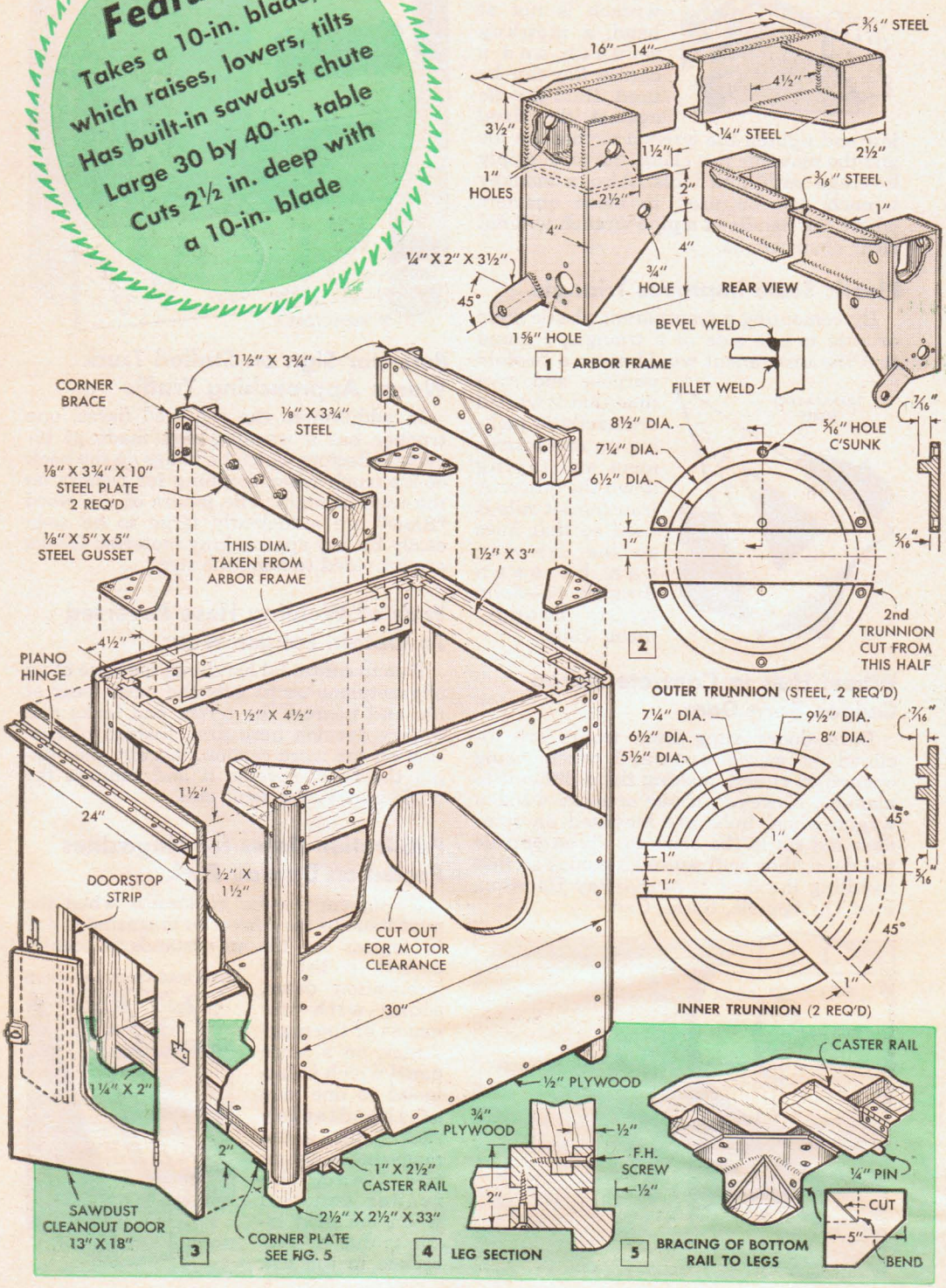
10-in. TABLE SAW

Features

Takes a 10-in. blade, which raises, lowers, tilts
Has built-in sawdust chute
Large 30 by 40-in. table
Cuts 2½ in. deep with a 10-in. blade



HAS TILTING ARBOR

By Elman Wood

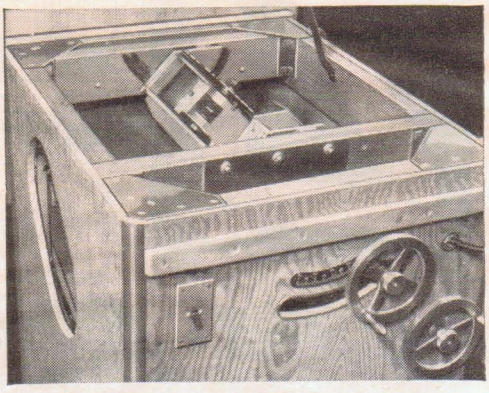
Part I

Hinged side and back extensions increase the size of the table so that the ripping fence can be set 25 in. from the saw blade. Rips to the center of 48-in. plywood panel

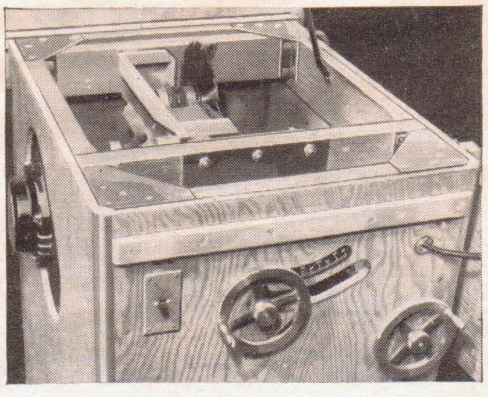
WOODWORKING craftsmen will rate this tilting-arbor table saw "tops" because of its versatility, speed and accuracy. By turning one handwheel the blade is raised or lowered for any depth setting within its capacity. A few turns of another handwheel tilt the blade for any angle cut up to 45 deg., the settings being indicated by a degree scale and pointer. The saw table remains always in a horizontal position; only the saw arbor tilts. The hardwood table with hinged extensions is plenty large enough to handle a 4 by 8-ft. plywood panel. An enclosed base catches all the sawdust, and swivel casters fitted to built-in foot lifts enable the operator to roll the saw to any part of the shop.

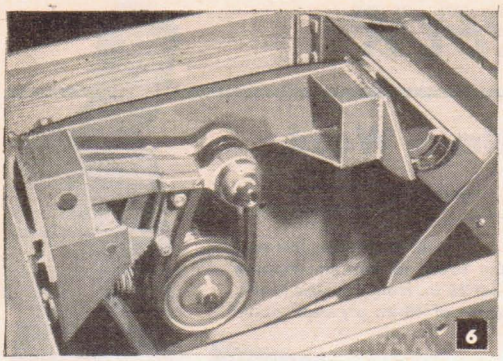
Construction should begin with the saw-base frame, Fig. 3. Building the base requires care in cutting and fitting as it must be strong and rigid to support the motor and arbor assembly. Use well-seasoned, selected oak for legs and rails. Rabbet the legs on adjacent sides as in Fig. 4 to take side and end panels flush. Both top and bottom rails are mortised into the legs, but note that the upper side rails are 4½ in. wide and that the end ones are 3 in. The tenons are glued and keyed with screws, and after the joining is completed, steel gussets are mortised into the top rails across the four corners, and the bottom rails are braced to the legs with steel corner plates cut, bent and attached as in Fig. 5. Caster rails, one across each end, are hinged to the underside of the

An accurate scale with pointer shows all angles from 0 to 45 deg. Here blade is tilted to full 45-deg. angle



Saw frame and arbor assembly completed ready for the table. Base is painted before table is installed





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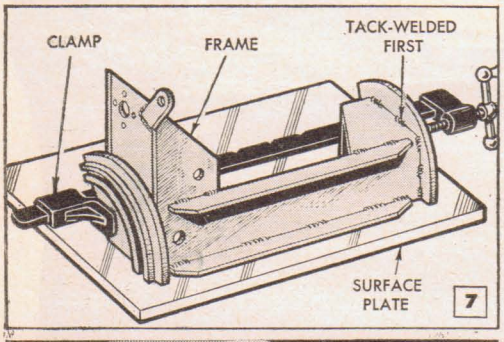

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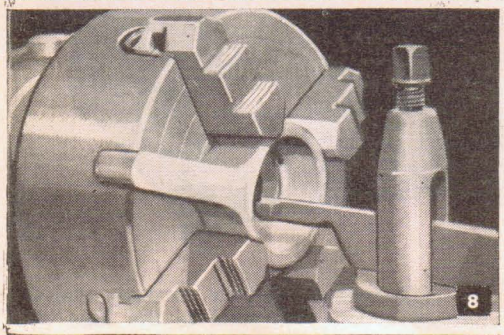

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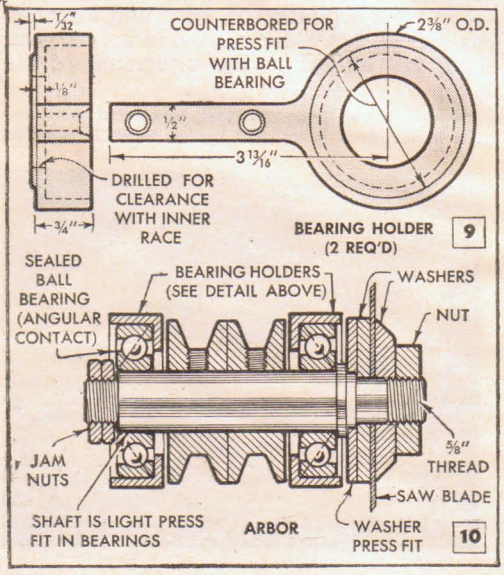
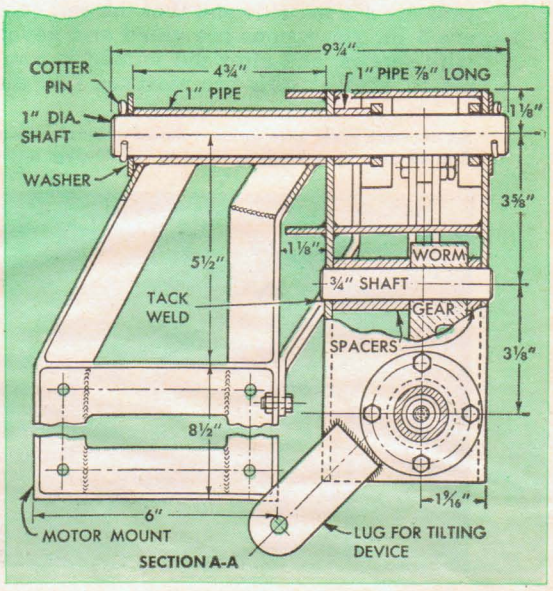


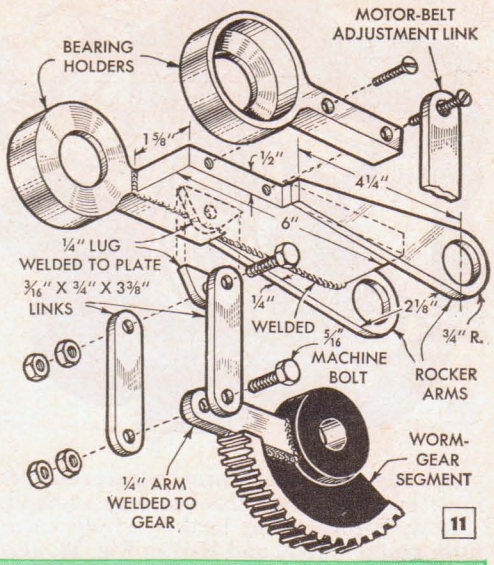
frame rails as in Figs. 3 and 5. The plywood bottom and the rear and right-side panels can now be installed, but the front and left-side panels are omitted at this stage as it is necessary to determine later the location of the handwheels and the size of the opening for the motor.

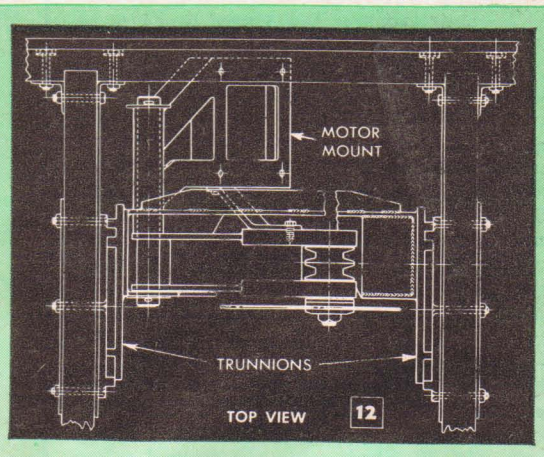
The arbor frame, shown in front and rear views in Fig. 1, comes next. This consists of a number of parts cut from steel plate and welded together to form the unit shown. This frame swings on trunnions made as detailed in Fig. 2. Each trunnion consists of an inner and outer segment, the two trunnions requiring four segments in all. These four segments are obtained from ¾-in. mild-steel plate turned first to the form of disks, which are then cut into segments as indicated in Fig. 2. Inner segments are welded to the arbor frame while the outer ones are attached to the steel-faced cross members in Fig. 3. In installing a trunnion-mounted saw arbor there are two precise requirements: The center line of the blade must coincide exactly with the center line of the outer trunnion segments and the center of rotation of the trunnions must be at that point where the plane of the blade intersects that of the saw-table top. Fig. 6 shows the arbor and arbor frame in position and Fig. 7 shows the first step in positioning the inner trunnion segments on the arbor frame. Use a surface plate or other flat surface and make sure that the parts are exactly in line before welding. This done, measure the length of the arbor frame, plus the four trunnion segments. This gives you the distance between the two trunnion-support members, Fig. 1. Face the members with steel plates as

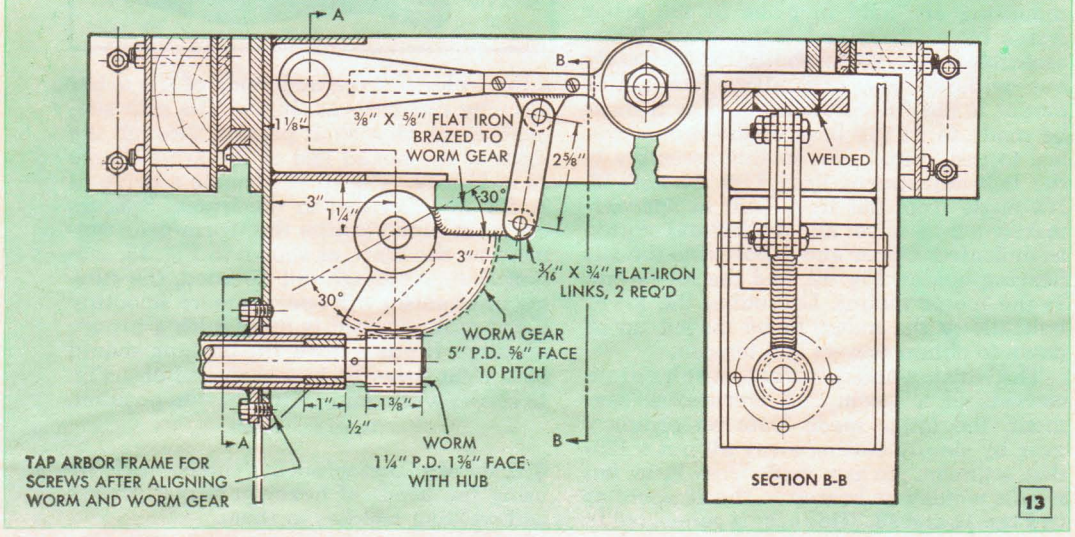


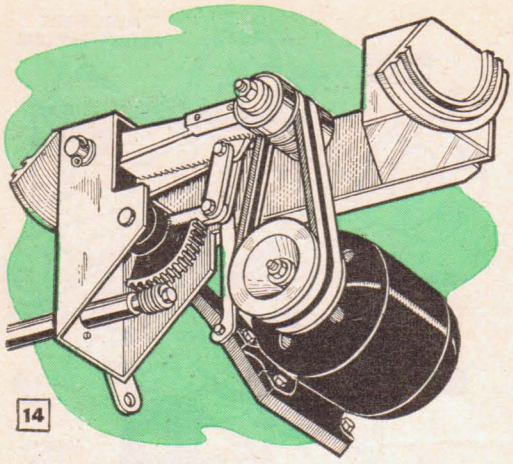
shown and drill the bolt holes. While the members are temporarily in position determine the center line of the saw base and scribe it on both members for guidance in locating the trunnions. Then slip the arbor frame and trunnions between the supports. The arbor frame should fit snugly but should swing on the trunnions with only a slight frictional drag. With all parts located on the center line of the saw base, clamp the outer trunnion segments to the cross members and lift out the whole assembly. Using each trunnion segment as a drilling jig, drill holes and bolt the segments to the cross members.

Next, come the arbor-bearing holders shown in detail in Fig. 9, and in section in Fig. 10, with the arbor, pulley and bearings in place. Holders are rough-cut from ¾-in. steel plate with a cutting torch or metal-cutting bandsaw and are recessed and bored through to suit the bearings as in Fig. 8. Bearings should be a fairly tight press fit in the recesses. The arbor or spindle is machined from steel and finish-ground to final dimensions. Note that it is flanged at the saw-blade end to form a seat for the press-fitted spacing washer. The spindle is shouldered and threaded at the left-hand end for jam nuts for pre-loading the bearings. Pulleys are locked on the spindle with socket-head setscrews, the ends of the setscrews seating on a flat, milled or filed on the saw spindle. Dimensions of the spindle through the bearings, Fig. 9, and also the bearing-recess diameter in Fig. 10, have been









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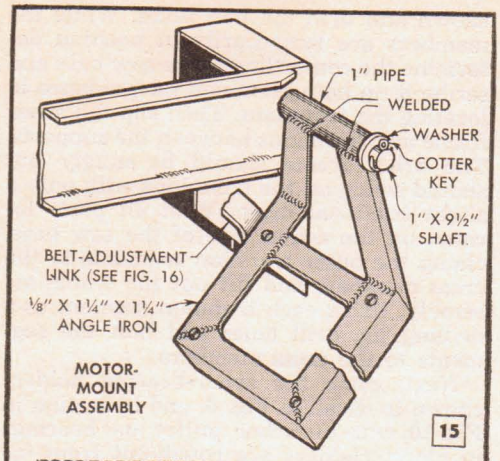
purposely omitted. These measurements must be taken from the bearings at hand.

Now, before going farther, study carefully sections A-A and B-B in Fig. 13, also the perspective and top views in Figs. 11 and 12. From Fig. 11 you will see that a ½-in. steel plate forms the mounting base for the saw-arbor assembly. Notches milled in opposite edges take the ends of the bearing holders, and rocker arms welded to the mounting base allow it to pivot on a rocker shaft for raising and lowering the saw blade and motor as a unit. When this assembly is complete, the saw spindle should turn freely in the bearings. Check this before finally welding the bearing holders in place. The motor mount, a separate assembly built up by welding together steel angles and flats, is welded to a length of 1-in. pipe which telescopes over the rocker shaft and fits snugly against the rocker arms. See Fig. 13, section A-A, and also the top view, Fig. 12. Shaft, pipe sleeve and arbor mounting are held in place in the arbor frame by washers and cotter keys. When assembled, the parts should move freely but without any end play. The motor mount is not fully dimensioned as it must be made to fit the base of the motor you are to use. Final unit in this assembly is the belt-adjustment link, Figs. 15 and 16. It's made from flat iron, bent to approximately a 2-in. offset and drilled and slotted as indicated. Upper end is bolted to the left bearing holder, Fig. 12, and the lower end to the motor mount. Loosening the lower bolt allows the motor to be moved up or down to obtain correct belt tension.

The raising-and-lowering mechanism consists of a worm and worm-gear segment, the latter made from an ordinary gear by simply cutting away all but a 120-deg. segment. An arm made from ¼-in. flat iron is welded or brazed to the segment as in Figs. 11 and 13. This arm is connected to



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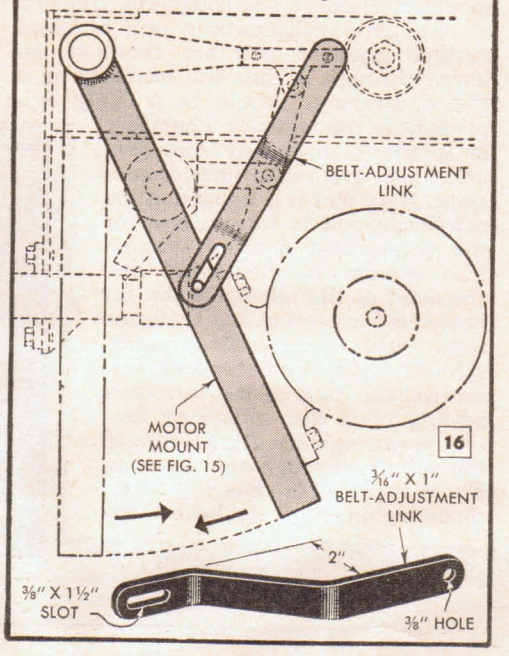

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a lug welded to the underside of the arbor plate by two links as shown. The gear segment turns on a shaft passing through the sides of the boxed end of the arbor frame as in Fig. 14. The shaft is made a drive fit in the holes drilled in the frame. Spacers cut from pipe position the worm-gear segment on the shaft, as shown in Fig. 13, section A-A. Although not detailed, the raising mechanism will operate more smoothly if the gear segment is fitted with a bronze bushing. If this is done, the bushing should be a tight drive fit in a reamed hole. Fig. 13 shows worm and worm shaft in position.

(To be continued)

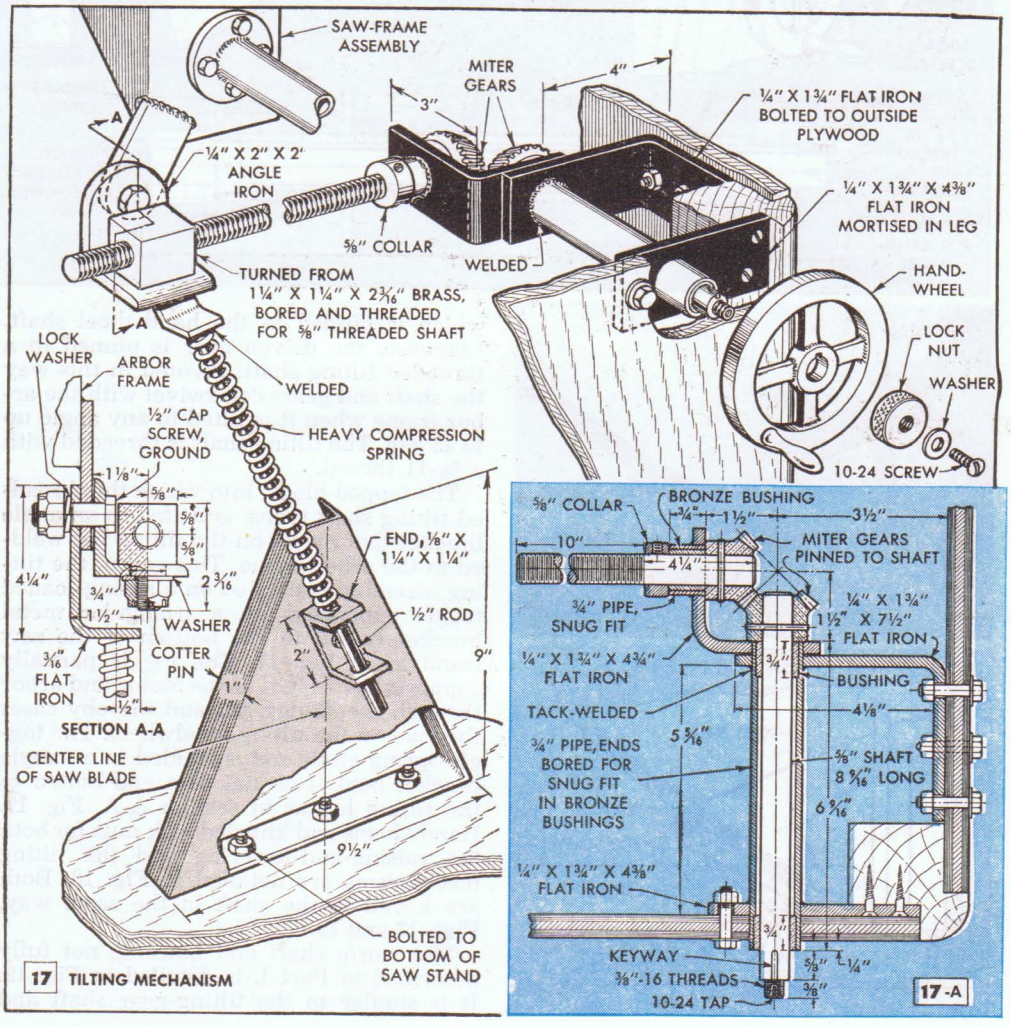
¶A set of socket wrenches can be made by using the heads of hexagon socket screws and welding handles to them.

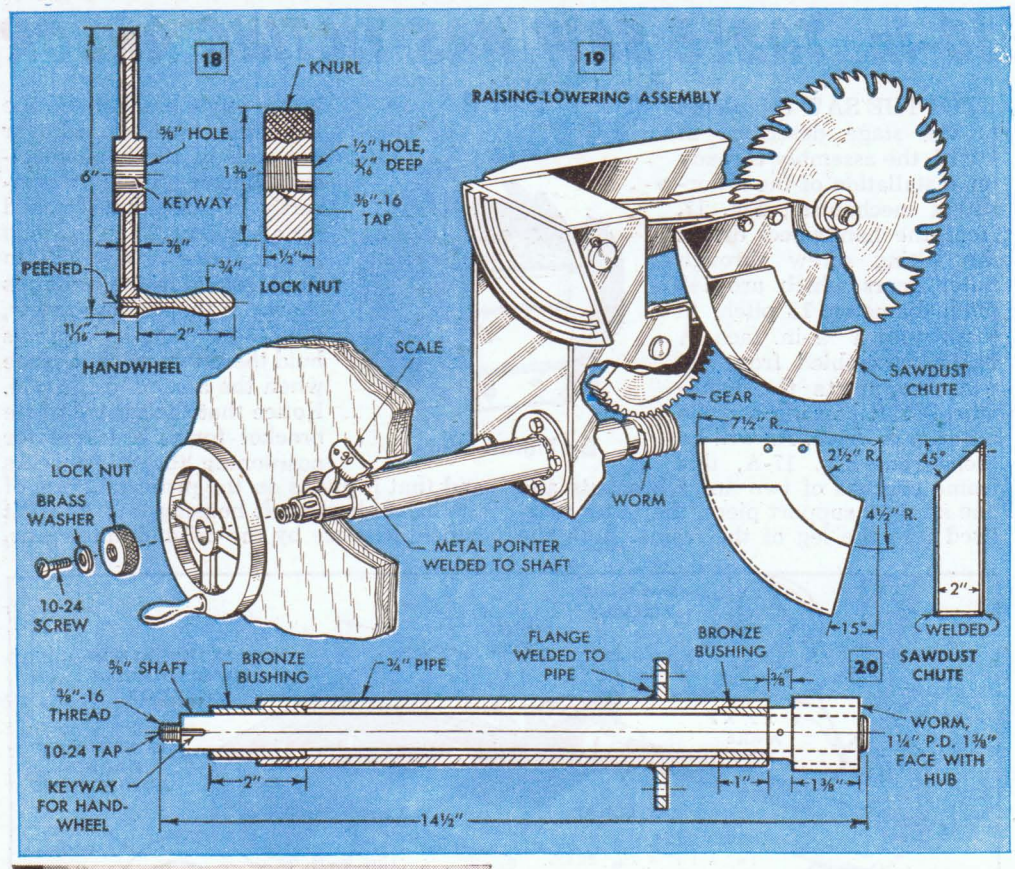
10-in. TABLE SAW HAS TILTING ARBOR

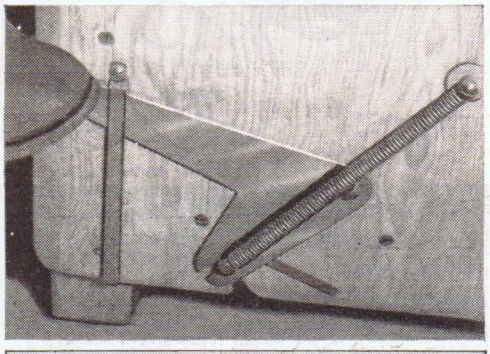
Part II

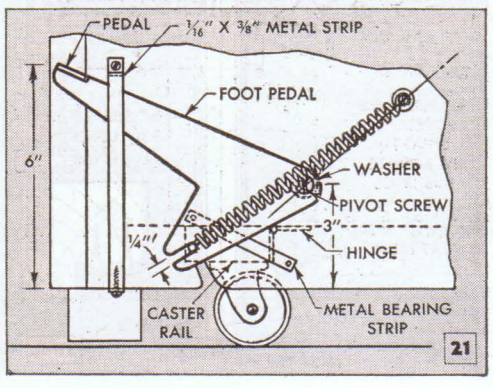
By Elman Wood

WITH THE SAW completed to the stage described in Part I, the assembly is ready for installation of the arbor-tilting mechanism, Fig. 17. Here the handwheel drives the tilting screw through miter gears which are 1½ pitch diameter, 12 pitch, 18 teeth with a 7/16-in. face. A frame, assembled from flat iron, supports the handwheel-shaft housing and the miter-gear drive. As will be seen from Fig. 17-A, this frame consists of two angle brackets and one straight support piece, the latter mortised into the leg of the frame. Both the larger angle bracket and the flat support are slipped over the ends of the handwheel-shaft housing, bolted temporarily in place and checked for alignment. Then the pipe housings are tack welded to the brackets in the positions shown in the sectional view, Fig. 17-A. Bolts and screws hold these two parts in place when the assembly is made. Notice that the second angle bracket forms a frame for positioning the miter gears and that it pivots on the projecting end of the handwheel-shaft housing, Fig. 17-A. It is held in place by the driving miter gear,





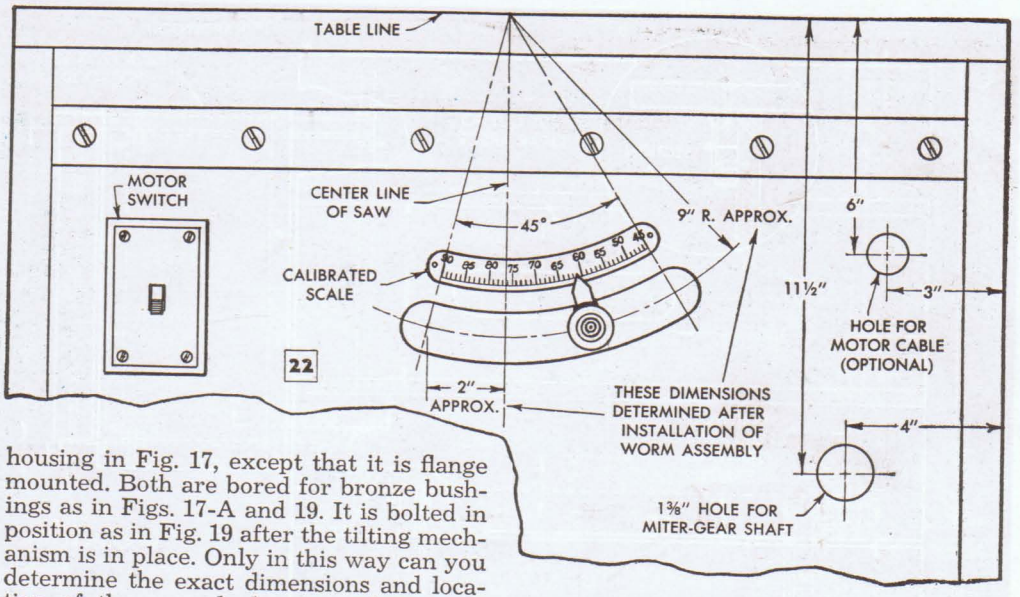




which is pinned to the handwheel shaft. Likewise, the driven gear is pinned to a threaded tilting shaft. Pivoted in this way the shaft and gears can swivel with the arbor frame when it is tilted to any angle up to 45 deg. The tilting shaft is threaded with a ⅝-11 thread.

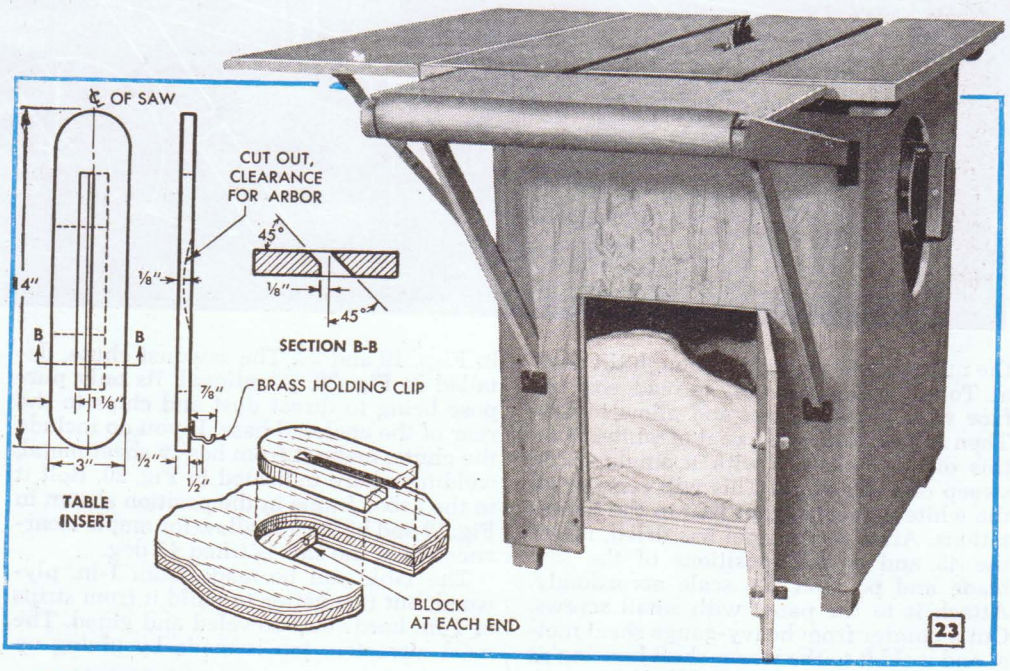
The tapped block, into which the threaded tilting shaft turns, is bolted to an angle bracket that pivots on the tilting lug welded to the arbor frame. This end of the tilting assembly is carried on a spring-loaded toggle supported by a triangular metal bracket bolted to the bottom of the saw stand as in Fig. 17. The toggle partially supports the weight of the motor and arbor through the 45-deg. tilt and thereby eases the load on the tilting handwheel. The toggle-spring guide rod is welded to an angle bracket bent from flat iron and bolted to the tilting lug as in section A-A, Fig. 17. Handwheels and knurled lock nuts for both the raising-and-lowering and the tilting mechanisms are detailed in Fig. 18. Both are keyed to the shaft in the same way, Figs. 17 and 19.

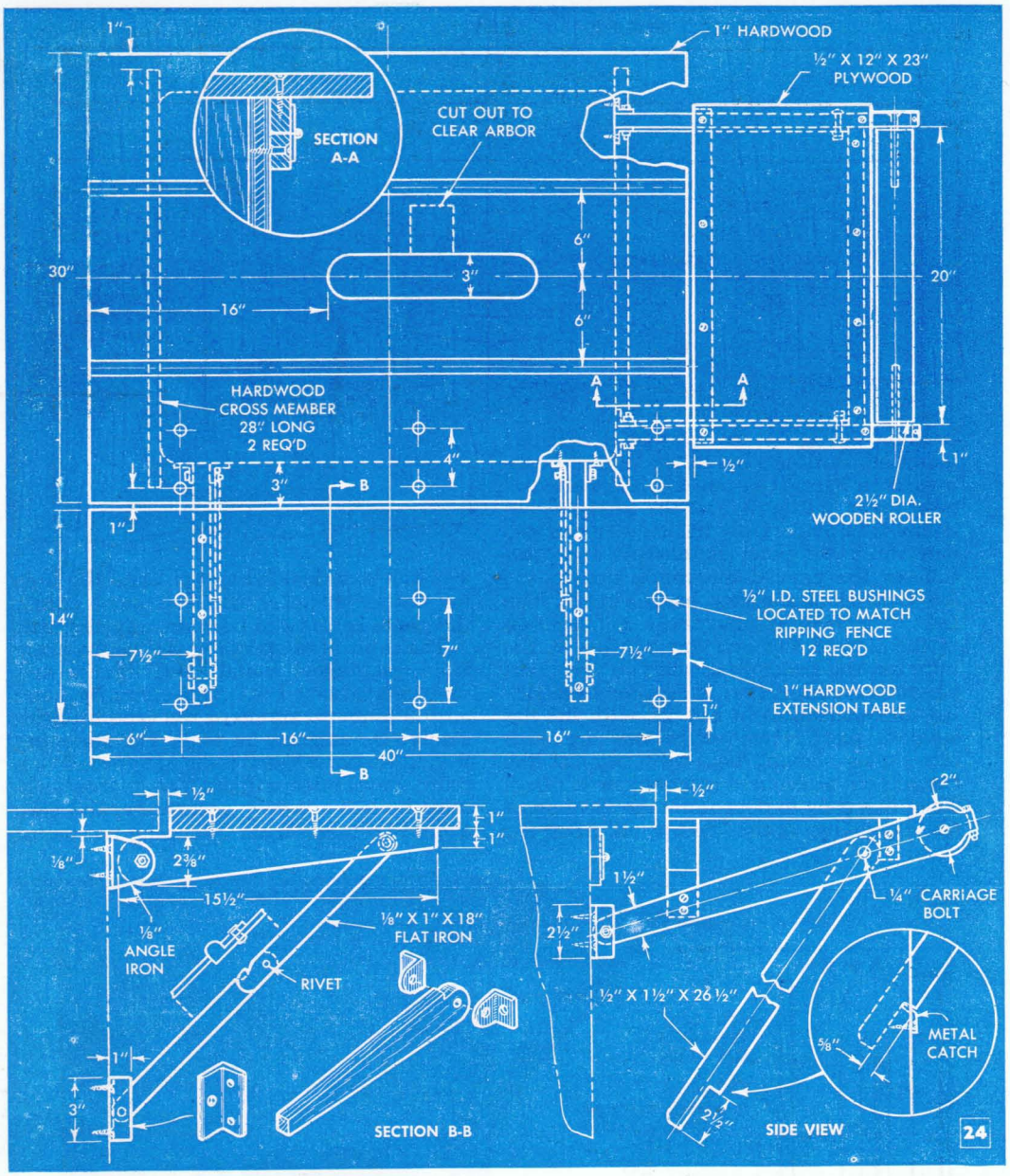
The worm shaft and housing, not fully described in Part I, is detailed in Fig. 19. It is similar to the tilting-gear shaft and



housing in Fig. 17, except that it is flange mounted. Both are bored for bronze bushings as in Figs. 17-A and 19. It is bolted in position as in Fig. 19 after the tilting mechanism is in place. Only in this way can you determine the exact dimensions and location of the curved clearance slot in the front panel of the saw base, Fig. 22. The best way to determine the exact location of the curved slot and the location of the hole for the miter-gear shaft in the front plywood panel, is first to assemble the tilting mechanism, as in Fig. 17, with the flat support plate attached to the leg with screws, as shown. This will support the completely assembled mechanism in place. Then it is easy to determine the location of these openings in the front panel. After the slot has been located and cut and the hole for the miter-gear shaft has been bored, the panel is screwed permanently in place.

The calibrated scale, Fig. 22, can be made from thin sheet metal with figures and divisions stamped into the metal by hand with a numeral stamp of the type used for stamping numerals on tools. For stamping the divisions, a ¼-in. lathe bit ground to a blunt chisel edge will do. The degree scale must be laid out very accurately, and care should be taken when stamping not to cut





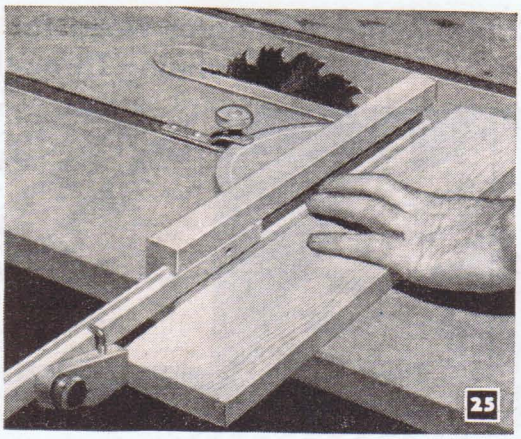
the numerals or divisions through the metal. To make the scale easy to read, coat the face with black enamel and allow to dry. Then follow with a thin coat of white. Wipe this off immediately with a single quick sweep of a dry cloth. This will remove all the white enamel except that in the indentations. After the enamel has dried, locate the 45 and 90-deg. positions of the saw blade and position the scale accordingly. Attach it to the panel with small screws. Cut a pointer from heavy-gauge sheet metal and weld it to the worm-shaft housing as in Figs. 19 and 22. The sawdust chute, detailed in Fig. 20, is optional, its only purpose being to direct dust and chips to the rear of the enclosed base. If you do include the chute, make it from heavy sheet metal, welding where indicated in Fig. 20. Bolt it to the arbor frame in the position shown in Fig. 19 and be sure to allow for ample clearance when the saw is tilted 45 deg.

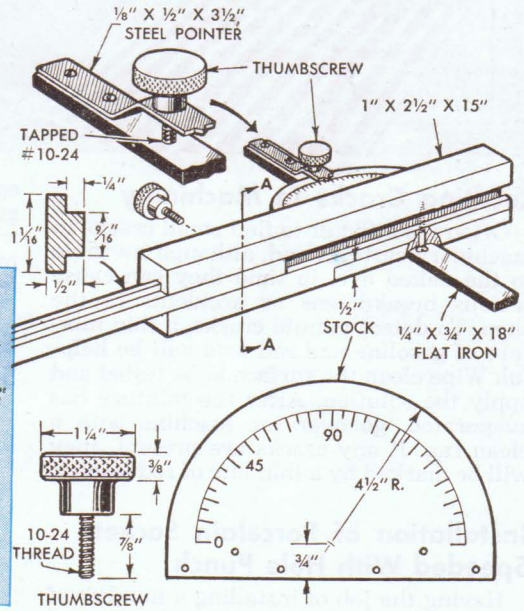
The table can be made from 1-in. plywood, but it is better to build it from strips of 1-in. hardwood doweled and glued. The most attractive job is made by gluing up

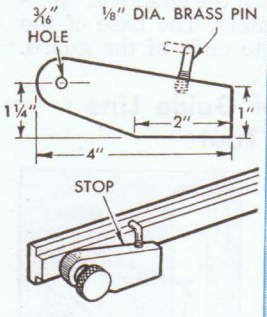
alternate 1 by 1-in. strips ripped from hardwoods of a contrasting color. Otherwise, using one wood such as maple, dowel and glue together 1-in. strips, each no wider than 2 in., to make the required table width as given in Fig. 24. Make the extension drop leaf in the same way and of the same material. After gluing, run grooves for the crosscut guide and cut an opening for the blade insert as in Fig. 24. Make and fit the insert as detailed in Fig. 23. Attach the table to the base as in Fig. 24, section A-A, checking to assure that the crosscut-guide grooves are aligned with the blade. Fig. 24, section B-B, shows how the side extension is mounted on the saw base. The back extension, Fig. 24, is optional equipment.

Use a regular crosscut guide or make one as in Figs. 25 and 26. Details on the hardwood ripping fence, Fig. 27, are self explanatory. Casters detailed in Fig. 21 also are optional. The lifting mechanism for each set of casters is fitted on diagonal corners of the base.

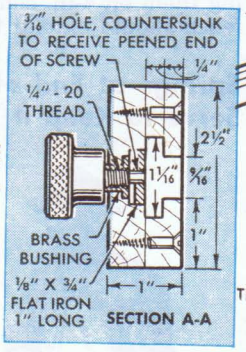
(The End)

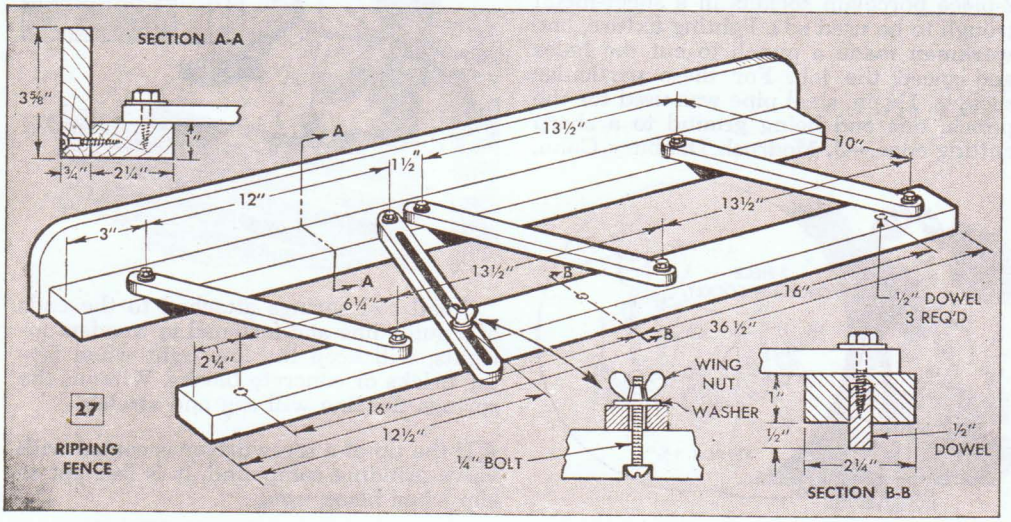






26 CROSSCUT GUIDE WITH STOP





27 RIPPING FENCE