Jan. 3, 1928.

1,654,931

M. GREENE

THEFT ALARM DEVICE

Filed June 4, 1926

2 Sheets-Sheet 1

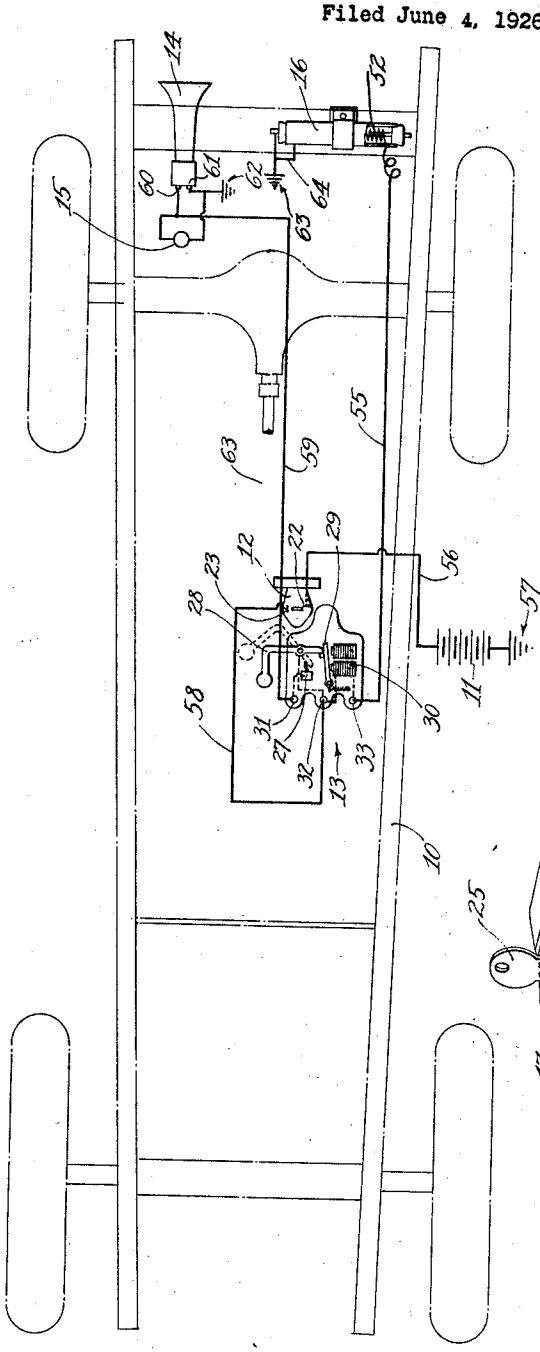


Fig. 1.

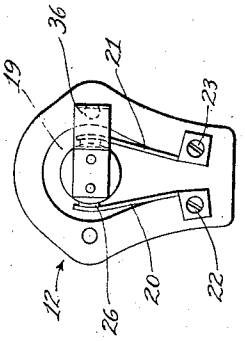


Fig. 8.

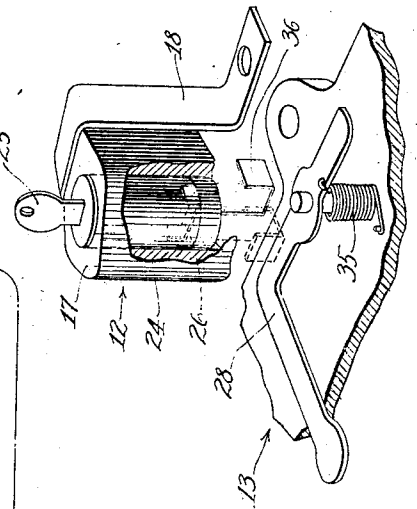


Fig. 7.

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2 Sheets-Sheet 2

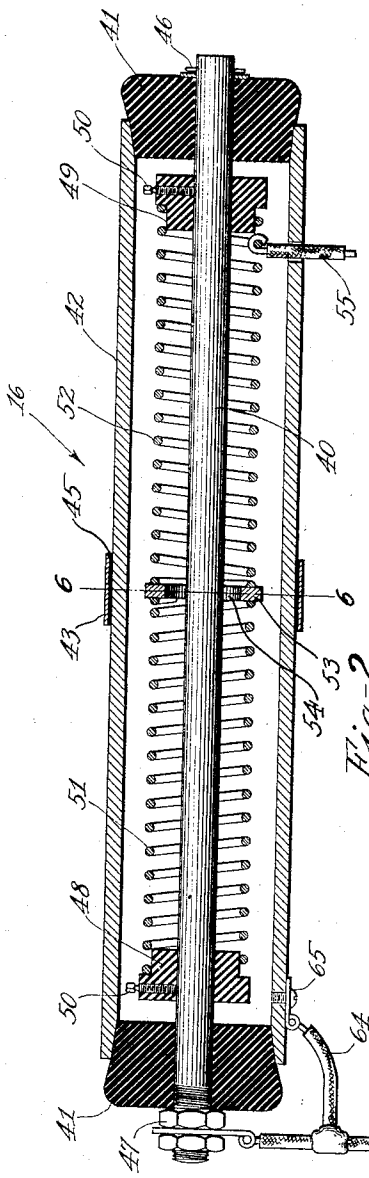


Fig. 2.

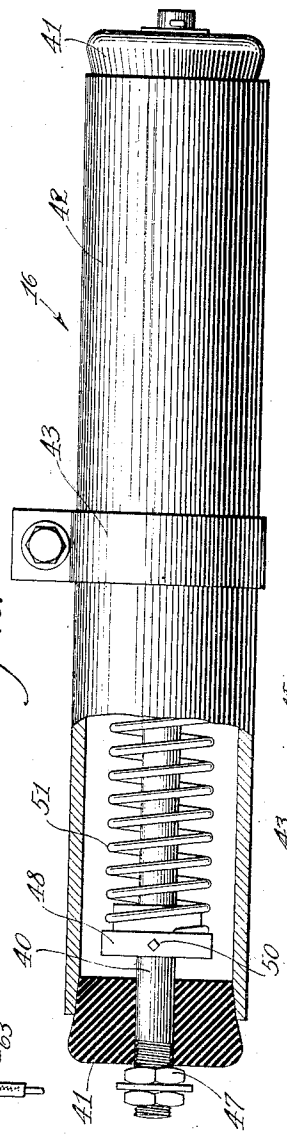


Fig. 3.

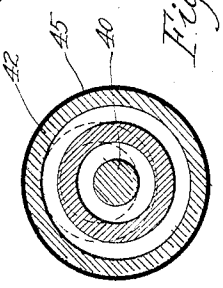


Fig. 6.

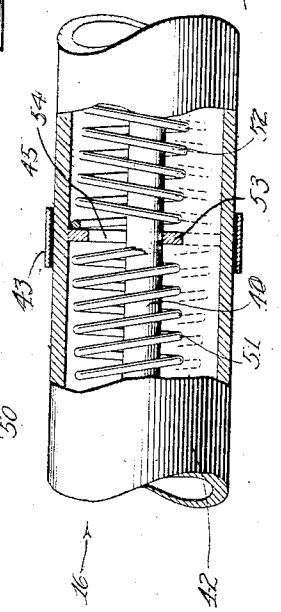


Fig. 5.

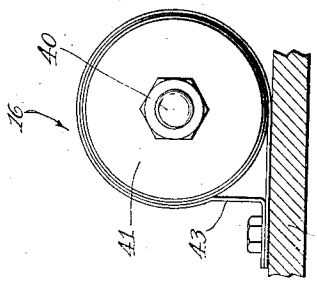


Fig. 4.

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Patented Jan. 3, 1928. 1,654,931

UNITED STATES PATENT OFFICE.

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THEFT-ALARM DEVICE.

Application filed June 4, 1926. Serial No. 113,623.

This invention relates to improvements in theft alarm devices, and has particular reference to electrical apparatus, including a novel circuit closing means, adaptable for use in automobiles and other environments.

In its broader aspects, the invention contemplates the use of a theft alarm, either audible, visible, or both, included in an electric circuit having a source of current supply, said circuit being normally open and having a circuit closer which may be actuated by vibrations set up by unauthorized use of or tampering with the device to which the invention is applied. Preferably a key-controlled switch may be included in the circuit in such a manner that an authorized person having the key may open the circuit and use the device without effecting operation of the alarm unit, and thereafter the apparatus may be set by closing the key-controlled switch and removing the key.

An important object of the invention is to provide a circuit closing device, for use in such a theft alarm system, wherein a contact member in the circuit is caused to vibrate and thus close the circuit when the device is moved or tampered with.

Another object is to provide such a device which will effectively operate in any position in which it may be left by the authorized person.

Another object is to provide such a device with adjusting means to vary the sensitivity of the device in accordance with necessity in its particular environment.

Another object is to provide a complete theft alarm system which will be particularly adapted for use in motor vehicles and the like, and which will embody an improved automatic circuit closer of the above mentioned character.

Another object is to provide such a theft alarm system wherein the alarm unit is brought into operation by an instantaneous closing of the circuit, and continues in operation after the circuit has been again broken in the initial circuit-closing mechanism.

Another object is to provide such a theft alarm system with a manually operated and preferably key-controlled switch having means for resetting the mechanism after the alarm has been given.

Other objects and advantages will be apparent from the following description, reference being had to the accompanying drawings, wherein the invention is shown by way of illustration, and wherein,

Figure 1 is a diagrammatic plan view of an automobile equipped with a theft alarm system in accordance with the present invention;

Figure 2 is a vertical longitudinal sectional view through the improved circuit closing means;

Figure 3 is a top plan view of the same partly in section;

Figure 4 is an end elevation of said circuit closing means;

Figure 5 is a fragmentary view, similar to Figure 2, showing the contact member in position for closing the circuit;

Figure 6 is a transverse sectional view on the line 6—6 of Figure 2;

Figure 7 is a detail perspective view of the manually operated switch and resetting mechanism, parts being broken away; and

Figure 8 is an end elevation of said switch per se.

The invention has been shown in Figure 1 as applied to an automobile, and while it is especially adapted for such use, it is not restricted to such environment but may be used in jewelry safes, bank vaults, trunks, and other articles wherein a theft alarm system is desirable.

Referring now to the drawings in detail, an automobile chassis frame 10 is diagrammatically illustrated in Fig. 1, as equipped with a battery 11 or other suitable source of electrical energy, connected electrically with a manually operated switch 12, an automatic drop unit 13, an audible signal 14, a visible signal 15, and an improved automatic circuit closer 16.

The manually operated switch 12 preferably includes a key-controlled lock having a housing 17 as best shown in Figures 7 and 8, said housing being formed of dielectric material, such as bakelite, and secured to a supporting bracket 18 by means of which it may be mounted. The lower side of the housing 17 is recessed as at 19 in Fig. 8 and provided with a pair of opposed, spaced contact members 20 and 21 formed of resilient metal and fitted with terminals 22 and 23 respectively. Rotatable in the housing 17, and between the extremities of the contact members 20 and 21, is a tumbler cylinder 24 controlled by a key 25, and provided adjacent its lower end with an insulated con-

ductor 26 adapted to bridge the gap between the contacts 20 and 21 when the cylinder is turned to its locked position. When the cylinder is turned to its unlocked position, the circuit is broken across the contacts 20 and 21.

The automatic-drop unit 13 may be of any ordinary or preferred type and includes a switch contact 27 adapted to be engaged by a spring-pressed switch arm 28 which is normally held out of engagement with the contact 27 and against the action of its spring, by a lug on armature 29 of an electro-magnet 30. The unit 13 is further provided with three binding posts or terminals 31, 32 and 33, and internally wired as follows: from terminal 31 to the switch contact 27; from terminal 32 to the pivot post of switch arm 28; and from terminal 33 to the electro-magnet 30, and from the electro-magnet back to terminal 32. From this it will be evident that when the electro-magnet 30 is energized, it will attract the armature 29 and thus release the switch arm 28, whereupon said switch arm is moved by its spring 35 against the contact 27 as indicated in dotted lines in Fig. 1. The alarm circuit will then be closed, and will remain closed until it is manually broken, and the switch arm 28 returned to its normally open position.

In order to facilitate resetting, the manually operated switch 12 is mounted in close proximity to automatic-drop unit 13, as best shown in Fig. 7, and the lower or inner end of the cylinder 24 carries a depending offset finger 36 which is adapted to selectively engage the switch arm 28. The finger 36 preferably extends in diametrical alinement with the conductor 26 and insulated from it in any suitable manner, the arrangement being such that when the tumbler is turned so the circuit is closed between the contacts 20 and 21, the finger 36 is out of engagement with the switch arm 28, and when the cylinder is turned through an angle of approximately ninety degrees, said finger 36 occupies a position as shown in dotted lines in Fig. 7. Under the latter condition, the switch arm 28 is incapable of movement to contact 27.

The signal means 14 and 15 may be of any ordinary type, the unit 14 being preferably an electrically operated siren, horn or bell capable of giving audible alarm, and the unit 15 being an electric lamp or the like. Either one or both of the signal units 14 and 15, may be used, and when both are used, they are preferably connected in parallel.

In order to frustrate theft, unauthorized use of, or tampering with the device, it has been found desirable to employ an automatic circuit closer of such sensitivity as to be operated by the slightest movement or vibration of the device. To this end, the unit 16 is provided, a preferred embodiment being shown in detail in Figures 2 to 6 inclusive. It includes a fixed conductor 40 preferably in the form of an elongated metallic rod supported by closure plugs 41 in the opposite ends of a cylindrical casing or container 42. The plugs 41 are preferably formed of dielectric material such as rubber, while the casing 42 may be metallic and provided with a clamping member 43 by means of which it may be mounted on any suitable support or portion 44 of the automobile, said clamping member being insulated from the container as indicated at 45. Any suitable means may be provided for securing the conducting rod 40 in place; for example, a cotter pin 46 may extend transversely through one projecting end of the rod, while the other end may be threaded for the reception of a nut 47.

Supported by the rod 40 within the casing 42 is a pair of spaced insulation bushings 48 and 49, adjustably secured by set screws 50, and each bushing being reduced in diameter at its inner end to provide opposed supporting seats for the outer ends of coil spring sections 51 and 52. The inner ends of the spring sections abut against and are secured to a contact member 53 in the form of an annulus having a central aperture 54 of greater diameter than that of the rod 40, said annulus encircling a portion of said rod. The arrangement is such that the distance between the inner periphery of the annulus and the surface of the rod 40 is equal to the distance between the outer periphery of the annulus and the inner surface of the casing 42. The spring sections are preferably under tension, and from this it will be evident that the contact member 53 will be yieldably supported and adapted to simultaneously contact with both the rod and the casing at opposite sides of its center as shown by dotted lines in Fig. 6. Such movement of the contact member 53 is caused by vibration of the spring sections, initiated by movement or vibration of the automobile or other device in which it is mounted. Any suitable means may be provided for connecting the contact member to one pole of an electric circuit, in this case a wire 55 being shown as attached to the spring section 52, the other end of said wire being connected to the terminal 33 on the automatic-drop unit 13.

Referring again to Fig. 1, the wiring connections of the parts are as follows: From the positive pole of the battery 11, a conductor 56 goes to terminal 22 of the switch 12, while the negative pole of the battery is grounded as at 57. The terminal 23 of said switch is connected by wire 58 to the intermediate terminal 32 of the automatic-drop unit, and a wire 59 extends from the terminal 31 to the terminal 60 of the alarm unit 14, the other terminal 61 of said alarm unit being grounded as at 62. The threaded end

of the rod 40 is grounded at 63, and in the event that the casing 42 is formed of conducting material, it may be connected to the ground 63 by means of a tap 64 and screw 65.

When the automobile is in legitimate use, the key 25 is turned to disconnect the conductor 26 from the contact members 20 and 21, thus breaking the circuit and rendering the mechanism inoperative. At the same time, the finger 36 engages the switch arm 28 preventing its movement to closed position even though it should be released by the armature 29.

If it is desired to leave the automobile, such as when parking it in the street, the legitimate user may set the theft alarm by turning the key 25 and then removing it. In this condition, the alarm circuit is complete through the switch 12, and is only interrupted by restraint of the switch arm 28. Thereafter, the slightest movement of the automobile incident to attempted theft or tampering therewith will cause the resilient support of the contact member 53 to vibrate and resulting in closing the circuit through the automatic circuit closer 16. When the circuit is thus closed, even though for just an instant, current flows from the battery 11 through wire 56, through switch 12, through wire 58, through the electro-magnet 30, to post 33, through wire 55, through automatic circuit closer 16, to ground at 63. As the current passes through electro-magnet 30, it energizes the same, attracting the armature 29 and thus releasing the switch arm 28 which is immediately moved by its spring 35 to contact 27. The alarm circuit is then complete, current flowing from the battery to the switch 12 as above described, thence through wire 58 to the pivot of arm 28 to contact 27, terminal 31, and then through wire 59 to terminal 60 of alarm member 14 and returning to battery through ground at 62. In this manner the alarm is given to call public attention to the fact that the automobile is being stolen, and the alarm will continue without interruption until the owner or other legitimate person arrives with the key 25 by means of which he may manually break the circuit and reset the device.

The various units and wiring employed in the system may be mounted in any suitable manner, preferably under the seat cushions where they will be concealed from view, and therefore not subject to unauthorized tampering without actuating the alarm.

The construction of the circuit closer 16 is such that it may be installed in any position, that is, either horizontal, vertical, or otherwise, and variations in position will not affect the suspended position of the contact member 53 relative to the conductors 40 and 42. This feature is particularly advantageous, and in fact necessary, for an automobile theft alarm, because automobiles are frequently parked on hills and the like, under which conditions devices having gravity-controlled members have become inoperative.

It may be found necessary to provide different tension on the springs 51 and 52 for different makes of cars, and to this end, the tension may be varied by adjustment of the bushings 48 and 49, said adjustment being preferably made at the time of installation, and if desired the container 42 may thereafter be permanently sealed.

From the foregoing it will be obvious that a substantial improvement has been made in this art, and that a circuit closer of extreme simplicity, sensitivity and reliability has been produced. The invention is, of course, susceptible of modification, in the details of construction and arrangement of parts, and the right is herein reserved to make such changes as fall within the scope of the appended claims without departing from the spirit of the invention.

Having thus described my invention, what I claim is:

1. In a circuit closing device for electric circuits, an elongated conductor adapted to be connected to one side of a circuit, an annular contact member surrounding a portion of said conductor and normally spaced therefrom, and resilient supporting means for said contact member, said supporting means being connected to the opposite side of the circuit and adapted to vibrate to close the circuit, and a tubular container enclosing said parts, said container being formed of conducting material and electrically connected to the same side of the circuit as the elongated conductor.

2. In a circuit closing device for electric theft alarm circuits, a rigid conductor adapted to be connected to one pole of a circuit, an annular contact member surrounding a portion of said conductor and normally spaced therefrom, said contact member being connected to the opposite pole of the circuit, and a coil spring for resiliently supporting said contact member and capable of transverse vibration in any direction to close the circuit and a second rigid conductor encircling the annular contact member in the same space-relationship as that between the first rigid conductor and the annular contact member, said second rigid conductor being of the same polarity as the first.

3. In a circuit closer of the character described, a tubular container, a conducting rod extending longitudinally within the container, an annular contact member surrounding the conducting rod intermediate its ends and normally spaced from the outer surface of said conducting rod, coil spring sections

secured to opposite sides of the annular contact member, insulation bushings mounted on the conducting rod and adapted to support said spring sections under compression, means for connecting the conducting rod to one pole of an electric circuit, and means for connecting the coil spring to the other pole of the circuit, whereby vibration of the spring will cause closing of the circuit.

4. In a circuit closer of the character described, a tubular container, a conducting rod extending longitudinally within the container, an annular contact member surrounding the conducting rod intermediate its ends and normally spaced from the outer surface of said conducting rod, coil spring sections secured to opposite sides of the annular contact member, insulation bushings mounted on the conducting rod in spaced relation and adapted to support said spring sections under compression, means permitting relative adjustment of said insulation bushings to vary the compression of the spring sections, and means for respectively connecting the conducting rod and the annular contact member to opposite poles of an electric circuit.

MARIUS GREENE.