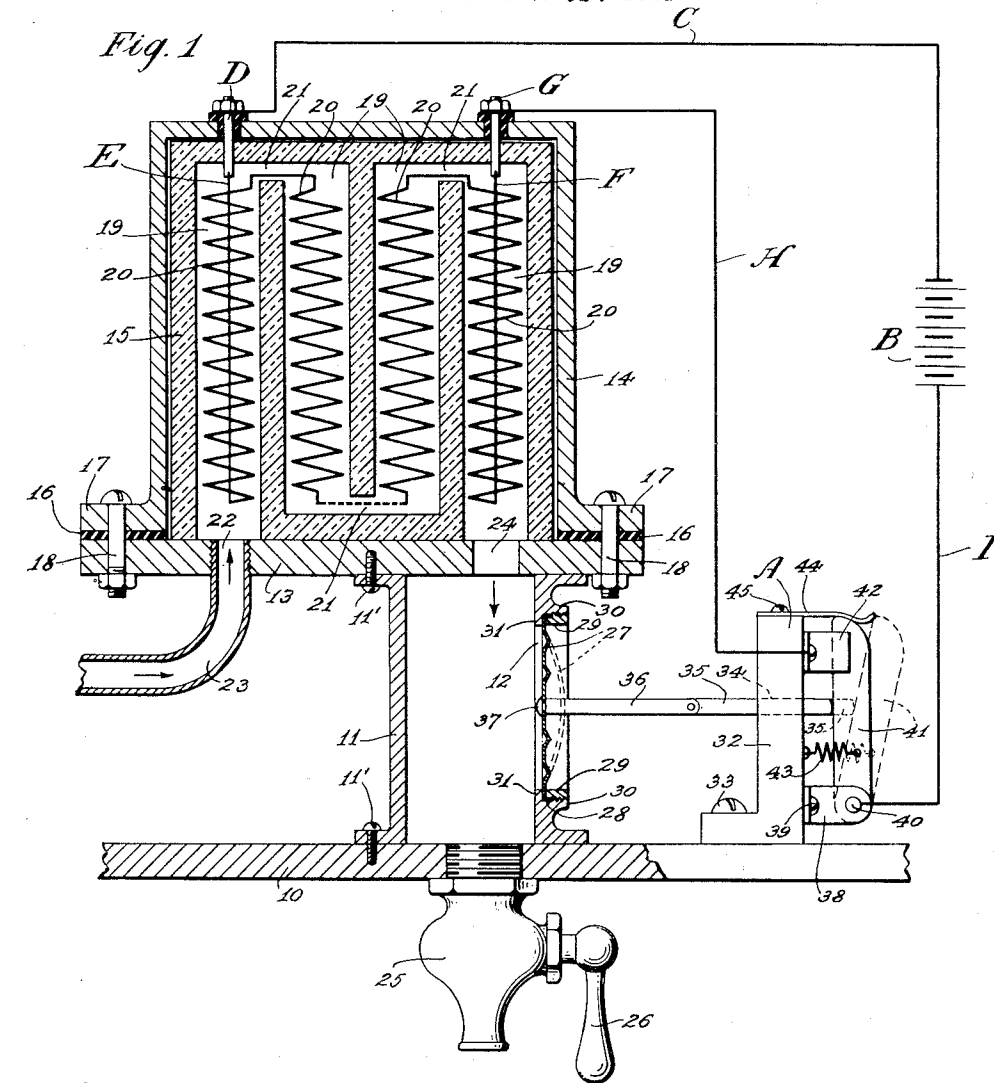
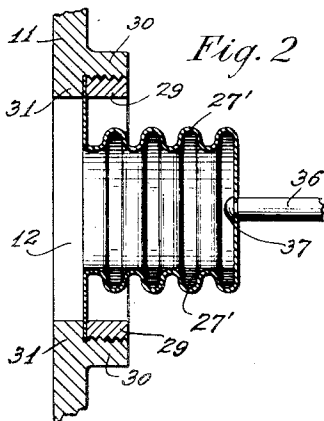


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F. E. MATTHEWS
ELECTRIC WATER HEATER

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ELECTRIC WATER HEATER.

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To all whom it may concern:

Be it known that FRANK E. MATTHEWS, a citizen of the United States, and resident of Bridgeport, in the county of Fairfield and State of Connecticut, has invented certain new and useful Improvements in Electric Water Heaters, of which the following is a specification.

This invention relates to an electric water heater, and an important object of the invention is to provide an improved heater of the present character which will include novel mechanism for automatically operating an electric switch whereby a circuit through the resistance coils of the heating element can be made or broken.

A further important object is to produce an electric water heater the automatically operated mechanism of which includes a diaphragm incorporated in the heater in such manner that it can be actuated to close or open an electric switch to make or break a circuit through the heating element, depending upon whether the heater is in use or out of use.

A still further and more specific object is to produce a heater in which is incorporated a diaphragm adapted to be actuated by water pressure to hold open a normally closed electric switch when the heater is not in use, but constructed to offer no interference to normal closing of the switch when the heater is in use and the pressure of the water therein is relieved.

With the above and other objects in view, the construction, arrangement and combination of parts constituting the invention will now be fully described and will hereinafter be specifically claimed, it being understood that the disclosure herein is merely illustrative and meant to in no way limit the scope of the invention, slight changes in details of construction and arrangement of parts being permissible so long as within the scope of the appended claims.

In the accompanying drawing forming a part of this specification,

Fig. 1 is a sectional view of the improved electric heater, showing an electric switch capable of use therewith in elevation and diagrammatically disclosing a wiring system between said switch and the heating element of the heater; and

Fig. 2 is a sectional view of a variant form of diaphragm that can be utilized as a sub-

stitute for the diaphragm of the heater of Fig. 1.

With respect to the characters and numerals of reference upon the drawing, 10 denotes any fixture upon which the heater may be supported or in connection with which it can be used, 11 denotes a cylindrical casing which, as shown, is situated upon the fixture, 12 denotes an opening in the casing for a purpose to be fully explained, 13 denotes a plate upon the casing 11, 14 denotes a housing upon the plate 13, 15 denotes a heating element of ordinary or preferred construction enclosed by the plate and housing, 16 denotes packing between a circumferential flange 17 of the housing and the plate to render the heater proper watertight, and 18 denotes generally means passing through the flange, packing and plate for securing the plate and housing together, all as will be understood. The casing 11 may be suitably secured to the plate 13 and to the fixture 10 in any manner, as by screws 11'.

The heating element shown has longitudinal channels 19 in which are arranged resistance coils 20, said channels providing one continuous water passage through the element which is suitably cutaway at its top and bottom, as suggested at 21, to allow communication between adjacent channels. The plate 13 is provided with an inlet opening 22 in which an inlet pipe 23 is suitably situated, and with an outlet opening 24 allowing communication between the heating element and the interior of the casing 11. 25 represents an ordinary faucet having a manipulating handle 26, the faucet being situated as shown in the fixture 10 and at the lower end of the casing 11, or at some other point preferably in proximity to the casing 11.

Within the opening 12 of the casing 11 is a diaphragm which may be of any construction suiting it to its purpose, the diaphragm 27 of Fig. 1 being a disc having a flange 28 about its marginal edge, and the diaphragm 27' of Fig. 2 being of general cylindrical conformation, an externally threaded ring 29 turned into a flange 30 of the casing 11 and against a flange 31 thereof about the opening 12 serving in the instance of each diaphragm the purpose of securing the diaphragm in position.

It should be here remarked that when the

manipulating handle 26 of the faucet 25 is in closed position, the water pressure within the heating element and the cylindrical casing 11 is approximately the same as the pressure within the system in which the heater is installed. The arrows in Fig. 1 denote the direction in which the water will flow when the manipulating handle is turned to open position, the position in which it is shown. When the faucet is open and water is escaping, the pressure in the heating element and casing is, obviously, relieved so the diaphragm can assume the position in which it is shown in full lines in said Fig. 1. As soon as the manipulating handle is turned to close the faucet, the normal pressure of the system is at once present in the element and casing. The diaphragm employed is constructed to be actuated by this pressure to move away from the casing as suggested in dotted lines in Fig. 1.

An electric switch A of any suitable construction, supported upon the fixture 10 or in some other manner, is set up in a wiring system to be actuated when the pressure within the casing 11 is relieved to make a circuit through the resistance coils of the heating element, and to be actuated when the pressure within the casing becomes normal to break said circuit. When the circuit is made, the resistance coils are heated to perform their function while water is being withdrawn from the faucet, and when the faucet is closed the circuit through the resistance coils is immediately broken.

Numeral 32 represents a standard secured upon the fixture 10 as at 33 and having a guide way 34 for an insulated part 35 of a lever 36 secured as at 37 to the diaphragm 27 or 27', preferably at the center part of said diaphragm. 38 represents a bracket attached to the standard as at 39 and pivotally supporting as at 40 a knife blade 41. 42 represents a blade contact member upon the standard 32, and 43 represents a coil spring having one of its ends attached to the standard 32 and its other end attached to the blade 41 and tending to hold said blade in closed circuit position. 44 represents a flat spring secured upon the upper end of the standard 32 as at 45 and adapted to engage the knife blade in a manner to become obvious.

Reference character B denotes a battery, C a lead wire leading therefrom to a binding post D in the housing 14, E a lead wire from binding post D to the resistance coils 20, F a lead wire from the resistance coils to binding post G also in the housing 14, and H a lead wire from binding post G to the contact member 42 of the switch A. I denotes a lead wire from battery B to knife blade 41.

The manner in which the knife blade 41 is actuated on its pivot to make and break

the circuit is apparent. When the pressure is relieved within the casing 11, the coil spring 43 acts to draw the knife blade 41 against the contact member 42, the flat spring 44 serving the purpose of first retarding the movement of the knife blade and then releasing it so that the stored up energy of the coil spring can act to make a quick connection as is desirable. When the pressure within the casing 11 becomes normal, the lever 36 is, moved from the full line position in Fig. 1 to the dotted line position therein, the end of said lever remote from the diaphragm being positioned to engage the knife blade and move it to open position, the flat spring first tending to hold the blade in closed position and then suddenly releasing it so that a quick break is effected against the weaker action of the coil spring 43.

Having thus fully described the invention, what I claim as new and desire to secure by Letters Patent is:

1. An electric water heater comprising a body normally containing water under pressure, a diaphragm associated with said body and acted upon by said water, and means for heating said water, said means being arranged to become operative when the pressure in the body is relieved.
2. An electric water heater comprising a body normally containing water under pressure, a diaphragm within said body and in communication with said water, and electrical means for heating said water, said means including a circuit adapted to be open when the body contains water under pressure and to be closed when the pressure is relieved.
3. An electric water heater comprising a body normally containing water under pressure, means for relieving the pressure of water in said body, a diaphragm actuated by changes in water pressure in said body, and an electrical circuit for heating said water, said circuit including a switch operated by said diaphragm.
4. An electric water heater comprising a body normally containing water under pressure, means for relieving the pressure of water in said body, a diaphragm actuated by changes in water pressure in said body, and an electrical circuit for heating said water, said circuit including a switch constructed to be open when the water in said body is under pressure and to be closed when the pressure in said body is relieved.
5. An electric water heater comprising a body normally containing water under pressure, means for relieving the pressure in said body, a diaphragm actuated by changes in water pressure in said body, and electrical means for heating said water, said electrical means controlled by the actuations of said diaphragm.
6. An electric water heater comprising a

body normally containing water under pressure, means for relieving the water pressure in said body, electrical means for heating said water, and a diaphragm actuated by changes in water pressure in said body to control said electrical means.

7. An electrical water heater comprising a body normally containing water under pressure, means for relieving the water pressure in said body, electrical means for heating said water, and a diaphragm actuated by changes in water pressure in said body and controlling said electrical means, said electrical means being inoperative when the body contains water under pressure and operative when the pressure is relieved.

8. An electric water heater comprising a body normally containing water under pressure, means for relieving the water pressure in said body, electrical means for heating said water, said electrical means including a switch, a diaphragm actuated by

changes in water pressure in said body and adapted to hold said switch in open circuit position when the water in said body is under pressure, and means for closing said switch when said pressure is relieved.

9. An electric water heater comprising a body normally containing water under pressure, means for relieving the water pressure in said body, electrical means for heating said water and including a switch, a diaphragm actuated by changes in water pressure in said body and adapted to hold said switch in open circuit position when the water in said body is under pressure, and a spring for moving said switch to closed circuit position when said pressure is relieved.

Signed at Bridgeport, in the county of Fairfield, and State of Connecticut this 29th day of October, A. D., 1921.

FRANK E. MATTHEWS.