Dec. 14, 1954 D. M. JACOBY 2,696,798

FIRE ALARM

Filed March 1, 1952

Fig. 1.

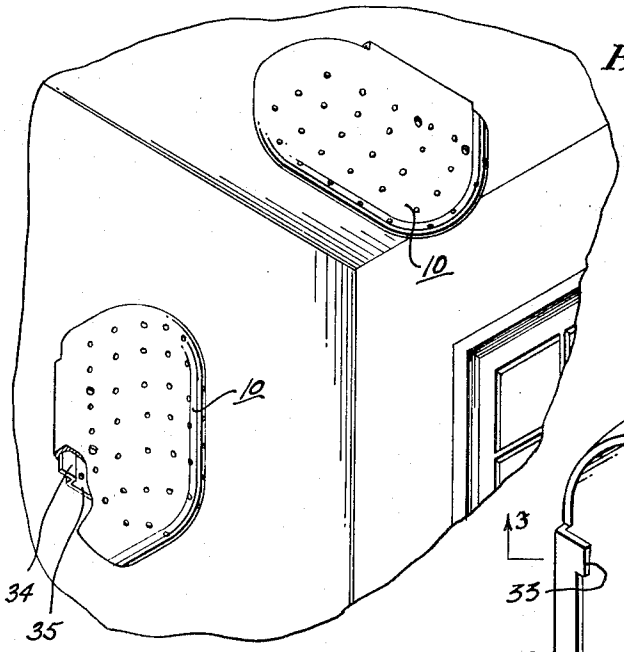
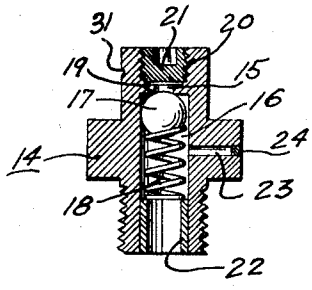


Fig. 5.



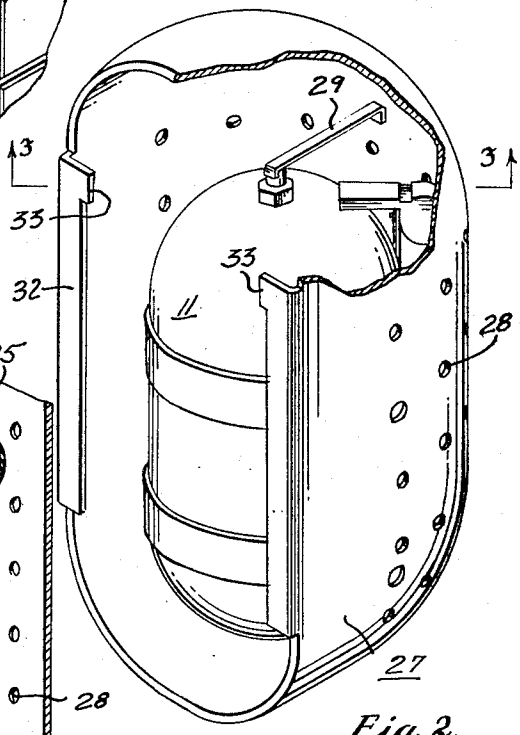
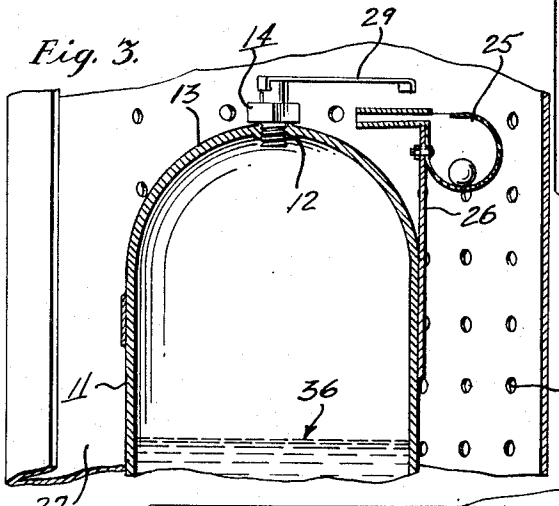


Fig. 2.

Fig. 3.



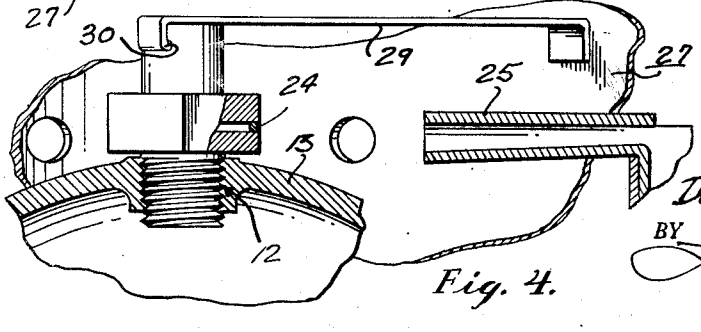


Fig. 4.

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FIRE ALARM

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4 Claims. (Cl. 116—106)

The present invention relates to audible alarms and particularly to fire alarms or heat-sensitive alarms.

An object of the present invention is to provide a self-contained fire alarm.

Another object of the present invention is to provide a unitary fire alarm constructed and arranged to emit an audible signal to indicate temperature-increase of the surrounding atmosphere.

Other objects will be apparent by reference to the appended specification, claims and drawings.

For the purpose of illustrating the invention, there is shown in the accompanying drawings one form thereof which is at present preferred, although it is to be understood that the various instrumentalities of which the invention consists can be variously arranged and organized and that the invention is not limited to the precise arrangements and organizations of the instrumentalities as herein shown and described.

In the drawings wherein like reference characters indicate like parts:

Figure 1 represents a perspective view of a room wherein two of the alarms of the present invention are operatively mounted; one on the wall and one on the ceiling.

Figure 2 represents a perspective view, partly in section, of an alarm which is one embodiment of the present invention.

Figure 3 represents a fragmentary vertical cross-sectional view taken generally on line 3—3 of Figure 2.

Figure 4 represents a fragmentary cross-sectional view, on an enlarged scale, of the discharge nozzle and juxtaposed whistle shown in Figure 3.

Figure 5 represents a vertical cross-sectional view of the valve-nozzle of the embodiment of the alarm shown in Figure 2.

The alarm **10** which is one embodiment of the present invention includes a vessel **11**, capable of withstanding excessive pressures from within, and having a threaded aperture **12** at one end **13** with a valve-nozzle **14** screw-threadedly secured, in an air-tight manner, in an aperture **12**.

The valve-nozzle **14** has a bore **15** and a counter-bore **16** and a ball-check in the counter-bore **16**; said ball-check including the ball **17** urged by the spring **18** against the seat **19** surrounding the bore **15**. On the opposite side of the seat **19** from the ball **17** is a threaded counter-bore **20** in which a plug or cap **21** may be secured. A sleeve **22** is press-fitted at the outer end of the counter-bore **16** to retain the spring **18** and ball **17** in the counter-bore **16**.

A transverse port **23** is formed in the valve-nozzle **14** at an angle to and intersecting the counter-bore **16** intermediate the ball **17** and the sleeve **22**.

The outer end of the port **23** is sealed with a fusible low-melting-point alloy (which may include bismuth, tin and/or cadmium and which may be of the type known as Belmont #140). This low-melting-point alloy forms a plug **24** at the outer end of the port **23** as long as the temperature surrounding said plug does not exceed a pre-determined amount, as, for instance, 140° F.

The nozzle-valve **14**, when secured to the threaded aperture **12**, provides means for filling the vessel **11**. The plug **21** is removed from the threaded counter-bore **20** and a supply-conduit connected thereto and a gas under pressure is admitted through the valve **14** (depressing the ball **17** against the spring **18**). When the supply-conduit is disconnected from the threaded counter-bore **20**, the gas, under pressure, is retained within the vessel **11** because the ball **17** seats securely against the valve-seat **19**. In addition, the plug **21** may be sealed in the counterbore **20** to prevent accidental leakage of the gas from the vessel **11**.

It is preferred that the vessel be filled with an easily liquifiable non-inflammable gas, such as dichlorodifluoromethane (Freon) or ammonia or sulfur dioxide or the like. When the vessel **11** is charged with the gas, under pressure, the gas liquifies and decreases in volume. It is desirable to limit the fluid-volume of the vessel-contents to 35% to 50% of the vessel-volume so that the fluid-surface **36** will not reach the nozzle **14** when the alarm is mounted in a horizontal position. When the plug **24** melts the vessel contents expand, as a gas, through the port **23** and the discharge of the gas through the port **23** continues for a relatively long period of time.

An audible sounding device such as the whistle **25** is operatively secured adjacent the vessel **11**, as by the support **26**, in alignment with the port **23** of the nozzle **14** so a gaseous discharge from the port **23** is directed toward and against the whistle **25** to operate said whistle. It is to be understood that the sounding device need not be a whistle but may be an air horn or the like and, moreover, it is not necessary that the audible signaling means be supported in spaced relationship to the discharge end of the port **23** but may, if desired, be directly connected thereto.

The operatively interconnected vessel, nozzle and signaling means may be suitably supported within and concealed by a heat-collector or heat-absorbing shield **27**—said shield having a plurality of vents or apertures **28** to permit air-circulation within said shield. In addition, a heat-conductor or bar **29** may be operatively secured intermediate the shield **27** and the nozzle **14**—said conductor having a finger-like end **30** for engagement within a groove **31** in the nozzle **14** whereby to hold the conductor **29** in intimate contact with the nozzle **14** so as to conduct heat from said shield **27** to the nozzle **14** and to the fusible plug **24** therein so that the nozzle **14** and the shield **27** will, at all times, be at the same temperature, and so that any rise in temperature in the vicinity of the alarm or any rise in temperature impinging upon the shield **27** either by contact with the surrounding air or by radiation, which therefore raises the temperature of the shield, will be quickly conveyed to the fusible-plug **24**.

The shield **27** may include a pair of in-turned flanges **32** having stop-members **33** at one end; said flanges being constructed and arranged to engage the shoulder portions **34** of a mounting plate **35**. The mounting plate **35** may be mounted on any convenient or suitable surface such as a wall or ceiling or the like whereupon the vessel-containing shield **27** may be secured to the mounting plate **35** by sliding the flanges **32** behind the shoulders **34** until the stop-members **33** engage the ends of the shoulders **34**.

The operation of the invention is as follows. After the alarm has been suitably mounted, as illustrated in Figure 1, it will remain inoperative as long as the temperature of the surrounding atmosphere (or surface) does not exceed the temperature at which the plug **24** fuses, as, for instance, 140° F. When the temperature of the surrounding atmosphere or surfaces reaches or exceeds 140° F. the heat will be transmitted through the heat-absorbing or heat-collecting shield **27** and conductor **29** to the nozzle **14** and plug **24** whereupon the plug will melt and the port **23** will be opened. Thereupon the gas in the vessel **11** will be discharged through the port **23** against the sounding means (whistle **25**) whereby to cause an audible signal and warn of the increase of temperature of the surrounding atmosphere and/or surfaces. The sounding of the alarm will continue for a period long enough to attract attention thereto as, for instance, five minutes.

After the alarm has once been operated and the gas within the vessel **11** discharged, the alarm may be used over and over again merely by removing the shield **27** and vessel **11** from the mounting bracket **35**, removing the vessel **11** from the shield **27**, re-plugging the port **23** with more fusible alloy, and recharging the vessel through the valve **14**.

The present invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof, and it is therefore desired that the present embodiment be considered in all respects as illustrative and not restrictive, reference being had to the appended claims rather than to the foregoing description to indicate the scope of the invention.

What is claimed as new and desired to be protected by Letters Patent is the following:

1. A unitary fire alarm including a closed vessel containing easily-liquifiable non-inflammable gas under pressure, a nozzle-valve in said vessel and a discharge-port in said nozzle-valve, said discharge port being substantially smaller than said vessel, a fusible plug in said discharge-port and signaling means in operative juxtaposition to said port.

2. A unitary fire alarm including a closed vessel containing easily-liquifiable non-inflammable gas under pressure, an aperture at one end of said vessel, said aperture being substantially smaller than said vessel, a fusible plug in said aperture and signaling means in operative juxtaposition to said aperture, and a cover for said vessel and said signaling means.

3. A unitary fire alarm including a closed vessel containing easily-liquifiable non-inflammable gas under pressure, an aperture at one end of said vessel, said aperture being substantially smaller than said vessel, a fusible plug in said aperture and signaling means in operative juxtaposition to said aperture, and a cover for said vessel and said signaling means, with a heat-conductor operatively interconnecting said cover and said plug.

4. A unitary fire alarm including a closed vessel containing easily-liquifiable non-inflammable gas under pressure, a heat-absorbing shield therefor, an aperture at one end of said vessel, said aperture being substantially smaller than said vessel, a fusible plug in said aperture, signaling means in operative juxtaposition to said aperture, and heat-conducting means operatively connecting said heat-absorbing shield and said fusible plug.

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