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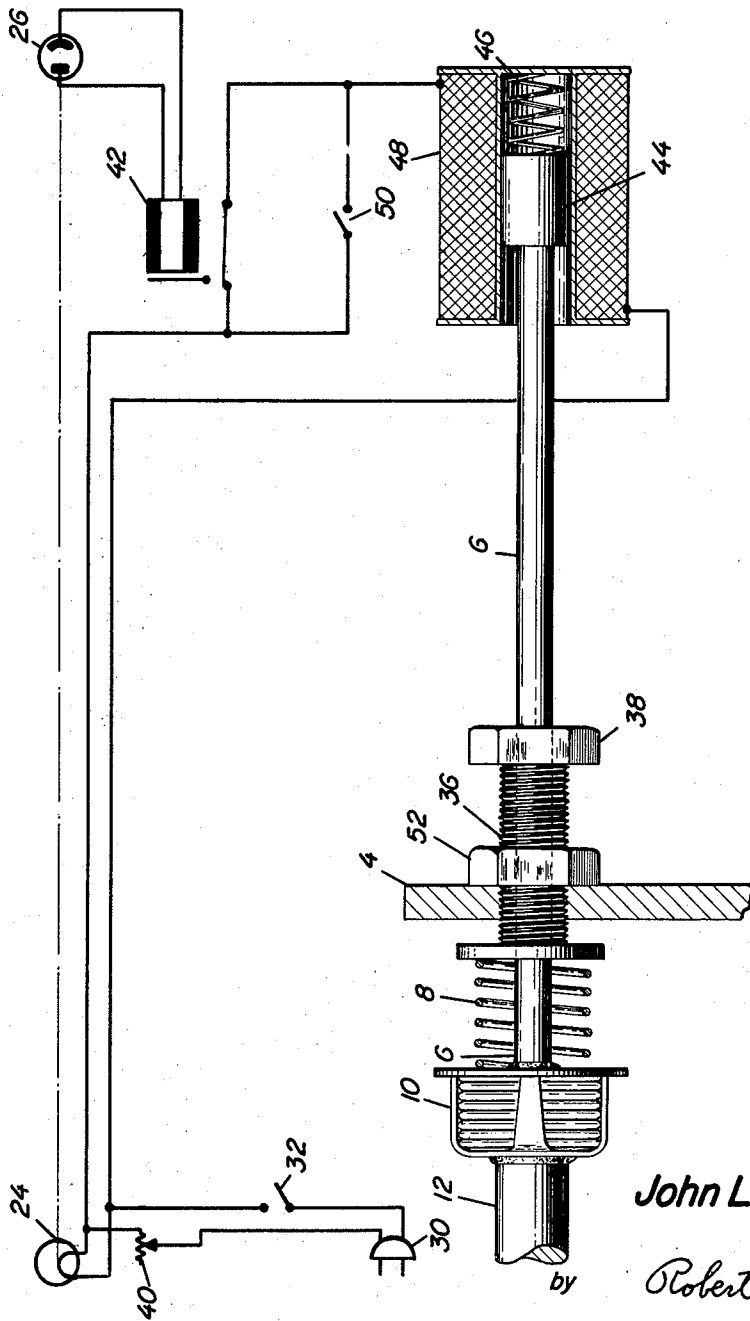
J. L. JENSEN

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COMBINED SMOKE AND FIRE ALARM

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2 Sheets-Sheet 2



INVENTOR  
John L. Jensen  
by Robert W. Geib, Jr.  
ATTORNEY

This invention relates to fire alarms, and more particularly to a novel one which renders an alarm when in the presence of smoke and/or excessive heat.

It is among the objects of the present invention to provide an improved fire alarm which is highly efficient in operation, durable in service, and simple and inexpensive to manufacture.

Another object is the attainment of the foregoing advantages in an apparatus which is small in size and light in weight, whereby it is rendered easily portable.

Still another object is the provision of an apparatus of the class described which is electrical and which may be powered by an ordinary household wiring circuit.

The invention, then, comprises the features hereinafter fully described and as particularly pointed out in the claims, the following description and the annexed drawing setting forth in detail certain illustrative embodiments of the invention, these being indicative of some of possibly several ways in which the principles of the invention may be employed.

In said drawing:

FIGURE 1 is a longitudinal elevational view, partly in section, of an apparatus constructed in accordance with the teachings of the invention; and

FIGURE 2 is an enlarged view of a portion of the elements shown in FIGURE 1 and illustrating more graphically the manner in which they cooperate.

Referring more particularly to the drawings, the numeral 2 generally designates a cabinet in which the operating instrumentalities of the apparatus of the invention may be fully housed, and, for example, may be composed of wood, metal, plastic, etc.

Disposed adjacent the middle of the floor of the housing or cabinet 2 is a vertical standard or support 4 through which there extends a horizontal push rod 6. As will be seen from the drawing, a compression spring 8 is disposed around the push rod 6 and immediately adjacent one side of the vertical standard or support 4, i.e., the left-hand side as viewed in FIGURE 1. The corresponding end of the horizontal push rod 6 projects very slightly beyond the compression spring 8 and is attached (as by welding, brazing, etc.) to the center of one of the end walls of a thermostatic bellows 10. A horizontal shaft 12 is similarly attached to the center of the other end wall of the thermostatic bellows 10.

Adjacent the outer end of the reciprocable shaft 12 is an aerosol operated horn 14 of the type which is widely used in connection with small pleasure boats.

This horn 14 is rendered operative by the downward movement of a lever 16 which releases the gas or aerosol into the noise-making portion of the horn (or whistle, etc.).

A suitable linkage, which may include a bellcrank lever 18, connects the outer end of the reciprocable shaft 12 with the gas or aerosol releasing lever 16.

Referring to the right-hand side of the cabinet or housing 2 (as viewed in the drawing), there is a solenoid 20 which is supported by the adjacent wall of the cabinet in axial alignment with the horizontal shaft 12.

The outer end of the operating shaft 22 of the solenoid 20 is suitably connected to the adjacent end of the push rod 6, whereby the movement of the said operating shaft 22 will, through the medium of the instrumentalities previously described, push the lever 16 downwardly and

thereby release the gas or aerosol and cause the whistle or horn to operate.

The compression spring 8 influences the thermostatic bellows and the reciprocable shaft 12 to the left (as viewed in the drawing), thereby taking up all of the lost motion and bucking to a slight extent the outward movement of the operating shaft 22 of the solenoid 20. The solenoid 20 may acceptably be of the well-known type which is characterized by having its operating shaft resiliently influenced inwardly and to thrust said shaft outwardly upon being magnetically actuated.

Referring still to the drawing, at the upper left-hand corner of the cabinet or housing 2 there is a photoelectric cell master unit, as indicated at 24. Upon the opposite wall of the cabinet there is mounted a photoelectric receiving eye 26 which is in axial alignment with the beam which is cast by the master unit 24.

Suitable electrical circuitry, including a relay 28, operatively connects the photoelectric cell master unit 24, photoelectric receiving eye 26, and relay 28 with solenoid 20.

As shown, the circuit also includes an electrical cord and plug-in 30, as well as a cut-off switch 32 for such times as it is desired to render the apparatus temporarily inoperative.

According to the foregoing construction and arrangement, excessive heat will cause the thermostatic bellows to expand and carry with it the reciprocable shaft 12 in such manner as to operate the lever 16 which releases the gas or aerosol; and the same objective will be attained by the interruption of the light-beam which is cast upon the photoelectric receiving eye 26 by the master unit 24.

Suitable holes or apertures 34 are provided in the cabinet or housing 2 for enabling the movement thereof of smoke or highly heated atmospheric air.

In FIGURE 2 of the drawings there is illustrated a modified form of the invention which comprises an adjustment for the loading of the spring 8, together with a solenoid possessing an armature which is magnetically held in stationary relationship and spring-actuated to cause the push rod 6, reciprocable shaft 12 etc. to energize the alarm.

As shown in FIGURE 2, the push rod 6 and the reciprocable shaft 12 are (as shown in FIGURE 1) welded to the end-walls of the thermostatic bellows 8. However, the push rod 6 extends through and projects from an externally screw-threaded ferrule 36 which extends through and screw-threadedly engages an aperture in the vertical standard or support 4. The end of the ferrule 36 which is remote from the thermostatic bellows 8 carries an adjusting nut 38. A conventional washer is disposed between the other end of the externally screw-threaded ferrule 36 and the adjacent end wall of the thermostatic bellows 8.

In FIGURE 2, the circuit operated by the photoelectric receiving eye 26 is shown as including a relay 42 which operates a switch 50 to maintain the energization of the field of the solenoid 48. Smoke issuing between the master unit 24 and photoelectric receiving eye 26 will, of course, result in the dropping-out of the relay 42 and the opening of the switch 50.

Nicety of adjustment of the externally screw-threaded ferrule 36 is attained through the hexagonal adjusting nut 38 and the relationship maintained by a lock nut 52.

The teachings of the present invention contemplate the substitution of a hand-wound bell alarm, or any conventional mechanical alarm in lieu of the aerosol type marine horn 14.

In addition, numerous refinements may be added, such as a simple holding lever (not shown) for retracting the bell-crank lever 18 into its at-rest position in case of a

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power failure, or if for any other reason the alarm is unintentionally actuated.

While I have shown and described certain specific embodiments of the present invention, it will be readily understood by those skilled in the art that I do not wish to be limited exactly thereto, since various modifications may be made without departing from the scope of the invention as defined in the appended claims.

I claim:

1. A fire and smoke alarm comprising, in combination, an alarm device; an actuating member for said alarm device; a reciprocable shaft connected to said actuating member; a push rod; a heat-responsive element disposed

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between, and operatively connected to, said reciprocable shaft and said push rod; a solenoid including an operating shaft adapted to move said push rod toward said heat-expansive member and said reciprocable shaft; light-sensitive smoke detecting means; and means actuated by said smoke detecting means for controlling said solenoid.

2. The fire and smoke alarm of claim 1 wherein said heat-responsive element is a thermostatic bellows.

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