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S. T. CURRAN

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KEY-EQUIPPED TELEPHONE SET

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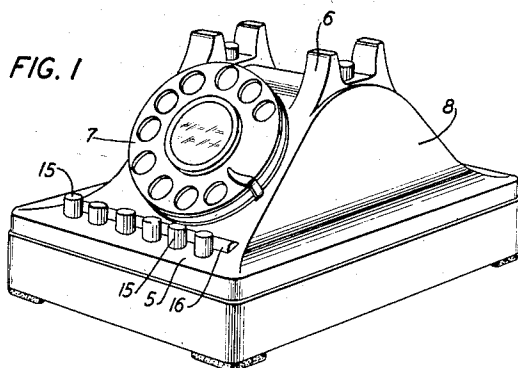


FIG. 2

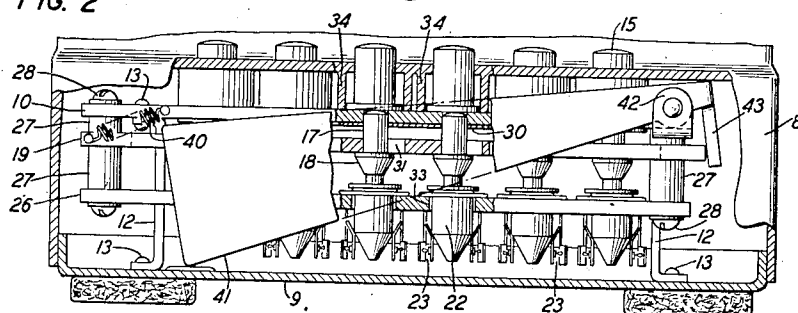


FIG. 3

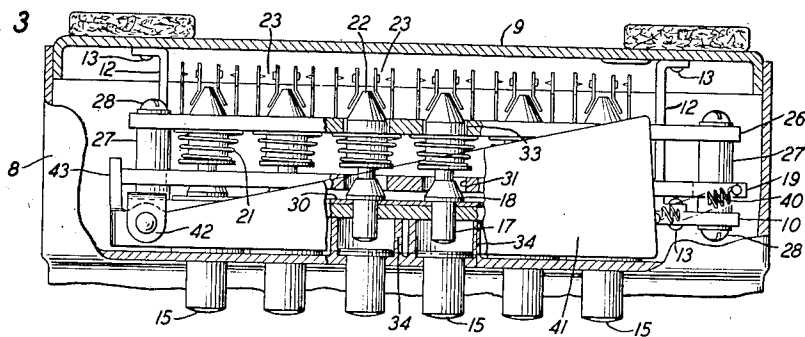
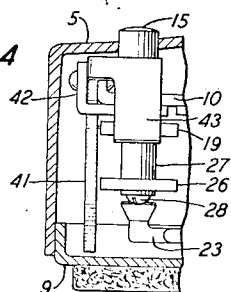


FIG. 4



INVENTOR
S. T. CURRAN
BY *[Signature]*
ATTORNEY

UNITED STATES PATENT OFFICE

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KEY-EQUIPPED TELEPHONE SET

Stanley T. Curran, Mountain Lakes, N. J., assignor to Bell Telephone Laboratories, Incorporated, New York, N. Y., a corporation of New York

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8 Claims. (Cl. 200—5)

This invention relates to telephone sets, and particularly to telephone sets which are equipped with manually operable switching keys.

In certain telephone facilities, subscribers' telephone sets are equipped with manually operable keys which function, when operated, to perform certain switching operations. Such keys are employed as "pick-up" keys, individually assigned to telephone lines, which enable the subscriber whose station is furnished with such a set to connect the telephone set to such lines. Such keys are of the mechanically locking type, so that when one key is actuated it remains in its locked position until released by the actuation of another key of the non-locking type. The non-locking key is usually employed as a holding key.

Some facilities of the type described above do not require a holding key, so that all the keys mounted on the telephone set are "picked-up" keys of the locking variety. It has been found that in such key-equipped telephone sets it is possible for a person, either maliciously or otherwise, to lock all the pick-up buttons down at one time, thereby requiring the attention of a maintenance man to release the keys.

It is the object of this invention to provide for the release of all the keys of a key-equipped telephone set which may have become locked at one time in their operated positions.

This object is attained in accordance with a feature of the invention by the provision of gravity operated means, housed in the base of the telephone set, which functions, when the telephone set is turned upside down, to operate the common key latching device and thereby release the locked keys.

The invention will be readily understood from the following detailed description made with reference to the accompanying drawing, in which:

Fig. 1 is a perspective view of a key-equipped telephone set which is furnished with a built-in key unit comprising six mechanically locking keys. In this figure the handset is not illustrated;

Fig. 2 is an enlarged front view of the base of the telephone set shown in Fig. 1 with the front wall broken away to show the key structure mounted in the base, and the gravity operated latch-plate releasing device in its normal position. In this figure the keys are shown operated and locked;

Fig. 3 is an upside down view of the front end of the telephone set shown in Fig. 1. In this figure the gravity operated releasing device is shown in its operated position; and

Fig. 4 is an end view of the key unit shown in

Figs. 2 and 3, looking towards the operating end of the key releasing device.

As shown in Fig. 1, the telephone set (exclusive of the handset) is provided with a standard type of housing 8, a calling dial 7 and a cradle 6 which is adapted to receive a standard type of handset, not shown. The shelf portion 5 of the set is equipped with key-buttons 15, 15 and in close proximity thereto is a designation strip 16 for designating the telephone lines associated with the respective key-buttons.

The switching keys, as clearly shown in Figs. 2 and 3, comprise a shank portion 17, a locking cam 18 cooperating with a locking plate 19, a mounting plate 10, compression spring 21 and an operating cam 22 which operates the contact springs 23, 23.

The mounting plate 10 is supported on and spaced from the base 9 of the housing 8 by means of the brackets 12, one of which is secured to the plate 10 near both extremities thereof. The bracket ends are flanged and secured to the plate 10 and base 9, respectively, by means of rivets 13, or by any other suitable means. The mounting plate 10 and locking plate 19 are arranged in substantial axial alignment with a lower mounting, or guide plate 26, the three said plates being held in spaced relation by the sleeves 27 and held together as a unit by the screws or bolts 28 whose shanks pass through the sleeves 27 and through corresponding holes in the plates 10, 19 and 26. The mounting of the latch plate 19 on the unit is such as to permit it to move longitudinally in either direction relative to the plates 10 and 26.

The mounting plate 10 is provided with holes or apertures 30 spaced at regular intervals and of such dimensions as to permit the shank portion 17 of the keys to operate freely therein. The latch plate 19 is provided with holes or apertures 31 spaced at regular intervals and of such dimensions as to permit the locking cams 18 to pass therethrough. The lower plate 26 is similarly apertured at regular intervals, as shown at 33, which permits the shank portion of the operating cams 22 to move therein.

The shelf portion 5 of the set 8 is provided with a plurality of spaced integral depending projections 34 which, as shown in Figs. 2 and 3, extend vertically to abut against the upper face of the mounting plate 10. Each pair of adjacent projections 34, with opposite portions of the shelf 5 and plate 10, respectively constitute a compartment in which the buttons 15 are freely confined.

The buttons 15 are shown in their normal un-

operated positions in Fig. 3 and, as therein illustrated, each button occupies a position immediately above the end of a corresponding key shank 17. The buttons 15 protrude from the shelf portion 5 of the housing 8.

When the button of any key is actuated, that is, when it is depressed, it engages the upper extremity of its associated key shank 17 and causes the shank to move downwardly through its corresponding plate aperture 30. In moving downwardly, the shank 17 carries with it its respective cams 18 and 22, the former passing through its corresponding aperture 31 in the latch plate and the latter moving freely in its plate aperture 33 to engage and actuate corresponding sets of contact springs 22. The passage of the locking cam 18 through its associated aperture moves the latch plate to the left (viewing Fig. 2) in a manner well known in the art, and when its passage through the aperture is completed the spring 40 functions to return the latch plate to the right, in which position the plate effectively holds the operated key locked in its operated position. The keys are shown locked operated in Fig. 2.

In usual practice, an operated key is released by the operation of a second key which serves to move the latch plate to the left, so as to permit the return movement of the locking cam 18 of the operated key through its respective latch plate aperture under the restoring action of a compression spring 21. It is apparent that when the keys of the key-equipped set are operated in the manner intended, the problem which the present invention solves does not present itself. As a matter of fact, the said problem does not come into being unless all the keys are operated at one time so as to become locked. In other words, it is possible for any number of keys, fewer than the total number of keys on the set to be operated and locked without requiring the use of applicant's invention. So long as there is one key in its normal unlocked position, it can be employed to release the other keys which may be locked operated. However, should all keys be operated and locked at one time, it is necessary that some other means be resorted to which functions to release the locked keys.

To meet and solve the problem indicated in the preceding paragraph, an elongated gravity operated element 41 is pivotally mounted on an L-shaped bracket 42, which bracket may be secured in any suitable manner to one end of the mounting plate 10, as shown in Figs. 2 and 3. The element 41 is so designed as to have its center of gravity located at a relatively great distance from its pivot support and is provided with a right-angle integral projection 43 which, when the keys are operated, that is, when the latch plate 19 is moved to its locking position shown in Fig. 2, abuts against the end of the latch plate. In this position, the element 41 does not interfere with the normal operation of the keys.

When all the keys have been operated and locked either accidentally or maliciously, as shown in Fig. 2, the telephone set is turned upside down, whereupon the element 41 is moved by gravity about its pivot, so that the right-angle projection 43 thereof engages the end of the latch plate 19 and moves it to its normal position thus allowing the operated keys to release under the action of their respective compression springs 21. Fig. 3 shows the gravity operated member 41 in its operated position and the keys in their normal released positions.

When the element 41 is in its normal position, as shown in Fig. 2, its uppermost right-hand edge (viewing Fig. 2) abuts the under-side of the shelf 5 of the housing 8. If desirable, however, the element 41 may be so designed that instead of its uppermost right-hand edge abutting the under-side of the shelf 5, its lowermost left-hand edge (viewing Fig. 2) may be made to engage the inner face of the base 9. In either case, the element 41 is so designed that, when in its normal position, its integral projection 43 does not interfere with the normal longitudinal movement of the latch plate 19.

The key releasing device of this invention is of such a design as to be readily incorporated in telephone sets already in service without any alterations being made to the key structure. It is simple in design, practical and efficient, and precludes the necessity for affixing any releasing mechanism to the exterior of the set housing, thereby preserving the standard appearance of the key-equipped telephone sets now in service.

While the foregoing description has been directed principally to the operation of the latch plate releasing device by overturning the telephone set, it will be observed that the releasing device may also be operated by lifting the set quickly and arresting its upward motion abruptly enough to throw the weight into the same position with respect to the key unit to which it is moved by gravity when the set is turned upside down.

What is claimed is:

1. In combination, a key unit comprising a plurality of switching keys, all of which may be operated at one time, means for effectively locking all of said keys when all of said keys are operated at one time, and means operated by gravity when said key unit is turned upside down for tripping said locking means.

2. In combination, a housing, a key unit contained in said housing comprising a plurality of switching keys, each key thereof having a manually operable button protruding from said housing for actuating its respective key, a latching device for locking said keys in their actuated positions, and means for operating said latching device to release the operated keys, said means comprising a device confined wholly within the said housing and inaccessible for manual operation from the exterior thereof.

3. In combination, a key unit, a plurality of switching keys included in said unit, a common locking device for locking said switching keys in their operated positions, and means automatically operated when said key unit is overturned for actuating said locking device to release said switching keys.

4. In combination, a key unit, a switching key included in said unit, a latch plate, means associated with said switching key for moving said latch plate when said key is actuated, means for returning said latch plate after the actuation of said key to cause said latch plate to lock said key in its actuated position, and means independent of said key for actuating said latch plate so as to effect the release of said key, said last-mentioned means comprising a gravity operated device operatively associated with said latch plate.

5. In combination, a housing, a key unit mounted in the base of said housing and comprising a plurality of switching keys, a latch plate for locking said keys in their operated positions, and gravity operated means for moving

said latch plate so as to release said keys when said housing is turned upside down.

6. In a key unit, a plurality of depressible switching keys, a latching plate operable by any of said keys for locking the key in its operated position, and means automatically effective when said key unit is overturned for operating said latching plate to release the locked key, said means comprising an elongated weighted member pivotally mounted at one end on said key unit having an integral projection adapted to engage with and operate said latching plate.

7. In a switching device, a plurality of contact operating plungers, means for locking said plungers in their operated positions comprising an apertured latching plate which is displaced longitudinally during the downward passage of said plungers through their respective latch plate apertures by a camming element associated with each of said plungers and restored to normal by a restoring spring when the camming element is depressed beyond the level of the latching

plate, whereby the depressed plungers are held locked in their depressed positions, and means for moving said latching plate longitudinally to permit the locked plungers to release and return to normal positions, said means comprising a gravity operated device adapted to engage with and move longitudinally said latching plate when the switching device is overturned.

8. In combination, a housing, a key unit housed in said housing comprising a plurality of keys, a latching plate operable by any of the keys of said unit to lock the key in its operated position, and means for tripping said latching plate comprising a weighted member housed within said housing, and operatively associated with said latching plate in such a manner that when the housing is raised quickly and its upward movement is stopped abruptly the said weighted member functions to operate said latching plate to release the operated key.

STANLEY T. CURRAN.