(No Model.)

M. E. ALLEY.

DEVICE FOR SUPPLYING SUPERHEATED STEAM TO FURNACES.

No. 431,682. Patented July 8, 1890.

Fig. 1.

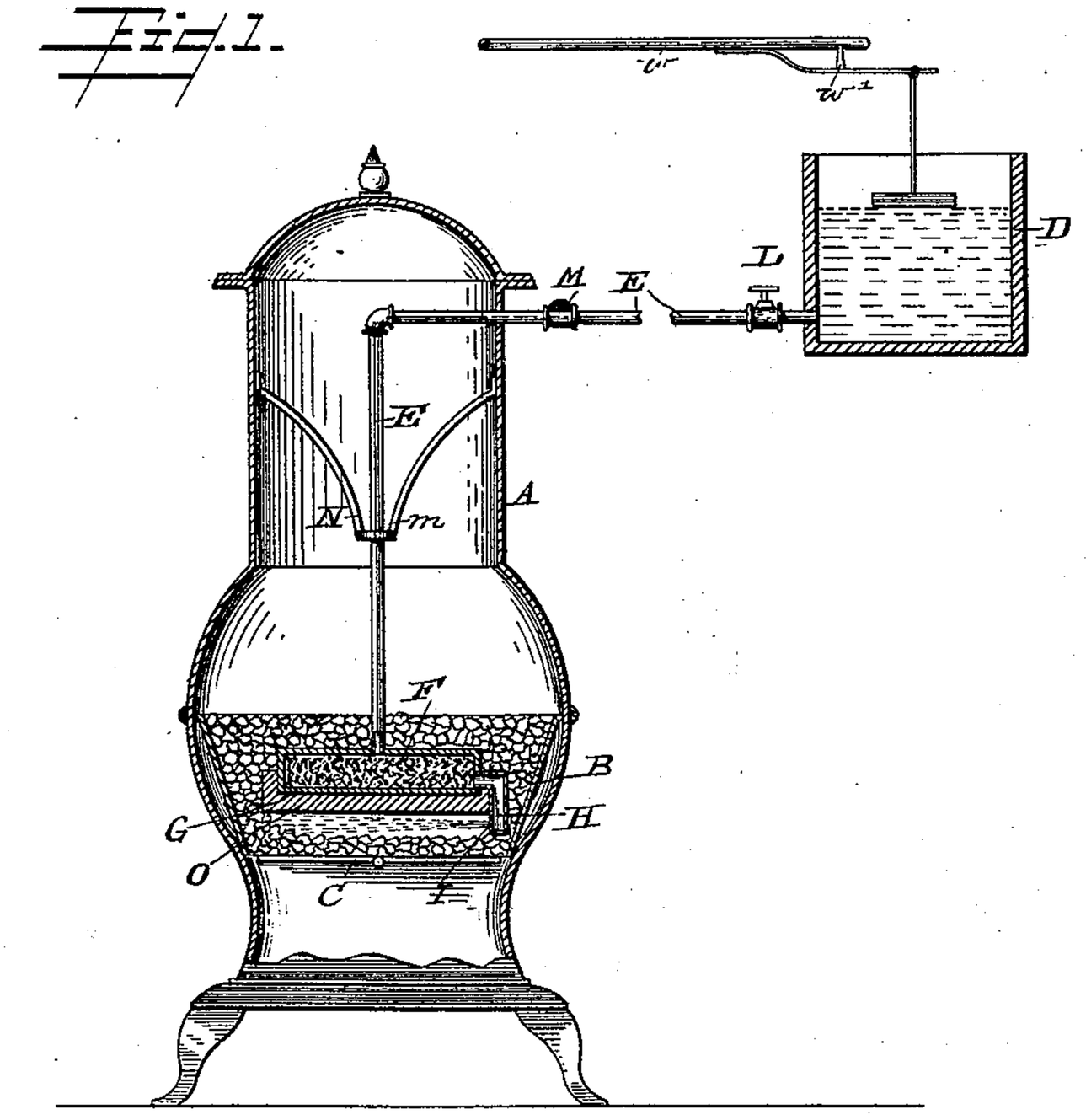
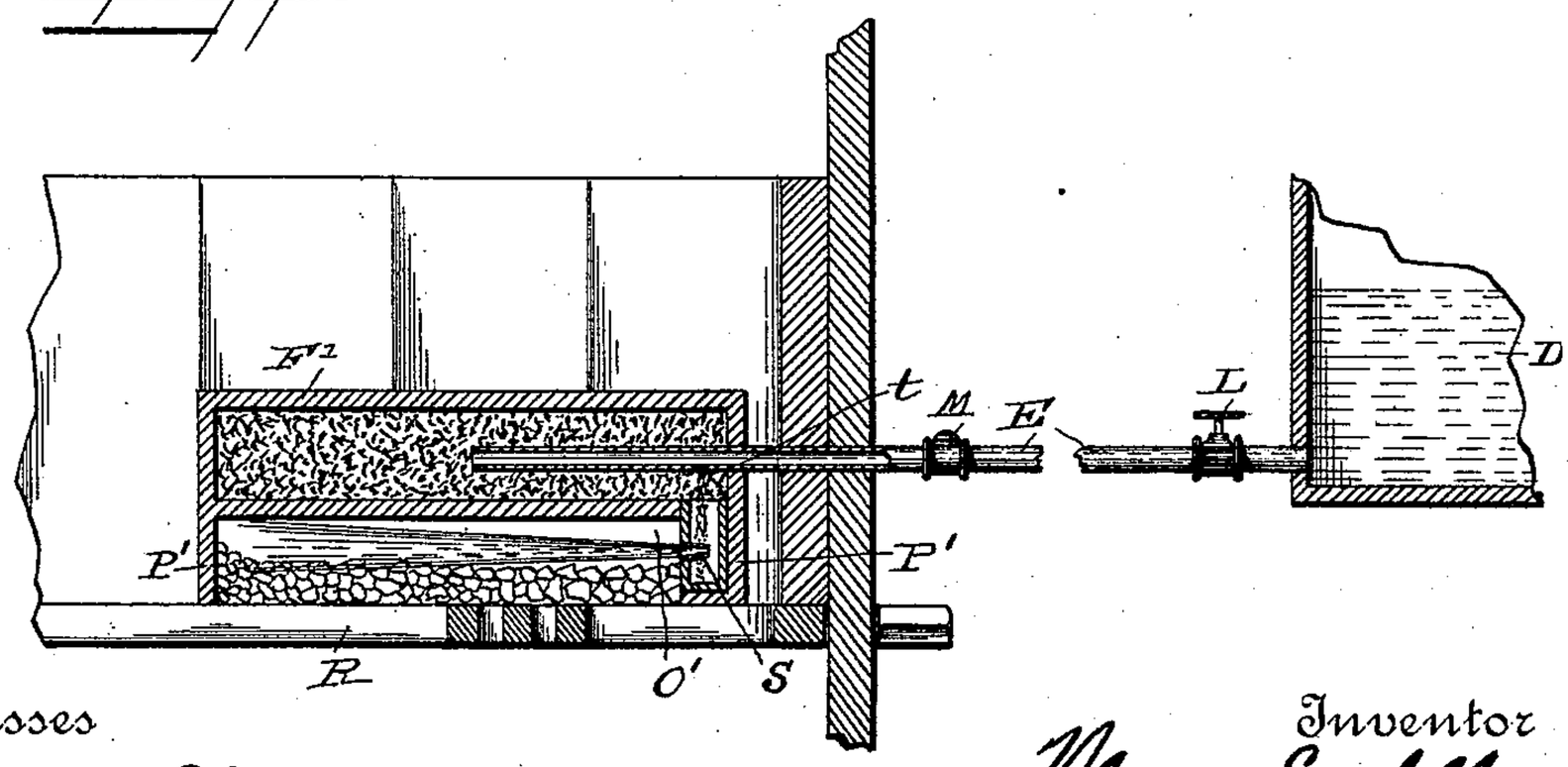


Fig. 2.



Witnesses
Jos. H. Blackwood.
Albert B. Blackwood

Inventor
Moses E. Alley
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UNITED STATES PATENT OFFICE.

MOSES E. ALLEY, OF MADISON, WISCONSIN.

DEVICE FOR SUPPLYING SUPERHEATED STEAM TO FURNACES.

SPECIFICATION forming part of Letters Patent No. 431,682, dated July 8, 1890.

Application filed November 13, 1889. Serial No. 330,184. (No model.)

To all whom it may concern:

Be it known that I, MOSES E. ALLEY, a citizen of the United States, residing at Madison, in the county of Dane and State of Wisconsin, have invented certain new and useful Improvements in Devices for Supplying Superheated Steam to Furnaces; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in a device for supplying superheated steam to the fire of furnaces, for which I filed an application for a patent on April 13, 1889, Serial No. 307,119, whereby a simplifying of the construction is secured and satisfactory results obtained.

In the drawings, Figure 1 shows my complete device in connection with an ordinary parlor coal-burning stove. Fig. 2 is a vertical section of a modified form of device adapted especially for use in connection with a wood-burning stove.

In Fig. 1, A is the shell of the stove, B is the wall of the fire-pot, and C is the grate at the bottom of the fire-pot.

D is a water-holding tank located near to the stove, but above the fire-pot, and provided with a small eduction-pipe E, running into the stove and terminating in a hollow metal retort F, which retort is located in the fire-pot or fire-chamber and in proximity to the fuel that is being consumed. When this device is used in connection with hard coal, a fire-brick G, preferably hollowed out in its upper part to receive the retort therein in the manner shown in Fig. 1, is attached to the retort F below and at its sides, whereby the retort is protected from immediate contact with the oxyhydrogen blaze, and at the same time is subjected to the steady but modified radiated heat of the fire-brick. A short discharging-tube H, secured in the under side of the retort and at one end thereof, extends downwardly at one end of the fire-brick, or it may be inclosed by the fire-brick.

V is a float for the tank D, which serves, in connection with a pipe *w* and valve *w'*, to fix the amount and pressure of water in said tank.

The tube H is provided with one or more lateral perforations I, through which the superheated steam is discharged into the fire above the fuel in the grate. The retort F is preferably filled with metal scraps K. The pipe E is provided with a stop-cock L and with a check-valve M, which check-valve closes toward the tank D and is adapted to prevent the discharge of steam from the retort F and the return of water backwardly into the tank. The check-valve may, if desired, be located otherwise, as within the water-supplying vessel or at or near the mouth of the pipe.

The pipe E may be secured in a fixed position in the stove by means of braces N N, if desired. The retort F and fire-brick G are located centrally in the fire-pot at a distance from the wall B and grate C, and when the coal is put into the fire-pot for burning it is dumped into the stove above the fire-pot and falls down around the retort and fire-brick, passing below it and arranging itself by gravity in the form shown in Fig. 1, whereby a fire-space O is formed, into which space the superheated steam from the retort is discharged and in which the superheated steam and gases from the coal are burned, producing an oxyhydrogen blaze having intense heat. This fire-space O is an important result of the construction and location of the retort and fire-brick, and is necessary to the fullest successful operation of my device. It will be understood that when the fire is started and the coal is burning the stop-cock L is opened and a small amount of water admitted through the pipe E into the retort F, which water passes readily through the check-valve M until a sufficient supply has been received in the retort for present use, when it will be converted into steam, which, having considerable pressure, would discharge itself rearwardly into the tank D were it not for the check-valve M, which prohibits escape in that direction, the check-valve M remaining closed until the water already introduced into the retort has been all converted into steam and mostly discharged into the fire-space, when the pressure rearwardly against the check-valve is so far reduced that a fresh supply of water will be admitted through the check-valve into the retort, thus keeping up a supply of steam in the retort by the water admitted intermittingly through the check-valve M.

In the modified form of device shown in Fig.

2, which is better adapted for wood, the retort F′ is shown as supported on feet P′ P′, resting on the grate or bottom R of a fire-chamber, the stove shown in this figure being intended to represent one adapted for the use of wood as fuel. These feet P′ P′ or some equivalent means are desirable not only for supporting the retort at a distance above the grate, but also to keep the wood which would be placed alongside from getting beneath the retort, whereby a similar fire-space O′ is formed in the fire-chamber. The steam-eduction duct S leads from the retort through one of the feet P′ to the fire-space O′, whereby the steam is discharged from the retort into the fire-space beneath the retort. In using the modified form of device having the feet P′ P′ (shown in Fig. 2) with a wood fire a fire-brick is not needed, on account of the less intense heat of the combustion. The steam-nozzle S projects into the hollow foot P′, so that water may drip into it from a perforation *t* in the water-pipe E for the purpose of modifying the temperature of the steam-pipe, and thereby to prevent its being closed up by the intense heat to which the nozzle is subjected.

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

1. In a device for supplying steam to a fire in a furnace, a retort located in a fire-pot, a pipe leading thereto from a water-supply, a fire-brick below and attached to the retort, and a discharge-pipe leading from the retort to a fire-space beneath the fire-brick and provided with one or more apertures for discharging the steam therefrom, substantially as described.

2. In combination with the supply-tank, fire-chamber, and retort, a steam-injection pipe leading from said retort to a space beneath said retort and over the ignited fuel and the water-pipe leading from the tank to the said retort and provided with a perforation located over said steam-pipe, whereby the heat of said steam-pipe is modified by the dripping from said water-pipe, substantially as described.

3. The combination, with a coal heating-stove having a fire-pot, of a tank, an eduction-pipe leading therefrom to the retort, a check-valve in the pipe, a hollow retort containing metal scraps, a fire-brick secured to the under side of the retort, and a discharge-pipe H, leading from the retort and provided with apertures for discharging steam therefrom, substantially as described.

4. In combination with the fire-chamber, a steam-generating retort located within said chamber, said chamber being provided with a grate to support the fuel and of sufficient depth to form a space between a body of ignited fuel on the grate and the retort, and a communicating pipe or pipes from said retort for injecting steam into said space beneath the retort, substantially as described.

5. The combination of the water-supply tank provided with a float, the pipe provided with a stop-cock and check-valve, the retort within said fire-chamber and into which said pipe leads, and a pipe leading from said retort into a space beneath the retort for discharging steam above a body of ignited fuel into said space, substantially as described.

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

MOSES E. ALLEY.

Witnesses:

HENRY E. COOPER,

JOS. H. BLACKWOOD.