May 12, 1931. W. J. DALTON 1,804,676

RADIO APPARATUS

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Fig. 1

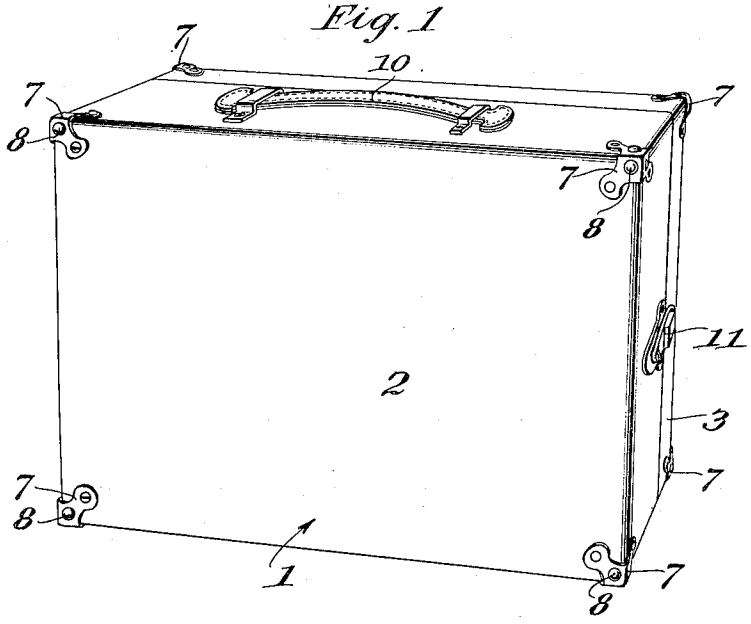
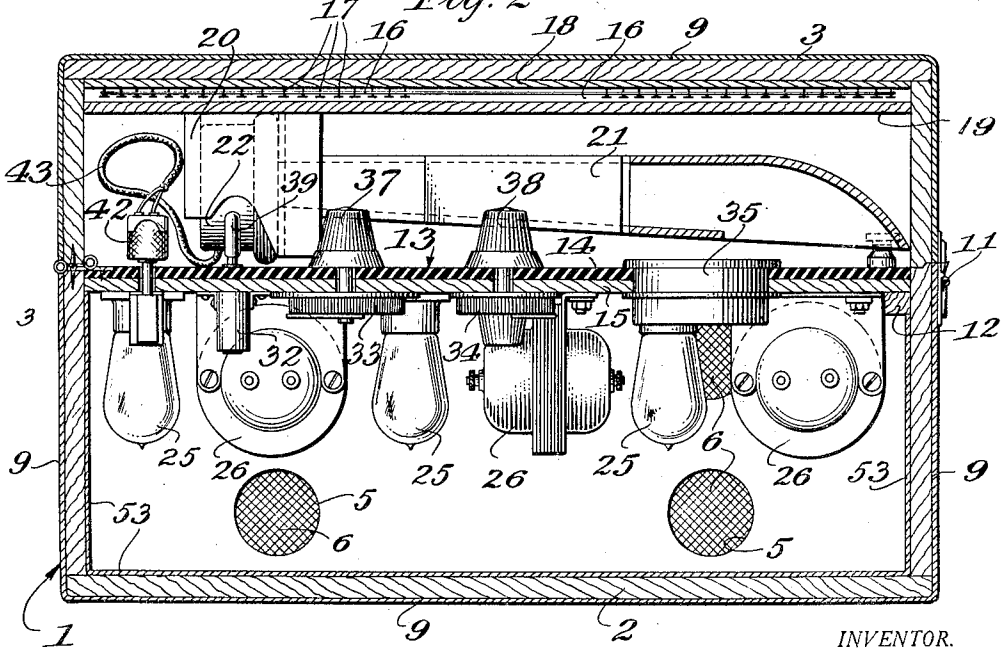


Fig. 2



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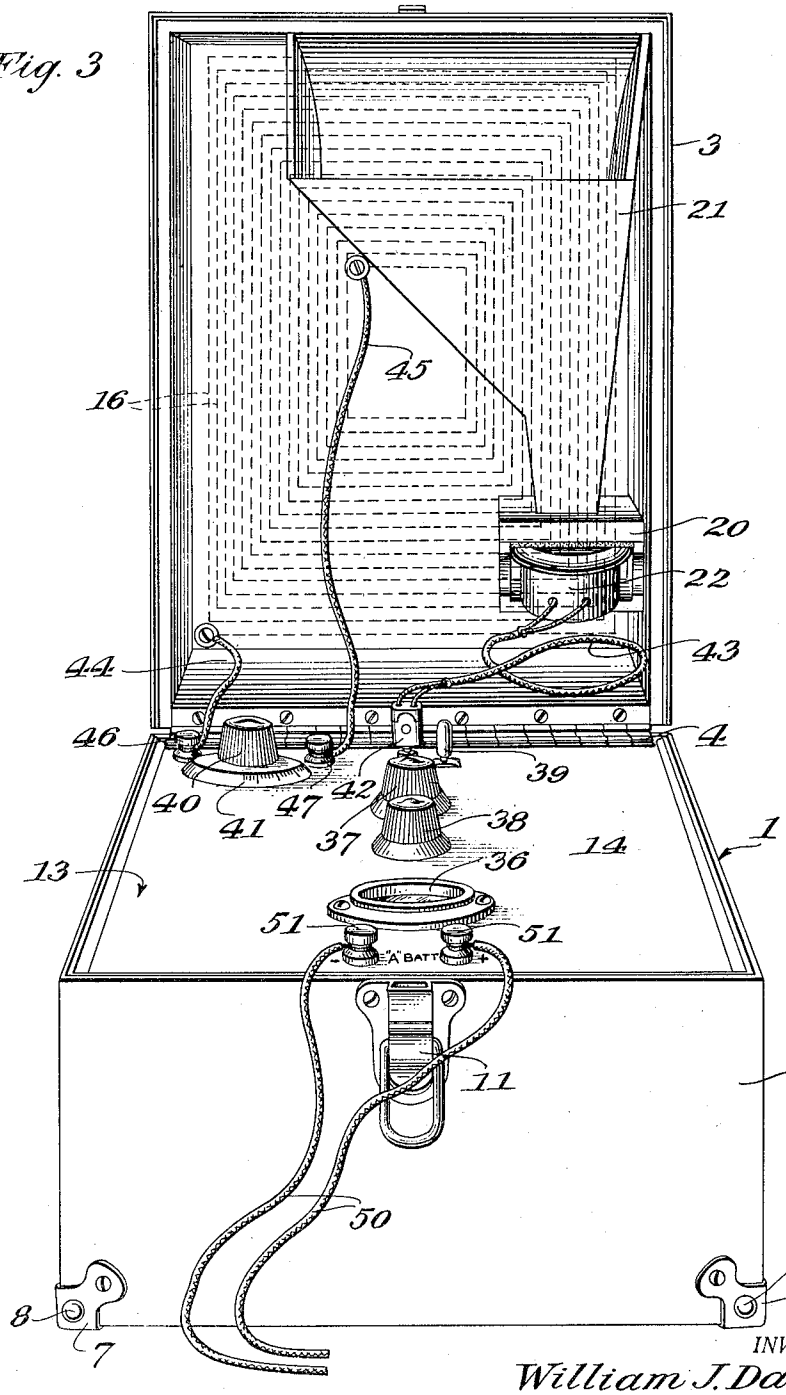
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RADIO APPARATUS

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Fig. 3



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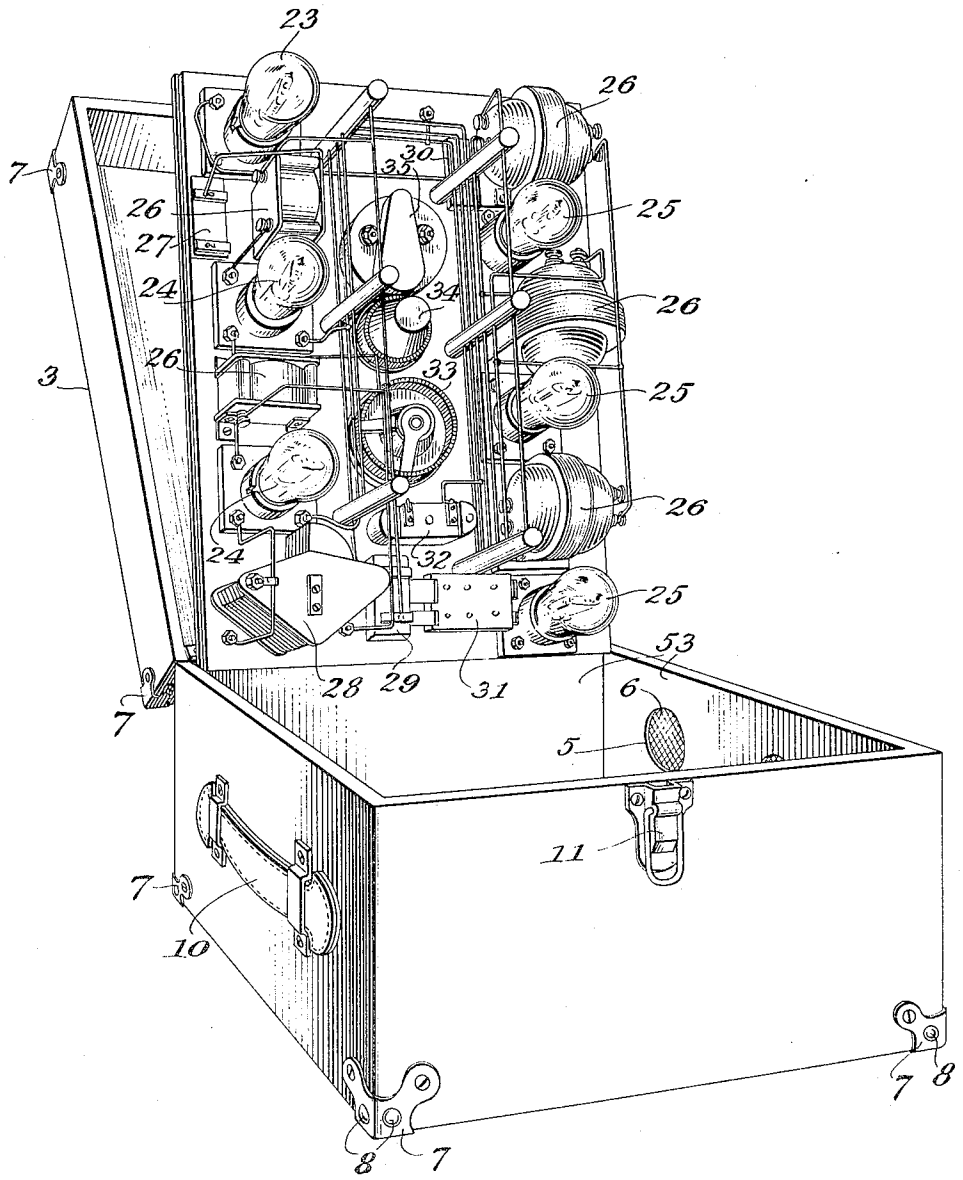
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Fig. 4



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RADIO APPARATUS

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Fig. 5

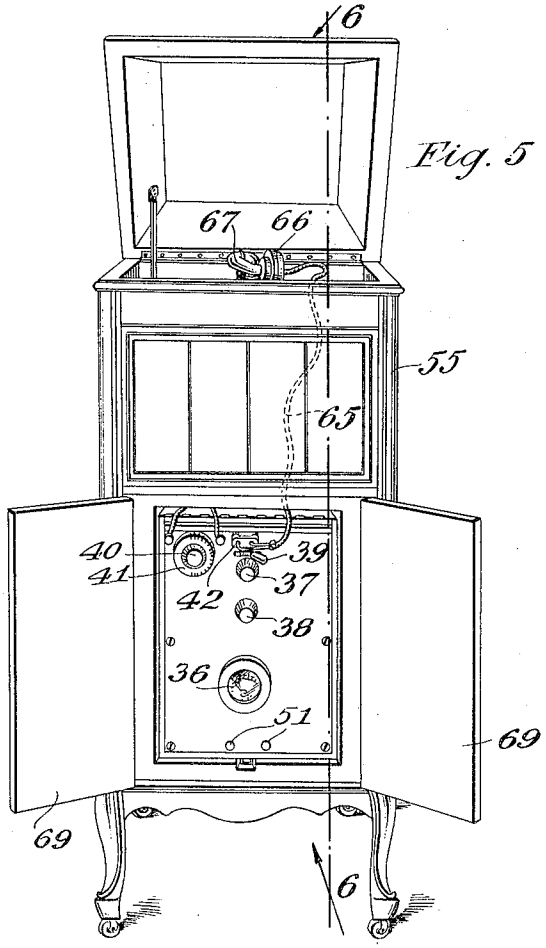


Fig. 6

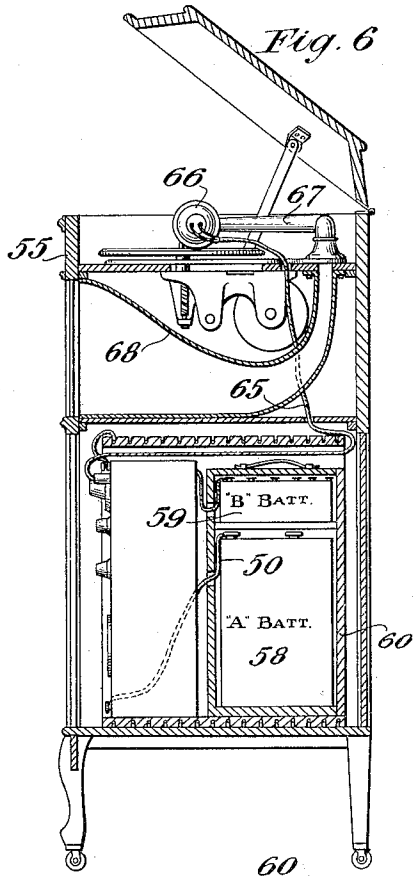


Fig. 7

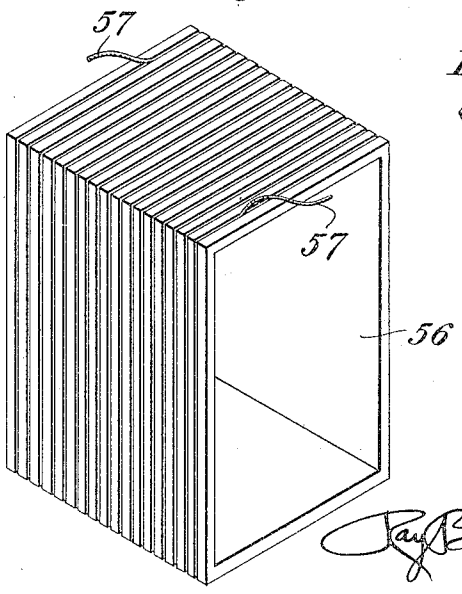
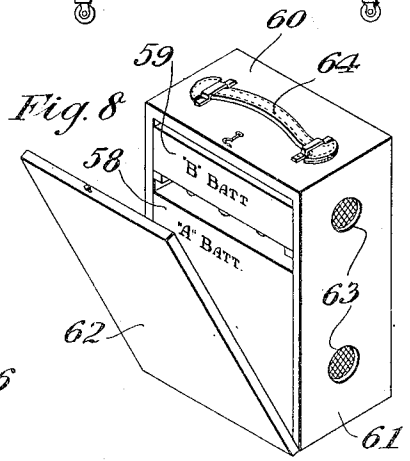


Fig. 8



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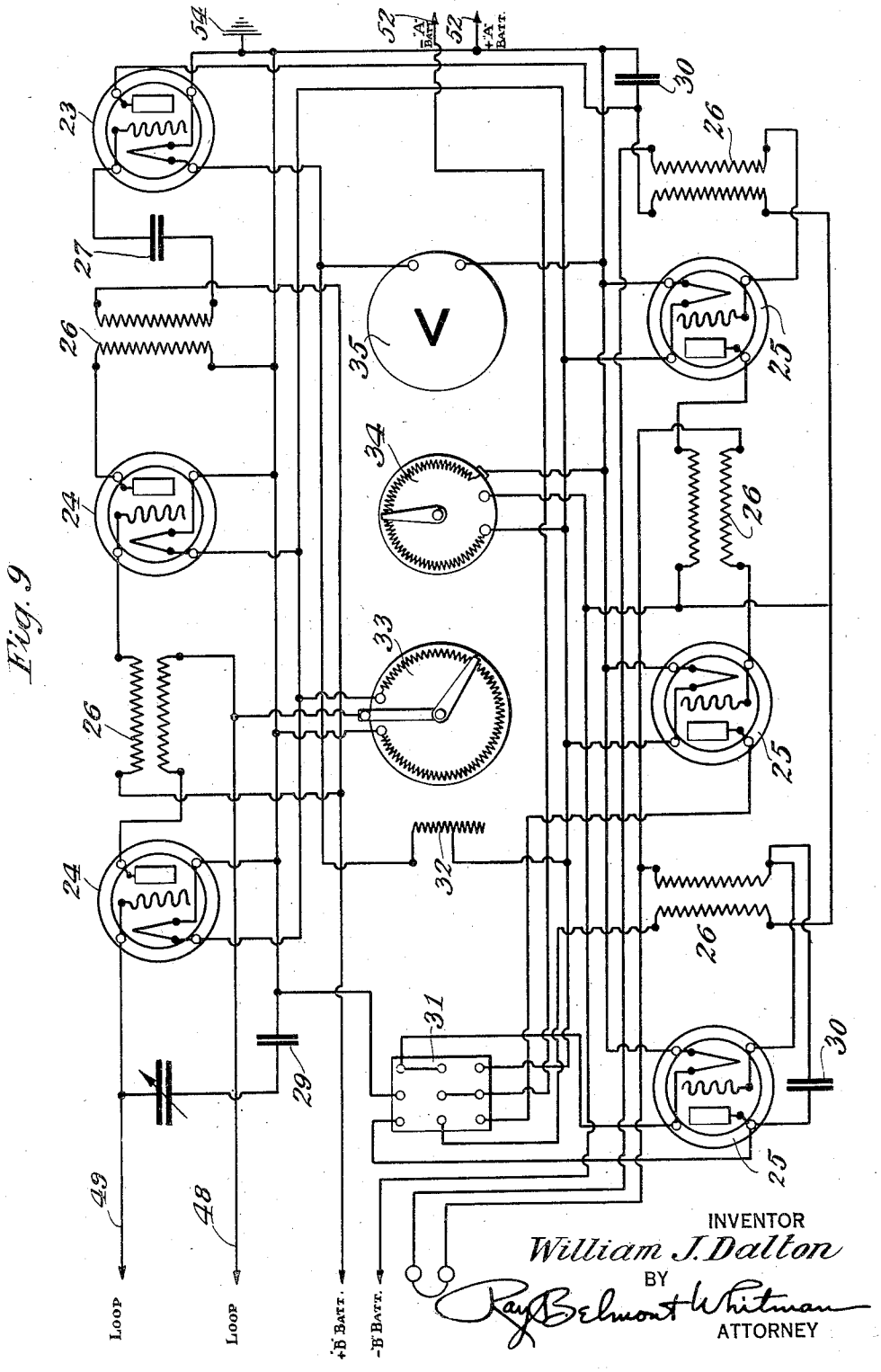


Fig. 9

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UNITED STATES PATENT OFFICE

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RADIO APPARATUS

Application filed March 5, 1925. Serial No. 13,131.

This invention relates to radiant energy, and particularly to radio receiving and like sets adapted to be used either in the home or for carrying about.

A primary object of the invention is to provide a radio receiving set which may be mounted in a phonograph cabinet without interfering with the operation of the phonograph, and which may be readily dismounted from the phonograph and conveniently carried from place to place.

Another object is to provide a radio receiving set which is entirely enclosed in a conveniently handled container, for transportation on camping trips and the like.

A further object is to provide a radio receiving set wherein the entire apparatus, including batteries, an amplifier, and an antenna, is fitted into a cabinet.

An additional object is to provide a radio receiving set for disposition in a phonograph cabinet and wherein the antenna surrounds the remainder of the structure.

Another object is to provide a portable radio set wherein the antenna is concealed in the lid.

A further object is to provide a portable radio set wherein an amplifier is disposed in the lid thereof.

An additional object is to provide a portable radio set including a lid which, when open, exposes the control dials.

Yet another object is to provide a portable radio set including a case, the lid of which contains the antenna, and an amplifier which is exposed when the lid is open.

A further object is to provide a sound-reproducing machine including a base and a lid wherein the reproducing means per se is permanently located in the lid.

A further object is to provide a portable radio set including a case containing two compartments, one of which, in one of its positions, conceals the operating dials for the contents of the other, and which, in its other position, exposes said dials and supports an amplifier in operative position.

Referring to the accompanying drawings:

Figure 1 is a perspective view of the portable container for the radio set, the container being closed and ready for transportation.

Fig. 2 is a longitudinal sectional view thereof.

Fig. 3 is a perspective view with the lid open and in operative position.

Fig. 4 is a similar view, the supporting panel for the radio parts being swung outward to expose the parts.

Fig. 5 is a perspective view of a floor type phonograph cabinet with the apparatus applied thereto.

Fig. 6 is a vertical sectional view of the device shown in Fig. 5, the view being taken on the line 6—6 thereof.

Fig. 7 is a perspective view of a form of loop to be used with the set when installed in a stationary cabinet, such as shown in Figs. 5 and 6.

Fig. 8 is a perspective view of the battery box, the same being partly open to disclose its contents in operative position; and

Fig. 9 is a diagrammatic view showing the wiring diagram or "hook-up," and the relative arrangement of radio parts.

Referring, in detail, to the drawings wherein, for the purpose of illustration, an embodiment of the invention is shown, a case or container adapted to completely enclose a radio set is shown at 1. (Figs. 1, 2, 3, and 4.) The case 1 includes a base 2 and a lid 3 hingedly connected thereto by a double hinge 4. Base 2 is provided with a plurality of combined vent and peep holes, 5, each of which is covered with a wire screen or the like 6. The openings 5 provide for the escape of heat generated within the base during the use of the set.

At each corner of the cabinet 1 there are provided corner plates 7 (Fig. 1) adapted to reinforce and protect the corner construction. Further, the plates 7 are provided with bosses 8 for supporting the flat surfaces of the cabinet out of contact with the supporting surface. The case, which is of wood, preferably has its outer surface covered with leather or the like 9.

A strap 10 (Figs. 1 and 4) is secured to one longitudinal edge of the case 1 and forms a hand grip by means of which the

case and its contents may be carried from place to place. Hinge 4 is disposed at one transverse edge of the case, and the opposite transverse edge carries a fastening means 11 whereby the case may be held closed. The fastening means shown is purely by way of example, and if desired, or found necessary, a lock of any preferred type may be substituted.

Disposed across the inner face of the forward transverse edge of the base 2, adjacent the upper edge thereof, is a strip or ledge 12 (Fig. 2). This ledge supports the forward edge of a dividing panel 13. This panel 13 includes an upper layer 14 of suitable insulation, such as bakelite, and a lower layer 15 of wood previously treated with paraffin and resin (half-and-half) to make it impervious to moisture and insulation. These two layers are formed integral to comprise the panel 13, whose object will later be fully explained.

The antenna 16 is secured, as by means of tacks 17, to a board 18 which is disposed against the inner wall of the lid or closure 3 (Fig. 2). Board 18 is secured to the lid 3 by any suitable means and the tacks 17 are so arranged, relatively, that the antenna 16 is in the form of a series of substantial squares, one within the other. This feature is best shown by the dotted line in Fig. 3. A board 19 (Fig. 2) is disposed in the lid 3 in a position to conceal the antenna. This board also serves an additional purpose which will later be described.

A base 20 of a horn or amplifier 21 (Figs. 2 and 3) is secured to the board 19 to move therewith and with the lid 3. The amplifier is so disposed in the lid that when the lid is opened, the amplifier is moved to operative position. The base 20 of the amplifier is made hollow to receive a sound reproducer 22 of any, or the usual, construction used in connection with the radio receiving sets.

A radio receiving set, including tubes, transformers, a detector rheostat, condensers, a voltmeter, potentiometers, and a switch, together with the necessary telephone jack, is disposed at the under side of panel 13 and mounted thereon to move therewith (Figs. 2 and 4). The manipulating portions of the apparatus are disposed at the upper side of the panel when closed. (Figs. 2, 3, and 5). Panel 13 is secured to a leaf of the hinge 4 and may be readily swung into the position shown in Fig. 4 to expose the parts for inspection, repair, replacement and the like.

Of the parts at the under side of the panel 13, a detector is shown at 23, Fig. 4, and diagrammatically in Fig. 9, reference being had to both figures. The set has five stages of amplification, three of audio-frequency, and two of radio-frequency. As shown, two radio-frequency tubes 24 and three audio-frequency tubes 25 are provided. Each of these tubes 24 and 25 has a transformer 26 associated with it.

A grid condenser and leak 27 is provided in circuit with the detector tube 23. A variable condenser 28 is provided in the lead-in line from the loop or antenna and has a fixed condenser 29 in circuit therewith. Two other fixed condensers 30 are provided in circuit with the audio-frequency tubes 25.

An anti-capacity switch is provided at 31, the same being disposed adjacent the hinged end of the panel 13. Also, a detector rheostat 32 is placed in the main circuit and is disposed between the switch 31 and a potentiometer 33 for the radio-frequency tubes. There is a potentiometer 34 for the circuit in which the audio-frequency tubes are located. Also, a voltmeter 35 is employed, the same being readable from the upper side of the panel 13 through a glass 36 (Figs. 3 and 5).

Operating knobs 37 and 38, for the potentiometers 33 and 34, respectively, are positioned at the upper side of the panel 13, to provide for the convenient operation thereof. The detector rheostat 32 has an operating handle 39 and a knob and dial 40 and 41, respectively, are provided for proper and convenient manipulation of the variable condenser 28. A plug 42 is inserted into a telephone jack and has leads 43 to the reproducer 22.

Wires 44 and 45 (Fig. 3) connect the antenna 16 with the terminals 46 and 47 which also have connection with the wires 48 and 49 (Fig. 9) at the under side of the panel 13. A pair of wires 50 (Fig. 3) form a connection between the terminals 51 and an "A" battery. Terminals 51 have contact with wires 52 (Fig. 9) at the under side of the panel 13.

The base 2 of the case 1 is lined with a sheet of copper. This lining is represented at 53 and acts as a counterpoise, a ground wire being shown at 54. The parts are substantially enclosed by this lining and the sheet 14 of insulation. In this way, a shield is formed around the operating parts and interference therewith by outside disturbances is prevented. The use of this shield is, of course, optional and is only desirable with certain sets.

When the lid 3 is closed, the operating or manipulating parts are enclosed and protected. Also, the horn or amplifier 21 and the microphone 22 will be concealed. In fact, when the lid 3 is closed, the case or cabinet has the appearance of a piece of high-grade luggage.

The set is adapted to be arranged in a phonograph cabinet 55 in such a manner as not to interfere with the operation of the phonograph. To adapt the cabinet to re-

ceive the set, the record storage space is cleared of shelving, etc. Next, an antenna (Figs. 6 and 7) comprising a frame or open-ended hollow rectangular member 56 having grooves in which the wire 57 is wound, is disposed in the record compartment of the cabinet. The wires being disposed below the surface of the member 56, there is no chance of their being short-circuited or chafed. Furthermore, due to the depth of the loop the set in connection with which the antenna is used will be non-directional.

"A" and "B" batteries 58 and 59, respectively, are positioned in a box or receptacle 60 (Fig. 8) which is positioned within the frame 56 in the cabinet (Fig. 6). The battery box or receptacle 60 includes a body 61 and a lid 62 hingedly connected thereto. Body 61 has a plurality of openings or vent holes 63. To provide for the convenient moving about of the battery box, the same is equipped with a strap 64 forming a hand grip.

After the battery box 60 is in position as shown in Fig. 6, the base 2 of the case 1 is positioned within the frame 56 in the cabinet. The batteries 58 and 59, as well as the antenna, are connected with the set in the usual manner.

A wire 65 leads from the switch 31 to a telephone-receiver 66 which is substituted for the ordinary phonograph reproducer. Telephone-receiver 66 is secured to the outer end of the tone-arm 67 by a pin and slot arrangement, as is common in phonograph manufacture. In this manner, the phonograph horn 68 serves as an amplifier for the radio as well as for the phonograph. The doors 69 of the phonograph 55 are closed in the usual manner to cover or conceal the manipulating knobs of the radio set.

When it is desired to use the phonograph mechanism, the telephone-receiver 66 is detached and an ordinary phonograph reproducer is attached to the tone-arm 67. The receiver 66 may again be readily reattached upon the phonograph reproducer being removed from the tone-arm. Horn 68 serves excellently in its dual capacity as amplifier for the phonograph and radio. Further, the addition of the radio to the cabinet 55 does not detract from its appearance.

In addition to the above, the radio receiving set may be readily dismounted from the cabinet and a portable set formed. This is a very advantageous arrangement, as a stationary cabinet set is provided for home use and is of such construction that it may readily be converted into a portable set for use on camping trips and the like. The owner of the device will, therefore, have in one set, all the advantages of both a portable and a non-portable set.

When the set is to be used in a cabinet as shown in Figs. 5 and 6, it is but necessary to remove the rear pin of the hinge 4, and the lid 3 may be removed from the base. The base containing the operating parts may then be installed in the cabinet 55. To again convert the set into a portable, it is but necessary to again secure the lid 3 in place on the base. Owing to the particular assembly employed, the operating parts are not deranged in converting the set from a portable and back again.

The battery box 60, together with the batteries, will be carried along when the set is used as a portable. Owing to the novel arrangement of the batteries in the box 60, they may be conveniently moved about with the set and are not apt to have their terminals broken, etc. Also, this arrangement provides for the neat and compact placing of the parts in the cabinet 55. Moreover, it is not necessary that two sets of batteries be provided—one for use with the set when in the cabinet 55, and another when it is used as a portable.

It will be understood that the only part provided in duplicate—in order to provide a portable and a non-portable set in accordance with this invention—is the loop antenna. However, this part is of small value and the part may be built by unskilled persons at little cost.

From the foregoing description, taken in connection with the accompanying drawings, it will be readily appreciated by those skilled in the art that many novel features of this invention may be used without the other features. Moreover, the different parts of the invention may be rearranged by skilled persons and good results obtained. Therefore, it is to be definitely understood that the invention is not to be considered as limited by this disclosure, the latter being by way of illustration and not by way of limitation. For a definition of the limitations of the invention, reference must be had to the annexed claims wherein the invention is defined.

I claim:

1. In combination, a cabinet, a radio set, and an open-ended frame non-rotatably mounted within the cabinet including a set supporting base, side walls, and a top wall, and an antenna disposed about the frame and extending substantially throughout its depth, the depth of said frame substantially approaching its other dimensions whereby the antenna is non-directional, said set being disposed within and surrounded by said frame and antenna.

2. In combination, cabinet, a radio set, and an open-ended frame non-rotatably mounted within the cabinet including a set supporting base, side walls, and a top wall, and an antenna disposed about the frame and extending substantially throughout its depth, the depth of said frame substantially approaching its

other dimensions whereby the antenna is non-directional, and set being removably disposed within and surrounded by said frame and antenna, and a loud speaker unit permanently mounted in said cabinet.

3. In combination, cabinet, a radio set, and an open-ended frame non-rotatably mounted within the cabinet including a set supporting base, side walls, and a top wall, an antenna disposed about the frame and extending substantially throughout its depth, the depth of said frame substantially approaching its other dimensions whereby the antenna is non-directional, said set being removably disposed within and surrounded by said frame and antenna, and batteries also disposed within and surrounded by said frame and antenna.

4. In combination, cabinet, a radio set, and an open-ended frame non-rotatably mounted within the cabinet including a set supporting base, side walls, and a top wall, an antenna disposed about the frame and extending substantially throughout its depth, the depth of said frame substantially approaching its other dimensions whereby the antenna is non-directional, said set being removably disposed within and surrounded by said frame and antenna, and a portable battery carrying case adapted to contain "A" and "B" batteries removably disposed within and surrounded by said frame and antenna.

Signed at Bridgeport, in the county of Fairfield, and State of Connecticut, this 16th day of February, A. D. 1925.

WILLIAM J. DALTON.