May 13, 1969 C. SUREK 3,444,547

ANTI-SHOPLIFTING DEVICE

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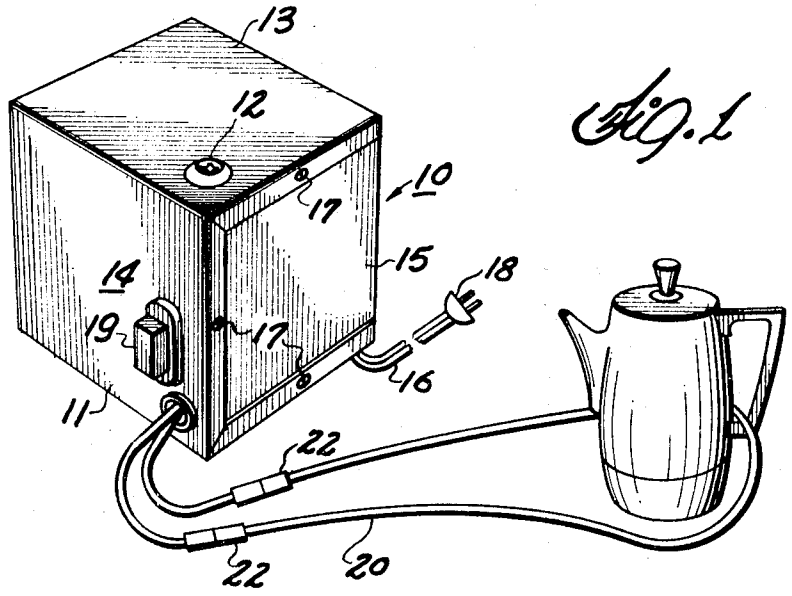


Fig. 1

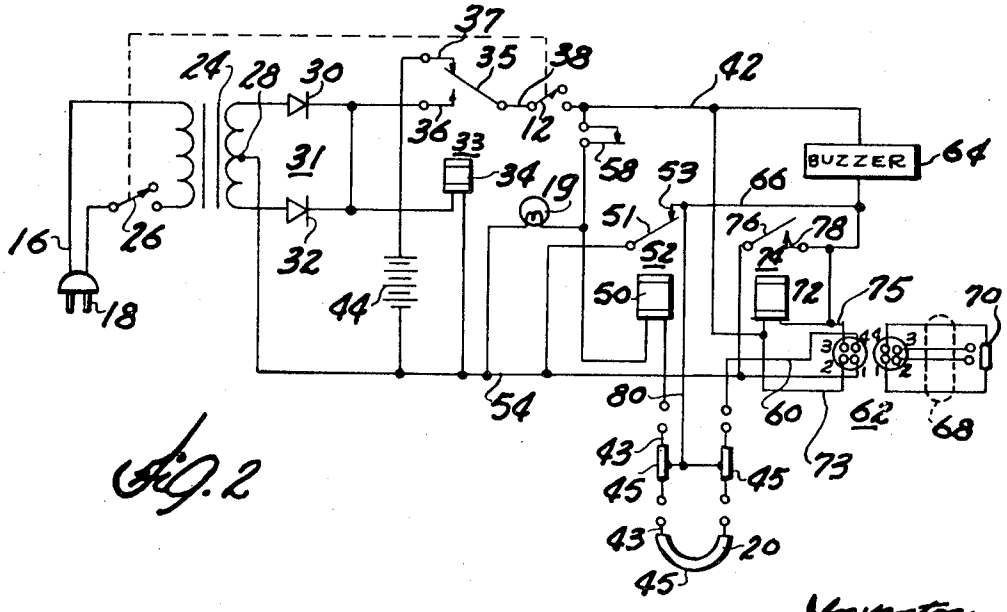


Fig. 2

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ANTI-SHOPLIFTING DEVICE

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ABSTRACT OF THE DISCLOSURE

A tamper-proof anti-shoplifting device energizes an alarm circuit through the operation of a relay, in response to disconnection of an elongated, shielded, low impedance conductor. A second relay is connected for actuation when the first relay is deactuated, and also when the elongated conductor is short-circuited with respect to its shield to continuously energize the alarm until the apparatus is reset.

This invention relates to anti-shoplifting apparatus and more particularly to such apparatus in which an alarm signal is set off when an electrical circuit connection is broken.

In the prior art, anti-shoplifting devices have been designed to initiate an alarm in response to opening an electric circuit when an article being protected by such a device is removed from its position. Such prior devices have suffered, however, from several disadantages. For one thing, it has been possible for a shoplifter to terminate the alarm by quickly reconnecting the circuit, so that an attempted theft may not be detected. In addition, a theft may be signaled by only a short alarm. For example, one such prior art anti-shoplifting device comprises a buzzer with a battery source of power and a relay. The circuit components are interconnected with a conductor which is intertwined with the articles to be protected in such a way that such articles may not be removed without opening the electrical circuit formed by the conductor. In this type of device, however, it has been possible to disconnect the conductor long enough to separate it from a protected article, and then rapidly reconnect it in order to terminate the alarm signal produced by the buzzer. The alarm does not last long enough to provide an adequate signal.

Accordingly, it is the principal object of the present invention to provide anti-shoplifting apparatus of the type including a conductor intertwined with the articles to be protected, with provision for the continuance of an alarm signal after the conductor has been disconnected, irrespective of its reconnection.

Another disadvantage of prior art devices is that a self-contained power supply is required to guard against defeating its operation by merely disconnecting an external source of power. As a result, such devices normally contain batteries, and the constant current drain on the batteries makes frequent battery servicing and maintenance essential.

Accordingly, a further object of the present invention is to provide such apparatus including a power supply which may be energized from either an A.C., or a D.C. source, thus eliminating the need to rely wholly on a self-contained source of power. In the present invention, interruption of the A.C. source automatically switches in a battery as an auxiliary power supply, so that interrupting the A.C. source does not disable the alarm device. Since there is no constant drain on the battery, servicing may be much less frequent.

A further disadvantage of prior art devices is that it

has been possible to short circuit the conductor around an article with a short-circuiting wire or "jumper." After the short-circuiting wire has been installed, no alarm is given when the conductor is disconnected and the protected articles are removed.

Accordingly, it is another object of the present invention to provide anti-shoplifting apparatus in which any attempt to install a short-circuiting wire will energize the alarm.

These and other objects and advantages of the present invention will be made manifest by an examination of this description and the accompanying drawings, in which:

FIG. 1 is a prespective view of a system embodying the invention; and

FIG. 2 is a schematic circuit diagram of one embodiment of the present invention.

Referring now to FIG. 1, the use of the invention is illustrated. A housing **10** encloses the circuitry illustrated in FIG. 2, and is provided with a lock switch **12** by which the apparatus may be turned on and off, and a pilot lamp **19** which is adapted to be lighted to show when the apparatus is on. The housing is providde with a cover **14**, having a front panel **11**, an upper panel **13** and a corresponding lower panel, integrally connected together and adapted to slide forwardly out of interlocking engagement with the back panel and two side panles **15** of the housing **10**, upon removing screws **17**. A switch **58** (FIG. 2) is provided interiorly of the housing **10**, and is adapted to be opened when the cover **14** is removed from the housing **10**, functioning as an interlock. As described hereinafter, this will trigger the alarm unless the key switch **12** has been opened. The housing **10** is provided with a line cord **16**, terminating in a plug **18**, by which A.C. power is supplied to the circuitry of FIG. 2 within the housing **10**.

A cable **20**, comprising a closed loop having both of its ends emanating from the housing **10** is utilized in the manner illustrated, by intertwining the cable **20** with the articles to be protected, such as the coffee pot **21** illustrated in FIG. 1, so that the articles may not be removed from association with the conductor **20** without disconnecting connectors **22**. As will be more fully described hereinafter, the disconnection of the connectors **22** causes the initiation of an alarm signal which continues even though the connector **22** may be reconnected.

Referring to FIG. 2, one embodiment of the present invention is illustrated in which line cord **16** is connected to the primary of a transformer **24** through an A.C.-D.C. switch **26**. The secondary of the transformer **24** is provided with a center tap **28**, and the voltage appearing at the secondary terminals is rectified in a full wave rectifier **31**, including diodes **30** and **32**. The D.C. voltage produced by the full wave rectifier is applied across the coil **34** of a relay **33**, such that its armature **35** is normally closed with a contact **36**, as illustrated in FIG. 2, applying the positive potential from the rectifier **31** to the line **38** and thence through the lock switch **12** to the line **42**.

A battery **44** is provided, with its negative terminal connected to the center tap **28** of the transformer **24** and its positive terminal connected to the normally open contact **37** of the relay **33**. If the A.C. power is interrupted, as for example by opening the switch **26**, the relay coil **34** is de-energized and the contact **36** opens, interrupting the current path from the rectifier **31** to the line **38**, and the armature **35** closes with the contact **37**, completing the current path from the positive terminal of the battery **44** to the line **38**. Hence, line **38** is always provided with a positive potential, irrespective of whether A.C. power is being furnished to the transformer **24**, and the center tap **28** of the battery is similarly provided with a negative potential.

The cable **20** illustrated in FIG. 1 comprises a shielded cable having an inner conductor **43** and a coaxial outer conductor **45**. The inner conductor **43** of the cable **20** has one end connected through the coil **50** of a relay **52** and through the cover-interlock switch **58** to the line **42** which is supplied with positive potential. The relay **52** has an armature **51** and a normally closed contact **53**. The other end of the inner conductor **43** of the cable **20** is connected by a line **60** through a connector **62** and a cable **68** to one terminal of a low resistance sensing device **70**. The other terminal of the device **70** is connected through the cable **68** and connector **62**, and through a line **54** to the center tap **28**. Thus, as long as the conductor **20** maintains a complete circuit between the negative potential present on line **54**, through the coil **50** of the relay **52** to the positive potential on line **42**, the coil **50** remains energized and the armature **51** remains out of contact with the contact **53**. The lamp **19** is connected in parallel with the coil **50** and the cable **20**, to indicate when they are energized.

A buzzer **64** is connected between the line **42** and the contact **53** of the relay **52**, by a line **66**, and is energized when the relay **52** is de-energized, thereby completing a circuit from the line **54** through the contact **53** to the buzzer **64**.

The connector **62** is provided with four terminals which are adapted to be connected by the cable **68** to a monitor at a remote location. The low resistance sensing device **70**, may conveniently be an ammeter or the like, and a current flowing through the device **70** indicates that the cable **20** has not been disconnected. Two other terminals of the connector **62** are connected across the terminals of the buzzer **64**, by lines **73** and **75**, and may be connected by the cable **68** to an alarm device at the remote location such as a buzzer or a lamp. A double check on the operation of the anti-shoplifting apparatus is available, because the current between the terminals **1** and **4** is interrupted, and a voltage appears between the terminals **2** and **3**, when the cable **20** is disconnected. Either one of these eventualities indicates that one of the protected articles has been moved and the cable **20** has been disconnected.

The coil **72** of a relay **74** is connected in parallel with the buzzer **64**, such that its armature **76** closes with its normally open contact **78** whenever the buzzer **64** is energized. The closing of the contact **78** with the armature **76** short circuits the corresponding contacts of relay **52**, to "hold in," or maintain the coil **72** of the relay **74** energized, irrespective of the condition of the relay **52**. Thus, after disconnection of the cable **20**, even if the cable is reconnected and the relay **52** is re-energized, the buzzer **64** remains energized through the contacts of the relay **74**.

The outer conductor **45** of the cable **20** is connected by a lead **80** to the normally open contact **53** of the relay **52**. The line **80** normally carries no current, but if an attempt is made to install a jumper wire around a protected article, a short circuit is formed between the central conductor **43** of the cable **20**, and its outer conductor **45**, which allows current to flow through the buzzer **64**, the line **80** and the outer conductor **45** to the short circuit, and thence through the inner conductor **43** and line **54** to the center tap **28**. The coil **72** of the relay **74** is energized with the buzzer **64** and keeps the buzzer **64** energized even though the relay **52** may remain energized, the circuit formed by the inner conductor **43** of the cable **20** not necessarily having been interrupted. Thus, the apparatus of the present invention generates an alarm signal if any attempt to install a jumper is made.

Once the buzzer **64** has been energized, it can only be de-energized by opening the lock switch **12**, which, when the cable **20** has been reconnected, resets the relay **74** by opening the circuit of its coil **72**. Thus, there is no way for a shoplifter to discontinue the alarm, once it has sounded. The cover interlock switch **58**, being connected in series with the cable **20**, produces the same effect as opening the circuit of the cable **20** when the housing **10** is tampered with.

What is claimed is:

1. In an anti-shoplifting device including signaling means, an elongated conductor, and first control means connected with the ends of said elongated conductor and adapted to energize said signaling means in response to a break in said conductor, the combination comprising an outer conductor surrounding said elongated conductor, and second control means connected with said elongated and outer conductors and adapted to energize said signaling means in response to a short circuit between said elongated and outer conductors said second control means comprising a voltage source, one terminal of said source being connected to one of said elongated and outer conductors, and a relay, said relay having a coil and a set of contacts, the opposite terminal of said source being connected to the other of said conductors through said relay coil so that said relay coil is in series with said voltage source and said short circuit, said set of contacts being connected in circuit with said signaling means and said voltage source.

2. Apparatus according to claim **1**, wherein said set of contacts comprises normally open contacts interconnected directly between said elongated and outer conductors, so that short circuit conducts only until said relay is actuated.

3. Apparatus according to claim **2**, wherein said signaling means is connected in parallel with said relay coil, one end of said parallel circuit being connected to one terminal of said voltage source, and the other end of said parallel circuit being connected to the opposite terminal of said source through said normally open contacts and said short circuit.

4. Apparatus according to claim **1**, wherein said elongated conductor is the central conductor of a coaxial shielded cable and said outer conductor is the outer conductor of said cable.

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