

April 7, 1959

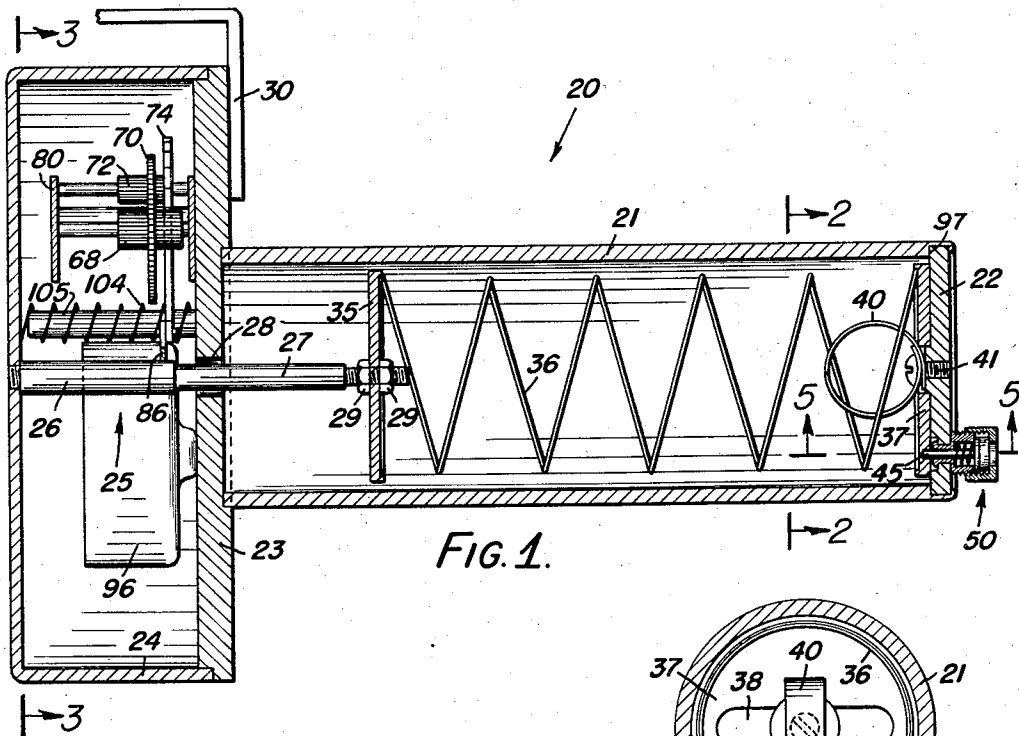
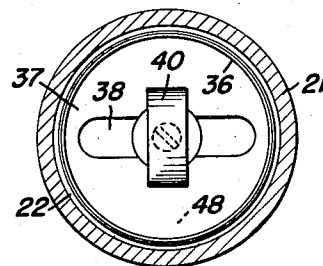
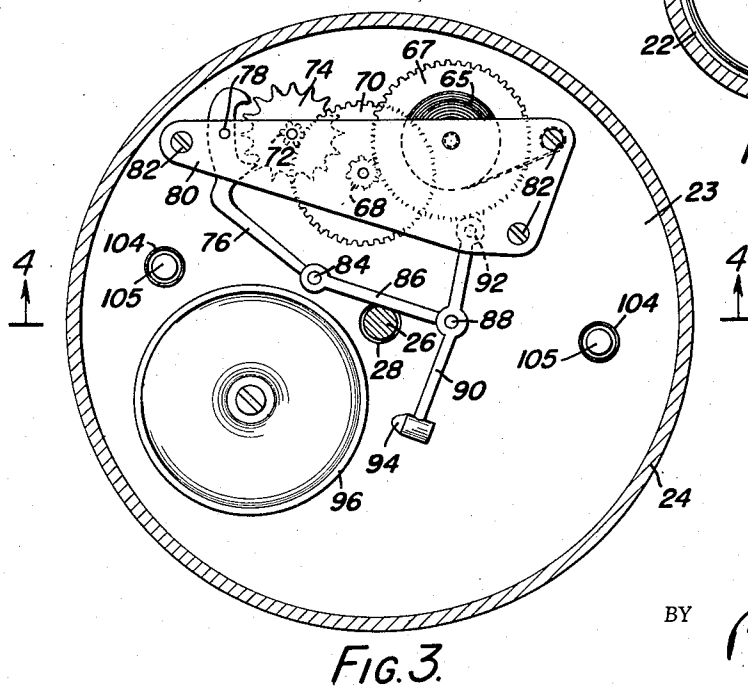
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2,880,690

FIRE ALARM

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3 Sheets-Sheet 1



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FIRE ALARM

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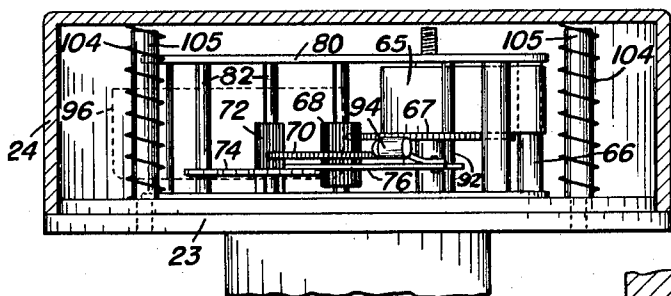


FIG. 4.

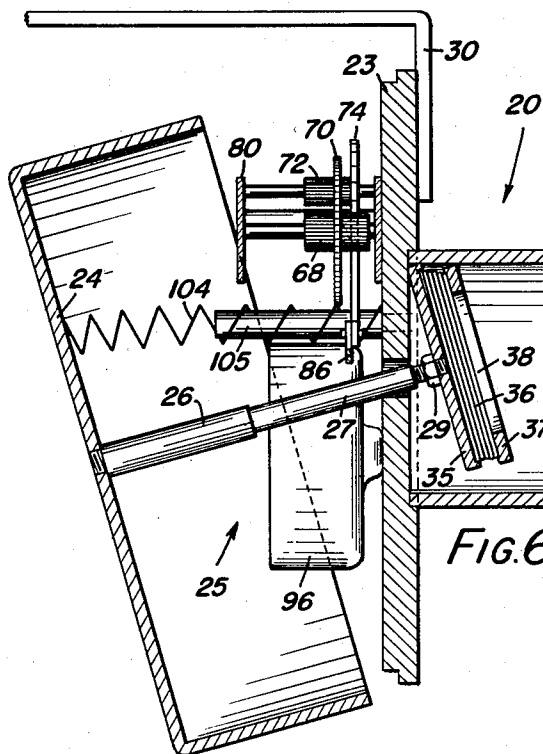


FIG. 6.

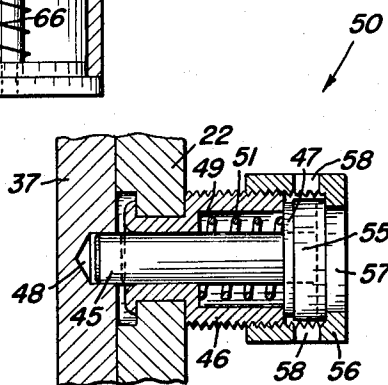


FIG. 5.

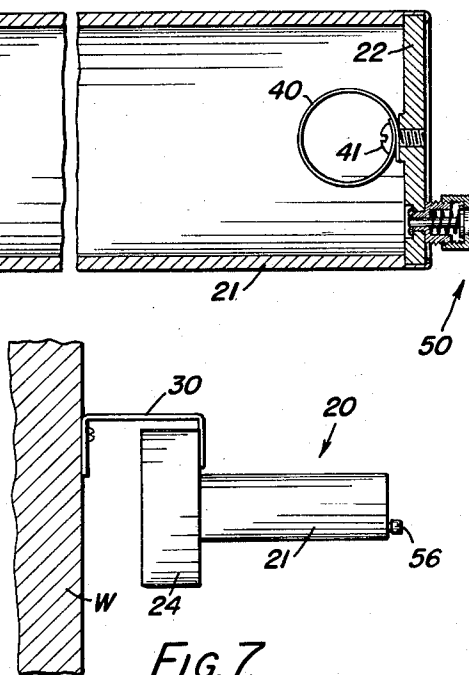


FIG. 7.

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FIRE ALARM

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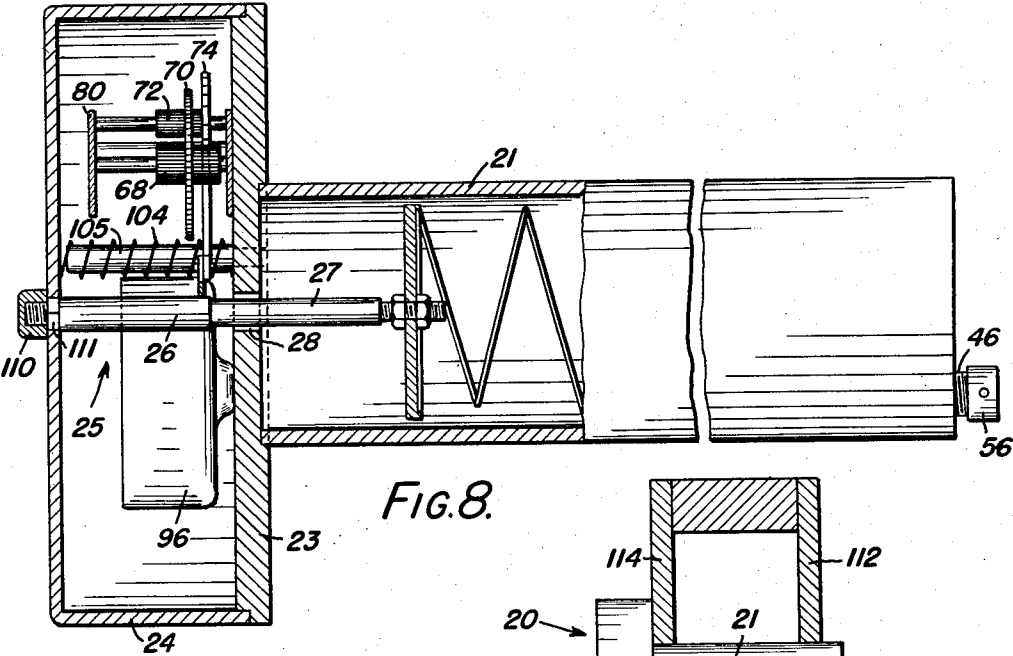


FIG. 8.

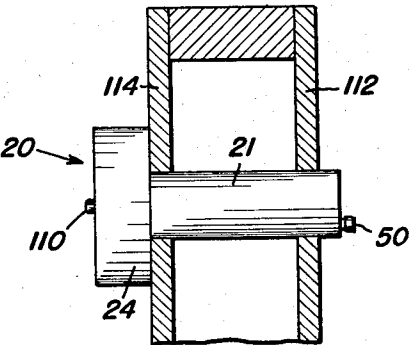


FIG. 9.

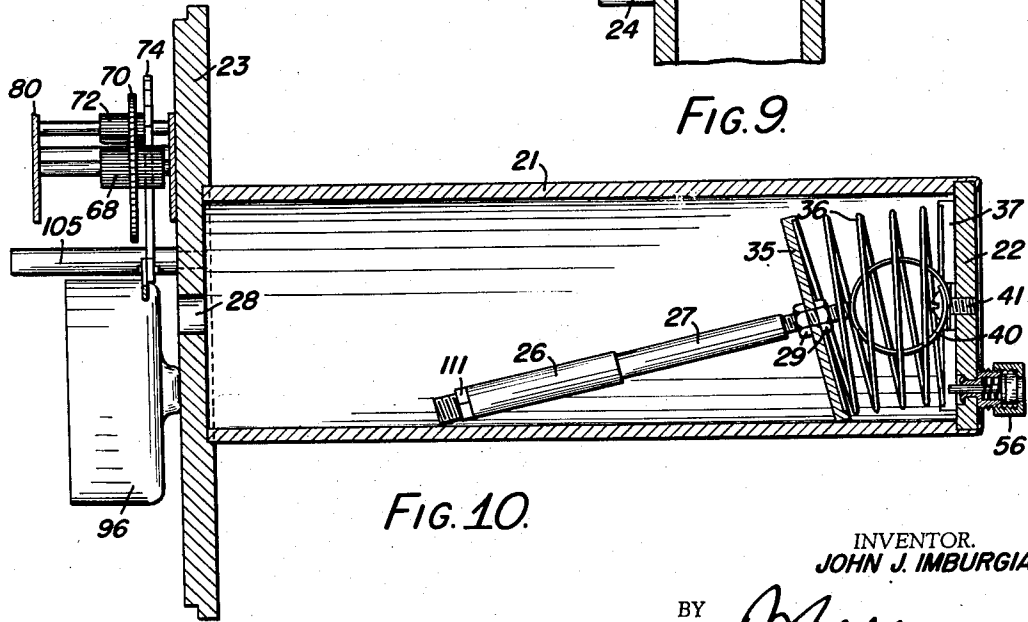


FIG. 10.

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FIRE ALARM

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Application March 3, 1958, Serial No. 718,810

10 Claims. (Cl. 116—106)

The present invention relates to fire alarms, and more particularly to a fire alarm intended for household use.

One object of the invention is to provide a fire alarm which is operated mechanically without dependence upon any electrical operating means whatsoever.

Another object of the invention is to provide a fire alarm which may be portable and installed at will in any part of a dwelling, garage, boat, boat-house, or other structure.

Still another object of the invention is to provide a fire alarm which may be installed permanently in a building or other structure.

Still another object of the invention is to provide a mechanically-operated fire alarm which is dependable, automatic in operation, and which can be built at a reasonable cost.

Other objects of the invention will be apparent herein after from the specification and from the recital of the appended claims.

In the drawings:

Fig. 1 is an axial section of a fire alarm constructed according to one embodiment of this invention, the device being shown in cocked condition;

Fig. 2 is a section taken on the line 2—2 of Fig. 1 looking in the direction of the arrows;

Fig. 3 is a section on the line 3—3 of Fig. 1 looking in the direction of the arrows;

Fig. 4 is a section on the line 4—4 of Fig. 3, looking in the direction of the arrows;

Fig. 5 is an enlarged sectional view on the line 5—5 of Fig. 1 looking in the direction of the arrows;

Fig. 6 is an axial section of the device showing the alarm after it has been tripped by the heat of a fire;

Fig. 7 is a view on a very much reduced scale showing how the device of Figs. 1 to 6 inclusive may be mounted removably on the wall of a home or other structure;

Fig. 8 is a part elevation, part sectional view, similar to Fig. 1, showing a modification of the invention;

Fig. 9 is a view on a reduced scale, illustrating how this embodiment of the invention may be mounted; and

Fig. 10 is a view, somewhat similar to Fig. 6, showing what happens when a fire heats the heat-sensitive element which holds the cover for this form of alarm in place.

Referring now to the drawings by numerals of reference, 20 indicates generally a fire alarm constructed according to one embodiment of this invention. This device comprises a tubular steel casing 21 which is adapted to be closed at one end by a cap 22, and which is welded or otherwise secured at its other end to a plate 23. The plate 23 forms part of a housing for the bell ringing mechanism of the alarm. The cover of this housing is denoted at 24.

Threaded in the cover 24 is the stud 25. This stud has a portion 26 of relatively large diameter within the cover 24, and a portion 27 of smaller diameter that is adapted when the alarm is cocked, to extend through an aperture 28 in the plate 23 into the casing 21. The inner

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end of the stud 25 is threaded and is adapted to be connected by the nuts 29 to a plate 35.

There is a coil spring 36 connected at one end to the plate 35. This spring is fastened at its opposite end to a trigger plate 37. The plate 37 has a diametral slot 38 (Fig. 2) extending through it. This plate is adapted to be detachably connected to the cap 22 by a circular leaf spring 40 which is secured to the cap 22 by a screw 41.

To connect the cap 22 to the plate 37, the spring 40 is passed through the slot 38 in the plate 37, and the cap 22 is turned through 90 degrees.

To prevent the cap 22 and the trigger plate 37 from rotating relative to each other after the alarm has been cocked and they have been coupled together by the spring 40, a pin or detent 45 (Figs. 1 and 5) is provided. This pin is mounted reciprocally in a cupped guide sleeve 46 that is riveted to the cap 22. It has a flat enlarged head 47 at one end, and it is adapted to engage at its other end in a recess 48 in the plate 37. Interposed between the head 47 of the pin and the shoulder 49 formed internally in the guide sleeve 46 is a coil spring 51 which constantly presses the pin 45 outwardly to released position, to disconnect the cap 22 from the trigger plate 37. The pin is adapted to be held, however, in engaged position by a block 55 of fusible metal which is held seated against the outer face of the head 47 by a nut 56 that is threaded on the sleeve 46. This nut may have an opening 57 in its front face, and radial openings 58 in its side wall in order that the fusible block 55 may readily be subjected to ambient temperature conditions, and if a fire occurs, the heat may readily melt the block.

Mounted on the plate 23 is a clockwork which may be of conventional construction. That shown comprises a coil spring 65 (Figs. 3 and 4) which is connected at one end to a post 66, and at its opposite end to a gear 67. This gear meshes with a pinion 68, that is fastened to a shaft to which there is also secured a gear 70. Gear 70 meshes with a pinion 72 that is mounted on the same shaft with a starwheel 74. An escapement 76 is adapted to engage this starwheel. This escapement is pivoted at 78 to a plate 80 which is spaced from and secured to the plate 23 by screw studs 82. The escapement is connected by a pivot pin 84 to arm 86, which is pivotally connected at 88 to an arm 90. Arm 90 is pivotally connected at one end by pin 92 to the plate 23. It carries at its free end a hammer 94 that is adapted to strike the bell 96. Bell 96 is shown only in dotted lines in Fig. 4.

The arm 86 is positioned to engage the rod 25; and the hammer 94 is normally held out of contact with the bell by engagement of the arm 86 with the large diameter portion 26 of the rod 25.

The alarm constituting the described embodiment of the invention is intended to be cocked at the factory, and to be returned to the factory, after use, for recocking. To cock the alarm, the trigger plate 37 is pulled forward in tube 21 by inserting a hook or other tool through the slot 38 in the plate. Once the plate has been pulled beyond the forward end of the tube 21, the plate can be grasped with the fingers. Cap 22 can then be secured to the plate by passing spring 40 through slot 38 and rotating the cap 90 degrees. The spring 40 will then occupy the position shown in Fig. 2; and the pin 45 may then be engaged in the recess 48 (Fig. 5) in the trigger plate 37 by threading up on the nut 56. Then the cap 22 may be seated against the shoulder 97 (Fig. 1) on the tube 21 and the end of the tube may be spun over the cap to hold the cap securely on the tube. The cap 22 is then rotated by grasping nut 56 (Fig. 5). This causes the trigger plate 37 to rotate also, twisting the torsion spring 36 and putting this spring under load. The friction between the cap 22 and the spun-over portion of the tube 21 and the friction between the cap 22 and shoulder 97 will hold

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cap 22 and trigger plate 37 in any position to which they are rotated.

When the heat of a fire melts the plug 55, the spring 50 will withdraw the detent 45 from the trigger plate 37. Then as soon as the end of the pin 45 clears the recess 48 in the trigger plate 37, the trigger plate will be rotated relative to the cap 22 by the torsion spring 36. When the trigger plate 37 has rotated 90 degrees, the spring 40 will register with the slot 38 in the trigger plate. Torsion spring 36 thereupon will recoil pulling the trigger plate 37 rearwardly as shown in Fig. 6. The release of the trigger plate 37 permits the coil springs 104, which surround posts 105 that are secured in plate 23, and which are interposed between the cover 24 and the plate 23, to force the cover 24 off the plate 23. This moves the large diameter portion 26 of the rod 25 clear of arm 86, releasing the arm 86 and the escapement 76 which is connected thereto. The spring 65 is now able to drive the train of gearing 67, 68, 70, 72 which connects the star-wheel to the spring. The escapement is thus oscillated to oscillate the arm 90 back and forth to cause hammer 94 to strike the bell 96 and sound the alarm.

The alarm of this embodiment of the invention is portable and may be transported by a handle 30 shown in Fig. 7 which is brazed or welded at one end to the cover 24. There may be a keyhole slot in the other end of the handle so that the alarm can readily be suspended from a screw or nail driven in the wall or ceiling of a room.

A modification of the invention is illustrated in Figs. 8 to 10 inclusive. This device is adapted to be fixed in the walls of a home or other structure so that it can detect fire in either of the two adjacent rooms of the house and sound an alarm. The device is essentially the same as that previously described except that instead of threading the stud 25 into the cover 24 of the bell housing, the stud is passed through that cover; and the cover is secured in position by a nut 110 of fusible material, which threads onto the stud 25 exteriorly of the cover 24. This device may be mounted for instance, in the dividing wall between two rooms, as illustrated in Fig. 7, one wall being denoted at 112 and the other at 114. One heat-sensitive element 50 projects into one room of the house; and the other heat-sensitive element 110 projects into the other room. If the room, into which the heat-sensitive element 50 projects catches fire, the apparatus will act in the same way as shown in Fig. 6. If the room, into which the heat-sensitive element 110 projects, catches fire, the heat will melt fusible element 110 and will release the stud 25. Under actuation of the spring 36 the stud 25 will then be pulled into the position shown in Fig. 10, releasing the arm 86 (Fig. 3), as before, and allowing hammer 94 to sound the bell 96 previously described.

The alarm device disclosed is fully sealed when assembled, and is, therefore, dust-proof and moisture proof.

While the alarm has been described in connection with use of a bell as the audible warning medium other audible signals may be used instead, as, for instance, a siren operated, for example, directly by a spring that is locked normally in wound-up condition and that is released by mechanism such as herein described.

While the invention has been described in connection with different embodiments of the invention, then, it will be understood that it is capable of further modification, and this application is intended to cover any variations, uses, or adaptations of the invention following, in general, the principles of the invention and including such departures from the present disclosure as come within known or customary practice in the art to which the invention pertains, and as may be applied to the essential features hereinbefore set forth, and as fall within the scope of the invention or the limits of the appended claims.

Having thus described my invention, what I claim is:

1. A fire alarm comprising a base plate, an audible

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signal mounted on said base plate, spring-operated means for actuating said signal, means for locking said actuating means against operation comprising a casing secured at one end to said base plate, a closure cap for the other end of said casing, a locking member extending into said casing and adapted to engage said actuating means to prevent operation thereof, a trigger plate, a torsion spring connecting said trigger plate to said locking member, means detachably securing said trigger plate to said closure cap including a fusible element adapted to melt above a given temperature, said trigger plate being detachable from said closure cap by rotation of said trigger plate relative to said closure cap, said spring operating when said trigger plate is disconnected from said closure cap to rotate said trigger plate relative to said closure cap to force said locking member out of engagement with said actuating means to permit said actuating means to actuate said signal.

2. A fire alarm comprising an audible signal device, means actuating said signal device, a first spring constantly urging said actuating means to operating position, a locking member preventing operation of said actuating means, a casing, a closure cap for one end of said casing, a coil spring connected at one end to said locking member, said coil spring being stretchable for releasable connection at its opposite end to said cap, means including a detent detachably securing said opposite end of said spring to said closure cap, the tension of said spring constantly urging its disconnection from said closure cap, means constantly urging said detent to inoperative position, and a fusible element adapted to melt above a predetermined temperature holding said detent in operative position, the melting of said fusible element causing said last-mentioned means to move said detent to inoperative position, thereby releasing said coil spring.

3. A fire alarm comprising an audible signal device, means for actuating said signal device, a first spring constantly urging said actuating means to operating position, a locking member preventing operation of said actuating means, a casing into one end of which said locking member normally extends, a closure cap closing the opposite end of said casing, said closure cap being rotatable on said casing, a trigger plate, a second combined tension and torsion spring connecting said locking member to said trigger plate, said second spring serving constantly to urge said locking member toward said trigger plate, connecting means releasably connecting said trigger plate to said closure cap and operable upon rotation of said trigger plate and closure cap together in one direction to load said second spring and operable upon rotation of the trigger plate in the opposite direction relative to said closure cap to detach said trigger plate from said closure cap, and means including a fusible element holding said trigger plate against rotation relative to said closure cap.

4. A fire alarm comprising an audible signal, spring-operated means actuating said signal, a slidable member for locking said actuating means against operation, a normally stationary part, a fusible element securing said slidable member at one end to said stationary part, a spring connecting the opposite end of said slidable member to a second normally stationary part which is spaced from the first-named stationary part a greater distance than the length of said slidable member, and means including a second fusible element securing said spring to said second stationary part.

5. A fire alarm comprising a support, an audible signal mounted on said support, spring-operated means mounted on said support for actuating said signal, an enclosure detachably connectable to said support to enclose said signal and said spring-operated means, means including a slidable member locking said actuating means against operation, a first fusible means securing said slidable member at one end to said enclosure to fasten said enclosure to said support, a first spring connected to the

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opposite end of said locking member, a trigger plate connected to the opposite end of said first spring, a second spring constantly urging said enclosure to open position, a tubular casing secured to said support at the opposite side thereof from said enclosure, a cap covering the open end of said casing, means detachably securing said trigger plate to said cap and adapted upon rotation of said trigger plate in one direction relative to said cap to detach said trigger plate from said cap, and a second fusible means holding said trigger plate against rotation relative to said cap.

6. A fire alarm comprising an audible signal, means for actuating said signal, a slidable member locking said actuating means against operation, said slidable member being movable in both directions to disengaged positions to unlock said actuating means, a first normally stationary part, a first fusible element releasably securing said slidable member to said first stationary part to hold said slidable member releasably in locking position, a second normally stationary part spaced from the first named stationary part, a first spring means urging said slidable member in one direction, and means connecting said slidable member with said second normally stationary part to hold said slidable member releasably in locking position comprising a second spring means, and a second fusible element, said first spring means moving the slidable member in said one direction to released position upon the melting of said second fusible element, and said second spring means moving said slidable member in the other direction to released position upon the melting of said first fusible element.

7. A fire alarm comprising a support, an audible signal mounted on said support, spring-operated means mounted on said support for actuating said signal, a casing secured to said support at the opposite side thereof from said signal, a slidable locking member locking said actuating means against operation, a closure covering said casing, a trigger plate, a torsion spring connecting said locking member to said trigger plate, means detachably securing said trigger plate to said closure upon rotation of said trigger plate in one direction relative to said closure, and

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means including a fusible element preventing rotation of said trigger plate relative to said closure in the opposite direction, said closure being rotatable on said casing to load said spring after said trigger plate has been secured to said closure.

8. A fire alarm as claimed in claim 7 having a cover detachably mounted on said support to enclose said signal and said actuating means, means including a fusible element securing said locking member to said cover to hold said cover on said support, and spring means biasing said cover to open position.

9. A fire alarm comprising a support, a bell mounted on said support, a clapper for said bell, means for operating said clapper comprising a spring motor, and a train of gearing, terminating in an escapement, for actuating said clapper, a rod reciprocable axially, a cover detachably secured to said support enclosing said bell, clapper, and train of gearing, means for securing said rod at one end to said cover, a tension and torsion spring secured at one end to the other end of said rod, a trigger plate secured to the opposite end of said tension and torsion spring, a casing secured to said support at the opposite side thereof from said bell, a closure covering the open end of said casing, means detachably securing said trigger plate to said closure upon rotation of said closure in one direction relative to said trigger plate, and means including a fusible element preventing rotation of said trigger plate relative to said closure in the opposite direction, said closure being rotatable on said casing with said trigger plate to load said spring torsionally.

10. A fire alarm as claimed in claim 9 in which the means securing said rod to said cover includes a second fusible element.

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