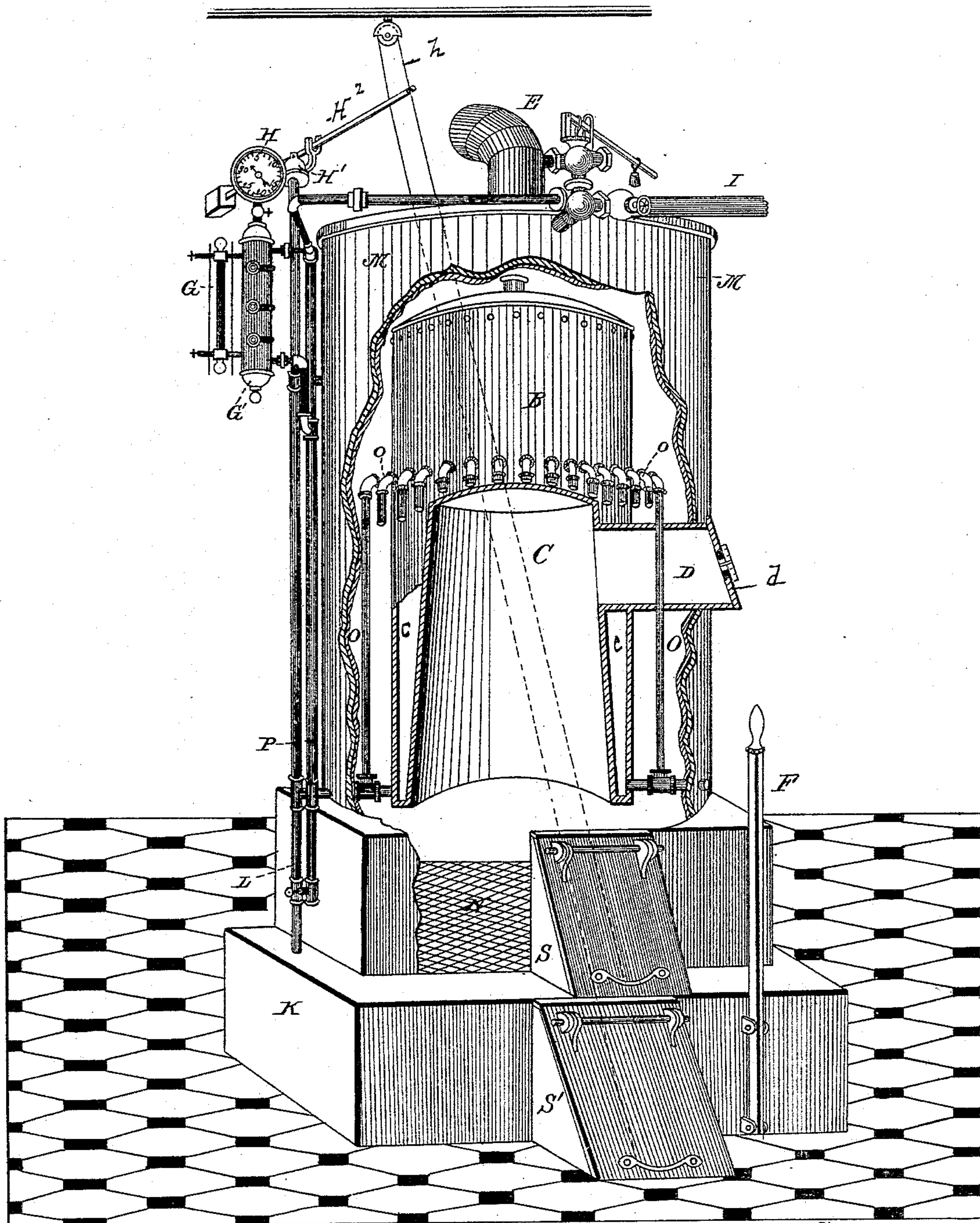


(No Model.)

I. B. POTTS.
BOILER FOR HEATING PURPOSES.

No. 401,300.

Patented Apr. 9, 1889.



Witnesses
M. B. Harris
W. J. Gordon

Inventor,
Isaac B. Potts
By his Attorney J. H. MacDonald

UNITED STATES PATENT OFFICE.

ISAAC B. POTTS, OF COLUMBUS, OHIO.

BOILER FOR HEATING PURPOSES.

SPECIFICATION forming part of Letters Patent No. 401,300, dated April 9, 1889.

Application filed November 22, 1888. Serial No. 291,568. (No model.)

To all whom it may concern:

Be it known that I, ISAAC B. POTTS, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented certain new and useful Improvements in Boilers for Heating Purposes; 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 vertical or upright base-burner furnaces for steam or water heating for houses, public buildings, &c., as will be hereinafter more fully described in the specification, illustrated in the accompanying drawing, and pointed out in the claim.

In the accompanying drawing, the figure 20 is a perspective view, partly in section, showing the details of my improved device for the purpose stated; and it consists, essentially, of an exterior jacket or shell, M, provided with an interior lining, M', of non-conducting material, to prevent radiation and loss of heat, as well as prevent condensation. The exterior jacket is of wrought-iron or sheet metal, whereby the necessity of brick-work or other masonry is avoided. It is further provided with a boiler, B, so constructed as to leave a cone-shaped magazine or coal-receptacle, C, tapering from a point about the center of the boiler to the bottom, thereby leaving from top to bottom an increasing span for the gradual spread of the fuel to the grate-bars N.

A series of tubes, O, lead from about the water-line of the boiler to the bottom thereof, and are on the outside of the boiler, and are therefore in direct contact with the heated gases given off by combustion.

Water is admitted to the boiler by a pipe, L, which passes below the fire-line, thus heating the water on its way to the boiler. This pipe has no connection with the steam, but has a cold dead-pressure, thus preventing the diaphragm H' in the regulator from being destroyed by heat. At the same time it bears the equalizing-pressure of the steam, as it is connected at the bottom with the water in the boiler by pressure only, and not by circulation.

The pipe P is connected at the top with the steam and at the bottom with the water in the boiler, and thus there is an equalization of pressure. As the diaphragm at first is comparatively cold, there can be no injury to it by heat, the outer pipe having the heat and cold combined. The steam or hot water passes off through the pipe P at the top, and any water of condensation is returned to the boiler. Suitable water and steam gages, G and H, are provided, as shown in the figure.

Coal or fuel is admitted by means of a door, d, near the top of the magazine, the tube D passing outward through the jacket M. Automatic means for opening and closing the door S leading to the fuel above the grate-bars N and to the door S' leading into the ash-pit K and beneath the grate-bars is as follows: When steam-pressure rises a height above 212° Fahrenheit, the diaphragm H' raises or actuates a lever, H², connected thereto and by chains or cords h, with the doors S S' in such a way as to close S' and open S—that is to say, the air is admitted above the grate-bars and closed below them, thus preventing rapid combustion. When the steam falls below one-pound pressure, the door S' is opened and door S closed, thus permitting the flow of air beneath the grate-bars and combustion increased.

A furnace thus constructed not only insures complete combustion, but economy of fuel, for as the heat passes upward around the boiler and exterior tubes the water in each is heated, the non-conducting lining M' preventing loss of heat by radiation; therefore all the caloric of the interior is utilized.

The cone shape of the magazine not only permits the coal to expand under heat within certain limits, but enables the coal to spread out over the surface of the grate-bars, hence permitting a maximum of oxygen to enter to support combustion. Moreover, by using the water of condensation the water gradually becomes pure, and as the loss through the pores of the pipes is slight, to refill the boiler frequently from using water chemically or otherwise impure is avoided; consequently it will seldom be necessary to fill the boiler oftener than once or twice a year. By this form of construction I am also enabled to ob-

tain a maximum of heat-generating devices with a minimum of parts and space; consequently the device is particularly applicable to the heating of private and public buildings.

Having thus described my invention, what I claim is—

In a furnace, the combination, with a boiler having a cone-shaped magazine and tubes in direct contact with the gases, of an exterior

metallic jacket having a non-conducting lining, the boiler-tubes being interposed directly between the boiler and jacket, as and for the purpose set forth.

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

ISAAC B. POTTS.

Witnesses:

I. H. MACDONALD,

LORENZO D. HAGERTY.