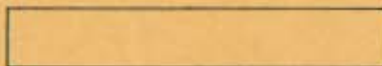




# INSTRUCTION MANUAL

## BER 4-150

### HEAVY DUTY SPINDLE MOULDER



PLEASE INSERT SERIAL  
NUMBER OF MACHINE

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

## **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.

### **BE CAREFUL**

**THIS MACHINE CAN BE DANGEROUS  
IF IMPROPERLY USED**

**Always Use Guards**

**Keep Clear Until Rotation Has Ceased**

**Always Operate As Instructed And  
In Accordance With Good Practice**

**Read Instruction Manual**





## 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

# 6" BER 4 150

## Spindle Moulder

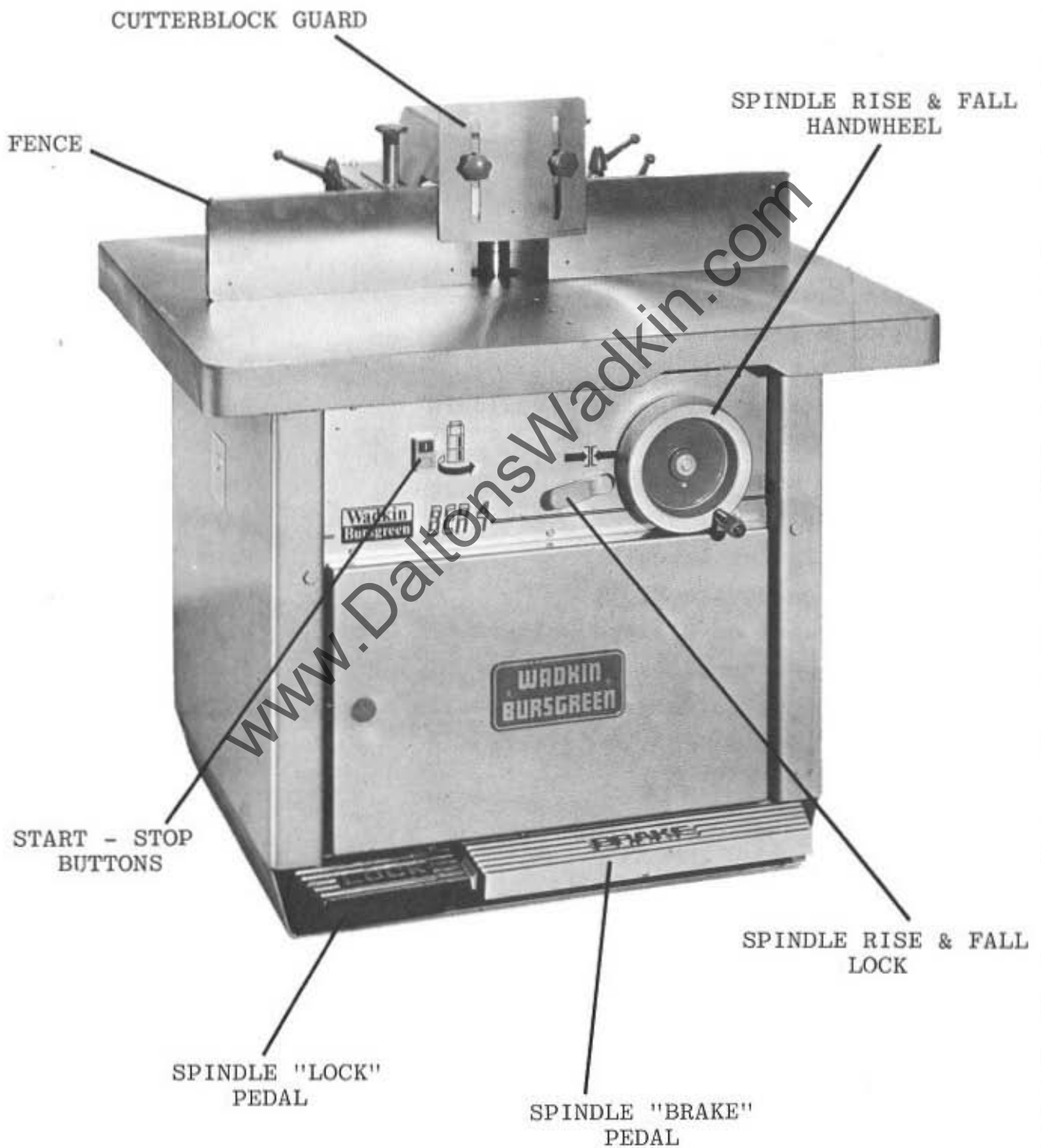


FIG. 1

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## Principal Dimensions & Capacities

Diameter of top piece	35mm	
Optional diameters of top piece	30mm, 1½ in or 1 in	
Size of table	900 x 1100 mm	36 x 43 in
Speed of spindle	3000, 4500, 6000 and 8000 rev/min or 3000, 4500, 6000 and 10000 rev/min	
Rise and fall of spindle	150 mm	6 in
Table height	855 mm	33 in
Four circular table plates giving openings of	80, 120, 175, 230, 340mm	3¼, 4¾, 7, 9, 13½ in
Size of fence plates	150 x 400 mm	6 x 16 in
Output of motor	5.5kW (7.5kW optional) 7½hp (10hp optional)	
Speed of motor, 50 Hz	3000 rev/min	
Speed of Motor, 60 Hz	3600 rev/min	
Floor space	900 x 1100 mm	36 x 43 in
Approximate net weight	405 kg	890 lb
Approximate gross weight	445 kg	980 lb
Approximate shipping dimensions	1,00m <sup>3</sup>	35 ft <sup>3</sup>

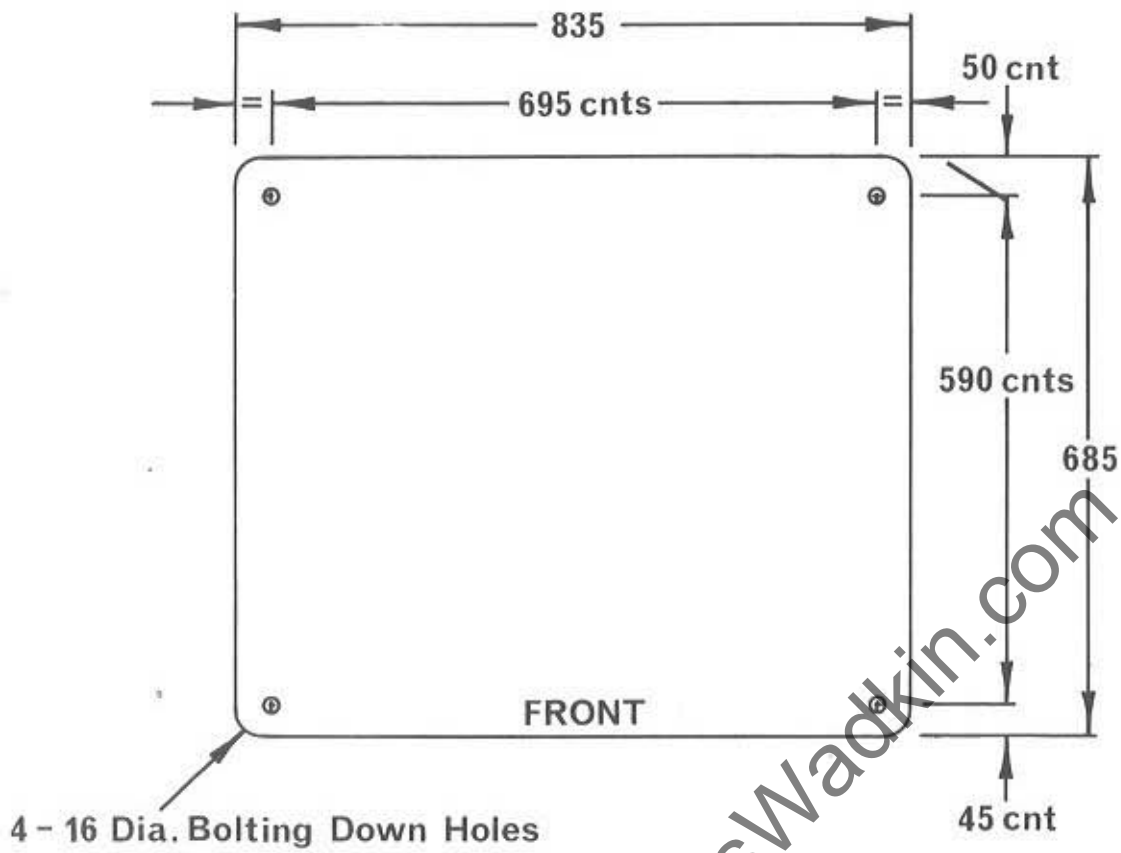


FIG. 2

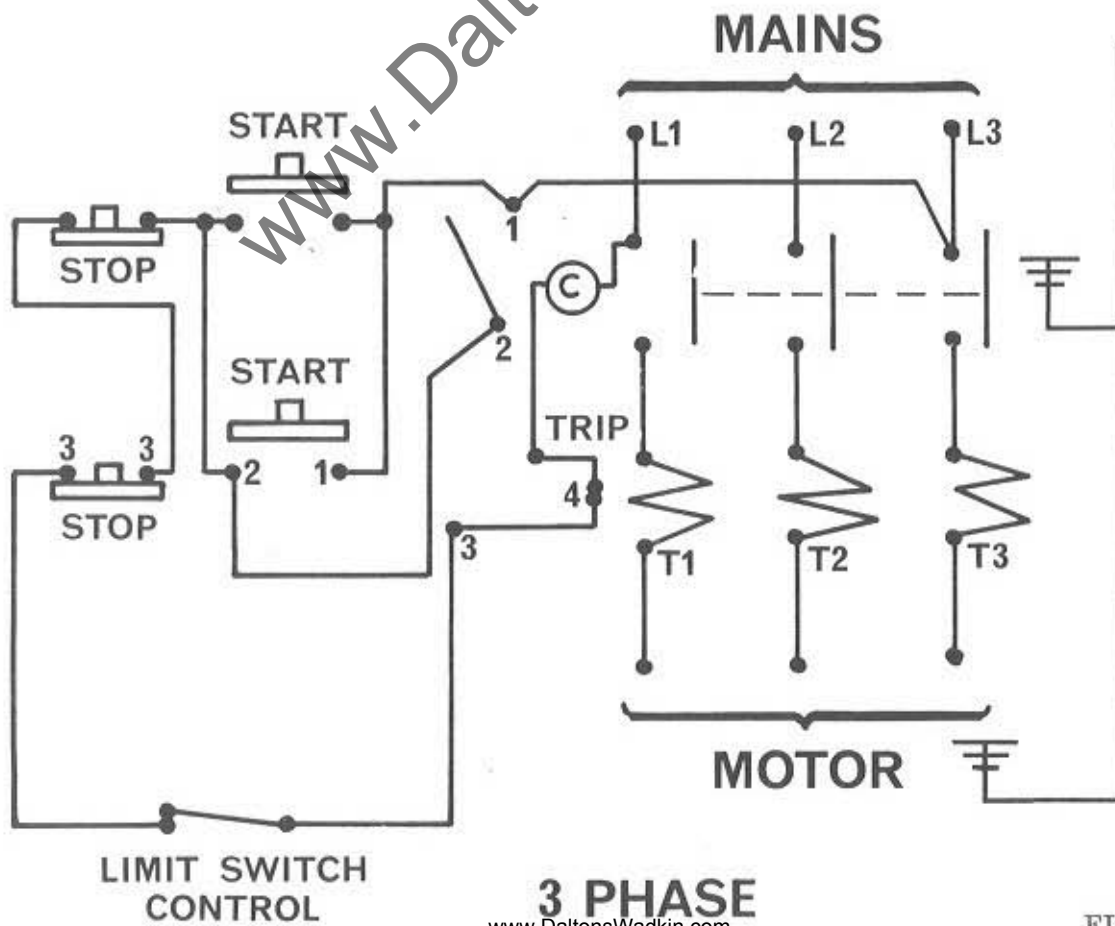


FIG. 3

## INSTALLATION

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

## FOUNDATION

See Fig. 2 for bolt positions and clearances required. When installing the machine, level the table by packing under feet.

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 of isolator when fitted.

Points to note when connecting to power supply:-

1. Check that 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 size of cable is used to give the correct voltage at the starter. Too light a cable will give a voltage drop at the starter and may damage the motor.
3. Check the main line fuses are of the correct capacity. See list below. When an isolator is fitted, the fuses are of the correct capacity as received.
4. Connect the line leads to the appropriate terminals. See Fig. 3 for 3 phase supply.
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 3 phase supply.

Voltage	Phase	H.P.	S.W.G. Tinned Copper Wire	Fuse Rating Amps
220	3	5½	18	45
380/420	3	5½	22	24
550	3	5½	23	20
220	3	7½	17	65
380/420	3	7½	19	38
500	3	7½	22	24

## LUBRICATION See Fig. 4

It is advisable to keep all bright parts covered with a thin film of oil to prevent rusting.

TYPE OF OIL RECOMMENDED

POWER EM 125

TYPE OF GREASE RECOMMENDED

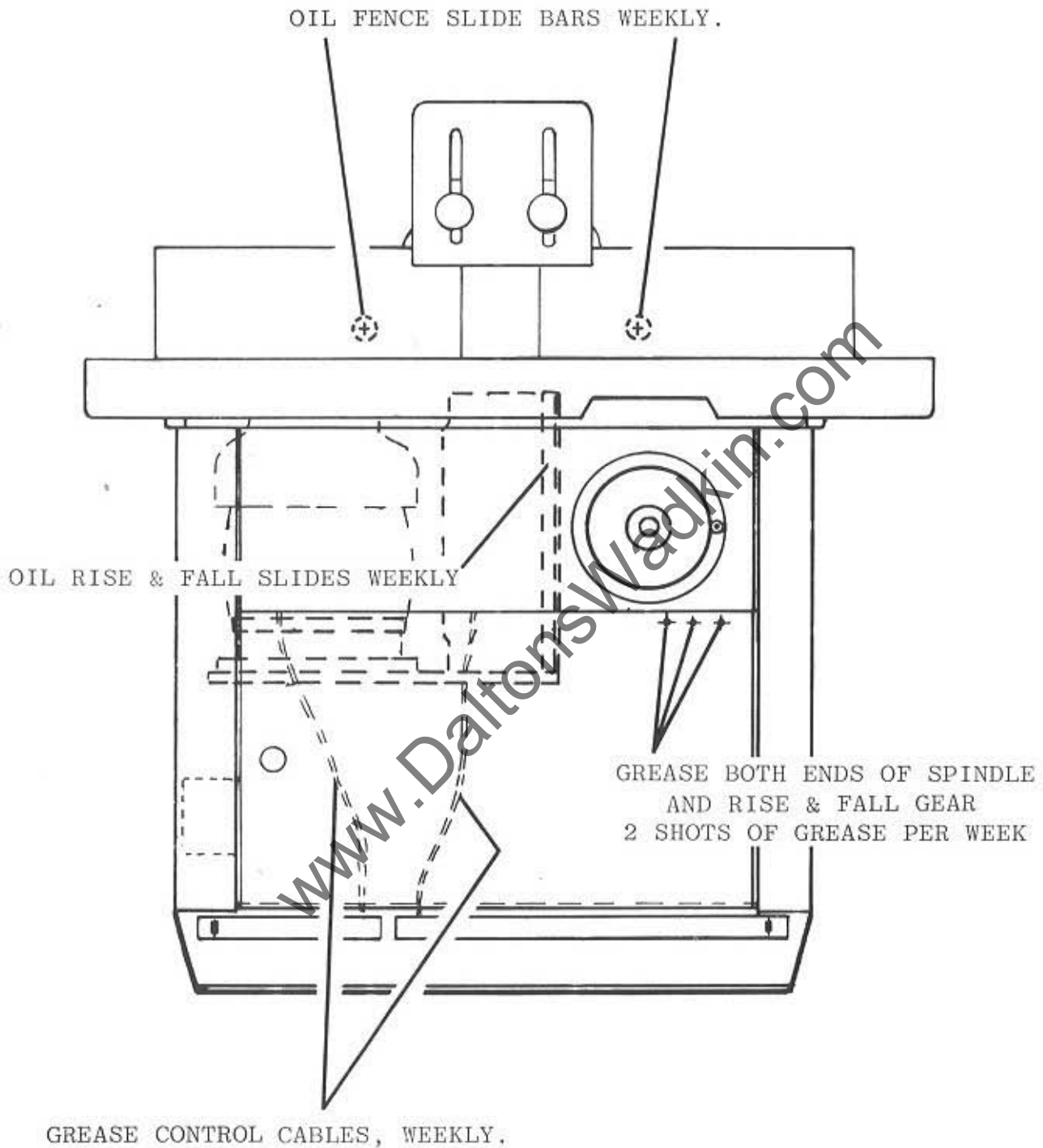
SHELL ALVANIA 3

TYPE OF GREASE

RECOMMENDED FOR BRAKE CABLE

CASTROLEASE BRAKE CABLE LUBRICANT





TYPE OF GREASE RECOMMENDED

SHELL ALVANIA 3

TYPE OF OIL RECOMMENDED

POWER EM 125

### SPINDLE SPEED CHANGE AND BELT TENSION

The machine is driven by an Alpha section vee belt from a 5.5kW (7.5kW optional extra) flange mounted motor.

To change the spindle speed proceed as follows:-

1. Isolate the machine electrically.
2. Open door in machine base for access to motor mounting assembly.
3. Loosen locking handle "A" in fig. 5 then using lever "B", pivot motor to release belt tension.
4. Change belt to appropriate pulley vee's for required spindle speed. See Fig. 7 for pulley layout diagram & speeds.
5. To re-tension belt, pivot motor by lever "B" then lock handle "A".

NOTE: A new belt may stretch slightly after hours of running.  
Re-tension as above if required.

### RAISE AND LOWER OF SPINDLE

The spindle rise and fall is by means of the handwheel "A" in Fig. 8 and operates through spiral gears giving maximum travel of 6" (152mm)

The spindle assembly can be locked at any height by means of the locking lever "B".

Whilst the rise and fall movement of the spindle provides an immediate adjustment of the cutter height, further adjustment outside the range of this can be affected by re-positioning the collars on the work spindle.

### SPINDLE LOCK & BRAKE FOOT PEDALS

The machine is fitted with spindle lock and spindle brake facilities which are activated by foot pedals "C" and "D" in Fig.5.

Depression of either foot pedal operates a limit switch which cuts electrical supply to spindle motor.

NOTE:- The motor can only be re-started by depressing start button "C" in Fig. 8.

### WARNING: NEVER DEPRESS "LOCK" PEDAL WHEN SPINDLE IS IN MOTION

Depression of BRAKE pedal will stop motor and spindle.

To operate spindle lock proceed as follows:-

When spindle has stopped, depress LOCK pedal, then keeping pedal depressed, turn spindle by hand until lock engages.

NOTE:- To maintain spindle in "locked" position, keep LOCK pedal depressed.

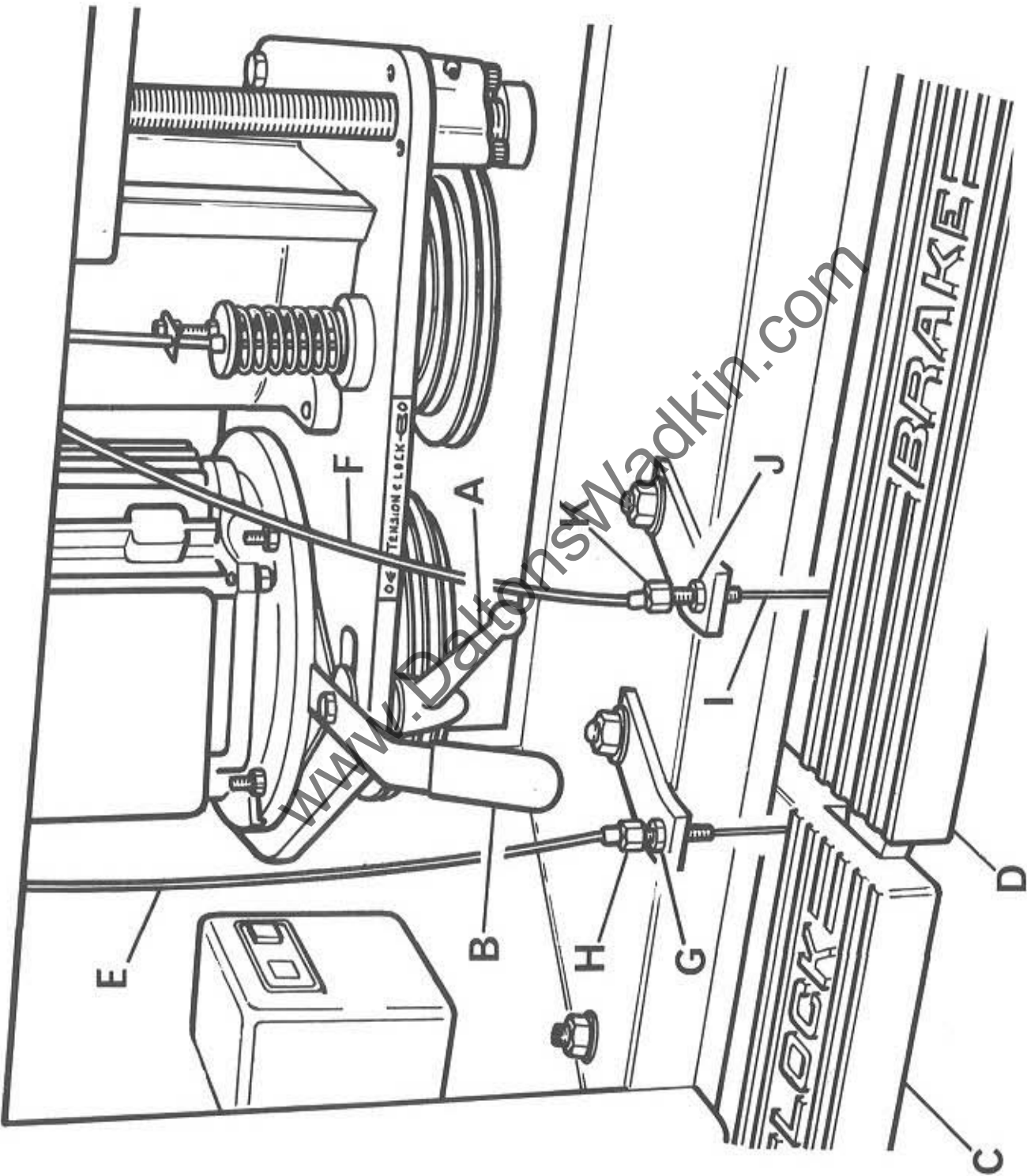
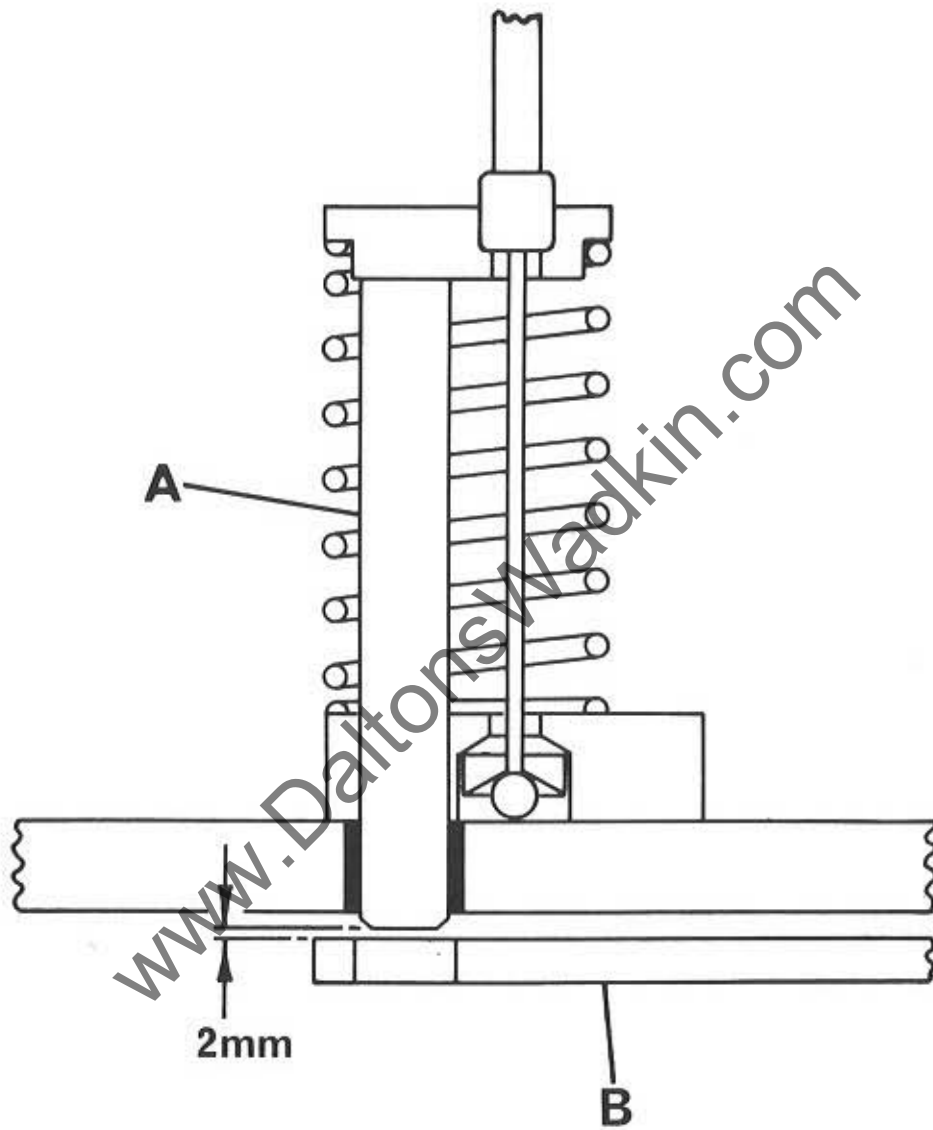


FIG. 5



**Sectional View Of Spindle Lock Assembly**



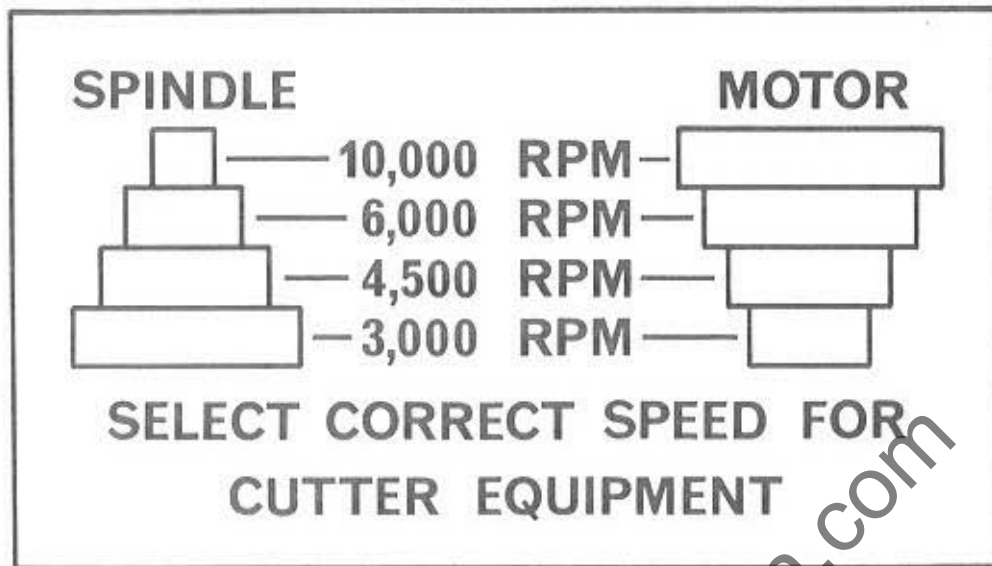


FIG. 7

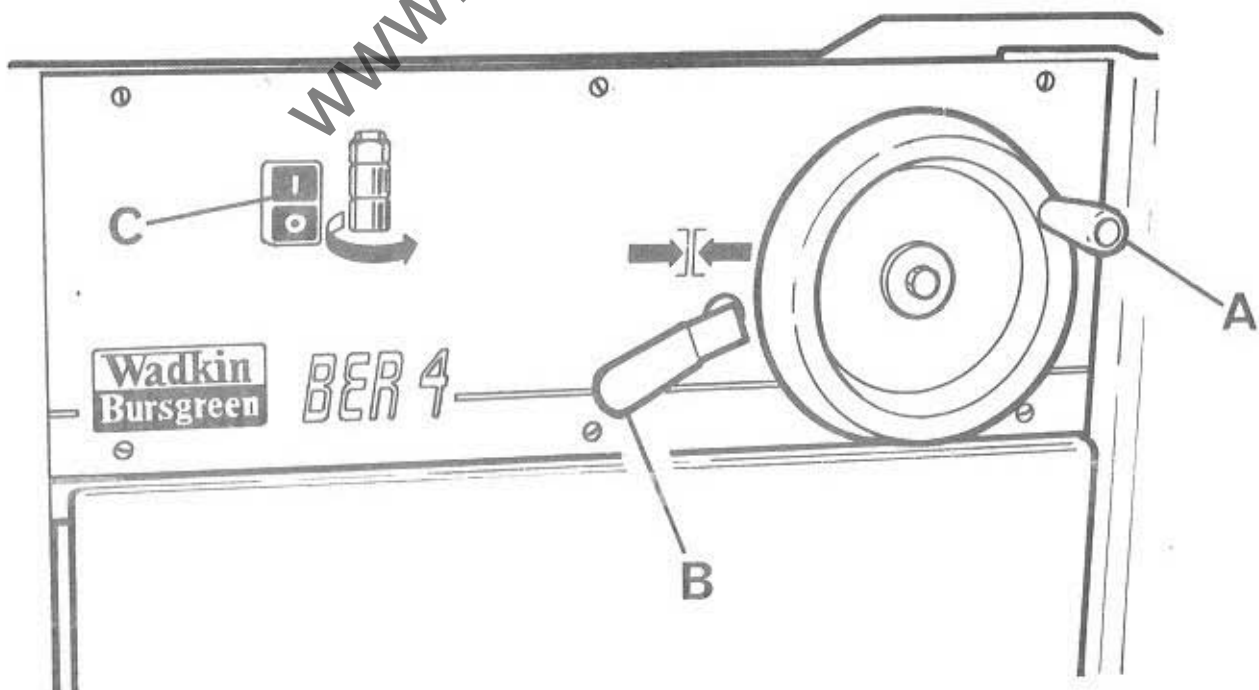


FIG. 8

## LOCK and BRAKE Adjustments

The LOCK and BRAKE adjustments are pre-set during the assembly of the machine and providing the cables "E" and "F" in FIG. 5 are greased regularly, these adjustments need only be checked once every 6 months.

The correct LOCK setting is as follows:-

With LOCK pedal in the "free" position (i.e. LOCK pedal not depressed) the locking plunger "A" in FIG 6 should be 2mm from location disc "B" as shown.

If this setting is incorrect, adjust as follows:-

1. Loosen locknut "G" in FIG 5 then turn adjusting screw "H" until plunger setting is correct as shown in FIG.6.
2. When set correctly, re-lock locknut "G".

The correct BRAKE setting is as follows:-

When the BRAKE pedal is depressed the exposed cable "I" should extend a further 13mm (1/2") before the brake is full on.

If this setting is incorrect, adjust as follows:-

1. Loosen locknut "J" then turn adjusting screw "K" until setting is correct as described above.
2. When set correctly, re-lock locknut "J".

## WORK SPINDLE INSTALLATION.

The four removable table rings give five table openings of 340, 230, 175, 120, and 80mm dia. (13.3/8", 9", 7", 4 3/4" and 3.1/4"). The required table opening should be selected before proceeding to fit the work spindle.

To insert the work spindle the undermentioned procedure should be followed:-

Insert the work spindle "A" in Fig.9, into the main spindle through the table opening selected. Great care should be taken to ensure that the work and main spindle seatings are completely free from all burrs, dirt and rust. A thin film of oil should be placed on the work spindle seatings before inserting. Align the peg in the work spindle with the slot in the main spindle and press spindle onto seating.

Depress "LOCK" foot pedal and slowly turn work spindle "A" in Fig.9 until spindle lock plunger locates in spindle brake disc "B" in Fig.6. Securely tighten spindle locknut "C" in Fig.9, on main spindle, firmly locking the work spindle in position.

## Important.

Always ensure at all times that the work spindle is securely held by the spindle locknut before starting the machine.

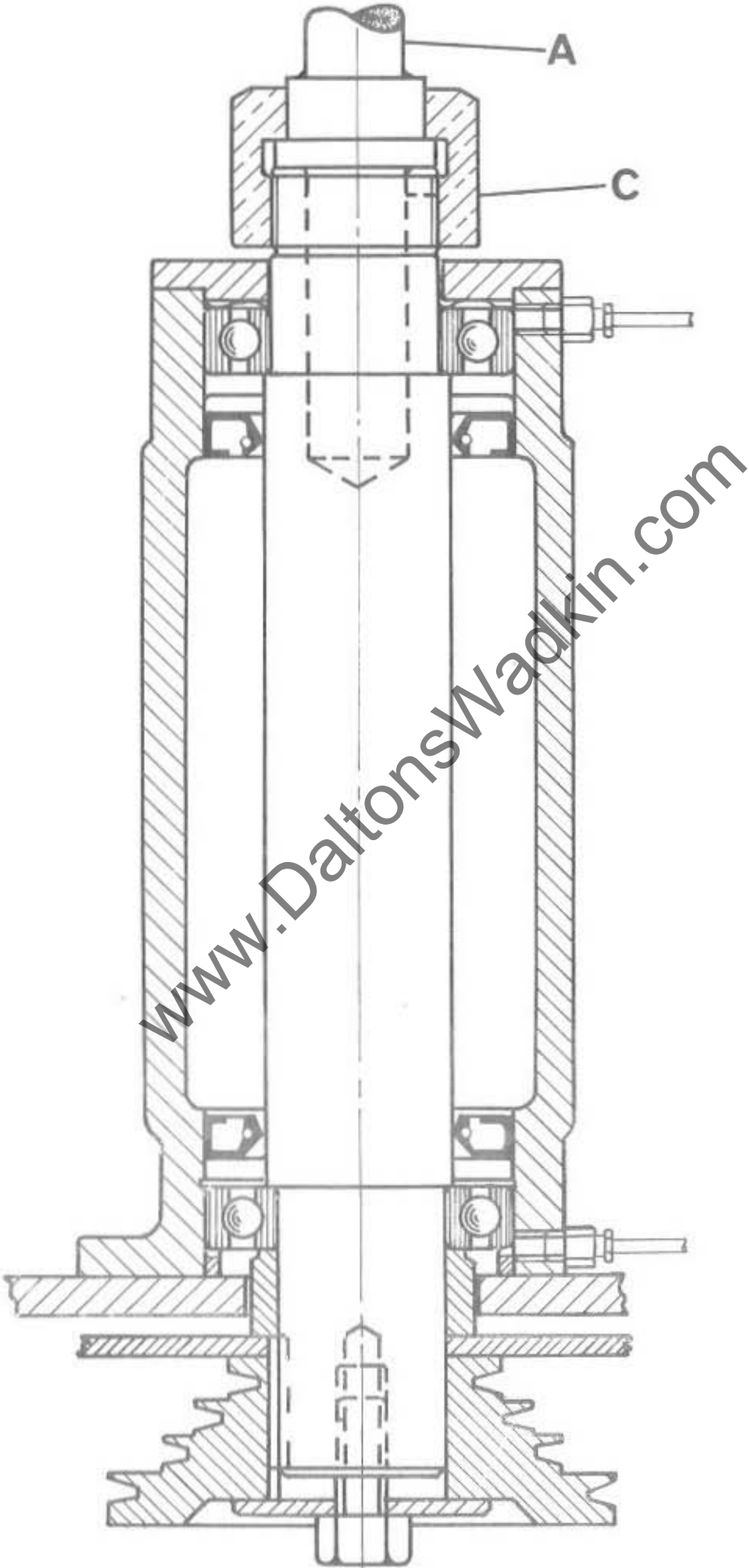


FIG. 9

## FENCE ADJUSTMENT

Each fence plate can be independently adjusted by means of the plastic handwheels "A" in Fig. 10. The fence plates can be set to the desired position and locked by the adjustable handles "B". The front fence plates can also be adjusted lengthwise.

The fence plates should be locked both ways at all times when the machine is in use.

The fence is fitted with a safety guard and a "shaw" guard can also be fitted if required.

The safety guard is adjustable depending on the section of timber being worked. This guard is shown in position in Fig. 10. To adjust the guard for various sections of timber, unscrew the plastic handwheels "C", set to required position and relock.

To adjust the safety guard in relation to the fence plates loosen the plastic handwheels "D", position the safety guard and relock.

## GENERAL HINTS

1. Always select the correct speed for the cutter equipment being used. Wadkin/Bursgreen cutterblocks are normally stamped with the maximum permissible speed, but this may need to be reduced dependent on shape and general condition of cutters being used.
2. Use sharp cutters which should be reasonably well balanced.
3. Ensure the cutters are tight on the blocks before starting machine. Use spanners provided and never fit a piece of piping to obtain greater leverage. This will strain the nuts and bolts and ultimately make them unsafe.
4. Never pack the cutters with sandpaper. This is most dangerous as the grit collapses when the cutter is working, and the cutter works loose. For packing use one thickness only of brown paper.
5. Keep nuts and bolts clean and keep oil on the threads.
6. Never run the cutter equipment at higher than the recommended speed.
7. Always use the guards available to ensure maximum protection.
8. Make good robust jigs and ensure that the parts are located securely on the jig.
9. Always isolate the machine electrically when changing cutter equipment or performing maintenance, etc..
10. Always notch cutters for french spindles as shown in Fig. 11 for the spindle locking bolt to locate the cutter.



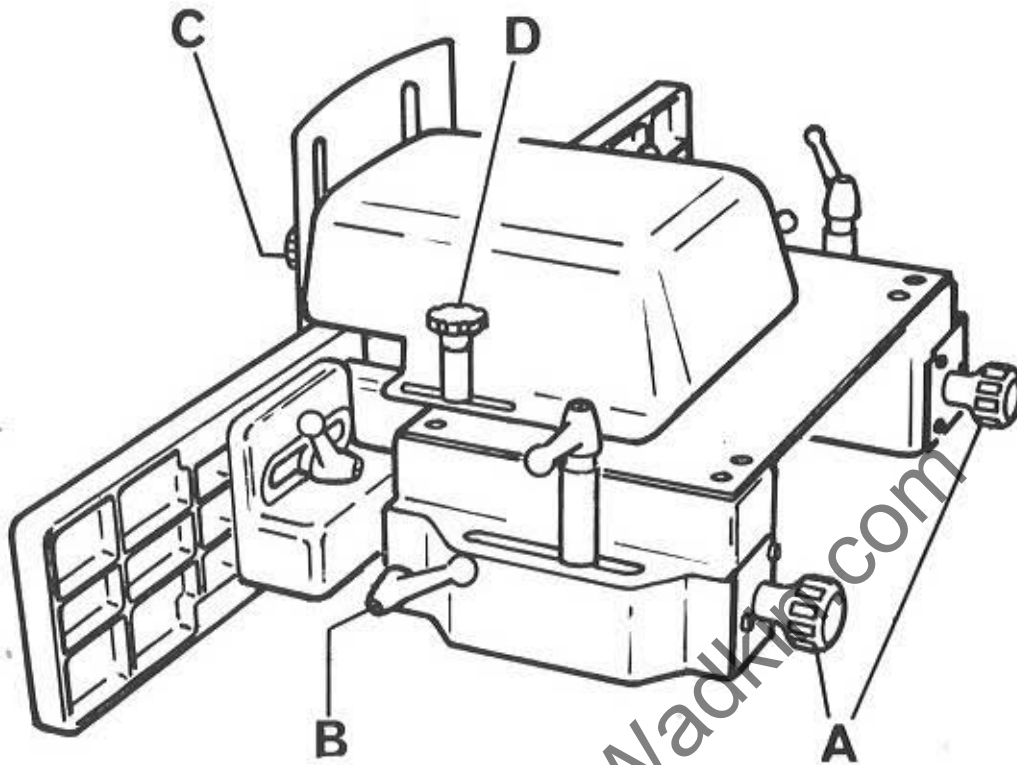


FIG. 10

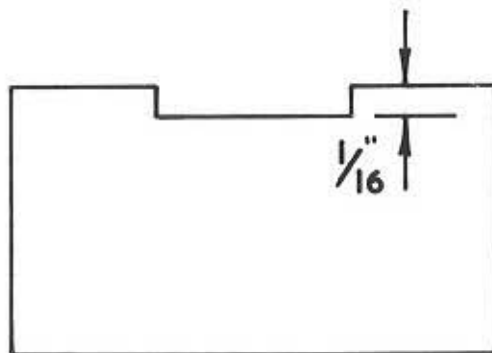
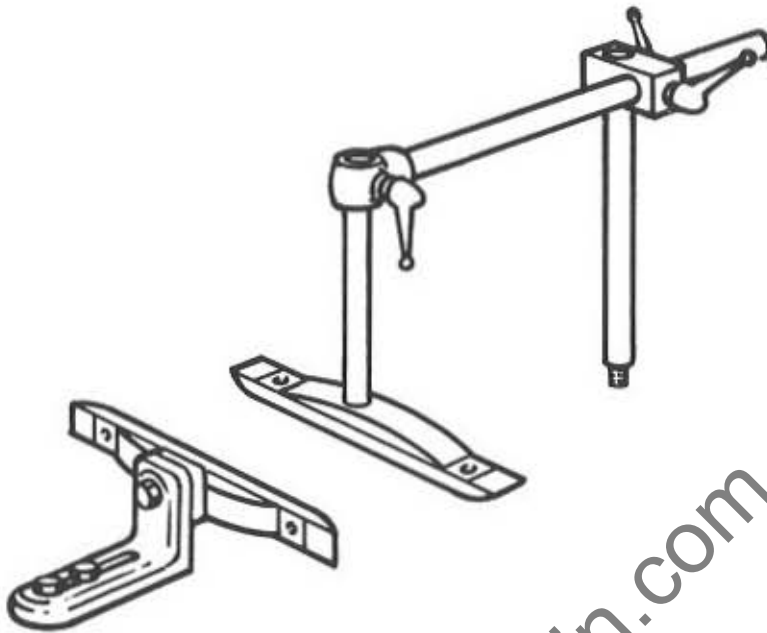
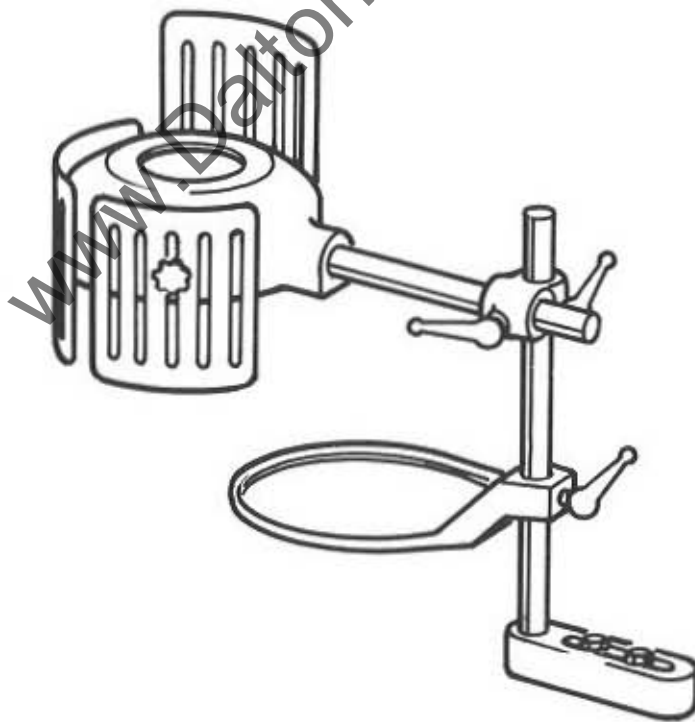


FIG. 11

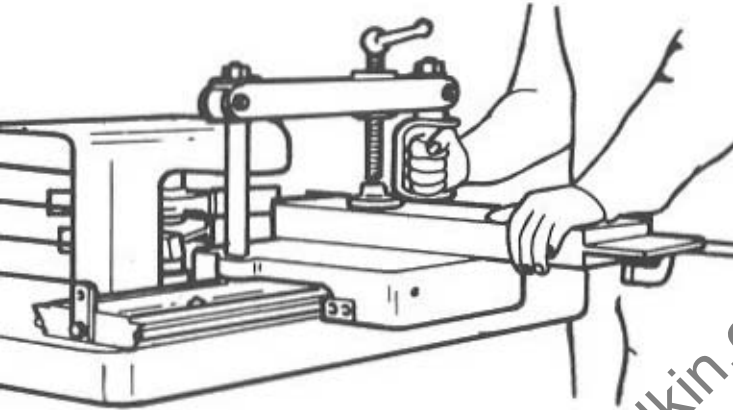


SHAW GUARD:- This guard provides top and side pressure and ensures safety in operation for use with the standard fence or as effectively with the ring fence for curved work.



#### SAFETY GUARD AND RING FENCE

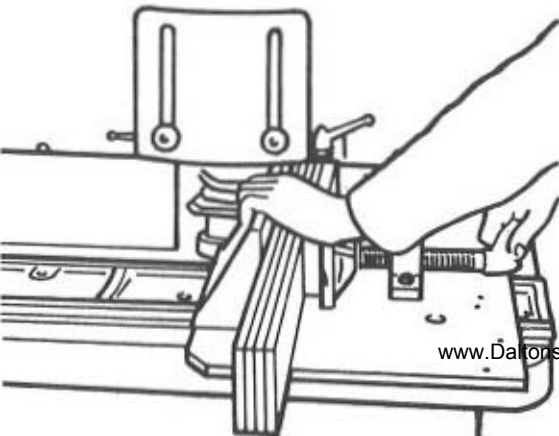
The safety guard has adjustable flaps which completely cover the cutter equipment. This is used in conjunction with the ring fence which is for use on all types of curved work.

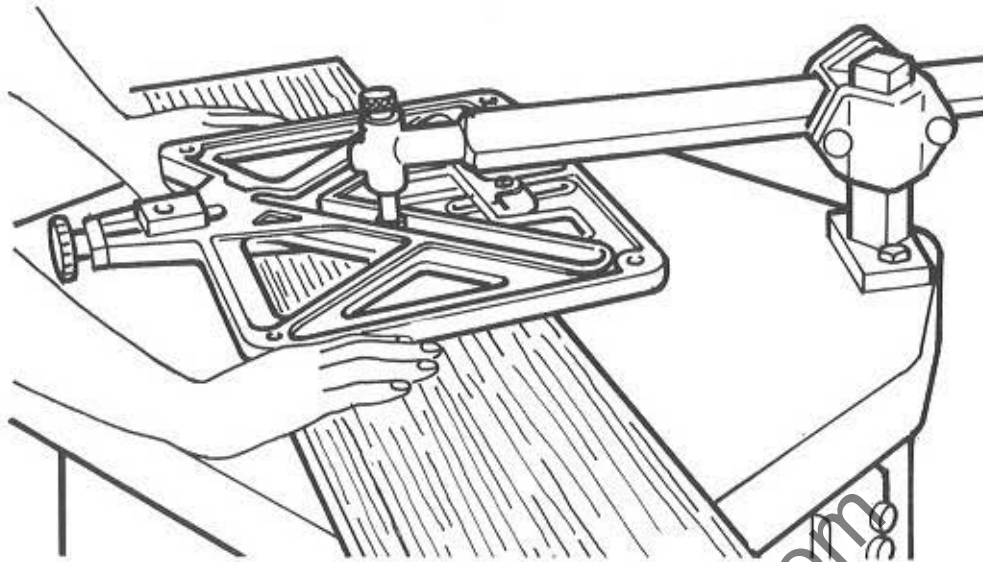


PE E.G.

nt and inexpensive method of tenoning on a  
attachment will cut single or double tenons up  
it will scribe either single or double at the  
l cut angular tenons; it can be used for half

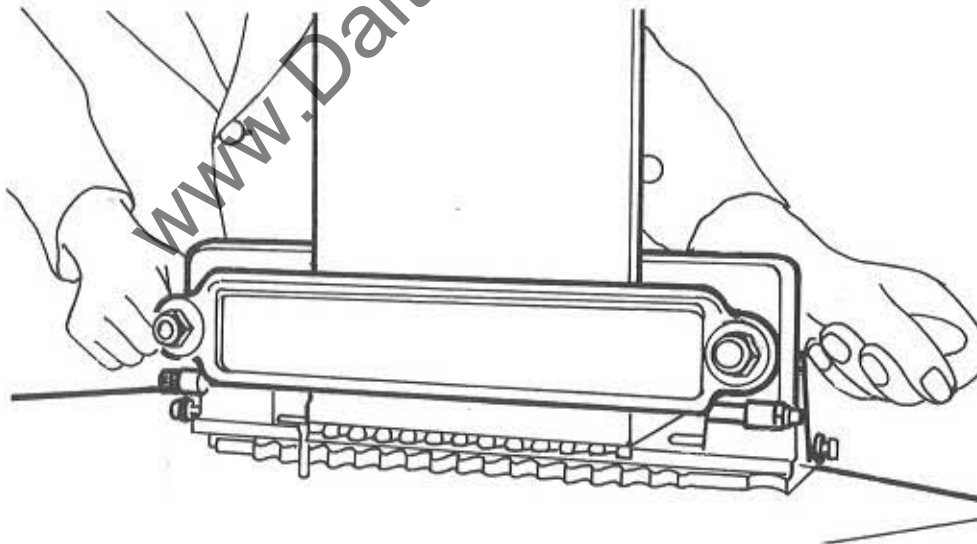
s are left dead square and no hand work is  
when they come off the machine.  
provided with stops to ensure exact length  
setting out is required.





**STAIR HOUSING ATTACHMENT:-** This attachment consists of template guide roller, arm and pillar.

This attachment can be fitted in a few minutes. The roller guide which controls the cut, is rigidly carried on a solid steel arm from a pillar and centred with the spindle. The template is secured to stair string by means of a hand nut. The template is reversible to produce a pair of strings right and left hand without resetting. Marking out is practically eliminated and a complete pair of strings can be cut in less time than is normally taken in marking out.

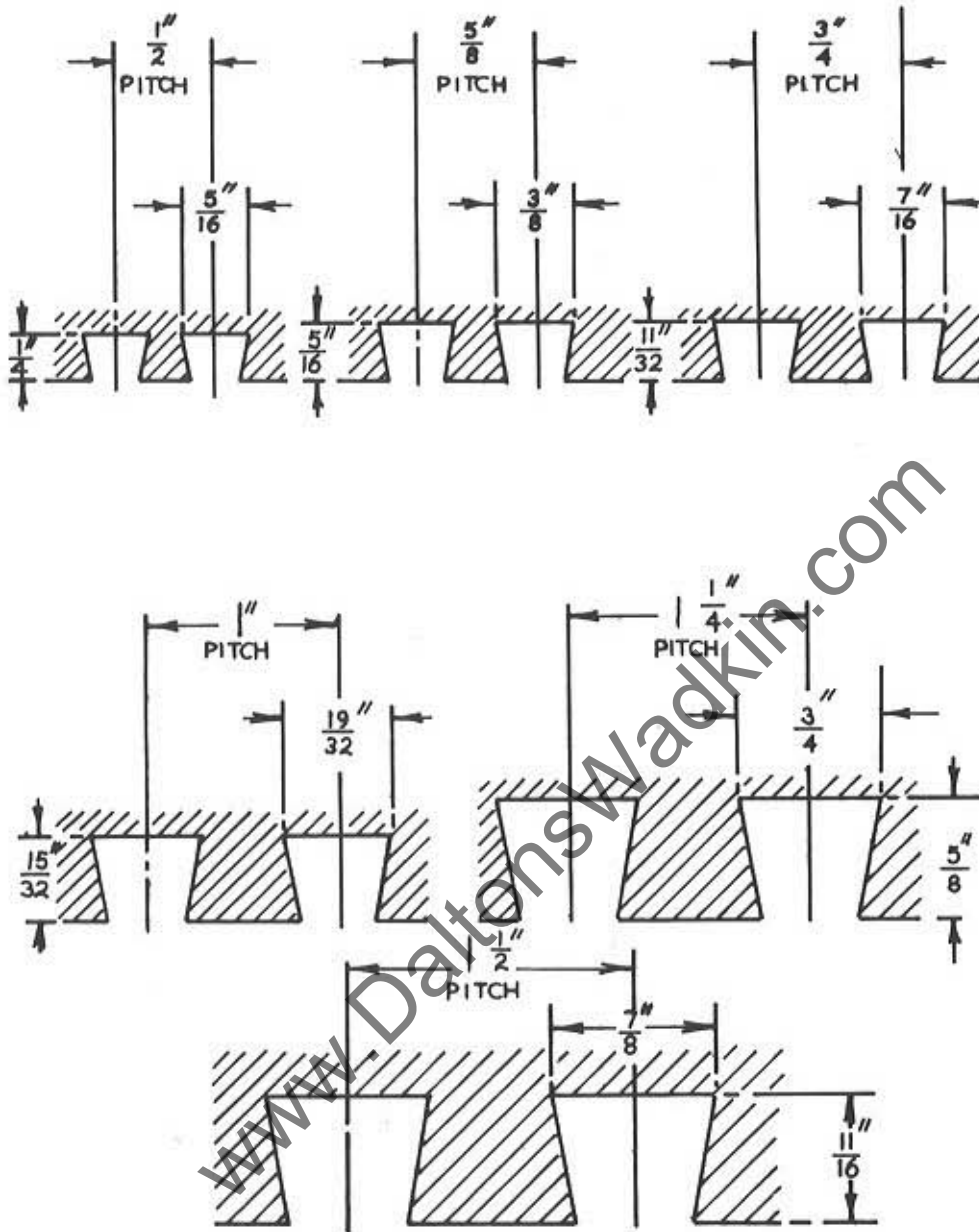


**DOVETAIL ATTACHMENT TYPE E.E.:-** For board up to 12" (305mm) wide supplied complete with comb plate, collet adaptor and 3/8" dia (9mm) H. type collet.

This attachment is a very simple efficient device for dovetailing two boards at right angles to each other. They are clamped in position and suitable stops are provided for setting. Both the dovetail and the pin are produced at the same operation, and the pin is rounded so that no hand work is necessary.



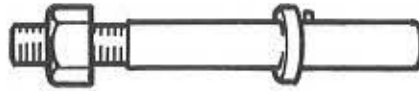
## DOVETAIL ATTACHMENT TYPE E.E. (Continued):-



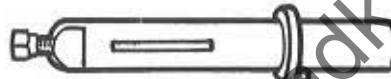
Guide plates and bits are available for the following pitches,  $\frac{1}{2}$ ",  $\frac{5}{8}$ ",  $\frac{3}{4}$ ",  $1$ ",  $1\frac{1}{4}$ " and  $1\frac{1}{2}$ " (13mm, 16mm, 19mm, 25mm, 32mm and 38mm)

NOTE:- When ordering spare dovetail bit, please specify pitch size not the diameter of the bit.

## Spindles & Adaptors

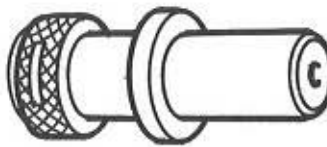


STANDARD LOOSE SPINDLES :- 1", 1½", 25mm, 30mm and 35mm dia. available. These are for carrying standard bore cutterblocks, slotted collars, grooving saws, etc.. The spindle threads are right hand, and all spindles are supplied with locknut and a set of making up collars.



SLOTTED FRENCH SPINDLE:- For carrying one ¼"(6mm) thick cutter only, which is secured by a hardened steel set screw.

Maximum recommended speed :- 4,500rpm.

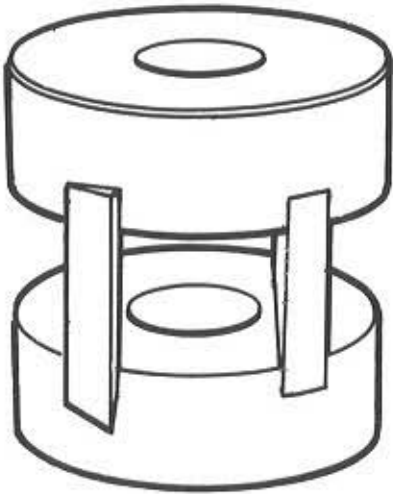


COLLET TYPE ROUTER ADAPTOR:- This adaptor is supplied complete with 3/8", ½" and 9/16" (9mm, 13mm and 14mm) "H" type collets. It enables standard router cutters to be used.



ADAPTOR FOR STAIR HOUSING ATTACHMENT:- Special adaptor having a 5/8" bore (16mm) to accept both "Z" type and clothes peg type cutter.

## Cutter Equipment



### SLOTTED COLLARS:-

25mm dia. work spindle:- 2½" (64mm) dia with ¼" (6mm) wide

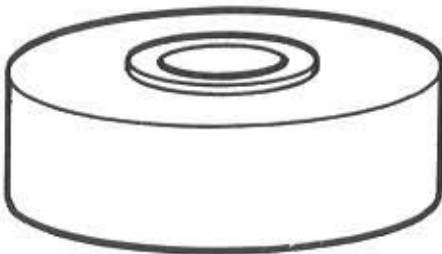
max cutting circle:- 3" (76mm)

30mm or 35mm dia work spindle:- 3" (76mm) dia with ¼" (6mm)

max cutting circle:- 3.5/8" (92mm)

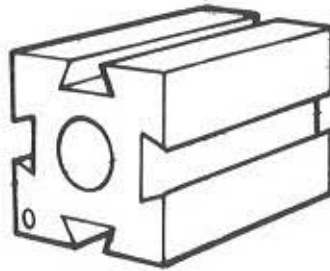
Slotted collar cutters have many advantages, they have a good angle, a comparatively small cutting circle and are easy to maintain and re-grind and also inexpensive. The maximum cutter length should not exceed 5/8" (16mm) to ensure maximum strength at the joint.

30mm dia x 1" (25mm) bore or 3.3/8" (86mm) dia x 1½", 30mm or 35mm dia x 1" or 25mm bore ball bearing type slotted collars also available.



CLAMPING GUIDES:- Available in two sizes for 3½" and 4" work (89mm and 101mm)

30mm dia x 1" or 25mm bore  
35mm dia x 1" or 25mm bore



**SQUARE CUTTERBLOCKS:-** These cutterblocks are used for long runs, cutters working in pairs. Two or more may be mounted on a single block to build up a mould.

For 1" or 25mm dia work spindle:-

2½" (64mm) square x 3" (76mm) long complete with 4 - ½" whit (13mm) dovetail cutter bolts, nuts and washers.

Maximum recommended speed:- 4,500 rpm

For 1½", 30mm or 35mm dia work spindle:-

3½" (89mm) square x 3" (76mm) long complete with 4 - 5/8" whit dovetail cutter bolts, nuts and washers.

Maximum recommended speed:- 4,500 rpm

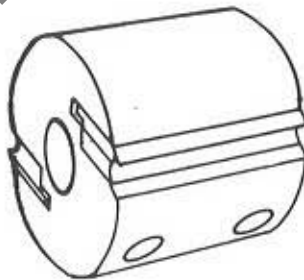
3½" (89mm) square x 4" (102mm) long complete with 4 - 5/8" whit dovetail cutter bolts, nuts and washers.

Maximum recommended speed:- 4,500 rpm

3½" (89mm) square x 5" (127mm) long complete with 4 - 5/8" whit dovetail cutter bolts, nuts and washers.

3½" (89mm) square x 6" (152mm) long complete with 4 - 5/8" whit dovetail cutter bolts, nuts and washers.

Maximum recommended speed:- 4,500 rpm



**CIRCULAR CUTTERBLOCKS:-** These cutterblocks have wedge type clamping for safety. They are smooth running and used for facing or shallow rebates etc..

For 1" or 25mm dia work spindle:-

3½" (89mm) diameter circular cutterblock, 3" (76mm) long or 2" (50mm) long

Maximum recommended speed:- 7,000 rpm

For 1½", 30mm or 35mm dia work spindle:-

4" (102mm) diameter circular cutterblock 3" (76mm) long

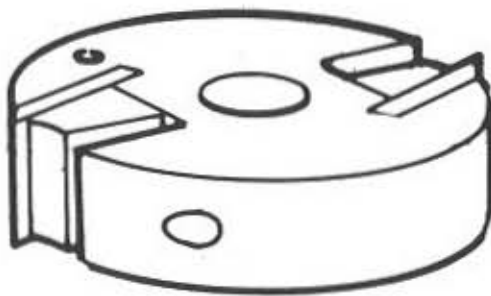
Maximum recommended speed:- 7,000 rpm

4½" (108mm) diameter circular cutterblock 4" (102mm) long

Maximum recommended speed:- 6,000 rpm

4½" (108mm) diameter circular cutterblock 6" (152mm) long

Maximum recommended speed:- 4,500 rpm



### TWO KNIFE WEDGE TYPE MOULDING CUTTERBLOCK

These cutterblocks are designed to take from  $5/32"$  (4mm) to  $1/2"$  (13mm) thick cutters; this permits tungsten carbide tipped cutters to be used when necessary.

The cutters can be used for mouldings requiring up to  $1/2"$  (13mm) cutter projection when using  $1/2"$  thick cutters.

$4"$  (102mm) dia x  $15/16"$  (24mm) thick x  $1"$  (25mm) bore. Part No. QR60.

This block uses  $5/32"$  (4mm) thick cutters only.

$4.7/8"$  (124mm) dia x  $15/16"$  (24mm) thick x  $1"$  (25mm) bore. Part No. QR 11/B

$4.7/8"$  (124mm) dia x  $15/16"$  (24mm) thick x  $1\frac{1}{4}"$  (30mm) or 35mm bore. Part No. QR 1/B

$4.7/8"$  (124mm) dia x  $1\frac{1}{4}"$  (32mm) thick x  $1\frac{1}{4}"$  (30mm) or 35mm bore. Part No. QR 2

$4.7/8"$  (124mm) dia x  $1\frac{1}{4}"$  (38mm) thick x  $1\frac{1}{4}"$  (30mm) or 35mm bore. Part No. QR 10

$4.7/8"$  (124mm) dia x  $2"$  (50mm) thick x  $1\frac{1}{4}"$  (30mm) or 35mm bore. Part No. QR3

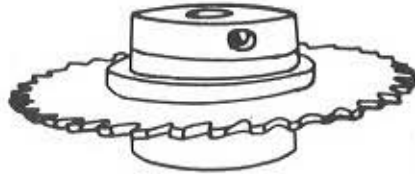
$4.7/8"$  (124mm) dia x  $2"$  (50mm) thick x  $1\frac{1}{4}"$  (30mm) or 35mm bore. 4 knife Part No. QR66

$5.3/8"$  (137mm) dia x  $15/16"$  (24mm) thick x  $1\frac{1}{4}"$  (30mm) or 35mm bore. Part No. QR 4

$4.7/8"$  (124mm) dia x  $2"$  (51mm) thick x  $1\frac{1}{4}"$  (30mm) or 35mm bore, with top and bottom bevels. Part No. QR 57

$8"$  (203mm) dia x  $15/16"$  (24mm) thick x  $1\frac{1}{4}"$  (30mm) or 35mm bore. Part No. QR 16





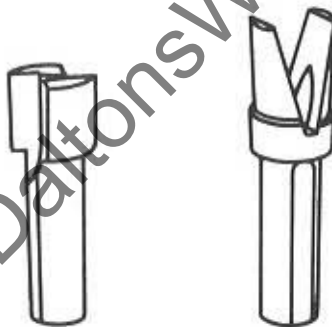
#### WOBBLE SAW:-

These saws are used where varied widths of grooving are called for, and where quantities are small. They are not recommended for quantity production or where precision accuracy or the highest standard of finish is required.

6" (151mm) diameter for grooves  $\frac{1}{8}$ " to  $\frac{3}{4}$ " (3mm to 19mm)

For use on 1",  $1\frac{1}{4}$ ", 25mm, 30mm or 35mm dia spindles

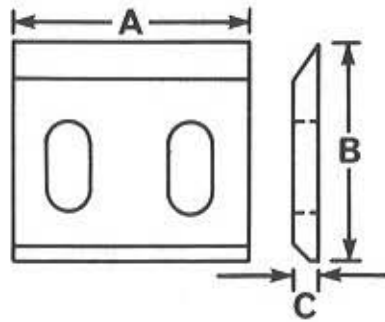
Maximum recommended speed 4,500 rpm.



#### CUTTERS FOR STAIR HOUSING ATTACHMENT:-

Z Type and Clothes peg type  $\frac{5}{8}$ " dia shank.

These cutters are designed to give a slightly undercut trench and perfectly uniform wedge space. All have  $\frac{5}{8}$ " dia. shank.

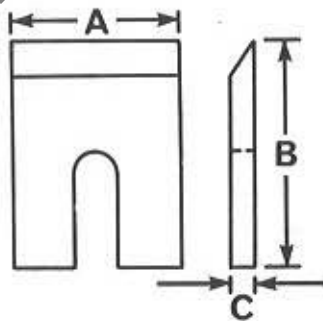


SQUARE IRONS - HIGH SPEED STEEL TIPPED  
CLOSED SLOT

	DEPTH "B"		THICKNESS "C"		PART NO.
	mm	inch	mm	inch	
Width "A" 38mm (1½")	80	3.1/8	9.5	3/8	1
Width "A" 44mm (1¾")	105	4.1/8	9.5	3/8	14
Width "A" 51mm (2")	80	3.1/8	9.5	3/8	2
	92	3.5/8	9.5	3/8	8
	98	3.7/8	9.5	3/8	12
	105	4.1/8	9.5	3/8	36
Width "A" 63mm (2½")	89	3.1/2	9.5	3/8	FCT 51
	105	4.1/8	9.5	3/8	37
Width "A" 76mm (3")	80	3.1/8	9.5	3/8	3
	92	3.5/8	9.5	3/8	31

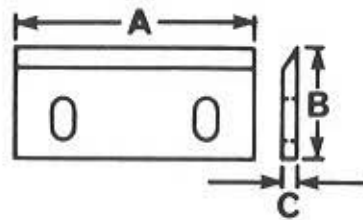
H.S.S. BEVELLED CILL  
IRONS

	HAND	DEPTH "B"		THICKNESS "C"		PART NO.
		mm	inch	mm	inch	
Width "A" 102mm (4")	R	140	5.1/2	12.5	1/2	61
	L	140	5.1/2	12.5	1/2	61



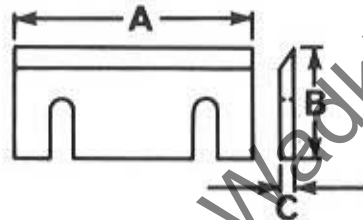
SQUARE IRONS-OPEN SLOT  
HSS TIPPED:-

	DEPTH "B"		THICKNESS "C"		PART NO.
	mm	inch	mm	inch	
Width "A" 44mm (1¾")	102	4	9.5	3/8	TB 14
Width "A" 51mm (2")	102	4	9.5	3/8	TB 15
Width "A" 57mm (2¼")	102	4	9.5	3/8	TB 16
Width "A" 63mm (2½")	102	4	9.5	3/8	TB 17
Width "A" 70mm (2¾")	102	4	9.5	3/8	TB 18
Width "A" 76mm (3")	102	4	9.5	3/8	TB 19



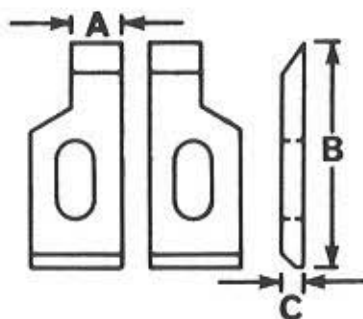
PLANING IRONS - CLOSED SLOT  
HSS TIPPED:-

WIDTH "A"		DEPTH "B"		THICKNESS "C"		PART NO.
mm	inch	mm	inch	mm	inch	
102	4	98	3.7/8	9.5	3/8	13
102	4	105	4.1/8	9.5	3/8	40
108	4 1/4	76	3	9.5	3/8	FCT255
108	4 1/4	89	3.1/2	9.5	3/8	FCT 52



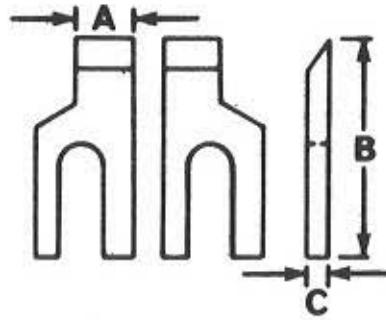
PLANING IRONS - OPEN SLOT  
HSS TIPPED:-

89	3 1/2	102	4	9.5	3/8	TY1
102	4	102	4	9.5	3/8	TY2
114	4 1/2	102	4	9.5	3/8	TY3
127	5	102	4	9.5	3/8	TY4



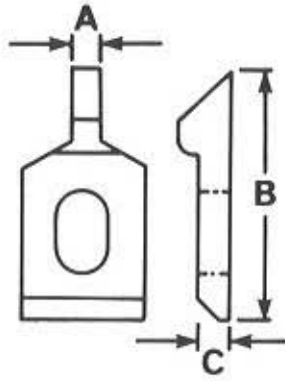
IRONS - CLOSED SLOT  
PED

	HAND	DEPTH "B"		THICKNESS "C"		PART NO.
		mm	inch	mm	inch	
A" 12.5 (½")	R	105	4.1/8	9.5	3/8	29
	L	105	4.1/8	9.5	3/8	30
A" 19mm (¾")	R	105	4.1/8	9.5	3/8	32A
	L	105	4.1/8	9.5	3/8	33B
A" 25mm (1")	R	92	3.5/8	9.5	3/8	4
	L	92	3.5/8	9.5	3/8	5
	R	105	4.1/8	9.5	3/8	32
	L	105	4.1/8	9.5	3/8	33
	R	117	4.5/8	9.5	3/8	48
	L	117	4.5/8	9.5	3/8	49
	R	92	3.5/8	9.5	3/8	6
	L	92	3.5/8	9.5	3/8	7
A" 38mm (1½")	R	98	3.7/8	9.5	3/8	10
	L	98	3.7/8	9.5	3/8	11
	R	105	4.1/8	9.5	3/8	34
	L	105	4.1/8	9.5	3/8	35
	R	117	4.5/8	9.5	3/8	41
	L	117	4.5/8	9.5	3/8	42



REBATE IRONS - OPEN SLOT  
HSS TIPPED

	HAND	DEPTH "B"		THICKNESS "C"		PART NO.
		mm	inch	mm	inch	
Width "A" 12mm ( $\frac{1}{2}$ " )	R	102	4	9.5	3/8	TB1
	L	102	4	9.5	3/8	TB2
Width "A" 16mm ( $\frac{5}{8}$ " )	R	102	4	9.5	3/8	TB3
	L	102	4	9.5	3/8	TB4
Width "A" 19mm ( $\frac{3}{4}$ " )	R	102	4	9.5	3/8	TB5
	L	102	4	9.5	3/8	TB6
Width "A" 22mm ( $\frac{7}{8}$ " )	R	102	4	9.5	3/8	TB7
	L	102	4	9.5	3/8	TB8
Width "A" 25mm (1" )	R	102	4	9.5	3/8	TB9
	L	102	4	9.5	3/8	TB10
Width "A" 32mm ( $1\frac{1}{4}$ " )	R	102	4	9.5	3/8	TB11
	L	102	4	9.5	3/8	TB12
Width "A" 38mm ( $1\frac{1}{2}$ " )	R	102	4	9.5	3/8	TB13
	L	102	4	9.5	3/8	TB13A



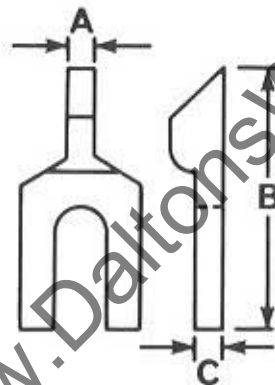
## CENTRAL HIGH BACK GROOVING IRONS - CLOSED SLOT

HSS TIPPED

WIDTH "A"		LENGTH "B"		THICKNESS "C"	
mm	inch	mm	inch	mm	inch

PART NO.

3	1/8	92	3.5/8	9.5	3/8	341
6	1/4	92	3.5/8	9.5	3/8	343
6	1/4	108	4.1/4	9.5	3/8	373
9.5	3/8	108	4.1/4	9.5	3/8	375



## CENTRAL HIGH BACK GROOVING IRONS - OPEN SLOT

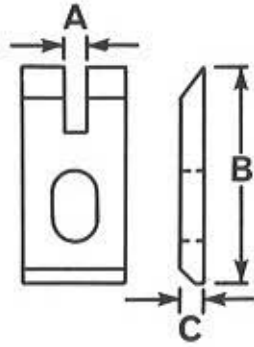
HSS TIPPED

WIDTH "A"		LENGTH "B"		THICKNESS "C"	
mm	inch	mm	inch	mm	inch

PART NO.

3	1/8	102	4	9.5	3/8	TX
5	3/16	102	4	9.5	3/8	TX1
6	1/4	102	4	9.5	3/8	TX2
8	5/16	102	4	9.5	3/8	TX3
9.5	3/8	102	4	9.5	3/8	TX4





## HIGH SPEED STEEL TONGUING IRONS (CENTRAL) - CLOSED SLOT

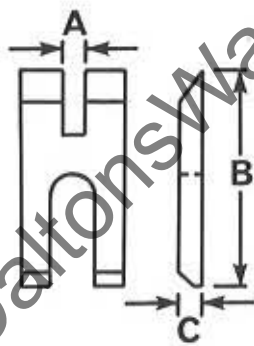
WIDTH "A"		DEPTH "B"		THICKNESS "C"	
mm	inch	mm	inch	mm	inch
6	1/4	92	3.5/8	9.5	3/8
6	1/4	108	4.1/4	9.5	3/8
9.5	3/8	108	4.1/4	9.5	3/8

PART NO.

353

383

385



## HIGH SPEED STEEL TONGUING IRONS (CENTRAL) - OPEN SLOT

WIDTH "A"		DEPTH "B"		THICKNESS "C"	
mm	inch	mm	inch	mm	inch
6	1/4	102	4	9.5	3/8
9.5	3/8	102	4	9.5	3/8

PART NO.

TV2

TV4

## CUTTERS AND CUTTER STEELS FOR SPINDLE MOULDERS

Special grades of steel are used for making cutters for different duties and applications on the spindle moulder. The following is a rough guide.

High speed steel on iron:- is used for long life and for cutting hard woods. High speed steel is brittle and is usually welded to a softer steel back for all types of unsupported irons. These are used on square cutterblocks, slotted collars and some thin knife moulding cutterblocks. A large range of irons for the square cutterblock and slotted collars are readily available in this steel.

Solid high speed steel:- is more brittle and is only used where the cutters are supported very close up to the cutting edge e.g. a thin knife on the circular cutterblock, or where a strong section can be used such as milled to pattern slotted collar cutter.

Alloy steel on iron:- is less expensive than high speed steel on iron, and is more ductile. Alloy steel is not as hard and will not stand up to heavy cutting or hard woods as well as high speed steel. A large range of irons for the square cutterblock and slotted collars are readily available in this steel.

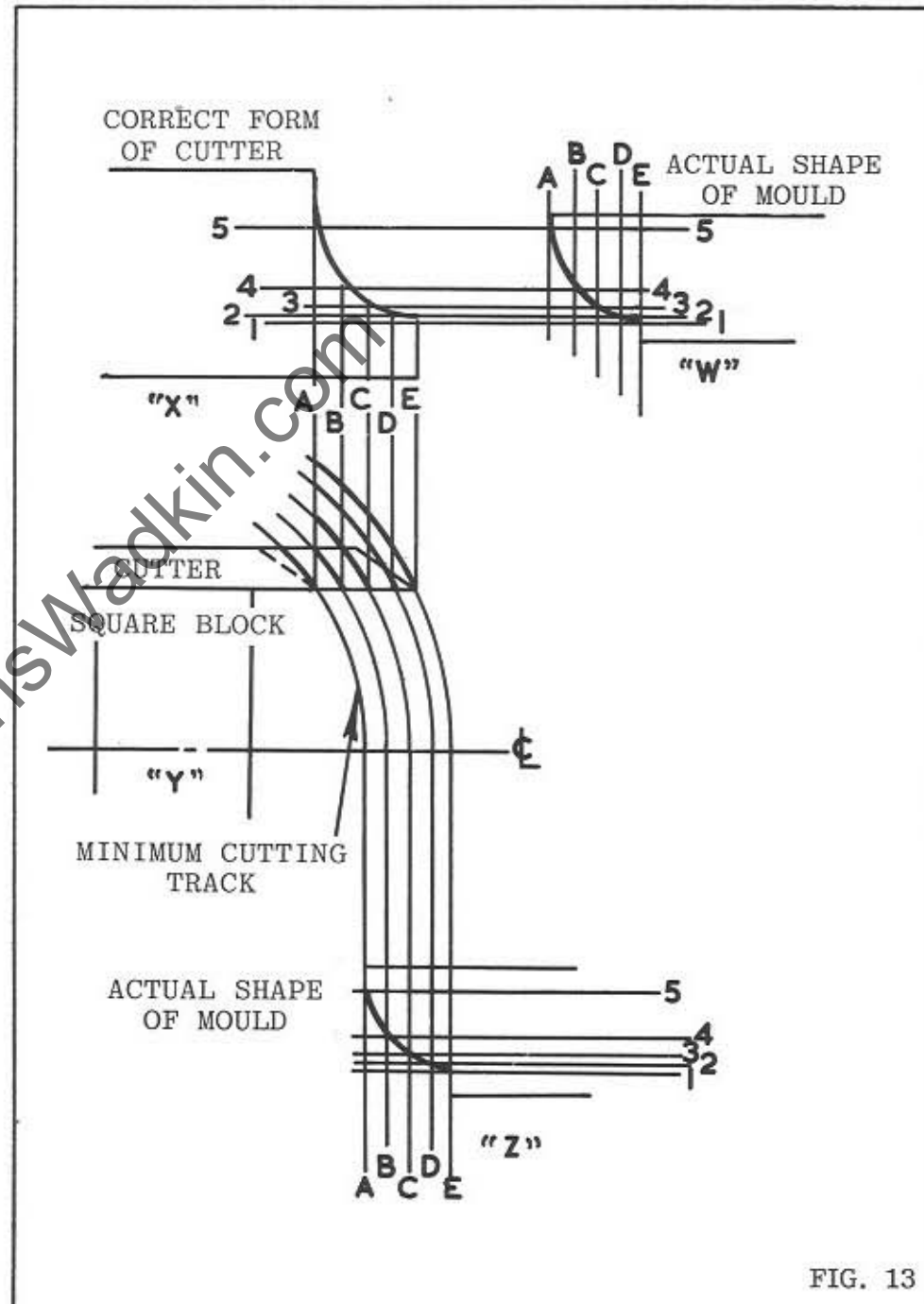
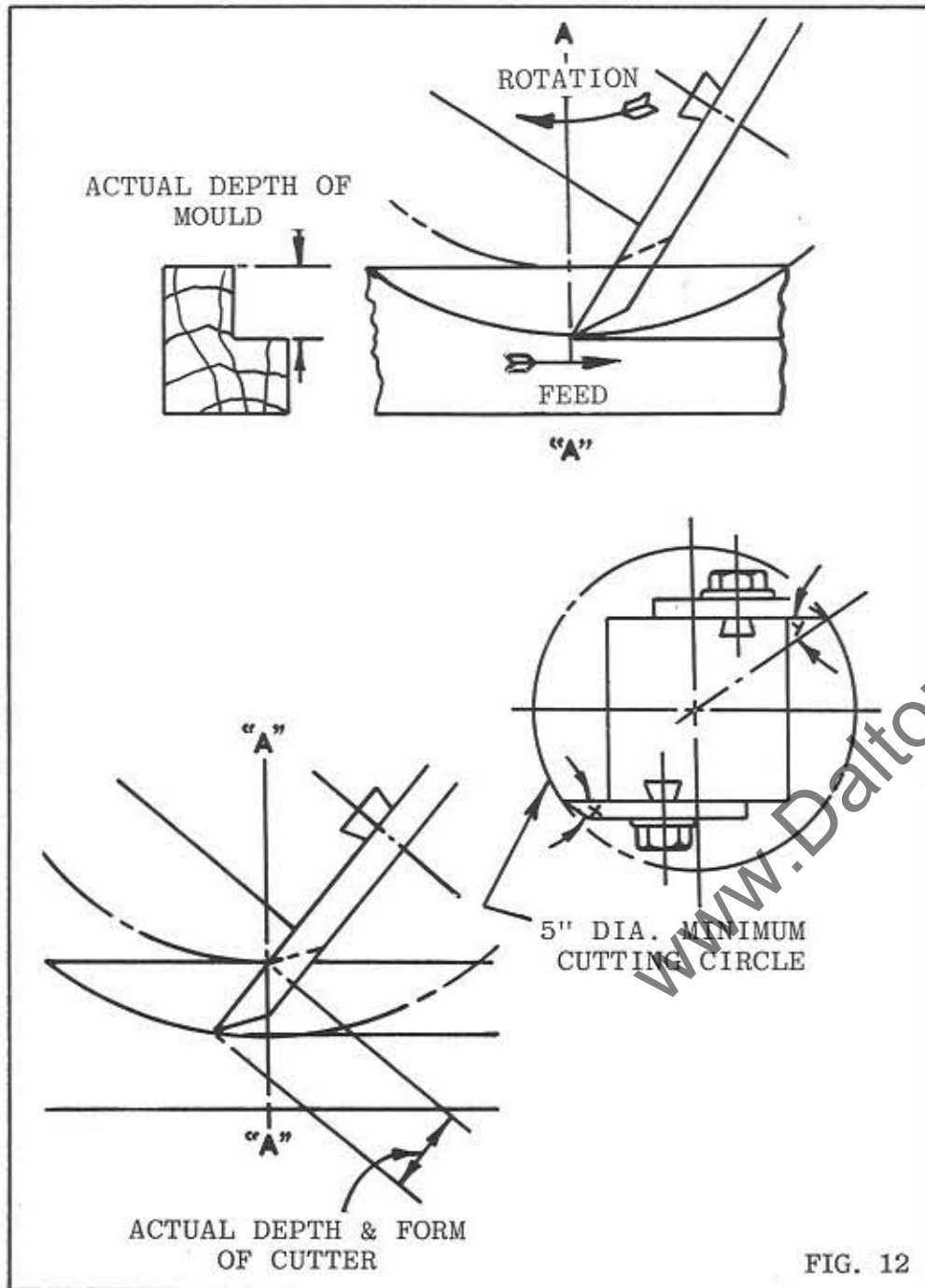
Solid alloy steel:- is normally supplied in bar form in the soft condition for cutting up by the customer. It is easily hardened and tempered and is normally used for french spindle work up to 6,000 rpm where the cutters are held by a locking screw in spindle, locking direct on to the side of the cutter.

All the above types can be supplied in bar form, micrometer ground to precision limits. The alloy and alloy on iron  $3/16"$  (5mm) x  $3/4"$  (20mm) up to  $1/2"$  (6mm) x 3" (76mm) in the soft condition and the solid high speed steel  $5/32"$  (4mm) x  $1 1/2"$  (38mm) and  $5/32"$  (4mm) x 2" (50mm) and high speed steel on iron  $1/2"$  (6mm) x  $1 1/2"$  (32mm) and  $1/2"$  (6mm) x  $1 1/2"$  (38mm) in the heat treated condition. These latter bars cannot be cut with a tool and the blanks should be ordered to correct grinding lengths unless the user has suitable grinding wheel equipment for cutting to length himself.

All the above cutters can be ground on the usual standard grinding equipment.

Tungsten carbide tips:- These are specially made for use on hardwoods, woods with high silica content also plywoods and hardboards where High Speed Steel will not stand up to the abrasive action. It is much more expensive but gives very much longer life. A limited range of these cutters for slotted collars and square cutterblocks are available. Special shapes can be supplied to order.

N.B. Special diamond impregnated grinding wheels and diamond hand caps are essential for shaping and servicing Tungsten Carbide Tipped Tools. These are available but expensive for the small user for whom we can offer a cutter grinding service if required.



## SHAPING CUTTERS

When shaping cutter for any mould on any type of cutterhead or slotted collars it is important that the correct allowance is made to the depth of form cutter.

Fig. 12 shows the projections of the cutter to produce a simple rebate. For example using the  $3\frac{1}{2}$ " square cutterblock, to produce a 1" (25mm) deep rebate the cutter must have a depth of form of  $1.3/16$ " (30mm) this being due to the angle at which the cutter strikes the work on the line "AA". When a shaped mould is required to be cut it is necessary to plot out the form of the cutter; this is shown in fig.13.

It is important when selecting blanks from which to make the cutter that they have the minimum necessary overhang. Also a blank as near the shape and width as possible should be selected so that there will be less waste and less chance of overheating cutters when grinding.

The minimum cutting circle is fixed to give the necessary clearance for the bolt head when working with straight irons only.

The cutting angle which is normally  $35^\circ$  is shown at "B" in fig.12 and the cutting angle at "C" this angle varies with the size of the cutterblock and the depth of the mould.

To obtain the correct cutter form for a shaped mould, without using the moulders rule, it is necessary to plot this out as shown.

First the square block and cutter at minimum cutting circle are drawn out at "Y" in fig.13. The radius of the minimum cutting circle is drawn around to the centre line and divided up by the lines A,B,C, D and E, into either  $1/16$ " (2mm) or  $1/8$ " (3mm) according to the size and intricacy of the shape, these lines are then struck round from the centre line radially to the face of the cutter.

At "X" the lines A1,B1,C1,D1 and E1 are carried across as shown, also at "W" the mould is produced exactly as at "Z" and divided up the same, the lines 1,2,3,4 and 5 which are from the points where lines A,B,C,etc., intersect the edge of the mould, are then drawn across to "X" thus E1 is cut by 1; D1 by 2 etc. The points of intersection are joined as shown thus giving the correct projected form of the cutter.

This takes up considerable time to do for each shape of cutters required, and can be very much reduced by using the moulder's rule as shown in fig.14. This is a graph on which the form can be plotted and automatically gives the necessary allowance on the depth of form.

When the mould is to be a standard, a template should be made to the projected form to which the cutters can be shaped when the job repeats. This will ensure uniformity on all future runs.

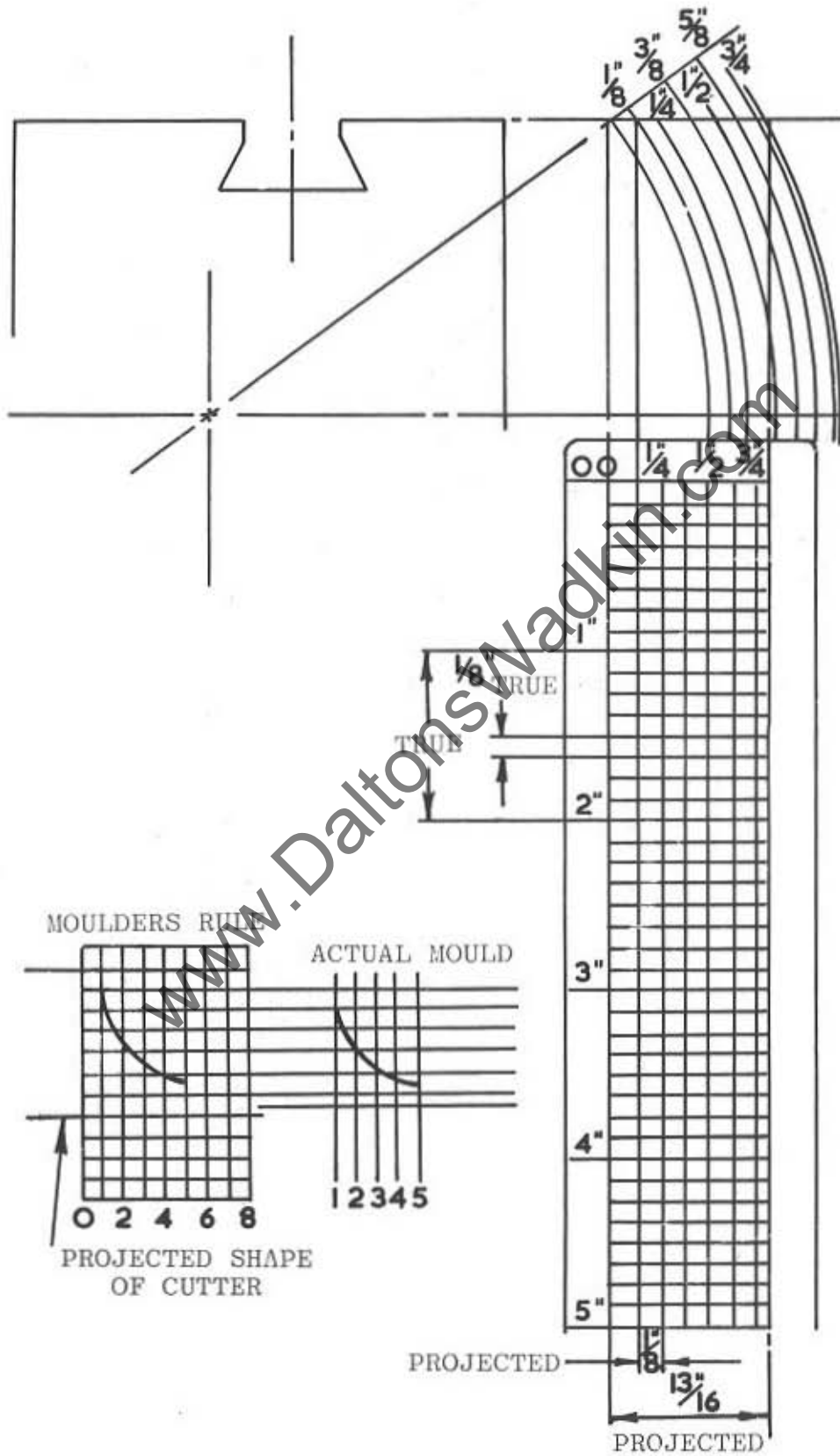


FIG. 14

## MOULDERS RULE

A permanent moulder's rule can be made by the customer in sheet brass and aluminium and will then be handy for use in the workshop.

To plot the form of a cutter by use of the moulder's rule it is necessary to draw the full size shape of the mould on tracing paper and rule  $1/8"$  (3mm) squares as shown in fig.14a. This is then placed alongside the moulder's rule and projected across, this will give a series of dots, which must be joined to give the form of the cutter. The cutter blank chosen must be wide enough to give at least  $1/8"$  (3mm) overlap beyond the edge of the mould. The depth of form of the cutter for the same mould varies slightly when used on a  $3\frac{1}{2}"$  (89mm) or  $2\frac{1}{2}"$  (64mm) square cutterblock due to the different cutting diameters. Moulder's rules are required for each size of square block. The cutters are not interchangeable from one size of cutterblock to another if a really accurate mould is required.

## CUTTER GRINDING

Cutters should be ground carefully avoiding any overheating as this will crack or soften cutters so that they will not stand up to the work.

A solution of soluble oil and water should be handy and the cutters should be held in this occasionally to cool them. This solution will also prevent rusting. Cutters should never be allowed to become discoloured during grinding, as this indicates overheating.

The correct cutting angle of  $35^\circ$  for most cutters should be maintained as this gives the correct strength to the cutting edge. When hollow grinding is carried out, the angle of the cutting edge, should be kept as near  $35^\circ$  as possible, see fig. 15(a) and (b).

Hollow grinding is recommended wherever possible, as a keen cutting edge is more easily obtained when hand lapping. When lapping or stoning a flat ground cutter, a good edge is more difficult to obtain due to the tendency to rock the stone and leave a convex face.

Good open grain wheels should be used and should not be allowed to become glazed, as this will cause excessive heat.

About 12" (304mm) diameter wheels used down to 10" (254mm) give the best radius for a hollow grind and an economic life. 8" (204mm) wheels used down to 6" (153mm) leave the grind too hollow.

Tungsten carbide tipped cutters should be purchased the shape required and re-ground only as necessary. In this case cutters should be relieved at  $35^\circ$  on the steel position and the tips finished with a diamond impregnated wheel at  $45^\circ$  as shown, using only very light cuts to prevent cracking. The diamond wheel should not be allowed to touch the steel backing as this clogs the wheel and causes excessive heat. Where available a copious flow of coolant should be used. They may be honed with a Diamond hand lap, as the cutter becomes dull, until a re-grind is necessary. A thin oil lubricant should be used on the hand lap.



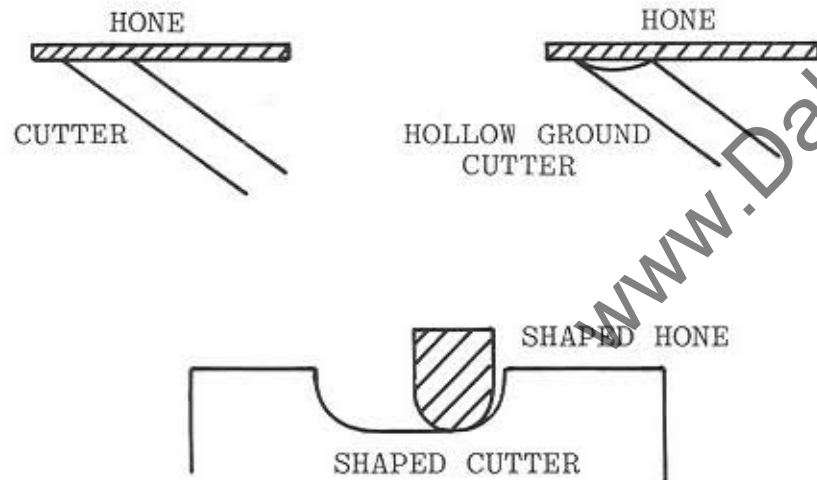
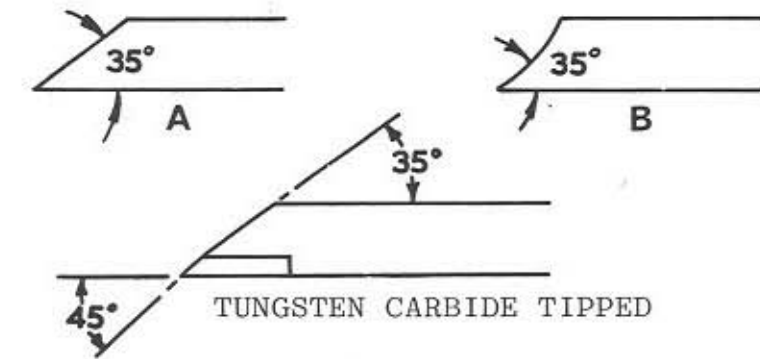


FIG. 15

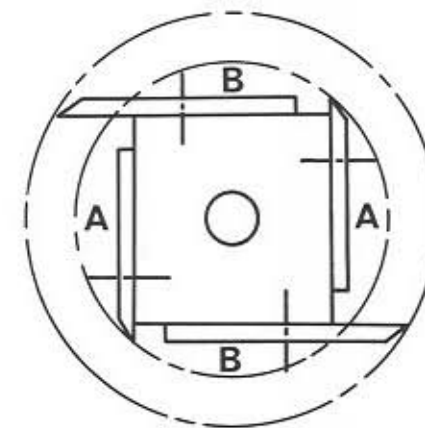
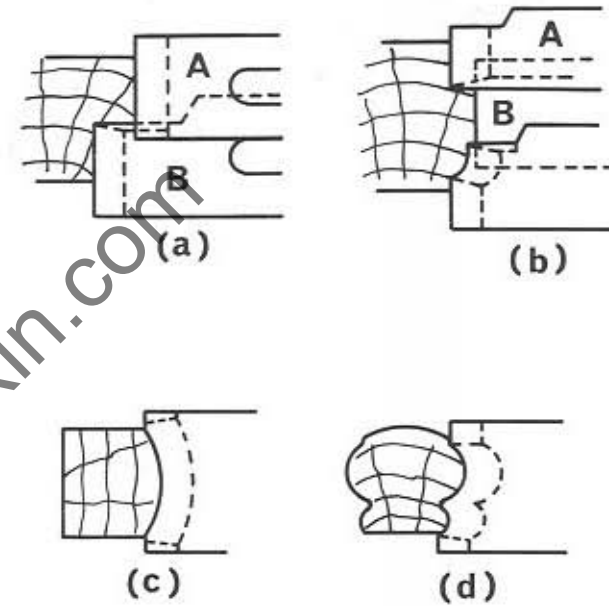


FIG. 16

## CUTTER GRINDING (Continued)

All cutter blanks sent out by us are ground only, and if used as chippers or rebate cutters, require honing with a 142 carborundum slip stone to produce a razor sharp edge before commencing to cut. This will ensure a good finish on the wood and an easy feed. Dull cutters give a poor, rough and plucked out finish, and make it difficult to feed the job past the cutters. Honing should be done by a reciprocating or rotary motion on the cutter, using a little paraffin to give "Bite" to the stone. The honing stone is a much finer grit than the grinding wheel and leaves a sharp keen edge. A number of honing stones of different shapes e.g. round sticks or square sticks will be found helpful in honing shaped cutters.

## TYPICAL CUTTER LAYOUTS

In all cases where possible when using square cutterblocks it is advisable to break up the cut over two or more pairs of cutters, this has many advantages as is shown in the examples in fig. 16. Fig. 16(a) SIMPLE REBATE. By using two pair of cutters there is very little grinding to be done, only side relief on the cutters "B" to give a good clean cut and prevent burning. Cutters are mounted on all sides of the block. This also spreads the cut over the four sides of the block and gives a smoother action.

Fig. 16(b) SASH MOULD. This is best worked with three pairs of cutters as it enables correct side relief to be obtained on all cuts. It also allows the same cutters to be used with varying widths of mould as they can easily be adjusted sideways.

Fig. 16(c) and (d) HAND RAIL MOULD. This is broken up into three separate operations. At fig. 16(c) the top is worked first so that the timber runs on a flat face. This cut is done by only one pair of cutters. At fig. 16(d) the sides are worked in two operations, one pair of cutters doing all the side work.

By breaking the moulds up as illustrated, it is possible to use the same cutters for many moulds thus reducing the total quantity of cutters required, it makes grinding of side relief a simple operation and enables the exact shape to be obtained by adjusting pairs of cutters across each other. It is essential to have each pair of cutters balanced for smooth vibrationless running of the machine.

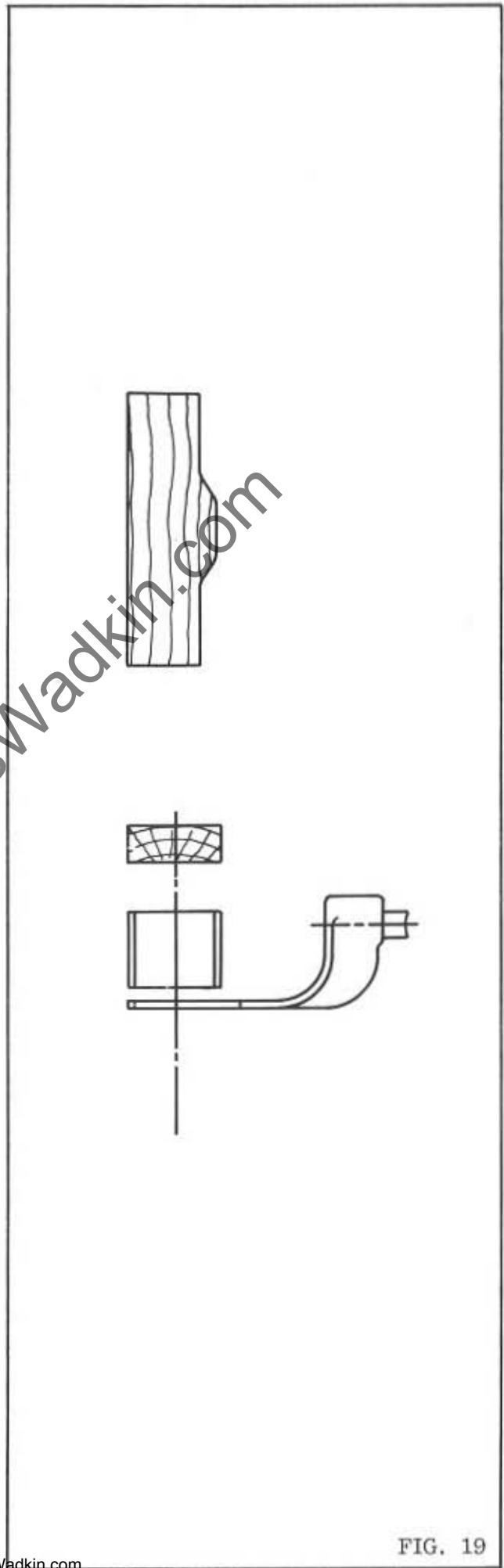
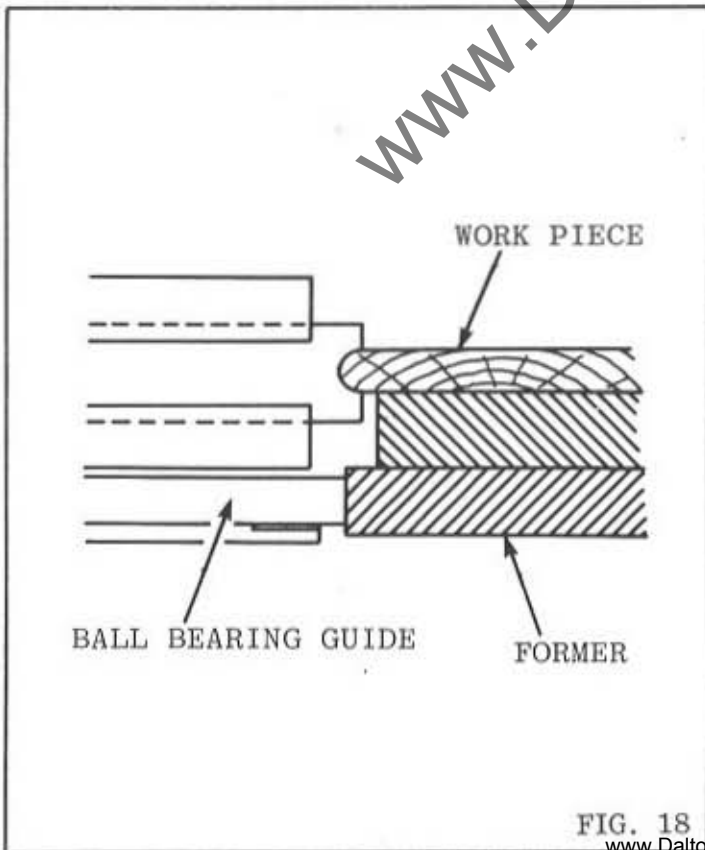
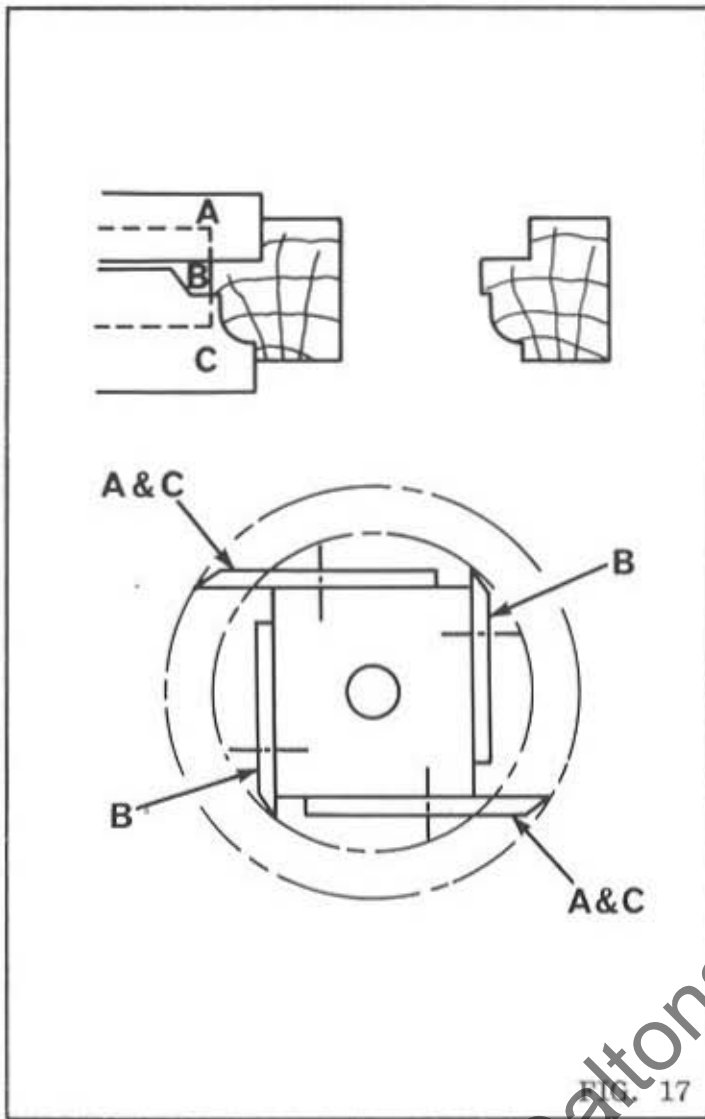
## FRAMING ON SQUARE BLOCK FIG. 17

Equipment required:- 35mm diameter loose screwed spindle, square cutterblock, three pair of cutters, straight fence and shaw guard. The cutters will have to be shaped to suit the moulded portion, allowing for angle by using the moulder's rule. Each pair of cutters must be balanced to prevent vibration, then accurately set up on the square block, so that all are cutting.

The cutterblock is then mounted on the spindle, fences set correctly in line, top and side spring pressures set to hold work firmly to the fences.

Spindle speed:- 4,500rpm

Note:- Cutters are always used in pairs to maintain balance.



SHAPED PANEL ON SLOTTED COLLARS FIG. 18

Equipment required:- 1" (25mm) diameter loose screwed spindle one pair of slotted collars (one being the ball bearing type) one pair nosing cutters and safety guard with flaps. The cutters are set up in the collars keeping minimum track in line with the bottom ball bearing slotted collar. The collars are mounted on a 1"(25mm) diameter loose top piece. The work piece is held by spikes to master former which is below the work.

The safety guard is set to cover the cutters and top piece. The former is passed across the guide. The cutters are completely shielded from the operator's hand by the work.

Spindle speed:- 7,000 rpm.

CIRCULAR CUTTERBLOCK WORK FIG. 19

Equipment required:- 35mm diameter loose top piece 3"(76mm) deep circular cutterblock, ring fence and safety guard with flaps.

The cutterblock is mounted on the 1½"(30mm) diameter loose top piece and set so that the cuttertrack is in line with the ring fence as shown in Fig. 17. The guard is then set to cover up block and top piece leaving only sufficient room for work to pass underneath. Work is to be mounted on a shaped fixture which is held up to the ring fence. Contact must always be at the same point on the ring fence to ensure even depth of cut. This is essential due to the shape of the ring.

The circularblock gives a good smooth cut and finish to work.

Spindle speed:- 7,000 rpm.

## Instructions For Regrinding Profile Cutters

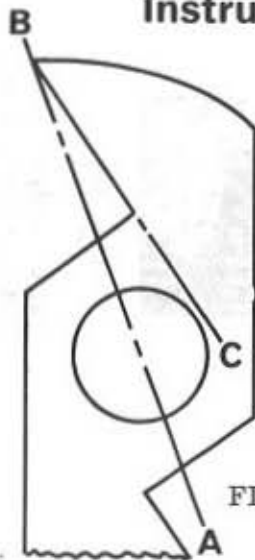


FIG. 1

**Correct**

FIG. 2

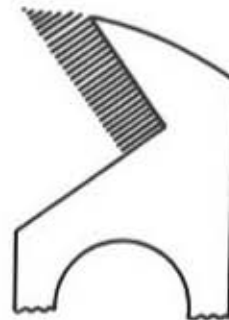
**Incorrect**

FIG. 3

There are two methods of grinding these cutters:

### 1. With precision tool grinder.

This method involves grinding the cutter on an arbor between centres. The machine should be set to grind the face of the cutter so that angle ABC, in Fig. 1 is the same after grinding as it was originally.

### 2. With hand or bench grinder

Before regrinding the cutters by this method, ensure that the check chart supplied with the cutters is to hand. To check the angle of the cutters, place the new ground face, i.e. line BC, in Fig.1, against that of the check chart and when the angle is correct, the bore of the cutter should correspond to that of the check chart. This ensures that the correct angle is maintained at all times.

### NOTES

1. A slight variation in the angle ABC, in Fig. 1 on opposite wings of the cutter is not too important, but for the best results, avoid having the point "B" in Fig. 1 or its opposite on a different radius. This would cause one cutting edge to do all the cutting and would make the cutter out of balance and cause vibration.

2. When making single cuts with more than one cutter in the set up, always STAGGER the cutting edges rather than line them up. Doing this improves the quality of the work and reduces vibration and chatter. Staggered cutters require less power than "in line" cutters.

3. Cutters must always be ground in the root of the tooth, as shown in Fig.2 never as in Fig.3. Otherwise the cutters will drag or fail to cut the complete shape. Failure in observing this point results in weakening the tooth form and shortening the usable life of the cutter.

### 4. REGRINDING SERVICE

We offer precision regrinding service and the charges are moderate and the service prompt.

RETURN THE CUTTERS TO:- BURSGREEN (DURHAM) LIMITED, FENCE HOUSES,  
HOUGHTON-LE-SPRING, TYNE & WEAR, ENGLAND.

### CAUTION

We do not recommend these cutters to be used on anything but short runs of plywood or resin bonded wood substitutes, because resinous glues used in making plywood etc. are extremely hard and abrasive. This causes the cutters to overheat and soften if not of the Tungsten Carbide Tipped variety. Write for prices of special tipped cutters for such materials.

# A Full Range Of Solid Profile Cutters Can Be Profitably Used.

www.DaltonsWadkin.com

40



**No. 2**

1 1/4" Square edge  
cutter (1 1/4" bore)



**No. 8**

3/16" Tonguing  
Cutter (1 1/4" bore)



**No. 9**

3/16" Grooving  
Cutter (1 1/4" bore)



**No. 13**

Reversible Glue  
Joint (1 1/4" bore)



**No. 19**

5/16" Rad. Ovolocutter  
(1 1/4" bore)



**No. 22**

3/4" dia. Nosing  
Cutter (1 1/4" bore)



**No. 23**

7/8" dia. Nosing  
Cutter (1 1/4" bore)



**No. 24**

1" dia. Nosing  
Cutter (1 1/4" bore)



**No. 36**

3/8" Rad. Ogeecutter  
(1 1/4" bore)



**No. 42**

45° Angle  
Cutter (1 1/4" bore)



**No. 43**

30° Angle  
Cutter (1 1/4" bore)