H. L. McAVOY.

Steam Heater.

No. 93,104.

Patented July 27, 1869.

Fig. 2

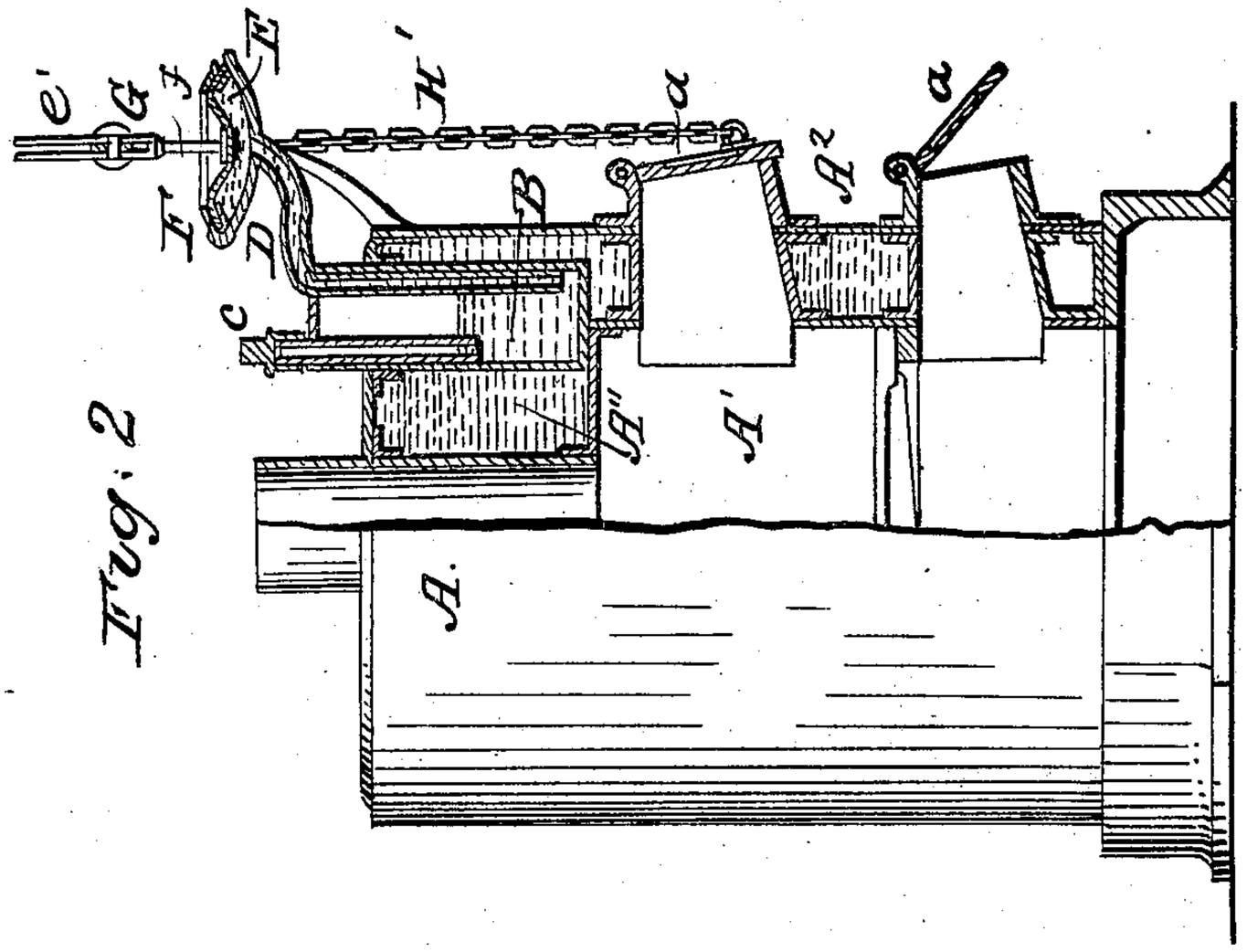
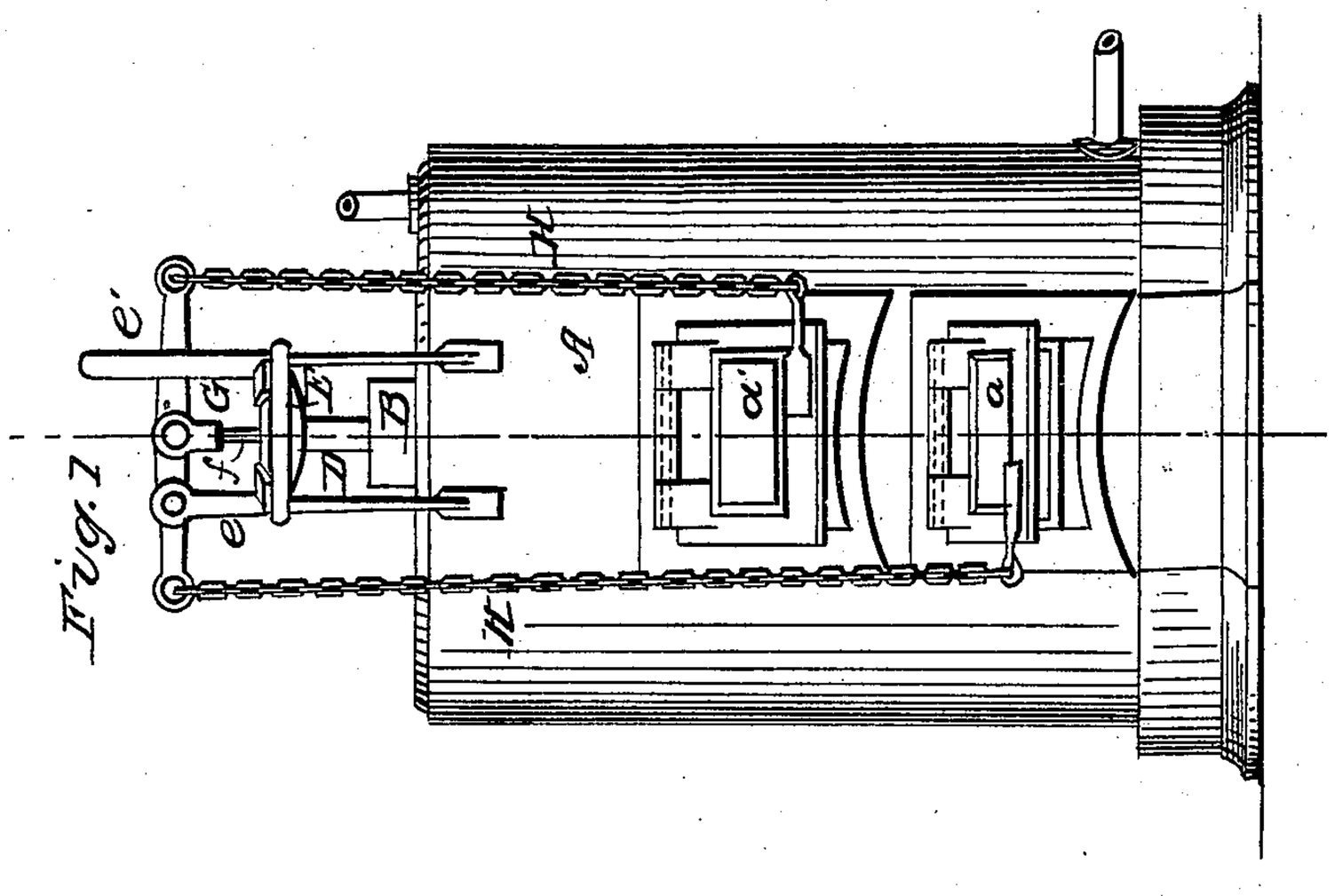


Fig. 1



Witnesses

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HUGH L. McAVOY, OF BALTIMORE, MARYLAND.

Letters Patent No. 93,104, *dated July* 27, 1869.

HEAT-REGULATOR FOR HOT-WATER APPARATUS.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, HUGH L. McAVOY, of the city of Baltimore, in the State of Maryland, have invented a new and useful Improvement in Heat-Regulators for Hot-Water and other Heating-Apparatus; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawing, which is made a part of this specification.

The object of my invention is to produce an automatic heat-regulator for hot-water and other heating-apparatus, which, being independent of the boiler, shall be adapted for all varieties of apparatus, and shall, at the same time, be entirely reliable.

It consists of an isolated cylinder, or chamber, surrounded by the water or steam of the apparatus, the heat of which is thus imparted to it, and provided with a pair of tubes, one extending about half way to the bottom, and provided, at its upper end, with a suitable cap or valve, through which the chamber is supplied with water, or other suitable fluid, and the other extending below the surface of the fluid to near the bottom of the chamber, and forming, or provided at its upper end with a cylinder, or chamber containing a diaphragm or other piston, or a float, on the bottom of which the fluid is caused to press, by the formation of steam and the rarefaction or expansion of the air within the chamber by unusual heat, the fluid rising through the last-named tube.

The stem of the piston or float is connected, through suitable media, to the draught and fuel-doors, or to a damper or dampers in the flues of the furnace, which it thus serves automatically to operate as required.

In the drawing—

Figure 1 represents a front elevation of a water-heating apparatus, provided with one form of my improved regulator.

Figure 2 is a side elevation thereof, partly in vertical section.

A represents the boiler or heater, which may be of any form;

A′, the fire-space, and

A″, the water-space thereof.

B represents an air-tight cylinder or chamber, arranged in the form of apparatus shown, within the water-space, being, however, entirely isolated therefrom.

C D are tubes or pipes, projecting downward in the cylinder or chamber B, as represented in fig. 2, the former to about the centre, and the latter to near the bottom thereof.

The upper end of the tube C is closed, by means of a screw-cap, *c*, or a suitable valve, and is employed to supply the chamber with water, or other suitable fluid, the introduction of which is determined by its length, the confined air in the space above its end preventing the fluid rising much above that point.

The tube D forms, or is provided at its upper end with a cylinder, or chamber E, for the reception of a diaphragm, F, or other suitable piston or float, the stem *f* of which is connected to a lever, G, fulcrumed in a standard, *e*, and traversing, at its other end, a slotted standard, *e′*, rising from the cylinder E, or other convenient part.

The ends of the lever G are connected by chains H H′ respectively, to the draught-door *a* and fuel-door *a′* of the furnace, or through any suitable media, to a damper or dampers, by which the draught, &c., may be controlled.

The chamber B may be applied to the boiler, at any desired point thereof, either within or exterior thereto, by suitable connections.

The operation of the device, in the form represented, is as follows:

The chamber B being applied to the boiler or heater, in suitable manner to be surrounded by the water or steam thereof, is supplied with water, or other suitable fluid, through the tube C, which is then closed.

As the water in the boiler becomes heated, its heat is imparted to the fluid and air in the chamber E, which are thus kept at about the same temperature as the water and steam in the boiler.

On an excessive heat being attained by the pressure caused by the accumulation of steam, and the rarefaction and expansion of the heated air above the surface of the fluid in the chamber B, said fluid will be forced up through the tube D, elevating the piston or float F, and, through its stem *f*, the lever G, depressing the chain H, and closing the draught-door *a*, which is held open by said chain.

Then, if the heat has not by this been checked sufficiently by the continued rise of the piston or float, the fuel-door *a′* will be opened, allowing the cold air to rush in on the fuel and the fire-surface, speedily restoring the boiler to the desired temperature.

On this being reached by the consequent contraction of the air in the chamber B, the piston or float will fall, and the doors be restored to their normal position.

My regulator, as employed in hot-water heating-apparatus, varies from all others of similar nature, in the following very material respects:

All automatic regulators for hot-water heating-apparatus, prior to my invention, have been of such a character as to render impossible the conveyance of the water to heating-surfaces, such as radiators, &c., above the boiler, for the reason that the water in the boiler was used to operate the float.

My device being independent, is adapted to be applied to the boiler at any point, and consequently

allows the water of the boiler to be carried up to any desired height above it, without affecting its operation.

Having thus described my invention, the following is what I claim as new therein, and desire to secure by Letters Patent:

I claim the combination, with a hot-water or other heating-apparatus, of the isolated chamber B, provided with the tubes C D, the diaphragm-piston F, or its equivalent, and the lever G, arranged to operate substantially in the manner described, for the purpose specified.

HUGH L. McAVOY.

Witnesses:

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