

No. 857,621.

PATENTED JUNE 25, 1907.

A. M. HAUBRICH.
SWITCHING DEVICE.
APPLICATION FILED SEPT. 28, 1904.

Fig. 1.

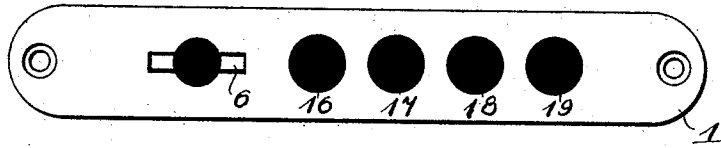


Fig. 2.

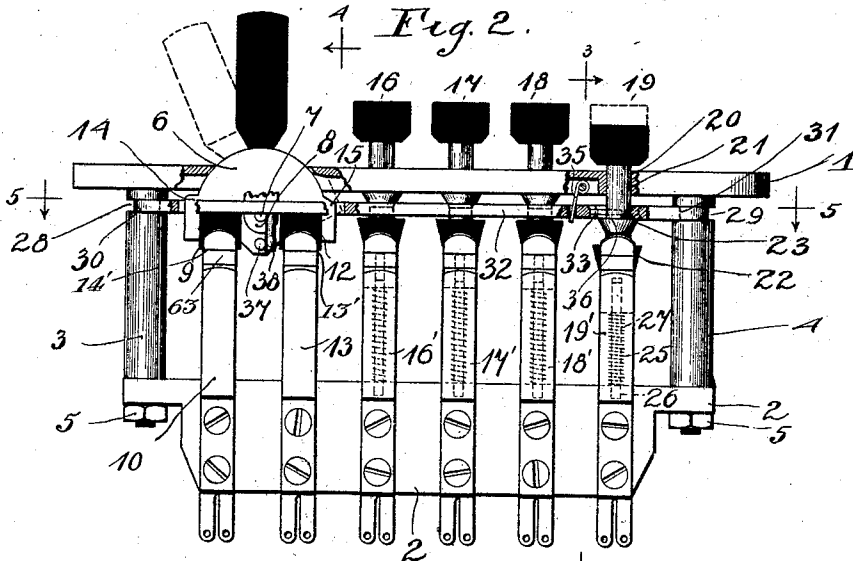


Fig. 3. Fig. 4.

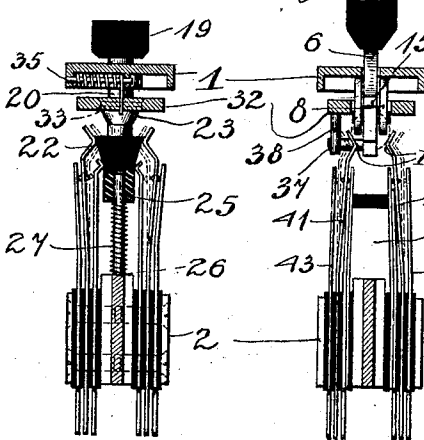


Fig. 5.

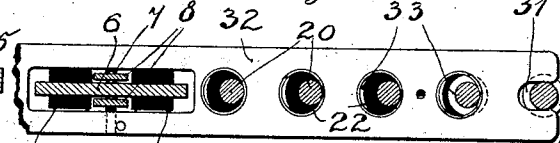
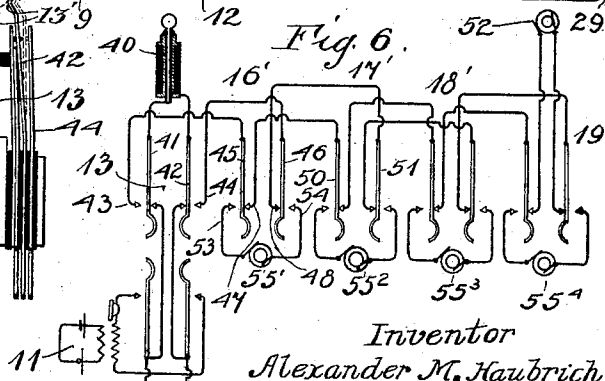


Fig. 6.



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SWITCHING DEVICE.

No. 857,621.

Specification of Letters Patent.

Patented June 25, 1907.

Application filed September 28, 1904. Serial No. 226,286.

To all whom it may concern:

Be it known that I, ALEXANDER M. HAUBRICH, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Switching Devices, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to electrical switching apparatus and is of particular adaptation in telephony where party lines are operated in conjunction with single subscriber lines.

Where party lines and single subscriber lines terminate at the same switchboard, it is desirable that the same cord circuits be utilized for both sets of lines and the selective party line keys should therefore be united with the usual operator's ringing and listening key into a compact arrangement or into a unitary key. A key of this kind is described in the co-pending application of Merritt S. Conner, Serial No. 208,685, filed May 19, 1904, and my invention may be considered as an improvement over a key of this construction.

In the key described in this co-pending application, the operator's ringing and listening key is combined in a compound unitary structure with the party line selective keys and when the ordinary subscriber is to be signaled only the ringing key is actuated and when any party line subscriber is to be signaled, the corresponding selective key is actuated, the listening key, however, being common to both sets of keys. In this key also a latching means is employed for locking the selective keys upon a slight depression thereof, further depression thereof causing actuation of the switch springs associated therewith. The actuated key remains slightly depressed until some other key of the selective set is depressed and upon actuation of the second key the latching mechanism is actuated to release the first key. The purpose of maintaining the keys depressed a distance is to enable the operator to ascertain which party line is being signaled should several signaling actuations of the key be necessary. However, upon withdrawal of the plug circuit including the keys, one of the selective keys would remain depressed and

when the answering plug of the cord circuit was again employed the operator would be confused by the depressed button.

My invention contemplates the return of all the selective buttons to their normal position upon actuation of the operator's key to its listening position, and thus before the party line desired is to receive signaling current all the selective keys are in their proper position and confusion will not result. I, therefore, also connect the operator's key with the key latching mechanism, the movement of the operator's key to its listening position causing actuation of the latch and release of any of the selective buttons which might have been held in depression.

My invention also contemplates other improved forms of construction and operation and the device of my invention will be best understood by reference to the accompanying drawing, in which:

Figure 1 is a plan view of the device, Fig. 2 is an elevation view thereof, Fig. 3 is a sectional view thereof taken on line 3, 3 of Fig. 2, Fig. 4 is a sectional view thereof taken on line 4, 4 of Fig. 2, Fig. 5 is a sectional view taken on line 5, 5 of Fig. 2, and Fig. 6 is a diagrammatic view showing the connection of the various switch springs of the keys and the connection therewith of various signaling current sources.

Like reference characters refer to like parts throughout the various figures.

The frame work of the device consists of the combined supporting and escutcheon plate 1 and the lower supporting bar 2 connected by pillars 3 and 4 which may have threaded engagement with the escutcheon plate and which may be secured to the bar 2 by means of bolts 5, 5. The operator's listening and ringing key comprises an actuating plate 6 pivoted at 7 in downwardly extending lugs 8 and carries a cylindrical actuating button 9 for actuating switch spring mechanism 10 having suitable connection with the cord strands and with an operator's telephone set 11. The actuating plate 6 also carries a cylindrical actuating button 12 for operating ringing switch mechanism 13 suitably connected with sources of ringing current, as will be described later.

The actuating plate 6 has stops 14 and 15 for engaging against the lower face of the

plate 1 as the operator's key is rotated. The adjustment of the stop 14 is such as to prevent sufficient rotation of the key to bring the center of the button 12 beyond the edge 13' of the actuating springs 13, so that the key will be thrown back to its normal position by the springs upon release. Stop 15, however, is adjusted to allow sufficient rotation of the key to carry the button 9 within the edges 14' of the actuating springs 63 whereby the key will be locked after actuation between the springs 63.

A plurality of selective buttons 16, 17, 18 and 19 are mounted on the escutcheon plate 1. Each button consists of a stem 20 passing through a corresponding opening 21 in the escutcheon plate. Each button is also provided with a wedge 22 of insulating material having screw threaded engagement with the lower end of the stem portion and above the actuating wedge is a cam detent 23. The actuating wedges are adapted upon depression of the button to engage the corresponding switch spring mechanisms 16', 17', 18' and 19' mounted upon the supporting bar 2. The stems of the buttons are prolonged into spindles 25 which are adapted to pass into openings 26 in the supporting bar 2 and helical springs 27 surround the spindles between the top of the bar 2 and the actuating wedges, the tendency of the springs being to maintain the buttons in a normal upper position. The pillars directly below the escutcheon plate are provided with grooves 28 and 29, respectively, and the bifurcated ends 30 and 31 of a latch bar 32 are adapted to ride in these grooves. The latch bar is provided with openings 33 large enough to allow ready passage therethrough of the cam detents 23. A spring 35 secured to the escutcheon plate 1 engages the latch bar and tends to move the latch bar toward the left of the device, as best shown in Fig. 2, and when in this position the right side edges of the opening 33 are disposed to the left of the detent edges 36 of the cam detents 23. Thus upon depression of the selective buttons, the detent cams will move the latch bar to the right and after the detent edge has passed downwardly below the latch plate, the spring 35 will return the latch bar to its position to the left, the edge of the latch bar opening below the depressed button, however, being disposed before the detent edge and the depressed button is locked in its depressed position.

Upon depression of a second button, the cam detent of this button will engage the latch bar and move it to the right sufficiently to allow escape of the first depressed button and the second button in turn will be locked in its depressed position after its cam detent has passed below the latch bar and thus depression of one button will serve to release all the depressed buttons. The actuating

plate of the operator's key is provided with an extension 37 and the locking bar is provided with an extension 38 projecting into the path of the extension 37. Upon actuation of the operator's key to its listening position, the extension 37 will engage the extension 38 to move the latch bar to the right to allow the escape of all selective keys which may have been locked. The advantage of this is evident. Upon the completion of conversation, and upon the withdrawal of the calling and answering plugs, the selective key actuated during connection of the cord circuit will be locked in its depressed position. Now when the operator upon again using this cord circuit inserts the answering plug and actuates her listening key to ascertain the connection desired, the locked selective button will be released simultaneously with the actuation of the operator's key and as all the selective keys are in a normal position, the operator may select the desired selective button without being subject to the confusion which might arise had the locked button remained depressed.

In Fig. 6 I have shown an electrical connection between the operator's key and the selective keys. I have shown a calling plug 40 connected with the actuating springs 41, 42 of the ringing switch spring mechanism 13. The outer contact springs 43 and 44 of the switch mechanism 13 are connected with the actuating springs 45 and 46 of the selective switch mechanism 16'. The inner springs 47, 48 of the switch mechanism 16' are normally connected with the actuating springs 50 and 51 of the switch mechanism 17', and so on. The inner springs of switch 17' are connected with the actuating springs of the mechanism 18' of which the inner springs are connected with the actuating springs of the switch mechanism 19', the inner springs of the mechanism 19', however, being preferably connected with a source of ordinary alternating ringing current 52. If the desired subscriber is connected with an ordinary single subscriber line, the operator actuates only the ringing key and current from the source 52 will pass serially through the selective switching mechanisms 19', 18', 17' and 16' through the outer springs 43, 44 and actuating springs 41, 42 of the switch mechanism 13 and through the plug into the line connected therewith. The outer contact springs 53, 54 of the selective switch mechanisms may be connected with different sources of signaling current 55¹, 55², 55³ and 55⁴. These different sources may provide alternating currents of different frequency or pulsating currents of different polarity or there may be any other forms of differing current flow. If the subscriber called for is connected with a party line, the corresponding selective key will first be depressed to be locked by the lock bar 32. If the key 16', 130

for instance, has been depressed, all the other keys 17', 18', 19', etc. will be disconnected upon actuation of the key 16' and the source 55¹ will be connected through the actuating springs 45, 46 of the key 16' with the outside springs 43 and 44 of the ringing switch mechanism 13. The selective key 16' having once been locked in position, the operator may actuate her key to the ringing position in the ordinary manner and upon actuation thereof the current from the source 55¹ will flow through the plug 40 and into the party line connected therewith and the signal apparatus at the substation responsive to the current flow from the source 55¹ will be actuated. Upon completion of conversation, the plugs are withdrawn and the button 16' still remains depressed. However, when the answering plug of this cord circuit is again used, the operator must necessarily move her key to the listening in position and upon such actuation as before described, the lock bar 32 will be moved to release the depressed selective button, in this case button 16'. When the operator now comes to depress the selective button corresponding to the desired party line subscriber, she will not be confused by buttons already depressed.

The device of my invention is thus automatically restored to its normal position before selection of the ringing buttons is made, it being impossible to move the operator's key to the listening in position without releasing the depressed buttons or to depress one of the selective buttons without releasing previously depressed buttons. With a ringing key of this description, a party line subscriber can be selected and signaled with as great rapidity as an ordinary subscriber, a convenient way of operation being to depress with the thumb the desired selective button and to actuate with the forefinger the operator's ringing key.

In the co-pending application, referred to, the talking current must pass serially through all the contacts of the several switch mechanisms and one of the most important features of our improved key is that the talking current need pass only through the two inside contacts of the operator's ringing switch 13, and the improvement is obvious.

The main object of my invention is to provide a key of this class in which the selective buttons are automatically returned to their normal position before selection is made and a key in which the talking current need not pass additional contacts, and I do not, therefore, wish to be limited to the exact construction herein shown and described as many modifications may be made for accomplishing the same purpose.

I claim as new and desire to secure by Letters Patent:

1. In an electric switching device, the

combination with an operator's ringing and listening key, of a plurality of actuating buttons, switch contacts actuated by said operator's key and said buttons, means for locking a button upon depression thereof, means for releasing said button upon depression of another button, and means for releasing depressed buttons upon rotation of the operator's key.

2. In a telephonic switching device, the combination with an operator's key, of a plurality of actuating buttons, switch mechanism associated with said operator's key and with said actuating buttons, means for locking said buttons in position upon depression thereof, and means upon rotation of said operator's key for releasing the depressed actuating buttons.

3. In a telephonic switching device, the combination with an operator's listening key, of a plurality of actuating buttons, switching mechanism for each of said actuating buttons, and a common lock bar for said buttons, depression of one of said actuating buttons causing it to be locked in its depressed condition by said locking bar, rotation of said operator's key causing movement of said lock bar to release said actuating button.

4. In a telephonic switching apparatus, the combination with an operator's key, of a plurality of actuating buttons associated therewith, switching mechanism for each actuating button, a locking bar common to said actuating buttons, a cam detent on each button, the depression of a button causing engagement of said locking bar with the detent of the button to lock said button in its depressed position, and means upon rotation of the operator's key for allowing said locking bar to escape from said detent to allow the locked button to return to its normal position.

5. In a telephonic switching apparatus, the combination with an operator's key, of a plurality of actuating buttons associated therewith, switching mechanism for each actuating button, a locking bar common to said actuating buttons having openings corresponding with the buttons, a cam detent for each button adapted to pass through the corresponding opening in the locking bar, spring mechanism for actuating said bar upon passage therethrough of a detent cam to lock the corresponding button in its depressed position, connecting mechanism between said operator's key and said locking mechanism, and means upon rotation of said operator's key for allowing said spring mechanism to move said locking bar to release the depressed buttons.

6. In a telephonic switching apparatus, the combination with an operator's key, of a plurality of actuating buttons associated therewith, switching mechanism for each

button, a locking bar common to said buttons provided with an opening below each button, a cam detent for each button for passing through the corresponding opening in said locking bar to be engaged by the bar to hold the button in its depressed position, and an extension from said operator's button for engaging a stud on said actuating bar to move said bar laterally upon rotation of the operator's key whereby depressed buttons are released from said locking bar.

7. In a telephonic switching apparatus, the combination with an operator's key, of a plurality of actuating buttons associated therewith, switch mechanism associated with each button, a locking bar common to said actuating buttons having an opening below each button, a cam detent for each button adapted to pass through the corresponding opening in the locking bar upon depression of the button, the cam detent causing lateral displacement of said locking bar upon depression of the button, spring mechanism for resisting this lateral displacement and for returning the locking bar after displacement to lock the depressed button, and an extension from said operator's key for engaging a stud on said locking bar to move said locking bar in an opposite lateral direction upon rotation of the operator's key, whereby the depressed button is released.

8. In a telephonic switching device, the combination with an operator's key, of a plurality of actuating buttons, switch mechanism associated with said operator's key, switch mechanism associated with said actuating buttons, means for locking said buttons in position upon depression thereof, independent means for locking the operator's key in position upon actuation thereof, and means upon actuation of said operator's key for releasing the pressed actuating buttons.

9. In a telephonic switching device, the combination with an operator's key, of a plu-

45 rality of actuating buttons, switch mechanism associated with said operator's key, switch mechanism associated with said actuating buttons, means for locking said buttons in position upon depression thereof, independent means for locking the operator's key in position upon actuation thereof, and means upon actuation of said operator's key for causing actuation of the locking means of the buttons for causing release of depressed buttons.

10. In a telephonic switching device, the combination with an operator's key, of a plurality of actuating buttons, switch mechanism associated with said operator's key, switch mechanism associated with said actuating buttons, a locking bar for locking said buttons in position upon actuation thereof, independent means for locking the operator's key in position upon actuation thereof, a pin extending from said locking bar, and an extension from said operator's key, actuation of said operator's key causing said extension to engage the pin to move the locking bar to release the actuating buttons.

11. In a telephonic switching device, the combination with an operator's key, of a plurality of actuating buttons, switch mechanism associated with said operator's key and with said actuating buttons, a locking bar for locking said buttons in position upon actuation thereof, a pin extending from said locking bar, and an extension from said operator's key, rotation of said operator's key causing said extension to engage the pin to move the locking bar to release the actuating buttons.

In witness whereof, I hereunto subscribe my name this 26th day of Sept. A. D., 1904.

ALEXANDER M. HAUBRICH.

Witnesses:

CHARLES J. SCHMIDT,
HARVEY L. HANSON.