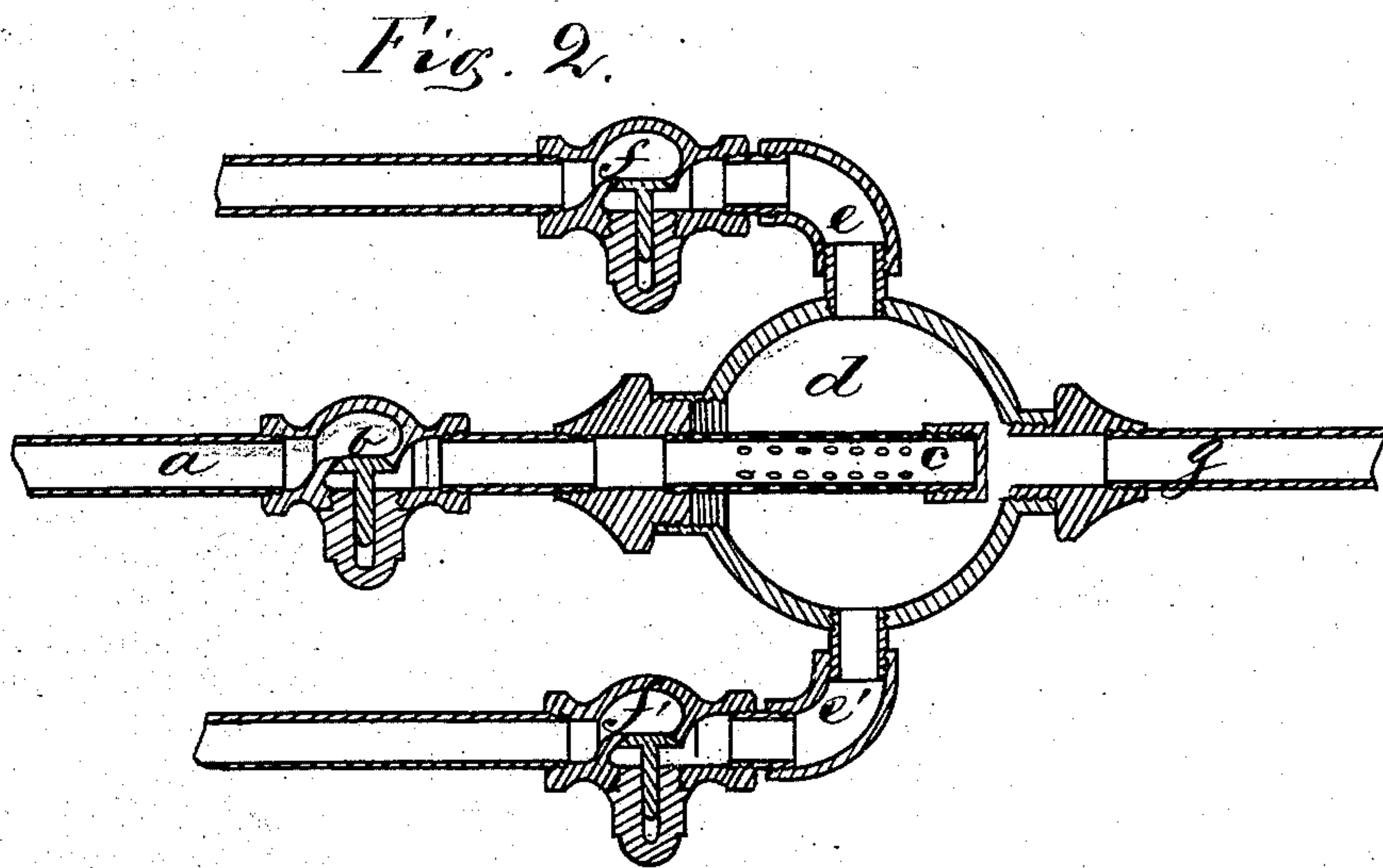
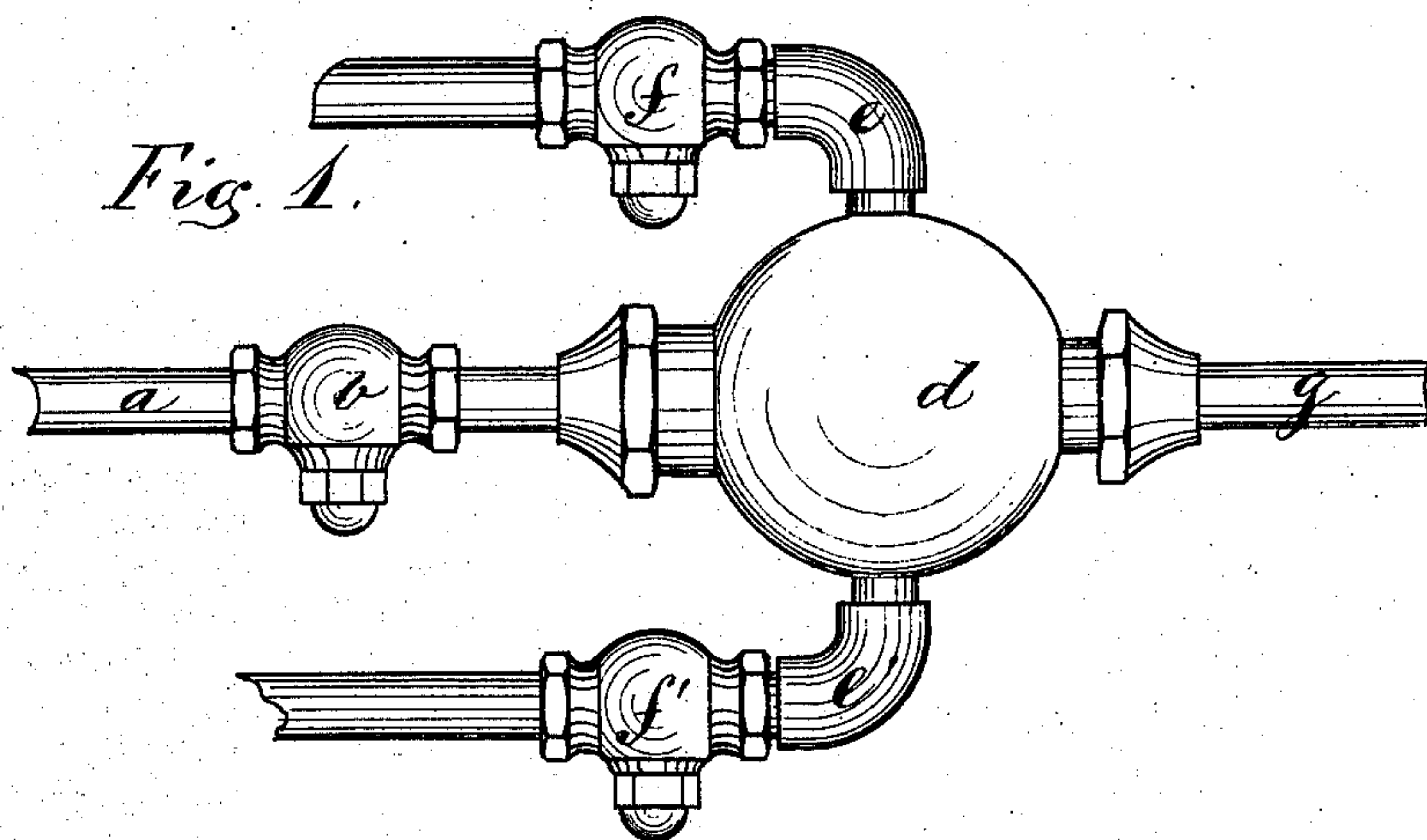


C. W. DOTEN.
Feed-Water Heaters.

No. 154,544.

Patented Sept. 1, 1874.



Witnesses:
John R. Heard
Francis Allen.

Inventor:
Clark W. Doten.
by Alan Andren atty

UNITED STATES PATENT OFFICE.

CLARK W. DOTEN, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN FEED-WATER HEATERS.

Specification forming part of Letters Patent No. 154,544, dated September 1, 1874; application filed July 3, 1874.

To all whom it may concern:

Be it known that I, CLARK W. DOTEN, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Feed-Water Heaters; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings and to the letters of reference marked thereon, which form a part of this specification.

My invention relates to improvements in feed-water heaters for steam-boilers, consisting in the combination, with the feed-pipe from the force-pump, of a chamber or receptacle having one or more communications from the water-space in the boiler, and check-valves arranged thereon in such a manner that they will close when the pump is forcing the water into the said chamber or receptacle, and open for the admission of the hot water from the boiler into the said chamber or receptacle when the pump is on its backward stroke, by which arrangement the water forced from the feed-pump is brought in intimate contact with the hot water from the boiler in the aforesaid receptacle or chamber previous to being forced into the boiler, in which manner the temperature of the feed-water is raised very materially before it is forced into the boiler, thus saving a great amount of the fuel used for the generation of steam in the boiler. The feed-pipe is provided with a check-valve, arranged between the aforesaid chamber or receptacle and the feed-pump, for the purpose of preventing back pressure on the pump when it is drawing water. The feed-pipe from the pump terminates in the aforesaid chamber or receptacle as a perforated pipe, by which arrangement the cold water that enters the said receptacle through the perforated pipe is more intimately brought in contact with the hot water from the boiler, as will now be herein more fully shown and described.

On the drawings, Figure 1 represents a ground plan of my invention, and Fig. 2 rep-

resents a central longitudinal section of the same.

Similar letters refer to similar parts wherever they occur on the drawings.

a represents the feed-pipe from the pump, provided with a check-valve, *b*, for the purpose of preventing back pressure on the pump. The feed-pipe *a* terminates as a perforated pipe or nozzle, *c*, in the chamber or receptacle *d*, as shown in Fig. 2. The chamber *d* is shown as a hollow globe, but I may substitute therefore any other form or shape as may be most expedient. From the water-space in the boiler to the chamber *d*, I arrange one or more inlets, *e e'*, provided, respectively, with check-valves *f f'*, arranged in such a manner that the hot water from the boiler will flow into the chamber *d* when the feed-pump is on its backward stroke, through the valves *f f'*; but that the water in the chamber *d* is prevented from being forced by the check-valves *f f'* when the feed-pump is forcing the water into the said chamber *d*. *g* represents a delivery-pipe from the chamber *d*, for the heated water to the boiler, which pipe may be provided with a check-valve, if necessary, without departing from the spirit of my invention.

The operation of my improved feed-water heater is as follows: When the feed-pump is drawing water—that is, when it is on its backward stroke—the check-valve *b* is closed automatically by the pressure in the chamber *d* at the same time as the valves *f f'*, one or more, are opened automatically by the pressure of the steam in the boiler, thereby admitting a small quantity of the hot water from the boiler into the chamber *d*, which hot water comes in intimate contact with the cold water that is forced subsequently by the pump into the chamber *d*. The water, after being heated and mixed in the chamber *d*, is forced through the pipe *g* to the boiler.

Having thus fully described the nature, construction, and operation of my invention, I wish to secure by Letters Patent and claim—

1. In combination with a receptacle, *d*, of the feed-pipe *a*, its check-valve *b*, one or more

pipes, *e e'*, and check-valves *f f'*, from the boiler to the said chamber, and a delivery-pipe, *g*, as and for the purpose set forth.

2. In combination with a receptacle, *d*, the pipes *e e'* and the check-valves *f f'*, as set forth, of a perforated feed-pipe, *c*, in a manner and for the purpose as herein set forth and described.

In testimony that I claim the foregoing as my own invention I have affixed my signature in presence of two witnesses.

CLARK W. DOTEN.

Witnesses:

ALBAN ANDRÉN,
JOHN R. HEARD.