

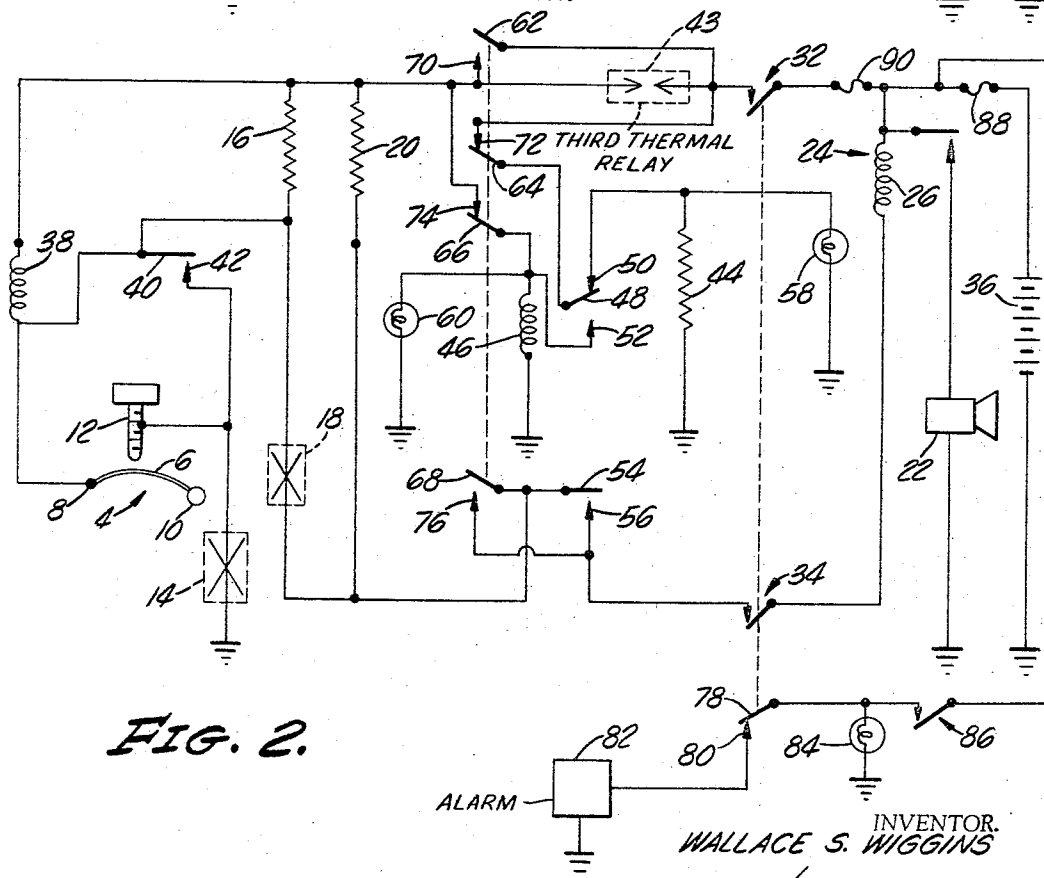
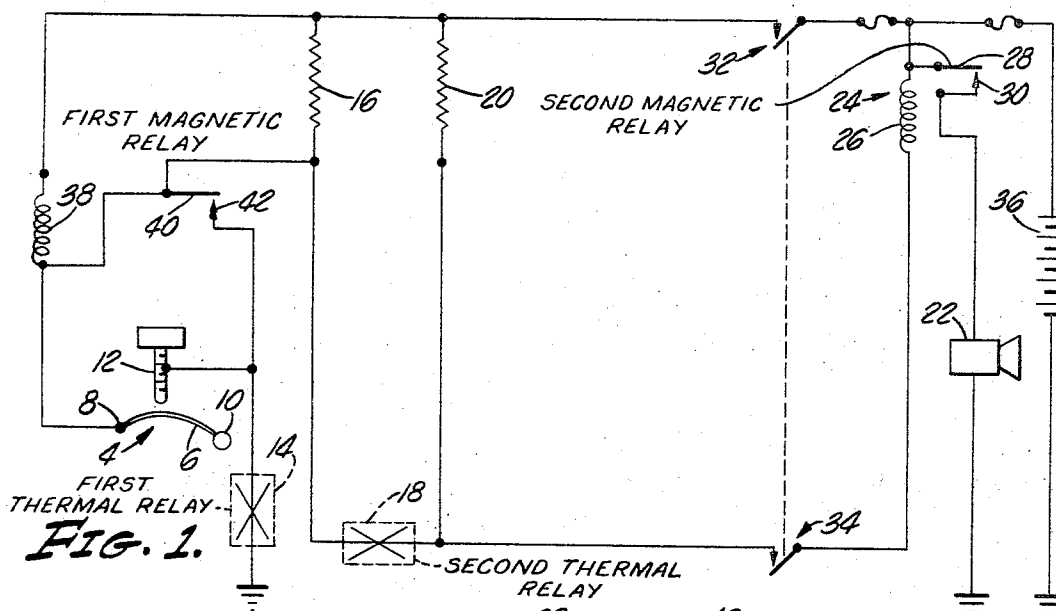
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VEHICLE THEFT ALARM

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VEHICLE THEFT ALARM

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This invention relates to a theft alarm for vehicles, and more particularly, for motor vehicles having some source of current, such as an electric battery.

It is a general object of the invention to provide a theft alarm for vehicles of relatively simple construction which can be armed or put in a condition for operation wherein, when so armed, there is no drain upon the vehicle battery or similar source of current.

Another object of the invention is to provide a theft alarm wherein simple and effective means is provided for temporarily delaying actuation of the alarm device, as when the occupant or occupants of the vehicle are leaving the vehicle after it is stopped, and wherein after a short interval, the alarm will automatically be armed for actuation after such short interval. In this case, a negligible amount of current is utilized from the battery, but it is so slight that danger of weakening the battery is not present.

A further object of the invention is to provide means whereby when the delayed arming or actuating feature is used, it can be conveniently completely disconnected at desired times, such as when the vehicle is to be parked or placed in storage for a substantial period of time.

Still a further object of the invention is to provide means for indicating to the user of the vehicle that the alarm has not been armed or placed in an operative condition.

The above and other objects will more fully appear from the following description in connection with the accompanying drawing, wherein:

FIG. 1 is a diagrammatic view of an embodiment of the invention in its simplest form;

FIG. 2 is a diagrammatic view including the arrangement of FIG. 1, but with additional features added.

In the circuitry of FIG. 1, the system includes an inertia switch 4, including a spring contact 6, anchored at 8, and having a free end provided with a weight 10. The anchored end 8 is secured to a portion of the vehicle, and when the vehicle moves in any manner, the weighted spring 6 will vibrate and engage an adjustable contact 12. There is a first single pole, single throw, normally closed thermal relay having a set of contacts 14 and a resistance coil 16. There is a second thermal relay having normally closed contacts 18 and a resistance coil 20. Heat generated in the coils 16 and 20 will act upon and separate the sets of contacts 14 and 18 respectively when said coils are energized. There is also an alarm device 22 which may be a horn or other audible signal, and its magnetic actuating relay 24 comprises a coil 26 and an armature 28, the latter being drawn into engagement with a stationary contact 30 upon energization of the coil 26. A manually actuated signal throw double pole switch 32, 34 is provided to arm the alarm or place it in condition for operation when the inertia switch 4 is closed.

With the vehicle at rest, the manual switch 32, 34 is

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closed. Any subsequent motion of the vehicle, caused by a person getting into it, starting the engine, or moving the vehicle by self-propulsion, pushing or towing, or merely by jostling, will cause the inertia switch arm 6 to vibrate and bring it into engagement with the contact 12 at least momentarily. This will complete a circuit from the vehicle battery 36, contacts 6 and 12, and the coil 38, of a magnetic relay having an armature 40 adapted to engage a contact 42. When contacts 40 and 42 are engaged, the circuit is completed through the contacts 14 of the first thermal relay 14, 16 and thence to ground as indicated.

When the coil 38 of relay 38, 40 causes contacts 40 and 42 to engage, the inertia switch comprising contacts 6 and 12 will be shorted out. However, the circuit being completed through the first magnetic relay 38, 40 and contact 42 to ground through contacts 14, said magnetic relay will remain energized, and contacts 40 and 42 will remain in contact.

Simultaneously with the closing of contacts 40 and 42, three other circuits are completed. One is from battery 36 through the coil 26 of the magnetic relay 24 through pole 34 of switch 32, 34, contacts 18, contacts 40, 42, and contacts 14 to ground. As this occurs, magnetic relay 24 closes contacts 28, 30 and energizes the grounded alarm signal 22. A second circuit is completed from the battery 36 through pole 32 of switch 32, 34, through the resistance or heater coil 16 of the first thermal relay 14, 16, contacts 40, 42 and contacts 14 to ground. A third circuit is completed from the battery 36 through pole 32 of switch 32, 34, through the resistance or heater coil 20 of the second thermal relay 18, 20, contacts 40, 42, and contacts 14 to ground.

The circuits to the resistances or heaters 16 and 20 of the first and second thermal relays being closed, of course heat will be generated in said coils. The interval required for the heater coil 16 to open its relay contacts 14 is considerably greater than that required for the heater coil 20 to open its relay contacts 18. In other words, the contacts 18 of relay 18, 20 have opening and closing cycles of much shorter duration than a single opening and closing cycle of thermal relay 14, 16. Furthermore, it will be seen that when the contacts 18 of thermal relay 18, 20 are opened due to the heating of the coil 20, the circuit through coil 26 of magnetic relay 24 will be opened and contacts 28 and 30 in the circuit through the alarm 22 will open. However, thermal relay 14, 16 will remain energized since the first magnetic relay coil 38 is still energized and contacts 40 and 42 are closed, thereby maintaining the circuit through the heater coil 16 of the first thermal relay 14, 16.

Of course after a predetermined interval of intermittent opening and closing of the second thermal relay contacts 18, the heater coil 16 of the first thermal relay will open its contacts 14 and break the circuit through the thermal relay 14, 16, and at the same time, deenergize the coil 38 of the first magnetic relay 38, 40, as well as breaking the circuit through the coil 26 of the second magnetic relay 24, and also causing contacts 28 and 30 in the audible alarm circuit to open, thus stopping the audible alarm and resetting the system to an armed condition.

In FIG. 2 there is shown means for delaying arming of the system for a predetermined period after the manual

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switch 32, 34 is closed. This feature is provided so that the operator or other authorized occupant of the vehicle can leave the vehicle without activating the inertia switch 4, but wherein the system will be armed, or placed in condition for operation, automatically, after the operator has left the vehicle. This will give the inertia switch 4 time to come to rest in an open position.

I provide a normally open thermal relay 43 with its heater or resistance coil 44 which will close the contacts of the relay when the coil is heated to a sufficient degree. I also provide a magnetic relay comprising a coil 46 with a movable armature 48 movable between fixed contacts 50 and 52. The coil 46 also acts upon armature 54 which is movable into engagement with a fixed contact 56. When the first manual switch 32, 34 is closed, the heater 44 is energized through the closed contacts 48 and 50, which are engaged. At the same time a pilot light 58 is energized to indicate a prearmed condition. Since the third thermal relay contacts 43 are open, no power is available from the battery 36 to actuate the relay 38, 40, 42. Contacts 54 and 56 are normally open and the ground path from the alarm actuating relay 24 is open and the signal device 22 will not be sounded even though inertia switch 4 is actuated.

After a desired predetermined interval, the heater 44 will close the third thermal relay contacts 43 and energize the magnetic relay coil 46 swinging its armature 48 from the contact 50 to the contact 52, and simultaneously, the coil 46 will swing the armature 54 into engagement with the contact 56.

Engagement of the armature 48 with the contact 52 disconnects power from the heater 44 and pilot light 58 and power is supplied through contacts 43 to the system as set forth in FIG. 1, so that if the vehicle is subjected to any type of motion, the inertia switch 4 will cause the alarm 22 to be actuated as described in connection with FIG. 1.

Even though the contacts 43 of the third thermal relay reopen upon deenergization of their heater 44, circuit is maintained around the open contacts 43 by reason of the continued energization of the third magnetic relay coil 46, and the circuit through its armature 48 and contact 52. Pilot light 60 simultaneously indicates an armed condition.

The third relay coil 46 has also swung the armature 54 into engagement with contact 56 completing the ground path for relay 24 and the system is fully armed or prepared for actuation upon closing of the inertia switch 4. In this condition of the circuit, the only drain on the battery is a very slight one through the third relay coil 46 and a pilot light 60, and this battery drain is negligible because the third relay coil 46 and pilot light 60 have comparatively high resistances.

When the manual switch 32, 34 is opened prior to operation, of the motor vehicle, the third relay coil 46 is deenergized and the system is open or unarmed, providing the return of armature 48 of the third magnetic relay to the contact 50, which opens the delayed arming feature of the device.

Means is provided for converting the above described circuitry in FIG. 2 in effect to that of FIG. 1 in the event the vehicle is to be parked for an extended length of time during which the amount of battery drain through the third magnetic relay coil 46 and pilot light 60 might eventually become appreciable because of the length of time. For such purpose I provide a four-pole single throw switch comprising poles 62, 64, 66 and 68 having cooperating contacts 70, 72, 74 and 76. In the position of this switch illustrated in FIG. 2, poles 62 and 68 are out of engagement with their respective contacts 70 and 76, while poles 64 and 66 are in engagement with their contacts 72 and 74. In this position, the third thermal relay 43, 44 and the third magnetic relay 46, 48, 50 and 52 are in operative condition in the circuit upon closing of the first manual switch 32, 34 and actuation of the inertia switch 4.

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When poles 64 and 66 are moved to an open condition, poles 62 and 68 will close contact with their stationary contacts 70 and 76, thus shorting out the third thermal relay contacts 43 and opening the circuit to the third thermal relay heater 44 and pilot light 58. Opening of the switch, including the pole 66, opens the power to the third magnetic relay coil 46 and pilot light 60. Closing of the switch comprising pole 68 and contact 76, shorts out the contacts 54, 56.

In this condition the circuit is similar to and operates exactly like the form of the circuit shown in FIG. 1, and there is no current drain when the system is armed by closing the first manual switch 32, 34. Of course when the second manual switch 62, 64, 66, 68 is returned to the position of FIG. 2, the delayed arming feature including the third thermal relay 43, 44 is restored.

FIG. 2 has also provided therein a reminder circuit which may be incorporated if desired. In such event the first manual switch 32, 34, which heretofore has been shown and described as a double pole single throw switch, can have substituted therefore a triple pole double throw switch, which when the poles 32 and 34 are opened, a pole 78 is closed against a contact 80. Contact 80 is connected to ground through a buzzer 82 or other desired indicator. Pole 78 is connected to the vehicle courtesy light or dome light 84 and through its vehicle door actuated switch 86, to the battery. Thus, when the vehicle door is opened, the courtesy light 84 will light as usual but also the alarm 82 will be actuated to inform the operator the first manual switch poles 32 and 34 are not closed. He thereupon closes poles 32 and 34 which opens pole 78 and deactivates the reminder alarm 82. To safeguard the system I provide a fuse 88 between the battery and the entire system, and a second fuse 90 ahead of the first manual switch 32, 34.

It will of course be understood that various changes can be made in the form, details and arrangement of the invention, without departing from the spirit thereof.

I claim:

1. In a vehicle theft alarm for use with a vehicle battery, an inertia switch, an alarm device, first and second normally open magnetic relays, first and second normally closed thermal relays, a manual switch, a circuit from said battery through said manual switch and inertia switch, the first of said magnetic relays and said first and second thermal relays being energizable by said inertia switch and so connected to said first thermal relay to maintain closed its contacts and maintain the circuit through the first magnetic relay, the inertia switch being connected to said first thermal relay to be shorted out thereby when the first thermal relay is energized, a circuit through the energized first magnetic relay and the coil of the second magnetic relay to close the contacts of said second relay and activate said alarm device, said first and second thermal relays having different cycles of operation and being connected between the battery and said first magnetic relay, said manual switch being operable to open and close the circuit to said first magnetic relay and said inertia switch.

2. The structure in claim 1, and said first thermal relay having a cycle of greater duration than that of said second thermal relay and sufficient to span a plurality of cycles of said second thermal relay.

3. The structure in claim 1, and means for delaying the effective operation of said inertia switch comprising an auxiliary circuit having a normally closed third magnetic relay between said manual switch and said inertia switch and first magnetic relay, and a normally open third thermal relay between said first and third magnetic relays, whereby, when the manual switch is closed, the circuit to said inertia switch and alarm device remains open until closed by said third thermal relay.

4. The structure in claim 3, and a second manual switch connected around said third magnetic relay to render inoperative said third magnetic relay when said second manual switch is closed.

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5. The structure in claim 1, and means for indicating that said first manual switch is open and the alarm incapable of operation comprising additional switch means connected to and actuated by said first manual switch, an open circuit indicator, and said additional manual switch means having another contact connected to said open circuit indicator.

6. The structure in claim 5, and a vehicle door actuated courtesy light switch connected between said additional manual switch means and its connection with said battery circuit.

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