(No Model.) 3 Sheets—Sheet 1.

G. B. MORRISON.

SYSTEM OF WARMING AND VENTILATING BUILDINGS.

No. 377,496. Patented Feb. 7, 1888.

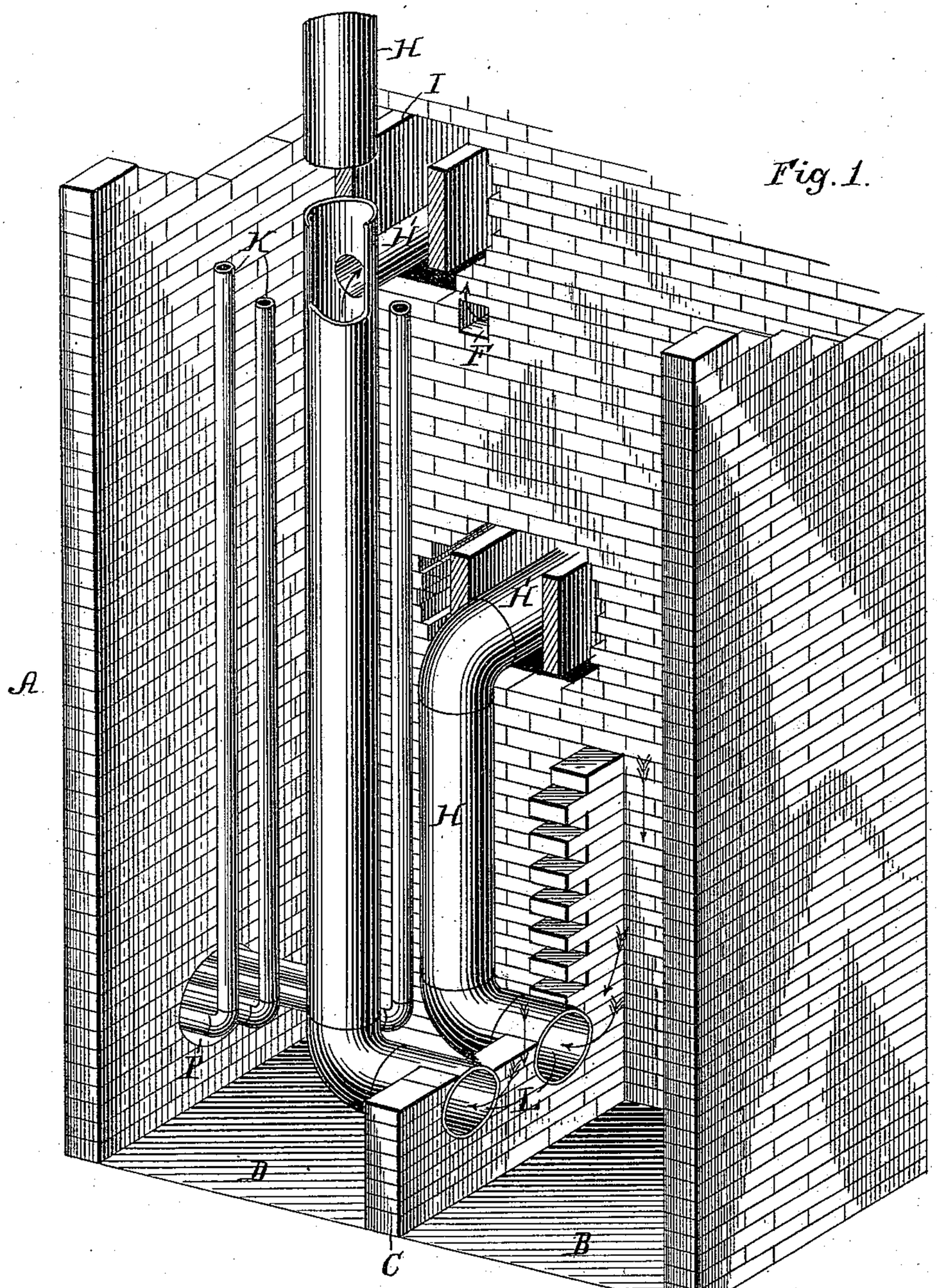

Fig. 1.

WITNESSES

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Fig. 2.

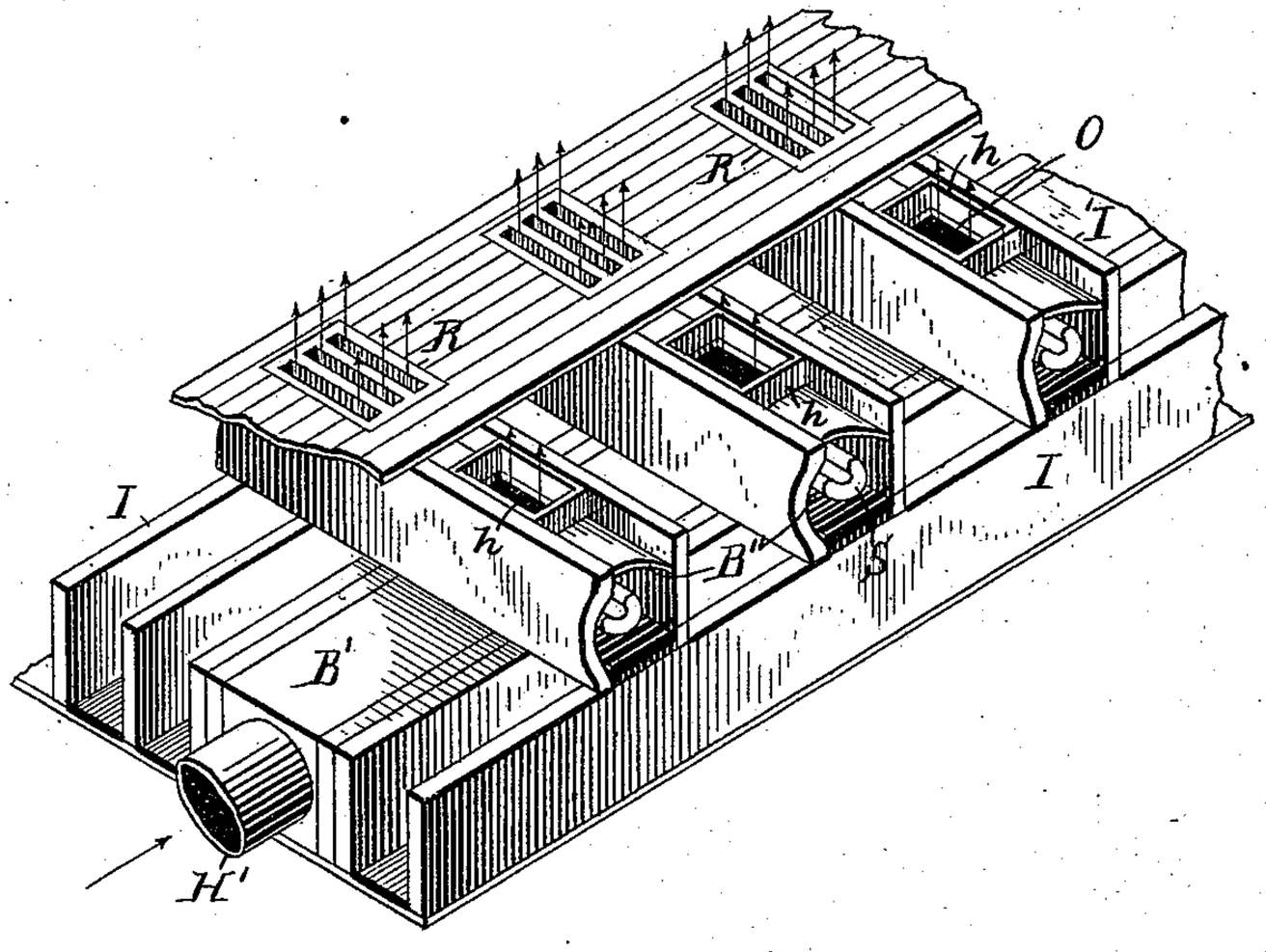

Fig. 3.

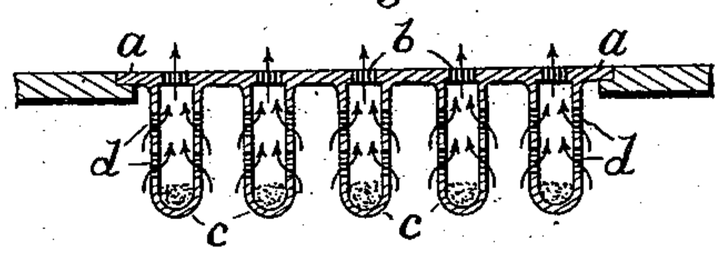

Fig. 4.

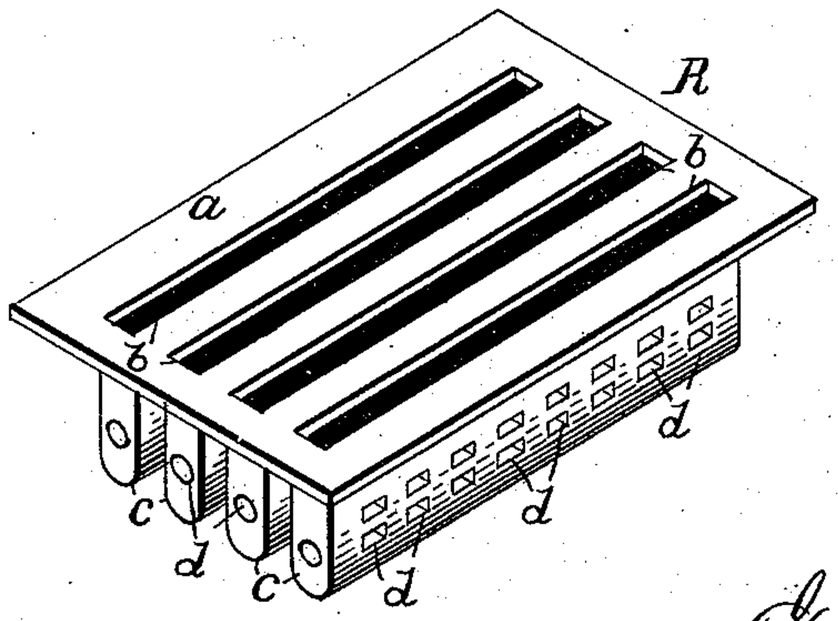

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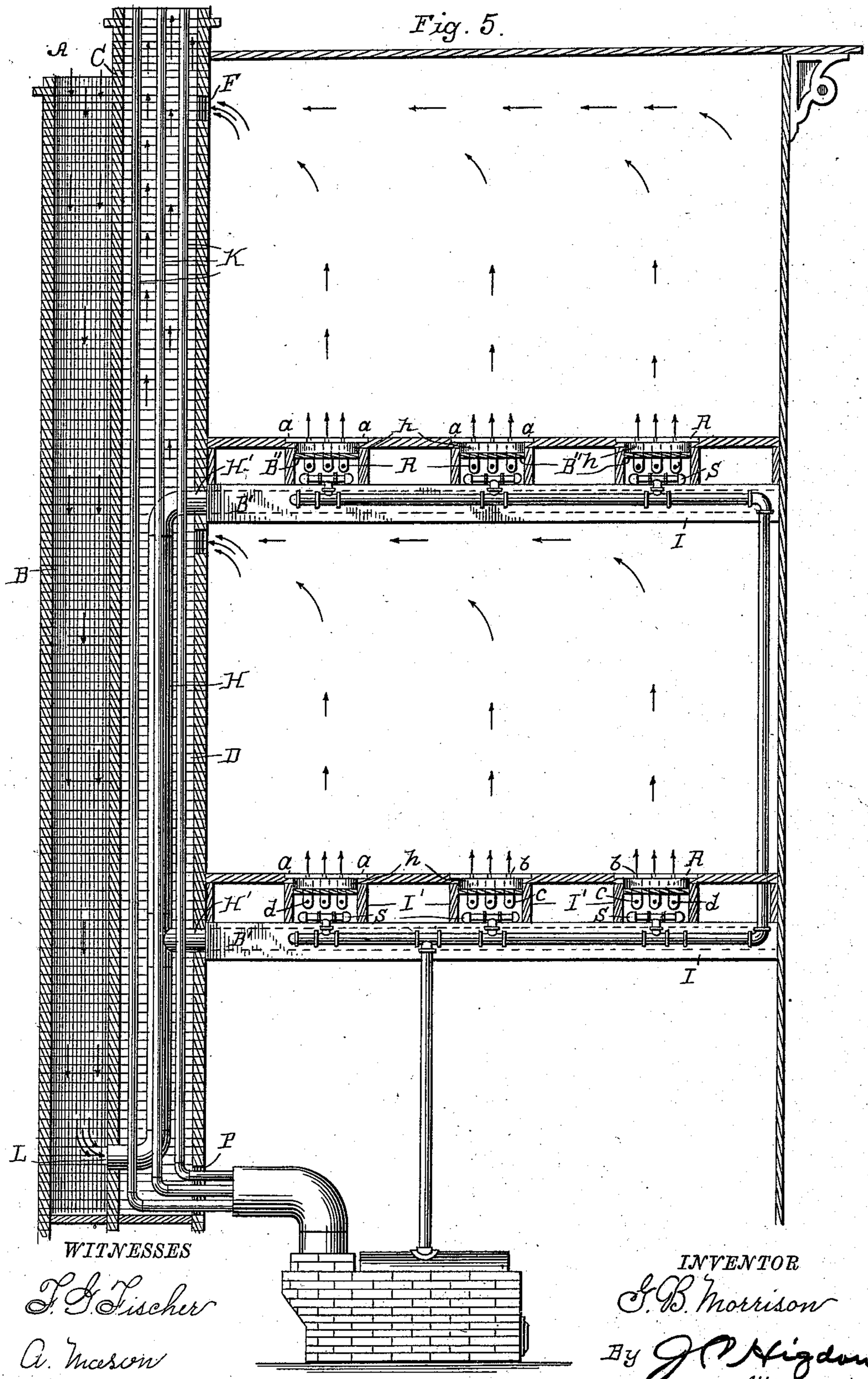
Fig. 5.



UNITED STATES PATENT OFFICE.

GILBERT B. MORRISON, OF KANSAS CITY, MISSOURI.

SYSTEM OF WARMING AND VENTILATING BUILDINGS.

SPECIFICATION forming part of Letters Patent No. 377,496, dated February 7, 1888.

Application filed June 20, 1887. Serial No. 241,845. (No model.)

To all whom it may concern:

Be it known that I, GILBERT B. MORRISON, of Kansas City, Jackson county, State of Missouri, have invented certain new and useful Improvements in Warming and Ventilating Buildings, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

This invention relates to an improved system of warming and ventilating buildings; and it may be said to consist in the method, means, and devices, and combination and arrangement of devices, hereinafter set forth, and pointed out in the claims.

In the drawings, which illustrate the manner of carrying out my invention, Figure 1 is a broken perspective view showing the interior of a double chimney or shaft, with its dividing-wall and the sides toward the observer removed, so as to reveal the devices that are located therein. Fig. 2 is a broken perspective view of a portion of the floor of a building to which my system has been applied. Fig. 3 is a transverse section through a register-frame that is used in making up my invention, and Fig. 4 is a detail view in perspective of said register-frame, and Fig. 5 represents a sectional view of a building to which my improved system has been applied.

Before proceeding to describe my invention, and in order to better estimate its value, I will enumerate the requirements of what I consider a perfect system of warming and ventilating: First, the air used must come from a pure source; second, it must be sufficient in quantity; third, it must be warmed before being admitted into the room; fourth, it must not be overheated; fifth, it must be distributed as it enters, so that it may be utilized before it reaches the top of the room; sixth, in order that this may be possible, it must be admitted through the floor; and, seventh, the ventilation of air-supply must be independent of doors and windows. Referring again to the drawings, I will now proceed to show how these results may be accomplished.

A indicates a double chimney or shaft extending from the cellar of a building up above the roof, and provided with a partition-wall, C, which extends its entire length and divides it into two shafts—a fresh-air shaft, B, and an aspirating-shaft, D. Within the shaft D, I locate one or more fresh-air tubes, H, the lower ends of which are connected with the lower end of fresh-air shaft B. Branch pipes H′ extend from the fresh-air tubes to a main radiating box or conduit, B′, which is located beneath the floor of the room to be warmed and ventilated.

I represents a series of floor-joists, and I′ another series resting upon the first at right angles thereto. This double arrangement is to give sufficient room for the various conduits which are necessary for perfect distribution of air.

The main conduit B′ is located between the lower series of joists, I, and a number of transverse conduits, B″, are located between the joists I′, and are connected with the main conduit B′ by a suitable opening. (Not shown.) It should be obvious that I may arrange a building with but a single series of joists in the ordinary manner, dispensing with the upper series, and locating the transverse conduits in the same plane with the main conduit B′ without departing from my invention; but the arrangement of two series of joists is much to be preferred.

F indicates a foul-air register or passage opening from the top of the room into the aspirating-shaft D.

I do not deem it necessary here to show a plurality of floors, as the arrangement of a number of them will be substantially the same as the one shown in Fig. 2.

In practice I may provide a separate fresh-air tube leading to each room, so as to avoid inequality of draft, or I may use a single fresh-air tube of sufficient size, and provide a branch therefrom for each room, as may be desired, thereby supplying a number of rooms from one main fresh-air tube.

O indicates openings in the top of transverse conduits B″, through which the warmed air passes through the registers, which are located upon the floor of the room at suitable distances apart.

h indicates the risers which connect the openings O with the register.

S indicates steam-pipes, which are located in the transverse conduits for further warm-

ing the air as it enters them. If desired, steam-pipes may also be located in the main conduit B′, to aid both in warming the air and increasing the strength and steadiness of the movement. These conduits are to be made of wood and lined with tin.

Any desired form of register or dampers may be used for regulating the draft through the several conduits; but to prevent the conduit beneath the floor from filling with dirt during use I provide a peculiar form of floor-register, which will now be described. (Shown more clearly in Figs. 3 and 4.)

R indicates the frame of the register, which is constructed of cast-iron, with flange *a*, by means of which it is supported by the floor, and having a number of hollow receptacles, *c*, which depend from the under surface of the frame, and which are provided with apertures *d*, for the passage of air. Slits or openings *b* are also formed in said plate and connect the interior of the receptacles *c* with the air of the room. It will be observed that the apertures *d* are located in the receptacles *c* some distance above their bottom, thereby leaving a considerable space to be filled with sediment and permitting the register-frame to be used a considerable length of time without being removed for cleaning. The peculiar shape of this frame, as represented, will be sufficient to suggest how the dirt is prevented from falling into the conduit. Everything which falls through the apertures in the frame will be received by the receptacles *c*. Floating dust will have no tendency to enter these holes, because the current of air will prevent it, being from a direction to drive it away. These frames, made of light castings, will not be expensive, and can easily be raised up and freed from dirt, which from time to time will accumulate in the receptacles.

K indicates a number of divisions of the smoke-pipe of a furnace of any desired form, which may be located in the building.

The large smoke-pipe, just before it enters the aspirating-shaft D, is divided into the several smoke-pipes, K, so that the waste heat from the fire may be utilized in heating the air in said shaft, thereby making the radiating-surface as large as possible. Said smoke-pipes enter the aspirating-shaft through another opening, P, near its lower end, as shown.

With this construction the operation of my invention will be as follows: The chimney A is to perform the work of ventilating and carrying the fresh air to any desired number of rooms, and of course it must be sufficiently large for the purpose. There will be little danger of getting it too large. For instance, if for four large rooms, it should have an area of cross-section of at least sixty-four square feet, making it equivalent to eight feet square. The air in the aspirating-shaft D, being heated by the smoke-pipes K, rapidly rises and creates a powerful upward draft, making a partial vacuum, which draws all the foul air through passages F at the top of the room. Said smoke-pipes K are to be extended upward to the top of the chimney to prevent the possible reflux of smoke, which might occur in windy weather. The heat from this pipe will also be communicated to the fresh-air pipe or pipes H, and the fresh air which they contain, being thus warmed, will rise and pass under the floor through the branch tubes H′. The air thus rising in the fresh-air tube is followed by cold pure air from fresh-air shaft B. This shaft, being a part of the chimney, extends to the top of the building, and therefore brings the air from an elevated and pure source. The top of fresh-air shaft B should be several feet below the top of the smoke part of the chimney to avoid the drawing down of smoke. Thus a continual circulation of air through the rooms is induced, the cold fresh air being drawn down shaft B and distributed to the several rooms through their respective floors, and the foul air being exhausted at the top of the room into the foul-air shaft of the chimney. The air is also thoroughly warmed during its distribution.

Summarized, a chimney thus constructed furnishes an outlet for smoke, for foul air, and an inlet for fresh air. The heat in it from the furnace has a tendency both to draw the foul air out and the pure air into the rooms, as explained. The heat from the steam-pipes located in the several conduits beneath the floor gives to the air already in motion another impulse in the same direction upward through the floor-registers, as indicated by the arrows, thus further increasing and securing constancy and steadiness of the air movement. The air on thus entering will be properly warmed, and being admitted at the floor will secure comfort for the feet. The warm air, thus properly distributed as it enters, rises toward the ceiling, both by its own specific lightness, due to temperature, and by its tendency to fill the vacuum produced at the top of the room from the draft of the aspirating-shaft, as before explained. In this system there can be no uncertainty about the disposition of the carbonic dioxide and the organic emanations from the skin and lungs. All of these impurities are carried off as fast as formed, both from a tendency which an animal temperature of 98° gives them to rise and the constant stream of rising air into which they are poured.

Having thus described my invention, what I claim is—

1. The combination, with a building, of a chimney provided with an exit-shaft for foul air and an inlet-shaft for fresh air which is separate from said exit-shaft, said inlet-shaft having a downward draft, substantially as described, one or more fresh-air tubes located in said exit-shaft and in communication with the inlet-shaft, a radiating pipe or pipes, also located in said exit-shaft, and conveying-pipes between said fresh-air tube or tubes and the rooms to be warmed, substantially as specified.

2. The combination, with a building, of a chimney provided with an exit-shaft and an in-

let-shaft, one or more fresh-air tubes located in said exit-shaft and having their lower ends connected to said inlet-shaft, conduits located beneath the floor of the rooms to be warmed, said conduits provided with passages for conveying the air from the upper portion of said rooms into said exit-shaft, and connections, substantially as described, between said fresh-air tube or tubes and the conduits located beneath the floor of the rooms to be warmed, and radiating pipe or pipes, also located in said exit-shaft, substantially as specified.

3. The combination, with a building, of a chimney provided with an exit-shaft and an inlet-shaft, one or more fresh-air tubes located in said exit-shaft and connected with the inlet-shaft, a lower series of floor-joists, a main conduit for receiving air from the inlet-shaft of said chimney located in the space between said joists and extending parallel therewith, another series of joists resting upon the first mentioned at right angles thereto, a conduit or conduits located in the space between the upper series of joists and extending transversely to the main conduit and connected thereto, passages leading from said transverse conduits and opening into the rooms to be warmed, a passage or passages opening from the top of the room or rooms into the said exit-shaft, and heat-radiating pipes located in said exit-shaft and extending the full length thereof, substantially as specified.

4. The herein-described portable register-frame, adapted to be removably secured in the floor of a building, consisting of a framing-plate provided with exit-opening, a supporting-flange by means of which the frame is supported in position, and a number of hollow receptacles which depend from the under surface of the frame and which are provided with transverse apertures for the passage of air, as set forth.

5. The register-frame R, constructed of cast-iron, with flange *a*, by means of which it is supported, and having hollow receptacles *c*, which depend from the under surface of said frame, and which are provided with transverse apertures *d*, located in the sides of the receptacles some distance above their bottom, said frame having slits or openings *b*, which connect the interior of the said receptacles with the air of the room, substantially as specified.

In testimony whereof I affix my signature in presence of two witnesses.

GILBERT B. MORRISON.

Witnesses:
A. SAVAGE,
F. G. FISCHER.