2 Sheets—Sheet 1.

J. C. SANBORN.

HOT-AIR FURNACE.

No. 186,217. Patented Jan. 16, 1877.

Fig 1.

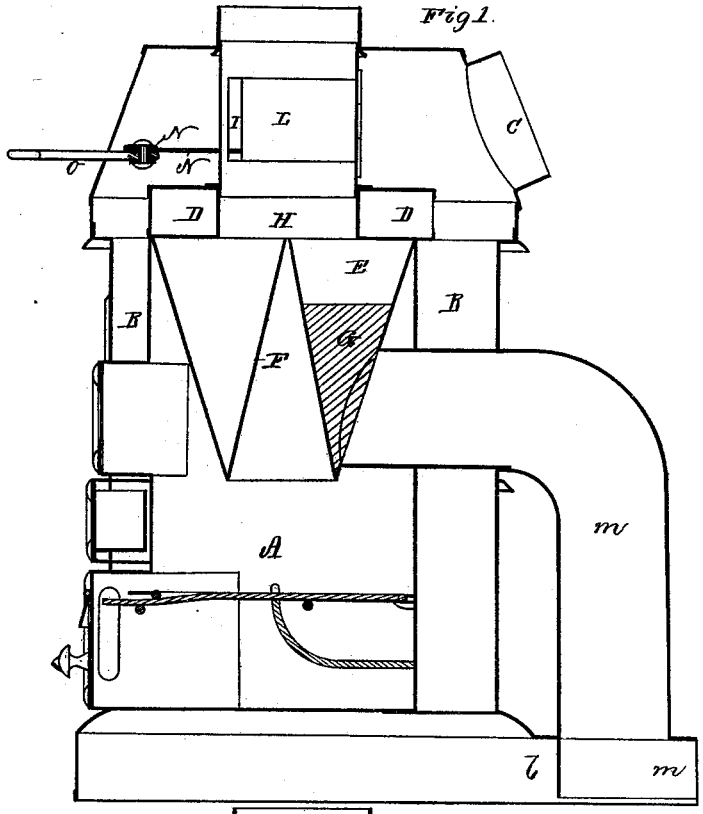
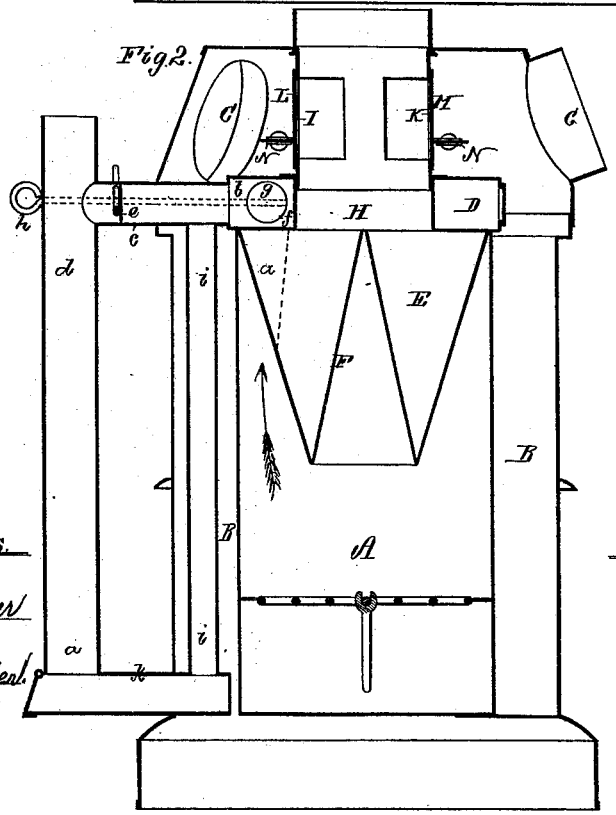


Fig 2.



Witnesses.

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2 Sheets—Sheet 2.

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HOT-AIR FURNACE.

No. 186,217. Patented Jan. 16, 1877.

Fig 3.

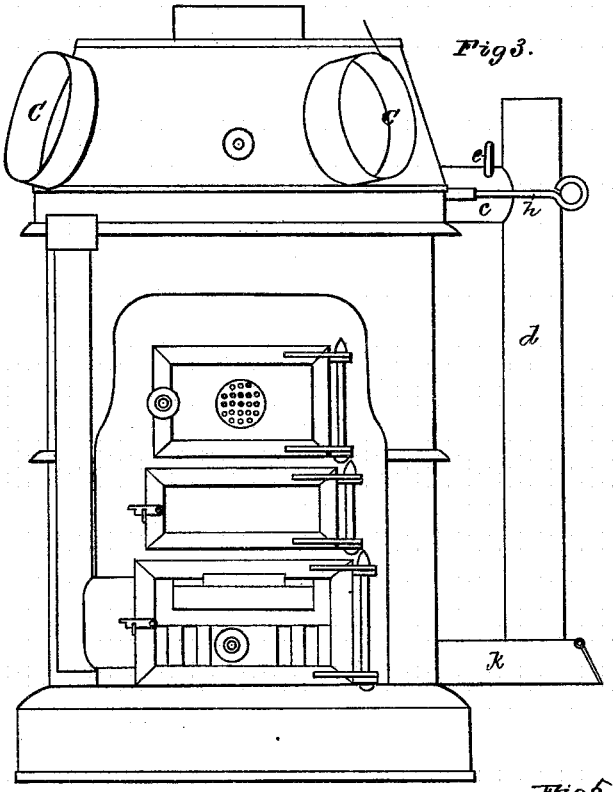


Fig 4.

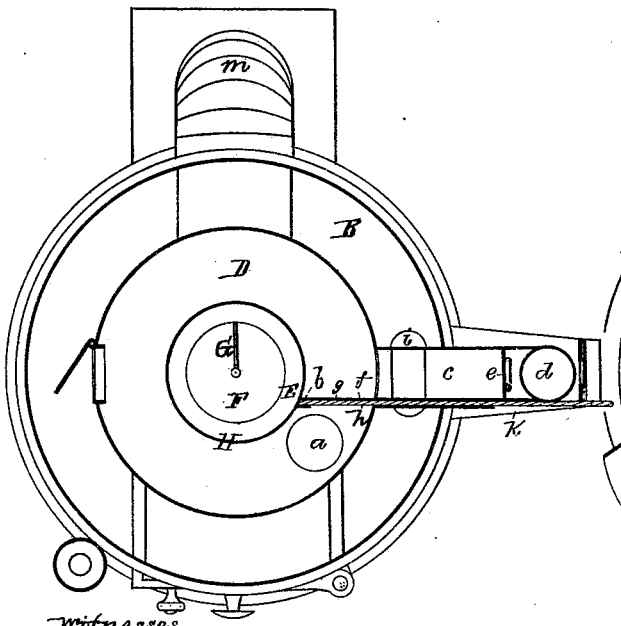
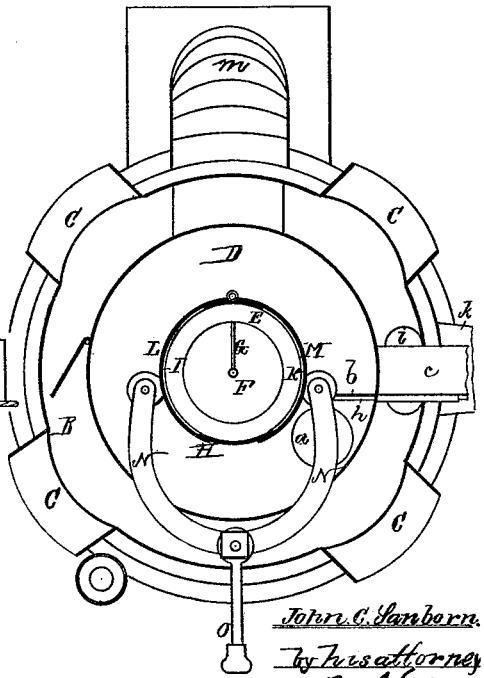


Fig 5.



Witnesses
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UNITED STATES PATENT OFFICE.

JOHN C. SANBORN, OF MANCHESTER, NEW HAMPSHIRE, ASSIGNOR TO VARNUM CORLISS, OF METHUEN, MASSACHUSETTS.

IMPROVEMENT IN HOT-AIR FURNACES.

Specification forming part of Letters Patent No. **186,217**, dated January 16, 1877; application filed July 24, 1876.

To all whom it may concern:

Be it known that I, JOHN C. SANBORN, of Manchester, of the county of Hillsborough, of the State of New Hampshire, have invented a new and useful Improvement in Furnaces for Heating Air for Warming the Apartments of a Building; and do hereby declare the same to be fully described in the following specification, and represented in the accompanying drawings, of which—

Figures 1 and 2 are vertical sections, and Fig. 3 a front elevation, of a furnace containing my invention. Fig. 4 is a horizontal section, taken through its upper or circular smoke-passage. Fig. 5 is a similar section, taken through its hot-air chamber and the valves and educts thereof.

My invention relates, first, to the combination of a chamber of combustion, and a surrounding or air-heating chamber with a circular flue and sundry pipes and dampers, all arranged and applied substantially as set forth; second, to the combination of two doors or valves and two toggles, and a pitman with an auxiliary air-heating chamber and its educt, combined with the main air-heating chamber, and the chamber of combustion; third, to the combination of a hollow radiator or cone, auxiliary air-heating chamber and its induct, and the chamber of combustion and main air-heating chamber; fourth, to the combination of the toothed cone, auxiliary air-heating chamber, and the induct of the latter, with a septum or partition extending from the outer surface of the hollow cone to and across the next adjacent mouth of the said induct, all being substantially as hereinafter explained.

In such drawings, the fire-place or fuel and flame chamber A is represented as concentric with and surrounded by an air-receiving chamber, B, which at its upper part is furnished with a series of educts, C C C C, arranged as shown, such being to connect with and open into pipes for conveyance of the heated air to various apartments of a building. The chamber of combustion A is surmounted by a circular smoke-flue, D, and opens into such by a passage or pipe, *a*, aside of a partition, *b*. Such partition extends across the flue and between the pipe *a*, and an exit-pipe, *c*. The said pipe *c* leads horizontally into a vertical pipe, *d*, and is provided with a damper, *e*. The partition *b* has a hole, *f*, through it, such hole being furnished with a damper, *g*, whose rod is shown at *h*. A pipe, *i*, leads down out of the pipe *c* through the air-chamber B, and into a horizontal pipe, *k*, which opens into the vertical pipe *d*.

From the above it will be seen that by opening the two dampers the smoke from the fire-place will be caused to pass directly into and through the pipe *c*. Also, that by closing the damper of the partition the smoke will course around through the circular flue D ere escaping by the pipe *c*. Also, that by closing the dampers the smoke will go through the flue D; thence down the pipe *i*, and next into the flue *k* and up the pipe *d*. I would remark that, in the place of the partition *b*, with its damper, a damper to extend entirely across the passage D may be used with the rod *h*. The circular flue D, and the pipe *i*, thus become means of heating the air in the chamber B, either or both being used as occasion may require. The air-heating chamber B receives its air from an induct, *l*, in which is a separate induct, *m*, to lead air into a pipe, *m*, arranged as shown, and opening into an auxiliary conical air-heating chamber E, which extends from the bottom plate *n* of the circular flue D, down within the chamber of combustion A, and has projected up within it from its lower end a hollow cone, F, all being as represented. A septum or vertical plate, G, extends from the said cone, diametrically across the adjacent opening or mouth of the pipe *m*, and serves to split or divide the column of air when passing from the pipe *m* into the auxiliary air-chamber E. By so splitting the said column, it will be heated to better advantage by the cones against which it may impinge, as such air becomes heated by heat radiated through the sides of the cone F and the chamber E. After being heated the air passes out of the chamber E, through the educt H, which is surrounded by the circular smoke-flue D, and extends to and out of the top of the hot-air chamber. Such educt H is to be supposed to be continued to and open into some

apartment to be heated. In that part of the educt H which is above the smoke-flue D are two openings, I K, which are arranged and provided with doors L M, as shown. These doors are pivoted to two curved toggles, N N, which at their junction are hinged together, and to a pitman or rod, O, extending through a hole in the side of the hot-air chamber, all being arranged as represented. The pitman having a knob on its outer end, should play loosely in the hole in order that, by means of the said pitman and the toggles, both doors may be opened or closed simultaneously, or one door be opened more or less than the other, in order to regulate the supply of heated air to the educts, as may be required, to effect an even draft through such, or to cause all the air escaping from the auxiliary air-heating chamber to pass away by the educt H without escaping through either or both of its side openings.

In the above described air-heating and distributing furnace I claim as of my invention the following:

1. The combination of the chamber of combustion A, air-heating chamber B, circular flue D, pipes *c*, *d*, *i*, and *k*, and the dampers *e* and *g*, all arranged and applied substantially as set forth.

2. The combination of the doors L M, toggles N N, and pitman O, with the auxiliary air-heating chamber E, its educt H, the chamber of combustion A, and the main air-heating chamber B, all being essentially as shown and described.

3. The combination of the hollow cone or radiator F, auxiliary air-heating chamber E, induct *m*, chamber of combustion A, and main air-heating chamber B, all arranged substantially as set forth.

4. The combination of the hollow cone or radiator F, the auxiliary air-heating chamber E, and its induct *m*, with a septum, G, extending from the outer surface of the cone F to and across the next adjacent mouth of the said induct, all being as set forth.

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Witnesses:
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J. R. SNOW.