WOOD, PLASTIC
METALWORKING
KNOW-HOW . . . WITH

9 2938

RETAIL STORE

RADIAL-ARM SAWS

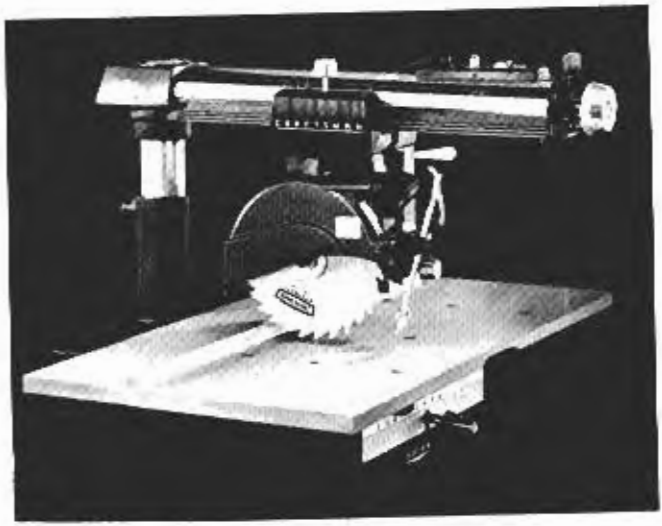
CRAFTSMAN

WOOD, PLASTIC AND METALWORKING KNOW-HOW

WITH

CRAFTSMAN RADIAL-ARM SAWS

OVER 200 OPERATIONS — FULLY ILLUSTRATED



ALTHOUGH THE CRAFTSMAN 10-IN. RADIAL-ARM SAW IS USED THROUGHOUT TO ILLUSTRATE THIS BOOK, ALL SET-UPS AND OPERATIONS DESCRIBED HEREIN CAN BE PERFORMED AS DESCRIBED WITH ALL CRAFTSMAN RADIAL-ARM SAWS

A MIDWEST TECHNICAL PUBLICATION
for

SEARS, ROEBUCK AND CO. — U. S. A.
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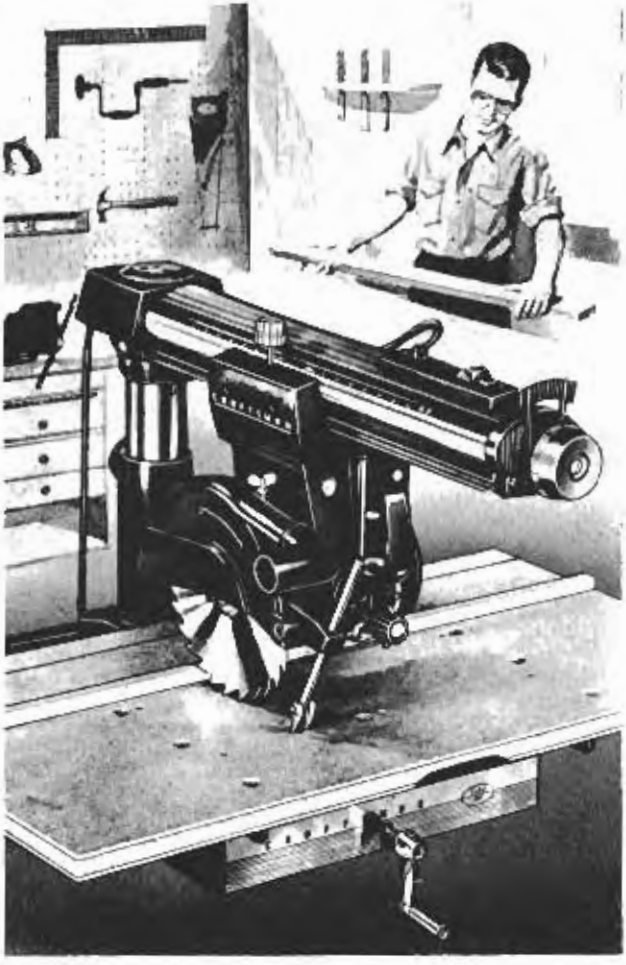
SEARS
RADIAL-ARM SAW KNOW-HOW

REVISED 1969

For information, address Customer Relations, Department 157, Sears, Roebuck and Co., Homan and Arthington Aves., Chicago, Illinois 60607.

A CRAFTSMAN HANDBOOK

CONTENTS



OUR BEST FOR HOMESHOP USE

CRAFTSMAN

10-IN. RADIAL-ARM SAW

- ***DEVELOPS 2 HP***
- ***AUTOMATIC FRICTION LOCK – holds carriage securely when at end of track – stops creeping.***
- ***ELECTRO-MAGNETIC BRAKE – stops blade in 10 sec. – no drag.***

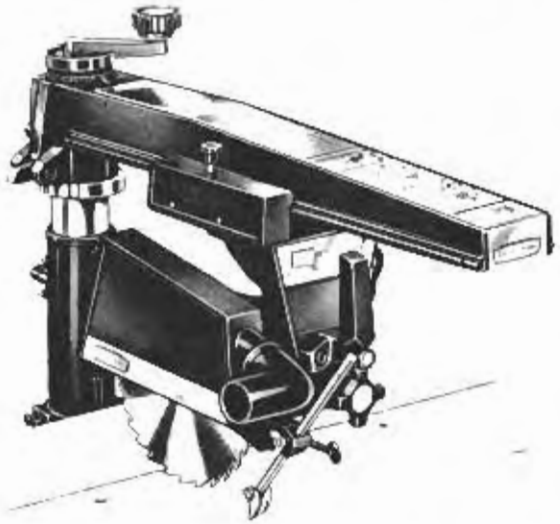
An exceptionally sturdy and durable tool for professional or homeshop use — extremely accurate. Color-coded controls for quick, easy set-ups. Extra large worktable. Key-lock ON-OFF switch guards against unauthorized use . . . thermal overload protector . . . no belts or gears. Sure, easy operation — carriage glides on permanently-lubricated ball bearings. Accessory shaft end 1/2 x 20 threaded for standard accessories. Fully equipped with adjustable anti-kickback device, sawdust discharge elbow, and 10" Kromedge combination blade — 3450 rpm, 110 or 230 V, capacitor motor with permanently-lubricated ball bearings.

SPECIFICATIONS

Blade – 10" x 5/8" hole
Table – 26-1/8" x 36", laminated hardboard
Scales – Miter, bevel, in- and out-rip
Arm Rotation – 360°
Miter Stops – 0° and 45° R and L
Yoke Swivel – 180° R and L
Yoke Stops – 0°, 45°, and 90° R and L
Power Unit Tilt – 180°
Bevel Stops – 0°, 45°, and 90° R and L
Depth of Cut – 2-1/2" vert. or 2-1/8" at 45°
Width of Rip – 25-3/8" max.
Width, Crosscut – 15-1/2" max.

CRAFTSMAN

9-IN. AND 12-IN. RADIAL-ARM SAWS



9-IN. SAW IS SHOWN HERE. 12-IN. SAW IS SIMILAR IN APPEARANCE, WITH ADDED FEATURES AS TOLD BELOW.

9-IN. HOMESHOP SAW

- ***DEVELOPS 1-3/4 HP***
- ***CARRIAGE RIDES ON STEEL TRACKS***

Lightweight and portable, yet accurate and rugged — a precision-built tool. Carriage glides smoothly, easily over permanently-lubricated ball bearings. Key-lock ON-OFF switch prevents unauthorized use. Has thermal-overload protector ... no belts or gears . . . anti-kickback device . . . sawdust discharge elbow . . . 9" Kromedge combination blade. Accessory shaft end is 1/2 x 20 threaded. Ball-bearing motor for 110 V, 60 cycle, AC. Specs. same as for 10-in. saw, except those below.

SPECIFICATIONS

Blade – 9" x 5/8" hole
Table – 27" x 32" chipboard
Scales – Miter, Bevel
Yoke Stops – 0°, 90°, R and L
Depth of Cut – 2-1/2" vert. or 2" at 45°
Width, Crosscut – 15-1/2" max.

COMMERCIAL-USE 12-IN. SAW

- ***DEVELOPS 3 HP – cuts wood 4-in. thick***

A massive, brawny, powerful saw, precision-built for top cutting accuracy. Top professional quality throughout. Has all the features of the 10-in. saw plus: no blade protrusion when out-ripping . . . smooth operation as carriage glides along steel tracks on permanently-lubricated ball bearings . . . easily removed and stored motor, yoke and carriage . . . legs do not require a stand, or when mounted horizontally, act as carrying handles. All specifications same as for 10-in. saw except as listed here.

SPECIFICATIONS

Table – 28-1/4" x 44" x 1" chipboard
Yoke Stops – 0° and 90°, R and L
Depth of Cut – 4" vert. or 3-1/8" at 45°
Width of Rip – 26-1/2" max.
Width of Crosscut – 36" max.

A CABINET FOR YOUR SAW

HEAVY-DUTY STEEL CONSTRUCTION FOR A SOLID MOUNTING

FOR 10-IN. SAW

Solid support for your radial-arm saw or other heavy tools. Holds 5 drawers or 4 shelves, or any combination. Perforated sides hold tool and accessory hooks. With casters, it's a shop-cart! Basic stand includes a top tray, bottom, back, adjustable feet, and 26 hooks.

FOR 9 OR 10-IN. SAW

BASIC STAND – For 10-in. saw only. Supplied as described above, but may be used with items below. Sized to accommodate your tool.
Steel Drawers – Size, 16-3/4x15-1/8x4-1/4" high. Complete with mounting rails and slides.
Steel Shelf – Size, 16-3/8x18-7/8x1-3/8".
Steel Door – Full-length hinge; tumbler lock; 2 keys.
Retractable Caster Set – Step on lever once to lower, again to raise casters. Set of 4.

UTILITY STAND – Steel, for 9" or 10" saw. Has perforated sides, 26 assorted hooks, adjustable feet (not for caster-mounting). Holds 5 drawers or 4 shelves or combinations (listed under BASIC STAND). Sized to accommodate your tool.

RADIAL-ARM SAW ACCESSORIES

FLOATING RING GUARD

Full view operation. Covers work as it is fed into saw. Fits 10-in. saw only.

MOLDING-HEAD GUARD

Specially designed to replace regular saw guard when shaping. Available in two sizes: 7 and 8 in.

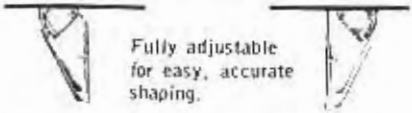
1/2-IN. KEY CHUCK

Precision-geared with key. For mounting at accessory shaft end for routing, drilling, etc. Holds standard shank boring tools, 5/64" to 1/2".

ROTARY SURFACE PLANER

Three blades give extra-smooth finish. Mounts on saw arbor.

SHAPER FENCE ATTACHMENT



Fully adjustable for easy, accurate shaping.

DOVETAIL ATTACHMENT

Complete with instructions for quick, easy making of professional-quality dovetail joints.

1

CRAFTSMAN KROMEDGE SAW BLADES

Whatever your cutting requirements, there is a quality *Craftsman* blade especially designed for the job. *Craftsman* blades stay clean (gum and rust resistant) and sharp longer, and cut smoother than ordinary steel blades. Each is made of finest saw steel and is *Kromedge* treated to increase the hardness and wearability of the surface and cutting edges. Blades listed below are available for 9, 10 and 12-in. Radial-Arm Saws.

2

3

1. FREE SMOOTH-CUT COMB.
2. FREE-CUT RIP
3. FREE-CUT COMBINATION
4. CABINET COMBINATION
5. OLD-WOOD, NAIL CUTTING
6. CHISEL-TOOTH COMBINATION
7. THIN-RIM VENEER
8. THIN-RIM CABINET COMB.
9. PLYTOOTH
10. CARBIDE-TIPPED
11. STEEL SLICER
12. MASONITE CUTTING
13. NON-FERROUS METAL

4

5

6

7

8

9

DADO HEAD SETS

No. 1 is best, professional-quality, satin-cut, 7" set – will even cut veneers and plywoods with practically no splintering. Dadoes to 1-1/4" deep. No. 2 is 8" heavy-duty set for extra tough jobs. Dadoes to 1-3/4" deep. Both are *Kromedge* quality.

10

11

12

13

1

2 1/8" outside cutters, 4 1/8" chippers and 1 1/16" chipper. Assembles to 13/16" width.

2

2 1/8" outside cutters, and 6 1/8" chippers. Assembles to 1" width.

Tungsten-carbide is one of man's hardest metals. That's why this carbide-tipped, *Kromedge* blade cuts so fast – stays sharp so long. Blade cuts smoother, feeds more evenly and takes less power than regular blades. Cuts all woods, most plastics, wallboard, thin brass or aluminum. Outlasts an ordinary blade 20 to 1.

MOLDING HEADS AND CUTTERS

1-CUTTER HEAD

3-CUTTER HEAD

1-Cutter Head, with 5-5/8" cutting dia., is excellent for 9 and 10-in. radial-arm saws. Set includes 18 different shape bits to mold various trim, edging and joint designs, with unlimited variations if bits are used in combinations.

3-Cutter Head, available in 4-3/4" and 7" cutting dia. – either in sets with an assortment of most popular bits, or heads only and 18 separate cutter patterns.

ADJUSTABLE DADO

Precision-cut, adjustable hub. Dial widths from 1/4" to 13/16" without removing from saw. Calibrated in 1/16th in. Max. depth of cut, 2". Use to plough, dado, lap, groove, joint, and rabbet. Tool steel, 7" blade has 8 precision-ground carbide-tipped teeth. Bevel-ground on front face for free cutting on plywood and crosscutting on all solid woods. Use on all radial-arm saws.

SANDING NEEDS

PLATE

DRUM

SANDER-POLISHER

SANDING PLATE – 10" diam., replaceable medium and coarse grit sides; flat sanding surface. 5/8x12 Acme thread hub. Fits all radial-arm saw arbors.

SANDING DRUM – 3" face, 2-1/4" diam. For 1/2x20 threaded accessory shaft. Replaceable medium grit sleeve cushioned by rubber drum.

SANDER-POLISHER KIT – Sponge rubber pad with rubber swivel joint; three 5" diam. sanding discs; lambswool polishing bonnet; tube of activator cement. Use on accessory shaft end for surface sanding or polishing.

GRINDING WHEELS

Fully-vitrified (crystallized) in an electrically-controlled kiln over 200 hrs. Perfectly-balanced. First quality aluminum-oxide abrasive grains of uniform size. Meets Industrial Standards. 3/4" hole. Use with bushing on saw blade arbor.

Fine (100) grit for knives, keen-edged tools, finish grinding, polishing. Medium-fine (60) grit for woodcutting tools, preparation for finish. Medium-coarse (36) grit for fast removal of stock, machine-shop use.

GRINDING, BUFFING ACCESSORIES

1

2

3

1. WHEEL BRUSH – Tampico-fiber, 6" diam. x 5/8" face. Use with 1/2" arbor chucked at accessory end.
2. WIRE SCRATCH WHEEL – For removal of rust and paint. 8" diam. Width: coarse, 11/16"; fine, 5/8"; heavy-duty, 1-3/8". Fits saw-blade arbor.
3. POLISHING BONNETS – Lambswool, 8" diam. Use over disk chucked at accessory shaft end.
4. BUFFING WHEELS – Top industrial quality 8" diam. Fits at accessory shaft end with 1/2" chucked arbor. Use with buffing compound to clean rusty tools, pots and pans, etc.
5. WIRE CUP BRUSH – Use to remove rust, paint, etc. 2-3/4" diam., 1/4" shank.
6. WIRE WHEEL BRUSH – Removes paint, burrs, etc. 3" diam., 1/4" shank. Fine or coarse.
7. ABRASIVE "FLAP" WHEEL – 6" diam., 1" thick, 3/4" hole. Use with bushing on saw-blade arbor. Polishes or grinds metal, removes paint, etc. Cloth-backed, 80-grit aluminum-oxide abrasive strips connected to steel flanges.

4

5

6

7

CRAFTSMAN TWIST DRILLS

Craftsman High-Speed Twist Drills are professional quality, precision-ground. For use at accessory-shaft end in drilling all metals, hardboard, etc. A black oxide coating acts as a coolant for longer drill life. Carbon steel twist drills may be used for wood or plastic boring. Both types of twist drills are available in all popular sizes.

WOOD BORING BITS

Specially designed for power wood boring. Precision-ground, hardened alloy steel with brad points for no-jump starts. Sizes from 1/8" to 1-1/4".

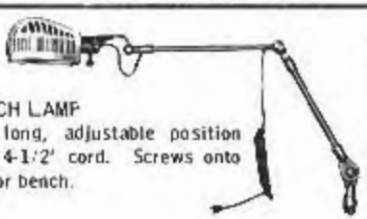
USEFUL ACCESSORIES

CRAFTSMAN HOLD-DOWN SET

Clamps to fence — provides 4 steel fingers to hold work down and in.

TAPER JIG

All-aluminum, very accurate. Makes it easy to plot and cut single or double tapers.



BENCH LAMP

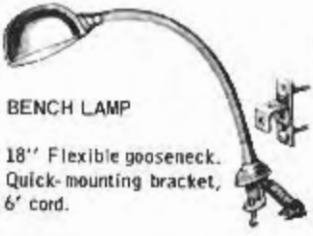
36" long, adjustable position arm, 4-1/2' cord. Screws onto tool or bench.

INDUSTRIAL GOGGLES

Hardened, ground, 50-mm lenses; adjustable plastic frames; side shields.

FLEXIBLE MASK-GOGGLES

Wide vision, clear, .050" plastic lens. Fit over spectacles



BENCH LAMP

18" Flexible gooseneck. Quick-mounting bracket, 6' cord.

CRAFTSMAN POWER-PAK

Two 3-prong outlets, on-off toggle switch (for up to 1-HP motor), and safety light to warn when "on". No cord. For 110-120 V., 15-amp., AC.

FACE SHIELD

Tough, clear plastic window protects eyes and face. Sweatband adjusts.

CHAPTER 1

YOUR RADIAL-ARM SAW FEATURES

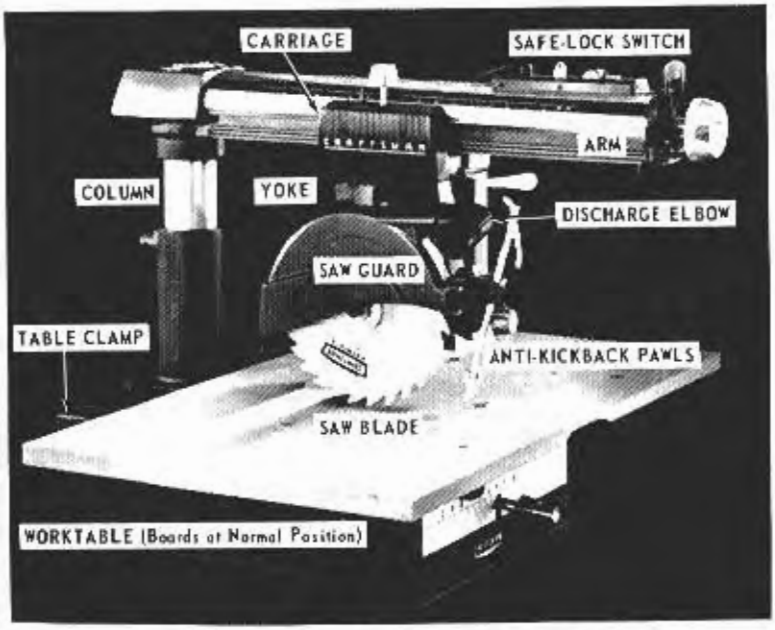
Your *Craftsman* Radial-Arm Saw is a professional quality tool. It features readily accessible controls that are color-coded for quick identification . . . and many design refinements which provide the utmost ease and safety of operation.

NOTE

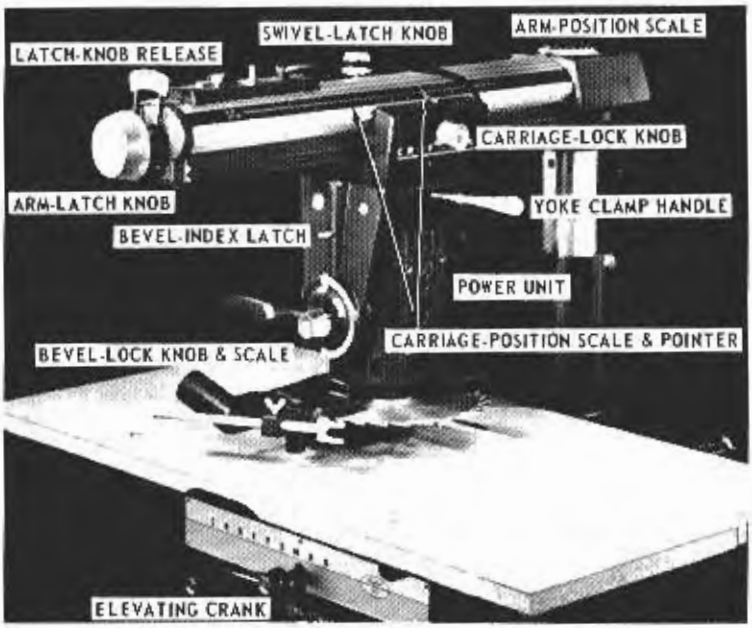
Most of the illustrations in this book show the Craftsman 10-Inch Radial-Arm Saw. However, all operations explained herein can also be performed, in much the same manner as described, with any other radial-arm saw.

THE POWER-UNIT MOTOR delivers full rated hp. Except for the 9-In. Saw, it is fitted with an automatic electro-magnetic brake that stops the blade within seconds, but does not drag during starts. There is an automatic overload protector with manual reset button for motor protection. An on-off keylock switch, conveniently located, provides extra safety for you.

THE SAW SHAFT-END is 5/8-in. dia. and is fitted with two arbor collars and a hex nut. Circular blades and other circular accessories (grindstones, dado sets, etc.) — up to the max. rated sizes for the saw — can be operated at this end.



LEFT-SIDE VIEW — 10-IN. RADIAL-ARM SAW

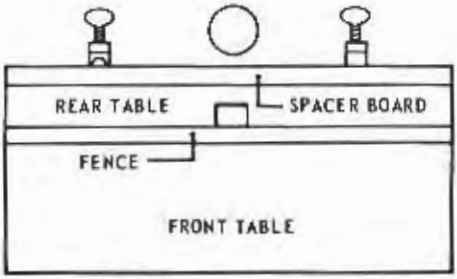


RIGHT-SIDE VIEW — 10-IN. RADIAL-ARM SAW

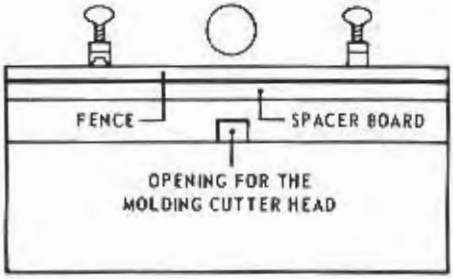
THE ACCESSORY SHAFT END has a 1/2-20 thread with protective cap. On it you can mount a key chuck (up to 1/2-in. capacity) to hold drill or router bits, etc. — or any 1/2-20 threaded wheel, brush, disc, drum, etc. that it is practicable to use.

THE SAW GUARD reduces the amount of blade that is exposed and is an important safety feature. It must never be removed when using a saw blade; but may be removed for use of a grindstone, sanding disc or similar "non-sharp" accessory. The guard is fitted with a *Sawdust Discharge Elbow* (to blow sawdust away from the operator), and with *Anti-Kickback Pawls* (to hold work down on table when ripping).

THE WORKTABLE consists of four pieces: a *Front Table* bolted to two steel channels — and a *Fence, Spacer Board and Rear Board* which can be arranged to suit the operation. The three interchangeable pieces rest on the channels and are secured by two *Table Clamps* which wedge them in behind the stationary front table.



FENCE AT NORMAL POSITION



FENCE AT REARMOUNT POSITION

The *Arm (C)* is positioned by manual rotation. It can be rotated 360° but indexes (locks) at 0° (centered position), 45° left and 45° right unless the *Latch Knob Release (B)* is held pulled out while rotating the arm. In any position — even one of the index positions — the arm must be locked to positively secure it. It is locked by clockwise tightening the *Arm Latch Knob (A)*, which must then be loosened 1/4 turn to reposition the arm. A *Scale* atop the column with a *Pointer* attached to the arm indicates arm setting at any position from 0° to 90° right or 90° left. The controls and pointer are coded *red*.

CARRIAGE TRAVEL & POSITIONING

ARM ELEVATION

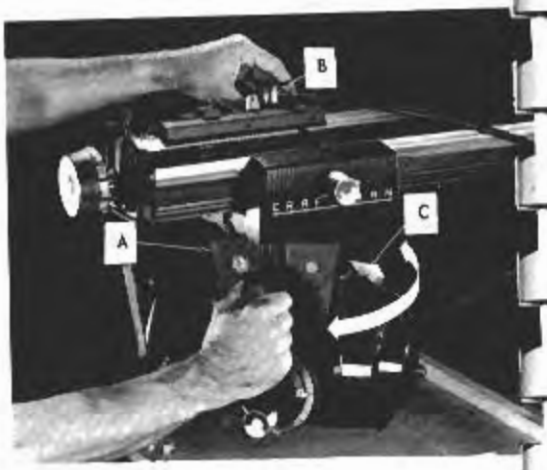
A convenient *Elevating Crank* raises or lowers the Arm, Carriage and Power Unit — exactly 1/16 in. for each half revolution of the crank. Maximum travel is 8-1/8 in. No lock is needed; the parts remain at any height to which adjusted. Crank and top-front of Column are coded *blue*.

ARM SWING

The *Carriage (A)* is positioned by manually gliding it along the arm — to any desired position indicated by a *Pointer (B)* with reference to a *Scale (C)*. There are two scales on right side, one to show "Out-Rip", the other to show "In-Rip" blade position with respect to the fence at its normal position. A single scale on left side shows "Out-Rip" blade position with respect to the fence at its rearmost position. If a fixed position is desired the carriage must be locked to eliminate play — by clockwise tightening of the *Carriage Lock Knob (D)*. Leave this knob loose, however, if your operation requires traveling the carriage along the arm . . . but never leave it loose with motor running unless you are holding the carriage handle. Knob and pointers are coded *green*.

YOKE SWIVEL (MITERING)

The *Power Unit Yoke (A)* can be manually swiveled on the carriage more than 180° clockwise or counterclockwise from normal (blade aligned with arm) position. There are six indexed positions: 0°, 45° and 90° right, 45° and 90° left, and 180°. The yoke stops at each position unless the *Swivel Latch Knob (B)* is held lifted up. In any position — even the index positions — the yoke must be locked to eliminate play — by pushing the *Yoke Clamp Handle (C)* tightly toward the column. Pulling the handle toward you loosens the yoke. Yoke, latch and handle are coded *orange*.



POWER UNIT PIVOT (BEVELING)

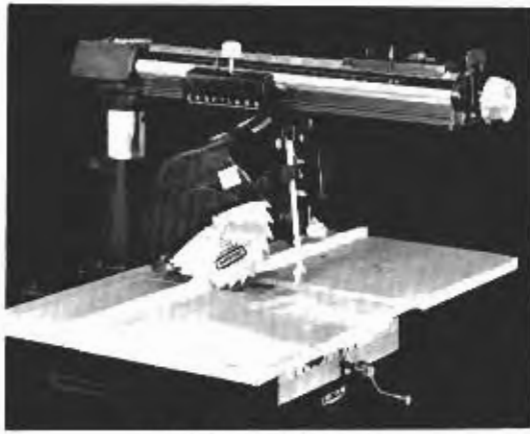
The *Power Unit* can be manually pivoted 180° in either direction in the yoke. Rotation is, however, limited by the guard or by any accessory mounted at either motor-shaft end. Pivoting is indexed at five positions: 1) Accessory Shaft at 90° (vertical and at bottom); 2) Accessory Shaft at 45° (to the right from 90°); 3) Both the Accessory Shaft and the Saw Shaft at 0° (horizontal — which places the saw blade vertical); 4) Saw Shaft at 45° (down from 0°); 5) Saw Shaft at 90° (at bottom, with blade horizontal). Positions 1 and 2 can be reached only with the saw blade and guard removed; positions 4 and 5 can be reached only when nothing is mounted at the accessory shaft end. To avoid or to release from an index position hold the *Bevel Index Latch (B)* up while pivoting. In any position — even an index position — the unit must be locked to eliminate play. To lock, tighten (clockwise) the *Bevel Lock Knob (A)*, which must be loosened for repositioning. A *Scale* (behind knob) with a *Pointer* indicates in degrees the blade bevel-angle setting. Latch, knob and pointer are coded *yellow*.

IMPORTANT: Whichever radial-arm saw you have, refer to the instruction sheet furnished with it. Your tool must be maintained in perfect adjustment to produce the top-quality work for which it has been designed.

THE 11 BASIC SET-UPS

All tool operations are performed using one or another of the eleven basic set-ups.

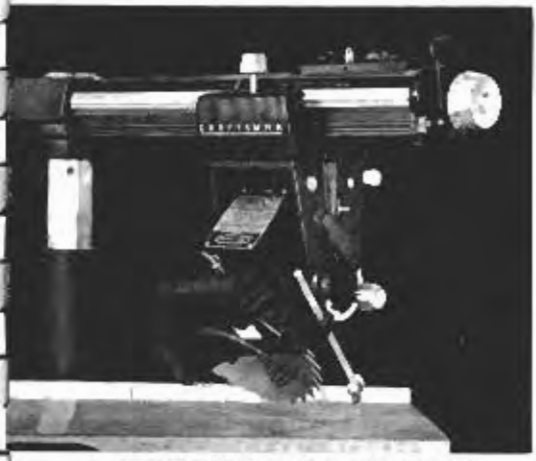
For every operation (except special ones explained later) the arm latch knob, the yoke clamp handle and the bevel lock knob *must all be tightened* after making the set-up. Never alter a set-up until power is off and the saw blade stopped.



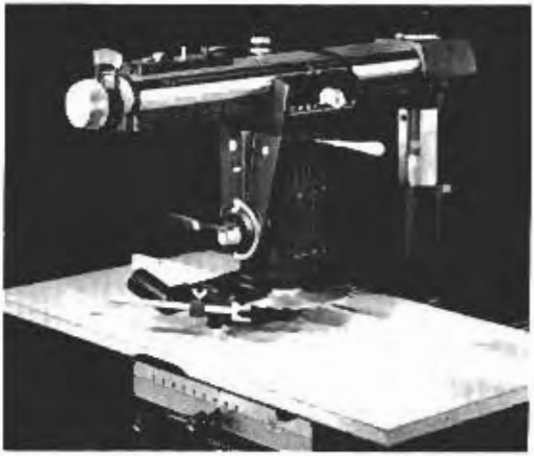
VERTICAL CROSSCUT
Arm 0°, Yoke 0°, PU 0°, Carr. Free

BEVEL CROSSCUT
Arm 0°, Yoke 0°, PU 1-45°, Carr. Free

MITER CROSSCUT
Arm 1-90°, Yoke 0°, PU 0°, Carr. Free



COMPOUND MITER CROSSCUT
Arm 1-90°, Yoke 0°, PU 1-45°, Carr. Free



HORIZONTAL CROSSCUT
Arm 0°, Yoke 0°, PU 90°, Carr. Free

VERTICAL IN-RIP

Arm 0°, Yoke 90° In, PU 0°, Carr. Locked

BEVEL IN-RIP

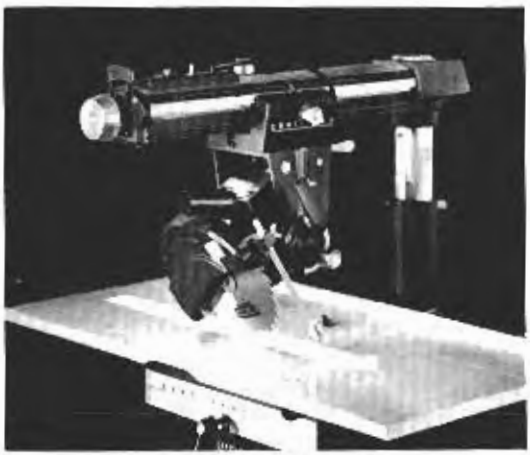
Arm 0°, Yoke 90° In, PU 1-45°, Carr. Locked

HORIZONTAL IN-RIP

Arm 0°, Yoke 90° In, PU 90°, Carr. Locked

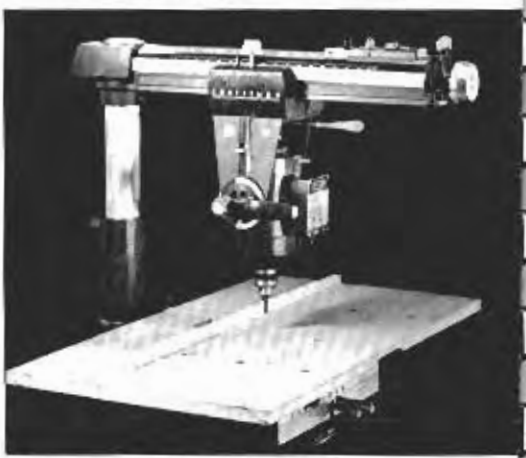
VERTICAL OUT-RIP

Arm 0°, Yoke 90° Out, PU 0°, Carr. Locked



BEVEL OUT-RIP

Arm 0°, Yoke 90° Out, PU 1-45°, Carr. Locked



VERTICAL ROUTING

Arm 0°, PU 90° R, Yoke & Carr. As Desired

CHAPTER 2

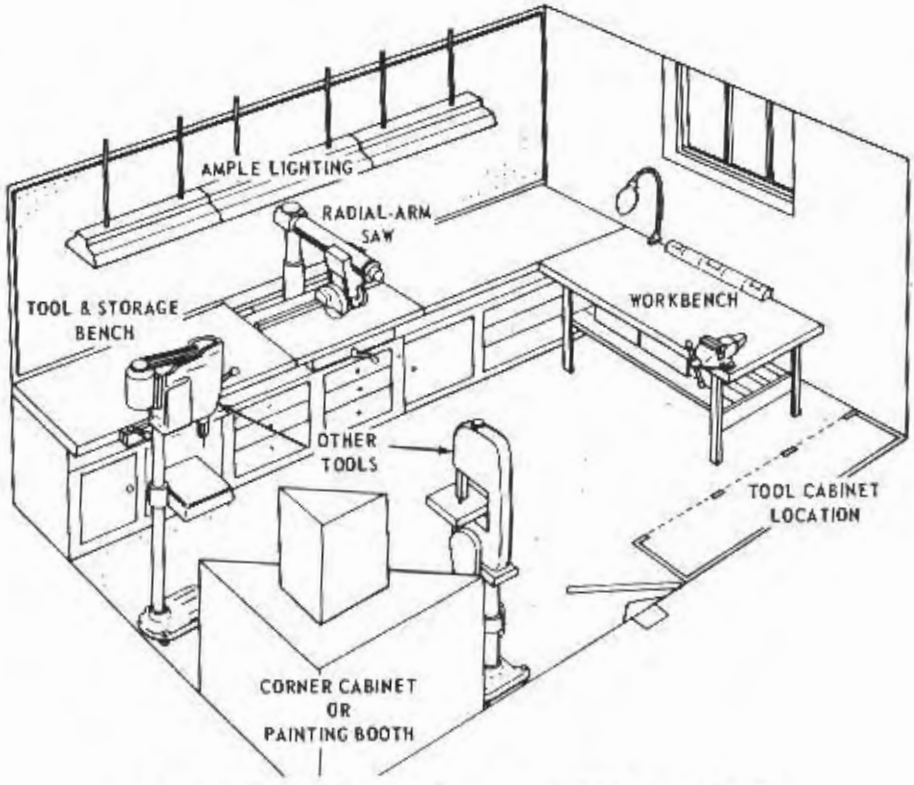
GETTING THE MOST FROM YOUR RADIAL-ARM SAW

SELECTING A LOCATION

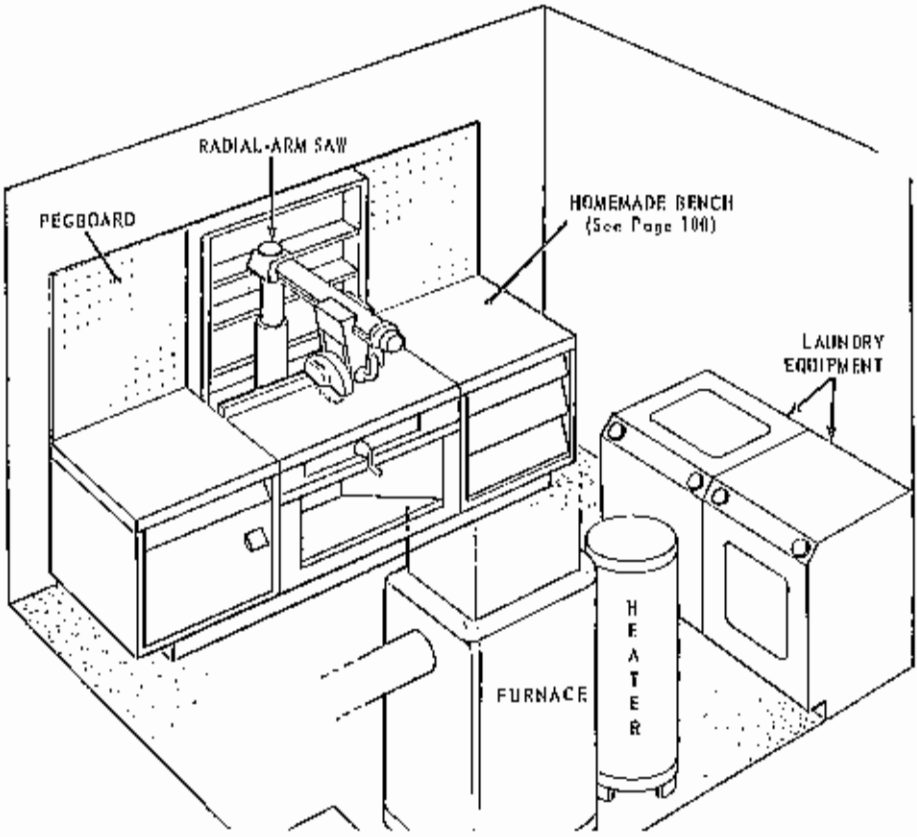
Sufficient light and space for unrestricted movements are two factors essential to maximum safety and professional-quality work. Be certain to have ample light — daylight or artificial. Preferably, arrange to have it fall directly on your workpieces . . . certainly, not in your eyes. Light that shines onto the worktable from behind your left or right shoulder is the most desirable. Also, allow all the room you can at each side of the tool and behind you. If a proper permanent location is impossible then best mount your saw so that its position can be shifted to meet the space needs of each different workpiece.

LEVELING YOUR SAW

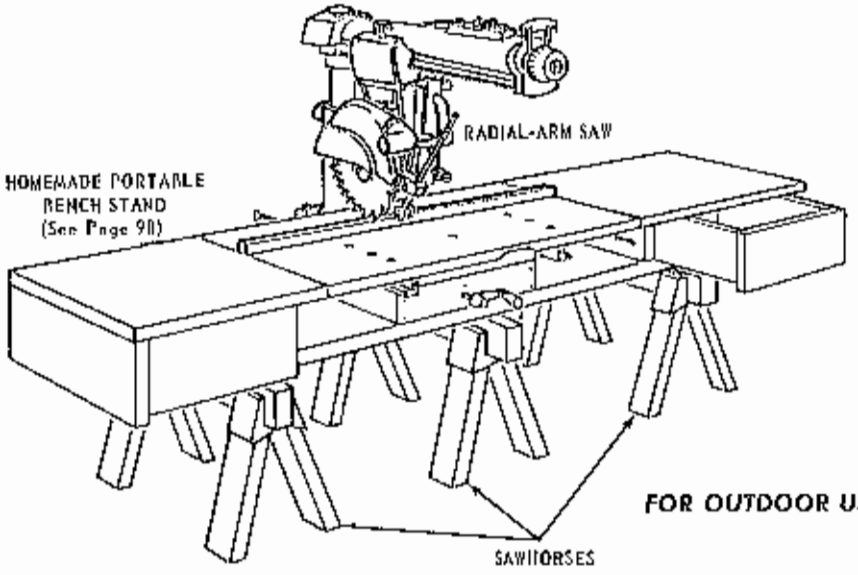
Most basement, garage or barn floors are sloped for drainage. If you are



TYPICAL RADIAL-ARM SAW SET-UP IN A WORKSHOP



A CORNER SHOP



FOR OUTDOOR USE

preparing a permanent bench set-up, cut off or shim up the bench legs to make it level. For a movable set-up make whatever leveling arrangements you can. To assure accurate work and ease of tool operation the saw must set level. Check with a spirit level on the worktable, side-to-side and fore-to-aft.

WIRE TOOL CORRECTLY

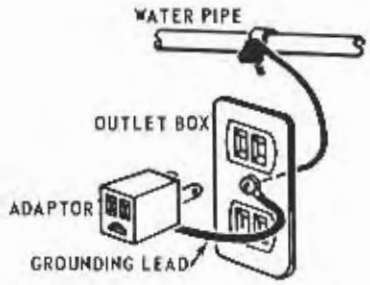
Make certain that your power supply is the same rated voltage and current (AC or DC) specified on your tool motor nameplate . . . and, if AC, that the phase and cylces are the same. Moreover, if there is any doubt, check (or have the power company check) to make certain that the voltage delivered to your saw does not drop more than 10% below the rated amount. An excessive voltage drop can occur, for instance, in an old building not originally wired for all the electricity now being used by the occupants . . . or in a farm barn to which the wiring is undersized or poorly insulated. Any drop in voltage has the same effect on your tool motor as overloading it . . . can, if consistently extreme, damage the motor and will, in any event, make it run with less efficiency.

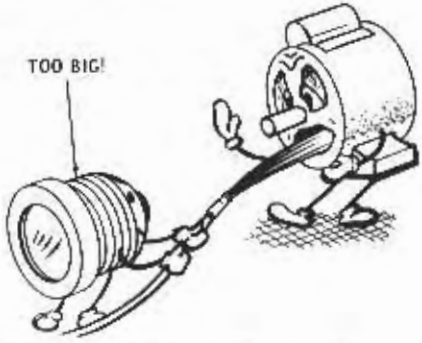
For the above reason also make certain that any extension cord you use for connecting motor to power supply is of sufficient wire size.

RECOMMENDED WIRE SIZES

Length of Run	Wire Size For 115V	Wire Size For 230V
Up to 100 ft.	No. 10	No. 12
100 to 150 ft.	No. 8	No. 10
150 to 200 ft.	No. 6	No. 8
200 to 400 ft.	No. 4	No. 6

Even a manual reset, thermal overload protector does not protect a motor from line voltage surges due to short circuits or other causes. For maximum protection fuse the circuit to your tool with a time-lag fuse





rated the same as the running amps specified on motor nameplate. Also, for safety, use the adapter plug furnished with your saw. If saw is to be operated on 230V, refer to the instruction sheet furnished with your tool.

PREPARING THE WORKTABLE

To saw completely through a workpiece the blade must bite into the worktable surface (about 1/16 inch). In time, these bites will deface the table surface. You can prevent defacement, however, by covering the table top with a 1/4-in. covering of plywood or hardboard. Cut a separate

covering for each table board (except the fence) and tack each covering in place at its four corners. Do *not* cover the square opening in rear table. After grooving the top (following), tack all around each edge on (approx.) 6-in. centers. When covering becomes too much defaced it can be turned over or replaced.

Every through cut will groove the tabletop, but there are certain cuts which you will perform so frequently that it is good practice to pre-groove the top for them. Properly made grooves also will help you position your workpieces for crosscutting. To this end, lock the table boards in *normal* position and do as follows.

---

1 - Position tool for a vertical crosscut. With carriage all the way at rear start the motor and lower the arm until the blade bites into tabletop 1/16 in. Pull carriage straight out to end of arm. The blade will cut a vertical crosscut groove, through the fence and out to front table edge.

2 - Position tool for a 45° bevel crosscut, and proceed as above to cut a 45° bevel-crosscut groove.

3 - Position tool for a 45° right miter crosscut, and similarly cut the groove for this crosscut. Also cut the groove for a 45° left miter crosscut.

STARTING THE VERTICAL-CROSSCUT GROOVE

4 - Position tool for a vertical in-rip. Begin with blade just touching the fence and lowered to take a 1/16-in. bite, then pull the carriage slowly outward, thus allowing blade to cut a trough in table top. When trough extends about half across the table, turn off the motor, elevate the arm, shift to the vertical out-rip position, relower the blade — and continue until trough extends all across table. The rip trough thus cut will provide blade clearance for ripping at any in- or out-rip carriage setting.

THE FINISHED RIP TROUGH

(Blade Back at Starting Position)

OPERATING SAFELY AND EFFICIENTLY

Good workmanship practices not only assure a maximum of operator's safety, they also produce a much higher degree of work quality. Here are some general rules to remember:

1 - Dress properly. No long dangling tie, no long flopping sleeves nor other loose clothing to be caught by the tool or the work. Also, wear a face shield, goggles or glasses to protect your eyes from flying chips or dust.

2 - Have firm footing. Make certain you will not slip at a critical moment. A sawdust footing can be treacherous. Don't allow surrounding objects to crowd you.

3 - Never place hands in jeopardy. Keep your hands well away from the whirling blade or any other cutting tool, keeping in mind the direction a hand may have to move while feeding the work . . . or the direction it could suddenly move should the workpiece slip. If there's even the slightest doubt, substitute a push stick or rig a safe set-up to hold and guide the work.

4 - Stop the tool between operations. Wait for the blade (or other cutting tool) to fully stop before changing the set-up of tool. Never use worktable as a bench for some intermediate operation while the tool is running.

5 - Use the guard and anti-kickback pawls. Every real professional knows that these improve, rather than hamper, the sawing operations. Don't disregard their importance to good, cleancut, safe workmanship.

6 - Lock all control clamps firmly. Failure to properly lock one of the control clamps will result in an untrue, wobbly tool setting — will produce poor quality, uncertain, and possibly unsafe operations.

7 - Don't misuse any cutting tool. A dull, gummy or rusted, bent or cracked cutting tool can't do what is expected of it. It is not only unsafe to use . . . it overloads the tool motor, strains the tool parts, and "butchers" the work. There's no saving and no sense in not keeping your cutting tools sharp, clean and in good condition. This also applies to misusing them — for purposes for which they are not intended.

8 - Keep your mind on your work. Work alone or with someone dependable; don't permit distractions. Remember, the tool doesn't automatically stop just because your attention wanders elsewhere! And you can't do good work either, if you don't think while you work.

9 - Remove the key when closing down. Your tool lock is to protect you against the hazard of accidental tool operation and mishap . . . by anyone you don't want to operate it.

10 - Plan each operation intelligently. A good workman is careful and thorough. He thinks along these lines:

a) Complete each set-up before starting the tool . . . it saves time. That is, do all your measuring, marking and planning for an operation before beginning it. You can then make the cut (or whatever you will do) without stopping midway to readjust or replan.

b) Never attempt to cut a workpiece that cannot be firmly supported . . . down on the table and/or up against the fence or a guide. A warped board must be properly laid on table (see illustration) to prevent wobble. A workpiece cannot be held firmly on edge (see illustration) by hand . . . it must be braced against or between clamped-down guides or a high-enough fence. There is always some correct way to assure firmness.

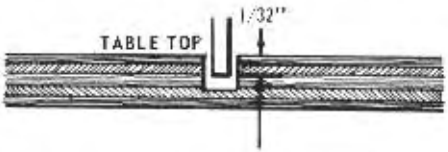
c) Examine old lumber. There's no profit in dulling a cutting tool on an embedded nail . . . or of jamming it in sap-, pitch-, or water-soaked lumber.

d) Listen while you work. The hum of your tool motor and, possibly, the whir of the cutting tool will keep you informed about the progress your tool is making. If the pitch of these sounds is too "airy" the tool is cutting overfreely . . . you can feed the work a little faster; but if the cutter pitch rises to a "screetch" or the motor pitch is reduced to a "moan" or a "groan", the tool is being overworked and you'd best slow the feeding. Should an overload become too much the overload protector or a fuse will "pop". If this happens, wait for the tool motor to cool before resetting (or replacing) to start again.

e) Do your sawing in the waste. A saw blade has thickness. If you saw on a line or inside it the kerf will reduce your workpiece to less than measured size. This also applies when routing, shaping, etc.

HANDLING A WARPED BOARD

POSITIONING FOR A CUT-OFF



LOWERING BLADE FOR CUT THROUGH

f) Lower blade properly for a cut through. Set it to ride 1/32-in. down in the groove trough if a pre-cut groove is to be used . . . or to bite into the table top no more than 1/16-in. if a new groove will be made.

FREE-CUT RIP

NAIL CUTTING

MASONITE

PLYTOOTH

CHISEL TOOTH

FREE SMOOTH-CUT COMBINATION

CABINET COMBINATION

MASONITE (Carbide Tips)

FREE-CUT COMBINATION

STEEL SLICER

THIN-RIM SATIN-CUT COMBINATION

THIN-RIM SATIN-CUT VENEER

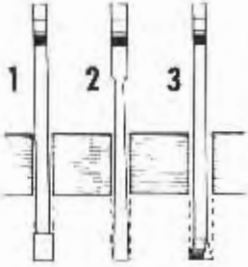
SELECTING A SAW BLADE

Your tool comes fitted with a *Craftsman Kromedge* Combination blade. This is an excellent general-purpose rip or crosscut blade for all woods or do-it-yourself (soft) aluminum, but is likely to chip plywood or hardboard and similar brittle materials. There are other blades *(see page A4)*, designed for cutting various other materials and for doing special work.

All toothed blades belong in one of three classes, depending upon how the blade is designed to provide its own clearance so as not to bind in its kerf (cutting slot).

1. Free-Cut Class. The teeth of this type are wider than the rest of the blade. There may be 8, 10 or as many as 40 teeth. Carbide-tipped blades belong in this class . . . the tips are brazed onto the outer edges of the wide teeth.

2. Hollow-Ground Class. This type of blade is ground thicker at the cutting edge with thickness decreasing toward the blade hub. The thinner, smoother-cutting blades generally belong in this class.



THREE METHODS OF PROVIDING BLADE CLEARANCE IN KERF

3. Set-Tooth Class. Blades of this type are of uniform thickness throughout . . . but the teeth are set (bent) outward at the edge according to a predetermined pattern so that the cutting edge is effectually wider. The general-purpose and faster, rougher-cutting blades are mostly this type.

CHANGING BLADES

With tool switch locked OFF and tool in the vertical crosscut position, remove the guard. Use the two wrenches furnished, as illustrated, to remove the shaft nut. Remove outer collar and blade.

Install replacement blade with its bottom teeth pointing *toward* tool column. Have the flats of the two shaft collars pressed against the blade sides. If blade bore requires use of a bushing, be sure it doesn't interfere with squeezing of the blade (itself) between these two collars. Reinstall the shaft nut tightly. Reinstall the guard.

NOTE

If blades of different thicknesses are used the two rip scale pointers must be readjusted to assure accurate carriage positioning for rip cuts. Refer to instruction sheet packaged with your tool.

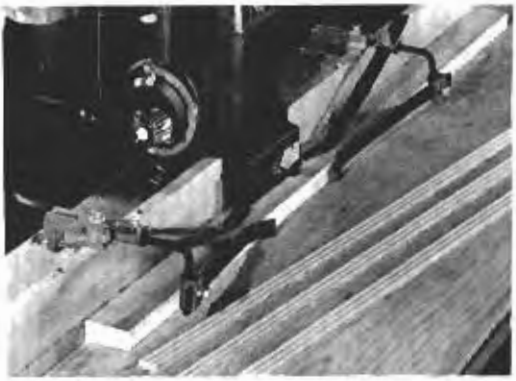
IMPORTANT

Any steel blade can rust — and tends to gum up with wood resin and bind. To overcome these disadvantages most *Craftsman* blades are chrome impregnated, to last the life of the blade — and make the blade last (and stay sharp) much longer. Look for the *Kromedge* label.

TWO SAFETY-IMPROVING ACCESSORIES

The *Ring Blade-Guard Attachment* shown increases the protective value of the guard by completing the encirclement of the blade at each side. The two rings float on the workpiece surface, bobbing up and down as necessary so as not to interfere with the work.

One or two *Hold-Down Attachments* can be secured to the fence (or an auxiliary fence) as shown to securely press the workpiece down on the worktable and/or up against the fence. When using small workpieces these eliminate the need for placing hands uncomfortably close to the cutting tool.



CHAPTER 3

STANDARD SAWING OPERATIONS

THE KINDS OF STANDARD SAW CUTS

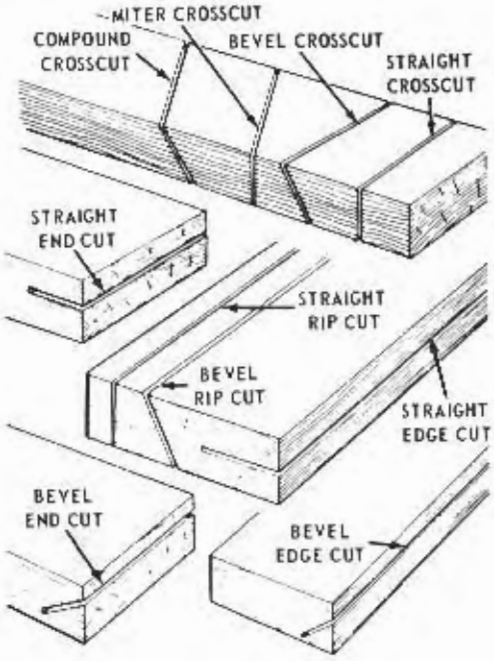
Commercial lumber has the grain running the long way of the board. Hence, the term "crosscutting" originally meant cutting across the grain to shorten the length of a board. Similarly, "ripping" originally meant sawing with the grain to reduce the width of a board.

With a combination blade and your radial-arm saw these old meanings do not apply. For you, "crosscutting" is any saw-cut made by traveling the carriage along the arm while the workpiece is held stationary. "Ripping" is any saw cut made by feeding the workpiece to the blade with all parts of the tool stationary. If a cut is made down through the narrow edge of a board to split the board into two thinner ones, it still is a rip cut but may also be referred to as "resawing".

NOTE

> Any rip cut may be straight or beveled, depending upon the power unit posiiioning. Any crosscut similarly may be straight or beveled . . . and, in addition, may be at a right angle or at a miter angle to the rear edge of the workpiece, depending upon the position of the arm.

In addition, there are two new kinds of cuts possible only with a radial-arm saw (without a special jig). Both of these are made with the blade horizontal (or nearly so). If the carriage is moved as in crosscutting, we call this "end cutting"; if the workpiece is moved as in ripping, we call it "edge cutting". Both straight and beveled end cutting or edge cutting can be done.



CROSSCUTTING

Why You Should Use a Pull-Through Stroke

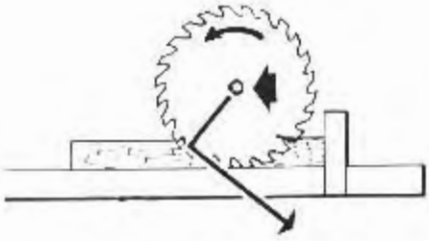
Your tool is designed primarily for pulling the carriage — from behind the fence out toward end of arm — when crosscutting. Consider the following:

1) When pulling, the direction of saw-blade thrust forces the workpiece down on table and back against the fence to keep it firmly positioned. With a push through stroke the tendency, at start of cut, can be to lift the rear of the workpiece up over the fence.

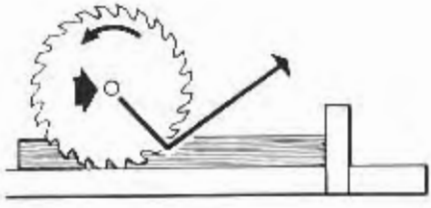
2) When pulling, if you feed too fast, run into a nail, or otherwise tend to overload the operation, at worst the blade will try to climb up on the work (which it can't do) and will jam. When pushing, any sudden overload can bounce the carriage (and blade) back at you.

3) When pulling, the blade rotates with the direction of travel and tends to feed itself. In fact, with thick and/or gummy workpieces this tendency may be so great that you will have to retard the feeding instead of pulling. When pushing, however, the opposite is true . . . you may have to push quite hard.

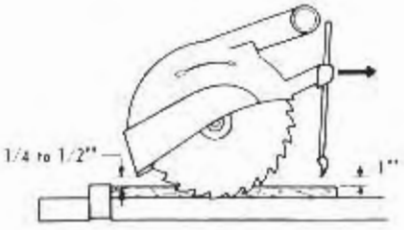
4) When pulling, you start at the fence . . . which binds the workpiece enough to prevent splintering of its edge. You don't have this advantage when pushing.



DIRECTION OF THRUST FOR A PULL-THROUGH CUT-OFF



DIRECTION OF THRUST FOR A PUSH-THROUGH CUT-OFF



Adjusting Guard, Etc.

For maximum safety adjust the guard and anti-kickback pawls as illustrated. The pawls are not needed to prevent kickback when crosscutting, so should not touch the workpiece — but hanging as shown they do add to the protective value of the guard. Turn the discharge elbow to blow sawdust down and away from you.

NEVER CROSS YOUR ARMS OR GET THEM INTO AN AWKWARD POSITION WHEN TRAVELING CARRIAGE TO MAKE A CROSSCUT

Use Correct Hand Positions

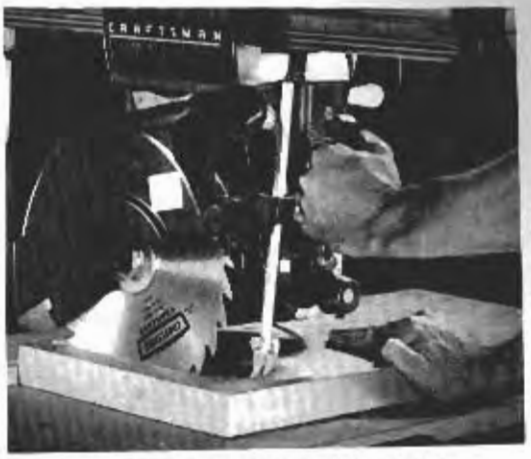
Either hand may be used to travel the carriage — while the other hand is used to hold the workpiece — provided you keep your arms approximately parallel. *Never* cross your arms. Always stand with the shoulder of the carriage-pulling hand directly in front of the end of the tool arm. Keep the workpiece holding hand well clear of the blade. This usually is easiest to do whenever making a bevel-angle and/or right-hand miter-angle cut if the left hand is used to hold the workpiece. When making any left-hand miter-angle cut it generally is easier to pull with the left hand.

If your stance and hand positions are correct you can pull the carriage through for even the widest crosscut, without awkwardness or hesitation. Just be certain you know the path the cut will take — and that your holding hand is clear of this path.

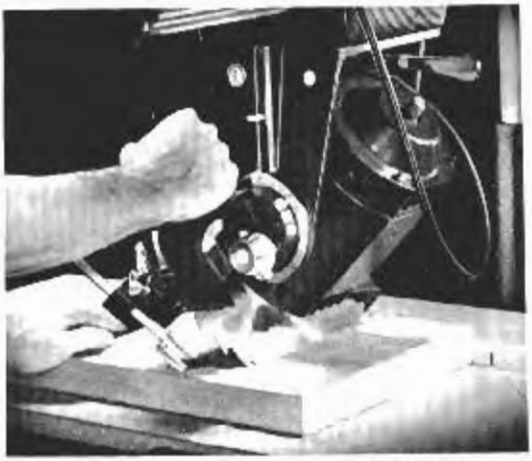
IMPORTANT

After a cut, tool motor may be left running if next cut is scribed, if it is *not* necessary to reposition the tool, and if carriage is locked, or held by hand or friction lock so it cannot creep. In all other cases stop the motor.

MAKING A STRAIGHT CROSSCUT



A LEFT-HAND PULL THROUGH



A RIGHT-HAND PULL THROUGH

A STRAIGHT CROSSCUT

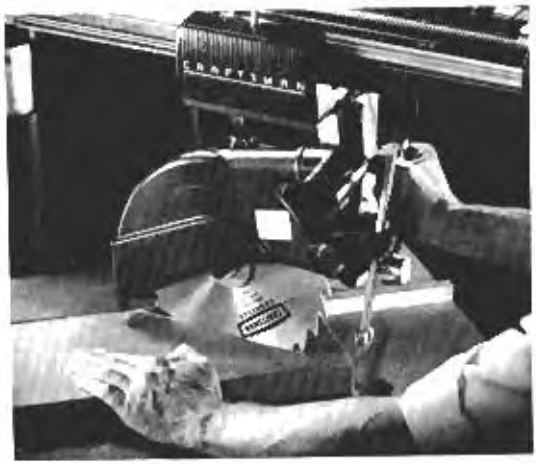
Use vertical crosscut position. Place workpiece squarely against fence with scribed cut line aligned with the straight crosscut groove in table top. Start the cut from in back of the fence with blade properly lowered 1/32 in. into table groove. Pull straight through. After making the cut, return carriage to starting position and either shut off the motor or lock the carriage in this position before removing your hand from the tool grip to handle the workpiece.

A BEVEL CROSSCUT

Use bevel crosscut position . . . and the same procedure as for a straight crosscut. Note that left hand is being used in the illustration for the pull through. This is because cut is being made at the left end of the workpiece, thus requiring that right hand be used to hold the workpiece in order to provide the greatest margin of hand safety. If a 45° bevel angle is to be made you can align a scribe mark made on the underside of the workpiece with the 45° bevel crosscut groove in the table top. For any other bevel angle, best groove the table top first so there will be a groove to align your scribe mark with.

A MITER CROSSCUT

Use miter crosscut position with the arm positioned at the miter angle required. Although arm can be swung either to the left or the right, positions at the right are generally preferable. A greater variety of miter angles and longer cuts can be made on the right side of the table. If cutting a known miter angle to which the arm is set, position the workpiece by aligning a scribe mark on its top side with a pre-cut table groove for this angle. To cut along a scribe mark on the workpiece at an unknown angle you can — with motor off — roll the carriage out and back along the arm to visually align blade with the scribe mark.



A COMPOUND CROSSCUT

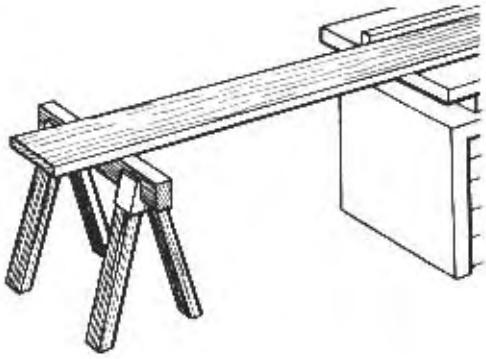
Use compound crosscut position with both the miter and the bevel angles set as required. Since a bevel angle is involved it is easiest, for accuracy, to use a scribe line on the workpiece underside for alignment with a pre-cut table groove at the angles desired. However, it is practical when necessary to use visual alignment (as explained preceding) — and a little experience will enable you to determine where the cut will break through the underside of the workpiece.

ADVANTAGES OF ANGLE SETTING

Your saw, if in proper adjustment, will cut both bevel and miter angles as set with extreme accuracy. In many instances it is neither necessary nor advisable for you to do detailed layout and scribing of cut lines on a workpiece. All that is required is for you to know the angle desired and to position your workpiece along the fence so that the cut will start at the proper place. For this reason the place and angle at which the saw blade cuts through the fence can be an important factor in helping you to properly position a workpiece for any type of crosscut. Keep this in mind and it will save you time.

CROSSCUTTING A LONG BOARD

One of the big advantages of a radial-arm saw is that a board of any length can be crosscut at any angle or at any place, with ease (since the board remains stationary). If the board greatly overhangs the table at one or both sides it is necessary only to support its end(s) so that the end(s) can't see-saw upward when the board is severed. A sawhorse or any support of the same height as the saw table will do.



CROSSCUTTING A WIDE BOARD

The table at the end of this chapter gives maximum cut lengths for various types of crosscuts. These lengths are based on the distance blade will move in traveling out to the end of the arm. Cuts of double these lengths can be made in two parts . . . by cutting in from one edge to the center, and by then cutting in from the opposite edge to meet the first cut. For a straight or a miter crosscut simply rotate the board 180°, same face up, and realign the blade with the cut line. If a bevel angle is involved, however, after rotating the board the bevel would be reversed . . . and the bevel angle would have to be reset to the same degree at the opposite side if possible. Flopping the board (other side up), however, will keep a bevel angle at the same side . . . but will reverse any miter angle involved. If the angle is a compound one, therefore, it is necessary to flop the board so as to keep the bevel aligned with the saw blade, then swing the arm to the opposite miter angle setting to realign the miter cut with the blade.

CROSSCUTTING A THICK BOARD

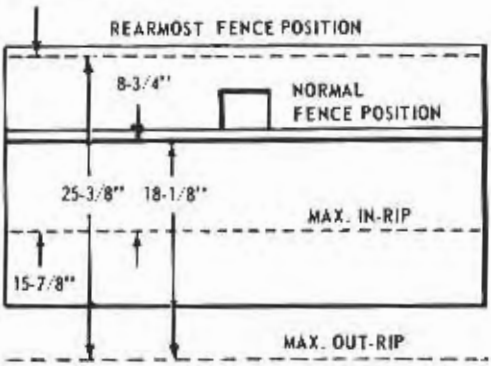
Refer to the table mentioned above. Cuts of double thickness can be made by flopping the workpiece (other side up) and making a second cut to align with the first. Keep in mind that flopping does not reverse a bevel angle, but does reverse a miter angle.

RIPPING

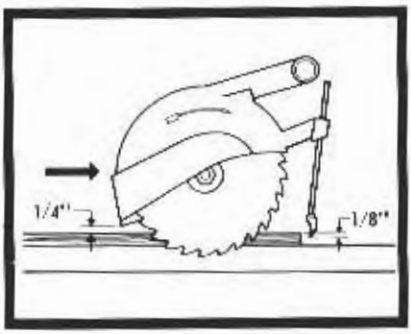
Set-Up Properly — for Safety

In a ripping operation the workpiece is fed to the blade. *Never* position the blade so that the workpiece will not touch the fence (or an auxiliary fence). It is virtually impossible to feed work straight without guiding it along a fence, and even a slight twist will bind the blade to cause a kickback.

As a further safety precaution always use the anti-kickback pawls as illustrated . . . with the guard also positioned as shown.



MAXIMUM IN- AND OUT-RIP CUTS

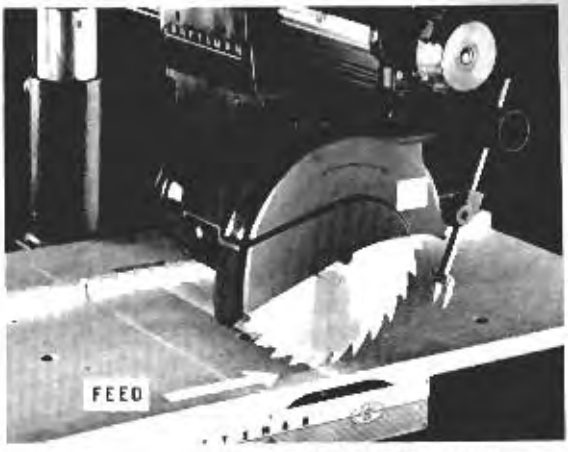


When to In-Rip — When to Out-Rip

The accompanying diagram shows maximum in-rip and out-rip blade positions for fence normal and rearmost positions. As shown, the maximum in-rip setting with fence at normal is 8-3/4 in. This means the resulting cut at this setting will produce a board 8-3/4 in. in width between the blade and the fence. The other dimensions are to be similarly interpreted.

To measure out-rip from rearmost fence position use scale at left. For other measurements use proper scale at right.

IN-RIP SET-UP



OUT-RIP SET-UP

Because it places the blade away from you, preferably use the in-rip set-up whenever possible. Then, too, in-ripping is always done from the right-hand side of the table, while feeding the workpiece toward the left using your right hand to feed. This is more natural for most operators than the out-rip set-up, which requires feeding from the table left-side toward the right, with the left hand. In any event, remember work is always fed against the direction in which the teeth at the bottom of the blade are moving. With an in-rip set-up the blade (viewed from front of table) revolves counterclockwise; with an out-rip set-up it revolves clockwise.

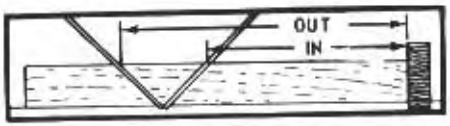
STRAIGHT RIPPING

MAKING A STRAIGHT IN-RIP CUT

Set up the fence at position desired (normal or rearmost). Determine the finished width of cut board desired and use the proper scale to make your in-rip or out-rip tool set-up, accordingly. Lock all control settings. Adjust the guard, sawdust discharge elbow (to blow conveniently out of the way) and anti-kickback pawls. Start the motor, then feed the workpiece by sliding it along the fence through the blade to make the cut. If there is ample room (generally, 6 in. or more) between blade and fence use your inner hand (right hand if in-ripping; left hand if out-ripping) to push the board all the way through. If not enough room inside but plenty of room at outer side of blade, use your outer hand to push the work through.

Whenever there is doubt or pushing through might prove awkward, you can always stop pushing midway of the cut, back the workpiece up half an inch, walk around to the other table side, and finish by pulling the work through

USING A PULL-THROUGH TO FINISH A RIP-CUT



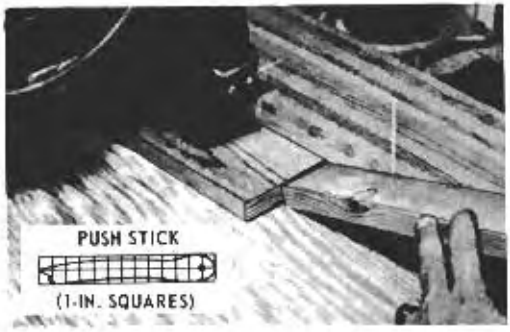
CHANGING THE ANGLE CHANGES CUT WIDTH OF WORK TOP

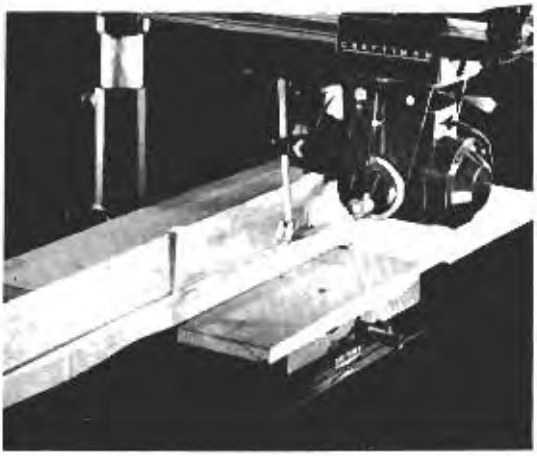
BEVEL-ANGLE RIPPING

Like straight ripping except that the power unit is pivoted to the desired bevel angle. Since the in-and out-rip scales indicate width of cut for the vertical blade position only, in setting the width for a bevel cut you must use your eye and compensate for the scale difference. Remember, one board surface (either the top or the bottom) will be narrower (distance between fence and cut) than the other. If in-rip beveling the narrower surface is on top; when out-rip beveling, it is at bottom.

RIPPING A SHORT, NARROW BOARD

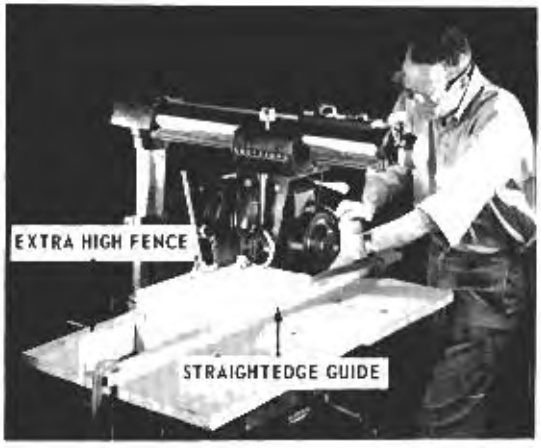
Whenever a workpiece is too small to either push or pull it through safely, use a push stick. Any scrap board will do — or you can make a conveniently designed one such as shown in the small diagram.





RIPPING A LONG BOARD

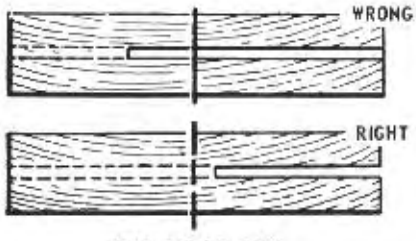
To support the end(s) and prevent springing up and down of the board, use a sawhorse at the end(s) as for crosscutting a long board. In addition, to prevent the kerf from closing and binding the saw blade, wedge it open (as illustrated) as soon as there is indication that it might close.



RIPPING A THICK BOARD (RESAWING)

The table at end of this chapter gives maximum depths of a straight rip cut. Bevel angling reduces this depth. As with crosscutting, however, double the depth can be obtained by flopping the board over (same edge against the fence) to make a second cut in from the other side.

If board is narrow and thick so it stands up high on a narrow, wobbly edge, best support it by substituting a sufficiently high board in place of the regular fence. It is helpful also to clamp a straightedge guide to the table so that work has a channel in which to slide. Splitting such a board in two by using two cuts (as above) generally is referred to as resawing. Whenever possible, make the first cut less than half through the board, leaving more than half to be severed by the second cut. If this isn't possible, the first cut kerf should be held open with wedges (at each end) while making the second cut. If board is too thick for the two cuts to sever it, make each of the two cuts at maximum depth (2-1/2 in.), then finish by using a hand or band saw (which will track easily in the kerfs of the two cuts).



THE FIRST CUT

THE SECOND CUT

RIPPING A BOARD WITH AN UNSTRAIGHT EDGE

Never try to rip a board by guiding an unstraight edge along the fence. Any deflection from a straight-line feed will bind the blade and cause kickback. If necessary, you can either nail a straightedge to the board to serve as a guiding edge . . . or can clamp a straightedge board to the outer bottom side so this will guide along the front table edge as illustrated.


STRAIGHTEDGE GUIDE

END AND EDGE CUTTING

When a board is so shaped that standing it on one end to cut down into the other end is impossible or unsafe, the only way to accomplish the cut is to set-up your tool with the blade horizontal. With the guard on and the arm lowered until the guard rests on the table top, the blade is still somewhat above the table — which limits the range of cuts. Removal of the guard will allow you to lower the blade a bit — but we *don't* recommend this.

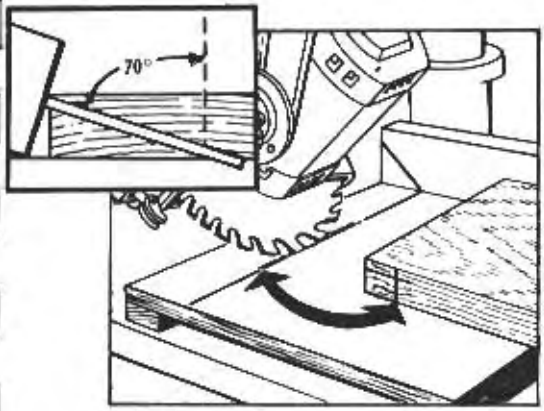
Instead, we recommend construction of an auxiliary table *(see page 99)* - two of them, in fact, one for the left half the other for the right half of the table. One such auxiliary table covering the right half of your tool table will greatly increase the range of end cuts you can make . . . two auxiliary tables covering the entire tool table will do the same for edge cuts. End cutting is like crosscutting; edge cutting is similar to rip-cutting.

FENCE CAN BE MARKED TO HELP YOU LOCATE WORK ON TABLE

If fence is at rear, start motor then slide work into the revolving blade to the proper depth to start the cut.

STRAIGHT END-CUTTING

Use horizontal crosscut position with guard in place, discharge elbow pointed down to left, and the anti-kickback pawls retracted out of the way. Lock the auxiliary table over tool table at right side by installing its fence in place of the regular fence (at either fence position), keeping it far enough to the right not to interfere with carriage travel. Place work on auxiliary table back against the fence, slide it to the left far enough for the blade to cut in to the depth required — then hold or clamp it in place. With carriage behind the fence, lower arm to align blade with your cut line. Start motor and pull carriage out to make the cut.



BEVEL END-CUTTING (CHAMFERING)

A bevel cut that enters the workpiece at its end (rather than its top surface) produces a chamfer. It is made like a straight end cut, but with the power unit pivoted to the desired bevel angle. The accompanying illustration shows the maximum angle and position at which an end bevel can be cut with the workpiece flat on the tool table; for a greater angle or entry at a lower point, use the auxiliary table to elevate the workpiece. To position the work, mark desired bevel on its edge (accompanying illustration), measure the bevel angle and set saw blade to this angle, lower the blade to groove the auxiliary table — then align the workpiece mark with this groove to make the cut.

STRAIGHT EDGE-CUTTING

Use the horizontal in-rip position with discharge elbow pointed down to rear and anti-kickback pawls up out of the way. Substitute a "window" fence (as illustrated) in place of the regular fence (at normal position). Elevate the arm to height of desired cut, roll the carriage forward until amount of blade projecting in front of the fence equals desired depth of cut, then lock all controls. If cut is to be lower than the blade can reach, elevate the workpiece by laying a flat, large-enough board under it. Start motor and feed workpiece from right to left along the fence, holding it down on the table top (or flat board).

NOTE Instead of the "window" fence two auxiliary tables may be used. Separate them enough to allow blade to project in front of their fences as desired.

BEVEL EDGE-CUTTING (CHAMFERING)

This is like bevel end-cutting, but from the in-rip position preceding. It generally is done with blade slanted down in front, to cut the underside of workpiece edge . . . but use of the auxiliary tables makes it possible also to slant the blade up at front (if angle is small), to cut off the top of the workpiece edge. A horizontal out-rip position also can be used, if work is narrow enough to slide between the blade and the fences.

MAXIMUM STANDARD CUTS THE 10-IN. SAW WILL MAKE

CROSSCUTTING (ONE PASS)

Max. depth of cut	2-1/2 in.
Max. length of cut (fence at rear)	15-1/2 in.
Max. length of cut (fence normal)	13-5/8 in.
Max. 45° left miter (fence at rear)	14-1/2 in.
Max. 45° left miter (fence normal)	4-1/2 in.
Max. 45° right miter (fence at rear)	17-5/8 in.
Max. 45° right miter (fence normal)	14-3/4 in.
Bevel angles	0° to 70°

Two passes will double any length or depth of cut given above.

RIPPING (ONE PASS)

Max. depth of cut	2-1/2 in.
Max. in-rip width (fence at rear)	15-7/8 in.
Max. in-rip width (fence normal)	8-3/4 in.
Max. out-rip width (fence at rear)	25-3/8 in.
Max. out-rip width (fence normal)	18-1/8 in.
Length of cut	Unlimited
Bevel angles	0° to 70°

Two passes will double depth of cut.
Width of workpiece in front of blade is unlimited.

END CUTTING (WITH AUX. TABLE)

Max. depth of cut	2-1/2 in.
Max. length of cut (fence at rear)	16-5/8 in.
Max. length of cut (fence normal)	13-5/8 in.
Ht. of cut in workpiece (approx.)	0 to 8 in.
Bevel angles	0° to 90°

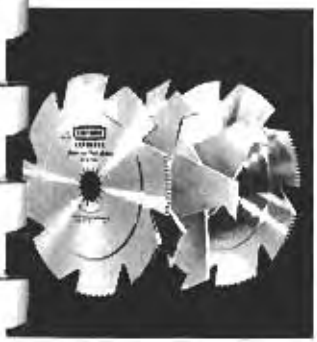
EDGE CUTTING (WITH AUX. TABLES)

Max. depth of cut	2-1/2 in.
Max. resawing cut through	5 in.
Max. work width, in-rip set-up	Unlimited
Max. work width, out-rip set-up (fence at rear)	15-5/8 in.
Max. work width, out-rip set-up (fence normal)	8-1/2 in.
Ht. of cut in workpiece (approx.)	0 to 8 in.
Length of cut	Unlimited
Bevel angles	0° to 90°

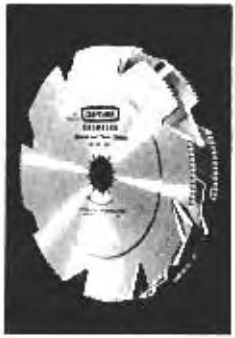
CHAPTER 4

A DADO HEAD AND ITS USES

A TYPICAL DADO SET

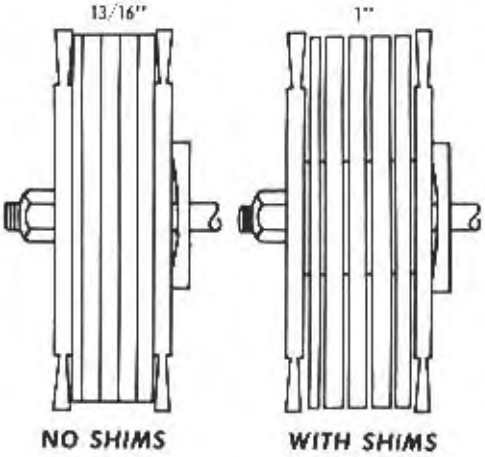


A dado set (head) is a group of related blades designed for cutting grooves wider than a normal sawblade kerf. The usual set consists of two outside cutters, each 1/8-in. thick, plus a number of inside "chipper" blades which can be installed between the two outside blades to increase the kerf width up to 13/16 in., with most sets.



The set illustrated is a typical *Craftsman Kromedge* Dado Set designed for radial-arm and bench saw use. It has two outside cutters, five chipper blades and a number of paper shims. The outside blades cut 1/64 in. deeper than the chippers to provide glue relief channels at each side of any cut groove — for cabinetmaking.

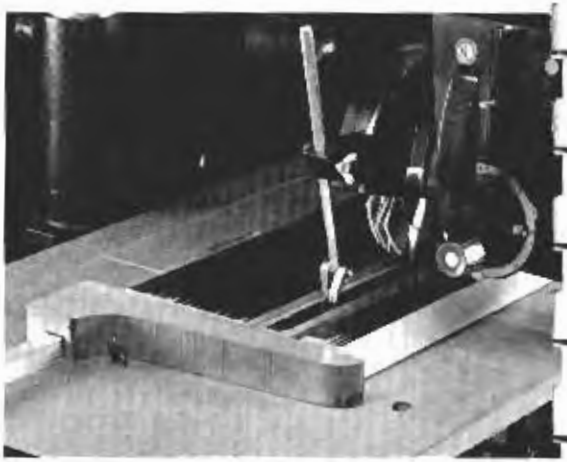
SETTING-UP A DADO SET ON YOUR SAW



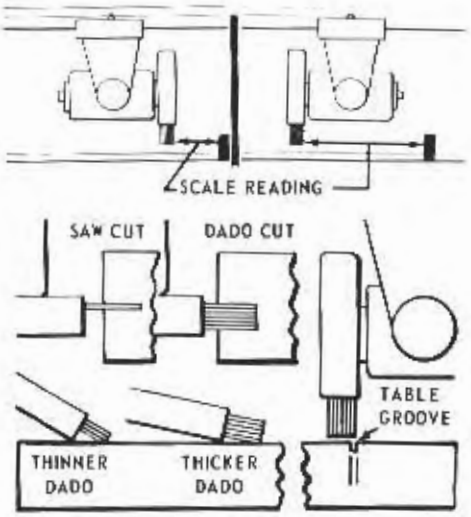
Outer collar omitted when over 7/8" wide.

One outside cutter makes a 1/8-in. groove; two together make a 1/4-in. groove. Four of the chippers are 1/8-in. and the fifth is 1/16-in. in width. The two outside blades with five chippers therefore total 13/16 in. Each paper shim furnished is 1/32 in. Therefore, the whole set assembled with a shim between each pair of blades will total exactly 1-in. width.

Never try to make a cut with chippers alone. When installing chippers space them as evenly as possible around the circle for balance, and make certain their teeth nest in the gullets of the cutters. Don't use more than one shim between each chipper and/or cutter. Assemble cutters, shims and/or chippers one at a time on saw arbor, facing all teeth in the proper direction. If assembly exceeds 7/8-in. width the outer saw-blade collar will have to be left off; but use it for all widths up to 7/8 in. *Never* exceed 1 in. total width.



Your in-rip and out-rip scales show the distance from the fence to the nearest edge of dado outside cutter that is closest to tool motor. If using a horizontal blade position, the extra width of assembled dado set is added on below the single-saw-blade position. When using vertical crosscut position, the extra width is added on to the left of the single-blade groove in table top — and the same is true for bevel crosscut positions. Keep these facts in mind when using dado set-ups of various widths.

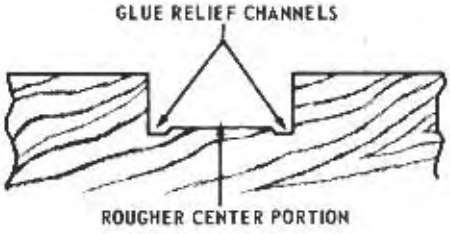


GENERAL RULES FOR DADO SAWING

All the positions and set-ups explained for standard sawing operations can be used for dado sawing operations.

The maximum vertical depth of cut with 8-in. dado is 1-1/2 in. Remember, however, a wider cut removes more wood . . . if you also attempt too deep a cut the excessive load will produce several undesirable results. It will slow down, possibly jam the tool and spoil the cut. There will be a tendency for the blade to hog and climb the wood in a crosscut operation; feeding will be difficult in a ripping operation. If cutting across the grain, the edges at start and finish may be splintered. Use judgment. If groove is to be deep, accomplish it by making successive shallow cuts, each to a deeper setting.

Run through your fence, a dado head will make a sizeable slot. To avoid ruining fence you can substitute a partial fence which will hold the work but will end just short of where dado head passes . . . or elevate the workpiece so that dado needn't cut the fence.



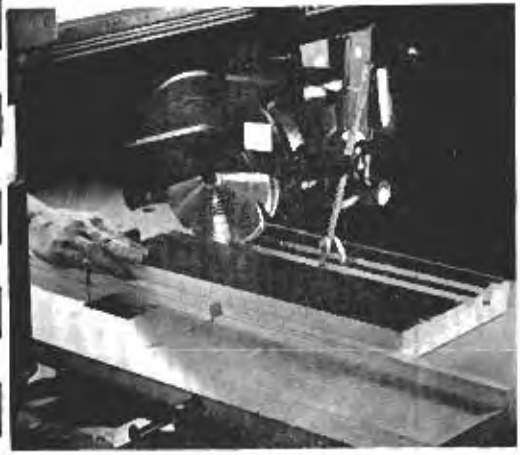
NOTE

Since the two outside blades cut slightly deeper than the chippers a cut slot will be slightly higher at its center. If slot is used for decorative purposes sand down the higher, rougher chipper-cut area to leave a smooth, level surface.

A PLAIN DADO GROOVE

A groove is a two-sided slot of desired width that runs from one workpiece edge across to the opposite edge, across the grain. If the groove runs with the grain it is referred to as a plough.

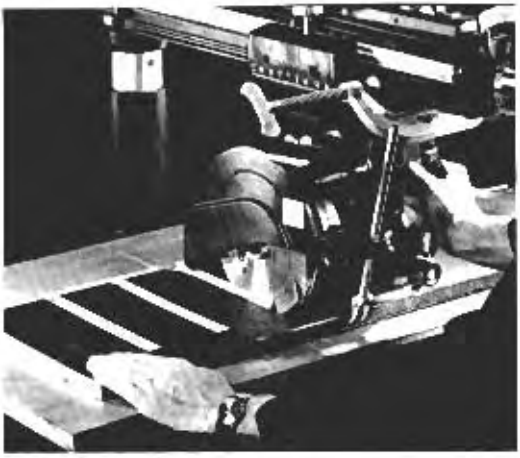
Grooving generally is done with a crosscut operation, as shown.



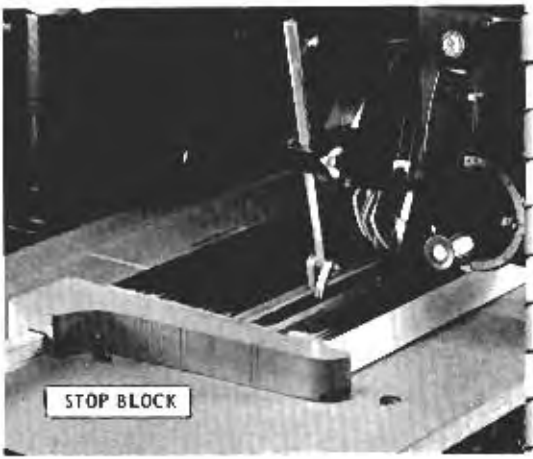
A PLAIN DADO PLOUGH

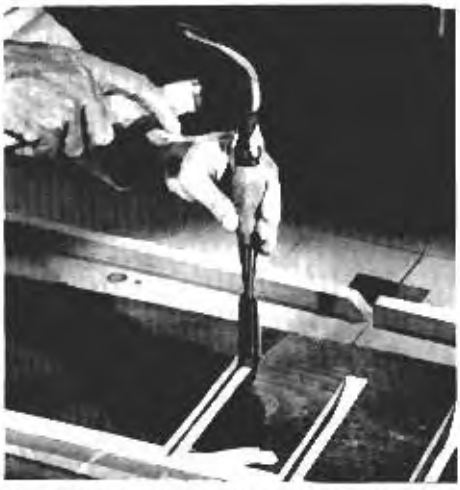
Ploughing generally is done with a ripping operation, as shown.

A GAIN



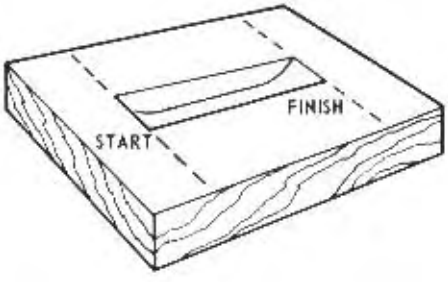
This is a groove or plough that is stopped before it reaches the opposite workpiece edge (is "blind" at one end). To stop the cut at an exact mark draw a line on work surface where the cut is to surface. Lower the dado head to the final depth of cut. If cut will be made by crosscutting, move the carriage to align the dado head with your line — then note position of the in-rip or out-rip pointer so you will know where to stop the carriage when making the cut. If cut will be made by ripping, slide the work along the fence until dado head is aligned with the line — then arrange a stop block to prevent work from sliding any farther.



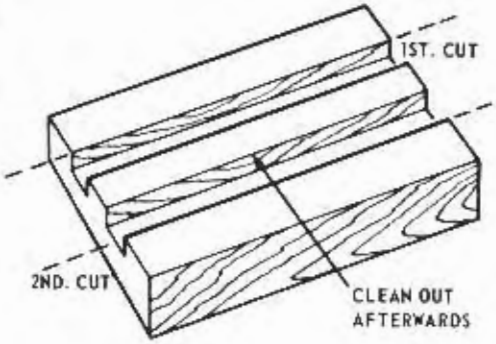


In either case, due to the circular dado head the finished gain will diminish in depth and surface at the point at which it is stopped. The shallow surfacing end can be squared up to uniform depth with a chisel.

A STOPPED DADO



This is a groove or plough that both starts and stops short of the workpiece edges (in short, it is "blind" at both ends). Draw both start and finish lines, as above. Align the dado head with the starting line . . . then start the motor and lower the revolving head into the workpiece to start the cut. Plan to stop at the finish as explained for a gain.



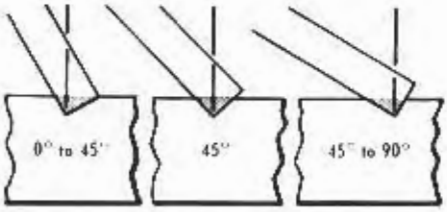
V-GROOVES AND PLOUGHS

These are made by bevel angling the dado head. With power unit pivoted to exactly 45°, one cut will make a centered V-slot to a depth at which top of head just starts to enter the wood. The side cut by head end will, however, not be smooth. It can be sanded, or a second cut at 45° from opposite side can be made to smooth it. Deeper V-slots will, of course, require two such cuts from opposite sides — and will be centered if a 45° bevel is used for each. For uncentered V-slots make the two cuts at angles which will total 90° (for instance, one at 30°, the other at 60°).

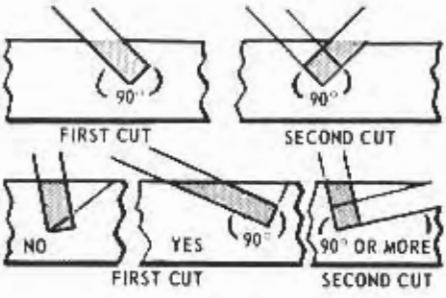
Wider, flat-bottomed V-slots require three or more cuts. Make the outside cuts as above to obtain the slant sides . . . then use a vertical blade setting to clean out the middle and produce the flat bottom.

WIDE GROOVES AND PLOUGHS

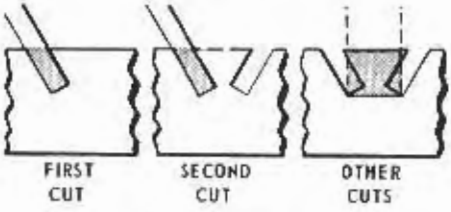
If cut is to be wider than your dado head make several passes alongside each other, overlapping them at least 1/16 in. When making cuts more than twice the dado width it is easiest to make the two outside cuts first — then clean out the center.



V-GROOVES IN ONE CUT



V-GROOVES IN TWO CUTS

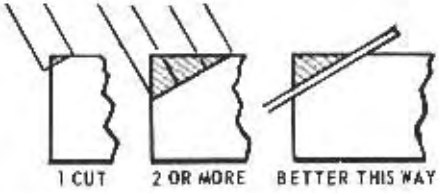


A FLAT-BOTTOMED V-GROOVE

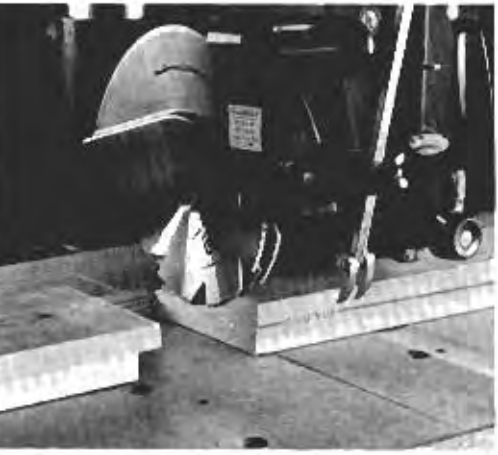
FOR BEST PERFORMANCE AND LONGEST LIFE
BUY ONLY CRAFTSMAN ACCESSORIES

A CHAMFER

This is simply a V-slot that runs off the workpiece edge so that only one slope of the V is cut into the workpiece. If this one slope isn't wider than dado it can be done in one cut as shown — but must be sanded smooth. Wider chamfers (as used in panel raising) can be made by elevating the dado head as necessary for additional cuts . . . but are more easily made by pivoting the head to slice off the corner (as with a regular saw blade).



USING 45° BEVEL ANGLE FOR DECORATIVE GROOVES AND END CHAMFERS

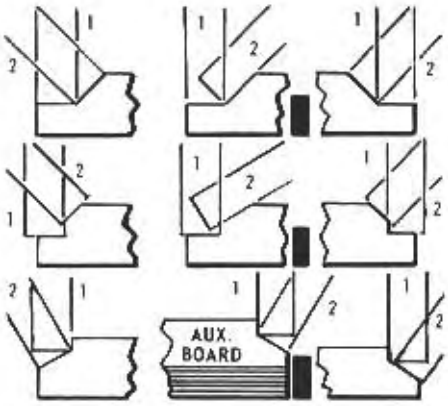


A RABBET

This is simply an ordinary (square) slot that, like a chamfer, runs off the workpiece edge. A rabbet that is no wider than the dado head is most easily cut with the blade vertical, cutting down from on top. A wider rabbet also can be cut in this manner by taking two or more passes as for a wide groove . . . but is more easily cut with the blade horizontal (see "A TENON", following).

COMBINATION EDGE TRIMS

By combining chamfers and rabbet cuts a variety of edge finishes can be achieved. The accompanying illustrations suggest some varieties and indicate the dado head positions and cutting sequences. The three in the left column are done as cross-cuts; the others are done as rip cuts (the black oblongs represent fence positions), those in the center column representing an in-rip set-up and those in the right column representing an out-rip set-up.



CUTTING TENONS

A tenon is formed at the end of a workpiece by rabbeting one, two, three or all four sides to reduce end so it will fit into a mortise (a square hole) or a slot in a mating workpiece to join the two workpieces. 1-, 2-, 3- or 4-sided tenons serve different jointing purposes, but are all essentially alike.

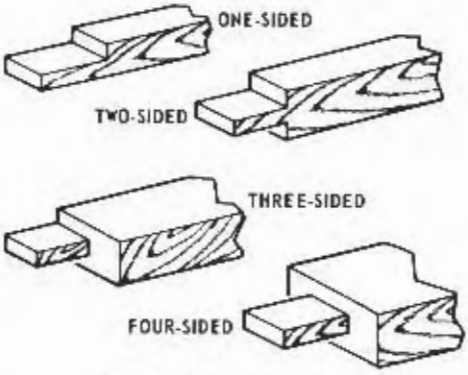
A one-sided tenon is most easily made like a wide rabbet . . . with the blade horizontal.

A two-sided tenon can be made as two equal rabbets (above) by flopping the workpiece 180^{0} to cut the second side while using exactly the same tool set-up so the two sides will be equal. Or, both first sides can be cut simultaneously if the two cutters are assembled with a proper width wooden washer between them (as illustrated). Use horizontal set-up with head elevated to proper height to center the tenon while making these first cuts. Afterwards, change to a vertical set-up to separately make each of the two second cuts.

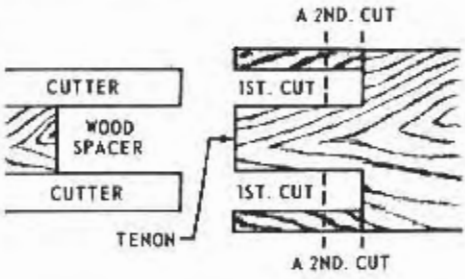
Three- and four-sided tenons are made as above with additional cuts to create the additional rabbeted sides.

PANEL RAISING

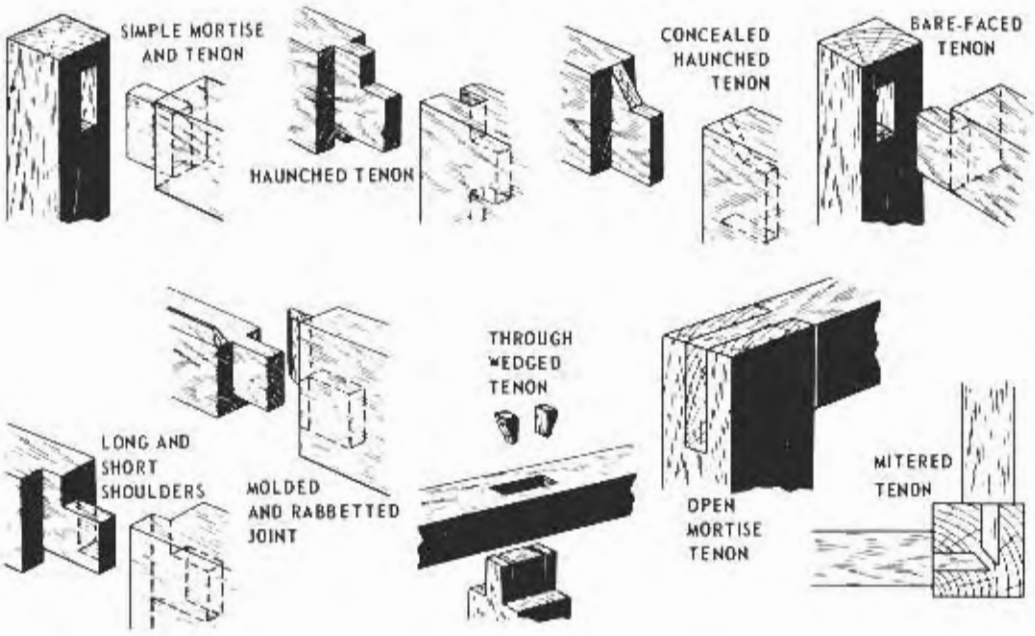
Raised panels are created by rabbeting and/or chamfering all around the workpiece perimeter. For best results do the cross-grain edges first, then the with-grain edges.



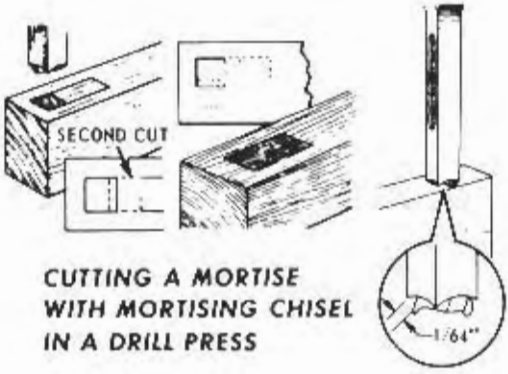
TYPES OF TENONS



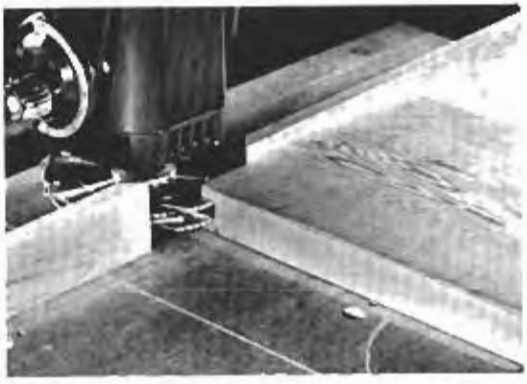
MORTISE-AND-TENON JOINTS



A mating mortise is cut with a mortising chisel in a drill press, or with a router. A routed mortise can be squared with a chisel . . . or the tenon can be sanded to fit the end radiuses. Refer to *Chapter 7*.



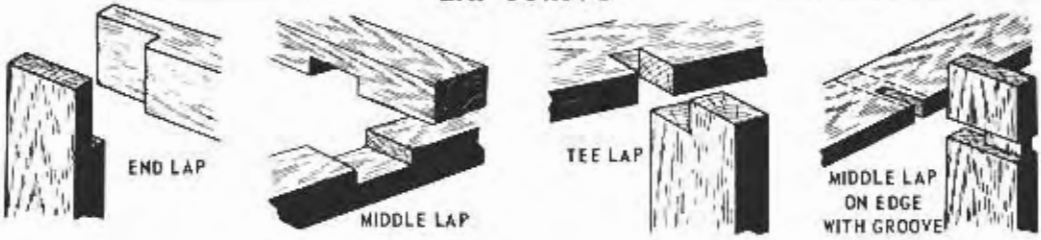
CUTTING A MORTISE WITH MORTISING CHISEL IN A DRILL PRESS



A TONGUE-AND-GROOVE JOINT

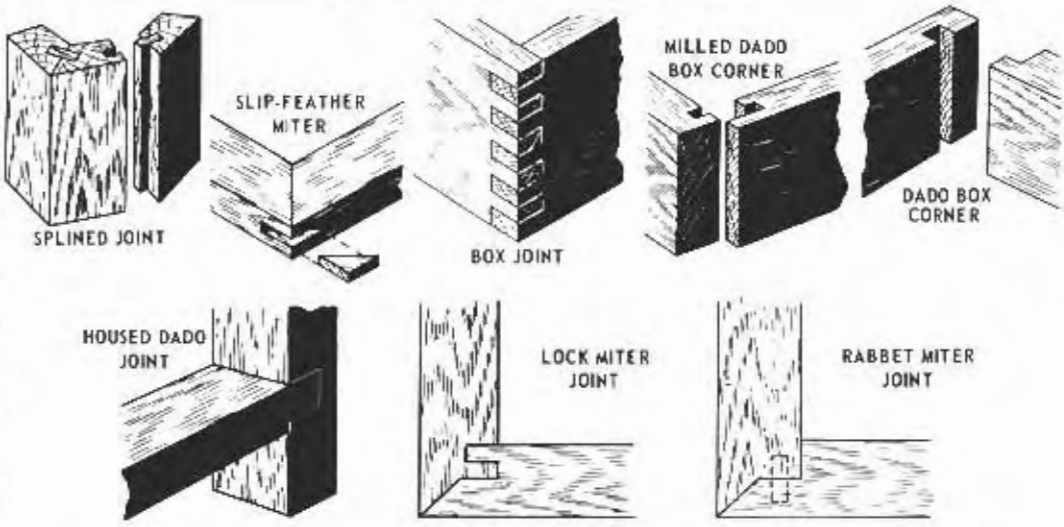
The tongue is cut like a two-sided tenon and the groove is cut with the blade horizontal, using a ripping setup if it is a long one or a crosscut if it is short. Make the groove 1/32 in. wider than the tongue thickness, and 1/32 to 1/16-in. deeper . . . for an easy fit.

LAP JOINTS



There are a variety of lap joints, such as illustrated. All are simply made by dado grooving, ploughing and/or rabbeting as required. Whenever fitting a board into a slot (as for the Middle Lap) make the slot about 1/32 in. oversize to allow an easy fit.

OTHER DADO MADE JOINTS



The Splined Joint is a modified tongue and groove having both boards grooved and using a suitable strip of wood as the tongue. In the example shown the grooves are cut with blade in horizontal in-rip position, but at required bevel angle.

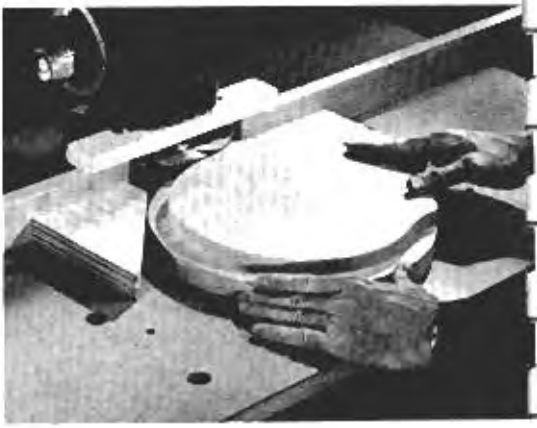
The Slip Feather Joint calls for simultaneously slotting the two workpieces. Use a horizontal crosscut set-up with the two boards clamped in position on auxiliary table.

The Box Joint requires a series of equal and equally-spaced grooves in each board. Use a horizontal crosscut operation with the board clamped on edge to the auxiliary table fence at a position which will allow blade to cut in to desired depth. Count the number of tenons in the two boards (total in illus. is 10) and divide board height by this number. The result is the required dado-head width. Flush the blade top with the board top to cut the first groove . . . then lower blade twice its own width (count the elevating handle turns) for each following groove. Do second board exactly the same, when it is flopped 180° the two will join as shown.

The other joints illustrated combine grooves or ploughs with rabbet and/or chamfer cuts. Use whichever saw position is most convenient, and make your settings accurately to obtain well-fitting joints.

CUTTING A CIRCULAR RABBET

To rabbet the edge of a circular workpiece use a horizontal set-up as shown — with the auxiliary tables or a cut-out fence. Clamp two guides to the fence or table so that work can be revolved without shifting its center.

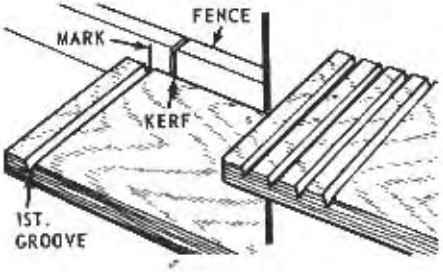


CUTTING A CIRCULAR TENON

To reduce a spindle (like a table leg) at one end to form a circular tenon, use a vertical crosscut set-up as shown. Cut two supports with V-notches in their top edges and secure them to the table top so that they will cradle the spindle and allow you to revolve its end under the blade. Start motor, lower blade to proper depth to start the cut . . . then revolve the spindle to finish the tenon.

EVENLY SPACED GROOVES AND PLOUGHS

A series of crosscut grooves (straight or at a miter angle) can be evenly spaced by making a guide mark on the fence (as shown) or on the auxiliary table top. Slide the work to align the same edge of each previous groove with this mark when cutting the next groove. To space ploughs evenly relocate the carriage a measured distance on the in- or out-rip scale.



Latticework — straight or diagonal — also can be created in the above manner. Use a depth-of-cut that is 1/32 in. (or more, if desired) greater than half the thickness of the workpiece . . . and evenly groove both of its sides.

The uprights to support a number of spaced shelves (as for a bookcase) are cut by the spaced crosscut method

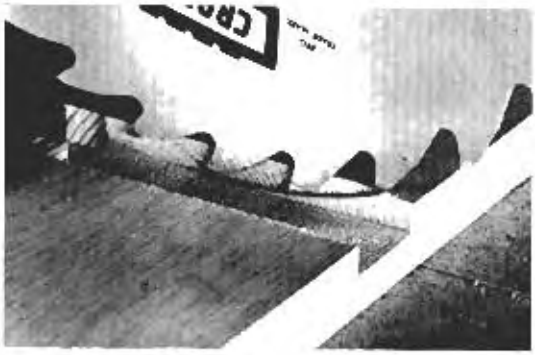
page 36 . . . and the rails for a shutter or similarly cut with the arm at a miter angle.

CHAPTER 5

SPECIAL SAWING OPERATIONS

CENTER CUTS

With your radial-arm saw it is very easy to start or stop a cut inside the edges of a workpiece. To start, simply start the motor first then lower your blade into the workpiece. To stop, elevate the blade out before stopping the motor. If crosscutting, lock the carriage — if ripping, clamp the work to the table — while lowering or raising the blade. In either case use guide lines on the work to position the cuts — and learn how far (how many handle turns) to crank the blade down without digging too far into table top.



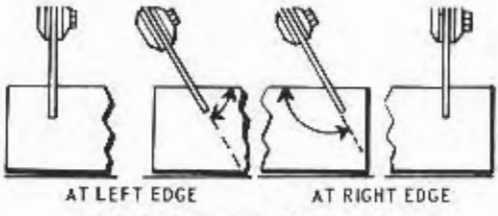
REGULAR-BLADE GROOVING

Though much thinner, a regular blade can be used like a dado to produce wide flat-bottomed grooves by overlapping the cuts.

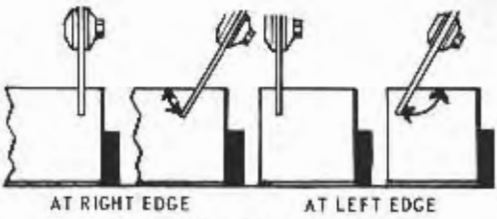
NOTCHING WITH A REGULAR BLADE

To cut a notch (V-groove) with a regular blade requires two cuts. After making first cut at desired bevel-angle setting, rotate work 180° to make second cut at the same setting. Either a cross- or a rip-cutting set-up can be used.

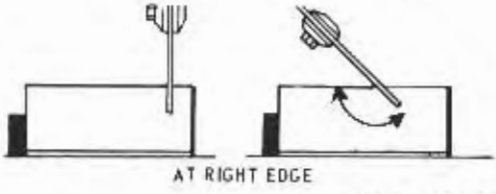
REGULAR-BLADE RABBETING

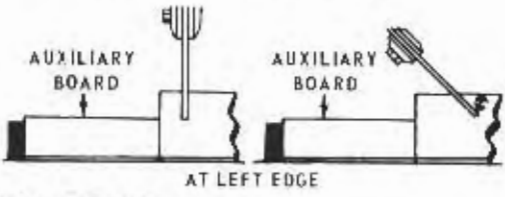


CROSSCUTTING THE TOP CUT



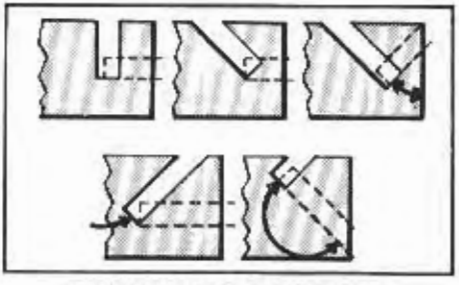
IN-RIPPING THE TOP CUT





OUT-RIPPING THE TOP CUT

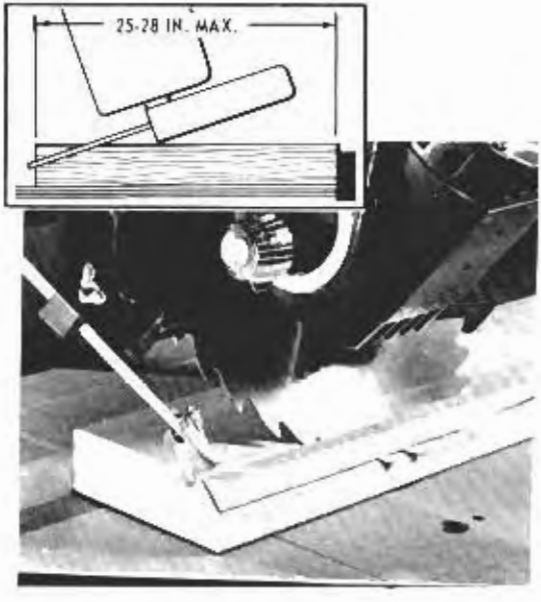
Two cuts are required. Preferably make the first cut down into the top (vertical or at any bevel angle desired) . . . then neatly remove the scrap strip with a second cut in from the side (which similarly can be horizontal or at any bevel angle desired). Usage of different angles for the two cuts will produce a variety of rabbet-edge shapes. The first three illustrations show shapes begun by using vertical and 45° bevel angles for the top cut; the last shows how a side cut will remove the scrap strip as desired.

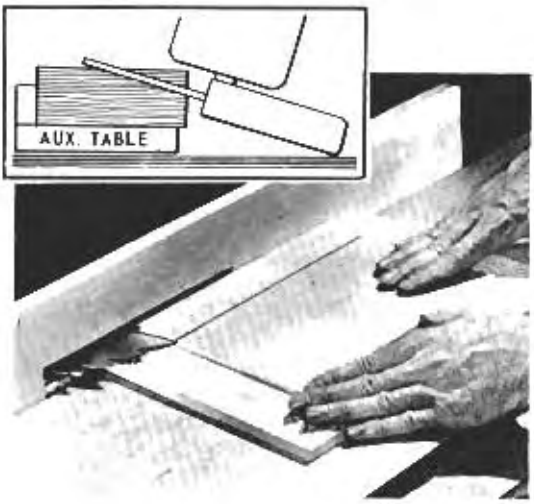


PLANNING THE SIDE CUT

REGULAR-BLADE CHAMFERING

A scrap strip can be sliced from workpiece edge in just one cut, if desired. If cutting from the top the obliqueness of the angle is limited by the guard and the reach of the blade; if cutting from the side the acuteness of the angle is limited by the height of the workpiece above the table top. Therefore, for an angle greater than 45° (measured between surface of cut and workpiece top) best do the cutting in from the side; for one less than 45° best do cutting from the top.



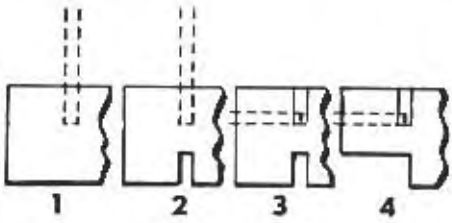


CHAMFERING TO RAISE A PANEL

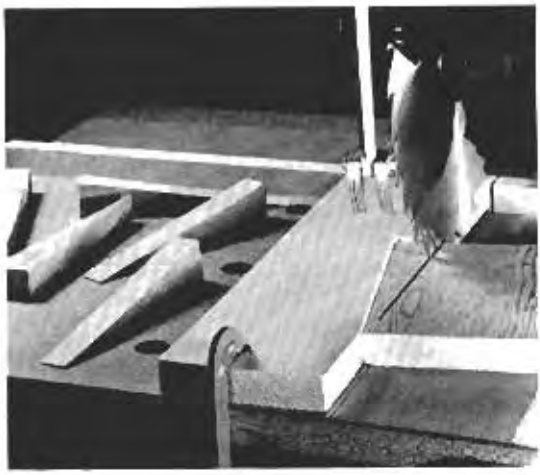
Raising a decorative panel as used in furniture making can be done by using an "up-angled" chamfer cut from either an in- or out-rip position. The illustration shows a horizontal in-rip set-up with a windowed fence and auxiliary board under workpiece.

REGULAR-BLADE TENONING

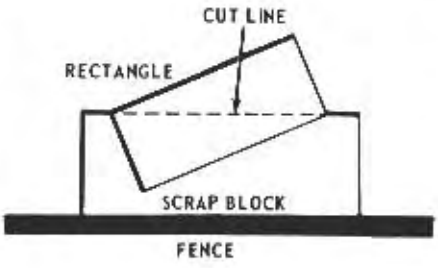
As you have learned, each face of a tenon is simply a deep rabbet. Since opposite faces generally must match, the only new requirement is to make them exactly alike. Do this by making the two top cuts at the same tool setting . . . then similarly making the two side cuts at one setting.



MULTIPLE RIGHT-ANGLE TRIANGLES



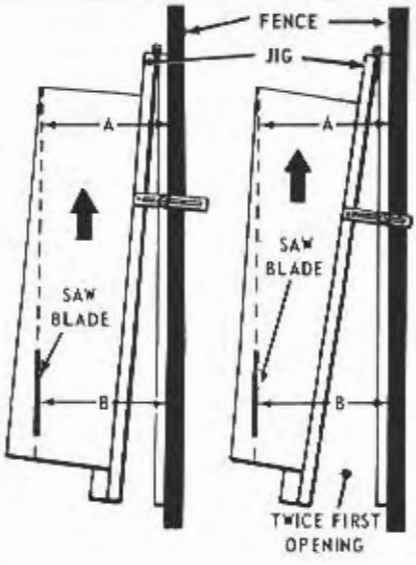
Duplicate wedges such as used for glue blocks can be cut quickly by first converting a scrap board into a template guide. Each pair of wedges can be cut from a presawed rectangle . . . or you can cut from a longer board if you flop the board to cut each second wedge, and also hold it in the template, parallel to the fence.



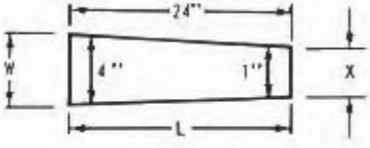
TAPER RIPPING FURNITURE LEGS

Symmetrically tapered pieces are often used for furniture legs, arms, etc. You can make these easily with the homemade jig *(page 102)* . . . or can purchase an excellent Aluminum Taper Jig *(see page A6)*.

Jig use is explained by the accompanying illustrations. An in-rip set-up is preferable, though an out-rip set-up can be used. You can make the two different jig settings simply by using a ruler to equalize distance "A" with distance "B" in each case, if desired. Or, to obtain precalculated tapers, you can use the accompanying formula. In either case, the second jig setting (for symmetrical tapers) is always twice the first.



Symetrical Taper Calculation



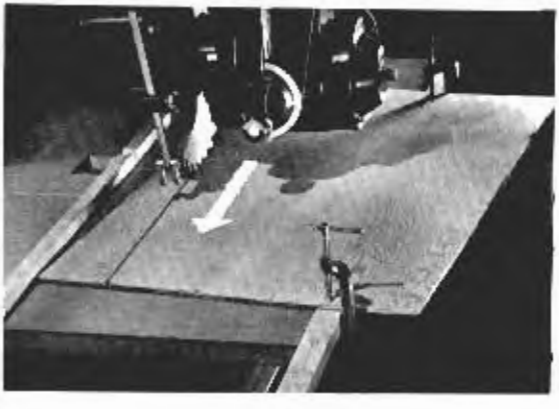
FORMULA

$$\frac{W-X}{L} \times 6 = \text{Taper of Each Side}$$

EXAMPLE

$$\frac{4-1}{24} \times 6 = \frac{3}{24} \times 6 = \frac{18}{24} = 3/4\text{" per ft.}$$

(If all taper is at one side use "12" for "6")

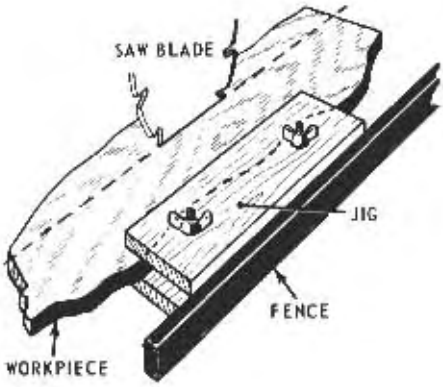


TAPERING A WIDE BOARD

For a board too wide to use the jig, clamp a straightedge to its underside at taper angle desired so that the straightedge will slide along front table edge.

HANDLING ODD-SHAPED PIECES

A workpiece which has no straight edge to slide against the fence can be rip cut squarely along a desired line by holding it in the convenient homemade jig *(see page 102)*.

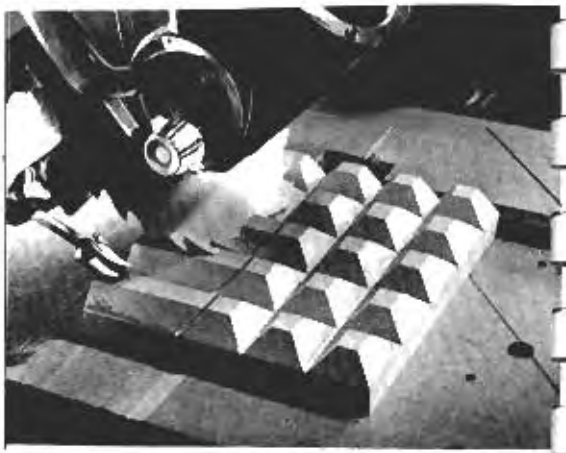


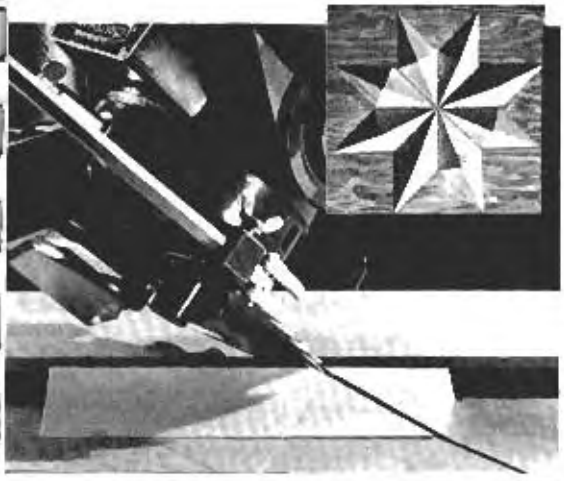
PATTERN SAWING

Duplicates of a shape otherwise difficult to copy can be made easily by using the original as a pattern. Secure the board for a duplicate to it in some convenient manner (very thin nails if holes won't matter — or rubber cement if you want no marks). Set tool up for out ripping with a straightedge board clamped to table against the fence. This board must be such that pattern will slide against its outer edge while the scrap portion of the duplicate rides over it to be cut off by the blade. The blade face must be flush with the board's outer edge . . . which requires cutting a clearance the thickness of the blade, prior to starting work.

DECORATIVE PYRAMIDS AND DIAMONDS

Pyramids (flat-topped or peaked) are created by making equally spaced V-groove cuts (with regular blade or dado) to form the sides. Those shown have square bases . . . the result of straight crosscutting in each of the two directions. Setting the arm at a miter angle instead will produce diamond-base pyramids. There are as many variations as there are bevel settings, miter settings and/or groove spacing arrangements.

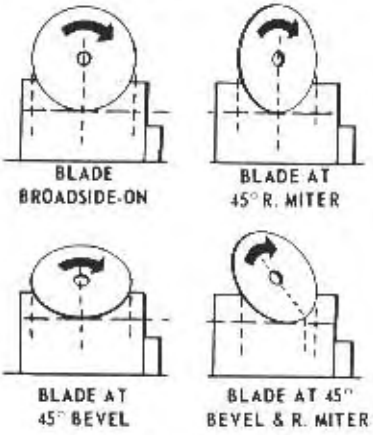




If grooves are cut with a regular blade the scrap strip left from the first direction cuts can be used to make decorative diamonds. Set-up for a 45° bevel and 45° right miter crosscut. Lay triangular strip base down against fence and cut off its right end. Turn it 180° (still base down) and cut the first diamond from its left end. Again turn it to cut second diamond off of right end . . . and so on until strip becomes too short to hold safely.

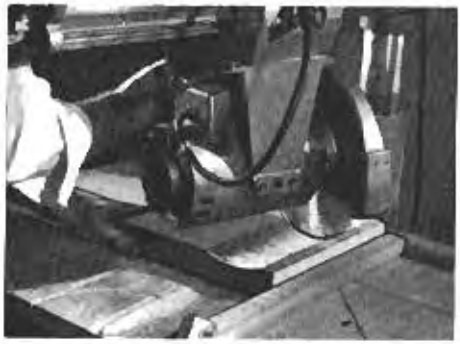
CUTTING COVES

The rip trough cut in your table top *(page 10)* is a shallow cove. A deeper cove can be crosscut in a workpiece in the same manner — but many passes, each at a lower level, are required. With the blade broadside-on not more than 1/8-in. of stock should be removed per pass — and this very slowly. If the blade is canted (by pivoting to a bevel angle and/or swiveling yoke to a miter angle) more of the teeth sharp edges will enter into the cutting action, and progress can be faster. Canting does, however, affect the depth and/or width to which a cove can be cut — as shown by accompanying illustrations.

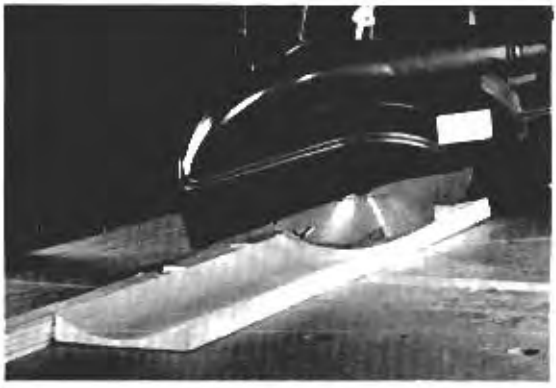


COVE SHAPES

Longer cove cuts can be made by using an in- or out-rip set-up. For faster cutting with less strain on the blade, the blade should be canted.



CROSSCUTTING A COVE

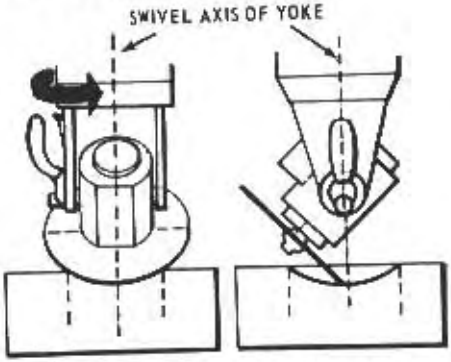


IN-RIPPING A COVE

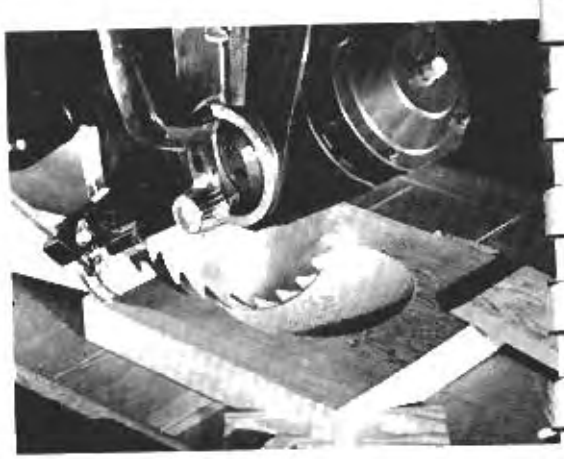
CUTTING BOWLS

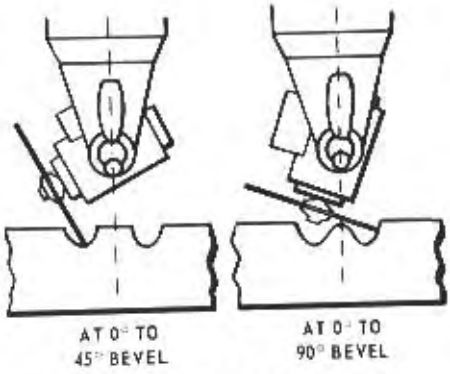
A bowl or dish cut is simply a cove cut that is "wrapped around" into a circle instead of following a straight line. Start with an in-rip set-up but, instead of moving the workpiece, hold the swivel latch knob up and rotate the yoke 180° to an out-rip position, then back again before lowering blade for another pass. Grasp the anti-kickback rod to do the rotating.

A 45° bevel setting will produce a symmetrical bowl shaped to the circumference of the blade at the deepest blade setting used. A 0° to 45° setting will produce a flat-centered ring; a 45° to 90° setting produces a dish with a peaked center portion.



BOWL CUTTING AT 45° BEVEL

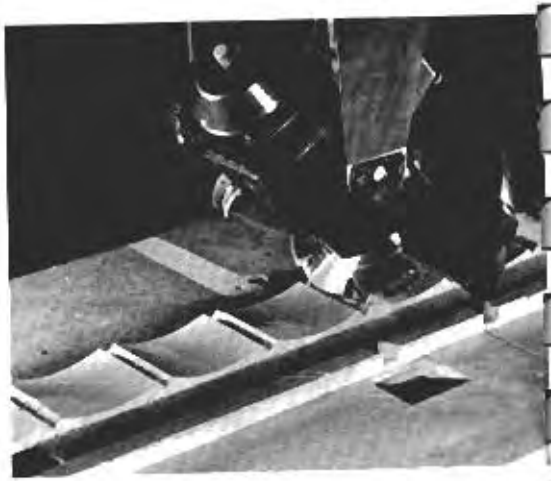




USEFUL VARIATIONS

DECORATIVE COVE-CUT TRIM

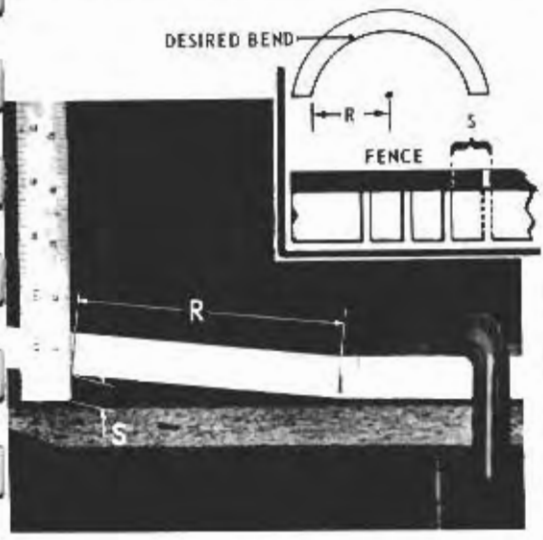
The decorative trim illustrated can be made to any width or length desired. It has a series of equally spaced crosscut coves separated by dado-cut V-grooves. Use a mark on the fence with guide lines on the work to obtain the equal spacing. If desired, the trim can later be sliced into thin strips for silouhette use.



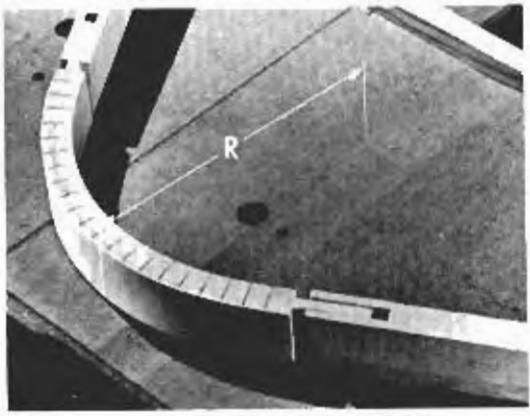
CURVING A WORKPIECE

You can make a smooth bend to any desired radius within reason by kerfing the back side of the workpiece. Kerfs must be uniformly spaced and should penetrate to same depth (1/4 to 1/16 in. from uncut side). The sharper the bend, the closer and deeper the kerfs must be. To determine spacing, make the first kerf. Clamp wood to table top, uncut side down, and mark off distance "R" equal to desired radius. Raise free end to just close the kerf, and measure distance "S" between mark and table top. "S" is the required spacing.

When cuts are completed fill kerfs with glue and clamp wood into desired radius until dry. Spaces may then be wood filled prior to finishing, to hide them.



FINISH BY GLUING TO CURVE

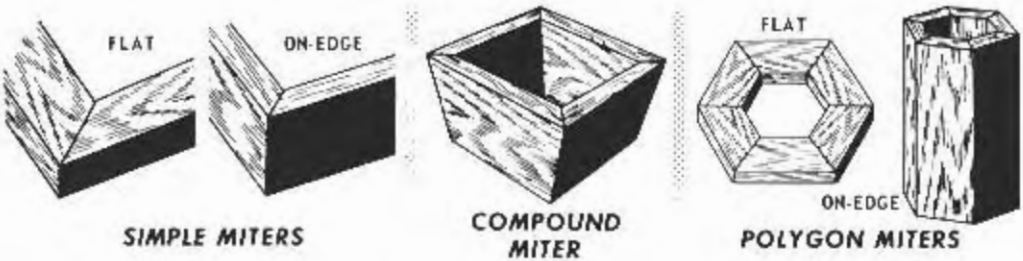


QUICK FIGURING OF BEVEL AND MITER ANGLES

Any closed construction, like a box, has a number of sides which must be joined together at the proper angles. If the sides are all equal in length (like those of an equilateral triangle, hexagon or octagon), there is a simple formula for figuring the angle (miter or bevel) at which to set your saw to cut each side where it joins the next. Simply divide 180 by the number of sides. The answer is your saw miter or bevel angle setting, in degrees.

EXAMPLES

NO. SIDES	ANGLE MITER OR BEVEL
3	60°
4	45°
5	36°
6	30°
7	25.7°
8	22.5°
9	20°
10	18°



SIMPLE MITERS *COMPOUND MITER* *POLYGON MITERS*

Simple (90°) Miters

Flat simple miters are crosscut at a 45° miter angle. Use same tool setting for all cuts. After cutting one end of board, turn it end-to-end and also flop it over to cut opposite end.

On-edge simple miters are crosscut at a 45° bevel angle. As above, use same tool setting throughout. Both turn and flop the board to cut its second edge.

Polygon Miters

These vary from simple miters only in the angles used. The angles are calculated as shown on page 45. Cut the flat ones by miter angling, the on-edge ones by bevel angling — and keep same tool setting for all cuts.

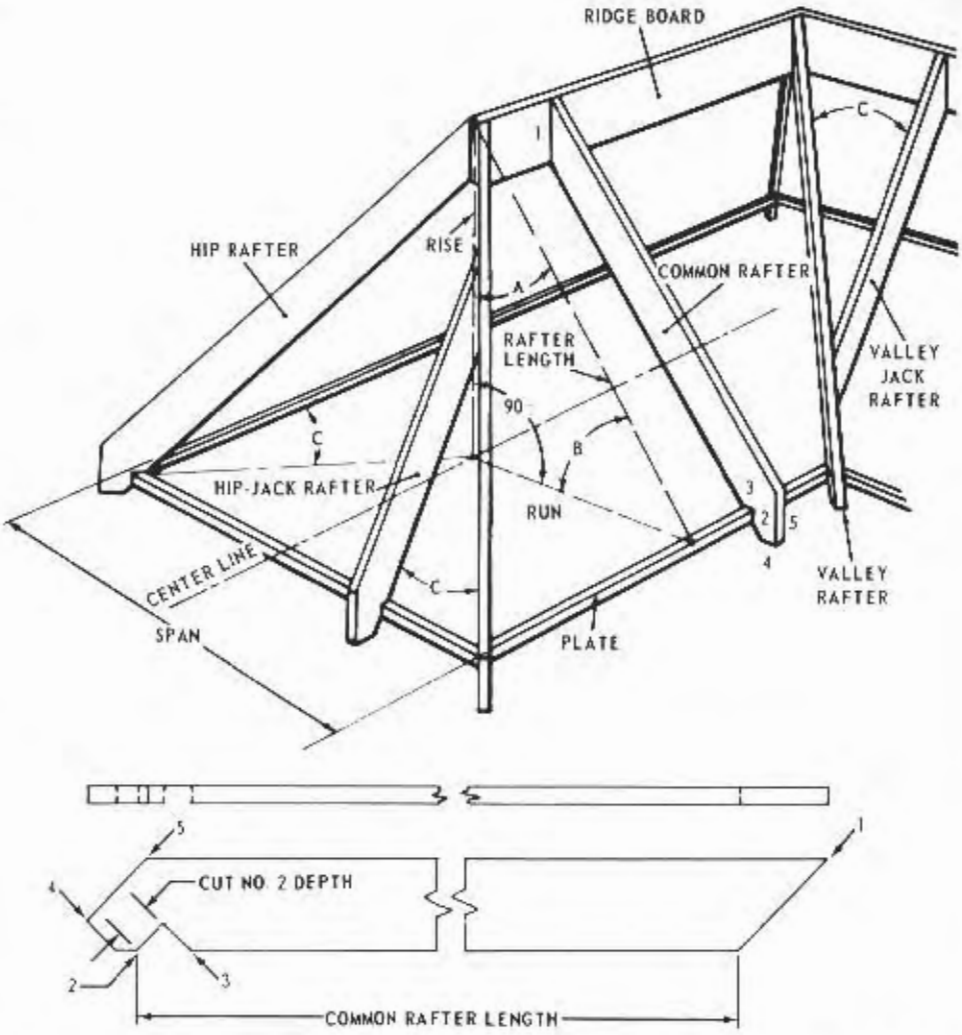
Compound Miters

Any 4, 6, 8, etc. sided structure with sloping sides requires a compound crosscut to make each edge. Pointed steeple roofs and picture frames with sides sloped in or out toward the wall are common examples. Do the cutting as above, after setting the proper compound angle used for all cuts. This compound angle is difficult to calculate, but the table on *page 48* gives you the miter (M) and bevel (B) angle setting for all 3- to 10-sided structures having sides pitched (sloped with respect to the structure base) at various pitch angles.

CUTTING RAFTERS

For each rafter, both the length and the angles at which the rafter board meets the ridge board and sets on the plate board will vary according to roof pitch (slope). All rafters of each type (common, valley, hip, etc.) in same roof are alike. For quickest work, therefore, make all like cuts in all rafter boards before resetting saw for next kind of cut. The table on page 48 gives required data for construction of an overhanging roof. First, determine the pitch (1/2, 1/4, etc.) desired — then use this line of the table. The total "rise" (in in.) will be the "rise per ft. of run" times the "run" (in feet).

Begin with a common rafter. Lay board flat on table and cut off one end (close to end as possible) with cut #1 at a miter angle. Measure its "length" along inside edge of board as shown, to locate start of cut #2. The "length" is the common-rafter "run" x "factor", shortened by 1/2 thickness of ridge board. Turn board on edge and use a bevel setting to make cut #2 so that blade enters to the depth given in table. Swing board around (still on edge), set saw for cut #3 bevel angle — and align blade to enter board so this cut will exactly meet cut #2 at its deepest point. Make cut #3. Slide board to left (still on edge) to make cut #4 to same (last) setting. The distance between cuts #2 and #4 will determine the amount of roof overhang (as you choose). Last, lay board on side



and use miter angle to make cut #5 so as to exactly meet the end of cut #4. Use this board to mark all other common rafters — then set up to do all of each cut in this sequence: cuts #1 and #5, cut #2, cuts #3 and #4.

NOTE

Cuts #2, #3 and #4 can be made only with the 12-in. saw. If using a 9-in. or 10-in. saw, do cut #4 first, at a miter angle — then start cuts #2 and #3 on saw and finish to depth required with a hand saw.

Hip and valley rafters are done like common rafters, with these differences: The "run" is a different length (see illus.). All cuts are changed to compound angle cuts by the addition of angle "C" (the angle between rafter and ridge board) which must be measured — then be added to saw setting as a miter or bevel angle, whichever is required to compound the cut.

A hip-jack rafter is cut at bottom like a common rafter, but at top like a hip rafter (angle "C" being the angle between this rafter and the hip

rafter). A valley-jack rafter is cut at top like a common rafter, but the bottom is a #5 cut at a compound angle (angle "C" being the angle between the rafter and the valley rafter). For both of these best actually measure required length, measuring along top edge of board.

FACTORS FOR RAFTER CUTS

ROOF PITCH	RISE PER FT. OF RUN	ANGLES OF CUTS 1, 2 & 5	ANGLES OF CUTS 3 & 4	FACTOR	DEPTH OF CUT 1
1/6	4"	18-1/2°	71-1/2°	1.05	1-1/4"
1/4	6"	26-1/2°	63-1/2°	1.11	1-3/4"
1/3	8"	33-3/4°	56-1/4°	1.20	2-5/8"
3/8	9"	37°	53°	1.24	2-1/2"
5/12	10"	39-3/4°	50-1/4°	1.30	2-3/8"
1/2	12"	45°	45°	1.41	2-3/4"
7/12	14"	49-1/2°	40-1/2°	1.53	3-1/8"
5/8	15"	51-1/4°	38-3/4°	1.60	3-1/8"
2/3	16"	53°	37°	1.66	3-1/8"
3/4	18"	56-1/4°	33-3/4°	1.80	3-1/8"
5/6	20"	59°	31°	1.85	3-1/8"
Full	24"	63-1/2°	26-1/2°	2.23	3-1/8"

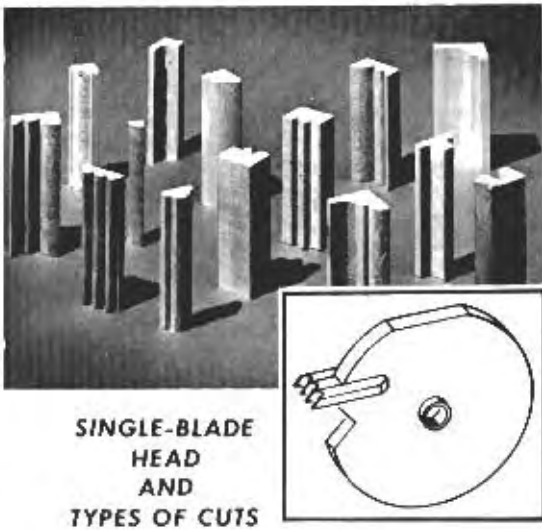
COMPOUND-ANGLE SETTINGS FOR POPULAR STRUCTURES

PITCH OF SIDE	NUMBER OF SIDES 3	4	5	6	7	8	9	10
0°	B- 0.0° M-60.0°	B- 0.0° M-45.0°	B- 0.0° M-36.0°	B- 0.0° M-30.0°	B- 0.0° M-26.0°	B- 0.0° M-22.5°	B- 0.0° M-20.0°	B- 0.0° M-18.0°
5°	B- 3.5° M-60.0°	B- 3.5° M-45.0°	B- 3.0° M-36.0°	B- 2.5° M-30.0°	B- 2.5° M-25.5°	B- 2.0° M-22.5°	B- 2.0° M-20.0°	B- 2.0° M-18.0°
10°	B- 8.0° M-59.5°	B- 7.0° M-44.5°	B- 6.0° M-35.5°	B- 5.0° M-29.5°	B- 4.5° M-25.5°	B- 4.0° M-22.0°	B- 3.5° M-19.5°	B- 3.0° M-17.5°
15°	B-12.5° M-58.5°	B-10.5° M-44.0°	B- 8.5° M-34.0°	B- 7.5° M-29.0°	B- 6.5° M-25.0°	B- 5.5° M-22.0°	B- 5.0° M-19.5°	B- 4.5° M-17.5°
20°	B-16.5° M-57.5°	B-14.0° M-43.0°	B-11.5° M-34.0°	B-10.0° M-28.5°	B- 8.5° M-24.5°	B- 7.5° M-21.5°	B- 6.5° M-19.0°	B- 6.0° M-17.0°
25°	B-22.0° M-56.0°	B-17.5° M-41.5°	B-14.5° M-33.0°	B-12.0° M-27.5°	B-10.5° M-23.5°	B- 9.0° M-20.5°	B- 8.0° M-18.5°	B- 7.5° M-16.5°
30°	B-28.5° M-53.5°	B-21.0° M-40.0°	B-17.0° M-32.0°	B-14.5° M-26.5°	B-12.5° M-22.5°	B-11.0° M-19.5°	B- 9.5° M-17.5°	B- 8.5° M-16.0°
35°	B-31.0° M-51.5°	B-24.0° M-38.0°	B-19.5° M-30.0°	B-16.5° M-25.0°	B-15.0° M-21.5°	B-13.5° M-19.0°	B-11.0° M-16.5°	B-10.0° M-15.0°
40°	B-35.0° M-48.5°	B-27.0° M-36.0°	B-22.0° M-28.5°	B-18.5° M-23.5°	B-16.0° M-20.0°	B-14.0° M-17.5°	B-12.5° M-15.5°	B-11.5° M-14.0°
45°	B-39.0° M-46.5°	B-30.0° M-33.5°	B-24.5° M-26.5°	B-20.5° M-22.0°	B-17.5° M-19.0°	B-15.5° M-16.5°	B-13.5° M-14.5°	B-12.5° M-13.0°
50°	B-42.5° M-42.0°	B-33.0° M-31.0°	B-27.5° M-24.5°	B-22.0° M-21.5°	B-19.0° M-17.5°	B-16.5° M-15.0°	B-15.0° M-13.5°	B-13.5° M-12.0°
55°	B-46.0° M-38.0°	B-35.5° M-28.0°	B-28.5° M-22.0°	B-23.5° M-18.5°	B-20.5° M-15.5°	B-18.0° M-13.5°	B-16.0° M-12.0°	B-14.5° M-11.0°
60°	B-49.5° M-34.5°	B-37.5° M-24.5°	B-30.5° M-19.5°	B-25.5° M-16.5°	B-21.5° M-14.0°	B-19.0° M-12.0°	B-17.0° M-10.5°	B-15.5° M- 9.5°
65°	B-52.5° M-29.0°	B-39.5° M-21.5°	B-32.0° M-17.0°	B-26.5° M-14.0°	B-23.0° M-12.0°	B-20.0° M-10.5°	B-18.0° M- 9.0°	B-16.5° M- 8.0°
70°	B-55.0° M-24.0°	B-41.5° M-17.5°	B-33.5° M-13.5°	B-28.0° M-11.5°	B-24.0° M- 9.5°	B-21.0° M- 8.5°	B-18.5° M- 7.5°	B-17.0° M- 6.5°
75°	B-57.0° M-18.5°	B-43.0° M-13.0°	B-34.5° M-10.5°	B-29.0° M- 8.5°	B-24.5° M- 7.0°	B-21.5° M- 6.5°	B-19.0° M- 5.5°	B-17.5° M- 5.0°
80°	B-58.5° M-13.0°	B-44.0° M- 9.0°	B-35.5° M- 7.0°	B-29.5° M- 6.0°	B-25.0° M- 5.0°	B-22.0° M- 4.0°	B-19.5° M- 3.5°	B-18.0° M- 4.0°
85°	B-59.5° M- 7.0°	B-44.5° M- 4.5°	B-36.0° M- 3.5°	B-30.0° M- 3.0°	B-25.5° M- 2.5°	B-22.5° M- 2.0°	B-20.0° M- 1.5°	B-18.0° M- 1.5°
90°	B-60.0° M- 0.0°	B-45.0° M- 0.0°	B-36.0° M- 0.0°	B-30.0° M- 0.0°	B-26.0° M- 0.0°	B-22.5° M- 0.0°	B-20.0° M- 0.0°	B-18.0° M- 0.0°

Each B (Bevel) and M (Miter) Setting Is Given to the Closest 0.5°.

CHAPTER 6

SHAPING, JOINTING & PLANING



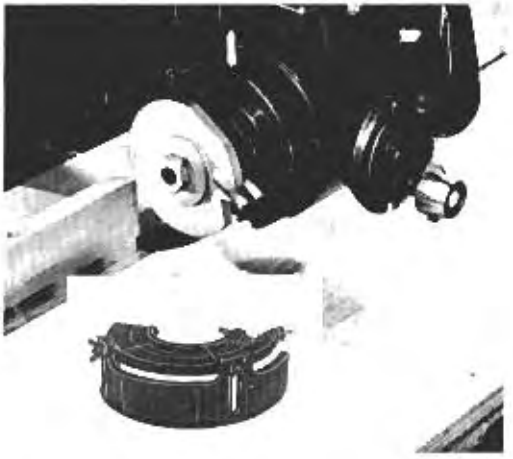
SINGLE-BLADE HEAD AND TYPES OF CUTS

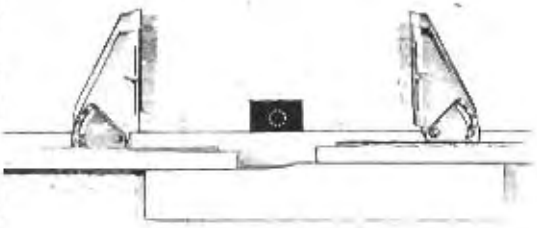
YOUR TOOL AS A SHAPER

Your Radial-Arm Saw is an exceptionally versatile shaper. It even offers many advantages not obtainable with an ordinary homeshop shaper . . . because it can shape from on top as well as from the side. You will need a Molding Cutter Head Set and a Molding Head Guard *(see page A3)*. The Shaper Fence, designed for your saw, will also prove useful. A cutter head is mounted in place of and exactly like the regular saw blade, with the flat side of its cutter(s) leading. The Molding Head Guard replaces the saw guard . . . and like the saw guard should *always* be used for maximum safety.

NOTE

The guard shown at right and in the following illustrations replaces the original model, but both models (whichever you have) serve exactly the same purpose.





CRAFTSMAN SHAPER FENCE ATTACHMENT

We highly recommend the use of this fence for the ease with which it makes possible many of the operations explained here.

ORDINARY SHAPER OPERATION

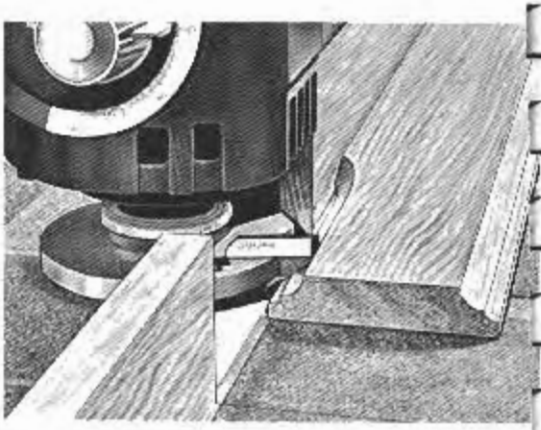
Shaping, as with a bench shaper, generally is done from the side . . . using an in-rip set-up with the blade horizontal and projecting just far enough forward of the fence to make the cut along the workpiece edge that is against the fence. Either the *Craftsman* Shaper Fence or a prepared fence with a suitable opening is required. The prepared fence can be simply two boards separated at center to allow the molding head and guard to project through . . . or you can use the two auxiliary tables or a "windowed" fence as described in Chapter 3.

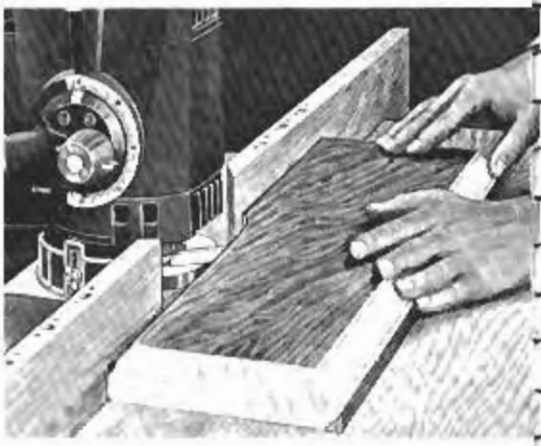
NOTE

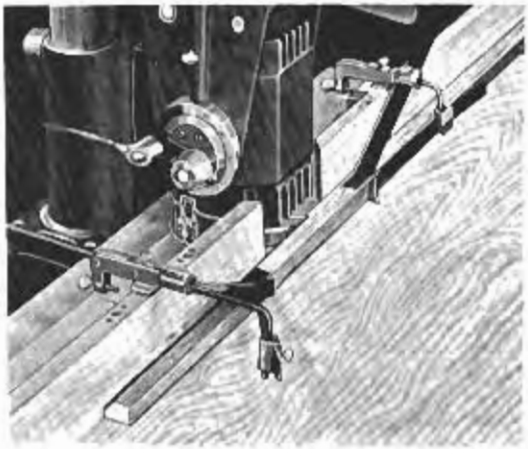
The right-hand portion of fence (on side from which workpiece is fed) is called the In-Feed Side; the other portion (at other side of cutter head) is the Out-Feed Side.

NOTE

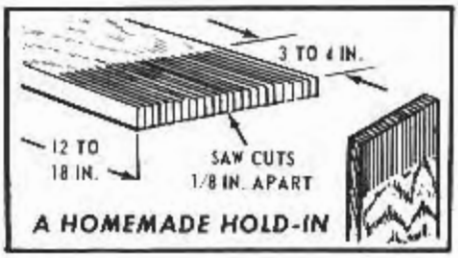
Illus. at top shows guard off for better view. In practice, however, always use a guard.



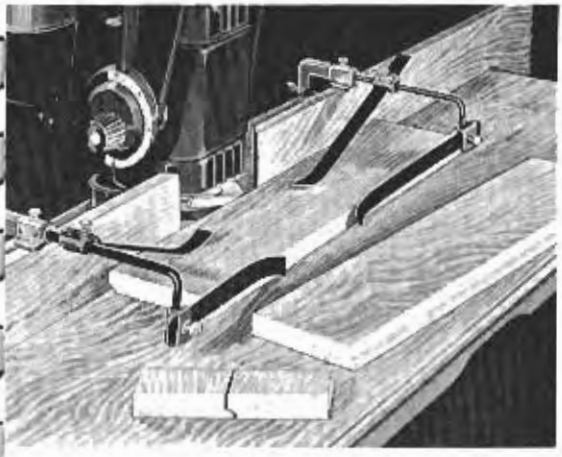




For narrow work and/or special operations your fence should be fitted with a Hold-Down Attachment — to keep the workpiece snugly in position on the table and against the fence for smoother, easier shaping. A second choice is to use homemade hold-ins clamped to table top . . . or, at least, to clamp a straightedge guide to table to butt against the workpiece outer edge.



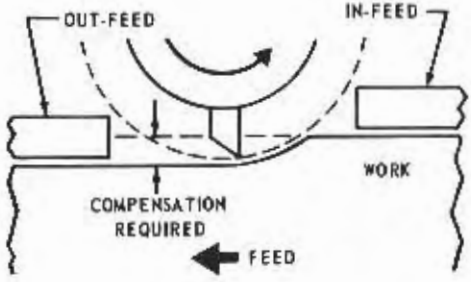
A HOMEMADE HOLD-IN



BOTTOM OR FULL-EDGE SHAPING

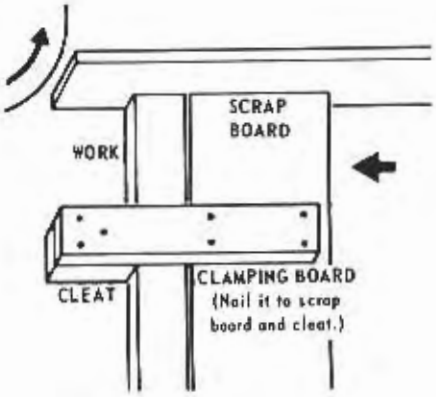
If fence is at normal with the cutter head over the square opening provided in table rear boards, the blade(s) can be lowered to scrape or dig into the table top. To cleanly shape a workpiece edge, however, it is preferable to have the blade overlap at least 1/16 in. Therefore, when shaping the bottom of a workpiece edge — or the entire edge — it generally is advisable to elevate the workpiece. Use either the auxiliary tables previously mentioned, or place a suitable board under the workpiece.

If a shaping operation removes stock from all of a workpiece edge, the already cut portion of the edge will be recessed back from the fence. When the remaining whole edge contacting the In-Feed Side of the fence becomes insufficient, your feeding pressure will rock the workpiece up against the Out-Feed Side and spoil the cut. To avoid this the *Craftsman* Shaper Fence is designed so that the Out-Feed Side can be adjusted forward to compensate for the removed stock. If you are using a board fence you will have to obtain and clamp to the Out-Feed Side a strip of material exactly thick enough to accomplish the compensation — or compensate the In-Feed Side as explained on the next page.



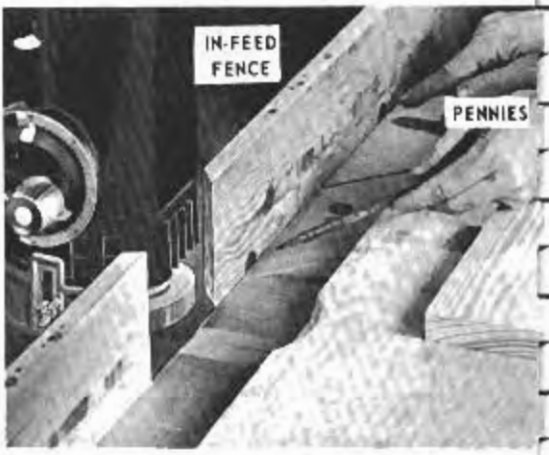
SHAPING A TOO-NARROW BOARD

Unless at least 50% of an edge being shaped is at all times in contact with either the In- or Out-Feed Side of fence, your feeding pressure is likely to rock the workpiece into the cutter to spoil the cut. In short, you can't feed the end of a too-narrow board successfully, all by itself. Instead, clamp your workpiece to a wider board that will provide sufficient bearing against the fence.

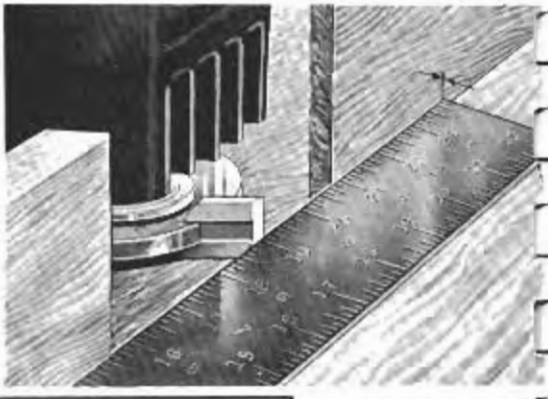


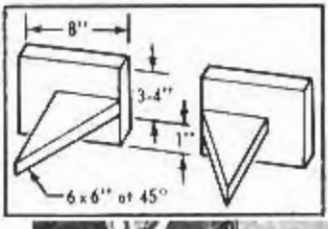
EDGE JOINTING

You can simultaneously reduce workpiece width and square the edge(s) by shaping the entire edge with the planer and jointer cutter(s). Preferably presize your workpiece so that no more than 1/4-in. (the maximum advisable in one pass) need be removed from each edge. If edge is no thicker than width of cutter the full edge can be jointed in one operation as explained preceding. A thicker edge, however, will require two or more operations, each with the cutter head elevated to a different height. In such case only the last operation (which finally fully recesses the out-feed side) requires fence compensation.



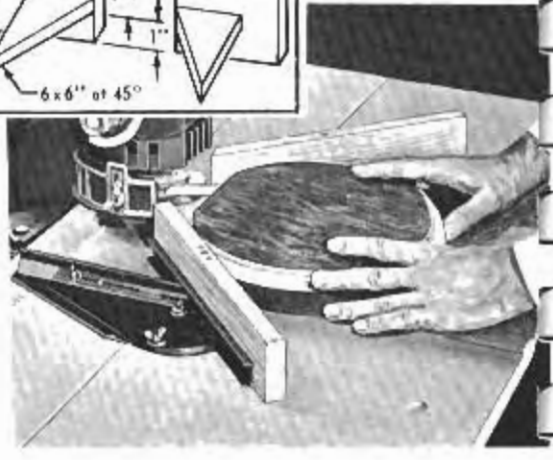
The smoothest possible surface will result if only about 1/16-in. of stock is removed. This requires very accurate adjustment of the *Craftsman* Shaper Fence or, if using a board fence, requires too thin a strip to be clamped to the Out-Feed Side. Better adjust the In-Feed Side. Use two separate fence boards and locate them at the rearmost table position. To obtain exactly 1/16-in. adjustment place two or more pennies down between the In-Feed Side and the table board in front of it. When clamped in place the In-Feed Side will then be recessed and the Out-Feed Side will be this distance forward from it.

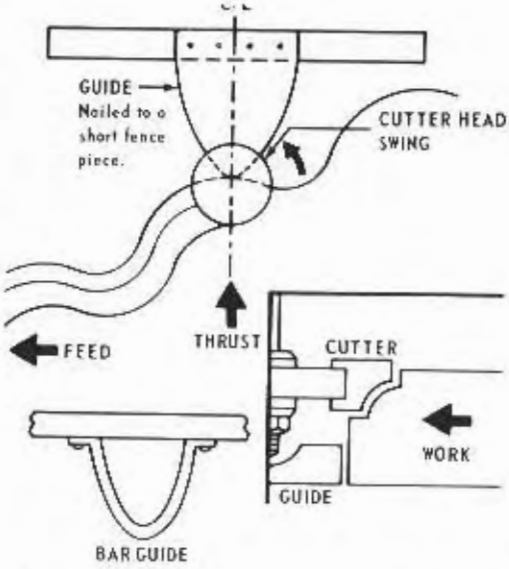




CIRCLE EDGE SHAPING

The *Craftsman* Shaper Fence can be adjusted to form a V for guiding circular work that is to be edge shaped. Another method is to use a pair of homemade V-block sections, as illustrated, to be installed at the fence position.

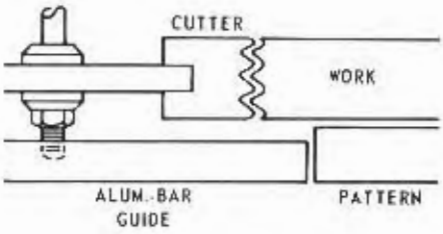




A piece of 1/2 x 1/8" alum. bar bent to shape and secured to a fence board makes an excellent guide.

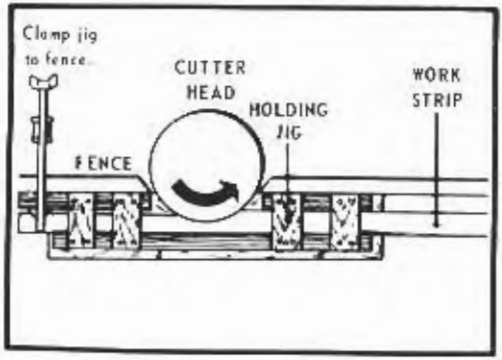
CONTOUR EDGE SHAPING

Contour shaping can be done as shown if the workpiece is presawed to the desired contour — and if only the top of the edge is to be shaped (so that bottom of edge remains to ride against the guide). The guide takes the place of the fence. It should extend forward far enough to provide room at each side for swinging the workpiece. Its nose should be blunt enough to ride within the smallest radius of the contoured edge . . . and the guide and cutter head must lie on a common centerline perpendicular to the table front edge. If necessary, make a hole or recess in guide so shaft end can be lowered into it. While feeding the workpiece keep swinging it so that the immediate portion of edge being cut is perpendicular to this centerline — and so that you are pushing it into the cutter along this centerline.



PATTERN SHAPING

The same guide described preceding can be used in much the same manner with a pattern. Shape the pattern to exact contour desired and size it so that as it rides against the guide the workpiece edge will be simultaneously reduced and shaped as required by the cutter blade(s). The workpiece edge need not be exactly presawed to contour — just have it enough oversize to allow for the cut, without requiring too much removal of stock. Use thin brads or rubber cement to hold bottom of workpiece to pattern.



For jig construction see page 102.

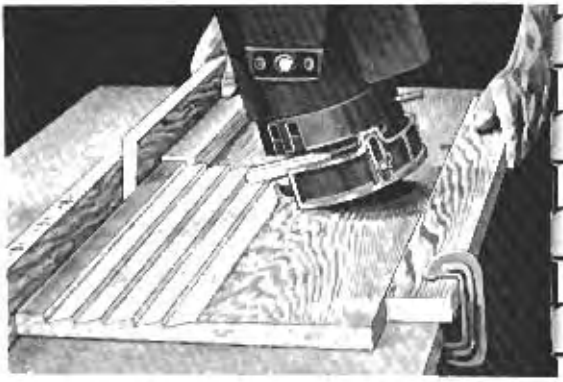
STRIP MOULDINGS

For molding thin workpieces make a simple wooden jig such as illustrated — to guide workpiece firmly past the cutter head. Or, you can mold the edge of a wider piece, then saw off the desired strip, if you prefer.

BEVEL ANGLE SHAPING

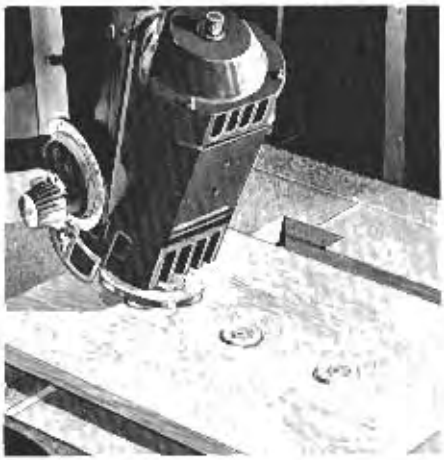
Bevel angling the cutter head (by pivoting power unit) will vary the type of shape produced by a cutter blade. The shaper guard will permit angling up to approx. 45^{0}.

If an out-rip (instead of in-rip) set-up is used, bevel angling will allow you to make cuts into the workpiece top surface. By resetting the carriage outward on the arm for each new cut a series of parallel cuts can be achieved. The illustration shows a planer blade in use to produce simulated louvers. Note that edges of workpiece against fence and straight-edge guide must be exactly parallel.



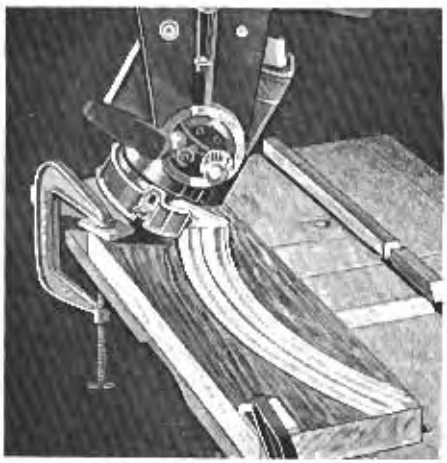
NOTE

Angles greater than permitted by the shaper guard can be obtained if the regular guard is used, instead. In fact, using the regular guard you can set the cutter head in a vertical in- or out-rip position, to cut straight down into workpiece, if desired. For safety, *always use one of the guards*.



SURFACE DECORATIONS

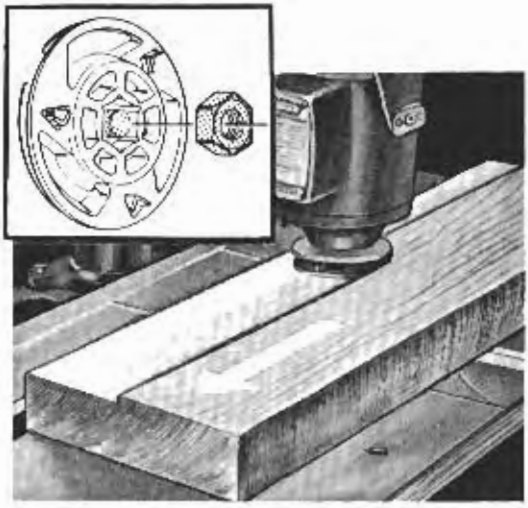
Two suggested methods of using molding cutters to decorate a workpiece surface are illustrated. The rosettes are made by using the same technique described in previous chapter for cutting a bowl. For making the radius type cuts use a bevel-angled out-rip set-up . . . lock the carriage, but hold the arm unlocked and swing it from right to left as required.



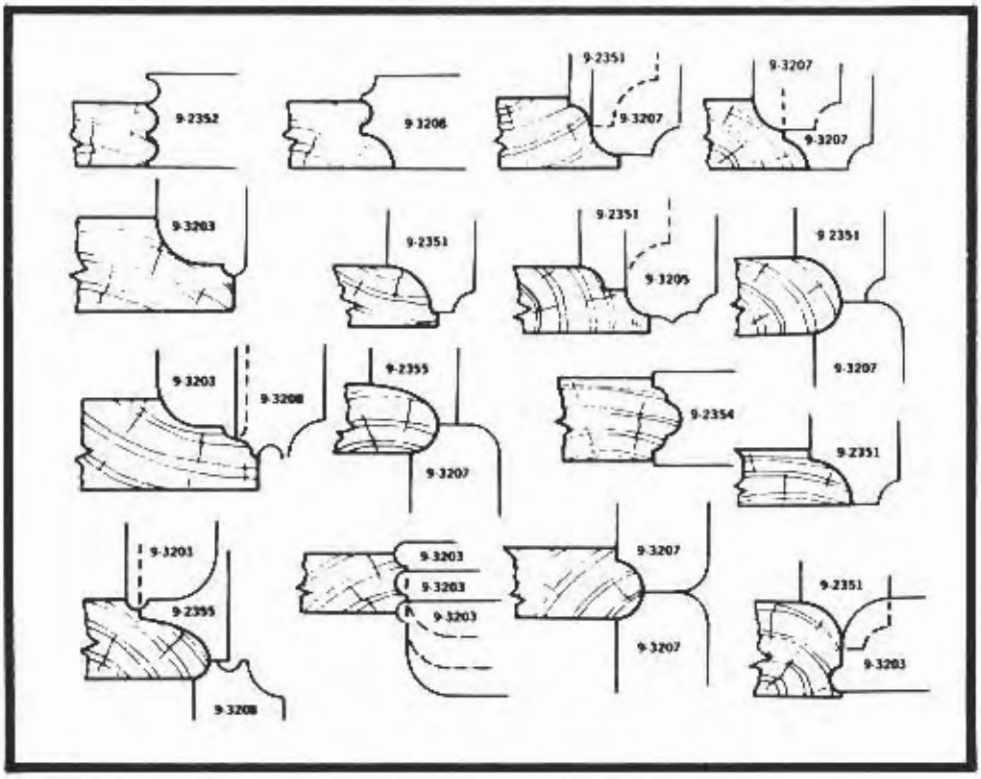
SURFACE PLANING
WITH ROTARY SURFACE PLANER ATTACHMENT

Excellent surface planing can be accomplished with a Craftsman Rotary Surface Planer Attachment (page A3) mounted at the accessory end. Cuts up to 1/4-in. deep can be taken — and a board can be both surfaced smooth and reduced to desired thickness (as with a thickness planer) by planning the amount of stock to be removed from each of its two sides.

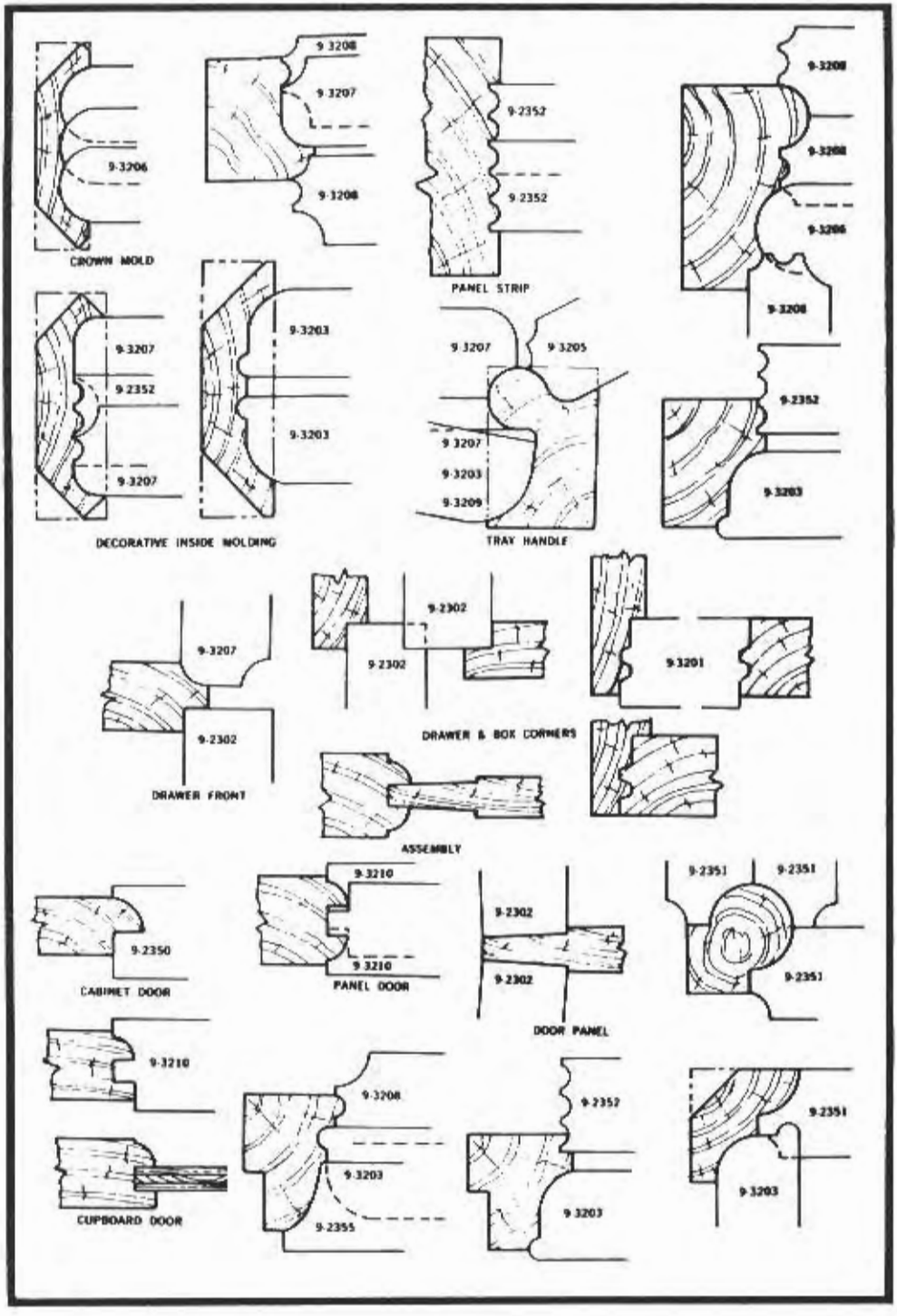
Use a vertical routing set-up. Advance and relock the carriage for each successive cut needed to cover entire surface. Repeat for another all-over operation at a new depth if removal of more stock is desired.



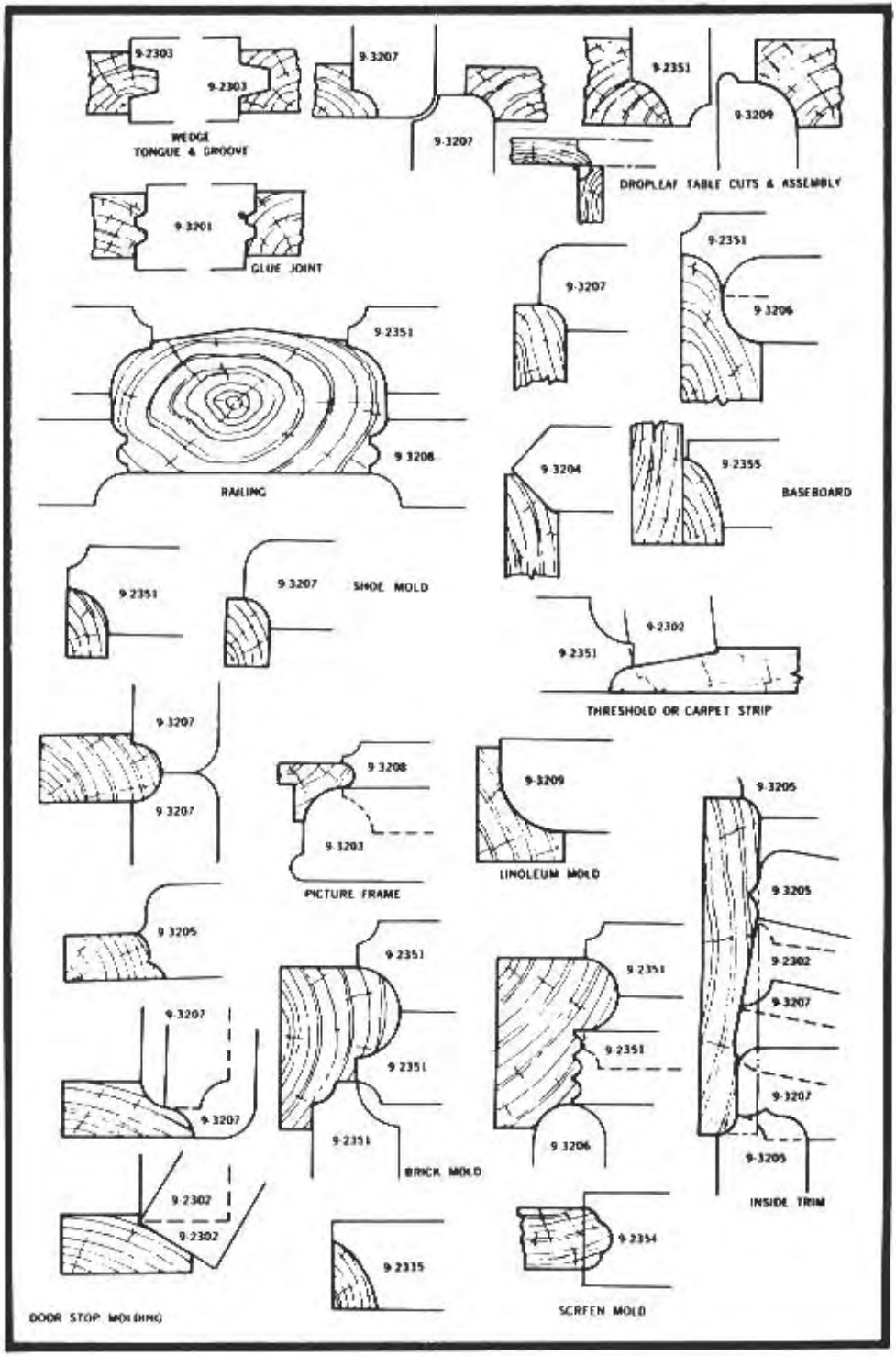
SHAPES YOU CAN MOLD WITH MOLDING HEAD CUTTERS



SHAPES YOU CAN MOLD WITH MOLDING HEAD CUTTERS



SHAPES YOU CAN MOLD WITH MOLDING HEAD CUTTERS



CHAPTER 7

ROUTING, CARVING & DRILLING

YOUR TOOL AS A ROUTER OR DRILL

Fitted with a chuck at the accessory shaft end your tool becomes a drill press . . . but a drill press that can be directed vertically, at any desired bevel angle, or horizontally, to accomplish routing, carving, shaping and drilling operations not possible with any other type of homeshop press. All that you need are a chuck and cutting tools, such as router and carving bits, wood and/or metal bits or drills. *Refer to page A6.*

Remove the saw guard and blade. Mount the chuck at the accessory shaft end (preferably a 1/2-in. key chuck for maximum performance), with the desired cutter in the chuck.

TOOL SET UP FOR CROSSCUT ROUTING

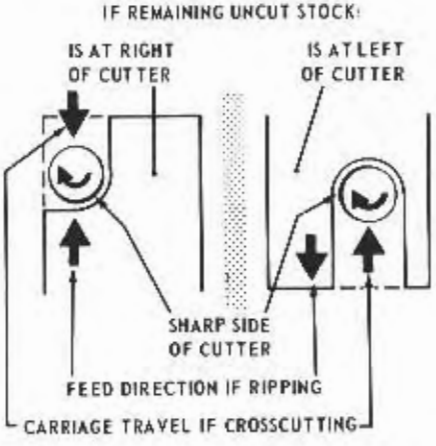
STRAIGHT-LINE ROUTING

Any work that calls for straight cuts — into or through workpiece from on top, or into edge from one side — can be accomplished either by a cross cut or ripping operation, whichever seems most suitable. For crosscutting the carriage is traveled; for ripping the work is slid along the fence. If routing deeply or clear through, increase the depth by stages. Width also can be increased by making more than one pass. Feed no faster than tool can take the work without noticeable slowing. To make angled slots, bevel angle the power unit and swivel the yoke to obtain desired direction of cutter approach.

TOOL SET UP FOR RIPCUT ROUTING

IMPORTANT

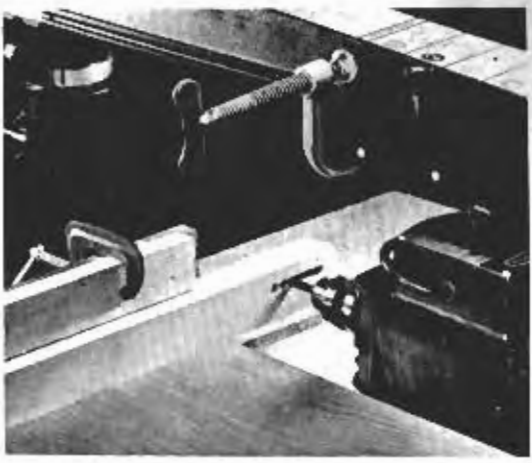
A chucked cutter revolves counterclockwise as viewed from above. Always move carriage or feed work so that stock being removed advances *into sharp side of cutter.*



FREEHAND ROUTING

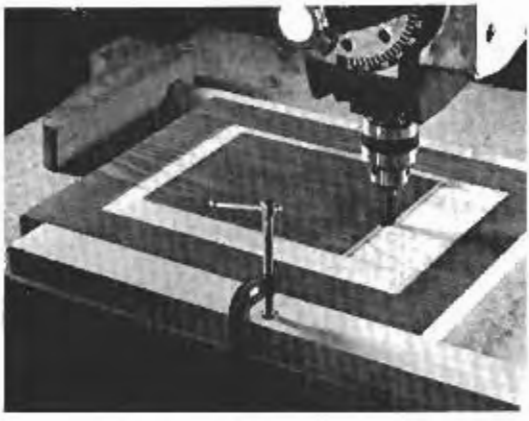
Either the tool or the work can be moved. If tool is to be moved, clamp the work onto the table, unlock the carriage and arm — then use one hand to travel the carriage while using other hand to hold the arm latch out and swing the arm. If work is to be moved, hold it while lowering revolving cutter to depth somewhere in area to be routed out — then use both hands to swing the work as desired. All tool controls are locked when work is moved.

The panel indenting illustrated is being accomplished by freehand tool movement to remove central area after straightline routing of the rectangular panel outline. Successive straightline cuts (rip or crosscut) also could be used to remove center. The cloverleaf design shown is being freehand routed by moving the workpiece under the locked tool.



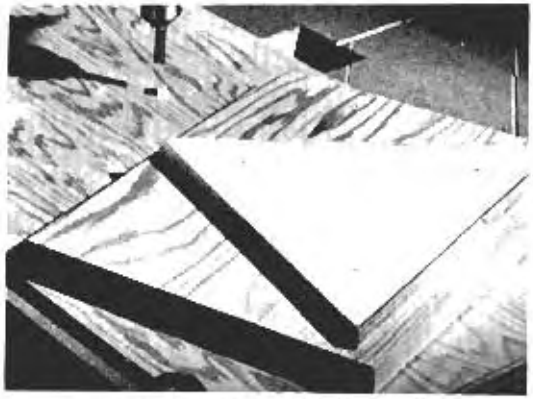
HORIZONTAL RIPCUT ROUTING

Clamp on arm stops carriage inward travel at start of cut. Lock carriage when depth is reached. Use stop blocks at each end of work, or marks on fence.



PATTERN ROUTING OF SURFACE DESIGNS

Either indented or raised panels of desired design can be quickly duplicated from an appropriate pattern secured (by thin brads or rubber cement) to underside of workpiece. Use an auxiliary board on table top, with a 1/4 to 1/2-in. dowel projecting up the thickness of pattern and directly under the router bit. Freehand feed the workpiece while pressing pattern edge against the dowel — to recreate the design outline in the workpiece.

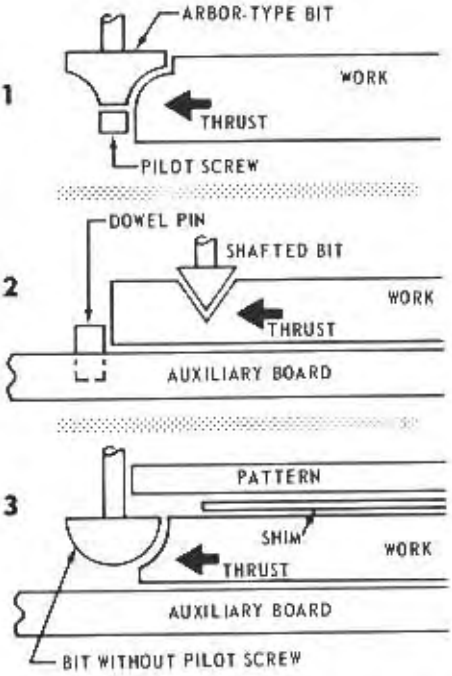


PATTERNS AND DOWEL SET-UP

PATTERN-GUIDED OPERATION

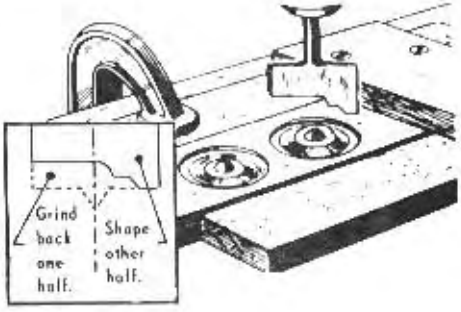
CIRCULAR GROOVING AND EDGE SHAPING

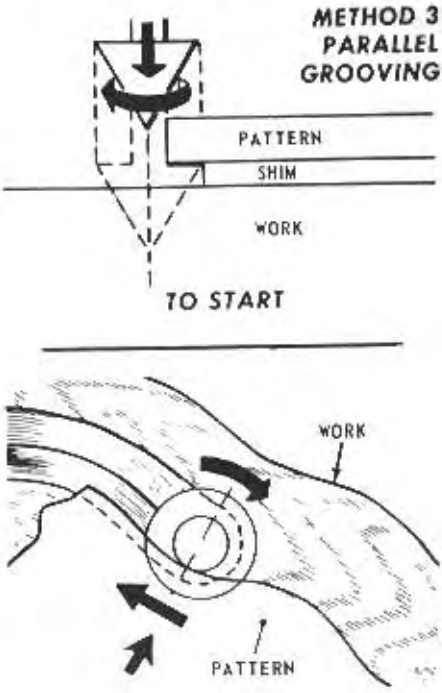
By using the *Craftsman* shaper fence or homemade V-blocks *(Chapter 6)* to guide rotation of circular workpiece, either perfect-circle routed slots or any of the edge shapes possible with the various router bits can be accomplished. Bevel angling will add variety to the results obtainable.



Using the desired shape router bit you can shape the edge or groove parallel to the edge of any contoured workpiece that the bit is not too large to follow. There are three methods.

If an arbor-type bit is used to shape the top of the edge, the uncut bottom portion of edge is thrust against a pilot screw added on at bottom of bit. If a shafted bit is used (at edge or for parallel grooving) use a dowel pin (as previously described) to press either the uncut edge portion or a





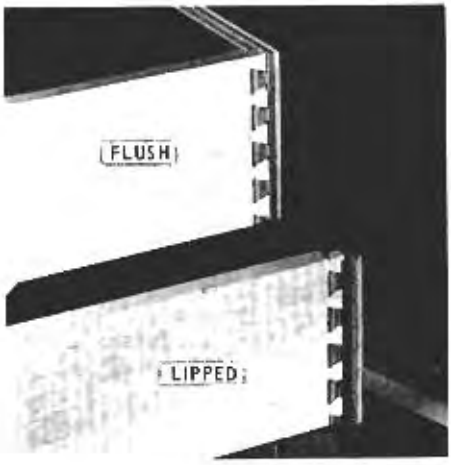
pattern (underneath workpiece) against. Locate the pin behind or in front of bit as required — but have it and bit on same line perpendicular to table front edge, so you can thrust straight back while swinging and feeding work to the bit. The third method is used if all or the bottom part of workpiece edge is to be cut. It requires a pattern secured on top of work and shimmed up high enough to ride against the bit shaft.

ROSETTES OF YOUR DESIGN

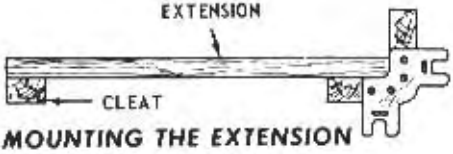
Rosettes of your own design can be created by using a power wood bit ground to shape desired, as shown.

DOVETAIL ROUTING

Interlocking dovetail joints, as used in fine cabinetwork, are quickly and easily made with a 1/2-in. dovetail bit on 1/4-in. shank and the Dovetail Attachment *(page A3)*. The attachment is furnished with instructions for setting it up.

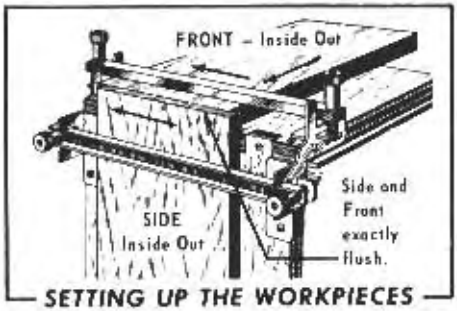


The two workpieces to be joined must be accurately sized and squared. They are mounted inner sides out in the attachment with the piece that is to be the front on top. Butt both firmly against the left-side stop brackets, and against each other, as shown.



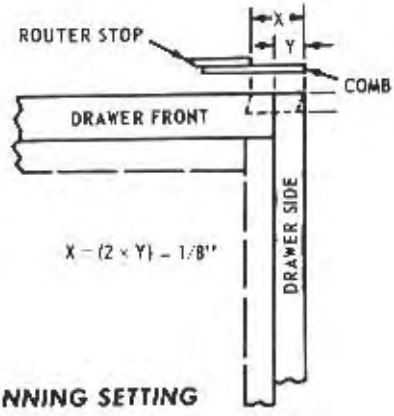
MOUNTING THE EXTENSION

FOR A FLUSH JOINT — draw a line on top piece parallel to edge that butts against vertical piece, and a distance in from the outer edge of the vertical piece that equals twice the vertical piece thickness less 1/8 in. Position the comb so the ends of its teeth are flush with outer surface of vertical piece — and look down between the teeth. If drawn line is visible, mount the router stop on comb with its outer edge above the line — and secure stop and comb to the attachment. If line is not visible, move comb back until line can just be seen — then secure comb in place without the stop.

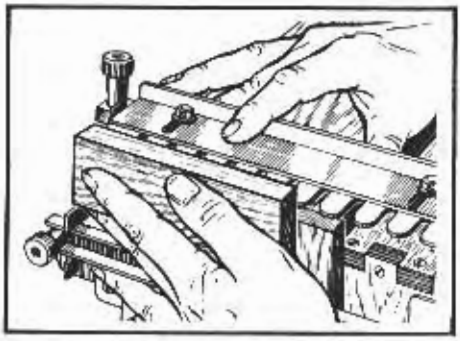


SETTING UP THE WORKPIECES

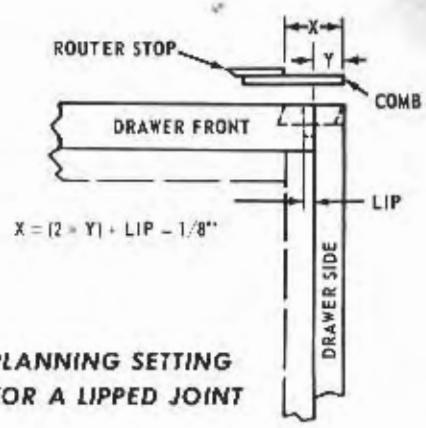
FOR A LIPPED JOINT — move the line back a distance equal to desired depth of lip, then mount comb without stop, as above. The top piece dovetail cuts will be recessed this much more . . . and following the dovetail operation you can rabbet this edge to the predetermined lip depth.



PLANNING SETTING FOR A FLUSH JOINT



SETTING GUIDE AND COMB FOR A FLUSH JOINT

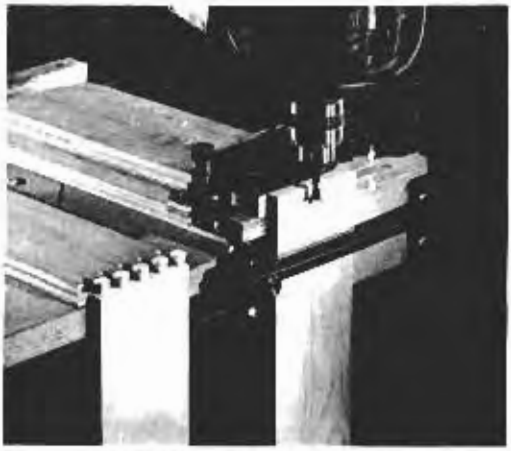


PLANNING SETTING FOR A LIPPED JOINT

FOR CUTTING — set dovetail bit to cut exactly 3/8-in. deep. A shallow setting makes a sloppy joint; too deep a cut makes a too tight joint. Position tool so you can slide dovetail attachment along a side edge of table, pulling it out toward you to feed bit in between comb teeth. Starting at one end, use both hands to feed work to bit. Carefully work bit in and out around each comb tooth from start to end.

NOTE

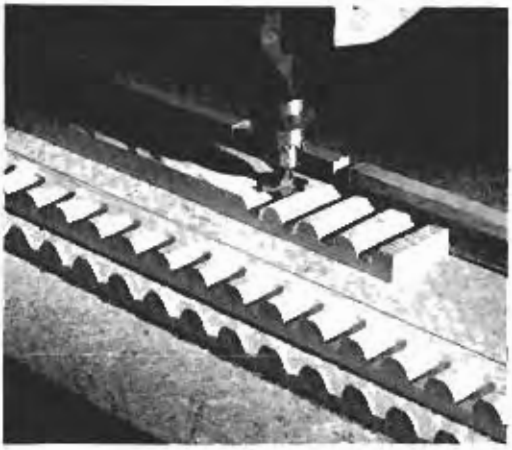
When doing a drawer, make joint for one end of front and first side as described . . . but to make joint for other end of front and second side butt the pieces against stops at right side of attachment (instead of those at left side).



SETTING DEPTH OF CUT

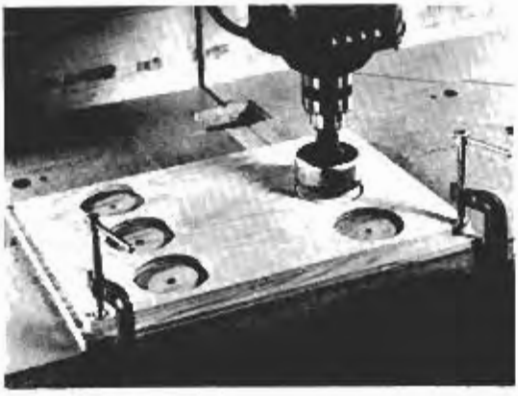
DECORATIVE ROUTED MOLDINGS

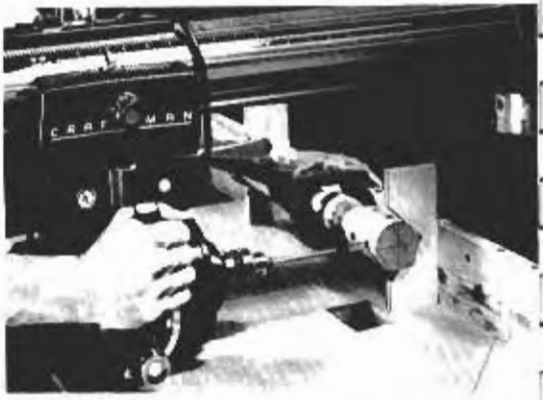
A typical routed molding is shown. Even spacing is obtained by using guide lines to advance the work along the fence for crosscut routing of each groove. Finished piece can be used as is, or be sliced into thin strips for bordering.

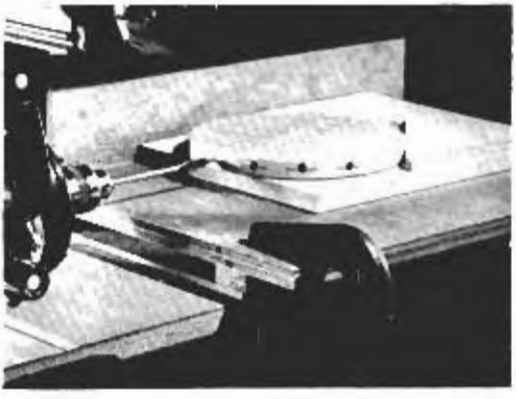


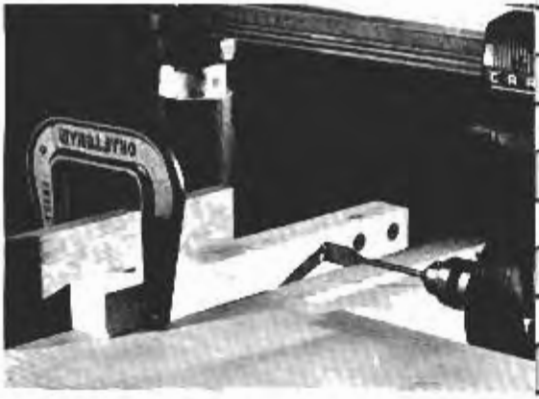
WOOD BORING

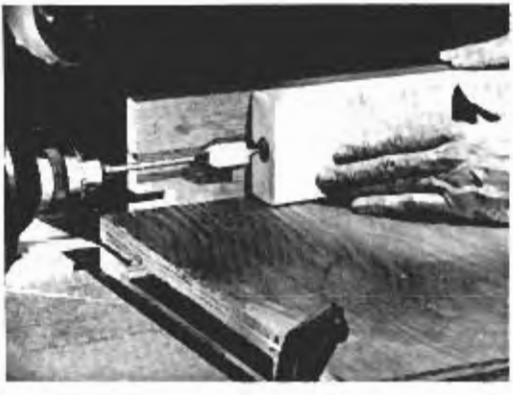
Any power wood bit, twist drill, hole saw or similar boring tool that can be used in a drill press can be used in your tool. And your radial-arm saw has the big advantage of being able to bore in at any angle desired — or to bore in horizontally, with extreme and simple accuracy, at the end of a long workpiece. Typical operations are illustrated. Note that wherever boring is done horizontally the work is properly backed up — by a high enough fence, by clamping, by a V-block, or in some manner to assure a firm support. Proper holding jigs assure better, easier work.

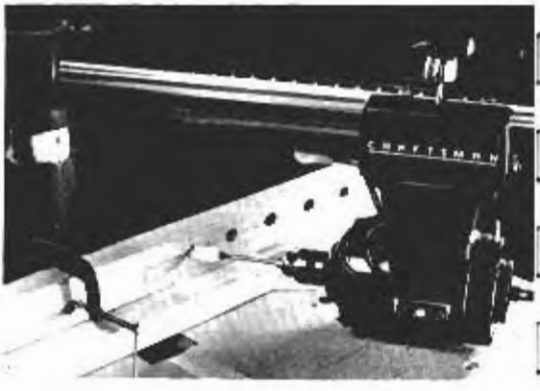












CHAPTER 8

SANDING & POLISHING

YOUR TOOL AS A SANDER-POLISHER

Your tool can be used as a disk sander, a drum sander, and as a surface sander and polisher. For disk sanding use the 10-in. plate, which has a threaded hub for mounting on the saw-blade shaft end. The drum is threaded to mount on the accessory shaft end; and the rubber sander-polisher disk has a 1/4-in. adapter for mounting in a chuck at the accessory shaft end. *(See page A5 for these items.)*

Three different grit sandpapers are available for the above: coarse, medium and fine. Use the coarse for removing large amounts of wood (especially softwood); the medium for closer shaping to contour; and the fine for all finish sanding to exact dimensions (when only about 1/32 in. of stock is left to be removed). Two different grits can be mounted, one each side, to the plate. Use either stick or liquid disk cement. General practice is to mount a fine and either a medium or a coarse. Interchangeable sanding sleeves hold by friction on the drum. The sander-polisher kit contains instructions for mounting various disks and the lambswool polishing bonnet.

GENERAL SANDING RULES

Power sanding is very much faster than hand sanding. Also, if not abused, the sandpaper will last much longer. For good work obey these rules:

1 - Don't press too hard — let the power (not your muscle) do the work.

2 - Don't shove a sharp corner directly into the sandpaper — round it off by approaching from its sides.

3 - Sand with the wood grain whenever possible — not across it.

4 - Avoid sloppy rounding off of edges and corners that should remain square.

5 - Keep your work and sandpaper dry. If wood is green (especially softwood), finish as best you can, rub wood surface lightly with a damp cloth to raise the wood nap (fuzz), let wood dry — then resand to a better finish.

6 - Don't sand to remove paint — use a paint remover.

7 - Keep sandpaper surface open by brushing occasionally with a stiff bristle brush to remove wood chips, gum, etc.

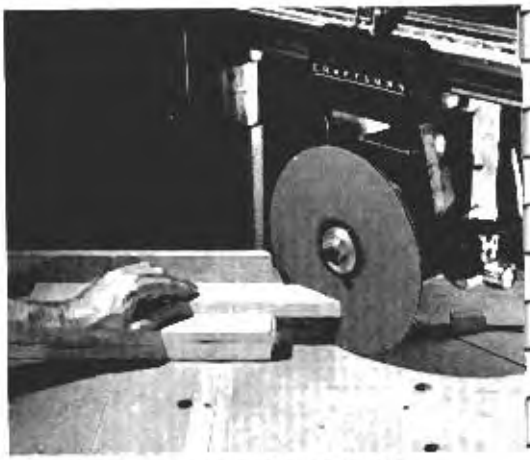
8 - If sandpaper becomes worn, torn or crumpled, replace it.

9 - Remember that outer part of a disk is moving faster than center part, will do faster work.

10 - Wherever there is a choice, hold work so that revolving disk or drum will tend to thrust it down or back against its support — instead of lifting or pulling it away.

DISC SANDING

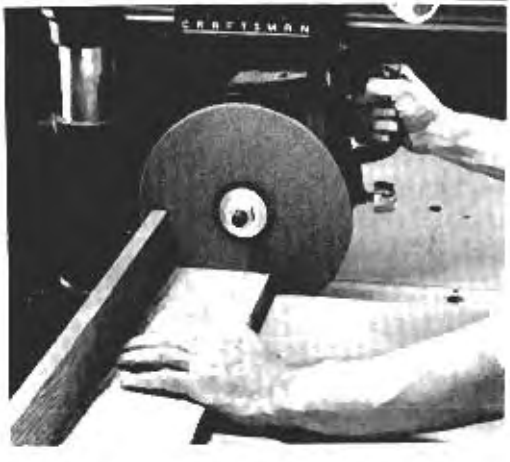
This can be safely done without the guard if you do not wear a tie, long sleeves, loose apron strings — or any such thing that could be caught up by the revolving plate or shaft. With the plate in place of the saw blade, your tool is just as versatile as it is when sawing. You can use all the various set-ups and approaches previously discussed.



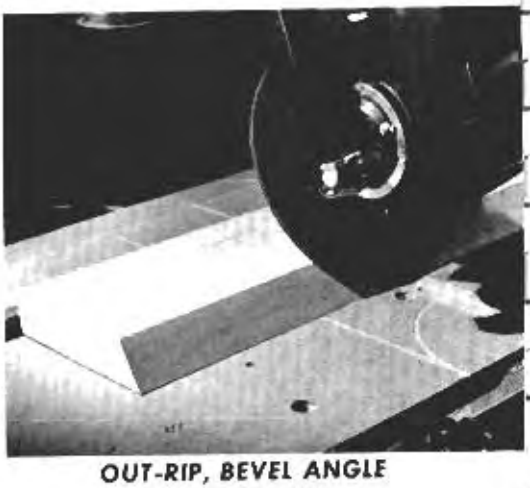
MITER ANGLE DISK SANDING

FREEHAND DISK SANDING

COMPOUND ANGLE DISK SANDING



CROSSCUT DISK SANDING



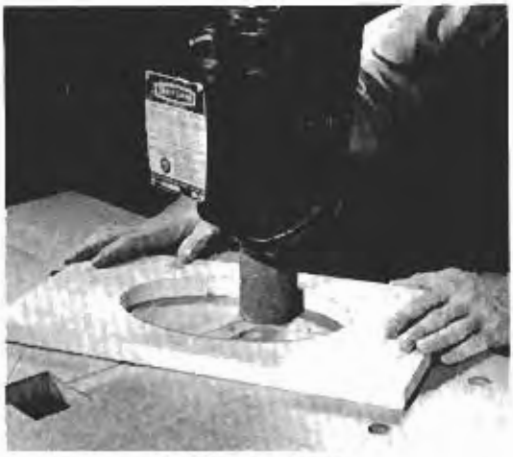
OUT-RIP, BEVEL ANGLE DISK SANDING

DRUM SANDING

The saw blade and guard are removed when a drum is mounted at the accessory end. Hence, all the set-ups and approaches already explained for routing and drilling can be used to apply the drum to the work. A drum is especially useful for sanding contoured edges, inside edges and long, narrow, straight edges — as shown by the illustrations.

FREEHAND DRUM SANDING
A CONTOURED EDGE

DRUM SANDING
A NARROW, LONG, STRAIGHT EDGE



DRUM SANDING
AN INSIDE EDGE

DRUM SANDING
A RABBET EDGE

Like the drum, the sanding-polishing disk is mounted at the accessory end — and various routing set-ups can be used. Its chief advantage, however, is its capacity to smoothly and accurately sand a surface to a true level and uniform workpiece thickness — and to power polish this surface after the application of wax or other shine-type wood finish.

CROSSCUT SURFACE SANDING

FENCE-GUIDED SURFACE POLISHING

CHAPTER 9

WORKING WITH METALS AND OTHER MATERIALS

The versatility of your radial-arm saw in woodworking also can be applied to working with metals and other materials — if the proper cutting, abrasive or other type tool is used. Some typical operations are pictured here, and briefly explained following:

The *Steel Slicer Blade (page A4)* will quickly and easily cut through sheet steel and tubing up to 1/16-in. thickness. It is also excellent for making clean, ungummed cuts through Lucite, Plexiglas and similar plastics up to about 1/4-in. thickness. Just keep cutting fast enough to avoid allowing the blade to overheat the plastic.

A *Ply-Tooth or Satin-Cut Veneer Blade (page A4)* will cut any of the do-it-yourself aluminum products — sheets, bars, tubing or extruded shapes. For harder metals, such as copper or brass, use a non-ferrous metal cutting blade.

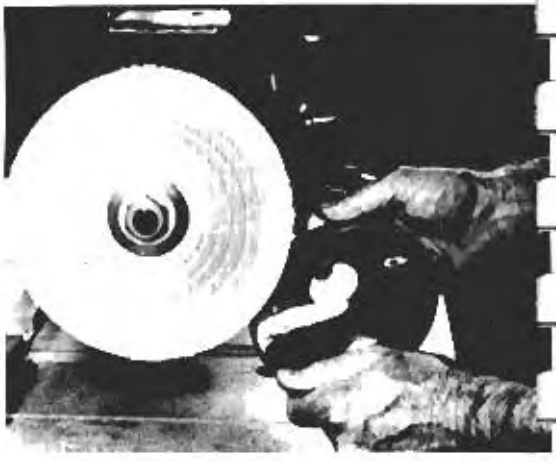
NOTE

Use pull-through carriage travel whenever crosscutting sheet stock . . . but use a push-through travel whenever crosscutting tubing, bar stock or any shape that is about as high as it is wide. It is easier to hold these latter shapes firmly if it is between fence and blade at start of cut.

A WIRE BRUSH OPERATION

A *Wire Scratch Wheel (page A5)* mounted at saw-blade shaft-end can be used for removing rust, paint, stains, mineral deposits, etc. from metals and other hard materials. The same purposes also can be accomplished with one of the shafted *Wire Cup Brushes* chucked at the accessory shaft-end.

Metal buffing and polishing also can be done either with a *Buffing Wheel (page A5)* at saw-blade shaft-end or a shafted *Buff or Polishing Wheel* chucked at the accessory shaft-end. Red Rouge and Tripoli (brown) are the two most used abrasives for metal polishing. These are furnished in bars for easy application to the buff while in operation.



A BUFFING OPERATION

Any drilling, countersinking, counterboring or honing operation that can be performed on a drill press of equivalent rpm (3450 rpm) can be accomplished with your tool and the proper cutting tool chucked at the accessory shaft-end.

CHAPTER 10

INFORMATION ABOUT MATERIALS

LUMBER

Lumber is naturally the most expensive material you will purchase for a project — and it is well to know something about lumber in order to save money on your purchases. There are several things to remember when buying lumber:

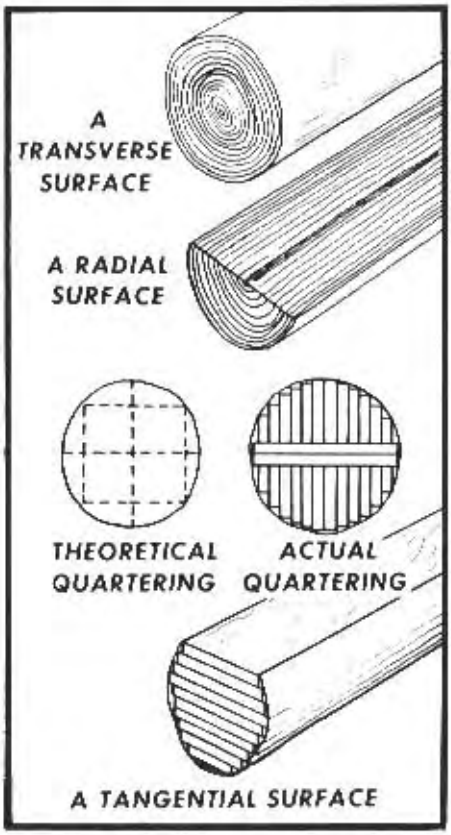
Boards, Dimension Lumber, Timbers and Moldings

1. All lumber is divided into hardwoods and softwoods. Hardwoods are the deciduous trees, which lose their leaves in the fall; while softwoods are the conifers (evergreens). Actually, a few "hardwoods" are softer than some "softwoods" and vice-versa; but, on the whole, hardwoods are tougher, closer grained, more durable, and more difficult to work with.

2. Hardwoods generally have better grain structure than the softwoods — take stains, waxes, etc. better. As a rule, softwoods are less expensive (notably pine, spruce and fir which are plentiful in this country because trees mature relatively fast permitting re-forestation on a commercial basis).

3. Wood contains pores — open spaces — which are more or less pronounced (according to the type of wood). Those having large pores (like mahogany and oak) are called "open-grained"; while those with small pores (like birch and maple) are called "close-grained".

4. Wood "grain" is caused by the manner in which a tree grows. At the end of each year's growth the circumference of the trunk (or a branch) is girdled with a new "annular" ring, which forms a harder, fibrous layer. As growth in some trees is very regular, these rings are evenly spaced, etc.; but in other varieties the rings are extremely uneven in spacing, thickness, etc. The pattern formed by the rings is called the grain. There are three practiced ways of slicing a tree

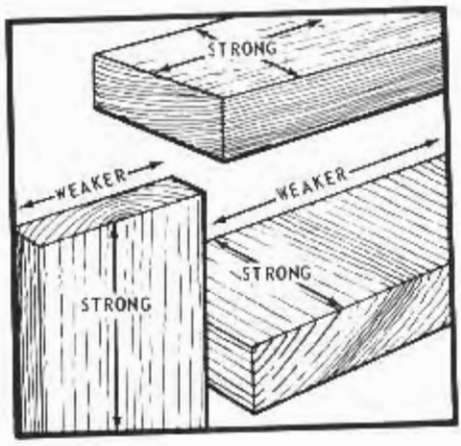


trunk to expose the grain in three different manners:

A TRANSVERSE SURFACE is obtained by crosscutting lumber at right angles to the grain (as when felling a tree). This surface exposes every ring so that, if you have a full round log, the grain runs around in more-or-less perfect circles.

A RADIAL SURFACE is obtained by slicing a log lengthwise through its center. Such a surface exposes the grain in more or less parallel lines at each side of the center (pith) of the tree. Two such cuts at right angles to each other produce what is called a Quarter-Sawed (or Quartered) board — which, to be made square, would have its other two sides sawed parallel to the first two. Hence, theoretically, one tree (regardless of its diameter) can make only four quartered boards; but in practice (and since only one face of a board is considered important), each of the four quarter sections is cut into many boards by making additional "slices" parallel to the original cuts. The eight or so boards produced which face on (or close to) one of the diameter cuts are then considered "quarter-cut" boards; while the remainder are classed as Tangential Surface boards.

A TANGENTIAL SURFACE is obtained by slicing a log lengthwise with parallel cuts, starting at one side and ending at the opposite side. Most commercial lumber is cut in this manner (called "plain-sawed") as it is easiest to run a log through a saw mill to make such cuts (no particular "planning" is required; a log is simply "sliced" into whatever number of pieces it will make — then the pieces are squared at the ends and planed). Resulting center cuts may be classed as "quarter-cut" pieces (but there are only two to four which could be so classed). The outer cuts generally have very erratic grains since, the farther out the cut is the broader each exposed ring surface



will be. If a ring happens to be flattened at the side parallel to an outside cut the resulting surface may be more-or-less all ring — and the grain lines may just about parallel the surface of the board through its thickness.

5. The strength of a board (plank) or a timber (beam) depends upon its grain. Wood — especially softwood — separates easily along any grain line as compared to the force required to break it across its grain lines. That is, a plank with transverse surfaces, while it offers the "prettiest" grain structure, has little strength; while one that is an outer cut with tangential surfaces, while least attractive in appearance, offers the greatest all-around strength. Quartered planks have good strength end-to-end; but are relatively weaker from side-to-side. In short, whenever the grain lines at plank's edges run from one surface through to the other surface, the plank is "relatively weak" along these grain lines and should not be used to support weight which could separate the grains and break the plank. "Knots", the solid rings formed where a branch joins the trunk, are any board's weakest points — in fact, after drying, many knots will separate and fall from a board of their own accord.

SOFTWOOD LUMBER GRADES

SELECT

This is lumber of good, "selected" appearance with good grain and finishing qualities.

GRADE A: Suitable for stains and other natural finishes. Practically flawless.

GRADE B: Also for stains; but with a few small defects or blemishes.

GRADE C: With defects which can be covered easily with paint.

GRADE D: With more defects than "C", but still of a type which can be hidden with paint.

COMMON

This lumber has too many defects for cabinet work or any application requiring a "finished" appearance.

NO. 1: Good, sound, water-tight utility lumber with tight knots and limited blemishes. No warp, wind, splits, checks or decay.

No. 2: On the whole, sound – but defects such as checks at board ends, loose knots (but not knotholes), blemishes and discoloration. Should be warp and wind free and without damaging splits.

No. 3: A medium-quality construction lumber with pronounced defects of all types which necessitate some waste when using it.

No. 4: A low-quality construction lumber – with even defects including open knotholes.

No. 5: Practically waste lumber, good only for use as a "filler" – and then with considerable waste.

6. Some wood – notably pine, fir, spruce, ash, elm and chestnut – presents a better grain for finishing when plain-sawed; while most popular hardwoods – mahogany, oak, walnut, cherry and hickory – are better (but generally more expensive) when quartered. On the whole, quartered boards shrink less in width when drying, and are less likely to warp.

7. All lumber is graded for sale, and priced according to grade. Softwoods and hardwoods are graded differently – there is no relation between softwood grades and hardwood grades. Refer to the accompanying charts for gradings, and buy lumber in grades according to your needs. Never waste money on a better grade than will serve your purpose. And when you do specify a certain grade (and pay for it) check carefully to be certain every board meets the specifications (mistakes can happen). Most lum-

HARDWOOD LUMBER GRADES

Hardwood grading is not consistent for all trees, nor in all parts of the country. On the whole, however, the grades are as follows:

FIRSTS: Lumber that is 91-2 3% clear on both sides – considered the best possible for cabinet work.

SECONDS: Lumber that is 83-1 3% clear on both sides – still very good for most cabinetwork.

FIRSTS & SECONDS: A selection which must contain not less than 20% firsts.

SELECTS (in alder, ash, beech, birch, cherry, chestnut, maple, mahogany, sycamore and walnut only): Lumber that is 90% clear on one side only (other side not graded). Good for most cabinetwork, with some waste.

SAPS (in poplar only): Approximately the same as select above.

NO. 1 COMMON: One side only, 66-2 3% clear. With waste, good for interior and less demanding cabinetwork.

NO. 2 COMMON: One side only, 50% clear. OK for painting, some paneling and flooring.

STAINED SAPS (in poplar only): Equivalent to No. 2 common above.

NO. 3A COMMON: One side only, 33-1 3% clear.

NO. 3B COMMON: One side only, 25% clear.

SOUND-WORMY (in chestnut only): A No. 1 above, but with wormholes.

NOTE: Hardwoods are supposed to be free of warp, wind, bad splits or checks. "Clear" refers to the number of clear cuttings that can be obtained.

ber dealers will take back rejects and exchange these for correct quality boards, if a mistake has been made and if you inform them correctly and promptly. If practicable, when purchasing a few boards, go to the yard and help select these yourself — you'll get exactly what you want with least trouble to you and to the lumber company!

8. Lumber (boards) is sold in three ways: Rough, Surfaced and Milled (or Worked).

ROUGH lumber consists of boards as cut to size by a saw mill. Boards of this type are furry and splintery (really "rough"). They will, however, "measure up" to their rated (Nominal) sizes in width and thickness. That is: a rough 2x4 is actually 2x4 inches.

SURFACED (dressed) lumber is rough lumber after it has been planed. Thus, the surfaced board measures less (in width and/or thickness) than its original (Nominal) dimensions. Boards and timbers may be surfaced on one side (S1S), two sides (S2S), one edge (S1E), two edges (S2E) — or a combination of any of these. However, the only lumber you will probably use is that commonly sold at dealers who cater to homeshop trade — which is fully dressed lumber, surfaced both sides and both edges (S4S). Remember that such lumber is still referred to by its Nominal (original rough) size; but will actually be somewhat smaller. The accompanying chart shows Nominal and Actual sizes of popular boards, timbers and dimension lumber (planed to a "stated" thickness).

MILLED lumber consists of boards formed (by milling) into various popular molded shapes. The accompanying charts show typical shapes in general use today. However, some shapes and sizes vary from time-to-time and place-to-place according to "fashion" — and then, too, not every dealer stocks a full assortment. So don't use the shapes shown *(page 78)* for planning a project; first learn what is available at your lumber yard.

9. Boards (rough and surfaced) may be sold by the Board Foot or by the Lineal Foot. The rule has been to price all boards of 4x1/2 inches (nominal width and thickness) and larger by the board foot; all smaller boards by the lineal foot. However, the tendency today is toward sale of pre-sized lumber (the dealer cuts boards to your exact requirements), and this is always priced by the lineal foot. Timber is usually sold by the lineal foot; and moldings always are.

A BOARD FOOT is a square foot of lumber 1 inch thick. Hence, a piece 4 inches wide (1/3 of a foot) x 2 inches thick x 6 feet long will contain 1/3 x 2x6 = 4 board feet. The formula is: Width (feet) times thickness (inches) times length (feet), divided by 12. Popular sizes in board feet are given in the accompanying table.

BOARD FEET PER LINEAL FOOT

To find the board feet in a piece of lumber multiply the the correct "Factor" below by the actual length of the lumber.

- NOMINAL - THICKNESS	WIDTH	FACTOR
1	2	0.167
1	3	0.25
1	4	0.333
1	5	0.417
1	6	0.5
1	8	0.667
1	10	0.833
1	12	1.0
1-1/4	4	0.417
1-1/4	6	0.625
1-1/4	8	0.833
1-1/4	10	1.041
1-1/4	12	1.25
2	4	0.667
2	6	1.0
2	8	1.333
2	10	1.667
2	12	2.0

EXAMPLE: A board 1-1/4x10x20 feet = 20x1.041 = 20.8 board feet.

A LINEAL FOOT measurement refers to the real length of a board, measured in feet.

10. When buying lumber, always buy the smallest standard size that will serve your purpose. There is no economy in buying one 12 inch wide board to make two 6 inch wide ones. First, the wider boards (being scarcer) cost relatively more; second, the dressed board isn't a full 12 inches to begin with — by the time you saw and re-dress it you'll have somewhat less than two 6 inch boards. Also, extremely long boards — especially in the better grades — carry a premium price mark-up according to their length. Generally speaking, avoid purchasing better grade boards over 14 feet long with the intention of cutting them into shorter ones. Last, pre-sized lumber (cut to exact lineal foot measurements) is necessarily more expensive than buying standard mill lengths. Standard lengths (in lineal feet) start at 4 feet and increase 2 feet at a time (4, 6, 8, etc.) up to the longest length your dealer happens to stock.

11. Wood is called "green" before its original moisture content has left it — then it is called "dried". If it is later soaked it does not again become "green" — just wet. Green lumber will shrink, and often twist and/or warp while drying; and should therefore be avoided. Properly dried lumber is stacked carefully to minimize warpage, and is either "dried" in an open shed or in an oven (called a kiln). If you do get green lumber, lay it flat (preferably with some weight on it) to dry. This also applies to wet lumber — which, if it hasn't swelled out of shape due to the wetting, can be re-dried satisfactorily. A green board is considered sufficiently seasoned for average use when its moisture content has been reduced to 20%; but for cabinetwork your boards should have no more than 6 to 10% moisture content. You will soon learn — by the feel and cutting quality of a board — whether it is green or dried; and the proper degree of dryness.

12. All grading of lumber naturally depends upon some individual's estimate — and even experienced lumber graders do not agree. When purchasing much of a particular grade (especially if it is a higher grade), best first be certain that you understand your particular dealer's standards for the grade. In short, be sure you know what to expect — then you won't be disappointed.

13. A few dealers around the country specialize in rare woods — some from this continent, but mostly imported. These are, of course, relatively expensive, and therefore not practicable for use as structural material in cabinetwork, etc.; but their beautiful and distinctive colorings and grainings make some of them very desirable for special uses — for inlays and similar limited area decoration. We cannot here list the dealers who carry such woods; but if you are interested your own lumber dealer can probably help you locate one nearest to you.

14. The terms used to describe lumber defects are as follows:

KNOTS. The solid, woody rings formed where a branch joined the piece. Some knots are solid enough to stay in place — and add a decorative quality; most are not.

SPLIT. This is a long, large crack.

CHECK. A slight grainwise crack, usually at the end of a board.

WARP. A curve across the grain.

WIND. A twist from end-to-end.

SHAKE. A separation of the grain.

DECAY. A rotted area.

MOLD. A discoloring stain.

WORMHOLE. Any insect hole.

PLYWOOD

Plywood is made of thin "peelings" of wood bonded together to form large, flat sheets that are stronger than comparable thickness sheets of plain lumber. These sheets are generally available in thicknesses of 1/8, 1/4, 3/8, 1/2, 5/8, 3/4 and 1 inch — and in sizes of 4 x 8 or 4 x 10 feet. Other sizes are available (as a rule) on special order. These large size sheets eliminate need of making the many joints ordinarily required when using lumber for a project. Furthermore, there is practically no shrinkage, expansion, or warpage to contend with; and — because the layers ("plies") have the grains running in alternated directions — plywood panels possess rigidity and strength in all directions. These sheets are therefore excellent for nearly all types of homecraft projects.

There are normally two types of plywood construction as recognized by the commercial standards agreed upon between the U.S. Department of Commerce and the hardwood-plywood manufacturers:

VENEER construction (the least expensive) consists of equal thickness plies throughout, with the outside plies having their grains running parallel to the length of the sheet. An odd number of plies is used . . . 3, 5, 7, etc., depending upon the thickness of the sheet.

LUMBER-CORE construction calls for a solid wood core enclosed between two thin (1/16 inch) layers, and faced with very thin (1/28 inch) facing plies. This center core is comparatively thick in the thicker sheets — which makes this construction more desirable for use in furniture or other projects using dowels and/or special wood joints.

Its strength is given to plywood by the bonding glues with which the plies are held together. These are of two types, with the result that there are two general types of plywood:

EXTERIOR plywood is made with 100% waterproof glue for outdoor use, or use wherever the plywood will be exposed to moisture.

INTERIOR plywood (less expensive) is bonded with a glue that is highly moisture-resistant, but is not waterproof.

Plywood may be faced with a finish (selected) ply on one side only, or on both sides. Facings may be of any wood — and generally are of hardwood, or of some rare, imported wood. There are practically endless varieties, and, though the rarer wood facings naturally cost more, these plywoods are so much less costly than solid pieces of the rare woods would be, that they make it possible for many homecrafters to enjoy using woods that they otherwise could not afford.

Hardwood plywoods are graded for appearance, and priced according to grade. The following four grades apply:

GRADE 1 — Calls for good matched grain, with a pleasing effect suitable for fine furniture or paneling. Such defects as pin knots, burls and discolorations must be very limited.

GRADE 2 — Calls for good grain and surface, but unmatched. Such defects as filled worm holes and open joints not exceeding 1/64 inch — in addition to those allowed for in grade 1 — are allowable.

GRADE 3 — Must be fairly sound, but may have open knots up to 3/8 inch, closed knots up to 3/4 inch, worm holes up to 1/8 inch, and minor splits.

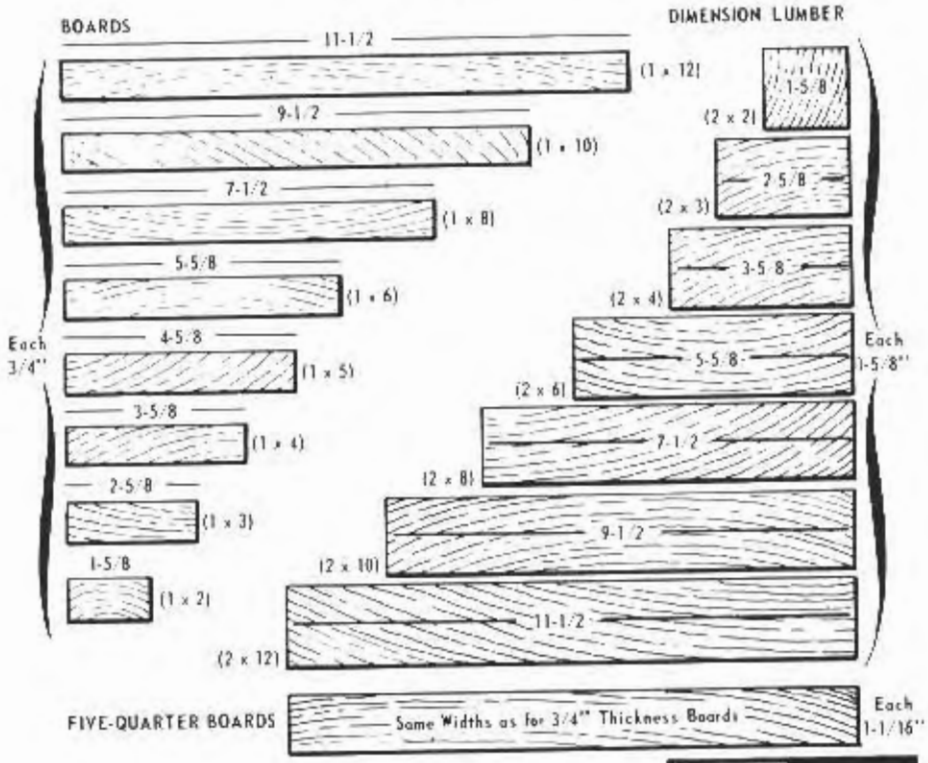
GRADE 4 — Consists of rejects that may have any type or number of defects — so long as the sheet is sound enough for construction use.

The above grading may apply to one side only — or to both sides. Naturally, if both sides of a sheet must meet a No. 1 or 2 grade classification, this sheet will cost more than if only one side need meet such a classification. Dealers commonly stock sheets graded 1-1, 1-2, 1-3, 1-4, 2-3 and 2-4.

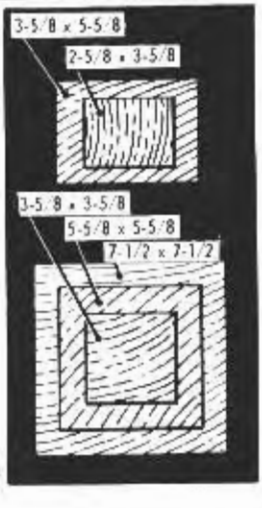
Plywoods are also available with special finishes, such as: embossed surface, brushed (striated) surface, textured and grooved surface, or fused, resin-bonded, ultra-smooth (wear-resistant) surface.

POPULAR WOOD - SIZES AND TYPES

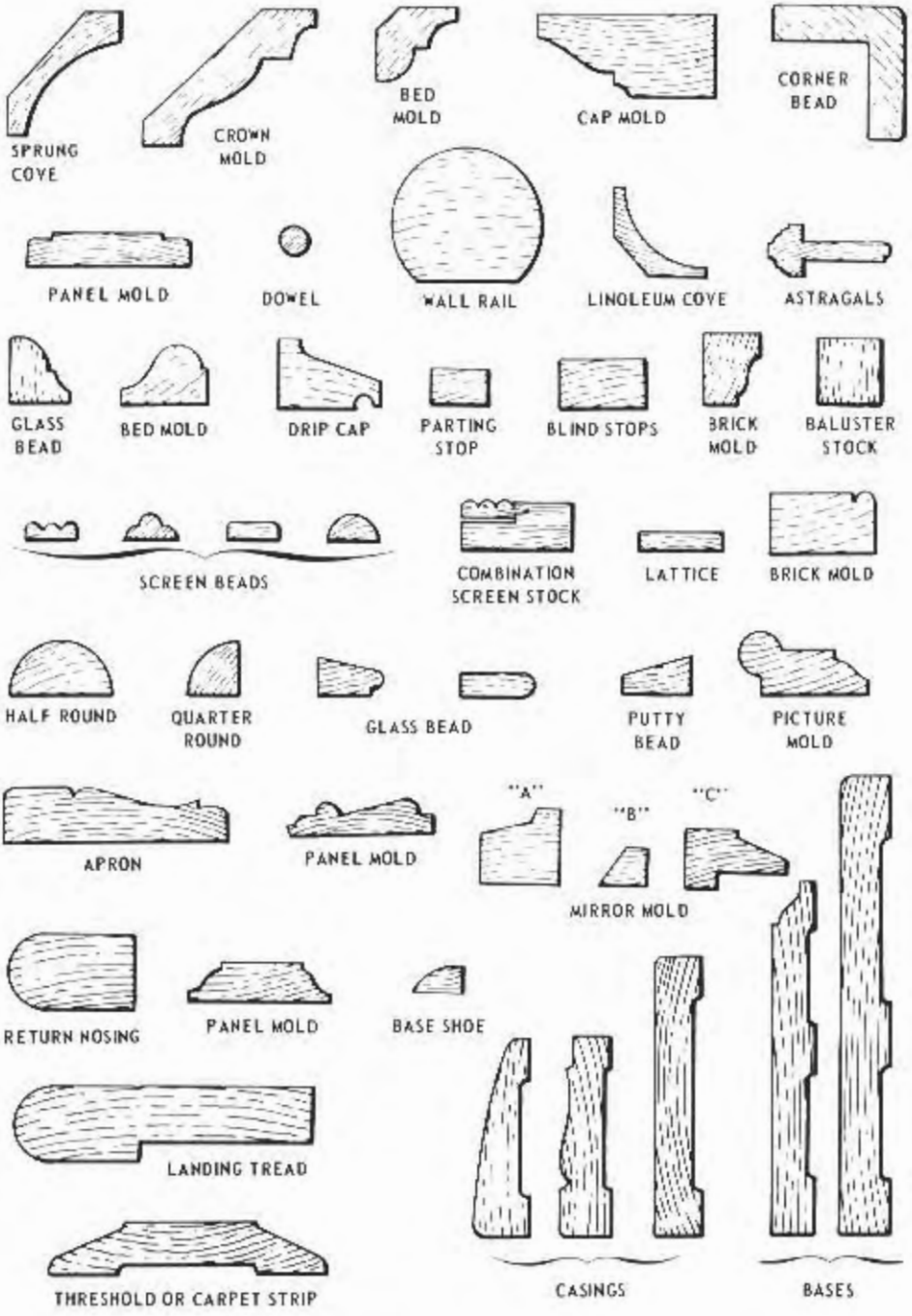
DRESSED LUMBER



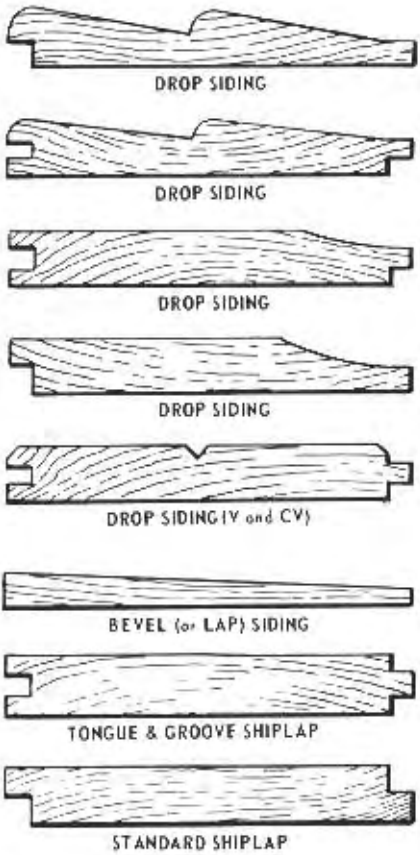
The accompanying chart shows popular homeshop dressed (surfaced four sides) lumber, together with the nominal and the average actual sizes (which may vary slightly in different areas). Nominal thicknesses and widths of boards (at left above) are shown down the center; actual widths are given above the respective boards; and the actual thicknesses are given in the side brackets. The "five-quarter" thickness boards are available in the same widths as the "3/4-inch" boards. Nominal and actual measurements of dimension lumber (at right above) are similarly shown. Only the actual sizes of timbers (at right) are shown; increase each fractional number to the next whole number — for nominal size (that is: 1-5/8 x 2-5/8 = 2 x 3).



POPULAR MOLDINGS



SIDINGS AND SHIPLAP

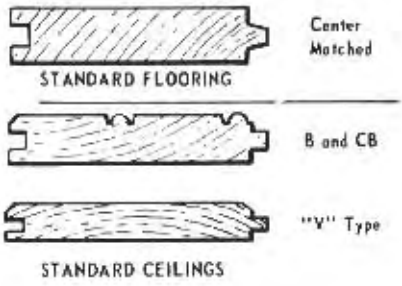


Sidings are manufactured in a variety of shapes, some of the most popular of which are shown here. Lengths range from 4 to 20 feet, in multiples of 2 feet. As with boards, actual sizes are smaller than nominal sizes.

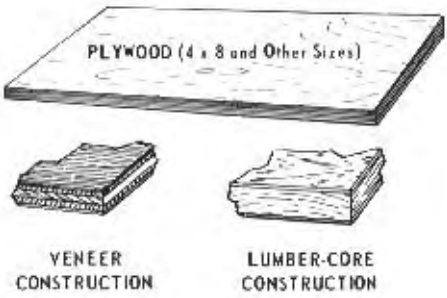
OTHER CONSTRUCTION MATERIALS

There are a great variety of manufactured wood-pulp (hardboard), asbestos-pulp (fire-resistant and fireproof types) and purely synthetic building and cabinetwork materials (such as Tileboard) sold under the trade names of the manufacturers.

FLOORING AND CEILING



PLYWOOD AND WALLBOARD



We cannot list these here, but the average lumber dealer stocks all the varieties you will need.

These materials are sold, like plywood, in sheets — generally 4x8 size (though other sizes are available). Hardboard is usually the same throughout (with both surfaces the same); while the synthetic materials and the composition and asbestos boards generally have a single face with a "filler-type" backing. However, there are exceptions — and it is best to inquire before making plans for use of such material.

Hardboard is very solid, moisture-resistant (some is moisture-proof) — and can be worked like wood, then painted or waxed (but not stained). It has no grain.

The synthetics generally have a special "advertised" finish with certain qualities (such as: stain-proof, fireproof, moisture-proof, acid-proof, a hard gloss, a special graining, texture, color, etc.). While these vary in hardness, most can be sawed or otherwise "worked" in about the same manner as wood.

Composition and asbestos boards are usually very "pulpy" with little strength — are not intended for structural work, but only to be used for facing (or insulating) walls or ceilings, etc. They can be used for such purposes as false partitions if well supported, will take paint on the right side; but must be handled carefully when sawing, etc., to keep them from breaking or tearing.

FASTENERS

Glue

The use of a good glue greatly strengthens practically any type of cabinetwork, even though other fasteners are also used. And glue with "hidden" dowels is always used whenever screw or nail holes (even though filled and resurfaced) would be objectionable (as in hardwood cabinetwork that is to be stained). When properly selected and applied, glue constitutes the neatest, and one of the most durable and strongest of the fasteners.

Wood glues are either "hot" or "cold," depending upon whether or not heat is used to prepare them. The "hot" glues are made from animal parts, are very strong and quick setting. Until quite recently these were considered by cabinetmakers to be the only truly satisfactory types; but recent development of new and better "cold" glues makes any such generalization debatable now. The "cold" glues are all synthetics of one type or another — and vary in durability and strength. Some are slow setting; while others make claim to being extremely fast setting — and will not only bond wood to wood, but also bond any number of other dissimilar materials to wood or to each other.

"Hot" glues generally are sold in dry sheets or flakes that are hard, brittle and transparent. These are to be mixed with water and heated for use, according to the manufacturer's directions. "Cold" glues may be sold in powder form, to be mixed according to directions, and then applied — or may be sold ready-mixed for immediate use. In all cases, the manufacturer's directions must be closely followed if the particular glue is to be used successfully.

Following are four types of glues presently in general use for cabinet work:

HIDE GLUE: Available in flakes to be mixed and heated; or in a prepared form as liquid hide glue, ready for use. Very strong — will even give strength to joints that do not fit too well; but is not waterproof (don't use for outdoor furniture, etc.). Light in color and easy to clean off, sand and finish over. Takes 3 hours to set after becoming tacky enough to clamp the joint.

UREA RESIN GLUE: Available as a powder to be cold mixed and used within four hours. Strong . . . if the joint fits well; and is almost waterproof (so that it is a good choice for work that must stand some exposure to moisture). Light colored and easy to clean off, sand and finish over; but must be applied at a room temperature of 70^{0} or warmer, and takes 16 hours to set after clamping.

LIQUID RESIN (WHITE) GLUE: Comes ready mixed for immediate use at any room temperature. Strong enough for most work (especially if

joints are well fitted); but is not waterproof and should not be used for outdoor furniture, etc. Doesn't require as tight a clamping as other types. Light colored, easy to clean off, etc. Sets in 1-1/2 hours.

RESOR-CINOL (WATERPROOF) GLUE: Sold in the form of a powder plus a liquid which are to be mixed each time (in small quantities) for use within eight hours. Strong and 100% waterproof — for outdoor use — but troublesome to use and not recommended for projects which do not require its waterproof feature. Dark colored — which makes it difficult to clean off and cover over. Also more expensive than other types. Should be applied at a room temperature of 70° or warmer, and takes 16 hours to set after clamping.

Wood Screws

Wood screws, though more trouble to use than nails, are preferable to nails for most cabinetwork. With a little care they make a neater joint and neater appearance; will "draw" a joint tighter — and hold better and longer. They are sold in sizes measured according to diameter and length Lengths are stated in inches and/or fractions thereof; diameters are stated by code numbers, the smallest being "No. 0" and the largest you are likely to use being "No. 24." Common sizes and types are shown on the chart in this chapter. Flathead types are measured (for length) from tip to top of head; oval-head types are measured from tip to the edge of the head; and the round- and fillister-head types are measured from the tip to the underside of the head.

The flathead type is most often used for cabinetwork — as it can be countersunk and puttied over to hide the head. If used with hardware, the hardware holes must be countersunk on top and the screw size must be exactly chosen to fit the holes — so that the heads will "sink" to perfect flatness. Other types can also be countersunk, but are generally used with the heads exposed in applications where this is not objectionable (or even desirable).

Standard wood screws have a single, straight-across screwdriver slot (for a standard blade screwdriver). These are the commonest kind. Phillips-head screws have a crossed slot which requires a Phillips screwdriver to fit into the slots. Because this kind of screwdriver does not overhang the screw head edges and will stay perfectly centered in the head during use, many cabinetmakers prefer these screws (as being less likely to damage a workpiece surface during application from "slippage" of the screwdriver). This is especially true when plywood is used as the thin ply edges around a screw hole are subject to easy damage.

Remember, screws can be removed easily; nails cannot be.

Nails

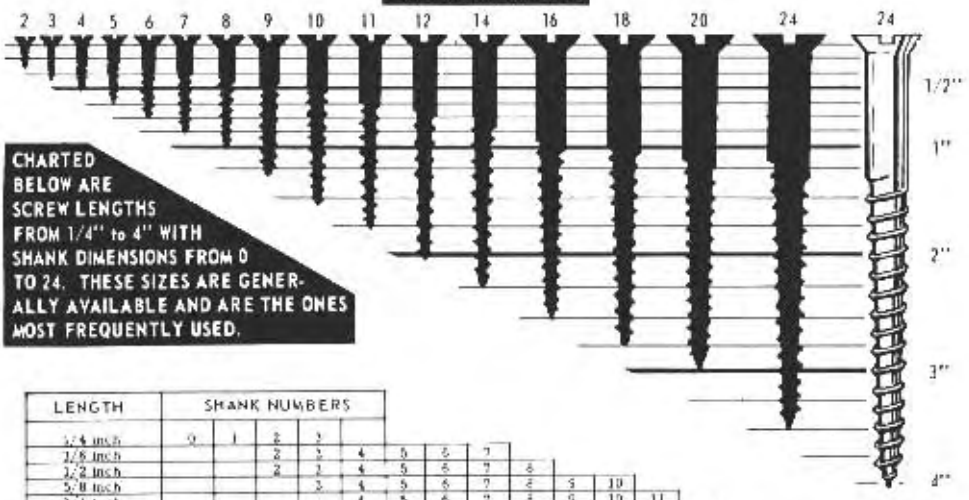
The charts accompanying this chapter show the lengths, diameter and head sizes of the various types of nails in general use for cabinet and other woodworking projects.

Nails (common and finishing) are sold by the pound and are offered in sizes (2d, 3d, etc.) from smallest to largest (60d for common nails). Their wire gage sizes (diameters) run in reverse order (15 for 2d to 2 for 60d).

Nails must be carefully selected to be the right size for a particular application. First, consider the type. Finishing nails may be driven below the top wood surface and covered over to be hidden; while common nails and the other types are not used in this manner. Next, consider the diameter. A nail that is thin enough not to dam-

SCREWS - SIZES AND TYPES

WOOD SCREWS



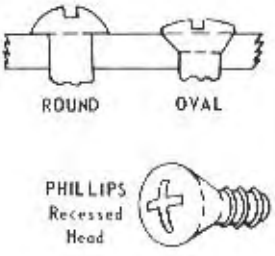
CHARTED BELOW ARE SCREW LENGTHS FROM 1/4" to 4" WITH SHANK DIMENSIONS FROM 0 TO 24. THESE SIZES ARE GENERALLY AVAILABLE AND ARE THE ONES MOST FREQUENTLY USED.

LENGTH	SHANK NUMBERS																			
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	16	18	20	24
1/4 inch			2	2	4	5	6	7	8										
3/8 inch			2	2	4	5	6	7	8	9	10								
1/2 inch			2	3	4	5	6	7	8	9	10	11							
5/8 inch				3	4	5	6	7	8	9	10	11	12						
3/4 inch					4	5	6	7	8	9	10	11	12	13	14				
7/8 inch							6	7	8	9	10	11	12	13	14	16			
1 inch							6	7	8	9	10	11	12	13	14	16	18		
1 1/4 inch								7	8	9	10	11	12	13	14	16	18	20	
1 1/2 inch							6	7	8	9	10	11	12	13	14	16	18	20	
1-3/4 inch									8	9	10	11	12	13	14	16	18	20	
2 inch									8	9	10	11	12	13	14	16	18	20	
2 1/4 inch										9	10	11	12	13	14	16	18	20	
2 1/2 inch													12	13	14	16	18	20	
2-3/4 inch															14	16	18	20	
3 inch																16	18	20	
3 1/2 inch																	18	20	24
4 inch																	18	20	24
0 TO 24 DIAMETER DIMENSIONS IN INCHES AT BODY	.060	.073	.086	.099	112	125	.138	.151	.164	.177	190	203	216	242	268	294	320	372	

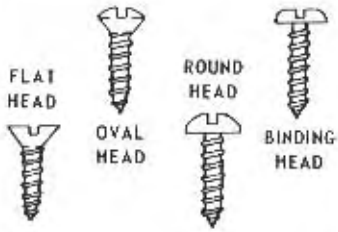
TWIST DRILL SIZES (For Round, Flat and Oval-Head Screws)

SHANK HOLE ANY WOOD	1/16	5/64	3/32	7/64	7/64	1/8	9/64	5/32	11/64	3/16	3/16	13/64	7/32	1/4	17/64	19/64	21/64	3/8
PILOT HOLE HARD WOOD	1/64	1/32	1/32	3/64	3/64	1/16	1/16	1/16	5/64	5/64	3/32	3/32	7/64	7/64	9/64	9/64	11/64	3/16
PILOT HOLE SOFT WOOD	1/32	1/32	1/64	1/16	1/16	1/64	5/64	3/32	3/32	7/64	7/64	1/8	1/8	9/64	5/32	3/16	13/64	7/32
AUGER BIT SIZES FOR COUNTERSUNK HEADS			3	4	4	4	5	5	6	6	6	7	7	8	9	10	11	12

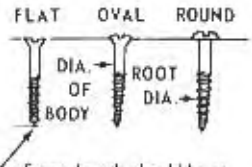
SCREW HEAD STYLES



SHEETMETAL SCREWS

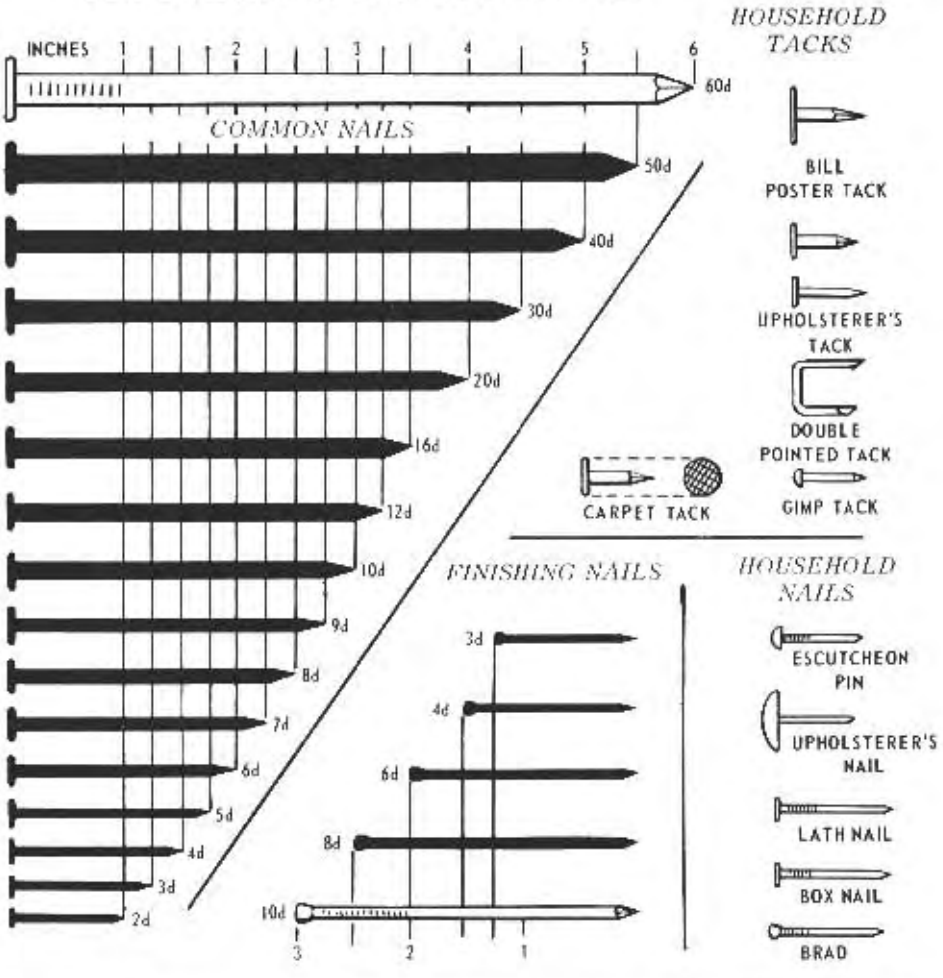


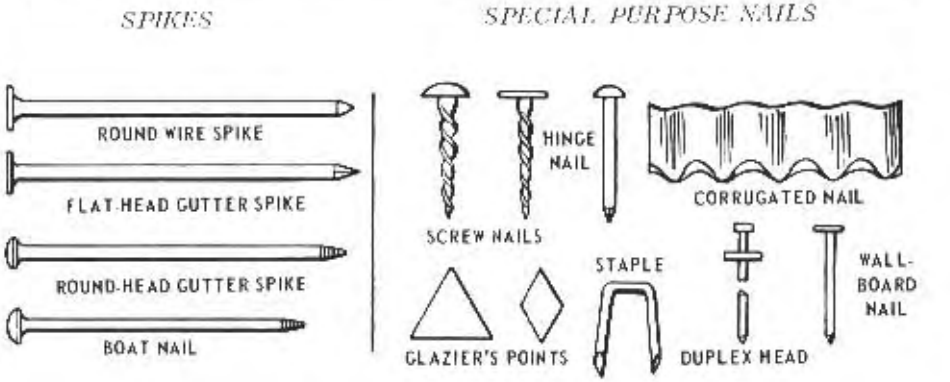
HOW TO MEASURE



Screw length should be at least 1/8" less than the combined measurement of material being joined.

NAILS - SIZES AND TYPES





REFERENCE TABLE — COMMON NAILS

SIZE	LENGTH and GAGE	DIA. HEAD	APPROX. NO. TO POUND
2d	1 inch . . . No. 15	11/64	845
3d	1-1/4 inch . . . No. 14	13/64	540
4d	1-1/2 inch . . . No. 12-1/2	1/4	290
5d	1-3/4 inch . . . No. 12-1/2	1/4	250
6d	2 inch . . . No. 11-1/2	17/64	165
7d	2-1/4 inch . . . No. 11-1/2	17/64	150
8d	2-1/2 inch . . . No. 10-1/4	9/32	100
9d	2-3/4 inch . . . No. 10-1/4	9/32	90
10d	3 inch . . . No. 9	5/16	65
12d	3-1/4 inch . . . No. 9	5/16	60
16d	3-1/2 inch . . . No. 8	11/32	45
20d	4 inch . . . No. 6	13/32	30
30d	4-1/2 inch . . . No. 5	7/16	20
40d	5 inch . . . No. 4	15/32	17
50d	5-1/2 inch . . . No. 3	1/2	13
60d	6 inch . . . No. 2	17/32	10

REFERENCE TABLE — FINISHING NAILS

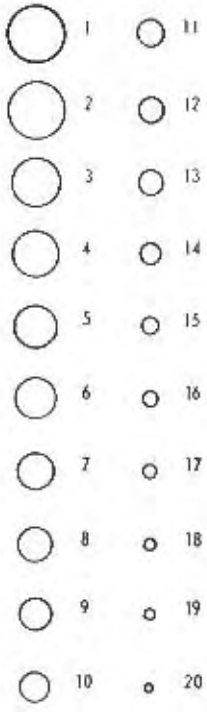
SIZE	LENGTH and GAGE	DIA. HEAD	APPROX. NO. TO POUND
3d	1-1/4 inch . . . No. 15-1/2	12-1/2	880
4d	1-1/2 inch . . . No. 15	12	630
6d	2 inch . . . No. 13	10	290
8d	2-1/2 inch . . . No. 12-1/2	9-1/2	195
10d	3 inch . . . No. 11-1/2	8-1/2	125

REFERENCE TABLE — CASING NAILS

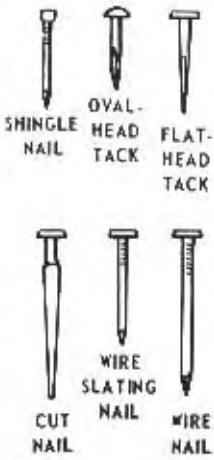
SIZE	LENGTH and GAGE	DIA. HEAD	APPROX. NO. TO POUND
4d	1-1/2 inch . . . No. 14	11	490
6d	2 inch . . . No. 12-1/2	9-1/2	245
8d	2-1/2 inch . . . No. 11-1/2	8-1/2	145
10d	3 inch . . . No. 10-1/2	7-1/2	95
16d	3-1/2 inch . . . No. 10	7	72

NAIL DIAMETER 1 TO 20 GAGE

USE A DRILL SMALLER THAN NAIL DIAMETER



RUST-PROOF NAILS



age the wood fiber unnecessarily will hold better than one so big that it distorts the grain structure. Last, consider the length. To properly hold, a nail should penetrate approximately 2/3 to 3/4 of the way into the second piece of wood. Less than 2/3 will make a weak joint – and "all the way through" does not improve the holding strength (unless the end is to be bent over) while it does raise the problem of what to do about the protruding end.

The corrugated fasteners have a special use – the joining of two boards side-by-side with a plain butt joint. If properly used, they create a strong joint; but cannot be hidden by covering over with any degree of success. This also applies to clamp nails, which are generally used only for miter joints.

Brads, tacks and the "little" thin (wire) nails and other special types are generally sold "so-many in a box." These all have special uses but differ little in application from the common and finishing nails.

HARDWARE

There is such an infinite variety of hardware (hinges, catches, knobs, drawer pulls, etc.) available today that it is impracticable to attempt to cover this subject here. Best "survey the market" and select hardware that will meet your requirements – before planning its use in any project. The average dealer can show you many types and special application varieties (many as new as "yesterday").

On the whole, hinges will probably be your most troublesome item – simply because there are so many kinds. There are the common (butt) hinges – with which doors are usually hung – that are more or less fully visible . . . and which are available for mortised or surface mounting, with square, rounded or elongate and/or specially shaped leaves. Ther are also "concealed" types (which ar not wholly invisible) and "invisible' types (which are invisible when the door is closed). There are alsc cabinet types, made with one or both leaves offset to fit into a rabbeted edge, etc. Then there are strap types, which cross over from one face of the door frame to the opposite face of the door itself. And, again, some hinges have loose pins (for separation of the leaves for mounting), while others have fixed pins.

Catches, handles, pulls, etc. also come in a large variety of sizes, shapes, kinds, and materials.

When buying any hardware you will probably first consider price; but don't let this weigh too heavily in your decision. "Cheap" hardware is seldom worth its cost – especially if you take your own time and trouble into consideration. It will tarnish and/or rust quickly – especially if exposed to the elements – may be of inferior strength and durability. And nothing can spoil the appearance of an otherwise beautifully executed project faster than hardware which becomes "shabby".

Be particularly cautious when purchasing chrome or nickle plated hardware. Unless the plating is done with proper "undercoats" and thickly enough, it will not last – will rust through quickly out-of-doors. Also be critical of brass – to be sure it is brass; and of the pot (white) metal hardware (which may be too weak for the purpose intended). Hardware made of aluminum and the other newer metals and plastic materials is well worth your consideration – has many desirable qualities.

PLASTICS

There is a large variety of plastic material generally available (in hobby

or specialty shops) in a multitude of molded, rolled or extruded shapes intended both for commercial and craftwork uses. We do not have space here for more than a brief mention of the uses of these plastics.

All plastics are either thermosetting or thermoplastic. Those in the thermosetting group (Bakelite, Catalin, Marblette — to name a few) can be worked in much the same manner as wood — except that they will crack or flake-off readily if too large a cutting bite is attempted. Those in the thermoplastic classification (Lucite and Plexiglas are typical examples) can be softened by the proper amount of heat and/or pressure, in which respect they do differ from wood and must be worked with their heat limitations in mind.

In general, the harder the plastic the finer-toothed the cutting tool should be. Any operation done on a thermoplastic material should be accomplished so as not to heat the material to its pliable state. For instance, when sawing or drilling don't allow the blade or bit to revolve in one spot until the plastic starts to melt . . . keep it moving forward, or stop the operation and cool the plastic before continuing. Special caution must be used when buffing or polishing such materials.

Cements of various kinds are used for bonding the different plastics. The proper type — with instructions for use — can be obtained from your plastics supplier.

DO-IT-YOURSELF ALUMINUM

This particular type of aluminum is now available in sheets, bars, tubing and a limited number of special shapes (such as screen beading, threshhold plates, etc.). Though harder and more durable than wood it is still considerably softer than tool steel. It can be sawed with a wood-cutting blade, or can be ground or filed like other, harder metals. For drilling, a metal twist drill should be used. For shaping, it is best to power sand or hand file it.

IN CONCLUSION

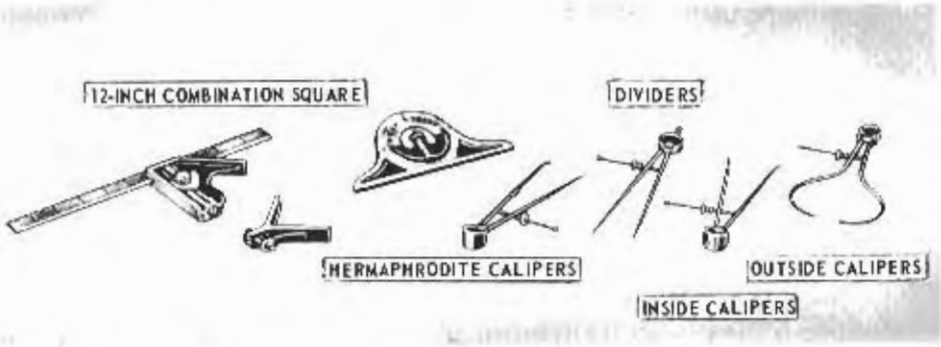
Sears offers you a very complete selection of lumber, plywood and other building materials *(Building Materials Department)* — and of nails, screws, hardware and the tools required for their application *(Hardware Department)*. In buying from Sears you are protected by Sears famous guarantee backed by Sears nation-wide sales and service organization. We recommend our merchandise and our service to you for your own complete satisfaction.

Use the best — the difference in cost is slight compared to the value of your efforts!

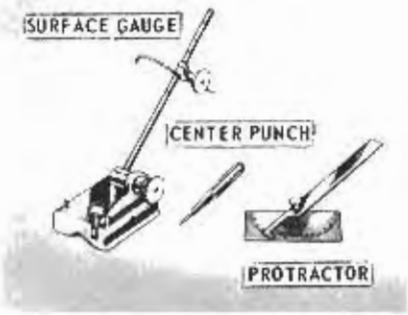
BUY AT SEARS

FOR QUALITY AND ECONOMY

LAYOUT METHODS



Before any work is done, it is best to draft some definite plan — whether this be a detailed blueprint, or simply a rough, dimensioned sketch of the project to be made. After the plan is prepared, you can then transfer appropriate dimensions to, and make guide lines upon your workpieces. But knowing, first, exactly how the piece will fit together will save you much time and material.



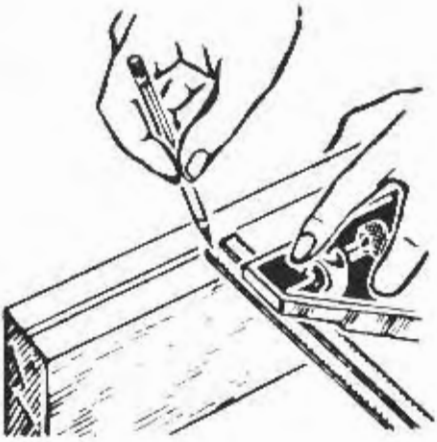
We cannot, in this brief space, give you any instructions for drafting plans. The accuracy and completeness of your plans will depend entirely upon how careful a workman you are — and upon how well you can visualize each detail of a finished project while it is still in the planning stage. Typical plans are shown in our project section, *Chapter 12*. However, the following ideas for converting plans into markings on the workpiece will help you with this phase of your work. The typical layout instruments used are shown here.

MARKING AND SCRIBING

Wood is most easily and plainly marked with a flat carpenter's pencil or a scratch awl. Preferably keep all lines thin (to avoid the inaccuracy of a varying thickness line), and do marking for a saw cut so that you can saw along one side of the line and the saw kerf will be in the waste material (rather than in or partly in the piece to be used). Use the combination square to mark a line parallel to an edge, or to draw a line at a right angle to an edge.

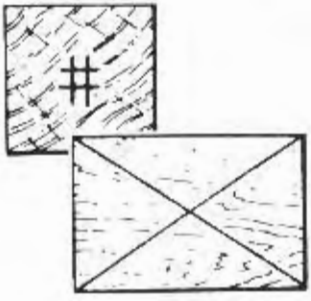
CENTERLINING

To approximate the centerline between two parallel edges, use the combination square to mark two lines, equidistant from the two edges and fairly close together. You can now "spot" the center between these two lines with your eye. If extreme



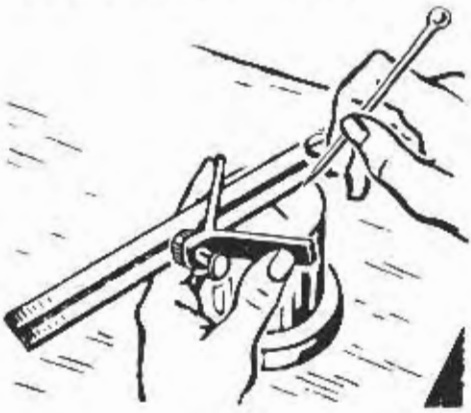
accuracy is required, take a measurement of the total distance between the two edges and divide this in half to locate the centerline.

CENTERING RECTANGULAR WORK AND POLYGONS



The exact center point of a perfectly square or rectangular piece can be quickly located by drawing two diagonal lines between opposite corners. These will cross at the center. If opposite sides are not exactly parallel, the approximate center can be found by using the combination square to draw lines equidistant from each of the four sides and fairly close together. You can now "spot" the center visually at the center of these four lines. In fact, this latter method will serve for centering five, six, etc. sided workpieces.

CENTERING ROUND WORK

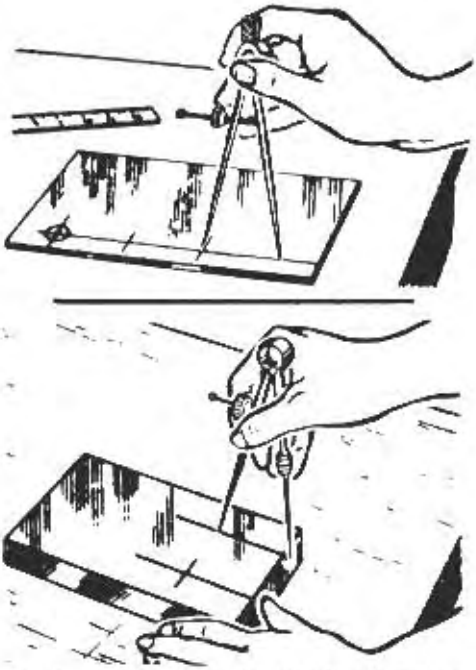


Use the V-shaped center head on the combination square, and encircle the round work with this "V". Scribe a line along the inner edge of the blade. This line will be a diameter of the circular end of the work. Rotate the center head approximately 90^{0} and scribe a second diameter. The center is where the two diameters cross.

Out-of-round work also can be centered by using the V-head on the combination square. Draw a number of "diameters" as above — then visually locate the spot at the center of the many-sided shape they create.

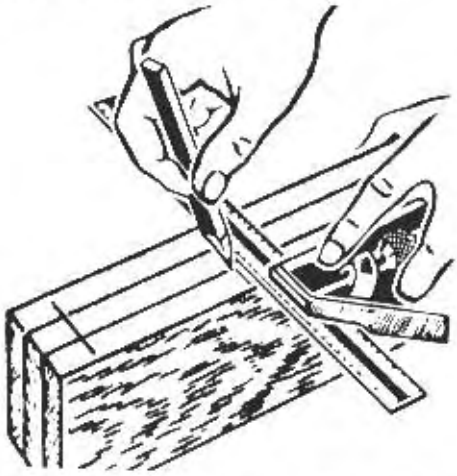
LOCATING HOLES

Accurate dimensions can be transferred from your plan or blueprint to a workpiece by use of dividers or a surface gage. Hermaphrodite calipers are useful when measuring in from the edge of a workpiece; while inside and outside calipers are used to take dimensions between lines or surfaces requiring inside or outside points of contact, respectively. If working to written dimensions rather than to a scaled plan, for accuracy do not use your ruler directly on the workpiece: instead transfer dimensions from the ruler to the workpiece with one of the above instruments.

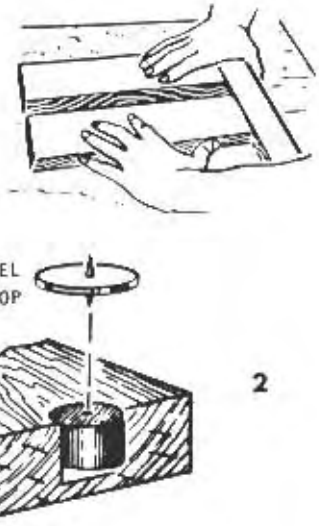


Best practice is to mark all holes prior to beginning work — as this saves time and increases over-all accuracy. While a pencil dot (or crossed lines) will locate the center of a hole, it will speed drilling if you also lightly center punch each hole for centering of the drill bit.

LOCATING DOWEL HOLES



With proper care in layout, it is possible to line up dowel holes in adjoining pieces of wood with great accuracy. When the work is an edge-to-edge joint, the simple and rapid method illustrated can be used. Both workpieces are first finished square all over — then laid face-to-face. With a combination square, draw lines across the edges to be joined at the points where the dowels are to be. Next, centerline each workpiece edge, accurately. Drill your dowel holes where the cross lines cross the centerlines.

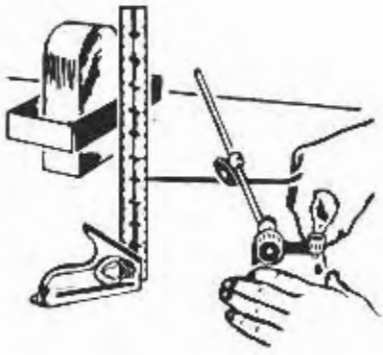


For other types of joints there are two easy methods of locating the dowels accurately. 1) Locate your dowel holes in one workpiece. Take brads and cut off the heads — then insert these (blunt ends down) into this workpiece at the dowel-hole centers. Accurately position the second workpiece against the first, and press them together so that the sharp ends of the brads leave prick points to locate the dowel holes in the second workpiece. Remove the brads — and drill all holes as now marked. 2) The same as "1", except that the first dowel holes are drilled at once — and dowel pops (illustrated) are used in place of brads to locate the second set of dowel holes.

Still another method is to use a template — of cardboard, tin or any suitable material. Make it so that it can be positioned accurately on each workpiece. Use a scratch awl to transfer the hole marks to the workpieces, through the guide marks (or holes) in the template.

LOCATING HOLES OR POINTS ON IRREGULAR SURFACES

The measurement of straight-line distances on an irregularly shaped surface is done easily with a surface gage. With the gageon a flat surface, set a combination square on end with



the scale standing upright alongside of the gage. Adjust the gage until its scriber point touches the scale at a height equal to the measurement desired. Now set the workpiece adjacent to the gage with the surface to be marked vertical and facing the gage — and scribe your mark on it with the pre-set scriber point. By similarly measuring other distances up from the bottom workpiece edge, any number of points with desired distances between can be located.

SEQUENCE OF STEPS FOR A PROJECT

The easiest way to "handle" any project is to "plan it through" so that you can do all like operations with your Radial-Arm Saw at one time. This type of planning necessitates the laying-out of each workpiece, before operations (other than sawing) are started.

Since you will probably start with boards which require cutting up into the final size, start by marking off your sawing dimensions on the various boards — then cut them all to "rough" size. "Rough" size depends upon the operation remaining to be done on each piece. If sanding is the only remaining operation, "rough" size should be a little larger than final size to leave only a minute amount of overage for finish sanding (the amount depending upon the depth of the imperfections to be sanded off). If edge shaping on a joint is to be formed along an edge, "rough" size should be to exact enough dimensions so that it will not be ncessary to further reduce the size during the following operation. In all cases, if the wood cannot be rough cut to leave the pieces perfectly "squared" and as smooth as a planing operation would leave them, then "rough" cut to an oversize which will permit subsequent planing and squaring.

After "rough" cutting, square and plane all workpieces requiring this.

Do not attempt to join or do other operations on workpieces which are not squared and planed. Smoothly sawed ends and edges generally need no planing — can be finished by sanding alone.

Next, make all joints that are to be made with the dado head, a router bit, or a regular saw blade. Group like joints and like operations so that you can finish with each set-up before proceeding to the next. Make all joints carefully — neither too loose nor too tight, but just a snug fit of the "bare" boards. A very little bit of sanding afterwards will provide plenty of "roominess" for the glue.

If any decorations (such as grooving) call for one of the joint making set-ups, do these while preparing the associated joints. Otherwise, plan your decorations now, in the same manner that the joints were planned.

Now sand all workpieces to finish dimensions, as required.

With all pieces cut, fitted, decorated and sanded you can now start the final assembly. If this calls for the use of screws or nails, set-up to drill the required holes (in groups according to sizes) and do all the drilling prior to any gluing and clamping. Also, if any surfaces that will be hard to reach after assembly require finish (fine) sanding, do this sanding prior to assembly (after drilling); but, if practicable, leave exterior finish sanding until after final assembly.

Finally assemble your project, gluing and/or screwing and nailing it according to plan. After it is all assembled (and the glue set, if used), fill all holes, etc. — then finish sand. While some projects could be carried to your tool in assembled form for this final sanding (with a fine-grit sandpaper), it is more practicable and better to do such sanding with an electric hand sander of the oscillating type. Only when joints are poorly fitted and require much "patching" is a faster, rougher type of sanding operation required after assembly. In such case, do this type of "covering-up" sanding on your tool (if workpiece can be positioned on it), or with a disc type electric hand sander. In any event, finish the wood for staining, painting, etc. with one of the oscillating type sanders — or by hand; then do the finishing work (staining, painting, etc.).

The last job (after finishing) is to mount all hardware.

CHAPTER 11

MAINTAINING YOUR SAW FOR ACCURACY

STEP ONE - INSTALL FRONT TABLE

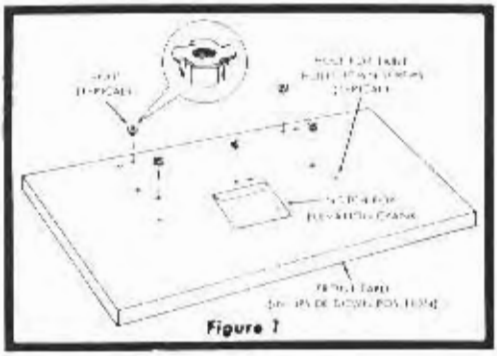


Figure 1

1. Place the large table board upside-down on floor. The bottom side has a notch (cutout) for clearance of elevation crank. Distinguish between the five throughbored (leveling screw) holes and the seven counterbored holes. Drive T-nuts into the five throughbored holes. (See figure 1.)

2. Place the large front table board on the two channels.

3. Align the counterbored holes with matching holes in the channels. Place a 1/4" flat washer and a 1/4-20 x 1" machine screw in each of the six counterbored holes located above the channels. Use a 1/4-20 x 1-1/4 machine screw in the counterbored hole at the center of the table board.

4. Attach lockwashers and nuts to the six screws in the channels. *Do not tighten these screws at this time.*

STEP TWO
CHECK LOOSENESS OF COLUMN IN COLUMN SUPPORT

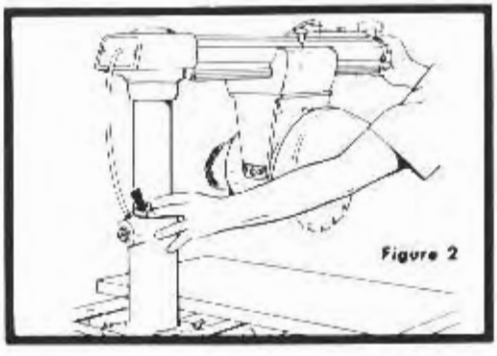


Figure 2

1. Tighten the arm latch knob (page 2).

2. Grasp the arm latch knob with one hand and hold fingers of other hand at parting line between column tube and column support. (See figure 2.) Apply gentle side force to the radial arm in opposing directions. Any looseness between column and column support, (indicated by arrow in figure 2) can be felt with the fingers.

3. If looseness can be felt, at point indicated by the arrow in figure 2, perform operations outlined in instructions that follow:

NOTE

Before attempting to adjust the column tube key, the function of this adjustment should be understood. Figure 3 is an exploded view of column tube key parts, and

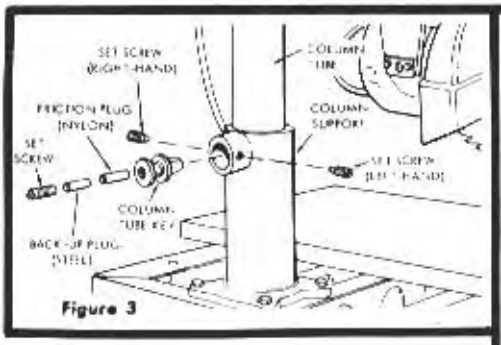


Figure 3

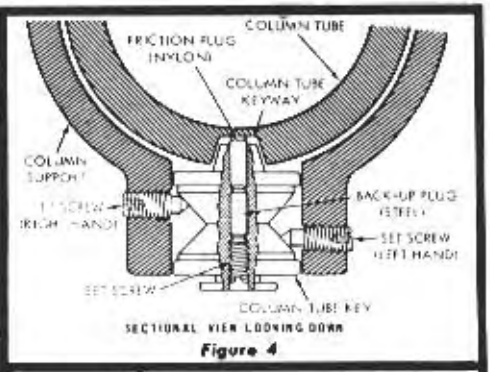


Figure 4

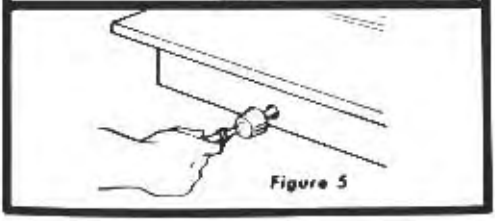


Figure 5

figure 4 is a sectional view through the column tube support (looking downward) at this location. By loosening the left-hand set screw and tightening the right-hand set screw the column tube key will be forced tighter into the column tube keyway. Conversely, loosening the right-hand set screw and tightening the left-hand set screw, the column key will be retracted out of the column tube keyway. The set screw in outer end of column tube key must be loosened while adjustment is being made and tightened with medium firmness after adjustment is completed. This screw applies pressure on the nylon friction plug and provides smoother elevation movement of column tube. This set screw should be tightened to provide maximum smoothness of operation. *Right and left positions are given with operator facing the saw — standing in front of saw table.*

a. Loosen set screw in center of column tube key. (See figures 3 and 4.)

b. Loosen left-hand set screw 1/4 turn. (See figure 4.)

c. Tighten right-hand set screw. (See figure 4.)

d. Tighten left-hand set screw. (See figure 4.)

e. Turn elevation crank to raise and lower radial arm. (See figure 5.) If too tight, loosen right-hand set screw (figure 4) slightly and check again for smooth operation. When correct, tighten left-hand set screw.

f. Tighten set screw in center of column tube key (figure 4) until smoothest operation is obtained.

g. Lock the yoke clamp handle (page 2) and the bevel lock knob, securely.

STEP THREE - SQUARING THE CROSSCUT

1. Loosen the arm latch knob (figure 6) 1/4 turn. Make sure the yoke clamp handle and bevel lock knob are tight.

2. Pull the latch knob release (page 2) outward and move the radial arm approximately 10^{0} to the right. Release the latch knob release and move radial arm into the 0^{0} (index) position. Do not bump or jar the arm. Push the arm latch knob, or latch knob release solidly with palm of hand in order to seat arm lock pin in the arm latch.

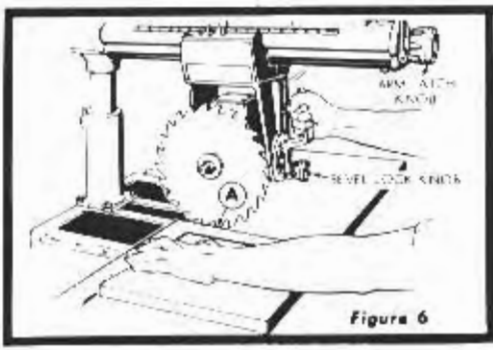


Figure 6

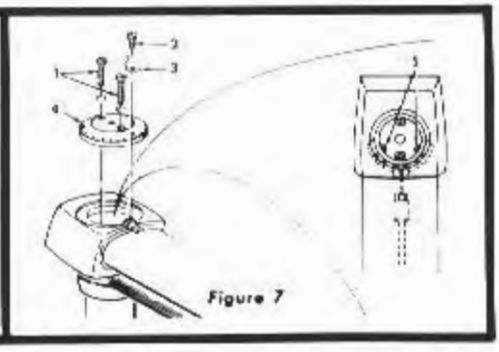


Figure 7

3. Tighten the arm latch knob.

4. Place a framing square on the table as shown in figure 6 and position the saw and square until the leg of the square just contacts a tooth of the saw blade. (Position "A", figure 6) Mark this tooth with crayon or chalk.

5. When the carriage is moved back and forth on the radial arm, the saw tooth "A" should just touch the square at all positions. If saw tooth "A" does not touch the square at all points, make the following adjustments.

a. If saw tooth ("A", figure 6) moves away from the square when moving the blade from the rear toward the front of the table, tap the right-hand front edge of the table.

b. If the saw tooth ("A", figure 6) moves into the square when moving saw from the rear to the front of saw table, tap the left-hand front edge of table.

c. Recheck . . . and, if correct, tighten all table hold-down screws.

6. In extreme cases, the above adjustment procedure may not be sufficient due to rough handling during shipment. Make the following adjustment only after tightening the table screws and the crosscut cannot be squared according to the preceding adjustment routine.

a. Remove three screws (1 and 2, figure 7), miter-scale indicator (3) and radial arm cap (4).

b. Turn the arm latch handle (figure 6) one-quarter turn counterclockwise, but do not pull it out.

c. Loosen (do not remove) the hex-head screws (5, figure 7) located inside the column tube.

d. Move radial arm slightly in the proper direction to make saw tooth ("A", figure 6) follow edge of square when the saw blade is moved in and out in a "crosscut" manner.

e. Retighten the hex head screws (5, figure 7) and arm latch handle. (See figure 6.)

f. Recheck travel of blade tooth ("A") with the square.

g. After the crosscut has been accurately squared, install the radial arm cap (4, figure 7), miter-scale indicator (3) and screws (1 and 2). Set the indicator (3) at 0^{0} position.

STEP FOUR - ADJUSTING TABLE PARALLEL TO RADIAL ARM

1. Remove the saw guard.

2. Insert a leveling set screw into each of the five leveling T-nuts (figure 1). Insert screws from top until they just touch the base.

3. Loosen channel clamping screws (figure 8) at both left and right sides of the base. Retighten to finger tightness for adjustment of table.

4. Loosen the arm latch knob (page 2) enough to obtain free movement of radial arm. Also loosen the latch knob release and loosen the carriage lock knob and move it to points (1, 2, 3 and 4, figure 9) to find at which of these points the blade first touches the top of the table.

NOTE

Actual contact with table top can be easily determined by rotating saw blade by hand and listening for a light "pinging" sound as the carriage is lowered.

5. The high point must be at one of the front screw holes before continuing the paralleling procedure. If high point is not at the front, adjust the screw at point (1, figure 9) so the high point is created at the front near point 1. Raise the blade slightly to pick up a "pinging" sound at this new high point.

NOTE

Do not change elevation of the blade during the remainder of the paralleling operation.

6. Move the blade to the back of the table, directly behind the high point. Raise the table to blade height at this point by adjusting the screw at point (3, figure 10) on left-hand side of table. Tighten the channel clamping screws at front and back of base on the left-hand side. (See figure 8.)

7. Return the blade to front of table and make a slight adjustment of the screw in this area, if necessary.

8. Swing the blade to front of table on right-hand side. Adjust screw at point (2, figure 11.)

9. Move blade to back of table. Raise the table to blade height at this point by adjusting the screw at point (4, figure 11.). Tighten channel clamping screws at front and back of base on right-hand side.

10. Return the blade to front of table and make a slight adjustment of the screw in this area, if necessary.

11. Move the saw blade to all four screw positions to recheck for proper paralleling of table. (Points 1 through 4, figure 9.)

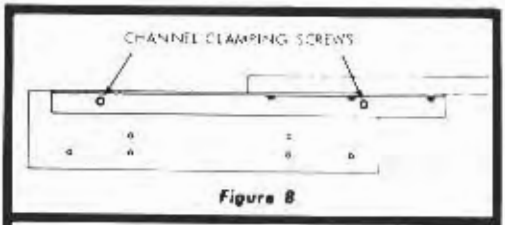


Figure 8

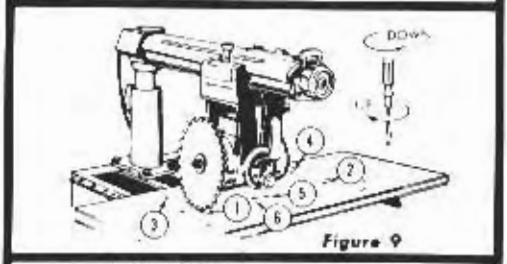


Figure 9

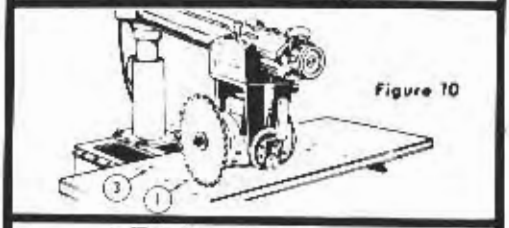


Figure 10

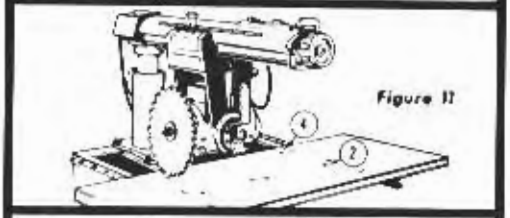


Figure 11

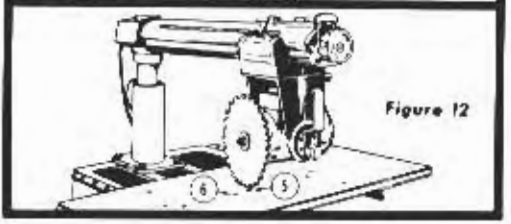


Figure 12

12. Move the saw blade to center of table. If the table is low at this point, raise it by adjusting the screw (point 5, figure 12). It may be necessary to back off the screw (6) to provide proper clearance.

13. If the table is high at the center, lower it by tightening the screw (6). When the table is adjusted parallel to the radial arm, rotate the set screw (5) clockwise until it bottoms on the base. This will serve as a lock for the adjustment of screw (6).

14. Place the rip fence in vertical position behind the front table board.

15. Place the rear table behind the rip fence, with the cutout forward (next to rip fence).

NOTE

The opening in rear table is used when shaping, or performing any operation where the particular cutter must extend below table top level.

16. Place the table spacer behind the rear table.

17. Install the table clamps at locations shown in the illustration on page 1 . . . and tighten them securely against the edge of the table spacer.

STEP FIVE - SQUARING THE SAW BLADE TO THE SAW TABLE

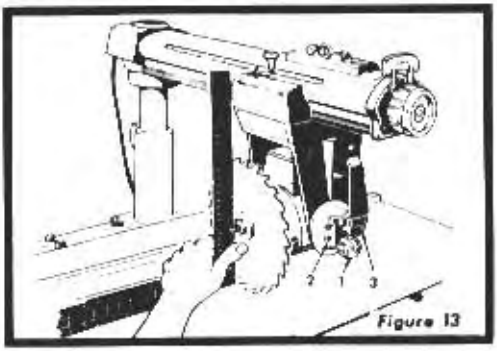


Figure 13

1. Place the edge of a framing square on the table top and against the saw blade as shown in figure 13.

2. When the saw blade is square to the table top, no light will be visible between the square and face of saw blade. Do not allow the square to rest against a tooth of the saw. If light is visible between the square and face of saw blade (with square leg held firm against the table top), perform the following adjustments.

a. Using a 1/4-inch hex "L" wrench, loosen just slightly the four socket-head screws (2, figure 13).

NOTE

It will be necessary to loosen the bevel lock knob (1, figure 16) several turns in order to provide room for inserting the Allen wrench into heads of socket-head screws (2).

b. Tilt the motor until the saw blade is square with the table top as shown in figure 13. Then, while holding the square firmly against the saw blade and table top, apply pressure against lower part of saw blade with the thumb until approximately 1/32-inch clearance exists between the square and lower edge of saw blade. This is to compensate for the possible slight shifting of the motor while screws (2) are being tightened.

c. Tighten the socket head screws (2, figure 13) and bevel lock knob (1).

NOTE

It may be necessary to perform more than one trial operation before the saw blade remains perfectly square with table top after tightening screws.

d. Recheck for blade squareness with table top.

e. The indicator (3, figure 13) should read 0^0 on the bevel index scale. If not, loosen the indicator attaching screw, adjust indicator to zero and tighten screw securely.

STEP SIX - CHECKING THE SAW BLADE FOR HEEL

1. Place a square against the rip fence and the saw blade as shown in figure 14. The long leg of the square must be held firmly against the rip fence and the short leg must not touch any of the teeth on the saw blade.

2. If a gap exists between the saw blade and the square, one of two types of "heel" exists. The two types of "heel" are illustrated in views "A" and "B", figure 15. To correct for either type of "HEEL" condition, proceed as follows:

a. Remove the left-hand carriage cover (1, figure 16).

b. Loosen the yoke clamp handle (2).

c. Loosen (slightly) the two hex-head machine screws (3).

d. Rotate the yoke until the gap between the saw blade and square is eliminated.

e. Lock the yoke and tighten the two hex-head machine screws (3).

f. Recheck for "heel" after tightening screws, and make corrections if necessary.

g. Retighten yoke clamp handle.

h. Install carriage cover (1, figure 16).

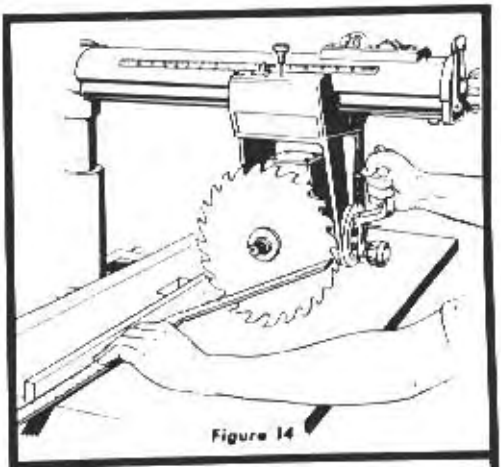


Figure 14

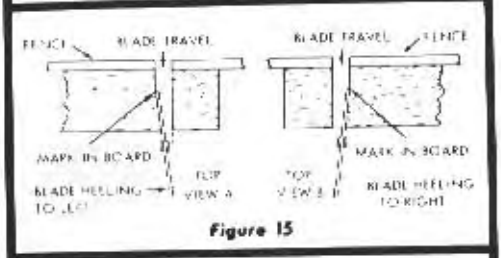


Figure 15

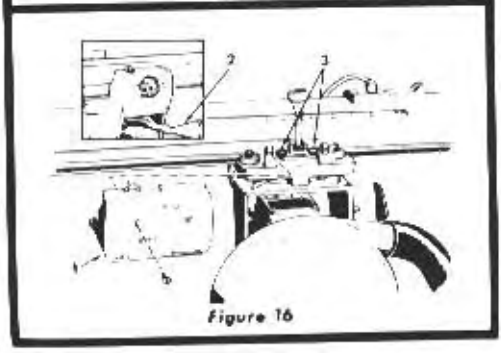


Figure 16

STEP SEVEN - DOUBLE-CHECK SQUARING OF SAW

1. Recheck for correct adjustment of the saw by performing "STEPS THREE, FIVE and SIX".

2. If the crosscut is not perfectly squared, proceed with "STEP THREE" (paragraphs 5 and 6) and "STEP SIX", if a correction is required.

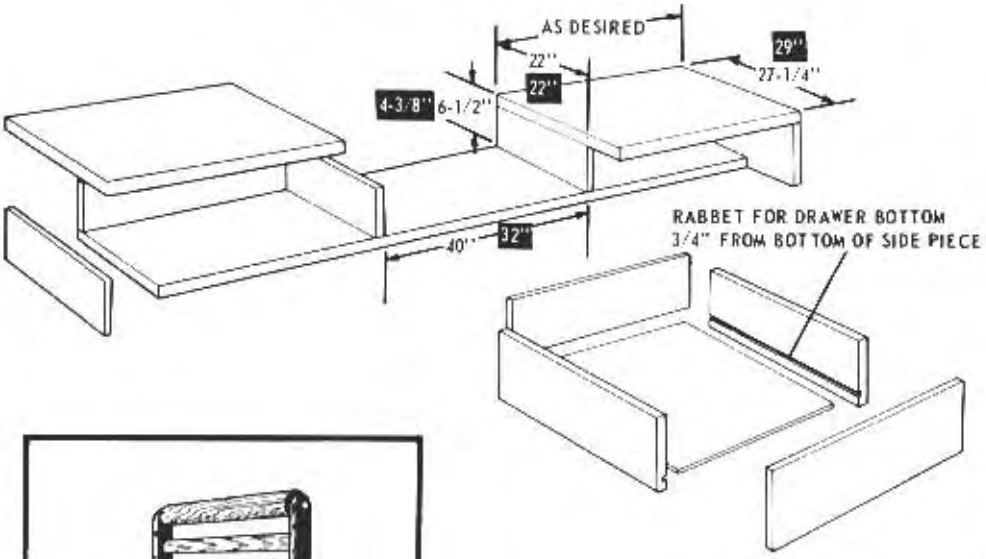
GOOD ADJUSTMENTS PRODUCE GOOD WORK

CHAPTER 12

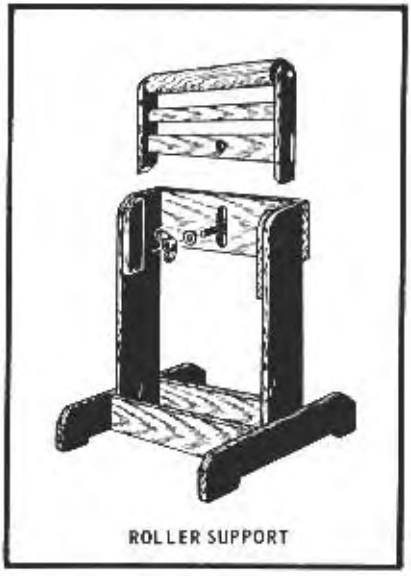
WORK HELPERS FOR YOU TO MAKE

A RADIAL-ARM SAW PORTABLE BENCH

NOTE: 10-Inch Tool dimensions are shown in black figures.
9-Inch Tool dimensions are shown in white figures.



DRAWER CONSTRUCTION

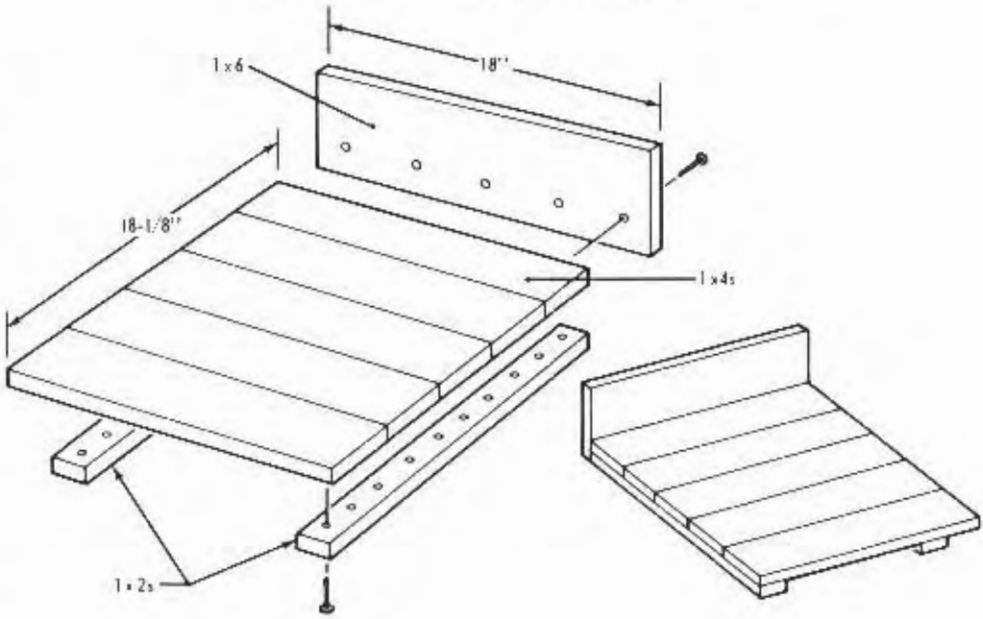


ROLLER SUPPORT

To adapt this portable bench for various uses, size all dimensions not specified on the drawing to suit your own requirements . . . only the critical dimensions (which must be exact) are shown.

We suggest a lock (a hasp with padlock will do) to hold the drawer shut in transit. Your Radial Arm Tool may be rested or bolted in place in the bench center well.

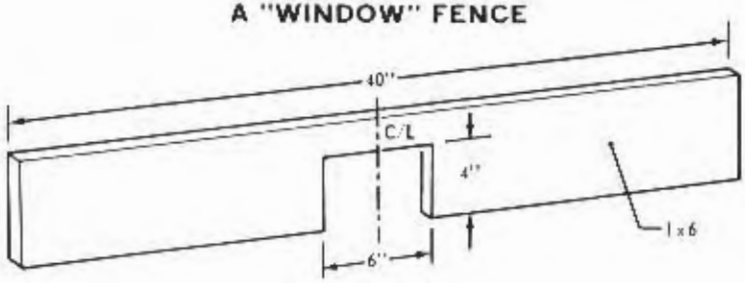
AUXILIARY TABLES TO ELEVATE YOUR WORK FOR END-CUTTING, SHAPING, ETC.



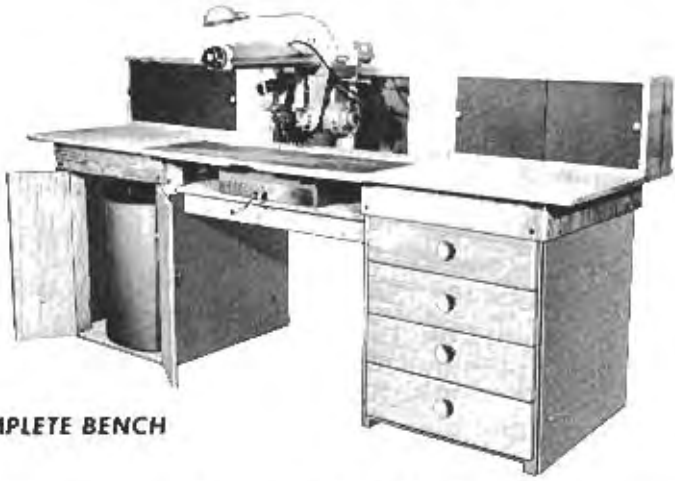
Before fastening the 1 x 6 fence to each table assemble the 1 x 4 boards on the 1 x 2 runners, then position the 1 x 6 board in the place of your saw-table fence and lay the assembled 1 x 4s on table top butting up against the face of the 1 x 6. Draw a line on he 1 x 6 using the top edge of the 1 x 4 touching it. Fasten the 1 x 6 to the end 1 x 4 with this line positioned as when drawn. This will allow the 1 x 6 to project down sufficiently to be clamped in place of the regular fence when auxiliary table is positioned on top of the saw table.

The inside ends of the two 1 x 6s (for the two auxiliary tables) can be cut back, if desired, to provide clearance for the tool motor when using a set-up in which motor will strike them. However, if using one table only, it can be positioned to one side — or, if using both tables, they can be spread apart — to allow room. If spreading tables apart leaves a gap that might hamper your operation, you can fill this gap with two (one atop the other) 1 x 4s or 1 x 6s, etc. as needed.

A "WINDOW" FENCE



RADIAL-ARM SAW WORKBENCH



COMPLETE BENCH

BILL OF MATERIALS

BASIC BENCH

Part	Material	Size	Number Req'd. Center Section	Center & 1 Side	3 Sections
1. Legs	2" x 4"	34" (See Detail X)	4	6	8
2. Rails	2" x 4"	40"	2	2	2
3. Table Sides	3/4" plywood	5-3/4" x 27-3/4"	2	2	2
4. Saw Table	3/4" plywood	26" x 40"	1	1	1
5. Table Sides	3/4" plywood	5" x 27-3/4"	0	1	2
6. Table Front and Back	3/4" plywood	5" x 25-5/8"	0	2	4
7. Side Tables	3/4" plywood	28" x 32"	0	1	2
8. Box Sides	3/4" plywood	18-1/2" x 9-3/8"	2	2	2
9. Box Front	1/4" plywood	18-1/2" x 7"	2	2	2
10. Box Top	1" x 10"		1 — 40" lg.	1 — 68" lg.	1 — 96" lg.
11. Baffle	1/8" hardboard	19" x 7"	1	1	1
12. Cabinet Side	1" x 10"	12"	0	1	2
13. Backing	1/8" hardboard	11-3/4"	1 — 40" lg.	1 — 68" lg.	1 — 96" lg.
14. Sliding Doors	1/8" hardboard	12" x 14"	0	2	4
*15. Cabinet Door Guides	1" x 2"	3/4" x 1" (grooved)	0	1 — 38-1/2" lg.	1 — 77" lg.
#16. Box Trim	1" x 2"	See Detail Z	1 — 76" lg.	1 — 76" lg.	1 — 76" lg.

*Groove first, then cut 1 piece 26-1/2", 1 piece 12" for each side cabinet.
#Cut 1 piece 26"; 2 pieces 18-1/2"; 2 pieces 6-1/2".

Material Required: (Carriage bolts, lag screws, nuts, bolts, washers, miscellaneous screws and nails.)

1" x 2"	1 — 8'	1 — 8' & 1 — 4'	2 — 8'
2" x 4"	1 — 12' & 1 — 8'	2 — 12'	2 — 12' & 1 — 8'
1" x 10"	1 — 4'	1 — 8'	1 — 10'
3/4" plywood	1 — 4' x 4' sheet	1 — 4' x 8' sheet	1 — 4' x 8' sheet
1/8" hardboard	1 — 4' sheet	1 — 8' sheet	1 — 10' sheet

FINISHED BENCH

Part	Material	Size	Center Section	Center & 1 Side	3 Sections
17. Cabinet Sides	1/8" hardboard	29" x 27-7/8"	0	1	2
18. Cabinet Inner Sides	1/8" hardboard	28-1/4" x 27-3/4"	0	1	2
19. Cabinet Back	1/8" hardboard	29" x 24-7/8"	0	1	2
*20. Cabinet Bottom	3/4" plywood	27-3/4" x 24-7/8"	0	1	1
*21. Doors	3/4" plywood	28-1/4" x 10-3/4"	0	2	2
22. Drawer Guides	3/4" plywood	27-3/4" x 6"	0	8	8
23. Bottom Drawer Guides	3/4" plywood	25-3/4" x 2"	0	2	2
24. Front Brace	3/4" plywood	21-5/8" x 2"	0	1	1
25. Rear Brace	3/4" plywood	20-1/8" x 2"	0	1	1
26. Drawer Bottom	3/4" plywood	27-3/4" x 21-5/8"	0	4	4
27. Drawer Sides	3/4" plywood	5-3/4" x 27-3/4"	0	8	8
28. Drawer Back	3/4" plywood	5-3/4" x 18-5/8"	0	4	4
29. Drawer Front	3/4" plywood	6-3/4" x 23-7/8"	0	4	4

*Used only on cabinet section.

Material Required: (Hinges, knobs, drawer pulls, bullet latches, angles, miscellaneous screws and nails.)

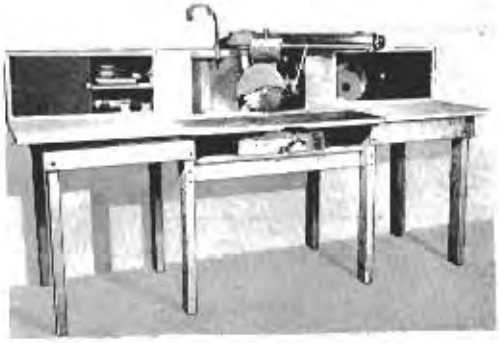
3/4" plywood	1 — 4' x 8' sheet 1 — 4' x 5' sheet
1/8" hardboard	1 — 3' x 8' sheet 1 — 3' x 5' sheet

The center section is a solid stand that will hold your saw without bolting it down — and provides space for stowing the saw arm when not in use. It includes a baffle which will cause much of the sawdust to blow back and drop through for collection in a box under the table.

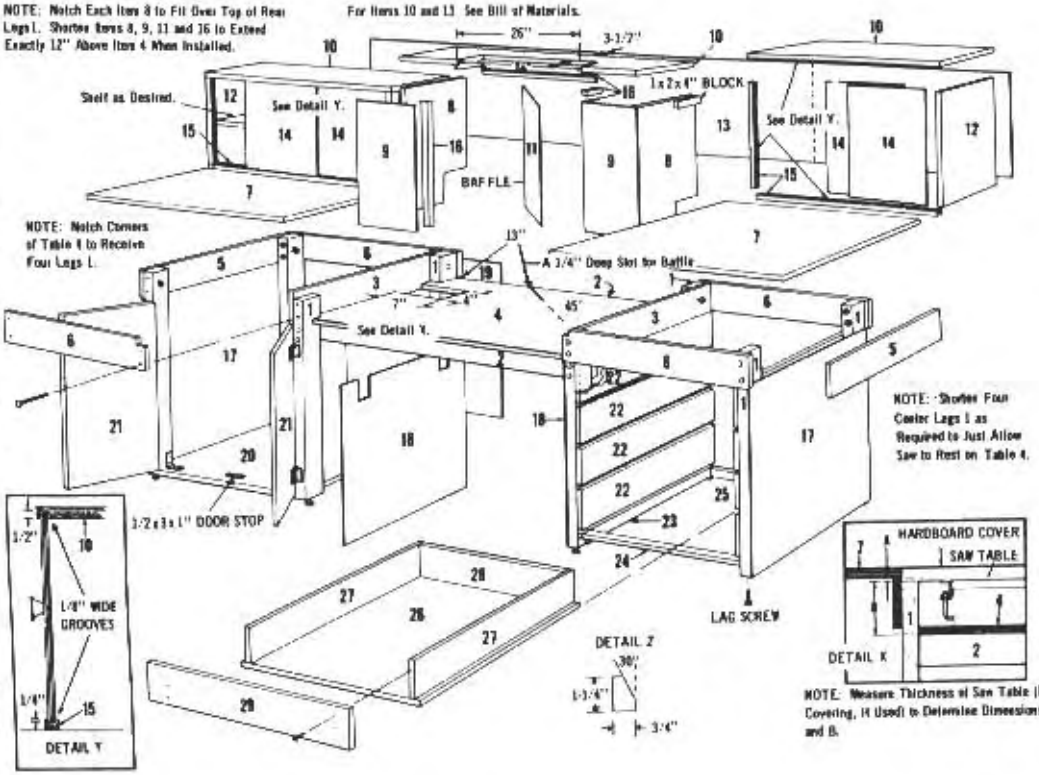
You can build the entire bench (which, with saw installed, provides an 8-ft. work top), or can begin with center section and add on either type of end section later. The top cabinets also are optional.

NOTE

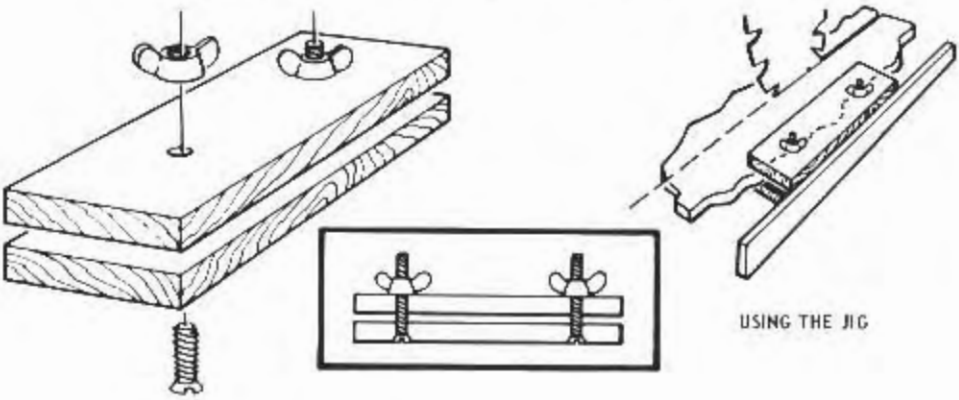
For 9-In. Saw increase Table (4) and all other front-to-back measurements by 1/2 in. Decrease length of Table (4) and Rails (2) to 32 in. and relocate Baffle accordingly. Raise level of Table (4) to be only 4-3/4 in. below top of saw table.



BENCH WITH INCOMPLETE END SECTIONS

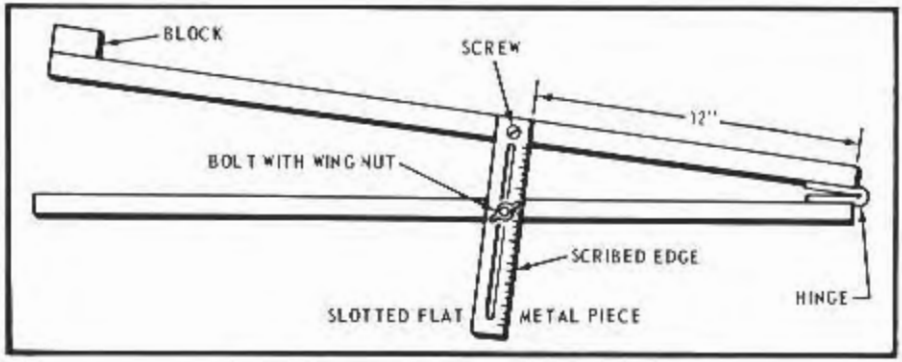


A HOLDING JIG — FOR ODD-SHAPED WORKPIECES



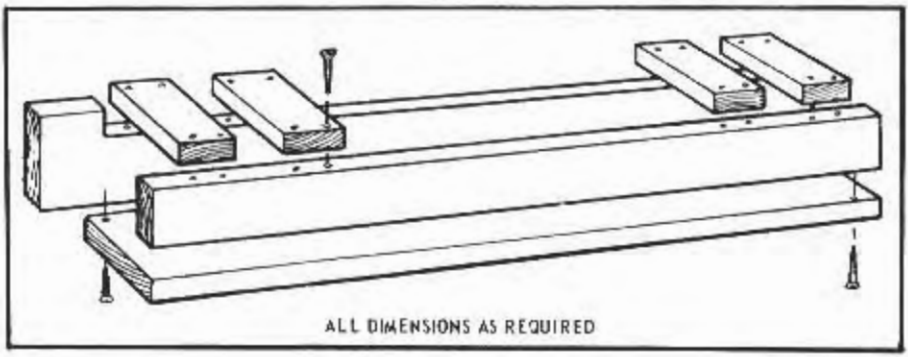
USING THE JIG

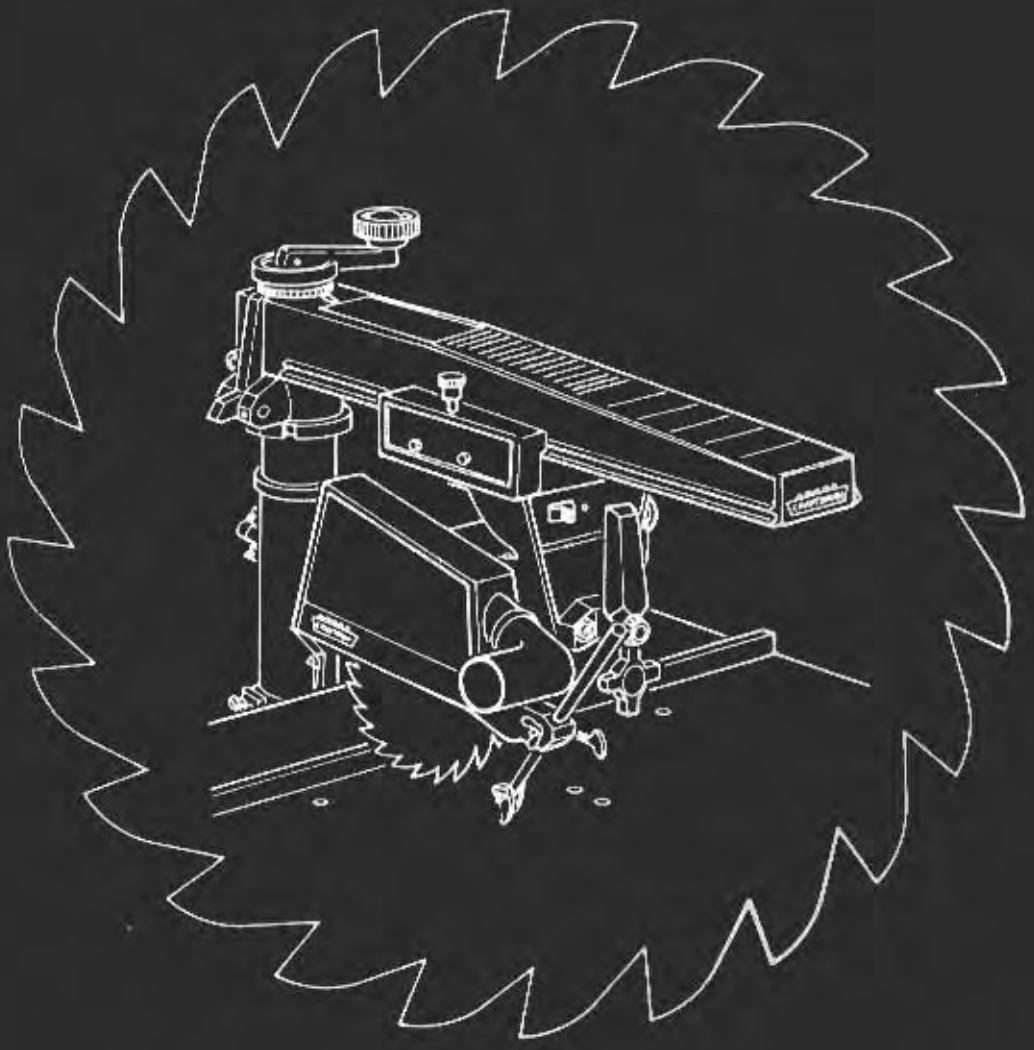
A TAPERING JIG



For Out-Rip Use Fasten Block and Slotted Flat to Other Straight Edge.

A STRIP-MOLDING JIG





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