

Dec. 30, 1952

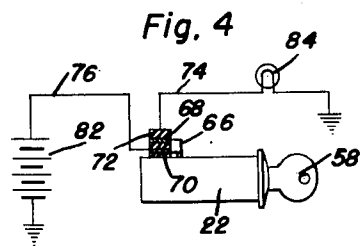
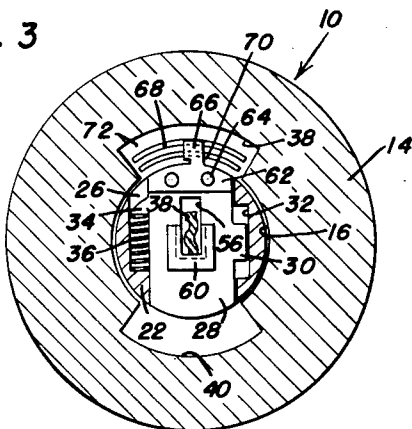
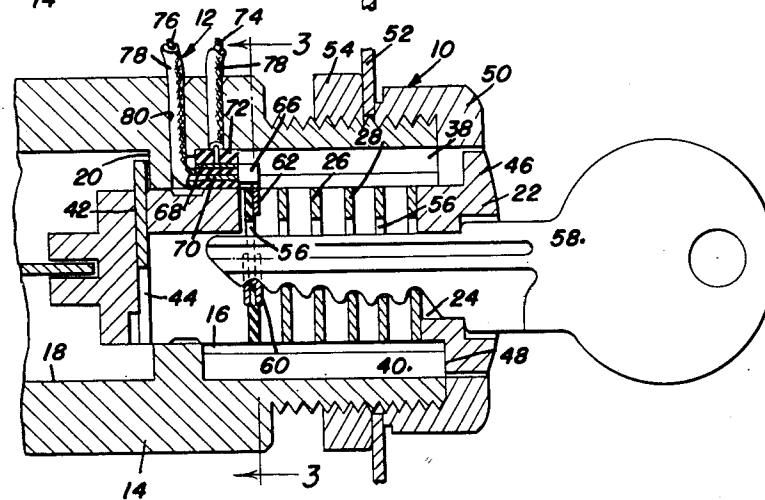
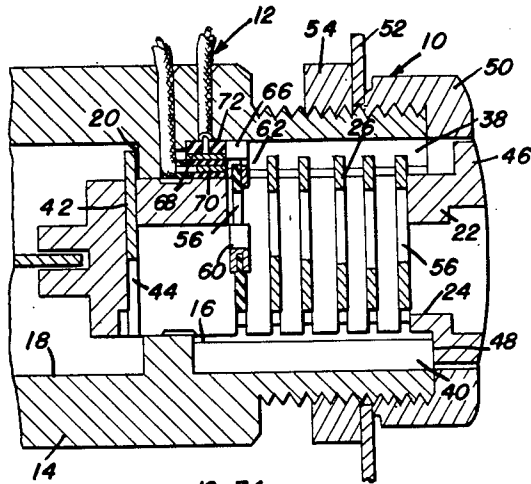
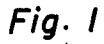
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2,623,959

ALARM FOR LOCKS

Filed Sept. 25, 1950

2 SHEETS--SHEET 1



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2 SHEETS—SHEET 2

Fig. 5

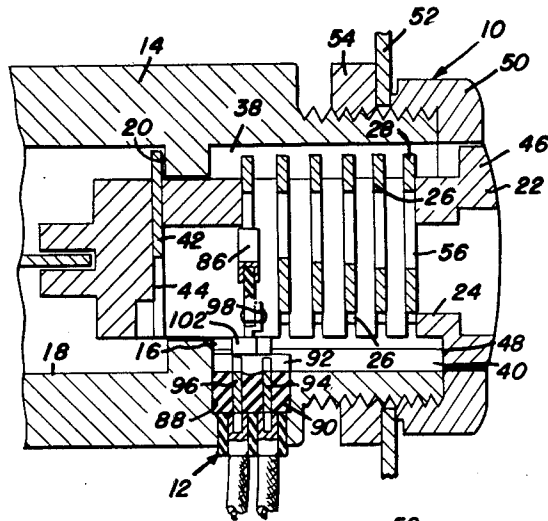


Fig. 6

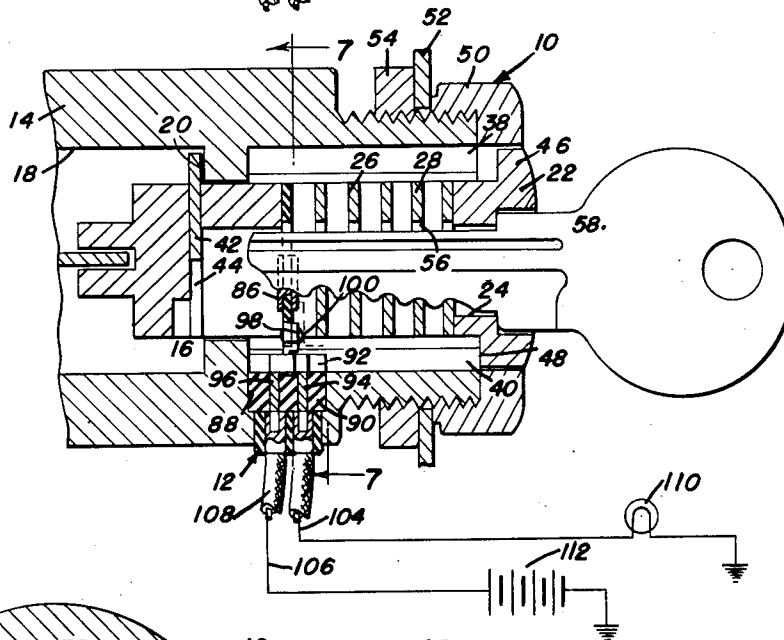


Fig. 7

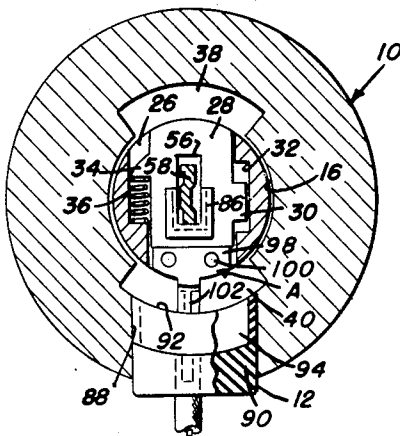
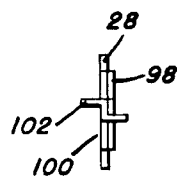


Fig. 8



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ALARM FOR LOCKS

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2 Claims. (Cl. 200—42)

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This invention comprises novel and useful improvements in switches, and more particularly pertains to a switch which is responsive to the positioning of a key in the lock.

An important object of this invention is to provide a switch which will be actuated whenever a key is positioned in the lock, whereby the switch may be utilized to actuate a signal to indicate that a key is positioned in the lock.

Another important object of this invention is to provide a switch which will be actuated whenever a key is positioned in the lock, which switch will remain actuated during the rotation of the lock barrel within the lock housing.

Still another object of this invention is to provide a switch, in accordance with the foregoing object, which switch is compactly disposed in the lock housing, and operatively connected to one of the tumblers to be actuated thereby, whenever a key is positioned in the lock in engagement with the tumblers.

An important feature of this invention resides in the provision of a lock housing having a barrel rotatably mounted in the housing, and a plurality of tumblers movably mounted on the barrel, together with a contact terminal disposed in the lock housing, and a contact arm carried by one of the tumblers, which arm is engageable with the terminal whenever the tumblers are moved into their inoperative position by a key.

Another important feature of this invention resides in the provision of a lock housing having a barrel rotatably journaled therein, which barrel has a plurality of tumblers movably mounted thereon, together with a pair of arcuate contact terminals disposed in the housing, concentrically of the barrel, with a contact arm carried by one of the tumblers, which contact arm engages the terminals whenever the tumblers are moved into their inoperative positions, and which switch will consequently maintain electrical contact independently of the angular position of the barrel with respect to the lock housing.

These, together with various ancillary objects and features are attained by this device, a preferred embodiment of which has been illustrated by way of example only in the accompanying drawings, wherein:

Figure 1 is a fragmentary longitudinal sectional view of the lock switch, with the tumblers shown in their locking positions;

Figure 2 is a fragmentary longitudinal sectional view of the lock switch, shown in Figure 1, with the tumblers moved into their inopera-

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tive position, and with the switch arm shown bridging the electrical contact terminals;

Figure 3 is a transverse sectional view of the lock switch, taken substantially on the plane 3—3 of Figure 2;

Figure 4 is a schematic wiring diagram showing the manner in which the lock switch is connected to a signal to actuate the latter whenever a key is positioned within the lock;

Figure 5 is a fragmentary longitudinal sectional view of a second embodiment of the lock switch;

Figure 6 is a fragmentary longitudinal sectional view of the lock switch, shown in Figure 5, with the tumblers shown moved into their inoperative position by a key, and with the switch shown bridging the electrical contacts;

Figure 7 is a transverse sectional view, taken substantially on the plane 7—7 of Figure 6; and

Figure 8 is a bottom plan view of the tumbler carrying the electrical contact arm.

Reference is now made more specifically to the accompanying drawings wherein like numerals designate similar parts throughout the various views, and in which a lock mechanism, indicated generally by the numeral 10 is provided with a switch mechanism, indicated generally by the numeral 12.

The lock mechanism 10, utilized in both embodiments of the lock switches shown in the accompanying drawings, is substantially the same, and includes a housing 14 having a bore 16 therein, and a counterbore 18 and an annular radial shoulder 20 between the bore and the counterbore. A cylindrical barrel 22 is provided with a longitudinally extending opening 24, and a plurality of transverse slots 26 which communicate with the opening 24, a plurality of tumblers 28 being reciprocally disposed within the slots 26. Each of the tumblers 28 is provided with an ear 30 which is receivable within a slot 32 in the barrel 22, whereby reciprocal movement of the tumblers relative to the barrel is limited. The tumblers 28 are also provided with a transverse lug 34 which is adapted to engage a spring 36, which spring otherwise engages the barrel 22, whereby the tumblers are yieldingly urged transversely of the barrel, and into locking position.

The housing 14 is also provided with a pair of longitudinally extending arcuate recesses 38 and 40, which recesses communicate with the bore 16, as is apparent from a consideration of Figures 1, 2, 5 and 6, and which recesses are of a length less than that of the bore 16, the inner

ends of the recesses 33 and 40 terminating in spaced relation to the annular shoulder 20. A transversely movable key 42 is slidably mounted upon the barrel 22, as by the guideway 44, the key 42 being biased, as by a spring or the like into the position shown in Figures 1, 2, 5 and 6, wherein the key abuts the shoulder 20 to prevent outward movement of the barrel 22 relative to the housing 14. The outer end of the barrel 22 is provided with an annular rim 46 which is adapted to engage the outer end 48 of the housing 14, to thereby limit inward movement of the barrel relative to the housing. As is shown clearly in the accompanying drawings, an internally threaded gland 50 rotatably embraces the rim 46, the gland 50 further serving to detachably lock the housing 14 to a supporting surface 52, in conjunction with a suitable lock nut 54.

Each of the tumblers 28 is provided with a central opening 56 through which a key 58 is adapted to extend, the sizes of the openings in the various tumblers varying, as is clearly apparent from a consideration of the accompanying drawings, whereby when the key 58 is positioned within the barrel 22, and in engagement with the tumblers 28, the latter will be disposed, as is shown in Figures 2 and 6 with the outer edges thereof coincident with the outer surface of the barrel 22. However, when the key 58 is removed, the tumblers assume the position shown in Figures 1 and 5, the tumblers 28 extending into the recesses 33 whereby rotary motion of the barrel 22 relative to the housing 14 is prevented.

The structure thus far described is conventional, and has been set forth merely as environment for the switch mechanism, to be described more fully hereinafter, which switch mechanism is actuated in response to movement of the tumblers into their inoperative position.

In the switch mechanism, shown in Figures 1 through 4, one of the tumblers 28 is formed of an electrically insulating material, as is shown in Figures 1 and 2, which tumbler is provided with a U-shaped channel member 60 adjacent the lower portion of the opening 56, which channel member provides a wear plate for the toothed edge of the key 58. A plate 62 is secured, as by fasteners 64 to the upper end of the tumbler 23 which is formed of electrically insulating material, which plate carries an offset contact arm 66. A first and a second arcuate contact terminal 68 and 70, respectively, are each embedded in an arcuate contact block 72, which block is disposed within the recess 38, adjacent the inner end thereof, with the contact terminals 68 and 70 spaced radially from the barrel 22. First and second electrical conductors 74 and 76 are housed in electrically insulated sheaths 78, which conductors extend through bores 80 in the housing 14, and which are terminally connected to the contact terminals 68 and 70, respectively. As will be appreciated from a consideration of Figure 1, the spring 33 yieldingly urges the electrically insulated contact arm 66 into the position shown in Figure 1, in which position the arm does not contact both the terminals 68 and 70. However, when a key such as 58 is inserted in the barrel 22, the arm 66 is reciprocated downwardly into the position shown in Figure 2, thereby establishing contact between the terminals 68 and 70. It is intended that one of the conductors such as 76 be connected to a suitable source of power 82, the other conductor 74 being electrically connected to an alarm 84, which may be of the audio or visual type. From the foregoing, it will be ap-

preciated that whenever a key is inserted in the barrel 22, that the alarm 84 will be actuated, and consequently indicate that a key is positioned within the lock. Since there are provided arcuate contact terminals 68 and 70, it will be appreciated that the arm 66 will maintain electrical contact, independently of the angular position of the barrel 22 relative to the housing 14.

In the second embodiment of the switch, shown in Figures 5 through 8, one of the tumblers 28 is also formed of electrically insulated material, which tumbler carries a U-shaped channel member 86, to provide a wear plate for the key 58. The housing 14 is provided with a radial opening 88 in which is disposed a block 90, of electrically insulating material, which block has an inner surface 92 of arcuate contour, which surface is disposed concentric with the barrel 22, as is clearly shown in Figure 7. A first and a second contact terminal 94 and 96 are disposed in the block 90, and spaced longitudinally of the bore 16 in the housing 14, the inner faces of which contact terminals being disposed flush with the arcuate inner surface 92 of the block 90. The lower end of the electrically insulated tumbler 28 has a plate 98 secured thereto, by means of fasteners 100, which plate has a contact arm 102 secured thereto, and extending longitudinally of the housing 14, which contact arm is adapted to bridge the terminals 94 and 96, in a manner clearly apparent from a consideration of Figure 6. As is more clearly apparent from a consideration of Figure 8, the plate 98 and arm 102 may be formed of a single piece of material.

The terminals 94 and 96 are respectively connected to conductors 104 and 106, which are disposed in the electrically insulating sheaths 108, the conductor 104 being electrically connected to a suitable alarm 110, of the audio or visual type, the conductor 106 being connected to a suitable source of power 112.

As will be appreciated from the foregoing, the contact arm 102 will be moved into engagement with the terminals 94 and 96 whenever a key 58 is inserted in the barrel 22, and since the inner surfaces of the contact terminals are arcuate, and disposed concentric with the barrel, it will be appreciated that electrical contact will be maintained during relative rotary motion between the barrel and the housing 14. It is further thought apparent that the switch unit 12, in the embodiment shown in Figures 5 through 8, in no way impairs the locking function of the electrically insulating tumbler 28, since the switch arm is connected to the lower end of the tumbler.

From the foregoing, it is thought that the operation and construction of the device will be readily understood, and further description is therefore believed to be unnecessary. However, since numerous modifications will readily occur to those skilled in the art after a consideration of the foregoing specification and accompanying drawing, it is not intended to limit the invention to that shown and described, but all suitable modifications may be resorted to falling within the scope of the appended claims.

Having described the invention, what is claimed as new is:

1. A combined lock and switch for controlling an annunciator circuit, annunciating the presence of a key in the lock comprising a rotatable tumbler cylinder rotated by manual operation of said key with radially movable locking tumblers, moved by the insertion of the key, a non-locking tumbler of insulating material carrying a bridg-

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ing contact member, a barrel surrounding said tumbler cylinder and carrying an insulating block, two spaced arcuate contact strips carried by said block concentric with the tumbler cylinder and extending over an arcuate length corresponding to the rotational movement of the tumbler cylinder moved by the key, means for connecting said arcuate contact strips with the annunciator circuit, said bridging contact member being of a length adapted to bridge and connect the two spaced contact strips, and biasing means holding normally said bridging contact radially spaced from said arcuate contact, said bridging contact when radially moved towards the spaced contact strips by the insertion of a key remaining in contact with the said strips in all positions of the key and tumbler cylinder.

2. A combined barrel-type tumbler lock and switch with a barrel enclosing a rotatable tumbler cylinder rotated upon insertion and turning of a proper key through a predetermined arc, said tumbler cylinder having a number of biased locking tumblers radially movable within said tumbler cylinder by the insertion of a key, said locking tumblers normally locking said tumbler cylinder against rotation until moved into non-locking position by the insertion of a proper key, whereupon the tumbler cylinder is rotatable by the said key through a predetermined arc comprising an additional radially movable biased non-locking tumbler of insulating material within said tumbler cylinder carrying a contact member, the radial position of which is changed by the insertion of the key, an insulating block member within said barrel and spaced strip-like arcuate contact

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segment carried by and held within said block, the arcuate contact segment being concentric with the tumbler cylinder and of a length substantially equal to the predetermined arc through which the key and tumbler cylinder is rotated, the contact member carried by the insulating non-locking tumbler member being of a length bridging the spaced contact segment carried by the block, and contact terminals on said barrel adapted to be connected with a circuit controlled by the combined lock and switch, the said bridging contact member carried by the tumbler being normally radially spaced from the arcuate contact segment in the insulating contact block and upon insertion of the proper key being radially moved into a position of contact, bridging the arcuate contact segment, and maintaining this position during the rotation of the key and tumbler cylinder during which the said tumbler contact member slides in the strip-like arcuate contact segment.

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