March 24, 1959 J. D. CARROLL 2,878,774

GAS OPERATED SAFETY WARNING DEVICE

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FIG. 1.

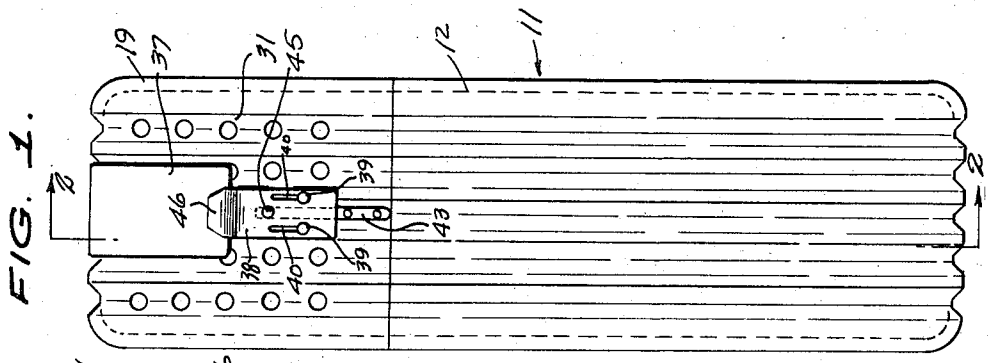


FIG. 2.

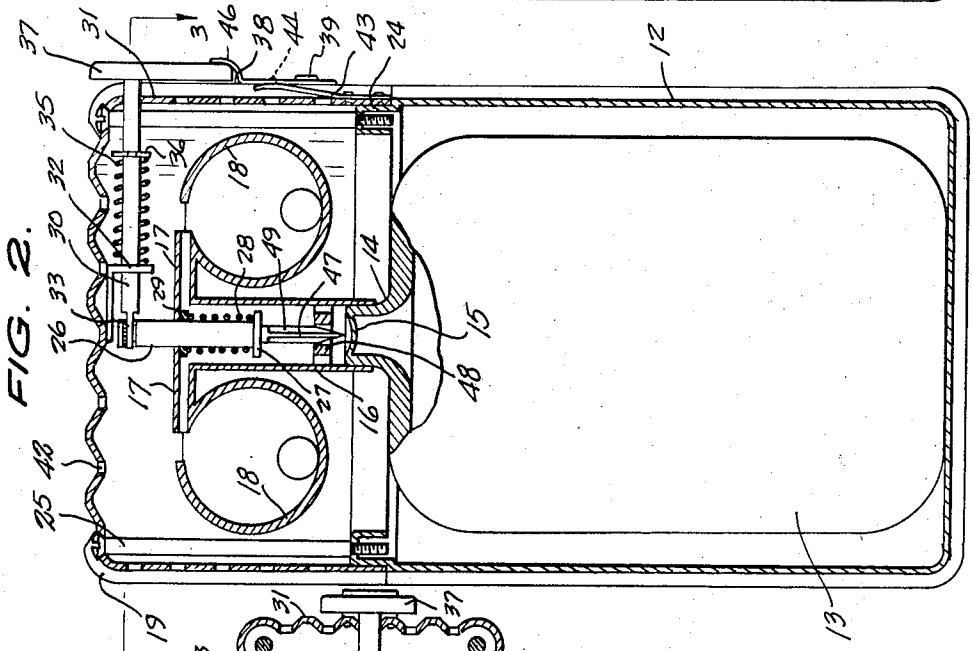
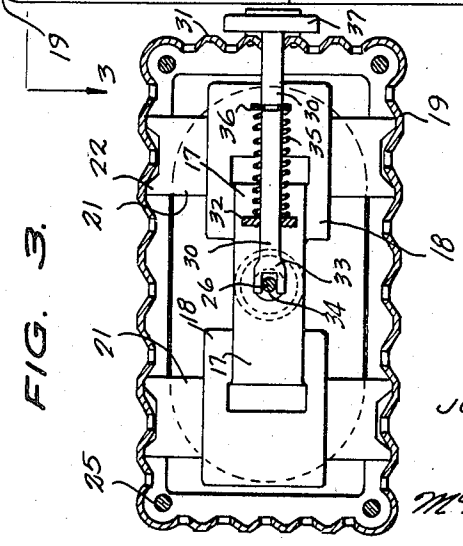


FIG. 3.



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FIG. 4.

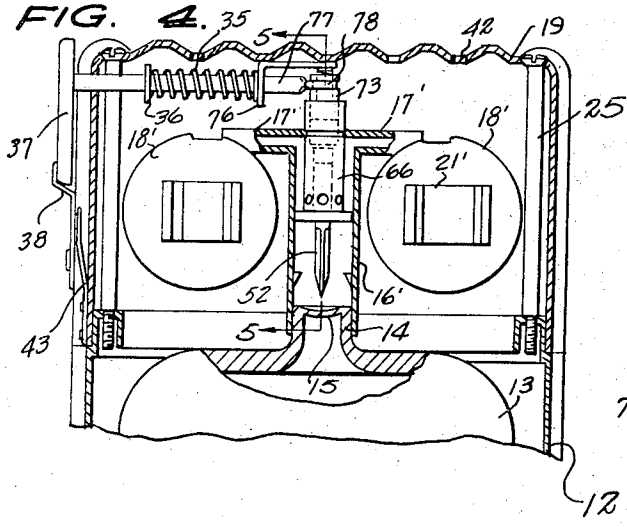


FIG. 5.

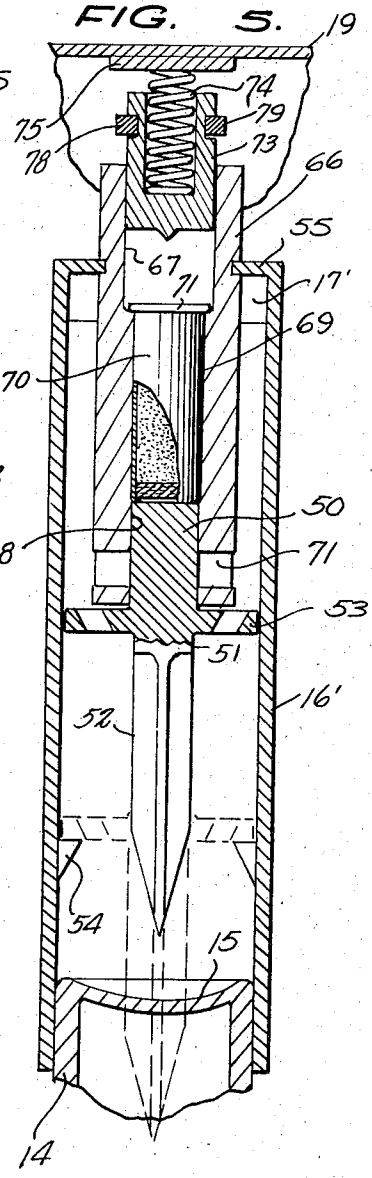
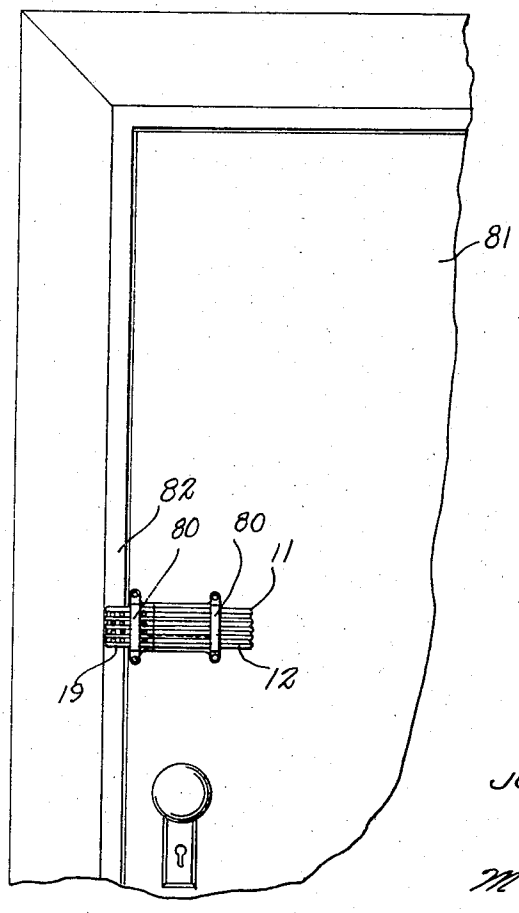


FIG. 6.



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United States Patent Office 2,878,774
Patented Mar. 24, 1959

2,878,774

GAS OPERATED SAFETY WARNING DEVICE

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Application April 26, 1957, Serial No. 655,250
3 Claims. (Cl. 116—112)

This invention relates to alarm devices, and more particularly to an emergency signalling device intended to provide a loud warning signal in case of an emergency, such as in case of assault by a criminal or in case of the unauthorized entry of an intruder or burglar into a building.

A main object of the invention is to provide a novel and improved alarm device which is simple in construction, which is arranged so that it may be placed into operation instantly when it is desired to produce an alarm signal, and being entirely automatic in operation, requiring no effort on the part of the user after it has been released.

A further object of the invention is to provide an improved gas-operated automatic signalling device which is inexpensive to manufacture, which is compact in size, and which may be used either as an emergency signal device carried on the person of the user or as a burglar alarm device which may be installed on a door so as to be actuated by the unauthorized entry of an intruder.

Further objects and advantages of the invention will become apparent from the following description and claims, and from the accompanying drawings, wherein:

Figure 1 is a side elevational view of an alarm device constructed in accordance with the present invention.

Figure 2 is a vertical cross sectional view taken on the line 2—2 of Figure 1.

Figure 3 is a horizontal cross sectional view taken on line 3—3 of Figure 2.

Figure 4 is a vertical cross sectional view taken through the upper portion of a modified form of alarm device according to the present invention.

Figure 5 is an enlarged vertical cross sectional view taken on line 5—5 of Figure 4.

Figure 6 is a fragmentary elevational view of a portion of a door and its associated doorway, showing the manner in which a signal device according to the present invention may be employed as a burglar alarm.

Referring to the drawings, and more particularly to Figures 1, 2 and 3, 11 generally designates an alarm device according to this invention. The device 11 comprises a main casing 12 of generally rectangular shape in which is mounted a container 13 filled with compressed gas. The container 13 is provided at its top with a reduced neck 14, the neck being closed by a frangible closure element 15. The neck 14 is received within the lower end of a vertical conduit member 16 which is integrally connected by means of horizontal conduit elements 17, 17 to a pair of whistle members 18, 18 of conventional construction, adapted to be actuated when compressed air from the container 13 is released through the conduit 16 and through the branch conduits 17, 17.

As shown in Figure 3, the whistle members 18, 18 are rigidly supported inside the upper portion of a cover member 19 engaged on the rim of the main casing 12. The whistle members 18, 18 are rigidly secured in the cover 19 by transverse bracket elements 21, 21, as shown in Figure 3, said bracket elements being secured against

the inside wall surfaces of the cover 19 in any suitable manner. For example, the arms 21, rigidly secured to the side walls of the whistle members 18, 18, may be formed at their ends with prongs 22, which frictionally engage with the inside surfaces of the opposite major walls of cover 19 and embed themselves in said opposite walls so as to rigidly support the whistle members 18, 18 in the cover 19 in the positions thereof illustrated in Figures 2 and 3.

As shown, the main casing 12 is formed with a reduced top rim portion 24 and the cover 19 is engaged on said top rim portion, being detachably secured thereto by corner bolts 25 threadedly engaged with the respective corners of the rim 24 and passing through the corners of the top wall of the cover 19, as is clearly shown in Figures 2 and 3.

A vertical plunger 26 is slidably engaged centrally through the common top wall of the branch conduits 17, 17, said plunger 26 being formed with an annular flange 27 at its lower portion against which bears the lower end of a coil spring 28 surrounding the plunger 26. The top end of the coil spring 28 bears against a rubber washer 29 surrounding the plunger 26 and bearing against the common top wall of the branch conduits 17, 17, as shown in Figure 2. The spring 28 constitutes a propelling means and biases the plunger 26 downwardly, but the plunger is normally held against downward movement by a horizontal yoke member 30 slidably engaged through the vertical end wall 31 of cover 19 and slidably supported on a depending bracket 32 secured to the top wall of the cover 19. Yoke member 30 is formed with a slotted end portion 33 engaging in an annular groove 34 formed in the top end of the plunger 26, as is shown clearly in Figures 2 and 3, to restrain the plunger 26 against downward movement. A coil spring 35 surrounds the yoke member 30, bearing between the bracket 32 and a collar element 36 secured on the yoke member, biasing the yoke member outwardly, namely, toward a releasing position with respect to the plunger 26. The outer end of the yoke member 30 is provided with a head portion 37 of substantial area, normally held against the vertical wall 31 of cover 19 by a slidable catch member 38 which is slidably secured to the vertical wall 31 by a pair of headed fastening members 39 engaging through respective longitudinal slots 40, 40 formed in the retainclips 38.

As shown, the cover member 19 is of corrugated shape, being formed with alternating crests and valleys, the valleys being perforated, as shown at 42, to allow sound waves to pass freely through the cover. Secured in one of the valleys in the vertical wall 31 adjacent to the retaining clip 38 is a leaf spring 43 provided with a projection 44 engageable in an opening 45 provided in the clip member 38 to yieldably lock the clip in its retaining position, shown in Figure 2. In this position, the offset end flange 46 of the clip member 38 engages over the edge of the head 37, holding the head 37 and preventing the yoke 30 from moving outwardly under the force of the biasing spring 35.

The projection 44 is relatively small so that the clip 38 may be manually moved away from the head 37 with a relatively small amount of effort when it is desired to release the signal device.

Secured axially to the plunger 26 is a prong 47 which extends slidably through an apertured transverse bracket element 48 rigidly secured inside the conduit 16 adjacent the frangible closure element 15 of the neck 14 of the gas receptacle 13. The prong 47 is disposed adjacent the frangible closure element 15, and is adapted to pierce said wall when the plunger 26 is released and is urged downwardly by the propelling means or spring 28. As shown, the prong 47 is formed with longitudinal

flutes 49, so that the gas from the receptacle 13 may pass freely along the prong 47 and discharge into the conduit 16 when the closure element 15 is pierced.

In operation, when the retaining clip 38 is moved away from the head 37, the apparatus is in a released condition. However, the user may maintain the yoke member 30 in its normal position by thumb pressure to prevent premature release of the device. When the thumb pressure is released, allowing the yoke member 30 to move outwardly under the biasing force of spring 35, the plunger 26 is freed for downward movement, and the propelling means or coil spring 28 then forces the plunger 26 downwardly, whereby prong 47 penetrates the frangible closure element 15 of the receptacle 13 and releases the gas therein. The gas passes upwardly through the conduit 16 and thence through the branch conduits 17, actuating the whistle members 18, 18, whereby a loud, shrill signal is given by the device.

As shown in Figures 1 and 2, the main casing 12 is corrugated in the same manner as the cover 19 so that the corrugations thereof are in registry with the corrugations of said cover. The device is of sufficiently small size to be conveniently carried in a persons' pocket, handbag, or any other conventional receptacle easily carried by a person.

Referring now to the form of the invention shown in Figures 4 and 5, the neck 14 of the receptacle 13 is closely received within the lower end of a conduit 16', corresponding to the conduit 16 of the modification illustrated in Figures 1 to 3. The conduit 16' is connected by respective branch conduits 17', 17' to whistle members 18', 18', as shown in Figure 4. The whistle members 18' are provided with the laterally extending arms 21' similar to the pronged arms 21 of Figure 3, said pronged arms being wedgingly engageable inside the cover 19.

Conduit 16' has a top wall 55 in which is axially secured a cylinder 66, said cylinder being formed with an upper bore portion 67 and a lower bore portion 68. The cylinder has an intermediate bore portion 69 adapted to receive a blank cartridge 70 in the manner illustrated in Figure 5, with the rim of the cartridge shown at 71, exposed in the bore 67.

Designated at 51 is a plunger having a cylindrical top portion 50 which is frictionally engaged in the lower bore portion 68 of the cylinder 66, and is adapted to be driven downwardly when the cartridge 70 is exploded. The lower portion of cylinder 66 is formed with radial vent openings 71 to allow free discharge of the products of combustion of the powder in the cartridge 70, the upper portion of the conduit 16' being similarly vented to conduit elements 17' to allow further escape of said products of combustion.

The plunger 51 is formed with an apertured flange 53 which is slidably engaged inside the conduit 16' to guide the plunger 51 for axial movement in the conduit 16'. The lower portion of the plunger 51 comprises the fluted prong 52 which is disposed adjacent the frangible closure element 15 of the container 13, said prong being adapted to be driven downwardly and to pierce said closure element 15 when the plunger 51 is driven downwardly by the explosion of the cartridge 70. Stop lugs 54 are provided inside the conduit 16' to limit the downward movement of the flange 53 to the position thereof shown in dotted view in Figure 5.

A firing pin 73 is slidably mounted in the upper bore 67 of cylinder 66, said firing pin 73 being biased downwardly by a coil spring 74 engaging between an axial recess in the firing pin 73 and a horizontal plate 75 secured to the top wall of cover 19. The vertical flange 76 is formed at one end of plate 75, said flange being apertured and slidably receiving a yoke member 77 generally similar to the yoke member 30 of the form of the invention shown in Figures 1, 2 and 3. The yoke member 77 has the notched end 78 engaging in an annular groove 79 in the firing pin 73, to restrain the firing pin against downward movement under the force of spring 74. It is to be noted that the thus described cylinder 66, cartridge 70, and the firing pin 73, which are operatively connected to the plunger 51 constitute a propelling means for the plunger 51.

A coil spring 35 surrounds the yoke member 77, bearing between flange 76 and a collar member 36 on the yoke member, biasing the yoke member 77 outwardly to a position wherein the notched end 78 of the yoke member disengages from the firing pin 73. As in the previously described form of the invention, the yoke member is provided with a head 37 of substantial area which is normally retained against an end wall of cover 19 by a safety clip 38, which is manually movable to a disengaging position, whereby the head 37 may be released. As in the previously described form of the invention, when the head 37 is released, spring 35 moves the yoke member 77 outwardly, releasing the firing pin 73, and allowing spring 74 to drive the firing pin downwardly to engage the cartridge rim 71. This explodes the cartridge 70, and drives the plunger 51 downwardly, as viewed in Figure 5, so that the fluted prong 52 penetrates the frangible closure element 15, allowing the gas to escape from the receptacle 13, and causing the whistle members 18' to operate.

As will be seen in Figure 6, either of the devices shown in Figures 1, 2 and 3, or in Figures 4 and 5, may be employed as burglar alarm devices, by engaging same in a pair of supporting brackets 80, 80 secured to the margin of a door 81, so that the retaining clip 38 will be moved to release position responsive to the horizontal engagement of the device in the aligned clips 80, 80, for example, by the contact of the edge of the clip 38 with the edge of the door jamb 82 as the device is engaged from the right, as viewed in Figure 6, through the supporting brackets 80, 80. The head member 37 of the device will then be disposed against the door jamb 82, and will be retained thereby until the door is opened. When the door is opened, the head 37 is released, allowing its biasing spring 38 to move the head outwardly, whereby the yoke associated therewith disengages from the operating mechanism of the device, allowing the device to be released and to provide the warning signal previously described derived from the discharge of the compressed gas from the container 13 and the consequent activation of the whistle members 18'.

While certain specific embodiments of an improved alarm device have been disclosed in the foregoing description, it will be understood that various modifications within the spirit of the invention may occur to those skilled in the art. Therefore it is intended that no limitations be placed on the invention except as defined by the scope of the appended claims.

What is claimed is:

1. In an alarm and warning device, a rigid casing, a container of gas under pressure mounted in said casing, said container being provided with a neck, a frangible closure element closing said neck, a vertical conduit member surrounding said neck and having the lower end secured to said neck and having the upper end spaced above said neck, a vertically disposed plunger having a prong projecting from the lower end positioned within said conduit member so that the prong is exteriorly of and above said frangible closure element with the portion adjacent the upper end projecting freely out of the upper end of said conduit member, propelling means operatively connected to said plunger for moving the plunger downwardly and project the prong through said frangible closure element with sufficient force to fracture same and release the gas in said container, means carried by said casing and operatively connected to the projecting upper end portion of said plunger for holding the plunger in the position in which said prong is exteriorly of and above said closure element, and a releasable catch member normally engaging said means and operable upon

release to permit actuation of said propelling means to project the prong of said plunger into said frangible closure element to fracture same.

2. In an alarm and warning device, a rigid casing, a container of gas under pressure mounted in said casing, said container being provided with a neck, a frangible closure element closing said neck, a vertical conduit member surrounding said neck and having the lower end secured to said neck and having the upper end spaced above said neck, a vertically disposed plunger having a prong projecting from the lower end positioned within said conduit member so that the prong is exteriorly of and above said frangible closure element with the portion adjacent the upper end projecting freely out of the upper end of said conduit member, propelling means operatively connected to said plunger for moving the plunger downwardly and project the prong through said frangible colsure element with sufficient force to fracture same and release the gas in said container, a horizontally disposed yoke member slidably carried by said casing and operatively connected to the projecting upper end portion of said plunger for holding the plunger in the position in which said prong is exteriorly of and above said closure element, and a releasable catch member normally engaging said yoke member and operable upon release to permit actuation of said propelling means to project the prong of said plunger into said frangible closure element to fracture same.

3. In an alarm and warning device, a rigid casing, a container of gas under pressure mounted in said casing,

said container being provided with a neck, a frangible closure element closing said neck, a vertical conduit member surrounding said neck and having the lower end secured to said neck and having the upper end spaced above said neck, a vertically disposed plunger having a prong projecting from the lower end positioned within said conduit member so that the prong is exteriorly of and above said frangible closure element with the portion adjacent the upper end projecting freely out of the upper end of said conduit member, propelling means operatively connected to said plunger for moving the plunger downwardly and project the prong through said frangible closure element with sufficient force to fracture same and release the gas in said container, a horizontally disposed yoke member slidably carried by said casing and operatively connected to the projecting upper end portion of said plunger for holding the plunger in the position in which said prong is exteriorly of and above said closure element, spring means operatively connected to said yoke member for urging said yoke member to a releasing position with respect to said plunger, and a releasable catch member normally engaging said yoke member and operable upon release to permit actuation of said propelling means to project the prong of said plunger into said frangible closure element to fracture same.

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