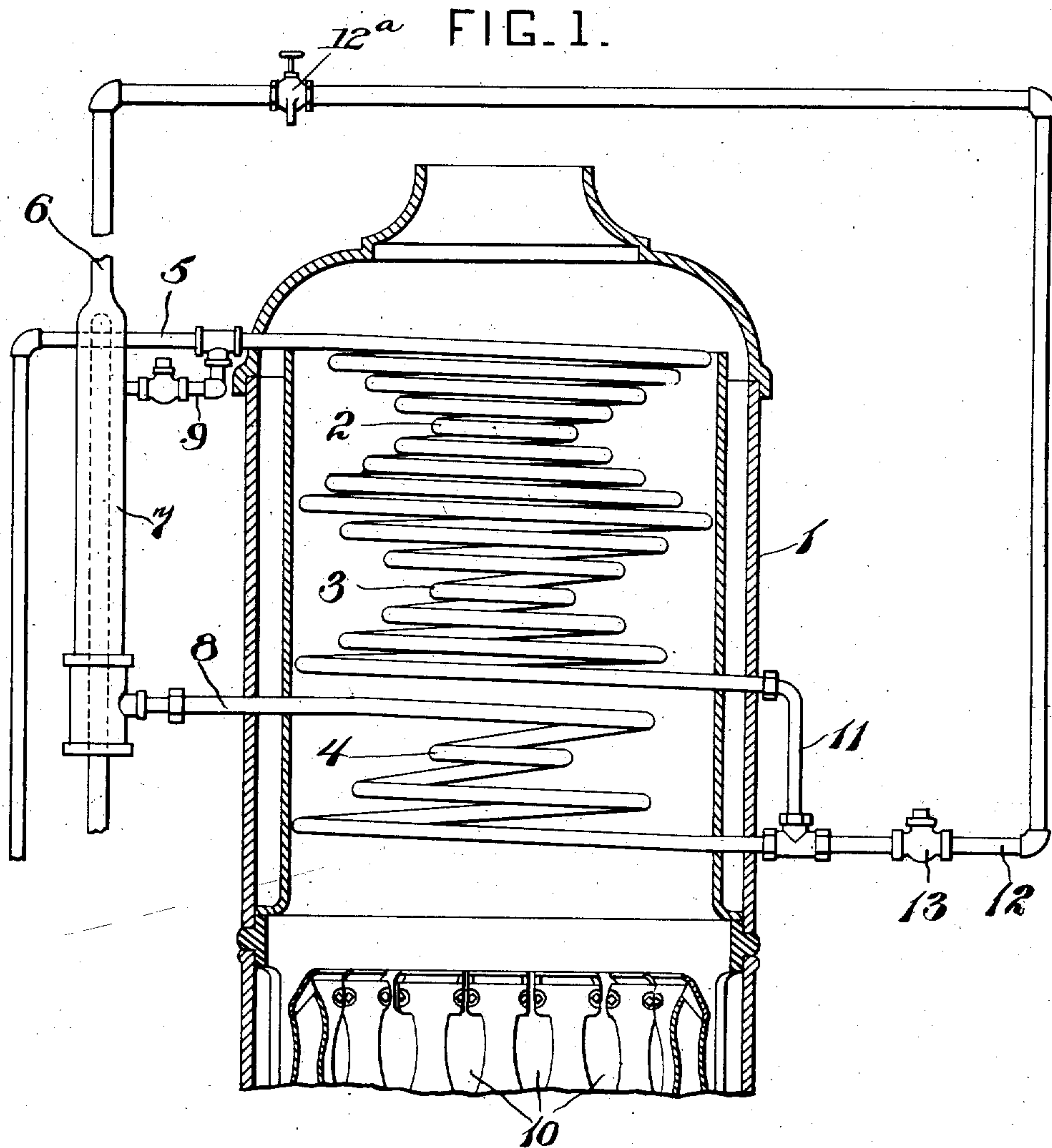


R. C. FRAMPTON.
INSTANTANEOUS WATER HEATER.
APPLICATION FILED NOV. 6, 1907.

973,646.

Patented Oct. 25, 1910.

2 SHEETS—SHEET 1.



WITNESSES:

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2 SHEETS—SHEET 2.

FIG. 2.

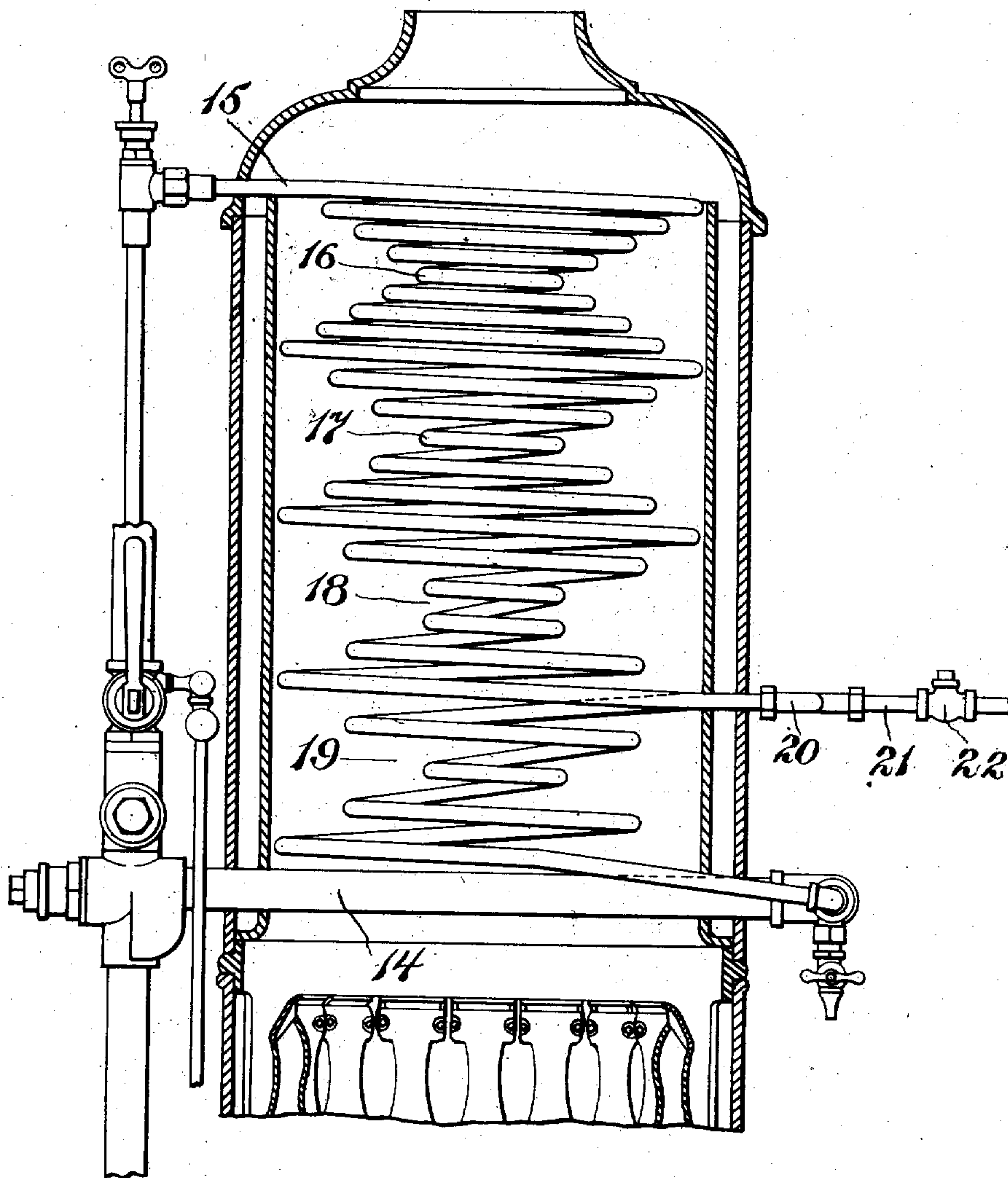
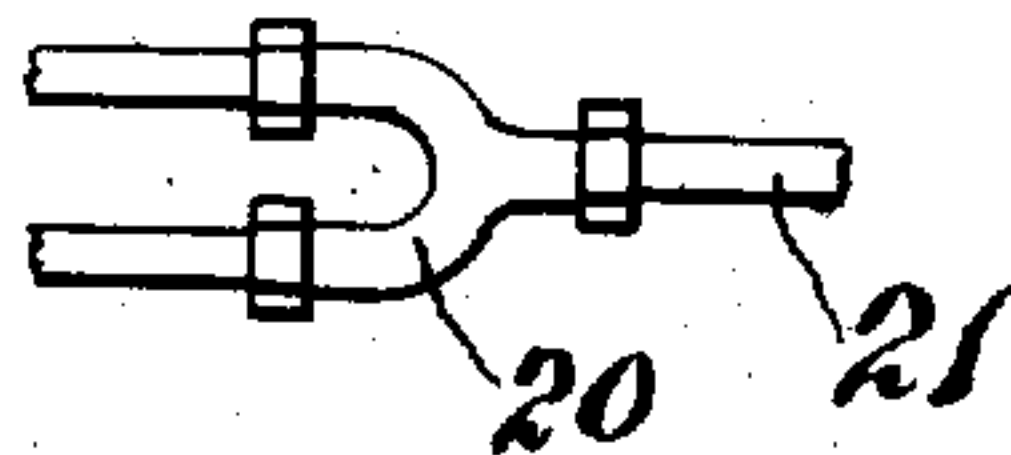


FIG. 3.



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UNITED STATES PATENT OFFICE.

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INSTANTANEOUS WATER-HEATER.

973,646.

Specification of Letters Patent.

Patented Oct. 25, 1910.

Application filed November 6, 1907. Serial No. 400,905.

To all whom it may concern:

Be it known that I, REYNOLDS C. FRAMPTON, a citizen of the United States, residing at Allegheny, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Instantaneous Water-Heaters, of which the following is a specification.

The invention relates to water heaters employing coil tubes, and has for its primary objects; the provision of an improved arrangement of tubes whereby a more complete combustion of fuel is secured, and the absorption of heat from the top to the bottom of the heater rendered more uniform, to the end that a higher efficiency be attained; the provision of improved means whereby that part of the boiler subject to the most severe usage may be easily replaced; and the provision of improved means for maintaining a constant circulation of hot water through the pipes supplied from the boiler. Certain embodiments of the invention are illustrated in the accompanying drawings, wherein:—

Figure 1 is a transverse section through the casing of one type of heater, the heating coil or boiler being shown in side elevation.

Figure 2 is a similar section through a somewhat different type of heater, and

Figure 3 is a detail plan view of the coupling used in device of Figure 2.

The form of boiler illustrated in Figure 1 is of the type shown in Reinecke No. 866,966, issued September 24, 1907. Referring briefly to the general construction as shown in this figure, 1 is the casing of the heater, 2, 3 and 4 are the coil formations constituting the boiler, 5 is the inlet pipe, 6 is the outlet pipe, 7 is the thermostat, 8 is the pipe leading from the lower portion of the boiler to the thermostat, 9 is a connection between the thermostat and the pipe 5, which connection is provided with a check valve, 10 are the burners, 11 is a detachable coupling or connection between the coils 3 and 4, 12 is a return pipe from the pipes supplied by the boiler whereby a constant circulation of hot water is maintained through the system when the outlet 6 is closed to which circulation pipe the usual outlet faucets are applied, one only of which, 12^a, is shown, and 13 is a check valve for preventing a backward flow of water to the right in the

pipe 12, which check valve may be located as shown or might, if desired, be placed in the tee at the lower end of the connection 11. This general arrangement is partially shown in Patent No. 866,966, and the present invention consists particularly in the arrangement of the coils constituting the formations 2, 3 and 4, and the use of the parts 11 and 12. The novelty of the coil construction consists in the varying of the spacing between the coils in different parts of the length of the boiler. It will be noted that the spaces between the coils of the formation 4 are greater than those between the coils of the formation 3, and these spaces between the coils of the formation 3 are in turn greater than those between the coils of the formation 2. The objects achieved by this arrangement are a more complete combustion of the fuel employed, and this at a position lower in the casing than has heretofore been the case, and further, a more uniform distribution of the work of heating the water in the boiler. It will be seen that the arrangement provides for a smaller body of water at the lower portion of the boiler, which condition results in a smaller reduction in the heat of the flame than has heretofore been the case, so that the combustion is more complete. From this it follows, that the complete combustion of the gases occurs at a point lower than that in boilers in which the spacing of the coils was uniform from top to bottom. It will also be seen that the upper formations 2 and 3 because of their greater heating surface than the coil 4, perform a greater proportion of the work of heating the water than has been the case with the old type of boilers wherein the lower coil performed a very large percentage of the work of the boiler. This latter result is further augmented by the change in speed at which the products of combustion pass the various coils of the heater. The upper coils being more closely spaced retard the movement of the heated gases, and such upper coils consequently exposed to the action of the gases for a longer period than the lower coils. It is obvious from the foregoing that the arrangement secures a uniformity of absorption of heat throughout the boiler because of the greater heating surface at the upper portions of the boiler, the longer distance through which the water

in the upper coils passes, and because of the greater time which it takes the gases to pass such upper coils.

The return of the water through the pipe 12 to the bottom of the boiler gives a very positive and effective circulation to the water in the pipes, constituting the system which the boiler supplies, as the water is returned to the hottest coil of the boiler and there is a constant upward circulation through this coil 4 even when the outlet 6 is closed in the manner fully described in Patent No. 866,966 referred to. The advantage of the arrangement will also be more apparent when it is recollected that when the burners are running low or only a single one burning, as is the case when the outlet 6 is closed, substantially all of the heat is absorbed by the coil 4, so that a circulation through this coil of the return water from the pipe 12 is all that is necessary to give it a proper amount of heat. It is obvious that the reduction in the length of coil tubing through which the return water has to pass, materially increases the rapidity of circulation. The arrangement also adds materially to the safety of the heater when water is not being drawn from the system, as the hottest water is given a positive and vigorous circulation through the system. The placing of the coupling 11 on the outside of the boiler removes the connections from the fire and makes the connecting and disconnecting of the coils 3 and 4 easy when it is desired to replace the coil 4, which coil 4 receives the most severe usage, and may need replacement before the coils 2 and 3 are worn to any great extent.

The principle of construction as shown in Figure 1, is also present in the device of Figure 2, the only difference being that the arrangement of the thermostat and certain other of the operating parts is somewhat different. The construction is one that is well known in the art, and it is unnecessary to go into detail other than to state that the part 14 is an internal thermostat, to which the outlet is connected, 15 is the inlet pipe, 16, 17, 18 and 19 are the coils whose spacing increases from the bottom to the top, 20 is a coupling between the coils 18 and 19, 21 is the return pipe and 22 is a check valve.

Having thus described my invention and illustrated its use, what I claim as new and desire to secure by Letters Patent is the following:—

1. A boiler comprising a tube of substantially uniform diameter throughout arranged in a series of coils one above the other, with the coils spaced apart distances decreasing from the bottom of the boiler to the top.

2. A coil tube boiler comprising a plurality of sets of coils arranged one above the other and having the spaces between the coils of the sets decreasing from the bottom to the top of the heater, the tubing of the boiler being of substantially uniform diameter throughout.

3. A coil tube boiler comprising a plurality of double helico volute formations arranged one above the other and having the spaces between the coils of the lower formation greater than those between the coils of the upper formations, the tubing of the boiler being of substantially uniform diameter throughout.

4. The combination in a coil tube boiler having a plurality of sets of coils one beneath the other in series, the lower one of which discharges from its upper end, of a coupling between the lower end of the lower set and the lower end of the set above, a return circulation pipe connected to the coupling, an inlet pipe connected to the upper end of the upper set, and means for preventing a back flow through such return circulation pipe.

5. The combination in a coil tube boiler having a plurality of sets of coils one above the other, of a detachable coupling between the two lower sets of coils, a return circulation pipe connected to such coupling and provided with a check valve to prevent a back-flow through the return pipe, an inlet pipe connected to the upper portion of the upper set for supplying cold water thereto, and an outlet pipe leading from the bottom set.

6. The combination in a coil tube boiler having a plurality of sets of coils, the lower one of which discharges from its upper end, of a coupling between the lower end of the lower coil and the lower end of the coil above and exterior to the boiler casing, an inlet pipe for supplying cold water to upper portion of the upper set, an outlet pipe leading from the bottom set, and a return circulation pipe connected to the coupling.

7. In combination, a coil tube heater having upper and lower sections, an inlet to the upper section, a connection from the lower end of the upper section to the lower end of the lower section, an outlet from the upper end of the lower section, and a return circulation pipe connected to the lower section below the outlet of such section.

In testimony whereof I have hereunto signed my name in the presence of the two subscribed witnesses.

REYNOLDS C. FRAMPTON.

Witnesses:

J. C. BRADLEY,
DOERING BELLINGER.