Modifications are made to these books from time to time and it is important therefore that only the book sent with the machine should be used as a working manual

PLEASE INSERT SERIAL NUMBER OF MACHINE

## INSTRUCTION MANUAL FOR

# BH 7

## 700mm Bandsaw

| | |
|---|---|
| Diameter of wheels. | 700mm |
| Width of wheels. | 45mm |
| Width of sawblade. | 38mm maximum |
| Length of sawblade. | 5025mm<br>MAXIMUM 5105mm (16'-9")<br>MINIMUM 4940mm (16'-2½") |
| Depth under sawguard. | 460mm |
| Throat dimension Maximum capacity. | 685mm |
| Size of table. | 762mm x 762mm |
| Table cants. | 45° to right |
| Table cants | 10° to left |
| Height of table from floor. | 974mm |
| Total height of machine. | 2284mm |
| Speed of sawblade. | 1676m/min |
| Motor. | 2.2KW standard<br>3000Rev/Min |
| Approx. floor space. | 1330mm x 880mm |
| Approx. net weight. | 830KG |
| Approx. gross weight. | 570KG |
| Approx. shipping dimension. | 2.55 x 0.75 x 1.31 metres |



**For Replacement Parts, Tools & Accessories,**
**Contact Brian Stacey,**
**Bursgreen (Durham) Ltd.,**
**Fence Houses, Houghton-le-Spring,**
**Tyne-Wear DH4 5RQ, England.**
**Telephone: Fence Houses 2385 (5 Lines)**
**Telex: 53441 (Bursgreen Duram)**

# SAFETY

1. Read Instruction Book.
2. Securely Lock Cutters.
3. Set Guards Correctly.
4. Select Correct Speed.
5. Use Feeding Devices Where Possible.
6. Refer To HSW Booklet No.41. (in UK) For Safety In The Use Of Woodworking Machinery.

HEALTH & SAFETY

# SAFETY OF WOODWORKING MACHINES

Woodworking machines can be dangerous if improperly used. The wide range of work of which they are capable, requires adequate safeguarding arrangements against possible hazards.

Many injuries to machinists are caused by carelessness or failure to use the guards provided or to adjust them correctly.

WADKIN LTD., supply machinery designed for maximum safety which they believe, as a result of thorough testing, minimizes the risks inevitable in their use. It is the user's responsibility to see that the following rules are complied with to ensure safety at work:

1. The operation of the machine should conform to the requirements of the Woodworking Machines Regulations 1974. All guards should be used and adjusted correctly.

2. Safe methods of working only should be adopted as given in the Health and Safety Work Booklet No.41, "Safety in the Use of Woodworking Machines", (obtainable from Her Majesty's Stationery Office) and as advised by Wadkin Ltd.

3. Only personnel trained in the safe use of a machine should operate it.

4. Before making adjustments or clearing chips, etc., the machine should be stopped and all movement should have ceased.

5. All tools and cutters must be securely fixed and the speed selected must be appropriate for the tooling.

*SAFETY IS OUR WATCHWORD BUT THE USER MUST COMPLY WITH THE ABOVE RULES IN HIS OWN INTEREST. WE WOULD BE PLEASED TO ADVISE ON THE SAFE USE OF OUR PRODUCTS.*

oOo



WADKIN LTD · GREEN LANE WORKS · LEICESTER LE5 4PF · ENGLAND · TELEPHONE 0533 769111
and York House, Empire Way, Wembley, Middlesex HA9 0PA
Telephone: 01-902 7714 Telex: 262210
Telex: 34646 (Wadkin Leicester)
Telegrams: Woodworker Leicester Telex

| Application | Approved Lubricant | | | | | |
|---|---|---|---|---|---|---|
| | Castrol | B. P. | Shell | Esso | Texaco/ Caltex | Wadkin |
| Worm Boxes | Alpha 617 | Energol CS425 | Vitrea 75 | Pen-O-Led E. P.3 | Regal Oil J | L. 2. |
| General Lubrication | Magna ED | Energol HP. 20 | Vitrea 33 | Esstic 50 | Ursa Oil P. 20 | L. 4. |
| Pneumatic Lubricators | Hyspin AWS 32 | Energol HL 65 | Tellus 27 | Nuto H 44 | Rando Oil HDA | |
| Grease | Spheerol AP. 3 | Energrease LS. 3 | Alvania 3 | Beacon 3 Starfak Premium 3 | Regal | L. 6. |
| Brake Cables | Brake cable grease | Energrease LTM | Alvania 3 | Multi-purpose grease H | | |

# 700mm Bandsaw Type BH7

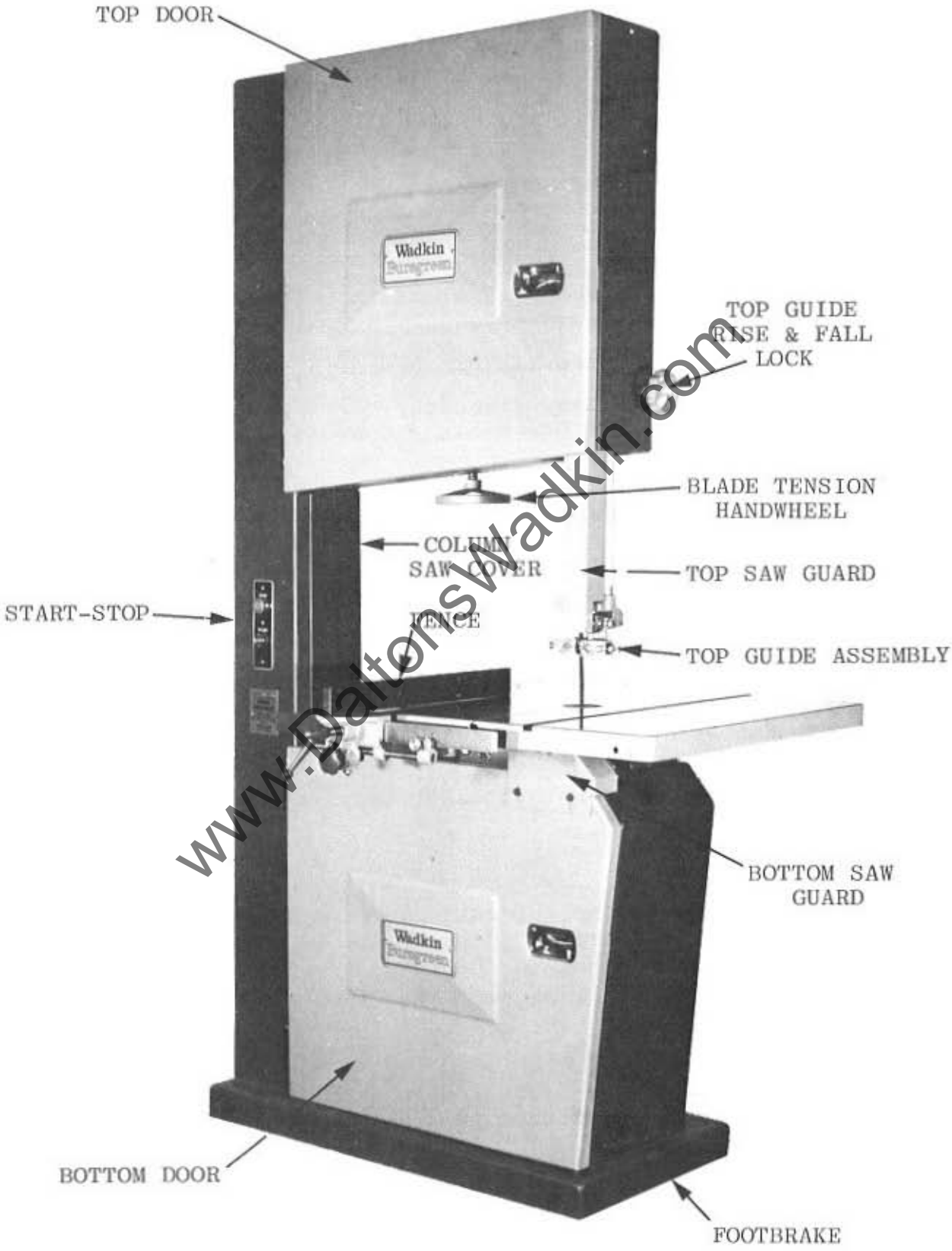


FIG 1

## INSTALLATION.

Remove protective coating from bright parts by applying a cloth soaked in paraffin, turpentine or other solvent.

When machine is cased for export, the table is removed and packed individually. Remove and re-assemble as shown in FIG.1.

## FOUNDATION.

See enclosed Foundation Drawing for bolt positions and clearance required. When installing the machine, level the table by packing under the base. Foundation bolts are not supplied with the machine except by special order.

## WIRING DETAILS.

The motor and control gear have been wired in before despatch. All that is required is to connect the power supply to the starter.

Points to note when connecting to power supply:

1. Check the voltage, phase and frequency correspond to those on the motor plate, also the correct coils and heaters are fitted to the starter.
2. It is important that the correct cable is used to give the correct voltage to the starter as running on low voltage will damage the motor.
3. Check the main line fuses are of the correct capacity. See fuse rating label inside starter enclosure (in base of machine).
4. Connect the line leads to the appropriate terminals. See Foundation Drawing for wiring diagram.
5. Check all connections are sound.
6. Check the rotation of the motor for the correct direction. If this is incorrect, reverse any two of the line lead connections.

For single phase supply, refer to booklet supplied with the starter for wiring details.



## LUBRICATION.

It is advisable to keep all bright parts covered with a thin film of oil to prevent rusting. Clean sawdust from inside main frame weekly. See enclosed Foundation Drawing.

TYPE OF OIL RECOMMENDED: SEE APPROVED LUBRICANTS:

## DUST EXTRACTION.

The machine has a built in dust chute with a 100mm x 125mm rectangular exhaust outlet and can be connected to main dust extraction plant if desired

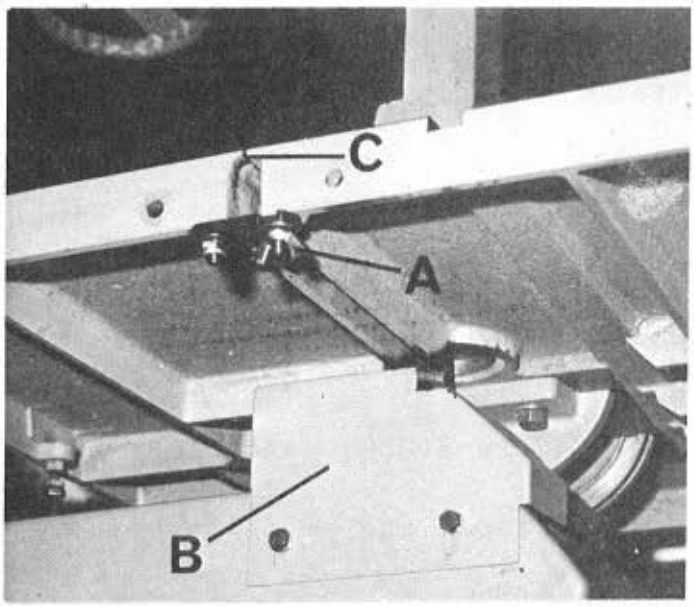


FIG 2

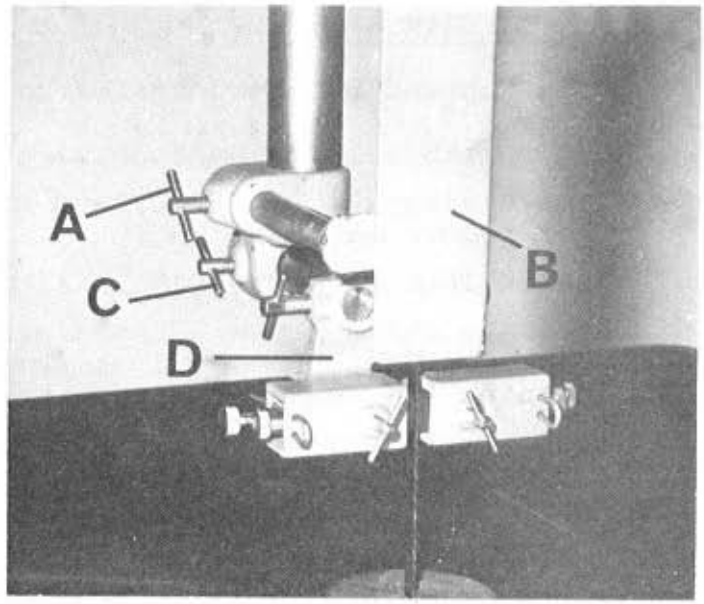


FIG 3

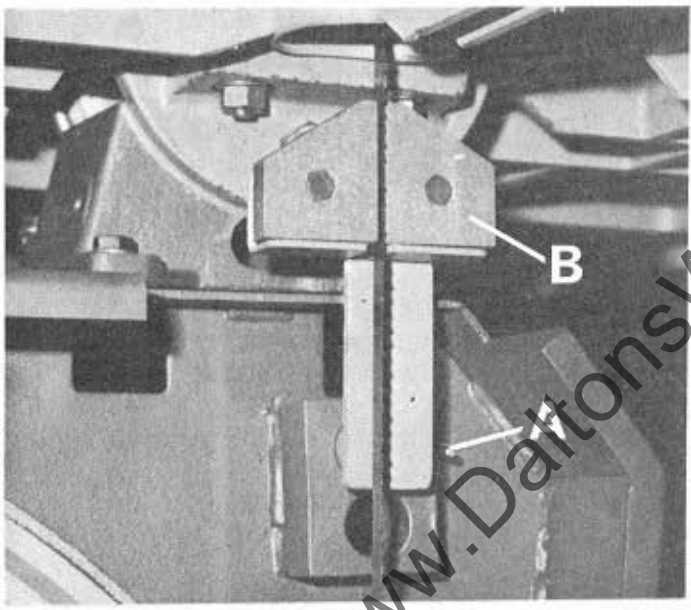


FIG 4

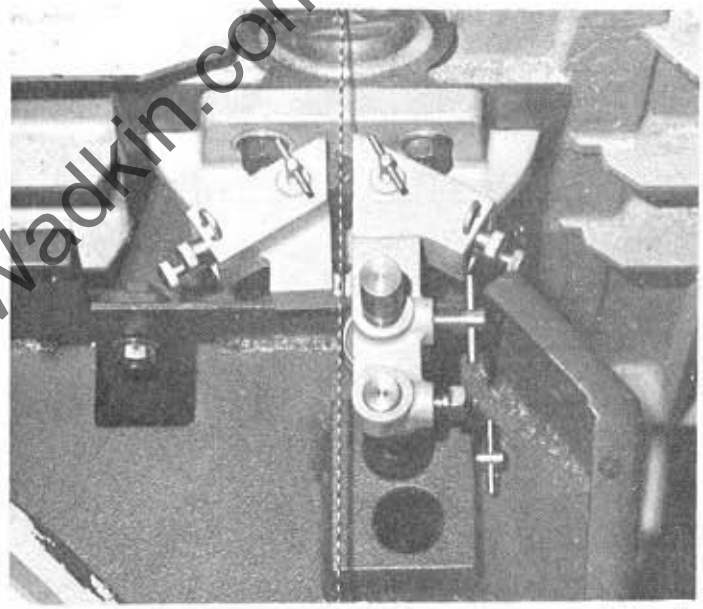

FIG 5

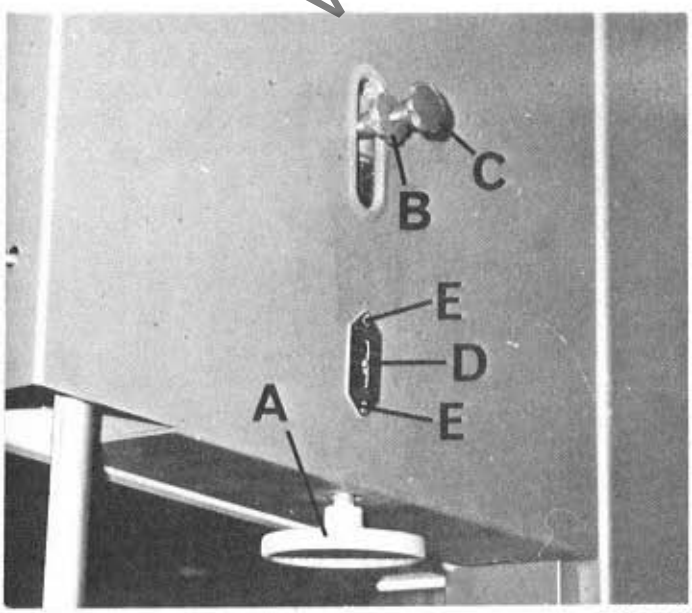


FIG 6

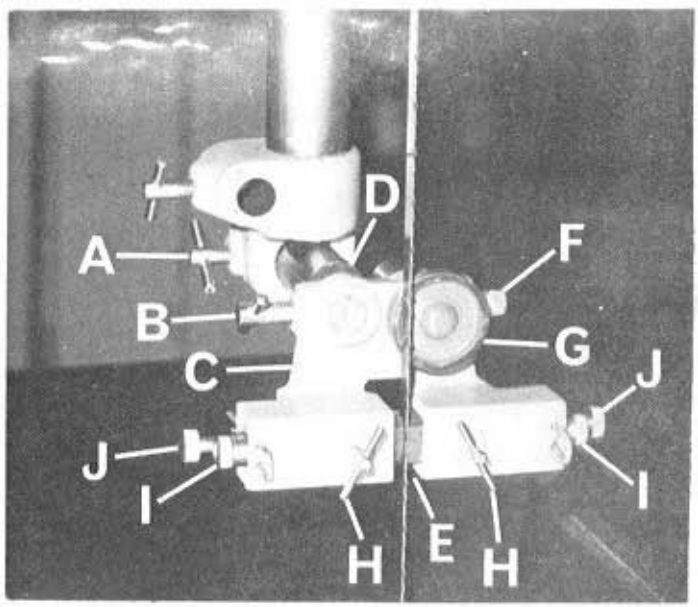


FIG 7

## FITTING BANDSAW BLADES.

1. Open top and bottom doors of main frame also column saw cover see FIG.1.
   Ensure table is in horizontal position.
2. Loosen wingnut "A" FIG.2, and swing table, keep plate clear of slot then remove sawguard "B".
3. Loosen locking screw "A" in FIG.3, then remove sawguard "B".
4. Loosen locking screw "C" and slide top saw guide "D" to extreme rear position. Loosen locking screw "A", FIG.4, and slide bottom sawguide "B" to extreme rear position.
5. Lower top wheel assembly by handwheel "A" in FIG.6, sufficient to allow blade to be fitted on both wheels.
6. Insert blade through slot "C", FIG.2, in table and position blade on top and bottom wheels.

NOTE: Cutting rake of teeth should be pointing down at cutting point. If teeth are not pointing down, turn blade inside out.

7. Turn tensioning handwheel "A", FIG.6, until blade is just held on the wheels.
8. Slide table keep plate across table slot and relock wingnut "A" in FIG.2.

## TRACKING OF SAWBLADE ON WHEELS.

Every sawblade has slightly different running characteristics on a bandsaw machine due to the condition of the steel ribbon from which the blade is made, the blade joints and tension in the blade ribbon. This is compensated by using a crowned or slightly curved rubber face on the wheels and providing the top wheel with a slight tilting adjustment.
To check the tracking of sawblade, follow the undermentioned procedure:

1. Rotate the top wheel slowly by hand in a clockwise direction and check the blade is running central on the wheels.
2. If not running central, loosen handwheel "B", FIG.6, then turn handwheel "C" until saw is tracking correctly, i.e. in the centre of both wheels.
3. When tracking is correct, relock handwheel "B". This adjustment is most important, that the sawblade, when tracking correctly, passes in a straight line between top and bottom wheels and does not snake. - When the latter occurs, the back of the sawblade keeps hitting the back guide roller and woodwork, resulting in damaged guides.

TENSIONING.

To tension the sawblade, turn the handwheel "A" in FIG.6, until the correct tension is reached according to the scale "D". The scale gives the correct tension for the width of blade which is being used irrespective of the length of the blade.

Incorrect tension or tightness of the sawblade over the wheels will result in saw breakages so always use tension indicator to achieve maximum blade life.

The scale and pointer are accurately set before despatch from the works. Should this be displaced for any reason, check the scale by the undermentioned procedure:

1. Tension the sawblade as previously described until it can be pulled ¼" (6mm) from its true line at a central point between the two wheels.
2. Check whether the scale indicates the correct sawblade width. If scale is incorrect, loosen the two screws "E" in FIG.6, and position scale correctly. When set, tighten screws "E". After the scale has been set in this manner it will read correctly for any width of blade within the range of the machine without further alteration, even if the length of sawblade varies for any given width.

For a ½" blade, the pointer should read ½", etc.
If the machine is left standing for a period, e.g. overnight, the tension should be reduced, and the blade re-tensioned before putting the machine into operation again.

SETTING GUIDES.

On this machine, 2 sawguide units are fitted, 1 above the table and 1 below. Each guide is fully adjustable for adequate sawblade support. The top guide unit is fitted with hardened graphite support blocks and a long life bearing.
Wooden support blocks are fitted to bottom guide unit as standard.

NOTE: A roller/graphite block type bottom guide unit or a pair of heavy duty guides (top and bottom) can be supplied as extras.

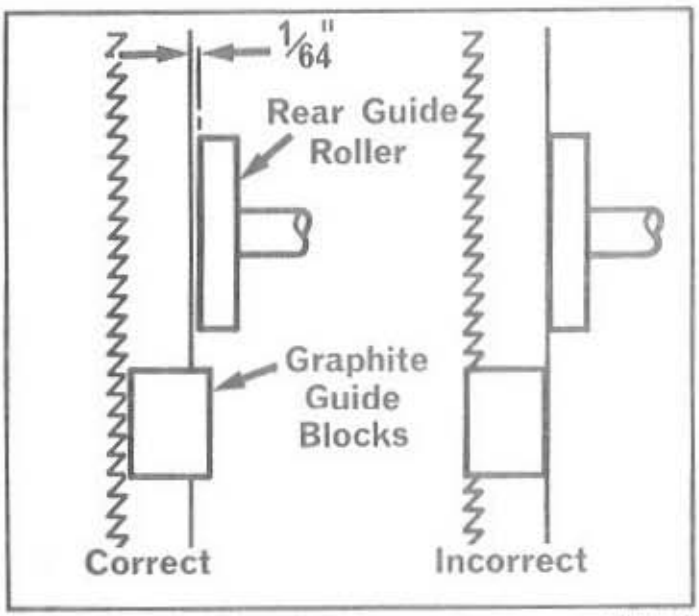


FIG 8

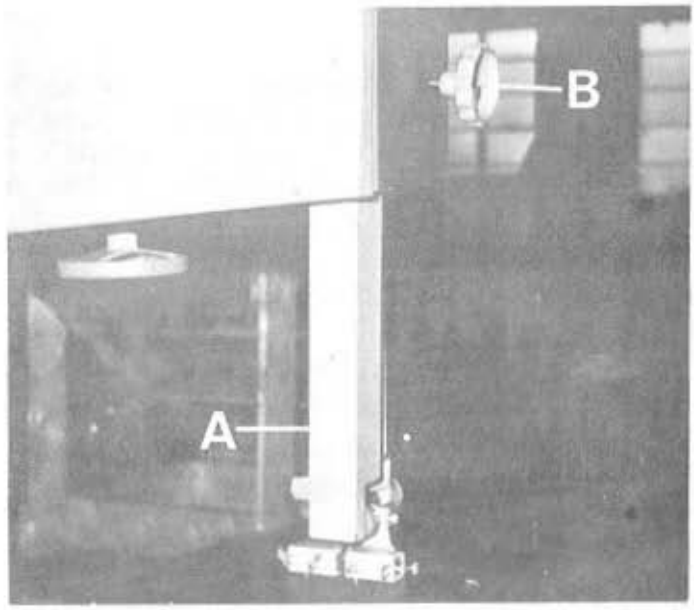


FIG 9

FIG 10


FIG 11

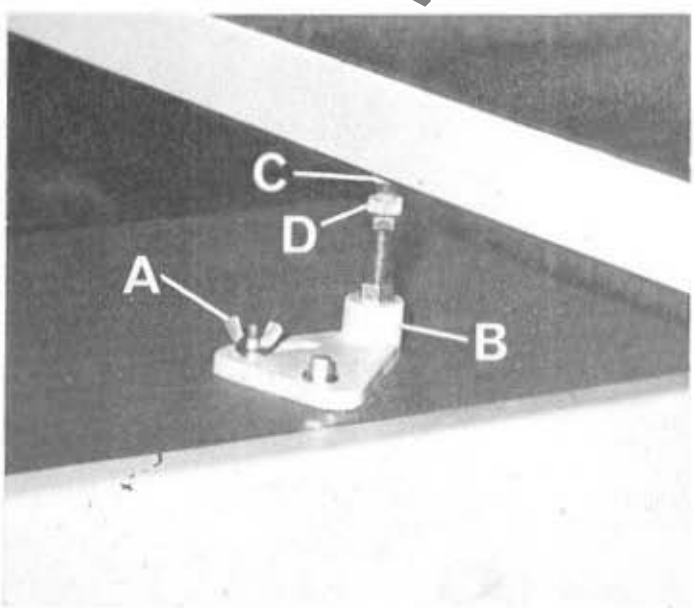


FIG 12

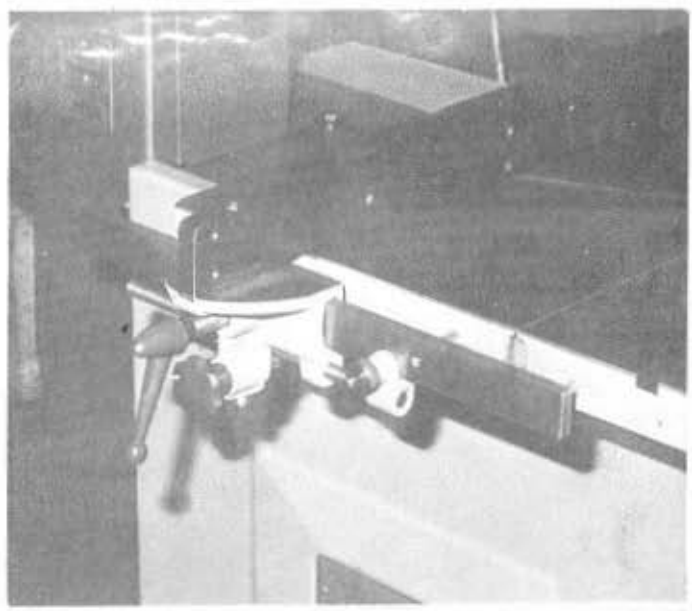

FIG 13

TOP GUIDE ASSEMBLY.

1. Isolate machine electrically.
2. Loosen locking screw "A", FIG.3, and remove sawguard "B".
3. Loosen locking screws "A" and "B", FIG.7, then holding guide unit "C" parallel to table top, proceed to revolve eccentric shaft "D" until sawblade is central in gap "E"
   Lock screw "B" then move guide unit either forward or back until saw teeth protrude slightly from front graphite support blocks as shown in FIG.8. When positioned correctly, relock screw "A", FIG.7, ensuring guide unit is parallel to table top.
4. Loosen locking screw "F", and move rear guide roller "G", FIG.7. to position shown in FIG.8. When set correctly, relock screw "F".
5. Loosen locking screws "H", FIG.7, then set graphite support blocks just clear of sawblade by adjusting screws "I", see FIG.8. (When wide sawblades are used, the rear graphite support blocks should also be adjusted just clear of sawblade by adjusting screws "J".) When set, lightly lock screws "H".

NOTE: Positioning of the graphite support blocks as above ensures that support is given to sawblade but blocks do not nip blade.

6. Replace sawguard "B", FIG.3, and lock screw "A".

IMPORTANT: Ensure sawguard does not foul teeth of sawblade or rear guide bearing.

TO VERTICALLY ADJUST TOP GUIDE UNIT PROCEED AS FOLLOWS:

1. Hold guide assembly "A", FIG.9, then loosen handwheel "B".
2. Position guide assembly "A" as required then relock handwheel "B".

BOTTOM GUIDE ASSEMBLY (STANDARD) FIG.4.

The bottom guide assembly is provided with adjustment to suit various blade widths and each guide block has individual adjustment to compensate or wear.
These wooden guide blocks when correctly adjusted will give adequate side support to blade underneath table.

NOTE: Bottom guide blocks should be positioned similar to correct graphite guide adjustment on top guide assembly.

BOTTOM GUIDE ASSEMBLY WITH GRAPHITE SUPPORT BLOCKS (EXTRA).

To adjust this guide assembly, use similar procedure to Top Guide Assembly, omitting operations 2 and 6.

TABLE.

The table cants 45° to the right and 10°to the left.
A canting scale "A", FIG.11, is fitted to underside of table.

FOR RIGHT HAND CANT:

1. Loosen the table locking lever "B", in FIG.11.
2. Cant table to required angle. The locking lever locks both front and rear trunion plates simultaneously, this gives perfect rigidity to the table.

FOR LEFT HAND CANT:

1. Loosen wingnut "A" in FIG.12, and swing stop bracket "B" clear of the stop screw in the table.
2. Loosen table locking lever "B", FIG.11 and cant table to required angle. Lock table in position.

TO CHECK 90° POSITIVE STOP, FOLLOW UNDERMENTIONED PROCEDURE:

1. Ensure top and bottom guides are clear of the blade, so it is not restricted in any way.
2. Check blade is square to table by means of a steel square after ensuring the stop bracket is in correct position as shown in FIG.12, and the adjustable stop screw in the table is hard against the stop bracket.
3. If adjustment is necessary, loosen locknut "C", FIG.12, then keeping table pressed against stop, adjust screw "D" until table is level. When set, relock locknut "C".
4. Check that pointer is correct on graduated scale "A", FIG.11, and reset if necessary.

RIP FENCE. FIG.13.

A rigid steel rip fence is mounted on a rectangular slide bar and both rapid and micro adjustment is provided.
The fence can be mounted to rip either to inside or outside of bandsaw blade. This fence can be supplied as an extra.

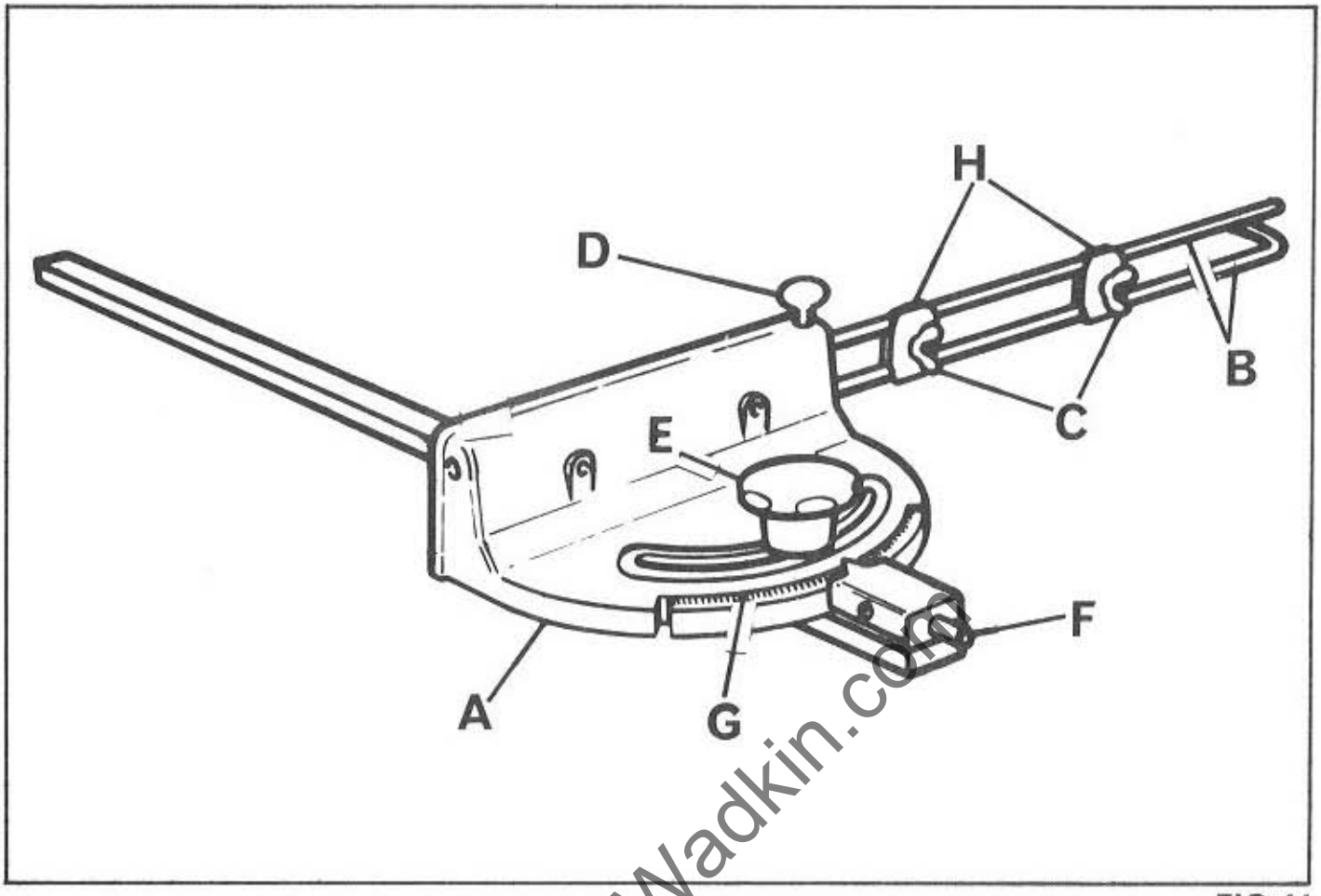


FIG 14

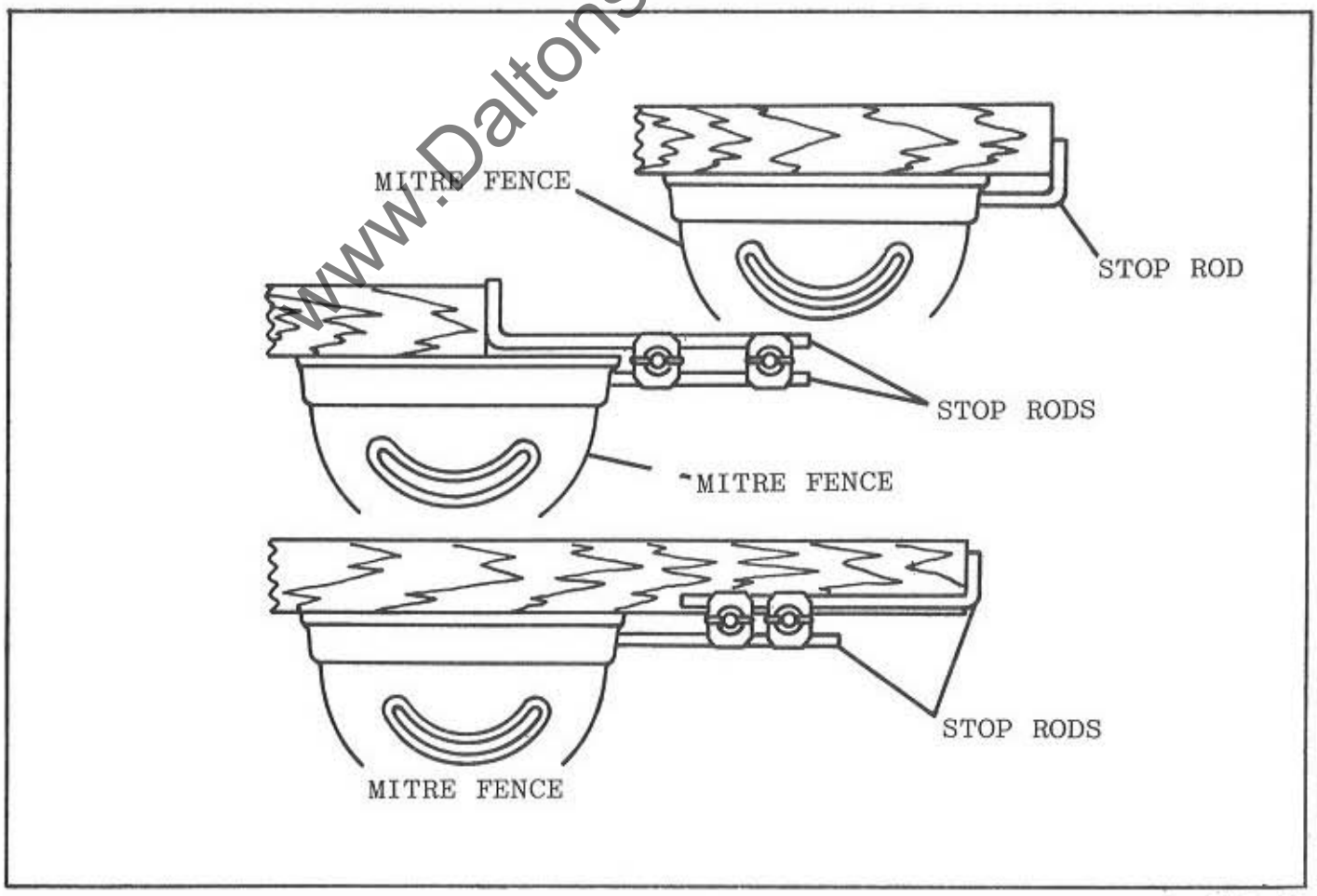


FIG 15

MITRE FENCE.

The mitre fence "A" in FIG.14, slides in the table slot. Two stop rods "B" are held together by two clamps "H" and wingnuts "C". The stop rods are secured to fence body by thumbscrew "D".

NOTE: Always ensure the stop rods are set clear of the sawblade or serious damage will result when machine is operated.

The mitre fence can be rotated through $90^{o}$ with positive stops at $90^{o}$ and $45^{o}$. To position mitre fence at required angle, loosen handwheel "E" in FIG.14, then pull plunger "F" from location, position fence as required using scale "G" then relock handwheel "E".

NOTE: Always ensure table slot is clean when using mitre fence.

USE OF MITRE FENCE STOP RODS.

Accurate repetitive cutting can be made using the stop rods, see FIG.15.
The rods are held in the fence by the thumbscrew "D" in FIG.14, and the stop rods held together by the two clamps "H". To adjust the rods by the clamps, loosen the wingnuts "C".

STARTING - STOPPING.

Start and Stop buttons are situated on the column of machine as shown in FIG.16.

FOOTBRAKE.

A footbrake is situated in the base of the machine as shown in FIG.10. A microswitch fitted to the footbrake, isolates the motor when the brake is depressed.

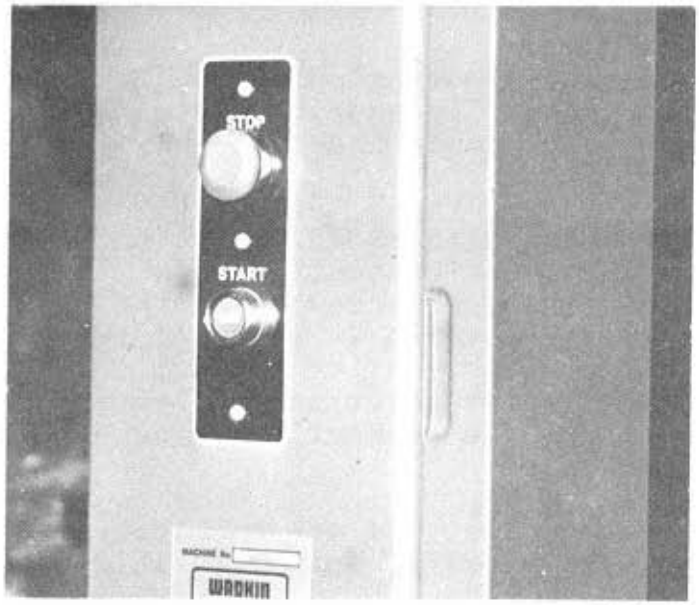


FIG 16

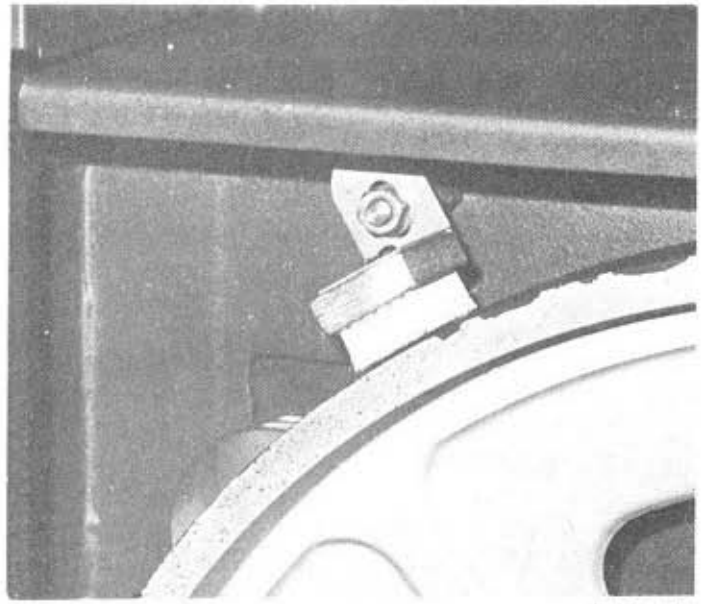

FIG 17

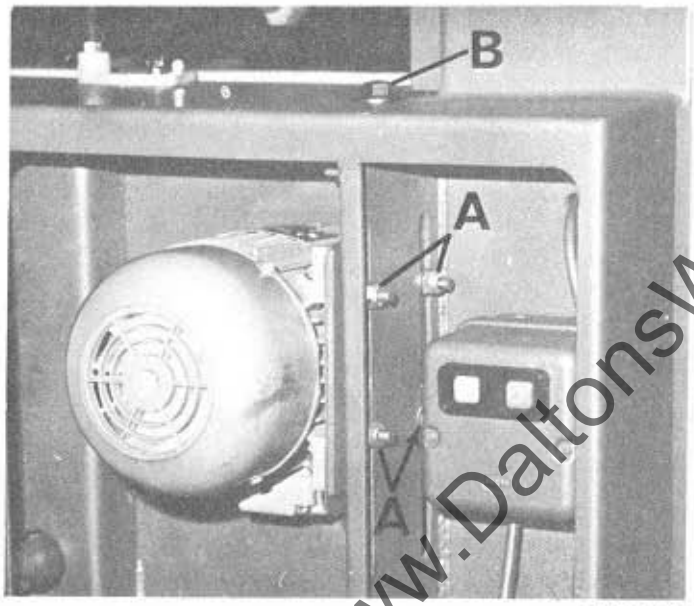


FIG 18

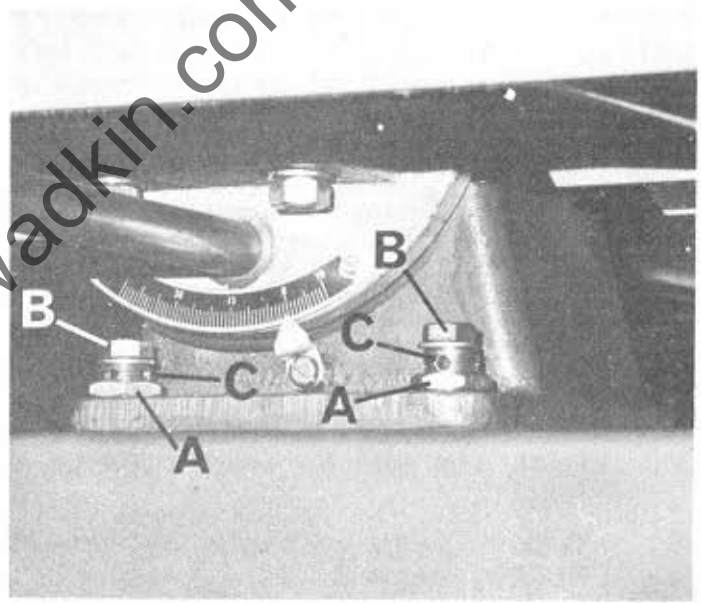


FIG 19

SAW WHEELS.

A brush as shown in FIG. 17 is provided on the bottom pulley to remove sawdust, whilst the rubber on the top pulley should be cleared daily to prevent accumulation of sawdust which could cause the blade to run out of a true line.

The saw pulleys must be kept in accurate balance to avoid vibration. It is essential that the rubbers on the faces are kept at an even thickness by truing up occasionally. This is done by revolving the pulleys and holding against it a wooden block covered in emery cloth or sandpaper. Care should be taken to ensure that, after truing, the wheels have a curved surface with the highest point in the centre of the wheel rim. This is most important for the correct tracking of the sawblade.

Badly worn pulleys should be replaced by new ones. If the machine is used with badly worn pulleys the saw will vibrate, resulting in bad sawing and saw breakages.

We have a service arrangement, which we recommend whereby newly rubbered pulleys can be supplied against the return of existing pulleys. An appropriate charge being made for re-rubbering only. To avail yourself of this service return existing pulleys to:

BURSGREEN(DURHAM)LTD.
FENCE HOUSES TRADING ESTATE.
HOUGHTON-LE-SPRING.
TYNE-WEAR.

REMOVAL OF TOP SAW WHEEL.

To remove top saw wheel proceed as follows:-

1. Isolate machine electrically.
2. Open top and bottom doors of main frame, also saw cover, see Fig.1.
3. Remove bandsaw blade by reversing procedure for "FITTING BANDSAW BLADE, page 8.
4. Remove M12 bolt and washer from centre of wheel.
5. Manually support weight of wheel and carefully pull wheel from spindle.

REMOVAL OF BOTTOM SAW WHEEL.

To remove bottom saw wheel proceed as follows:-

1. Isolate machine electrically.
2. Open top and bottom doors of main frame, also saw cover, see Fig.1.
3. Remove bandsaw blade by reversing procedure for "FITTING BANDSAW BLADE, see page 8.
4. Open door at rear of machine.
5. Loosen 4-M10 aerotight nuts "A", Fig.18, then turn M12 adjusting screw "B" anti-clockwise, releasing belt tension on pulleys.

NOTE:- Care should be taken to ensure that adjusting screw "B" is not completely unscrewed from motor platform.

6. Remove M12 bolt and washer from centre of saw wheel.
7. Place hand down behind wheel and remove vee belts from motor pulley.



8. Manually support weight of saw wheel and pull wheel from spindle.

BELT TENSIONING.

The high performance of modern belts, particularly wedge type, cannot be achieved without correct tensioning.

To check for correct tension proceed as follows:-

1. Isolate machine electrically.
2. Open bottom door of machine, see Fig.1.
3. Place hand down behind saw wheel and hold vee belts at centre point between motor pulley and wheel pulley.

NOTE:- At this point, the belts, when tensioned correctly, should be allowed 5mm movement.

SHOULD BELTS NEED TENSIONING CORRECTLY, PROCEED AS FOLLOWS:-

1. Open door at rear of machine.
2. Loosen 4-M10 aerotight nuts "A", Fig.18, then turn adjusting screw "B" clockwise until correct belt tension is achieved.
3. When set correctly, re-lock 4-M10 aerotight nuts "A".
4. Close front and rear doors.

TABLE SQUARE TO SAWBLADE ADJUSTMENT.

The table is set square to sawblade, from front to rear, before despatch from works. Should this setting be disturbed for any reason, check the undermentioned procedure.

1. Ensure top and bottom guides are clear of blade so it is not restricted in any way.
2. Check the blade is tracking correctly, i.e. running in centre of each wheel, (See instructions under "Tracking of Sawblade", page 3.)
3. Check blade for square to table by use of a steel square.

If adjustment is necessary, proceed as follows:-

1. Isolate machine electrically.
2. Loosen the 2 - 20mm locknuts "A", Fig. 19.
3. Loosen the 2 - M10 bolts and nuts "B", NOTE: For access to nuts, open small louvered door situated in base.
4. Turn the 2 - 20mm adjusting screws "C" by means of a small toggle bar (not supplied) inserted in the holes provided until table is set square to sawblade.
5. When table is set square to sawblade, securely tighten the 2 - M10 bolts and nuts "B" then lock the 2 - 20mm locknuts "A".
6. Close louvered door.

MAINTENANCE OF BANDSAW BLADES.

A properly sharpened bandsaw blade will give clean, accurate cutting and this is achieved by proper setting and sharpening of the teeth. Always set the teeth before sharpening.

SETTING.

In order to cut satisfactorily, bandsaw teeth must be set by bending the teeth alternately out of the line of the blade. This presents alternate pairs of teeth, wider than the thickness of the ribbon and prevents the ribbon rubbing in the wood being cut and overheating There are two usual ways of setting bandsaw teeth depending generally upon the amount of work to be done.

1. HAND SETTING. SEE FIG. 20

The points of the teeth are set by using a hand setting tool of the plier type. The points only of the teeth must be set and as a general rule the set on each side is .010" (.3mm). Set is applied in opposite directions for each alternate tooth.
Where hand setting is employed, it cannot be ensured that all the teeth are cutting, and in order to overcome this, the teeth should be stoned occasionally. An ordinary fine grit stone is used and the back runner guides should be temporarily brought forward until it is in contact with the back of the blade. The blade should then be run and the stone carefully applied to the teeth each side of the blade. When the saw is subsequently sharpened, it will be noted that each tooth has not been marked with the stone, and such teeth should only be filed very slightly. The remainder of the teeth which have actually been stoned should be filed in the normal manner until the flat caused by the stone disappears. Bandsaws may require stoning approximately once to every six sharpenings.

MACHINE SETTING.

A setting attachment can be supplied to special order for fitting to the standard grinding machine. This attachment is shown under Bandsaws and Accessories in the rear of this manual.

SHARPENING.

This is normally done by using a triangular section file. Again, this operation can be done by hand or machine.

HAND FILING. SEE FIG. 21 and 22.

It is essential to employ an efficient and quick acting vice and round cornered triangular file, both as illustrated in FIG. 27 and 28.
The face of each tooth should be filed across, and with the same stroke the back of the following tooth should be filed at the same time. One stroke of the file should be sufficient to sharpen each tooth, and this stroke should be as light as possible in order to avoid producing a burr. The shape of the gullet is automatically maintained at 60° by the file, which the angle of the hook on the tooth is dependable on the position of the file. For general work, approximately 5° of positive hook should be given. A greater or smaller hook should be applied for soft or harder woods respectively.
In the case of particularly hard woods, a negative rake may be necessary, while a wider tooth pitch than standard may be required for sawing timbers of an abrasive nature, and those containing gum. Always sharpen square across the face of each tooth and NOT on the bevel, otherwise the saw will vibrate violently, which shatters the steel and cracks appear causing saw breakages.
Use a file with rounded corners and of triangular section. It is important to keep the gullet of each tooth rounded otherwise cracks will soon appear. Saws must be sharpened at regular intervals and should never be forced to cut with teeth which have become blunt.

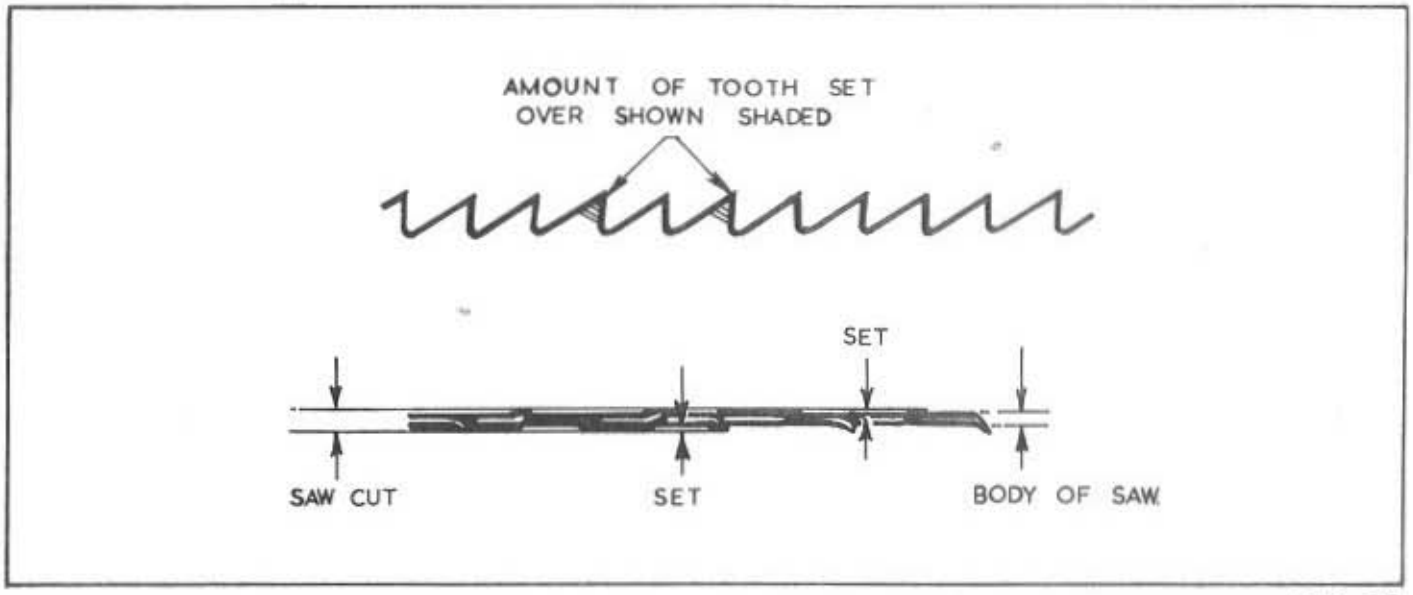


FIG 20

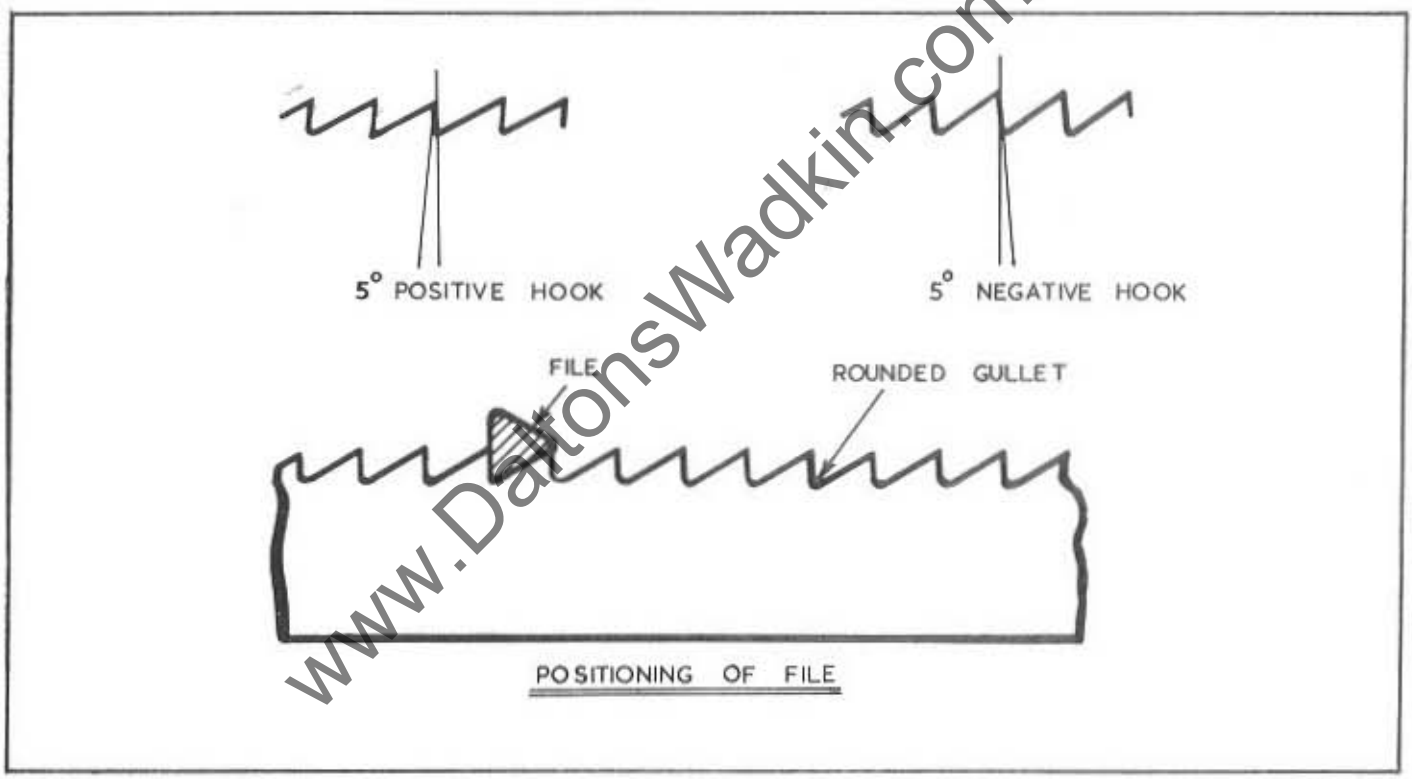




FIG 21

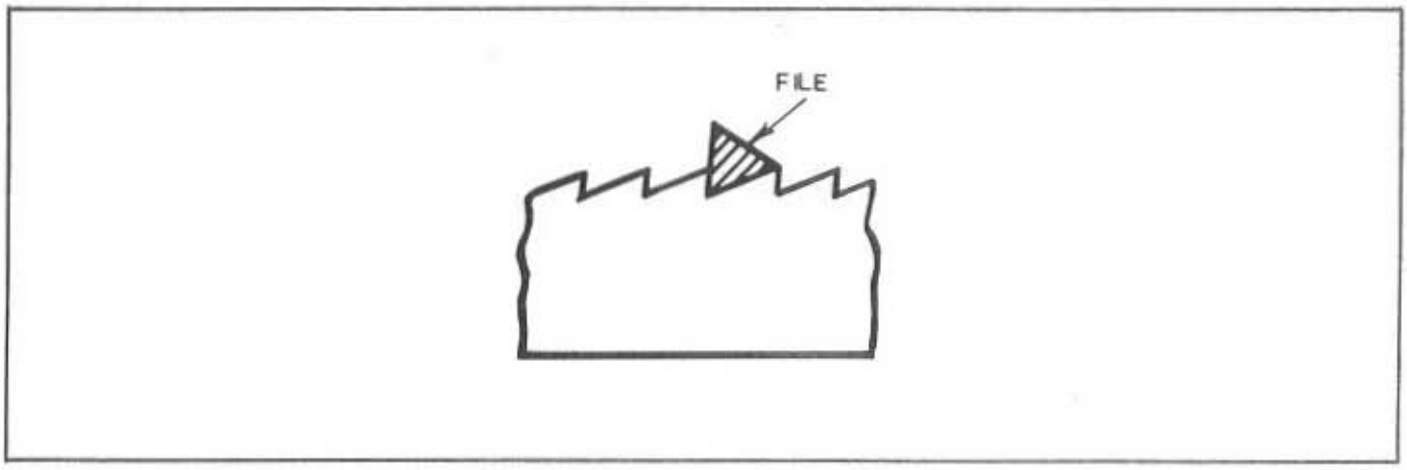


FIG 22

NOTE:-

WHEN RECONDITIONING BANDSAW BLADES IT IS NECESSARY TO SET THE TEETH FIRST BEFORE SHARPENING.
This ensures that the face of the tooth is square. If the sharpening was carried out first, the subsequent setting would result in an angular tooth shape being obtained.

MACHINE FILING.

An automatic machine for filing blades is shown under Bandsaws and Accessories in the rear of this manual and can be supplied by special order.

GENERAL CAUSES OF SAW TROUBLE.

1. Crystallisation of the ribbon, produced by the back of the saw rubbing against the back runner guide. The disc should revolve only by contact with the back edge of the saw when actually cutting.
2. Using a blade that is too wide for the radii being cut. In attempting to cut a small curve with a saw too wide, the blade tends to twist against the guides causing friction and over-heating which destroys the temper in the steel.
3. Not enough set.
4. Sharpening with a sharp cornered file. See FIG. 22
5. Bad brazing due to dirty joints or badly prepared laps or incorrect positioning of the laps, causing a bump on the back of the blade at the joint. See Bandsaws and Accessories at the rear of this manual for an efficient bandsaw brazer.

SMALLEST RADII WHICH MAY BE SAWN WITH GIVEN WIDTH OF BLADE.

| | | | | |
|---|---|---|---|---|
| WIDTH OF BLADE. | 3mm | 5mm | 6mm | 10mm |
| MINIMUM RADIUS | 3mm | 8mm | 16mm | 37mm |
| WIDTH OF BLADE. | 13mm | 16mm | 19mm | 25mm |
| MINIMUM RADIUS. | 64mm | 95mm | 138mm | 184mm |

FOLDING BANDSAW BLADES.

Bandsaw blades are folded in thirds. This is done by holding the blade firmly in both hands with the palms upwards as shown in FIG. 23A Turn the hands over, this will twist the blade, as shown in FIG. 23B Do not let the blade slip or turn in the hands. The blade will almost automatically fall into three loops.
The blade should be kept in a safe dry place.

BANDSAW BRAZING.

An efficient bandsaw brazing machine is shown under Bandsaws and Accessories in the rear of this manual and can be supplied by special order.

HINTS ON CUTTING.

(a) WATCH FEED DIRECTIONS. - SEE FIG. 24.

Mentally follow the path of the cut before actually cutting the work. If not started properly many pieces of work will foul against the trunk of the machine.

(b) MAKE SHORT CUTS FIRST. - SEE FIG. 25.

When a choice of starting points is offered, always make short cuts first. Back tracking out of a short cut can be done much more quickly than backing out of a long cut.

(c) BACKTRACK ON CORNERS. - SEE FIG. 26.

Very narrow grooves must be nibbled as shown at A, B, C. On other inside corners, cut to the corner and then backtrack to lead the blade over to second line.

BANDSAW BLADES.

Spare bandsaw blades of the correct length, ready set and sharpened, for wood cutting are available from stock. Where it is preferred, bandsaw blading in strip form can be supplied for customers to make up their own blades. This bandsaw strip is offered either toothed only or toothed, sharpened and set.
In addition to woodcutting, we can supply bandsaw blades for plastics, bonded wood, non-ferrous metals, meat, etc., provided that the correct machine speeds are available.

TAPER TRIANGULAR FILES FOR HAND USE.

LENGTH: ..... 6", 8", 10".

The edges of these files have rounded corners to produce the round gullet which prevents saw cracks.

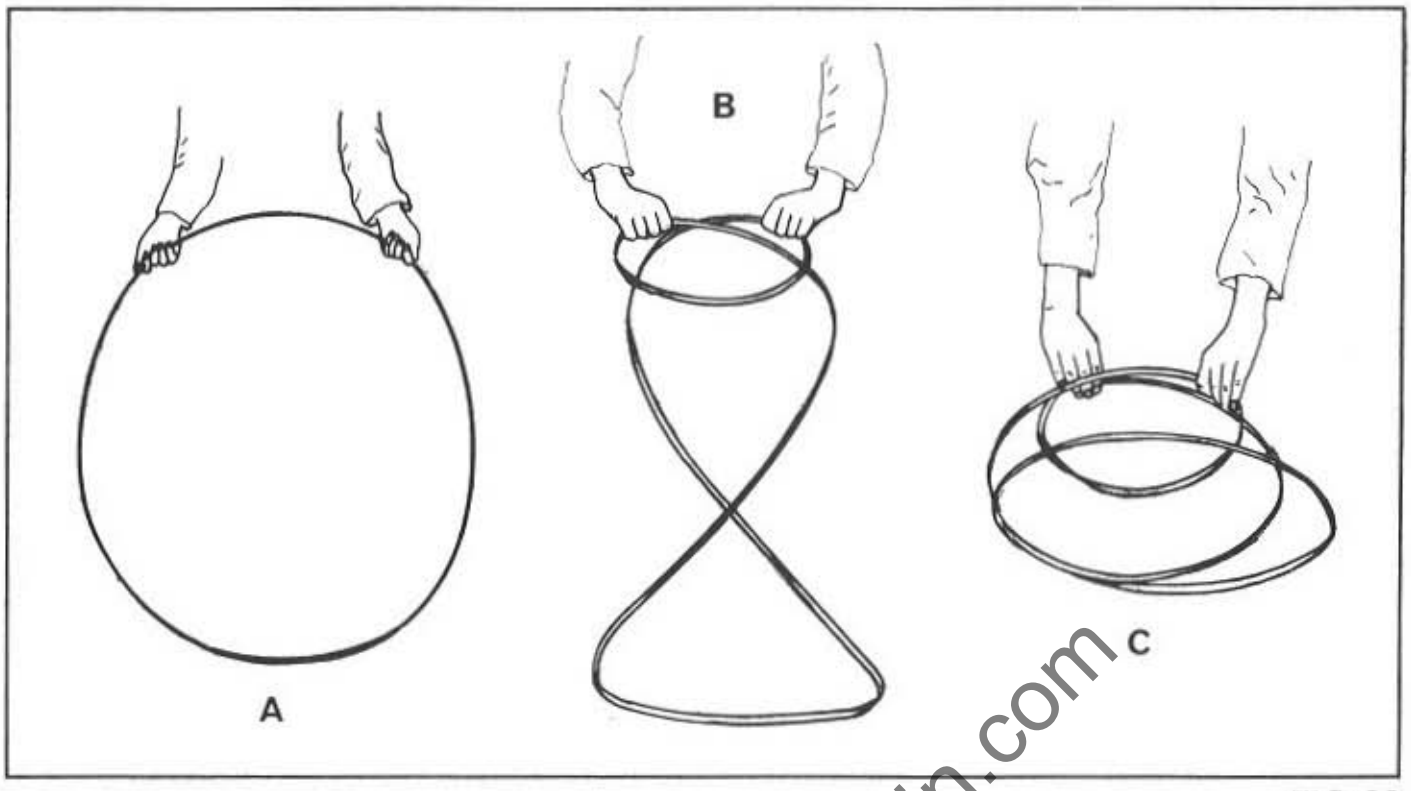


FIG 23

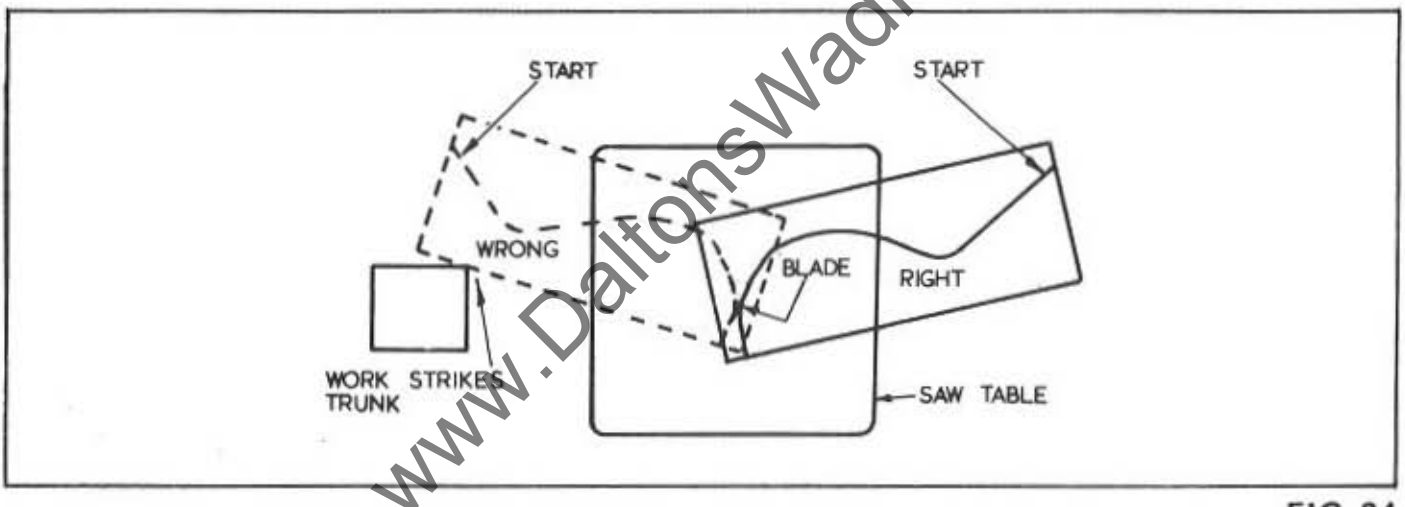


FIG 24

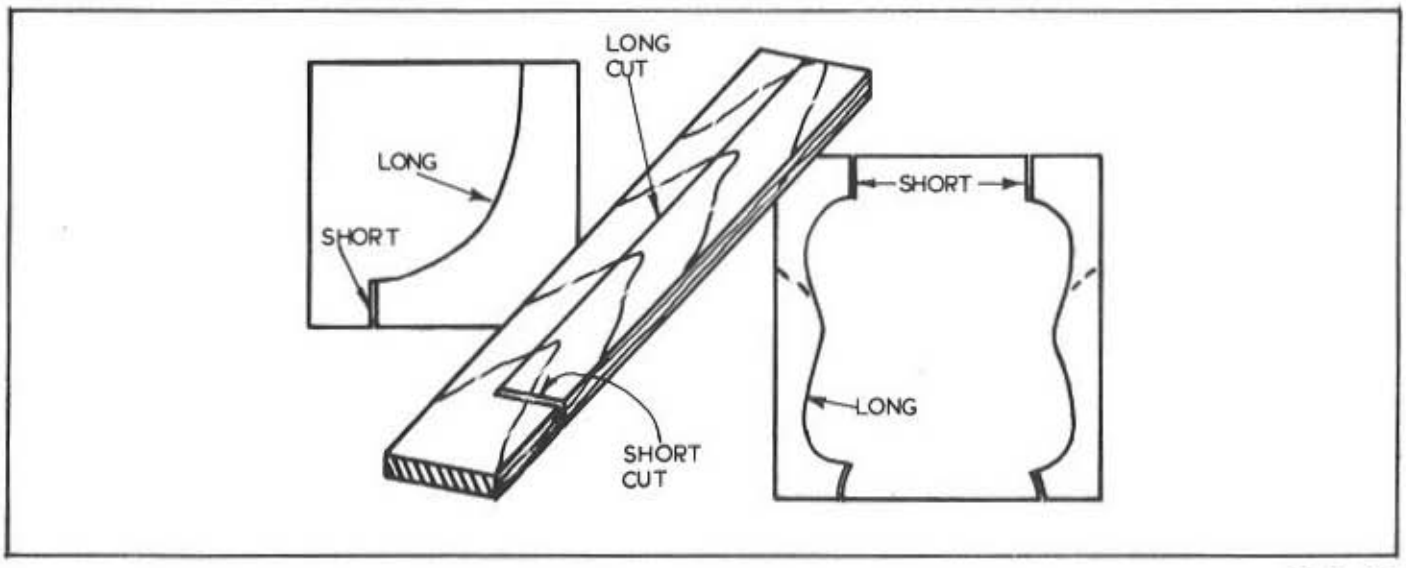


FIG 25

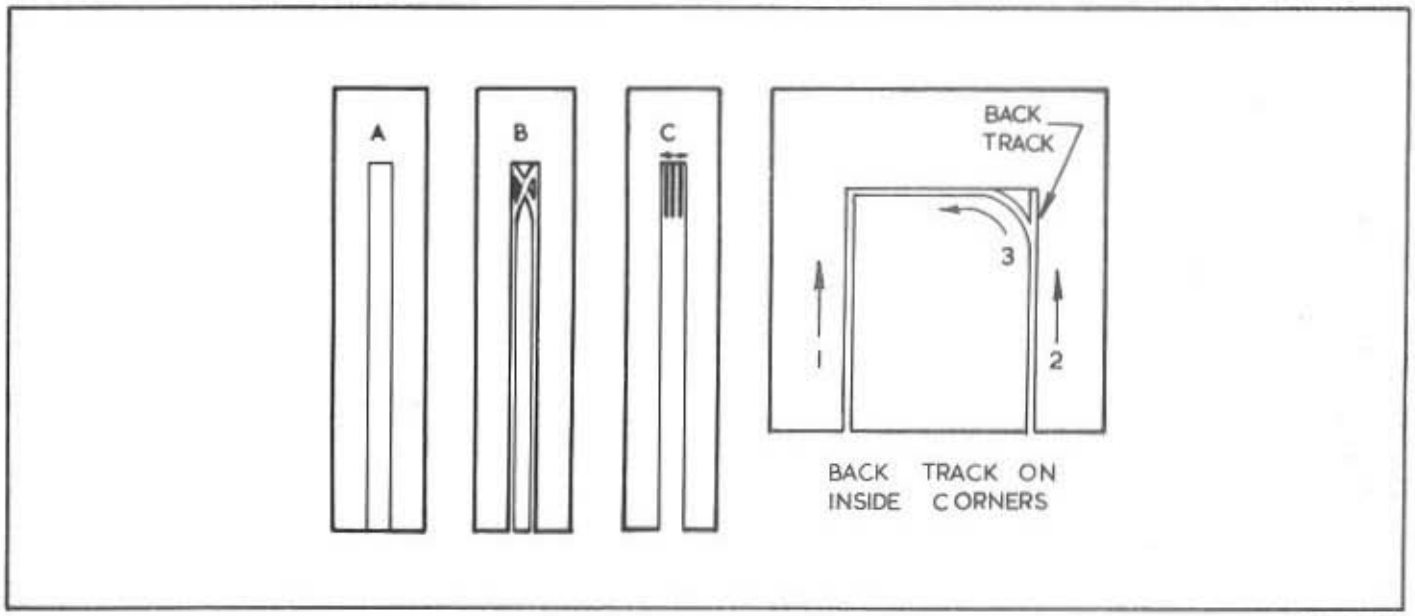


FIG 26

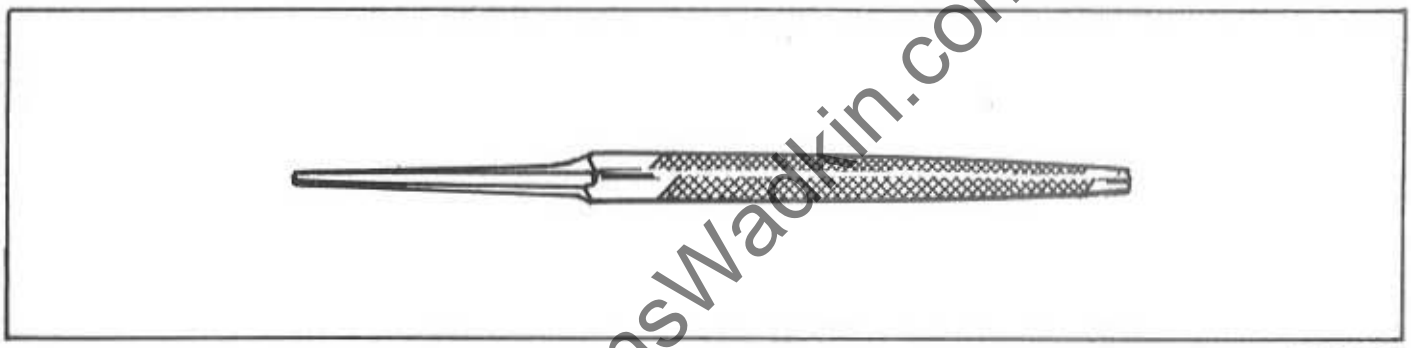

FIG 27

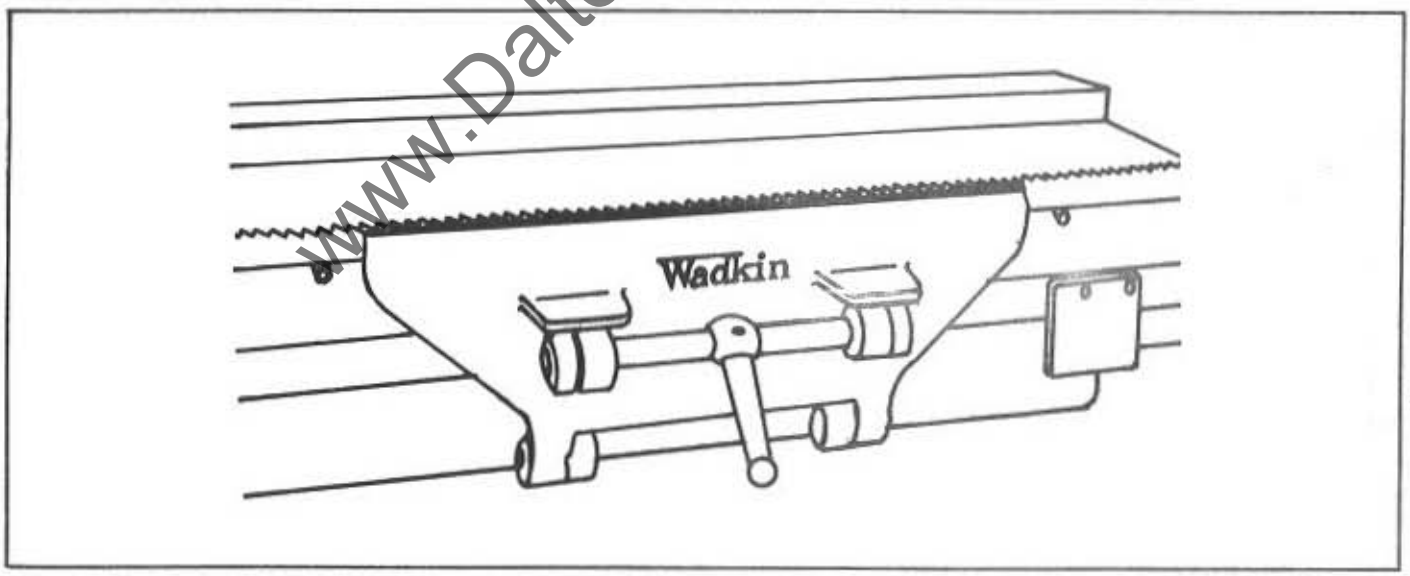


FIG 28