Feb. 3, 1931. F. THORINGTON 1,791,173

AUDITORIUM LOUD SPEAKER

Filed Nov. 8, 1929 2 Sheets-Sheet 1

Fig. 1.

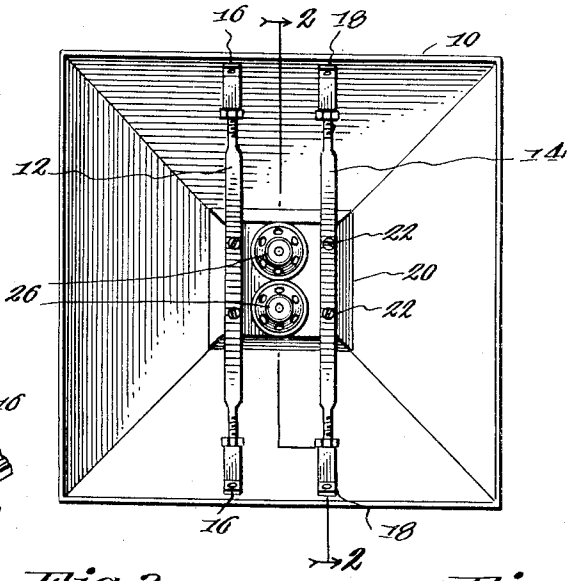


Fig. 5.

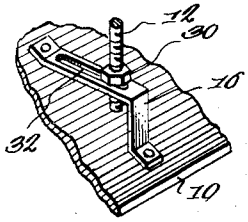


Fig. 2.

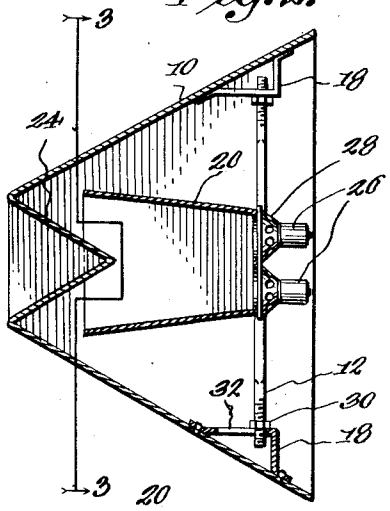
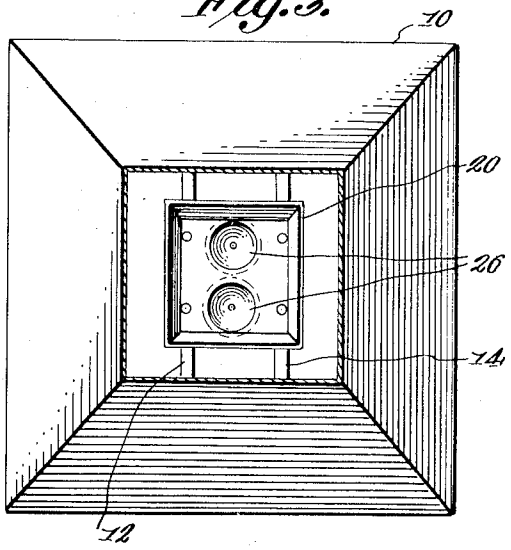


Fig. 3.



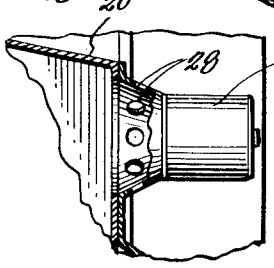


Fig. 4.

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Fig. 6.

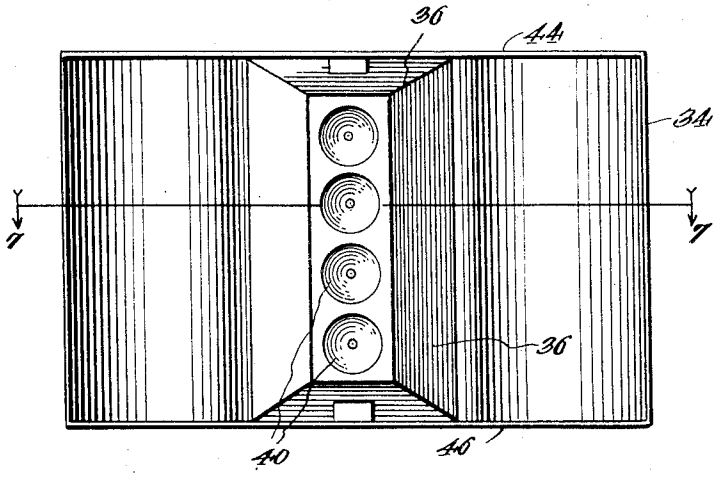
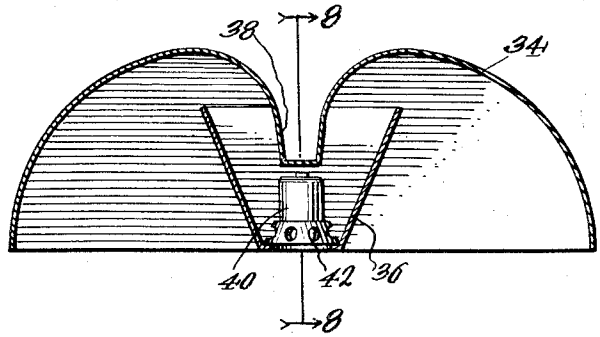


Fig. 7.



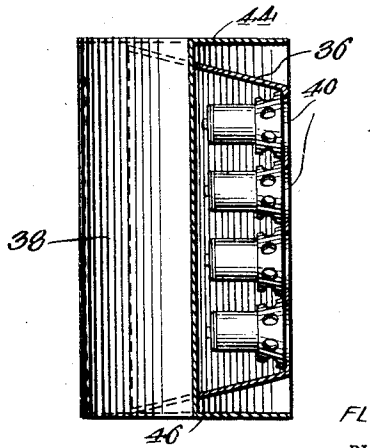


Fig. 8.

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UNITED STATES PATENT OFFICE

FLETCHER THORINGTON, OF BIRMINGHAM, ALABAMA

AUDITORIUM LOUD-SPEAKER

Application filed November 8, 1929. Serial No. 405,741.

The present invention relates to an auditorium loud speaker.

One of the objects of the invention is to design a loud speaker which will require a minimum amount of space and produce a maximum response.

Another object of the invention is to construct a loud speaker which will reproduce both low and high frequencies.

And a still further object of my invention is to construct a speaker having a plurality of speaker units which gives the effect of a single speaker having a single speaker unit.

In carrying my invention into effect I employ an outer horn and an adjustable inner horn which acts as a baffle, the outer horn being provided with a sound directing member projecting into the inner horn. On the outer horn there are a plurality of speaker units arranged to direct part of the sound waves into the open space and part into the inner horn.

The inner horn acts as a baffle and provides a path through the air stopping the air circulation sufficiently to allow the loud speaker to reproduce the low tones and at the same time to permit the high frequencies to be directed directly from the speaker unit into the atmosphere.

The features of my invention which I consider novel are pointed out with particularity in the appended claims. The invention itself, however, both as to its arrangement and method of operation together with further objects and advantages thereof will best be understood by reference to the following description taken in connection with the accompanying drawings in which

Figure 1 is a front elevational view of a loud speaker constructed in accordance with the invention.

Figure 2 is a vertical sectional view on line 2—2 of Figure 1,

Figure 3 is a vertical sectional view on line 3—3 of Figure 2,

Figure 4 is a fragmentary sectional view of one of the loud speaker units,

Figure 5 is a fragmentary view of the adjusting rods of the inner horn,

Figure 6 is a front elevational view of a modification of the invention,

Figure 7 is a horizontal sectional view of line 7—7 of Figure 6,

Figure 8 is a vertical sectional view on line 8—8 of Figure 7.

Referring to the accompanying drawings, an outer truncated pyramidically shaped horn 10 has arranged on its open end a pair of spacedly disposed adjustable rods 12 and 14 which are mounted on L-shaped attaching members 16 and 18 disposed on the upper and lower inner surfaces of the horn. An inner horn 20 of similar shape to the outer horn is fixed to the adjustable rods 12 and 14 by means of screws 22 and projects into the outer horn. The outer horn has an inner member 24 which projects into the inner horn leaving sufficient space between the inner surface of the inner horn to permit sound waves to pass from the inner horn into the outer horn. A plurality of speaker units 26 which are provided with a number of apertures 28 arranged in the outer surface of its cone are mounted on the inner horn so that the sound waves may be directed directly from the cone of the speaker units into the inner horn and also through the apertures 28 of the speaker units directly into the atmosphere. The rods 12 and 14 are adapted to slide horizontally in grooves 32 in the L-shaped members 16 and 18 to permit a horizontal adjustment of the inner horn and the rods 16 and 18 are provided with nuts 30 to permit a vertical adjustment of the inner horn. While the outer horn is shown as being pyramidically shaped it is obvious that either the inner or outer horn may be cone or any desired shape.

The speaker units may be of any of the desired standard speakers and while only two speaker units are shown on the inner horn it is obvious that any number may be arranged thereon without departing from the scope and spirit of the invention.

Part of the sound waves from the speaker unit are directed from the speaker units 26 into the inner horn 20 which acts as a baffle against the projection 24 into the outer horn 10 and out into the atmosphere. The

apertures 28 arranged in the cone shaped horn of the speaker units 26 permit the higher frequencies to be directed into the atmosphere directly without the necessity of expanding into the inner horn and through the outer horn.

Referring to the modification illustrated in Figures 6, 7 and 8, a transversely curved longitudinal outer horn 34 having a central depression 38 defining a sound deflecting member has arranged therein a truncated pyramidically shaped inner horn 36 into which projects the sound directing member 38. The outer horn is provided with a top 44 and a bottom 46 to which the inner horn 36 is attached.

The sound directing member 38 which projects into the inner horn 36 may be integral with the outer horn 34 or it may be a separate member. A plurality of speaker units 40 are spacedly arranged in the outer side of the inner horn 36. These units have apertures 42 in which cone surfaces are fixedly mounted in the inner horn so that part of the sound is directed from the apertures 42 into the inner horn 36 against the directing member 38 and out through the outer horn into the atmosphere and also directly to the atmosphere from apertures in the cone metal mounting of the speaker units.

While I have described my invention with particular reference to the structure shown in the accompanying drawings I do not wish to be limited to the use of this particular structure shown and described, as it will be apparent that other structures may be used without departing from the scope of my invention as set forth in the appended claims.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. A loud speaker comprising an outer horn, an inner horn centrally disposed in said outer horn, a sound deflecting member in said outer horn projecting into said inner horn and being spacedly disposed therefrom, a plurality of speaker units in said inner horn, said speaker units being provided with means for directing part of the sound into said inner horn and a part of the sound directly into the atmosphere.

2. A loud speaker comprising an outer horn, an inner horn centrally disposed in said outer horn, a sound deflecting member in said outer horn projecting into said inner horn and being spacedly disposed therefrom, a plurality of speaker units in said inner horn, said speaker units being provided with means for directing part of the sound into said inner horn and a part of the sound directly into the atmosphere, and means for horizontally and vertically adjusting said inner horn relative to said outer horn.

3. A loud speaker comprising an outer horn, an inner horn of the same shape as said outer horn suspended in said outer horn and spacedly disposed therefrom, a sound deflecting member in said inner horn, a plurality of speaker units arranged in said inner horn, said speaker units being provided with a plurality of apertures for emitting a portion of the sound waves directly from said speaker units directly into the atmosphere and a single aperture for directing a portion of the sound waves into the inner horn.

4. A loud speaker comprising a truncated pyramidically shaped outer horn having an inwardly pyramidically shaped depression closing one end of the horn and defining a sound deflecting member, an inner horn of substantially the same shape as the outer horn disposed opposite said deflecting member and spacedly arranged therefrom, a plurality of speaker units arranged in said inner horn having cone shaped horns with a plurality of apertures therein disposed outside of said inner horn whereby a portion of the sound from said speaker units is directed through the major opening in the cone shaped horn of the speaker into the inner horn and a portion of the sound is emitted directly from the apertures in said cones to the atmosphere.

5. A loud speaker comprising an outer horn, an inner horn disposed in said outer horn, a sound deflecting member in said outer horn projecting into said inner horn and being spacedly disposed therefrom, a plurality of speaker units in said inner horn having cone shaped horn members, said cone shaped horn members having a plurality of apertures therein and being arranged in said inner horn so that a portion of the sound is emitted from said plurality of apertures into the inner horn and a portion of the sound emitted directly from the major opening of the horn into the atmosphere.

6. A loud speaker comprising an outer horn, an inner horn disposed in said outer horn, a sound deflecting member in said outer horn projecting into said inner horn for deflecting the sound waves from said inner horn into said outer horn, a plurality of speaker units arranged in said inner horn having a plurality of sound emitting apertures therein, said speaker units being arranged in said inner horn so that a portion of the sound is emitted from said speaker units directly into the atmosphere and a portion is directed into the inner horn against the deflecting member and into the outer horn.

7. A loud speaker comprising an outer horn, an inner horn disposed in said outer horn, a sound deflecting member in said outer horn projecting into said inner horn and a plurality of speaker units arranged in said inner horn, said speaker units having a major sound emitting aperture therein and a plurality of minor sound emitting apertures and being arranged in said inner horn so that the sound emitted from said minor apertures is directed into the inner horn and the sound

emitted from said major aperture is emitted directly to the atmosphere.

8. An auditorium loud speaker comprising an outer horn, an inner horn disposed in said outer horn, a sound deflecting member in said outer horn projecting into said outer horn and being spacedly disposed therefrom, a plurality of speaker units arranged in said inner horn, said speakers being provided with sound emitting means for directing a portion of the sound into said inner horn and a portion of the sound into the atmosphere.

9. An auditorium loud speaker comprising an outer horn, an inner horn disposed in said outer horn, a sound deflecting member in said outer horn projecting into said inner horn and being spacedly disposed therefrom, a plurality of speaker units arranged in said inner horn, said speaker units being provided with sound emitting means for directing a portion of the sound into said inner horn and a portion of the sound into the atmosphere, and means for longitudinally adjusting said inner horn relative to said outer horn.

10. An auditorium loud speaker comprising an outer horn, an inner horn disposed in said outer horn, a sound deflecting member in said outer horn projecting into said inner horn and being spacedly disposed therefrom, a plurality of speaker units arranged in said inner horn, said speaker units being provided with sound emitting means for directing a portion of the sound into said inner horn and a portion of the sound into the atmosphere, and means for adjusting said inner horn relatively to said outer horn.

In testimony whereof I affix my signature.

FLETCHER THORINGTON.