit correctly. Dispose of cleaning cloths and contaminated spirit according to factory regulations/safety procedures.

Coolant strainers, work baskets, chutes etc., can then be placed in position, see fig.2.3.

The swarf conveyor, if supplied, may also be fitted, see fig.2.4 for the positioning of the swarf deflection chutes and electrical connection etc.

The machine has an aperture in the tray floor for use with underground disposal systems, where all swarf and coolant passes through the tray and is conveyed to a collection depot. Machines are supplied with a cover plate fitted to the aperture and this should be unscrewed during installation in factory shops using the system and connections made to the centralised coolant supply.

2.4 Electrical Equipment

It is impossible in a general handbook to cover the electrical specification on each machine supplied, since the electrical equipment on each machine can vary considerably. Reference should be made to the wiring diagrams and other information forwarded with each machine.

The standard electrical control enclosure includes an isolator/main circuit breaker. Its only necessary to connect the line and earth. The rotation of the main motor should be clockwise when viewed from the pulley end. Before starting the main motor, read through the procedure in Section 2.7.

The wiring diagram is included and can be found in the data pocket inside the door of the control enclosure.

Star Delta starting is employed for the main motor unless otherwise specified. On Star Delta equipment, operation of the timer should be checked for a time lag of approximately 15 seconds, and all starter gear should be checked for freedom of movement.

Careful attention should be exercised in order to ensure that all the motor circuit breakers and the thermal overload heaters are correct for the electrical supply; this is important when dual voltage motors are supplied.

Supply voltage to the fluorescent tooling area lighting is 110V or the control circuit voltage. The voltage is increased through a transformer mounted in the lighting unit. The above details are checked by Wickman Bennett before despatch, but should also be rechecked at customer's site.

The swarf conveyor motor starter is fitted in the control panel and its control buttons are mounted upon the panel door. These controls comprise:-

(a) A two position selector/push button switch, which when turned counter-clockwise and pressed will start the helical conveyor transporter turning, when turned clockwise and pressed the helical conveyor transporter can be reverse jogged to clear any blockage.

(b) An adjacent stop button, which, when pressed will stop the helical conveyor transporter.

The various relays operated by the trip mechanism limit switches are in the control panel. Space is also provided in the control panel for additional starters for attachment motors if required. The supply leads should be brought to the mains terminals in the control panel.

Fig.2.3 Coolant Strainers,Work Baskets & Chutes

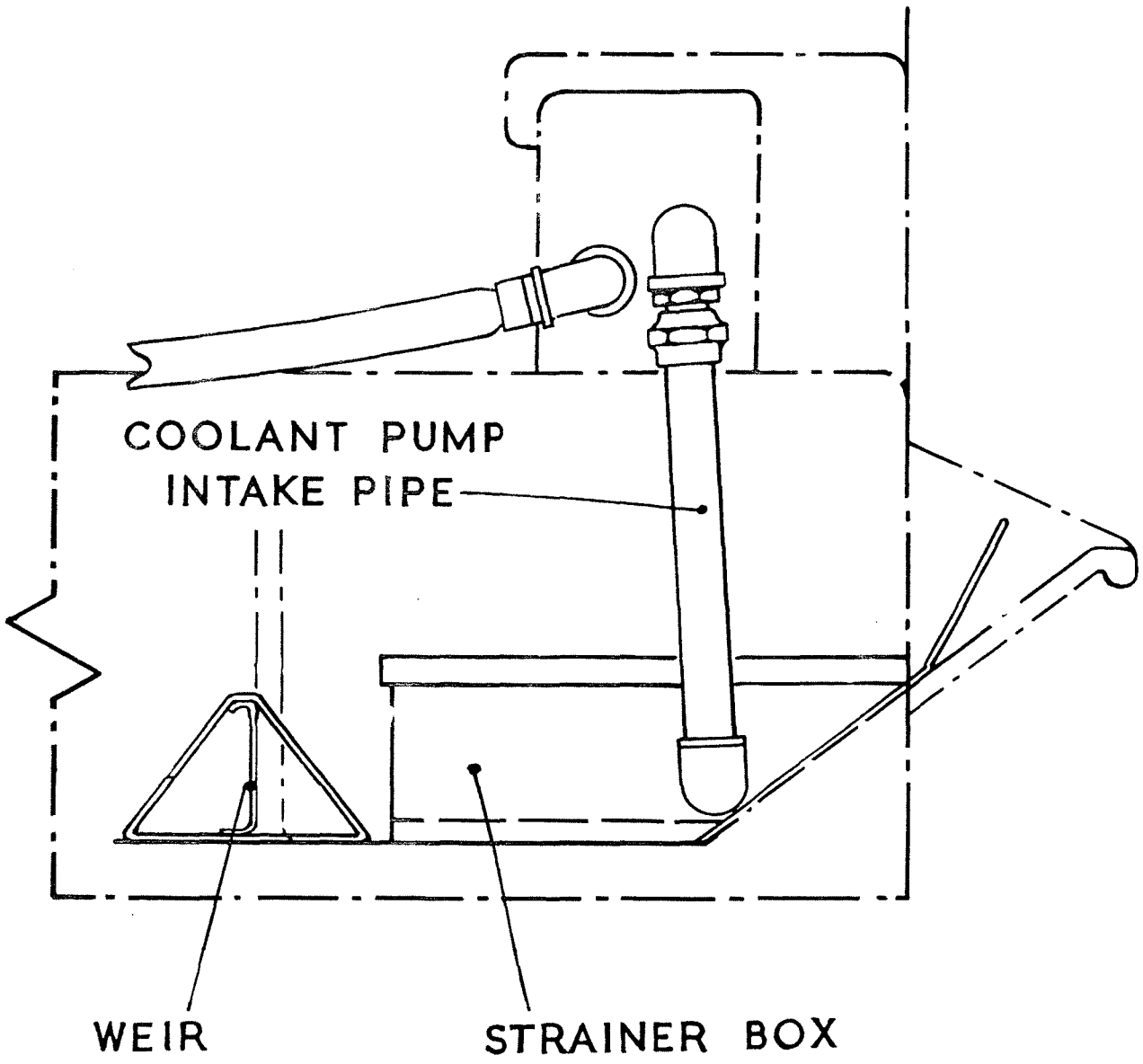
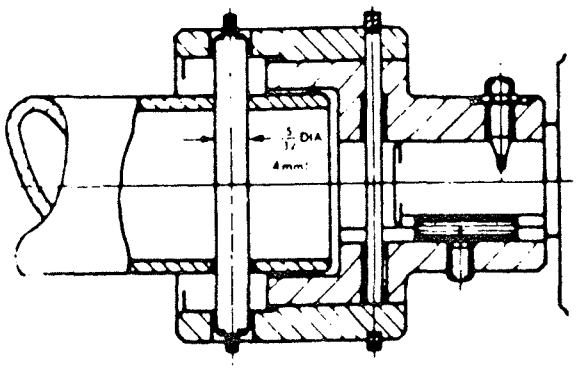
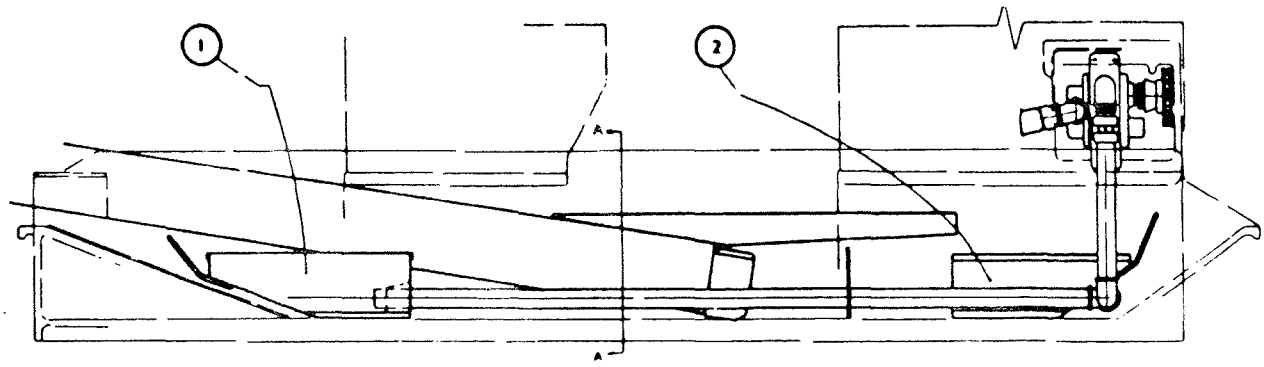
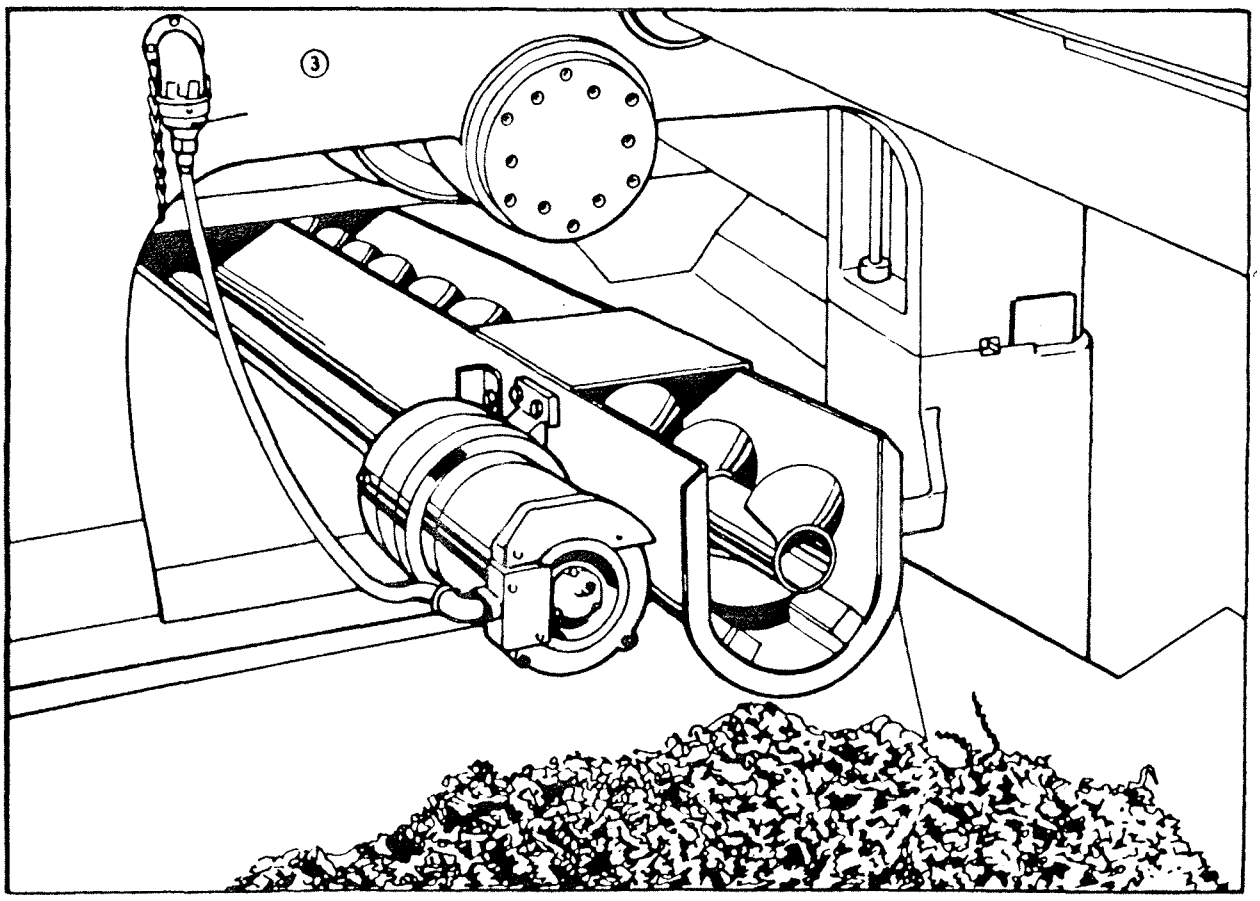


Fig.2.4 Swarf Conveyor

1. Coolant Strainer Box
2. Basket to collect fine swarf
3. Niphan plug and socket







2.5 Lubrication

The oil tank is situated in the tray of the machine in the front of the main drive housing, see fig.2.5, drg.168Z10B. Care must be taken to ensure that only lubricating oil is put into this tank. Use oil grade ISO 3498 CB68 or alternatives HL68 or HM68. The tank is filled through a filler/breather/strainer provided and accessible externally. When fitted, (optional extra) a low level float switch will shut down the machine if the oil falls to a level which would create a critical situation.

The lubricating pump is of the gear type and is chain driven from the constant speed pulley shaft. The pump is mounted in an eccentric bush for chain adjustment and is locked by a locknut.

The oil is drawn through a strainer with an adjacent foot valve to avoid priming. A relief valve is also fitted in the intake pipe to release pressure should the main motor be started running in the opposite direction. The oil is drawn through a stainer and pumped through a 'Purolator' filter to a relief valve set at maximum pressure. This does not normally require adjustment. The 'Purolator' knob should be turned daily and its element taken out and cleaned periodically. Part of the oil pumped through the 'Purolator' and the relief valve goes to the 'Micronic' filter situated on top of the machine and part is bypassed before the 'Micronic' filter to another relief valve set to give a pressure of approximately 20lbs/inch sq. (1.4 kg/cm sq.) in the circuit from the 'Purolator'/relief valve, this pressure being displayed on a pressure gauge.

The oil which passes through the 'Micronic' filter feeds the spindles via the spindle sight feeds as well as all points feeding the drum housing, the upper cross slides and certain points on the collet and bar feed mechanisms. The 'Micronic' filter has a replacement element which must be changed periodically. A spare element is included with the equipment supplied with the machine. The spindle oil sight feeds are adjusted by the needle valves above each sight feed and should be set to give 10 to 20 drops of oil per minute. They should be observed frequently to see that the rate of feed is steady and in accordance with the instruction plate. The actual rate of feed should be adjusted according to the spindle speed, but should be kept on the generous side while the machine is new.

The oil which is bypassed before the 'Micronic' filter circulates to various needle valve headers and spray pipes arranged to feed points in the main drive housing. Oil is also fed to a drip tray above the longitudinal slides mechanism and is provided with drip pipes to feed all the important points in the mechanism.

The lubrication system is adjusted correctly before the machine is despatched but should be checked on installation and at regular intervals.

Concerning Lubrication:

(a) Check the oil level in the tank, it must not fall below the level indicated.
(b) Frequent checks of the spindle sight feeds are necessary; also check that the main drive oil is circulating.
(c) Turn the 'Purolator' knob daily.

Summary of Lubricants

Wickman Oil Grade	1	2	3	4	5
Application	Light Spindle Oil	Air Line Lubrication for Cold Climates	Air Line Lubrication for Warm Climates	Centralised Lube. Air Line Lub'e Hyd. syst. Gen.Lub'e for Cold Climates	General Lubrication Centralised System for Warm Climates
B.P	Energol HL 40	Energol HL 50	Energol HL or HLP 65	Energol HLP 80	Energol HLP 100
CASTROL	Hyspin AWS 10	Hyspin AWS 22	Hyspin AWS 32	Hyspin AWS 46	Hyspin AWS 68
CENTURY	P79A	P313	PWLA	PWLB	PWLC
DUCKHAMS	Zircon 1	Zircon 3	Zircon 4	Zircon 5	Zircon 6
ESSO	Nuto H36	Nuto H40	Nuto H44	Nuto H48	Nuto H54
GULF	Harmony 34AW	Harmony 40AN	Harmony 43AW	Harmony 48AW	Harmony 54AW
MOBIL	Velocite oil No 6	Velocite oil No 10	DTE oil light or DTE 24	DTE oil med. or DTE 25	DTE oil heavy med. or DTE 26
PETROFINA	Cirkan 15	Hydran 21	Hydran 31	Hydran 31	Hydran 37
SHELL ISO VG NO	10	22	37	46	68
TEXACO	Spintex 60	Spintex 100	Rando HD.A	Rando HD.B	Rando HD.C
VAUGHAN	KSO 5L	KSO No.1	Evco Med. Hyd. or Hydrodrive HP 150	Evco Heavy Hyd. or Hydrodrive HP 200	Evco Extra Heavy Hyd.or Hydrodrive HP 300

Where alternative grade references are given it is recommended that the lighter grade (lower number) is used unless oil consumption is excessive.

For Slideways Grade 5 is suitable for use with oil-base coolants and Grade 7 for use with water-base coolants.

Wickman Oil Grade	6	7	Wickman Grease Grade	1	2
Application	Reduction Units (Swarf conveyor)	Slideways		GREASES: Electric Motors	GREASES: Spindle Nose Cap
B.P	Energol CS 300	Energol HP 20-C		Ener Grease LS3	Ener Grease LS3
CASTROL	Alpha 417	Magna BD		Spheerol AP3	Spheerol AP3
CENTURY	WLP	428AP		Lupus 3	Lupus 3
DUCKHAMS	Galrex 9	Adglide 6		Admax 13	Admax 13
ESSO	Esstic 78	Febis K73		Beacon 2/3	Beacon 2/3
GULF	Mechanism LP 85	Gulway 52 or Slidway 52		Gulfcrown No. 3	Gulfcrown No. 3
MOBIL	DTE oil BB	Vectra Oil		Mobilplex 48	Mobilplex 48
PETROFINA	Solna 58	Artac 37		Marson HTL 3	Marson HTL 3
SHELL ISO VG NO:	220	68 or 320		Alvania R2 & R3	Alvania R2 & R3
TEXACO	Regal GR & O	Way Lubricant D		Regal Starfal Premium 3	Regal Starfal Premium 3
VAUGHAN	Cosmolubric EHC	Way Lubricant		Evco BB No. 3 Grease	*Cosmolube Grease/No4 Grease

REMARKS:

For Slideways Grade 5 is suitable for use with oil-base coolants and Grade 7 for use with water-base coolants.

* Re: Cosmolube No. 4: Use sparingly and only in nose cap seals.

2.6 Concerning Coolant

Soluble oils can cause rust in the machine. The type and dilution of the soluble oil should be carefully determined, the soluble oil must contain rust inhibitors & be changed often to avoid contamination. Extra maintenance precautions are essential if rust is to be avoided.

The strainer box must be kept clear of swarf.

When a swarf conveyor is fitted, ensure that both the basket and the strainer are kept in position.

Keep the level of the coolant in the tray as high as possible at all times.

Clean swarf and sediment from the machine tray at regular intervals.

2.7 Procedures before Starting the Machine

Before starting the machine the following procedures should be carefully carried out:-

1) Ensure that all protective grease has been cleaned off the machine and that the oil tank in the tray of the machine is clean, and that all residual protective grease and the cleansing agents are removed from the machine tray.

2) Fill the oil tank in the tray of the machine. This is done through the filler/breather/strainer provided and accessible externally. Approximately 10 gallons (45 litres) of oil are required. Use oil grade ISO 3498 CB68 or alternative HL68 or HM68.

3) Apply the grease gun to all nipples as indicated on fig.2.5, using lubricant as specified in the Summary of Lubricants.

4) Fill the tray with coolant (approximately 80-100 gallons/ 363-455 litres). Check that the rotation of the electrically driven pump is correct, that the strainer box is correctly positioned and that all coolant taps are closed.

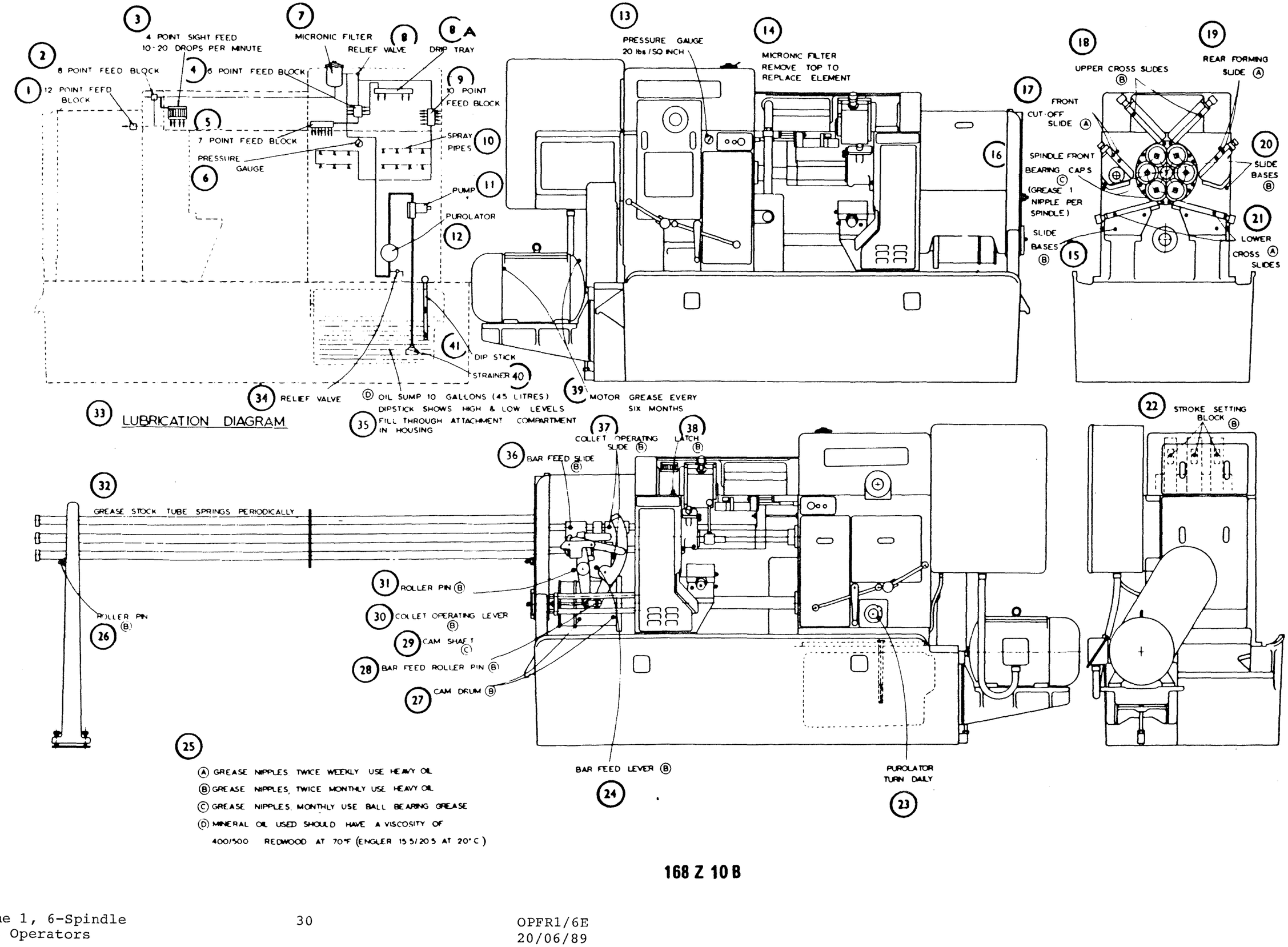
5) Place the speed range change gears in the neutral position and the feed clutch in brake, when checking the direction of the main motor rotation. Should any bar ends remain in the machine, disengage both the feed slipping clutch and the fast motion slipping clutch before wiring up and DO NOT handwind the machine.

6) Check the direction of rotation of the motor (clockwise looking on pulley), see fig.2.6. Read the section on Controls before starting the machine.

7) Run the motor to check that the lubrication system is working. See that the spindle sight feeds are functioning correctly. Remove the cover over the speed pick off gears and see that the main drive lubrication system is working by observing the oil pipes feeding the pick off gears.

8) Lift the cover on the top of the main drive housing and check that oil is feeding a distributer tray beneath. Check the spindle sight feeds on the beam.

9) Check that the collets and feed fingers are correctly fitted. Disengage indexing, bar feed and the collet operating mechanism by means of the index clutch lever.


1 12 POINT FEED BLOCK
2 8 POINT FEED BLOCK
3 4 POINT SIGHT FEED 10-20 DROPS PER MINUTE
4 6 POINT FEED BLOCK
5 7 POINT FEED BLOCK
6 PRESSURE GAUGE
7 MICRONIC FILTER
8 RELIEF VALVE
8A DRIP TRAY
9 10 POINT FEED BLOCK
10 SPRAY PIPES
11 PUMP
12 PUROLATOR
13 PRESSURE GAUGE 20 lbs / SQ INCH
14 MICRONIC FILTER REMOVE TOP TO REPLACE ELEMENT
15 SLIDE BASES (B)
16
17 FRONT CUT-OFF SLIDE (A)
18 UPPER CROSS SLIDES (B)
19 REAR FORMING SLIDE (A)
20 SLIDE BASES (B)
21 LOWER CROSS SLIDES (A)
22 STROKE SETTING BLOCK (B)
23 PUROLATOR TURN DAILY
24 BAR FEED LEVER (B)
25 (A) GREASE NIPPLES TWICE WEEKLY USE HEAVY OIL
(B) GREASE NIPPLES, TWICE MONTHLY USE HEAVY OIL
(C) GREASE NIPPLES. MONTHLY USE BALL BEARING GREASE
(D) MINERAL OIL USED SHOULD HAVE A VISCOSITY OF 400/500 REDWOOD AT 70°F (ENGLER 15.5/20.5 AT 20°C)
26 ROLLER PIN (B)
27 CAM DRUM (B)
28 BAR FEED ROLLER PIN (B)
29 CAM SHAFT (C)
30 COLLET OPERATING LEVER (B)
31 ROLLER PIN (B)
32 GREASE STOCK TUBE SPRINGS PERIODICALLY
33 LUBRICATION DIAGRAM
34 RELIEF VALVE
35 FILL THROUGH ATTACHMENT COMPARTMENT IN HOUSING
36 BAR FEED SLIDE (B)
37 COLLET OPERATING SLIDE (B)
38 LATCH (B)
39 MOTOR GREASE EVERY SIX MONTHS
40 STRAINER
41 DIP STICK
(D) OIL SUMP 10 GALLONS (45 LITRES) DIPSTICK SHOWS HIGH & LOW LEVELS

168 Z 10 B

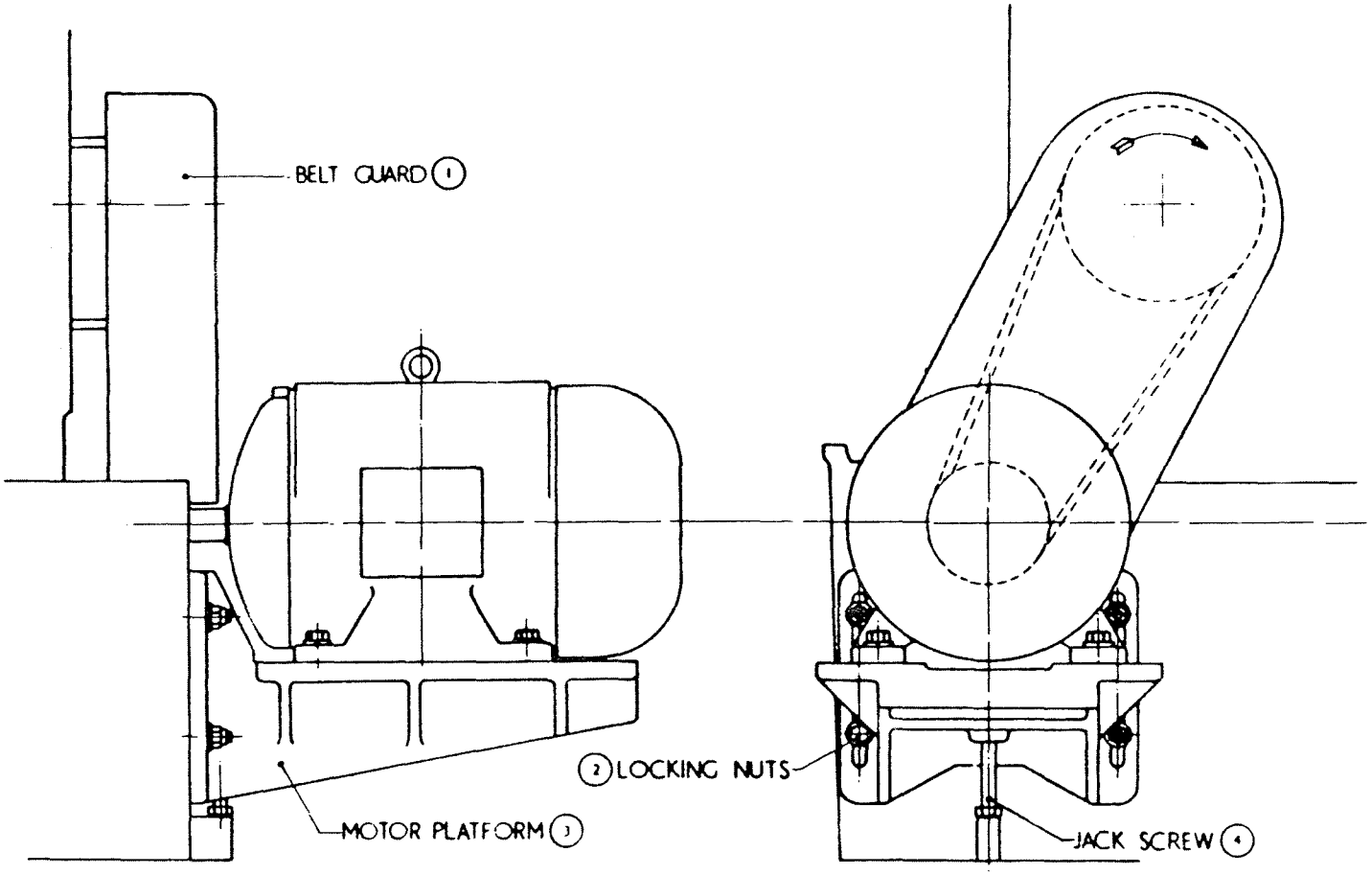
10)Test the freedom of the spindle drum and the tool slides and the clearance of any toolholders and attachments fitted, by handwinding the machine through a complete cycle. If excessive pressure is required on the hand crank, locate the cause and correct before proceeding.

11)Engage the index clutch, disengage the collet operating shoe and bar feed shoe and handwind the machine through index, if excessive pressure is required, locate the cause, correct before proceeding.

12)Re-engage the speed range change sliding gear.

13)With the machine tray filled with coolant the machine can then be tooled, tooling proven and made ready for running on production.

Fig.2.6 Drg.100Y151



SECTION THREE - OPERATOR'S CONTROLS

3.1 Controls

The machine controls fall basically into two groups:-

(I) The electrically hand operated switches at the front and rear of the machine together with additional switchgear mounted on the front of the control panel door.

(II) The manual controls.

3.2 Electrical Controls

The 'Front' or 'Rear' key selector switch, the main motor control, the feed control and indicator light, coolant 'On' and 'Off' switch and indicator light, the emergency stop button, the 'feed stop' and the optional automatic bar loader/bar feeder control switch are duplicated at the front and the rear of the machine in the most ergonomic position for maximum operater efficiency. Further switch gear is mounted on the front of the control panel door.

The front and rear key selector switches are dual function switches and must be at the same setting, either 'front' or 'rear' before the appropriate main motor start/jog button can be used to start the main motor. This acts as a safety precaution when making adjustments or setting the tooling.

Setting both selector switches to the 'front' position renders the rear main motor start/jog button inoperative, similarly, setting both selector switches to the 'rear' position renders the front main motor start/jog button inoperative. The key selector switches are marked 'A' for the front and 'B' for the rear.

The main motor start/jog and the feed run/jog buttons are dual purpose switches with the means of selecting the function and activating the same. In order to set the switch for start or jog it is necessary to turn the knurled ring surrounding the pushbutton to the appropriate function before depressing the pushbutton. The main motor and the feed pushbuttons are marked 'I' and 'T'. The 'I' position is the run function and the 'T' position the jog function. When the feed is engaged, start the machine only by the jog button. After starting the machine allow a lapse of a few seconds before engaging the feed clutch in order to provide time to enable the electrical control gear to change from star to delta and allow the lubrication system to operate.

The coolant 'On' an 'Off' switch is a two position rotary switch, the position marked 'I' is coolant 'On' and the position marked 'O' is coolant 'Off'.

The emergency stop and the feed stop are pushbuttons.

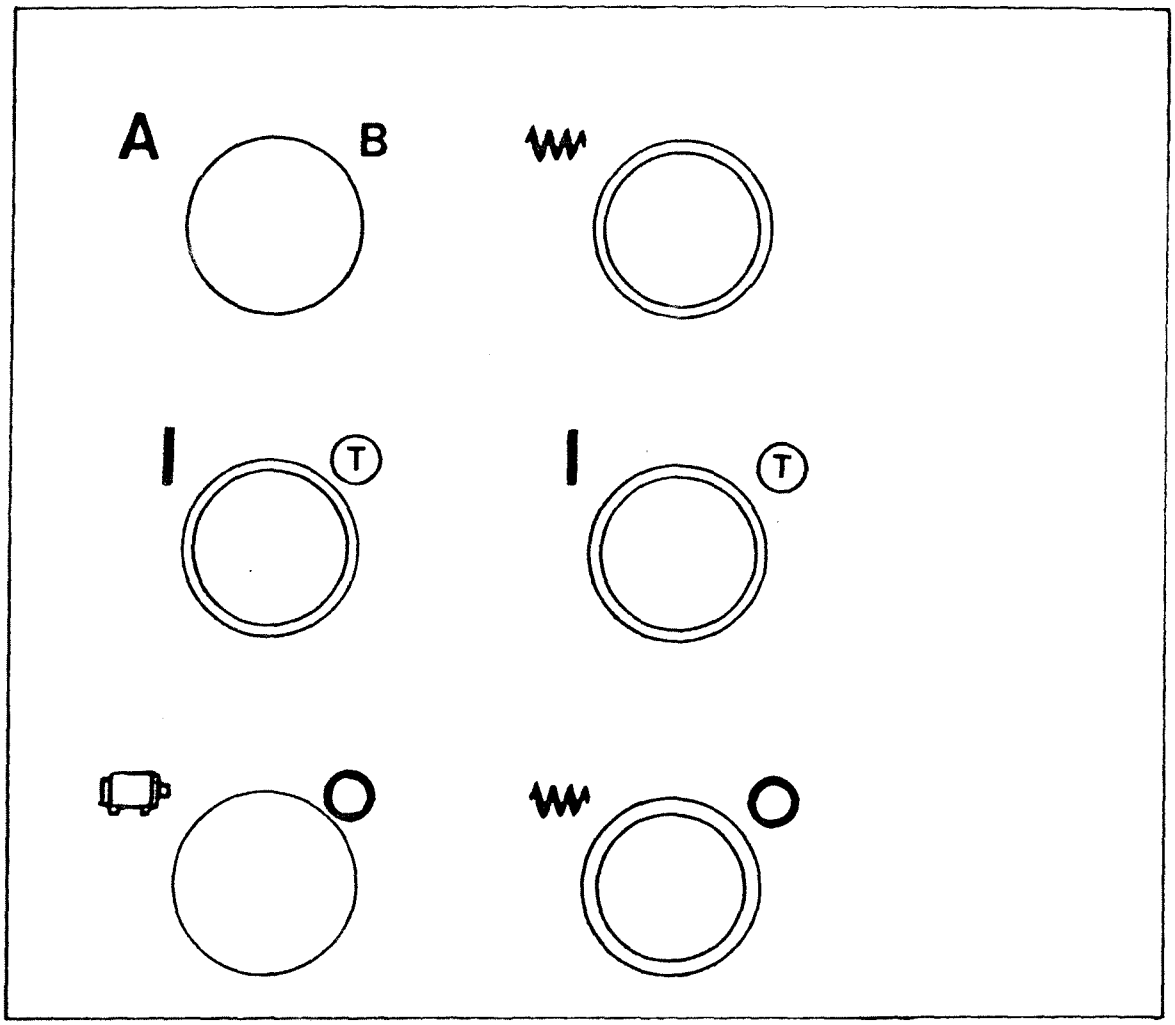
The switch gear mounted on the front of the control panel door comprises:- The swarf conveyor 'Stop' pushbutton, the swarf conveyor dual purpose selection/pushbutton with the 'run' and conveyor reverse 'jog' functions, a three position rotary selection switch for the 'production run', 'set up' and 'stop end of cycle' functions and a further two position rotary switch for the tool area lighting 'On' and 'Off' functions. When the three position rotary selection switch is turned to 'production run' the machine will run on continuous cycle until the bar is exhausted unless the machine stops under conditions described in Section 5 of this Handbook. When turned to 'set up' the machine will run on continuous cycle without coolant and without the

swarf conveyor operating. This function is only used for setting purposes. The third function of this rotary switch is 'stop end of cycle', which prepares the machine to stop at the end of cycle should it be necessary during a production run or when setting.

A warning light is mounted above the switches on the control panel and its purpose, when illuminated, is to warn the operator that the guards enclosing the collet and bar feed mechanisms have been left open

Fig.3.1 Front Control Panel

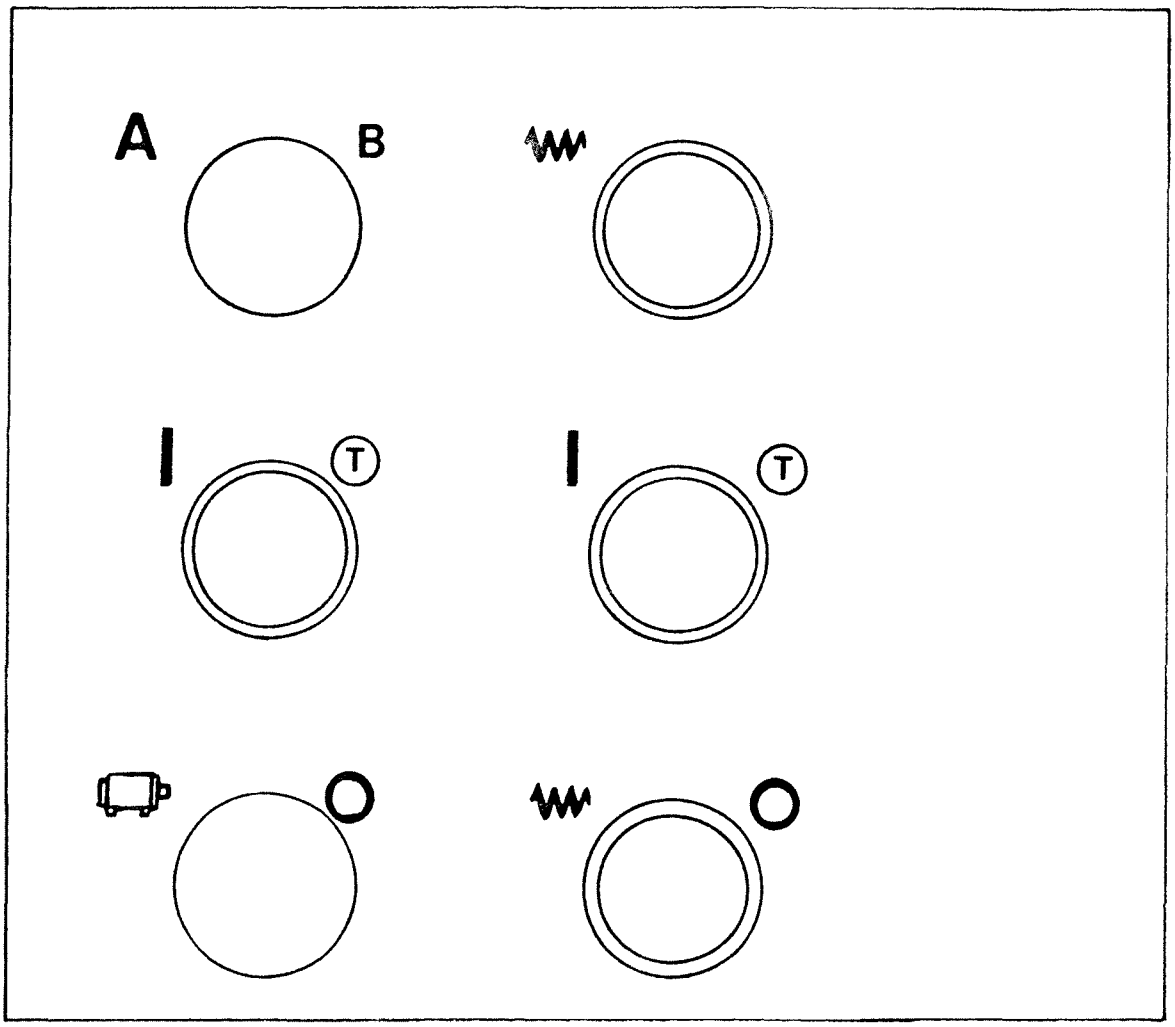
STANDARD CONTROL DISPLAY



CONTROL BUTTONS ADDED
TO CUSTOMERS' REQUIREMENTS

Fig.3.2 Rear Control Panel

STANDARD CONTROL DISPLAY



CONTROL BUTTONS ADDED
TO CUSTOMERS' REQUIREMENTS

3.3 Manual Controls

The manual controls comprise:-

(i) The feed shaft dog clutch operating lever.
(ii) The hand-wind engagement mechanism, handwind shaft & crank.
(iii) The index clutch lever.
(iv) The collet hand operation lever.
(v) The bar feed shoe lever.
(vi) The collet operating shoe disengagement mechanism.
(vii) The bar stop lever.

Concerning Manual Controls

(a) After starting the machine allow a lapse of a few seconds before engaging the electro-magnetic feed-clutch in order to enable the electrical control gear to change from "star" to "delta" and also to ensure all working parts are adequately lubricated.
(b) When a slipping clutch has disengaged, locate the cause of the overload and correct the condition before re-engaging the clutch and re-starting the machine.
(c) Remember you cannot handwind the machine through the feed motion if the tooling set-up includes a threading operation, unless the necessary steps are taken to ensure that the tap or the diehead do not cut a thread.
(d) Test all clutches by hand for adjustment. They should not be set so slack as to cause slip or too tight, and excessive pressure should not be required to operate them.
(e) Check the air gap of the electro-magnetic feed clutch & brake.

Handwinding the Machine:-

Handwinding the machine through its cycle of operations is necessary when checking the freeness of operation of the spindle drum when indexing, the machine slides through their cycle of operations and also for setting purposes. Handwinding can be achieved by engaging the manual controls 'i', 'ii' and 'iii' in the following order:-

(i) The feed drive shaft dog clutch operating lever is duplicated at the front & rear of the machine. In their horizontal "in feed position", it is not possible to fit the handwind crank to its shaft and as long as these levers are horizontal the dog clutch is engaged and the feed and braking by means of the electrical push buttons is possible.

Once the feed is braked by means of the appropriate button, the lever is raised into its over-centre position, physically disengaging the feed drive shaft dog clutch and electrically isolating the electro-magnetic feed clutch from the electro-magnetic brake. Raising the lever also releases the mechanical interlock allowing the handwind shaft pinion to be engaged.

(ii) The handwind crank can be fitted to the handwind pinion shaft at either the front or rear of the machine. The handwind pinion is engaged by sliding the pinion shaft across the machine. It is retained in the engaged or disengaged positions by a spring loaded plunger. This can only be done with the feed drive shaft dog clutch operating lever in its "up" position. Handwinding is not possible unless electric power is energising the machine, or when electrical power is not available by releasing the electro-magnetic spring applied brake manually by means of the tensioning screws; see the instruction plate on the brake cover.

In order to handwind the machine it is first necessary to press the feed stop push button to arrest the feed. The feed drive shaft dog clutch operating lever may now be lifted until it comes against a stop and retains itself. The action of raising this lever disengages the dog clutch through which power could be transmitted, trips the feed dog clutch interlock switch to open the feed circuit and moves the mechanical interlock lever into a position where it is possible to slide the handwind pinion into mesh with the handwind gear mounted on the lower worm shaft. The action of sliding the pinion into mesh trips the handwind interlock switch which energises the electro-magnetic brake, thus releasing the brake to permit handwinding to take place.

In the event of a machine not having electric power available, the electro-magnetic spring applied brake can be released manually in the following manner. Two retraction screws are provided in the brake cover. These, and two knurled plugs should be removed from the cover. Insert the retraction screws through the holes vacated by the knurled headed plugs and screw them into the brake unit until the brake armature plate is solidly retracted. Handwinding is now possible. It is impossible to engage the feed until the screws have been removed and it is impossible to lower the feed drive shaft dog clutch operating lever from the handwind position whilst the handwind crank is on the shaft. The handwind crank requires approximately 37 turns for one revolution of the camshaft.

(iii) The index clutch lever actuates the index clutch on the main camshaft. When the lever is fully over to the right, the index clutch is disengaged. This renders inoperative the drum indexing the collet operation, the bar feed & the drum locking mechanisms By this means it is possible to repeat a cut as many times as may be required during setting. An interlock is fitted so that the index clutch cannot be disengaged during the fast motion portion of the cycle. The clutch is spring loaded into engagement. A spring loaded detent lever is fitted to the drum housing wall and restrains the Geneva arm and the cam drum from rotating beyond a point when the index clutch is disengaged.

Care should be taken not to run the machine spindles longer than is absolutely necessary without indexing the drum, as the lubrication of the work spindles is effected at the top two positions of the spindle drum only.

(iv) Collet hand operation lever
When loading bars, the collet may be opened and closed by hand by inserting the hand lever provided, into the collet operating lever and pulling the hand lever towards the end of the machine. This is only possible when the cam roller is opposite the gap in the cams.

(v) The bar feed shoe lever.
During bar loading, the bar feed shoe lever should be brought to the 'down' position, this moves the feed shoe out of engagement with the feed tube bobbin. The thrust, when the bars are being pushed through the feed finger, is taken by the aligning ring. The bar feed shoe lever must be moved up again to engage the bar feed shoe with the feed tube bobbin before machine start-up.

(vi) The collet operating shoe disengagement mechanism.
A screw in the top of the collet operating slide acts as a back stop for the collet operating finger. By unclamping this

screw and screwing it inwards, the collet operating shoe may be disengaged from the bobbins rendering the collet operating mechanism inoperative. The collet operating shoe is spring loaded so that if the bobbin indexes out of position, the finger will be depressed thus preventing damage.

(vii) Bar stop lever.
In order to facilitate the removal of the bar ends, the bar stop may be hand operated by the lever on the bar stop. By pulling this lever the bar stop is moved clear of the bar, permitting the bar end to be removed.

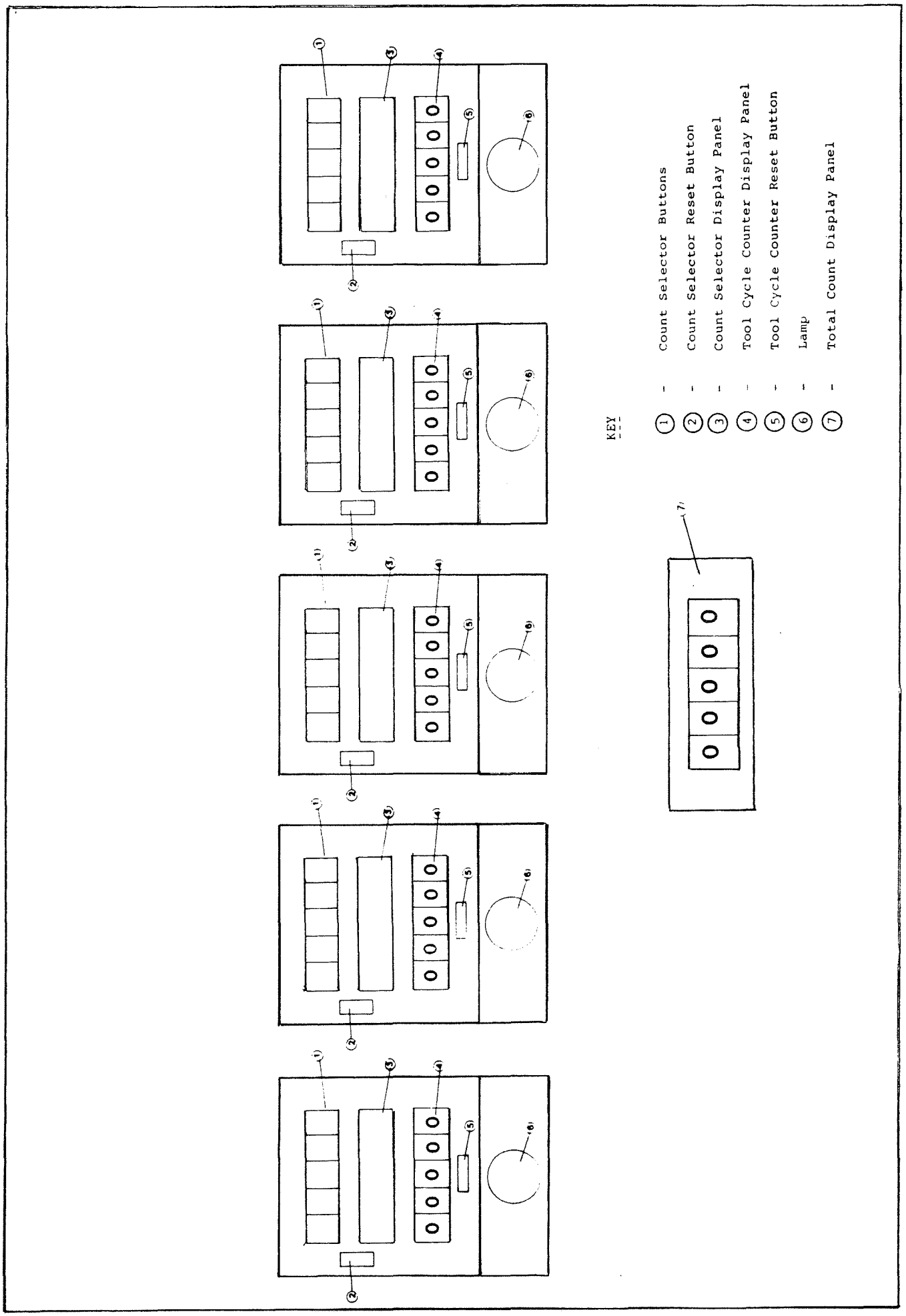
3.4 Tool Life Counter (Optional)

Five Tool Life Counters are set into an enclosure beneath the main control panel, each has to be set individually to monitor a particular tool in any given sation.

When setting, ensure that the Count Selector Display (3) is registered at zero, if not, reset by pressing the Reset Button (2). Select the required tool life number by pressing the Count Select Buttons (1), the selected number will be displayed on the Count Selector Display (3). Reset to zero the Tool Cycle Counter Display Panel by pressing the Reset Button (5). The Counter is now set to record the number of passes a selected tool makes, the machining cycle can now take place.

As the machining cycle progresses, the counter will register continuously, the number of machining operations the tool makes. This count is displayed on the Tool Cycle Counter Display Panel (4). When this display matches the selected count shown on the Count Selector Display Panel (3), the machine will shut down at the completion of the machining cycle. The lamp (6) will become illuminated, indicating to the operator/tool setter which tool station requires a change. When the tool change is complete, reset lamp (6) by pressing. Reset tool count displays in the manner described above before continuing the machine cycle. The Total Count Display Panel (7) registers the total number of machining cycles completed. See fig.3.3.

Fig.3.3 Tool Life Counter (Optional)



SECTION FOUR - OPERATING ADJUSTMENTS AND PROCEDURES

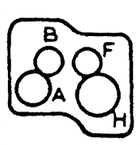
General

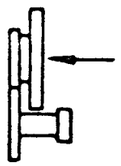
Only authorised personnel or trainees under the supervision of a qualified and authorised person should attempt to operate all machine tools.

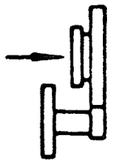
When carrying out procedures regarding the setting of tooling or the changing of gears, collets, feed fingers or steady bushes the machine should whenever possible be isolated from the shop power supply.

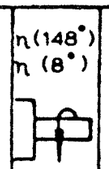
The machine should be handwound through a complete cycle after any alterations have been made to the machine set-up. Care should be taken when handwinding a cycle which incorporates a threading operation. For further details concerning handwinding refer to all relevant headings in Sections 4 & 5.

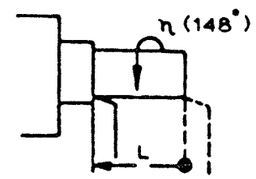
Wickman 1"-6











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N/MIN.		4014	3626	3286	2986	2719	2371	2167	1895	1734	1517	1386	1209	1101	1000	1075	971	880	800	728	635	580	507	464	406	371	324	295	268	n (148°)	n (8°)	1/4	1/2	3/4	1	2	2 1/2		INS
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F	H	T SECS.																																						

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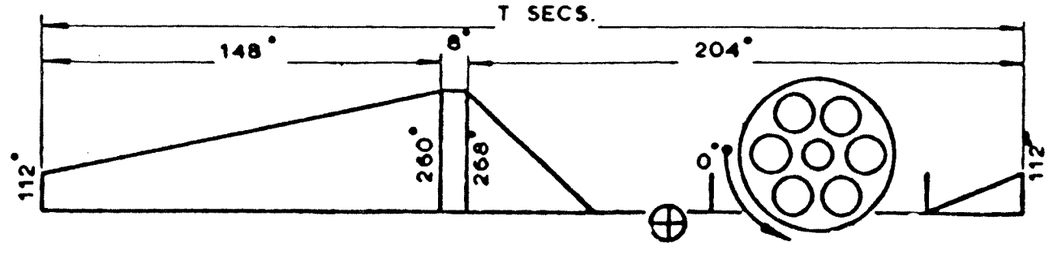

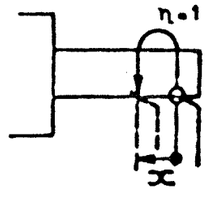

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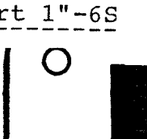
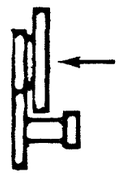
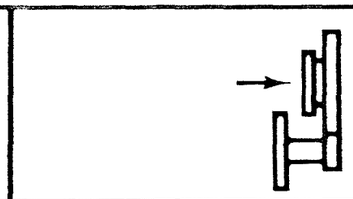
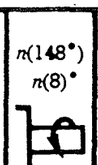
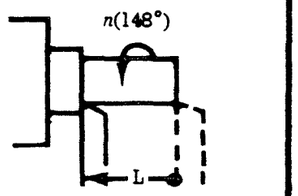
Wickman 1"-6S











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B		32	34	36	39	41	44	46	49	51	54	56	58	32	34	36	39	41	44	46	49	51	54	56	58										
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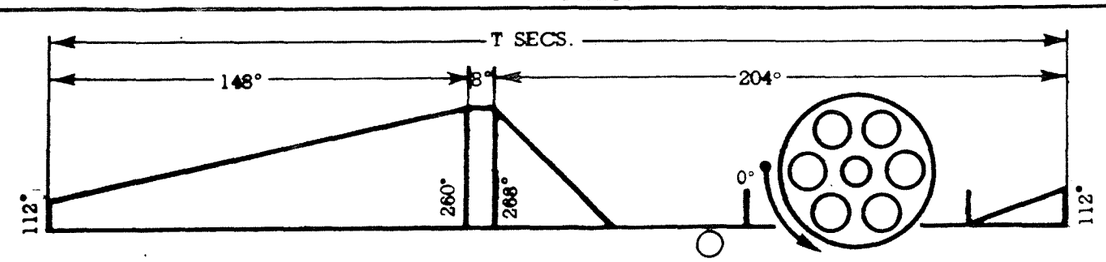
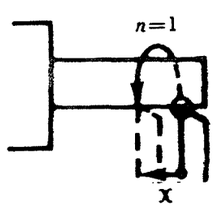
25	59	8·1	8·8	9·5	10·7	11·6	13·0	14·1	15·9	17·3	19·6	21	23	26	29	32	36	39	45	49	56	61	70	76	84	286	15·5	·9	1·8	2·6	3·5	7·0	8·8	21	
23	61	8·9	9·7	10·5	11·8	12·8	14·4	15·7	17·7	19·2	22	24	26	30	32	35	40	44	50	55	62	68	78	85	94	321	17·4	·8	1·6	2·3	3·1	6·2	7·8	18·7	
21	64	10·0	10·9	11·8	13·4	14·5	16·4	17·8	20	22	25	27	30	34	37	41	46	51	58	63	72	78	89	98	108	369	20	·7	1·4	2·0	2·7	5·4	6·8	16·3	
18	66	11·8	12·8	14·0	15·8	17·2	19·5	21	24	27	30	33	36	40	44	48	55	60	69	75	86	94	107	118	129	444	24	·6	1·1	1·7	2·3	4·5	5·6	13·5	
F	H	T SECS.																																	

X(0·01 M.M.)

X(0·001 INS.)





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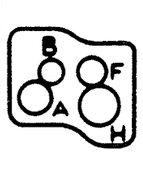
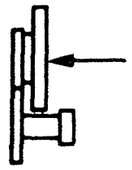
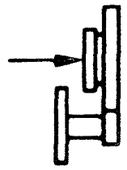
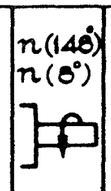
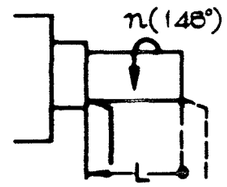
Wickman 1"-6





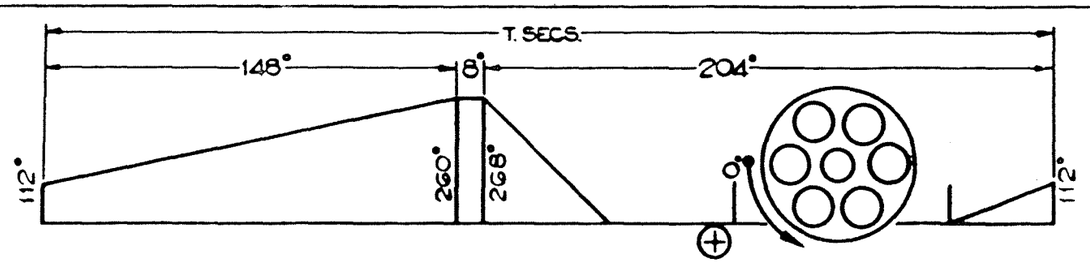


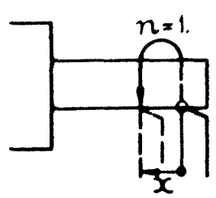




A		58	56	54	51	49	46	44	41	39	36	34	32	58	56	54	51	49	46	44	41	39	36	34	32	n(148°)	n(8°)	2·5	5	7·5	10	20	25	60	M.M.
B		32	34	36	39	41	44	46	49	51	54	56	58	32	34	36	39	41	44	46	49	51	54	56	58			1/4	1/2	3/4	1	2	2½		INS.
N/MIN.		3030	2750	2510	2190	2000	1750	1600	1400	1280	1115	1015	923	812	737	672	586	535	468	426	374	342	299	272	247										
64	21				3·5	3·6	3·9	4·0	4·3	4·6	5·0	5·3	5·6	6·1	6·5	7·0	7·7	8·2	9·2	9·8	11·0	11·8	13·3	14·4	15·6	53	29	4·7	8·4	14·0	19·0	37	47	112	
61	23			3·5	3·7	3·9	4·2	4·4	4·7	5·0	5·4	5·8	6·1	6·7	7·2	7·7	8·6	9·2	10·2	11·0	12·3	13·3	14·9	16·2	17·6	61	33	4·1	8·1	12·2	16·3	33	41	98	
59	25		3·5	3·7	3·9	4·1	4·4	4·7	5·1	5·3	5·8	6·2	6·7	7·3	7·9	8·4	9·4	10·1	11·3	12·1	13·6	14·7	16·5	18·0	19·6	69	37	3·6	7·3	10·8	14·5	29	36	87	
56	27	3·6	3·7	3·9	4·2	4·4	4·8	5·0	5·5	5·8	6·4	6·8	7·3	8·1	8·7	9·3	10·4	11·2	12·5	13·5	15·2	16·4	18·6	20	22	76	42	3·2	6·4	9·6	12·7	25	32	76	
54	30	3·8	4·0	4·2	4·6	4·8	5·2	5·5	6·0	6·4	7·1	7·6	8·1	9·0	9·7	10·5	11·7	12·6	14·2	15·3	17·2	18·6	21	23	25	90	49	2·8	5·5	8·3	11·1	22	28	66	
51	32	4·1	4·3	4·5	4·9	5·2	5·6	6·0	6·6	7·0	7·7	8·3	8·9	9·9	10·7	11·6	13·0	14·0	15·7	17·0	19·2	21	24	26	28	102	55	2·4	4·9	7·3	9·8	19·6	25	59	
49	35	4·4	4·6	4·9	5·3	5·6	6·1	6·5	7·2	7·7	8·5	9·2	9·9	11·0	11·8	12·9	14·5	15·7	17·6	19·1	22	24	27	29	32	116	63	2·2	4·3	6·5	8·6	17·2	22	52	
46	38	4·7	5·0	5·3	5·8	6·2	6·8	7·3	8·0	8·6	9·6	10·3	11·2	12·4	13·5	14·6	16·5	17·8	20	22	25	27	31	33	37	134	73	1·9	3·7	5·6	7·4	14·9	18·6	45	
43	41	5·2	5·5	5·8	6·4	6·8	7·6	8·1	9·0	9·6	10·7	11·6	12·6	14·0	15·2	16·6	18·7	20	23	25	28	31	35	38	42	155	84	1·6	3·2	4·8	6·4	12·9	16·1	39	
41	43	5·5	5·9	6·2	6·9	7·3	8·1	8·7	9·6	10·4	11·6	12·6	13·6	15·2	16·6	18·0	21	22	25	27	31	34	38	42	46	171	92	1·5	2·9	4·4	5·9	11·7	14·6	35	
38	46	6·0	6·5	6·9	7·6	8·2	9·1	9·7	10·8	11·7	13·1	14·2	15·4	17·3	18·8	21	23	25	29	31	35	38	44	48	53	197	107	1·3	2·5	3·8	5·1	10·2	12·7	30	
35	49	6·7	7·2	7·7	8·5	9·1	10·2	10·9	12·2	13·2	14·8	16·1	17·6	19·7	22	24	27	29	33	36	41	44	50	55	60	226	123	1·1	2·2	3·3	4·4	8·8	11·0	26	
32	51	7·4	7·9	8·5	9·4	10·1	11·3	12·2	13·7	14·8	16·6	18·1	19·7	22	24	27	30	33	37	40	46	50	57	62	68	259	140	1·0	1·9	2·9	3·9	7·7	9·6	23	
30	54	8·0	8·7	9·3	10·4	11·2	12·5	13·5	15·2	16·4	18·6	20	22	25	27	30	34	37	42	45	52	56	64	70	77	293	158	·9	1·7	2·6	3·4	6·8	8·5	20	
27	56	9·0	9·7	10·4	11·7	12·6	14·1	15·3	17·2	18·6	21	23	25	28	31	34	39	42	48	52	59	64	74	81	89	337	182	·7	1·5	2·2	3·0	5·9	7·4	18	
25	59	9·9	10·8	11·6	13·0	14·1	15·8	17·1	19·3	21	24	26	28	32	35	38	44	47	54	59	67	73	83	91	100	384	21	·7	1·3	2·0	2·6	5·2	6·5	15·6	
23	61	10·9	11·8	12·8	14·4	15·6	17·5	19·0	22	23	27	29	32	36	39	43	49	53	60	66	75	82	94	102	113	432	23	·6	1·2	1·7	2·3	4·6	5·8	13·9	
21	64	12·3	13·3	14·4	16·3	17·6	20	22	25	27	30	33	36	41	45	49	56	61	69	75	86	94	107	117	129	496	27	·5	1·0	1·5	2·0	4·0	5·0	12·1	
18	66	14·4	15·6	17·0	19·2	21	24	26	29	32	36	39	43	49	53	58	67	73	83	90	103	112	129	141	155	597	32	·4	·8	1·3	1·7	3·4	4·2	10·1	
F	H	T SECS.																																	

(.001" x 0.01 MM.)

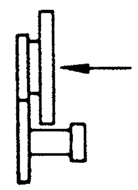


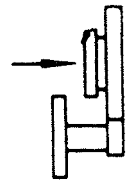


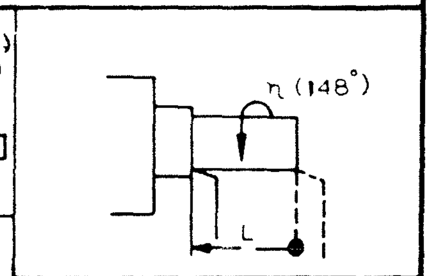
160. Y. 135.

4.1 Feed and Speed Chart 30mm-6

Wickman 30-6



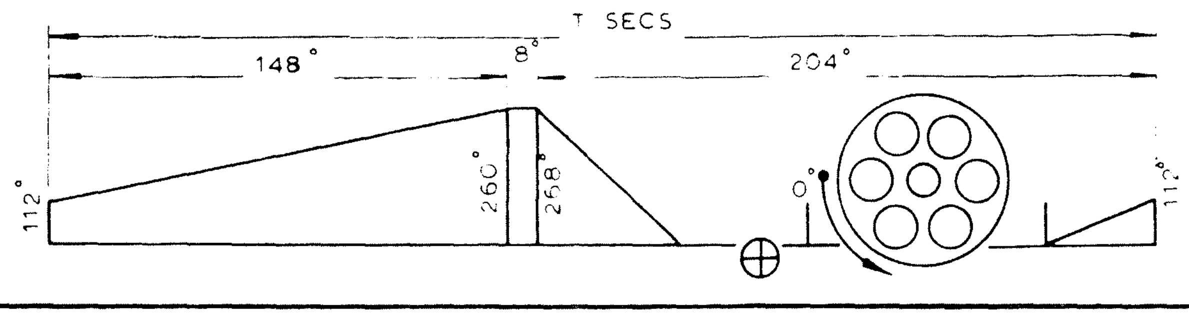


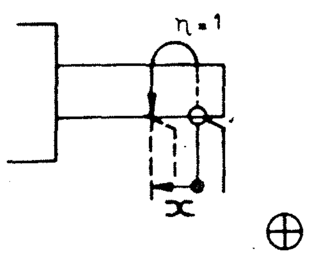


η (148°)
η (8°)

A		62	60	58	56	54	51	49	46	44	41	39	36	34	32
B		28	30	32	34	36	39	41	44	46	49	51	54	56	58
N/MIN		4014	3626	3286	2986	2719	2371	2167	1895	1734	1517	1386	1209	1101	1000
F	**H**	**T SECS**													
64	21			1·9	2·0	2·1	2·3	2·4	2·6	2·7	3·0	3·2	3·5	3·7	4·0
61	23		2·0	2·1	2·2	2·3	2·5	2·6	2·8	3·0	3·3	3·5	3·8	4·1	4·4
59	25	2·0	2·1	2·2	2·3	2·4	2·6	2·8	3·0	3·2	3·5	3·8	4·2	4·5	4·8
56	27	2·1	2·2	2·4	2·5	2·6	2·9	3·0	3·3	3·5	3·9	4·1	4·6	5·0	5·3
54	30	2·3	2·4	2·6	2·7	2·9	3·1	3·3	3·7	3·9	4·3	4·6	5·1	5·5	6·0
51	32	2·4	2·6	2·8	2·9	3·1	3·4	3·6	4·0	4·3	4·7	5·1	5·7	6·1	6·6
49	35	2·6	2·8	3·0	3·2	3·4	3·7	4·0	4·4	4·7	5·2	5·6	6·3	6·8	7·4
46	38	2·9	3·1	3·3	3·5	3·8	4·2	4·4	4·9	5·3	5·9	6·4	7·1	7·7	8·4
43	41	3·2	3·4	3·6	3·9	4·2	4·6	5·0	5·5	5·9	6·6	7·2	8·1	8·8	9·5
41	43	3·4	3·6	3·9	4·2	4·5	5·0	5·4	6·0	6·4	7·2	7·8	8·8	9·5	10·4
38	46	3·7	4·0	4·3	4·7	5·0	5·6	6·0	6·7	7·3	8·2	8·8	10·0	10·8	11·8
35	49	4·2	4·5	4·8	5·2	5·6	6·3	6·8	7·6	8·2	9·3	10·0	11·3	12·4	13·5
32	51	4·6	5·0	5·4	5·8	6·3	7·0	7·6	8·5	9·2	10·4	11·3	12·8	13·9	15·2
30	54	5·0	5·5	5·9	6·4	6·9	7·8	8·4	9·5	10·3	11·6	12·6	14·3	15·6	17·0
27	56	5·6	6·1	6·7	7·2	7·8	8·8	9·6	10·8	11·7	13·2	14·4	16·3	17·8	19·5
25	59	6·3	6·8	7·4	8·1	8·8	9·9	10·7	12·1	13·2	14·9	16·2	18·4	20	22
23	61	6·9	7·6	8·2	9·0	9·7	11·0	11·9	13·5	14·7	16·6	18·1	21	23	25
21	64	7·8	8·5	9·3	10·1	11·0	12·5	13·6	15·4	16·7	18·9	21	24	26	28
18	66	9·2	10·0	11·0	12·0	13·0	14·8	16·1	18·3	19·9	23	25	28	31	34

A		62	60	58	56	54	51	49	46	44	41	39	36	34	32	η (148°)	η (8°)	L						
B		28	30	32	34	36	39	41	44	46	49	51	54	56	58			2 5	5	7 5	10	20	25	60 MM
N/MIN		1075	971	880	800	728	635	580	507	464	406	371	[illegible]	295	268	η	η	1/4	1/2	3/4	1	2	2½	INS
F	**H**	**T SECS**																**x (0·01MM) / x (0·001")**						
64	21	3·8	4·1	4·4	4·7	5·1	5·7	6·1	6·8	7·3	8·2	8·9	10·1	11·0	12·0	46	2·5	5·4	10·8	16·3	22	43	54	130
61	23	4·2	4·5	4·9	5·2	5·7	6·3	6·8	7·7	8·3	9·3	10·1	11·4	12·4	13·6	53	2·9	4·7	9·4	14·2	18·9	38	47	113
59	25	4·6	4·9	5·3	5·8	6·2	7·0	7·6	8·5	9·2	10·3	11·2	12·7	13·8	15·1	60	3·2	4·2	8·4	12·6	16·8	34	42	101
56	27	5·0	5·5	5·9	6·4	6·9	7·8	8·4	9·5	10·3	11·6	12·6	14·3	15·6	17·1	68	3·7	3·7	7·4	11·1	14·8	30	37	89
54	30	5·6	6·1	6·7	7·2	7·8	8·8	9·6	10·8	11·7	13·2	14·4	16·3	17·8	19·5	78	4·2	3·2	6·4	9·6	12·8	26	32	77
51	32	6·2	6·8	7·4	8·0	8·7	9·8	10·7	12·0	13·1	14·8	16·1	18·3	20	22	88	4·8	2·8	5·7	8·5	11·3	23	28	68
49	35	7·0	7·6	8·3	9·0	10·0	11·1	12·0	13·6	14·7	16·7	18·2	21	23	25	100	5·4	2·5	5·0	7·5	10·0	20	25	60
46	38	7·9	8·6	9·4	10·2	11·1	12·6	13·7	15·5	16·9	19·1	21	24	26	29	116	6·3	2·2	4·3	6·5	8·6	17·2	22	52
43	41	8·9	9·8	10·7	11·7	12·7	14·4	15·7	17·8	19·3	22	24	27	30	33	134	7·3	1·9	3·7	5·6	7·4	14·9	18·7	45
41	43	9·7	10·7	11·7	12·7	13·9	15·7	17·1	19·4	21	24	26	30	33	36	147	8·0	1·7	3·4	5·1	6·8	13·6	17·0	41
38	46	11·1	12·1	13·3	14·5	15·8	18·0	19·6	22	24	28	30	34	38	41	170	9·2	1·5	2·9	4·4	5·9	11·8	14·7	35
35	49	12·6	13·9	15·2	16·6	18·2	21	23	26	28	32	35	40	43	48	197	10·6	1·3	2·5	3·8	5·1	10·2	12·7	30
32	51	14·2	15·6	17·2	18·8	21	23	26	29	32	36	39	45	49	54	224	12·1	1·1	2·2	3·3	4·5	8·9	11·1	27
30	54	15·9	17·5	19·2	21	23	26	29	33	36	41	44	51	56	61	253	13·7	1·0	2·0	3·0	4·0	7·9	9·9	24
27	56	18·2	20	22	24	26	30	33	37	41	47	51	58	64	70	292	15·6	·9	1·7	2·6	3·4	6·9	8·6	21
25	59	21	23	25	27	30	34	37	42	46	53	58	66	72	80	332	17·9	·8	1·5	2·3	3·0	6·0	7·5	18·1
23	61	23	25	28	31	34	38	42	48	52	59	65	74	81	89	373	20	·7	1·3	2·0	2·7	5·4	6·7	16·1
21	64	26	29	32	35	38	44	48	55	60	68	74	85	93	102	428	23	·6	1·2	1·8	2·3	4·7	5·8	14·0
18	66	32	35	38	42	46	53	57	65	71	81	89	102	112	123	515	28	·5	1·0	1·5	1·9	3·9	4·9	11·6





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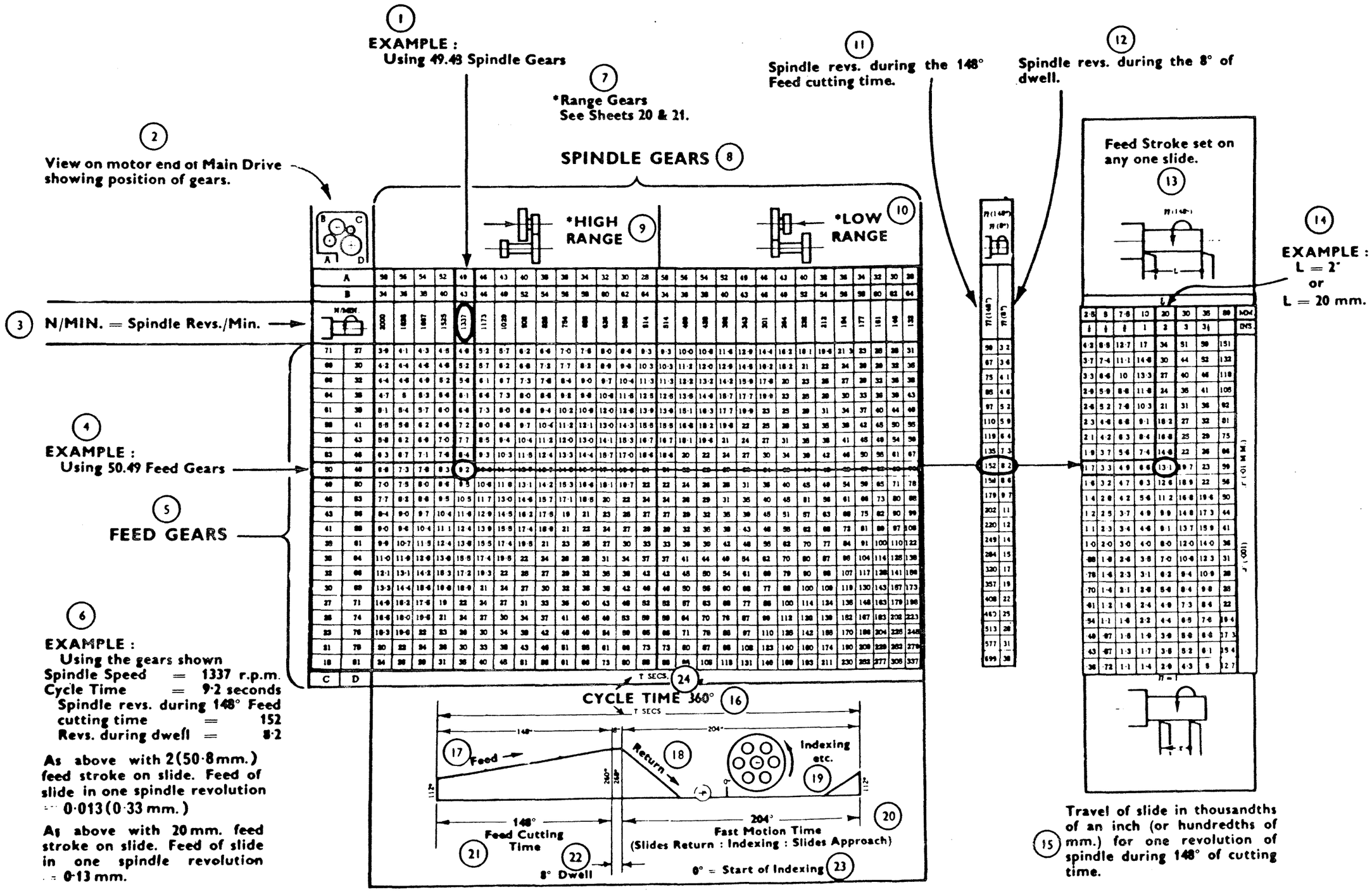


EXAMPLE OF USE OF SPEED & FEED CHART

4.2 Changing Spindle Speed Gears

An example of the use of the speed and feed plate and charts is shown in Section 4.1.

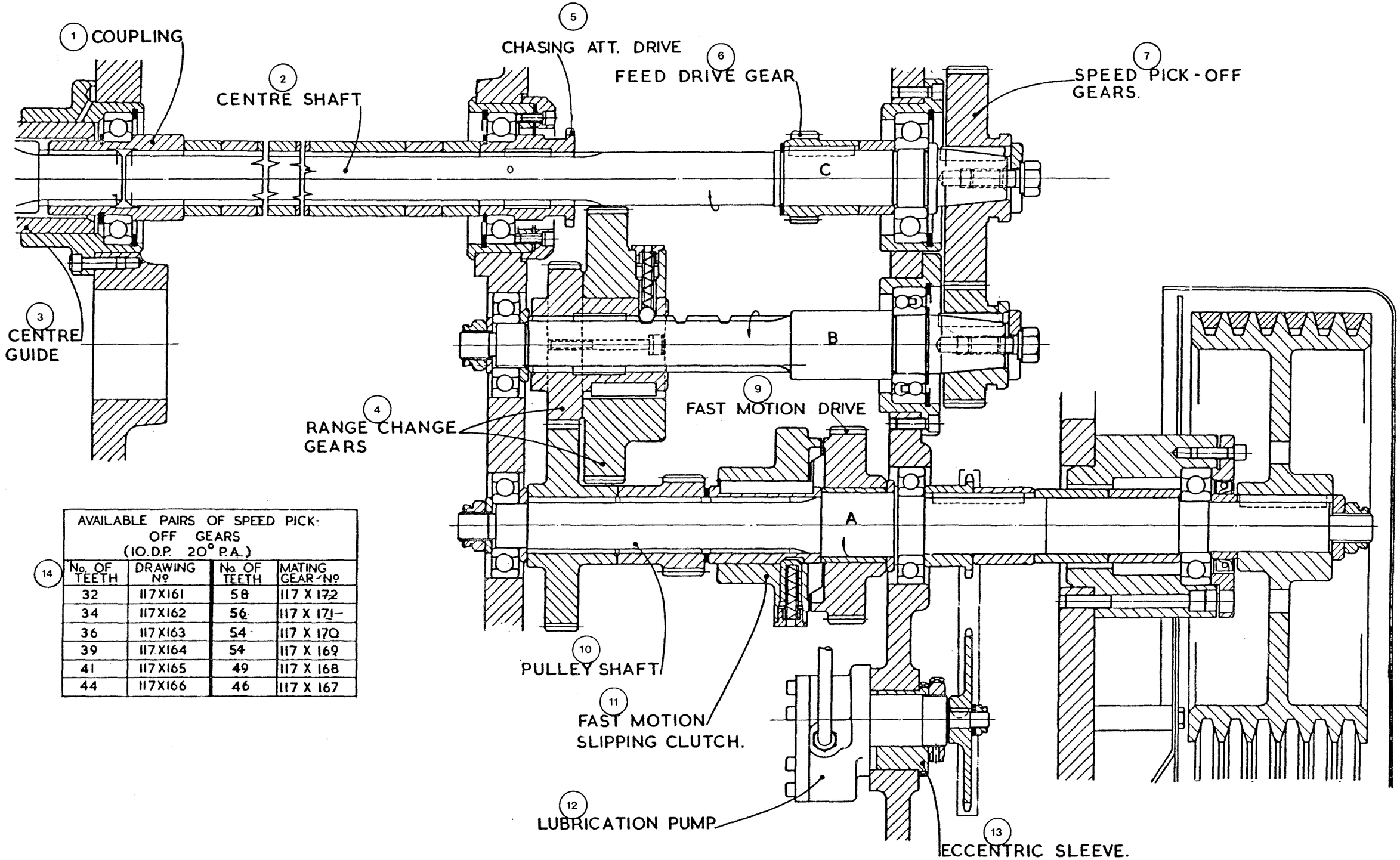
Access to the spindle speed pick off gears "A" and "B" can be gained by removing the cover on the end face of the main drive housing situated above the belt guard.

Access to the high-low range change, Drg.100Z67, fig.4.2 is gained by removing the cover above the manual controls at the front of the main drive housing.

The speed and feed plate on the main drive housing and the feed and speed charts contained in this Handbook show the gears 'A' and 'B' in the top column and immediately below, the spindle speed N revolutions per minute for the high range and the low range.

The two gears "A" and "B" are keyed onto taper shafts and held by slotted washers and hexagon nuts. Unscrew the nuts sufficiently to remove the washers and slide the gear extractor, supplied in the tool kit, over the groove in the gear boss. Tighten the extractor bolt against the end of the shaft to withdraw the gear. One gear should be withdrawn just enough to be free on its taper and then the other gear completely removed. This ensures that the gears remain meshed thus preventing the shaft from turning whilst using the extractor. A gear that is very tight will free if the extractor bolt is given a sharp tap with a mallet. Gears and shafts must be cleaned before replacing.

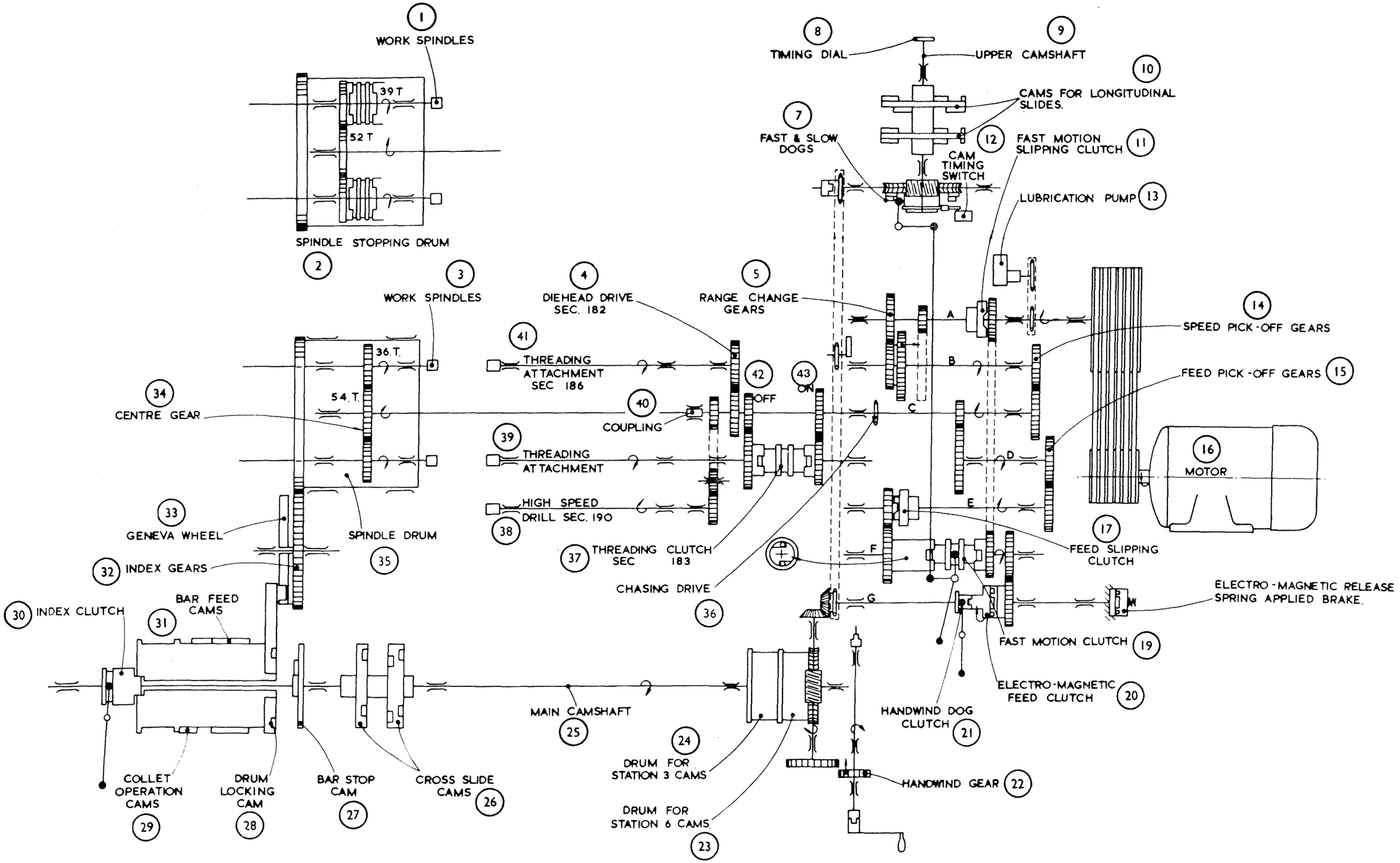
In order to change the high-low range, lever the gear into position. The compound gear assembly has a spring detent which engages into the location grooves cut into the driven shaft 'B' (fig.4.2) to locate the appropriate gear into the required speed range. Facing the front of the machine, slide the gear to the extreme right for the low range and to the extreme left for the high range. Neutral is midway between the extremes.



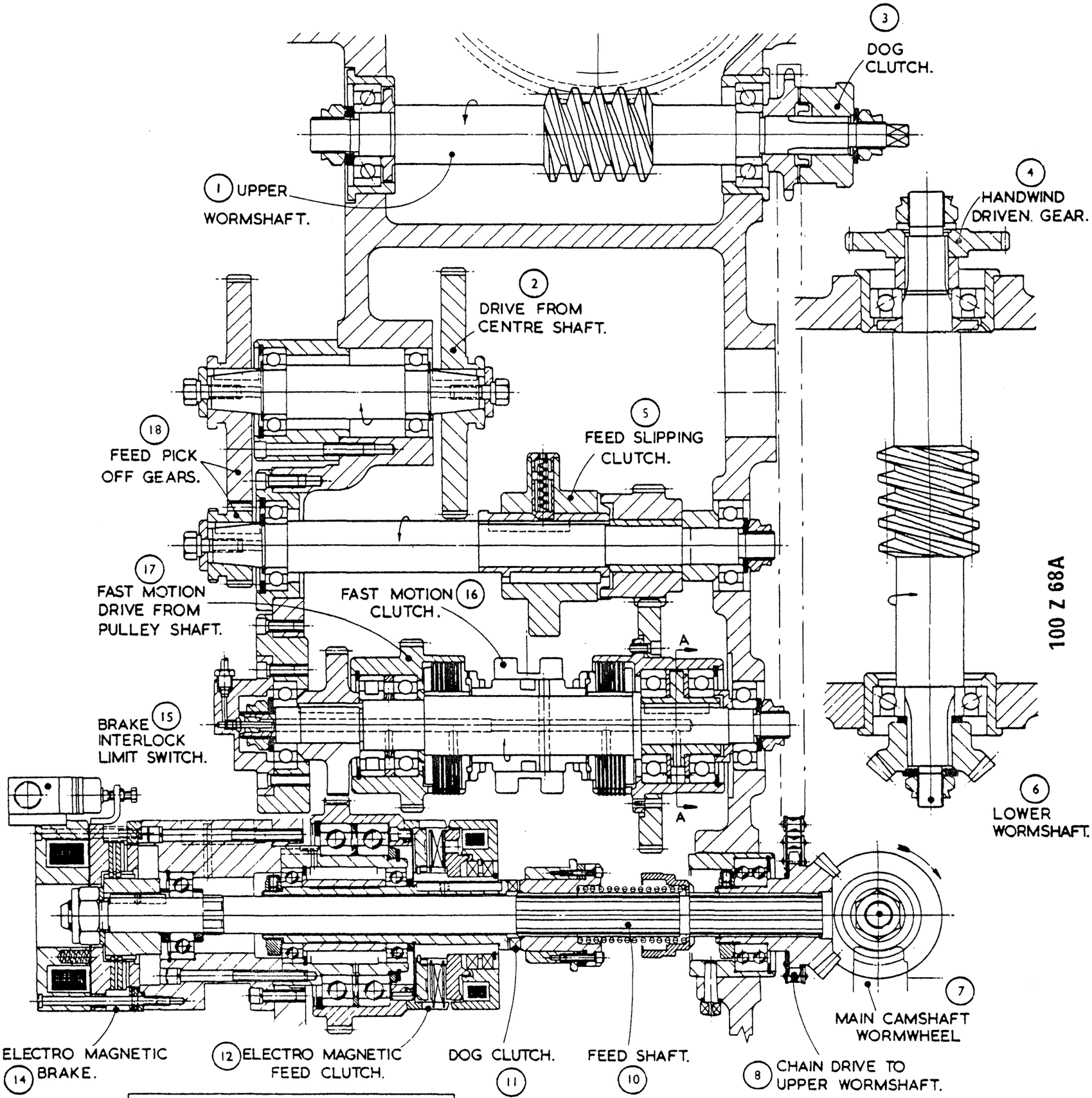
14

AVAILABLE PAIRS OF SPEED PICK-OFF GEARS (10 D.P. 20° P.A.)			
No. OF TEETH	DRAWING Nº	No. OF TEETH	MATING GEAR Nº
32	117X161	58	117 X 172
34	117X162	56	117 X 171
36	117X163	54	117 X 170
39	117X164	54	117 X 169
41	117X165	49	117 X 168
44	117X166	46	117 X 167

100 Z 67

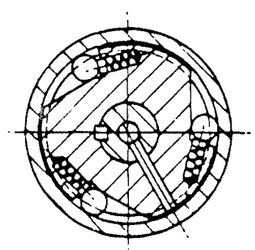

1 WORK SPINDLES
39 T
52 T
SPINDLE STOPPING DRUM
2
3 WORK SPINDLES
36 T.
54 T.
34 CENTRE GEAR
33 GENEVA WHEEL
SPINDLE DRUM
35
32 INDEX GEARS
30 INDEX CLUTCH
31 BAR FEED CAMS
COLLET OPERATION CAMS
29
DRUM LOCKING CAM
28
BAR STOP CAM
27
CROSS SLIDE CAMS
26
4 DIEHEAD DRIVE SEC. 182
41 THREADING ATTACHMENT SEC 186
42
OFF
43
ON
40 COUPLING
39 THREADING ATTACHMENT
HIGH SPEED DRILL SEC. 190
38
37 THREADING CLUTCH SEC 183
CHASING DRIVE
36
MAIN CAMSHAFT
25
24 DRUM FOR STATION 3 CAMS
DRUM FOR STATION 6 CAMS
23
5 RANGE CHANGE GEARS
8 TIMING DIAL
9 UPPER CAMSHAFT
10 CAMS FOR LONGITUDINAL SLIDES.
7 FAST & SLOW DOGS
12 FAST MOTION SLIPPING CLUTCH
11
CAM TIMING SWITCH
LUBRICATION PUMP 13
A
B
C
D
E
F
G
14 SPEED PICK-OFF GEARS
FEED PICK-OFF GEARS 15
16 MOTOR
17
FEED SLIPPING CLUTCH
ELECTRO-MAGNETIC RELEASE SPRING APPLIED BRAKE.
FAST MOTION CLUTCH 19
ELECTRO-MAGNETIC FEED CLUTCH 20
HANDWIND DOG CLUTCH 21
HANDWIND GEAR 22

100 Z 54B



13 LIST OF AVAILABLE FEED PICK OFF GEARS.

		MATING GEAR	
No.OF TEETH	DRG. REF. No.	No.OF TEETH	DRG. REF. No.
18	FX 7547	66	118 X 190A
21	118X172	64	118 X 189
23	118X173	61	118 X188
25	118 X174	59	FX 7548-7
27	118 X175	56	118 X 186
30	118 X176	54	118 X 185
32	118X177	51	118 X184
35	118 X178	49	118 X 183
38	FX 7548-3	46	FX 7548-5
41	118 X 180	43	118Y 181



SECTION AA 9
OVER-RUN CLUTCH.

100 Z 68A

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Fig.4.4 Drg.100Z68A

4.4 Changing Feed Fingers and Steady Bushes

The feed tubes should be withdrawn from the machine at station 6, or stations 3 and 6 on the double bar feed machine. The feed fingers are fitted to the feed tubes which carry on their outer ends the bar feed bobbins, the outer part of which are formed by shielded anti-friction bearings. The feed tube steady bushes are also fitted in the bobbins and locked into position by screwed sleeves and slotted locknuts.

In order to remove the feed fingers, it is first necessary to slide back the stock carriage tubes. This is acheived by first pushing back the stock carriage tube towards the machine and then turning it counter clockwise until the head of the tube is free to slide back.

The feed tubes may be removed complete in station 6, or in stations 3 and 6 on the double bar feed machine. By turning the plate on the rear of the centre stop, which is held in position by a spring plunger, until a gap in the plate is in line with the bar feed station and by disengaging the bar feed shoe by moving the bar feed shoe lever into its down position, allows the feed tube assemblies to be removed from the machine complete.

The removal of the bar feed tube assemblies in any other stations than those mentioned above also requires the alignment fingers to be lifted clear.

When removing the feed fingers from their tubes, it is necessary to place the feed tube assembly on a round rod held in a vice through the holes drilled in the feed tube at the feeder end. This enables each feed finger to be unscrewed (left hand thread) with the wrench provided without distorting the tube. Gripping the feed tube in a vice will distort the tube and prevent the feed finger from being unscrewed. Refrain from using a mallet on the wrench to overtighten when replacing feed fingers. The feed fingers should be cleaned and their threads free from debris before assembling them into their feed tubes, which should also be thoroughly clean.

4.5 Changing Collets

The collets, which are the 'draw-in' style, are operated by a toggle mechanism on the end of the work spindles. The collets may be removed by drawing back the spring plunger and turning the left hand threaded adjusting sleeve. This will release the collet complete with its draw tube. Replacement collets should be well cleaned and each spindle nose seating examined and cleaned to remove all debris and coolant scum deposits before fitting each replacement collet on the spindle nose location key and screwing the adjusting sleeve into the collet. Tension is set on the collet by means of the adjusting sleeve. Tension must be tested by means of the hand lever, care being taken to ensure that excessive pressure is not required to close the collet. A spring compensator is included in the toggle mechanism to accomodate small variations in bar size. If the machine is run without collets and tubes, the collet adjusting sleeves must be removed from the spindles.

Before replacing bars in the feeders and finally adjusting the collet tension, set the bar feed stroke.

Always taper the bar ends to ensure their easy passage through the feeder and collet.

The leverage provided by the length of the collet closing lever, when testing collet tension by hand, is sufficient to close a correctly adjusted collet. A tube extension placed on the lever is dangerous.

Coolant should not be directed at a running spindle which is empty of bar as the coolant will run through the spindle and spray out at the back. If tubes are being machined, bungs should be fitted in the rear end of the tubes to prevent coolant flowing through.

Check that the collet is closed before starting the machine. Always close the collet before disengaging the collet operating finger from the bobbins. Alway re-engage the locking plunger after adjusting the collet.

4.6 Setting Bar Feed Stroke

The bar feed stroke should be set before bars are loaded into the machine. First handwind the machine until the bar feed slide is in the fully forward position. Loosen the centre stop and slide back as far as it will go. On all machines fitted with Sec.153 (the auto stop after completion of the bar), the pusher plate and bracket and the guide ring carrier assembly must also be moved back. These are clamped on their rods by means of pad bolts. In order to move the pusher plate and bracket backwards it may be necessary to lift it clear of the bar feed bobbin.

Next handwind the machine until the bar feed slide is in the fully back position for the selected stroke the center stop should be set to its new position and on machines fitted with auto stop after completion of bar, the guide ring carrier assembly, the pusher plate and bracket should be reset. In this case the centre stop is set so that the back of the plate is in line with the bottom of the milled slot in the guide ring carrier assembly.

The stock carriage tubes may be adjusted to and from the spindle by releasing the head of the tube and reclamping in the desired position. This is desirable, when using small diameter bars, in order to give the maximum support to the bar.

If the stock carriage tubes have been set forward, they should be moved back before increasing the bar feed stroke and reset after the change.

When repositioning the centre stop on machines fitted with automatic stop, it may be set further back than as previously stated. This is useful when short bar feed strokes are set since it gives more available movement for forcing the new bar through the feed finger when bar loading. The centre stop should be set so that the bar feed tubes cannot wander backwards or foul the stock carriage tubes if these are adjusted forward.

Should it be necessary to change the bar feed stroke after all the bars are loaded into the machine, all collets should be opened before starting the above procedure. If the bar feed stroke is increased whilst bars are in the machine and the collets are not open, the aligning ring on the bar feed slide will have to return all the feed tubes at once and this extra load will cause the bar feed link to collapse. If the stroke is decreased when bars are in the machine, each bar feed tube must be set in the loading station until all six are in the new position; the centre stop can then be reset.

The bar feed shoe is spring loaded and will be depressed should a bar feed bobbin index round out of position. Always ensure that the centre stop is correctly reset after changing feeders or altering the bar feed stroke.

Check that the bar feed shoe is put into engagement after inserting a new bar.

On machines with automatic stop after completion of bar, ensure that the guide ring carrier assembly, centre stop and pusher plate are all correctly set after changing the bar feed stroke and securely clamped.

Be sure that the feed fingers grip sufficiently and that the collets are adjusted correctly. A tight collet can break the toggles.

4.7 Adjusting the Bar Stop

The bar stop arm is mounted on and keyed to a shaft which passes through the drum housing and the cut-off slide base. It is clamped to this shaft by a pad bolt, the stud of which is extended to form the bar stop hand lever. The bar stop itself is bolted to the bar stop arm and may be turned around to accommodate longer components.

The bar stop can be arranged to swing up or to swing downwards by connecting the link rod to the appropriate location on the double lever. The maximum bar feed stroke is 4" (102mm), with the exception of the spindle stopping machine which is 5" (127mm) and the long bar feed machine which is 12mm-203mm. The bar stop arm and its bar stop can be positioned along its shaft to give a minimum distance from the drum housing face of 3" (76.2mm) and a maximum distance from the drum housing face of 11.25" (286mm). In order to adjust the position of the bar stop arm and its bar stop in relation to the face of the drum housing, release the pad bolt by releasing the hexagon nut on the upper face of the bar stop arm and move the bar stop to the desired dimension. On reaching the dimension, clamp the pad bolt by locking the hexagon nut.

On the double bar feed machine the bar stop operating mechansim is arranged to swing the bar stop over the 3rd and 6th stations cross slides to the bar feed position.

4.8 Bar Loading

Bar stock should be in good condition, clean, straight and free from scale, corrosion and paint in order to keep the down time for bar loading to a minimum. Dependent on the component geometry and cycle time, bar loading can account for a large proportion of the down time, the quality of bar is an important factor of high operational efficiency. To remove an unsatisfactory bar from a machine loses valuable working time; bars with a large diametral tolerance are also disadvantageous. The grading of bars to the same approximate overall length is recommended. To assist bar loading they should be chamfered at each end and the end faces squared to minimise drill breakage.

Machines with automatic stop after bar exhaustion stops the machine automatically with the collet open, the machine feed disengaged and the main motor stopped in order to permit the operator to remove the bar end and rebar the machine. The hand lever provides the facility to swing the bar stop arm clear of the bar when removing the bar end. Bar ends should not be allowed to drop into the swarf conveyor trough.

When loading into the machine in station 6, or 3 or 6 on the double bar feed machine, enter the bar into the stock carriage tube and feed it forward so that it enters the bar feed tube. Release and withdraw the stock carriage tube sufficiently to grip the bar by hand and feed the bar up to the internal taper in the feed finger. With a sharp movement of the arm, tap the bar through the feed finger and collet up to the bar stop. In circumstances where the tooling includes some machining operations behind the cut-off datum, in order to prepare the bar for further machining in the subsequent cycle of operations, it may be preferable to feed the new bar just past the cut-off datum so

that it can be prepared during the first complete cycle of operations. This ensures that tools do not foul the new bar in fast motion when the new bar is fed to the bar stop and the subsequent machining takes place.

After loading bar, close the collet with the hand lever, adjust collet tension as necessary. Return the stock tube into its forward seating and lock it in position by turning it clockwise.

Under no circumstances should a collet tension be set that cannot be easily closed by the lever provided. Do not use the 'inch' or 'jog' button to close the collet under power.

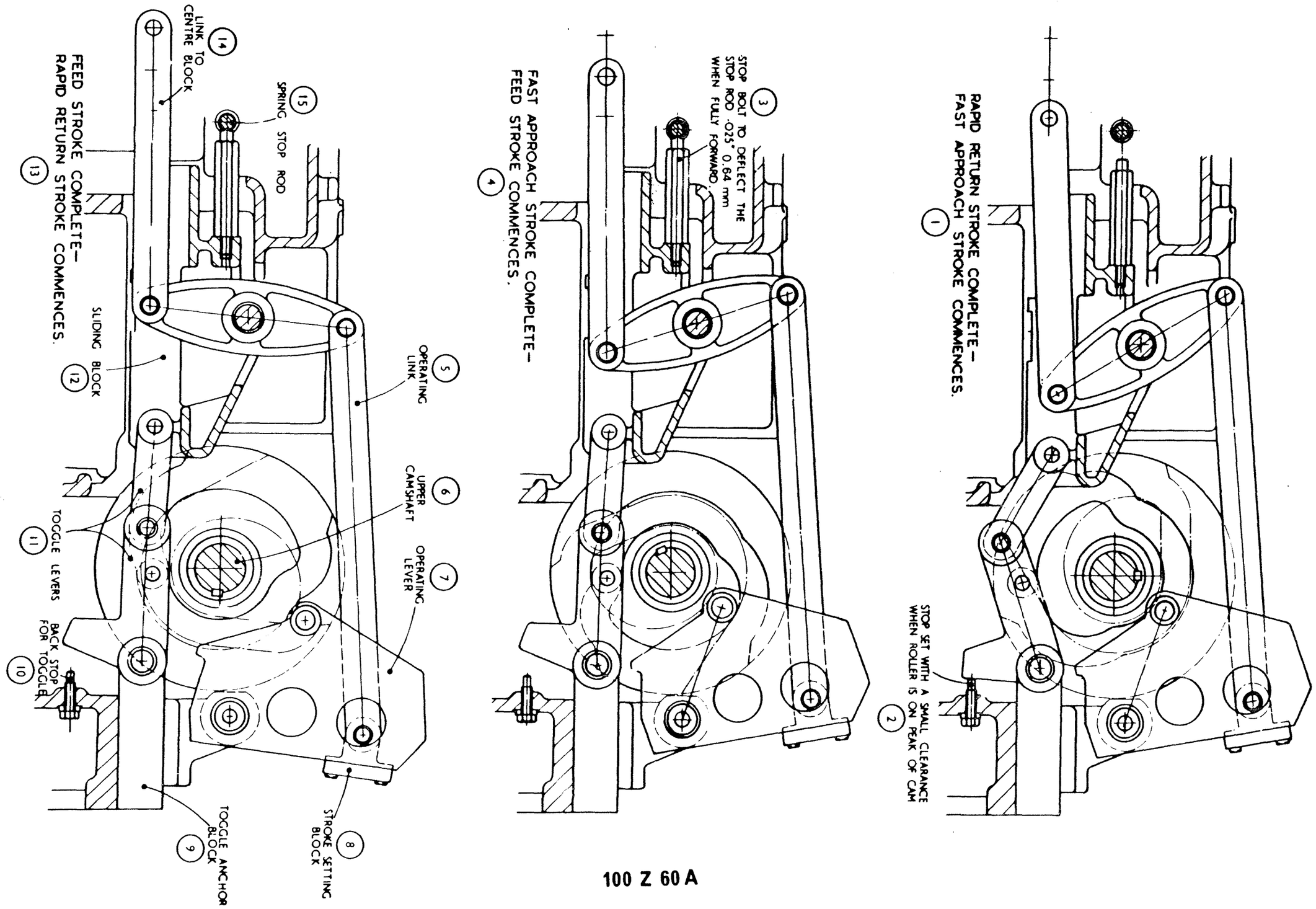
4.9 Setting the Longitudinal Slides

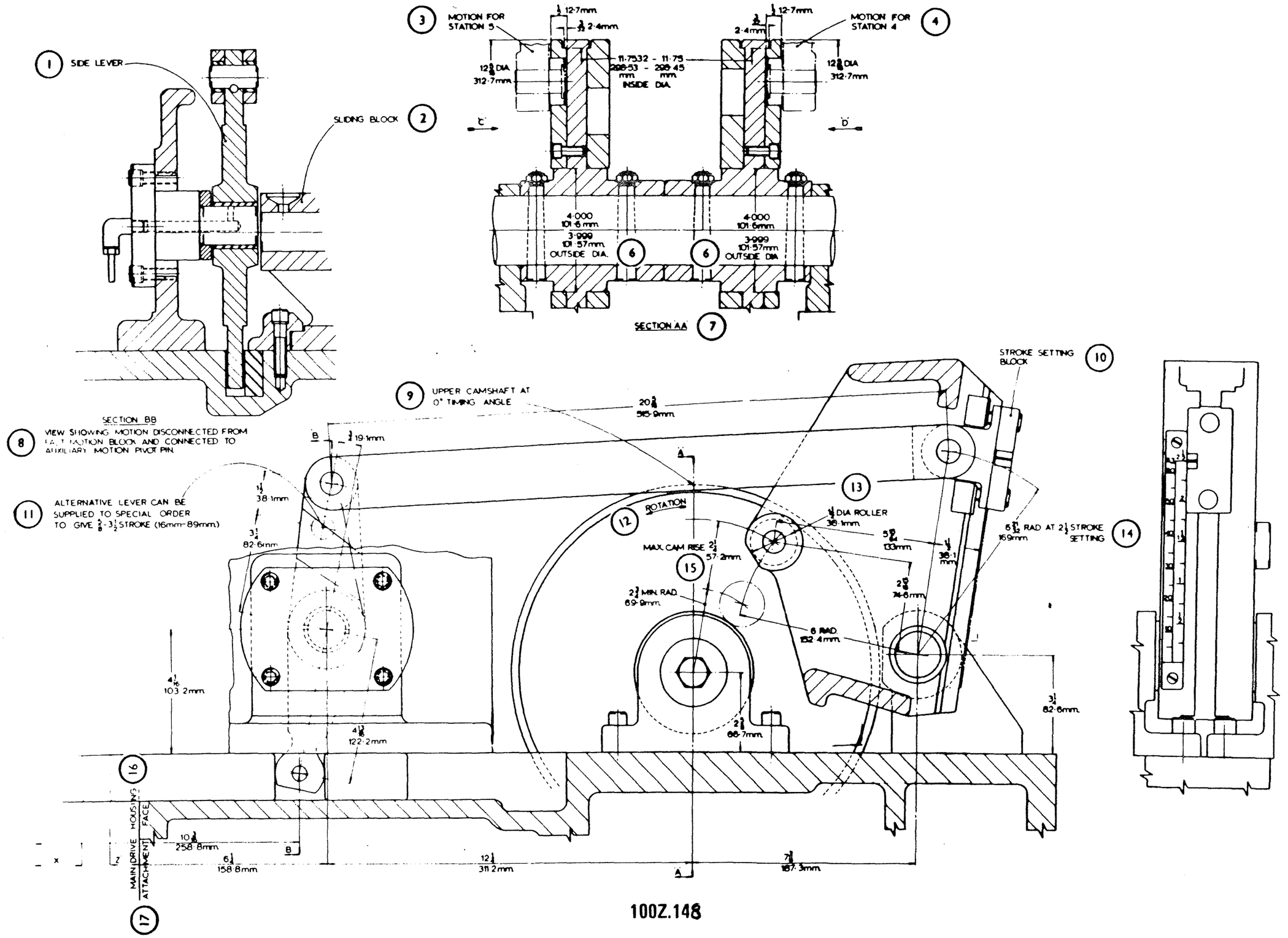
The centre tool block and the front and rear independent longitudinal slides are adjusted for feed stroke on the three quadrants shown on figs. 4.5, 4.6 & 4.7. Adjustment is easier with the machine stopped in the "dwell" position at the end of forward feed as indicated on the timing dial and with the stops on the centre block and the independent slides adjusted clear.

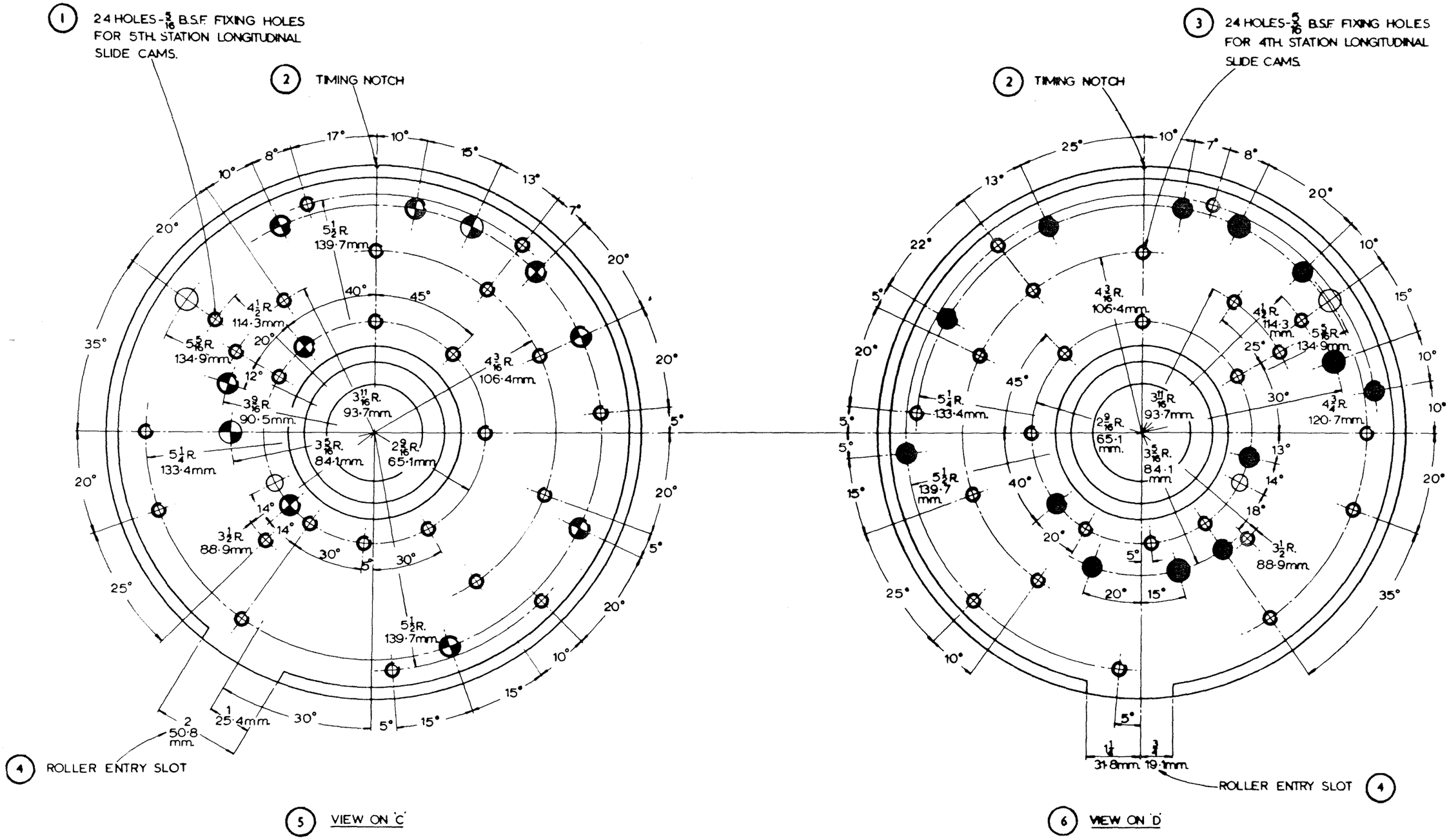
Loosen the two hexagon socket screws in the setting block to permit the block to be moved to the required stroke, indicated on a scale on the quadrant. Re-tighten the screws and re-set the slide stops.

Linear position of the two independent longitudinal slides is adjusted 2.75" (69.8mm) by the means of the hexagon nuts along a screwed pusher rod, and the slide stops may be moved into several positions to accommodate this adjustment. The centre tool block position is not adjustable and the forward position is constant for all stroke settings as is the independent slides for each selected position.

Fig.4.5 Drg.100Z60A




1 SIDE LEVER
2 SLIDING BLOCK
3 MOTION FOR STATION 5
4 MOTION FOR STATION 4
12·7mm
2·4mm
11·7532 - 11·75 inside dia
298·53 - 298·45 mm
12 DIA 312·7mm
4·000 101·6 mm
3·999 101·57mm OUTSIDE DIA.
6
SECTION AA 7
SECTION BB
8 VIEW SHOWING MOTION DISCONNECTED FROM STATION MOTION BLOCK AND CONNECTED TO AUXILIARY MOTION PIVOT PIN
9 UPPER CAMSHAFT AT 0° TIMING ANGLE
20 505·9mm
10 STROKE SETTING BLOCK
11 ALTERNATIVE LEVER CAN BE SUPPLIED TO SPECIAL ORDER TO GIVE 2/8-3½ STROKE (16mm-89mm)
12 ROTATION
13
14 6½ RAD AT 2½ STROKE SETTING 169mm
15 MAX. CAM RISE 2¼ 57·2mm
2¾ MIN. RAD 69·9mm
6 RAD 152·4mm
5¼ 133mm
1½ 38·1mm
3¼ 82·6mm
4 1/16 103·2mm
4⅞ 122·2mm
2⅝ 66·7mm
2⅞ 74·6mm
16
MAIN DRIVE HOUSING ATTACHMENT FACE
10⅛ 258·8mm
6¼ 158·8mm
12¼ 311·2mm
7⅜ 187·3mm
17
100Z.148


1 24 HOLES-5/16 B.S.F. FIXING HOLES FOR 5TH. STATION LONGITUDINAL SLIDE CAMS.
2 TIMING NOTCH
5½R. 139·7mm.
4½R. 114·3mm.
5 5/16R. 134·9mm.
4 3/16R. 106·4mm.
3 11/16R. 93·7mm.
3 9/16R. 90·5mm.
5¼R. 133·4mm.
3 5/16R. 84·1mm.
2 9/16R. 65·1mm.
3½R. 88·9mm.
1 25·4mm.
2 50·8 mm.
4 ROLLER ENTRY SLOT
5 VIEW ON 'C'
7 CENTRE BLOCK FEED CAM HOLES
3 24 HOLES-5/16 B.S.F. FIXING HOLES FOR 4TH. STATION LONGITUDINAL SLIDE CAMS.
2 TIMING NOTCH
4 3/16R. 106·4mm.
4½R. 114·3 mm.
5 5/16R. 134·9mm.
4¼R. 120·7mm.
3 11/16R. 93·7mm.
2 9/16R. 65·1 mm.
5¼R. 133·4mm.
5½R. 139·7 mm.
3 5/16R. 84·1 mm.
3½R. 88·9mm.
31·8mm. 19·1mm.
ROLLER ENTRY SLOT 4
6 VIEW ON 'D'
8 SLIDING BLOCK CAM HOLES

100Z.149

4.10 Cross Slide Adjustment & Stroke Setting

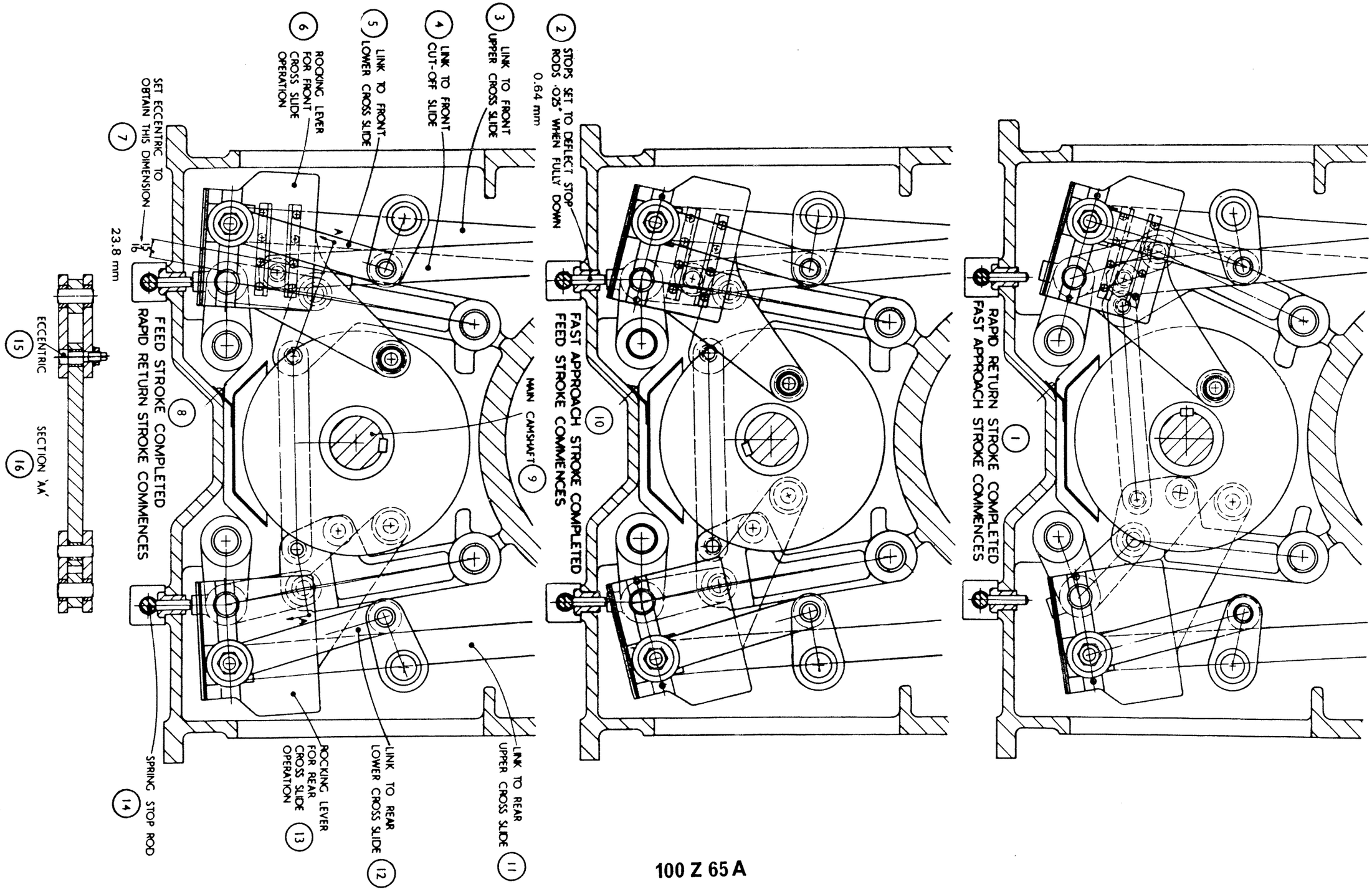
The capacity charts give the maximum forward and back positions and the main dimensions of the cross slides, together with all the relative data regarding feed and fast motion strokes from which it is possible to determine the maximum back position. The mechanism gives an approximately constant forward position at the end of the feed stroke to all cross slides for all feed strokes. Linear adjustment of the cross slides is made in the following manner:-

The upper and lower cross slides may be adjusted to and from the work by releasing the square head set screw in the bracket at the end of the slide and turning the graduated knob. The cross slides fitted to the 3rd & 6th stations are each adjusted by slackening the hexagon nut on the top face of the slide and turning the graduated knob.

Care must be taken on all cross slide adjustments to retighten the hexagon nut or the square head set screw before handwinding or running the machine. No adjustments should be carried out or change of stroke made without first slackening off the cross slide stop and resetting it afterwards. The cross slide stops are screwed into sleeves which are held in brackets by pad bolts. This arrangement allows the sleeves to slip if excessive stop pressure is set.

Feed stroke on any slide may be set independently by sliding the block of the operating link along the rocking lever tee slot to the desired stroke indicated on the scale. Stroke setting blocks must be firmly clamped when set to the required stroke. The feed strokes are more easily set if the cross slides are in their fully forward positions. See fig.4.8.

Fig.4.8 Drg.100Z65A



4.11 Special Slide Motions

By utilising auxiliary motions and special cams, non standard slide motions for special applications can be provided. For details of the auxiliary longitudinal motions, refer to the section dealing with the attachments. Details of these motions are also descibed in the Maintenance Manual supplied with the machine.

4.12 Feed Trip, Manual Trip & Automatic Stop Mechanisms

Automatic safety mechanisms and a manually selected "stop end of cycle" function are incorporated to stop the machine should any of the following situations arise:-

1. The disengagement of the feed slipping clutch.

2. A manually operated selector switch, panel mounted, (see section 3.1, electrical controls), set to stop the machine at the end of the cycle.

3. The automatic stop mechanism has been activated when the bar stock is exhausted in any spindle.

4. Safety switches incorporated into special tooling devices become activated.

Feed Trip Mechanism

An electrical circuit is prepared by a limit switch operated by the disengagement of the feed slipping clutch to instantly de-energise the electro-magnetic feed clutch, activate the electro-magnetic brake and stop the main motor.

Manual Trip Mechanism

A manual selector switch mounted on the control panel door covers three functions:- "Production Run", "Set-Up" and "Stop End of Cycle". When set to "Production Run" the machine runs in continuous cycle. The "Set-Up" function allows the machine to run without the coolant and swarf conveyor working. "Stop End of Cycle" prepares an electrical circuit so that when a roller follower on the switch lever of a limit switch, mounted adjacent to the camshaft operating the longitudinal slides, drops into a notch cut into a cam plate mounted on the cam shaft, the electro-magnetic feed clutch is disengaged, the electro-magnetic brake activated and the main motor stopped at the end of the cycle with the collet open. This position can be varied if required.

The Automatic Stop Mechanism (Bar Stock Exhausted)

When each spindle indexes from the 5th to 6th station, a spring loaded pusher plate contacts the side of the feed tube bobbin bearings. If the feed finger is gripping the bar, the plate is retained in position and the machine operation continues normally. If the bar is used up and the feed finger is off the end of the bar, the pusher plate will move 5/32" (3.97mm) towards the stock carriage under the action of a spring and controlled by the cams cut on the face of the stock carriage support disc. This action activates a limit switch and prepares an electrical circuit, so that when the cam timing switch mounted adjacent to the longitudinal slide's camshaft is operated by its camshaft mounted cam at the point in the cycle when the collet is open, the electro-magnetic feed clutch is de-energised, the electro-magnetic feed brake applied and the machine spindles stopped.

The bar end should be removed prior to loading a new bar. Before loading the new bar, the bar feed shoe lever must be moved into the down position. The collet tension should be checked by hand for each new bar.

After loading the new bar, the bar feed shoe lever must be moved to its up position with the bar feed shoe engaging the bearing assembly mounted on the feed tube bobbin. The main motor should be started, The plunger "L" (fig.4.9) must be released so that the trip lever "G" takes up its normal position before operating the feed start push button. A more detailed explanation of the automatic stop mechanism will be found in the Maintenance Manual supplied with the machine. A signal lamp mounted on the top of the control panel is illuminated when the machine stops for any reason.

4.13 Double Bar Feed Machines

This machine is arranged to feed bar in the 3rd & 6th stations. The bar feed operation and collet operation are duplicated on the front and the rear of the machine.

The bar feed at the rear of the machine is operated by the bar feed lever at the front of the machine. The bracket to which the link is connected on the rear bar feed slide is adjustable so that components of different lengths can be produced up to a maximum of 1" (25.4mm) difference. A scale is provided on the bracket which is set to the difference between the bar feed lengths. The longer component must always be set at stations 1, 2 & 3 so that its bar feed takes place on the front bar feed slide. Where the components are of equal length the scale setting on the rear bar feed bracket is set at zero.

The rear collet slide is operated by an independent lever from its own cams

The components are parted off the parent bar in stations 3 & 6, cut off slides being provided in both stations. Bar feed occurs after the feed stroke immediately before indexing.

The bar stop fitted in station 3, is operated from cams on the spare cam disc in the drum housing. This excludes the use of the auxiliary cross slide motions, sections 193, 193A 193B & 193C.

The automatic stop mechanism (bar stock exhausted) is fitted as standard. Duplicate units are fitted to operate in both stations and operate in conjunction with the cam timing switch adjacent to the longitudinal slides cam shaft and its camshaft mounted cam as described in section 4.12.

The automatic bar stop indicator lamps are situated one behind the other and so indicate which station the bar is exhausted. These are mounted in the door of the control panel.

The double bar feed machine can be operated as a single bar feed machine after making the following adjustments:

1. Remove the rear bar feed shoe complete with spring and plunger.

2. Set the same bar feed stroke on the rear as is set on the front.

3. Retain the rear collet operating finger clear of the collet bobbins by means of the plunger.

4. Remove the spring 'N' (Fig.4.9) from the lower auto stop mechanism. This will render the mechanism inoperative. The upper auto stop mechanism must not be altered.

5. Remove the rear bar stop.

4.14 Spindle Stopping Machine

When very large quantities of components are to be produced, requiring one or more secondary cross operations, ie, cross drilling, reaming, milling, sawing, tapping, etc, the Wickman Bennett 1"-6 machine can be supplied with a spindle stopping mechanism. Provision for fitting this mechanism is, however, not made in standard machines and must be provided at an early stage of manufacture.

A special spindle drum is used, and each spindle runs on a precision parallel roller bearing at the front and a pair of "face to face" preloaded angular contact ball bearings, enclosed in a flanged housing, at the rear. See fig.4.10.

Special Speed and Feed Chart

Different ratio spindle drive gears are used on the spindle stopping machine, and different speeds and feeds, attachment ratios and gears are therefore available. See Speed and Feed chart on page 50.

Each spindle gear is driven from the central gear and runs loosely on ball and roller bearings when the multi-plate brake is engaged. The brake is non-adjustable, as a series of preloaded cushion springs are provided to limit and maintain the torque, which is sufficient to brake the spindles rapidly to a standstill.

The multi-plate clutch on each spindle is engaged by the axial thrust developed by a row of balls, squeezed inwards against conical and flat faces by the clutch bobbin, when it is shifted by the cam operated clutch glut. The clutch is adjusted by turning the slotted locknut from serration to serration on its right hand thread, the serrations being maintained in engagement by the clutch plate separating springs. The clutch is accessible in station 6, and a adjustment of one serration at at time can easily be made by a sharp hammer blow on a suitable punch. After each adjustment, each clutch must be checked by levering the glut into and out of engagement, so as to ensure that the adjustment is not to tight and that the glut pressure is not so excessive as to cause overheating or a jam.

The glut should be levered by inserting a suitable bar through the hole in the fulcrum bracket which is provided in the drum housing. The inner end of the bar should be levered against the roller on the glut.

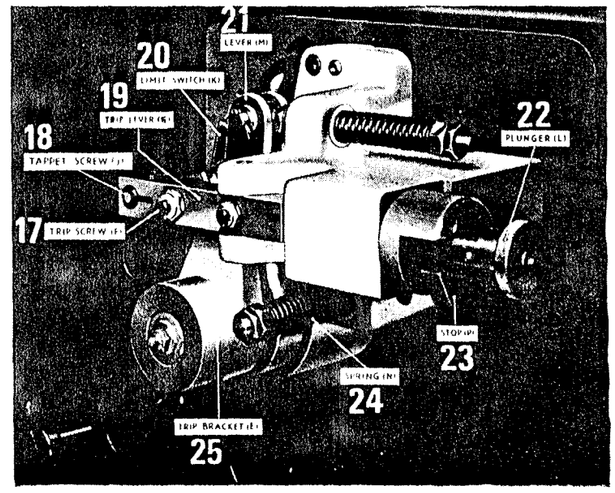
The clutch gluts are operated in turn during indexing of the spindle drum by a suitable series of cams secured in the cam recess around the drum housing bore. The cams may be selected to suit varying tooling conditions and are supplied to order. See fig.4.11.

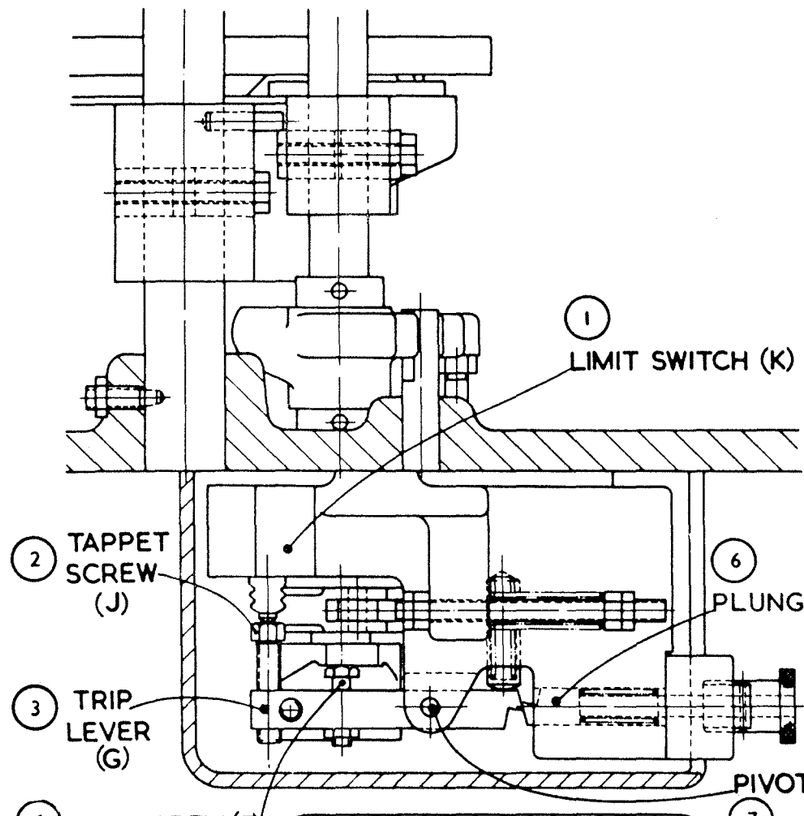
Access to the cams is provided through cored openings at the front and rear of the machine, on opening the drum housing doors, and also at the top of the drum housing by removing the covers. When fitting new cams, care must be taken by handwinding through index, that the glut cam rollers pass freely all round the cam track.

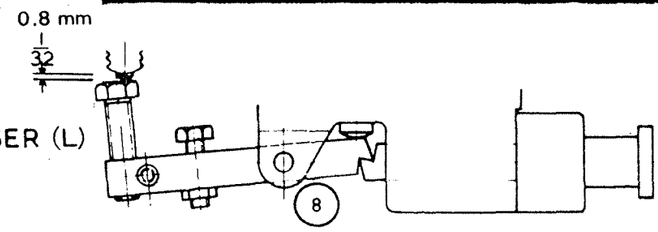
A start cam 102V218 is fitted as standard in station 1 to ensure that the spindle clutches do not gradually disengage on machines which are used without stopping the spindles in any station. The cam also ensures that the clutches are engaged if left inadvertently in the brake position during hand testing of the clutch tension. If cams are fitted to stop the spindles in station 1, cam 102V218 is supplied loose with the machine, and should be fitted in position when the above stopping cams are removed on a change of set-up.

The cam roller for each glut runs on an eccentric roller pin which is secured in its glut by a dog-point screw during building, after being adjusted so as to ensure that all clutch bobbins have an equal amount of overtravel. When a spindle clutch is engaged by its cam on handwinding through index, the edge of the bobbin should be in line with the turned groove in the serrated ring.

The collet closing bobbin and its associated parts at the rear of each spindle are identical with the standard machine.







VIEW SHOWING TAPPET SCREW (J) WITH PLUNGER (L) IN ENGAGEMENT WITH TRIP LEVER (G)

100 Z 64 A

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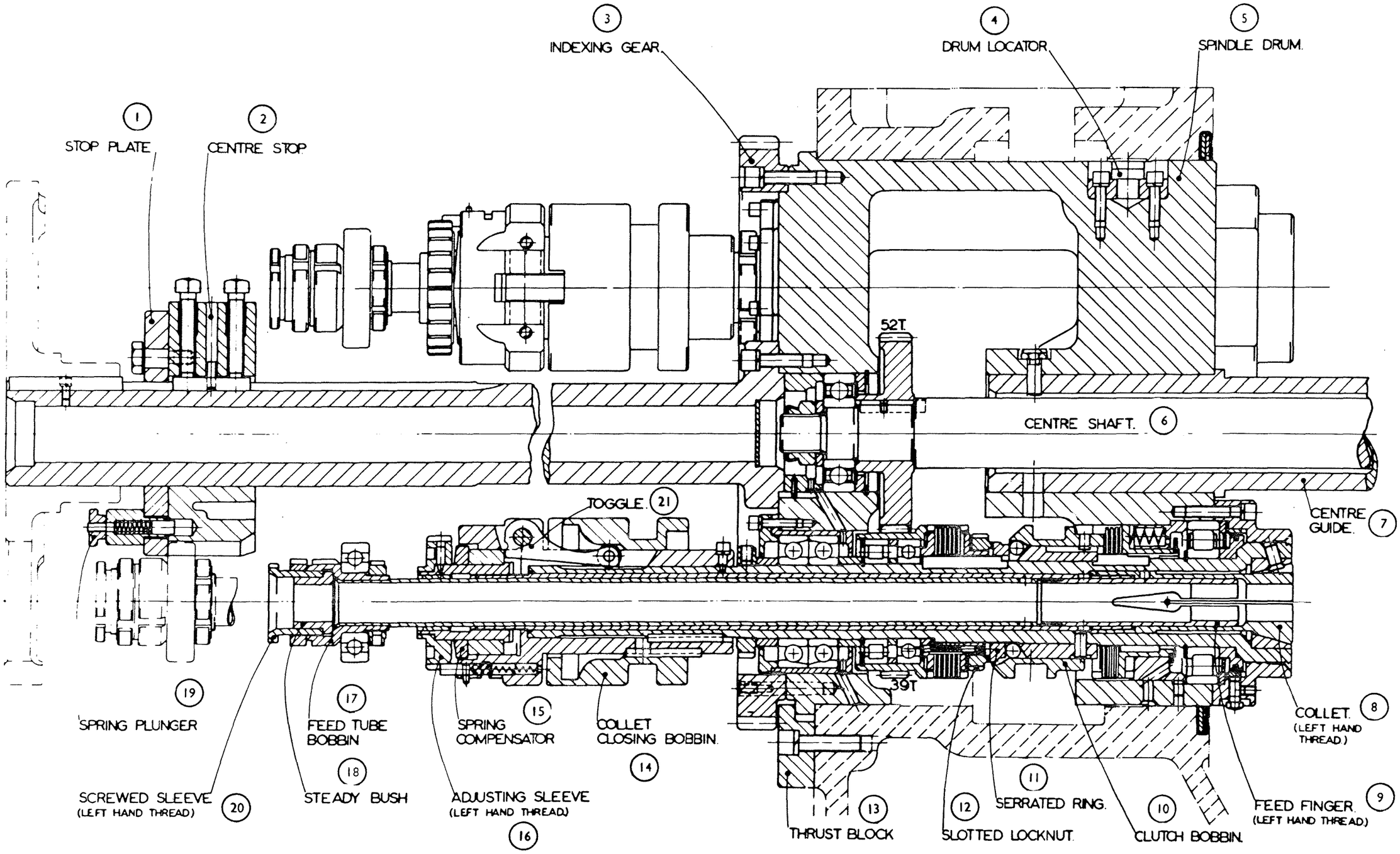
Frame 1, 6-Spindle
Bar, Operators

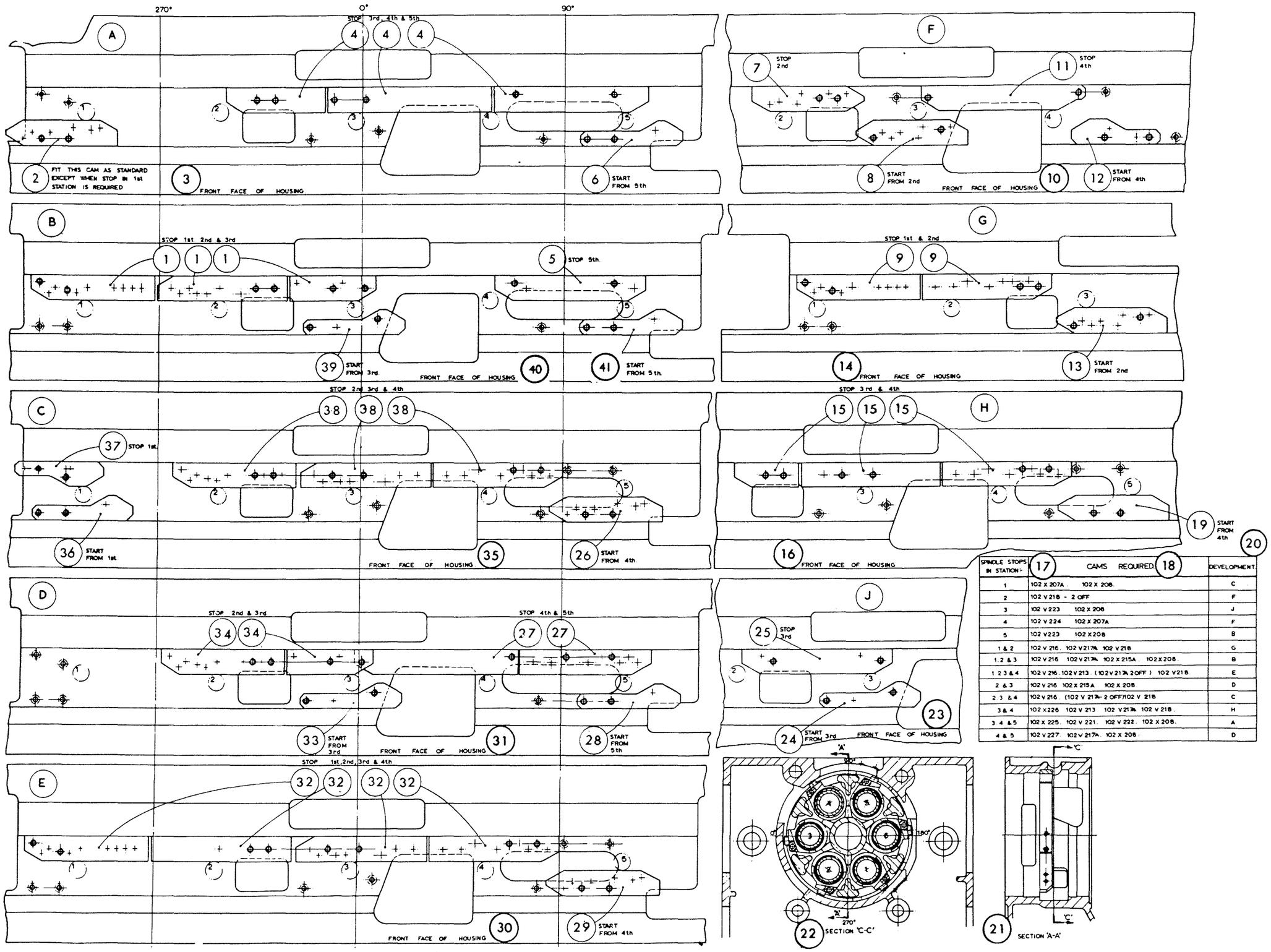
Fig.4.9 Drg.100Z64A

Fig.4.10 Drg.100 Z 69



100 Z 69

Fig.4.11 Drg.102Z3C



SPINDLE STOPS IN STATION :- (17)	CAMS REQUIRED (18)	DEVELOPMENT (20)
1	102 X 207A . 102 X 208.	C
2	102 V 218 - 2 OFF	F
3	102 V 223 102 X 208	J
4	102 V 224 102 X 207A	F
5	102 V 223 102 X 208	B
1 & 2	102 V 216. 102 V 217A 102 V 218	G
1, 2 & 3	102 V 216 102 V 217A 102 X 215A . 102 X 208.	B
1 2 3 & 4	102 V 216. 102 V 213 . (102 V 213A 2 OFF) 102 V 218	E
2 & 3	102 V 216 102 X 215A 102 X 208	D
2 3 & 4	102 V 216 . (102 V 213A - 2 OFF) 102 V 218	C
3 & 4	102 X 226 102 V 213 102 V 217A 102 V 218 .	H
3 4 & 5	102 X 225 102 V 221 102 V 222 . 102 X 208.	A
4 & 5	102 V 227 102 V 217A 102 X 208 .	D

102 Z 3C

SECTION FIVE - ATTACHMENTS

Attachments are available for high speed drilling in any station, independent reaming in stations 3 & 6 and for threading in stations 3,4,5 & 6. An external chasing attachment is available for use in station 5. Also available are auxiliary cross slide motions for Stns.3,4,5 & 6.

Because many of the parts are interchangable between the various attachments, they are split into sections. The sections required to make up any particular attachment can be seen on the attachment sections chart,(Drg.No.100Y38A). Fig.5.1.

When more than one attachment is to be fitted to the machine, the items required are an addition of all the sections designated in the respective columns. When the attachments are not used concurrently, any common sections beyond the number required for any one layout need not be duplicated.

(59) TOOLING ARRANGEMENT. THE ARRANGEMENTS OR ANY COMBINATION OF ARRANGEMENTS MAY BE FITTED IN ANY OF THE STATIONS SHOWN SUBJECT TO LIMITATIONS AS GIVEN - 182Z10A & 190Y10A & 192Z4.

(39) SECTION NUMBER	(1) DESCRIPTION OF SECTIONS (40) STATION →	(2) THREADING WITH REVOLVING DIEHEAD THREADING ATTACHMENT. 3	4	5	6	(3) THREADING WITH FULL THREADING ATTACHMENT-WITH HEAVY DUTY DRIVE 3	4	5	6	HIGH SPEED DRILLING WITH NORMAL MOTION 1 TO 6	(9) A HIGH SPEED DRILLING WITH INDEPENDENT MOTION. 3	6	REAMING WITH INDEPENDENT MOTION. 3	6	CHASING N 4TH STATION. 4	(7) CHASING N 5TH STATION. 5	(8) AUXILIARY CROSS SLIDE MOTION. 3	4	5	6	(61) REMARKS
(12) 181A	PARTS COMMON TO CONE & HERBERT CLUTCH DRIVES					1	1	1	1		(4)	(5)	(6)								
(13) 181D	GEARS FOR ALL ATTACHMENTS.	2 GEARS	2 GEARS	2 GEARS	2 GEARS	3 GEARS	3 GEARS	3 GEARS	3 GEARS	1 GEAR	1 GEAR	1 GEAR									
	(41) A —	FOR GEARS REQD SEE 182Z10A				FOR GEARS REQD SEE 183Z10A				FOR GEAR SEE 190Y10A											
(14) 182	THREADING ATTACHMENT DRIVE SLEEVE.	1	1	1	1	1	1	1	1												
(15) 183	HERBERT CLUTCH DRIVE (HEAVY DUTY)					(41) B	1	1	1	(41) C											
(16) 186	PARTS COMMON TO THE THR'D'G. ATT. (STATIONS 3,4,5 & 6)	1	1	1	1	1	1	1	1												
(17) 186A	THREADING ATTACHMENTS ADDITIONAL PARTS (STATIONS 4 & 5)		1	1			1	1													
(18) 186B	THREADING CAMS (STATION 4) MARK 4.		1				1														
(19) 186C	THREADING CAMS (STATION 5). MARK 4.			1				1													
(20) 186D	PUSHER BRACKET THR'D'G REAMING (STATIONS 3 & 6)	1			1	1			1		(46)	(47)	(48)	(49)							
(23) 187	AUXILIARY LONG MOTION CAMS (STATIONS 3 & 6) (42)	1 SET		(43)	1 SET	1 SET	(44)	(45)	1 SET		1 SET	1 SET	1 SET	1 SET							FOR CAMS REQD SEE 187Y,1a,2a,3a (50)
(24) 188	ATTACHMENT BODY & SLIDE (STATIONS 3,4,5 & 6)	1	1	1	1	1	1	1	1		1	1	1	1							
(25) 189A	AUXILIARY LONGITUDINAL MOTION (STATION 6)				1				1			1		1							
(26) 189B	AUXILIARY LONGITUDINAL MOTION (STATION 3)	1				1					1		1								
(28) W616Q	BRACKET TOOLHOLDER									1											
(21) 186F	THREADING ATTACHMENT CHECK RETURN SWITCH	1	1	1		1	1	1													
(22) 186G	EXTRA PARTS TO FIT 186F TO 1"-6	186GM6	186GM5	186GM5		186GM4	186GM5	186GM5													
(27) 190G	HIGH SPEED DRILLING SPINDLE									1	1	1									
(36) 190H	HIGH SPEED DRILLING DRIVE									1	1	1									SPECIFY DRIVE GEAR SEE 190Y10A (51)
(37) 190J	SYNCHRONOUS DRIVE ATTACHMENT																				
(29) 192	CHASING ATTACHMENT (STATION 5 & 4) (MARK III)														1	1					
(30) 192A	CHASING ATTACHMENT DRIVE (STATION 5) MARK II															1					
(31) 192B	CHASING ATTACHMENT CAMS & GEARS														1 CAM 2 GEARS	1 CAM 2 GEARS					SPECIFY CAMS & GEARS REQD SPECIAL PARTS FOR L.H.S. (52)
(38) 192D	CHASING ATTACHMENT DRIVE (STATION 4)														1						
(32) 193	AUXILIARY CROSS SLIDE MOTION - STATION 3														(58)		1				CAMS EXTRA, TO SUIT JOB (53)
(33) 193A	AUXILIARY CROSS SLIDE MOTION - STATION 4																	1			CAMS EXTRA, TO SUIT JOB (54)
(34) 193B	AUXILIARY CROSS SLIDE MOTION - STATION 5																		1		CAMS EXTRA, TO SUIT JOB (55)
(35) 193C	AUXILIARY CROSS SLIDE MOTION - STATION 6																			1	CAMS EXTRA, TO SUIT JOB (56)
(10) 124D	AUXILIARY LONG SLIDE OP 5TH STN SPECIFY LEVER AND CAMS	O'-2½" OR ⅜"-3½" MAX. STROKE																			
(57) 125D	AUXILIARY LONG SLIDE OP 4TH STN SPECIFY LEVER AND CAMS	O'-2½" OR ⅜"-3½" MAX. STROKE																			
(60) 124A	AUXILIARY LONG SLIDE OP 5TH STN	1½"-4¾" MAX. STROKE																			
(11) 125A	AUXILIARY LONG SLIDE OP 4TH STN	1½"-4¾" MAX. STROKE																			

5.1 Slow Speed Reaming

In certain circumstances it is desirable to ream at a lower surface speed than that chosen for the other operations. When the reamer is driven in the same direction as the work spindle, but at a faster or slower speed, the difference between the speed of the work and that of the reamer will provide a suitable speed for reaming.

It should be noted that right hand cutting reamers should be driven slower than the spindle speed and left hand cutting reamers should be driven faster than the spindle speed.

The rotation of the reamer can be obtained by mounting the reamer holder in the threading spindle, Sec.186, housed in the attachment body and slide, Sec.188, or a bracket toolholder and driving it with the threading attachment drive sleeve, Sec.182. Drives using driven gears with over 42 teeth cannot be used in adjacent stations.

When using the table shown below:-
The effective reamer speed in R.P.M. = $\frac{\text{Work spindle R.P.M.}}{\text{Ratio}}$

	Driving Gear		Driven Gear		Std.Machine	Spindle Stopper
	Teeth	Ref.No.	Teeth	Ref.No.	Ratio	Ratio
R.H.	45	181DX101/45	45	181DX102/45*	3	4
Cutting	47	181DX101/47	43	181DX102/43*		5.5
	49	181DX101/49	41	181DX102/41	4.92	
L.H.	55	181DX101/55	35	181DX102/35		5.59
Cutting	58	181DX101/58	32	181DX102/32	4.8	

Gears marked * cannot be used in adjacent stations

5.2 Auxiliary Longitudinal Slides Operation - Stns.4 & 5.

Two types of unit are available:-

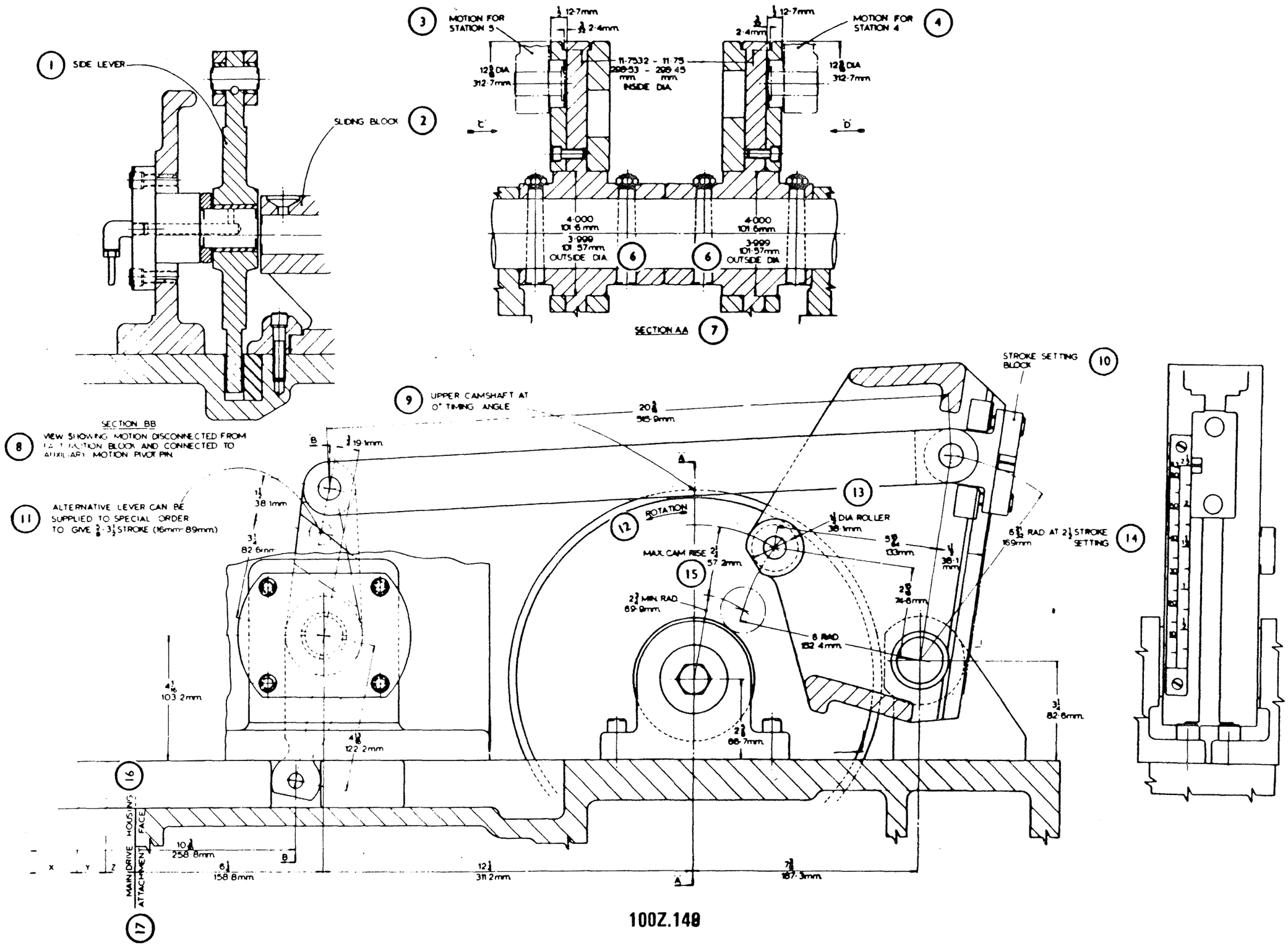
(1) The simpler type, Sec.124D for the 5th station and Sec.125D for the 4th station, consists of a lever mounted on a fulcrum stud located in and clamped to the beam, this lever replacing the standard lever carried on the sliding block mechanism. A shorter lever shaft is fitted to the sliding block and the standard link is connected to the special lever of the auxiliary motion in the appropriate 4th and/or 5th station.

A maximum stroke of 2.5" (63.6mm) is available using the auxiliary mechanism and the standard feed cam, the feed rates being those shown on the speed and feed chart.

Alternatively, a different lever may be mounted on the fulcrum stud to give strokes ranging from a minimum of 5/8" (15.88mm) to a maximum of 3.1/2" (88.9mm) giving a lesser mechanical advantage.

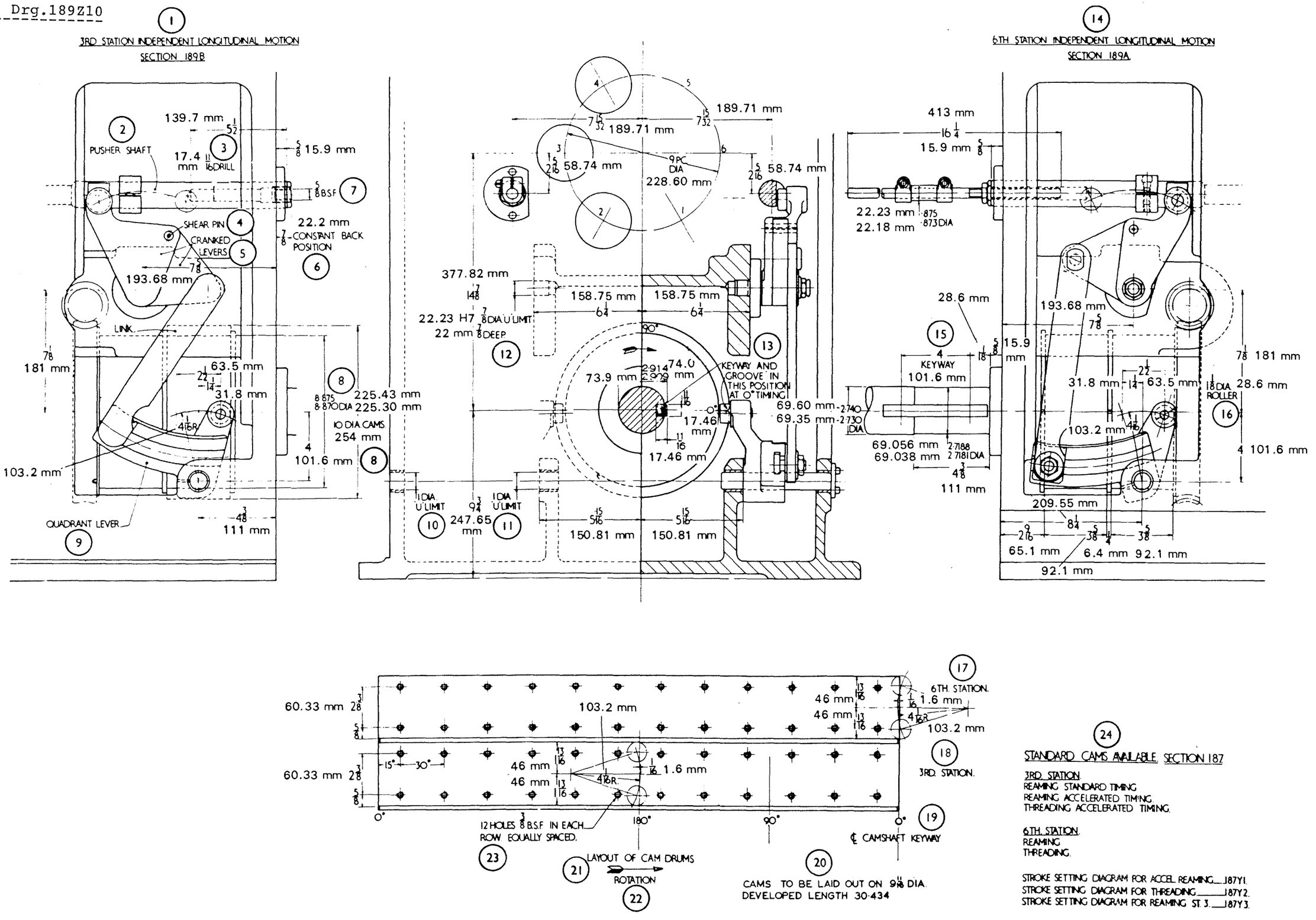
This unit can be interchanged between the 4th and 5th stations. Special cams may be used with these motions to suit tooling requirements.

(2) A second type of unit, Sec.124A for stn.5 and Sec.125A for stn.4 is available to be mounted as described above, but a non-standard linkage and cam lever are used to obtain a minimum stroke of 1.5" (38.1mm) ranging up to 4.3/4" (120.65mm). See Drg.100Z148 fig.5.2.


1 SIDE LEVER
2 SLIDING BLOCK
3 MOTION FOR STATION 5
4 MOTION FOR STATION 4
12·7mm
2·4mm
11·7532 - 11·75 mm INSIDE DIA
298·53 - 298·45 mm
12⅛ DIA 312·7mm
4·000 101·6mm
3·999 101·57mm OUTSIDE DIA
6
7 SECTION AA
8 VIEW SHOWING MOTION DISCONNECTED FROM FAST FACTION BLOCK AND CONNECTED TO AUXILIARY MOTION PIVOT PIN
SECTION BB
9 UPPER CAMSHAFT AT 0° TIMING ANGLE
10 STROKE SETTING BLOCK
11 ALTERNATIVE LEVER CAN BE SUPPLIED TO SPECIAL ORDER TO GIVE ⅜-3½ STROKE (16mm-89mm)
12 ROTATION
13
14 6½ RAD AT 2½ STROKE SETTING
15 MAX CAM RISE 2¼ 57·2mm
2¾ MIN RAD 69·9mm
8 RAD 152·4mm
16
17 MAIN DRIVE HOUSING ATTACHMENT FACE
19·1mm
38·1mm
82·6mm
103·2mm
122·2mm
258·8mm
158·8mm
311·2mm
187·3mm
X Y Z A B

100Z.148

Fig.5.3 Drg.189Z10



189 Z 10

5.3 Auxiliary Longitudinal Motions for Stns.3 & 6.

Station 6 Sec.189A.
Station 3 Sec.189B.

These motions are required for operating the attachment body and slide, Sec.188, to perform reaming, threading and other operations in both stations 3 and 6.

The stroke is adjusted by sliding the link block along the quadrant lever, making sure that the link block is securely clamped after setting the stroke or making adjustments to the stroke. The scale reading on the quadrant lever gives the total stroke range in imperial and metric.

The upper bell crank lever is articulated and the two halves connected by a shear pin. Should the pin shear due to an overload, the attachment operated by the mechanism will be positively returned but will not be fed forward during the subsequent cycles.

In station 3, should a potential danger to tooling in the subsequent stations exist by the 3rd station attachment not feeding forward, the shear pin may be replaced by a solid bolt if considered desirable.

Fitting Auxiliary Longitudinal Motions. Stns.3 and 6.

First assemble the required cams to the drum on the main cam shaft in the attachment drive compartment. Ensure that 0 deg. timing on the cams coincides with 0 deg. timing on the cam drum and that a 1.1/8" (28.6mm) diameter roller will pass at all points around the cam track of the cams mounted on the cam drum. Assemble the pusher shaft (1) into the appropriate bores in the walls of the attachment drive compartment in the main drive housing. Assemble the upper bell crank lever assembly and its pivot onto the wall in the attachment drive compartment ensuring that the bell crank operating roller engages in its operating slot on the pusher shaft. Assemble the quadrant lever assembly onto its operating shaft ensuring that its cam roller engages in the cam track of the selected cams. Finally assemble the link connecting the bell crank and the quadrant lever assemblies. See fig.5.3 Drg.189Z10.

5.4 Threading Attachments

Threading can be performed in statons 3,4,5 and 6. Threading operations are usually performed at lower surface speed than those suitable for turning or drilling and as it is not possible to vary the spindle speed during the cycle, and in order to obtain suitable surface speeds for threading whilst still using economical work spindle speeds, it becomes necessary to rotate the threading tool in the same direction as the work spindle but at a faster or slower speed. The difference between the work spindle speed and the threading tool speed will then provide an effective surface speed for threading.

A commonly used threading speed is 1/5th of the work spindle speed, requiring the threading tool to be rotated at 4/5th of the work spindle speed for right hand threads, or one-and-one-fifth times the work spindle speed for left hand threads. This is termed an "On" ratio of 5, being the ratio of work spindle revolutions to threading revolutions during the "On" threading of the die or tap. If the cycle time permits, higher ratios may be used to reduce the surface speed for threading as varying materials may dictate, and to increase tool life and improve surface finish. Lower ratios may also be employed on free cutting materials, thus achieving faster cycle times.

Since a solid tap or die after cutting the thread must also be run "Off" the component during the feed cycle, this non-productive operation should be performed as quickly as possible. Excessive difference between forward and return speeds will, however, increase clutch wear and create a possible difficulty in maintaining threading length & surface finish. A commonly used "OFF" ratio is approximately 2:1, ie. the relative speed is half the work spindle speed.

Fitting The Threading Clutch Drive. Sec.183

Assemble the threading drive gears onto their adaptors and together with their spacers, assemble them onto the centre shaft as shown on drawing 183Z10A. In order to facilitate this it is necessary to withdraw the centre shaft sufficiently to provide the space to assemble the aforementioned parts onto the centre shaft. To remove the centre shaft it is necessary to remove the speed pick-off gears and the screws retaining the bearing housing. This enables the bearing housing and the centre shaft to be withdrawn outwards from the main drive housing wall.

If threading clutches are to be fitted in stations 4 and 5, the reset bracket should next be fitted to the underside of the sliding block.

Fit the rear bearing housing into the appropriate bore in the inner wall of the main drive housing attachment drive compartment and clamp same by the clamping washer and the socket head cap screw.

Assemble the threading clutch complete onto its shaft together with its rear journal bearing, locknut, the chosen threading driven gears and spacers. Feed the assembly into the attachment drive compartment, locating its rear journal bearing into the rear bearing housing and meshing the driven gears with their driving gears on the centre shaft. Follow by inserting the threading attachment driving sleeve into the bore in the forward wall of the main drive housing to engage the spigot on the threading clutch shaft in order to support the threading clutch assembly. Clamp the threading attachment drive sleeve to the forward wall with socket head cap screws and spring washers and clamp the threading clutch shaft to the threading attachment drive sleeve with self locking hexagon nuts. Connect the oil supply to the rear bearing housing, two connections being provided from the top of the

main drive housing forward of the upper worm wheel. The oil supply is adjusted at the distributor block on top of the housing.

The clutch actuating shaft together with its latch mechanism and operating glut should be fitted after assembling the clutch into the machine, with the actuating spring being removed for this purpose. With the operating glut adjusted and clamped onto its actuating shaft so that in the "ON" position there is a 1/64" (0.4mm) clearance between the clutch bobbin and the adjacent clutch parts and the latch has 0.015" (0.038mm) clearance to drop into engagement. The actuating spring should then be assembled and correctly tensioned with the two locknuts.

In station 4 and 5 the clutch actuating shaft reset collar and hexagon locknut should be set with the sliding block fully back in order to obtain the above conditions.

In stations 3 and 6 the reset block is set on the push rod so that when the rod is fully back and with the interaction of the actuating shaft reset collar and hexagon locknut, the clutch aforementioned "ON" conditions are achieved.

In all stations the pair of hexagon locknuts limiting the travel into the "OFF" position should be set so there is 1/32" (0.8mm) clearance between the bobbin and the adjacent clutch parts.

Both sides of the clutch should then be adjusted and finally the actuating spring should be adjusted so that the clutch will trip satisfactorily. When the threading clutch drive is used with self opening dieheads, the actuating spring with its hexagon locknuts should be removed. The latch and its pivot pin are then removed. The pair of locknuts on the clutch actuating shaft must then be moved along the shaft and clamped against the coaxial sleeve to retain the clutch in the "ON" position.

Clutch Adjustment

Both sides of the clutch should be adjusted to give satisfactory non-slip drive in the "ON" and "OFF" positions. The serrated cam disc should be tapped around a serration at a time using a flat ended punch and hammer. To increase the driving power, rotation should be clockwise looking from the centre of the clutch towards the clutch plates.

The glut spring should be removed and the clutch tested by levering with a bar between the main drive housing opening and the operating glut. When the clutch is operated from a mid position, the sliding bobbin should first move easily, then build up resistance to a maximum just as the plates compress together and then ease slightly as the internal toggles move over their high point. Set the minimum adjustment to obtain this 'feel' without obtaining clutch slip or overheating. The clutch is a wet type and requires a good oil supply to the plates.

Clutch Dismantling (Servicing or Overhaul Purposes)

This is straight forward procedure, except for the removal of the operating bobbin which must be moved endwise after removing the clutch plates and the adjustment assemblies, rotated through 60 degs. and again moved endwise off the inner member to allow three of the six operating pins to pass the toggles. Reverse the procedure to re-assemble.

The Threading Clutch Drive. Sec.183.

The replacement on a diehead drive of the driven gear and its adaptor plate by a threading clutch results in a universal threading drive which can be used for solid taps or dies. This unversal threading drive gives an "ON" ratio and an "OFF" ratio. When more than one threading clutch is fitted, the following conditions apply:-

R.H. threads together:
Two different "ON" ratios may be fitted
One "OFF" ratio only may be fitted

L.H. threads together:
One "ON" ratio only may be fitted
Two different "OFF" ratios may be used

R.H. & L.H. threads together:
One R.H. "ON" & one L.H. "OFF" ratio may be fitted
One R.H. "OFF" & one L.H. "OFF" ratio may be fitted

To cut L.H. threads the clutch assembly must be reversed on its shaft. It should be noted that the driven gear for L.H. "ON" ratios must be built into the clutch and is not readily changeable

When the threading clutch is fitted for use with a self opening diehead, the "ON" ratio is engaged continuously by retaining the glut shaft in the one position. This avoids frequent stripping and refitting of the clutch drive to suit solid taps and dies or self opening dieheads. It also permits different "ON" ratios to be used concurrently when using more than one self opening diehead. It is also necessary when left and right hand threads are cut concurrently with self opening dieheads.

Calculating Work Spindle Revolutions for Threading

When considering using threading attachments,it is first necessary to establish the number of work spindle revolutions required. These depend on the lead, the length of thread to be cut and the threading ratios used, an allowance of two threads being made for starting.

When using self-opening dieheads the number of work spindle revolutions required may be found by multiplying the number of threads to be cut, plus the allowance for starting, by the "ON" ratio used.

Calculation "A"

Work spindle revolutions = {(length of thread X TPI) + 2} X ON ratio.

Example:- To cut a 20 T.P.I. thread 3/4" long with an "ON" ratio of 5, work spindle revolutions are {(3/4" X 20 T.P.I.) + 2} X 5} = 85 work spindle revolutions.

Solid Taps and Dies

When using solid taps and dies extra revolutions must be allowed for the tap or die to run off the job.

Calculation "B"

Work spindle revolutions = {(length of thread X T.P.I.) + 2 X {"ON" ratio + "OFF" ratio}

Example:- To cut a 20 T.P.I. thread 3/4" long with an "ON" ratio of 5 and an "OFF" ratio of 2, work spindle revolutions are {(3/4" X 20 T.P. I.) + 2} X {5 + 2} which equals 119 work spindle revolutions.

When working in metric the length of thread X T.P.I. is replaced by the length of thread divided by the pitch in the preceding calculations.

When threading in stations 3,4 or 5 and using standard timing cams, ascertain that the work spindle revolutions required for threading do not exceed the available cutting revolutions which are given on the speed and feed chart. The available cutting revolutions depend on the cycle time and are determined by the longest operation which, in some cases, may be the threading operation.

When threading in stations 3 and 6 and employing accelerated threading cams to make provision for the cut-off operation in these stations, (station 6 on a single bar feed machine and stations 3 and 6 on a double bar feed machine), the work spindle revolutions required for threading should not normally exceed half of the available cutting revolutions. When using accelerated threading cams provision is made for the return cam to be retarded in two steps, giving a maximum 9/16th or 5/8th of the available cutting revolutions for threading. The use of these figures will be dependent upon the operation occupying the remainder of the available cutting revolutions such as cut-off.

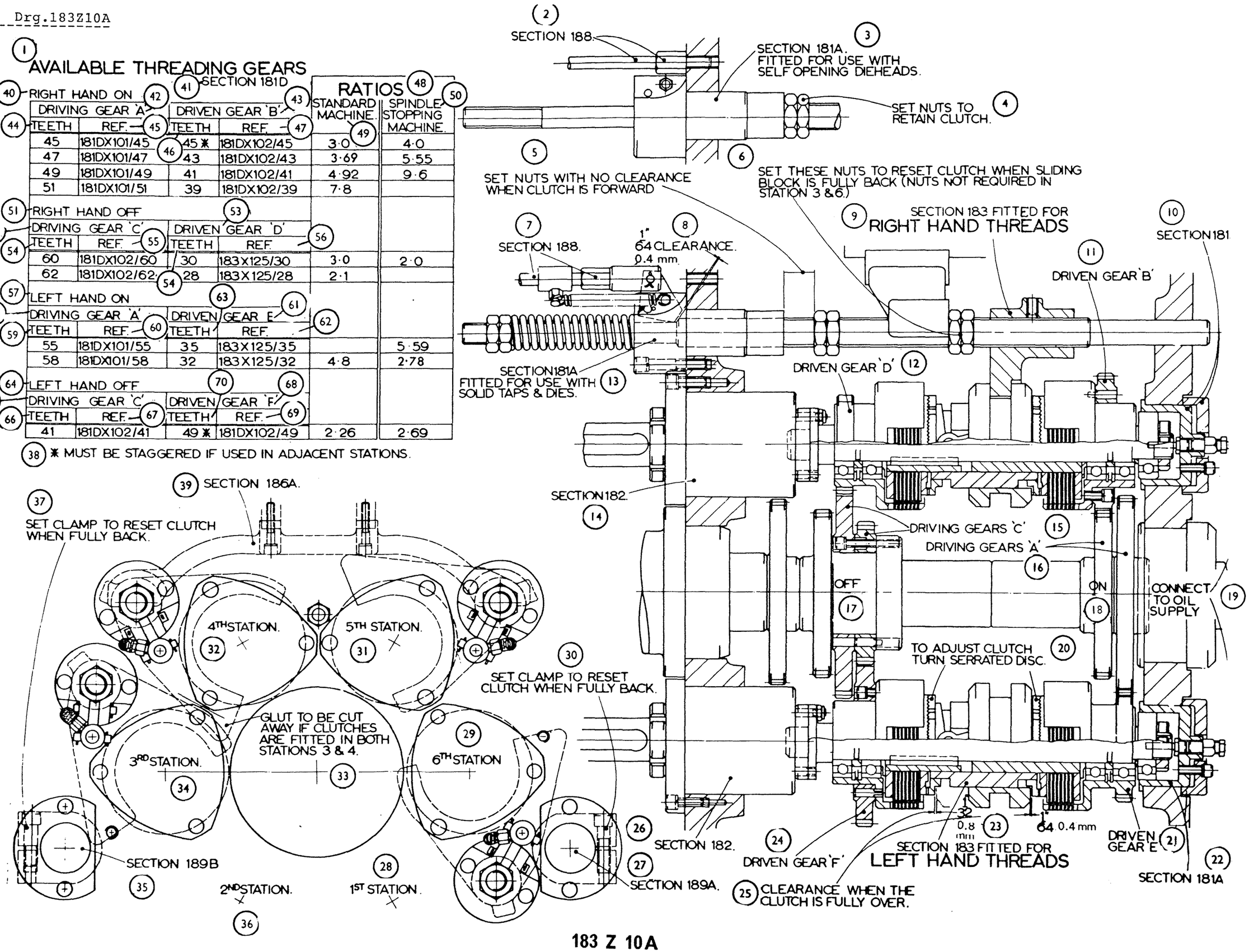
If the calculated revolutions required for threading exceed the maximum, either the cylce time must be increased to give more available cutting revolutions or a faster "ON" ratio must be used.

Setters Notes

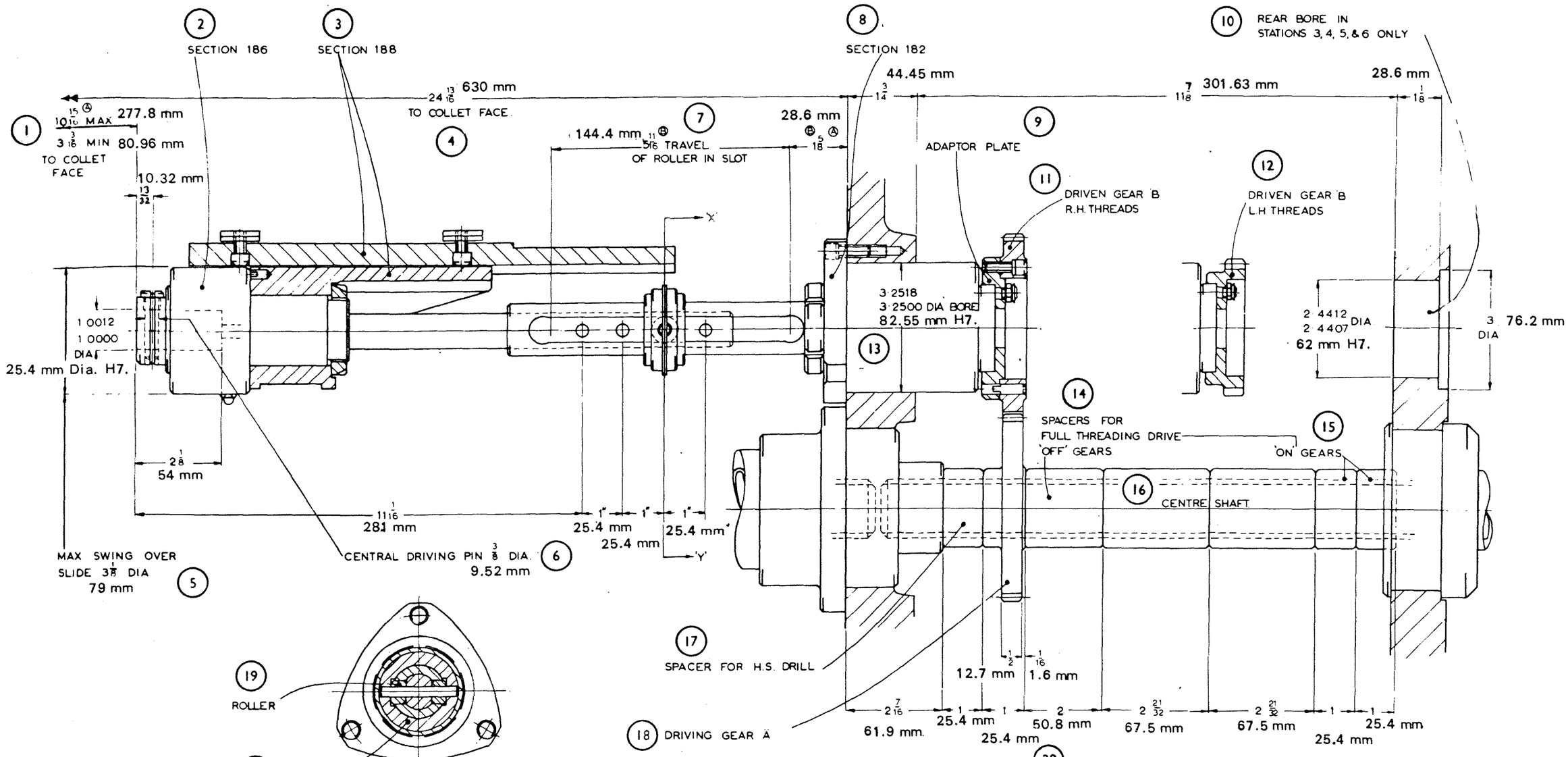
(1) AVAILABLE THREADING GEARS

(40) RIGHT HAND ON		(41) SECTION 181D		(48) RATIOS	
(42) DRIVING GEAR 'A'		(43) DRIVEN GEAR 'B'		(49) STANDARD MACHINE.	(50) SPINDLE STOPPING MACHINE.
(44) TEETH	(45) REF.	TEETH	REF. (47)		
45	181DX101/45	(46) 45 ✱	181DX102/45	3·0	4·0
47	181DX101/47	43	181DX102/43	3·69	5·55
49	181DX101/49	41	181DX102/41	4·92	9·6
51	181DX101/51	39	181DX102/39	7·8	
(51) RIGHT HAND OFF		(53)			
(52) DRIVING GEAR 'C'		DRIVEN GEAR 'D'			
(54) TEETH	REF. (55)	TEETH	REF. (56)		
60	181DX102/60	30	183X125/30	3·0	2·0
62	181DX102/62	(54) 28	183X125/28	2·1	
(57) LEFT HAND ON		(63)			
(58) DRIVING GEAR 'A'		DRIVEN GEAR 'E' (61)			
(59) TEETH	REF. (60)	TEETH	REF. (62)		
55	181DX101/55	35	183X125/35		5·59
58	181DX101/58	32	183X125/32	4·8	2·78
(64) LEFT HAND OFF		(70)	(68)		
(65) DRIVING GEAR 'C'		DRIVEN GEAR 'F'			
(66) TEETH	REF. (67)	TEETH	REF. (69)		
41	181DX102/41	49 ✱	181DX102/49	2·26	2·69

(38) ✱ MUST BE STAGGERED IF USED IN ADJACENT STATIONS.



183 Z 10A



24 AVAILABLE THREADING GEARS

25 DRIVING GEAR A		26	DRIVEN GEAR B		27	RATIOS.	
TEETH	REF. 28		TEETH	REF. 28		STANDARD MACHINE 30	SPINDLE STOPPING M/C 31
45	181DX101/45	22 R.H. THREADS	45 ✱	181DX102/45		3·0	4·0
47	181DX101/47		43	181DX102/43			5·55
49	181DX101/49		41	181DX102/41		4·92	9·6
51	181DX101/51		39	181DX102/39		7·8	
52	181DX101/52		38	181DX102/38		11·4	
55	181DX101/55	23 L.H. THREADS	35	181DX103/35			5·59
58	181DX101/58		32	181DX103/32		4·8	

33 SEC. 181 D.

✱ CANNOT BE USED IN ADJACENT STATIONS.

32

29

182 Z 10A

Threading Attachment Drive Sleeve. Sec.182

When using a self-opening diehead or collapsing tap, the drive sleeve only may be used to drive the threading spindle as it gives an "ON" ratio only, with the driven gear mounted on its adaptor plate engaging the driving gear on the centre shaft. This arrangement is known as diehead drive. When more than one diehead drive is fitted to the machine with the ratio gears in the same plane, the ratio must be the same for each. If it is required to fit attachment drive sleeves in adjacent stations, the driven gears must not exceed 42 teeth. Should different diehead ratios be required concurrently, these can be obtained by using the threading clutch drive in one of the stations.

5.5 Fitting the Threading Units to Stations 4 and 5

Assemble the threading spindle, Sec.186, into the attachment body and slide, Sec.188, radially locating and clamping the threading spindle housing into the attachment body with the coaxial washer and slotted locknut.

Assemble the retaining collar and spring clip onto the driving portion of the threading attachment drive sleeve, Sec.182.

Offer the assembly of the threading spindle and attachment body and slide up to the appropriate upper independent slide (Stn. 4 or 5) locating the tail of the threading spindle into the bore of the driving sleeve of the threading attachment drive, Sec.182. Clamp the body and slide assembly to the independent slide, taking care to position the slide to reduce to a minimum the overhang of the threading attachment body on its slide during its working positions.

Assemble the driving rollers into the driving slots of the drive sleeve and fit the driving pin through the retaining collar, rollers and the tail shaft of the threading spindle, selecting the appropriate hole in the tail shaft which gives satisfactory clearances at each end of the slots of the driving sleeve in the forward and return positions of the threading attachment. Finally fit the roller pin retaining spring clip.

The appropriate pusher brackets, Sec.186A, are fitted to the independent slide and the attachment body together with the push rods, clamps, spring assembly, Sec.186, and and extension spring as shown on drg. 186Z10B. This drawing illustrates the threading unit as used in conjunction with the threading clutch drive or as a diehead drive, finally fit the trip rod with clamp "E" for tripping the threading clutch, or alternatively when using a self opening diehead, the diehead trip rod, clamp "C" and "D" and diehead operating glut.

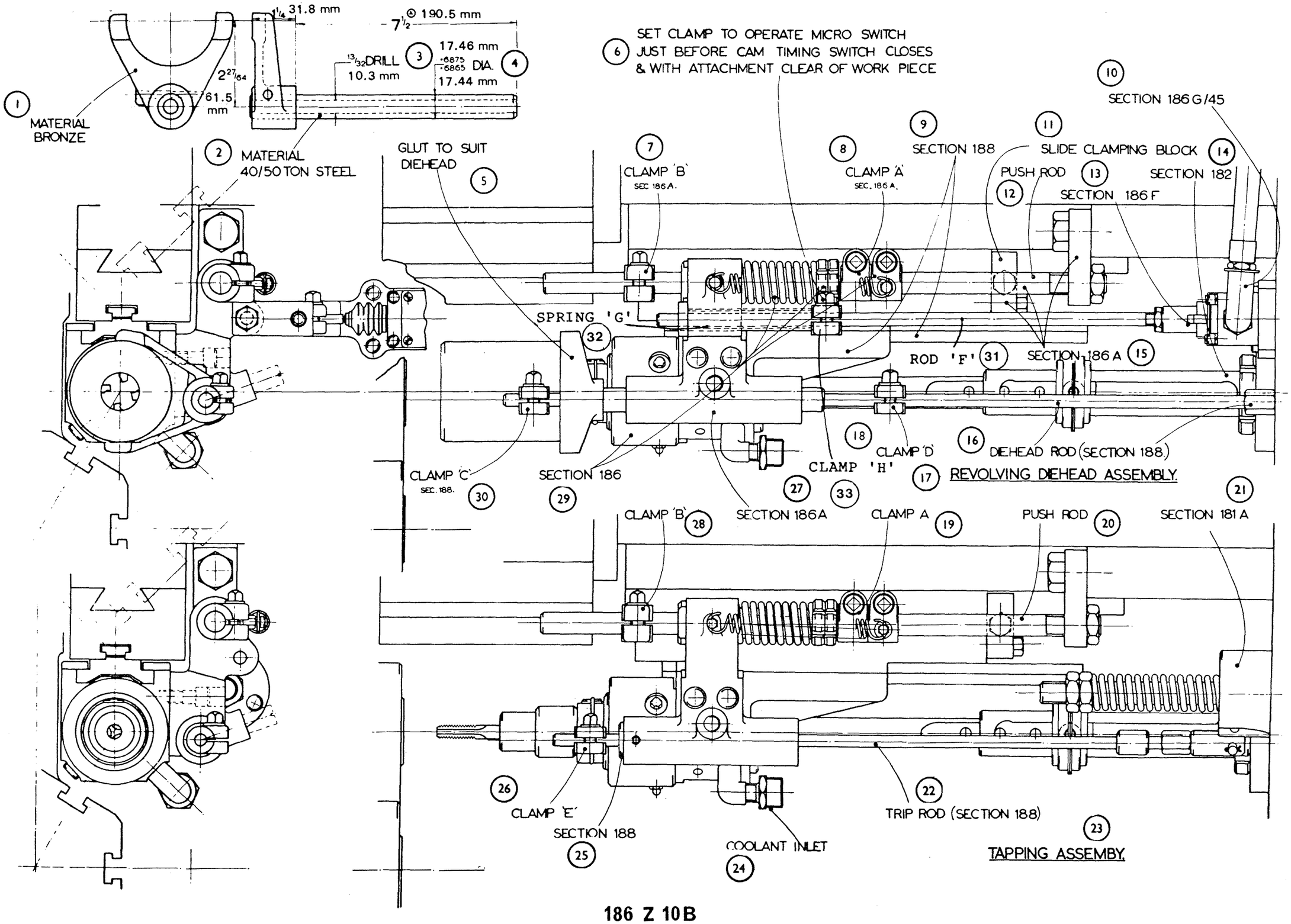
The diehead or tap or button die holder is fitted into the bore at the front end of the threading spindle and is driven by a central pin housed in the spindle nose which passes through the shank of the diehead or tap or button die holder. It is essential that the spring security ring is replaced in the coaxial external groove of the threading spindle nose to ensure that the threaded central pin does not fret loose when the threading spindle is revolving.

When using taps or button dies it is essential that they are mounted in floating holders.

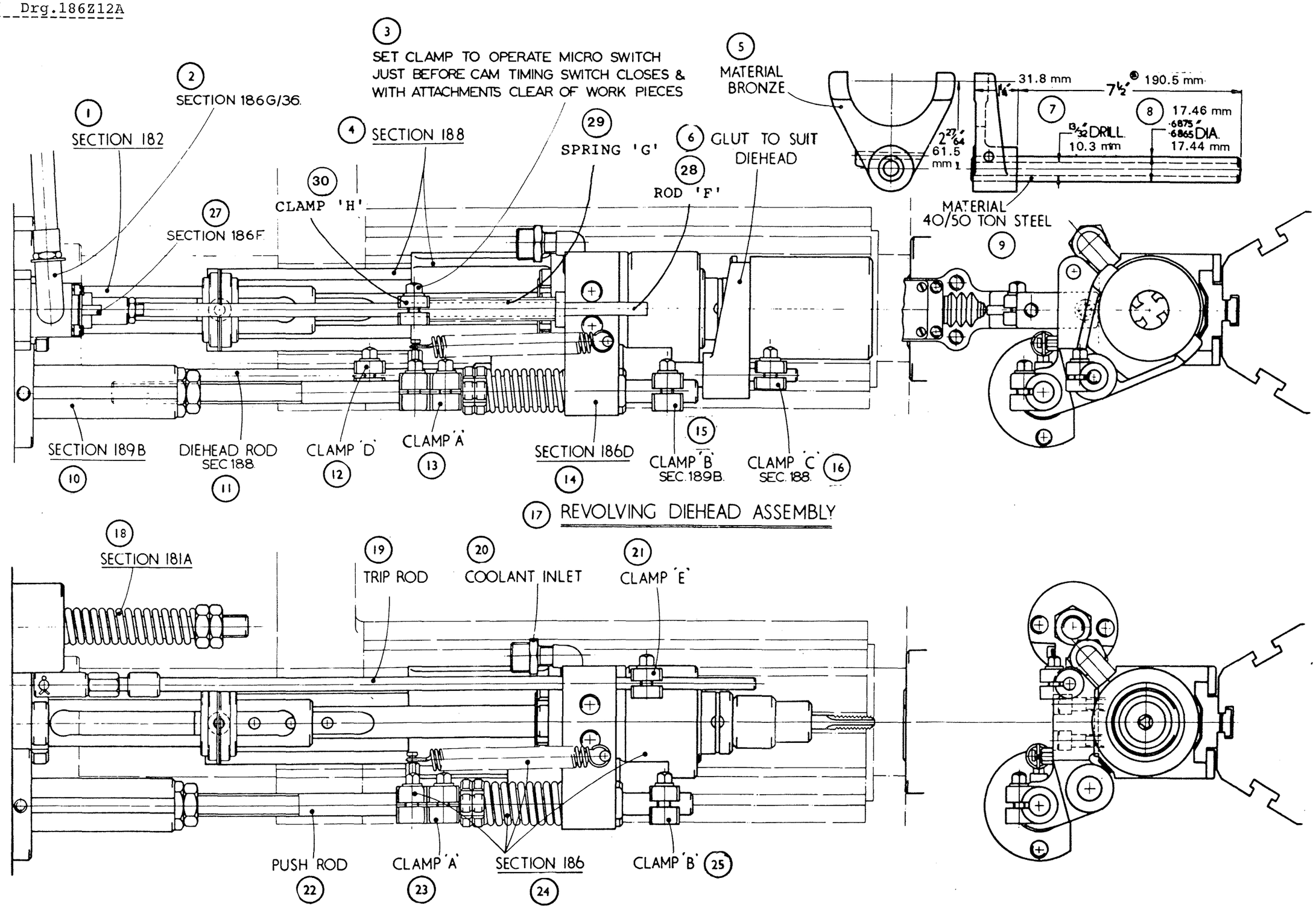
Fitting the Threading Units to Stations 3 and 6

The fitting instructions for stations 4 and 5 equally apply to the stations 3 and 6 with the exception that the units when used in station 3 and 6 are clamped to the centre tool block and pushed by the 3rd and/or 6th auxiliary longitudinal motions, Secs.189A for stn.6 and 189B for stn.3. See drg.186Z11A. It is advisable to fit the auxiliary longitudinal motions before fitting the threading attachments.

Fig.5.6 Drg.186Z10B

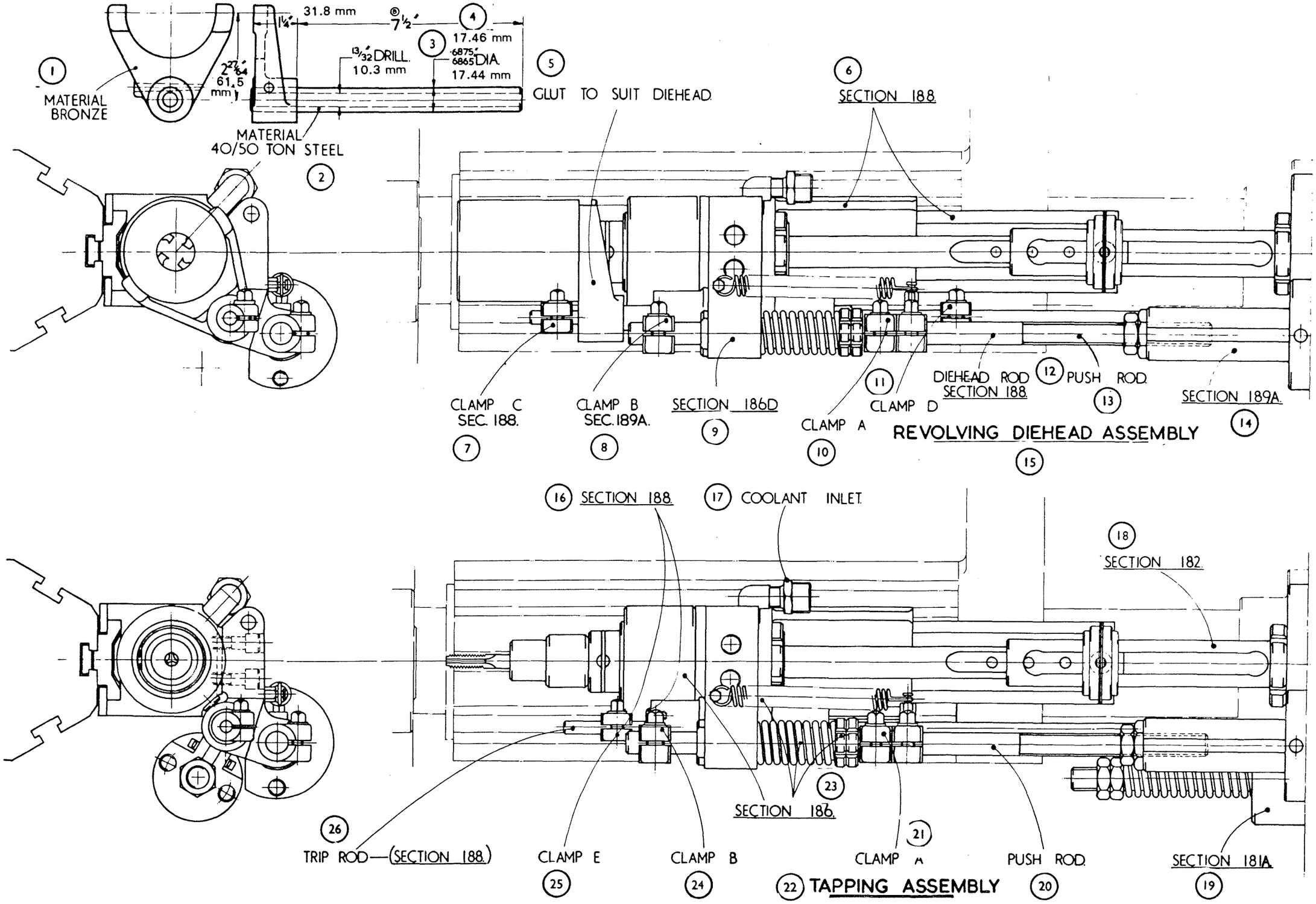


186 Z 10B


3
SET CLAMP TO OPERATE MICRO SWITCH JUST BEFORE CAM TIMING SWITCH CLOSES & WITH ATTACHMENTS CLEAR OF WORK PIECES
5
MATERIAL BRONZE
31.8 mm
7½" 190.5 mm
7
8
17.46 mm
13/32 DRILL. 10.3 mm
-.6875 -.6865 DIA. 17.44 mm
2 27/64 61.5 mm
MATERIAL 40/50 TON STEEL
9
2
SECTION 186G/36.
1
SECTION 182
4
SECTION 188
29
SPRING 'G'
6
GLUT TO SUIT DIEHEAD
28
ROD 'F'
30
CLAMP 'H'
27
SECTION 186F
SECTION 189B
10
DIEHEAD ROD SEC.188.
11
CLAMP 'D'
12
CLAMP 'A'
13
SECTION 186D
14
CLAMP 'B' SEC.189B.
15
CLAMP 'C' SEC.188.
16
17 REVOLVING DIEHEAD ASSEMBLY
18
SECTION 181A
19
TRIP ROD
20
COOLANT INLET
21
CLAMP 'E'
PUSH ROD
22
CLAMP 'A'
23
SECTION 186
24
CLAMP 'B'
25
26 TAPPING ASSEMBLY

186 Z 12A

Fig.5.8 Drg.186Z11A



186 Z 11A

5.6 Setting the Threading Attachment for Stations 4 and 5

Refer to the application drawing when fitting the attachment to the machine. Refer to the attachment chart, Drg.100Y38A, for the sections required to build and fit these attachments in stations 4 and 5.

Setting instructions for taps, button dies and self opening dieheads:-

(1) Set the stroke setting block on the appropriate feed operating quadrant lever to the scale setting as calculated using the following described procedures. Make sure the stroke setting block is securely clamped after setting the stroke or making adjustments to the stroke.

(2) Handwind the machine to the begining of feed stroke.

(3) Adjust clamp 'A', Sec.186A, until the tap, button die or diehead dies are just clear of the thread to be cut in or on the workpiece. If the length of thread to be cut is less than the scale setting, a minimum clearance equal to the scale setting less the thread length must be set between the threading tool and the start of the thread in or on the workpiece.

(4) Self opening dieheads only:- Set clamp 'B', Sec.186A, with a minimum clearance equal to the thread length plus the clearance set between the dies and the thread start on the workpiece less the scale setting. It is advisable to start with more clearance than specified and adjust closer after diehead trip has been set correctly. This clamp must not contact the push sleeve before the diehead has opened.

Colapsing taps may also be used, but the machine manufacturer's advice should be sought at the planning stage regarding capacity limitations.

(4a) Taps and Button Dies only:- Set clamp 'B', Sec.186A, with a minimum clearance equal to the thread length plus the clearance between the tap or button die and the work plus 1/8". It is advisable to start with more clearance than this and adjust closer after the clutch trip has been set correctly. This clamp 'B' must not contact the push sleeve before the tap or button die has finished cutting the thread, reversed out and is clear of the thread.

(5) Self opening dieheads only:- Set clamp 'C',Sec.188, to open the diehead when the correct length of thread has been cut. The forward motion of the push rod must have ceased before the diehead opens.

(5a)Taps and button dies only:- Set the clamp 'E', Sec.188, to trip the clutch into reverse when the tap or button die has reached the specified length of thread to be cut. This can be done by setting the clamp clear of the bush by an amount equal to the thread length plus the clearance set, less 1/8" (3mm).

(6) If using a threading cam altered to the 1 to 1 feed rate, the clearance in 3 and 4A will be modified. If the length of thread is less than 0.18 scale setting, a minimum clearance equal to 0.18 scale setting less the thread length must be set between the tap or die and the work.

(7) Self opening dieheads only:-
Set clamp 'D', Sec.188, to close the diehead when the attachment is fully back.

General Notes on Setting Threading Attachments

These notes are applicable to attachments in all the threading stations, ie. 3,4,5 & 6.

It is advisable to check threading attachment threadings by use of the "jog" button and with the index clutch out so that all settings and adjustments can be checked and modified if necessary.

Never handwind the machine through feed when threading is set and a component is at the threading station.

Never handwind the machine backwards without either relieving the clamp 'A', see Drg.186Z10B,186Z11A & 186Z12A, and ensuring that the tap or button die is clear of the workpiece, or removing the tap or button die from the attachment. When using a self opening diehead, this may be tripped open in order to handwind backwards.

When setting, watch the movement of the attachment to observe whether the threading clutches are slipping; movement ceases when this occurs and the machine should be stopped immediately.

The scale setting, the clearance to be set between the threading tools and the start of the thread and the threading cams to be used should be specified on the tool layout and not left to the setter to calculate.

These threading instructions refer to normal threaded components. Should it be required to thread very long components, reference should be made to the machine's manufacturer.

5.7 Setting the Threading Attachment for Stations 3 and 6

Having selected the appropriate threading cam for the required scale setting, assemble the cam onto the drum on the main camshaft. This is essential before fitting the auxiliary longitudinal motion.

(1) Set the stroke setting block on the appropriate feed operation quadrant lever to the scale setting as calculated.

(2) Handwind the machine to the begining of the feed stroke.

(3) Adjust clamp 'A', Sec.189A, until the tap, button die or diehead dies are just clear of the thread to be cut in or on the workpiece at the begining of the feed cycle. If the length of thread to be cut is less than the feed stroke setting, a minimum clearance equal to the feed stroke less the thread length must be set between the threading tool and the start of the thread in or on the workpiece.

(4) Dieheads only:-

Set clamp 'B', Sec.189B, so that whilst never touching the push sleeve during the forward motion of the diehead, it would never-the-less give a positive pull back to the attachment should the return spring fail.

(4A)Taps and button dies only:-

Set clamp 'B', Sec.189B, so that whilst never touching the push sleeve during the forward motion of these cutting tools, it would never-the-less give a positive pull back to the attachment should the return spring fail.

(5) Dieheads only:-

Set the clamp 'C' to arrest the diehead opening glut and sleeve so that the continued forward motion of the diehead to open same, cuts the required length of thread. The forward movement of the push rod must have ceased before the diehead opens.

(5A) Taps and button dies only:-

Set clamp 'E' to trip the threading clutch into reverse when the tap has reached full depth. This is achieved by setting clamp 'E' clear of the bush in the attachment pusher bracket by an amount equal to the thread length plus the clearance set between the tap or the button die and the start of the thread in or on the workpiece,less 1/8" (3.17mm).

(6) Dieheads only:-

Set clamp 'D' to close the diehead when the threading attachment is fully back.

Calculating the Scale Setting for Threading Cams for Staions 4 & 5

The 4th & 5th station threading cams have the same amount of rise as the standard feed cams and therefore the total stroke is equal to the scale setting plus fast motion.

The rate of feed during the feed stroke is twice the feed rate of the standard feed cams,ie. twice the feed rate given on the feed and speed charts for the particular scale setting.

Calculation of scale setting for threading:-

$$\text{Scale setting in inches} = \frac{\text{Available\_cutting\_revs.}}{2 \times \text{"On" ratio} \times \text{t.p.i.}}$$

$$\text{Scale setting in mm} = \frac{\text{Available\_cutting\_revs.}}{2 \times \text{"On" ratio.}}$$

For example, to cut a 20 t.p.i. thread using an "On" ratio of 5:
From speed and feed chart, available cutting revolutions = 100 (this is determined by the longest operation).

$$\text{Scale setting} = \frac{100}{2 \times 5 \times 20 \text{ t.p.i.}} = \frac{100}{200} = 1/2"$$

For example, to cut a 1.5mm pitch thread using an "On" ratio of 5:
From speed and feed chart, available cutting revolutions = 100 (this is determined by the longest operation).

$$\text{Scale setting} = \frac{100 \times 1.5\text{mm}}{2 \times 5} = \frac{150}{10} = 15\text{mm}$$

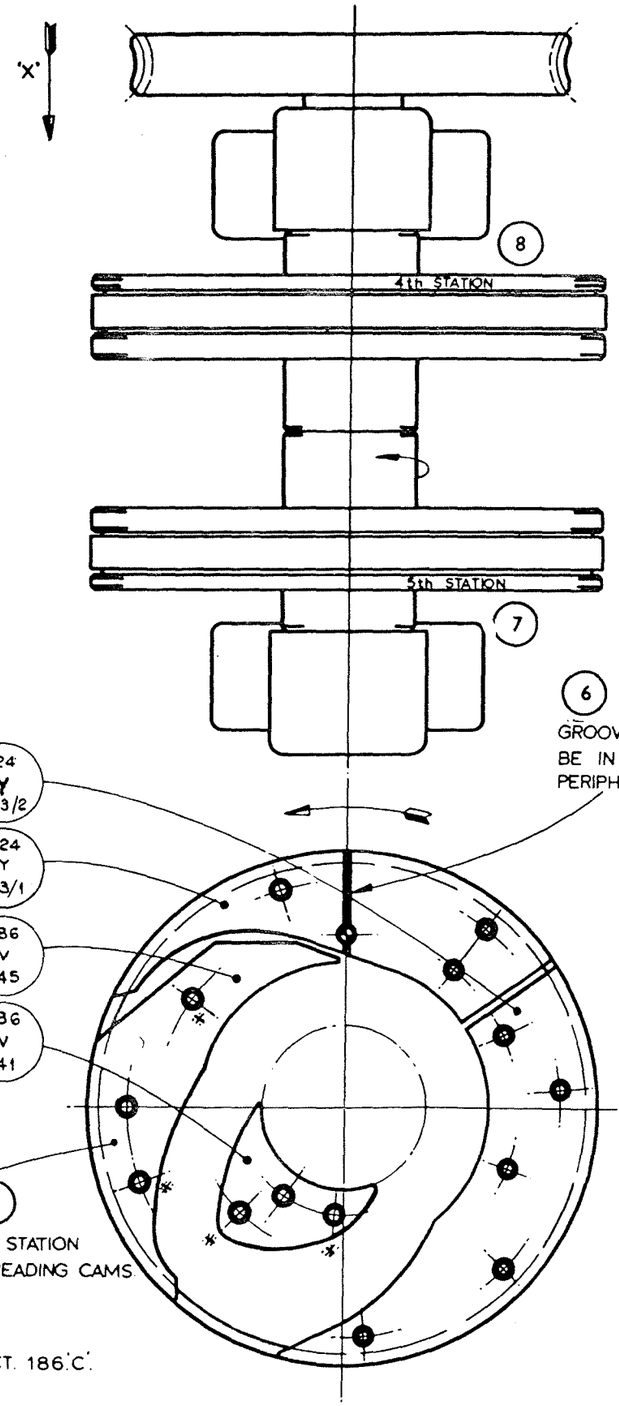
Threading cams are marked with a line indicatiing a 1:1 feed rise at the top end of the cam. Cams can be cut to this line which will give an approach stroke at 2:1 and a threading stroke at 1:1 and the feed rate will be as given on the feed and speed charts. The scale setting required will be twice that given by the calculations above. The modified cam is useful on very long components with a thread at the work spindle end of a long plain portion, e.g. stop tap spindles.

NOTE: The total stroke will be approximately 8/9 x scale setting (plus the machine fast motion stroke). Data to be given on the layout

For the modified cam, the scale setting calculations will be:-

$$\text{Scale setting in inches} = \frac{\text{Available\_Cutting\_Revolutions}}{\text{"ON" ratio} \times \text{T.P.I.}}$$

$$\text{Scale setting in mm} = \frac{\text{Available\_Cutting\_Revolutions\_x\_Pitch\_of\_Thread}}{\text{"ON" ratio}}$$

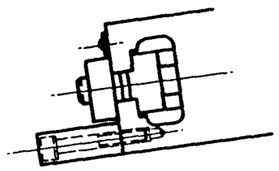


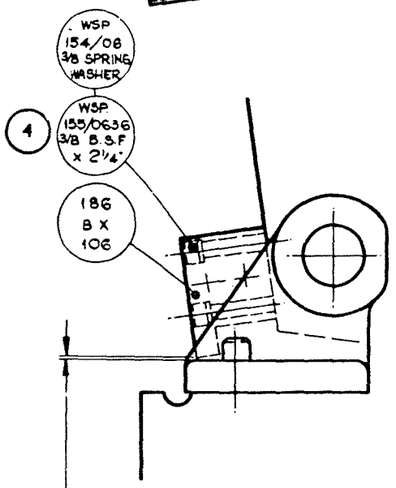
(9) TO FIND SCALE SETTING REQUIRED (9)

Scale setting in m.m.

$= \frac{\text{Available cutting revs x pitch.}}{\text{2 x 'On' Ratio}}$

FEED PER REV. IS TWICE THAT SHOWN ON FEED & SPEED CHART.
FOR ANY GIVEN FEED SCALE SETTING
TOTAL STROKE = SCALE SETTING + FAST MOTION.
APPROACH STROKE = FAST MOTION.
FEED STROKE = SCALE SETTING.



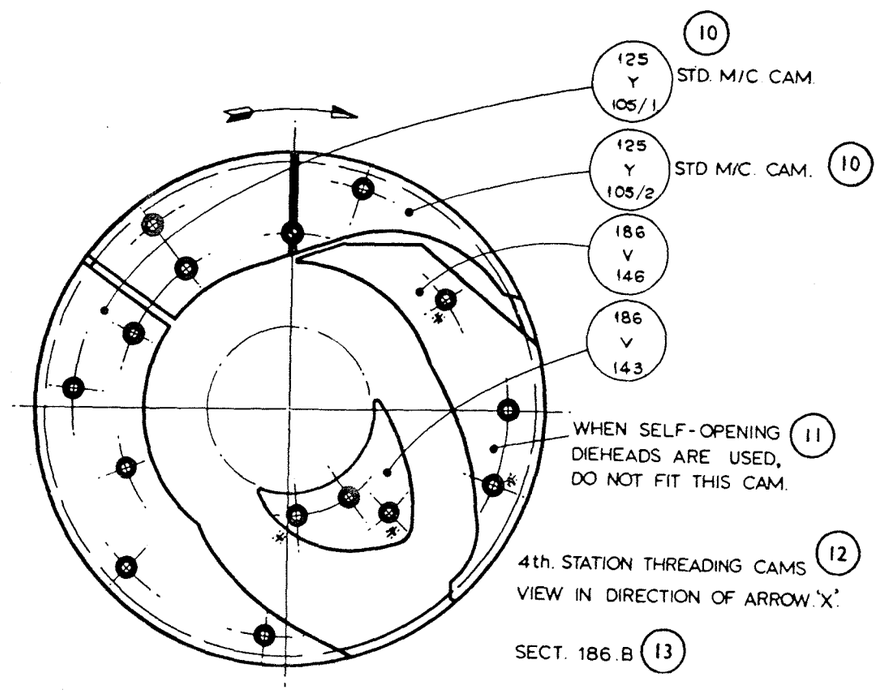


3 ADJUST FACE OF LUG TO GIVE 1/64 CLEARANCE WHEN ROLLER IS ON PEAK OF CAM.

2 WHEN SELF-OPENING DIEHEADS ARE USED DO NOT FIT THIS CAM.

14 SECT. 186.'C'.

6 GROOVE ON OUTER CAMS TO BE IN LINE WITH NOTCH ON PERIPHERY OF CAM CARRIER.



WHEN SELF-OPENING DIEHEADS ARE USED, DO NOT FIT THIS CAM. (11)

4th. STATION THREADING CAMS (12) VIEW IN DIRECTION OF ARROW 'X'.

SECT. 186.B (13)

186 BY 2 B

5.8 Scale Setting for Threading Cams in Stns.3 & 6

A range of four cams are available for stations 3 and 6. These are shown on Drg. No.187Z2A. Whereas the feed stroke and the scale setting for threading in stations 4 and 5 are identical, this is not so for stations 3 and 6.

In these stations, it is first necessary to determine the feed stroke to provide the required feed for the thread to be cut as specified in the following formula. When the feed stroke has been determined, the quadrant scale setting for the selected cam can be determined by reference to the feed stroke/scale setting chart at item '1' on Drg.No.187Z2A. This shows the feed stroke in mm/inches and parallel to this is the scale setting for the chosen cam. In order to find the quadrant scale setting, mark the required feed stroke on the vertical scale marked "FEED STROKE", then draw a horizontal line across to the scale setting for the appropriate cam. Where the horizontal line intersects, the scale setting line is the figure for positioning the stroke setting block on the quadrant scale.

The feed stroke may be determined as follows:-

$$\text{Feed stroke reqd:} = \frac{\text{The available cutting revolutions X thread pitch}}{5.5 \text{ X "ON" ratio}}$$

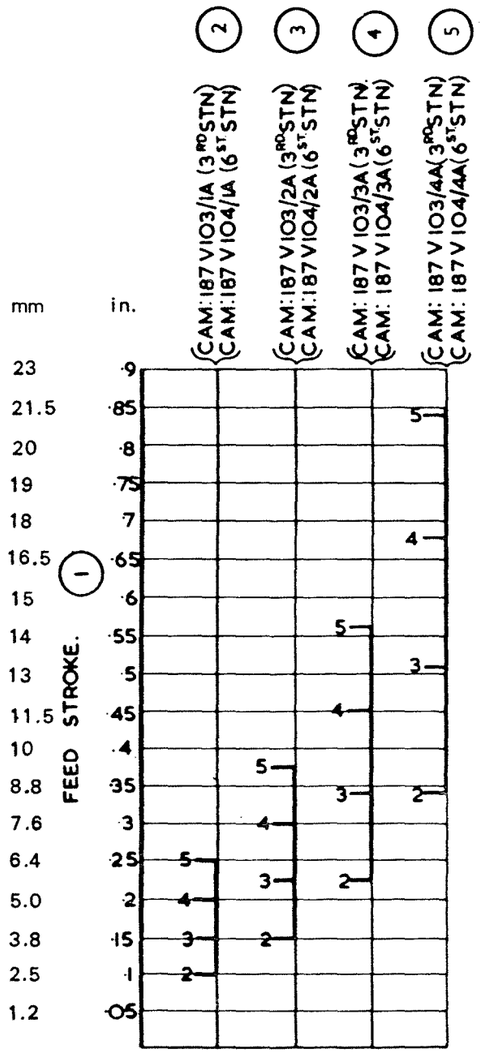
Example:- To cut a 1.5mm pitch thread using an "ON" ratio of 5. From the speed & feed chart the available cutting revolutions ('n' 148 deg.) equals 322.

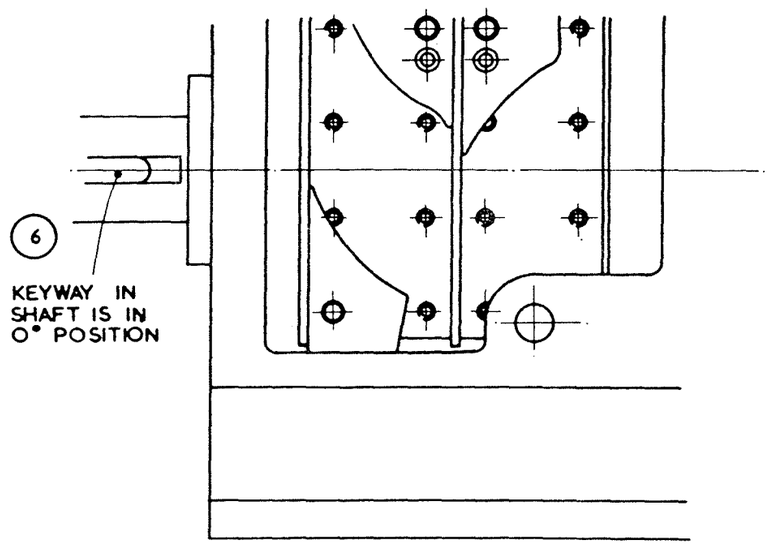
$$\text{The feed stroke} = \frac{322 \text{ X } 1.5}{5.5 \text{ X } 5} = \frac{483}{27.5} = 17.6\text{mm}$$

The quadrant scale setting would then be 4.0 and the selected feed cam indicated at item '5' on Drg.187Z2A.

The formula for the feed stroke computation has two variables for a given thread pitch, the available cutting revolutions and the "ON" ratio. The "ON" ratio is determined by the optimum surface speed for cutting the material to be threaded. The available cutting revolutions are directly dependent upon the cycle time. The choice of cam is dependent upon the tooling considerations and this will have a bearing on the cycle time and hence the available cutting revolutions.

The cam giving the greatest scale setting should be used wherever possible for ease of removal of bar ends. The scale setting which gives the total stroke in inches must be at least equal to the distance from the end of the workpiece to the furthest end of the thread to be machined, plus 1" to allow clearance for the bar stop.





12 VIEW SHOWING DRUM WITH 3RD AND 6TH THREADING CAMS IN POSITION.

TO OBTAIN FEED STROKE REQUIRED.

USE THE FOLLOWING FORMULA FOR STROKE REQUIRED FOR BOTH 3RD AND 6TH STATION CAMS.

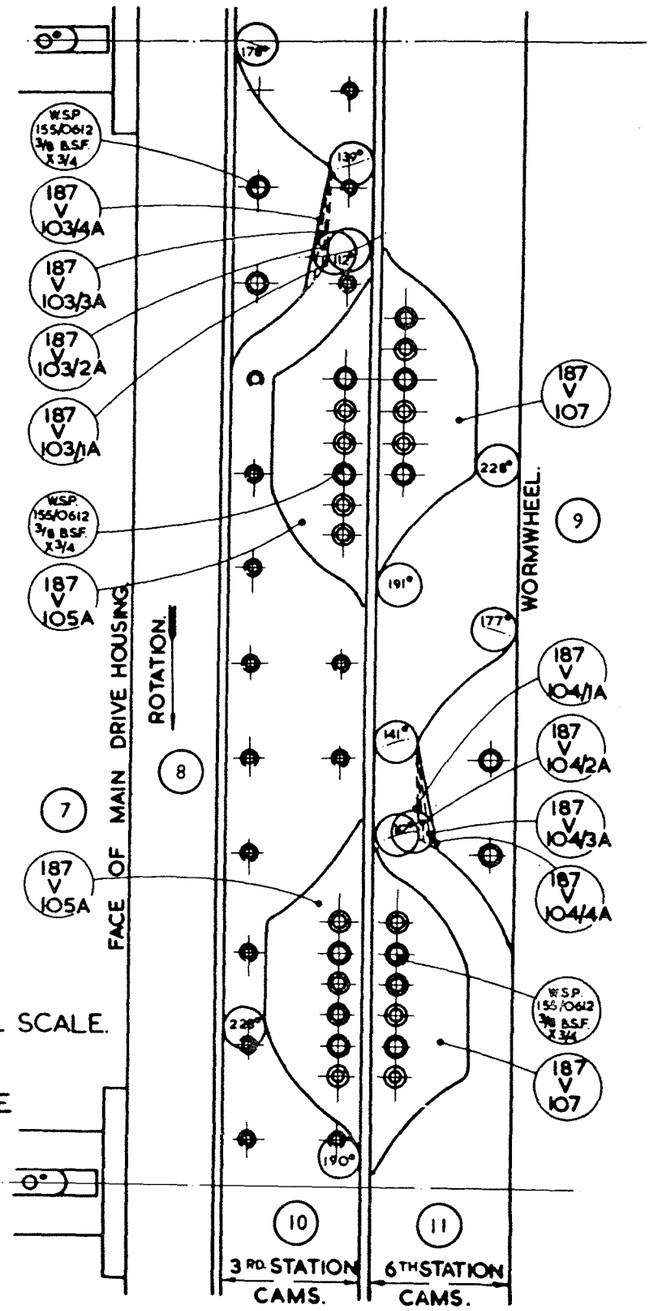
FEED STROKE REQUIRED. = AVAILABLE CUTTING REVS. / 5·5 X T.P.I. X 'ON' RATIO.

13 TO FIND STROKE SETTING.

1. MARK FEED STROKE REQUIRED ON VERTICAL SCALE.
2. DRAW HORIZONTAL LINE ACROSS WHERE THIS LINE CUTS THE CAM LINES. GIVES THE QUADRANT SCALE SETTING.

IT IS ADVISABLE TO USE THE HIGHER SETTING WHERE ALTERNATIVE IS POSSIBLE.

NOTE:- SCALE SETTING GIVES TOTAL STROKE IN INCHES.



187 Y 2A

5.9 Threading Attachment Return Check Switch

The unit is fitted to the threading attachment when used in stations 4 and 5. It can also be fitted in station 3, single bar feed machines only, providing the threading operation is not combined with a part off operation in this station.

It consists of a bracket mounted micro switch with a spring cushioned bell crank lever, a spring operated rod, stop plate, Sec.186F, and the necessary electrical connections, Sec.186G.

The unit is designed to close a micro switch on the threading attachment return stroke to allow the machine to continue in its continuous production mode. Failure of the threading attachment to return keeps the micro switch open and allows the feed trip cam on the longitudinal camshaft to operate the adjacent micro-switch to de-energise the electro-magnetic feed clutch and brake to allow the brake springs to apply the braking pressure to arrest the feed shaft at the end of the cycle with the collet open and to stop work spindle rotation.

The switch bracket is bolted to the main drive housing attachment face, and the stop plate bolted to the threading attachment bracket; the operating rod carrying the spring and the clamp is passed through the stop plate and assembled to the bell crank lever in the micro switch assembly.

The mechanism is set by hand-winding the machine until the feed trip switch de-energises the feed during the slides return. Then handwind backwards three turns of the crank handle, and set the clamp on the operating rod to compress the spring/springs and hold the micro switch in its closed position. Check that sufficient spring movement is available to cover any further return stroke.

It is advisable to check the action of the micro switch daily by holding the rod so that it does not operate the switch and in this condition the feed should be tripped when the attachment returns.

5.10 Attachment Body & Slide. Sec.188, Drg.188Z10

The attachment body and slide is designed to carry reamers, the threading spindle, the High Speed Drilling spindle and any other end working tools of the shank type.

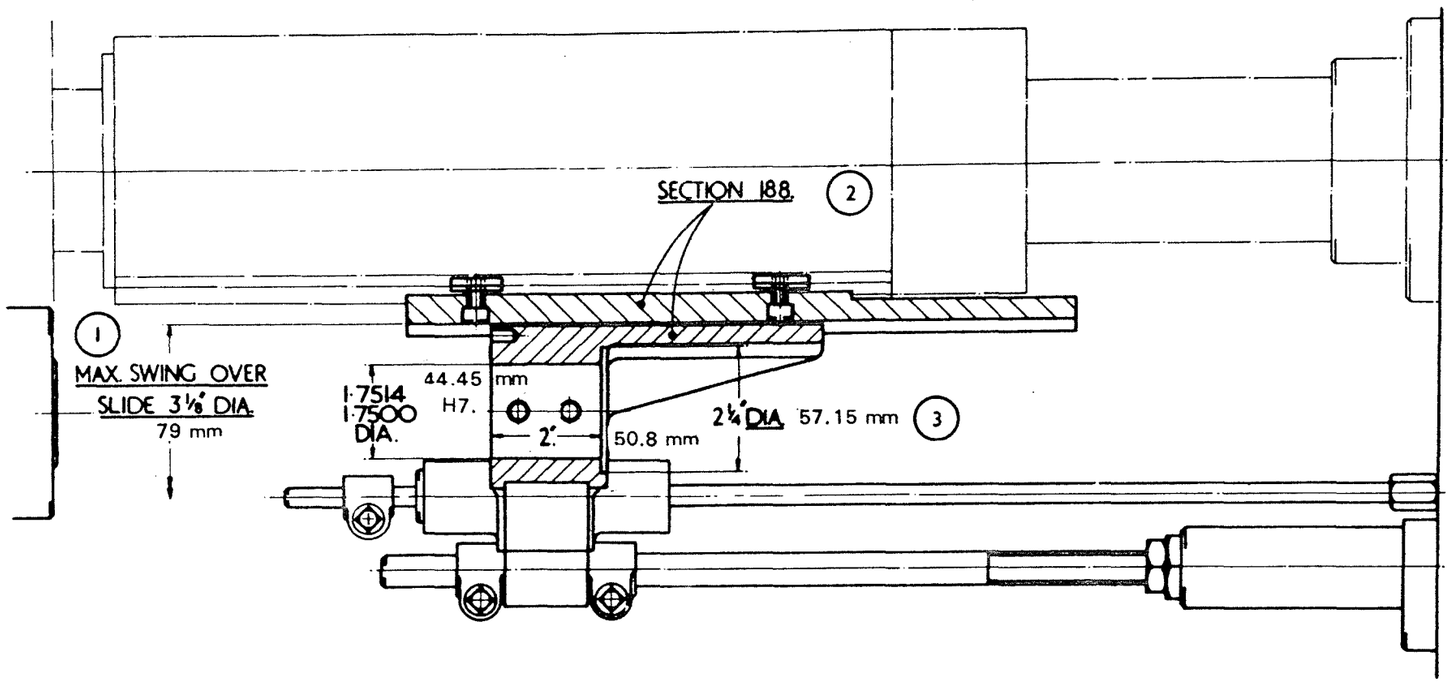
The attachment body and slide can be fitted in the 3rd and/or 6th stations, the slide being mounted on the centre tool block. It can also be mounted in the 4th and 5th stations on the independent longitudinal slides.

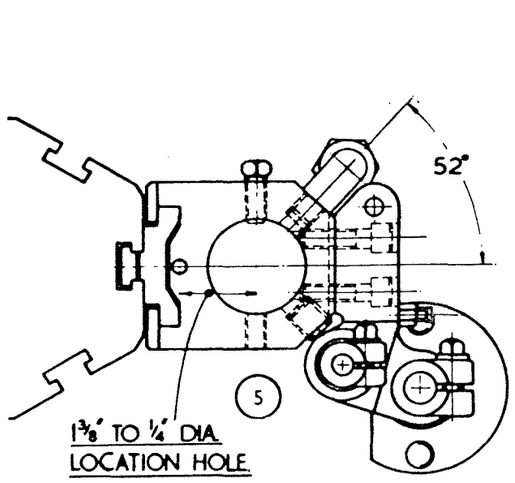
The attachment is operated in stations 3 and 6 by cams through the auxiliary longitudinal motion for the station concerned. See Drg.189Z10. Cams are available for accelerated and standard timing reaming and for threading in station 3 and for accelerated timing reaming and for threading in station 6. Drg.187Y2A shows the cams for threading and Drgs.187Y1A & 187Y3A for reaming.

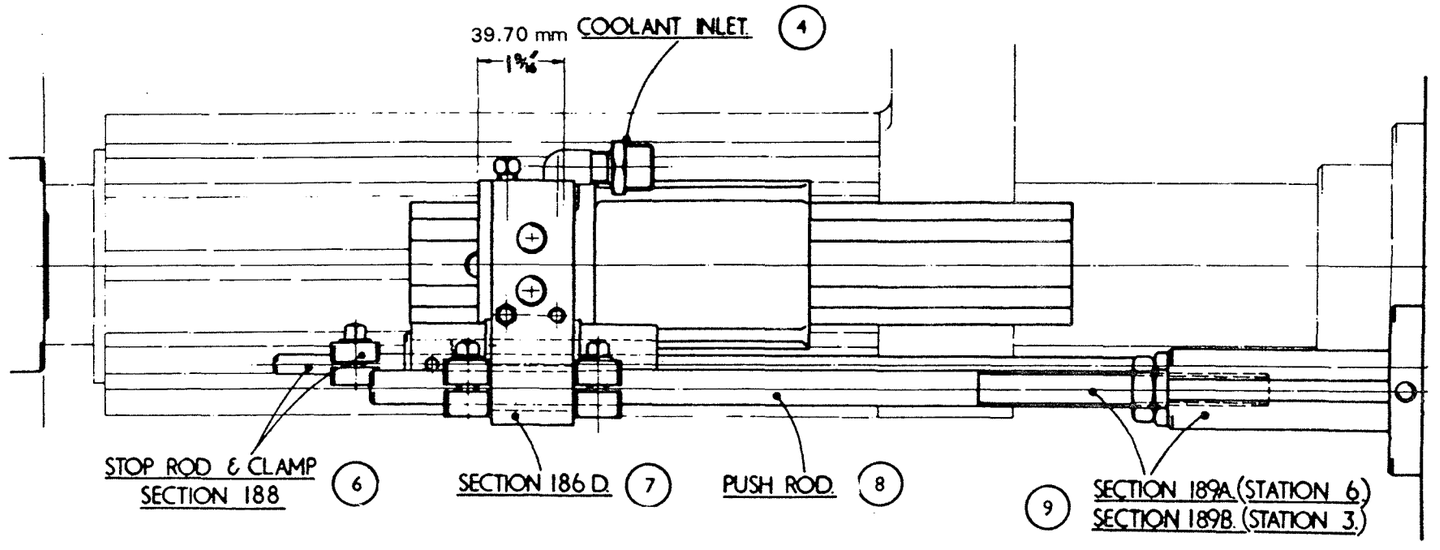
Four reaming feed cams are available for accelerated timing in station 3 and 6 and two for standard timing in station 3. A range of cams is required to give different proportions of feed to approach stroke. Standard timing cams are timed with the centre block, whilst accelerated timing cams return early to clear the work prior to the completion of the cut-off operation.

Four threading feed cams are available for stations 3 and 6 to cover a wide range thread leads, cycle times and threading ratios.

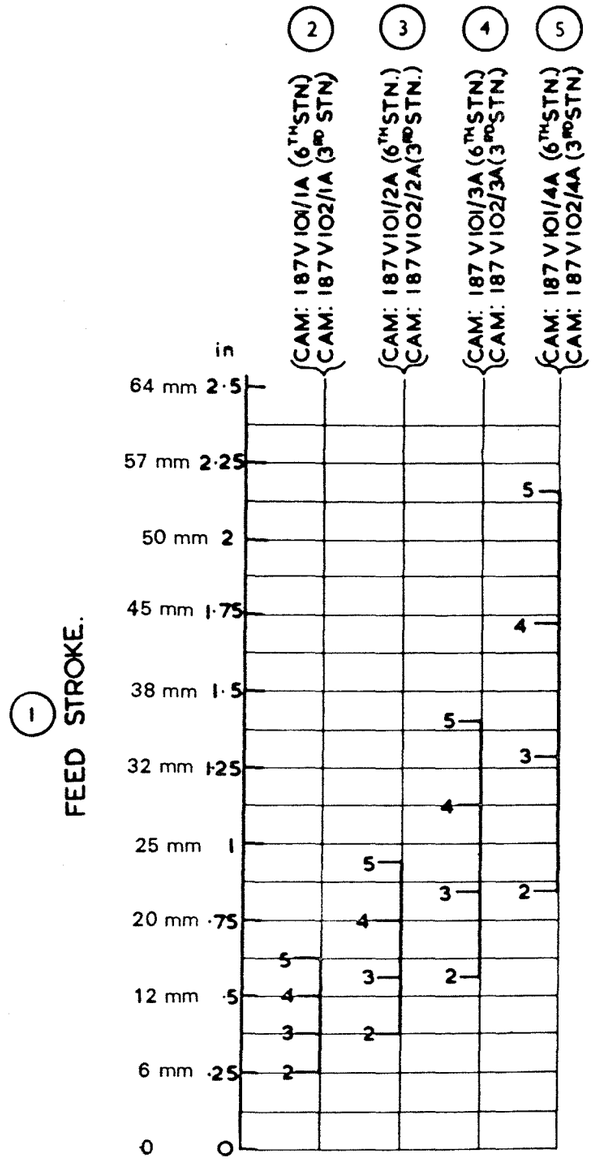
The slide should be set on the machine slide so that there is the minimum of overhang of the attachment body on its slide during the working stroke in all positions.

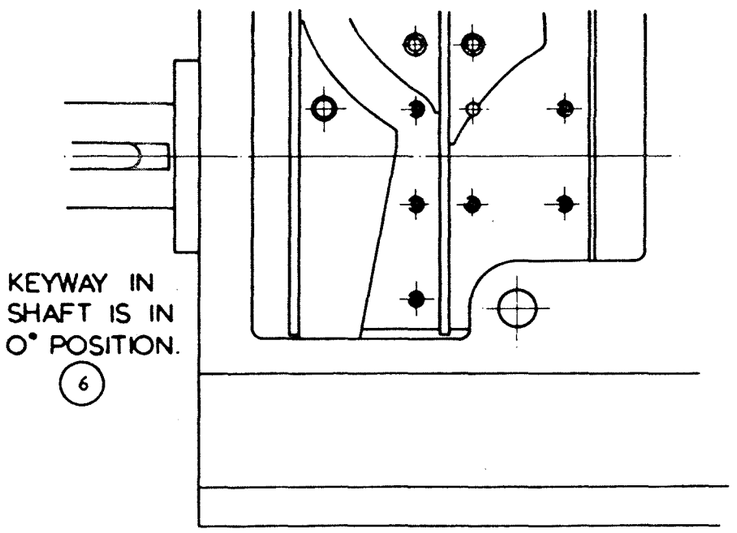

SECTION 188
2
1
MAX. SWING OVER
SLIDE 3⅛" DIA.
79 mm
1·7514
1·7500
DIA.
44.45 mm
H7.
2"
50.8 mm
2¼" DIA. 57.15 mm
3


52°
5
1⅜" TO ¼" DIA.
LOCATION HOLE


39.70 mm
1⅝"
COOLANT INLET
4
STOP ROD & CLAMP
SECTION 188
6
SECTION 186 D.
7
PUSH ROD.
8
9
SECTION 189A (STATION 6)
SECTION 189B. (STATION 3)

188 Z 10





(7) VIEW SHOWING DRUM WITH 3RD AND 6TH REAMING CAMS IN POSITION.

TO OBTAIN FEED/REV.

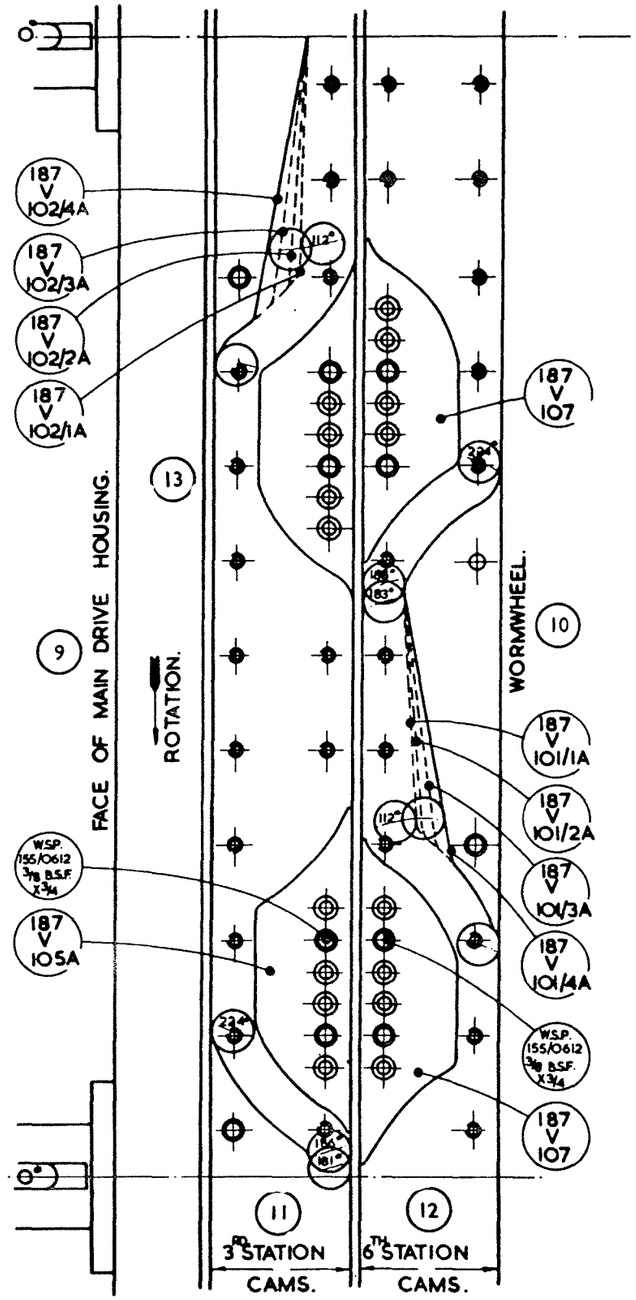
MULTIPLY THE ACTUAL FEED STROKE BY 2·2 AND FIND THE FEED/REV. FOR THAT STROKE.

(8) TO FIND STROKE SETTING.

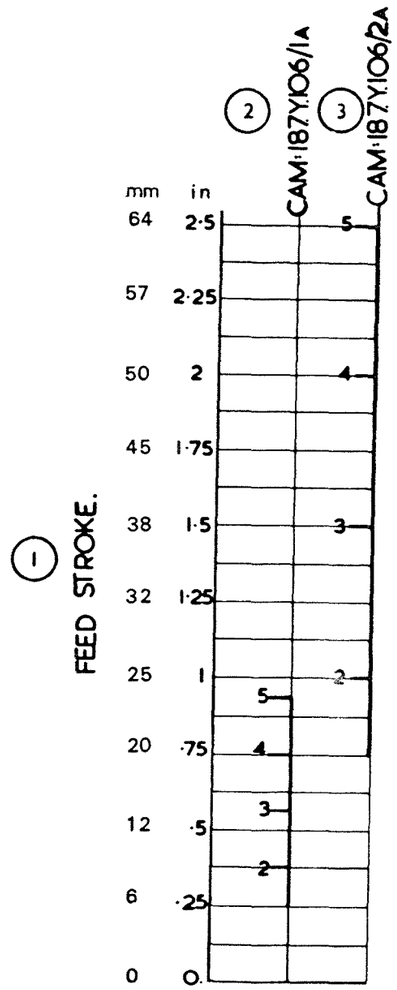
DRAW A HORIZONTAL LINE FROM REQUIRED FEED STROKE, WHERE THIS CUTS THE CAM. LINE GIVES THE SCALE SETTING.
IT IS ADVISABLE TO USE THE HIGHER STROKE WHERE ALTERNATIVE IS POSSIBLE.

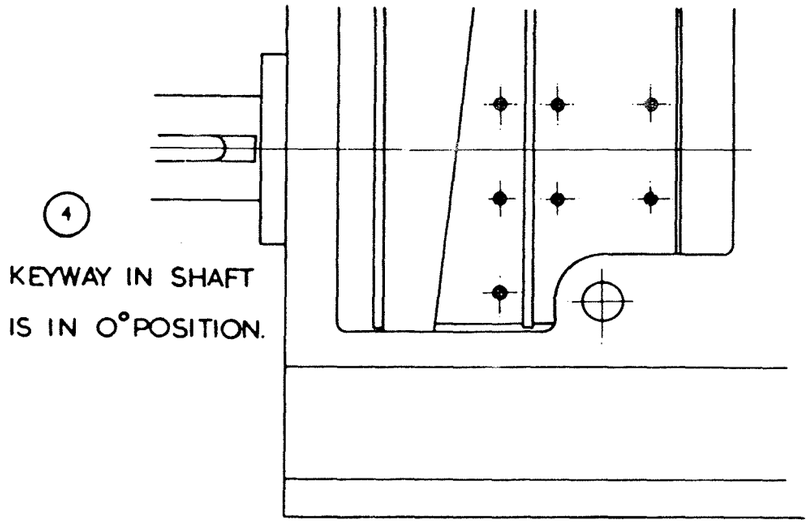
NOTE:-

THE SCALE SETTING GIVES THE TOTAL STROKE IN INCHES.



187 Y 1A



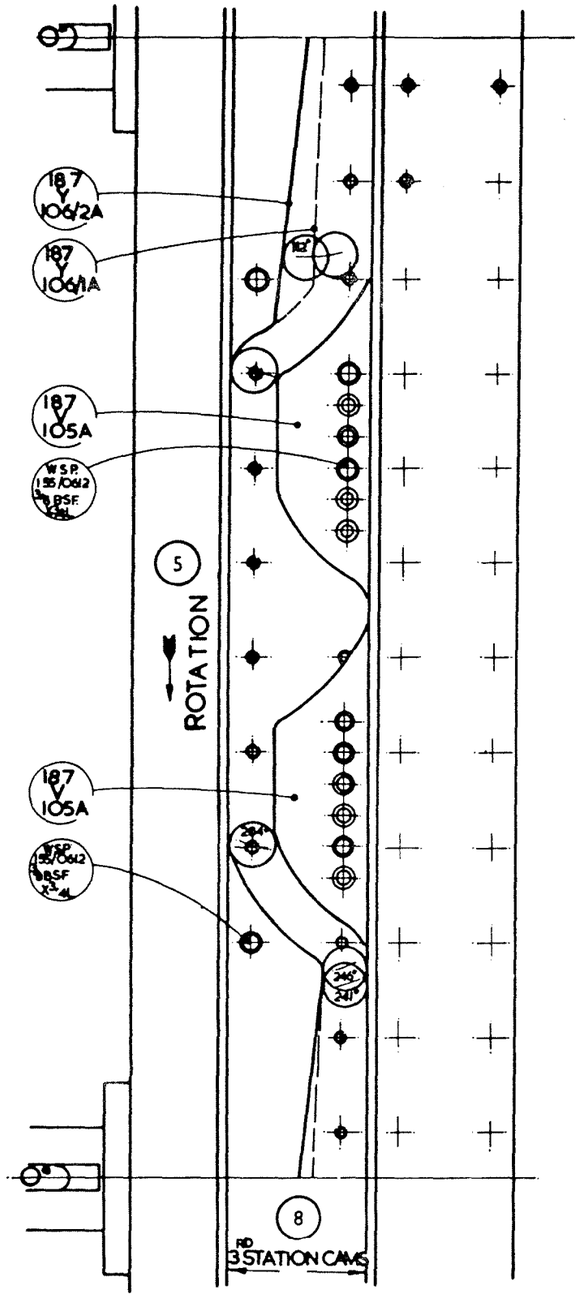


6 VIEW SHOWING DRUM WITH 3RD STATION REAMING CAM IN POSITION

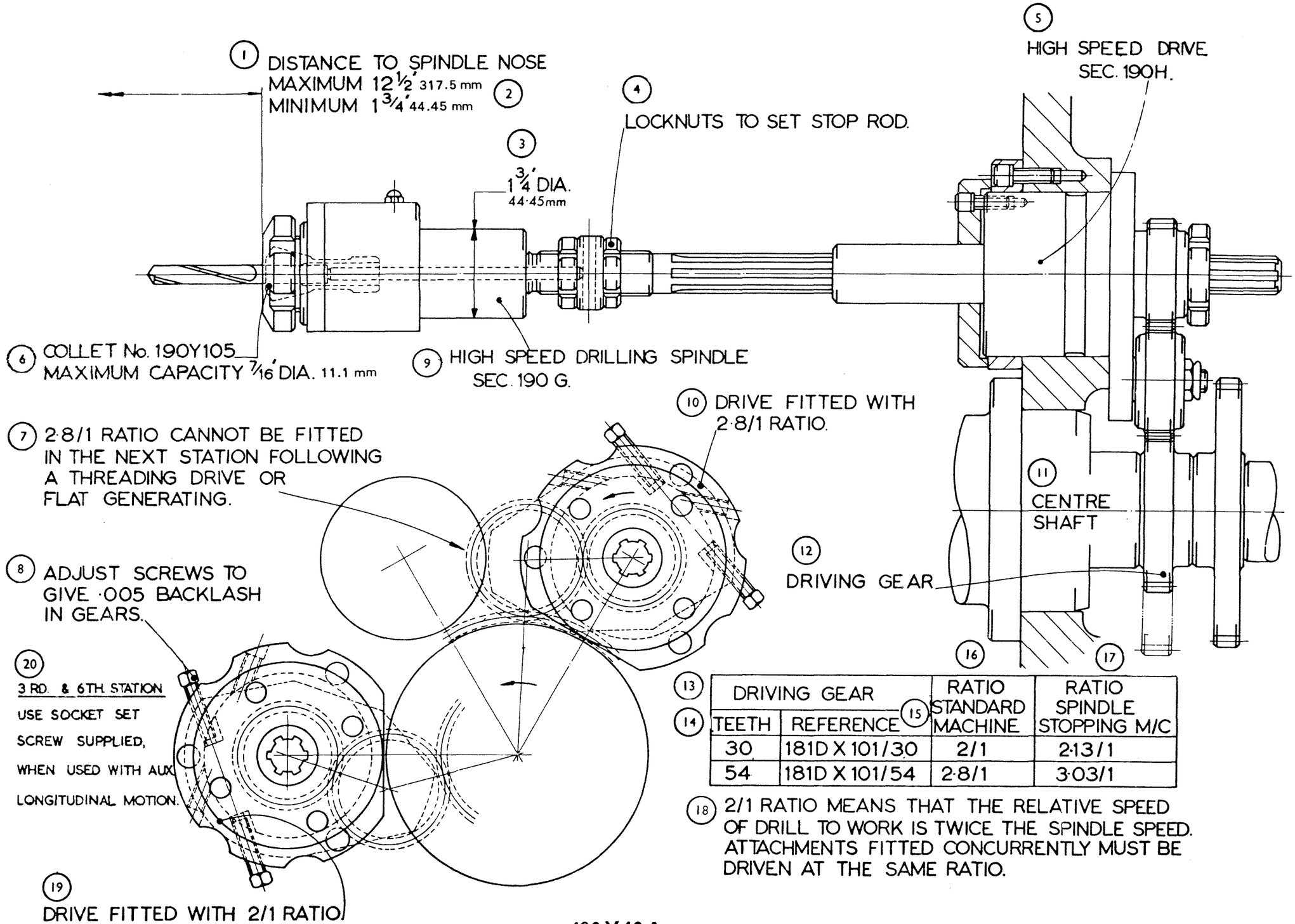
7 TO OBTAIN FEED/REV.
MULTIPLY THE ACTUAL FEED STROKE BY 1·15 AND FIND THE FEED/REV. FOR THAT STROKE.

TO FIND STROKE SETTING.
DRAW A HORIZONTAL LINE FROM REQUIRED FEED STROKE, WHERE THIS CUTS THE CAM LINE GIVES THE SCALE SETTING.

NOTE.
THE SCALE SETTING GIVES THE TOTAL STROKE IN INCHES.



187 Y 3A



13 DRIVING GEAR		15 RATIO STANDARD MACHINE	RATIO SPINDLE STOPPING M/C
14 TEETH	REFERENCE		
30	181D X 101/30	2/1	2·13/1
54	181D X 101/54	2·8/1	3·03/1

18 2/1 RATIO MEANS THAT THE RELATIVE SPEED OF DRILL TO WORK IS TWICE THE SPINDLE SPEED. ATTACHMENTS FITTED CONCURRENTLY MUST BE DRIVEN AT THE SAME RATIO.

190 Y 10 A

5.12 Pick-Up Attachment

Pick-Up attachments are available for the 3rd and 6th stations. They may be used for either 'plain pick-up' where a component is to be steadied to provide a pipless part-off, or for 'pick-up and back machining operations' where a component is to receive a minor back machining operation after part-off such as chamfering, recessing or deburring. The latter is done in conjunction with a special bar stop cam and mechanism, with a suitable tool mounted on the rear face of the bar stop arm, see Fig.5.17 (195Z5)

The pick-up attachment, Fig.5.15,(195Z1), is of the dead length collet type with the collet operated by twin toggles 'A', controlled by a special cam mounted on the main camshaft in front of the main drive housing. The attachment is slidable on the subslide 'B' bolted to the centreblock and is traversed by the standard auxiliary motion.

The component is gripped under the action of the spring compensating washers 'C', fig.5.15, which take up any minor variation in component size. Ejection of the component from the pick-up collet is normally of the solid type but spring loaded ejection can be provided for special applications by inserting a suitable spring between the clamp 'D' and the bush 'E'. In the case of solid ejection, the sleeve 'F' and the plunger 'G' allow for overtravel after collet opening. The pick-up ejector 'H' and the collet 'J' are made to suit the component.

The dead stop rod 'K' ensures that every component is picked up at the same position. The stop screw 'L' in conjunction with the stop pad 'EE' on the combined bar stop and back burr arm, see fig.5.17, ensures that the back forming operation is constant on all components.

Cams for the longitudinal motion are supplied as standard for 'plain pick-up' only, but for 'pick-up and back machining' the cam is designed to suit the component. However, semi-standard cams are available to cover certain ranges of components and details are available from Wickman Bennett.

Assembly

The following procedure should be adopted when assembling 3rd or 6th station attachments on the machine.

Fit the standard auxiliary motion 'PP' (section 189A 6th stn.), (section 189B 3rd stn.) with cam, see fig.5.15. Assemble the bearing housing 'Q' of the synchronous drive attachment (section 190J) in its appropriate bore in the main drive housing face and fit the attachment gear 'R' to mesh with the driving gear 'S' on the centre shaft. Next fit the ejector rod bung assembly 'E' complete with the ejector rod 'U' and clamps 'D' in the bore of the inner wall of the main drive housing in line with the bearing housing.

Remove the splined shaft 'V' from the pick-up attachment and place it in the splined bush of the bearing housing 'Q'. Offer the attachmnet up to the machine complete with the auxiliary slide 'B', dead stop rod 'K' and pusher rod 'P', slide the tee nuts into the tee slots and lock the slide to the centre block.

Re-assemble the splined shaft 'V' to the coupling, fit the pusher rod to the pusher shaft on the longitudinal motion and screw in the dead stop rod to the main drive housing face, leaving all clamps nuts loose for the time being. Fit the pick-up collet 'J' and ejector 'H' to the attachment.

Collet Operating Mechanism

Assemble the cam drum 'Z', fig.5.16, on the main camshaft in its approximate position. Offer up the pivot bracket 'W' complete with the lever 'X' and the pusher rod 'Y' to the main drive housing and slide the rod into the attachment glut sleeve 'F', see fig.5.15. Fix the bracket to the face of the main drive housing using the tapped holes provided and with the attachment in its maximum back position ensure that the rod 'Y' has free movement in the attachment sleeve 'F' before completely tightening up the cap screws. Finally slide the cam drum to centralise approximately in a vertical line with the pivot shaft.

Note: On machines where tapped holes are not provided it will be necessary to drill and tap four suitable holes in the main drive housing face for the pivot bracket 'W'. In this case the holes should be marked off from the bracket and besides following the foregoing instructions, care should be taken to see that the pivot shaft 'V' is horizontal and that the pivot bracket is centralised with the machine centre line in case an extra pick-up attachment is required in the opposite station at some future date, ie, 3rd and 6th stations combined.

Combined Bar Stop and Back Machining Mechanisms

For pick-up and back machining applications, a special bar stop mechanism is required to replace certain parts of the standard bar stop mechanism, also a special bar stop cam is required to replace the standard cam. Reference should be made in the fitting of these, to the arrangement drawing of the combined bar stop and back machining mechanism, fig.5.17.

When fitting the stop bracket 'FF' it may be found necessary on some machines to remove a lubricating nipple at the side of the cross slide base. If this is the case, the hole should be plugged and a 1/8" BSP hole drilled and tapped into the front of the base to break into the previous hole. The nipple should then be fitted into this new position.

Setting of the Bar Stop Arm

Handwind the machine to the peak of the first rise of the bar stop cam and by means of the adjusting nuts on the vertical bar stop rod in the rear compartment of the drum housing, set the pad of the stop lever 'GG' to just touch the pad on the stop bracket 'FF'. Next, set the bar stop arm exactly on spindle centre line and again using the nuts on the vertical rod adjust the lever 'GG' until its pad is approximately 1/32" away from the stop bracket pad. Continued handwinding of the machine should now provide sufficient spring pressure on the stop pads with the bar stop arm on the spindle centre line.

Setting of the Attachments

Adjust the tension of the pick-up attachment collet by gripping a test piece in the collet and adjusting the nuts 'M' and 'N', see fig.5.15, on the main spindle. The collet may be closed by inserting a lever between the side of the glut 'AA' and the end of the attachment body and pushing back. By this method it is possible to judge the amount of tension on the collet which is provided by the spring compensating washers 'C'. Care should be taken to tighten up the set screws in the nuts after adjustment.

Determine the stroke setting of the longitudinal motion from the tooling layout and set the scale of the motion to this figure.

Handwind the machine until the longitudinal motion just reaches its maximum forward position. Push the attachment to its correct forward maximum position, and tighten up the clamps to trap the attachment between them. Set the clamp nut on the dead stop rod.

With the glut (T) in the collet open position, move the collet operating lever 'X', fig.5.16, forwards towards the drum housing by approximately 5/16" (8mm) from the vertical. Push the front clamp nut on the collet operating rod up to the head of the glut sleeve 'F', fig.5.15, and tighten up. Next slide the rear cam dog 'BB' round on the cam drum in the direction of shaft rotation, until it just touches the roller on the operating lever and lock in position. Continued handwinding should close the collet.

Bring the attachment to its maximum back position and set the ejector rods until the ejector nose is just level with the end of the collet. Lock up the two clamps 'D', fig.5.15, on the rear ejector rod.

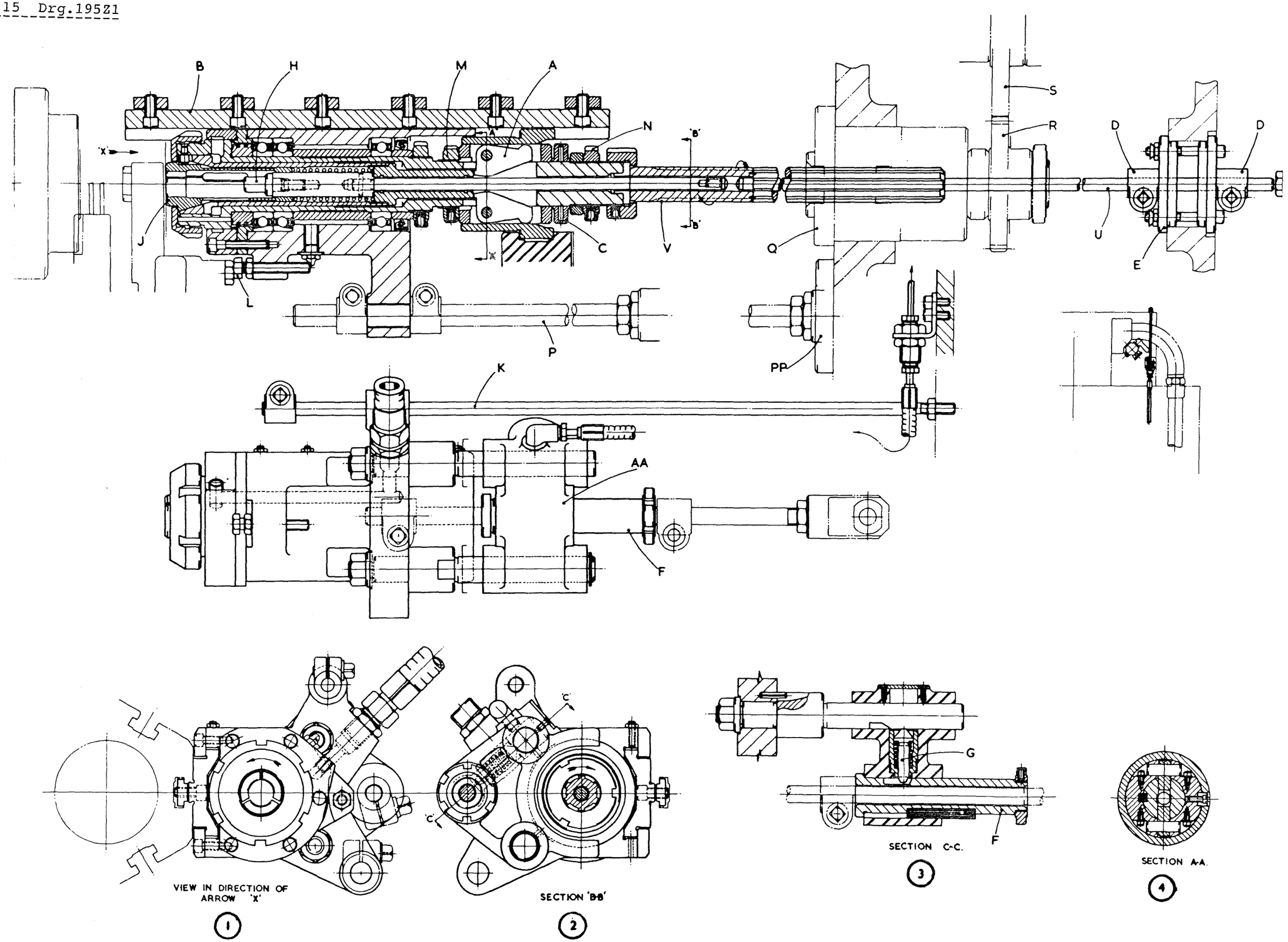
Handwind the machine to the finish of the back machining position on the cam. Slide the rear clamp up to the collet operating sleeve 'F' and lock in position. Move the front cam dog 'CC' round in the direction of shaft rotation, until it just contacts the roller on the lever and lock in position.

Adjust the stop screw 'L', fig.5.15, on the front end of the attachment until it just touches the pad on the bar stop arm. This will ensure that the back machining operations are consistent on each individual component. Further handwinding of the machine should now retract the attachment and at the same time open the collet.

It should be realised that most of the instructions given are approximate setting only and finer adjustments may be necessary to suit the component.

Lubrication

Mount the oil feed bracket complete with fittings on the main drive housing face to the dimension shown and connect the flexible hose assembly from the glut 'AA'. At the other end of the fitting connect a length of 3/16" outside diameter copper tubing and run this to the lubrication header inside the upper camshaft housing at the rear of the machine. Fill the attachment with oil through the oiling nipple in the body.



VIEW IN DIRECTION OF ARROW 'X'

1

SECTION 'BB'

2

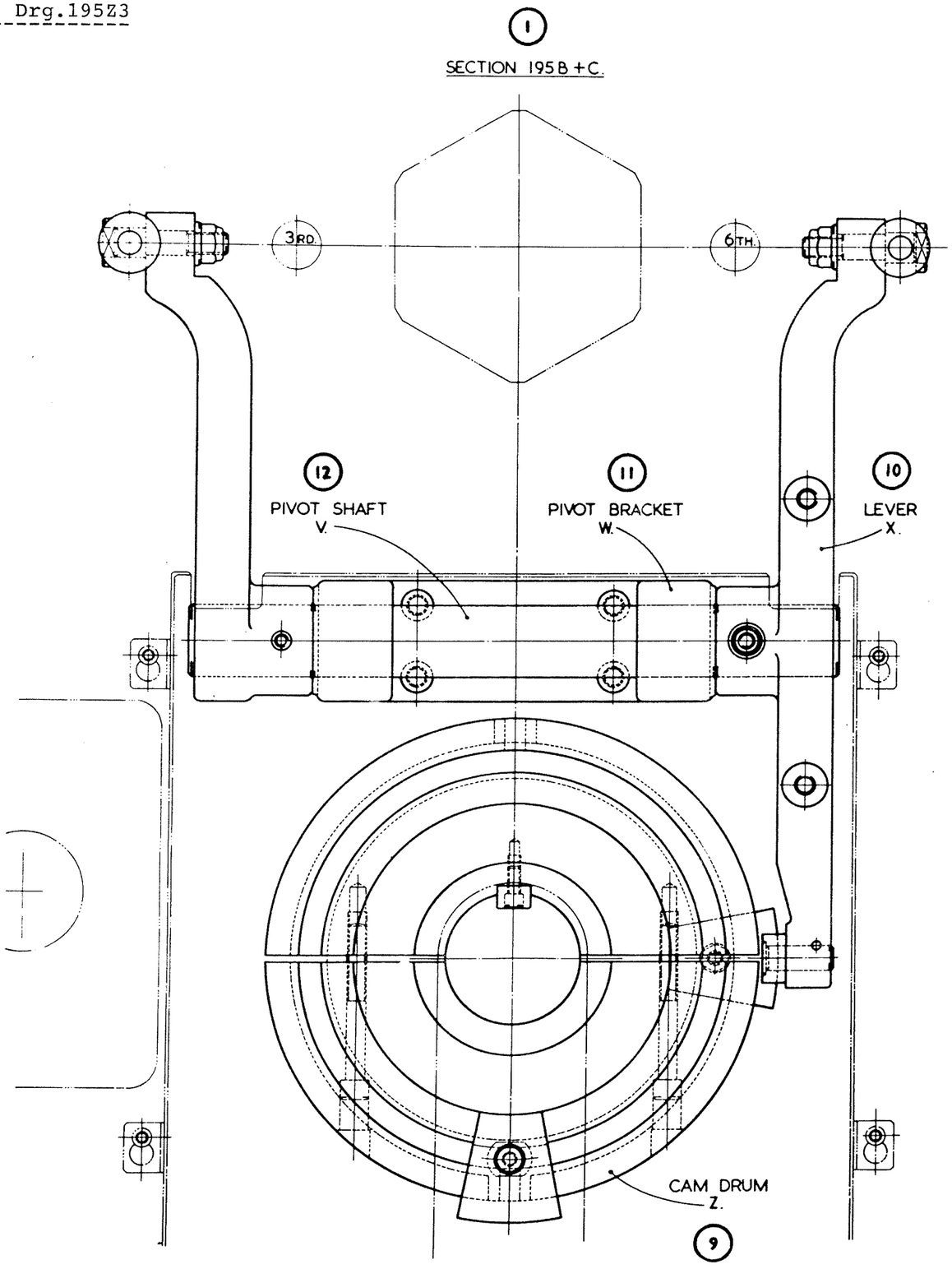
SECTION C-C.

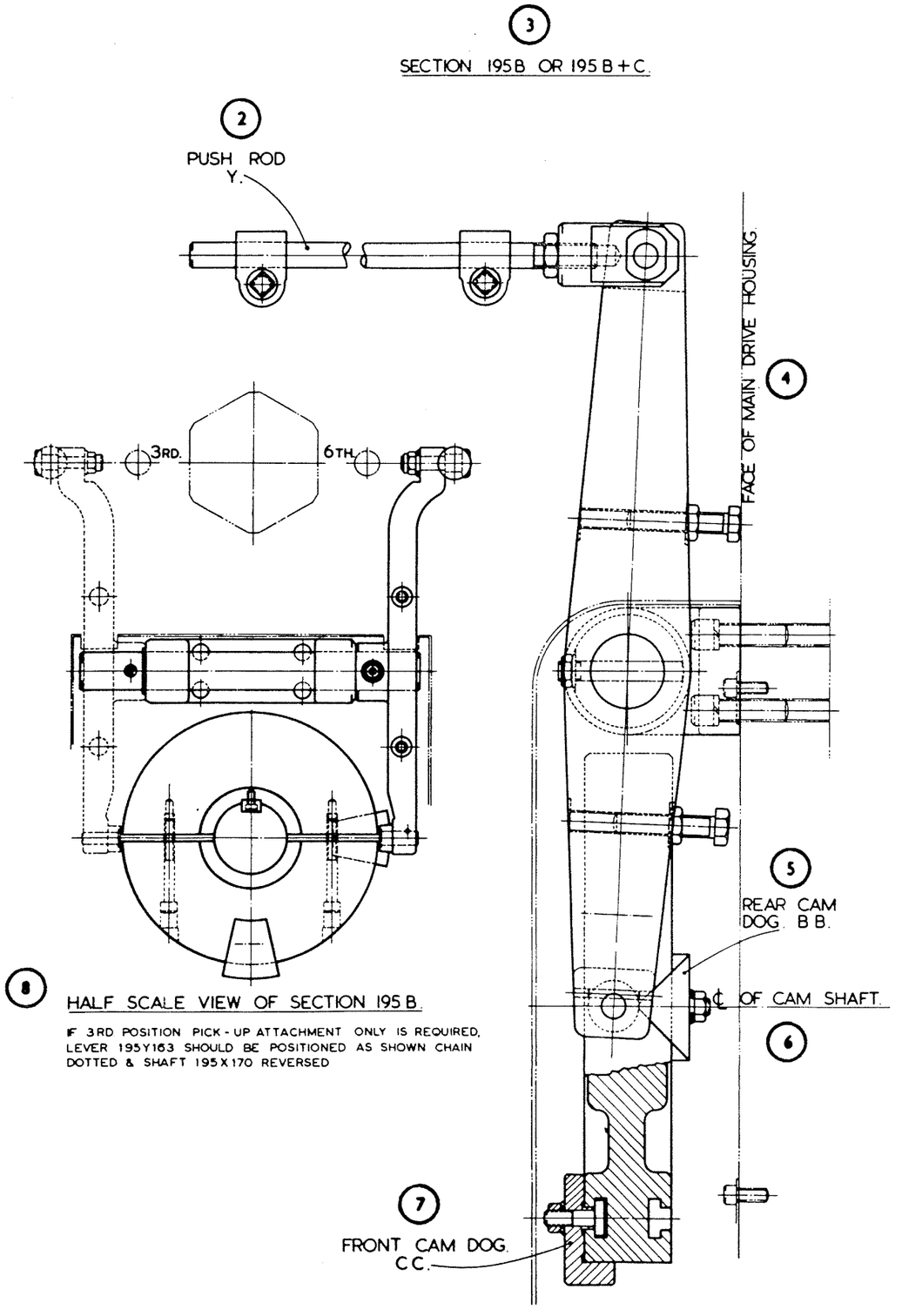
3

SECTION A-A.

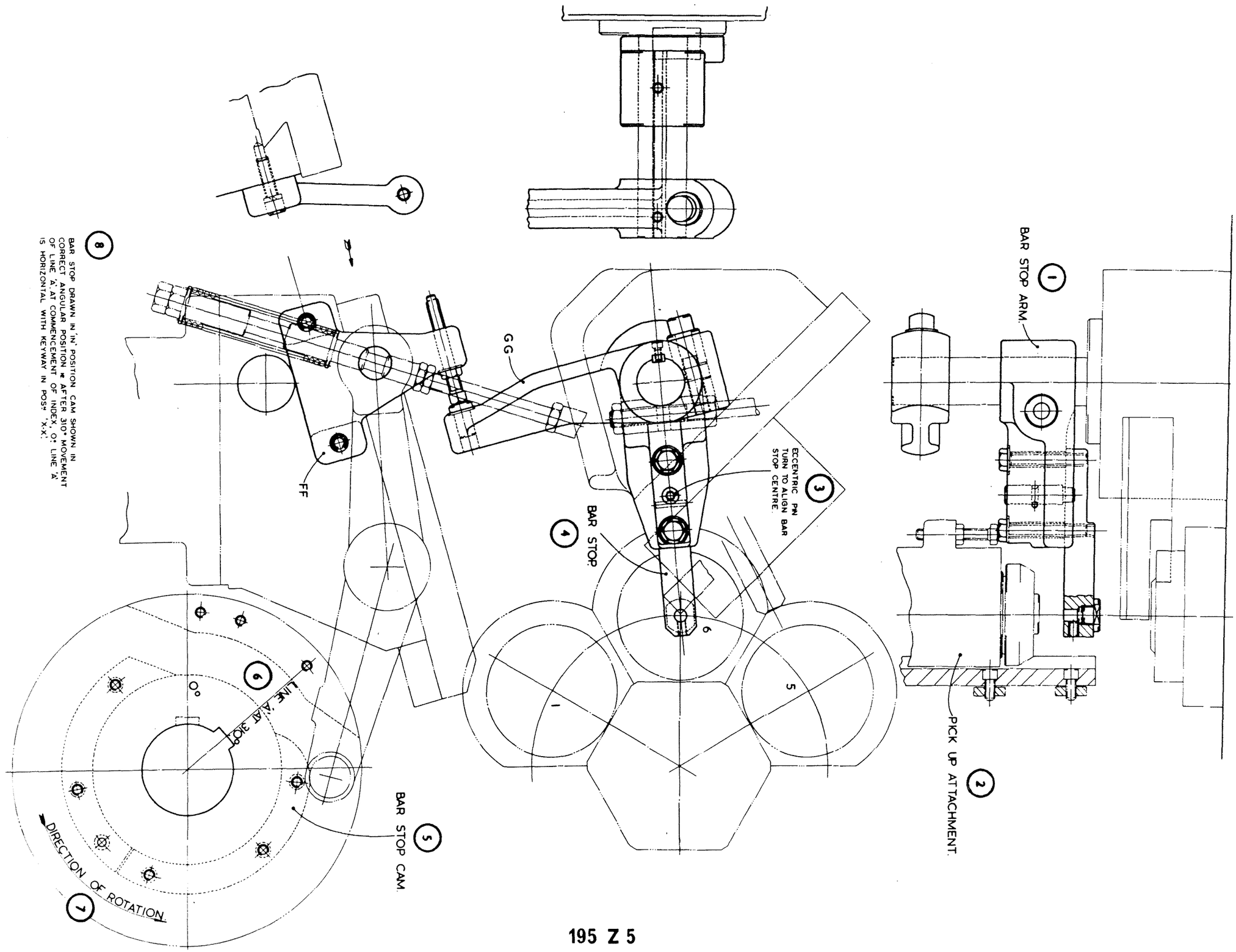
4

195 Z 1


1
SECTION 195B+C.
3RD.
6TH.
12
PIVOT SHAFT
V.
11
PIVOT BRACKET
W.
10
LEVER
X.
CAM DRUM
Z.
9


3
SECTION 195B OR 195B+C.
2
PUSH ROD
Y.
3RD.
6TH.
4
FACE OF MAIN DRIVE HOUSING.
5
REAR CAM
DOG. BB.
℄ OF CAM SHAFT.
6
7
FRONT CAM DOG.
CC.
8
HALF SCALE VIEW OF SECTION 195B.
IF 3RD POSITION PICK-UP ATTACHMENT ONLY IS REQUIRED, LEVER 195Y163 SHOULD BE POSITIONED AS SHOWN CHAIN DOTTED & SHAFT 195X170 REVERSED

195 Z 3


BAR STOP ARM.
1
PICK UP ATTACHMENT.
2
ECCENTRIC PIN TURN TO ALIGN BAR STOP CENTRE.
3
BAR STOP
4
BAR STOP CAM.
5
6
DIRECTION OF ROTATION
7
LINE 'A' AT 310°
8
GG
FF
0°
BAR STOP DRAWN IN 'IN' POSITION CAM SHOWN IN CORRECT ANGULAR POSITION ✱ AFTER 310° MOVEMENT OF LINE 'A' AT COMMENCEMENT OF INDEX, O° LINE 'A' IS HORIZONTAL WITH KEYWAY IN POS" 'X-X'.

195 Z 5

5.13 Chasing Attachment

This attachment can be fitted to the cross slide in the 5th station and comprises:

1. The Drive Unit, Sec.192A Mark2. See Drg.No.192AZ10, fig.5.18.

The drive is by chain from the centre shaft sprocket to a shaft which extends through to the drive unit mounted on the attachment face of the main drive housing. The final drive across to the chasing attachment is by a universally jointed shaft.

The drive unit is fitted with two pick-off gears which are selected to give the ratio required to suit the job.

The ratio is the number of work spindle revolutions during one revolution of the attachment camshaft, ie. with a ratio of 6:1 the spindle revolves six times during one revolution of the camshaft.

On the spindle stopping machine, the final gears on the drive unit are different to those used on the standard machine. When ordering the attachment for use on a spindle stopping machine this must be stated. The relation of the drive pin in the slotted shaft must be correct as indicated by the identification letters

2. 5th Station Chasing Attachment,Sec.192,Mk3, Drg.No.192Z10 Fig.5.19

The chasing slide is oscillated by the lead cam and is moved to and from the work by the relief cam and tension spring. The tension of the spring is adjusted by the nuts on the spring anchor whilst the attachment is running to give the quietest running. The tension required varies according to the speed. The maximum speed at which the attachment should be run is 400 cycles per minute. Oil must be maintained in the reservoir and sight feed lubricator. Check daily.

3. Selection of Threading Ratio

The ratio is chosen in conjunction with the lead cam to suit the lead of the thread to be cut, both of which are selected from the chart at Drg.No.192Z10, fig.5.19. With any lead cam, various leads can be cut by using different ratios. Ratios of 4:1, 5:1 and 6:1 are preferred in order to obtain the maximum number of passes of the tool over the work during the cutting cycle. When using high spindle speeds, the ratio chosen must be such as to keep the speed of the attachment within the maximum allowable. The number of work spindle revolutions during the 8 deg. dwell (See Feed & Speed Charts) must be more than the ratio used. This ensures at least one complete pass to give a parallel thread.

4. Changing Lead Cams

Remove attachment from crossslide and cover plate above chasing slide.
Release the tension on relief spring and unhook from the spring anchor
Swing the slide forward until roller is free from lead cam.
Remove the large end cap on the face opposite to drive shaft.
Remove the camshaft nut, bearing and spacer.
The lead cam may then be removed. Extraction holes 1/4" BSF are provided in the inner cam.
The new lead cam is fitted in the reverse order, checking that there is clearance for the lead roller all the way round the cam track.

5. Chasing Cutter

This is designed to suit the lead cut. The width of chasing cutter may be determined by the job when threading behind a shoulder. The length behind the shoulder must be equal to the total travel due to the lead cam, plus the width of the chasing cutter, plus an allowance at each end for clearance. Determine the minimum width of undercut as follows:

$$\text{Minimum width of undercut} = .0725L + \frac{L}{R} + \text{clearance}$$

where L = lead of cam
R = ratio
clearance = .010in (.025 mm.)

If found necessary to reduce the cutting load, teeth may be ground off the chaser, leaving 1 in $\frac{R}{2}$ teeth.

(Take $\frac{R}{2}$ to nearest less whole number).

e.g. Using ratio of 7, leave one in every
$(\frac{7}{2} = 3.1/2)$ three teeth.

The chasing cutter is mounted on a removable bracket which clamps to the dovetail on the slide. A stop screw in the bracket can be set so that the bracket may be removed and replaced without altering the endwise setting. The height of the cutting edge is set from the edge of the bracket by the gauge provided.

6. Setting

The feed strokes set on the cross slide is set to the depth of thread plus .005" (.01 mm). This is so small that the stroke must be set and checked by using a dial indicator. With the cross slide at the start of the feed, mount a dial indicator so that it registers the stroke of the slide. Handwind to the end of feed and check the travel indicated adjust cross slide link until correct travel is obtained.

Taper in the thread can be eliminated by loosening the clamp bolts and adjusting the set screws in the strip behind the attachment. Ensure that all bolts are tight before running the attachment.

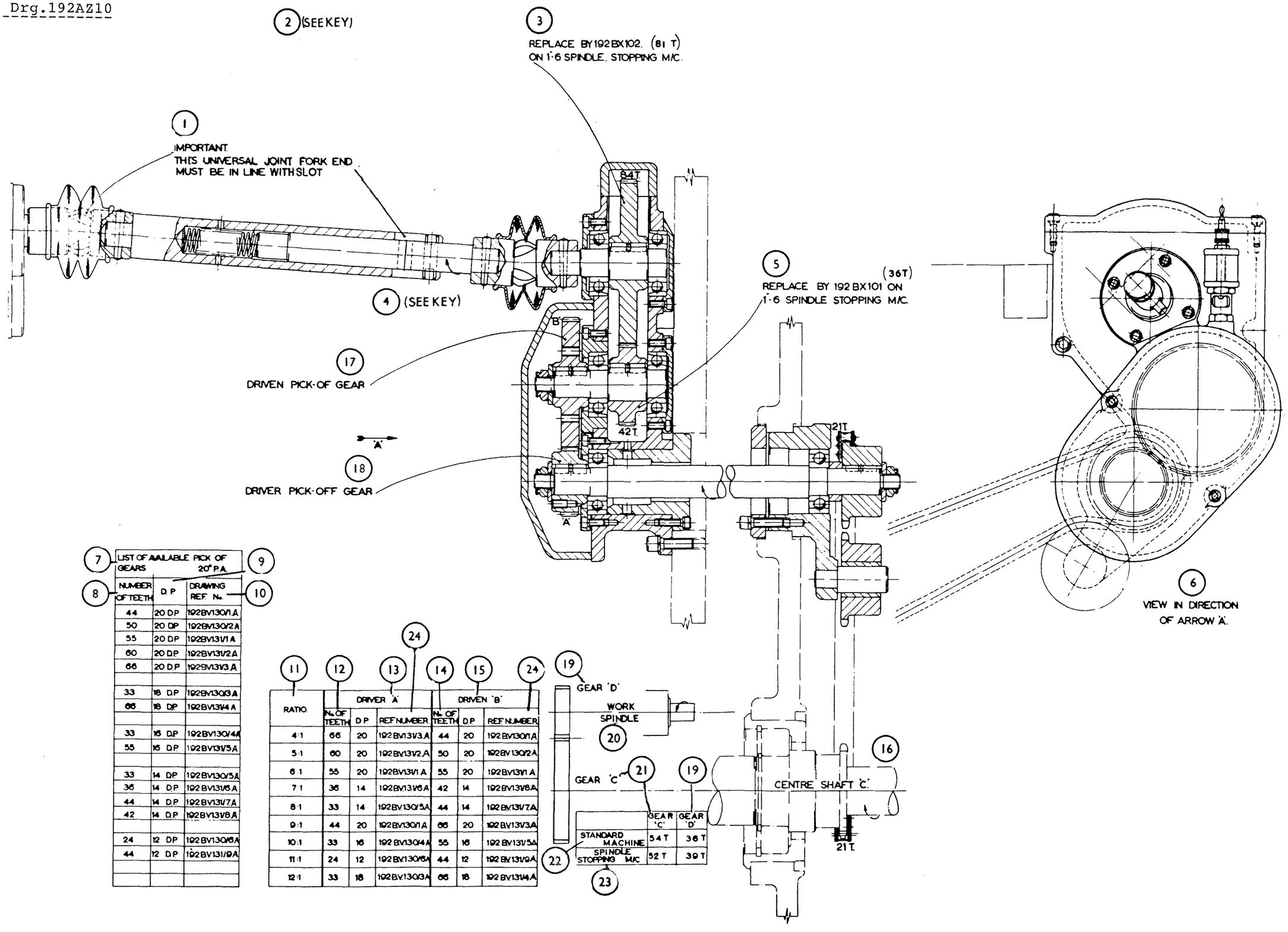
Left Hand Threads

Left hand threads are obtained by using left hand lead cams, 192.BY.148.

The spring, plunger and cap in the attachment chasing slide must be reversed to give endwise pressure in the opposite direction.

5.14 Auxiliary Cross Slide Motions

These are used when a cross slide is required to be timed differently to standard timing. The cams are attached to the back of the rear cross slide cam. Only one of these attachments can be fitted at any one time. The cams must be designed for the application required.

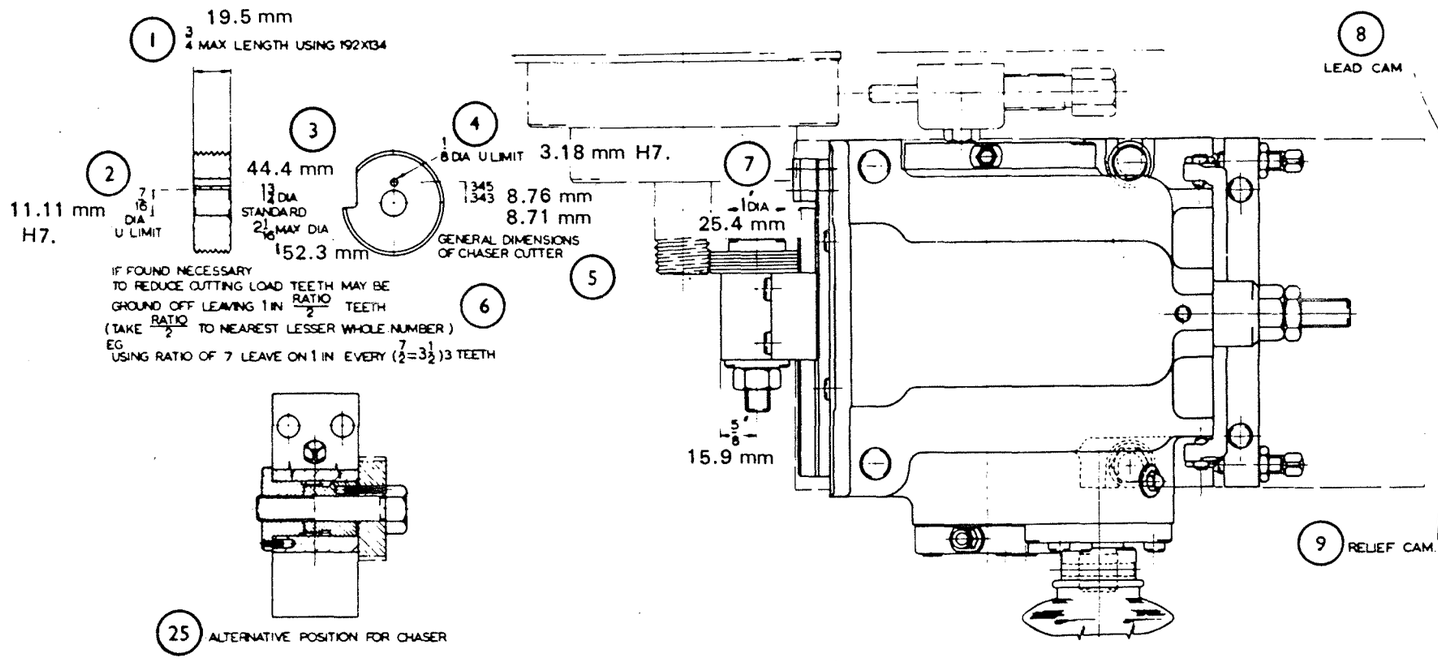


NUMBER OF TEETH	D.P	DRAWING REF. No.
44	20 D.P	192BV130/1A
50	20 D.P	192BV130/2A
55	20 D.P	192BV131/1A
60	20 D.P	192BV131/2A
66	20 D.P	192BV131/3A
33	18 D.P	192BV130/3A
66	18 D.P	192BV131/4A
33	16 D.P	192BV130/4A
55	16 D.P	192BV131/5A
33	14 D.P	192BV130/5A
36	14 D.P	192BV131/6A
44	14 D.P	192BV131/7A
42	14 D.P	192BV131/8A
24	12 D.P	192BV130/6A
44	12 D.P	192BV131/9A

RATIO	DRIVER 'A'			DRIVEN 'B'		
	No. OF TEETH	D.P	REF NUMBER	No. OF TEETH	D.P	REF NUMBER
4:1	66	20	192BV131/3A	44	20	192BV130/1A
5:1	60	20	192BV131/2A	50	20	192BV130/2A
6:1	55	20	192BV131/1A	55	20	192BV131/1A
7:1	36	14	192BV131/6A	42	14	192BV131/8A
8:1	33	14	192BV130/5A	44	14	192BV131/7A
9:1	44	20	192BV130/1A	66	20	192BV131/3A
10:1	33	16	192BV130/4A	55	16	192BV131/5A
11:1	24	12	192BV130/6A	44	12	192BV131/9A
12:1	33	18	192BV130/3A	66	18	192BV131/4A

	GEAR 'C'	GEAR 'D'
STANDARD MACHINE	54 T	36 T
SPINDLE STOPPING M/C	52 T	39 T

192 AZ 10



MINIMUM WIDTH OF UNDERCUT	CAM LEAD	LEAD CAMS DRG NO. RIGHT HAND THREADS	LEFT HAND THREADS
.041"±1 PITCH	1/2	192 BY 151/12	192 BY 148/12
.034"±1 PITCH	2/3	192 BY 15V25	192 BY 148/25
.081"±1 PITCH	4/11	192 BY 15V411	192 BY 148/411
.028"±1 PITCH	1/3	192 BY 15V13	192 BY 148/13
.028"±1 PITCH	4/13	192 BY 15V413	192 BY 148/413
.084"±1 PITCH	5/19	192 BY 151/519	192 BY 148/519
.023"±1 PITCH	1/4	192 BY 15V14	192 BY 148/14
.020"±1 PITCH	1/5	192 BY 15V15	192 BY 148/15
.017"±1 PITCH	1/6	192 BY 15V16	192 BY 148/16
.016"±1 PITCH	2/13	192 BY 15V213	192 BY 148/213
.015"±1 PITCH	1/7	192 BY 151/17	192 BY 148/17
.014"±1 PITCH	1/8	192 BY 15V18	192 BY 148/18
.013"±1 PITCH	1/9	192 BY 15V19	192 BY 148/19
.021"±1 PITCH	8/17	192 BY 151/27	192 BY 148/27
0·33±1 PITCH	2·5mm	192 BY 151/25mm	192 BY 148/25mm
0·37±1 PITCH	3 mm	192 BY 151/3 mm	192 BY 148/3 mm
0·38±1 PITCH	3·5mm	192 BY 15V35mm	192 BY 148/35mm
0·44±1 PITCH	4 mm	192 BY 151/4 mm	192 BY 148/4 mm
0·51±1 PITCH	5mm	192 BY 151/5 mm	192 BY 148/5 mm
0·59±1 PITCH	6 mm	192 BY 151/6 mm	192 BY 148/6 mm
0·66±1 PITCH	7 mm	192 BY 151/7 mm	192 BY 148/7 mm
0·73±1 PITCH	8 mm	192 BY 151/8 mm	192 BY 148/8 mm
0·80±1 PITCH	9 mm	192 BY 15V9 mm	192 BY 148/9 mm
0·88±1 PITCH	10 mm	192 BY 15V10 mm	192 BY 148/10 mm
1·02±1 PITCH	12 mm	192 BY 15V12 mm	192 BY 148/12 mm

LEAD TO BE CUT	CAM LEAD	RATIO	CAM LEAD	RATIO	CAM LEAD	RATIO	CAM LEAD	RATIO	CAM LEAD	RATIO	CAM LEAD	RATIO	CAM LEAD	RATIO
·5 mm	CAM LEAD	RATIO	2mm	5	3mm	6	3½mm	7	4mm	8	5mm	10	6mm	12
7 mm	CAM LEAD	RATIO	3½mm	5	7mm	10								
75 mm	CAM LEAD	RATIO	3mm	4	6mm	8								
8 mm	CAM LEAD	RATIO	4mm	5	8mm	10								
1 mm	CAM LEAD	RATIO	4mm	4	5mm	5	6mm	6	7mm	7	8mm	8	10mm	10	12mm	12
1·25 mm	CAM LEAD	RATIO	5mm	4	10mm	8								

LEAD TO BE CUT	CAM LEAD	RATIO	CAM LEAD	RATIO	CAM LEAD	RATIO
1·5 mm	CAM LEAD	RATIO	6mm	4	12mm	8
1·75 mm	CAM LEAD	RATIO	7mm	4		
2 mm	CAM LEAD	RATIO	8mm	4	10mm	5	12mm	6
2·5 mm	CAM LEAD	RATIO	10mm	4		
3 mm	CAM LEAD	RATIO	12mm	4		
	CAM LEAD	RATIO				

LEAD TO BE CUT = LEAD OF CAM / RATIO
CUTTING STROKE = 5 × CAM LEAD
TOTAL STROKE = ·645 × CAM LEAD

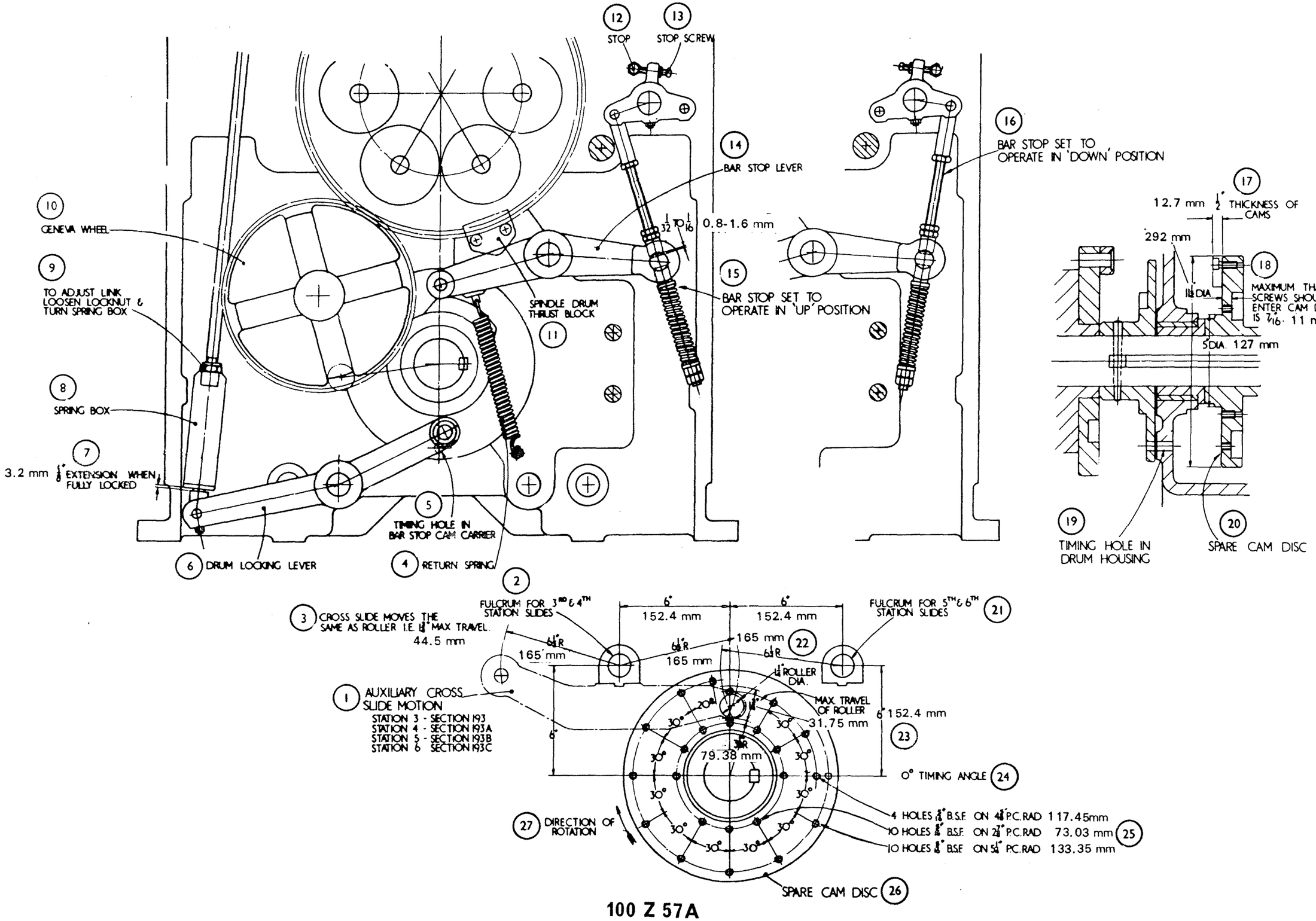
TPI	TPI × 1/LEAD = RATIO			
40	LEAD	1/4	1/5	1/8
	RATIO	10	8	5
36	LEAD	1/4	1/3	1/9
	RATIO	9	12	4
32	LEAD	1/4	1/8	
	RATIO	8	4	
28	LEAD	1/4	1/7	
	RATIO	7	4	
26	LEAD	4/13	2/13	
	RATIO	8	4	
24	LEAD	1/4	1/3	1/2
	RATIO	6	8	12
22	LEAD	4/11	1/3	
	RATIO	8	11	

TPI	TPI × 1/LEAD = RATIO			
20	LEAD	1/4	1/5	2/5
	RATIO	5	4	8
18	LEAD	3/10		
	RATIO	5		
16	LEAD	1/2	1/8	
	RATIO	8	8	
16	LEAD	1/4	1/3	
	RATIO	4	8	
14	LEAD	1/2	4/7	
	RATIO	7	4	
13	LEAD	4/13		
	RATIO	4		
12	LEAD	1/2	1/3	
	RATIO	4	6	

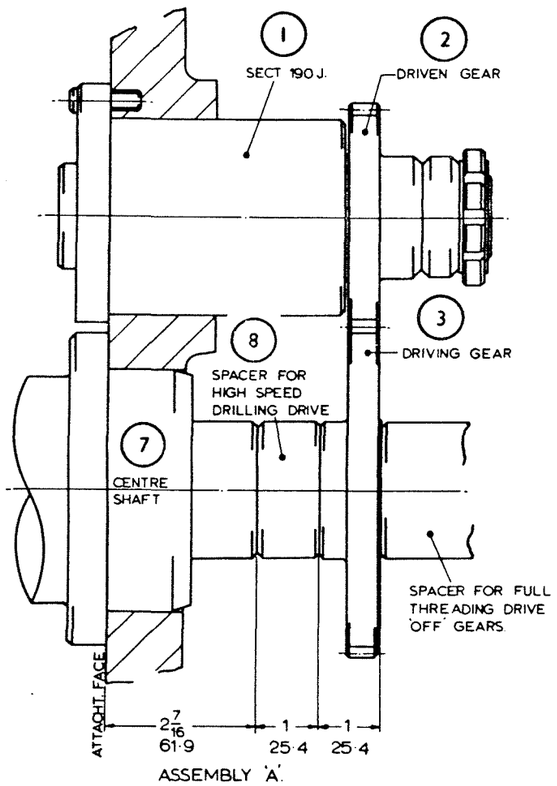
TPI	TPI × 1/LEAD = RATIO		
11	LEAD	4/11	
	RATIO	4	
10	LEAD	1/2	1/5
	RATIO	4	5
9	LEAD	4/9	
	RATIO	4	
8	LEAD	1/2	
	RATIO	4	

192 Z 10

Fig.5.20 Drg.100Z57A

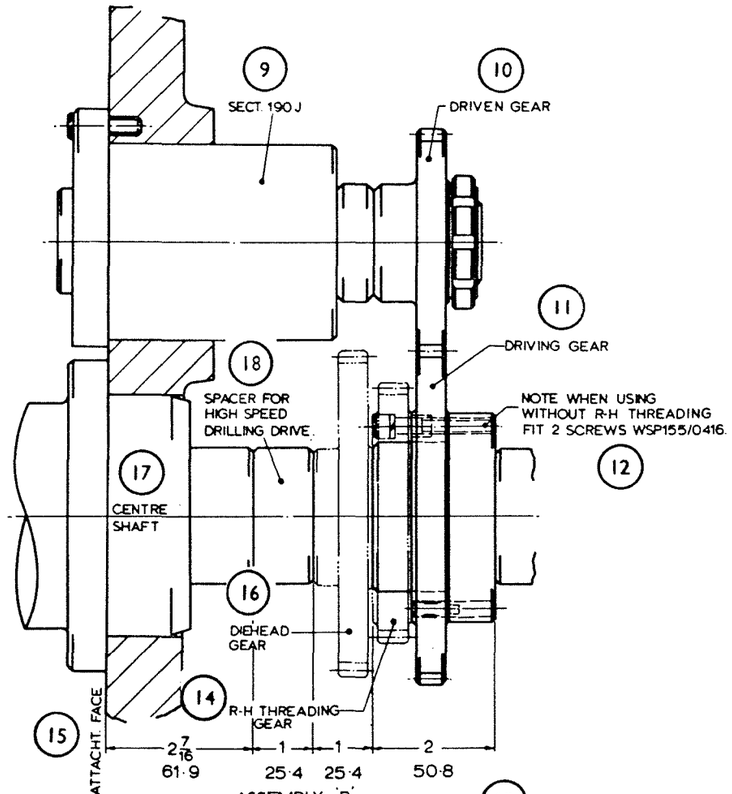


100 Z 57A



ASSEMBLY 'A'.

USED BY ITSELF OR CONCURRENTLY WITH R-H OR L-H FULL THREADING. (5)

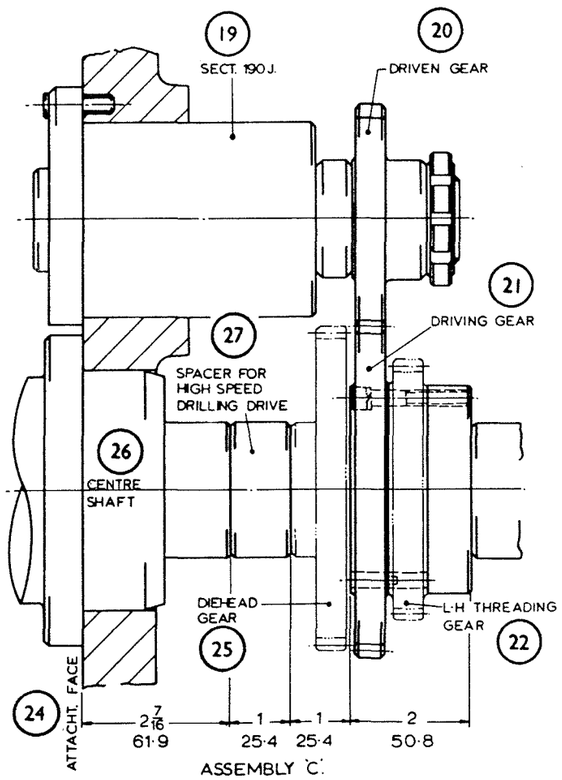


ASSEMBLY 'B'. (13)

USED CONCURRENTLY WITH DIEHEAD. R-H FULL THREADING CAN ALSO BE USED.

(34) PART No.	(35) PART	(29) M/C APPLICATION. (30) USED BY ITSELF OR CONCURRENTLY WITH R-H OR L-H FULL THRD'G. ASSY 'A'. 1-6	1-6S	(31) USED CONCURRENTLY WITH DIEHEAD. ASSY. 'B'. 1-6	1-6S	(32) USED CONCURRENTLY WITH DIEHEAD AND L-H FULL THREADING ASSY 'C'. 1-6	1-6S	(33) USED CONCURRENTLY WITH DIEHEAD AND R-H FULL THREADING ASSY. 'B'. 1-6	1-6S
SECT. 190J.	SYNCHRONOUS DRIVE ATTACHT.	1	1	1	1	1	1	1	1
181DX101/54	DRIVING GEAR	1							
181DX102/54	DRIVING GEAR			1		1		1	
181DV106/52	DRIVING GEAR		1						
181DV107/52	DRIVING GEAR				1		1		1
181DX105/36	DRIVEN GEAR	1		1		1		1	
181DX105/39	DRIVEN GEAR		1		1		1		1
181AX130	ADAPTR SLEEVE			1	1				
181AX131	GEAR SPACER								
WSP155/0416	SKT. HD. CAP SCR			3	3				
WSP154/04	SPRING WSHR.			3	3				

(36) HIGH SPEED DRILLING DRIVE WITH 2:1 RATIO CAN BE USED IN ANY OTHER STATION. HIGH SPEED DRILLING DRIVE WITH 2·8:1 RATIO CAN BE USED IN ANY OTHER STATION EXCEPTING THE ONE FOLLOWING THAT IN WHICH THIS SYNCHRONOUS DRIVE IS FITTED.



ASSEMBLY 'C'.

USED CONCURRENTLY WITH DIEHEAD AND L-H FULL THREADING. (23)

(28) WHEN USING SYNCHRONOUS DRIVE WITH PICK-UP ATTACHMENT ON 1-6 & USING HEXAGON, SQUARE OR OTHER FORMED SECTION COLLETS, DRIVEN GEAR 181DX105/36 SHOULD BE MODIFIED TO 181DX108.

190 Z 11

Fig.5.22 Drg.100Y29A