Feb. 5, 1957 F. J. LA CAVERA 2,780,689

ALARM TRIPPING MECHANISM

Filed June 11, 1954

FIG. 1

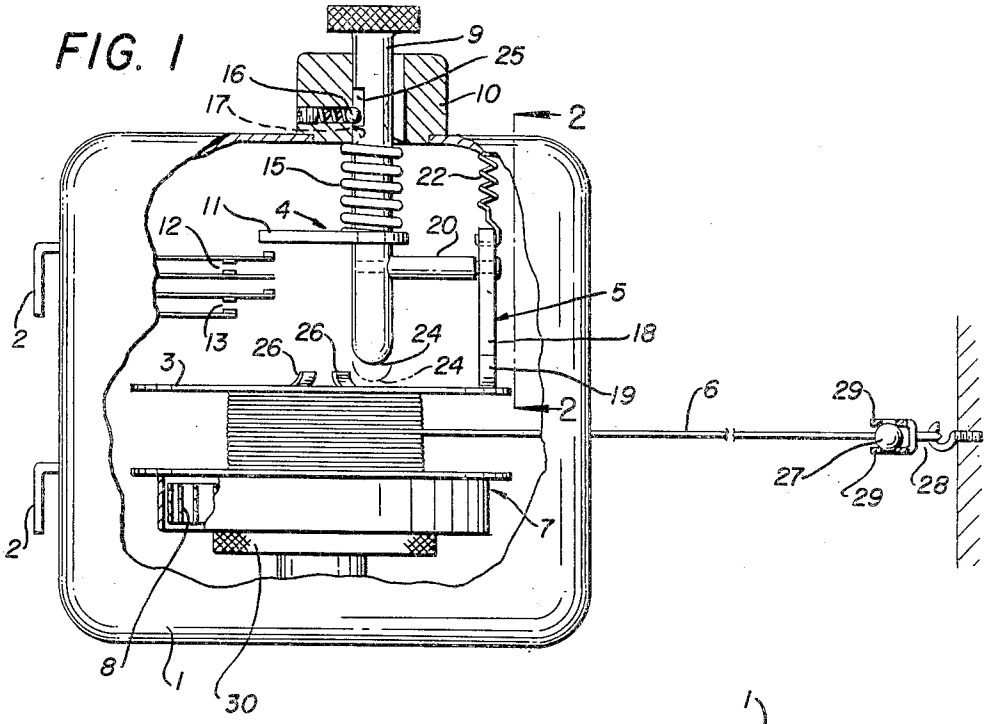


FIG. 5

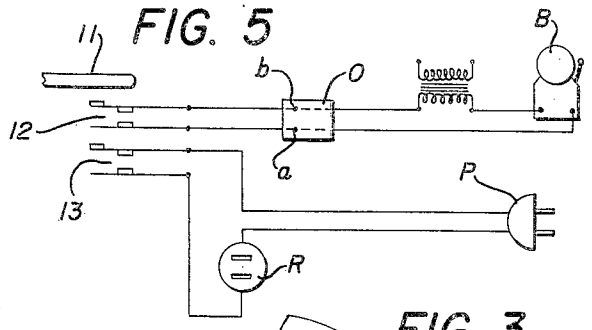


FIG. 3

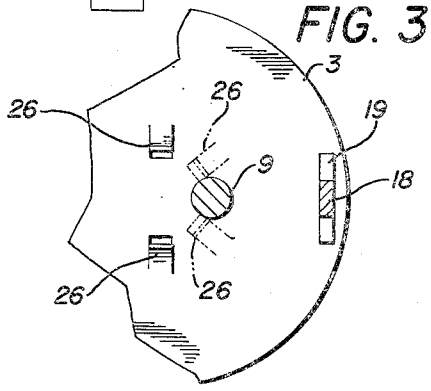


FIG. 2

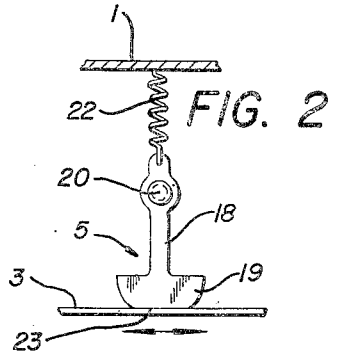
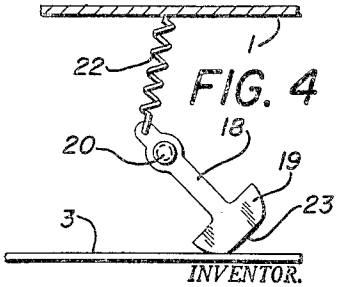


FIG. 4



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ALARM TRIPPING MECHANISM

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11 Claims. (Cl. 200—61.93)

This invention relates to an alarm tripping mechanism for use in connection with burglar alarms and particularly a tripping mechanism for use in connection with electrically operated alarms such as described in my copending application Serial No. 153,972, filed April 4, 1950 and now abandoned.

As pointed out in the above entitled application, it is desirable to provide for use in connection with a single burglar alarm device a trigger mechanism operated by a trip cord which, at locations remote from the trigger mechanism and alarm device, can be positioned across several probable paths of an intruder into the premises to be guarded by the alarm device.

In connection with such alarms, the trigger mechanism should be relatively free from accidental operation but at the same time should be operable very readily by movement or release of the trip cord. It should be operable by the trip cord when the cord is engaged and moved slightly by the intruder with a pressure so light as to be unnoticeable to him.

The trigger mechanism should be such that the trip cord can be withdrawn readily as it is installed across the paths to be guarded yet, in event the trip cord is broken or released, it will not be tangled in any way by rewinding or retraction by the trigger mechanism. For best effects, the trigger mechanism should operate quietly so that the intruder is not made aware of what has caused the alarm to operate.

Generally the mechanism alarm of the present invention is one which is simple, compact, and light, quiet in operation, and readily installable in operating condition in the place to be guarded thereby.

In general, the tripping mechanism comprises a platform member which is supported for movement, a switch operating device which is movable by a spring or gravity from an inoperative to a switch operating position, and a dead center member which is operatively connected to the platform so as to constrain the switch operating device from movement to the operative position so long as the dead center member is in dead center position and to release the switch operating device so that it can operate the switch when the platform is moved sufficiently to move the dead center member out of dead center position. The platform member is so moved by means of a trip cord which preferably is attached directly to it, though it may be attached to the dead center member so that the platform member is moved by the cord through the medium of the dead center member.

More specific features reside in the provision of means for locking the switch operating device in an inoperative position; of means for connecting the free end of the trip cord so that it can become loosened readily by a force unnoticeable by the intruder and not be broken by an intruder; and of means for releasing the cord so that it can be unreeled and located where desired and yet cannot be rewound by the tripping mechanism until the tripping mechanism is again reset for that express purpose.

Various other objects and advantages will become apparent from the following description wherein reference is made to the drawings, in which:

Figure 1 is a front elevation of the device embodying the principles of the present invention, part being in section;

Figure 2 is an enlarged fragmentary sectional view taken on the line 2—2 of Figure 1 and showing the dead center member thereof in dead center position;

Figure 3 is a fragmentary top plan view of part of the device illustrated in Figure 2;

Figure 4 is a view similar to Figure 2 but showing the dead center member at its extreme dead center position; and,

Figure 5 is a wiring diagram showing one manner of connecting the device of the controls of an alarm device.

Referring to the drawings, which illustrate a preferred embodiment of the invention, the invention is shown as one which is enclosed in a suitable casing 1 provided with suitable supporting brackets 2 which are receivable in suitable wall sockets for supporting the device.

The operating elements of the device comprises generally a platform member 3, a switch operating device 4, and a dead center member 5 which is operatively connected to the platform member 3 and switch operating device 4 so as to hold the switch operating device in preset condition in which it is inoperable and to release the switch operating device to permit it to move to the switch operating position.

The dead center member 5 is so arranged with respect to the platform member 3 that upon movement of the platform member, the dead center member is moved out of dead center position whereupon it releases the switch operating device for moving to the switch operating position direction. The movement of the platform member is in response to a pull on or release of a trip cord 6 which, in the form illustrated, is shown as connected directly to the platform member 3 instead of indirectly by way of the dead center member 5.

Referring more specifically to the main parts of the device as described, the platform member 3 may comprise one end of the self-winding reel 7 which is mounted for rotation about an upright axis in the form illustrated. Thus, the platform member 3 is movable in fixed relation to the reel 7.

The trip cord 6 is wound on the reel 7. A return spring 8 is operatively connected to the reel in a manner such that the spring 8 is wound up as the cord 6 is unreeled by pulling the cord endwise and can rotate to return and wind up the cord when the end of the cord is released.

The switch operating device comprises a suitable guided rod 9 non-rotatively mounted in a collar 10 on the casing 1 for axial reciprocation. Carried on the rod 9 is a switch operating finger 11 adapted to engage and close switches, such as indicated at 12 and 13, when the rod, along with the finger 11, is moved a predetermined distance from a fully upwardly withdrawn position to a lowered position. The rod 9 and finger 11 are urged in the switch closing direction toward the plane of the platform 3 by any suitable means, such as gravity or a compression spring 15. The collar is provided with a spring seated detent 16 which engages a suitable notch 17 in the rod 9 for latching the seating device in an inoperative position independently of the dead center device 5.

Operatively interposed between the device 4 and the platform 3 is the dead center member 5 heretofore mentioned. The dead center member 5 is arranged so that one end engages the platform member 3 and prevents the movement of the device 4 to switch operating position. In the form illustrated, the dead center member is in the form of a pendulum having a shank portion 18 and a foot portion 19. The pendulum is arranged for rocking in a vertical plane in the form illustrated. For this purpose, it

may be mounted on a suitable laterally extending arm 20 carried on the rod 9. It is mounted on the arm 20 for rocking movement about a horizontal axis. Due to its weight and its distance from the pivotal axis of the dead center member 5, the foot 19 normally causes the dead center member 5 to assume a vertical position as illustrated in Figure 2. However, it may be that the alarm tripping mechanism as a whole may be tilted so that gravity cannot be depended upon to hold the pendulum in the upright position. Accordingly, a centering spring 22 is provided and is connected to the casing 1 and to the member 5 so as to normally yieldably hold the member 5 with its body portion 18 in a rocked position in which it is at right angles to the plane of the platform member 3.

The foot 19 is preferably provided with a flattened bottom surface 23 which rests on the platform 3. Since this surface 23 is somewhat elongated it tends to steady the dead center member in position when it is pressed against the platform member 3 and requires a somewhat greater movement of the platform 3 in either direction to move the member 5 out of dead center position. The elongated bottom 23 thereby eliminates over-sensitivity of the dead center member and assists it in assuming the proper position when setting the mechanism.

The rod 9 is such that its inner end, indicated at 24, is spaced from the platform member 3 when the dead center member 5 is in operating position with its bottom surface 23 bearing against the platform 3. This spaced relation is such that when the rod 9 is released by the dead center member 5, the rod can be moved a sufficient distance by the spring 15 to close the switches 12 and 13 and preferably approach quite closely to the plane of the platform 3. The rod 9 is provided with an elongated axially extending notch 25 in which the detent 16 is operable, the length of the notch 25 being such, and its ends being so located, as to limit the outward movement of the rod 9 axially and cause the finger 11 to be positioned just clear of the switches 12 and 13 and to lift the dead center member 5 clear of the patform 3. The location of the opposite ends of the notch 25 is such to engage the detent 16 and arrest inward movement of the reel in a position in which the finger 11 has closed the switches 12 and 13 and the inner end 24 of the rod is clear of the platform member 3.

On the platform member 3 are a plurality of circumferentially spaced stops 26, these preferably being tongues turned out of the sheet metal forming the upper end of the reel. These stops preferably are spaced 180° apart about the reel axis and extend above the platform member 3 a sufficient distance so that when the rod 9 is in its innermost position, as indicated by the dotted lines in Figure 1, one or the other of the stops 26, depending upon the direction of rotation of the reel, will engage the rod and arrest rotation of the reel after a maximum of a half turn in either direction after the mechanism has been tripped.

The free outer end of the cord 6 is provided with a ball 27 by which the cord 6 may be detachably secured to a suitable anchor. Preferably, the anchor is such as indicated at 28 and is adapted to be fastened to a wall or some structure remote from the mechanism. The anchor 28 preferably comprises a plurality of resilient fingers 29 which grip the ball and hold it against removal by the pressure of the return spring but permit its detachment by a pull exerted on the cord 6 materially greater than that exerted by the return spring 8.

When the rod 9 is released by a movement of the platform member 3 which disposes the dead center member 5 out of dead center position, it is moved downwardly by the spring 15 so that the switches 12 and 13 are closed successively. The closure of these switches may complete a circuit to the device described in my copending application or to the suitable alarm mechanism. For example, as shown in Figure 5, the switch 12 may be connected to a suitable alarm bell B and to an outlet box O which has terminals *a* and *b* which may be connected to the input lead wires of the device in my said copending application. The switch 13 may be connected to a suitable plug-in receptacle into which the usual plug for a cord leading to alarm lights can be connected for connecting the lights to the 110 volt circuit. A circuit leading to the switch 13 is provided with the usual plug P by which it can be connected to the 110 volt line.

For convenience the self-winding reel may be of the type provided with the usual spring winding drum 30 so that the spring can be wound to the desired tension. Any spring return reel provided with the conventional wind-up means for winding up the reel may be provided, as the details thereof form no part of the present invention.

In operation, it is assumed that the circuit is connected as illustrated in Figure 5. A suitable electric cord leading to alarm lights, if desired by the owner of the premises, are plugged into the receptacle R. The alarm device of my copending application may be connected to the terminals *a* and *b*. These connections are made while the rod 9 is held in the upper or retracted position by engagement of the detent 16 in the notch 17. The device is fastened on a wall by the brackets 2. In this condition, the reel 7 is freely rotatable except for the resisting force of the spring 8. The anchor 28 is installed in the desired location about the premises.

Next, the trip cord is pulled and unreeled by the gripping the leading end and leading it through suitable wall supported hooks or eyes, if necessary, across the selected paths about the premises. When the cord is unwound and extended in its desired position, the ball 27 on the free end is snapped between the fingers 29 so that the free end of the cord 6 is held in fixed but readily detachable position against the force of the return spring 8 of the reel 7.

With the cord thus positioned, the rod 9 is pressed inwardly of the casing 1, releasing the detent 16 from the notch 17 and disposing it in the notch 25. The rod 9 moves downwardly under the force of the spring 15 until the undersurface or bottom 23 of the foot 19 of the dead center member 5 rests squarely on the platform member 3 wihch, in the form illustrated, is the upper end of the reel 7. In this position, the finger 11 is positioned just above the operating position with respect to the switches 12 and 13 and the lower inner end of the rod 9 is clear of the upper end of the reel and of the stops 26.

These relative positions of the operating parts are retained until the dead center member 5 is moved out of its dead center position. If any tension is exerted on the cord 6, the reel is rotated in one direction, thus disposing the dead center member 5 to one side of dead center. On the other hand, if the cord 6 becomes detached the spring 8 rotates the reel in the opposite direction, thus disposing the dead center member 5 at the opposite side of dead center. In either event, when the member 5 passes beyond the dead center limit, the rod 9 is released and the finger 11 closes the switches 12 and 13 to initiate operation of the alarms controlled thereby.

It is apparent, therefore, that the device is operated effectively when any intruder strikes the cord and exerts a slight amount of pressure thereagainst or causes it to break or become released from the anchor 28. Also, in the event of failure of the cord 6 or accidental detachment of it from one of the eyelets or from the anchor 28, the device will "fail safe" in that it thereby becomes operative and initiates the alarm operation. As a result of making the device operative either by tension on the cord 6 or release of tension, the owner of the premises cannot be misled into belief that the alarm which he has set is ready for operation when, in fact, the cord has become dislodged or broken.

When the rod 9 has become released there ordinarily would be a tendency for the spring 8 to wind up the reel rapidly and thus cause the free end of the cord 6 to whip about and possibly become entangled. However, due to the engagement of the stops 26 with the rod 9, rotation of the reel more than a half revolution is prevented. The

same is true should the intruder's foot become entangled in the cord and tend to unroll an unnecessary amount of it.

By using a cord 6 which is non-metallic readily combustible material the mechanism may be used as a fire alarm. Thus if the cord is burned in two, the spring 8 will immediately actuate the reel so as to trip the mechanism.

It is apparent from the foregoing description that I have provided a simple, light, compact, and efficient tripping mechanism for the purposes described and one that "fails safe" in event of inadvertent breakage or release of its trip cord.

Further, I have provided a mechanism which does not require any externally exposed power conductors for initiating the closing of the switches.

Having thus described my invention, I claim:

1. An alarm tripping mechanism comprising a platform member, means supporting the platform member for movement along a predetermined path, a switch operating device movable from an inoperative position to an operative position, means urging the device toward operative position, a switch operatively connected to said device operated thereby when the device is moved to its operative position, a dead center member having one end operatively connected to the device and its other end operatively connected to the platform member for movement of the dead center member by the platform member out of dead center position when the platform member is moved a predetermined distance along said path, said dead center member constraining the device from movement toward its operative position while the dead center member is in its dead center position and releasing the device for movement to its operative position when the dead center member is moved out of its dead center position, and a trip cord connected to the platform member and operable when moved endwise under tension to move the platform member along said predetermined path a predetermined distance.

2. An alarm tripping mechanism according to claim 1 characterized in that said platform member is rotatable about a predetermined axis, and said dead center member is a compression member and is rockable into and out of dead center positions by frictional movement of its said other end in the direction of rotation of the platform member.

3. An alarm tripping mechanism according to claim 2 characterized in that a reel is provided, said cord is wound on said reel, and said platform member is rotatable in fixed relation to the reel.

4. An alarm tripping mechanism according to claim 3 characterized in that one end of the reel is the platform member.

5. An alarm tripping mechanism according to claim 3 characterized in that self-winding spring means are connected to the reel for rotating the reel in a direction for winding the cord on the reel.

6. An alarm tripping mechanism according to claim 5 characterized in that stop means are provided and are movable in fixed relation to the reel, cooperable stop means are provided in fixed relation to the switch operating device and are disposed in the path of the stop means of the reel when the device is in switch closing position for stopping the movement of the reel by the spring means after a limited movement of the reel by the spring means.

7. An alarm tripping mechanism according to claim 6 characterized in that a ball is connected to the cord, a detachable grip adapted to be connected to a supporting member is provided and comprises spaced resilient fingers adapted to receive the ball therebetween and yieldably retain the ball in position against the return force of the spring means and to release the ball when a pull is exerted on the cord appreciably greater than the pull exerted by the spring means.

8. An alarm tripping mechanism comprising a platform member, means supporting the platform member for rotation, a switch operating device movable, and normally urged, from an inoperative to an operative position, a switch operatively connected to said device for operation thereby when the device moves to said operative position, a rigid dead center member interposed between the device and platform member and, at one end, resting against the platform member when the dead center member is in a dead center position so as to constrain the device from movement to the switch operating position while the dead center member is in said dead center position and to release the device for movement to switch operating position when the dead center member is moved out of a dead center position, said dead center member being operatively connected to the platform member for movement out of dead center position by rotation of the platform member a predetermined distance, a reel rotatable in fixed relation to the platform member, and a trip cord connected to the reel and operable when moved endwise under tension to rotate the reel.

9. A trigger mechanism for a burglar alarm comprising a self-winding reel, means supporting the reel for rotation about a predetermined axis, a trip cord wound on the reel, a switch operating device movable toward one end of the reel and arranged when moved a predetermined distance toward said end of the reel to operate a switch, means urging the device toward the end of the reel, a compression dead center member operatively interposed between the device and said one end of the reel and normally constraining said device from movement toward the reel to switch operating position and being displaceable from dead center position so as to release the device for movement to switch operating position upon rotation of the reel in either direction a predetermined distance from a given position.

10. A trigger mechanism for a burglar alarm according to claim 9 characterized in that the dead center device is a pendulum pivotally mounted on the switch operating device and depending from its pivotal connection for swinging in opposite directions along the path of rotation of the end of the reel about an axis parallel to the plane of the end of the reel.

11. A trigger mechanism for a burglar alarm according to claim 10 characterized in that means are provided to latch said switch operating device in an inoperative position with the pendulum spaced out of contact with the end of the reel.

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