March 24, 1953 W. RUSNAK 2,632,887

AUDIBLE AND VISIBLE ALARM

Filed Jan. 11, 1952

Fig. 1

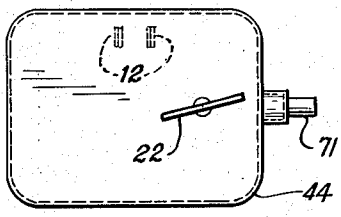


Fig. 2

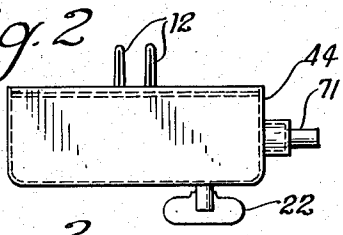


Fig. 6

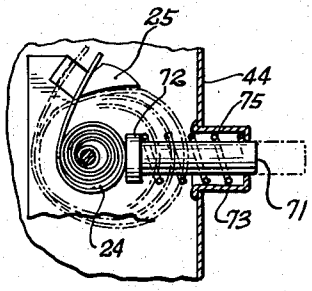


Fig. 3

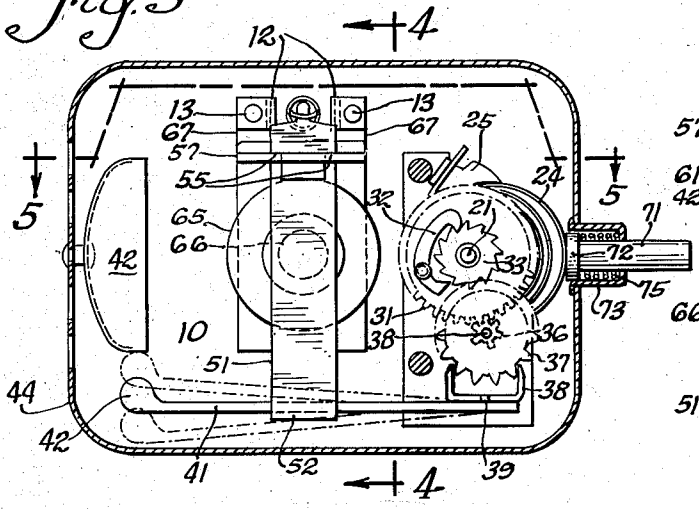
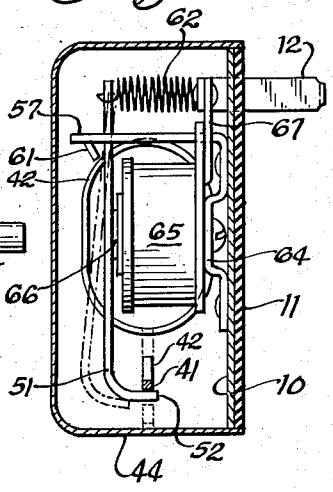


Fig. 4



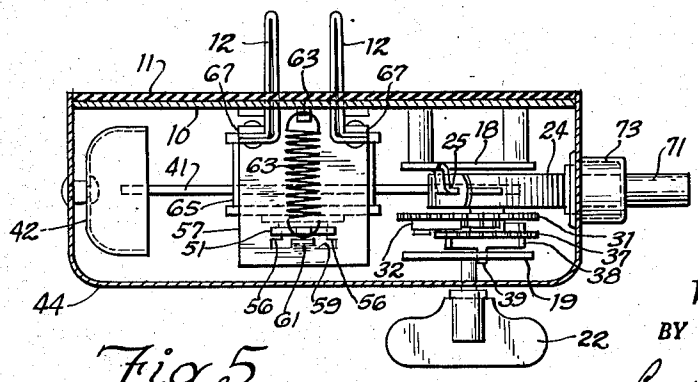


Fig. 5

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AUDIBLE AND VISIBLE ALARM

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1 Claim. (Cl. 340—253)

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This invention relates to a signalling device for warning by visible and audible means, of a failure in a source of electric current.

By way of illustrating a preferred use of the invention it will be recognized that an outbuilding on a farm may be utilized as a hatchery. Inasmuch as in nearly all cases present-day brooders employ electric lamps to provide heat for the chicks, a power failure may lead to loss of an entire brood. Such power failure may occur at a time when the farmer is away from the hatchery, for example, during the night, and, in such case, it is desirable to provide an alarm which is not only audible so as to awaken the farmer from his sleep, but which will also give semi-permanent visible evidence in case the alarm is actuated while the farmer is away from the location thereof.

In devices for the foregoing purpose known to me a switching device, e. g. a relay, was maintained energized by line voltage, and, upon interruption of power, the relay would drop out and close a circuit including a bell and dry cells. Thus, unless the cells were checked periodically and renewed when necessary, it was possible for the device to be inoperative due to deterioration of the cells with age. Obviously such arrangement is far from desirable, since farmers are not generally regarded as assiduous in inspecting and maintaining equipment of what may be considered a technical character.

With the foregoing in view a principal object of the invention is to provide an alarm device of a visible and audible character which is dependent upon mechanical, rather than electrical, means and which may be initiated into action upon failure or reduction of line voltage.

In the latter connection it will be appreciated that a reduction of line voltage may diminish the functioning of the facility desired to be protected to the point of hazard. For example, heat lamps for brooder use may, when the applied voltage is reduced by some certain amount, fail to maintain the temperature required for the chicks' best welfare.

Another object is to provide a signalling device for the purpose stated which may be connected into the wiring system without alterations therein, or expensive adaption.

Still another object is to provide a device as aforesaid which may be directly attached to a standard wall receptacle, and without the interposition of a connecting line.

A further object lies in the provision of a device for the purpose stated in which the functioning of the several parts is independent of gravity, and whereby the device may accordingly be mounted in any position.

An additional object lies in providing a device in accordance with the preceding objects which will indicate, by means of the visible warning signal, that the device requires resetting, in the event it has functioned to give the alarm.

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Other objects will become apparent from the following description taken together with the appended drawing, in which latter:

Fig. 1 shows a front elevational view of a device embodying the invention;

Fig. 2 is a top plan view thereof;

Fig. 3 is a view similar to that of Fig. 1, but enlarged, and with the front of the cover cut away to show the mechanism;

Fig. 4 is a cross section taken on the line 4—4 of Fig. 3;

Fig. 5 is a cross section taken on the line 5—5 of Fig. 3; and

Fig. 6 is a detail of a portion of Fig. 3, and showing the visible signal in safe position.

In its broad aspects the invention contemplates the provision of a spring-driven motor driving an anchor escapement of a well-known type, the pallet of the escapement carrying a clapper arranged to strike a bell. Energy is stored in the coil spring by a key and the usual anti-reverse pawl and ratchet. Braking of the clapper, which in turn maintains the spring in wound condition, is effected by means of a solenoid-operated armature having a latch portion. As long as current flows through the solenoid as a result of line voltage the latch will retain the clapper immobile. However, upon diminution or interruption of line voltage the latch is allowed to move to released position by virture of a retracting spring secured to one end thereof, and the clapper is then driven by the motor to sound the bell. In order to provide a visible signal a red flag or similar attention-arresting device in the nature of a plunger, or capable of being operated in a manner similar to a plunger, is arranged to be moved by the motor spring proper as it uncoils. Thus, the increasing periphery of the spring may actuate the plunger in the manner of a cam to move the same from a "safe" position to a "danger" position. Such conditions may correspond to concealment or revealment of a substantial portion of the plunger or flag, as the case may be. Since it is desirable to be able to mount the device in any position, I prefer to arrange for retraction of the flag by means of a spring having less force than that of the motor. Alternatively the expanding motor spring may operate a pivoted lever which carries a flag, pointer or equivalent indicia capable of providing a visible signal corresponding to a completely unwound condition of the spring.

Turning now to the drawing, there is shown by way of example a base plate 10 backed by a sheet 11 of electrically insulating material upon which a pair of prongs 12—12 are partially supported, as by being snugly fitted through slots in the sheet 11. Prongs 12—12 are adapted to be engaged in the slots of a standard wall receptacle, and whereby line voltage is applied to the solenoid.

Mounted rigidly upon the plate 10 is a pair of sub-plates 18—19 which are provided with aper-

tures for supporting the winding spindle 21 to which the key 22 is secured. A coil spring 24 is attached by its inner terminus to the spindle 21 in the well-known manner, and by its outer terminus to a lug 25 outstanding from the sub-plate 18. An output gear 31 is rotatably carried on the spindle 21 and has a ratchet pawl 32 pivoted thereon. A ratchet wheel 33 is secured to the spindle 21 and thus, while the spring 24 is being wound, and thereafter during such time as the gear 31 is withheld from rotation, unwinding of the spring is prevented by engagement of the pawl 32 with the wheel 33.

In mesh with the gear 31 is a pinion 36 affixed to an escapement wheel 37, both being keyed to a shaft 38 journaled in the sub-plates 18 and 19. A pallet 38 is pivoted at 39 between the sub-plates 18 and 19, and carries an arm 41 terminating in a head 42 to constitute a clapper. A bell or gong 42 is secured to one side of a housing 44 snugly fastened to the back plate 10.

By reason of the arrangement just described energy stored in the spring 24, when released, may evidence itself as oscillation of the clapper against the bell, and as a consequent audible signal, the escapement operating for this purpose in the conventional manner. However, to restrain the driving mechanism during idle periods of the device, i. e. while the power line is functioning properly, there is provided a paramagnetic latch 51 having a bent-over portion 52 adapted to engage below the arm 41 when the latter is in neutral position, i. e. when the pallet 38 is in locking engagement with the wheel 37, and unwinding of the spring 24 therefore prevented.

The latch 51 is hinged at its upper end by providing notches 55—55 therein which are engaged over portions 56—56 formed in the shelf 57. Assembly of the latch 51 with respect to the shelf 57 is facilitated by means of a slot 59 through which the latch may be passed, and thereafter fitted into operative position as shown. The forward margin of the slot 59 may be suitably formed to provide a downwardly directed lug 61 serving as a backstop for the latch 51. A spring 62 extending between the upper extremity of the latch 51 and a hook 63 secured to the back-plate 10 biases the latch to released position, and as indicated in phantom in Fig. 4.

The shelf 57 is preferably formed as an extension of a base 64, these together constituting a part of the magnetic path or yoke for the coil 65, which includes a core 66, and by means of which and a screw 67 the coil is supported on the yoke. Prongs 12—12 are riveted to lugs 67—67 forming the leads to the coil 65.

From the foregoing description it will have become apparent that as long as the coil 65 is energized, corresponding to voltage on the line of a predetermined value, the latch 51 will be held in to restrain the clapper 42 against movement. On the other hand, upon failure of voltage or diminution thereof below a preselected norm the latch will be biased by the spring 62 to free the clapper for action, and the sounding of an audible signal. Re-establishment of voltage will retract the latch to clapper-restraining position, whereupon the spring may be re-wound for a succeeding event.

It is possible that an alarm may be given with no one within hearing distance. In such case it is desirable to provide a supplementary visible signal which will be evident without close inspection. Thus, a person returning to the place where the device is located may, at a glance, observe whether an alarm has been given.

To this end there is provided a plunger 71 having a head 72 adapted to bear on the surface of the spring 24, and guided within a sleeve 73 secured to one side of the housing 44. A compression spring 75 serves to bias the plunger inwardly. When the spring 24 has been fully wound (Fig. 6) the plunger 7 is positioned with practically its entire extent concealed, the spring 75 effecting such action. However, upon release of the spring 24, and consequent unwinding thereof, the perimeter thereof will increase to an extent which will force the plunger 71 to the position shown in Fig. 4, and whereat nearly all of the body plunger is exposed. By coloring that portion of the plunger in a distinctive manner, e. g. red, a visible indication is readily obtained.

By locating the prongs 12—12 adjacent the margin of the device the same may be engaged in one pair of slots of a conventional duplex receptacle without the need of covering, and hence rendering useless, the neighboring receptacle. Moreover by providing the spring 75 the device is made independent of the effect of gravity, as would otherwise be the case if the spring were omitted, and the device installed with the plunger 71 directed downwardly. It will be understood that the force of the spring 75 is less than the maximum radial force component of the spring 24 measured paraxially of the plunger 71.

While I have shown a particular embodiment of my invention, it will be understood, of course, that I do not wish to be limited thereto since many modifications may be made, and I therefore contemplate by the appended claim to cover any such modifications as fall within the true spirit and scope of my invention.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

An alarm device comprising a housing, a motor driven by a coil spring supported in said housing, a bell supported in said housing, a clapper for said bell, means interconnecting said motor and clapper for actuation of said clapper, braking means for restraining unwinding of said spring, electrically-operated means coactive with said braking means which, upon energization, will actuate said braking means into braking relation and, upon de-energization, release said braking means, electrical terminals carried by said housing connected to said electrically-operated means and arranged for engagement with an electric receptacle whereby said device may be connected to a source of current, a visual signal adapted to occupy visible and concealed positions, and means forming part of said signal and engageable by said spring upon unwinding thereof to move said signal from concealed to visible position.

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