

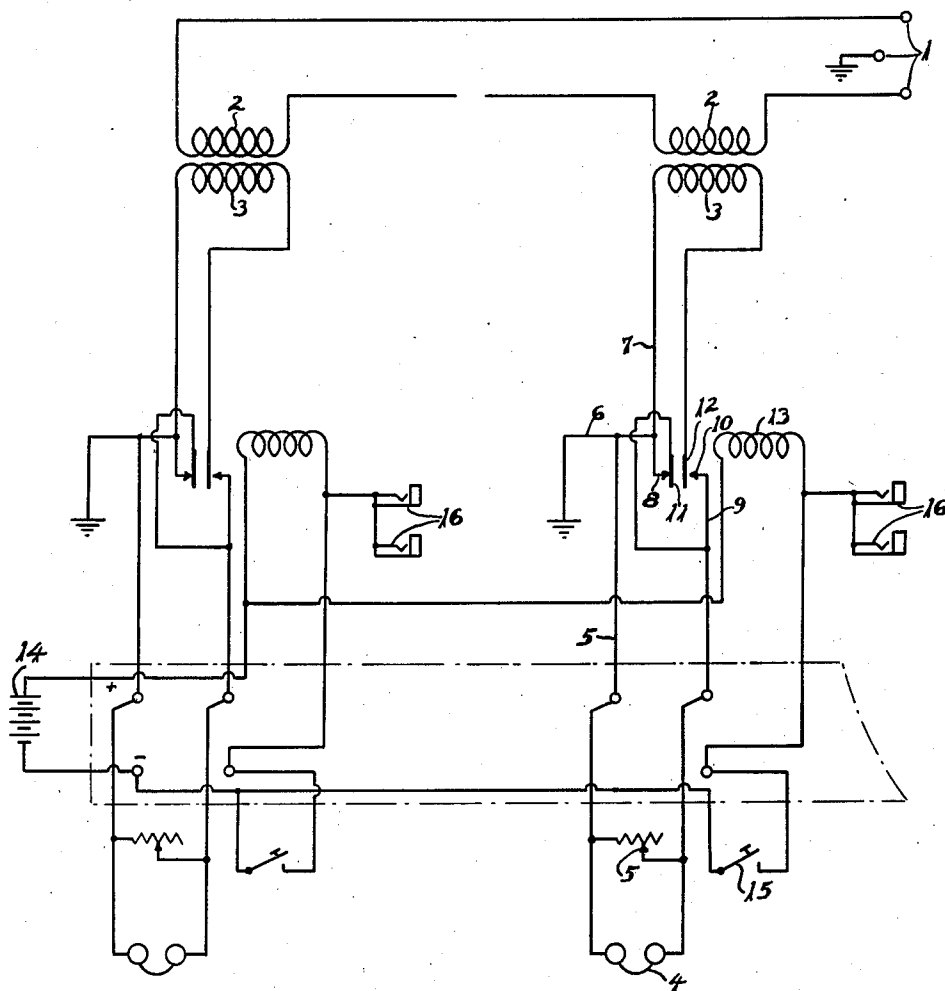
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MULTIPLE OUTLET SYSTEM FOR AUDIO FREQUENCIES

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MULTIPLE OUTLET SYSTEM FOR AUDIO FREQUENCIES

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This invention relates to a multiple outlet audio system, especially adapted for instruction and practice in receiving code signals.

Among the several objects of this invention are:

To provide means of distributing energy at audio frequencies, to any one or more of several outlets, from a single source of supply, without the load on any outlet affecting the quantity of energy supplied to any other outlets connected to the same power source;

To eliminate cross talk and other energy to idle outlets from the loads on active outlets;

To provide means for controlling any one, or all, of several outlets from a switch at any one of the outlets;

To provide means for controlling the energy supplied each outlet without varying the output of the energy source.

The single figure of the drawing shows schematically one embodiment of our present invention.

It is frequently desirable to distribute energy to each of a number of outlets connected to a common source so that the response at each outlet is identical, for example, in giving instruction or practice in the reception of code signals by radio. It is essential for the successful operation of such a system that it be possible to connect any number of the outlets to the common source without affecting the volume of output at any outlet that may be already connected and in use, without the necessity of varying the output of the source each time load is added or removed by connecting or disconnecting additional outlets. These requirements are successfully met by our invention.

A source of audio-frequency energy, such as an audio-frequency oscillator may be connected to the terminals 1 to supply energy to the several transformer primaries 2 connected in series in the output circuit of the source. It is to be understood that any desired number of primaries may be used up to the capacity of the source available. Coupled to each primary 2 is a secondary 3, constituting with the primary a transformer of the air core type having very low efficiency of transformation for audio frequencies and so wound that the impedances of the outlets are matched by the respective transformers. As an example, in devices embodying our invention heretofore made and used each primary has 1350 turns and each secondary has 1500 turns, but these values are given by way of illustration and not of limitation. By using transformers having the characteristics mentioned there is no change in the output of one due to drawing load from others or ceasing to draw load from others. In fact, it is possible to connect twenty such transformers in our apparatus and short-circuit the secondaries of nineteen of these without caus-

ing appreciable change in the output level of the remaining secondary. Hence, once the output of the source is satisfactorily adjusted, it need not be varied thereafter to compensate for changes in the number of outlets being used.

Associated with each secondary coil 3 is a sound translating device 4 such as a head phone, provided with a variable resistance 5 shunted across it to permit individual adjustment of signal strength in the translating device 4. One terminal of each translating device 4 is connected by a lead 5 to a grounded conductor 6 that is also connected by a lead 7 to one terminal of transformer secondary 3 and is connected to a fixed relay contact 8, the other terminal of the translating device 4 being connected to a lead 9 to a fixed relay contact 10 and also connected to the movable relay contact 11. The other terminal of secondary 3 is connected to a movable relay contact 12. A coil 13 energizable from source 14 upon closing the key 15 actuates the movable contacts 11 and 12 to move contact 11 from its normal closed circuit position to open position away from contact 8 and to move contact 12 from its normal open circuit position to closed circuit position against contact 10.

It will be observed that when the relay contacts are in the position shown in the drawing the sound translating device 4 is short-circuited and has both terminals grounded through lead 6 and also that transformer secondary 3 has one terminal grounded. This completely prevents cross talk or other transfer of energy from an active outlet to an idle one. This is very advantageous in that the transformers may be located at some distance from the devices 4 and all wires connecting the devices 4 to their respective secondaries may be bunched, that is, not transposed or individually shielded. Closing key 15 energizes relay coil 13 and breaks the circuit between contacts 8 and 11 while simultaneously closing the circuit between contacts 10 and 12, thereby disconnecting the device 4 from the ground connection and making an operative circuit between the device 4 and its respective secondary. Jacks 16 are connected to each relay coil 13 to permit combining, by inter-connecting or patch cords, more than one relay coil in a circuit controlled by any key 15 associated with a coil so connected. This permits one person, for example, an instructor, to control the supply of signals to the various devices 4 so connected.

The invention herein described and claimed may be used and/or manufactured by or for the Government of the United States of America for governmental purposes without the payment of any royalties thereon or therefor.

We claim:

1. A multiple outlet audio energy system, comprising an audio energy supply circuit including

a plurality of air core transformer primaries in series, a secondary inefficiently coupled to each primary, a fixed relay contact connected to one terminal of each said secondary and a movable relay contact connected to the other terminal thereof, means to ground each said fixed contact, a sound translating device connected at one side to said fixed contact, a second fixed contact disposed to coact with said movable contact connected to the other side of said device, a second movable relay contact disposed to coact with the first said fixed contact and connected to said second fixed contact, said second movable contact being normally in circuit closing relation with the coacting fixed contact to ground said device and said one side of said secondary, a relay coil disposed to break the circuit at said second movable contact and close the circuit through said secondary and said device at said first movable contact when energized, means including a switch to energize each said relay coil, jack means connected to each relay coil to permit selectively connecting said relay coils together in a desired combination controlling more than one relay coil by one said switch, and an adjustable resistance across each said device.

2. A multiple outlet audio energy system, comprising an audio energy supply circuit including a plurality of air core transformer primaries in series, a secondary inefficiently coupled to each primary, a fixed relay contact connected to one terminal of each said secondary and a movable relay contact connected to the other terminal thereof, means to ground each said fixed contact, a sound translating device connected at one side to said fixed contact, a second fixed contact disposed to coact with said movable contact connected to the other side of said device, a second movable relay contact disposed to coact with the first said fixed contact and connected to said second fixed contact, said second movable contact being normally in circuit closing relation with the coacting fixed contact to ground said device and said one side of said secondary, a relay coil disposed to break the circuit at said second movable contact and close the circuit through said secondary and said device at said first movable contact when energized, means including a switch to energize each said relay coil, and an adjustable resistance across each said device.

3. A multiple outlet audio energy system, comprising an audio energy supply circuit including a plurality of air core transformer primaries in series, a secondary inefficiently coupled to each primary, a fixed relay contact connected to one terminal of each said secondary and a movable relay contact connected to the other terminal thereof, means to ground each said fixed contact, a sound translating device connected at one side to said fixed contact, a second fixed contact disposed to coact with said movable contact connected to the other side of said device, a second movable relay contact disposed to coact with the first said fixed contact and connected to said second fixed contact, said second movable contact being normally in circuit closing relation with the coacting fixed contact to ground said device and said one side of said secondary, a relay coil disposed to break the circuit at said second movable contact and close the circuit

through said secondary and said device at said first movable contact when energized and means including a switch to energize each said relay coil.

4. A multiple outlet audio energy system, comprising an audio energy supply circuit including a plurality of air core transformer primaries in series, a secondary inefficiently coupled to each primary, means grounding one terminal of each said secondary, a sound translating device, an adjustable resistance connected across said device, means normally connecting said device to ground but actuatable to connect said device across said secondary instead of to ground, operating means to actuate each of said connecting means to connect the respective device to the corresponding secondary and means selectively connectible to render more than one of said operating means subject to a single control.

5. A multiple outlet audio energy system, comprising an audio energy supply circuit including a plurality of low efficiency air core transformer primaries in series, a secondary coupled to each said primary, a sound translating device associated with each said secondary, a variable resistance across each said device, means operable to connect each said device and one terminal of the coacting secondary to ground or to connect said device across the respective secondary, and means selectively connectible to render more than one of said connecting means subject to a single control.

6. A multiple outlet audio energy system, comprising an audio energy supply circuit including a plurality of air core transformer primaries in series, a secondary coupled to each said primary, a sound translating device associated with each said secondary, a variable resistance across each said device, means operable to connect each said device and one terminal of the coacting secondary to ground or to connect said device across the respective secondary, and means selectively connectible to render more than one of said connecting means subject to a single control.

7. A multiple outlet audio energy system, comprising an audio energy supply circuit including a plurality of air core transformer primaries in series, a secondary coupled to each said primary, a sound translating device associated with each said secondary, means operable to connect each said device and one terminal of the coacting secondary to ground or to connect said device across the respective secondary, and means selectively connectible to render more than one of said connecting means subject to a single control.

8. A multiple outlet audio energy system, comprising an audio energy supply circuit including a plurality of transformer primaries in series, a secondary coupled to each said primary, a sound translating device associated with each said secondary, and means operable to connect each said device and one terminal of the coacting secondary to ground or to connect said device across the respective secondary, the parameters of said transformers being so evaluated that operation of any number of said devices does not diminish the energy supplied to any other said device.

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