Feb. 7, 1939. W. R. ALLISON 2,146,325

SOUND AMPLIFIER

Filed Feb. 9, 1937

Fig. 2.

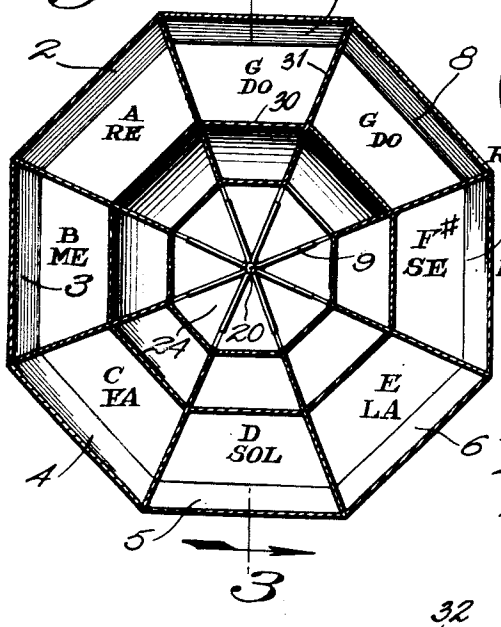


Fig. 1.

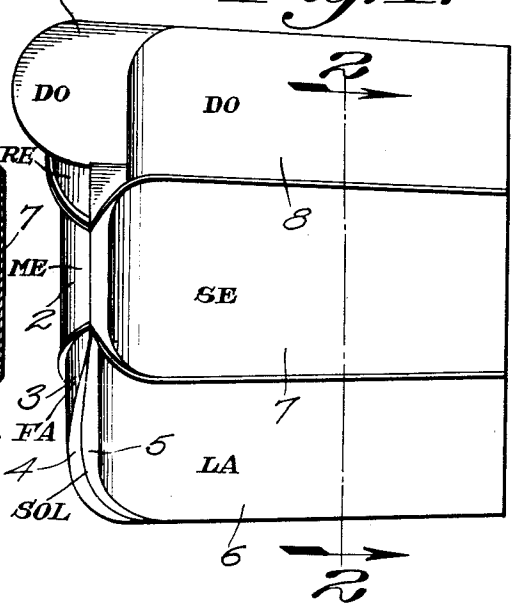
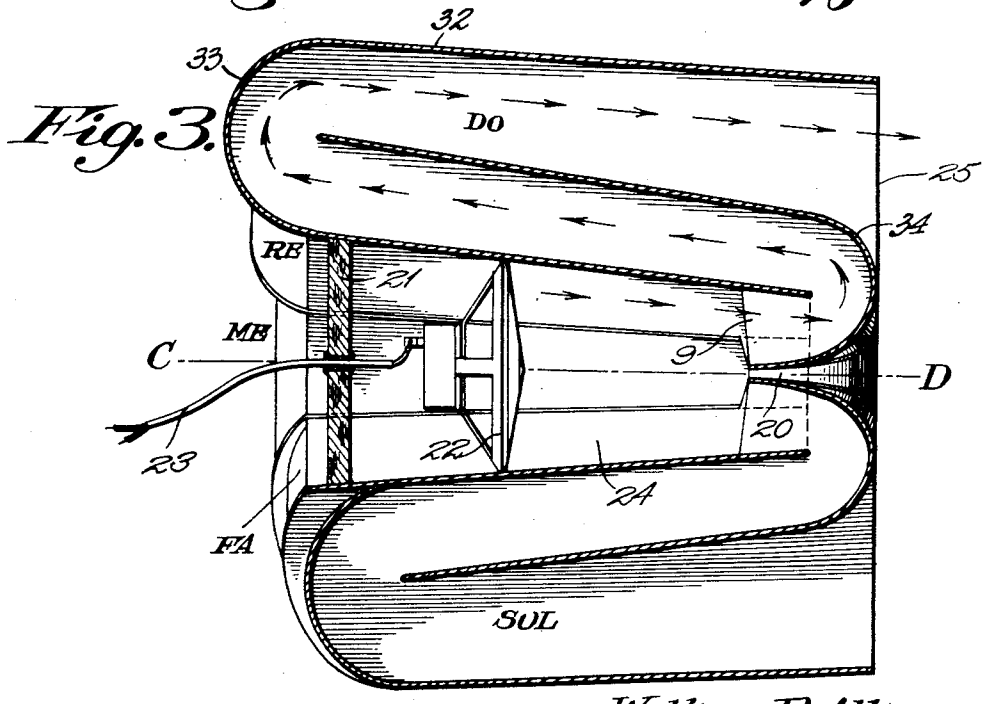


Fig. 3.



William R. Allison
INVENTOR

BY Victor J. Evans & Co.
ATTORNEYS

R. E. Arise.
WITNESS

Patented Feb. 7, 1939 2,146,325

UNITED STATES PATENT OFFICE

2,146,325

SOUND AMPLIFIER

William R. Allison, Cullman, Ala.

Application February 9, 1937, Serial No. 124,945

1 Claim. (Cl. 181—27)

This invention relates to sound amplifiers and has for an object to provide an amplifier for radio receiving sets or other apparatus, adapted to produce clearer and more natural reproduction than hitherto possible.

A further object of the invention is to provide a second amplifier having tubular horn-like members of respectively different lengths providing air columns tuned respectively to one-half the wave length of notes of the scale so as to reproduce accurately notes of one-half the wave length, or the harmonics of one, two, four, eight or more within any predetermined column.

A further object is to provide an amplifier of this type in which the emergent wave is substantially in the same plane as the beginning of the wave, the different respective lengths of the horns being accomplished by arranging the rear ends of the horns in stepped relationship.

A further object is to provide a sound amplifier of this type adapted to amplify all notes on the diatonic scale regardless of pitch, a diatonic scale being the only scale of true notes or tones, all other notes being half tones and not pleasing to the human ear.

A further object is to provide a sound amplifier or loud speaker having columns of air set in motion at a common source, the air columns being of respectively different lengths, the length of the air column corresponding to the lowest note G being of predetermined length and all of the columns being respectively of predetermined shorter length to correspond to the wave lengths of progressively higher notes in the scale.

With the above and other objects in view the invention consists of certain novel details of construction and combinations of parts hereinafter fully described and claimed, it being understood that various modifications may be resorted to within the scope of the appended claim without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawing forming part of this specification,

Figure 1 is a side elevation of a sound amplifier constructed in accordance with the invention.

Figure 2 is a cross sectional view taken on the line 2—2 of Figure 1.

Figure 3 is a longitudinal sectional view taken on the line 3—3 of Figure 2.

Referring now to the drawing in which like characters of reference designate similar parts in the various views, the reference numerals 1 to 8 inclusive designate respectively tubular horns of substantially U-shape longitudinal section, or reversed upon themselves, to economize in length, these horns being shown as substantially frusto-pyramidal in cross section, although they may be circular, oval, or of other desired cross sectional area.

The horns are arranged concentrically in juxtaposed position about a common axis of sound projection indicated by the line C—D in Figure 3, and each horn is of a respectively different length than the next succeeding horn, for example, the longest horn 1, being of a predetermined length to correspond to one-half the wave length of the low G note, on the diatonic scale, or do, the next horn in advance being of a length corresponding to one-half the wave length of the next higher note A, or re on the scale, and so forth, eight of the horns being shown, of respectively decreasing length from the low G to the G an octave above.

The horns are supported upon a spider 9 forming separators between the horns, the spider being mounted at the entrance of the horns, as best shown in Figure 3. The horns are all spaced slightly apart at their intake ends in the spider to provide an air vent 20.

A panel 21 of sound insulating material is disposed between the horns at the rear ends thereof and between the panel and the spider there exists an air chamber 24 adapted to receive a conventional reproducer 22 of the magnetic or dynamic type, the input wires 23 of which may be connected to the audio-frequency posts of any conventional radio receiving set or other sound reproducing apparatus.

Vibrations set up in the air chamber 24 between the reproducer 22 and the intake ends of the horns will be amplified by the air columns in the horns. The small vent opening 20 permits freedom of fluctuations in the air space in front of the reproducer 22 without back pressure. It will be further pointed out that the air columns of the various horns, set in motion by a common source (the reproducer 22) have a common point of entry in the horns and although the columns are of respectively different lengths all are united in the same wave plane, designated by the numeral 25 at the front of the horns, so that the emergent wave is substantially in the same wave plane as the beginning of the wave in the separator or spider 9. The variations in length of the horns respectively are accomplished by arranging the rear ends of the horns in stepped relationship.

More specifically the central chamber tapers from a large end to a small end shown in Figure 3

and is formed of side walls 30 forming an octagon as shown in Figure 2, there being radially disposed division walls 31 extending outwardly from the meeting longitudinal edges of the side walls of the chamber. Serpentine walls 32 are disposed between the radial walls, each having a reverse bend 33 intermediate the ends thereof to economize in length, the inner ends of the serpentine walls having reverse bends 34 spaced apart to provide the before mentioned vent opening 20. The serpentine walls coact with the radial walls 31 and side walls 30 of the chamber to form horns of respectively different lengths arranged in the form of an annulus around an axis C—D and having the intermediate reverse bends stepped to provide a loud speaker of compact box-like structure in which the outlet ends of the horns lie in the same plane.

The amplifier may be formed of any suitable non-resonant material and the panel 21 may be formed of a suitable pad of soft sound absorbing material which will completely fill the opening at the rear of the air chamber 24 in the device and absorb all tones from the rear of the reproducer, which tones in practice are found to be not true tones.

From the above description it is thought that the construction and operation of the invention will be fully understood without further explanation.

What is claimed is:

A sound amplifier comprising a central chamber tapering from a large end at the rear to a small end at the front and having side walls forming substantially an octagon, radially disposed division walls extending outwardly from the meeting longitudinal edges of the side walls of the chamber, serpentine walls between the radial walls, each serpentine wall having a reverse bend intermediate its ends to economize in length and form a loud speaker horn of box-like structure, the inner end of each serpentine wall having a reverse bend disposed at the smaller end of the chamber coacting with the walls of the chamber in forming a sound intake end for the horn, all of the horns being arranged in an annular series around the longitudinal axis of the chamber, a spider forming division walls between the serpentine walls and walls of the chamber at the sound entrance ends of the horns, a sound absorbing panel in the chamber in said intermediate reversed bends of the serpentine walls, a sound producer in the chamber between the sound absorbent panel and the spider, there being an opening between the reversely bent sound entrance ends of the horns venting the chamber to the atmosphere, the horns being of such respective lengths as to provide air columns tuned respectively to one-half the wave length of an octave of notes of a diatonic scale to produce accurately notes of one-half the wave length or the harmonics of 1, 2, 4, 8 or more harmonics of a note in any predetermined column, the outlet ends of the horns all terminating in a single plane, the reverse bends of the horns being disposed in stepped relation to permit the outlet ends lying in the same plane.

WILLIAM R. ALLISON.