

(No Model.)

F. H. BOLTE  
AUTOMATIC FIRE ALARM.

No. 506,096.

Patented Oct. 3, 1893.

Fig. 1.

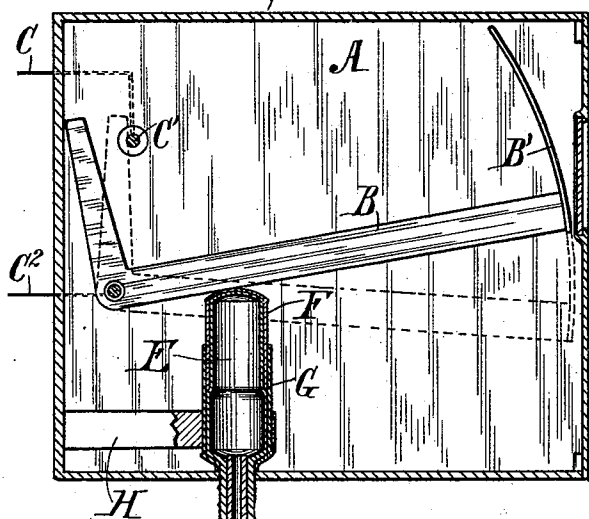


Fig. 2.

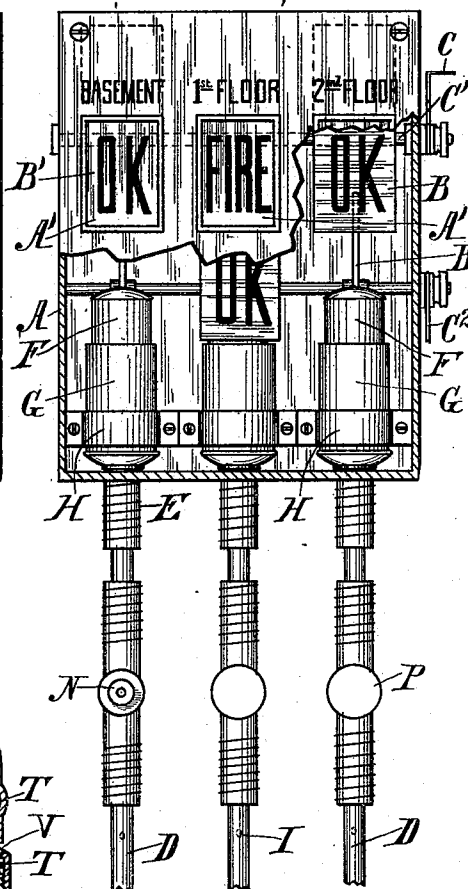
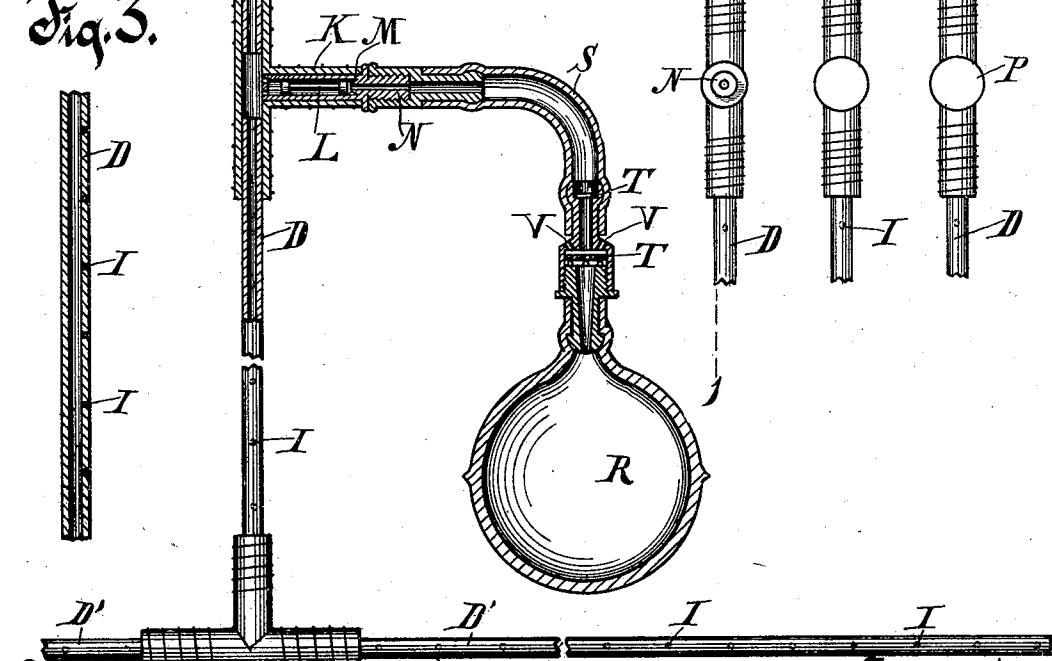


Fig. 3.



Witnesses.

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# UNITED STATES PATENT OFFICE.

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## AUTOMATIC FIRE-ALARM.

SPECIFICATION forming part of Letters Patent No. 506,096, dated October 3, 1893.

Application filed January 24, 1893. Serial No. 459,544. (No model.)

*To all whom it may concern:*

Be it known that I, FRANK H. BOLTE, of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented a new and useful Improvement in Automatic Fire-Alarms, of which the following is a description, reference being had to the accompanying drawings, which are a part of this specification.

There are automatic fire alarms in use in many buildings but most of these are objectionable in several respects, among which objectionable features are, that they are expensive of construction, that the heat actuated devices are located at considerable distances apart and are therefore not quickly actuated except by fire in close vicinity, and that the apparatus is liable to break or get out of order without disclosing its non-active condition except by inspection made with care and direct reference thereto. In my improved device these objections are obviated by a construction of parts that adapts it to be operated quickly by heat existing almost in any part of a room in which the heat actuated portion of the apparatus is located, and that at once discloses the fact of the operative mechanism being out of order, and that has the merit of being comparatively inexpensive of construction and adapted to be readily attached to a building and kept in working order.

A leading feature of my device is pneumatic pressure, the apparatus being kept in working order under and by action of compressed air.

Figure 1, is a vertical plan of the interior of an annunciator forming a part of my apparatus, in connection with fragments of the air pipe, air pump for compressing air, and air-actuated piston or telescoping device partly in section, making up the principal features of my improved apparatus. Fig. 2, is a front elevation of the annunciator shown in Fig. 1 in connection with fragments of the air pipes and the pistons or telescoping devices used in connection therewith, a portion of the annunciator box being broken away to show interior construction. Fig. 3, is a fragment of the air pipe in longitudinal central section.

In the drawings, A, is an annunciator box of suitable size and form, in and on which to mount operative mechanism. The front of this box is provided with apertures A', glazed or open, through which can be seen the face of the index. Above these apertures the words "Basement," "1st floor," "2nd floor" appear, which indicate that the indexes immediately behind these words respectively are connected with pipes in my apparatus leading to the several parts of the building indicated. There may be as many indexes and corresponding apertures in the box, as there are stories to the building or rooms in the building to which separate pipes are run. An index arm B pivoted to the annunciator box carries on its free end a face plate B' on which are provided suitable characters, letters or words, preferably the word "Fire" to indicate when it comes opposite to an aperture A', that there is fire or excessive heat in the part of the building indicated thereby. Also the letters "O K" are on the face plate in such position as when they come opposite the aperture A' to indicate that the apparatus is in normal condition. The letters "O K" on the face plate are below the word "Fire," the index being arranged to be held up by the pressure of the imprisoned compressed air in such position as to expose the letters "O K" opposite the aperture A', and when the lifting energy of the air is removed, to fall, showing the word "Fire" opposite the aperture. An electric circuit is also preferably used in connection with the annunciator, in which electric circuit is the insulated wire C terminating in the insulated post or cross bar C', in the annunciator box. The electric circuit includes a primary battery and a gong of such form as are in common use, and which it is not deemed necessary to show in the drawings or describe further as they form no part of my invention. The cross bar C', is located at any convenient place in the annunciator box to catch the index B, when it falls and limit its movement, and at the same time to ground the electric conductor C, either through the wire C', or through the annunciator box and its support by such means as is common in connection with electric devices.

For supporting the index arm B, in an elevated position, substantially as shown in Fig. 1, I use pneumatic pressure. For this purpose a pipe, conveniently a small lead pipe, D, leading from the annunciator box to a floor or room of the building, and closed at its farther extremity, is also closed at the annunciator box extremity by a flexible elastic bag or diaphragm E, which is secured air tight about the pipe D, and extends into a movable shell or hollow piston F. The shell or piston F is constructed of metal and fits loosely movably on or in a small hollow metal cylinder G, supported in a bracket H, fixed to the annunciator box. The hollow piston F, is closed at its upper extremity and is open at its lower end, and the diaphragm E fits in the piston, bearing when expanded, against the top of the piston and lifting it against the index arm B, which it carries upwardly with it, substantially to the position shown in Fig. 1.

The annunciator is usually located at the office in the building, or at such other place as is desired, where it can be readily seen by persons about, or in charge of the building. A second annunciator located on and actuated by the compressed air in a branch pipe may be located on the outside of the building if desired. From the annunciator the pipe D runs to any story or room of the building desired, and it may by branches D', D', if preferred extend to opposite or diverse parts of the room or building. The pipe is preferably located on the walls of a room, or story, near the ceiling and may run entirely around them if desired. The pipe is provided with a series of apertures I, closed by a solder that fuses at a comparatively low heat, as at a temperature of from 140° to 160° Fahrenheit. An alloy for a solder to thus close these apertures is readily made of bismuth, antimony, cadmium, tin and lead, which will fuse at the low heat suggested. In the small lead pipe which I recommend for this purpose, the apertures may readily be formed by a sewing machine needle.

It will be understood that air being forced into the pipe D under compression, say of ten or fifteen pounds, the diaphragm E will be expanded and will force the piston F upwardly sufficiently to raise and hold the index arm B, in the normally elevated position shown in Fig. 1; also that if any one or more of the apertures I, are opened by the fusing of the plugs therein, the air will at once escape, and the piston F and arm B will fall by gravity, exposing the word "Fire," to sight through the aperture A', and the falling of the arm B, will close the electric circuit, in those cases where the electric circuit is used, setting off the gong or such other signal as is employed therewith. The electric circuit may, if desired, be connected with the fire alarm service of a city, so as to give an alarm of fire to the fire department. Any accident that occurs to the apparatus whereby the air escapes from the pipe will result in giving

the alarm, and thereby call attention to the break or other imperfect condition of the apparatus. Air may be pumped into and compressed in the pipe by any suitable air pump. I have shown and use for this purpose, such a small rubber collapsible hand pump as is found in the market in combination atomizers and syringes, which is sufficient for this purpose. For attaching a pump to the pipe and charging it with air I provide a nipple K having a reciprocating valve L adapted to close outwardly against a seat M formed by a hollow screw threaded tip N, inserted in the nipple. A screw threaded cap P, closes the nipple when the pump is detached. The end of the valve L that seats itself against the tip N, is covered with soft rubber to accomplish a perfect closure of the orifice. The pump consists of the hollow rubber collapsible ball R, having a flexible neck S, suitable valves T T, and induction orifices V V. It is arranged to be attached removably to the nipple K, by means of the screw threaded tip N. The pump forms no invention.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. A fire alarm device, comprising a closed pipe preferably of lead adapted to hold compressed air to be extended into a room or rooms of a building, parts of which pipe are of material adapted to fuse at a lower degree of heat than lead fuses at and when so fused to allow the compressed air to escape from the pipe, and a piston connected with the pipe arranged to be forced in one direction by the compressed air, and while actuated by such compressed air to support a movable index and when no longer actuated by the air to withdraw rearwardly permitting the index to move from its supported position, substantially as described.

2. In an automatic fire alarm, the combination of a closed pipe preferably principally of lead adapted to hold compressed air and to be extended into a room or rooms of a building, which pipe is provided with a series of apertures, closed by material adapted to fuse at a lower degree of heat than that at which lead is fusible, and when so fused to allow the compressed air to escape from the pipe, a piston connected with the pipe and arranged to be forced in one direction by the air therein, an index arm bearing against and arranged to be actuated in one direction by the piston, and an index plate on the arm, which plate has characters thereon arranged to be exposed to sight in different relations to a fixed object as the index arm is moved, substantially as described.

3. In an automatic fire alarm, the combination of a metal pipe having a series of apertures, plugs composed of material fusible at an abnormal but lower heat than such as would fuse the pipe, inserted in and closing said apertures in the pipe, whereby the pipe is adapted in normal temperature to hold com-

pressed air, a flexible diaphragm covering and closing an extremity or aperture of the pipe and a movable elongated shell piston over the diaphragm adapted to be moved and supported in one direction by the distension of the diaphragm actuated by compressed air in the pipe and to automatically move in the other direction when the energy of the compressed air is discontinued, substantially as described.

4. In an automatic fire alarm, the combination with a closed pipe adapted to hold compressed air, of a flexible diaphragm secured to the pipe closing an aperture thereof and adapted to be distended by the compressed air and to retract on the escape of the compressed air from the pipe, a shell piston inclosing and actuated by the extension of the flexible diaphragm, a guide in or on which the shell telescopes, and an indicator sup-

ported by the piston, substantially as described.

5. The combination in an automatic fire alarm, with a pipe adapted to hold compressed air, and provided with a series of apertures closed by plugs fusible at a low degree of heat and a piston connected with the pipe and actuated in one direction by the compressed air, of a movable index arm bearing against and actuated by the piston, and a metal cross bar or contact point with which the index arm engages automatically when no longer actuated by the piston, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

FRANK H. BOLTE.

Witnesses:

C. T. BENEDICT,  
ANNA V. FAUST.