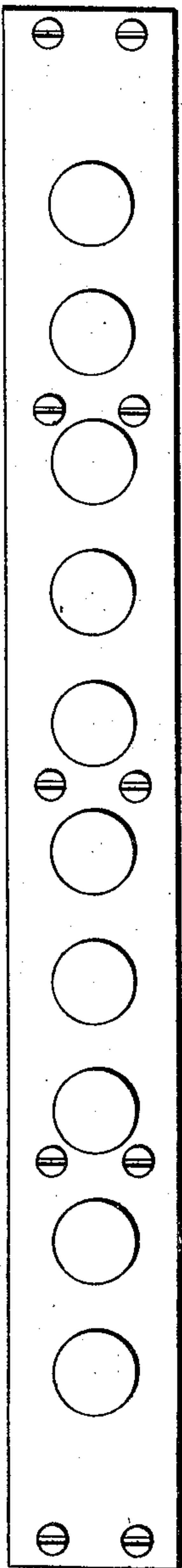


991,590.

J. L. WRIGHT.
ELECTRICAL SWITCH.
APPLICATION FILED APR. 20, 1907.

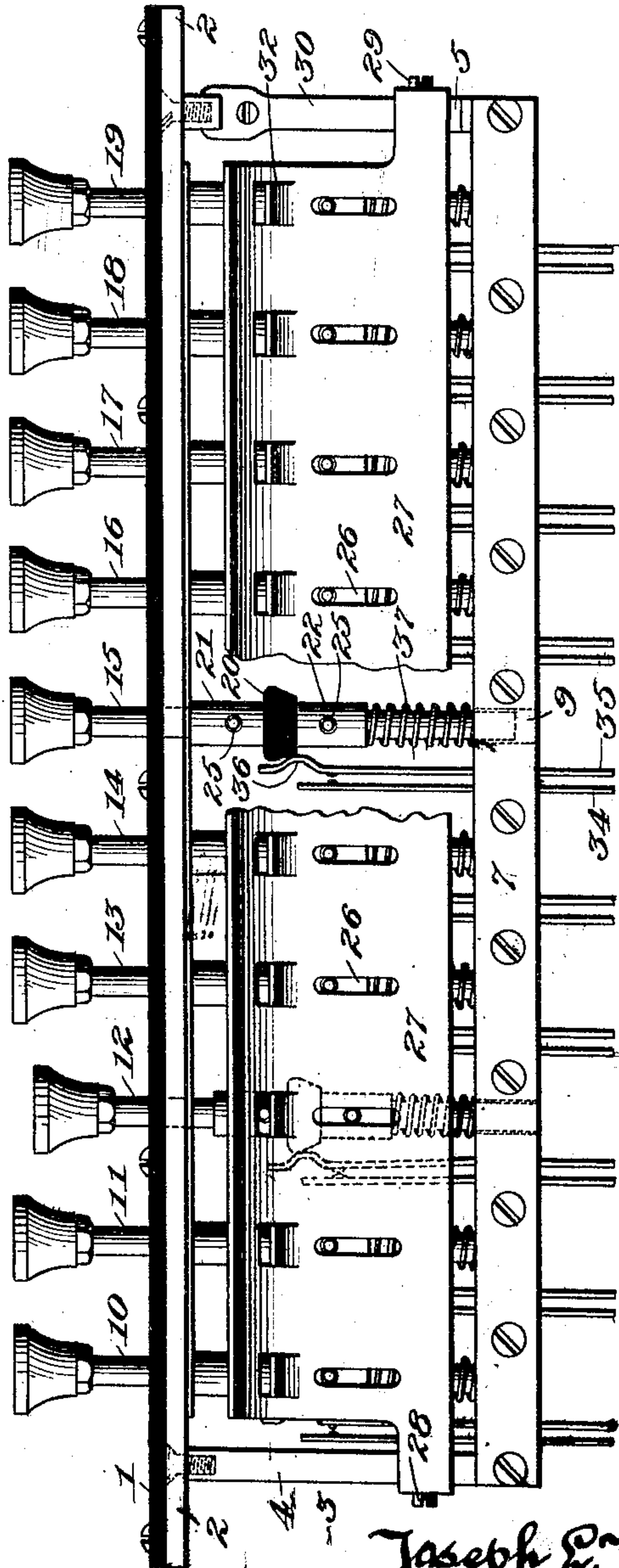
Patented May 9, 1911.

Fig. 1.



Witnesses
A. A. Whiting
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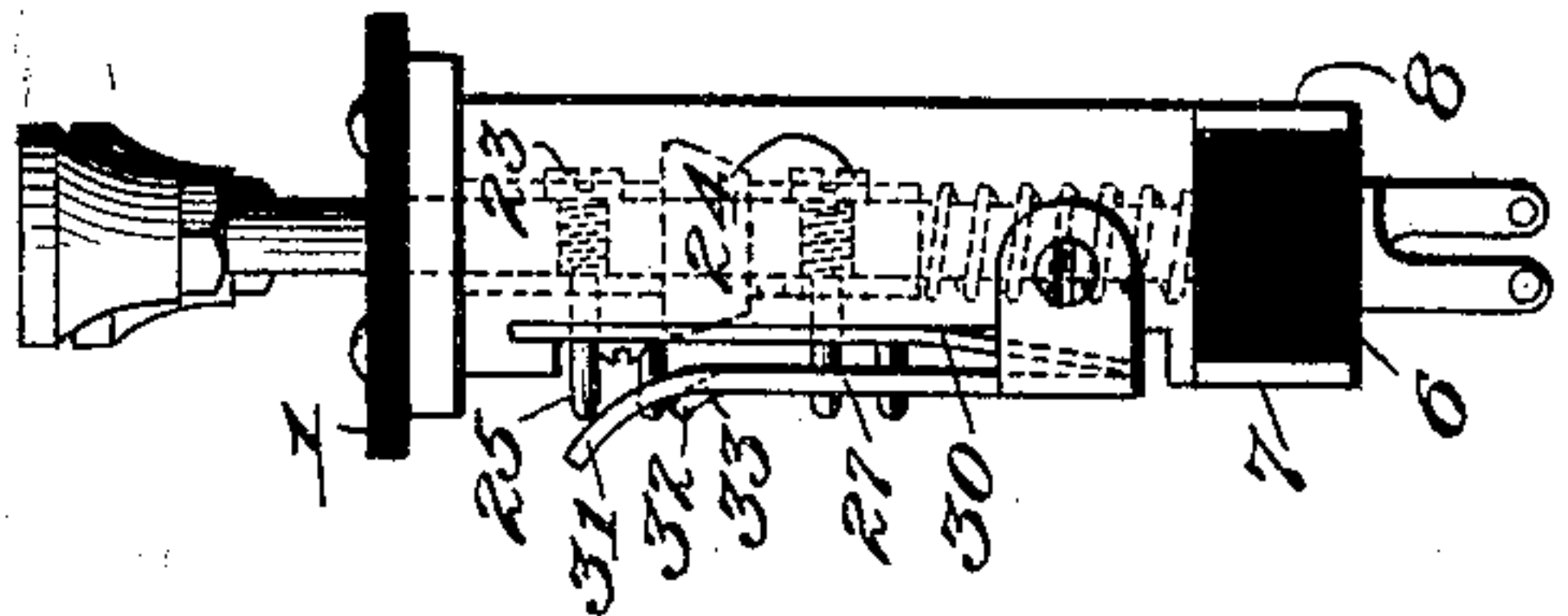
Fig. 2.



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Fig. 3.



UNITED STATES PATENT OFFICE.

JOSEPH L. WRIGHT, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE NORTH ELECTRIC COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

ELECTRICAL SWITCH.

991,590.

Specification of Letters Patent.

Patented May 9, 1911.

Application filed April 20, 1907. Serial No. 369,204.

To all whom it may concern:

Be it known that I, JOSEPH L. WRIGHT, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Electrical Switches, of which the following is a specification, reference being had therein to the accompanying drawing.

My invention relates to electrical switches and particularly to telephone switchboard keys for controlling different apparatus in the exchange. Switches of this general type are now employed in telephone exchanges for selective ringing and other purposes and are commonly known to those versed in the art as push button switches, the contacts being operated by plungers having push buttons upon their ends. In party-line systems the switches usually have three positions, a normal position, an operative position and a position intermediate the two which is an inoperative position and only indicates to the operator the last button depressed. In intercommunicating systems this intermediate position performs a function other than that of ringing and generally completes the talking circuit. Any button, after being depressed to perform its function, is returned to the intermediate position and then forced to the normal position upon the depression of another button, which in turn is locked in the intermediate position after release. In these devices the locking plate frequently is not thrown far enough to accomplish the release of previously depressed buttons and where it is accomplished positively the mechanism is complicated and liable to become deranged. In the present case I have used the general type of switch or selective key now in commercial use, but have provided means which obviates the difficulties above mentioned and which makes the key cheaper to manufacture, more positive in its action, and able to withstand a maximum amount of hard usage.

Briefly stated the invention comprises a frame in which are mounted a plurality of reciprocating plungers and a series of contacts controlled thereby. Suitable mechanism locks each plunger as it is depressed, in its operating position, and means carried by the locking means and operating upon the depression of another plunger cause an

overthrow motion of the locking means whereby the plunger previously depressed may be released. As distinguished from keys having their intermediate position an operative one for talking circuits or those having an intermediate position inoperative except for indicating, I use in this key only two positions, a normal and an operative position. Any further depression of the key accomplishes nothing more than is accomplished in the operating position except that it causes the overthrow motion which releases the previously depressed plunger.

My invention is illustrated in the accompanying drawing in which the same reference letters indicate the same parts throughout and in which—

Figure 1 is a top plan view, Fig. 2 is a side elevation thereof showing the latch plate partly broken away and one of the buttons depressed, and Fig. 3 is an end elevation thereof.

Referring to the drawings, 1 is the top plate of the key frame which I have shown faced with hard rubber on a metal underplate 2. This top plate is let into the top of the key shelf transversely thereto and with the frame 3 projecting down through the shelf. This frame consists of end members or posts 4—5 secured at their upper ends to the top plate 2 and at their lower ends by the bar 6 of hard rubber and which is provided with facing plates 7 and 8. The rubber strip 6 is drilled as shown at 9 to receive the lower ends of the plungers 10, 11, 12, 13, 14, 15, 16, 17, 18 and 19. The upper ends of these plungers work in aligned openings in the top plate and are each fitted with a push button as shown. These buttons may be of different colors if desired and may also be numbered consecutively or otherwise.

About midway of the length of each plunger is secured a fiber or hard rubber collar 20 secured upon the shank of the plunger by the sleeves 21 and 22, held in position by the screws 23 and 24 respectively, which pass through the sleeves and are threaded into the shank and provided with projecting ends 25. The lower one of these screws, numbered 24, has its projecting end 25 engaging in a slot 26 in the latch plate 27, so as to prevent turning of the plunger. The upper screw 23 has its projecting end 25 engage the cam-shaped upper surface of the

latch plate 27 so that when the push button is depressed it forces the plate away as will be hereinafter described. The latch plate 27 extends the entire length of the frame and is pivoted upon the end posts 4 and 5 by means of the screws 28 and 29. A spring 30 secured near the upper end of the post 5 has its projecting lower end engaging the bottom edge of the latch plate 27 below the pivot screw 29, so that the upper end of the latch plate is thrown into engagement with the projecting ends 25 of all the screws 23. The upper surface of the latch plate is bent over at 31 as shown in Fig. 3 to form a cam surface which upon depression of the plungers would tend to force the latch plate away from its normal position. Below the cam surface 31 I provide a plurality of longitudinally arranged apertures, one for each plunger, aligned with the pins 25. These openings are made by stamping out tongues of metal 32 which are bent over to form cams 33 and at the same time form latch openings for the pins 25 when depressed. The upper edge of each opening thus formed engages with its pin when down and the cam surface 33 is acted upon as the pin passes farther down to give an overthrow motion. It will be observed that the pins 25 when they pass will latch under the edges of the apertures before they reach the limit of their downward movement and that any further movement will bring them into engagement with the cam surfaces 33 and force the latch plate 27 farther than before. This extreme movement of the plate 27 insures the positive release of pins previously engaged by the edges of their respective apertures.

The strip 6 is transversely slotted adjacent all of the plunger apertures so as to receive the contact springs 34 and 35. As these are identical I shall only describe one pair. The spring 34 is the anvil or stationary contact and the spring 35 at its upper end is provided with a projecting portion 36 adapted to be engaged by the collar 20 so as to force the spring 35 into engagement with the spring 34. These springs are alike for all the plungers and extend up in pairs adjacent thereto and are separated as between themselves by strips of hard rubber insulation wedged in between them.

In operation my key mechanism works as follows: When any plunger is depressed its projecting pin 25 first strikes the cam surface 31 on the plate 27 and throws the latter back against the tension of the spring 30. This movement continues until the pin has passed down under the edge of its aperture, all other pins in the meantime having been released if any were caught. The contact spring 35 is forced against its companion 34 and there it remains until some other plunger is depressed, the pin 25 retaining the plunger depressed and showing

the push button below the normal level of other buttons. As before stated, plungers in the position of the plunger 12 in Fig. 2 may not be released by ordinary actuation of the plate 12 if the pin 25 only engages the cam surface 31; and to overcome this difficulty and insure positive return to normal of the depressed plunger by the spring 37, I provide the tongue 32 with its cam surface 33 which acts upon a further depression of the plunger to give the overthrow motion which positively disengages the plate from all pins.

It will be seen that I have used only one pin for each plunger in my device to accomplish the latching and the positive release of previously depressed plungers whereas with other devices of this character two pins are necessary, one of greater length than the other. The pin 25 of the lower screw 24 performs no function except to guide and prevent the turning of its plunger.

I am quite well aware that many changes and modifications may be made in the details of the apparatus herewith presented and I therefore do not wish to limit myself to the specific form described but consider all such modifications and changes as within the purview and scope of the appended claims.

Having thus described my invention what I claim and desire to secure by Letters Patent is:

1. In a switch, the combination with a frame, of a plurality of selective plungers mounted therein, selective contacts controlled thereby, unitary locking means carried on said plungers, and a latch plate co-operating with said locking means to lock any one of said plungers out of normal position when depressed, said latch plate carrying also means coacting with the unitary plunger locking means on the further depression of any plunger to positively release all previously depressed plungers.

2. In a switch, the combination with a frame, of a plurality of selective plungers mounted therein each provided with a pair of studs, selective contacts controlled by said plungers, and a latch plate arranged to coact with one stud on any plunger to lock said plunger in a position out of normal, with the same stud on further movement of the plunger to release other plungers, and with the second stud on each plunger to keep the same from turning.

3. In a switch, the combination with a frame, of a plurality of selective plungers mounted therein, selective contacts controlled thereby, a latching plate common to all of the plungers, means carried by the plungers adapted to operate in connection with the latch plate to secure the plunger in its operative position, and means carried by the latch plate and associated with the means carried by the plunger whereby an

overthrow motion is given to the latch plate to positively release any previously depressed plunger.

4. In a switch, the combination with a frame, of a plurality of selective plungers mounted therein, selective contacts controlled thereby, a latch plate common to all the plungers, a single stud carried by each plunger and adapted to operate in connection with the latch plate to lock the plungers, and cams on the latch plate, one for each plunger, adapted to be engaged by the studs to give the latch plate an overthrow movement which positively releases any previously depressed plunger.

5. In a switch, the combination with a frame, of a plurality of selective plungers mounted therein, selective contacts controlled thereby, an apertured latch plate common to all the plungers, a stud carried by each plunger adapted to engage one of the apertures of the latch plate and latch itself thereon in a position to operate the contacts, a cam tongue below each one of said apertures adapted to be engaged by the stud of its respective plunger so that upon further operation of the plunger the latch plate is given an overthrow motion to release any previously depressed plunger, and means for guiding and preventing rotation of the plunger.

6. In a switch, the combination with a frame, of a plurality of selective plungers mounted therein, selective contacts controlled thereby, an apertured latch plate common to all the plungers, a stud carried by each plunger adapted to engage one of

the apertures of the latch plate and latch itself thereon in a position to operate the contacts, a cam tongue below each one of said apertures adapted to be engaged by the stud of its respective plunger so that upon further operation of the plunger the latch plate is given an overthrow motion to release any previously depressed plunger, means for returning the plungers to normal, and means for guiding and preventing rotation of the plungers.

7. In a switch, the combination with a frame, of a plurality of selective plungers mounted therein, selective contacts, cams of insulating material carried by the plungers and adapted to operate the contacts, an apertured latch plate common to all the plungers, a stud carried by each plunger adapted to engage one of the apertures of the latch plate and latch itself thereon in a position to operate the contacts, a cam tongue below each one of said apertures adapted to be engaged by the stud of its respective plunger to force the latch plate in an overthrow motion so as to positively release any previously depressed plunger, means for returning the plungers to normal, and a second stud cooperating with the latch plate to guide and prevent rotation of the plungers.

In testimony whereof I affix my signature in presence of two witnesses.

JOSEPH L. WRIGHT.

Witnesses:

P. C. THWAITE,
G. N. KINGSTON.