May 22, 1928. 1,670,767

A. A. GRASSI ET AL

ELECTRIC WATER HEATER

Filed Aug. 30, 1926

Fig. 1.

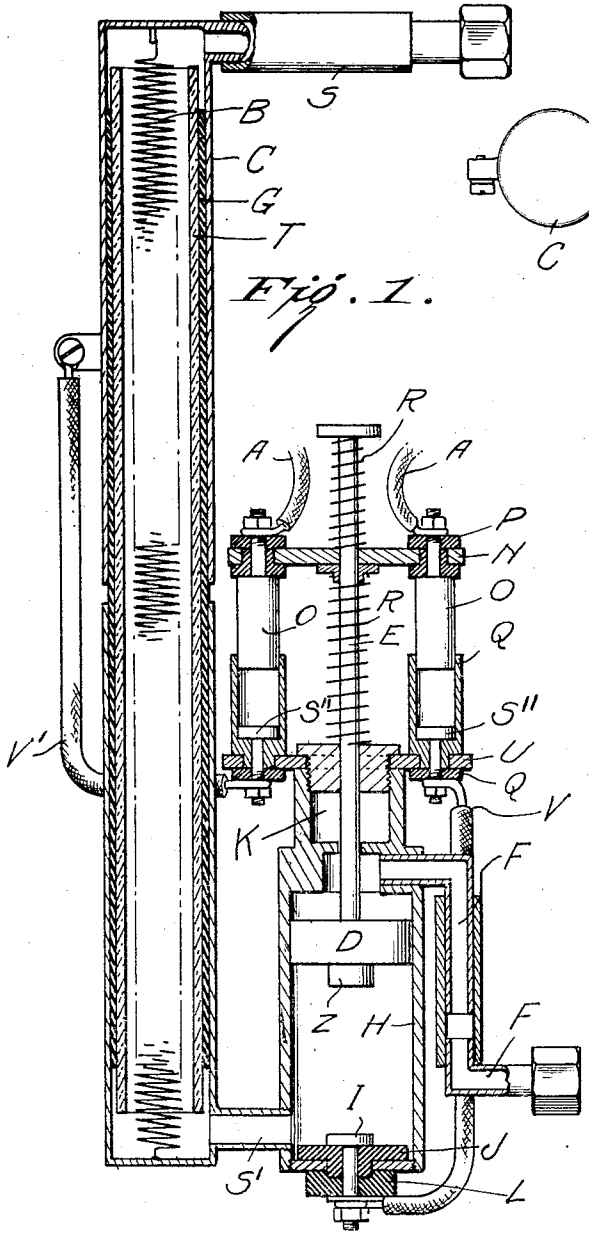



Fig. 2.

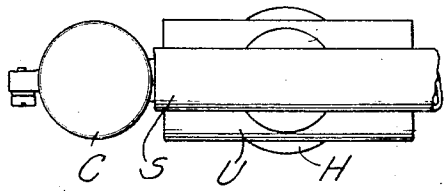
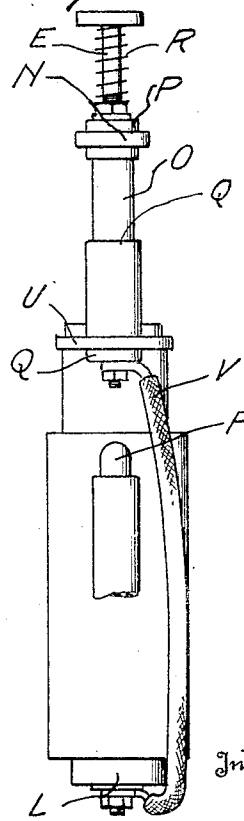



Fig. 3.




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# UNITED STATES PATENT OFFICE.

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## ELECTRIC WATER HEATER.

Application filed August 30, 1926. Serial No. 132,498.

Our present invention relates to an automatic electric water heater its main object being to provide an electric water heater for any suitable use, which shows many advantages over those proposed and used heretofore.

In order that our present invention may be clearly understood and easily carried into practice, a preferred embodiment thereof has been shown in the appended drawings wherein,

Figure 1 is a vertical section of the apparatus showing the main elements thereof.

Figure 2 is a plan view of the heater and

Figure 3 is a side elevation thereof.

Similar characters of reference denote the same or like parts throughout the said drawings.

The apparatus has been shown without its outer envelope and it is obvious that changes in size may be introduced without departing from the scope of the invention.

The apparatus includes several elements. The heating tube proper consists of a glass tube T through which water circulates and within which a resistance B is placed, said resistance consisting of several wound up Nichrom wires and being fixed at its ends to the metal tube C. This tube C consists of two electrically insulated portions. The glass tube fits within the metal tube with an intermediate rubber or insulating tube G fixed under pressure. S is the outlet for the hot water and S′ the inlet they being respectively at the upper part and at the lower of the heating tube.

Under the term of "automatic" I desire to mean the device by which the electric circuit and the water flow are automatically regulated. H is the body portion of the automatic device having an inner cylindrical section in which a piston D having a contact member Z thereon is capable of reciprocating. Said piston has a rod E secured thereto and is held in its upper position by the action of the springs R. The rod E passes through a stuffing-box K in order to avoid the escape of water which enters the body of the automatic device through the tube F. N is a metal cross piece mounted upon the rod E and supporting at its ends the insulating pieces P on which the upper contact members O are fixed, said contacts being the terminals for the wires A, through which current is fed to the apparatus.

On the body of the automatic device there is a metal piece U on which two insulating members Q are fixed, said members carrying the contacts S placed below and separated from the contacts O. One of the said contacts is connected by a wire V′ to the copper portion of the tube C while the other contact S is connected by means of another wire V to a contact member I placed within the device at the bottom thereof and electrically insulated therefrom by the pieces J and L.

The tube F is connected to a water pipe while the outlet S is connected to one or more cocks. The subject matter of the automatic device has been included in my co-pending divisional application filed February 18, 1928, under Serial No. 255,366.

When the cocks are closed the parts will be in the positions shown in the drawings, the heater and the automatic device will be full of water and the electric circuit will be cut off.

When a tap or cock is opened, the water, due to the pressure set up by the circulation enters the automatic device and presses down the piston D against the action of the springs R and keeps it down so long as the water flows, that is so long as any of the cocks are open.

In these circumstances, the upper contacts O will contact with the contacts S″, one of which leads to the upper end of the resistance B while the other is connected to the contact I, against which the contact Z of the piston closes, thereby closing also the electric circuit to the lower end of the said resistance B. At the same time the water flows through the automatic device and circulates up to the heating tube through S′, and issuing as hot water through the upper end of the said tube.

When the tap is closed, the water remains stationary within the apparatus and automatic device and the piston D is raised by the springs R, thereby cutting off the current first between the contacts Z and I and then at the contacts O and S. No sparking will take place as the first breaking off of the circuit takes place in the water within the automatic device. It is obvious that the closing and cutting off of the electric circuit takes place only under the control of the flowing water and that should there not be any water, the electric circuit will not be closed even when one of the taps or cocks is opened.

The apparatus according to our present

invention has the great advantage of not requiring any electric switch and that it may be connected to any suitable number of taps or cocks.

It is obvious that many constructional changes may be introduced without departing from the scope of our present invention which has been clearly set forth in the appended claiming clauses.

Having now fully described and ascertained the nature of our present invention and in what manner the same is to be carried into practice, we declare that what we claim and desire to protect by Letters Patent is:

1. An electric water heater comprising a glass tube; an insulating tube surrounding said glass tube; a pair of metal tubes mounted around said insulating tube, said metal tubes being spaced from each other; and a heating wire in said glass tube, one end connected to one metal tube and the other end connected to the other metal tube to complete an electric circuit, said glass tube being adapted to have water circulated therethrough which is heated by the wire.

2. An electric water heater comprising a glass tube; an insulating tube surrounding said glass tube; a pair of metal tubes mounted around said insulating tube, said metal tubes being spaced from each other at their inner ends and closed at the outer ends; a heating wire in said glass tube, one end connected to one metal tube and the other end connected to the other metal tube to complete an electric circuit, said glass tube being adapted to have water circulated therethrough which is heated by the wire; and an inlet for the water at the outer end of one of the metal tubes and an outlet for the water at the outer end of the other metal tube.

In testimony whereof we affix our signatures.

ANGEL A. GRASSI.

RAFAEL DE OLIVEIRA CÉZAR.