

J. B. BEAUVAIS.
WATER HEATING APPARATUS.
APPLICATION FILED DEC. 7, 1908.

994,562.

Patented June 6, 1911.

2 SHEETS—SHEET 1.

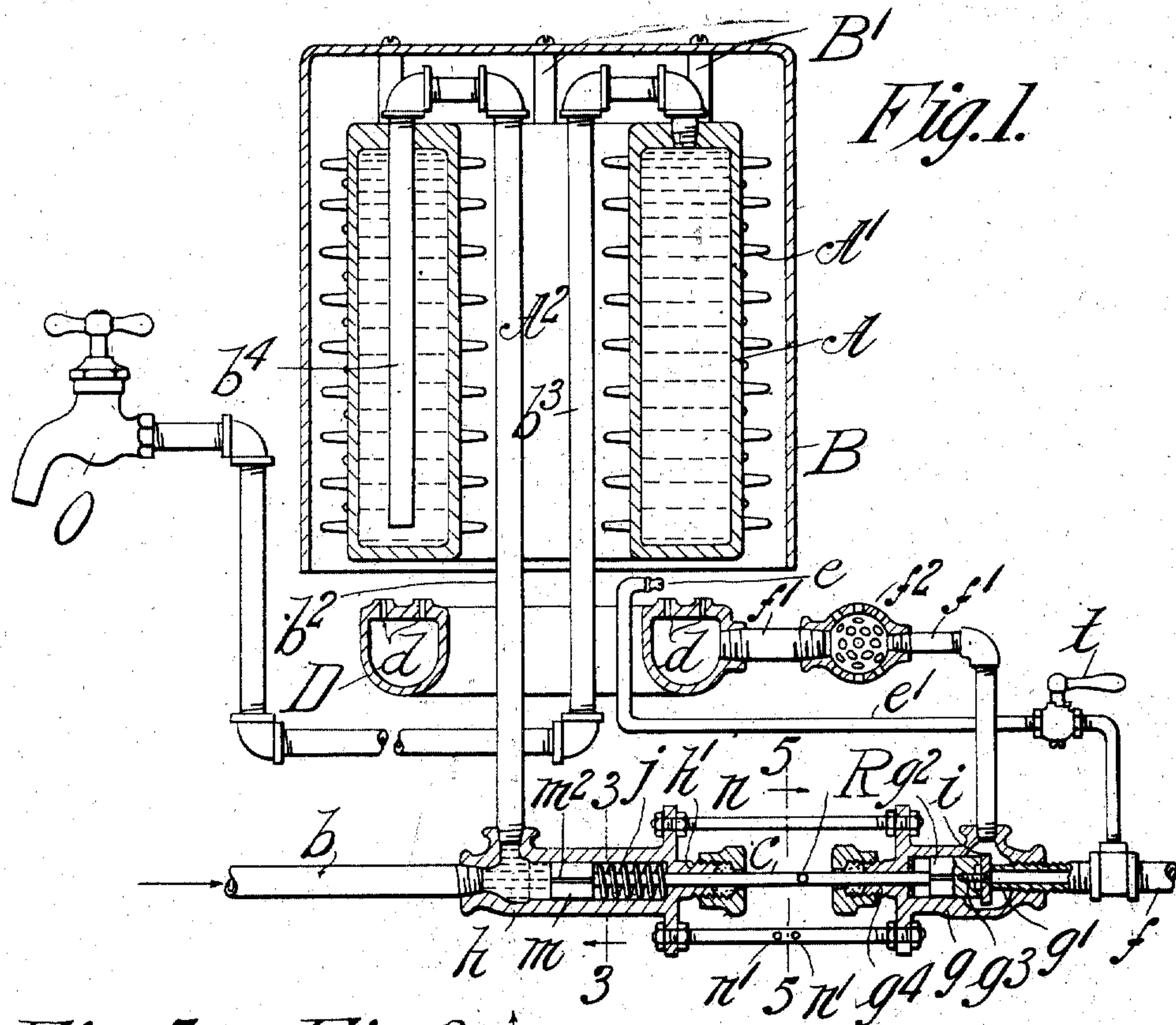


Fig. 5.

Fig. 2.

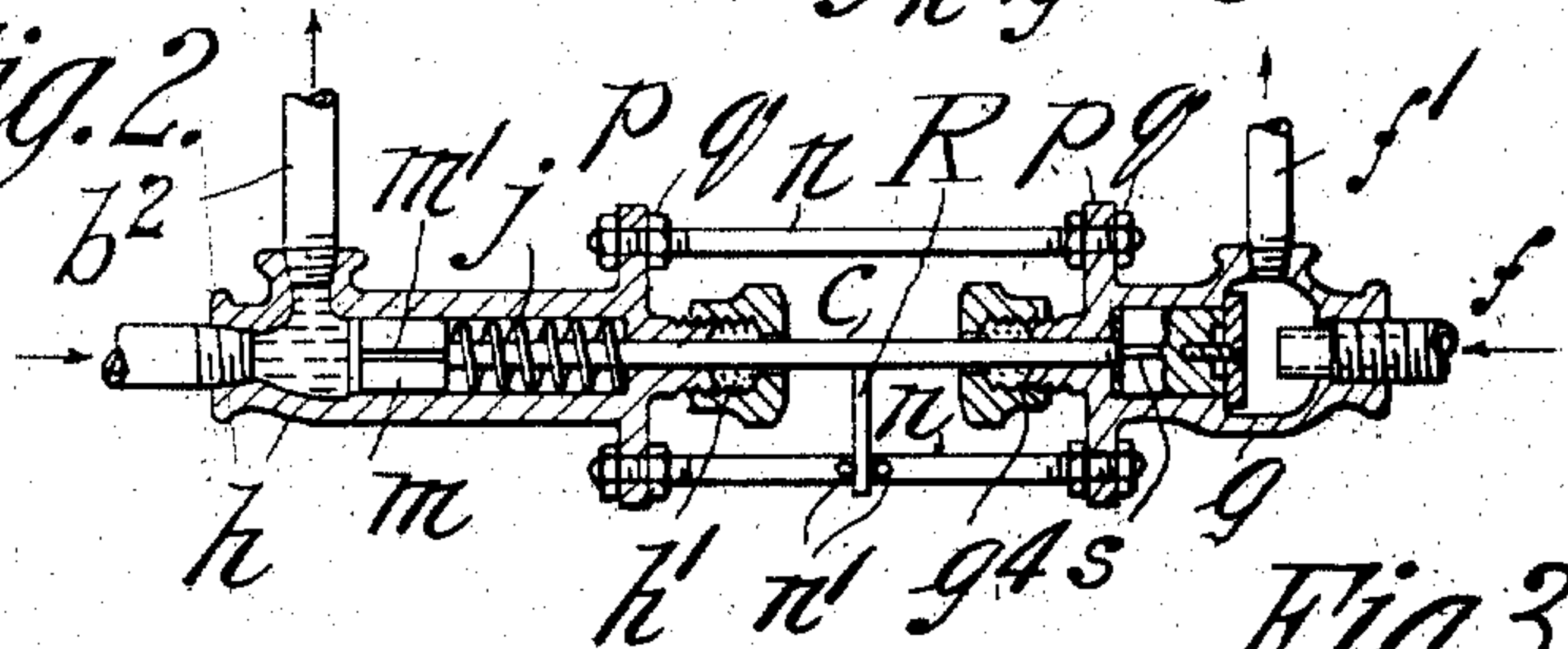


Fig. 3.

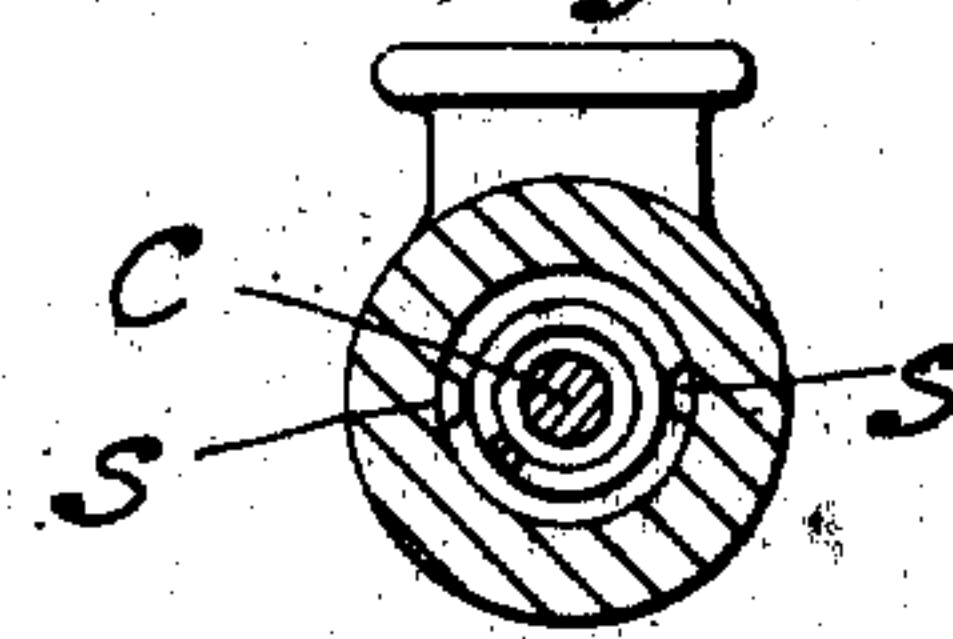
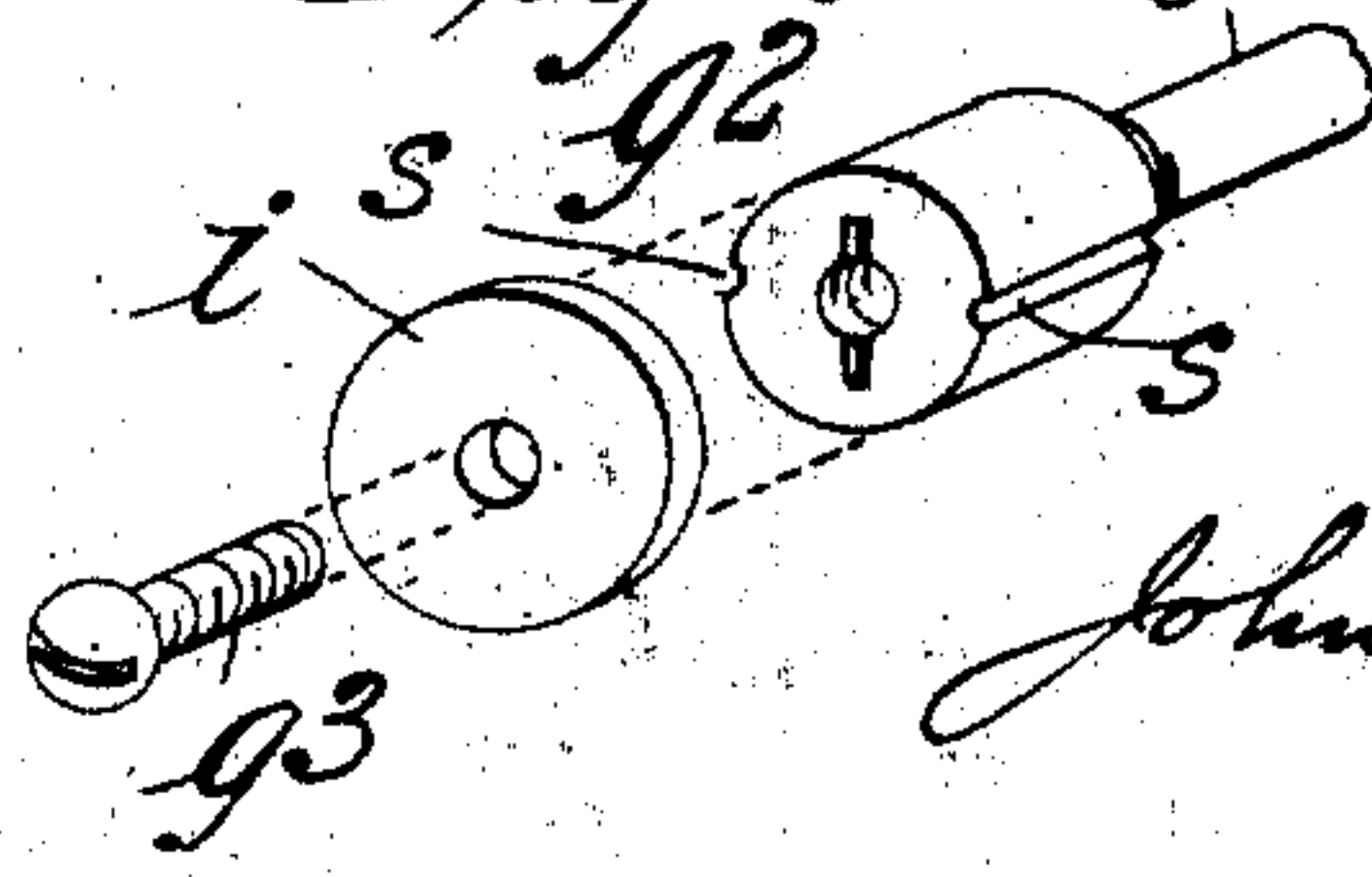


Fig. 4.



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Fig. 6.

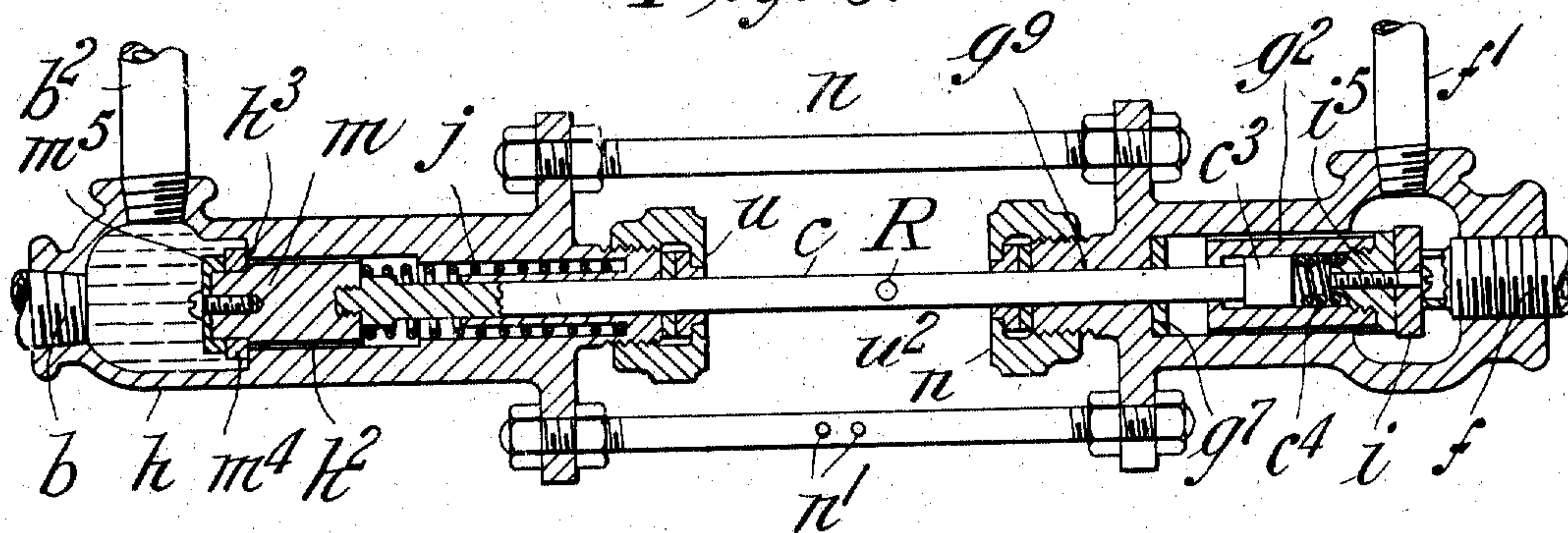
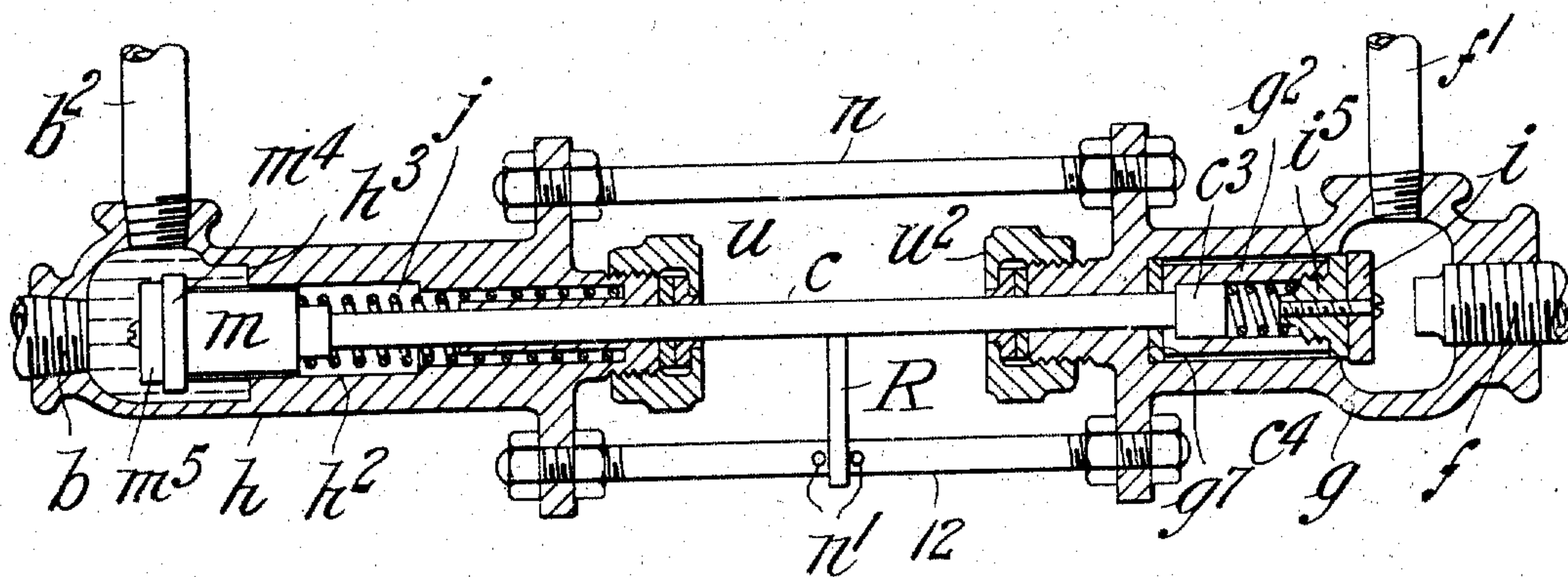


Fig. 7.



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WATER-HEATING APPARATUS.

994,562.

Specification of Letters Patent.

Patented June 6, 1911.

Application filed December 7, 1909. Serial No. 531,796.

To all whom it may concern:

Be it known that I, JOHN B. BEAUVAIS, a citizen of the United States of America, and resident of Holyoke, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Water-Heating Apparatuses, of which the following is a full, clear, and exact description.

10 This invention relates to a water heating apparatus and has for its object the provision of a water heater and a fluid fuel burner, together with means for automatically supplying fuel to said burner when water is
15 withdrawn from the heater, whereby the water flowing into the heater to replace that which has been withdrawn from the heater, will in its turn be heated.

A further object of the invention is the
20 provision of an apparatus as above set forth, comprising means for manually controlling the supply of fuel to the burner to thereby provide for the initial heating of the water before any of the water has been
25 withdrawn from the heater, these various objects being accomplished by means of a structure, in which the usual hot water storage tank is eliminated and the hot water is drawn directly from the heater.

30 Further objects and advantages of the invention will be set forth in the detailed description which now follows:

In the accompanying drawing, Figure 1
35 is a vertical sectional view of a water heater and burner and fuel controlling apparatus, Fig. 2 is a sectional view through the fuel controlling apparatus showing the parts in a slightly different position, Fig. 3 is a
40 transverse vertical section upon line 3—3 of Fig. 1, looking in the direction indicated by the arrow, Fig. 4 is a detail perspective view of the parts comprising a gas valve hereinafter described, and, Fig. 5 is a trans-
45 verse vertical section upon line 3—3 of Fig. 1, looking in the direction indicated by the arrow. Figs. 6 and 7 are enlarged sectional views showing structural details hereinafter referred to.

50 Like reference characters designate corresponding parts in all of the figures of the drawing.

Referring to the drawing, A designates an annular water receiving chamber having external ribs or lugs A' and internal ribs
55 or lugs A². This chamber A is inclosed by

a heat confining shell B, this shell being supported from the chamber A by braces B'. A pipe line b³ leads from the top of the chamber A to a draw-off faucet O, it being understood that this faucet provides
60 means for controlling the flow of the heated water from the chamber A. A water supply pipe line b² leads from a valve casing h to which water is conducted through a
65 water supply pipe b from a city service line or other source of water supply. It will be noted that both of these lines pass upwardly through the center of the annular water chamber and that consequently both of these
70 pipes are subjected to the action of the heat from a gas burner D. It will be noted that this gas burner is disposed beneath the annular chamber A and is provided with ports
75 or openings d at which the gas is lighted in the usual and well known manner, it being understood that the flame will be directed
80 against the underside of the annular chamber A and will pass upwardly through and around the walls of said annular chamber, and will heat these walls and the lugs A' and A², and the water contained in the
85 chamber A. A pilot burner e is disposed adjacent the burner D and is connected by a branch pipe e' with a main gas supply pipe f. A stop cock t located in the branch pipe
85 e' controls the flow of gas to the pilot burner e and provides means for cutting off the gas from the pilot burner.

The supply pipe f leads directly to a gas valve casing g, the end of this pipe project-
90 ing into said casing at g' in such manner that a leather disk i carried by and forming part of a gas valve g² may be forced against the end of said pipe as will be hereinafter set forth. The disk i is secured to the gas
95 valve g² by a screw g³, see Fig. 4. A rod c is connected to the gas valve g² and to a piston m disposed within the valve casing h, this piston being peripherally and longitudinally grooved at m². A spring j is disposed
100 between the piston m and the end of the valve casing h and normally tends to force said piston and the rod c toward the left in Figs. 1 and 2, it being apparent that move-
105 ment toward the left of these parts will move the disk i away from the end g' of the gas supply pipe, to permit gas to flow through pipe line f' and mixing chamber f² to the main burner D. The rod c passes
110 through suitable stuffing boxes h' and g⁴.

The valve casings g and h are connected by tie rods n , these tie rods passing through flanges p of the valve casings, and having nuts q threaded thereon. One of the tie rods carries a pair of pins n' , and the rod c is provided with an arm R , these parts serving purposes which will be described in the operation of the device.

The operation of the device is as follows:

10 Assuming that the water in the heater is cold and that it is desired to heat the same, the stop cock t is opened and the pilot burner e lighted. The arm R is then grasped and the rod c is forced to the left against the pressure of the water upon the piston m , and this arm is then swung downwardly to the dotted line position shown in Fig. 5 and is engaged between the pins n' , these pins then serving to hold the gas valve g^2 in its open position. This will permit an initial flow of gas to the main burner D , which gas will be ignited from the pilot burner e to thereby heat the water in the chamber A . After the water has been sufficiently heated, the arm R is disengaged from between the pins n' and the pressure of the water upon the piston m forces the rod c and the gas valve g^2 toward the right until the disk i abuts against the end of the pipe g' to cut off the flow of gas to the burner D . The parts will remain in this position until the faucet O is opened for the purpose of drawing hot water therefrom. The opening of this faucet relieves the pressure upon the piston m and the spring j acts to force the piston toward the left to again open the gas valve and admit gas to the main burner D . It will therefore be seen that as hot water is withdrawn from the chamber A , the water flowing into the chamber through the pipe line b^4 will be heated. When the faucet O is again closed, the increased pressure of the water upon the piston m again forces the piston and the rod c toward the right to close the gas valve and cut off the further flow of gas to the main burner D . The piston m is grooved at m^2 to permit the escape of any water that has leaked past the piston into the right hand end of the valve casing h . The port formed by this groove is a comparatively small one, so small that the pressure upon the right hand side of the piston will not be sufficient to neutralize the pressure upon the left hand side thereof. In like manner, the gas valve g^2 may be grooved at s to permit the escape of any gas that has leaked past this valve and into the left hand end of the gas valve casing g .

From the foregoing description, it will be seen that simple and efficient means are herein provided for accomplishing the objects of the invention, but while the elements shown and described are well adapted to serve the purposes for which they are intended, it is to be understood that the in-

vention is not limited to the precise construction set forth, but includes within its purview such changes as may be made within the scope of the appended claims.

As represented in Figs. 6 and 7, the chambered casing coupling section h having the pocket h^2 for the piston m has an annular seat h^3 at the junction of such pocket with the chambered enlargement; and the piston has at its end portion which is located in such enlargement an external annular flange m^4 of compressible material held in place by the screw confined retainer m^5 and to constitute when the piston is forced to its limit of the high pressure of the water, a valve to close against the seat h^3 and prevent leakage of water along the rod or stem c which connects the piston and gas valve to possibly leak through the stuffing box u . And the chambered casing and coupling section g has the cylindrical pocket in which the gas valve is slidably fitted made with an annular seat g^7 for the end of the gas valve opposite its end which closes against the end of the gas supply pipe f which protrudes into the chambered casing; and thus when the water pressure is lowered and the piston recedes so as to permit the gas valve to be opened to permit the flow of the gas through the pipe f' to the burner, the end of the gas valve opposite its gas shutting off end will close against the seat g^7 and prevent a leakage of gas through the guiding part of the coupling section g which has a contracted opening for the rod and which is provided with a stuffing box u^2 . In order that after the gas valve has seated, as shown in Fig. 6 to offset the shunt off gas from the burner, and in order that the piston m may also certainly close against the seat h^3 , the gas valve is yieldingly connected with the rod c . As specifically constructed to this end, the cylindrical gas valve is made with an inclosed longitudinal cylindrical chamber closed at its one end by the screw plug z^5 which carries the valve proper i and having a contracted opening the size of the rod c through its other end; and the rod has a head or enlargement c^3 playing in the manner of a piston in the said cylindrical chamber in the valve in one direction against and in the other with the reaction of the spiral spring c^4 which is provided in compression between the end of the piston-like enlargement c^3 and the inner end of the plug z^5 . Therefore, it will be understood that in the action of the rod united piston and gas valve a resumption of the water pressure to its high normal will be effective to force the piston to the right (in the relations in which the parts are here illustrated) and force the gas valve to its position for shutting off, with certainty, the flow of gas from the gas supply,—this closure occurring more or less before the piston has moved to its

rightward limit; and then after the positive closing of the gas valve, the piston under the high water pressure in being forced so that its valve member m^4 will close against the seat h^3 will have such final movement under the compression of the comparatively light spring c^4 inclosed within the body of the gas valve.

Having described my invention, what I claim is:

1. In a device of the character described, the combination with a water receiving chamber, of a cold water service pipe discharging thereinto, a burner beneath said chamber, a casing disposed in and forming a part of the cold water supply pipe line, a piston mounted in said casing, a gas valve casing disposed in alinement with the piston containing casing, a rod connected to said piston and extending into the gas valve casing, a gas valve carried by said rod and serving to control the flow of gas through said casing, said rod, said piston and said gas valve being capable of both reciprocatory and rotational movement, and a locking member carried by said rod which serves, when said rod is rotated to one position, to hold the gas valve in its open position.

2. In a device of the character described, the combination with a water receiving

chamber, of a cold water service pipe discharging thereinto, a hot water service pipe leading therefrom, a burner beneath said chamber, a casing disposed in and forming a part of the cold water supply pipe line, a piston mounted in said casing, a gas valve casing disposed in alinement with the piston containing casing, a rod connected to said piston and extending into the gas valve casing, a gas valve carried by said rod which serves to control the flow of gas through the gas valve casing, means for conducting gas from said casing to the burner, a spring bearing between the piston and the end of its casing which normally tends to open the gas valve, the piston and gas valve connected rod being mounted for both rotation and reciprocation, a transversely extending member carried by said rod, and a fixed member with which said transverse member is adapted to engage when the rod is rotated, to thereby hold the gas valve open against the tension of said spring.

Signed by me at Springfield, Mass., in presence of two subscribing witnesses.

JOHN B. BEAUVAIS.

Witnesses:

G. R. DRISCOLL,

WM. S. BELLWS.