

F. J. RUPPEL.
WATER HEATER.
APPLICATION FILED JULY 20, 1908.

952,280.

Patented Mar. 15, 1910.

Fig. 1.

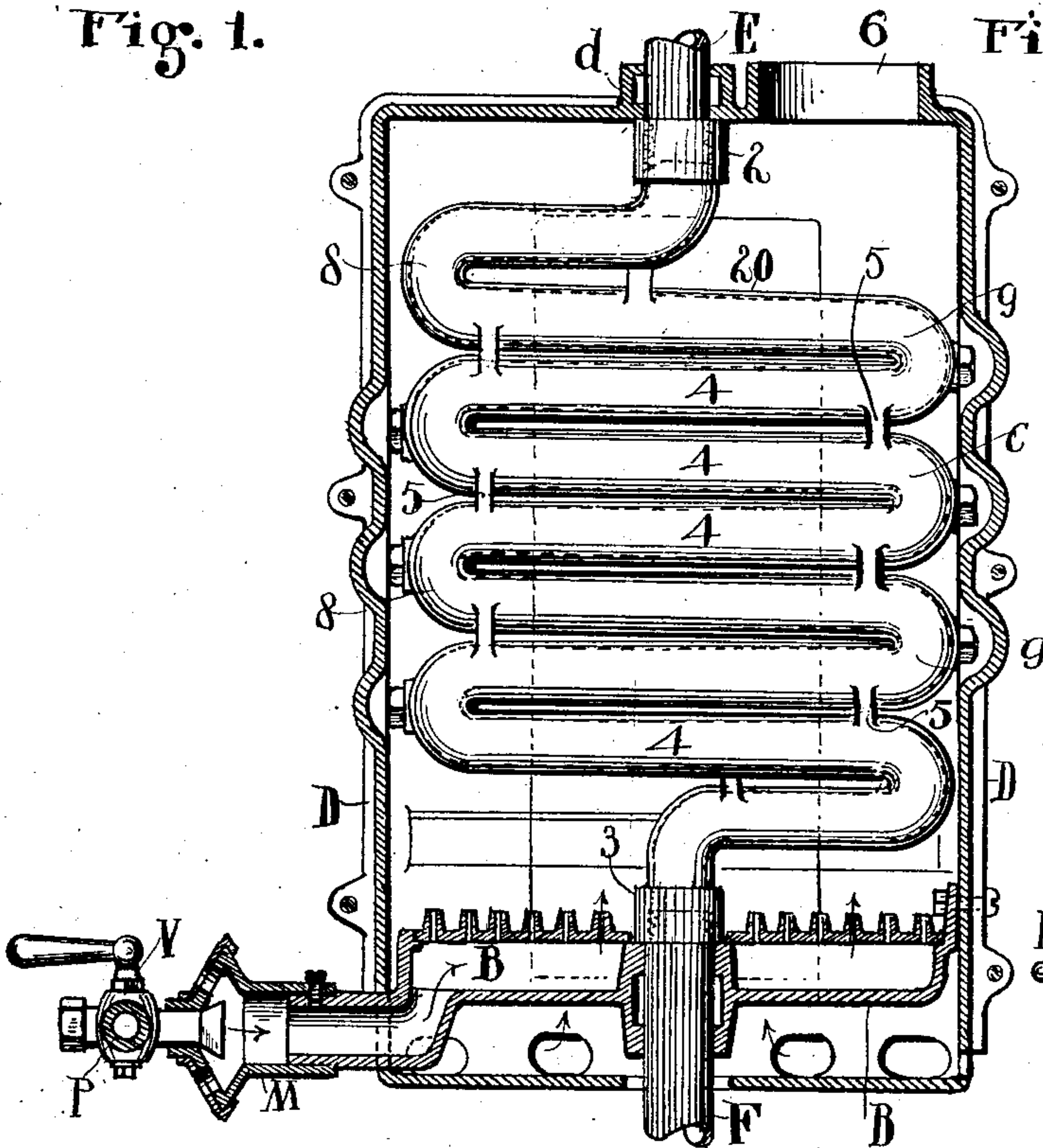


Fig. 2.

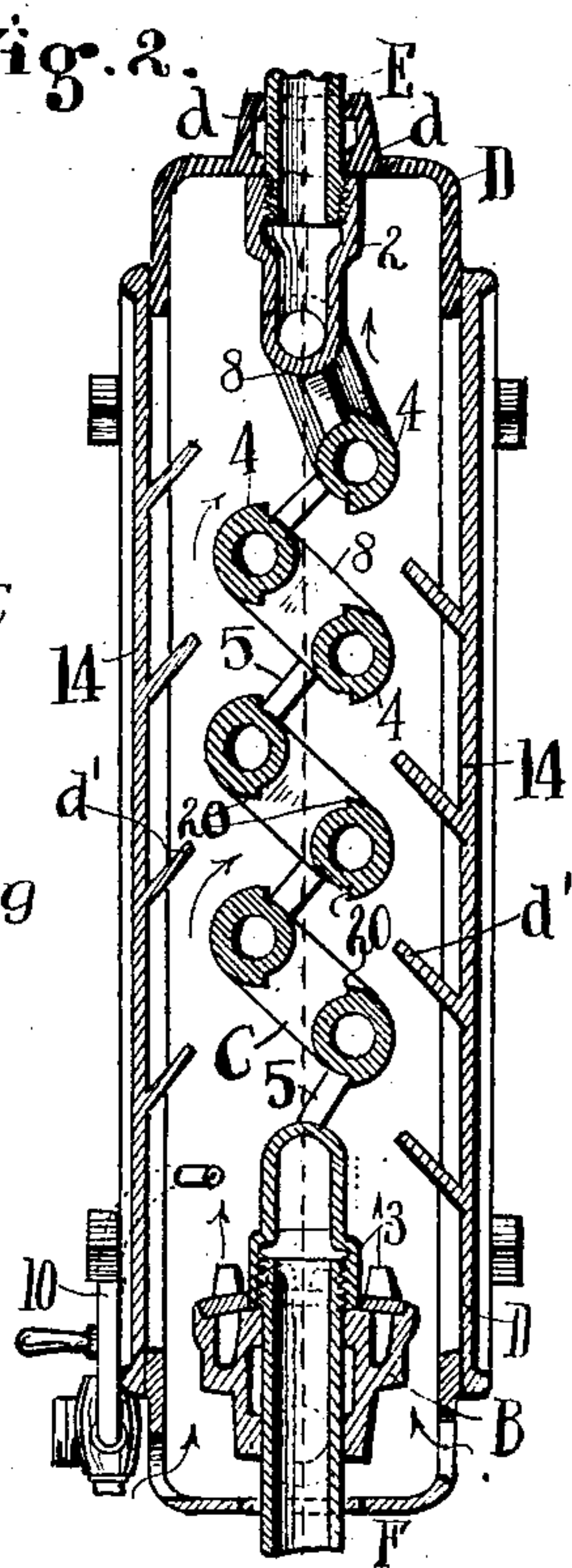


Fig. 3.

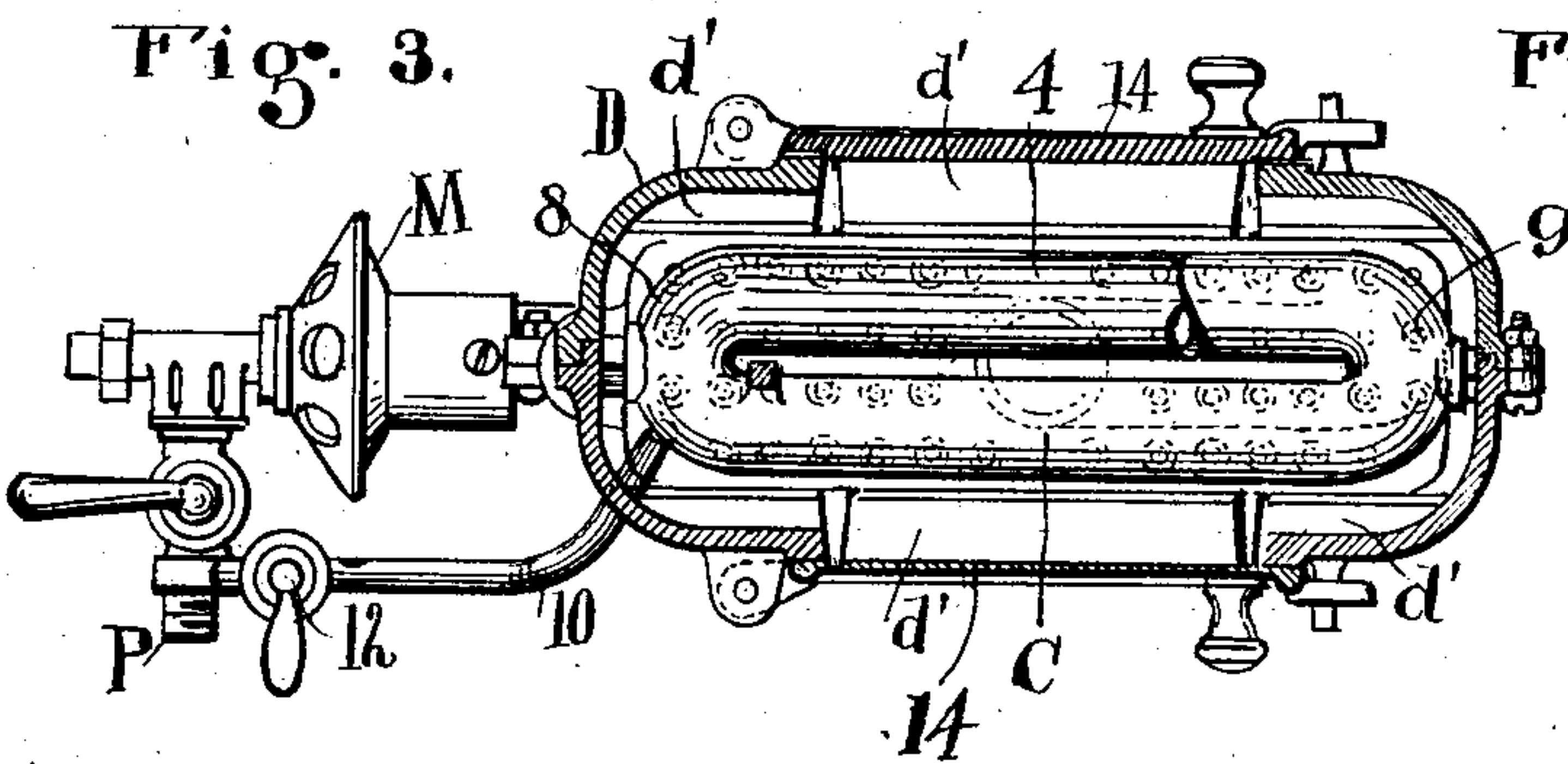
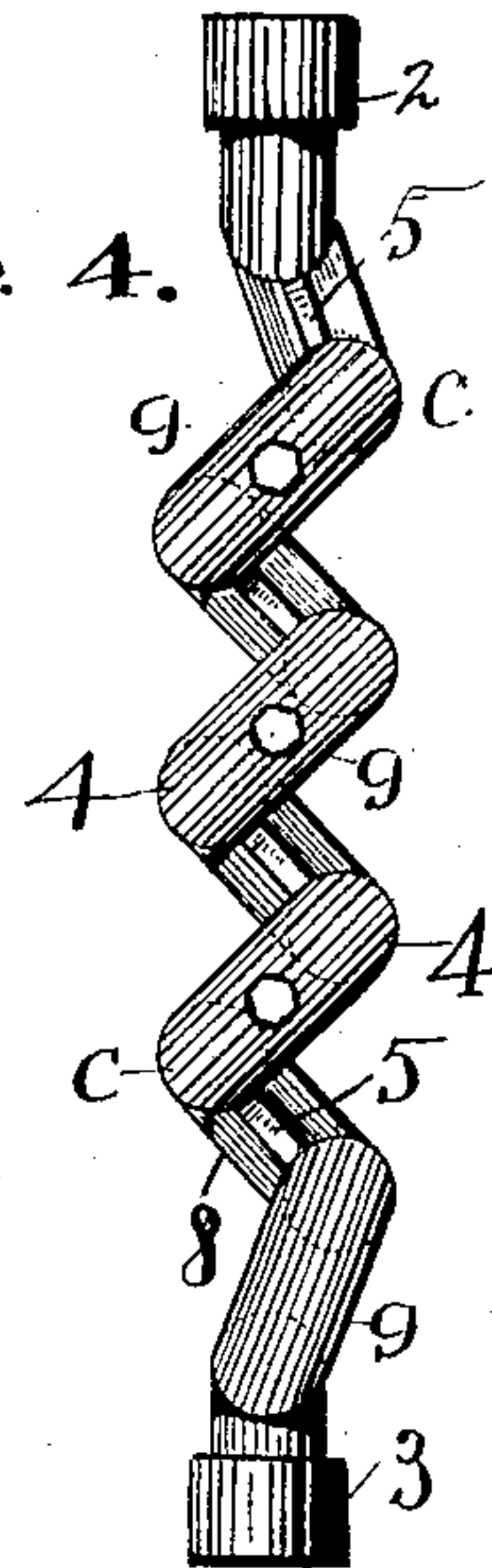


Fig. 4.



ATTEST
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WATER-HEATER.

952,280.

Specification of Letters Patent.

Patented Mar. 15, 1910.

Application filed July 20, 1908. Serial No. 444,308.

To all whom it may concern:

Be it known that I, FREDERICK JOSEPH RUPPEL, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Water-Heaters, and do declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to a new and improved water heater, the same being constructed and adapted to operate substantially as shown and described and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a sectional elevation of the burner and the casing and a side elevation of the water pipes therein. Fig. 2 is a central cross sectional elevation of the casing and water column and connecting parts. Fig. 3 is a cross sectional plan view of the complete heater, and Fig. 4 is an edge elevation of the water column alone.

The object of the present invention is to provide a water heater which will absorb and utilize all the heat units produced by the burner within the smallest space practical, whereby a relatively small but highly efficient heater is obtained, all as will now appear in detail. Thus, B represents a burner, C, a so-called water column and D a casing or inclosure therefor.

The invention resides, first, in water column C, and several peculiarities of construction enter into this column which distinguish it from all the prior art familiar to me and contribute to its exceptional efficiency as a water heating medium. Thus, said column is cast throughout in a single piece and comprised as a unit between its terminals 2 and 3, having pipe connections E and F respectively. Said terminals are directly opposite each other top and bottom and adapt the said column to be set into a pipe that is already in position by the side of a kitchen or like water tank by merely removing a section of said pipe to set said column therein, but of course this is not the only use or relation of the said column, and it can be placed in any other position or relation where it may be available and heated water is desired. Now, one of the novel features of construction in the said column is the body thereof comprising the suc-

cessive and staggered or zig-zag sections indicated by 4. These sections or portions of the complete column lie in approximately horizontal planes and though shown as slightly inclined between their ends they may be horizontal if preferred, and are in position to be equally and uniformly exposed to the heat from burner B from end to end. Said sections 4 from one point of view are arranged in pairs, Figs. 2 and 4, united by webs 5 where there is no joint, and from another point of view they are arranged in parallel vertical rows, also seen in Fig. 2. Both views sustain the zig-zag relation, with equal intervening draft spaces through which the products of combustion flow to exit 6 at the top of casing D.

From the point of view of pairs the said sections 4 occupy positions in different vertical and horizontal planes, one being wholly above the plane of the other and wholly at one side thereof in proportions about as shown, and the disposition of the said pairs is the same successively in the column from bottom to top. This arrangement gives each section complete individual exposure to the products of combustion in its zone, and the purpose of the arrangement is to intercept and absorb the heat as it flows upward over said sections until as the last section is reached practically all the heat will have been taken up in and by said column. The comparatively free space between sections both horizontally and vertically and the inter-play of the products of combustion between them on this account compels the surrender of the heat to the said sections and emphasizes the operating value of this construction. The elbows or bends 8 connecting said pairs are at one side or edge of the column and the elbows or bends 9 uniting the sections in the pairs are at the other ends or edge of the column, and the connection of the sections is continuous between the terminals 2 and 3 as already described. The webs or cross connections 5 between sections come successively at the opposite ends from said joints or elbows and make a perfectly rigid structure of the column.

The burner B is built into the bottom of casing D, being provided with a central hole through which the pipe F projects and enters terminal 3 of the column, and casing D has a corresponding opening at its top for pipe E to connect with terminal 2. Casing D is comparatively narrow between its sides

to confine the heat to the water column, and may be asbestos lined to confine the heat against radiation. Gas is supplied through pipe P where the flow is controlled by valve V as it enters mixer M.

An initial or pilot light is provided by means of short pipe 10 which proceeds from the main supply line and enters casing D next above burner B in position to ignite the gas therefrom. Said pipe 10 has a valve 12 of its own with a mixer and is independent of the main burner and adapted also to maintain a permanent flame for keeping the water column warm when the main burner is turned off. In fact this flame may be maintained permanently and turned as high and as low as desired.

A door 14 is provided on each side of the main casing, so that both sides are equally adapted to be set to the front, according to the place where the heater is erected. I have said that as between their ends the said sections or portions 4 are slightly inclined so as to give a gradual upward rise thereto, but from another view the respective pairs in themselves are each positioned at substantially 45 degrees to a vertical plane but otherwise lie between parallel and vertical planes, as shown in Figs. 2 and 4. This also brings each section or portion 4 into a different vertical and horizontal plane from the one immediately preceding it in the column as well as from the one next succeeding it therein.

The casing or jacket D for the water column is original and novel in several particulars. Thus, the said casing is formed in two equal halves or sections vertically, and provided each with a semi-circular neck portion d at its top adapted to be hung upon collar or extremity 2 of column C. Otherwise the said sections or sides are bolted or otherwise fixed together at their edges so as to be easily separated and taken down and erected. The bottom of said casing closes about pipe F, and is perforated for admission of air to the burner, and the inside of the casing and the doors 14 thereon are alike provided with deflectors d' horizontally on their inside adapted to throw the draft inward into the path of column C. Lengthwise ribs 20 are formed on sections 4, above, and below.

It will be seen that there is direct co-action between the deflectors d' on the sides of the jacket D, and the water column sections or portions 4 successively by reason of the construction and arrangement of the said parts in relation to each other and which subserves the purpose I have in mind

of absorbing all the heat units in the said column in the least possible space. To this end the said sections 4 are arranged at an inclination of about 45° whichever way they are viewed in Fig. 2, and hence have draft spaces between adjacent sections as well as between the pairs or portions of each section, and the deflectors d' are disposed on the walls D in such relation and to such purpose that they will divert the products of combustion partially inward through said open spaces while a portion or say half is permitted to flow up at the respective sides of the section. Each section is thus entirely surrounded by the heat and such exposure makes a maximum absorption of the heat by the water column possible and which could not be obtained without the deflectors d' and the special construction and arrangement of the sections 4 as shown.

What I claim is:—

1. In heaters for hot water tanks, a water column having a succession of pairs of straight heating portions arranged substantially in a horizontal plane from end to end and in parallel vertical planes and said pairs inclined laterally at substantially 45° to a horizontal plane and having open draft spaces between pairs and the members of each pair, in combination with a casing having flat sides equally spaced from the sides of the said column and provided with inclined heat deflectors adapted to direct the products of combustion inward into the spaces between said water column pairs.

2. A water heater having a water column with substantially straight transverse heating portions in pairs set in a zigzag relation successively from bottom to top, each pair being directly above the next lower pair in the same vertical plane and at substantially 45° to a horizontal plane, whereby space is afforded for the products of combustion to flow entirely around each of said heating portions, in combination with a casing inclosing said column having flat sides and deflectors for the heat at successive elevations on both sides thereof at an angle of about 45° and adapted to deflect the heat to said water column and away from the sides of the casing and the said deflectors in zigzag relation as between the sides of the casing.

In testimony whereof I sign this specification in the presence of two witnesses.

FREDERICK JOSEPH RUPPEL.

Witnesses:

E. M. FISHER,

F. C. MUSSUN.