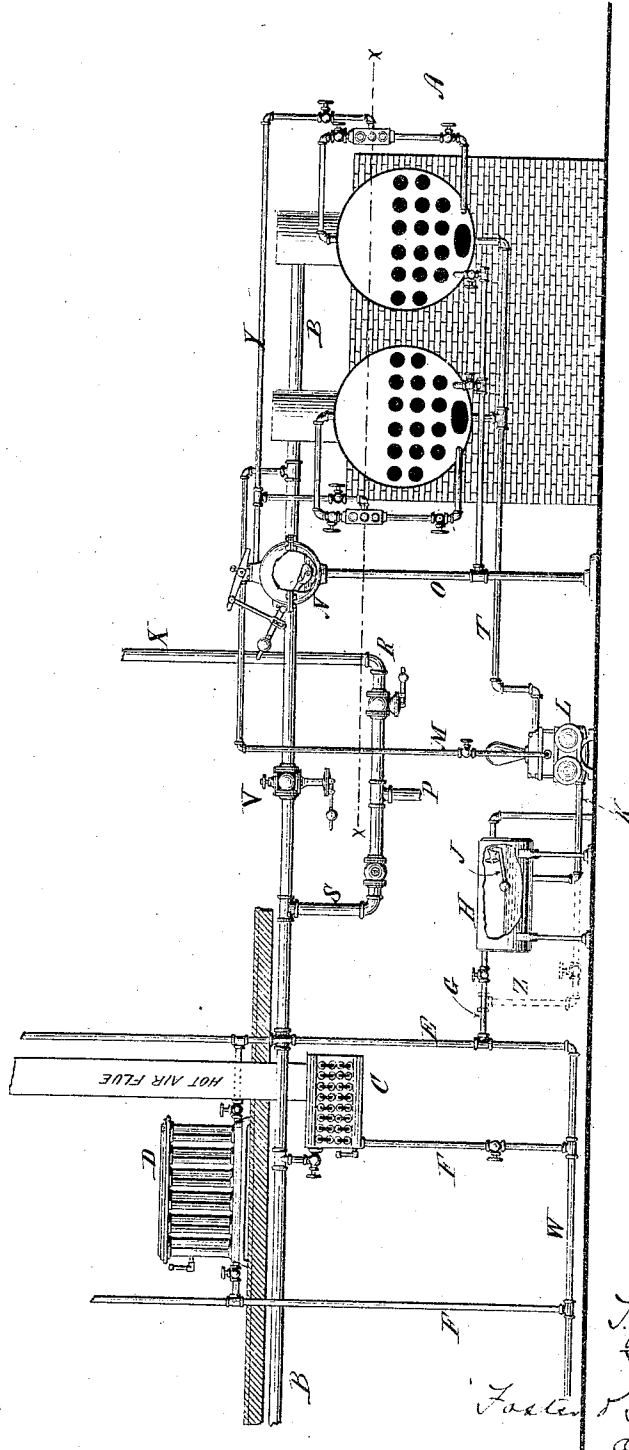


(No Model.)

T. J. KIELEY,
AUTOMATIC RETURN STEAM HEATING SYSTEM.

No. 406,220.

Patented July 2, 1889.



Witnesses:
Wm. Gardner
Wm. A. Pollock

T. J. Kieley
Inventor: by
Foster & Freeman
attys. at l.

UNITED STATES PATENT OFFICE.

TIMOTHY J. KIELEY, OF NEW YORK, N. Y.

AUTOMATIC RETURN STEAM-HEATING SYSTEM.

SPECIFICATION forming part of Letters Patent No. 406,220, dated July 2, 1889.

Application filed April 13, 1887. Serial No. 235,238. (No model.)

To all whom it may concern:

Be it known that I, TIMOTHY J. KIELEY, of the city, county, and State of New York, have invented a new and useful Improvement in Automatic Return Steam-Heating Systems, of which the following is a full, true, and complete description, reference being had to the accompanying drawing.

My invention relates to a steam-heating system in which I automatically return to the boiler the water of condensation and, if necessary, automatically supply an additional amount of water to keep the water up to a predetermined level in the boiler. By means of a pump-governor I determine the operation of the pump, so as to return constantly a sufficient amount of water to maintain the proper water-level.

My invention will be readily understood from the accompanying drawing.

A represents a boiler or battery of boilers sufficient to supply the required steam. The main steam-supply passes from the boilers by the live-steam pipe B, which pipe contains the reducing-valve V. From this main steam-pipe B the steam passes to the radiators D C, as may be required, and thence to the main return W. An equalizing-pipe E inside of the branch return F serves as a relief-pipe from the main steam-pipe; but this may be dispensed with. The pipe G, forming a part of the main return, connects with the pipe E above the pipe W, as shown, and delivers into the tank H. This tank H contains a float-valve J, which regulates the water-supply from the street-main, as will be described. The return passes from the tank H by the pipe K to the pump L and thence by the return T to the boilers. The pump L is operated by steam passing through the pipe M from the boilers, as shown. The exhaust from the pump may pass into the low-pressure side of the heating system by the pipe P, which communicates with the pipe B by the pipe S beyond the reducing-valve and by the pipe X through the back-pressure valve R with the atmosphere. The steam passing through the pipe M is regulated by the pump-governor N, which may be a boiler-feed governor of any well-known structure, its operation being such that when this chamber is

emptied or partly emptied it will permit live steam to go to the pump and operate the same, whereas when it is filled with water the operation of the pump is arrested. The pump-governor communicates by the pipe Y with the boiler at the water-level, which it is desired to maintain, and by the pipe O returns to the bottom of the boiler. As the pump-governor is situated above the water-level of the boiler, it is apparent that whenever the water-level of the boiler is high enough to close the pipe Y the pump-governor will be filled with water, whereas when the pipe Y communicates with the steam-space of the boiler the pump-governor N will be filled with steam, the water passing back into the boiler by its own gravity. Suitable air-cocks should be connected with the pump-governor N to relieve it when necessary.

The operation of my apparatus can now be readily understood. Steam passes through the main steam-pipe B and then by the operation of the steam-pump L it is forced back to the boiler. The steam-pump L will only operate, as described, when the boilers require additional water—that is, when the water-level has fallen below the level of the dotted line *x x*. If the main return to the tank H is insufficient to supply the boilers with the required amount of water, then the water-level in that tank H will fall so low that the float-valve J will permit an additional supply of water to enter from the main. If it is desired, this tank may be dispensed with by opening the pipe J and closing the passage through the tank, when the water will return directly to the pump. The exhaust from this pump is advantageously used through the pipes P and S for heating, when such heating is required. On the other hand, by closing the valve in the pipe S the exhaust from the pump will escape by the back-pressure valve R and pipe X to the roof. In case the pressure on the street-main is insufficient to force the water into the tank H against the reduced pressure of the system, an ordinary drain-trap, as indicated by dotted lines, may be interposed in the pipe G, which will, by reducing the pressure further in the tank H, permit the water to be supplied from the street when required.

By the term "boiler-feed governor" when used in this specification I mean a governor of any well-known construction which will control the valve to which it is connected by reason of the changes within predetermined limits in the water-level in the boiler.

I am aware that heating systems have been provided with pumps for returning the water of condensation to the boiler, the operation of which pumps was controlled by a governor operated by the amount of condensed steam gathered in a receptacle provided therefor in the return-pipe; hence I disclaim such a construction as forming my invention.

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

1. The combination, in a steam-heating system, of a main steam-supply pipe, a main return-pipe, and a pump in said main return pipe for forcing the water back to the boiler, a steam-pipe carrying steam to said pump, a boiler-feed governor operating the valve of said steam-pipe, a connection from the bottom of said boiler-feed governor below the water-level of the boiler, and a connection from the top of said boiler-feed governor to the boiler at the level at which it is desired to maintain the water in the same, substantially as described.

2. In a steam-heating system, the combination of a boiler, a main steam-supply pipe, and a main return-pipe connecting the boiler and radiators, a pump in the main return-pipe for forcing the water back to the boiler, a steam-supply pipe connecting with said pump, a controlling-valve in the steam-pipe for the pump, and a boiler-feed governor connected with said valve to operate the same, substantially as described.

3. The combination of the boiler A, main steam-supply pipe B, main return-pipe W, pump L in said main return-pipe for forcing water back to the boiler, the boiler-feed governor N, provided with a float-connection O from said governor below the water-level of the boiler, connection Y from said governor to the boiler at its water-level, and the automatic supply-tank H, communicating with the pump, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

TIMOTHY J. KIELEY.

Witnesses:

ANTHONY GREF,
WM. A. POLLOCK.