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J. Y. LAMBERT

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FIRE ALARM

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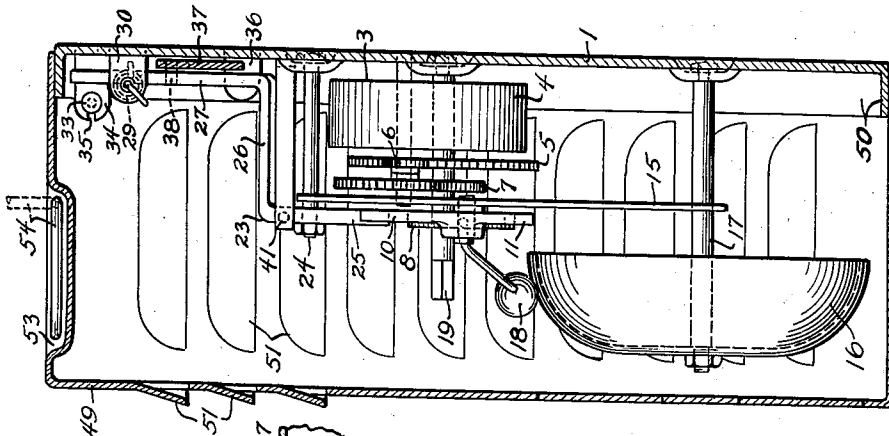


FIG. 2

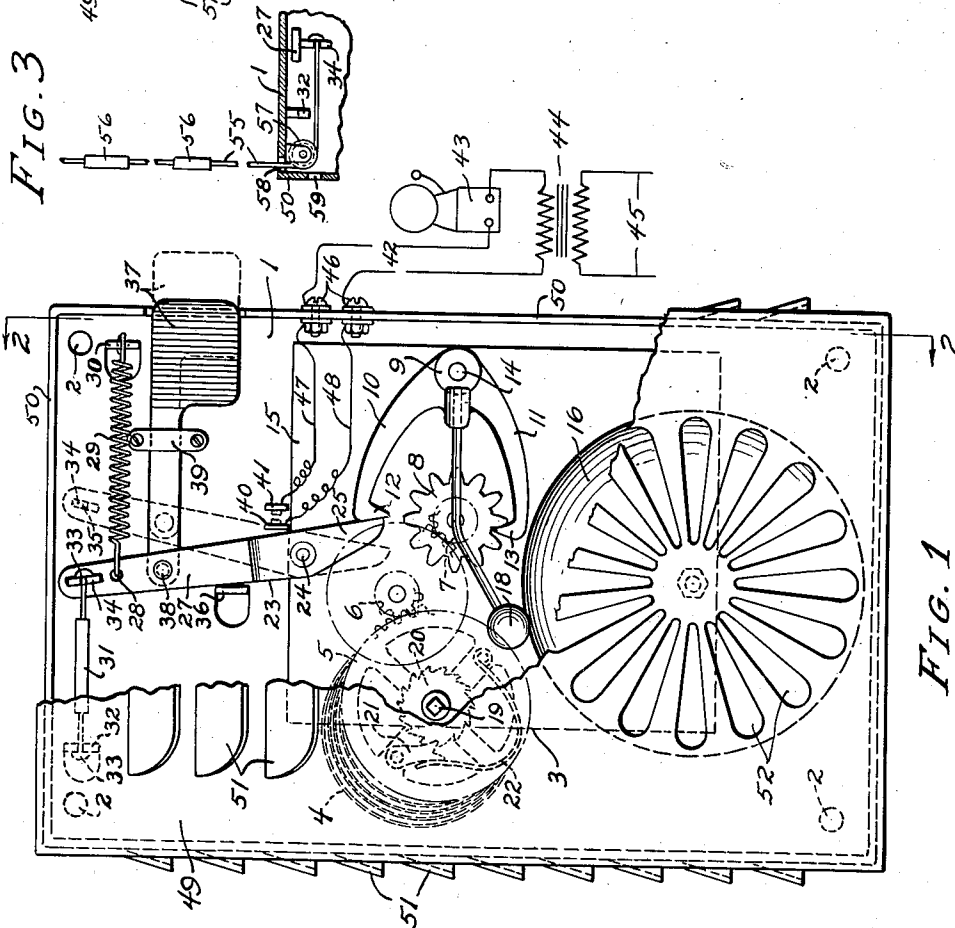


FIG. 1

FIG. 3

INVENTOR
J. Y. LAMBERT
BY *Robert R. Cobb*
ATTORNEYS

UNITED STATES PATENT OFFICE

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FIRE ALARM

John Y. Lambert, Syracuse, N. Y.

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3 Claims. (Cl. 116—106)

This invention relates to fire alarm mechanisms, and more particularly, to those types of alarm devices which are primarily adapted to automatically give an audible signal in the event that a fire starts in some place where the fire is not likely to be promptly observed.

One of the primary objects of the invention is to provide a simple, efficient and reliable, self-contained automatic alarm unit which may be manufactured at comparatively low cost so as to come within the means of the average person. In other words, it is my aim to provide an alarm unit which is readily adaptable for common usage, as in ordinary dwellings, and eliminating the usual complications and expense attached to the installation of fire alarms such as have heretofore been available. Of course, my alarm unit may be installed any place where a fire is liable to occur, as it is not limited to use in dwellings.

A further object of the invention is to provide an improved spring-actuated alarm unit which is normally restrained from operation by one or more fusible links, which will melt quickly when a fire breaks out and thereby release the alarm trip so that one or more signal devices, preferably of an audible character, will be sounded automatically.

Another object of the invention is to provide an improved means for facilitating the replacement of the fusible link or links forming a part of the alarm apparatus, and thereby enabling the alarm apparatus to be reset quickly and by a very simple operation.

A still further object of the invention is to provide a means for indicating whether or not the alarm has been tripped, so that if a signal has been given without attracting attention, the necessity for resetting the alarm will be made apparent, preferably through mere observation of a suitable signal or indicator member which becomes visible only when the alarm is set off, and remains visible until the alarm is reset.

Other and further objects and advantages of the invention will be hereinafter described and the novel features thereof defined by the appended claims.

In the drawing:—

Figure 1 is a front elevation of an alarm unit embodying the improved features of my invention, a portion of the front wall of the housing or casing being broken away to expose the interior mechanism;

Figure 2 is a sectional view taken approximately on the line 2—2 of Figure 1, looking in the direction of the arrows; and

Figure 3 is a fragmentary detail view of a modified fusible restraining link arrangement, as viewed in looking downwardly at the upper lefthand corner of the alarm unit illustrated in Figure 1.

Like reference characters designate corresponding parts in the several figures of the drawing, wherein 1 designates a plate or base having suitable apertures 2, 2 therein to enable the plate to be secured to a wall or other convenient support, as by means of screws or nails. Upon this plate 1 is mounted a spring-actuated motor, generally designated 3, which may be of any well known or conventional type. As illustrated, the motor is an ordinary clockwork motor embodying primarily a power spring 4 operatively connected through a suitable gear train, generally designated 5, 6, and 7, to an escapement, comprising a toothed escapement wheel 8 and an escapement pawl 9 adapted to coact with the latter. The escapement pawl 9 is composed of a pair of arms 10 and 11, having their free extremities 12 and 13 arranged to coact with the escapement wheel 8 at opposite sides thereof. The pawl 9 is pivotally mounted at 14 so as to oscillate about the pivotal axis pursuant to rotation of the escapement wheel 8 under the influence of the spring 4. The parts of the motor, with the exception of the escapement wheel 8 and pawl 9, are preferably interposed between the plate 1 and a plate 15, forwardly spaced relatively thereto, said plates constituting frames for the motor works. The escapement wheel 8 and pawl 9 are positioned forwardly of the frame 15, and on this same side of the frame is arranged a gong 16, which may be mounted in any suitable manner, as on the post 17. Fixedly secured to the pawl 9, for oscillation therewith, is a striker or clapper 18, adapted to strike the gong 16 when the escapement is actuated by the spring motor. The power to drive the motor may be stored in the spring 4 by winding the shaft 19 with a key, in the conventional manner. The ratchet 20, pawl 21 and spring arm 22 serve to establish an operative connection between the wind shaft and the gear train, while permitting the wind shaft to be rotated to wind up the spring without producing motion in the gear train during the winding operation.

In order to set the alarm and restrain the same from operation until a fire occurs, I provide a detent lever 23, which is pivotally mounted on the frame plate 15, as at 24. The free end 25 of the detent lever is disposed for operative engagement with the end 12 of the arm 10 of the

escapement pawl 9, when the detent lever is pivotally shifted in one direction. When so shifted, the detent lever rocks the pawl 9 in a clockwise direction, as viewed in Figure 1, causing the end 13 of the pawl arm 11 to engage and lock the escapement wheel 8 against rotation.

The detent lever 23 is extended rearwardly, as at 26, towards the plate 1, and thence upwardly adjacent to the front of the plate 1, as at 27. Adjacent to the upper extremity of the detent lever, as at 28, is connected one end of a helical spring 29, the opposite end of said spring being fixedly connected to a stationary post or lug 30, which extends forwardly from the plate. The spring is so tensioned as to normally urge the detent lever in a clockwise direction, whereby to withdraw the end 25 of the lever away from engagement with the end 12 of the pawl arm 10 and thus free the escapement and permit the motor to drive the same for sounding the gong 16.

In order to restrain the detent lever from being shifted under the urge of the spring 29, I provide a fusible link, generally designated 31. The opposite ends of the link 31 are respectively adapted to engage the detent lever and a fixed stud or post 32. For convenience of replacement of the fusible links, the links may be made up in standard lengths and provided with knobs or heads 33 on the ends thereof. The post or lug 32 is slotted so that when the corresponding end of the link is inserted into the slot, the head 33 will prevent the link from being drawn through the slot, as will be obvious from inspection of the drawing. A lug or post 34, generally similar in form to lug 32, may be provided on the detent lever adjacent its upper end to facilitate the detachable connection of the opposite end of the fusible link with the detent lever. 35 designates the slot in the lug 34 which receives the end of the fusible link 31, as best viewed in Figure 2.

A stop lug 36 is preferably provided so as to limit the movement of the detent lever in a counter-clockwise direction, as viewed in Figure 1, and thereby prevent undue strain from being inadvertently placed upon the escapement or other parts of the mechanism, during setting of the alarm, as in replacing the fusible links. The lug 36, as well as the lugs 32 and 30, may be formed by stamping the same out of the material of the plate 1, and bending the same forwardly, the plate being preferably made of relatively thin gauge metal.

The operation of the mechanism just described should be clear from the foregoing, and may be briefly summarized as follows: Assuming that the spring motor has been wound, the alarm may be set and restrained from operating by shifting the detent lever 23 in a counter-clockwise direction, as viewed in Figure 1, and inserting the opposite ends of a fusible link 31 in the respective lugs 32 and 34. This places the spring 29 under tension normally tending to urge the detent lever in a clockwise direction. Should a fire break out, the heat will melt the link 31 and thereby free the detent lever so as to cause it to be shifted in a clockwise direction, as viewed in Figure 1, by the spring 29, thereby freeing the escapement and allowing the latter to be driven by the clockwork motor. In the operation of the escapement, the pawl 9 and clapper 13 are oscillated on the pivot 14, resulting in engagement of the clapper with the gong 16, sounding an audible alarm.

If for some reason the alarm should be set

off inadvertently, causing the spring motor to run down so as to become inoperative for sounding an alarm, an indicator, preferably of a visible character, will be presented to view as a warning that the alarm unit should be rewound and reset. The indicator also serves as a reminder if the resetting of the alarm unit is overloaded after an alarm has been given pursuant to the breaking out of a fire. As illustrated, the indicating means embodies a signal arm 37, having one end pivotally connected, as at 38, with the detent lever, and its opposite end adapted to be projected beyond one side of the plate 1. By coloring the outer end of the signal arm with a distinctive color, it will readily attract attention as soon as it is projected. 39 designates a guide for guiding the movement of the signal arm 37 as it is projected laterally to the position indicated by the dotted lines in Figure 1, pursuant to tripping of the detent lever 23 to allow it to be urged to the dotted line position shown in Figure 1, under the influence of the spring 29.

It will be readily understood that the mechanism just described constitutes a self-contained alarm unit which may be installed without requiring any auxiliary source of power or auxiliary external parts. However, there may be occasions where it is desired to cause a signal to be given at some point remotely distant from the alarm unit, when a fire breaks out and the alarm unit trips. To this end, I have provided a pair of electrical contacts 40 and 41, which are normally spaced apart, but arranged to be engaged, preferably by the detent lever 23, when the lever swings towards the dotted line position of Figure 1, upon rupture of the fusible link 31. When so engaged, the switch contacts are adapted to close an electrical circuit, diagrammatically designated 42, said circuit embodying one or more signalling devices such as a signal light, bell, buzzer, or the like. For purposes of illustration, I have shown a bell 43 in the circuit 42, and it is to be understood that this bell or other signal device may be located some distance away from the gong 16, so that in case the sound of the gong 16 should not attract attention, the signal device 43 may additionally be relied upon to give the alarm. The power source for energizing the signal device 43 may be of any suitable type, as for example, a transformer 44, operatively connected with a service main 45. For the purpose of facilitating the connection of the contacts 40 and 41 in the auxiliary circuit 42, I provide a pair of terminals 46, which may be mounted upon the base plate 1 in any suitable manner, and insulated therefrom, to which the conductors 47 and 48 leading to the respective contacts 41 and 40 may be secured.

As a specific example of a practical application of the alarm unit to use in an ordinary dwelling, the unit may be installed in the basement of the building, say near the furnace or heating system, where a fire is most likely to start. The gong 16 should be of such size that the sound thereof may be heard at a considerable distance. However, the occupants of the building may not be able to hear the gong if they should happen to be on the upper floors of the building, as for instance, after retiring to their bed chambers which may be located a considerable distance from the gong 16. Accordingly, the signal device or devices 43, if located somewhere in the building on one or more of the upper floors, or in one or more of the bed chambers, may be relied upon to give an alarm signal even if the sound of the gong 16

should not be heard. In many homes, the building is wired for service signals, embodying one or more buzzer or bell circuits, and it is to be understood that this circuit, or circuits, may be utilized as the auxiliary circuit represented diagrammatically by the circuit designated 42 in Figure 1, in which event, it will only be necessary to connect the existing circuit to the terminals 46 so as to place the circuit under the control of the switch contacts 40 and 41.

To protect the alarm mechanism, and to enhance the appearance of the unit, I preferably provide a cover or housing, generally designated 49, which is substantially box-like in form, with its rear side open so that the same may be placed over the mechanism and telescoped onto the forwardly projecting flanges 50 of the base plate 1. The friction between the marginal edges of the cover and the flange 50 ordinarily is adequate to retain the cover in position, but if desired, any suitable securing means may be utilized to releasably fasten the cover to the base so that it may be conveniently removed to give access to the alarm mechanism, as when it is desired to replace the fusible link, or to wind up the spring, after an alarm has been given.

The cover 49 is preferably provided with louvers 51 in order to enable the fusible element to be subjected to the surrounding atmospheric temperatures without appreciable lag, inasmuch as it is essential that the fusible element be ruptured quickly in the event a fire should break out. I also preferably provide grill-like openings 52 in the front wall of the casing or cover 49 so that the sound of the gong may be heard at a substantial distance away from the alarm unit. The top wall of the casing or cover 49 is recessed, as at 53, and pivotally secured to this wall is a handle or bail 54 which may be utilized to suspend the alarm unit from a suitable support such as a hook or nail, where such a mounting is preferred in lieu of screws or other fastenings which are adapted to be passed through the openings 2 in the base plate 1. The handle 54 also serves as a convenient means for enabling the alarm unit to be carried from place to place, as desired. When not in use, the handle may be folded down into the recess 53, to an out-of-the-way position, as will be obvious.

Referring now to Figure 3, I have shown a slightly modified construction of the alarm unit which is particularly adaptable to the use of a remotely located fusible link, whereby the alarm may be set off in response to the rupture of the fusible link even though it may be located at a considerable distance from the alarm mechanism. In other words, it is within the purview of my invention to substitute for the fusible link 31 of Figure 1, a flexible member such as a cable or wire 55, which may be extended through other rooms of the building, or even to other buildings, at quite some distance from the alarm unit. In the flexible member 55, may be inserted one or more fusible elements 56, which will be located within the zone or zones which are to be protected by the alarm apparatus. For example, if the alarm unit is mounted in the basement of a dwelling, the flexible member 55 may be extended to the upper floors, or out to the garage or other outlying buildings, and there would be a fusible element inserted in those portions of the flexible member which extend to the other floors or to the garage. Of course, the arrangement of the flexible members and fusible elements may be widely varied according to the particular condi-

tions presented for a given installation. Now it will be understood that the distal end of the flexible element 56 will be fixedly secured so that the detent lever 23 will be restrained against the urge of the spring 29, when the alarm is set, the fusible elements 56 being located intermediate the detent lever and the fixed end of the flexible element. In adapting the alarm unit to the use of a long flexible element such as the wire or cable 55, I preferably mount a pulley 57 on the base plate 1 adjacent to the upper lefthand corner thereof, as viewed in Figure 1, over which pulley the flexible member may be trained. An opening 58 is provided in the base plate 1 so that the flexible member may be extended rearwardly from the alarm unit. A similar opening 59 in the side flange 50 permits the flexible member to be extended laterally from the alarm unit should such an arrangement be more suitable. It will be understood, of course, that the cover or casing 49 is slotted so as not to obstruct the opening 59, and the opposite side wall of the cover is also slotted or notched out so as to allow the signal arm 37 to be projected laterally to the dotted line position indicated in Figure 1 when the alarm is set off. It will be noted that the pulley 57 extends forwardly so that when the flexible member 55 is trained thereabout, the flexible member will clear the lug 32 which is not used when the long cable or wire 55 is in use. The construction illustrated in Figure 3 is therefore adapted for the alternative arrangement of the fusible elements, as just described, or the arrangement previously described and illustrated in Figure 1. The other mechanism of the Figure 3 construction may be the same as illustrated in Figures 1 and 2.

Instead of mounting the gong 16 as illustrated in Figures 1 and 2, it will be obvious that the same may be positioned more nearly over the center of the spring motor, with the striker or clapper adapted to engage the inner surface of the gong, in which event, the alarm unit may be shortened in length to provide a more compact structure. By mounting the various elements constituting the alarm mechanism, all on the base plate 1, the unit will give satisfactory service even if the casing or housing 49 is not employed, or is removed. However, by reason of the fact that the louvers 51 in the casing are inclined downwardly, the fusible element 31 will rupture a little quicker responsive to the heat of a fire, when the cover is mounted on the base, due to the natural tendency of the heated air in the vicinity of the alarm unit to rise, and thereby be deflected by the louvers into the interior of the casing.

Because of the simplicity and comparatively low cost of my improved alarm unit, it is entirely practical and feasible to employ several of the units in the same building. Preferably, there should be a unit mounted in each vertical shaft or opening in the building, as for example, in each dumb-waiter shaft, elevator shaft, and stairway shaft. Also, by providing a unit at or adjacent to each exit, the sounding of an alarm will indicate to the occupants of the building that there is a likelihood that the exit is blocked by the fire, when the alarm is tripped.

While the specific details of construction have been herein shown and described, the invention is not confined thereto, as changes and alterations may be made without departing from the spirit thereof as defined by the appended claims.

Having thus described my invention, what I

claim as new and desire to secure by Letters Patent is—

1. In an alarm apparatus of the class described, the combination with a spring-actuated motor including a toothed escapement wheel and a pivotally mounted escapement pawl having a plurality of arms coacting with said escapement wheel respectively at opposite sides thereof, a gong, and a clapper mounted for oscillating movement responsive to pivotal movement of the escapement pawl, of a detent lever pivotally mounted intermediate its ends and having one end adapted to engage one arm of the escapement pawl when the lever is pivoted in one direction, whereby to rock the escapement pawl on its pivot and move the other arm of the pawl into locking engagement with the escapement wheel and thereby maintain the motor and clapper inactive, means yieldably urging said detent lever in a direction tending to release said escapement wheel so that the motor may operate the clapper and sound the gong, and means including a fusible element for restraining the detent lever against movement under the urge of said yieldable means aforesaid.

2. In an alarm apparatus of the class described, the combination with a spring-actuated motor including a toothed escapement wheel and a pivotally mounted escapement pawl coacting with said escapement wheel, a gong, and a clapper mounted for oscillating movement responsive to pivotal movement of the escapement pawl, of a detent lever pivotally mounted intermediate its ends and having one end adapted to engage the escapement pawl when the lever is pivoted in one direction, whereby to maintain the pawl in locking engagement with the escapement wheel and thereby maintain the motor and clapper inactive, spring means having one end fixed to a stationary part of the apparatus and the other end connected with the detent lever adjacent to the end of the latter on the side of the pivotal axis of the detent lever opposite to the pawl-engaging end for yieldably urging said detent lever in a direction tending to release said escapement wheel so that the motor may operate the clapper and sound the gong, and

means including a fusible element for restraining the detent lever against movement under the urge of said yieldable means aforesaid, said last named means having one end fixed to a relatively stationary part and its opposite end connected with the end of the detent lever to which the spring means is connected and extending therefrom in opposed relation to the spring means with the fusible element intermediate the fixed end and the detent lever.

3. In an alarm apparatus of the class described, the combination with a spring-actuated motor including a toothed escapement wheel and a pivotally mounted escapement pawl coacting with said escapement wheel, a gong, and a clapper mounted for oscillating movement responsive to pivotal movement of the escapement pawl, of a detent lever pivotally mounted intermediate its ends and having one end adapted to engage the escapement pawl when the lever is pivoted in one direction, whereby to maintain the pawl in locking engagement with the escapement wheel and thereby maintain the motor and clapper inactive, spring means having one end fixed to a stationary part of the apparatus and the other end connected with the detent lever adjacent to the end of the latter opposite to the pawl-engaging end for yieldably urging said detent lever in a direction tending to release said escapement wheel so that the motor may operate the clapper and sound the gong, and means including a fusible element for restraining the detent lever against movement under the urge of said yieldable means aforesaid, said last named means having one end fixed to a relatively stationary part and its opposite end connected with the end of the detent lever to which the spring means is connected and extending therefrom in opposed relation to the spring means with the fusible element intermediate the fixed end and the detent lever, and the detent lever having a slotted part forming an open-ended recess for receiving and establishing interlocking engagement with one end of the fusible element.

JOHN Y. LAMBERT.