Sept. 27, 1960 W. P. GOULD 2,954,548

FIRE ALARM

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FIG. 1

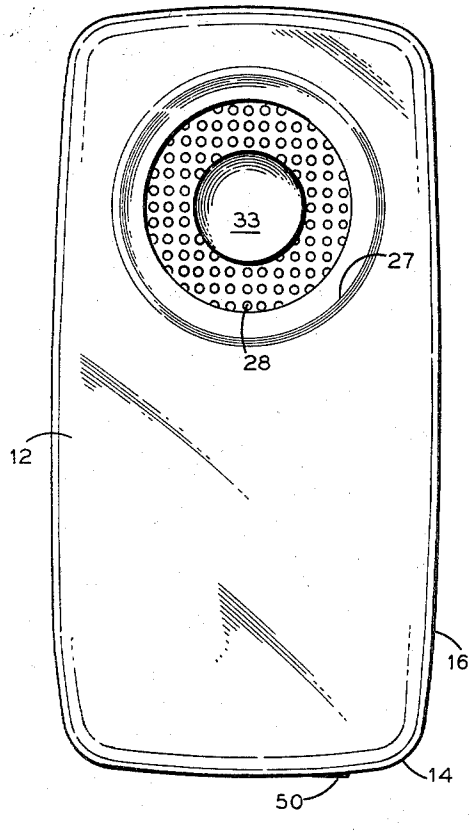


FIG. 2

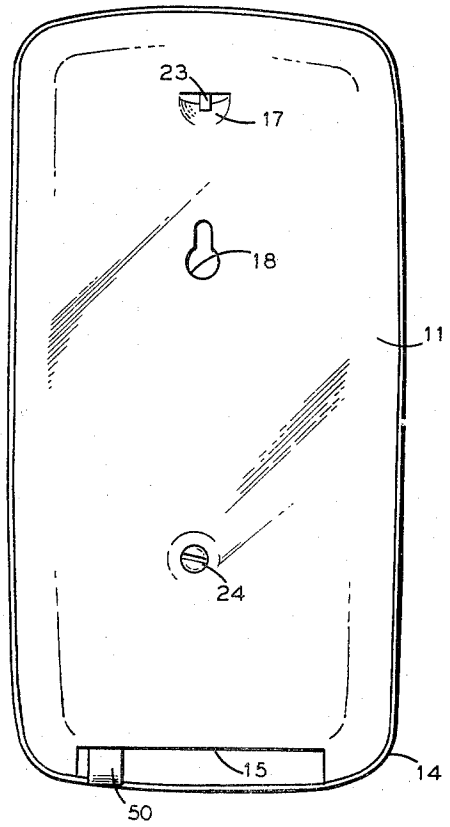
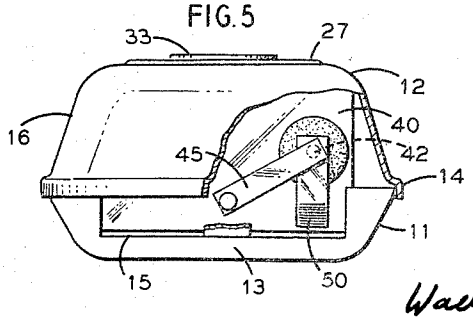


FIG. 5



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FIG. 3

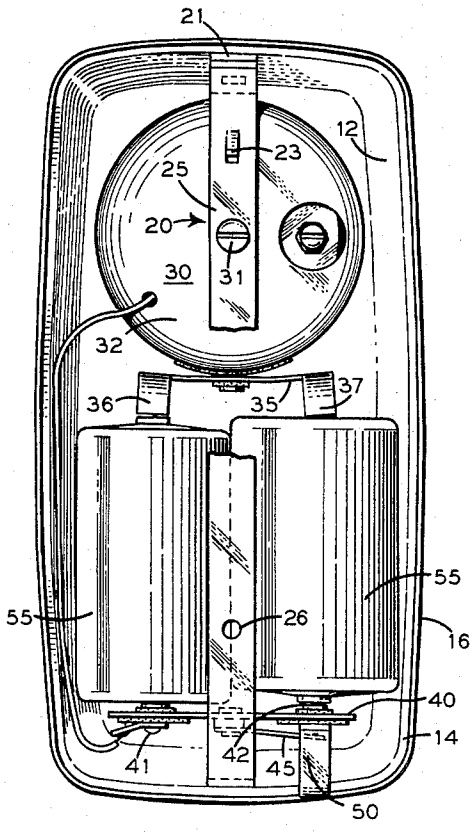
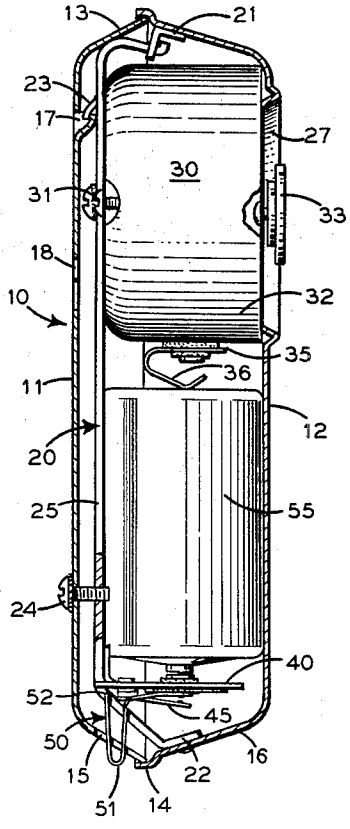


FIG. 4



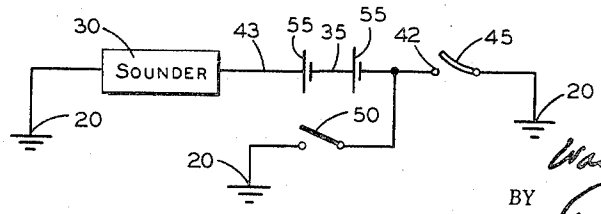


FIG. 6

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FIRE ALARM

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2 Claims. (Cl. 340—227)

This invention relates to automatic fire alarms and, more particularly to a novel compact and self-contained automatic electric fire alarm including novel manually operable testing means.

Many factories, warehouses, institutions and the like buildings are equipped with automatic fire alarm systems including detector devices at strategic locations operable to activate an alarm upon a predetermined rise in the ambient temperature at any location. Such systems, while effective in their functioning, are relatively expensive to install, particularly where the detectors are to be positioned at a number of locations.

This expense of installation of such systems has prevented their being used for smaller buildings, such as private homes, where it would be desirable to have detector and alarm devices at such locations as adjacent furnaces and kitchen ranges, for example. To remedy this condition, it has been proposed to provide individual detector and alarm units for each location. However, such units as have been proposed hitherto have not found wide acceptance for numerous reasons such as cost of the unit, difficulty of installation, unreliability when left unattended, and lack of simple means for periodically testing the operability of the unit.

More specifically, the unit comprises a two-part housing of metal or other suitable rigid and preferably resonant material. The two parts of the housing are constituted by a relatively shallow dished base and a relatively deeper dished cover, these elements having mating rim portions. The cover contains a metal grounding frame secured therein and including a vertically extending member projecting somewhat beyond the rim of the cover. This member is formed to hook into the base adjacent one end of the latter and to receive a single attaching screw securing the base, adjacent its opposite end, to the member. The base is formed with a keyhole slot whereby the assembled unit may be readily hung on a headed screw or nail secured in a wall or other vertical surface.

An electrical sounder, such as a bell or buzzer, is secured to the vertical frame member near the upper end of the latter and has one terminal grounded to the frame. A resilient double contact bridge conductor member is secured in insulated relation to the sounder to extend transversely on either side of the frame member intermediate the height of the latter. The frame includes a resilient metal cross member extending transversely thereof adjacent its lower end and carrying a pair of contacts each secured in insulated relation through an end of the cross member.

One contact is electrically connected to the other terminal of the sounder. The other contact has secured thereto a metal spring arm having a free bent end normally spaced from the frame but engageable therewith by manual pressure. The bight of the bent end projects through an opening in the lower rim of the base, this opening providing for circulation of air into the unit and out through perforations in the cover adjacent the sounder.

The fire detector comprises a thermostatically deflectable arm secured to the frame and having a free end extending in slightly spaced relation to such other contact. The unit is completed by a pair of flashlight cells mounted, in reversed relation, between each contact and the double contact bridge conductor so as to be in series circuit relation between the ungrounded terminal of the sounder and the contact engageable by the detector arm.

With the foregoing arrangement, when the temperature of the ambient air equals or exceeds a pre-set value, the thermostatic detector arm bends to engage its associated contact to complete an energizing circuit for the sounder, whose sound volume is augmented by the resonant housing. To test the unit it is only necessary to press the bent end of the "test button" to engage the frame to complete a parallel energizing circuit for the sounder.

For an understanding of the invention principles, reference is made to the following description of the typical embodiment thereof as illustrated in the accompanying drawing. In the drawing:

Figure 1 is a front elevation view of the sounder;

Fig. 2 is a rear elevation view thereof;

Fig. 3 is a rear elevation view of the cover with the base removed;

Fig. 4 is a transverse vertical sectional view of the unit;

Fig. 5 is a bottom plan view of the unit, partly broken away; and

Fig. 6 is a schematic wiring diagram of the unit.

Referring to Figs. 1–5, the unit **10** includes a simple attractive housing comprising a base **11** and a cover **12**.

Base **11** is a relatively shallow, generally rectangular member, of metal or other resonant, relatively rigid material, having a peripheral rim **13** formed with an elongated transverse aperture **15** in its lower end. Rim **13** is arranged to seat in an overlapping offset **14** in the relatively deeper rim **16** of cover **12**. For a purpose to be described, base **11** has a lip **17** struck inwardly near its upper end, is formed with a keyhole slot **18** below lip **17**, and has a central aperture near its lower end.

Cover **12** has secured therein a metal grounding and support frame **20**. Frame **20** includes a central vertical strip **25** projecting beyond offset **14** and into base **11**. The upper end of member **25** is hooked into an angle bracket **21** secured inside the upper wall of rim **16**, and the lower end of member **25** is rivetted to the lower wall of rim **16** as at **22**. Near its upper end, member **25** has an outstruck tongue **23** engageable by lip **17** of base **11**. The base is secured in position by a screw **24** threaded into an aperture **26** in member **25**.

An electric sounder, shown as a bell or buzzer **30**, is secured to the upper end of member **25** as by a screw **31** attaching its resonator **32** to the member and acting as a grounding connection for one terminal of the sounder to grounding frame **20**. A circular rimmed depression **27** is formed in cover **12** adjacent and coaxial with resonator **32**, and an annular series of apertures **28** are

formed around an ornamental button 33 projecting from the center of depression 27.

A resilient bridging conductor member 35 is secured centrally, in insulated relation, to resonator 32 to extend transversely to either side of member 25. Conductor 35 has spring contacts or terminals 36, 37 on either end. A T-shaped grounding strip 40 has its bent stem electrically and mechanically secured to member 25 adjacent the lower end of the latter, to form part of grounding frame 20. A pair of contacts 41, 42 project through either end of strip 40 in insulated relation thereto, and a conductor 43 connects contact 41 to the ungrounded terminal of sounder 30.

A thermostatic detector strip 45 is electrically and mechanically secured to the central part of strip 40 and its free end extends in spaced aligned relation to the lower end of contact 42. This contact has secured thereto a "test button" comprising a conductive strip 50 having a bent end 51 whose bight projects downwardly through opening 15. The end 52 of strip 50 is normally spaced slightly from grounding strip 40.

To complete the assembly, a pair of flashlight dry cells 55 are snapped between strips 35 and 40, so that one cell engages contacts 36 and 41 and the other cell engages contacts 37 and 42. The cells are reversely positioned so as to be connected in series through member 35.

Unit 10 operates as follows: Ambient air circulates through opening 15 and apertures 28 and, should the ambient temperature equal or exceed a pre-set value, strip 45 deflects to engage contact 42. This completes an energizing circuit for sounder 30 as will be clear from Fig. 5. The sound output of the sounder is augmented by the resonant housing 11—12. To test the sounder, "button" 50 is depressed to ground its free end 52 against grounding strip 40 to complete an energizing circuit for sounder 30, "button" 50 being in shunt with detector strip 45.

The unit is attractive in appearance, easily mounted by engaging keyhole slot 18 with a headed fastener, self-contained and internally energized, and reliable in operation.

While a specific embodiment of the invention has been shown and described in detail to illustrate the application of the invention principles, it will be understood that the invention may be embodied otherwise without departing from such principles.

What is claimed is:

1. A self-contained fire detector and alarm unit comprising, in combination, a housing including a relatively shallow and elongated dished metal base constructed and arranged for mounting on a substantially upright surface, and a relatively deep and elongated dished metal cover having side and end walls, the base and the cover having mating peripheral rims arranged to be engaged to complete the housing; a first relatively elongated conductive metal ground strip extending longitudinally of said cover and having its ends secured to the opposite end walls of the cover; an electric sounder, including a metal resonator constituting one terminal of the sounder and electrically and mechanically connected to said ground strip adjacent one end of the latter; a relatively elongated electrically conductive spring metal bridge member secured centrally and in electrically insulated relation to said resonator and extending to either side of said first ground strip, said bridge member being formed with spring contacts extending from each end thereof and bent to extend in spaced relation to the main portion of said bridge member, and said spring contacts extending away from said resonator; a second electrically conductive spring metal ground strip electrically and mechanically secured in integral relation to said first ground strip adjacent the opposite end thereof, said second ground strip being substantialy normal to said first ground strip and projecting laterally to either side

thereof; a pair of contact members each extending through a respective end of said second ground strip and electrically insulated therefrom, each of said contact members being substantially longitudinally aligned with a respective one of said spring contacts; a conductor connecting the other terminal of said electric sounder to one of said contact members; a relatively elongated thermostatic metal strip electrically and mechanically secured at one end to said second ground strip and having its free end extending across and normally in spaced relation to the other contact member on the side of said second ground strip toward said opposite end of said first ground strip; said thermostatic strip deflecting, upon a predetermined increase in the ambient temperature, to engage said other contact member to ground the latter; each spring contact and the contact member aligned therewith being arranged to have an electric cell snapped therebetween and resiliently held in position by virtue of the resiliency of the spring contact, of the conductive bridge, and of the second ground strip, the electric cells being arranged in relatively reversed position so as to be connected in series by said conductive bridge; whereby, upon deflection of said thermostatic strip to engage said other contact member, said electric sounder will be energized; and a test contact spring of electrically conductive metal secured electrically and mechanically at one end to said other contact member and having a reversely bent free end including a bight projecting through an opening in said housing and a free end edge normally spaced from said second ground strip; whereby, upon pressing inwardly on said bight, said other contact member is grounded to energize said electric sounder to test the operability of said unit.

2. A self-contained fire detector and alarm unit comprising, in combination, a housing including a relatively shallow and elongated dished metal base constructed and arranged for mounting on a substantially upright surface, and a relatively deep and elongated dished metal cover having side and end walls, the base and the cover having mating peripheral rims arranged to be engaged to complete the housing; a first relatively elongated conductive metal ground strip extending longitudinally of said cover and having its ends secured to the opposite end walls of the cover; an electric sounder, including a metal resonator constituting one terminal of the sounder and electrically and mechanically connected to said ground strip adjacent one end of the latter; a relatively elongated electrically conductive spring metal bridge member secured centrally and in electrically insulated relation to said resonator and extending to either side of said first ground strip, said bridge member being formed with spring contacts extending from each end thereof and bent to extend in spaced relation to the main portion of said bridge member, and said spring contacts extending away from said resonator; a second electrically conductive spring metal ground strip electrically and mechanically secured in integral relation to said first ground strip adjacent the opposite end thereof, said second ground strip being substantially normal to said first ground strip and projecting laterally to either side thereof; a pair of contact members each extending through a respective end of said second ground strip and electrically insulated therefrom, each of said contact members being substantially longitudinally aligned with a respective one of said spring contacts; a conductor connecting the other terminal of said electric sounder to one of said contact members; a relatively elongated thermostatic metal strip electrically and mechanically secured at one end to said second ground strip and having its free end extending across and normally in spaced relation to the other contact member on the side of said second ground strip toward said opposite end of said first ground strip; said thermostatic strip deflecting, upon a predetermined increase in the ambient temperature,

to engage said other contact member to ground the latter; each spring contact and the contact member aligned therewith being arranged to have an electric cell snapped therebetween and resiliently held in position by virtue of the resiliency of the spring contact, of the conductive bridge, and of the second ground strip, the electric cells being arranged in relatively reversed position so as to be connected in series by said conductive bridge; whereby, upon deflection of said thermostatic strip to engage said other contact member, said electric sounder will be energized; said first ground strip having bent ends secured to said cover and a central portion projecting

beyond the peripheral margin of said cover; and interengageable means on said central portion and on said base arranged to interconnect said cover and said base.

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