

A Linen-Diaphragm Loud-Speaker

Covers an Excellent Range



HIS speaker has proved very popular among amateur constructors — so much so that our stocks of the number carrying the description have long since been exhausted. As still more inquiries have come in, we have complied with request and repeated the description with a few minor alterations.

This is a type of loudspeaker called the balanced-tension type of reproducer. There are several patterns. One pattern has both frames of the same size with linen diaphragms, another has the back diaphragm much smaller, and employs skin in place of linen, and so on. The employment of skin or parchment obviates the stiffening of the linen by impregnating it with varnish, celluloid solution, or else with four or five coats of thin collodion or Duco. All patterns alike give very fine reproduction, including the lower notes that are mostly suppressed by the average small horn speaker. Construction is simple, and if the instructions are carefully followed, a loudspeaker of which the constructor may be proud will result.

Construction of Frame.

THE first operation is the assembly of the wooden frame upon which the linen diaphragms are stretched. The back view of the frame, Fig. 2, shows how the various pieces of rimu or other suitable wood are cut and mortised together. This construction should be followed, for if the parts of the frame are not securely fastened by glueing, a rattle will be introduced in the speaker that cannot be eliminated without a great amount of trouble. After the pieces A and B have been glued, the corner pieces E are attached. The pieces marked C and D are next joined and screwed to the sides of E, making sure that the pieces D are centred.

While the points of the wooden frame are drying, the two diaphragms of high-grade linen are prepared. It is necessary that a hem one half inch wide be sewed along each side of both the large and the small squares; the one being 26 inches square and the other 8 inches.

When the joints are thoroughly dried, the large square of cloth is placed over the front of the frame.

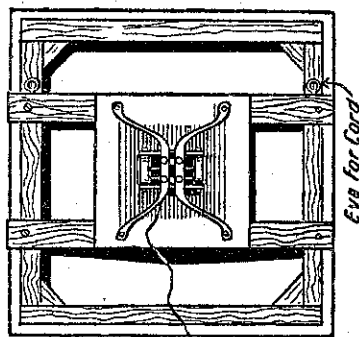


Fig. 1 *Back View of Speaker*

tacking down one edge; be careful to place the tacks fairly close to one another, so that there will be little danger of the cloth's pulling out. When one edge has been fastened stretch the linen as tightly as possible and tack down the opposite side. This process is repeated for the other two sides. The 8-inch-square of linen is fastened to the rear frame in the same manner.

Preparing the Diaphragm.

NOW locate the exact centres of both diaphragms and carefully, with the point of a compass or a sharp nail,

force a hole in the linen. Be careful not to break any threads, but spread them apart until the hole is $\frac{1}{4}$ -in. in diameter. Then prevail upon one of the ladies of the family to work a buttonhole stitch around these two holes. The next operation should be performed either outdoors or in a room with the windows open, as otherwise the fumes from the collodion are liable to cause an unpleasant sensation. Paint the face of each diaphragm with the thin collodion and allow it to dry. Four or five coats are required; let each coat dry before applying the next one. When the last coat is dried the diaphragms will be stiff and slightly flexible, and when tapped with the finger will sound like a drum.

An alternative method of treatment to the above is to impregnate the diaphragms with celluloid dissolved in amyl-acetate, or with a suitable varnish.

The small coupling bolt is next prepared. This is a 8/32 bolt, $\frac{1}{4}$ in. in length, through which is drilled lengthwise a small hole, just large enough to take the driving-rod of the loud-speaker unit which is to be used. One of the washers is put over the bolt, and the head with the washer is put through the hole in the large diaphragm, from the front. The two diaphragms are forced together until the bolt can be slipped through the hole in the smaller square, after which the other washer and the nut are put on and tightened down. The edges of all metal washers coming in contact with

treating them with the collodion. The
tacks should be covered over with an
attractive passe-partout binder for ap-
pearances sake.

The material needed for constructing this speaker is as follows:—

- 4 pieces of rimu, $24 \times 2 \times 1\frac{1}{2}$ inches
("A, B").
2 pieces of rimu, $24 \times 1\frac{1}{2} \times 1$ inch
("C").

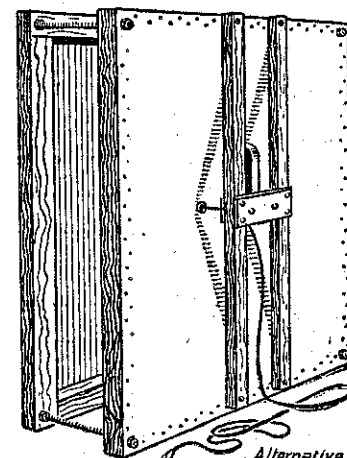
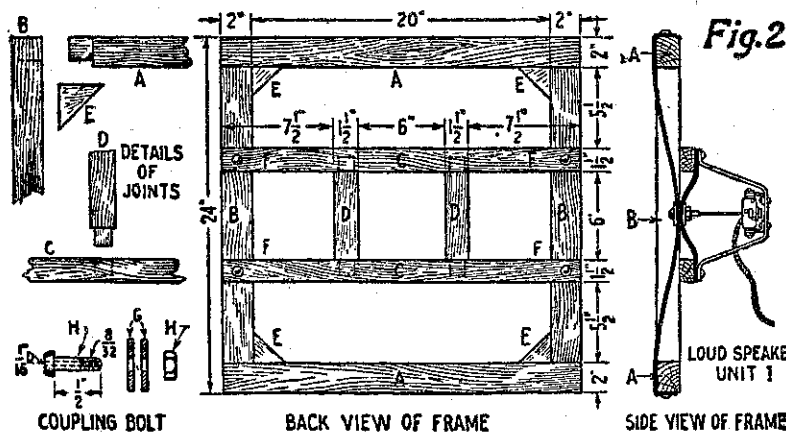


Fig. 3 *Alternative Construction*

- 2 pieces of rimu, $7\frac{1}{2} \times 1\frac{1}{2} \times 1$ inch
("D").
4 triangular pieces rimu, $1\frac{1}{2} \times 1\frac{1}{2}$ inches
("E").
2 squares of medium-weight linen, one
26 x 26 inches and the other 8 x
8 inches.
4 $1\frac{1}{2}$ -inch woodscrews ("F").
2 $\frac{1}{2}$ -inch washers ("G").



SIDE VIEW OF FRAME

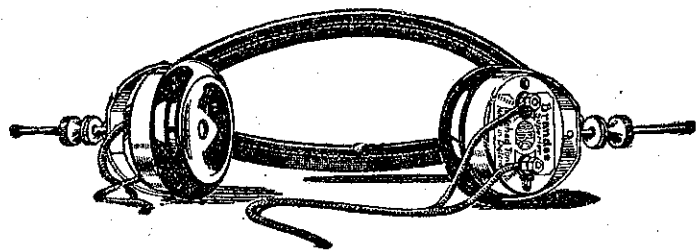
BACK VIEW OF FRAME

COUPLING BOLT

DETAILS

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The details of the construction of the wooden frames for both the large and the small diaphragm, also the mounting of the loudspeaker unit.

the diaphragm should be rounded off so that they will not cut the fabric. They can also use silk for the diaphragm.

The mounting of the unit itself is left to the ingenuity of the constructor. The method employed with good results by the writer can be seen in the accompanying illustrations. It is important to remember that the unit must be so lined-up that the driving-pin will come exactly in line with the hole in the bolt.

6 The finished speaker may be placed in a cabinet or hung from the ceiling. If it is desired to colour the linen diaphragms this must be done before

A $\frac{1}{2}$ -inch 8/32 brass screw and nut
("H").

A package of No. 4 cut tacks.

A roll of passe-partout binder

10oz. collodion (obtainable at chem-
ists) or varnish.

A balanced-armature loudspeaker unit with driving rod ("I").

Proof against Overloading.

FROM the foregoing description it becomes obvious that the weight or tension of the vibrating diaphragms does not act as a constant load on the driving unit. Therefore, although it might be imagined that the highly-taut diaphragms require a great deal of