

No. 764,610.

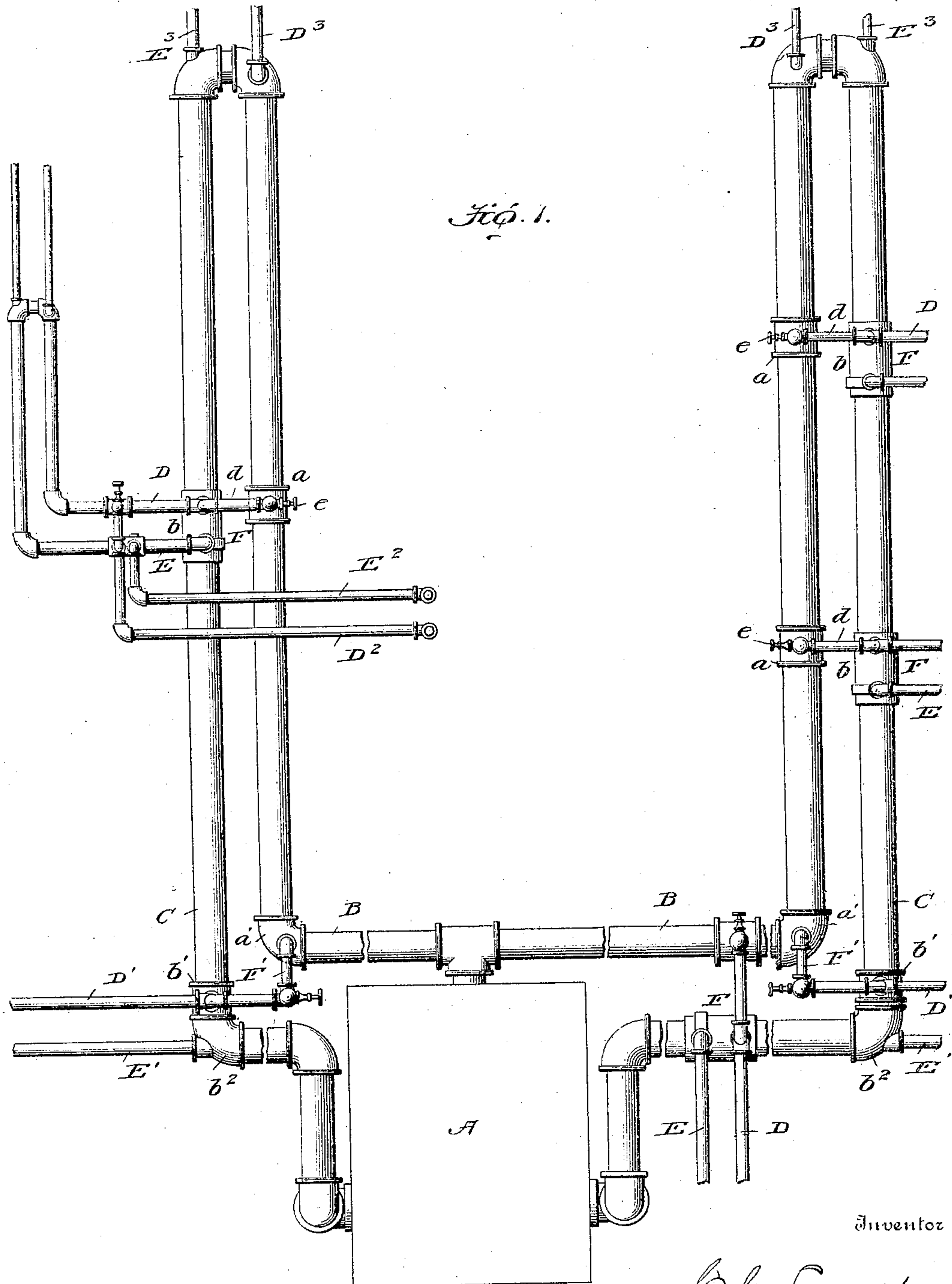
PATENTED JULY 12, 1904.

C. C. LONGARD.  
HOT WATER HEATING SYSTEM.

APPLICATION FILED AUG. 17, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



Inventor

Witnesses

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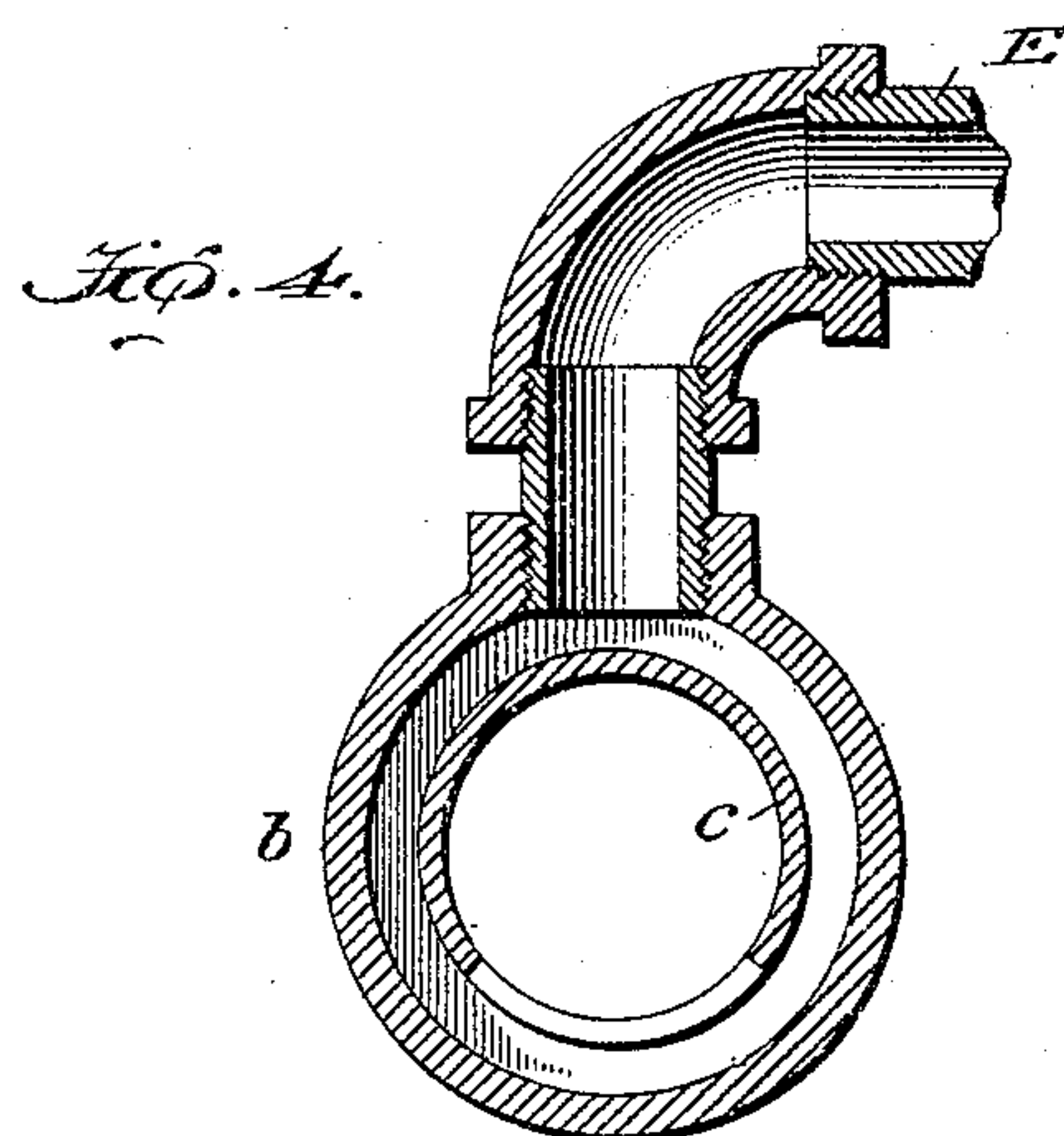
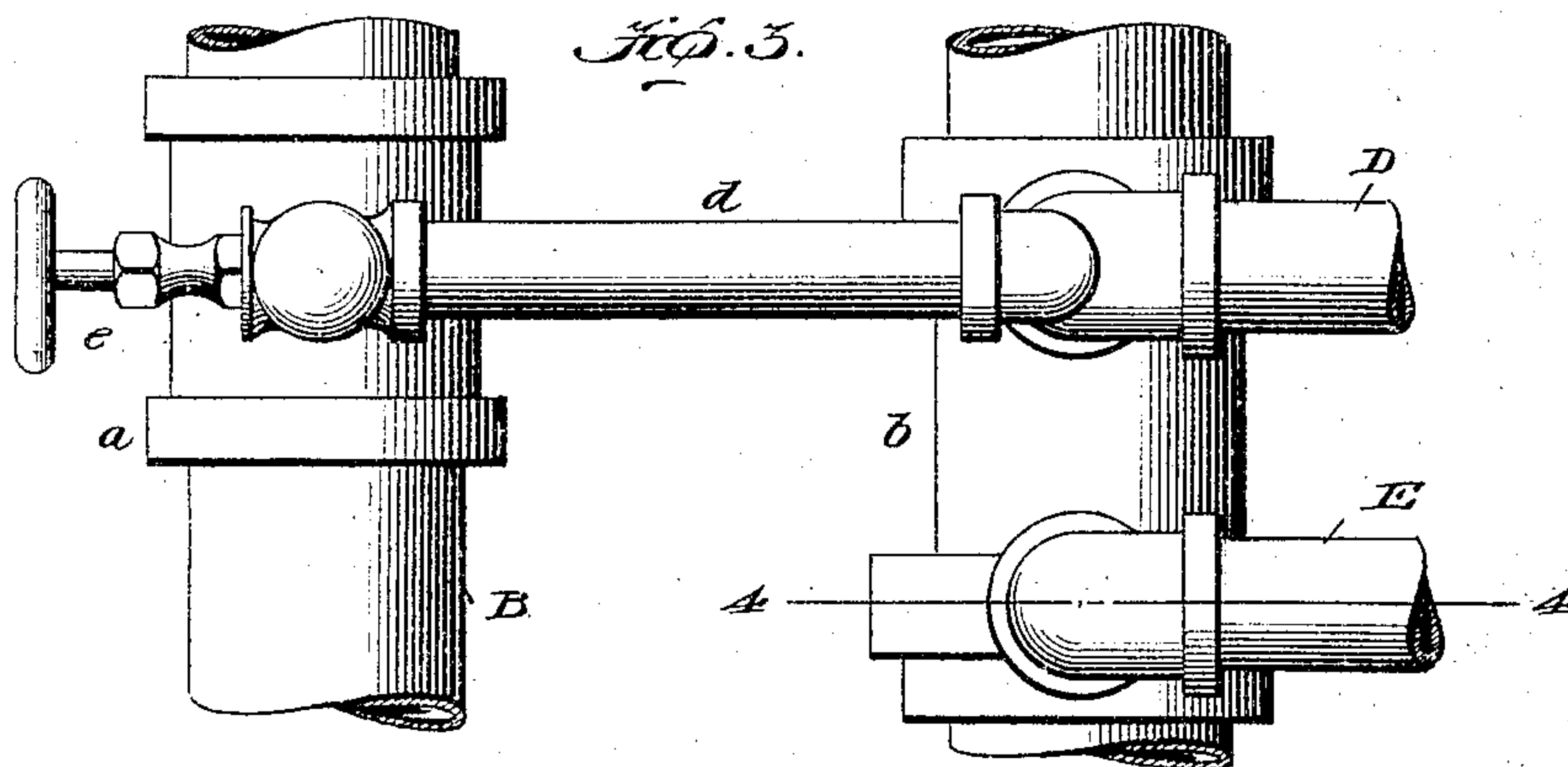
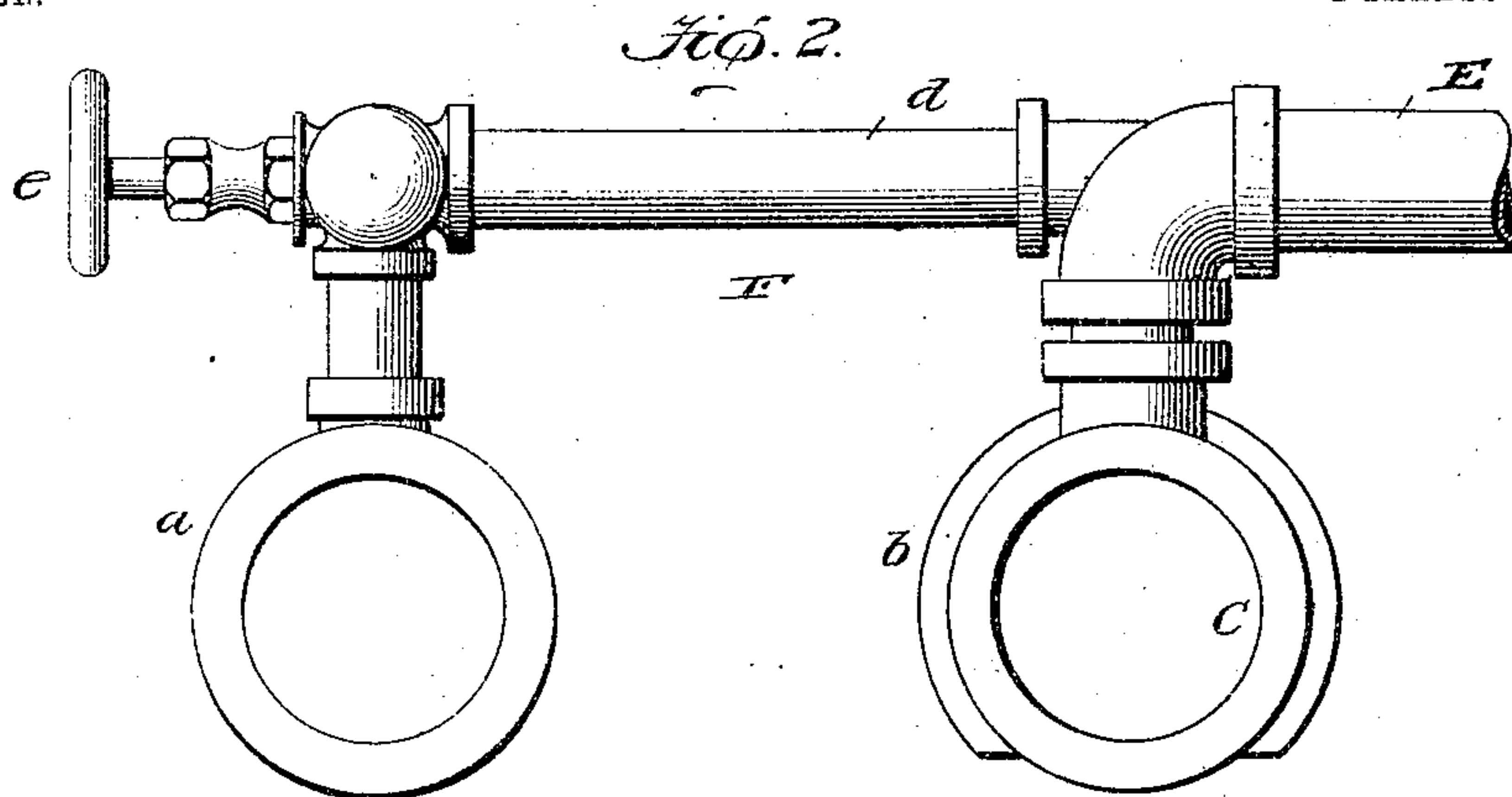
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2 SHEETS—SHEET 2.



Witnesses  
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# UNITED STATES PATENT OFFICE.

CLARENCE C. LONGARD, OF HALIFAX, CANADA.

## HOT-WATER HEATING SYSTEM.

SPECIFICATION forming part of Letters Patent No. 764,610, dated July 12, 1904.

Application filed August 17, 1903. Serial No. 169,822. (No model.)

*To all whom it may concern:*

Be it known that I, CLARENCE C. LONGARD, a citizen of Canada, residing at Halifax, in the Province of Nova Scotia and Dominion of Canada, have invented new and useful Improvements in Hot-Water Heating Systems, of which the following is a specification.

My invention pertains to hot-water heating systems; and it has for its object to provide a system embodying means whereby the supply of hot water to a plurality of radiators located at different distances from a common water-heater may be equalized and all of the radiators thereby heated to the same extent.

With the foregoing in mind the invention will be fully understood from the following description and claims, when taken in connection with the accompanying drawings, in which—

Figure 1 is a broken diagrammatic view illustrating the preferred embodiment of my invention. Fig. 2 is an enlarged elevation of one of the fixtures embraced in the system. Fig. 3 is a plan view of the same, and Fig. 4 is a transverse section taken in the plane indicated by the broken line 4 4 of Fig. 3.

Similar letters designate corresponding parts in all of the several views of the drawings, referring to which—

A is a water-heater, which *per se* forms no part of my invention and may therefore be of any suitable construction.

B B are flow-pipes connected with and adapted to conduct hot water from the heater.

C C are return-pipes, into which the flow-pipes merge at a point remote from the heater and which have for their purpose to conduct the water back to the heater after the water has given off its heat.

D D are branch pipes arranged at different distances from the heater and designed to effect connection between the pipes B C and radiators, (not shown,) so as to supply the latter with hot water.

E E are pipes, one of which is employed in conjunction with each pipe D and for the purpose of leading cool water from its respective radiator to the adjacent return-pipe.

D' D' are modified pipes for the same pur-

pose as the pipes D, but differently arranged with respect to the continuous flow and return pipes.

E' E' are cool-water pipes complementary to the pipes D' D'.

F F are the fixtures which I prefer to employ for effecting connection between the pipes D E and the flow and return pipes B C, and F' F' are the fixtures preferably employed for connecting the pipes D' E' and the pipes B C. The fixtures F are similar in construction, and therefore a detailed description of the one shown in Figs. 2 to 4 will suffice to impart a clear understanding of all. Said fixture, Figs. 2 to 4, comprises a T *a*, effecting connection between sections of the pipe B, a double T *b*, effecting connection between the adjacent pipe C and pipes D E and having a deflector *c*, Fig. 4, below the pipe E, so as to enable the same to discharge cool water into the lower portion of the pipe C, and a pipe *d*, leading from the T *a* to the pipe D, so as to effect direct connection between the flow-pipe B and said pipe D and having a suitable valve *e* for controlling the flow of hot water from the former to the latter. The fixtures F' are substantially the same as the fixtures F, with the exceptions that they comprise L's *a'* in lieu of T's *a* and T's *b'* and L's *b''* in lieu of double T's *b* and have their pipes *d'* interposed between the L's *a'* and the pipes D' and their L's *b''* connected to the pipes E'. Said fixtures F' also differ from the fixtures F in that they do not comprise deflectors *c*, the connection of the pipes E' to the L's *b''* rendering the employment of deflectors unnecessary.

In the practical operation of my improved system it will be observed that hot water will flow from the heater A through the pipes B and the pipes C, which latter are preferably of the same size as the pipes B, and will pass from the pipes C through the pipes D D' to the radiators, (not shown;) also, that the water after giving off its heat in the radiators will pass by way of the pipes E E' to the lower portions of the pipes C and return through the latter to the heater to be reheated. It will further be observed that when the valves *e* of the fixtures F F' are open hot water will



pass from the pipes B through pipes *d* to the radiator feed-pipes and through the latter in company with the less-heated water from the pipes C to the radiators. From this latter it follows that by opening the valves *e*, complementary to the radiators nearest the heater A, to the greatest extent, the next valves *e* to a less extent, and the next valves *e* to a still less extent, and so on, the supply of hot water to the several radiators may be equalized and all of the radiators uniformly heated irrespective of their location with respect to the heater A, which is an important desideratum. The valves *e* nearest the heater A are opened to the greatest extent, because the pipes C are depended on to supply the major portion of hot water to the radiators, and the radiators nearest the heater are connected with the pipes C at the points most remote from the heater.

The pipes *d* in the preferred embodiment of my invention are preferably reduced as compared with the pipes D in about the proportion shown, this because the major portion of hot water is conducted from the pipes C to the radiators, as stated.

It will be appreciated from the foregoing that the continuous flow and return pipes form loops through which hot water is conducted from and cool water returned to the heater A; also, that branch pipes are connected to the return stretches of the loops at intervals in the length thereof to conduct hot water to radiators, and branch pipes are connected to the same stretches of the loops for conducting cooled water from the radiators thereto, while auxiliary pipes are connected to the outgoing stretches of the loops for the purpose of conducting hot water direct from the same to radiators. I prefer to employ the valves described for equalizing the supply of hot water from the loops to the radiators, but do not desire to be understood as confining myself to the same, as the supply may be equalized in any other approved manner and still be within the scope of my invention.

The pipes D and E and D' and E' may be directly interposed between the pipes B and C and radiators or may be connected with other pipes designed to supply hot water to and return cold water from radiators, as shown at the left of Fig. 1. In this latter case the pipe D merges into the pipe E in the same manner that the main pipes B merge into the pipes C, and a fixture F, similar to those before described, is employed to effect connection between the pipes D E and pipes D<sup>2</sup> E<sup>2</sup>, which latter pipes are designed to supply hot water to and conduct cold water from a radiator, (not shown,) respectively.

When desirable, pipes D<sup>3</sup>, Fig. 1, may be carried from the pipes B at the points farthest from the heater A to radiators (not shown) to supply the latter with hot water, and pipes E<sup>3</sup> may be arranged between said radiators and

the pipes C at the points farthest from the heater A to return cool water to the latter pipes. Similar pipes D<sup>3</sup> E<sup>3</sup> may when desired be employed in connection with the pipes D E at the left of Fig. 1 and for the same purpose.

While I have shown and described my improved system as comprising two sets of pipes B C, provided with certain appurtenances, it is obvious that the system may have one, two, or more sets of pipes, as desired, without involving departure from the scope of my invention.

Hot water is the agent for which my improved system is particularly designed; but I desire it understood that steam or any other suitable agent may be used in lieu of hot water when desired without involving departure from the scope of my invention.

I have entered into a detailed description of the construction and relative arrangement of the parts embraced in the present and preferred embodiment of my invention in order to impart a full, clear, and exact understanding of the same. I do not desire, however, to be understood as confining myself to such specific construction and relative arrangement of parts, as such changes or modifications may be made in practice as fairly fall within the scope of my invention as claimed.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a heating system, the combination of means for heating the agent employed, a conduit-loop for conducting heated agent from and returning cooled agent to the heating means, a branch conduit for conducting heated agent from the return stretch of the loop to a radiator or the like, a branch conduit for conducting cooled agent from the radiator or the like to the return stretch of the loop, and an auxiliary conduit for conducting heated agent from the outgoing stretch of the loop to the radiator or the like.

2. In a heating system, the combination of means for heating the agent employed, a conduit-loop for conducting heated agent from and returning cooled agent to the heating means, a branch conduit for conducting heated agent from the return stretch of the loop to a radiator or the like, a branch conduit for conducting cooled agent from the radiator or the like to the return stretch of the loop, an auxiliary conduit for conducting heated agent from the outgoing stretch of the loop to the radiator or the like, and a valve in said auxiliary conduit.

3. In a heating system, the combination of means for heating the agent employed, a conduit-loop for conducting heated agent from and returning cooled agent to the heating means, branch conduits, located at different distances from the heating means, for conducting heated agent from the return stretch of the



loop to radiators or the like, branch conduits, located at different distances from the heating means, for conducting cooled agent from the radiators or the like to the return stretch of the loop, and auxiliary conduits, located at different distances from the heating means, for conducting heated agent from the outgoing stretch of the loop to the radiators or the like.

4. In a heating system, the combination of means for heating the agent employed, a conduit-loop for conducting heated agent from and returning cooled agent to the heating means, branch conduits, located at different distances from the heating means, for conducting heated agent from the return stretch of the loop to radiators or the like, branch conduits, located at different distances from the heating means, for conducting cooled agent from the radiators or the like to the return stretch of the loop, auxiliary conduits, located at different distances from the heating means, for conducting heated agent from the outgoing stretch of the loop to the radiators or the like, and valves in said auxiliary conduits.

5. In a heating system, the combination of means for heating the agent employed, a pipe B and a pipe C, connected together and to the heating means, and forming a conduit-loop for conducting heated agent from and returning cooled agent to the heating means, branch pipes connected to the pipe C, at different distances from the heating means, and adapted to conduct heated agent to radiators or the like, branch pipes connected to the pipe C, at different distances from the heating means, and adapted to conduct heated agent to radiators or the like, branch pipes connected to the pipe C, at different distances from the heating means, and adapted to conduct cooled agent from the radiators or the like to the pipe C, and auxiliary branch pipes, arranged at different distances from the heating means, and leading from the pipe B to the first-mentioned branch pipes.

6. In a heating system, the combination of means for heating the agent employed, a pipe B and a pipe C, connected together and to the heating means, and forming a conduit-loop for conducting heated agent from and returning cooled agent to the heating means, branch pipes connected to the pipe C, at different distances from the heating means, and adapted to conduct heated agent to radiators or the like, branch pipes connected to the pipe C, at different distances from the heating means, and adapted to conduct cooled agent from the radiators or the like to the pipe C, auxiliary branch pipes arranged at different distances from the heating means, and leading from the pipe B to the first-mentioned branch pipes, and valves in said auxiliary branch pipes.

7. In a heating system, the combination of means for heating the agent employed, a pipe B and a pipe C, connected together and to the heating means, and forming a conduit-loop for

conducting heated agent from and returning cooled agent to the heating means, branch pipes, at different distances from the heating agent, for conducting heated agent to radiators or the like, branch pipes, at different distances from the heating means, for leading cooled agent from radiators or the like to the pipe C, couplings connecting said branch pipes and the pipe C, couplings carried by the pipe B, and arranged at different distances from the heating means, auxiliary branch pipes connecting the first-mentioned branch pipes and the last-mentioned couplings, and valves in said auxiliary branch pipes.

8. In a heating system, the combination of means for heating the agent employed, a conduit-loop for conducting heated agent from and returning cooled agent to the heating means, a branch conduit for conducting heated agent from the return stretch of the loop to a radiator or the like, a branch conduit for conducting cooled agent from the radiator or the like to the return stretch of the loop, and an auxiliary conduit connecting the outgoing stretch of the loop and the first-mentioned branch conduit.

9. The combination in a heating system, of a flow-pipe, a return-pipe, a branch pipe for conducting heated agent from the return-pipe to a radiator or the like, a branch pipe for conducting cooled agent from the radiator or the like to the return-pipe, and an auxiliary branch pipe for conducting heated agent from the flow-pipe to the radiator or the like.

10. In a heating system, the combination of means for heating the agent employed, a conduit-loop for conducting heated agent from and returning cooled agent to the heating means, a branch conduit for conducting heated agent from the return stretch of the loop, a branch conduit connected with the first-mentioned branch conduit, for conducting cooled agent to the return stretch of the loop, and an auxiliary conduit leading from the outgoing stretch of the loop, and connected with the branch conduits.

11. In a heating system, the combination of means for heating the agent employed, a conduit-loop for conducting heated agent from and returning cooled agent to the heating means, a branch conduit for conducting heated agent from the return stretch of the loop, a branch conduit connected with the first-mentioned branch conduit, for conducting cooled agent to the return stretch of the loop, an auxiliary conduit leading from the outgoing stretch of the loop and connected with the branch conduits, and a valve in said auxiliary conduit.

12. In a heating system, the combination of means for heating the agent employed, a conduit-loop for conducting heated agent from and returning cooled agent to the heating means, a branch conduit for conducting heated agent from the return stretch of the loop to

a radiator or the like, a branch conduit for  
conducting cooled agent from the radiator or  
the like to the return stretch of the loop, an  
auxiliary conduit connecting the outgoing  
5 stretch of the loop and the first-mentioned  
branch conduit, and a valve in said auxiliary  
conduit.

In testimony whereof I have hereunto set  
my hand in presence of two subscribing wit-  
nesses.

CLARENCE C. LONGARD.

Witnesses:

EDMUND P. ALLISON,  
JOHN T. ROSS.