

(No Model.)

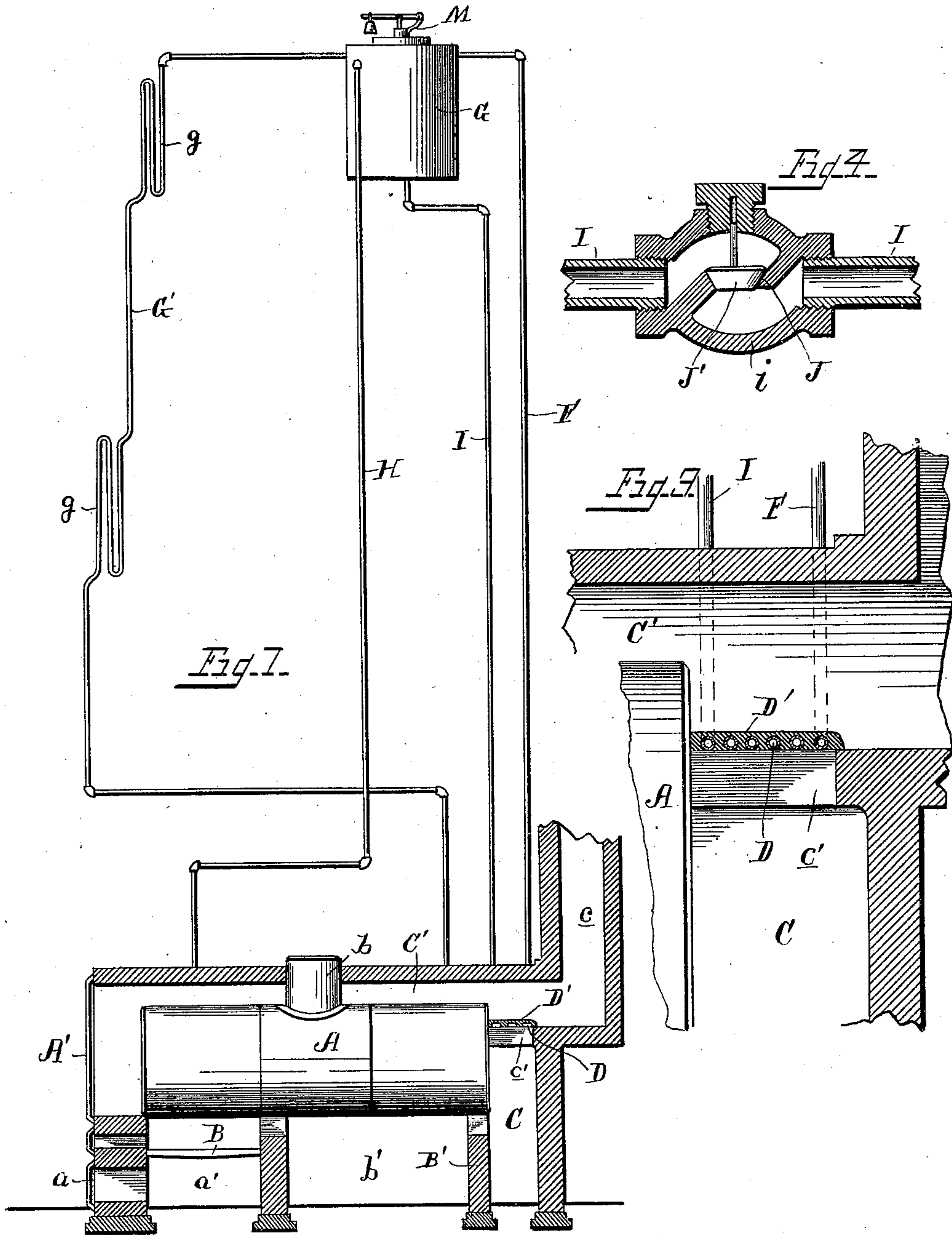
2 Sheets—Sheet 1.

J. HERVEY.

FEED WATER HEATER AND WATER HEATING SYSTEM.

No. 587,055.

Patented July 27, 1897



Witnesses

Carroll J. Webster
A. E. Glascock.

Inventor

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John Hewey
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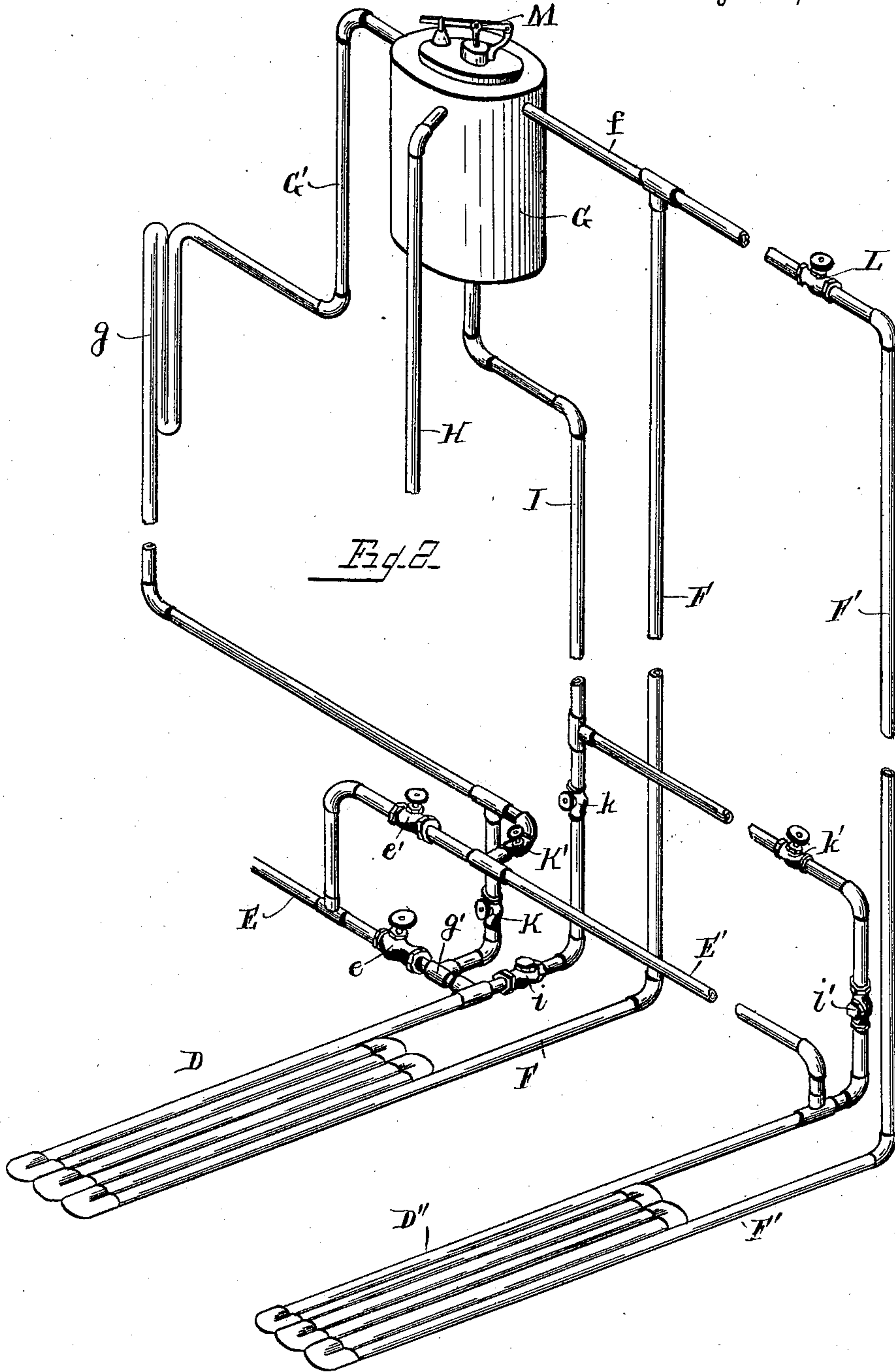
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by James G. Young
his Attorney

UNITED STATES PATENT OFFICE.

JOHN HERVEY, OF KANSAS CITY, KANSAS.

FEED-WATER HEATER AND WATER-HEATING SYSTEM.

SPECIFICATION forming part of Letters Patent No. 587,055, dated July 27, 1897.

Application filed December 27, 1895. Serial No. 573,486. (No model.)

To all whom it may concern:

Be it known that I, JOHN HERVEY, a citizen of the United States, residing at Kansas City, in the county of Wyandotte and State of Kansas, have invented certain new and useful Improvements in Means for Heating Water for Boiler-Feed and Hot-Water Heater Systems, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to a new and useful improvement in means for heating water for boiler-feed and hot-water heater systems; and it consists in the construction and arrangement of parts hereinafter described, and definitely pointed out in the claim.

The aim and purpose of this invention is to utilize the gases of combustion from a steam-boiler furnace as they pass through the smoke-arch or back connection for the passage of the gases of combustion into the rear end of the boiler-tubes to heat a coil of pipes filled with water, which will in turn supply the hot water for a water-heating system and to heat feed-water for the boiler.

Another object of my invention is to provide a water-heating and feed-water system which can be easily heated from the gases of combustion which have heretofore been wasted without requiring additional fuel and a system which is easily controlled and which provides automatic means for supplying the heating-coils with water when the supply is turned off to prevent injury to the coil by overheating.

These objects and others not heretofore specified are accomplished by the construction illustrated in the accompanying drawings, wherein like letters of reference indicate corresponding parts in the several views, and in which—

Figure 1 is a diagrammatic view of my invention applied to the back connection of a steam-boiler furnace. Fig. 2 is a perspective view of the device detached from the furnace. Fig. 3 is a detail sectional view of the back connection of a steam-boiler furnace with the heating-coil applied thereto, and Fig. 4 is a detail section of the check-valve.

A represents a horizontal tubular steam-boiler having the ordinary tubes (not shown) through which the gases of combustion pass;

A', the furnace-door; a, the ash-pit door; a', the ash-pit; B, the grate; b, the steam-dome; B', the bridge-wall; b', the combustion-chamber; C, the back connection for the passage of the gases of combustion into the rear of the tubes; C', the flue above the boiler, and c the uptake. These parts, with the exception of the back connection, are of the ordinary construction as now used in steam-boiler furnaces. This back connection C has its top cut away, forming an opening c', and over this opening is placed the coil D, as shown in Figs. 1 and 3. This coil is covered on its top with asbestos or other suitable non-combustible material D', and the coil and its packing make a tight joint in the opening in the back connection, so that no gases of combustion can pass through the opening c', but will all pass through the flues in the boiler, as plainly shown in Figs. 1 and 3. It will thus be seen from the above that none of the gases of combustion are wasted, but their passage through this back connection is simply used to heat the water-coil which supplies the hot water for the heating system and feed-water.

Water is fed into the coil D through the feed-pipe E, which connects with the water-main or other source of supply, and the supply is controlled by the valve e. The end of the coil opposite from the feed is connected to a vertical pipe F, and the upper end of this pipe is connected to the horizontal pipe f, which leads into the tank G, which is located at the highest point of the hot-water heating system.

G' is a pipe leading from the tank to the various coils g, located in the different parts of the building to be heated by this system, and this pipe is extended downward and connects with the feed-pipe E at g' between the controlling-valve e and the coil.

H is a pipe leading from the tank to the boiler-supply, which provides heated water for the same.

I is a safety return-pipe leading from the bottom of the tank direct to the coil. This safety-pipe is controlled by the check-valve i, (plainly shown in Fig. 4,) which consists of the valve-seat J and the gravity-valve J', all of the ordinary construction. This valve is so constructed and arranged that when the controlling-valve e is turned on the pressure

of the water from the supply-pipe passing into the coil will keep the check-valve closed; but if the water from the main supply should be turned off or stopped for some reason then
 5 the pressure on the check-valve would cease and the weight of the water in the pipe I would raise the valve J' and the water would rush into the coil and prevent the same from becoming overheated or burned out. This water
 10 then in the coil would become heated and rise up in the pipe F and the water would circulate as if the supply was still on.

It is sometimes desirable to connect the furnaces in batteries. Then a coil can be utilized for each back connection. I have shown
 15 such a construction in Fig. 2, wherein a branch E' from the supply-pipe leads to a second coil D'', and this pipe is controlled by the valve e'. This second coil is placed over the
 20 back connection of the second furnace, and its rear end is connected to the vertical pipe F', which leads to the horizontal pipe f, leading into the tank. This second coil is also protected by a branch I', leading from the
 25 safety-pipe I, and is controlled by a check-valve i' in a similar manner.

It is sometimes desirable to use one furnace and coil only, and for that purpose I provide the valves K K' in the return-pipe from the
 30 water-heating system and the valves k k' in the safety return-pipes. Now if only the first coil D is to be used, there being no fire in the second furnace, the valve e' is closed, also the valve K' in the return-pipe and the valve k'
 35 in the safety-pipe, which will entirely disconnect one coil from the other. These coils can be once more united by simply opening these

valves. I also provide a valve L in the pipe f, which can be used in this connection, if necessary. Although I have shown but two
 40 coils, it is obvious that I could have any number of furnaces and coils by simply connecting them by suitable pipes.

M is a safety-valve located at the top of the tank for releasing any surplus steam which
 45 might accumulate in the tank.

I am aware that many minor changes can be made in the construction and arrangement of parts herein shown and described without in the least departing from the nature and
 50 principles of my invention.

What I claim as new, and desire to secure by Letters Patent, is—

The combination with a water-heating system, a feed-water system for boilers, a steam-
 55 boiler furnace and the back connection of the furnace having a cut-away portion at the top of the connection forming an opening, of a water-coil connected to the water-heating system resting over the cut-away portion and
 60 forming a cover for the opening a pipe leading from the water-heating system to the feed-water system, and a non-combustible packing secured to the coil, the packing and coil forming an air-tight cover for the cut-away portion
 65 so that the products of combustion will pursue their normal course back through the flues of the boiler, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN HERVEY.

Witnesses:

ELLEN REES,
 KITTIE REES.