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S. J. GOLD  
STOVE & FURNACE.

PATENTED AUG 1 1871

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Sheet 1.

Fig. 1.

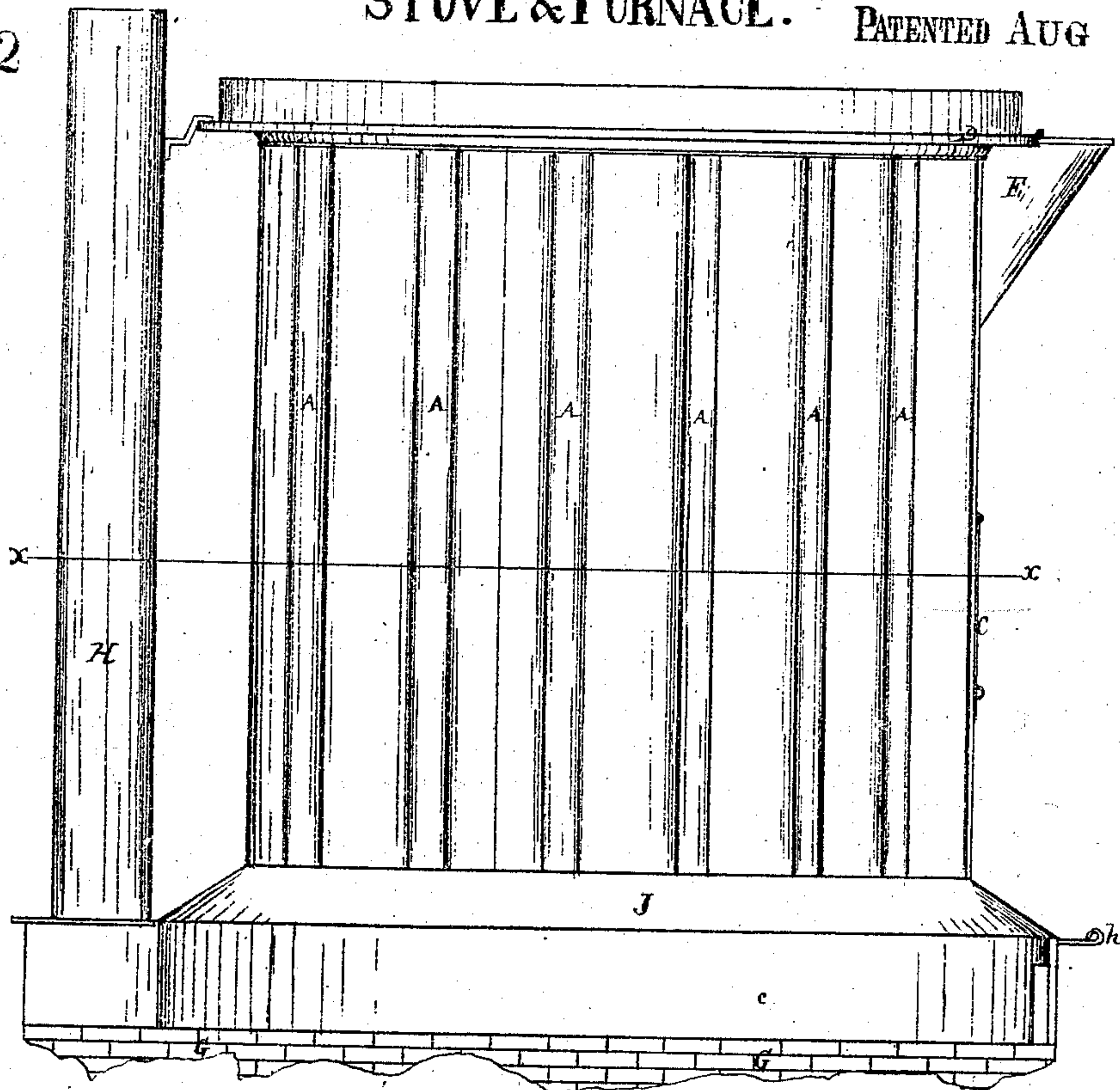
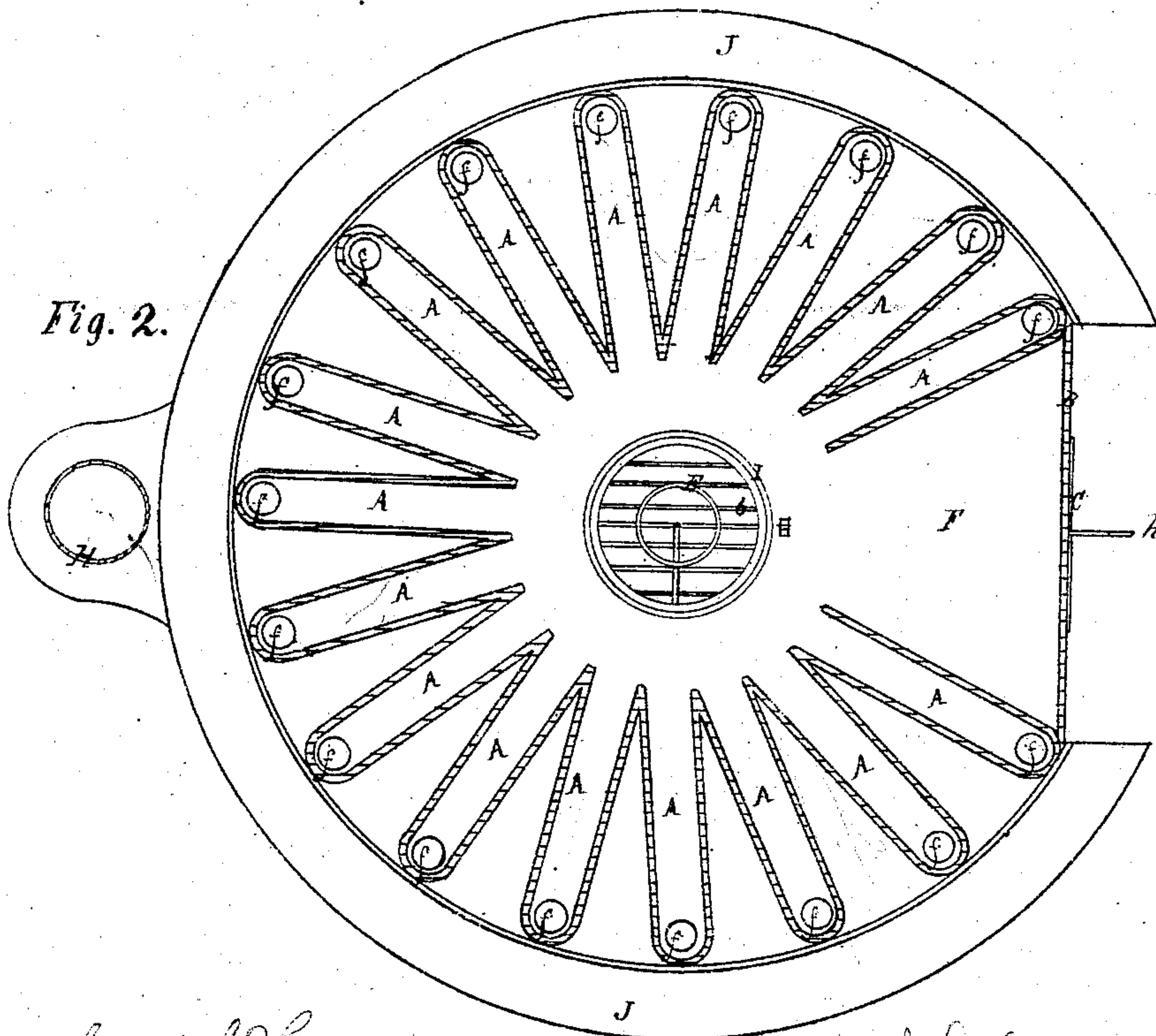


Fig. 2.



Witnesses { *Samuel Thomas*  
*Wm Driville*

*Stephen J. Gold*  
*By Thos. H. How*  
*att'y*

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2 Sheets.  
Sheet 2.

Fig. 3.

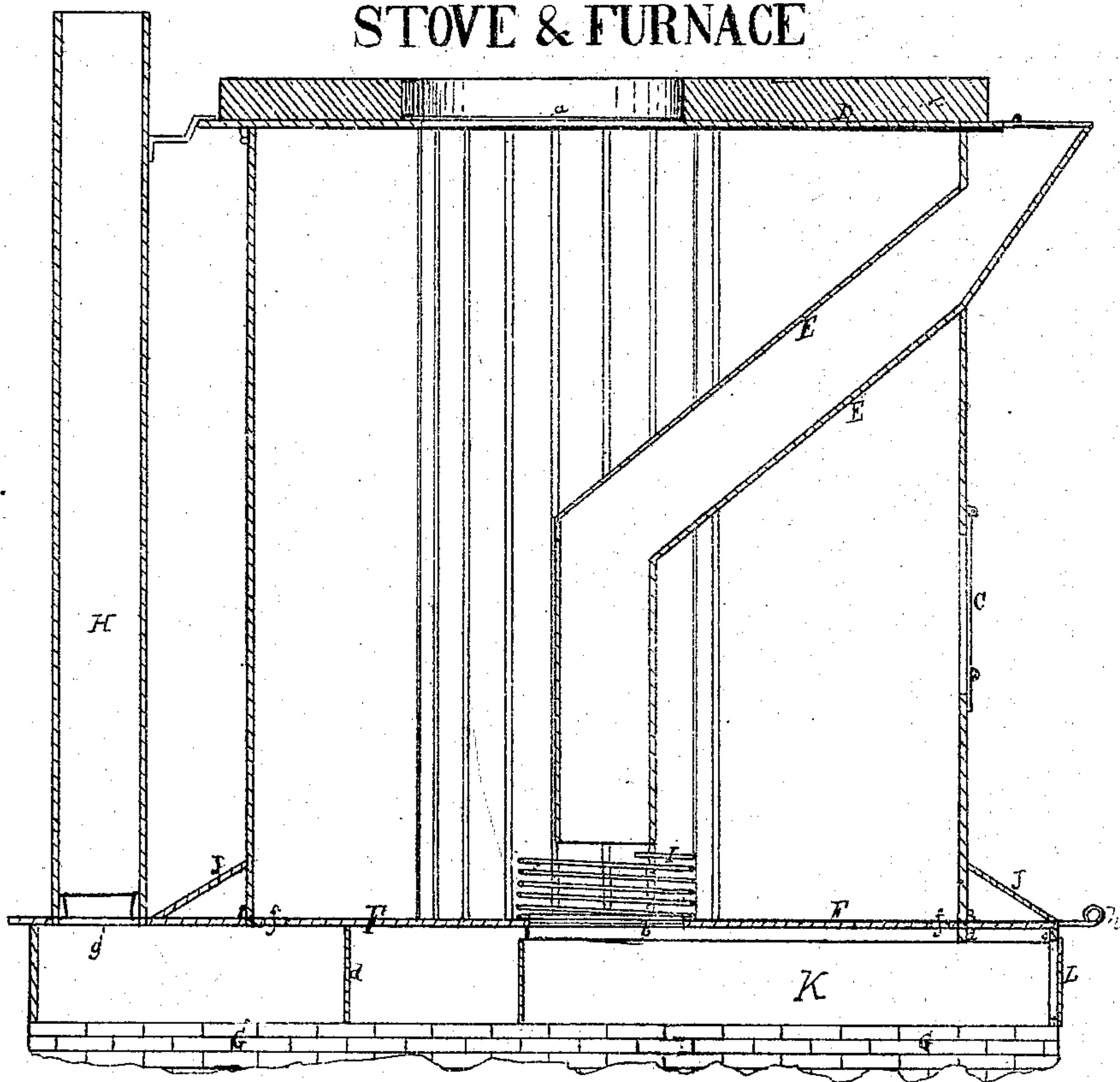
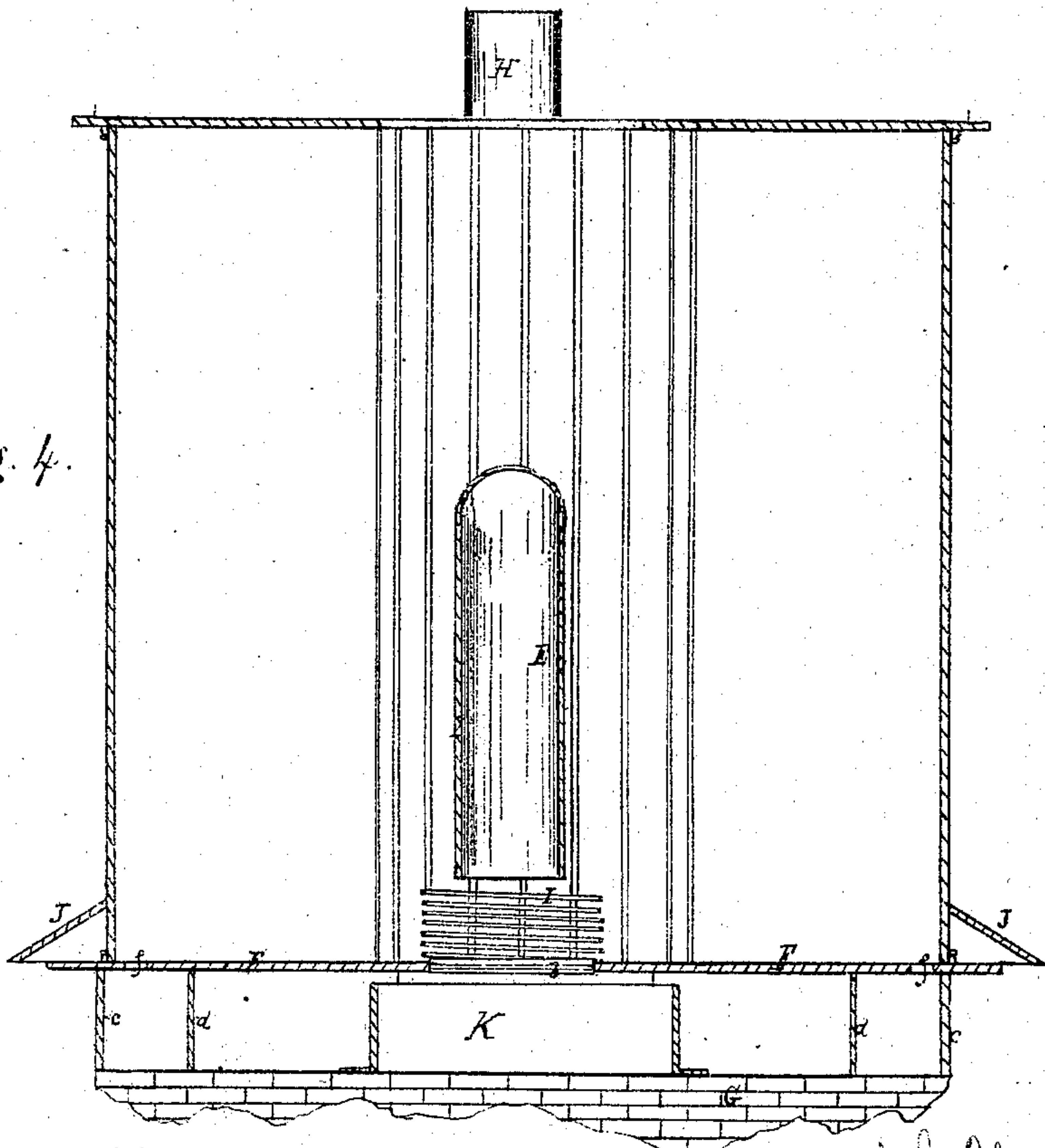


Fig. 4.



Witnesses.

*Lemo S. Humes*  
*Wm. Danell*

*Stephen J. Gold*  
*By Thos. P. Cow*  
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# UNITED STATES PATENT OFFICE.

STEPHEN J. GOLD, OF CORNWALL, CONNECTICUT.

## IMPROVEMENT IN HEATING-STOVES AND FURNACES.

Specification forming part of Letters Patent No. 117,532, dated August 1, 1871.

*To all whom it may concern:*

Be it known that I, STEPHEN J. GOLD, of Cornwall, in the county of Litchfield and State of Connecticut, have invented certain Improvements in Air-Heating Stoves and Furnaces, of which the following is a specification:

This invention relates to stoves and furnaces for warming buildings and apartments, either by being set in the room to be warmed or by being set in brick-work and provided with the appliances usually employed in connection with hot-air furnaces. The construction may also be such as to be used as a basement fire-place heater. The principal object of this invention is to secure an efficient and complete radiation of the heat supplied by the fuel at a low temperature of the radiating-surfaces, so that they shall not be overheated in being warmed and thus rendered unfit for respiration. Among the objects of this invention are also the securing of a more perfect diffusion of the heat to the radiating-surfaces, a more perfect combustion of the combustible material of the fuel, and a more perfect contact of the air to be heated with the heating-surfaces. To accomplish these purposes I form the sides of my stove or furnace (except, sometimes, the front or a portion thereof) of a series of metallic plates or surfaces, arranged in the manner hereinafter described, by which the radiation of the heat from the fire-pot is partially cut off or eclipsed from all portions of the extended surfaces of the sides of the furnace, (except, perhaps, a very small portion of the front where the fire-door may be hung,) as hereinafter more fully set forth. This arrangement which I am about to describe forms the sides of the stove or furnace into a series of open side flues or pockets extending outward from near the fire-pot to a considerable distance therefrom. I also construct the base-plate, on which the plates forming these open side flues or pockets rest, with a series of openings from the outer portions of these open side flues or pockets into a chamber which connects with the smoke-pipe, by which these open side flues or pockets are made to serve also as diving-flues, and thereby more fully exhaust and radiate the heat of the fire into the air to be warmed; and the combustion is also by this arrangement rendered more perfect. I also combine with these open side flues or pockets an inclined plate, so arranged, in connection with the outside of said pockets, as to gather the air to be

warmed into the spaces between them and bring it all more perfectly in contact with the heating-surfaces. I also arrange the fire-pot entirely within the body of the stove or furnace, in combination with the open-sided diving-flues or pockets above mentioned, as hereinafter more fully set forth.

Figure 1 is a side elevation of a stove or furnace embodying my invention. Fig. 2 is a horizontal section of the same, showing the parts which lie below the line *x x* drawn across Fig. 1. Fig. 3 is a vertical section of the same taken from front to back through the center. Fig. 4 is a vertical section of the same taken from side to side through the center.

A A are the open side flues or pockets above mentioned, forming the sides of the stove or furnace. These open side flues or pockets I prefer to arrange in the general form of a circle around the fire-pot, as shown, and a portion of the front of the stove or furnace being made flat, as shown, when a fire-door is required at the side of the stove or furnace, for the attachment of such fire-door; but for some stoves, and perhaps some furnaces embodying this invention, this fire-door in front and the flat section may be dispensed with and the circle of open side flues or pockets made complete around the entire circumference. I prefer to make these open side flues or pockets in about the form and proportions represented in the drawing, with nearly or quite parallel sides terminating at the outer portion in a semicircle, and joined to each other at the inner edge in the form of a V, with a sharp edge. By this construction and arrangement the whole of these open side flues or pockets, except the extreme outer portions, is made to present an acute angle of incidence to the radiation of the heat from the fire, which renders its action upon them at any particular point less intense, and contributes very materially to the prevention of the overheating of the air to be warmed. The sides of these open side flues or pockets are constructed in a line, which, if continued inwardly, would pass through the fire-pot at an angle of divergence commencing at the inner edge of the flue; and it will be observed, upon the careful examination of the construction I have described, that no part of the walls or sides of these open side flues or pockets is exposed to the radiation of heat from the whole of the fire; but, on the contrary, a large portion



of the fire is eclipsed, or, in other words, its radiation cut off from every part of each individual open side flue or pocket. This is essential and important to prevent the overheating of any portion of the air to be warmed. The precise form and arrangement which I prefer are clearly shown in Fig. 2; but it is obvious that this form and arrangement are capable of some modification without involving a departure from the requisites I have stated or changing the principles of this invention, or the substantial results accomplished by it. These open side flues or pockets A A may be made up of separate castings—that is to say, one side of one pocket being cast with the adjoining side of the next, so as to form a V-shaped plate—and joined at the outer edge of the pocket in a manner well known to manufacturers of furnaces and stoves; or they may be cast upon a core in one piece with the front B, to which the fire-door C (if any) is hung; or they may be formed in some, and perhaps in most, cases of wrought-iron plate. It is essential, however, that the sides of these open-sided flues or pockets should meet at an acute angle at their inner edges or those nearest the fire, so as to eclipse or shut off all parts of these open side flues or pockets from the direct radiation of the heat of the fire, and prevent these inner edges from being overheated from the direct incidence of the heat from the fire which would take place if these sides were either joined upon a circle or upon an acute angle, by which a portion of the air to be warmed would be overheated, and the principal object of my invention destroyed. D is the top plate of the stove or furnace, which plate should be made of cast-iron, and may be provided, or not, with a cover, *a*, in the center for the introduction of fuel or for any other purpose. To prevent this top plate D from exposing a too highly-heated surface to the air which may be brought in contact with it to be warmed, it should be covered with brick, sand, cement, a coating of plaster of Paris, or some similar covering which will prevent air brought in contact with the top of the furnace from being overheated; and if a cover, *a*, is used it should be covered in like manner. E is a feeding-tube, through which the fuel may be supplied in a manner common in stoves and furnaces. F is the base-plate of the furnace, which, like the top plate D, should be made of cast-iron, and which is provided with an opening in the center over which the fire-pot is set and in which the grate is hung. Said plate is also furnished with downwardly-projecting flanges *c* and *d*, between which, when the stove or furnace is set upon brick-work G, (or may be an additional iron plate,) a chamber is formed to receive the products of combustion from the open side flues or pockets A A and discharge them into the smoke-pipe H; the base-plate F being provided with openings *f f* to allow the products of combustion to pass downward from the outer portion of the open side flues or pockets A A into the chamber formed between the flanges *c* and *d*, which chamber is also provided with an opening, *g*, under the smoke-pipe H. This chamber formed between the flanges *c*

and *d* may be wholly formed of brick, if desired, and the flanges *c* and *d* omitted from the casting, care being taken that the passage to the smoke-pipe H is smoothly made and proper in size, so that there will be no obstruction in this chamber to the draught of the furnace. I is the fire-pot, which may be made of a bar of round iron coiled into the form shown, or of heavy cast-iron made up in sections, or it may be made of fire-brick, as is common in stoves and furnaces. A circular flange should be formed around the opening in the base-plate F, sufficiently back from the edge that the fire-pot can stand on the base-plate and the flange keep it in place. This arrangement of the fire-pot entirely within the body of the furnace, instead of below it, throws the whole of the heat into the combustion-chamber of the furnace and aids materially in consuming the smoke, while, at the same time, the construction of the radiating surfaces that surround the fire-pot is such as to secure nearly the entire benefit of the heat derived from the combustion of the fuel, very little escaping to the smoke-pipe, and, in combination with the diving-flues, allows the heavy gases of combustion to fall off more readily from the ascending current of heated air than if the fire were placed below instead of within the body of the furnace.

In the operation of my stove or furnace the heat and products of combustion (except the heavy and incombustible gases which fall directly off from the fire-pot) are drawn into the chamber below which leads to the smoke-pipe H, rise quickly to the top plate D, and then, separating equally, or nearly so, into all of the open side flues or pockets A A, the gases of combustion descend through the outer portions of these open side flues or pockets to the openings *f f* and pass off into the smoke-pipe. The heat is thus transmitted evenly through the plates which form these open side flues or pockets A A, and is so perfectly taken up by the air which is brought against these plates to be warmed that the smoke-pipe is scarcely warmed, and never made hot enough to cause any danger of fire therefrom.

J is an iron plate, bent or cast in the general form of an inverted funnel, to fit upon the outside of the open side flues or pockets A A, and inclined inwardly at the top, as shown, so as to gather the air into the spaces between these flues and cause it to be more thoroughly and equally heated. This plate is arranged near the base of these flues, with the bottom of it about even with the base-plate F and resting upon it at the front and back of the furnace, as shown. This plate J may, however, be a flat ring, so arranged as to compel the air to pass between the flues. K is the ash-pit of the furnace, and L is the door opening into it. *h* is a rod for tilting and shaking the grate.

I am aware that furnaces have been constructed with corrugated sides, in some of which a small portion of the corrugations has presented a surface which, if extended in the same direction sufficiently far, would pass through the fire-pot; but the principal portion of each corruga-



tion forming the sides was exposed to the radiation of the heat from the whole size of the fire-pot.

I claim as my invention—

1. The combination of the open side flues or pockets A, constructed substantially as described, with the openings *ff* in the base-plate, substantially as hereinbefore set forth.

2. In combination with the open side flues or pockets A and the openings *ff* in the base-plate,

the arrangement of the fire-pot within the combustion-chamber, substantially as hereinbefore set forth.

3. The combination of the open side flues or pockets A, the openings *ff*, and the plate J, substantially as hereinbefore set forth.

STEPHEN J. GOLD.

Witnesses:

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WM. DOMELLY.