

(No Model.)

B. W. FELTON.
Hot-Air Furnace.

No. 228,336.

Patented June 1, 1880.

Fig. 1

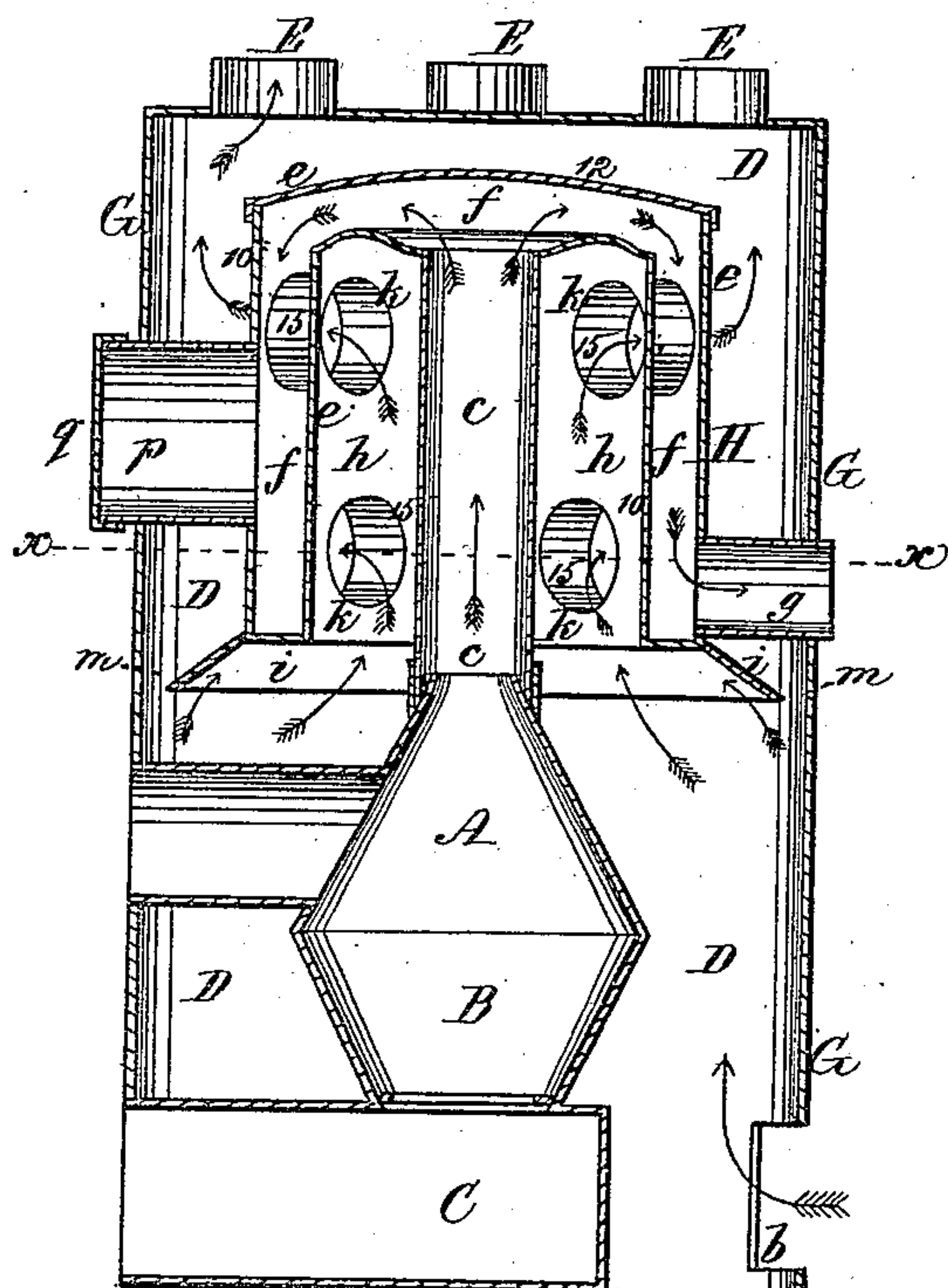


Fig. 2

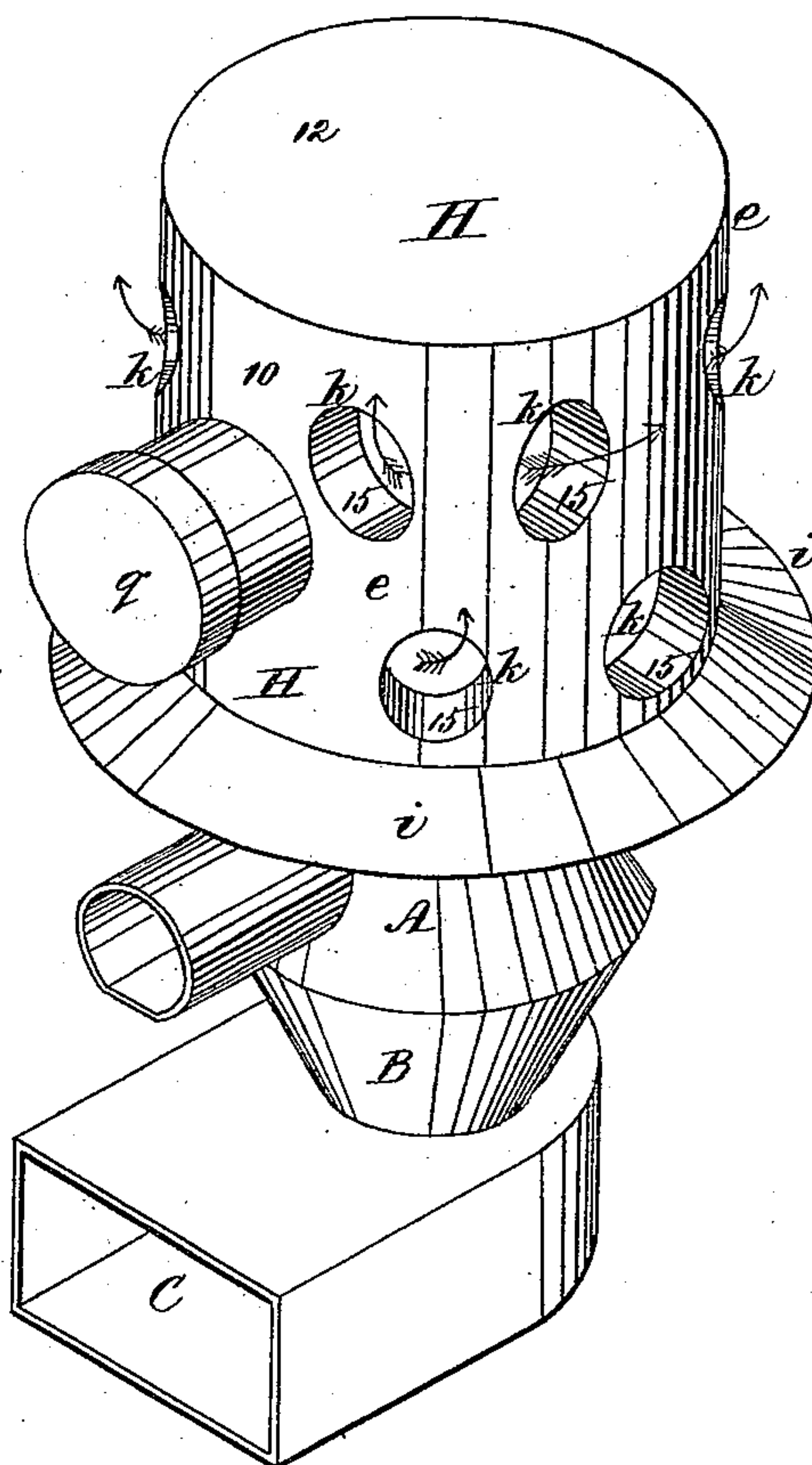
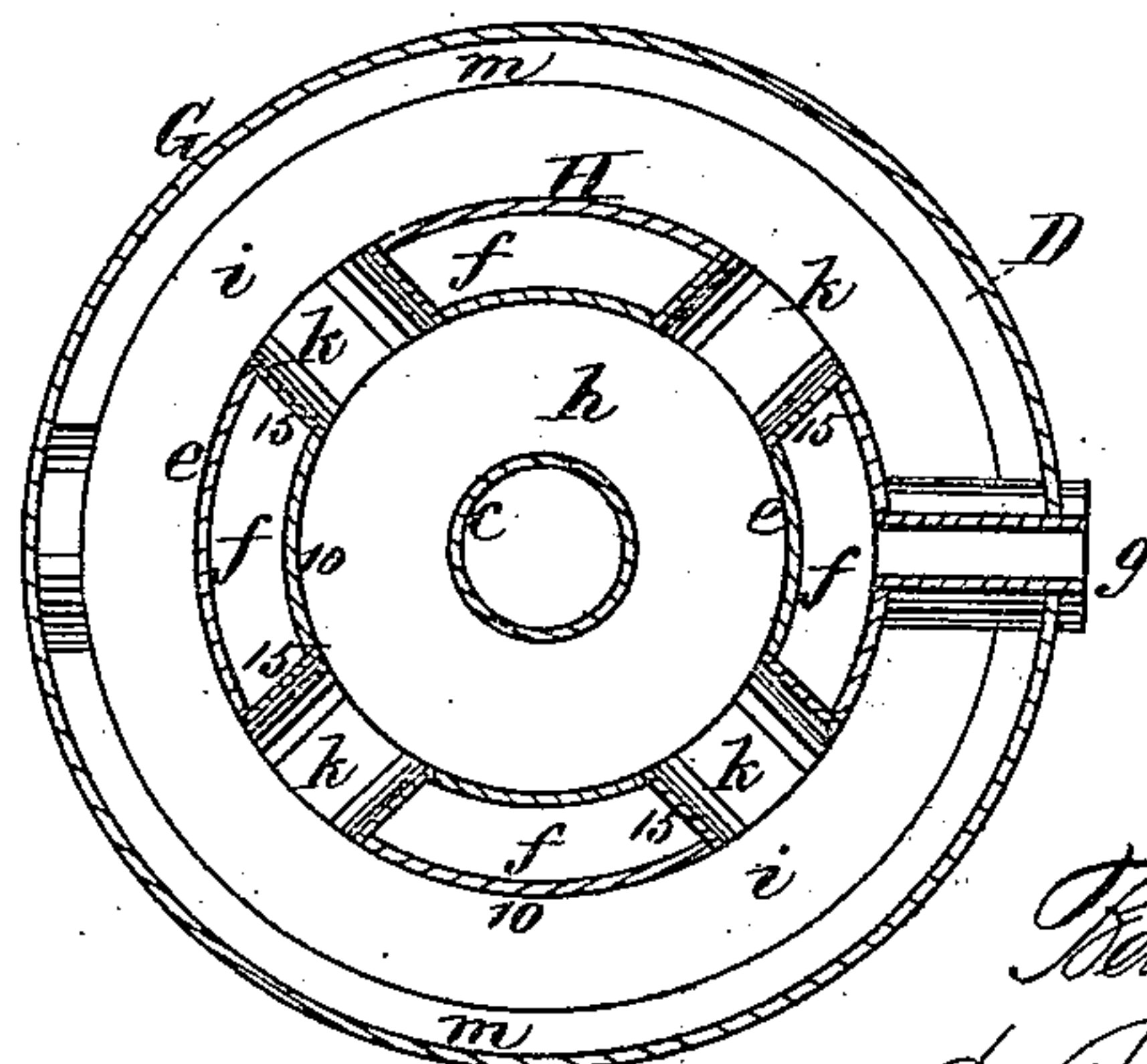


Fig. 3



Witnesses,
H. J. Cambridge
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UNITED STATES PATENT OFFICE.

BENJAMIN W. FELTON, OF BOSTON, MASSACHUSETTS.

HOT-AIR FURNACE.

SPECIFICATION forming part of Letters Patent No. 228,336, dated June 1, 1880.

Application filed April 3, 1880. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN W. FELTON, of Boston, in the county of Suffolk and State of Massachusetts, have invented an Improvement in Hot-Air Furnaces, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a vertical section through a hot-air furnace constructed in accordance with my invention. Fig. 2 is a perspective view of the same with the outer casing removed. Fig. 3 is a horizontal section on the line *x x* of Fig. 1.

My invention relates to an improvement in the construction of radiators for hot-air furnaces, and has for its object to compel the whole or the greater portion of the cold air which enters the hot-air chamber near its bottom to pass into contact with the hottest part of the furnace before entering the pipes leading to the apartments to be warmed, thereby materially increasing the heating capabilities of the furnace and preventing strong upward currents of cold air from entering the hot-air pipes, and thence passing through the registers; and my invention consists in a radiator provided with a central tube communicating directly with the combustion-chamber, and surrounded by a drum having a double wall and top, within which is formed a flame-chamber communicating with the central tube and the smoke-flue, the central portion of the interior of the drum around the central tube forming an air-heating chamber, into which the air from the cold-air box or the greater portion thereof is directed in its ascent by means of a flange or deflector at the bottom of the drum, and from which it escapes, in an intensely-heated condition, through suitable apertures, into the upper portion of the hot-air chamber.

In the said drawings, A represents the dome or combustion-chamber of a hot-air furnace, B the fire-pot, C the ash-pit, and D the hot-air chamber, from the upper portion of which extend the ordinary hot-air pipes, E, to the apartments to be warmed; and near the bottom of the hot-air chamber is the usual opening, *b*, in the outer casing, G, through which the air from the cold-air box is admitted.

Immediately above the combustion-chamber

A is placed the radiator H, which is provided with a central vertical tube, *c*, the bottom of which is fitted to an opening at the top or apex of the dome or combustion-chamber A, with which it communicates. This tube *c* has secured to its upper end and serves as a support for a drum, *e*, the walls 10 and top 12 of which are made double, in order to form a space or flame-chamber, *f*, which thus communicates with the combustion-chamber of the furnace, and with the smoke-flue or exit-pipe *g*, located near the bottom of the chamber *f*, through which all the smoke and products of combustion are thus caused to pass when the ordinary damper, which controls the direct passage to the chimney, is closed, whereby the tube *c* and drum *e* are heated to a high degree, as required.

The central portion, *h*, of the drum outside of and immediately around the vertical tube *c*, constitutes an air-heating chamber, which is open at its bottom and in direct communication with the hot-air chamber D, a downwardly-inclined annular flange, *i*, secured to the bottom of the drum *e*, and extending nearly out to the casing G, serving as a deflector to catch and direct the upward currents of air rising from the bottom of the chamber D into the heating-chamber *h*, where they are rapidly and intensely heated by contact with the extended radiating-surface afforded by the inner walls of the drum *e* and the tube *c*. The air, after becoming heated within the chamber *h*, escapes therefrom through a series of outlet apertures or passages, *k*, into the hot-air chamber D, whence it passes, as usual, to the hot-air pipes E. These passages *k* are formed by extending short tubes 15 across the space within the double walls of the drum *e*. The flange or deflector *i* thus operates to cause the greater portion of the cold air which enters at the bottom of the chamber D to pass into contact with the hottest portion of the furnace in its ascent, which insures its being heated to the greatest possible extent, and this flange or deflector *i* furthermore serves to break up currents of cold air, which, in an ordinary furnace, often pass directly up from the bottom of the chamber D to the hot-air pipes, and are blown through the registers into the apartments, which is a great objection to many furnaces now in use.

If desired, the flange *i* may be made of sufficient width to extend entirely across the space between the drum *e* of the radiator and the outer casing, *G*, in which case all of the air which enters at the bottom of the chamber *D* will be compelled to pass through the heating-chamber *h* and apertures *k* on its way to the hot-air pipes *E*. I prefer, however, to leave a narrow annular space, *m*, between the outer edge of the flange, *i*, and the outer casing, *G*, as the passage of a small quantity of air through this space will tend to keep the outer casing cool, as desired, while the greater portion of the air is deflected into the heating-chamber *h*, as before described.

p is an aperture, through which access can be had to the interior of the flame-chamber to allow of its being cleaned out, this aperture being closed by a cap, *q*.

By the employment of a radiator constructed as above described and provided with a deflector, *i*, I am enabled to utilize the heat to the greatest possible extent, while an extended area of radiating or heating surface is afforded, which absorbs the heat, so that a comparatively small amount is allowed to pass up the chimney to waste, and consequently the fuel is economized to the greatest possible extent, and the heating capabilities of the furnace are increased, so as to enable me to obtain the maximum amount of heat from a furnace of a given size.

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

1. In a hot-air furnace, the radiator *H*, pro-

vided with a central tube, *c*, in communication with the combustion-chamber *A*, and with a flame-chamber, *f*, formed within the double casing of the surrounding drum *e*, and having an exit-pipe, *g*, in combination with the flange or deflector *i*, applied to the bottom of the drum *e*, and a central air-heating chamber, *h*, surrounding a tube, *c*, and provided with outlet-apertures *k*, through which the heated air escapes into the hot-air chamber *D* above the deflector *i*, substantially as set forth.

2. In a hot-air furnace, the combination, with a radiator provided with an air-heating chamber, *h*, and outlet-apertures *k*, and arranged above the dome or combustion-chamber *A*, with which it communicates, of a flange or deflector, *i*, for directing the upward currents of air into the heating-chamber *h*, substantially as described.

3. A radiator for hot-air furnaces, composed of a central vertical tube, *c*, surrounded by a drum, *e*, provided with a double casing, forming a flame-chamber, *f*, and having a central air-heating chamber, *h*, between the tube *c* and the double casing, with outlet-apertures *k*, leading into the hot-air chamber *D*, operating substantially in the manner and for the purpose set forth.

Witness my hand this 1st day of April, A. D. 1880.

BENJAMIN W. FELTON.

In presence of—

P. E. TESCHEMACHER,
W. J. CAMBRIDGE.