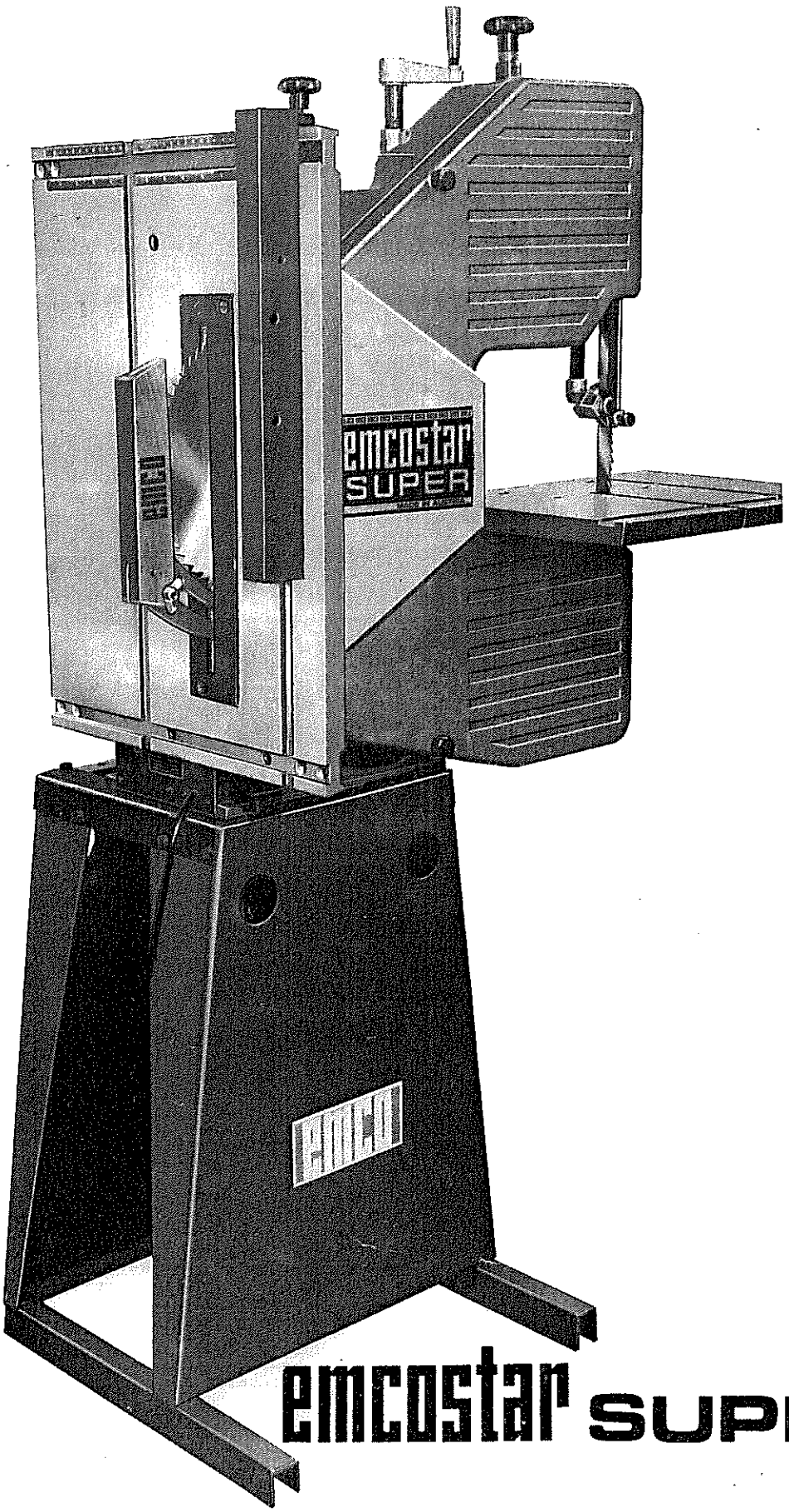
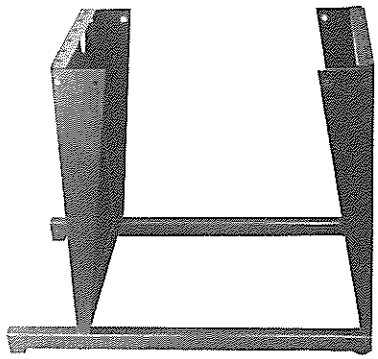


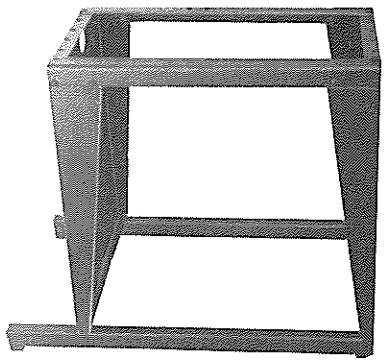
emcostar SUPER

INSTRUCTION BOOK

Englisch

Contents



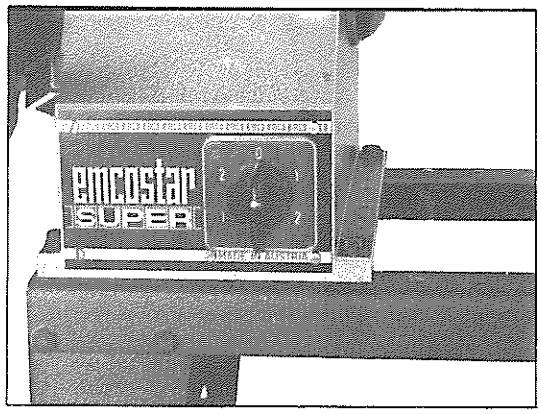


Assembling the Machine Stand

The short and the long machine stand are assembled in the same way.

1. Lay down the longitudinal beams.
2. Put on the sides, tighten nuts slightly.
   Make sure that sides are at right angles to beams
3. Put on and bolt down angular plates (using hex-head bolts M8x16) in such a way that the fixing holes for the machine base are positioned on the side at which the beams project over the side parts. Check angles, tighten nuts.

The machine is now put in position and the cast iron base bolted to the angular plates (using 4 hex-head bolts M8x30).



Electrical Connections

For the Emcostar Super, a. c. or three-phase current motors for various voltages and cycles are available.

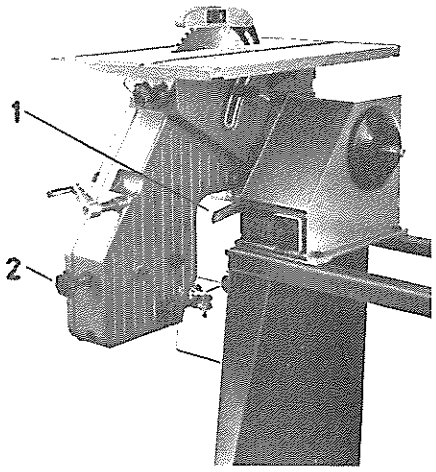
As there are so many different types of plugs, the Emcostar Super ist supplied with loose cable ends. The green/yellow wire of the cable is the earth and has to be connected accordingly to the protective contact of the shrouded contact plug.

Only use sockets with protective plug reception installed according to safety regulations.

Drive can be effected either by a. c. or three-phase current. Various types of motors for various voltages and cycles are available.

The arrow on the fan cover shows the correct direction of rotation of the spindle. When using three-phase current, it may happen that after fitting the plug, the motor is running in the wrong direction. In this case, two phases have to be interchanged.

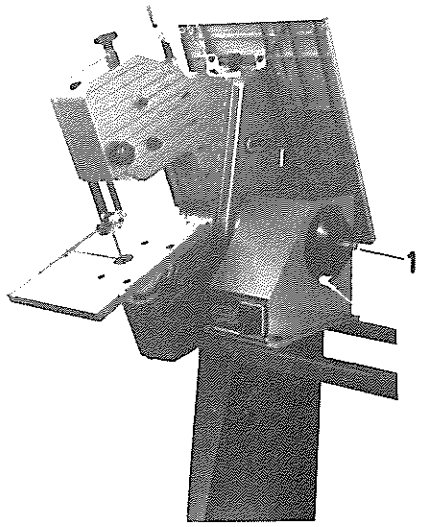
Operating Positions of the Machine



The machine is brought into the operating position by a simple swivel movement. It can take up three defined positions, in which it is held by a lever engaging in a slot.

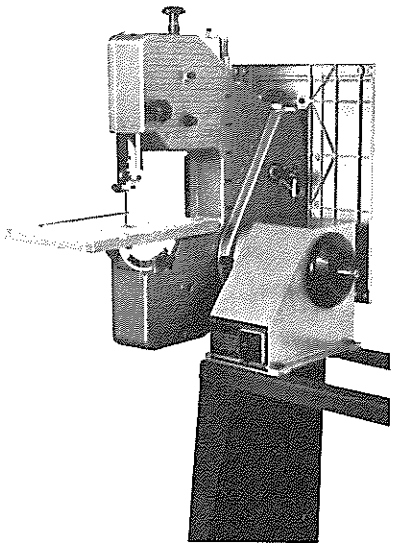
On the right the machine is in the „circular sawing" position.

To swivel, the right hand – by lifting the lever (1) (pressure of the fingertips is sufficient)– releases the fixing. The left hand, using the star handle moves the machine into the required position.



The intermediate or "idling position" is used for all work which is to be done with tools mounted on the motor shaft (1).

For safety reasons, in this position the circular saw and band saw are automatically disconnected (safety regulations).



For the position "band saw", compared to the position "circular saw", the machine is rotated 90°. The maximum travel is limited by stops at both ends.

Technical Data:

Dimensions of the machine (in mm)

	width	height	depth
with machine stand short	880	1360	870
with machine stand long	1450	1360	870

Circular Saw:

blade dia.:	max. 250 mm
Bore:	20 mm
rpm:	1500/3000
cutting speed:	19.5/39 m/sec.
cutting height with circular saw blade of 250 mm dia.:	85 mm (max. 170 mm double cutting)
dimension of table:	540 x 400 mm can be tilted and secured through 45°

Grooving and Box Combing

width of notch:	up to 20 mm
depth of notch:	up to 85 mm
	up to 40 mm when box combing

Band Saw:

band saw blades:	1500 mm endless
thickness:	0,4 mm
max. width:	20 mm
wheel dia.:	220 mm, with vulcanized rubber coating
rpm:	1500/3000
cutting speed:	17/34 m/sec.
cutting height:	max. 145 mm
distance from blade to throat:	205 mm
dimensions of table:	350 x 270 mm can be tilted and secured through 45°

Disc Sanding: sanding disc dia 250 mm, usable at both sides

rpm:	1500/3000
work table (circular saw table):	540 x 400 mm
miter sanding:	up to 45° max.

Planing Attachment:

cutter head:	dia. 140 mm
planing width:	40 mm
rpm:	1500/3000
cutting speed:	11/22 m/sec.
constant depth – of – cut setting:	1 mm

Profile Moulding Attachment:

profile moulding head:	dia. 140 mm
profile width:	30 mm
rpm:	1500/3000
cutting speed:	11/22 m/sec

Wood Turning Attachment:

height of centers:	145 mm
distance between centers:	650 mm

Due to continual improvement we reserve the right to make design changes.

SAFETY ARRANGEMENTS

Electrical Safety Measures

1. Protective earthing

2. Electrical cut-out interlock

2.1 Possibility to start
The motor can only be started when the machine is secured in one of the working positions (locking lever engaged) and the Dahlander switch turned from "0" to "1" (compulsory zero-setting of switch).
The motor will not start, e. g. if it is plugged in with the Dahlander switch at "1" or "2".

2.2 Automatic switching-off
If the machine is taken out of a working position, the motor is switched off by a limit switch. Re-start see 2.1.

2.3 Cut-out of electrical mains
After a mains failure the motor will not re-start on its own, although the switch may be set at 1 or 2.
Re-start see 2.1.

2.4 Switch interlock
To avoid a possibility of tools loosening with deceleration, an interlock is fitted. This prevents the machine being switched from 2 to 1. Tools at the circular saw spindle are held by a L.H. nut which tightens with speeding up and could possibly slacken when slowing down.

Mechanical Safety Provisions

The provisions are listed below. The correct use is stated for each function of the machine in the relevant chapter.

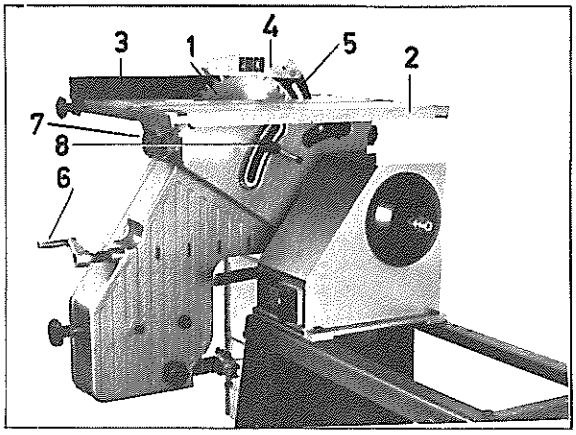
Motor: Guard over motor shaft
Circular Saw: Splitter, saw guard
Band Saw: Adjustable allround protection of saw blade, marking on band saw tightening bolt
Profile Moulder: Hand guard,
form-fitting holding fixture for cutter blades
Tool Grinding
Attachment: Wheel guard

ATTENTION!

1. Use only correct and properly ground tools!
2. Do not use more than one tool at a time!
3. Use safety attachments!
4. Observe all regulations as shown in Operation Manual!
5. Take care that unauthorized persons (e.g. children) cannot start the machine!
6. Take out plug or fuses if the machine is to be repaired or not used for some time!

Circular Sawing

The circular table saw is the most important woodworking machine. It can be used for ripping, crosscutting, mitering, moulding, rabbeting, grooving, box combing, etc.



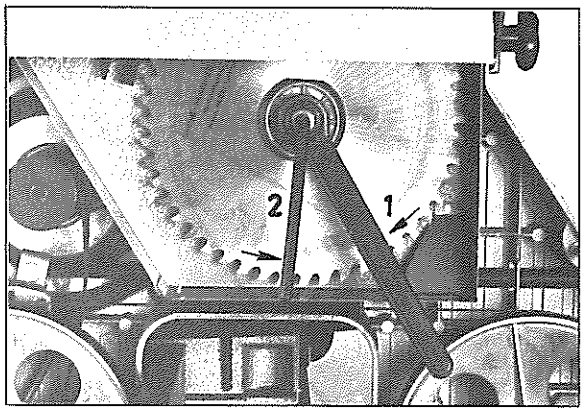
Technical Data:

saw blade:	max. dia. 250 mm, bore 20 mm
rpm:	1500/3000
cutting speed:	19.5/39 m/sec.
cutting height:	adjustable from 0 to 85 mm, max. 170 mm when going through twice
table:	540 x 400 mm tiltable through 45°
wobbling attachment:	width of groove up to 22 mm depth of groove up to 85 mm (saw blade dia. 250 mm, toothing, 10 mm, mounted as a wobbling saw)

Description of Parts:

1. Saw blade
2. Saw table
3. Rip fence
4. Saw guard
5. Splitter
6. Crank
7. Tilting table bracket
8. Clamping lever

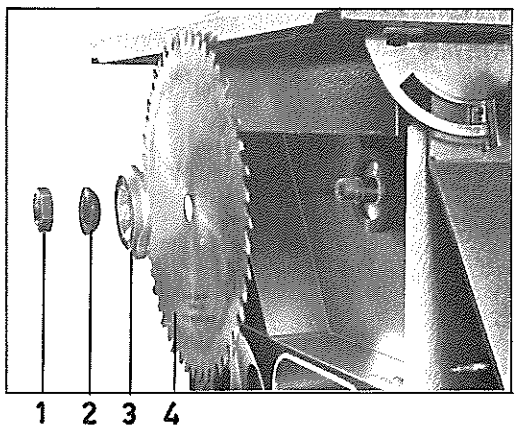
Attention!
Only let the circular saw run when clamped in position.



Removal and Replacement of Circular Saw Blade

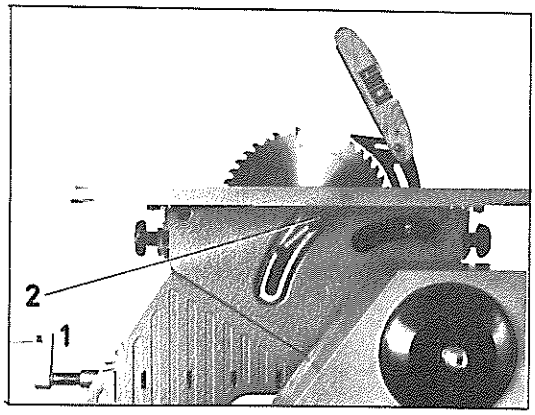
1. Adjust the machine to the position "circular saw".
2. Adjust blade projection to a minimum, using the crank.
3. Take off housing cover (two knurled bolts).
4. Use ring wrench and hex. socket screw key as shown on the picture. Ring wrench 1 points to the right, hex. socket screw key 2 points to the left, and by moving in the direction of the arrow (squeezing like a pair of pincers) this loosens the nuts.
5. Remove the nut (note: LH thread) and take off parts in the following sequence:
   1) nut
   2) spherical type washer
   3) clamping disc
   4) saw blade

   The washer remaining on the journal of the circular saw spindle only must be removed if a wobbling washer or a tool head is to be fitted instead.



Assembly:

Assemble parts in the reverse sequence. Make sure the teeth point clockwise (picture 2). For tightening, the pincer method can be used again. In this case the ring wrench points to the left, the hex. socket screw key to the right.



Blade Projection

The blade projection is the part of the circular saw blade, which projects over the table. The blade projection should always exceed the board thickness by 10 mm. If e. g. a 15 mm board is to be sawed, the blade projection must be 25 mm.

When cutting twisted ply-wood boards, the blade projection must be larger, in order to avoid a possible kick-back.

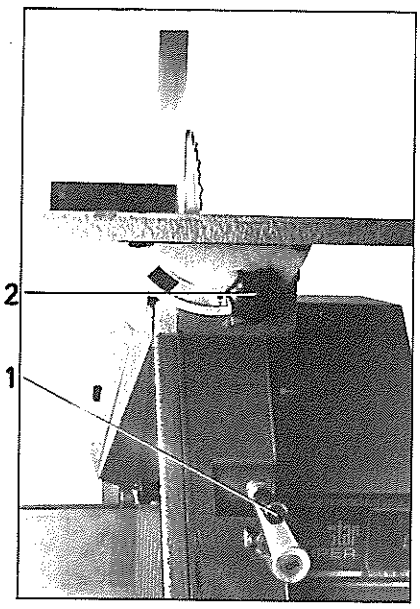
The correct projection ensures the smallest possible friction surface on the saw blade and therefore a minimum of heating up.

Adjusting the Blade Projection

The blade projection is adjusted by turning the crank (1). One turn gives a variation of approx. 5 mm.

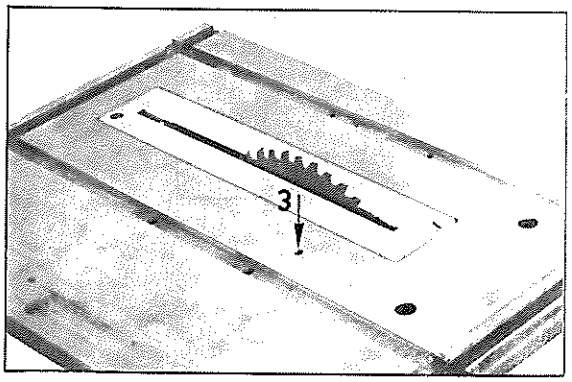
The position can be secured by clamping lever 2.

For normal use it is sufficient to tighten the clamping lever so that it is just possible to change the position by use of the crank.

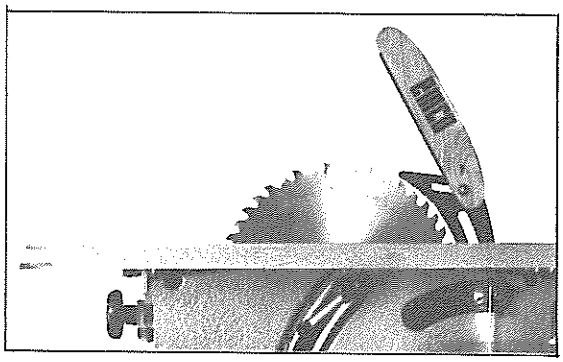


Adjustment of Graduation

1. Adjust blade projection to maximum, using crank (1).
2. Loosen both clamping handles 2. Loosen lock nuts (on the side of the stop) on the underside of the table, adjust the table exactly into position by turning the stop screw, tighten lock nut again (3).
3. Tighten clamping handles.
4. Loosen fixing screw of the pointer, adjust it to the 0° division line and tighten it again.
5. Adjust blade projection according to the material you work with.
6. The feed has to be adjusted to the type of work piece.
7. Loose knots must be hammered out of the work piece before sawing, in order to avoid kick-back.



Adjustment of Splitter and Mode of Action



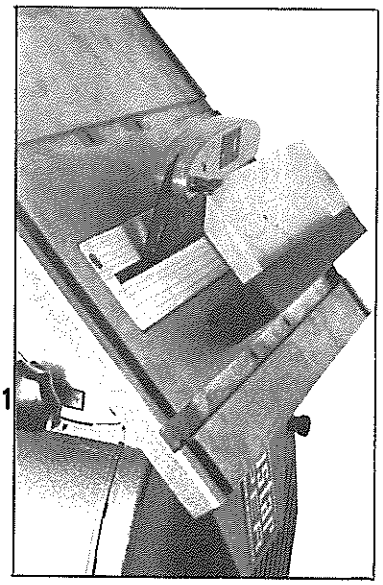
The splitter is an important safety device of the circular saw. It prevents the kerf from closing and also prevents the workpiece from kicking back.

Adjustment:
The splitter is adjusted correctly when the distance to the tooth edge of the circular saw blade is 2 to 3 mm and its top is not more than 3 mm under the highest point of the saw blade.

Loosen the clamped splitter by the star handle 1, so that it can be adjusted correctly for any position of the circular saw. Tighten after adjusting!

If the splitter is to be removed, e.g. for moulding or disc sanding, it can be taken out completely after loosening the star handle.

Tilting the Circular Saw Table



For angular cuts, the table can be tilted through 45°. For this purpose, the clamping pads have to be loosened by turning the star handles 1. The exact angle of inclination can be obtained by using the graduations on the front tilting table bracket. Afterwards tighten clamping pads.

Safety Recommendations

Only work with correct, sharp, set, undamaged saw blades.

Do not use mis-shapen saw blades.

Except when grooving etc., the **splitter** must be used and adjusted as follows: The maximum distance between saw teeth and splitter must not exceed 5 mm, and the splitter must not be more than 3 mm below the highest point of the blade (measured from saw table).

The saw guard must be used when ever possible.

For ripping narrow work pieces (less than 80 mm wide), a push stick or similar device has to be used alongside the rip fence.

Take care that cut off pieces are not caught by the teeth of the saw blade and thrown out.

When cutting round wood, a travelling device must be used, which prevents the work piece from turning at both sides of the blade.

For grooving etc., devices to prevent the work piece from kicking back have to be used.

After switching off the drive, do not slow down the saw blade by applying pressure on the sides.

Only use one tool at a time.

Uncouple the tools not in use or protect with guards.

The relevant safety devices must be used.

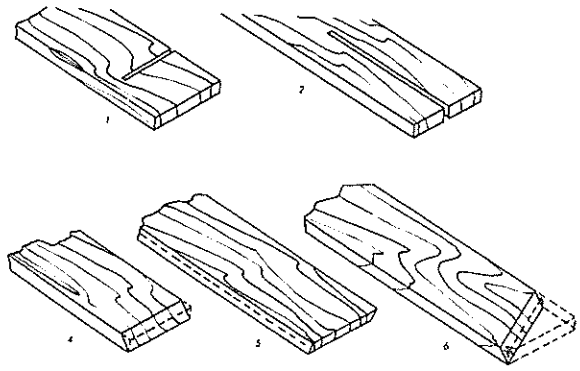
The saw blade has to be mounted correctly and safely on the circular saw spindle, taking care that the teeth point in the correct direction.

When cutting round wood, a travelling device must be used, which prevents the work piece from turning at both sides of the blade.

The width of the splitter is to be matched with the saw-blade un use.

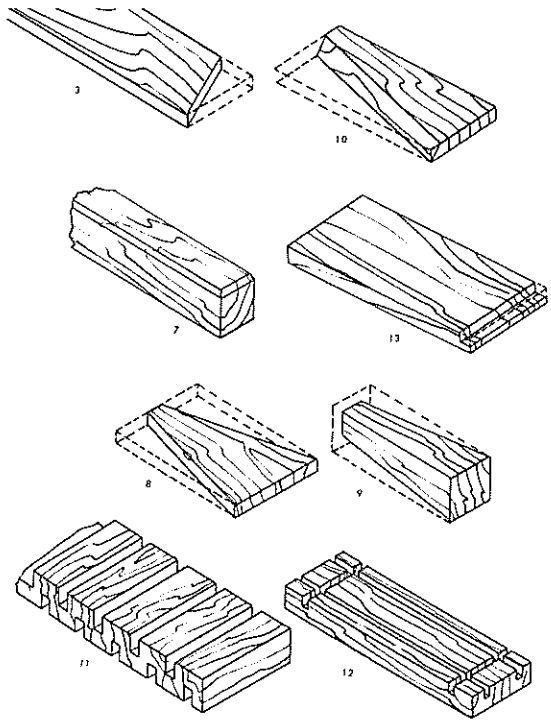
Tips for Working with the Circular Saw

The circular saw can be used for various types of cutting. Its range can even be extended by using simple additional accessories, e.g. wobbling-, box combing- and moulding attachment.

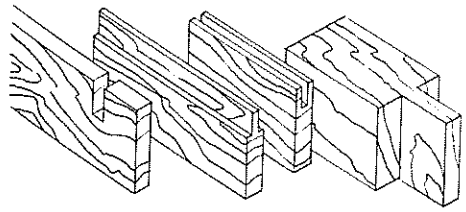


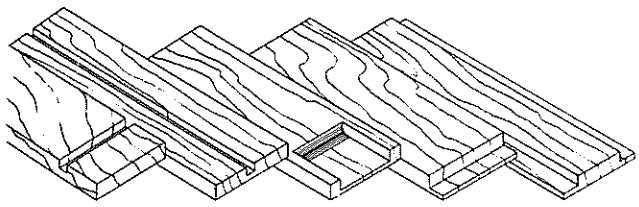
Description of cuts possible with a normal saw blade:

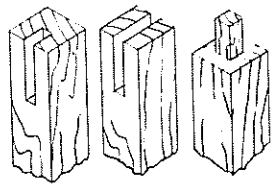
1. Cross cut
2. Rip cut
3. Miter
4. Cross-bevel
5. Rip-bevel
6. Compound miter
7. Chamfer
8. Two-sided taper
9. Four-sided taper
10. Compound rip-bevel
11. Kerfing
12. Kerfing
13. Rabbeting

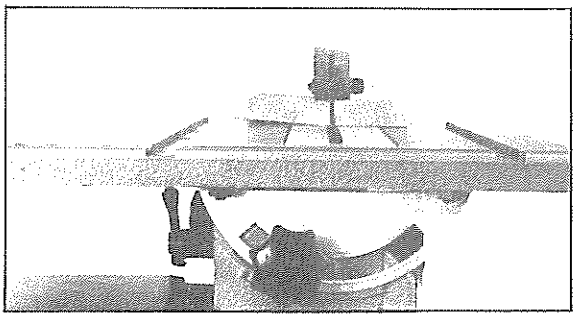


Using the wobbling disc makes the following cuts possible:









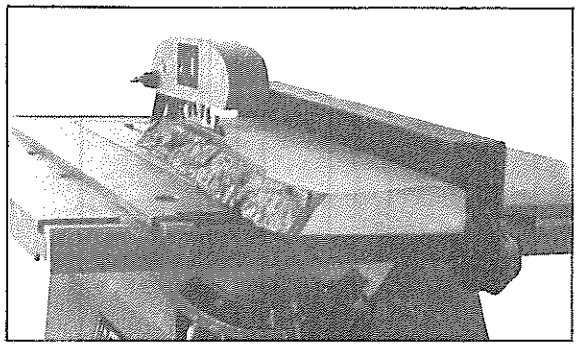
Ripping
For ripping use the coarse toothed saw blade.
Place the work piece on the saw table, arched side down. This ensures that the two parts of the board fall away from the blade and jamming is avoided.

Rip Cut with Fence
Exact width can only be achieved by "planing" on side of the work piece.
The fence is adjusted to the desired dimension.
For coarse adjustment the saw table scale is sufficient (running tolerance of the circular saw blade gives slight variations).

For fine adjustment, it is necessary to make a trial cut on a test piece.

Rip Cut with Inclined Table
For adjustment of inclination see page 10.

Before you start to work, make sure the table is secured! The same advice apply as for longitudinal cutting with fence.



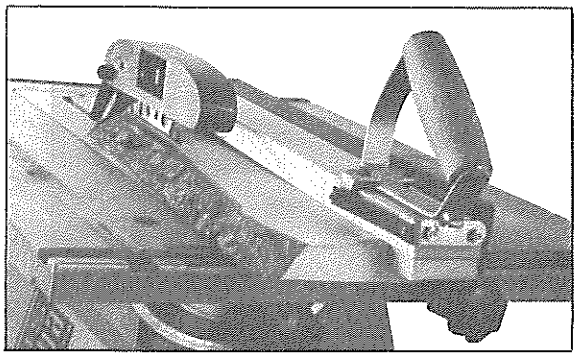
The range of optional accessories includes a very useful handle which quickly changes any batten into a pusher.

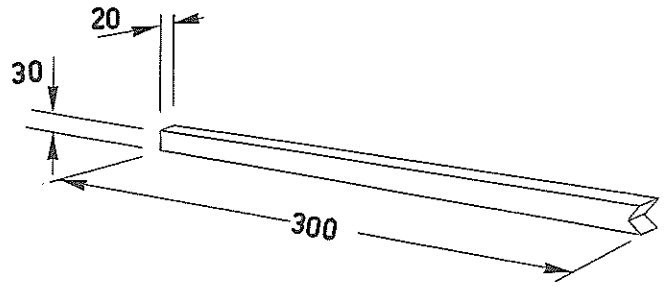
If the pusher becomes unusable after some time, simply knock it off the handle and replace it by a new piece of wood.

To: Rip Cut with Fence

It is dangerous if the distance between the saw blade and the rip fence is less than 7 cm. In this case it is advisable to use a wooden pusher towards the end of the cut. This keeps your hands away from the dangerous area.

You can easily make a pusher from a strip of wood.





Crosscutting to Length of Several Pieces

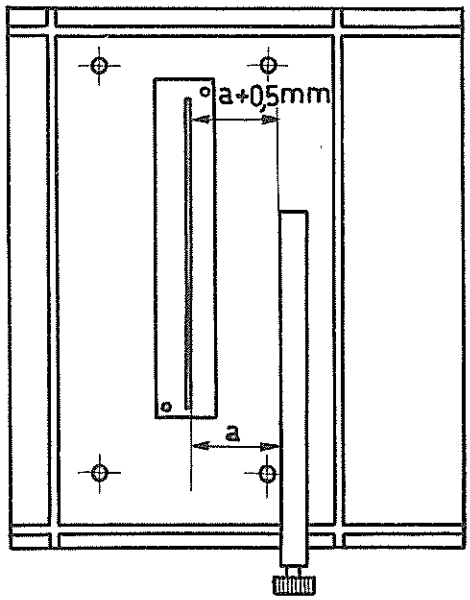
If many pieces are to be cut to the same length, it is advisable to use the rip fence together with an auxiliary fence. Without the auxiliary fence the pieces cut off could get jammed between the rip fence and the saw blade.

In order to cut several pieces to the same length, it is also useful to use the rip fence.

The distance between the rip fence and one tooth set in its direction defines the length of the work piece.

Re-adjusting the rip fence to ensure it is parallel to the circular saw blade:

1. Loosen screws that secure the table.
2. Adjust table, with the rip fence mounted on it, in such a way, that circular saw blade and guide are parallel to each other (see sketch).
3. Secure table



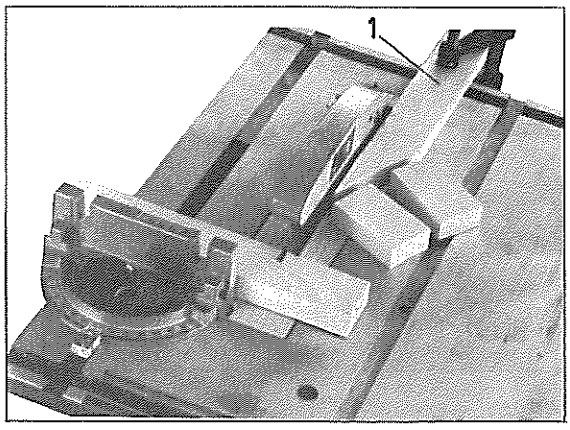
Crosscutting of Short Pieces

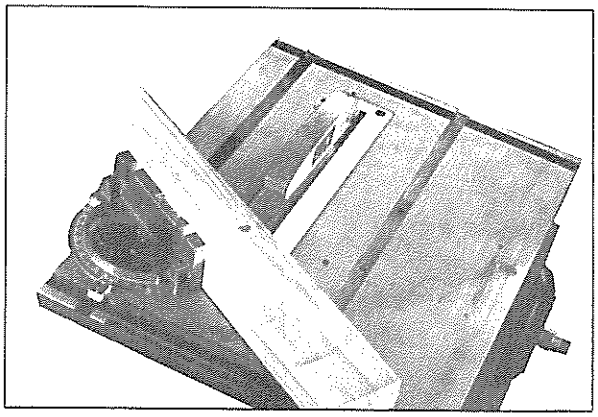
In order to properly square off the end of a board use the miter-gauge.

Placing the work piece against the miter-gauge ensures an exact cut.

Depending on the shape of the work piece, the miter-gauge can be used with either the left or the right T-slot.

If you have to square off a great many times, we recommend to mount a guide wedge (1). This directs the waste pieces sideways and prevents kick-backs.





Mitering

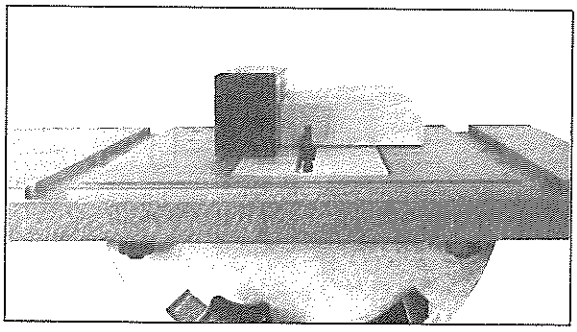
For mitering flat parts, the circular saw is especially suitable. For this purpose the work piece is put against the miter-gauge.

Before doing so, adjust the miter-gauge to the desired angle using the graduation.

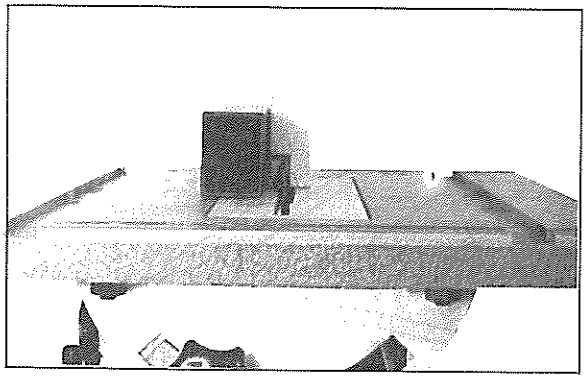
If many miter cuts have to be carried out, it is advisable to mount a guide wedge.

Rabbeting

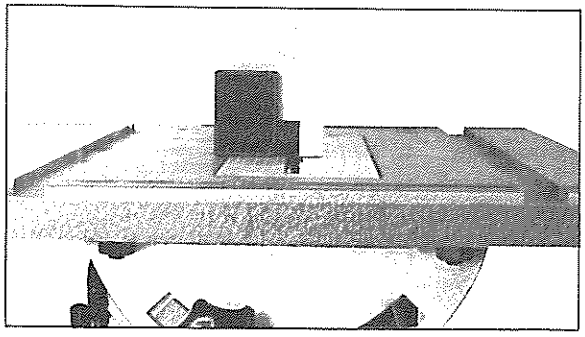
The work piece must be fed in slowly as the saw dust cannot be rejected upwards. The operating sequence is shown on the pictures.



1st cut



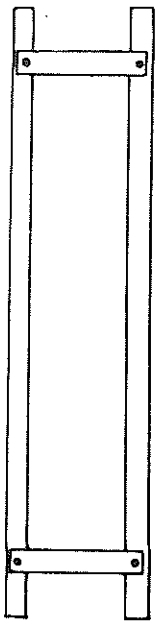
2nd cut



finished rabbet

Coving

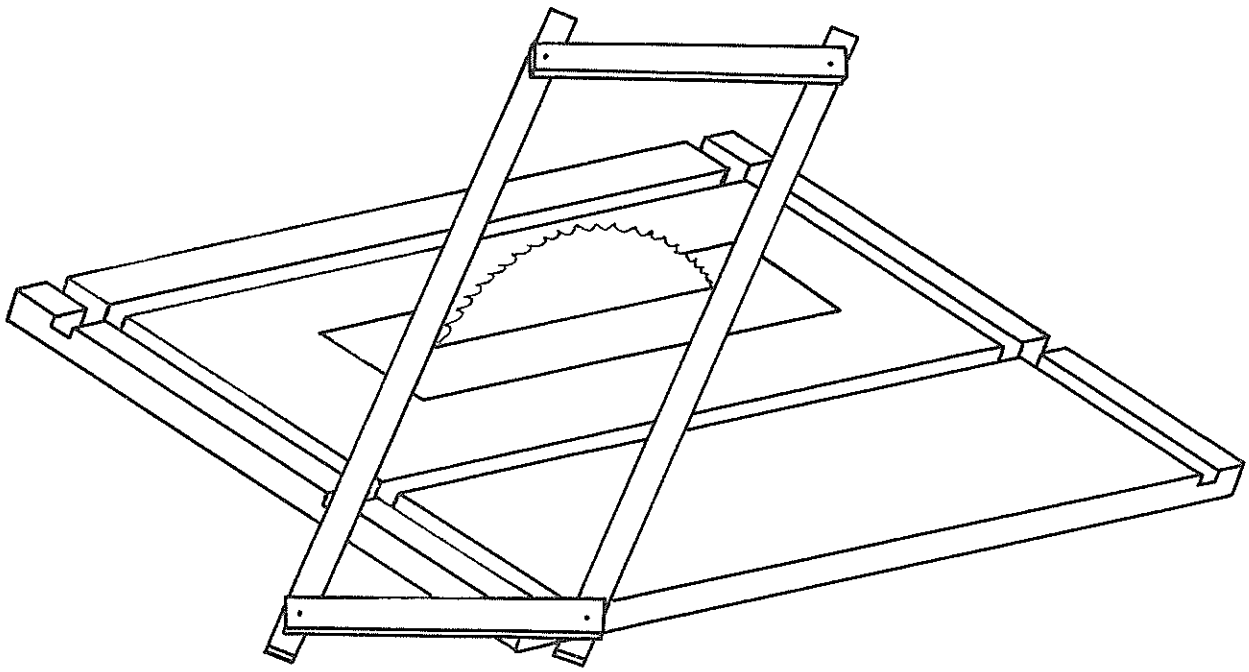
The cutting of coves and gutters requires a special technique For this purpose do not adjust the work piece to the same plane as the saw blade, but at a certain angle to it, which defines the diameter of the cove.
The cut thus achieved has the shape of an ellipse. A combination blade with set teeth (e. g. Magna Dado) is most suitable.

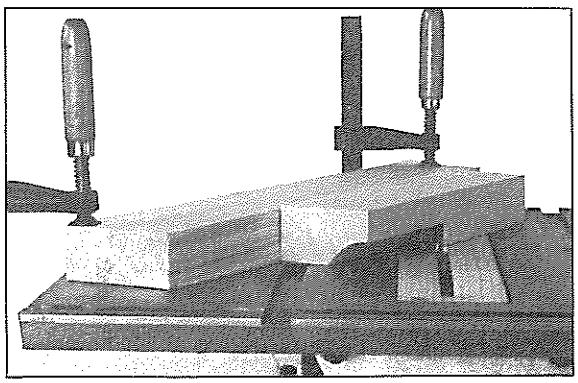


How to Work Out the Angle of Adjustment

In order to find the necessary angle, you should make a parallel rule, as shown on the right hand side.

1. Adjust the parallel rule to the width of the cove desired.
2. Adjust blade projection to the radius of the desired cove or to greatest depth of cut.
3. Place the parallel rule alongside the circular saw blade in such a way that the edge of the teeth touch it slightly. The frame now shows the correct angle.
4. Using C-clamps, fasten a guide batten on the table at the angle so worked out. The distance must be such that the alignment of the desired cove coincides with the circumference of the circular saw blade.

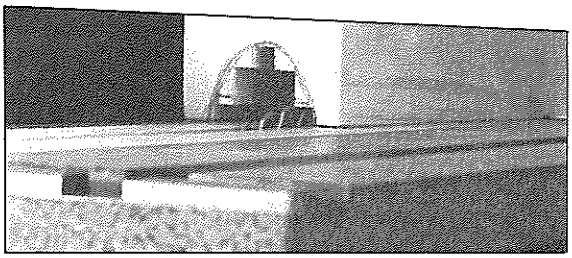




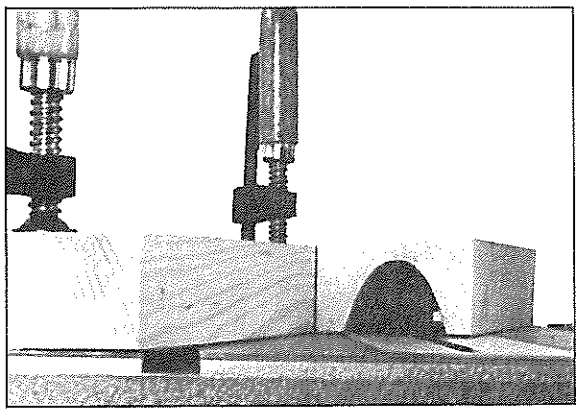
Coving

When adjusting the work piece at an angle to the plane of the circular saw blade, the depth of the cut is always less than the tooth height of the blade.

Therefore the waste material has to be removed in successive passes together with a gradual increase in the saw blade projection,



or you first of all remove the waste material by kerfing . . . . .



. . . . . and make the last cut a coving cut.

It depends on the shape of the work piece, which method will be quickest and most efficient.

Trouble-shooting Chart for the Circular Saw

Ripping:

The Trouble	Possible Causes	The Cure
work piece jams between splitter and saw blade, or pulls to the side	misalignment	rip fence and/or T-slots of table must be parallel to the saw blade
	incorrect feed	be sure that during operation the work piece is always snug against the fence
	edge of work piece not straight	plane the side of the work piece which runs along the rip fence
finished work piece approx. 3 mm too narrow	measured from the wrong side of the blade	take into consideration the width of the cut! The distance of the fence has to be measured from a tooth set towards the fence.
cut edge has slight bevel	table not square to saw blade	adjust the table!
cut surfaces show marks	blade chatters	reduce feed. Check tooth sharpness. Use the correct rpm.
blade stalls when cutting	blade blunt tough wood	sharpen blade reduce feed and/or rpm.
	blade sticky with pitch and gum	clean blade with turpentine or similar solvent
sides of cut burn	blade projection too small	correct blade projection
blade jams in the kerf	kerf closes after cutting, green wood	use splitter!

Cross Cutting

The Trouble	Possible Causes	The Cure
cut not sqaure	miter-gauge not to saw blade	adjust miter-gauge!
cut not congruous with miter-gauge setting	misalignment; work allowed to creep	check and adjust miter-gauge setting; hold work securely when making pass
cut has slight bevel miter-gauge hard to push	misalignment miter-gauge bar too snug in table slots	adjust setting on table clean mating parts, wax surfaces
blade jams in kerf	excessive overhang tilts work piece	support the work piece to make sure it stays level with the table

Grooving (Notching)

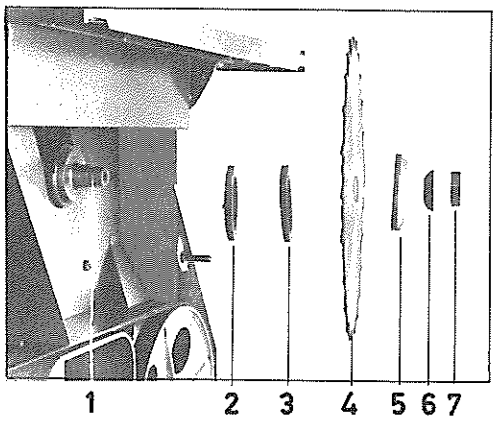
For cutting notches and finger laps, the circular saw is working as a wobbling saw. The circular saw blade is mounted on the shaft with wobble discs and adjusted to the desired travel.

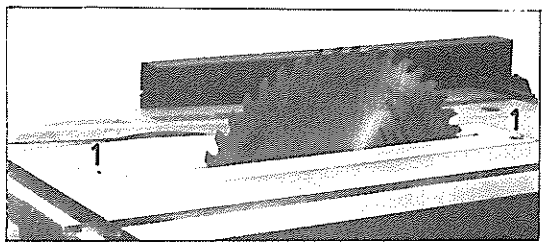
Technical Data:

width of notch	max. 22 mm
depth of notch	max. 85 mm
with saw blade	250 mm dia.
teething	10 mm

Description of parts:

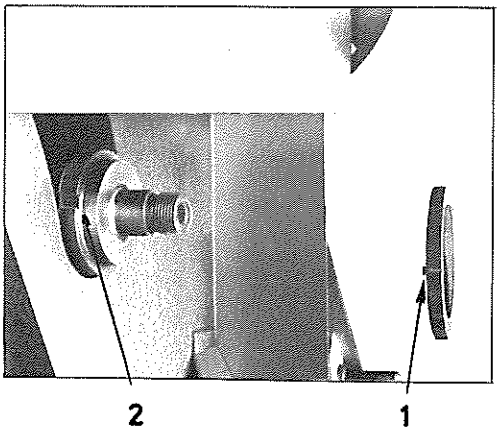
Circular saw spigot	1
wobble disc with lug	2
wobble disc with slot	3
circular saw blade	4
clamping disc	5
spherical-type washer	6
nut	7

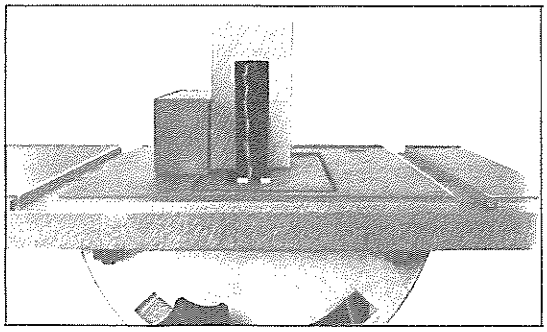


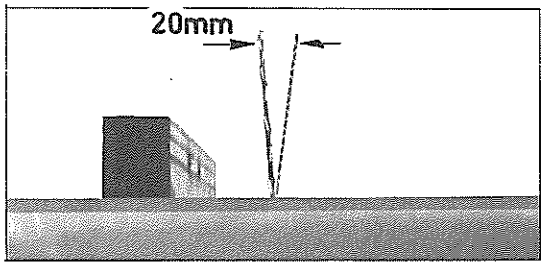


Mounting of the Wobbling Attachment:

1. Remove splitter
2. Remove circular saw table insert by loosening both countersunk screws 1
3. Take out saw blade and washer
4. Put on the first wobble disc in such a way that its lug 1 engages in the groove 2 of the circular saw spigot.
5. Put on the remaining parts in the following sequence:
   2nd wobble disc with slot
   saw blade
   clamping disc
   spherical-type washer
   nut
6. Put in the wobbling saw table insert.







Tips for Grooving (Notching)

The width of the notch should only be one third of the wood thickness (test cut; if necessary, correct width by adjusting wobble discs).

For accurate guiding of the work piece, it is advisable to enlarge the area of the guide by fitting (with screws) a small board to it.

The amount of wobble is adjusted by use of a screw driver which fits the slot of the second wobble disc and which turns it.

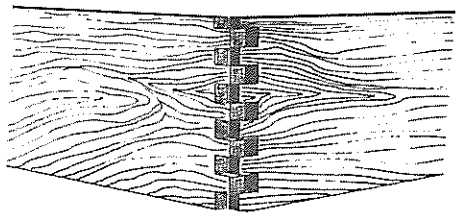
By means of the scale on the first wobble disc and the slot on the second disc, the angle of the saw blade can be adjusted. One division on the scale gives approx. 2 mm.

After adjustment tighten nut and do a test cut.

Box Combing

Finger laps make a specially strong joint. Due to their shape they offer a large area for glueing.

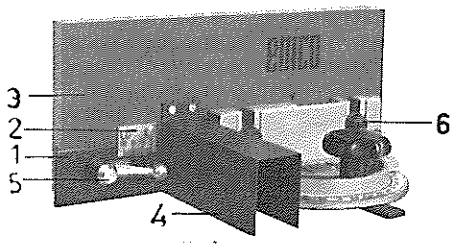
Finger laps are cut easily and quickly by means of the wobbling- and box combing attachment.



Box Combing Attachment Description of Parts

Box Combing Attachment, complete

1. guide block
2. graduated plate
3. auxiliary fence
4. guard
5. locking handle
6. mushroom-head screw

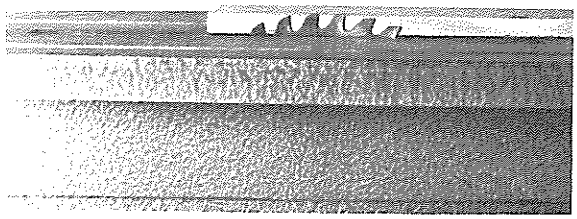


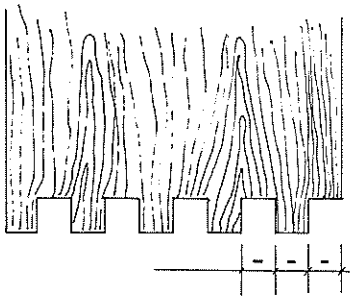
The box-combing attachment is bolted to the miter-gauge by means of hex nuts.

Adjustment of Blade Projection Wobble Travel and Box Combing Guide

1. Saw blade projection

The depth of the finger lap must be exactly equal to the thickness of the board.
The blade projection (see also page 9) is therefore adjusted exactly to this dimension.

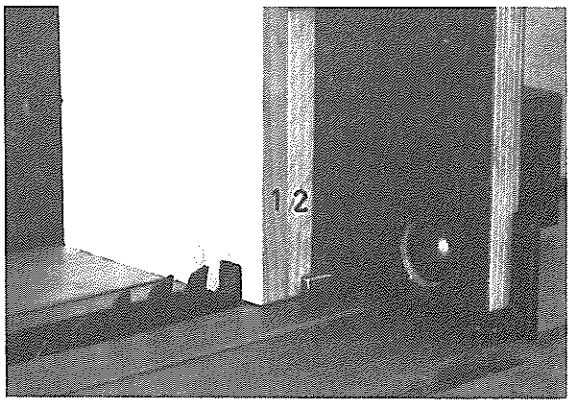




2. Wobble Travel

Finger laps and notches have to be equally wide as they must fit on one with the other.

First of all the notch width is obtained by adjusting the wobble travel (see also page 21) . It should equal the approx. thickness of the board. If the notches and finger laps are too wide, this looks clumsy. Especially with light work pieces a width of approx. 1 cm is usual.



3. Box Combing Guide Block

The width of the finger lap is defined by the guide block. To give an approximate adjustment of the guide block, scale 2 is used. The mark on the guide block 1 is first of all set to the notch width and the guide block secured with the locking handle 5. Exact adjustment is carried out after a test cut.

Test Cut:

The test cut is carried out simultaneously on two boards, one laid on top of the other..

First Cut:

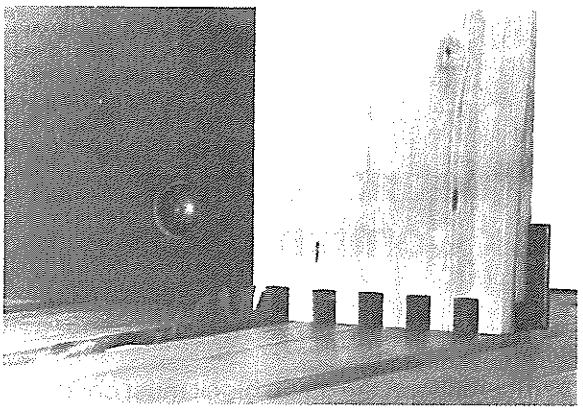
Place the edge of the board alongside the guide block and push it together with the miter-gauge against the saw blade.

Further Cuts:

Shift the board to the next cutting position by placing the previous cut in line with the guide block.

Now check if finger laps and notches fit into each other. If the gap is too big, the guide block has to be pushed away from the saw blade by the amount of the error.

If the finger laps are too wide, the guide must be moved towards circular saw blade. Repeat test cut!

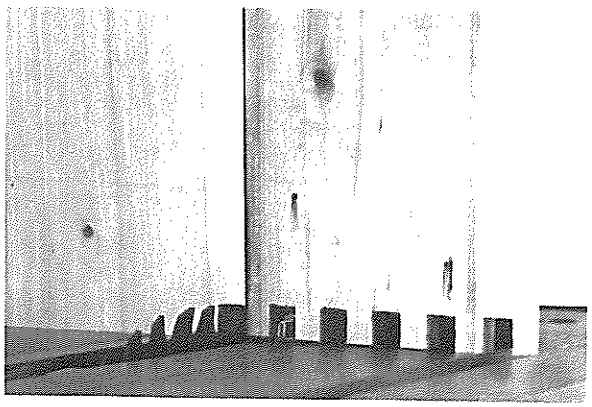


Cutting of Work Piece

Do not start on the work piece until you have achieved a good test cut!

The work pieces are cut singly. The edge of the first board is placed againt the guide block and therefore starts with a finger.

The corresponding board has to start with a notch. In order to achieve this, for the first cut the board cannot be placed directly against the guide block, but



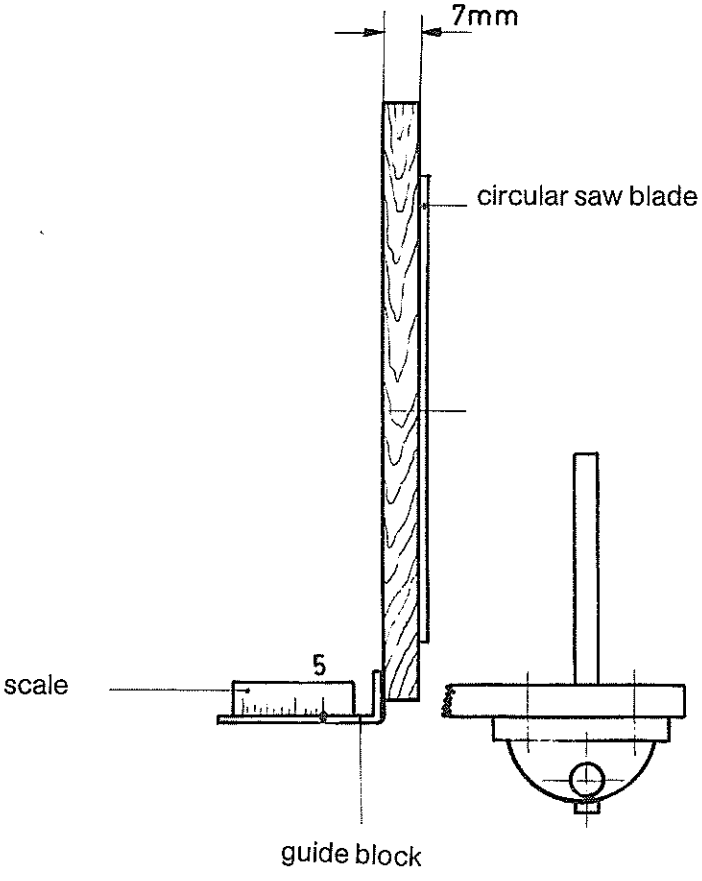
the first finished board is reversed and – with the finger cut first – placed against the guide. Thus it serves as a guide for the first cut on the second board.

For all further cuts the previous notch is used as the guide.

Now the boards can be mated.

Trouble-shooting Chart for the Wobbling Attachment

The Trouble	Possible Causes	The Cure
groove bottom slightly curved	caused by wobbling movement of saw blade	characteristic of the method of operation gives room for glue
wood or tool burns	feed too fast, cut too deep	reduce feed. take successive cuts
	gum and pitch accumulation on tool	clean saw blade with turpentine or similar solvent
	blunt blade	sharpen
splintering or excessive feathering at end of cut	breaking out of cut too fast	towards the end of the cut, guide work piece slowly and carefully



Adjustment of the Box Combing Scale

1. Place a 7 mm board againt the circular saw blade
2. Adjust guide block
3. The mark on the guide block must coincide with figure 5 on the box combing scale. If not adjust scale.

Band Saw

The band saw is suitable for rip-, cross-, miter-, circular- and curved cuts. Slots and tenons can also easily be cut by use of the rip fence and the miter-gauge.

Technical Data:

Band saw blades	length 1500 mm	
	thickness 0,4 to 0,5 mm	
		used for:
band saw blade	1500x20x0,4 Z/A 6 mm	rip cut
band saw blade	1500x20x0,4 Z/A 4 mm	cross cut
band saw blade	1500x10x0,4 Z/A 4 mm	curved cut
band saw blade	1500x20x0,4 Z/A 3 mm HF hardened	wood chip panel
band saw blade	1500x10x0,4 Z/A 3 mm HF hardened	wood chip panel
band knife	1500x12 mm	felt, cardboard, leather

Wheel diameter 220 mm

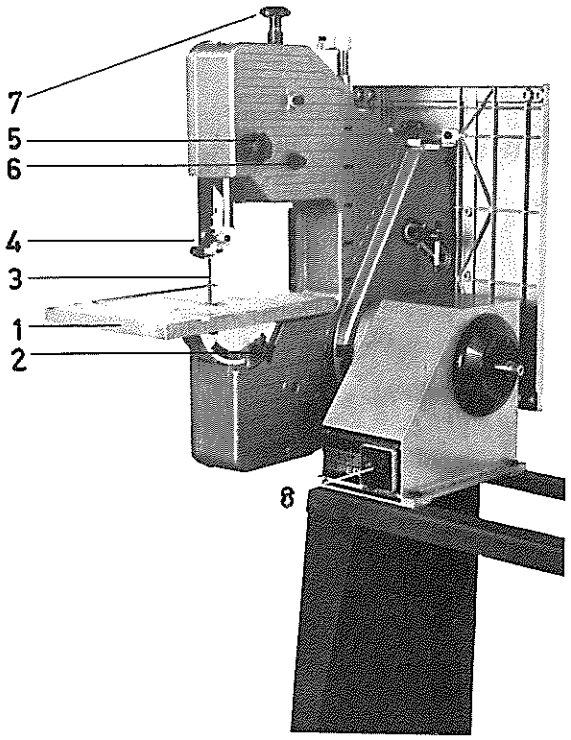
Whenever you use the band-saw, only choose 1500 r.p.m. for your pulley speed. (Switch position 1)

cutting height	max. 145 mm
distance from blade to throat	max. 205 mm
table: length	270 mm
width	350 mm

can be tilted and secured through 45°.

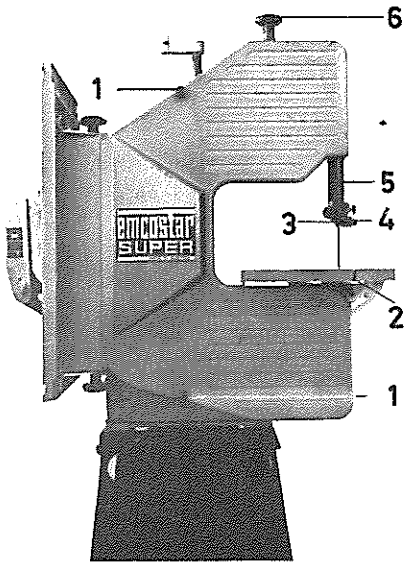
Description of Parts

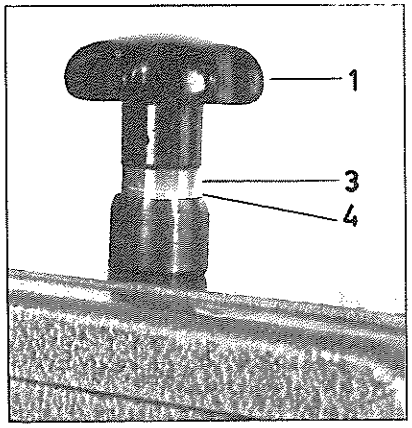
1 Band saw table
2 Star handle to secure the table
3 Band saw blade
4 Band saw guide with band saw guard
5 Star handle to secure the upper guide
6 Adjustment screw
7 Blade-tension screw
8 On-off switch



Changing of the Band Saw Blade

1. Take off the housing cover after loosening both knurled nuts 1
2. Remove bolt plate 2, so that the slot is uncovered
3. Loosen knurled screw 3.
4. Take out blade guide 4.
5. Take off band saw guard 5.
6. Release the tension on the band saw blade by turning the blade-tension screw 6 counterclockwise.
7. Carefully take the saw blade off the wheels and remove it through the slot of the table.
8. For assembly follow the reverse sequence. When mounting the saw blade check that the teeth point in the right direction; if not, turn "inside out"!
   After mounting check all operating positions as described on the following pages!





Various Adjustments on the Band Saw

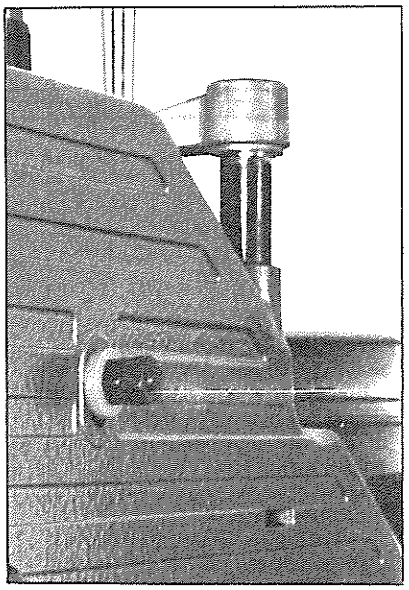
Adjustment of the Saw Blade Tension

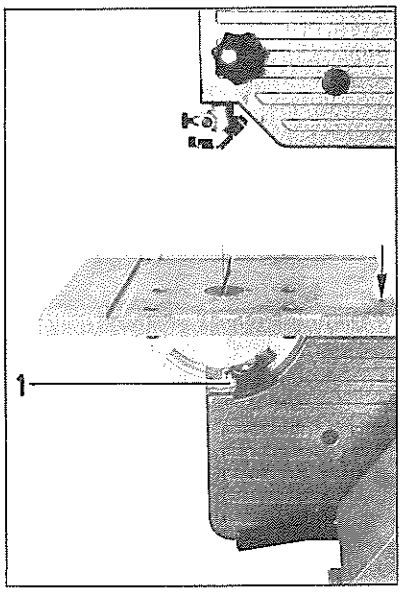
The saw blade is held in tension by a compression spring. Turning the star handle 1 on the blade tension screw clockwise tightens the saw blade. By this the upper spring cup slides into the bottom spring cup. For narrow saw blades the tension is correct when the recess 4 reaches the edge of the bottom spring cup and the bright surface disappears.

For broader saw blades increase tension until the upper end of the recess approches the bottom spring cup.

The hex nut 1 should only be tightened to such a degree that when the saw blade is taken out, the upper band saw wheel can easily be moved up and down by aid of the blade-tension screw or even by hand, but without much side play.

The nut is secured with a lock nut.





Adjustment of the Band Saw Table

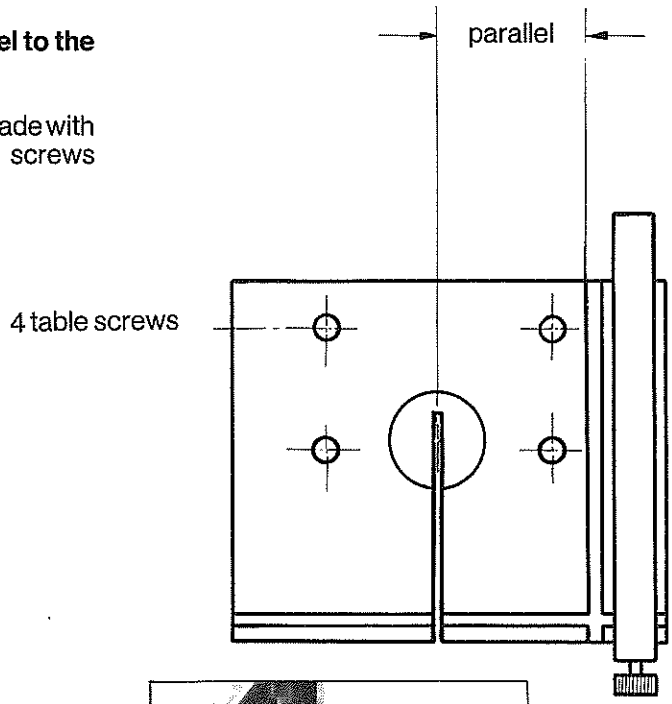
Similar to the circular saw table the band saw table can also be tilted through 45°.

The table can be secured with the star handle 1.

In horizontal position the table must be exactly at right angles to the saw blade. Adjustment is carried out from the top by means of the jack screw. To allow this the lock nut at the underside of the table must be loosened. After the table has been secured in the exact position, the pointer mark can be adjusted to the zero division line of the graduation.

Adjustment of the T-slot of the Band Saw Table Parallel to the Band Saw Blade

Carry out test cuts using the rip fence, to line up the saw blade with the table.After a parallel cut has been achieved, the screws securing the table are re-tightened.



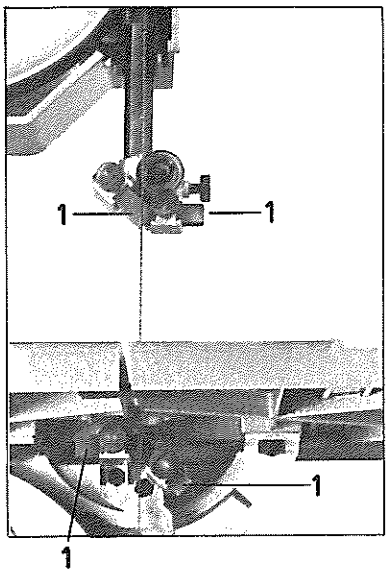
Adjustment of the Band Saw Guide

The band saw blade is guided above and below the table by laminated fabric blade guides, in order to prevent sideways movement. This guiding attachment is very important for perfect cuts.

After loosening the knurled screw 3, the guide roller is pushed towards the saw blade until its distance is 0,5 mm when blade is idling.

A guide roller 2 counteracts the pressure caused by the feed on the saw blade when working.

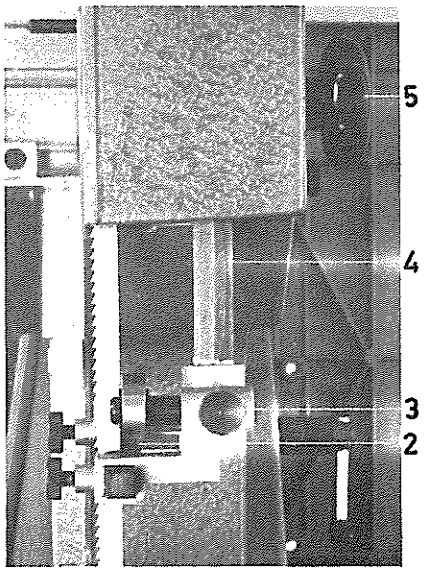
After loosening he knurled screw 3, the guide roller is pushed towards the saw blade until its ditance is 0,5 mm when blade is idling.

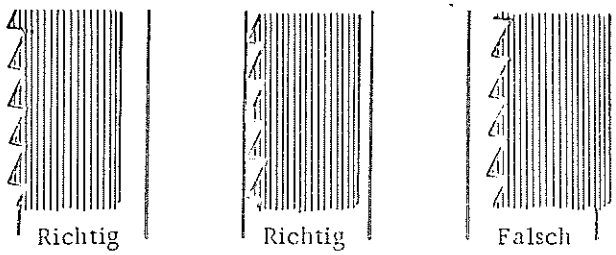


Adjustment of Upper Blade Guide Holder

In order to achieve favourable cutting capacity and for safety reasons, the guide head 4 should be positioned as low as possible. The best position would be just clear of the work piece surface.

The height is adjusted by loosening the star handle 5 with the right hand and lifting and lowering the blade guide holder with the left hand. The desired position can be secured again with the star handle.





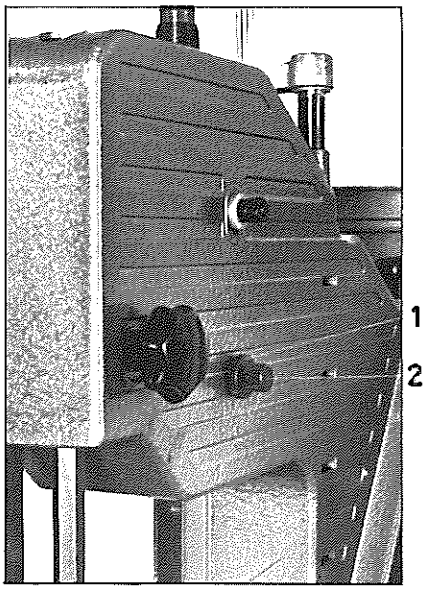
Adjustment of the Saw Blade on the Band Saw Wheel

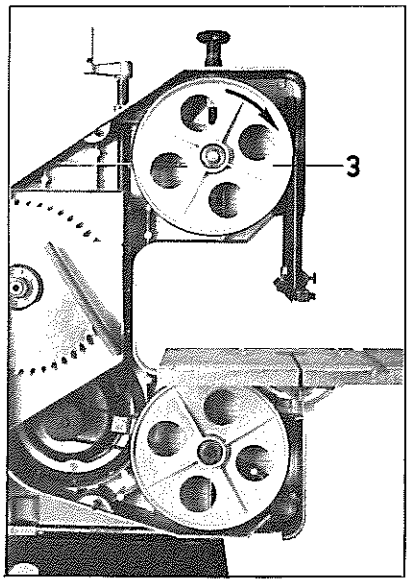
The edges of the saw blade teeth may protrude over the rim of the band saw wheel or be flush with it.
It is not good if the teeth are too far back. However, the rubber-rimmed wheel protects the teeth if the blade is wrongly adjusted.

After loosening the lock nut 1, the position of the saw blade on the wheel can be adjusted by turning the knurled screw 2.

Turning counterclockwise pushes the blade forward.

Adjustment is made easier, if at the same time the band saw wheels 3 are turned by hand.





Tips for Operating

In order to achieve a long life for the saw blades, the following advice should be observed:

1. Mounting of the Saw Blade
   The saw blade must be mounted according to the mounting instructions page 26.

   Also for adjusting the top and bottom blade guides, the instructions have to be followed exactly.
   If the band saw is not used for some time, the blade tension should be released.
2. Correct Cutting
   When working with the band saw, it is very important that the feed is correct. This depends on the thickness of the wood. Never push the work piece through by force!

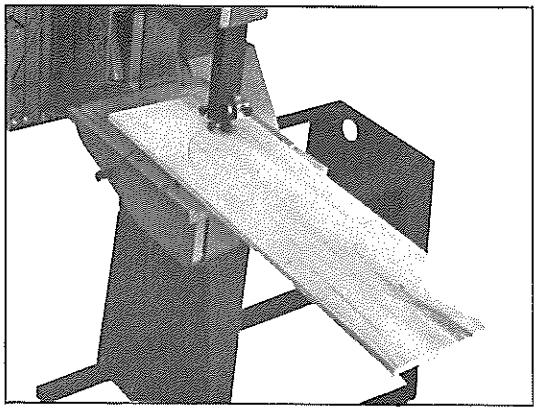
   A properly sharpened and set band saw blade will not bind. After some experience you can tell from the sound and feel if the saw blade is right.
   When cutting curves, a blade to suit the radius must be used.

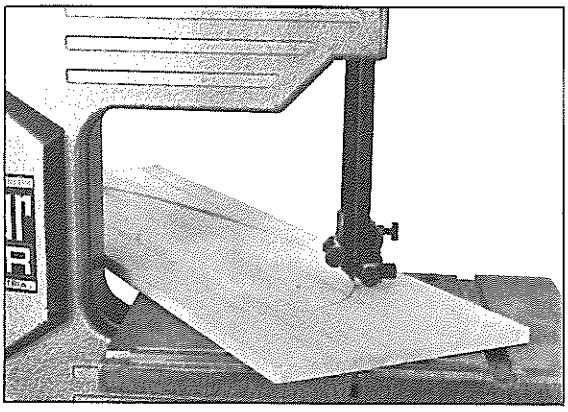
Putting into Operation

1. The machine must be in the position "band saw" and must be locked into position by engaging the handle.
2. Check tension of the blade, saw blade guide and height adjustment of the blade guide holder.
3. Now the motor can be switched on.
   Hard materials require low rpm (1500) and a fine feed (switch position 1). Soft materials can be worked at higher rpm (3000) and a coarser feed (switch position 2).
4. When not in operation for some time, the saw blade should be slackened.

Safety Recommendations

1. Only work with sharp, correctly set band saw blades.
2. Check tension of blade before switching the machine on.
3. Set upper band saw blade guide as low as possible.
4. Torn, warped, buckled or twisted blades must be replaced!
5. If the guide-kerf becomes worn-out, replace the round table insert.
6. When cutting round timber, use a feeding device that prevents the workpiece from turning on both sides of the blade.
7. The band-saw blade must never be slowed down by pressing wooden blocks against the sides of the blade!

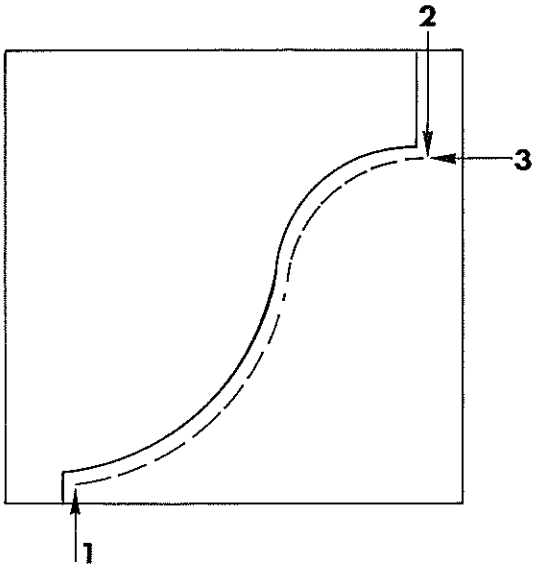


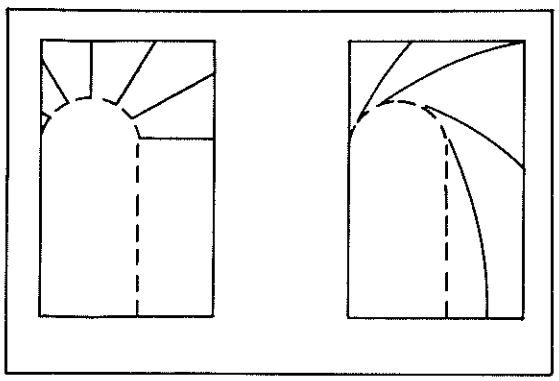


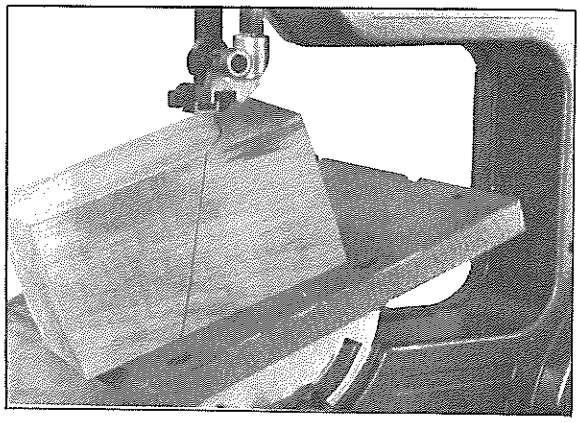
Before commencing, decide from which side it would be best to start. Sometimes a cut can be made in one, from one side, whereas from the other side back tracking would be necessary.

Back-tracking cannot always be avoided. Therefore, all the cuts have to be considered and be carried out in a logical sequence, in a way that the back-tracking has to be done over the shortest possible distances.

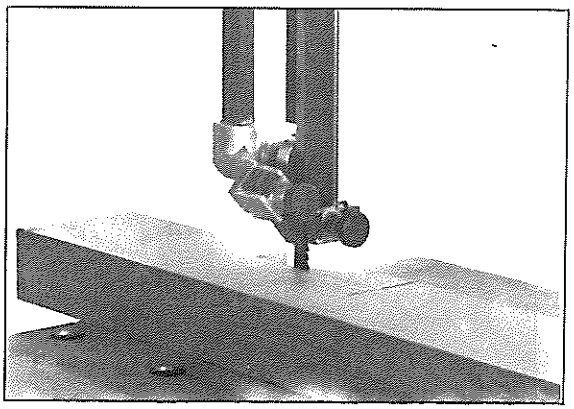
By radial or tangential cutting, tighter curves can be made than would otherwise be possible.





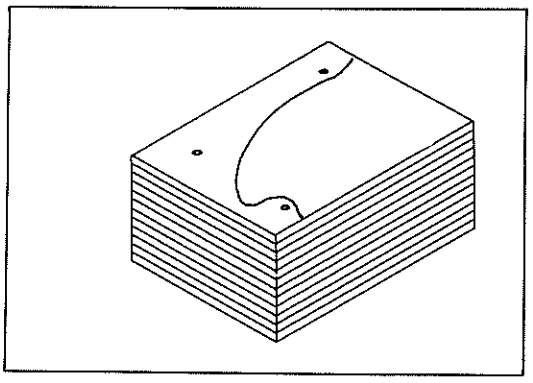


A special advantage of the band saw is its suitability to cut very thick pieces.
For these, however, the cut surface is not quite smooth. Cuts across the grain have a coarser finish.



Cut-outs can be made with the band saw economically. First make two cuts from the end. Then, starting from any point in between them, the next cut approaches a corner. With a further cut to the other corner the cut-out is complete.

It is possible to produce identical pieces by placing several pieces one on top of the other. These layers are held together by nails in the bits being cut off.



Trouble-shooting Chart for the Band Saw

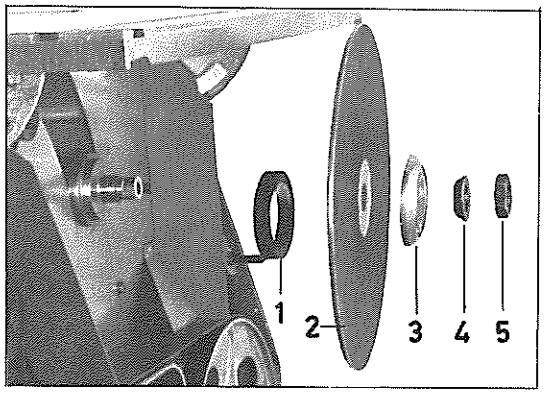
The trouble	Possible Causes	The Cure
bowed cut	blade too narrow	use largest blade available
	insufficient tension	adjust saw blade tension to the type of blade used
blade pulls away from the cutting line	blade guide wrongly adjusted	adjust blade guides and guide roller
	work piece is not being guided correctly	guide work piece safely with your left hand; use right hand to feed forward
	large number of knots	feed slowly, guide carefully
cut not square	miter-gauge not square to saw blade	adjust table square to saw blade
saw blade binds in cut	radius of cut too small	choose saw blade width to suit the radius
jamming when pulling back	saw dust has piled up in the kerf behind the saw blade	cut slowly, especially with fine blades
blade breakage	turning too sharply	choose cutting radius that suits the width of the blade
	blade blunt and bent	sharpen saw blade or use a new one
coarse cut surface	teeth not suitable	change blade
scraping noise when running free	blade guides running against the saw blade	adjust blade guides
knocking noise	saw blade damaged at one point	renew saw blade
irregular cut	saw blade is bent or twisted at one point	renew saw blade

Disc Sanding

Disc sanding on the circular saw blade spindle:

Disc sanding is suitable for smoothing (sanding) of all work pieces pre-cut by the circular- or bandsaw.

By use of the miter-gauge and the adjustable circular saw table, work pieces can be sanded also at any angle desired.



Mounting of the Sanding Disc:

The sanding disc is a steel disc to which abrasive paper is glued on both sides. It is mounted in the same way as a circular saw blade.

The parts are mounted in the following sequence on the circular saw blade spindle and secured with a hex. socket screw key and a ring wrench (left hand thread):

1. washer
2. sanding disc
3. clamping disc
4. spherical type washer
5. nut

Glueing on the abrasive paper:

Abrasive papers with three different grit sizes are available:

abrasive paper 28 cm dia. grit 100 fine
abrasive paper 28 cm dia. grit 80 mm
abrasive paper 28 cm dia. grit 60 coarse

For glueing, contact glue is used. This is applied to the disc and the back of the abrasive paper evenly by means of a brush or spatula. Let it dry for 10 minutes. Then put the paper on the disc and press it on by hand. In this way (the first abrasive layer being worn out) up to three layers of paper can be glued one on top of the other. After this, the abrasive paper and the glue have to be removed by means of a scraper.

To remove remnants of glue, use a recommended solvent to suit the glue.

Tips for Operation

The sanding disc prepares the surface for the finish, staining polishing or varnishing. The good looks of the work piece depend largely on careful sanding.

The work piece should be lightly pressed against the downward moving half of the disc. Too much pressure results in a burned surface.

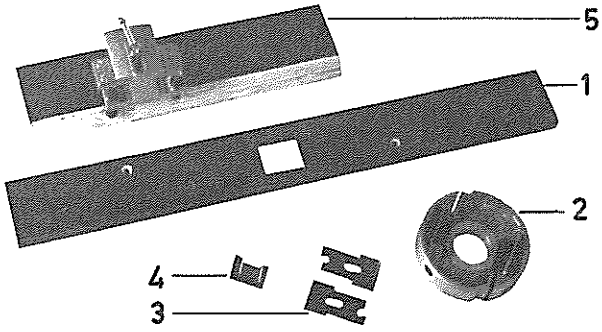
For hard wood work at 1500 rpm, with soft wood at 3000 rpm.

Unfallverhütung

1. The abrasive paper has to be glued on the sanding disc. Be aware of bubbles; if this is not observed, excessive wear and tear results.
2. Replace worn abrasive paper! Worn paper causes burns on the work piece!
3. Do not use torn abrasive paper. Replace!
4. Guide the work piece safely and firmly!

Planing

The planing device serves for planing battens up to a width of 4 cm, and for planing chamfers.

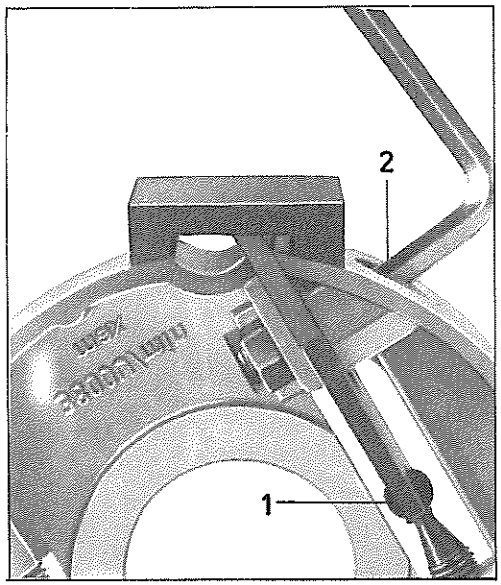


Required parts:

1. Planing top-piece
2. Cutter Head
3. Planing blades
4. Setting gauge
5. Planing fence

Mounting of the Blades and Cutter Head

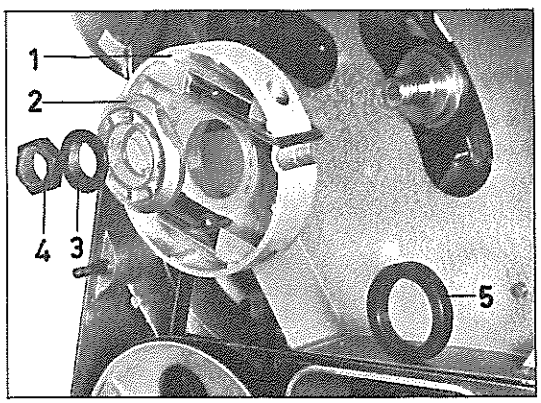
The blades are mounted in the head in the position shown. By turning the screws 1 with a screw driver, the blades can be brought into the correct position. The setting gauge mounted on the circumference of the head indicates how much the blades should protrude over the head. Once the correct position is reached (make sure the cutting edge and setting gauge are parallel), the blade is secured with a socket head cap screw 2.

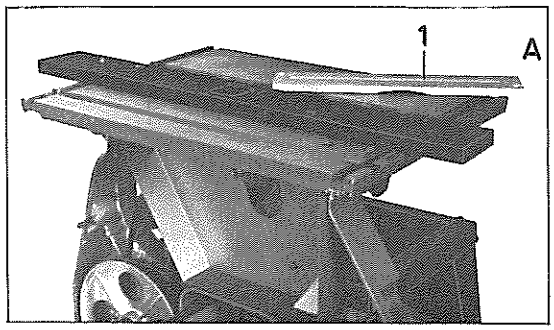


The head is then mounted on the circular saw blade spindle as follows:

1. cutter head
2. clamping disc
3. spherical type washer
4. nut

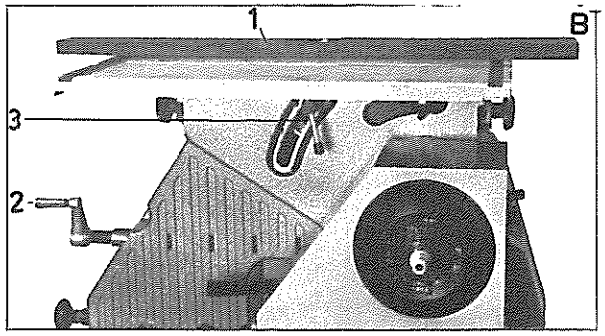
The second washer 5 is not used in this instance.





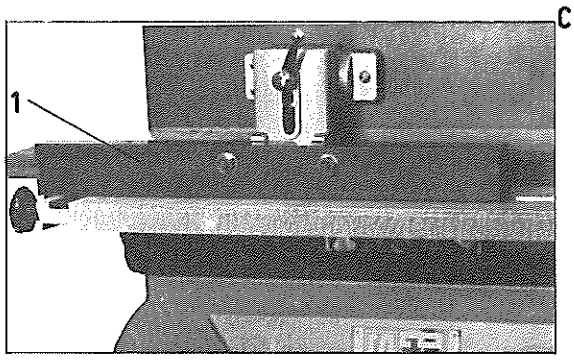
A
Mounting of the Planing Top Piece

The insert of the circular saw table 1 is taken out and the top piece bolted into its place.



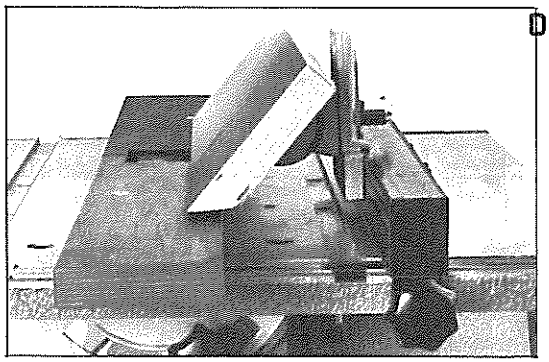
B
Height Adjustment of the Cutter Head

The effective circle of the blades must be in accordance with the height of the outfeed end of the top piece 1. Adjust with handle 2 and secure with locking handle 3.



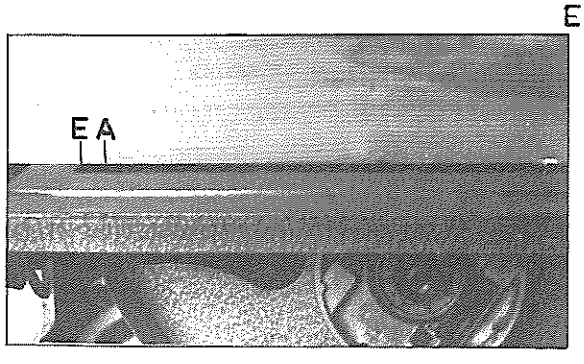
C
Mounting of the Planing Fence

The planing fence is fixed to the rip fence 1 by screws. For this purpose there are two holes provided in the rip fence to receive the hex screws.



D

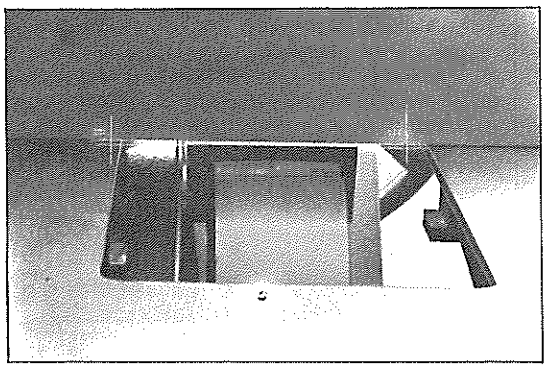
The planing fence can be used either left or right of the cutter head according to requirements.



E
How to check the adjustment of the blades if no setting gauge is available:

1. Adjust the height of the head so that the effective circle of the blades is approx. 0,1 mm above the circular saw table.
2. Place a straight batten on the circular saw table and turn the cutter head by hand. The batten will be carried a ditance A to E by the first blade.
   Mark starting and end point with pencil.
3. Put the batten back into its original position and repeat the operation with the second blade.
   If the batten is carried an equal distance to he same end position E, both blades are in the correct position.
   If not, the second blade must be corrected accordingly.

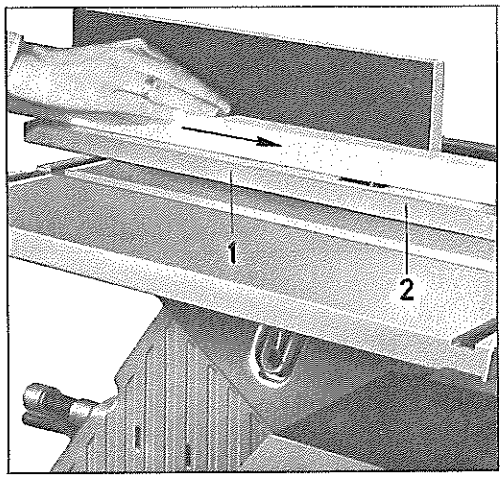
It is also necessary to check if the blade edges are parallel to the table plane. For this purpose place for example a planed batten on the table and bring the cutter head close to it. The two edges must lie parallel to each other.

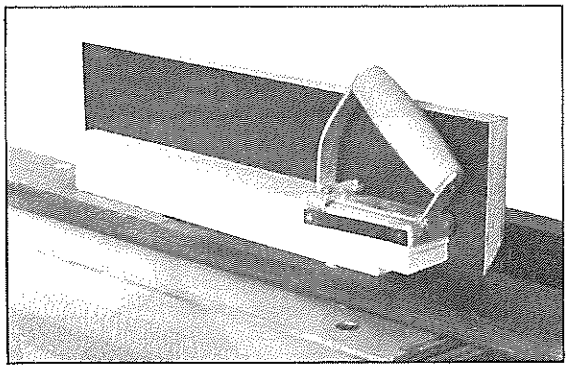


Plaining is carried out at 3000 rpm (switch position 2).
The shape of the top piece is such that the depth-of-cut is fixed at 1 mm. This produces a very cleanly worked surface.

The piece to be planed is placed on the infeed end of the top piece 1, pressed down with both hands and pushed slowly against the cutter head. As soon as it has passed this, press it on the outfeed end of the top piece 2 with one hand while continuing to push it against the cutter head with the other hand.

Short work pieces should be planed by use of a self-made pusher-hold-down, in order to avoid injuries to your hands. By glueing an abrasive paper on the underside of the pusher, it becomes more effective.





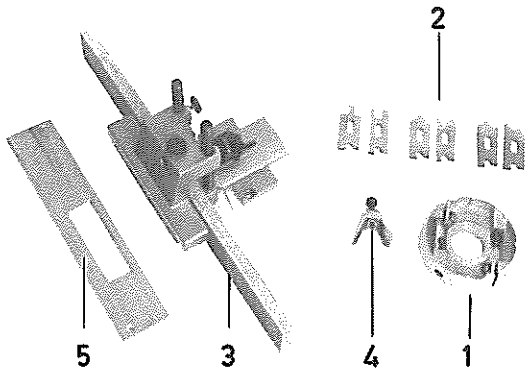
Safety Recommendations

1. Only use sharp planing blades!
   This reduces the danger of kick-backs considerably!
2. For planing short work pieces, use a pusher-hold-down.
3. Use the flat of your hands to press the work piece, never use your fingertips!
4. Saw dust collected should be pushed off with a board or blown off.

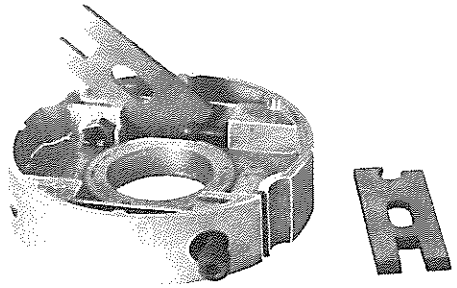
Profile Moulding

Moulding is the most simple and exact method of producing tongues and grooves.

Even more interesting is the moulding of decorative profiles. The various possibilities of combining the basic profiles make it easy to manufacture very effective surface shapes.

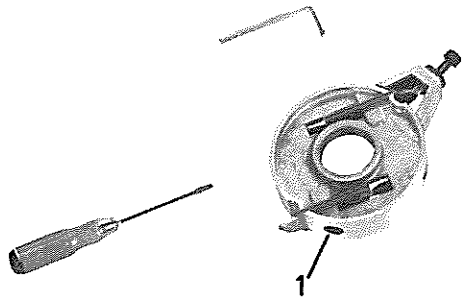


1 Cutter head
2 Profile blades
3 Moulding attachment
4 Setting gauge
5 Insert



Mounting the Profile Blades

The blades are hung on the ball heads of the special screws and swivelled into the cutter head. The blades can then be brought in line with the cutter head by placing the cutter head on a flat surface (e. g. circular saw table). The blades must also have their longitudinal sides pressed on the flat surface.



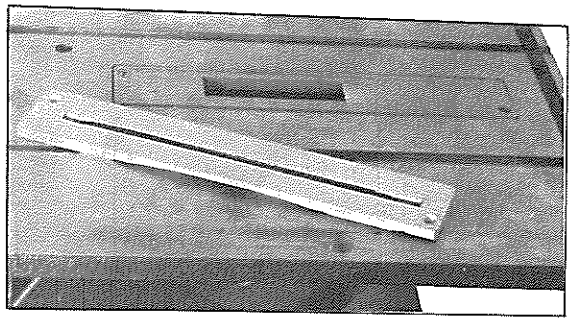
Then the blades are adjusted to a common effective radius. First of all one blade is tightened with the socket head cap screw 1.

The adjustment gauge is placed on the circumference of the cutter head and the screw adjusted to the height of the cutting edge and secured with a locking nut.

The gauge is placed over the second blade and the blade adjusted to the correct height. Adjustment can be made by turning the adjusting screw. Finally the second blade is secured by the socket head cap screw.

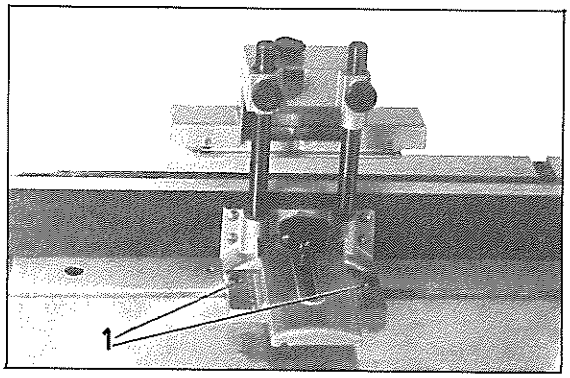
When the blades are correctly secured, the cutter head is fastened to the circular saw spindle as before.

Cutter head
Clamping disc
Spherical type washer
Nut

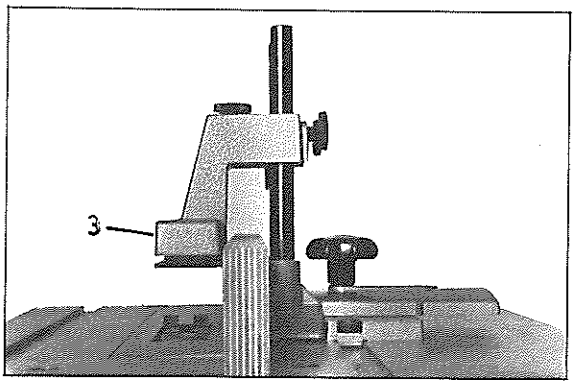


The second washer is not used in this instance.

The insert of the circular saw table must be replaced by the insert belonging to the moulding attachment.

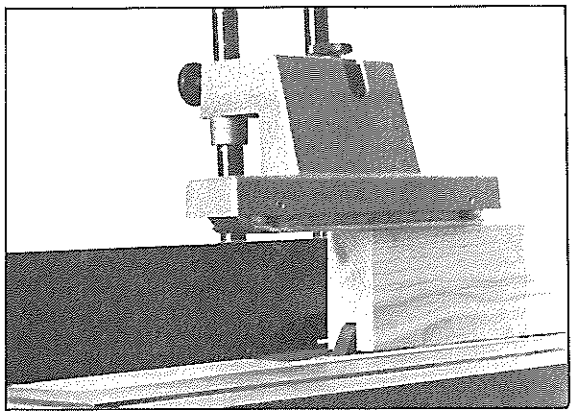


The moulding attachment, which carries the fence and the hand guard, can be bolted on either left or right of the cutter head, using the holes 1 in the circular saw table.



The desired depth of profile is obtained by adjusting the height of the cutter head with a crank. After this, secure with locking handle.

The hand guard 3 is adjusted in such a way that it lightly touches the upper surface of the work piece.



Operating Instructions

For moulding, sharp blades and high revs (switch position 2) are necessary to achieve a smooth cut.

The following rules have to be observed:

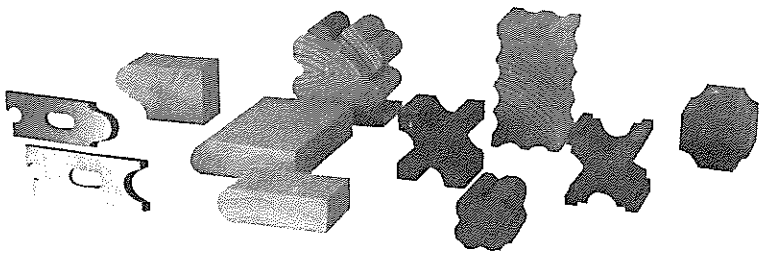
1. Be sure work is snug againt fence throughout pass.
2. Feed the work piece against the direction of the rotation of the cutter head.
3. Keep your hands clear of the rotating blades!
4. Keep fingers of both hands bent over the edge of the work piece to avoid the danger of slipping.
5. Never feed the work piece by force, feed it slowly and evenly.
6. Use pusher if necessary. Never hold the work piece over the tool with your hands!
   With moulding there is always the danger that the wood breaks through pressure and the hands come in contact with the blades.

Groove-moulding a Board

The moulding fence must be adjusted laterally in such a way that the groove is cut in the middle of the board.

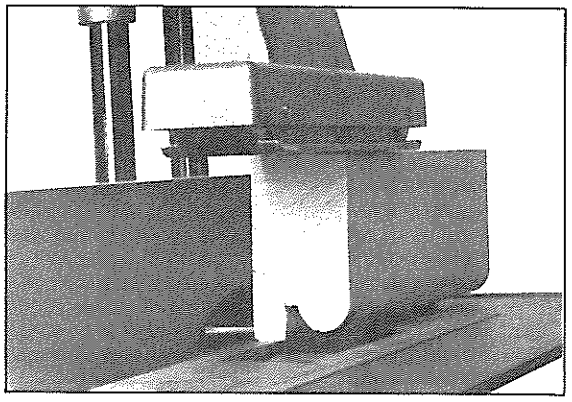
With one single profile blade, different profiles can be made by several cuts.

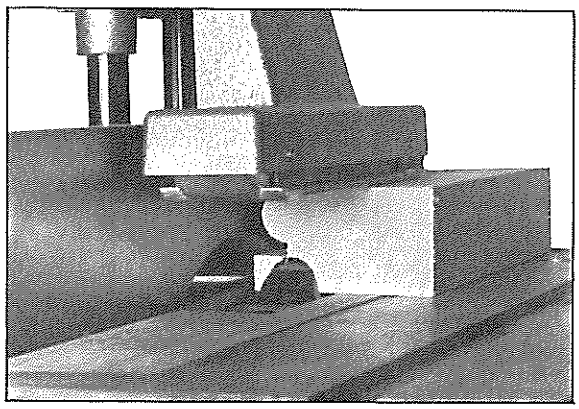
Typical profiles which can be produced by one or more cuts, using full or part depth of the blade.



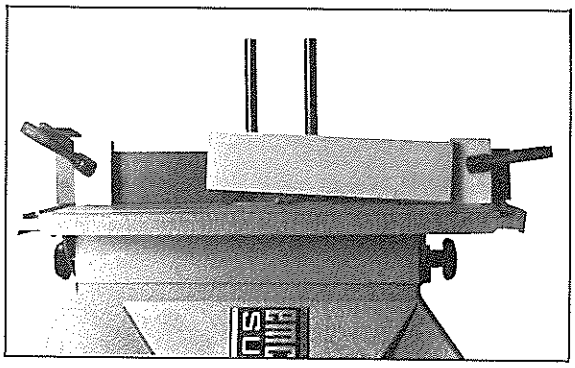
Moulding of a shaped batten in two cuts.
It is of advantage to mark the desired profile on the front face and then choose the suitable blades for it.
It is not always necessary to use the full depth of cut to form the required shape.

In the example shown on the right, the second cut requires not only a different profile blade. In this case it is also better to put the fence on the other side in order to assist in guiding the work piece.



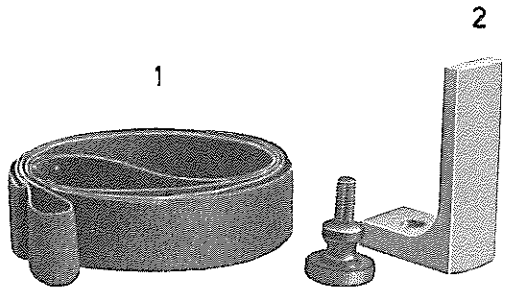


For cuts, when only part of the edge is being removed, stop-blocks secured with C-clamps are an advantage. First place the work piece against the front stop and slowly move it down on the cutter head. Then mould to the back stop.



Safety Recommendations

1. Only use sharp blades!
2. Make sure the blades are well and correctly secured!
3. Always adjust the handguard so low that it lightly touches the work piece surface!
4. Loose knots must be hammered out before starting to work.
5. Use a depth-of-cut and feed which is not too great!
6. During operation, the work piece must be pressed both on the table and against the guide!
7. Do not feed small work pieces by hand, but with a self-made pusher (see sketch page 13).
8. Use lateral fence!

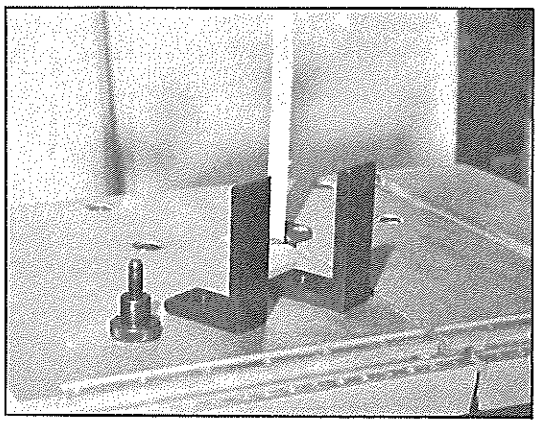


Sanding Curves

Both with disc sanding and with belt sanding only level surfaces can be worked. That is why the form sanding attachment represents a useful supplement for sanding curved surfaces. With the form sanding attachment a small endless sanding belt is used, which runs on the band saw wheels. A sanding support, mounted on the band saw table, will provide the necesssary backing.

When mounting the form sanding attachment, the band saw blade is exchanged for the sanding belt. This is done in the same way as replacing the band saw blade. Care has to be taken as soncerns the bonded overlap of the sanding belt, to prevent the belt from being ripped up by the work piece.

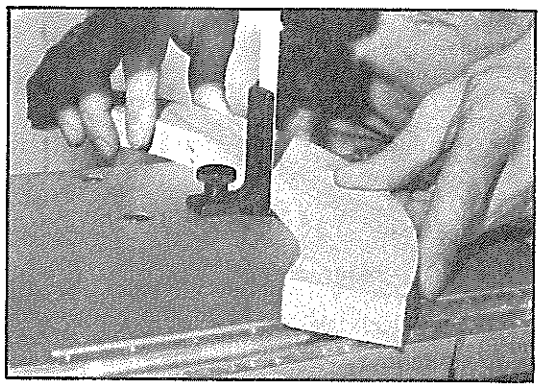
The band saw blade guides on the abrasive side of the belt have to be slightly retracted to avoid unnecessary wear. The sanding belt requires less tensioning than the band saw blades.



Tips for Operating the Form Sander

The sander will operate most efficiently at high speed (Switch position 2), since the surface will then be smoother. The contact pressure, however, should be kept at a minimum as frictional heat tends to burn the work piece.

The work piece must be guided securely using both hands. It is also a good idea to keep the work piece moving evenly. Stopping too long in one and the same place causes an unwanted recess, as the sanding belt keeps on removing material!



Safety Recommendations

1. The band saw guard should cover the sanding belt as much as possible.
2. Check whether the bonded overlap of the sanding belt can be ripped-up by the work piece.
3. When sanding hold work piece firmly!
4. Never use torn sanding belts!

Disc Sanding on the Motor Spindle

Some jobs frequently require the alternative use of the circular saw as well as the sanding disc. By mounting the sanding disc on the motor spindle this continuous irksome change of tools can be avoided. In order to carry-out various sanding jobs, an additional sanding table and a machine stand (extra equipment) are necessary.

In the basic equipment, machines with a circular saw spindle (inch) also have a sanding disc with an inch bore. As the motor design is metric, this disc (inch) cannot be mounted on its spindle. In this case an additional disc (metric design) must be purchased.

Mounting the Sanding Disc on the Motor Spindle

1. Remove cap from motor spindle.
2. Items are to be mounted on the motor spindle 5 in the following sequence:
   sanding disc 2
   distance ring 3
   hex-nut 4

Mounting the Sanding Table

First of all the U-channel with the clamping-plate loosely bolted to it is mounted on the machine stand. Then the table is inserted between the clamping-plate 1 and the U-channel 2 and secured with two socket head cap screws 3.

Putting into Operation

For disc sanding the machine must be in the position „Attachment". Remove disc guard. Now the disc sanding attachment is ready for operation.

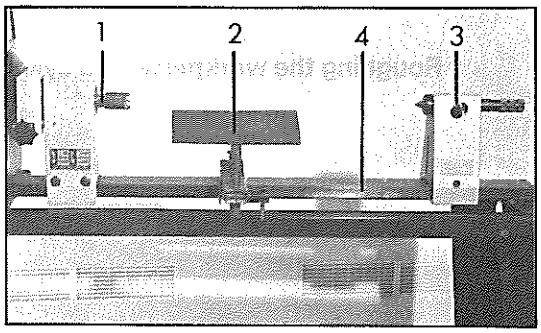
Never forget to re-mount the disc guard when working again and exclusively on the circular saw. The sanding disc then must remain completely covered.

Wood Turning

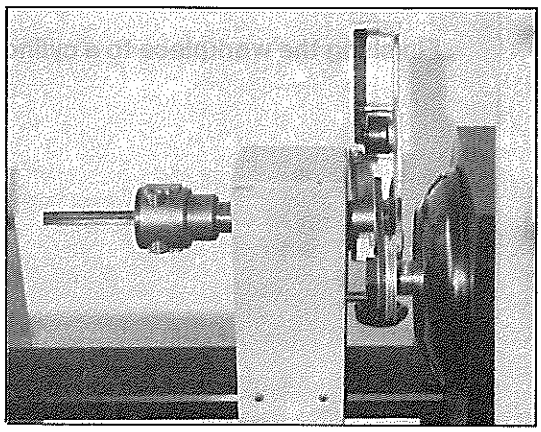
The turning lathe:
Long machine stand and longitudinal beam (long)

1 Spindle nose
2. Tool rest and clamping device
3. Tailstock
4. Guide column

Motor speed: Switch position 1 1400 r.p.m.
Switch position 2 2800 r.p.m.

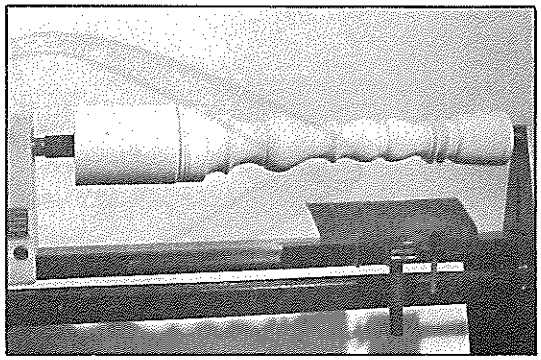


Headstock end gearing:
This gearing can be used advantageously to match the spindle speed with the material and the turning diameter to be machined.
4 spindle speeds are available 700, 1400, 2800, 5600 r.p.m.

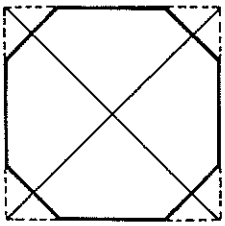


Basically one has to distinguish between two types of wood-turning:

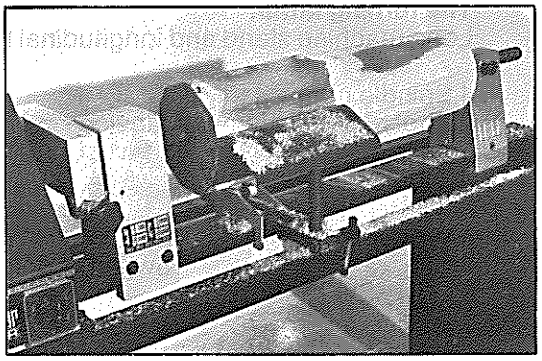
a) Turning of wood with longitudinal grain:
This is no doubt the type of wood turning used most often. A possible field of application is the manufacture of lamp-posts, candlesticks, legs of chairs and tables etc. As the heading of this paragraph already implies, the direction of the grain of the wood to be turned runs parallel to the axis (headstock – tailstock). The choice of the proper tool depends largely on the wood-structure (soft-or hardwood).



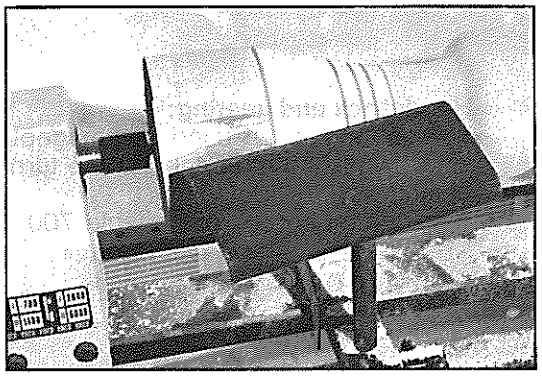
Method of working:



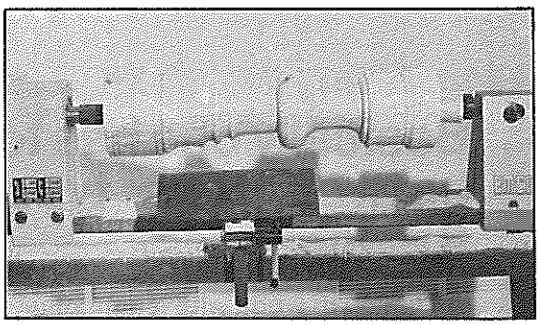
Roughing the workpiece to a cylindrical shape:

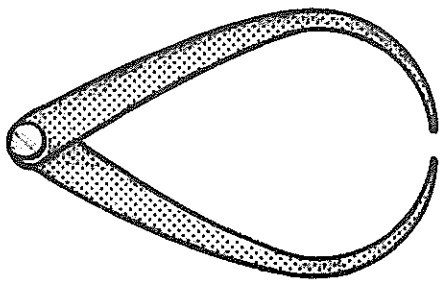


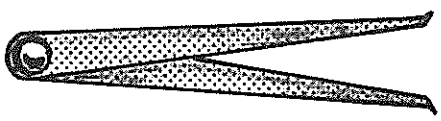
Finishing the workpiece to a cylindrical shape:



Checking with a pair of dividers or calipers:

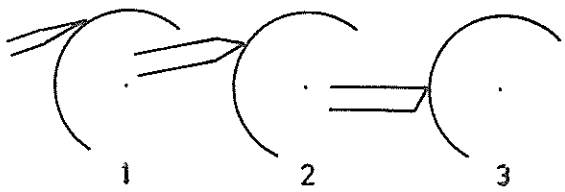






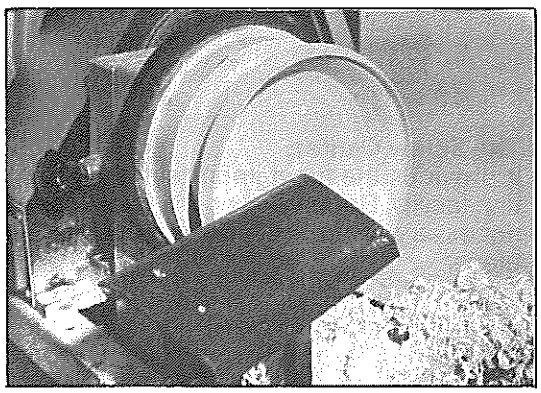
Finishing with the Chisel

Bring the cutting edge of the chisel close to the work piece. Lift the chisel slightly on its handle till the edge starts scraping-off material. It takes some practice to feed the chisel slowly and uniformly over the work piece. This type of finishing is only possible with wood that is neither too hard nor must it have knots. Its diameter must not exceed 15 cm. With work pieces larger than 15 cm dia., the scrapping technique is applied for finishing, i. e. bring the edge of the chisel closer to a horizontal plane (see figure 2,3).



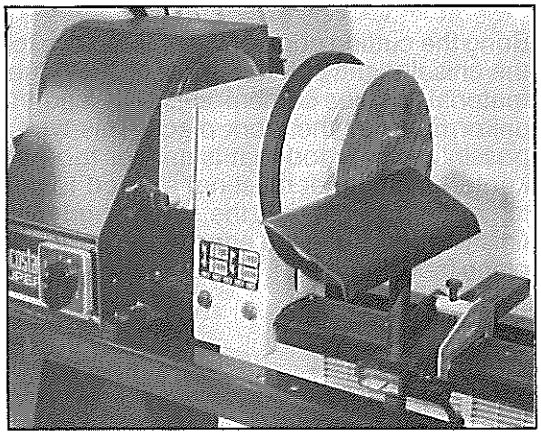
Drilling of center holes in wood with longitudinal grain:
This represents an important operation the wood-worker very often comes up against, e.g. most internal shapes or cavities first will have to be rough-drilled.
The application of drill bushes facilitates the drilling of accurate center holes. Dipping the auger bit every now and then in oil will prevent burning and improve sliding during drilling operations.
Drill bushes available: ⌀ 8 and 12 mm.

b) Turning of wood with cross grain:
A possible field of application for this type of wood turning is the manufacture of plates, bowls, large, lamp bases etc. The direction of grain in this case runs at right angles to the axis (headstock – tailstock). It is adviseable to use short tools when carrying out facing operations. The tools also ought to have one cutting edge.



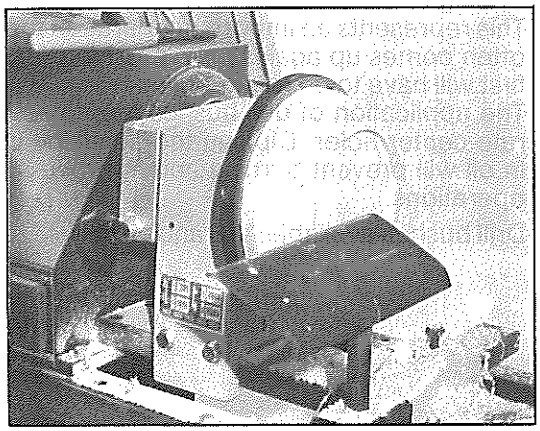
According to shape and material of the work piece, various attachments for mounting it become necessary. For that matter you must distinguish clearly between turning wood with longitudinal or cross direction of grain.

Attachments for Clamping and Mounting Work Pieces

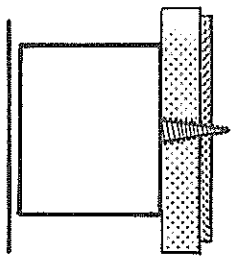


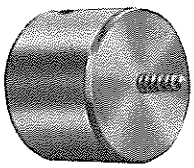
Mounting attachment for cross grain

The Faceplate:
The faceplate is used for turning large discs, bowls, rings etc. By means of screws, the work piece can be mounted directly on the faceplate.



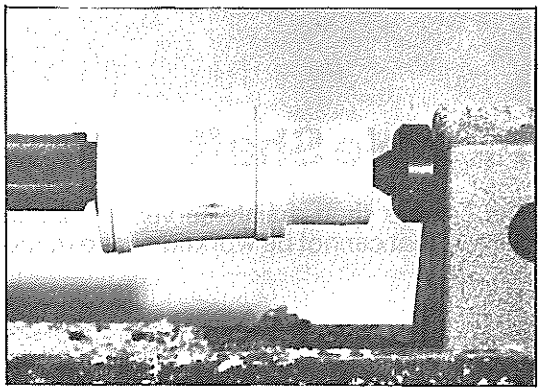
The Screw Center:
It provides the most important and the most versatile mounting facility. Depending on the thickness of the piece it may be necessary to put washers between the center and the work piece.

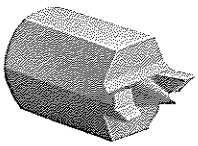




Mounting Attachment for Longitudinal Grain

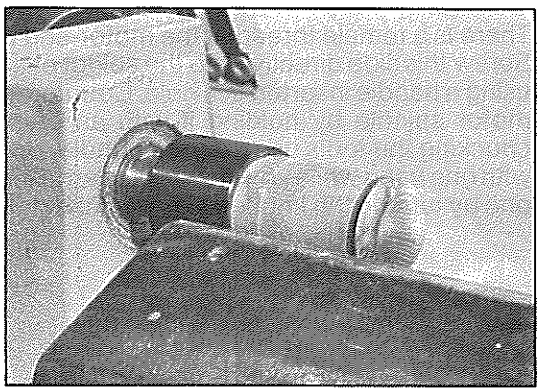
The two-pronged spur center:
The spur center drives stock to be turned without slippage. The prongs are sunk into the spindle-side of the stock. A live center on the tailstock-side provides an accurate support. Most often the work piece is rough-turned between the spur- and live center. Then a tenon is cut on one side of the stock. This tenon makes it possible to mount the stock in a so-called cup center where it can be finished.

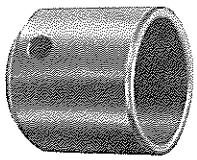




The cup center:

The cup center is mounted directly on the motor spindle spigot. It is suited for mounting short work pieces with longitudinal grain (under certain conditions also wood with a radial grain).



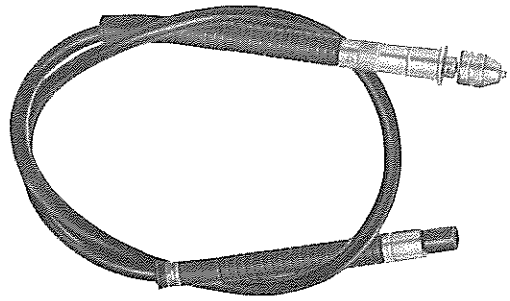


Safety Recommendations

1. Center drill both faces of the work piece before clamping it!
2. Make sure that the work piece is clamped securely before you switch on the machine. Also inspect whether the tailstock is seated properly!
3. For large and out-of-balance work pieces only use low number of revs!
4. Support chisel with both hands!
5. Only use correct and properly ground tools!

Flexible Shaft

The flexible shaft mainly serves to machine stationary work pieces, that cannot be worked on the machine.



Mounting

There is a female thread at the motor-end of the flexible shaft. Screw this side directly onto the spigot of the motor spindle by using a handle inserted in a hole. Counteract the torque on the motor spindle by holding it with an open jaw wrench. For chucking the tools use a similar handle. Hold the flexible shaft with one hand while you insert and clamp the tool with the other one by turning the knurled sleeve of the drill chuck.

Putting into Operation

1. The machine must be in the position „Attachment".
2. Screw the flexible shaft on to the motor spindle spigot.
3. Chuck desired tool.
4. Switch on the motor – choose number of revs according to the tool.
5. Avoid buckling and excessive bending of the flexible shaft.

Safety Recommendations

1. The flexible shaft has to be screwed right up to collar of the motor spigot!
2. Do not use crooked drills!
3. Only use correct and properly ground tools!
4. Before you switch on the motor, pick-up the flexible shaft by the handle!

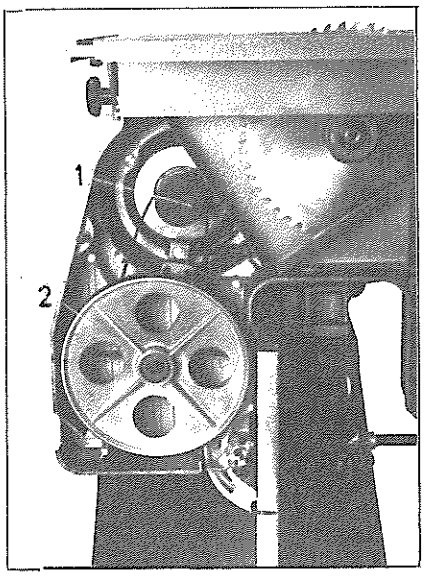
Servicing

Regular servicing of the machine is not necessary. The bearings are greased for life time and do not require further greasing. As a rule, wood working machines should not be greased additionally, because surfaces soiled with grease cannot be varnished satisfactorily. A grease-free lubricant for the circular saw and the band saw is available for purchase.

The following parts of the machine naturally are subject to wear after a long period and may require re-adjustment.

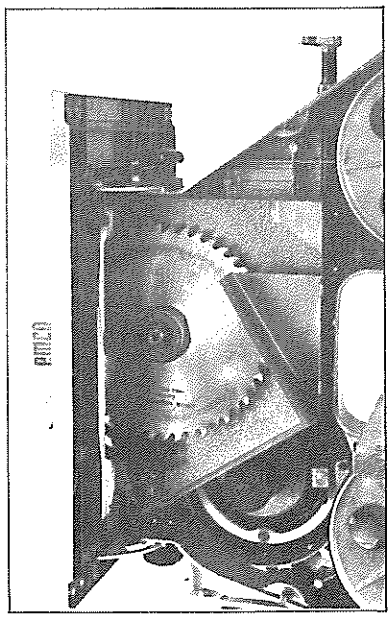
Flat Belt

The circular saw has a higher power requirement. Therefore the circular saw belt wears quicker than the band saw belt. After the wearing surface of the belt has worn off (fabric ply shows), the friction decreases and the full power is not transmitted. This does not require a new belt. Just turn it so that the unworn side lies on the pulley.
Only after both sides are worn has the belt to be renewed.



Changing of the Flat Belt of the Band Saw

1. Set the machine in position band saw.
2. Take off band saw blade (see page 26).
3. Set machine in position circular saw.
4. First take belt off the motor pulley 1, then take it out over the lower band saw wheel 2.
5. Put on the new belt and re-assemble in the reverse order.

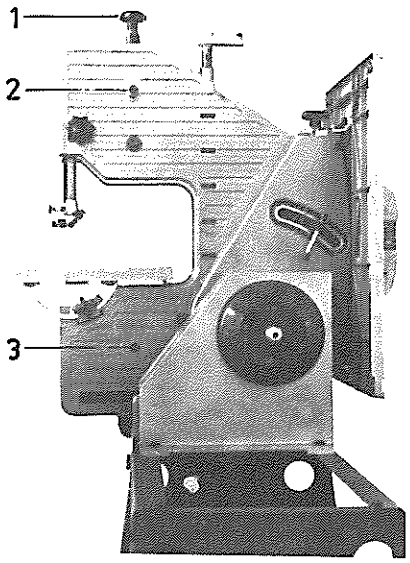


Changing the Flat Belt of the Circular Saw

1. Take off the belt of the band saw (see above).
2. Take off circular saw blade (see page 8).
3. Take off splitter (see page 10).
4. Take off the saw dust container by loosening the three fitting screws.
5. Set machine in position band saw.
6. Now the belt can be taken off.
7. Put on new belt and re-assemble in the reverse order.

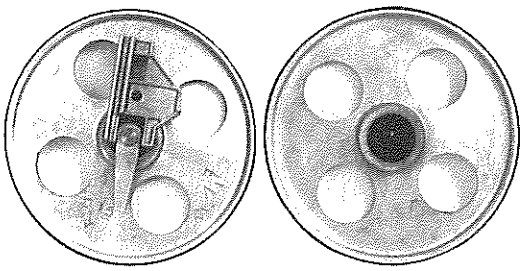
Band Saw Wheel

If in the course of time wear shows, or if the running surfaces get damaged, the band saw wheels must be renewed.



Changing

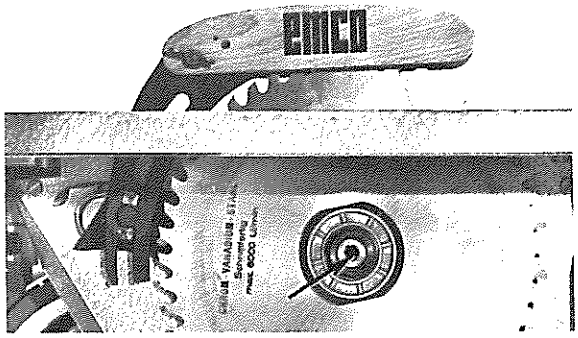
1. Take off band saw blade.
2. Take out blade tension screw 1 completely.
3. Loosen both nuts 2, take out upper wheel. The wheel is exchanged along with its bearings and axle, complete wih the pivoting lever and blade tensioning slide.
4. The lower band saw wheel is taken off simply by loosening the socket head cap screw 3. Also this is exchanged complete with bearing and axle.

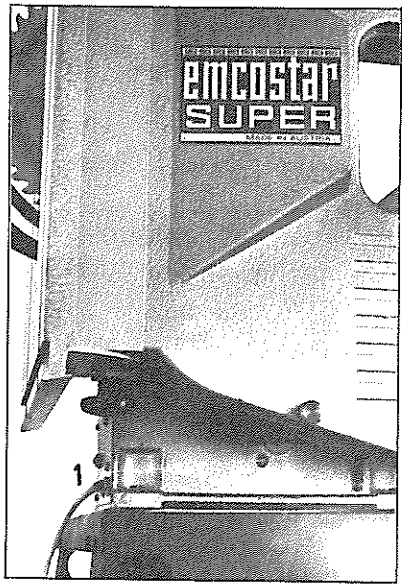


Circular Saw Spindle

It is important for correct operation that the circular saw blade spindle has no clearance.
Clearance can be adjusted as follows:

In the hexagonal opening of the circular saw spindle is s 6 mm socket head cap screw for the adjustment of the bearing clearance. By tightening the screw carefully with a hex. socket screw key SW 5, bearing clearance can be eliminated.





Limit Switch

The limit switch controls the engaging of the locking handle in the working position.
It is mounted in the cavity of the cast iron base under the motor. It can however be adjusted from outside by turning screw 1.

The switch is adjusted correctly when it is actuated (a slight click can be heard) shortly before the locking handle reaches the stop.
When the screw 1 is turned clockwise, the switch acts later and for anticlockwise earlier.

Orders, Complaints

All components and tools, also complete sets for adding to the machine can be ordered from the additional range of the accessories.

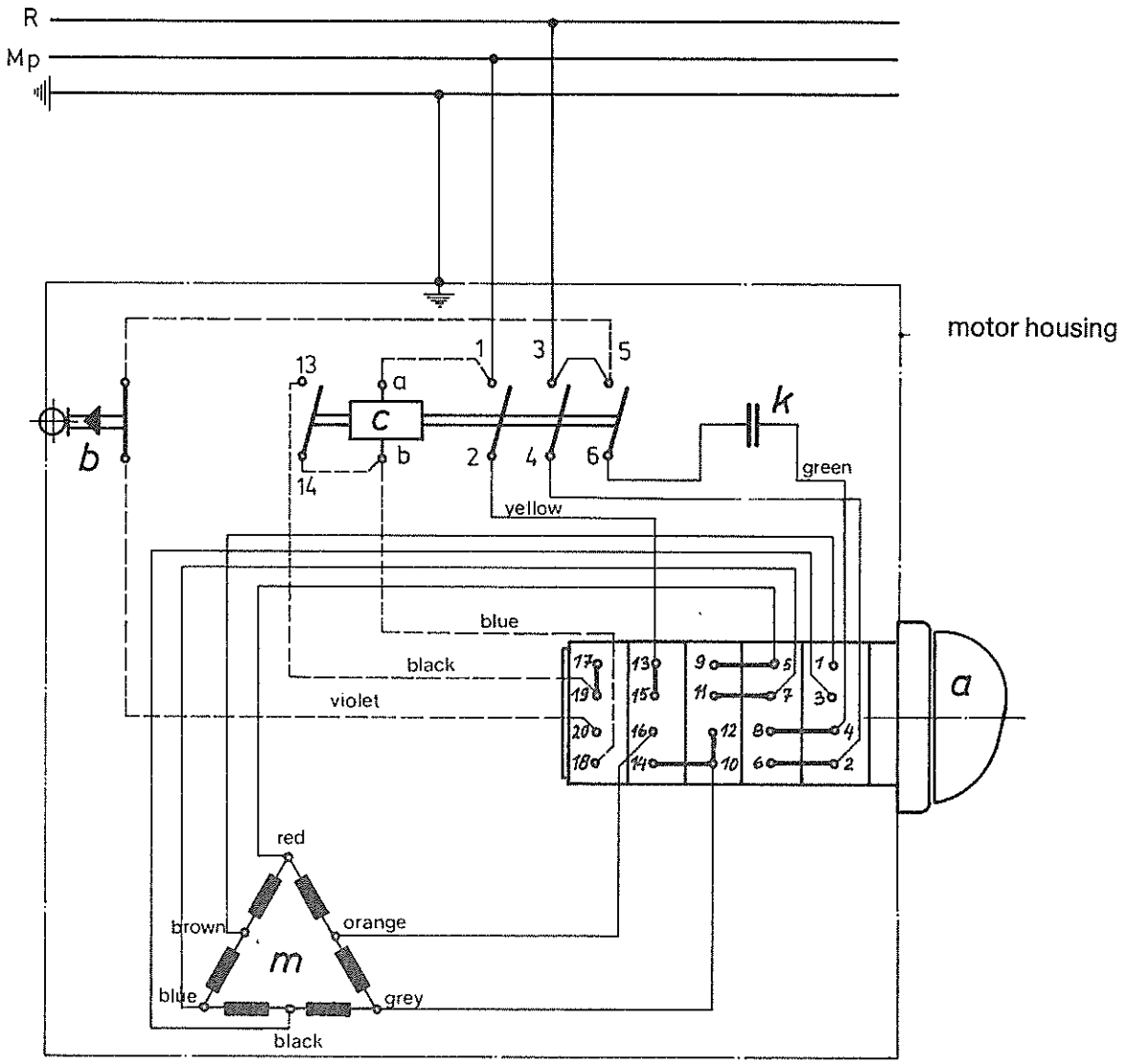
In the parts list, all parts are shown and numbered. These numbers must be stated in the order without fail, in order to avoid mix-up.

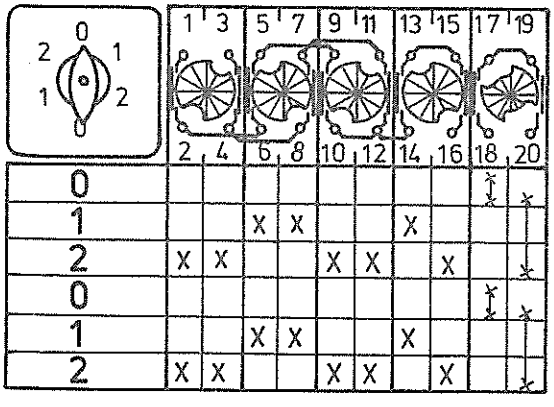
If the machine shows faults, which were possibly caused in production, a claim should be made on the form provided. Using the form at the back of this manual speeds up action.

EMCOSTAR SUPER

Wiring Diagram

for single-phase a.c.





a - Dahlander Switch

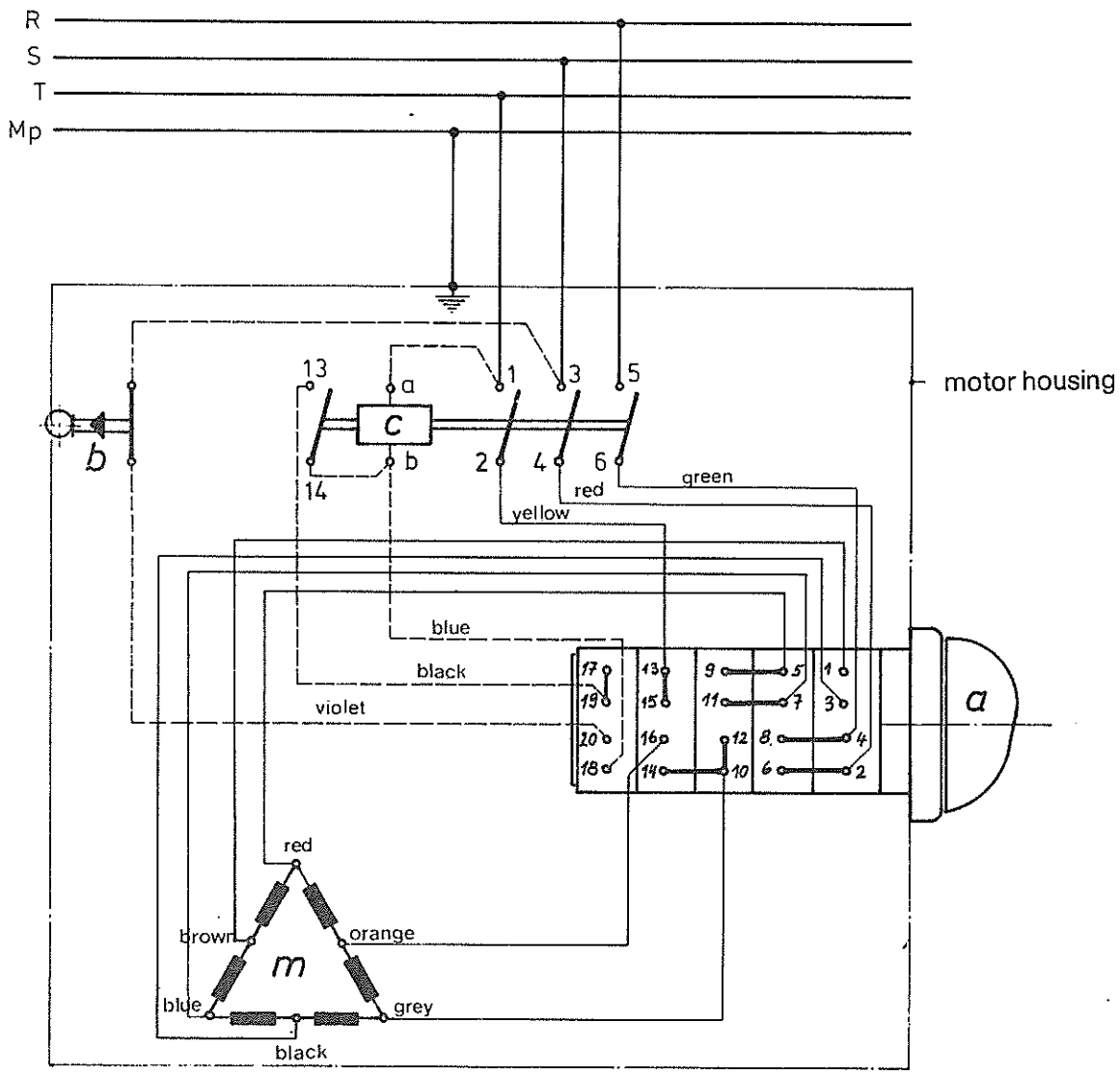
C14 A8M569 (Kraus & Naimer)

Rotary switching and reversing lock from 2 to 1 and 0 to 2 auxiliary contact for contactor control, requires zero position after mains failure.

EMCOSTAR SUPER

Wiring Diagram

fo three-phase current



	1 3	5 7	9 11	13 15	17 19
	2 4	6 8	10 12	14 16	18 20
0					
1		X X		X	
2	X X		X X		
0					
1		X X		X	
2	X X		X X		

a – Dahlander Switch

C14 A8M569 (Kraus & Naimer)

Rotary swtiching and reversing lock from 2 to 1 and 0 to 2, auxiliary contact for contactor control, requires zero position after mains failure