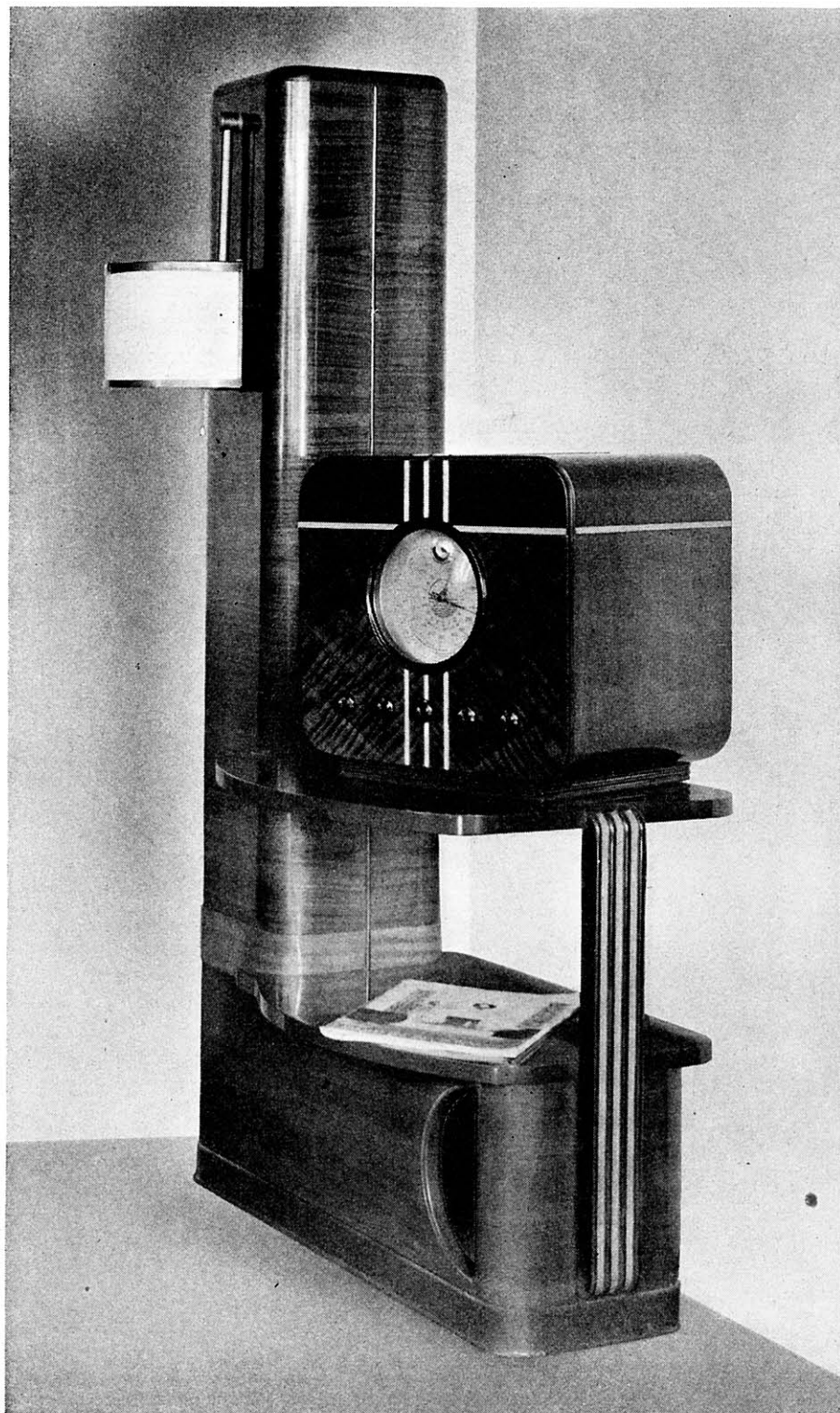


# UNIQUE SOUND REPRODUCERS

by WILLIAM H. HUTTER

*Sound reproducers, artistically designed for home use  
and constructed to produce utmost clarity and brilliance.*



**F**ROM many years spent in laboratories where efforts were constantly being made to find better methods of sound reproduction with the invariable result that newer instruments always fell into preconceived patterns, the author determined to start afresh and scientifically design a reproducer that would give tone and voice unheard of breadth, clarity and brilliance.

Without going into the many technical limitations that now beset radios and phonographs and other listening devices commonly used in the home, let us look into the radio speaker, where even a superficial examination reveals obvious shortcomings. The speaker is usually set underneath or beside the chassis in the cabinet some twelve to eighteen inches off the floor. When sound emanates from the speaker it is directional to the extent that it strikes the floor where to a large measure it is absorbed by the carpet.

Secondly, all notes emerge from the conal center of the speaker with no mechanical provision being made for variance, with the possible and inadequate exception of toy lifts labeled "Bass," "Treble," or "music," which do not in the slightest enhance the acoustic value. Thus, highs and lows are blended into a mumbo-jumbo of ear shattering unpleasantness.

Even if these were the only reasons for attempting to devise newer and better sound receivers, the author was convinced that they were motive enough. Keeping this in mind, the sound resonators that are to be described were developed.

The following aims were set up and achieved. They are: that the acoustic apparatus be suitable for use in conjunction with a radio set or any other suitable source for delivering energy to be converted into sound; that the acoustic or sound emitting unit may be attached to or be an integral part of the radio cabinet; or it can be constructed as one or more separate units, to be placed in desired locations and operated and controlled from the remotely located radio set; that the sound be diffused or distributed instead of being projected in one or more

High fidelity reproducer with speaker mounted at top of column. The high frequencies are projected towards the ceiling while the lower frequencies are emitted through the opening at the bottom

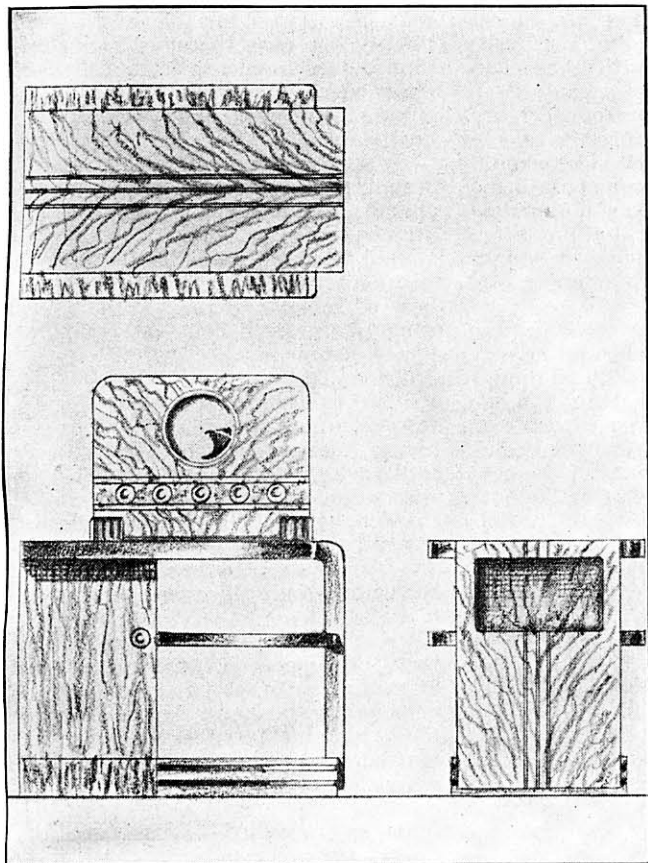
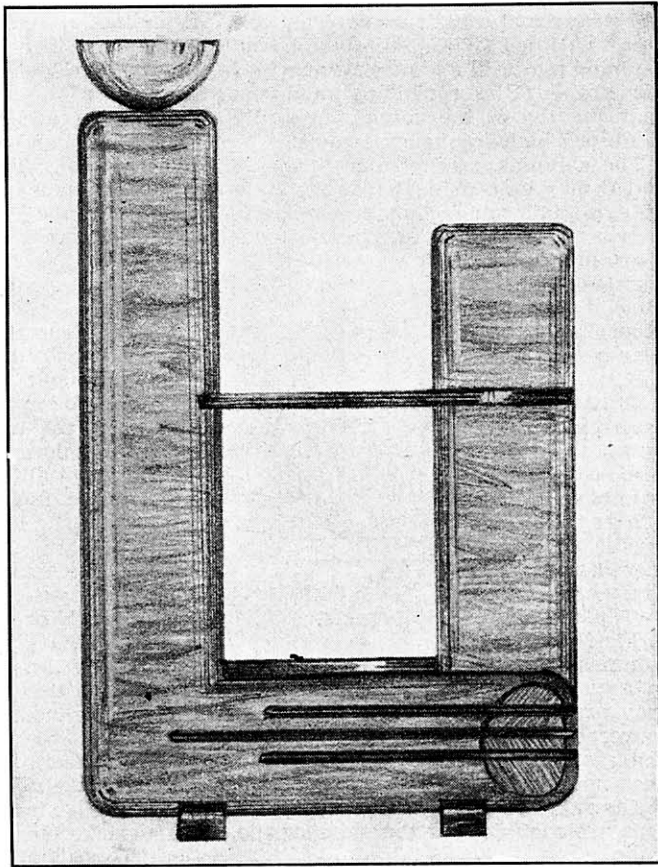


Table style reproducer with speaker mounted inside compartment.



Dual resonators with each column tuned to a different frequency.

definite directions; the quality and fullness of tone be infinitely improved; and in general, to provide novel acoustic apparatus adapted to resonate over substantially the entire audible frequency range, and to respond with fidelity to the sound vibrations from such converters as loud speakers.

The figures shown on these pages are illustrative of the flexibility of design that these acoustic units lend themselves to. Figures 1. and 2. are essentially rectangular in shape with speakers placed at the center and low. They can be mounted, as shown in figure 4 on any sound reproducing unit whether it be a radio, phonograph or combination of both. It, however, must be remembered that where more than one speaker is employed on a single reproducing unit, they must be ar-

ranged in the proper phase relation.

Figure 5 is illustrative of the multiple column where a battery of speakers are used. This is suggested where it is desired to resonate sound at various or different frequencies to better amplify and improve the tone quality. The particular shape of the columns is of no consequence. But it is very important that the resonance features of each column approximate those of the associated speaker.

Figures 1 and 2 may take a general rectangular shape and serve as front and back, top and bottom, opposite sides or walls of the radio. Figures 3, 5 and 7 can be separated from and even remotely placed in respect to the source of sound and be substantially tubular in shape.

Turning to figures 1, 2 and 4, one loud speaker may be selected which is responsive to relatively high frequencies while the other would be tuned to low frequencies. The former would be mounted near an end of the side wall of the receiver as shown in Fig. 4 and the latter near the end of the other side wall. The side, which has the high-frequency speaker mounted upon it, is provided with a plurality of apertures about the periphery of the speaker in order to eliminate sounds

of low frequency and to establish an equilibrium of air pressure at opposite sides of the speaker. (A-Fig. 4.)

Now to the side wall carrying the high-frequency loud speaker, attach a channel of a suitable sounding board material, preferably  $\frac{1}{2}$ " thick, such as straight grain spruce, provided with a sound insulating gasket of rubber or felt between the wood channel and speaker sound board, to prevent sound leakage. This channel should possess a hard well polished finish and then

Fig. 1.

Fig. 2

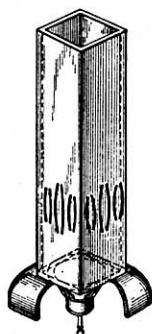
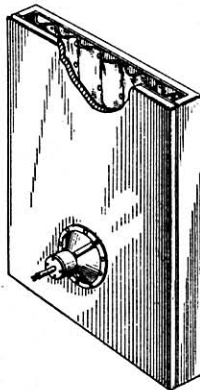
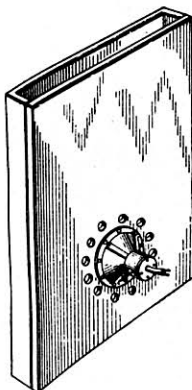


Fig. 3.

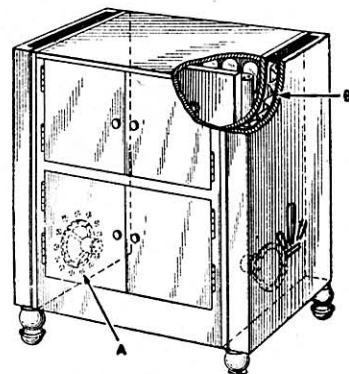


Fig. 4.

it is susceptible to various modifications in shape and construction, such as cross bracing, sectionalization and aperturing to better provide the column with resonance characteristics approximating those of the associated loud speaker and create greater fidelity of sound.

To the side wall, on which is posted the low-frequency speaker, a channel



of heavier material is used. This column is lined with suitable sound damping material and may be provided with drapes (B) arranged to hang from near the top of the column inwardly to absorb high-frequency sounds.

The columns, as shown in figures 3 and 7, may be constructed to resonate at high and lower frequencies, respectively, as described above. The construction principles are identical, the difference occurring in the shape of the column.

It has been determined that by far the most responsive performance is made possible by the columns identified by the figures, the multiple 5, and 7. Firstly, these columns lend themselves more easily to a variety of designs inasmuch as they are remotely removed from the source of sound energy. Secondly, it can assume a number of colors and does not necessarily have to conform to the radio color as do those columns that are mounted on the sides of the radio.

These columns can be made of a good grade of wood and can be hexagonal, square, or columnar in shape.

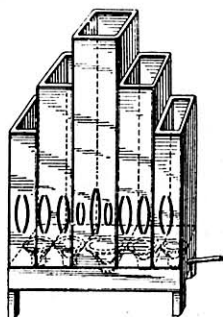


Fig. 5.

Standing about five feet six inches from the floor, the column can be painted to blend in with the background.

The base can be perforated, as figure 7 shows, or can be apertured to relieve air pressure. The inner sides should make allowance for accommodating a speaker of about 18 inches in diameter which can rest on the bottom after allowance has been made to snugly receive the speaker so that no tone is lost.

In this, as in the other columns previously described, sound insulating material of about an inch thick should line the column interior. And, as described of the other type of column, highs and lows are separated and emerge from different ends of the column. Highs find their way to the bottom, while the low tones seek the top levels.

Here, the maker must first decide whether he prefers a high or low frequency speaker. In making this choice, the accent should be placed on taste, so that in the final analysis the aural reception blends in more completely with the personal desires. Beyond the simple mechanical requirements that

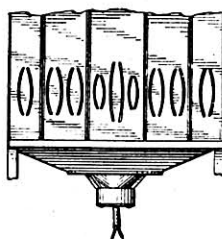


Fig. 6.

must be followed to achieve high sound fidelity, the constructor of such a column is free to choose from a limitless number of physical columnar designs and colors.

Perhaps the outstanding characteristic that immediately strikes the most uninitiated in sound reproduction is the rich fullness of sound and the sharply etched brilliance of tone.

Often, it has been the author's experience to take guests into his home, turn on the radio, ask them to close their eyes and then ask the listeners to point out the source of the sound. Invariably they fail to do so. This is due to the sound rising to the ceiling and falling as rain from on high.

Principally, this arises from the fact that the tone is diffused rather than directional as in most conventional and present day speakers. Moreover, when the gain is increased to the fullest extent on any present day radio, and the sound is emitted through this type of column, there is still a clarity of tone that is unrivalled. Each tone distinctly sounded and the total tonal blending in a harmony of sound that is a pleasurable revelation to the listener.

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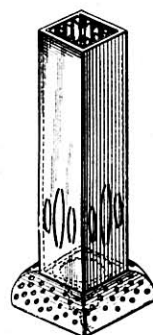
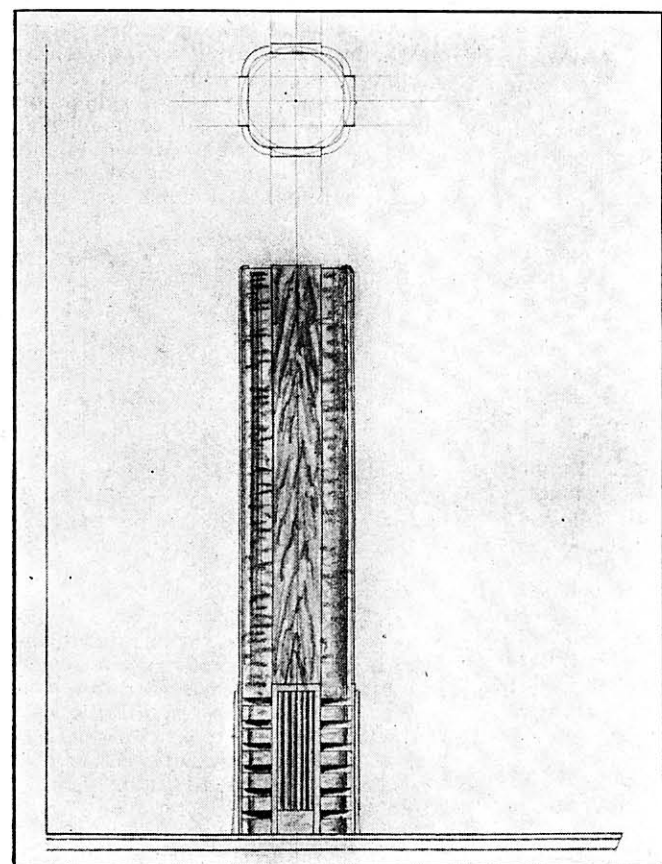


Fig. 7.

Column resonator, approximately 5½' high for 100 cycle resonance.



Reflectors mounted on the top are to project a diffused response.

