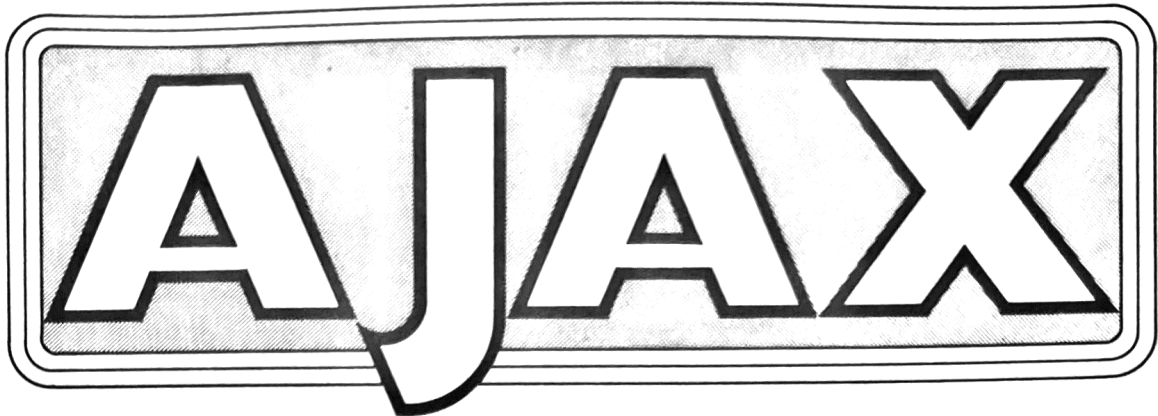


**AJSD6,
AJHD6
& AJHD 10
Metal Sawing
Machines**

Installation, Operation & Spare Parts Manual

AJAX MACHINE TOOL CO. LIMITED
Stockport Road, Bredbury, Cheshire SK6 2AT
Telephone: 061-430 5231
Telex: 668396

A member of the **CEL** group of companies



**AJSD6,
AJHD6
& AJHD10
Metal Sawing
Machines**

Installation, Operation & Spare Parts Manual

AJAX MACHINE TOOL CO. LIMITED
Stockport Road, Bredbury, Cheshire SK6 2AT
Telephone: 061-430 5231
Telex: 668396

A member of the  group of companies

INDEX

	<i>Page</i>
Procedure for Ordering Spare Parts	4
Method of Lifting Models AJSD6, AJHD6 and AJHD10 – Fig. 1	5
Lifting Machine	6
Preparation of Foundation	6
Side Elevation – Fig. 2 and Rear Elevation – Fig. 2a and Foundation Dimensions	7
Cleaning Machine	8
Electrical Connections (Three Phase System) All Models	8
Electrical Equipment – Fig. 2b	9
Electrical Wiring Diagram (Single and Three Phase System)	10
Electrical Connections (Single Phase System) Model AJSD6 only	11
Lubrication	12
Section through Drive (Models AJHD6 and AJHD10) – Fig. 3	13
Specification	13
Feed Screw Assemble – Fig. 5, Feed Mechanism, Bow Slide and Bow Frame – Fig. 6, Section through Bow Slide – Fig. 7	14
Coolant System	15
Fitting Blade to Bow Frame	16
Preparing Machine for Cutting	16
Stroke Length Adjustment, Model AJSD6 only	16
Mounting Blade in Bow Frame – Fig. 4	17
Key to Controls – Fig. 9	18
Angular Cutting-Off	19
Selection of Cutting Speed, Model AJSD6	20
Selection of Cutting Speed, Model AJHD6 and AJHD10	20
Regulation of Feed Rate – All Models	20
Commencing Cutting	21
Cutting Faults and their Causes	21
Blade Breakage	21
Rapid Blade Wear	21
Choice of Blade	21
Key to Part Numbers	23

Procedure for Ordering Spare Parts

When ordering spare parts please quote:-

- 1 Model Number of Machine. ie. – AJSD6, AJHD6 or AJHD10.
- 2 Serial Number of Machine – This Number will be found on rear face of Machine.
- 3 Part Number and Description as identified from Figs. 2, 2b, 3, 5, 6 and 7 and key to part numbers.
- 4 Should electrical spare parts be required for Model AJSD6 please state whether machine is operating on single phase or three phase supply.

Although the information given in this manual was correct at the time of printing, we are constantly working to improve the performance of the machines we produce and consequently reserve the right to make alterations to design and specification without notice.

Lifting Machine

Models AJSD6, AJHD6 and AJHD10

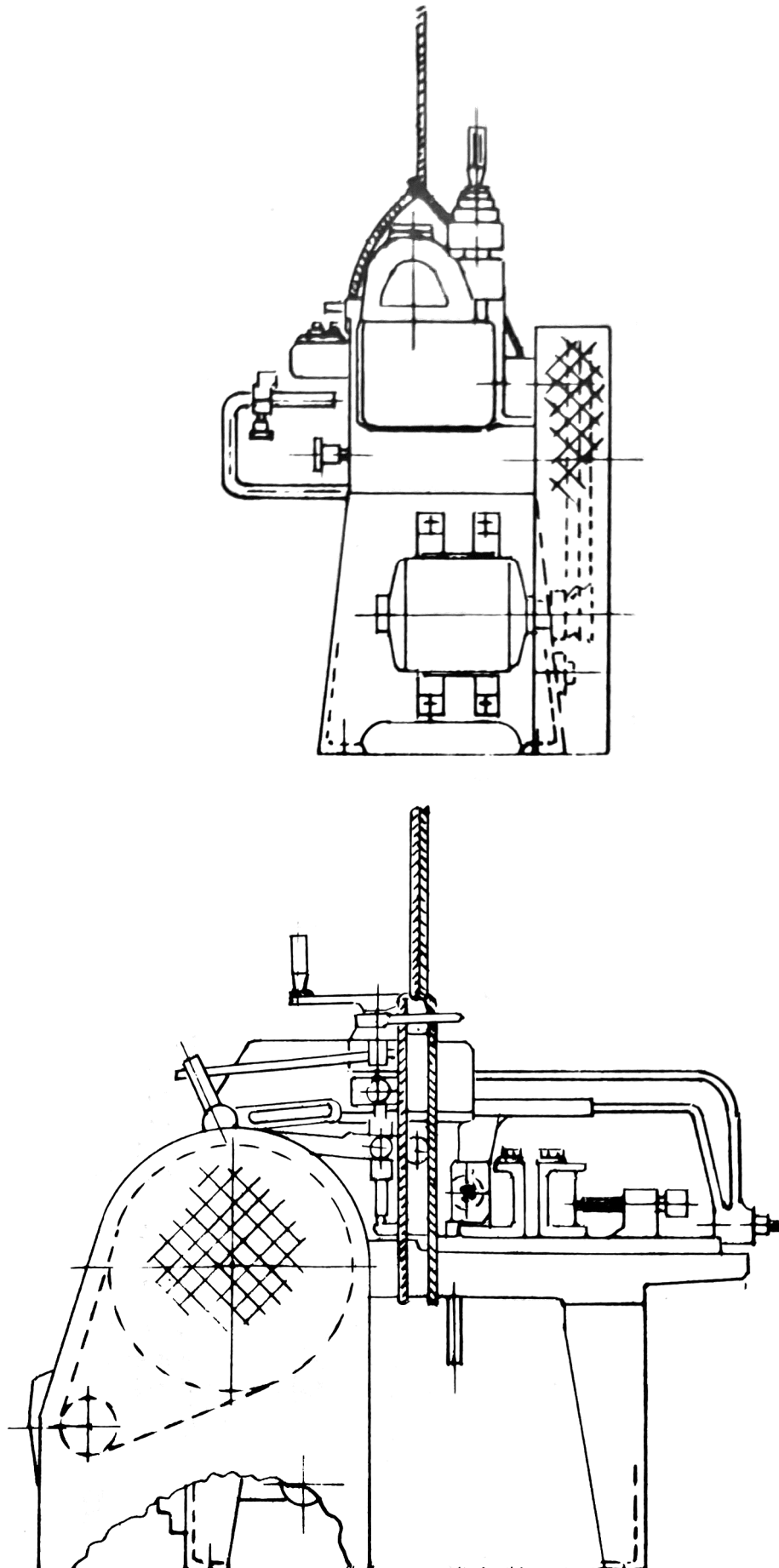


Fig. 1

Installation of Models AJSD6, AJHD6 and AJHD10 Metal Sawing Machines

Lifting the Machine

To lift the machine, a sling should be positioned around the machine frame as shown in Fig. 1. Check to ensure that the lifting sling is of correct capacity to lift the weight of the machine and that the sling is in good condition. (Weight of each model of machine is given in Specification Table Page 13).

Foundation

The site selected for the machine should be one where the concrete floor is level, smooth and of reasonable thickness, say not less than 150mm. The machine should be positioned so that access is available all round the machine and sufficient space of not less than 6 metres should be available at the left hand side of the machine (driving pulley side) so that standard stock lengths of bar material can be loaded into the machine and space of not less than 3 metres should be available at the right hand side of the machine.

The foundation for the machine should be prepared to the dimensions given in Table and Figs. 2 and 2a for the appropriate model of machine.

Ample size holes should be provided in the foundation for the four rag-bolts. The minimum depth of concrete required for the foundation is 150mm but is dependent upon the customers knowledge of local conditions of the ground on which the machine is going to stand.

- (a) Lift the machine as indicated in Fig. 1 and through each of the four bolt holes provided in the feet of the machine, fit a rag-bolt, 10mm diameter ($\frac{3}{8}$ " diameter) for Model AJSD6, 14mm diameter ($\frac{9}{16}$ " diameter) for Models AJHD6 and AJHD10 \times 100mm long (4" long) with a nut and washer, the nut being screwed on to the bolt so that the end of the bolt is just flush with the upper surface of the nut.
- (b) Lower the machine onto the foundation guiding the rag-bolts into their appropriate holes in the foundation.
- (c) Remove the front vice jaw and vice screw nut from the machine and thoroughly clean the machined surface on which the vice jaw fits.
- (d) With a level on the vice jaw surface, level the machine longitudinally and transversely by means of the use of varying thicknesses of metal packings placed between the surface of the foundation and the underside of the machine feet. Adjustments to the height of these packing pieces should be made until the level reads zero both longitudinally and transversely.
- (e) Grout should be run into the bolt holes and under the feet of the machine until the grout level is just above the under surface of the machine feet.
- (f) A full 24 hours should be allowed for the grout to cure and after this time has elapsed the rag-bolt nuts should be tightened but very little movement should be experienced at the nuts if the grout has cured sufficiently and the metal packings were placed under the machine feet securely.
- (g) Check level of machine longitudinally and transversely.

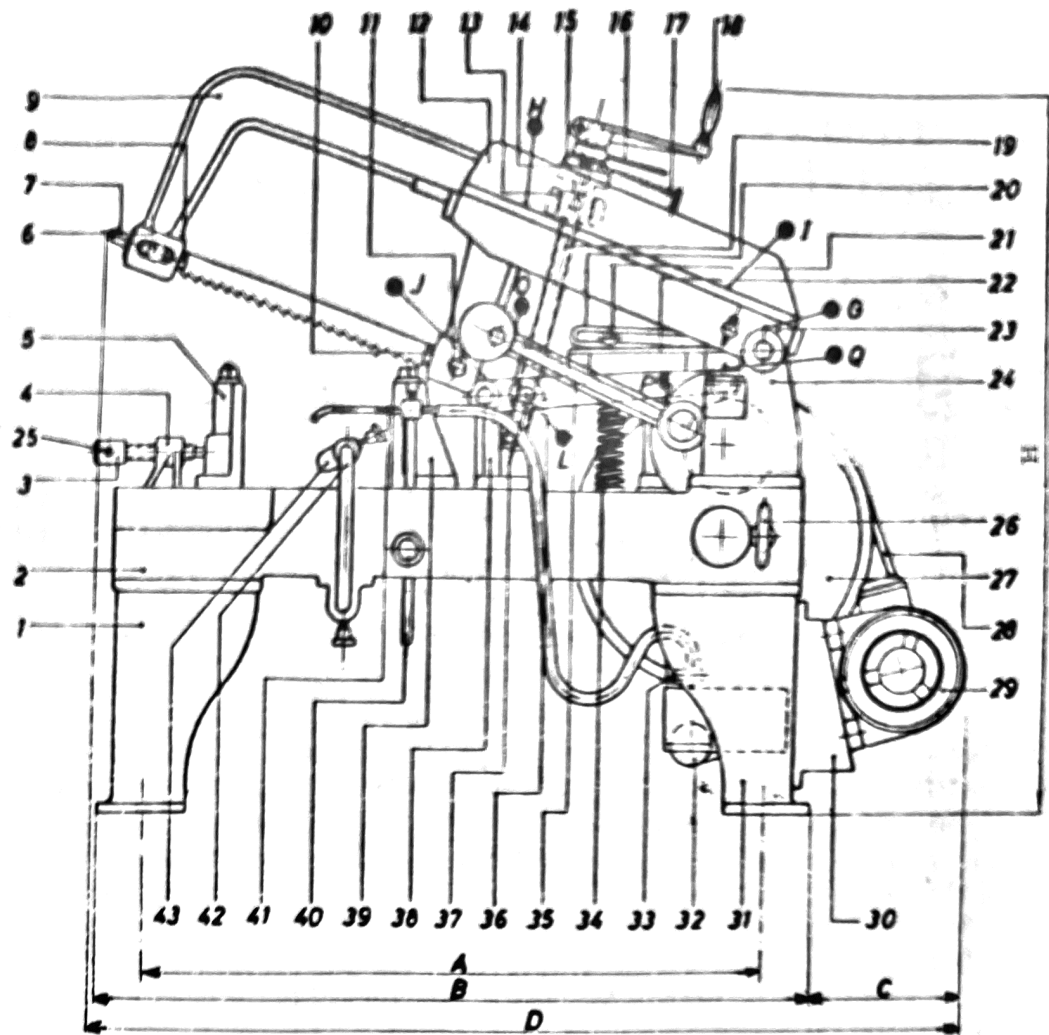


Fig. 2 Side Elevation

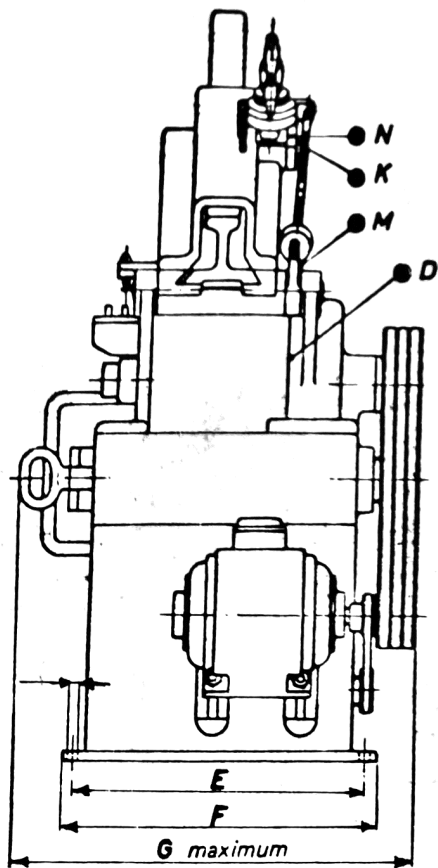


Fig. 2a Rear Elevation

AJHD. 6
 AJHD.10 = 15
 AJSD. 6 = 10,5

Dimensions Dimensions mm	Model No.		
	AJ SD6	AJ HD6	AJ HD10
A	550	790	1120
B	605	910	1250
C	220	270	210
D	1000	1200	1500
E	270	328	450
F	335	410	500
G	450	600	750
H	880	1070	1100

Installation of Models AJSD6, AJHD6 and AJHD10 Metal Sawing Machines (continued)

Cleaning

Machines are despatched from our works with a coating of rust preventive applied to the slideways and all machined and bright parts. This preventive must be removed (by means of a cloth soaked in white spirit) before the machine is put into service and the slideways and bright parts should then be coated with a film of oil.

Electrical Connections (Three Phase System) All Models

To connect the machine to an electrical supply:-

- (a) Remove the cover of Contactor Part No. 50a Fig. 2b.
- (b) The three leads of the ingoing Three Phase electrical mains supply along with the earth lead (Green/Yellow) should be passed through the vacant hole in the bottom face of the contactor case which should be fitted with a grip type gland.
- (c) The three phases of the ingoing supply should then be connected to the terminals marked R, S and T (See Wiring Diagram) at the top of the contactor and the earth lead (Green/Yellow) should be connected to the earth terminal provided in the contactor box.

The motor should now be checked for correct direction of rotation as follows:-

- (1) Switch on electrical supply.
- (2) Depress Start Push Button on Switch Part No. 50 Fig. 2b.
- (3) The large 'Vee' Belt Pulley at the left hand side of the machine should rotate in an anti-clockwise direction when viewed from the left hand side of the machine.
- (4) Should the pulley rotate in the opposite direction then the position of any two of the three leads connected at terminals R, S and T in the contactor box should be reversed.
- (5) When the direction of rotation is correct the cover of Contactor Box Part No. 50a Fig. 2b should be replaced and secured by means of the screw.

Electrical Equipment

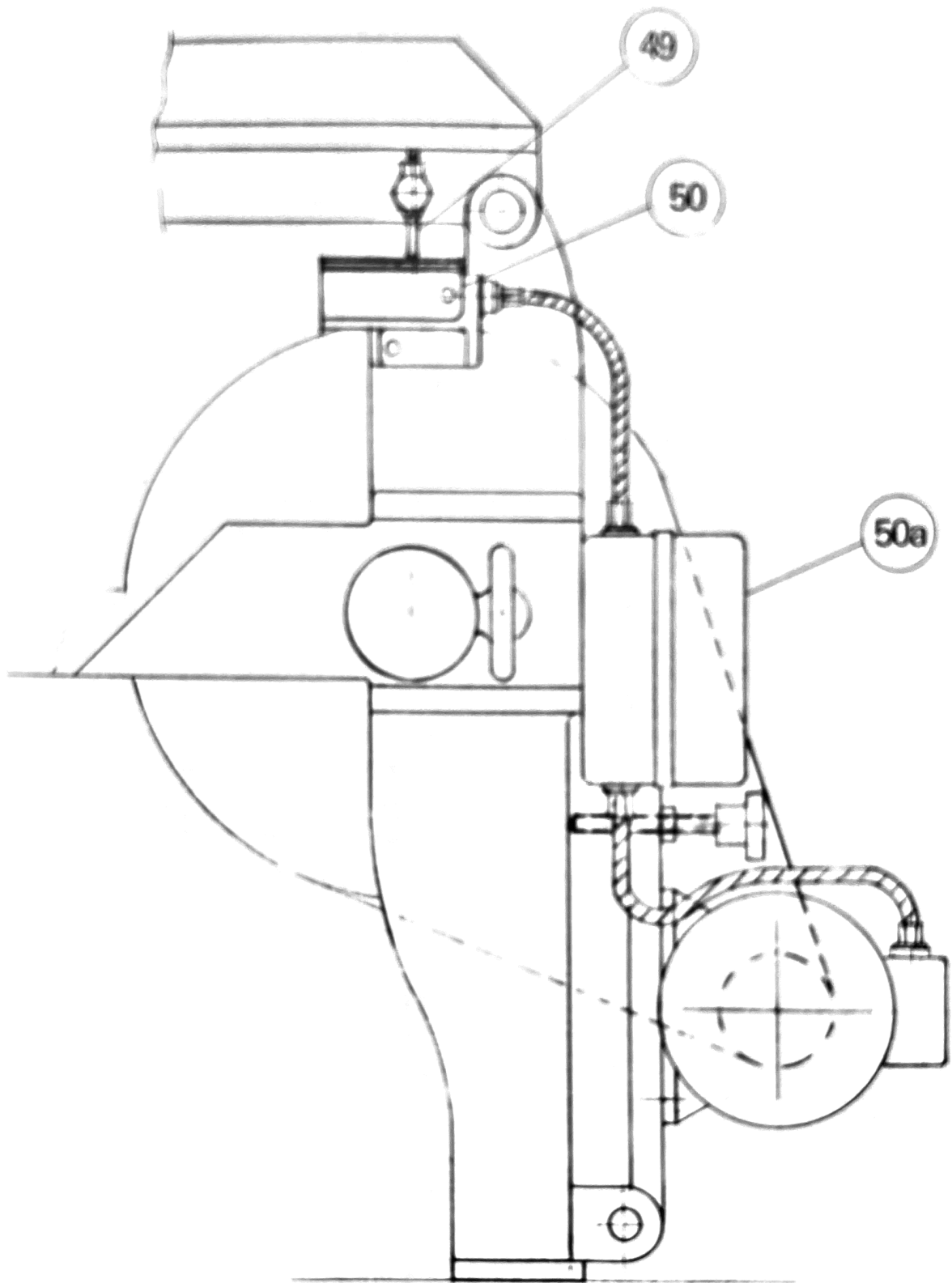
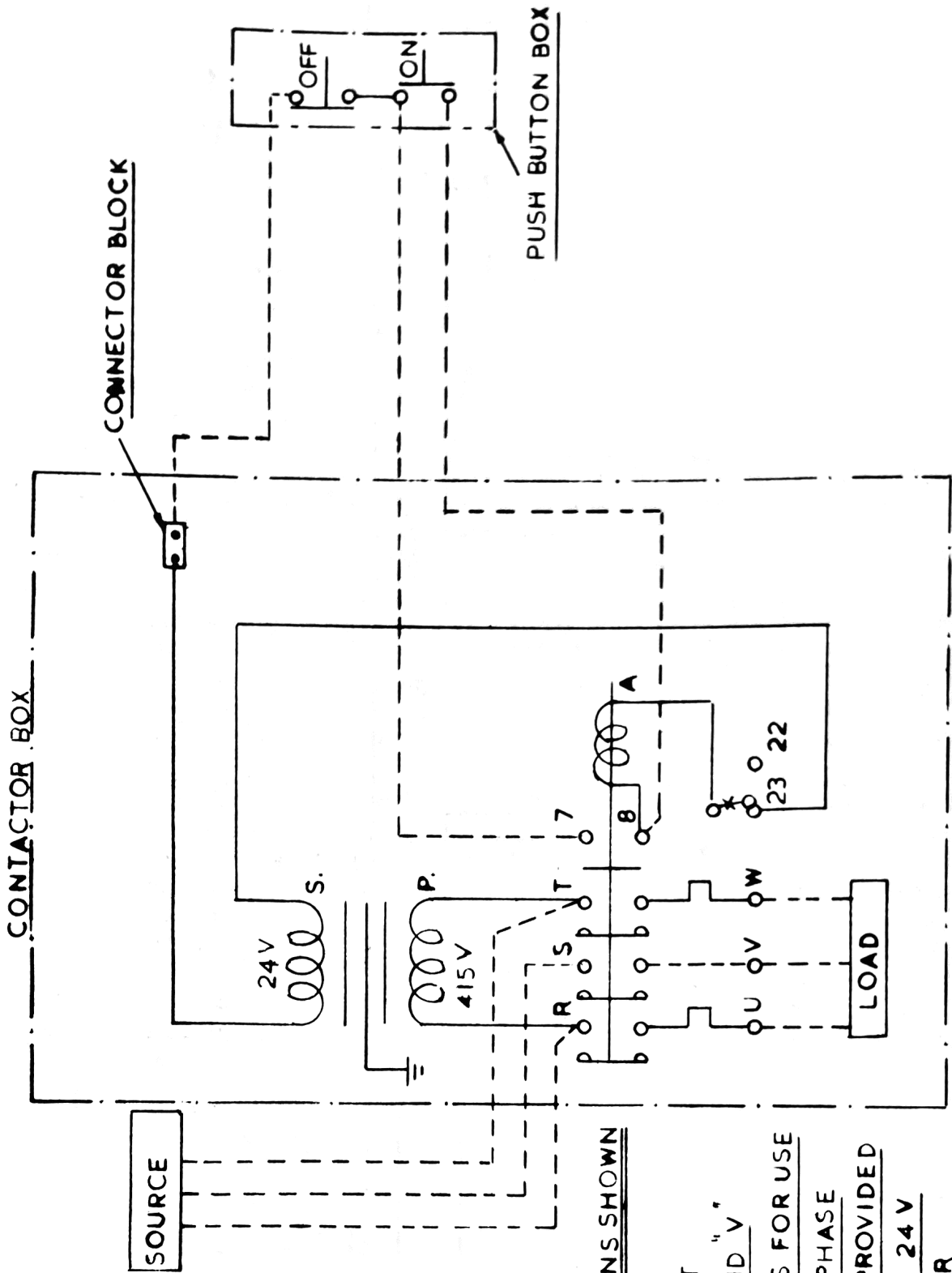


Fig. 2b



3 PHASE CONNECTIONS SHOWN
FOR SINGLE PHASE
APPLICATIONS OMIT
CONNECTIONS 'S' AND 'V'
NOTE:- CONTACTORS FOR USE
ON SINGLE PHASE
SUPPLY ARE PROVIDED
WITH 240V / 24V
TRANSFORMER

DIAGRAM OF CONNECTIONS BETWEEN CONTACTOR AND
PUSH BUTTON STATION

Installation of Models AJSD6, AJHD6 and AJHD10 Metal Sawing Machines (continued)

Electrical Connections (Single Phase System) Model AJSD6 Only

To connect the machine to an electrical supply:-

- (a) Remove cover of Contactor Part No. 50a Fig. 2b.
- (b) The two leads of the ingoing Single Phase electrical mains supply along with the earth lead (Green/Yellow) should be passed through the vacant hole in the bottom face of the contactor case which should be fitted with a grip gland.
- (c) Live lead (Brown) should be connected to terminal R of the contactor and Neutral lead (Blue) should be connected to Terminal T of the contactor. (See Wiring Diagram). The Earth lead (Green/Yellow) should be connected to the earth terminal provided in the contactor box.

The motor should now be checked for correct direction of rotation as follows:-

- (1) Switch on electrical supply.
- (2) Depress Start Push Button on Switch Part No. 50 Fig. 2b.
- (3) The large 'Vee' Belt Pulley at the left hand side of the machine should rotate in an anti-clockwise direction when viewed from the left hand side of the machine.
- (4) Should the pulley rotate in the opposite direction isolate the electrical supply and remove the terminal box cover of the driving motor. On the inside face of this cover will be found a pair of electrical diagrams showing terminals marked A2, B2, B1 and C1. Two positions for the metal straps connecting the above-mentioned terminals in the motor terminal box are shown in the diagrams and to reverse the direction of rotation of the motor the straps connecting these terminals should be re-positioned to the alternative position shown in the diagrams to those of the original position of the straps.
- (5) When the direction of rotation is correct the terminal box cover of the motor should be replaced and also the cover of the Contactor Box Part No. 50a Fig. 2b and secure by means of the screws.

Lubrication

Regular attention should be given to lubrication of the various oscillating and rotating parts of the machine.

The following Parts should be lubricated daily with good quality medium grade machine oil, the parts referred to by the letters E to Q are shown in Figs. 2 and 2a and are indicated by black spots.

<i>Position</i>	<i>Number of Lubrication Points</i>	<i>Description of Part</i>
F, G	2	Bow Slide Fulcrum Pivot
H, I	4	Bow Slideways
J	4	Fork Lever Pivot and Nut Pivot
K, L	2	Feed Screw Bearing and Nut
M	1	Balance Lever Joint
N	2	Cross Head Pivot
O, P	2	Con Rod Big End and Small End
Q	1	Feed Lever Roller

The following Parts shown in Fig. 3 (Models AJHD6 and AJHD10) and Fig. 8 (Model AJSD6) should be lubricated with Shell Alvania R2 Grease.

A, B, C, D	4	Bearings of Driving Gear Shafts (Every 100 hours operating time)
E	1	Gear Teeth (Every 50 hours operating time)

Section through Drive (Models AJHD6 and AJHD10)

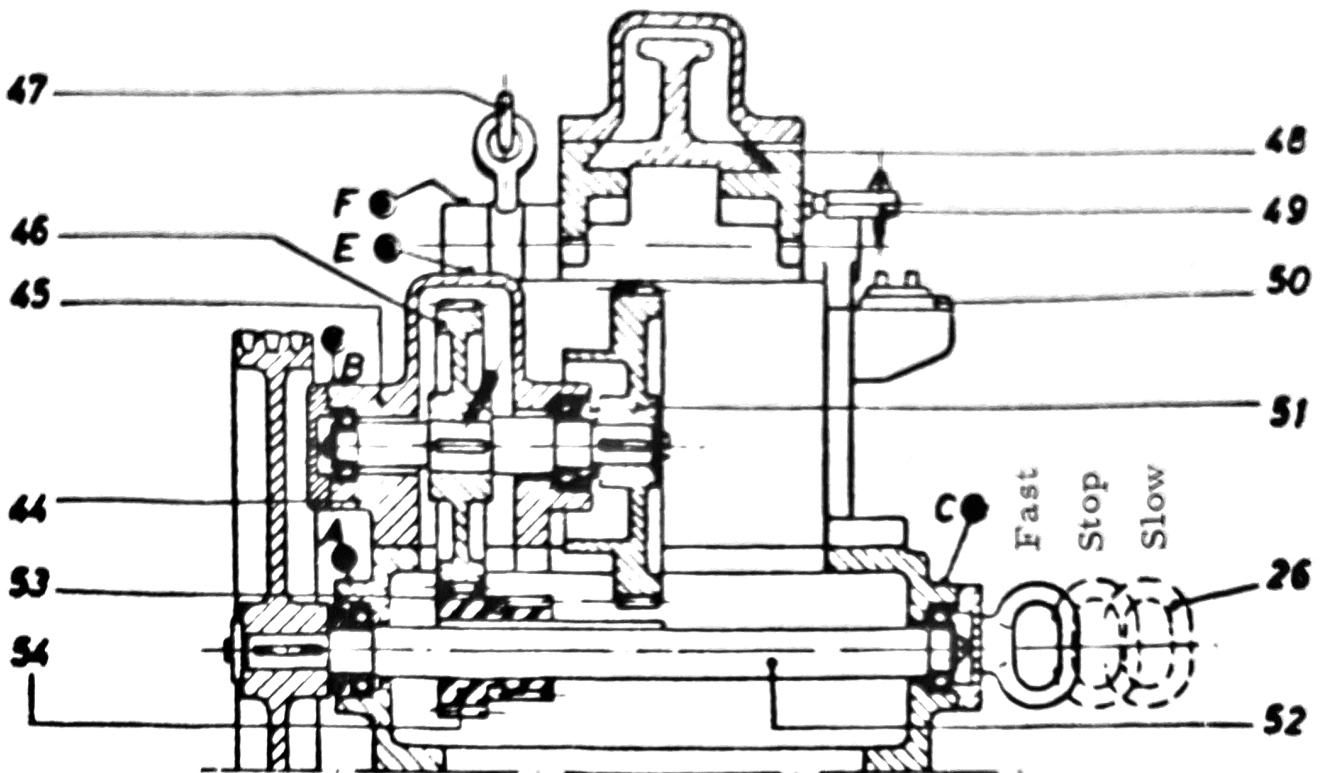


Fig. 3

Specification				
Model No.		AJSD.6	AJHD.6	AJHD.10
Cutting Capacity	Round (mm)	150	150	250
	Square (mm)	140	140	225
Blade Size (mm)		320 × 25 × 1.5	350 × 30 × 1.5	450 × 30 × 2.5
Motor H.P.		0.75	1	1.5
Cutting Speeds Strokes/min.		75 and 105	70 and 95	70 and 95
Blade Stroke (mm)		75 and 125	140	153
Nett Weight (kg)		150	320	540

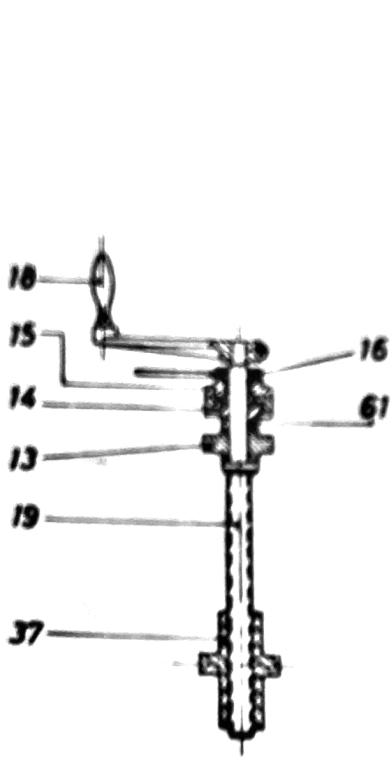


Fig. 5

Feed Screw Assembly

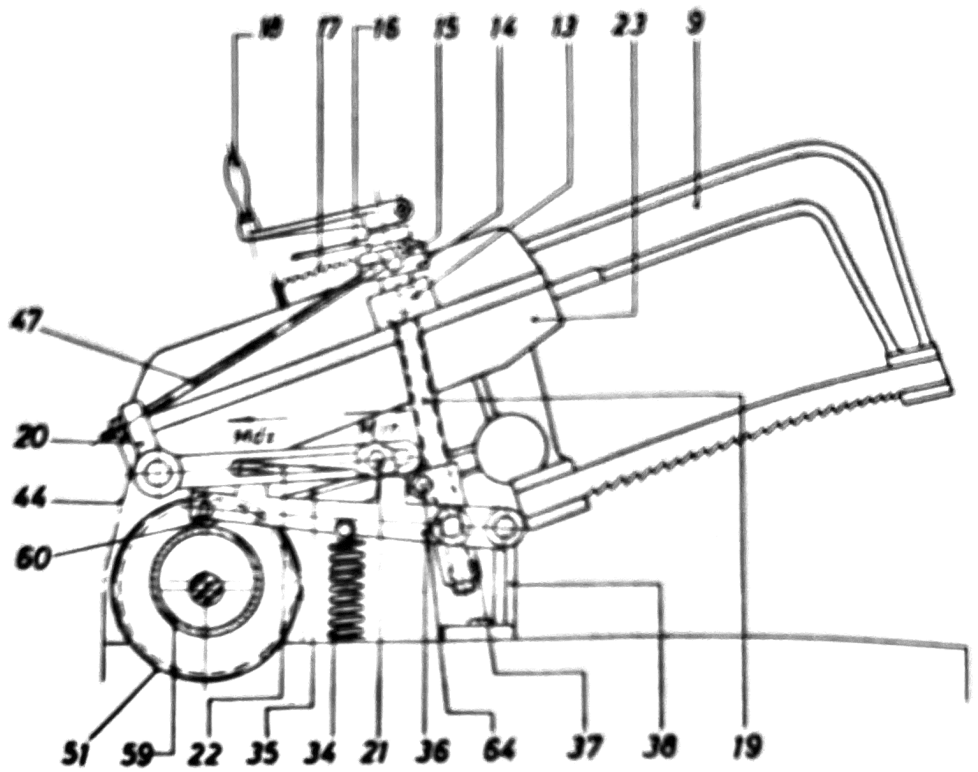


Fig. 6

Feed Mechanism, Bow Slide and Bow Frame

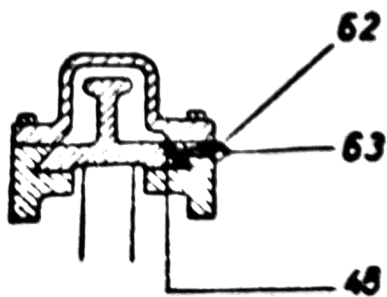


Fig. 7

Section thro' Bow Slide

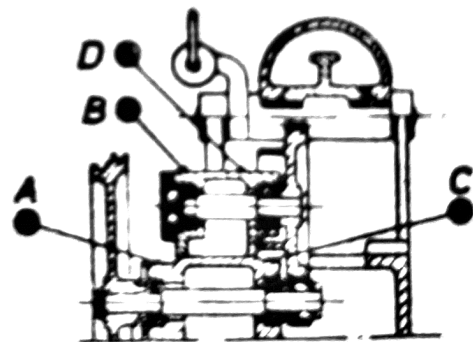


Fig. 8

Section thro' Drive (AJSD. 6)

Coolant System

The machine is provided with an integral coolant system.

The coolant tank is mounted below the bed of the machine and from the rear leg of the machine and the coolant pump which is belt driven from the motor pulley is mounted at the left hand side of the coolant tank.

The outlet port of the coolant pump is tubed to the under side of the bed and at the upper surface of the bed a flexible coolant pipe is fitted, the nozzle of which is adjustable so the coolant flow to the cutting blade can be regulated. Regulation of flow of coolant is effected by rotating this nozzle. If the nozzle is rotated anti-clockwise when looking on the end of the nozzle the rate of flow of coolant will be increased. If the nozzle is rotated clockwise the rate of flow will be decreased and if the rotation of the nozzle in a clockwise direction is continued the flow of coolant will stop.

The flexible tubing can be adjusted to a position so as to give the most convenient supply of coolant from the nozzle to the saw blade and work-piece.

Return of the coolant to the coolant tank from the coolant trough formed in the bed of the machine is through a return pipe fitted towards the rear of the bed.

Swarf should constantly be removed from the coolant trough of the bed so that coolant flow to the return pipe is not impeded.

To fill the system pour new clean coolant into the coolant tank. Use a good quality coolant so that unnecessary sludge and corrosion conditions are eliminated. We recommend the use of Shell Dromus Oil diluted with clean water in the proportions of 1 part of oil to 20 parts of water.

The coolant tank should be cleaned out regularly ensuring that the pump unit is free of swarf at all times.

Operating Instructions

Fitting Blade to Bow Frame

- 1 Loosen Blade Tensioning Nut 1 Fig. 4.
- 2 Remove Front Blade Clamp Washer off Pin 2 Fig. 4 and Rear Blade Clamp Washer off Pin 3 Fig. 4.
- 3 Loosen Front Blade Clamp Bolt 4 Fig. 4.
- 4 Locate Blade with the points of the teeth pointing in the direction as indicated in Fig. 4 (ie. – to cut when Bow Frame moves to rear of machine) on the locating Pins 2 and 3 Fig. 4 adjusting the centres of Pins 2 and 3 Fig. 4 by means of Blade Tensioning Nut 1 Fig. 4 so that the Pins 2 and 3 Fig. 4 align with the fixing holes in the Blade.
- 5 Fit Clamp Washers on Pins 2 and 3 Fig. 4 and secure with Nuts.
- 6 Tension Blade by rotating Tensioning Nut 1 Fig. 4 clockwise tapping Blade with a metallic object whilst rotating this nut until a ringing tone is obtained from the blade. When this condition is reached the blade is adequately tensioned.
- 7 Tighten Front Blade Clamp Bolt 4 Fig. 4.

Preparing Machine for Cutting

Raise blade by rotating Handle 1 Fig. 9 anti-clockwise until there is sufficient clearance between the blade and the surface of the bed of machine and adjust the moveable jaw of the vice by sliding Vice Jaw 3 Fig. 9 along the bed of the machine until there is sufficient room to pass the cross section of the stock material to be cut into the vice.

Slide stock material through vice jaws until the required length which is to be cut-off projects beyond the blade at the right hand side when looking at the front of the machine. (Measure length from right hand side of blade).

Slide Moveable Vice Jaw 3 Fig. 9 up to face of material to be cut and nip Vice Jaw Securing Bolt 4 Fig. 9. Locate heel of Vice Nut 2 Fig. 9 in suitable heel location on bed of machine and tighten Vice Screw securely and then tighten Vice Jaw Bolt 4 Fig. 9. (Check length which is to be cut-off by measurement). If it is required that a number of pieces of material of the same length are to be cut-off set material stop which is carried on stop bar so that face of the material stop contacts the end of the bar which is to be cut and secure the stop bar and material stop by means of the locking knobs.

Model AJSD6 Metal Sawing Machine Only

The blade of this model can be operated at two different stroke lengths. The different lengths of stroke are obtained as follows:-

Long Stroke condition is obtained with crank pin in position A Fig. 4. Stroke length 125mm.

Short Stroke condition is obtained with crank pin in position B Fig. 4. Stroke length 75mm.

Mounting Blade in Bow Frame

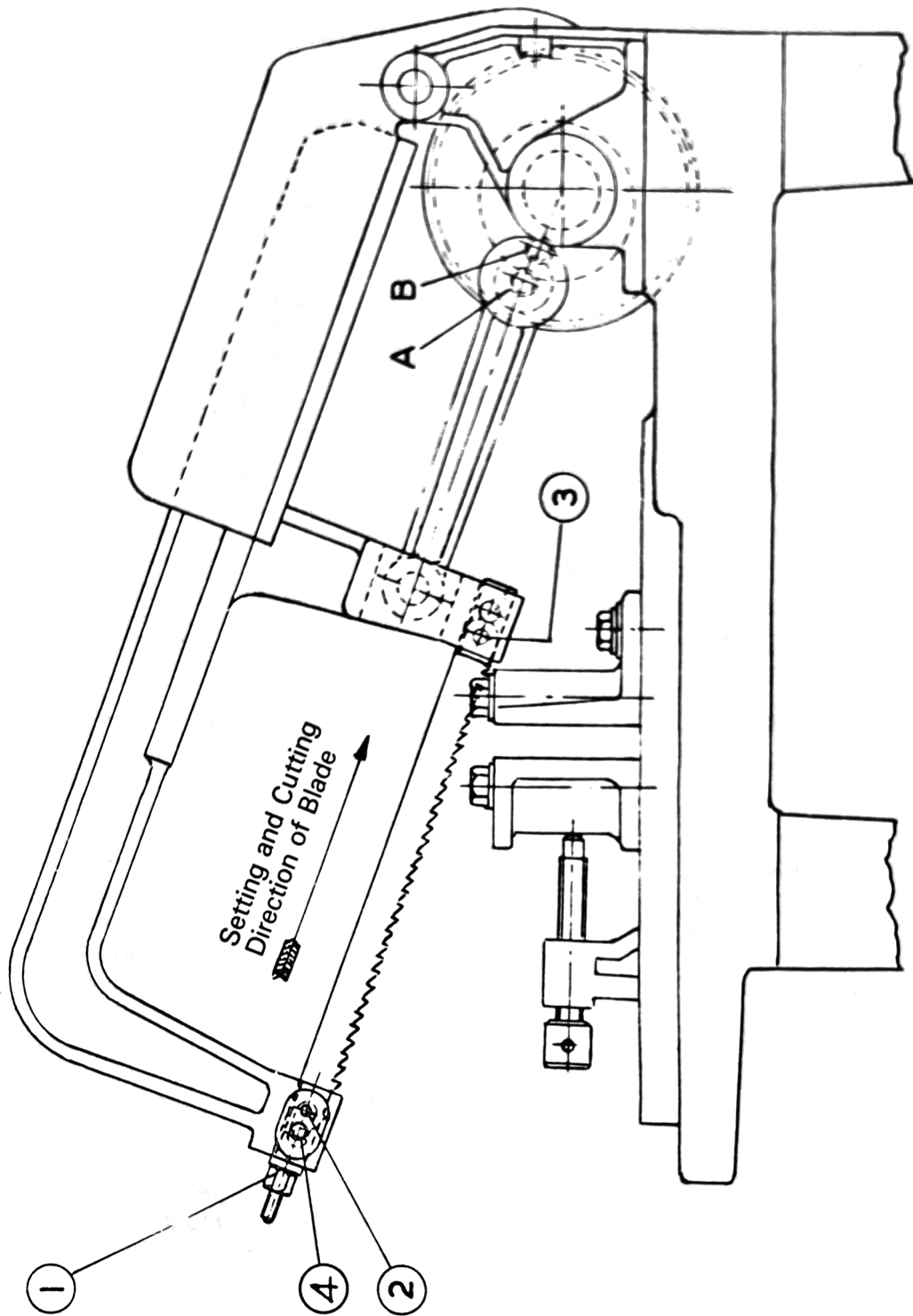


Fig. 4

Key to Controls

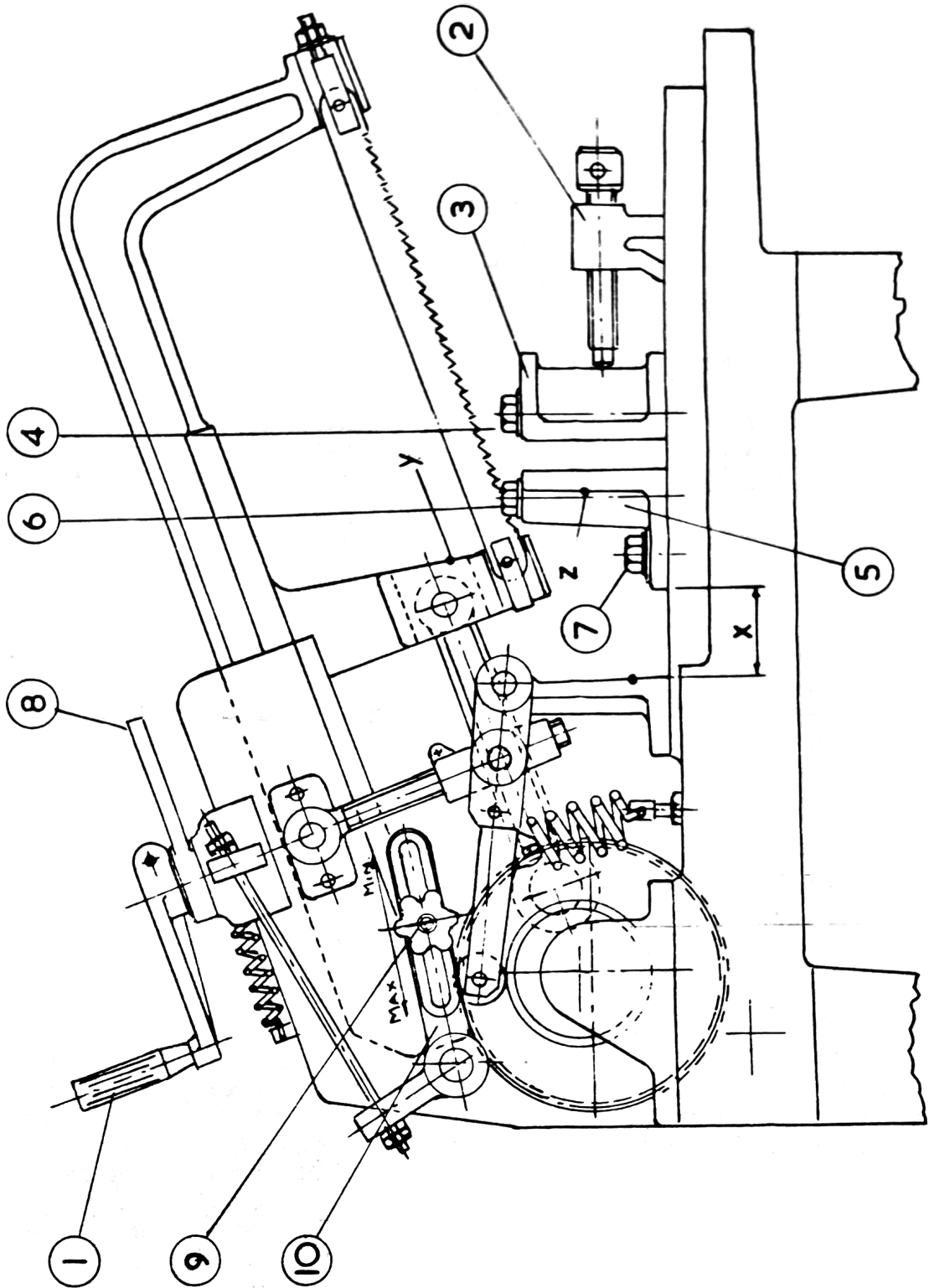


Fig. 9

Operating Instructions (continued)

Important

When the crank pin is in position A Fig. 4 giving long stroke condition dimension X Fig. 9 (distance between face of fulcrum bracket and edge of fixing flange of Rear Vice Jaw) must never be less than $1\frac{1}{2}$ ".

Observance of this condition will ensure that there is always clearance between face Y Fig. 9 of Bow Frame and face Z Fig. 9 of Rear Vice Jaw when the Bow Frame is fully extended towards the front of machine.

Care should also be taken when initially setting up the machine with crank pin in position B Fig. 4 giving short stroke condition ensuring that the Rear Vice Jaw is so positioned that clearance is present between face Y Fig. 9 of Bow Frame and face Z Fig. 9 of Rear Vice Jaw when the Bow Frame is fully extended towards the front of machine.

To change stroke length unscrew crank pin with spanner and move crank pin to the alternative tapped hole in the crank disc and tighten securely ensuring that the spacer washer on each side of the connecting rod seat correctly.

Observance of the above instructions ensures that the Bow Frame does not foul the vice jaws or material which is being cut at any time.

Angular Cutting-Off Model AJSD6

The Rear Vice Jaw 5 Fig. 9 is adjustable so that angular cutting-off can be carried out on this machine.

To set the face of the Rear Vice Jaw 5 Fig. 9 to the required angle between 90° and 45° to the blade line release Vice Jaw Bolt 6 Fig. 9 and Setscrew 7 Fig. 9.

Set the required angle on a protractor and with the stock of the protractor against the blade rotate the Rear Vice Jaw 5 Fig. 9 until the Face of the Vice Jaw aligns with the blade of the protractor.

Tighten Vice Jaw Bolt 6 Fig. 9 and Setscrew 7 Fig. 9 securely.

With the material to be cut pushed up to the face of the Rear Vice Jaw 5 Fig. 9 and the stock to be cut projecting the required length beyond the blade on the right hand side the Moveable Vice Jaw 3 Fig. 9 is pushed up to the face of the material to be cut and is tightened as previously described.

Angular Cutting-Off Models AJHD6, AJHD10

The Rear Vice Jaw 5 Fig. 9 of these two models is fitted with two dowels which locate the face of the jaw at 90° to the line of the blade.

To swivel this jaw for angular cutting-off these dowels have to be removed and then the above procedure relating to the Model AJSD6 can be followed.

When the Rear Vice Jaw 5 Fig. 9 is returned to the 90° position replace the two dowels.

Operating Instructions (continued)

Selection of Cutting Speed Model AJSD6

The cutting speeds obtainable with this model are 75 and 105 Cutting Strokes per minute.

To obtain a speed of 75 Strokes per minute the 'Vee' belt should be positioned on the pair of vee grooves nearest to the machine frame of the motor and driven pulleys.

To obtain a speed of 105 Strokes per minute the 'Vee' belt should be positioned on the pair of vee grooves furthest away from the machine frame of the motor and driven pulleys.

To change the speed remove wire mesh guard enclosing vee belt drive.

Slaken bolts securing motor to slide rails.

Release tension on vee belt by sliding motor on slide rails.

Position belt in appropriate groove of motor and driven pulley.

Re-tension vee belt by sliding motor on slide rails and secure motor fixing bolts.

Replace wire mesh guard.

Selection of Cutting Speed Models AJHD6 and AJHD10

The cutting speeds obtainable with these models are 70 and 95 Cutting Strokes per minute. The speed change is made by the selection of different ratios of pairs of gears.

Handle 26 Fig. 3 is moved to the inner position for the higher speed and moved to the outer position for the lower speed. The mid position of the Handle 26 Fig. 3 is neutral.

Speed changes must not be made when the motor is running.

Regulation of Feed Rate – All Models

The feed rate is controlled by the position of Stud 9 Fig. 9 in the Feed Rate Adjustment Lever 10 Fig. 9 which determines the amplitude of rise and fall of the Feed Rate Adjustment Lever 10 Fig. 9 and hence controls the amount of movement imparted to the sprag clutch mounted on the Feed Screw 19 Fig. 5. The resistance to rotation of the Feed Screw 19 Fig. 5 can be adjusted by means of the set screw fitted to the split portion of the Feed Nut 37 Fig. 5.

To decrease the feed rate move Stud 9 Fig. 9 away from the pivot point of Feed Rate Adjustment Lever 10 Fig. 9.

To increase the feed rate move Stud 9 Fig. 9 towards the pivot point of Feed Rate Adjustment Lever 10 Fig. 9.

The amount of feed selected will depend on the type of material to be cut and care should be exercised when setting Stud 9 Fig. 9.

Operating Instructions (continued)

Commencing Cutting

Disengage Feed Clutch by rotating Clutch Locking Handle 8 Fig. 9 half a turn anti-clockwise.

Set feed rate per stroke by adjusting position of Feed Rate Control Pin 9 Fig. 9 in Feed Rate Adjustment Lever 10 Fig. 9 (eg. set pin midway along slot when cutting 40mm diameter mild steel bar) and secure with Locking Knob.

Feed rate should be regulated to suit the various materials and size of material to be cut:

Softer or smaller sections – increase feed rate.

Harder or larger sections – reduce feed rate.

Start motor by depressing Start Push Button in Switch 50 Fig. 2b.

Lower the blade to the work by rotating Handle 1 Fig. 9 clockwise until the blade is within approximately 2mm of the surface of the material to be cut.

Adjust coolant delivery pipe to a convenient position so that coolant will flow on to the blade and into the cut formed as cutting takes place.

Open the Coolant Delivery Nozzle which is situated in the Coolant Delivery Pipe and regulate the flow as required.

Rotate Clutch Locking Handle 8 Fig. 9 clockwise thus engaging the Feed Clutch.

The blade will continue to cut through the material and when the required piece has been cut-off the electric motor will be stopped automatically as Plunger 49 Fig. 2b depresses Stop Push Button in Switch 50 Fig. 2b.

Disengage Feed Clutch by rotating Clutch Locking Handle 8 Fig. 9 half a turn anti-clockwise and raise blade to the start position for the next cut by rotating Handle 1 Fig. 9 anti-clockwise.

Cutting Faults and their Causes

An out of Square Cut can result from:-

- Insufficient blade tension
- Rate of blade feed too great
- Worn blade (set worn off one side of blade)
- Variation in hardness of material being cut
- Slideway wear

Blade Breakage may result from:-

- Rate of blade feed too great
- Wrong type of blade for material being cut
- Work-piece moving in the vice

Rapid Blade Wear:-

- Too small or too great a feed rate
- Pitch of teeth in blade too fine
- Insufficient Coolant

Choice of Blade

Material to be cut	Number of Teeth per inch		
	AJSD6	AJHD6	AJHD10
Soft materials such as brass, copper etc.	8	6	4
Soft to medium quality steels, cast iron up to 200 Brinell	10	8	6
Cast steels, chrome-nickel steels, stainless steel and alloy steels	12	10	8

Key to Part Numbers

Figures 2, 2b, 3, 5, 6 and 7

- | | |
|---------------------------------|------------------------------------|
| 1 Front leg | 32 Coolant Tank and Pump |
| 2 Bed | 34 Tension Spring |
| 3 Vice screw | 35 Connecting Rod |
| 4 Vice nut | 36 Cam Lever |
| 5 Moveable vice jaw | 37 Feed Screw Nut |
| 6 Blade carrier (Moveable) | 38 Cam Lever Pivot |
| 7 Blade tightening nut | 39 Fixed vice jaw |
| 8 Blade securing washer and nut | 41 Coolant pipe |
| 9 Bow Frame | 42 Adjustable Length Bar |
| 10 Blade carrier (Fixed) | 43 Material Stop |
| 11 Blade carrier Bolt | 44 Crank Shaft Housing |
| 12 'Vee' Slide Cover | 45 Crank Shaft |
| 13 Feed Screw Cross Head | 46 High Speed Gear |
| 14 Sprag Clutch | 47 Feed Clutch Operating Rod |
| 15 Friction Shoe | 48 Gib Strip |
| 16 Clutch nut | 49 Switch Stop Plunger |
| 17 Clutch return spring | 50 Switch |
| 18 Feed Screw Handle | 50a Contactor |
| 19 Feed Screw | 51 Low Speed Gear and Cam |
| 20 Feed Adjustment Lever | 52 Main Drive Shaft |
| 21 Feed Adjustment Stud | 53 Speed change fork |
| 22 Feed Stud Plate | 54 Double gear |
| 23 Main 'Vee' Slideway | 56 Moveable vice jaw securing bolt |
| 24 Slideway Fulcrum Bracket | 57 Fixed vice jaw securing bolt |
| 25 Tommy Bar | 58 Fixed vice jaw swivel bolt |
| 26 Speed change handle | 59 Cam |
| 27 Driven Pulley | 60 Cam Lever Roller |
| 28 'Vee' Belt | 61 Feed take up washer |
| 29 Motor | 62 Gib Stud Nuts |
| 30 Motor support | 63 Gib Adjustment Studs |
| 31 Back leg | 64 Feed Nut Adjustment Screw |

