E. THOMSON.

SYSTEM OF HEATING,

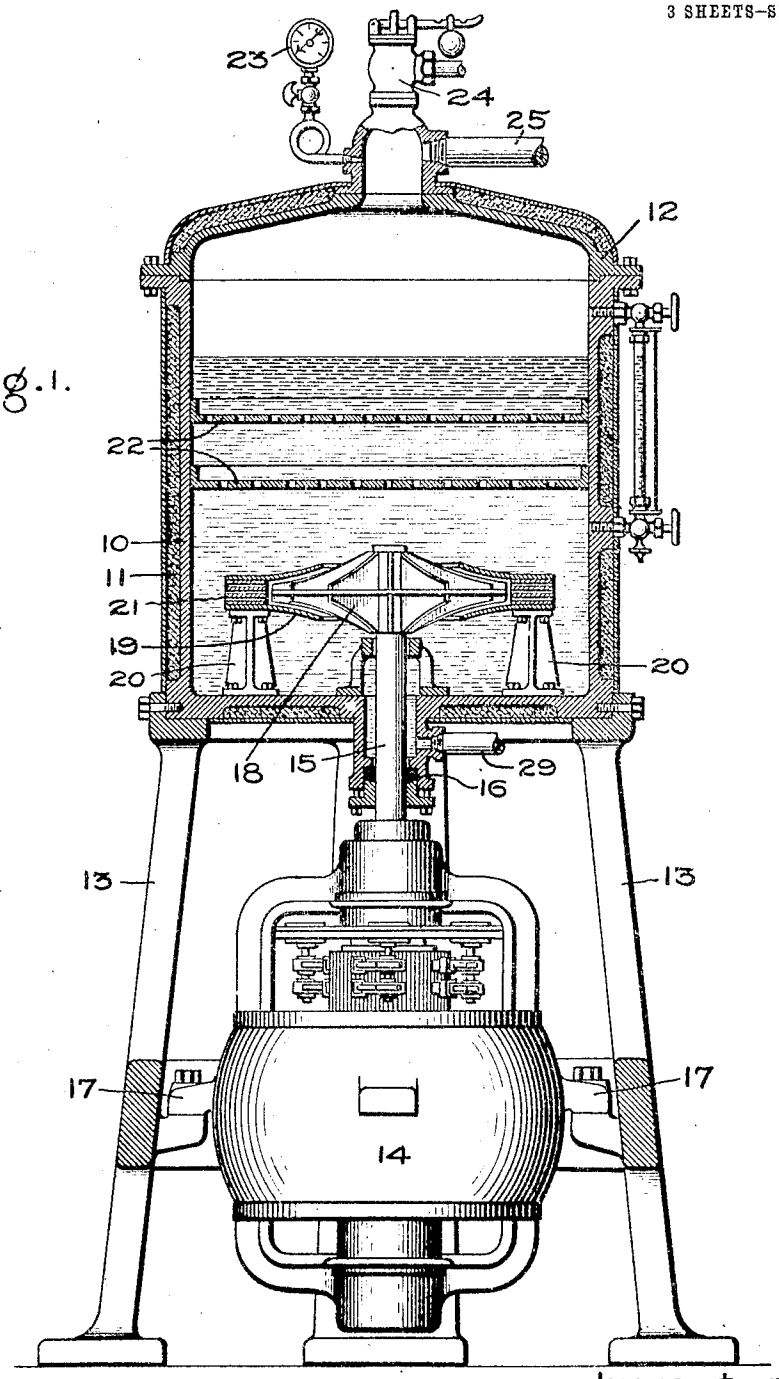
APPLICATION FILED AUG. 14, 1909.

1,031,489.

Patented July 2, 1912.

3 SHEETS-SHEET 1.

Fig. 1.



Witnesses:

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Inventor:

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3 SHEETS-SHEET 2.

Fig. 2.

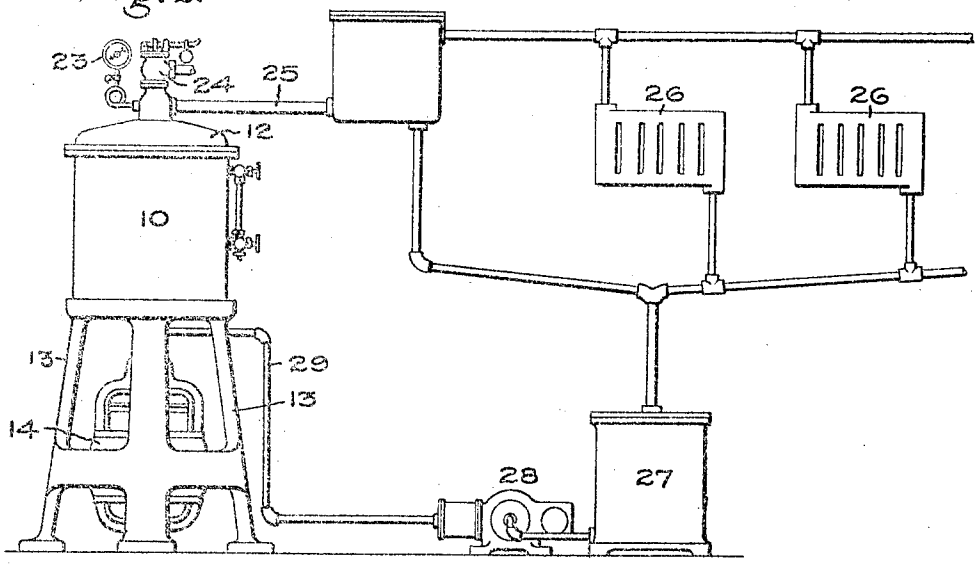


Fig. 3

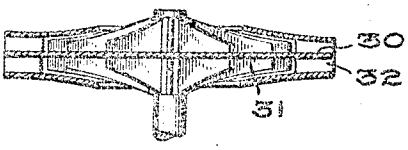


Fig. 4.

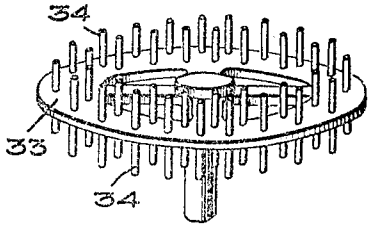


Fig. 5.

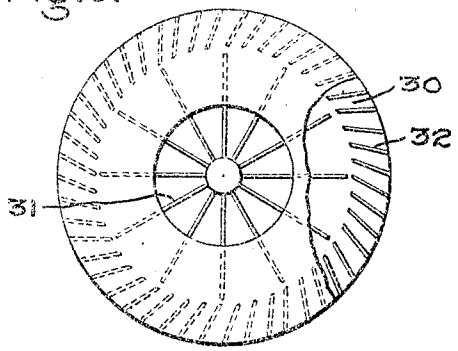
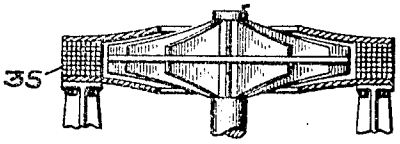


Fig. 6.



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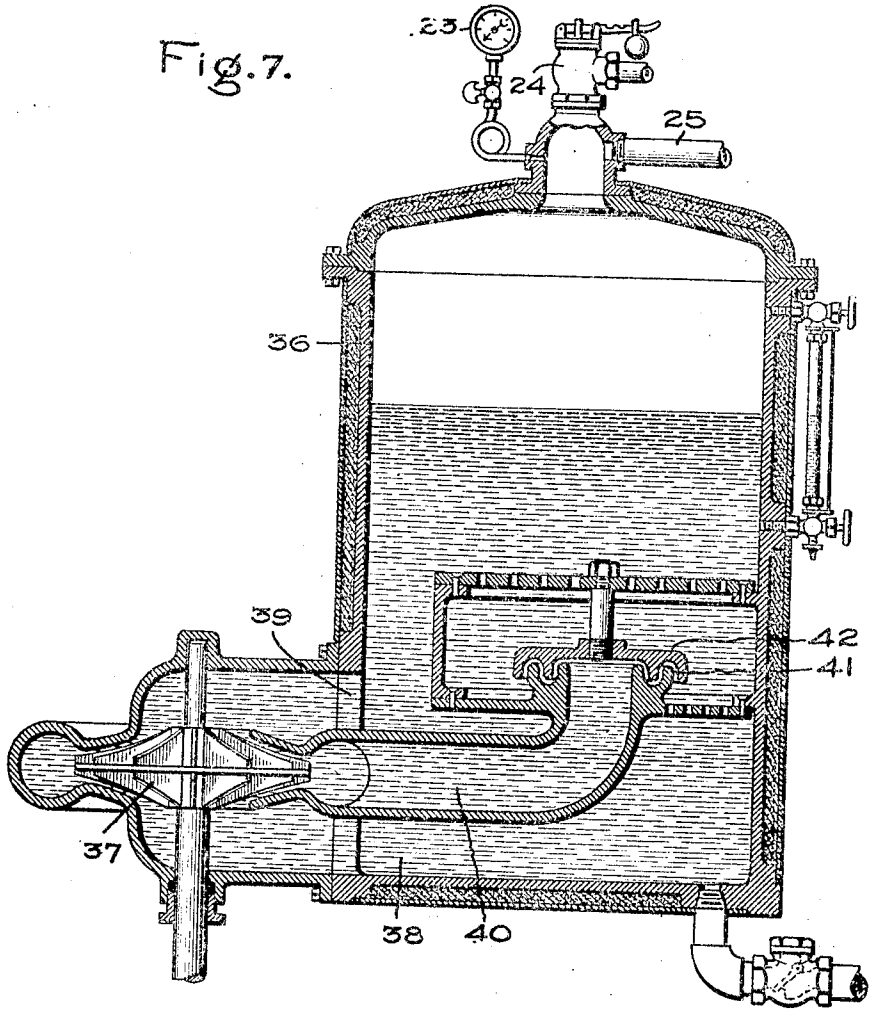
3 SHEETS—SHEET 3.

Fig. 7.



Witnesses

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UNITED STATES PATENT OFFICE.

ELIHU THOMSON, OF SWAMPSCOTT, MASSACHUSETTS, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

SYSTEM OF HEATING.

1,031,489. Specification of Letters Patent. Patented July 2, 1912.

Application filed August 14, 1909. Serial No. 512,823.

To all whom it may concern:

Be it known that I, ELIHU THOMSON, a citizen of the United States, residing at Swampscott, county of Essex, State of Massachusetts, have invented certain new and useful Improvements in Systems of Heating, of which the following is a specification.

This invention relates to heaters and heating systems and has for its object the provision of means whereby water or other fluid may be mechanically set into motion, and provided with impeding devices for resisting the flow of the water and thereby transforming its energy into heat.

My invention relates more specifically to means for transforming electric energy into heat by the action of mechanical devices for agitating the water and heating the same. In carrying out my invention, I utilize means, such, for instance, as an electric motor, for agitating the fluid in the boiler. My system is particularly well adapted for use in trains heated by steam or hot water. Instead of employing an electrical resistance of the ordinary type, I utilize the current for driving an electric motor which in turn drives a mechanical device which heats the water.

Other objects of my invention will appear in the course of the following specification, in which I have disclosed my invention embodied in concrete form for purposes of illustration.

In the drawings illustrating my invention, Figure 1 is a vertical section of my heating device, the motor being in elevation; Fig. 2 is a view showing the entire heating system; Figs. 3, 4, 5 and 6 show modified forms of impellers, Fig. 5 being a plan view of the impeller shown in Fig. 3; and Fig. 7 shows a sectional view of a modified form of fluid container.

Referring to the drawings, 10 represents a fluid container or receptacle, which may be a boiler adapted for containing steam under pressure. This boiler is preferably lagged with heat insulating material 11, as, for instance, asbestos or mineral wool. If desired, in order that the interior may be readily accessible, the boiler may have its end in the form of a cap 12, which is bolted to the body portion as shown. This receptacle is provided with legs 13, to which is connected the electric motor 14 having a vertical shaft 15, which extends upward through a stuffing box 16 into the receptacle 10. The particular type of motor and its arrangement with reference to the receptacle forms no part of my invention, although I have shown the motor attached to the legs by means of the lugs 17 for purposes of illustration. At the upper end of the shaft 15 is a rotary element, such as the impeller 18, arranged within the receptacle so as to set the water in motion. This impeller 18 is surrounded by a casing 19 mounted upon supporting brackets 20. The casing is preferably cut away at its central portion to allow the water to enter at the center of the impeller, while the impeding devices are arranged around the periphery of the impeller. These impeding devices may be of any desired form, as, for instance, in the form of annular plate 21 concentrically arranged around the outside of the casing and spaced from each other so as to form narrow passages through which the water is forced. These passages cause a considerable drop in the pressure of the water and thereby convert the energy into heat. In order to prevent the turbulence or confusion of the water produced by the agitation of the impeller from reaching the upper surface, I have interposed perforated diaphragms 22. The forcible churning of the water raises its temperature and the pressure developed may be read upon a gage 23 and controlled by safety valve 24. The steam may be delivered through the pipe 25 and radiators 26, as shown.

In Fig. 2 I have shown a closed system, so that the stem which condenses in the pipes returns to the hot well 27 and is forced by means of a pump 28 to the boiler through the passage 29. A supply of cold water may also be furnished so as to make up the losses which may occur. The unboiled water would necessarily return to the intake, but all the chokings by valves or the like, instead of being detrimental, tend to assist the operation by causing the absorption of the energy by the water.

In Figs. 3 and 5 I have shown another form of impeller in which the impeding devices 30 form part of the impeller and rotate therewith. In this case the impeller is in the form of a paddle wheel 31 arranged

with a casing and having the vanes 32 set at an angle, as shown, so as to offer resistance to the free passage of the water.

In Fig. 4 I have shown another form of revolving element consisting of a disk 33 provided with pins 34 projecting from both sides of the plate and adapted to agitate the water.

In Fig. 6 I have shown a slightly modified form in which the impeding devices consist of layers of wire gauze or netting 35 arranged in the path of the water for impeding its motion.

In Fig. 7 I have shown another form in which the receptacle or boiler 36 is arranged to one side of the impeller, which is in the form of a centrifugal pump 37 taking in fluid through passages 38 and 39 and discharging it around the periphery through the passage 40. From this passage 40 the water passes through a tortuous passage 41 formed of a flanged cap or cover 42 over the flanged end of the upwardly turned portion of the passage 40. The amount of turbulence of the water may be varied by making the passage more or less tortuous and varying its length.

Various modifications may be made in the structure of the parts and the arrangement thereof, and various other means of carrying out my invention will suggest themselves to those skilled in the art, the one essential feature of the invention being the causing of the liquid to be agitated or rendered turbulent by means of a moving element. All such means for bringing about this result I regard as within the spirit of my invention in so far as they fall within the scope of the annexed claims.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. Means for converting electrical energy into heat comprising a container, means for forcing water into said container and maintaining it under pressure, an electric motor, an impeller driven by said motor to circulate water in the container, and means for impeding the said circulation to heat the water.

2. Means for converting electric energy into heat comprising an electric motor, a container, a piping system connected with said container, means for forcing water into said container and maintaining it under pressure, an impeller driven by said motor for setting the water in said container in motion, and means for impeding the motion of the water to convert its energy into steam.

3. Means for converting electric energy into heat comprising a container, means for forcing water into said container under pressure, an electric motor, an impeller driven by said motor for circulating the water in the container, means for impeding the said circulation to heat the water, and diaphragm plates for preventing turbulence of the water.

4. Means for converting electric energy into heat comprising a water container, a supporting frame, an electric motor mounted in said frame, an impeller mounted on the motor shaft and extending into the water for circulating the same, and means within said container for impeding the circulation of the water to convert its energy into heat.

5. Means for converting electric energy into heat comprising a water container, a piping system connected therewith, a pump for forcing water into the container, an electric motor, an impeller mounted on the motor shaft and extending into the water to circulate the same within the container, and means for impeding the motion of the water to convert its energy into steam.

6. Means for converting electric energy into heat comprising a water container, an electric motor mounted adjacent thereto, an impeller mounted on the motor shaft and extending into the water in said container for circulating the same, means within said container for impeding the circulation of the water to convert its energy into heat, and diaphragm plates for preventing turbulence of the water.

7. Means for converting electric energy into heat comprising a water container, a supporting frame therefor, an electric motor mounted in said frame, an impeller on the motor shaft extending into the fluid in said container for circulating the same, a pump for forcing water into said container, means within the container for impeding the circulation of the water to convert its energy into heat, and diaphragm plates for preventing turbulence of the water.

In witness whereof, I have hereunto set my hand this 12th day of August, 1909.

ELIHU THOMSON.

Witnesses:
DUGALD McK. McKILLOP,
CHARLES A. BARNARD.