

Shield Box

□ Begin construction by making the shield box (Fig. 5) as detailed in Fig. 6. The box is essential to prevent personal injury due to possible implosion of the tubes. Make the sides, top, and bottom of $\frac{3}{4}$ -in. wood stock. Cut the back panel from Bakelite, hardboard, or plywood. Drill the back panel as shown in Fig. 6 for mounting of standoff insulators and banana jacks, and to provide holes for admitting the vacuum hose. Mount four rubber feet on the bottom of the box.

Next, make the hinged door which supports a pane of safety glass cut from salvaged auto glass. To cut safety glass, score the glass on *both* sides using a sharp glass cutter. Then, with the glass overhanging a table edge, tap the underside sharply at the score mark and chase the crack along the score mark.

Invert the glass and repeat for the remaining score mark. Next, apply lighter fluid along the crack and ignite to soften the sand-

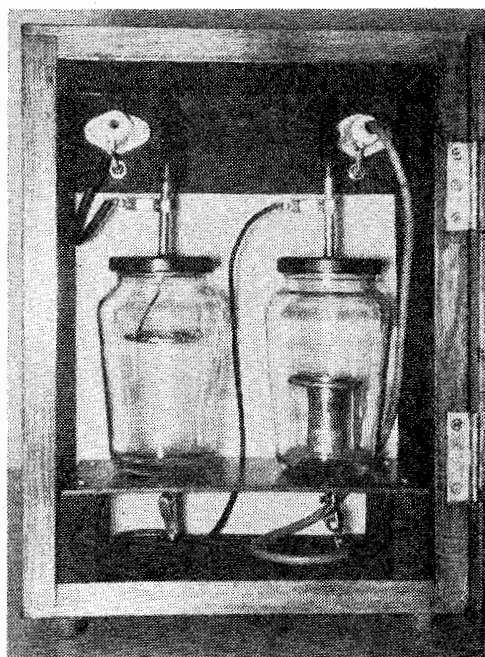
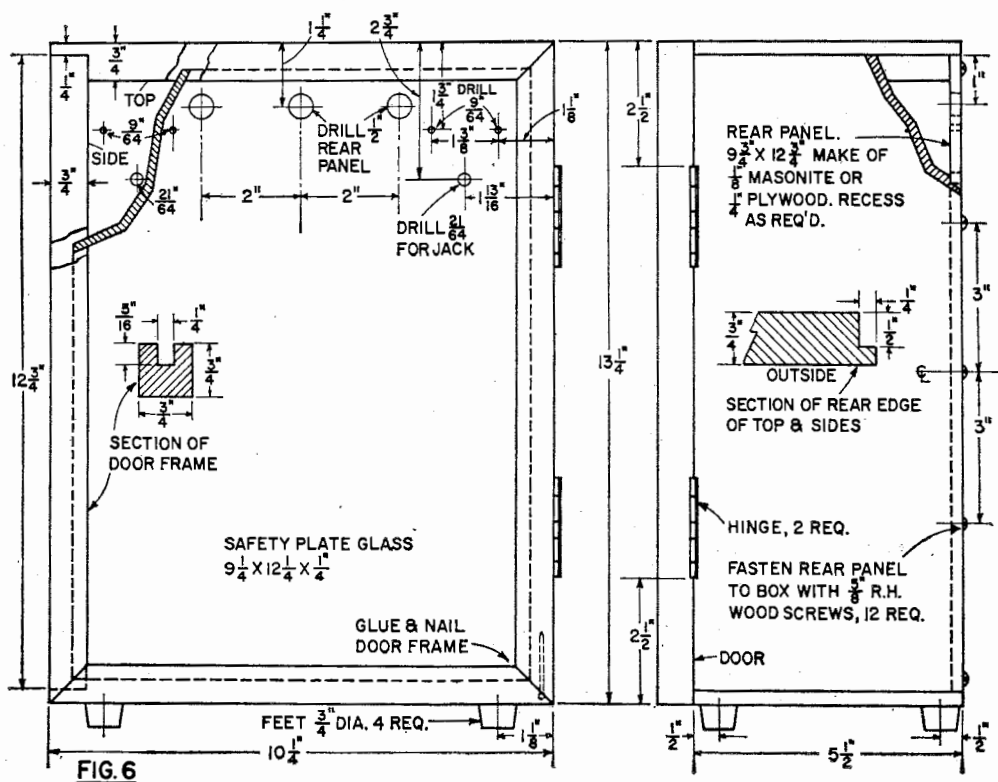
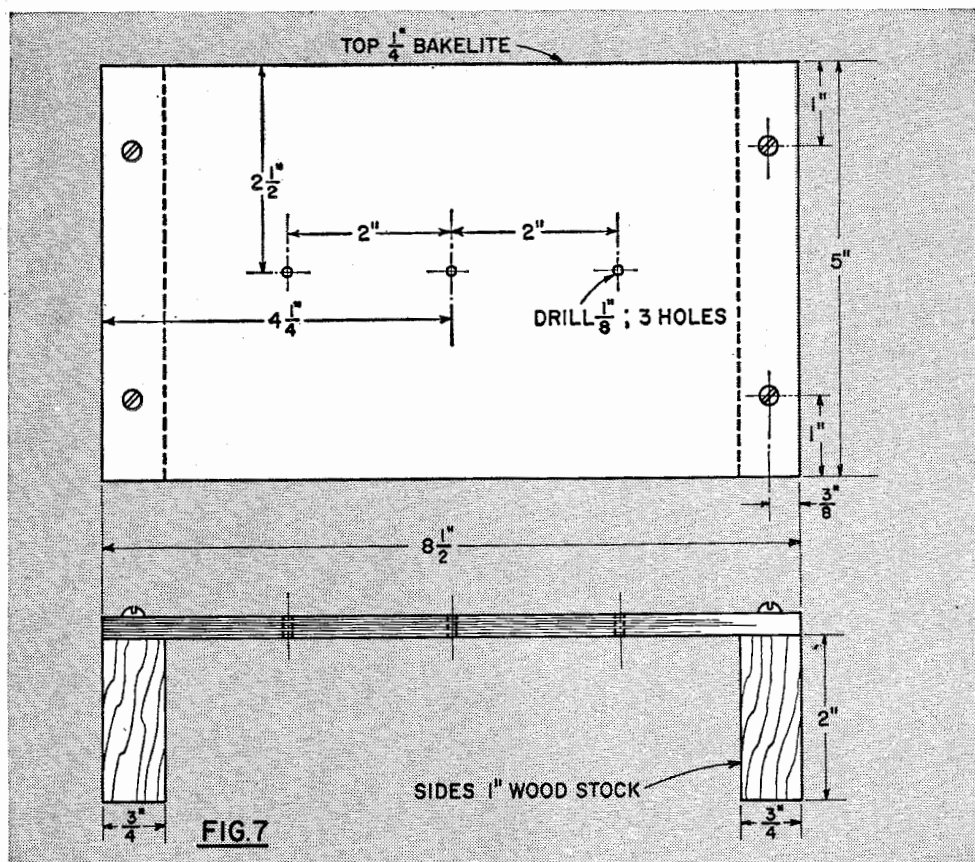


FIG. 5. Front of shield box. De La Rive tube at right, cold cathode rectifier tube left.





wicked plastic sheet. Bend the sheet slightly at the crack and cut the plastic using a razor blade. Break all sharp edges using a medium grit whetstone to permit safe handling. The slightly irregular edge of the glass will be hidden by the door frame.

After making the door frame, insert the glass and glue and nail the corners. Mount the door using a pair of brass hinges. In addition, and especially when used in Science Fair projects, mount a small hinge hasp on the door to permit locking of the shield box for security.

Paint the interior of the box with flat black paint and finish the exterior to suit. Due to the glass pane's weight, the box tends to tip when the door is partly open. If this is objectionable, mount a heavy steel plate beneath the bottom.

Install and wire the standoff insulators and banana jacks on the back panel. Place a black banana jack on the left and a red jack

on the right (as viewed from the front of the box). Wire the jacks directly to their adjacent standoff insulators.

Attach a copper clip to a 6-in. length of black HV test prod wire and solder the lead to the lug on the negative standoff insulator (left). Next, attach a copper clip to one end and a red high-voltage banana plug to the other end of a 20-in. length of red HV test prod wire. This lead plugs into the banana jack on the positive standoff insulator (right) and the copper clip connects to the lower terminal of the tube in use.

Mask a pair of 3-ft. cables using red and black HV test prod wire and attach banana plugs of corresponding color at each end of both cables. Next, construct the tube stand as detailed in Fig. 7 using $\frac{1}{4}$ -in. Bakelite or plastic. Three $\frac{1}{8}$ -in. holes in the stand allow passage of the lower terminal of the tubes at any of the three tube positions provided.