(No Model.) W. J. BAULIEU. 3 Sheets—Sheet 1.

AUTOMATIC FIRE ALARM.

No. 343,687. Patented June 15, 1886.

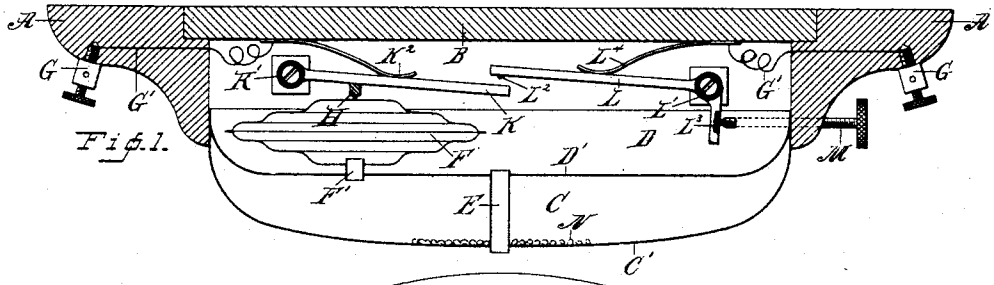


Fig. 1.

Fig. 2.

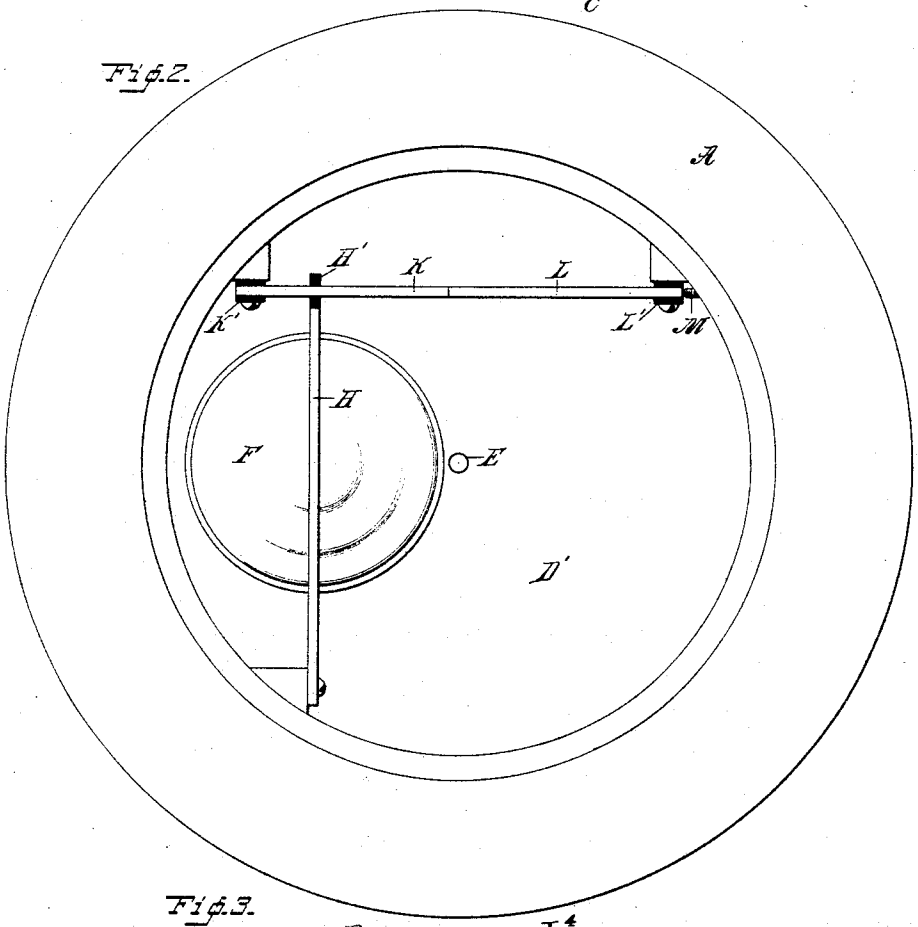
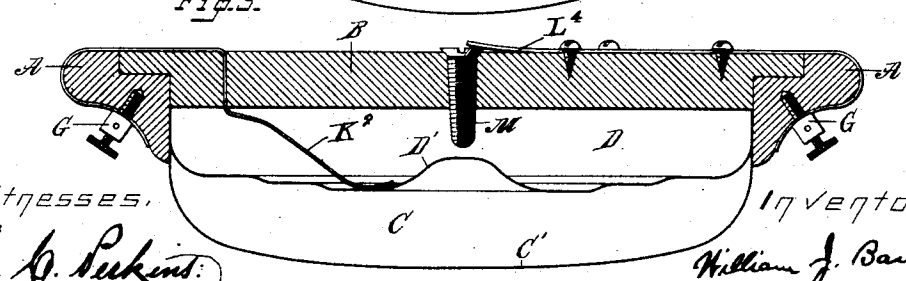


Fig. 3.



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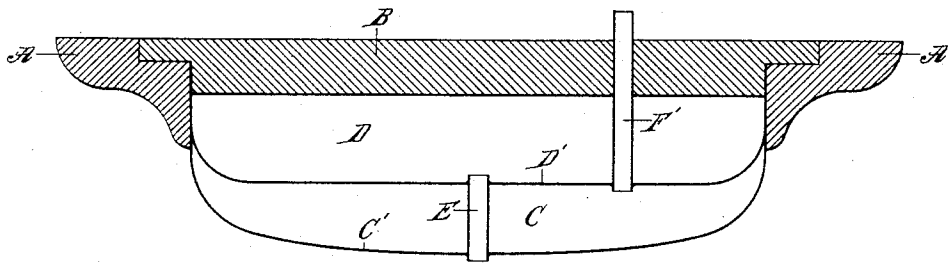
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Fig. 4.



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(No Model.) 3 Sheets—Sheet 3.

W. J. BAULIEU.

AUTOMATIC FIRE ALARM.

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Fig. 6.

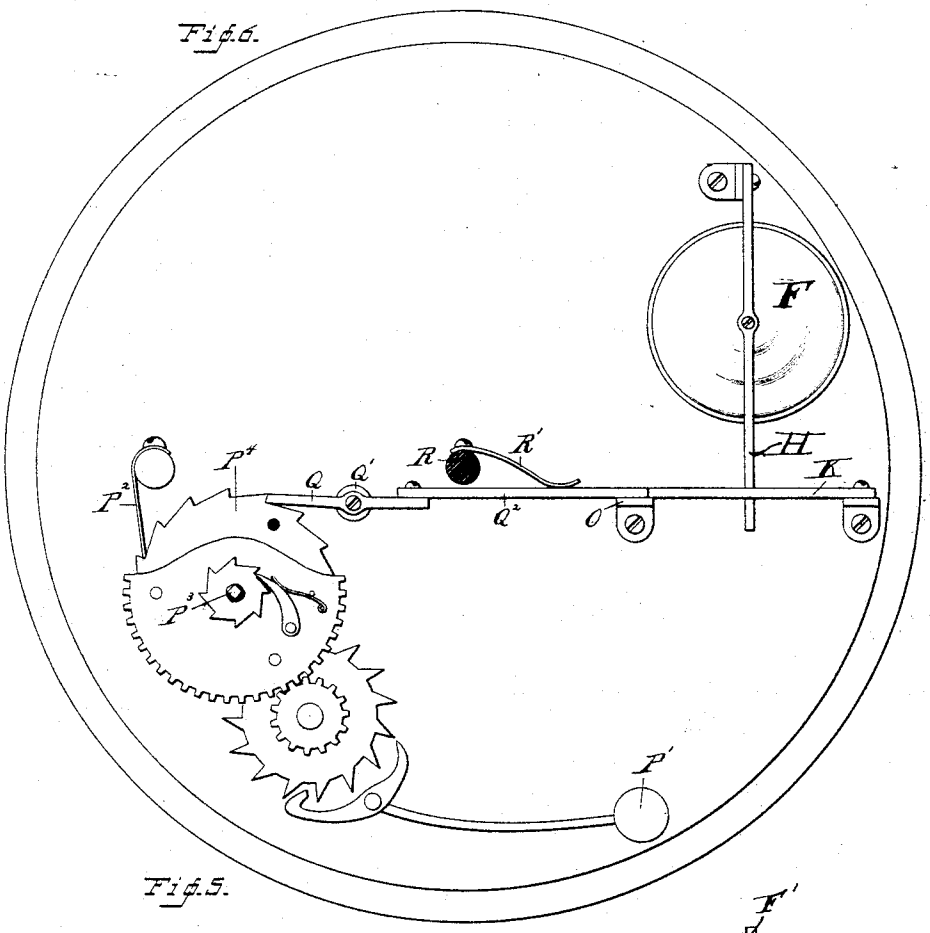
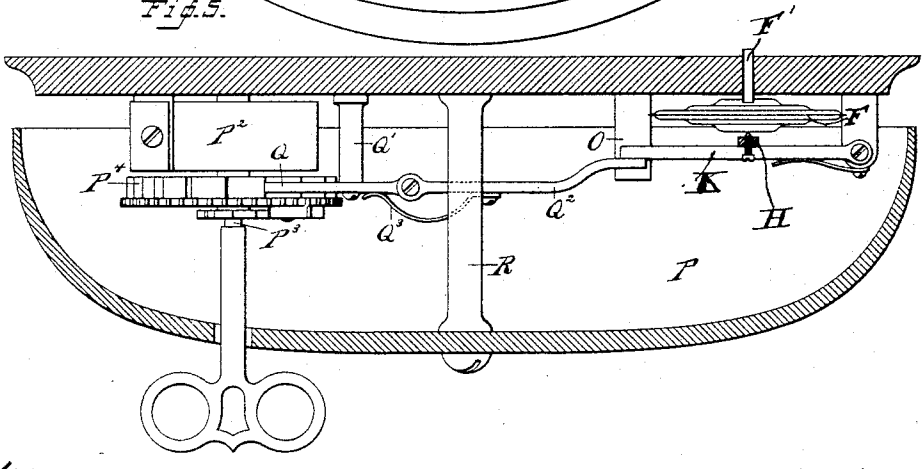


Fig. 5.



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UNITED STATES PATENT OFFICE.

WILLIAM J. BAULIEU, OF BRIDGEPORT, CONNECTICUT.

AUTOMATIC FIRE-ALARM.

SPECIFICATION forming part of Letters Patent No. 343,687, dated June 15, 1886.

Application filed November 23, 1885. Serial No. 183,820. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM J. BAULIEU, a citizen of the United States, residing at Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Automatic Fire-Alarms; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention has for its object to produce automatic mechanism for sounding an alarm when the temperature of a room shall be suddenly raised.

The gist of my invention lies in utilizing the increase in volume caused by the expansion of air or the vaporization of sulphuric ether or any equivalent chemical that will readily vaporize when the temperature of the room is raised above a certain degree, which may be regulated by adjustment. The device will work, if desired, without the use of any chemicals, the expansion of the air in the chamber being sufficient to operate it when the temperature of the room shall have been sufficiently raised. The use of ether or an equivalent chemical is preferred, however, as its action is quicker than that of air. In order to accomplish these results—to produce, in brief, an automatic alarm that shall be simple and economical in construction and practically impossible to get out of order—I have devised the novel construction, of which the following description, in connection with the accompanying drawings, is a specification, similar letters denoting the same parts in all the figures of the drawings.

Figure 1 is a central section illustrating one form of carrying my invention into practice. Fig. 2 is a plan view corresponding therewith; Fig. 3, a modified form of the construction illustrated in Fig. 1; Fig. 4, a section of the ether-chamber in another modified form; Fig. 5, a section of the remaining portion of the second modified form, and Fig. 6 an inverted plan view of the parts shown in Fig. 5, the gong being removed.

Turning now to Figs. 1 and 2, A represents the case, and B the cover therefor. The case may be attached to the wall in the horizontal position or at any desired angle, the cover lying next to the wall, or whatever article it may be attached to. C indicates an air-tight chamber, the outer wall, C′, of which is made of metal, and is curved away from the case, as clearly shown in Fig. 1; and D indicates another chamber separated from chamber C by wall D′. E is a tube leading into chamber D from the outside to admit external air, in order that the temperature in said chamber may be the same as that of the room. Within chamber D is an expansible bag, F, made of light elastic metal, and air-tight, except that it is connected with chamber C by means of a pipe, F′. G indicates binding-posts in the case which are connected with the positive and negative poles of a battery. (Not shown.) H represents a lever, which rests upon the bag, one end of said lever being pivoted to the case, and the other end insulated, as at H′, by the attachment of a piece of hard rubber or similar non-conducting substance. K is a lever pivoted to the case at a right angle to lever H, and insulated, as at K′. This lever is supported by lever H, but is only in contact with the insulated portion thereof. K^2 is a spring secured to the cover, which rests upon lever K, serving to hold it at its normal position, no matter in what position the case may be placed. A wire, G′, from one of the binding-posts connects with this spring. L is a bell-crank lever pivoted to the case opposite to lever K. The ends of these two levers lap by each other, but are not ordinarily in contact. Lever L is insulated, as at L′, and is ordinarily provided near its end with a contact-point, L^2. The lower arm of this lever is additionally insulated, as at L^3, by setting a piece of hard rubber, or any suitable piece of non-conducting substance, into the arm, as is indicated in Fig. 1. M is a set-screw, which passes through the case, and whose inner end bears against the insulated part of the downwardly-projecting arm, for the purpose of changing the adjustment of the lever, as will be more fully explained. L^4 is a spring secured to the cover similarly to spring K^2. A wire, G′, leading to the other binding-post, connects with this spring, the action of the spring being to hold lever L to its normal position. When thumb-screw M is turned in, it acts against the power of this spring.

As stated above, the gist of my invention

lies in utilizing the expansion of air, or the property possessed by certain chemicals, notably sulphuric ether, of vaporizing at a comparatively low temperature, thus greatly increasing their volume. As chamber C is made perfectly air-tight, a few drops of sulphuric ether, or any chemical that will readily vaporize, may be placed in said chamber in the manufacture of the device. I preferably, however, saturate kernels of rice in ether and place a few of the kernels in the bottom of the chamber, as indicated at N. In practice I have found two pennyweights of the saturated kernels to produce perfectly satisfactory results.

In Fig. 1 the parts are shown at their normal position—that is, the circuit is broken. The operation is as follows: The effect of a sudden increase of temperature in a room is to heat the outer wall, C′, sufficiently to expand the air or to vaporize more or less of the chemical in chamber C. The vapor of course passes instantly to bag F and expands it, thus raising lever H, which in turn raises lever K, bringing the end of the latter in contact with lever L, thus closing the circuit, the current passing from binding-post to binding-post through wires G′, levers K and L, and springs K^2 and L^4. The distance between the tips of levers K and L, when in their normal position, may be readily changed by turning set-screw M either in or out, as may be necessary. It will of course be seen that by careful adjustment of lever L the alarm may be caused to sound whenever the temperature of the room shall have been raised to a predetermined point.

I have not shown special electric ringing mechanism, as I contemplate using my automatic mechanism in connection with any ordinary electric-bell mechanism and have moreover illustrated ringing mechanism in Figs. 5 and 6.

In the modified form illustrated in Fig. 3, bag F and levers H, K, and L are dispensed with. Wall D′ is corrugated sufficiently to provide for the expansion of said chamber when vaporization of the chemical takes place, the vapor causing the chamber itself to expand, instead of passing into a separate bag and expanding that. It will of course be understood that in this form wall D′ must be made of light elastic metal, similar to that of which the bag is made. The set-screw M passes through the cover, and spring L^4 rests upon the top of the screw and connects directly with the binding-post; or a wire may be used, as in the other form. Spring K^2 connects with the other binding-post and rests upon the top of wall D′, acting to hold it down to its normal position. When the heat in the room becomes sufficient to vaporize the ether, wall D′ is of course raised, and as soon as it comes in contact with screw M the circuit is closed, the current from binding-post to binding-post passing through springs K^2 and L^4, screw M, and wall D′. The amount of vaporization necessary to insure contact is regulated by the screw M, as before. In the other modification (see Figs. 4, 5, and 6) I dispense with the electric connection and cause the alarm to be sounded by the direct action of the ether vapor—that is to say, the expansion of bag F moves certain levers, which in turn start the bell to ringing.

Turning now to Fig. 4, it will be seen that pipe F′ passes directly out through the cover. Fig. 4 is drawn to the same scale as Figs. 1, 2, and 3; but in Figs. 5 and 6 the scale has been reduced one-half.

Fig. 5 is a section, and Fig. 6 an inverted plan view, the gong being removed, of ringing mechanism, bag F, and the intermediate connecting mechanism. Bag F is connected by means of pipe F′ to chamber C, (see Fig. 4,) the same as in the other form, it being of course understood that the parts illustrated in Figs. 5 and 6 may be at any reasonable distance from the chamber. In this form, as shown, pipe F′ enters the bag from above instead of from below. This, however, is a matter of no consequence whatever, as I contemplate placing the parts in any convenient position—that is, either horizontally, vertically, or at any intermediate angle. In this form the insulation of the levers is of course not necessary. Any marked increase in temperature causes bag F to expand, moving levers H and K, the same as in the other form. Lever K is supported by a post, O, whose surface is parallel to the plane of movement of the lever, which is free to move over the face thereof.

Any ordinary style of ringing mechanism may be used in connection with my invention. I have illustrated a simple form of mechanism which I have found perfectly satisfactory in practice. P is the gong, P′ the clapper, P^2 the spring, P^3 the winding-post, and P^4 the ratchet. Q is a lever pivoted to a post, Q′, the outer end of which engages the ratchet, as is clearly shown in Fig. 6. At the other end of this lever is pivoted an arm, Q^2, which swings in the same plane as lever K. As shown in Fig. 5, the rear end of this arm laps by the end of lever K, and is supported by post O. R is the central stud which supports the gong. R′ is a spring attached to this stud, the outer end of which bears against arm Q^2, holding it upon post O. In use spring P^2 requires to be wound up by a key, in the usual manner. Lever K is held in proper position by spring K^2, the same as in the other form. Arm Q^2 is held against lever K by a spring, Q^3, pivoted either to said arm or to the lever itself. When the temperature of the room in which chamber C is located is raised, bag F is expanded, raising levers H and K, the ultimate action of which is to force arm Q^2 off from post O. It should be understood that arm Q^2 will move freely in the same plane with lever K without disturbing lever Q in the slightest. As soon, however, as the arm is forced off from the post, spring R′, acting in

the plane in which lever Q swings, forces said lever out of engagement with the ratchet, thus setting the ringing mechanism into operation.

I do not of course desire to limit myself to the exact details of construction shown and described, as it is obvious that the details may be varied to suit different applications of my invention without departing in the slightest from the spirit thereof.

In practice I can use the form in which electric connections are not shown in connection with a district-telegraph system, by placing ratchet P^4 upon the crank-shaft of an ordinary alarm-box, no changes whatever in the mechanism being required.

Having thus fully described my invention, I claim—

1. Chamber C, containing an easily-vaporized chemical, the expansible bag, and a pipe connecting said chamber and bag, in combination with an alarm-insulated lever, H, resting on said bag, insulated lever K, resting across lever H, and an insulated lever, L, having electric connections extending to said alarm, all arranged substantially as shown, whereby the expansion of said bag causes lever K to come in contact with lever L, thus completing the circuit.

2. Chamber C, the bag, and pipe F', in combination with levers K and L, the latter having arm L^3, springs K^2 and L^4, an alarm, electric connections operated by said bag, and a set-screw, whereby the increase in temperature required to sound the alarm may be regulated.

3. Chambers C and D and expansible bag F, located in chamber D, in combination with a pipe connecting the bag with the chamber C, and a tube for admitting external air to chamber D, as and for the purpose set forth.

4. An air-tight chamber and a bag connected therewith, in combination with pivoted lever K and bell-crank lever L, both insulated, as shown, springs for holding said levers in position, electric connections, and a set-screw bearing against one arm of the bell-crank lever, whereby said lever is adjusted to regulate the temperature at which the alarm will sound.

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

WILLIAM J. BAULIEU.

Witnesses:
A. M. WOOSTER,
C. E. RUGGLES.