(No Model.)

A. REINEMANN.

HEAT ANNUNCIATOR.

No. 450,425. Patented Apr. 14, 1891.

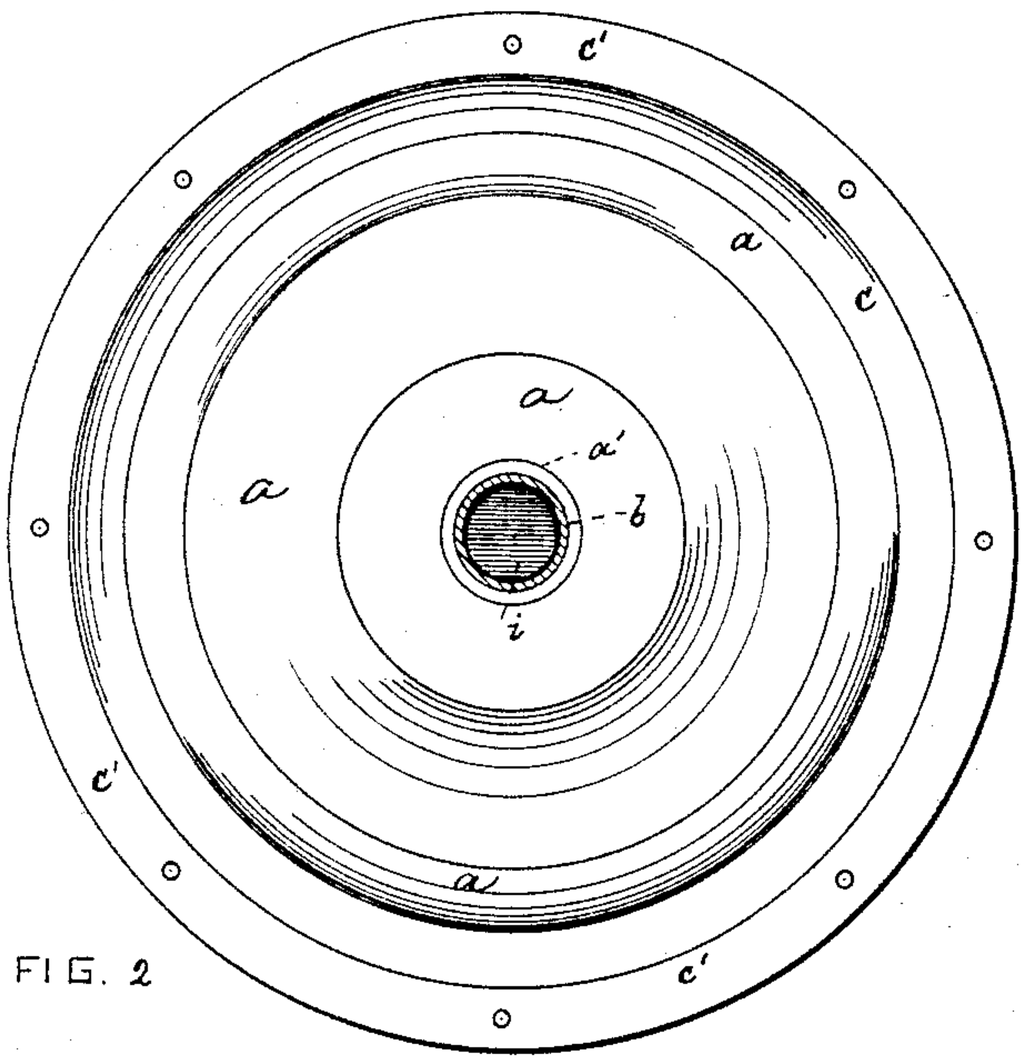

FIG. 2

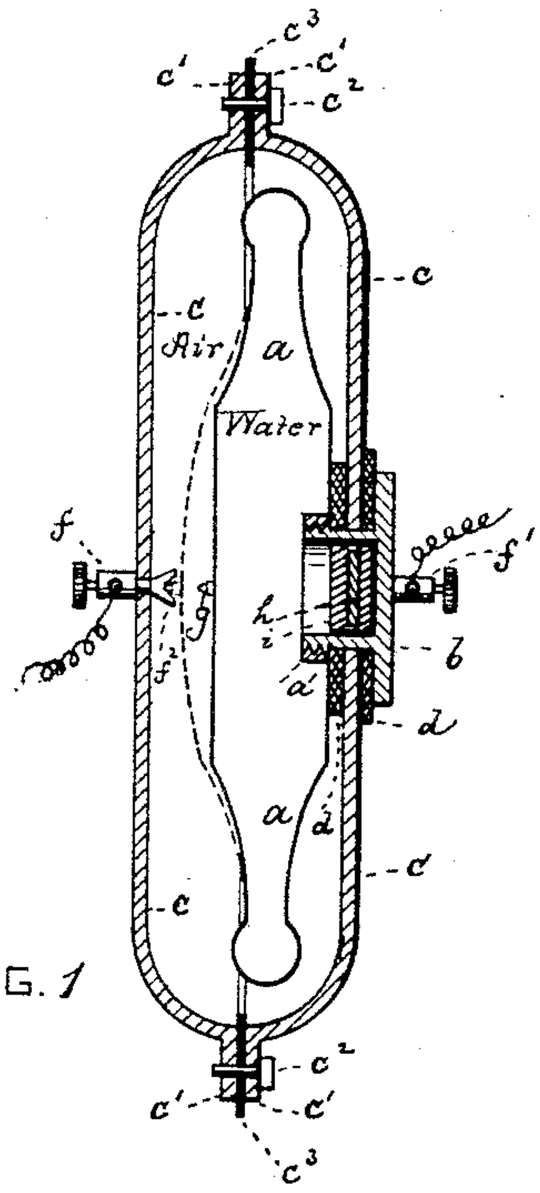

FIG. 1

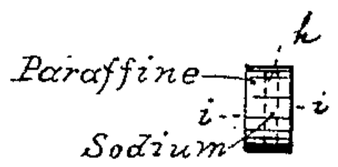

FIG. 7

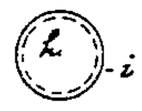

FIG. 6

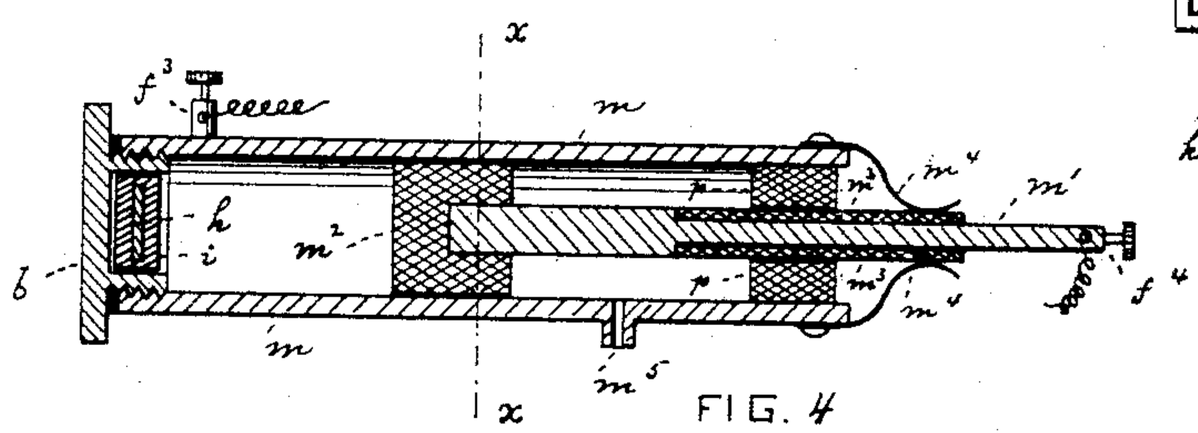

FIG. 4

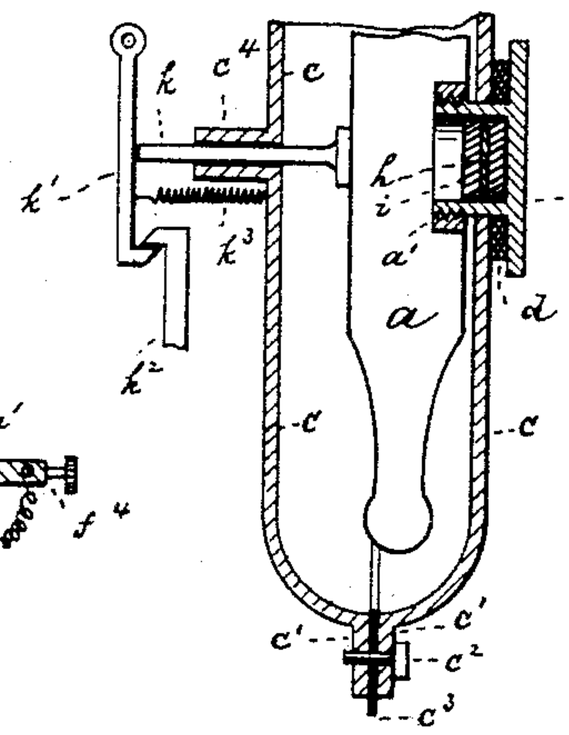

FIG. 3

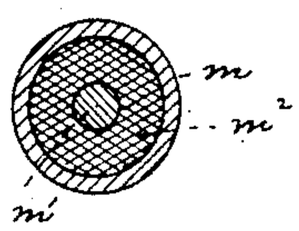

FIG. 5

WITNESSES

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UNITED STATES PATENT OFFICE.

ADOLPH REINEMANN, OF NEW YORK, N. Y.

HEAT-ANNUNCIATOR.

SPECIFICATION forming part of Letters Patent No. 450,425, dated April 14, 1891.

Application filed May 31, 1890. Serial No. 353,820. (No model.)

To all whom it may concern:

Be it known that I, ADOLPH REINEMANN, of New York city, New York, have invented an Improved Heat-Annunciator, of which the following is a specification.

This invention relates to an improved heat or fire annunciator of novel construction.

The invention consists, briefly stated, of a yielding vessel containing two or more chemicals or substances that are separated by a readily-fusible partition. When the partition melts down, the chemicals or substances react or combine and evolve gases that expand the yielding vessel. The vessel in expanding makes a suitable mechanical or electrical contact that sets off the alarm.

In the accompanying drawings, Figure 1 is a vertical central section of my improved heat-annunciator. Fig. 2 is an inner face view thereof with one-half of the jacket removed. Fig. 3 is a partial vertical central section of a modification; Fig. 4, a vertical central section of a further modification; Fig. 5, a cross-section on line $x\,x$, Fig. 4; Fig. 6, a face view, and Fig. 7 an end view, of the charge.

The letter a represents a yielding vessel, preferably made of thin sheet metal and of such a shape in cross-section that it will expand under pressure from within. At one side the vessel a is provided with a screw-tapped opening or bushing a', that receives a hollow screw-plug b. A jacket or casing c surrounds vessel a. This jacket is likewise provided with an opening for the passage of the screw-plug, as shown. Insulating-washers $d\,d$ should be placed upon the plug at either side of the jacket. The jacket c is made in two sections provided with lateral flanges c', through which pass screws c^2, that connect the sections. Between the flanges c' there is placed a gasket c^3. To the jacket c there is secured a binding-post f, and to the screw-plug b there is secured a second binding-post f'. The posts carry the wires of an electric circuit, which when closed sounds a suitable alarm in the usual manner. Opposite to an inner extension f^2 of post f the casing a is provided with a pin or contact g. When the vessel a is expanded, the pin g makes contact with extension f^2 of post f, and thus the circuit is closed through post f', plug b, vessel a, pin g, extension f^2, and post f, and the alarm is sounded.

The charge contained within vessel a should be a double charge—that is, it should be composed of two ingredients which when separated by an envelope remain inert, while when brought together by the destruction of the envelope they commingle and develop a gas that acts against the vessel to bulge or throw it outward. For making the double charge a variety of substances may be used. I prefer to fill the vessel a with water and to put into the hollow of the screw-cap b, and therefore into communication with the interior of the vessel, a charge consisting of a piece or disk of sodium h, surrounded by an envelope of paraffine i.

At the ordinary variations of temperature the paraffine will not melt, and will prevent contact between the sodium and the water. When, however, the temperature is raised above the melting-point of the paraffine, the latter will in melting permit direct contact between the sodium and the water. The sodium will now readily decompose the water and a large volume of hydrogen will be generated that will expand the vessel, and thereby establish the contact $g\,f^2$ (dotted lines, Fig. 1) to sound the alarm, as already described.

Of course the charge can be varied according to fancy and according to the degree of heat which is to be announced. In place of the sodium some salt rich in carbonic acid, (such as sodium bicarbonate,) in combination with an acid, (such as tartaric acid,) both incased in two compartments of a paraffine cylinder or mixed in a dry granular state, may be used. Applied in the same way they will remain quiescent until the heat melts away the paraffine, when carbonic-acid gas will be liberated. So, also, the charge may be made in the form of a metal tube closed by a plug of paraffine-wax, fat, rosin, or another easily-fusible material. There are also a number of substances which act on water in the presence of acids, (zinc,) or, combining with each other, will evolve gases. I have mentioned the above substances as typical and well suited for the purpose.

Paraffine can be produced in different quali-

ties or varieties with well-defined constant melting-points from 115 to 170° Fahrenheit. By using different articles impervious to water, from the easily-fusible tallow or cocoa-butter up to hard rosin, gums, mineral, hydrocarbons, and metal alloys, a long range of temperatures is obtained at which the apparatus is set off.

My improved apparatus is particularly applicable where comparatively low degrees of heat are to be announced. Moreover, it will stand rough usage, will work in any position or in motion, is small, portable, and can be placed in direct contact with the substances (even if liquid) the heat of which is to be controlled. Thus the apparatus can be put into a pile of tan-bark, grain, hops, coal, cotton, or other substances that are subjected to spontaneous overheating.

In Fig. 3 a mechanical contact is used in lieu of the electrical one shown in Figs. 1 and 2. Here the binding-posts are dispensed with. The jacket c is provided with a cylindrical extension c^4, in which slides a piston k, the head of which is in contact with vessel a. The piston k, when forced out by the expansion of the vessel, vibrates a hook k' and disengages the latter from catch k^2 against action of spring k^3. This will set off the alarm.

In Figs. 4 and 5 I use a stiff cylindrical vessel m, open at one end for the reception of a piston m'. This piston is the equivalent of the yielding or giving part of vessel a. The head m^2 of the piston is made of hard rubber or similar substance. The stem of the piston passes through a packing p, and is in part also protected by a non-conducting sleeve m^3. This sleeve interrupts metallic contact between the body of the piston and contact-springs m^4 on the body of vessel m. The vessel m carries one binding-post f^3 and the piston m' carries the second binding-post f^4 of an electric circuit. At the bottom the vessel m is closed by the screw-plug b, containing the charge. As the latter expands it forces the piston out until the non-conducting sleeve m^3 is forced beyond the springs m^4. The circuit will now be closed by post f^4, piston-rod m', springs m^4, vessel m, and post f^3, and the alarm will be sounded. An opening m^5 in vessel m permits the water and gases to escape after the piston has been forced out.

What I claim is—

1. The combination of a yielding closed vessel with a double charge, and a fusible envelope separating the ingredients of the charge, substantially as specified.

2. The combination of a yielding closed vessel with a double charge, a fusible envelope separating the ingredients of the charge, and a pin or piston on the vessel adapted to move outward by the expansion of the vessel, substantially as specified.

3. The combination of a yielding vessel having an opening with a hollow screw-plug received by said opening and with a charge within the screw-plug, substantially as specified.

4. The combination of a yielding vessel having an opening with a screw-plug within said opening, a surrounding jacket, a double charge within the vessel, and a fusible envelope separating the ingredients of the charge, substantially as specified.

ADOLPH REINEMANN.

Witnesses:
F. v. BRIESEN,
A. JONGHMANS.