Jan. 13, 1925. 1,523,096

R. ZIEGLER

BOILING AND HIGHEST TEMPERATURE INDICATING DEVICE

Filed Sept. 3, 1924

Fig. 1.

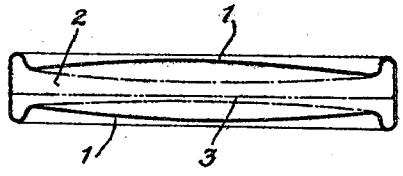


Fig. 2.

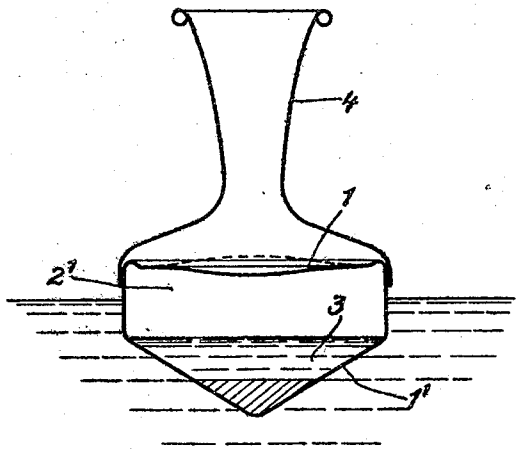


Fig. 3.

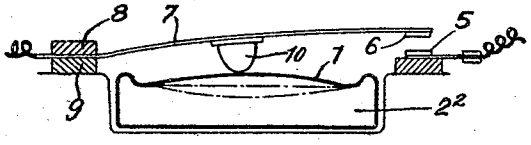
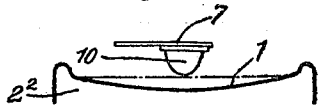


Fig. 4.



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UNITED STATES PATENT OFFICE.

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BOILING AND HIGHEST-TEMPERATURE INDICATING DEVICE.

Application filed September 3, 1924. Serial No. 735,691.

To all whom it may concern:

Be it known that I, ROBERT ZIEGLER, a citizen of the Republic of Switzerland, residing at Genf, Canton of Genf, Republic of Switzerland, have invented certain new and useful Improvements in Boiling and Highest-Temperature Indicating Devices, of which the following is a specification.

Temperature indicating devices are known in which an evaporable liquid or a gas, enclosed in an air-tight vessel, acts by means of its pressure corresponding to a definite temperature to release a signal.

Heretofore, such a device has always had a special mechanically or electrically operated acoustic signalling means (bell), which made the device cumbersome and liable to derangement.

According to this invention special signalling devices are dispensed with, and instead the vessel has at least one arched wall or membrane adapted, at a definite temperature, to be suddenly flexed or snapped by the pressure within the vessel from a position of curvature on one side of a median plane to a position of curvature on the other side of said plane, thereby giving an audible report.

The extreme simplicity of this device, excluding frictional or jointed parts, ensures reliable indication. Further, the device is very easily cleaned and in the course of cooling the flexible wall or membrane snaps back, under the action of the external atmospheric pressure, automatically and with another report into its original position.

Three constructional forms of the device are illustrated, by way of example, on the accompanying drawing, Fig. 1 being a vertical section of one form, Fig. 2 a similar view of the second form and Figs. 3 and 4 are similar views of the third form.

In Fig. 1, the reference numerals 1, 1 denote two flexible walls or membranes of a flat metal box 2 made in two parts connected air-tight with each other and containing an evaporable liquid indicated at 3, or a gas.

To use the indicator in connection with liquids to be heated, it is placed in the liquid, for instance milk, and floats on its surface. Normally the membranes 1, 1 take up the curved positions indicated by the dotted lines, but the thickness of metal of the box, the nature and quantity of the liquid or gas contained in the box and the dimensions of the box are such that the membranes suddenly flex or snap outwardly to the positions shown in full lines (by the internal pressure resulting from the evaporation of said liquid or the expansion of said gas) a few seconds before the required boiling point or highest temperature is reached. This sudden flexing of each membrane 1 produces an audible report which serves as a signal. After the first membrane 1 flexes outwards the space for expansion within the box becomes somewhat greater and consequently the flexing of the second membrane 1, and therefore the second signal, occurs somewhat later.

When, after the device has been removed from the heated liquid, it is allowed to cool, the internal pressure in the box disappears and the atmospheric pressure restores the membranes 1, 1 to their normal positions with an audible report.

The metal box can be of any shape, for instance it may be cubical in form; and any number of the membranes may be made to produce, either simultaneously or successively, as many detonations as there are flexible walls or membranes.

In the form of the device shown in Fig. 2, the metal box 2^1 containing the liquid or gas 3 has a flexible wall or membrane 1, a non-flexible bottom 1^1, and a trumpet or funnel-shaped neck or extension 4 to increase the strength of the report.

In the example shown in Figs. 3 and 4 a device according to the invention works together with an electric switch for the purpose of suddenly switching off the heating current. 5 and 6 are two contacts, of which one, 5, is stationary and the other, 6, is carried by a spring arm 7. This arm is secured between two insulating plates 8 and 9 and is provided with a nipple 10 of insulating material. This nipple only contacts with the membrane 1 of the metal box 2^2, when the flexible wall 1 projects above its middle or neutral position, so that the contacts 5 and 6 will be suddenly separated. The position of the nipple 10 when the contacts 5 and 6 are in working condition is shown in Fig. 4. The membrane 1 automatically and suddenly snaps into this position, when the pressure within the box falls below the atmospheric pressure.

What I claim is:—

A device for indicating the temperatures of liquids, comprising a buoyant, air-tight

vessel adapted to be placed in the liquid being tested and to float freely on the surface thereof in operating position; said vessel containing an evaporable liquid or a gas and having a thin, arched top wall which is adapted, at a definite temperature, to be suddenly flexed by the pressure within the vessel from its position of curvature below a median plane to one above said plane, such sudden flexion itself giving an audible report, and a similar report being given by the said wall when, after cooling, the pressure within the vessel falls below atmospheric pressure and the wall snaps back into its original position.

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

ROBERT ZIEGLER.

Witnesses:
U. BURGI,
DORIS PORTMAN.