

April 15, 1941.

R. E. CHAPEL

2,238,246

ALARM APPARATUS

Filed Oct. 17, 1938

2 Sheets-Sheet 1

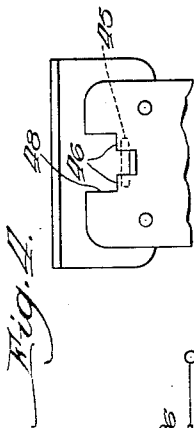


Fig. 2.

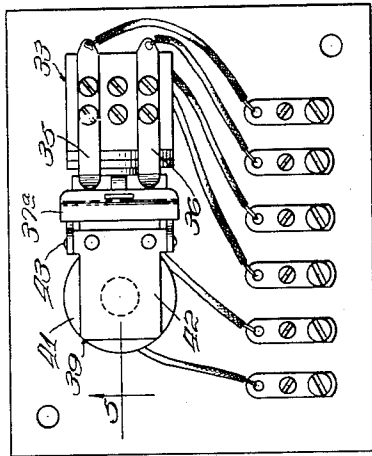


Fig. 3.

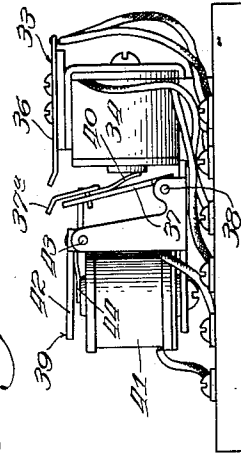
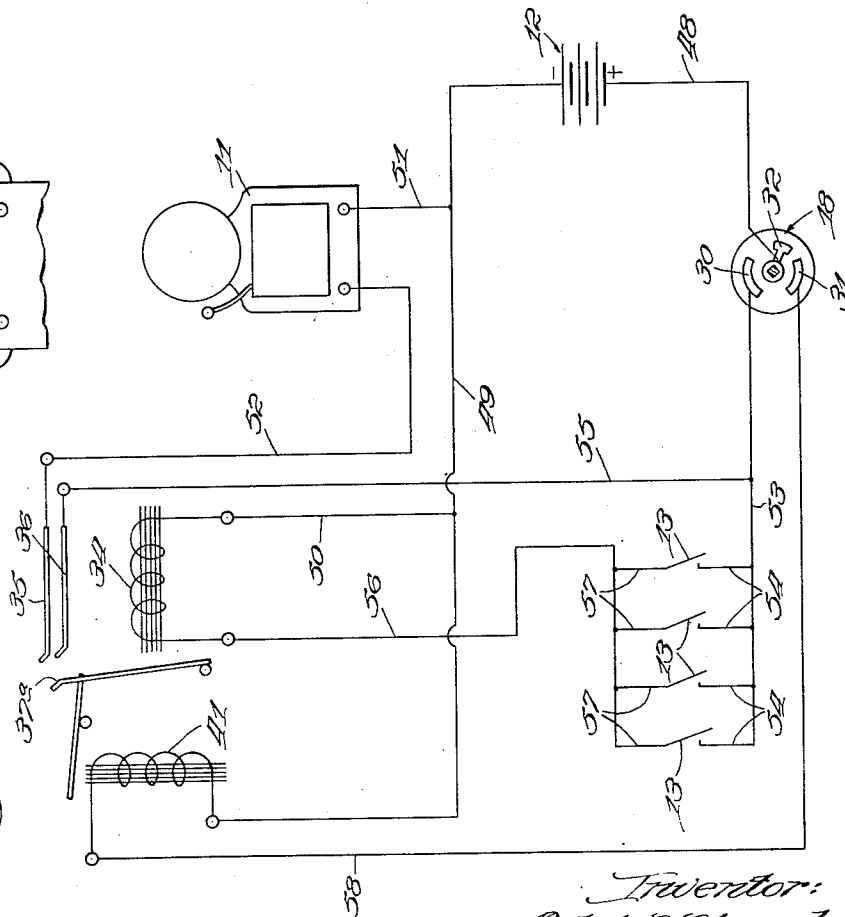


Fig. 1.



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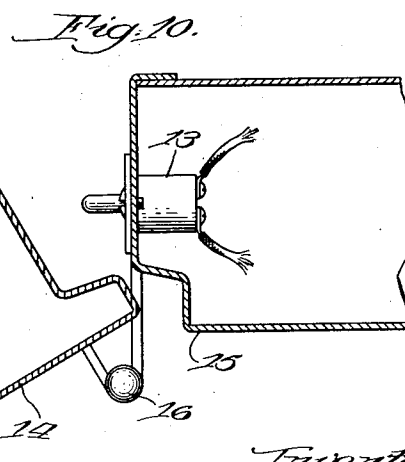
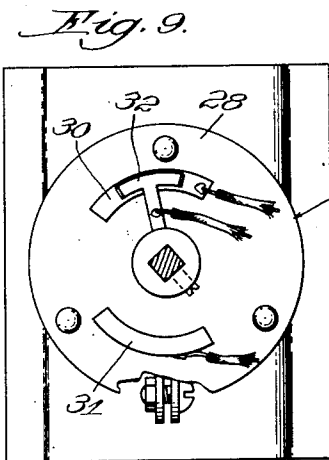
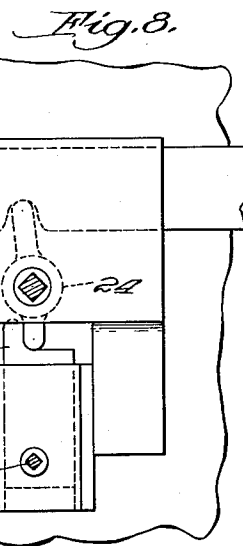
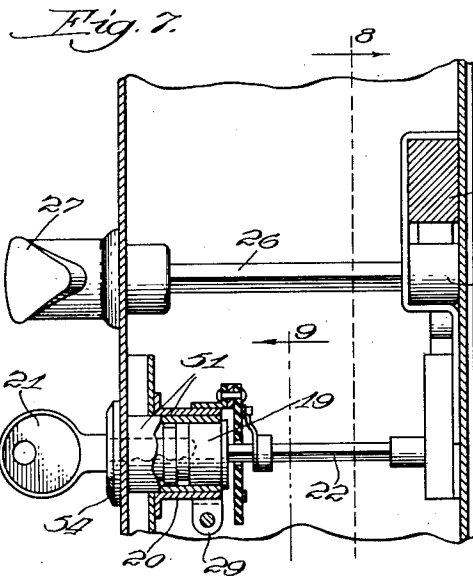
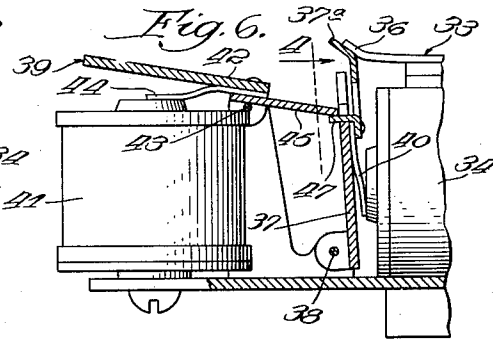
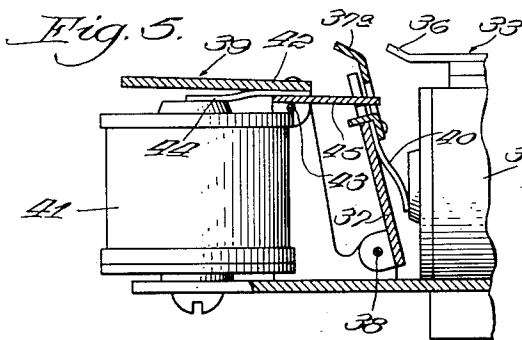
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ALARM APPARATUS

Filed Oct. 17, 1938

2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

2,238,246

ALARM APPARATUS

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Application October 17, 1938, Serial No. 235,488

7 Claims. (Cl. 177-314)

My invention relates generally to alarm apparatus but more especially to alarm apparatus for automobiles.

One of my objects is to generally improve upon alarm apparatus as hitherto provided to the end of rendering such apparatus better adapted for its intended purpose.

Another object, and which applies more particularly to automobiles, is to provide an alarm apparatus whereby should any of the doors of the automobile be opened by an unauthorized person an alarm will be sounded; still another object in this connection being to maintain the sounding of the alarm even should the person opening the door move the door to closed position.

Another object is to provide an apparatus whereby it will become automatically set to sound an alarm in the case of unauthorized opening of the door of an automobile, by the mere act of the operator in locking the lock-controlled door thereof; and become automatically conditioned for opening of the doors without sounding the alarm, by the mere act of unlocking such door.

A still further object is to provide an apparatus whereby should the alarm be set into operation it may become restored to normal inoperating position only by the act of unlocking the lock-controlled door of the automobile; and other objects as will be manifest from the following description.

Referring to the accompanying drawings:

Figure 1 is a diagrammatic view illustrating an embodiment of my invention for use in connection with an automobile having four doors.

Figure 2 is a plan view of a combined relay and resetting device forming a part of the installation.

Figure 3 is a view in side elevation of the device of Fig. 2.

Figure 4 is a fragmentary view in elevation of a part of the relay and reset device, this view being taken generally at the line 4 on Fig. 6 and viewed in the direction of the arrow.

Figure 5 is a view in elevation, partly sectional, of the device of Fig. 2, the section being taken substantially along the line 5 on Fig. 2 and viewed in the direction of the arrow, the device being shown in circuit-open condition.

Figure 6 is a view like Fig. 5 of the parts therein shown, the device being shown in circuit-closed position.

Figure 7 is a fragmentary view in vertical section taken through the key-controlled locking

means of one of the doors of the automobile showing a switch used in connection therewith in accordance with the illustrated embodiment of my invention.

Figure 8 is a fragmentary sectional view taken at the line 8 on Fig. 7 and viewed in the direction of the arrow.

Figure 9 is an enlarged sectional view taken at the line 9 on Fig. 7 and viewed in the direction of the arrow; and

Figure 10, a fragmentary plan sectional view through one of the doors of the automobile and the adjacent portion of the body thereof and illustrating a switch device cooperating with the door in accordance with the illustrated embodiment of the invention.

As a preface to the following description it may be stated that the apparatus, in accordance with the preferred illustrated embodiment of the invention, involves the provision of an electric switch which is operated by the lock, as for example as commonly provided on one of the doors of an automobile of the closed type and operated by a key, this switch, upon the act of locking the door, as by means of a key, becoming so conditioned that should any one of the doors of the car be opened otherwise than by first unlocking the lock, an electric circuit through any suitable alarm device, as for example an electric bell, will be closed and such circuit maintained closed to continue the sounding of the alarm, even should the person close the open door, until the door-lock referred to is unlocked, the mere act of unlocking this lock breaking the circuit in which the alarm device is interposed.

In the illustrated arrangement, an electrically operated alarm device, such as an electric bell, is represented at 11 and a source of current supply, as for example a storage battery, at 12.

Associated with each door of the automobile is an electric switch which is normally open, namely, when the door cooperating therewith is closed, the four switches for the doors referred to being represented at 13.

In Fig. 10 I have illustrated one of the doors, represented at 14, and the adjacent door jamb shown at 15 to which the door is hinged at 16, the switch 13 of the type above referred to being carried by the door casing and provided with a stem 17 which normally, under spring pressure, projects into the path of movement of the door 14 in the swinging of the latter to closed position, the stem 17 upon being forced inwardly by the closing of the door, operating to open this switch, it being understood that such a

switch device would be provided for each of the four doors.

The apparatus also involves a switch device represented generally at 18 and controlled by the key-controlled lock as commonly provided on one of the doors of the automobile. The lock shown is of the well known barrel type involving a tumbler equipped barrel 19 rotatably confined within the door, in a cylindrical bushing 20 stationarily secured to the door, the barrel 19 being adapted for rotation by a suitable key 21 slid into the barrel 19. The rotatable barrel 19 has a stem 22 which cooperates with means (not shown) for vertically sliding a detent block 23 into and out of a position obstructing the rotation of a rock member 24 engaging the bolt 25 for the door, the rock member 24 being rotated through a shaft 26 by a handle 27 at the outer face of the door. When the barrel 19 is rotated by the key to locking position the detent of the member 23 prevents retraction of the bolt 25 by the handle 27, as shown in Fig. 8. It will be understood, however, that the locking mechanism shown and briefly described is of common and well known construction and therefore full description and illustration appears to be unnecessary.

The switch device 18 comprises a disk 28 of current insulating material surrounding the stem 22 and stationarily secured in position on the stationary housing 20, as by a clamp represented at 29, the disk 28 carrying two separated segmental electrical contact pieces 30 and 31.

The switch device 18 also comprises a brush 32 rigidly secured to the stem 22 and adapted when the latter is rotated to travel across the contacts 30 and 31 and in engagement therewith.

It may be here stated that in the unlocked condition of the door carrying the lock above described, the brush 32 will occupy the position, relative to the contacts 30 and 31, generally as shown in Fig. 1 in which position it is out of engagement with both of said contacts, this brush, when the key 21 is rotated to lock the door engaging the contacts 31 and 30 in succession and finally engaging contact 30 only.

The apparatus shown also comprises a relay represented generally at 33 controlling the energizing of the alarm device 11. The electromagnet of the relay is represented at 34 and its spring contacts, which are stationary, at 35 and 36. The armature of the relay is represented at 37 it being pivoted at 38 on a stationary part of the device and is in a position to be attracted by the electromagnet 34 when the latter is energized. The armature 37 is provided with an extension 37^a adapted when the armature is drawn toward the electromagnet 34 to engage the contacts 35 and 36 and thus close the circuit at this point.

The apparatus also comprises a re-set device 39 which automatically operates, upon energizing the relay 33, to lock the armature 37 in circuit-closed position against the tension of a spring 40 carried by the armature and engaging the electromagnet and to automatically disengage from the armature 37, to permit the armature to move to circuit-open position, upon energizing the re-set device 39. The device 39 as shown comprises an electromagnet 41 and an armature 42 hinged at 43 to the electromagnet, a spring 44 tending to rock the armature 42 from the position shown in Fig. 5 to the position shown in Fig. 6. The forward end 45 of the armature 42 is of such width, as shown, that when the armature 37 is attracted to the magnet 34 to close the

circuit at the contacts 35 and 36 it will oppose portions 46 of the armature 37, in which position the armature 42 rests upon a ledge 47 on the armature 37 and holds the armature 37 in circuit-closed position (Fig. 6) upon deenergization of the electromagnet 34, but upon energizing the electromagnet 41 to the position shown in Fig. 5, will extend into registration with a notch 48 of greater width than the forward end 45 of the armature 42, and thus permit the armature 37 to swing out of circuit-closed position (Fig. 5) after deenergization of the electromagnet 34 and thus open the circuit at the contacts 35 and 36.

Referring now to the circuit arrangement illustrated in Fig. 1, one of the terminals of the battery 12 connects, by a wire 48, with the brush 32. The other terminal of the battery connects, by a wire 49, with one of the terminals of the electromagnet 41 of the re-set device 39; by a wire 50 with one of the terminals of the electromagnet 34, and, by a wire 51, with one of the terminals of the electric bell 11, the other terminal of the bell connecting by a wire 52 with the contact 35. The contact 30 of the switch 18 is connected with a wire 53 having branch wires 54 which connect with one of the terminals of the switches 13, respectively, the wire 53 being connected, by a wire 55, with the contact 36. A wire 56 connects, through a series of branch wires 57, with the other terminals of the several switches 13 and with the other terminal of the electromagnet 34; and a wire 58 connects the other terminal of the electromagnet 41 with the contact 31 of the switch device 18.

A description of the operation of the apparatus is as follows:

In the normal unlocked condition of the automobile in which its doors are closed the several switch devices described are in open position as shown in Fig. 1 and the relay and re-set devices are in the position shown in Fig. 5. When the operator of the car locks the key-controlled door, by turning the key 21 in clockwise direction in Fig. 1, all of the other doors being in closed condition (whether locked or not) the brush 32 of the switch device 18 moves across, and in engagement with, the contact 31 and thence out of contact therewith and into engagement with the contact 30 thus closing the circuit at this point, the brush 32 coming to rest on the contact 30. Should anyone open any one of the four doors of the automobile (except by first unlocking the key-controlled door) the switch 13 cooperating with the opened door will automatically close. This will result in energizing the magnet 34 through the following circuit: Battery 12, wire 48, brush 32, contact 30, wire 53, switch 13, wire 56, electromagnet 34, wire 50, and wire 49, back to battery. Energizing the electromagnet 34 attracts the armature 37 which moves to the position shown in Fig. 6, in which position it becomes locked by the armature 42, thereby closing the circuit at the contacts 35 and 36 which energizes the electric bell 11, the circuit thus established being as follows: Battery 12, wire 48, brush 32, contact 30, wire 53, wire 55, contact 36, armature portion 37^a, contact 35, wire 52, electric bell 11, wire 51, and wire 49 back to battery 12. The electric bell 11 continues to ring, regardless of the closing of the door the opening of which effected the energization of the electromagnet 34, until the circuit is broken between the contacts 35 and 36 and this can only be done by actuating the electromagnet 41 of the re-set device to permit the armature 37 to swing out of circuit-closed position.

The energization of the electromagnet 41 is effected when the operator turns the key 21 back to the door-unlocked position shown in Fig. 1, the brush 32 in this operation, in moving out of engagement with the contact 30, momentarily engaging the contact 31, the circuit thus momentarily established and energizing the electromagnet 41 being as follows: From battery 12, through wire 48, brush 32, contact 31, wire 58, electromagnet 41 and wire 49 back to battery.

While I have illustrated and described a particular construction embodying my invention, I do not wish to be understood as intending to limit it thereto as the same may be variously modified and altered without departing from the spirit of my invention.

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

1. An alarm apparatus for a structure one of the doors of which has a lock, comprising an alarm device, means controlled by said lock and by the position of the doors, operative when said lock is in door-locking position and one of the doors is thereafter opened, to actuate said alarm device, means locking said first-named means in alarm-actuating condition, and means controlled by said lock and operative when said lock is moved to door-open position to release said second-named means to a condition in which actuation of said alarm device is discontinued and said first-named means is re-set for subsequent operation.

2. An alarm apparatus for a structure one of the doors of which has a lock, comprising an alarm device, means controlled by said lock and by the position of the doors, operative when said lock is in door-locking position and one of the doors is thereafter opened, to actuate said alarm device, and comprising a circuit-controlling member normally tending to move to a position in which said alarm device is inactive, means automatically locking said member in alarm-actuating condition, and means operative when actuated to release said second-named means for releasing said member for restoring said first-named means to a condition in which actuation of said alarm device is discontinued and said first-named means is re-set for subsequent operation.

3. An alarm apparatus for a structure provided with a closure lock and with supplemental circuit closers comprising, an alarm device, means jointly controlled by said lock and by said supplemental circuit closers operable when said lock is in a closure-locking position and one of the supplemental circuit closers is operated to actuate said alarm device and means controlled by said lock and operable when said lock is moved to unlocked position to restore said first-named means to a condition in which actuation of said alarm device is discontinued and said first-named means is re-set for subsequent operation.

4. An alarm apparatus for a structure provided with a closure lock comprising, a closure securable by said lock, an alarm device, a supplemental circuit closer controlled by the opening of a second closure of the structure, an electrical circuit in which said alarm device is interposed, switches in said circuit one of which is controlled by said closure-lock and the other of which is a relay switch operable out of normal position by the opening of the second closure to control said relay switch for operating said alarm device, said

relay switch when moved to alarm-actuating position remaining in said position regardless of the position of the second closure, and electrically actuated means controlled by movement of said lock switch to unlocked position for re-setting said relay switch to normal position.

5. An alarm apparatus for a structure provided with a closure-lock comprising an alarm device, a closure securable by said lock, a supplemental circuit closer controlled by the opening of a second closure of the structure, an electrical circuit in which said device is interposed, switches in said circuit one of which is controlled by said closure-lock and the other of which is a relay switch operable out of normal position by opening of the said second closure controlling said first-named switch for operating said alarm device, said relay switch when moved to alarm actuating position remaining in said position regardless of the position of the second closure and electrically actuated means operated in the movement of said lock to unlocked condition to re-set said relay switch to normal position.

6. An alarm apparatus for a structure provided with a closure-lock comprising, a closure securable by said lock, an alarm device, a switch actuated by the opening of a second closure of the structure, an electrical circuit in which said device is interposed, switches in said circuit one of which is controlled by said closure-lock and the other of which is a relay switch operable out of normal position by the opening of said second closure controlling said supplemental switch for operating said alarm device, a second circuit, an electrical re-set device in said second circuit operative to hold said relay switch in alarm-actuating position regardless of the position of the second closure, said lock-controlled switch being interposed in said second circuit also and operative to control said second circuit for operating said re-set device to release position in the movement of said lock to unlocked position.

7. An alarm apparatus for a structure provided with a closure-lock comprising, a closure securable by said lock, an alarm device, a switch controlled by the opening of a second closure of the structure, an electrical circuit in which said device is interposed, switches in said circuit one of which is controlled by said lock and the other of which is a relay switch operable out of normal position by the opening of the second closure and controlling said first-named switch for operating said alarm device, a second circuit, an electrical re-set device in said second circuit operative to hold said relay switch in alarm actuating position regardless of the position of the second closure, said lock controlled switch having contacts in said circuits, respectively, and a contact movable in succession in engagement with said first-named contacts in the actuation of said lock, moving first in engagement with said contact in said second circuit and then in engagement with the other of said contacts when the first-named closure is moved to closure-locking position, and from said last-referred to contact into, and out of engagement with said contact in said second circuit in moving to closure-unlocking position for controlling said second circuit for actuating said re-set device to releasing position through said engagement with said contact in said second circuit.

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