

A Three-Foot Roll-Type Speaker

A Reproducer Simple of Construction and With Excellent Tonal Quality

By CLYDE J. FITCH

THE loud speaker offers one of the most interesting fields of experimentation open to the radio listener. When we see the vast number of horn speakers of all shapes and sizes, and also plain cones, oval cones, eccentric cones and roll- or book-type speakers, both free-edge or otherwise, of various sizes and forms, we begin to realize how enormous is the loud-speaker field, and also to wonder if the loud-speaker problem will ever be satisfactorily solved. Its evolution is toward better quality of reproduction. What the final solution will be is difficult to predict.

The large, three-foot-cone type of loud speaker has proven itself so excellent, as far as quality of reproduction is concerned, that by analogy why should not a large roll-type speaker prove superior to the smaller ones? (And the small ones are very good.) With this in mind, a large roll speaker was built, with the parts designed for a three-

as shown in the various illustrations, Fig. 4 giving the dimensions. Be sure to use a heavy, hard wood, such as oak; because, the more weight added to the unit, the better will be the results. Remember that, on these large speakers, the vibrating member or diaphragm weighs as much as the unit; and unless weight is added to the unit, the diaphragm will remain stationary and the unit will vibrate.

The roll, or rather double roll, is made from one sheet of 38 x 38-inch speaker cone material. The sheet is folded once through the center, across the grain, as shown in Fig. 4. (This material is usually supplied in rolls, with the grain running lengthwise with the roll.) Before folding, draw a line through the center with a straight edge. Now using the straight edge and a sharp pointed tool, go over this line, making an indentation in the paper. The sheet may now be folded along this line without fear of crushing.

Next we require a thin piece of brass cut out and drilled as shown in Fig. 4A. This is fastened to the threaded drive rod of the unit, bent up around the outside nut, and clamped upon the center of the folded edge of the sheet with a small nut and screw, as shown at B. Before clamping this piece to the sheet, mount the unit on the center of the wooden frame with wood screws.

With the unit in place and the folded sheet attached to it, procure a few thumb tacks; bend the sheet over to the sides of the frame and securely attach it with the tacks. If desired, a gold braid may be placed along the sides to improve the appearance. The addition of a cord to hang the instrument to the picture moulding completes the assembly. Although called a three-foot roll, the speaker in fact is 38 inches long and 28 inches wide.

A loud speaker of this type lends itself admirably to decoration in a style harmonious with its surroundings. In contrast to the neutral tint of the diaphragm paper, braid trimmings may be used in brighter colors, agreeing with the other furnishings and the general scheme of the room in which it is hung.

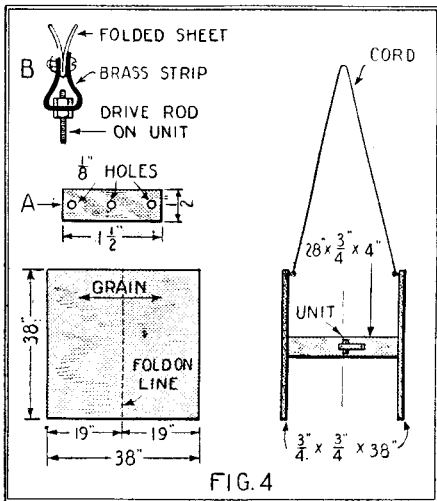
In selecting the parts for this speaker be sure to procure a good cone unit, preferably a direct-drive one; in other words, one that has no mechanical reducing levers for reducing the motion applied to the cone. The one used in the writer's experiments was not a balanced unit, and could therefore be directly connected in the plate circuit of the output power tube of the set, without the use of an output transformer or choke coil and con-

denser system. A type 112, 171, or 210 power tube may be used in this manner without fear of damaging the unit.

THEORY OF OPERATION

The theory of operation of the large roll speaker is somewhat similar to that of the cone speaker. In order to obtain faithful reproduction of the low tones, such as are produced by the bass viol, it is necessary to move a large volume of air. This requires a large, light, and strong diaphragm, the larger the better, up to a certain point where the lowest musical tones are reproduced. A sheet of paper may be large and of light weight;

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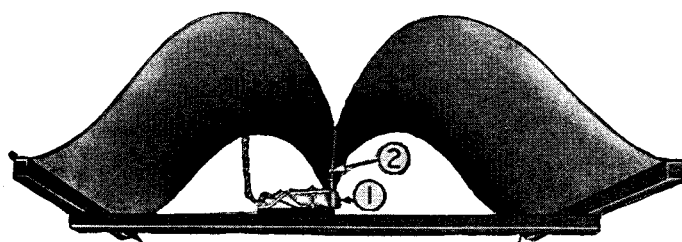


Details of construction for the roll-type speaker. At the upper left are data for preparing the metal strip that is attached to the diaphragm.

foot cone speaker. The roll speaker, shown in the accompanying illustrations, was found surprisingly simple to make. Only a few minutes were required to assemble it; it was then directly compared with a three-foot cone, using a resistance-coupled set. Whether the roll is superior to the cone, is difficult to determine. It is slightly higher in pitch than the cone and it certainly gives excellent reproduction. It is a matter of personal opinion which is the better speaker; many who heard the roll speaker prefer it to the cone, and vice versa. The type of set used with this speaker must also be taken into consideration when tests are being made.

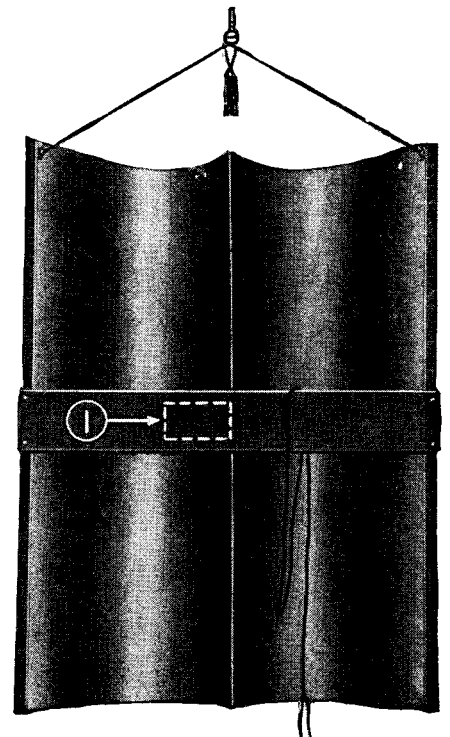
CONSTRUCTION OF SPEAKER

The construction of the speaker is so utterly simple that it requires little comment here. First a frame of three sticks was built,



On the left is the end view of the speaker, showing the manner in which the unit is mounted. No. 1 in both views is this unit and No. 2 is the point where the unit's drive rod is attached to the paper diaphragm. On the right, rear view of the speaker.

Photos by courtesy Engineers' Service Co.



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but it has no strength unless formed into a cone or roll, after which it serves as an excellent diaphragm. In the cone the vibrations are applied at the apex and waves radiate outward; in the roll speaker the transition between vibratory and undulatory motion is more gradual, giving it a distinctive tone of its own, not found in other speakers.