INSTRUCTION MANUAL

WADKIN

THROUGH FEED FOUR SIDE PLANING MACHINE AND MOULDER

MODEL XE

PREFACE

Health and Safety
Safeguarding machines

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

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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 re-supply 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.

Cutter equipment is suitable for machine spindle speed.

Loose clothing is either removed or fastened and jewellery removed.

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 3 OPERATING INSTRUCTIONS (cont.)

SECTION 5 ILLUSTRATED PARTS LIST (cont.)

SECTION 1 GENERAL DESCRIPTION

OPERATING PRACTICE

General Notes on 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.

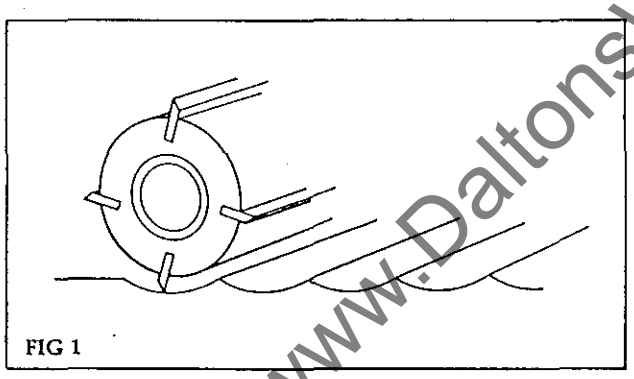


FIG 1

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).

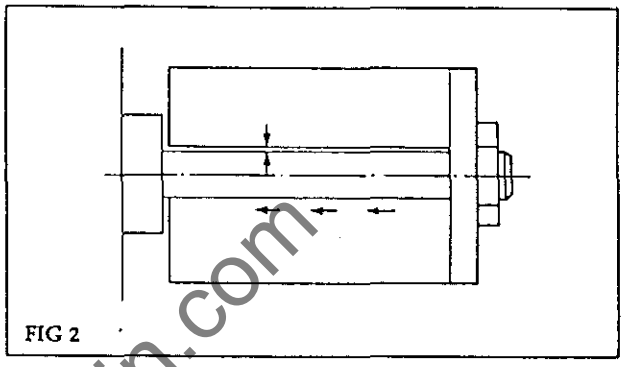


FIG 2

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.

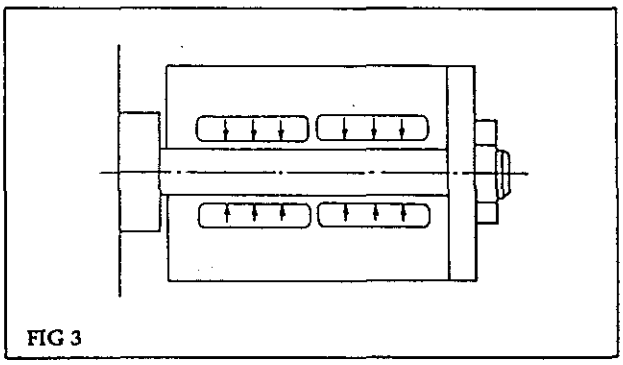


FIG 3

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).

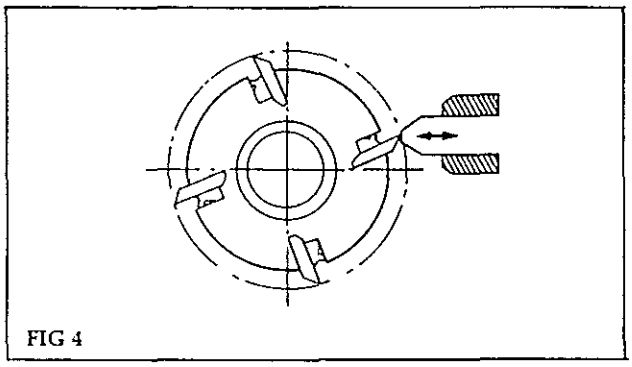


FIG 4

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.

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

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

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).

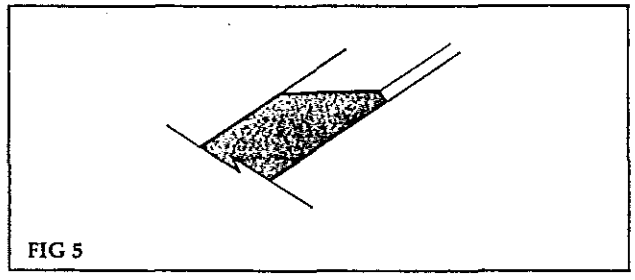


FIG 5

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 2½× (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.

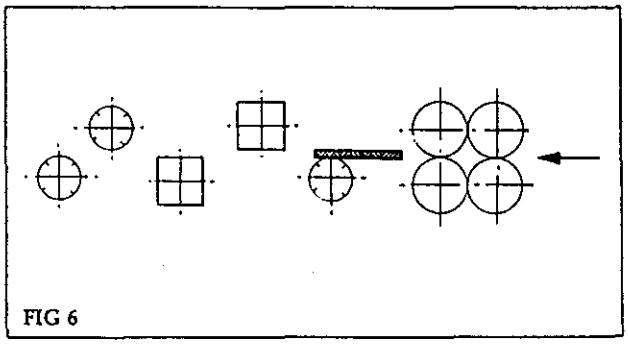


FIG 6

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.

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.

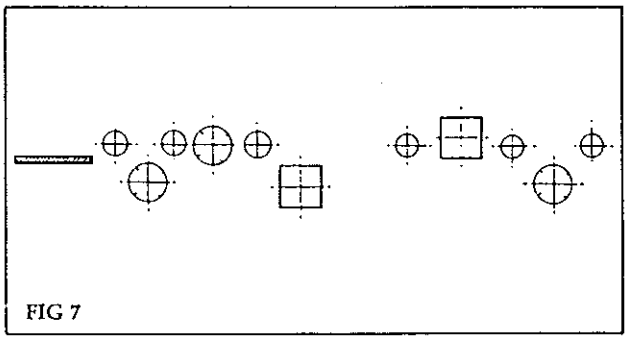


FIG 7

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).

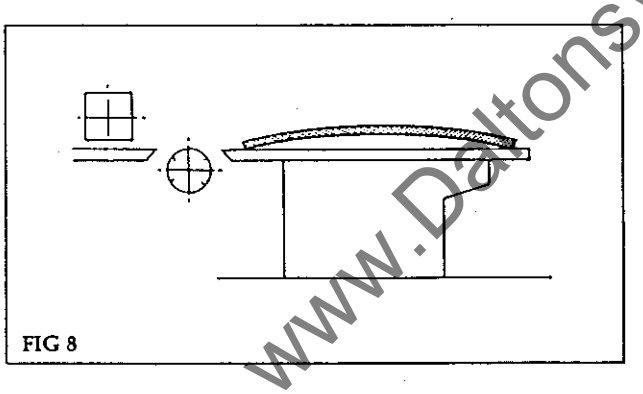


FIG 8

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).

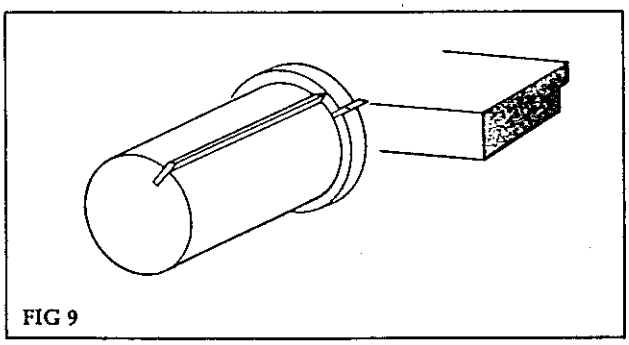


FIG 9

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.

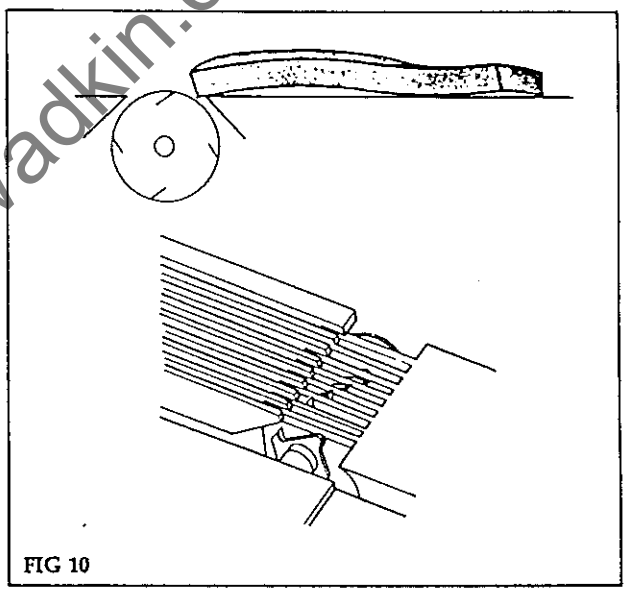


FIG 10

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.

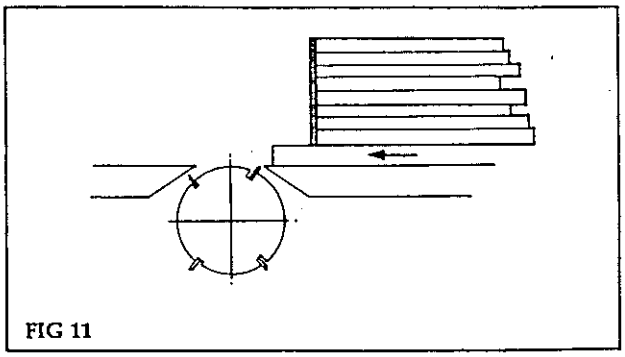


FIG 11

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.

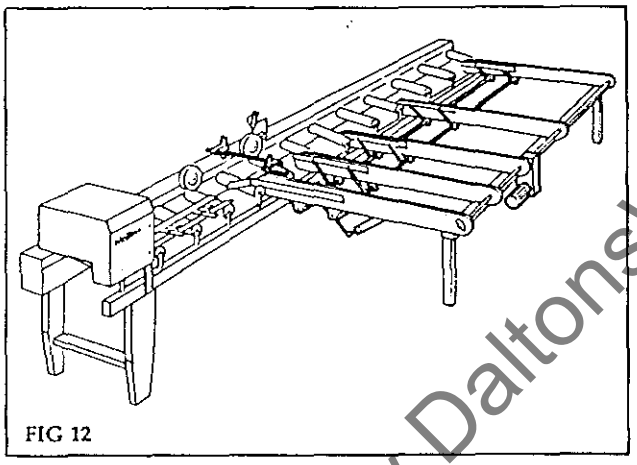


FIG 12

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 extra top side or bottom heads. These are available on both push and through feed machines.

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.

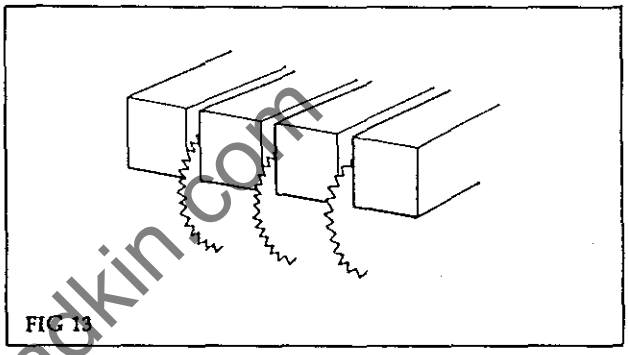


FIG 13

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

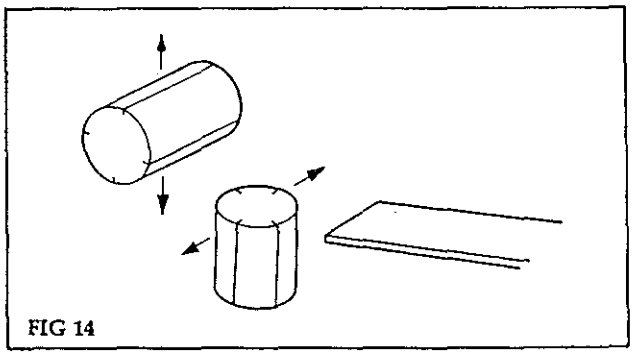


FIG 14

material, the set up time can be reduced by fitting Dial-a-size positioning (see Fig 17 in **Operating Instructions**).

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.

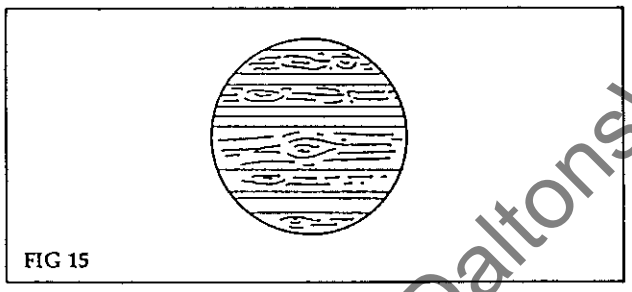


FIG 15

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.

A hard chrome plated bed is also available. This is usually used on high feed speed machines or where particularly abrasive timber is being machined. The reduction in bed wear is very considerable, and feeding is improved because of the low coefficient of friction of chrome plating.

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.

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.

The manufacturers can supply (or give information about suppliers) a suitable sound enclosure. It is also possible with materials generally available in a sawmill, to make an enclosure on site. 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.

See **WARNINGS** in Operating Instructions before operating the machine.

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 Fig 9/2).

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).
Size of joint on cutting edges (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

Contrary to what would appear, it is not always wise to have the maximum number of knives in a cutterblock, particularly when running unjointed. eg: it is more expensive in horse power to run four knives than two.

When practicable, and heads are available, rough on one head and finish on another, or take part of a mould out on one head and the second part on another. Each subsequent joint on a knife increases the width of land. Overjointing (too wide a land) causes hammering, produces raised grain, and uses more power.

LEADING PARTICULARS

Principal Dimensions and Capacities

Maximum size of timber admitted	230mm X 130mm
Maximum size of finished work	220mm X 120mm thick
Feed speed infinitely variable	6.0 to 42 metres per min
Pressure adjustment of Feed Rolls	6 bar (reduced)
Limit switch at the extremities of the Rise and Fall beam	
Feed Rolls	140mm dia. 2 X 20mm + 1 X 10mm wide rolls to each position
Diameter of Cutter Spindles	standard - 40mm optional-45mm-50mm-1 13/16
Speed of Cutter Spindles	standard - 6000rpm option-4500 to 9000 RPM

Diameter of Cutterblocks		standard Spindle	optional Spindles
1st Btm & unv	min-max dia	125-180mm	140-180mm
F.S & N.S.H	" " "	125-205mm (moulding)	140-205 (moulding
Top & 2nd Btm	" " "	125-250mm (saw)	140-250mm (saw)

Maximum straightening	10mm
Maximum cut of First Bottom - Horizontal head	10mm
Maximum cut of Fence Side - Vertical head	10mm
Length of Infeed table	1M, 2M or 2.5M straightening

Output of Motors

Feed motor	11KW (15hp)
Rise and Fall motor	1.1KW (1½hp)

Spindle Motors

Standard all heads	4KW (5½hp)
Option all heads	5.5KW, 7.5KW, 10KW, 11KW
Option to top and 2nd bottom heads	15KW, 18.75KW
Option to universal head	5.5KW (7.5hp), 7.5KW (10hp), 11KW (15hp)

SECTION 2 INSTALLATION

LIFTING AND TRANSPORTATION

Unloading

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

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.

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.

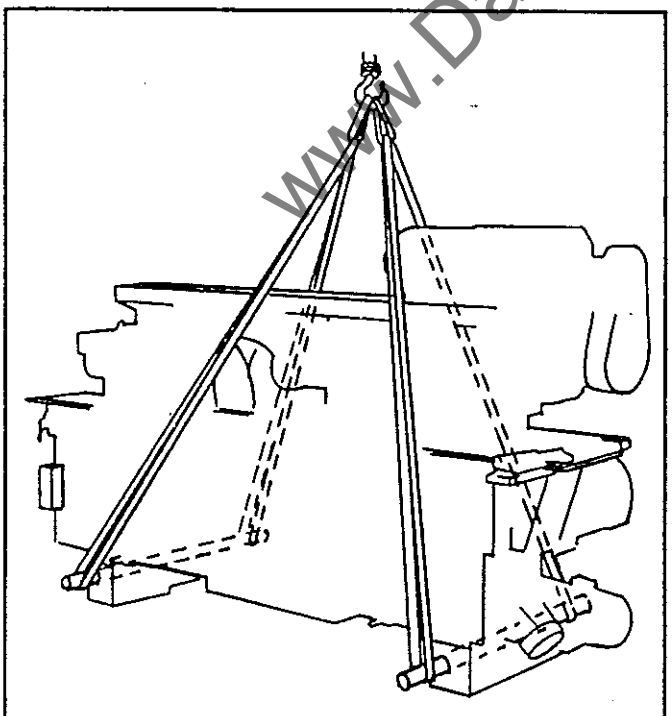


FIG 1 LIFTING THE MACHINE

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.

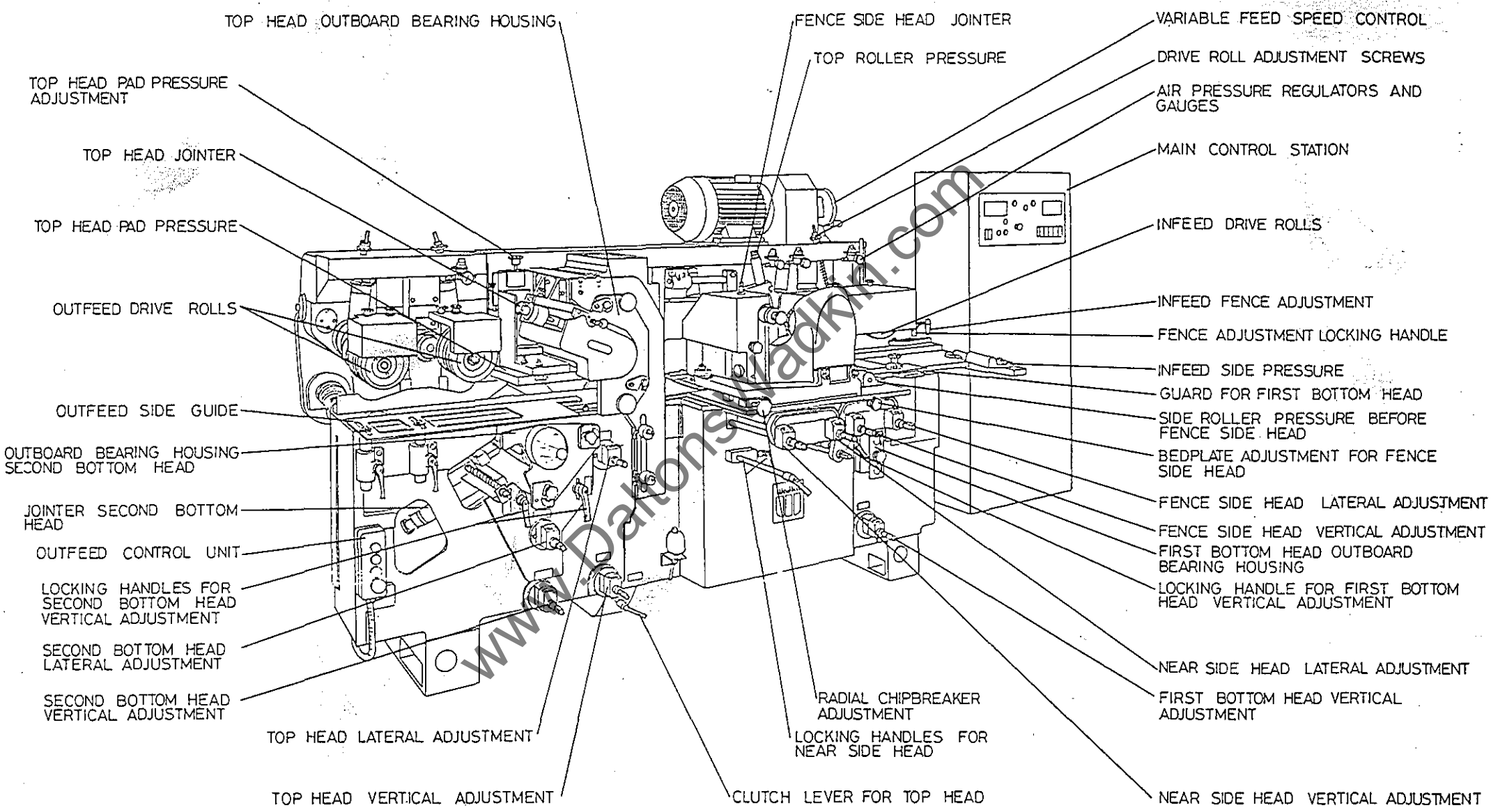


FIG 1 MACHINE CONTROLS

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 Bottom Fence and Near side heads	27-30 cu. metres/min. (953-1053 cu.ft/min)
For Top heads	37-40 cu. metres/min. (1305-1411 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.

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 front 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.

Cutter equipment is suitable for machine spindle speed.

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

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

Before starting the machine, operators should familiarise themselves with the various controls and their usage

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 speeds throughout 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

MOUNTING THE CUTTERBLOCKS

General

The XE machine can be fitted with plain bore or Hydorgrip (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 plain bore 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 are fitted to the horizontal spindles to give greater rigidity to the cutterblock; these support each spindle at its outer position.

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 side locks and are interlocked to the powered 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 and once released the power can be isolated before commencing to change/alter cutterblocks.

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

To change cutterblocks

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. Isolate machine from power scource.

Plain bore type cutterblocks

To remove cutterblocks:

(1) Unscrew the cutterblock nut 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.

Hydrogrip cutterblocks (fig 1)

To remove cutterblocks:

(1) After removal of the outboard bearing release locking screw on safety collar (fig 2) and remove from spindle.

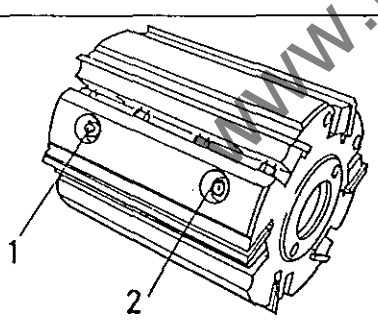


FIG 1 HYDROGRIP CUTTERBLOCK

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

(3) Slide the cutterblock from the spindle.

(4) Always leave the pressure release screw (2) undone when the cutterblock is not in use to avoid distortion to the cutterblock due to the variation in room temperatures.

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. After fitting the cutterblock, replace the outboard bearing assembly and pressurise the bearing to 300bar hydraulically. 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 1).

(3) Fit safety collar (see fig 2) and tighten securing screw.

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

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

(6) 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 2)

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.

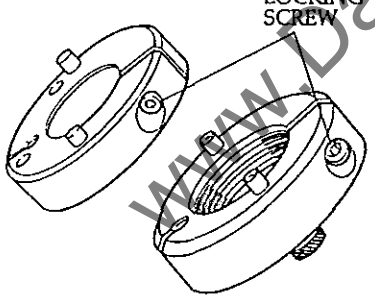


FIG 2 SAFETY COLLARS

(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 de-pressurisation.

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 to 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.

FIRST BOTTOM HEAD (Fig. 3)

(1) Lift guard (1) for access. Depressurise the outboard bearing by turning the pressure release valve one quarter of a turn using a 3 mm Allen Key.

(2) Slacken off the two 12mm collar nuts (2) securing the outboard and slide lock plate (3) up. The outboard bearing housing plate (4) should now pull off.

(3) Remove and replace new cutterblock as described in General section.

(4) Replace outboard bearing housing plate (4). Tighten pressure release valve and pressurise bearing to 300 bar (4350 psi) by application of hydraulic pressure to the nipple in the recess on the face of the bearing. Lock up collar nuts (2) whilst gently supporting outboard bearing plate.

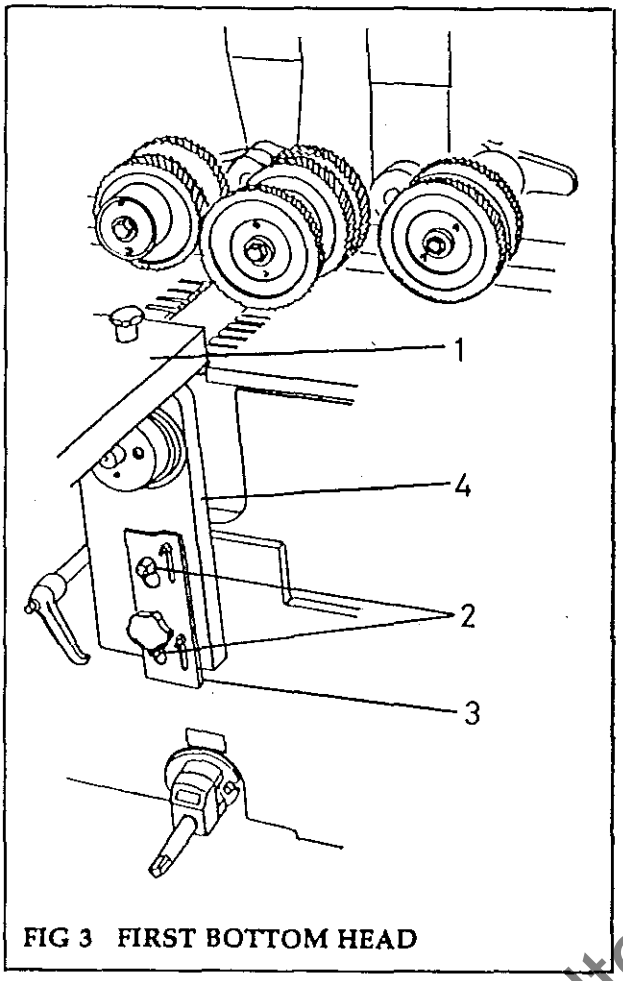


FIG 3 FIRST BOTTOM HEAD

SIDE HEADS

(1) Remove covers, guards and extraction ducts as required to allow easy unimpeded access to cutterblock.

(2) Remove and replace new cutterblocks as described in General section.

(3) Replace guards ETC.

TOP HEADS (fig4)

(1) Slacken off shoulder screws (1) and remove outboard bearing cover (2).

(2) Depressurise the outboard bearing by turning the pressure release valve one quarter of a turn using a 3mm Allen Key.

(3) Slacken off the two 12mm collar nuts (3), swing captive 'c' washers (4) clear and remove outboard bearing housing (5)

Note: This housing is spigoted and must be pulled horizontally.

(4) Remove and replace new cutterblock as deccribed in General section.

(5) Replace bearing housing (5) and re-tighten captive 'c' washer (4) and collar nuts. Tighten pressure release valve and pressurise bearing to 300 bar (4350 p.s.i) by application of hydraulic pressure to the nipple in the recess on the face of the bearing. Replace outboard bearing cover.

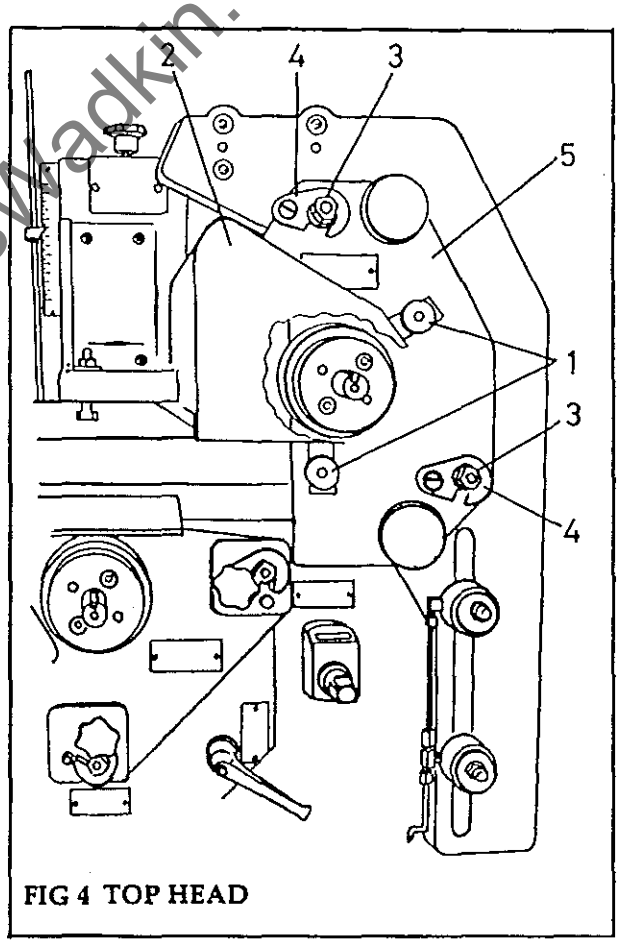


FIG 4 TOP HEAD

SECOND BOTTOM HEAD (if fitted)

(1) The procedure for removal of the cutterblock is the same as the top heads.

UNIVERSAL HEAD (fig 5) - if fitted

(1) Remove guard for access, remove existing cutterblock as follows:

a. Release cutterblock (1) using the combination spanner provided on the spindle hexagon (2) and the two flat faces of the cutterblock locknut (3).
b. Withdraw cutterblock from spindle.

(2) Check that the spindle flange and the flange end of the replacement cutterblock are clean.

(3) Slide the new cutterblock (1) onto the spindle (4) and tighten using the combination spanner provided.

NOTE: Do not use excess force

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

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.

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. (See fig 21 for Univerasal head modes). Fig 5 shows the head in the near side vertical (angled or canted) mode.

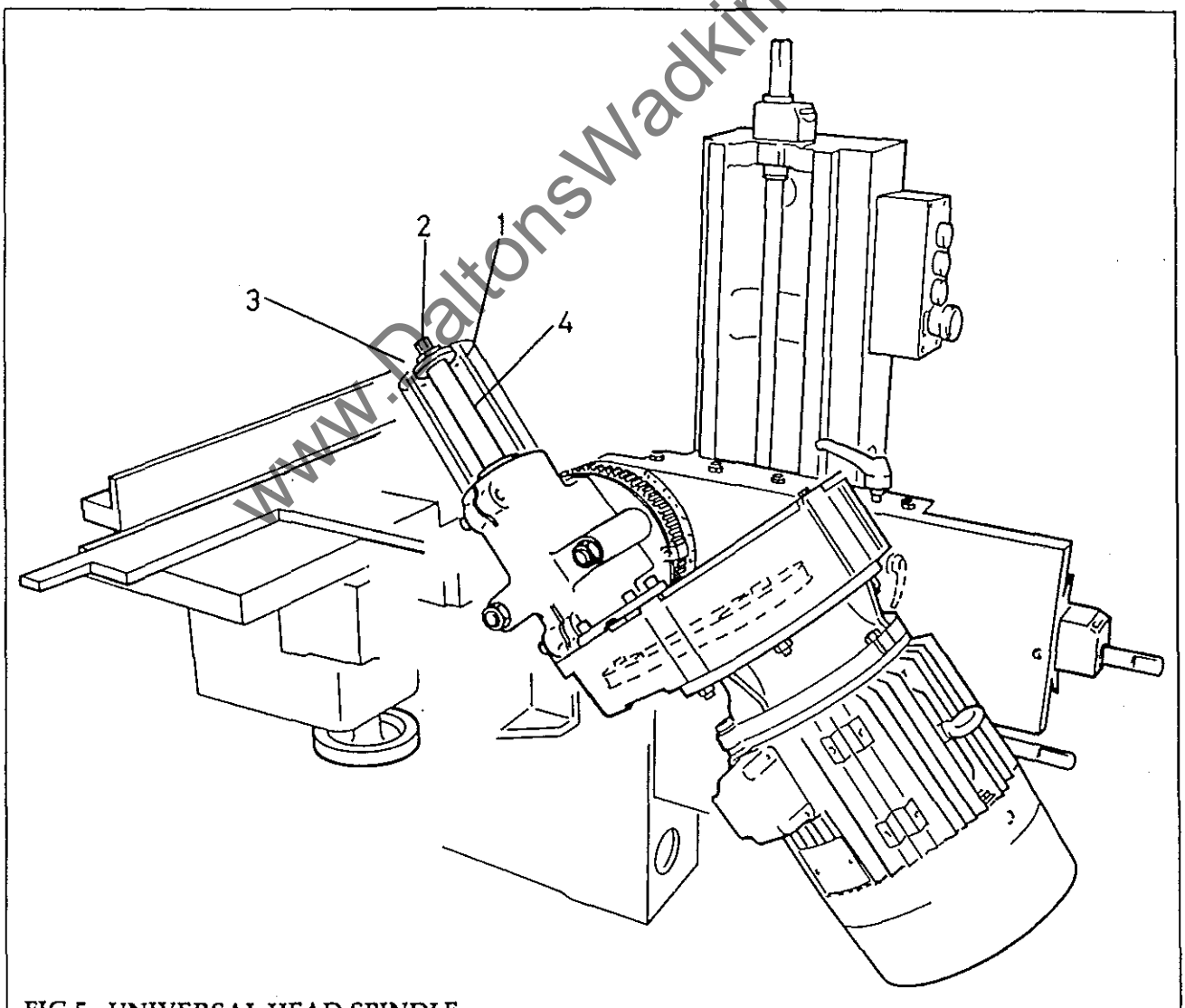


FIG 5 UNIVERSAL HEAD SPINDLE

SETTING UP THE MACHINE

GENERAL (Fig.1)

Due to modern machining techniques lateral adjustment to horizontal heads is not generally required and as such the motor and belts only move with the vertical spindles. A small amount of adjustment is catered for on the horizontal heads.

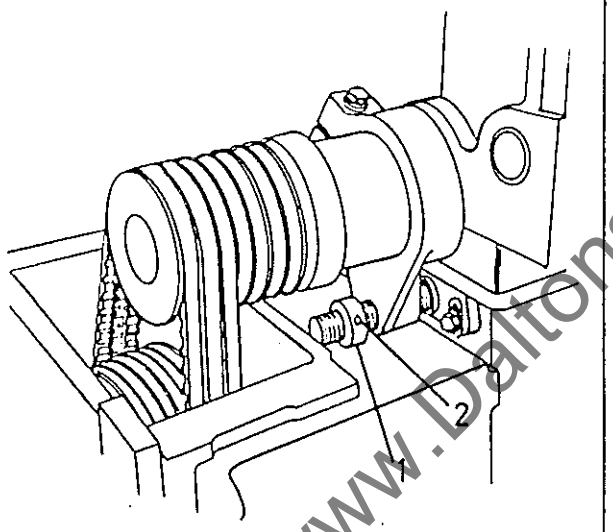


FIG 1 HORIZONTAL HEAD ADJUSTMENT

NOTE: The machine is factory set to give 12mm movement backwards from the datum face of the fence when it is set at ZERO.

If it should be necessary to obtain further lateral movement when at the maximum rearward position, it may be obtained by removing the pulley guard and then releasing the belt tension. (Refer to Section 4 Scheduled Maintenance - V Belt Drive Tensioning).

Move the belts onto the next vacant pulley groove to bring them back into line and then re-tension the belts.

Locking collars prevent the spindle movement exceeding the original factory set boundaries and therefore if the belts are repositioned, then the rear stop (1) must also be reset.

This may be done by slackening off the grub screw (2), moving the collar back a further 12mm and then retightening the grubscrew (2).

First Bottom Head (Figs 2, 3.)

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

(1) Remove guard for access.

(2) Ensure the outfeed table is clean.

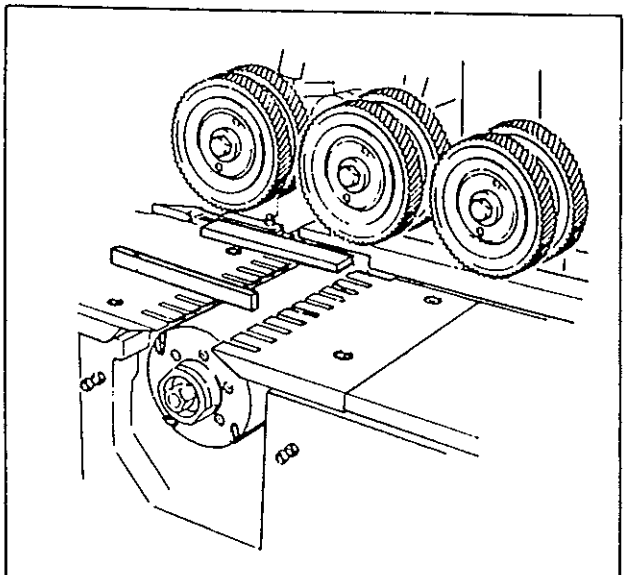


FIG 2 FIRST BOTTOM HEAD

(3) Place a straightedge on the outfeed table projecting over the bottom horizontal cutterblock (fig 2). The cutter blades should just touch the underside of the straightedge.

(4) If necessary, reset the cutter height as follows: (Fig 3)

a. Release locking handle (1) and adjust the cutterblock height by rotating the adjusting screw (2) clockwise to raise the spindle, or anti-clockwise to lower.

b. Refasten the locking handle (1).

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 (if fitted), ie. just touching the straightedge, (fig 2). Adjust the fence. If necessary, adjust the cutter spindle laterally as follows:

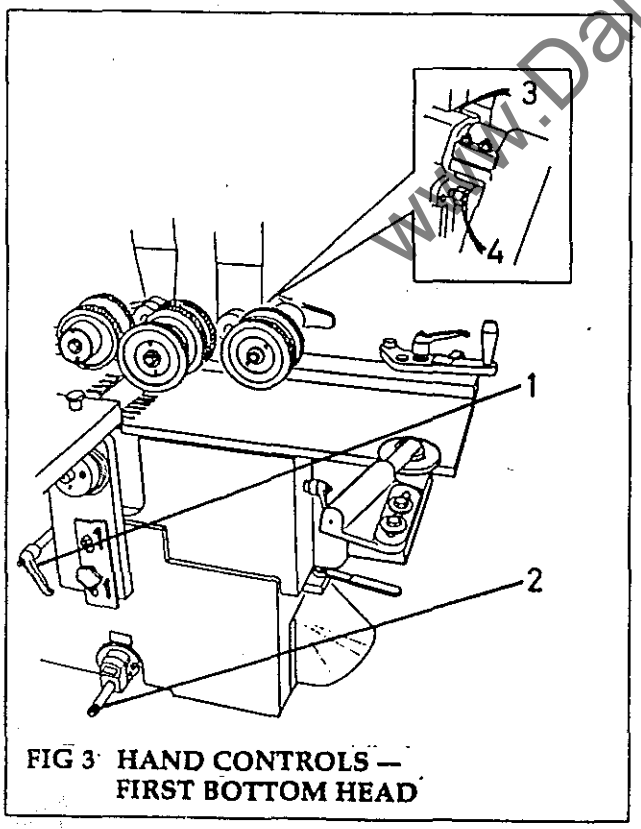


FIG 3 HAND CONTROLS — FIRST BOTTOM HEAD

a. Release the spindle barrel lock (3) at the rear of the head (see inset fig 3). Depressurise the outboard bearing. Rotate the adjuster (4) to re-position the spindle.

b. Retighten the barrel lock (3) and re-pressurise outboard bearing.

Fence Side Head (Fig 4, Fig 5)

(1) Ensure that the machine bed is clean.

(2) Set the fence guide (1) with a straightedge (2) against the fence guide and cutters (3) in a similar manner to that used for the First Bottom head. If necessary adjust the spindle laterally as follows:

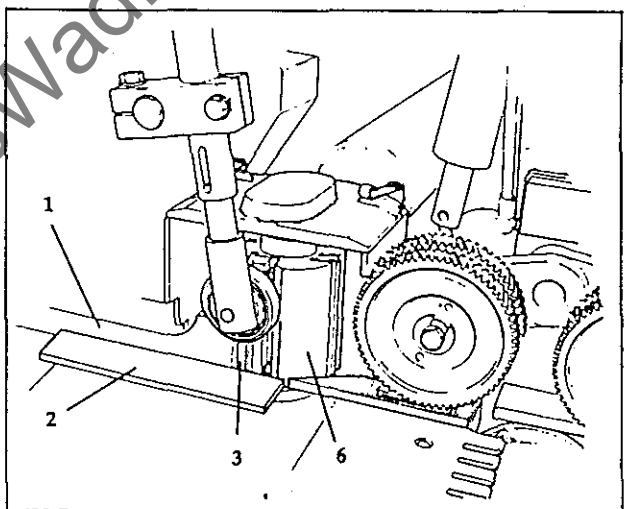


FIG 4 FENCE SIDE HEAD

a. Release the locking handle (4).

b. Rotate the handscrew (5) clockwise to advance the spindle or anticlockwise to retract the spindle.

c. Refasten the locking handle (4).

NOTE: Maximum lateral adjustment is 65mm.

(3) Set the axial position (height) of the cutterblock (6) as follows:

a. Release the locking handle (4).

b. Release the spindle clamp (7) and adjust cutter height by rotating the handscrew (8) anti-clockwise to lower or clockwise to raise the spindle.

c. Refasten the spindle clamp (7)

d. Refasten the locking handle (4)

(4) Set the sliding bedplate using adjusting knob (9) to within 5mm of the cutterblock.

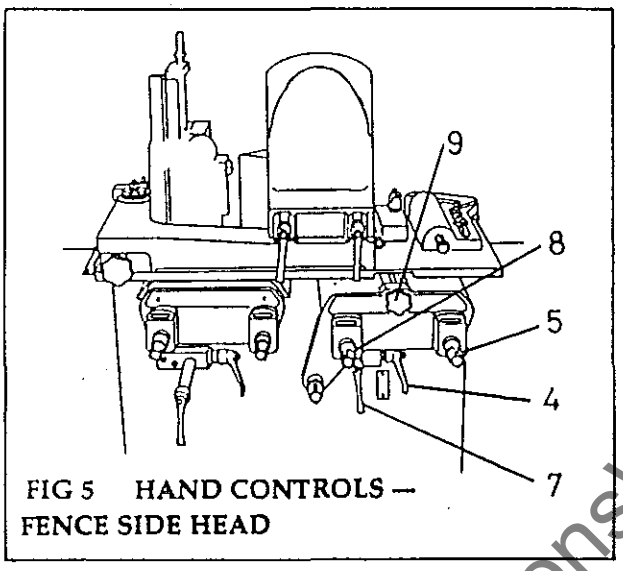


FIG 5 HAND CONTROLS — FENCE SIDE HEAD

NEAR SIDE HEAD (Fig 6, Fig 7)

(1) Ensure that the machine bed is clean.

(2) Check the digital readout (if fitted) using a datum block (1) of known width inserted between the fence guide (2) and cutterblock (3) The cutter blades should just touch the near side of the datum block. If necessary, reposition as follows:

a. Release locking handle (5)

b. Rotate handscrew (6) clockwise to advance the spindle or anti-clockwise to retract the spindle.

c. Refasten locking handle (5)

d. Reset digital readout, (where fitted) to the known dimension.

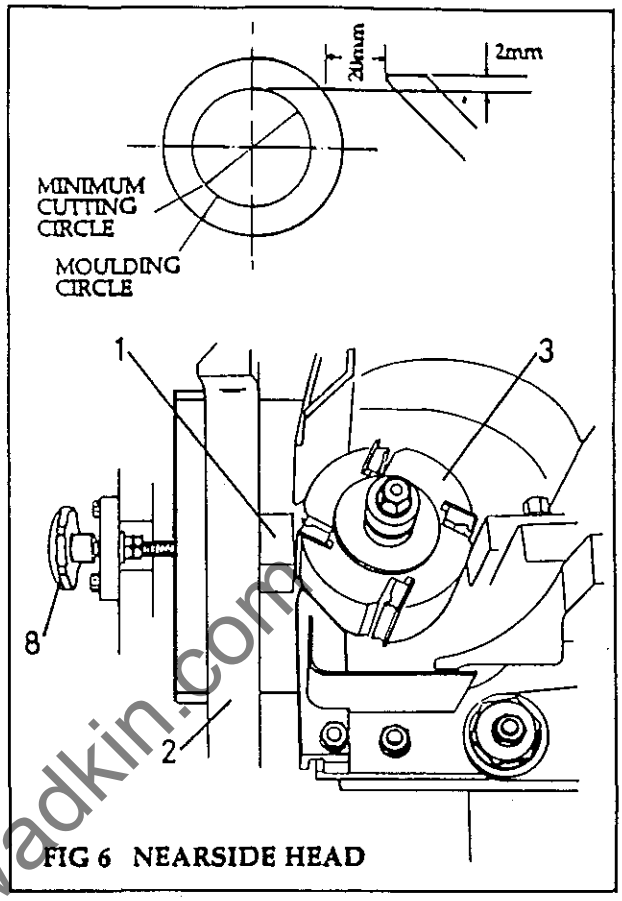


FIG 6 NEARSIDE HEAD

(3) Set the axial position (height) of the cutterblock (3) as follows:

a. Release the locking handle (5)

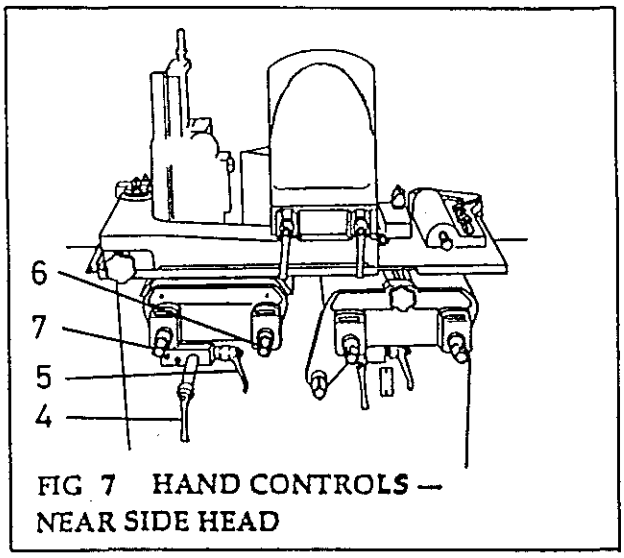


FIG 7 HAND CONTROLS — NEAR SIDE HEAD

b. Release the spindle clamp (4) and adjust the cutter height by rotating the handscrew (7) anti-clockwise to lower the spindle or clockwise to raise the spindle.

c. Refasten the spindle clamp (4)

d. Refasten locking handle (5)

(4) Set the sliding bedplate using adjusting knob (8) to within 5mm of the cutterblock.

NEAR SIDE HEAD CHIPBREAKER (Fig 8, Fig 9)

The relationship between the side pad pressure and chipbreaker is factory pre - set but may, if required, be adusted as follows:

Slacken off lock nut (7) and turn screw (8) to adjust chipbreaker.

The spring tension for the chipbreaker may be varied by adjusting screw (9)

(1) Set up as follows:

a. Remove dust/jointer hood (4)

b. Slacken off the two locking nuts (5)

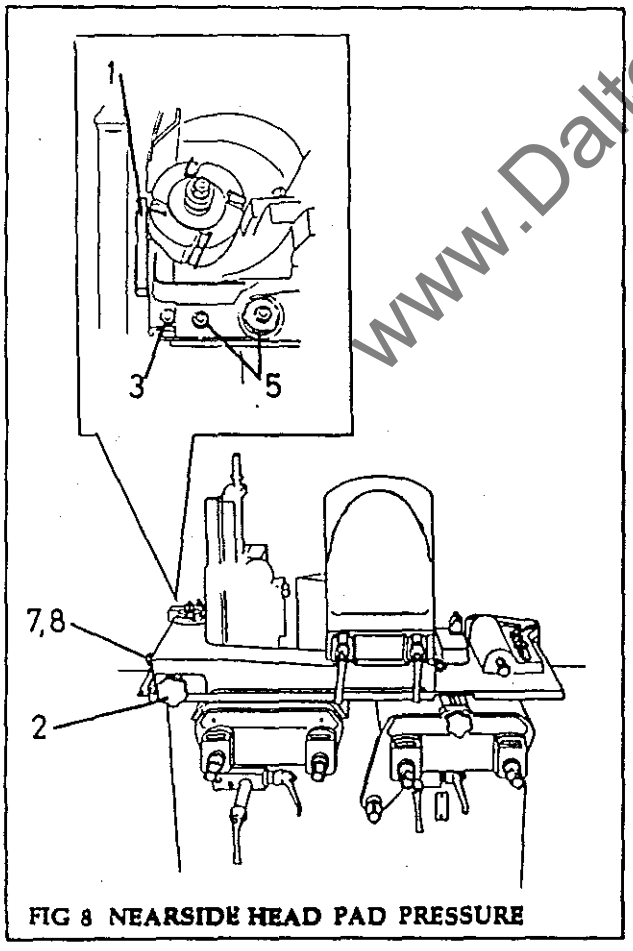


FIG 8 NEARSIDE HEAD PAD PRESSURE

c. With a straightedge placed along the side pad pressure (1) after the near side head, position the whole radial chipbreaker unit by turning the hand wheel (2) such that the cutterblades just touch the straightedge. With this set the chipbreaker should be approximately 2mm nearer the fence than the side guide.

(2) Tighten up locking nuts (5)

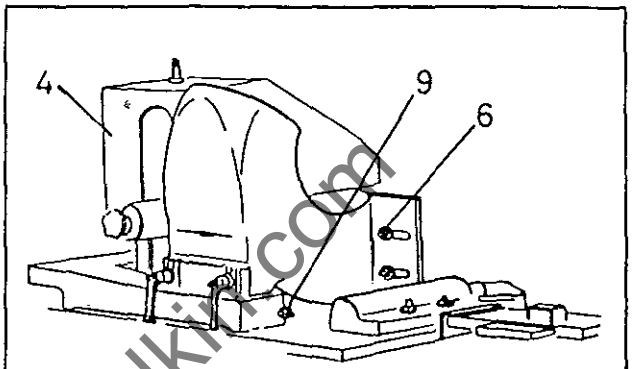


FIG 9 NEAR SIDE HEAD CHIPBREAKER ADJUSTMENT

(3) Slacken off the side pad pressure locking nut (3) and reposition the pad pressure laterally so the nose is approximately 5mm from the cutterblock.

(4) Loosen the two nuts (6) holding the chipbreaker and reset this so that the nose is appoximately 20mm from the cutterblock.

(5) Tighten up nuts (6)

TOP HEAD (Fig 10, Fig 11)

To adjust the spindle horizontally

(1) Release the spindle barrel lock (2)

(2) Adjust using the handscrew (1)

(3) Tighten barrel lock (2)

CAUTION

The outboard bearing support is hydraulically locked into position and MUST be released before any vertical adjustment is made. The lock and unlock control buttons are found on the main control cabinet.

(4) To manually adjust/set the top head, proceed as follows:

a. Release hydraulic locks

b. Ensure bed is clean

c. Place a datum block (5) of known thickness under the cutterblock.

d. Rotate the hand screw (4) clockwise to lower the spindle or anti-clockwise to raise the spindle. The knives should just touch the block.

e. Check and reset if necessary digital readout to known datum block thickness.

f. Set head to desired position.

g. Refasten outboard bearing support locks

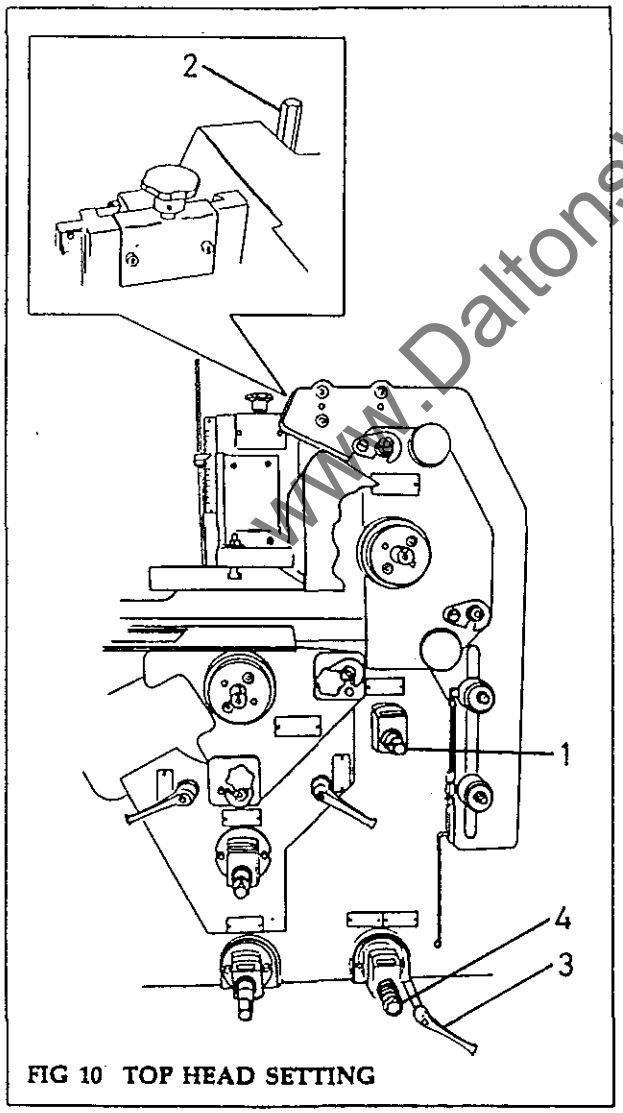


FIG 10 TOP HEAD SETTING

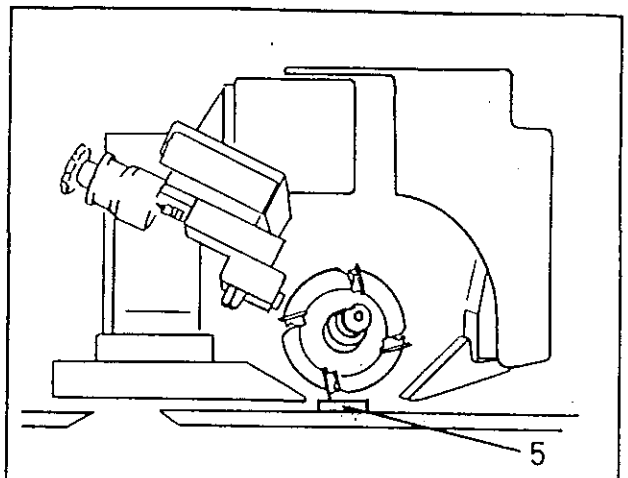


FIG 11 TOP HEAD CHIPBREAKER

(5) To electrically move top head with beam proceed as follows:

a. Release outboard bearing support locks

b. Engage clutch lever (3) if the clutch does not readily engage turn the handscrew (4) slightly to the left or right until it engages.

c. To raise or lower the head/beam press the rise and fall button on the clutch panel.

NOTE: The powered veritcal adjustment of the beam is electrically interlocked with top head and can not move until the hydraulic locks are disengaged.

d. Lock outboard supports.

SECOND BOTTOM HEAD (Fig 12)-if fitted

(1) Ensure the bed is clean.

(2) Using a straight edge (1) placed on the outfeed bed plate set the cutterblock knives to just touch the underside.

To adjust the head Vertically

first release the two locking handles (2) and then turn the hand screw (3) to raise or lower cutterblock.

(3) Tighten the locking handles (2).

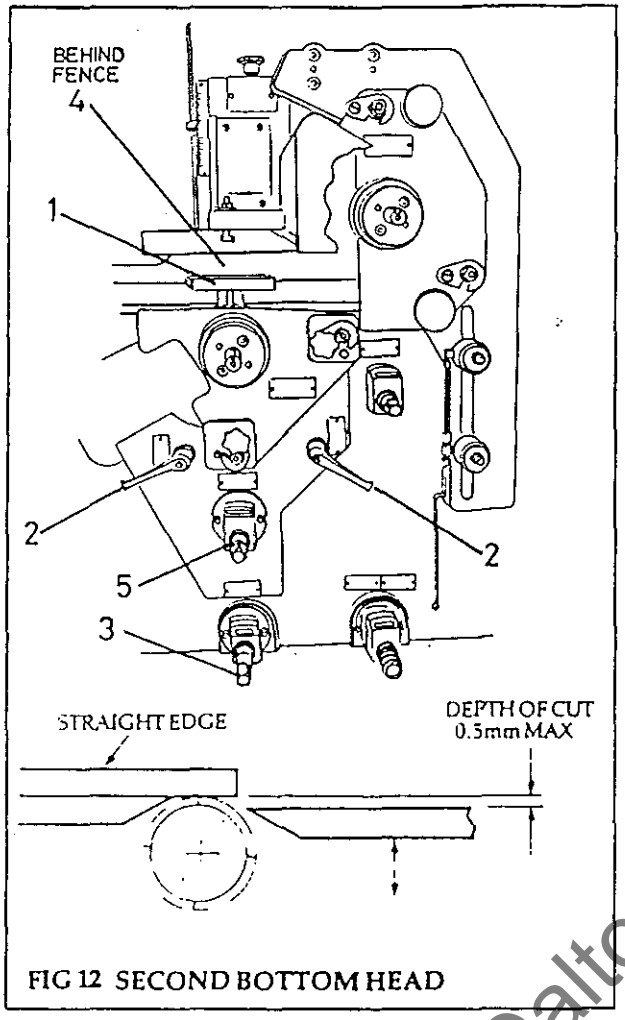


FIG 12 SECOND BOTTOM HEAD

To adjust the spindle horizontally

(4) Release the spindle barrel lock (4) at the rear of the head.

(5) Depressurise outboard bearing.

(6) Adjust using handscrew (5)

(7) Retighten barrel lock (4)

(8) Re-pressurise outboard bearing.

Top Head Chipbreaker and pad Pressure (Fig 13)

(1) Ensure bed is clean and cutterblock has been set up.

(2) Place straight edge under pad pressure and adjust its height by screw (1) until in line with the base cutting circle of the cutterblock.

(3) Slacken off pad pressure locking nuts (2) and laterally position the pad nose 5mm clear of the maximum cutting circle. Also postion pad width wise to suit timber.

(4) Retighten nuts (2)

The chipbreaker is made up of a bank of three individual units each positioned in a similar way. Set each unit as follows:

(5) Slacken off the two locknuts (3)

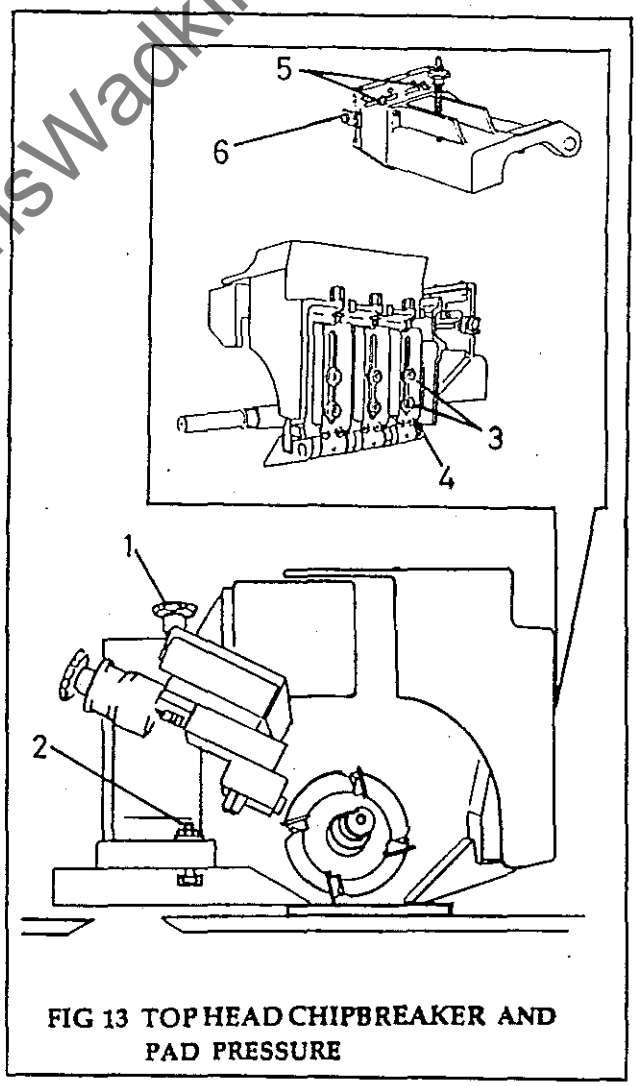


FIG 13 TOP HEAD CHIPBREAKER AND PAD PRESSURE

(6) Raise/lower the chipbreaker unit until the nose touches the straight edge placed under the pad presure after the top head.

(7) Tighten the locknuts (3)

(8) A stop screw (4) provides for small adjustment to align all the chipbreaker nose pieces.

Lateral adjustment

(9) Slacken off the two locknuts (5) at the rear of the top head and turn the adjusting screw (6) until the chipbreaker nose is approximately 20mm from the cutter knives.

(10) Fasten rear locknuts (5)

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 avialable is 10mm.

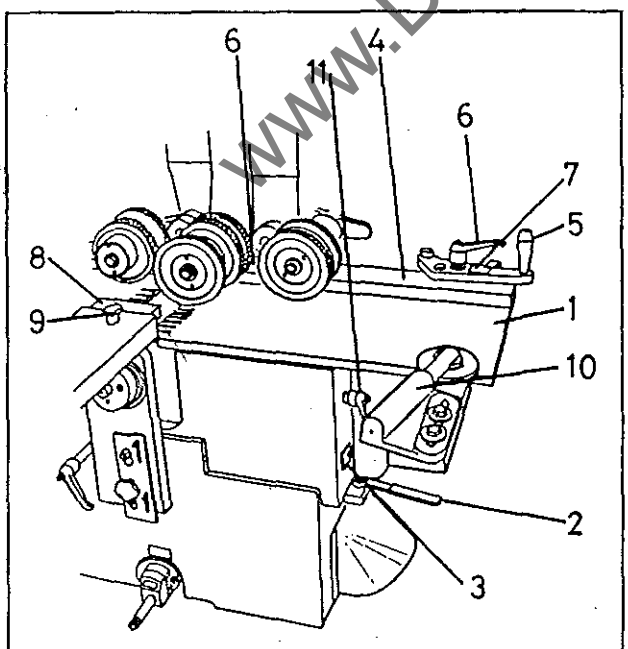


FIG 14 INFEED TABLE—SHORT

NOTE: release lock (11) before adjustment, lock after

(2) Set the fence (4) adjustment with handle (5) after releasing clamps (6). Refasten clamps after adjustment. Set the amount of cut 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), to suit width of workpiece.

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 anti-clockwise. Set the cut required from direct reading on the graduated scale (3) by moving handle as require Turn handle clockwise to lock in position. The maximum adjustment available is 10mm.

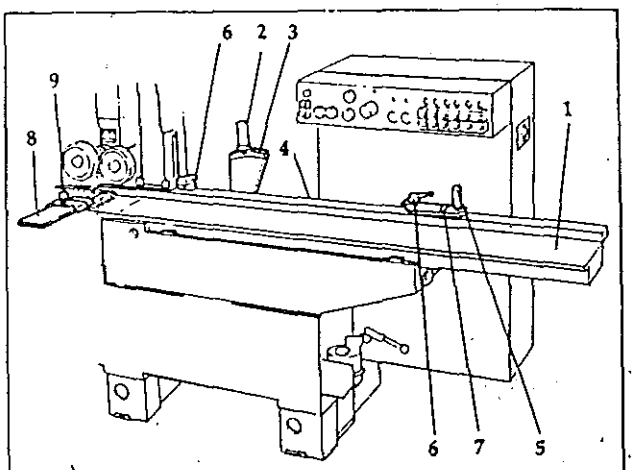


FIG 15 INFEED TABLE—STRAIGHTENING

(2) Set the fence (3) adjustment with handle (5) after releasing clamps (6). Refasten clamps after adjustment Set the amount of cut 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 retighten starwheel.

Check/Adjust at Fence Side Head (fig 16)

(1) Adjust the side shoe pressure to the timber so that moderate force is exerted on the timber:

a. Adjust the side pressure (1) by unscrewing the two nuts (2) and adjusting side rollers to suit width of stock.

(2) Adjust the top roller pressure to the timber as follows:

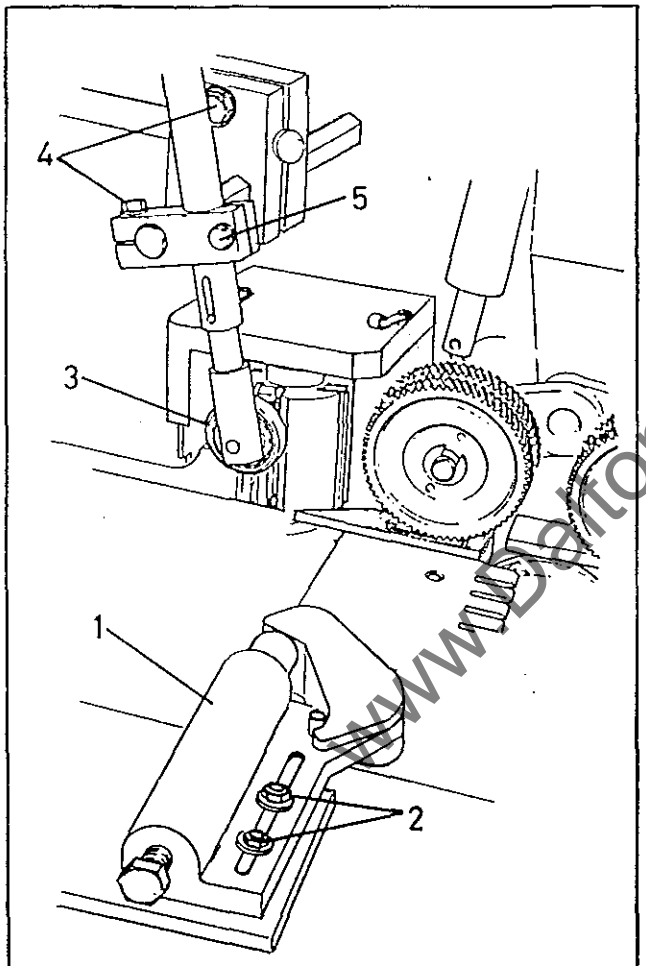


FIG 16 FENCE SIDE HEAD SETTING

a. Adjust the top roller (3) by loosening one screw (4) for lateral adjustment and right hand screw (5) above the roller for height adjustment. Retighten screws.

Set Feed Rolls (fig 17, fig 18)

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

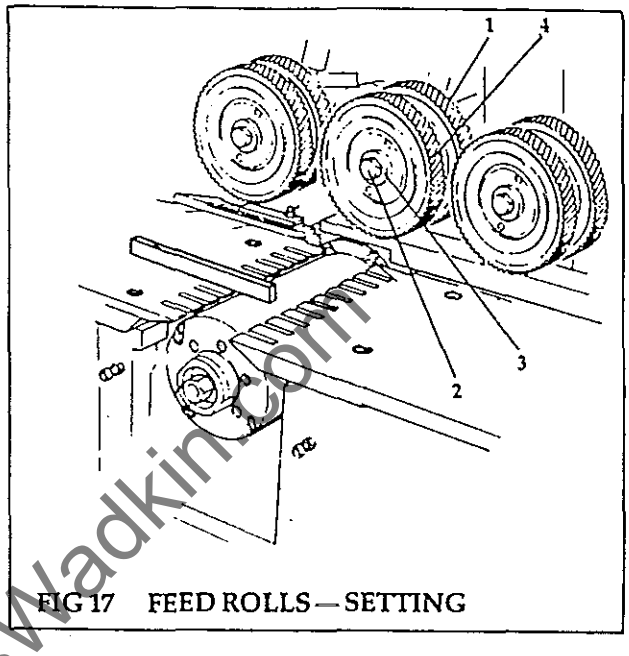


FIG 17 FEED ROLLS—SETTING

NOTE: To achieve maximum traction on wide timber, it is advisable to space rolls apart (fig 17), rather than having a solid bank of feed rolls. Stagger the feed rolls at different stations using the spacing collars so that each roller runs on a different area of the top surface of the timber. Use the Control Station Rise and Fall pushbutons to set the height of the rolls.

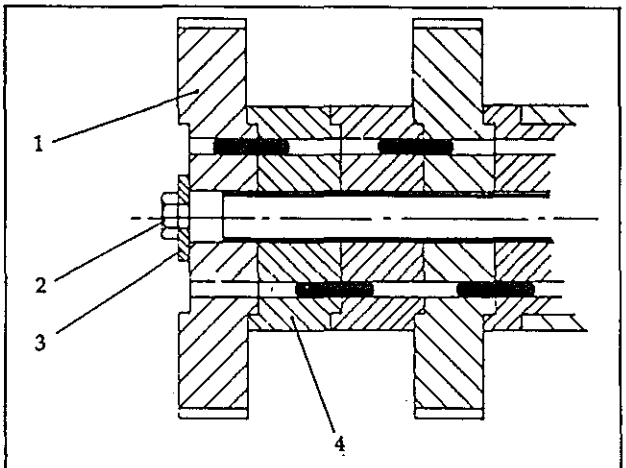


FIG 18 FEED ROLLS—SPACER DETAILS

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 ensuring that each roll drive pin engages with its mating part

c. Refit 'c' washer (3) and re-tighten centre screw (2).

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

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

Set Feed Roll Pressures (fig 19)

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

(2) Check the plain feed rolls (2) after the top head to 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 pneumatic 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)

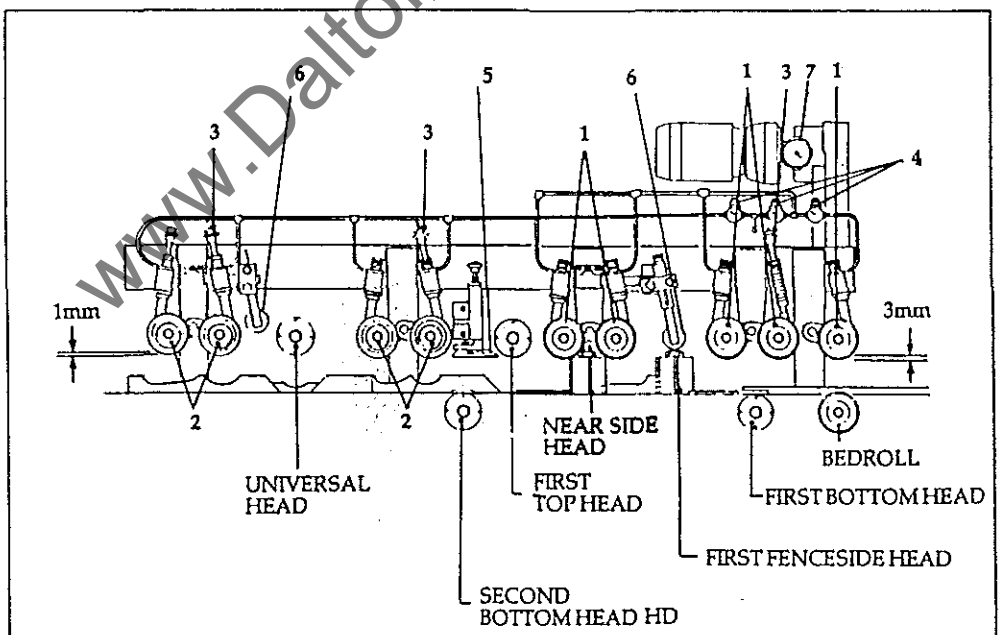


FIG 19 SET ROLL PRESSURES — TYPICAL MACHINE

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

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

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

(7) 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

Universal Head Modes (fig 20, 21, 22)

The universal spindle attachment can be positioned above or below the bed and at any angle between horizontal and vertical. Basically it can be considered as a three position head providing:

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

Optional 4 position universal head can be used in the fence side position.

NOTE: After any change of mode, run the motor momentarily to check direction of spindle rotation.

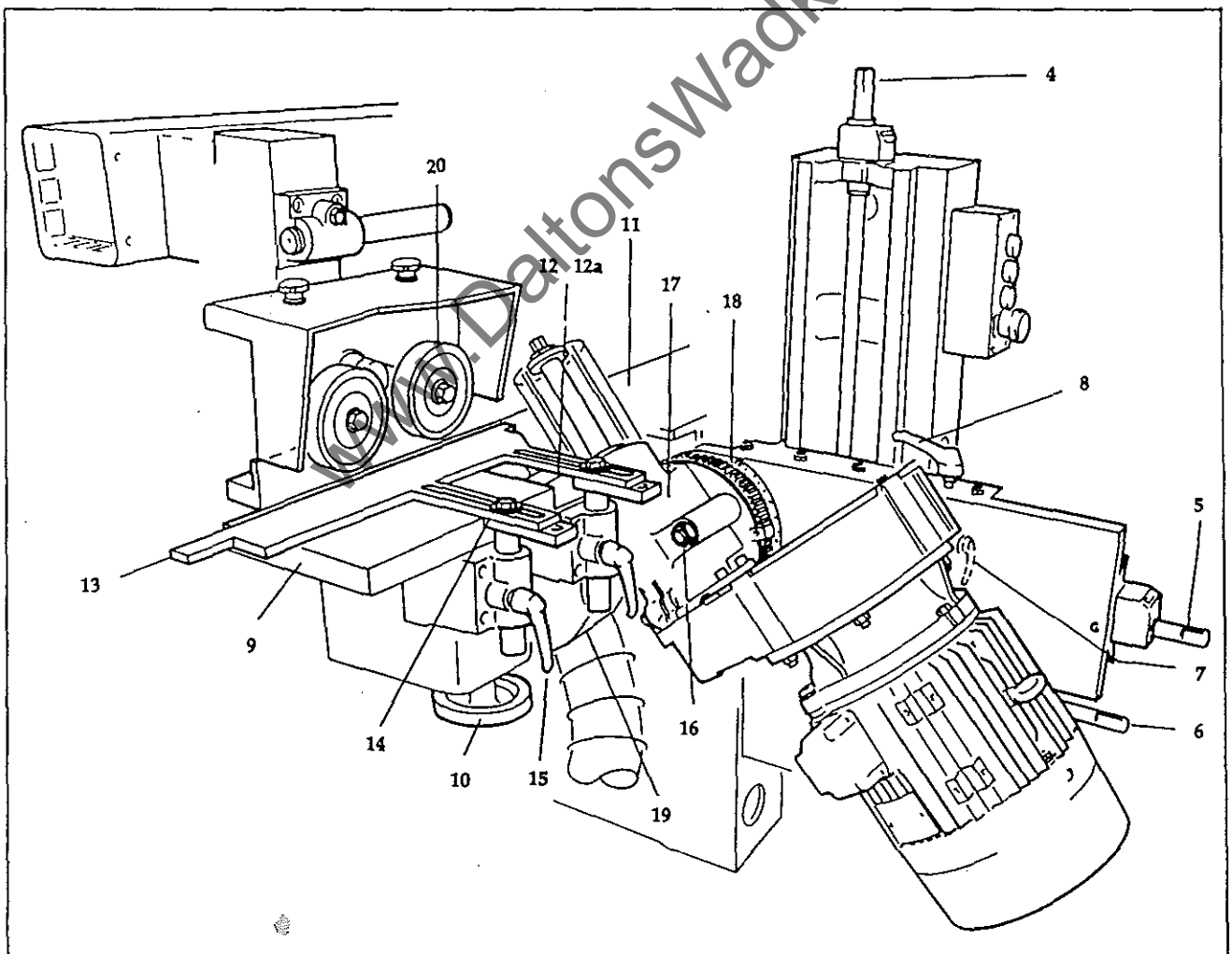


FIG 20 UNIVERSAL HEAD ATTACHMENT

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 anti-clockwise 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 anti-clockwise 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 postition 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.

In fence Side Vertical Mode (option)

The fence vertical mode is similar in operation to the near side vertical mode except for direction of the cutters.

(1) Set the spindle in a vertical position as for the near side head.

(2) Remove intervening bedplates and dust hood.

(3) Move spindle across to fence side positior

(4) Replace bedplates with metal rails as for top head.

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

(6) Set up and operate as for near side mode.

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.

In this situation the outfeed table is adjusted vertically to the same height as the bedplate after the **Second Bottom Head**, using the handwheel (10). Adjust the feedrolls (20) and roller pressure to suit the thickness of work (see fig 19)

Height and lateral adjustment 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 wormdrive 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) (or fence side vertical position)	Universal head motor rotates clockwise 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 before commencing work (see fig 21)

In Bottom Horizontal Mode

(1) Remove the dust cover from the spindle hood and fit the extractor hood (19) to the frame support using two M8x12 mm long hexagon bolts. Connect the dust extractor.

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

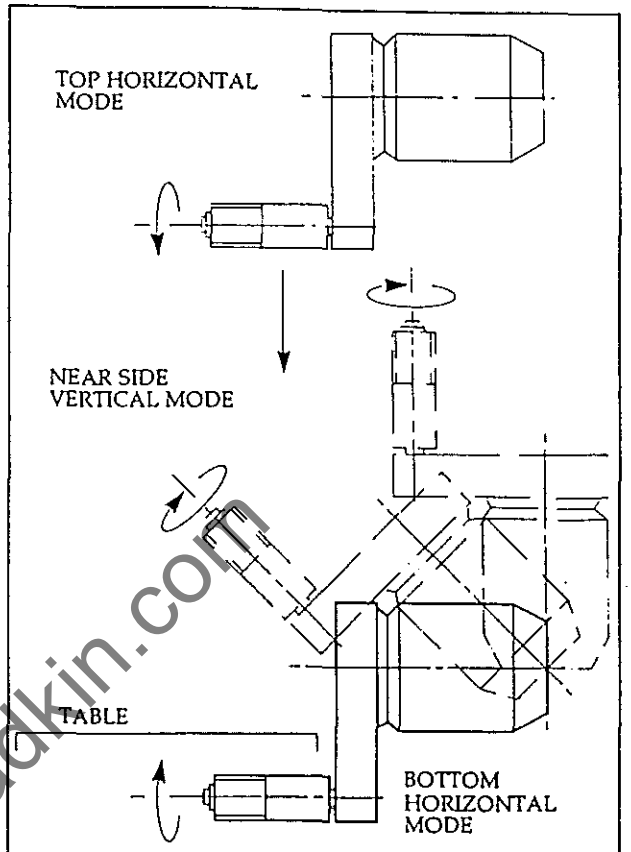


FIG 21 UNIVERSAL HEAD MODES

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

(3) Fit the cutterblock see **Mounting the Cutterblocks.** 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 anti-clockwise to lower. Refasten locking handle (7) after making adjustment.

b. To adjust laterally: release locking handle (8), place crank handle on square of traverse screw (5), turn clockwise to move head forward or anti-clockwise 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 straightedge 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 20)

In Top Horizontal Mode (fig 20)

(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 shoes, 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.

(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 adequate clearance at dust hood and moving parts.

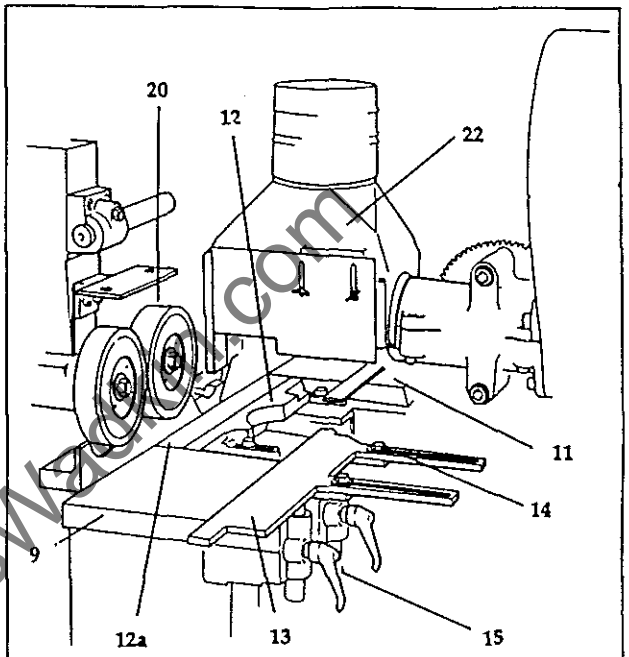


FIG 22 UNIVERSAL HEAD — TOP HORIZONTAL MODE

(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). Re-tighten 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 180mm. The spindle can be positioned at any angle between vertical and horizontal as required (see fig 20), 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).

JOINTING

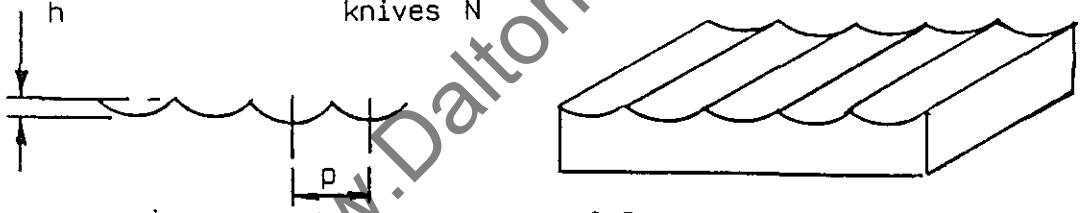
Principles and practice (Fig 1, Fig 2)

Jointing is a dressing technique which is applied to a rotating cutterblock in order to true all the knives to a common cutting circle. By applying this technique the feed speed of the machine can be increased by a factor equal to the number of knives in the cutterblock.

In order to appreciate this fact, the nature of the machined surface of the timber resulting from the rotary cutting technique must be understood.

The surface finish consists of a series of adjacent waves, (as shown in Fig 1), the pitch and depth of these waves being directly related to the cutter spindle speed, number of finishing knives, feed speed and radius of cutter head. These are related, (see Operating Practice).

$$\text{Wave pitch } p \text{ (mm)} = \frac{\text{Feed Speed } f \text{ (mm/min)}}{\text{Spindle Speed } n \text{ (rpm)} \times \text{number of finishing knives } N}$$



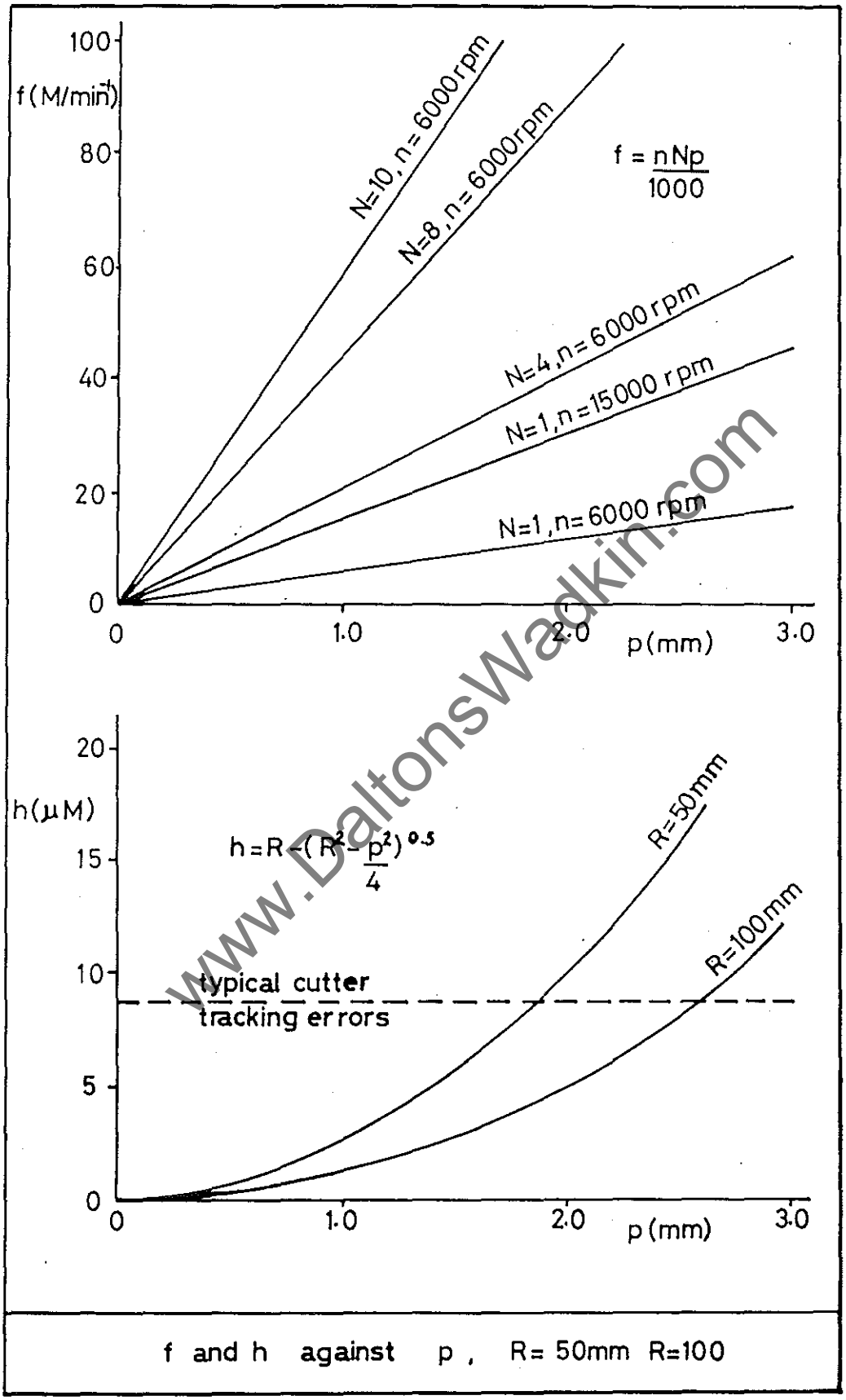
$$\text{Wave height } h \text{ (mm)} = R - \left(R^2 - \frac{p^2}{4}\right)^{0.5}$$

FIG 1

Under normal toolsetting techniques only one knife in the cutterblock produces a finishing wave, the other knives cut the timber but do not affect the finish.

When jointing is applied the cutting edges are trued exactly and consequently all the knives in the cutterblock produce a finishing wave. In theory, this would produce a very fine wave pitch if run at the feed speed suitable for a single finishing knife. This would produce overcutting and power requirements would also increase.

In practice wave pitch values of 1.0 to 2.5mm are necessary, depending on the end use of the timber. Therefore, when jointing the feed speed must be increased to give desired wave pitch.



f and h against p , R= 50mm R=100

50A

Typical wave pitch values for different applications are:

Sawmilling	1.5 to 2.5mm
Joinery	1.5 to 2.0mm
Strip Moulding	1.3 to 2.0mm
Furniture	1.0 to 1.5mm

These are for the visible surfaces of a product, clearly larger values can be permitted on hidden faces.

It should be noted that as wave pitch and depth of cut are reduced the power required may increase, due to the cutting edge tending to rub over the timber surface rather than cutting.

PRACTICE

The technique of jointing is achieved by grinding all cutting edges of the knives in the cutterblock within 0.010mm of the true cutting circle in the toolroom. When mounted in the machine an abrasive stone is traversed across the width of the cutterblock (straight jointing) while it rotates at the correct operating speed, (normally 4500 or 6000 rpm).

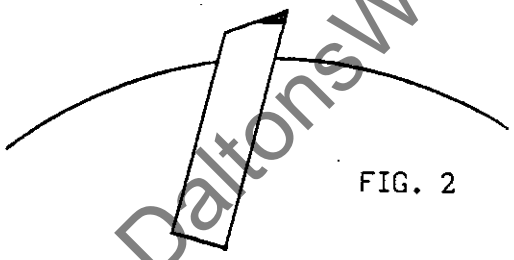


FIG. 2

This action effectively puts a flat on the cutting edges of the knives in the cutterblock. The width of flat (joint) produced increases for each successive jointing and for efficient operation should not exceed 0.5mm.

There are two types of jointing, depending on the cutters to be jointed. 'Straight', across the knife, for planing; or 'Profile', toward the knife, for profiled moulding cutters. The latter operation is also referred to as 'plunge' jointing.

The stone used in straight jointing is relatively hard. This is set to the cutter as shown in **Operating Practice**, then traversed across the cutterblock face to ensure that all cutters touch. The spindle is then rotated under power and a traverse taken to true the cutting circle.

The stone used in profile jointing is relatively soft. This is fed toward the cutterblock knife faces, the stone being shaped to suit the cutter profile. Both methods are described.

Straight Jointing

1) Using the index wheel, set the jointing stone to just touch the cutter knives, then traverse the stone across the cutter head (stationary) to ensure that all cutters touch. Park the stone 5 to 10mm away from cutters until ready to use.

2) Set spindle in operation. When up to normal operating speed, traverse once. Set a further increment of cut on the index wheel and repeat traverse. A smooth hand operation is best.

3) Switch off spindle head. Bring the spindle to rest as smoothly as possible using automatic braking (if fitted).

4) Check the cutter joint, using a light to ascertain if even jointing has been applied to all cutting edges.

5) Repeat as necessary until an even joint heel (see Operation Practice - Jointing) has been achieved. Park the stone away from the cutters.

When rejointing, it is useful to apply a black ink marker along the cutting edges. This will help identify when all the cutters have been successfully jointed.

Profile Jointing

1) The profile to be used is first marked out on the stone, which is then hand-ground to the required shape, using a profile template. It is good practice to finally bevel the stone edges (see Fig 3).

2) Mount the profiled stone in the holder located on the machine body and secure in position with the locking screws.

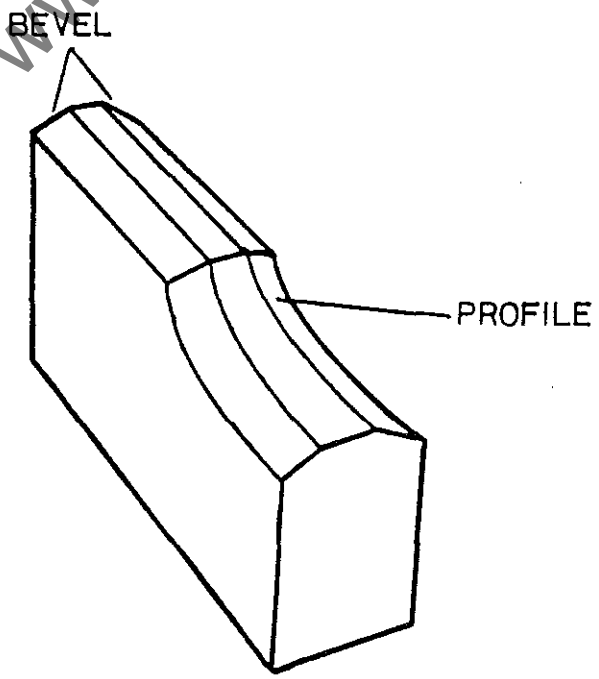


FIG 3
TYPICAL PROFILE
JOINTING STONE

3) Position the stone to the cutterhead using the jointer cross traverse and radial feed screws. Lock the jointer slide in the correct axial position, making sure that the stone profile corresponds to the cutter knives.

4) The stone is finally shaped to the cutters turning the spindle slowly by hand - termed 'chipping'.

5) Carry out jointing operation, steps (2) to (5) as for 'Straight' jointing; except that instead of traversing the cutter knives, the stone is now progressively fed (plunged) into the tool face until the correct heel or land is achieved on the cutter knives.

6) When profile jointing, the index ratchet may be disengaged to allow the stone to be retracted quickly after the required joint has been achieved.

7) Park the profile jointing stone 5 to 10mm away from the cutters.

Jointer - Fence Side Head (Fig 4)

This is a combined straight knife and profile jointer with traverse screw and index feed, located on a post fitted to the fence side head cross slide and positioned adjacent to the cutterblock.

The traverse screw is operated from the front of the machine via a bevel gear arrangement using a removable handle applied to a square on the geared shaft extension which forms part of the fence side head controls.

The jointer locating post and bevel gear form an integral part of the head cross slide. The jointer itself is demountable, but will normally remain in position.

Method of Use

1) Fit pre set profile or straight jointer stone cartridge (1) to head clamp block (2) and secure.

2) Move the jointer head into position relative to the cutterblock using the traverse (3) and index wheel (4).

3) Proceed as described in Jointing Practice - Methods, as applicable, until an even joint has been obtained.

4) When straight jointing: Fit winding handle to the square on the traverse screw (3).

5) When profile jointing: Lock the traverse screw in position. Feed the profile stone to the cutter using index wheel (4).

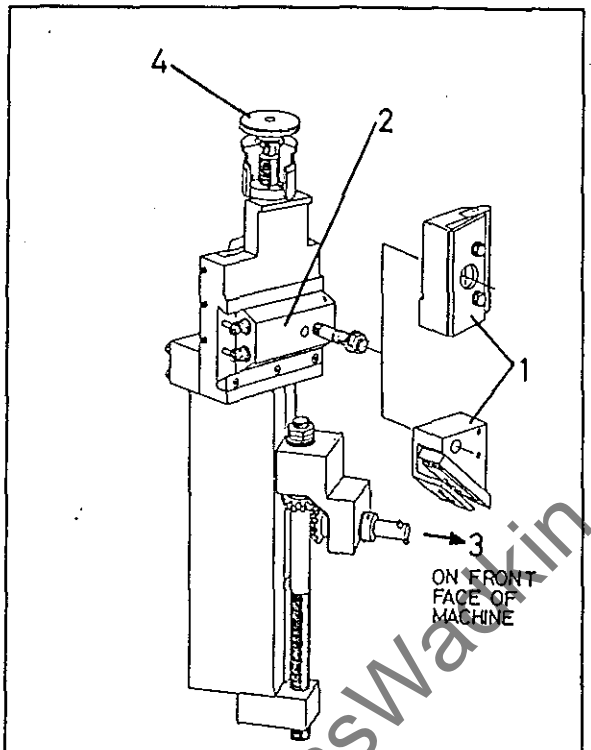


FIG 4 FENCE SIDE HEAD JOINTER

6) On completion, retract the jointing stone and park away from the cutter knives. Restore head covers to original position.

Note: When straight jointing the stone is positioned in the angled slot. When profile jointing, parallel to the cutters.

Jointer - Near Side Head (Fig 5)

This is a combined straight knife and profile jointer with traverse and indexed feed similar to the fence side head. The jointer is located on a post positioned adjacent to the cutter spindle on the near side.

The traverse screw is operated by a removable handle applied to a square extension located at the top of the jointer slide. The feed index operates in a similar way to the fence side head.

When the jointer is in use the cover of the near side hood may be removed to give increased access to the cutterblock. After use retract and park the stone. Replace covers or guards removed.

Method of use

1) Proceed as described in Fence Side Head, items (1) to (3), until an even joint has been obtained.

2) When straight jointing: Fit winding handle to the square on the traverse screw (1).

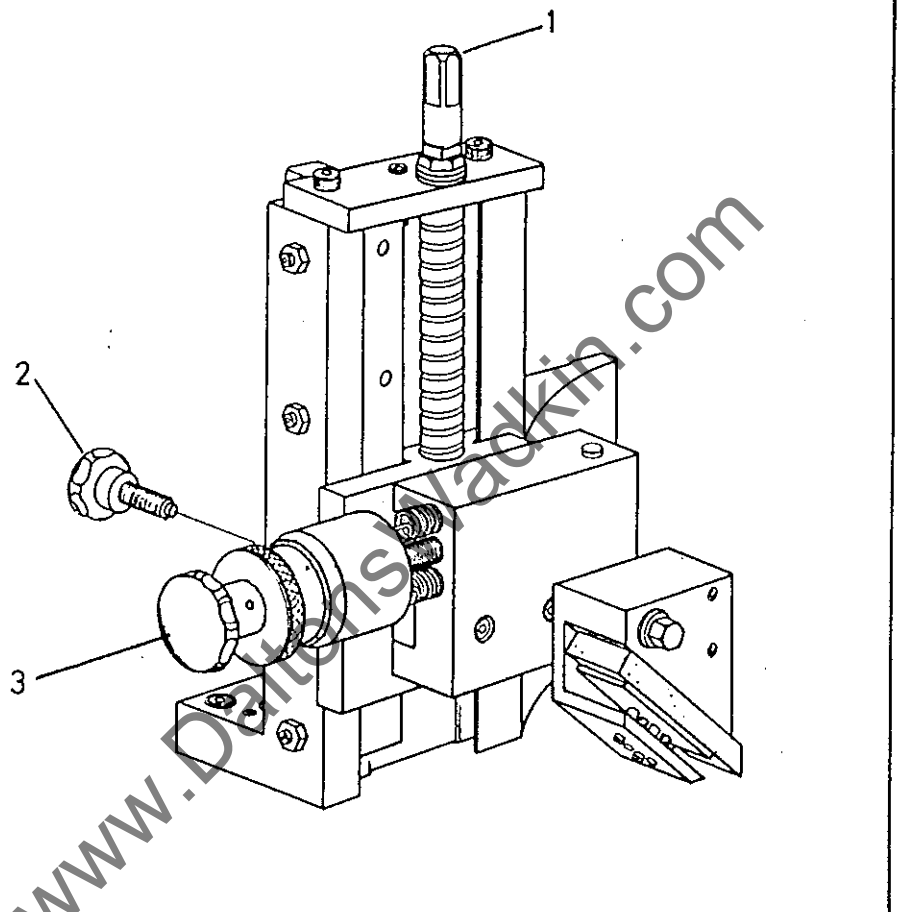


FIG 5 NEAR SIDE HEAD JOINTER

3) When profile jointing: Lock the traverse screw in position with screw (2). Feed the profile stone to the cutter using index wheel (3).

4) On completion, retract the jointing stone and park away from the cutter knives in nearside position. Restore head covers to original position.

NOTE: When straight jointing the stone is positioned in the angled slot. When profile jointing, use the slot parallel to the cutters.

Jointer - Top Heads (Fig 6)

This is a built-in combined straight and profile jointer, forming part of the assembly which also carries the top head chipbreaker and outboard bearing attachment.

The method of traverse and feed are similar to the bottom heads. When straight knife jointing, the axial traverse is effected by a winding handle applied to the square end of the traverse screw. A locking screw is provided to lock the slide traverse while profile jointing.

Method of Use

1) Fit pre set profile or straight jointer stone cartridge (1) to head clamp block (2) and secure.

2) Move the jointer head into position relative to the cutterblock using the traverse (3) and index feed (4).

3) Proceed as described in Jointing Practice - Methods, as applicable, until an even joint has been obtained.

4) When straight jointing: Fit winding handle to the square on the traverse screw (3).

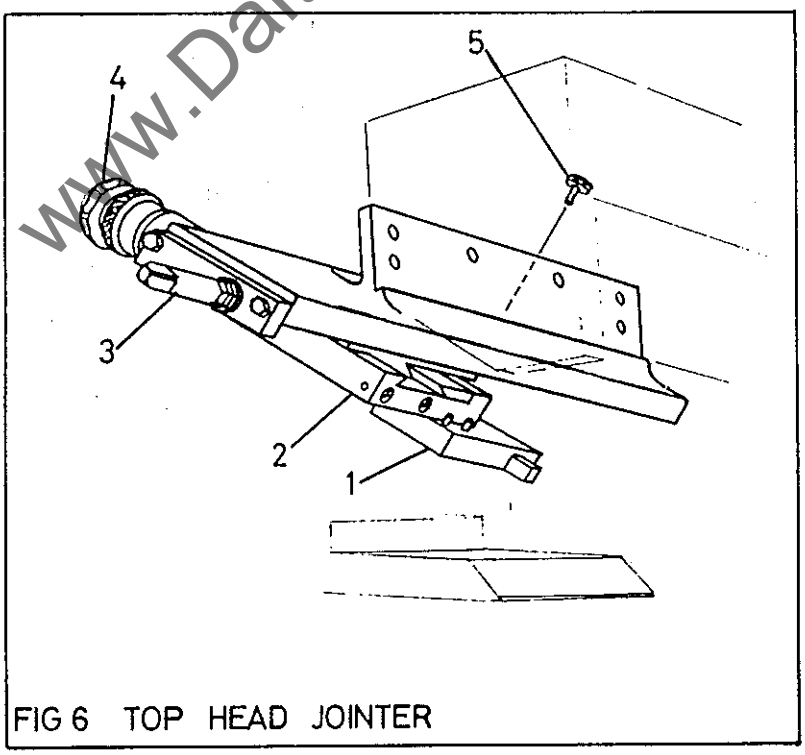


FIG 6 TOP HEAD JOINTER

5) When profile jointing: Lock the traverse screw in position with screw (5). Feed the profile stone to the cutter using index wheel (4).

6) On completion, retract the jointing stone and park away from the cutter knives in nearside position.

NOTE: When straight jointing, the stone is positioned in the angled slot. When profile jointing, use the slot parallel to the cutters.

Jointer - Second Bottom Head (Fig 7)

This is a 'built in' combined straight knife and profile jointer, with index feed wheel and traverse screw similar to the top head jointer. The method of operation is similar.

On the Second Bottom head the outfeed bedplate can be retracted to give increased access to the jointer by slackening two screws on the bedplate.

When straight jointing the axial traverse is effected by using a winding handle on the square end of the traverse screw.

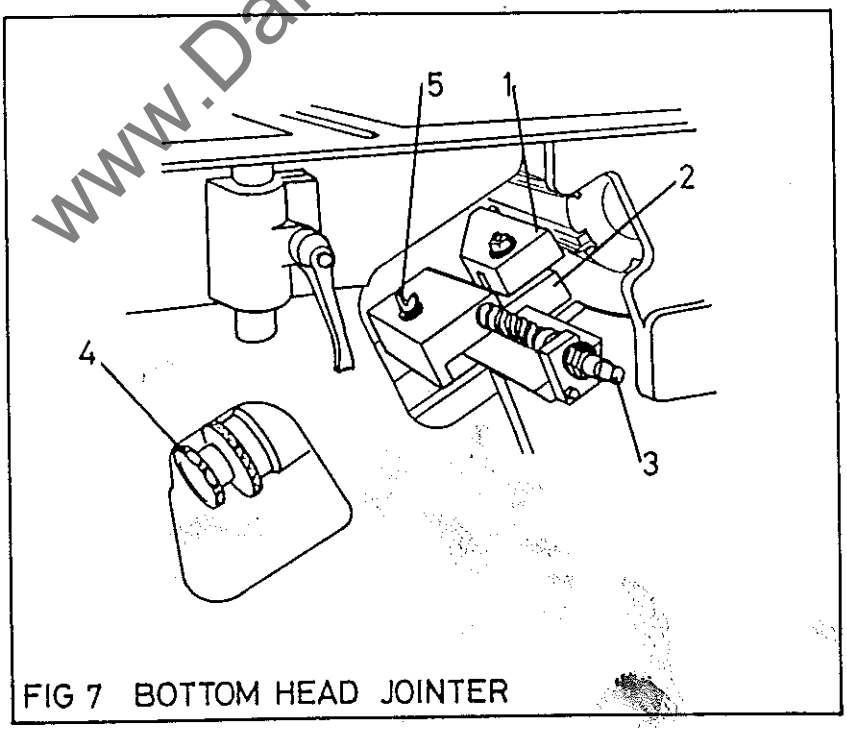


FIG 7 BOTTOM HEAD JOINTER

Method of Use

1) Fit pre set profile or straight jointer stone cartridge (1) to head clamp block (2) and secure.

2) Move the jointer head into position relative to the cutterblock using the traverse screw (3) and index wheel (4).

3) Proceed as described in Jointing Practice - Methods, as applicable, until an even joint has been obtained.

4) When straight jointing: Fit winding handle to the square on the traverse screw (3).

5) When profile jointing: Lock the traverse screw in position with screw (5). Feed the profile stone to the cutter using index wheel (4).

6) On completion, retract the jointing stone and park away from the cutter knives in nearside position.

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 electrical control panel (see Fig 1).

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 (see 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 changeover lever).

To move the heads to a pre-determined position

(1) Switch to 'Elgo' operation **(see 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.

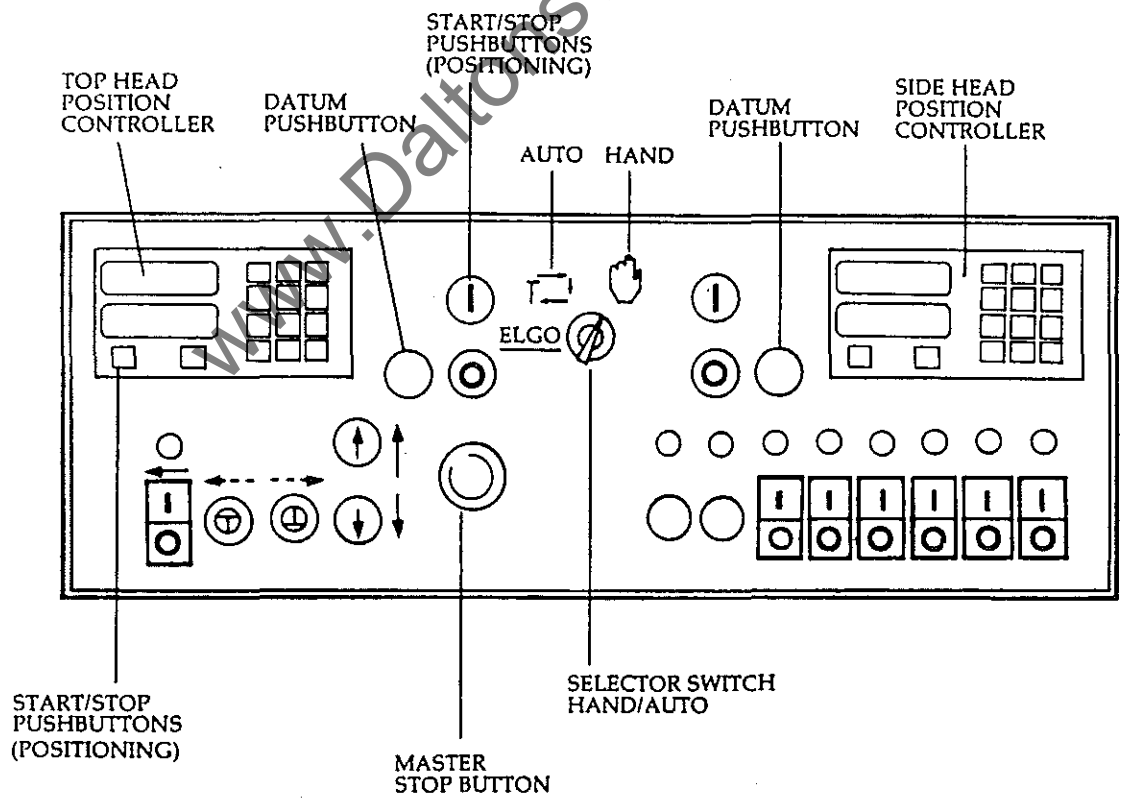


FIG 1 DIAL-A-SIZE CONTROL PANEL

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.

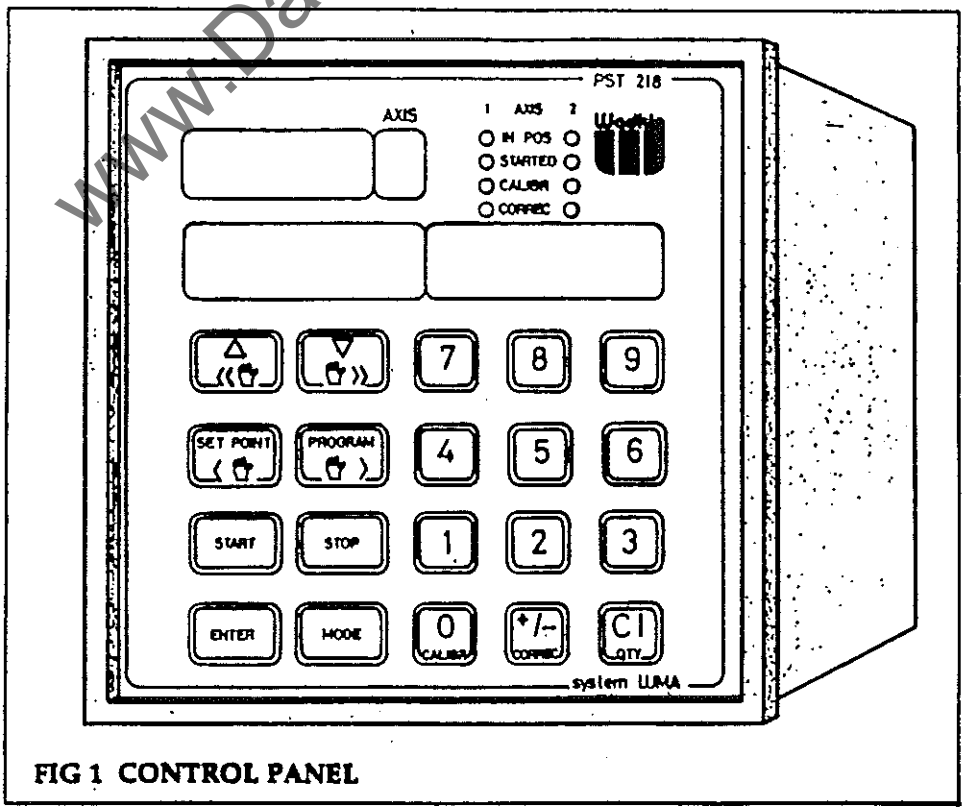


FIG 1 CONTROL PANEL

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

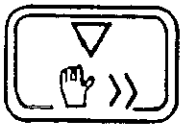
SWITCH ON MACHINE

CALIBRATION (Manual)

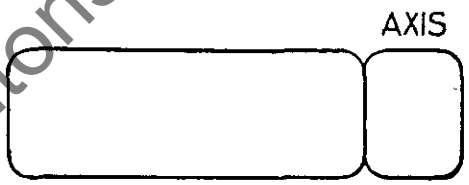
Each axis must be datumed before production is started.

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.

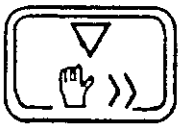
Press enter.

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.

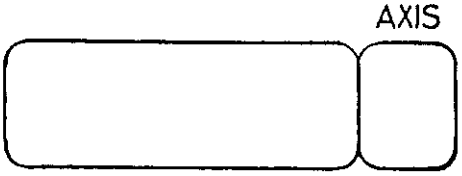
Confirmation is in the top right of the unit where there are LED lights for each axis which represent the calibration.

MANUAL POSITIONING

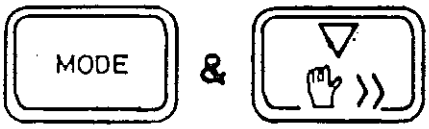
The axis to be moved must be selected first.



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.



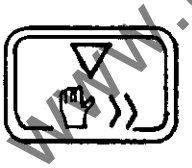
Move to a higher value than the position.

Move to a lower value than the position.

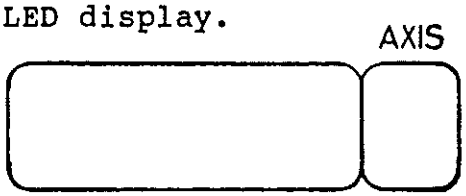
When manual positioning is finished, the stop button must be pressed to put the unit back into the automatic mode.

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.

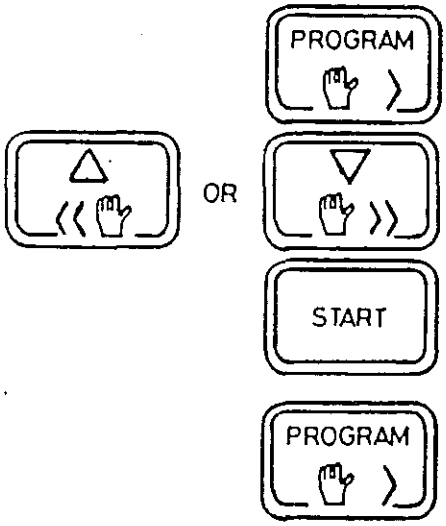
Pressing the 'start' button will send the axis to the position.

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.

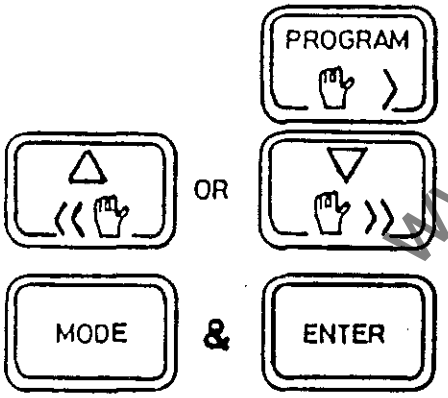
Pushing either of the two button will increase or decrease the program number to the one required.

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 O is only for test purposes.

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

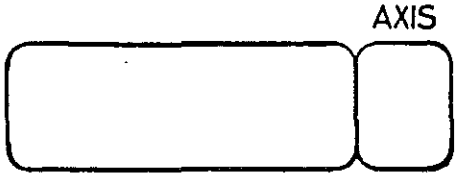
TO USE THE RADIUS OFF-SET FEATURE

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.



MODE & 0 CALIBR

The mode and calibration buttons must be pressed simultaneously.

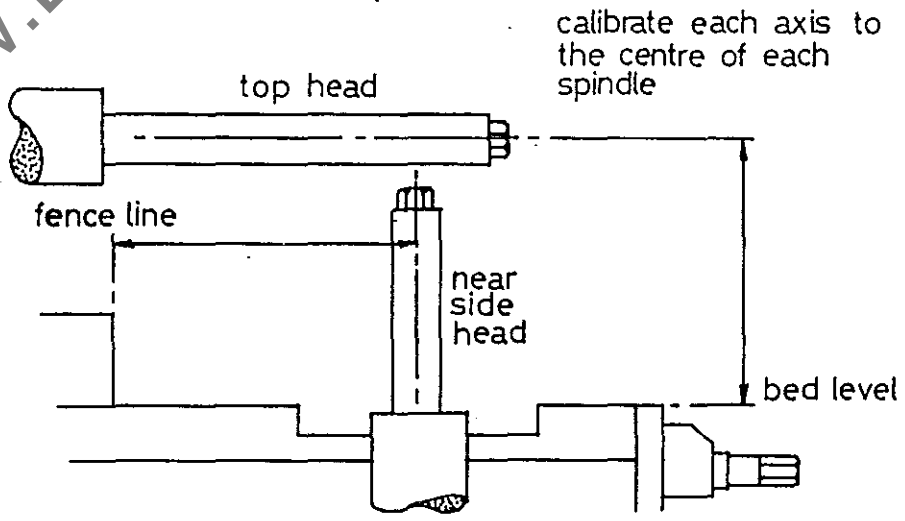
Enter the distance from the centre of the spindle to the bed, or fence, depending which axis is being calibrated.

ENTER

Press Enter

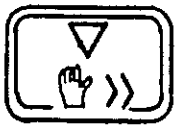
The axis should now be datumed, repeat the same operation for the second axis. When both axis have been datumed, the unit is ready for use.

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.

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.

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 lubricaion 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 where possible. 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.

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 mechanical variable speed drive unit.

Daily

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

A hand operated lubricating pump is fitted to provide oil feed lubrication to the machine bed. The hand lever is 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 pre-set amount. The oil reservoir holds 1 litre (1.76 pints) of oil. Replenish with Wadkin Grade L4 oil (see Approved Lubricants) as needed.

The machine can be fitted with auto-bed lubrication, this is controlled by a selector switch on the main panel. The amount of oil delivered is pre-set by taps on the machine.

Weekly

The chain drives to the bottom feedrolls should be lubricated weekly with an oil can using Wadkin Grade L4 oil. Access to the chains driving the feedrolls is gained from the rear of the machine.

Monthly/3 Monthly

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

Generally, machine drive spindles and cardan shafts will be lubricated monthly using Wadkin Grade L6 grease.

Shaft Drives

The XE woodworking machine is fitted with shaft drive to the feedworks.

The primary drive is by solid shaft and couplings to a gearbox at each working head. The primary drive is virtually maintenance free.

Power transfer to each feedroll is via a right-angle gearbox and cardan shaft. The bottom rolls are driven by a chain and sprocket drive taken off 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 hour intervals). Request information for this item before changing lubricant.

The cardan shafts should be lubricated at intervals as specified in Lubrication. No other maintenance will normally be required on the shaft drive.

Chain Drive Tensioning (Fig.1)

Adjustment is provided to the chain drives. These should be checked at regular intervals (Monthly/3 Monthly) and any slack in the drive taken up.

Checking/Adjustment is carried out as follows:

(1) Remove the drive cover.

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

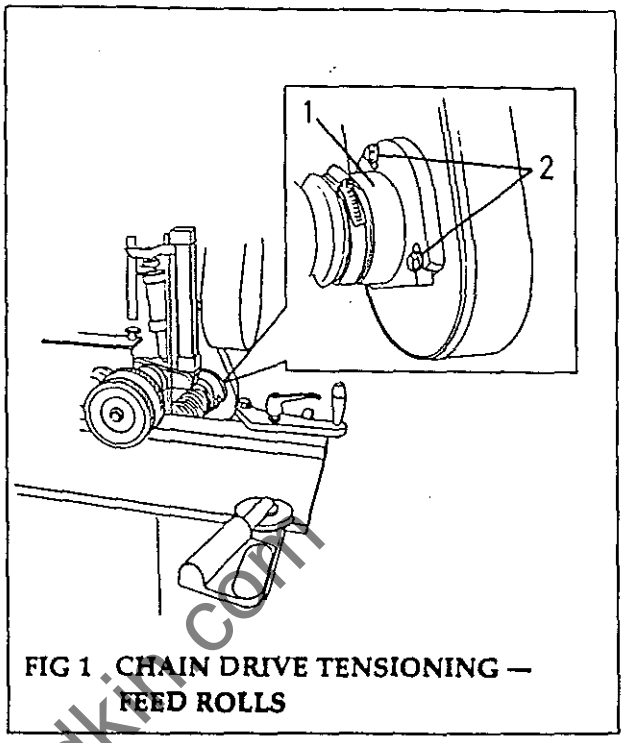


FIG 1 CHAIN DRIVE TENSIONING — FEED ROLLS

(3) To adjust: Re-position the driven sprocket spindle (1), by slackening the securing screws (2) and moving the spindle with sprocket outward to take up any slack in the chain. Retighten screws (2) after adjustment.

Note: Do not overtension chain.

(4) Refit drive cover.

Vee-Belt Drive Tensioning

Vee-belts are fitted to the primary drive to the feedworks shafts on the hydraulic variable speed drive arrangement and to the individual motor drives to the cutterblock spindles on either arrangement.

Check drive belts at regular intervals (as indicated below). If the need arises re-tension. 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 spindle drive belts to take up initial belt stretch for the feedworks drive.

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 belt stretch.

It is important to check the condition and tension of the cutterspindle drive belts at regular 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 1/2 - 2 cm per metre of span by application of average thumb pressure, 5 -7 pounds force.

3) The method of adjustment is as follows :-

Drive Belt (Fig 2)

To adjust: Release the securing screws (1). Turn the adjusting screws (2), on the motor support bracket until any slack has been removed from the drive. Retighten the securing screws after adjustment. Do not overtension belts.

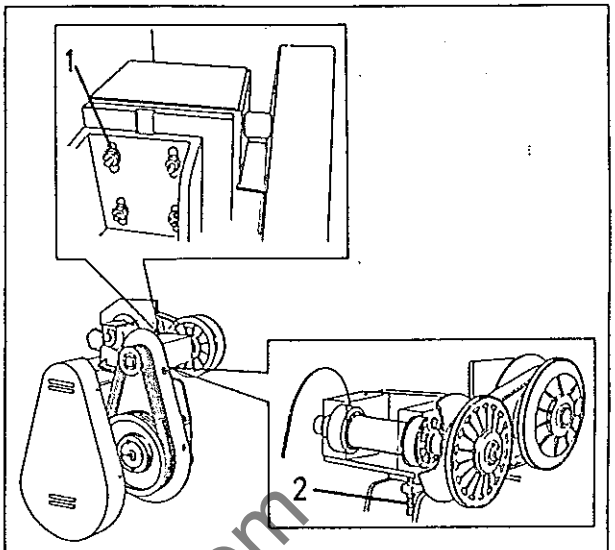


FIG 2 VEE-BELT DRIVE TENSIONING

lst bottom head (Fig 3)
a) Slacken off motor clamping bolts.
b) Fit spanner (1) provided, to adjusting screw (2) located at motor bracket and turn in on anti-clockwise direction to tension the belt drive.
c) Tighten motor clamp bolts. (1)

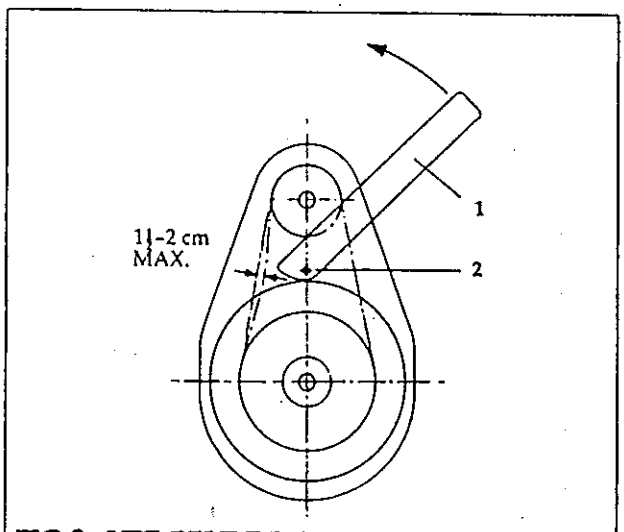


FIG 3 VEE-BELT DRIVE TENSIONING - FIRST BOTTOM HEAD

Fence side head (Fig 4)
a) Slacken off motor clamping bolts (1)
b) Tension belt using an outward force on the motor.
c) Tighten motor clamp bolts. (1)

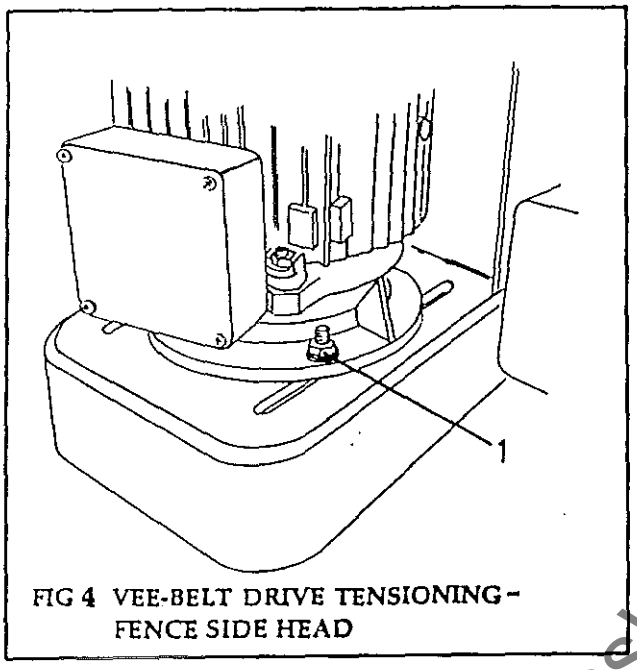


FIG 4 VEE-BELT DRIVE TENSIONING - FENCE SIDE HEAD

Near side head (Fig 5)
This motor is pivoted and as such the tensioning is against the pivot.

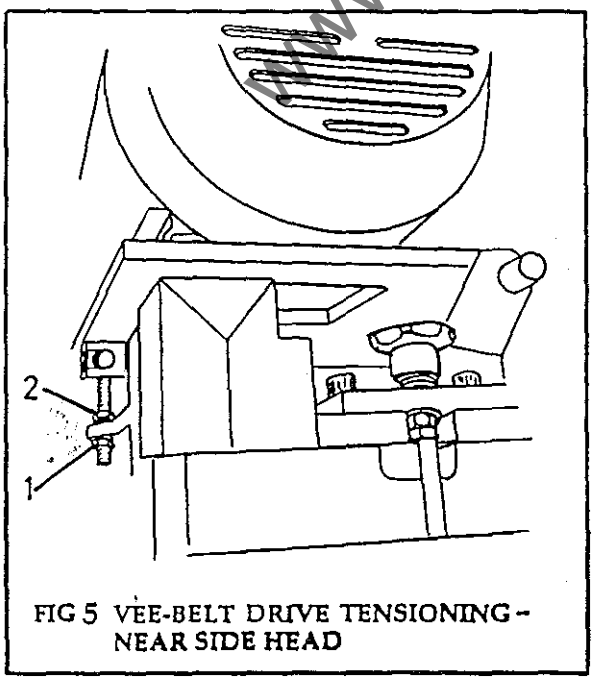


FIG 5 VEE-BELT DRIVE TENSIONING - NEAR SIDE HEAD

a) Slacken off the back locknut (1) and turn the front locknut (2) in an anti-clockwise direction to tension.
b) When the correct tension has been reached lock up both nuts (1 and 2).

Top and 2nd bottom heads (Fig 6)
a) Slacken of motor mounting plate clamp bolts (1)
b) Tension belt by slackening the top locknut (2) and turning the bottom locknut (3) in a Clockwise direction.
c) When tensioned lock up both locknuts (2 and 3) and motor mounting plate clamp bolts (1).

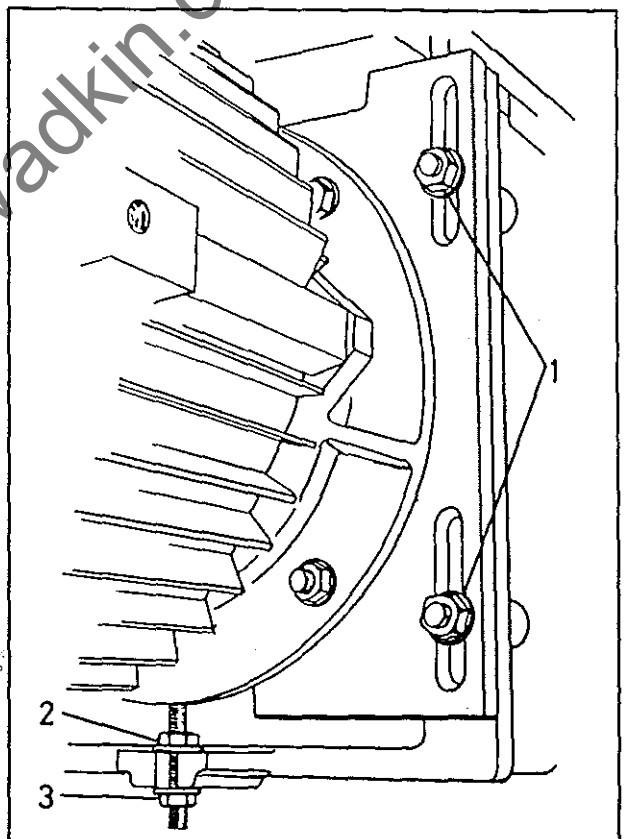


FIG6 VEE-BELT DRIVE TENSIONING - TOP HEAD AND SECOND BOTTOM HEADS

(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. Always retighten any securing features fitted.

If one or more of the vee-belts becomes faulty it will usually 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.

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 over-lubricate.

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

UNSCHEDULED MAINTENANCE

Unscheduled maintenance consists of replacing or correcting worn, damaged, or unserviceable components on the machine. 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 - such as changing bearings, should be performed by competant personnel.

Changing Cutterblock Spindle Bearings

The bearings have been fitted to the cutterblock spindles 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 (3).

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

Wadkin strongly recommend buying an exchange spindle unit rather than attempting a bearing change.

Before fitting a new bearing, the protection 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.

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) = d x B x 0.01
d = bore of bearing in mm
B = width in mm

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

Bearing Change
40mm Spindles only (Fig.1)

NOTE:
Work must take place in a clean and dry environment failure to do so could result in premature bearing failure.

(i) Remove pulley assembly from spindle by unscrewing the M12 hexagon screw (9), withdraw spigot (8), pulley (7) and remove parallel key (11) from spindle.

(ii) Ensure spindle nut (1) has been removed. Release and remove bearing nuts (3 & 4). The spindle (2) can now be withdrawn from the pulley end (rear) of the spindle housing (10). Remove existing bearings (6) and bearing spaces (5), using a bearing pulley on the bearing rings.

NOTE:- Care must be taken, not to damage the spindle (2) or the housing (10).

(iii) After preparation; fit new bearings (6) to spindle (2) and housing (10), ensuring that the bearings (6) are fitted the correct way round and that the bearing spacers (5) are re-fitted. Use only sufficient pressure to fit bearings, applying pressure to the inner ring only. Ensure that bearing fits up to location shoulder. Bearings (6) must be lubricated (see preparation) before fitting.

(iv) Reassemble spindle unit, fit bearing nuts (3 & 4). Tighten nuts until assembly is secure (see note on changing cutterblock bearings)

NOTE: DO NOT OVERTIGHTEN

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

(vi) Refit parallel key (11), pulley (7), spigot (8) and M12 hexagon securing screw (9). Tighten screw to spindle until the assembly is secure.

Bearing Change
45mm, 50mm and 1.13/16" Spindles only (Fig.2)

NOTE:
Work must take place in a clean and dry environment, failure to do so could result in premature bearing failure.

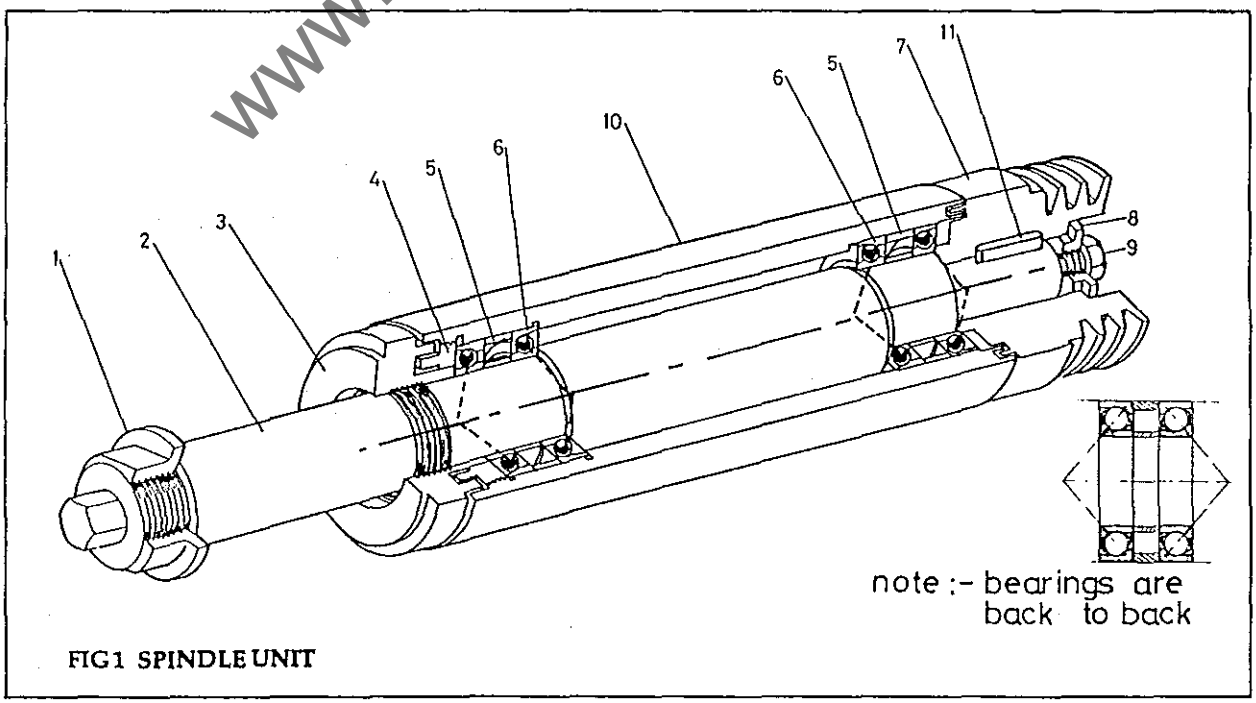


FIG1 SPINDLE UNIT

(i) Remove pulley assembly from spindle by unscrewing the M12 hexagon screw (9). Withdraw pulley (7), spigot (8), and remove parallel key (11) from spindle.

(ii) Ensure spindle nut (1) has been removed. Release and remove bearing nuts (3 & 4). The spindle (2) can now be withdrawn from the spindle end (front) of the spindle housing (10). Remove existing bearings (6) and bearing spacers (5 & 12), using a bearing puller on the bearing rings.

NOTE: Care must be taken not to damage the spindle (2) or the housing (10).

(iii) After preparation; fit new bearings (6) to spindle (2) and housing (10) ensuring that the bearings (6) are fitted the correct way round and that bearing spacers (5) are refitted. Use only sufficient pressure to fit bearings, applying pressure to the inner ring only. Ensure that bearing fits up to location shoulder. Bearings (6) must be lubricated (see preparation) before fitting.

(iv) Reassemble spindle unit ensuring that bearing spacer (12) is fitted correctly, fit bearing nuts (3 & 4). Tighten nuts until assembly is secure. (See note on changing cutter block bearings)

NOTE: DO NOT OVERTIGHTEN

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

(vi) Refit parallel key (11), pulley (7) and hexagon securing screw (9). Tighten screw to spindle until the assembly is secure.

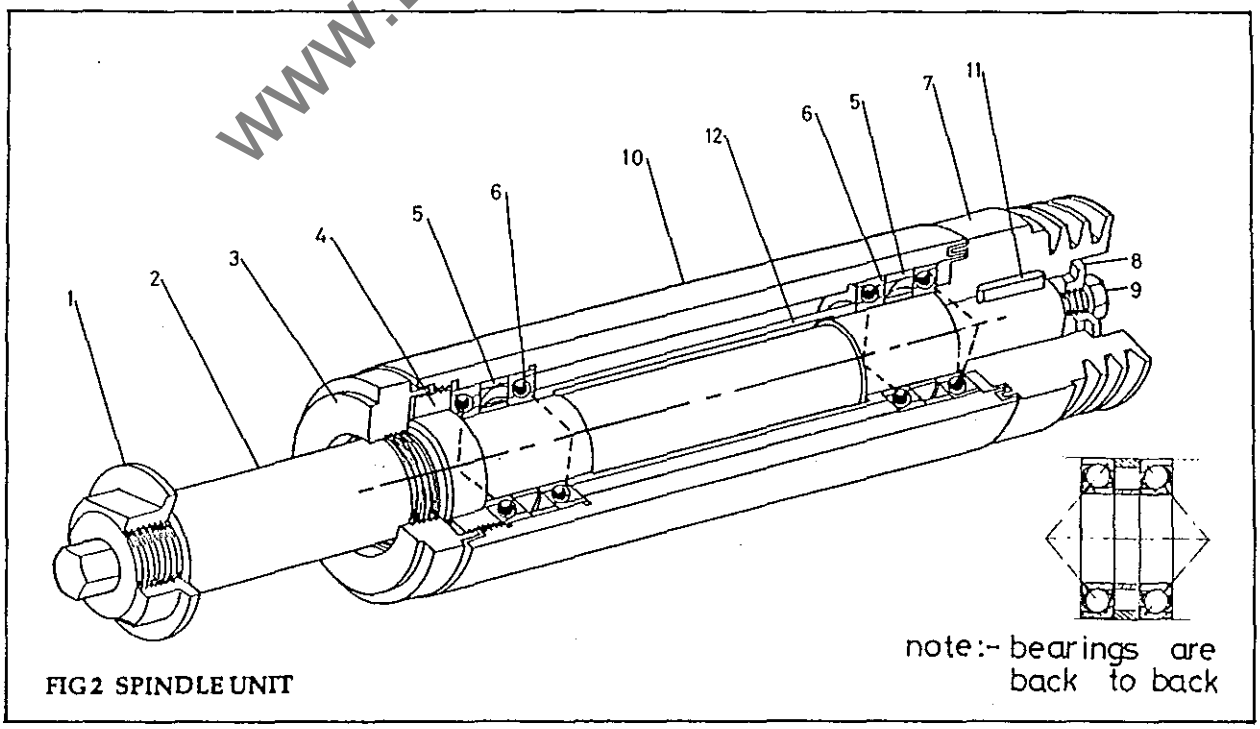


FIG 2 SPINDLE UNIT

Outboard Bearing Change 1st & 2nd Bottom Heads (Fig.3)

NOTE
Work must take place in a clean and dry enviroment, failure to do so could result in premature bearing failure.

To remove bearings

(i) Remove outboard bearings assembly from machine.

(ii) Remove bearing locknut (2), un-screw hexagon socket capscrews (10) and remove the protective ring (1), it is not necessary to remove the grease nipple (9) or the pressure release valve (8).

(iii) Remove the end cap for the outboard bearing housing (5) by removing 4-off hexagon socket capscrews (11).

(iv) Withdraw the ETP sleeve(12) the bearing spacer (3) and the spring disc (4). The bearing (6) should be withdrawn with the sleeve, unless the failure of the bearing (6) has caused it to seize in the housing (7).
If the bearing is stuck in the housing remove it using a bearing puller on the bearing rings. Take care not to damage the housing (7).

(v) After preparation, (see preparation prior to fitting bearing) fit new bearing (6) to ETP sleeve (12) ensuring that the bearing spacer (3) and the disc spring (4) have also been fitted.
Use only sufficient pressure to fit bearings, applying pressure to the inner ring only. Ensure that bearing ring fits up to location.

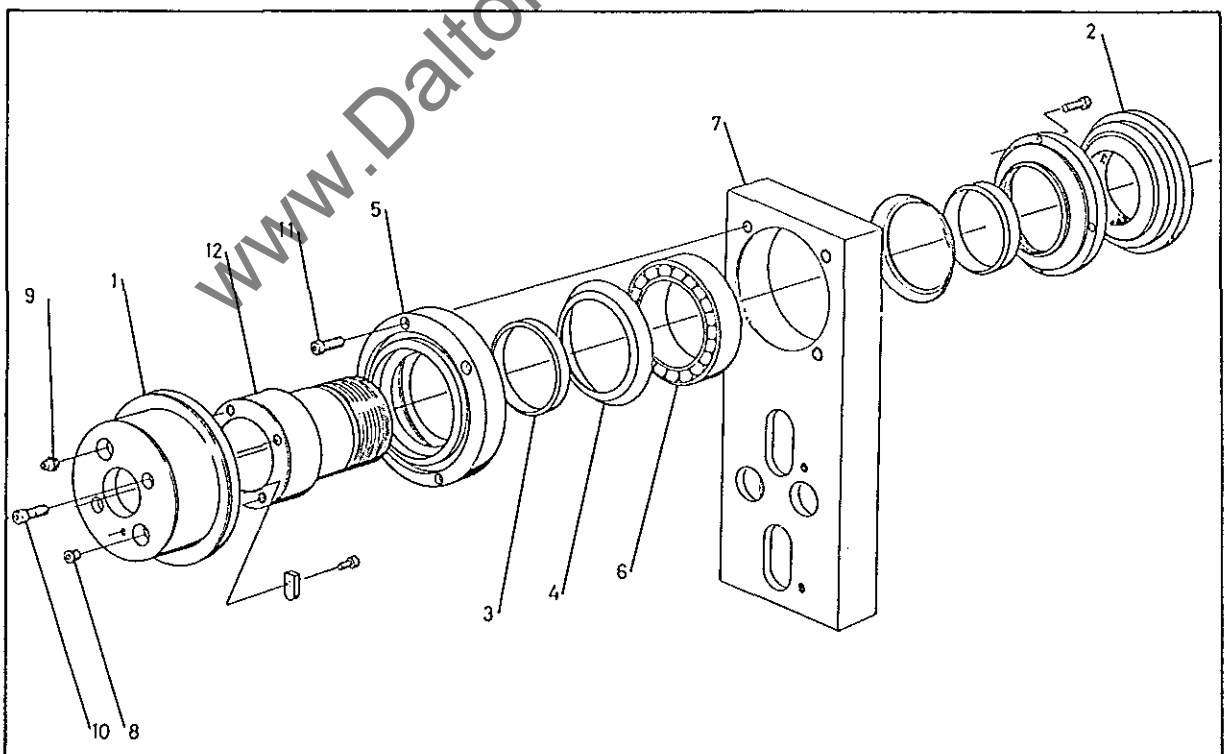


FIG 3 OUTBOARD BEARING

(vi) Lubricate bearing (see preparation)

(vii) Reassemble unit by reversing stages iii, ii, i) ensuring that the labrinyth seals in the outboard bearing end caps (5) are refilled with grease.
Care must be taken when fitting bearing locknut (2) not to overtighten. A small amount of engineering adhesive (loctile grade 241) should be applied to the thread of the bearing locknut (2).

NOTE:
The bonding adhesive from the previous assembly may be left as a powder and must be removed before applying further adhesive.

(viii) Check that outboard assembly runs freely.

Outboard Bearing Change Mk III Top Heads (Fig.4)

NOTE
Work must take place in a clean and dry environment, failure to do so could result in premature bearing failure.

(i) Remove outboard bearing assembly from machine.

NOTE: It is not necessary to remove the housing assembly (2) from the mounting plate (1), unless the housing (2) has become damaged.
To remove see later note "housing removal".

(ii) Remove 2.off GRUB SCREW (15)
Remove ETP sleeve locknut (4), remove 2-off hexagon socket capscrew (10) which will then allow the ETP end cap (5) to be withdrawn.

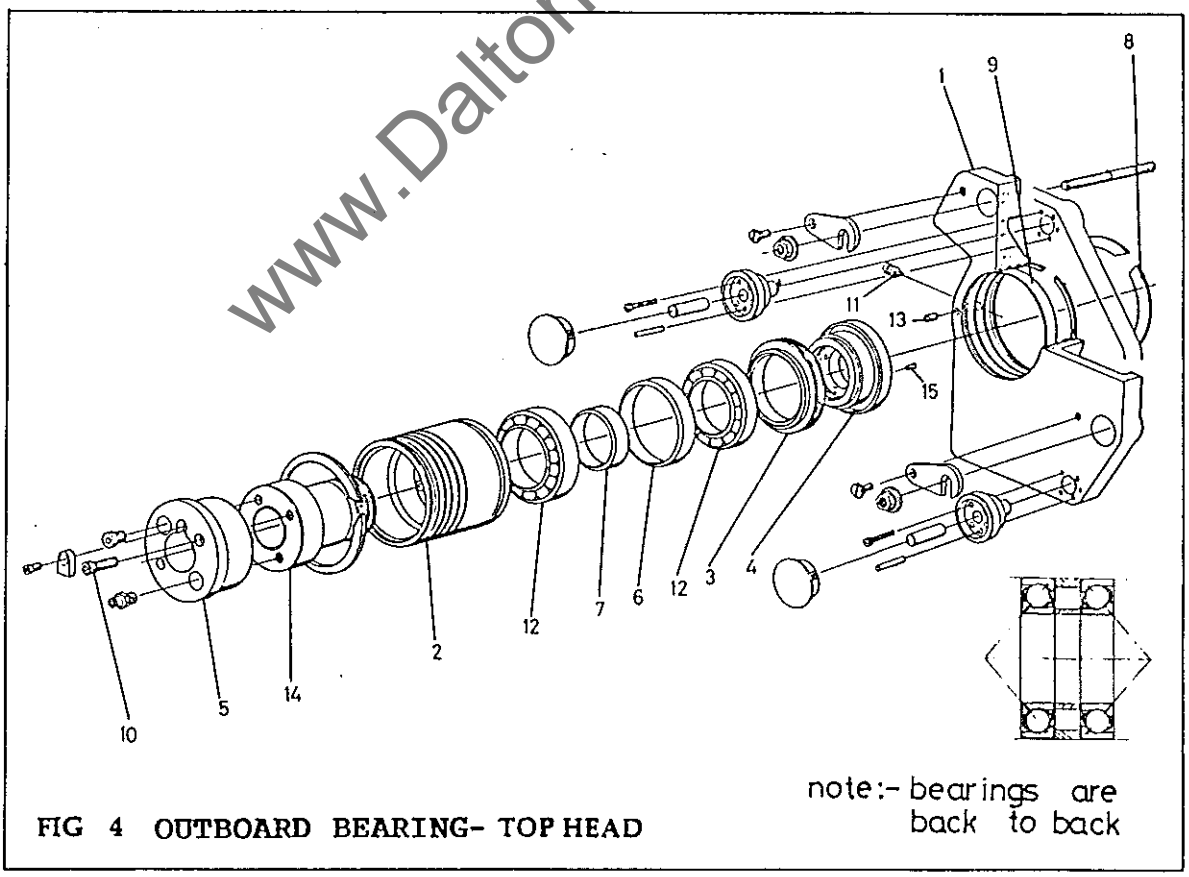


FIG 4 OUTBOARD BEARING- TOP HEAD

Remove bearing locknut (3), the ETP sleeve (14) and the bearing assembly can be withdrawn from the rear of the housing (2).

(iii) The bearings (12) can now be removed along with the bearing spacers (6 & 7) using a bearing puller.

NOTE
Care must be taken not to damage the ETP sleeve (14).

(iv) After preparation (see preparation prior to fitting bearings), and lubrication. The new bearings (12) can now be fitted to the ETP sleeve (14) complete with the bearing spacers (6 & 7). Ensure that the bearings (12) are fitted the correct way round. Use only sufficient pressure to fit bearings, applying pressure to the liner rung only. Ensure that the bearing rung fits up to the location shoulder.

(v) Refit ETP sleeve (14) and bearing assembly into the housing (2) ensuring that the assembly fits right upto the shoulder of the housing (2). Refit bearing locknut (3) ensuring that it is tight. Refit sleeve end cap (5) and sleeve locknut (4) insert grubscrews (15).

NOTE
Ensure all Labyrinth seals are re-filled with grease.

HOUSING REMOVAL

(i) Remove outboard bearing assembly from machine.

(ii) Remove grubscrew (13), remove anti rotation pin (11). Remove the External circlip (8) from the rear of the housing, this will allow the housing assembly to be removed from the front of the machine. Care must be taken not to damage the housing assembly (2) or the mounting plate (1).

(iii) To refit the housing reverse the previous steps. Re-assembly will be aided by smearing the bore of the housing plate (1) with oil.

NOTE
Care must be taken when re-assembly not to damage the tape strip (9) in the housing plate (1).

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 belt drive

(i) 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 upward.

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

(ii) Remove old drive belts, fit a new set of belts, same size, type and reference (see motor drive belt data).

(iii) Retension the new belt set (see Vee-Belt tensioning - scheduled maintenance) as applicable to drive motor attachment.
Secure all fixing/adjusting belts.

NOTE
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. (See, remove and refit Drive pulleys)

Replacing Variable Speed Drive Belt (Fig 5)

(1) With the machine in motion adjust the drive unit to the maximum output speed. Before dismantling switch off drive.

(2) Remove the front and rear covers (1) and the first rear drive cover (2).

(3) Unbolt and remove the variable speed adjustment unit mounting bracket (3).

(4) Removing the circlip (4) at the end of the pulley shaft, allows the variable speed pulley to be separated by sliding the outter pulley half (5) off the shaft.

(5) The old belt may now be removed and a new 'Simplabelt' drive belt fitted.

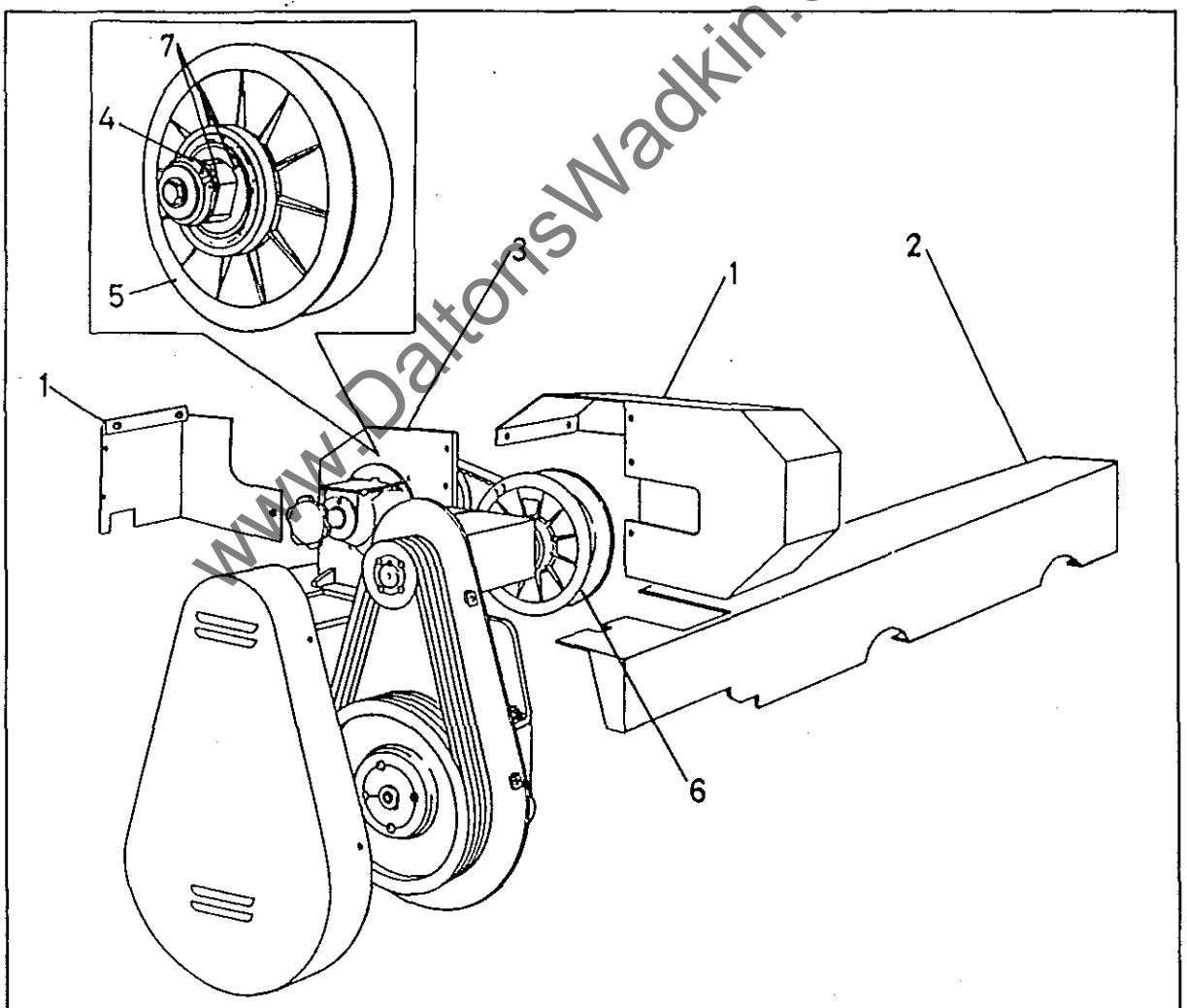


FIG 5 REPLACING VARIABLE SPEED DRIVE BELT

First place the new belt into the sprung loaded pulley (6). Ensure belt is seated below pulley rims.

NOTE:- It may be necessary to slightly open out the pulley halves with a soft piece of wood to allow the belt to fit. Care must be taken not to damage or distort pulley.

(6) Refit variable pulley outter halve (5) trapping the belt between halves. Replace Circlip (4).

NOTE:- The pulley is balanced and as such should be refitted lining up balance lines (7).

(7) Assembly procedure is the reverse sequence.

Removal and Refit of Drive Pulleys (Fig.6)

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) alternatively 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.

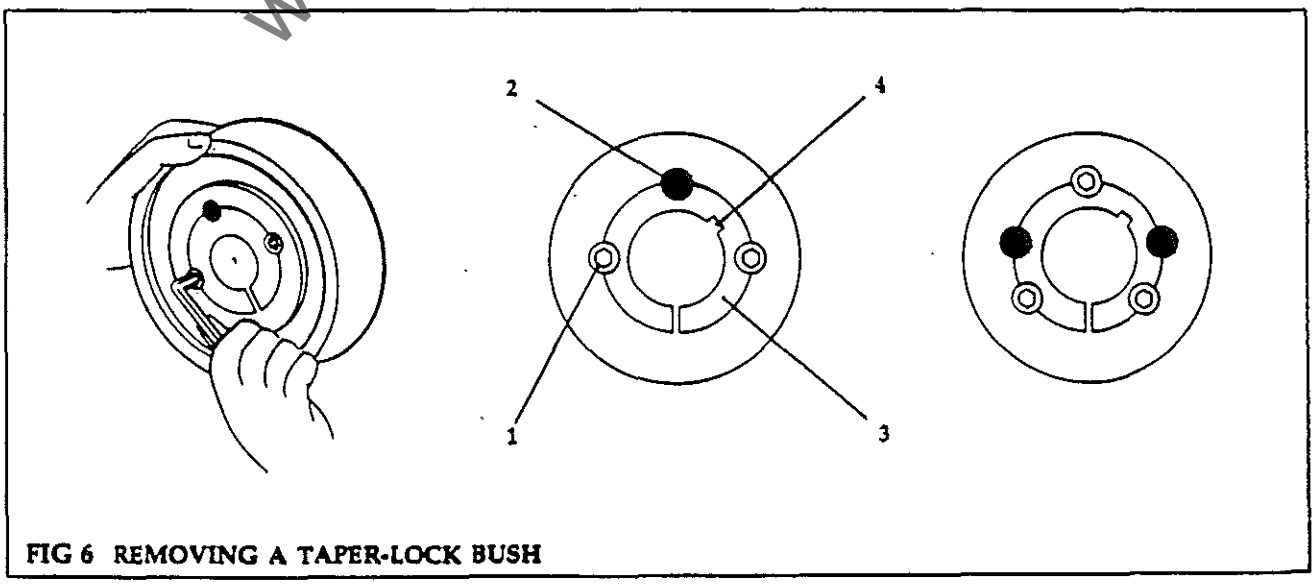


FIG 6 REMOVING A TAPER-LOCK BUSH

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.

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. Replace contactor

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 complete contactor

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 infeed 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.

Belts and pulleys for spindle drive to NEAR SIDE HEAD Frequency 50 Hertz													
Motor			Motor Pulley		Motor Taper Lock Bush			Belts				Spindle Pulley	Spindle Speed
Frame Size	K.W.	HP	Fenner Ref.	Wadkin Ref.	Bore M.M.	Fenner Ref.	Wadkin Ref.	Fenner Ref.	Optibelt Ref.	Wadkin Ref.	Qty	Wadkin Ref.	R.P.M
D132	5.5	7.5	031Z0223	K3078218	38	2012	K3078113	SPZ 1650 CR		K3078649	3	GA 7714	6000
D132	5.5	7.5	031Z0303	K3078245	38	2012	K3078113	236Z 0180		K3078638	3	GA 7714	9000
D132	7.5	10.0	031Z0223	K3078218	38	2012	K3078113	SPZ 1650 CR		K3078649	3	GA 7714	6000
D132	7.5	10.0	031Z0303	K3078245	38	2012	K3078113	236Z 0180		K3078638	3	GA 7714	9000
D160	11.0	15.0	031Z0223	K3078218	38	2012	K3078113	SPZ 1650 CR		K3078649	3	GA 7714	6000
D160	11.0	15.0	031Z0303	K3078245	38	2012	K3078113	236Z 0180		K3078638	3	GA 7714	9000

Belts and pulleys for spindle drive to NEAR SIDE HEAD Frequency 60 Hertz													
Motor			Motor Pulley		Motor Taper Lock Bush			Belts				Spindle Pulley	Spindle Speed
Frame Size	K.W.	HP	Fenner Ref.	Wadkin Ref.	Bore M.M.	Fenner Ref.	Wadkin Ref.	Fenner Ref.	Optibelt Ref.	Wadkin Ref.	Qty	Wadkin Ref.	R.P.M
D132	5.5	7.5	031Z0203	K3078272	38	2012	K3078113	236Z 0160		K3078652	3	GA 7714	6000
D132	5.5	7.5	031Z0263	K3078244	38	2012	K3078113	263Z 0170		K3078650	3	GA 7714	9000
D132	7.5	10.0	031Z0203	K3078272	38	2012	K3078113	236Z 0160		K3078652	3	GA 7714	6000
D132	7.5	10.0	031Z0263	K3078244	38	2012	K3078113	236Z 0170		K3078650	3	GA 7714	9000
D160	11.0	15.0	031Z0203	K3078272	38	2012	K3078113	236Z 0160		K3078652	3	GA 7714	6000
D160	11.0	15.0	031Z0263	K3078244	38	2012	K3078113	236Z 0170		K3078650	3	GA 7714	9000

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

Motor			Motor Pulley		Motor Taper Lock Bush			Belts				Spindle Pulley	Spindle Speed
Frame Size	K.W.	HP	Fenner Ref.	Wadkin Ref.	Bore M.M.	Fenner Ref.	Wadkin Ref.	Fenner Ref.	Optibelt Ref.	Wadkin Ref.	Qty	Wadkin Ref.	R.P.M
D132	5.5	7.5	031Z0266	K3078240	38	2517	K3077194		SPZX/3V-960PL	K3078655	3	GA 7713	6000
D132	5.5	7.5	031Z0306	K3078242	38	2517	K3077194		SPZX/3V-1060PL	K3078670	3	GA 7686	9000
D132	7.5	10.0	031Z0266	K3078240	38	2517	K3077194		SPZX/3V-960PL	K3078655	3	GA 7713	6000
D132	7.5	10.0	031Z0306	K3078242	38	2517	K3077194		SPZX/3V-1060PL	K3078670	3	GA 7686	9000
D160	11.0	15.0	031Z0266	K3078240	38	2517	K3077194		SPZX/3V-960PL	K3078655	3	GA 7713	6000
D160	11.0	15.0	031Z0306	K3078242	38	2517	K3077194		SPZX/3V-1060PL	K3078670	3	GA 7686	9000
D160	15.0	20.0	031Z0266	K3078240	42	2517	K3077101		SPZX/3V-960PL	K3078655	5	GA 7713	6000
D160	15.0	20.0	031Z0306	K3078242	42	2517	K3077101		SPZX/3V-1060PL	K3078670	5	GA 7686	9000
D160	18.75	25.0	031Z0266	K3078240	42	2517	K3077101		SPZX/3V-960PL	K3078655	5	GA 7713	6000
D160	18.75	25.0	031Z0306	K3078242	42	2517	K3077101		SPZX/3V-1060PL	K3078670	5	GA 7686	9000

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

Motor			Motor Pulley		Motor Taper Lock Bush			Belts				Spindle Pulley	Spindle Speed
Frame Size	K.W.	HP	Fenner Ref.	Wadkin Ref.	Bore M.M.	Fenner Ref.	Wadkin Ref.	Fenner Ref.	Optibelt Ref.	Wadkin Ref.	Qty	Wadkin Ref.	R.P.M
D132	5.5	7.5	031Z0246	K3078204	38	2517	K3077194		SPZX/3V-950PL	K3078675	3	GA 7713	6000
D132	5.5	10.0	031Z0246	K3078204	38	2517	K3077194		SPZX/3V-950PL	K3078675	3	GA 7713	6000
D160	11.0	15.0	031Z0246	K3078204	38	2517	K3077194		SPZX/3V-950PL	K3078675	3	GA 7713	6000
D180	15.0	20.0	031Z0246	K3078204	42	2517	K3077101		SPZX/3V-900PL	K3078660	3	GA 7713	6000
D180	18.75	25.0	031Z0246	K3078204	42	2517	K3077101		SPZX/3V-900PL	K3078660	3	GA 7713	6000

Belts and pulleys for spindle drive to FENCE SIDE HEAD Frequency 50 Hertz													
Motor			Motor Pulley		Motor Taper Lock Bush			Belts				Spindle Pulley	Spindle Speed
Frame Size	K.W.	HP	Fenner Ref.	Wadkin Ref.	Bore M.M.	Fenner Ref.	Wadkin Ref.	Fenner Ref.	Optibelt Ref.	Wadkin Ref.	Qty	Wadkin Ref.	R.P.M
D132	5.5	7.5	031Z0223	K3078218	38	2012	K3077113	236Z0125		K3078648	3	GA 8366	6000
D132	5.5	7.5	031Z0303	K3078245	38	2012	K3077113	236Z0140		K3078637	3	GA 8366	9000
D132	7.5	10.0	031Z0223	K3078218	38	2012	K3077113	236Z0125		K3078648	3	GA 8366	6000
D132	7.5	10.0	031Z0303	K3078245	38	2012	K3077113	236Z0140		K3078637	3	GA 8366	9000
D160	11.0	15.0	031Z0223	K3078218	38	2012	K3077113	236Z0125		K3078648	3	GA 8366	6000
D160	11.0	15.0	031Z0303	K3078245	38	2012	K3077113	236Z0140		K3078637	3	GA 8366	9000

Belts and pulleys for spindle drive to FENCE SIDE HEAD Frequency 60 Hertz													
Motor			Motor Pulley		Motor Taper Lock Bush			Belts				Spindle Pulley	Spindle Speed
Frame Size	K.W.	HP	Fenner Ref.	Wadkin Ref.	Bore M.M.	Fenner Ref.	Wadkin Ref.	Fenner Ref.	Optibelt Ref.	Wadkin Ref.	Qty	Wadkin Ref.	R.P.M
D132	5.5	7.5	031Z0203	K3078272	38	2012	K3077113		SPZX3V1212PL	K3078653	3	GA 8366	6000
D132	5.5	7.5	031Z0263	K3078244	38	2012	K3077113		SPZX3V1312PL	K3078651	3	GA 8366	9000
D132	7.5	10.0	031Z0203	K3078272	38	2012	K3077113		SPZX3V1212PL	K3078653	3	GA 8366	6000
D132	7.5	10.0	031Z0263	K3078244	38	2012	K3077113		SPZX3V1312PL	K3078651	3	GA 8366	9000
D160	11.0	15.0	031Z0203	K3078272	38	2012	K3077113		SPZX3V1212PL	K3078653	3	GA 8366	6000
D160	11.0	15.0	031Z0263	K3078244	38	2012	K3077113		SPZX3V1312PL	K3078651	3	GA 8366	9000

Belts and pulleys for spindle drive to UNIVERSAL HEAD Frequency 50 Hertz

Motor			Motor Pulley		Motor Taper Lock Bush			Belts				Spindle Pulley	Spindle Speed
Frame Size	K.W.	HP	Fenner Ref.	Wadkin Ref.	Bore M.M.	Fenner Ref.	Wadkin Ref.	Fenner Ref.	Optibelt Ref.	Wadkin Ref.	Qty	Wadkin Ref.	R.P.M
D132	5.5	7.5	031Z0223	K3078218	38	2012	K3077113	SPZ940		K3077156	3	GA 1475	6000
D132	5.5	7.5	031Z0303	K3078245	38	2012	K3077113	SPZ1120		K3078513	3	GA 1475	9000
D132	7.5	10.0	031Z0223	K3078218	38	2012	K3077113	SPZ940		K3077156	3	GA 1475	6000
D132	7.5	10.0	031Z0303	K3078245	38	2012	K3077113	SPZ1120		K3078513	3	GA 1475	9000
D160	11.0	15.0	031Z0223	K3078218	38	2012	K3077113	SPZ940		K3077156	3	GA 1475	6000
D160	11.0	15.0	031Z0303	K3078245	38	2012	K3077113	SPZ1120		K3078513	3	GA 1475	9000

Belts and pulleys for spindle drive to UNIVERSAL HEAD Frequency 60 Hertz

Motor			Motor Pulley		Motor Taper Lock Bush			Belts				Spindle Pulley	Spindle Speed
Frame Size	K.W.	HP	Fenner Ref.	Wadkin Ref.	Bore M.M.	Fenner Ref.	Wadkin Ref.	Fenner Ref.	Optibelt Ref.	Wadkin Ref.	Qty	Wadkin Ref.	R.P.M
D132	5.5	7.5	031Z0203	K3078272	38	2012	K3078113	260Z0090		K3078351	3	GA 1475	6000
D132	5.5	7.5	031Z0263	K3078244	38	2012	K3078113	260Z0090		K3078351	3	GA 1475	9000
D132	7.5	10.0	031Z0203	K3078272	38	2012	K3078113	260Z0090		K3078351	3	GA 1475	6000
D132	7.5	10.0	031Z0263	K3078244	38	2012	K3078113	260Z0090		K3078351	3	GA 1475	9000
D160	11.0	15.0	031Z0203	K3078272	38	2012	K3078113	260Z0090		K3078351	3	GA 1475	6000
D160	11.0	15.0	031Z0263	K3078244	38	2012	K3078113	260Z0090		K3078351	3	GA 1475	9000