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PORTABLE PUBLIC ADDRESS SYSTEM

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FIG. 1.

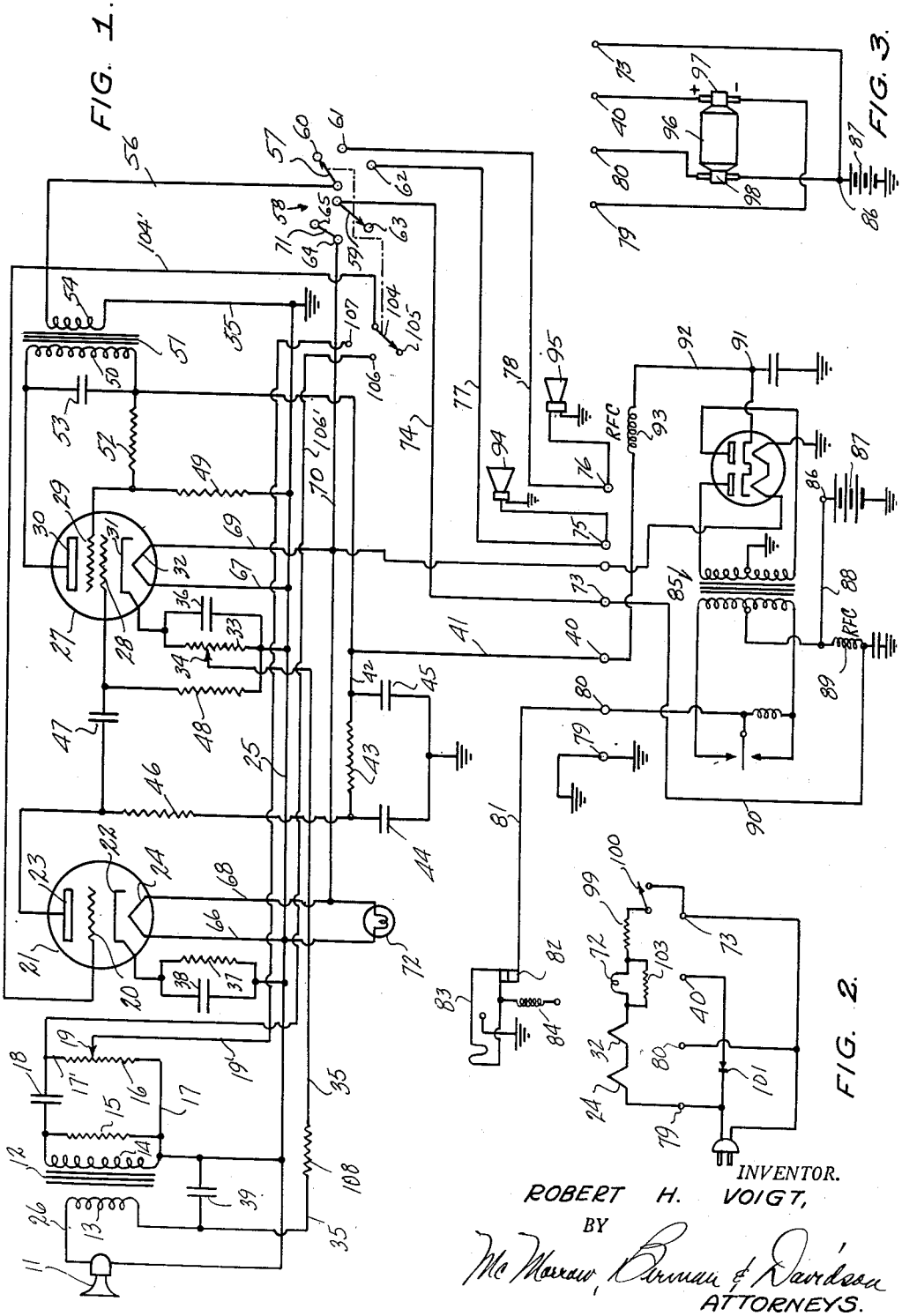


FIG. 3.

FIG. 2.

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PORTABLE PUBLIC ADDRESS SYSTEM

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6 Claims. (Cl. 179—1)

1

This invention relates to public address systems, and more particularly to a portable public address system particularly adapted to be employed on a vehicle such as a bus, or the like.

A main object of the invention is to provide a novel and improved portable public address system adapted for use either inside a passenger vehicle, such as a bus or the like, or outside the vehicle, said public address system involving very simple components, being easy to install, and being very reliable in operation.

A further object of the invention is to provide an improved public address system of the type employing a carbon microphone in conjunction with an amplifier and one or more loud speakers, the improved system involving very inexpensive components, requiring only a small amount of battery power, and being readily adaptable for use with an external power source.

Further objects and advantages of the invention will become apparent from the following description and claims, and from the accompanying drawings, wherein:

Figure 1 is a wiring diagram of an improved portable public address system constructed in accordance with the present invention, shown connected to a conventional vibrapack power supply;

Figure 2 is a wiring diagram of the power supply circuit which may be employed to energize the public address system from a 110-volt alternating current power source;

Figure 3 is a schematic diagram illustrating a dynamotor power source which may be employed with the public address system illustrated in Figure 1.

Referring to the drawings, and more particularly to Figure 1, 11 designates a carbon microphone of conventional construction, preferably of the press-to-talk type. Designated at 12 is an input transformer having a primary winding 13 and a secondary winding 14. Connected across secondary winding 14 is a load resistor 15 which is of the order of 220,000 ohms. Designated at 16 is a potentiometer whose resistance is of the order of 1 megohm. One terminal of the potentiometer resistance is connected to one terminal of load resistor 15 by a wire 17. The other terminal, shown at 17', of the potentiometer resistance is connected through a coupling condenser 18 of the order of .006 mfd., to the remaining terminal of the load resistor.

The movable tap of the potentiometer, shown at 19, is connected by a wire 19' to a fixed contact 107, engageable by one pole 104 of a three-pole,

2

triple-throw switch, 58. The pole 104 is connected by a wire 104' to the grid 20 of an amplifier tube 21. Tube 21 has a cathode 22, a plate 23 and a filament 24. Another fixed contact 106 of switch 58, engageable by pole 104, is connected by a wire 106' to the potentiometer terminal 17'. Designated at 105 is still another fixed contact engageable by pole 104, as shown in Figure 1, placing pole 104 in open circuit position. When pole 104 engages contact 107, potentiometer tap 19 controls the input voltage applied to the grid 20, for example, when the system drives speakers mounted inside a vehicle and maximum volume is not required. When pole 104 engages contact 106, terminal 17' is connected directly to grid 20, applying maximum input voltage to tube 21, as where it is desired to drive outside speakers.

Designated at 25 is a ground wire. One terminal of microphone 11 is connected to ground wire 25. The other terminal of the microphone is connected by a wire 26 to one of the terminals of the transformer primary 13. Designated at 27 is an output tube having a control grid 28, a screen grid 29, a plate 30, a cathode 31 and a filament 32. Cathode 31 is connected to ground wire 25 through the resistance winding of a potentiometer 33, which provides the grid bias voltage for tube 27. The remaining terminal of the primary 13 of the input transformer is connected through a resistor 108 of about 470 ohms to the movable tap 34 of the potentiometer 33 by a wire 35, whereby the voltage drop between tap 34 and ground wire 25 provides a source of direct current for the circuit of the carbon microphone 11. A by-pass condenser 36 is connected across the resistance winding of potentiometer 33. Said resistance winding is of the order of 300 ohms.

Cathode 22 of amplifier tube 21 is connected to ground wire 25 through a biasing resistor 37 of the order of 5,000 ohms. Resistor 37 is bypassed by a condenser 38.

A filter condenser 39, of the order of 50 mfd. is connected between wire 35 and ground wire 25, in the manner shown in Figure 1, to filter out fluctuations in the D. C. voltage appearing between tap 34 and ground wire 25. Resistor 108 also aids in suppressing such fluctuations.

Designated at 40 is a plate supply terminal. Connected to terminal 40 by a wire 41 is a wire 42. Connected to wire 42 is one terminal of a resistor 43 of the order of 2200 ohms. Connected between the respective terminals of resistor 43 and ground are the respective filter condensers 44 and 45, which may have capacities of 10 and 20 mfd., respectively. Connected between the

plate 23 of tube 21 and the junction of resistor 43 and condenser 44 is a load resistor 46, of the order of 200,000 ohms. Plate 23 is connected to the grid 28 of output tube 27 through a coupling condenser 47, of the order of .006 mfd. Connected between grid 28 and ground wire 25 is a grid leak resistor 48, of the order of 500,000 ohms.

Connected between screen grid 29 and ground wire 25 is a resistor 49 of the order of 50,000 ohms. Connected across plate 30 and wire 42 is the primary 50 of an output transformer 51. Screen grid 29 is connected to wire 42 through a resistor 52 of the order of 10,000 ohms. Connected across primary 50 is a condenser 53 of the order of .006 mfd. The secondary 54 of the output transformer has one of its terminals grounded by a wire 55. The other terminal of said secondary is connected by a wire 56 to one of the poles 57 of the three-pole, triple-throw switch 58. Another pole of switch 57 is shown at 59. Poles 104, 57 and 59 are mechanically coupled together. Pole 57 is successively engageable with respective stationary contacts 60, 61 and 62. Pole 59 is successively engageable with successive stationary contacts 63, 64 and 65.

One terminal of each of the filaments 24 and 32 is connected to the ground wire 25 by respective wires 66 and 67. The other terminals of the filaments are connected by respective wires 68 and 69 to a wire 70 connected to switch contact 64. Switch contact 64 is connected to switch contact 65 by a wire 71. Connected between wires 25 and 70 is a pilot lamp 72. Designated at 73 is a terminal which is connected by a wire 74 to pole 59. Designated at 75 and 76 are additional terminals, connected by respective wires 77 and 78 to the respective switch contacts 62 and 61.

Designated at 79 and 80 are additional terminals. Terminal 79 is grounded. Terminal 80 is connected by a wire 81 to the stationary contact 82 of a pivoted hook switch 83. Switch 83 is grounded and is biased into engagement with contact 82 by a spring 84. Microphone 11 is adapted to be hung on hook switch 83, and when so hung, disengages switch 82 from contact 82.

Designated generally at 85 is a conventional vibrapack connected at 86 to the positive terminal of the storage battery 87, which may be the storage battery of a vehicle in which the public address system is employed. The negative terminal of the battery 87 is grounded. From Figure 1 it will be seen that the positive terminal of battery 87 is connected to terminal 73 through a wire 88, a radio frequency choke 89 and a wire 90. The high voltage output terminal of the vibrapack, shown at 91, is connected by a wire 92 through a radio frequency choke 93 to the terminal 40.

Suitable loud-speakers shown at 94 and 95 may be respectively connected between the respective terminals 75 and 76 and ground, as shown.

From Figure 1 it will be seen that the filaments 24 and 32 will be de-energized when the switch poles 57 and 59 are in their open-circuit positions, as shown. When the microphone 11 is hung in switch hook 83, the vibrapack will also be de-energized, since its ground connection will be open at contact 82. The speakers 94, 95 will also be de-energized.

When the switch poles 59 and 57 are moved respectively into engagement with contacts 64 and 61, wire 70 is connected to wire 74 by pole 59, energizing filaments 24 and 32, and wire 56 is connected to wire 78 through switch pole 57 connecting speaker 95 to the secondary 54 of output transformer 51. At the same time, pole 104 engages contact 106, connecting grid 20 to terminal 17'. Similarly, when poles 59 and 57 are engaged respectively with contacts 65 and 62, the filaments are likewise energized and speaker 94 is connected to the secondary of output transformer 51. At this time, pole 104 engages contact 107, connecting grid 20 to potentiometer tap 19.

With the switch poles 59 and 57 in either of the above-described, circuit-closing positions, when microphone 11 is lifted from hook switch 83, the vibrapack 85 becomes energized by the completion of its ground circuit at contact 82, and plate voltage is provided at terminal 40. The microphone circuit is provided with current by its connection between tap 34 and wire 25. The fluctuations of sound energy impinging on the diaphragm of the microphone 11 produces expansion and compression of the carbon granules therein, causing corresponding variations in the current in primary 13, and producing an audio signal across the load resistor 15. This signal is amplified in tube 21 and applied to the grid 28 of the output tube 27. The output of tube 27 is delivered to the speaker 94 or 95 through the output transformer 51.

It will be noted that by connecting the carbon microphone 11 in the manner shown in Figure 1, no additional battery is required to energize the microphone, the microphone current being derived from the cathode resistor 33 of the output tube 27.

Instead of employing a vibrapack, a dynamotor 96 may be connected to the storage battery 87 and to the terminals 79, 80, 40 and 73 in the manner illustrated in Figure 3. The high-voltage commutator of the dynamotor is shown at 97, and the high-voltage circuit is controlled by the hook switch 83 in the same manner as in Figure 1. The low-voltage commutator of the dynamotor is shown at 98.

The public address system may be powered from a 110-volt alternating current power supply by wiring the filaments 24, 32, pilot light 72, a suitable dropping resistor 99, and a switch 100 in series across the power lines and employing a half-wave rectifier 101 in the well-known manner illustrated in Figure 2 to provide the required filament and plate current for the amplifier. The connections to terminals 80 and 40 in Figure 2 are the same as those shown in Figure 1. A suitable shunt resistor 103 is employed across the pilot light 72 to prevent excessive voltage from being applied across said pilot light.

The public address system schematically illustrated in Figure 1 is especially suitable for use as a compact, versatile and economical unit to be mounted in a school bus or similar passenger vehicle for providing a means of furnishing safety instructions or other information to the passengers of the vehicle.

The switch 58 enables either the speaker 94, mounted inside the vehicle, or the speaker 95, mounted at an outside location, to be selected and automatically applies maximum input voltage to amplifier tube 21 when the outside speaker 95 is selected by connecting terminal 17' of the potentiometer winding 16 to the grid 20 of tube 21.

The microphone 11 may be mounted in the vehicle in any suitable manner, for example, it may be carried on a flexible shaft attached to the side of the vehicle near the driver so that it may be moved into position before the driver when required. A floor switch may be substituted for the hook switch 83.

If increased power output is desired, an additional output tube may be connected in parallel with or in any other suitable arrangement with relation to output tube 27.

Although a specific embodiment of an improved public address system has been disclosed in the foregoing description, it will be understood that various modifications within the spirit of the invention may occur to those skilled in the art. Therefore, it is intended that no limitations be placed on the invention except as defined by the scope of the appended claims.

What is claimed is:

1. In a public address system, a carbon microphone, a vacuum tube amplifier including at least one tube having a grid, a plate, and a cathode, a cathode resistor, and means for connecting said cathode resistor to provide a bias voltage for the grid, an input circuit connected to said carbon microphone and coupled to said amplifier, and circuit means connecting at least a portion of said cathode resistor, said input circuit and said microphone in series and arranged to energize said microphone.

2. In a public address system, a carbon microphone, a vacuum tube amplifier including at least one tube having a grid, a plate, and a cathode, a cathode resistor, and means for connecting said cathode resistor to provide a bias voltage for the grid, a tap movably contacting said cathode resistor, an input circuit connected in series with said carbon microphone and coupled to said amplifier, and circuit means connecting said input circuit and microphone between said tap and one of the terminals of said cathode resistor, whereby at least a portion of said cathode resistor is in series with the microphone and input circuit and is arranged to energize said microphone.

3. In a public address system, a carbon microphone, a vacuum tube amplifier including at least one tube having a grid, a plate, and a cathode, a cathode resistor, and means for connecting said cathode resistor to provide a bias voltage for the grid, a tap movably contacting said cathode resistor, an input circuit including a transformer, the carbon microphone being connected in series with the primary of said transformer and the input circuit being coupled to said amplifier, and circuit means connecting said carbon microphone and primary in series between said tap and one of the terminals of said cathode resistor, whereby at least a portion of said resistor is in series with the primary and microphone and is arranged to energize said microphone.

4. In a public address system, a carbon microphone, a vacuum tube amplifier including at least one tube having a grid, a plate, and a cathode, a cathode resistor, and means for connecting said cathode resistor to provide a bias voltage for the grid, an input circuit connected to said carbon microphone and coupled to said amplifier, circuit means connecting said cathode resistor in series with said input circuit and microphone and arranged to energize said microphone, a plurality of output devices, switch means for selectively connecting said output devices to the output circuit of the amplifier, and means controlling the input to said amplifier in accordance with the operation of said switch means.

5. In a public address system, a carbon microphone, a vacuum tube amplifier including at least one tube having a grid, a plate, and a cathode, a cathode resistor, and means for connecting said cathode resistor to provide a bias voltage for the grid, a power source, circuit means connecting said power source to the amplifier, an input circuit connected in series with said carbon microphone and coupled to said amplifier, circuit means connecting at least a portion of said cathode resistor in series with said input circuit and microphone and arranged to energize said microphone, a plurality of output devices, movable switch means for selectively connecting said output devices to the output circuit of the amplifier, said switch means having an open circuit position and being formed and arranged to uncouple the input circuit from the amplifier when moved into said open circuit position.

6. In a public address system, a carbon microphone, a vacuum tube amplifier including at least one tube having a grid, a plate, and a cathode, a cathode resistor, and means for connecting said cathode resistor to provide a bias voltage for the grid, an input circuit connected in series with said carbon microphone, a tapped resistor terminating said input circuit, circuit means connecting said cathode resistor in series with said input circuit and microphone and arranged to energize said microphone, a plurality of output devices, switch means arranged to selectively connect said output devices to the output circuit of the amplifier, and means connecting selected taps of said tapped resistor to said amplifier in accordance with the operation of said switch means, whereby different signal levels may be furnished to the amplifier for amplification in accordance with the selection of different output devices.

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