(No Model.) 2 Sheets—Sheet 1.

H. J. WATTLES.

HEATING APPARATUS.

No. 470,727. Patented Mar. 15, 1892.

Fig. 1.

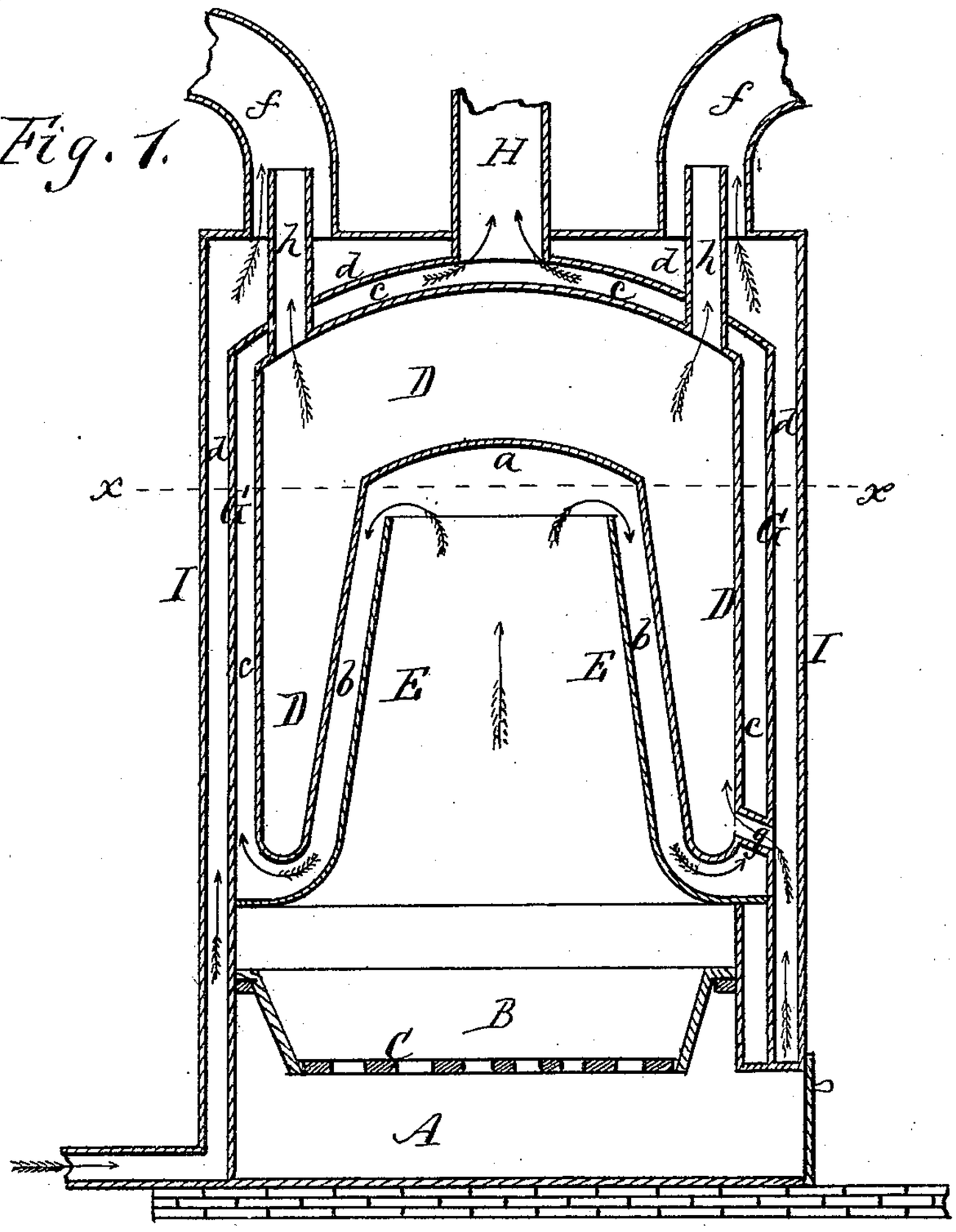
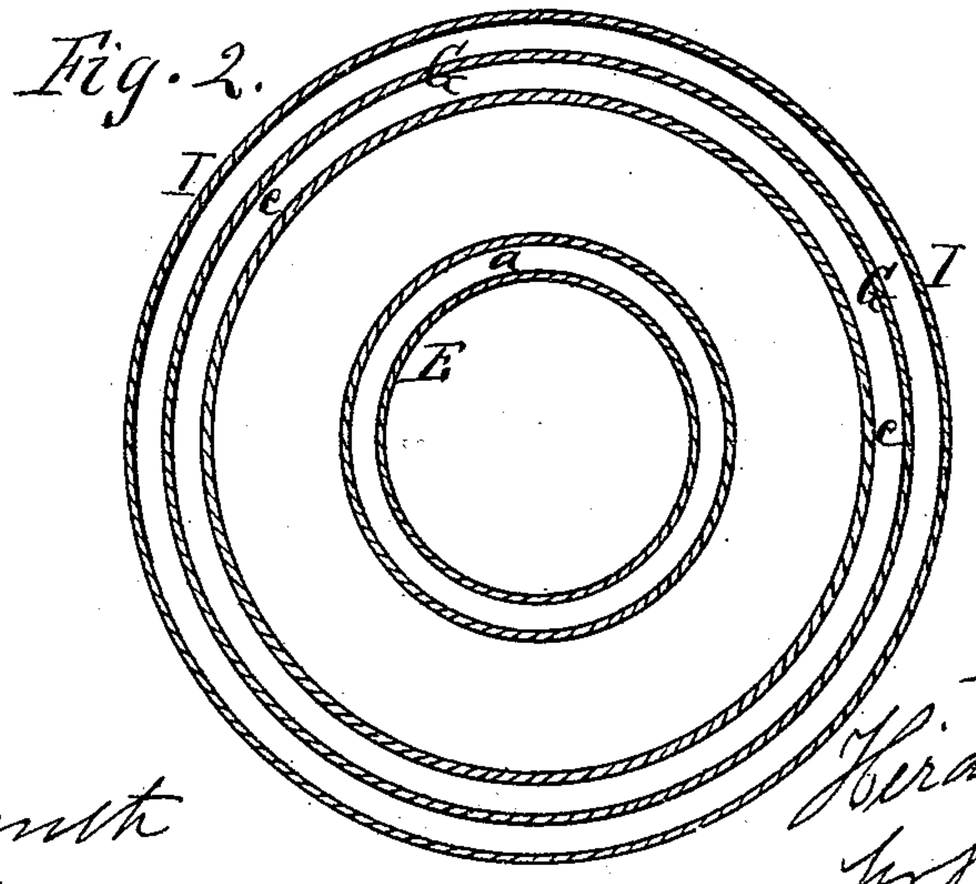


Fig. 2.



Attest.
A. S. Smith
J. C. Culver

Inventor.
Hiram J. Wattles,
by C. F. Osgood.
Atty.

(No Model.) 2 Sheets—Sheet 2.

H. J. WATTLES.

HEATING APPARATUS.

No. 470,727. Patented Mar. 15, 1892.

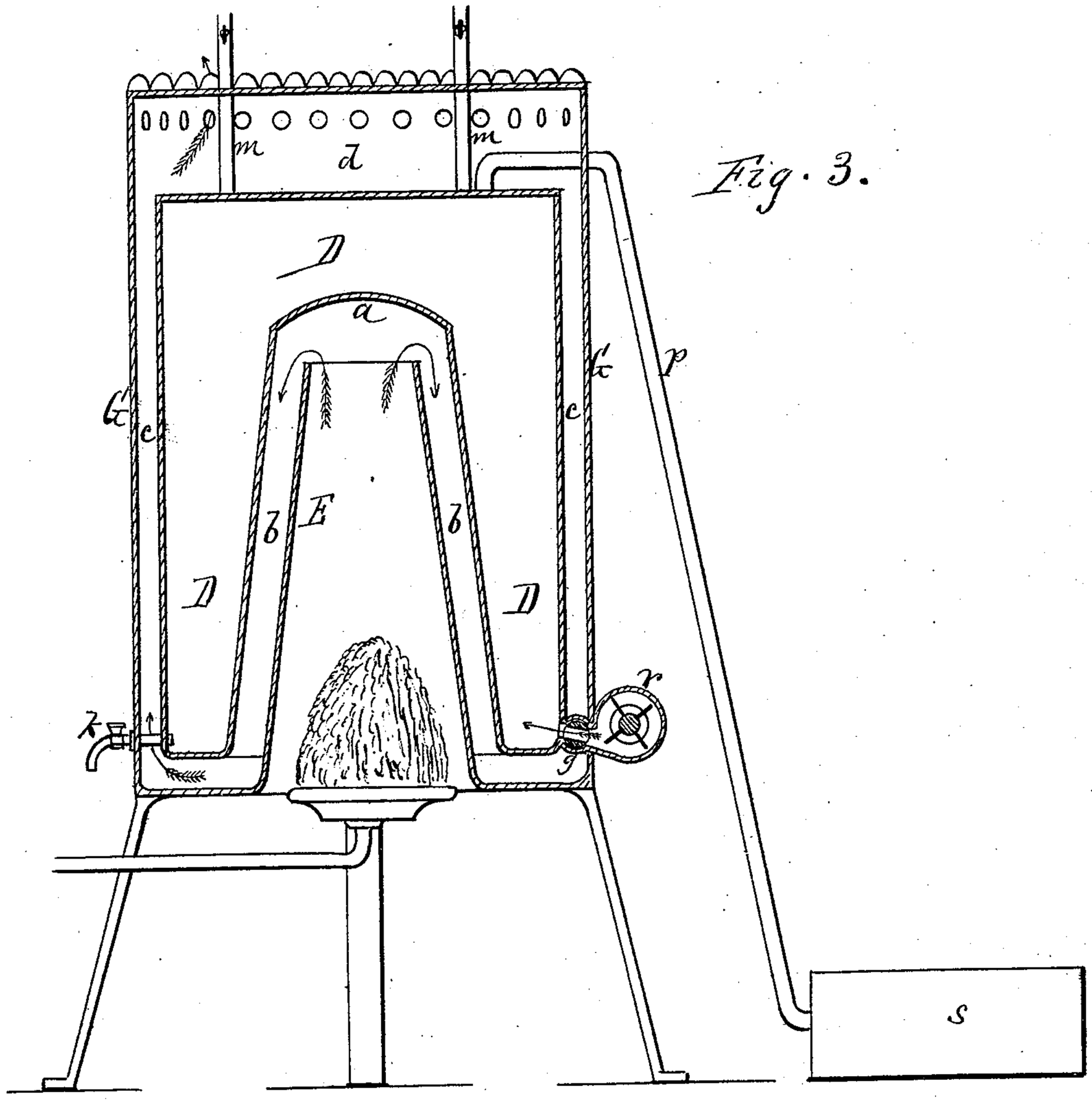


Fig. 3.

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A. S. Smith
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Hiram J. Wattles,
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UNITED STATES PATENT OFFICE.

HIRAM J. WATTLES, OF ROCHESTER, NEW YORK.

HEATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 470,727, dated March 15, 1892.

Application filed December 19, 1887. Serial No. 258,312. (No model.)

To all whom it may concern:

Be it known that I, HIRAM J. WATTLES, of Rochester, in the county of Monroe and State of New York, have invented a certain new and useful Improvement in Heating Apparatus; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the drawings accompanying this specification.

My improvement relates to heating apparatus; and it consists in the construction and arrangement of parts hereinafter described and claimed.

In the drawings, Figure 1 is a central vertical section of the air-heater. Fig. 2 is a cross-section of same in line *x x* of Fig. 1. Fig. 3 is a central vertical section similar to Fig. 1, but showing a modification.

The apparatus shown in Fig. 1 is in the nature of a hot-air furnace, in which A designates the ash-pit, B the fire-pot, and C the grate.

My improvement is as follows:

D is the hot-air cylinder, constructed with an arch *a* on the under side, which forms a dome over the fire-chamber and receives the heat before it is carried off to the chimney. The lower portion of the hot-air space which surrounds this dome is brought down near the fire-pot, so that the air receives the best action of the heat.

E is a heat-conductor, which is a tube in the form of a frustum of a cone and forms a chimney resting over and covering the fire-pot and extending up into the arch *a* nearly to the top, but leaving a flue-space *b* all around at the sides between it and the inner walls of the arch, said flue communicating at the bottom with a vertical jacket-space *c*, which lies between the outer walls of the hot-air cylinder D and a cylindrical casing G, that extends up around the hot-air cylinder, covering its top and provided with an exit-pipe H. The heat from the fire-chamber passes up the interior heat-conductor E and through its open top, thence into the flue *b*, thence down around the heat-conductor; thence up jacket-space *c*, and finally escapes at the top through the exit-pipe H. By the use of the heat-conductor E a positive and active draft is produced, and there is no deadening and counteraction of the currents of heat, as there is where an arch or space under the hot-air cylinder is used without the heat-conductor. Such an arch has before been used; but as the hot air ascends directly therein counter currents are produced which materially retard the upper passage of the heated air.

I is an exterior casing to the furnace, having a cold-air space *d* between it and the casing G, that surrounds the hot-air chamber. The air that passes up the space *d* gradually becomes heated and escapes at the top through hot-air pipes *f f*. The interior hot-air chamber D is supplied with air at the bottom by one or more air-inlet tubes *g g*, and the hot air escapes at the top through escape-pipes *h h*, which open into the hot-air pipes *f f*.

Fig. 3 shows a modification, in which a blower *r* is connected with the tube *g* for forcing air into the heater. This form of apparatus is also adapted to heating water by making the suitable pipe connections. In the case water is heated in the apparatus the steam may be carried off through pipes *m m* at the top.

p is a pipe extending from the top of the chamber D downward to a pan *s* for the purpose of heating any material placed in the pan.

Having described my invention, I do not claim, simply and broadly, extending the top of the fire-pot up within the casing, so as to produce an indirect or downward draft; but

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

1. In a heater, the combination, with the cylinder D, provided with the dome *a*, which is closed at its top, of the conductor E, extending up into the dome, said conductor being open at the top and flanged at its bottom, forming a cover over the outer edges of the fire-pot, and a heater for the air passing down the indirect flue *c*, as shown and described, and for the purpose specified.

2. In a heater, the combination of the cylinder D, provided with the dome *a*, the conductor E, open at the top and flanged at its

bottom, covering the outer edges of the fire-pot, the casing G, surrounding the cylinder, the cold-air pipe *g*, opening into the chamber, the blower *r*, the discharge-pipe *p*, and the heating-pan *s*, as shown and described, and for the purpose specified.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

H. J. WATTLES.

Witnesses:
R. F. OSGOOD,
P. A. COSTICH.