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Patented Apr. 4, 1899.

J. O. SEABORG & C. CHRISTENSEN.

HOT AIR FURNACE.

(Application filed May 20, 1898.)

(No Model.)

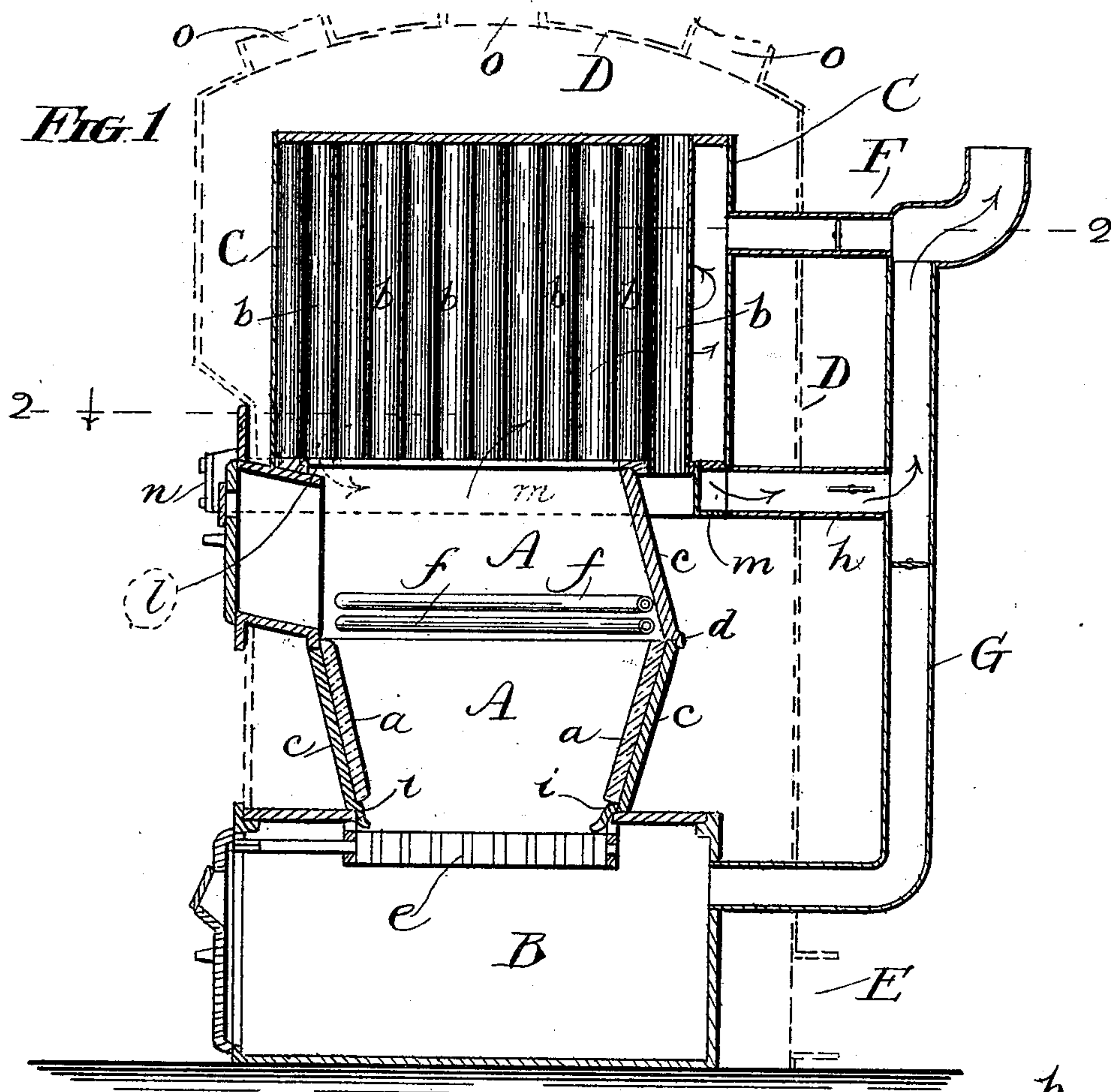


FIG. 2

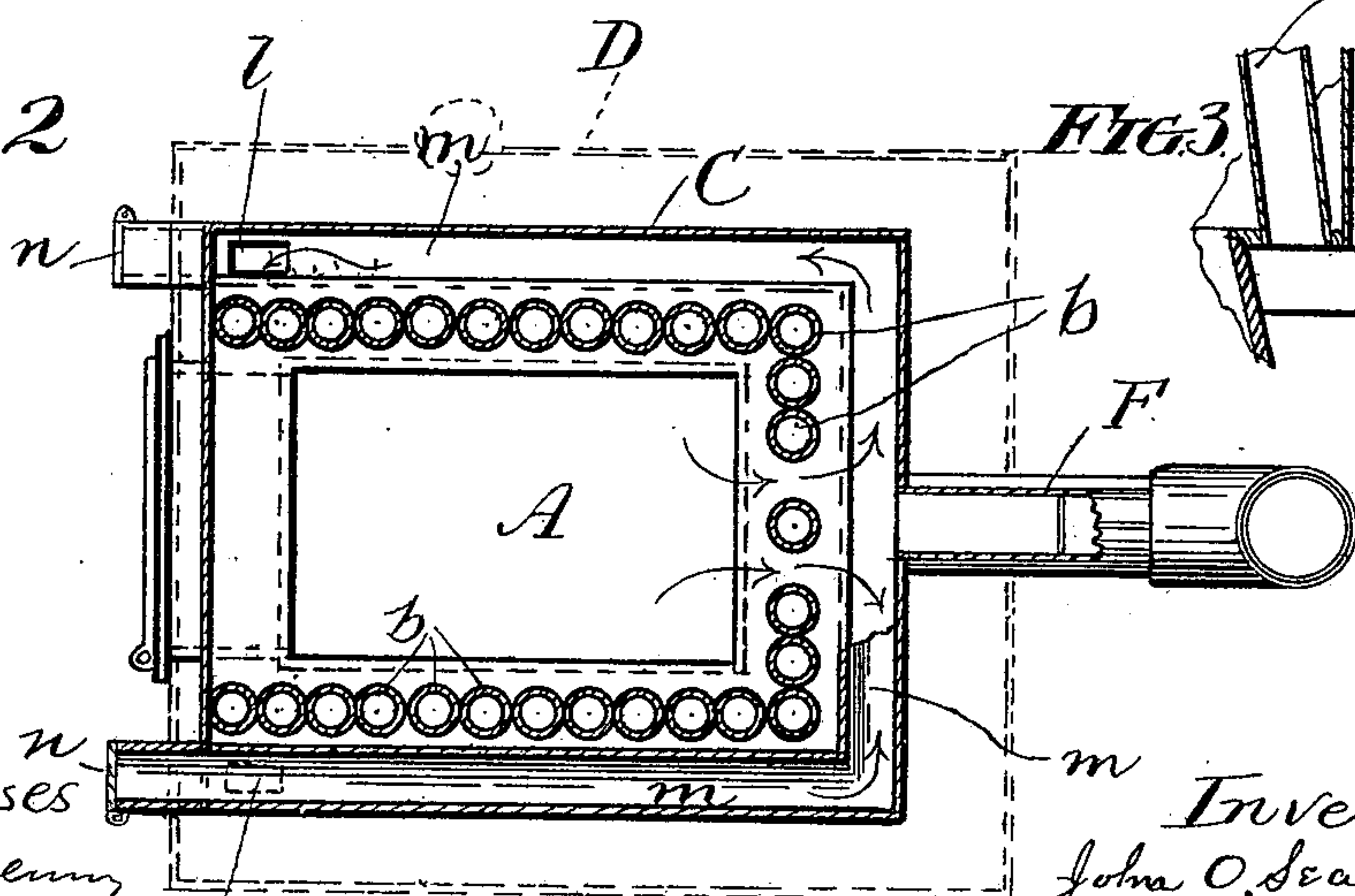
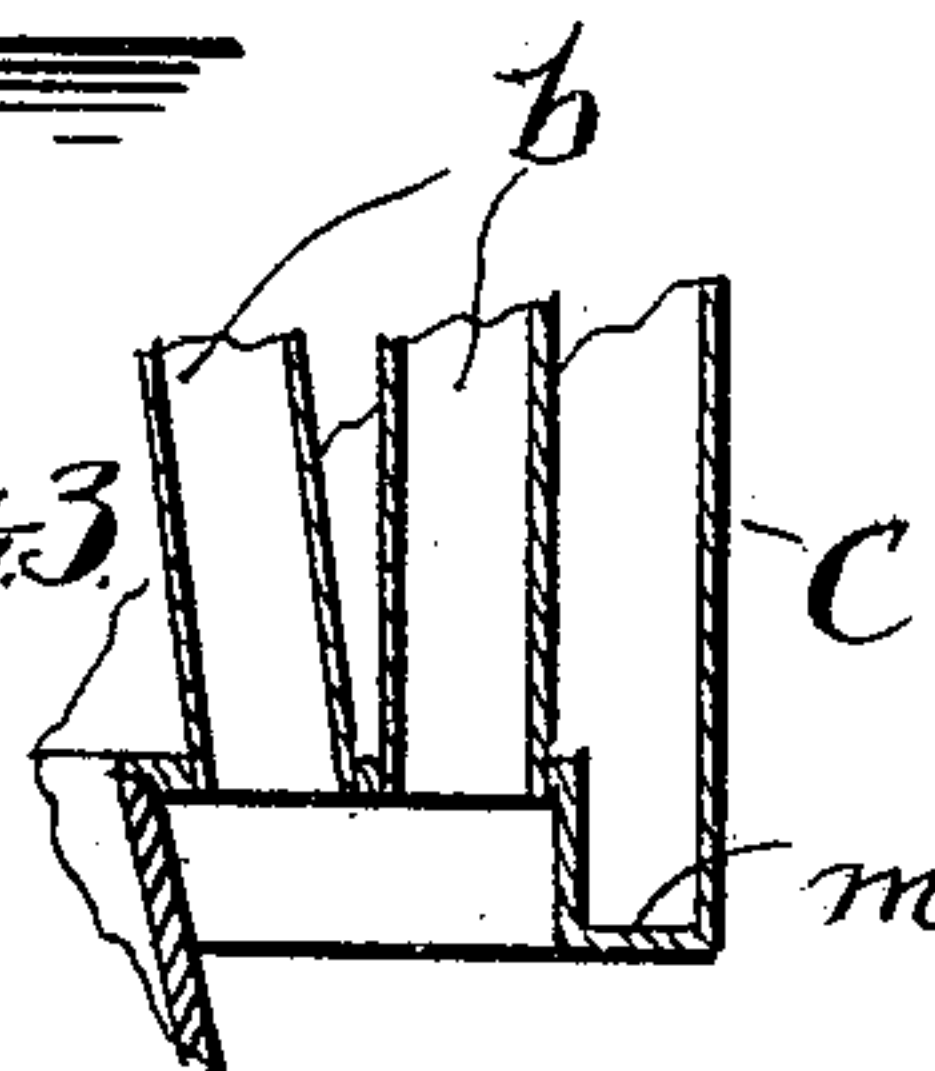


FIG. 3



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JOHN O. SEABORG AND CHRISTEN CHRISTENSEN, OF CHICAGO, ILLINOIS.

HOT-AIR FURNACE.

SPECIFICATION forming part of Letters Patent No. 622,278, dated April 4, 1899.

Application filed May 20, 1898. Serial No. 681,240. (No model.)

To all whom it may concern:

Be it known that we, JOHN O. SEABORG and CHRISTEN CHRISTENSEN, citizens of the United States, residing at Chicago, county of Cook, and State of Illinois, have invented a new and useful Improvement in Hot-Air Furnaces, of which the following is a specification.

The objects of our invention are to provide an increased circulation of hot air by radiation by means of a dome surmounting the fire-pot provided with radiating-flues which open into the air-chamber provided by the outer casing. The fire-pot opening into the dome, the gases released by the fire ascend into it and are more or less consumed therein. The hot-air flues becoming heated heat the air passing upward to a higher degree, expanding it and creating a stronger upward current, consequently delivering into the rooms above a larger volume of warm air than the ordinary furnace.

Our device is illustrated in the accompanying drawings, in which—

Figure 1 is a sectional elevation of the furnace. Fig. 2 is a horizontal section of the dome on line 2, Fig. 1. Fig. 3 is a small detail showing a modification of the arrangement of the radiating-flues.

Similar letters refer to similar parts throughout the several views.

A fire-pot A, erected on the square base B, is quadrangular or square in form. The sides C C incline outwardly toward the central portion *d* and then inwardly to the top of the pot, which then is surmounted by a square dome C. The base B is also the ash-receiver and forms the support for the grate *e* in the usual manner.

The fire-pot A is of cast-iron and may be cast in separate parts and fitted together, or the upper and lower parts of the pot may be cast separately as integral parts and joined at the central point *d*, so as to be detachable for the renewal of the parts or for repairs. The lower half of the fire-pot A is lined with fire-brick *a a*, made to fit so as to readily slide into their places. A seat *i i* is arranged at the bottom of the inner sides of the pot for the support of the fire-brick. By inclining the sides of the fire-pot inwardly at the top we reduce the opening in the top of the pot—first, for the purpose of aiding the draft; sec-

ondly, to concentrate the rays of heat and the current of the gases toward the center of the dome C, and, third, to permit the sides of the dome to extend over the exterior sides of the fire-pot to a line with the sides of the base B. The dome C is provided with hot-air flues *b b b* around the three inner sides and open at both ends. These flues may be multiplied, so as to permit some of them to extend toward the central part of the top of the dome by bending or inclining the flues, as shown in the modification Fig. 3, or the flues may be bent at any angle to accomplish the same purpose. It is, however, essential that the lower portion of the flues should open outside of the radius of the fire-pot A, so that the air entering the outer casing D at the inlet E as it becomes warmed by contact with the heated exterior of the fire-pot passes upward into and through the flues.

The top of the fire-pot A is open and covered by the dome C, so that the heat direct from the fire and the flame and gases arising therefrom pass directly into the dome C. The dome being so much larger than the fire-pot gives room for the expansion and consumption of a considerable portion of the gases and smoke before passing into the smoke-flue F and aids materially in giving additional heat to the hot-air flues *b b b*. The warmed air entering the flues from the outer chamber is again subject to a higher degree of temperature in passing through the heated flues, by which it obtains increased expansion and more rapid circulation, thereby delivering a larger volume of the hot air to the rooms above through the discharge-flues *o o o*. The object attained by this method is that the air warmed by the exterior portion of the heater on rising to the top of the furnace within the outer casing has no opportunity to become cooled by contact with the casing, which then would deflect the air downward again before it could escape, as in the ordinary heater.

A tortuous or indirect draft is provided, by means of flue *m*, underneath the floor of the dome along each side from front to rear, where the two arms of the flue meet and discharge into the house-flue by the connecting-flue *h* and extension. The vertical hot-air flues *b b b* are placed in contact with each other in the

row along the sides of the dome from front to the rear, except at the central part of the rear, where they are separated to provide a passage for the products of combustion to the direct flue F when starting the fire. When, however, the fire is under headway, the flue F is closed by a cut-off or damper and the products of combustion pass from the fire-pot up into the center of the dome, thence rearward through the lateral opening between the flues, and, dividing, return to the front between the flues *b b b* and the outer wall of the dome, thence down through the floor of the dome, through the openings *l* and the flue or channels *m*, and then passing rearward under the sides of the dome. The currents from the two sides or two arms of the flue meet and pass out through the flue *h*. The doors *n n* at the front of the furnace extend from the bottom of the flue *m* to about an equal space above the floor of the dome, so as to provide ingress to the dome and flue. By this method of providing for the discharge of the products of combustion by a downward draft the consumption of a larger proportion of the gases escaping from the fuel is secured. The flue *m*, it will be observed, is placed underneath the floor of the dome outside of the rows of the vertical tubes, so as to provide as large radiating-surface as possible.

The furnace may also provide hot water by placing a circulating-pipe *c c* on the sides on the top of the fire-brick in the fire-pot and connected with a circulating-boiler for this purpose.

While we are aware that the radiating heating-flues in connection with hot-air furnaces are not new, we do not claim the same broadly; but

What we do claim as new, and desire to protect by Letters Patent, is—

In a hot-air furnace the combination of a fire-pot erected upon a base with a dome (cubical in form) surmounting said fire-pot, its sides extending beyond the radius of the fire-pot, a row of vertical flues placed in contact with each other and extending along on each side and rear in said dome with a lateral opening at the rear to provide a smoke-passage, the lower ends of the vertical flues adapted to open outside the radius of the fire-pot and above it; the upper ends to discharge heated air toward the top of the outer casing, a smoke-flue having direct draft connecting the rear of the dome with the house-flue provided with a cut-off, a downward and indirect draft by means of a flue having an arm on each side of the dome extending from the front to the rear underneath the floor of the dome and outside the line of the vertical flues, the two arms of the flue uniting at the rear, where it is provided with a discharge-flue, a door at the front of the dome on each side adapted to provide communication with the lower portion of the dome and the flue underneath.

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