Dec. 16, 1941. W. R. SCHLAGE 2,266,086

DOOR LOCK ACTUATED SWITCH

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Fig. 1.

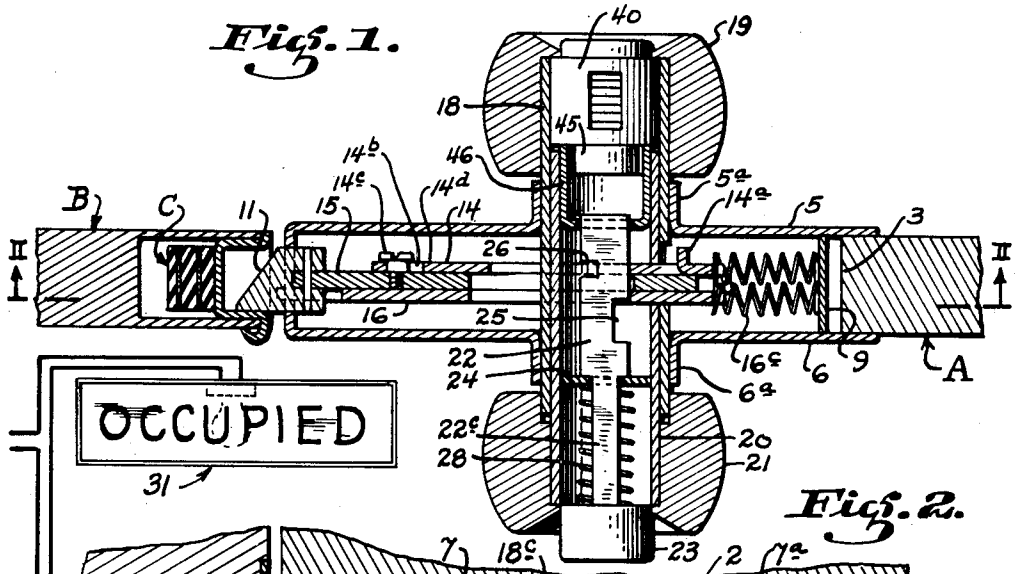



Fig. 2.

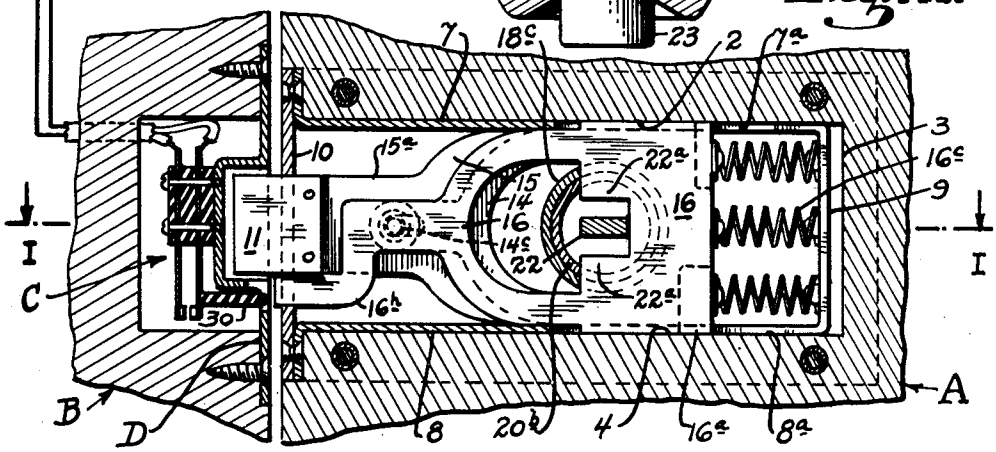


Fig. 4.

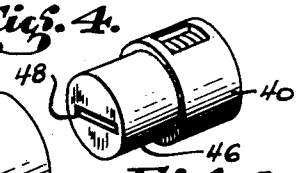


Fig. 3.

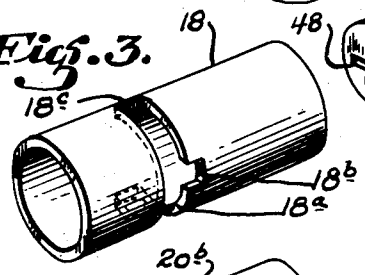


Fig. 6.

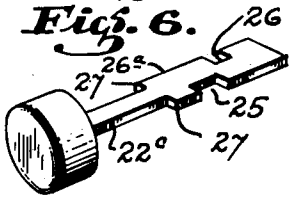
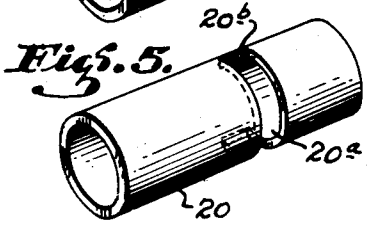


Fig. 5.



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Fig. 7.

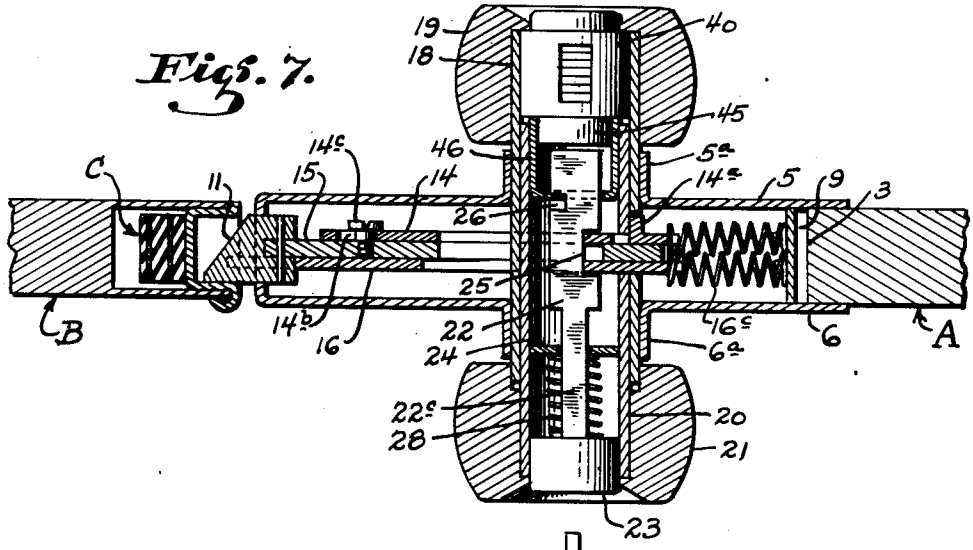



Fig. 8.

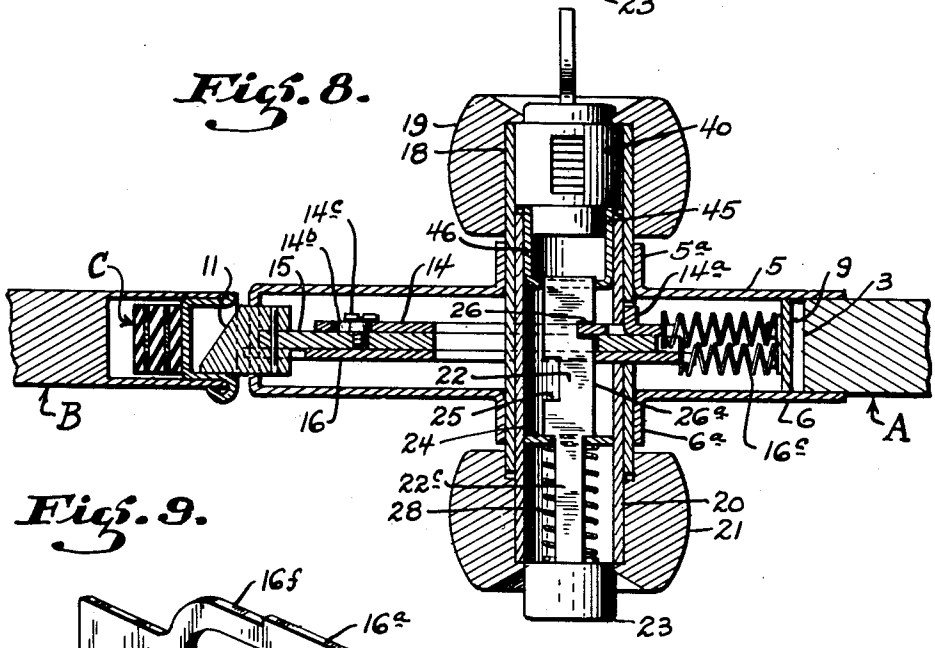
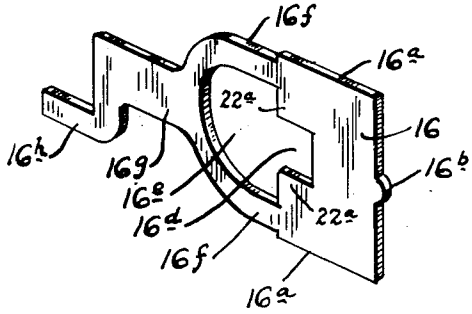



Fig. 9.




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# UNITED STATES PATENT OFFICE

2,266,086

## DOOR LOCK ACTUATED SWITCH

Walter R. Schlage, Burlingame, Calif., assignor to Schlage Lock Company, San Francisco, Calif., a corporation of California

Application October 7, 1940, Serial No. 360,149

12 Claims. (Cl. 200—55)

This invention relates to an electrically illuminated sign, for instance the word "occupied," to be placed over or adjacent the door of a lavatory or like room which is only temporarily occupied, and particularly to a switch which is actuated by the lock to close a circuit to illuminate the sign whenever the room is occupied.

The object of the present invention is generally to improve and simplify the construction and operation of door lock actuated electric switches; to provide a door lock having an inner and an outer knob and a latch bolt actuated thereby, a cooperating switch, and means carried by the inner knob for dogging the outer knob against rotation, and for simultaneously closing the switch; to provide a lock of the character described in which the switch is opened and the outer knob released from the dogging member either by rotation of the inner knob or retraction of the latch bolt; and further, to provide a lock of the character described in which key actuated means are mounted in the outer knob, which serve the function of dogging the outer knob against rotation, and simultaneously blocking or preventing closing of the switch, so that illumination of the sign can not take place when the door is locked from the exterior.

The invention is shown by way of illustration in the accompanying drawings, in which

Fig. 1 is a horizontal section of the lock and switch mounted in a door, said section being taken on line I—I of Fig. 2;

Fig. 2 is a vertical section taken on line II—II of Fig. 1; said view also diagrammatically indicating the electric sign actuated by the switch;

Fig. 3 is a perspective view of the outer knob spindle;

Fig. 4 is a perspective view of the key cylinder which is insertable in the outer knob;

Fig. 5 is a perspective view of the inner knob spindle;

Fig. 6 is a perspective view of the push button and the bar actuated thereby;

Fig. 7 is a section similar to Fig. 1, showing the outer knob dogged by means of the button which is mounted in the inner knob;

Fig. 8 is a section similar to Fig. 1, showing the outer spindle and knob dogged by means of the key-actuated mechanism in the outer knob; and

Fig. 9 is a perspective view of the switch actuating plate.

Referring to the drawings in detail, and particularly Figs. 1 and 2, A indicates a door and B a jamb or frame having an opening formed therein in which the door is hung or hinged in the usual manner. Formed in one edge of the door is a rectangularly shaped opening defined by the lines 2, 3 and 4, and adapted to be received and secured in said opening is a housing which consists of a pair of parallel plates 5 and 6, and a U-shaped frame which is secured between said plates. The plates 5 and 6 engage opposite faces of the door, as shown in Fig. 1, while the U frame fits the rectangular opening formed in the door. That is, the U frame consists of an upper leg 7 which parallels the upper side 2 of the door opening, a lower leg 8 which parallels the lower edge 4, and an end member 9 which engages the inner end 3 of the door opening. The outer end of the housing is closed by a face plate 10, and this has an opening formed in it through which a latch bolt 11 is adapted to extend. The several parts of the housing may be secured together by welding or otherwise, and a rectangular enclosed pocket is thus formed.

Mounted within the pocket and extending longitudinally thereof are three flat plates, which are indicated at 14, 15 and 16. The plate 14 will hereinafter be referred to as a dogging plate, as it carries a dogging lug 14*a*. The plate 15 will be referred to as a latch or retracting plate, as it carries the latch bolt 11, and the plate 16 will be known as the switch actuating plate, as the sole function of this plate is to open or close a switch generally indicated at C.

The plate 16 is best shown in Figs. 2 and 9. The rear end of the plate is rectangular in shape and has a pair of extending lugs 16*a* which extend into guide slots 7*a* and 8*a* formed in the respective legs of the U frame. A small lug 16*b* is formed on the inner end of the plate to receive a spring 16*c*. A rectangular notch 16*d* is formed in the plate, and this communicates with an opening 16*e* which is substantially semicircular in form. The plate otherwise consists of two forwardly extending legs 16*f* which terminate in a single forwardly projecting bar 16*g*, and this in turn terminates in an offset forwardly projecting member 16*h*, which extends below the latch bolt 11, as shown in Fig. 2, and which is adapted to be projected into a recess formed in the striker plate, generally indicated at D.

The latch plate 15 is substantially identical in shape to the plate 16, the only difference being that the offset portion 16*h* is eliminated, while the bar 15*a*, which is equivalent to the portion 16*g* of the plate 16, is projected forwardly to receive and secure the latch bolt 11.

The plate 14 is of similar shape to the other

plates, but differs therefrom to the extent that the part indicated at 14d, which is equivalent to the part 16g of the plate 16, terminates at a point rearwardly of the latch bolt 11, and that a slot 14b is formed therein through which a pin 14c extends, this pin being secured to the latch plate 15.

All of the plates have lugs on their rear ends similar to the lug 16b, and a spring similar to spring 16c is placed between the inner end 9 of the U frame and said lugs, so that there is a tendency for all the plates to move in a forward direction.

The side plate 5 of the lock housing is provided with a projecting spindle bearing 5a, and the plate 6 with a similar spindle bearing 6a. Extending through the bearings 5a and 6a is a tubular spindle 18, and secured on the outer end thereof is a knob 19, which will be referred to as the outer knob. Telescoping with relation to the spindle 18 is an inner spindle 20, and secured on the outer end thereof is a knob 21, which will be referred to as the inner knob. Both spindles (see Figs. 3 and 5) are cross-slotted as indicated at 18a and 20a, and a dog-receiving opening 18b is formed in the outer spindle in addition to the cross-slot 18a. When the spindles are inserted and in place, the slots 18a and 20a will align and register, and they thus provide a space into which shoulders 22a formed on each plate are adapted to enter. Also, the unslotted portion of each spindle forms a rollback member, the rollback on the outer spindle being indicated at 18c, and the rollback on the inner spindle at 20b. Extending through the inner knob and spindle is a bar 22 (see Figs. 1 and 6). On the outer end of the bar is mounted a push button 23. Approximately half of the bar is reduced in width, as indicated at 22c. This portion extends through a transverse bar 24 secured in the inner spindle. The remaining portion of the bar is of full width, but notches are formed in the opposite edges, as indicated at 25 and 26, the purpose of which will hereinafter appear. Shoulders are also formed, as indicated at 27, and these engage the cross-plate 24 and thereby limit outward movement of the bar and the button 23 secured on the outer end thereof. A spring 28 surrounds the reduced portion 22c of the bar, and is interposed between the transverse plate 24 and the button 23, thus normally maintaining the button in extended position. The button may, however, be depressed to move the bar inwardly, and when the button is depressed it will assume the position shown in Fig. 7, thereby permitting the plates 14 and 16 to move forwardly a distance equal to the depth of the notch 25. The plate 15, which supports the latch bolt, will not move forward as it is already in its most forward position. When the plate 14 moves forward, the dogging lug 14a will enter the notch 18b in the outer spindle, and it will thus dog the outer spindle and knob against rotation, and when the plate 16 moves forward its forward offset end 16h will engage a pin 30 carried by one of the arms of the switch C, and thus move the contacts of the switch into engagement and thereby close the circuit.

The circuit may be utilized for the purpose of illuminating the sign indicated at 31, which carries the word "occupied." For instance, if a person enters the room and closes the door and then pushes the button, two things will be accomplished: first of all, the outer knob and spindle will be dogged against rotation, thus preventing anyone from entering from the outside; and simultaneously with said dogging operation, plate 16 will move forward and close the circuit through the switch, the sign "occupied" will thus be illuminated and displayed, and a person passing by will know that the room is occupied. When a person desires to leave the room it is only necessary to grasp the knob 21 and rotate it. When that is done, the rollback 20b formed on the inner spindle will engage the shoulders 22 of all of the plates, and they will thus be moved rearwardly out of the notch 22, and the moment this happens, spring 28 will return the bar to normal position. During this rotation of the knob, all three plates, as already stated, are moved rearwardly; thus the latch bolt is retracted, which permits opening of the door, the outer spindle is undogged, and the circuit through the switch is broken, as the member 16h has been moved out of engagement with the pin 30.

The lock and switch here shown are particularly intended for use on board railway trains, air liners, and the like. When an air liner lands, the lavatory or rest room is usually locked by the stewardess, so that the room can not be occupied during the period on the ground, and the same is true of railroad trains, as it is not desired that the lavatory be used while the train is in the station or while the plane is on the landing field.

To accomplish this, a key-actuated cylinder lock, generally indicated at 40, is mounted in the outer end of the spindle 18, or within the knob 19. The barrel part of the spindle has an extension formed thereon, as indicated at 45, and to this is secured a sleeve 46 which extends inwardly. The inner end of the sleeve 46 is closed by an end, and in the end is formed a transverse slot 48 into which the inner end of the bar 22 extends. If a key is inserted in the cylinder lock, and the core 45 thereof rotated, the sleeve 46 will also be rotated, and so will the bar 22, as it extends into the transverse slot 48. By rotating the core of the lock and the bar 22, a half a turn, the notch 26 will align with the plate 14, as shown in Fig. 8, and the plate 14 may thus move forwardly, the forward movement being just sufficient to permit the dogging lug 14a to enter the dogging recess of the outer spindle. By then removing the key, the door will be locked, as the outer knob and spindle are dogged against rotation. Similarly, switch C can not be actuated, as the plate 16 can not be advanced, since it is blocked by the edge 26a of the bar, as plainly shown in Fig. 8.

From the foregoing, it should be obvious that when a person enters the room he or she can readily lock the door by merely depressing the push button, as such depression of the button causes dogging of the outer knob and spindle against rotation, and simultaneously permits advance of the plate 16 to a position where it will close the switch and thereby illuminate the sign over the door, which reads "occupied." To open the door, it is only necessary to rotate the inner knob, as such rotation automatically restores the several parts to normal position, that is, undogs the inner knob and spindle and permits opening of the switch and thereby breaking of the circuit. Again, it is possible to lock the door from the outside by the key-actuated means, and at the same time to prevent operation of the switch to illuminate the sign.

While certain features of my invention have

been more or less specifically described and illustrated, I nevertheless wish it understood that changes may be resorted to within the scope of the appended claims, and that the materials and finish of the several parts employed may be such as the manufacturer desires or conditions demand.

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

1. In a door lock having an inner and an outer knob, a latch bolt actuated thereby, an electric switch, and means mounted on the inner side of the door for rendering the outer knob inoperative and for simultaneously closing the switch.

2. In a door lock having an inner and an outer knob, a latch bolt actuated thereby, an electric switch, means mounted on the inner side of the door for rendering the outer knob inoperative and for simultaneously closing the switch, and means actuated by rotation of the inner knob for restoring the outer knob for operation and for opening the switch.

3. In a door lock having an inner and an outer knob, a latch bolt actuated thereby, an electric switch, and means carried by the inner knob for dogging the outer knob against rotation and for simultaneously closing the switch.

4. In a door lock having an inner and an outer knob, a latch bolt actuated thereby, an electric switch, means carried by the inner knob for dogging the outer knob against rotation and for simultaneously closing the switch, and means actuated by rotation of the inner knob for opening the switch and for moving the dogging member out of dogging position.

5. In a door lock having an inner and an outer knob, a latch bolt actuated thereby, an electric switch, means carried by the inner knob for dogging the outer knob against rotation and for simultaneously closing the switch, and means actuated by retraction of the latch bolt for opening the switch and for moving the dogging member out of dogging position.

6. In a door lock having an inner and an outer knob, a latch bolt actuated thereby, an electric switch, and means carried by the outer knob for dogging the outer knob against rotation and for simultaneously locking the switch against being closed.

7. In a door lock having an inner and an outer knob, a latch bolt actuated thereby, an electric switch, and key actuated means carried by the outer knob for dogging the outer knob against rotation and for simultaneously locking the switch against closing movement.

8. In a door lock having an inner and an outer knob, a latch bolt actuated thereby, an electric switch, a manually operable push button carried by the inner knob, and means actuated by the button for dogging the outer knob against rotation and for simultaneously closing the switch.

9. In a door lock having an inner and an outer knob, a latch bolt actuated thereby, an electric switch, a manually operable push button carried by the inner knob, a bar secured to the button and movable in unison therewith, and means actuated by the bar for dogging the outer knob against rotation and for simultaneously closing the switch.

10. In a door lock having an inner and an outer knob, a latch bolt actuated thereby, an electric switch, a manually operable push button carried by the inner knob, a bar secured to the button and movable in unison therewith, a spindle secured to each knob, a spring actuated dogging member engageable with the spindle on the outer knob to dog the spindle and outer knob against rotation, said bar normally maintaining the dog out of engagement with the spindle, a spring actuated switch closing plate engaged by the bar and normally maintained in a position where the switch is open, and a depression formed in the bar which registers with the dogging member and the switch closing plate when the button is pushed inwardly, said depression permitting the dog to engage the outer spindle and the switch closing plate to engage and close the switch.

11. In a door lock having an inner and an outer knob, a latch bolt actuated thereby, an electric switch, a manually operable push button carried by the inner knob, a bar secured to the button and movable in unison therewith, a spindle secured to each knob, a spring actuated dogging member engageable with the spindle on the outer knob to dog the spindle and outer knob against rotation, said bar normally maintaining the dog out of engagement with the spindle, a spring actuated switch closing plate engaged by the bar and normally maintained in a position where the switch is open, a depression formed in the bar which registers with the dogging member and the switch closing plate when the button is pushed inwardly, said depression permitting the dog to engage the outer spindle and the switch closing plate to engage and close the switch, and means actuated by rotation of the inner spindle for moving the dog and the switch closing plate to undog the outer spindle and to permit opening of the switch.

12. In a door lock having an inner and an outer knob, a latch bolt actuated thereby, an electric switch, spring means normally maintaining the switch open, a spring actuated member engageable with the switch to close the same, a bar engaging the switch closing member and normally maintaining it out of engagement with the switch to permit the switch normally to remain open, and key actuated means in the outer knob for dogging the outer knob against rotation and for maintaining the bar in a position where it will maintain the switch closing member out of engagement with the switch and thereby prevent closing of the switch.

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