

June 13, 1944.

O. A. SHANN

2,351,459

TELEPHONE SET

Filed June 8, 1943

2 Sheets-Sheet 1

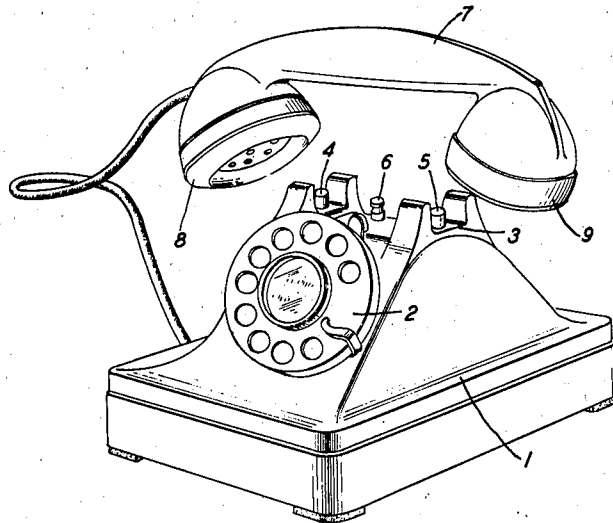


FIG. 1

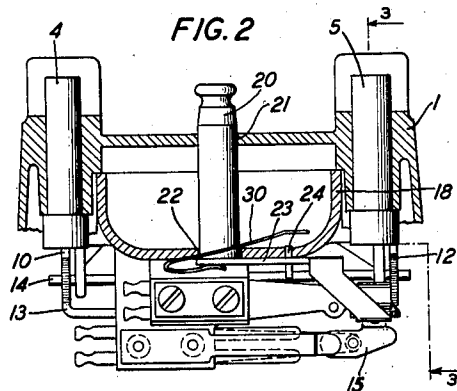


FIG. 2

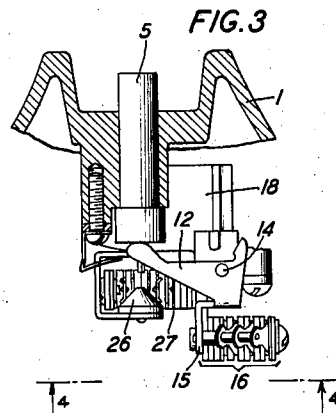


FIG. 3

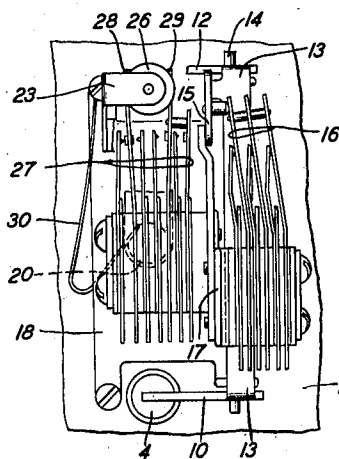


FIG. 4

INVENTOR
O. A. SHANN
BY
W. V. McKenney
ATTORNEY

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O. A. SHANN

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2 Sheets-Sheet 2

FIG. 5

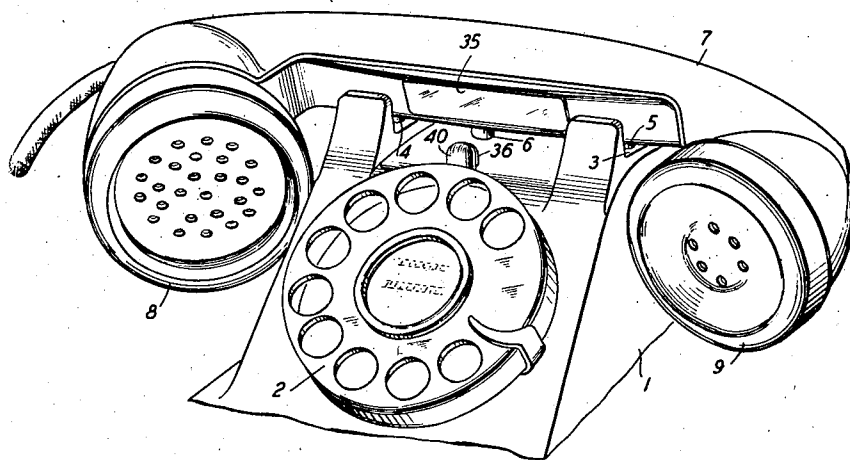


FIG. 6

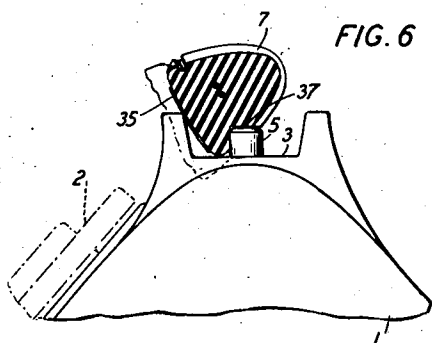


FIG. 7

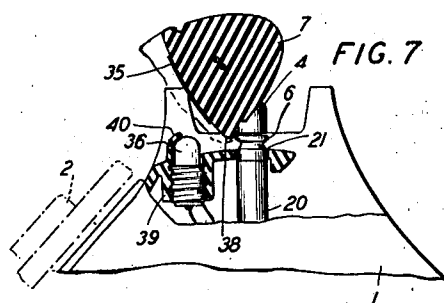


FIG. 8

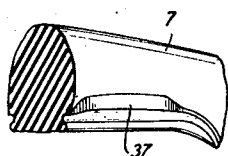
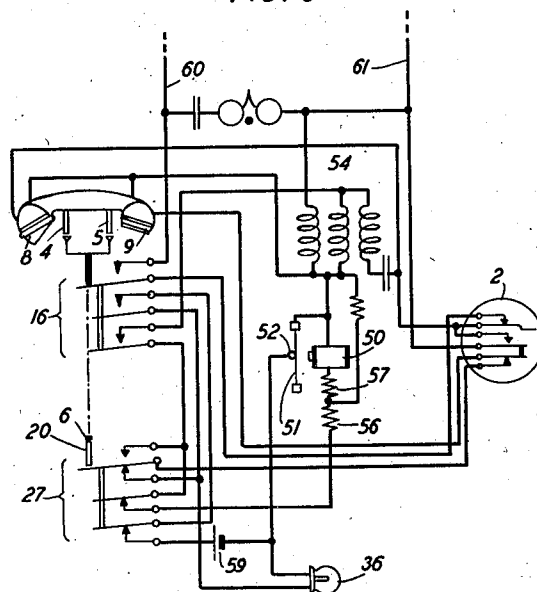


FIG. 9



INVENTOR
O. A. SHANN
BY *W. R. McKenney*
ATTORNEY

UNITED STATES PATENT OFFICE

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TELEPHONE SET

Oscar A. Shann, Short Hills, N. J., assignor to Bell Telephone Laboratories, Incorporated, New York, N. Y., a corporation of New York

Application June 8, 1943, Serial No. 490,034

12 Claims. (Cl. 179-100)

This invention relates to telephone sets and particularly to improvements in switching mechanisms for such sets.

An object is to increase the utility of such sets and materially simplify the manipulation of the telephone equipment.

Heretofore telephone sets have been used in which plungers in the cradle where the handset normally rests control switching contacts to close the line circuit when the handset is removed from the cradle. Other plungers and contacts have also been provided to control amplifying and volume control devices for the receiver when the telephone set is in use. Lighting devices for illuminating the sets and the dial equipment have also been used and controlled by various switching arrangements in the telephone set.

The present invention relates to arrangements in telephone sets of instrumentalities of these general characteristics to simplify the manipulations required in dialing a desired subscriber over the associated line circuit. A feature thereof is the provision, in addition to the usual plungers in the cradle and the line switching contacts controlled thereby, of a special plunger in the cradle and switching contacts controlled thereby, of a sound amplifying device and a lamp and circuit connections for these equipments and a reflecting mirror on the underside of the handle portion of the handset, said elements and circuits being so arranged that by tilting the handset in the cradle until notches in the handle portion thereof engage the plungers for the line switching contacts these plungers are released to permit the line switching contacts to close the line circuit to the set, while the special plunger is held in its normal position by the handset in this tilted position. Under these circumstances the circuit connections include the amplifying device in the receiver circuit with a local battery and close a circuit to light the lamp from this battery. The tilted position of the handset now causes the rays from the lighted lamp to be reflected by the mirror in the handle portion to illuminate the dial. The subscriber may then dial a desired number without removing the handset. If the line is busy, the busy tone will be distinctly heard in the receiver due to the presence of the amplifying device in its circuit. If the line is idle the subscriber may remove the handset from the cradle and in so doing the special plunger will be released to permit the switching contacts controlled thereby to remove the amplifying device from the receiving circuit and open the lamp circuit to extinguish the lamp.

The lamp will be so placed in the stand that the light rays therefrom will be shielded from the subscriber's eyes.

The applicant's invention has been illustrated in the accompanying drawings, in which:

Fig. 1 shows a perspective of a telephone set with the handset removed from the cradle and provided with the usual dialing equipment and to which the applicant's invention has been applied;

Fig. 2 is a cross-section of a part of the handset taken on a line directly through the cradle across the usual plungers and the special plunger arranged in accordance with the applicant's invention;

Fig. 3 is a partial cross-section taken approximately on the line 3-3 of Fig. 2 showing one of the line switching contact plungers and the mechanism controlled thereby;

Fig. 4 is a partial view taken from the bottom of the handset showing the line switching contacts and the special contacts controlled by the special plunger;

Fig. 5 shows a portion of the telephone set with the handset tilted in its cradle;

Fig. 6 is a partial cross-section through the handle part of the handset showing how it is locked in tilted position by one of the regular plungers;

Fig. 7 shows a cross-section similar to that shown in Fig. 6 taken across the special plunger and the lamp inserted on one side of the cradle;

Fig. 8 shows a partial perspective of the handle of the handset with one of the notches clearly shown; and

Fig. 9 shows a typical subscriber's telephone circuit with the applicant's invention applied thereto.

The telephone set illustrated in Fig. 1 consists of the usual housing 1, a dial 2, a cradle 3 through which the usual line switching plungers 4 and 5 protrude and also the special plunger 6, the purpose of which will be described hereinafter. The handset consists of the handle 7 with the transmitter 8 and the receiver 9. Referring now particularly to Figs. 2, 3 and 4 in particular, it will be noted that the regular line switching plungers 4 and 5 operate on levers 10 and 12 forming part of a bracket 13 rotatably mounted on the shaft 14. This bracket controls, by means of a projection 15, the line switching contact set 16 supported on a projection 17 from the member 18 secured inside the housing 1. Normally when the handset is placed in the cradle these plungers are depressed, rotating the bracket 13 to

maintain the line switching contacts 16 open. In Fig. 4 these contacts have been shown closed as it is assumed that the handset has been removed. In the middle of the cradle is located a special plunger 20 which is journaled in the cradle 3 at 21 and in the support 18 at 22. Attached to this plunger and running first in a horizontal direction is the bracket 23 which is guided by a pin 24 so as not to turn when the plunger is depressed. This bracket 23 beyond the pin 24 is bent downwardly in an oblique direction and then horizontally to form a support for a cone-shaped insulation button 26 for control of the special contact group 27 mounted on the extension 17 on the opposite side of the line switching contacts 16. Normally when the plunger is down in its lower position the button 26 is located below the springs 27 and when it is raised the button 26 separates two of the contacts 28 and 29 of the group 27 and thereby causes various combinations of connections to be made between the contacts and in this group. The button normally is made to rise into a position to control the contacts 27 by means of a spring 30 secured to the member 18. In Fig. 4 the contacts 28 and 29 have been shown separated to establish the connection desired when the handset is removed from the cradle.

Referring to Figs. 5 to 8, these figures illustrate how the handset may be tilted in the cradle. In Fig. 5 it is shown lying in the cradle in the tilted position and the mirror 35 secured to the underside of the handle 7 is in position to reflect rays from the lamp 36 which is located in front of this mirror but out of reach of the handle of the handset no matter in what position it is located. In this tilted position of the handle 7 the notches such as 37 on the rear side of the handle engage the plungers 4 and 5 and permit these plungers to lock the handset in this position and to rise sufficiently to cause the closure of the line switching contacts 16 as shown in Fig. 6 for example. In Fig. 7 it will be noticed that the special plunger 20 is not permitted to rise sufficiently to operate the contacts 27 but is held in its downward normal position by the edge 38 of the handle 7 in the tilted position in the same manner as it would be held when the handset rests normally in the cradle. In Fig. 7 is also shown a cross-section where the lamp 36 is located. This housing 1 may be so shaped that when the lamp is screwed into its socket 39 in the housing it will be in a position where a shielding portion of the housing as shown at 40 prevents rays from this lamp to be directed in the subscriber's eyes while on the right-hand side of the lamp looking at Fig. 6 the rays may shine on the mirror 35 and be reflected by this mirror directly on to the dial 2 and illuminate it sufficiently so that in case the dial is to be operated in the dark sufficient light will shine on the dial to permit the numerals to be observed by the subscriber. The dial may be made of a transparent material that will aid in further diffusing the rays from the lamp to illuminate the dialing.

Referring now to the circuit diagram shown in Fig. 9, the manipulation of the telephone set in dialing will now be described. When the subscriber desires to dial a number he will tilt the handset to the position shown in Figs. 5 to 7 and thereby cause the plungers 4 and 5 to rise to close the switching contacts 16. It should be observed, of course, that at this time the plunger 20 is not moved to change the condition of

the contacts 27. By this movement of the handset the line circuit is closed through to the central office to permit dialing. It should also be observed that an amplifier, which may consist of the usual magnet 50, diaphragm 51 and microphone contact 52, is included in the receiver circuit when the switching contacts 27 are closed. This amplifier may be enclosed in the housing 1 with the other standard elements of the telephone set such as the induction coil, ringer and condenser. The receiver circuit under this condition may be traced from the receiver 9 through the middle winding of the inductance coil 54, contacts 16 and 27, resistances 56 and 57, winding of coil 50, diaphragm 51, button 52, battery 59, contacts 27, contacts 16 and 27, contacts of dial 2 back to the receiver 9. Therefore, if the called line is busy the busy tone transmitted across the line conductors 60 and 61 will pass from conductor 60, contacts 16, contacts of the dial 2, transmitter 8, the left-hand winding of repeating coil 54 to conductor 61 and will be repeated to the middle winding of this coil over the above traced receiver circuit and amplified through the amplifying device. Thus this tone will be distinctly heard in the receiver while it remains on the cradle in the tilted position and thereby save the subscriber from the trouble of removing and replacing the handset in the usual manner when a busy signal is received. All the subscriber has to do is to restore the handset from the tilted position to the normal position in the cradle. Of course, if the line is idle the subscriber will merely remove the handset from the cradle and thereby cause the operation of the contacts 27 as the button 20 will now be permitted to rise in the cradle to operate these contacts. When these contacts are operated the amplifying device will be removed from the receiver circuit which will now extend from the receiver 9 through the middle winding of the repeating coil 54, contacts 16 and 27, contacts of dial 2 back to the receiver, the amplifier circuit being open at contact 27. As stated the lamp 36 will light the moment the handset is put in the tilted position in the cradle. The circuit for this lamp may be traced from the lamp 36 through battery 59, contacts 27 and 16 back to the lamp and thus the light from this lamp will be reflected through the mirror 35 to illuminate the dial. When the handset is removed from the cradle or restored to the normal position in the cradle, this lamp circuit will be opened on the operation of contacts 27.

What is claimed is:

1. In combination, a line, a telephone handset including a receiver, a stand having a cradle for said handset, sound amplifying means in the stand, a signal lamp in the stand, a source of current, means operative when the handset is tilted in the cradle in a certain position for holding it in said position and for lighting said lamp from said source, and connecting the receiver and amplifier in series across said source and to the line and operative when the handset is subsequently removed for extinguishing said lamp and disconnecting said amplifier from the line and the receiver.

2. In combination, a line, a telephone handset, a stand having a cradle for said handset, a dial mechanism having a dial located outside of said stand, a lamp signal, means responsive to the tilting of the handset in the cradle in a certain position for holding it in said position and for lighting the lamp and connecting the dial mech-

anism to the line for dialing, a mirror on said handset in position to reflect light from said lamp on the dial when the handset is in said tilted position.

3. In combination, a telephone handset, a mirror connected to said handset, a stand having a cradle in which the handset normally rests in a certain position to hide the mirror from view, a lamp in said stand, and means operated on the tilting of said handset in said cradle to another position for lighting said lamp and cause rays from said light to be reflected by said mirror on the stand to illuminate it.

4. In combination, a telephone handset, a mirror secured to said handset, a stand having a cradle in which the handset normally rests in a position so that the mirror is hidden from view in the cradle, a lamp in said stand, means operative on the tilting of said handset in said cradle to occupy another position for lighting said lamp, said other position of the handset being such that rays from the light are reflected by the mirror to illuminate the front portion of the stand, means operative on the subsequent removal of the handset from the cradle for extinguishing said lamp.

5. In combination, a line, a telephone handset, a mirror mounted on said handset, a stand having a cradle in which the handset normally rests in a position to hide the mirror from view, a dial mechanism inside the stand having a translucent finger wheel outside said stand, a lamp in said stand, means including plungers in the cradle and switching contacts inside the stand for actuating certain of said plungers when the handset is tilted into a certain position in the cradle to control said contacts to light said lamp and cause the rays from said lighted lamp to be reflected by said mirror to illuminate the finger wheel and to enable the dial mechanism for dialing over the line, and for actuating another plunger when the handset is subsequently removed from the cradle for extinguishing said lamp.

6. In combination, a line, a telephone handset including a receiver, a stand having a cradle in which the handset normally rests, sound amplifying means for the receiver in said stand, switching springs and circuits in said stand for connecting the receiver and the amplifying means therefor to the line, plungers for actuating said springs to normally maintain the receiver and amplifier means disconnected from the line when the handset rests in its normal position in the cradle, said plungers and said handset being so shaped that if the handset is tilted at a certain angle while resting in the cradle, the plungers will be released and engage the handset to hold it in said tilted position, the release of the plungers causing the release of said springs to control said circuits to connect said amplifying means and receiver to the line, another plunger in said cradle operative when the handset is removed from the cradle and other springs and circuits in said stands operative when said last-mentioned plunger is actuated for disconnecting the amplifying means from the receiver and the line.

7. In combination, a line, a telephone handset including a receiver, a desk stand having a cradle in which the handset normally rests, sound amplifying means for the receiver in said stand, a source of current, a signal lamp for illuminating the outside of said stand, switching springs and circuits in said stand for connecting the receiver, the amplifier and the signal lamp across said source of current and to the line, plungers in

said stand for actuating said springs to normally maintain said receiver, amplifier and signal lamp disconnected from the line and from the source of current, said plungers and said handset being so related and shaped that if the handset is tilted in the cradle at a certain angle while remaining in the cradle, the plungers will release and engage the handset to hold it in said tilted position, the release of the plungers causing the release of said springs to control said circuits to connect said receiver, amplifier and signal lamp across said source of current and to said line, another plunger operative only when the handset is removed from the cradle and other contact springs and circuits in said stand actuated by the operation of said other plunger for disconnecting the amplifier and signal lamp from across said source of current and from said line.

8. In combination, a telephone handset, a mirror in said handset, a stand having a cradle in which the handset normally rests in a certain position, a lamp in said stand, three plungers in said cradle normally depressed by the handset when resting in the cradle in the normal position, said plungers being so related to the handset that when the handset is tilted to a certain other position in the cradle two of said plungers are released and engage notches in the handset to maintain said handset in said tilted position while the other plunger is only released when the handset is removed from the cradle, means including contacts in the stand controlled by said two plungers when the handset is in tilted position to light said lamp, a mirror on said handset being so located that when the handset is tilted it will reflect the light from the lamp to illuminate the stand, and means including contacts in said stand controlled by said other plunger when the handset is removed from the cradle for extinguishing said lamp.

9. In combination, a telephone handset, a mirror in said handset, a stand having a cradle in which the handset normally rests in a certain position, a telephone circuit, a line, an amplifier in said stand, a lamp in said stand, plungers in said cradle normally depressed by the handset when resting in the cradle in the normal position, said plungers being so related to the handset that when the handset is tilted to a certain other position in the cradle two of said plungers are released and engage notches in the handset to maintain said handset in said tilted position while another plunger is only released when the handset is removed from the cradle, means including contacts in the stand controlled by said two plungers when the handset is in tilted position to light the lamp and include said amplifier in the telephone circuit to amplify signals received over the line and to connect said line to the telephone circuit in the stand, the mirror in said handset being so located that when the handset is tilted, it will reflect light from the lamp to illuminate the stand, and means including contacts in said stand controlled by said other plunger when the handset is removed from the cradle for extinguishing the light and removing the amplifier from the telephone circuit.

10. In combination, a line, a telephone handset including a receiver, a mirror in said handset, a stand having a cradle in which the handset normally rests in a certain position, an amplifier in said stand, a lamp in said stand, plungers in said cradle normally depressed by the handset when resting in the cradle in the normal position, said plungers being so related to the handset

when the handset is tilted to a certain other position in the cradle that two of said plungers are released and engage notches in the handset to maintain said handset in said tilted position while another plunger is only released when the handset is removed from the cradle, means including contacts in the stand controlled by said two plungers when the handset is in tilted position to light the lamp and connect the amplifier and the receiver in series to the line to amplify signals received over the line, the mirror in said handset being so located that when the handset is tilted, it will reflect light from the lamp to illuminate the stand, and means including contacts in said stand controlled by said other plunger when the handset is removed from the cradle for extinguishing the light and removing the amplifier from the receiver and line.

11. In combination, a line, a telephone handset

including a receiver, a stand having a cradle for said handset, sound amplifying means in the stand, means operative when the handset is tilted in the cradle to a certain position for holding it in said position and for connecting the receiver, and amplifying means to the line to enable the subscriber to hear signals incoming on the line without having to hold the receiver to his ear.

12. In combination, a line, a telephone handset including a receiver, a stand having a cradle for said handset, sound amplifying means in the stand, a dial in the stand, means operative when the handset is tilted in the cradle to a certain position for holding it in said position and for connecting the receiver, and amplifying means to the line for listening and for connecting the dial to the line for dialing.

OSCAR A. SHANN.