Sept. 4, 1962 M. L. BERRY 3,052,758

COLUMN SPEAKERS SUITABLE FOR USE IN PUBLIC ADDRESS SYSTEMS

Filed Feb. 25, 1959 2 Sheets-Sheet 1

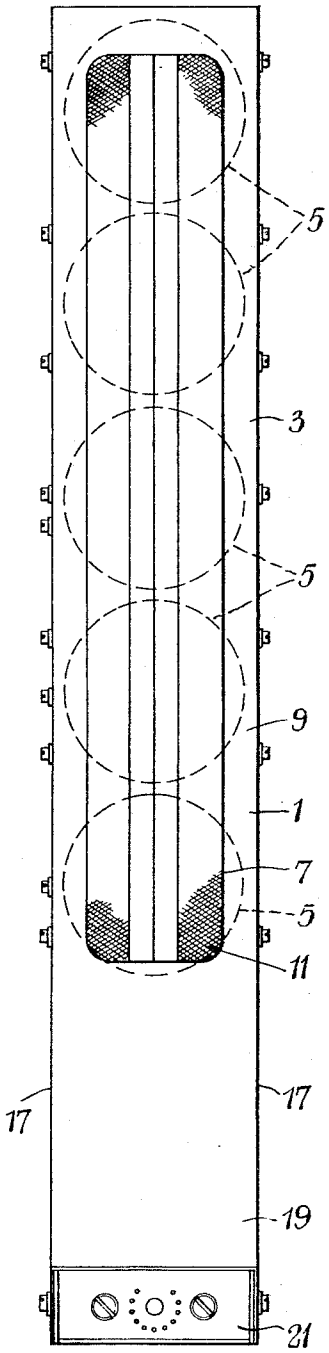


FIG.1

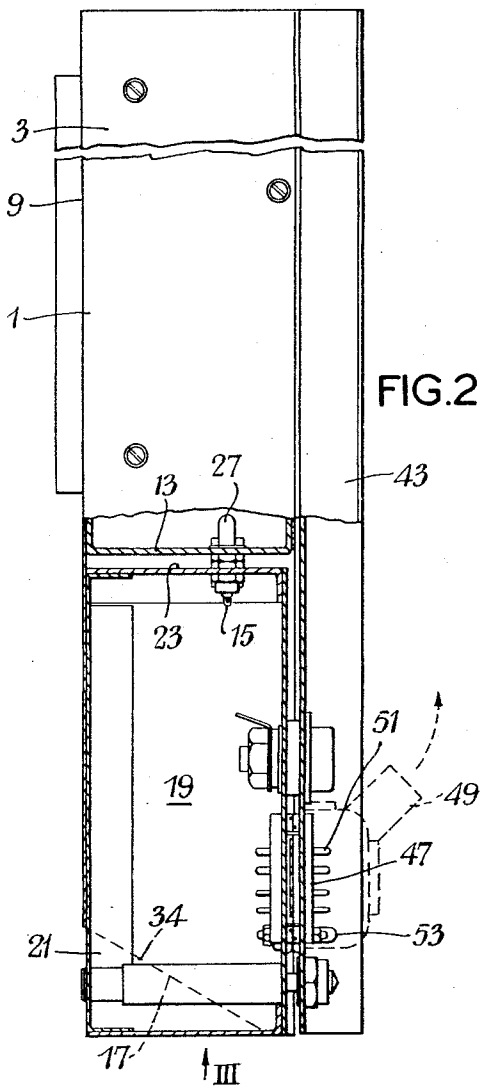


FIG.2

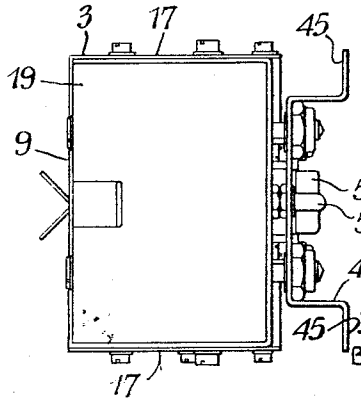


FIG.3

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COLUMN SPEAKERS SUITABLE FOR USE IN PUBLIC ADDRESS SYSTEMS

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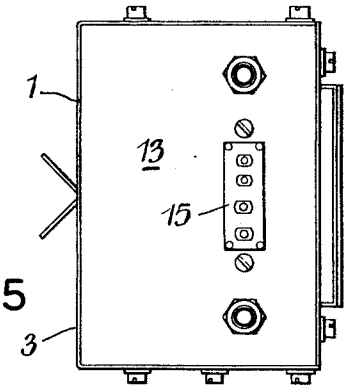


FIG.5

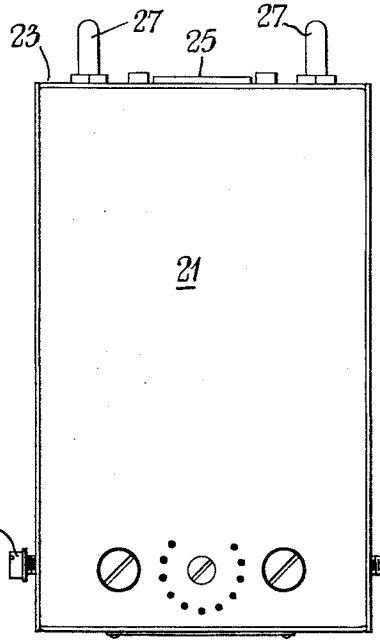


FIG.6

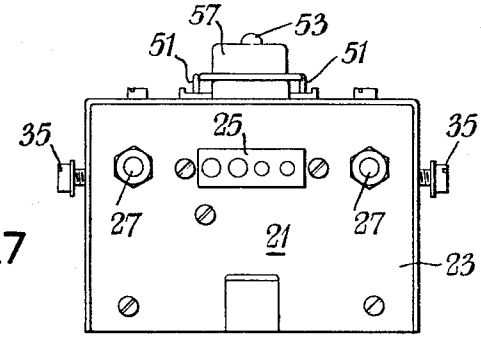


FIG.7

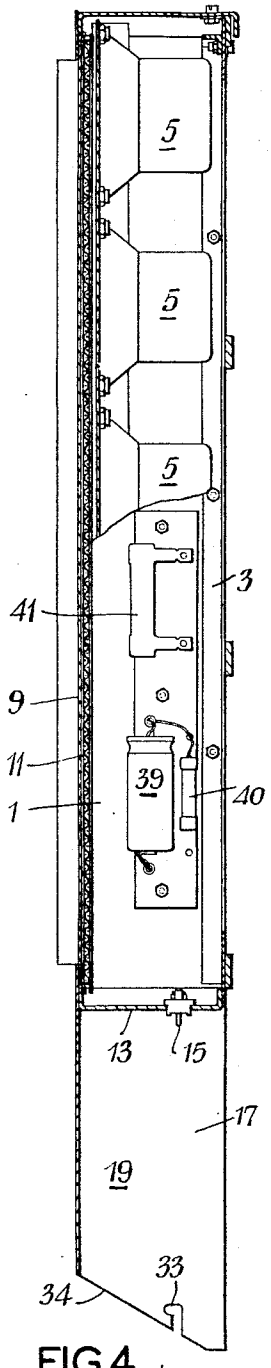


FIG.4

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COLUMN SPEAKERS SUITABLE FOR USE IN PUBLIC ADDRESS SYSTEMS

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Filed Feb. 25, 1959, Ser. No. 795,437
3 Claims. (Cl. 179—1)

This invention relates to column speakers suitable for use in public address systems. By the expression "a column speaker" is meant a bank of loud speakers respectively having conical diaphragms arranged rectilinearly with their axes substantially parallel. When vertically mounted, a column speaker of the kind specified emits a beam of sound which spreads horizontally rather than vertically. In a known form of public address system employing column speakers of the kind defined a control amplifier serves to provide voltage amplification for an input signal and the amplified output from the control amplifier is supplied to a power amplifier which in turn supplies an output signal to a predetermined number of column speakers. With such an arrangement, however, when it is desired to use less than the predetermined number of column speakers, satisfactory operation can only be achieved by utilising a dummy load in place of each column speaker which is not in use. Thus the danger exists that unsatisfactory operation would ensue if the public address system were switched on after having removed some of the column speakers and before having replaced the column speakers removed with equivalent dummy loads. It is one object of the invention to overcome this danger.

The present invention includes a column speaker suitable for use in public address systems and comprising a bank of loudspeakers respectively having conical diaphragms arranged rectilinearly with their axes substantially parallel, in combination with an elongated casing within which the loudspeakers are mounted, a housing detachably secured to the casing, components of a power amplifier mounted within the housing, and complementary, separable electrical connections provided respectively on the casing and the housing whereby the power amplifier components are operatively connected with the loudspeakers of the column speaker.

The removability of the amplifier housing facilitates maintenance of the public address system.

The invention will now be described, by way of example, with reference to the accompanying, somewhat diagrammatic drawings, in which:

FIGURE 1 is a front elevation of a column speaker according to this invention;

FIGURE 2 is a side elevation partly in section of the column speaker of FIGURE 1;

FIGURE 3 is a view taken in the direction of the arrow III in FIGURE 2;

FIGURE 4 is a longitudinal sectional view illustrating further details of the column speaker of the previous figures;

FIGURE 5 is a view taken in the direction of the arrow V in FIGURE 4; and

FIGURES 6 and 7 are a front elevation and a plan view respectively of a part of the apparatus shown in FIGURES 1 and 2.

Referring to the drawings, a column speaker generally indicated by the reference numeral **1** is disposed within an elongated casing **3** of rectangular cross-section within an upper part of which is disposed a bank of loudspeakers **5** suitably having conical diaphragms and of the moving coil type which are preferably connected in electrical parallel relationship. The loudspeakers **5** are so disposed

as to direct sound forwardly through an elongated aperture **7** formed in a front wall **9** of the casing **3'** and between the forward end of the loudspeakers **5** and the front wall **9** of the casing is located a grill **11** suitably formed from expanded metal.

The upper part of the casing **3** in which the loudspeakers are accommodated is separated from a lower part of the casing by a partition plate **13** in which is supported a four pin plug **15**. The front wall **9** and parallel side walls **17** of the casing **3** are longitudinally extended downwardly to form a channel **19** within which there is engaged a housing **21** of rectangular cross-section which accommodates the principal components of a power amplifier suitable for operating the speaker elements **5**.

An upper side **23** of the housing **21** has supported thereon a socket **25** which complementarily engages the four pin plug **15** on the partition plate **13**. Guide pins **27** are provided on opposite sides of the socket **25** and engage respective complementary apertures formed in the partition plate **13** when the housing **21** is operatively engaged in the column speaker casing **3**. The pins **27** and their complementary apertures ensure proper alignment between the power amplifier housing **21** and the casing **3**.

Securing means are provided for fastening the power amplifier housing **21** to the casing **3** and include opposed, inverted L-shaped slots **33** each extending upwardly in one of the side walls **17** of the casing **3** from a lower, upwardly and forwardly inclined edge **34** thereof. The power amplifier housing **21** in the operative position thereof is secured to the casing **3** by two bolts **35** which are respectively provided on opposite sides of the housing **21** and engage uppermost end parts of the slots **33**.

Because of its closed construction it is desirable to avoid excess heat dissipation of the housing **21**. Thus, conveniently, some of the heat dissipating circuit elements **39**, **40** and **41** of the power amplifier are disposed in the upper part of the casing **3** alongside the loudspeaker **5**. The elements **39**, **40** and **41** are appropriately connected to pins of the four pin plug **15** so that they complete the circuit of the power amplifier when the housing **21** is operatively engaged in the casing **3**.

The column speaker in its operative position is arranged with the bank of loudspeakers **5** vertically disposed. To this end, the casing **3** is removably clamped to a back plate **43** of U-shaped cross-section and having laterally extending flanges **45** by means of which the back plate can be mounted on a vertical wall.

On the lower part of the back plate **43** are provided two parallel sockets **47** to which are connected conductors (not shown) which are led to the sockets by way of a conduit **49**. The sockets **47** are engaged by complementary four pin plugs **51** provided on a rear face of the housing **21** and in this way connection is effected between the power amplifier and the necessary power supply therefor and between the power amplifier and the output of a control amplifier.

For ensuring proper alignment of the rear face of the housing **21** relative to the back plate **43** there is provided on the housing **21** a rearwardly extending pin **53** which is disposed between the plugs **51** and engages a complementary aperture in the back plate **43**. An appropriate aperture is also made in the back plate **43** so as to accommodate a part **57** of the power amplifier which projects rearwardly from the housing **21**.

Though the design of the power amplifier circuit forms no part of the present invention, preferably a two stage amplifier of known form employing transistors is used and with such a circuit, the removal from the housing **21** of the heat dissipating circuit elements **39**, **40** and **41** enables the housing to act as an efficient heat sink for the transistors. Also, the use of transistors ensures that

the power amplifier can be constructed in a compact manner.

A public address system utilising the present invention includes a control amplifier which provides voltage amplification for an input signal derived, for example, from a microphone or gramophone pick-up and, plugged into the control amplifier, are a plurality of column speakers which, as described above, each incorporate a power amplifier. Thus, to the power amplifier of each column speaker is supplied an output signal from the control amplifier which is suitably amplified by the power amplifier and applied to the parallel connected loudspeakers of the column speaker.

In the event of a fault developing in the power amplifier of a particular column speaker, the power amplifier housing **21** can be readily removed from the casing **3** and replaced by a new power amplifier housing **21**. The faulty power amplifier circuit can therefore be repaired without further interference in the operation of the public address system.

A predetermined maximum number of column speakers with respective power amplifiers can be plugged into the control amplifier and, during operation, a column speaker can be disconnected from the control amplifier without materially affecting the load on the other column speakers. Thus, a very flexible form of public address system is provided in which each column speaker has a power amplifier individual thereto.

A public address system as described above is particularly useful in the passenger compartments of aircraft or trains. Thus, adequate sound distribution can be obtained, for example, in the passenger compartment of an aircraft by the provision of a public address system according to the invention employing one or perhaps two column speakers at each end of the compartment.

What I claim is:

1. In a public address system the combination of a control voltage amplifier, a plurality of column speakers each of said column speakers comprising a bank of loudspeakers having conical diaphragms arranged rectilinearly one above another with their axes substantially parallel and an elongated upright casing having a front wall on which the loudspeakers are mounted so as to project rearwardly into the casing and providing a single chamber of shallow depth from front to rear thereof common to all the loudspeakers, a plurality of housings respectively detachably secured to the column speaker casings, components of a power amplifier mounted within each housing, first readily releasable electrical connecting means for operatively connecting the power amplifier components in each housing with the loudspeakers in the associated column speaker casing thereby to provide each column speaker with a power amplifier individual thereto, and second readily releasable electrical connecting means for operatively connecting the power amplifier components in each housing with the control voltage amplifier.

2. A public address system as claimed in claim 1, wherein each column speaker casing is formed with an axial channel-shaped extension within which the associated power amplifier housing is detachably secured.

3. A public address system as claimed in claim 2, wherein the first electrical connecting means are engaged and separated respectively by attaching and detaching the power amplifier housing in relation to its associated column speaker casing.

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