

Oct. 15, 1940.

S. T. CURRAN ET AL

TELEPHONE SET

Filed March 30, 1938

2,218,328

FIG. 1

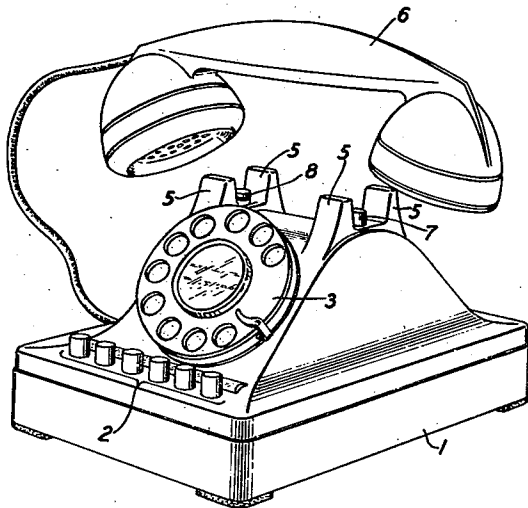


FIG. 3

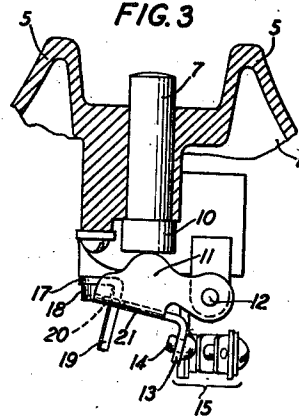


FIG. 2

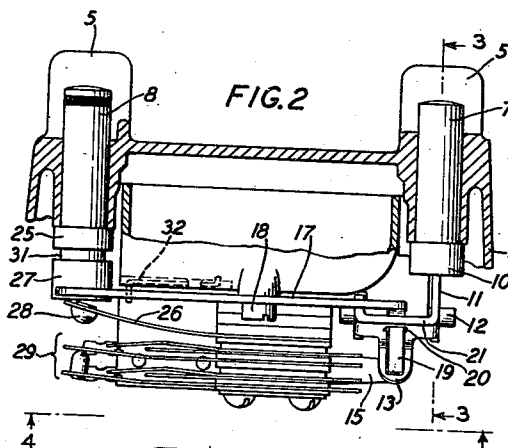


FIG. 4

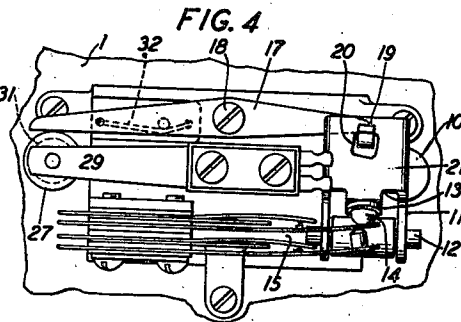
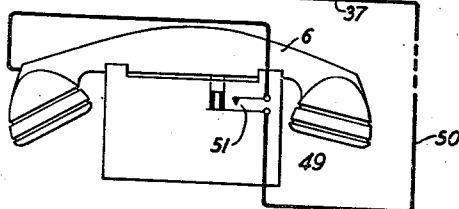
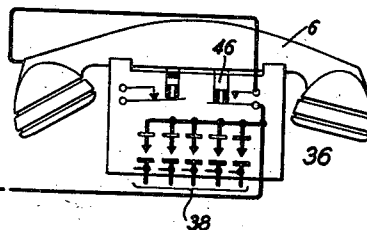
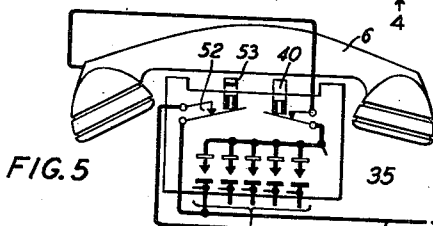


FIG. 5



INVENTORS: S.T. CURRAN
J.J. KUHN

BY

M. J. McKenney

ATTORNEY

UNITED STATES PATENT OFFICE

2,218,328

TELEPHONE SET

Stanley T. Curran, Mountain Lakes, and John J. Kuhn, Elizabeth, N. J., assignors to Bell Telephone Laboratories, Incorporated, New York, N. Y., a corporation of New York

Application March 30, 1938, Serial No. 198,822

8 Claims. (Cl. 179—99)

This invention relates to telephone apparatus and particularly to improvements in subscribers' telephone sets.

The objects of the invention are to increase the usefulness of telephone sets; to facilitate the acts required to manipulate them; to simplify their structure and operation and to secure other advantages and improvements.

It has been the practice heretofore to provide subscribers' substations with means enabling them to perform certain switching operations apart from those which usually result from the removal and replacement of the telephone instrument with respect to the switchhook or cradle. For example, keys have been provided by means of which the subscriber may establish and disestablish telephone connections between his station and extension stations associated with his own line. Also it has been common practice to provide the stations in an intercommunicating system with keys or buttons for making connections.

An arrangement is disclosed in a copending application by A. Tradup, Serial No. 198,819, filed March 30, 1938, in which two plungers are arranged in a cradle and whereby the lifting of the handset from the cradle releases one plunger to operate the usual line spring contacts to connect the telephone set with a line and whereby the subsequent manual lifting or raising of the other plunger causes the operation of so-called secrecy contacts to open the extension telephone connections to secure privacy on the line calling and whereby the replacing of the handset on the cradle restores the two plungers and associated contacts to normal position.

It is a feature of the present invention to secure improvements in telephone sets of the type disclosed in this copending application by an arrangement whereby when the telephone set is lifted from the cradle, one plunger is automatically raised to operate the line contacts and whereby the subscriber may then depress the other plunger to operate the secrecy contacts and whereby said second plunger is locked in operated position and released only by the restoring of the line contact operating plunger to normal.

The invention has been illustrated in the accompanying drawing in which:

Fig. 1 is a perspective of a desk stand for intercommunicating telephone sets provided with a dial for establishing connections to a central office, keys for establishing connections to intercommunicating lines and a plunger equipment in accordance with the present invention;

Figs. 2, 3 and 4 show the construction of the two plungers in the cradle and the contact arrangement controlled thereby; and

Fig. 5 shows in diagrammatic form two regular telephone stations and an extension station equipped in accordance with applicants' invention and with a circuit of an intercommunicating line between these stations and a plunger equipment for excluding the extension station.

Referring now particularly to Fig. 1, the desk stand may consist of a base 1 on which are shown keys 2 for establishing connections between stations and a dial 3 for calling over a line to a central office. This base also is shown provided with four upwardly extending prongs 5 forming a cradle in which a handset 6 may rest when the telephone is not in use. Between the left-hand prongs 5 in this figure is shown a plunger 7 which may control line spring contacts and between the right-hand prong 5 is shown a plunger 8 which may control secrecy contacts.

Referring now to the detail construction of the plungers 7 and 8 and the contacts operated thereby as shown in Figs. 2, 3 and 4, Fig. 2 is a vertical cross-section taken through the center of the cradle of Fig. 1 exposing the two plungers 7 and 8. These plungers are shown in the released position they occupy when the handset is removed. The plunger 7 is inserted in an aperture in the casing 1 and is provided with a lower shoulder 10 to limit its upward movement. The plunger 7 operates on a lever 11 pivoted on a shaft 12 secured in any suitable manner in the casing. Fig. 3 shows a side view of this plunger and associated contacts and the lever 11 taken on the line 3—3 of Fig. 2. This lever 11 has an angular extension 13 provided with an insulating knob 14 which operates on the line spring contacts 15 which may be supported in any suitable manner in the casing 1. When the plunger 7 is in the position shown in Figs. 2 and 3, these contacts are closed and when the plunger is depressed by the replacing of the handset 6, the contacts 15 are opened. As shown in Fig. 4 there are two sets of line spring contacts. Supported on the casing 1 is another lever 17 rotatably connected to the casing by a screw 18. One end of this lever 17 is provided with an angular cam projection 19 which enters an aperture 20 in the bracket portion 21 of the lever 11. The plunger 8 is also inserted in an aperture in the casing 1 and is shown in Fig. 2 in the raised position that it occupies when the handset has been removed from the cradle. This plunger is provided with a shoulder 25 that limits its upward movement

and is, therefore, placed in the position shown by the spring 26 which engages the underside of another shoulder 27. Below this spring 26 are shown the secrecy contacts 29 which are normally closed and if the handset is replaced on the cradle, the plunger 8 is merely lowered to depress spring 26 a short distance, but the spring 26 does not at this time operate on the contacts 29 to open them. In case, however, it is desired to open these secrecy contacts the plunger 8 may, after the handset is removed from the cradle, be depressed below its normal position that it occupies when the handset is on the cradle and thus causes the spring 26 with its insulation knob 28 to engage contacts 29 to open. When the plunger 8 is in this lowered position, the left-hand end of the lever 17 will engage a slot 31 between the shoulders 25 and 27 under pressure of the spring 32 and thus hold the plunger 8 in locked position. The plunger 8 cannot be released from this position until the handset has been again replaced on the cradle at which time the plunger 7 is depressed and restores the lever 11 to normal position. As the lever 11 is restored, the left-hand edge of aperture 20 looking at Fig. 3 engages the cam extension 19 on lever 17 and thereby causes this lever 17 to rotate on its pivotal point at 18 to cause its opposite end to disengage itself from the slot 31 whereupon the plunger 8 will be restored to its normal position by spring 26, that is, the position it occupies when the handset 6 is replaced on the cradle. It is evident that the plunger 8 can also be unlocked by merely depressing the plunger 7 manually.

Fig. 5 shows desk stands as described above employed in an intercommunicating telephone system. The single line arrangement for two regular sets and an extension station has been shown. It should be observed, however, that this line and its connecting contact equipment has only been shown diagrammatically to merely illustrate the general principles of the communication facilities that may be used in connection with the applicants' invention. A description will now be made of the operation of this system. 35 and 36 are regular sets equipped with keys 37 and 38, respectively. The operation of any one of these will select a corresponding line and the removal of the handset 6 will complete a telephone circuit from the calling subscriber's line to the selected line. For example, if the subscriber at station 35 removes his handset from the cradle, his plunger 40 which corresponds to plunger 7 will be raised as described and close a connection from the transmitter and receiver in the handset to the keys 37. Then the subscriber may operate, for example, the left-hand key and close this telephone line connection to the line 45 which may be the line leading to station 36 and suitable circuits may be provided as is well known in the art for ringing the called party at this station. When the subscriber at station 36 removes his handset 6 from the cradle a connection will be completed by the raising of the plunger 46 which corresponds to plunger 7 at this station. At station 35 the handset has been shown removed from the cradle with the plunger 40 raised to close the line contacts, while at station 36 the handset remains in the cradle to show how the connection to the handset is opened. An extension station 49 for station 35 has also been shown. This station is not provided with any keys for intercommunicating, but a connection 50 extends from this station over the line contacts 51 through contacts 52 at sta-

tion 35 to line 45. It should be observed that in case the subscriber at station 49 lifts his handset from the cradle while station 35 is engaged, contacts 51 will be closed and this subscriber will be able to listen in on the conversation between the subscribers at the stations 35 and 36. If, however, these subscribers require secrecy, that is, if they desire to carry on conversation without having the subscriber at station 49 listening in, in case he should remove his handset from the cradle, the subscriber at station 35 may operate his plunger 53 which corresponds to plunger 8 by depressing it as described in connection with Figs. 2, 3 and 4. This will open the contacts 52 and thus break the connection between lines 45 and 50 and prevent the subscriber at station 49 from listening in. Should the subscriber at station 35 then desire to permit the subscriber at station 49 to listen in, he merely depresses the plunger 40 which unlocks the plunger 53 which thereby closes the connection through contacts 52.

It should be understood that while the applicants' invention has been illustrated in connection with a system in which the plunger 8 operates spring contacts 29 that are employed as secrecy contacts to exclude an extension station, such as station 49, such contacts may readily be employed for other purposes without departing from the spirit of the invention.

What is claimed is:

1. A handset, a stand for said handset, two sets of contacts in said stand, a plunger for each set of contacts, a lever cooperating with one of said plungers, means operative in response to the removal of said handset from the stand for causing said lever to raise said first-mentioned plunger and to operate the associated set of contacts, and means for operating said other set of contacts in response to the lowering of the other plunger, a second lever cooperating with said second plunger and said first lever for locking said second plunger in operated position when the first plunger is in raised position and for unlocking it when the first plunger is restored to normal by the replacing of the handset on the stand.

2. A handset, a stand for said handset, two sets of contacts in said stand, a plunger for each set of contacts, a first lever in said stand, a second lever in said stand, means operative in response to the removal of the handset for causing said second lever to raise one of said plungers and to operate said associated set of contacts, means responsive to the lowering of the other plunger for operating the associated contacts, means including said first and second levers and said second-mentioned plunger operative when said first-mentioned plunger is in raised position for locking said second-mentioned plunger in the lowered position and for unlocking said second-mentioned plunger from its locked position when said first-mentioned plunger is restored to normal by the replacing of the handset on the stand.

3. In combination, a telephone handset, a stand therefor having a cradle member in which the handset normally rests, a reciprocating plunger in said cradle movable under control of the handset from a normal position to an operated position, also manually movable from the operated position to the normal position after the handset has been removed, a set of contacts actuated by said plunger in the actuated position, a second reciprocating plunger in said cradle having a normal position and two operated

positions and movable to a first operated position upon the removal of the handset and manually movable from said first operated position to the second operated position, a second set of contacts actuated by said second plunger in its second operated position, and means for locking said second plunger in said second operated position when the first plunger is in its operated position and unlocking it when the first plunger is restored to its normal position.

4. In combination, a telephone handset, a stand therefor having a cradle member in which the handset normally rests, a reciprocating plunger in said cradle movable under control of the handset from a normal position to an operated position, also manually movable from the operated position to the normal position after the handset has been removed, a set of contacts actuated by said plunger in the actuated position, a second reciprocating plunger in said cradle having a normal position and two operated positions and movable in one direction to a first operated position upon the movement of the handset and manually movable from said first operated position to the second operated position in the opposite direction past the normal position, means for locking said second plunger in said second operated position when the first plunger is in its operated position and to permit it to release to its normal position when the first plunger is released to its normal position by the replacing of the handset or to permit it to return to its first operated position when the first plunger is manually released to its normal position when the handset is not replaced.

5. A handset, a stand for said handset, two sets of contacts in said stand, a plunger for each set of contacts, means responsive to the raising of one plunger for actuating the associated set of contacts, means responsive to the lowering of the other plunger for actuating the associated set of contacts, and two levers and a spring co-operating with the said two plungers so that one lever is operated upon by the raising of said first plunger to release the second lever to be acted upon by the spring to automatically lock the second plunger in the lowered position and so that said first lever is operated upon by the lowering of the first plunger to actuate said second lever to unlock the second plunger from its lowered position.

6. In combination a telephone handset, a stand therefor having a cradle member in which the handset normally rests, a reciprocating plunger in said cradle movable under control of the handset from a normal position to an operated po-

sition, a set of contacts actuated by said plunger in the actuated position, a second reciprocating plunger in said cradle having a normal position in which it is held by the handset when resting in said cradle and having an operated position to which it is movable manually after the handset is removed from the cradle, a second set of contacts actuated by said second plunger in its operated position and means for locking said second plunger in said operated position when the first plunger is in its operated position and unlocking it when the first plunger is restored to its normal position.

7. In combination, a telephone handset, a stand therefor having a cradle member in which the handset normally rests, a reciprocating plunger in said cradle movable under control of the handset from a normal position to an operated position, also manually movable from the operated position to the normal position after the handset has been removed, a set of contacts actuated by said plunger in the actuated position, a second reciprocating plunger in said cradle having a normal position and two operated positions and movable in one direction to a first operated position upon the removal of the handset and manually movable from said first operated position past the normal position to the second operated position, a set of contacts actuated by said second plunger when moved into said second operated position, means for locking said second plunger in said second operated position when the first plunger is in its operated position, and to permit it to release to its normal position when the first plunger is released to its normal position by the replacing of the handset or to permit it to return to its first operated position when the first plunger is manually released to its normal position when the handset is not replaced.

8. In combination, a handset, a stand having a cradle in which said handset normally rests, two sets of contacts in said stand, a plunger in said cradle, means for raising said plunger under control of the handset for operating one of said sets of contacts, a second plunger in said cradle having a normal position in which it rests when said handset is in the cradle and having an operated position to which it is lowered manually to operate the other of said contact sets only after said handset has been removed from the cradle and means for locking said second plunger in its lower position and for unlocking it in response to the lowering of said first plunger.

STANLEY T. CURRAN.
JOHN J. KUHN.