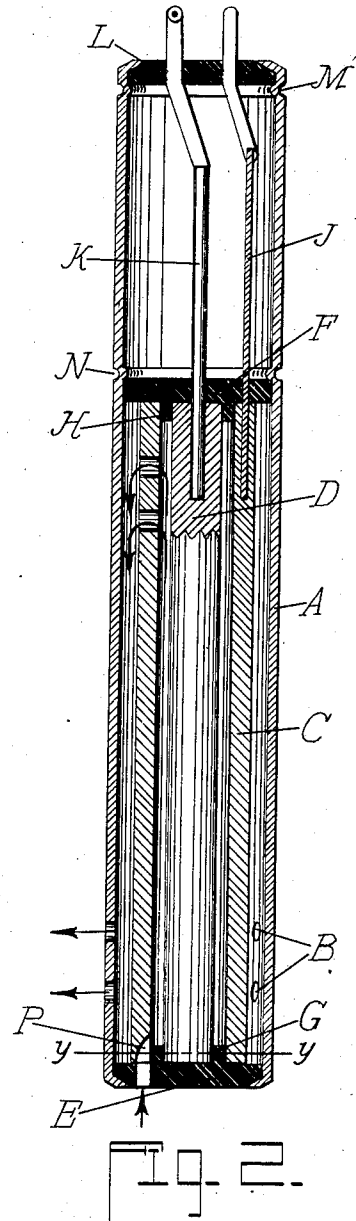
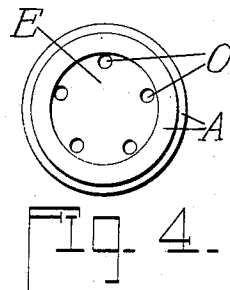
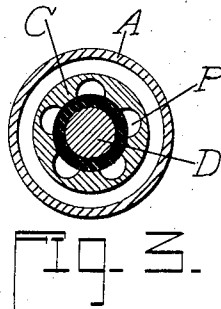
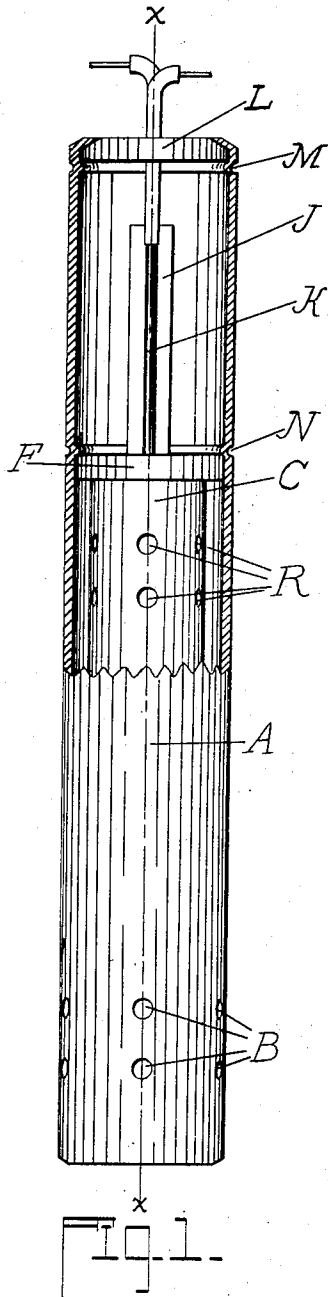


J. R. LAWSON.
ELECTRIC HEATER FOR LIQUIDS.
APPLICATION FILED NOV. 17, 1910.

1,025,281.

Patented May 7, 1912.



WITNESSES:

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UNITED STATES PATENT OFFICE.

JAMES R. LAWSON, OF DALLAS, TEXAS, ASSIGNOR OF ONE-THIRD TO WILLIAM H. YOAKUM, OF FORT WORTH, TEXAS, AND ONE-THIRD TO C. W. WHITE, OF WACO, TEXAS.

ELECTRIC HEATER FOR LIQUIDS.

1,025,281.

Specification of Letters Patent.

Patented May 7, 1912.

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To all whom it may concern:

Be it known that I, JAMES R. LAWSON, a citizen of the United States, residing at Dallas, in the county of Dallas and State of Texas, have invented certain new and useful Improvements in Electric Heaters for Liquids, of which the following is a specification.

My invention relates to new and useful improvements in electric heaters for liquids. Its object is to provide a portable electric heater of such a size as to be easily immersed in any ordinary water vessel, and adapted to be connected with any common lighting circuit by means of a plug and socket.

The object is more specifically to provide an electric heater for liquids which shall consist of two electrodes mounted within a suitable casing and spaced from each other, it being possible for the liquid in which the heater is immersed to circulate between the two electrodes, forming a closed circuit between the same and offering a sufficiently high resistance to produce the necessary heat.

Finally the object of the invention is to provide a device of the character described that will be strong, durable, simple and efficient, automatic in operation when inserted in the fluid to be heated, and also one which will be comparatively easy to construct, and which will not be likely to get out of working order.

With these and various other objects in view, my invention has relation to certain novel features of construction and operation, an example of which is described in the following specification, and illustrated in the accompanying drawing, wherein:

Figure 1 is a side elevation of the heater in partial section, the upper portion of the casing being broken away. Fig. 2 is a vertical sectional view taken on the line $x-x$ of Fig. 1. Fig. 3 is a sectional view taken on the line $y-y$ of Fig. 2. Fig. 4 is a bottom view of the heater.

Referring now more particularly to the drawing wherein like letters of reference designate similar parts in all the figures, the letter A denotes the tubular casing of the heater, which is provided in its lower portion with a number of perforations B, the purpose of which will be explained hereinafter. Within this casing are mounted two electrodes C and D, the former being a hol-

low cylinder spaced from the casing A, and the latter being a cylindrical rod centrally mounted within the casing and spaced from and within the cylinder C. The electrodes C and D are of even length and are held firmly in their proper relative positions by a plug E at their lower extremities and a plug F at their upper extremities. The plug E has a flange G upon its top surface, and the plug F has a similar flange H upon its under surface. The electrode D has its extremities seated within the flanges G and H, and the electrode C has its extremities seated over said flanges.

The electrical connections to the electrodes C and D are denoted by the letters J and K respectively. An air tight and water tight casing is provided between the plugs L and F for these electrical connections J and K, the space about the connections will thus be kept dry and electrolysis of the connections thereby prevented.

Wires extending from these connections through a plug L fixed in the upper extremity of the casing may be extended to any suitable source of current, either direct or alternating. The upper extremities of the casing are turned over to prevent upward displacement of the plug L, and an annular groove M is formed in the casing below the plug to prevent downward displacement thereof. A water tight connection is thus formed. An annular groove N is also provided in the casing directly above the plug F preventing upward displacement of the same, and forming a water tight connection between the plug and the casing. The lower extremity of the casing is turned inward to prevent downward displacement of the plug E. This plug is provided with a plurality of apertures O which extend therethrough adjacent to the outer wall of the flange G and are oppositely positioned to the apertures P provided in the inner portion of the lower edge of the electrode C. The apertures P and O thus form by their combination continuous passages from the exterior of the casing to the space between the two electrodes. These passageways are intended as inlets for the liquid in which the heater is immersed. The water thus entering will fill the space between the two electrodes and establish an electrical connection between the same. After the water has become highly heated, it may es-

cape from the aforesaid space through a plurality of apertures R provided in the upper portion of the electrode C. It will then be free to pass downward between the outer casing and the electrode C and to escape through the apertures B in the lower portion of the casing A. This will tend to set up a continuous circuit of water which will be constantly rising between the two electrodes and constantly flowing downward between the outer electrode and the casing. The circuit thus established is indicated in Fig. 2 by arrows. By thus causing the liquid to traverse an extended path through the heater, the liquid is brought into contact with a large heating surface so that its temperature may be quickly raised.

The electrodes C and D will be preferably composed of carbon since this element is not subject to the destructive action of electrolysis such as would occur if metals were used. The plugs F., G and L will be preferably made of porcelain although other forms of insulating material might be made to serve the purpose.

What I claim is:

1. In an electric heater, the combination with an elongated casing having a plurality of apertures in its lower portion, of an insulating plug mounted in the lower portion of said casing and provided with a plurality of apertures, an insulating plug mounted in the upper portion of the casing and forming a water tight connection therewith, a pair of electrodes mounted between said plugs and separated by a space, with which space the apertures in the lower plug communicate, and a plurality of apertures provided in the upper portion of one of said electrodes.

2. In an electric heater, the combination of an elongated casing, a plug of insulation material forming an air tight and water tight partition in said casing, a plug of insulation material closing one end of said casing, concentric electrodes carried by said plug and said partition, the outer electrode

and said casing having provision for the circulation of water between said electrodes and between the outer electrode and said casing, electrical connections for said electrodes projecting through said partition and a plug of insulation material closing the other end of said casing and forming an air and water tight inclosure for said electrical connections.

3. In an electrical heater, the combination with a casing; of an insulating plug closing one end of said casing, an insulating plug forming an air tight and water tight partition in said casing, a solid inner electrode and an outer electrode carried by said plugs, said outer electrode being spaced from the inner electrode and from said casing and said outer electrode and said casing having provision for the circulation for fluid therebetween and between the inner electrode and outer electrode, electrical connections for said electrodes projecting through said partition, and an insulating plug closing the other end of said casing and forming an air and water tight inclosure for said electrical connections, said electrical connections having provisions for the connection with a supply source of electricity.

4. In an electrical heater, the combination with an elongated casing having apertures for circulation of water therein at the lower portion; of a pair of electrodes mounted in said casing and spaced from each other and from said casing, an air and water tight inclosure being formed in the upper portion of said casing and electrical connections for said electrodes extending therefrom into said air and water tight casing, said electrical connections having provision for connection with a supply source of electricity.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JAMES R. LAWSON.

Witnesses:

J. S. MURRAY,

S. R. HICKMAN.