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.
Consult your Distributor in the event of difficulty or servicing requirements. Your Distributor is qualified to advise on the proper maintenance of your Bandsaw, to assess any claims under the Warranty and to supply and fit genuine STARTRITE parts.

STARTRITE

V&R series
(WITH FIXED TABLE)
BANDSAWING MACHINES
HANDBOOK
2C

QUALITY BANDSAW BLADES

TO SUIT THE V & R SERIES MODELS

ORDER LINE- 01634 850833

A.L.T. SAWS & SPARES LTD

Unit 15, Pier Road Industrial Estate

Gillingham

Kent

ME7 1RZ

www.altsawsandspares.co.uk

CONTENTS :

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.

PARTS LISTS & ILLUSTRATIONS :

SECTION 30 - TRANSMISSION :
- 10 Speed Gearbox
- Instructions for Dismantling & Re-assembling

SECTION 33 - BANDWHEEL MOUNTINGS :
- Top Brackets
- Tension Indicator
- Fixed Bandwheel Hub
- Tracking Bandwheel Hub
- Bandwheels
- Wheel Brush
- Pivot Bracket

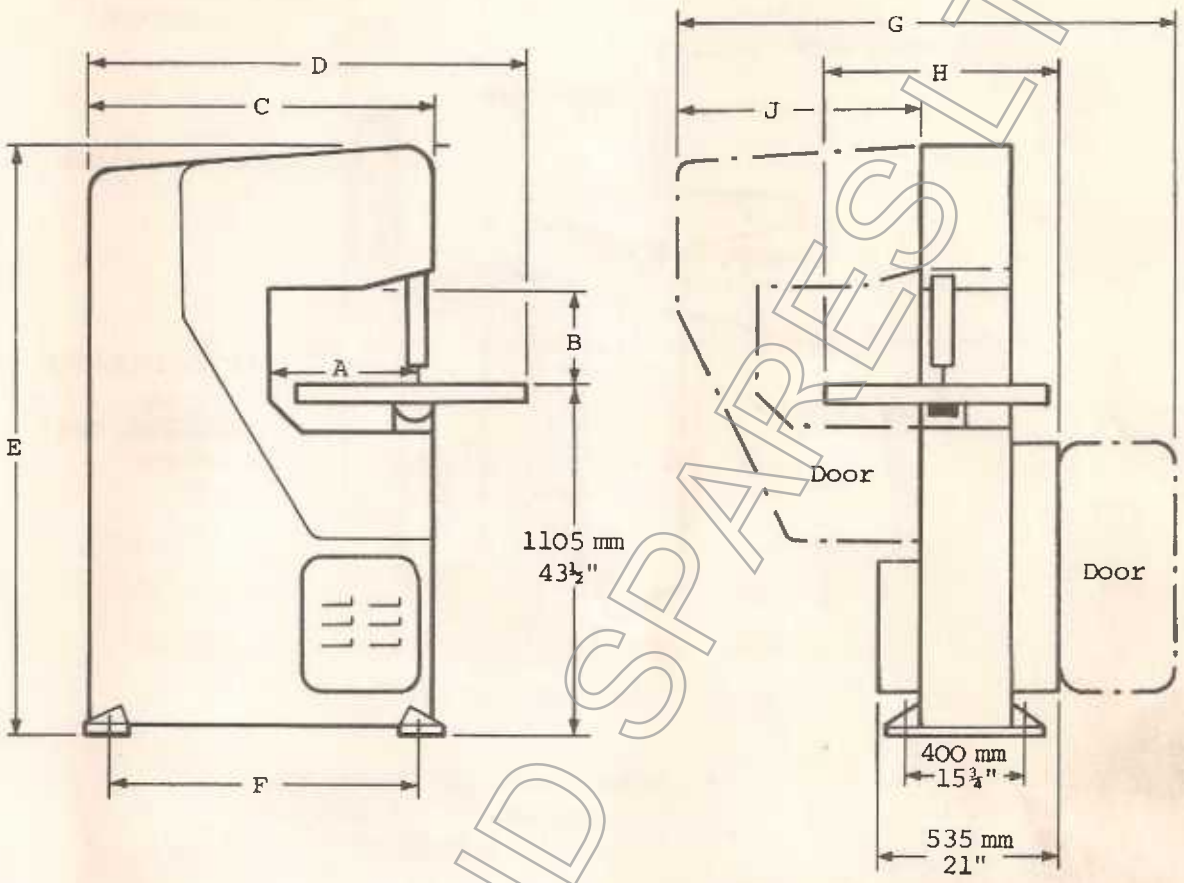
SECTION 36 - FIXED TABLE :
- Fixed Tables
- Auxiliary Table
- Cradle

SECTION 39 - COMPRESSOR / PUMP :
- Air Compressor
- Air Pump
- Chipblower

SECTION 41 - MOTOR PLATFORM :
- Motor Platforms
- Motor Pulley
- Vee-Belts
- Worklight

SPECIFICATION :

Model - R Series	-	14R : 13½" Throat, 2 Wheel Machine. 20R : 20" Throat, 3 Wheel Machine. 30R : 30" Throat, 3 Wheel Machine.
Model - V Series	-	18V : 18" Throat, 3 Wheel Machine. 24V : 24" Throat, 3 Wheel Machine.
Wheel Diameter	-	R Series : 355 mm, 14" V Series : 305 mm, 12"
Gross Weights	-	14R : 318 kg, 700 lbs. 20R : 363 kg, 800 lbs. 30R : 431 kg, 950 lbs. 18V : 272 kg, 600 lbs. 24V : 318 kg, 700 lbs.
Motor	-	R Series : 1½ h.p., 1.1 kW, 900 r.p.m. V Series : 1½ h.p., 1.1 kW, 1200 r.p.m.
Electric Supply	-	550 Volt 3 Phase 60Hz. 220/240 Volt 3 Phase 60Hz. 380/440 Volt 3 Phase 60Hz.
Blade Lengths	-	14R : 2845 mm, 112" 20R : 3305 mm, 130" 30R : 2845 mm, 112" & 3735 mm, 147" 18V : 2895 mm, 114" 24V : 3200 mm, 126"
Max. Blade Width		R Series : 20 mm, ¾" V Series : 15 mm, ⅝"

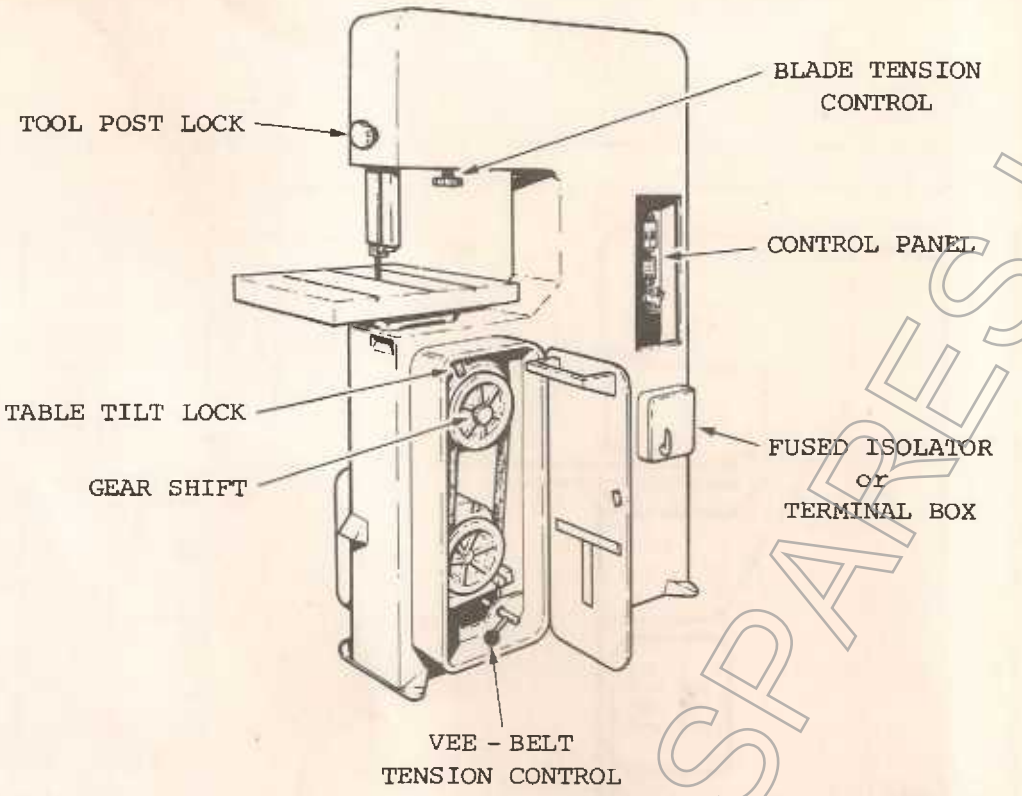


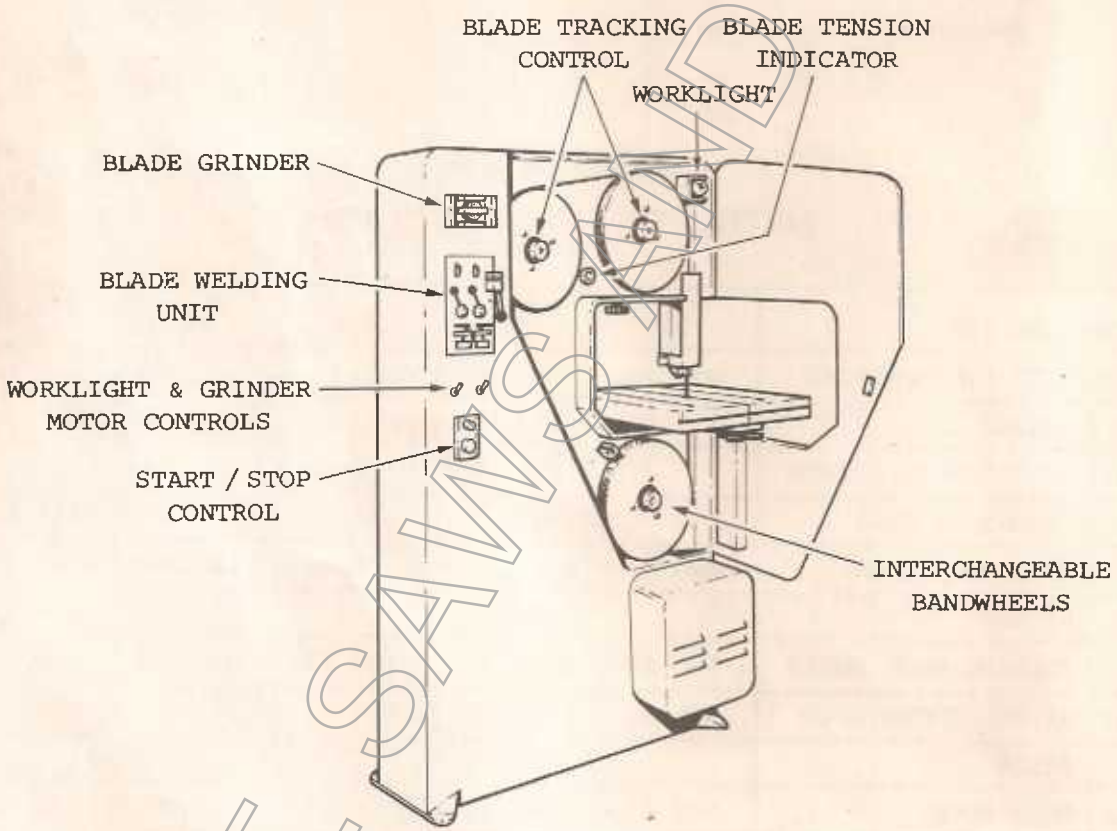
FOUNDATION PLAN

(DETAILS VARY ACCORDING TO MODEL)

MACHINE TYPE		14"	20"	30"	18"	24"
PRINCIPLE DIMENSIONS		mm ins	mm ins	mm ins	mm ins	mm ins
A	THROAT SIZE	345 13½	510 20	760 30	455 18	610 24
B	HEIGHT UNDER GUIDES	255 10			205 8	
C	LENGTH OF BODY	760 30	1065 42	1370 54	915 36	1145 45
D	LENGTH OVERALL	1065 42	1370 54	1675 66	1115 44	1345 53
E	HEIGHT	1830 72			1755 69	
F	BOLTING DOWN HOLES	750 29½	1055 41½	1360 53½	900 35½	1130 44½
G	WIDTH - DOORS OPEN	1420 56	1730 68	2310 79	1395 55	1625 64
H	WIDTH	635 25			535 21	
J	MAIN DOOR	535 21	840 33	1115 44	685 27	915 36

ALL DIMENSIONS APPROXIMATE.





GENERAL LAYOUT OF BANDSAWING MACHINE.
(DETAILS VARY ACCORDING TO MODEL)

INSTALLATION.

To transport machine to site, use fork lift truck with forks placed under base of machine (steady machine during transport), or use hoist with sling positioned as shown in Fig.1.

WARNING : ATTACHMENT OF SLING TO TABLE MAY DAMAGE THE MACHINE.

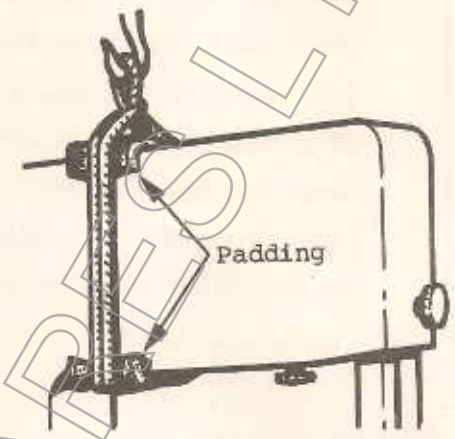


Fig.1.

Adequate working and job lay off space is essential to efficient operation, so do not site the machine in a cramped position in the workshop.
Bandsaw blades tend to get tangled and damaged if hung from a hook or stacked on the floor, therefore cupboard space provided adjacent to the machine will protect saw blades in storage and encourage the operator to select a suitable saw blade for the job.
The base of the machine is provided with four fixing holes to accept ⅜" dia. anchor bolts (not supplied) but the machine may be fixed in position with resilient mounting pads secured by adhesive in order to avoid damage to the floor. Where necessary, the floor must be levelled so that the machine stands with equal firmness at all fixing points.
Remove the anti-rust protective coating where applied, and in particular from the working elements of the machine.

If the machine has been shipped with the table as a separate item, re-assemble table to machine in the following manner :-

1. Lift the table into position allowing the trunnions to seat and the bolt to pass through the slot in the cradle. Where necessary, the bolt may be assembled into the trunnion by passing it through the table insert aperture.
2. From the underside of the cradle platform, assemble in bolt on order :-
   Spring Housing, spigot end first.
   Spring, into body of housing.
   Washer, plain face first.
   Nut, using wrench supplied.

CONNECTION TO THE ELECTRICITY SUPPLY.

Before connecting to the electricity supply, see Section on Electrical System for full instructions.

SETTING UP THE MACHINE.

For full instructions on how to set up the machine for correct use, see Section on Setting Up / Blade Guides.

OPERATOR SAFETY PRECAUTIONS.

Keep hands clear of the saw blade.

Position the top guide as close as possible to the workpiece.

Stop the machine to make adjustments.

Keep the blade guard(s) in position when sawing.

Keep the work area free of tools and off-cuts.

Do not leave bandsaw blades on the floor.

MACHINE CONTROLS.

10 SPEED MACHINES :

Operation of the Vee-belt tension control releases the tension on the Vee-belt, see Fig.2, which enables a higher or lower speed to be selected.
Blade speed variation is effected by means of a five step pulley, in conjunction with a two speed gearbox. To select high gear pull OUT gearshift, to select low gear push IN gearshift, see Fig.2. Always ensure that the gearshift is fully engaged before starting the machine. Turning the Vee-belt pulley by hand will help gears engage.

IMPORTANT : STOP THE MACHINE BEFORE SHIFTING GEAR. OPERATING THE GEARSHIFT WHILE THE TRANSMISSION IS IN MOTION WILL DAMAGE THE GEARBOX.

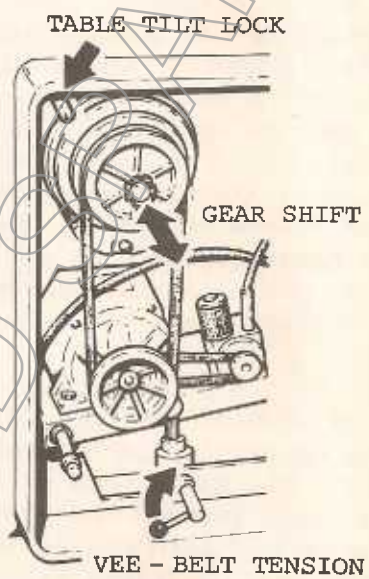


Fig.2.

FIXED TABLES :

The table is secured in position by a single bolt passing through the cradle with the tilt locking nut accessible through the door at the rear of the machine, see Fig.2. Slackening the nut about one half turn will allow the table to be tilted. The table can be tilted 45° to the right. The table will also tilt 15° to the left if the zero stop pin is first removed from its position at the left hand side of the table mounting.

WEEKLY MAINTENANCE.

Remove embedded chips from bandwheel tires.
Clean upper and lower blade guide assemblies.

MONTHLY MAINTENANCE.

Remove air filter from top of air compressor (one screw) and insert a few drops of oil onto screw hole. Do not crush filter when replacing screw.
Check condition and tension of Vee-belts.

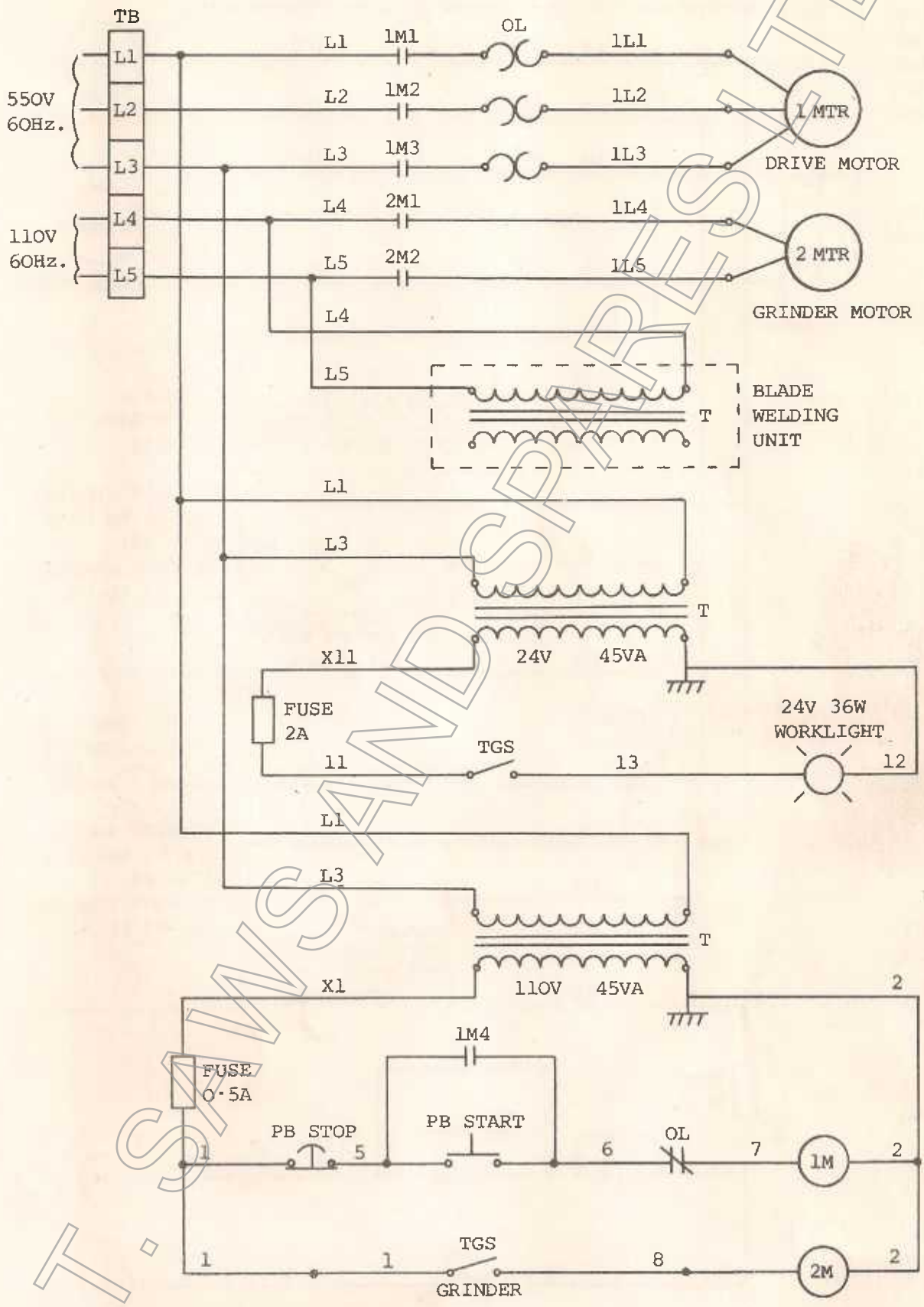
YEARLY MAINTENANCE.

Drain gearbox, and refill with clean oil to level of filler hole.

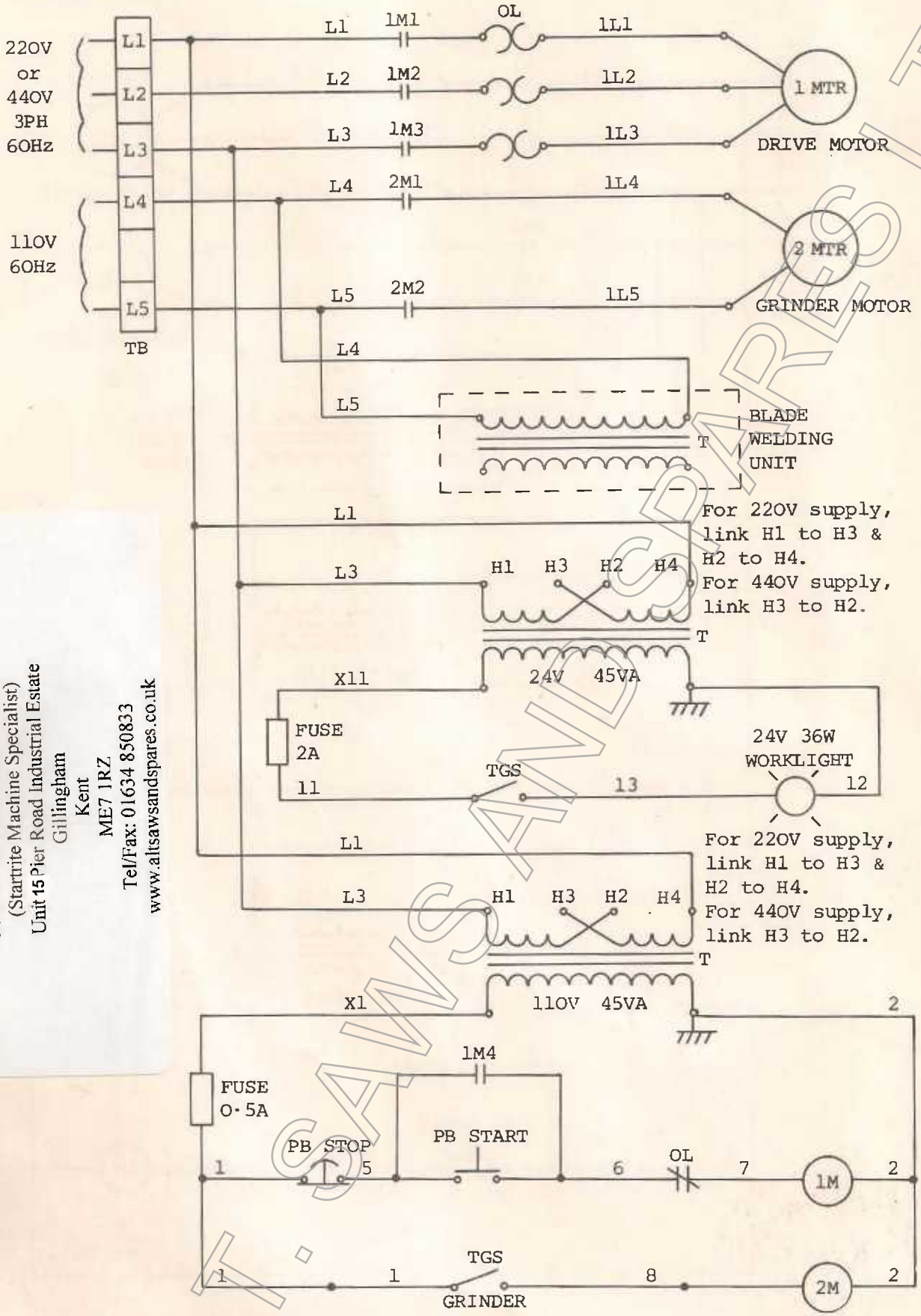
GENERAL.

Otherwise than above, clean and lubricate working parts as required.
The bandwheels and pumps have sealed-for-life bearings which do not require further lubrication.

APPROVED LUBRICANTS.	
GENERAL LUBRICATION AIR COMPRESSOR	ESSO Esstic 50 Oil GULF Service 51 Oil MOBIL Vactra Heavy Medium Oil TEXACO Ursa P20 Oil
MOTOR BEARINGS	ESSO Beacon 3 Grease GULF Gulfcrown No.3 Grease MOBIL Mobilplex 48 Grease TEXACO Regal Starfak Premium 3 Grease
GEARBOX	ESSO Pen-o-led EP2 Oil GULF EP65 Lubricant Oil MOBIL Mobilgear 629 Oil TEXACO Meropa 2 Lubricant Oil



CIRCUIT DIAGRAM FOR 550V/60Hz - 110V/60Hz MACHINES WITH WELDER & GRINDER.



CIRCUIT DIAGRAM FOR 220V/440V 3PH 60Hz MACHINES WITH WELDER & GRINDER.

A.L.T. SAWS & SPARES LTD
(Startrite Machine Specialist)
Unit 15 Pier Road Industrial Estate
Gillingham
Kent
ME7 1RZ
Tel/Fax: 01634 850833
www.altsawsandspares.co.uk

WIRING INSTRUCTIONS.

If the machine is of the correct voltage, connect supply leads to terminals L1, L2 and L3 in terminal box (or disconnect switch if fitted) at rear of machine.

IMPORTANT : DO NOT SHIFT GEAR WHEN MOTOR IS RUNNING.

Check motor rotation, saw blade must pass downward through the table. If necessary interchange supply leads L1 and L3 to reverse rotation.

ELECTRIC CONTROL PANEL.

The electric control panel, see Fig.1, is located inside the machine body, and access is obtained by removing the panel cover situated at the rear of the machine. The complete panel may be removed from the machine by disconnecting the supply wires to the terminal block and securing nuts retaining the panel.

Item 1. Davenset transformer 550V or 220/440V primary, 24V 45VA secondary for worklight.

Item 2. Davenset transformer 550V or 220/440V primary, 110V 45VA secondary for control circuit.

Item 3. Fuse holder Bussman type HKP and fuse Bussman type AGC ½.

Item 4. Fuse holder Bussman type HKP and fuse Bussman type AGC 2.

Item 5. contactor with 110V coil. Provides Start/ Stop control for main motor.

Item 6. overload unit (see Chart on page 4 for part numbers and amperage ratings). Provides overload protection for main motor.

Item 7. C10 contactor with 110V coil. Provides Start/ Stop control for grinder motor.

Items 8 & 9. Terminal blocks.

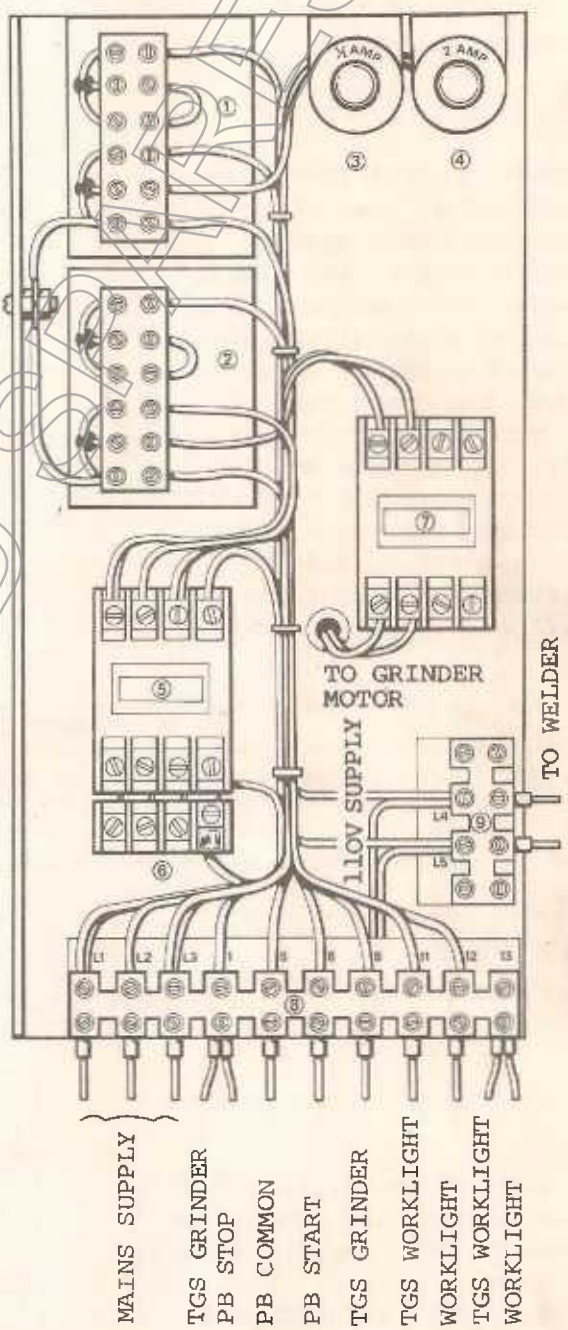


Fig.1.

SECTION 7

CONVERSION FOR ALTERNATIVE SUPPLY VOLTAGE.

220 Volt machines will operate on 220/240V 3PH 60Hz supply.
440 Volt machines will operate on 380/440V 3PH 60Hz supply.
Machines supplied for use on 440V 3PH 60Hz supply may be adapted to operate on 220V 3PH 60Hz supply and vice-versa.

To effect conversion, it is necessary :-

A. Replace the motor overload unit with one of suitable rating.
B. Change the transformer terminal connections.
C. Change the main drive motor terminal connections.

Proceed as follows :-

A.

Remove control panel cover situated at rear of machine. Identify motor starter and overload unit, see Fig.2. Remove overload unit from starter after slackening starter terminal screws 2,4, 6 & 8, and disconnecting wire 7. Fit alternative overload unit of suitable amperage rating according to supply voltage (see Chart below). Set pointer at side of overload unit to indicate full load amps of motor.

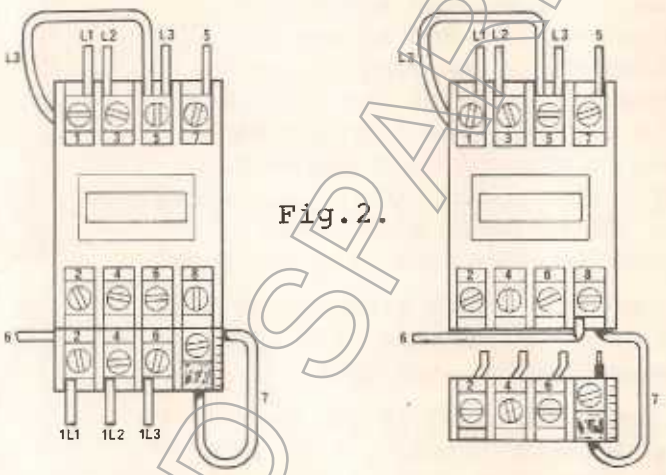


Fig.2.

OVERLOAD UNIT FITTED

OVERLOAD UNIT DETACHED

MACHINE TYPE	MOTOR 3 PHASE 60Hz.					OVERLOAD UNIT	
	HP.	RPM.	VOLTS	F/L AMPS	STARTING AMPS	PART No.	AMPS RANGE
14" 20" 30"	1½	900	550 380 - 440 220 - 240	2.4 3.4 5.9	13 17 29	47LO107 47LO108 47LO109	1.8 - 2.8 2.7 - 4.2 4.0 - 6.2
18" 24"	1½	1200	550 380 - 440 220 - 240	2.1 2.7 5.3	11 13 26	47LO107 47LO108 47LO109	1.8 - 2.8 2.7 - 4.2 4.0 - 6.2

B.

On control panel, identify transformers and substitute links to suit supply voltage, as shown in Fig.3. (Split primary coil transformers only).

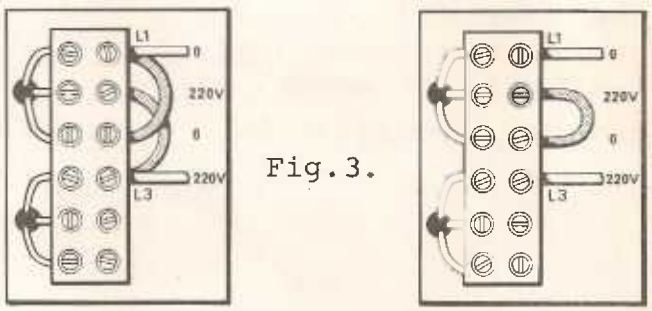


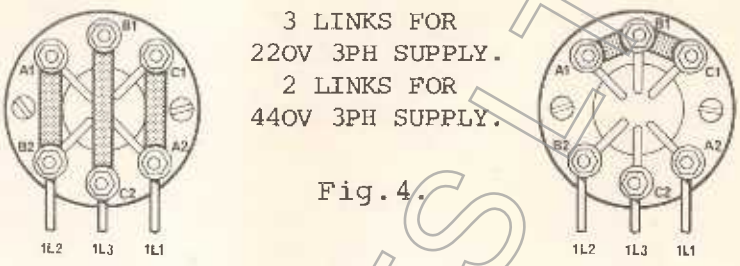
Fig.3.

2 LINKS FOR 220V 3PH SUPPLY

1 LINK FOR 440V 3PH SUPPLY

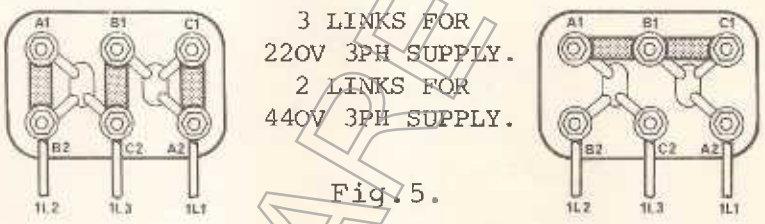
C.

Remove cover of motor terminal box. Identify main drive motor terminal arrangements, see Figs.4, 5,6 & 7. Change the motor terminal linkage to suit appropriate voltage as shown, using correct method of connection.



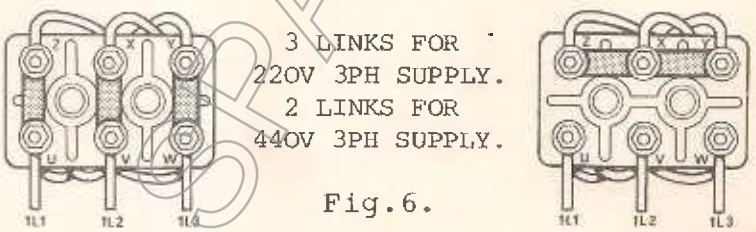
3 LINKS FOR 220V 3PH SUPPLY.
2 LINKS FOR 440V 3PH SUPPLY.

Fig.4.



3 LINKS FOR 220V 3PH SUPPLY.
2 LINKS FOR 440V 3PH SUPPLY.

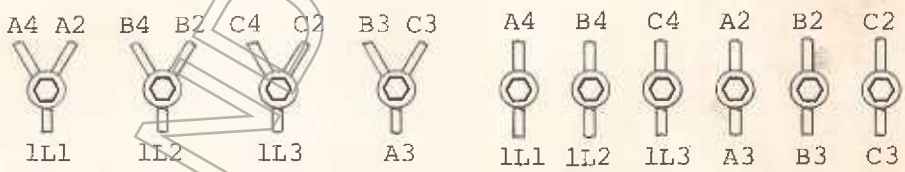
Fig.5.



3 LINKS FOR 220V 3PH SUPPLY.
2 LINKS FOR 440V 3PH SUPPLY.

Fig.6.

Connections to be made by nut, bolt and washers, and to be wrapped with adhesive p.v.c. insulating tape.



CONNECTIONS FOR 220V 3PH SUPPLY.

CONNECTIONS FOR 440V 3PH SUPPLY.

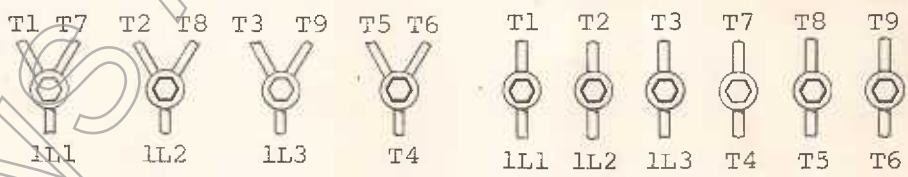


Fig.7.

SETTING UP THE MACHINE.

Select a saw blade suitable for the work in hand, see Section on Sawing Practice.
Place the saw blade upon the bandwheels with the teeth facing forwards and downwards through the table. Apply sufficient tension to take up the slack of the saw blade. Rotate the bandwheels by hand and at the same time operate the blade tracking control so that the saw blade runs approximately central on the bandwheels, see Fig.1. It is important that the guides are set back clear of the saw blade whilst this operation is being carried out in order that the saw blade is free to follow its natural path between the bandwheels.

NOTE : 30" Throat Machines have a tracking control fitted to both the top and third bandwheels. Care must be taken when setting these machines in order to avoid conflicting settings between the tracking controls. For this reason, the top bandwheel should be set in the mean position and the tracking controlled from the third bandwheel. After this procedure has been completed a small final adjustment may be necessary to the top bandwheel control. This point does not arise of course when the machine is to be used on two wheel operation, as the tracking procedure is carried out solely by the top bandwheel control.

TRACKING CORRECT
Blade runs approximately central on bandwheel.

TRACKING INCORRECT
Blade runs toward front edge of bandwheel.

TRACKING INCORRECT
Blade runs toward rear edge of bandwheel.

Fig.1.

When the saw blade is tracking in a satisfactory manner, apply the appropriate blade tension as shown by the tension indicator, see Fig.2. The tension scale registers tension applied in terms of saw blade width, thus a reading of '½' indicates that tension to suit a ½" wide saw blade has been applied. The saw blade length, provided that it is acceptable to the machine, does not affect the indicated tension. The indicator will give a fair guide as to the correct tension required, but it may be necessary to vary this slightly according to circumstances.

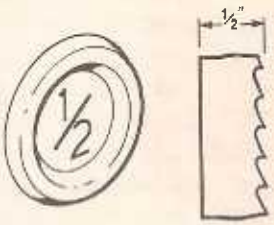


Fig.2.

BLADE GUIDES.

Several types of blade guides are available and these are described on the following pages.
It is most important that the guides are set to offer maximum support to the blade in its working condition. The top blade guide should be set as close as possible to the workpiece.
Using the machine with incorrectly adjusted guides can only result in poor quality work and short blade life.

SECTION 14

SOLID INSERT GUIDES.

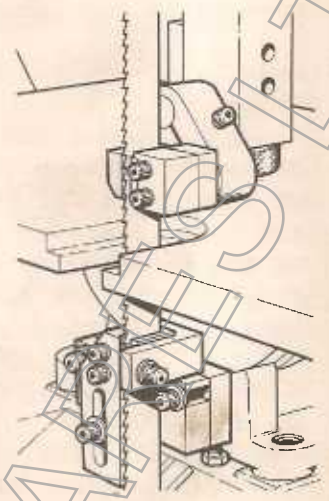
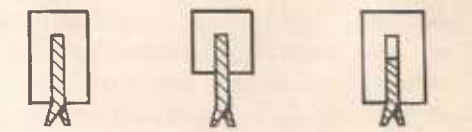


Fig.3.

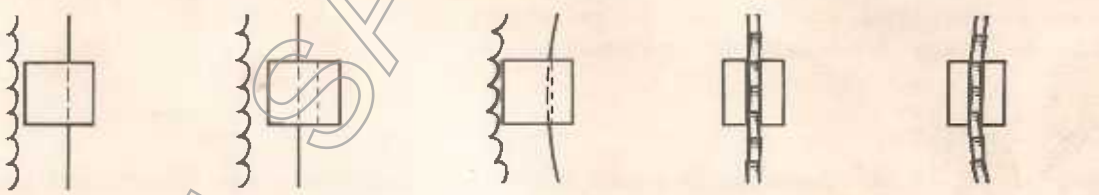
These guides give the greatest possible support to the blade and are therefore most suitable for precision sawing. In most cases greater working life of the blade can be obtained than is possible with other types of guides.
Solid insert guides (see Fig.3) as the name implies, have the guiding faces machined into a solid block, thereby eliminating the need for individual adjustment to separate controlling elements. The guide inserts are made in a range of sizes to suit blade widths (see Parts List on page 3). After initial setting each size of insert is automatically positioned when fitted into the guide holder.
Check each new blade before use for smoothness on sides and back edge at welded joint.
New guide inserts should be allowed to bed in by being subjected only to light feed pressure during the first few minutes of use.
An occasional small application of saw wax or tallow to the blade will generally improve performance and prolong working life of both blade and inserts. Remove and clean the inserts at each blade change, or more frequently if necessary. Do not allow the inserts to become seized in the holders so that the self aligning action is inhibited.

Fit guide inserts (Item 21) to suit width of blade to be used.
NOTE : Blade width capacity of machines vary according to model, see Machine Specifications at front of book.
Initial setting of the guide holders is best accomplished by fitting a wide blade. Slacken securing screws (Items 1 & 19) and position the insert locators to hold the inserts with minimum side clearance but free enough to pivot under finger pressure.
The use of the correct size guide insert permits maximum engagement with the flanks of the saw blade without snagging the set of the teeth, see Fig.4. With the blade correctly tracked and tensioned, position both guide holders so that guide inserts support the blade without deflecting it from a straight line, see Fig.5. After adjusting the guides, rotate the bandwheels by hand to ensure that the saw blade runs free and that all the adjustments have been correctly carried out.



CORRECT INCORRECT INCORRECT

Fig.4.



CORRECT Maximum support for blade.

INCORRECT Insufficient support for blade.

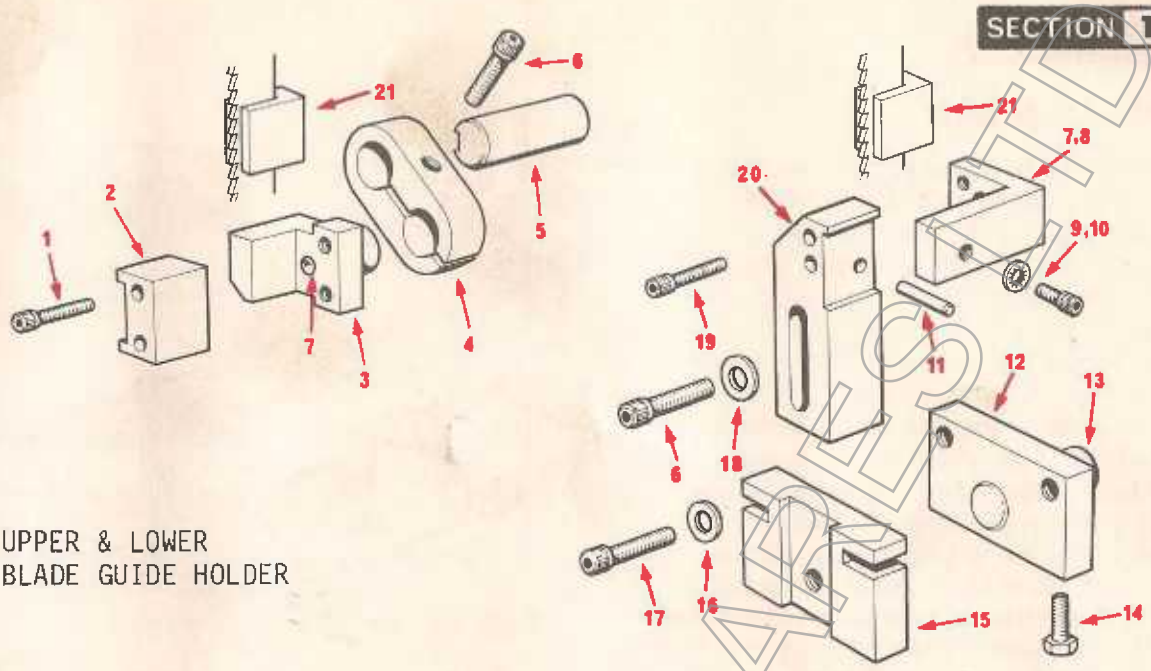
INCORRECT Guide deflecting blade.

CORRECT Guide supporting blade.

INCORRECT Guide deflecting blade.

Fig.5.

A.L.T. SAWS & SPARES LTD
(Startrite Machine Specialist)
Unit 15 Pier Road Industrial Estate
Gillingham
Kent
ME7 1RZ
Tel/Fax: 01634 850833
www.altsawsandspares.co.uk



UPPER & LOWER
BLADE GUIDE HOLDER

UPPER BLADE GUIDE HOLDER - PART No.SP624

ITEM	PART NUMBER	DESCRIPTION	No. OFF
1		Soc.Cap Screw	2
2	4157	Insert Locator	1
3	4158	Stem	1
4	4156	Guide Arm	1
5	4154	Spigot	1
6		Soc.Cap Screw	1
7		Drive Screw Type	1

LOWER BLADE GUIDE HOLDER - PART No.SP712

6		Soc.Cap Screw	1
7		Drive Screw Type	1
8	4326	Insert Locator	1
9		Shakeproof Washer	1
10		Soc.Cap Screw	1
11		Mills Pin GP3	1
12	4324	Back Plate	1
13	4327	Spigot	1
14		Hex.Hd.Screw	2
15	4325	Stem Holder	1
16		Std.Washer	2
17		Soc.Cap Screw	2
18		Std.Washer	1
19		Soc.Cap Screw	2
20	4323	Stem	1

SOLID GUIDE INSERTS - PART NUMBERS (ITEM 21 - TWO REQUIRED PER SET).

BLADE THICKNESS	BLADE WIDTH 1/8"	3/16"	1/4"	3/8"	1/2"	5/8"	3/4"
.025"	4146	4147	4148	4149	4150		
.032"						4151	4152
.035"			4148/1	4149/1	4150/1		4152/1

SECTION 14

COMBINATION GUIDES.

Combination guides, as the name implies, have two different functions. They can be set in the normal position (see Fig.6) and used for continuous high speed sawing, or they can be set at an angle (see Fig.7) and used for angled sawing. Combination guides will accept either guide inserts or side rollers (see Parts List on page 5). The guides, which are available as an optional extra, utilise standard location points on the machine, and are therefore fully interchangeable with other guides and attachments on all models.

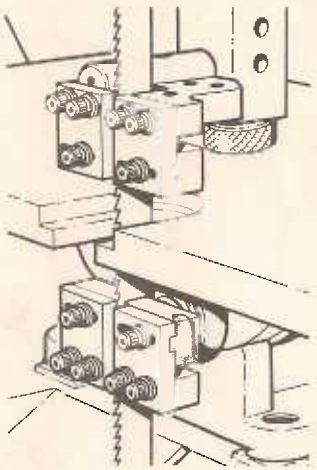


Fig.6.

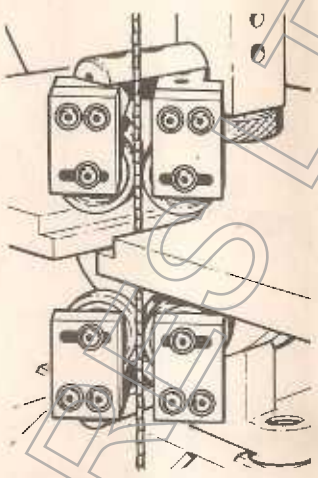


Fig.7.

Assemble the guides to the machine using the standard location points. Fit guide inserts (Item 39) or side rollers (Item 38) to suit width of blade to be used (see Parts List on page 5). Slacken securing screws (Item 36) and position the guide inserts so that they support the blade without deflecting it from a straight line. The arm (Item 30) may be set at an angle to the guide body (Item 32). By this means the saw blade is twisted at an angle of 40° to the axis of the table, so as to overcome the limited capacity of the throat size when sawing across a long narrow workpiece, see Figs.8 & 9. When the guides are used in the angled position, side rollers (Item 38) must be fitted and the saw blade speed should not exceed 300 feet per minute (91 meters per minute).

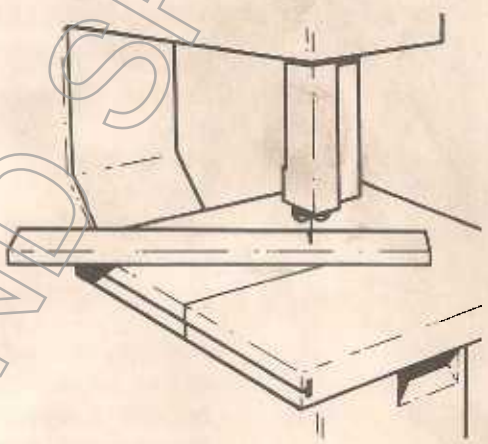


Fig.8.

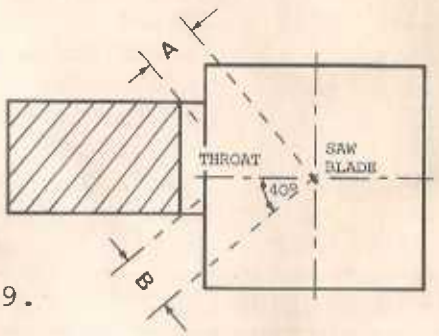
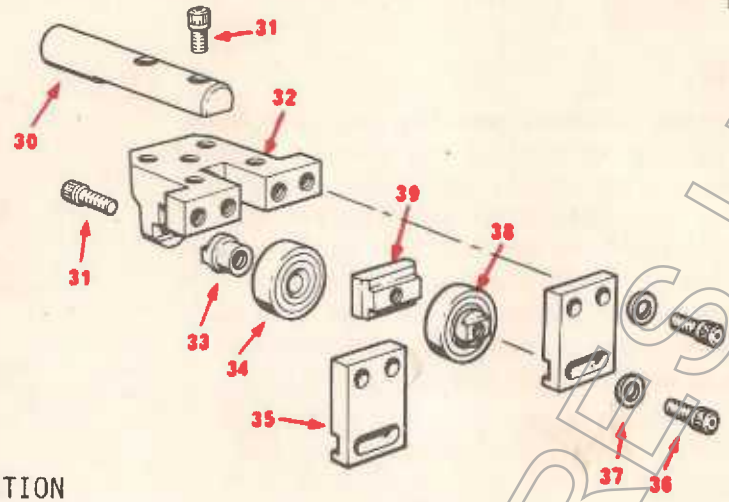


Fig.9.

Approximate throat capacity with saw blade twisted at 40°:-

MACHINE THROAT SIZE	13½"	20"	30"	18"	24"
DIMENSION 'A'	5.9"	11"	18.7"	9.5"	14"
DIMENSION 'B'	7"	11.3"	17.7"	10"	13.9"



COMBINATION
BLADE GUIDES

COMBINATION BLADE GUIDE ASSEMBLY - PART No.SP290

NOTE : Two SP290 Combination Blade Guide Assemblies required per machine. Quantities shown below are for TWO assemblies.

ITEM	PART NUMBER AND DESCRIPTION		No.OFF
30	2563	Arm	2
31		Soc.Cap Screw	6
32	2562	Guide Body	2
33	2565	Bearing Bush	2
34		Ball Race RHP	2
35	2564	Guide Bracket	4
36		Soc.Cap Screw	8
37		Std.Washer	8
	SIDE ROLLERS		
38	SP306	Side Rollers for $\frac{5}{8}$" Blade Width	4
	SP307	" " " $\frac{1}{2}$" " "	4
	GUIDE INSERTS		
39	SP316	Guide Inserts for $\frac{5}{32}$" - $\frac{1}{8}$" Blade Width	4
	SP317	" " " $\frac{1}{4}$" - $\frac{1}{16}$" " "	4
	SP318	" " " $\frac{1}{2}$" - $\frac{3}{8}$" " "	4
	SP319	" " " $\frac{5}{8}$" " "	4

SECTION 14

UNIVERSAL GUIDES.

The universal blade guides, see Fig.10, are most suitable for high speed sawing and general cut-off work where sawing accuracy is not very important. These guides use the same size inserts for all widths of saw blades (see Parts List below). The guides, which are available as an optional extra, utilise standard location points on the machine, and are therefore fully interchangeable with other guides and attachments on all models.

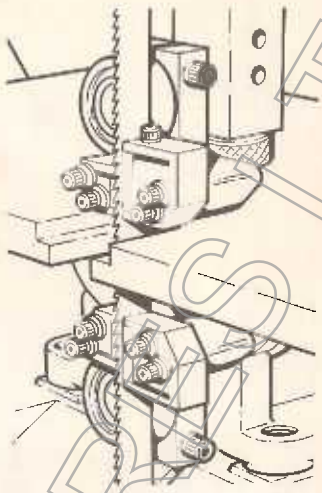
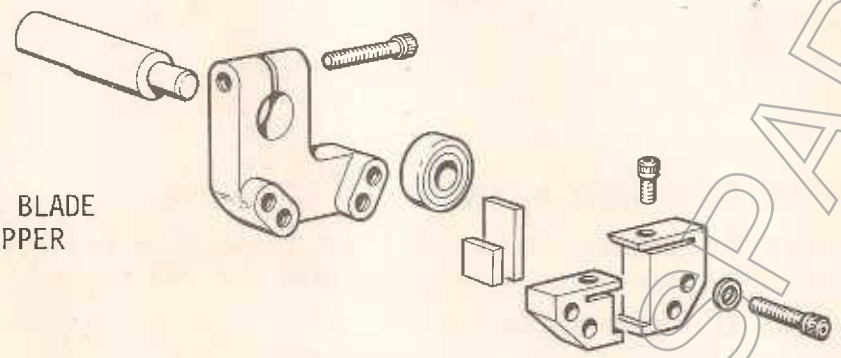
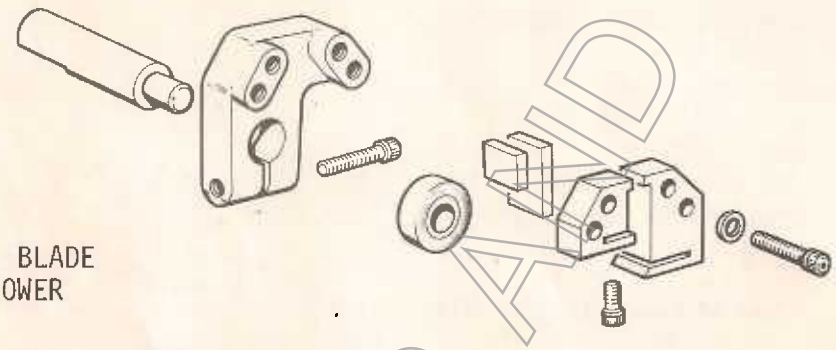


Fig.10.

UNIVERSAL BLADE GUIDE - UPPER



UNIVERSAL BLADE GUIDE - LOWER



UNIVERSAL BLADE GUIDE - UPPER - PART No.SP454
UNIVERSAL BLADE GUIDE - LOWER - PART No.SP455

NOTE : Items 50 to 59 common to SP454 & SP455, quantities shown are for both assemblies.

ITEM	PART NUMBER AND DESCRIPTION		No.OFF
50	3504	Support Arm	2
51		Soc.Cap Screw	2
52		Ball Race	2
53	3512	Guide Insert - Small	2
54	3513	Guide Insert - Large	2
55	3505	Guide Holder - Small	2
56	3506	Guide Holder - Large	2
57		Soc.Cap Screw	4
58		Std.Washer	8
59		Soc.Cap Screw	8
60	3507	Guide Body - Upper -	1
61	3508	Guide Body - Lower -	1

SAW AND SPEED SELECTION CHART.

MATERIAL	WATER TO STARCOOL RATIO		MATERIAL THICKNESS			
			UNDER ¼"	¼"-½"	½"-1"	OVER 1"
ANALINE FORMALDEHYDE	-	FPM TPI	3500 18	3200 14	3000 10	2900 3S
ALUMINIUM - Die Casting	20	FPM TPI	1500 18	1200 10	900 8	750 6S
ALUMINIUM - Sand Cast Alloy	20	FPM TPI	1200 18	1000 14	800 10	600 6S
ALUMINIUM - Rolled & Extruded Sections	20	FPM TPI	2500 18	2000 10	1500 8	1400 6S
ASBESTOS - Corrugated	-	FPM TPI	3000 14	3000 10	3000 6	3000 3S
ASBESTOS - Paper	-	FPM TPI	3000 10	3000 8	3000 6	2800 3S
ASBESTOS - Wall Board	-	FPM TPI	150 14	100 10	100 6	100 3S
BABBIT	20	FPM TPI	2500 18	2000 14	1500 8	1200 6
BAKELITE	-	FPM TPI	2500 14	2300 10	2000 8	1500 6S
BERYLLIUM	-	FPM TPI	175 18	150 14	100 10	75 8
BONE	-	FPM TPI	3500 10	3200 8	3000 6	3000 3S
BRAKE LINING	-	FPM TPI	300 14	250 10	200 8	200 6
BRASS - Cast	-	FPM TPI	350 18	300 14	200 6	150 3S
BRASS - Hard Drawn	-	FPM TPI	360 18	330 14	300 8	280 6
BRASS - Soft Commercial	-	FPM TPI	2500 18	2000 14	1500 8	1300 6
BRONZE - Aluminium	-	FPM TPI	330 18	320 14	300 10	250 6
BRONZE - Manganese	-	FPM TPI	800 18	600 14	350 8	300 6
BRONZE - Phosphor	-	FPM TPI	500 18	350 14	300 8	250 6

Speeds indicated are for Carbon Steel Saw Blades.
(Regular tooth where not stated otherwise.)
H = Hook Tooth S = Skip Tooth SC = Scallop Blade KN = Knife Edge Blade
W = Water FPM = Feet Per Minute TPI = Teeth Per Inch

SAW AND SPEED SELECTION CHART.

MATERIAL	WATER TO STARCOOL RATIO		MATERIAL THICKNESS			
			UNDER ¼"	¼"-½"	½"-1"	OVER 1"
BRONZE - Silicon	-	FPM	1200	900	600	400
		TPI	18	14	10	6
CADMIUM	-	FPM	3500	3200	3000	2800
		TPI	10	8	6H	4H
CARBON	-	FPM	3600	3600	3600	3000
		TPI	18	14	6	3S
CARDBOARD - Corrugated	-	FPM	3500	3500	3000	3000
		TPI	SC	SC	SC	SC
CARDBOARD - Sheet	-	FPM	3000	3000	3000	2500
		TPI	14	10	8	6H
CELLULOSE ACETATE	20	FPM	3500	3500	3000	2500
		TPI	14	10	8	3S
CELLULOSE NITRATE	W	FPM	1500	1200	1100	1000
		TPI	10	8	6S	3S
COPPER - Beryllium	20	FPM	2500	2500	1600	1200
		TPI	14	10	6	3S
COPPER - Hard Drawn	20	FPM	800	700	550	400
		TPI	18	14	10	6H
COPPER - Commercial Pure	20	FPM	3200	3000	2700	2500
		TPI	18	14	6	3S
CORK	-	FPM	3500	3500	3500	3500
		TPI	14	10	6H	4H
ETHYL CELLULOSE	W	FPM	3500	3000	2500	2000
		TPI	10	8	6	3S
FIBER BOARD	-	FPM	2500	1500	1100	1000
		TPI	18	14	10	6
FORMICA	-	FPM	3500			
		TPI	18			
FRONTIER METAL	20	FPM	800	750	700	600
		TPI	18	14	8	3S
GLASS BONDED MICA	-	FPM	75	75	50	50
		TPI	18	14	10	8
GLASS FIBER	-	FPM	1000	1000	1000	1000
		TPI	18	14	10	6H
GRAPHITE	-	FPM	3000	3000	3000	2500
		TPI	18	14	10	4H

Speeds indicated are for Carbon Steel Saw Blades.
(Regular tooth where not stated otherwise.)
H = Hook Tooth S = Skip Tooth SC = Scallop Blade KN = Knife Edge Blade
W = Water FPM = Feet Per Minute TPI = Teeth Per Inch

SAW AND SPEED SELECTION CHART.

MATERIAL	WATER TO STARCOOL RATIO		MATERIAL THICKNESS			
			UNDER ¼"	¼"-½"	½"-1"	OVER 1"
HORN - Animal	-	FPM TPI	2500 24	2000 18	1500 14	1200 10
IRON - Grey Cast	-	FPM TPI	200 24	150 18	125 14	100 10
IRON - Malleable	-	FPM TPI	275 18	260 14	230 10	200 6
IRON - Meehanite	-	FPM TPI	150 18	130 14	120 10	110 6
LEAD	20	FPM TPI	3000 18	2500 14	1800 10	1200 6S
LEATHER	-	FPM TPI	3500 14	3200 10	3000 6	2800 3S
LINEN	-	FPM TPI	3500 KN	3500 KN	3500 SC	3500 SC
MAGNESIUM	W	FPM TPI	3500 14	3300 10	3200 6H	3000 4H
MICA	-	FPM TPI	225 18	225 14	200 10	200 8
MONEL	-	FPM TPI	150 18	125 14	50 8	50 6H
NEOPRENE	-	FPM TPI	3000 10	2800 8	2500 6	2300 4H
NICKEL SILVER	20	FPM TPI	300 18	250 14	200 10	180 6
PAPER - Sheet	-	FPM TPI	3000 18	3000 14	2500 10	2500 6H
PAPER - Tissue	-	FPM TPI	3500 SC	3500 SC	3500 SC	3000 SC
PAPIER MACHE	-	FPM TPI	3500 KN	3500 10	3000 6H	3000 4H
PERSPEX	20	FPM TPI	3500 14	3500 10	3000 6	2500 3S
PHENOL FORMALDEHYDE	-	FPM TPI	3500 14	3500 10	3000 6	3000 3S
PLEXIGLASS	-	FPM TPI	3500 14	3500 10	3000 6	2500 3S

Speeds indicated are for Carbon Steel Saw Blades.
(Regular tooth where not stated otherwise.)
H = Hook Tooth S = Skip Tooth SC = Scallop Blade KN = Knife Edge Blade
W = Water FPM = Feet Per Minute TPI = Teeth Per Inch

SAW AND SPEED SELECTION CHART.

MATERIAL	WATER TO STARCOOL RATIO		MATERIAL THICKNESS			
			UNDER ¼"	¼"-½"	½"-1"	OVER 1"
POLYSTYRENE	-	FPM	3000	2500	2000	2000
		TPI	10	8	6	3S
RUBBER - Crepe	-	FPM	3500	3500	3500	3000
		TPI	10	8	6	6S
RUBBER - Hard	-	FPM	3000	2800	2500	2300
		TPI	10	8	6	4H
SILVER	20	FPM	2800	2400	2200	2000
		TPI	18	14	10	6
SLATE	-	FPM	750	700	600	500
		TPI	18	14	10	6
STEEL - Carbon Case Hardening SAE 1010 1012 1016 EN32A/B	20	FPM	180	160	150	140
		TPI	24	14	10	6H
STEEL - 0.2% Carbon SAE 1018 - 1023 EN3	20	FPM	240	210	180	160
		TPI	24	14	10	6H
STEEL - Carbon Manganese SAE 1024 1027 EN14	20	FPM	240	220	200	175
		TPI	18	14	10	6
STEEL - 0.3% Carbon SAE 1029 1030 EN5	20	FPM	230	200	180	160
		TPI	24	14	10	6
STEEL - 0.4% Carbon SAE 1037 - 1040 EN8	20	FPM	200	150	125	100
		TPI	24	14	10	6
STEEL - 0.55% Carbon SAE 1054 1055 EN9	20	FPM	200	150	125	100
		TPI	24	14	10	6H
STEEL - Low Carbon Free Cutting SAE 1111-1113 1211-1213 1215 EN1	20	FPM	250	220	200	180
		TPI	18	14	10	6H
STEEL - Case Hard Free Cutting SAE 1115 1117 EN32M,202	20	FPM	200	190	180	160
		TPI	24	14	10	6
STEEL - 0.4% Carbon Free Cutting SAE 1137-1141 EN8M	20	FPM	230	200	180	160
		TPI	24	14	10	6
STEEL - 3% Nickel SAE 2317-2330-2345 EN33,51	20	FPM	150	125	100	90
		TPI	18	14	10	6H
STEEL - 1% Chrome Molybdenum SAE 4130-4140 EN19,20	20	FPM	150	100	90	60
		TPI	18	14	10	6H
STEEL - 1½% Nickel Chrome Moly SAE 4340 EN24	15	FPM	150	125	100	75
		TPI	18	14	10	6H
STEEL - 2% Nickel Molybdenum SAE 4640 EN160	15	FPM	150	125	100	75
		TPI	18	14	10	6H

Speeds indicated are for Carbon Steel Saw Blades.
(Regular tooth where not stated otherwise.)
H = Hook Tooth S = Skip Tooth SC = Scallop Blade KN = Knife Edge Blade
W = Water FPM = Feet Per Minute TPI = Teeth Per Inch

SAW AND SPEED SELECTION CHART.

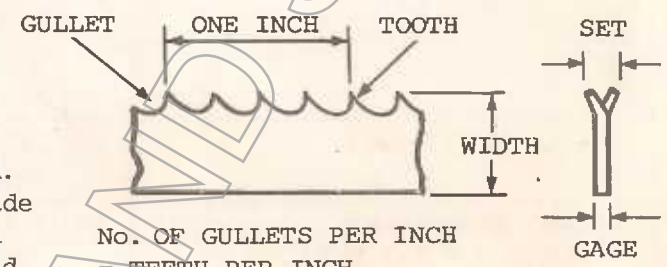
MATERIAL	WATER TO STARCOOL RATIO		MATERIAL THICKNESS			
			UNDER ¼"	¼"-½"	½"-1"	OVER 1"
STEEL - 1% Chrome Vanadium SAE 6150 EN47	15	FPM TPI	175 18	125 14	100 10	75 6H
STEEL - Nickel Chrome Moly SAE 8616-8645 EN100	20	FPM TPI	140 18	110 14	90 10	70 6H
STEEL - Silicon Manganese SAE 9255 EN45	20	FPM TPI	160 18	140 14	125 10	100 6H
STEEL - 3% Nickel Chrome SAE 9310-9217 EN36	15	FPM TPI	125 18	100 14	80 10	60 6H
STEEL - 1% Carbon Chrome SAE 50100-52100 EN31	15	FPM TPI	160 24	130 14	100 10	75 6H
STEEL - Die D-2 D-3	15	FPM TPI	125 18	100 14	80 10	60 6H
STEEL - Die D-7	15	FPM TPI	100 24	80 18	65 10	60 6H
STEEL - Hot Working H-12 H-13 H-21	15	FPM TPI	125 18	100 14	75 10	60 6H
STEEL - Tool L-6 L-7	15	FPM TPI	115 18	95 14	80 10	65 8
STEEL - High Speed M-1	20	FPM TPI	185 18	150 14	125 10	90 6H
STEEL - High Speed M-2 M-3 M-4 M-5 M-10	15	FPM TPU	130 18	100 14	80 10	60 6H
STEEL - Die O-1 O-2	20	FPM TPI	175 18	150 14	125 10	100 6H
STEEL - Die O-6	20	FPM TPI	210 18	180 14	150 10	120 6H
STEEL - Shock Resisting S-1	15	FPM TPI	125 18	100 14	80 10	65 6H
STEEL - Shock Resisting S-2 S-5	15	FPM TPI	100 18	80 14	60 10	55 6H
STEEL - High Speed T-1 T-2	15	FPM TPI	140 18	110 14	90 10	70 6H
STEEL - High Speed T-4 T-5 T-6 T-8	15	FPM TPI	115 18	95 14	85 10	70 6H
STEEL - Water Hardening	20	FPM TPI	175 18	150 14	125 10	100 6H

Speeds indicated are for Carbon Steel Saw Blades.
(Regular tooth where not stated otherwise.)
H = Hook Tooth S = Skip Tooth SC = Scallop Blade KN = Knife Edge Blade
W = Water FPM = Feet Per Minute TPI = Teeth Per Inch

SAW AND SPEED SELECTION CHART.						
MATERIAL	WATER TO STARCOOL RATIO		MATERIAL THICKNESS			
			UNDER ¼"	¼"-½"	½"-1"	OVER 1"
STRAW BOARD	-	FPM TPI	3500 14	3500 10	3000 8	3000 6S
STRING	-	FPM TPI	3500 SC			
TUFNOL	-	FPM TPI	2500 14	2300 10	2000 6H	1500 6H
WOOD	-	FPM TPI	3600 14	3600 10	3600 6H	3600 4H
ZINC	20	FPM TPI	2500 14	2300 10	2000 6H	1500 6H
Speeds indicated are for Carbon Steel Saw Blades. (Regular tooth where not stated otherwise.) H = Hook Tooth S = Skip Tooth SC = Scallop Blade KN = Knife Edge Blade W = Water FPM = Feet Per Minute TPI = Teeth Per Inch						

SAW TERMINOLOGY.

An understanding of the design and application of the various types of saw blades obtainable is essential if the bandsawing technique is to be fully exploited. Selection of the most suitable blade for the job is very important as a poor choice can lead to much wasted time and money.

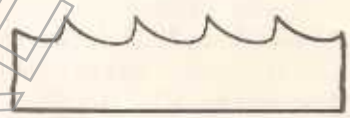


TOOTH PITCH is important if optimum blade performance is to be obtained. Tooth pitch is determined mainly on the basis of material thickness and to some extent on material hardness. For a given material thickness, a tough or abrasive material will require more teeth in engagement than a soft ductile one. Too many teeth in engagement will decrease the tooth loading to the point where the teeth cannot penetrate the material and so skid across the cutting face. The heat generated by friction due to this rubbing action will cause the cutting edges to break down. It is a common error, especially where work hardening materials are concerned, to increase feed pressure so as to make the saw teeth bite under these conditions. This practice will produce a ragged inaccurate cut and rapidly destroy the saw blade. Where there are insufficient teeth in engagement however, they can penetrate the material too quickly to produce a well formed chip. The stubby chip so produced leaves an inclined face where it breaks away from the cutting face and so causes the succeeding tooth to bounce. When this condition is reached, the uneven penetration of the teeth set up periodic vibrations in the form of saw blade chatter. Persistant sawing under these conditions can dull the teeth by impact and in extreme cases, cause the tips of the teeth to break away. The chip produced by each tooth remains trapped in the gullet until it emerges from the underside of the workpiece, therefore as the material thickness

increases, the gullet must accommodate a larger chip. Considerable heat is generated if the chip is compressed into insufficient gullet space and with ductile materials, such chips tend to become welded to the teeth resulting in seizure or breakage of the saw blade.

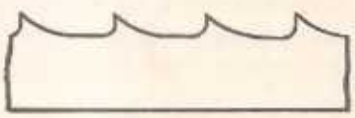
TOOTH FORM refers to the profile of the tooth. Metal cutting bandsaw blades are generally manufactured with one of three basic forms, namely, Regular, Skip, or Hook tooth form. Terminology varies among saw blade manufacturers and these may be otherwise referred to as Precision, Buttress, and Claw tooth respectively.

REGULAR TOOTH saw blades are the most common in 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 accurate fine finish work in steel and most medium hard materials but tend to clog when used on soft or ductile alloys. Standard pitches are 6,8,10,14,18,24 & 32 teeth per inch.

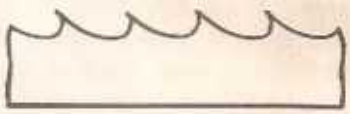


REGULAR TOOTH

SKIP TOOTH form is similar to the regular tooth form but alternate teeth are omitted, a design which allows greater gullet capacity without unduly weakening the body of the blade. Providing the thickness of the material permits, a skip tooth saw blade will give best performance on aluminium and copper alloys. Fast economical sawing of hardwoods and plastics are possible with this type of saw blade. Standard pitches are 3,4 & 6 teeth per inch.



SKIP TOOTH



HOOK TOOTH

HOOK TOOTH form has positive front rake which considerably assists work penetration and hence produces faster cutting times on harder materials. The coarse pitch and large gullets associated with this type of saw blade make it particularly suitable for sawing deep sections. It is not recommended for use on abrasive materials. Standard pitches are 2,3,4 & 6 teeth per inch.

TOOTH SET is the angling of the saw teeth so that the tips protrude beyond the body of the saw blade. The width of the saw cut produced provides the working clearance necessary for the body of the saw blade and permits some degree of steering to negotiate curves.

STANDARD SET teeth are set alternately to the left and to the right, a style which is popular for cutting soft materials and wood.

RAKER SET saw blades have one tooth set to the left and one tooth set to the right followed by one unset tooth. This style of set is widely used and is to be preferred for contour sawing.

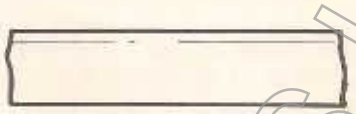
RAKER SET

WAVY SET blades have the teeth alternately set to the left and right in groups or waves. With this formation of tooth set, relatively few teeth are cutting at the side of the kerf and therefore there is some tendency for the saw blade to jam when sawing abrasive materials.

WAVY SET

SAW GAGE is the actual thickness of the body of the saw blade. Some makers produce special gage saw blades for specific purposes but generally saw blades up to and including ½" wide are .025", ⅝" and ¾" wide are .032", and 1" wide are .035" gage thickness.

Knife edge bands are suitable for cutting soft material such as woven fabrics, sponge, rubber, and corrugated cardboard. Where the nature of the material is fibrous and difficult to sever, wavy or scalloped edge blades are better as the teeth provide a more positive cutting action. Typical applications are cutting cork, filter elements, felt and composite materials such as transformer coils. Because these bands separate the material, no dust or swarf is produced and a smooth finish is usually obtained.
Most plastics can be sawn with a metal cutting saw blade. Very little difficulty should be experienced in sawing thermosetting materials, although some have an abrasive nature which shortens the life of a saw blade.



KNIFE EDGE BAND

SCALLOPED EDGE BAND

WAVY EDGE BAND

BLADE WIDTH FOR CONTOUR SAWING.

For contour sawing the width of the saw blade must be chosen with regard to the smallest radius to be sawn, thus a small radius will demand the use of a narrow saw blade. The beam strength and permissible tension decreases rapidly for narrow saw blades and it therefore follows that narrow saw blades are particularly sensitive to excessive stress which will cause stretching and deformation at low speed or premature breakage through fatigue at high speed. Saw blades which fail through abuse of this kind are useless and must be discarded although the teeth may be still in good condition. It is impossible to be precise as to the smallest radius any given saw blade will cut as so much depends on job conditions and the skill of the operator.
The Saw Blade Width Selection Chart below offers a basic guide on this point. Several drilled holes at strategic points around the contour may be necessary to negotiate small radii or cut to a sharp corner.

SAW BLADE WIDTH	⅛"	3/16"	¼"	⅜"	½"	⅝"	¾"
MINIMUM SAWING RADIUS	1/16"	⅛"	1"	1½"	2½"	4"	5¾"

NOTE : Blade width capacity of machines vary according to model.

BANDSAWING PRACTICE.

For straight sawing use the widest saw blade the machine will accept.
The success of a bandsawing operation is determined by the accuracy, finish, blade cost and operating time involved. It is usually possible to improve on one of these factors at the expense of the others, and this may be expressed in general terms as follows :-
Maximum saw blade life : Medium saw blade tooth pitch, speed and feed.
Minimum sawing time : Coarse tooth pitch, fast speed and heavy feed.
Fine accurate finish : Fine tooth pitch, fast speed and light feed.
The foregoing must be interpreted with discretion as there are limits to which the factors involved can be varied.

COMMON SAWING PROBLEMS.

BLADE WANDERS FROM TRUE LINE :

Excessive feed pressure.
Blade teeth dull or of too fine pitch.
Guide inserts not controlling blade through wear or incorrect adjustment.
Blade tracking incorrect.
Loss of set to one side of saw teeth.

PREMATURE BLADE BREAKAGE :

Excessive feed pressure, and/or too much blade tension.
Worn or incorrectly set guides.
Joint improperly welded and annealed.
Blade too wide for curved cut.
Bandwheels worn.
Blade teeth of too fine pitch.

BLADE BOWS IN DEEP CUT :

Excessive feed pressure.
Blade teeth dull or of too fine pitch.
Insufficient blade tension, and/or blade too narrow for depth of cut.
Blade running off at start of cut.

BLADE TEETH DULL RAPIDLY :

Insufficient feed pressure.
Blade pitch too fine.
Guide inserts snagging set of teeth.
Speed too fast.

TEETH TORN FROM BLADE :

Excessive feed pressure.
Gullets of teeth loading.
Pitch of teeth too coarse.
Blade speed too fast.

BLADE DEVELOPING TWIST :

Excessive feed pressure.
Guide inserts snagging blade.
Blade too wide for radius of cut.
Excessive blade tension.
Blade not tracking correctly.
Loss of set to one side of saw teeth.

BLADE VIBRATES IN CUT :

Workpiece not properly seated or securely held.
Blade speed too fast, and/or blade pitch too coarse.
Insufficient blade tension.

DIE MAKING.

By careful drilling it is possible to produce a punch and die from one piece of material, the waste from the die aperture forming the punch, see Fig.1. The chart gives recommended saw blade width, hole sizes, and angles for die thickness of ½" - 3".

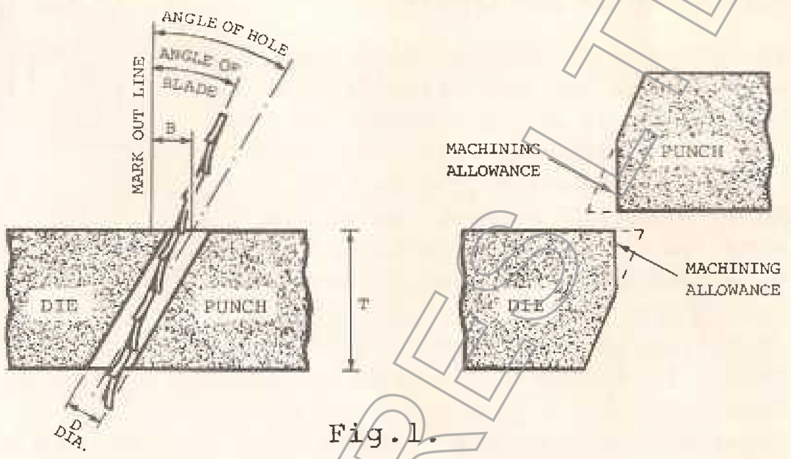


Fig.1.

DIE THICKNESS T.	½"	¾"	1"	1¼"	1½"	1¾"	2"	2½"	3"
BLADE WIDTH B.	⅛"	⅛"	⅛"	3/16"	3/16"	3/16"	3/16"	¼"	¼"
ANGLE OF HOLE	37°	26½°	20½°	24°	20½°	18°	15½°	16½°	14°
HOLE DIA. D.	3/16"	3/16"	3/16"	9/32"	9/32"	9/32"	9/32"	⅜"	⅜"
ANGLE OF BLADE	26½°	18½°	14°	16½°	14°	12°	10½°	11½°	9½°

For other combinations of die thickness and saw blade width calculate the machining geometry as follows :-

Let T = Die Thickness
B = Width of selected saw blade
Then :- Starting hole diameter = $\frac{3B}{T}$
Starting hole center to mark out line = B
Tangent of starting hole angle = $\frac{3B}{T}$
Tangent of saw blade angle = $\frac{2B}{T}$

By following the foregoing formulae, a machining allowance equal to 75% of the saw blade width will be obtained. This allowance may be reduced by slight alteration of the drilling and sawing angles.

TANGENTS OF ANGLES.											
TANGENT	.017	.035	.052	.070	.087	.105	.123	.140	.158	.176	.194
ANGLE	1°	2°	3°	4°	5°	6°	7°	8°	9°	10°	11°
TANGENT	.213	.231	.249	.268	.287	.306	.325	.344	.364	.384	.404
ANGLE	12°	13°	14°	15°	16°	17°	18°	19°	20°	21°	22°
TANGENT	.424	.445	.466	.488	.510	.532	.554	.577	.601	.625	.649
ANGLE	23°	24°	25°	26°	27°	28°	29°	30°	31°	32°	33°
TANGENT	.675	.700	.727	.754	.781	.810	.839	.869	.900	.933	.966
ANGLE	34°	35°	36°	37°	38°	39°	40°	41°	42°	43°	44°

SECTION 17

BUTT - WELDING SAW BLADES.

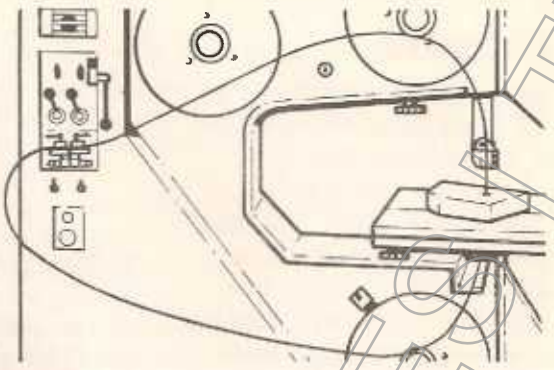


Fig.2.

The process of butt-welding consists of clamping the saw blade between two sets of jaws, one set fixed and the other set moveable. The ends of the blade are heated by the passage of a heavy electric current and at the same time, they are forced together by a pre-determined amount under spring pressure. The blade welding unit enables the operator to rejoin broken blades or to produce new bands from bulk coil blade strip as required. Internal contours may be sawn after passing one end of the blade strip through a starting hole, then making the joining weld, see Fig.2.

PREPARING THE SAW BLADE.

Cut the saw blade to length using the blade shear attached to the front of the welder. The shear is operated by moving the handle upwards. With coarse pitch blades, the blade should be sheared in line with the tooth point in order to maintain a uniform tooth pitch after welding. It is important that the ends of the blade are sheared square in both planes. To achieve this the blade is to be inserted in the shears with the teeth facing to the front. The back edge of the blade must seat against the back of the shears and against the alignment stop. Thoroughly clean each end of the blade with emery for a distance of 1½" until bright metal shows over the whole width of the blade. Make sure the clamping jaws of the welder are free from dirt and grease.

WELDING.

A diagram of the butt-welder is given in Fig.3. Adjust the welding current, up-set way and up-set pressure according to saw blade width. Place the prepared ends of the blade into position by means of the clamping screws, making sure that the two ends of the blade butt together at a point mid-way between the jaws. In order to avoid damage to both jaws and blade, it is important that the blade teeth face forward against the front stops. Turn the up-set way lever to the position marked WELD and hold it there until the weld is finished. The current is switched off automatically at the completion of the welding operation. After welding, slacken the clamping screws.

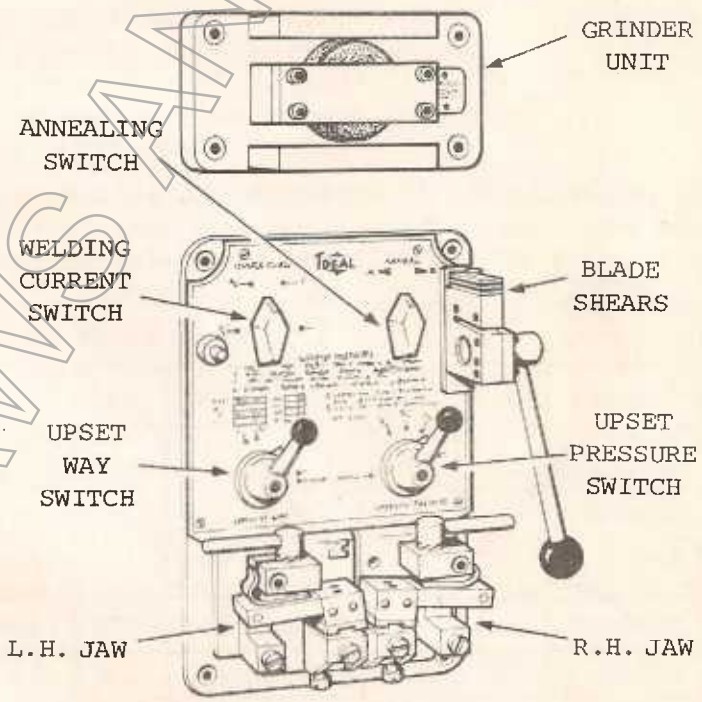


Fig.3.

CAUTION :
Sparks may fly during welding, therefore it is advisable to protect the face.

ANNEALING.

A join produced by welding alone is brittle and would break after very little service. In order to overcome this the blade join must be annealed by a second operation. Set the up-set way swich to the ANNEAL position. Re-clamp the blade with the weld midway between the jaws. Press the anneal button continuously until the weld is a dark cherry red. This process should be repeated a few seconds at a time letting the heat go slowly. Gradually reduce the length of time that the button is depressed as the process proceeds.

FINISHING.

The excess weld flash must be removed by grinding, some care being taken to maintain a uniform blade thickness.
The gullets of the teeth adjacent to the weld should be cleaned out as necessary. After the weld has been dressed in this fashion, anneal the joint to a pale blue color.

POSSIBLE FAULTS.

If the weld has run too much or even shows holes, then the proportion of up-set pressure to welding is incorrect. In such a case increase the up-set pressure or decrease the welding current, it may be necessary to do both. If however, the up-set pressure is too great and the welding current too small, the weld will have the appearance of loose layers.

NOTE : Operating characteristics may vary slightly according to supply voltage therefore it may be necessary to use an alternative setting in order to achieve optimum results.

CARE OF THE BUTT - WELDING UNIT.

The most important part of the care of the welder is the careful handling of the bronze jaws. It is impossible to obtain satisfactory welds with dirty or uneven jaws. Any drops of weld, or dirt which may have entered the jaws should be removed immediately. From time to time check the clamps for uniform clamping pressure as follows :- Place in position as for annealing, a clean smooth band (blade with set of teeth removed) as wide as the jaws. Upon operation of the annealing button, the band should become simultaneously and uniformly red over the whole width. If this is not the case, inspect the clamps for any foreign matter which may have entered. If the jaws and pressure faces appear clean, it will be necessary to dress the pressure faces where the band heats most quickly bearing in mind that the band heats less quickly where the clamping pressure is least. The pressure faces should be dressed in line with fine emery wrapped around a piece of wood. Take care to thoroughly clean away emery dust. The bronze jaws should not be filed. The moving jaws are mounted on a sensative ball bearing track and therefore should not be forced in any way.

CARE OF THE GRINDING UNIT.

The grinding motor will produce excessive whine if allowed to run with an unbalanced wheel. Dress new wheel upon replacement and if necessary, adjust wheel clamping washer to run eccentric in order to improve dynamic balance. Dress periphery of wheel occasionally to remove embedded swarf.

Wheel size : 63 mm. Dia. x 15 mm. Wide x 10 mm. Bore
Grade : A 46 PV
Max. speed : 3000 r.p.m. Synchronous

AIR/SPRAY COOLANT KIT.

Fig.1 shows the air/spray coolant kit (Part No.PK115) fitted to a machine. The coolant is delivered through a drip feed system, which works in conjunction with an air pump driven from the main motor. The spray nozzle should be positioned as close as is convenient to the saw blade with the air jet impinging on the teeth at the point of entry into the workpiece. Apart from cooling and lubricating the saw teeth, the air/spray assists in cleaning the saw gullets and removes swarf ahead of the saw cut to facilitate following a marked line. A solution of one part STARCOOL soluble cutting oil with twenty parts water will prove suitable for machining most materials where a coolant is required. The necessary quantity to be applied is quite small and generally be no more than can be evaporated and carried away by the chips. Pools of coolant forming on the job and table serve no useful purpose and usually indicate that excessive coolant is being used.

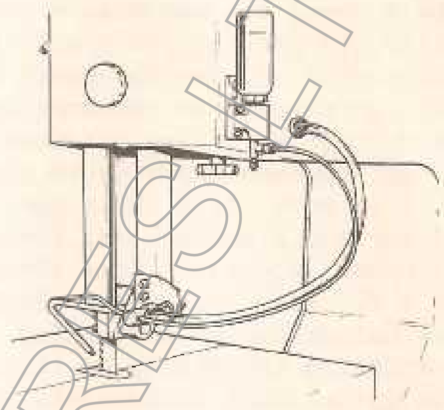


Fig.1.

NOTE : DILUTED STARCOOL SOLUBLE CUTTING OIL IS THE ONLY RECOMMENDED COOLANT. USE OF OTHER OILS MAY CAUSE DIFFICULTY IN OPERATION, AND IN SOME CASES, DAMAGE TO PARTS OF THE MACHINE.

CIRCLE CUTTING ATTACHMENT.

Fig.2 shows the circle cutting attachment (Part No.SP260) in use on a machine, which facilitates the production sawing of circular blanks up to 18" dia. The unit is easily fitted to the tool post and thus may be raised and lowered when feeding blanks without disturbing the setting of the location pin. A drilled or punched location point will be required in each blank, the location being positioned at a distance equal to the sawing radius from one edge. Sufficient material should be allowed on the other sides of the blank to prevent the blade emerging from the cut until the full circle has been completed. Select the blade width according to the radius to be sawn. The location pin must be set to lie tangential to the blade otherwise blade wander will result. If the blade tends to cut away from a true circle, the pin position is incorrect, or possibly the blade is too wide.

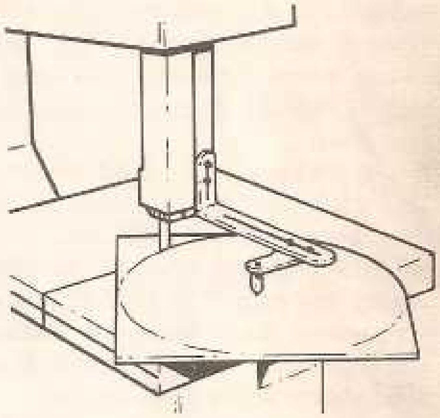


Fig.2.

RIP FENCE.

Fig.3 shows the rip fence (Part No. SP302) in use on a machine. It can be used for making accurate parallel cuts using hand feed, or as a work stop using power feed.

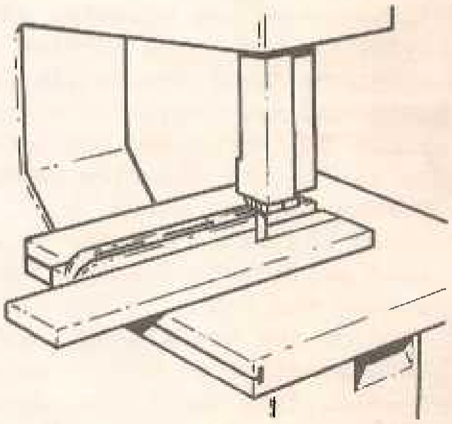


Fig.3.

BANDFILE GUIDE.

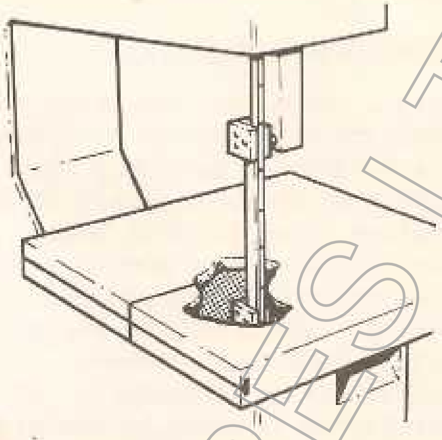


Fig.4.

Fig.4 shows the bandfile guide (Part No. SP287) in position on a machine, which adapts the machine for power filing. Band filing presents an economic method of production machining straight and contour faces. Because there is no tendency for the file to rock, wide faces can be finished to fairly close tolerances. Bandfiles consist of short lengths of file sections attached to a flexible steel band which has a joint for unlocking and re-joining, thus permitting the filing of internal contours. The guides will accommodate standard files of ¼", ⅜", or ½" width.
To set up the machine for bandfiling :-
Remove the saw blade, blade guides, blade guard and table insert. Assemble back guide and spacers to suit width of file to be used. Insert the support arms into the same holes as used to locate the blade guides. Mount the band file on the bandwheels with the teeth facing downwards through the table, and track in a similar way to a saw blade. Apply only sufficient tension to keep the fileband on the bandwheels without it slipping. NOTE : EXCESSIVE TENSION WILL DAMAGE THE BAND. Position the bandfile back guide just clear of the back fence of the band. Fit special table insert provided.
WARNING : An incorrectly adjusted file guide may prevent the file segments from interlocking in the correct manner and thus result in the segments being torn from the backing band. It is important that a new bandfile is only lightly loaded when first used in order to allow the file segments to bed down.
Use a filing speed of around 60 feet per minute for die steel, and up to 120 feet per minute for mild steel. Speeds in excess of 300 feet per minute may damage the bandfile.
Embedded swarf should be periodically removed to prevent the workpiece being scored. This problem can be reduced by a light application of tallow or chalk. Care must be taken to avoid kinking the backing band in storage and for this reason, the bandfile should be stored in its original container when not in use.

ABRASIVE BAND GUIDE.

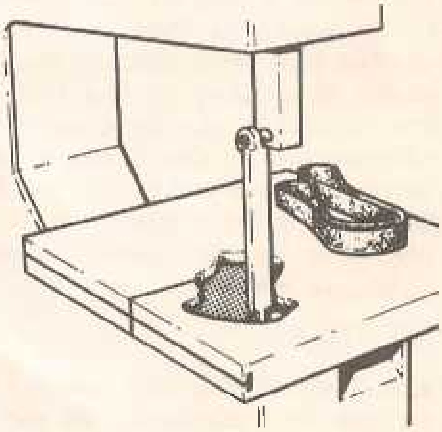


Fig.5.

Fig.5 shows the abrasive band guide (Part No. SP298) set up on a machine. One inch wide abrasive bands are available in 40,80 or 120 grit and are ideal for a large variety of small finishing and deburring operations.
To set up the abrasive band guide :-
Remove the saw blade, blade guides, blade guard and table insert. Assemble abrasive band guide into the same holes as used to locate the blade guides. Mount the abrasive band on the bandwheels, with the joint of band overlap (on the abrasive side) to face upwards from the table. Apply tension as for a ¼" wide blade. Align face of guide to back of band. Use highest blade speed available.

PUSHER ATTACHMENT.

Fig.6 shows the pusher attachment (Part No. SP198) in use on a machine. The pusher provides an easy means of feeding and controlling the workpiece.

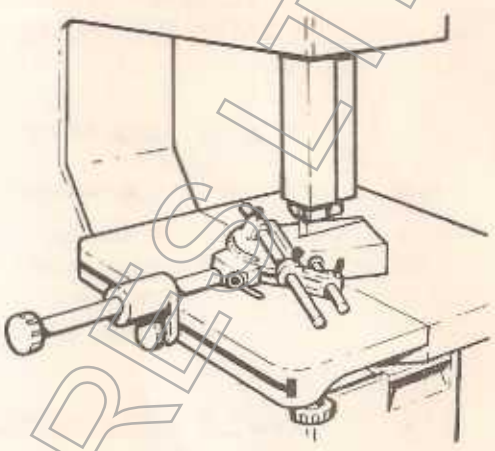


Fig.6.

GEARED PUSHER ATTACHMENT.

Fig.7 shows the geared pusher attachment (Part No. SP46) in use on a machine. On machines with fixed tables some mechanical advantage may be obtained by using this equipment. The geared pusher attachment is clamped to the front table flange and provides a practical means of applying feed pressure with a high degree of control.

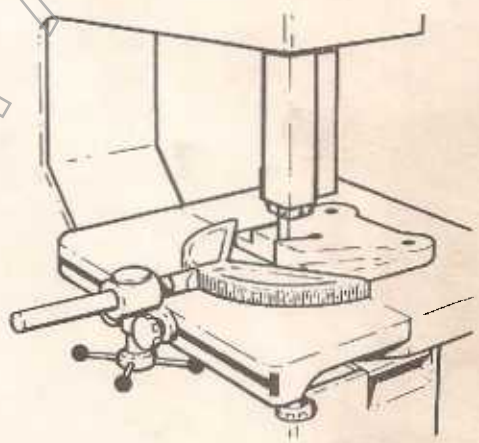


Fig.7.

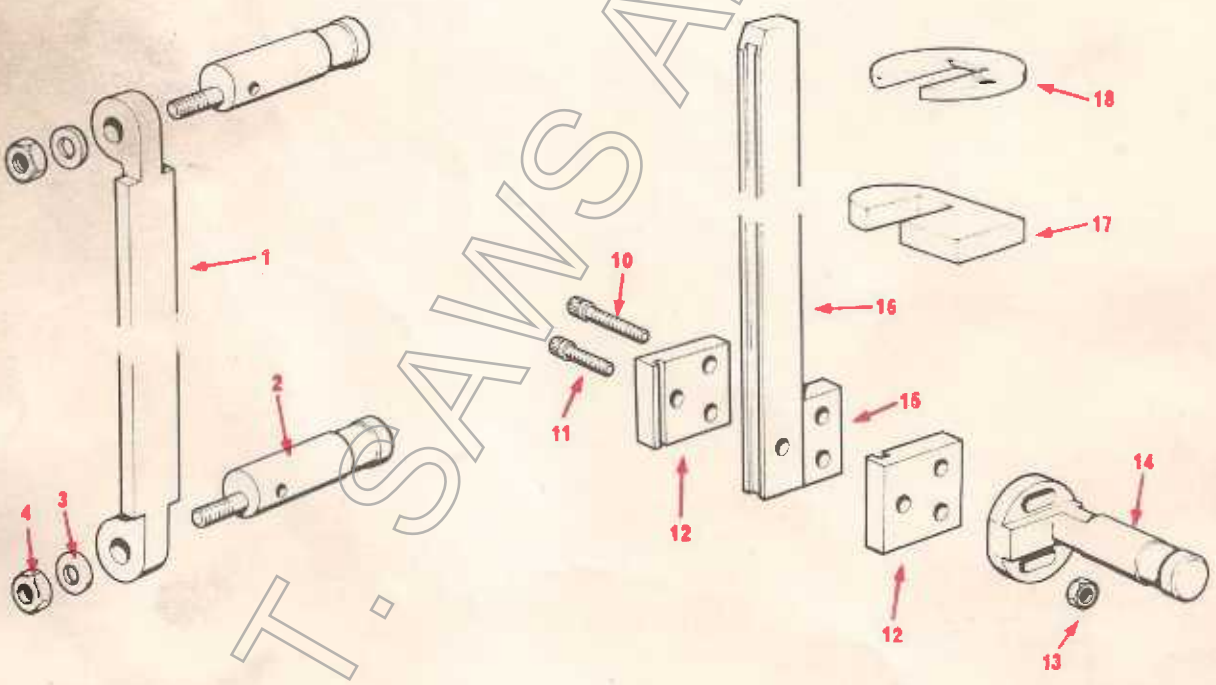
PARTS LISTS & ILLUSTRATIONS
FOR OPTIONAL EXTRA EQUIPMENT.

ABRASIVE BAND GUIDE ASSEMBLY - PART No.SP298

ITEM	PART NUMBER AND DESCRIPTION		No. OFF
1	2426	Back Guide	1
2	2425	Support Arm	2
3		Std.Washer	2
4		Std.Nut	2

BANDFILE GUIDE ASSEMBLY - PART No.SP287

10		Soc.Cap Screw	4
11		Soc.Cap Screw	1
12	1984	Edge Guide	4
13		Std.Nut	4
14	2377	Guide Bracket	2
15	1990A	Spacer for	2
	1990B	" "	2
	1990C	" "	2
16	1989A	Back Guide for	1
	1989B	" " "	1
	1989C	" " "	1
17	2422	Table Insert (Split Table Machines)	1
18	3134	Table Insert (Fixed Table Machines)	1



ABRASIVE BAND GUIDE

BANDFILE GUIDE

CIRCLE CUTTING ATTACHMENT - PART No.SP260

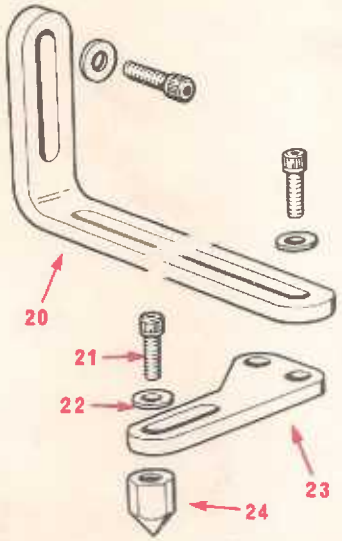
ITEM	PART NUMBER	AND DESCRIPTION	No.OFF
20	2545	Arm	1
21		Soc.Cap Screw	5
22		Std.Washer	5
23	2544	Bracket	1
24	2543	Location Pin	1

AIR/SPRAY COOLANT KIT - PART No.PK115

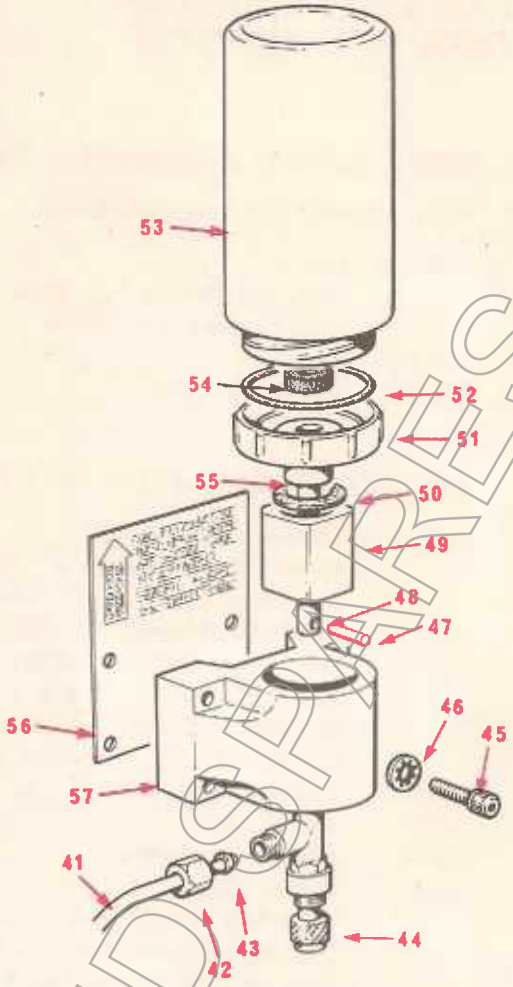
40	SP679	Coolant Tube	1
41		Nylon Tube Black	1
42		Nut Simplifix	1
43		Ferrule Simplifix	1
44		Metering Valve Simplifix	1
45		Soc.Cap Screw	4
46		Shakeproof Washer	4
47		Mills Pin GP3	1
48	4202	Valve Stem	1
49	4200	Valve Body	1
50	1209	Sealing Washer	1
51	4203	Screw Cap	1
52		'O' Ring	1
53		Polypropylene Bottle	1
54		Tap Washer Neoprene	1
55	4201	Bush	1
56	4204	Instruction Plate	1
57	4199	Mounting Bracket	1

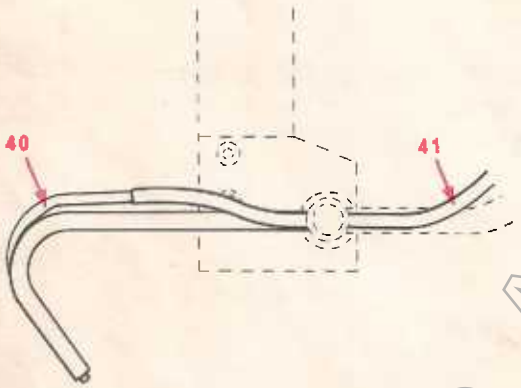
RIP FENCE ASSEMBLY - PART No.SP302

60	1205	Fence	1
61	2575	Spring	1
62	1114	Special Washer	1
63	1143	Locking Handle	1
64		Mills Pin GP3	1
65	1112	Adjustment Collar	1
66	1111	Locking Handle	1
67	1206	Bracket	1
68	3229	Stud	1
69	2842	Tenon Nut - Small	2
70	2841	Stud	1
71	1113	Adjustment Screw	1

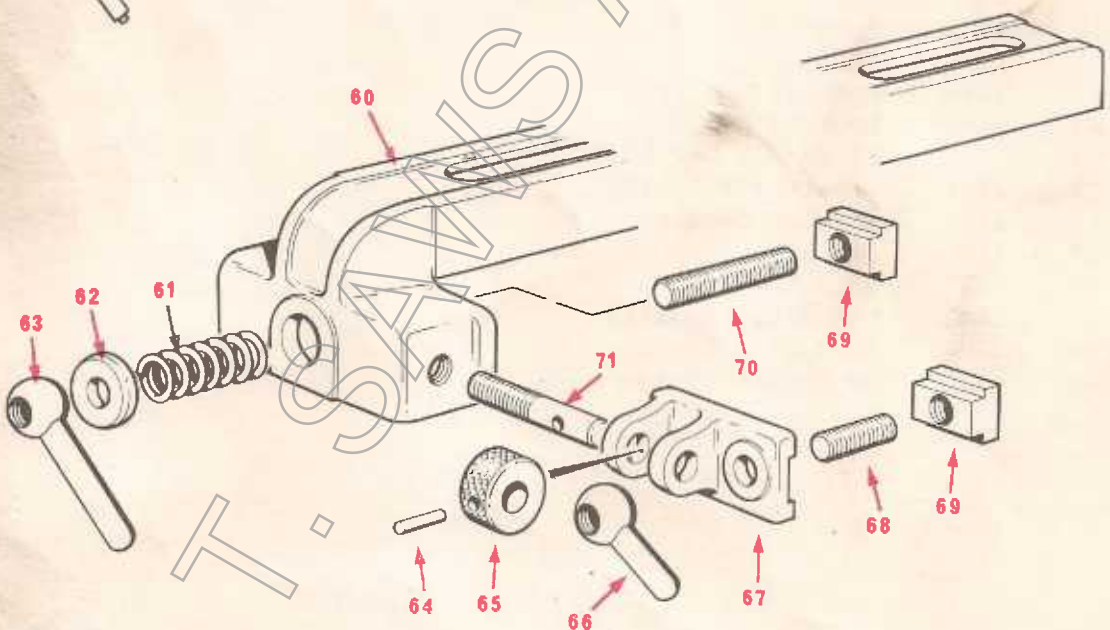


CIRCLE CUTTING
ATTACHMENT





AIR/SPRAY COOLANT KIT



RIP FENCE

PUSHER ATTACHMENT - PART No.SP198

ITEM	PART NUMBER AND DESCRIPTION		No. OFF
80	1822	Slide Shaft	1
81	1507	End Stop Bracket	1
82		Soc.Grub Screw	1
83	1388	Zero Plate	1
84		Drive Screw Type	2
85	1513	Indicator Scale	1
86		Rd.Hd.Screw - Recessed	2
87		Thumb Screw Type	3
88	1526	Stop Rod	1
89	1837	End Stop	1
90		C'sk.Screw - Slotted	2
91	1821	Wood Facing Plate	1
92	1511	Protractor Body	1
93	1820	Special Nut	1
94		Lock Nut	1
95	1514	Cradle	1
96	1499	Compression Spring	1
97	1516	Stud	1
98	1515	Sleeve	1
99	1143	Ball Handle	1
100	2842	Tenon Nut - Small	1
101	3229	Stud	1
102		Std.Washer	1
103	2513	Thumb Knob	1
104		Hand Knob Evans	1
105	2512	Housing	1
106	2514	Shaft	1

GEARED PUSHER ATTACHMENT - PART No.SP46

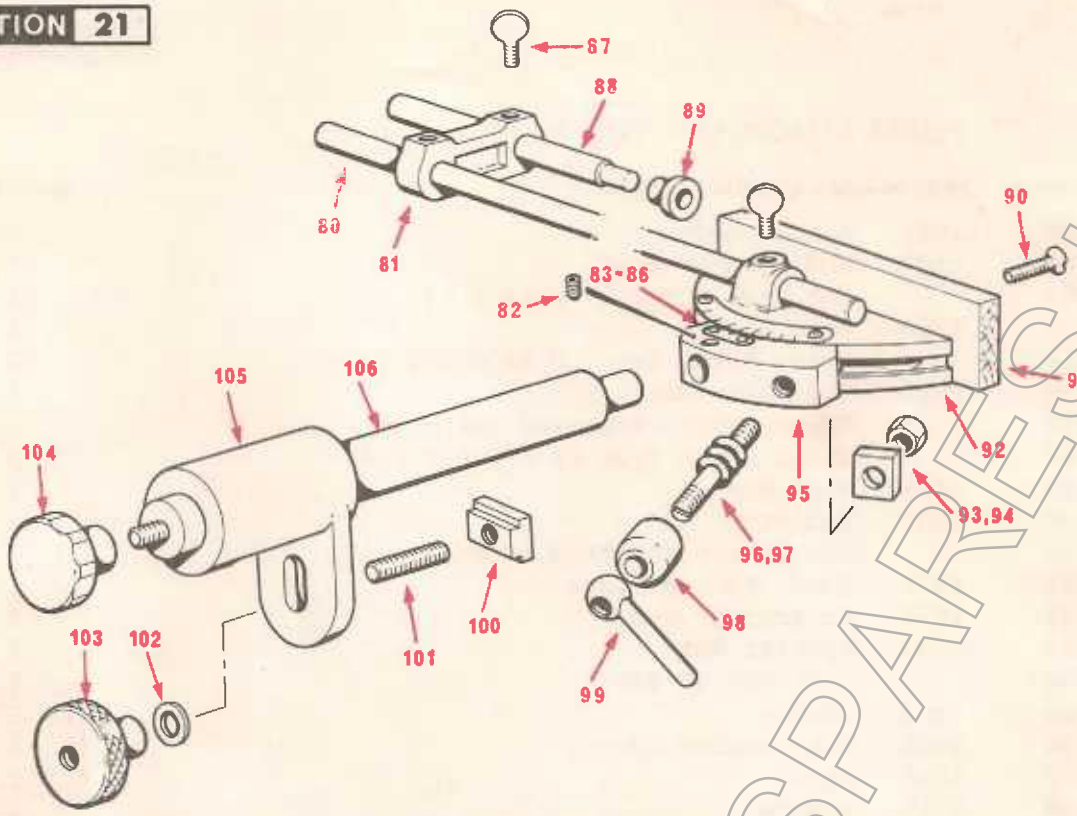
NOTE : Items 80 to 99 of SP198 common to SP46.

110		Rd.Hd.Screw - Recessed	3
111	1525	Cover Plate	1
112	1077	Pinion	1
113	1519	Housing	1
114		Hand Knob	2
115		Mills Pin	1
116	1522	Hub	1
117	1391	Lever	4
118		Ball Knob Rencol Pat	4
119	1524	Rack	1
120	SP351	Tenon Strip	1
121		Soc.Grub Screw	3
122	2057	Pusher Head - Split	1
123	2058	Leaf Spring	1
124	2056	Pusher Head - Solid	1
125	2008	Work Holder	1

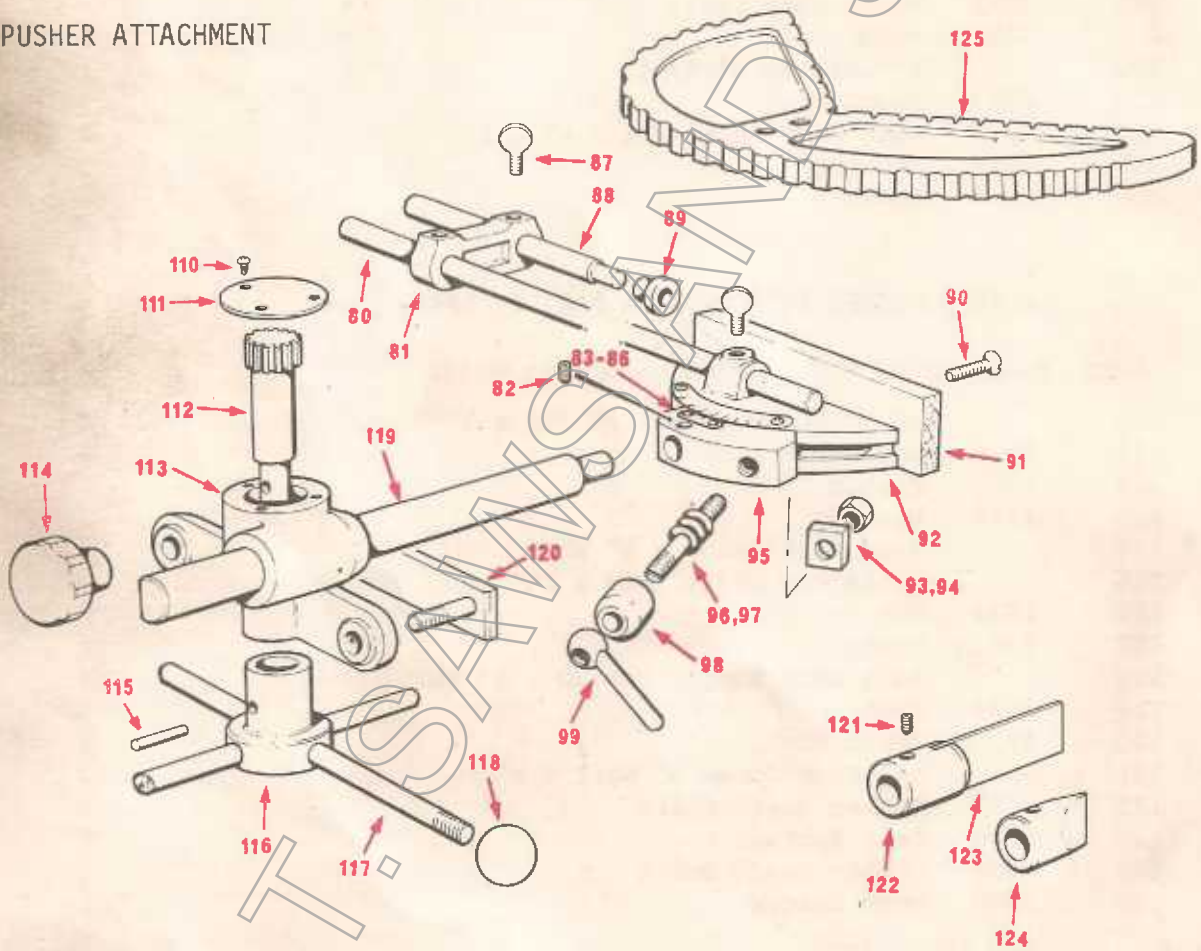
NOT ILLUSTRATED :

	Grease Nipple Tecalemit NC6055	1

SECTION 21



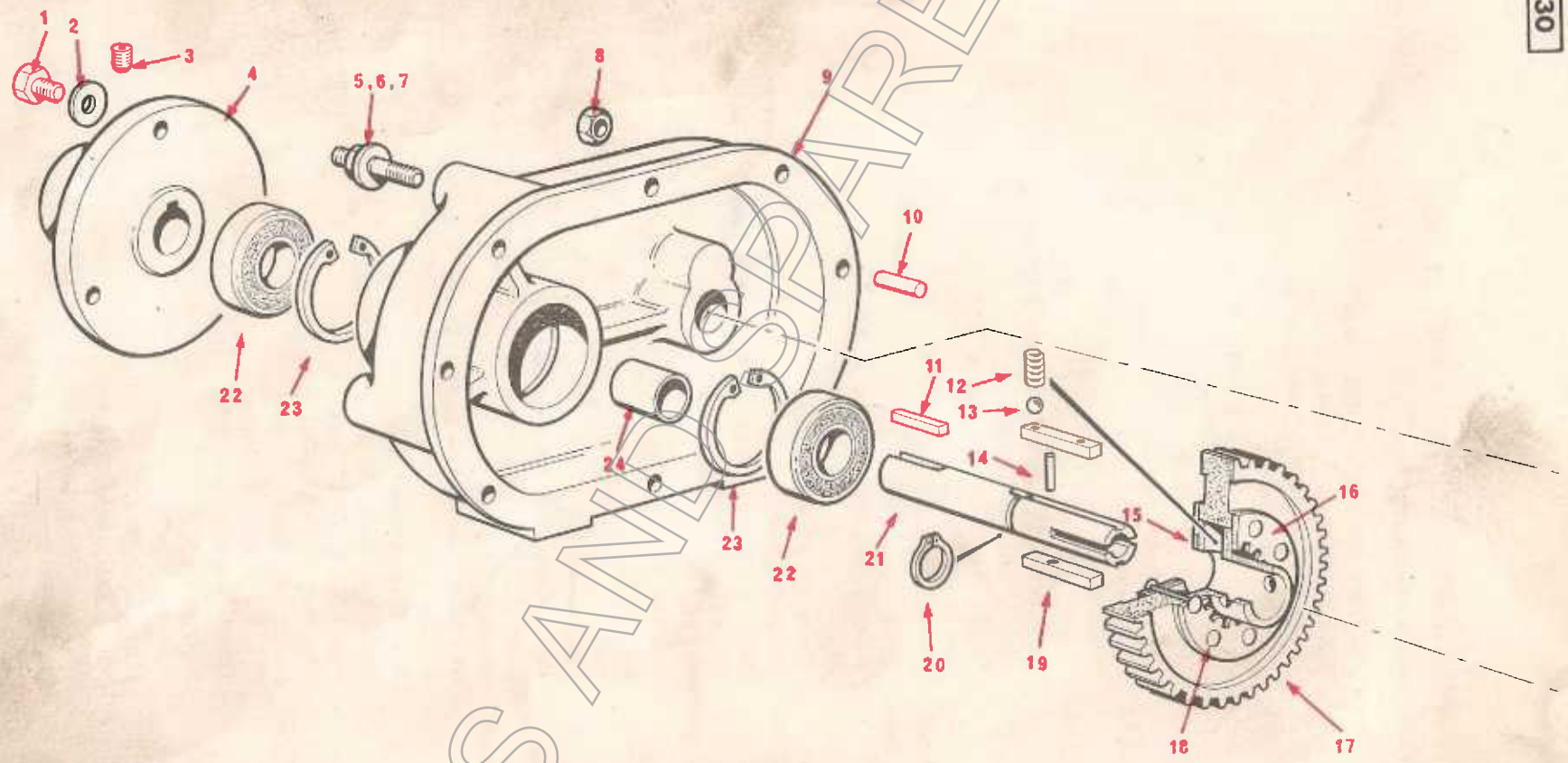
PUSHER ATTACHMENT



GEARED PUSHER ATTACHMENT

10 SPEED GEARBOX ASSEMBLY - PART No.SP681

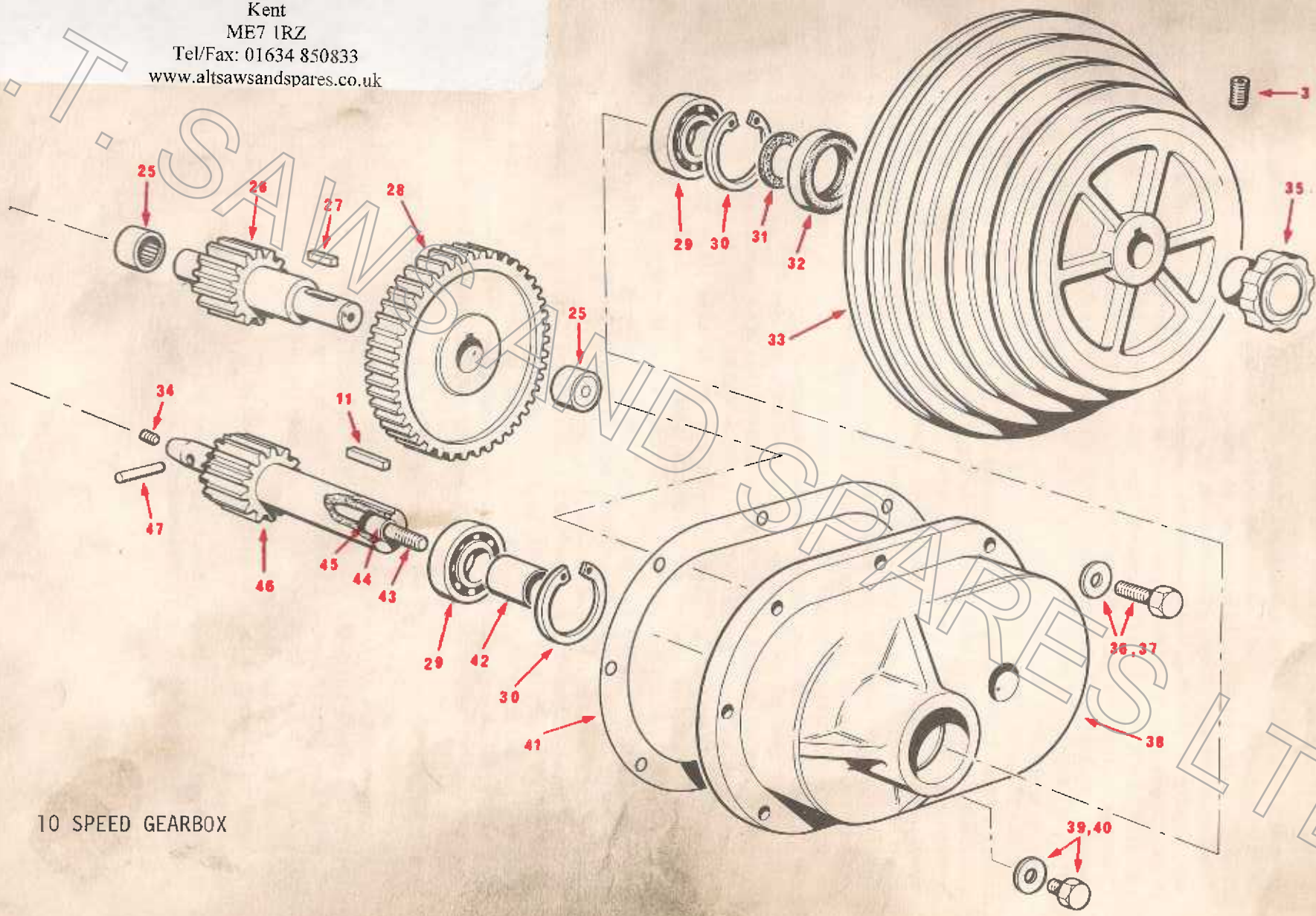
ITEM	PART NUMBER AND DESCRIPTION		No. OFF
1		Hex.Hd.Screw	3
2		Std.Washer	3
3		Soc.Grub Screw	2
4	2561	Bandwheel Hub	1
5		Std.Stud	3
6		Std.Washer	3
7		Std.Nut	3
8		Std.Nut	6
9	4172	Gearbox Housing	1
10		Std.Dowel	2
11	1148	Key	2
12		Compression Spring	1
13		Steel Ball	1
14		Mills Pin GP3	1
15	1036	Liner	1
16	1035	Clutch Plate	1
17	1044	Gear	1
18		Snap Hd.Rivet	8
19	1027	Key	2
20		Circlip	1
21	1029	Output Shaft	1
22		Ball Race -302061	2
23		Circlip	2
24	1030	Spacer	1
25		Needle Bearing	2
26	3253	Layshaft	1
27	1147	Key	1
28	3252	Gear	1
29		Ball Race -302009	2
30		Circlip	2
31	1209	Washer	1
32		Oil Seal	1
33	1228	Pulley	1
34		Soc.Grub Screw	1
35		Handknob Pat.	1
36		Hex.Hd.Screw	6
37		Std.Washer	6
38	4173	Gearbox Cover	1
39		Hex.Hd.Screw	2
40		Fibre Washer	2
41	4223	Gasket	1
42	1031	Spacer	1
43	1037	Control Rod	1
44		Compo Bush	1
45		'O' Ring	1
46	1032	Input Shaft	1
47	1024	Pin	1



10 SPEED GEARBOX

A.L.T. SAWS & SPARES LTD
(Startrite Machine Specialist)
Unit 15Pier Road Industrial Estate
Gillingham
Kent
ME7 1RZ
Tel/Fax: 01634 850833
www.altsawsandspares.co.uk

A.L.T. SAWS & SPARES LTD
(Startrite Machine Specialist)
Unit5 Pier Road Industrial Estate
Gillingham
Kent
ME7 1RZ
Tel/Fax: 01634 850833
www.altsawsandspares.co.uk



10 SPEED GEARBOX

SECTION 30

INSTRUCTIONS FOR DISMANTLING AND RE-ASSEMBLING GEARBOX.

Remove blade and lower bandwheel from the rear of the machine, remove main drive Vee-belt and nuts securing gearbox to body.
Drain oil by removing drain plug at lower end of gearbox casing.
Unscrew handknob (Item 35). Remove two dowels (Item 10), six screws (Item 36) and separate the two halves of the gearbox casing. Lift out layshaft and gear (Items 26 & 28). Pull the control shaft (Item 43) away from the box (Item 9), which will also remove the gear (Item 17) and clutch assembly. (Take care not to lose the spring loaded ball (Items 12 & 13) concealed inside the hub.) Stand the box (Item 9) on its joint face and remove the hub (Item 4) and key (Item 11). Press out the output shaft (Item 21). Remove circlips, spacer and bearings (Items 22,23 & 24).
The shift gear (Item 17) is rivetted to the clutch plate (Item 16) and liner (Item 15). Should it be necessary to replace any of these items, (15,16 & 17) it is recommended that the three items be ordered as pre-assembled. Eight mild steel snap head rivets (Item 18) will be required to re-assemble this unit if individual items are replaced. It is essential that the liner (Item 15) slides freely over the dimpled keys (Item 19), and this point must be checked before re-assembling further. Before final re-assembly insert the spring (Item 12) followed by the steel ball (Item 13) into the hole which opens into the bore of the liner (Item 15). Press the ball into the hole and slide shaft into bore.
Centralize the control rod and continue sliding on the hub assembly until a second click is heard which will indicate that the seating in the dimple in the key and the hub is fully home on the shaft.
If the needle bearings (Item 25) are replaced, take care to ensure that the end of the bearing casing is slightly underflush on re-assembly.
The lid section (Item 38) of the box may be dismantled by first removing the drive pulley (Item 33) and key (Item 11). Press out the input shaft (Item 46). Remove bearings, spacer and circlips (Items 29,30 & 42). Do not damage cork sealing washer (Item 31).
The oil seal (Item 32) may be left undisturbed unless this item is to be replaced. If only the oil seal is to be replaced, it is not necessary to remove the bearing etc. as the old seal may be levered from its seating with the input shaft in position. When re-assembling shaft and oil seal, ensure that the sharp edges of the shaft keyway do not damage the wiping lip of the oil seal.
When the lid section is re-assembled it is important that the following points are observed :-
The threaded end of the control rod must be coated with grease before the rod is inserted into the input shaft. Carefully press the control rod through the 'O' ring seal (Item 45). The pulley must be pressed home and locked in order to compress the cork sealing washer (Item 31) between the faces of the pulley hub and bearing.
Failure to follow this procedure may result in oil leakage along the input shaft.
The two halves of the gearbox may now be re-assembled.
Fill with oil according to maintenance instructions.

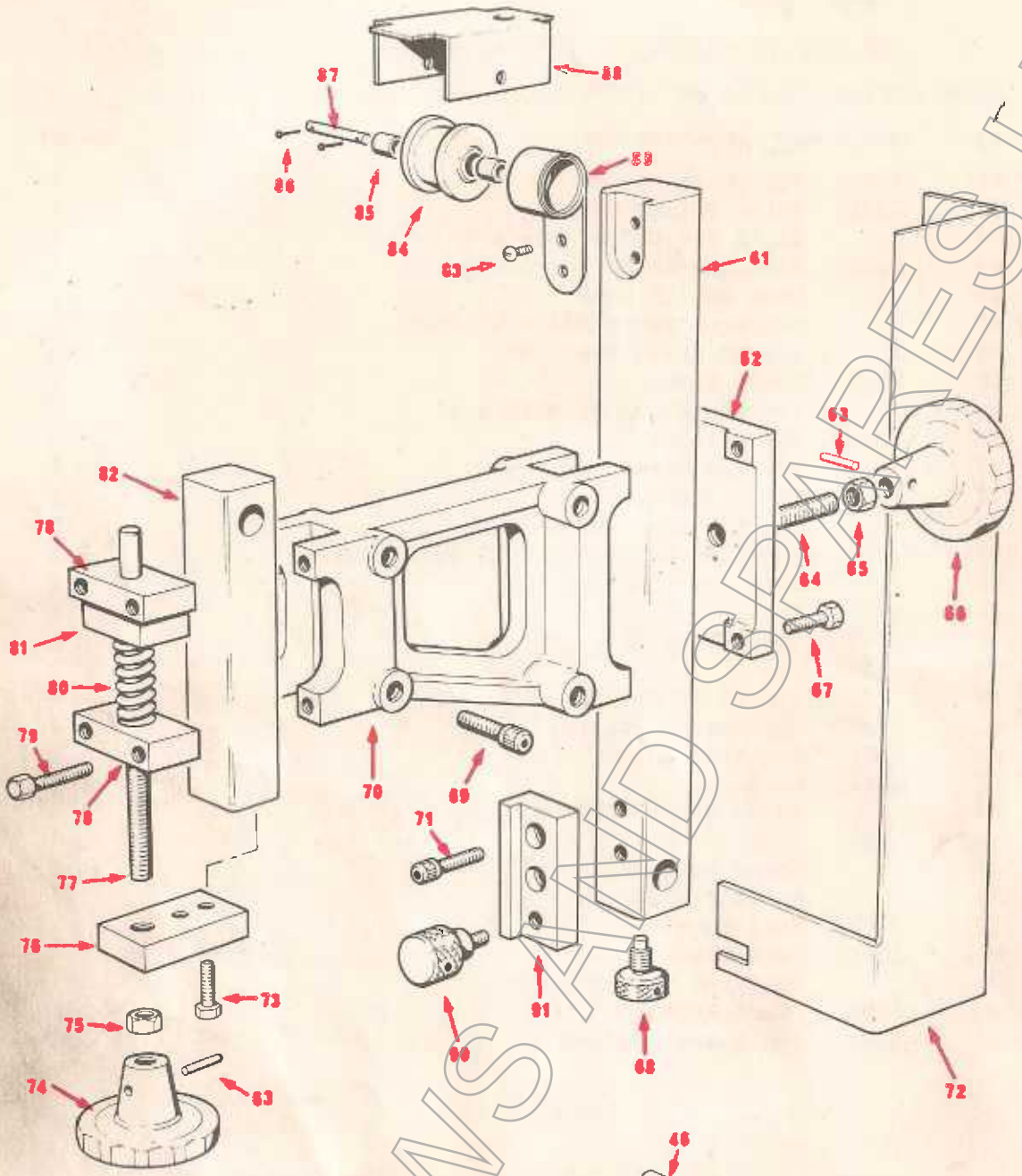
TOP BRACKET ASSEMBLY - PART No.SP283

NOTE : SP283 Used on 18" & 24" Throat Machines.

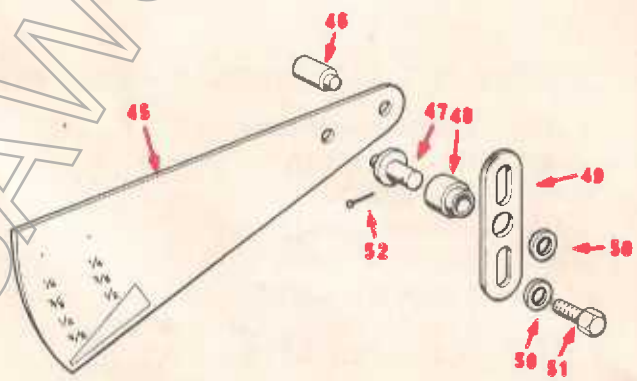
ITEM	PART NUMBER AND DESCRIPTION		No. OFF
61	2343	Top Guide Pillar	1
62	2331	Guide Pillar Cap	1
63		Mills Pin GP3	2
64	2339	Clamping Stud	1
65		Lock Nut	1
66		Handknob Evans	1
67		Hex.Hd.Screw	4
68	2501	Thumb Screw	1
69		Soc.Cap Screw	4
70	2330	Top Bracket	1
71		Soc.Cap Screw	2
72	2364	Blade Guard	1
73		Hex.Hd.Screw	2
74		Handknob Evans	1
75		Lock Nut	1
76	2345	Threaded Block	1
77	2340	Tensioning Screw	1
78	2337	Cap	2
79		Hex.Hd.Screw	4
80	2490	Compression Spring	1
81	2341	Register Block	1
82	2342	Slide Bar	1
83		Rd.Hd.Screw - Recessed	2
84	2380	Reel	1
85		Compo Bush	2
86		Split Pin	2
87	2379	Reel Spindle	1
88	2378	Reel Bracket	1
89		Tensator Spring	1
90	2338	Thumb Screw	1
91	2453	Top Guard Bracket	1

TENSION INDICATOR ASSEMBLY - PART No.SP291

45	2353	Indicator Plate	1
46	2349	Register Pin	1
47	2350	Fulcrum Pin	1
48	2351	Fulcrum Bush	1
49	2352	Fulcrum Plate	1
50		Std.Washer	3
51		Hex.Hd.Screw	2
52		Split Pin	1



TOP BRACKET



TENSION INDICATOR

A.L.T. SAWS & SPARES LTD
(Startrite Machine Specialist)
Unit 15 Pier Road Industrial Estate
Gillingham
Kent
ME7 1RZ
Tel/Fax: 01634 850833
www.altsawsandspares.co.uk

TOP BRACKET ASSEMBLY - PART Nos.SP598 & SP599

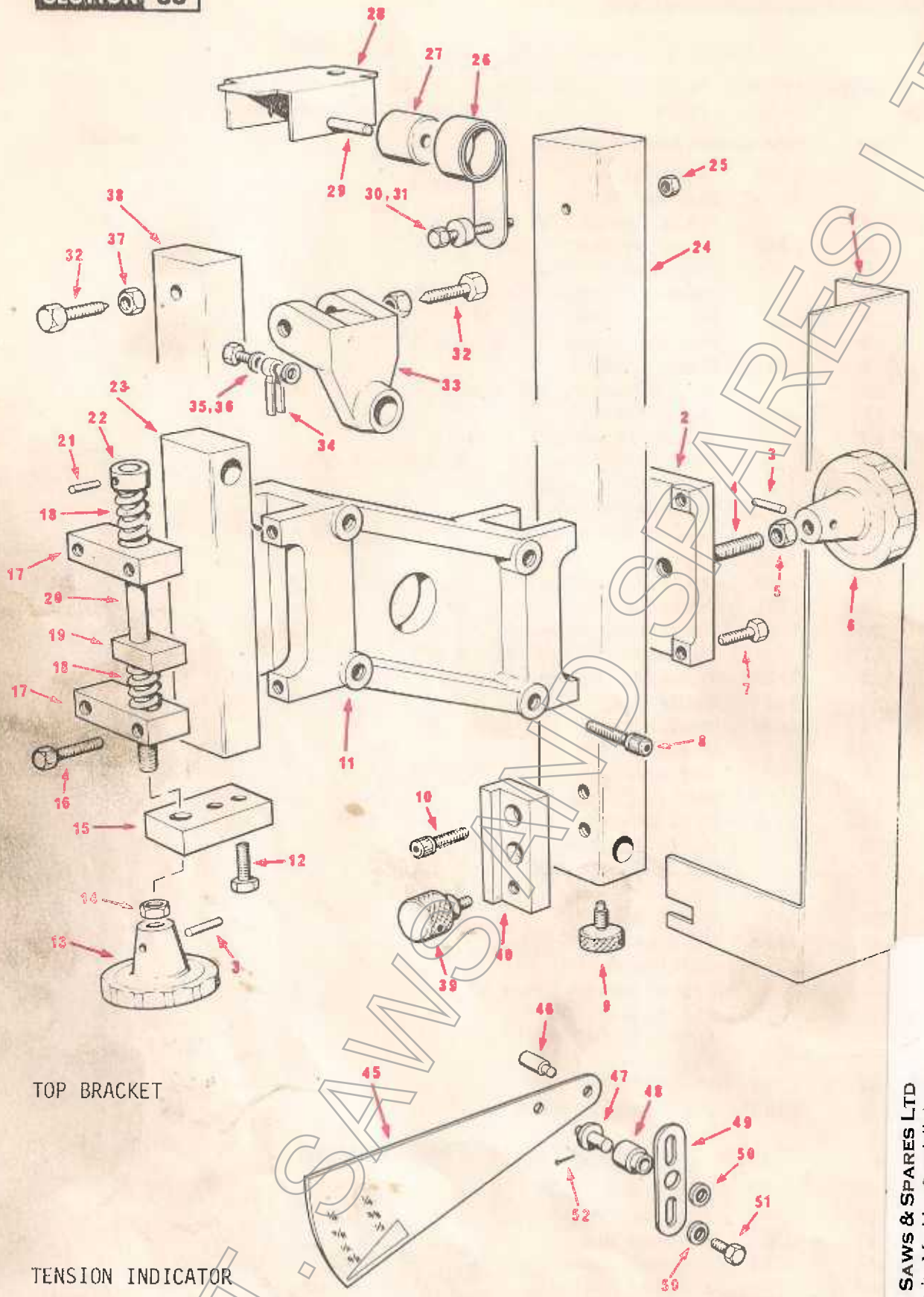
NOTE : SP598 - Items 1 to 31 ONLY. (20" Throat Machines)
SP599 - Items 1 to 40. (14" & 30" Throat Machines)

ITEM	PART NUMBER AND DESCRIPTION		No. OFF
1	2364	Blade Guard	1
2	4108	Capping Plate	1
3		Mills Pin	2
4	2339	Clamping Stud	1
5		Lock Nut	1
6		Handknob Evans	1
7		Hex.Hd.Screw	4
8		Soc.Cap Screw	4
9	2501	Thumb Screw	1
10		Soc.Cap Screw	2
11	4103	Top Bracket	1
12		Hex.Hd.Screw	2
13		Handknob Evans	1
14		Lock Nut	1
15	2345	Threaded Block	1
16		Hex.Hd.Screw	4
17	3258	Cap	2
18	2490	Compression Spring	2
19	2341	Register Block	1
20	3260	Tensioning Screw	1
21		Mills Pin GP3	1
22	2520	Threaded Collar	1
23	4107	Guide Bar	1
24	4106	Tool Post	1
25		Std. Nut	1
26		Tensator Spring	1
27	4105	Reel	1
28	2378	Reel Bracket	1
29		Mills Pin	1
30		Hex.Hd.Screw	1
31	4104	Washer	1
32	2336	Pivot Screw	2
33	2332	Tilt Bracket	1
34	2344	Locking Spring	1
35		Hex.Hd.Screw	1
36		Std.Washer	2
37		Lock Nut	2
38	3259	Guide Bar	1
39	2338	Thumb Screw	1
40	2453	Top Guard Bracket	1

TENSION INDICATOR ASSEMBLY - PART No.SP291

45	2353	Indicator Plate	1
46	2349	Register Pin	1
47	2350	Fulcrum Pin	1
48	2351	Fulcrum Bush	1
49	2352	Fulcrum Plate	1
50		Std.Washer	3
51		Hex.Hd.Screw	2
52		Split Pin	1

SECTION 33



TOP BRACKET

TENSION INDICATOR

FIXED BANDWHEEL HUB ASSEMBLY - PART No.SP213

ITEM	PART NUMBER AND DESCRIPTION		No. OFF
121	2415	Spindle	1
122	2061	Bandwheel Hub	1
123	1940	Circlip	2
124		Ball Race	2
125	2064	Spacer	1
126	3644	Washer	1
127		Hex.Hd.Screw	1
128		Std.Washer	3
129		Hex.Hd.Screw	3

TRACKING BANDWHEEL HUB ASSEMBLY - PART No.SP284 -

122	2061	Bandwheel Hub - SP115	1
123	1940	Circlip	2
124		Ball Race	2
125	2064	Spacer	1
128		Std.Washer	3
129		Hex.Hd.Screw	3
130	2347	Jacking Screw	1
131	2346	Spindle - SP114	1
132		Soc.Grub Screw	2
133	2348	Thumb Knob	1
134	2466	Instruction Label	1
135	2473	Bandwheel (20" & 30" Throat Machines)	3
	2473	Bandwheel (14" Throat Machines)	2
	1102	Bandwheel (18" & 24" Throat Machines)	3

WHEEL BRUSH DETAILS

136		Std.Nut	3
137		Std.Washer	2
138	2579	Stud	1
139	2270	Wheel Brush	1

PIVOT BRACKET ASSEMBLY - PART No.SP333

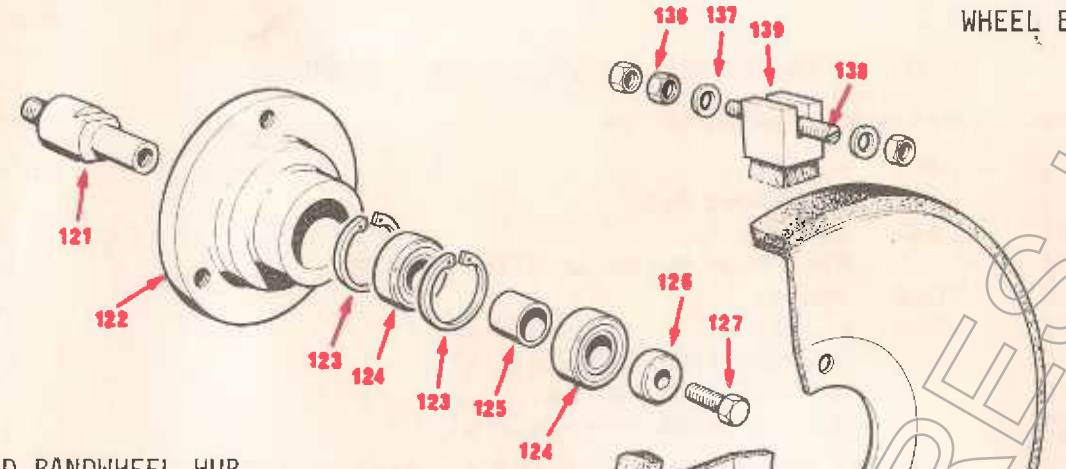
150	3708	Bridge Piece	1
151		Lock Nut	2
152	2336	Pivot Screw	2
153		Hex.Hd.Screw	1
154		Std.Washer	1
155	2344	Locking Spring - SP681	1
156	2332	Tilt Bracket	1
157		Soc.Cap Screw	4

INTERMEDIATE SAW GUARD ASSEMBLY - NOT ILLUSTRATED.

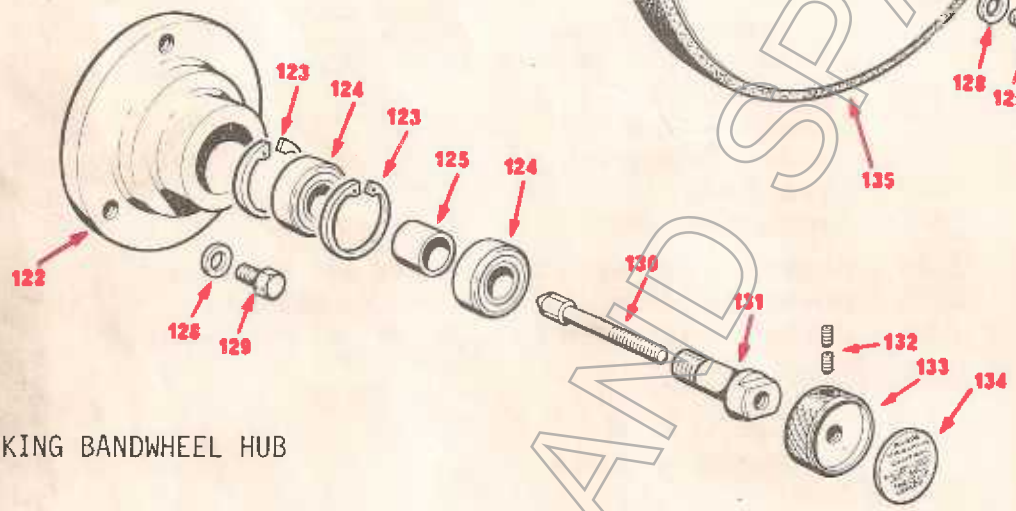
NOTE : 30" Throat Machines Only.

	SP443	Intermediate Saw Guard	1
	2711	Thumb Knob	2
		Lock Nut	2
		Std.Washer	2
		Rd.Hd.Screw - Recessed	1
		Rd.Hd.Screw - Recessed	1

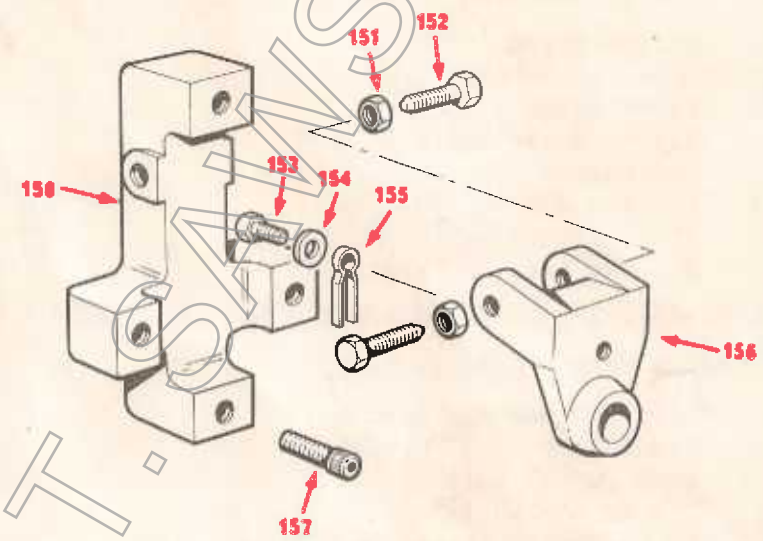
WHEEL BRUSH



FIXED BANDWHEEL HUB



TRACKING BANDWHEEL HUB



PIVOT BRACKET

A.L.T. SAWS & SPARES LTD
(Startrite Machine Specialist)
Unit 15 Pier Road Industrial Estate
Gillingham
Kent
ME7 1RZ
Tel/Fax: 01634 850833
www.altsawsandspares.co.uk

TABLE ASSEMBLY - PART No.SP569

ITEM	PART NUMBER AND DESCRIPTION		No. OFF
1	3346	Table	1
2		C'sk.Hd.Screw - Slotted	1
3	2922	Table Insert	1
4	2828	Swing Latch	1
5		Std.Stud	2
6		Std.Washer	2
7		Handknob	2

TABLE ASSEMBLY - PART No.SP301

10	2365	Fixed Table	1
11	2366	Sub - Table	1
12	2375	Table Insert	1
13		Soc.Grub Screw with Nylon Insert	4
14		Std.Stud	2
15		Std.Washer	2
16	5130	Handknob Evans	2

AUXILIARY TABLE ASSEMBLY - NOT ILLUSTRATED.

NOTE : 30" Throat Machines Only.

2705	Auxiliary Table	1
2709	Spacer	4
2936	Stud	4
	Std.Nut	12

SECTION 36

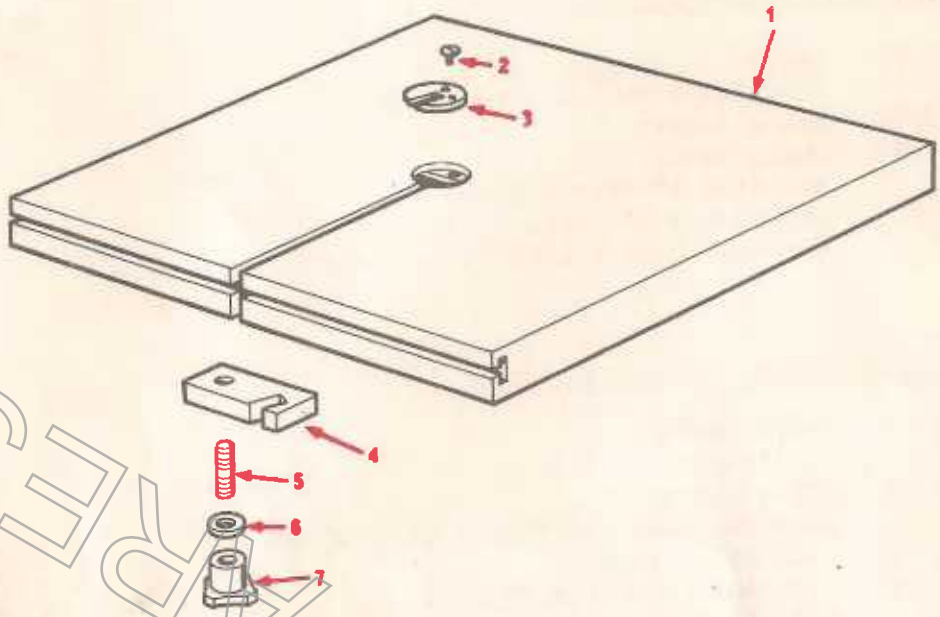


TABLE ASSEMBLY

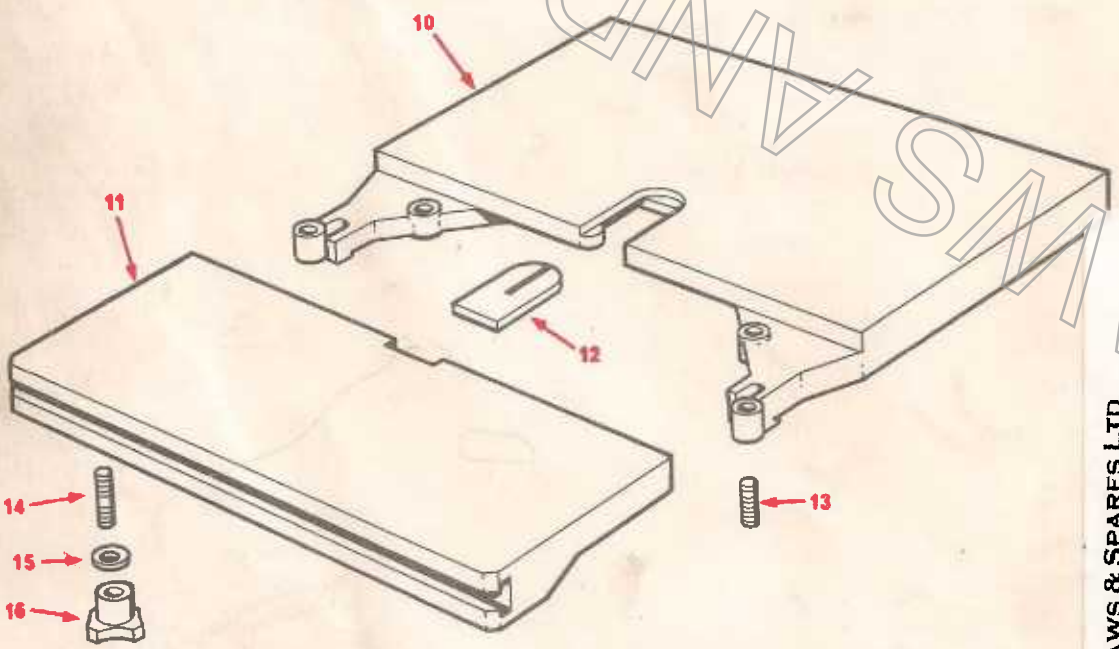
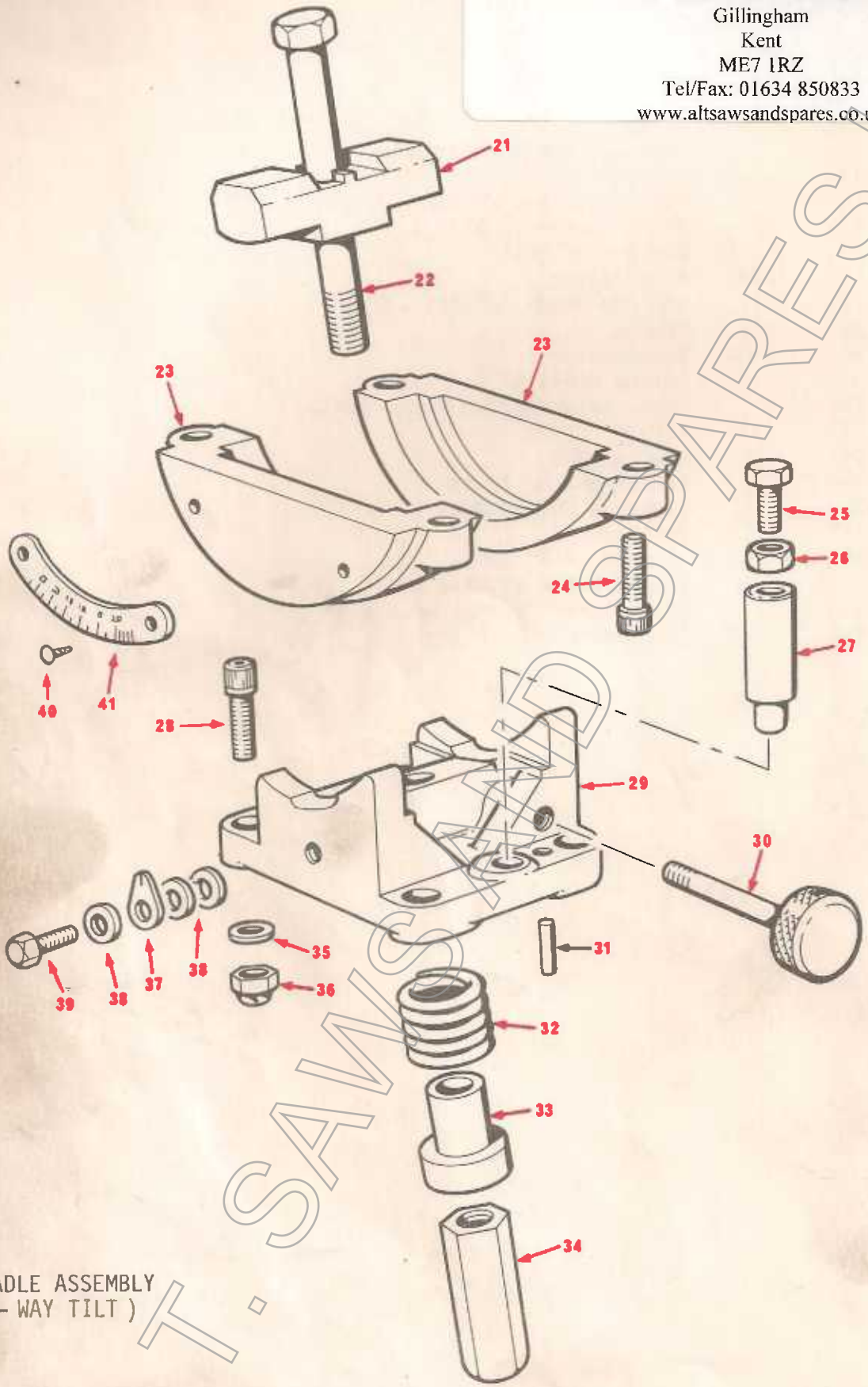


TABLE ASSEMBLY

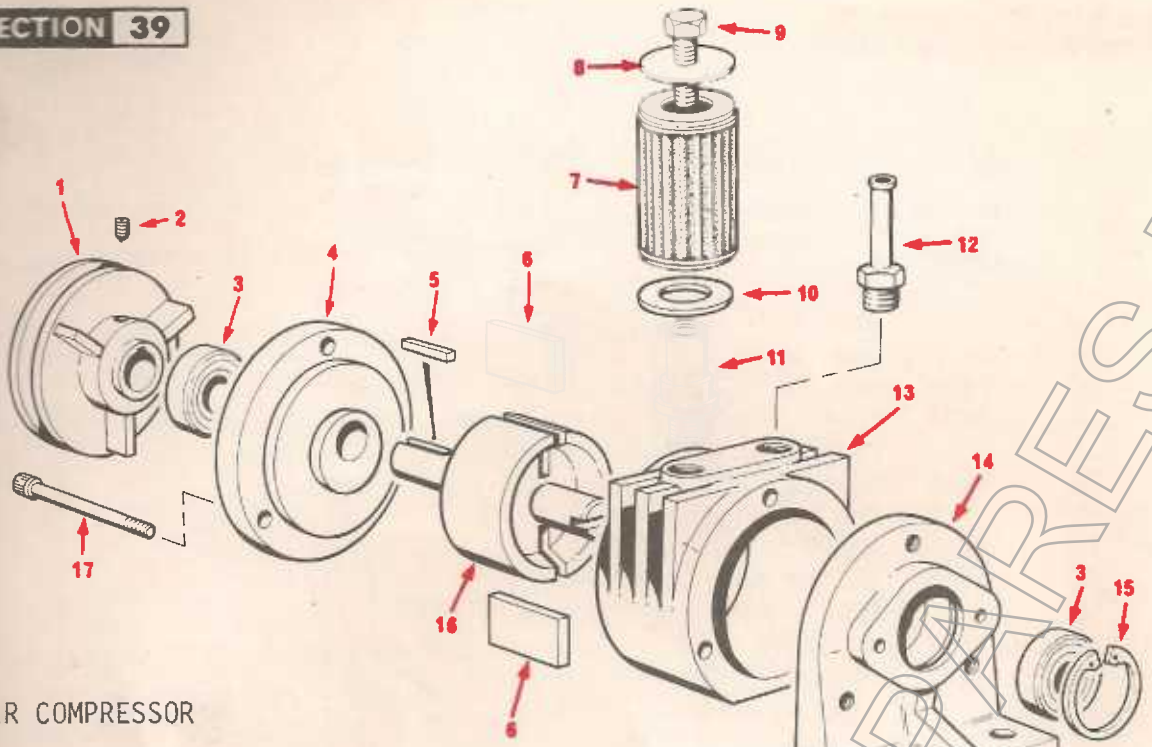
CRADLE ASSEMBLY (2 - WAY TILT) - PART No.SP286

ITEM	PART NUMBER AND DESCRIPTION		No. OFF
21	2369	Clamp	1
22		Hex.Hd.Screw	1
23	2368	Trunnion	2
24		Soc.Cap Screw	4
25		Hex.Hd.Screw	1
26		Std.Nut	1
27	2373	Stop Pillar	1
28		Soc.Cap Screw	4
29	2367	Cradle	1
30	2500	Thumb Screw	1
31		Spring Dowel	1
32		Compression Spring	1
33	2370	Sleeve	1
34	2409	Special Nut	1
35		Std.Washer	4
36		Simmonds Nut	4
37	2372	Pointer	1
38		Std.Washer	3
39		Hex.Hd.Screw	1
40		Drive Screw Type	1
41	2371	Tilt Scale	1

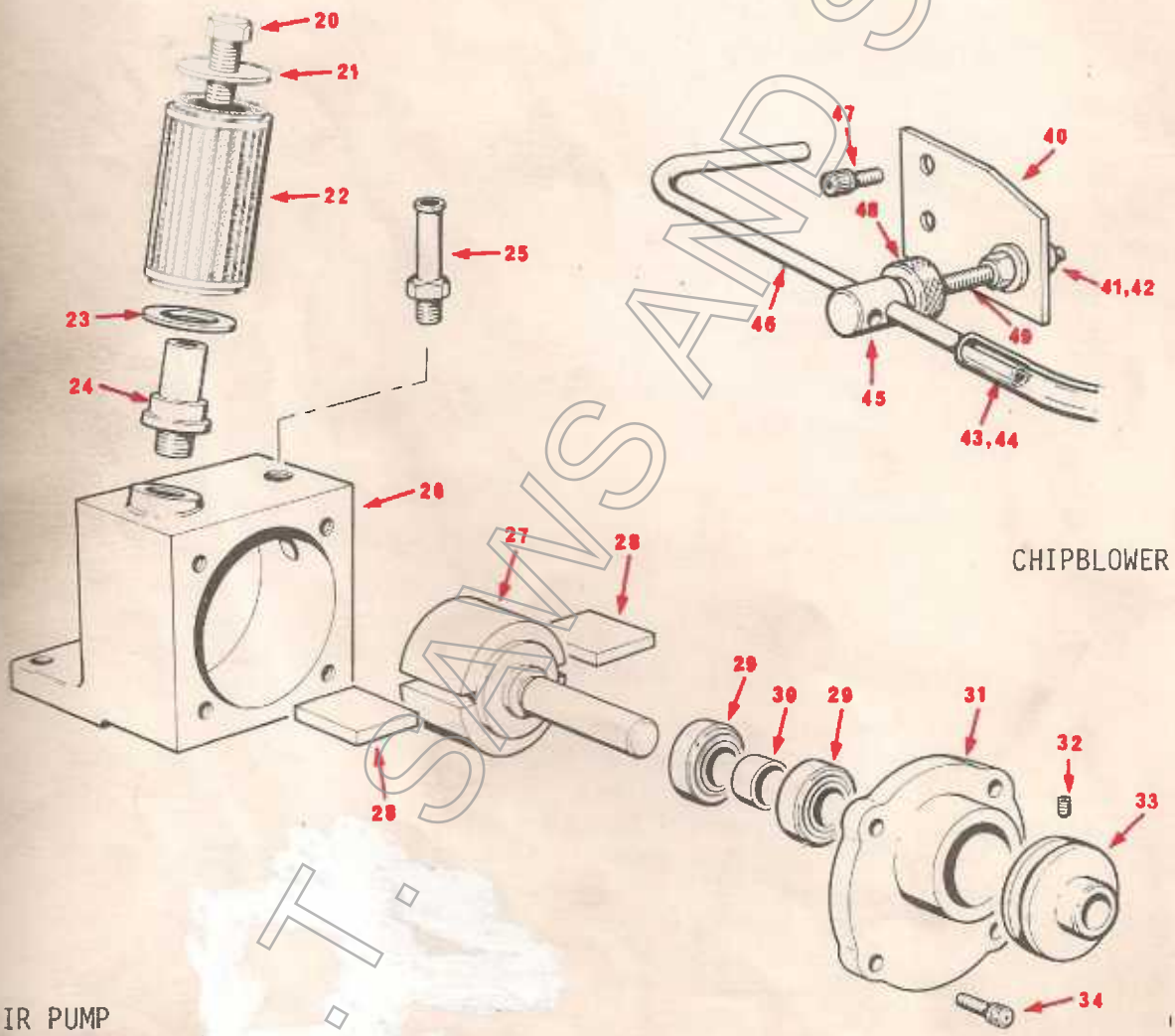
A.L.T. Saws & Spares Ltd
(Startrite Machine Specialist)
Unit 15 Pier Road Industrial Estate
Gillingham
Kent
ME7 1RZ
Tel/Fax: 01634 850833
www.altsawsandspares.co.uk



CRADLE ASSEMBLY
(2 - WAY TILT)



AIR COMPRESSOR



AIR PUMP

CHIPBLOWER

AIR COMPRESSOR ASSEMBLY - PART No.SP486

ITEM	PART NUMBER AND DESCRIPTION		No. OFF
1	3580	Pulley	1
2		Soc.Grub Screw	1
3		Ball Race	2
4	3575	End Cap	1
5	1148	Key	1
6	3579	Vane	2
7		Filter AC -	1
8	3611	Washer	1
9		Hex.Hd.Screw	1
10	3612	Washer	1
11	3599	Filter Mounting	1
12		Tube Connector	1
13	3576	Cylinder	1
14	3577	Cylinder Mounting	1
15		Circlip	1
16	3578	Rotor	1
17		Soc.Cap Screw	3

AIR PUMP ASSEMBLY - PART No.SP98

20		Hex.Hd.Screw	1
21	3611	Washer	1
22		Filter AC -	1
23	3612	Washer	1
24	3621	Filter Mounting	1
25		Tube Connector	1
26	1245	Body	1
27	1247	Spindle	1
28	1248	Vane	2
29		Ball Race	2
30	535	Spacer Collar	1
31	1244	Cover	1
32		Soc.Grub Screw - Cup Point	1
33	1231	Pulley	1
34		Soc.Cap Screw	4

CHIPBLOWER ASSEMBLY - PART No.PK172

40	4241	Mounting Plate	1
41		Std.Nut	2
42		Std.Washer	2
43		Nylon Sleeve	1
44		Clear P.V.C. Tube	1
45	3630	Sleeve	1
46	4930	Chipblower Pipe	1
47		Soc.Cap Screw	2
48	3628	Thumb Knob	1
49	3635	Adjustment Screw	1

MOTOR PLATFORM ASSEMBLY - PART No.SP684

NOTE : SP684 used on 14",20" & 30" Throat Machines.

ITEM	PART NUMBER	DESCRIPTION	No.OFF
1	2957	Motor Platform	1
2	2851	Mounting Sleeve	4
3		Rubber Bush	4
4		Cotter Pin	2
5		Std.Washer	2
6	2870	Pivot Shaft	1
7		Soc.Grub Screw	4
8	2452	Collar	4
9	2488	Latch	1
10	2450	Support Shaft	1
11		Lock Nut	1
12		Rd.Hd.Screw - Recessed	1
13	2447	Washer	1
14		Std.Nut	4
15	2446A	Trunnion	1
16	1756	Lever	1
17		Ball Knob	1
18	2445	Fork	1
19	2936	Stud	1
20	2558	Spring	1

MOTOR PLATFORM ASSEMBLY - PART No.SP683 - NOT ILLUSTRATED

NOTE : SP683 used on 18" & 24" Throat Machines.
Items 2 to 14 & 16 to 20 of SP684 common to SP683.

2449	Motor Platform	1
2446	Trunnion	1

MOTOR PULLEY DETAILS & VEE-BELTS - NOT ILLUSTRATED

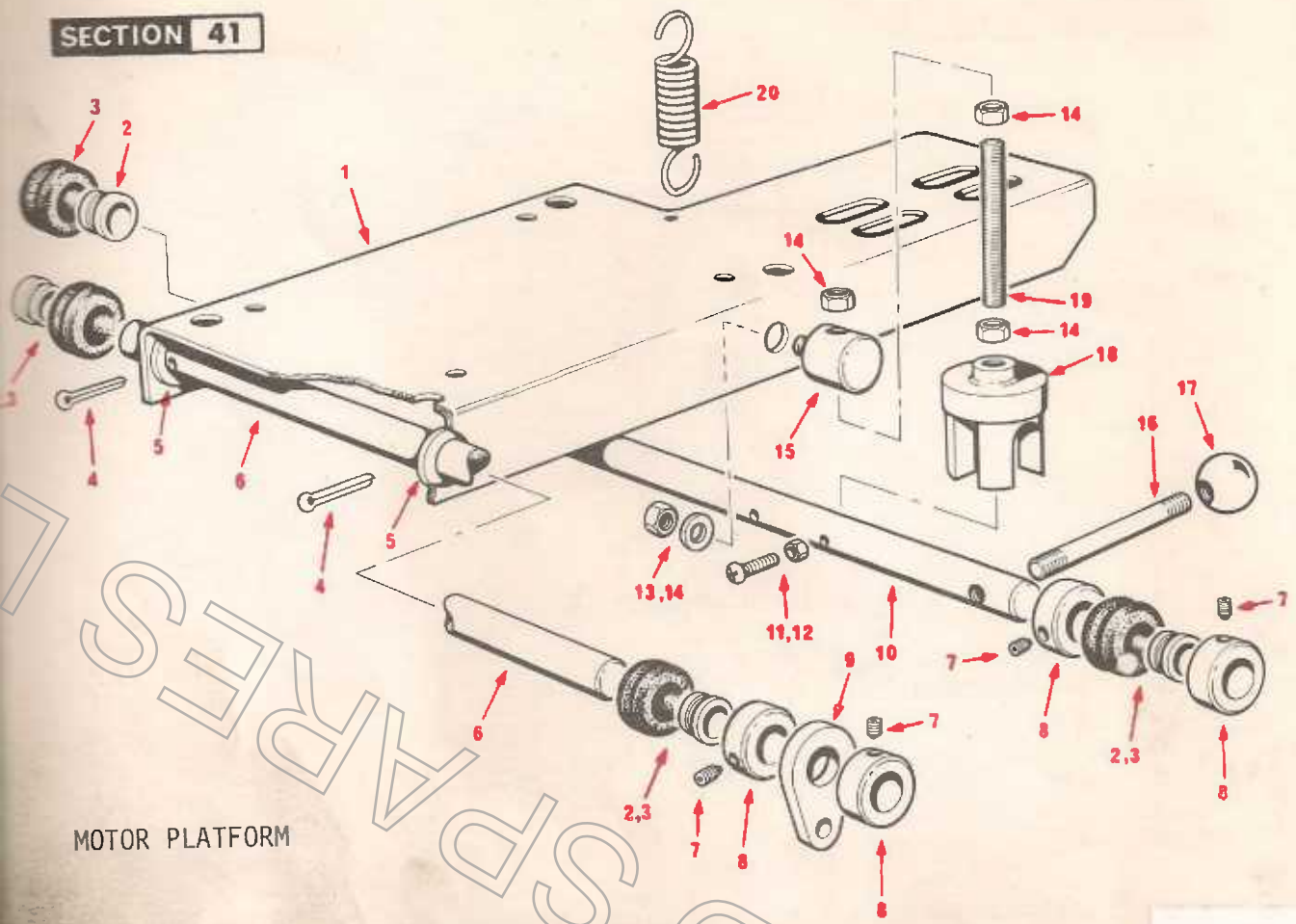
2010	Motor Pulley	1
2141	Motor Pulley - Pump	1
3555	Motor Pulley - Pump	1
1149	Key	1
	Mills Pin GP3	1
	Soc.Grub Screw	1
	Main Drive Vee-belt	1
	Pump Drive Vee-belt	1
	Pump Drive Vee-belt	1

WORKLIGHT DETAILS

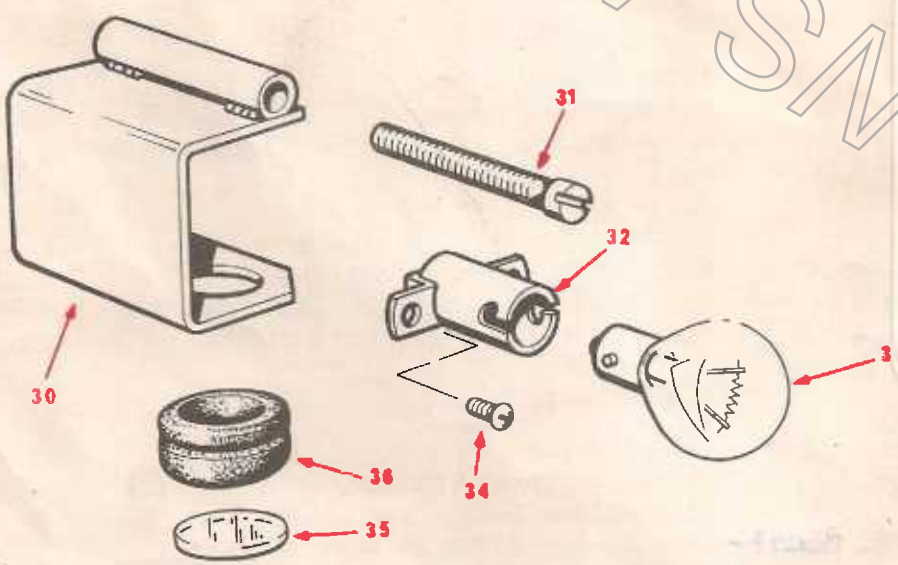
30	SP516	Lamp Housing	1
31		Cheese Hd.Screw - Slotted	1
32		Lamp Holder Bulgin	1
33		Lamp Osram	1
34		Rd.Hd.Screw - Recessed	2
35	3605	Lens	1
36	3601	Lens Mounting	1

To remove lamp, press inwards, twist anti-clockwise and pull out.

SECTION 41



MOTOR PLATFORM



WORKLIGHT

A.L.T. SAWS & SPARES LTD
(Startrite Machine Specialist)
Unit 15 Pier Road Industrial Estate
Gillingham
Kent
ME7 1RZ
Tel/Fax: 01634 850833
www.altsawsandspares.co.uk