

Cone Speaker Construction

Useful Hints for Prospective Builders

(By "MEGOHM")



GOOD dynamic cone (or moving coil) is undoubtedly the best type of loudspeaker at the present time, especially where great volume is required. But there are many listeners who will have to be content with a reproducer less expensive both in initial outlay and in running cost. Those who study economy will still find in the magnetic type of speaker a faithful friend that will give good service, and quality according to its particular design and capabilities.

There was a time when cone speakers were less sensitive than the horn type, but with the rapid improvement in the design of units during the last two years, the cone has come to the front, leaving the horn speaker well in the shade. These remarks are not intended to apply to the exponential horn of lengthy dimensions, but to the ordinary small metal horn. Large exponential horns give good reproduction, but their size makes them unsuitable for general use. To reproduce the lowest note of the piano, 26 cycles, an exponential horn must be 31 feet long, with a mouth over 9 feet square! But 26 cycles per second is a very low rate

of vibration, and very good reproduction is obtained in actual practice with a speaker that will respond to 50 cycles as its lowest note.

Deficiencies of Loudspeakers.

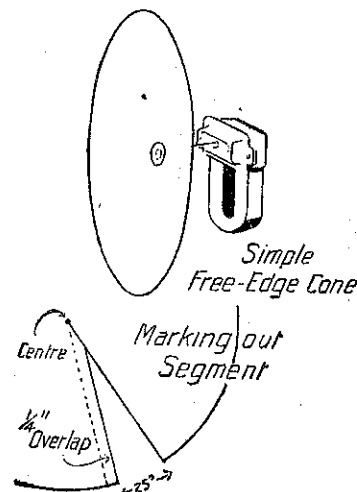
GOOD reproduction of broadcast musical items should contain all the notes, high, middle, and low, just as they are played at the studio; yet very many listeners never hear many of the lower notes as they are played. This is because their loudspeaker will not respond sufficiently well to notes below a certain audio-frequency to allow of their being audible. In the smallest horn speakers this deficiency is at its maximum, and the "cut-off" may be at 200 cycles, or even higher. The melody or "air" of the tune is present clear enough, but the accompanying bass notes are either much weakened or entirely lost, according to the slowness of their rate of vibration.

The worst feature of such speakers is that some of the notes that are only partially reproduced serve to form a background of "mush" which greatly detracts from the quality of the high-pitched notes that are strongly brought out.

The foregoing briefly illustrates the kind of musical struggle that is going on in any speaker doing its best to handle notes that are not within its range. This is of course apart from any deficiencies that may be present in the audio amplifier, where poor

less there is a piercing shrillness, which may possibly be developed in the amplifier, or by a particular crystal detector emphasising the high frequencies so that they are obtrusive when amplified. A fixed condenser of small value across the speaker leads will often subdue any tendency to "scratchiness," and some units are provided with such a condenser built in, as in the well-known "66" units.

In order that bass notes may be reproduced with reasonable volume, the diameter of the cone should not be too small. From 24 to 27 inches diameter is good and will give all that is required. The double cone as described on page 89 of the "Listeners' Guide" is a very satisfactory form and looks well when hanging on the wall, as there is no cabinetwork showing if the back of the cone is glued to a small square frame as described in this column on June 28, 1929. This frame holds the unit securely and also allows its adjustment in any direction, so that tension on the spindle is reduced to the desired minimum. The diagrams show the 66A unit in position, but if the 66K is used, a hole will be made in the wooden support, through which the adjusting knob may pass. The same applies also to the 66P unit, which also has an adjusting knob, and will attach to the support in a slightly different way, owing to the altered shape of the frame. It would be clamped by two strips of wood, one running through the magnet and the other behind the support. The two strips would then be bolted together at each end with a suitable thin bolt.



The "Linen-Diaphragm."

THE "Linen-Diaphragm" speaker was described on July 12 last, and on October 11 a different method of construction was described, using silk for the diaphragm, and suspending the unit instead of fixing it rigidly. This method suits any unit, and simplifies construction. This is the "top dog" of home-built magnetic speakers, though the two-foot cone is a near approach. The absence of the paper diaphragm seems to impart to the tone just that little extra touch of pleasing quality that we all desire. Volume obtained is limited chiefly by the amount the unit will carry without rattling. The 66P is a new unit now obtainable, working with a fully neutralised balanced armature, and capable of giving good volume and quality reproduction.

transformers and other conditions may also tend towards the loss of low notes.

Range of Reproduction.

WHAT is most desired is a speaker that will reproduce at least every note or audio-frequency that the amplifier, especially its last stage, is capable of handling. On account of its limitations the ordinary horn-speaker is not capable of giving reproduction throughout the musical range in general use, but a cone speaker with a well-constructed balanced-armature unit will give a faithful rendition, provided that the size and texture of the cone is suited to the requirements of bass-note reproduction. There is usually little trouble with the high notes un-

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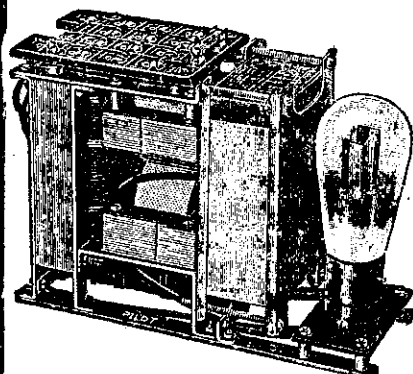
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