

1,059,556.

This technical drawing illustrates a steam boiler system. The boiler is shown in a cross-sectional view, featuring a large cylindrical body with a hemispherical top and a rectangular base. A vertical pipe, labeled 'f', extends from the top of the boiler, passing through a series of valves and fittings. The pipe is connected to a horizontal pipe at the top, which is labeled 'm'. The vertical pipe has several valves, including a large valve labeled 'q' and a smaller valve labeled 'q'' at the top. A horizontal pipe labeled 'h' is connected to the vertical pipe. The boiler has a large arched door at the top, labeled 'a', and a smaller rectangular door at the bottom, labeled 'c'. A horizontal pipe labeled 'i' is connected to the side of the boiler, passing through a valve labeled 'j'. A vertical pipe labeled 'k' is connected to the side of the boiler. The boiler is supported by a base, and a horizontal pipe labeled 'l' is connected to the top of the boiler. The drawing is signed 'H. J. 1.' in the bottom right corner.

Fig. 1 of R.

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DAMPER-REGULATOR FOR STEAM-HEATING SYSTEMS.

1,059,556.

Specification of Letters Patent.

Patented Apr. 22, 1913.

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To all whom it may concern:

Be it known that I, HUGO MUNZER, a citizen of the United States, residing at Paterson, in the county of Passaic and State of New Jersey, have invented certain new and useful Improvements in Damper-Regulators for Steam-Heating Systems, of which the following is a specification.

This invention relates to damper regulating apparatus for steam heating systems and particularly to that class of such apparatus in which, with a view to accomplish the charging of the whole heating system with steam before the apparatus becomes effective in its capacity of self-adjustment, the displacement of the boiler-water by the pressure of the steam is utilized for actuating the moving element of the apparatus.

According to this invention, a regulating apparatus of the class particularly mentioned above is produced which is found to be extremely delicate and sensitive in operation, remaining fully efficient where the operating pressure is much lower than is ordinarily the case in damper regulating apparatus.

In the accompanying drawing, Figure 1 is a front elevation of a steam boiler provided with the improved apparatus, a part of the boiler and the smoke pipe appearing in section; and, Fig. 2 is a vertical sectional view of that part of the apparatus which directly includes the liquid receiver.

The steam boiler *a*, provided with dampers *b* and *c* for controlling the draft of its furnace, has attached thereto below the water-level therein a pipe *d* which in the present instance is bent downwardly, its free upwardly projecting end having suitably attached thereto the cylinder *e* which is open at the top. In this cylinder as a guide is adapted to move vertically the cylindrical liquid-receiver *f* which is closed except as hereinafter stated and has a downwardly projecting nipple on which and the extremity of pipe *d* are fitted the ends of a helical flexible tube *g* housed in the cylinder and constituting an extensible and contractible extension of said pipe. To allow the exclusion and admission of liquid to said receiver at atmospheric pressure and yet prevent the escape of the liquid therefrom any suitable valve *h* adapted for this function may be attached thereto.

The damper *b* has a two-armed lever *i* carrying a weight *j* which acts normally to

hold both dampers open, *k* being a suitable connection between the lever and damper *c* for causing the dampers to open and close together. Over suitable guides *l* extends a wire, cord or other flexible connection *m*, one end of which is attached to the weighted end of lever *i* and the other to an eye *m'* on the top of the receiver. In the position (open) in which the dampers are normally held by the weight *j* the receiver is normally raised, as shown.

The apparatus is operatively complete as so far described. I may, however, provide it with means for altering the pressure at which self-adjustment becomes operative somewhat similar to that set forth in my Patent No. 1,048,090. Thus: the water-leg or downward bend of pipe *d* has a short-circuiting return connection *n* provided with a check-valve *n'* opening (relatively) toward the boiler. From points respectively below and above this connection lead upwardly the pipes *o* and *p* having the cut-off valves *o'* and *p'* and connected by the pipes *q* arranged at different elevations and having the cut-off valves *q'*. Pipe *d* has a cut-off valve *d'* between the connection *n* and pipe *o*. With valve *d'* open and valves *o'* and *p'* closed the course of flow from the boiler to the reservoir is through the whole length of pipe *d*, or direct; with valve *d'* closed and valves *o'* *p'* open the course of flow from the boiler to the receiver is through pipe *o*, pipe *d*, one of the pipes *q*, pipe *p*, and then the part of pipe *d* which is between pipe *p* and the receiver. The return from the receiver is via the part of pipe *d* which is short-circuited by connection *n*. The altering of the pressure at which closing movement of the dampers of the apparatus accrues in the second instance is of course accomplished by closing the first, or first and second (from the bottom) valves *q'*, and thus changing the elevation to which the water must rise before it can reach the receiver.

Operation: It will be understood that, with the boiler cold and the dampers and receiver in the position which they are normally caused to assume and shown in the drawing, the level of the water in the means for conducting the water to the receiver will be coincident with that in the boiler. Upon starting up the system, and when the pressure therein rises sufficiently, the pressure will force the water through the conducting means into the receiver. When the load

thus imposed on the receiver becomes sufficient to overcome the resistance to downward movement of the receiver, the latter will descend, resulting in the corresponding
5 or closing movement of the dampers. The fire being thus checked, and the pressure consequently reducing, the water contained in the receiver will run back toward the boiler, thus lightening the receiver and per-
10 mitting the same to rise and the dampers to move toward the open position. In practice, the changes thus occurring will be usually hardly apparent because of the highly sensitive character of the mechanism, due to the
15 simplicity of its construction and the reduction to the minimum of friction and other factors which tend to discourage perfect responsiveness to variations in pressure.

Having thus fully described my invention,
20 what I claim as new and desire to secure by Letters Patent is:—

1. An automatically controlled heating apparatus including a boiler, a furnace, means to control the furnace draft including
25 a normally raised downwardly movable liquid receiver and a liquid-conducting means discharging into said receiver and communicating with the boiler below the water level therein, and comprising a rigid tubu-
30 lar portion and a flexible helical tubular

portion, and a cylinder containing and guiding said receiver, housing the flexible portion of the conducting means, and carried by said rigid portion thereof.

2. In combination, with a boiler having a
35 furnace, and with a damper for the furnace, a damper regulating fluid motor having its moving element operatively connected with the damper, a fluid conductor leading from the boiler to the motor and having a down-
40 wardly depending water-leg between the boiler and the motor, a tubular system having its ends connected at different elevations with that part of said conductor which is be-
45 tween the lowest extremity of said water-leg and the motor and including differently elevated valved branches, a short-circuiting pipe connecting the aforesaid part of the
conductor with the part thereof which is be-
50 tween the lowest point in its water-leg and the boiler and a check-valve in the short-circuiting pipe opening toward the boiler, substantially as described.

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

HUGO MUNZER.

Witnesses:

JOHN W. STEWARD,
WM. D. BELL.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."