

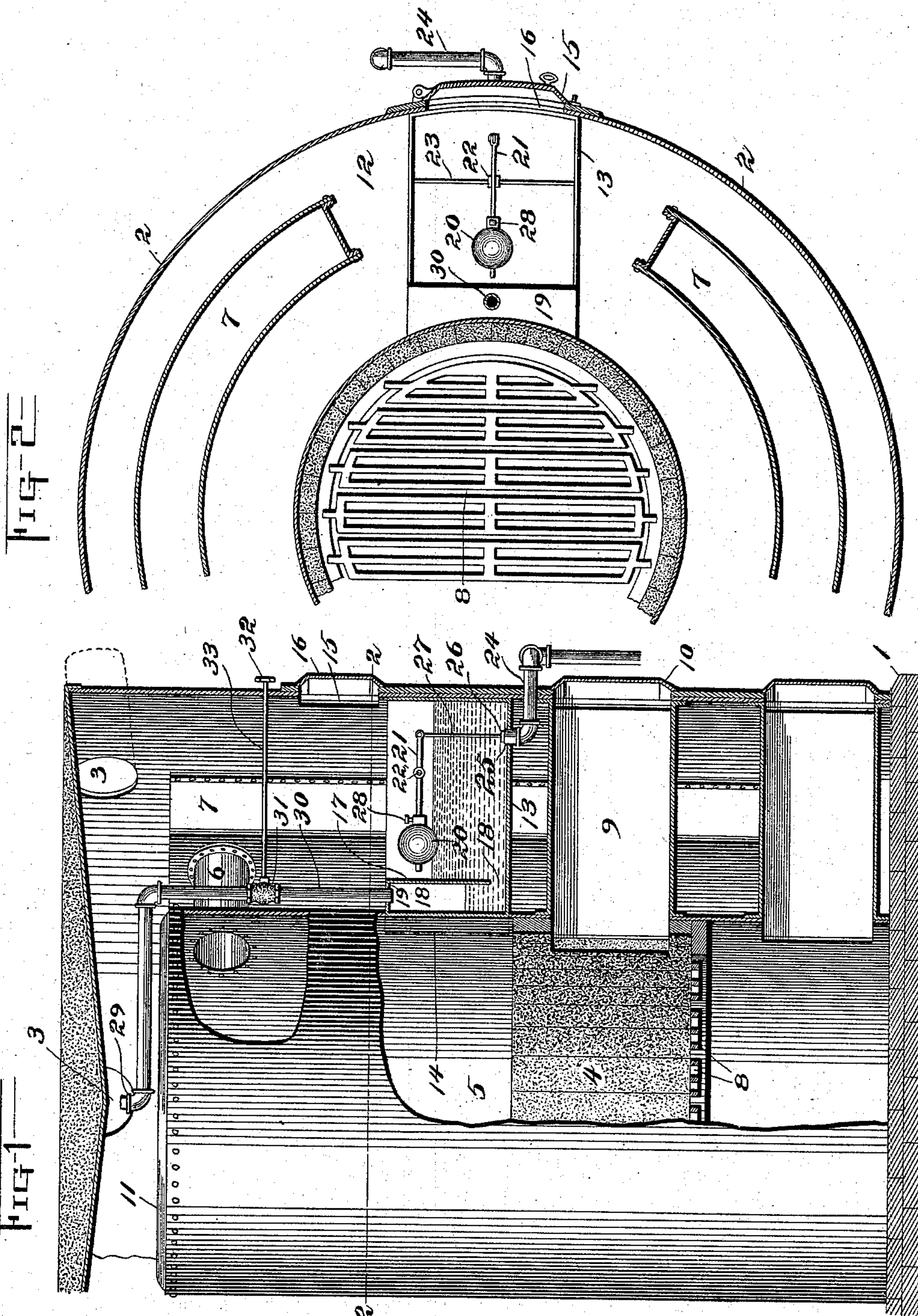
(No Model.)

G. W. FRIDRICH.

AIR MOISTENING DEVICE FOR HOT AIR FURNACES.

No. 528,202.

Patented Oct. 30, 1894.



Witnesses:
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UNITED STATES PATENT OFFICE.

GEORGE W. FRIDRICH, OF ST. LOUIS, MISSOURI.

AIR-MOISTENING DEVICE FOR HOT-AIR FURNACES.

SPECIFICATION forming part of Letters Patent No. 528,202, dated October 30, 1894.

Application filed December 11, 1893. Serial No. 493,439. (No model.)

To all whom it may concern:

Be it known that I, GEORGE W. FRIDRICH, of St. Louis, State of Missouri, have invented certain new and useful Improvements in Air-Moistening Devices for Hot Air-Furnaces, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to an improved air moistening device for hot air furnaces and consists in the novel construction, combination and arrangement of parts, hereinafter specified and designated in the claims.

The object of my invention is to provide an improved automatic or self regulating air moistening apparatus for retaining at all times a supply of water in the boiler or tank of said air moistening apparatus, and which shall have perfected means for distributing the vapor or steam in the warm air chamber of the furnace.

In the drawings, Figure 1 is a sectional side elevation of portions of furnace having my invention thereon. Fig. 2 is a sectional plan view taken on the line of 2—2 of Fig. 1.

1 indicates the usual foundation of brick work or stone upon which the furnace is supported for use; 2, the outer shell surrounding the available heating surface of the furnace and forming the usual warm air-chamber, to the upper portion of which warm air pipes, as 3, are connected for conveying the warmed and moistened air to the various parts of a building.

Located within the outer shell 2, is the usual fire pot 4, while above said fire pot is the combustion chamber 5, provided with the tubes 6 adjacent its upper end, for the passage of the products of combustion into the usual radiating chamber 7.

The furnace is provided with any suitable form of grate such as here shown and indicated by 8.

9 indicates a fuel passage formed in the walls of the furnace above the grate and extending from the fire chamber thereof outward through the outer shell and fitted with a fire door 10 at its outer end for the usual purpose. The usual ash pit and ash door are provided. There is a space between the top 11 of the combustion chamber and the top of said outer shell. The annular radiat-

ing chamber 7 is constructed to provide a space 12 in front of the said combustion chamber above the fuel passage 9. The usual smoke pipe connection with the combustion chamber will also be provided.

I will now proceed to describe the construction of my improved automatic regulating apparatus for retaining a normal supply of water in the tank of the air moistening apparatus.

13 indicates a small boiler, which is preferably rectangular in contour, having closed bottom and sides and a portion of its top open and a portion of it closed. The inner side of the said boiler is arranged preferably (but not necessarily) to be contacted directly by the flame in the combustion chamber, the same being located in an opening 14, cut in adjacent wall of said chamber, so that said boiler is located directly above the fuel passage 9, and preferably has its adjacent side walls in vertical alignment with the side walls of said passage and said boiler extends from said combustion chamber outward to or closely adjacent the outer shell of the furnace. Directly above the plane of the upper side of the boiler a door opening 15 is formed in the outer shell of the furnace and is normally closed by a suitable door or slide 16 by means of which access may be had to the mechanism of the boiler for adjusting, repairing, &c. Fixed in the boiler is a transverse partition 17 which extends therein with its lower edge separated a distance from the bottom of the boiler, the lower portion of which steam chamber is in communication with the larger chamber of the boiler, by way of the passage formed beneath the lower edge of said transverse partition and the top of which chamber is closed by a head or cap 19 placed thereon.

A normal water line is maintained in the large chamber of the boiler by means of a common float 20, mounted therein upon a float lever 21 pivoted at 22 upon a transverse horizontal rod or bracket 23 mounted in said chamber, in combination with other connections now to be described.

24 indicates a water supply pipe, the outer end of which is to be properly connected with the water works piping of the building, and which pipe is placed through an opening formed in the outer shell of the furnace and extends to a point beneath the bottom of said

larger chamber of said boiler above the top of said fuel passage 9 and is thereat turned outward and placed in communication with an opening 25 in the bottom of said chamber 5 and this opening is controlled by valve 26 mounted upon a valve rod 27, having its upper end connected with the float lever 21, on the side of the pivotal point 22 of said lever, which is opposite the side upon which said float is located, so that when said float rises by the rise or fall of water in said chamber, said valve will be moved upward or downward, away from or toward the opening of the bottom of said chamber. The said valve 15 will thereby more or less close the water supply opening of said boiler. The float is preferably adjustable upon said float lever, so that it may be moved nearer to or farther from the pivotal point of said lever and secured by means of a common set screw or other fastening 28, so that said float may rise earlier or later to retain a greater or less height of water in the boiler-chamber which contains said float.

29 indicates a steam-discharge preferably located centrally of the top 11 of the combustion chamber in the space between said top and the top of the outer shell of the furnace.

30 indicates a steam pipe which connects said steam discharge with the steam chamber 18 of the boiler, the lower edge of said pipe being connected with the head or cap 19 of said chamber, so that the interior communicates with such chamber at the upper end thereof, and said pipe extends to a point preferably in the plane of said steam discharge and then horizontally of such discharge.

31 indicates a common valve applied to the steam pipe 30 and having a handle 32 mounted upon the outer end of a valve rod 33, by means of which the passage of steam through said pipe may be controlled or regulated. The said rod 33 extends horizontally outward 45 through an opening in the outer shell at a point directly above the door or slide 16 and the handle 32 is located thereon at such point.

The operation is as follows:—A fire being started in the fire pot, the products of combustion rise and pass to the smoke pipe or chimney in the usual manner. Prior to this however, the float chamber of the boiler should be supplied with water. Fresh air enters the warm air chamber at the usual point 55 adjacent to the lower end thereof by way of the usual fresh air duct or passage (not shown) and by contact with the heating surface of the adjacent parts has its temperature raised and rises between the outer shell 60 and the annular radiating chamber, and in the space between said chamber and combustion chamber and fire pot, and enters the warm air pipes and is conducted to the various rooms of the building. Meanwhile the boiler has been supplied with water by the supply pipe 24, to such height that the float 20 has been raised thereby, and the height of

water in the float chamber of said boiler is retained at normal elevation therein and also in the steam chamber 18, if the valve 31 be 70 fully opened, the water in both chambers of the boiler seeking a common level and retaining the same under the above mentioned conditions and steam being generated in said steam chamber and vapor being thrown off 75 in said float chamber, steam passes by way of the pipe 30 to the steam discharge 29 and is discharged in the warm air chamber, and diffuses itself or commingles with the warmed air therein, and said vapor and said steam 80 unite to moisten said air to the maximum degree of humidity. If less humidity of the air is desired, the discharge of steam may be limited by closing the valve 31, by means of its handle 32. If said valve be entirely or nearly 85 closed, the steam accumulates under pressure in the upper portion of said steam chamber and forces the water therein downward a corresponding distance, thereby removing the water from the exposed heating surface of said 90 steam chamber and diminishing the generation of steam thereby to a corresponding degree. I have found that the higher the water level in said steam chamber, the greater the quantity of steam generated by such surface 95 and vice versa.

I am aware that air moistening devices have heretofore been provided with an open pan or boiler in various forms, to discharge steam or vapor, and I therefore do not claim such 100 as my invention, for the reason that in all of such devices no provision has been made for discharging the steam or vapor under a variable pressure, and in fact the construction has been such that it was impossible for a 105 body of steam to accumulate under a perceptible pressure.

What I claim is—

1. An air moistening device having a steam boiler vertically divided into two sections 110 communicating with each other and in contact with the flames in said furnace, a feed water pipe communicating with one portion of said steam boiler, float valve mechanism controlling the communication of the feed 115 pipe with said boiler, a steam-pipe leading from the remaining section of said steam boiler and communicating with the hot air chamber near the top of the furnace, and a manually operated valve controlling the passage through said steam-pipe. 120

2. In a device of the class described, the combination of a boiler located adjacent to, and in the path of, the flames from the grate, a vertical partition in said boiler having a 125 passage-way at the bottom thereof, a steam-pipe communicating with the closed upper end of one of the sections formed by the said partition and extending to a point of discharge in the top of the air chamber, a manually operated valve controlling a passage 130 through said steam-pipe, a feed water pipe communicating with the remaining section of the steam boiler and having an open top,

a valve normally seated on said top closing
the port in the steam pipe, a valve-rod con-
nected to said valve, a lever fulcrumed in
the boiler and pivotally connected with the
5 valve-rod, and a float adjustably connected
to said lever, whereby the flow from the feed
water pipe is automatically controlled.

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

GEORGE W. FRIDRICH.

Witnesses:

W. J. SANKEY,
E. E. LONGAN.