RECORD MACHINE DETAILS	DISTRIBUTOR
MODEL	
SERIAL No.	
DATE of PURCHASE	
VOLTAGE	
PHASE	
CYCLES	
QUOTE THIS INFORMATION WHEN REQUESTING SERVICE OR SPARES.	

This Bandsaw is engineered to a high standard of construction and performance. Attention to maintenance and service will be repaid by many years' trouble-free operating.

STARTRITE®

Model H250A

HORIZONTAL BANDSAWING MACHINES

HANDBOOK

25E

QUALITY
BANDSAW
BLADES

ORDER LINE- 01634 850833

A.L.T. SAWS & SPARES LTD

Unit 15, Pier Road Industrial Estate

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(STARTRITE MACHINE SPECIALIST)

CONTENTS:

PARTS LISTS AND ILLUSTRATIONS

SPECIFICATION :

Model H250A	-	Automatic Horizontal Bandsawing Machine
Cutting Capacity at 90° Only	-	255 mm, 10" Dia. 255 mm x 255 mm, 10" x 10"
Blade Speeds	-	15 - 92 m/min. 50 - 300 ft/min.
Material Feed Rate	-	3.6 m/min., 12 ft/min.
Wheel Diameter	-	355 mm, 14"
Saw Blade Size	-	3200 mm x 25 mm x 0.9 mm 126" x 1" x .035"
Motors - Main Drive	-	1.5 kW., 2 h.p., 940 r.p.m.
Material Feed	-	0.19 kW., 0.25 h.p.,
Hydraulic Pump	-	0.19 kW., 0.25 h.p., 1350 r.p.m.
Electric Supply	-	220/240 Volt 3 Phase 50Hz. 380/440 Volt 3 Phase 50Hz.
Gross Weight	-	516 kg., 1138 lbs.

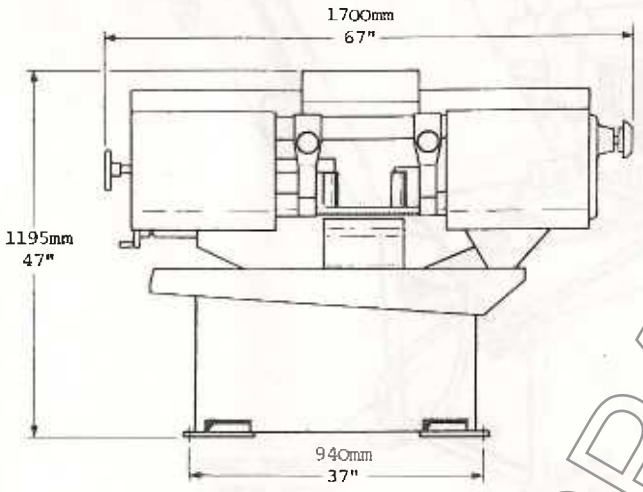
WHEN ORDERING PARTS, PLEASE STATE :-

1. Quantity required.
2. Part No. (where applicable) and description.
   Specify power supply for electrical components.
3. Machine Model and Serial No.

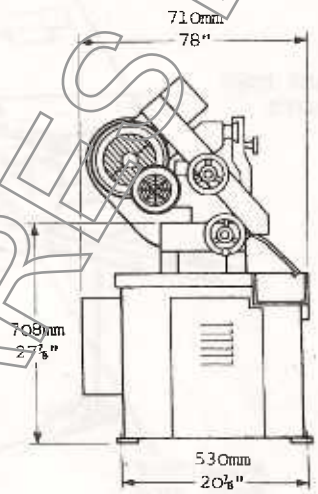
NOTE : ILLUSTRATIONS MAY VARY IN DETAIL, ACCORDING TO MODEL.

HEIGHT OF MACHINE WITH BOW RAISED : 1780 mm, 70"

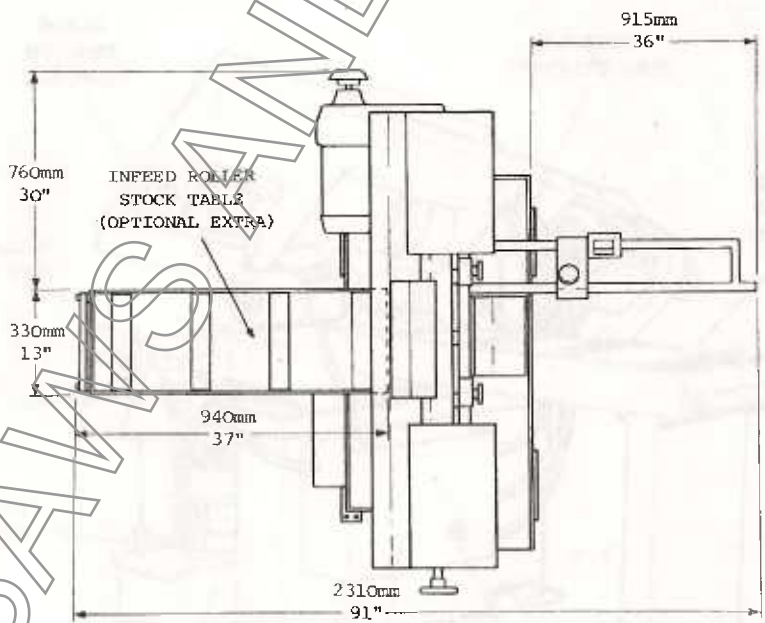
ALL DIMENSIONS APPROXIMATE.



FRONT VIEW

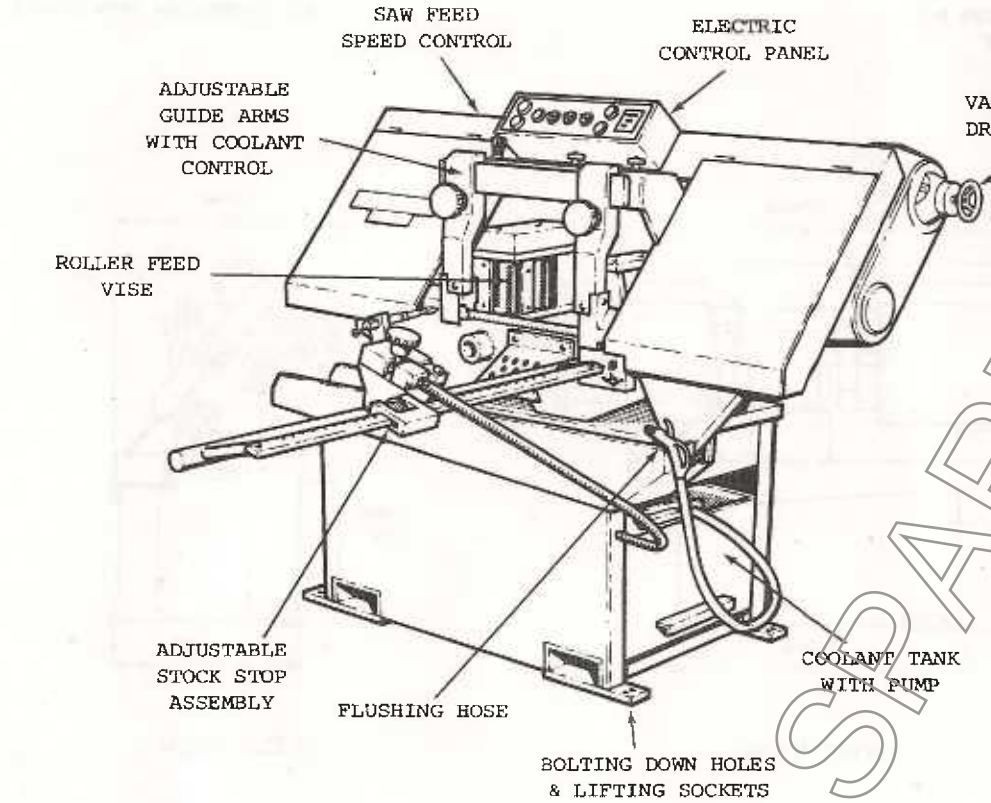


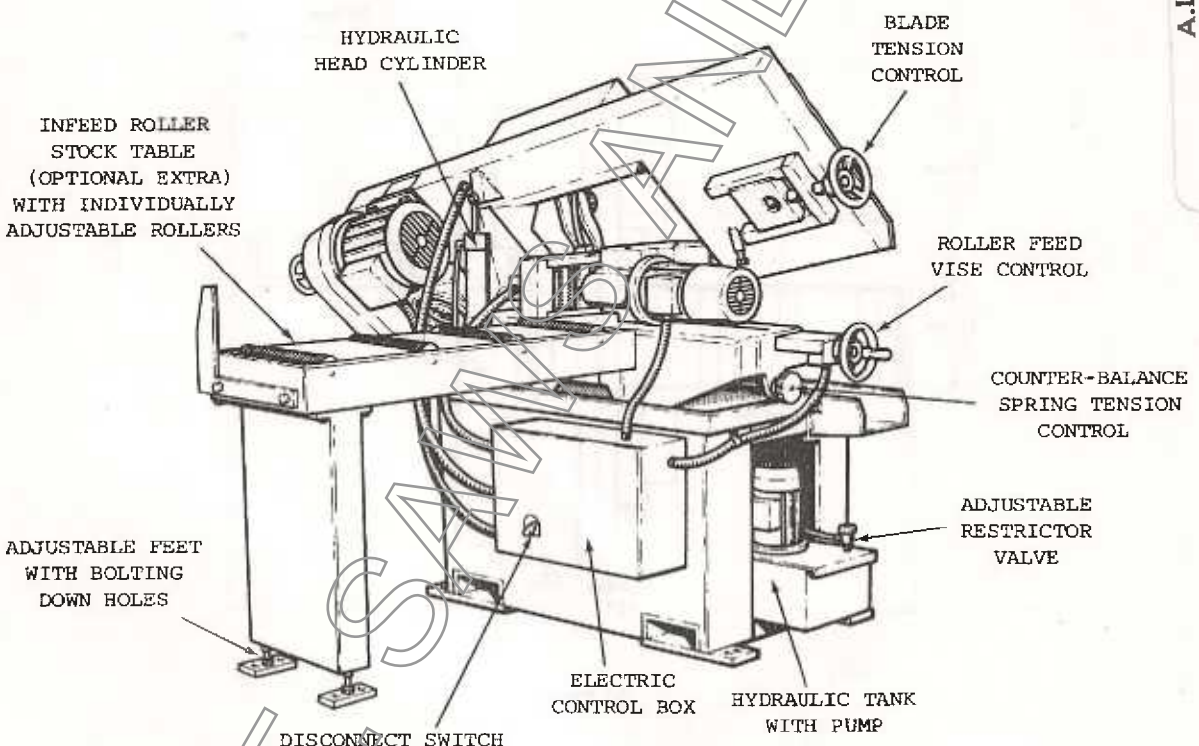
SIDE VIEW



PLAN

FOUNDATION PLAN OF MODEL H250A HORIZONTAL BANDSAW.





GENERAL LAYOUT OF MODEL H250A HORIZONTAL BANDSAW.

OPERATING SAFETY PRECAUTIONS.

BEFORE ATTEMPTING TO OPERATE THE MACHINE, BECOME FAMILIAR WITH THE CONTROLS AND OPERATING INSTRUCTIONS.

NO PERSON SHOULD OPERATE THIS MACHINE WITHOUT SUFFICIENT TRAINING AS TO ITS SAFE AND PROPER OPERATION, OR WITHOUT SUCH SUPERVISION AS MAY BE NECESSARY.

This bandsaw has been equipped with guards and other devices to protect from moving parts wherever possible. However, remember that it is a machine tool designed to cut metal using a sharp cutting tool (saw blade) moving at high speed. It also has moving parts and components which are hydraulically and electrically actuated and, if the machine is operating automatically, will move without any action on the part of the operator. Therefore, the operator must be fully aware of these conditions and take care to avoid injury.

Never operate the machine unless all guards and covers supplied are in place and closed.

Always disconnect the power at source when performing maintenance work on the machine or making adjustments other than those necessary for the normal operation of the machine.

Never load the machine while the blade is running.

Never adjust the guide arms while the blade is running.

Always support long and heavy stock pieces behind and in front of the machine to prevent them from falling and causing injury.

Use care in uncoiling and installing new bandsaw blades as the teeth are very sharp. It is advisable to wear gloves when handling saw blades.

Never leave tools or other objects on the bed or other surfaces of the machine while it is operating.

Accumulations of chips can create potentially dangerous situations, keep the machine clean.

Pressing th green START push-button with the head up in contact with the limit switch at top of head travel will automatically start the saw blade and coolant pump. All feeds and stops should have been adjusted before pressing this button and the operator should be sure he is in the clear.

With the switch set at AUTO, pressing the green START push-button can produce motion from the roller feed vise. If the machine is loaded, the stock may be fed forward. The operator must be alert to these possibilities and be sure that he and other personnel are in the clear.

The electrical circuit of this machine is designed to stop the blade drive motor at end of cycle and out of stock conditions. However, it is possible that a malfunction could prevent the motor from stopping. The operator should ascertain visually if the motor has in fact stopped before entering the cutting area for re-loading or performing other operations.

Always wear eye protection when operating or attending this machine.

INSTALLATION.

To transport machine to site, use fork lift truck with forks placed in the slots provided in the base of the machine.
IMPORTANT : DO NOT LIFT THE MACHINE BY SLING FROM HEAD.

Site the machine with adequate working space around it for ease of use. Avoid siting the machine in a cramped corner where operation may prove difficult or near a gangway where a long workpiece may cause an obstruction. The whole working area should be well illuminated and the floor around the machine provided with a level and non-slip surface.

The cabinet base is provided with four bolting down holes to accept 12 mm (½") diameter bolts (not supplied). Before bolting the machine down, ensure the machine stands firm and level.

Remove the anti-rust protective coating where applied, and in particular from the working elements of the machine.

Remove the bracket clamping the head of the machine to the bed. This bracket is fitted to avoid damage during transit and is not required for the operation of the machine.

Fill hydraulic tank with approximately 2 U.S. gallons (8 litres) of hydraulic oil to oil level plate.

Fill coolant tank with approximately 8.25 U.S. gallons (32 litres) of a good grade of soluble oil diluted about 10 to 1.
IMPORTANT : DO NOT LET PUMP RUN DRY, OR DAMAGE MAY RESULT.

CONNECTION TO THE ELECTRICITY SUPPLY.

Before connecting to the electricity supply, see Section on Electric/ Hydraulic Systems for full instructions.

EXPLANATION OF CONTROLS.

POWER ON - White signal light.

This indicates the machine has been switched on at disconnect switch on electrical control box at rear of machine.

START - Green push button.

Starts blade drive motor and coolant pump motors ONLY with head fully raised or head in contact with HEAD UP limit switch.

STOP - Red push button. Stops ALL motors.

HEAD : LOWER/RAISE - Black spring-centered switch.

RAISE - (MODE switch must be set on MANUAL). Starts hydraulic pump motor and raises head while held in position.
LOWER - (MODE switch can be set on either AUTO or MANUAL). Lowers head while held in position.

ROLLER FEED JOG : REVERSE/FORWARD - Black spring-centered switch.

Switch can only be operated with head in contact with HEAD UP limit switch. Operates roller feed vise drive motor for moving workpiece forwards or backwards as required.

EXPLANATION OF CONTROLS (CONTINUED).

MODE : AUTO/MANUAL - Black two-way switch.

Sets machine in MANUAL (single cut-off), or AUTOMATIC (multiple pre-set number) operation.

BARFEED EMPTY - Amber signal light.

Indicates bar stock is required. Machine will not operate when light is on.

COUNTER.

Stops machine after pre-set number of cuts. Machine will not START if counter is set at zero.

COOLANT CONTROL.

Two adjustable valves control the supply of coolant to each guide unit. Coolant system is pressure relieved allowing both valves to be shut off if required. With the coolant switch set at ON position the coolant pump is started by depressing START push button.

FLUSHING HOSE.

With coolant switch set at FLUSH position the flushing hose can be used independently from the coolant system without the machine running.

OPERATING INSTRUCTIONS.

ROLLER FEED VISE JAWS :

Raise head to maximum height and load workpiece between roller vise jaws. Turn control handle (see Fig.1) until workpiece is firmly gripped between the rollers. Check BARFEED EMPTY signal light is off.
NOTE : Machine will not operate when BARFEED EMPTY signal light is on.

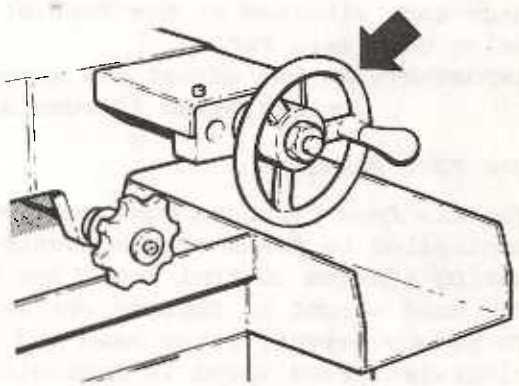


Fig.1.

HEAD UP CONTROL (SAWING AUTOMATICALLY):

The head height can be adjusted to suit the size of workpiece.
Operate HEAD LOWER switch until saw blade just clears workpiece.
At rear of machine on pivot, slacken off locking lever (see Fig.2) and adjust bracket so that it operates limit switch and lock in position.

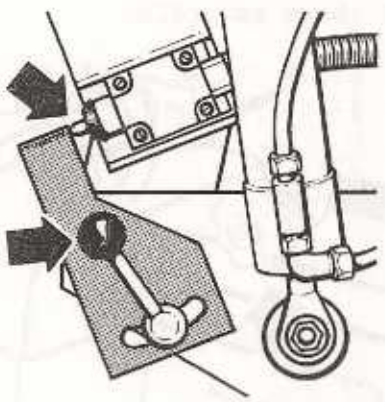


Fig.2.

BLADE GUIDES :

At all times both blade guide assemblies should be set as close as possible to the workpiece.

OPERATING INSTRUCTIONS (CONTINUED).

STOCK STOP ASSEMBLY :

The adjustable stock stop allows cuts of predetermined lengths from $\frac{3}{16}$" (5 mm) to 24" (610 mm) for both AUTOMATIC or MANUAL operations.
To set stock stop, release locking knob 'A' (see Fig.3) and slide assembly along until pointer is aligned with scale for required length. Use fine adjustment control 'B' to obtain accurate setting and make sure main casting is pressed against fine adjustment bracket before locking in position. Adjust height of stop pin to suit workpiece and operate ROLLER FEED JOG switch to feed workpiece forward to stop pin.

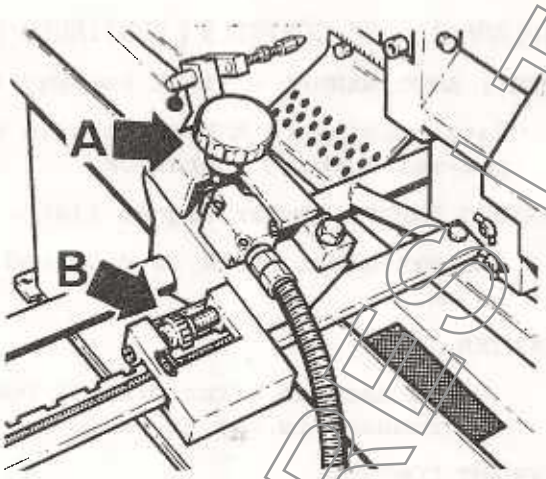


Fig.3.

SPEED SELECTION:

The 'Sawing Guide Chart' (see Section on Sawing Practice) gives a guide as to the speed required for different materials. Variation of saw speed is through a stepless drive, controlled by means of a hand-knob situated at the rear of the drive unit (see Fig.4).
IMPORTANT: Do not adjust saw speed unless blade is running.

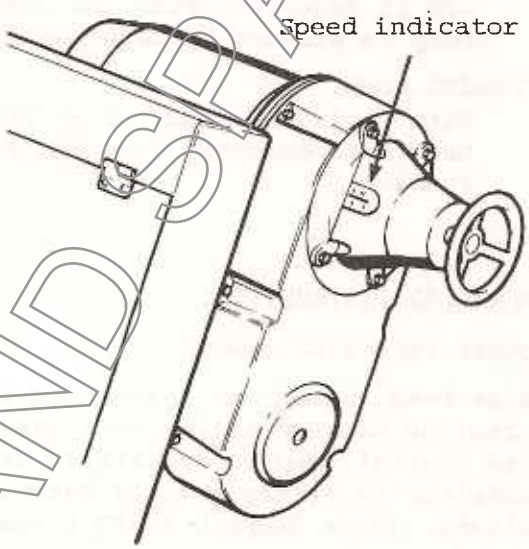


Fig.4.

SAW FEED PRESSURE :

The saw feed pressure (or head weight) is controlled by means of the counter-balance spring tension control knob (see Fig.5). The head weight is factory set on maximum. To reduce weight, raise head and turn knob clockwise. Feed speed is controlled by the hydraulic control valve (see Fig.6). The 'Guide To Using Sawing Controls' (see Section on Sawing Practice) gives a guide as to the use of these controls.

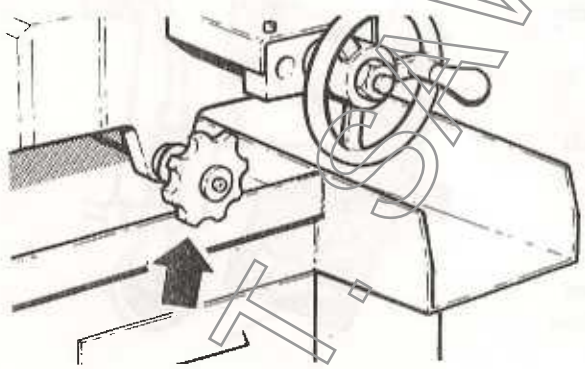


Fig.5.

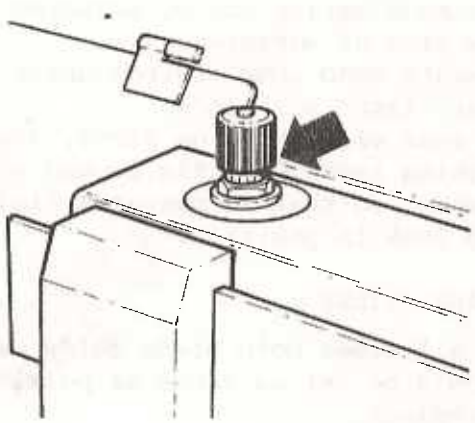


Fig.6.

MAKING MANUAL (SINGLE) CUTS.

1.
Set MODE switch to MANUAL.

2.
Raise head to full height and close the feed speed control valve.

3.
Open roller feed vise jaws, load workpiece and clamp in place.

4.
Set guide assemblies and counter-balance spring tension.

5.
Set stock stop assembly.

6.
Operate ROLLER FEED JOG switch to feed workpiece forward to stop pin.

7.
Press START push-button and select saw speed.

8.
Set feed speed control.

9.
Adjust coolant controls as necessary.

NOTE: The machine automatically stops at end of cut.

SAWING AUTOMATICALLY.

NOTE: Saw settings for 'Sawing Automatically' are identical to that of 'Manual Sawing' (steps 1 to 9 above).

1.
After making manual trim cut as above, check piece for accuracy and adjust stock stop assembly if necessary.

2.
Raise head until saw blade just clears workpiece and set head up control.

3.
Set counter to required number.

4.
Set MODE switch to AUTO, this will operate roller feed vise jaws and feed workpiece forward to stop pin.

5.
Press START push-button. At end of each cut (on AUTO only) the workpiece retracts clear of the saw blade toavoid jamming.

NOTE: The automatic cycle can be interrupted by switching to MANUAL position while in the cut, at which time the machine will complete the cut and then stop.

BLADE TENSIONING/FITTING A NEW BLADE.

To remove saw blade, slacken off blade tension by means of blade tensioning knob (see Fig.7). Raise bandwheel covers and remove blade guards. Slide saw blade out of guides and remove from machine. Select a saw blade suitable for the work in hand (see Section on Sawing Practice). Place saw blade over bandwheels with teeth facing towards pivot as shown in Fig.8 and insert saw blade carefully into guide assemblies. Check that back edge of saw blade is against flanges of bandwheels before tensioning blade. To obtain correct blade tension, turn blade tensioning knob until collar allows setting slip to become engaged as shown in Fig.7.

NOTE : Check blade tension periodically as the saw blade may stretch.

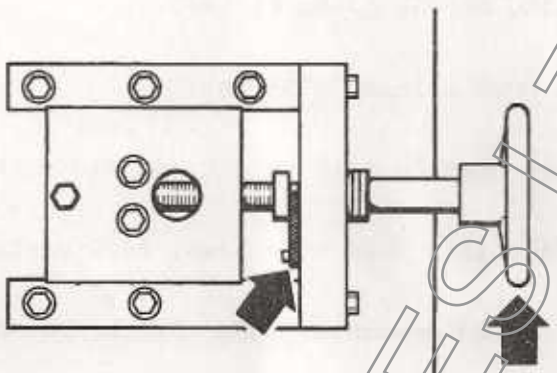


Fig.7.

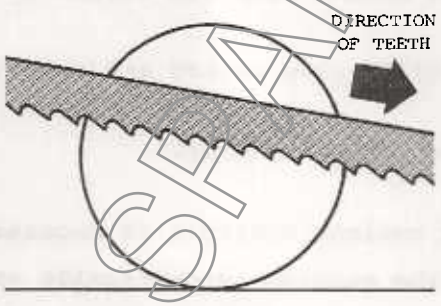


Fig.8.

MAINTENANCE.

NOTE : ATTENTION TO MAINTENANCE WILL BE REPAID BY MANY YEARS' TROUBLE-FREE OPERATING.

GENERAL :

Check blade tension frequently and adjust as necessary.
Clean out coolant tray frequently.

WEEKLY :

Check level of coolant in coolant tank. If necessary top up with a good grade of soluble oil diluted about 10 to 1.
Clean and lubricate all miscellaneous parts.

MONTHLY :

Apply grease to both ends of pivot head shaft.
Check blade guide assemblies for wear.
Check level of oil in hydraulic tank and top up as necessary.

MAINTENANCE.

NOTE : ATTENTION TO MAINTENANCE WILL BE REPAID BY MANY YEARS' TROUBLE-FREE OPERATING.

GENERAL :
Check blade tension frequently and adjust as necessary.
Clean out coolant tray frequently.

WEEKLY :
Check level of coolant in coolant tank. If necessary top up with a good grade of soluble oil diluted about 10 to 1.
Clean and lubricate all miscellaneous parts.

MONTHLY :
Apply grease to both ends of pivot head shaft.
Check blade guide assemblies for wear.
Check level of oil in hydraulic tank and top up as necessary.

DRAIN COOLANT TANK, clean tank and pump. Refill with approximately 8.25 U.S. gallons (32 litres) of clean coolant diluted about 10 to 1.

DRAIN HYDRAULIC SYSTEM , clean tank and pump, and replace filter (part No.443). Refill with approximately 2 U.S. gallons (8 litres) of clean hydraulic oil and operate controls to remove air locks.

NOTE: The main drive gearbox and roller feed gearbox are grease sealed for life and should not require further maintenance.

APPROVED LUBRICANTS.	
GENERAL LUBRICATION	ESSO Esstic 50 Oil GULF Service 51 Oil MOBIL Service or D.T.E. Heavy Medium Oil TEXACO Ursa P20 Oil
GREASE POINTS	ESSO Beacon 3 Grease GULF Gulfcrown No.3 Grease MOBIL Mobilplex 48 Grease TEXACO Regal Starfak Premium 3 Grease
HYDRAULIC SYSTEM	ESSO Nuto H44 Oil GULF Harmony 43AW Oil MOBIL D.T.E. 24 Oil TEXACO Rando HDA or HD32 Oil

CHECKING & RE-CALIBRATING HEAD WEIGHT (SAW FEED PRESSURE).

1.
Raise head and close 'Feed Speed' control valve. Turn control knob 'B' (see Fig.10) anti-clockwise until it is against retaining washer 'C'.

2.
Lower head to within a few inches of the machine bed and close 'Feed Speed' control valve.

3.
Place spring-balance scales over blade tension handle (see Fig.11). Hold spring-balance scales and open 'Feed Speed' control valve. A head weight reading of 31 lbs.(14.1 kg.) should be obtained.

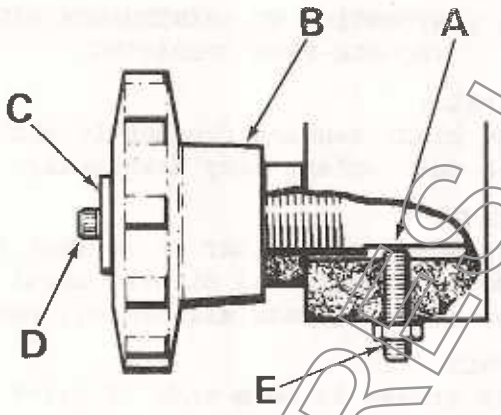


Fig.10.

4.
If the head weight is incorrect, raise head, remove set screw and locking nut 'E' and proceed as follows:-
For HEAVIER head weight turn control knob 'B' ANTI-CLOCKWISE which will turn threaded shaft 'A' anti-clockwise and increase the head weight.
For LIGHTER head weight place a socket wrench into socket cap screw 'D' and turn CLOCKWISE to turn threaded shaft 'A' and decrease the head weight.

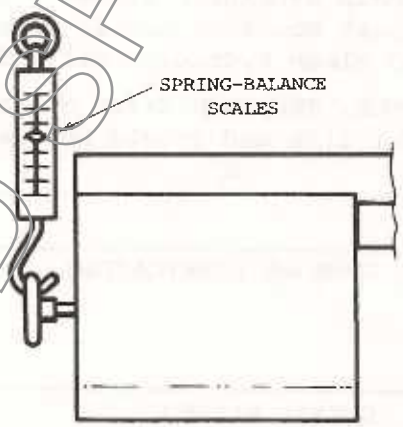
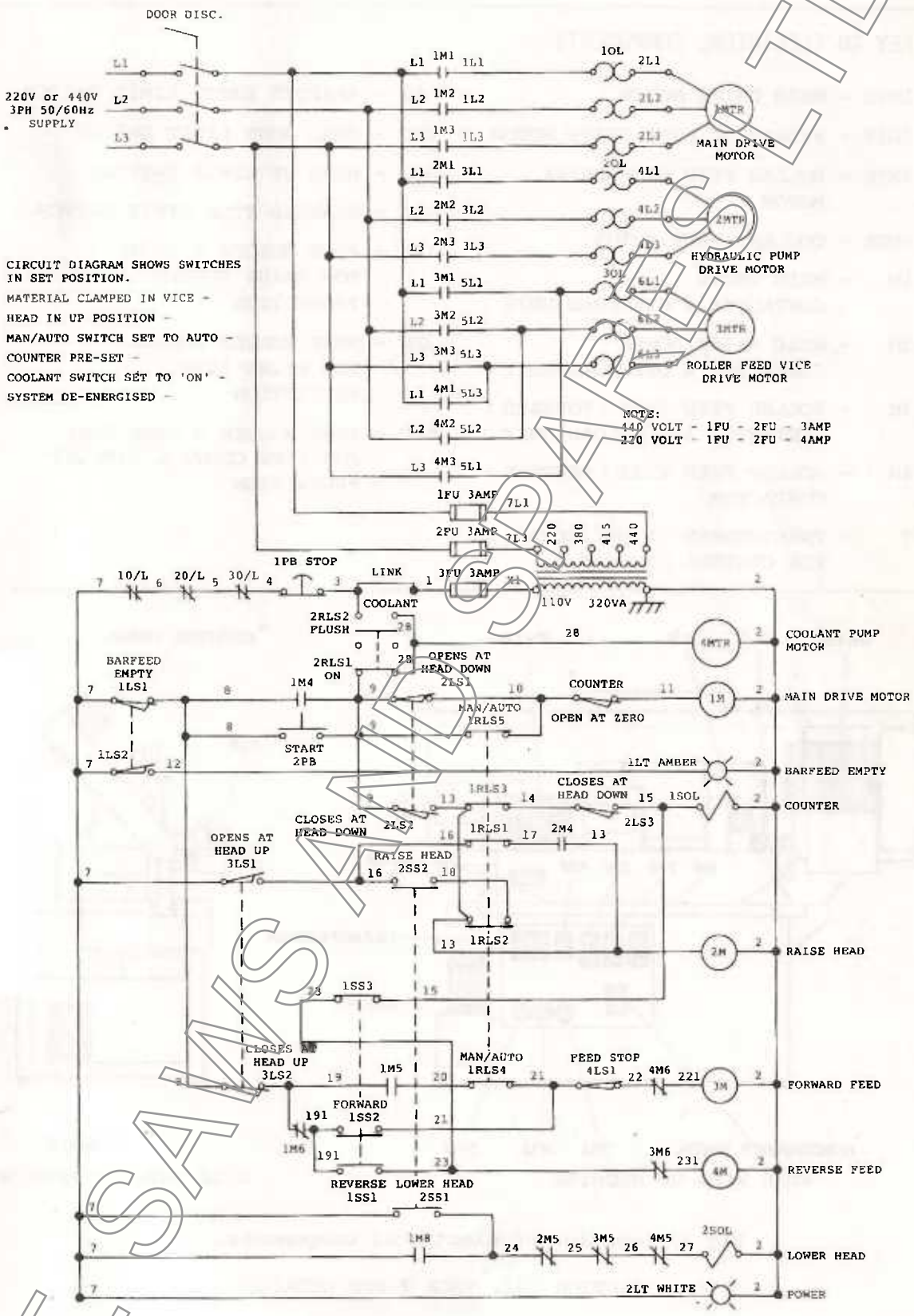


Fig.11.

5.
Re-check head weight as before. If it is now correct, screw in set screw 'E' making sure it just locates into keyway in shaft (see Fig.10) and lock in place.

6.
When correctly set the control knob 'B' should give a working range of approximately 10 lbs.(4.5 kg.) MINIMUM - 31 lbs.(14.1 kg.) MAXIMUM (9 FULL TURNS of control knob).
When no further adjustment of the spring is possible it should be replaced.



CIRCUIT DIAGRAM FOR 220V/440V 3PH 50/60Hz MACHINES.

KEY TO ELECTRICAL COMPONENTS :

1MTR - MAIN DRIVE MOTOR

2MTR - HYDRAULIC PUMP DRIVE MOTOR

3MTR - ROLLER FEED VISE DRIVE MOTOR

4MTR - COOLANT PUMP MOTOR

1M - MAIN DRIVE CONTACTOR & OVERLOAD UNIT

2M - HEAD RAISE/LOWER CONTACTOR & OVERLOAD UNIT

3M - ROLLER FEED VISE (FORWARD) CONTACTOR & OVERLOAD UNIT

4M - ROLLER FEED VISE (REVERSE) CONTACTOR

T - TRANSFORMER FOR CONTROL CIRCUIT

1LS - BARFEED EMPTY LIMIT SWITCH

2LS - HEAD DOWN LIMIT SWITCH

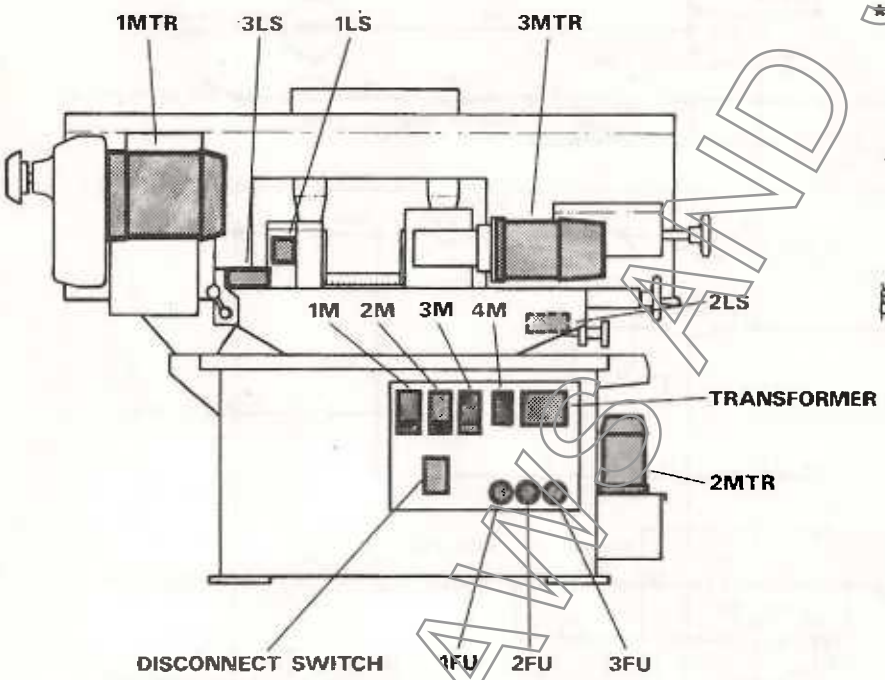
3LS - HEAD UP LIMIT SWITCH

4LS - BARFEED STOP LIMIT SWITCH

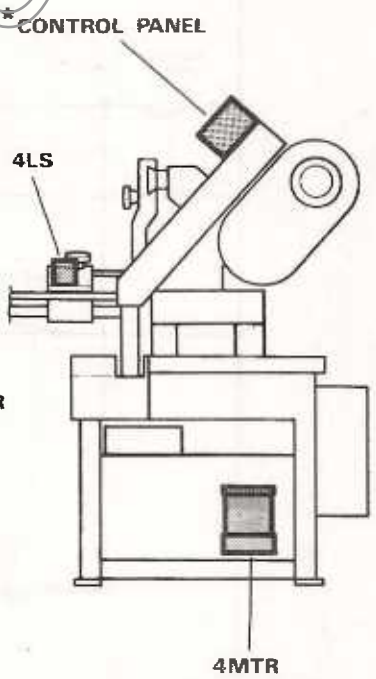
1FU - FUSE HOLDER & FUSE FOR MAINS SUPPLY PROTECTION

2FU - FUSE HOLDER & FUSE FOR MAINS SUPPLY PROTECTION

3FU - FUSE HOLDER CONTROL CIRCUIT PROTECTION



REAR VIEW OF MACHINE



SIDE VIEW OF MACHINE

Fig.1 : Location of electrical components.

*(SEE SECTION 282, PAGE 7 FOR DETAILS)

KEY TO ELECTRICAL MANUFACTURERS.

1MTR -

2MTR - (STARCRO 65 - 60Hz) (STARCRO 67 - 50Hz)

3MTR - (STARCRO 69 - 60Hz) (STARCRO 68 - 50Hz)

4MTR -

1M - 2M - 3M - 4M -

T - MELLOR ELECTRICS LTD.

1LS -

2LS -

3LS - 4LS - SAME AS 1LS.

1FU - 2FU - 3FU -

DISCONNECT SWITCH -

(MANUFACTURERS NAMES MAY CHANGE WITHOUT NOTICE).

CONNECTION TO THE ELECTRICITY SUPPLY.

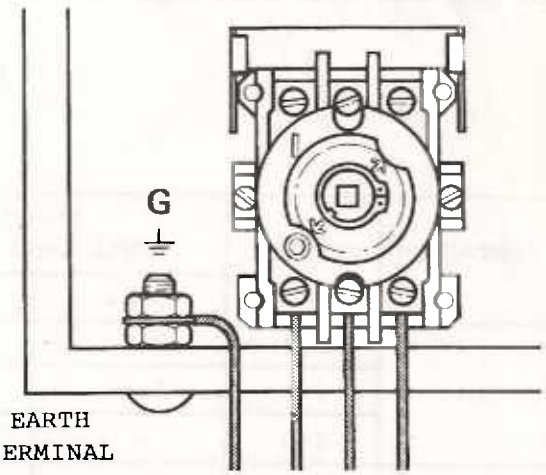
IMPORTANT : Check that the electricity supply is suitable for the machine, see data lable inside electrical control box.
At all times ensure that the machine is isolated from the mains supply before making any electrical connections or adjustments.

Remove five screws from electrical control box at rear of machine and open door. Identify door disconnect switch (see Figs.1 & 2).
Pass supply leads through hole in underside of control box and connect supply leads L1, L2 & L3 to lower terminals of disconnect switch and earth lead to earth terminal as shown in Fig.2.

IMPORTANT : IN ALL CASES THE MACHINE MUST BE EFFICTIVELY EARTHED.

A three phase motor may run in either direction, therefore, close control box door, raise bandwheel covers and check that bandwheels run in an anti-clockwise direction. If necessary, interchange any two supply leads to reverse rotation.
With all connections made, replace screws to secure control box door.

Fig.2.



IMPORTANT : The service of a competent electrical engineer must be obtained if there is doubt on any point regarding electrical installation.

CONVERSION FOR ALTERNATIVE SUPPLY VOLTAGE.

220 volt machines will operate on 220/240 volt 3 phase supply.
440 volt machines will operate on 380/440 volt 3 phase supply.

Machines supplied for use on 440 volt 3 phase supply may be adapted to operate on 220 volt 3 phase supply and vice-versa.

To effect conversion, it is necessary to :-

A. Replace motor overload units with ones of suitable ratings.

B. Change the transformer terminal connections.

C. Change motor terminal connections.

A.

Inside electrical control box indentify contactors and overload units (see Figs.1 & 3).
Make a note of numbered wires leading to terminals of overload unit and slacken terminal screws 2, 4 & 6 (see Fig.3) to remove overload unit.
Fit alternative overload unit of suitable amperage rating according to supply voltage (see Chart below).
Re-connect wires to replacement overload unit as before and set pointer at side of overload unit to indicate full load amps of motor.

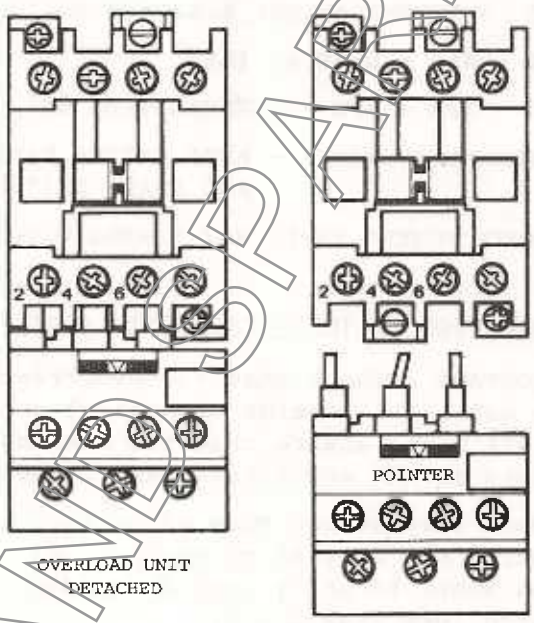
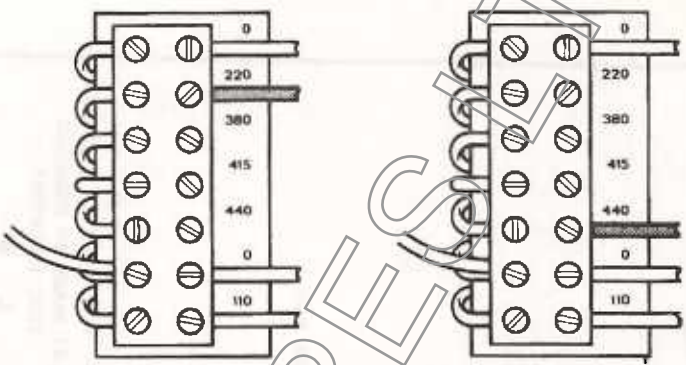


Fig.3.

CONVERSION FOR ALTERNATIVE SUPPLY VOLTAGE (CONTINUED).

B.

Inside electrical control box identify transformer (see Figs.1 & 4). Change wire to suit required supply voltage as shown in Fig.4.

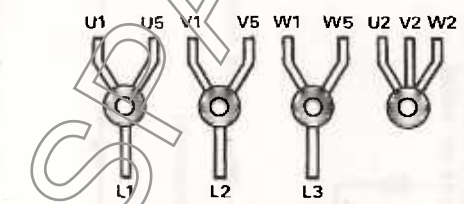


220V 3PH SUPPLY 440V 3PH SUPPLY

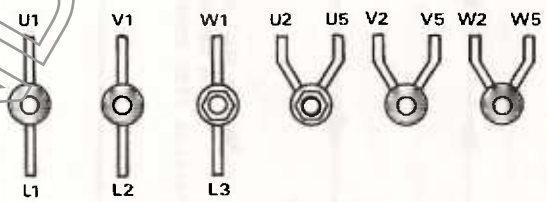
Fig.4.

C.

Remove motor terminal box covers from all motors (except for Coolant Pump Motor 4MTR - see Fig.1). Change the motor terminal linkage to suit appropriate supply voltage as shown in Fig.5 and replace covers.



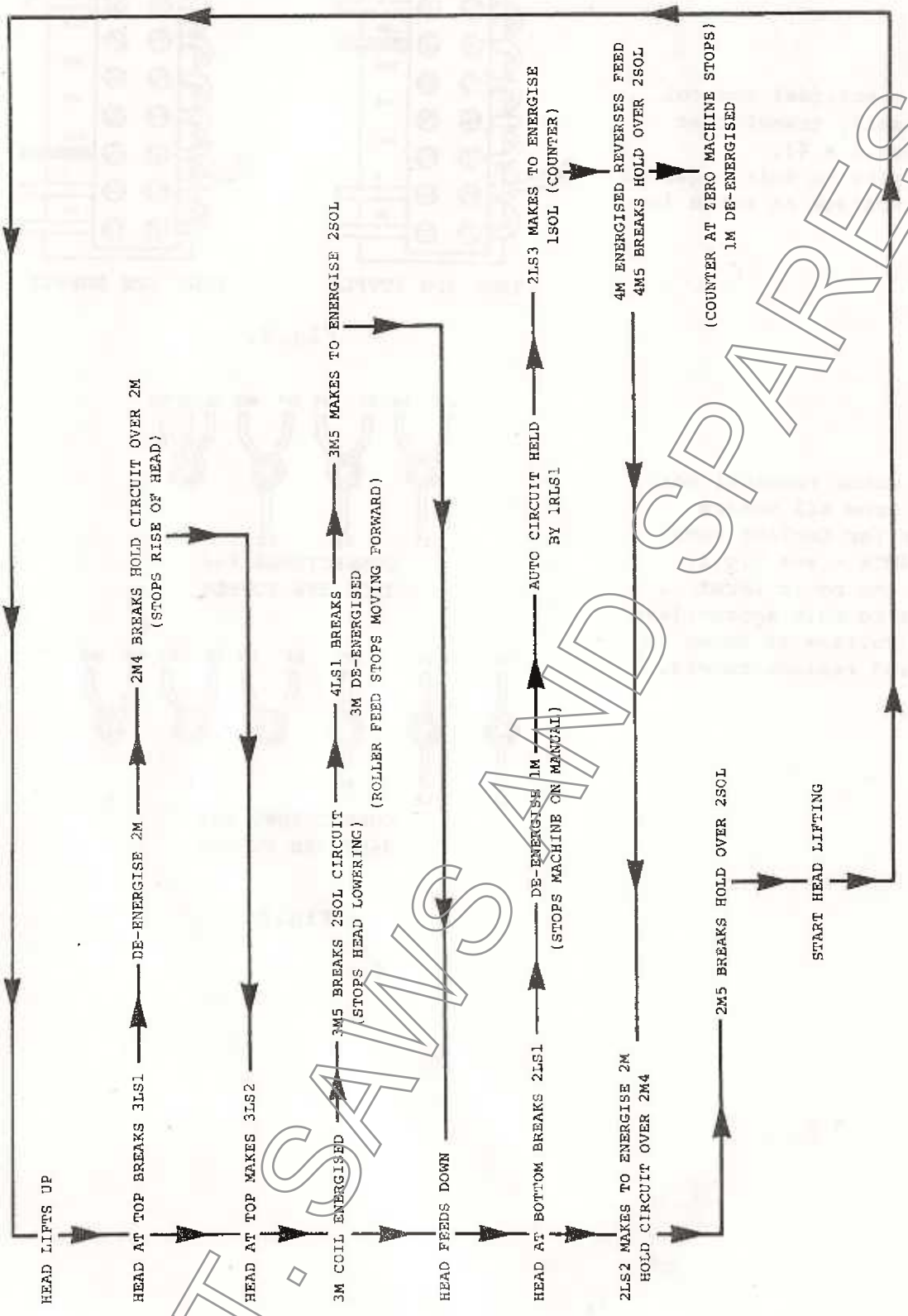
CONNECTIONS for 220V 3PH SUPPLY



CONNECTIONS for 440V 3PH SUPPLY

Fig.5.

25Æ



H250A AUTOMATIC CONTROL SEQUENCE DIAGRAM.

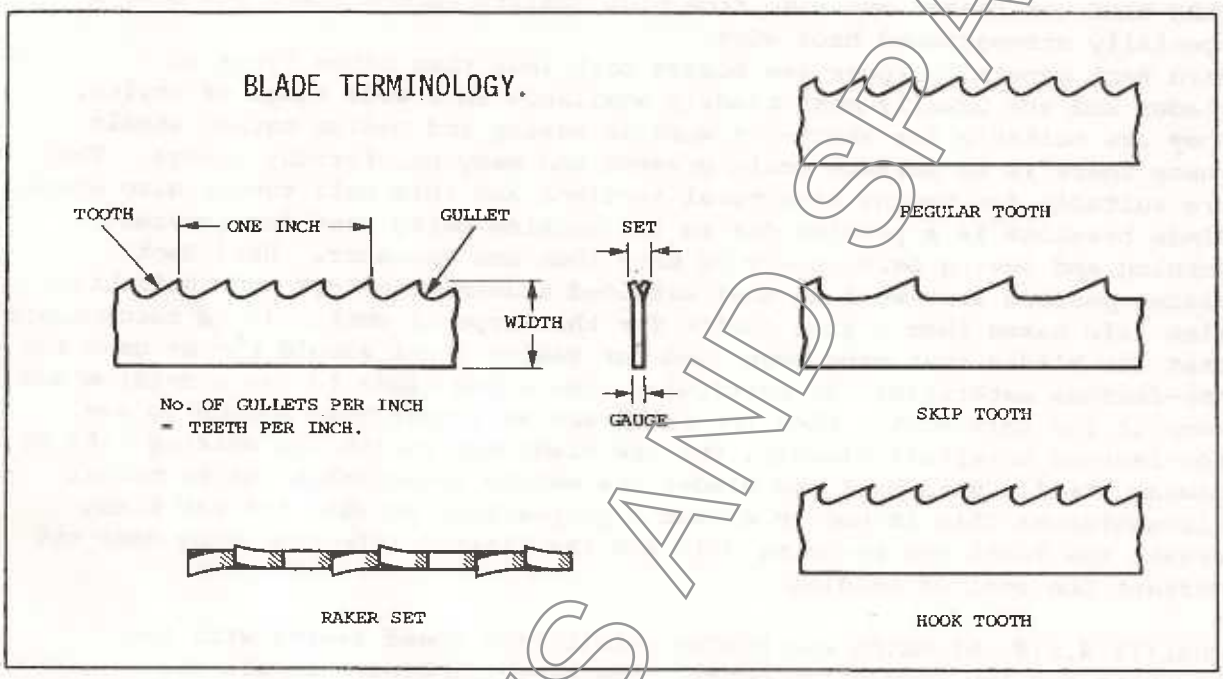
BLADE SELECTION.

There are many types of saw blades available and each is superior in some way for specific applications. Selection of the correct blade for the job is a positive first step achieving economic cut-off production, for no machine tool can function more efficiently than its cutting tool will allow and the bandsawing machine is no exception to this rule. No one saw blade will cope with all the jobs satisfactorily, in fact in some cases an ill chosen blade will virtually not saw at all. The objective of this section of the handbook is to present the information necessary to select the correct saw blade for the job.
To fully describe any saw blade it is necessary to know not only its size, but its material composition and tooth form.
The cost of each type varies considerably and selection should be made according to duty as the lowest cost saw blade is not necessarily the more economic while the use of the more expensive types is often not justifable.

HARD BACK saw blades are made from high quality carbon steel and have a specially strengthened back edge.
Hard Back general purpose saw blades cost less than other types of blades and are usually most readily available in a wide range of styles. They are suitable for short-run work in sawing and medium carbon steels where there is no surface scale present and many non-ferrous alloys. They are suitable for sawing structural sections and thin wall tubes, also where blade breakage is a problem due to the machine being used for general jobbing and sawing particulary be more than one operator. Hard Back blades perform very well on most extruded aluminium alloys and their high flex life makes them a good choice for this type of work. It is recommended that saw blades that have been used for sawing steel should not be used for non-ferrous materials. In particular, use a new blade to saw aluminium and keep it for this work. When the teeth are no longer keen enough to saw non-ferrous materials cleanly, the saw blade may finish its working life on sawing steel. Hard Back saw blades are easily re-weldable but in normal circumstances this is not an economic proposition as when the saw blade breaks the teeth are becoming dull and the limited life remaining does not warrant the cost of welding.

QUALITY H.S.S. BI-METAL saw blades permit high speed sawing with low breakage and low production costs. The bi-metal blade has all the resilience of a basically chrome vanadium alloy steel structure, electron beam welded to a quality high speed cutting edge, giving high speed steel performance and a tough flexible backing. The high speed section of the blade ends short of the gullet reducing shatter if a blade should snap on a really awkward cut. Built-in breakage resistance and tough enough to give a really fast and accurate cut time after time makes the use of bi-metal blades advatageous to all bandsaw operators. Re-welding these blades is possible on standard welding units.

M42 COBALT H.S.S. BI-METAL saw blades offer all the advantages of the M2 quality bi-metal blade and has in addition, a higher quality, higher performance high speed steel for the cutting edge. The use of M42 Cobalt H.S.S. material for the cutting edge offers a balanced combination of superior hardness and toughness, making this blade ahead in performance on the most difficult or abrasive materials. The use of this type of blade is not restricted to the cutting of difficult materials, but can also be used on the more easily machined materials where greatly improved blade life can be expected. Heat treated to give high tooth hardness to resist abrasion, this blade has been specially developed for use on austenitic nickel chrome steels, nimonics, inconel, cobalt and nickel based alloys, heat resisting alloys and the space age exotic materials. Re-welding these blades is as for M2 blades.



Each of the types of saw blade are available in various tooth forms and tooth pitches. Here again selection is required to obtain the right blade to achieve optimum sawing performance. Metal cutting blades are generally manufactured in three basic tooth forms.
Namely :-
REGULAR TOOTH, SKIP TOOTH & HOOK TOOTH.
Terminology varies among saw blade manufacturers and these may be otherwise referred to as :-
PRECISION TOOTH, BUTTRESS TOOTH or CLAW TOOTH respectively.

REGULAR TOOTH saw blades are in most common use because the zero front rake and well rounded gullet present a robust tooth with good shock resistance and work penetration properties. It will produce firm accurate work on most ferrous materials and is recommended for most general cutting operations except soft and ductile materials where its teeth have a tendency to clog. Standard pitches are 6, 8, 10 & 14 teeth per inch.

SKIP TOOTH is characterised by the straight sided teeth, sharp root radius and long, flat gullet. Skip tooth saw blades are especially suitable for sawing soft non-ferrous materials as the tooth profile breaks up the large ductile chips which tend to clog regular teeth. Standard pitches are 3, 4 & 6 teeth per inch.

HOOK TOOTH form has a positive front rake which considerably assists in work penetration and hence produces better and faster cutting on the harder ferrous and non-ferrous materials, particularly when sawing large sections. This tooth form is not very suitable for use on abrasive materials and is not recommended for sawing thin wall tubing. Standard pitches are 2, 3, 4 & 6 teeth per inch.

VARIABLE TOOTH saw blades have both varying size teeth and cutting angles which are best used for sections, bundle cutting pipes, tubing etc. and reduces vibration.

TOOTH SET is the angling of the saw teeth so that the tips protrude beyond the body of the blade. The increased width of cut produced provides the working clearance necessary to prevent the saw blade binding in the work piece. There are several styles of tooth set, the most popular for general use being raker set, where one tooth is set to the left, one to the right, and one tooth unset in a repeat pattern.

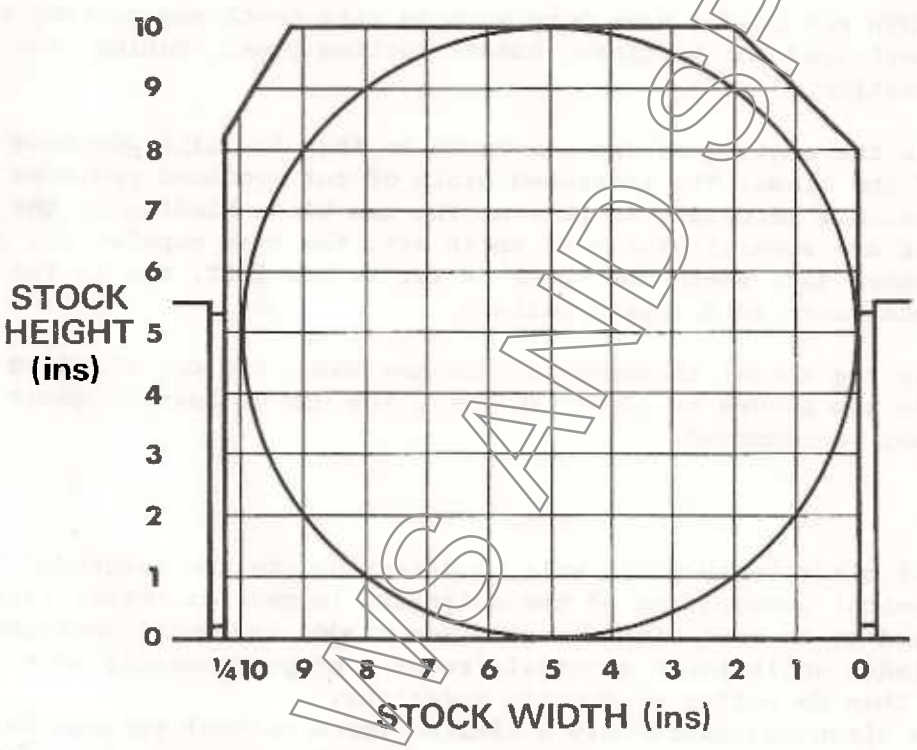
SAW GAUGE is the actual thickness of the saw band, and for standard 1" (25 mm) wide saw blades is .035" (0.9 mm). The use of heavier gauge saw blades is not recommended.

Selection of blade tooth pitch will be determined by the length of the cut and the chemical composition of the material. In general terms, large sections need to be sawn with a coarse saw blade, and small sections with a fine saw blade, while tough materials require proportionately more teeth in engagement than do softer or ductile materials.
Since a saw blade can exert only a limited force without serious deflection, too many teeth in engagement will reduce the individual tooth loading to the point where they tend to skid across the face of the cut and produce only small powdery chips. This results in a very slow cutting rate and it is a common error to attempt to correct the situation by applying excessive feed pressure, thus producing a bowed and inaccurate cut. Too few teeth in engagement, particularly in conjunction with a heavy feed rate, cause each tooth to attempt to remove too much material. The stubby chips produced break away prematurely and cause vibrations in the form of blade chatter. Persistent sawing under these conditions rapidly dull the teeth by impact and in extreme cases overload the saw blade to the point where the teeth break away.

(CONTINUED.)

As a general guide to selecting an appropriate tooth pitch, use ten to six teeth per inch on sawing solid sections up to one inch wide; eight to six teeth per inch on sections one to three inches wide; six to four teeth per inch on sections three to six inches wide; and three to two teeth per inch on sections over six inches wide.
Steel tubes and structural sections sometimes present a problem as the actual length of the saw cut alters considerably due to changes in section. In these cases use a saw blade which allows two or three teeth in engagement at the thinnest section.
The working life of a saw blade can be extended by using only a light feed pressure during its first few minutes of sawing. Care must be taken when running in a new saw blade on work hardening materials as any tendency for the teeth to rub will rapidly burnish the cut and make further sawing impossible.

CUTTING CAPACITY CHART



SAWING GUIDE CHART.

MATERIAL	BLADE SPEED F.P.M.
CARBON STEEL	
1008-1035	300
1040-1095	200
FREE MACHINE STEELS	
1108-1132	300
1212-1213	300
1137-1151	300
MANGANESE STEEL	
1320-1345	200
NICKEL STEEL	
2317	300
2330-2345	200
2512-2517	200
NICKEL CHROME STEEL	
3115-3130	300
3135-3150	300
3310-3315	200
MOLYBDENUM STEEL	
4017-4042	300
4047-4068	200
CHROME MOLY STEEL	
4130-4140	300
4142-4150	200
NICKEL CHROME MOLY STEEL	
4317-4340	200
8615-8645	200
8715-8750	200
9437-9445	200
9747-9763	200
9840-9850	200
NICKEL MOLY STEEL	
4608-4640	200
4812-4820	200
CHROME STEEL	
5045-5046	300
5120-5135	300
5140-5160	200
50100-52100	200

MATERIAL	BLADE SPEED F.P.M.
CHROME VANADIUM STEEL	
6117-6120	200
6145-6152	200
SILICON STEEL	
9255-9260	200
9261-9262	200
HIGH SPEED TOOL STEEL	
T1, T2, T4, T5, T6, T8	125
T15	80
M1, M2, M3	125
M4, M10, M15, M42, M43	80
DIE STEELS	
A2	200
D2 *, D3 *	125
D7 *	80
O1, O2, O6	200
* Normally cut dry	
CARBON TOOL STEEL	
W-1	200
HOT WORK STEEL	
H-12, H-21, H-22, H-25	200
SHOCK RESISTING TOLL STEEL	
S-1	200
S-2, S-5	125
SPECIAL PURPOSE TOOL STEEL	
L-6, L-7	200
STAINLESS STEEL	
201, 202, 302	125
304, 321, 347	125
303, 303F, 440F, 443	125
308, 310, 314-317, 330	80
410, 420, 420F, 440A, B, C	125
416, 430F	200
430, 446	80
17-4PH, 17-7PH	80

NOTE : SAWING GUIDE FOR MATERIALS USING BI-METAL SAW BLADES.

SAWING GUIDE CHART.

MATERIAL	BLADE SPEED F.P.M.
COPPER BASE ALLOYS	
Aluminium Bronze	
70-90 BHN	300
190-220 BHN	200
Phosphur Bronze 5% - 8%	
60-100 BHN	300
180-210 BHN	200
Manganese Bronze	
90-120 BHN	300
Silicon Bronze	
70-100 BHN	300
180-210 BHN	200
Beryllium Copper - 25	
100-120 BHN	300
220-250 BHN	200
310-340 BHN	125
NICKEL BASE ALLOYS	
Monel	
125-200 BHN	125
R. Monel	
145-180 BHN	125
K. Monel	
100-210 BHN	80
NICKEL BASE ALLOYS (CONT.)	
K. R. Monel	
Inconel	80
Inconel X	80
Hastelloy A	
210-260 BHN	125
Hastelloy B	
230-270 BHN	80
Hastelloy C	
185-250 BHN	80
TITANIUM ALLOYS	
Mst 6al-4V	
310-360 BHN	125
RC 130 B	
290-330 BHN	125
Ti-140A	
300-330 BHN	80
T 150A	
325-350 BHN	80
99% Pure Titanium	
270-315 BHN	80

NOTE : SAWING GUIDE FOR MATERIALS USING BI-METAL SAW BLADES.

SAWING GUIDE.

The Sawing Guide Charts are intended as a guide only.

Speeds shown are for cutting 3" to 6" material. When cutting material smaller than 3" increase blade speed 25%. When cutting material larger than 6" reduce blade speed 25%.

In general blade speeds listed should not be exceeded. However, it is a serious mistake to use blade speeds which are too low, particularly with finer pitch saw blades, unless feed pressure is reduced also. This can cause overloading of the teeth and inaccurate cuts or blade breakage.

BLADE TYPE SELECTION CHART		
MATERIALS	VOLUME	BLADE TYPE
EASY TO SAW : Low Carbon Steel Cold Rolled Steel Structural Steel Pipe Free Machining Sulphurized Steel Cast Iron Some Non-Ferrous Metals	Light	Hard Back
	Semi-Production	Hard Back
	Production	Hard Back Bi-Metal
MODERATE TO SAW : High Carbon & Tool Steels 400 Series Stainless Steel Alloy Steels (Annealed)	Light	Hard Back
	Semi-Production	Bi-Metal Hard Back
	Production	Bi-Metal Hard Back
DIFFICULT TO SAW : 300 Series Stainless Steel Air Hardening Die Steels Alloy Steels (Heat Treated) Nickel Alloys & Exotic Space Age Nickel Based Non-Ferrous Metals	Light	Bi-Metal
	Semi-Production	Bi-Metal Hard Back
	Production	Bi-Metal

GUIDE TO USING SAWING CONTROLS.

FEED PRESSURE :

Required to move saw frame and remove chips.
Should be set 'HEAVIER' on materials with low machinability rating and 'LIGHTER' on materials that are more easily machined.
Excessive feed pressure leads to premature blade breakage and/or crooked cuts.
Insufficient feed pressure dulls the saw blade as it tends to rub rather than cut.
Increases in feed pressure normally require corresponding increases in blade speed especially in less hard materials.

FEED SPEED :

Controls the rate at which the saw frame moves.
The speed should be set so that the saw frame moves only as fast as the material is being removed.
The speed should be set slow enough to approach the workpiece without damaging the saw blade upon contact with the workpiece.
Can be set to control the sawing with precision, especially while cutting thinner portions of light tubing or structurals and helps to avoid plunging.
If the speed is too slow the chip load will be less than optimum.

BLADE SPEED :

Controls how quickly the material is being removed.
Should be set fast enough to stop teeth becoming overloaded.
If the speed is set too fast the chip load will be less than optimum and/or the saw blade may dull prematurely.
Increases in blade speed require corresponding increases in feed pressure especially in less hard materials.

CHIP LOAD :

Careful observation of the chip load is very important when sawing.
Chips should be curled as shown in the illustration.
Excessively tight curling indicates too much feed pressure, and a lack of any curl indicates feed pressure is too light.
Chips that are blue in color indicate blade speed is too fast and/or too much feed pressure leading to premature blade breakage.

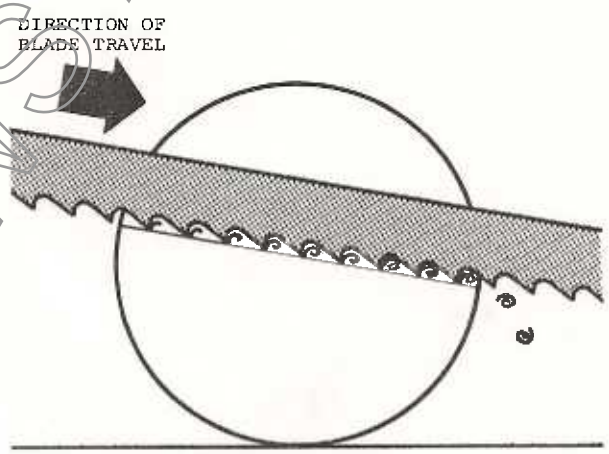


Illustration showing desirable chip form.

COMMON SAWING PROBLEMS.

SAW BLADE WILL NOT CUT :

Drive motor running in wrong direction, bandwheels should run in an anti-clockwise direction.
Blade teeth facing in wrong direction, teeth must point in direction of blade travel.
Material far too hard for type of saw blade being used.

BLADE VIBRATES IN CUT :

Workpiece not properly seated or securely held.
Guides set too close on small diameter workpieces.
Blade speed too fast and/or blade pitch too coarse.
Insufficient blade tension.

PREMATURE BLADE BREAKAGE :

Excessive feed pressure.
Incorrect blade speed and/or incorrect blade selection.
Incorrect blade tension and/or incorrect tracking.
Feed speed too fast.
Worn or incorrectly set guides.
Blade joint improperly welded and annealed.
Workpiece not firmly clamped in vise jaws.
Cut-off piece binding between blade and stock stop.
Blade overheating due to cutting without coolant.
Chips and swarf building up on bandwheels.

TEETH TORN FROM BLADE :

Excessive feed pressure.
Blade speed too slow.
Gullets of teeth overloading, blade pitch too fine.
Blade pitch too coarse.
Feed speed incorrectly set.
Workpiece not firmly clamped in vise jaws.
Workpiece too wide, where possible cut rectangular pieces up on side.

CROOKED CUTS :

Excessive feed pressure.
Incorrect blade tension.
Blade speed too slow.
Feed speed incorrectly set.
Guides not controlling blade correctly through wear or incorrect adjustment and/or guides set too far from workpiece.
Blade teeth dull or of too fine pitch.
Vise jaws not set square to saw blade.
Bandwheel flanges worn causing loss of set to one side of saw teeth.

COMMON SAWING PROBLEMS.

BLADE TEETH DULL RAPIDLY :

Blade overheating due to cutting without coolant.
Blade speed too fast.
Feed speed too slow.
Blade pitch too coarse.
Feed pressure too light.
Material too hard for type of saw blade being used.

SAW BLADE BACK DAMAGED :

Material too hard for type of saw blade being used.
Tracking incorrect, blade set too hard against bandwheel flanges.
Carbide back-up insert missing from one guide assembly.

SAW BLADE STALLS IN CUT :

Excessive feed pressure.
Feed speed too fast.
Incorrect belt tension and/or worn belt or worn pulleys.
Incorrect blade speed and/or incorrect blade selection.

HEAD BOUNCES DURING CUT :

Blade joint improperly welded and annealed.
Teeth missing from saw blade.
Feed pressure set too light.
Bandwheels or pulleys loose.

CUTTING TIME INCREASES :

Blade teeth have become dull.
Feed pressure set too light.
Incorrect blade speed.

INFEED ROLLER STOCK TABLE (PART No.SM1239).

Complete with tail end stop, rollers and adjustable feet (see Fig.1), this unit can be bolted to the rear of the machine when cutting long or heavy materials.
To level unit place only the outboard roller in position and with a straight-edge laid off the machine bed, align roller for height by adjusting feet.
More than one infeed roller stock table can be used by simply bolting units end to end and level as before.

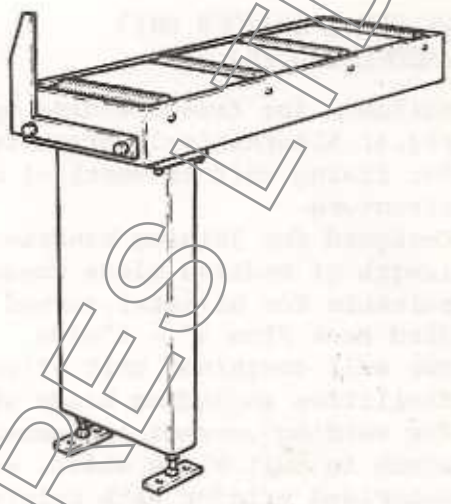


Fig.1.

OUTBOARD MATERIAL SUPPORT (PART No.SM1240).

The outboard material support (see Fig.2) is for use when cutting off long lengths of material. The machine should be operated on MANUAL MODE and the material removed by hand, although the material can still be fed forward to the stock stop using the ROLLER FEED JOG switch.
The outboard material support utilises the support bar from the stock stop assembly (supplied as standard with machine). The support bar supplied locates into hole in the machine bed, and a sturdy leg complete with adjustable feet is secured to outboard ends of both support bars.
The two roller assemblies simply locate over both support bars and can be placed in any position to suit the length of material being cut off.

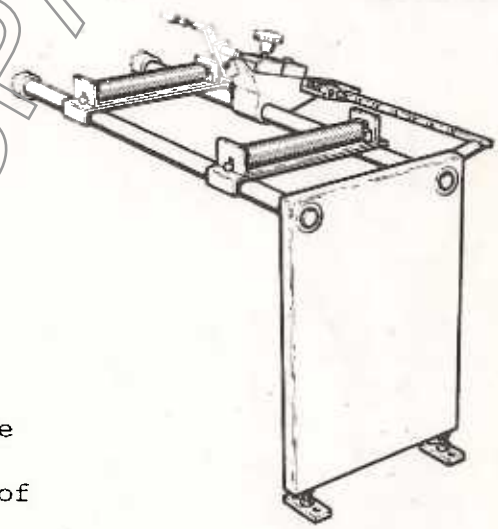


Fig.2.

STOCK STAND (PART No.SP561).

A fully adjustable sturdy stock stand (see Fig.3) is available for use at the front or rear of the machine when cutting long or heavy materials.

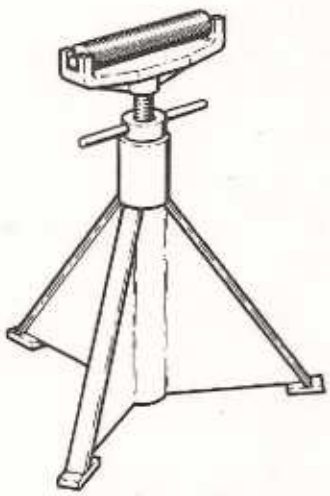


Fig.3.

WELDER & GRINDER UNIT (MODEL BSO.25).

Suitable for free-standing operation (see Fig.4).Alternatively brackets are supplied for fixing unit to vertical or horizontal structure.
Designed for joining bandsaw strip into any length of endless blade these units are suitable for bi-metal,carbon steel and Hard Back from ⅛" - 1"wide.
The self contained unit offers complete facilities including blade shear,controls for welding current and amount of material upset to suit blade width, annealing and motorised grinder with safety guard for weld dressing.
Simple to use - complete with operating handbook.

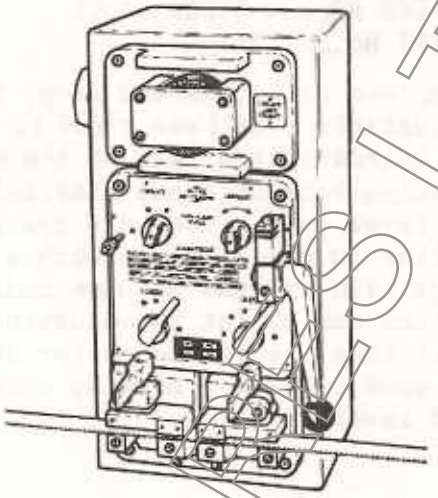


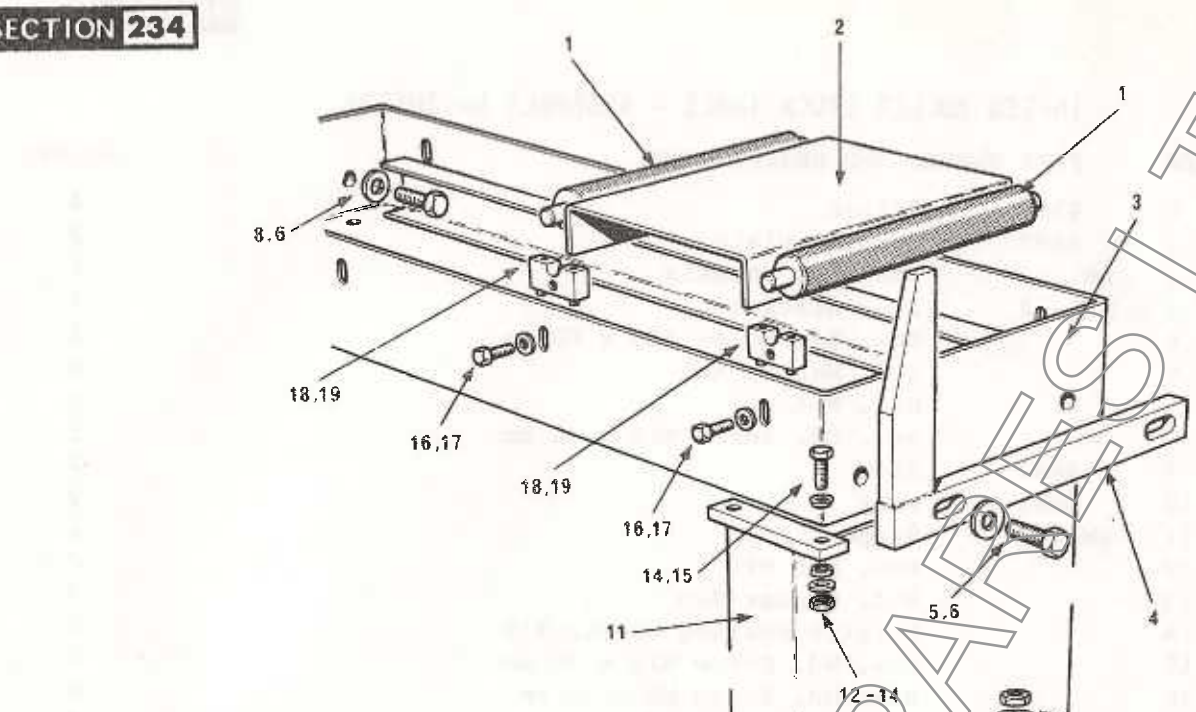
Fig.4.

INFEED ROLLER STOCK TABLE - ASSEMBLY No.SM1239

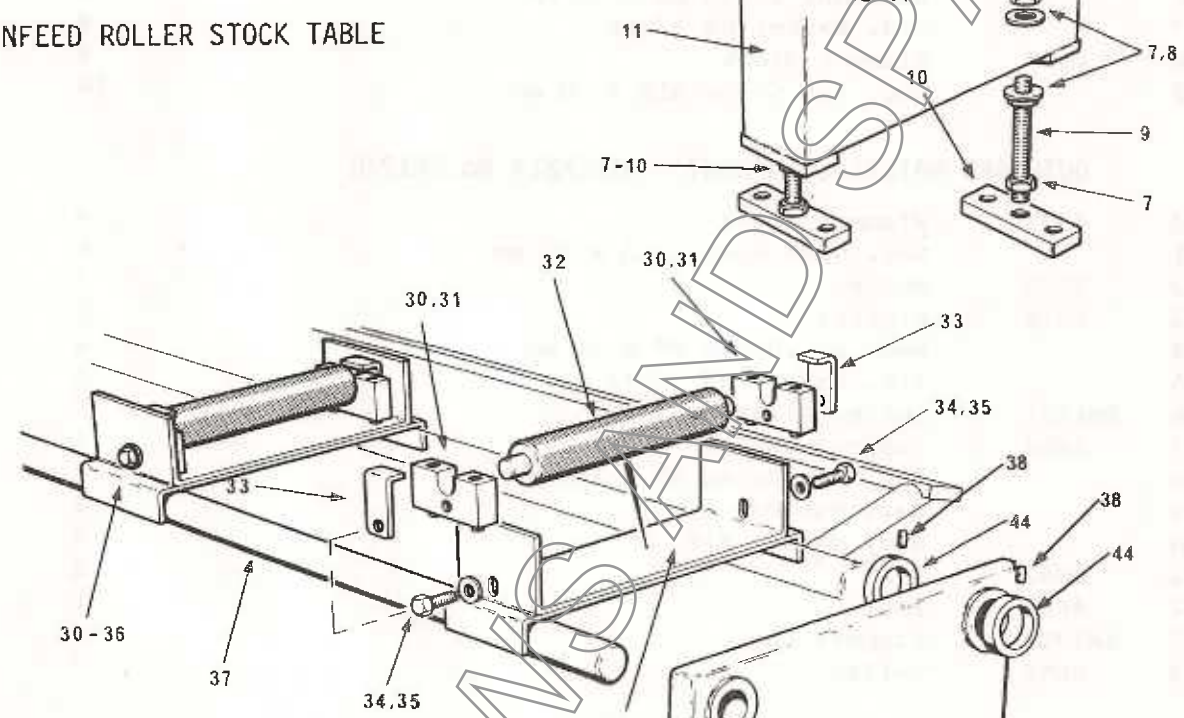
ITEM	PART NUMBER AND DESCRIPTION		No.OFF
1	4389	Roller	4
2	4497	Support Plate	3
3	SM1363	Conveyor Chassis	1
4	SM1232	Stop Bracket	1
5		Hex. Hd. Screw	2
6		Std. Washer	8
7		Hex. Nut	6
8		Hex. Hd. Screw	2
9	4682	Stud	2
10	4681	Foot	2
11	SM1364	Support Leg	1
12		Hex. Nut	4
13		Std. Washer	4
14		Nyltite Sealing Washer	8
15		Hex. Hd. Screw	4
16		Hex. Hd. Screw	8
17		Std. Washer	8
18	4387	Plummer Block	8
19		Soc. Set Screw	16

OUTBOARD MATERIAL SUPPORT - ASSEMBLY No.SM1240

30	4387	Plummer Block	4
31		Soc. Grub Screw	8
32	4389	Roller	2
33	6518	Bracket	4
34		Hex. Hd. Screw	4
35		Std. Washer	4
36	SM1291	Roller Platform	2
37	6404	Support Shaft	1
38		Soc. Set Screw	3
39		Hex. Nut	6
40		Std. Washer	4
41	4682	Stud	2
42	4681	Foot	2
43	SM1293	Support Leg	1
44	6696	Collar	2

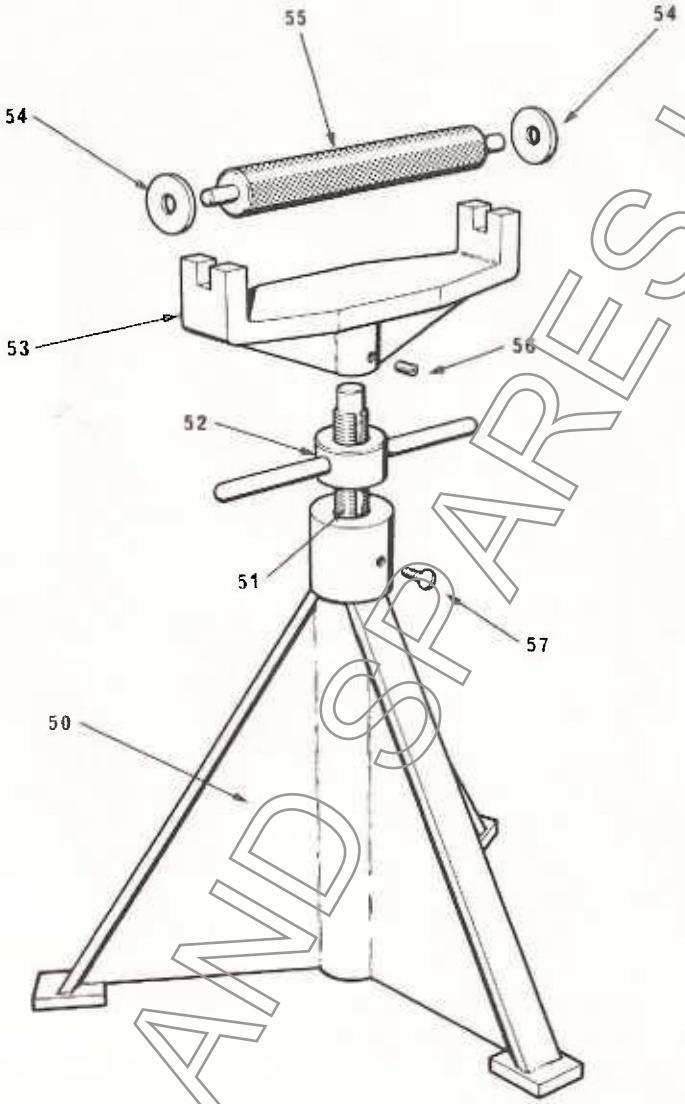


INFEED ROLLER STOCK TABLE



OUTBOARD MATERIAL SUPPORT

233/4-4



STOCK STAND

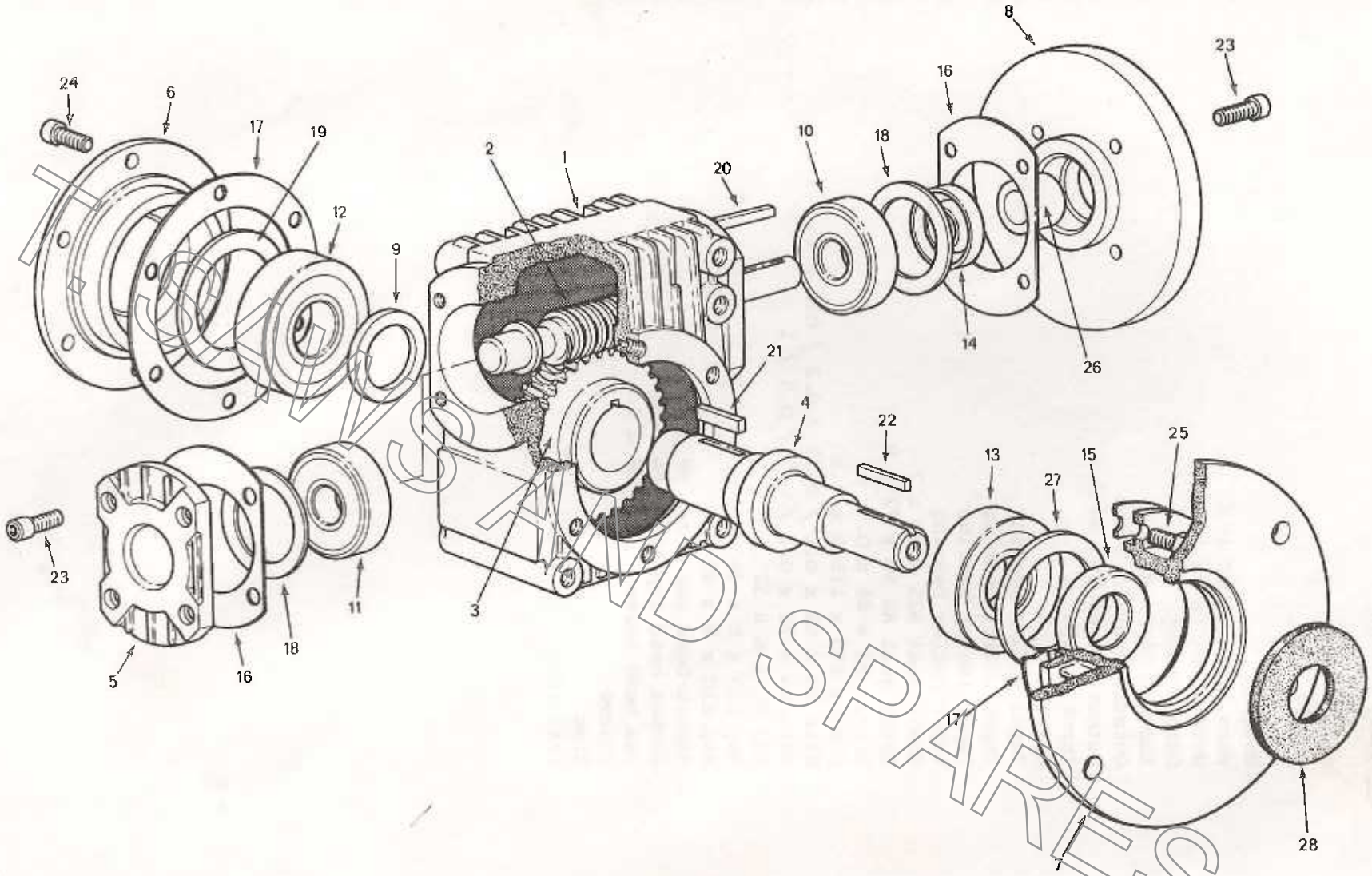
STOCK STAND - ASSEMBLY No.SP561

233/4-5

ITEM	PART NUMBER AND DESCRIPTION		No.OFF
50	SP560	Stand	1
51	3869	Jacking Screw	1
52	SP557	Adjuster	1
53	3867	Roller Bracket	1
54	6553	Stop Plate	2
55	3866	Roller	1
56		Soc. Set Screw	1
57		Thumb Screw	1

WORM GEARBOX

ITEM	DESCRIPTION	No.OFF
1	Housing	1
2	Worm shaft	1
3	Worm wheel	1
4	Output shaft	1
5	Input cover - closed	1
6	Output cover - closed	1
7	Output flange	1
8	Input flange	1
9	Spacer	1
10	Taper Roller Bearing	1
11	Taper roller bearing	1
12	Taper roller bearing	1
13	Taper roller bearing	1
14	Shaft seal	2
15	Shaft seal	1
16	Gasket	2
17	Gasket	2
18	Shim	2
19	Shim	1
20	Key	1
21	Key	1
22	Key	1
23	Socket head cap screw	8
24	Socket head cap screw	6
25	Hex head screw	6
26	Sleeve	1
27	Ring	1
28	Felt ring	1



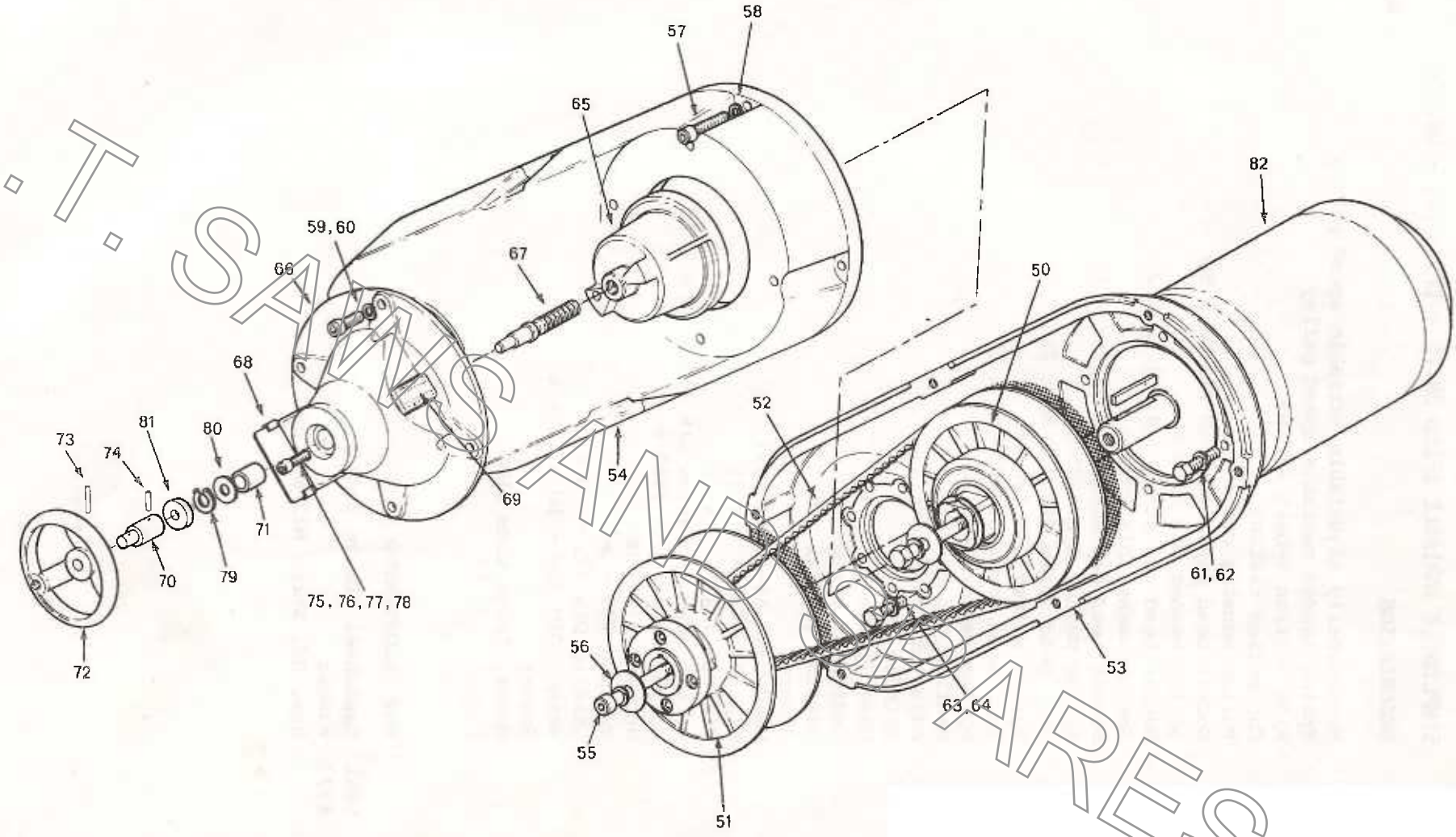
GEARBOX

SIMPLABELT VARIABLE SPEED DRIVE - 11.235.16 - 06.004

ITEM	DESCRIPTION	No.OFF
50	Mechanically adjustable variable speed pulley	1
51	Spring loaded variable speed pulley	1
52	Wide section V-belt	1
53	Connecting casting	1
54	Pulley housing cover	1
55	Socket head cap screw	1
56	Spring washer	1
57	Socket head cap screw	6
58	Spring washer	6
59	Socket head cap screw	4
60	Spring Washer	4
61	Hex. head screw	4
62	Spring washer	4
63	Hex. head screw	4
64	Spring washer	4
65	Bearing cap casting	1
66	Adjuster cover casting	1
67	Spindle	1
68	Cover plate	1
69	Indicator scale	1
70	Adaptor journal	1
71	Sleeve	1
72	Handwheel	1
73	Pin	1
74	Pin	1
75	Socket head cap screw	1
76	Spring washer	1
77	Nut	2
78	Nut	1
79	Circlip	1
80	Washer	1
81	Spacer	1
82	Motor,	1

NOT ILLUSTRATED :

5961	Bandwheel (Drive End)	1
4333	Washer	1
	Hex. Hd. Screw	1



SIMPLABELT VARIABLE SPEED DRIVE - 11.235.16 - 06.004

BLADE GUIDES & GUARDS - ASSEMBLY No.SM1200

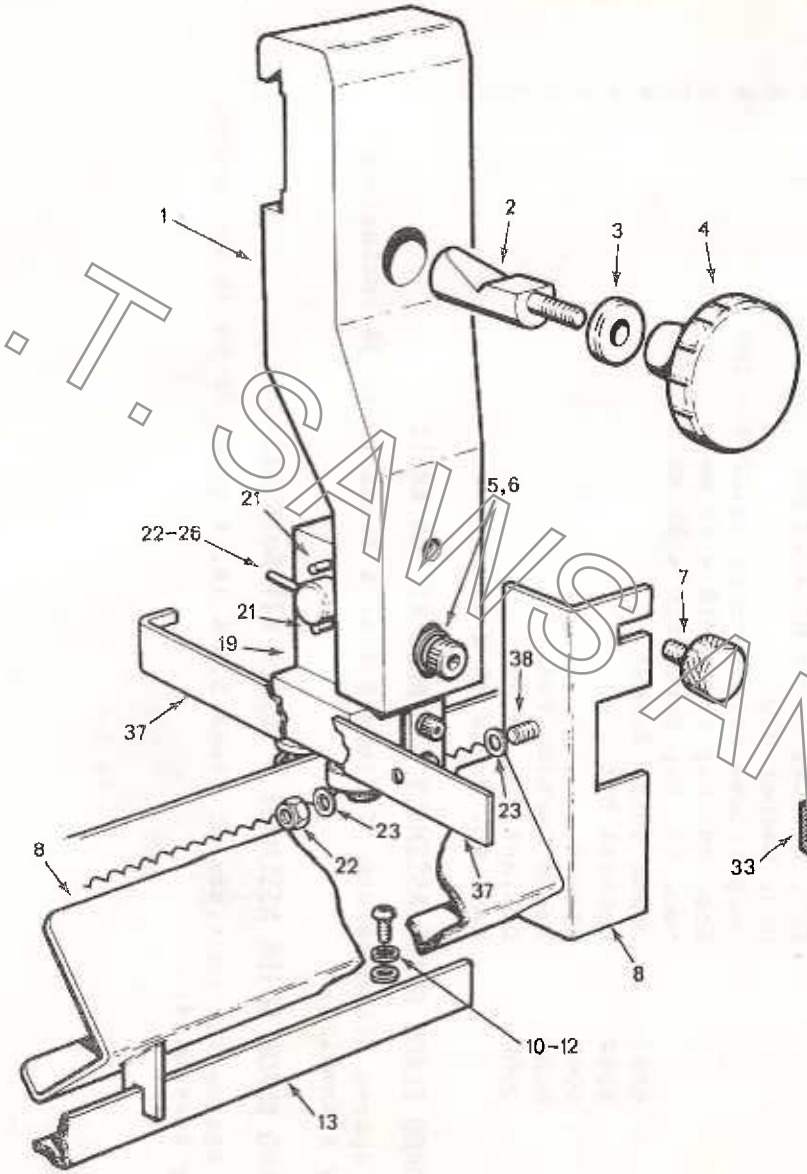
ITEM	PART NUMBER AND DESCRIPTION		No.OFF
1	5981	Guide Arm	2
2	3743	Locking Pad	2
3	4537	Washer	2
4	5130	Handknob	2
5		Soc. Hd. Cap Screw	2
6		Std. Washer]	2
7	6638	Thumb Screw	2
8	SM1223/2	Outboard Blade Guard	1
9	SM1226	Inboard Blade Guard	1
10		Soc. Dome Hd. Screw	2
11		Shakeproof Washer	2
12		Std. Washer	2
13	6370	Blade Guard Slide	1
14	5997/1	Guide Rail	1
15		Spring Dowel	2
16		Soc. Set Screw	8
17		Soc. Hd. Cap Screw	4
18	6060/1	Guide Body - Inboard	1
19	6060	Guide Body - Outboard	1
20	6400	Coolant Connector	2
21		Spring Dowel	4
22		Self Locking	4
23		Std. Washer	6
24		Spring Dowel	2
25	6650	Coolant Nozzle	2
26		'O' Ring No	4
27		Soc. Hd. Cap Screw	2
28		Soc. Hd. Cap Screw	4
29		Std. Washer	6
30		Deep Groove Ball Bearing	4
31		Soc. Hd. Cap Screw	2
32		Soc. Hd. Cap Screw	2
33	6393	Blade Guide Insert	4
34	6394	Conical Nut	4
35	6062	Spacer	2
36	6068	Round Carbide Pad	2
37	7908	Coolant Tap Lever	2
38		Hex. Hd. Screw	2

OUTBOARD BLADE GUIDE ASSEMBLY - SPARES KIT No.KM511

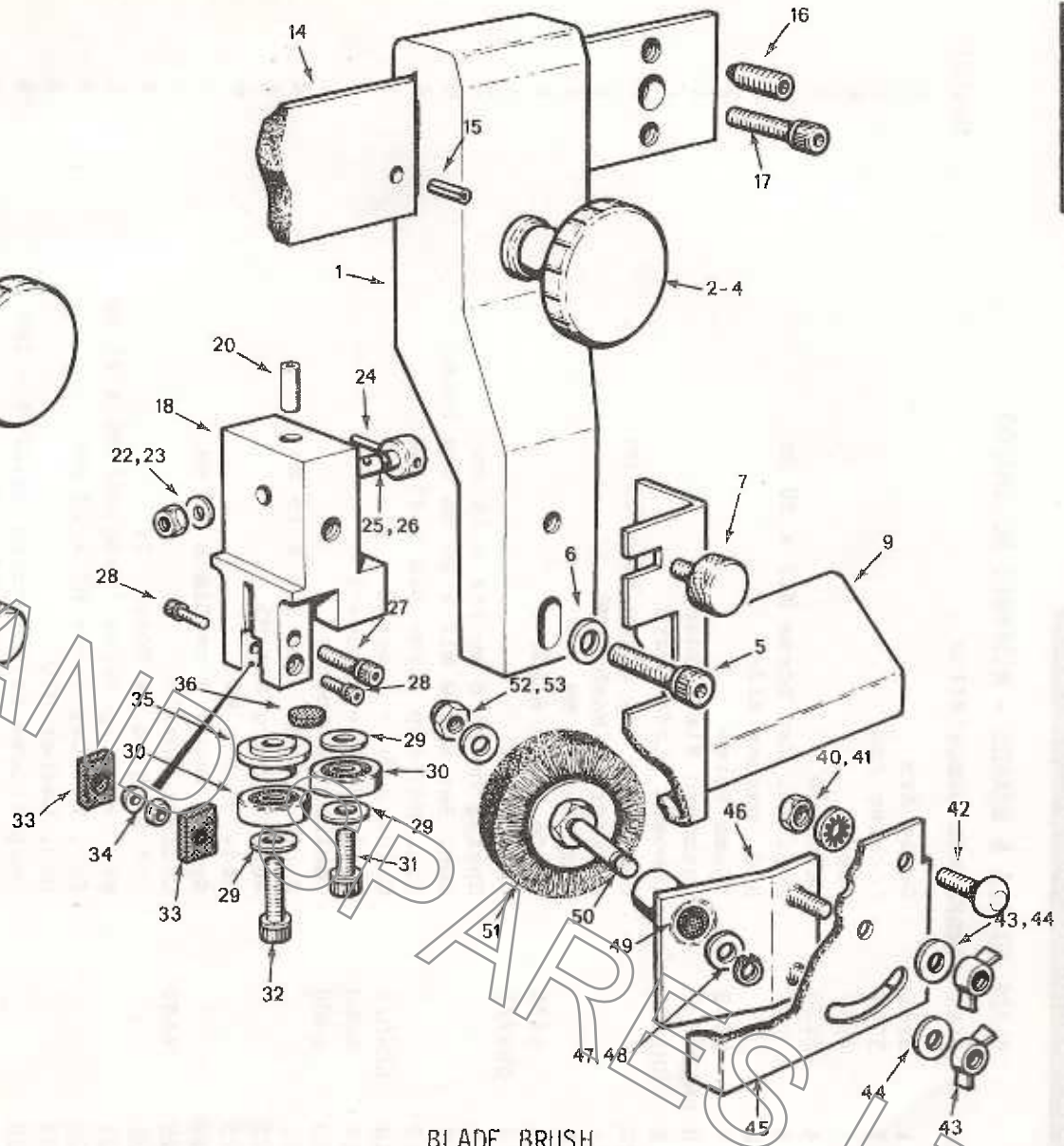
This Spares Kit consists of Items 5 & 6, & Items 19 to 36 inclusive, fully assembled.

INBOARD BLADE GUIDE ASSEMBLY - SPARES KIT No.KM511/1

This Spares Kit consists of Items 5,6 & 18, & Items 20 to 36 inclusive, fully assembled.



BLADE GUIDES & GUARDS



BLADE BRUSH

BLADE BRUSH - ASSEMBLY No.SM1225

ITEM	PART NUMBER AND DESCRIPTION		No.OFF
40		Std. Nut	2
41		Shakeproof Washer	2
42		Coach Bolt	2
43		Wing Nut	2
44		Std. Washer	2
45	6396	Blade Brush Guard	1
46	SM1228	Brush Bracket	1
47		Circlip External	1
48		Std. Washer	1
49		Compo Bush No.SNOO5	2
50	6399	Blade Brush Pivot	1
51		Blade Brush No.SP	1
52		Std. Washer	1
53		Self Locking Nut	1

BANDWHEEL - DRIVE END

59	5961	Bandwheel (Drive End)	1
60	4333	Washer	1
61		Hex. Hd. Screw	1
62	5962	Key	1

ITEMS: 59 - 62 NOT ILLUSTRATED

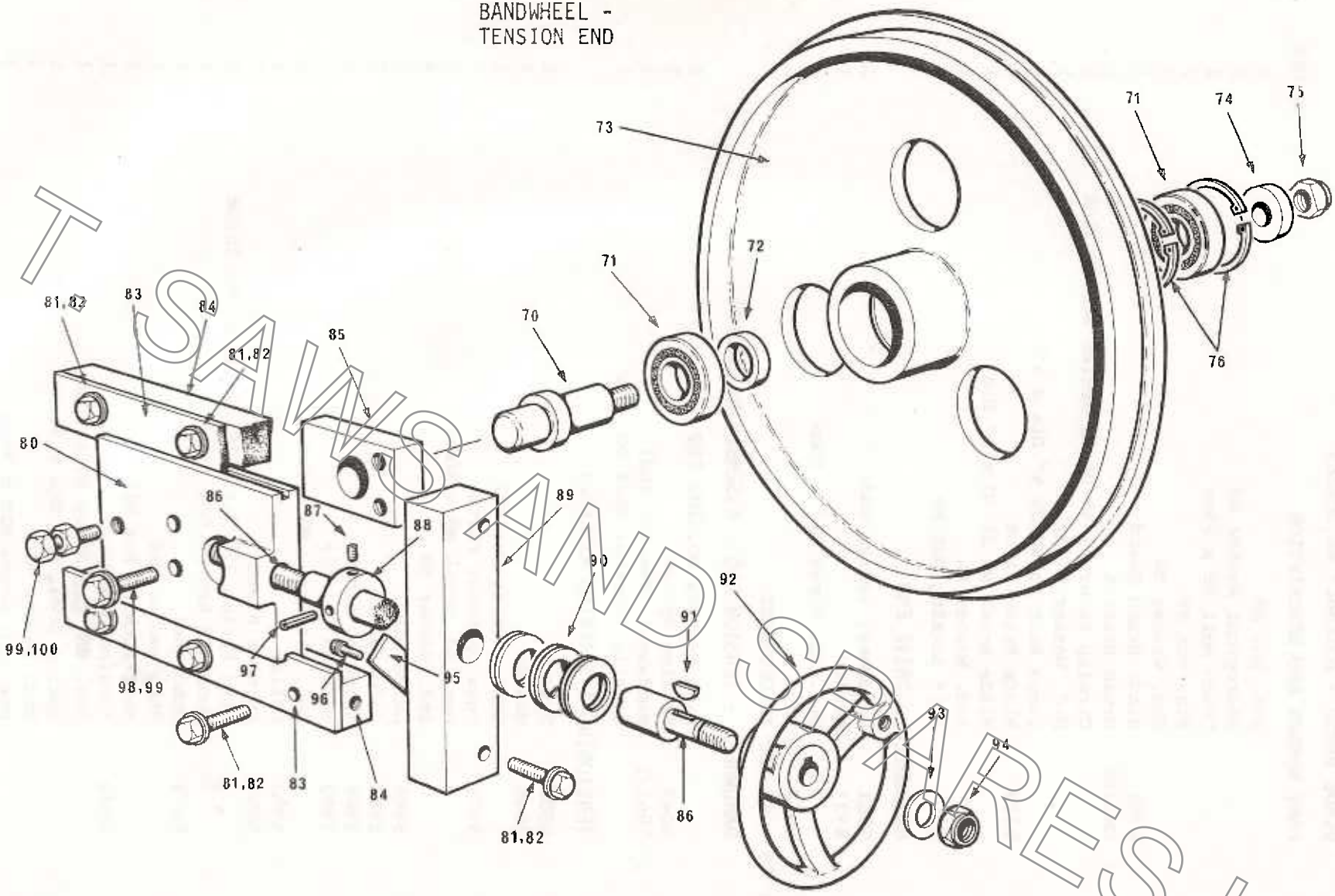
BANDWHEEL - TENSION END - ASSEMBLY No.SM1234

71		Ball Bearing	2
72	6047	Bearing Spacer	1
73	5961/1	Bandwheel (Tension End)	1
76		Circlip Internal	2

TENSIONING & TRACKING ASSEMBLY

70	5985	Spigot	1
74	6048	Washer	1
75		Self Locking Nut	1
80	5979	Tension Guide Plate	1
81		Hex. Hd. Screw	8
82		Std. Washer	8
83	5986	Guide Gib	2
84	5987	Guide Block	2
85	5984	Tracking Block	1
86	5989	Tension Spindle	1
87		Soc. Set Screw	1
88	5990	Collar	1
89	5988	Spindle Plate	1
90		Disc Spring	6
91		Woodruff Key	1
92	6679	Handwheel	1
93		Std. Washer	1
94		Self-Locking Nut	1
95	6089	Tension Gauge	1
96		Soc. Hd. Cap Screw	1
97		Spring Dowel	1
98		Std. Washer	2
99		Hex. Hd. Screw	3
100		Hex. Nut	1

BANDWHEEL -
TENSION END



TENSIONING & TRACKING

INSTRUCTIONS FOR TRACKING THE SAW BLADE.

The twisting of the saw blade as it passes through the blade guides sets up an effect which causes the saw blade to run-off the bandwheels. This is counteracted by inclining both bandwheels inwards towards each other, this inclining of the bandwheels to align the saw blade is known as 'tracking' (see Fig.1).

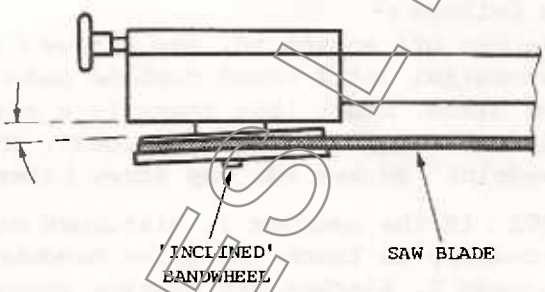


Fig.1 : Diagramatic plan of machine.

When the machine is tracking correctly the back of the saw blade should run .010"/.030" clear of the bandwheel flanges.

All machines are correctly tracked before leaving the factory and should not require further adjustment. If however, the tracking is disturbed, proceed as follows :-

At front of machine, remove blade guards, and inboard and outboard guide assemlies and over arms as complete units.
NOTE : Do not disturb the setting of the blade guides relative to the over arms.

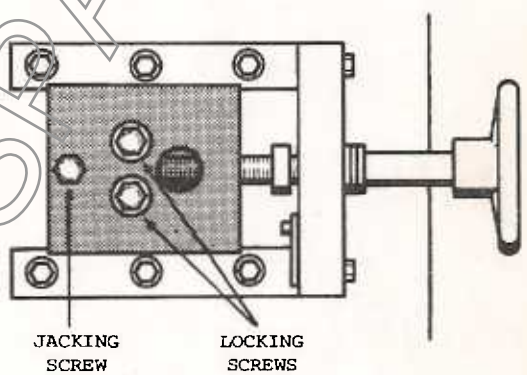


Fig.2.

Place saw blade on bandwheels with edge of saw blade ⅛" clear of bandwheel flange. Run machine at lowest speed for a few minutes, and then check the position of the saw blade on the bandwheel.

If the saw blade has moved up hard against the flanges of the bandwheel this will produce undue wear on the bandwheel flange, and burr the edge of the saw blade. To overcome this the bandwheel must be inclined to a lesser degree. At rear of machine slacken off both locking screws (see Fig.2) and locking nut on jacking screw. Turn jacking screw clockwise until bandwheel moves slightly.

If the saw blade has moved towards the rear edge of the bandwheel the saw blade will tend to run-off the bandwheel. To overcome this the bandwheel must be inclined more. Slacken off both locking screws and locking nut on jacking screw. Turn jacking screw anti-clockwise until bandwheel moves slightly.

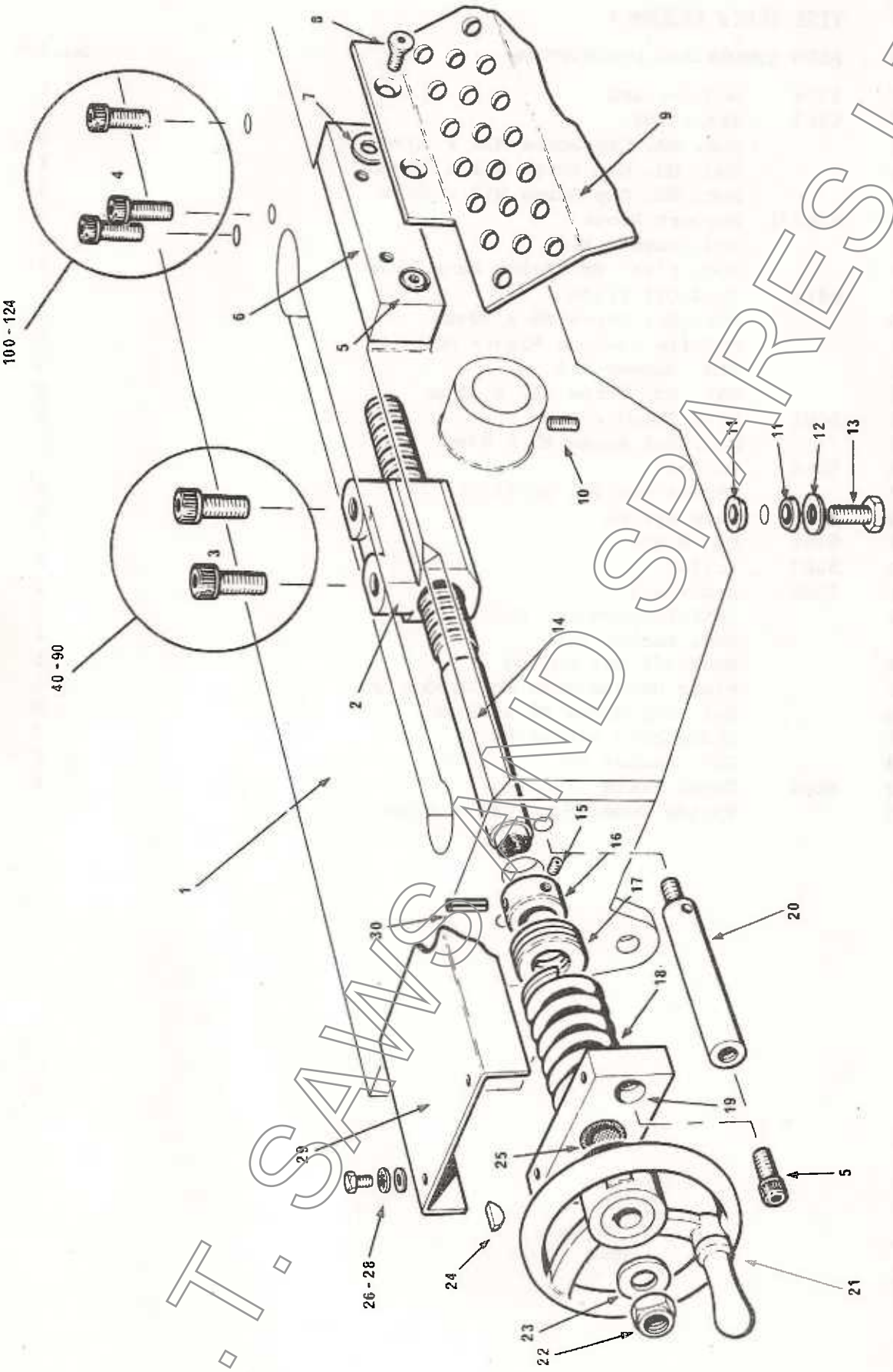
After completing the adjustments, place the saw blade ⅛" clear of flange and run machine for a few minutes. Check the position of the saw blade and if it is still not correct carry out adjustments again. With saw blade tracking correctly, fully tighten locking nut and locking screws. Replace over arms and guide assemblies complete, and blade guards.

(CONTINUED).

INSTRUCTIONS FOR TRACKING THE SAW BLADE (CONTINUED).

If the setting of the blade guide assemblies have been disturbed, proceed as follows :-
Slacken off socket hd. cap screws (Item 5 - see page 2) and lower guide assemblies until round carbide pad (Item 30) just touches the top edge of the blade. Check that there is a clearance between the guide inserts (Item 27) and the blade of .003". This can be adjusted by means of the 'wedglok' socket hd. cap screw (Item 21).

NOTE : If the gearbox is disturbed or replaced for any reason it may be necessary to track the drive bandwheel. This is carried out as described on page 5. Slacken off gearbox securing screws (Item 8 - see Section on Transmission) and adjust either inboard or outboard jacking screws (Items 10 & 11) as required and tighten securing screws.
However, unless the gearbox has been disturbed it should not be necessary to alter this setting under normal circumstances.



VISE SCREW ASSEMBLY

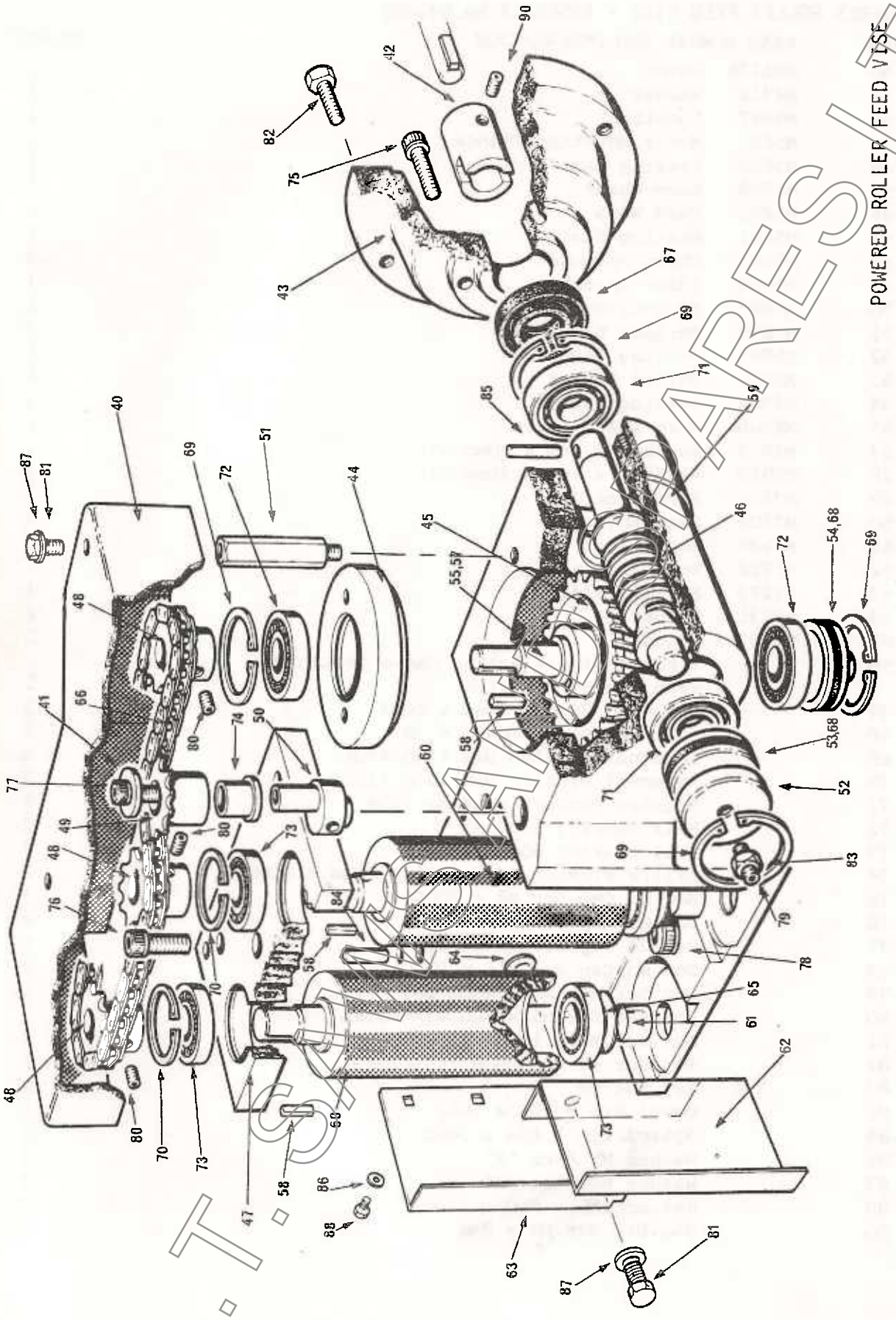
264·2

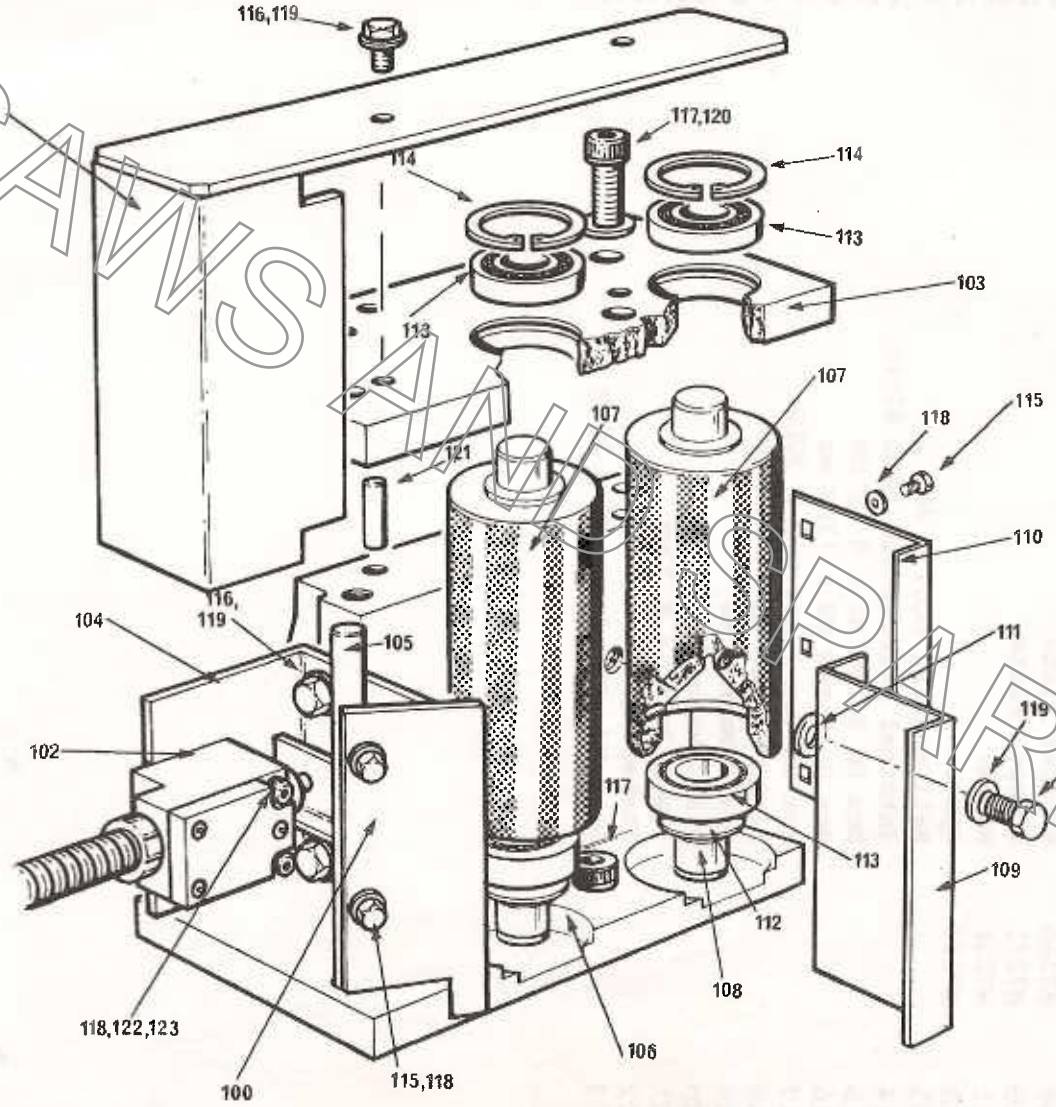
VISE SCREW ASSEMBLY

ITEM	PART NUMBER	AND DESCRIPTION	No. OFF
1	5954	Bed Casting	1
2	5967	Tenon Nut	1
3		Soc. Hd. Cap Screw	2
4		Soc. Hd. Cap Screw	3
5		Soc. Hd. Cap Screw	4
6	6362/1	Support Block	1
7		Std. Washer M10	2
8		Soc. C'sk. Hd. Screw	2
9	6413	Feed Off Plate	1
10		Soc. Set Screw	3
11		Nyltite Sealing Washer	8
12		Std. Washer	4
13		Hex. Hd. Screw	4
14	6001	Vise Spindle	1
15		Soc. Set Screw	1
16	5964	Collar	1
17		Thrust Bearing	1
18	5863	Vise Spring	1
19	5965	End Plate	1
20	5963	Pillar	2
21	5966	Handwheel	1
22		Self-Locking Nut	1
23		Std. Washer	1
24		Woodruff Key	1
25		Plain Bronze Bush	1
26		Hex. Hd. Screw	2
27		Shakeproof Washer	2
28		Std. Washer	2
29	6002	Cover Plate	1
30		Spring Dowel	

POWERED ROLLER FEED VISE - ASSEMBLY No.SM1400

ITEM	PART NUMBER	DESCRIPTION	No.OFF
40	SM1176	Cover	1
41	M4919	Washer	1
42	M5867	Coupling	1
43	M5887	Motor Mounting Flange	1
44	M5888	Bearing Cap	1
45	M5889	Worm Wheel	1
46	M5890	Feed Worm	1
47	M5891	Bearing Plate	1
48	M5895	Chain Sprocket	3
49	M5896	Idler Sprocket	1
50	M5897	Eccentric Spigot	1
51	M5898	Scraper Stud	3
52	M5899	Jacking Plug	1
53	M5902	Thrust Washer	1
54	M5904	Sealing Washer	1
55	M5908	Worm Wheel Shaft	1
57	M5919	Key	1
58	M5920	Key	3
59	M7200	Feed Vise Jaw	1
60	M7202	Feed Roller	2
61	M7205	End Spigot	2
62	M7222	Scraper Plate	1
63	M7223	Scraper Plate	1
64	M7231	Washer	2
65	M7233	Spacer	2
66		Roller Chain with connecting link	1
67		Oil Seal	2
68		'O' Ring Gace	2
69		Internal Circlip	4
70		Internal Circlip	2
71		Angular Contact Bearing	2
72		Ball Bearing	2
73		Ball Bearing	4
74		Oilite Flanged Bush	1
75		Soc Hd Cap Scr	3
76		Soc Hd Cap Scr	2
77		Soc Hd Cap Scr	1
78		Soc Hd Cap Scr	2
79		Soc Set Scr	1
80		Soc Set Scr	3
81		Hex Scr	8
82		Hex Scr	4
83		Hex Nut	1
84		Dowel Pin	2
85		Spirol Pin	1
86		Washer	3
87		Washer	7
88		Hex.Scr	3
90		Soc.Set Scr	1





FIXED ROLLER FEED VISE

FIXED ROLLER FEED VISE - ASSEMBLY No.SM1403

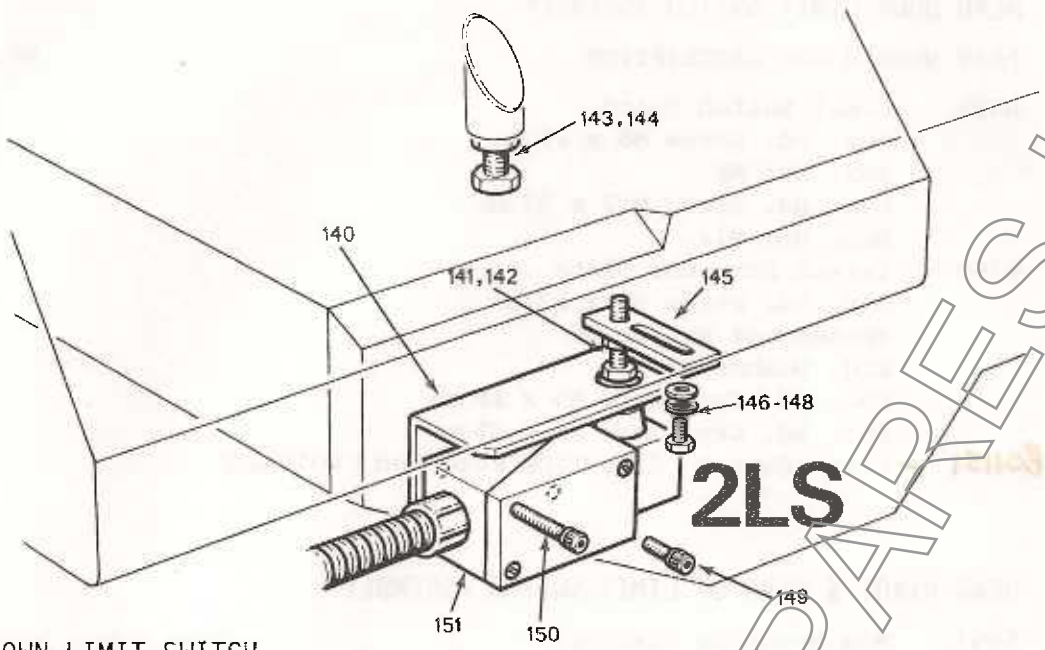
ITEM	PART NUMBER	AND DESCRIPTION	No.OFF
100	SM1414	Actuator Bracket Assembly	1
101	SM1175	Guard Assembly	1
102	SM1179	Limit Switch Assembly	1
103	M5892	Bearing Plate	1
104	M5903	Switch Plate	1
105	M5905	Pivot Pin	1
106	M7201	Rear Feed Vise Jaw	1
107	M7203	Vice Roller	2
108	M7205	End Spigot	2
109	M7220	Scraper Plate	1
110	M7221	Scpaper Plate	1
111	M7231	Washer	2
112	M7233	Spacer	2
113		Ball Bearing	4
114		Internal Circlip	2
115		Hex Hd Screw	5
116		Hex Hd Screw	6
117		Hex Hd Cap Screw	2
118		Plain Washer	7
119		Plain Washer	6
120		Plain Washer	2
121		Dowel	2
122		Shakeproof Washer	2
123		Soc. Hd. Cap Screw	2

HEAD DOWN LIMIT SWITCH ASSEMBLY

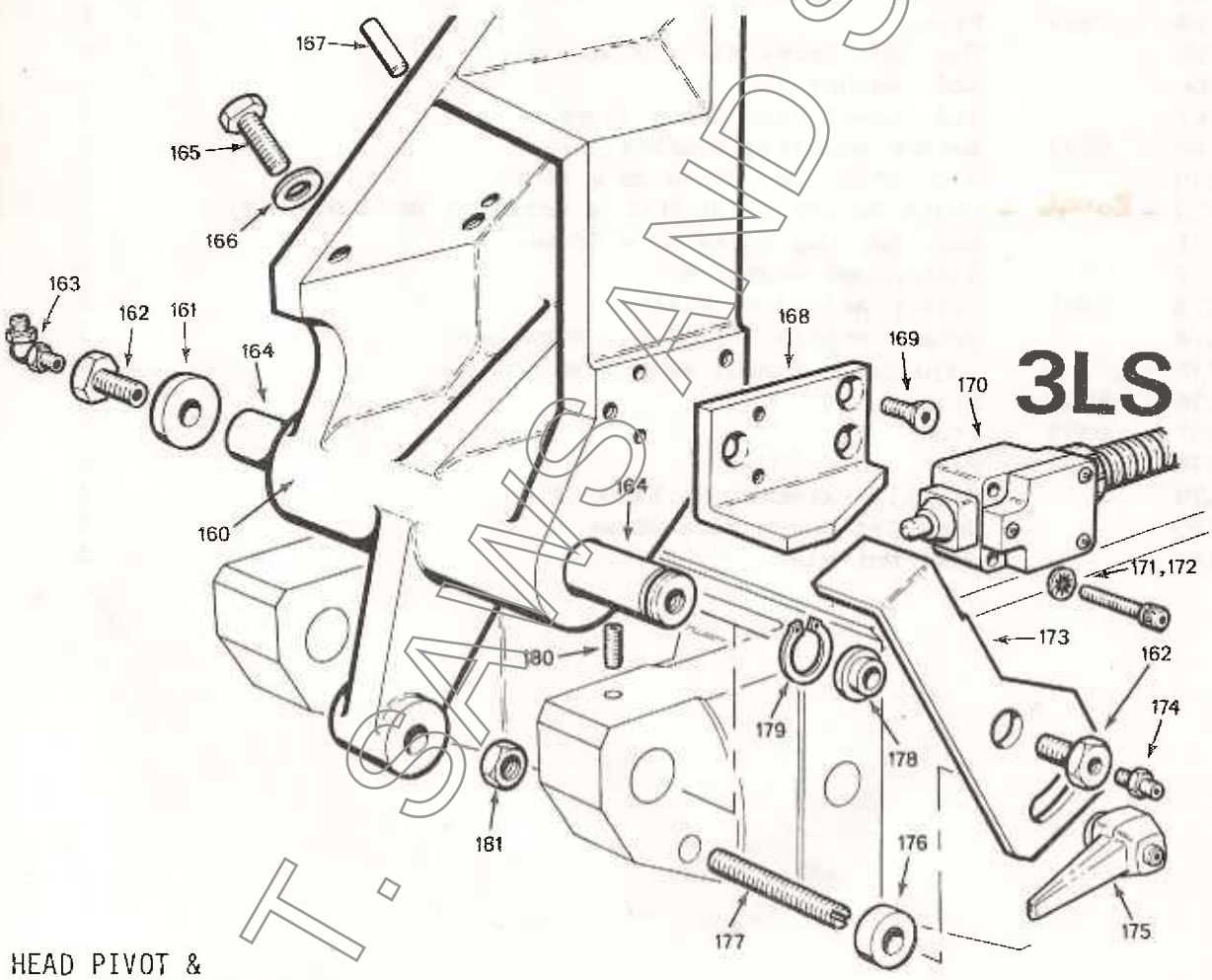
ITEM	PART NUMBER AND DESCRIPTION	No.OFF
140	6425 Limit Switch Guard	1
141	Hex. Hd. Screw	1
142	Hex. Nut	1
143	Hex. Hd. Screw	1
144	Hex. Nut	1
145	6760 Switch Actuator Plate	1
146	Hex. Hd. Screw	2
147	Shakeproof Washer	2
148	Std. Washer	2
149	Soc. Hd. Cap Screw	1
150	Soc. Hd. Cap Screw	1
151	Bo1151 – Limit Switch (Side Type Push Rod)	1

HEAD PIVOT & HEAD UP LIMIT SWITCH ASSEMBLY

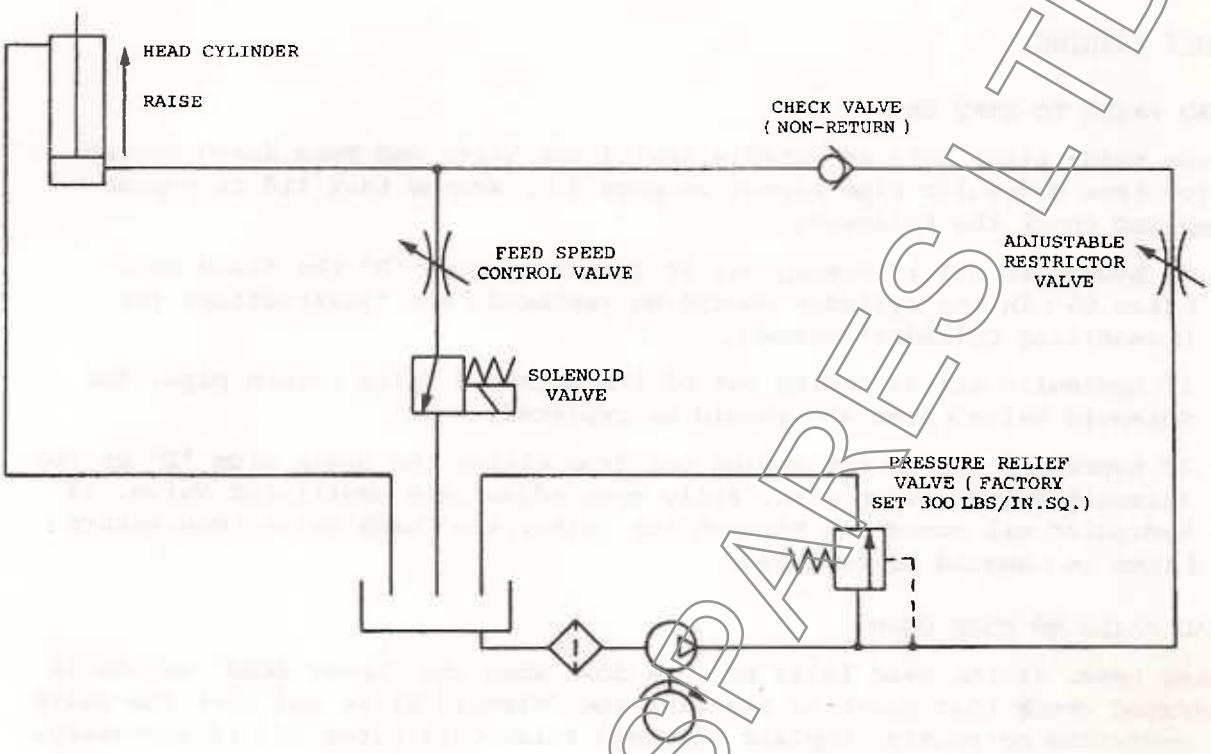
160	5953	Bow Mounting Casting	1
161	6048	Washer	1
162	5998	Pivot Screw	2
163		Grease Nipple	1
164	5983	Pivot	1
165		Hex. Hd. Screw	6
166		Std. Washer	6
167		Std. Dowel	2
168	5994	Switch Mounting Bracket	1
169		Soc. C'sk. Hd. Screw	3
170	Bo1146 – Limit Switch & Actuator Head		1
171		Soc. Hd. Cap Screw	2
172		Shakeproof Washer	2
173	5991	Switch Actuating Plate	1
174		Grease Nipple	1
175		Adjustable Handle	1
176	5993	Sleeve	1
177	6359	Stud	1
178	5992	Bush	1
179		Circlip External	1
180		Soc. Set Screw	1
181		Hex. Nut	1



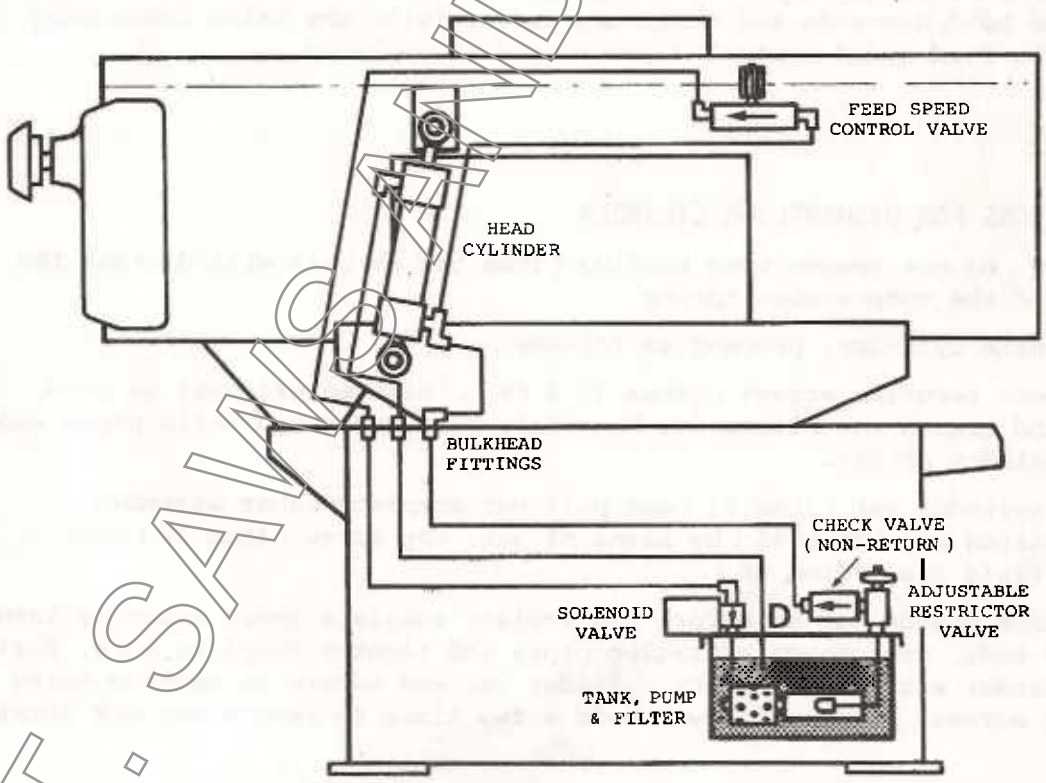
HEAD DOWN LIMIT SWITCH



HEAD PIVOT &
HEAD UP LIMIT SWITCH



HYDRAULIC CIRCUIT DIAGRAM.



HYDRAULIC PIPE LAYOUT.

FAULT FINDING.

HEAD FAILS TO STAY UP :

Raise head, close both Adjustable Restrictor Valve and Feed Speed Control Valve (see Hydraulic Pipe Layout on page 1). Remove tank lid to expose pump and check the following :-

1. If hydraulic oil is coming out of the drain pipe 'D' the fluid seal (Item 66) in the cylinder should be replaced (see 'Instructions for Dismantling Cylinder' below).
2. If hydraulic oil is coming out of the Solenoid Valve return pipe, the Solenoid Valve (Item 40) should be replaced.
3. If hydraulic oil is not coming out from either the drain pipe 'D' or the Solenoid Valve return pipe, fully open Adjustable Restrictor Valve. If hydraulic oil comes out through the filter the Check Valve (Non-Return) (Item 16) should be replaced.

HEAD FAILS TO COME DOWN :

Raise head. If the head fails to come down when the 'Lower Head' switch is operated check that power is reaching the Solenoid Valve and that the valve is operating correctly. Replace Solenoid Valve Coil (Item 39) if necessary.

RATE OF DESCENT CANNOT BE CONTROLLED :

Raise head, fully open Feed Speed Control Valve and start machine. As the head descends, slowly shut off valve. If this has no effect on the speed at which the head descends and continues to fall with the valve completely closed the Feed Speed Control Valve should be replaced.

INSTRUCTIONS FOR DISMANTLING CYLINDER.

IMPORTANT : Do not remove rose bearing (Item 58) as this will disturb the setting of the compression spring.

To dismantle cylinder, proceed as follows :-

Remove both securing screws (Items 57 & 68), slacken off nuts on stud elbows and branch tee (Items 50, 70 & 71), disconnect hydraulic pipes and empty cylinder of oil.

Unscrew cylinder cap (Item 51) and pull out complete inner assembly. Remove piston nut (Item 65) by means of soc. cap screw (Item 72) and replace fluid seal (Item 66).

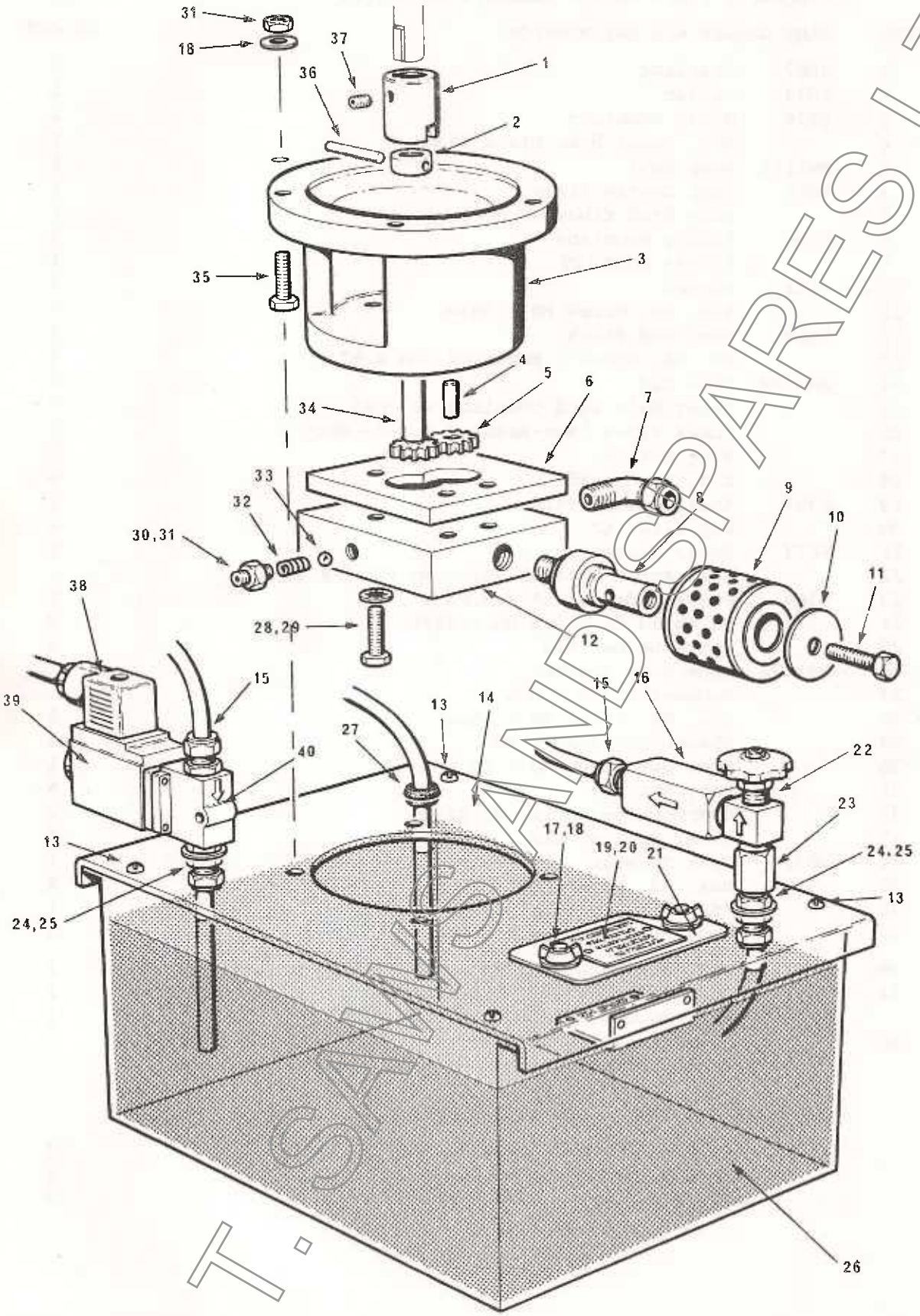
Re-assemble piston nut as before and replace complete inner assembly into cylinder body, re-connect hydraulic pipes and tighten coupling nuts. Partly fill cylinder with oil, replace cylinder cap and secure to machine using securing screws. Raise and lower head a few times to remove any air locks.

HYDRAULIC POWER PACK - ASSEMBLY No.SM1170

ITEM	PART NUMBER	DESCRIPTION	No.OFF
1	5867	Coupling	1
2	5873	Collar	1
3	5874	Motor Mounting	1
4		Std. Dowel	1
5	SM1171	Pump Gear	1
6	5868	Pump Centre Plate	1
7		Male Stud Elbow	1
8	5870	Filter Mounting	1
9		Filter	1
10	3611	Washer	1
11		Hex. Hd. Screw	1
12	5869	Pump End Block	1
13		Rd. Hd. Screw - Recessed	4
14	SM1374	Tank Lid	1
15		Taper Male Stud Coupling	2
16		Check Valve (Non-Return)	1
17		Wing Nut	2
18		Std. Washer	6
19	6387	Instruction Plate	1
20		Pop Rivet	2
21	5877	Cover Plate	1
22		Std. Angle Control Valve	1
23	5564	Female Adaptor	1
24		Bulkhead Coupling	2
25		Fibre Washer	2
26	SM1372	Tank Body Assembly	1
27		Grommet	1
28		Hex. Hd. Screw	4
29		Shakeproof Washer	4
30		Soc. Set Screw	1
31		Hex. Nut	5
32		Compression Spring	1
33		Steel Ball	1
34	5872	Gear Spindle	1
35		Hex. Hd. Screw	4
36		'Spirol' Pin	1
37		Soc. Set Screw	1
38	SM1248	HIRSCHMAN PLUG ASSEMBLY :-	1
39		Coil	1
		Coil	1
40		Solenoid Valve	1
		Solenoid Valve	1

BULKHEAD FITTINGS - NOT ILLUSTRATED :

	Bulkhead Coupling	3
	Female Stud Elbow	1
	Fibre Washer	3



HYDRAULIC POWER PACK

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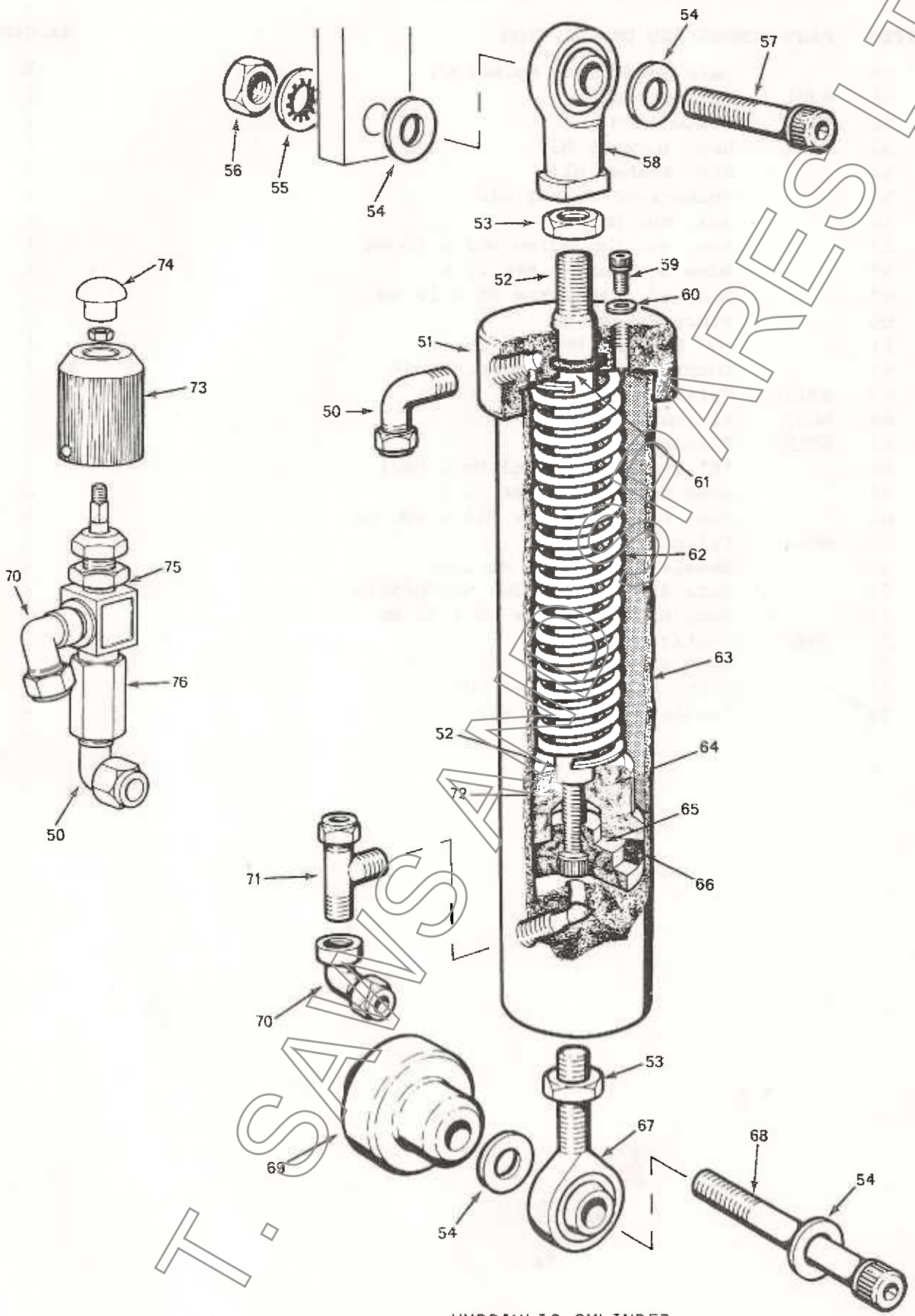
HYDRAULIC CYLINDER - ASSEMBLY No.SM1194

ITEM	PART NUMBER	AND DESCRIPTION	No.OFF
50		Male Stud Elbow	2
51	6391	Cylinder Cap	1
52	5999	Piston Rod	1
53		Hex. Locknut	2
54		Std. Washer	4
55		Shakeproof Washer	1
56		Hex. Nut	1
57		Soc. Hd. Cap Screw	1
58		Rose Bearing	1
59		Soc. Hd. Cap Screw	1
60		Fibre Washer	1
61		'O' Ring No.RM	1
62		Compression Spring	1
63	SM1185	Cylinder Body	1
64	6007	Piston	1
65	6018	Piston Nut	1
66		'K' Type Fluid Seal	1
67		Rose Bearing	1
68		Soc. Hd. Cap Screw	1
69	6066	Cylinder Spacer	1
70		Female Stud Elbow	1
71		Male Stud Branch Tee	2
72		Soc. Hd. Cap Screw	1
73	7882	Control Knob	1
74		Bung	1
75		Control Valve,	1
76		Female Adaptor	1



HYDRAULIC CYLINDER

267 6

COOLANT ASSEMBLY

ITEM	PART NUMBER	AND DESCRIPTION	No.OFF
1	SM1187	Coolant Tank	1
2		Clear Flexable Plastic Tube	1
3		Coolant Nozzel Valve	2
4		Clear Flexable Plastic Tube	1
5		Soc.Hd.Cap Scr	3
6		Tubing Clip	3
7		'Y' Stem Adaptor	1
8		Clear Flexable Plastic Tube	1
9		Coolant Nozzle	1
10		Clear Flexible Plastic Tube	1
11	6080	Coolant Filter	1
12	SM795	Coolant Filter Trav	1
13		'T'Stem Adapter	1
14		Clear Flexible Plastic Tube	1
15		Pipe Clip	1
16		Coolant Pump	1
17	6505	Pump Bracket	1

COOLANT PUMP MAINTENANCE INSTRUCTIONS.

This pump is designed to circulate mild liquids, and is cooled by either sitting in liquid (submerged), or circulating liquid through the head.

IMPORTANT : DO NOT LET PUMP RUN DRY, OR DAMAGE MAY RESULT.

This pump is a sealed unit, factory serviced with oil and should not require further lubrication.

IMPORTANT : DO NOT OPEN THE SEALED PORTION OF THE UNIT, OR REMOVE ANY SCREWS OTHER THAN INDICATED IN FIG.1.

The only maintenance needed on the pump may be that from time to time the pump may become clogged by swarf or chips.

To clean out pump, proceed as follows :-

DISCONNECT PUMP FROM MAINS SUPPLY.
Remove plastic screen at front of pump, then remove three screws (indicated in Fig.1), and take off pump head.
IMPORTANT : DO NOT REMOVE ANY OTHER SCREWS WHICH MAY BE EXPOSED.
Clean out any swarf or chips which may have clogged the impeller, taking care to avoid the painted surface.
Turn the impeller by hand to make sure it is free.
Re-connect the pump to the mains supply to make sure the impeller turns freely. If it does, disconnect pump from mains supply and replace pump head, three screws and plastic screen. Re-connect pump to mains supply.

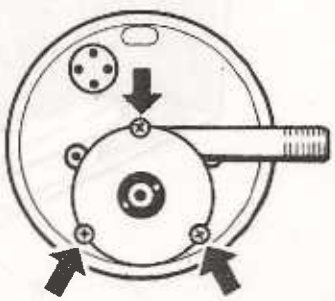
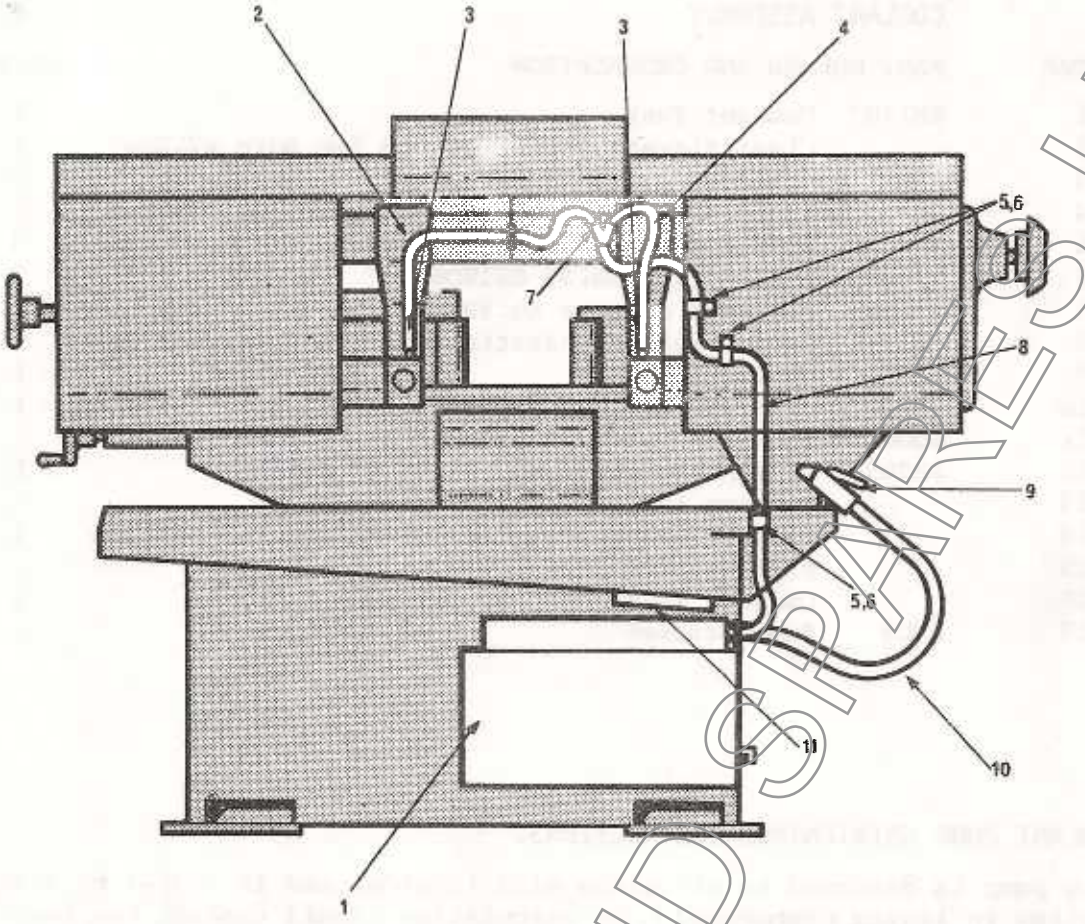
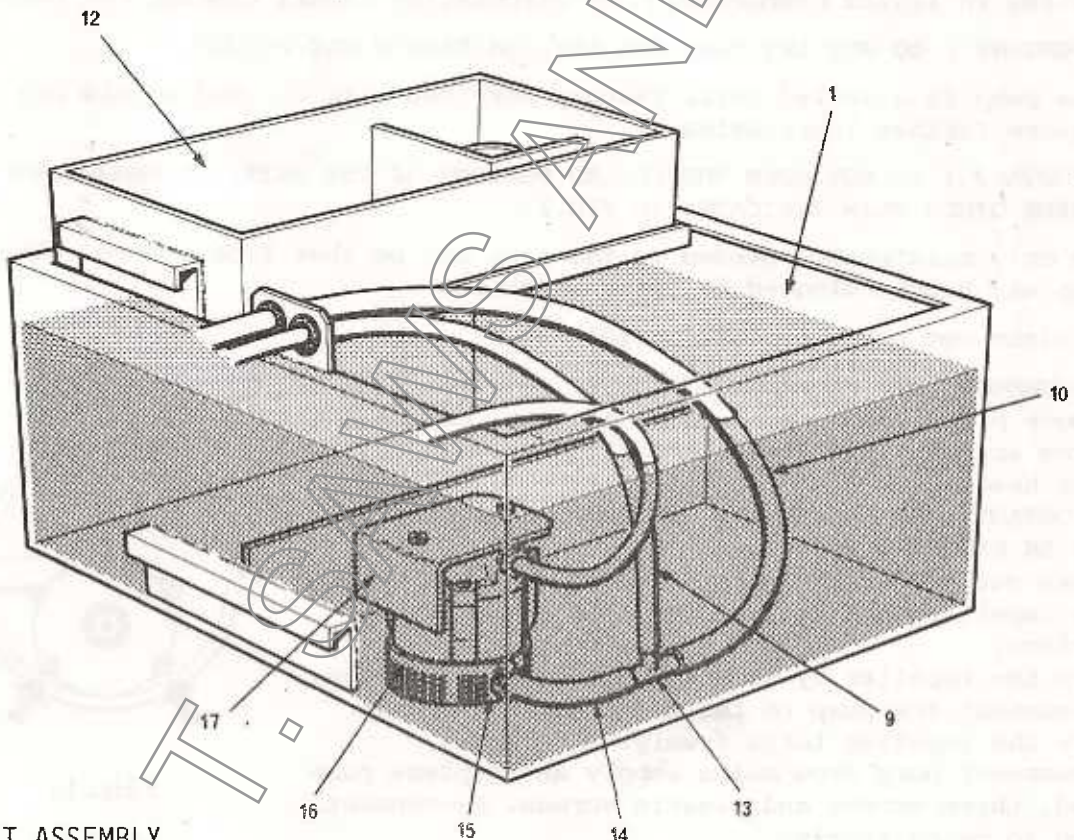


Fig.1.

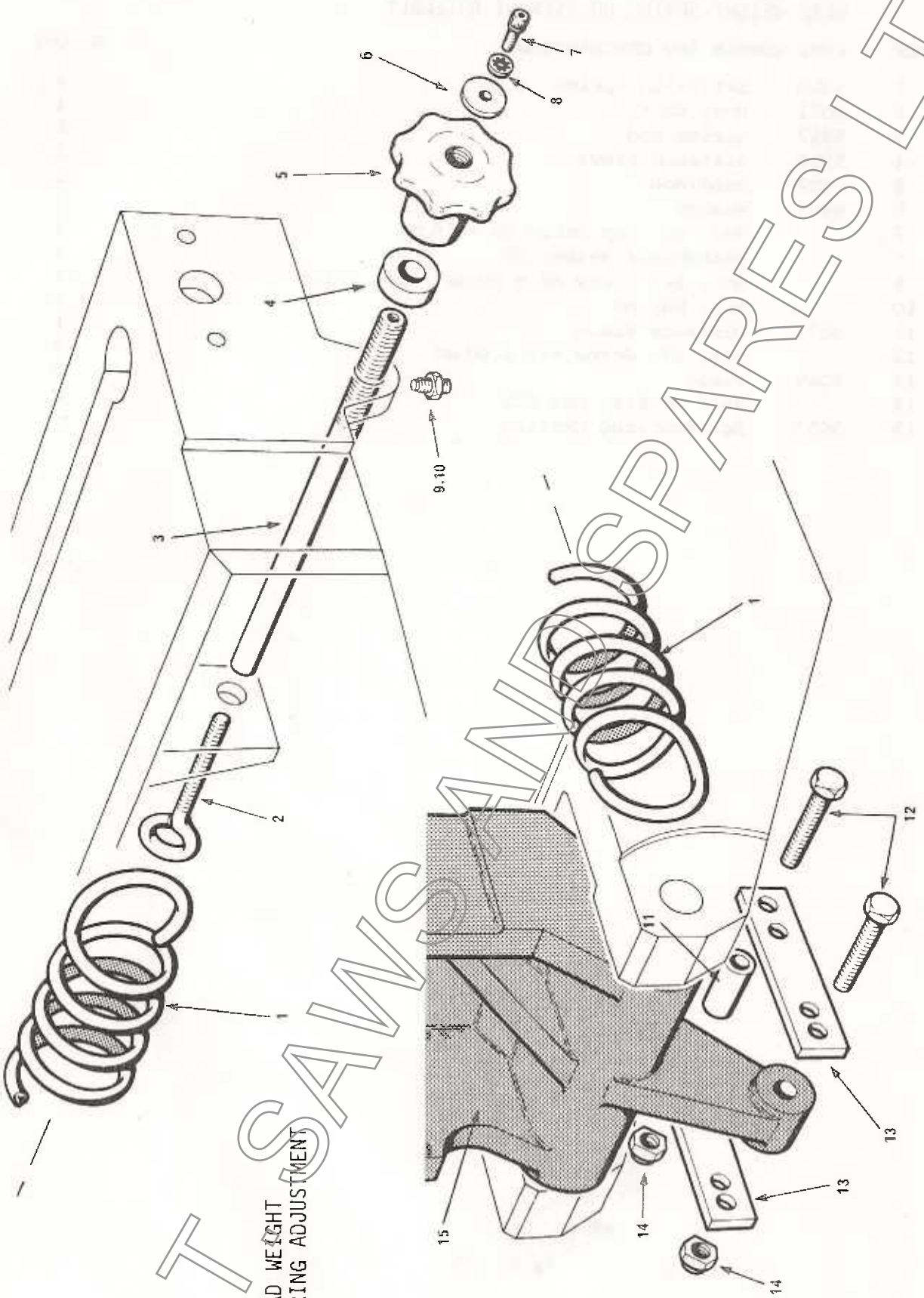




COOLANT ASSEMBLY

HEAD WEIGHT SPRING ADJUSTMENT ASSEMBLY

ITEM	PART NUMBER	AND DESCRIPTION	No. OFF
1	5960	Extension Spring	1
2	6071	Hook Bolt	1
3	5957	Spring Rod	1
4	5958	Distance Piece	1
5	6402	Handknob	1
6	6403	Washer	1
7		Soc. Hd. Cap Screw	1
8		Shakeproof Washer	1
9		Soc. Set Screw	1
10		Hex. Nut	1
11	6070	Distance Piece	1
12		Hex. Hd. Screw	2
13	6069	Plate	2
14		Self Locking Nut	2
15	5953	Bow Mounting Casting	1



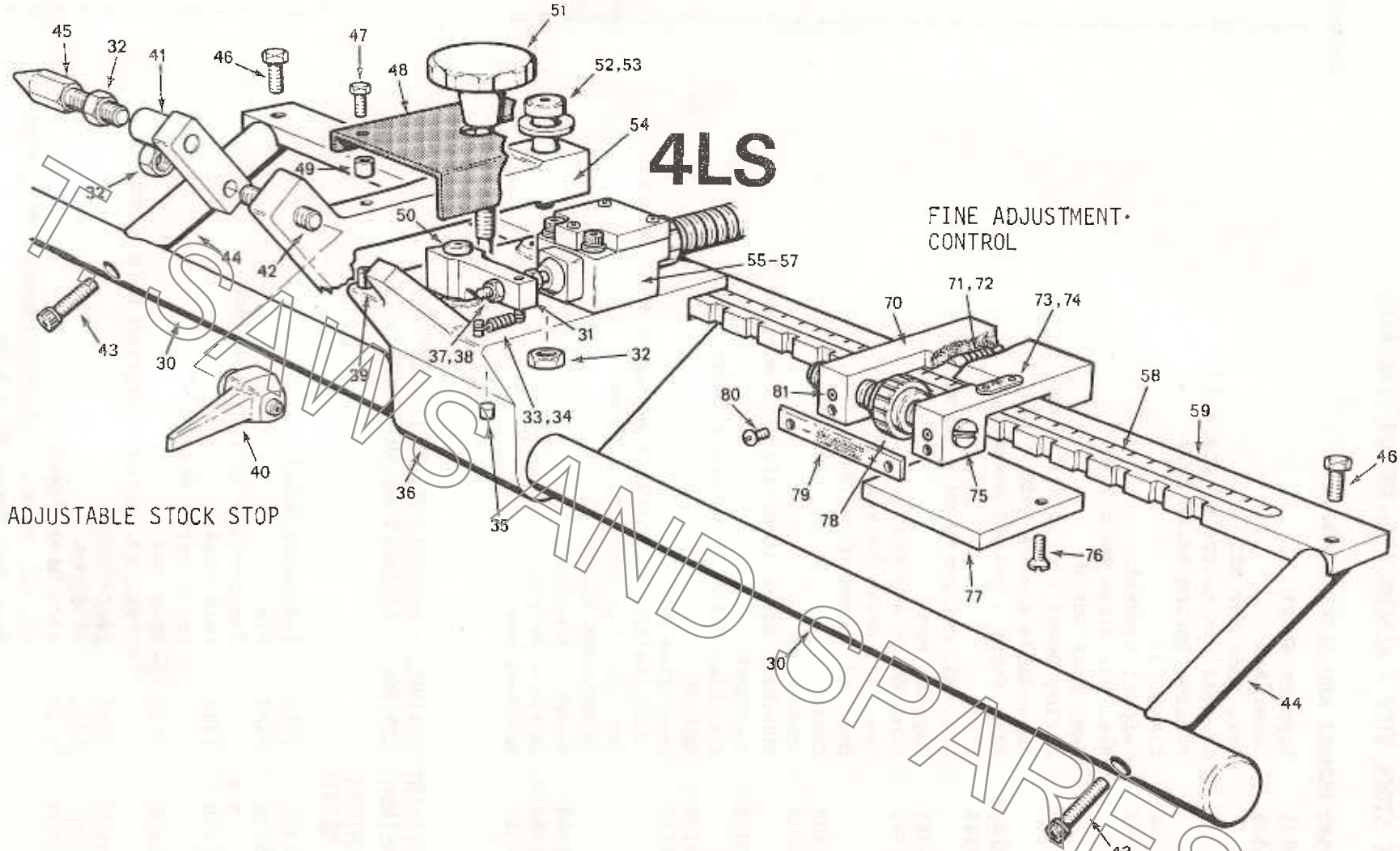
HEAD WEIGHT
SPRING ADJUSTMENT

ADJUSTABLE STOCK STOP - ASSEMBLY No.SM1409(IMPERIAL)
ADJUSTABLE STOCK STOP - ASSEMBLY No.SM1409/1(METRIC)

ITEM	PART NUMBER AND DESCRIPTION		No.OFF
30	6681	Support Shaft	1
31	6338	Lever Arm	1
32		Hex. Lock Nut	3
33		Grooved Pin	2
34		Tension Spring	1
35	6346	Clamp Pad	1
36	6092	Support Bracket	1
37		Hex. Hd. Screw	1
38		Hex. Lock Nut	1
39		Spring Dowel	1
40		Adjustable Handle	1
41	SM1408	Stop Shaft - Welded Assembly	1
42	M5526	Stud	1
43		Soc. Hd. Cap Screw	2
44	6342	Support Arm	1
45	M6761	Stop Shaft Adjustable	1
46		Hex. Hd. Screw	2
47		Hex. Hd. Screw	2
48	6389	Cover	1
49	1899	Spacer	2
50		Shoulder Screw	1
51	SM1216	Handknob	1
52		Shoulder Screw	1
53	6339	Spacer	1
54	6337	Operating Arm	1
55		Limit Switch	1
56		Soc. Hd. Cap Screw	2
57		Shakeproof Washer	2
58	3944	Scale - Imperial	1
	3944/M	Scale - Metric	1
59	6343	Notched Bar	1

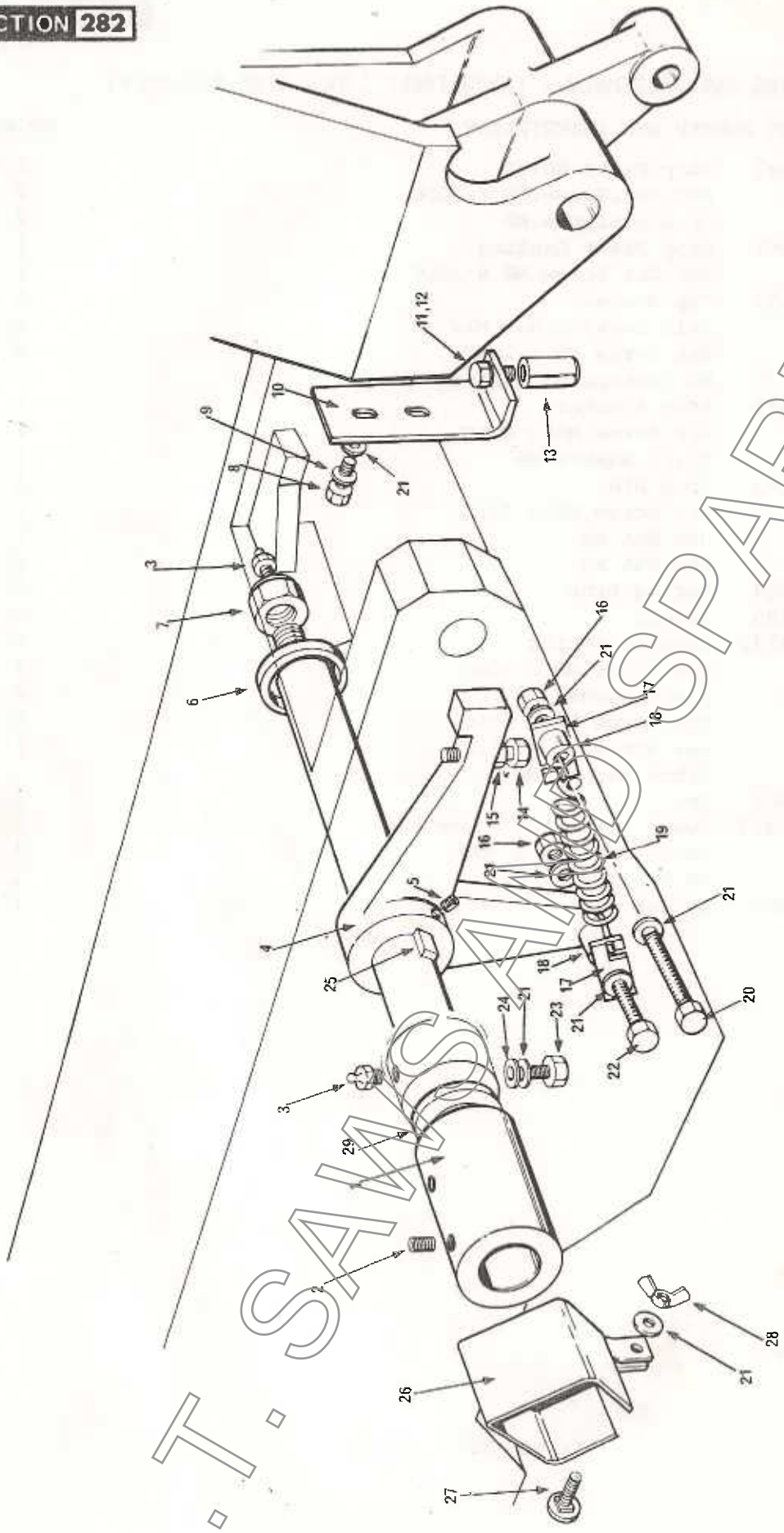
FINE ADJUSTMENT CONTROL - ASSEMBLY No.SM1092(IMPERIAL)
FINE ADJUSTMENT CONTROL - ASSEMBLY No.SM1093(METRIC)

	SM1092 IMPERIAL	SM1093 METRIC		
70	5700	5718	Indicator Block	1
71	5698	5698	Pin	2
72			Compression Spring	2
73	1388	1388	Zero Plate	1
74			Drive Screw	2
75	5696	5710	Stop Rod	1
76			C'sk. Hd. Screw - Slotted	2
77	5697	5697	Plate	1
78	5716	5711	Stop Nut	1
79	5699	5719	Indicator Plate	1
80			Rd. Hd. Screw - Slotted (Brass)	2
81			Soc. Set Screw	2



SWING AWAY ASSEMBLY - (ADJUSTABLE STOCK STOP ASSEMBLY)

ITEM	PART NUMBER	AND DESCRIPTION	No.OFF
1	M6682	Stop Pivot Shaft	1
2		Soc.Set.Screw.	2
3		Grease Nipple.	2
4	M6691	Stop Pivot Casting	1
5		Soc.Set Screw.	1
6	M6697	Cup Washer	1
7		Self Locking Nut	1
8		Hex Screw I	2
9		M8 Shakeproof Washer	2
10	M6675	Stop Bracket	1
11		Hex Screw	1
12		Plain Washer	1
13	M6693	Stop Pin	1
14		Hex Screw	1
15		Hex Nut	1
16		Hex Nut	2
17	M6694	Spring Link	2
18	M6695	Spacer	2
19	AX4132	Tension Spring	1
20		Hex Screw	1
21		Plain Washer	8
22		Hex Screw	1
23		Hex Screw	1
24		Fibre Washer	1
25	M5962	Key	1
26	SM1417	Swarf Deflector Plate	1
27		Coach Bolt	1
28		M8 Wing Nut	1
29	M7304	Spacer	1

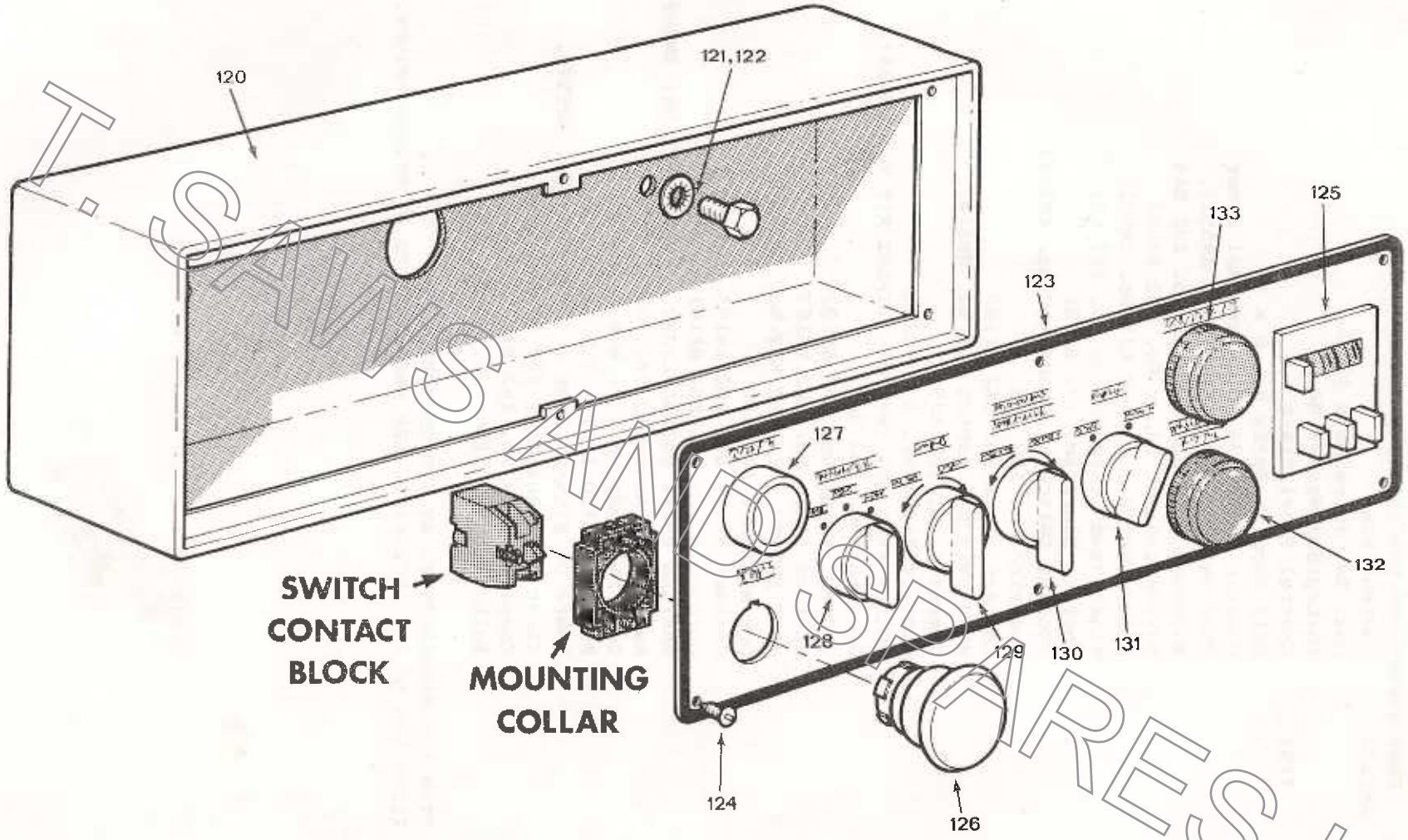


SWING AWAY ASSEMBLY
(ADJUSTABLE STOCK STOP)

282.6

CONTROL PANEL - ASSEMBLY No.SM1760

ITEM	PART NUMBER	AND DESCRIPTION	No.OFF
120	SM1220	Control Box	1
121		Hex. Hd. Screw	2
122		Shakeproof Washer	2
123	7492	Control Panel Plate	1
124		Self Tapping Screw	6
125		Counter	1
126		STOP SWITCH : (SPARE KIT No. KM552).	
		Mushroom Head Stop Button	1
		Switch Contact Block	1
127		START SWITCH : (SPARE KIT No. KM551)	
		Flush Head Start Button	1
		Contact Block	1
128		COOLANT SWITCH : (SPARE KIT No. KM553)	
		Operator No.	1
		Contact Block No.	1
129		HEAD SWITCH : (SPARE KIT No. KM554).	
		Operator	1
		Contact Block	1
130		ROLLER FEED JOG SWITCH : (SPARE KIT No. KM555).	
		Operator	1
		Contact Block	1
		Contact Block	1
131		MODE SWITCH : (SPARE KIT No. KM556).	
		Operator	1
		Contact Block	1
		Contact Block	3
132		BARFEED EMPTY SIGNAL LIGHT : (SPARE KIT No. KM558)	
		Amber Lens Assembly	1
		Complete Body	1
		Bulb	1
133		POWER ON SIGNAL LIGHT : (SPARE KIT No. KM557).	
		Clear Lens Assembly	1
		Complete Body	1
		Bulb	1



CONTROL PANEL