Jan. 13, 1925. 1,522,603

A. SUNDH

FLUID HEATER

Filed April 2, 1921 2 Sheets-Sheet 1

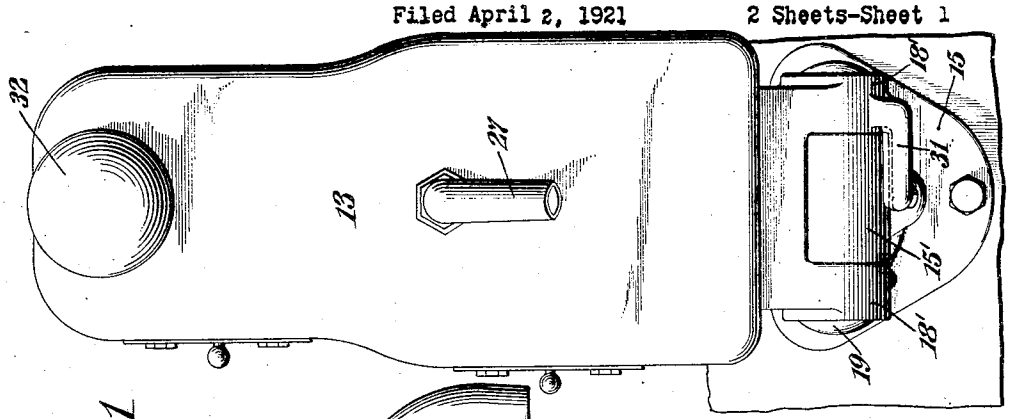

Fig. 1.

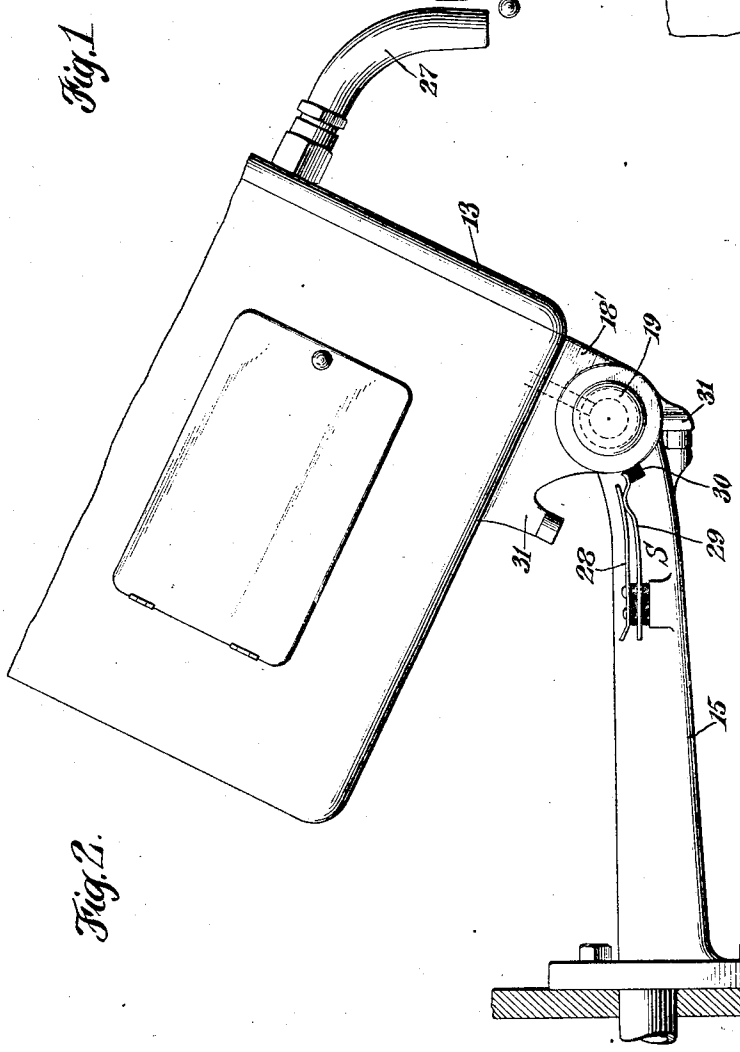

Fig. 2.

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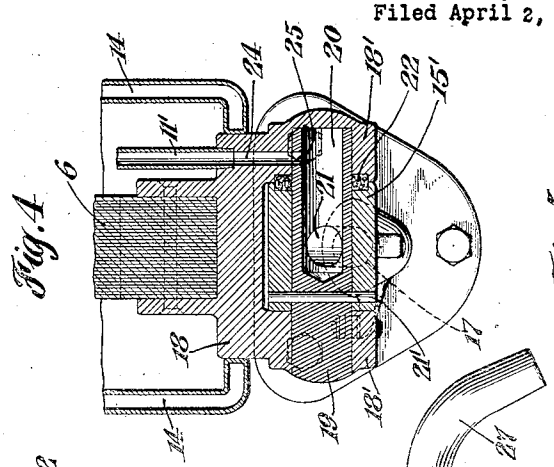

Fig. 4.

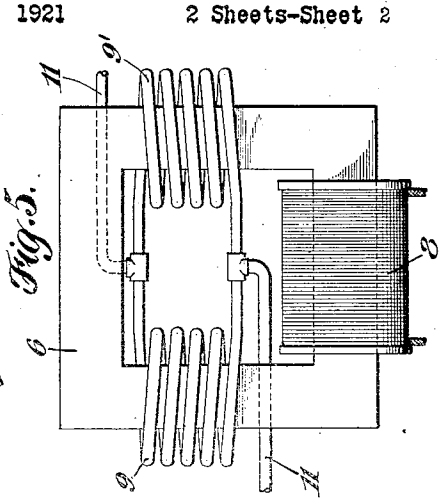

Fig. 5.

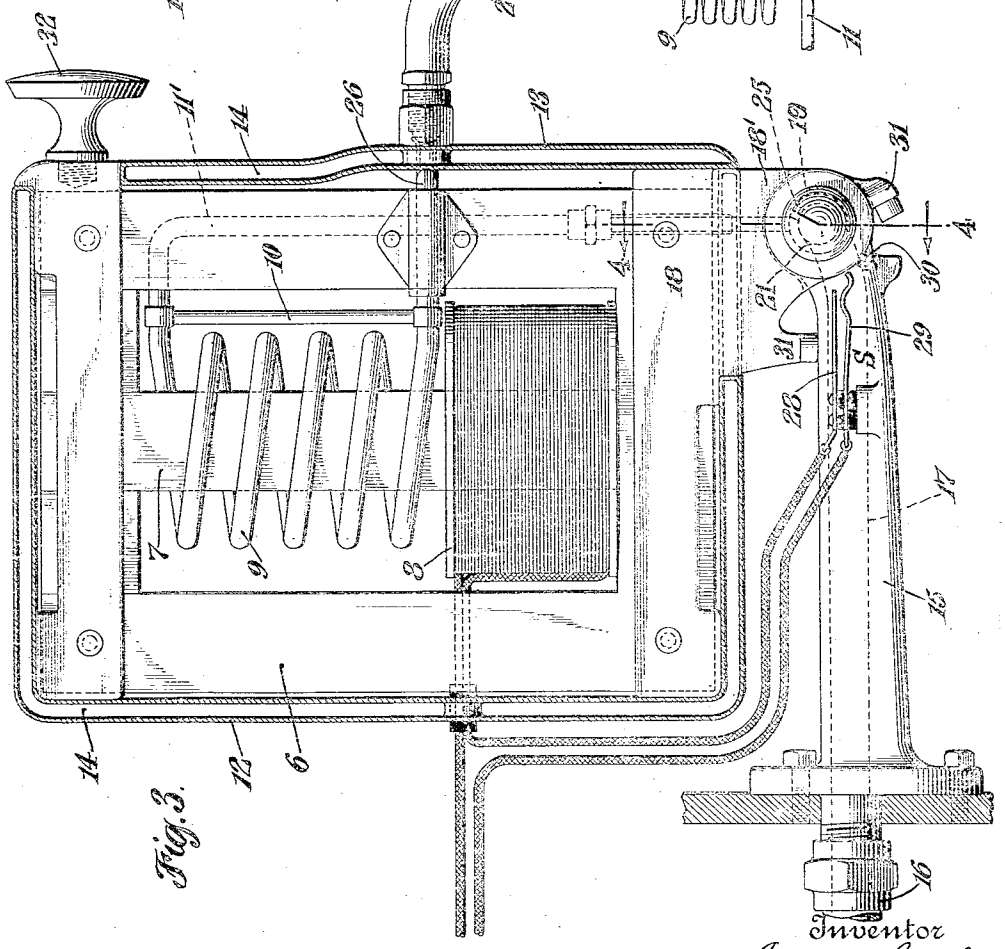

Fig. 3.

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Patented Jan. 13, 1925. 1,522,603

UNITED STATES PATENT OFFICE.

AUGUST SUNDH, OF YONKERS, NEW YORK.

FLUID HEATER.

Application filed April 2, 1921. Serial No. 458,079.

To all whom it may concern:

Be it known that I, AUGUST SUNDH, a citizen of the United States, and a resident of Yonkers, county of Westchester, and State of New York, have invented certain new and useful Improvements in Fluid Heaters, of which the following is a specification.

My invention relates to fluid heaters and particularly to heaters constructed and adapted for operation by electric current.

An object of my invention is to provide a fluid heater wherein the flow of fluid and the heating effect will be interdependently controlled, a further object being to control the fluid flow and the heating effect by a tilting of the heating device.

Another object of my invention is to provide a fluid heating device in which the heating effect is obtained from electric current; a further object being to efficiently utilize alternating current in a fluid heater.

Another object of my invention is to provide a fluid heater in which a fluid heating element is heated by electric current induced therein, a further object being to form the secondary coil of the transformer of tubular electric and fluid conducting material to constitute the fluid heating element.

Another object of my invention is to provide a simple, compact and efficient fluid heating device in which the heating is carried on within an insulated chamber.

Other and further objects of my invention appear from the following description taken in connection with the accompanying drawings and will be pointed out in the hereunto appended claims.

In the drawings in which like reference characters indicate similar parts, Fig. 1 is a front elevation of a fluid heating device embodying my invention; Fig. 2 is a side view of the construction shown in Fig. 1 partly broken away; Fig. 3 is a vertical sectional view of the construction shown in Fig. 1; Fig. 4 is a sectional view on the line 4—4 of Fig. 3; and, Fig. 5 shows a modified form of a construction embodying my invention.

My invention involves the heating of fluid by electric current and it also involves making an element heated by electric current in tubular form and passing the fluid therethrough. It also involves the production of a flow of current in the heating element by induction, particularly by utilizing the heating element as a secondary of a transformer, the secondary being preferably short circuited electrically and, if desired, being short circuited as to flow of fluid. In the latter case, the coil is provided with a supply at one point and a discharge at another point.

In accomplishing these ends I provide a laminated magnetic circuit or transformer core 6 preferably comprising top, bottom and side members and a center core 7, Associated with and preferably encircling a portion of the magnetic circuit is a primary coil 8 intended to be energized by an alternating current so as to set up in the magnetic circuit an alternating flux. Associated with the magnetic circuit is a fluid heating element 9, preferably in the form of a coil, and made of electrically conductive material. In order to simplify the construction and add to the efficiency of this heating element, it may be made of tubing so that the fluid to be heated is brought into contact with it by being passed through it. It will be apparent that when the primary coil is energized an electromotive force will be induced in the element 9 and in order to heat the element it is short circuited electrically by a member 10 connecting the ends of the coiled element 9. The same result is obtained in the construction shown in Fig. 5 wherein the heating element comprises the parts 9 and 9′ which are connected together to form both an electric and fluid short circuit, the fluid being led to and from the element respectively at different points by the tubes 11.

Surrounding the heating elements 9, as well as the primary coil 8 and the magnetic circuit or core 6, is a casing comprising the parts 12 and 13 which are double-walled and there is maintained a vacuum in the spaces 14. A bracket or other suitable base 15 supports the heating device in the manner hereinafter described. A fluid supply pipe 16 leads to a passage 17 passing through the bracket. Through the end 15′ of the bracket (see Fig. 4) an opening intersects the passage 17 and a base member 18 on which the core 6 is supported has ears 18′ positioned on opposite sides of the end 15′ of the bracket. One of these ears has an opening and the other has a recess both registering with the end 15′ of the bracket. Through these openings and into the recess there extends a pin 19 which has a recess 20 communicating through the hole 21 with the passageway 17. This pin 19 is held in position by the pin

21'. Suitable packing 22 seals the joint between the pin 19, the recessed ear 18' and the end 15' of the bracket for a purpose hereinafter made apparent. A tubular member 11' leads from one end of the element 9 to a passage 24 through the base 18 and a passage 25 leads from the recess 20 in the pin 19 so that fluid will pass from the passage 17 to the heating element when the device is tilted to the position shown in Fig. 2 wherein the passages 24 and 25 are in register or the fluid flow will be cut off when the device is tilted to the position shown in Fig. 3. The pivotal mounting of the device therefore constitutes a fluid flow controlling means. From the other end of the heating element 9 a passage 26 leads to a discharge member 27.

In order to prevent overheating of the heating element it is my intention that the primary coil 8 will not be energized except when fluid is acted upon by the heating element 9. My invention therefore contemplates simultaneous control of the source of heat and fluid and therefore interdependence of the respective controlling devices therefor. As a simple form of interdependent controlling devices I have shown a switch S for controlling the flow of current to the primary coil which is closed when the heating device is tilted to such a position that fluid will flow through the heating element. To this end, I provide flexible contacts 28 and 29 fastened upon the bracket 15 and insulated from one another and adapted to be flexed into contact by the lug 30 of insulating material mounted upon one of the ears 18' at such time when the device is tilted to permit flow of fluid. Stop members 31 act upon the bracket 15 to limit the tilting of the device which is effected by the handle 32. If desired, the fluid heating element may be insulated from the source of supply in any convenient manner such as making the coupling member 16 or the necessary parts thereof of insulating material.

While I have described the specific details of my invention it is to be understood that I do not limit myself to the specific details but intend that my invention shall be defined by the hereunto appended claims.

What I claim as new and desire to secure by Letters Patent is:

1. As an attachment to the discharge member of a fluid system, a fluid heater comprising a tubular electric resistance element, means for supplying electric current to said element means for supplying fluid to said element, and means for controlling said current inter-dependently with the flow of fluid from said discharge member.

2. In a fluid heater, a tubular electric resistance element, means for supplying electric current to said element a pivoted support for said element, a fluid supply, and means for controlling said current and fluid supplies and operated by movement of said element upon its pivot.

3. As an attachment to the discharge member of a fluid system, a fluid heater comprising an electrically inductive fluid conducting element and means for inducing a current therein said means being inter-dependently controlled with the flow of fluid from said discharge member.

4. As an attachment to the discharge member of a fluid system, a fluid heater comprising a primary coil, a secondary coil of tubular material, connected at one end with said discharge member means for supplying current to said primary coil and means for supplying fluid to said secondary coil the heating effect of said secondary coil being inter-dependently controlled with the flow of fluid from said discharge member.

5. As an attachment to the discharge member of a fluid system, a fluid heater comprising a primary coil, a short-circuited secondary coil of fluid conducting material, means for supplying current to said primary coil, and means for supplying fluid to said secondary coil at one point and withdrawing it through said discharge member, the current supplied to said secondary coil being inter-dependently controlled by the flow of fluid through said discharge member.

6. As an attachment to the discharge member of a fluid system, a fluid heater comprising a casing, a primary coil therein, electric conductors leading into said casing for energizing said primary coil, an electric switch controlling the current passing through said conductors, a tubular inductive secondary coil within said casing, and means for conducting fluid into said casing to one point of said secondary coil, and from another point of said secondary coil out of said casing, said electric switch being inter-dependently controlled by the flow of the fluid into said conducting means.

7. As an attachment to the discharge member of a fluid system, a fluid heater comprising a casing, a primary coil therein, electric conductors leading into said casing for energizing said primary coil, an electric switch controlling the current passing through said conductors, a tubular inductive secondary coil within said casing, and means for conducting fluid into said casing to one point of said secondary coil and from another point of said secondary coil out of said casing, said secondary coil being electrically short-circuited, said electric switch being interdependently controlled by the flow of the fluid into said conducting means.

8. In a fluid heater, a fluid heating element, and a valve, having a plurality of

members, for controlling flow of fluid, said element being supported on one of said members and another of said members being supported, whereby tilting of the heating element controls fluid flow.

9. In a fluid heater, a fluid heating element, a source of energy for heating said element, a valve, comprising a plurality of members, for controlling flow of fluid, said element being mounted upon one of said members and another of said members being supported, whereby tilting of said element controls fluid flow, and means operated by tilting said element to control said energy source.

10. In a fluid heater, a pivoted fluid heating element, said pivot comprising a fluid valve, and means operated by movement of said element on its pivot for controlling the heating of said element.

11. In a fluid heater, a transformer having a secondary coil of tubular fluid-conducting material, and a casing for said transformer having double walls between which a vacuum is maintained, said casing having means for admitting and discharging the fluid to be heated.

12. In a fluid heater a heat insulated casing, a fluid element within the casing constituting a secondary coil, and a source of electric current arranged to induce a current in said element whereby to heat the fluid therein.

In testimony whereof, I have signed my name to this specification.

AUGUST SUNDH.