Nov. 3, 1931. T. J. NIUTTA 1,830,672

AUTOMATIC CIRCUIT BREAKER FOR BOILERS

Filed Jan. 30, 1929

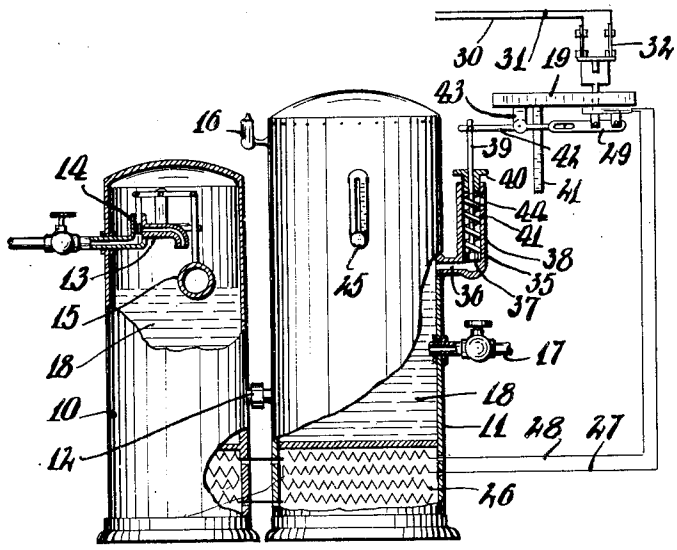


Fig. 1.

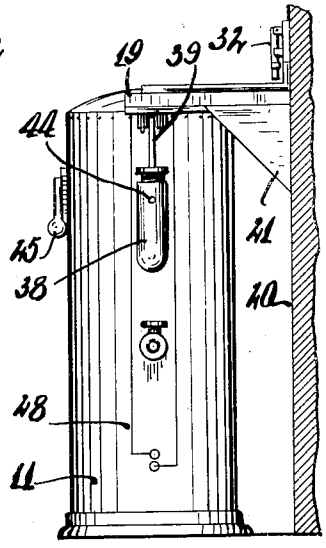


Fig. 2.

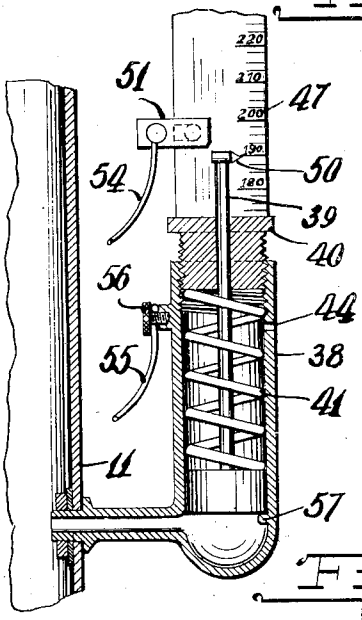


Fig. 3.

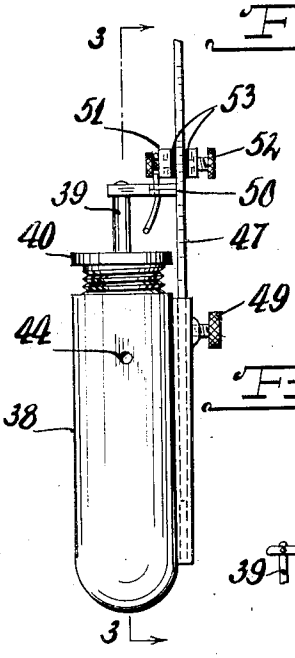


Fig. 4.

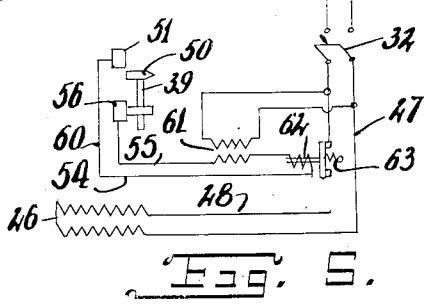


Fig. 5.

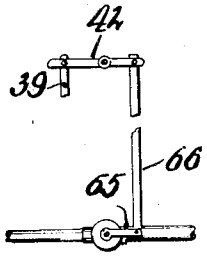


Fig. 6.

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AUTOMATIC CIRCUIT BREAKER FOR BOILERS

Application filed January 30, 1929. Serial No. 336,276.

This invention relates to an automatic heat controller for boilers, hot water tanks and the like and its object is to provide a device which will open, or close a switch or a valve mechanism when acted upon by the internal pressure which is created by the heating of a liquid in a boiler of the class described.

A further object is a means for adjusting the controller to act at a pre-determined degree of heat.

These and other objects and features of the device will be fully set forth in the following specification and claim and illustrated in the accompanying drawings.

Fig. 1 shows a front view of a large and a small boiler coupled together and with the controller in section and mounted on the side of the larger boiler. The tanks are partly broken away to disclose the interiors and the heat coils in the base portions.

Fig. 2 shows a side view of the foregoing.

Fig. 3 shows, in enlarged section, a form of the controller having an adjustable scale and electrical contact elements. This view is taken on the line 3—3 of Fig. 4.

Fig. 4 shows a side view of the controller as illustrated in Fig. 3.

Fig. 5 is a wiring diagram showing the method of operation of the device as seen in Figs. 3 and 4.

Fig. 6 shows a fragmentary view of the switch rocker arm of Fig. 1 connected to a valve in a gas supply pipe.

The device may be applied to boilers in power plants, or to those used for house heating, or may be used on hot water tanks, coffee urns, or like appliances.

In the illustrations seen in Figs. 1 and 2, two boilers 10 and 11 are coupled together by the pipe 12. On these boilers are the usual equipment elements such as the water intake valve apparatus 13, which is of customary design and acts by the movement of the plunger 14 and the ball 15. A safety valve 16 and an outlet pipe 17 are suitably connected. Liquid contents are shown at 18. A shelf 19 projects from the wall 20, being supported by the angle brace 21. A thermometer 25 is mounted on the front of the large boiler. Heat coils 26 are shown in the base portions of the boilers and these are supplied by the wires 27 and 28 which connect with the switch 29. The said switch being in circuit with the line wires 30 and 31 through the master switch 32.

A heat controller which embodies the invention claimed, is seen at 35 mounted on the boiler 11 and opens thereinto through the duct 36. A piston 37 is slidably mounted within the cylinder 38 and a lifting rod 39 is secured to the said piston. An adjustable plug 40 is screwed into the top of the cylinder and a pressure spring 41 bears against the piston at one end and the plug 40 at the other. A vent 44 is located in the cylinder wall to prevent air cushioning back of the piston when in operation. A rocker arm 42 is supported under the shelf 19 by the element 43, and this arm is operatively connected to the lever of the switch 29.

The controller is adjusted in the following manner:—Assuming, for illustration, that it is desired to maintain the contents of the boilers at approximately 250 degrees Fahrenheit. The plug 40 is screwed down tight, the master switch is then closed thus throwing the current into the coils 26. Now, when the thermometer 25 registers 250 degrees, the plug 40 is unscrewed until the pressure of the spring 41 is too weak to hold down the piston. The piston will then rise and lift the rocker arm 42.

The lifting of the rocker arm will open the switch 29 and cut off the current. As soon as the heat goes back to a point below that desired the piston will be forced down and the switch 29 re-closed. Thus the heat is kept at approximately the desired point.

In the form of the invention shown in Figs. 3 and 4, a scale plate 47 is slidably mounted on the cylinder 28. This is secured by the screw 49. A pointer 50 which is also a contact element, is mounted at the upper extremity of the rod 39. The contact block 51 is secured to the scale plate by the screw 52 and is insulated as seen at 53. This may be set in any desired position. Wires 54 and 55 are connected to the said block, and to the cylinder casing as seen at 56. A stop lug 57 is shown in Fig. 3 which acts as a down

stop for the piston. This is also used in the simpler form seen in Fig. 1, but is too small to be apparent in that view.

The device in the foregoing form is set as follows:—The plug is screwed down and the thermometer reading taken as heretofore described, and the plug is adjusted to allow the lifting of the piston at the desired degree of heat. The scale is then set with the degree point opposite the pointer 50 and the contact block 51 is moved down so that the pointer element will contact with it when it rises above the set point.

The flat scale plate 47 is attached on the cylinder 38 so as to be parallel with the axis of the cylinder. The pointer 50 is radially fixed upon the lifting rod 39 and has a sharpened side edge clearly shown on the drawings constituting the point for indicating upon the scale 47, and is formed with a flat front end in contact with the flat scale plate for limiting movement of the pointer longitudinally on the scale plate 47 and preventing lateral disengagement of the pointer from the scale plate upon turning of the plug 40 for adjustments in said compression element 41. The flat front end of the pointer 50 also prevents turning of the pointer due to vibrations which may be present.

The action may now be described with reference to the wiring diagram seen in Fig. 5. When the pointer 50 rises to contact with the block 51, the current over the secondary circuit 60 derived through the transformer 61 will energize the relay 62 and open the circuit which supplies the coils 26, and when the piston drops because of lower heat pressure, the spring 63 will re-close the supply circuit.

The device may be adapted to a boiler with a fuel gas supply in the manner shown in Fig. 6, in which the gas valve 65 is actuated by the rod 66 which is connected to the rocker arm 42, or if current is available, a relay similar to that shown at 62 may be connected to operate the valve 65.

While I have shown the device in its preferred forms, it is understood that such minor changes may be made therein as shall come within the spirit and scope of the appended claim.

Having thus described the invention, what is claimed as new, and desired to be secured by Letters Patent, is as follows:—

In a device of the class described, a cylinder, a compression element within said cylinder, a plug threadedly engaged in one end of said cylinder and turnable for changing the tension in said compression element, a lifting rod coaxial in said cylinder and said plug and slidably mounted thru the plug for longitudinal movements, a flat scale plate attached on said clyinder parallel with the axis of the cylinder, and a pointer radially fixed on said lifting rod and having a sharpened side edge constituting the point for indicating on a scale on said scale plate and a flat front end in contact with the flat scale plate for allowing movements of the pointer longitudinally on said scale and preventing lateral disengagement of the pointer from the scale plate upon turning of said plug for adjustments in said compression element.

In testimony whereof I have affixed my signature.

THOMAS J. NIUTTA.