

Dec. 28, 1965

P. KAUFMAN ETAL
MINIATURE ALARM

3,226,705

Filed Oct. 4, 1963

2 Sheets-Sheet 1

FIG. 1

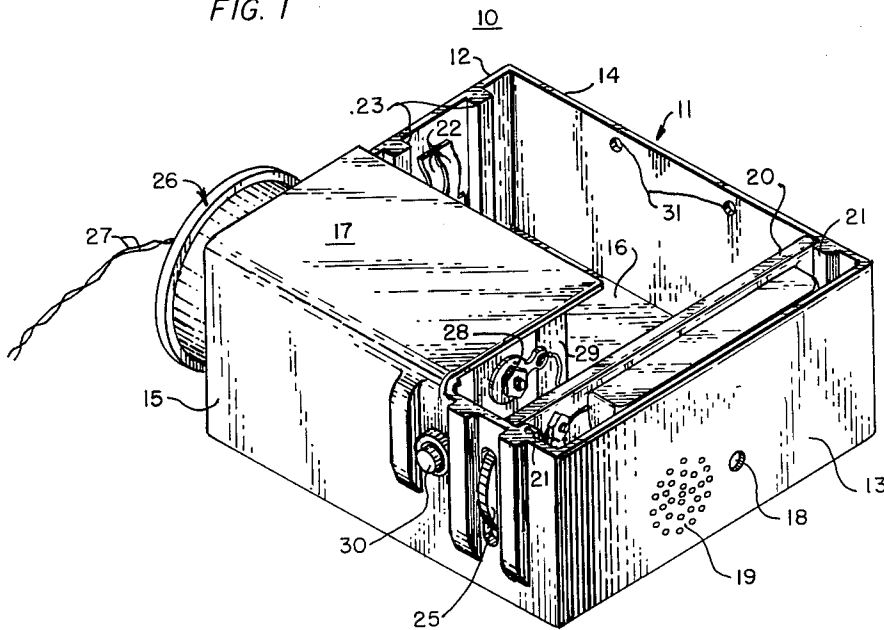


FIG. 2

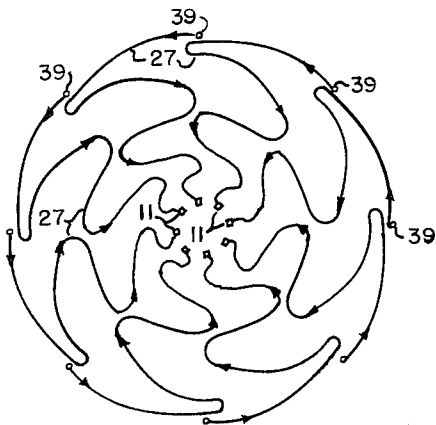
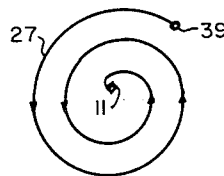


FIG. 3



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FIG. 4

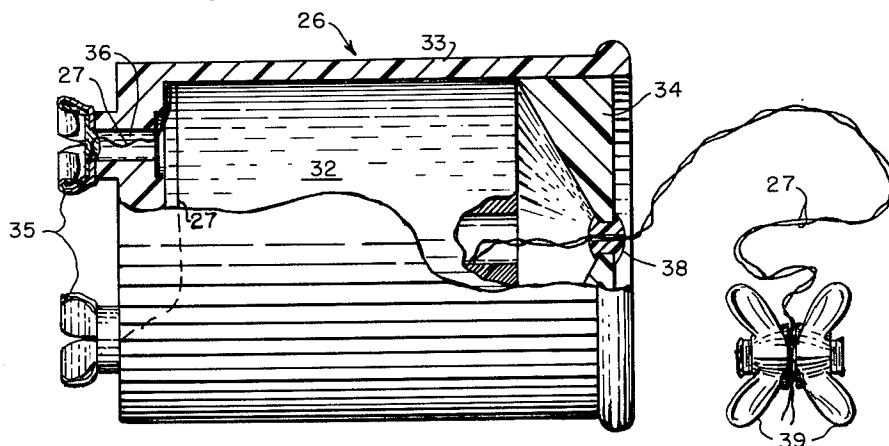
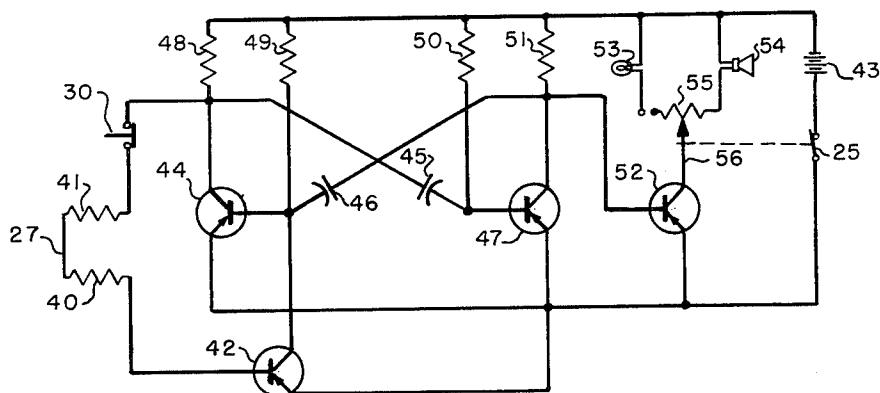


FIG. 5



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3,226,705

MINIATURE ALARM

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Filed Oct. 4, 1963, Ser. No. 314,077
5 Claims. (Cl. 340-273)

(Granted under Title 35, U.S. Code (1952), sec. 266)

The invention described in the following specification and claims may be manufactured and used by or for the Government and for governmental purposes without the payment of any royalty thereon.

The present invention relates to a miniature electric alarm unit wherein a signaling device is actuated by a sensing means upon the detection of an intruder, burglar, or the like.

In the field of warning devices, it has been the general practice to employ burglar alarms to detect and signal the presence of intruders or burglars in security areas such as factories, stores, etc. Such devices, being large and complex are usually of a permanent nature requiring professional installation.

Those concerned with the development of such devices have long recognized the need for a reliable, small and light-weight alarm which could be easily installed by anyone around a security area in a reasonably short length of time. It is also desirable that such devices be simply constructed so that their manufacture will be relatively inexpensive.

It is therefore an object of the present invention to provide a miniature alarm unit which is both reliable and inexpensive.

Another object is to provide a miniature alarm wherein the sensing means for detecting intruders may be quickly and easily installed around a security area.

Other objects and many of the attendant advantages of this invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings in which like reference numerals designate like parts throughout the figures thereof and wherein:

FIG. 1 shows a perspective view of a preferred embodiment of the invention;

FIGS. 2 and 3 show two breakwire patterns which may be used in protecting a security area;

FIG. 4 shows a sectional view of the breakwire assembly; and

FIG. 5 shows a circuit diagram of the electronic circuit employed in the device of FIG. 1.

Referring now to the drawings, wherein like reference characters designate like or corresponding parts throughout the several views, there is shown in FIG. 1 a miniature alarm unit 10 comprising a casing 11 having end walls 12 and 13, side walls 14 and 15, bottom wall 16, and a partial top wall 17. End wall 13 is provided with openings 18 and 19. A loudspeaker and a light are mounted on a removable electronic circuit board 20 directly behind openings 19 and 18 respectively. Board 20, carrying the electronic circuitry shown in FIG. 5, is frictionally held between side walls 14 and 15 which carry ridges 21. These ridges space the circuit board from the end wall 13 thus preventing damage to the electronic components and provide a rigid mount for a conventional dry cell battery (not shown). The battery, when installed, extends from the circuit board 20, where a contact (not shown) is provided, to the end wall 12. End wall 12 carries a contact 22 and a pair of ridges 23. The contact 22 makes contact with the protruding cell cap of the battery to provide

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electric power for the alarm. Ridges 23 are provided to prevent the battery from being inserted incorrectly.

Extending from board 20 and through wall 15 is a rotatable disc 25 for controlling the on-off switch of the circuit and the volume of the audio signal.

A cylindrical container 26 carrying a spool of fragile, very fine enameled conductors 27 is inserted in an opening (not shown) in end wall 12 and makes an electrical connection with contacts 28 (only one is shown) mounted on a partition 29. Conductor 27 is connected to the electronic circuit through the contacts 28 and a spring biased break switch 30. Switch 30 is provided as a test switch to simulate a break in conductor 27. An L-shaped cover (not shown) is secured to the top of casing 11 by a flange which is inserted beneath top 17 and two projections on the cover which snap into openings 31 in wall 14.

FIGS. 2 and 3 show conductors 27 laid in two convenient patterns for guarding a particular area. FIG. 2 shows a plurality of alarm devices 11 with conductors 27 starting from some remote points and zig zagging into a central area. This pattern is useful for protecting a large area or for providing directional warning. The pattern of FIG. 3 requires only one alarm device 11 while the conductor 27 starts at a remote point and spirals around and into the area to be protected. Of course, an infinite number of patterns could be laid depending on the shape of the area. For example, in protecting buildings the conductor 27 would follow the contour of the windows, doors, etc.

The details of the spool 32 and container 26 are shown in FIG. 4. Container 26 includes a cylindrical cup 33 having a removable cover 34 inserted in one end and a pair of contacts 35 mounted over openings 36 at the other end. Inserted in cup 33 is a spool 32 of the two conductors 27. One end of the conductors 27 extends from the exterior of spool 32 and are each connected to one of the contacts 35. From the center of spool 32 the other ends of conductors 27 extend through a silicon rubber seal 38 to the outside of the container 26. This seal 38 embraces the conductors 27 and provides a sufficient amount of drag on the conductors 27 to prevent any accidental unraveling of the roll 32. A connector 39 is provided for shorting the ends of the conductors 27. The connector 39 comprises two wings nuts mounted on a single shaft which may be screwed down upon each other with the conductors 27 mounted therebetween. The wing nuts will crush the insulation on the conductors 27 and provide a short between these conductors. Because these conductors 27 are so fragile, removal of the insulation by the conventional scraping means usually results in breaking the conductors.

Referring now to FIG. 5 there is shown the electronic control circuit for the alarm unit. The conductor 27 which has some inherent resistance shown as 40 and 41 is mounted between one terminal of test switch 30 and the base of PNP transistor 42. The other terminal of switch 30, which is normally closed, is connected to the negative side of battery 43 through resistor 48 while the positive side of battery 43 is connected to on-off switch 25. The emitter of transistor 42 is connected to switch 25 while the collector is connected to the base of PNP transistor 44. Transistor 44 is coupled by capacitors 45 and 46 to PNP transistor 47 to form an astable multivibrator. Resistors 48 to 51 are connected between the negative terminal of battery 43 and the multivibrator in the usual manner to provide the correct bias. A PNP transistor 52 acting as an amplifier or normally open switch or the like is connected to transistor 47. The volume of speaker 54 is controlled by an attenuator 55 and movable arm 56 which in turn is coupled to the on-off switch 25.

The bias on the transistors is such that transistor 42 conducts and acts as a normally closed switch when conductor 27 is not broken and switch 30 is closed. Transistor 42, when conducting, effectively shorts out the base emitter circuit of transistor 44 making the multivibrator inoperative. When the conductor 27 is broken or switch 30 is opened, transistor 42 is shut off providing an open switch and thereby removing the short from the base of transistor 44. The multivibrator is now made operative. The signals generated are now fed to the base of transistor 52 which is normally not conducting. Transistor 52 now conducts and is switched on and off by the signals applied to its base. Speaker 54 or light 53 is now activated by the pulsing of the transistor 52 at the frequency of the multivibrator.

It can be seen from the foregoing that an alarm using components which are inexpensive, reliable, and small has been invented. The device requires a minimum of moving parts. Installation of the device merely requires the operator to simply feed out the two fragile conductors in any desirable array. When doing this, the ends of the conductors should first be shorted with the connector 39 and the device turned on, so that any break in the conductors will be immediately detected by the alarm. Such breaks could be easily repaired by applying additional connectors 39. The conductors, being very fragile, may also be destroyed by fire making the alarm also useful as a fire alarm.

Obviously many modifications and variations of the present invention are possible in the light of the above teachings. For example, an electric eye or a photocell could be used as the sensing means. It is therefore to be understood, that within the scope of the appended claims, the invention may be practiced otherwise than as specifically described.

What is claimed is:

1. An alarm breakwire assembly comprising; a hollow cylindrical container having first and second opposed end walls; said first end wall having an opening therein; said second end wall having a pair of electrical contacts mounted on the exterior thereof and communicating with the interior of said container; a pair of fragile conductors placed in said container; each said conductor being insulated throughout its length; one end of each said conductors extending through said opening to the exterior of said container; the other end of each said conductor being connected to a different one of said electrical contacts; the intermediate portion of said conductors being substantially adjacent throughout the length thereof and each con-

ductor being coiled in the same direction into a cylindrical tubular roll with the outside diameter of said roll being substantially equal to the inside diameter of said chamber and mounted coaxially therewith; said one end of each said conductor extending axially from the interior of said tubular roll and said other end of each said conductor extending from the exterior of said tubular roll; the coils of said roll being unattached to each other whereby said two conductors may be simultaneously unwound from the interior of said roll and through said opening upon the application of tension to said one end of each said conductor.

2. The device according to claim 1 and further including means provided in said opening frictionally embracing said conductors to provide a drag on said conductors to prevent accidental unwinding thereof.

3. The device according to claim 1 and further including means for electrically connecting together said one ends of said conductors.

4. The device according to claim 3 and further including an electrical alarm means connected across said electrical contacts; and circuit means including said pair of conductors for holding said alarm means in the inoperative condition, whereby said alarm means becomes operative upon the breakage of either of said conductors.

5. The device according to claim 3 further including a multivibrator connected to said electrical contacts; an alarm means connected to said multivibrator and responsive to the operation thereof; and circuit means including said pair of conductors for holding said multivibrator in the non-operative condition, whereby said multivibrator becomes operative upon the breakage of either of said conductors.

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