May 24, 1966 F. DOWNER 3,253,270

THEFT ALARM FOR SHOPLIFT PREVENTION

Filed Aug. 2, 1963

FIG. 1.

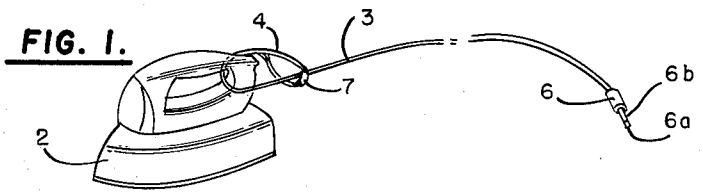


FIG. 2.

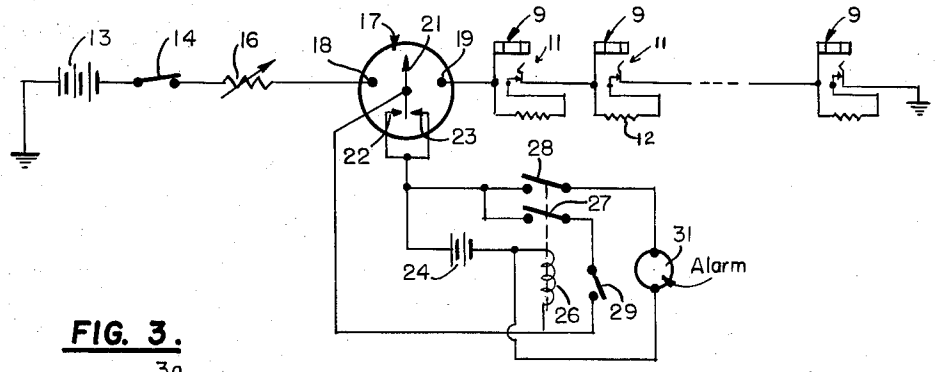


FIG. 3.

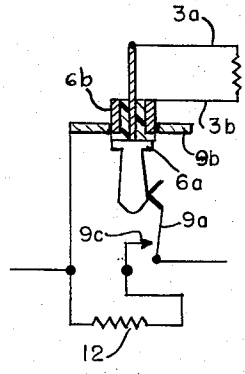


FIG. 4.

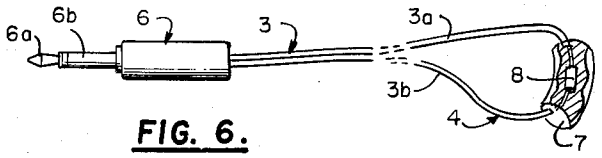


FIG. 6.

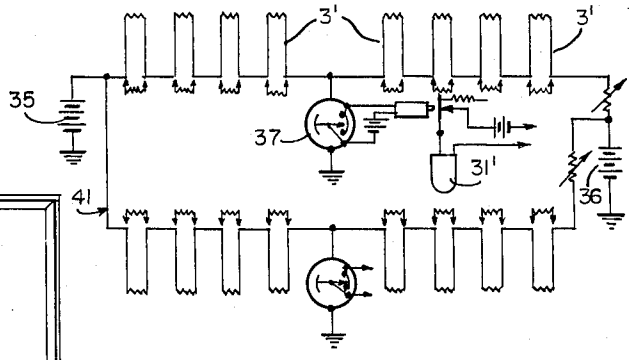
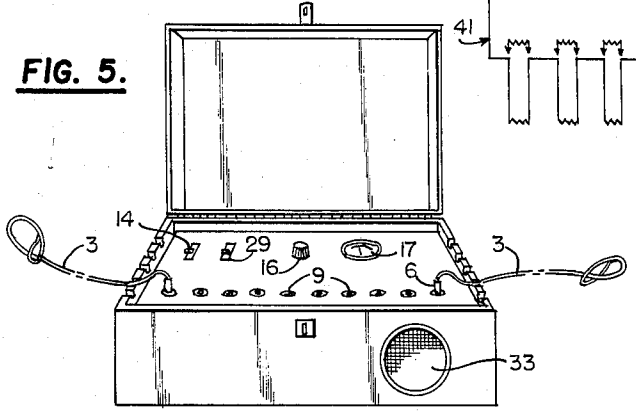


FIG. 5.



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United States Patent Office 3,253,270 Patented May 24, 1966

3,253,270

THEFT ALARM FOR SHOPLIFT PREVENTION

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Filed Aug. 2, 1963, Ser. No. 299,513
3 Claims. (Cl. 340—280)

This invention relates to a protective device for theft alarm for preventing the unauthorized removal of merchandise from a display counter or the like.

Shoplifting is an aggravating problem for the retail store which displays small but valuable items of merchandise on counters where the buying public is allowed to handle or try out the merchandise. Such goods as small radios, electric saws, percolators, etc., are easily removed by shoplifters, especially when the store is crowded and the sales people are too busy to watch every item. Electrical alarm devices have been proposed wherein a long electric wire is looped through a portion of the merchandise and made a part of an alarm circuit so that if the wire is cut or broken in order to remove the goods, an alarm is sounded. The present invention relates to improved devices or systems of this class.

One drawback of prior devices is that the electric wire can easily be shorted ahead of the object through which it is looped, and the wire then cut without the alarm sounding. It is a major object of the present invention to provide a theft alarm which cannot be thwarted in this manner.

Another object is to provide a relatively simple alarm which can be battery-powered and therefore used in any location; which has a very small battery drain in normal use, and which provides separate long leads to each piece of goods to be protected, so that the goods can be handled and tried out at or near the counter without inconvenience to the prospective purchaser.

A further object is to provide a theft alarm which can be operated by unskilled personnel and which is rugged and reliable in operation.

The specific nature of the invention, as well as other objects and advantages thereof, will clearly appear from a preferred embodiment as shown in the accompanying drawings, in which:

FIG. 1 shows the manner in which the protective line is attached to a display item to protect it;

FIG. 2 is a circuit diagram of the protection system;

FIG. 3 is an enlarged schematic detail showing the manner in which the plug of the protective line unit cooperates with the main circuit;

FIG. 4 is a view showing one of the protective lines;

FIG. 5 is a perspective view of a cabinet embodying the apparatus; and

FIG. 6 is a schematic circuit diagram of an alternative protective circuit.

Referring to FIG. 1, an article to be protected, e.g., an electric iron **2** has the flexible line **3** looped around a suitable part thereof, for example the handle. A loop or eyelet **4** is provided for this purpose at one end of the line **3**, and a jack **6** (having terminals **6***a* and **6***b*) similar to a small telephone jack, is provided at the other end for a purpose which will be explained below. Jack **6** is sufficiently small to pass easily through the eyelet **4** so that the object to be protected can be readily and securely engaged by line **3**. In the event that the object to be protected has no apertured element by which it can be looped as shown, it can be fastened to line **3** in any other suitable manner. Since the invention is generally used with sample display objects which are not themselves sold, the connection to line **3** can be made so that it is not readily removable without tools, if desired, as by a special screw or clamp; in the case of some objects, a sufficiently small hole can be drilled

in the wall of the object so that the line **3** can be passed through the hole, the enlarged portion **7** being too large to pass through the hole so that the line is thereby engaged with the object to be protected.

A separate line **3** is provided for each object to be protected, and each line has two conductors **3***a* and **3***b*, each connected at one end to a terminal jack **6**, e.g., line **3***a* is shown in FIG. 3 connected to terminal **6***a* of the jack and line **3***b* to terminal **6***b*. The other end of each line **3***a* and **3***b* is connected to one of the terminals of a small resistor **8**, preferably located at the very end of the flexible line **3**. Each line of the apparatus has such a resistor and they are all preferably of the same resistance value.

After a line **3** is suitably engaged with a display item as shown above, the jack **6** is plugged into any one of a number of plugs **9** (FIGS. 2 and 4). Each of these plugs has an internal switch **11** by means of which a small resistor **12**, equal in value to resistor **8**, is put into the circuit between the terminals of the jack when the plug is not inserted in the jack. When the plug is inserted, terminal **6***b* engages ring terminal **9***b*, terminal **6***a* of the plug engages spring terminal **9***a* of the jack which disengages it from terminal **9***c* to open the circuit of resistor **12**, so that this last resistor is cut out of the line when the plug is inserted, and at the same time resistor **8** is put into the line circuit, as will be apparent from the circuit diagram of FIGS. 2 and 3. Thus, inserting jack **6** into the plug does not change the circuit values, as it merely substitutes one resistor for another of equal value.

FIG. 2 shows the alarm circuit into which the lines **3** may be plugged. The device may be powered from any source, but is preferably provided with its own battery supply for convenience, since the power drain can be made so small that the batteries will last for practically their shelf life, and at most need be replaced once or twice a year. Separate batteries are preferably used for the detection circuit and for the alarm circuit, to minimize the changes in the voltage of the detection circuit due to operation of the alarm. Thus battery **13** is used to power the detection circuit. A master switch **14** is closed when the device is in operation. An adjustable resistor **16** is used to adjust the setting of meter **17**, which measures the current in the system and is connected at terminals **18** and **19** to the detection line. From terminal **19** the detection circuit continues through the plugs **9**, previously described, to ground and back to the battery **13**. In a practical circuit, there are up to ten plugs, which means that ten lines **3** can be used and up to ten devices protected.

Meter **17** has a needle **21** which is used as the movable switch contact of a relay circuit to operate the alarm or other signal used to indicate an attempt to remove a display item without authorization. For this purpose, the meter needle cooperates with two spaced contacts **22** and **23** as shown, the arrangement being such that if the needle moves in either direction it engages one of the spaced contacts to close a circuit from battery **24** through relay **26**, which in turn closes sets of contacts **27** and **28**. Contacts **27** provide a holding circuit in parallel with the meter contacts, so that even if the meter contact operation is only momentary, the relay circuit closes and stays closed until switch **29** is opened. Contacts **28** control the alarm circuit and cause operation of alarm **31**, which may be either a visual alarm, e.g., a flashing light, or an audible alarm, as a bell, or both if desired. The alarm circuit is opened by opening switch **29**. If one of the lines **3** has been cut or shorted during an attempted theft, needle **21** will still be resting against one or the other of the contacts **22** or **23**; it is then only necessary to remove the plug of the altered line **3** which

will immediately restore the rest of the circuit to normal operation. When desired, another line can be inserted into the plug, or else the damaged line can be repaired at leisure and put back into operation.

Initially, resistor **16** is adjusted to set the needle **21** in the middle of the gap between the two contacts **22** and **23**. As previously explained, it makes no difference whether the lines **3** are plugged in or out, since all of the resistance elements **8** and **12** are of the same value; however, it is preferable practice to make the initial adjustment after all the lines **3** which it is desired to use are in place. In fact, resistors **12** can be omitted if desired, in which case the only difference will be that the lines **3** should all be first attached through the units they are to protect, then plugged in, before switch **14** is closed and resistor **16** is adjusted. However, the operation is simpler for unskilled personnel with the circuit shown, also, it permits the use of less than the full number of available lines **3** if desired.

As shown in FIG. 4, the entire apparatus can be installed in a box or housing **32**, preferably provided with a lid **33** which can be locked after the instrument is initially adjusted so that it cannot be tampered with. The lid should be arranged to clamp on the lines **3** where they emerge from the box, so that the lines cannot be pulled out of their plugs to render them inoperative. A grilled aperture **33** may be provided so that the sound of the bell or other audible alarm will not be muffled.

By putting the resistance elements **8** at the very tip of each line, it will be seen that it becomes practically impossible to short out the line so as to remove an attached unit by cutting the line, without also shorting out the resistance element; this will cause a change in the current of approximately 10%, assuming ten lines in the circuit, and the meter needle will respond to such a change by engaging, for example, contact **22**. On the other hand, cutting any one of the lines will open the circuit and cause the meter needle to engage the other contact **23**, which will also operate the alarm. The resistance elements are of sufficiently high value so that a millimeter can be used, and there is very little drain on the battery **13**.

FIG. 6 shows an alternative circuit arrangement. In this case, a balanced circuit is employed, with two batteries **35** and **36**. Meter **37** may be a zero-center D.-C. meter. The circuit is initially balanced by adjusting resistance **39**, and it will be apparent that either opening one of the lines **3'** or shorting it out will unbalance the circuit and cause the meter contacts to engage and set off the alarm. The advantage of this circuit is that it draws no current at all in normal operation and thus no battery drain occurs until the circuit is unbalanced. Additional circuits **41** may be added if desired to increase the total number of lines, since this puts no extra drain on the battery. Each circuit will have its own meter and relay circuit as shown, but they may all be connected to the same bell or alarm. In all other respects, the device of FIG. 6 can be made like that of the preceding figures.

While the alarm circuit of FIG. 1 is shown as a normally open circuit which is closed by the meter needle, it will be understood that it could be a normally closed circuit in the operative position of the meter needle. However, this would seem to be less desirable because it would involve some battery drain. It will also be apparent that instead of the ten lines and their resistance elements being in series, they could be in parallel, and

the change in current due to any one line being tampered with would still be detected.

It will be apparent that the embodiments shown are only exemplary and that various modifications can be made in construction and arrangement within the scope of my invention as defined in the appended claims.

I claim:

1. A theft alarm system for the protection of a plurality of movable objects, comprising an electric alarm, a source of electric power, a circuit connected to said source including a number of independently movable long two-conductor lines in series with said source and with each other, each of said lines having a fixed end at which the two conductors are connected to the circuit, and a free end at which the two conductors are connected to each other through a small fixed resistor element, the two conductors being spaced at the free end to provide a loop through which the line can be passed around a portion of a movable object to be protected, all of said lines and resistors being in the same circuit to provide a definite value of electric current flow in the circuit, and sensing means responsive to a change in said value of current flow corresponding to the removal of even one of said resistors from the circuit to operate said electric alarm device, said fixed end comprising a jack having two terminals, said circuit having a two-terminal socket for receiving said jack, and a resistance element normally connected in said circuit across the terminals of said socket by circuit means including movable contact means which are normally engaged, and arranged to be disconnected from the circuit, by disengagement of said contact means, when the jack is plugged into the socket, said resistance element having the same value as said resistor, whereby plugging the jack into the socket does not change the electrical value of the circuit.

2. The invention according to claim **1**, said sensing means comprising an electric meter having a movable element for measuring the electric value in said circuit, a contact carried by said movable element, fixed contact means engaged by said movable element when the movable element is in a certain portion of the range of its movement, an alarm circuit controlled by said fixed movable contacts for operation only when the movable element is within said portion of said range.

3. The invention according to claim **2**, and means for adjusting the electrical value of said circuit to control the position of said movable element.

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