

No. 708,373.

Patented Sept. 2, 1902.

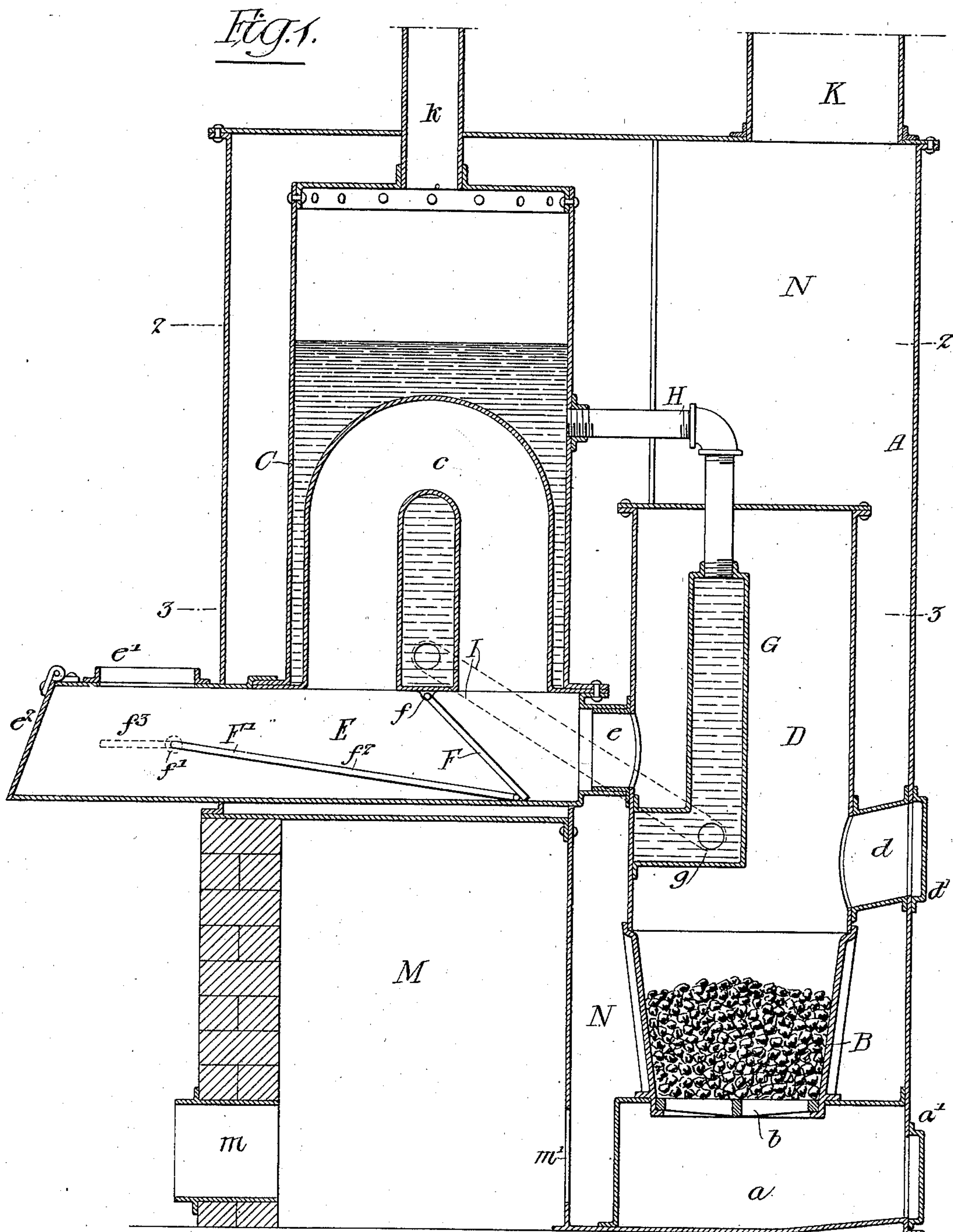
A. L. LOGAN.

COMBINED HOT AIR AND WATER OR STEAM HEATER.

(Application filed July 16, 1901.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses:-

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Herman C. Metcalf.

Inventor:-

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2 Sheets—Sheet 2.

Fig. 2.

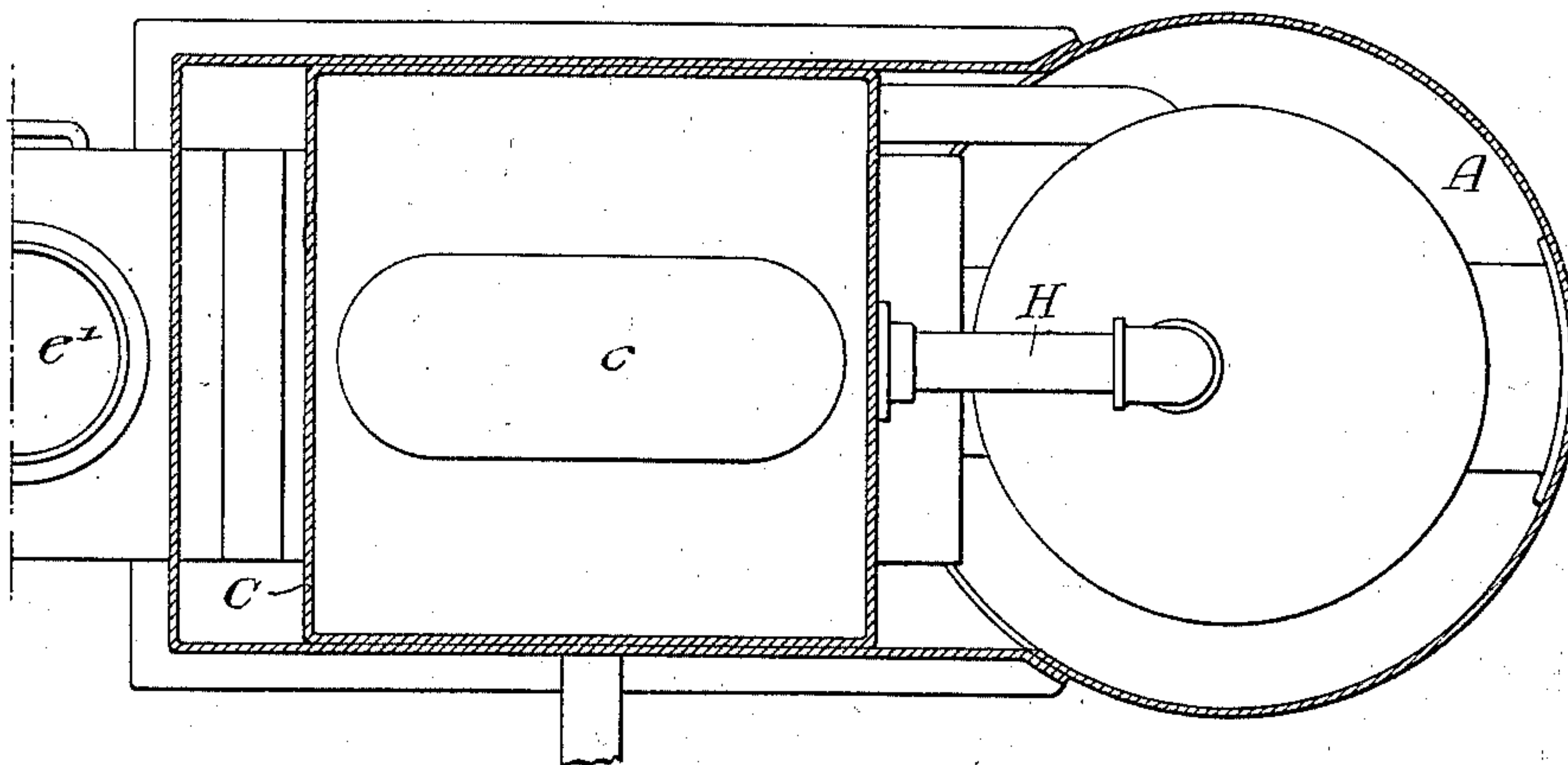


Fig. 3.

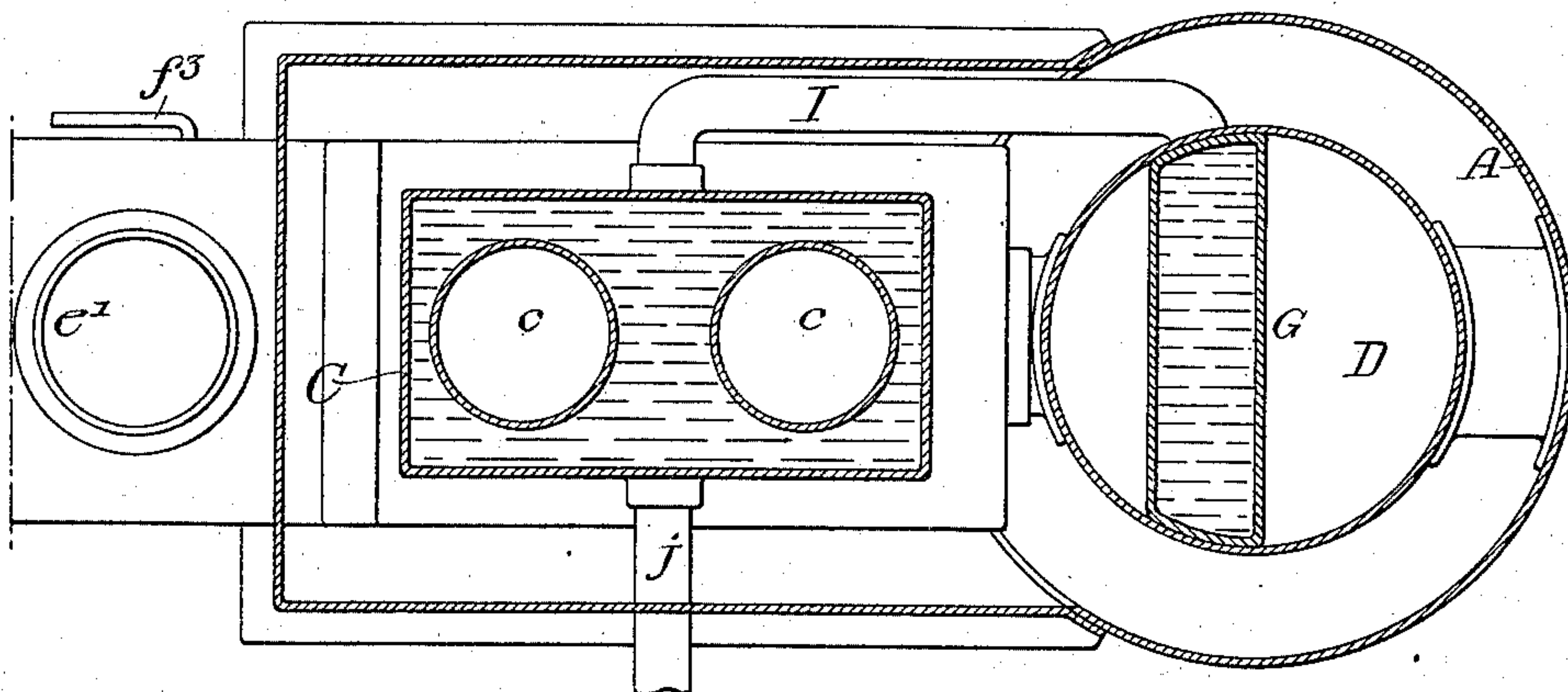
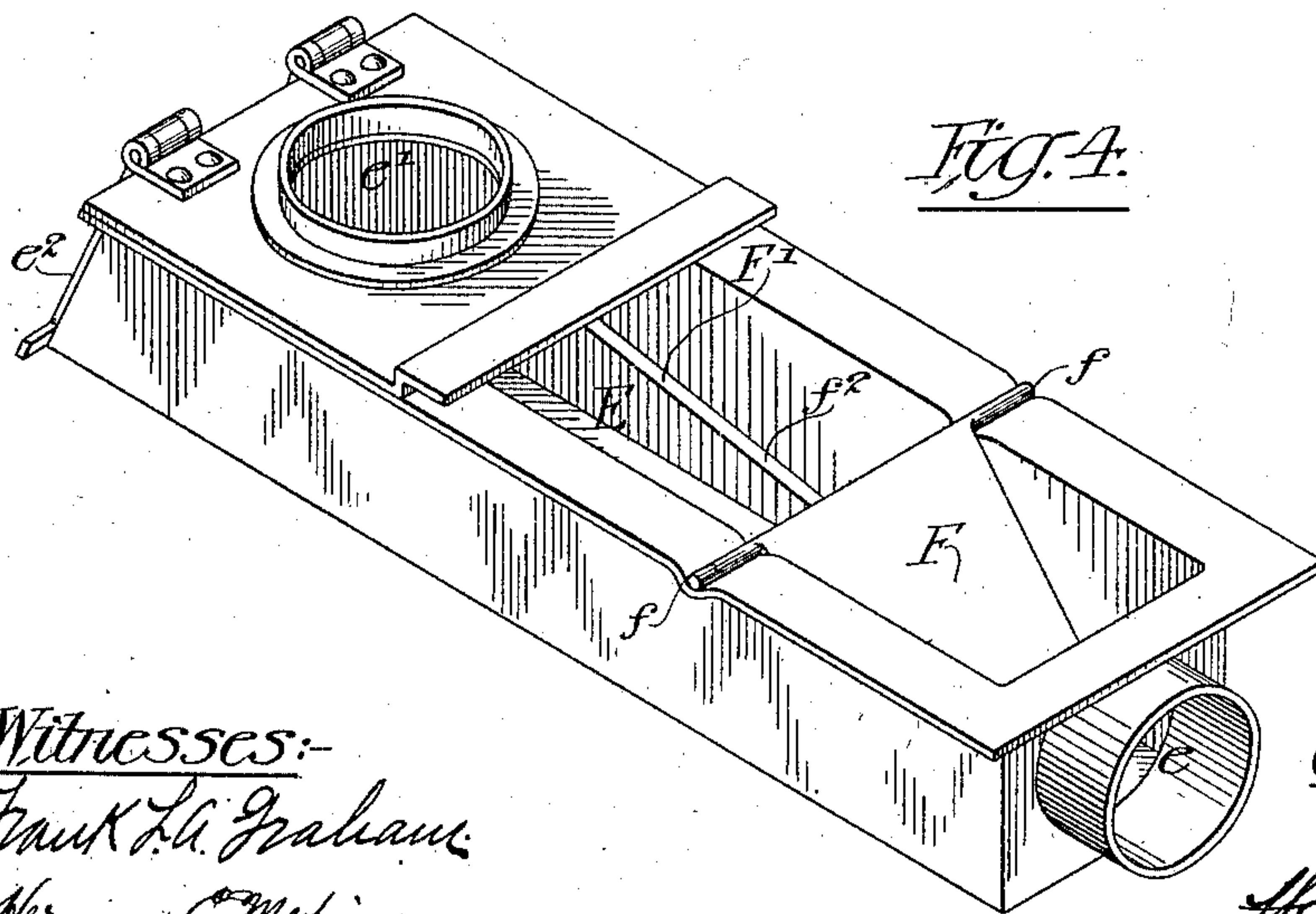


Fig. 4.



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UNITED STATES PATENT OFFICE.

ABRAM L. LOGAN, OF MONTCLARE, PENNSYLVANIA.

COMBINED HOT-AIR AND WATER OR STEAM HEATER.

SPECIFICATION forming part of Letters Patent No. 708,373, dated September 2, 1902.

Application filed July 16, 1901. Serial No. 68,496. (No model.)

To all whom it may concern:

Be it known that I, ABRAM L. LOGAN, a citizen of the United States, and a resident of Montclare, Montgomery county, Pennsylvania, have invented certain Improvements in a Combined Hot-Air and Water or Steam Heater, of which the following is a specification.

The main object of my invention is to provide a heater particularly adapted for use in heating buildings, such as dwelling-houses, in which air can be heated to the desired temperature and utilized to heat part of the building and hot water or steam can be utilized to heat the balance of the building.

A further object of the invention is to so combine the parts as to make an economical heater, both as to the manufacture and the consumption of fuel, making it compact and easy of access in case of repairs.

In the accompanying drawings, Figure 1 is a vertical sectional view of my improved heater. Fig. 2 is a sectional plan view on the line 2 2, Fig. 1. Fig. 3 is a sectional plan view on the line 3 3, Fig. 1, and Fig. 4 is a perspective view illustrating the flue.

A is the casing of the heater, which can be of any form desired.

B is the fire-pot of the ordinary type, having a grate *b*, under which is an ash-pit *a*.

Mounted upon the fire-pot is a combustion-chamber *D*, extending into the heating-chamber inclosed by the casing *A*. This combustion-chamber is closed at the top and is provided with a suitable opening *d* at the front, through which the fire-pot may be charged with fuel. This opening is provided with a fire-door *d'* and the ash-pit with a door *a'*, common to ordinary heating-furnaces. The combustion-chamber *D* communicates with the horizontal flue-section *E* through the pipe *e*, and this horizontal section extends to the back of the furnace and has a nipple *e'*, to which the smoke-pipe can be attached. On the end of the flue-section *E* is pivoted a damper-door *e²*, which can be raised when it is necessary to check the fire.

Mounted above the flue-section *E* is a water chamber or boiler *C*. This water-chamber has a U-shaped flue *c* extending up into its interior and communicating with the horizontal flue *E*. Situated in the horizontal flue

E between the inlet and outlet of the flue *c* is a damper *F*, pivoted at *f*. This damper when down, as shown in the drawings, cuts off direct communication between the combustion-chamber and the smoke-pipe, and the products of combustion must pass up through the flue *c* within the hot-water chamber or boiler *C*; but if the damper is raised then direct communication is afforded between the combustion-chamber and the smoke-pipe. To operate this damper from the exterior of the furnace, I provide a lever *F'*, which is pivoted at *f'* and has a long arm *f²* extending within the flue *E* and bearing against the under side of the damper *F*, while the short arm *f³* of this lever is on the outside of the furnace and within easy reach of the operator. The damper *F* can be held in its raised position by a suitable catch, which will engage the arm *f³* of the lever, or by a suitable weight, as desired.

Within the combustion-chamber *D* is a water-receptacle *G* of the form shown in Figs. 1 and 3, which acts as a partition to direct the products of combustion upward at the front of the combustion-chamber and downward at the back. This water-receptacle is, in fact, a partition which extends from one side of the combustion-chamber to the other and has a rearwardly-projecting lower portion *g*, which prevents the products of combustion passing direct from the combustion-chamber to the flue-pipe *e*. As this water-receptacle is situated directly above the fire, it receives the direct heat of the products of combustion, and water is heated very quickly in this chamber and brought to the desired temperature. A pipe *H* communicates with the upper end of the water-receptacle *G* and with the upper portion of the water chamber or boiler *C*, while a pipe *I* forms a communication between the lower portion of the water chamber or boiler *C* and the lower portion of the water-receptacle *G*, so that a circulation of water through both chambers is assured. The casing *A* incloses both the combustion-chamber *D* and the water chamber or boiler *C*, so that the heat which radiates from these parts is collected in the chamber and can be utilized to heat a current of air passing through the chamber. Air is admitted to the chamber formed by the

casing A through an opening *m*, which communicates with an air-chamber M, which in turn communicates through a passage *m'* with the bottom of the heating-chamber N. One
 5 or more flues K may be connected to the upper portion of this heating-chamber N, so as to carry the hot air to the different portions of the building to be heated. The hot water or steam can pass out through a pipe *k*, communicating with the water-chamber C, and
 10 can be returned through a pipe *j*, communicating with the bottom of the said water-chamber. When my improved heater is used as a combined hot-air and steam heater, then
 15 the level of water in the water-chamber C is sufficiently low to allow for a suitable steam-chamber above the water; but if it is used for hot-water heating then the entire space within the chamber C can be used for water.
 20 It will be seen that by my improvement I can construct a very economical combined hot-water and steam or hot-air heater which can be readily controlled and which will heat a large quantity of air and in which the
 25 water has a free circulation.

The design of the heater may be varied without departing from the essential features of my invention, and in some instances the water-chamber C may be dispensed with when
 30 it is desired to use the water-receptacle G within the combustion-chamber for the same purpose as a water-back when hot water is desired for ordinary use and not for heating purposes.

35 I claim as my invention—

1. The combination in a heating-furnace, of a casing, a fire-pot, a combustion-chamber mounted above the fire-pot, a water-receptacle within the combustion-chamber and forming
 40 a partition therefor, a horizontal flue communicating with the combustion-chamber, said partition being so formed that the products of combustion will have an indirect passage to the flue, a U-shaped flue communicating with the horizontal flue, a damper with-
 45 in the horizontal flue between the inlet and

outlet of the U-shaped flue, and means for operating the damper from the outside of the furnace, substantially as described.

2. The combination in a combined heating-furnace, of a casing, a fire-pot, a combustion-chamber mounted on the fire-pot within the casing, a water-receptacle mounted within the combustion-chamber and forming a partition for the combustion-chamber, so that
 55 the products of combustion will have an indirect passage therethrough, a horizontal flue communicating with the combustion-chamber on one side of the partition, a water chamber or boiler mounted above the horizontal
 60 flue, a flue within the water-chamber and communicating with the horizontal flue, pipes forming communication between the upper portion of the water-receptacle and the water-chamber, and a pipe forming communication
 65 between the lower portion of the water-receptacle and the lower portion of the water-chamber, substantially as described.

3. The combination in a heating-furnace, of a casing, a fire-pot, a cylindrical combustion-chamber mounted above the fire-pot, a transverse water-receptacle mounted within the combustion-chamber and forming a partition,
 70 the space in front of the partition communicating with the fire-pot, a horizontal flue communicating with the space back of the partition so that the products of combustion will pass over the water-receptacle and down to the flue, a damper in said flue, means for operating said damper, a water receptacle or boiler
 80 mounted above the flue and having a passage therein for the products of combustion, the damper being arranged to close the said passage, substantially as described.

In testimony whereof I have signed my
 85 name to this specification in the presence of two subscribing witnesses.

ABRAM L. LOGAN.

Witnesses:

CHARLES C. NORRIS, Jr.,
 A. J. PURSELL, Jr.