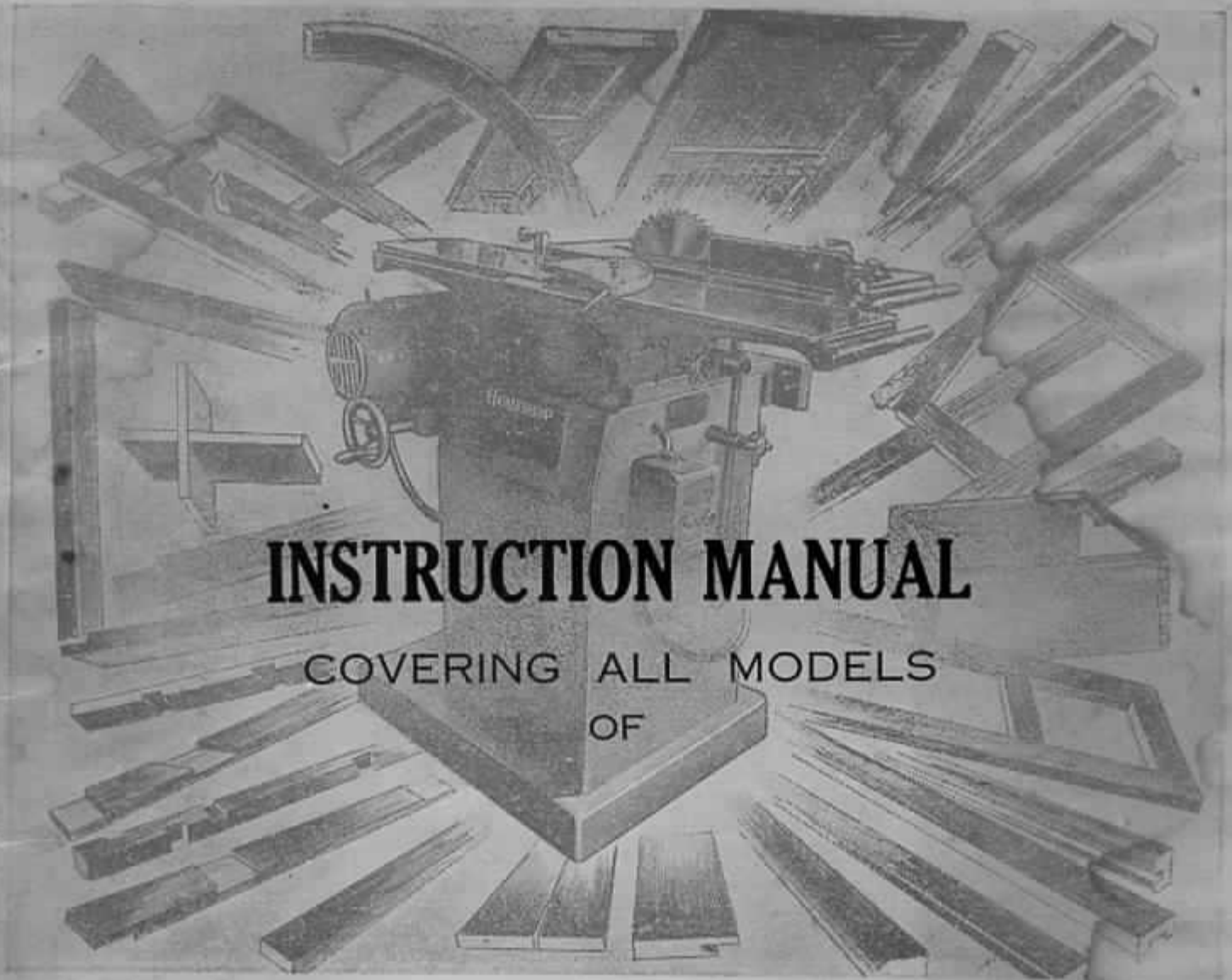


INSTRUCTION MANUAL

COVERING ALL MODELS
OF

THE BEHRENS
HOMESHOP

REG. DESIGN No 30083 PATENT No. 164958

THE UNIVERSAL MACHINE OF QUALITY

MADE IN AUSTRALIA
BY

H. A. BEHRENS LTD.

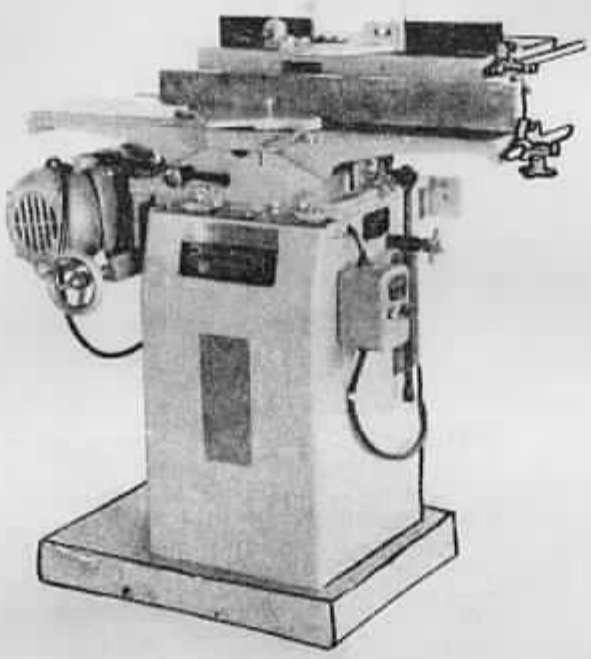
96 QUEEN ST., NORWOOD, SOUTH AUSTRALIA
PHONE: F 2147

I N S T R U C T I O N S

Covering The Full Range Of

H O M E S H O P

Models



MINOR SERIES	4½" & 6"
MAJOR SERIES	4½" & 6"
WORKMATE SERIES	4½" & 6"

With full instructions on the Installation, Operation, and Maintenance of all Models and their Attachments and Accessories so far developed. Also numerous hints and suggestions in the ways and means of doing many types of operations and projects.

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INTRODUCTION

A great deal of thought and work has been put into this book, and its purpose is to enable you, the user, to get the best possible results from your Homeshop.

We feel that it is better to touch briefly on as wide a range of work as possible rather than into minute detail with the most commonly used operations. In this way we feel we are doing the greatest good for the greatest number. With a book of this nature, it is impossible to cover everything in such a vast field as woodworking, but we think sufficient has been included to give you a good start and perhaps whet your appetite for more ambitious things.

A word of caution - do not rush in and attempt some very complicated job. Quietly and carefully get familiar with the operation of your Homeshop. Make one or two useful accessories for it, like an oil pad for the tables, a rack to hang the spanners and bannister brush for cleaning it down. Perhaps a cover to protect it when not in use. Take a pride in your workshop and its equipment and watch the quality of your work improve.

If you strike difficulty with some project, persevere; there is nothing more demoralising than dropping a project before completion, no greater thrill than completing a difficult assignment.

We have every confidence that no matter how far you go with your projects, your Homeshop will prove a faithful servant and accurately produce your requirements.

In the industrial field, the Homeshop has belied its name and is in use in every conceivable branch of the trade.

Read and digest this volume systematically and thoroughly to get the best out of your Homeshop.

The Manufacturers
H. A. BEHRENS LTD.

HOMESHOP MODELS

The Homeshop is available in two types or series. In each series there are two sizes, the 4½" Buzzer with 10" x 18" Saw Table, and 6" Buzzer with 22" x 13" Saw Table. It may be asked - Why not larger sizes? For two very good reasons - practicability of handling, and cost. Large universal units have to be so built that set-up does not involve too much lifting, and the machine is usually just as costly, and sometimes more so than individual units.

MAJOR SERIES: This type of Homeshop is the one by which it is best known, featuring asit does such unique features as built-in Vertical Spindle Moulder, Three-speed Drive, etc.

The Buzzer, by virtue of its function, has to be a self-contained unit. The saw table can be placed in two other positions besides that for sawing.

As expressed on the Operation Chart of the machines.....:

Position I : The sawing and planing position for doing all types of sawing operations and, together with Position II, can also be used for planing.

To change: clamp guide bars and back off the three holding screws under table. Lift off saw table, tilt buzzer slightly and hold by locking star wheel on tilt bar. Unscrew saw spindle.

Position II : The boring and sanding position for doing all types of hole boring, slot mortising, disc sanding etc. Changing over is similar to Position I, but the alternative row of guide holes is now being used, and saw table is reversed 180° from Position I.

Position III: The moulding position used for all types of moulding and operations such as dovetailing, bob sanding, etc. The rise and fall unit is removed from its position in I and II and after tilting buzzer to vertical, the unit is bolted to bottom of buzzer base. Table, is in same relative position as for sawing.

HOMESHOP MODELS

(CONTINUED)

MINOR SERIES: In an attempt to give customers a low-cost unit without sacrifice of quality, we have produced the Minor. Parts used are to the same high standard as the Major series, many of them being interchangeable, the considerable reduction in price being achieved by leaving off all non-essentials.

The Minor is basically a 4½" or 6" Buzzer, a 10" rise and fall table Saw Bench and a Dowel Borer or Slot Mortiser, all combined in a simple easily-convertible form.

To set up the saw, the spindle with its saw blade is screwed onto the buzzer head and tightened. The long guides of saw table are placed in their holes, making sure that the fence bar is towards working end of machine and table is set to required height.

To set up for boring or mortising, the short guides are placed in the guide holes andtable is lowered into position. The chuck is then screwed on and the required bit fitted and locked with the two grub screws.

The standard hand-operated rise and fall of the Minor can be supplemented by a simple type of elevating screw and wheel at moderate cost.

For low cost, simple operation, quick changeover and low maintenance, there is nothing to equal a Homeshop Minor.

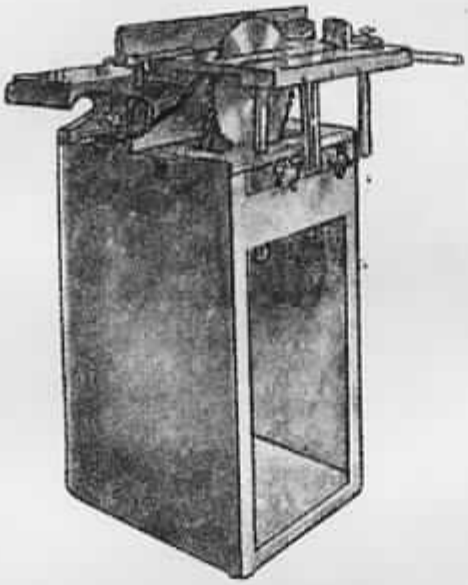
-----oOo-----

If you find variations to the foregoing descriptions when you take delivery of your machine, it is because of our ceaseless striving to produce a better machine at better value. As a result, your Homeshop is the most advanced design of universal woodworking machine available anywhere.

Setting Up

HOMESHOP

Minor Series



ABOVE LEFT: The Homeshop Minor, set up for planing and/or sawing. The saw on its spindle is screwed onto the end of buzzer cutter head. The long bars under the saw table are inserted in the holes in stand top and table clamped at the desired height.

Planing is entirely independent of saw and has the normal buzzer adjustments.

ABOVE RIGHT: The Homeshop Minor, set up for planing and/or boring, or slot mortising. The short bars under the saw table are inserted in the holes in stand top and the table let down to bottom position. The chuck with the desired bit inserted, is then screwed onto the end of buzzer head and table brought up to the required height.

By installation of the latest machine tools in a modern well-lit factory building, we have been able to produce a high-grade finish at a very competitive price.

In your Behrens Homeshop you see the culmination of some 23 years of using, developing and designing woodworking machinery.

We want you to get satisfaction from your Homeshop and offer you After-Sales Service of a high order.

Nothing in this world is perfect, but in your Homeshop you will find an honest attempt to attain that goal whilst still trying to keep within the reach of your pocket. With something approaching 4,000 Homeshops in use all over Australia, in New Guinea and a steadily-increasing number in overseas countries, this famous little unit, like Dale Carnegie, has learned to "Win Friends and Influence People."

THE NEW WORKMATE SERIES

In response to customer demand we have recently replaced the Minor series with an improved version which we have named the Workmate.

The main differences are as follow:

The stand has been improved in design.

The sawing and boring operations have an inbuilt precision rise and fall, similar to the Major series.

The fences for saw and buzzer are separate and the same as Major series.

The greatest advance has been a new, large saw table with a separate section which tilts up to allow the main outer part to be brought below spindle level for boring without removal of the table from the machine.

The operation of the Workmate buzzer is the same as for the Major series.

To Set Up The CirCular Saw:

Loosen clamp under front edge of table where two sections join.
Raise the inner section of table on its pivot and lock in the UP position. Screw saw spindle onto end of buzzer head and lower the inner section of table. Saw blade should pass through slot in this inner section.

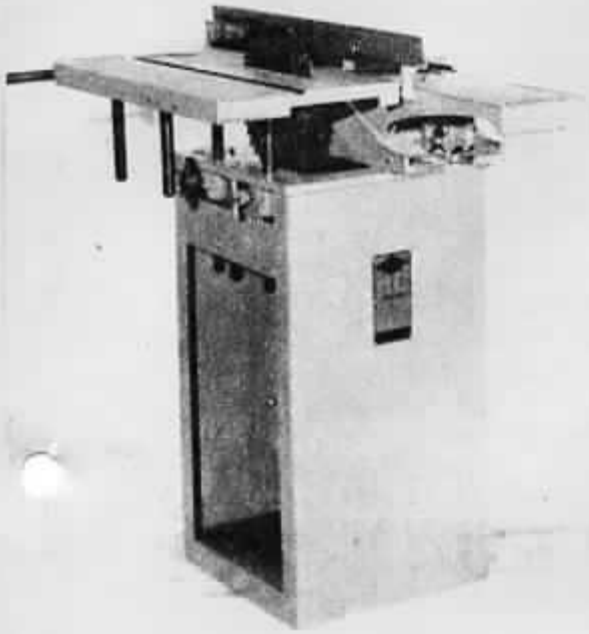
Saw is now ready for adjustment to suit the job in hand. If wide work is being cut, it may be necessary to remove the buzzer fence and lock the guard by screwing its knurled knob into place in the buzzer table.

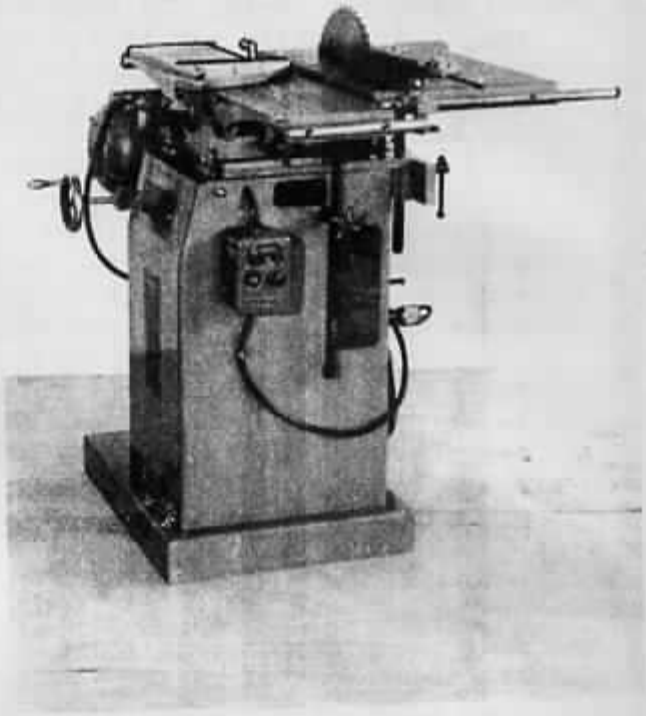
To Set Up The Boring And Slot Mortising Chuck:

Raise inner section of table as before, remove saw spindle and replace with the chuck supplied. This has a ½" diameter hole for the bits which are secured in place by the two grub screws. Shanks of bits should have a flat on them for grub screws to "bite" onto.

With inner section left in the raised position, simply lower the table to the required height and insert the desired drill or bit into the chuck.

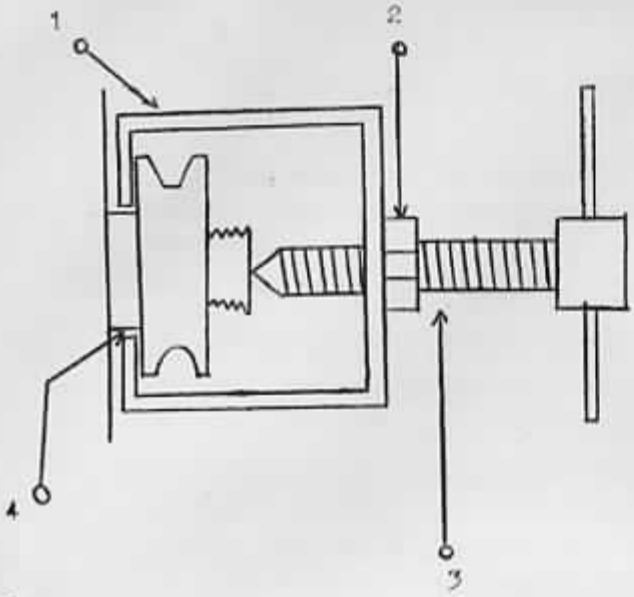
This design is probably the simplest and easiest to operate of any combination yet offered. Whilst it has not the great versatility of the Major series, it does cover the fundamental operations of wood machining and the majority of Homeshop attachments can be used. Obviously such things as the dovetailing attachment requiring a vertical spindle are not applicable and the thicknesser would require special fittings which will be available in due course. At the time of this printing the Workmate is a new model andthe Minor series were never intended for such features as thicknessing.





ABOVE LEFT is the Homeshop Minor series, set up for sawing. Saw spindle with its blade has been screwed onto the end of buzzer head and saw table has been placed in position with the long bars in the guide holes and the fence at the front of the machine, i.e. at the same end as the main clamps and tolt control of buzzer fence. In its standard form, Minor series saw tables are raised and lowered by hand, although an optional, simple screw-raising mechanism is available for raising the table up to its required height.

ABOVE RIGHT is the Homeshop Major series, set up for sawing. The buzzer cutterhead has been blocked off by locking the guard with the set screw or knurled knob provided and the fence has been removed. This is only essential when wide work is being done. With the rise and fall gear in place, as shown for Positions I & II on Operation Chart of machine and with saw spindle in place, the table is placed on the three bars in the inner row of sockets with fence facing the front of the machine (as for Minor) and the three set screws have been moderately tightened. Clamp screws are then loosened if height of table is needed to be varied.



A SIMPLE PULLEY PULLER

(1) A simple frame, bent up or welded, of approximately 1" - 1¼" x ¼" flat steel.

(2) A nut welded to the frame.

(3) A threaded spindle to suit nut (2) preferably Whitworth in a small unit such as this.

(4) The frame wants to fit well in behind the pulley.

SWITCH ADJUSTMENTS
(Not applicable to Minor)

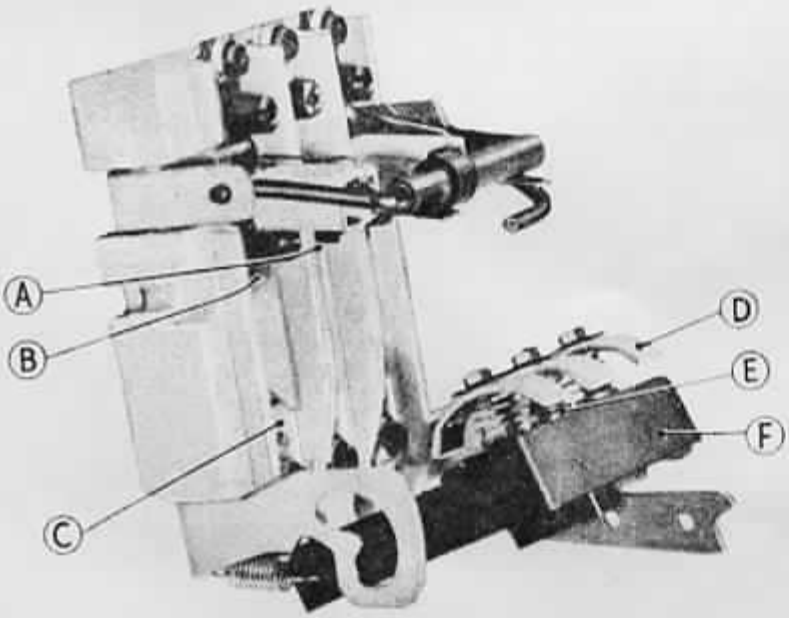
If the overload trips too readily, it can be caused by:

1. Set at lower position when the current consumption of motor requires the higher position.
2. Undue voltage drop in the power lines.
3. The bi-metal breaker strip or strips are set too closely to trip bar.
4. Some fault in the motor.

OVERLOAD ADJUSTMENT

Each Starter is provided with adjustable heater settings varying from 1 to 1.3 approx. of its minimum rating. The starter is supplied with the trip catch in position "L" giving the min. rating and the max. rating can be obtained by adjusting the trip catch to position "H". Always ensure that adjusting screws have been tightened after adjustment.

INTERIOR SHOWING SPARES



SHORT CIRCUIT PROTECTION

Fuses of capacity not exceeding four times the maximum rating of the starter should be installed in the main lines to protect the thermal overload heaters against short circuit faults.

A. Top centre Fixed Contact	14645N1
B. Top outer Fixed Contact	14627N1
C. Bottom Fixed Contact ..	14628N1
D. Moving Contact	14631N1
E. Moving Contact Spring	14933N1
F. Moving Contact Carrier	14912N1

CHAPTER II

INSTALLATION, MAINTENANCE AND SAFETY HINTS

The precision-ground tables of your Homeshop are coated with a rust preventative. If you have collected your machine from the factory, it will be a lanoline type, removed with petrol or kerosene on a rag. If your Homeshop has been delivered by carrier or other means, it will have a special grease on the tables and other parts and this is removed in a similar manner after a preliminary wipe over with a dry rag.

Overseas shipments of the Homeshop, besides being boxed, will have a more liberal and widespread application of grease, particularly when going to or through Tropical areas.

Since the tables of a woodworking machine are the prime factors in accuracy, the better the method of finishing, the better the accuracy. A precision-ground finish is the best of all as, apart from its handsome appearance, it reduces the force necessary to push timber over the table, and the force needed is more even. The bigger the work the more important this becomes.

If destined for Australian use all models except the Minor, have approximately 15ft. of flex and a three-pin flat plug top for single-phase or four-pin 407W Rowco plug top for three-phase, unless otherwise specified.

Most machinery these days is powered by electric motors, and provided ordinary common sense is used it is the safest, cheapest and most reliable source of power.

N.B. Where a three-phase motor is fitted, before starting for the first time, remove belt to check direction of motor. This is important as there is no telling direction of rotation otherwise and damage can result by running machine in the wrong direction with saw spindle in place. To alter direction of rotation change over any <u>two</u> of the three live leads at any terminal point. DO NOT move the green earth wire.

With single-phase, direction of rotation can be determined at the factory.

The reel of fuse wire attached to front of stand is there because many domestic fuse boxes have fuse wire just too light to take the starting current of single-phase motors.

One of the commonest troubles encountered by users of the more powerful types of single-phase motor, as installed in the Homeshop, is voltage drop. Leaving out areas where this is in the electricity mains, the usual cause of the trouble is inadequate wiring. If you cannot plug the lead supplied direct into a power plug, do not rush to the nearest electrical shop and buy more flex.

Firstly, the usual flex is only suitable for vacuum cleaners, electric drills and the like; secondly, a stranded cable is less expensive in proportion and for some reason is less prone to voltage drop.

If you plug your Homeshop into a long flexible lead you will find your motor lacks power, tends to run hot, and is slow to reach working speed. You also run the risk of burning out the starting windings. Always use wiring with a minimum rating of 15 amps., and for the 1½-HP motor, even heavier.

The Homeshop need not be bolted down, but should have a reasonably level surface in the one plane.

The illustrations prior to the appropriate chapter should indicate clearly enough where the various parts go and their various functions.

To retain that bright lustrous finish on the tables, they should be given a wipe over with an oil-soaked pad after the day's work. Whilst all operators do not do this, you will find it worthwhile. Where practicable, parts are Cadmium Plated or Blued, the latter needing a light film of oil to help repel rust.

The main bearings of cutterhead and motor are precision ball-races and in the motor can be disregarded for long periods. The manufacturers usually speak in terms of five years, but it is preferable to have them checked by a competent electrical mechanic, due to the electrical parts that might be disturbed during inspection.

The cutterhead bearings should be inspected every 2,000 hours of operation, or annually, usually the latter. To do this, remove lead in or front buzzer (see later this chapter) and unscrew cap on the outside of bearing housing at rebating end of cutterhead.

The other end is checked by removing the pulley. Loosen the grub screw in pulley boss and preferably extract with a pulley puller. If one is not available, and it is impracticable to make a simple version as per sketch, the pulley can often be removed with a double lever action of two large screw drivers or similar. However, there is usually some garage or similar workshop within reach where the pulley can be extracted.

If the bearings have sufficient grease then replace caps. Never remove old grease or clean bearings unless there is obvious contamination with detectable foreign matter or the grease has caked hard like soap. If it just looks black but there is no sign of grit then it can be left. The more often that new grease is added to a bearing the sooner it seems to show signs of excess wear.

When you do have to clean bearings, never use kerosene, always petrol or cleaning fluid.

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The other moving parts and threaded spindles of your Homeshop only need a light application of thin oil. Too much and too heavy a lubricant only attracts wood dust and rpomotes gumming up. Never use undue force in working any part, check first.

If fence brackets are unduly loose or get too tight, they may be closed or opened by clamping or spreading within reasonable limits as they are made of a fairly ductile alloy. Never use anything but your hand to tighten or loosen a star wheel.

It cannot be stressed enough the importance of S-A-F-E-T-Y. Always remember that any machine tool is only as good as the cutting tools in it. Sharp cutting tools are safer than dull ones - they cut smoothly and evenly. Safety First and always. A careful operator rarely gets hurt, but he follows a few fundamental rules:

(1) NEVER clean, oil, or adjust any machinery whilst it is running.
(2) NEVER get your hands close to moving parts, particularly cutters.
(3) NEVER try to machine too short a piece of timber held by hand.
(4) NEVER force a machine to cut too fast. The few seconds saved are more than lost in faulty work and poor finish.
(5) NEVER operate a machine on a badly uneven base or where you do not feel comfortable or not in full control.
(6) NEVER leave a machine connected up when not in use or you want to move it to another position.
(7) NEVER use an electrical appliance with a frayed lead, or without PROPERLY connected Earthwire.

Trouble shooting your O.J.5 overload switch

1. If motor is 1-HP or greater in single-phase, or is 2-HP 3-phase, then the little brass catch on bakelite arm should be up as high as it will go. Loosen the two small set screws, push up to end of movement and re-tighten.

2. Undue voltage drop is most commonly caused by unduly long runs of inadequate flex. Flex of any type should be avoided on principle over 15-20 ft. particularly in single-phase installations. Where there is only the standard flex being used and voltage drop is suspected, then the District Foreman of your Electricity Authority will have to be consulted.

Single-phase motors show the presence of voltage drop most commonly by a long gradual start with the centrifugal switch taking much longer to throw out. This throws excessive load on starting windings and could lead to a burn-out.

3. It occasionally happens that the bimetal breaker strip (one for single-phase, two and sometimes three for 3-phase) is too close to the trip bar for normal running. This is more common and

more critical in single-phase. By trial and error, a bit of judicious bending will cure the trouble. N.B. Always wait until strip is quite cold before bending and isolate the switch. A little bit at a time and try it. Never more than about ⅛" gap when contacts of switch are closed.

4. Any faults developing in the motor within 12 months of purchase should be investigated only by an authorised Service Agent of the motor manufacturers, otherwise you will void the warranty.

JOINTER SLIDES

It is advisable periodically to remove buzzer tables and clean the slides of any wood dust and chips. Before replacing, THINLY smear with a light grease. Adjust pressure on clamping nut so that table can be raised or lowered without undue effort but tight enough to hold table down firmly on its slides. The rear or lead out table should be kept somewhat tighter than the lead in table as it is not moved often; its height is critical for accurate jointing and any movement can be disconcerting.

TO REMOVE BUZZER TABLES

With Minors, one must reach underneath, but the Major range are more easily done by tilting buzzer to vertical or spindle moulder position. With saw table removed, or left in boring position, loosen clamping star wheel on buzzer tilt bar at front of stand. Tilt buzzer to vertical and reclamp. The two aircraft lock nuts, or in 4½" buzzer the two ring nuts, when removed, allow the wedge blocks to be withdrawn and table can then be taken off. Once nuts are loosened, table should be held with the other hand to prevent falling off.

When cleaning slides, make sure all foreign matter is removed from the top ends where it will sometimes pack against the bearing housing preventing the last bit of movement of table.

TO CHANGE SPEEDS

Make sure the knurled locking knob is free on motor bracket at end bearing near the control wheel. Wind motor in the direction needed until the appropriate groove is approximately opposite the groove in cutter head pulley. Loosen star wheel on tension locking bar. Push motor towards cutter head until belt is loose enough to be slipped into the groove wanted. Let weight of motor tension the belt then reclamp the tension bar. A final movement of the control wheel will then give perfect alignment.

With practice, this secondary adjustment is usually not necessary. To change speeds rapidly the motor can be pushed forward with the thigh and the belt changed with one hand whilst the other (right hand) is still on the control wheel. In this way speeds can be altered in a matter of seconds.

As a general guide to speeds, the harder the material being cut and the larger the diameter of the cutting tool and the wider the face of the cut, then the slower the speed. As the widest cuts are usually done on comparatively small diameter cutters, this all helps to keep the desirable speeds within a reasonable range. It will be found that practically every woodworking operation can be performed with the three sizes of pulley groove on the Homeshop Motor.

In the case of the Minors, where only one speed is available, this is a compromise which will cover planing, sawing (up to 10" saws) boring and mortising, with reasonable efficiency.

ENAMEL FINISH

Your Homeshop is carefully prepared and coated with primer-surfacer before the application of high-gloss synthetic enamel. An occasional rub over with Autobrite, Repo or similar polish will help retain its pristine gloss. Any paint or foreign matter should be removed immediately. Due to the nature of the metal, aluminium parts are difficult to make enamel finishes adhere with the same tenacity as ferrous metals, but if you are keen to keep these parts looking nice, a small tin of either of the colors used can be supplied from the factory at a nominal figure of 2/6d.

When parts get badly chipped they should be cleaned off and completely repainted, but odd scratches and chips can be touched up with a camel hair brush.

CHAPTER III

THE CIRCULAR SAW

For performing the fundamental operations in straightline sawing, the circular saw is the basic machine in any woodworking shop. It is not a difficult machine to operate - plain ripping and crosscutting come naturally to most people and other more involved jobs are easily learned.

The Homeshop has the most versatile saw bench practicable on a universal machine and will do practically any operation possible on a single-purpose saw. The latter has certain advantages of convenience, particularly if it has a tilting arbor but such units are often more expensive than a complete Homeshop.

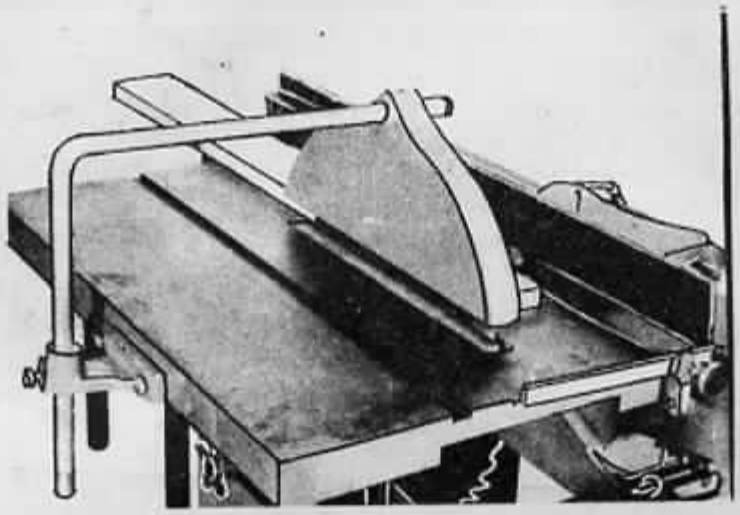
POWER AND SPEED: The size motor depends on a lot of factors, not least the operator. In our experience with several thousand operators, we have seen cases where one operator will manage quite successfully with a 12" saw and ½-HP motor where another will burn out a 1½-HP motor on a 10" machine.

As a general guide, ½-HP is a minimum for 8", ¾-HP for 10", 1-HP for 12", other factors being favorable, but if the cost of a more powerful motor is no objection and it is permissible to install it then there are obvious advantages. Whilst some handbooks will give a peripheral speed of 10,000 f.p.m., generally speaking it will be found that 7 - 8,000 f.p.m. is plenty fast enough. The Job Selector Chart on your machine will give you the best all-round guide.

GUARDS: The question of guards on woodworking machines is a contentious one. You will hear arguments all the way from any guard obstructs your view and movements and hence is a potential hazard, to the regulation that demands guards that prevent you getting your fingers anywhere near the cutting blades, no matter how hard you try. How one cuts timber is not mentioned and does not seem of any importance.

One of the simplest and most effective guards for a circular saw now frowned on by many authorities, pivots up to allow the work to pass under. The current Homeshop saw guard, which is optional equipment, is the next best. It keeps the sawdust out of your eyes, will stop pieces being thrown back at you and will protect you if you fall on the blade.

A very effective safety device is the splitter, or better still the riving knife. The accompanying illustration shows a unit available for your Homeshop. This holds the saw cut open so that the timber cannot rub on the saw and cause burning. It will also stop pieces being thrown back at the operator if kept properly adjusted.

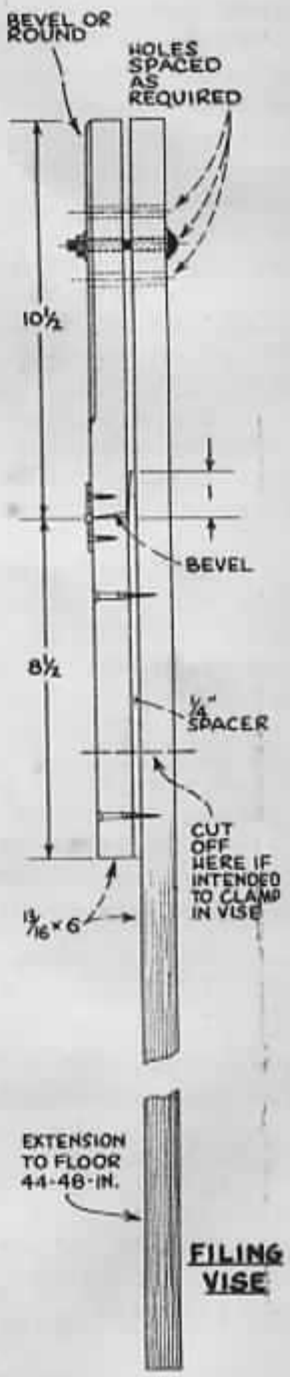


ABOVE

A saw guard in position on the Homeshop. This type fits all models. There are several variations, in an optimistic attempt to please all States' regulations.

RIGHT

A sketch of a simple filing vise for filing circular saw blades. With the Homeshop it is possible to do it in the machine, but this fixture makes it even easier. It is not essential to carry the extension to the floor. In fact, providing a good solid bench vise is available, the fixture can terminate at the hinge and still give satisfactory results.



FILING VISE

SAW BLADES AND CUTTERS: There are a variety ~~of blades~~ available for saw benches, the principal ones being as follow:

The rip saw for cutting parallel to the grain. This has the most universally used tooth and is supplied as standard equipment with your Homeshop, unless otherwise ordered. It will do any wood cutting operation but does not leave as good a finish as other types of teeth. However, when cutting with the grain this is the only tooth for speed, ease of cutting and avoidance of burning. The illustrations show the various types.

The cross-cut saw: It will be noted that there is no rake or hook on the teeth. They are more upright. This blade is suitable for all cross-cutting, i.e. at right angles to the grain.

The fine-tooth cross-cut: Its main purpose is for cutting plywood, wood fibre boards like Masonite, etc., but is also an excellent blade for small soft wood cross cutting. Excessive speed of cut, size of work or hardness of timber will cause burning as, with such small gullets, the teeth cannot carry the chips away fast enough.

The combination tooth: As the name suggests, it is a compromise and like all compromises, it sacrifices something in each type of operation. Suitable for work where there is a great variety of cutting done in small lots.

The fancy tooth combination: An attempt to overcome some of the shortcomings of the ordinary combination tooth, but not very popular with saw doctors.

The Wigo Patent saw: This is a German Patent, which is probably the best all-round saw yet developed. Its only objections are high initial cost and the need to have it done up on the special machine as designed by the Wigo Works if all its advantages are to be retained.

The skip tooth: This is a specialised form used exclusively for very hard timbers and would not normally come within the scope of the average Homeshop user.

The average saw blade is swage set and whilst there are hollow-ground saws available for giving a very smooth finish, they are prone to burning even when using the fancy combination tooth. The advantage of avoiding subsequent planing is usually not worth the extra trouble they can often cause.

SAW BLADE MAINTENANCE: It is usually not advisable, for the amateur at least, to attempt gulleting, setting or hammering, but touching up the teeth with a mill saw file to keep the blade keen is well worth the bit of trouble in mastering. To make the job easier, a filing vise as per accompanying sketch, can easily be made but is not essential. If you look after your saw blades properly, it is only a matter of a light touch with a file and this can be done in the machine.

FILING SAW BLADES: When touching up, use a fine mill cut file on the small angular face at the top of the tooth only. Do not stroke back and forth but towards the point of the tooth only, i.e., in the direction of the arrow. Only file enough to give a sharp edge, and if

any teeth show no signs of being blunt or dull, do not file them and they will gradually even up with successive sharpenings.

SAWS FOR GROOVING

SOLID GROOVING SAWS: Due to the tendency to burn, these should have teeth with set thereby limiting their practical size to about ¼" wide. Where large quantities of grooving are done in the one sizewithin the above range, the solid grooving saw blade has many advantages. It is used like any other saw blade except that the wood rubbing strip is removed by undoing the two holding bolts and the table is raised so that the saw only protrudes the desired amount. This is one operation where a long fence is desirable. Either make up a wood or metal extension for your saw fence and use a small G clamp at lead-out end of table or, use the buzzer fence on the saw table with the wide ground face flat on the table and what is normally the top edge as the fence face, clamping as with the extension.

DRUNK SAW AND COLLARS: This equipment has been popular amongst tradesmen in this country for many years but has several inherent disadvantages. It must be tested for fit every time it is set up, on a scrap piece of wood. Only the teeth at the extreme outermost edges of eccentricity do the bulk of the work thereby reducing speed and finish. In wide grooves the top is slightly curved, giving what is termed a "cove cut".

Admittedly under many conditions the above points are not important, and in unusual cases where odd-sized grooves are necessary the drunk saw has the advantage with its capacity for infinite variation, but at little if any increase in cost, for most work the ideal set-up is

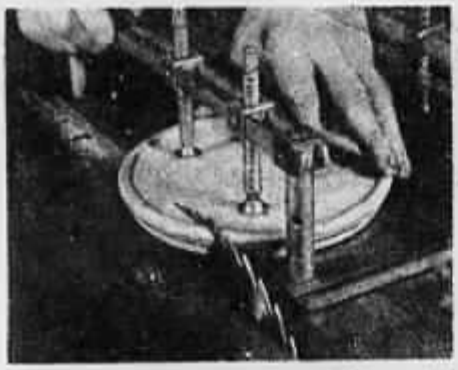
THE DADO SET: As the illustration shows, it consists of two heavy gauge saw blades and four chippers which are fitted between the saw blades. In most sets the two blades alone give 3/16 and an appropriate addition of chippers will give grooves up to ¼" or ⅜" wide in 1/16" rises. A free fit can be obtained by inserting a paper or shim metal washer between two cutting components.

MOULDING HEAD: With the exclusive Homeshop feature of a vertical spindle moulder, a moulding head on the saw spindle is rarely needed, but for moulds well in from the edge of wide boards it will be found necessary, and a moulding head to fit the Homeshop is illustrated on the page showing grooving saws.

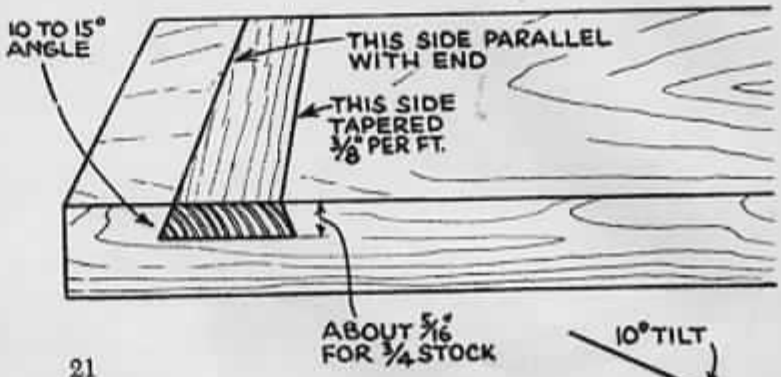
ABRASIVE CUTTING: It is possible to do such operations as cutting off tubing with abrasive cut-off wheels in the Homeshop, and even such material as glass, porcelain, plastics, hard rubber etc., but the importance of an adequate guard cannot be stressed enough because such wheels are always liable to fly to pieces. It is not a recommended practice for a woodworking saw bench but with care it can be done.

SOME POINTS ON OPERATION

It should hardly be necessary to stress the following points:



Sliding table jig is useful for holding odd shaped work.



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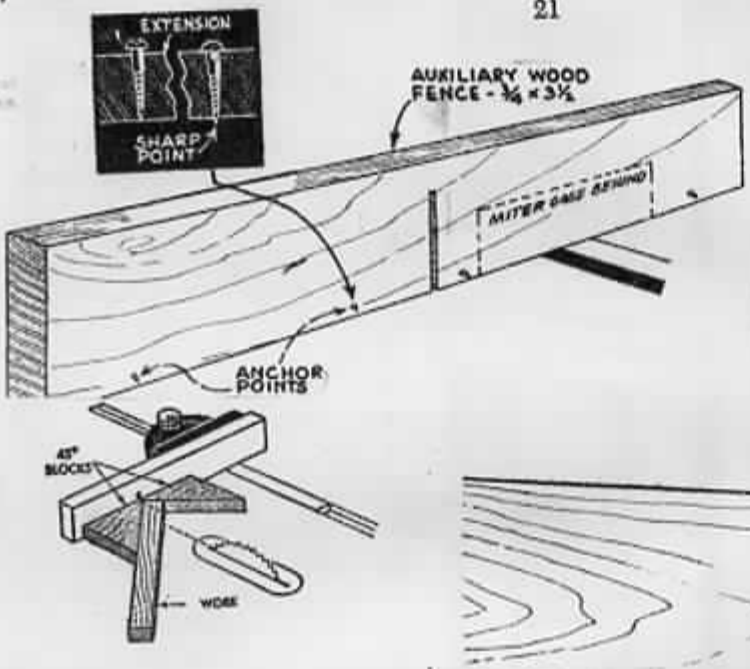

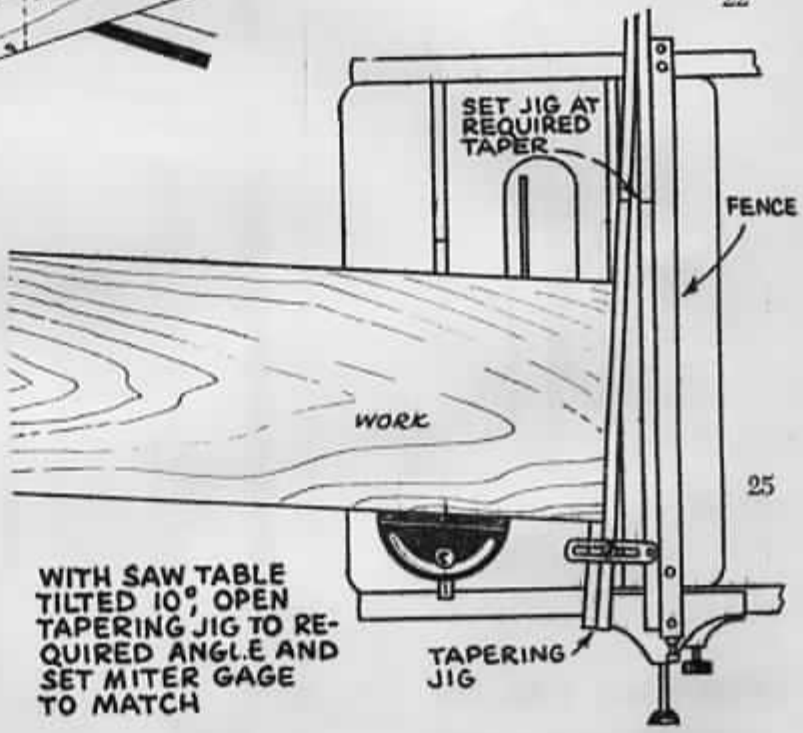

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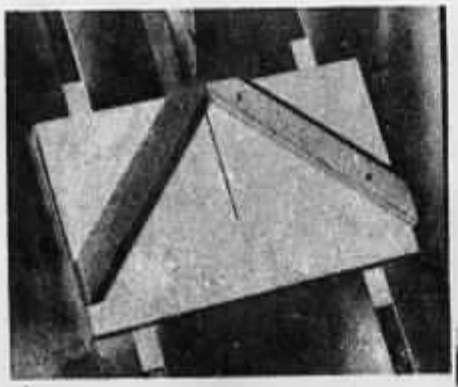
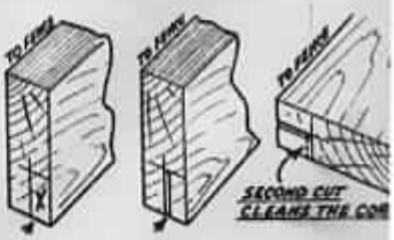
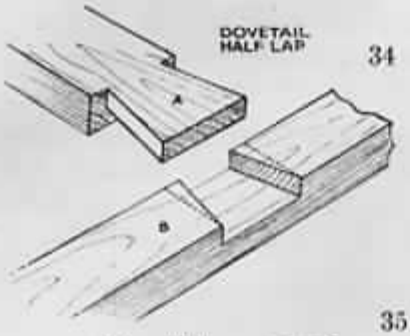
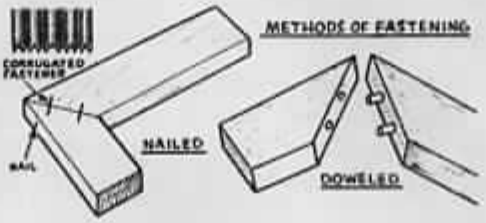
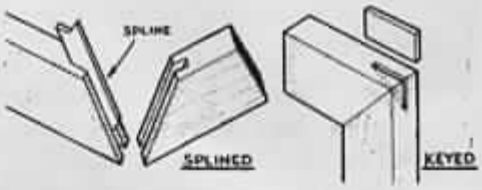


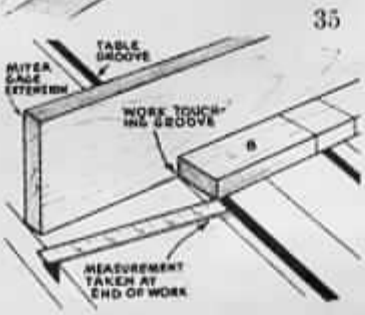
Drawing and photos above show two simple forms of mitering jigs. Sliding table, Fig. 4, is best since it is self-contained.

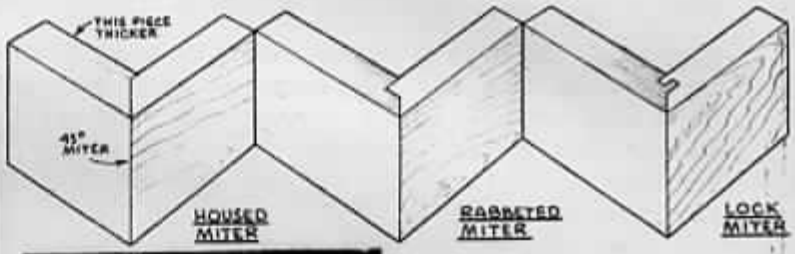



DOVETAIL HALF LAP
34
A
B


METHODS OF FASTENING
CORRUGATED FASTENER
NAIL
NAILED
DOWELED


SPLINE
SPLINED
KEYED

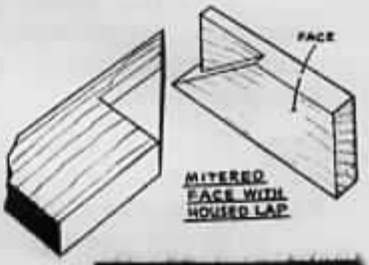

35
TABLE GROOVE
MITER GAGE EXTENSION
WORK TOUCHING GROOVE
B
MEASUREMENT TAKEN AT END OF WORK

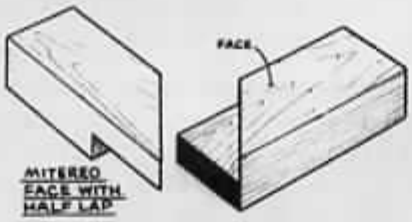

THIS PIECE THICKER
45° MITER
HOUSED MITER
RABBETED MITER
LOCK MITER

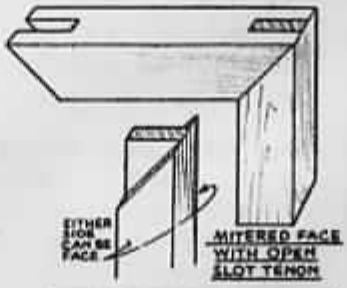
SAW CUTS
B

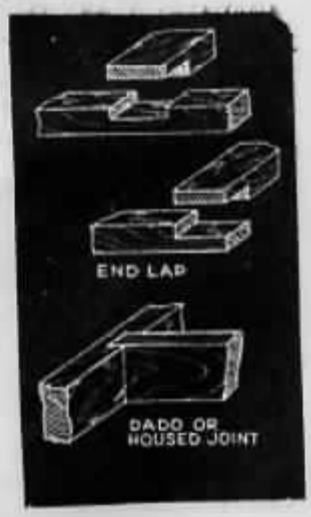
FACE
MITER FACE JOINTS

MITERED FACE WITH LAP AND OPEN SLOT TENON
FACE


FACE
MITERED FACE WITH HOUSED LAP

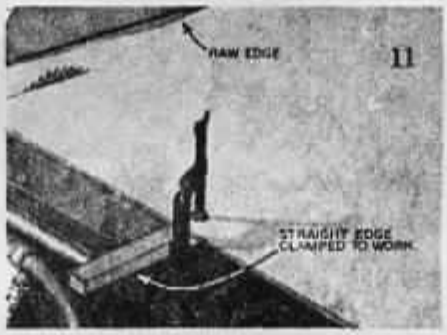

FACE
MITERED FACE WITH HALF LAP


EITHER SIDE CAN BE FACE
MITERED FACE WITH OPEN SLOT TENON


END LAP
DADO OR HOUSED JOINT

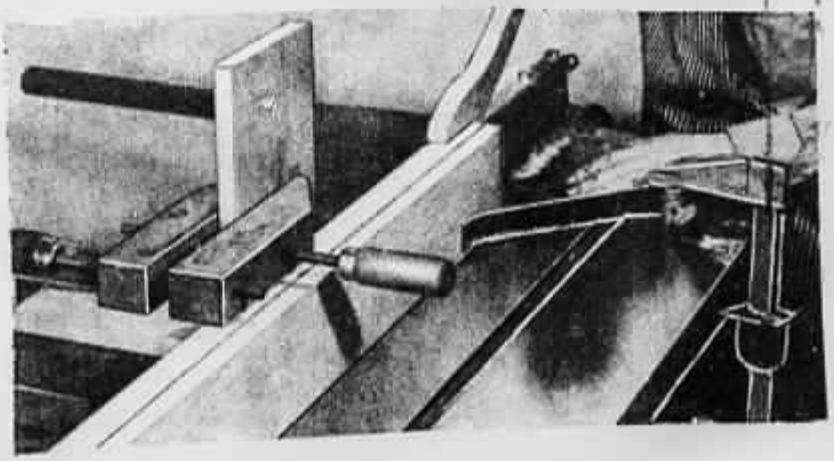
DADO
MORTISE
COGGED JOINT

Sliding table idea plus anchor points to hold the work makes a good set-up for ripping raw edges.

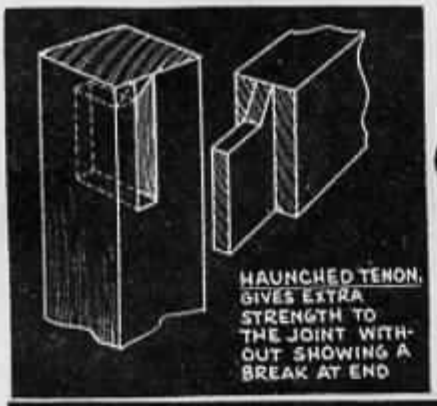


Another idea for ripping raw edges—straight edge clamped to work rides against edge of saw table.

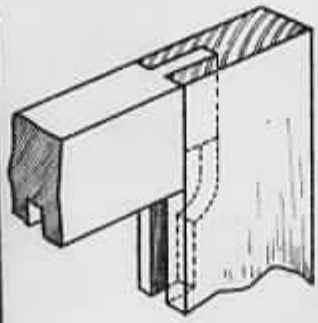
TAPER RIPPING



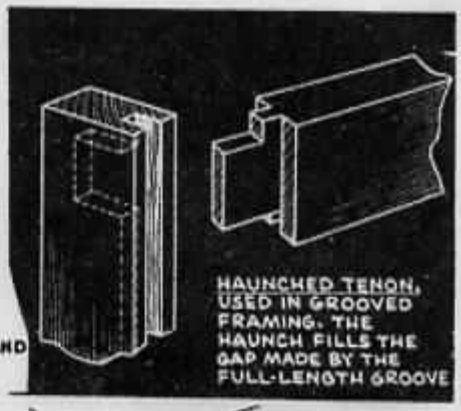
The Safe Way To Rip Narrow Stock.
(NOTE WELL THE PUSHING STICK).



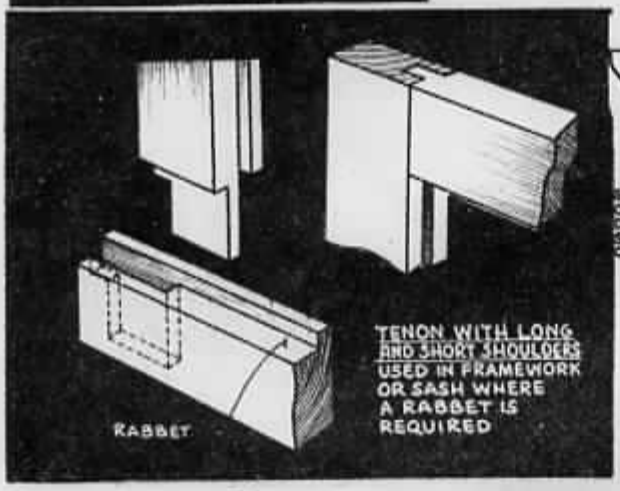
HAUNCHED TENON. GIVES EXTRA STRENGTH TO THE JOINT WITHOUT SHOWING A BREAK AT END



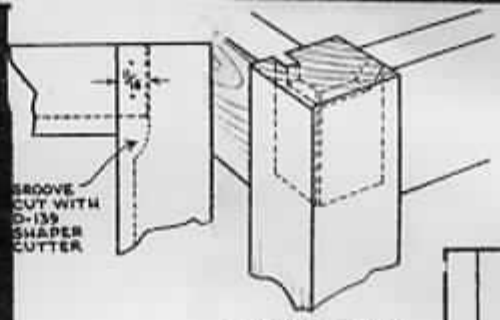
STUB TENON IN SLOT. NOT A TRUE MORTISE-TENON BUT EASILY MADE AND USEFUL FOR LIGHT FRAMING



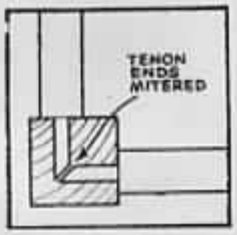
HAUNCHED TENON, USED IN GROOVED FRAMING. THE HAUNCH FILLS THE GAP MADE BY THE FULL-LENGTH GROOVE



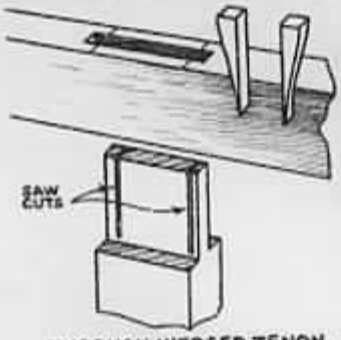
TENON WITH LONG AND SHORT SHOULDERS USED IN FRAMEWORK OR SASH WHERE A RABBET IS REQUIRED



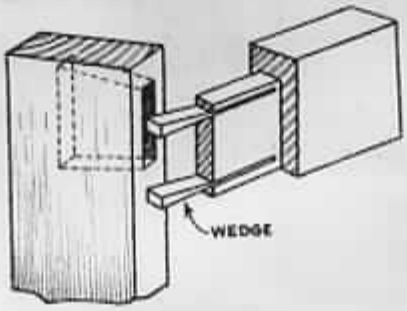
MITERED TENON, USED TO SECURE MAXIMUM LENGTH OF TENON



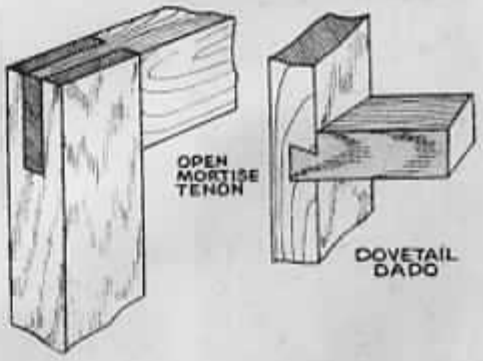
Mortise-and-Tenon . . . is the standby for cabinet joinery. The tenon portion of the joint is cut on the circular saw, while the mortised part is cut with the use of a mortising chisel on the drill press. The tenon is usually cut first.



THROUGH-WEDGED TENON, USEFUL WHERE ADDED STRENGTH IS REQUIRED

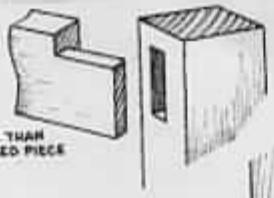


BLIND-WEDGED TENON, ADDED STRENGTH WHERE THROUGH TENON CANNOT BE USED

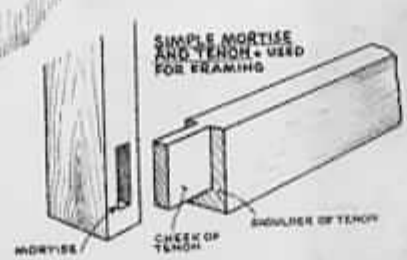


OPEN MORTISE TENON

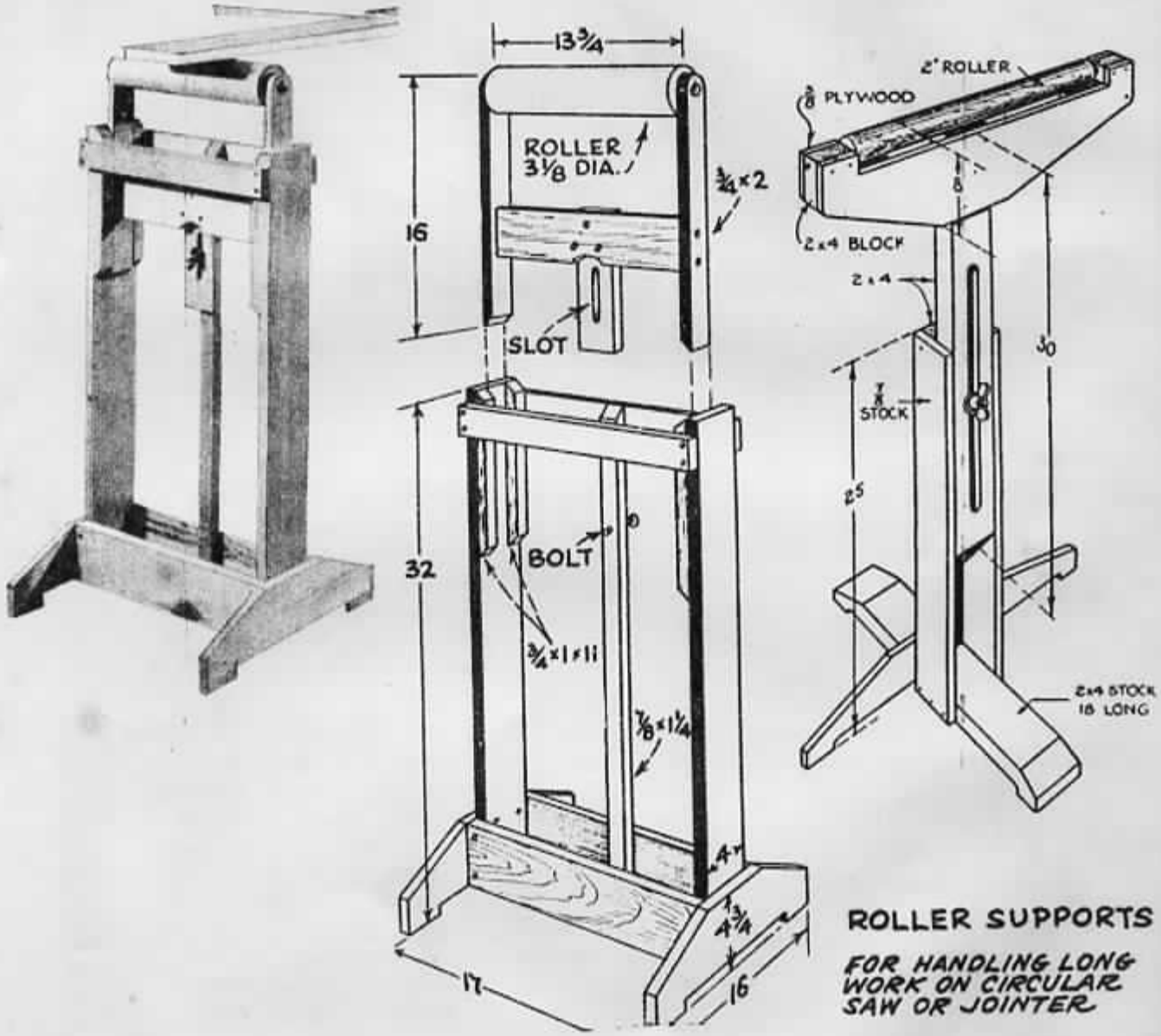
DOVETAIL DADO



BARE FACED TENON. HAS BUT ONE SHOULDER. USED WHEN TENONED PIECE IS THINNER THAN MORTISED PIECE



MIN. MAKE WIDER FOR CROSS CUT USE



ROLLER SUPPORTS

FOR HANDLING LONG WORK ON CIRCULAR SAW OR JOINTER

(1) ~~Half-rolled~~ sleeves or any ~~dangling clothing are always~~ dangerous

(2) Narrow stock should always be fed with a pushing stick.

(3) Long pieces should be supported on a roller stand or "tailed out" by an assistant.

(4) Standing directly behind the offcut is asking for a "smack in the tummy" to use the vernacular.

(5) In cross cutting the offcut or free piece should never be gauged by the rip fence. Use a stop on the mitre gauge fence for the piece held by your hands.

ROLLER SUPPORTS: The use of these is fairly obvious for supporting long work. They can be used for cross cutting as well as ripping with the roller parallel to the direction of travel. Being in contact only at the top of the roller there is very little friction. If the roller is made fairly long the one support as shown in the sketch will suffice for both side and end work.

CROSS CUTTING: The fundamental difference between cross cutting and ripping is that you are cutting wood fibres at right angles to their length. To give the best finish a cross cut saw blade should be used. In general terms plywood and material without grain like the wood fibre boards can be treated as cross cutting in all directions. The best results are got with a 10" fine tooth cross cut blade at middle speed unless other factors force the need for lower speed.

The illustrations give some useful hints on cross cutting.

SPECIAL OPERATIONS

Taper ripping: The jig illustrated in the accompanying sketch explains the principle. If a great variety of tapers are likely to be cut then the step block should be screwed to the guide board so that various step blocks can be made as required. This operation is most commonly used in producing taper legs. Where such a four-sided taper piece is needed then the step block has two steps. The first used for the first two adjacent cuts, the second used for the other two being twice the distance out from the guide board.

Dovetail Tapers: Wide pieces of solid timber are often fitted with dovetailed key pieces to prevent warping where an ordinary cleat is unsightly or impractical. The illustrations show the general idea and method. The idea of some small amount of taper is to give ease of driving and avoid the great accuracy needed for a neat fit over some length. Taper should be approximately ⅜" per foot.

All cross cutting operations are more conveniently worked and with greater safety if the mitre gauge is fitted with an auxiliary wood facing. There are two main types. One all on one side and supported by the roller stand preferably graduated on the top edge with a sliding clamp as shown, the other at least 1" - 1½" wider than the maximum cut of the saw, extending equally on both sides of the saw blade.

Extremely short work is ALWAYS dangerous to handle and extra precautions should be taken. Here again the illustrations show better than words.

RABBETING OR REBATING: Whilst rebates within its capacity are normally done on the jointer for reasons of convenience and a planed finish, there are occasions when the circular saw is used. It is done by making two ripping cuts of required depth to remove the corner.

Various techniques are used but as good a method as any is as follows:

The rebate is marked out and saw table and fence are adjusted to do the cut where the timber is on edge. This cut is done first with the blade a trifle shy of required depth. With timber laid flat the second cut is done with the saw blade set a trifle deeper than required, this then gives a clean corner.

MITRES: Whilst a fundamentally simple operation, there is probably more difficulty experienced with obtaining accurate mitre joints than any other single operation. Despite its name the Mitre Gauge is not the perfect answer for this work. If a lot of mitre cutting is done a rigid gauge as per sketch will pay good dividends in accurate joints.

A prime cause of inaccuracy in mitres is creep. To prevent this use sharpened screw points just showing through the fence face attached to the gauge. These can be adjusted to suit the work and the operator.

Where a long mitred edge is required, carefully set a protractor or bevel set to 45° and set the tilting fence from this. If the timber is wide a wooden extension piece of adequate width to support or another person "tailing out" is even more important than for plane ripping.

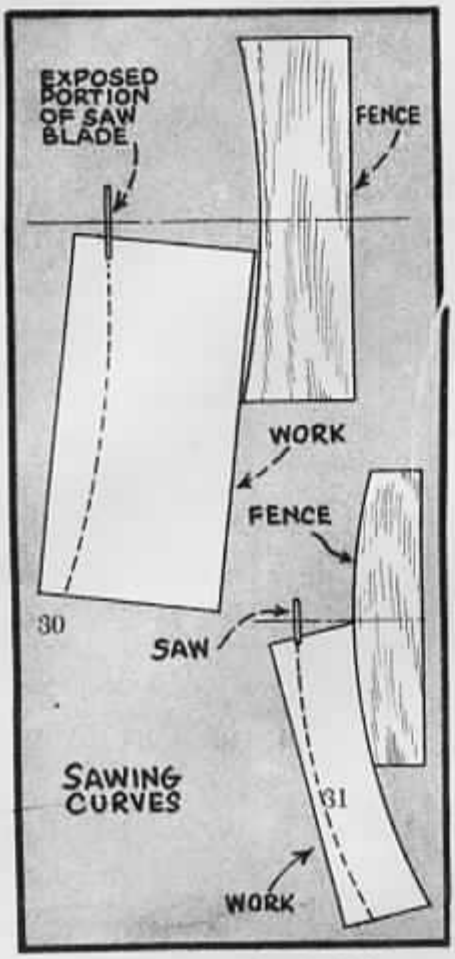
CUTTING CURVES: Whilst, as the initial remarks in the Chapter pointed out, the circular saw is primarily intended for straight cutting, it can be used for sweeps, i.e. curves of large radius.

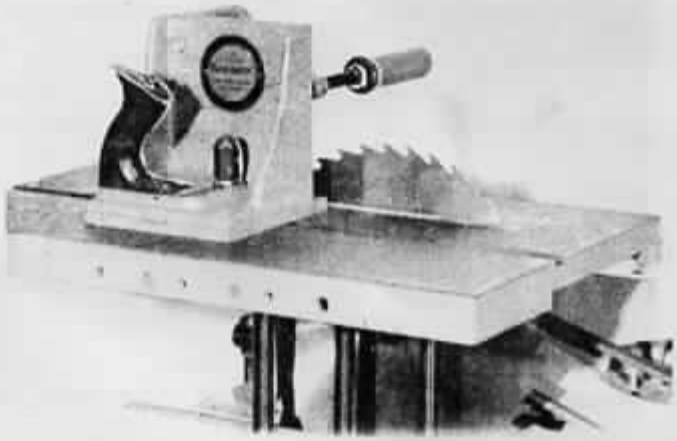
The initial cut must be done to a pencil line and then the offcut is used as a guide fence. Where the curve does not exceed about 1" in 2 feet, the circular saw will produce a smoother sweep than a bandsaw and do it much faster. Other special operations, such as cove cutting, spline grooves, saw cut mouldings, etc., are beyond the scope of this book which is intended to start you on the right track.

THE MOULDING HEAD

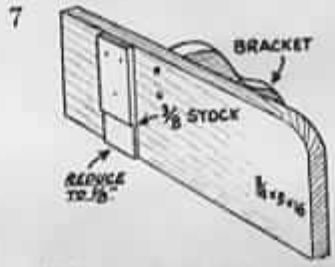
Whilst the Homeshop spindle moulder with its vertical spindle covers practically the whole range of moulding requirements, there are cases where a moulding head on the saw can be useful, such as work in the middle of a wide board.

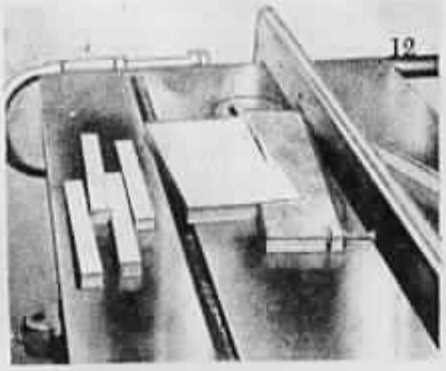
The moulding head attached to the saw spindle used in the spindle moulder can also be quite useful for certain work as the cutters are easily set up and are less expensive in many cases.



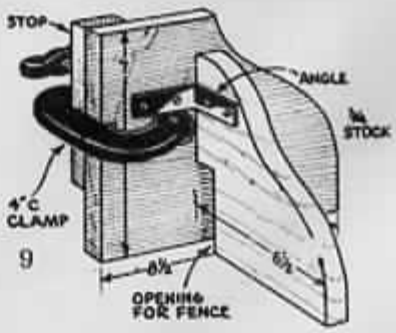


Slow curves not exceeding 1 inch in two feet can be cut on the circular saw by the method shown above.





Adjustable jig for cutting wedges.



With tenoning jigs as simple and easy-to-make as these, there is no sense risking your fingers attempting freehand work.

When using the moulding head in the saw it is preferable to make up two shaped blocks as inserts so that there is a minimum of gap. The sketch gives one method of doing this. Circular work can be done on the saw with the moulding head although there is not much advantage over the spindle moulder if you invest in the ring fence and the latter will do all sorts of irregular curves as well.

Small tenons can also be cut with straight knives in the moulding head but the width of one cut is limited so that unless the tenons are less than about 1½" long, it is doubtful as to whether there is any great saving in time.

THE DADO HEAD

Of the three tools available for grooving, trenching and similar work the dado head has the most to commend it.

The drunk or wobble saw is usually a little less expensive in the smaller sizes as used in the Homeshop but has several disadvantages. Size is attained by trial and error. Wide grooves have a curved top and only the two outermost teeth of the saw do most of the work, resulting in poorer finish and slower cutting.

The solid grooving saw is quite satisfactory for up to ¾" but is not practical beyond as it must then be hollow ground or alternatively side and face milling cutters used and then cost is prohibitive.

The dado set on the other hand minimises all the above faults and is to be recommended as the best all round tool in this field.

Besides grooving and trenching of the ordinary type it can also be used for making splined joints (2 grooves with a filler piece) rabbeting, tenoning, etc.

JIGS

TENONING: The Homeshop tenoning attachment is the ideal set-up for cutting tenons on the circular saw, but a practical home-made substitute can be made as shown in the sketch.

HOLD DOWNS: A screen door closer of the snap action type with two rollers makes a good hold down for thin material. It is fitted to an auxiliary wooden fence which is in turn attached to the Homeshop saw fence. This helps prevent lifting and bucking. Other uses will be found for this fitting as time goes on. It is also a handy gadget on the buzzer.

RIPPING IRREGULAR EDGES: Two methods are shown. The sliding table has several projecting pins, the work being pressed down onto them. The second method is particularly good for large pieces like sheets of plywood. The Homeshop is one of the few machines that you can do this on, as all the table edges are machined true.

WEDGE CUTTING: An adjustable jig is needed for cutting wedges or other tapered work. The illustration is more or less self-explanatory. The bolt is screwed in or out for adjustment and is locked with the two nuts. Needless to say the hole continues on into the wooden block to allow the bolt to screw right in if needed.

CHAPTER IV

THE JOINTER OR BUZZER

The buzzer, or to use its full title Overhand Planing Machine, as its primary function, is used for the planing and straightening of timber. With small buzzers, this is principally the edges of timber, hence the term jointer. As a Circular Saw is classified by the diameter of the blade, so a Buzzer is named by the length of the cutting blades. With the Homeshop, there are currently two sizes, 4½" and 6".

In order to do satisfactory work, the blades must of course be sharp and the rear or lead-out table must be exactly level with the uppermost point reached by the knives. The more evenly placed the knives, the better finish will result. Edges of blades must also be parallel with surface of rear table.

The easiest method of setting knives up is to hold lightly in their places and with a straight edge held flat on rear table and projecting over cutter head, by oscillating the head with each blade in turn at its uppermost section of travel, and testing at each side of the table, the blades are tapped down with a piece of end grain hardwood until at all points they just touch the straight edge. This sounds more complicated than it is.

The first once or twice will probably prove tedious, but practice makes perfect.

GRINDING KNIVES: This is an operation that it pays to get your saw doctor to do. The special steel used in your Homeshop Buzzer should be ground wet to avoid undue heat. Unless you have a special sliding holder you will not get them even enough and for the cost involved you will find it does not pay you.

When replacing knives, the rear edge or heel of the bevel should be about 1/16" from the surface of the cutterhead.

HONING KNIVES: It should be noted that blades do not have to be ground each time they become dull. By covering part of an oil stone with strong paper or something similar so as not to move the table surface, blades can be honed without removing either table, although it is probably simpler in the long run to remove the rear table and hold the oil stone as close as possible to the heel of the blade bevel without actually touching the cutterhead. It is such a simple matter to take the table off your Homeshop Buzzer that the first method is not worth the risk and extra care involved.

OPERATING THE BUZZER: The jointing of an edge is the simplest and most commonly performed operation on a small buzzer, and the illustrations show the correct procedure. The fence is square to the table, depth of cut ⅛" on the average less for a good straight narrow face, more for a warped, rougher, wider or out-of-square face.

FIG. 26 TAPERING WITH EXTENSION TABLE

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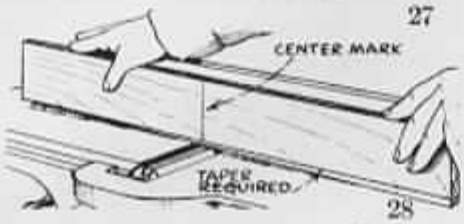

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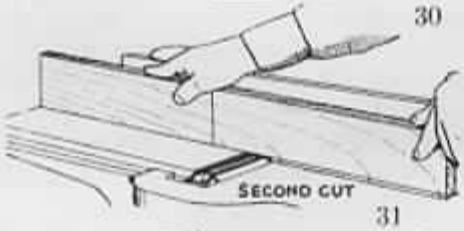

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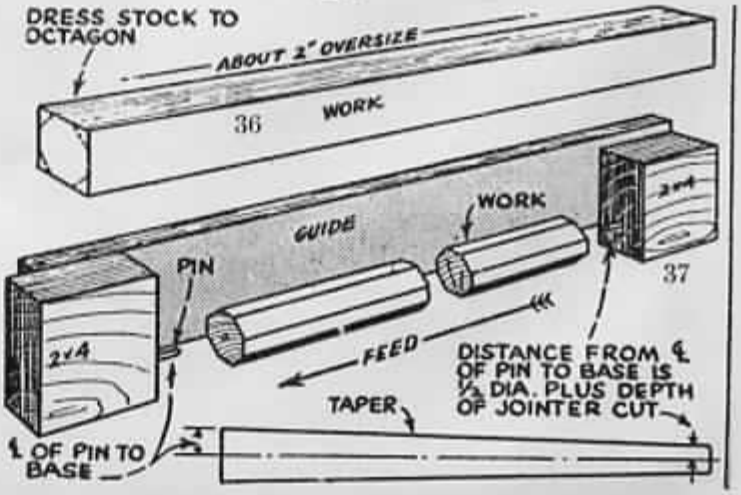

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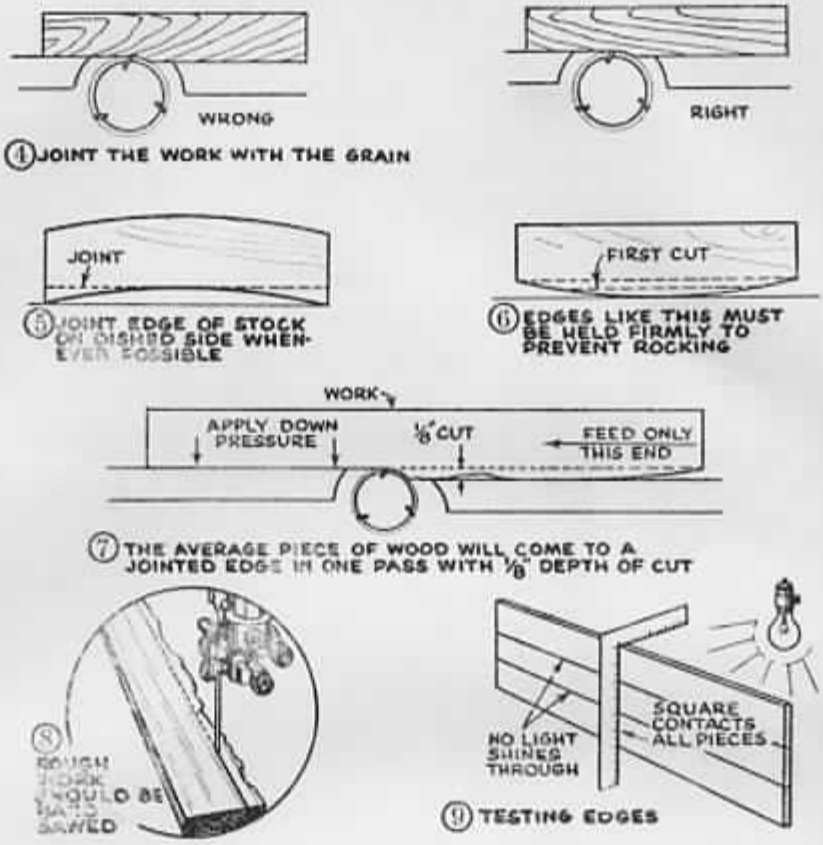


ints to observe in jointing various kinds of edges are shown in the diagram above.

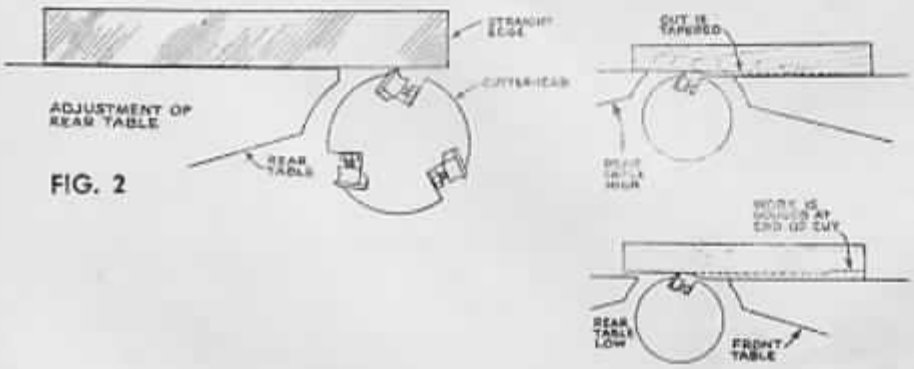
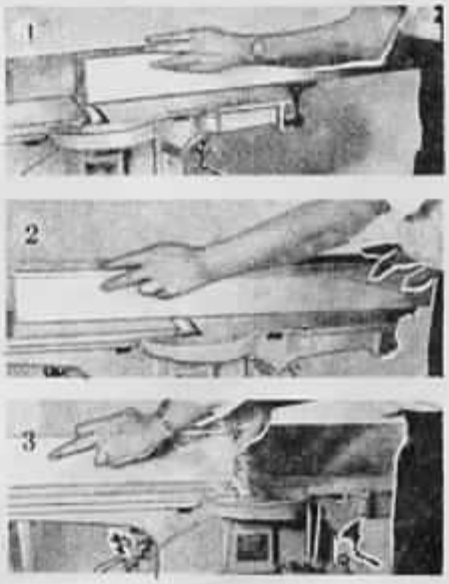


FIG. 2

EFFECT OF HIGH AND LOW REAR TABLE ON JOINTER CUTS



Above, successive stages in jointing an edge. The guard has been removed to show the cutting action.

The hand over the rear table presses the work down so that the newly-planed surface keeps perfect contact with the table. The hand over the lead-in table does the pushing without downward pressure. Both hands help in keeping the timber against the fence.

It is a good rule to avoid passing either hand directly over the knives. To do this, both hands are initially over the lead-in table, but as soon as the timber is resting solidly on the rear table, the left hand (usually) is lifted and placed on this portion of the wood. Similarly with the right hand.

Actually, with adequate sized work pieces and sharp knives and normal precautions, there is very little risk with passing the hands over the cutterhead, but if they are kept clear when working then you cannot get hurt whatever happens.

POINTS TO REMEMBER: To get a good finish, you must plane with the grain as with a hand plane.

When straightening timber, wherever possible, plane the concave face first. If this is not desirable, pick out the center of the convex curve. As there is no base line to start with, timber must be held steady with the ends of the curve about an equal distance above the table. Once the first cut is made, successive cuts become easier as the base line becomes longer, and so the operation reverts to an ordinary jointing process.

Where a second face is being planed square or to a certain angle to the first face, it is vital that the work piece be kept firmly pressed against the side of the fence. With the outer clamp on Homeshop buzzer fence, this makes the job much easier as the fence will not wander around as with most machines lacking this feature. If the edges of very wide pieces are being jointdd, it may be advisable to fasten an auxiliary high fence to the standard one. This is rarely necessary, so that the Homeshop has no holes provided, but they can easily be drilled in the position to suit the operator's own personal preference.

PLANING END GRAIN: There are various dodges used to avoid splintering the last few fibres of timber at the end of the cut, but probably the simplest is to hold the work with one hand and a back-up block is held firmly behind the work with the other. An alternative is to take a short cut on end, then reverse the piece and start from the other end. However, the cuts will not always match.

SURFACING: Planing a true working face on a piece of timber having warp or wind or both can be one of the most difficult buzzing operations.

Warped timber is curved across the grain, in wind is a twist throughout its length. Where the minimum loss of timber is desired, it is advisable to mark the work carefully. Sight it with two straight edges to determine the general contours of the surface. A

hold-down block is useful in these cases.

REBATING: Another common use for the Buzzer. The fence sets the width, and the amount the lead-in table is lowered, sets the depth. End rebates on narrow pieces should be done with a back-up block as with planing end grain, partly for the same reason and partly to steady the rate of cut and the work piece.

ROUND TENONS: Whilst not commonly used except in such special jobs as chair-making, the accompanying illustration will show an easy way of doing these if you so desire.

STOP REBATING AND CHAMFERING: Two of the occasions where both tables of the buzzer are lowered. A stop block is helpful to avoid kicking back. The length of the chamfer or rebate itself is restricted to slightly less than the overall length of both tables, otherwise when the solid part where they "stop" drops over the end, a deeper cut is taken, spoiling the work. Clamp a block on the end of each table to give the correct amount of travel. With the work against the starting block, lower the piece slowly but firmly onto the rotating cutterhead until it is flat on the tables and proceed with the cut until the other block is reached, then lift clear.

CHAPTER V

Consider the Homeshop in its standard form. The same principle applies for Minor and Major range.

In the case of Homeshop Minor, loosen the two clamping star wheels that hold the saw table rise and fall. Lift table up until guide bars come right out. Remove the saw spindle. It may require the use of two spanners applied to the flats on the saw spindle and buzzer pulley. It is a ¾ Whit. right-hand thread on all models.

When replacing the saw table turn it through 180° and fit the two shorter guide bars into the guide holes allowing the table to reach its lowest point. Then screw the chuck on with the drill required fitted. The table is then brought up to the desired height and clamped.

If you have purchased the screw rise and fall for the Minor, the locking screw up under the table is released before removing the table. This allows screwed spindle and wheel to remain in place, which you will find is the simplest procedure.

With the Homeshops in the Major range, to remove saw table release the three locking screws up under the table which hold the two plain and central screwed bars in position. This is a good method for screw rise and fall on Minor too. The table is then lifted off, the buzzer, tilted slightly and locked by the clamping star wheel, and saw spindle removed. Screw the chuck on and fit the desired bit. Replace table after turning through 180° in the set of holes close to the edge. Lock the three set screws but DO NOT USE UNDUE TENSION as it is not necessary and will eventually burr over the end and/or strain the bars. Lower the table well down and then the buzzer may be lowered into the horizontal position and relocked.

It should be noted that once the buzzer has tilted, any shavings should be wiped off the stand top by hand before returning to the horizontal, otherwise the buzzer will not seat properly.

The chuck normally supplied for Standard or Major is a three-jaw type ideal for dowelling but not suitable for slot mortising. The mortising chuck is optional on these two machines and is the chuck used on the Minors. This chuck can be used for dowelling provided ½" parallel shank drills are used but is not quite as convenient to set up as the three-jaw.

<u>DOWELLING</u>: Usually done at fairly high speed. In models having a speed change, top speed is usually best but certain jobs may require a lower speed due to hardness of timber or size of drill, or both. Quite good results can be obtained free handed although the lever-controlled mortising table to be described later in this chapter is undoubtedly the perfect answer.

The best drill to use is the ordinary spiral fluted metal or Cleveland drill with the point spurred as illustrated. This requires a minimum of pressure but does not "bite in" and the spurs ensure a smooth hole whilst the centre point locates positively.

When boring for dowels free hand, once the height has been fixed the position of dowel holes need only be located by a line drawn square across the face.

In boring end grain the drill will tend to follow the grain under certain circumstances. This can easily be overcome with the Homeshop by taking the fence bar off the end of the table and fitting it in the holes provided on the outer edge. This then puts the blade of the saw fence parallel with the dowelling drill so that it will act as both a guide and a gauge.

SLOT MORTISING: Good accurate mortises may be cut with your Homeshop in its standard form; all you need, as stated previously, is the mortising chuck and a suitable bit. The miller pattern cut freer sideways than any other types, although they are not as easy to push in, i.e. cutting end on as with a plain hole.

To cut a mortise, mark your timber with cross lines to give end limits, set your table to height, and go into depth a LITTLE SHORT of each end. Then take light cuts between the holes holding the face side firmly on the table.

You will find it is easier to get a good finish, if you limit your cutting to the direction in which the cutting edges of the drill are moving downwards towards the table face, although if you are working with soft timber, a sharp bit and not too large a one, you will find you can cut in both directions.

When you have finished to depth all along the mortise, bring the ends out to the marks. The reason for drilling short of the ends is that it is quite easy to overshoot the mark.

It is a matter of taste as to whether you round the edges of the tenons on say the sanding disc, or square out the ends of mortise with a chisel; either method produces good results. With the round ended mortise and tenon, wedge in the centre with a fairly wide saw cut to drive into.

THE LEVER-CONTROLLED MORTISING AND DOWELLING TABLE: This attachment makes an easy job child's play and lends itself to mass production.

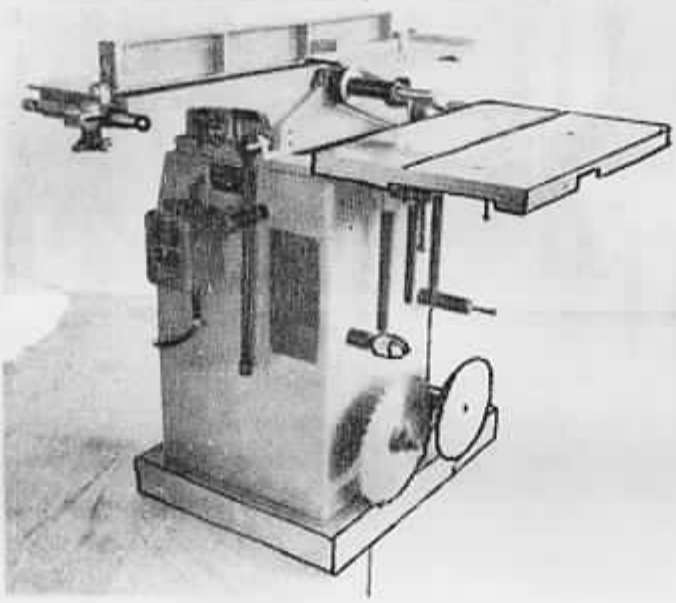
It consists of a table mounted on a double set of V slides, working at right angles to each other. These slides are connected to levers, enabling the table to move in towards the cutting bit and to and fro across its axis of rotation. The rise and fall gear of the Homeshop provides vertical adjustment.

There are two fences with adjustable clamps, either one of which may be removed and bolted at right angles for doing end grain work.

End stops are provided for cross travel and infeed.

To install on the Homeshop, remove the two plain rise and fall bars on the mahine and wind the screwed one well down. Fit the bars of the attachment into the holes and slide down until screwed spindle fits into the socket under the attachment. Tighten the locking screw moderately, and you are ready to adjust the table for height with the

SETTING UP THE BORER OR SLOT MORTISER ON THE HOMESHOP



(1) Remove saw table if machine has been used for other operations. Rise & Fall gear remains attached to pads on stand top.

(2) Saw table is replaced but turned through 180° to sawing position and fitted to the outer row of holes.

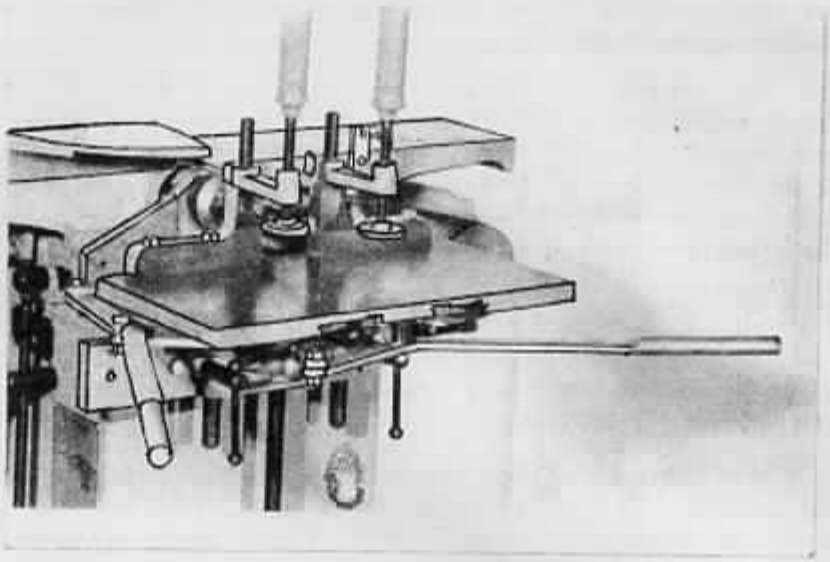
(3) Saw table is lowered to approximate desired height and buzzer clamped at a slight angle to facilitate attaching chuck, etc.

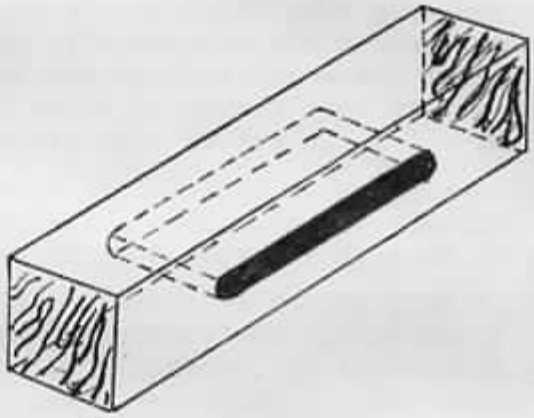
(4) Screw chuck or desired fitting onto spindle.

(5) Lower buzzer to horizontal position.

(6) Adjust height of table to suit job and clamp rise and fall bars.

(7) select desired speed.





ABOVE:

The Lever-Controlled Mortiser, in position on the Homeshop. It takes the place of the standard saw table when set up for boring and utilises standard chucks for the appropriate operation of dowelling or boring.

ABOVE RIGHT: A sample slot mortise. Either the ends of the tenon can be rounded to suit the mortise, or the ends of mortise may be squared out with a chisel.

control wheel.

The fundamental processes of dowelling and slot mortising are the same, but the operation is much faster and the result more uniform.

By the use of jigs and/or end rods, even the simplest marking out can be eliminated, although this may not always be desirable or practical.

The slides should be adjusted to take any slack out of them with the screws provided, but not so tightly as to be stiff. They should always have a thin film of light oil on the surfaces to prevent galling. Do not overtighten the clamps, you won't get any improved holding and once they are strained they never grip as well.

SOME POINTS ON DOWELLING: Hardwood dowels can vary in size due to worn dies, shrinkage of timber etc., so that you may find it advisable to use a drill a sixty-fourth above or below the nominal size on occasion. The dowel should fit the hole with an easy sliding feel. Too tight will squeeze all the glue out, too loose will allow the assembled piece to get out of true before the glue sets unless you are very careful, and quite often the glue does not fill the space all around the hole, resulting in a weakened joint.

Never try to squeeze too many dowels into a joint. Two dowels will hold a rail from twisting and it has to be a wide piece before it needs more. ⅜" is the most widely used as a dowel, is strictly an interior joint and most interior work has comparatively light cross sections. Some more fragile pieces may call for ¼" and heavier work will call for ½".

Do not despise the dowel; properly used in its right place, it is an excellent joint, but keep it inside or at least away from the weather, although with modern synthetic resin glues, even this admonition could be ignored.

The ends of dowels should be slightly rounded; the sanding disc will do this easily and quickly.

The edges of the holes should be lightly chamfered to give a ring of glue at the matingsurfaces of the timber. An adjustable countersink clamped to the dowel bit will act as both depth stop and chamfering tool.

Needless to say, it is essential for all faces and ends to be accurately squared and dowels should always be shorter than combined depths of the two holes by about 10%. After assembly, it is preferable to hold the workpiece with sash cramps until the glue sets.

THE DISC SANDER

This operation has certain definite applications and within its range, is a most useful tool.

It has come into disrepute amongst some users for two main reasons. They try to use it where it is not capable of doing satisfactory work, and they use it at too high a speed.

Where it is used on a combination unit with only one speed, there is no easy cure for burning. Avoid lingering over the job and replace abrasive paper as soon as it gets dull and tends to burn. With your Homeshop in the Major range, always use bottom speed.

Except for end grain edges the disc sander should never be used where the timber is to be varnished. It is not intended for sanding of large flat surfaces at any time. Edges and putting a draft on patterns for sand moulded castings, for rounding corners and the like, your disc sander will serve you well. You don't try and use a thicknesser for straightening or a circular saw for sharp curves, and you should not expect a bandsaw to do continuous straight ripping so why expect the disc sander to be a maid of all work?

To set up your Homeshop for disc sanding, proceed as for boring, but fit sanding disc instead of the chuck and put into bottom speed. To fix abrasive paper to disc, the most satisfactory way is to glue it on and by far the best and easiest adhesive so far developed is Behr Manning Disc Cement. Whilst directions are given on each tin, it will do no harm to repeat them.

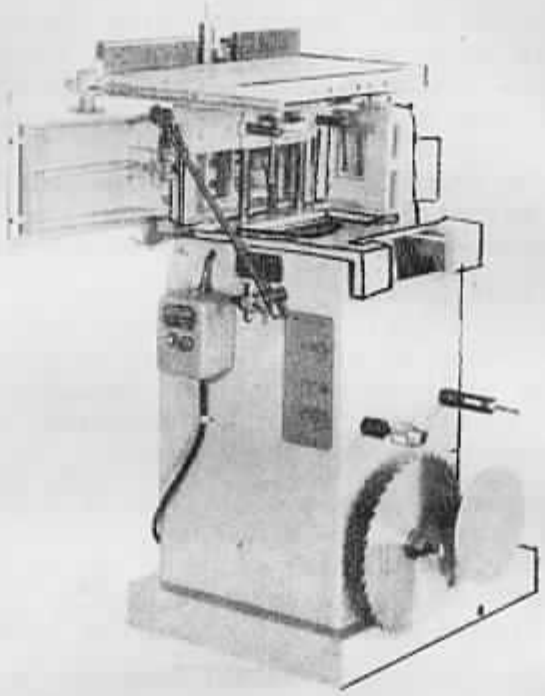
The inevitable and obvious caution of clean dry surfaces is stated. Apply disc cement thinly and evenly to both back up plate and abrasive disc (brush old hacksaw blade with teeth ground off or even a clean forefinger will do). Allow to dry until tacky, then press surfaces firmly together. Disc can be used immediately.

TO REPLACE DISCS: Prepare another abrasive disc as above, then carefully peel worn out disc away from back up plate and make bond as previously. Any cement in unwanted places can be removed with mineral turps.

You will find a 60-grit open coat Aluminium Oxide or Garnet about the best for general work. For fine finishing, go to a finer grit.

The sanding disc will be found to be a real Godsend for those awkward jobs like getting that last touch to a mitred beading or picture frame, a smooth square edge on end grain of boards, fitting a cupboard door that binds, cleaning up mortise and tenon joints, etc.

SETTING UP THE VERTICAL SPINDLE MOULDER ON THE HOMESHOP



(1) Speed desired (usually top speed) is preferably selected before tilting buzzer. It can be done afterwards, but not as conveniently.

(2) Saw table is removed and buzzer tilted to vertical position and clamped.

(3) Rise & Fall gear is removed by unscrewing the two holding set screws. It is then re-bolted to the bottom of buzzer base.

(4) Saw table is fitted to rise & fall base, as for sawing. This brings round hole into line with main spindle.

(5) The desired cutting device is screwed onto spindle.

(6) The fences are fitted, if needed, and then adjusted to suit the work.

CHAPTER VI

THE SPINDLE MOULDER

This unit can be likened to the metal worker's milling machine, in that it is used in the cutting of those shapes, which the other equipment generally used, will not produce.

The spindle moulder or shaper differs from most other woodworking machines in having a vertical spindle and easily-removed cutters, which are ground to the shape required.

A fundamental feature of a well-designed moulder is a removable top spindle or head. This greatly increases the versatility of the machine which can then be used for other things than just moulding.

The moulder on your Homeshop has all these features without any great number of extra parts being needed. To set up for moulding, remove saw table and any attachments that happen to be screwed onto the buzzer spindle. (Remove buzzer fence and lock the guard in position to keep the cutter head covered, with the set screw in the centre of the guard which screws down into the table.) Loosen buzzer, tilt clamping starwheel and tip the buzzer over through90° so that the cutter head is in a vertical position.

Take out the two set screws holding the rise and fall bracket and move the bracket up into position on the bottom of buzzer base, now in a vertical position. You will see a plain and a threaded hole at each end to take a steel dowel and a set screw respectively. If there is any difficulty in entering the dowels the extreme left-hand end one is the one to move with a light tap, as the right-hand and middle ones must be correct for the other position on the stand top.

When the rise and fall bracket has been bolted into place, the table may be placed in position and the locking set screws tightened onto the bars. Remove the clamping starwheel under saw fence and replace with the 1¼ x ⅜ set screw supplied, as the starwheel will sometimes foul the buzzer table when the spindle table is used in a low position.

Bolt the horseshoe fence onto the end of saw fence and start the set screw through slot in horseshoe fence into threaded hole in table.

Set up the blade or blades in the moulding head, preferably held in a vice. You will find careful rule measurement will be accurate enough for most purposes. Then screw moulding head onto spindle of machine and tighten moderately.

Set the fences to suit the work and you are ready to start. If the work piece is only having a portion of its face moulded then both fence faces are level and the depth of cut is set by the fence bracket at end of saw part of fence, the set screw in the slot of horseshoe fence being tightened to steady the whole assembly.

If the work is being moulded or shaped over its whole face then the two parts of the fence act like jointer tables and are

offset the depth of minimum stock removal, i.e. the shallowest point of the mould.

It should be stressed that in the moulder position, the timber is fed in from the motor end of table and blades must be set up accordingly.

MOULDING HEADS: There are a variety of these in use, the most popular type depending on what part of the world the work is being done and the type of work.

The open face, slotted or grooved collar or English type head is the most generally used in commercial work in this country. The sketches show the general construction and will be recognised by most people as having been seen in a joinery or cabinet shop at one time. This type is available for the Homeshop. It is optional as the French head, to be described later, is easier to set up and more versatile.

With the English head, care should be taken to see that both cutters are exactly the same width, otherwise the centre spindle will be distorted, causing excessive vibration. Knives can usually be set accurately enough by rule measurement, provided you use a good metal machinist's rule. It is easier to set up the knives in the head before installing on the Homeshop.

THE FRENCH HEAD: As shown in the sketches, it consists of a central spindle with a slot cut vertically through the centre and a set screw with lock nut screwing down from the top to lock the single blade. The blade may be single or double ended, but the latter will naturally give better results and is balanced.

SOLID FORGED CUTTERS: These are undoubtedly the safest and easier type to use but are very costly and not readily obtainable in this country. They can also be machined up from solid bars of tool steel.

INSERTED BLADE CUTTER HEAD: This can have two or more knives and is an attempt to gain the advantages of the solid cutters without their high cost, but like all compromises, it has its drawbacks.

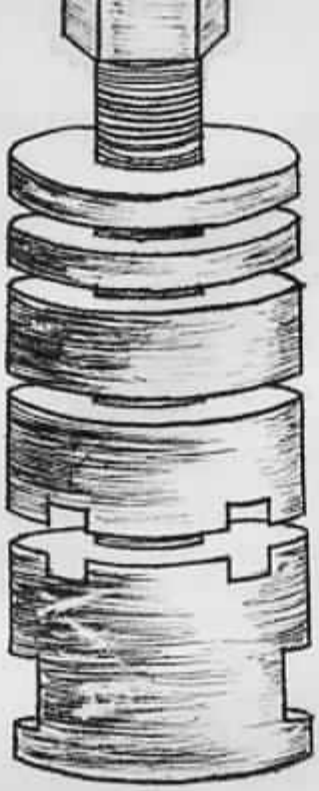
CUTTERS

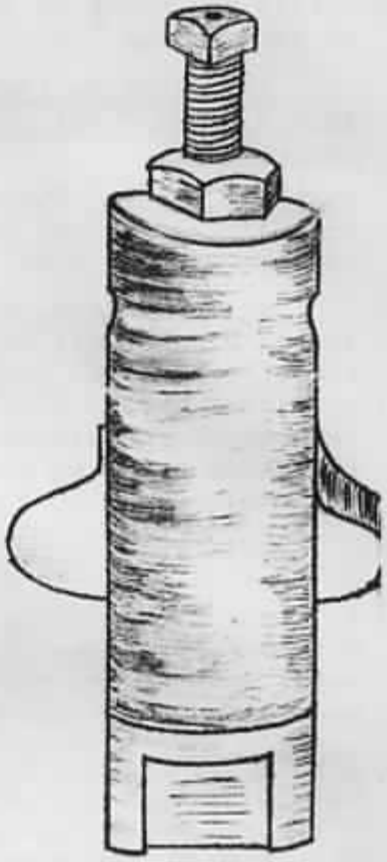
There are so many different shapes and variations of given shapes in use that it is impractical to go into all of them here.

In general terms, you must be guided by your own taste as to what shape to use for a given application, although there has been a general set of conventional moulds for a given job in the past. However, as the desire for being different and distinctive has grown, many of the rules have automatically been discarded.

If you desire to be as self-contained as possible by making at least some of your own cutters, this is practicable within limits.

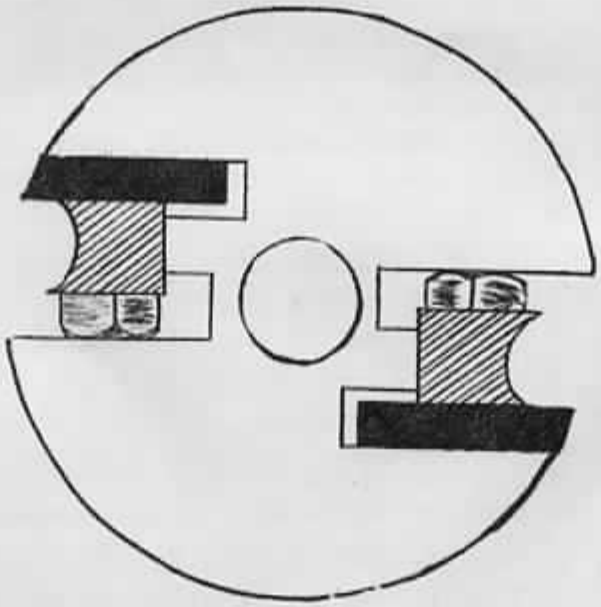
Tackle simple cutters for a start. Use inexpensive steel like Autoflex or similar for short run cutters and until you are sure of your technique. Use a template to get even operation of two cutting faces. Watch to relieve or back off all cutting edges.





ABOVE: The English-type Head with grooved collars.

RIGHT: The French Head, using a single blade.



The Moulding Head for circular saw. Can also be used on vertical spindle moulder.

All cutting edges should be honed to give a smooth finish.

Care and attention to detail will pay dividends. Most users can get along quite well with a comparatively few cutters, as apart from certain cases you can often get the desired result by running the work through several times using parts of different cutters.

Whilst all machine tools are only as good as the cutters in them, this particularly applies to a moulder so KEEP YOUR CUTTERS SHARP. It is much safer too. Also remember, if you keep your hands away from the cutters, you will not cut yourself.

The vertical spindle moulder is such a versatile machine that it is quite impractical to supply all the possible fence guide and jig set-ups that might be needed. Some of these are available as attachments for your Homeshop, the rest can be made up to suit your own requirements.

FOR STRAIGHT-LINE MOULDINGS

THE HIGH FENCE: Its main use is to steady wide timber in an upright position. Quite a simple gadget that can be made by any moderately ambitious Homeshop.

THE LONG FENCE: Another variation, but used to support long work. By the use of stop blocks where needed, it simplifies such jobs as fluting and reeding which are analogous to stop chamfering and stop rebating on the buzzer.

THE MITRE FENCE: A variation of the plain long fence. The angled face could be made adjustable with a little ingenuity, although the average user does not do enough of this type of work to warrant the trouble.

A SLIDING WORK HOLDER: This type of jig can be made up either incorporating the mitre gauge or as a completely separate unit. It slides in the mitre gauge groove. It is particularly useful for return moulds around the ends of narrow strips. This operation can also be done with the ring fence but for best results, needs a smooth guiding template. However, the sliding jig obviously is restricted to straight-line moulds.

There are other special types of fences and jigs that can be made to suit special work and their variety is only limited by the ingenuity of the operator. An instance of this is the tunnel jig for moulding beading from offcuts as sketched.

CONTOUR MOULDING

The three main methods of cutting a mould on a curved edge are as follows:

THE RING FENCE: This is probably the easier and safest to operate and is available in a simple, easily adjusted form for your Homeshop. It consists of an angle bracket with a slot for adjustment in its vertical face and a ring with one side extended into a bulge with another slot for horizontal adjustment. The depth of cut is regulated by the depth of knife protruding beyond the ring. The cutters may be either above or below the ring, but the ring should

be kept below, near or on the table whenever possible, for the sake of rigidity.

Where the whole face of the timber is being cut, it is necessary to have the ring on the table and mount the work on a plywood or similar template.

BALL-BEARING COLLARS: In this method, the work is held against one of the collars of an English-type head which incorporates a ball-bearing and the operation is similar to a ring fence. It is more expensive than the ring fence and not quite as versatile, but probably better suited to mass production techniques. Not so far available for the Homeshop, although anyone keen enough could have one made up by any competent machinist.

"OFF THE COLLARS": This is simply working off the ordinary rotating collars and has an element of risk.

It is not recommended for amateurs, although the chance of kicking can be minimised by using a starting pin or block. This method is quite popular in the United States of America, but we would suggest you spend the small sum involved and get a ring fence if you wish to do contour moulds.

HOLD DOWNS

Here again, there is a wide diversity of opinion as to types and when and if to use them. They are not supplied with the Homeshop, as a very satisfactory type can be made by the operator himself and so save this expense.

As shown in the sketch, a piece of hardwood has an end cut square to the face but at an angle to the edges. A series of fairly wide saw cuts are then run down to leave a series of springy fingers.

By fitting one each side on the high fence they can be used to hold down vertically as well as horizontally.

There are also steel hold-downs with and without rollers, but some operators dislike these, particularly on small work where they are most needed.

The circular saw tenoning attachment can be put to many uses on the spindle moulder. It will probably need a backing block in some cases to bring the work within reach of the cutters.

Another very useful holding device already mentioned consists of a small table with a guide fixed to its lower surface to slide in the mitre gauge groove. On top is mounted a universal type of clamp. This is particularly useful for end-grain work.

Then there are a whole series of special-purpose jigs each made for a special purpose.

THE FLUTING JIG: has centers like a woodlathe, the headstock having a dividing plate, or alternatively a drum so that the flutes can be evenly spaced. The centers can be mounted on a shaped base. This base will then control the depth of shape of the cut lengthwise when held against the collars or the ring fence.

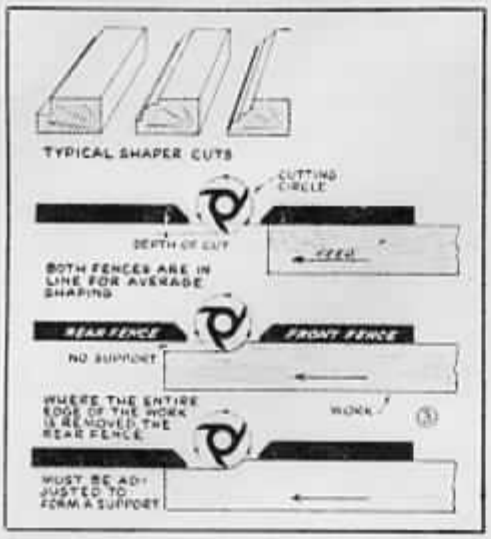
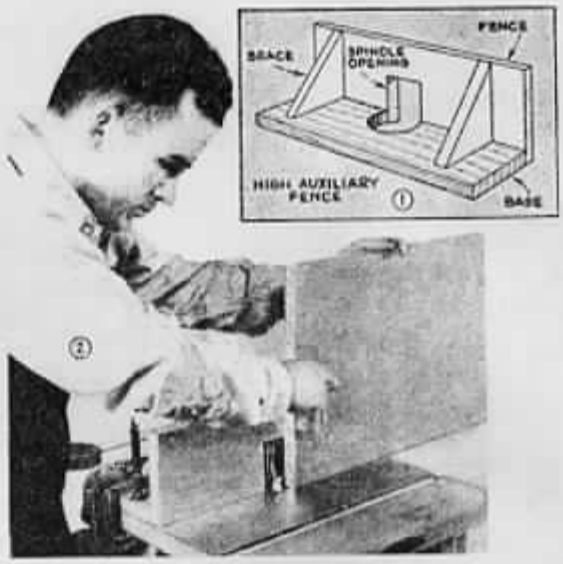
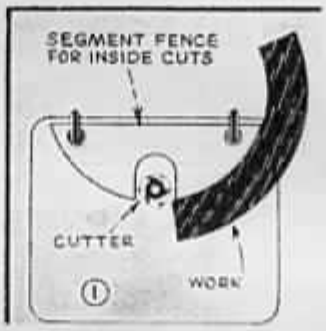


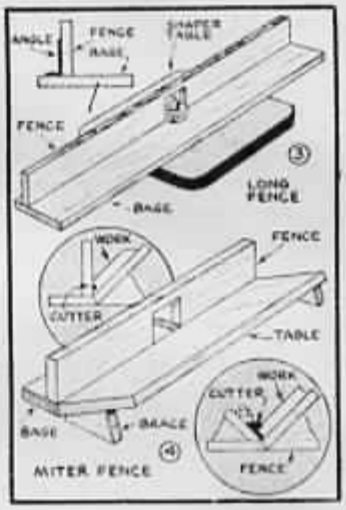
Diagram above shows how the shaper fence must be adjusted for making various cuts.

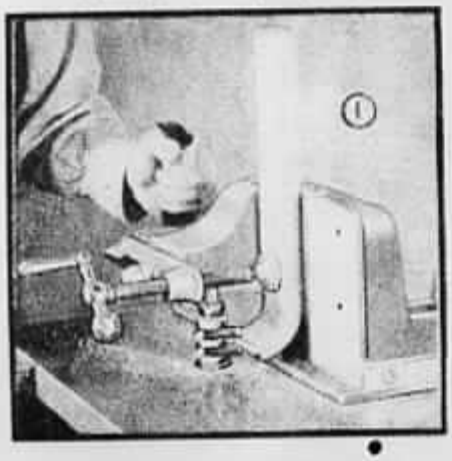


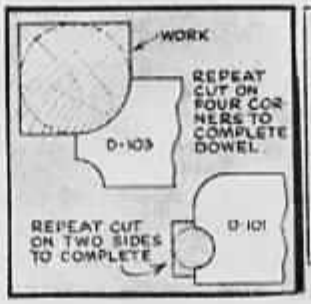
The high fence simplifies face shaping of wide stock; center, construction of long and miter fences.

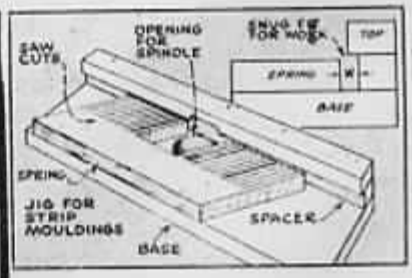
The circular saw tenoning jig can be used to good advantage for many shaper operations.

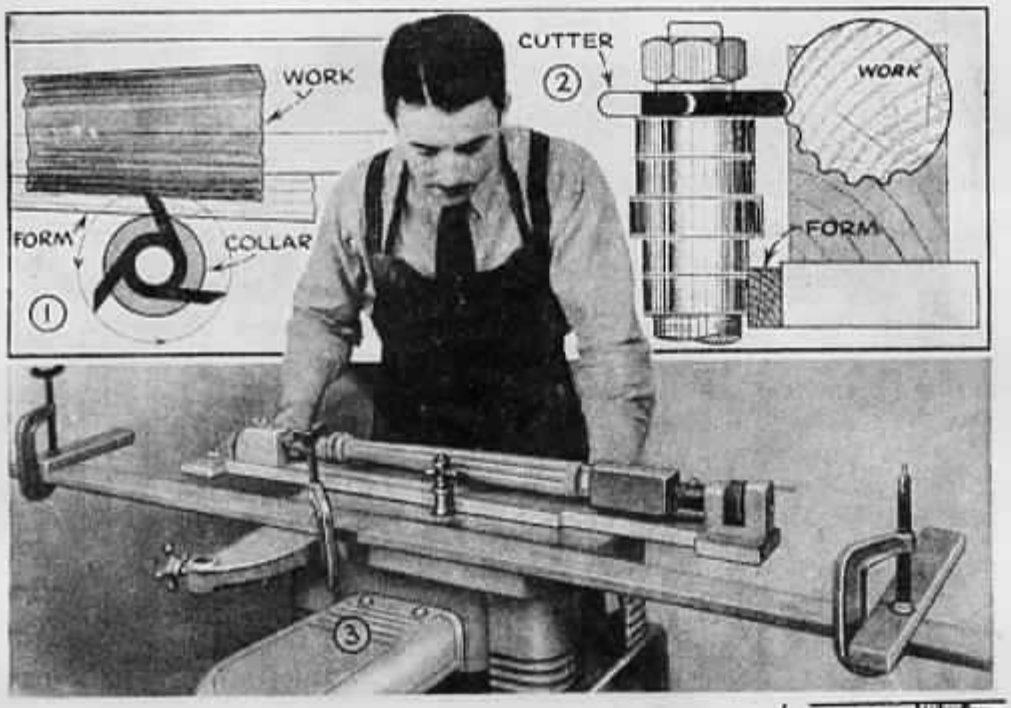


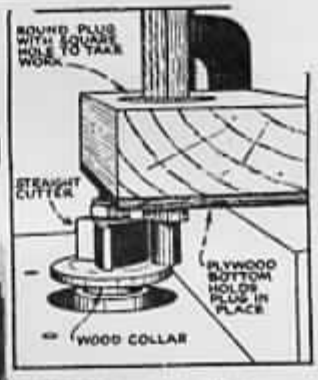




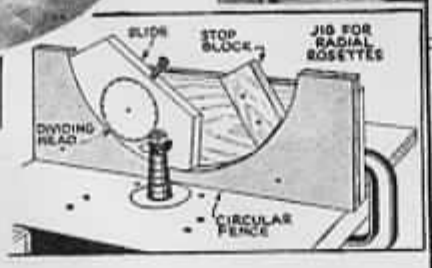


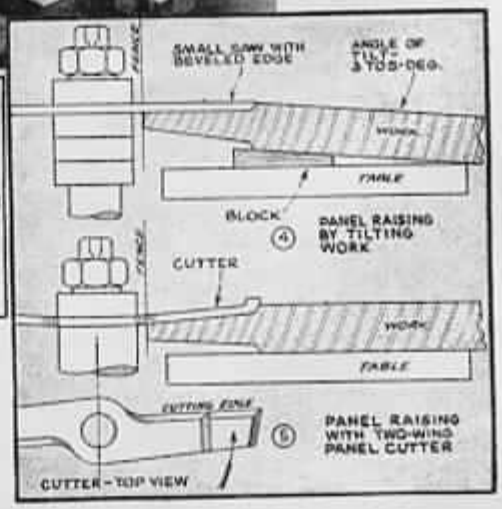






Ornamental radial rosettes in many patterns can be made with the simple jig shown.





THE ROUND TENON JIG: The illustrations show the way this is used. It is the easiest and fastest way of cutting round tenons on the end of square stock particularly where it is impractical to turn in a lathe.

RADIAL ROSETTE JIG: The illustration and sketch show more fully than words the layout and use of this rather unusual fixture. The work piece is fastened with brads or screws to the dividing head. Needless to say, some careful calculation is necessary to ensure that the fastenings do not come on the line of a cut. The cutter is usually of the same form as used for reeding, and must be very sharp to prevent tearing the wood.

Rosettes of this type make up best if the centre is first recessed, this opening being later fitted with a round turned button projecting slightly above the rest of the piece.

To do this type of work careful planning and operation is essential and it is not recommended for beginners.

CIRCLE MOULDING JIG: The sketches show a simple way of moulding the edges of circles. This fixture could solve an otherwise tedious problem where a number of circles have to be done.

CHAPTER VII

FURTHER SPINDLE MOULDER ATTACHMENTS

THE DOVETAILER

Dovetailing is generally accepted as the best method of joining the ends of two boards at right angles. In the case of a drawer where the front is subject to continual pulling, this is particularly so, as the tapered edges of the pin counteract this pull.

Unfortunately, the dovetail has one major drawback to anyone not owing a Homeshop. It is a costly and time-consuming operation requiring considerable practice and skill. With Homeshop models having a vertical spindle moulder, you can buy a dovetailing attachment which will cut these joints fast and accurately. There is no real skill required and a couple of simple adjustments are all that is necessary.

Because drawers are the commonest use for dovetails, do not think that you are restricted to these. Any type of box worth the trouble is a far superior article with dovetailed joints.

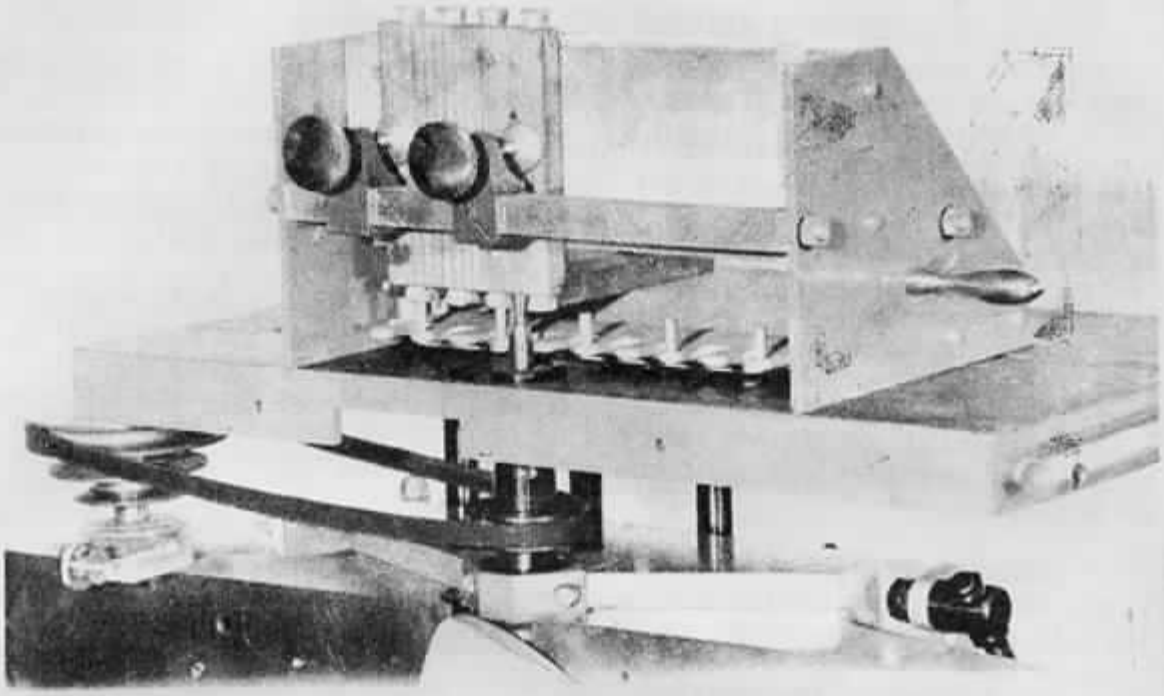
The following instructions for use should enable any Homeshop owner to produce dovetail joints that will compare favorably with the best factory-made article:

This unit is designed to produce high-grade dovetail joints fast and efficiently. Adjustments and setting-up have been reduced to the absolute minimum, and cost is such as to keep it within the reach of the hobbyist whilst doing work to tradesman's standard.

By using care and a sharp cutter, it is quite easy to produce a dovetail joint to the highest standards. The sides of the drawer or box are clamped to the front of the vertical wooden cross bar, with the end to be jointed resting on the stops (round pins) that protrude above the comb; the vertical edge is kept against the side or edge stop.

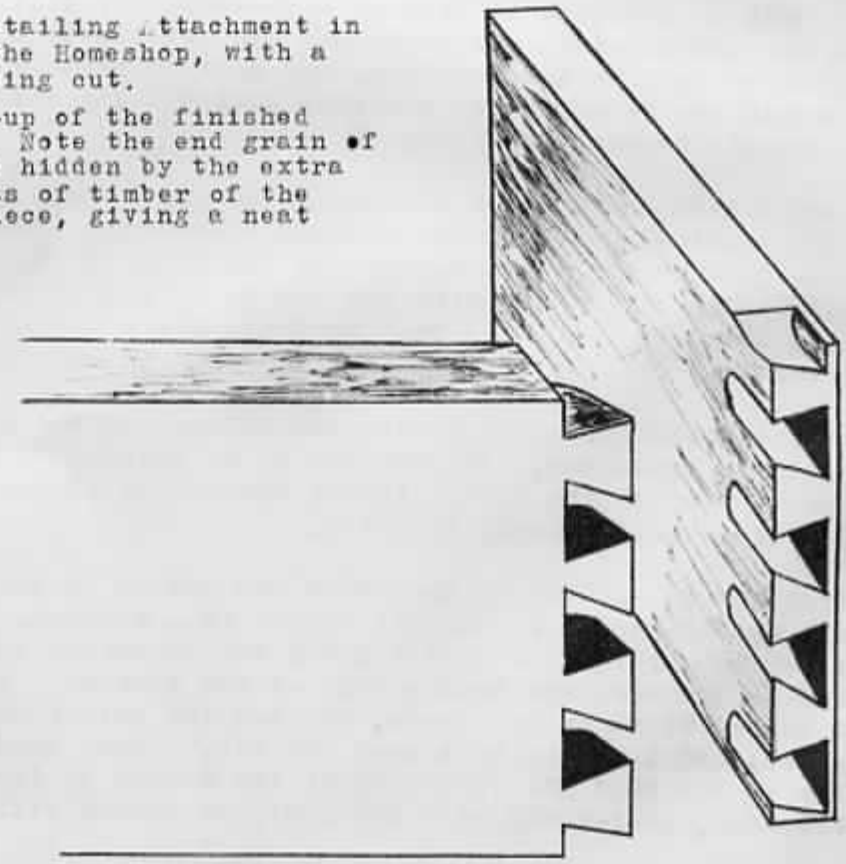
Similarly, the backs and fronts are clamped on top of the horizontal cross bar, with the end to be jointed up against the rear face of the side, already clamped in place. Again the edge is kept against the stop.

The cutter is mounted on its arbor and set up in the vertical spindle moulder, and all fences etc. removed. For a trial cut, raise the cutter until its uppermost cutting point is ⅜" above the bottom edge of the timber. If the fit is too tight or too loose, raising the cutter tends to tighten, and lowering to loosen the fit. Care should be taken to see that the roller under the cutter is free and lubricated, preferably with red lead, or better still, with



ABOVE: The Dovetailing Attachment in use on the Homeshop, with a joint being cut.

BELOW: A close-up of the finished joint. Note the end grain of the pins hidden by the extra thickness of timber of the other piece, giving a neat finish.



graphite included in the lubricant. If the roller does not turn it will wear the comb prematurely, and a worn comb will cause loose joints.

The attachment is worked by hand, so that the roller under the cutter follows around the outline of the comb.

The flat bar clamped under the comb by two set screws in slots is adjusted so that the cutter goes into the backs and fronts to produce sockets of the required depth. This bar must be parallel to the line of the outer tips of the comb, and once it is set to bring the sides flush with the ends of backs or fronts, it should not be necessary to alter the adjustment unless the operator wishes to do offset (rebated) drawer fronts, when it is usual to remove it altogether.

When doing rebated fronts, the two front joints obviously have to be done as a separate operation to the back joints, as the latter require the stop bar at its usual setting. Apart from this, they are done in exactly the same way.

N.B. Do the dovetail joint FIRST then rebate out the surplus afterwards to bring the timber between the sockets flush with sides, otherwise you will get tearing of the backs of the pins.

If dovetailing is done before any grooving for ply or cutting bottom of backs, or any such work - in other words, whilst the drawer parts are just pieces of planed timber - then you will avoid the necessity of working out which joints must be done on the left side and which on the right side of the attachment. This has a further advantage in that it is preferable to use the left hand side (facing the attachment) as the thrust of the cut tends to push the work against the edge stop and not away from it, as on the right side.

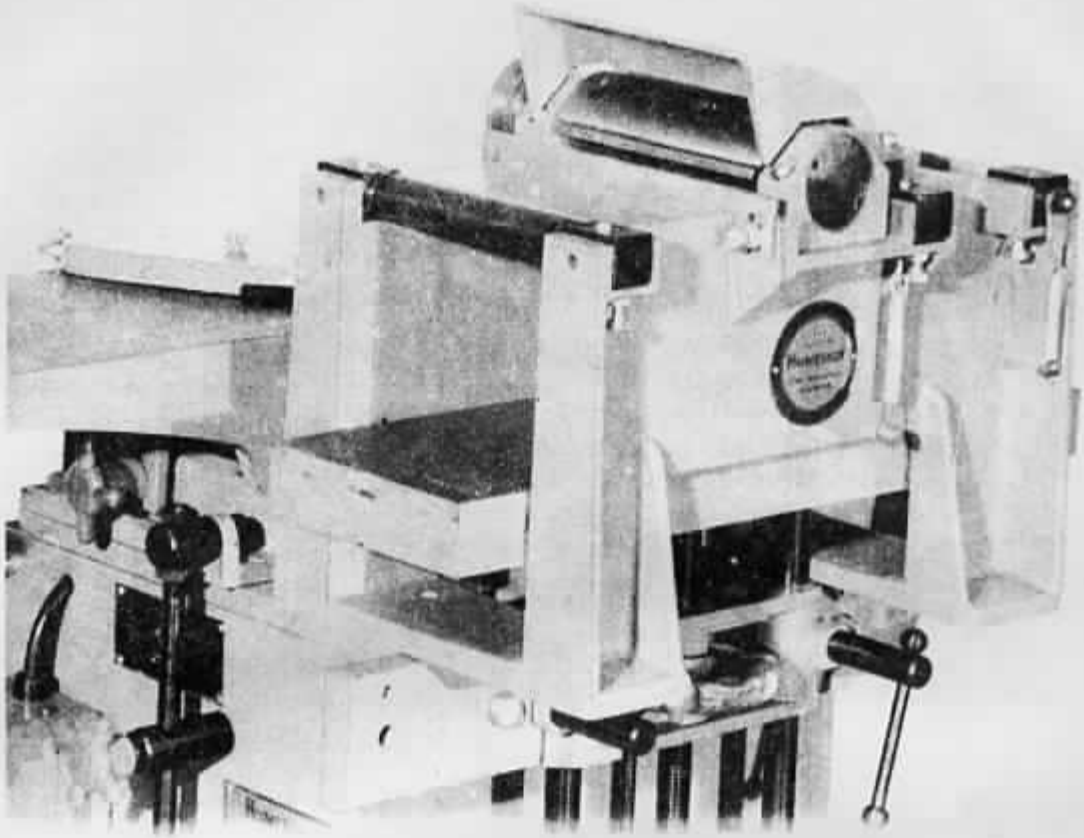
Cutters should be sharpened by honing with a small stone in the two vertical grooves only. The stone should be shaped to fit the groove and the outside surfaces should never be touched or you will ruin the cutter. Unless you are an expert at free-hand grinding, never try using a grinding wheel except in a tool and cutter grinder or special fixture. To get the best results, you must have a sharp cutter, but as it is made of high speed steel, it will retain its edge for a surprising length of time.

Remember that this is an attachment which takes the place of skilled hand work and does a normally tricky operation, so exercise patience and if at first you don't succeed etc. .....

When trying out this unit always use scrap pieces of timber, but they must, of course, be planed true and accurately squared on the ends. This will avoid the chance of spoils of good parts. Even when quite familiar with the attachment, it is always safer to use a trial piece when setting up, as there is always the adjustment for height of cutter to be made each time the spindle moulder is set up.

It is most important that all edges be perfectly square if a neat joint is required. Some timbers produce better joints than others, but experience will be the best guide. Whether the ends of fronts and backs project slightly and are subsequently cleaned off, or are adjusted to come flush, is again a matter of choice. A good quality glue should be used, and there is quite a variety of type and brand.

By observing the above, and with a little practice, you should be able to produce joints as good as the best craftsman.



THE THICKNESSER ATTACHMENT IN
POSITION ON THE HOMESHOP

Note that the saw table and saw spindle have been removed and thicknesser is positioned over the rise & fall gear. Buzzer can still be used without dismantling anything. Rise & fall gear should always be clamped in use except perhaps for light work.

Never use without chip guard in position and you never take heavy cuts with a thicknesser. Table surface must be clean and free of all stickiness.

CHAPTER VIII

THE THICKNESSER

One of the biggest time and work savers in the industry, the Thicknesser is not more widely used, largely because it is usually a costly machine. With the Homeshop Thicknessing Attachment, you have the proper machine on a smaller scale and at a fraction of the cost.

To install, remove the saw table and any attachments screwed onto the spindle. Pick up the thicknesser by the ends of its table, with the pulley pointing away from you and place on the stand top alongside the buzzer fitting the rise and fall bars into the sockets under the table as for the Homeshop saw table. The three set screws can then be clamped onto the bars.

If the buzzer is tilted to the vertical position, you will find it easier to fit the inside set screw that holds the frame in place. When all three holding screws are started, line up the body or frame so that the table will rise and fall freely and tighten MODERATELY.

Return the buzzer to the horizontal position and fit the thicknesser belt (46A) to the high speed, or largest pulley groove, and align the motor to suit.

The depth gauge is adjustable and is done by planing a piece of timber, measuring its thickness by setting accordingly.

The pressure bar is adjusted by stopping the machine when a piece of timber has been planed far enough for it to be under the pressure bar. The two set screws are then loosened and the bar allowed to rest on the planed surface. The set screws are then re-tightened and no further adjustment should be necessary until the blades are replaced or the honing reduces the depth of their cutting edge appreciably.

Timber is fed in from the motor end, as it passes under the cutter, whereas with the buzzer, it is over the top; since direction of rotation is unchanged, direction of feed must be reversed.

POINTS ON THICKNESSING: Remember that the only thing in common with buzzer and thicknesser is that they are both planing machines.

The thicknesser will NOT straighten a warped or twisted face. It planes one surface parallel to the other surface resting on the table. If you want a true piece of rectangular planed timber you must plane two adjacent faces square and true over the buzzer first, then plane the other two faces in the thicknesser.

A buzzer will not give you the other two faces parallel to the first two, anymore than the thicknesser will plane the first two true and square. Admittedly, by careful sawing first you can get fairly close to it and good enough for many jobs, but the thicknesser and buzzer together give you the ideal set-up with minimum work and maximum speed at the same time.

When feeding in, keep the timber flat on the table avoiding any tendency for the leading edge to rise into the cutter head. To make sure of this, once the piece has passed under the first roller have the outer end of the timber slightly higher than the table. The amount will depend on the length and thickness. Obviously, when planing a short rigid piece it will only amount to applying slight upward pressure without deflection, whereas with a long springy bit there will be an appreciable upward bend. The same remarks apply to "tailing out" only even more so.

To hone blades or remove them undo the two screws holding the guard and lift it off. Honing is then quite easy, or blades may be removed for hollow grinding with the same socket spanner supplied with your Homeshop for the buzzer head. Blades for the thicknesser are identical with blades for 6" buzzer.

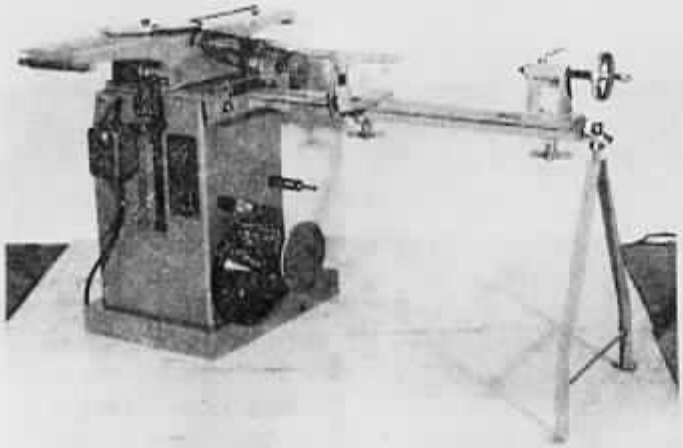
The easiest way to set blades in a thicknesser is cut two short blocks from a planed piece of timber, placing them on the table under the cutter head, one each side. Set the blades in position, held lightly and bring the table up until each blade just touches each block when the cutter head is oscillated. By judicious juggling and with a bit of practice you will be surprised how accurately you can set the blades this way. When they are all even, then tighten up all holding screws.

The thicknesser can also be used for other planing work such as angled edges, shallow curves or sweeps, chamfering etc. by using suitable jigs and fixtures. The illustrations show a few of these and others can be devised to suit the job in hand.

Never try to take too heavy a cut with a thicknesser, it is not safe or advisable. For this reason the Homeshop thicknesser will not feed more than a full ¼" cut. You will notice a difference in pressure at the ends of the work where only one feed roller is in contact. This is unavoidable in a hand-fed machine, but a little practice will enable you to adjust the pressure accordingly. A 50-50 mixture of oil and kerosene sprinkled on the table lightly and occasionally will improve the feed.

The bearings of rollers are oilite sintered bronze and should only need a squirt of light oil when inspecting ball bearings of cutter head annually for grease.

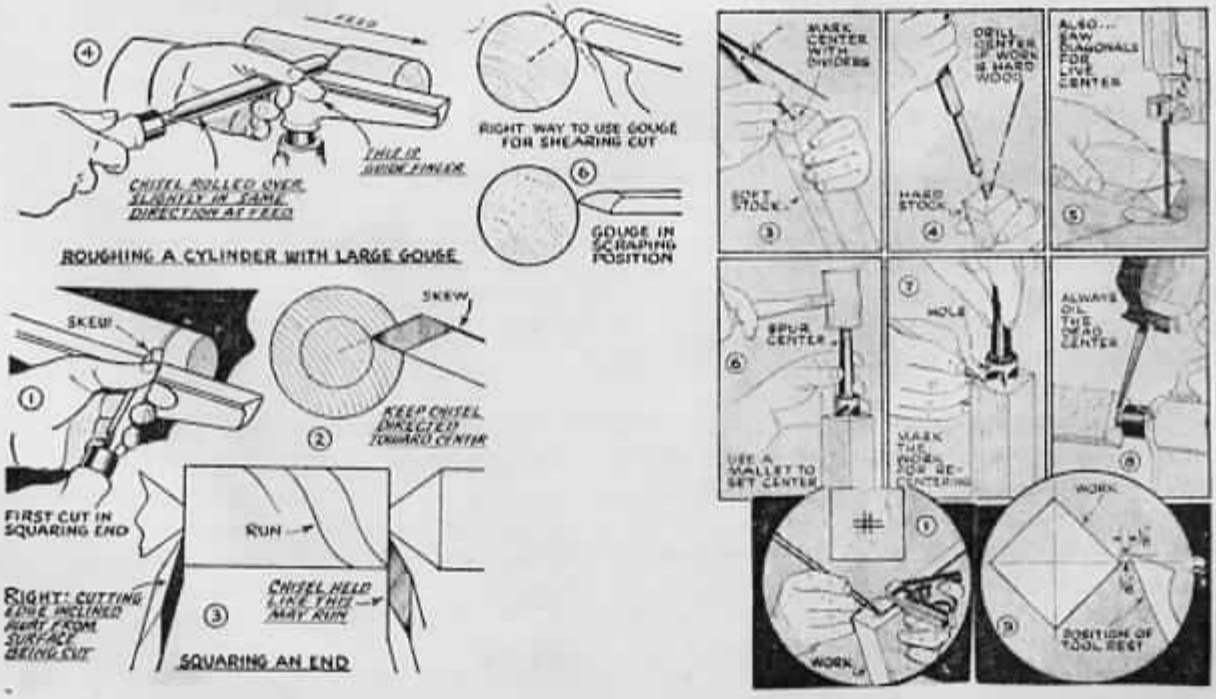
The anti-kick back can be adjusted for position by loosening the nut holding the spring bar. It should not be necessary to alter its height, but this can be done with shim washers between the bearing blocks and the frame if desired.



The illustration shows the wood lathe attachment in position on the Homeshop. If the leg is not adjusted to the correct height, pieces between centers will tend to work out of position.

Rest should always be adjusted as often as necessary to keep it at the correct working distance. A wide gap can cause accidents.

ILLUSTRATED BELOW ARE SOME USEFUL HINTS IN WOOD TURNING



CHAPTER IX

THE WOOD LATHE

Wood turning is a fascinating art and the wood lathe is probably one of the most self-contained machines in woodworking, being capable of producing the finished article right from raw stock.

Whilst the beginner can get quite good results by using scraping methods, true wood turning is a cutting operation and to produce fast, accurate work this way demands practice and skill but is well worth the effort.

The Homeshop wood lathe attachment, whilst making no pretence to being a universal heavy duty wood lathe, will nevertheless handle most of the work done these days.

To install, remove the saw table and rise and fall unit. With the leg at its approximate height, bolt the other end of the bed in place where the rise and fall unit came off. Screw the driving centre onto the end of buzzer spindle and bring tail stock centre up to meet driving centre. By adjustment of the leg the vertical height can be corrected and by adjustment of the bed where it bolts onto the Homeshop, the slots will allow correction for any discrepancy sideways. Working height is for a seated position, but you will find this gives you excellent control over the cutting tools.

Whilst there are five main types of cutting tool, the two most important are the gouge for roughing and cove cutting and certain other jobs and the turning chisel for straight smooth cutting. The other types, the diamond point, the round nose and parting chisel are not essential as the first two will substitute in most cases for these.

The measuring tools used with a wood lathe can be confined to a rule, internal and external calipers.

Most wood turning is done between centres. For this work the piece should be approximately square or if large, bevelled to give an octagon and the ends should be square. After obtaining the centres by any of the approved geometric methods, mark the centres with a punch or scriber point. If using hardwood, drill a small hole about ⅛" deep. The driving centre is engaged by holding the work piece up to it with the point in the centre hole and tapping the other end with a mallet. With hardwood put a shallow saw cut first across the face to line up with the driving spurs.

The tailstock centre is then brought up to the other end and with the tailstock clamped, is wound in while slowly rotating the work by hand. When it is firmly seated, back off slightly to give free rotation and clamp the tailstock spindle. Apply some oil, grease, tallor or beeswax for lubrication and you are ready to start turning.

As some work requires removal from the lathe at intermediate stages, an index mark on one spur of the driving centre is a great convenience. A centre punch mark on the barrel of the centre, in line with one spur is a simple method, but the end of the work must be correspondingly marked. Grinding off one corner of the spur will identify the work as well automatically.

The tool rest is now set as close to the work as practicable. Approximately ⅛" to ¼" from the highest point of the periphery of the work piece as it revolves about ⅛" above centre and approximately parallel to the general longitudinal contour of the work piece.

The large gouge is used for the first roughing cut to bring the work to a circular shape. Hold the gouge canted towards the direction of cut.

Start about 2" from the tailstock and cut towards it off the end. A second cut starts about 2" or 3" to the left of the first and so on, until about 2" from the headstock end. The gouge is then rolled over to cut the remainder in the opposite direction.

This method avoids tearing long slivers from the edge. Keep the gouge well up on the work with bevel approximately at a tangent to the work, otherwise you get a scraping action and a tendency to dig in. Hold the turning tools to give you adequate leverage and control. One hand is held against the tool rest to control depth, the particular method being a matter of choice.

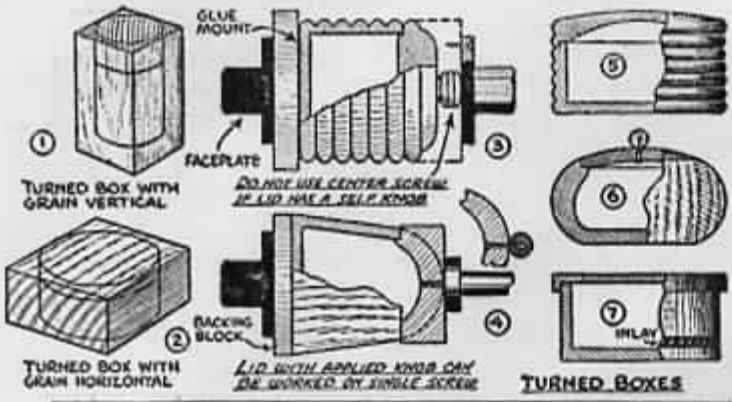
The smoothing cut on a plain cylinder is done with a large turning or skew chisel. This demands practice and is one of the fundamental skills of the experienced woodturner. Resist that tendency to scrape. To get proper results the turning chisel should be kept ground perfectly flat as shown in the sketches. Not double-bevelled or rounded, as you cannot then control the cut.

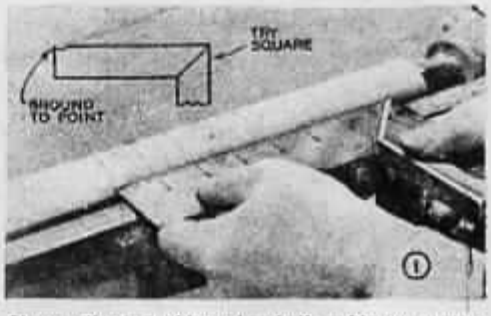
The sketches show the fundamental do's and dont's of squaring an end. There is a parting tool used in wood turning which can be used for this, but it will not give the smooth finish of a skew chisel as it is essentially a scraping tool in its action.

Cutting small beads, V grooves, etc. is easiest done by scraping. These operations can be done with skew chisels and produce smoother work, particularly in soft woods, but it takes practice.

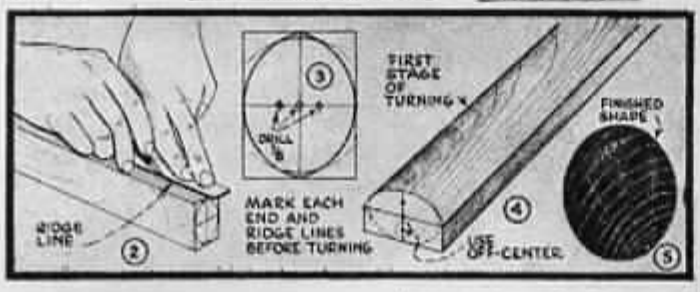
MASTER SHAPES: In all turning of two or more duplicate parts, use the first one off as a master for all reference of measurement, shape, etc., in turning the others. If this is mounted on a hinged board directly behind the work piece in the lathe, it is a great help. The board can be swung in against the work for reference as needed.

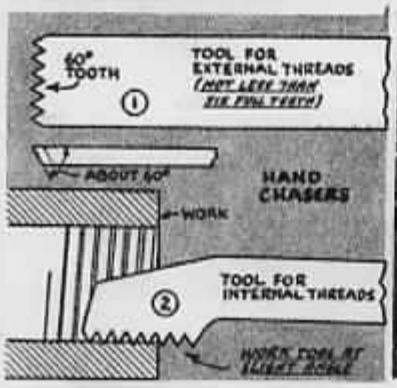
Whilst calipers are the standard means of measuring diameters, fixed gauges cut along the edge of a piece of plywood are preferred by many operators, although they are probably only worth the trouble where a lot of turning is done.

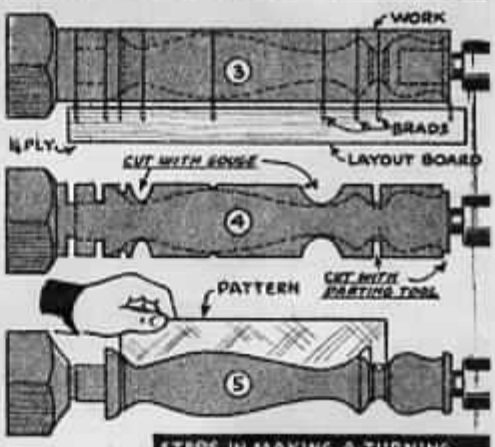




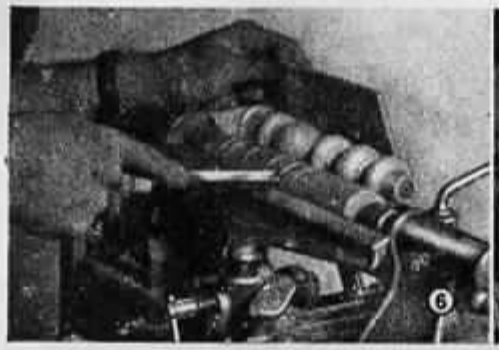
Above, direct marking of spindle with try square. Photos and drawing below show various other methods used in laying out and sizing duplicate turnings.

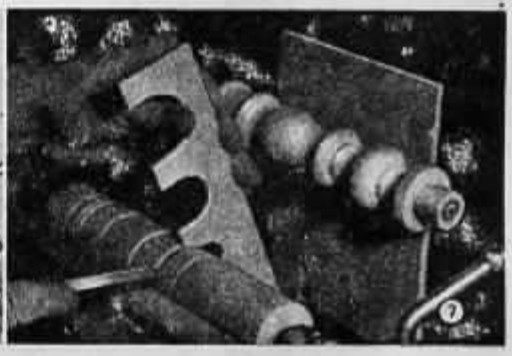


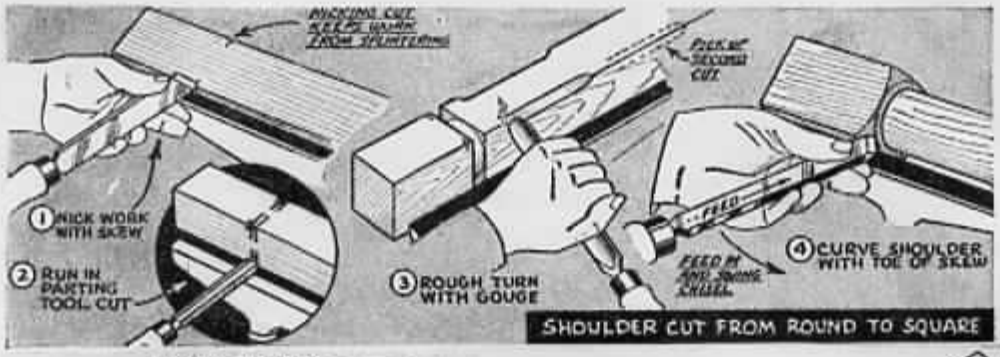


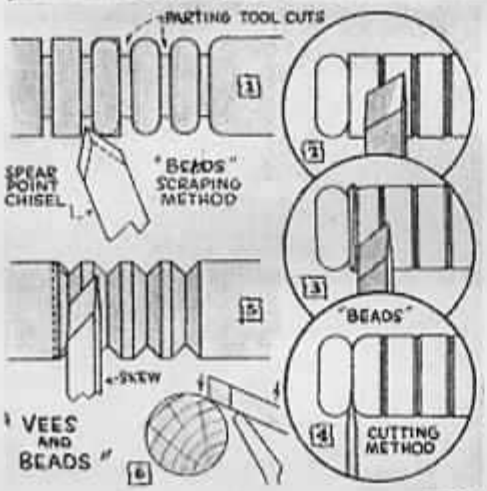


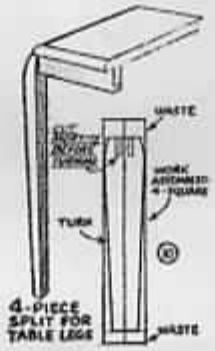
STEPS IN MAKING A TURNING

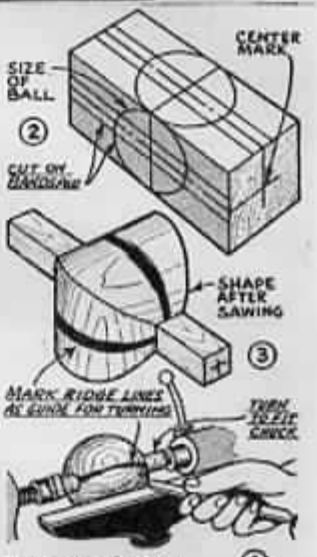


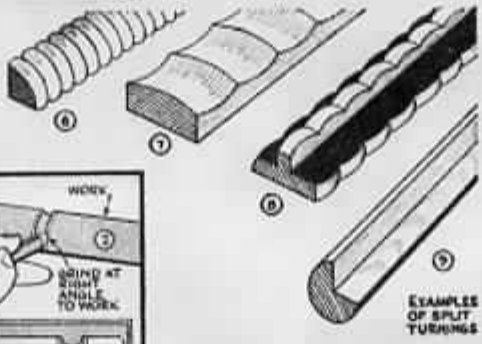


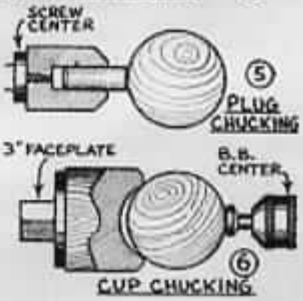

BACKING CUT KEEPS WORK FROM SPLINTERING
PICK UP SECOND CUT
1 NICK WORK WITH SKEW
2 RUN IN PARTING TOOL CUT
3 ROUGH TURN WITH GOUGE
FEED
FEED IN AND SWING CHISEL
4 CURVE SHOULDER WITH TOE OF SKEW
SHOULDER CUT FROM ROUND TO SQUARE

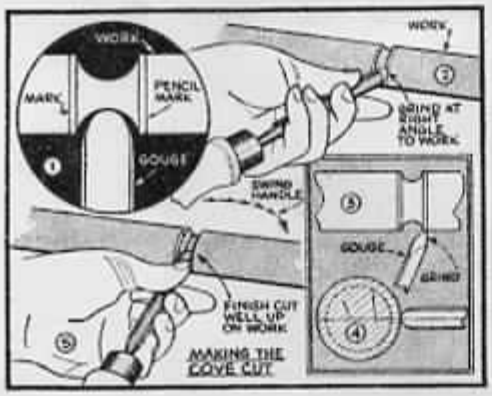

PARTING TOOL CUTS
SPEAR POINT CHISEL
"BEADS" SCRAPING METHOD
SKEW
VEES AND BEADS"
"BEADS"
CUTTING METHOD

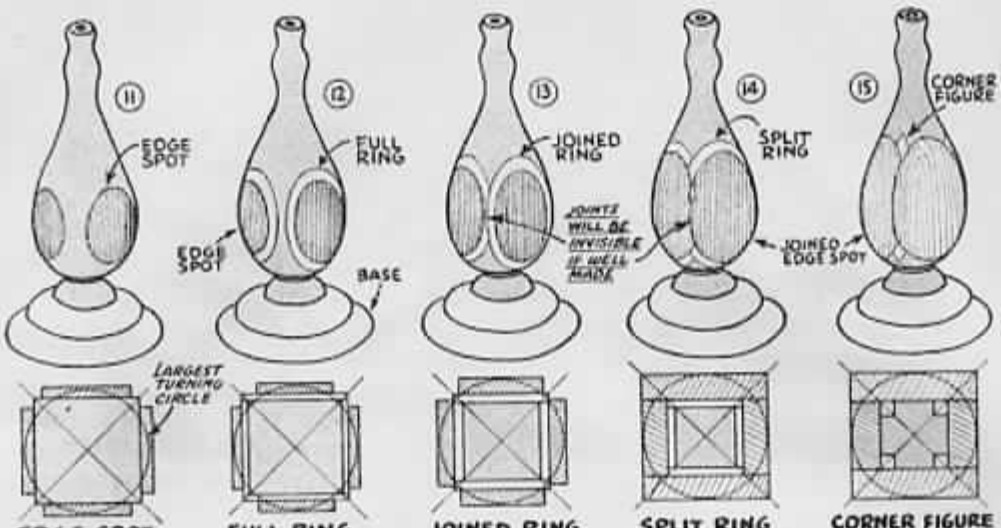

WASTE
WORK ASSUMES SQUARE
TURN
WASTE
4-PIECE SPLIT FOR TABLE LEGS


CENTER MARK
SIZE OF BALL
CUT ON BANDSAW
SHAPE AFTER SAWING
MARK RIDGE LINES AS GUIDE FOR TURNING
TRIM TO FIT CHUCK
TURNING A BALL


EXAMPLES OF SPLIT TURNINGS


SCREW CENTER
PLUG CHUCKING
3" FACEPLATE
B.B. CENTER
CUP CHUCKING


WORK
MARK
PENCIL MARK
GOUGE
WORK
GRIND AT RIGHT ANGLE TO WORK
SWING HANDLE
GOUGE
GRIND
FINISH CUT WELL UP ON WORK
MAKING THE COVE CUT



EDGE SPOT OUTER LAYER IS LESS THAN 1/4 OF FULL TURNING CIRCLE

FULL RING CORNERS OF SECOND LAYER ARE OUTSIDE THE TURNING CIRCLE

JOINED RING CORNERS OF SECOND LAYER ARE CUT BY TURNING CIRCLE

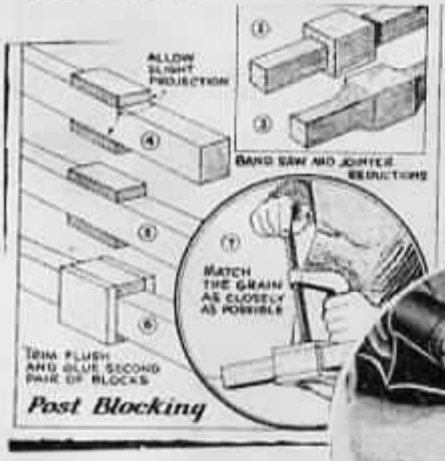
SPLIT RING THE SPLIT RING COMES WHOLLY INSIDE THE TURNING CIRCLE

CORNER FIGURE THIS IS MADE BY RABBETING CORNER BLOCKS INTO CORE

Post Blocked . . . FOUR-SQUARE

Post Blocked . . . EIGHT-SQUARE

Segments . . . HOLLOW RING



FACE PLATE TURNING: Turning work which cannot be done between centres must be mounted on a face plate or in some sort of chuck. In wood-turning, the face plate is the usual method.

All cutting in face plate work is done by scraping, as there is too great a tendency to dig in with the usual cutting method.

The sketch shows the mounting of work on the face plate. Where screw fastenings interfere the work piece can be glued first to a mounting block, also shown.

In turning, the tool rest is positioned to put the cutting edge of the chisel on the work centreline. The handle end of the chisel being slightly lower to improve cutting. Any chisel to suit the shape may be used.

When doing deep boring at least start with a pre-drilled fairly large centre hole or better still, rough out the shape with a series of holes drilled to depth in a drilling machine.

TURNING A BALL: Wooden balls of any size within the capacity of the lathe can be turned by mounting between centres. Watch to keep length and diameter even or you will get some weird effects. Frequent checking with a template is vital. Stick to scraping here unless you are really good with the cutting technique. If the ball is over about 2" diameter it is a help to rough out in the bandsaw as shown in the sketch. Mark the outline on two adjacent sides of the square stock, extending the centre lines to the ends of the piece. Always work a little oversize to allow for cleaning up. Bandsaw the shape, nailing the pieces from the first cut back into place for the second cut, but position your nails with care, as they play havoc with bandsaw blades.

Put black ridge lines on the finished piece as shown and then centre carefully in the lathe. To get a well-finished job, do the final sanding etc., in either a plug or cup chuck as shown.

Where a number of similar balls are required, they sho ld be turned in line allowing a parting tool cut between for cleaning up. Balls less than about 1" diameter are often turned with a form tool which is a chisel ground to shape.

BUILT-UP TURNINGS: For spectacular effects, you can build up several different sorts of timber glued together in a definite pattern. There are three general types, Laminated, Post Blocked & Segments. Work of this kind to be lasting, demands perfectly seasoned wood and perfect glue joints, preferably using one of the modern synthetic adhesives.

The turning techniques are much the same as for ordinary work although where there is much variation in the hardness of woods used extra care must be taken.

CHAPTER XI

VARIOUS ATTACHMENTS INCLUDING GRINDING & BUFFING, SANDING DRUM, SANDING BOB & BELT SANDER

GRINDING & BUFFING: This consists of a spindle made to screw on to the end of buzzer head to take ¾ bore grinding wheels and has a taper threaded end for cloth buffs and similar tools. The grinding wheel is held between recessed collars by a nut like a circular saw blade.

Then there is a simple adjustable rest.

The maximum diameter wheel that can be used is 8" and these must never be used above bottom speed. The recommended wheel is 6", never to be used faster than middle speed.

Where wheels are 4" or less in diameter top speed may be used.

The above speed limits apply whether wheels are larger ones worn down or new at that size as centrifugal force, a function of diameter, is the limiting force.

Cloth buffs are normally used at about 2800 r.p.m., bottom speed on your Homeshop, irrespective of size but with very small buffs, it may be found an advantage to go to a higher speed.

To set up this attachment remove the saw table and rise and fall gear, screw the spindle onto the screwed end of cutter head. Fit the steel dowel of the rest into the plain hole in side of buzzer base and screw the set screw into the tapped hole. The rest should be adjusted to just clear the grinding wheel. If operations like grinding chisels are to be done you may prefer to round the appropriate corner of the vertical rest support to allow the rest itself to tilt back to any desired angle.

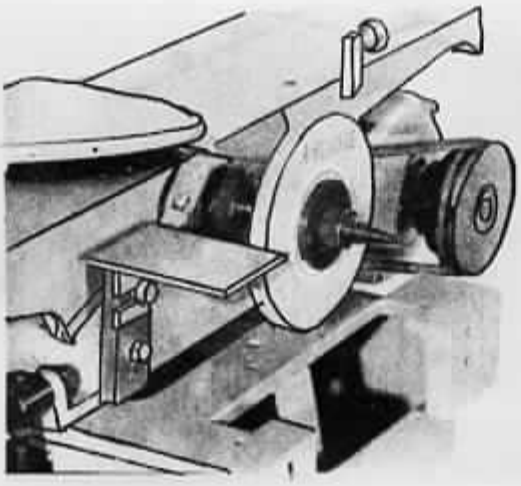
In grinding cutting tools unless they are high speed steel, it is advisable to dip the work in water at frequent intervals to prevent taking the temper out.

There is such a wide range of wheels available that to get the best results for a number of different jobs you would need a whole pile of wheels but by remembering that hard materials need a soft bond and the reverse for soft materials, that a smoothly dressed coarse wheel will often grind as smoothly as a roughly dressed coarse wheel you can limit the number of wheels considerably.

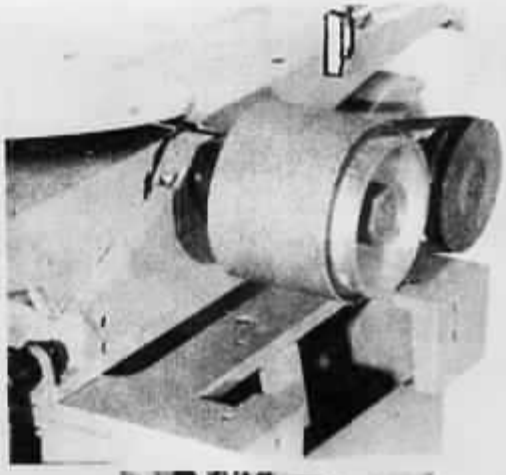
A grey aluminium oxide wheel is generally used for most metals in the soft or annealed condition and white aluminium oxide for hardened metals.

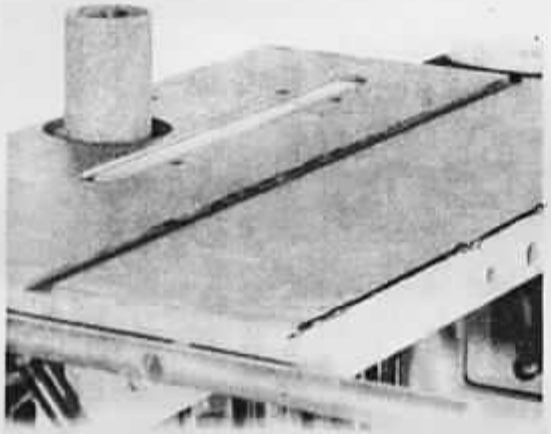
Sintered Carbides of Tungsten and other such metals are best done on green Allicon Carbide wheels but this application will probably not arise.

THE GRINDING & BUFFING ATTACHMENT

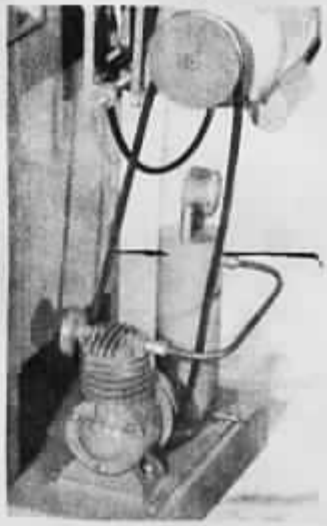


THE SANDING DRUM

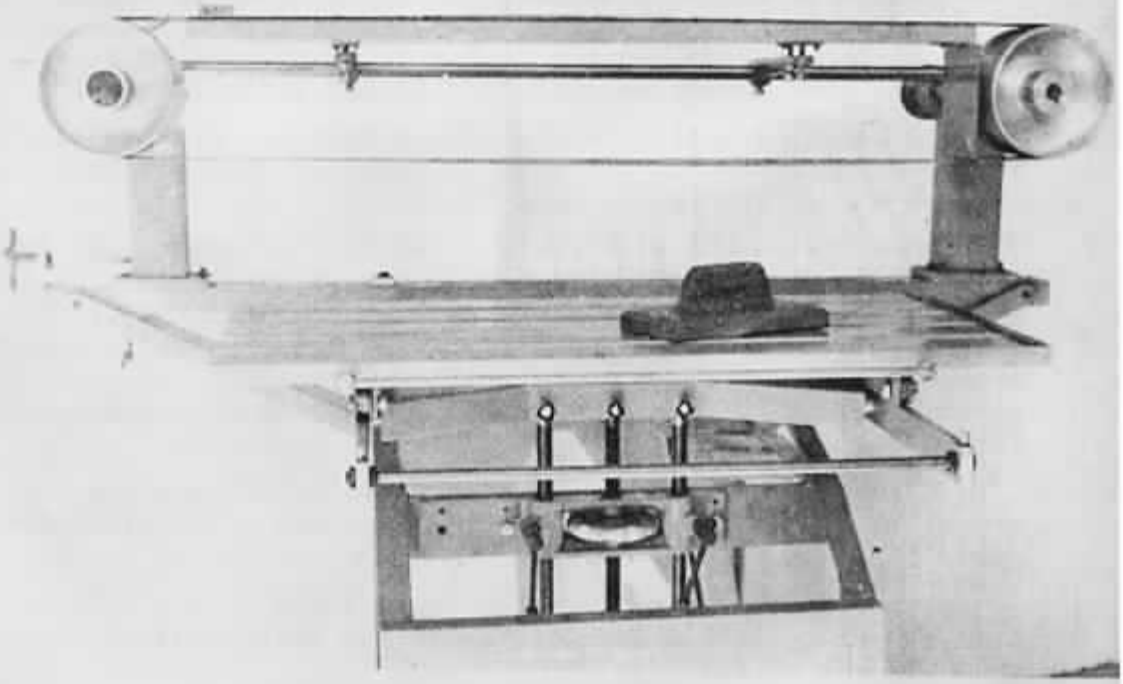




THE SANDING BOB



THE COMPRESSOR



THE BELT SANDING ATTACHMENT

If you have a 60 grit white aluminium-Oxide
a 45 " grey " "
a gulleting wheel
these three will cover most of your requirements.

Cloth buffs are used by metal polishers mostly at the one speed of 2800 r.p.m. (this is bottom speed on the Homeshop) irrespective of size but with very small buffs it may be found an advantage to go to a higher speed.

A cloth buff on its own will not polish except in certain special applications. A tablet of polish suited to the material being polished is rubbed on the buff lightly every once in a while during polishing. Tripoli powder is the most commonly used, but is too harsh for certain finishes such as chrome and silver.

However, you will not be concerned over the finer points of polishing in most cases and if you are, then it is advisable to get more details from someone in the trade or a supplier of electroplating equipment as there are all sorts of little tricks that are simple enough but difficult to put into words.

SANDING DRUM: This handy unit has an internally tapered rubber sleeve fitting over an externally tapered aluminium mandrel. Inside the mandrel is a steel spindle with a pressure plate at one end and a nut at the other. Tightening the nut pushes the mandrel into the sleeve expanding it and tightening the abrasive belt into position. Bottom speed of your Homeshop is the only one to use with this tool.

To set it up, remove saw table, rise and fall gear and any fittings from main spindle as for grinding attachment, then screw drum on into place.

To fit a fresh abrasive belt, remove spindle.

If sleeve will not pull off mandrel, hold it firmly, then smartly tap the small end of the mandrel with a piece of end grain wood or the handle end of a hammer. Slide abrasive belt over sleeve, smear talc or French chalk on the inner tapered surface, push mandrel in as far as it will go by hand, push spindle into place and tighten nut sufficiently to hold the belt firmly. Do not use undue pressure or you may burst the belt.

DO NOT RUN THE DRUM WITHOUT BELT IN PLACE.

If not being used for some time, it is advisable to release pressure, as abrasive belts tend to stretch particularly in moist weather. When first fitting new belts they often need a subsequent tighten after a short run.

The correct belt for this drum is the standard 15½" x 3½" made by all leading abrasive cloth manufacturers and belts can be obtained for doing various types of material and in a variety of grits. The sanding drum does a particularly good job on metals.

A further ~~reminder:~~ maximum speed and ~~correct speed~~ 2800 - 3000 r.p.m., i.e. bottom speed on your Homeshop or spindle speed of a 2 pole electric motor.

THE SANDING BOB: This useful little gadget can be utilised on a variety of jobs where a smooth finish or an awkward shape is required, not warranting a special cutter. Whilst its commonest application is the sanding of shaped edges on the spindle moulder, it can be used in the horizontal position free hand as a miniture sanding drum or for sanding bevels with the long fence on the moulder, etc.

It is advisable to use cloth backed rather than paper backed abrasive. To fit this to the bob, cut a piece to width and long enough so that the ends overlap the width of the groove. Hold abrasive around the bob in the palm of the hand and with fingers and thumb, press the ends into place. One end should be level with the edge of the slot, passing over it, around the bob over the first end to the other side of the slot. Place the clamping bar in position and push the point of a scriber through the holes in the bar and the abrasive cloth. This will enable the 3/16 metal thread screws to be started in their holes. As they are tightened up, the bar clamps the cloth tightly around the bob.

BELT SANDER: This is one of the main finishing tools for the cabinet maker and to do a complete and satisfactory job is quite expensive even as an attachment, but if your work calls for its use there is no real substitute.

The separate unit calls for no other comment outside of the remarks applying to the attachment as it is the attachment work head fitted to a stand with separate motor and switch.

To set the attachment up on your Homeshop, remove saw table, buzzer fence and guard. Place the main frame on the buzzer tables with the arms on the pulley side and clamp in place in approximately a central position with the two bolts and special clamps provided.

Then fit the table guide assembly onto the rise and fall bars in the same way as with the saw table. The rolling table can then be dropped onto its ways and the swivel telescoping leg adjusted for height when the table has been raised to its desired position.

If the work is to be varnished make sure the grain is always parallel with the belt travel otherwise unsightly scratches will mar the work. The belt should be just clear of the work without the stroking block being applied.

Steady even strokes and a regular movement of the table as each stroke is completed will ensure an even finish. Never try and take too much off at once.

Where edges have to be done, use the top surface of the belt where there is a platten to support it. The work is held by hand but the job is naturally restricted to twice the length of the platten.

With flat surfaces 36" or less wide, there is no theoretical limit to the length of work that can be done, provided adequate outer supports are provided.

The maximum size both ways is 6 ft. 8 in. by 3 ft. which you will find includes a big range of work like standard doors, sheets of ply up to 3 ft. wide, etc.

Maintenance of the Sander is normally limited to the annual grease check of the ball bearings which are housed in standard Homeshop components and take the same lubricants and a shot of thin oil in the sintered bronze bushes of the table rollers. If and when the linoleum surface of the stroking block should tend to produce too much friction, a good floor polish will help it to slide freely.

When the lino is worn out, glue a fresh piece on with some strong adhesive like Contact Cement or Pliobond.

Whilst you can join your own abrasive belts, it is probably simpler and cheaper in the long run to buy them ready joined for the number you will use. If you wish to make certain of a strong joint, you use a rigid setting nonthermo plastic cement such as urea-formaldehyde, but not a very hard glue like casein as with the flexing over the pulleys will crack it.

The abrasive must be removed from one face where the joint comes by softening with water for a few minutes and scraping it down to the bare cloth.

THE COMPRESSOR: Whilst this attachment has no direct application to the Homeshop, for those owners who use their machines as a hobby or a one-man business, it can prove indispensable. Apart from such simple things as blowing up tyres, cleaning dust out of the machine, odd spray painting, etc., there are special little high-speed air tools for carving, routing and grinding.

There is really nothing complicated about the attachment. It must be bolted to the base of the stand with easily removable fastenings as it is in the way for wood machining to get chips and shaving out of the stand.

Place it in such a position that the belt can be lined up with the bottom speed or smallest pulley groove. Make sure the crankcase has an adequate supply of the correct grade of oil and that the compressor is rotating in the correct direction. The air filter should be cleaned periodically and the oil in the crankcase changed regularly. As a unit of this type is normally only used on intermittent duty, an annual oil change should be sufficient but if used fairly frequently, then do it every six months. The accepted time is 350 hours actual running.

If you wish to get the best results with polished furniture without the tedious labor of the old style French polish, then the clear lacquer finish must be sprayed on. A low-pressure, low-consumption gun like the Arnold is about ideal for this unit.

CHAPTER X

THE BANDSAW

All bandsaws operate on the same general principle, the saw being a flexible band of steel with teeth cut on the edge. This band usually runs over two wheels mounted low on the left side for increasing throat, but the principle is the same. The wheels are rubber tyred and the top wheel has adjustments for tension and tracking. To prevent twist, and to support it during cutting, the blade has guides and thrust wheels above and below the table. The guide above the table is adjustable for height to suit the thickness of working being cut. The table usually tilts to 45° to allow for angle cutting. Bandsaw size is designated by diameter of wheels.

To set up your Homeshop for bandsawing, remove saw table and any attachments screwed to the cutterhead. Remove the buzzer fence and guard and bring the lead in table to the position of zero cut. Place bandsaw with mounting plate attached on top of buzzer tables with the front facing rebate side. Fasten with the two ⅜ set screws provided and fit the 60A V belt onto the pulley and down to bottom speed or smallest groove of motor pulley. N.B. Never run at any higher speed.

With the 10" bandsaw as used on the Homeshop, 16-gauge blades up to ½" wide can be used. It is possible to use 25-gauge, but their life will be limited due to the greater strain on inner and outer surfaces with the flexing as it passes over the wheels.

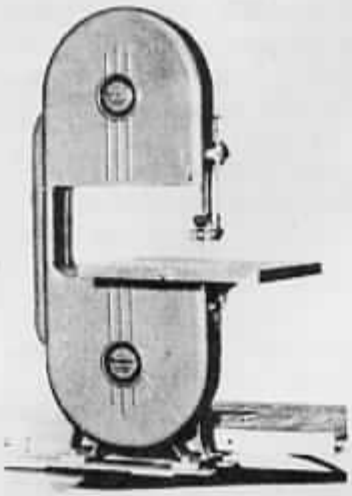
The two main types of tooth in use are the standard and buttress tooth, although standard tooth is by far the most readily available.

FOLDING A BANDSAW BLADE: The sketches show more clearly than words. The blade is folded in thirds. This is done by grasping the blade firmly as shown. Note how one thumb points up whilst the other points down. If you twist the blade - don't let it slip or turn in the hands - it will almost automatically fall into three loops.

FILING & SETTING: These are such tedious operations by hand and so fast by machine that it is not worthwhile doing your own blades. A saw doctor will do them for you at a very reasonable figure. The same remarks apply to joining the blades. Brazing is preferable on a wood cutting blade to butt welding, but it takes practice to do the job quickly and neatly.

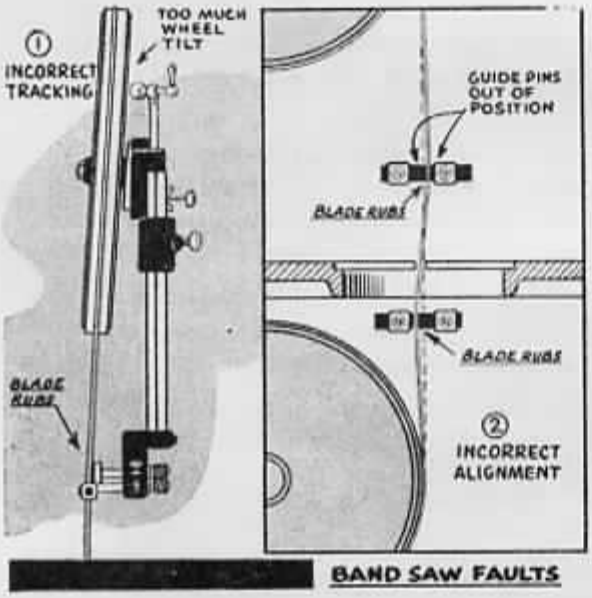
CUTTING: Certain fundamentals need to be thoroughly understood by the operator. They are summed up by the illustrations and when they become second nature, then you have mastered bandsawing.

A bandsaw will frequently tend to run towards one side. This can be countered, if not too pronounced, by angling the timber whilst feeding. It is caused by improper setting of guides and/or

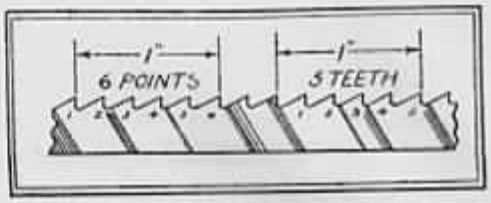


ABOVE: The Bandsaw Attachment

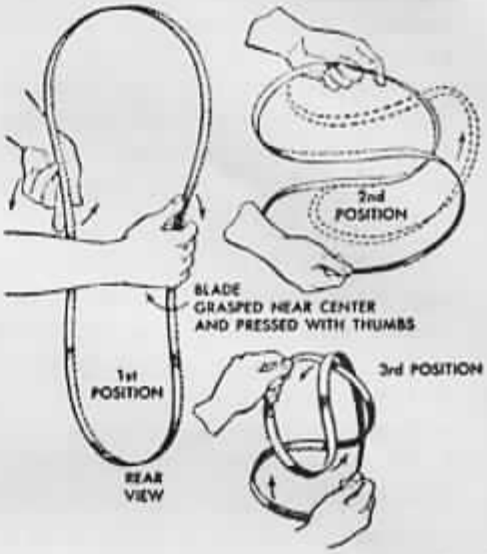
RIGHT & BELOW: Various helpful hints in the operation of a Bandsaw.



BAND SAW FAULTS

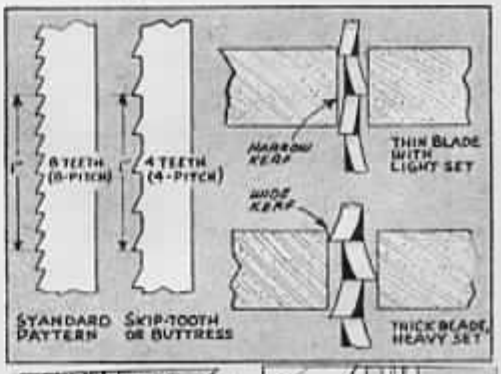


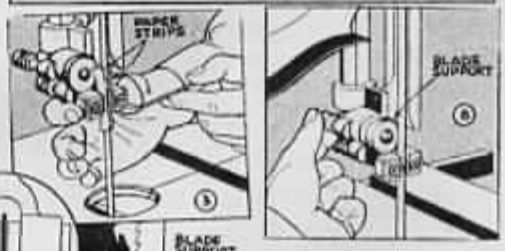
In any style of band saw blade, there is always one more point-per-inch than teeth-per-inch.



Above, how to fold the blade. Secret is starting hand position, with one thumb up and the other down.

Below, a thin blade with light set cuts smooth but slow; heavy set blade cuts fast but coarse.





blades. A bandsaw will also tend to follow the grain of the timber to some extent.

The blade will follow a straight line freely across the grain unless badly in need of "doing up" but with the grain it not only tends to follow the grain but cuts slower as well.

You will find this exemplified when cutting a circle from solid wood since the circular cut goes through the full range of grain direction.

Because cross grain cutting is a little easier to do, it follows that in circle cutting, you should start across the grain.

Avoid run outs. The best bandsaw cut is always a continuous one. If you must run out then do it on cross grain wherever possible as it is easier to pick up the cut again accurately.

TRAPS FOR THE UNWARY: There are two main types: wrong starting position and wrong side marking. The first is the easier to remedy since it is only a matter of back tracking or sawing out and starting again. Marking on the wrong side means usually that the work has to be re-marked on the opposite side which can be a long job. It is difficult to lay down hard and fast rules, but in general, it is a matter of visualising the cutting when marking out and doing your initial cuts to avoid having the work collide with the frame.

LAYOUT: Besides the annoyance of marking on the wrong side, layout warrants some thought to avoid waste of timber, to simplify the work or to do a better job. The illustrations show some of the standard dodges used but with practice and thought you will find plenty of others for yourself.

SAFETY: The bandsaw is inherently a safe machine, but because of that, some operators are prone to get careless. However, the commonest cause of accident in all woodworking is the dull blade. The main reason is the greater hand pressure needed to feed the work.

The greater muscular effort, the more likely you are to slip and the less control you have to stop the slip after it happens.

In all tool operation, safety is primarily the removal of any element of chance. If you work with the guide too high you expose yourself needlessly if your hands should slip.

A bad hand position will expose you to unnecessary risk. Your hands should always be in such a position that if anything goes amiss or you slip they will be clear of the blade.

RIPPING: Whilst ordinary ripping can be done in a bandsaw, it is not the easiest, fastest or most economical. For this reason, you should restrict your ripping in the bandsaw to certain special applications.

ROUND WORK: The sketch illustrates a good way to overcome the

difficulty of ripping round work parallel with its axis. This is always a tricky job without special aids and the bandsaw in conjunction with the jig shown will make it much easier. The wedge in the saw cut allows for adjustment of fit of the stock to give a nice firm sliding action. The metal strip behind the blade keeps the work square and prevents spiralling. With large pieces of round material, it can usually be done with sufficient accuracy in a V block as shown.

If you wish to cut a slotted end in round stock the easiest way is to bore the right sized hole in a rectangular block of wood; this then gives you a flat working surface. Here again the sketch will show more clearly than words.

RESAWING: This is the ripping of a thick board into two or more thin boards and the bandsaw is the ideal machine for the job. The machine known as a band resaw is really a bandsaw on a very large scale for commercial resawing. Size is the key to the success of this operation as it is a ripping job which means a wide blade to keep the cut straight and coarse teeth to cut freely, neither of these being a characteristic of small bandsaws. Except for certain special jobs calling for a very narrow cut or for some special reason it is better to do resawing on your Homeshop circular saw. In any case, with the bandsaw attachment the guide does not rise high enough to give you any greater depth of cut than you can get by double cutting with the circular saw.

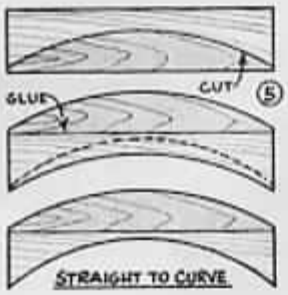
CIRCLE CUTTING: This is one of the common jobs for a bandsaw. Where it is a case of one off, the usual method of free hand cutting to a line is the way to do it. However, where a number of circles have to be cut and the thickness, hardness and grain of the timber is not such as to require manipulation, a pivot type circle cutting jig is a great help. In order to get perfect circles, the blade must be keen and have adequate set and the pivot point must be at an exact right angle to the blade and on a line with the cutting edge.

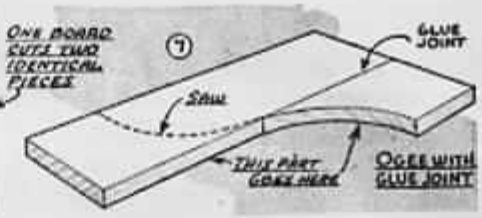
What happens when this basic rule is not followed is shown in diagrammatic form. A forward pivot point will cause the blade to cut inside the true track and a backward pivot point will have the opposite effect.

The two types of circle cutting jig practicable to use on your Homeshop bandsaw are illustrated.

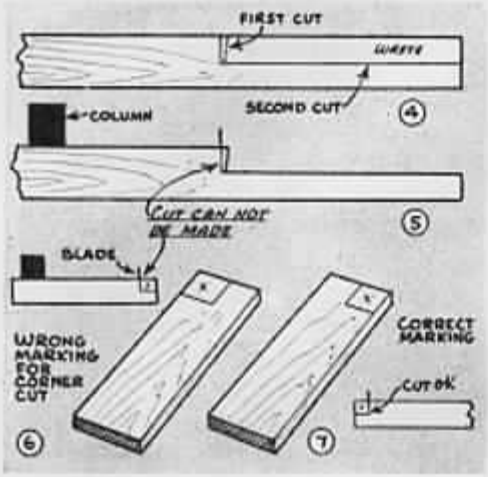
For small circles the method using a slotted arm clamped to a long blade guide made from a piece of square steel, is probably the most satisfactory and having an overhead pivot point, it is easier to locate satisfactorily. It does not have to work off the blade guide as shown. You may prefer some other type of attachment.

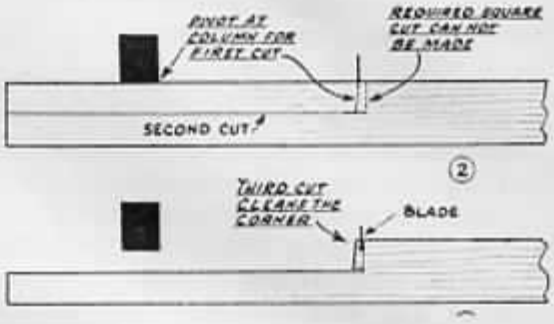
The other type involves making up a wooden table with built-in slide to give varying radii for the pivot point.

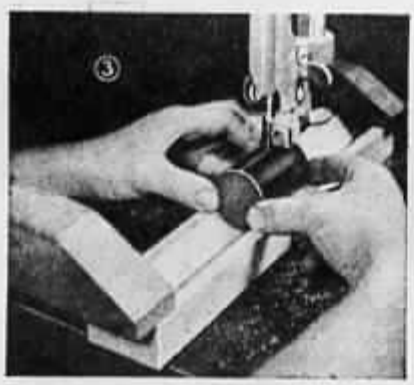


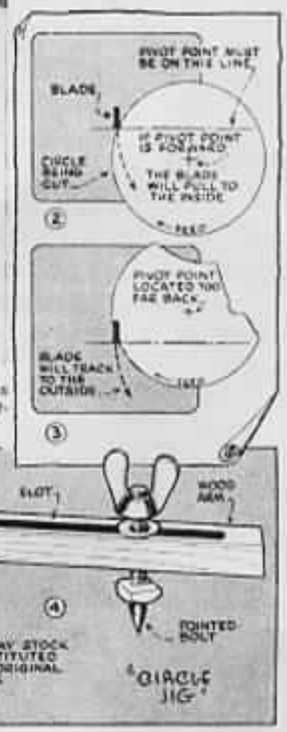


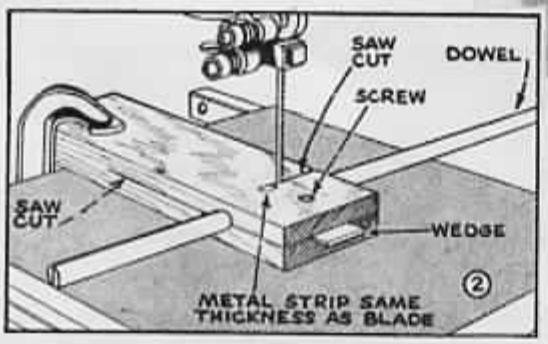
Stock layout tricks save lumber. Diagram at left shows method of cutting curve from straight board without waste. Above, cutting symmetrical ogee shape.



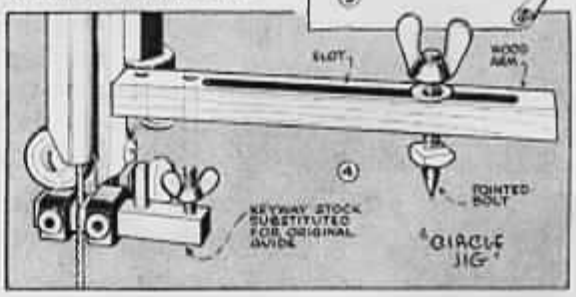


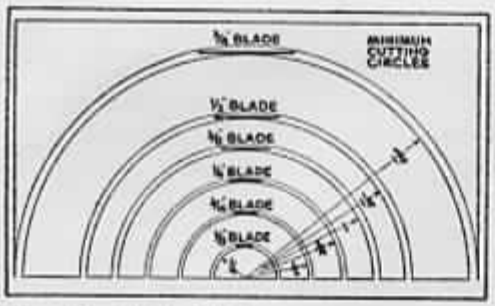




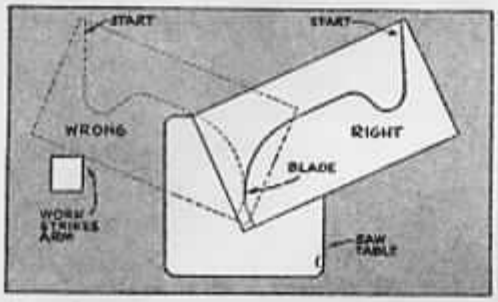


Extension guide bar type of circle jig has advantage of overhead pivot. Below, set-ups for hand sawing big circles.

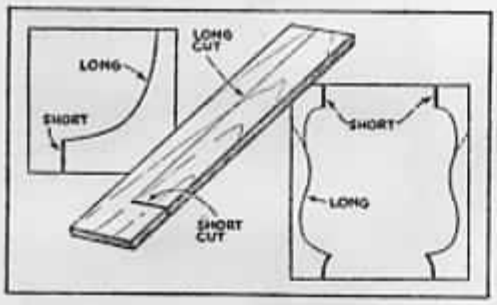




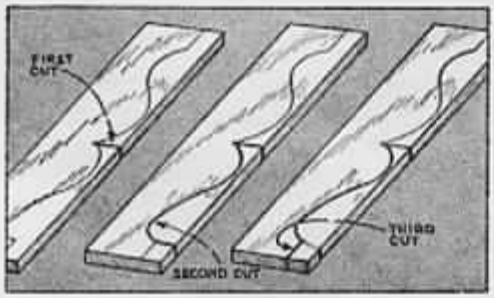
Use the Right Blade: *Use this table. For example, a ¾-inch blade cannot cut a circle less than 1¾-inch radius. In actual work, it is best to work one size smaller.*



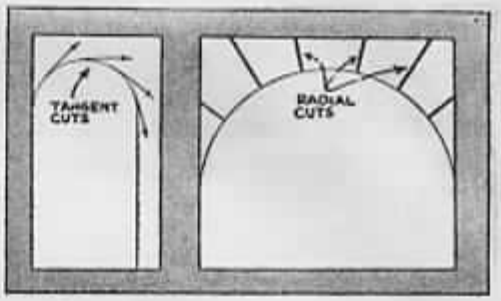
Watch Feed Direction: *Mentally follow the path of the cut before actually cutting the work. Many pieces of work will swing in such a fashion as to bind against the upper arm if not started properly.*



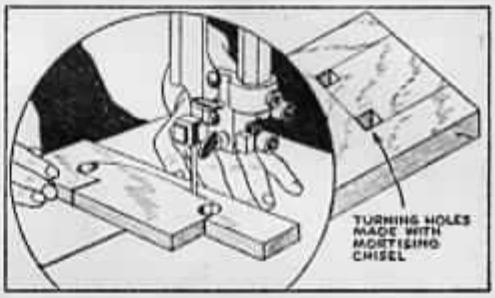
Make Short Cuts First: *Where choice of starting points is offered, make the shortest cut first. Backtracking out of the short cut can be done much more quickly than backing out of a long cut.*



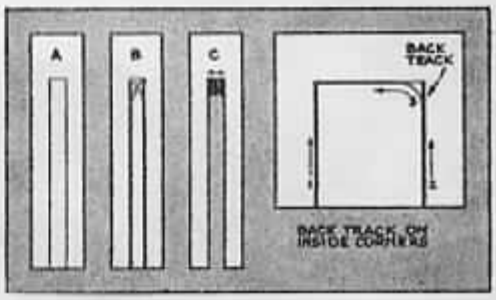
Break up Combination Cuts: *Combination cuts should be broken into a number of smaller cuts. The diagram shows a typical example. Study each piece of work to determine simplest method of cutting.*



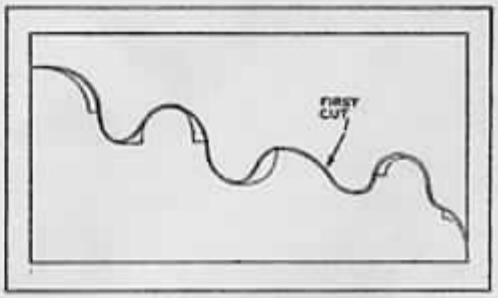
Break up Short Curves: *When it is necessary to make a wide blade go around a short curve, break the cut into a number of shorter tangent cuts, or, eliminate twisting strain by the use of radial cuts.*



Use Turning Holes: *Time can be saved if round turning holes are drilled and square turning holes mortised into the work before band sawing. Use this method for short curves with a wide blade.*



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



Rough out Complex Cuts: *Where cuts are complex, start at one end and follow as much of the line as possible on the first cut, then go back over the work and complete the smaller cuts.*

When cutting circles by this method, it is wise to keep a constant check on the finished job as once set or sharpness fall off, the blade will tend to wander.

There is also the completely external pivot point for cutting large circles but this hardly applies to a bandsaw the size of the Home-shop unit.

SPECIAL OPERATIONS

To support long light work or odd shaped pieces, a so-called loading table is used. It is essentially a piece of timber of required length, wide enough and thick enough to support the work piece where the latter is not rigid enough on its own. The method of fastening the work to the loading table will depend to some extent on the job being done, the fastening usually being put into the offcut wherever possible.

PARALLEL CURVES: Curved work with parallel edges can be cut with the use of a pivot guide as shown. One edge of the work is first cut to a pencil line, the parallel cut being taken by keeping the first cut against the pivot point. This set-up is hardly worthwhile for odd jobs, but where a number off are needed, it pays dividends.

COMPOUND CUTS: A good illustration of this was mentioned in the chapter on the wood lathe, where the stock was being prepared for turning a ball. Some of the illustrations are repeated for convenience.

SAWING TO A MASTER TEMPLATE: Where a number of similar pieces are to be cut, sawing with a template or pattern is a useful method of working. It requires a certain amount of skill in manipulating the work, and is only applicable to moderate curves. The set-up as shown, consists of a wooden arm clamped to the table, the end of the arm is cut to either a concave or convex curve depending on the work, and the centre of the curve is in line with the teeth of the blade. A slight notch is made at this point to house the teeth.

A pattern cut to the required shape of the work is necessary and should be sanded smooth on the edges to minimise friction. Anchor points such as screws or nails must be provided for holding the work. The blade should just clear the pattern, if it touches, recess it further into the arm.

It is a trifle confusing at first, as you are sawing blind, but with practice, results will surprise you.

THE PLANER BLADE SHARPENER

This attachment is primarily intended for the owner who is too far away to conveniently get his blades re-ground by a saw doctor, although there are always some of us who prefer to be self-contained wherever we are.

To use the sharpener, set your Homeshop up for boring except that the cup grinding wheel on its arbor is fitted in place of the boring chuck.

There is a groove in the bottom plate of the unit to suit each model Homeshop, and the guide strip should be fitted to the appropriate one for your machine. Before finally tightening, make sure the front face of the attachment is a true 90° to the spindle. Insert a blade in the holder, making sure it protrudes evenly and far enough. With the wheel running (top speed in Major series) slide the attachment to and fro gradually bringing the blade into contact with the wheel. As soon as any gaps have been ground out or the new grinding has reached the whole edge, the blade is ready for a final honing with a hand stone and can then be fitted to the machine.

To avoid undue heating, take light cuts with rapid passes. The slower the rate of passing the wheel and the heavier the cut, the more heat is generated.

NEVER grind off more than is necessary as you are shortening the life of the blade.

Do not be tricked by the feather edge that often forms with this type of grinding. It is not a rough edge but just a fringe of loose metal that falls off with honing.

The blade should contact the wheel approx. across its diameter.

All grinding wheels should be dressed occasionally, although the white wheels used for this operation usually wear down fast enough and evenly enough for dressing to be only a rare need. The problem is, the proper tool for this type of wheel dressing is a diamond and such a tool costs several pounds.

Whilst admittedly this set-up does not give a hollow grind, it is compensated for by a slightly greater angle of bevel and the difference in honing is barely noticeable.