

Nov. 6, 1934.

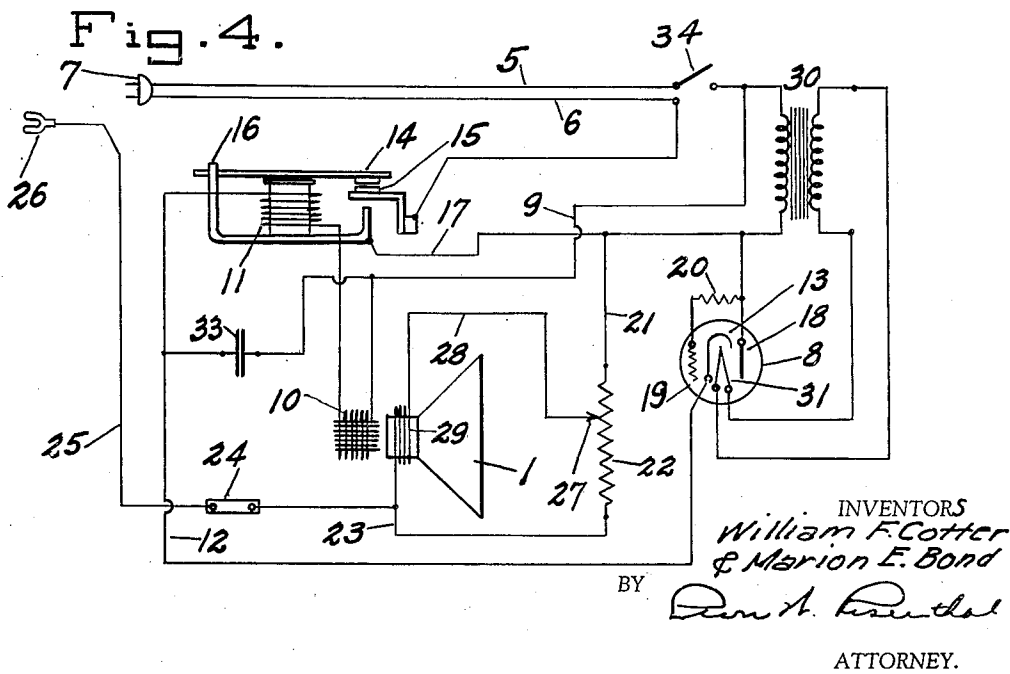
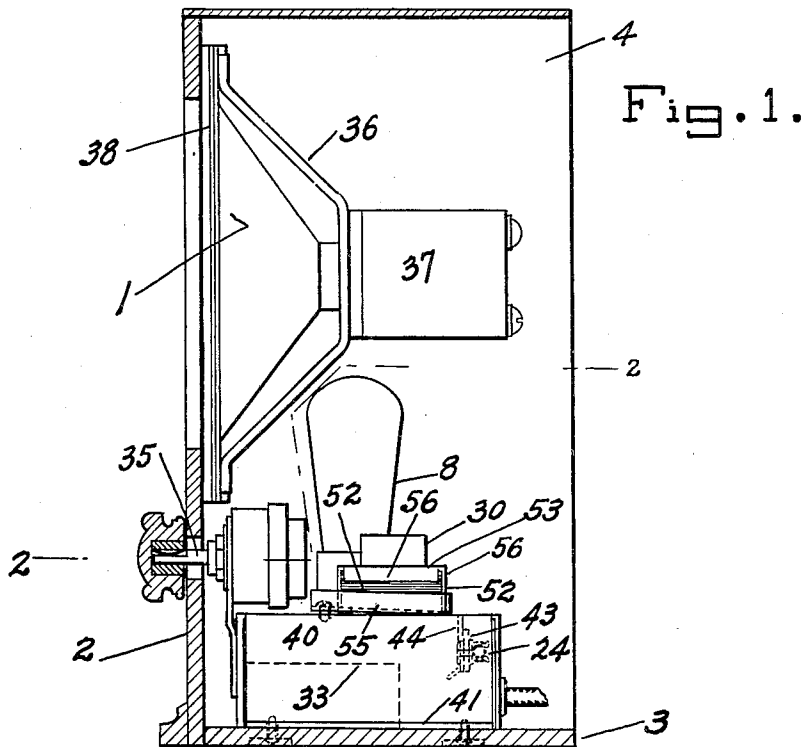
W. F. COTTER ET AL

1,979,453

LOUD SPEAKER

Original Filed March 23, 1933

2 Sheets-Sheet 1



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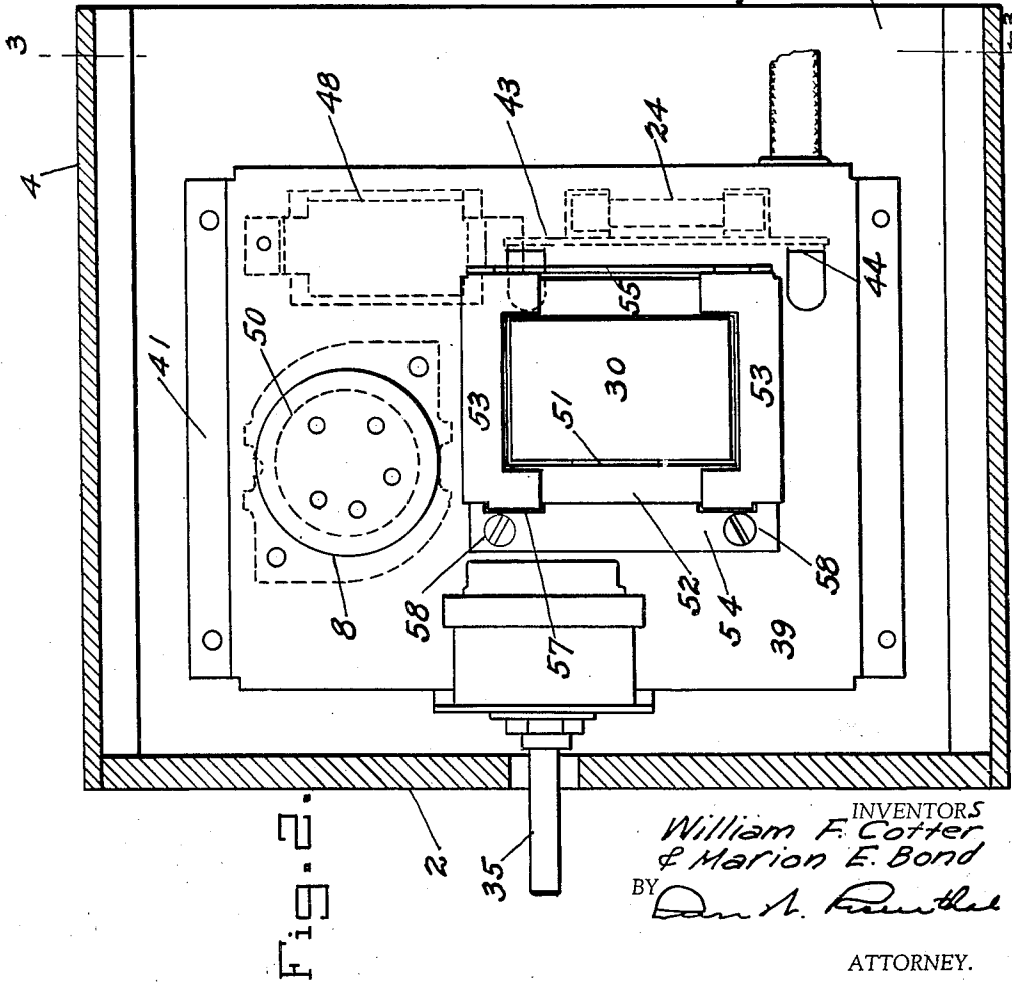
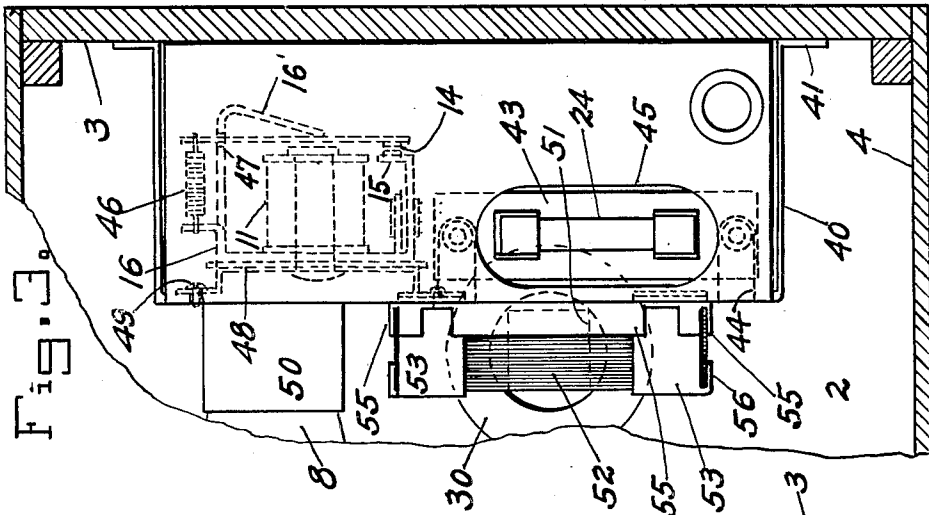
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2 Sheets-Sheet 2



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1,979,453

LOUD SPEAKER

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Renewed April 28, 1934

8 Claims. (Cl. 179—184)

This invention relates to improvements in loud speakers; and especially loud speakers which can be connected directly to the outlet of a light or power circuit to receive and transform audio frequency oscillations impressed thereon by a radio receiver at another point in said circuit.

An object of the invention is to provide a loud speaker in a casing containing devices and connections forming a relay to safeguard the loud speaker against damage, in case the connection to the light and power circuit is incorrectly made, the entire combination being constructed in the form of a single structural unit.

Another object of the invention is to provide a loud speaker containing in the casing thereof means for mounting and supplying current to a suitable rectifier so that unidirectional current can be supplied to the field coil of the speaker.

The foregoing and other objects and advantages of the invention are described in the ensuing specification and the novel features are pointed out in the appended claims; and we of course reserve the right to make changes which do not depart from the principle of the invention or exceed the scope of the terms in which the claims are expressed.

On the drawings:

Fig. 1 is a side view of a loud speaker according to this invention, the casing being partly in section to one side of the center, to show the inside arrangement of the parts;

Fig. 2 is a section on the line 2—2 of Fig. 1;

Fig. 3 is a rear view of what is shown in Fig. 2; the casing being in section on the line 3—3, Fig. 2; and

Fig. 4 shows diagrammatically the arrangement of parts and circuit connections in the speaker.

On the drawings the same numerals identify the same parts throughout.

The body of the loud speaker is shown at 1 and it is secured to the apertured front 2 of the casing having a base 3 and a strip of metal or veneer forming top and sides 4. The rear may be open or closed in any suitable manner. The speaker and the other devices in this casing are supplied with electric current through conductors 5 and 6 forming a suitable cable which may terminate in an ordinary connector plug 7, having prongs or similar terminals to enable the plug to be inserted into the outlet for a vacuum cleaner, electric toaster or any other device to be connected for use in a house or building, or to a suitable plug in a lamp socket. In the casing is also a vacuum tube rectifier 8. As shown in Fig. 4 one end of the conductor 5 is joined by a wire 9

to the field coil 10 of the speaker; this field coil being in series with a relay coil 11, which is also connected by a wire 12 to the cathode 13 of the rectifier 8. The relay coil 11 operates a movable contact 14 into engagement with a fixed contact 15. The latter is joined to the other conductor 6. The contact 14 is carried upon an arm suitably mounted upon the frame 16 of the relay coil, this frame being conductive and joined by a wire 17 to the anode 18 of the rectifier. This rectifier also contains a grid 19 which may be joined outside of the rectifier to the anode to the resistance 20 of about 300 ohms. From a point on the connector 17 between the relay and the anode, leads a conductor 21, to a volume control resistance 22, which is also connected by a wire 23 to the fuse 24. This fuse has a conductor 25 attached to its opposite terminal bearing a ground clamp 26. Engaging the resistance 22 is a movable contact 27 joined to a conductor 28 which leads to the moving coil 29 of the speaker 1, this coil being joined to the wire 23 between the resistance 22 and fuse 24. Also connected to the wire 5 and to the anode 18 as shown is the primary of the filament transformer 30, the secondary of which supplies current to the filament 31 to heat the cathode 13. With this arrangement of connections, the clamp 26 is attached to a pipe or the like leading to the earth in a house or dwelling and when the speaker is to be used the plug 7 is inserted into an outlet to connect it to a light or power circuit. The prongs of the plug 7 must be so united to the power circuit that the fixed contact 15 will be connected to the low or grounded side thereof. Sufficient current will then pass through the rectifier to operate the speaker; but if the plug is reversed, then the speaker will not operate because too little current will pass through the rectifier for this purpose. The particulars of this circuit are recited in the claims of a separate application, Serial No. 662,255, made jointly by ourselves, for a patent on electric relay, filed by us of even date herewith.

The circuit also includes a filter condenser 33 in parallel to both the coils 10 and 11. Also in the line of the conductor 5 there may be a suitable hand switch 34 at a convenient point in the casing. The arrangement of the circuits and various parts in the speaker is shown in Figs. 1, 2 and 3. To operate the contact 27 along the volume control resistance 22, this contact is arranged on a shaft 35, which projects through the front of the casing below the speaker 1 and carries an outside operating knob thereon. The frame of the speaker comprises a bridge-piece 36

which spans the opening in the front of the casing for the loud speaker and to the rear of this bridge piece within the casing is secured a magnetic yoke 37 in which the speaker coils may be placed. The yoke is vertical and the upper and lower ends are secured to rings 38 by which the speaker is mounted on the front 1.

Below the speaker on the base 3 is a platform consisting of a raised plate 39 having its sides and ends 40 turned down to form supports, the lower edges of which are bent outward at 41 to provide feet that can be attached to the base 3. The fuse 24 is carried by this platform in the usual clips fixed to a piece of insulation 43 secured to tongues 44 that are cut from the top of the platform 39 and bent downward. This fuse is exposed to an opening 45 in the downturned rear of the platform 40.

The relay 11 is likewise secured to this platform and the frame 16 thereof is shown having a lug carrying a spring 46 which engages one end of the arm carrying the movable contact 14. This arm rests on a fulcrum 47 formed by inside projections at the sides of a slot in an extension 16' in the frame 16 through which the arm passes. Obviously said arm could be pivotally attached to the frame 16 in any suitable way. Normally the spring pulls on the end of the lever so as to tilt it on the fulcrum 47 and hold it against the frame 16' to keep the contacts apart. This frame is affixed to a yoke 48 beneath the platform 39, the ends of this yoke being attached by screws 49 or otherwise in position. On top of this platform is a socket 50 of the rectifier tube 8.

The filament transformer 30 is supported on top of the platform 39. It has a core 51 at the middle of a square frame 52 that is secured at its ends by metal clips 53 attached to the platform 39. Under the frame is an apertured plate 54 having its one side and two end edges turned-up at 55, and the backs of the clips 53 are turned-down at 56. One downturned end of each clip 53 is clamped by the adjacent upturned edge 55 of the plate 54 and the other end passes through a slot 57 in the plate 54 and is bent under this plate. Suitable fastening means or screws 58 are employed for the purpose of attaching the plate 54 to the platform 39.

With this construction the speaker and the various parts and circuit connections for the relay are all disposed in a single housing with a supply cable containing the conductors 5 and 6 and carrying the lug 7 attached. The speaker can be moved about very easily and plugged into circuit in any room of an apartment or dwelling so as to convert into sound effects any radio signals which are impressed upon the light or power circuit. There is no danger of any damage resulting from a wrong connection because as stated, the rectifier will not operate if the plug 7 is improperly inserted.

Having described the invention, what is claimed is:

1. Apparatus of the class described comprising a casing, a loud speaker therein and devices and connections including a relay and contacts controlled thereby in the casing to enable the loud speaker to be connected to a light or power circuit for signal reception, without risk of damage.

2. A device of the class described comprising a casing, a loud speaker in the casing, a vacuum tube rectifier in the casing, a relay in the casing, and connections for enabling the device to be connected to a light or power circuit so that a pre-

terminated contact of the relay can always be connected to the "low" side of the circuit, and if connected to the "high" side thereof will fail to provide sufficient current to operate the speaker without risk of damage to any of the parts of the device.

3. A device of the class described comprising a casing, a loud speaker therein and devices and connections including a relay and contacts controlled thereby in the casing below the loud speaker to enable the speaker to be connected to a light or power circuit for radio reception, without risk of damage.

4. A device of the class described comprising a casing, a loud speaker therein and devices and connections in the casing below the loud speaker to enable the speaker to be connected to a light or power circuit for radio reception, without risk of damage, said devices comprising a rectifier for part of the windings for the loud speaker and a relay to control the closing of the circuit of said connections.

5. A device of the class described comprising a casing, a loud speaker in the casing, a vacuum tube rectifier in the casing, a relay in the casing, and connections for enabling the device to be connected to a light or power circuit so that a predetermined contact of the relay can always be connected to the "low" side of the circuit, and if connected to the "high" side thereof will fail to provide sufficient current to operate the speaker without risk of damage to any of the parts of the device, said rectifier, relay and connections being mounted in the casing below the loud speaker.

6. A device of the class described comprising a casing, a loud speaker secured therein to the upper part, a vacuum tube rectifier, a relay, and a transformer in the lower part of the casing, means comprising a bottom plate, and end clips for securing the core of said transformer in the casing, said transformer being connected to heat the cathode of the rectifier, a frame mounted to the lower part of the casing to support the relay, and connections for enabling the device to be united to a light or power circuit, so that a predetermined contact of the relay can always be connected to one side of said circuit to operate the speaker and if connected to the opposite side of said circuit will fail to pass sufficient current to actuate the speaker but without damage to any of the parts of the device.

7. A device of the class described comprising a casing, a loud speaker having a field coil mounted in said casing, a power supply circuit, a relay controlling said circuit, and means for energizing said field coil with direct current, said means co-operating with said relay to prevent operation of said speaker when a connection of incorrect polarity is made with said power supply circuit.

8. A device of the class described comprising a casing, a loud speaker having a field coil mounted in said casing, a power supply circuit, a rectifier connected to one side of said circuit and having an output circuit, connections including said field coil in said output circuit, a relay having a winding included in said output circuit, a circuit breaker in the other side of said power supply circuit being controlled by said relay, and connections whereby said rectifier does not pass operating current until a connection of predetermined polarity is established in said power supply circuit.

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