

1,288,074.

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

Fig. 7.

Fig. 8.

Fig. 9.

Fig. 10.

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LOCKING MECHANISM.

1,288,074.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, WILLIAM D. LUTZ, a citizen of the United States, residing in Allendale, in the county of Bergen and State of New Jersey, have invented a new and useful Improvement in Locking Mechanism, of which the following is a specification.

My invention relates to an improvement in locking mechanism and embodies a longitudinally movable cylinder in which a key is inserted, which cylinder is actuated by the insertion of the key therein and the inward thrust of the key, and is returned to normal position by an outward pull on the key, and the locking mechanism is designed to prevent its use except by one having the proper key. There are many uses for a locking mechanism of this type, for instance the ignition switches for spark coils in automobile engines require such protection, and also the push buttons of a push button controlled electric elevator designed for private use only, wherein electric circuit closers, commonly called push buttons, are located at each floor landing.

Referring to the drawings, Figure 1 shows in section, an elevational view of a key actuated push button switch constructed in accordance with my invention, the various parts therein being shown in their normal locked position; Fig. 2 is a view similar to Fig. 1 with the push button in section, but showing the various parts in unlocked position with key inserted; Fig. 3 is a plan view of Fig. 1; Fig. 4 shows in detail an enlarged elevational view of a push button containing a set of tumblers which co-act with another set of tumblers to release or unlock the push button upon the insertion of the proper key therein; Fig. 5 is a plan view of Fig. 4, and shows in addition thereto a view of the key; Fig. 6 is a sectional elevation view of a modification; Fig. 7 shows in detail an enlarged elevation view of the push button associated with the modification shown in Fig. 6; Figs. 8, 9 and 10, show additional modification of a rotatable push button and a housing.

The mechanism in detail in Fig. 1, comprises a shell or casing 1, made preferably of hard rubber. Switch mechanism C is normally electrically open as shown, and comprises a contact 2 made preferably of brass, positioned on the base 3 of the casing, to be engaged by a circuit closer comprising

a retractile contact 4, the spring tension thereof normally maintaining its free end 4' out of engagement with the contact 2. The contact 4 is positioned on a base 5, which together with a block 6 is firmly secured to the base 3, by screws 7, either of which serve as terminal studs. The contact 2 is secured to the base by screws 8, either of which also serves as a terminal stud.

I associate the well known tumbler lock principle with the push button and switch mechanism, in which a key is the controlling factor. The locking mechanism X comprises a housing 10, provided with a flange 11, which supports the housing in the casing, and also serves as a cover therefor. The housing is securely held in position by screws 12, which engage bosses 13 formed integrally with the housing. The latter has an opening 26 to receive a metallic push button or lock cylinder B, having a segmental cross sectional area, which coincides with the opening 26 in the housing and thereby prevents rotation of the push button. The push button is insulated from the contact 4 by an insulating disk 14 having a button head 14' formed thereon which coöperates with said contact, the disk being secured to the push button by screws 12'. The button is provided with an opening 15 adapted to receive the key 9, and with a series of bores *a*, *b*, *c*, and *d*, which contain tumblers *a'*, *b'*, *c'* and *d'*, respectively. The housing 10 is provided with bores *e*, *f*, *g*, and *h*, matching the bores *a*, *b*, *c*, and *d*, respectively. Plungers *e'*, *f'*, *g'* and *h'* are inserted in said bores respectively, and are pressed inwardly by spiral springs 16 across the meeting line between the button and housing, and into holes matching therewith in the button, thereby locking the button, with the switch mechanism open, as shown. The springs are held in the bores by a cover 17, which engages a slot 18, said cover having a prick punch 19 which engages the edge of the bores, and holds the cover in place.

The plungers are all the same length, but the tumblers vary in length according to the desired construction of the key, to guard against operation of the switch by one not possessing a proper key.

The tumbler *b'* is larger in cross sectional area than the remaining like members, as is the bore *f* in the housing which is of a corresponding area. The key is provided with

a high portion 36, which co-acts with the tumbler *b'* when the key is pulled and causes the button to be moved therewith, and prevents the releasing of the key from the button until the latter is in normal position, as hereinafter fully described.

In order to electrically "close" the switch mechanism C, the key is inserted to its full length into the button, and co-acts with the tumblers to release all the plungers from locking engagement with the button, whereupon the inserted key and button are pushed inwardly and move the free end of the contact 4 into engagement with the contact 2, the inward movement of the button being limited by a flange 26' formed thereon.

It is found that the friction incident to the insertion of the key into the button, causes the button to move inwardly, thereby exerting a slight wedging action on the plungers enough to prevent the latter from dropping to their releasing positions.

To overcome this objectionable feature, I provide two steel balls 21 which are contained in bores 22, in the housing. The balls set into depressions 23, provided therefor on the outer periphery of the button, and are positioned to equalize each other, at diametrically opposite sides of the button. The balls are forced into the depression by compression springs 24, which are adjustable by means of a screw 25. It will now readily be seen that sufficient resistance is afforded by the spring pressed balls to resist any inward movement of the button due to the above noted cause, but after the key is inserted to its full length, and a further pressure exerted on the key to move the button inwardly to close the contact mechanism, the initial movement of the button causes the balls to ride out of the depression, thereafter permitting a free inward movement of the button.

The switch mechanism can be maintained closed as long as the key remains inserted, and in order to maintain the button in said position, against the spring tension of the contact 4, and without requiring a continued pressure on the key, additional depressions 27 are formed on the periphery of the button 14, into which the balls 21 set, and thereby offer sufficient resistance to movements of the barrel due to the action of the spring contact 4, due to continued jarring were the lock mechanism applied, for instance, to an automobile.

In restoring the contact mechanism to open position, the key is pulled and the high portion 36 co-acts with the larger tumbler *b'*, thereby effecting a movement of the button therewith. The withdrawal of the key is not permissible until the tumbler *b'* is in alinement with the bore *f*, whereupon the key is pulled and the high portion 36 moves the tumbler *b'* into the bore *f* thereby

releasing the plungers which fall into locking position, with the contact mechanism open. It is to be noted that the button has to be pulled to its normal position permitting the contact 4 to maintain its normal full "open" position, before the key can be released. Upon pulling the key, the initial movement of the button causes the balls 21 to ride out of the depressions 27, whereupon a free movement of the button is had, and the balls will again set into the depressions 23, when the button is again in its normal position.

In general, the construction of the modification shown in Figs. 6 and 7, is similar to the mechanism herein just described, and covers the same general principles, the main difference in construction being as follows: Instead of the button and opening in the housing being segmental in cross sectional area to prevent a rotary motion of the button after the key is inserted and the button unlocked, I provide a slot 28 in the housing which is engaged by the top of the key, thereby preventing a rotary motion of the bottom.

Instead of providing four tumblers and plungers as in the former construction, I provide only two plungers and two tumblers one of the tumblers and its co-acting plunger being larger in cross sectional area than the other like members, for the purpose heretofore set forth, this construction of course, requiring a properly constructed key as shown.

Only one ball 21 is used, which of course requires a depression 29 in the button, to seat the ball with the button in normal locked position.

The construction of the casing 1 and switch mechanism C is of a type more particularly adapted for use as a "hall push button switch" used in connection with an automatic push button electric elevator system, wherein the casing is let into a wall or partition, the said parts being fully shown and described in my co-pending application, Serial No. 754,463, filed March 15, 1913.

In the additional modification comprising Figs. 8, 9 and 10, the plungers and tumblers are all similar in cross section area and after the key is inserted to its full length into the button, the button is rotated a certain amount before it can be pushed inwardly to close the contact mechanism.

In this construction the button is provided with abutments 31 and 32 having heads 33 thereon, screw threaded to engage corresponding screw threads in the button. With the button in its normal locked position the abutments rest on a solid portion 34 of the housing. To close the contact mechanism C, the key is inserted to its full length into the button, unlocking the same, and the key is then turned to rotate the button until the

abutments are in alinement with grooves 35 in the housing. The button is now pushed inwardly by the keys, thereby closing the contact mechanism. In restoring the contact mechanism to open position the key is pulled 5 carrying the button with it, and when the abutments ride out of the grooves, the key is turned to rotate the button to its normal position with the bores and tumblers in 10 proper alinement, thereupon the key can be released thereby permitting the plungers to fall into locking engagement with the button. In an application of my invention to an automobile, the contacts 2 and 4, consti- 15 tute the magneto connection, and I provide an additional contact 2' (see Fig. 1) for the battery connection. The contact 2' is positioned to be engaged by the contact 4, upon the initial movement thereof, and if de- 20 sired the circuit therebetween can be maintained, without continued pressure on the key, by providing additional depressions in the button into which the balls 21 set when the button is pushed inwardly enough 25 to close the said contacts. The push-button device herein just described may readily be adapted for use as a "circuit opener" instead of a "circuit closer" by slight rearrangement of the contact mechanism, and it is obvious 30 that various other modifications in the details of construction and arrangement of parts can be made by those skilled in the art without departing from the spirit and scope of my invention, therefore I do not wish to be limited to the precise construction and ar- 35 rangement of parts herein shown.

What I claim is:—

1. The combination with a locked push button having a depression therein, and 40 adapted to receive a key to unlock the button for operation, and means adapted to engage the depression and prevent movement thereof caused by friction incident to the introduction of the key into the button.
2. In a device of the class described, a 45 locked push button having a depression therein, and adapted to receive a key to unlock the button for operation, and adjustable yielding means adapted to engage the 50 depressions and maintain the button in its operated position.
3. In a device of the class described, a locked push button having a depression therein and adapted to receive a key to un- 55 lock the button for operation, and yielding means adapted to engage the depression.
4. The combination with a push button, of a key removably engaged in the button, means engaging the button and adapted to 60 be liberated by the insertion of the key and release the button for operation, and friction means, to prevent a movement thereof caused by the friction incident to the introduction of the key into the button.
5. The combination with a push button, of 65

a key removably engaged in the button, transverse members engaging the button and adapted to be liberated by the insertion of the key and release the button for operation, and means frictionally engaging the button 70 to prevent a wedging action thereof against the transverse members upon the insertion of the key therein.

6. In a device of the class described, a 75 push button, a key removably engaged in the button, transverse members engaging the button and adapted to be liberated by the insertion of the key and release the button for operation, and yielding means frictionally 80 engaging the button to prevent a wedging action thereof against the transverse members, upon the insertion of the key into the button.

7. In a device of the class described, a 85 push button, a key removably engaged in the button, transverse members engaging the button and adapted to be liberated by the insertion of the key and release the button for operation, a yielding friction member and 90 depressions in the button to seat the yielding member when the button is in locked position, and in operated position.

8. In a device of the class described, a 95 push button, a key removably engaged in the button, means engaging the button and adapted to be liberated by the insertion of the key and release the button for operation, a yielding friction member, depressions in the button adapted to seat the yielding mem- 100 ber when the button is in locked position, and in operated position, and an additional depression to seat the yielding member at an intermediate point of operation of the button.

9. In a device of the class described, a nor- 105 mally locked push button, a key removably engaged in the button, a friction member, a depression in the button adapted to seat the friction member with the button in its normal locked position, another depression in the 110 button adapted to seat the friction member with the push button in operated position, and means engaging the button adapted to be liberated by the insertion of the key and release the button for operation, said means 115 comprising a plurality of plungers and co-acting tumblers, one of the plungers and its matching tumbler being larger in cross sectional area than the remaining like members to permit the releasing of the key from the 120 button only when the button is in normal position to be locked.

10. In a device of the class described, a cas- 125 ing, a push button, a housing for the push button fixed to the casing and having a flange thereon to cover the casing, the push button being segmental in cross sectional area, and co-acting with a corresponding 130 area in the housing to prevent rotation of the push button, a key removably engaged

in the button, spring pressed plungers contained in the housing and engaging the button, tumblers contained in the button, the tumblers matching the plungers and co-acting therewith to release the button for operation upon the insertion of the key into the button, one of the plungers and its matching tumbler being larger in cross section than the remaining like members, to permit removal of the key from the button only when the button is in normal position to be locked, a friction member, a depression in the button to seat the friction member with the button in its normal locked position, and another depression adapted to seat the friction member with the button in its operated position.

11. In a device of the class described, a locked push button, a key which unlocks and actuates the button by one and the same or continued thrust thereof into the button,

and means which are self-acting, for maintaining the button in an actuated position, and for releasing the button by a pull on the latter.

12. In a device of the class described, a locked push-button adapted to receive a key which unlocks and actuates the button by one and the same or continued thrust into the button, and self-acting means for maintaining the button in its full operated position and in an intermediate point of operation, said means releasing the button from either position by movement of the button.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM D. LUTZ.

Witnesses:

WALTER C. STRANG,
JAMES G. BETHELL.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."