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

HANDBOOK
BO10006

V SERIES

TEN SPEED
BANDSAWING
MACHINE

Issue 2 17-05-94 RF 11097

QUALITY BANDSAW BLADES

TO SUIT THE

V 10/S10

MODELS

ORDER LINE- 01634 850833

A.L.T. SAWS & SPARES LTD

Unit 15, Pier Road Industrial Estate

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Kent

ME7 1RZ

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CONTENTS

SPECIFICATION

MODEL	14V	13.5"	THROAT	340mm	2 WHEEL MACHINE
	20V	20"	THROAT	500mm	3 WHEEL MACHINE
	24V	24"	THROAT	610mm	3 WHEEL MACHINE
	30V	30"	THROAT	760mm	2 AND 3 WHEEL MACHINE
WHEEL DIAMETER		14"	355mm		
BLADE LENGTHS	14V	112"		2845mm	
	20v	130"		3302mm	
	24V	126"		3200mm	
	30v	112"		2845mm	2 WHEEL
	30V	147"		3734mm	3 WHEEL
MAX BLADE WIDTH		5/8"		16mm	
MOTOR ALTERNATIVE		1.5 HP	900 RPM	1.1KW	
		1.5 HP	750 RPM	1.1KW	
ELECTRIC SUPPLY		220/240 VOLTS		1 PHASE	50Hz
ALTERNATIVE (1)		220/240 VOLTS		3 PHASE	50Hz
ALTERNATIVE (2)		220/240 VOLTS		3 PHASE	60Hz
ALTERNATIVE (3)		380/440 VOLTS		3 PHASE	50Hz
ALTERNATIVE (4)		380/440 VOLTS		3 PHASE	60Hz
ALTERNATIVE (5)		575 VOLTS		3 PHASE	60Hz
GROSS WEIGHTS	14V	570 POUNDS		250 kgs	
	20V	670 POUNDS		300 kgs	
	24V	700 POUNDS		318 kgs	
	30V	770 POUNDS		350 kgs	
MAX DISTRIBUTED FIXED TABLE LOAD		80 POUNDS		36 kgs	

FOR BEST RESULTS USE 'STARTRITE' BANDSAW BLADES

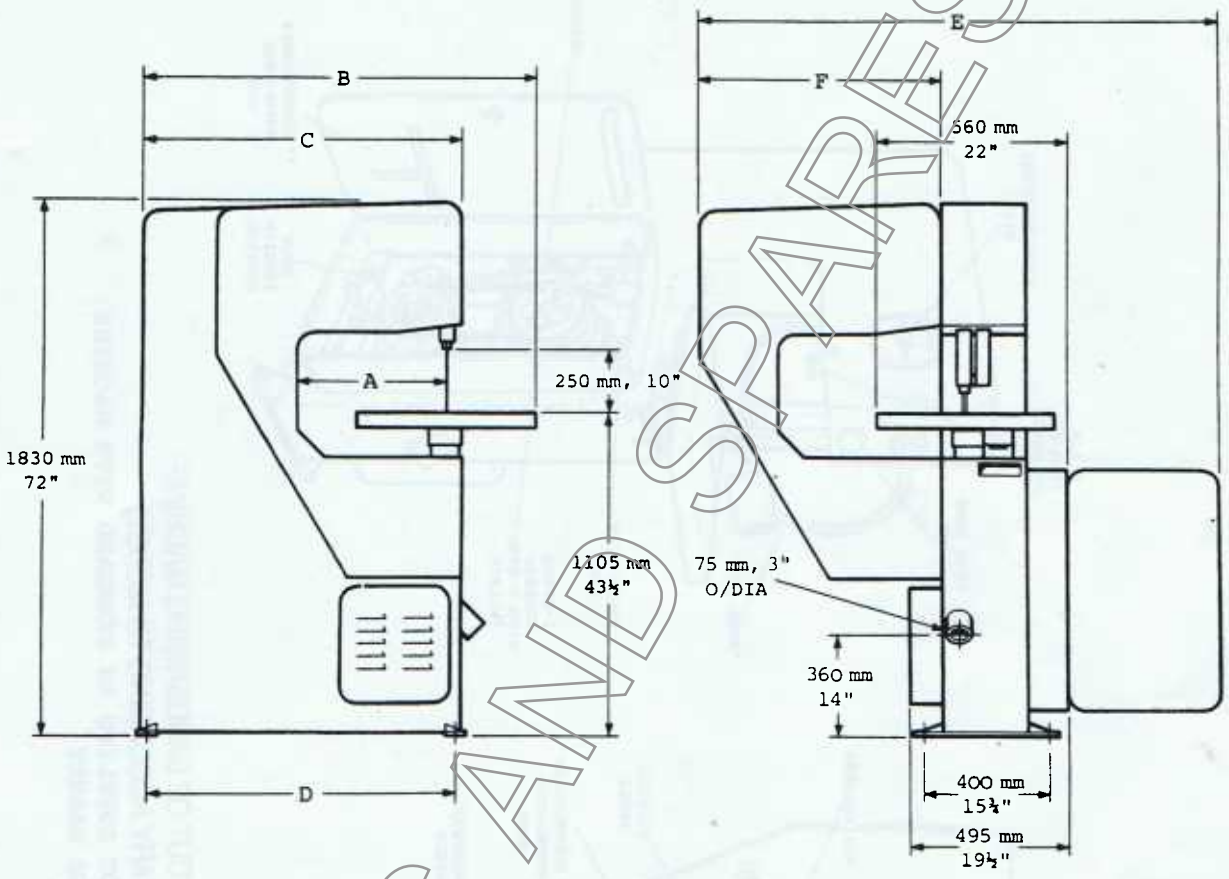
When ordering parts, please state:

1. Machine, Model and Serial number
2. Part Number (where applicable) and Description
3. Quantity required
4. Specify power supply for electrical components

NOTE: ILLUSTRATIONS MAY VARY IN DETAIL, ACCORDING TO MODEL

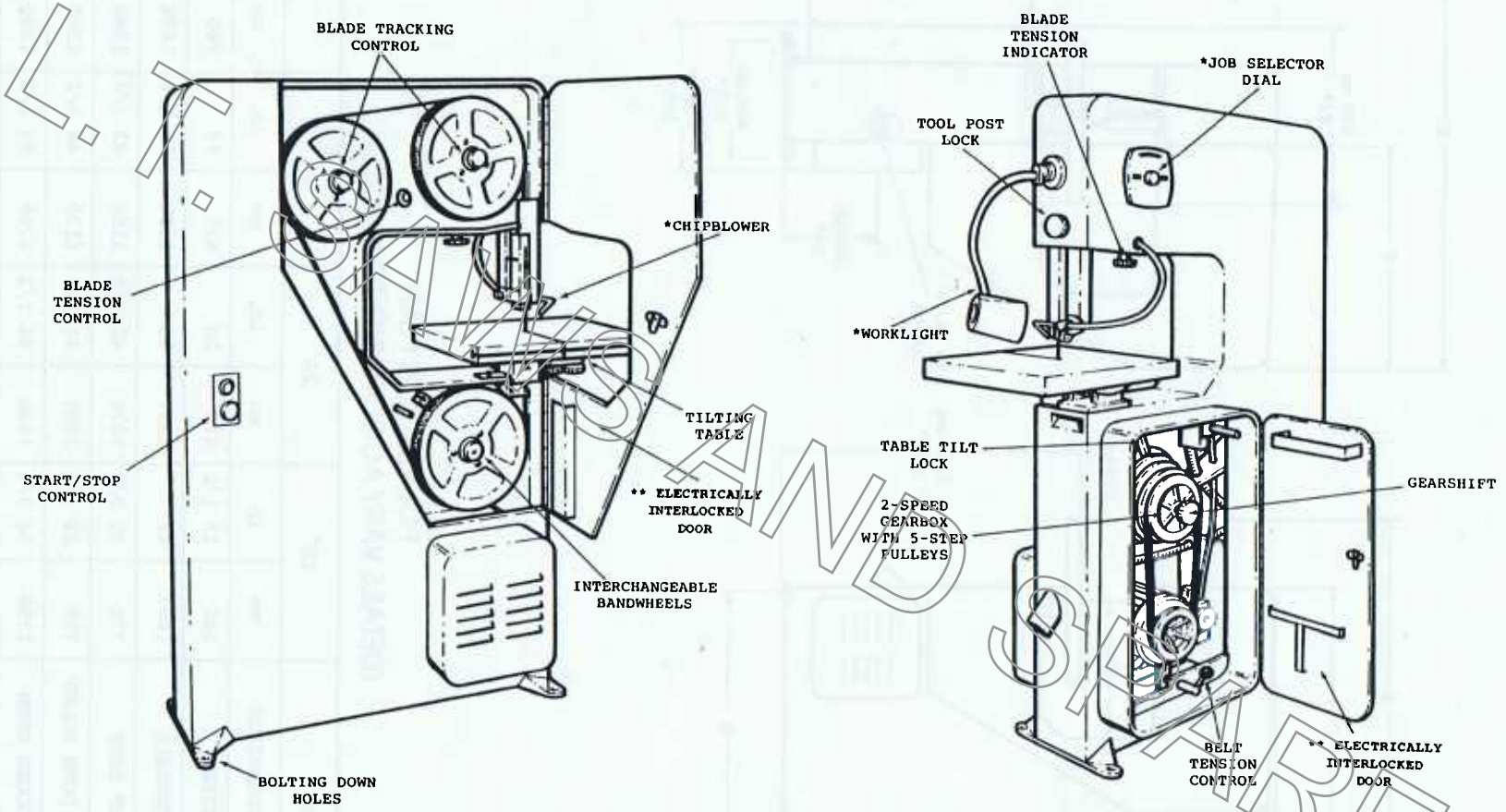
Startrite Machine Tool Company Limited,
Waterside Works, Waterside Lane,
Gads Hill, GILLINGHAM,
Kent, ME7 2SF
England

ALL DIMENSIONS ARE APPROXIMATE



FOUNDATION PLAN
(DETAILS VARY ACCORDING TO MODEL)

MACHINE TYPE		14"		20"		24"		30"	
PRINCIPLE DIMENSIONS		mm	in.	mm	in.	mm	in.	mm	in.
A	THROAT SIZE	345	13 1/2	510	20	610	24	760	30
B	LENGTH OVERALL	1067	42	1397	55	1350	53 1/8	1676	66
C	LENGTH OF BODY	770	30 3/8	1075	42 3/8	1150	42 1/4	1380	54 3/8
D	BOLTING DOWN HOLES	750	29 1/2	1055	41 1/2	1130	44 1/2	1360	53 1/2
E	WIDTH -DOORS OPEN	1390	54 3/4	1690	66 1/2	1765	69 1/2	1980	78
F	MAIN DOOR	525	20 5/8	820	32 1/4	900	35 1/2	1115	43 7/8



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

* OPTIONAL EXTRAS (NOT SUPPLIED AS STANDARD WITH MACHINE)
** NOT SUPPLIED FOR US MARKET

OPERATING SAFETY PRECAUTIONS

Before attempting to operate machine, become familiar with the controls and operating instructions.
Do not start machine unless all guards are in place, keep guards in place when sawing.
Adjust and secure table before loading workpiece.(Do not exceed the maximum table load).
Position the top guides as close as possible to the workpiece.
Hold small or unstable workpieces by means of a clamp or other device.
Keep hands clear of the saw blade at all times.
Keep the work area free of tools and off-cuts.
Stop the machine to make adjustments.
Stop the machine before leaving it unattended.
Wear eye protection.
Use care in uncoiling and installing new saw blades as the teeth are very sharp. It is advisable to wear gloves when handling saw blades.
Do not leave saw blades on the floor. Machining some materials may create a hazard to health in the form of fumes, dust or the risk of fire or explosion. In such cases it is imperative that expert advice is obtained on the correct handling of such materials, and the fitting of additional equipment to the machine in order to achieve the required standard of safety.

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.

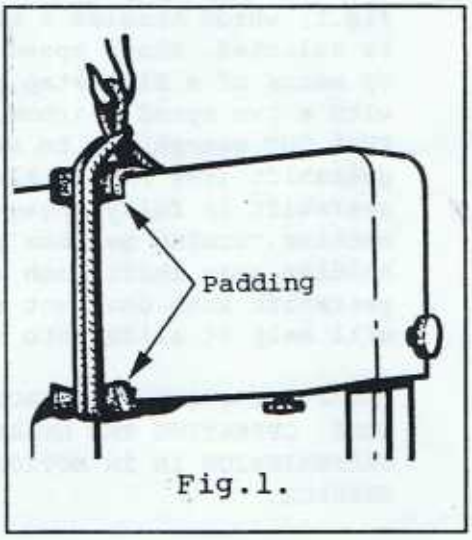


Fig.1.

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

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 3/8" 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 trunnion 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.

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 gearbox pulley by hand and holding gear shift knob (making sure that gearshift knob does not rotate with pulley) will help it slide into mesh.

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

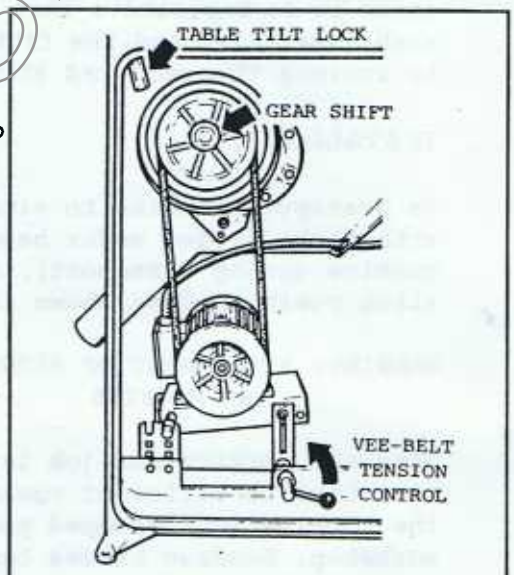


Fig.2.

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.

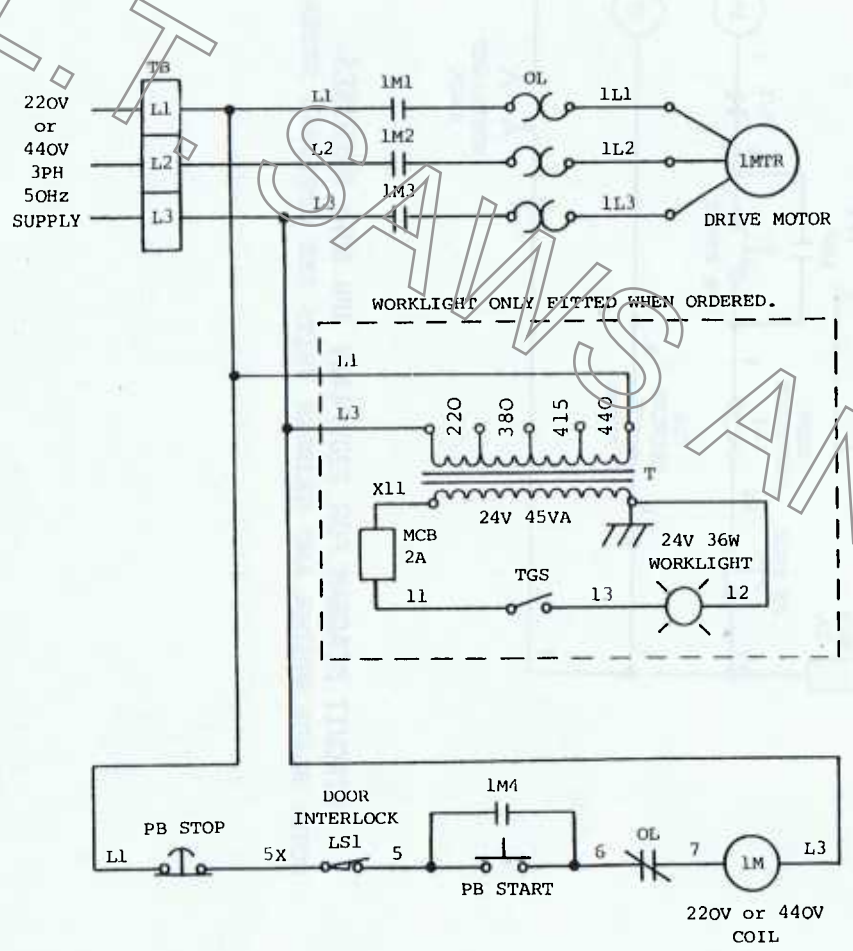
MAINTENANCE

WEEKLY MAINTENANCE:
Remove embedded chips from bandwheel tyres. Clean upper and lower blade guide assemblies and check for wear.

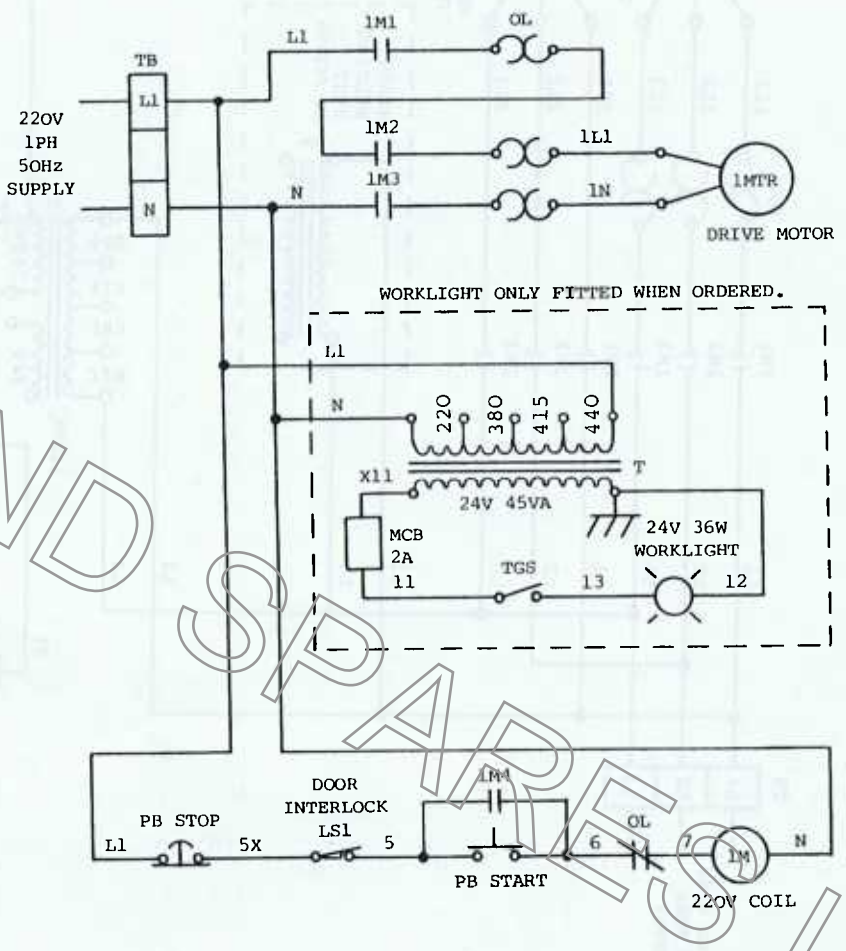
MONTHLY MAINTENANCE:
Check condition and tension of vee-belts. (V Models ONLY): Remove air filter from top of air compressor (one screw) and insert a few drops of oil onto screw hole. Do not crush filter when replacing screw.

GENERAL:
Otherwise than above, clean and lubricate working parts as required. The bandwheels have sealed-for-life bearings which do not require further lubrication. (V Models ONLY): Periodically inspect the welder and grinder units, see Section on Die Making/Welding for instructions.

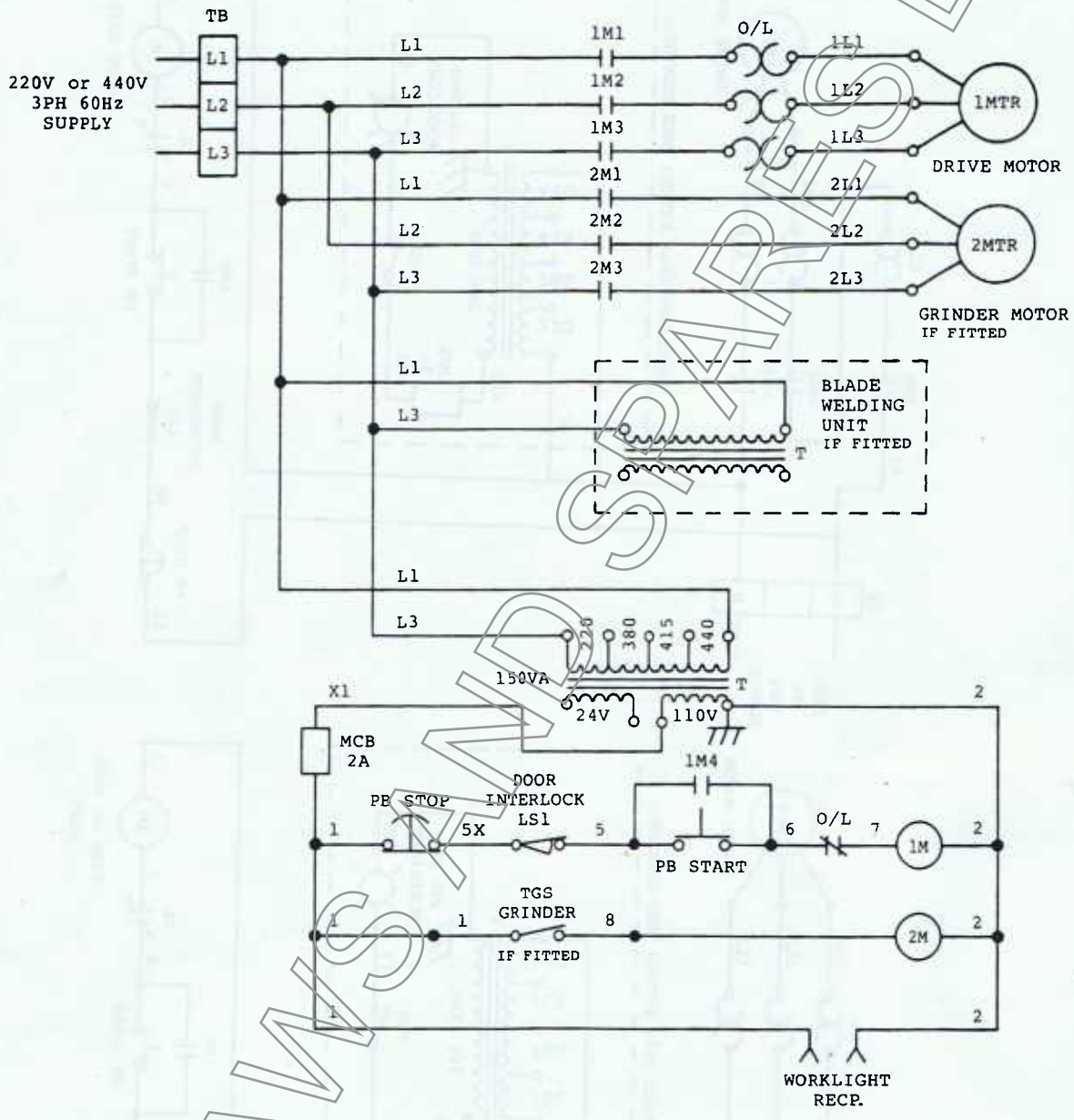
APPROVED LUBRICANTS	
GENERAL LUBRICATION AIR COMPRESSOR	ESSO Esstic 50 Oil GULF Service 51 Oil MOBIL Mobilgear 629 Oil TEXACO Ursa p20 Oil
MOTOR BEARINGS	ESSO Beacon 3 Grease GULF Gulfcrown No.3 Grease MOBIL Mobilplex 48 Grease TEXACO Regal Starfak Premium 3 Grease
GEARBOX	ESSO Pen-0-led EP2 Oil GULF EP65 Lubricant Oil MOBIL Mobilgear 629 Oil TEXACO Meropa 2 Lubricant Oil



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



CIRCUIT DIAGRAM FOR 220V
1 PHASE 50Hz MACHINES.



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

NOTE: BLADE WELDER AND GRINDER UNITS ARE OPTIONAL EXTRAS.

WIRING INSTRUCTIONS

Connect supply leads to the terminals L1; L2 and L3 in the 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 - **ALL MACHINES**

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

Item 1 Transformer
220/440V 150 Va primary; 24V 110Va secondary.

Item 4 Circuit Breaker
2 amp rating for worklight and circuit breaker.

Item 5 Contactor
For main motor.

Item 6 Overload Unit
Provides overload protection for main motor.

Item 7 Contactor
For grinder motor.

Item 8 Terminal Block

Item 9 Terminal Block

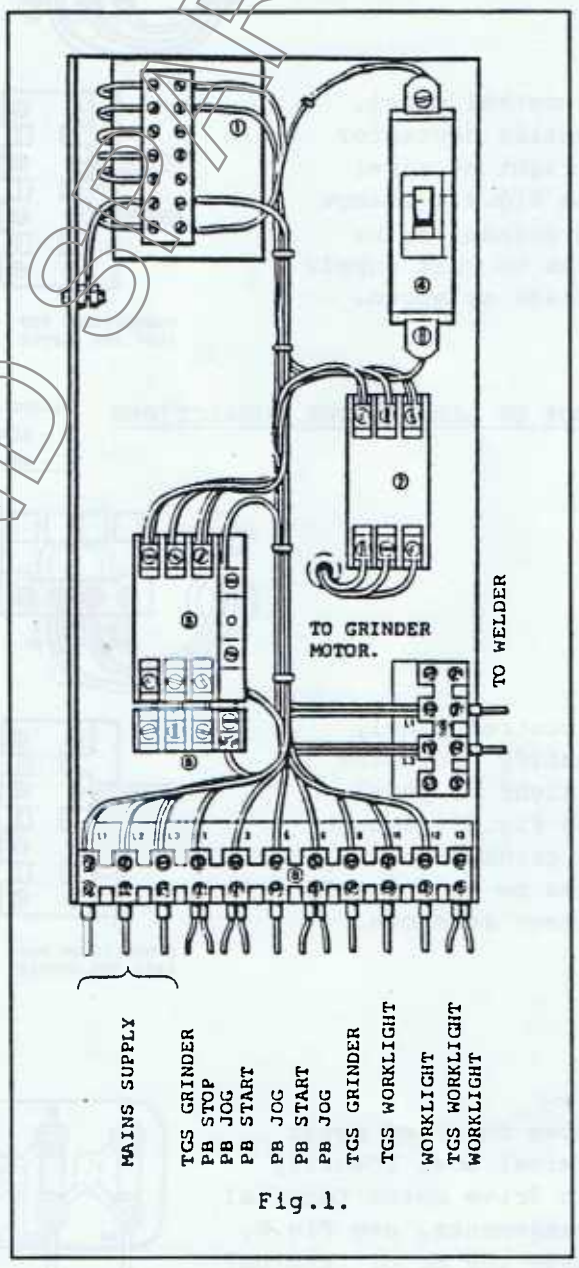


Fig.1.

SECTION 11

CONVERSION FOR ALTERNATIVE SUPPLY VOLTAGE (CONTINUED).

ASEA MOTOR CONNECTIONS

COLOUR CODE :

B - BLACK	BR - BROWN	Y - YELLOW
G - GREEN	BL - BLUE	W - WHITE

On control panel, identify contactor on right of panel (see Fig.4). Change the grinder motor wires to suit supply voltage as shown.

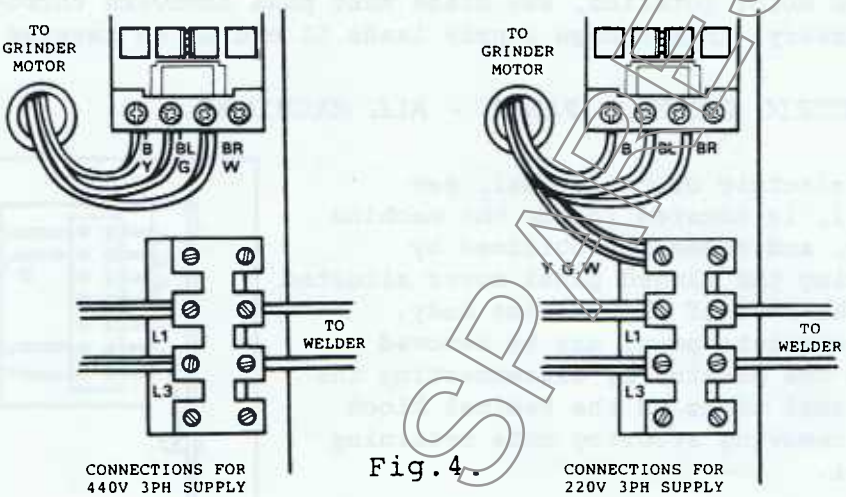


Fig.4.

BROOK OR LEMAC MOTOR CONNECTIONS

COLOUR CODE :

B - BLACK	BR - BROWN	Y - YELLOW
R - RED	BL - BLUE	W - WHITE

On control panel, identify contactor on right of panel (see Fig.5). Change the grinder motor wires to suit supply voltage as shown.

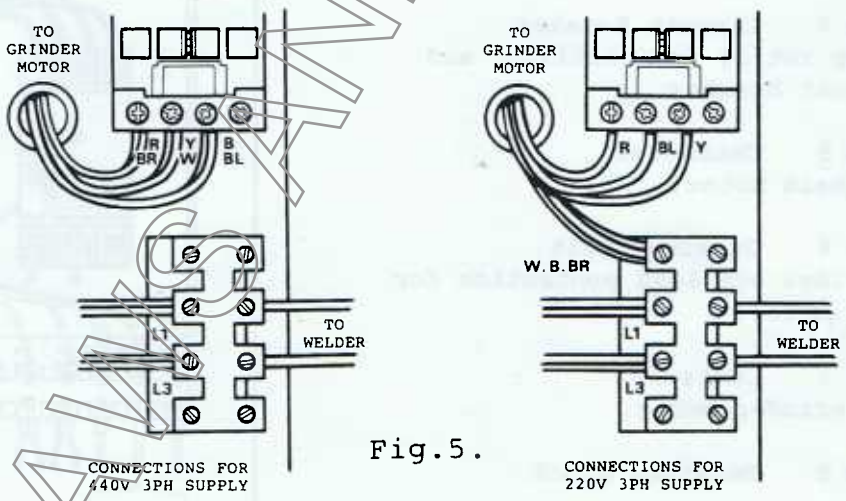


Fig.5.

E.

Remove cover of motor terminal box. Identify main drive motor terminal arrangements, see Fig.6. Change the motor terminal linkage to suit appropriate voltage as shown.

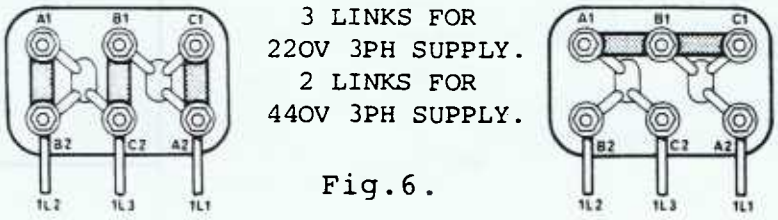


Fig.6.

SETTING UP THE MACHINE.

Select a saw blade suitable for the work in hand, see Section on Sawing Practice. If the work involves internal contour sawing, or the blade is to be made up from bulk strip, refer to Section on Welder & Grinder Units (where applicable).

Lower the top bandwheel by turning the blade tension control knob and remove saw blade. Place selected saw blade over bandwheels with the teeth facing forward and downward through the table (see Fig.1), and apply sufficient blade tension to remove slack. It is important that both the top and bottom guide assemblies are set back clear of the saw blade so that it is not deflected and follows a true path between the bandwheels. Rotate the bandwheels by hand to establish the path of the saw blade. Adjust the tracking control knob to position the saw blade approximately central on the bandwheels as shown in

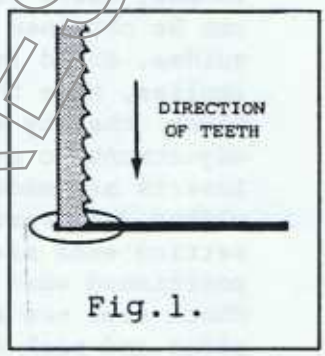


Fig.1.

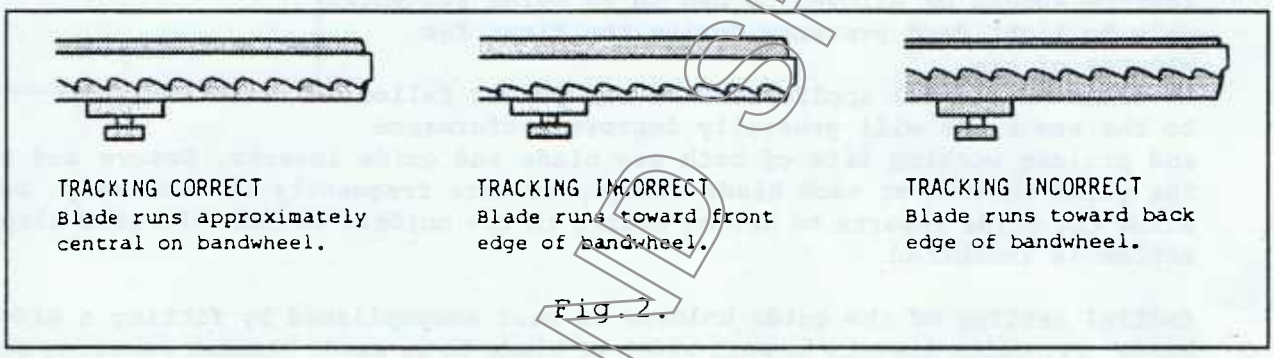


Fig.2.

NOTE: 30" Throat Models 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.

When the saw blade tracks in a satisfactory manner, apply the appropriate blade tension as shown by the tension indicator, see Fig.3. The tension scale registers tension applied in terms of saw blade width, thus a reading of 1/2" indicates that tension to suit a 1/2" 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.

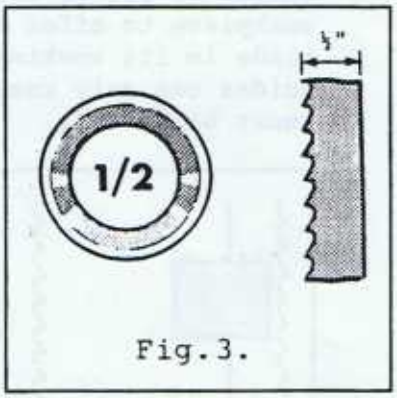


Fig.3.

SECTION 15

SOLID INSERT BLADE GUIDES

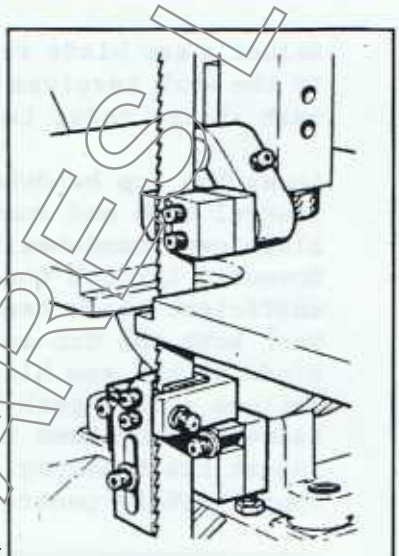


Fig.4.

These guides (fitted as standard on all machines) give the greatest possible support to the saw blade and are therefore most suitable for precision sawing. In most cases greater working life of the saw blade can be obtained than is possible with other types of guides. Solid insert guides (see Fig.4) 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 saw 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 saw blade will generally improve performance and prolong working life of both saw blade and guide inserts. Remove and clean the guide inserts at each blade change, or more frequently if necessary. Do not allow the guide inserts to become seized in the holders so that the self aligning action is inhibited.

Initial setting of the guide holders is best accomplished by fitting a wide saw blade. Fit guide inserts to suit width of blade to be used. Slacken securing screws (Items 1 & 19) and position the insert locators to hold the guide inserts with minimum side clearance but free enough to pivot under finger pressure. The correct size guide inserts should always be used as they offer maximum support to the sawblade (see Fig.5).
Position guide holders so that guide inserts support the saw blade without deflecting it from a straight line (see Fig.6). After adjusting the guides, rotate bandwheels by hand to ensure that the saw blade runs free. The top guides should be set as close as possible to the workpiece to offer maximum support to the saw blade in its working condition. Incorrectly set guides can only result in poor quality work and short blade life.

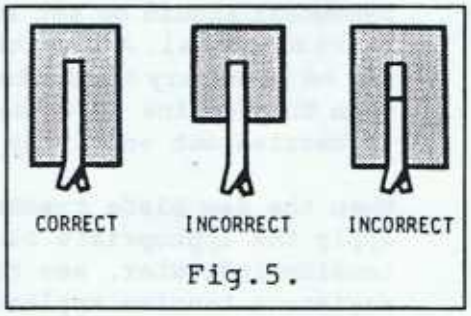


Fig.5.

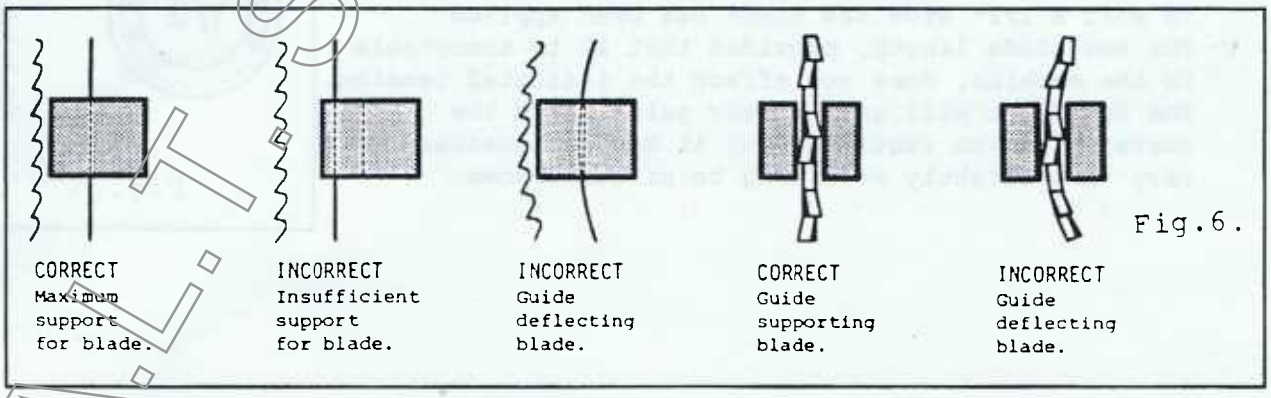
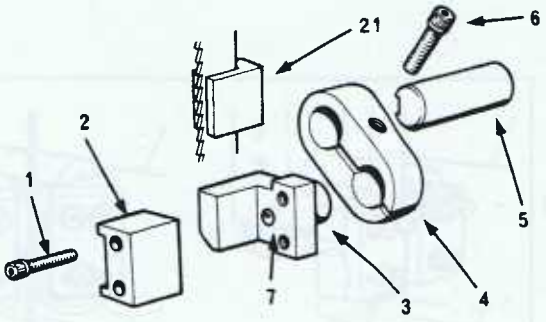
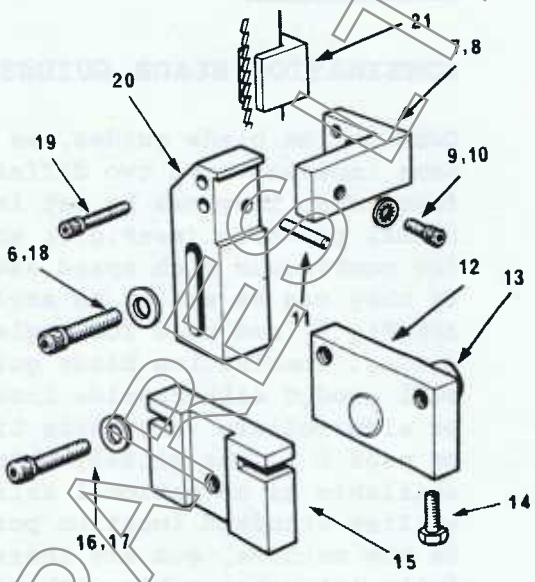


Fig.6.





SOLID INSERT BLADE GUIDES (UPPER) - ASSEMBLY NO: SM624

ITEM	PT NO	DESCRIPTION	NO OFF
1	BO5010	Cap Screw	2
2	4157	Insert Locator	1
3	4158	Guide Insert Holder	1
4	4156	Holder Arm	1
5	4154	Spigot	1
6	BO5028	Cap Screw	1
7	BO5870	Drive Screw	1

SOLID INSERT BLADE GUIDES (LOWER) - ASSEMBLY NO: SM712

6	BO5027	Cap Screw	1
7	BO5870	Drive Screw	1
8	4326	Insert Locator	1
9		NOT USED	
10	BO5004	Cap Screw	1
11	BO5331	Mills;	1
12	4324	Back Plate	1
13	4327	Spigot	1
14	BO5501	Hex Screw	2
15	4325	Stem Holder	1
16	BO5915	Washer	2
17	BO5021	Cap Screw	2
18	BO5918	Washer	1
19	BO5011	Cap Screw	2
20	4323	Stem	1

SOLID GUIDE INSERTS - PART NUMBERS - ASSEMBLY NO: SM1950

ITEM 21

BLADE THICKNESS		DESCRIPTION	NO OFF
0.025"	4146/A	Guide Insert x 1/8" wide	2
0.025"	4148/A	Guide Insert x 1/4" wide	2
0.025"	4149/A	Guide Insert x 3/8" wide	2
0.025"	4150/A	Guide Insert x 1/2" wide	2
0.032"	4151/A	Guide Insert x 5/8" wide	2

SECTION 15

COMBINATION BLADE GUIDES

Combination blade guides, as the name implies, have two different functions. They can be set in the normal position (seeFig.7) and used for continuous high speed sawing, or they can be set at an angle see Fig.8) and used for angled sawing. Combination blade 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 all other blade guides and attachments on all models.

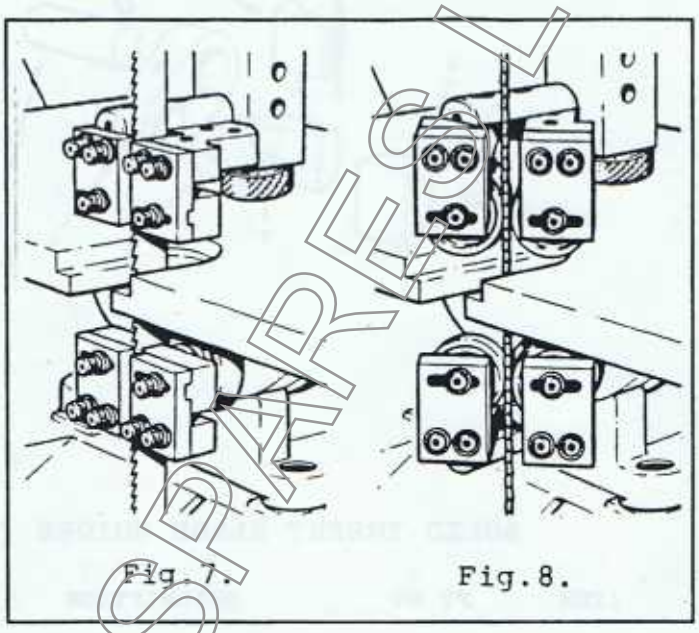


Fig.7. Fig.8.

Assemble the blade guides to the machine using the standardlocation 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 saw blade without deflecting is from a straight line. The arm (Item 30) may be set an angle to the guide body (Item 32). By this means the saw blade is twisted at an angle of 40o 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.9 & 10. When the guides are used in the angled position, side rollers must be fitted and the blade speed should not exceed 300 ft/min. (91 meters /min.).

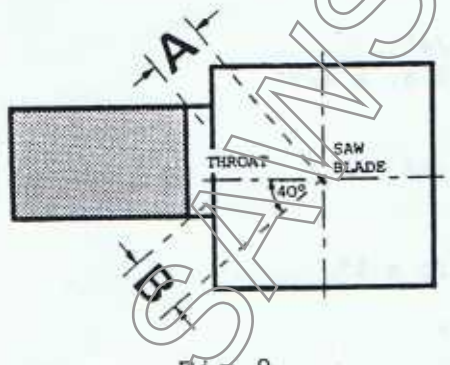


Fig.9.

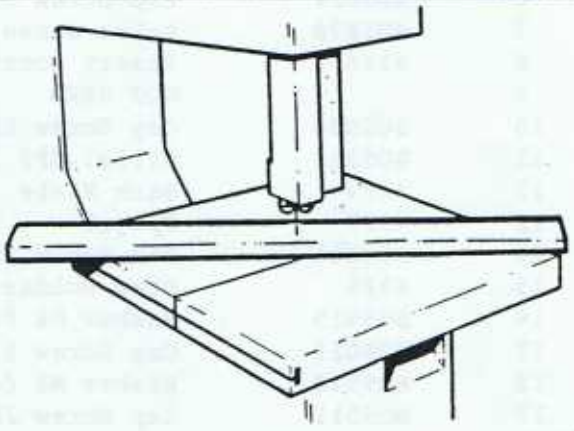
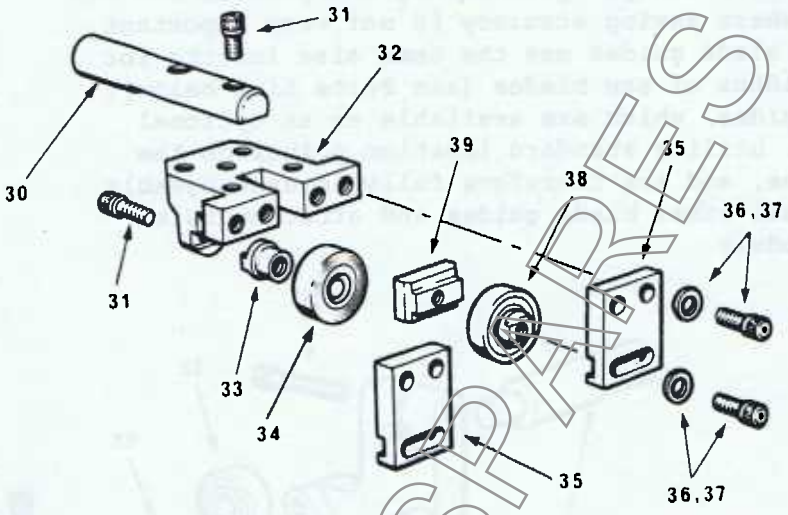


Fig.10.

APPROXIMATE THROAT CAPACITIES WITH SAW BLADE TWISTED AT 40o										
MACHINE TYPE	14"		18"		20"		24"		30"	
	ins	mm	ins	mm	ins	mm	ins	mm	ins	mm
DIMENSION 'A'	5.875	150	9.5	240	11	280	14	355	18.625	475
DIMENSION 'B'	7	175	10	255	11.25	285	13.75	350	17.625	450



COMBINATION GUIDES (UPPER & LOWER) - ASSEMBLY NO(S): SM290/A; SM290/B & SM290/C

NOTE ! Two (2) SM290 Combination Guide Assemblies req'd per machine. Quantities shown are for two assemblies.

ITEM	PT NO	DESCRIPTION	NO OFF
30	2563	Arm	2
31	BO5007	Cap Screw	1
32	2562	Guide Body	1
33	2565	Roller Spindle	1
34	BO2002	Bearing;	1
35	2564	Guide Bracket	1
36	BO5006	Cap Screw	1
37	BO5913	Washer	4

SIDE ROLLERS used on SM290/B & SM290/C only

38	SM306	Side Rollers for 5/8" wide blade	4
	SM307	Side Rollers for 1/2" wide blade	4

GUIDE INSERTS used on SM290/A only

39	SM316	Guide Inserts; 5/32"-1/8" wide blades	4
	SM317	Guide Inserts; 3/16"-1/4" wide blades	4
	SM318	Guide Inserts; 3/8" -1/2" wide blades	4
	SM319	Guide Inserts; -5/8" wide blades	4

SECTION 15

UNIVERSAL BLADE GUIDES

The universal blade guides (see Fig.11) are most suitable for high speed sawing and general cut-off work where sawing accuracy is not very important. These blade 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 all other blade guides and attachments on all models.

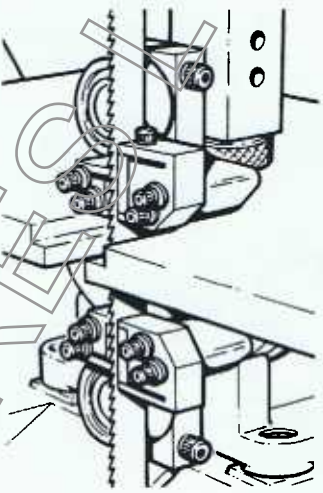
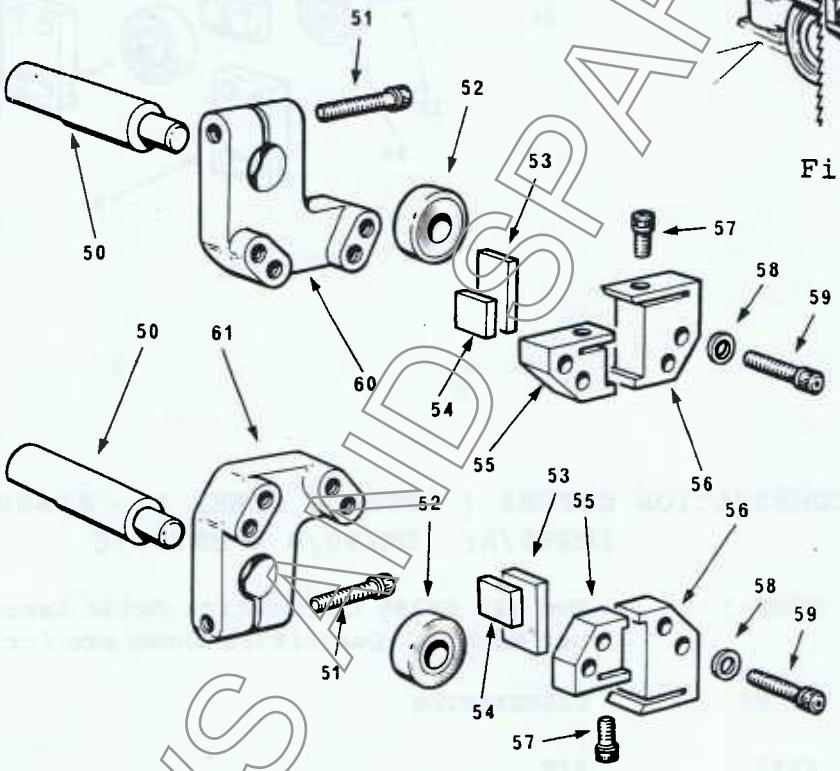


Fig.11.



UNIVERSAL BLADE GUIDES (UPPER) - ASSEMBLY NO: SM454
UNIVERSAL BLADE GUIDES (LOWER) - ASSEMBLY NO: SM455

NOTE ! Items 50 to 59 are common to both assemblies and quantities shown are for BOTH assemblies.

ITEM	PT NO	DESCRIPTION	NO OFF
50	3504	Support Arm	2
51	BO5011	Cap Screw;	1
52	BO2002	Bearing;	2
53	3512	Guide Insert - large	1
54	3513	Guide Insert - small	1
55	3505	Guide Holder	1
56	3506	Guide Holder	1
57	BO5001	Cap Screw;	2
58	BO5941	Washer	4
59	BO5003	Cap Screw;	4
60	3507	Guide Body - top	1
61	3508	Guide Body - bottom	1

UNIVERSAL ROLLER BLADE GUIDES

The universal roller blade guides (see Fig.12) are the most suitable for high speed sawing with light feed pressure and can be used with various widths of blades. To set guides, adjust thrust rollers (Item 78) to touch back of blade. Slacken off thumb screws (Item 71) and adjust rollers (Item 73) so they are set back clear of the saw teeth, and turn eccentric bushes (Item 74) so the rollers support the saw blade. The guides, which are available as an optional extra, utilise standard location points on the machine, and are therefore fully interchangeable with all other blade guides and attachments on all models.

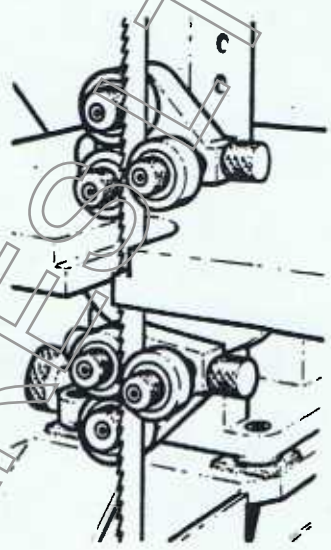
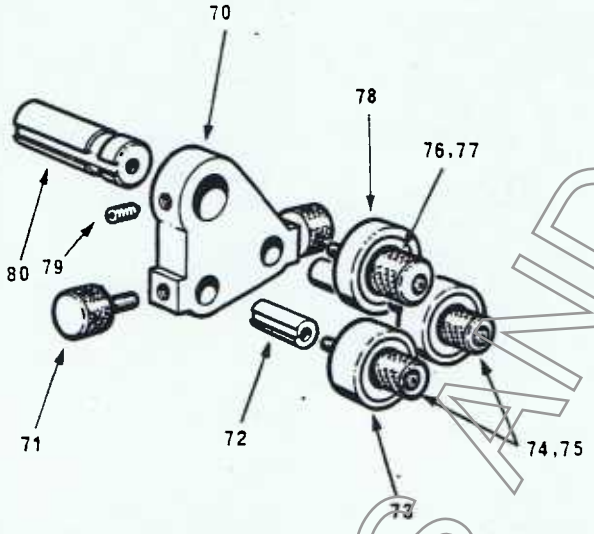
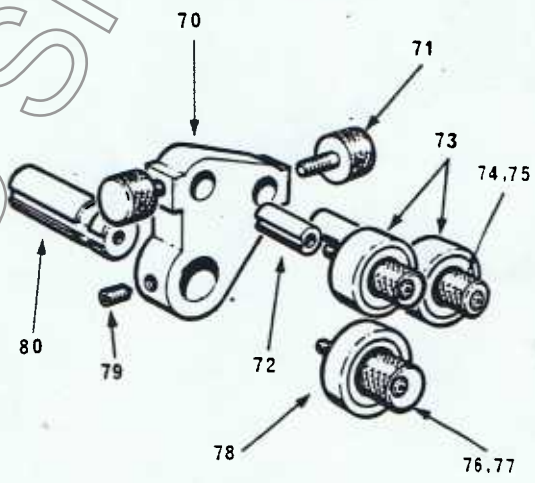


Fig.12.



UNIVERSAL ROLLER BLADE GUIDES - UPPER



UNIVERSAL ROLLER BLADE GUIDES - LOWER

UNIVERSAL ROLLER BLADE GUIDES (UPPER) - ASSEMBLY NO: SM1559/A
UNIVERSAL ROLLER BLADE GUIDES (LOWER) - ASSEMBLY NO: SM1559/B

NOTE ! Quantities shown are for BOTH assemblies.

ITEM	PT NO	DESCRIPTION	NO OFF
70	7467	Guide Body	1
71	2535	Thumb Screw	2
72	7466	Guide Roller Spindle	2
73	BO2010	Bearing;	2
74	2458	Guide Roller Bush	2
75	BO5012	Cap Screw;	2
76	2459	Thrust Roller Bush	1
77	BO5011	Cap Screw;	1
78	BO2002	Bearing;	1
79	BO5194	Set Screw;	2
80	2456	Thrust Roller Spindle	1

SAW AND SPEED SELECTION CHART.

MATERIAL	WATER TO STARCOOL RATIO		MATERIAL THICKNESS UNDER 0.25"	0.25"-0.5"	0.5"-1"	OVER 1"
ANALINE FORMALDEHYDE	-	FPM	3500	3200	3000	2900
		TPI	18	14	10	3S
ALUMINIUM - Die Casting	20	FPM	1500	1200	900	750
		TPI	18	10	8	6S
ALUMINIUM - Sand Cast Alloy	20	FPM	1200	1000	800	600
		TPI	18	14	10	6S
ALUMINIUM - Rolled & Extruded Sections	20	FPM	2500	2000	1500	1400
		TPI	18	10	8	6S
ASBESTOS - Corrugated	-	FPM	3000	3000	3000	3000
		TPI	14	10	6	3S
ASBESTOS - Paper	-	FPM	3000	3000	3000	2800
		TPI	10	8	6	3S
ASBESTOS - Wall-Board	-	FPM	150	100	100	100
		TPI	14	10	6	3S
BABBIT	20	FPM	2500	2000	1500	1200
		TPI	18	14	8	6
BAKELITE	-	FPM	2500	2300	2000	1500
		TPI	14	10	8	6S
BERYLLIUM	-	FPM	175	150	100	75
		TPI	18	14	10	8
BONE	-	FPM	3500	3200	3000	3000
		TPI	10	8	6	3S
BRAKE LINING	-	FPM	300	250	200	200
		TPI	14	10	8	6
BRASS - Cast	-	FPM	350	300	200	150
		TPI	18	14	6	3S
BRASS - Soft Commercial	-	FPM	2500	2000	1500	1300
		TPI	18	14	8	6
BRONZE - AlumiNIUM	-	FPM	330	320	300	250
		TPI	18	14	10	6
BRONZE - Menganese	-	FPM	800	600	350	300
		TPI	18	14	8	6
BRONZE - Phosphor	-	FPM	500	350	300	250
		TPI	18	14	8	6
BRONZE - Silicon	-	FPM	1200	900	600	400
		TPI	18	14	10	6
CADMIUM	-	FPM	3500	3200	3000	2800
		TPI	10	8	6H	3S
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	300	300	2500
		TPI	14	10	8	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 0.25"	0.25"-0.5"	0.5"-1"	OVER 1"
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
FIBRE 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 FIBRE	-	FPM	1000	1000	1000	1000
		TPI	18	14	10	6H
GRAPHITE	-	FPM	3000	3000	3000	2500
		TPI	18	14	10	4H
HORN - Animal	-	FPM	2500	2000	1500	1200
		TPI	24	18	14	10
IRON - Grey Cast	-	FPM	200	150	125	100
		TPI	24	18	14	10
IRON - Malleable	-	FPM	275	260	230	200
		TPI	18	14	10	6
IRON - Meehanite	-	FPM	150	130	120	110
		TPI	18	14	10	6
LEAD	20	FPM	3000	2500	1800	1200
		TPI	18	14	10	6S
LEATHER	-	FPM	3500	3200	3000	2800
		TPI	14	10	6	3S
LINEN	-	FPM	3500	3500	3500	3500
		TPI	KN	KN	SC	SC
MAGNESIUM	W	FPM	3500	3300	3200	3000
		TPI	14	10	6H	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 0.25"	0.25"-0.5"	0.5"-1"	OVER 1"
MICA	-	FPM	225	225	200	200
		TPI	18	14	10	8
MONEL	-	FPM	150	125	50	50
		TPI	18	14	8	6H
NEOPRENE	-	FPM	3000	2800	2500	2300
		TPI	10	8	6	4H
NICKEL SILVER	20	FPM	300	250	200	180
		TPI	18	14	10	6
PAPER - Sheet	-	FPM	3000	3000	2500	2500
		TPI	18	14	10	6H
PAPER - Tissue	-	FPM	3500	3500	3500	3000
		TPI	18	14	10	6H
PERSPEX	20	FPM	3500	3500	3000	2500
		TPI	14	10	6	3S
PHENOL FORMALDEHYDE	-	FPM	3500	3500	3000	3000
		TPI	14	10	6	3S
PLEXIGLASS	-	FPM	3500	3500	3000	2500
		TPI	14	10	6	3S
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 Hard'g	20	FPM	180	160	150	140
SAE1010;1012;1016; EN32A/B		TPI	24	14	10	6H
STEEL - 0.2% Carbon	20	FPM	240	210	180	160
SAE101-1023; EN3		TPI	24	14	10	6H
STEEL - Carbon Manganese	20	FPM	240	220	200	175
SAE1024; 1027; EN14		TPI	18	14	10	6
STEEL - 0.3% Carbon	20	FPM	230	200	180	160
SAE1029; 1030; EN5		TPI	24	14	10	6
STEEL - 0.4% Carbon	20	FPM	200	150	125	100
SAE1037-1040; EN8		TPI	24	14	10	6
STEEL - 0.55% Carbon	20	FPM	200	150	125	100
SAE1054; 1055; EN9		TPI	24	14	10	6H
STEEL - Low Carbon F/Cut	20	FPM	250	220	200	180
SAE1111-1113;1211-1213;1215;EN1		TPI	18	14	10	6H
STEEL - Case Hard F/Cut	20	FPM	200	190	180	160
SAE1115;1117;EN32M;202		TPI	24	14	10	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 0.25"	0.25"-0.5"	0.5"-1"	OVER 1"
STEEL - 0.4% Carbon F/Cut	20	FPM	230	200	180	160
SAE1137-1141; EN8M		TPI	24	14	10	6
STEEL - 3% Nickel	20	FPM	150	125	100	90
SAE2317; 2330-2345; EN33,51		TPI	18	14	10	6H
STEEL - 1% Chrome Molybdenum	20	FPM	150	100	90	60
SAE4130-4140; EN19,20		TPI	18	14	10	6H
STEEL - 1.5% Nickel Chrome	15	FPM	150	125	100	75
Moly; SAE4340; EN24		TPI	18	14	10	6H
STEEL - 2% Nickel Moly	15	FPM	150	125	100	75
SAE4640; EN160		TPI	18	14	10	6H
STEEL - 1% Chrome Vanadium	15	FPM	175	125	100	75
SAE6150; EN47		TPI	18	14	10	6H
STEEL - Nickel Chrome Moly	20	FPM	140	110	90	70
SAE8616-8645; EN100		TPI	18	14	10	6H
STEEL - Silicon Manganese	20	FPM	160	140	125	100
SAE9255EN45		TPI	18	14	10	6H
STEEL - 3% Nickel Chrome	15	FPM	125	100	80	60
SAE9310-9217; EN36		TPI	18	14	10	6H
STEEL - 1% Carbon Chrome	15	FPM	160	130	100	75
SAE50100-52100; EN31		TPI	24	14	10	6H
STEEL - Die	15	FPM	125	100	80	60
D-2; D-3		TPI	18	14	10	6H
STEEL - Die	15	FPM	100	80	65	60
D-7		TPI	24	18	10	6H
STEEL - Hot Working	15	FPM	125	100	75	60
H-12; H-13; H-21		TPI	18	14	10	6H
STEEL - Tool	15	FPM	115	95	60	65
L-6; L-7		TPI	18	14	10	8
STEEL - High Speed	20	FPM	185	150	125	90
M-1		TPI	18	14	10	6H
STEEL - High Speed	15	FPM	130	100	80	60
M-2 to M-5; M-10		TPI	18	14	10	6H
STEEL - Die	20	FPM	175	150	125	100
O-1; O-2		TPI	18	14	10	6H
STEEL - Die	20	FPM	210	180	150	120
O-6		TPI	18	14	10	6H
STEEL - Shock Resisting	15	FPM	125	100	80	65
S-1		TPI	18	14	10	6H
STEEL - Shock Resisting	15	FPM	100	80	60	55
S-2; S-5		TPI	18	14	10	6H
STEEL - High Speed	15	FPM	140	110	90	70
T-1; T-2		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

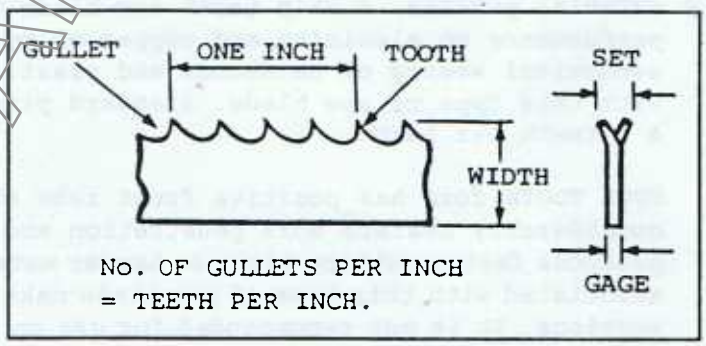
SAW AND SPEED SELECTION CHART.

MATERIAL	WATER TO STARCOOL RATIO		MATERIAL THICKNESS UNDER 0.25"	0.25"-0.5"	0.5"-1"	OVER 1"
STEEL - High Speed	15	FPM	115	95	85	70
T-4; T-5; T-6; T-8		TPI	18	14	10	6H
STEEL - Water Hardening	20	FPM	175	150	125	100
		TPI	18	14	10	6H
STRAW BOARD	-	FPM	3500	3500	3000	3000
		TPI	14	10	8	6S
STRING	-	FPM	3500			
		TPI	SC			
TUFNOL	-	FPM	2500	2300	2000	1500
		TPI	14	10	6H	6H
WOOD	-	FPM	3600	3600	3600	3600
		TPI	14	10	6H	4H
ZINC	20	FPM	2500	2300	2000	1500
		TPI	14	10	6H	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.



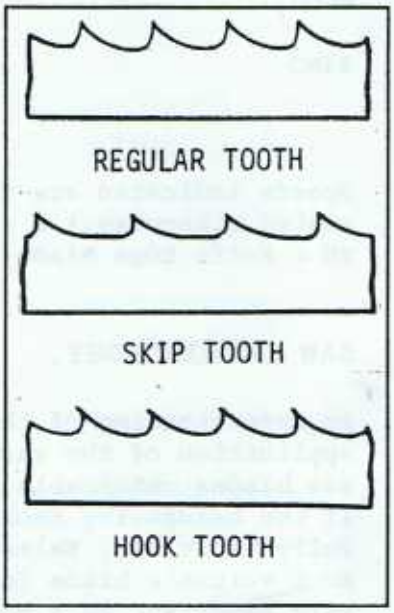
TOOTH PITCH is important if optimum blade performance is to be obtained. Tooth pitch is determined mainly on the basis of material thickness and to some extent on material hardness. For a given material thickness, a tough or abrasive material will require more teeth in engagement than a soft ductile 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.

TOOTH PITCH - continued

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 basis 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 / inch.



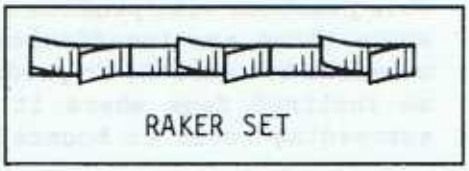
SKIP TOOTH form is similar to the regular tooth form but alternate teeth are omitted, a design which allows greater gullet capacity without unduly weakening the body of the blade. Providing the thickness of the material permits, a skip tooth saw blade will give best performance on aluminium and copper 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.

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.

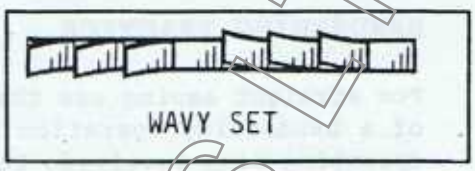
TOOTH SET is the angling of the saw teeth so that the tips protrude beyond the body of the saw blade. The width of the saw cut produced provides the working clearance necessary for the body of the saw blade and permits some degree of steering to negotiate curves.

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.

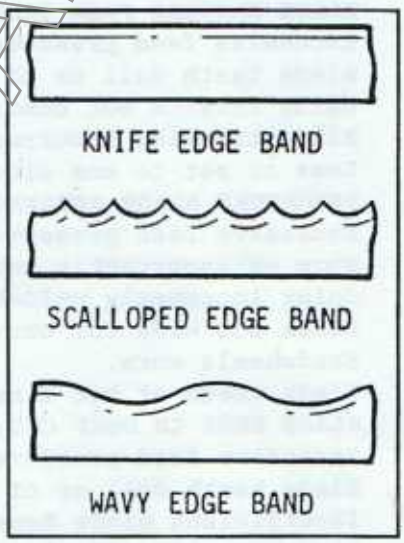


WAVY SET blades have the teeth alternately set to the left and right in groups or waves. With this formation of tooth set, relatively few teeth are cutting at the side of the kerf and therefore there is some tendency for the saw blade to jam when sawing abrasive materials.



SAW GAUGE is the actual thickness of the body of the saw blade. Some makers produce special gauge saw blades for specific purposes but generally saw blades up to and including 1/2" wide are .025", 5/8" and 3/4" wide are .032", and 1" wide are .035" gauge 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.



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	1/8"	3/16"	1/4"	3/8"	1/2"	5/8"	3/4"
MINIMUM SAWING RADIUS	5/16"	5/8"	1"	11/2"	21/2"	4"	53/4"

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

SECTION 16

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. 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.

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 1/2"-3".

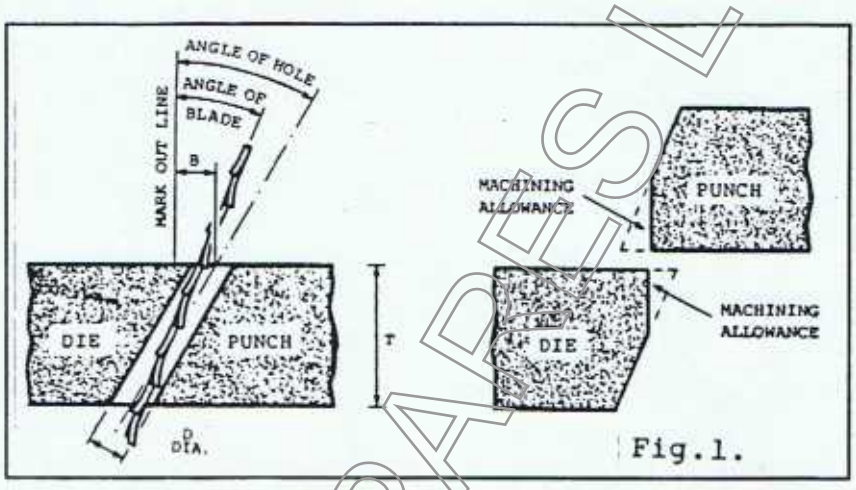


Fig.1.

DIE THICKNESS T.	1/2"	3/4"	1"	11/4"	11/2"	13/4"	2"	21/2"	3"
BLADE WIDTH B	1/8"	1/8"	1/8"	1/16"	1/16"	1/16"	1/16"	1/4"	1/4"
ANGLE OF HOLE (DEG)	37.0	26.5	20.5	24.0	20.5	18.0	15.5	16.5	14.0
HOLE DIA. D.	3/16"	3/16"	3/16"	9/32"	9/32"	9/32"	9/32"	3/8"	3/8"
ANGLE OF BLADE	26.5	18.5	14.0	16.5	14.0	12.0	10.5	11.5	9.5

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

Let T = Die Thickness
B= width of selected saw blade
Then:- Starting hole diameter = 3B/T
Starting hole centre to mark out line =B
Tangent of starting hole angle 3B/T
Tangent of saw blade angle = 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 OFANGLES

TANGENT	0.017	0.035	0.052	0.070	0.087	0.105	0.123	0.140	0.158	0.176	0.194
ANGLE	1	2	3	4	5	6	7	8	9	10	11
TANGENT	0.213	0.231	0.249	0.268	0.287	0.306	0.325	0.344	0.364	0.384	0.404
ANGLE	12	13	14	15	16	17	18	19	20	21	22
TANGENT	0.424	0.445	0.466	0.488	0.510	0.532	0.544	0.577	0.601	0.625	0.649
ANGLE	23	24	25	26	27	28	29	30	31	32	33
TANGENT	0.675	0.700	0.727	0.754	0.781	0.810	0.839	0.869	0.900	0.933	0.966
ANGLE	34	35	36	37	38	39	40	41	42	43	44

BUTT-WELDING SAW BLADES

The process of butt-welding consists of clamping the saw biade 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.1.

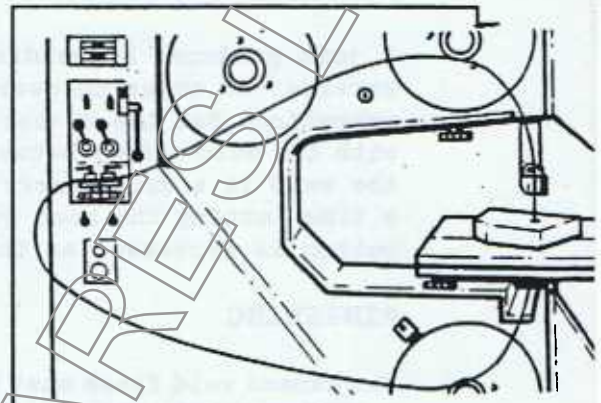


Fig.1.

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 saw blade are sheared square in both planes and without burr. 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 11/2in. 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.2. 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.

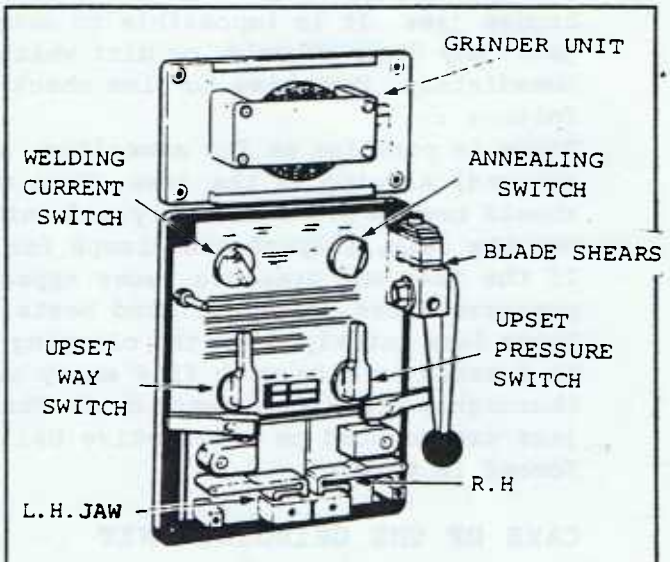


Fig.2.

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

SECTION 19

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 switch 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 colour.

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 anyway.

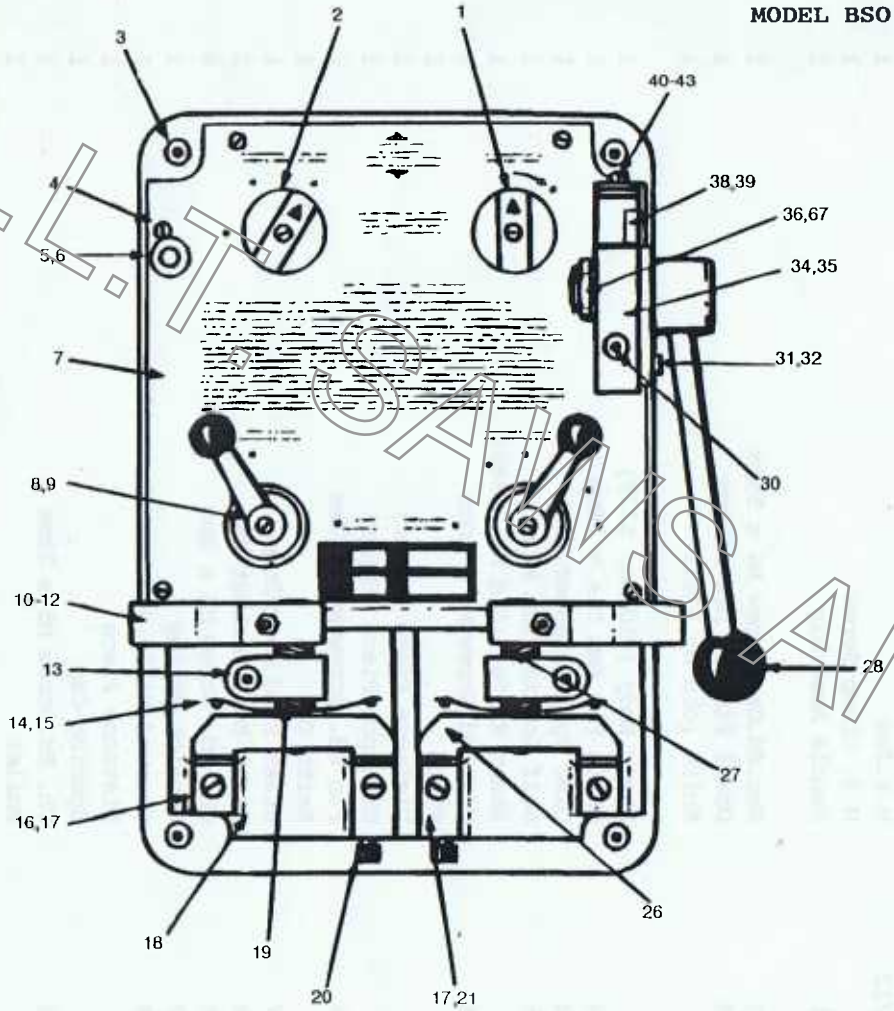
CARE OF THE GRINDING UNIT

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** : A46PV; **Max. speed:** 3000 r.p.m. Synchronous

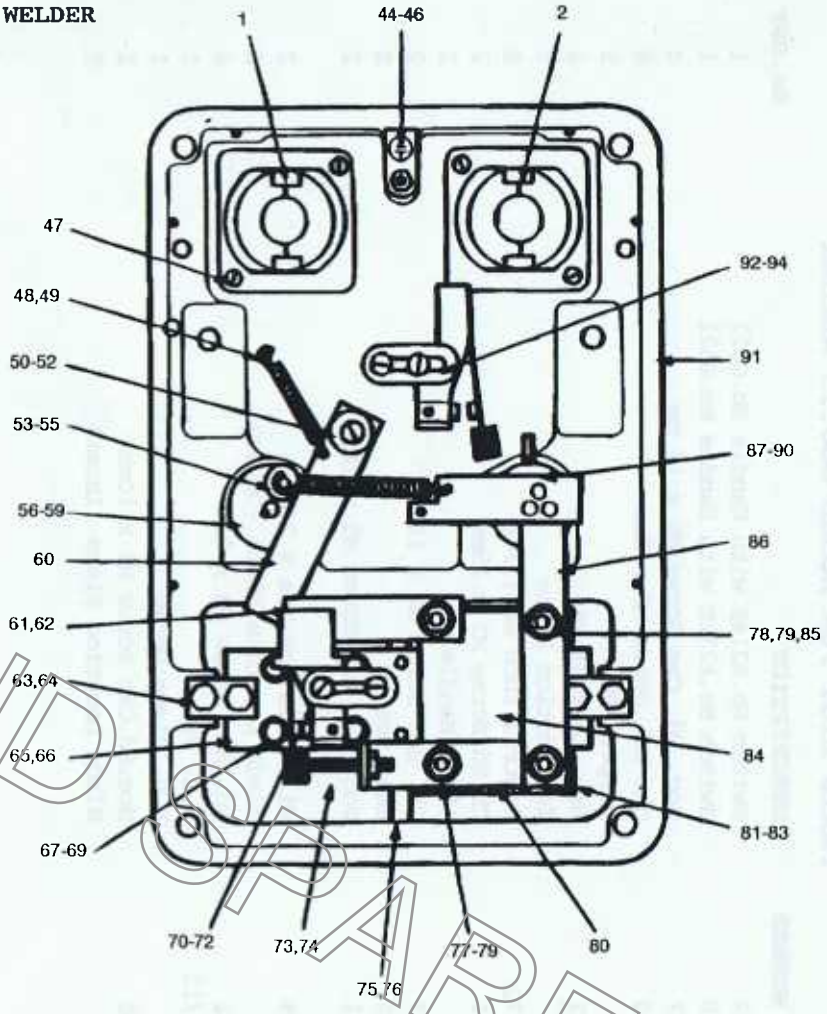
PARTS LIST FOR MODEL BSO.16 WELDER

ITEM	PART NUMBER	DESCRIPTION	No.OFF
1	BO1329	Switch No.A214E with Handle No.G521	1
2	BO1328	Switch No.A231E with Handle No.G521	1
3	BO5067	Soc. Hd.	4
4	BO7750	Ch. Hd. Screw	6
5	5385	Support Bolt	1
6	BO5752	Hex. Locknut	1
7	5285	Instruction Plate	1
8	BOS1172	Control Knob	2
9	BO7751	Ch.Hd.Screw	2
10	5247	Clamp Handle	2
11	BO5477	Ch. Hd. Screw	2
12	BO5712	Hex. Nut	2
13	BO5061	Soc. Hd. Cap Screw	2
14			
15	BO7769	Mills Pin	2
16	5259	Blade Location Plate (Outer)	2
17	BO7752	Rd. Hd. Screw	4
18	EAB90/12	L.H. Jaw	1
19	5246	L.H. Clamp Screw	1
20	BO5059	Soc.Hd.Cap Screw	2
21	5260	Blade Location Plate (Inner)	2
22			
23			
24			
25			
26	EAB90/12	R.H.Jaw	1
27	5245	R.H. Clamp Screw	1
28	SM1391	Handle Assembly	1
29			
30	BO5072	Soc.Hd.Cap Screw	1
31	BO5890	Dowel Pin	1
32	6665	Knife (Old No.5381)	1
33			
34	6663	Shear Body (Old No. 5379)	1
35	BO7754	Mills Pin	1
36	BO2244	Disc Spring Washer	1
37	BO5755	Self Locking Nut	1
38	6664	Shear Knife (Old No. 5380)	1
39	BO7755	C'sk.Hd.Screw	2
40	5383	Plate	2
41	5382	Distance Piece (Lower)	1
42	5384	Distance Piece (Upper)	1
43	BO7756	Pan Hd. Screw	1
44	3879	Earth Tag	1
45	BO7757	Brass Stud	1
46	BO7758	Brass Hex. Locknut	2
47	BO5476	Ch. Hd. Screw	4
48	BO5427	Tension Spring	1
49	BO7759	Grooved Mills Pin	1
50	5423	Distance Piece	1
51	5425	Spacing Cap	1
52	BO5478	Ch. Hd.Screw	1
53	5424	Roller	1

(CONTINUED)



FRONT VIEW



REAR VIEW
(WITH TRANSFORMER REMOVED)

PARTS LIST FOR MODEL BSO.16 WELDER - CONTINUED

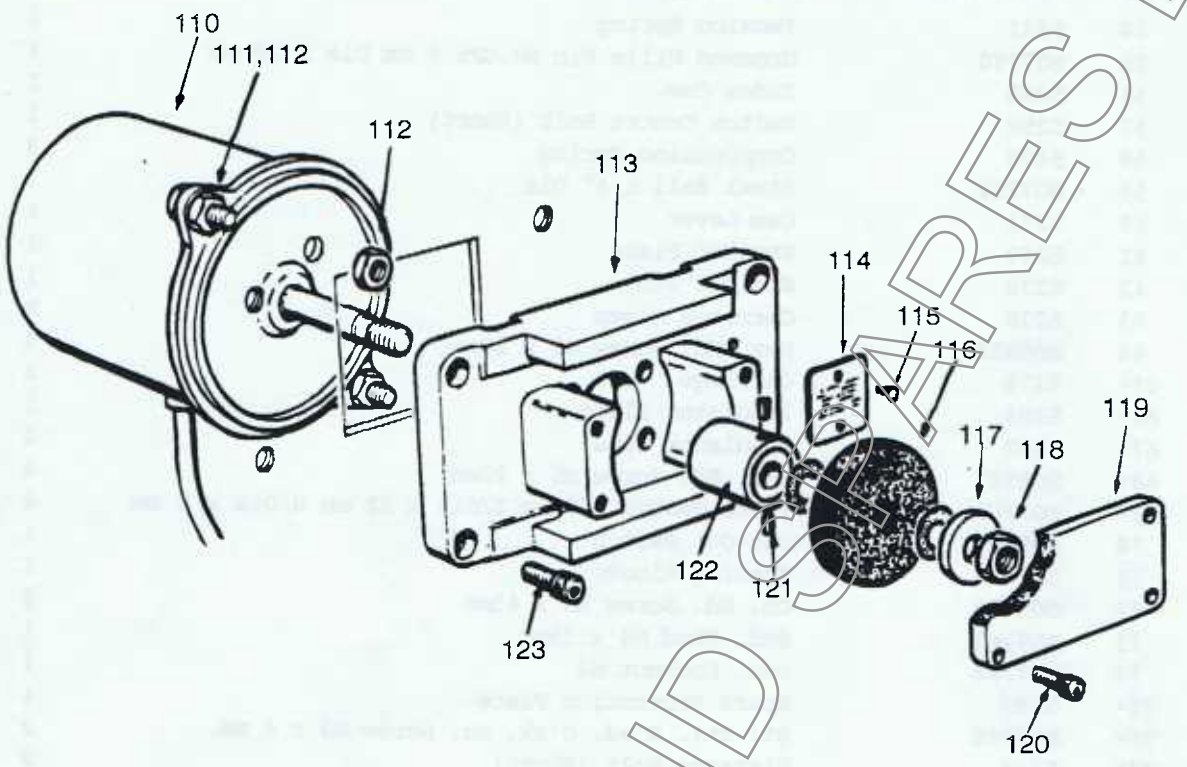
ITEM	PART NUMBER	DESCRIPTION	No.OFF
54	5431	Tension Spring	1
55	BO7760	Grooved Mills Pin	1
56	5268	Index Cam	1
57	5250	Switch Centre Bolt (Short)	1
58	5426	Compression Spring	3
59	BO7761	Steel Ball	3
60	5271	Cam Lever	1
61	5269	Striker Plate	1
62	5270	Striker Pin	1
63	5276	Carriage Clamp	2
64	BO5552	Hex. Hd. Screw	4
65*	5278	Carriage	1
66*	5281	Insulator Plate	1
67*	5282	Insulator Tube	4
68*	BO5547	Hex. Hd. Screw	4
69*	BO7762	Fibre Washer	4
70	SM980	Cut-Out Switch	1
71	5430	Spacing Block	1
72	BO5479	Ch. Hd. Screw	2
73	BO7763	Std. Stud	1
74	BO7764	Hex. Locknut	1
75*	5283	Spark Protection Plate	1
76*	BO7765	St. Stl. R'sd. C'sk. Hd.	2
77*	5274	Distance Bolt (Short)	2
78*	BO5751	Hex. Locknut	4
79*	BO5713	Hex. Nut	5
80	5272	Switch Bracket	1
81*	SM944	Hair Pin & Strip Assembly	4
82*	5279	Slide Rail L.H. & R.H.	1
83*	BO7766	Steel Ball	14
84*	5273	Connection Plate	1
85*	5275	Distance Bolt (Long)	2
86	SM936	Cam Striker	1
87	5251	Switch Centre Bolt (Long)	1
88	5252	Centre Cam	1
89	BO7767	Dowel Pin	1
90	BO5340	Sel-lock Pin	1
91	5240	Front Plate	1
92	SM981	Start Switch	1
93	5428	Spacing Block	1
94	BO7768	Ch. Hd. Screw	2

NOTE * ITEMS INCLUDED ON SM945 CARRIAGE ASSEMBLY

NOT ILLUSTRATED:

Transformer (State Voltage)

GRINDER - ASSEMBLY No.SM918



ITEM	PART NUMBER	DESCRIPTION	No.OFF
110	STARCRO091	Motor (1PH)	1
	STARCRO092	Motor (3PH)	1
111	BO5548	Hex.Hd.Screw	2
112	BO5713	Hex. Nut	4
113	4565	Mounting Plate	1
114	4567	Speed Plate (50Hz)	1
	4670	Speed Plate (60Hz)	1
115	BO5871	Hammer Drive Screw	2
116	BO2570	Grinding Wheel	1
117	5084	Washer	1
118	BO5716	Hex. Nut	1
119	4566	Guard Plate	1
120	BO5007	Soc. Hd. Cap Screw	4
121	BO5186	Soc. Set Screw	2
122	5189	Collar	2
123	BO5067	Soc. Hd. Cap Screw	4

CHIPBLOWER ASSEMBLY

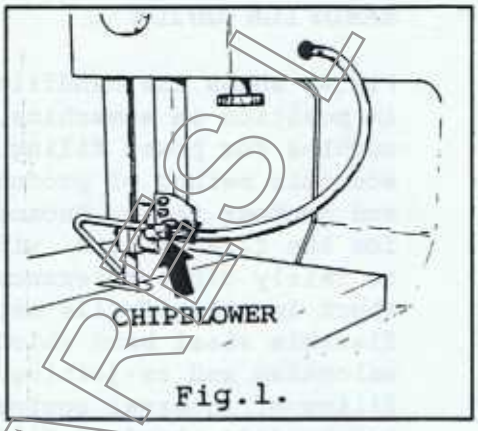


Fig.1.

Fig.1. shows the chipblower which gives a constant supply of air to the cutting area removing chips & swarf and allowing the operator to follow the cut line accurately. The air pump/compressor is mounted on a seperate platform behind the motor platform and driven from a vee belt from the main motor.

AIR/SPRAY COOLANT KIT

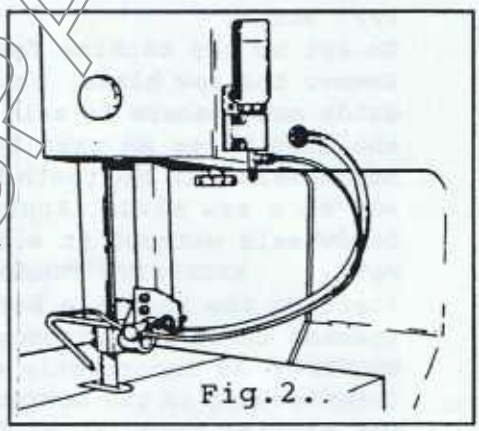


Fig.2..

Fig.2. shows the air/spray coolant kit (Part No.SM2021) 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.

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

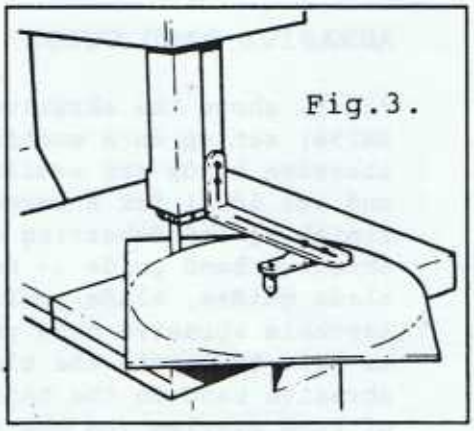


Fig.3.

Fig.3. shows the circle cutting attachment (Part No.SM260) 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.

SECTION 21

BANDFILE GUIDE

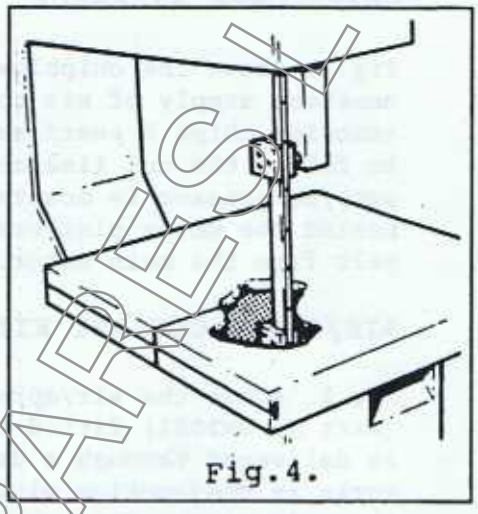


Fig.4.

Fig.4. shows the bandfile guide (Part No. SM287) 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 attatched 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 1/4",3/8", or 1/2" 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 importantthat 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

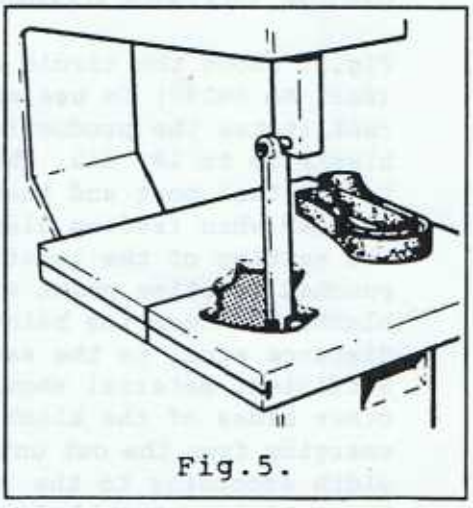


Fig.5.

Fig.5. shows the abrasive band guide (Part No. SM298) 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 1/4" wide blade. Align face of guide to back of band. Use highest blade speed available.

RIP FENCE

Fig.6. shows the rip fence (Part No.SM302) 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.

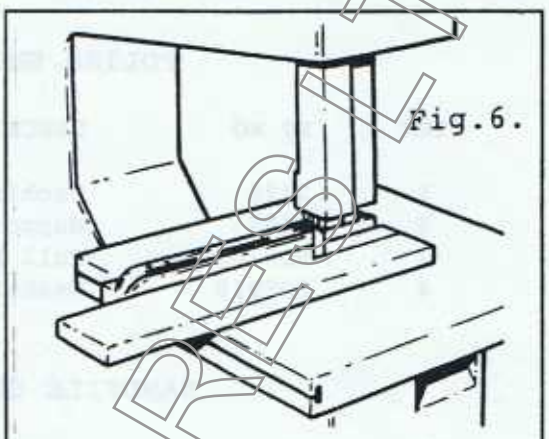


Fig.6.

PUSHER ATTACHMENT

Fig.7. shows the pusher attachment (Part No. SM198/B) in use on a machine. The pusher provides an easy means of feeding and controlling the workpiece.

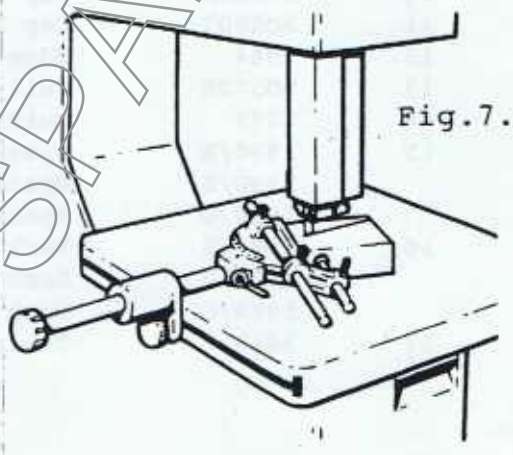


Fig.7.

GEARED PUSHER ATTACHMENT

Fig.8. shows the geared pusher attachment (Part No. SM46/A) in use on a machine. On machines with fixed tables somemechanical 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.

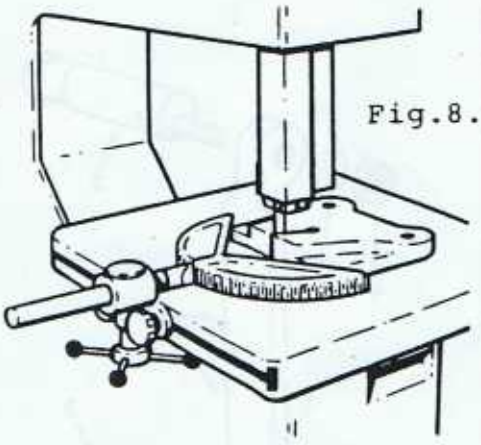


Fig.8.

WORKLIGHT

Fig.9. shows the worklight which plugs into the machine on a low voltage circuit. The magnetic base and flexible arm allow the light to be positioned anywhere to give good illumination of the workpiece and the optional magnifying lens allows greater accuracy.
NOTE : The worklight and magnifying lens are supplied as seperate items.

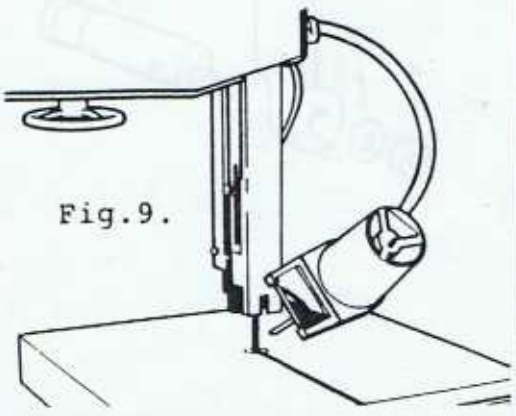


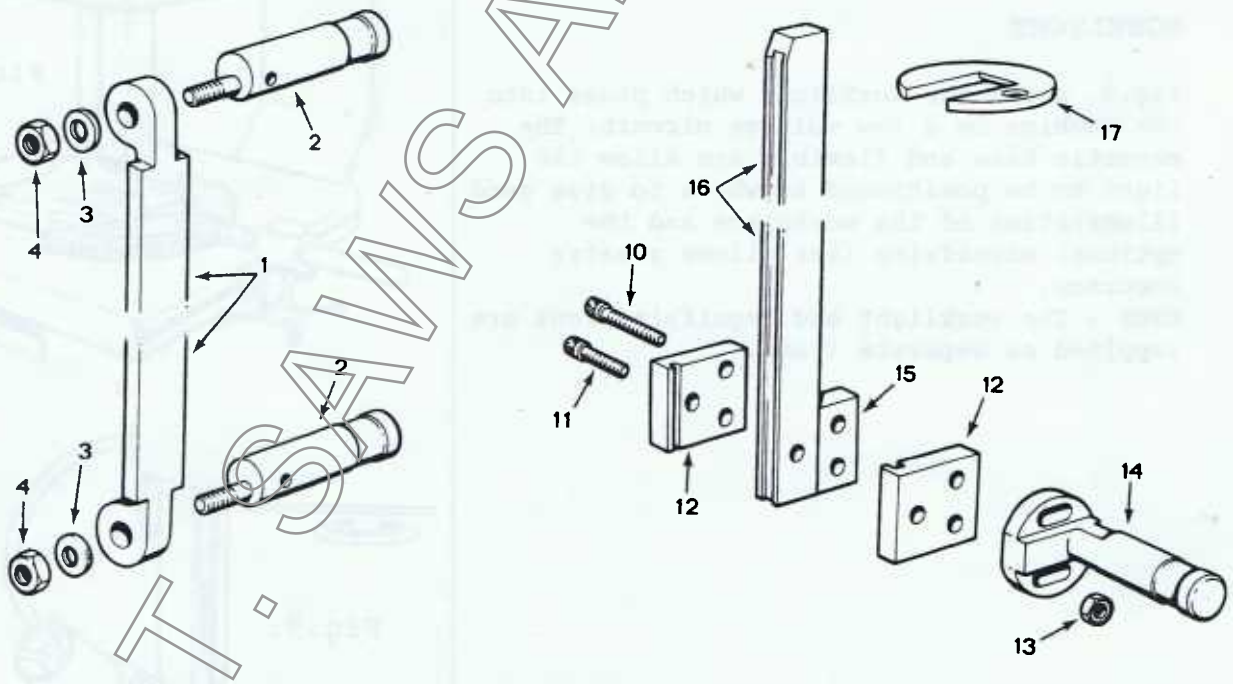
Fig.9.

POLISH GUIDE - ASSEMBLY NO: SM298

ITEM	PT NO	DESCRIPTION	NO OFF
1	2426	Backing Plate	1
2	2425	Support Arm	2
3	BO5703	Full Nut	2
4	BO5918	Washer	2

BANDFILE GUIDE - ASSEMBLY NO: SM287

10	BO5012	Cap Screw;	4
11	BO5007	Cap Screw;	1
12	1984	Edge Guide	4
13	BO5700	Full Nut	4
14	2377	Guide Bracket	2
15	1990/A	Spacer 1/4"	2
	1990/B	Spacer 3/8"	2
	1990/C	Spacer 1/2"	2
16	1989/A	Back Guide 1/4"	1
	1989/B	Back Guide 3/8"	1
	1989/C	Back Guide 1/2"	1
17	3613	Table Insert	1



SECTION 21

CIRCLE CUTTING ATTACHMENT - ASSEMBLY NO: SM260

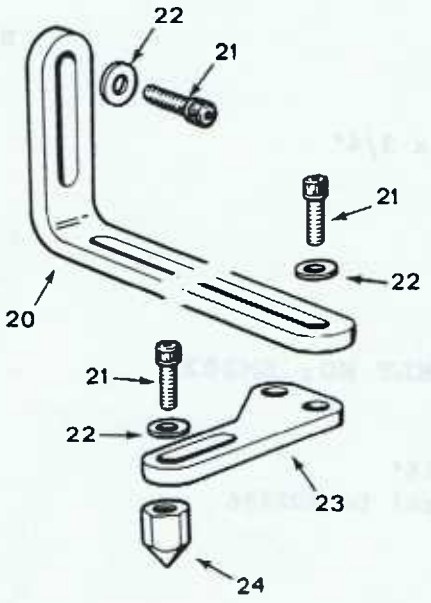
ITEM	PT NO	DESCRIPTION	NO OFF
20	2545	Arm	1
21	BO5019	Cap Screw;	5
22	BO5915	Washer	5
23	2544	Centre Bracket	1
24	2543	Centre Pin	1

COOLANT (PK115) ASSEMBLY NO: SM2021

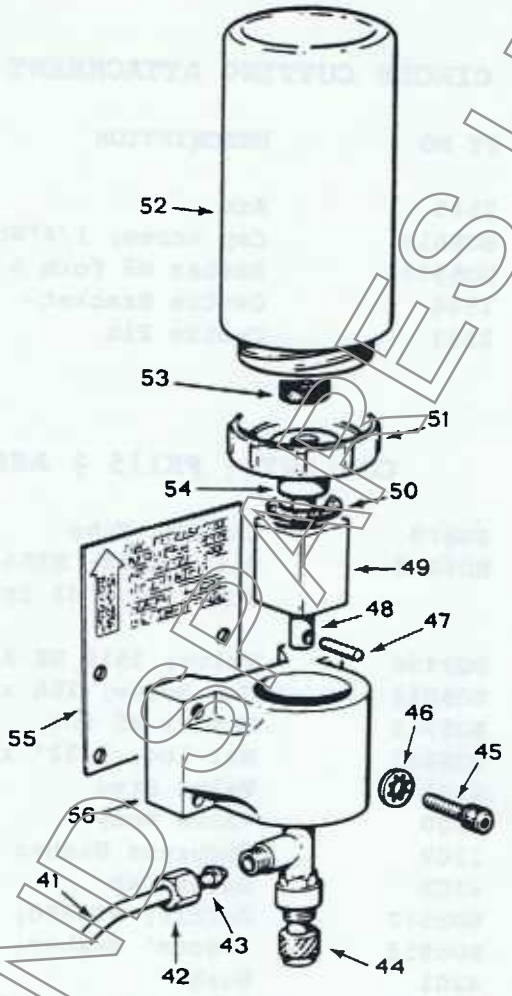
40	SM679	Coolant Tube	1
41	BO6382	Black Tube;	0.91
42		Items 42 & 43 integral to BO2456	
43			
44	BO2456	Valve;	1
45	BO5011	Cap Screw;	4
46	BO5942	Washer	4
47	BO5367	Sel-loc;	1
48	4202	Valve Stem	1
49	4200	Valve Body	1
50	1209	Neoprene Washer	1
51	4203	Screw Cap	1
52	BO2572	Bottle;	1
53	BO5958	'Vacca' Washer;	1
54	4201	Bush	1
55	4204	Instruction Plate; Coolant	1
56	4199	Mounting Bracket	1

RIP FENCE - ASSEMBLY NO: SM302

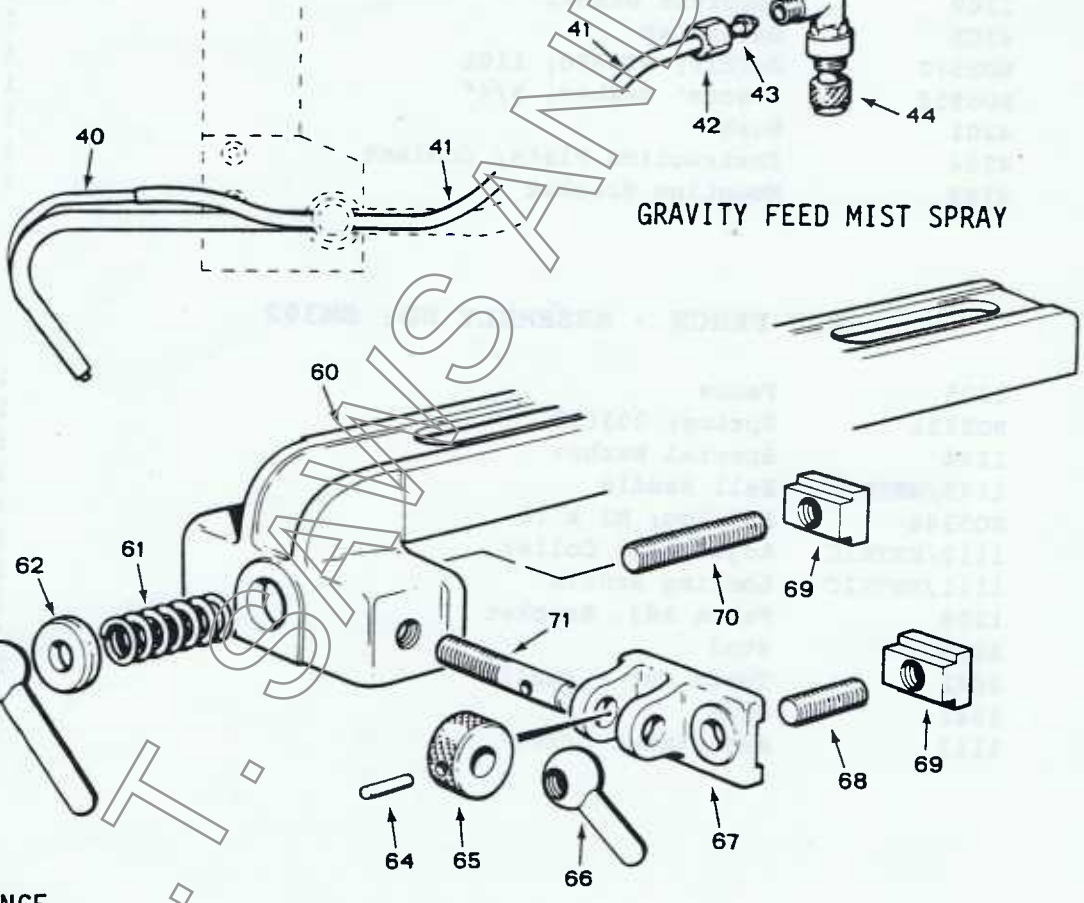
60	1205	Fence	1
61	BO2231	Spring;	1
62	1114	Special Washer	1
63	1143/METRIC	Ball Handle	1
64	BO5346	Sel-loc;	1
65	1112/METRIC	Adjustment Collar	1
66	1111/METRIC	Locking Handle	1
67	1206	Fence Adj. Bracket	1
68	3229	Stud	1
69	2842	Tenon Nut - small	2
70	2841	Stud	1
71	1113	Adjustment Screw	1



CIRCLE CUTTING
ATTACHMENT



GRAVITY FEED MIST SPRAY



RIP FENCE

MITRE GUAGE & PUSHER ATTACHMENT - ASSEMBLY NO: SM198/B

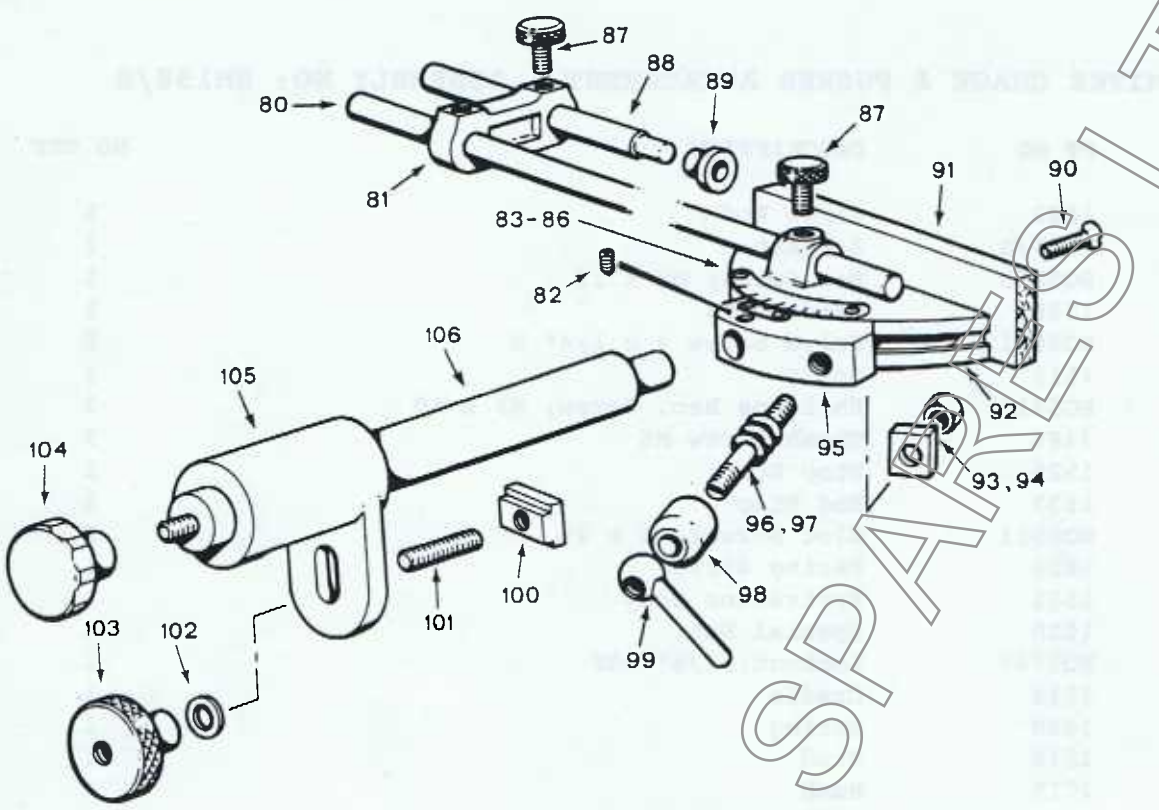
ITEM	PT NO	DESCRIPTION	NO OFF
80	1822	Gauge Rod	1
81	1507/A	Bracket	1
82	BO5195	Set Screw;	1
83	1388	Zero Plate	1
84	BO5871	Drive Screw	2
85	1513	Scale	1
86	BO5415	Phillips Rec. Screw;	2
87	7486	Thumb Screw	3
88	1526	Stop Rod	1
89	1837	End Stop	1
90	BO5311	Slot Screw;	2
91	1821	Facing Strip	1
92	1511	Protractor Body	1
93	1820	Special Nut	1
94	BO5747	Locknut;	1
95	1514	Cradle	1
96	1499	Spring	1
97	1516	Stud	1
98	1515	Bush	1
99	1143/METRIC	Ball Handle	1
100	2842	Tenon Nut - small	1
101	3229	Stud	1
102	BO5919	Washer	1
103	2513/METRIC	Hand Knob	1
104	5130	Handknob; RH	1
105	2512	Housing	1
106	2514/A	Shaft; long	1

GEARED PUSHER ATTACHMENT - ASSEMBLY NO: SM46/A

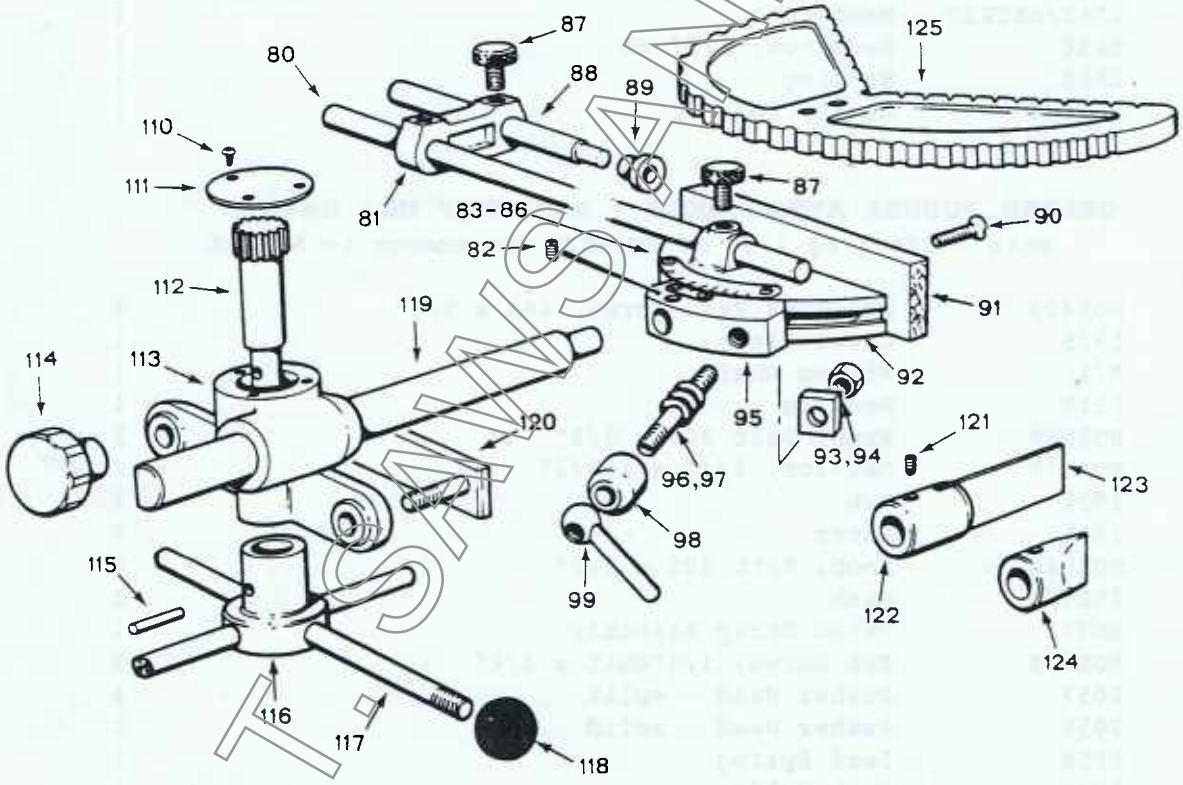
Note ! Items 80 - 99 of SM198/B are common to SM46/A

110	BO5405	Phillips Rec. Screw;	3
111	1525	Cover Plate	1
112	971	Pinion Shaft	1
113	1519	Housing	1
114	BO2539	Knob;	2
115	BO5379	Sel-loc;	1
116	1522	Hub	1
117	1391	Lever	4
118	BO2540	Knob;	4
119	1524/B	Rack	1
120	SM351	Tenon Strip Assembly	1
121	BO5163	Set Screw;	3
122	2057	Pusher Head - split	1
123	2058	Pusher Head - solid	1
124	2056	Leaf Spring	1
125	2008	Work Holder	1

NOTE ! Not Illustrated is Tecalemit Grease Nipple



MITRE GAUGE ATTACHMENT



GEARED PUSHER ATTACHMENT

AIR COMPRESSOR - ASSEMBLY NO: SM486/A

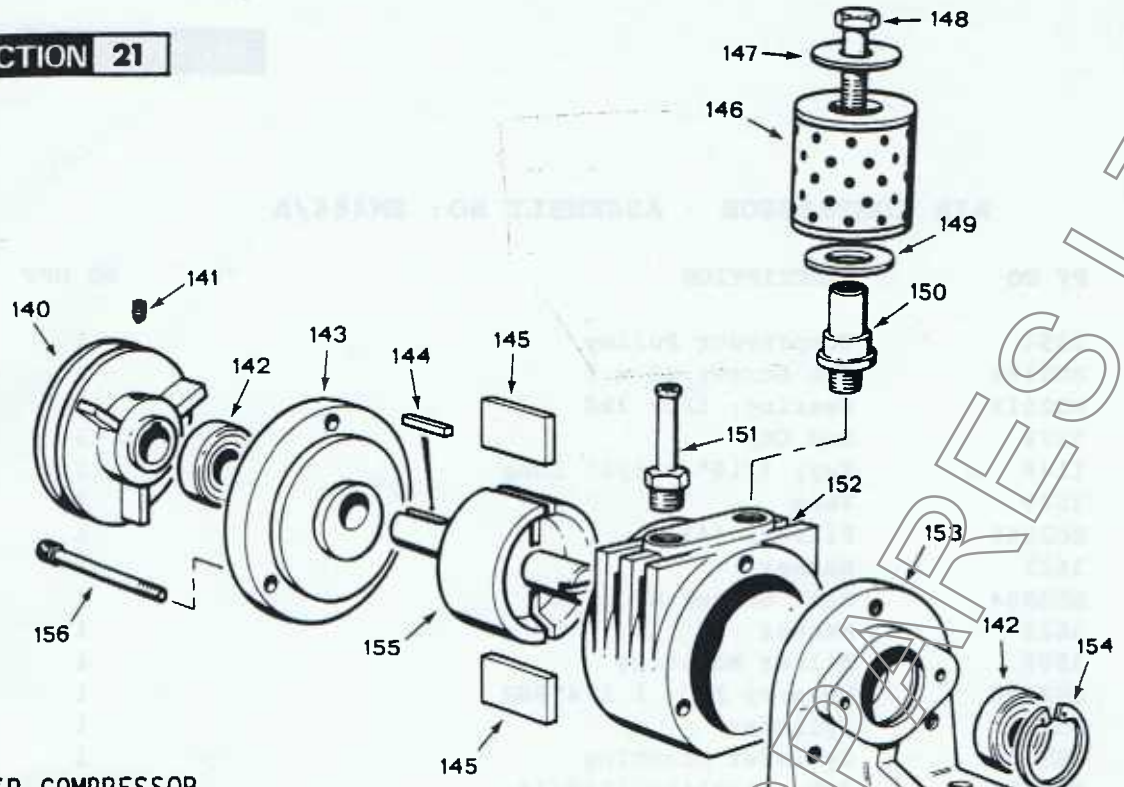
ITEM	PT NO	DESCRIPTION	NO OFF
1	5354	Compressor Pulley	1
2	BO5186	Set Screw;	1
3	BO2013	Bearing;	2
4	3575	End Cap	1
5	1148	Key;	1
6	3579	Vane	2
7	BO2568	Filter;	1
8	3611	Washer	1
9	BO5564	Hex. Screw;	1
10	3612	Washer	1
11	3599	Filter Mounting	1
12	BO2430	Nozz;e;	1
13	3576	Cylinder	1
14	3577	Cylinder Mounting	1
15	BO6034	Int. Circlip;	1
16	3578	Rotor	1
17	BO5016	Cap Screw;	3

AIR PUMP - ASSEMBLY NO: SM98

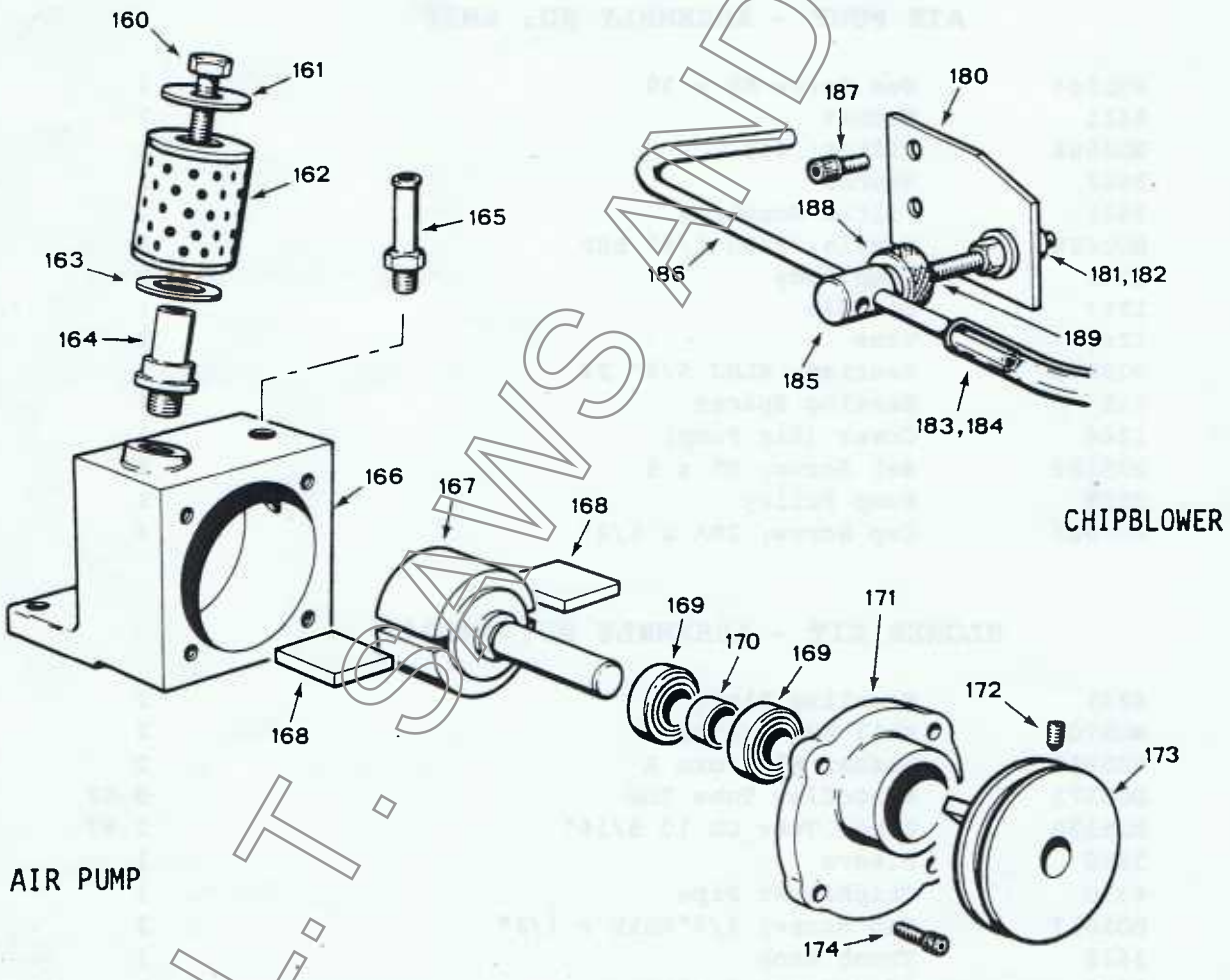
20	BO5564	Hex.Screw	1
21	3611	Washer	1
22	BO2568	Filter;	1
23	3612	Washer	1
24	3621	Filter Mounting	1
25	BO2429	Nozzle;	1
26	1245	Pump Body	1
27	1247	Spindle	1
28	1248	Vane	2
29	BO2000	Bearing;	2
30	535	Bearing Spacer	1
31	1244	Cover (Air Pump)	1
32	BO5186	Set Screw;	1
33	5353	Pump Pulley	1
34	BO5007	Cap Screw;	4

BLOWER KIT - ASSEMBLY NO: SM2041

40	4241	Mounting Plate	1
41	BO5708	Full Nut	2
42	BO5919	Washer	2
43	BO6373	Westoflex Tube	0.02
44	BO6378	Clear Tube	2.92
45	3630	Sleeve	1
46	4930	Chipblower Pipe	1
47	BO5017	Cap Screw;	2
48	3628	Thumb Knob	1
49	3635	Adjustment Screw	1



AIR COMPRESSOR



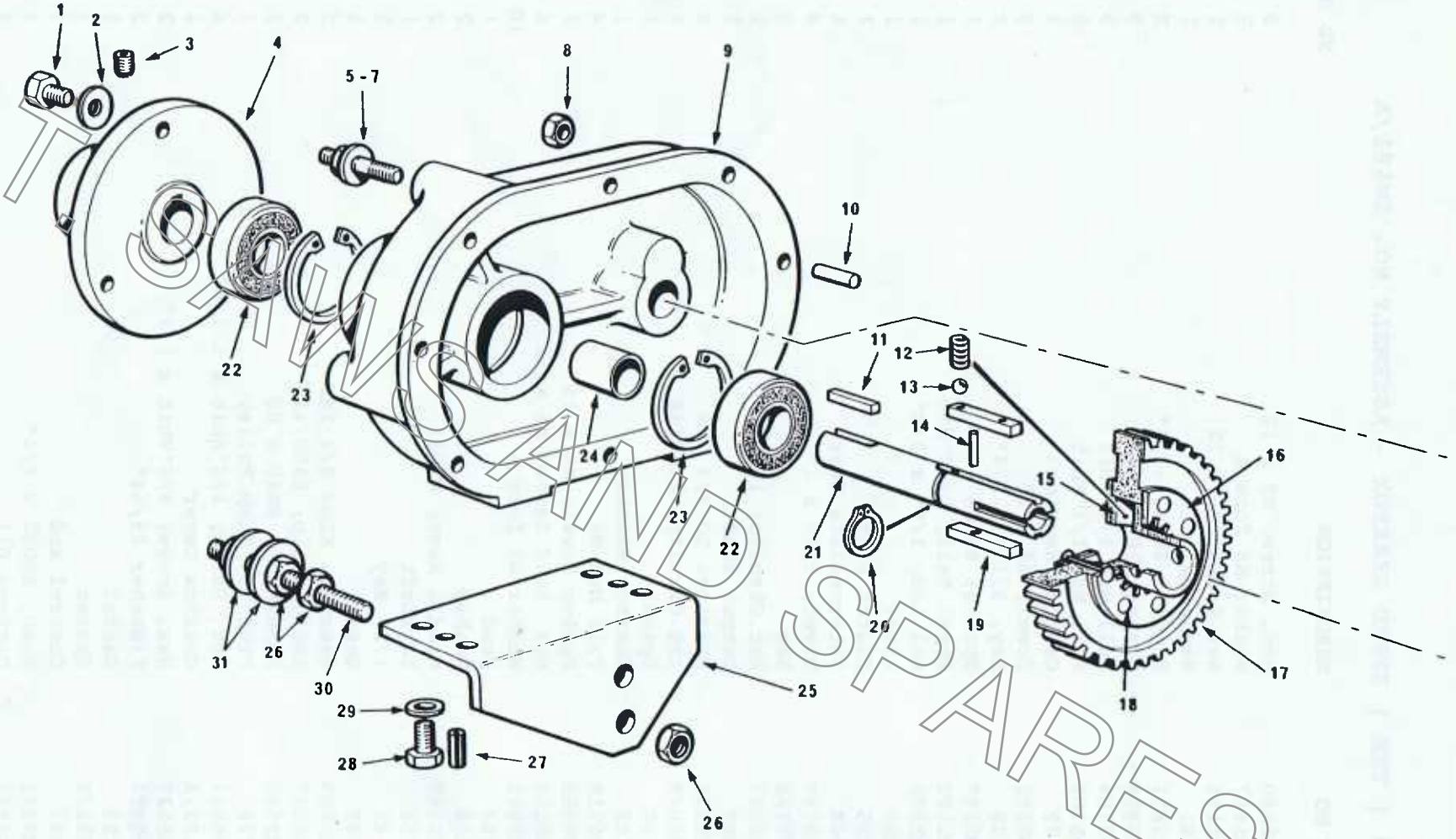
CHIPBLOWER

AIR PUMP

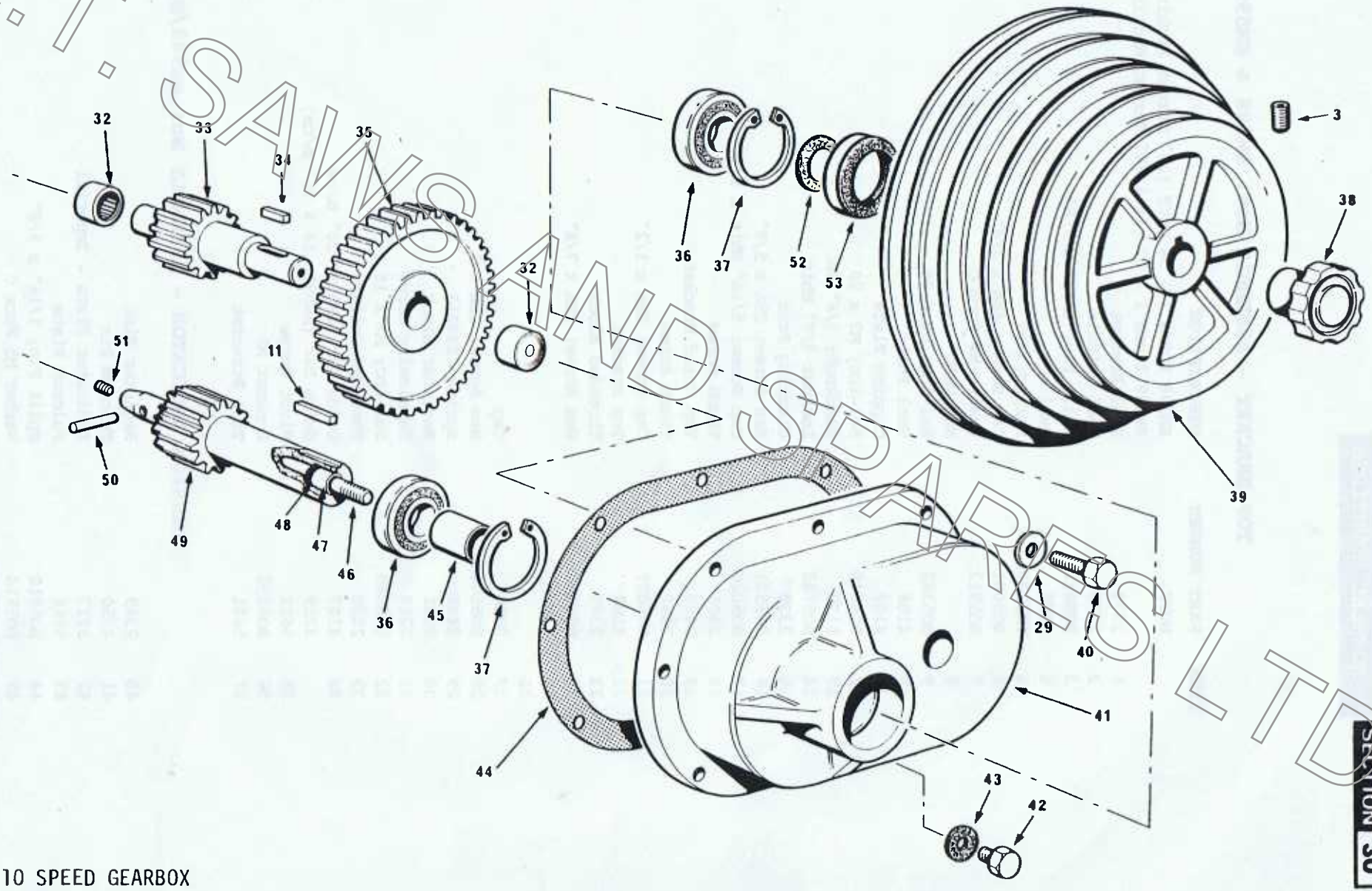
10 (TEN) SPEED GEARBOX - ASSEMBLY NO: SM681/A

ITEM	PT NO	DESCRIPTION	NO OFF
1	BO5560	Hex. Screw;	3
2	BO5917	Washer	3
3	BO5195	Set Screw;	2
4	2561	Bandwheel Hub	1
5	BO5831	Stud;	3
6	BO5919	Washer	3
7	BO5704	Full Nut	3
8	BO5702	Full Nut	6
9	4172	Gearbox Housing	1
10	BO5893	Dowel;	2
11	1148	Key;	2
12	BO2197	Spring;	1
13	BO2100	Steel Ball;	1
14	BO5370	Sel-loc;	1
15	1036	Liner	1
16	1035	Clutch Plate	1
17	1044	Intermediate Gear	1
18	BO5799	Rivet;	8
19	1027/A	Key	2
20	BO6007	Ext.Circlip;	1
21	1029	Output Shaft	1
22	BO2001	Bearing;	2
23	BO6040	Int.Circlip;	2
24	1030	Spacer	1
25*	5706	Gearbox Bracket	1
26*	BO5715	Full Nut	4
27*	BO5356	Spring Dowel;	2
28*	BO5553	Hex. Head Screw;	4
29	BO5915	Washer	10
30*	5717	Stud	1
31*	4238	Washer	2
32	BO2069	Needle Race;	2
33	3253	Layshaft	1
34	1147	Key	1
35	3252	Gear	1
36	BO2009	Bearing;	2
37	BO6037	Int.Circlip;	2
38	BO2545	Handwheel;	1
39	1228	Five (5) Step Pulley	1
40	BO5512	Hex. Screw;	6
41	4173/A	Gearbox Cover	1
42	BO5525	Hex. Screw;	2
43	BO5954	F/Washer	2
44	4223	Gasket	1
45	1031/B	Spacer	1
46	1037	Control Rod	1
47	BO2311	Bush;	1
48	BO2261	O-Ring;	1
49	1032	Input Shaft	1
50	1024	Pin	1
51	BO5151	Set Screw;	1
52	1209	Neoprene Washer	1
53	BO2120	O-Seal;	1

* denotes these valid parts do not belong to this assembly



10 SPEED GEARBOX



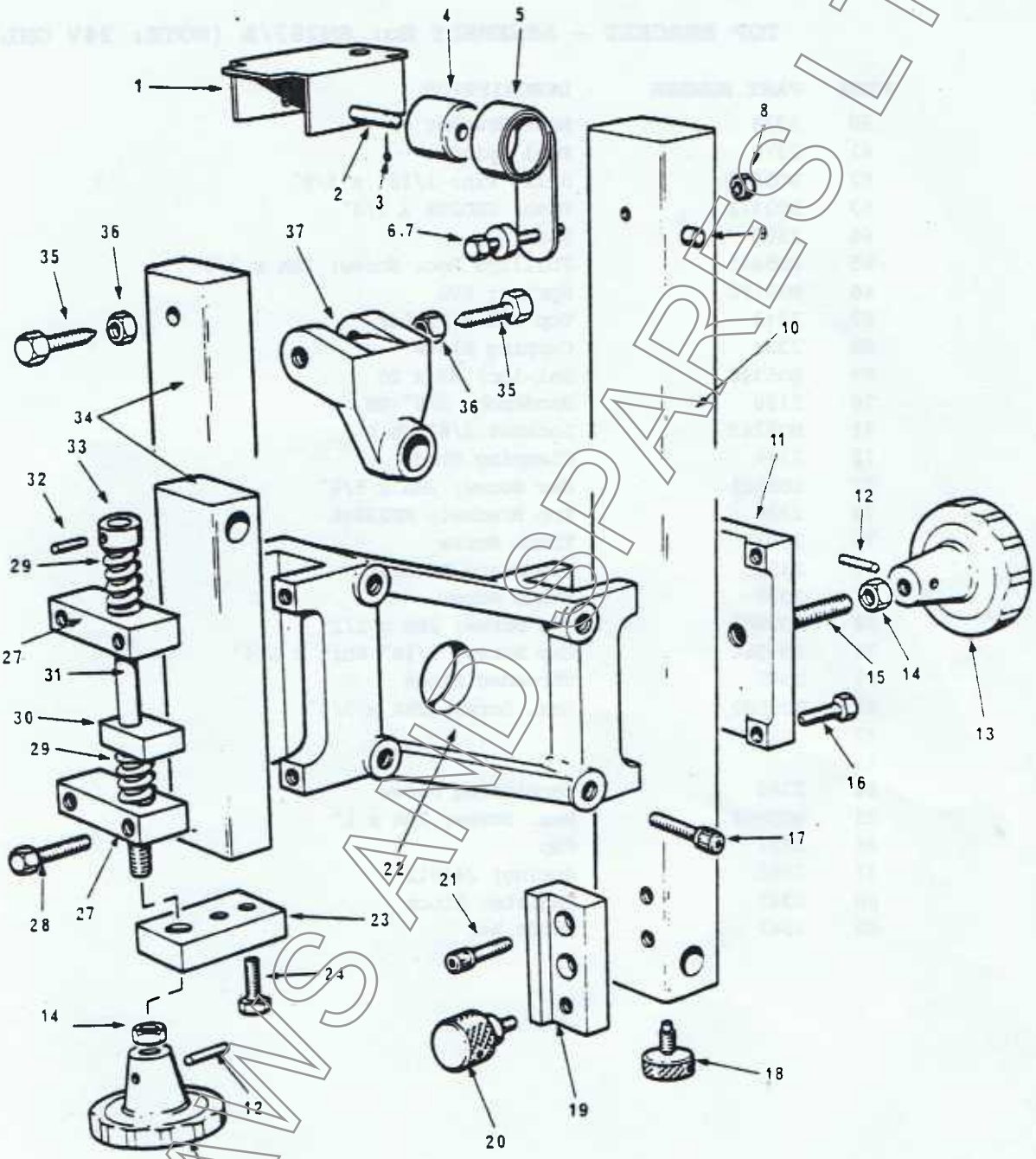
10 SPEED GEARBOX

TOP BRACKET - ASSEMBLY NoS: SM598 & SM599

ITEM	PART NUMBER	DESCRIPTION	No OFF
	NOTE:	SM598 Items 1 - 34 ONLY (20" Throat Machines)	
		SM599 Items 1 - 37 (14 & 30" Throat Machines)	
1	2378	Reel Bracket	1
2	2379	Reel Spindle	1
3	BO5810	Split Pin;	2
4	4105	Reel	1
5	BO2189	Spring;	1
6	BO5001	Cap Screw;	1
7	BO5912	Washer	1
8		NOT USED	
9	BO5362	Sel-loc;	1
10	4106	Tool Post	1
11	4108	Capping Plate	1
12	BO5346	Sel-loc;	2
13	5130	Handknob RH	2
14	BO5743	Locknut	2
15	2339	Clamping Stud	1
16	BO5501	Hex Screw;	4
17	BO5026	Cap Screw;	4
18	2501	Thumb Screw	1
19	2453	Top Guard Bracket	1
20	2338	Thumb Screw	1
21	BO5007	Cap Screw;	2
22	4103	Top Bracket	1
23	2345	Threaded Block	1
24	BO5503	Hex Screw;	2
25			
26			
27	3258	Cap	2
28	BO5504	Hex Screw;	4
29	2490	Spring;	2
30	2341	Register Block	1
31	3260	Tensioning Screw	1
32	BO5345	Sel-loc;	1
33	2520	Threaded Collar	1
34	4107	Guide Bar (SM598; 20" m/cs	1
	3259	Guide Bar (SM599; 14 & 30" m/cs)	1
35	5682	Pivot Screw	2
36	BO5153	Locknut	2
37	5681	Tilt Btracket	1

TENSION INDICATOR - ASSEMBLY No: SM963/B

40	2349	Register Pin	1
41	2350	Fulcrum Pin	1
42	5213	Indicator Plate - Imperial	1
43	5466	Fulcrum Plate	1
44	BO5810	Split Pin;	1
45	BO5914	Washer	1
NOT ILLUSTRATED			
	5467	Fulcrum Bush	1

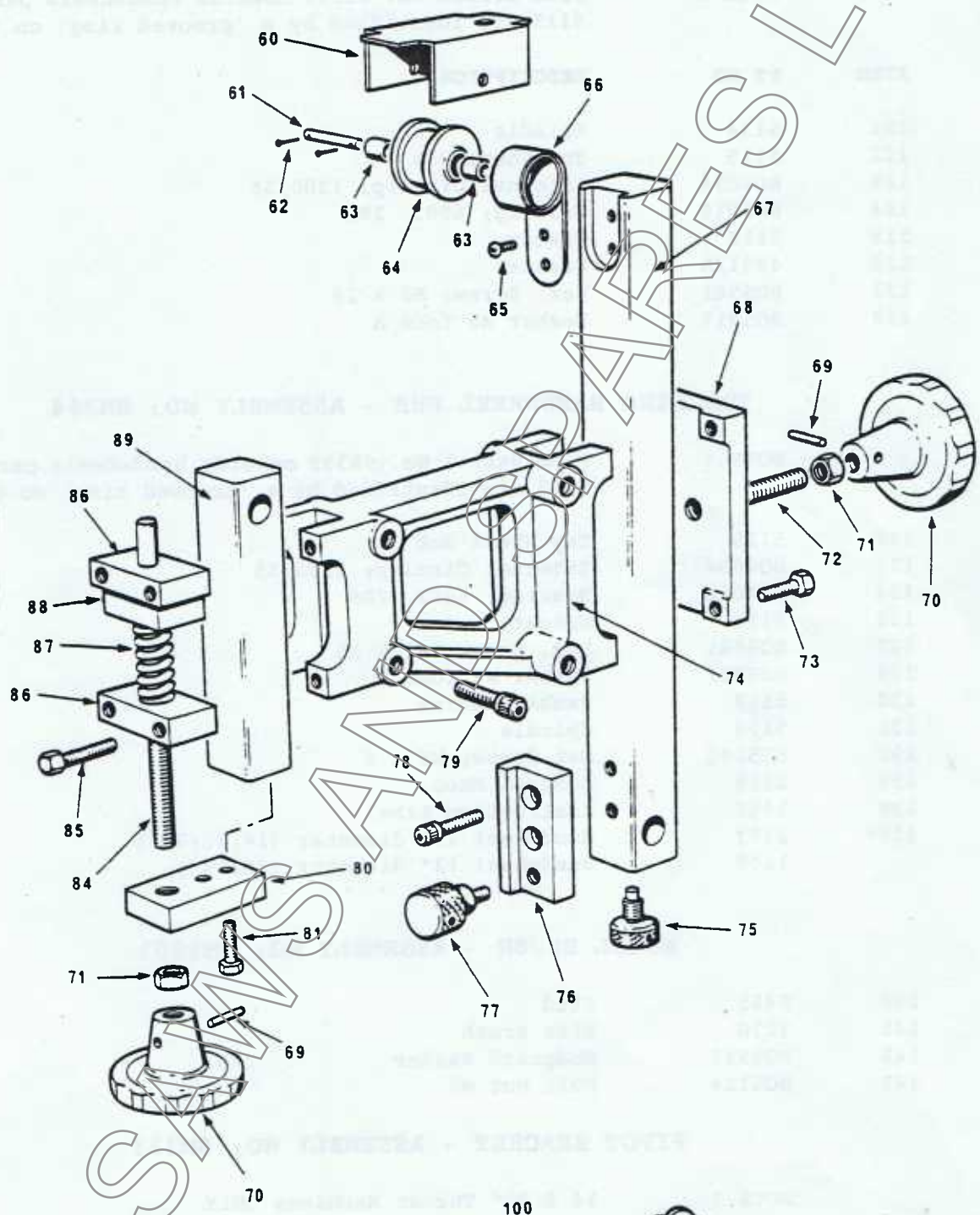


TOP BRACKET

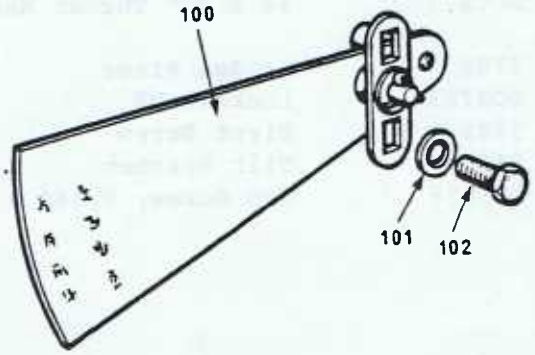
TENSION INDICATOR

TOP BRACKET - ASSEMBLY No: SM283/A (NOTE: 24V ONLY)

ITEM	PART NUMBER	DESCRIPTION	No OFF
60	2378	Reel Bracket	1
61	2379	Reel Spindle	1
62	BO5810	Split Pin;	2
63	BO2312	Bush;	2
64	2380	Reel	1
65	BO5401	Phillips Rec.	2
66	BO2190	Spring;	1
67	2343	Top Guide Pillar	1
68	2331	Capping Plate	1
69	BO5346	Sel-loc;	2
70	5130	Handknob;	2
71	BO5743	Locknut	2
72	2339	Clamping Stud	1
73	BO5501	Hex Screw;	4
74	2330	Top Bracket;	1
75	2501	Thumb Screw	1
76	2453	Top Guard Bracket	1
77	2338	Thumb Screw	1
78	BO5007	Cap Screw;	2
79	BO5260	Cap Screw;	2
80	2345	Threaded Block	1
81	BO5502	Hex. Screw;	2
82			
83			
84	2340	Tensioning Screw	1
85	BO5504	Hex. Screw;	4
86	2337	Cap	2
87	2490	Spring;	2
88	2341	Register Block	1
89	2342	Slide Bar	1



TOP BRACKET



TENSION INDICATOR

TOP HUB - ASSEMBLY NO: SM213

NOTE ! From Serial No. 56399 onwards bandwheels part number 5115 are identified by a 'grooved ring' on the hub.

ITEM	PT NO	DESCRIPTION	NO OFF
121	5134	Spindle	1
122	5115	Top Wheel Hub	1
123	BO6034	Internal Circlip;	2
124	BO2016	Bearing;	2
125	5116	Spacer	1
126	4941/A	Washer	1
127	BO5561	Hex. Screw;	4
128	BO5917	Washer	3

TRACKING BANDWHEEL HUB - ASSEMBLY NO: SM284

NOTE ! From Serial No. 56399 onwards bandwheels part number 5115 are identified by a 'grooved ring' on the hub.

122	5115	Top Wheel Hub	1
123	BO6034	Internal Circlip;	2
124	BO2016	Bearing;	2
125	5116	Spacer	1
127	BO5561	Hex. Screw;	3
128	BO5917	Washer	3
130	5117	Jacking Screw	1
131	5114	Spindle	1
132	BO5186	Set Screw;	2
133	5118	Control Knob	1
134	2466	Instruction Label	1
135*	2473	Bandwheel 14" diameter	
	1102	Bandwheel 12" diameter	

WHEEL BRUSH - ASSEMBLY NO: SM1001

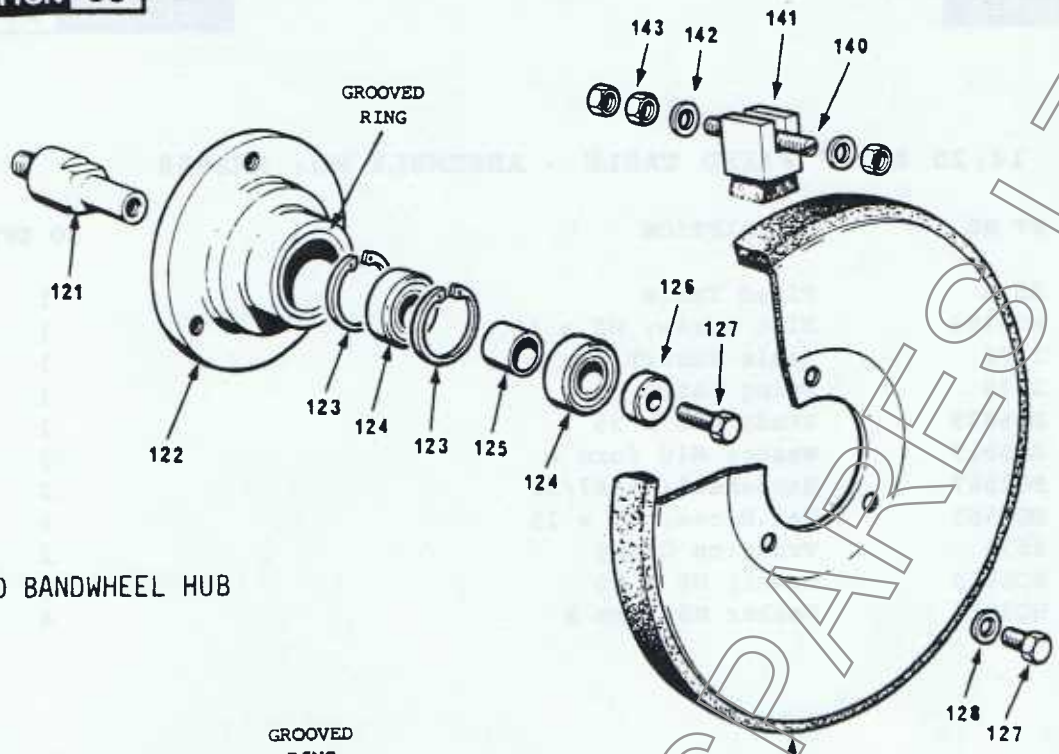
140	5485	Stud	1
141	2270	Wire Brush	1
142	BO5928	Mudguard Washer	2
143	BO5714	Full Nut	2

PIVOT BRACKET - ASSEMBLY NO: SM333

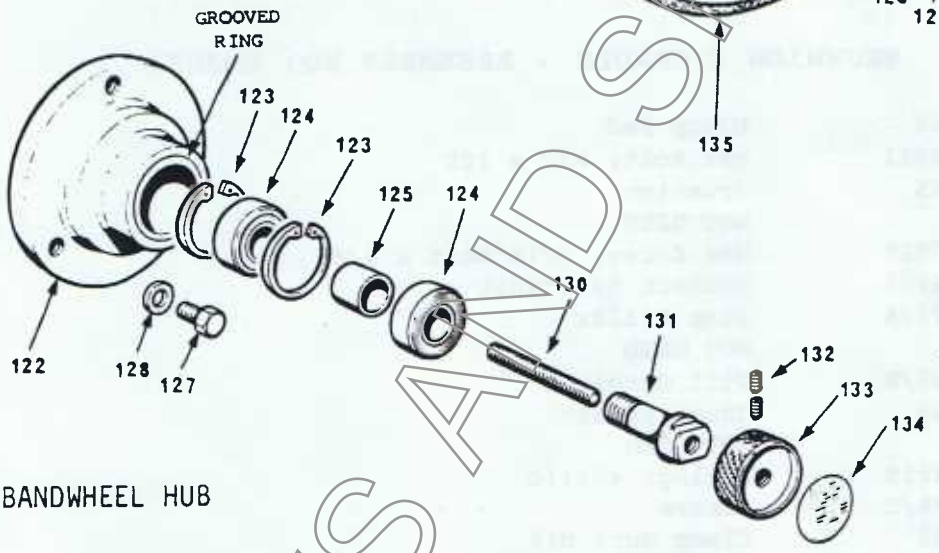
NOTE ! 14 & 20" Throat Machines ONLY

150	3708	Bridge Piece	1
151	BO5753	Locknut	2
152	5682	Pivot Screw	2
153	5681	Tilt Bracket	1
154	BO5028	Cap Screw;	3

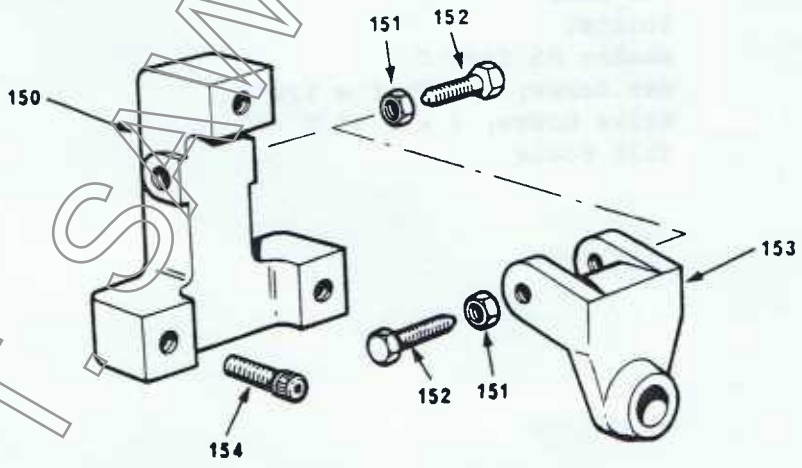
* denotes these valid parts do not belong to this assembly



FIXED BANDWHEEL HUB



TRACKING BANDWHEEL HUB



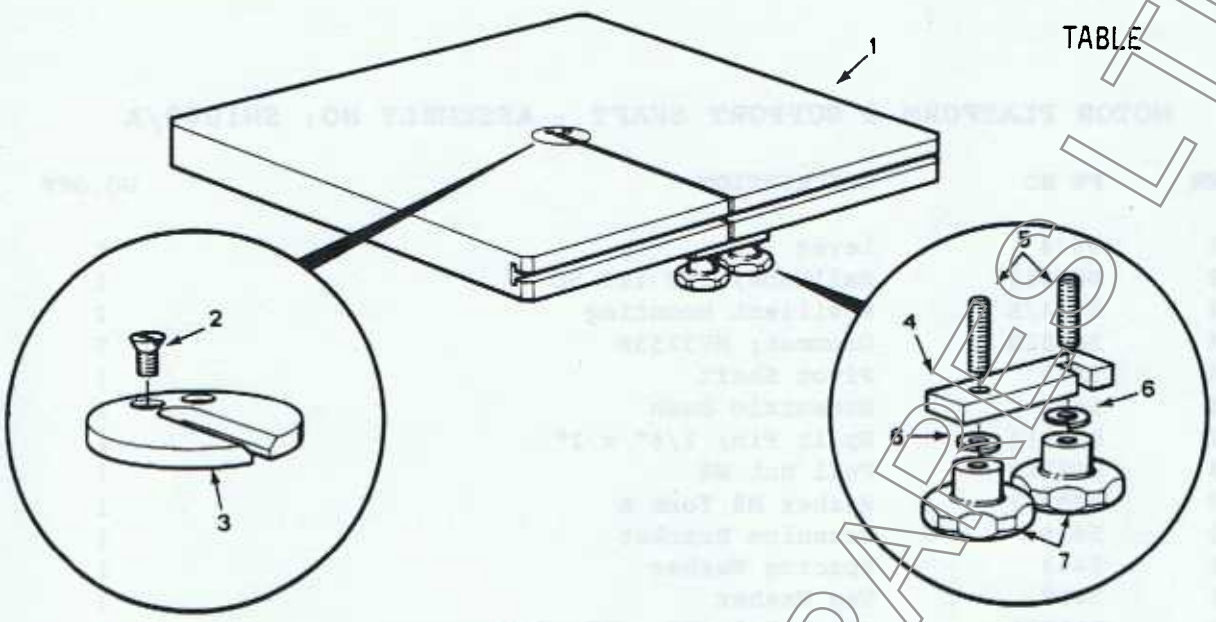
PIVOT BRACKET

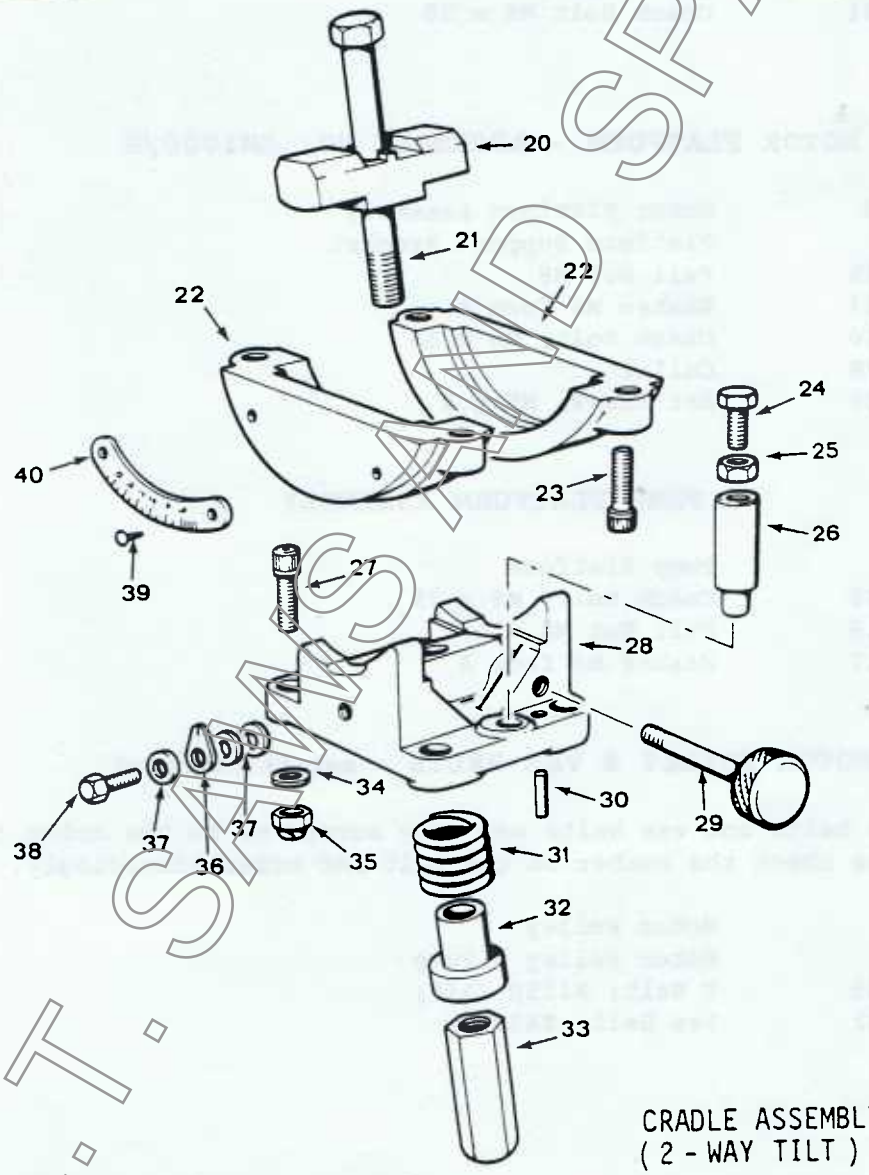
14;20 & 30" FIXED TABLE - ASSEMBLY NO: SM2058

ITEM	PT NO	DESCRIPTION	NO OFF
1	8595	Fixed Table	1
2	BO5306	Slot Screw;	1
3	2922	Table Insert	1
4	2828	Swing Latch	1
5	BO5839	Stud;	2
6	BO5919	Washer	2
7	BO2547	Handwheel;	2
	BO5563	Hex.Screw;	4
	8579	Trunnion Clamp	2
	BO5890	Dowel;	2
	BO5917	Washer	4

TRUNNION & CRADLE - ASSEMBLY NO: SM2057

20	8556	Clamp Pad	1
21	BO5611	Hex.Bolt;	1
22	2835	Trunnion	1
23		NOT USED	
24	BO5517	Hex.Screw;	1
25	BO5742	Locknut	1
26	2373/A	Stop Pillar	1
27		NOT USED	
28	2367/B	Tilt Cradle	1
29	2500	Thumb Screw	1
30		NOT USED	
31	BO2215	Spring;	1
32	2370/B	Sleeve	1
33	8557	Clamp Nut;	1
34		NOT USED	
35		NOT USED	
36	2372	Pointer	1
37	BO5914	Washer	3
38	BO5507	Hex.Screw;	1
39	BO5871	Drive Screw;	2
40	2371	Tilt Scale	1





CRADLE ASSEMBLY
(2 - WAY TILT)

MOTOR PLATFORM & SUPPORT SHAFT - ASSEMBLY NO: SM1000/A

ITEM	PT NO	DESCRIPTION	NO.OFF
1	5474	Lever	1
2	BO2529	Ballknob;	1
3	5404/B	Resilient Mounting	2
4	BO6320	Grommet;	2
5	5441	Pivot Shaft	1
6	5442	Eccentric Bush	1
7	BO5816	Split Pin;	1
8	BO5715	Full Nut	1
9	BO5917	Washer	1
10	5436	Trunnion Bracket	1
11	5443	Spacing Washer	1
12	5429	Tag Washer	1
13	BO5621	Coach Bolt	1

MOTOR PLATFORM - ASSEMBLY NO: SM1000/B

20	SM999	Motor Platform Assembly	1
21	5435	Platform Support Bracket	2
22	BO5715	Full Nut	4
23	BO5917	Washer	4
24	BO5620	Coach Bolt;	4
25	5401/B	Collar	2
26	BO5186	Set Screw;	2

PUMP PLATFORM ASSEMBLY

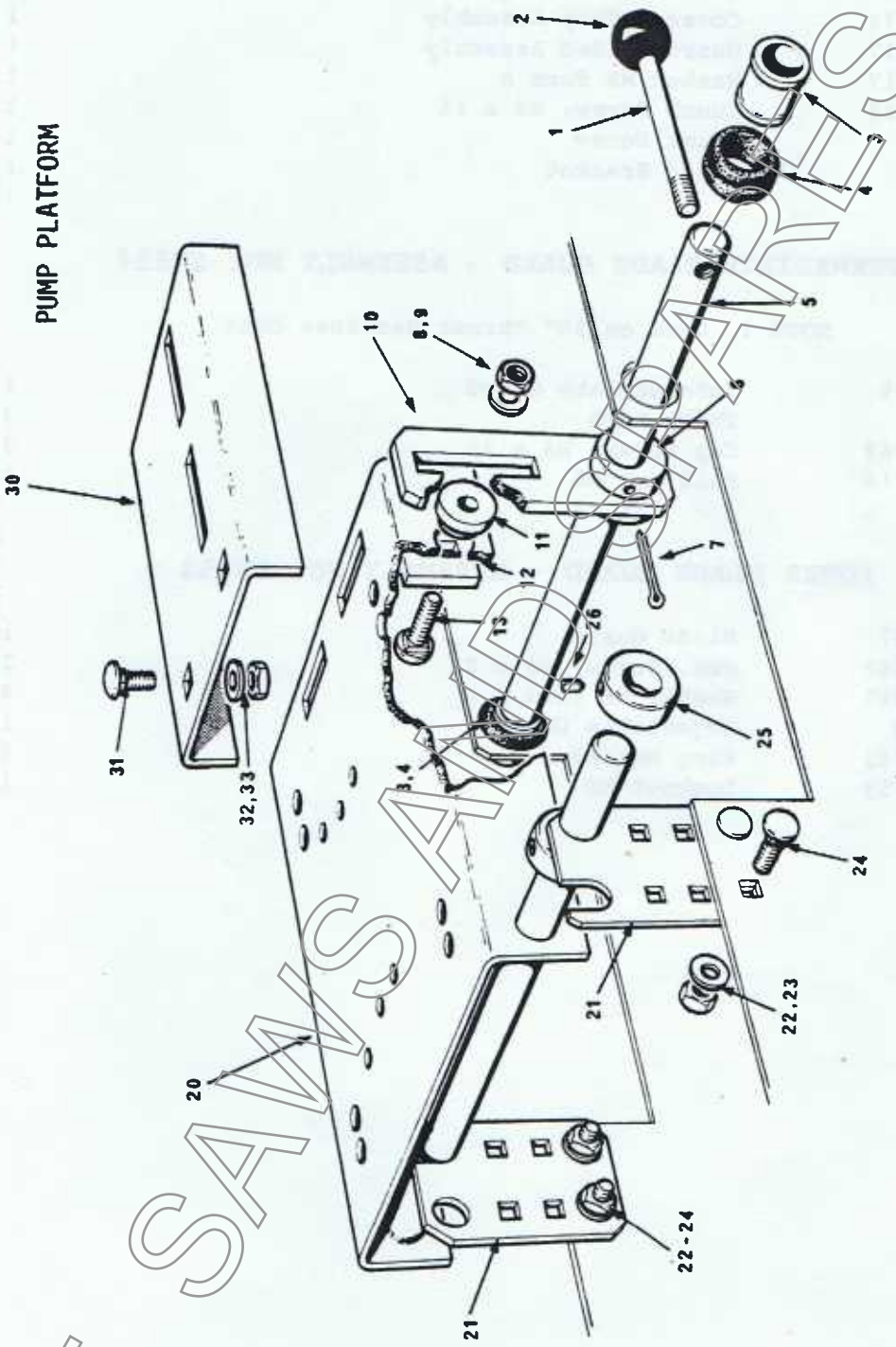
30	5434	Pump Platform	1
31	BO5620	Coach Bolt;	2
32	BO5715	Full Nut	2
33	BO5917	Washer	2

MOTOR PULLEY & VEE BELTS - not illustrated

NOTE ! Drive belts and vee belts may vary according to the motor fitted. Please check the number on the belt and order accordingly.

	2010	Motor Pulley	1
	3555	Motor Pulley - Pump	1
	BO2149	V Belt;	1
	BO2142	Vee Belt;	1

* denotes these valid parts do not belong to THIS assembly.



MOTOR PLATFORM & SUPPORT SHAFT

UPPER BLADE GUARD - ASSEMBLY NO: SM1076

ITEM	PT NO	DESCRIPTION	NO OFF
1	SM1078	Cover & Stop Assembly	1
2	SM1077	Guard Welded Assembly	1
3	BO5917	Washer	1
4	BO5826	Thumb Screw;	1
5*	2338	Thumb Screw	1
6*	2453	Guard Bracket	1

INTERMEDIATE BLADE GUARD - ASSEMBLY NO: SM524

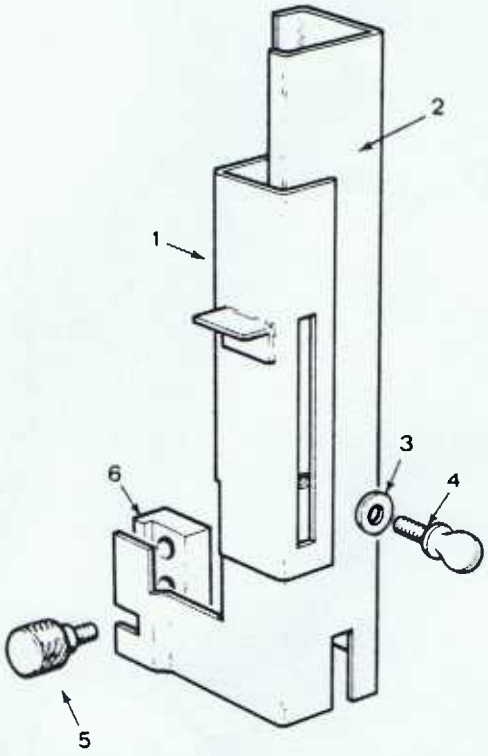
NOTE ! Used on 30" Throat Machines ONLY

10	SM389	Intermediate Guard	1
11	2711	Thumb Knob	3
12	BO5069	Cap Screw;	3
13	BO5714	Full Nut	3

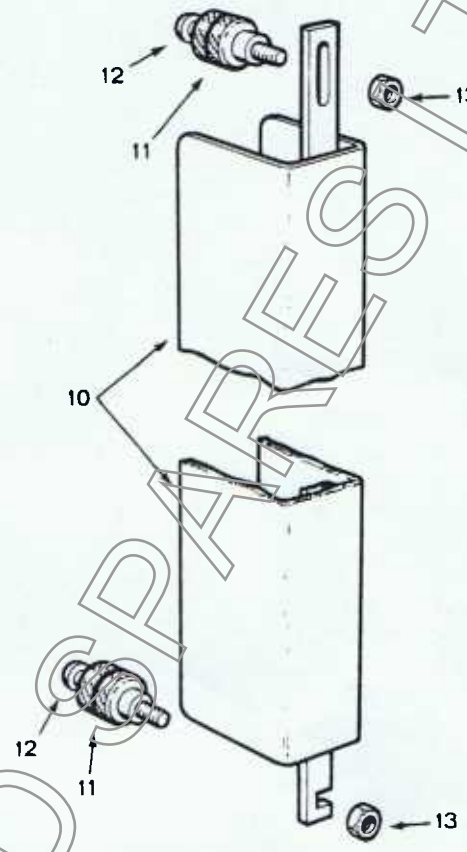
LOWER BLADE GUARD - ASSEMBLY NO: SM858

20	SM857	Blade Guard	1
21	BO5562	Hex. Screw;	2
22	BO5917	Washer	4
23	5035	Adjustable Guard	1
24	BO5785	Wing Nut	4
25	BO5753	Locknut	1

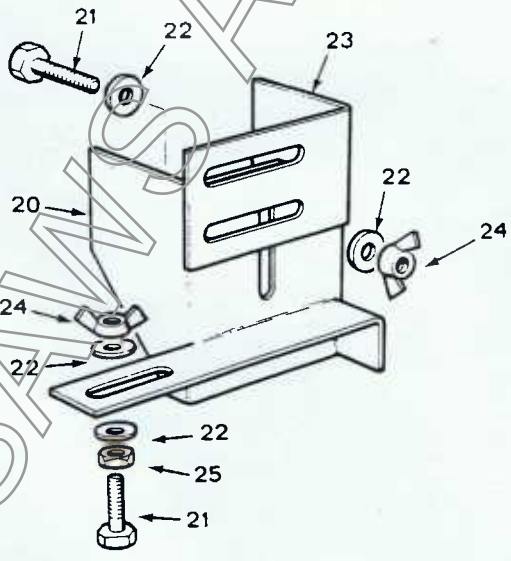
* denotes these valid parts do not belong to THIS assembly.



UPPER BLADE GUARD



INTERMEDIATE
BLADE GUARD



LOWER BLADE GUARD