points and additional resistors and condensers. Suggested values of capacity, in addition to C_2 and C_3, are 0.001 and 0.002 μfd. From R_2, resistors of 2, 3 and 5 megohms may be added.

When connecting the output terminals of the keyer to the circuit to be keyed, care must be used to connect the grounded output terminal to the negative side of the keyed circuit.

¶ Rack Construction

Most of the units described in the constructional chapters of this *Handbook* are designed for standard rack mounting. The assembly of a selected group of units to form a complete transmitter is, therefore, a relatively simple matter. While standard metal racks are available on the market, many amateurs prefer to build their own less expensively from wood. With care, an excellent substitute can be made.

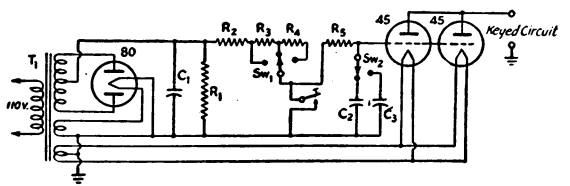
The plan of a rack of standard dimensions is shown in Fig. 1392. The rack is constructed entirely of 1 × 2-inch stock of smooth pine, spruce or redwood, with the exception of the trimming strips, *M*, *N*, *O* and *P*. Since the actual size of standard 1 × 2-inch stock runs appreciably below these dimensions, a much sturdier job will result if pieces are obtained cut to the full dimensions.

The main vertical supporting members of the wooden rack each is comprised of two pieces (*A* and *B*, and *I* and *J*) fastened together at right angles. Each pair of these members is fastened together by No. 8 flathead screws, with heads countersunk.

Before fastening these pairs together, pieces *A* and *J* should be made exactly the same length and drilled in the proper places for the mounting screws, using a No. 30 drill. The length of pieces *A*, *J*, *B* and *I* should equal the total height of all panels required for the transmitter plus *twice* the sum of the thickness and width of the material used. If the dimensions of the stock are exactly 1 × 2 inches, then 6 inches must be added to the sum of the panel heights. An inspection of the top and bottom of the rack in the drawing will reveal the reason for this. The first mounting hole should come at a distance of ¼ inch plus the sum of the thickness and width of the material from either end of pieces *A* and *J*. This distance will be 3¼ inches for stock exactly 1 × 2 inches. The second hole will come 1¼ inches from the first, the third ½ inch from the second, the fourth 1¼ inches from the third and so on, alternating spacings between ½ inch and 1¼ inch (see detail drawing D, Fig. 1392). All holes should

Fig. 1390 — Wiring diagram of the practical vacuum-tube keyer unit and power supply shown in Fig. 1391.

C_1 — 2-μfd. 600-volt paper.
C_2 — 0.003-μfd. mica.
C_3 — 0.005-μfd. mica.
R_1 — 0.25 megohm, 1-watt.
R_2 — 50,000 ohms, 10-watt.
R_3, R_4 — 5 megohms, 1-watt.
R_5 — 0.5 megohm, 1-watt.
Sw_1, Sw_2 — 3-position 1-circuit rotary switch.
T_1 — 325–0–325 volts, 5 volts and 2.5-volts (Thordarson T-13R01).



be placed ⅜ inch from the inside edges of the vertical members.

The two vertical members are fastened together by cross-member *K* at the top and *L* at the bottom. These should be of such a length that the inside edges of *A* and *J* are exactly 17½ inches apart at all points. This will bring the lines of mounting holes 18¼ inches center to center. Extending back from the bottoms of the vertical members are pieces *G* and *D* connected together by cross-members *L*, *Q* and *E*, forming the base. The length of the pieces *D* and *G* will depend upon space requirements of the largest power supply unit which will rest upon it. The vertical members are braced against the base by diagonal members *C* and *H*.

Rear support for heavy units placed above the base may be provided by mounting angles on *C* and *H* or by connecting these members with cross-braces as shown at *F*.

To finish off the front of the rack pieces of ¼-inch oak strip (*M*, *N*, *O*, *P*) are fastened around the edges with small-head finishing nails. The heads are set below the surface and the holes plugged with putty or plastic wood.

The top and bottom edges of *M* and *O* should be ¼ inch from the first mounting holes, and the distance between the inside edges of the vertical strips, *N* and *P*, 19 1/16 inches.

To prevent the screw holes from wearing out when panels are changed frequently, ½ × 1/16, or 1/32 inch iron or brass strip may be used to back up the vertical members of the frame.

The outside surfaces should be sandpapered thoroughly and given one or two coats of flat black, sandpapering between coats. A finishing surface of two coats of glossy black "Duco" is then applied, again sandpapering between coats. It is very important to allow each coat to dry thoroughly before applying the next, or sandpapering.

Since the combined weights of power supplies, modulator equipment, etc., may total to a surprising figure, the rack should be provided with rollers or wheels so that it may be moved about when necessary after the transmitter has been assembled. Ball bearing roller-skate wheels are suitable for the purpose.

Standard metal chassis are 17 inches wide. Standard panels are 19 inches wide and multiples of 1¾ inches high. Panel mounting holes start with the first one ¼ inch from the edge of the panel, the second 1¼ inches from the first, the third ½ inch from the second, the fourth 1¼ inches from the third, and the distances between holes from there on alternated between ½ inch and 1¼ inches. (See detail D, Fig. 1392.) In a panel higher than two or three rack units (1¾ inch per unit), it is common practice to drill only sufficient holes to provide a secure mounting. All panel holes should be drilled ⅜ inch in from the edge.

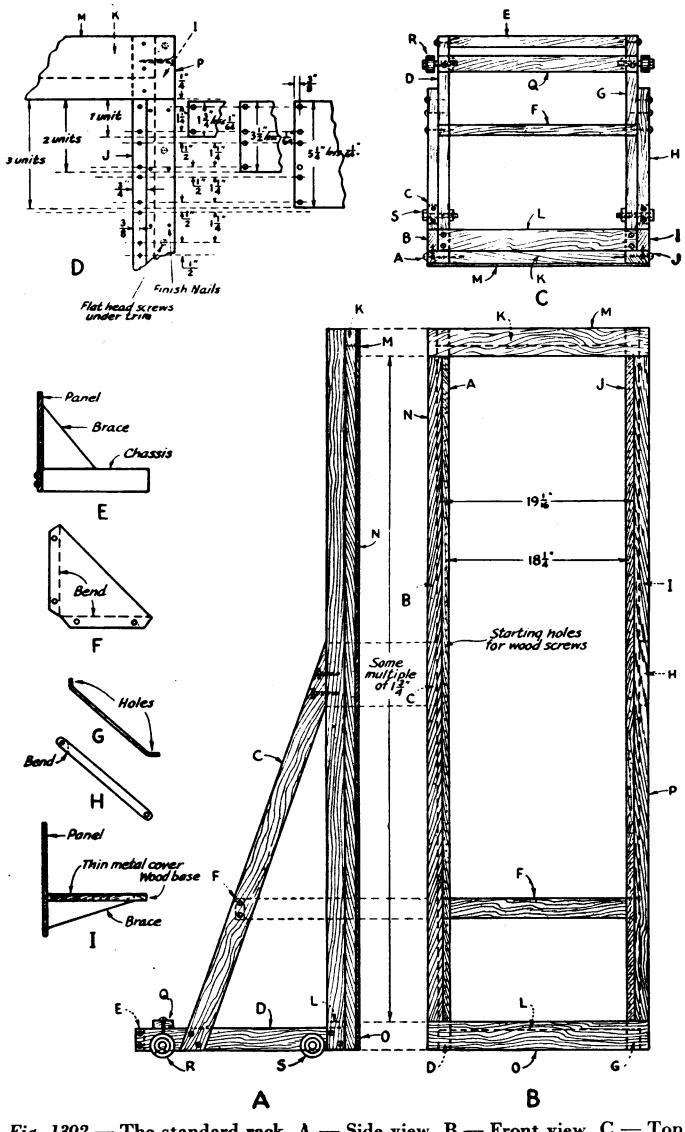


Fig. 1392 — The standard rack. A — Side view. B — Front view. C — Top view. D — Upper right hand corner detail. E — Panel and chassis assembly. F, G, H — Various types of panel brackets. I — Substitute for metal chassis.

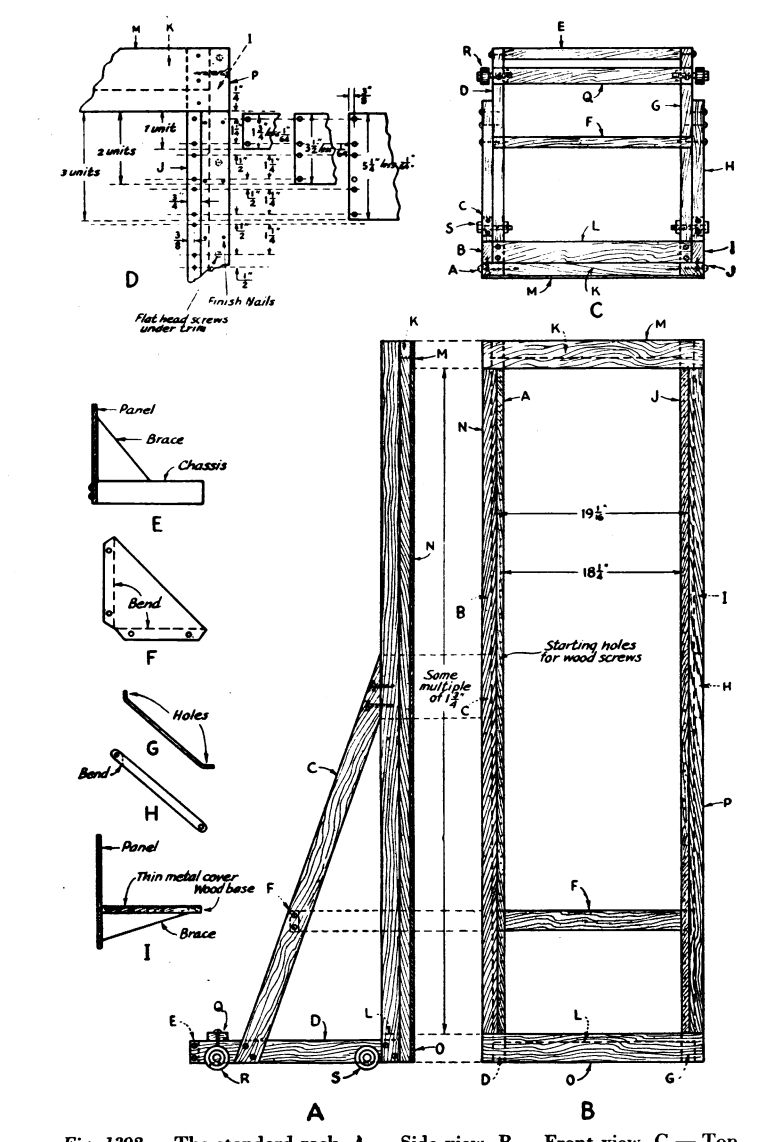


Fig. 1392 — The standard rack. A — Side view. B — Front view. C — Top view. D — Upper right hand corner detail. E — Panel and chassis assembly. F, G, H — Various types of panel brackets. I — Substitute for metal chassis.