

H. Q. HAWLEY.

GAS-STOVE.

No. 171,617.

Patented Dec. 28, 1875.

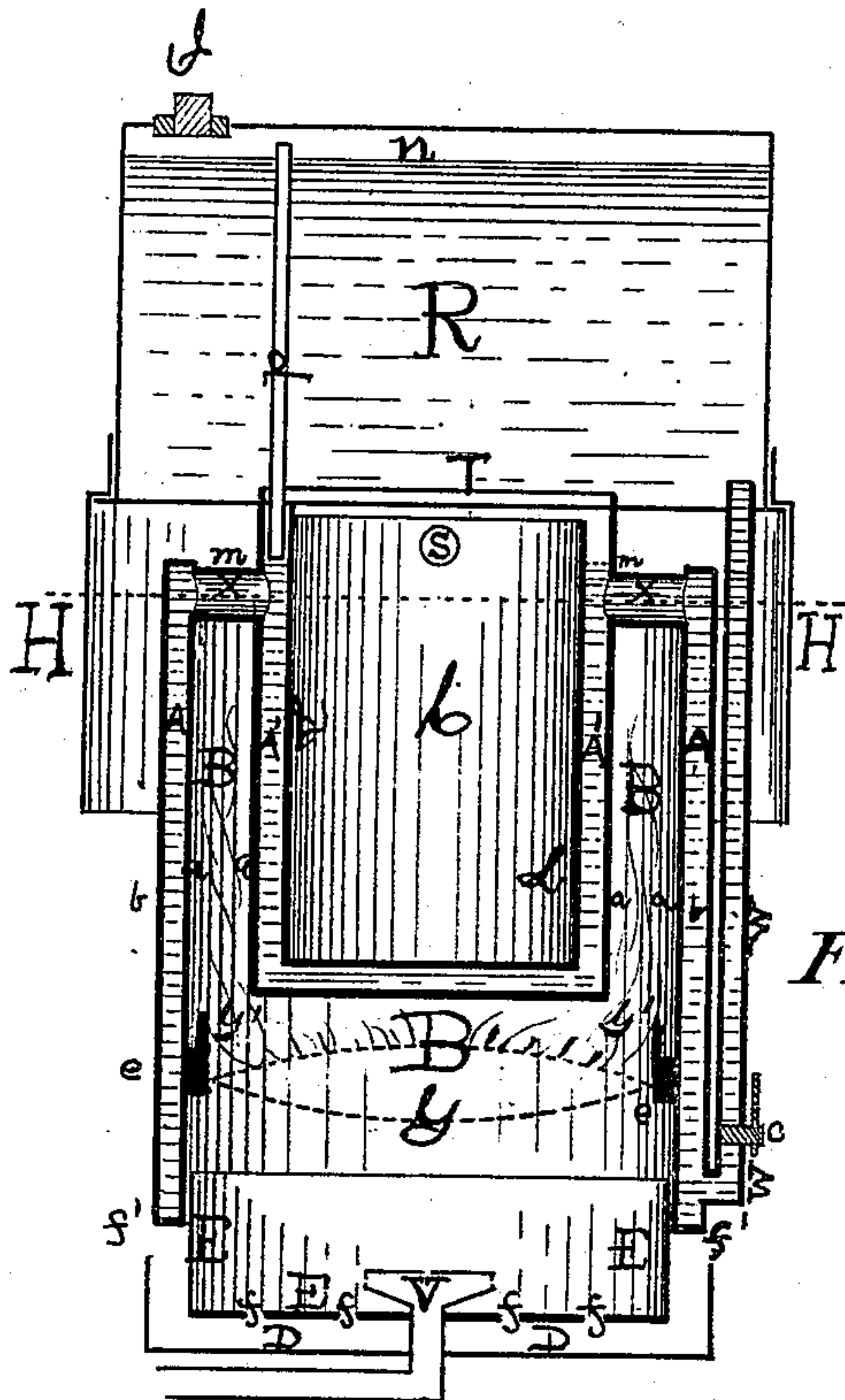


Fig. 2.

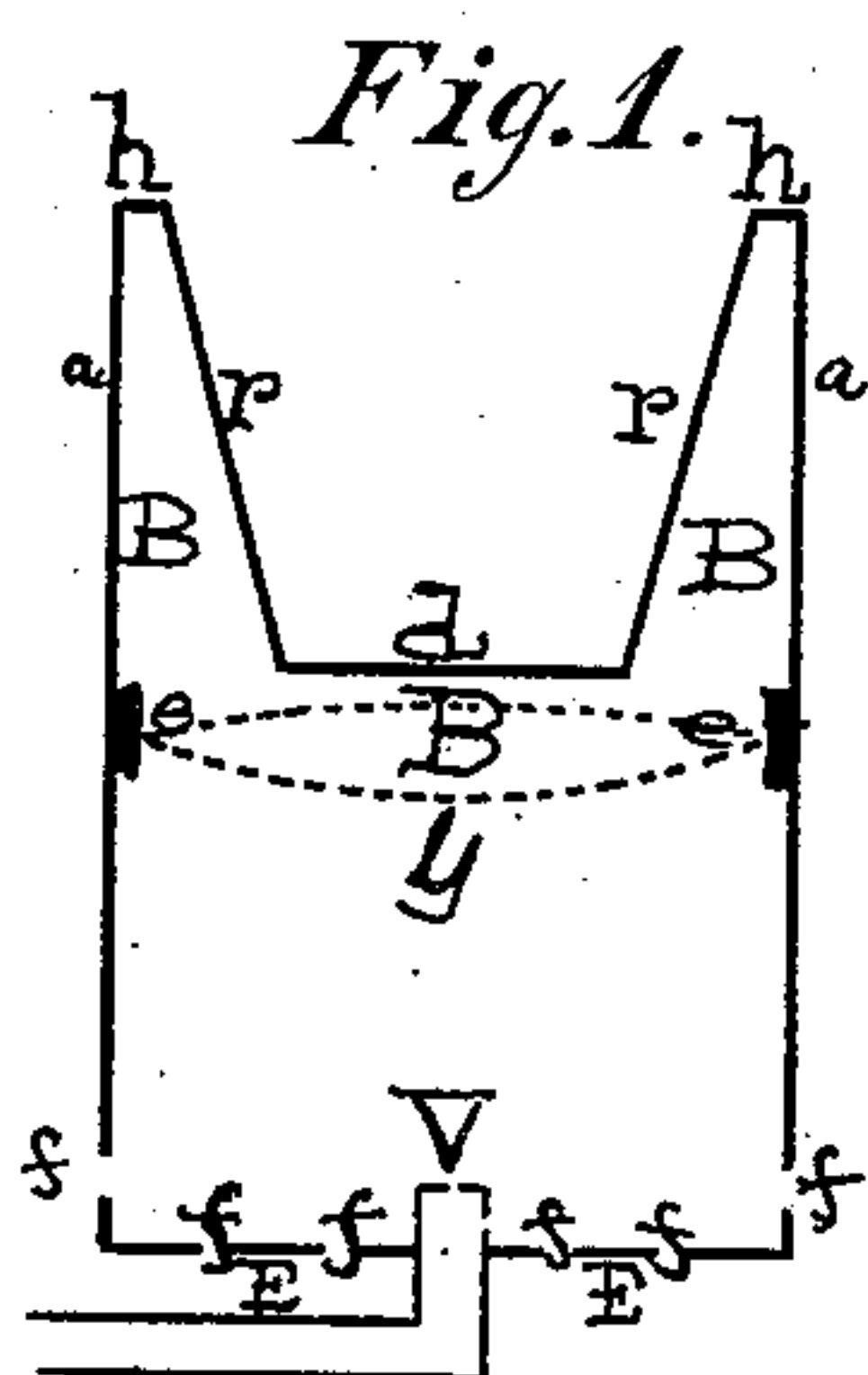


Fig. 1.

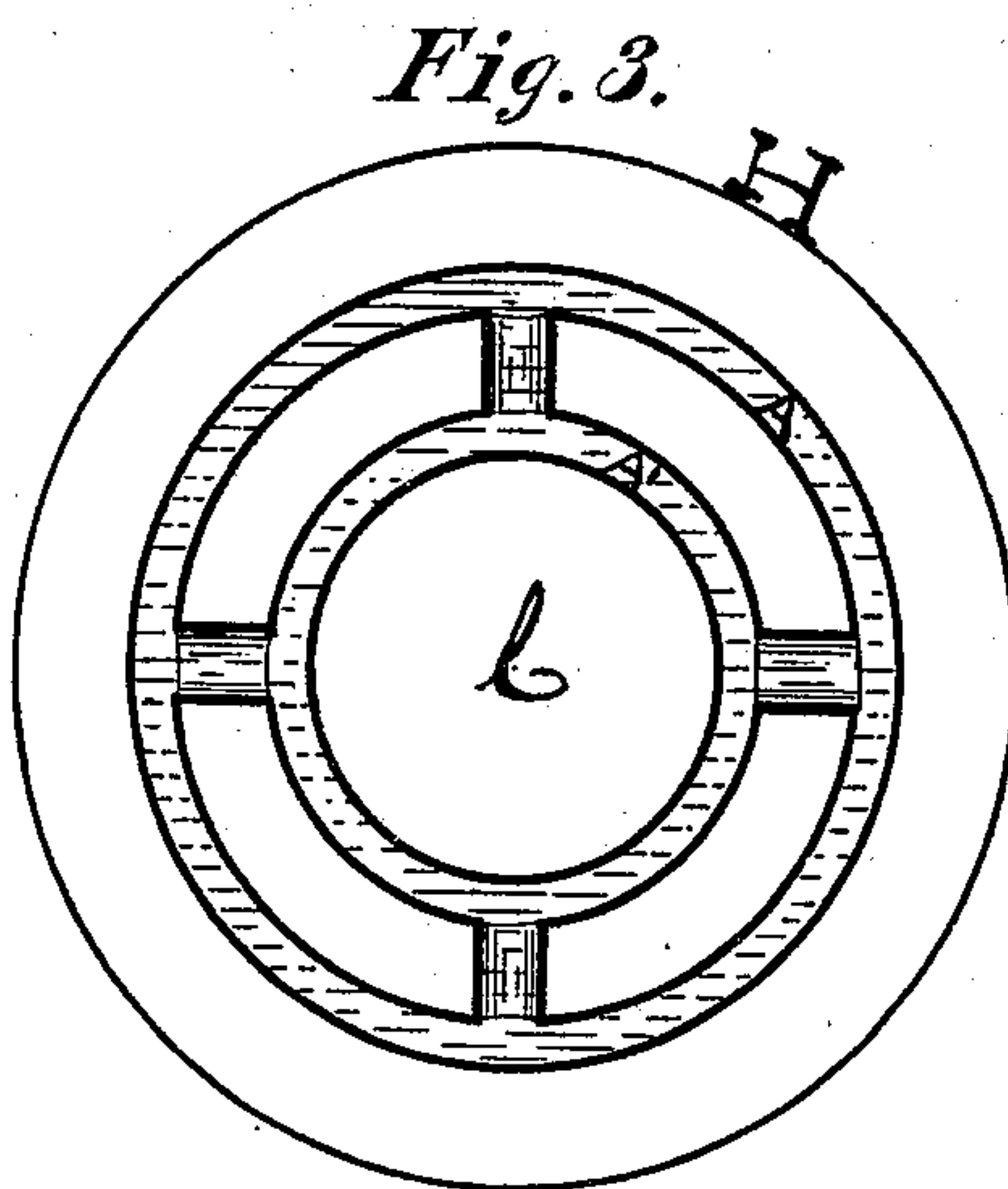


Fig. 3.

Witnesses.

J. Cad. Henick
C. M. Belknap -

Henry L. Hawley
Inventor

UNITED STATES PATENT OFFICE.

HENRY Q. HAWLEY, OF ALBANY, NEW YORK, ASSIGNOR TO GIDEON
HAWLEY, OF SAME PLACE.

IMPROVEMENT IN GAS-STOVES.

Specification forming part of Letters Patent No. **171,617**, dated December 28, 1875; application filed
June 11, 1875.

To all whom it may concern:

Be it known that I, HENRY Q. HAWLEY, of Albany, New York, have invented a Gas Heating and Cooking Furnace, of which the following is a specification:

The nature of my invention consists in an improved construction of apparatus used for heating and cooking, or generating steam, when the fuel is gas or vapor, mixed with air before combustion, and burnt over wire-gauze or perforated metal.

As such apparatus has been heretofore constructed the gauze has formed the top or upper part of the side of the burner, or has been so near said top that cold air from above cools the flame near to and over the entire surface of the gauze, and blows it away from the edge toward the center of the burner, whereby the perfect combustion of the gas is prevented and bad and unhealthy odors are generated. To remedy these defects I construct my burner with a combustion-chamber above the gauze, of sufficient height to prevent currents of cold air entering from above to agitate and cool the gas near the gauze while being consumed, and to create a moderate draft above it, so that all the heat generated may be kept in contact with the gas until it is entirely consumed, and the air used for combustion can be heated and its quantity regulated, as none can enter the flame except from below the gauze.

My improvements further consist in using two or more gauzes instead of one, to make the burner more durable; in making them of curved form; in checking the draft at the center of the fire to secure a more perfect combustion at its edge; and, when the apparatus is to be used for generating steam, in making the walls of its combustion-chamber, except for a short distance above the gauze, a part of a double-shell boiler, and when said walls, from their height, would make the draft excessive, in regulating said draft by a hood over the flues or by lessening their diameter at the top.

Having explained the nature and object of my said improvements, I proceed to describe their construction.

Figure 1 is a vertical section of the apparatus when used as a furnace for heating and

cooking. Fig. 2 is a vertical section of the apparatus when used for generating steam. Fig. 3 is a horizontal section, through the dotted line, Fig. 2, of the boiler A A', the pipes X, and the hood H.

In Fig. 1, B is the combustion-chamber of the furnace; *a a*, its wall; G, the wire-gauze; *d*, a plate over the center of G; *h*, a rim around the top of *a*; *r r*, rods to connect *d* with *h*; *e e*, shoulders for holding G in its place; V, the inlet gas-pipe; E, the bottom of furnace; *f f*, air-holes in bottom and lower end of furnace. The wire-gauze being in the center of this furnace, I find it works well when the space above and below said gauze is about three inches. It can also be used with one gauze, either straight or curved, and without the plate *d* and rim *h*, but not as well. The plate *d* and rim *h* are not required when a boiler is placed over the fire, or a plate or pan, to throw back the heat, but when said boiler is placed within the combustion-chamber B the addition of the hood H is an advantage. A gauze can also be placed above the air-holes *f*, but below the apertures in V, (for the gas to enter,) to distribute the air, but it is not a necessary addition. The gauze G being in the center of this furnace, it answers well without the outside bottom D, but, if desired, it can, of course, be added. In Fig. 2, A A' is the boiler; B, the combustion-chamber; C, the steam-chamber; R, the water-reservoir; I, the inlet of R; *p*, the steam-pipe connecting the space in R, above its water-line *n*, with the boiler A' at its water-line *m*. W is the water-pipe connecting R with the boiler A near its lower end. G is the wire-gauze. G' is a sheet-wall around the edge of G to prevent the cooling of the flame while the water in the boiler A is cold. E is the inner bottom of furnace, arranged to be taken out with D when required to renew the wire-gauze. D is the outer bottom, arranged to act as an air-valve when it is important to regulate the admission of the air. V is the gas-pipe; *f* and *f'* the air-openings; S, the outlet from the steam-chamber C; H, the hood over the chamber B, arranged to slide up and down to permit the gas to be lighted, and also to permit of its being raised until the boiler is suffi-

ciently heated to allow the draft to be checked. X X are pipes connecting the two parts of the boiler A A'. *a a* are the walls of the chamber B and of the boiler A A'. *b b* are the outer walls of A. L is the inner wall of A', open at the top to permit the steam, when formed, to enter C. T is a second head to C, to prevent the water in R from cooling the steam in C. *c* is a cock in the water-pipe W.

It is not shown in the drawings, but it is intended to connect the water-cock *c* with the cock required in the steam-pipe S, so that both can operate together, and also to use a water-gage and safety-valve.

It is also intended to pass the exhaust steam through R, and, when it is important to use the water over again, to add a condensing apparatus. When desirable, an outer casing around the entire apparatus, open only at the top, can also be used.

The apparatus being constructed as above, its operation is as follows: In the furnace illustrated in Fig. 1, the gas being turned on and ignited above the gauze G, and the admission of air regulated by the position of the bottom D when such bottom is used, the heat almost immediately causes the gauze to become red-hot, whereby no gas escapes unconsumed and no smell is created, in evidence of which results a round furnace, four inches in diameter, will only require three to three and a half feet of gas per hour, and the heat generated will be greater than any other gas-burner known to me can obtain from eight to ten feet of gas per hour.

In the apparatus illustrated in Fig. 2, the reservoir R, the pipe W, and the boiler A A', are filled with water up to the lower mouth of the steam-pipe *p*, at or slightly above the water-line *m*, and the cock *c* in the water-pipe W, and the cock in the steam-pipe S, are closed. The gas is then lighted above the gauze G, and the admission of air below it properly regulated, and, as soon as sufficient steam has been generated for the purpose required, the cocks above referred to are opened, and the apparatus is, and continues, in full operation as long as any water remains.

It will be observed that the boiler A' and hood H throw back the heat, whereby it not only acts to better advantage upon the boiler, but renders the combustion of the gas more regular and perfect.

It will also be observed that, by making the combustion-chamber B a part of the boiler, and constructing said boiler so that the steam is generated from the part of the water next said chamber, the least fuel will give the most steam—a feature of great importance in engines for small work, (as driving sewing-machines, &c.) to which gaseous fuel is necessary and rapid generation of steam a necessary condition. And it will further be observed that an apparatus constructed as in Fig. 2 partially heats the water in the reservoir before any of it is required in the boiler, and therefore the automatic action of the pipe *p* is more regular.

Assuming the effects of my improvements to be as I have described, their advantages are great, as they make gas a practical fuel for many purposes, and vapor from naphtha cheaper than coal for any use.

I do not claim the automatic feed to boilers above described; but

What I do claim as my invention is—

1. In a gas heating or cooking furnace, the combustion-chamber B, in combination with the double gauze G, all constructed and operating substantially as set forth.

2. In a gas heating or cooking furnace, the combination of the plate *d* with the chamber B and double gauze G, constructed and operating substantially as and for the purpose set forth.

3. In a gas heating-furnace used for boiling water or generating steam, and having the combustion-chamber B and double gauze G, the boiler placed within said chamber in the manner described, so that it will throw back the heat against the gauze.

4. In the apparatus herein described, the hood H, constructed and operating substantially as and for the purpose set forth.

5. The double bottom E D, in a gas heating or cooking furnace, in which air is mixed with gas before combustion for the purpose of heating the air before it is so mixed.

6. In a gas heating or cooking furnace, the double gauze screens made in a double curved form, substantially as described, for the purpose set forth.

HENRY Q. HAWLEY.

Witnesses:

D. CADY HERRICK,
C. M. BELKNAP.