Wadkin

'Wadkin' Through Feed Four Side Straightening/ Planing Machine and Moulder

Model XR

M/C. No.
TEST No.

Instruction Manual

Wadkin

PREFACE

IMPORTANT

IT IS OUR POLICY AND THAT OF OUR SUPPLIERS TO CONSTANTLY REVIEW THE DESIGN AND CAPACITY OF OUR PRODUCTS. WITH THIS IN MIND WE WOULD REMIND OUR CUSTOMERS THAT WHILE THE DIMENSIONS AND PERFORMANCE DATA CONTAINED HEREIN ARE CURRENT AT THE TIME OF GOING TO PRESS, IT IS POSSIBLE THAT DUE TO THE INCORPORATION OF THE LATEST DEVELOPMENTS TO ENHANCE PERFORMANCE, DIMENSIONS AND SUPPLIERS MAY VARY FROM THOSE ILLUSTRATED

THIS MANUAL IS WRITTEN AS A GENERAL GUIDE. DUE TO THE NUMBER OF VARIATIONS (OPTIONS) AVAILABLE A TYPICAL MACHINE IS SHOWN TO ILLUSTRATE THE MAIN FEATURES. WHERE APPLICABLE THE OPTIONS ARE INCLUDED IN THE APPENDICES.

INSTRUCTION MANUAL

WADKIN

THROUGH FEED FOUR SIDE STRAIGHTENING/PLANING MACHINE AND MOULDER

MODEL XR

PREFACE

Health and Safety
Safeguarding machines

HEALTH AND SAFETY

This machine is designed and constructed using the principles of safeguarding and practical guidance contained in the British Standard Codes of Practice BS5304: 1988 "Safeguard of machinery", BS6854: 1987 "Safeguard woodworking machines" and current guidance issued by the Health and Safety Executive.

The Health & Safety at Work etc Act 1974 places duties in designers, manufacturers and suppliers to ensure that:-

(1) Articles supplied for use at work are, so far as is reasonably practicable, safe and without risks to health during setting, use, cleaning and maintenance.

(2) Persons supplied with the articles are provided with adequate information about the use for which they are designed, and about conditions necessary to ensure that they will be safe and without risks to health.

These duties are transferred to you if you resupply the machine by way of sale, lease, hire or hire-purchase.

Persons who install this machine for use at work have a duty under the Health and Safety at Work etc Act 1974, to ensure so far as is reasonably practicable, that nothing about the way in which it is installed makes it unsafe or a risk to health. This includes such aspects as correct assembly, electrical installation, construction of enclosures, fitting of guards and exhaust ventilation equipment. When installing the machine, consideration must be given to the provision of adequate lighting and working space.

The legal duties of designers, manufacturers, importers, suppliers, erectors and installers are explained in the free Health and Safety Executive leaflet IND(G) 1(L) 1987.

The machine is supplied complete with all necessary safeguards to enable the user to comply with the Woodworking Machines Regulations 1974. Details of correct installation and use, together with guidance on fitting and proper adjustment of guards are described in Sections 1 to 4 of this manual.

You are reminded that the Woodworking Machines Regulations place absolute legal duties on employers and employees to ensure that guards and any other safety devices are securely fitted, correctly adjusted and properly maintained.

Repairs and maintenance must only be undertaken by suitably qualified and competent technicians. Ensure that all power supplies are isolated before any maintenance work commences. Instructions for routine maintenance are given in Section 4 of this manual.

Machine operators must have received sufficient training and instruction as to the dangers arising in connection with the machine, the precautions to be observed and the requirements of the Woodworking Machines Regulations which apply, except where they work under the adequate supervision of a person who has a thorough knowledge and experience of the machine and the required safeguards.

Persons under the age of 18 years must successfully complete an approved course of training before operating this machine at work, unless participating in a course of training under adequate supervision. (N.B. This paragraph is only relevant to; circular sawing machines, any sawing machine fitted with a circular blade, any planing machine for surfacing which is not mechanically fed or any vertical spindle moulding machine.)

Before commencing work, ensure that the cutters/blades are, set to cut in the correct direction, securely fitted, sharp, and are compatible with the machine and spindle speed.

Dust

Wood dust can be harmful to health by inhalation and skin contact and concentrations of small dust particles in the air can form an explosive mixture. These concentrations usually occur in dust extraction equipment which may be destroyed unless explosion precautions have been taken in the design and installation of the equipment.

Employees have duties under the Factories Act 1961 and the Health and Safety at Work etc Act 1974 to control wood dust in the workplace and from 1st October 1989 more specific requirements will be imposed by the Control of Substances Hazardous to Health Regulations 1988.

Employers should carry out an adequate assessment of the possible risks to health associated with wood dust to enable a valid decision to be made about the measures necessary to control the dust. It may be necessary to provide effective exhaust appliances.

Prevention or control of wood dust exposure should, so far as is reasonably practicable, be achieved by measures OTHER than the provision of personal protective equipment.

Airborne dust levels should not exceed 5 mg/cub.m

Further information and reference to practical guidance are contained in the following free leaflets available from the Health and Safety Executive:-

Wood Dust: Hazards and Precautions	IND(S) 10(L) 1987
Control Hardwood Dust	IND(S) 21(L) 1988

Noise

Noise levels can vary widely from machine to machine depending on conditions of use. Persons exposed to high noise levels, even for a short time, may experience temporary partial hearing loss and continuous exposure to high levels can result in permanent hearing damage. The Woodworking Machines Regulations require employers to take reasonably practicable measures to reduce noise levels where any person is likely to be exposed to a continuous equivalent noise level of 90 dB(A) or more, over an 8 hour working day. Additionally, suitable ear protectors must be provided, maintained and worn.

An adequate assessment of likely noise exposure should be made using manufacturer's date and if necessary, a noise survey should be carried out by a competent person. It may be necessary to construct a suitable noise enclosure, in which case professional advice should be sought.

Machines identified as generating unhealthy noise levels should be appropriately marked with a warning of the need to wear hearing protection and it may be necessary to designate particular areas of the workplace as ''Ear protection zones''. Suitable warning signs are specified in the Safety Signs Regulations 1980.

Further information and reference are contained in the free Health and Safety Executive leaflet - Noise at Woodworking Machines IND(S) 22(L) 1988.

SAFEGUARDING MACHINES

To comply with the Woodworking Machines Regulations 1974, operators must ensure that they fully understand the instructions given and have received sufficient training in the use of the machine and the particular safety instructions to be observed.

NOTE: Persons under the age of 18 years **must not** operate the machine except under supervision during a course of training.

BEFORE OPERATING THE MACHINE ENSURE THAT:

All guards and fences are securely fitted and correctly adjusted in accordance with the Regulations.

Cutters/blades are the correct type and rotate in correct direction of cut, are sharp and securely fastened.

Correct spindle speed is selected for the cutter equipment.

Loose clothing is either removed or fastened and jewellery removed.

Suitable jigs and push sticks are available as appropriate.

Sufficient working space is provided and that lighting is adequate.

All dust extraction equipment is switched on, properly adjusted and working efficiently.

DURING MACHINING:

Wear suitable protective equipment, e.g. goggles, ear defenders, and dust mask.

Stop the machine before making adjustments or cleaning chips from the work area.

Keep the floor area around the machine clean and free from wood refuse.

Do not allow the floor to become slippery with oil or grease.

Report immediately to a person in authority, any machine malfunction or operator hazard. Do not attempt to repair the machine unless qualified to do so.

Ensure all power sources are isolated before commencing any maintenance work.

WARNING: Failure to comply with the Regulations is a criminal offence and could result in legal proceedings.

SECTION 1 GENERAL DESCRIPTION

OPERATING PRACTICE

General Notes on all models of Wadkin Planing and Moulding Machines

A planing and moulding machine produces planed or moulded surfaces on all four sides of lengths of timber, both hard and softwood, at feed speeds determined by the cutter equipment and quality of surface finish required.

A series of 'ridges' (cutter marks) is created on the surface of the timber as it is moved past a rotating cutterblock (see Fig 1). The quality of surface finish is determined by the number of knife marks per 25mm (1") (the pitch of the cutter marks). The closer the pitch the better the quality of surface finish.

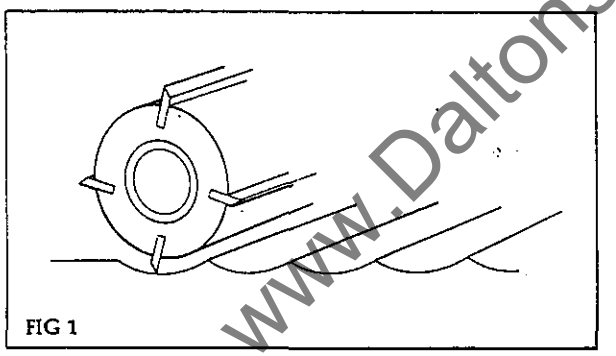


FIG 1

From experience a good quality surface finish has knife marks at a pitch of 1.5 to 2 mm. Reducing the pitch improves the surface finish but increases the wear on the cutters, increasing the pitch reduces the quality.

The number of cutter knives in a cutterblock will only be effective when all are rotating in precisely the same cutting circle. Two main factors influence this:

a. The fit of the cutterblock on the spindle
b. The concentricity of grinding.

The conventional method of mounting a cutterblock is to lock a plain bore block on to a plain ground spindle with a locknut. The tolerances in each component give a possible 0.05mm (0.002") clearance in the bore and thus eccentric running (see Fig 2).

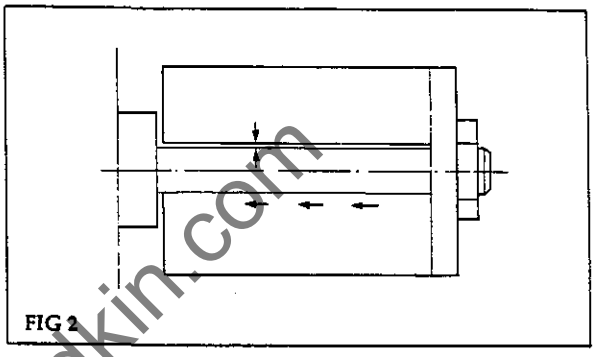


FIG 2

The Wadkin Hydrofix locking system eliminates this clearance by pressurising the bore of the cutterblock onto the spindle (see Fig 3).

Axial locking is not required and a simple safety collar is recommended to prevent the cutterblock moving axially, or rotating on the spindle, if the hydraulic pressure is not applied.

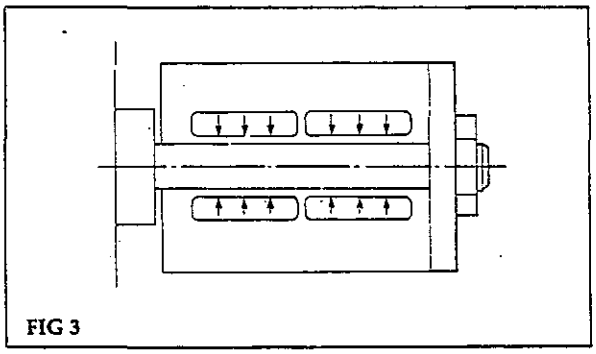


FIG 3

Because the Hydrofix locking is also used while the knives in the cutterblock are ground in the toolroom, it can be seen that the high accuracy of the grinding process is transferred directly to the planing and moulding machine. This accuracy, together with the true running of the precision spindle of the moulder, reduces the running of the knives to within 0.002 to 0.005mm of the true cutting circle. However, this minimum run-out is still such that only one knife leaves a finishing cut, no matter how many are in the block.

To ensure that all the knives in a cutterblock run in an absolutely true cutting circle, the technique of jointing is used, in which the jointing 'stone' trues all the knives while rotating at cutting speed in the planing and moulding machine (see Fig 4).

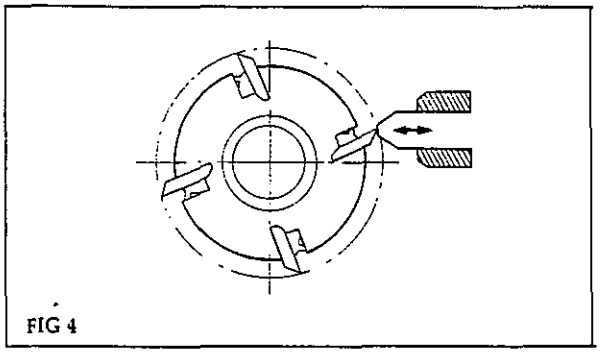


FIG 4

It can be seen that for a given spindle speed and quality of surface finish (pitch of knife marks), the feed speed may be increased in direct relationship to the number of knives in the cutterblock.

$$\text{Cuttermark pitch} = \frac{\text{Feedspeed in mm per min}}{\text{Block rpm} \times \text{No of Cutters}}$$

For example $\frac{12 \times 1000}{6000 \times 1}$ = 2m pitch

for a spindle running at 6000 rpm and a feed speed of 12m/min and unjointed (1 knife finishing)

Jointing a 4 knife block and increasing the feed speed to (4×12) ie: 48m/min gives the same resulting pitch (finish).

Jointing can be carried out on straight planing blocks — 'straight' jointing, and on profile blocks — 'plunge' jointing.

The process of jointing, which can be repeated several times, produces a heel on the knives. In the interests of quality this must not be allowed to exceed a certain width. This is approx 0.5mm on softwood and 0.7mm on hardwood (see Fig 5).

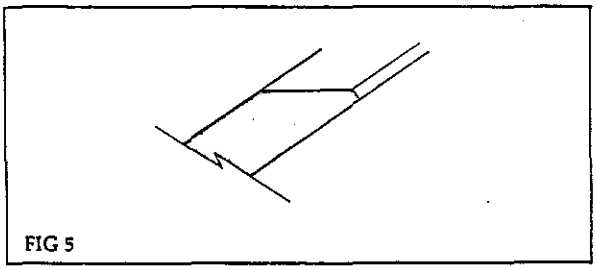


FIG 5

Both high speed steel and carbide knives may be jointed but require a different composition of jointing stone.

An alternative method of increasing output is to increase the spindle speed thus permitting a faster feed speed for a given quality of surface finish. 'Wadkin' can offer alternative spindle speeds up to a maximum of 15000 rpm. This highest spindle speed, achieved with very high precision, lubricated for life bearings, permits a $2\frac{1}{2}\times$ (250%) increase in output without jointing.

Typical surface finish pitch values for different applications are listed:

Sawmilling	1.5 to 2.5 mm
Joinery	1.5 to 2 mm
Strip moulding	1.3 to 2.0 mm
Furniture	1 to 1.5 mm

Machine Feed Systems

Push Feed (Fig 6)

This original method of feeding a planing and moulding machine is still provided, and consists of two top driven and two opposed bottom driven feed rolls at the infeed end of the machine. An idle roller and pad pressures between the cutterheads controls the timber down to the bed and across to the fence as it passes through the machine. It follows that if bowed or twisted stock is fed to the cutters, that while a perfect profile will be produced, the component will be as twisted or bowed as it entered.

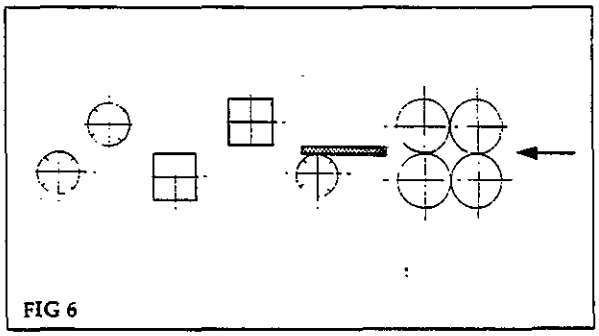


FIG 6

The pushfeed machine has the disadvantage that the last piece of timber is always left in the machine; traction stops as the trailing end leaves the feedworks. The last piece can only be retrieved by following with a scrap length or by reverse feeding, in which case the component is unfinished.

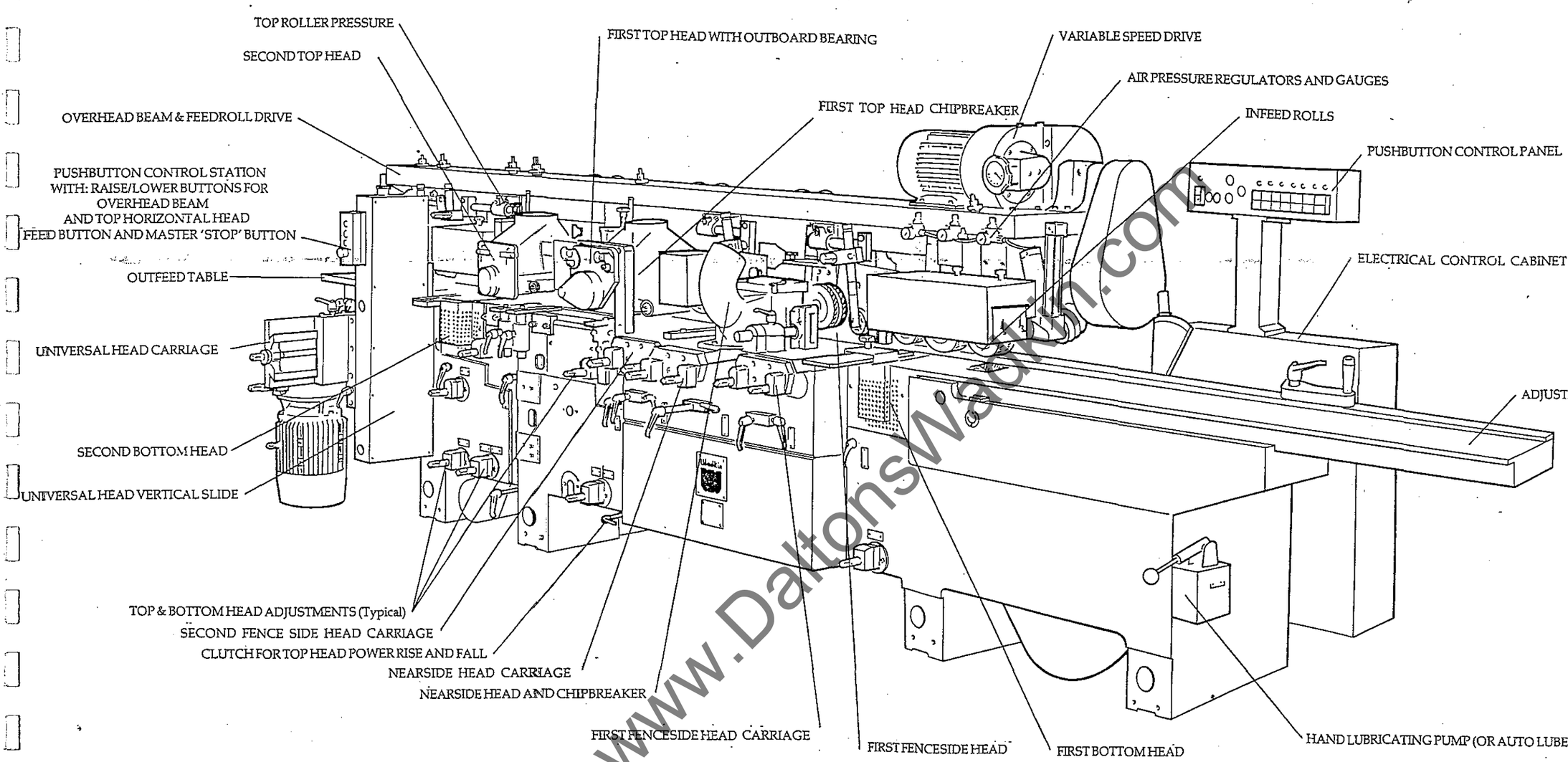


FIG 1 TYPICAL MACHINE WITH UNIVERSAL HEAD

Through feed (Fig. 7)

Through feed was developed to overcome the handicap of the last piece remaining in cut, and to eliminate the heavy top and side pressures.

Drive rolls between each cutterhead feed the components through the machine.

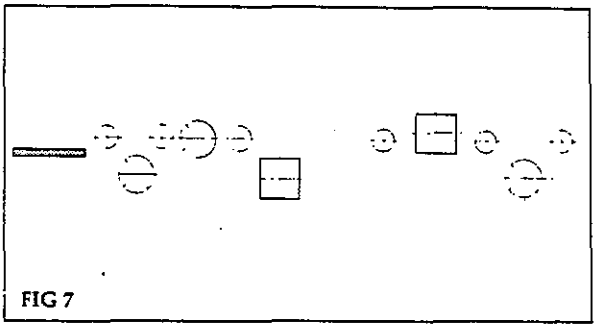


FIG 7

A long infeed table before the first bottom head, together with the much lighter loading on the timber, enables straightening of the component ie: the underside being straightened (surfaced) at the first bottom head, and the edge (fence side) being straightened at the first side head (see Fig 8).

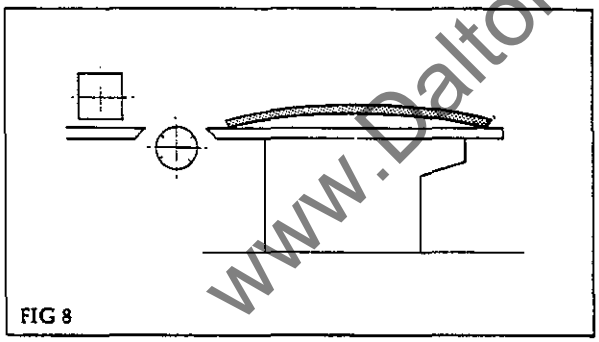


FIG 8

An alternative method of straightening combines underside and fence side straightening, using a single cutterblock, planing the underside in the normal way and machining a reference edge with a rebating disc on the same block (see Fig 9).

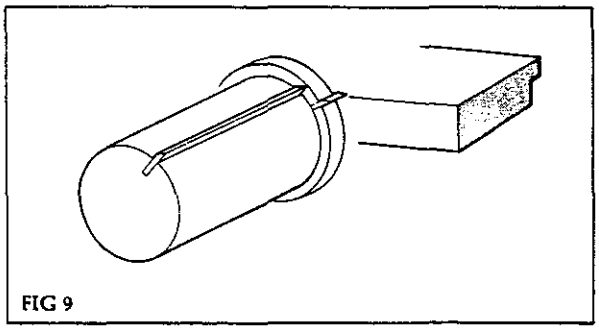


FIG 9

The above straightening techniques are most successful on timber which is bowed and has square ends, typical of softwood. For timber which is twisted and has out-of-square ends, typical of some hardwoods, an alternative technique is provided.

Grooved bed straightening (Fig 10)

In this design, grooving cutters on the first bottom head permit support in the form of rails right through the cut, thus preventing 'dipping in' of the twisted timber, or 'buckling' as out-of-square ends come into contact with each other. The grooves on the underside are subsequently machined out on a second bottom head, which is obligatory. Fitting a standard lip plate and cutterblock converts the machine to conventional use.

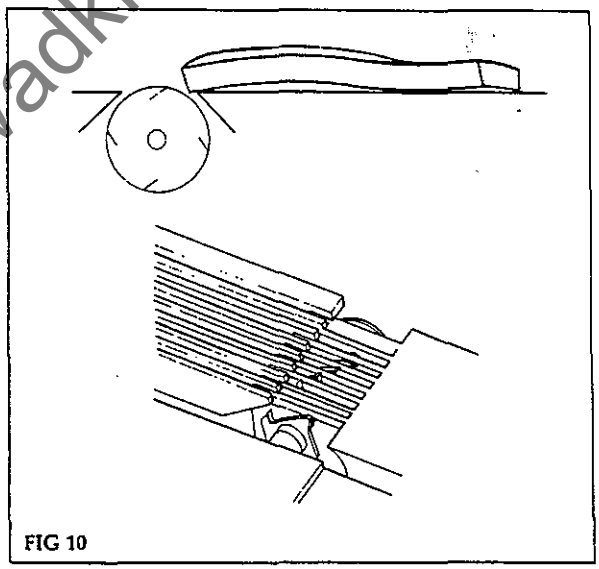


FIG 10

Hopper Feeding (Fig 11)

To enable the operator to feed timber at relatively fast feed speeds and still maintain butt up, (this may be difficult on short lengths), various types of hopper feed are available.

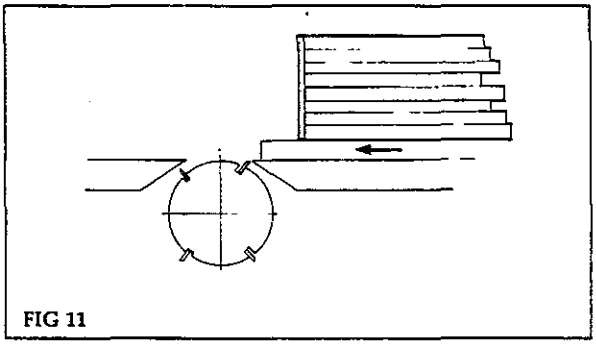


FIG 11

Components are stacked in a hopper at the infeed end of the machine and automatically fed one at a time from the bottom of the stack at a rate to ensure 'butt-up'. A slipping device prevents the hopper feed trying to overdrive the machine feed.

Feeding at very high feed speeds, typically on flooring, cladding etc, also presents problems to the operator, again a special feeding device. (Fast feed table, Fig 12) can be provided.

The fast feed table, in line with the machine feed, receives timber from a tilt hoist and cross chains, the driven rollers in the fast feed table and an overhead hydraulically driven nip roll ensure butt up before entry into the machine feedworks, a slipping arrangement prevents overdriving.

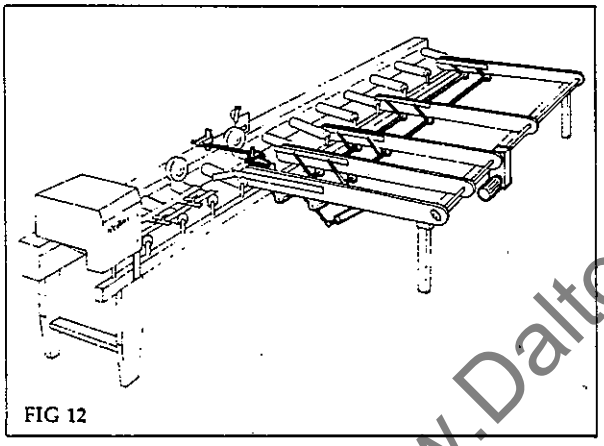


FIG 12

Outfeed Equipment

Generally used on high feed speed machines, this equipment can be provided at the outfeed end of 'Wadkin' moulders to transfer to another process, ie: stack, bundle, wrap, count, etc. Outfeed equipment can be provided and programmed to print on each component some identifying information. eg. Job No. Date, etc. Combinations of these facilities enable the finished components to be presented in a variety of ways at the outfeed end of the machine.

Extra Head Positions

Typically a planing and moulding machine has four heads to machine all four faces, these can be augmented with the addition of other heads. The most common is a second bottom head to ensure clean up on the underside. Where the amount of timber to be removed is great, or where the mould detail is complex, it may be necessary to provide an extra bottom head, available as an option.

Splitting (Fig 13)

Splitting is a common operation, usually done on the last bottom head, and often requiring very large horse powers. Such a head is available and may be fitted with anti kick-back fingers to prevent ejection towards the operator. Only one saw can be fitted on the smaller machines, ie. GC.

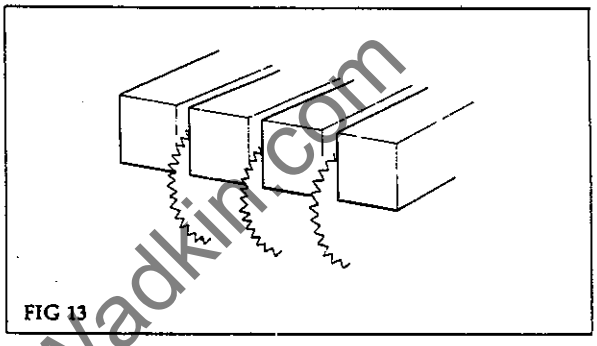


FIG 13

Universal Head

A universal head, either three or four position (always last head on the machine) can be provided to order, or the machine prepared to fit the head at a later date. The three position head may be used as a top head, bottom head or near side head and at any angular position in between. The four position head has the added capability of use as a fence side head.

The universal head gives greater flexibility for splitting and moulding on a conventional machine, and special pressures, chipbreakers, etc. can be provided to ensure perfect control of the workpiece.

Dial-a-Size Positioning (Fig 14)

On machines which are used for a large variety of small quantity batches of square dressed

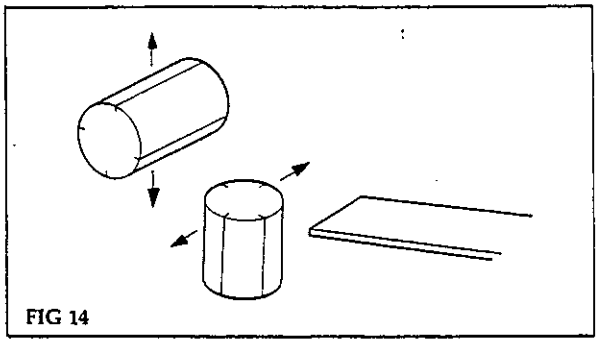


FIG 14

material, the set up time can be reduced by fitting Dial-a-size positioning (Appendix A).

The near side head horizontal adjustment is motorised and fitted with an encoder, the motorised vertical movement of the top head and feed is also fitted with an encoder.

A programmable memory stores the widths and thicknesses of the workpieces to be produced, and on command the two heads are repositioned to the preset dimensions. In a similar manner, where components of random width are machined (eg. Table tops, see Fig 15). The machine can be arranged to sense the width of the incoming pieces and automatically move the outside head to the required position.

Whilst being a slow operation, (butt feeding is not possible and the feed speed is slow), the facility does have great advantage to some users.

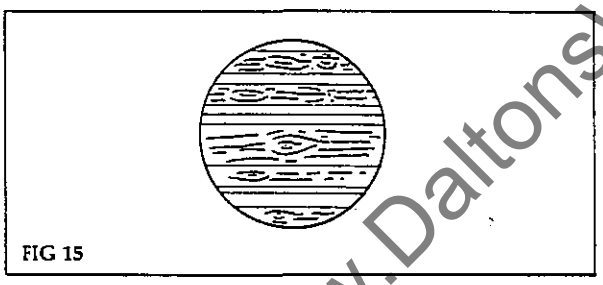


FIG 15

Feed Enhancement

The 'Wadkin' push feed and through feed systems are the result of years of experience in the planing and moulding industry, and for the great majority of work are exemplary. However, the great variety of timbers available, and the different conditions in which they are presented to the machine is acknowledged in the various options available to enhance feeding and minimise bed wear.

Bed Lubrication

A lubricant is introduced to the surface of the machine bed, from a manual or auto pump; this reduces friction, improves feeding capability and reduces bed wear.

An alternative; of introducing air between the timber and the bed of the machine, can be provided for those machines that do not have a second bottom head to machine off the small amount of oil introduced to the underside of the timber, or where the material being machined must not in any circumstances be contaminated with oil.

Feed Rolls

The top driven feed rolls of a through feed moulder are normally spring loaded down onto the workpiece. The required amount of load can vary with the nature of the work being run, although as a general rule it must be as light as practicable, and variation in rough timber thickness will of course increase the load as the feed rolls yield more. Adjustment of the loading is done at each individual roll.

Pneumatic loading can be provided; this has a number of advantages. The loading does not vary with any variation in lift, and the amount of loading can be changed more easily, using an air regulator valve.

One regulator controls the loading to rolls before the top head, and the other regulator controls the rolls after the top head.

Noise

Planing and moulding machines, by virtue of the number of cutter heads and the speed of the heads, produce high noise levels, typically between 95dB and 115dB when cutting.

The woodworking machine regulations require that an operator is not to be subjected to noise levels above 90 dBA for 8 hours, some precautions are therefore required, and a safety/ acoustic cover can be supplied for this purpose.

It should be noted however that even with a sound enclosure, under some circumstances, because of 'break out' (at say the infeed end), the noise level at the operating positions will be above 90 dBA.

For personal safety reasons the operator should wear ear defenders.

WARNING Before operating the machine read the Preface and Notice to Operators in Section 3, Operating Instructions.

1 MAIN PUSHBUTTON CONTROL PANEL
2 INFEED FENCE ADJUSTMENT LEVER & CLAMP
3 INFEED TABLE RISE AND FALL ADJUSTMENT
— INFEED TABLE ADJUSTMENT LEVER
4 LOCKING LEVER FIRST BOTTOM HEAD VERTICAL ADJUSTMENT
5 SQUARE SHAFT EXTENSION FIRST BOTTOM HEAD VERTICAL ADJUSTMENT
6 SQUARE SHAFT EXTENSION FIRST FENCESIDE HEAD LATERAL
7 LOCKING LEVERS FIRST FENCESIDE HEAD ADJUSTMENT
8 SQUARE SHAFT EXTENSION FIRST FENCESIDE HEAD VERTICAL ADJUSTMENT
9 SQUARE SHAFT EXTENSION NEARSIDE HEAD LATERAL ADJUSTMENT
10 LOCKING LEVERS NEARSIDE HEAD ADJUSTMENT
11 SQUARE SHAFT EXTENSION NEARSIDE HEAD VERTICAL ADJUSTMENT
12 SQUARE SHAFT EXTENSION SECOND FENCESIDE HEAD LATERAL ADJUSTMENT
13 LOCKING LEVERS SECOND FENCESIDE HEAD ADJUSTMENT
14 SQUARE SHAFT EXTENSION SECOND FENCESIDE HEAD VERTICAL ADJUSTMENT
15 CLUTCH LEVER POWER RISE AND FALL TOP HEADS
16 SQUARE SHAFT EXTENSION FIRST TOP HEAD VERTICAL, ADJUSTMENT
17 LOCKING LEVER FIRST TOP HEAD VERTICAL ADJUSTMENT
18 SQUARE SHAFT EXTENSION FIRST TOP HEAD LATERAL ADJUSTMENT
19 SQUARE SHAFT EXTENSION SECOND TOP HEAD VERTICAL ADJUSTMENT
20 LOCKING LEVER SECOND TOP HEAD VERTICAL ADJUSTMENT
21 SQUARE SHAFT EXTENSION SECOND TOP HEAD LATERAL ADJUSTMENT
22 SQUARE SHAFT EXTENSION SECOND BOTTOM HEAD VERTICAL ADJUSTMENT
23 SQUARE SHAFT EXTENSION SECOND BOTTOM HEAD LATERAL ADJUSTMENT
24 LOCKING LEVER SECOND BOTTOM HEAD VERTICAL ADJUSTMENT
25 LOCKING LEVER UNIVERSAL HEAD VERTICAL ADJUSTMENT
26 SQUARE SHAFT EXTENSION UNIVERSAL HEAD CANTING ADJUSTMENT
27 SQUARE SHAFT EXTENSION UNIVERSAL HEAD LATERAL ADJUSTMENT
28 LOCKING LEVER UNIVERSAL HEAD LATERAL ADJUSTMENT
29+ HANDWHEEL FOR VERTICAL ADJUSTMENT OF OUTFEED TABLE
30+ LOCKING LEVER FOR VERTICAL ADJUSTMENT OF OUTFEED TABLE
31 PUSHBUTTON CONTROL STATION
32 SQUARE SHAFT EXTENSION UNIVERSAL HEAD VERTICAL ADJUSTMENT
33 OVERHEAD BEAM FOR FEEDROLL DRIVE
34 TOP ROLLER PRESSURE OVER UNIVERSAL HEAD
35 HAND OPERATED HEIGHT SCREWS FOR FEEDROLLS
36 TOP PAD PRESSURE AFTER TOP HEADS
37 CHIPBREAKER FOR TOP HEADS
38 TOP ROLLER PRESSURE
39 AIR PRESSURE REGULATORS AND GAUGES
40 ADJUSTMENT SCREW FOR FEEDROLLS
41 VARIABLE SPEED DRIVE
42+ HEX. ADJUSTER FOR FIRST BOTTOM HEAD SPINDLE
43+ LOCKNUT
\+ HIDDEN DETAIL

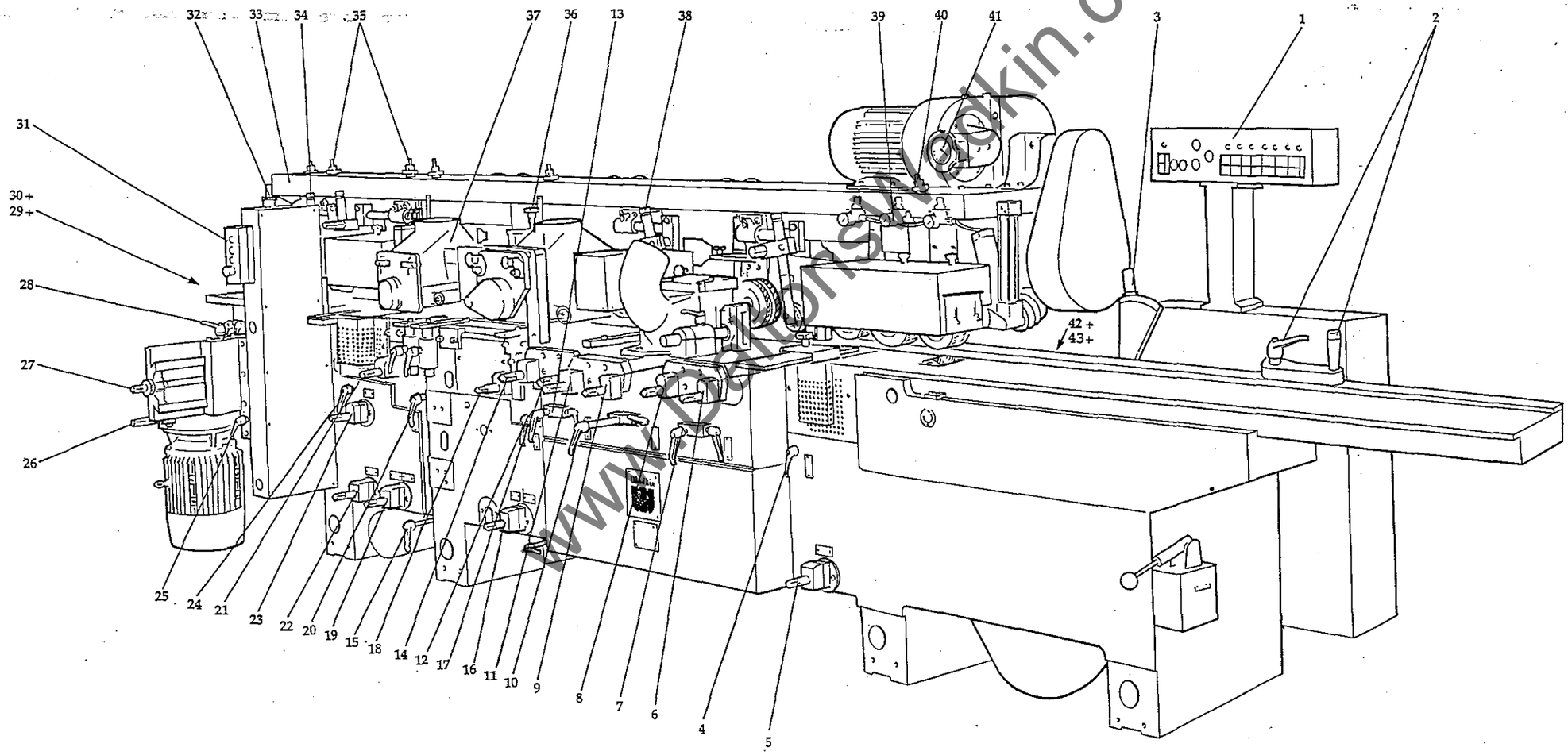
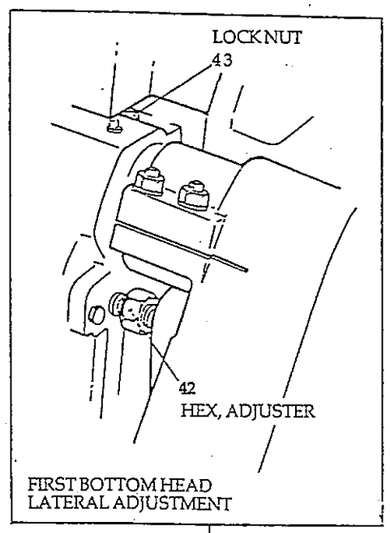
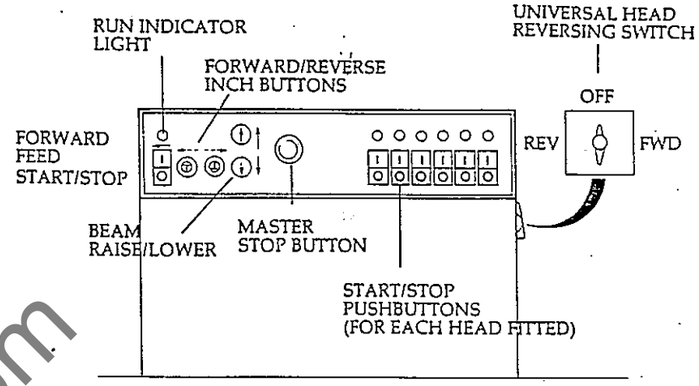


FIG 1 MACHINE CONTROLS AND ADJUSTMENTS





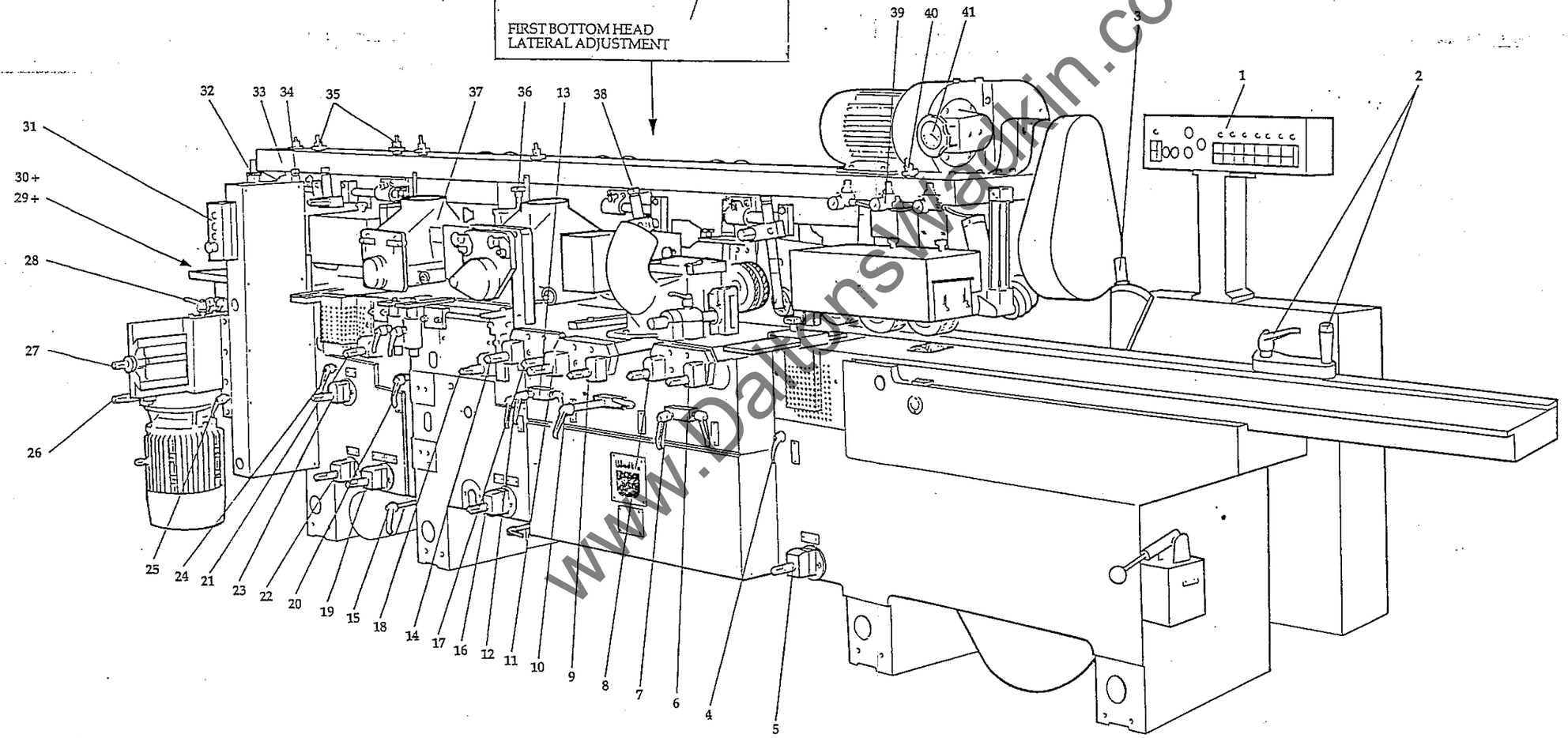


FIG 2 HAND CONTROLS AND ADJUSTMENTS

COMMON OPERATING PROBLEMS

When resolving problems, always work in a systematic logical sequence. Work from the infeed end of the machine through to the outfeed end, checking for faults in a progressive manner.

In this way faults will not be overlooked and remedial action can be taken where needed.

Set (spring loaded) top/side pad pressures with minimum amount of lift. Set side guides (not spring loaded) just up to timber ie: not clear, not trapping. When feeding wide pieces, on a through feed machine it is normally better to space feed rollers than have a solid bank, (see *Setting up the Machine*).

FAULT **Timber stops in machine**

Check

Setting of cutterblocks to table and fences.
Amount of pressure applied to feedrolls (pneumatic or spring).
Sharpness of cutters.
Yield of chipbreakers and pad pressures.
Tightness of side guides onto timber.
Oil level of bed lubrication pump (if fitted).
Position of feedrolls on workpiece.

FAULT **Ripples appear on surface of workpiece**

Check

Setting of cutterblocks to table or fences.
Pressure is applied to feedrolls (pneumatic or spring)
Sharpness of cutters.
Chipbreakers are set correctly and have sufficient pressure to control timber.
All locks are applied.
All pressure pads are in contact with timber.
Spindle speed (if two speed spindle fitted)
Tooling is suitable for the work.

FAULT **Bumps on infeed or outfeed end of workpieces**

Check

Setting of cutterblocks to table and fences.
Sharpness of cutters.
Chipbreakers are set correctly and have sufficient pressure to control timber.
All locks are applied.
All pressure pads are in contact with timber.
Position of side and top pressure rollers.
Bed and fences for build up of resin or chips.

FAULT **Machine will not straighten timber**

Check

Setting of cutterblocks to table and fences (accurate setting of knife edge to table/fence is criticial to obtain perfect straightening).
Sharpness of cutters.
Feed rollers and top/side pressures should not be used before the first bottom head.
Is the amount of cut set at the infeed fence and table adequate for the amount of bow in the timber?
Is the timber to be straightened a stable section?
Is the workpiece within the length of the straightening table and fence?

FAULT **Timber runs away from fence**

Check

Position of side pressure roller before first bottom head (if fitted, and section being worked does not require straightening).
Near side head chipbreaker is in contact with timber.
Top idle roller pressures at side heads are parallel to fence.
Side guides after fence sidehead are adjusted correctly.
Mating faces of feed rolls and spacers are clean.

Tooling

When practicable and heads are available, rough out on one head and finish on another, or take part of a mould out on one head and part on another.

Sharp tools produce good quality work, therefore change blocks and sharpen knives at regular intervals to obtain best performance. The cutterblocks supplied with the machine are fitted with high speed steel cutter knives, unless otherwise specified. The cutter spindles should not be run at speeds above that indicated.

LEADING PARTICULARS

Principal Dimensions and Capacities

Maximum size of timber admitted	140mm x 110mm
Maximum size of finished work	130mm x 100mm

Controlled adjustment of feed rolls and all pressures.
Limit switch at extremities of the raise and fall beam.

Feed speed infinitely variable	7 to 42 metres per min
Pressure adjustment of Feed Rolls	6 bar reduced.
Limit switches for maximum adjustment on Rise and Fall Beam	
Diameter of through feed Rolls	140mm
Width of feed rolls	2 x 20mm + 1 x 10mm wide each position (170 & 220) 1 x 20 + 1 x 10 opposite N.S.H. (170)
Diameter of cutterblock spindles	40mm
Diameter of cutterblock spindles	30mm (High speed heads)
Speed of cutterblock spindles (Pre-dressing heads)	6000 rpm standard, (7500 and 9000 rpm optional)
Speed of Cutterblocks Spindles (High speed heads)	7500/15000 RPM
Diameter of cutting circles	100mm min. all heads 195mm max. (155mm High speed heads)
Maximum cut on First Bottom Head	10mm
Maximum cut on First Fence Side head	10mm
Length of Infeed straightening table 2.5 metres (optional)	2 metres (standard)
Maximum straightening	10mm

Output of Motors

Feed Motor	7.5kW (10hp) — standard 11kW (15hp) — option
Rise and Fall Motor for beam	0.37kW (0.5hp) — standard
All spindle head motors	5.5kW (7.5hp) — standard 7.5 kW (10 HP) 11 kW (15 HP) — option

Star — delta starting available as an option on all motors

Fig 1 Typical machine with Universal head shows a typical machine general layout

Due to the variety of machine layouts available, it is impossible to give details of each machine and the user is referred to Wadkin for this information.

Wadkin

SECTION 2 INSTALLATION

LIFTING AND TRANSPORTATION

Unloading (Fig 1)

Verify the weight of the machine (see **Installation Data**). Ensure that all lifting equipment used is capable of lifting this weight as a minimum.

To lift the machine, place two 45mm diameter steel rods 1.2 metres long in the holes provided in the machine body (see Figure 1). To gain access to one of the holes it will be necessary to remove the cover (identified) from the rear of the machine.

Carefully place two short slings of suitable capacity on the crane hook. Keep these as wide apart as possible by inserting wooden chocks between the machine body and the slings to avoid damage. Locate the slings securely on the steel rods.

THE MACHINE IS DELIVERED WITH THE LARGE SAFETY COVER REMOVED,THIS MUST BE REFITTED BEFORE OPERATING ANY DRIVE OR CUTTER.

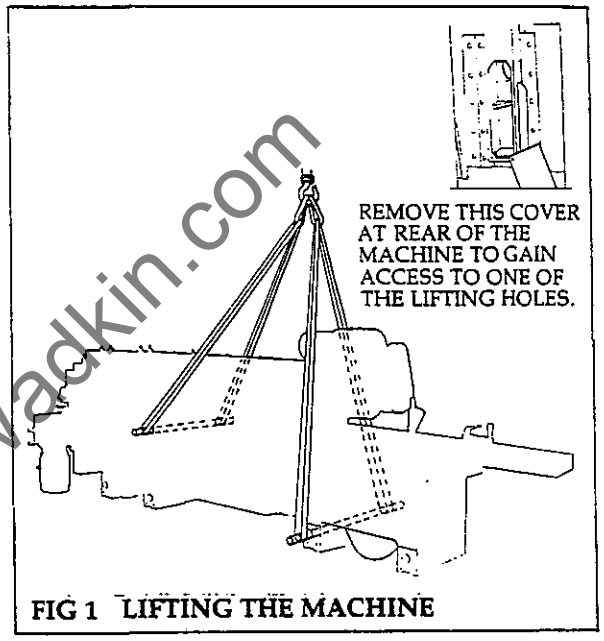


FIG 1 LIFTING THE MACHINE

Moving

In the process of moving, avoid jolting or vibrating the machine. If the ground is flat the machine can be positioned on wooden plinths and moved by rollers instead of lifting.

IMPORTANT: When lifting, the machine has a tendency to tilt backwards (towards the electric motors and the motor mounting brackets). Allowance should be made for this in positioning.

Unpacking

Undo the packing and make sure that damage has not occurred during transit; undo the case of accessories and ascertain that the machine is complete with all fittings.

Cleaning

Before levelling the machine, carefully remove the anti-rust material particularly from the bright parts.

Clean the machine with paraffin or diesel and a soft rag. Do not use a substitute - it may precipitate an explosion.

INSTALLATION DATA

Major Dimensions and Weight

Overall Dimensions and Weights:

Due to the variety of machine layouts available, it is impossible to give specific details of each machine and the user is referred to Wadkin for this information.

Location and Foundations

To obtain the best results from the 'Wadkin' woodworking machine it is important that the floor on which the machine is to stand has been prepared and is dry. Level the machine from the middle of the bed between the adjustable screw supports by the use of a spirit level. Place the steel plates supplied with the machine under the adjustable levelling screws.

Suggested levelling aids:

Straightedge 2 metres long
Feelers (thickness gauges), 0.50, 0.10, 0.15 and 0.2mm
Engineer's spirit level

Levelling longitudinally

Place the spirit level on the table and moving the level lengthwise check any variation. Adjust machine level by use of the adjustment screws in the feet of the machine. Deviation should not be more than 0.2 mm.

The straightening table (ie: table before the First Bottom Head), should be in line with the table after the First Bottom Head. Maximum tolerance is 0.1mm in 1600mm.

Levelling transversely

Place the spirit level across the table at right angles to the fence and repeat this action at intervals of 800mm. Total variation at each position should not exceed 0.1mm.

The foundations

The size of the foundations depends upon the specific machine model, format of the heads and disposition of the exhaust outlets and will be provided for individual machines.

If the floor consists of 100mm–150mm (4 to 6 inches) solid concrete, no special foundation is necessary. M12 'HILTI' type holding down bolts (not supplied with the machine) can be used to secure the machine to the floor.

NOTE: THE MACHINE MUST BE BOLTED DOWN BEFORE USE

See Foundation Plan for details of floor area required.

Supplies and Services

Electrical Supply

The customer is responsible for an adequate electrical supply. Details of power requirements are provided with the machine.

The machine is delivered with its complete electrical equipment ready for connection.

The electrical connection and schematic diagram are found in the electrical control cubicle of the machine. All that is required is to connect the power supply to the disconnect (Isolator) switch at the electrical control cubicle or panel.

POINTS TO NOTE WHEN CONNECTING THE POWER SUPPLY

Check the voltage, phase and frequency correspond with those on the machine nameplate details.

Check the main fuses are of the correct capacity in accordance with the machine nameplate details.

Connect the incoming supply leads to the appropriate terminals.

Check all connections are sound and that equipment is earthed.

Check the spindle rotation is correct. When looking from the front of the machine the feed rolls should rotate in a clockwise direction. To reverse the rotation on any drive, reverse any two of the line lead connections at the incoming supply.

IMPORTANT: ANY ELECTRICAL MODIFICATIONS SHOULD BE CARRIED OUT BY A COMPETANT ELECTRICIAN.

Pneumatic pressure equipment (where fitted).

Where the machine is equipped with pneumatic pressure operated feedrolls, the number of connections are shown on the pneumatic circuit diagram and foundation plan. To make the system operative connect up the air pipes and fittings to a suitable air supply.

The size of the air inlet connection is 1/4in. BSP female.

The size of the air pipe is 8mm O.D. x 5mm I.D.

Pressure required is 6 bar (approx. 90 psi), see **Operating Instructions** for feedroll pressures.

The air consumption is approximately 200 cu.dm/hr (7cu.feet/hr).

Exhaust (Dust Extraction) Connections

The size of the connections are given on the Foundation and Dust Extraction Plan.

The part of the air extraction pipe fitted to the exhaust hood should be flexible and detachable. The length of the flexible part is dependant on the way the pipe is used and the adjustment required on the work spindle. As a guide use a flexible pipe one metre long for the lower and fence side spindles and two metres for the top and near side spindles.

The flow of air to the exhaust hoods should be approximately 25 to 30 metres per second.

Volume of Air Required

For Horizontal/Vertical Spindles	17-20 cu. metres/min. (600-700 cu.ft/min)
For Universal Spindle	17-20 cu. metres/min. (600-700 cu.ft/min.)

The total volume of air required for the Dust Extraction is directly related to the total number of spindles and will be confirmed on supply of equipment.

Schematic Diagram for Electrical Services

The electrical wiring and schematic diagram will be in the electrical control cubicle of the machine.

SECTION 3 OPERATING INSTRUCTIONS

GENERAL INFORMATION

Safety

The safe operation of woodworking machinery requires constant alertness and close attention to the work in hand.

Read this instruction manual, the Preface, and the Safety Notes carefully before operating the machine.

Blunt cutters often contribute to accidents. An efficient machinist knows when sharpening is necessary, but if there is reluctance to spend time on grinding and resetting, the cutters may run beyond their efficient limits and instead of cutting efficiently and smoothly they will tend to chop and snatch at the workpiece. This not only increases the risk of accidents but also lowers the quality of work.

Customers are strongly advised at all times to use high tensile cutterblock bolts which should be tensioned by means of a torque spanner. When choosing cutterblocks ensure they are suitable for the minimum cutting speed of the machine.

It is recommended that personnel involved with the machine are acquainted with the Woodworking Machines Regulations 1974 and also Booklet No. 41 'Safety in the use of woodworking machines', issued by the Department of Employment and available from Her Majesty's Stationery Office. Also BSI Code of Practice 'Safeguarding Woodworking Machines' Part 1 BS 6854.

Safety Devices

The safety covers and dust hoods must be closed during the time the machine is running. Cover the non-used part of the cutterblocks with the guards provided.

Only remove the feed roller guard when changing rollers and with spindles switched off at the control panel.

Spindles which are run in two directions (ie: Universal Head), should be fitted with a locking collar to prevent unforeseen unlocking on mode changeover.

Do not work spindles if the spindle nuts or intermediate collars are not securely tightened.

Only remove the cover of the drive belt housing when changing or retensioning belts. The drive spindle must be stationary before making any adjustments.

WARNINGS

Notice to Operators

Read and follow the guidelines given in **Safeguarding Machines** and **Safety Notes** which are repeated on the bed of the machine.

Before operating the machine

Ensure that all guards and fences are securely fitted and correctly adjusted. Guards and other safety devices are NOT to be removed while the machine is in operation. They are there for YOUR SAFETY.

Ensure cutters/blades are the correct type and rotate in correct direction of cut, are sharp and securely fastened.

Correct spindle speed and feed is selected for the cutter equipment.

Remove or fasten loose clothing; confine long hair and remove jewellery, etc.

Ensure suitable jigs and push sticks are available as appropriate.

Ensure sufficient working space is provided and that lighting is adequate.

Switch on all dust extraction equipment, ensure it is working correctly.

During machining

Wear suitable protective equipment, e.g. goggles, ear defenders, dust mask.

Stop the machine before making adjustments or cleaning woodchips from the work area.

Keep the floor area around the machine clean and free from wood refuse.

Do not allow the floor to become slippery with oil or grease.

Report any machine malfunction or operator hazard to a person in authority immediately. Do not attempt to repair the machine unless qualified to do so.

Ensure all power sources are isolated before commencing any maintenance work.

Comply with the Woodworking Machines regulations. Failure to do so could result in legal proceedings.

Machine Controls (Fig 1, Fig 2)

Before starting the machine, operators should familiarise themselves with the various controls and their usage (Fig 1).

Check direction of spindle rotation , ensuring that the spindles rotate freely. Check each spindle motor separately.

Check the infeed table raise and lower operation.

The machine has continuous feedworks. When started, timber stock will be fed to the cutter heads until the pass is completed or the machine is stopped. The feed speed is variable and can be adjusted by a handwheel at the drive gearbox to give throughout speeds within the machine range. Only adjust the variable speed drive while in motion.

The feed rolls have serrated teeth up to the top cutter head after which they are rubber covered. The serrated rolls need to be adjusted to 3mm lower than the thinnest workpiece; the rubber covered rolls should be adjusted to 1mm lower than the workpiece.

The height of the feed roll adjustment is indicated by the graduated scale on the vertical pillar adjacent to the feed table. Adjustment of the feed rolls is made by pressing the pushbuttons marked:

— raise feed rolls

— lower feed rolls

The pushbuttons are positioned on the Electrical Control Panel located at the infeed end of the machine and also at the control station located at the outfeed end of the machine.

The adjustment for height of the rubber covered (plain) rolls may be made independently to suit the finished workpiece.

The panel mounted control station at the infeed end of the machine contains the following features:

START-STOP Pushbutton;
with indicator light , for each spindle.
START-STOP Feed Pushbutton;
with indicator light.
FORWARD-REVERSE
(Inch) Feed Pushbuttons.
RAISE-LOWER Pushbuttons;
for beam adjustment.
MASTER STOP (Emergency) Button.
REVERSING switch;
for Universal head operation

The following may also be fitted:

Switch for auto bed lubrication.
Dial a Size controls.

Fig 1 Machine Controls — shows the general layout of the machine controls.

Fig 2 Hand Controls and Adjustments — identifies controls and adjustments referred to in the text.

Machine enclosure

The machine can be fitted with a close fitting GRP enclosure. When setting up the machine, be aware of any interlocks fitted. Do not return machine to service until all safety fittings are operational.

MOUNTING THE CUTTERBLOCKS

General

The XR machine can be fitted with screw-on or Hydrogrip (hydraulic pressure) cutterblocks. Hydrogrip cutterblocks are used to provide an improved surface finish and allow higher feed speeds to be used. The method of fitting the two types differs.

When changing cutterblocks, be aware that the spindles for screw-on blocks have right or left-hand threads, dependent on spindle location, and tighten accordingly.

The spindles are threaded as follows:

Bottom Horizontal spindles — left-hand thread
Near Side Vertical spindle — left-hand thread

Top Horizontal spindles — right-hand thread
Fence Side Vertical spindle — right-hand thread

The Hydrogrip blocks are not screw fitting and require to be pressurised in position on the spindle. To protect the Hydrogrip cutterblock and the machine spindle in the event of hydraulic failure, it is necessary for safety drive collars to be used.

The consequence of not using the safety drive collars will result in the cutterblock seizing on the machine spindle in the event of either; The operator neglecting to pressurise the cutterblock and then running the spindle, or the Hydrogrip cutterblock sleeve losing pressure.

If a seizure occurs, the spindle and cutterblock must be returned to Wadkin for repair. An appropriate charge will be made for this service.

Two types of safety collar are used. These are a threaded safety collar; for use when full length tooling is in use on the machine spindle. A plain safety collar; for use when short length tooling is used on the machine spindle.

Outboard bearings can be fitted to the horizontal spindles to give greater rigidity to the cutterblock; these support each spindle at its outer position and allow higher machine spindles.

The outboard bearing support bracket on the bottom heads is attached and locked to the support plate manually. The top heads are hydraulically locked from the control panel or slide locks and are interlocked to the powered rise and rise and fall of the spindle to ensure the plate is free to move with the spindle. The bearing plate locks must be released before making adjustments.

The outboard bearings must be de-pressurised before removal, or making lateral (horizontal) adjustments to the heads.

To Change Cutterblocks (Figs 3, 4, 5)

The method of changing cutterblocks depends on the type fitted and it will be first necessary to remove any outboard bearing, locking collar, spindle nut, and spacers fitted, as applicable.

Plain bore type cutterblocks

(1) Unscrew the cutterblocks from the spindle with the spanner/s provided. Can be right or left-hand thread (see **General**).

a. Place the spanner/s on the hexagon of the spindle and the two flat faces of the cutterblock locknut, or;
b. Hold the spanner (top) securing the spindle firmly in position and unscrew the cutterblock locknut from the spindle with the bottom spanner.

NOTE: DO NOT use any form of percussion tool or damage to spindle bearings can result. DO NOT use a box or extension spanner.

Outboard bearings (Fig 3)

To remove the assembly:

(1) Remove safety covers (1) to gain access. The cover is secured by tension pins, pull to release.

(2) De-pressurise the outboard bearing (2), turning the pressure release screw (3), located in a recess on the face of the bearing, one-quarter turn to release, using a 3mm A/F hexagon key.

(3) Release the outboard bearing support bracket nuts (4) and 'C' washers (5) and/or locking handles (see Notes 1 & 2) where fitted.

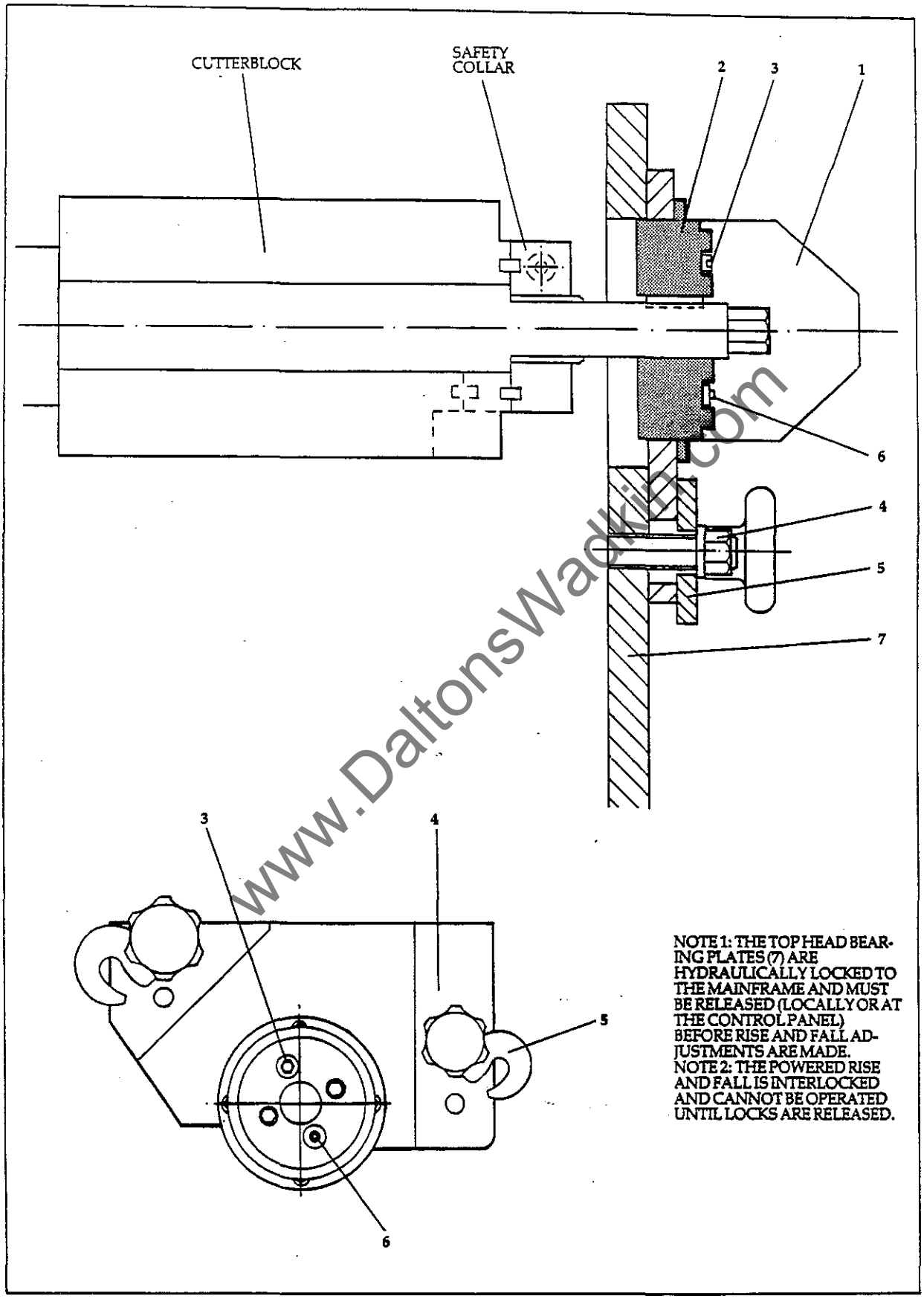


FIG 3 OUTBOARD BEARING ASSEMBLY

(4) Slide the bearing assembly off the spindle by pulling outwards.

To replace the assembly:

(1) After fitting a new cutterblock. Slide the bearing assembly into position on the spindle. Lock in position with bearing support bracket nuts (4) and 'C' washers (5) and/or locking handles (see Notes 1 & 2).

(2) Tighten pressure release screw (3). Pressurise the bearing to 500bar (7250psi) by application of hydraulic pressure to nipple (6) in the recess on the face of the bearing.

(3) Ensure that locking handles, or hydraulic locks on top heads, are secured before running the spindle.

Hydrogrip cutterblocks (Figs 4, 5)

To remove cutterblocks:

(1) After removal of the outboard bearing. Release locking screw on safety collar (Fig 5) and remove from spindle. Remove intermediate spacers, if fitted.

(2) Depressurise the Hydrogrip cutterblock in the same manner as for the outboard bearing. The pressure release screw (2) is located in a recess on the barrel of the cutterblock.

(3) Slide the cutterblock from the spindle.

To replace both types of cutterblock:

(1) Carefully clean spindles, cutterblocks, spacers and collars before fitting new cutterblocks.

(2) Carefully place the cutterblock on the spindle. On the Hydrogrip blocks tighten pressure release screw (2), and pressurise the cutterblock by applying hydraulic pressure to the pressure nipple (1) located in a recess located on the barrel of the block, (see Fig 4).

(3) Add spacers if needed. Fit safety collar (see Fig 5) and tighten securing screw.

(4) On plain bore cutterblocks. Tighten the block to the spindle with the spanner/s provided.

(5) After fitting the cutterblock, replace the outboard bearing assembly and pressurise the bearing to 500bar hydraulically. (see Fig 3).

(6) Turn the spindle slowly to ensure the cutterblock is free and replace cover.

(7) Operate the spindle for a short period to ensure it rotates freely and without vibration.

CAUTION

Take care not to allow the cutterblock to fall onto the spindle shoulder while fitting. This can cause damage to spindle bearings and subsequent vibration and is especially applicable to vertical spindles.

Safety Collars (Fig 5)

Fitting procedure:
A. Threaded collar

(1) Mount the cutterblock onto the machine spindle. Make sure the cutterblock fits up to the shoulder on the spindle.

(2) Pressurise cutterblock to the correct working pressure.

(3) Unscrew the pins in the threaded safety collar to the fullest extent, using the knurled heads.

(4) Screw the collar onto the spindle, finger tight, against the end face of the cutterblock.

(5) Reverse the collar on the threads, sufficient to allow the pins to be brought into line with corresponding holes in the end face of the cutterblock.

(6) When in line, screw the pins into position, locating into the holes of the cutterblock.

(7) Tighten the capscrew in the collar, using an Allen key. This causes the collar to grip the threads on the spindle.

(8) The collar will now maintain the drive to the cutterblock in the event of depressurisation.

NOTE: A spacing collar is provided for use when a space is left between the cutterblock and the safety collar. This is fitted prior to the safety drive collar.

To release; reverse the procedure.
B. Plain collar

(1) Mount the cutterblock onto the machine spindle, making sure it fits up to the spindle shoulder. Pressurise cutterblock to the correct working pressure.

(2) Slide the collar with its pins facing the cutterblock along the machine spindle up to the cutterblock. Locate the pins in the corresponding holes in the block.

(3) Tighten up the cap screw in the collar, using an Allen key. This causes the collar to grip the spindle.

(4) The collar will now maintain the drive to the cutterblock in the event of depressurisation.

To release; reverse the procedure.

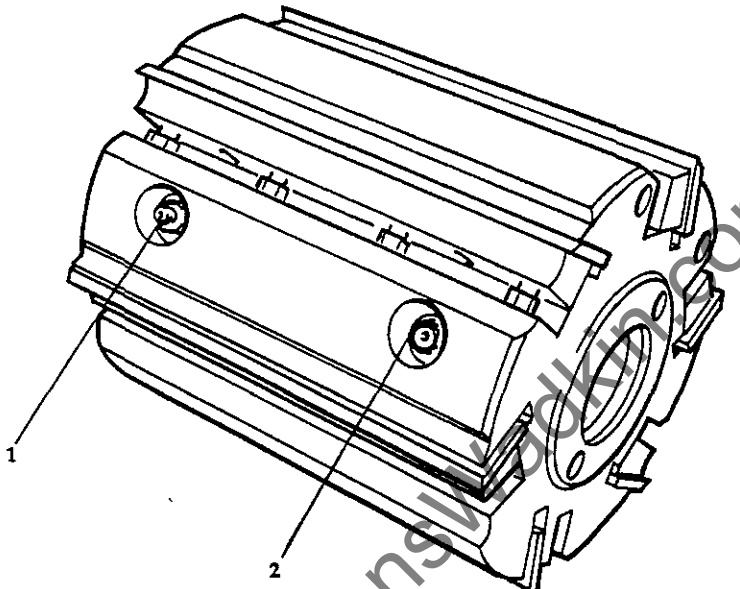


FIG 4 HYDROGRIP CUTTERBLOCK

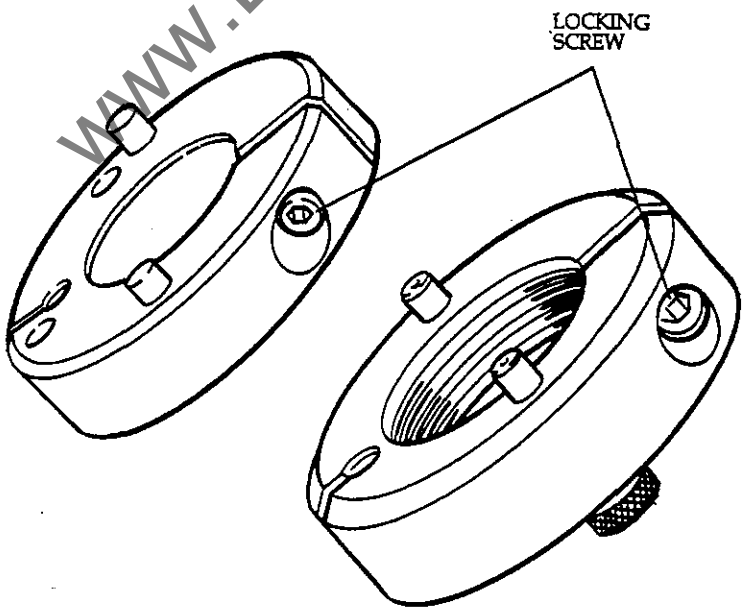


FIG 5 SAFETY COLLARS

SETTING UP THE MACHINE

First Bottom Head (Fig 6A, 6B, Fig 2)

The spindle can be adjusted vertically from the front of the machine. Lateral adjustment is from the rear of the machine.

(1) Remove guard for access.

(2) Ensure the outfeed table is clean.

(3) Place a straightedge on the outfeed table projecting over the bottom horizontal cutterblock (Fig 6A). The cutter blades should just touch the underside of the straightedge.

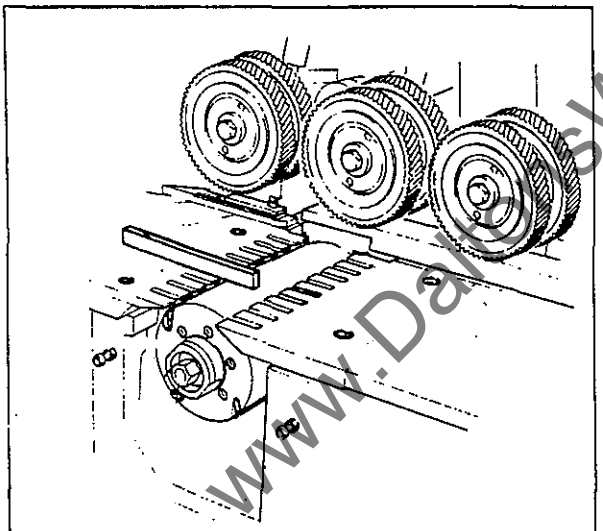


FIG 6A FIRST BOTTOM HEAD

(4) If necessary, reset the cutter height as follows: (Fig 2)

a. Release locking handle (4) and adjust the cutterblock height by rotating the adjusting screw (5) clockwise to raise the spindle, or anti-clockwise to lower.
b. Refasten the locking handle (4).

NOTE: All adjusting screws are fitted with a square shaft extension. A winding handle is supplied to fit the extension.

(5) Place a straightedge against the outfeed fence and check the fence and edge reference cutter are in line, ie. just touching the straightedge, (Fig 6B). Adjust the fence.

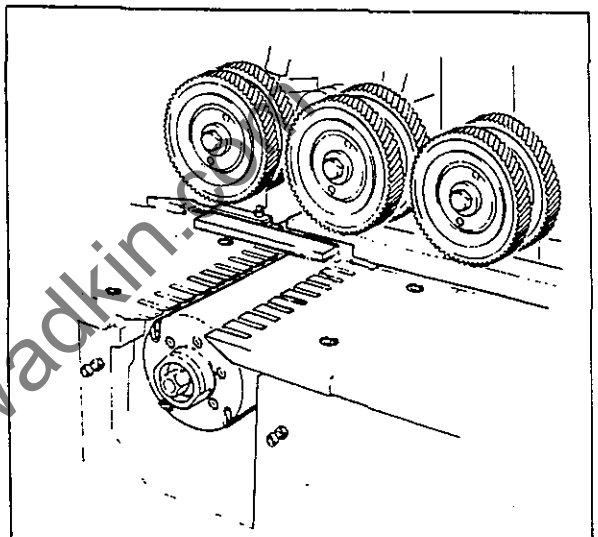


FIG 6B FIRST BOTTOM HEAD

If necessary, adjust the cutter spindle laterally as follows:

a. Release the hexagon locknut on the bottom head housing at the rear of the machine (see Inset — Fig 2) and rotate the adjuster (42) to re-position the spindle.
b. Retighten the hexagon locknut on the housing.

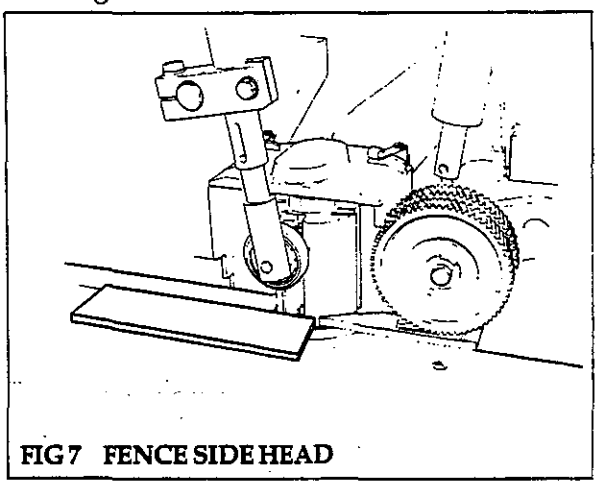


FIG 7 FENCE SIDE HEAD

First Fence Side Head (Fig 7, Fig 2)

The spindle can be adjusted vertically and horizontally.

(1) Ensure that the machine bed is clean.

(2) Place a straightedge against the fence and cutters. Set the spindle so that when rotated the knives lightly touch the straightedge, (Fig 7).

(3) To adjust the spindle laterally, proceed as follows: (Fig 2)

a. Release the locking handles (7).
b. Rotate the adjusting screw (6) clockwise to advance the spindle or anticlockwise to retract the spindle.
c. Refasten the locking handles (7).

NOTE: Maximum lateral adjustment is 65mm behind the fence. The spindle can be lowered 40mm below the table.

(4) If necessary, set the height of the cutterblock as follows: (Fig 2).

a. Release the locking handles (7).
b. Adjust the cutter height by rotating the adjusting screw (8) anticlockwise to lower the spindle or clockwise to raise the spindle.
c. Refasten the locking handles (7).

(5) To set thickness of cut, adjust the infeed fence.

(6) Adjust the fence nosepieces, before and after fence side head, to approximately 5mm clear of the maximum cutting circle of the cutterblock.

NOTE: On models with two fence side heads, set second fence side head and fence prior to setting this head, **(Fig 8 Intermediate Fences).**

The Second Fence Side head (when fitted) is adjusted in the same way as the **First Fence Side Head**, after releasing locking lever (13) and turning the head adjusting screws (12) and (14) as needed. Retighten locking lever (23) after adjustment, (see Fig 2).

Intermediate Fences (Fig 8) (2 fence side head models)

After mounting the cutterblocks to the Fence Side Heads the intermediate fence (1) must be adjusted to suit the workpiece.

(1) Slacken the two screws (2) using a 10mm A/F hexagon key.

(2) Adjust the fence by turning the eccentric bolt (3) to the left to remove the least amount of timber, or to the right to increase the amount of cut (to a maximum of 2mm).

(3) After adjusting the fence (11), tighten the two screws (2), to secure in position.

(4) The adjustable nose pieces (4) of the fence must be set approximately 5mm from the cutterblock. Unscrew the hexagon bolts (5), position the nose pieces, the retighten the bolts to secure in position.

(5) When adjusting the nose pieces ensure that these and the fence supports are free from trapped wood shavings.

The correct adjustment of the fences has a great influence on the finish and quality of the work and will repay time spent setting up correctly.

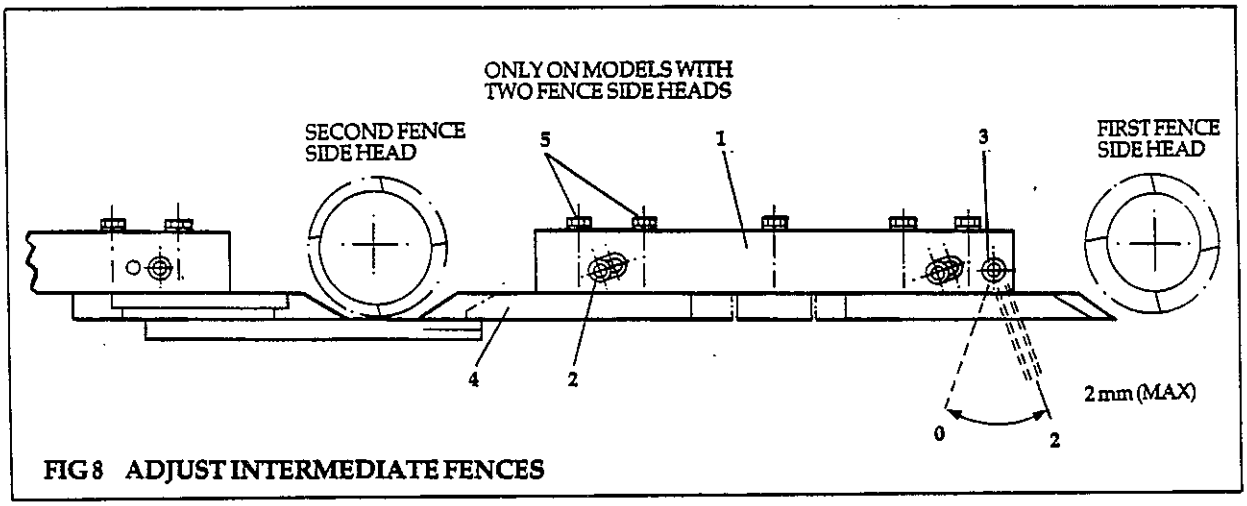


FIG 8 ADJUST INTERMEDIATE FENCES

Near Side Head (Fig 9, Fig 2)

The spindle can be adjusted vertically and horizontally.

(1) Ensure that the machine bed is clean.

(2) Check the digital readout, using a datum block (1) of known width inserted between the fence guide (2) and the cutter (3). The cutterblades should just reach the nearside of the datum block.

If necessary, adjust the spindle laterally as follows: (Fig 2)

(3) Release locking handles (10).

a. Rotate adjusting screw (9) clockwise to advance the spindle, or anticlockwise to retract the spindle.
b. Refasten locking handles (10).
c. Reset digital readout, where fitted, to the known dimension.

To adjust vertically: (Fig 2) can be lowered 40mm.

(4) Release locking handles (10).

a. Rotate adjusting screw (11) clockwise to raise, or anticlockwise to lower.
b. Refasten locking handles (10).

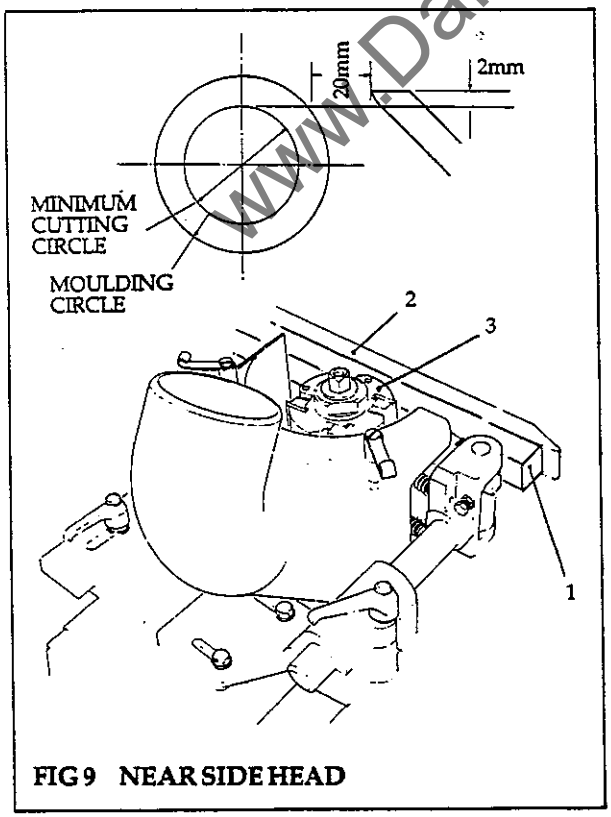


FIG 9 NEAR SIDE HEAD

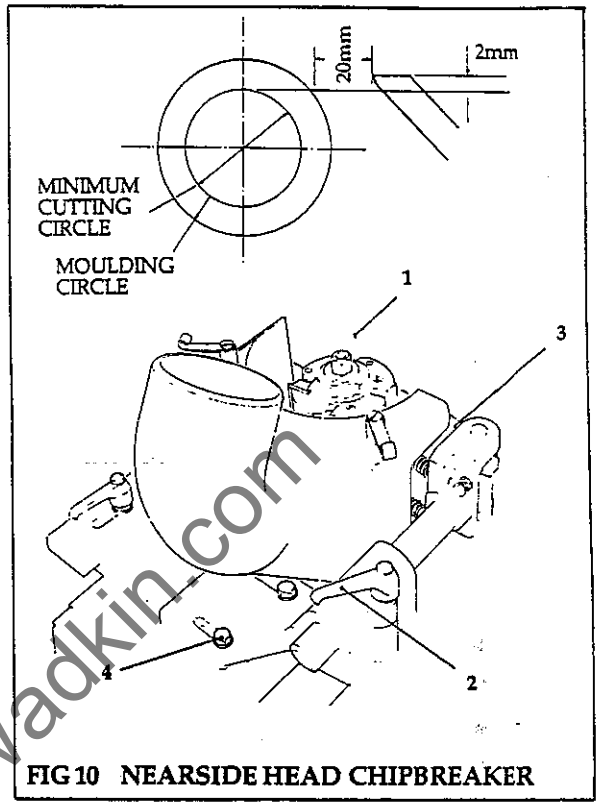


FIG 10 NEARSIDE HEAD CHIPBREAKER

Near Side Head Chipbreaker (Fig 10)

(1) Check the setting of the chipbreaker adjacent to the near side head.

Re-set the chipbreaker as follows:

(2) Remove the cover of the dusthood (1).

The chipbreaker has two adjustments.

(3) Release the locking handle (2) and adjust the chipbreaker (3) approximately 2mm clear of the smallest cutting circle. Refasten the locking handle (2).

(4) Unscrew the bolts (4) and adjust the chipbreaker body (5) to clear the cutterblock and the largest cutting circle by 20mm, (see Fig). Retighten the bolts (4).

Top Heads (Fig 11, Fig 2)

The spindle can be adjusted vertically and horizontally. The vertical adjustment can be either manual, or powered with the beam rise and fall. Where outboard bearings are fitted, the beam rise and fall is interlocked to the top head outboard bearing locks which must be released prior to adjustment.

Using the same method and datum block as for **Near Side Head**, check the digital readout, (Fig 11). If necessary, adjust cutter spindle as follows: (Fig 2)

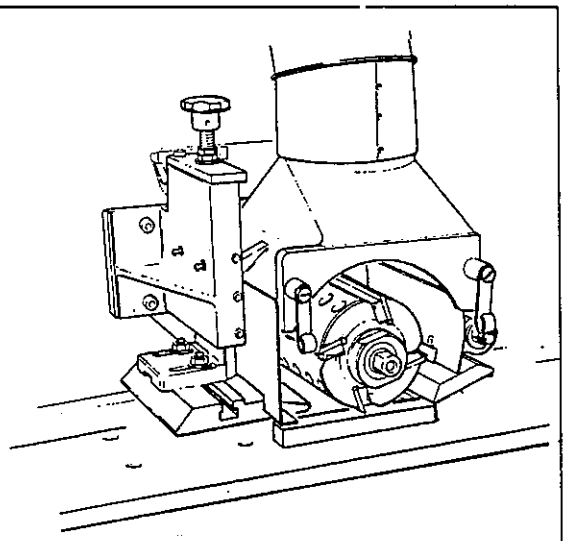


FIG 11 TOP HEAD

(1) Release hydraulic locks on outboard support bearing support plate by pressing UNLOCK Top Head pushbutton on control panel, (refer to **Fig 1 Controls**), or locking handle (17). If bearings are not fitted, release locking handle (17).

(2) Rotate adjusting screw (16) clockwise to lower the spindle or anticlockwise to raise the spindle.

(3) Refasten locks on outboard bearing support plate by pressing LOCK pushbutton on control panel, or retighten locking handle (17) as applicable.

To use the vertical adjustment; to move beam only, or beam and top head/s:

(1) Release hydraulic locks, by pressing UNLOCK Top Head pushbutton on control panel, or releasing locking handle (17). Engage clutch ever (15) and hold until clutch is engaged. If the clutch does not readily engage, operate the adjusting screw (16) by turning slightly (to right or left) until engagement is made.

(2) To raise or lower the spindle, press the appropriate pushbutton at the control station. Disengage clutch lever (15) after positioning.

NOTE: The powered vertical adjustment of the top head only works in conjunction with the feedworks and is electrically interlocked to the top head locks which must be released first.

(3) Make final adjustment manually with handwheel (16).

(4) Press LOCK pushbutton on control or local panel to re-engage outboard bearing locks, or retighten locking handle (17) as applicable.

To adjust the cutterblock laterally: (Fig 2)

NOTE: When making lateral adjustments it is necessary to release the pressure in the outboard bearing to allow the spindle to move in relation to the support plate (see Fig 3).

(5) Unlock handle (17). Operate adjusting screw (18) to advance or retract the spindle.

(7) Re-pressurise the outboard bearing after making adjustments, (see Fig 3) and lock handle (17).

The **Second Top Head** (when fitted), is set up in a similar manner, using controls (19), (20), (21).

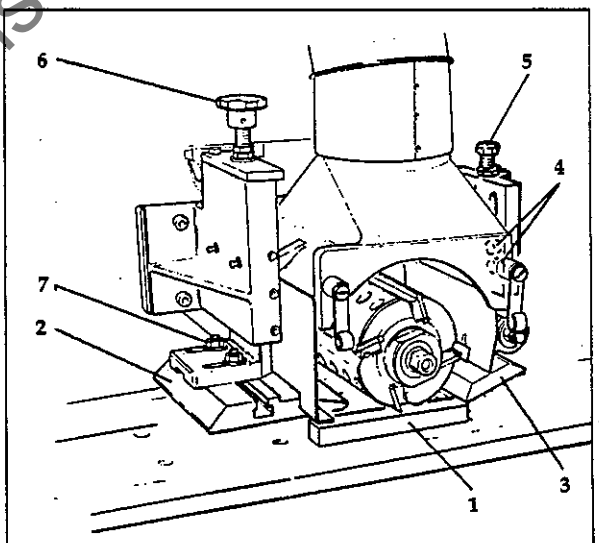


FIG 12 TOP HEAD CHIPBREAKER

Top head chipbreaker and pad pressure (Fig 12)

(1) Using a straightedge (1), set the face of the pressure pad (2) in line with the base circle of the cutterblock. Ensure that the pad nose is clear of the maximum cutting circle.

(2) Set the nose of the chipbreaker (3) to the straightedge, and clear of the cutting circle.

(3) To adjust; Release screws (4) and set the chipbreaker shoe to be a minimum of 20mm from the largets cutting circle. Secure screws (4).

(4) Adjust the spring pressure; (adjuster screw (5) on body) to achieve the required holding down force on the chipbreaker.

(5) Check chipbreaker clears the cutterblock through its full movement.

NOTE: If the chipbreaker is radial action type (option), when the nose is depressed it will move in line with the cutting circle.

(6) The pressure pad (2) is adjusted vertically using star wheel (6), and horizontally after releasing nuts on tee-bolts (7). Retighten nuts after setting.

When finally set; the cutterblock, pad pressure, and the chipbreaker should all be in-line.

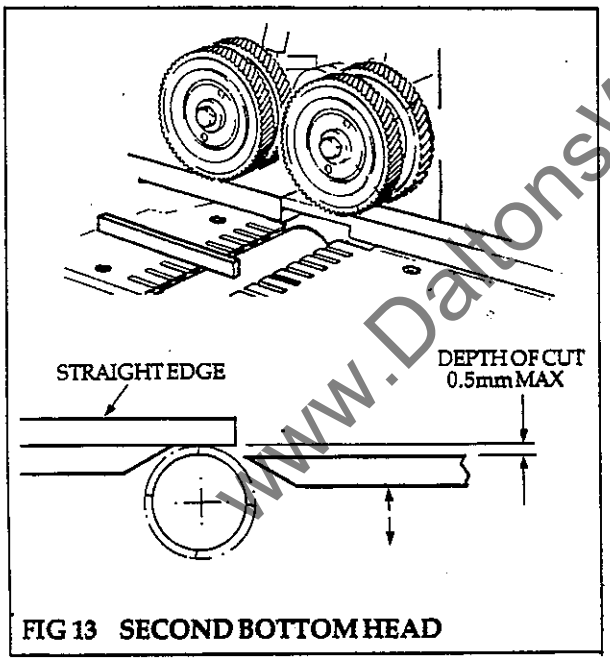


FIG 13 SECOND BOTTOM HEAD

Second Bottom Head (Fig 13, Fig 2)

The spindle can be adjusted vertically and horizontally.

(1) Ensure the machine bed is clean.

(2) Using a straightedge, as in setting the **First Bottom Head**, set the cutter height by adjusting the spindle, the blades should just touch the underside of the straightedge, (see Fig 13 and included diagram).

To adjust the spindle vertically; (Fig 2).

(3) Release locking handle (24), rotate adjusting screw (22), clockwise to raise, or anticlockwise to lower.

(4) Retighten the locking handle (24).

To adjust the cutterblock laterally: (Fig 2)

(5) Release hexagon locknut (42). Rotate adjusting screw (23) to advance or retract the spindle

(6) Re-tighten hexagon locknut (43).

Infeed Table and Feedworks

The GA machine can be fitted with alternative feed arrangements:

Short Table (with push feed works)
Long Table (straightening)

The short infeed table is fitted with top feedrolls and bedrolls (optional) driven from the feedworks drive.

The pressure on the rolls can be varied using the pressure regulators (see Fig 2) and can be set by the operator to give a positive drive at all times. The bedrolls are preset and will normally not require adjustment.

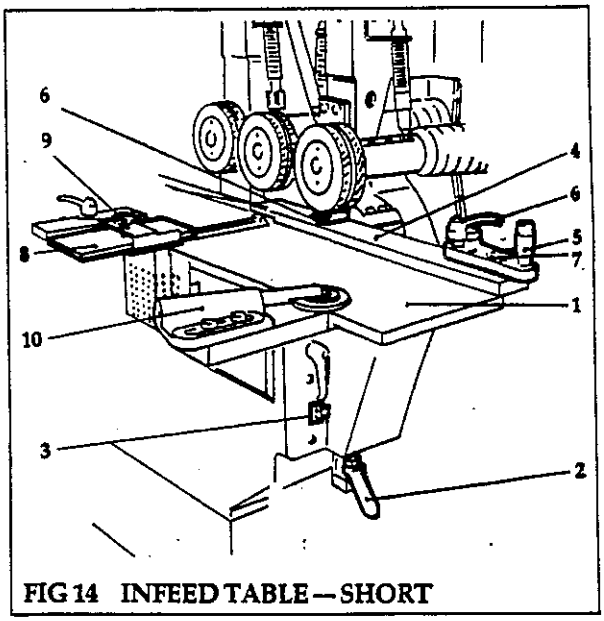


FIG 14 INFEED TABLE—SHORT

Infeed Table (Short) (Fig 14)

(1) The table (1) rise and fall is adjusted by turning ratchet spanner (2). Set the height required from scale (3) moving the ratchet handle to right or left. Maximum adjustment available is 10mm.

(2) Set the fence (4) adjustment with handle (5) after releasing clamps (6). Refasten clamps after adjustment. Set the amount of offset by direct reading on the scale (7).

(3) The adjustable guard (8) must be set within 5mm of the maximum timber size. Slacken starwheel (9), set guard and re-tighten starwheel.

(4) Set side rollers (10), if fitted, to suit width of workpiece.

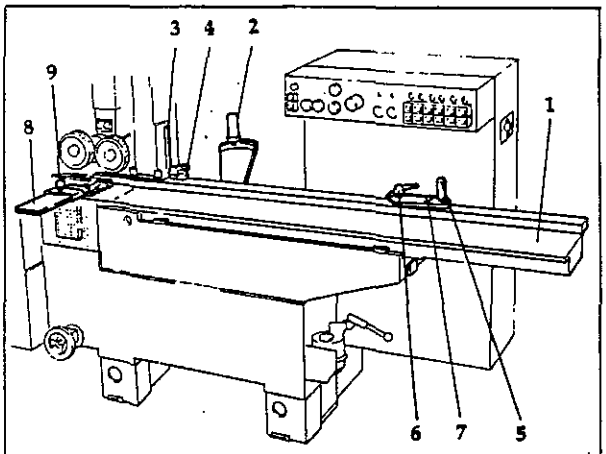


FIG 15 INFEED TABLE — STRAIGHTENING

Infeed (Straightening) Table (Fig 15)

(1) The height of the infeed table (1) is adjusted by the handle (2). To unclamp table turn the handle anticlockwise. Set the height required from direct reading on the graduated scale (3) by moving handle as required. Turn handle clockwise to lock in position. The maximum adjustment available is 10mm.

(2) Set the fence (4) adjustment with handle (5) after releasing clamps (6). Refasten clamps after adjustment. Set the amount of offset required by direct reading on the scale (7).

(3) The adjustable guard (8) must be set to within 5mm of the maximum timber size. Slacken starwheel (9), set guard and re-tighten starwheel.

Set Feed Rolls (Fig 16A, Fig 16B)

(1) Set the feed rolls (1) to suit width and thickness of timber, ie: width of rolls is similar to width of timber.

NOTE: To achieve maximum traction on wide timber, it is advisable to space rolls apart (Fig 16A), rather than having a solid bank of feed rolls.

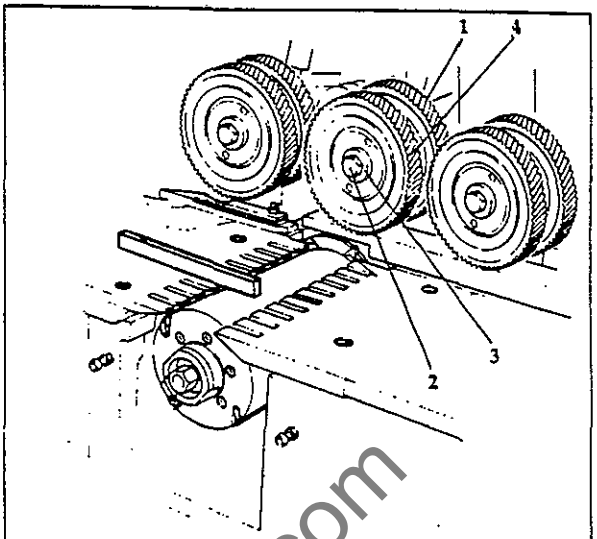


FIG 16A FEED ROLLS — SETTING

Use the Control Station Rise and Fall pushbuttons (see **Fig 2 Machine Controls**) to set the depth of the rolls.

If necessary, change the rolls as follows:

a. Slacken centre screw (2), using a 19mm A/F spanner.
b. Remove 'C' washer (3), add or remove rolls, or spacers (4), to suit width of stock (Fig 16B) ensuring that each roll drive pin engages with its mating part.
c. Refit 'C' washer (3) and retighten centre screw (2).

(2) Set feed roll height 3mm lower than thinnest workpiece to give a positive drive.

(3) When set up, inch timber through the machine to check the setting and switch off.

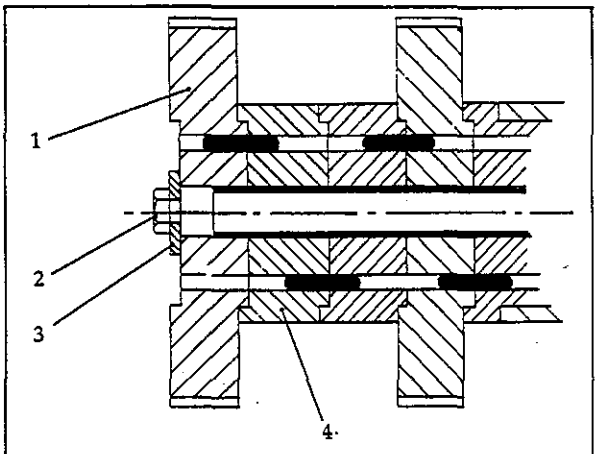


FIG 16B FEED ROLLS — SPACER DETAILS

Set Feed Roll Pressures (Fig 17)

(1) Check infeed (serrated) feed rolls (1) for height setting. These rolls should be set 3mm lower than workpiece, using height setting screw (3).

(2) Check the plain feed rolls (2) after the top head suit the new dimension of the finished workpiece. These are adjusted independently by screws (3) when inching timber through machine. These rolls should be set 1mm lower than the workpiece.

(3) Set the pnuematic loading on the feedrolls (1) and (2) using the air supply regulators (4) and gauges.

NOTE: The regulator and gauge for the serrated steel rolls up to the top head, should be set to a lower pressure than the plain rolls. The following pressures are recommended:

a. steel feedrolls — 3 bar (1 bar = 14.5 psi)
b. plain (composition) covered — 4 bar
c. bedrolls — fixed (where fitted)

(4) Pass a test piece through the machine and check the dimensions.

(5) To set the spring pressure on the feed rolls manually, use the hand adjuster screws on the spring tensioners (3).

a. To increase spring pressure, turn the knurled screw on the top of the spring tensioner in a clockwise direction. To decrease pressure turn the screw anticlockwise.
b .If the screw is turned through a distance of 5mm, pressure on the roller is approximately 250N (25kg). If the screw is turned through a maximum of 16mm, pressure on roller is approximately 500n (50kg).

(6) Check pressure pad adjustment (5) after top head. Raise or lower by use of the starwheel.

(7) Check the top pressure rollers (6) are in contact with the workpiece and maintain this in contact with the table.

(8) Set the machine feed speed by rotation of the handwheel (7) on the speed indicator dial (see **Machine Controls**) with the machine running.

NOTE: DO NOT adjust with machine feed stationary.

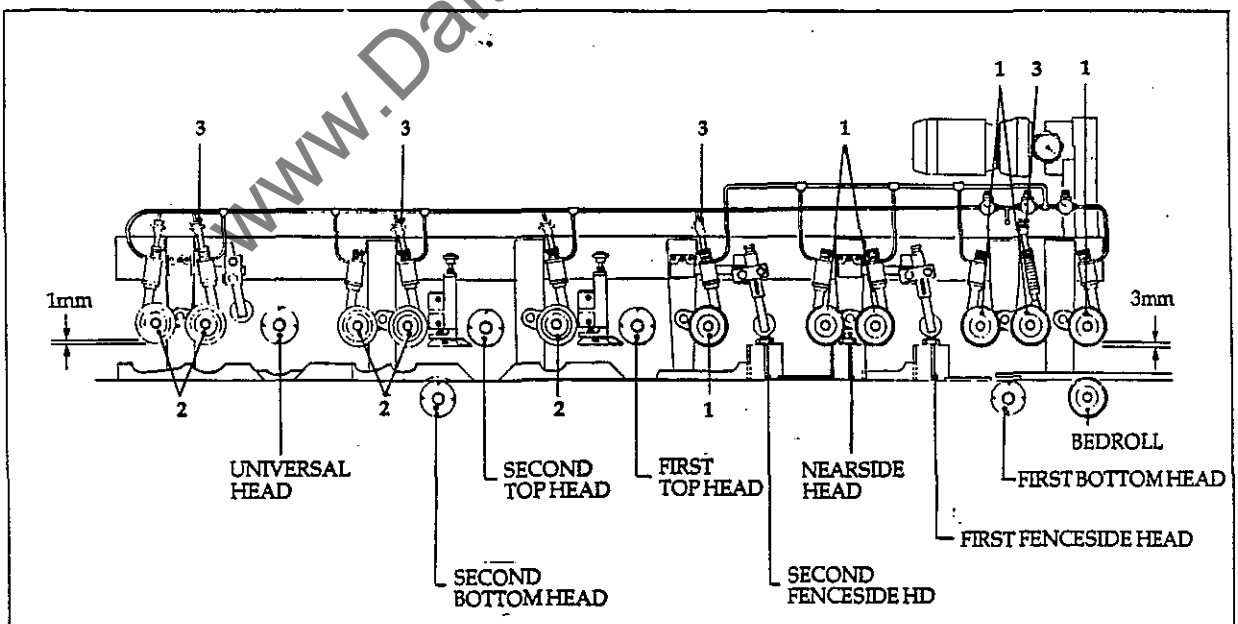


FIG 17 SET ROLL PRESSURES—TYPICAL MACHINE

Near side Head With Random Width Selection (fig 18)

(1) Adjust/set the near side head as for the standard near side head.

(2) The random selection device is factory set to produce a 2 mm cut. This may be altered by slackening off the two capscrews (1) and moving the unit within the machined slot.

(3) The device will accept any width of timber within the below criteria, fed in any order.

Max feed speed	15 m/min
Max cut on any piece	15 mm
Min length	400 mm
Min width (finished)	50 mm
Max width (finished)	220 mm
Max timber width variation	100 mm
Max height (finished)	100 mm

(4) An automatic illuminated lamp (2) on the main control station indicates when timber may be fed into the machine.

Note: On no account should an attempt be made to feed timber when the light is not illuminated.

(5) The mechanical digital readout (3) must be removed before the near side head is electrically operated for random width setting.

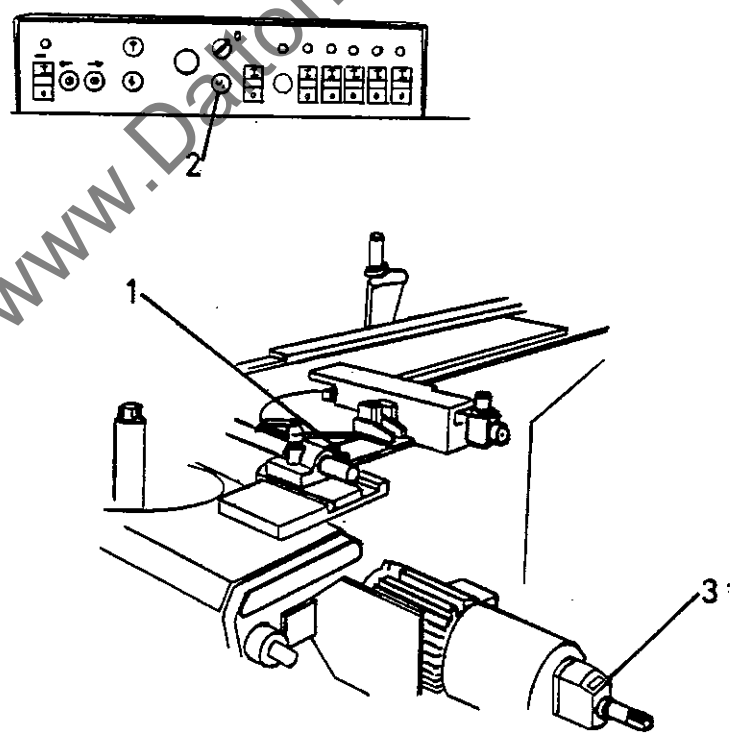


FIG 18 Near side Head With Random Width Selection

FAULTS IN THE WORKPIECES AND THEIR CAUSES

General

FAULT — Blips at the leading end of the underside of the timber.
Cause — The cutterblock is too low in relation to the outfeed bedplate.
Remedy — Adjust the cutterblock correctly.

FAULT - Scars on the trailing end of the underside of the timber.
Cause — The cutterblock is too high in relation to the outfeed bedplate.
Remedy — Adjust the cutterblock correctly.

FAULT — The trailing end of the top face of the timber shows blips.
Cause — Pad and roller pressures are incorrectly adjusted.
Remedy — Adjust the pad pressures correctly

Faults Caused by Tools

FAULT — Out of square stock after planing.
Cause — The cutters are not parallel to the outfeed bedplate, or are badly ground.
Remedy — Adjust, or sharpen the cutters carefully

FAULT — Burn marks on the stock.
Cause — Cutters are blunt and need regrinding.
Remedy — Regrind cutters.

Faults in Grinding and Setting

FAULT — Nicks in the edges of the cutters especially carbide.
Cause — Generally caused by removing too much metal when regrinding. This results in undue stresses and subsequent cracking and breaking away of the cutting edge when machining.
Remedy — Take greater care when regrinding cutters.

FAULT — Vibrating heads
Cause — Cutterblocks have been set up incorrectly. Reset.

CLEANING THE MACHINE

Machines are designed to need a minimum of maintenance. However, it is recommended that the machine be cleaned thoroughly once a week. This is esential when working on hardwood such as Sipo (Utile) or similar.

If cleaning with compressed air, take care not to direct the jet onto the spindle and moving shaft, bearing housings,etc. Clean the spindles and remove all remains of resin and grease. Do the same with the cutterblock collars and machine tables (bedplates) and lightly lubricate.

Check that all machine parts slide easily at friction points.Lubricate as indicated in the lubricating instructions (see **Maintenance**).

Adjust the variable speed drive unit through the full range once a week to avoid the feed drive mechanism jamming.

99 SETTING PROGRAMABLE MEMORY POSITIONING

Near Side Head and Top Head

This unit has the capacity to be programmable for ninty-nine positional head settings.

The powered traverse movement to the near side head is by a geared motor.

The traverse movements of the heads are each connected to an 'encoder' which sends pulse signals to its respective digital read out controller situated in the electrical control panel.

The traverse of the heads reacts to data put into the controller which displays the cutter-block position in relation to its datum face. The datum face for the near side head is the fence. Datum for the top head is the bedplate.

The head traverse movements may be hand or power operated and a switch is provided for this purpose.

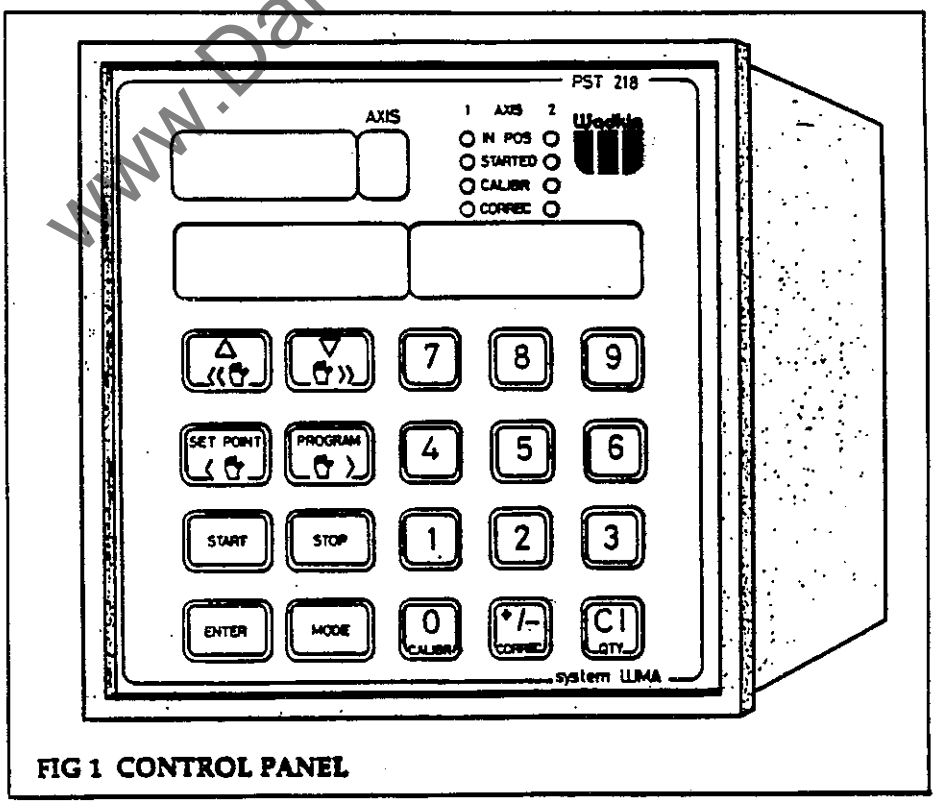


FIG 1 CONTROL PANEL

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The illustrations (buttons) on the left hand side of each page show the buttons to be pressed, and in what order.

If buttons are shown with an '&' sign between them, they must then be pressed simultaneously.

POSITIONING PST 218

SWITCH ON MACHINE

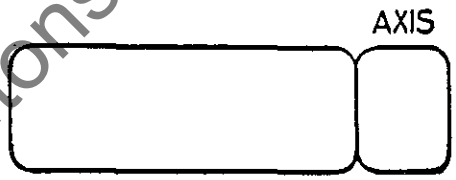
CALIBRATION (Manual)

Each axis must be datumed before production is started.

The calibrating procedure is as follows:

The PST 218 unit can control 2 axes, both of which must be independently datumed.

Push the button until the axis to be datumed (either axis 1 or axis 2) is shown as a number in the LED display.



The mode and calibration buttons must be pressed simultaneously.

Enter new value.

Press enter.

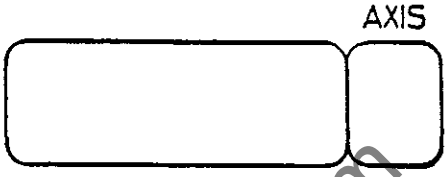
The axis should now be datumed. Repeat the same operation for the second axis. When both axes have been datumed, the unit is ready for use.

Confirmation is in the top right of the unit where there are LED lights for each axis which represent the calibration.

MANUAL POSITIONING

The axis to be moved must be selected first.

Push the button until the axis to be moved (either axis 1 or axis 2) is shown as a number in the LED display.



For manual positioning of the unit, the mode key and the direction of travel must be pressed simultaneously.

Move to a higher value than the position.

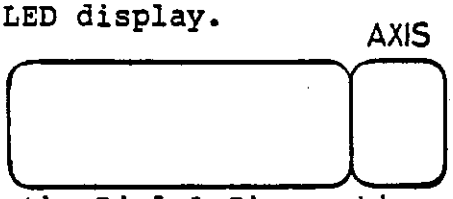
Move to a lower value than the position.

When manual positioning is finished, the stop button must be pressed to put the unit back into the automatic mode.

DIAL-A-SIZE POSITIONING (SET POINTS)

The axis to be moved must be selected first.

Push the button until the axis to be moved (either axis 1 or axis 2) is shown as a number in the LED display.



To use the Dial-A-Size option, this is simply a case of pressing the set point button and then the dimension.

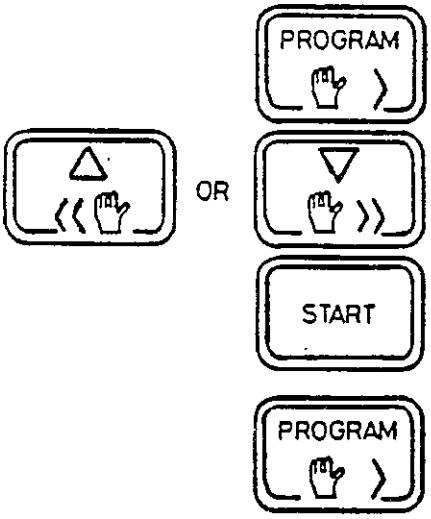
Pressing the 'start' button will send the axis to the position.

When is position, an LED in the top right of the unit will be lit.

Whilst positioning is taking place, the 'started' LED will be lit.

PROGRAM POSITIONING (For programming of, see later instructions)

CALLING UP PROGRAM



By press the 'program' button, the display will change to the program mode.

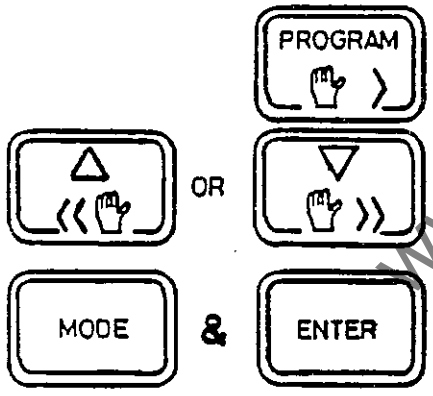
Pushing either of the two button will increase or decrease the program number to the one required.

Pushing the 'start' button will drive the axis to the position stated in the program.

NOTE: To escape from the program mode of the unit, press the 'program' button.

When the axis is in position, the 'in position' LED will be illuminated in the top right of the unit.

PROGRAMMING OF THE UNIT



By pressing the 'program' button, the display will change to the program mode.

Push either of the two buttons until the program number required to be programmed is found.

The buttons 'mode' and 'enter' when pressed simultaneously will enable you to have the access to the program number that is illustrated in the display.

You will now have access to the axis.

Enter the required figures if a new number or an alteration.

NOTE: If the figures for axis 1 are correct and it is only axis 2 which has to be altered, you can press 'ENTER' without altering any figures will give you access to axis 2.

Pushing the 'enter' button will enter the figures into the memory and give you access to axis 2.

Enter the required figures.

Pressing the 'enter' button will enter the new figures into the memory.

The unit is now ready for use as 'calling up program'.

NOTE: Program P 0 is only for test purposes.

To clear existing information, press 'CL Qty' before entering new figures.

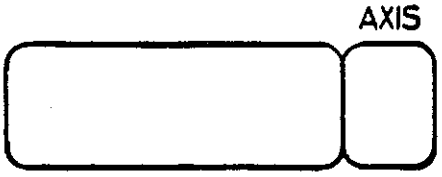
TO USE THE RADIUS OFF-SET FEATURE

CALIBRATION (MANUAL)

The centre of both the left hand and top head spindle must be calibrated to use the off-set feature

Each axis must be datumed before production is started. **NOTE:** Maximum travel limit parameters may require changing. Calibration for using radius off-set is as follows:

Push button until the axis to be datumed (either axis 1 of axis 2) is shown as a number in the LED display.



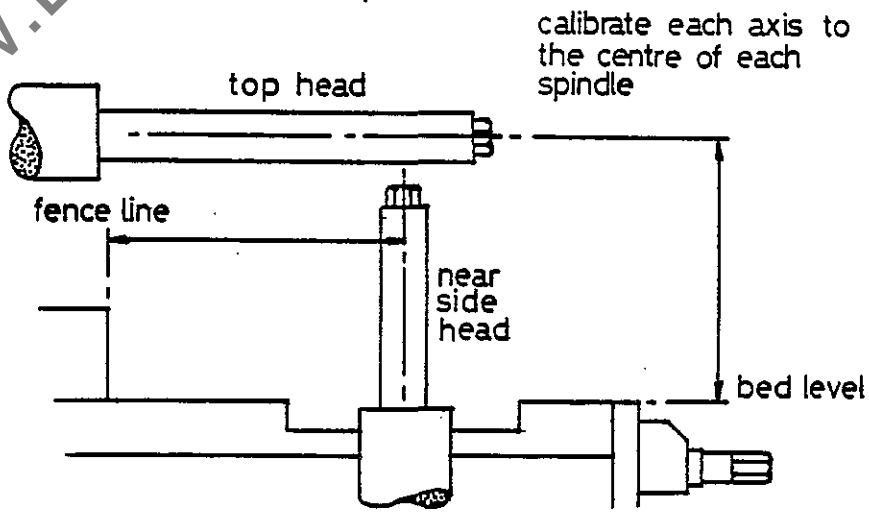
The mode and calibration buttons must be pressed simultaneously.

Enter the distance from the centre of the spindle to the bed, or fence, depending which axis is being calibrated.

Press Enter

The axis should now be datumed, repeat the same operation for the second axis. When both axis have been datumed, the unit is ready for use.

Confirmation is in the top right hand of the unit where there are LED lights for each axis, which represents the calibration.



To enter the radius off-set

Measure and record the radius of the cutterheads to be used.

Push the button until the axis to be off-set (either axis 1 or axis 2) is shown as a number in the Led display.

The 'Mode' and 'Correct' buttons must be pressed simultaneously.

Enter radius value of the cutterhead for that particular axis.

Press 'Enter' twice.

Repeat the same procedure for the second axis.

When both axis have had the radius off-sets entered, the unit can be used as "calling up a program."

When the heads are moving into their programmed positions and, when they are in position, the display will show the relevant position of the centre of the spindle.

To display the actual "finished" size positions, of the cutterheads, push the 'program' button.

FAULT FINDING

FAULT	SOLUTION/CHECK
Axis will not position accurately.	Check that unit is calibrated (LED top right if unit), recalibrate if necessary.
	Physical object causing an obstruction. Remove object and check overload. Try again.
	Movement is greater than the axis limits. Insert new figures.
	Negative value in positioning memory.

PARAMETER SECTION - To enable the E.S.P System to function in either Metric (MM) or Imperial (inches)

PARAMETERS - This section should only be entered into by a competent person, who fully understands their function.

To enter into the parameter section, press 'mode' and '1', then '2' '0' '5'.

	Imperial		Metric	
	Axis 1	Axis 2	Axis 1	Axis 2
Decimal Point Display = PA. Pres '0' to change Press Enter				
Calibration Method Display = PAD Press Enter				
Pre-Switch off Value/Over Run Display = PA Press Enter This parameter to correct any positioning error due to "over run"				
Tolerance Value Display - PA Press Enter				
Loop Mode Positioning Direction Display = PAb Press Enter				
Loop Value Display = PAb Press Enter				

Delay Time Display - PAde Press Enter		
Minimum Travel Limit Display = PA= Press Enter		
Maximum Travel Limit Display = PA Press Enter Note: If the radius off-set feature is used then the maximum travel limit should be		
Spindle Factor Counter For Generator Matching Display = PA Press Enter		
Spindle Factor Denominator Display - PA Press Enter		
Conversion (mm - Inch) Display = PA		

Press mode and then Enter to switch from Axis 1 to Axis 2, and go through the same parameters

When finished with both Axis 1 and Axis 2, press Mode and 1 to exit parameter section.

SECTION 4 MAINTENANCE

SCHEDULED MAINTENANCE

Scheduled maintenance consists of regularly maintaining the machine in a good operating condition, capable of safely producing good quality trouble free work, with the minimum of downtime.

This includes tasks such as daily/weekly cleaning and lubrication which can and should be performed by the operator. Tasks carried out at longer intervals will require more specialised knowledge and tools to perform.

Lubrication

Much attention has been given to keeping lubrication and maintenance to a minimum. In consequence, 'sealed for life' bearings and 'Oilite' bushes have been used. The cutterblock spindles have been fitted with permanently lubricated bearings; these should only require replacement of lubricant if the spindle bearings are replaced. However, there are exceptions as follows:

Electric motors, where 'sealed for life' bearings have not been fitted, are provided with grease nipples. These should be greased at *monthly* intervals with Wadkin L6 grease.

There is no requirement for periodic lubrication of the feed rolls motor driven variable speed unit.

Daily

Grease the machine slideways and the various traverse screws with Wadkin Grade L6 grease (see **Approved Lubricants**).

A hand operated lubricating pump is fitted to provide oil feed lubrication to the machine bed. The hand lever should be operated to deliver the required amount of oil to the bed. A tap is fitted to the pump to control the oil flow rate to a preset amount.

The oil reservoir holds 1 litre (1.76 pints) of oil. Replenish with Wadkin Grade L4 oil (see **Approved Lubricants**) as needed.

Weekly

On machines fitted with chain driven feedworks, the chains should be lubricated at least weekly with an oil can using Wadkin Grade L4 oil. Access to the horizontal chains in the top beam is gained by removing covers on top of the beam.

Monthly/3 Monthly

Grease machine drive spindles and drive motor shafts, where fitted with grease nipples, using Wadkin Grade L6 grease unless otherwise stated. Do not overfill bearing housings.

Generally, machine drive spindles will be lubricated *monthly*.

Chain Drive Tensioning (Fig.1,Fig.2)

Adjustment is provided to all chain drives. These should be checked at regular intervals (Monthly/3 Monthly), if the drive snatches on start-up or is noisy.

Two types of chain adjuster are fitted; a roller arm or sprocket, or a slipperblock (on horizontal chain drive through beam).

Checking/Adjustment is carried out as follows:

A. Roller arm/sprocket.

(1) Remove the drive cover.

(2) Check chain for adjustment or wear. Adjustment is correct if no slack is present in the chain.

(3) To adjust: Reposition the chain tensioner arm (1), by slackening the two securing screws (2) and sliding the arm with roller or sprocket toward the chain. Take up any slack in the chain. Retighten screws (2) after adjustment, (see Fig 1).

NOTE: Do not overtension chain

(4) Refit drive cover

B. Slipper block (Nylatron runner)

(1) Remove the drive cover, or covers.

(2) Check chain for adjustment. Adjustment is correct if no slack is present in the chain.

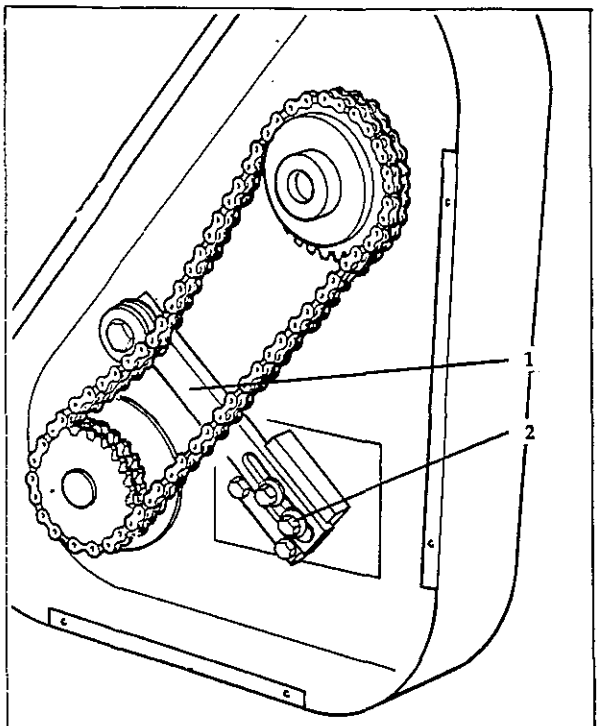


FIG 1 CHAIN DRIVE TENSIONING — FEEDWORKS

(3) To adjust: Reposition the chain runner/tensioner block (1) in relation to the support plate (2), by resetting the two support screws (3), after releasing locknuts (4). Take up slack in the chain. Retighten lock nuts (4) after setting, (see Fig 2).

NOTE: Do not overtension chain.

(4) Refit drive cover or covers.

Vee-Belt Drive Tensioning (Fig.3)

Check drive belts at regular intervals (as indicated below). If the need arises retension. Insufficient tension causes slipping and premature belt wear. Too much tension causes bearing wear. Tension as indicated in Checking/Adjustment.

Observe the operation of the machine when first put into service. After approximately one hours effective use, check and retension belts to take up initial belt stretch.

In general, Vee-belts will require adjustment at intervals to take up any slack due to use. *Three-monthly* intervals are recommended as an initial guide for the feedworks drive.

It is important to check the condition and tension of the cutterspindle drive belts at more frequent intervals, depending on conditions of use, if problems relating to quality of finish are to be avoided. *Monthly* intervals are recommended initially.

Checking/Adjustment is carried out as follows:

(1) Remove the drive cover.

(2) Check belt tension. The belt should be capable of being depressed approximately $1\frac{1}{2}$ to 2 cm by application of average thumb pressure (see Fig.3).

(3) To adjust: fit spanner (1) provided, to adjusting screw (2), located at motor support bracket and turn in an anticlockwise direction to tension the belt drive (see Fig.3).

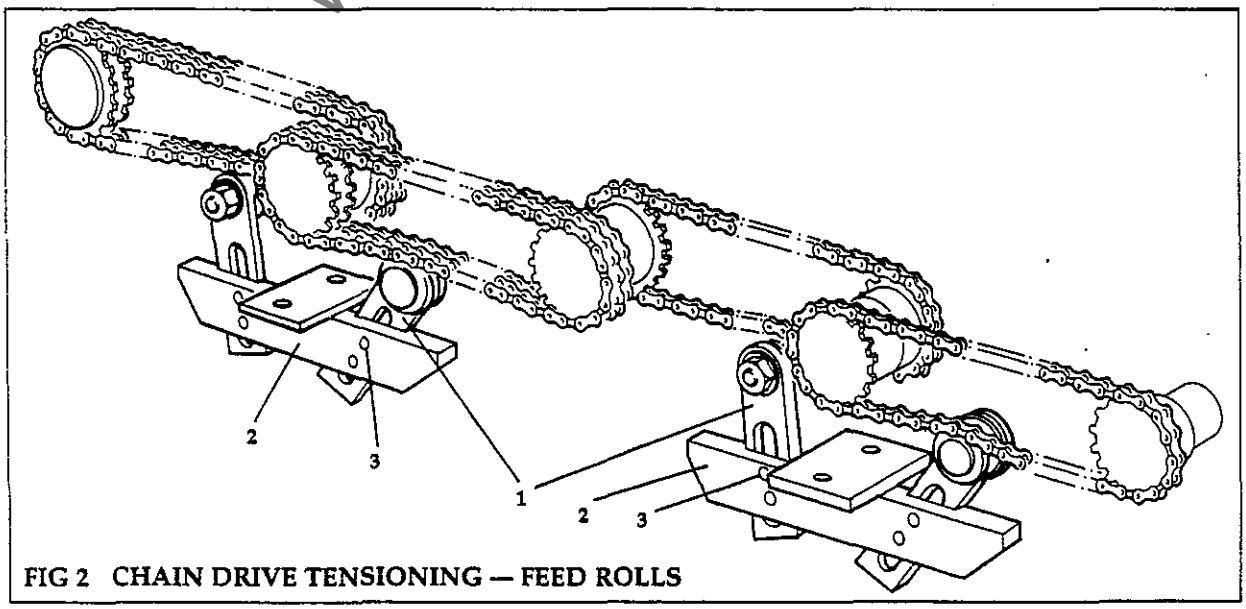


FIG 2 CHAIN DRIVE TENSIONING — FEED ROLLS

NOTE: Do not overtension belts.

(4) Refit drive cover.

There may be occasions where the tensioning arrangement does not follow that described. However, all belt drive adjustment follows the same general principle; this involves moving the drive pulley centres or motor platform, thus taking up any slack in the belt drive. The method used will normally be self evident. Retighten any securing features fitted.

If one or more of the vee-belts becomes faulty it will be necessary to replace as a complete set. (see **Replacing Drive Belts**). It is impossible to obtain a correctly tensioned drive, with all belts taking an equal share of the load, by mixing old and new, or different belts.

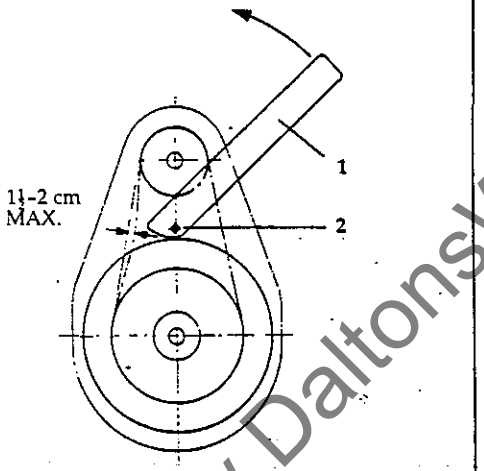


FIG 3 VEE-BELT DRIVE TENSIONING

Feed Drives

The GA machine can be fitted with either chain or gear drive to the feedworks. Where gear drive is fitted the primary drive from the variable speed unit is by solid drive shaft and couplings to a gearbox at each cutting head and is virtually maintenance free. Power transfer to the feedrolls is via right-angle gearbox and cardan shaft. The bottom rolls (where fitted) are driven by a chain and sprocket from the rear of the gearbox.

Each gearbox is filled with lubricant on assembly and will normally not need any attention for long periods (10,000 hours). If needed, refill with Wadkin Grade L2 gear oil.

The Cardan shafts should be lubricated at *monthly* intervals using Wadkin L6 grease at the lubricating points.

Cleaning

Woodworking machines are designed to need a minimum of maintenance. However, a certain level of maintenance, especially cleaning and lubrication, will pay dividends in quality of work.

It is recommended that the machine be cleaned thoroughly once a week, especially when working on hardwood or highly resinous material, to prevent choking of ventilator airways and build up of deposits on working parts.

Clean all spindles regularly and remove all remains of resin and grease. Do the same with cutterblock collars and machine tables. Check that all machine parts slide, or rotate freely. Lightly lubricate as directed, do not overlubricate.

If cleaning with compressed air, take care not to direct the jet onto the spindle bearing housings, moving shafts, etc., to avoid forcing dust and debris into bearings and housings.

UNSCHEDULED MAINTENANCE

Unscheduled maintenance consists of replacing or correcting items which are worn, damaged, or are otherwise unserviceable. Generally items which are defective will be replaced.

These tasks require specialised knowledge and tools to perform. Following this type of maintenance, the machine will need to be set up prior to return to work.

All unscheduled tasks — such as changing bearings, should be performed by competant personnel.

Changing Cutterblock Spindle Bearings (Fig 4)

The bearings (5) have been fitted to the cutterblock spindles (6) in an orthodox manner. At the non-drive end of the spindle a liquid engineering adhesive ('Loctite' grade 241) has been applied to the internal thread diameter of the bearing nut (4).

NOTE: This nut can be right or left-hand thread, dependant upon spindle rotation and tightens against the direction of rotation.

To dis-assemble parts joined by 'Loctite' adhesive use normal tools and methods. If the holding force of the 'Loctite' joint is too great then apply gentle heat and break the bond while the parts are still hot. The bonding adhesive may be left as a powder and must be removed before applying further adhesive.

Preparation Prior to Fitting Bearings

Before fitting a new bearing , the protective lubricant must be meticulously removed with petroleum spirit, triethamolamine, or other volatile solvent.

In order to prevent the moving parts from being damaged by drying out due to over cleaning, add a small amount of the bearing lubricant to the cleaning agent at the second bath. The film of grease which remains after the solvent has evaporated will provide protection for the bearing until charged with lubricant.

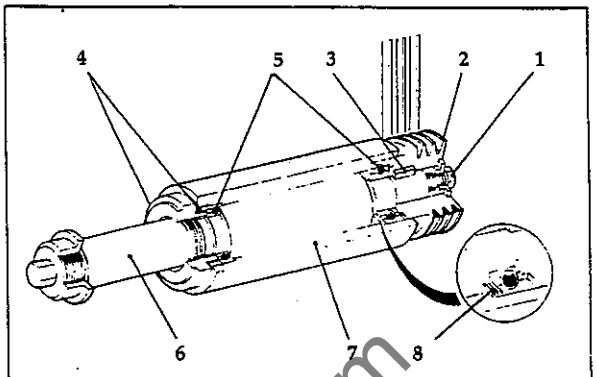


FIG 4 SPINDLE UNIT BEARING ASSEMBLY

The new bearings should be charged with 'Kluber' lubricant, type 'Isoflex' NBU 15. It is important that the correct amount of grease is applied, preferably using the formula:

G (weight in grams) = dxBx0.01

where; d = bore of bearing in mm
B = width in mm

This is approximately sufficient to fill one third of the bearing volume.

To remove the bearings:

(1) Remove pulley assembly from spindle by unscrewing the M12 hexagon screw (1). Withdraw pulley (2) and remove parallel key (3) from spindle.

(2) Remove bearing nuts (4). Remove existing bearings (5), using a bearing puller on the bearing rings. Take care not to damage the spindle or housing.

(3) After Preparation; fit new bearings (5) to spindle (6) and housing (7), include spring discs (8) as previously fitted. Use only sufficient pressure to fit bearings, applying pressure to the inner ring only. Ensure that bearing ring fits up to location shoulder on the spindle.

(4) Reassemble spindle unit, lubricate bearing (see **Preparation**). Fit bearing nuts (4). Tighten nuts until assembly is secure. Do not over tighten.

(5) Check that spindle assembly runs freely and without end float.

(6) Refit parallel key (3), pulley and M12 hexagon securing screw. Tighten screw to spindle until the assembly is secure.

Replacing Drive Belts

Drive belts must be replaced as a set to obtain correct drive performance. Before access can be gained to any drive belt it will be necessary to remove the guard covers.

To Replace a Drive Belt:

(1) Relieve tension on the drive by reducing drive centres. This can be done by either:

a. Releasing the fixing bolts on the motor support bracket and sliding the motor forward, or

b. Slackening off the motor tensioner bolt, or bolts.

(2) Remove old drive belts. Fit a new set of belts, same size, type and reference (see **Motor Drive Belt Data**).

(3) Retension the new belt set (see **Vee-Belt Drive Tensioning — Scheduled Maintenance**), reversing step (1) a. or b., as applicable to drive motor attachment. Secure fixing bolts.

It may at times be necessary to remove a drive pulley. The motor shaft pulleys are fitted with Taper-Lock bushes (see Fig.3), cutterblock spindles are fitted with parallel keys.

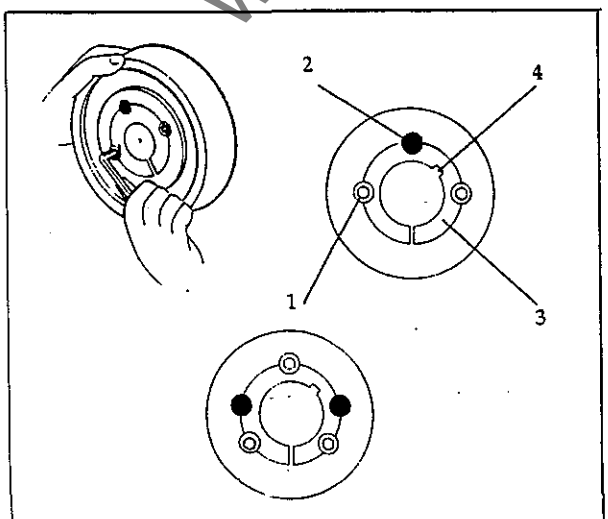


FIG 5 REMOVING A TAPER-LOCK BUSH

Removel and Refit Drive Pulleys (Fig 5)

To remove a Taper-Lock bush pulley:

(1) Slacken off all screws (1) several turns using a hexagonal key. Remove one or two screws according to number of jacking holes (2).

(2) Insert screws in jacking holes after oiling thread and point of grub screws, or thread and head of cap screws, as applicable.

(3) Tighten screws (1) alternately until bush (3) is loosened in pulley hub and assembly is free on shaft.

(4) Remove pulley assembly from shaft.

To refit a Taper-Lock bush pulley:

(1) Ensure that mating taper surfaces are completely clean and free from oil or dirt. Insert bush in hub and line up screw holes.

(2) Oil thread and point of grub screws, or thread and head of cap screws. Place screws (1) loosely in threaded holes in hub of pulley.

(3) Clean shaft, fit hub and bush to the shaft as a unit. Locate in position. On fitting; the bush will nip the shaft first, then hub will be drawn onto bush.

NOTE: It is necessary to axially align drive and driven pulleys.

(4) Using a hexagon key, alternately tighten screws (1), until all screws are pulled up **securely. Use a short length of pipe on key to increase leverage.**

(5) After the bush (3) has been tightened onto the shaft, fit the parallel key (4). The key is side fitting with top clearance.

(6) After the drive has been running under load for a short time, stop and check tightness of screws. Tighten if needed.

(7) Fill empty screw holes with grease to exclude dirt.

Variable Speed Drive (Fig. 6)

The variable speed drive incorporated within the feed roll drive is virtually maintenance free. The only items likely to require attention are the Simplabelt drive belt and and Vee-belts transfering the drive to the feedshaft.

The drive consists of the following:

Simplatrol speed control adjuster
Simplabelt mechanically adjusted pulley
Simplabelt spring loaded pulley
Simplabelt vee-belt, wide section

The mechanically adjusted (speed control) pulley is keyed to the motor drive shaft. Adjustment of the speed control varies the drive pulley diameter and hence speed. The driven (spring loaded) pulley is keyed to an intermediate shaft which transfers the drive via multi vee-belts to the feedroll drive and gearboxes.

The bottom rolls are driven through a chain drive taken off the rear of the feedroll gearboxes, as applicable, (see Fig 7).

Should it be necessary to repair the feed drive, or fit a new drive belt, proceed as follows:

To Dismantle

A. General

(1) Adjust the drive unit to the maximum output speed before dismantling. Switch off drive.

(2) Unscrew setscrews (1) and remove the half cover (2) to obtain access to the belt and driven (spring loaded) pulley.

B. Removing wide section drive belt

(1) Unscrew the setscrews (3) and remove the speed adjustment control (4) complete.

(2) Unscrew hexagon head screws (5) and remove plate (6) from drive cover. Unscrew hexagon head screws (7) and remove drive cover (8) to expose the variable speed pulley (9).

(3) Remove wide section belt from the variable speed pulley (9).

Dismantling variable speed pulleys from motor and intermediate drive shaft

a. Mechanically adjustable variable speed pulley (motor shaft)

(1) Unscrew axial tightening screw (10) and remove end cap (11).

(2) Position a suitable extractor behind the circlip of the pulley and with an extractor, remove pulley (9) from the motor shaft.

b. Spring loaded variable speed pulley (driven shaft)

(1) Unscrew axial tightening screw (12) and remove cap (13).

(2) Remove the spring and spring retaining cap with a suitable extractor. Then using an extractor (gripping behind the hub flange) remove the pulley (14) from the shaft.

D. Remove Motor and Intermediate Drive

(1) Unscrew setscrews (1) and (7) and remove cover from drive.
(2) Remove drive pulleys as items A, B and C above.
(3) Unscrew hexagon head screws securing motor to bedplate and remove motor.
(4) Remove intermediate drive as for **Remove and Refit Drive Pulleys (Fig 5).**

To Re-Assemble

The re-assembly procedure is the reverse sequence to dismantle. ie: steps D,C,B,A.

(1) When refitting the wide section drive belt; first place belt onto the fully opened mechanical variable speed pulley (9), then over the rim of the spring loaded variable speed pulley (14). **Adjust the speed control only with the motor running.**

Note: Only original 'SIMPLABELT' wide section drive belts must be used on the variable drive.

Spare Parts

When ordering spare parts, all the information shown on the item nameplate must be quoted.

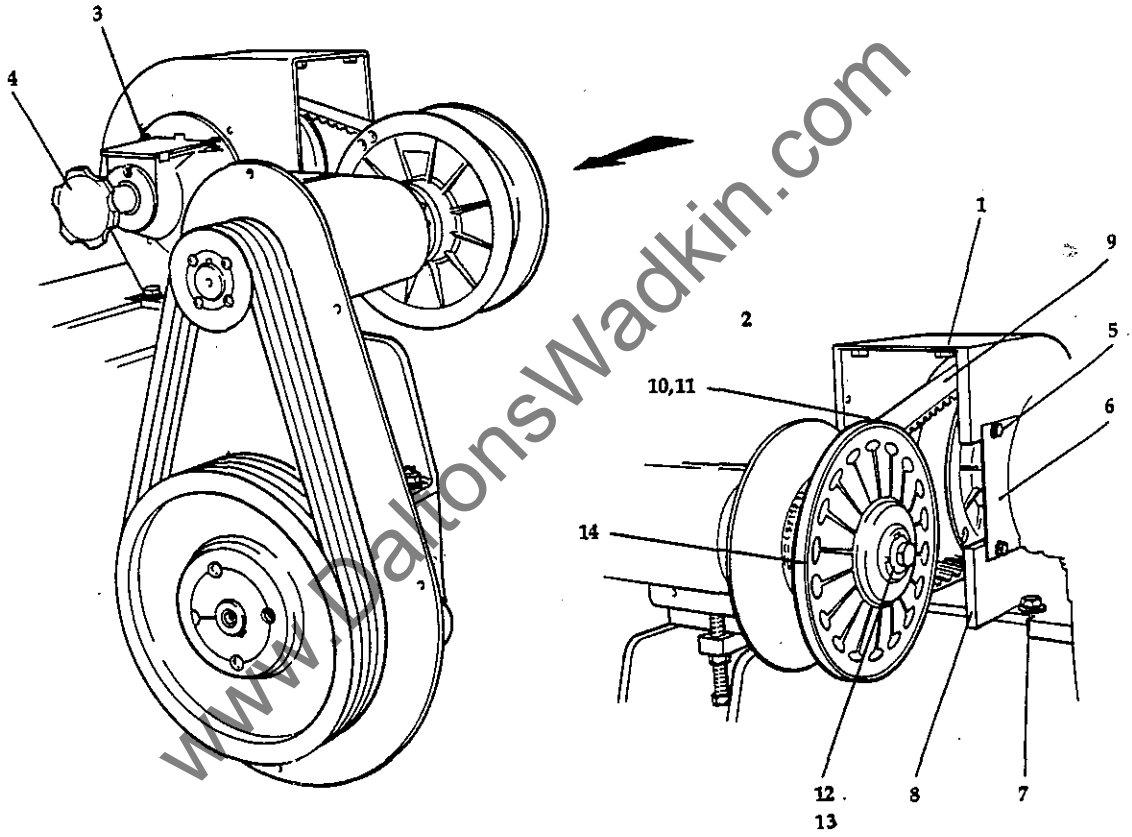


FIG 6 VARIABLE SPEED DRIVE

Shaft Drive System (Fig 7)

The XR woodworking machine can be fitted with shaft drive to the feedworks in place of the chain drive.

The primary drive from the variable speed drive is by solid drive shaft and couplings to gearboxes at each head and is virtually maintenance free. Power transfer to the feedrolls is via right-angle gearbox and sprocket from the rear of the gearbox.

The final drive chain to the bottom feedrolls is adjusted from the rear of the machine by slackening the securing screws on the bottom bearing housing and repositioning the housing to take up chain slack. Retighten the screws to secure in position.

Cutters and Tool Holders

When choosing cutters, make sure they are suitable for the speed of the machine. Dynamically balance and check for defeats and cracks.

The life of a cutterblock is directly related to the quality of the steel and nature of timber to be worked. It is impossible to give exact values of cutter life; the following is a guide.

High speed steel	HLS	2-5 hours
Very high speed steel	HSS	3-8 hours
Carbide steel	HM	20-70 hours

Honing at regular intervals will prolong the life of the cutters. When regrinding cutters it is very important to ensure the edge does not become overheated. Overheating can be prevented if light grinding cuts are taken.
Ensure that all cutters of a multiple cutterblock are the same, the objective being all should cut the timber evenly and equally. The performance of any tool depends to a large extent on the care in the way it is used. The life of the cutters and the surface finish of the workpiece are directly related to the care which is given to the work.

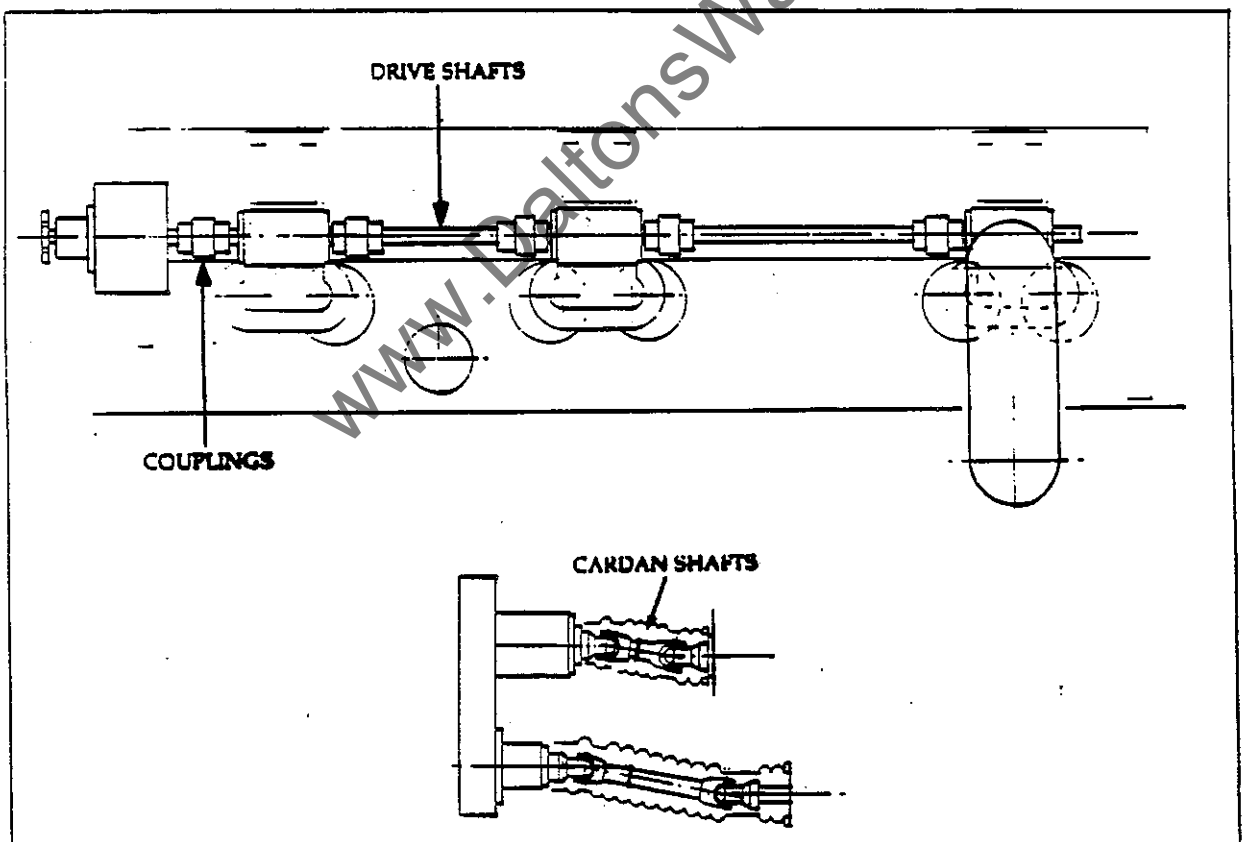


FIG 7 SHAFT DRIVE SYSTEM

FAULT FINDING

Mechanical Faults

Apart from mechanical failure (breakage) the majority of mechanical faults can be attributed to incorrectly tensioned drive chains or belts; the setting of cutterblocks and cutterblades; items working lose due to vibration — failure to set or tighten correctly; wrong speed setting; or misuse.

Therefore to get the best perfomance it is essential that the machine is set-up and used correctly, when many mechanical faults can be avoided.

Elimination of Vibration

It is important to check condition and tension of the cutter spindle drive belts regularly (see **Scheduled Maintenance).**

It is also important that the cutters are evenly ground and set to run true in the cutterblock, the assembled cutterblock should be statically balanced before fitting to the spindle.

In the case of high speed machines it is highly recommended that cutterblocks be dynamically balanced (see **Maintenance: Cutters and Toolholders**).

Electrical Faults

FAULT The machine does not run when any 'START' button is operated

Diagnosis

a. Disconnect (isolator) switch has not been closed
b. Main fuse or control circuit fuse has blown
c. Overload relay has tripped

Remedial Action

a. Check and close if needed
b. Replace fuse
c. Reset relay. Check reason for trip

FAULT A motor does not start — loud humming sound

Diagnosis

a. An open circuit in at least two 'line leads' of the motor
b. The fuses of the motor have blown

Remedial Action

a. Check circuit and rectify
b. Replace fuse

FAULT An air break magnetic contactor does not operate

Diagnosis

a. The contacts are burned and make improper contact
b. Broken connection wire
c. An overload relay has tripped
d. A fuse has blown

Remedial Action

a. Clean or replace contacts
b. Remake connections
c. Reset relay. Check reason for overload
d. Replace fuse

FAULT A Star/Delta connected motor does not operate when the contactor is connected in star

Remedial Action

Check/Remedy the symptoms outlined in paragraph above

FAULT When a motor is started, the fuses blow and the overload relay trips

Diagnosis

a. The motor does not run freely
b. There is a short circuit in the wiring mains
c. The motor windings or winding are/is earthed

Remedial Action

a. Check that the motor is free running
b. Check the circuit wiring
c. Check the windings in turn for electrical continuity and also earth faults with a 'Megger'

FAULT The motor overheats when running 'light' (unloaded)

Diagnosis

a. The motor windings are connected in delta instead of star
b. The mains voltage is too high
c. The ventilating air ducts of the motor frame have become blocked with dust or chips, the cooling air passage has become impeded, or the cooling fan (if fitted) is not functioning correctly

Remedial Action

a. Check connections
b. Check mains voltage and correct
c. Clean airways. Check fan operation

FAULT Motor overheats while working

Diagnosis

a. The motor is overloading
b. The motor is running under single phase conditions

Remedial Action

a. Check reason and correct
b. Check electrical circuits

FAULT The motor makes an abnormal noise

Diagnosis

a. The cause can be of a mechanical or electrical nature
b. If the noise is caused by an electrical fault, the noise will disappear when power is switched off
c. If the noise is caused by a mechanical fault, the noise will diminish as speed of rotation decreases

Remedial Action

a. Establish mechanical or electrical origin
b.c. Check symptoms. Deduce by elimination to locate position and nature of fault

FAULT **The Air Break Magnetic Starter is noisy**

Diagnosis
a. The mains voltage is too low
b. The surfaces of the 'fixed' and 'moving' contacts are dirty

Remedial Action
a. Check mains voltage and correct
b. Clean or replace contacts

FAULT **The air break magnetic starter remains 'closed' after a STOP button has been operated**

Diagnosis
a. The contactor 'fixed' and 'moving' contacts have welded together following a short circuit

Remedial Action
a. Check and remove cause of the short circuit. Replace the damaged contacts. It may be necessary to replace the complete contactor if too damaged

FAULT **A fault condition arises on a motor and the overload current relay fails to operate.**

Diagnosis
a. The overload relay may be incorrectly rated – it should correspond to the normal full load current of the motor (given on the motor nameplate) for Direct-on-Line starting
b. If the overload relay is connected in a Star/Delta starter, the rating of the overload should be the normal full load current of the motor (given on the motor nameplate) multiplied by 1/1.73 (0.58)

Remedial Action
a. Replace with correctly rated relay

FAULT **A Spindle stops, but the motor still runs**

Diagnosis
a. The drive belts are loose, broken, or have come off

Remedial Action
a. Retension or replace belts

FAULT **The Rise and Fall drive motor does not operate**

Diagnosis
a. The limit switch on the top horizontal head, or the limit switch at the end of the machine is jammed by wood chips or is damaged
b. The push button is faulty

Remedial Action
a. Check and clean the limit switches
b. Check and clean the push button

FAULT **If the limit switch between the Top Head and Beam is operated simultaneously with either of the two Beam Vertical Traverse limit switches, the Beam will not lower**

Diagnosis
Disengage the clutch on top head and manually wind down the top head until limit switch is released, then bring beam down by normal procedure (pushbutton control)

The foregoing observations are of a general nature and intended to be of assistance to avoid the incidence of breakdown. They do not preclude the user from calling a qualified electrician. In the case of an electrical fault or breakdown, in the interest of personal safety, it is always advisable to call a qualified electrian if the fault repeats.

TABLES

APPROVED LUBRICANTS

WADKIN	CASTROL	B.P.	SHELL	MOBIL	ESSO	GULF	CALTEX
L1	HYSPIN AWS 32	ENERGOL HLP 32	VITROL 32	DTE OIL LIGHT 24	NUTO 44 OR ESSTIC H44	HARMONY 43 AW	RANDO OIL HDA
L2	ALPHA ZN 150	ENERGOL HP 150 OR CS 150	VITREA 150	VACTRA EXTRA HEAVY	ESSTIC 65	SERVICE 13	URSA P40
L4	MAGNA 68	ENERGOL HP 68 OR CS 68	VITREA 68	VACTRAL OIL HEAVY MEDIUM	ESSTIC 50	SERVICE 51	URSA P20
L6	SPHEEROL AP 3	ENERGREASE LS3	ALVANIA GREASE NO. 3	MOBILPLEX GREASE NO. 48	BEACON 3	GULFCROWN GREASE NO. 3	REGAL STARTAK PREMIUM 3

L1	OIL	Hydraulic oil with anti-corrosion, anti-oxidation, anti-wear, anti-foam performance.
L2	OIL	Gear oil (Viscosity 150 centi-stokes at 40°C).
L4	OIL	Plain mineral oil (Viscosity 68 centi-strokes at 40°C).
L6	GREASE	Grease NLG1 No. 3 consistency Lithium bearing grease.

The worm drive gearboxes are supplied filled to the correct level with a semi-fluid grease, IP Tevela Compound A. No maintenance will normally be required on these gearboxes which are sealed for life.

The variable speed unit (Stober) gearbox can be refilled with Wadkin L2 oil.

MOTOR AND DRIVE BELT DATA

Belts and pulleys for spindle drive to **BOTTOM AND TOP HORIZONTAL HEADS** 50 Hertz

Motor			Motor Pulley		Taper Lock Bush			Belts			Spindle Pulley	Spindle Speed
Frame Size	K.W.	H.P.	Fenner Ref.	Wadkin Code	Bore M.M.	Fenner Ref.	Wadkin Code	Fenner Ref.	Wadkin Code	Quan.	Wadkin Number	R.P.M.
D112	4.0	5.5	031Z 0222	K30 78 237	28	2012	K30 77 114	SPZ 850	K30 78 213	2	GA 109	6000
D132	5.5 7.5 11.0	7.5) 10.0) 15.0)	031Z 0223	K30 78 218	38	2012	K30 77 113	SPZ 850	K30 78 213	3	GA 410	6000
D160	15.0	20.0	031Z 0224	K30 78 209	42	2517	K30 77 101	SPZ 850	K30 78 213	4	GA 755	6000
D112	4.0	5.5	031Z 0262	K30 78 238	28	2012	K30 77 114	SPZ 900	K30 78 351	2	GA 109	7500
D132	5.5 7.5 11.0	7.5) 10.0) 15.0)	031Z 0263	K30 78 244	38	2012	K30 77 113	SPZ 900	K30 78 351	3	GA 410	7500
D160	15.0	20.0	031Z 0264	K30 77 290	42	2517	K30 77 101	SPZ 900	K30 78 351	4	GA 755	7500
D112	4.0	5.5	031Z 0302	K30 78 241	28	2012	K30 77 114	SPZ 1010	K30 77 115	2	GA 1638	9000
D132	5.5 7.5 11.0	7.5) 10.0) 15.0	031Z 0303	K30 78 245	38	2012	K30 77 113	SPZ 1010	K30 77 115	3	GA 1475	9000
D160	15.0	20.0	031Z 0304	K30 78 225	42	2517	K30 77 101	SPZ 1010	K30 77 115	4	GA 1514	9000

Belts and pulleys for spindle drive to **BOTTOM AND TOP HORIZONTAL HEADS** 60 Hertz

Motor			Motor Pulley		Taper Lock Bush			Belts			Spindle Pulley	Spindle Speed
Frame Size	K.W.	H.P.	Fenner Ref.	Wadkin Code	Bore M.M.	Fenner Ref.	Wadkin Code	Fenner Ref.	Wadkin Code	Quan.	Wadkin Number	R.P.M.
D112	4.0	5.5	031Z 0202	K30 78 294	28	1610	K30 77 184	SPZ 800	K30 78 208	2	GA 109	6000
D132	5.5 7.5 11.0	7.5) 10.0) 15.0)	031Z 0203	K30 78 272	38	2012	K30 77 113	SPZ 800	K30 78 208	3	GA 410	6000
D160	15.0	20.0	031Z 0204	K30 77 289	42	2012	K30 77 196	SPZ 800	K30 78 208	4	GA 755	6000
D112	4.0	5.5	031Z 0243	K30 78 499	28	2012	K30 77 114	SPZ 900	K30 78 351	2	GA 1494	7500
D132	5.5 7.5 11.0	7.5) 10.0) 15.0)	031Z 0243	K30 78 499	38	2012	K30 77 113	SPZ 900	K30 78 351	3	GA 1494	7500
D160	15.0	20.0	031Z 0244	K30 78 224	42	2517	K30 77 101	SPZ 900	K30 78 351	4	—	7500
D112	4.0	5.5	031Z 0262	K30 78 238	28	2012	K30 77 114	SPZ 900	K30 78 351	2	GA 1638	9000
D132	5.5 7.5 11.0	7.5) 10.0) 15.0)	031Z 0263	K30 78 244	38	2012	K30 77 113	SPZ 900	K30 78 351	3	GA 1475	9000
D160	15.0	20.0	0312 0264	K30 77 290	42	2517	K30 77 101	SPZ 900	K30 78 351	4	GA 1514	9000

Belts and pulleys for spindle drive to FENCE SIDE HEADS 50 Hertz												
Motor			Motor Pulley		Taper Lock Bush			Belts			Spindle Pulley	Spindle Speed
Frame Size	K.W.	H.P.	Fenner Ref.	Wadkin Code	Bore M.M.	Fenner Ref.	Wadkin Code	Stephens Ref.	Wadkin Code	Quan.	Wadkin Number	R.P.M.
D112	4.0	5.0		GA 415				METEOR CE 3P	K30 05 383	1	GA 413	6000
D132	5.5	7.5										
	7.5	10.0		GA 416				METEOR CE 6P	K30 05 384	1	GA 413	6000
	11.0	15.0)							K30 05 436	1		
D112	4.0	5.5		GA 1338					K30 05 376	1	GA 413	7500
D132	5.5	7.5										
	7.5	10.0		GA 1298				METEOR CE 6P	K30 05 366	1	GA 413	7500
	11.0	15.0)							K30 05 457	1		
D112	4.0	5.5		GA 1535				METEOR CE 6P	K30 05 376	1	GA 1497	9000
D132	5.5	7.5										
	7.5	10.0		GA 1498				METEOR CE 6P	K30 05 375	1	GA 1497	9000
	11.0	15.0							K30 05 472	1		

Belts and pulleys for spindle drive to FENCE SIDE HEADS 60 Hertz												
Motor			Motor Pulley		Taper Lock Bush			Belts			Spindle Pulley	Spindle Speed
Frame Size	K.W.	H.P.	Fenner Ref.	Wadkin Code	Bore M.M.	Fenner Ref.	Wadkin Code	Stephens Ref.	Wadkin Code	Quan.	Wadkin Number	R.P.M.
D112	4.0	5.5		GA 415				METEOR CE 6P	K30 05 384	1	GA 414	6000
D132	5.5	7.5										
	7.5	10.0		GA 416				METEOR CE 6P	K30 05 385	1	GA 414	6000
	11.0	15.0)							K30 05 436	1		
D112	4.0	5.5		GA 1450				METEOR CE 3P	K30 05 383	1	GA 1452	7500
D132	5.5	7.5										
	7.5	10.0		GA 1451				METEOR CE 6P	K30 05 385	1	GA 1452	7500
	11.0	15.0)							K30 05 436	1		
D112	4.0	5.5		GA 1338				METEOR CE 6P	K30 05 376	1	GA 1483	9000
D132	5.5	7.5										
	7.5	10.0		GA 1298				METEOR CE 6P	K30 05 366	1	GA 1483	9000
	11.0	15.0)							K30 05 457	1		

Belts and pulleys for spindle drive to NEAR SIDE HEAD 50 Hertz												
Motor			Motor Pulley		Taper Lock Bush			Belts			Spindle Pulley	Spindle Speed
Frame Size	K.W.	H.P.	Fenner Ref.	Wadkin Code	Bore M.M.	Fenner Ref.	Wadkin Code	Stephens Ref.	Wadkin Code	Quan.	Wadkin Number	R.P.M.
D112	4.0	5.5		GA 415				METEOR CE 3P	K30 05 387	1	GA 413	6000
D132	5.5 7.5 11.0	7.5 10.0 15.0)		GA 416				METEOR CE 6P	K30 05388 K30 05 459	1 1	GA 413	6000
D112	4.0	5.5		GA 1338				METEOR CE 3P	K30 05 387	1	GA 413	7500
D132	5.5) 7.5) 11.0)	7.5 10.0 15.0)		GA 1298				METEOR CE 6P	K30 05 367 K30 05 461	1 1	GA 413	7500
D112	4.0	5.5		GA 1535				METEOR CE 6P	K30 05 413	1	GA 1497	9000
D132	5.5 7.5 11.0	7.5 10.0 15.0)		GA 1498				METEOR CE 6P	K30 05 418 K30 05 490	1 1	GA 1497	9000

Belts and pulleys for spindle drive to NEAR SIDE HEAD 60 Hertz												
Motor			Motor Pulley		Taper Lock Bush			Belts			Spindle Pulley	Spindle Speed
Frame Size	K.W.	H.P.	Fenner Ref.	Wadkin Code	Bore M.M.	Fenner Ref.	Wadkin Code	Stephens Ref.	Wadkin Code	Quan.	Wadkin Number	R.P.M.
D112	4.0	5.5		GA 415				METEOR CE 3P	K30 05 387	1	GA 414	6000
D132	5.5 7.5 11.0	7.5 10.0 15.0)		GA 416				METEOR CE 6P	K30 05 389 K30 05 460	1 1	GA 414	6000
D112	4.0	5.5		GA 1450				METEOR CE 3P	K30 05 387	1	GA 1452	7500
D132	5.5 7.5 11.0	7.5) 10.0) 15.0)		GA 1451				METEOR CE 6P	K30 05 388 K30 05 459	1	GA 1452	7500
D112	4.0	5.5		GA 1338				METEOR CE 3P	K30 05 387	1	GA 1483	9000
D132	5.5 7.5 11.0	7.5) 10.0) 15.0)		GA 1298				METEOR CE 6P	K30 05 367 K30 05 461	1 1	GA 1483	9000

Belts and pulleys for spindle drive to UNIVERSAL HEAD 50 Hertz												
Motor			Motor Pulley		Taper Lock Bush			Belts			Spindle Pulley	Spindle Speed
Frame Size	K.W.	H.P.	Fenner Ref.	Wadkin Code	Bore M.M.	Fenner Ref.	Wadkin Code	Fenner Ref.	Wadkin Code	Quan.	Wadkin Number	R.P.M.
D112	4.0	5.5	031Z 0222	K30 78 237	28	2012	K30 77 114	SPZ 940	K30 77 156	2	GA 109	6000
D132	5.5 7.5 11.0	7.5) 10.0) 15.0)	031Z 0223	K30 78 218	38	2012	K30 77 113	SPZ 940	K30 77 156	3	GA 410	6000
D160	15.0	20.0	031Z 0224	K30 78 209	42	2517	K30 77 101	SPZ 940	K30 77 156	4	GA 755	6000
D112	4.0	5.5	031Z 0262	K30 78 238	28	2012	K30 77 114	SPZ 1000	K30 78 435	2	GA 109	7500
D132	5.5 7.5 11.0	7.5) 10.0) 15.0)	031Z 0263	K30 78 244	38	2012	K30 77 113	SPZ 1000	K30 78 435	3	GA 410	7500
D160	15.0	20.0	031Z 0264	K30 77 290	42	2517	K30 77 101	SPZ 1000	K30 78 435	4	GA 755	7500
D112	4.0	5.5	031Z 0302	K30 78 241	28	2012	K30 77 114	SPZ 1120	K30 78 513	2	GA 1638	9000
D132	5.5 7.5 11.0	7.5) 10.0) 15.0)	031Z 0303	K30 78 245	38	2012	K30 77 113	SPZ 1120	K30 78 513	3	GA 1475	9000
D160	15.0	20.0	031Z 0304	K30 78 225	42	2517	K30 77 101	SPZ 1120	K30 78 513	4	GA 1514	9000
D112	4.0	5.5	031Z 0182	K30 77 191	28	2012	K30 77 114	SPZ 900	K30 78 351	2	GA 109	4500
D132	5.5 7.5 11.0	7.5) 10.0) 15.0)	031Z 0183	K30 77 139	38	2012	K30 77 113	SPZ 900	K30 78 351	3	GA 410	4500

Belts and pulleys for spindle drive to UNIVERSAL HEAD 60 Hertz												
Motor			Motor Pulley		Taper Lock Bush			Belts			Spindle Pulley	Spindle Speed
Frame Size	K.W.	H.P.	Fenner Ref.	Wadkin Code	Bore M.M.	Fenner Ref.	Wadkin Code	Fenner Ref.	Wadkin Code	Quan.	Wadkin Number	R.P.M.
D112	4.0	5.5	031Z 0202	K30 78 294	28	1610	K30 77 184	SPZ 900	K30 78 351	2	GA 109	6000
D132	5.5 7.5 11.0	7.5) 10.0) 15.0)	031Z 0203	K30 78 272	38	2012	K30 77 113	SPZ 900	K30 78 351	3	GA 410	6000
D160	15.0	20.0	031Z 0204	K30 77 289	42	2012	K30 77 196	SPZ 900	K30 78 351	4	GA 755	6000
D112	4.0	5.5	031Z 0243	K30 78 499	28	2012	K30 77 114	SPZ 950	K30 78 500	2	GA 1494	7500
D132	5.5 7.5 11.0	7.5) 10.0) 15.0)	031Z 0243	K30 78 499	38	2012	K30 77 113	SPZ 950	K30 78 500	3	GA 1494	7500
D160	15.0	20.0	031Z 0244	K30 78 224	42	2517	K30 77 101	SPZ 950	K30 78 500	4		7500
D112	4.0	5.5	031Z 0262	K30 78 238	28	2012	K30 77 114			2	GA 1638	9000
D132	5.5 7.5 11.0	7.5) 10.0) 15.0)	031Z 0263	K30 78 244	38	2012	K30 77 113			3	GA 1475	9000
D160	15.0	20.0	031Z 0264	K30 77 290	42	2517	K30 77 101			4	GA 1514	9000

SECTION 5 ILLUSTRATED PARTS LIST

CONTENTS

IMPORTANT: WHEN ORDERING SPARES ALWAYS QUOTE MODEL AND MACHINE NUMBER

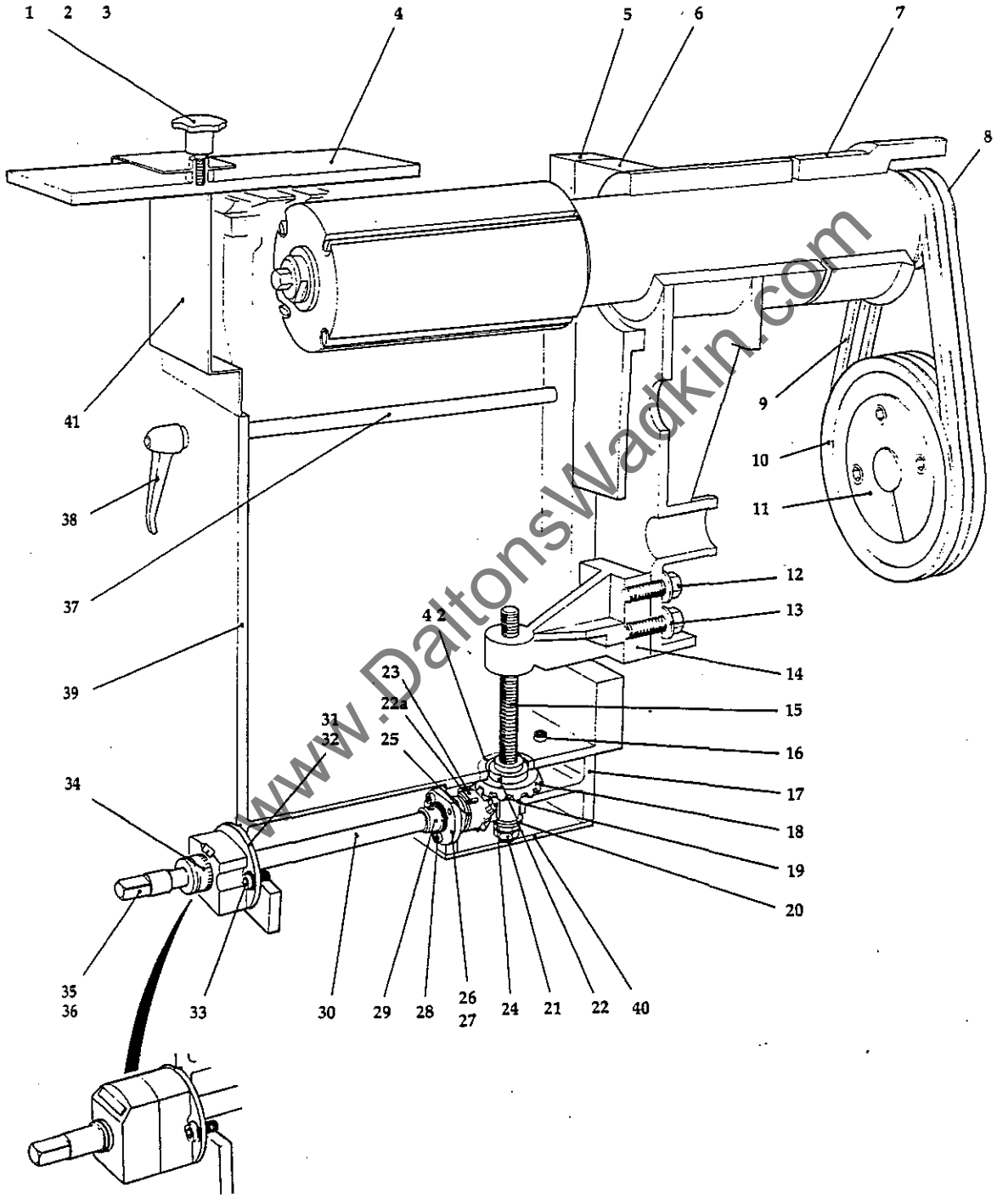
1. BEDPLATE AND FENCE VARIATIONS

Due to the number of variations possible on the GA machine, reference should be made to Wadkin for replacement parts, quoting the machine Model, Serial Number and Date of Manufacture.

(NO FIGURE)

FIG 1 BEDPLATE AND FENCE VARIATIONS

ITEMS 1 TO 4 ONLY ON FIRST BOTTOM HEAD



DIGITAL READOUT (OPTIONAL)

FIG 2. FIRST AND SECOND BOTTOM HEADS

2. FIRST AND SECOND BOTTOM HEADS

Ref. No.	Description	No. Off
1	Handwheel, standard, black plastic moulding, M12 blind hole	1
2	Locking screw for guard, First Bottom Head cutterblock	1
3	Locking pad for cutterblock guard	1
4	Top sliding guard, First Bottom Head	1
5	Slide strip	1
6	Bottom Head spindle housing, vertical slide	1
7	Pulley belt housing, horizontal heads	1
8	Spindle pulley, Bottom and Top Heads	1
9	Fenner vee belt, SPZ 850	2 or 3
10	Fenner vee belt pulley } see Tables	1
11	Fenner Taper-Lock bush } see Tables	1
12	Hexagon head screw, M10 x 30mm long	4
13	Spring washer, 10mm diameter, single coil	4
14	Bracket nut, Bottom Head vertical adjustment	1
15	Vertical adjustment screw, First Bottom Head	1
16	Hexagon socket capscrews, M6 x 75mm long	4
17	Bevel box, Bottom Head vertical adjustment	1
18	Bevel gear wheel	1
19	Bearing washer, top and bottom	2
20	Thrust washer	1
21	M16 hexagonal nut	2
22	Parallel key 5mm x 5mm x 20mm long	1
22a	Parallel key 8mm x 7mm x 20mm long	1
23	Bevel gear pinion	1
24	Circlip, 16mm external, pinion shaft (not shown)	1
25	Thrust washer	1
26	Bronze bush, 25mm ID x 30mm OD x 25mm long	1
27	End cap, bevel box	1
28	Hexagon socket capscrews, M6 x 20mm long	3
29	Collar	1
30	Extension shaft, bevel gear	1
31	Bearing bracket, extension shaft	1
32	Bronze bush, 20mm ID x 25mm OD x 25mm long	2
33	Hexagon socket capscrews, M6 x 20mm long	2
34	Calibrated dial, GA 6768	1
35	Square end shaft extension	1
36	Taper pin, No.5	1
37	Extension shaft, vertical lock	1
38	Locking handle, M12 x 25mm, male	1
39	Main Frame	1
40	Cover, bevel box	1
41	Front guard, Bottom Head spindles	1
42	Top cover, bevel gear	1

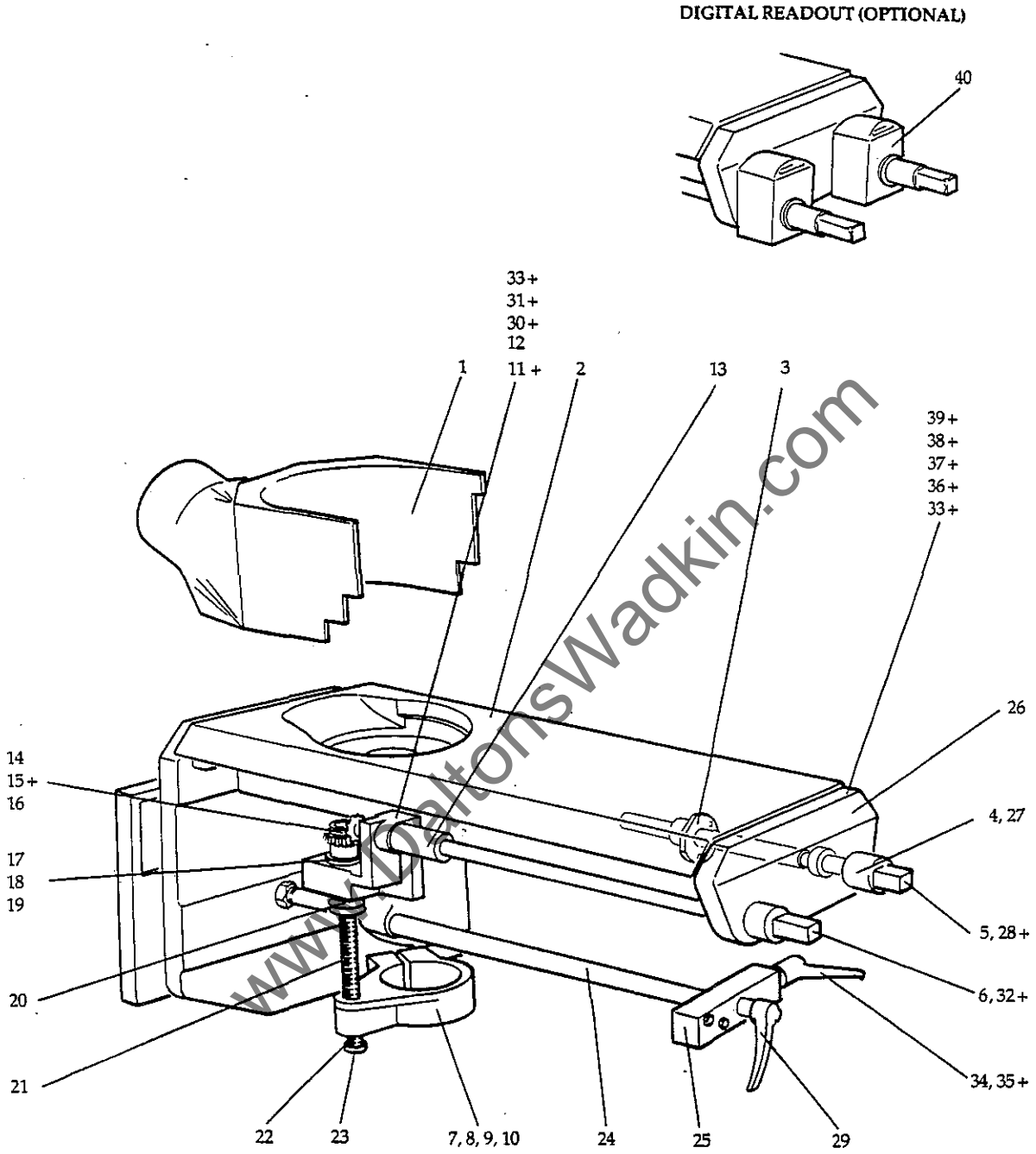


FIG 3 FENCE AND NEAR SIDE HEAD CARRIAGE UNIT ADJUSTING MECHANISM

3. FENCE AND NEAR SIDE HEAD CARRIAGE UNIT ADJUSTING MECHANISM (INCLUDING RISE AND FALL WHEN FITTED)

Ref. No.	Description	No. Off
1	Exhaust hood (Fence Side illustrated)	1
2	Fence or Near Side Head spindle carriage	1
3	Nut for lateral movement	1
4	Calibrated dial	2
5	Horizontal shaft for lateral movement	1
6	Front horizontal shaft for vertical movement	1
7	Nut for vertical adjustment	1
8	Hexagon head screw, m10.dia. × 80mm long	1
9	Bright mild steel washer size M10	2
10	Hexagon nut, M10	1
11+	Rear horizontal shaft for vertical adjustment	1
12	Mitre gear bracket for side head vertical adjustment	1
13	Collar for horizontal shaft for vertical adjustment	1
14	Straight mitre bevel gear (16T 2.5 MOD)	2
15+	Hexagon socket screw-cup point, M6 dia. × 6mm long	2
16	M12, self locking nut	1
17	'INA' bearing AXK 2542	2
18	'INA' bearing AS 2542	2
19	'INA' bearing LS 2542	2
20	Chamfered notch nut, M24 × 1.5	2
21	Vertical screw for side head vertical adjustment	1
22	Large dia. Mild steel washer size, M10	1
23	Hexagon head screw, M10 × 20mm long	1
24	Locking shaft for fence or near side head spindle barrel	1
25	Clamping block for side head horizontal movement	1
26	Legend plate	1
27+	Collar, M20 dia.	2
28+	'O' Ring	2
29	Locking handle, M12 × 25mm, male	1
30+	Mitre gear bracket guard	1
31+	Key, 5 × 5 × 20	3
32+	'INA' Bearing thrust washer	1
33+	Grease nipple	4
34	Locking handle, M10 × 25mm, male	1
35+	Brass pad, dia. 6 × 5mm	1
36	Bearing plate	1
37+	'INA' Bearing AXK 2035	2
38+	'INA' Thrust washer AS 2035	3
39+	'INA' Shaft washer WS 81104	1
40	Digital readout	1

\+ Not illustrated
\+ Not illustrated

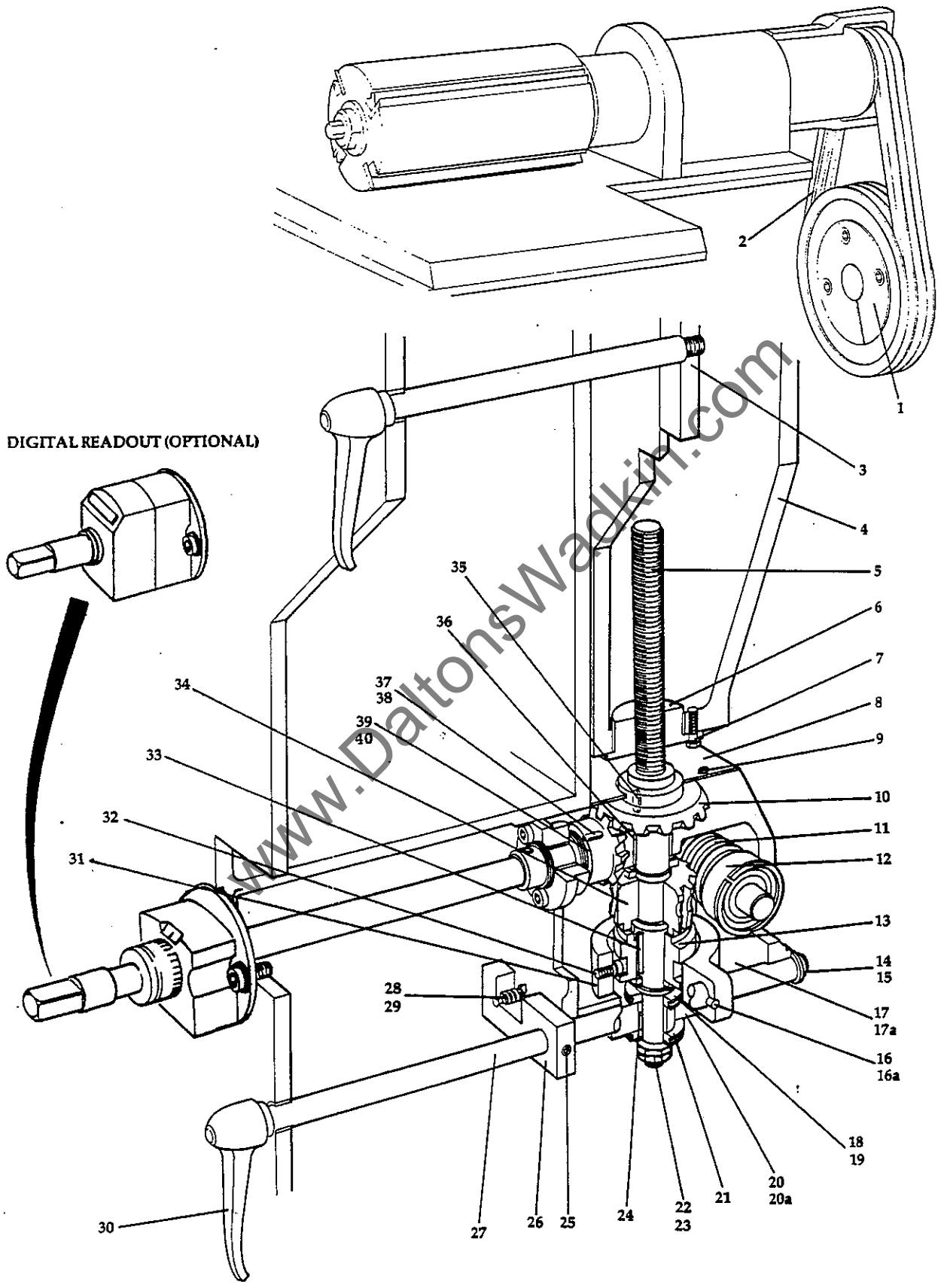


FIG 4 TOP HEAD INCLUDING POWER RISE AND FALL

3. TOP HEAD INCLUDING POWER RISE AND FALL

Ref. No.	Description	No. Off
1	Fenner vee belt pulley	1
2	Fenner vee belt, SPZ 850	2 or 3
3	Slide strip	1
4	Top Head vertical slide	1
5	Vertical screw, Top Head rise and fall	1
6	Bracket nut, Top Head rise and fall	1
7	Hexagon head screws, M8 x 25mm long	2
8	Top cover, gearbox/clutch housing	1
9	Socket head capscrews, M6 x 10mm long	4
10	Bevel gear wheel	1
11	Worm gear, rise and fall top beam/head	1
12	Bearing, 6204 RS	2
13	Dogclutch, Top Head rise and fall	1
14	Circlip, 16mm external (not shown)	1
15	Spacer washer	1
16	Tension pin, 6mm x 32mm long	1
16a	Hexagon socket screw cup point, M6 x 6mm long	1
17	Gearbox/clutch housing	1
17a	Socket head capscrews, M12 x 30mm long	4
18	Spacer washer	2
19	Circlip, 30mm external	2
20	Bottom cover, gearbox/clutch housing	1
20a	Securing screws, M8 x 16mm hex. socket	4
21	Thrust washer	2
22	Plain washer, 16mm	1
23	M16 hexagon nut	2
24	Bronze bush, 25mm ID x 30mm OD x 20mm long	1
25	Hexagon socket screw, cup point, M6 x 10mm long	1
26	Clutch location arm	1
27	Clutch shaft	1
28	Spring, clutch location arm lock	1
29	Steel ball, 10mm diameter	1
30	Locking handle, M10×25mm, male	1
31	Clutch yoke, top head rise and fall	1
32	Hexagon socket capscrews, M6 x 10mm long	2
33	Parallel key, 8mm x 7mm x 32mm long	1
34	Worm wheel, Top Head rise and fall	1
35	Parallel key, 8mm x 7mm x 14mm long	1
36	Bronze bush, 30mm ID x 35mm OD x 20mm long	1
37	Circlip, 16mm external (not shown)	1
38	Parallel key, 5mm x 5mm x 20mm long	1
39	Spacer washer	2
40	Bevel gear, pinion	1

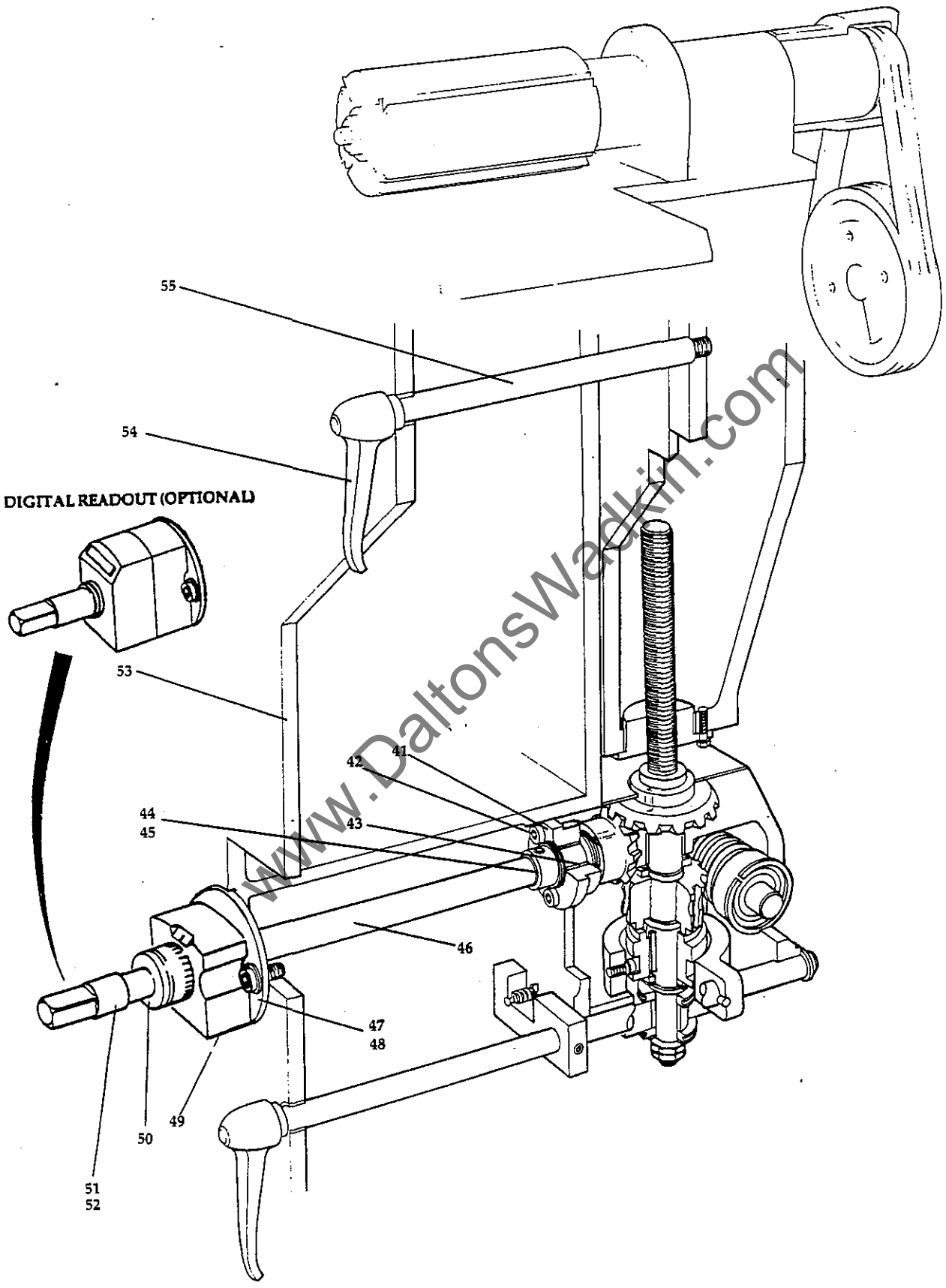


FIG 4 TOP HEAD INCLUDING POWER RISE AND FALL

4. TOP HEAD INCLUDING POWER RISE AND FALL (cont.)

Ref. No.	Description	No. Off
41	End cap, bevel box	1
42	Socket head capscrew, M6 × 20mm long	3
43	Bronze bush, 20mm ID × 25mm OD × 25 long	1
44	Collar	
45	Hex. socket screw – cup point, M6 × 6mm long	1
46	Extension shaft	1
47	Bearing bracket, extension shaft	1
48	Bronze bush, 20mm ID × 25mm OD × 25mm long	1
49	Hex. socket capscrews, M6 × 20mm long	2
50	Digital readout	1
51	Square end shaft extension	1
52	Taper pin, No. 1	1
53	Main frame	1
54	Locking handle	1
55	Extension shaft, vertical lock	1
56+	Hex. head screw, M12 × 30mm	4
57+	Circlip Safety feature	1
58+	Spring	1

\+ Not illustrated. Attachment of gearbox/clutch housing to mainframe.

DIGITAL READOUT (OPTIONAL)

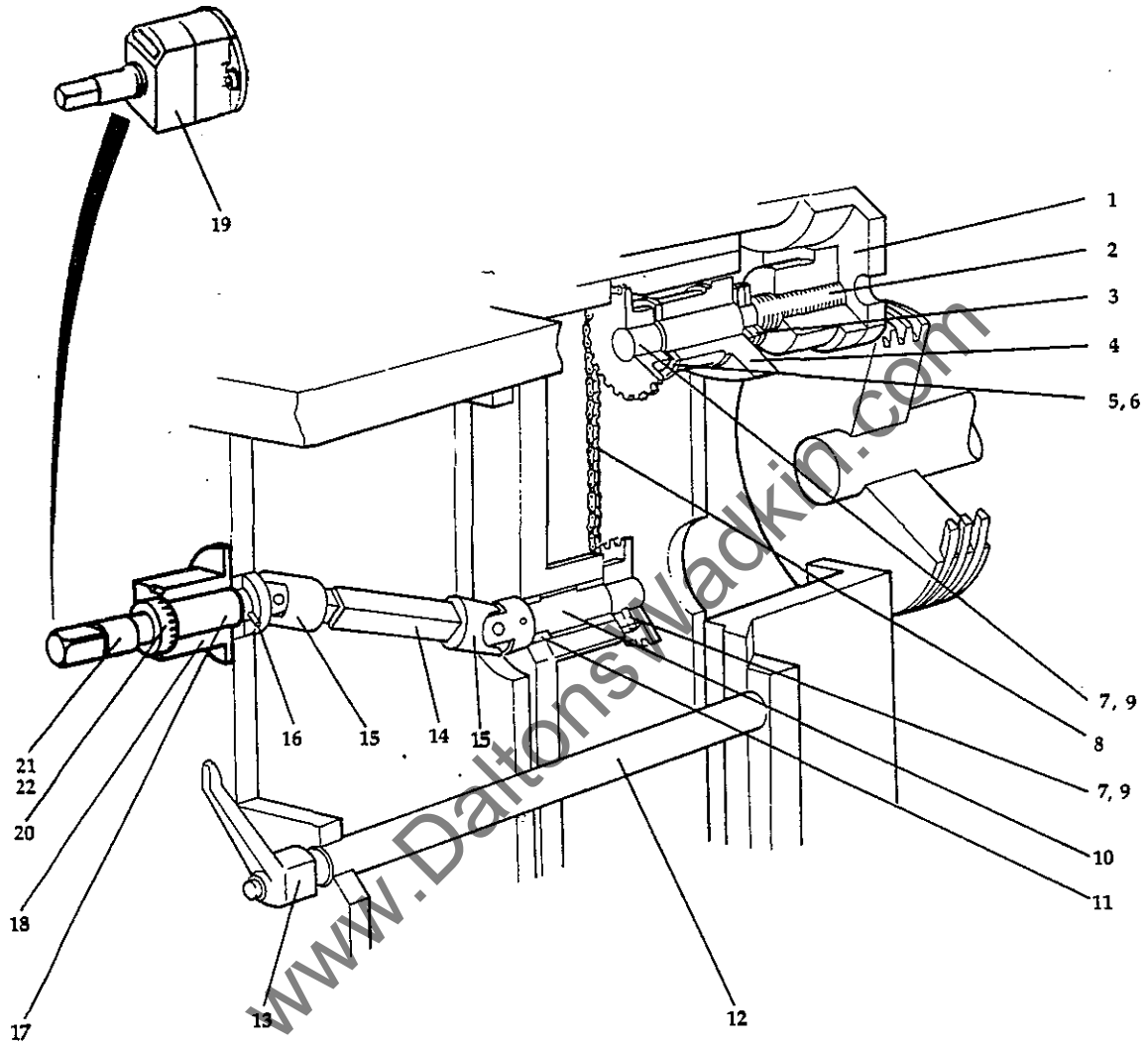


FIG 5 BOTTOM (EXCLUDING FIRST) AND TOP HEADS AXIAL ADJUSTMENT

5. BOTTOM (EXCLUDING FIRST) AND TOP HEADS AXIAL ADJUSTMENT

Ref. No.	Description	No. Off
1	Nut for horizontal head adjustment	1
2	Shaft for horizontal head adjustment	1
3	M24. × 1.5 chamfered notch nuts	2
4	Bearing bracket for horizontal adjustment	1
5	'INA' bearings AXK 2542	2
6	'INA' bearings AS 2542	4
7	Sprocket for horizontal head axial adjustment	2
8	'RENOLD' Roller chain No. 111046 12.9mm (1/2in.) pitch, 40 pitches including connecting link	1
9	No. 4. taper pin	2
10	Shaft	1
11	20mm. I.D. × 25mm. O.D. × 20mm. long bronze brush	2
12	Extension for vertical lock to horizontal heads	1
13	Locking handle M12. × 25mm. male	1
14	Universal coupling and square tube assembly for horizontal head adjustment	1
15	Universal coupling and square tube assembly for horizontal head cross adjustment	1
16	6mm. dia. × 32mm. long tension pin	1
17	Shaft for horizontal head cross adjustment	2
18	Bearing block	1
19	Digital readout	1
20	Calibrated dial (option)	1
21	Square shaft extension	1
22	Taper pin. No.1	1

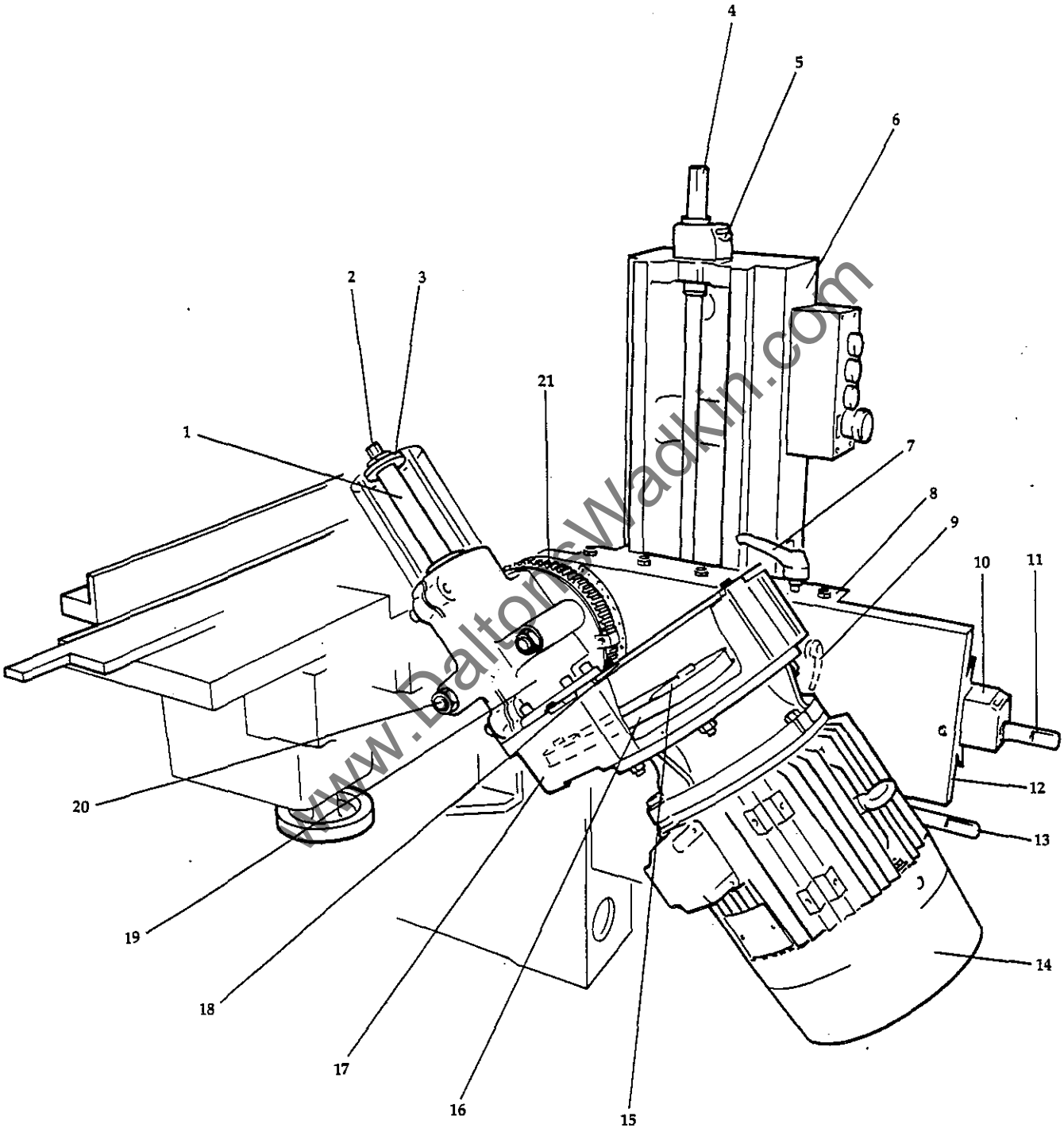


FIG 6 UNIVERSAL HEAD ADJUSTING MECHANISM

6. UNIVERSAL HEAD ADJUSTING MECHANISM

Ref. No.	Description	No. Off
1	Universal Head spindle, 40mm dia.sq.shoulder	1
2	Locking nut	1
3	Locking collar assembly	1
4	Vertical traverse screw	1
5	Digital readout (option)	1
6	Vertical slide stand	1
7	Locking handle, M10×50mm, male	1
8	Saddle, Universal Head	1
9	Locking handle	1
10	Digital readout (option)	1
11	Horizontal traverse screw	1
12	Cross slide, Universal Head	1
13	Worm gear shaft	1
14	Electric motor, frame D132	1
15	Drive pulley	1
16	Drive belt, Fenner, SPZ 940	3
17	Pulley/belt housing	1
18	Pulley/belt housing cover	1
19	Spindle carriage, Universal head	1
20	Bolt, spindle carriage	2
21	Wormwheel, Universal Head	1

7. BOTTOM TOP & UNIVERSAL HEAD SPINDLE UNIT – 40MM DIAMETER SQUARE SHOULDER

Ref. No.	Description	No. Off
1	Locking nut, Bottom Head and Near Side head spindles	1
1a	Locking nut Fence side head. Top head Universal	1
2	Bottom Head spindle, 40mm. dia. square shoulder	1
2a	Top Head spindle, 40mm square shoulder	1
2b	Universal Head spindle, 40mm square shoulder	1
3	Bearing nut, Bottom Head and Near Side spindles	1
3a	Bearing nut Fence side head. Top head and Universal spindles	1
4	Bearing nut, spindle housing	1
** 5	Bearing, RHP or SKF 6009	1
6	Barrel, Horizontal and Near Side spindle	1
** 7	Bearing, RHP or SKF 6306	1
8	Parallel key, 8mm × 7mm, 40mm long	1
9	Pulley spigot for spindle	1
10	Hexagonal head screw, M12 × 45mm long	1
11	'BELLEVILLE' series 'K' disc spring, for bearing 6306, 71.5mm OD × 45.5mm OD × 0.7mm	6

** 'KLUBER' Grease packed

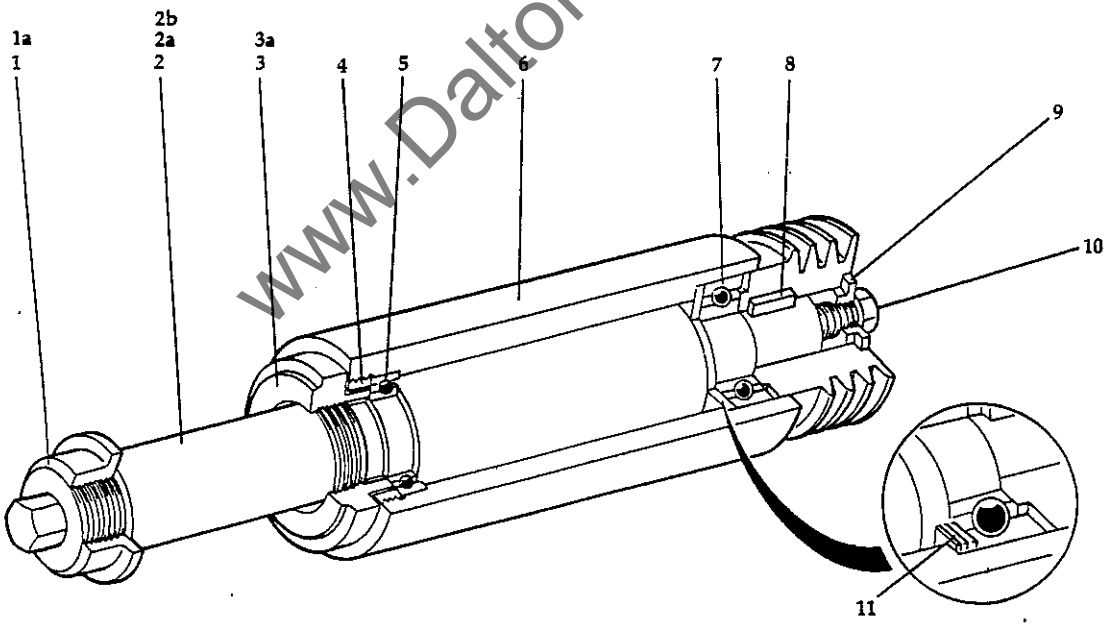


FIG 7. BOTTOM TOP AND UNIVERSAL HEAD SPINDLE UNIT

8. FENCE AND NEAR SIDE HEAD SPINDLE UNIT – 40MM DIAMETER SQUARE SHOULDER

Ref. No.	Description	No. Off
1	Locking nut Fence Side Head, Top Head and Universal Head spindles	1
1a	Locking nut, Bottom Head and Near Side Head spindles	1
2	Fence Side Head spindle, 40mm, dia. square shoulder	1
2a	Near Side Head spindle, 40mm, dia. square shoulder	1
3	Bearing nut, Fence Side Head, Top Head and Universal Head spindles	1
3a	Bearing nut, Bottom Head and Near Side Head spindle	1
4	Bearing nut, spindle housing	1
** 5	Bearing, RHP or SKF 6009	1
6	Barrel, Horizontal and Side Head spindles	1
** 7	Bearing, RHP or SKF 6306	1
8	Pulley spigot for spindle	1
9	Hexagon head screw, M12 × 35mm	1
10	Parallel key, 8mm × 7mm × 40mm long	1
11	'BELLEVILLE' series 'K' disc spring, for bearing 6306, 71.5mm OD × 45.5mm ID × 0.7mm	6

** 'KLUBER' Grease packed

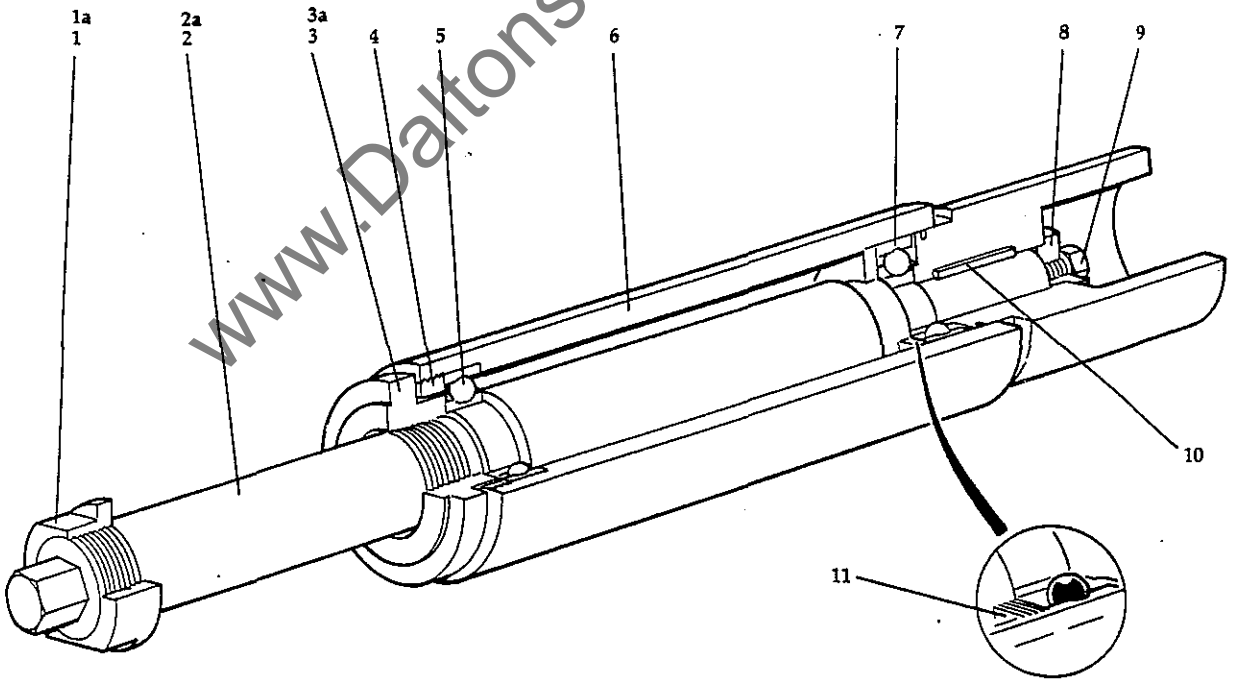


FIG. 8 FENCE AND NEAR SIDE HEAD SPINDLE UNIT – 40MM DIAMETER SQUARE SHOULDER

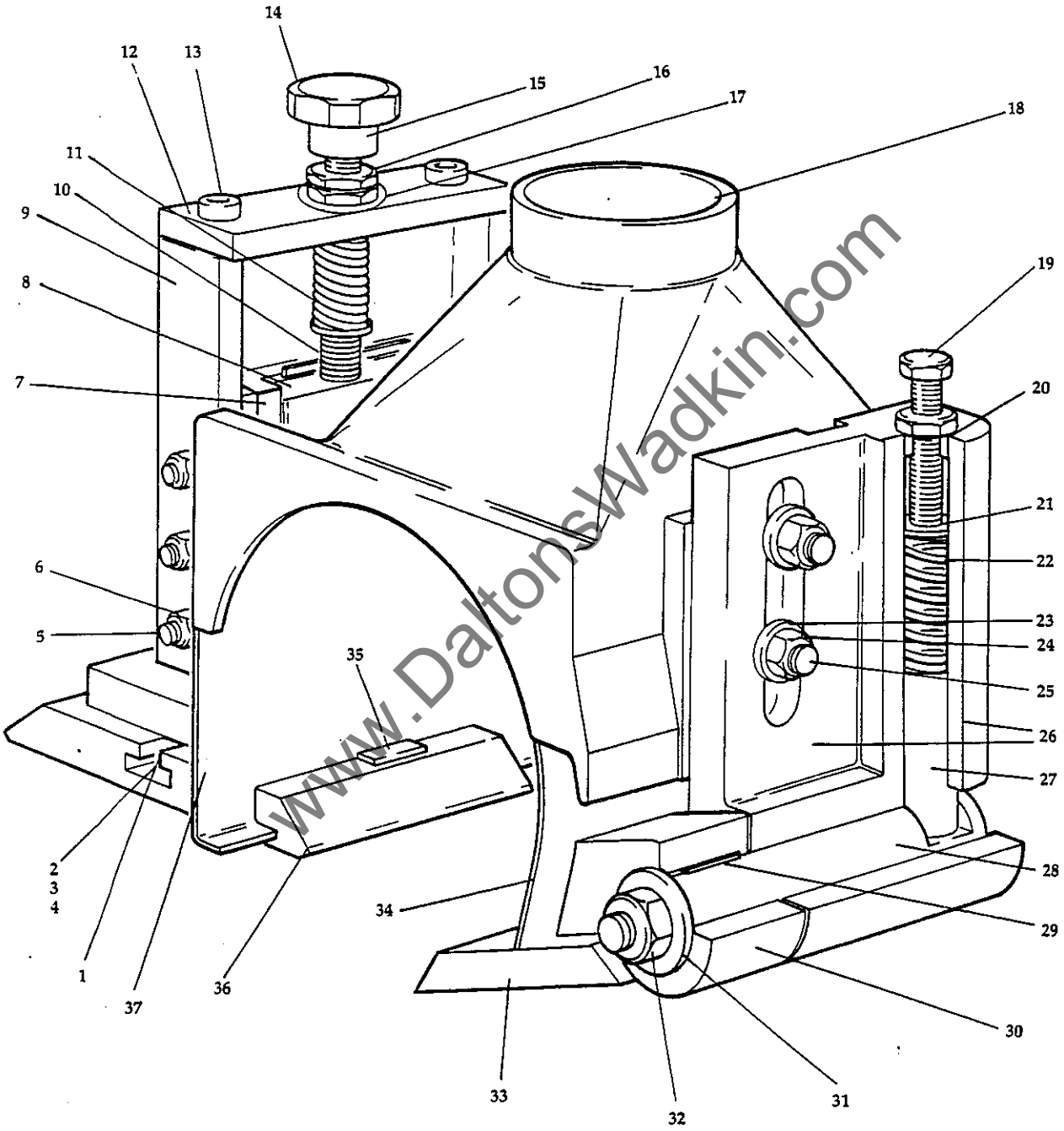


FIG 9 TOP HEAD CHIPBREAKER, PRESSURE PAD AND EXTRACTION HOOD

9. TOP HEAD CHIPBREAKER, PRESSURE PAD AND EXTRACTION HOOD

Ref. No.	Description	No. Off
1	Tee-nut, M10, ref. WDS 664 203	2
2	Screwed stud, M10 x 45mm long	2
3	Washer 10mm, bright mild steel	2
4	Hexagon nut, M10	2
5	Hexagon socket screws, half dog point, M6 x 35mm long	3
6	Hexagon nut, M6	3
7	Gib strip, rise and fall bracket, Top Head pressure pad	1
8	Slide, rise and fall, for shoe Top Head pressure pad	1
9	Bracket, rise and fall, Top Head pressure	1
10	Screw, raise/lower, Top head pressure pad	1
11	Compression spring, Top Head pressure pad	1
12	Top plate, Top Head pressure pad	1
13	Hexagon socket screw, M8 x 20mm long	2
14	Handwheel, M12 blind hole	1
15	Taper pin. No.0	1
16	Hexagon nut, thin, M12	2
17	Washer, 12mm, bright mild steel	1
18	Exhaust hood, Top Head	1
19	Hexagon head screw, M12 x 40mm long	1
20	Plug, spring loaded Top Head chipbreaker	1
21	Cap, Top Head chipbreaker spring	1
22	Spring, Top head chipbreaker	1
23	Washer, 10mm, bright mild steel	2
24	Hexagon nut, M10	2
25	Screwed stud, M10 x 50mm long	2
26	Pivot bracket, Top Head chipbreaker	1
27	Plunger, spring loaded Top Head chipbreaker	1
28	Pivot shaft, Top Head chipbreaker	1
29	Parallel key, 8mm x 6mm x 32mm long	1
30	Holder, Top Head chipbreaker shoe	1
31	Washer, chipbreaker pivot shaft	1
32	Nut, M12, self locking	1
33	Shoe, Top Head, 70mm long	1
—	Shoe, Top Head, 82mm long	1
—	Shoe, Top head, 105mm long	1
34	Chip deflector, Top Head chipbreaker	1
35	Cross tenon for shoe, top head pressure	1
36	Shoe, Top Head pressure	1
37	Cover, Top Head pressure pad	1

10. NEAR SIDE HEAD CHIPBREAKER AND EXTRACTION HOOD

Ref. No.	Description	No. Off
1	Spring clip	2
2	Shoulder pin, M16 dia.	2
3	Spacer, M20 dia.	2
4	Top cover for Near Side Head hood	1
5	Exhaust Hood for Near Side Head	1
6	Post	2
7	Near Side head chip deflector	1
8	Spring	2
9	Hexagon socket capscrew, M8 × 10mm	4
10+	Hexagon socket countersunk screw, M8 × 10mm	2
11	Pivot pin for Near Side head chipbreaker	1
12	Near Side head and chipbreaker shoe pivot bracket	1
13+	Cup point grub screw, M8 × 12mm	4
14	Hexagon full nut, M8	1
15	Hexagon head screw, M8 × 40mm	1
16	Near Side head chipbreaker shoe	1
17+	Screwed stud, 10mm × 60mm, M10	1
18	Washer, 10mm	3
19	Locking handle, M10 female	1
20	Adjusting bar for Near Side head chipbreaker	1
21	Hexagon head screw, M10 × 25mm	2
22	Shoe chipbreaker bracket	1
23+	Side Cover for Near Side Head Hood	1
24+	Screwed Stud, 6mm × 25mm, M6	2
25+	Washer, 6mm	2
26	Wing Nut M6	2

\+ Not illustrated

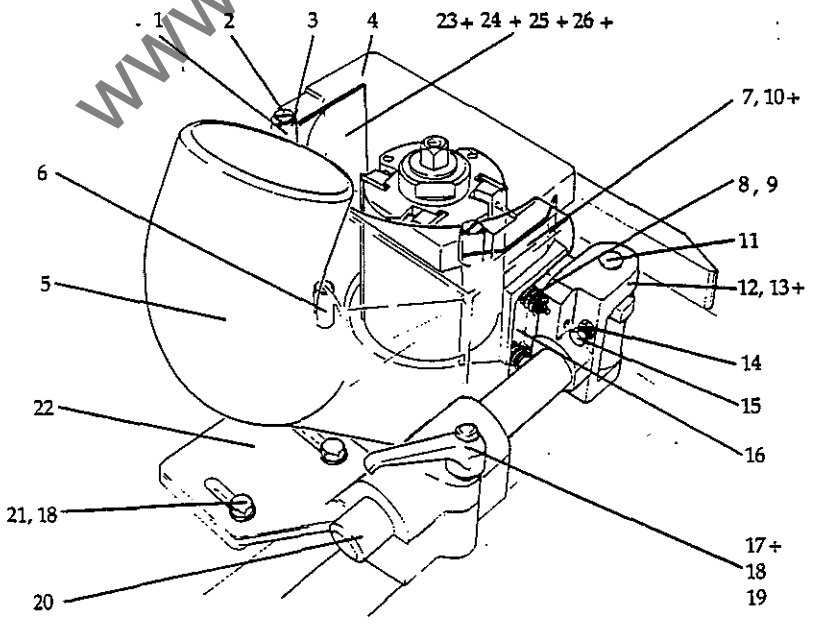


FIG 10 NEAR-SIDE HEAD CHIPBREAKER AND EXTRACTION HOOD

11. VARIABLE SPEED DRIVE

Ref. No.	Description	No. Off
1	Drive cover, half, fixed	1
2	Drive cover, half, removable	1
3	Standard 3 phase motor, foot mounted	1
4	Pulley, mechanically adjustable (motor shaft)	1
5	Locking plate	1
6	Washer disc, or nut	1
7	Screw, hexagon head	1
8	Vee-belt wide, Simplabelt 37/900, K30.78.414	
9	Pulley, spring loaded (driven shaft)	1
10	Locking plate	1
11	Washer disc, or nut	1
12	Screw, cheese head	1
13	Hand adjuster	1
14	Lock washer, spring	4
15	Screw, cheese head	4
16	Cover plate	1
17	Screw, hexagon head	4
18	Lock washer, spring	4
19	Pulley, drive, Fenner 031Z 0104 (28M)	
–	Taper Lock, 1210–30 bore	1
20	Pulley, driven, Fenner 031Z 0304 (28M)	
–	Taper Lock, 2517–28 here	1
21	Vee-belt, Fenner SPZ 1120 (28M).	4
22	Worm gear transmission for chain drive	1

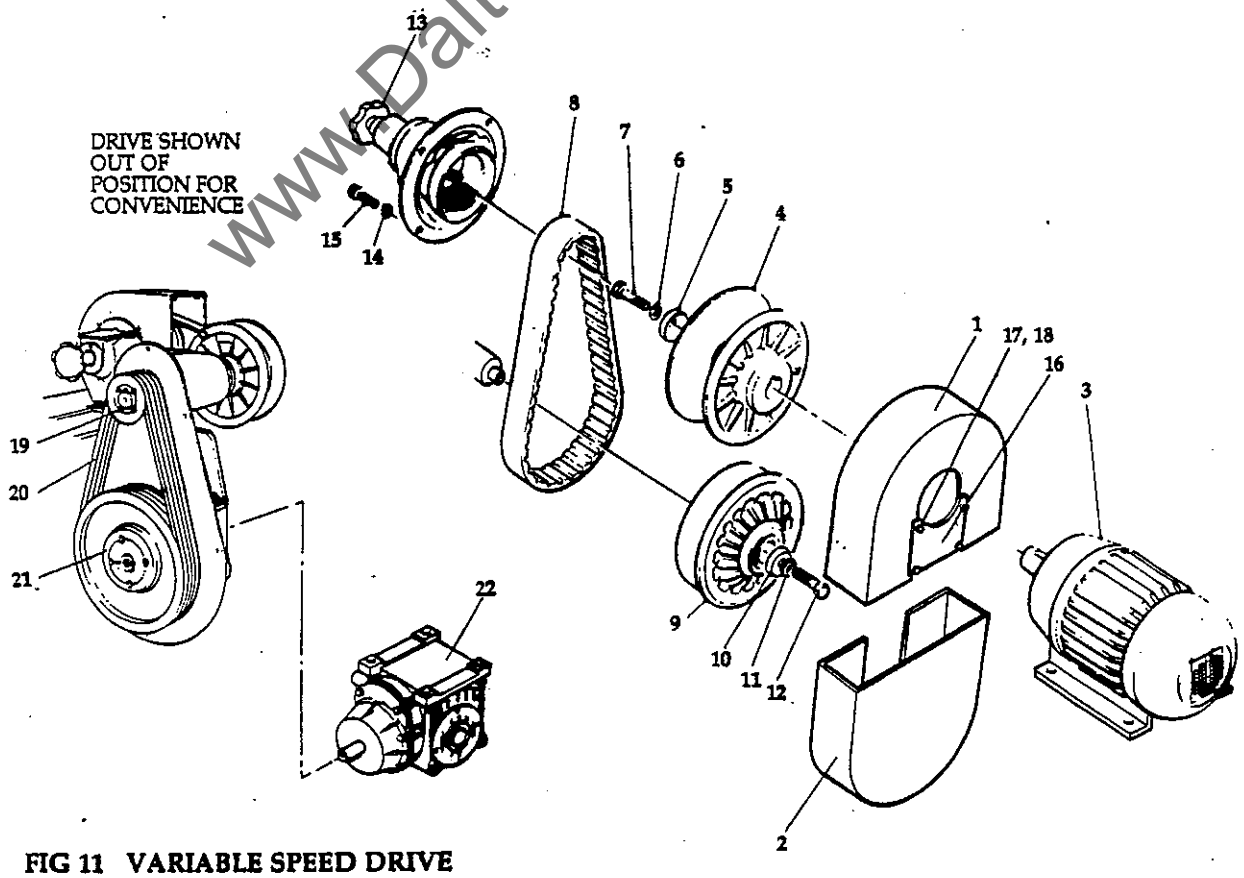


FIG 11 VARIABLE SPEED DRIVE

12. DRIVE TO CHAIN DRIVEN FEEDWORKS

Ref. No.	Description	No. Off
1	Chain guard and cover, feed roll drive unit	1
2	'Duplex' chain sprocket	1
3	'Renold-Duplex' roller chain, No. 114056 — 15.8mm (5/8in.) pitch × 54p	1
4	Connecting link, No. 26, doe No. 114056	1
4a	Cranked link, No. 30, for No. 114056	
5	'Duplex' chain sprocket	1
6	Parallel key, 8mm × 7mm × 40mm	1
7	Chain tension wheel	1
8	Spindle chain tension wheel	1
9	Hex. head screw, M12 × 60 mm long	1
10	Washer, 10mm	1
11	Sliding bar, chain tensioning	1
12	Screw, Hexagon head, M 10 × 30mm long	2
13	Washer, 12mm, large	2
14	Washer, 12mm	2
15	Screw, hexagon head, M6 × 12mm long	5
16	Washer, lock 6mm	5

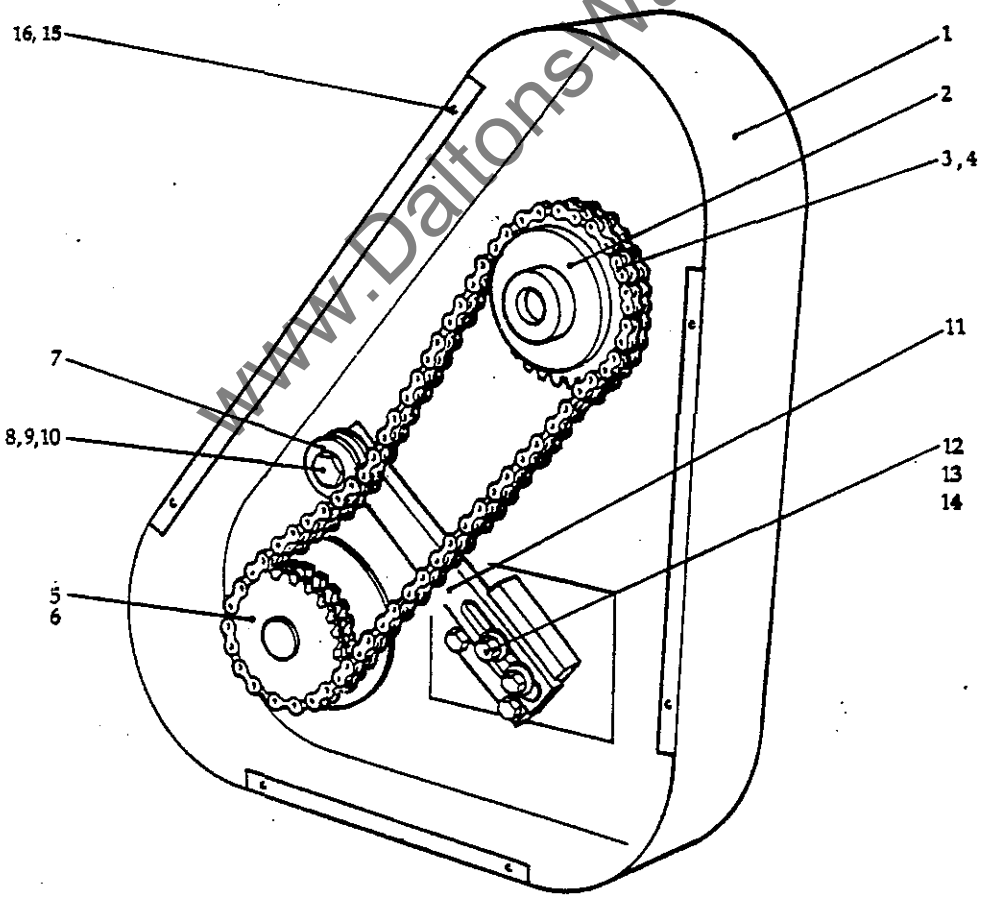


FIG 12 DRIVE TO CHAIN DRIVEN FEEDWORKS

13. FEED ROLLS DRIVING CHAIN TENSIONING MECHANISM

Ref. No.	Description	No. Off
1	Chain tension wheel	4
2	Spindle, chain tensioner	4
3	Washer, bright mild steel, 16mm	4
4	Arm, chain tensioner	4
5	Screw, hexagon head, M10×30mm long	8
6	Washer, bright mild steel, 10mm	8
7	Bracket, feed roll chain tensioner	2
8	Screw, hexagon socket head, M10×25mm long	4
9	Washer, spring, single coil 10mm	
10	Nut, hexagon M12	4
11	Washer, spring, single coil 12mm	
12	Roller chain	1
13	Roller chain	1
14	Roller chain	1
15	Roller chain	1

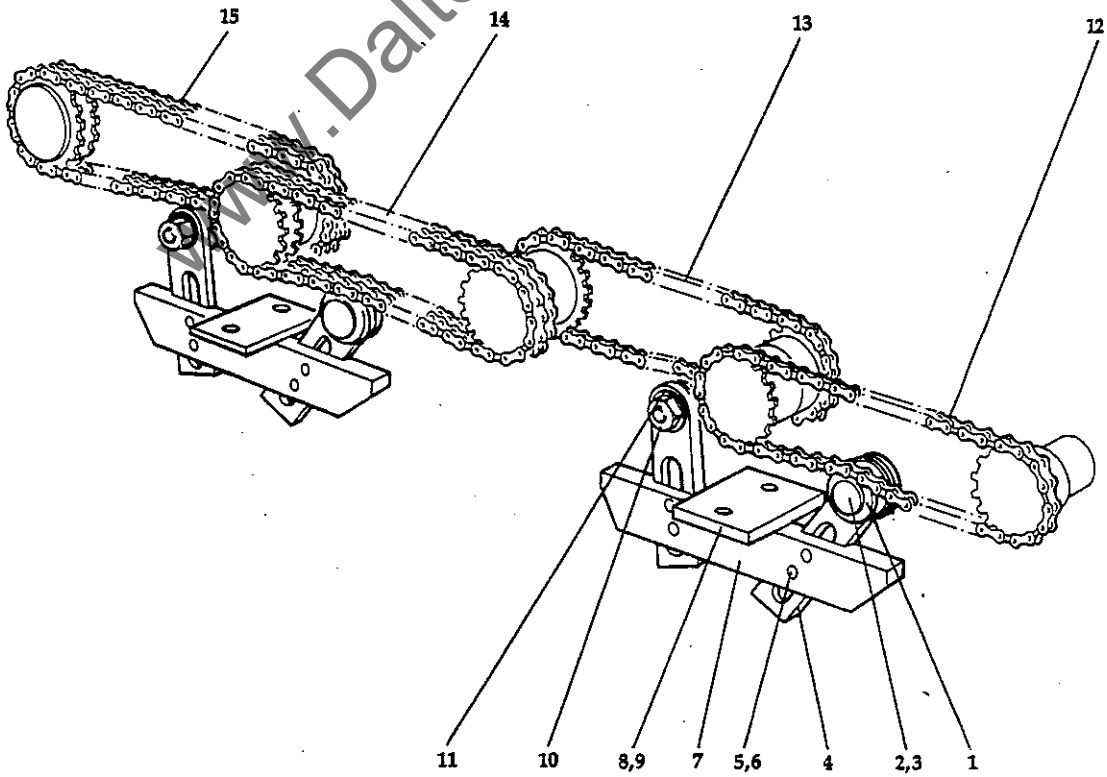


FIG 13 FEED ROLL DRIVE CHAINS TENSIONING MECHANISM

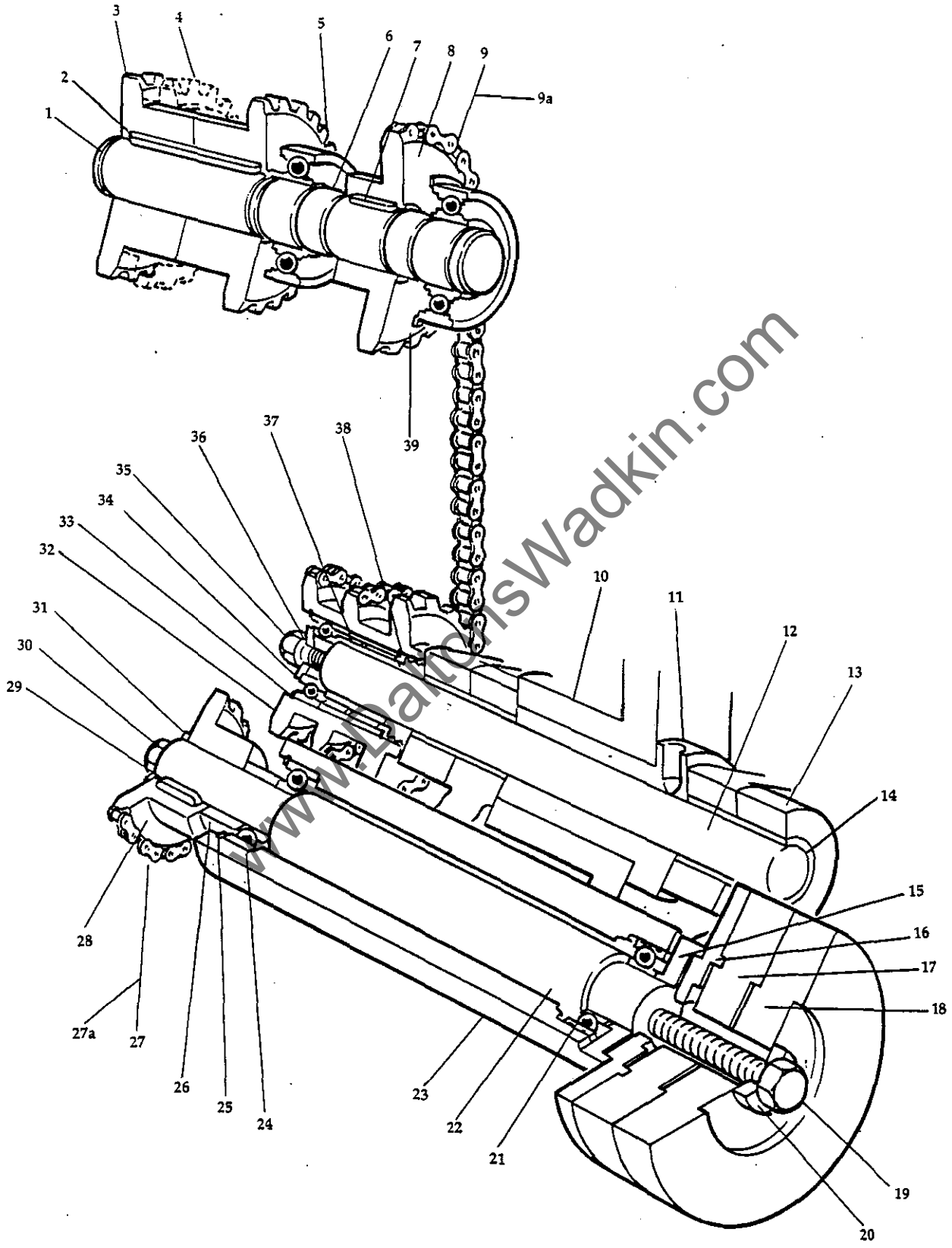
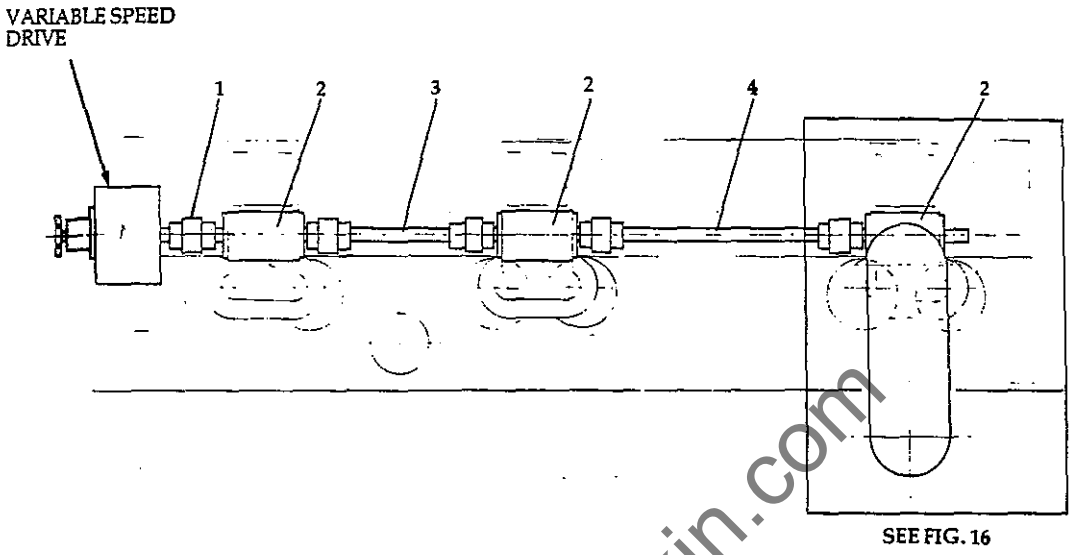


FIG. 14 FEEDROLL UNIT CHAIN DRIVE (DOUBLE SWING)

14. FEEDROLL UNIT CHAIN DRIVE (DOUBLE SWING)

Ref. No.	Description	No. Off
1	'Seeger' circlip, 30mm external, No.V118	8
2	Parallel key, 8mm x 7mm x 63mm long	1
3	Chain sprocket, single lane, rear chain drive	2
4	'Duplex' chain sprocket, rear chain drive	1
5	Bearing, 6206 2RS	2
6	Shaft, top intermediate drive to feed rolls	1
7	Parallel key, 8mm × 7mm × 20mm long	1
8	Sprocket, top intermediate, rear chain drive	1
9	'Renold' roller chain, No. 110056, 15.8mm (5/8in.) pitch × 43 pitches	1
9a	Connecting link, No. 26, for 110056 chain	1
10	Vertical slide, feed roll beam	1
11	Eccentric bush, feed roll drive chain tensioner	1
12	Pivot shaft for swings	1
13	Feed roll swing, right hand	1
14	Bronze bush, 25mm ID × 30mm OD × 25mm long	4
15	Flange, feed roll mount	2
16	Feed roll, top spiral, saw tooth narrow	2
17	Feed roll, top spiral	2
18	Spacer, feed roll	2
19	Draw bolt	2
20	Washer, 'C' type	2
21	Bearing, 6006 2RS	2
22	Feed roll shaft	1
23	Feed roll swing, left hand	1
24	Bearing, 6205 2Z	2
25	Circlip, internal, 52mm, No. 5000/206	2
26	Spacer, feed roll shaft drive sprocket	2
27	'Renold' roller chain, No. 110046, 12.7mm (1/2in) x 31 pitches	2
27a	Connecting link, No.26, for 110046 chain	2
28	Chain sprocket, for feed roll shaft	2
29	Parallel key, 8mm x 7mm x 20mm long	2
30	Screw, hexagon head, M8 x 20mm long	2
31	Washer, end locking, feed roll shaft drive sprocket	2
32	Chain sprocket, feed rolls drive	1
33	Circlip, 42mm, internal	2
34	Bearing, 6004 Z	1
35	Screw, hexagon head, M8 x 16mm long	1
36	Washer, retaining, feed roll drive sprocket	1
37	Bearing, 'INA' NA 6905	1
38	Grease retainer, feed roll swings	1
39	Circlip, internal, bore size 62mm	1



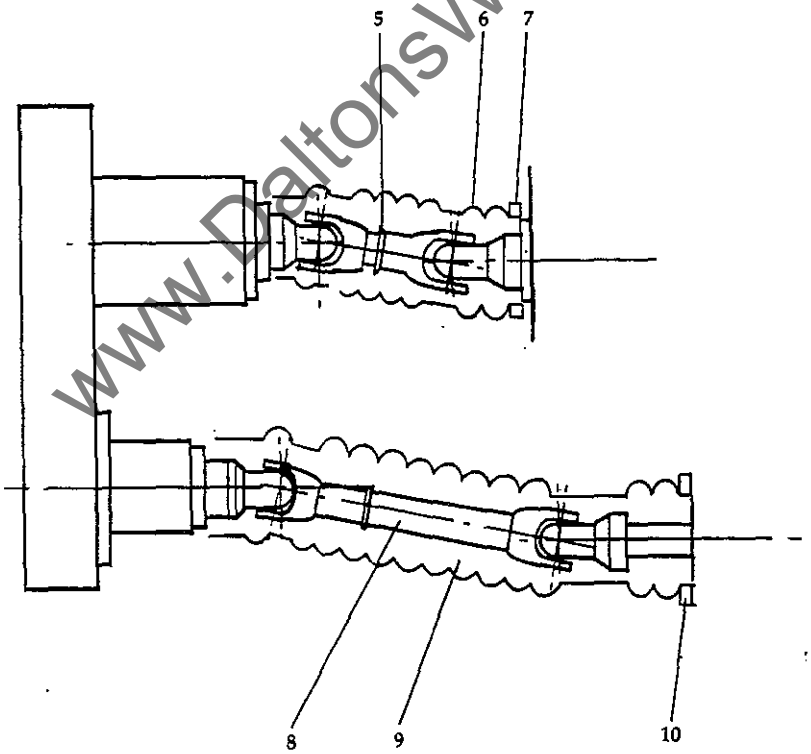


FIG. 15 SHAFT DRIVES

15. SHAFT DRIVES

Ref. No.	Description	No. Off
1	Coupling	5
2	Gear box assembly (See Fig 16)	3
3	Drive shaft	1
4	Drive shaft	1
5	Cardan shaft	5
6	Cover, flexible	5
7	Clip	10
8	Cardan shaft, outfeed bedroll	1
9	Cover, flexible	1
10	Clip	2

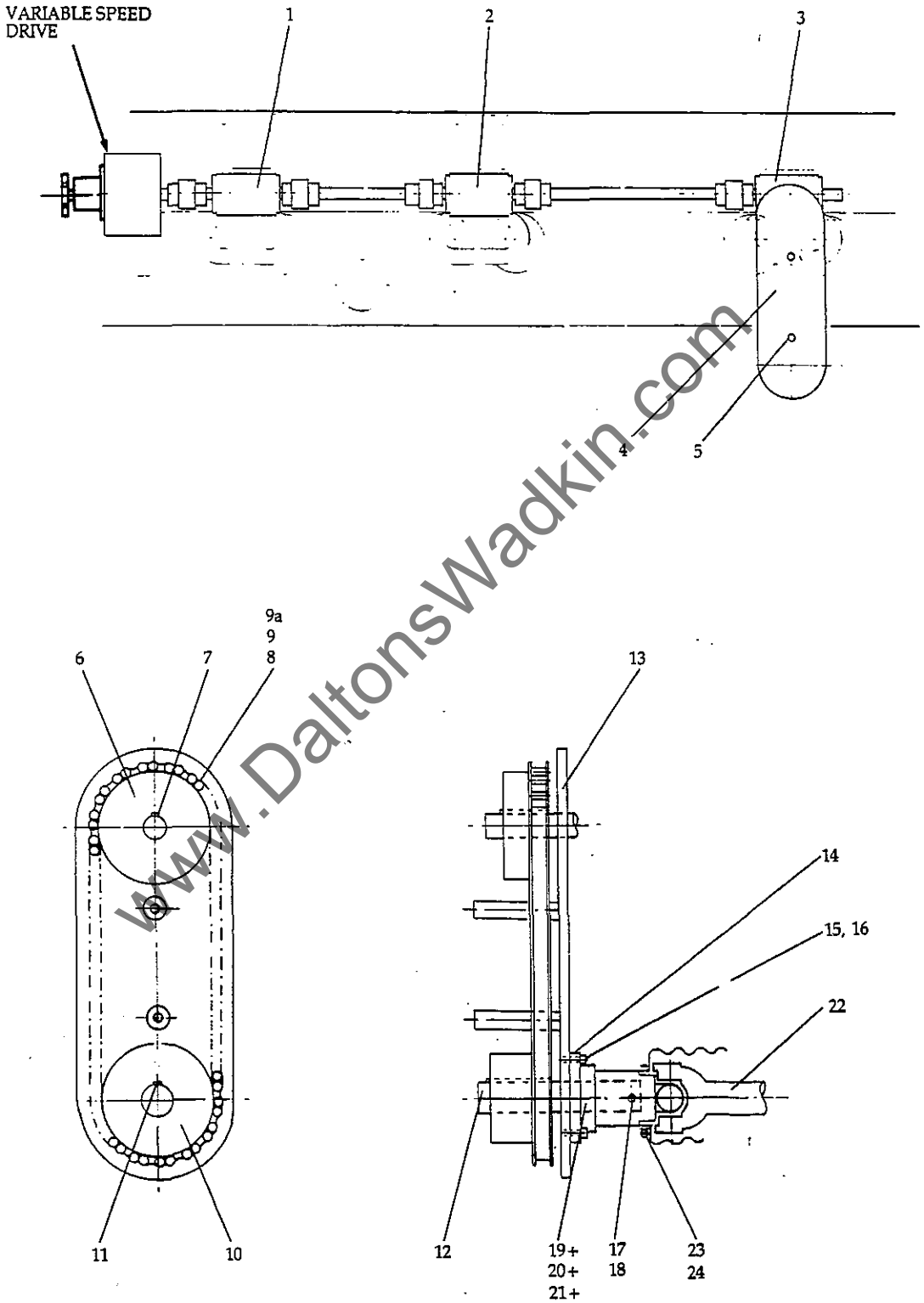


FIG 16 GEARBOXES AND BOTTOM ROLL DRIVE

16. GEARBOXES AND BOTTOM ROLL DRIVE

Ref. No.	Description	No. Off
1	Gearbox assembly, single or double roller	1
2	Gearbox assembly, double roller	1
3	Gearbox assembly, double roller plus drive to bed roll	1
4	Cover, bottom roll drive	1
5	Hex, head screw M8 × 20mm	2
6	Drive sprocket 22T, c/w socket head set screw	1
7	Parallel key, 6mm × 6mm × 32mm	1
8	Chain, No. 110056 – 15.8mm (5/8in.) pitch × 56p	1
9	Connecting link, No. 26, for No. 110056 chain	1
9a	Cranked link, No. 30, for No. 110056 chain	1
10	Driven sprocket, 25T c/w socket head set screw	1
11	Parallel key, 8mm × 7mm × 32mm	1
12	Drive shaft, bottom	1
13	Drive support plate.	1
14	Bearing housing	1
15	Hex. head set screws, M8 × 25mm	3
16	Washers, M8	3
17	Parallel key, 8mm × 7mm × 20mm	1
18	Nyloc socket screw M8	2
19+	Circlip, external, 30mm	2
20+	Ball bearing, SKF 6206 — 2RS	2
21+	Circlip, internal, 62mm	2
22	Drive shaft, universal joint	1
23	Jubilee clip, K30 09 429	2
24	Cover, GA 8307	1

Note: Item 2 is final box on Universal Head machines

Item 3 is final box on Non-Universal Head machines

17. SINGLE SIDE ROLLER PRESSURE UNIT OPPOSITE FENCE SIDE HEAD

Ref. No.	Description	No. Off
1	Bracket, single roller side pressure unit	1
2	Pin, side pressure roller	1
3	Pressure roller	1
4	Sliding shaft, pressure roller	1
5	Infeed pressure spring	1
6	Hexagon head screw, M12 x 35mm long, for GA128	2
7	Washer 12mm, bright mild steel, for GA128	2
8	'Heyco' nylon domed plug, black, 8mm hole, DP312 for GA128	1
9	Circlip, 20mm external, for GA 110	1
10	Bearing, SKF 6004 2RS, for GA 110	1
11	Tension pin, 8mm dia x 30mm long, for GA111	1
12	Tension pin, 5mm dia x 30mm long, for GA111	1

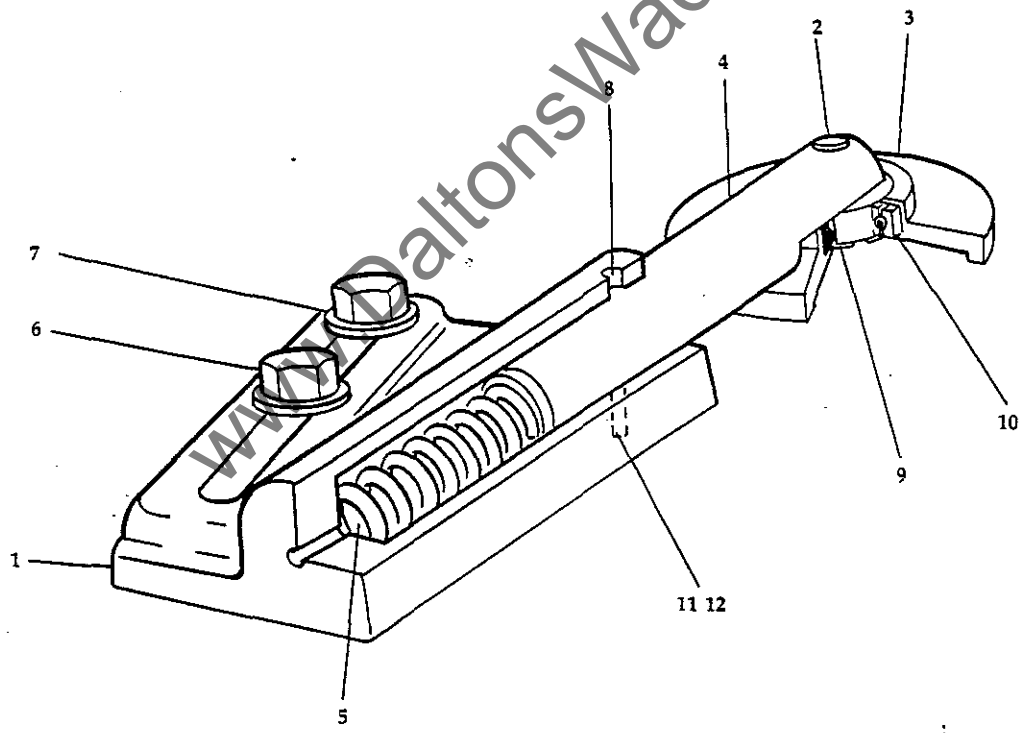


FIG 17 SINGLE SIDE ROLLER PRESSURE UNIT OPPOSITE FENCE SIDE HEAD

18. DOUBLE SIDE ROLLER PRESSURE UNIT

Ref. No.	Description	No. Off
1	Bracket, double roller side pressure unit	1
2	Pin, side presure roller	2
3	Pressure roller	2
4	Sliding shaft, pressure roller	2
5	Infeed pressure spring	2
6	Casing, spring, pressure roller	2
7	Pressure adjusting screw	2
8	Nylon domed plug, black, 8mm hole	2
9	Hexagon head screw, M 12 x 35mm long	2
10	Washer, 12mm, bright mild steel	2
11	Circlip, 20mm external	2
12	Bearing, SKF 6004 2RS	2
13	Tension pin, 8mm x 30mm long	2
14	Tension pin, 5mm x 30mm long	2

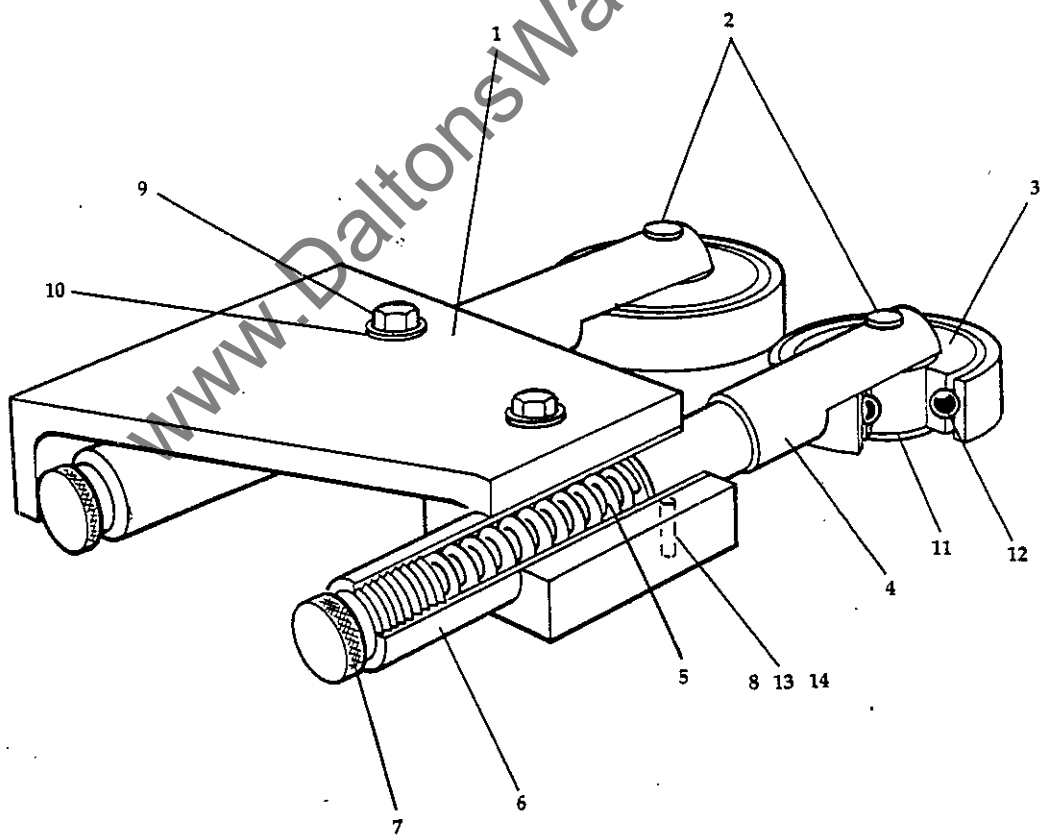


FIG 18 DOUBLE SIDE ROLLER PRESSURE UNIT

19. TOP ROLLER PRESSURE UNIT

Ref. No.	Description	No. Off
1	Barrel, top pressure roller	1
2	Spring tensioner, top pressure	1
3	Split clamp, top pressure barrel	1
4	Roller arm, top pressure	1
5	Roller, top pressure	1
6	Roller pin, top pressure	1
7	Spring, infeed pressure	1
8	Tension pin, 8mm dia. x 24mm long	1
9	Tension pin, 5mm dia. x 24mm long	1
10	Hexagon head screw, M12 x 45mm long	2
11	Circlip, 20mm external	1
12	Bearing, SKF 6004 2RS	1

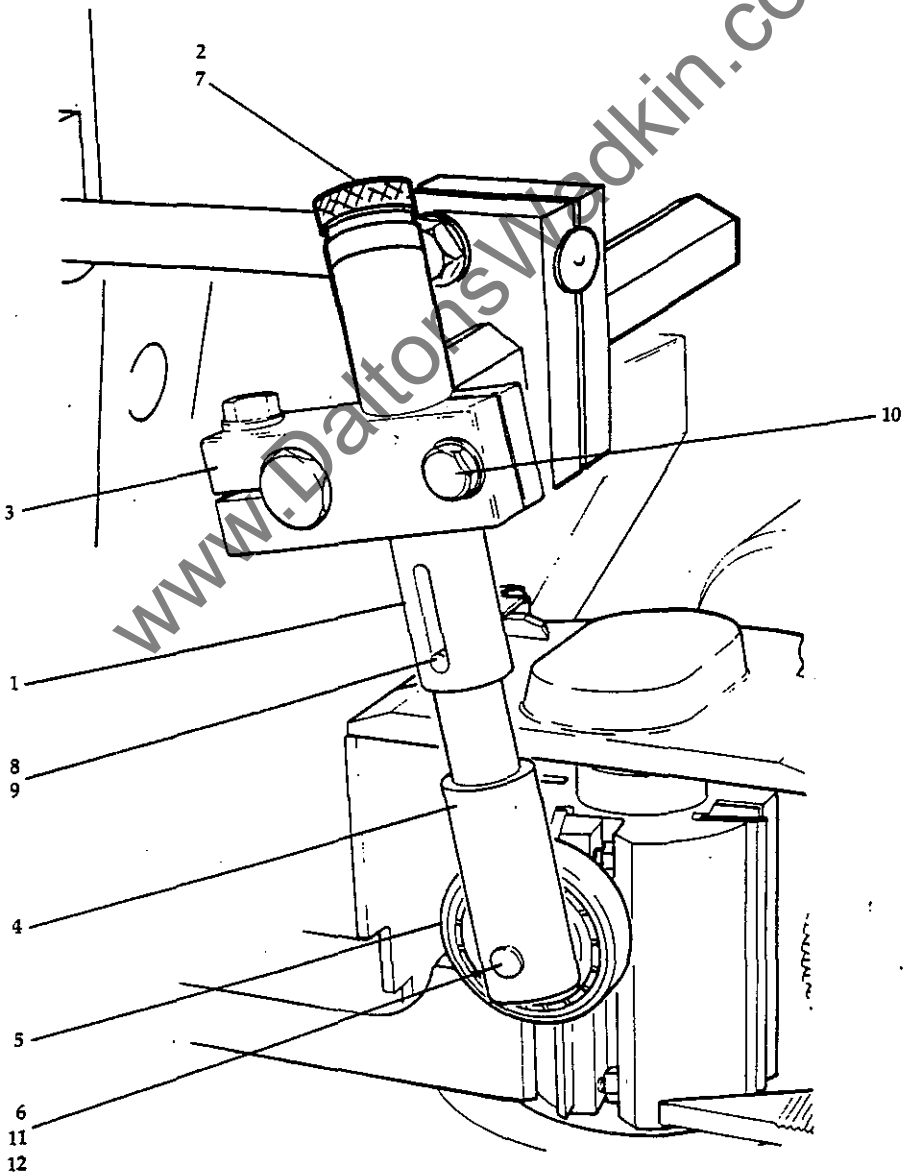


FIG 19. TOP ROLLER PRESSURE UNIT

20. MOUNTING FOR TOP PAD OR ROLLER PRESSURE UNIT BEFORE TOP HEAD

Ref. No.	Description	No. Off
1	Bracket, top pressure	1
2	Horizontal bar, longitudinal adjustment	1
3	Horizontal bar, transverse adjustment	1
4	Split clamp, top pressure horizontal bars	1
5	Screwed stud, M10 x 55mm long	1
6	Hexagon nut, M10	1
7	Washer, 10mm, bright mild steel	1
8	Hexagon socket screw, M10 x 25mm long	2
9	Hexagon head screws, M12 x 40mm long	2

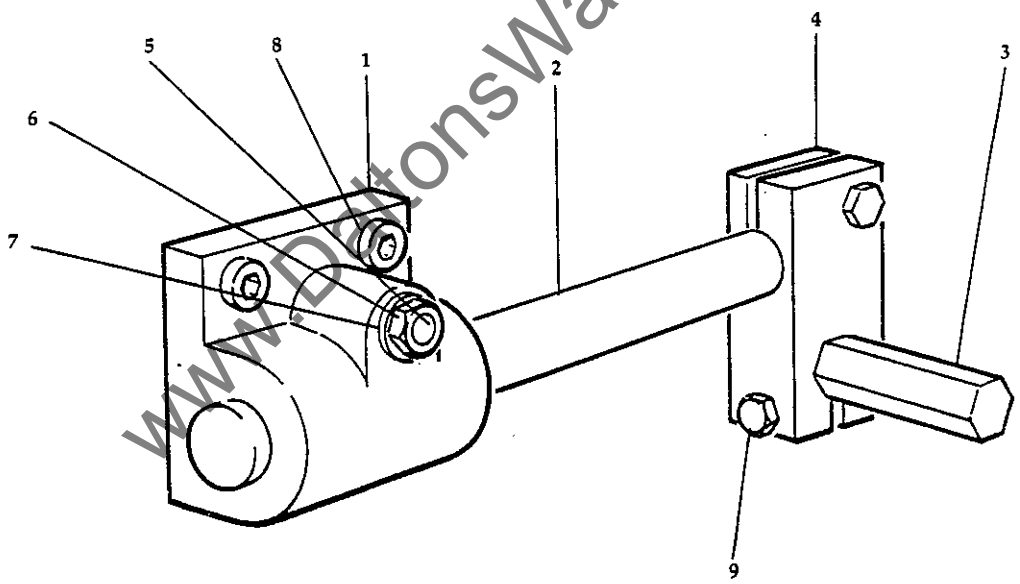


FIG 20 MOUNTING FOR TOP PAD OR ROLLER PRESSURE UNIT BEFORE TOP HEAD

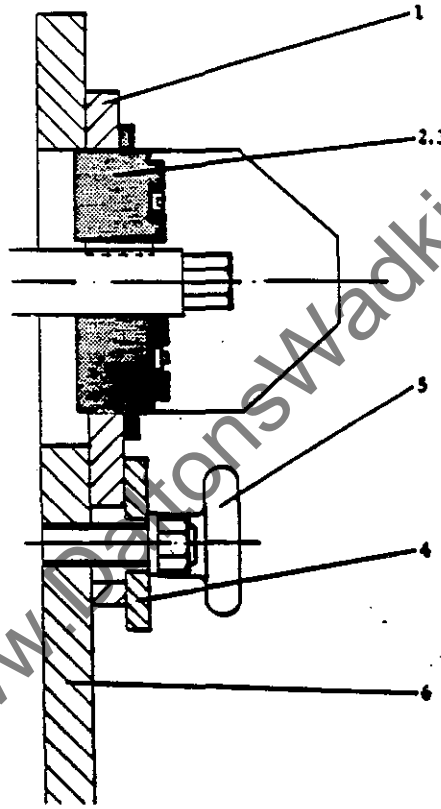


FIG 21 OUTBOARD BEARING ASSEMBLY

21. OUTBOARD BEARING ASSEMBLY

Ref. No.	Description	No. Off
1	Outboard bearing assembly plate	1
2	Outboard bearing complete	1
3	Socket head capscrew, M6 × 30mm	4
4	'C' washer	2
5	Handwheel, M8	2
6	Outboard bearing plate (ref.-on machine)	-

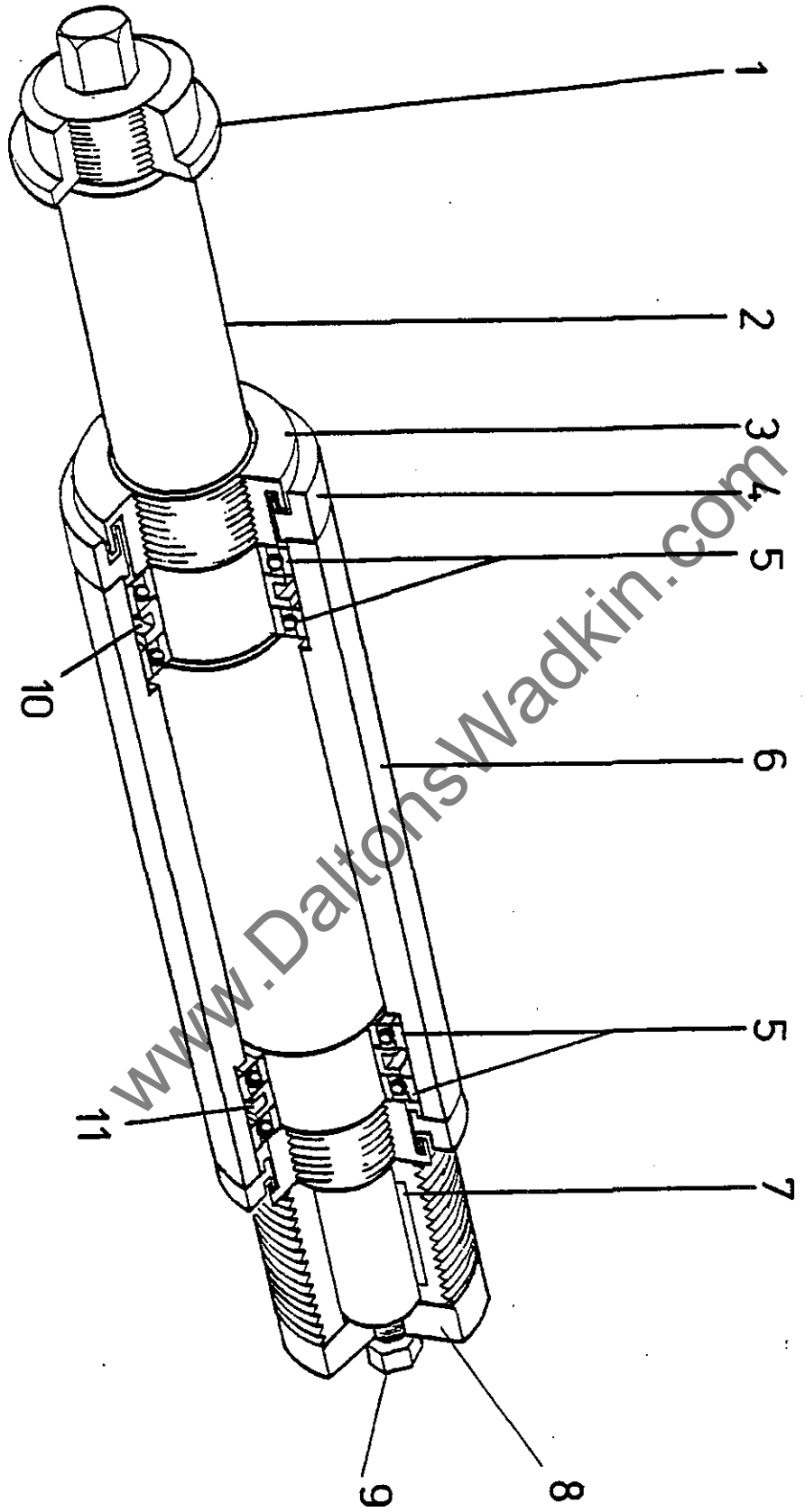


FIG 22 BOTTOM HEAD SPINDLE UNIT

22. BOTTOM HEAD SPINDLE UNIT - 30MM DIAMETER

	REF.NO:	DESCRIPTION	NO:OFF
	1	Locking nut for Bottom Head and Near Side head spindles	1
	2	30 mm. dia. square shoulder Bottom Head spindle	1
	3	Bearing nut for Bottom Head and Near Side head spindles	1
	4	Bearing nut for spindle housing	1
Ø	5	SNFA Bearing E235-7CEI-DU (paired bearings)	2 sets
	6	Barrel for Horizontal and Side Head spindle	1
	7	8mm. x 7mm. x 40mm. long key	1
	8	Pulley spigot for spindle	1
	9	M12. x 45 mm. long hexagonal head screw	1
	10	Outer bearing spacer	2
	11	Inner bearing spacer	2

Ø "KLUBER" grease packed

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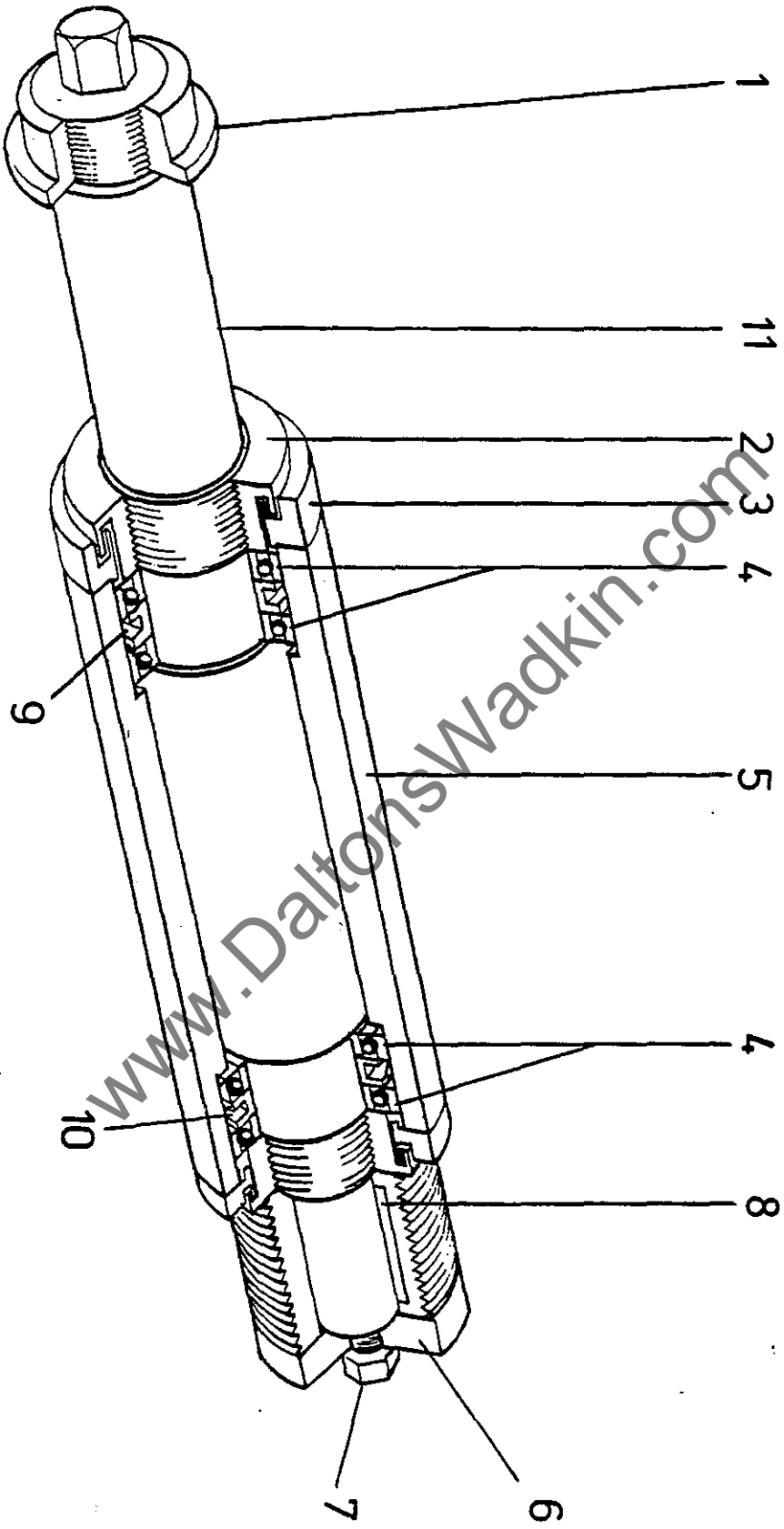

FIG 23 FENCE SIDE HEAD SPINDLE UNIT

23 . FENCE SIDE HEAD SPINDLE UNIT - 30MM DIAMETER

	REF.NO:	DESCRIPTION	NO:OFF
	1	Locking nut for Fence Side head, Top head and Universal head spindles	1
	2	Bearing nut for Fence Side head, Top head and Universal head spindles	1
	3	Bearing nut for spindle housing	1
Ø	4	SNFA Bearing E235-7CEI-DU (paired bearings)	2 sets
	5	Barrel for Horizontal and Side head spindle	1
	6	Pulley spigot for spindle	1
	7	M12. x 35mm. long hexagon head screw	1
	8	8mm. x 7mm. x 40mm. long key	1
	9	Outer bearing spacer	2
	10	Inner bearing spacer	2
	11	40mm. dia. square shoulder Fence Side head spindle	1

Ø "KLUBER" greased packed

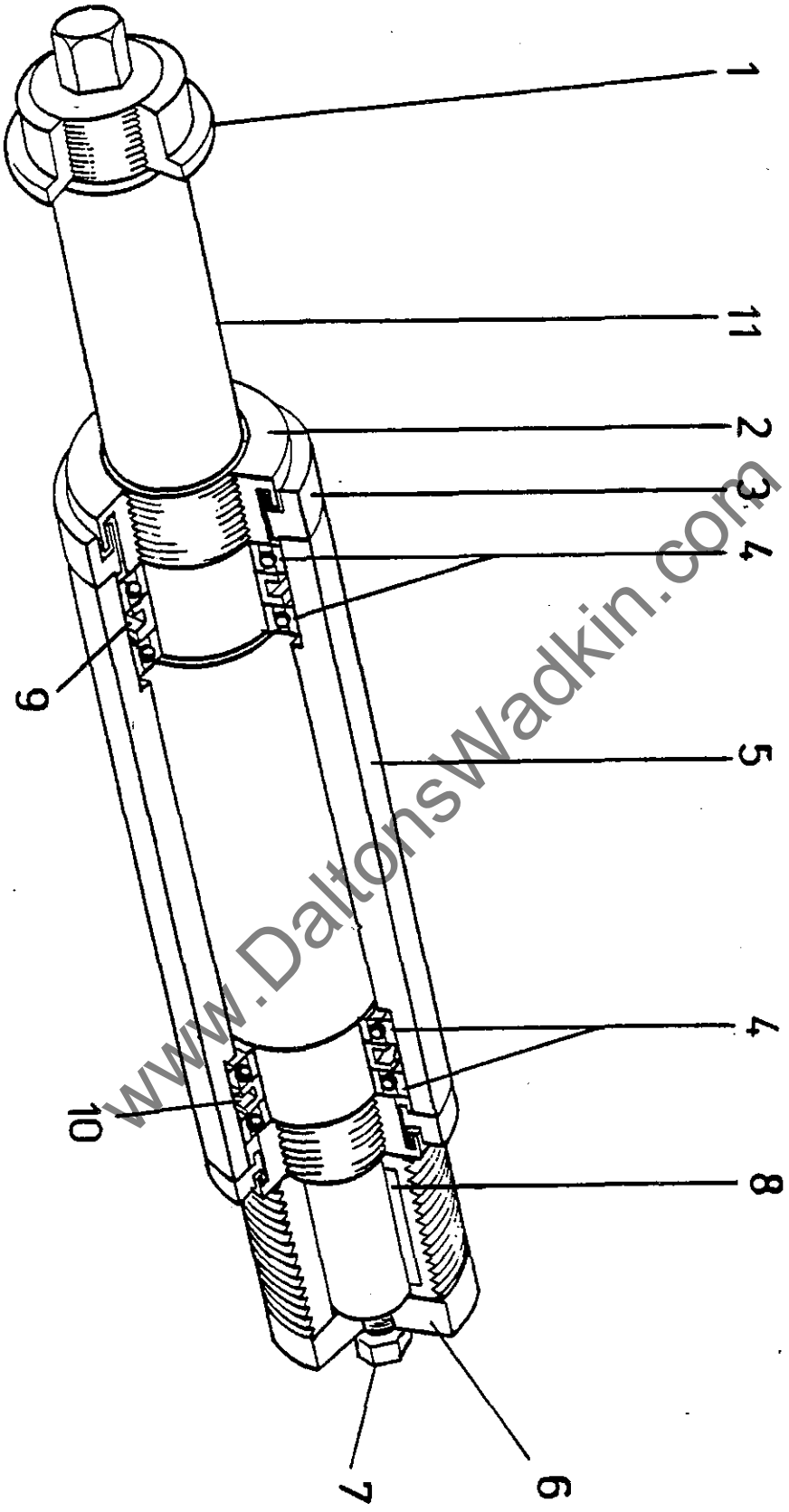

FIG 24 NEAR SIDE HEAD SPINDLE UNIT

24. NEAR SIDE HEAD SPINDLE UNIT — 30MM DIAMETER

	REF.NO:	DESCRIPTION	NO: OFF
	1	Locking nut for Bottom head and Near Side head spindles	1
	2	Bearing nut for Bottom head and Near Side head spindles	1
	3	Bearing nut for spindle housing	1
Ø	4	SNFA Bearing E235-7CEI-DU (paired bearings)	2 sets
	5	Barrel for Horizontal and Side head spindle	1
	6	Pulley spigot for spindle	1
	7	M12. x 35mm. long hexagonal head screw	1
	8	8mm. x 7mm. x 40mm. long key	1
	9	Outer bearing spacer	2
	10	Inner bearing spacer	2
	11	30mm dia. square shoulder Near Side head spindle	1

Ø "KLUBER" grease packed

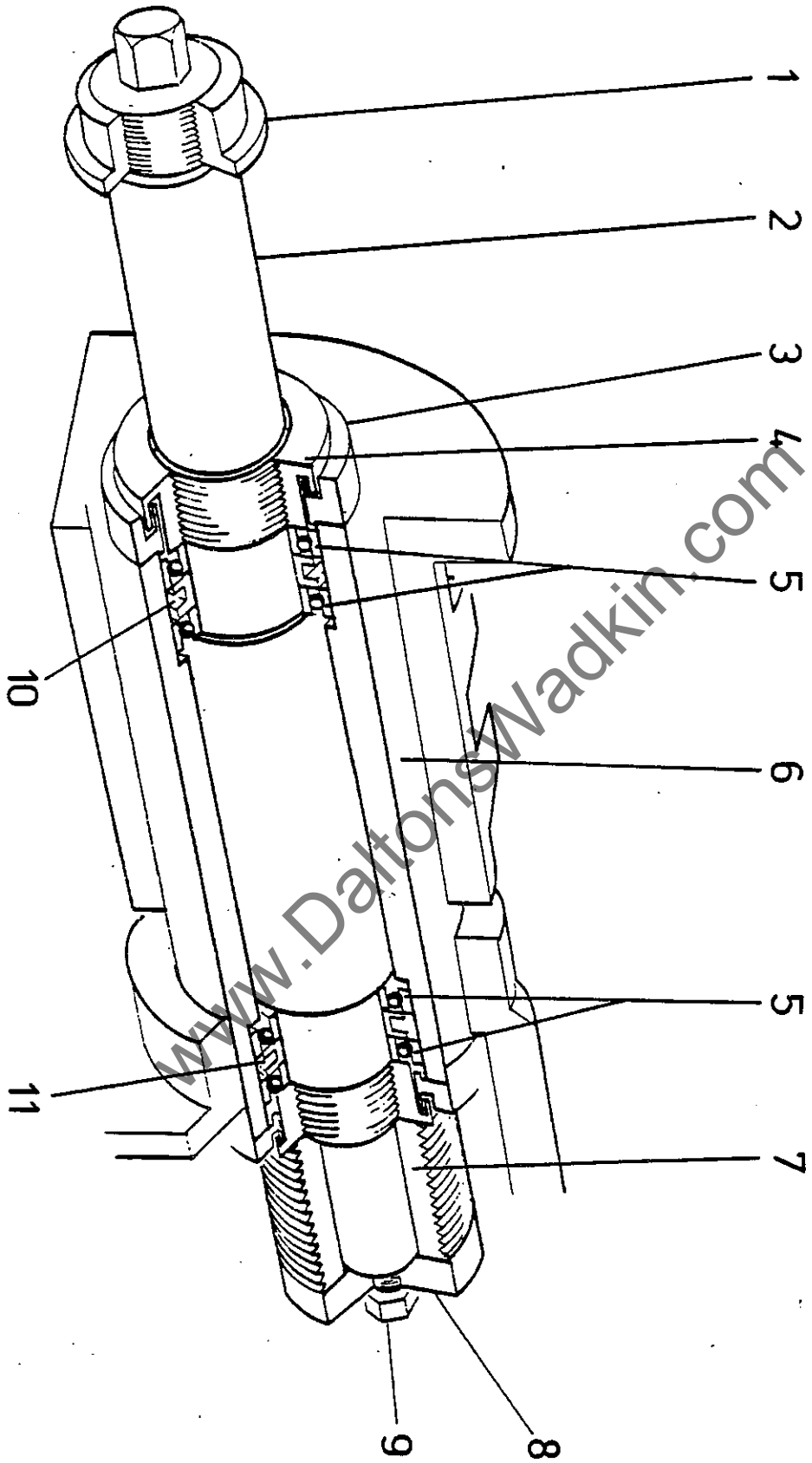

FIG 25 TOP HEAD SPINDLE UNIT

25. TOP HEAD SPINDLE UNIT — 30MM DIAMETER

	REF.NO:	DESCRIPTION	NO:OFF
	1	Locking nut for Fence Side head, Top head, Universal head spindles	1
	2	30 mm. dia. square shoulder Bottom Head spindle	1
	3	Bearing nut for Fence Side, Top head and Universal head spindles	1
	4	Bearing nut for spindle housing	1
Ø	5	SNFA Bearing E235-7CEI-DU (paired bearings)	2 sets
	6	Barrel for Horizontal and Side head spindle	1
	7	8mm. x 7mm. x 40mm. long key	1
	8	Pulley spigot for spindle	1
	9	M12. x 45mm. long hexagonal head screw	1
	10	Outer bearing spacer	2
	11	Inner bearing spacer	2

Ø "KLUBER" grease packed

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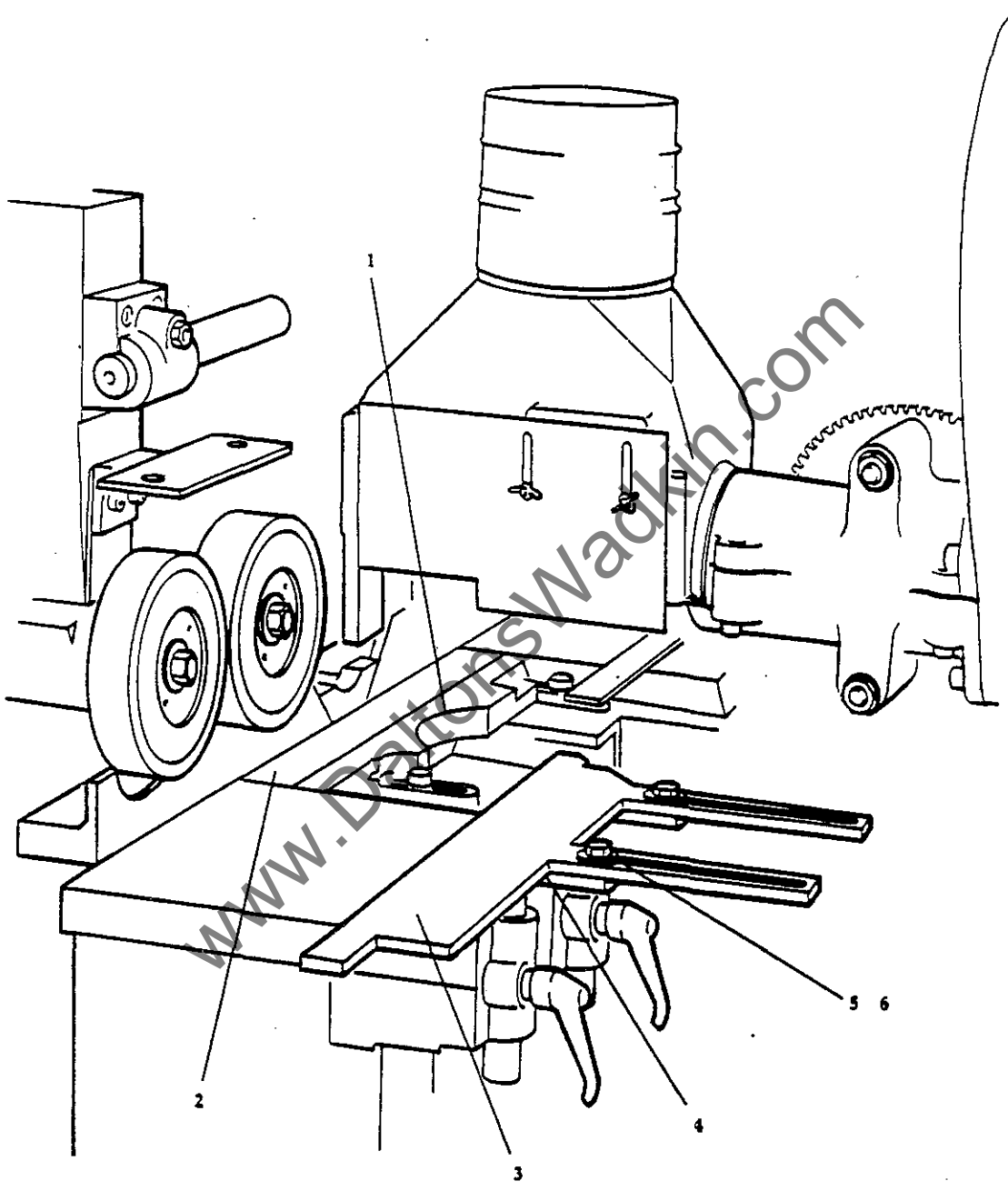

FIG 26 BEDPLATES FENCES AND GUIDES — UNIVERSAL HEAD ATTACHMENT

26. BEDPLATES FENCES AND GUIDES UNIVERSAL HEAD ATTACHMENT

Ref. No.	Description	No. Off
1	Bedplate	2
2	Bed rail	2
3	Guide	1
4	Attachment bracket	2
5	Screw, hexagon head, M10 × 25mm long	2
6	Washer, 10mm, bright mild steel	2

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SECTION 6 APPENDICES

Appendix A	Dial-a-Size Electronic Positioning
Appendix B	Universal Head
Appendix C	Throating Head
Appendix D	Pneumactically Linked Floating Nip Feed Rolls

APPENDIX A

DIAL-A-SIZE ELECTRONIC POSITIONING

Near Side Head and Top Head

The powered traverse movement to the near side head is by a 'KEMO' geared motor.

The traverse movements of the heads are each connected to an 'encoder' which sends pulse signals to its respective 'Elgo' digital read out controller situated in the main control panel (see Figs 1, 2 — Machine Controls.

The traverse of the heads reacts to data put into the 'Elgo' controller which displays the cutterblock position in relation to its datum face. The datum face for the near side head is the fence. Datum for the top head is the bedplate.

The head traverse movements may be hand or power operated and a switch is provided for this purpose.

Setting Up

All setting parameters are available via the front keypad. Programming is inhibited until a link at the back of the unit is opened.

The programming link is in the form of a two terminal plug-in block, with a shorting wire. Unplug to set in parameters. Re insert plug to operate.

NOTE: The controller will not run with the link open.

Setting of the parameters is achieved as follows:

(1) Press T, top display extinguishes and 'CH' is displayed. This ensures that the operator knows when the T button has been depressed (even by accident).

(2) Enter functions [1] .....[5], 'CH' is extinguished. Title name is displayed in top window; value of parameter is displayed in bottom window.

(3) Press C to clear existing value, enter required value.

(4) Press T again to revert to operating mode.

The [T] functions/parameters are as follows:

[1] This sets the slowdown point during approach to position. 'SLSP' is displayed.

[2] This sets the stop correction offset. 'COR' is displayed.

[3] Saw width compensation is entered. 'SABL' is displayed.

[4] Time at standstill during backlash over-run and delay in drop-off of 'In Position' relay after drive stop is initiated.

'Ti' is displayed. Time can be set from 00.0 to 15.9 seconds. Also sets the auto retract time (ie; distance).

[5] This sets the decimal point position in the displays.
'DP' is displayed.
1 means units only, (ie; no decimal point).
2 means tenths displayed, (ie; one decimal place 0.0).
3 means hundreds displayed, (ie; two decimal places 0.00).

One [T] function is available with programme link either open or closed. That is Inch/Metric selection. This is used as follows:

(1) Press [T]; 'CH' appears in display.

(2) Press [O], 'INCH' or 'MM' appears in display.

(3) Press [C] to changeover.

(4) Press [T] to revert to operation.

The decimal point is automatically moved and any actual value correctly recalculated. The set up parameters are also in the chosen units.

When [T] is pressed inadvertently, 'CH' is displayed to warn operator that he has pressed the button. Simply pressing [T] again returns controller to operating mode.

NOTE: All these parameters will be preset by Wadkin during the setting-up of the machine.

Method of Operation

To Set Datum

(1) Switch to 'Hand' operation (Fig 1).

(2) Determine the distance between the cutterblock and either the fence or bedplate, by use of a known thickness setting block or piece of timber; by hand winding the spindle up to the setting block.

(3) Enter this figure using the keypad.

(4) Press Datum pushbutton (Blue) on control panel.

These figures will be displayed on the demand value display (bottom window). The Datum figure is now set.

NOTE: (a) These Datum figures need only be re-set at machine switch-on, or if the cutterblocks are changed.

NOTE: (b) To hand set the height of the top horizontal spindle independently of the beam, disengage clutch (ie; operate power rise/fall lever, (see Fig 2 — Machine Controls).

To move the heads to a pre-determined position

(1) Switch to 'Elgo' operation (Fig 1).

(2) Enter the required position using the keypad.

(3) Press 'Start' push button.

The head selected will now move automatically to the set position and the figures will be displayed in the actual value display (top window).

(4) To move to a new position, repeat steps (2) and (3).

NOTE: The feed can only be inched in this mode.

To run the machine

(1) Switch to 'Auto' position.

(2) The feed can now be run continuously, or inched.

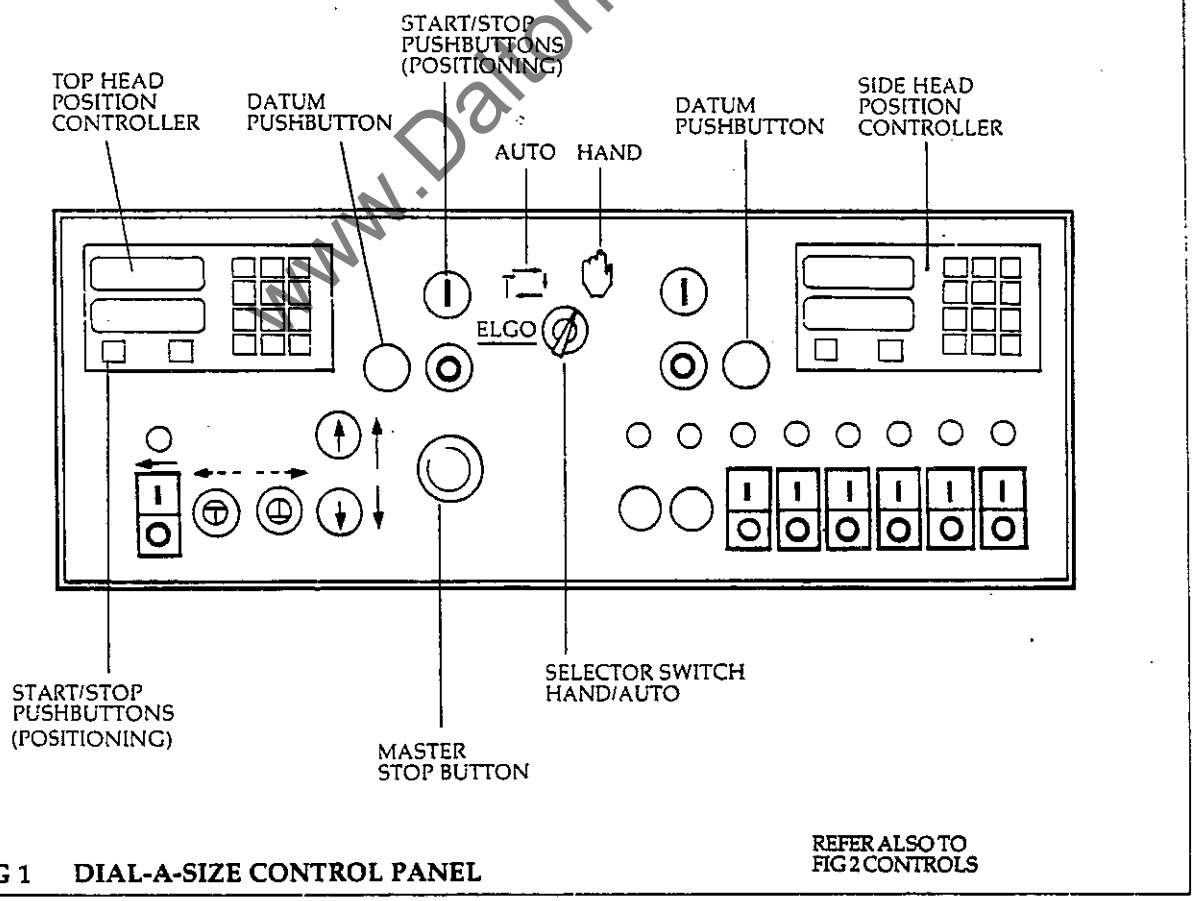

FIG 1 DIAL-A-SIZE CONTROL PANEL

REFER ALSO TO FIG 2 CONTROLS

APPENDIX B

UNIVERSAL HEAD

Universal Head Cutters (Fig 1)

(1) The cutterblock (1) is removed and replaced in the same manner to the screw on type, (see **Operating Instructions — general**), using the combination spanner on nut (2) and the cutterblock flats, with the head in Bottom Horizontal mode.

(2) Check direction of cut. Ensure the locking collar (3) is fitted.

NOTE: In the Bottom Head position always change the cutterblock from the rear of the machine. However, in the Vertical mode it is possible to change the cutterblock from the nearside, using a similar procedure. Fig 1 shows the head of the nearside vertical (angled or canted) mode.

WARNING

As the universal head can be run in the reverse direction of rotation, depending on position, it is essential the locking collar is always fitted.

Universal Head Modes (Fig 2)

The universal spindle attachment can be positioned above or below the bed and at any angle between horizontal and vertical, in the following modes.

Bottom Horizontal modes
Top Horizontal mode
Nearside Vertical mode (at any angle 0–90 degrees.)

NOTE: After any change of mode, run the motor momentarily to check direction of spindle rotation (see **Reversing Switch**).

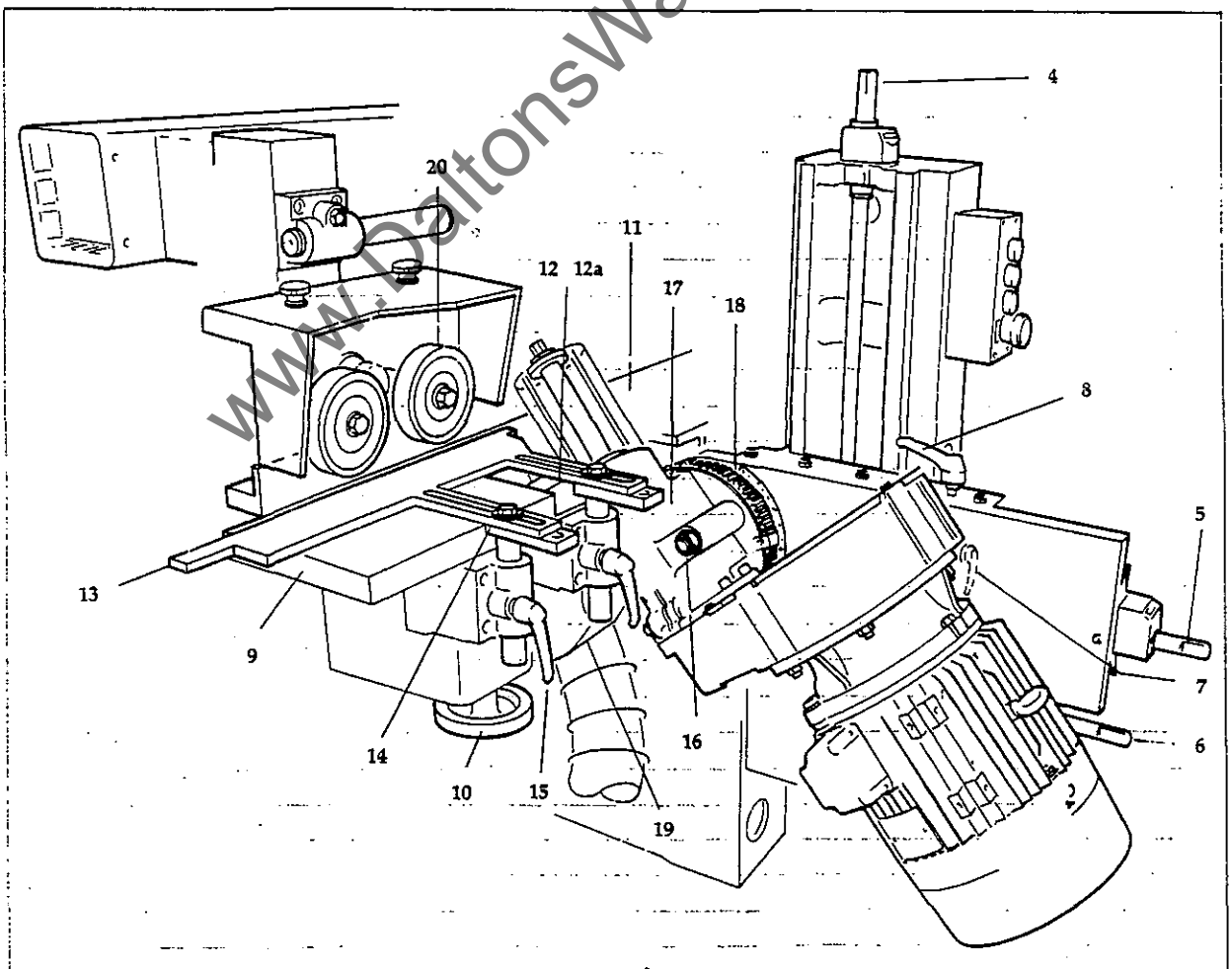

FIG 1 UNIVERSAL HEAD ATTACHMENT

When the spindle is in the bottom position, two adjustable bedplates are fitted to suit the cutting circle of the cutterblock. If the spindle is in the nearside vertical, angled, or top horizontal position, metal rails are fitted as bedplates. The forward rail is secured by two square-headed bolts.

The outfeed table is adjusted to the same height as the bedplate after the **Second Bottom Head,** using handwheel (10). Adjust the feedrolls (20) and roller pressure to the work.

Height and lateral adjustments of the universal head can be made in 0.1mm increments using the traverse screws (4) and (5). Angle adjustments can be made using the worm shaft (6).

Reversing Switch

A reversing switch is fitted to the control panel to change the drive motor direction of rotation as below:

Switch to the right (FWD) (spindle in bottom head position)	— Universal head motor rotates clock-wise when viewed on fan end of motor
Switch to the left (REV) (spindle in top or near-side vertical positions)	— Universal head motor rotates anti-clockwise

NOTE: Check direction of spindle rotation

In Bottom Horinzontal Mode

(1) Remove the dust cover from the spindle hood and fit the extractor hood (19) to the frame support using two M8×12 mm long hexagon bolts. Connect the dust extractor.

(2) Set the spindle in the required position under the table.

NOTE: In this position always change the cutterblock from the rear of the machine.

(3) Fit the cutterblock see **Operations Instructions — General**. The adjustment of the cutterblock in relation to the bedplate (11) is as follows:

a. To adjust vertically: release locking handle (7), place crank handle on square of vertical traverse (4), turn handle clockwise to raise head or anticlockwise to lower. Refasten locking handle (7) after making adjustment.

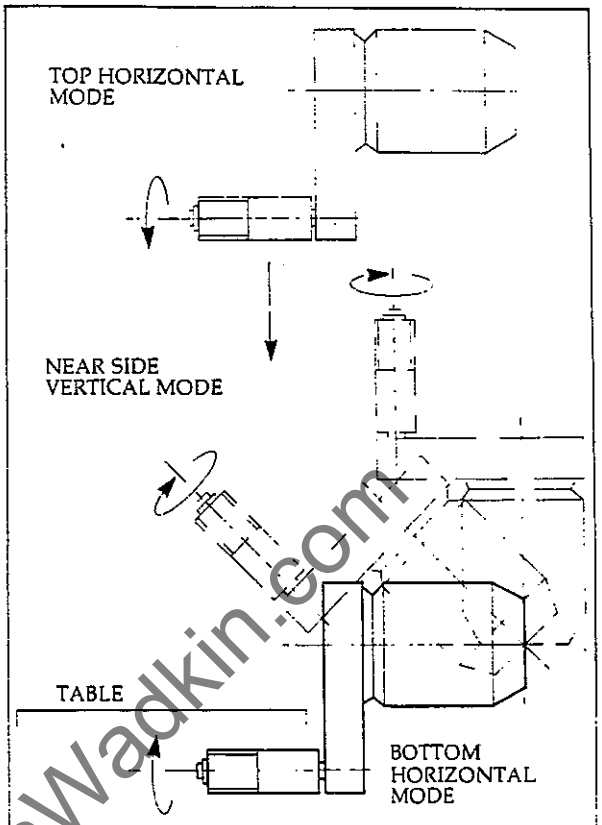

FIG 2 UNIVERSAL HEAD MODES

b. To adjust laterally: release locking handle (8), place crank handle on square of traverse screw (5), turn clockwise to move head forward or anticlockwise to move backward. Refasten locking handle (8) after adjustment.

(4) Adjust the outfeed table (9) height in relation to the infeed table to suit timber cut using handwheel (10).

Level with a straighedge in the same manner as **First and Second Bottom Heads.**

(5) Set guide (13) for width and height using setscrews (14) and locking handles (15) (see Fig. 14).

In Top Horizontal Mode (Fig 3)

(1) Set the spindle in the required working position, above the bedplates, using the traverse screws (4) and (5).

(2) Remove the pressure rollers and pressure shows, together with clamps and support bars. Fit dust extraction hood (22).

NOTE: In raising or moving the spindle, ensure it does not come into contact with any part of the machine. Check direction of rotation of spindle after each change of mode.

(3) Adjust the outfeed table (9) to the same height as the infeed table (11). Replace bedplates with the metal rails (12) (12a) provided. These are placed side by side ; the last rail fitted prevents sideways movement of the others.

The rails ensure a continuous feed transfer between the infeed and outfeed tables.

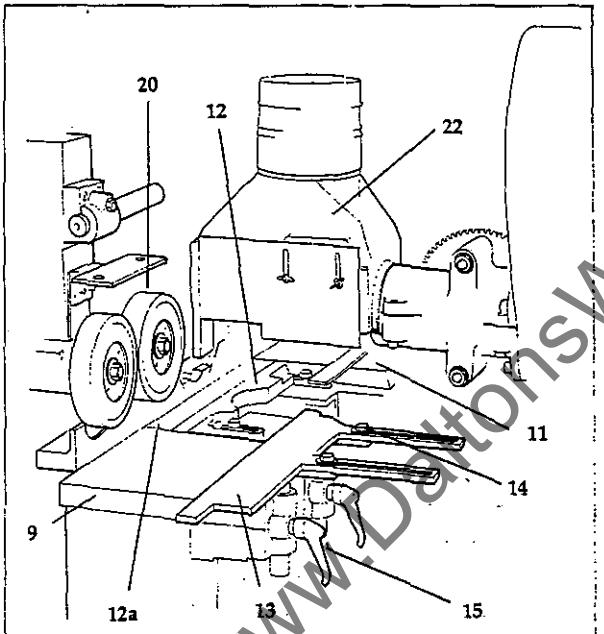

FIG 3 UNIVERSAL HEAD — TOP HORIZONTAL MODE

(4) Fit the cutterblock. Note change in direction of spindle rotation. Adjust vertically and laterally, using traverse screws (4) and (5), as required.

(5) Mount pressure shoes, when supplied, before and after the cutterblock.

(6) Select reverse motor drive (left hand position REV) at control panel. Check rotation of spindle.

(7) Before feeding the timber, spin the cutterblock to ensure there is adequate clearance at dust hood and moving parts.

(8) Set guide (13) to suit width of timber in the same way as **Bottom Horizontal Mode** after releasing setscrews (4). Vertical height is set using handles (15). Retighten after adjustment.

In Nearside Vertical Mode

The universal head in the nearside vertical mode will accomodate a cutterblock having a cutting circle of 125 to 180 mm. The spindle can be positioned at any angle between vertical and horizontal as required (see Fig 1), using the wormdrive shaft (6). In addition, the cutter can be positioned vertically and laterally in relation to the workpiece, in increments of 0.1mm, using the traverse screws (4) and (5).

NOTE: In the nearside and angled positions it is necessary to remove the dust-hood (19).

(1) To adjust vertically: release the locking handle (7), place crank handle on square of vertical traverse screw (4), turn clockwise to raise head or anticlockwise to lower. Refasten locking handle (7) after adjustment.

(2) To adjust laterally: release the locking handle (8), place crank handle on square of lateral traverse screw (5), turn clockwise to move forward or anticlockwise to move back. Refasten locking handle (8) after adjustment.

(3) To angle (cant) the spindle: unscrew the two hexagon nuts (16) at the spindle carriage (17), place crank handle on square of worm drive (6) and adjust angle. Retighten the two nuts (16) after adjustment. The angle is measured in degrees from the horizontal on the graduated scale (18).

(4) Fit metal rails (12a) to suit width of the work.

(5) Select reverse motor drive (lefthand position REV) at the control panel. Check rotation of spindle.

(6) Adjust the feed roll pressure, pressure shoes and side guides on first workpiece to ensure a smooth feed.

APPENDIX C

THROATING HEAD

Throating Head Attachment (Fig 1)

The Throating Head, supplied as an independently driven attachment, can be used in either the Top or Side Head positions.

A switch for changing the direction of cutterblock spindle rotation is provided on the control panel (see Reversing Switch and Universal Head modes which are similar), dependent on the setting of the head.

To change position of the head:

(1) Remove the extraction hood and flexible hose.

(2) Slacken nuts (1) on motor mounting plate and rotate motor through 90 degrees.

(3) Slacken nuts (2) on radial clamps, rotate pulley/belt housing to reposition cutter towards the fence or bedplate.

(4) Retighten nuts (1) and (2) after repositioning head.

Rise and Fall adjustments:

(5) Slacken off slide nuts (3), adjust height of cutting head using the vertical traverse screw (4).

(6) Retighten slide nuts (3). Refit extraction hood and hose.

(7) Select direction of rotation required for cutter at the control panel. Ensure that the cutter has been correctly mounted and locked to suit direction of rotation and position of head.

WARNING

As the throating head can be run in the reverse direction of rotation, depending on position, it is essential the locking collar is always fitted.

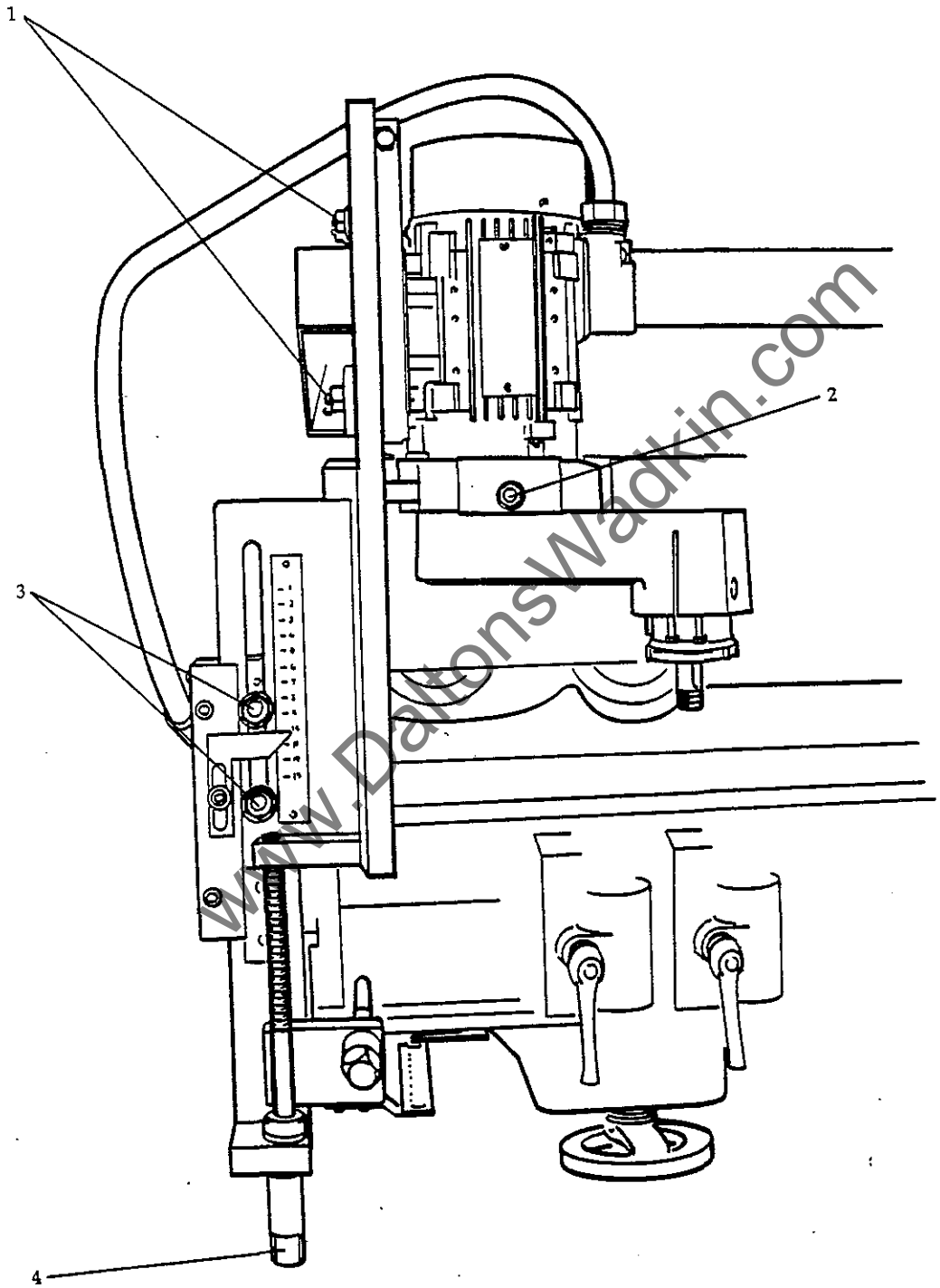

FIG 1 THROATING HEAD

APPENDIX D

PNEUMATICALLY LINKED FLOATING NIP FEED ROLLERS

Principal

The opposed infeed rollers once pressurised and gripping will feed the timber positively whilst being unaffected by any distortion in the timber.

Setting

Pneumatically open the infeed nip rollers using the switch (1) and set the infeed table for the required depth of cut. The bottom infeed roller (2) should be set just below the bed level. Movement of the bottom roller is restricted by the stop nut (3). Adjustment to the nut raises or lowers the bottom infeed roller.

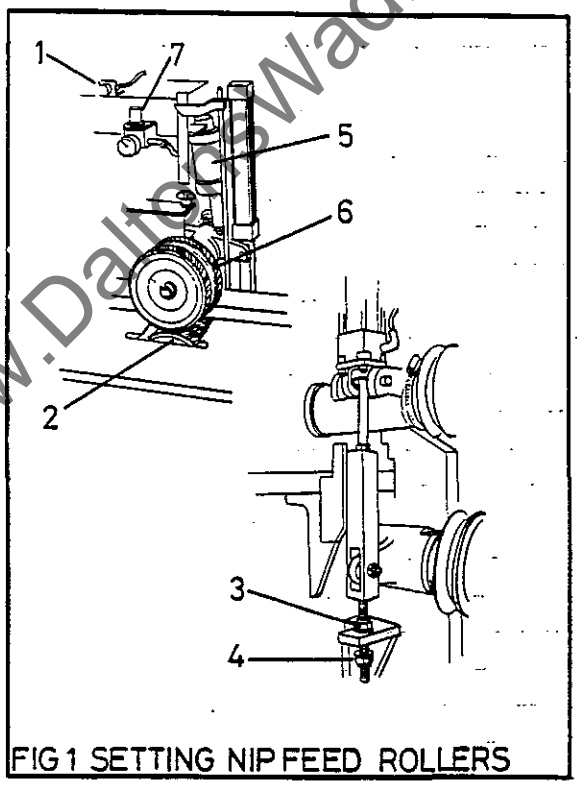

FIG 1 SETTING NIP FEED ROLLERS

The lower stop nut (4) limits the bottom infeed roller to a maximum height above the bed of approx 8mm. This stop nut (4) is factory set and should not need adjusting.

The air cylinder (5) is not connected to the pneumatics and acts only as a link. When setting the top throughfeed rollers this will position the top nip infeed roller (6) in line with the other feed rollers through the machine.

The optimum working pressure is that which just lifts the bottom nip roller (2) off its stop. Air pressure is regulated at its respective gauge (7). For difficult timber where extra grip may be required the pressure should be increased.

MOULDER MODEL XR130

HEAD SETTING SEQUENCE FOR RMT TOOLING

CUSTOMER

MOULD NO.

FENCE

BED

VIEWED FROM OUTFEED

HEAD POSITION	CUTTER BLOCKS	CUTTERS	SPACERS	SIDE PROJECTION		MINIMUM CUTTING CIRCLE	HEAD ANGLE	DATUM	REMARKS
				5MM	7.5MM				