T. P. BACON.

COMBINATION PRESSURE GAGE AND CIRCUIT BREAKER.

APPLICATION FILED MAY 3, 1917.

1,300,107. Patented Apr. 8, 1919.

Fig. 1.

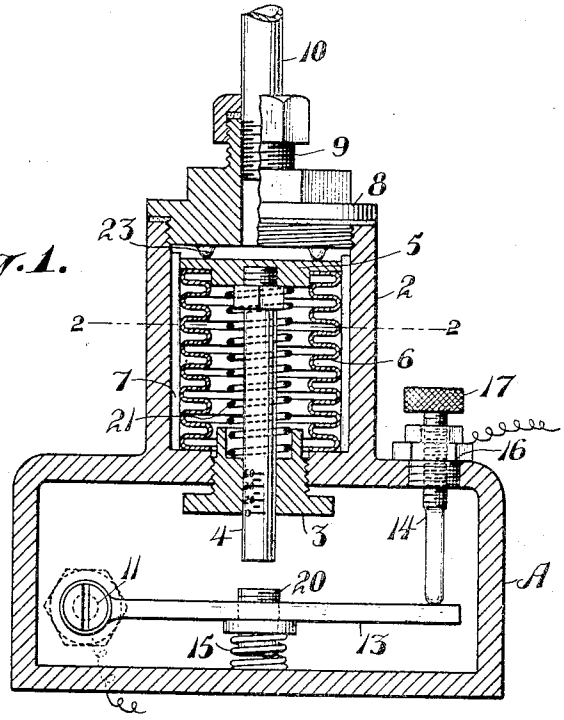
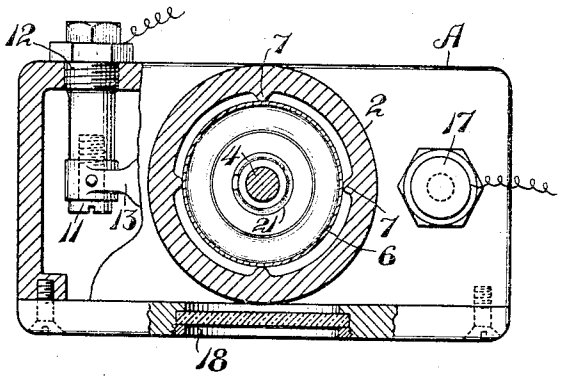


Fig. 2.



WITNESSES:

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COMBINATION PRESSURE-GAGE AND CIRCUIT-BREAKER.

1,300,107. Specification of Letters Patent. Patented Apr. 8, 1919.

Application filed May 3, 1917. Serial No. 166,268.

To all whom it may concern:

Be it known that I, THOMAS P. BACON, a citizen of the United States, residing at Oakland, in the county of Alameda and State of California, have invented new and useful Improvements in Combination Pressure-Gages and Circuit-Breakers, of which the following is a specification.

This invention relates to a combination pressure gage and circuit breaker.

The present invention is intended for use in connection with steam vulcanizers, heaters, and the like, in which the steam is generated by an electric heating element; and the object of the present invention is to automatically open the circuit through the heating element the moment a predetermined temperature and steam pressure are obtained. Another object of the invention is to provide an adjustment which permits the circuit through the heating element to be automatically opened or closed at any pressure or temperature desired and which will simultaneously register and visibly indicate the pressure. Further objects will hereinafter appear.

The invention consists of the parts and the construction and combination of parts as hereinafter more fully described and claimed, having reference to the accompanying drawings, in which—

Figure 1 is a central, vertical section through the pressure gage and circuit breaker.

Fig. 2 is a plan section on the line 2—2 of Fig. 1, partly broken away.

Referring to the drawings in detail, A indicates a rectangular shaped casing, on the upper side of which is formed a cylindrical extension 2. Mounted in the top of the casing A, or in the bottom part of the cylindrical extension, is an adjusting screw 3, through which extends a rod 4. This rod is secured at its upper end in a head member 5, which in turn forms a closure for an expansion tube 6 which is secured within the cylindrical extension and guided by means of inwardly projecting ribs 7.

Forming a closure for the upper end of the cylindrical extension is a threaded cap 8, on the upper end of which is formed a threaded extension 9 adapted to receive the discharge end of a steam pipe 10. The central opening through the screw cap communicates at one end with the chamber formed within the cylindrical extension while the opposite end communicates with the pipe 10. Pivotally mounted on a stud bolt 11, secured in an insulating bushing 12 extending through one side of the casing, is a switch arm 13, which is normally held in engagement with a contact screw 14 by means of a spring 15. The screw 14 also passes through an insulating bushing 16 and as the upper end is provided with a thumb-nut 17 it can readily be seen that the switch arm 13 may be raised or lowered with relation to the rod 4 to increase the distance between the same, as will hereinafter be described.

A spring 15 contacts with an insulating bushing secured in the switch arm, and as this bushing extends through the arm and forms an alinement with the rod 4, it can readily be seen that a circuit through the switch arm and the contact screw 14 can only pass through the stud 11, the arm 13 and the screw 14 rendering it practically impossible to short circuit the current. The front portion of the casing may be closed by a window frame 18 or may remain open, so that the moving parts are always exposed and also to permit the pressure gage to be read.

As previously stated, the device is particularly intended for use in connection with steam vulcanizers, heaters, and the like, in which steam is generated by means of an electric heating element. In practically all such devices it is desirable to either maintain a constant temperature or to automatically open the circuit through the heating element when a predetermined temperature or pressure is obtained. This is accomplished in the present instance by connecting the pipe 10 with the vulcanizer or heater at a point where the steam may freely escape. Pressure generated by the heating of the water and the generation of steam is thus transmitted through pipe 10 to the chamber within the cylindrical extension 2. The expansion tube 6 is in this manner compressed and the rod 4 will move in a downward direction until it engages a bushing 20, carried by the switch arm, and swings it about its pivot a sufficient distance to break the circuit through the adjusting screw 14.

The current or circuit through the electric heating element is in this manner automatically opened and the pressure and temperature previously obtained will consequently gradually diminish as the heat is

rapidly radiated and carried away by conduction. The pressure will in this manner gradually drop and will finally permit the switch arm to move back into contact with the adjusting screw, thus automatically maintaining a predetermined temperature and pressure.

An expansion tube of the character here shown, if subjected to high pressures, gradually loses its life and will, therefore, not return to its normal position after it has been used for some time. I, therefore, place the spring 21 within the expansion tube, the tension of which may be adjusted by means of the screw 3. This spring will always have sufficient tension to raise the expansion tube up against a pair of stop lugs 23, formed on the lower end of the screw cap, thereby insuring a positive return of the tube when the pressure has been removed. The lower end of the rod may, therefore, be graduated from zero to any degree desired and as it is always projected, when pressure is applied, it can readily be seen that a visible reading or indication of the pressure generated is possible.

The device as a whole is simple, compact and substantial in construction and as all parts employed are constructed of metal, with the exception of the insulating bushings, its life, usefulness and accuracy can be depended upon. This is of great importance in many instances where regulators of this type are employed, as a variation of one or two degrees, for instance in incubators, may produce damaging results.

The materials and finish of the several parts of the device may be such as the experience and judgment of the manufacturer may dictate.

I wish it understood that various changes in form, proportions and minor details of construction may be resorted to within the scope of the appended claims, and that I do not wish to limit myself to the specific design and construction here shown.

Having thus described my invention, what I claim and desire to secure by Letters Patent is—

1. A pressure actuated circuit breaker comprising an inclosed casing connected with a source of pressure supply, a corrugated tube mounted within the casing, a head member forming a closure for one end of the tube, said tube adapted to be compressed when pressure is exerted thereon and extended when the pressure is reduced, a circuit breaker comprising a stationary contact and a movable arm, means connected with the compressible tube for moving the arm into and out of engagement with the stationary contact, means for increasing the compressibility of the corrugated tube, said means comprising a spring mounted interiorly of the corrugated tube and engageable with the head thereof, and means for increasing or decreasing the tension of said spring.

2. A pressure actuated circuit breaker comprising an inclosed casing connected with a source of pressure supply, a corrugated tube mounted within the casing, a head member forming a closure for one end of the tube, said tube adapted to be compressed when pressure is exerted thereon and extended when the pressure is reduced, a rod secured to the head extending downwardly through the corrugated tube, a spring surrounding said rod engageable with the head, a nut forming a guide for the lower end of the rod, a seat for the spring, said nut also adapted, when adjusted, to increase or decrease the tension of the spring, a switch arm pivotally mounted in alinement with the rod, and an adjustable contact with which the free end of said arm is normally adapted to engage, said rod adapted to engage the arm and swing it about its pivot and away from the contact when the tube is compressed.

3. A pressure actuated circuit breaker comprising a cylindrical-shaped inclosed casing, means connecting one end of said casing with a source of pressure supply, a corrugated tube open at its lower end secured within the cylindrical-shaped casing, guides formed interiorly of the casing to guide the tube vertically, said guides forming an annular chamber between the casing and the tube, a head forming a closure for the upper end of the tube, a nut passing through the bottom of the casing and centrally positioned with relation to the tube, a rod secured to the head extending through the nut and guided thereby, a spring surrounding the rod interposed between the nut and the head, said spring adapted to be compressed or extended by adjusting the nut and said tube and spring adapted to be compressed when pressure is exerted within the casing and extended when the pressure is reduced, and a circuit breaking arm mounted in alinement with the rod, said arm being engaged by the rod when this moves in unison with the compressible tube, said movement of the arm adapted to make or break a circuit.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

THOMAS P. BACON.

Witnesses:
JOHN H. HERRING,
W. W. HEALEY.