July 28, 1953

J. FORRESTER

2,646,852

LOUD-SPEAKER CABINET

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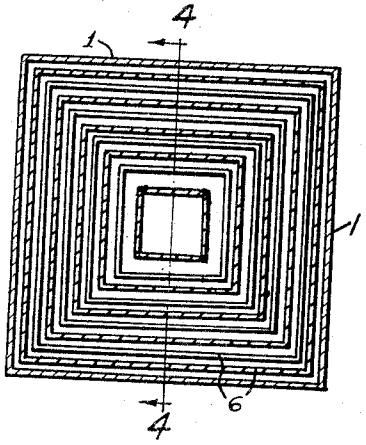

FIG. 1

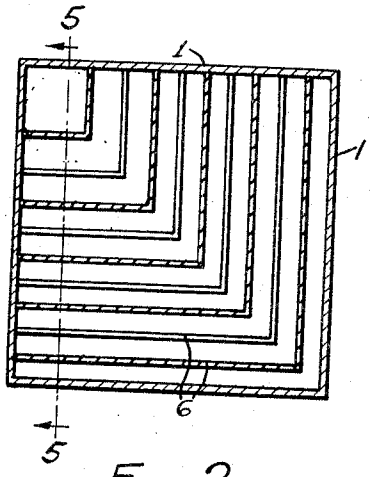

FIG. 2

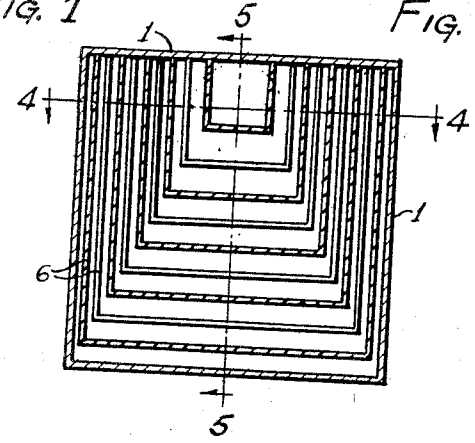

FIG. 3

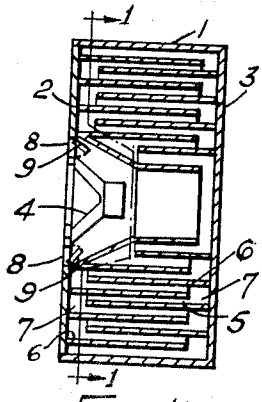

FIG. 4

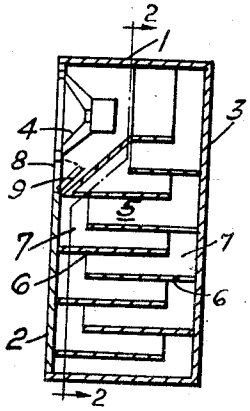

FIG. 5

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LOUD-SPEAKER CABINET

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6 Claims. (Cl. 181—31)

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This invention relates to loud speakers and has for an object to produce a compact construction having a good frequency response by utilizing the principle of the stopped organ pipe.

A loud speaker according to the invention comprises a casing divided into a series of communicating compartments, each compartment having towards opposite ends openings to the two adjacent compartments, the first compartment of the series being first to receive sound emission from the sound-emitting unit, and being provided with a port leading from the interior of the compartment to the exterior of the casing.

The casing may be circular in cross-section, or it may be rectangular, having side, front and rear walls.

The unit may be located at, or near, the centre of the front, or the rear wall of the casing, each succeeding compartment surrounding the compartments earlier in the series.

Where the casing is rectangular, the unit may be located at one corner of the casing, two walls of each compartment being constituted by a portion of two adjacent walls of the casing, and the two adjacent inner walls of each succeeding compartment being constituted by the two adjacent outer walls of the preceding compartment.

In an alternative construction the unit may be located near the middle of a side wall of the casing, each succeeding compartment being further removed from the unit in a radial direction than the preceding compartment.

The openings between adjoining compartments may be close to the front and the rear walls of the casing alternately.

The manner of partitioning may be varied widely to produce the effect of a long pipe or expanding chamber without departing from the invention.

The cross-sectional areas of succeeding compartments increases according to an exponential or other selected mathematical law.

Means, e. g., a door, may be provided to vary the effective area of the port.

Practical embodiments of the invention are illustrated in the accompanying diagrammatic drawings in which Fig. 1 is a vertical sectional view taken on the line 1—1 of Fig. 4, and illustrates a construction in which the sound-emitting unit is located at the centre of one wall of the casing, Fig. 2 is a vertical sectional view taken on the line 2—2 of Fig. 5, and illustrates a construction in which the sound-emitting unit is located at one corner of the casing, and Fig. 3 is a vertical sectional view taken on the line 2—2

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of Fig. 5, and illustrates a construction in which the sound-emitting unit is located near the junction of a side wall and the front wall of the casing. Fig. 4 is a section taken on the line 4—4 in Fig. 1 or Fig. 3 with the front wall in place, Fig. 5 is a section taken on the line 5—5 in Fig. 2 or Fig. 3.

In the drawings, 1, 2 and 3 denote the side, front and rear walls respectively of a casing, 4 denotes a sound-emitting unit, and 5 denotes compartments formed by partitions 6 and communicating with one another through openings 7, which are formed by the gap between the longitudinal edges of the partitions and the front wall 2, or the rear wall 3 of the casing. 8 denotes ports, each controlled by an adjustable door 9.

In practice, sound waves emitted by the sound-emitting unit 4 travel through the succeeding compartments 5 to the last compartment, and are reflected back through the compartments 5, to the first compartment and issue through the ports 8.

The loud speaker thus functions after the fashion of a stopped organ pipe. As the same column of air is traversed twice by the sound waves, the column of air in the stopped tube will resonate at the same frequency as that in an open tube twice as long, or, in other words, the length of the stopped tube need only be one quarter of the wave length of sound waves at the desired resonating frequency as against one-half of the wave length in the case of an open tube.

What is claimed is:

1. A loud speaker comprising a casing having side, front, and rear walls, a series of similar-shaped spaced partitions located within said casing and dividing the interior of said casing into a series of communicating compartments, at least one outer wall of each compartment being constituted by a portion of a wall of the casing, each compartment intermediate the end compartments of the series being located between two adjacent partitions and having towards opposite ends openings to the two adjacent compartments, each compartment of the series being at least in part surrounded by a succeeding compartment, said last compartment opening solely into the next preceding compartment of the series, and a sound-emitting unit located in the first compartment of the series, the first partition of the series at least in part surrounding the sound emitting unit and being spaced therefrom, an outer wall of said first compartment constituted by a portion of a wall of said casing being formed with at least one port leading from the interior

of said first compartment to the exterior of said casing.

2. A loud speaker as claimed in claim 1, in which the sound-emitting unit is located in the vicinity of the centre of the front wall of the casing, and in which each compartment of the series except the first surrounds a compartment earlier in the series.

3. A loud speaker as claimed in claim 1, in which said sound-emitting unit is located adjacent the front wall of the casing and said port is in the front wall of the casing.

4. A loud speaker as claimed in claim 1, in which the sound-emitting unit is located at the front wall of the casing and said port is in the front wall of the casing outside and adjacent to said unit.

5. A loud speaker as claimed in claim 1, in which the partitions within the casing are arranged in parallel relationship between the front and rear walls of the casing and in which each partition, except the first, surrounds the next preceding partition in the series between the front and rear walls of the casing.

6. A loud speaker comprising a casing having side, front and rear walls, partitions located within said casing and dividing the interior of said casing into a series of communicating compartments, the cross sectional area of each of which measured at right angles to the direction of propagation of the sound waves is greater than that of the preceding compartment, at least one outer wall of each compartment being constituted by a portion of the wall of the casing, each compartment intermediate the end compartments of the series having towards its opposite ends openings to the two adjacent compartments, each compartment except the last compartment of the series being at least in part surrounded by a succeeding compartment, said last compartment opening solely into the next preceding compartment of the series, and a sound-emitting unit located in the first and smallest compartment, an outer wall of said smallest compartment constituted by a portion of a wall of said casing being formed with at least one port leading from the interior of said first compartment to the exterior of said casing.

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References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,810,708	Hutchison	June 16, 1931
1,985,881	Buckley	Jan. 1, 1935
2,205,804	Wells	June 25, 1940
2,214,591	Massa	Sept. 10, 1940
2,224,919	Olson	Dec. 17, 1940

FOREIGN PATENTS

Number	Country	Date
246,634	Great Britain	Feb. 4, 1926
337,264	Great Britain	Oct. 30, 1930
656,732	Great Britain	Dec. 19, 1951