

(No Model.)

W. H. HEESON.

SMOKE CONSUMING FURNACE.

No. 378,006.

Patented Feb. 14, 1888.

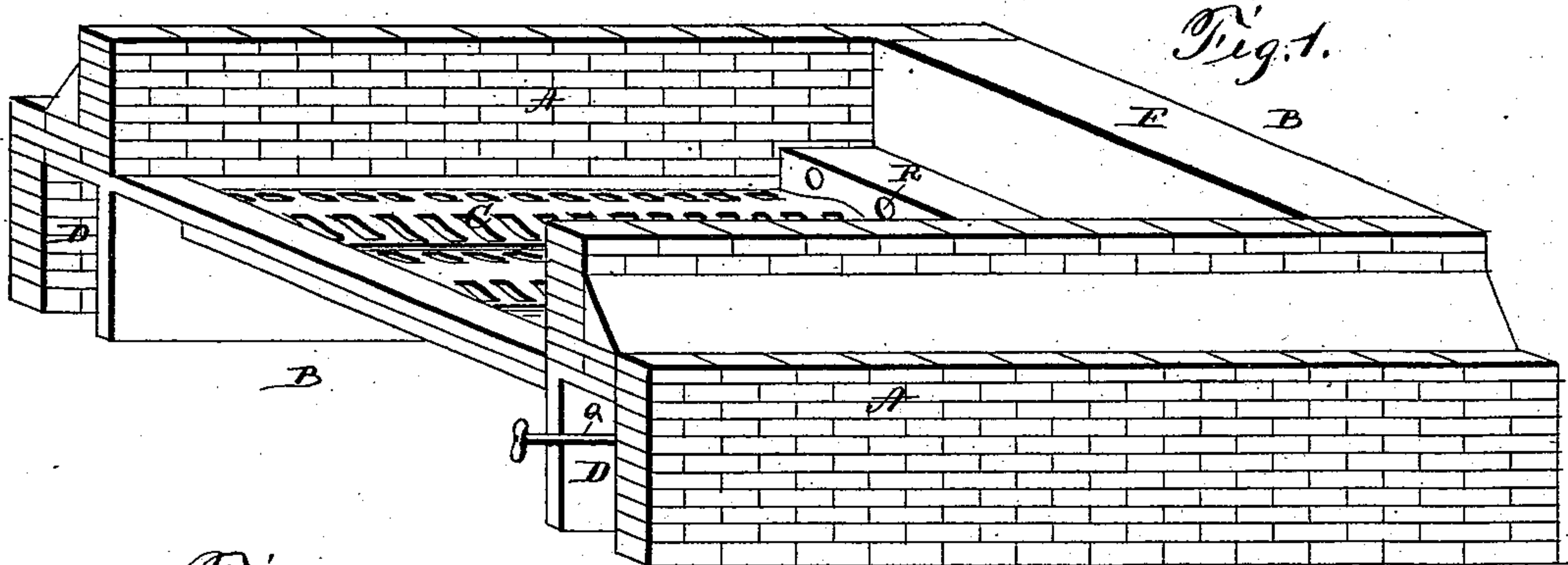


Fig. 2.

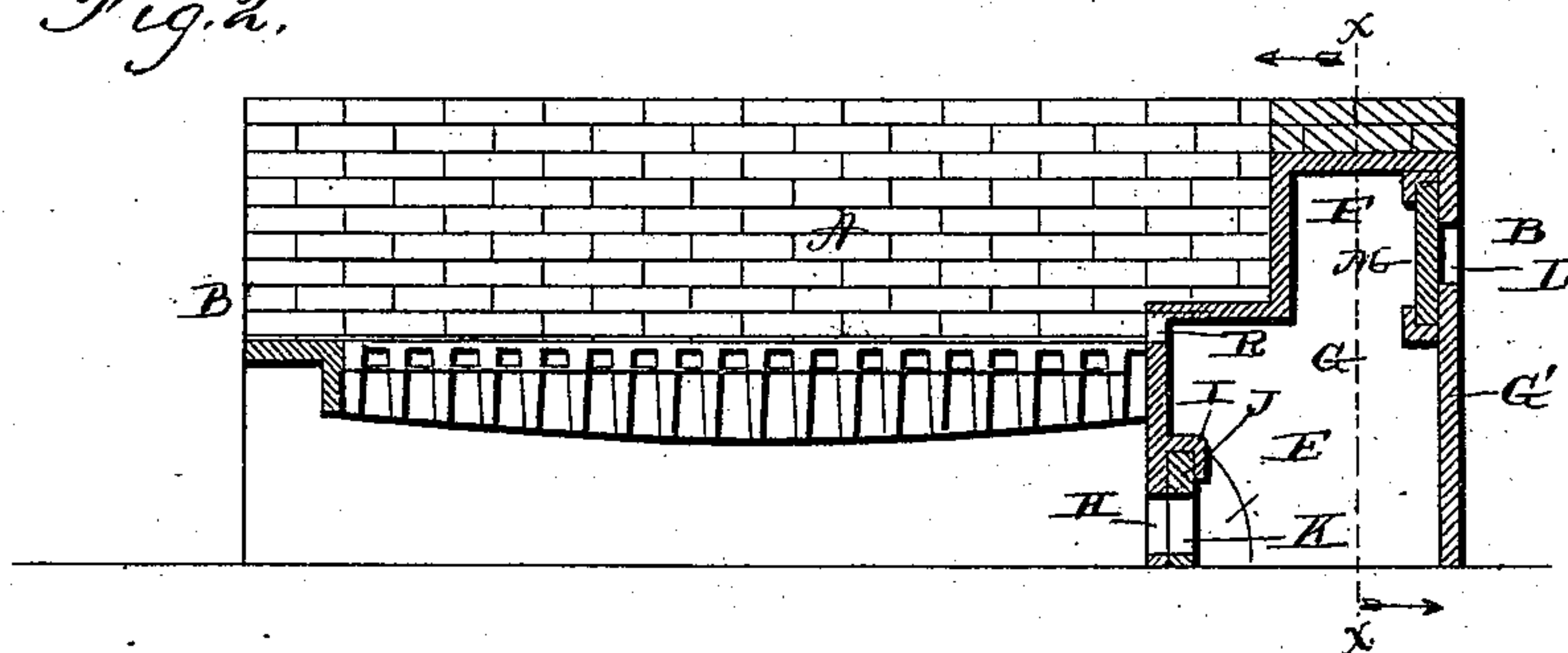


Fig. 3.

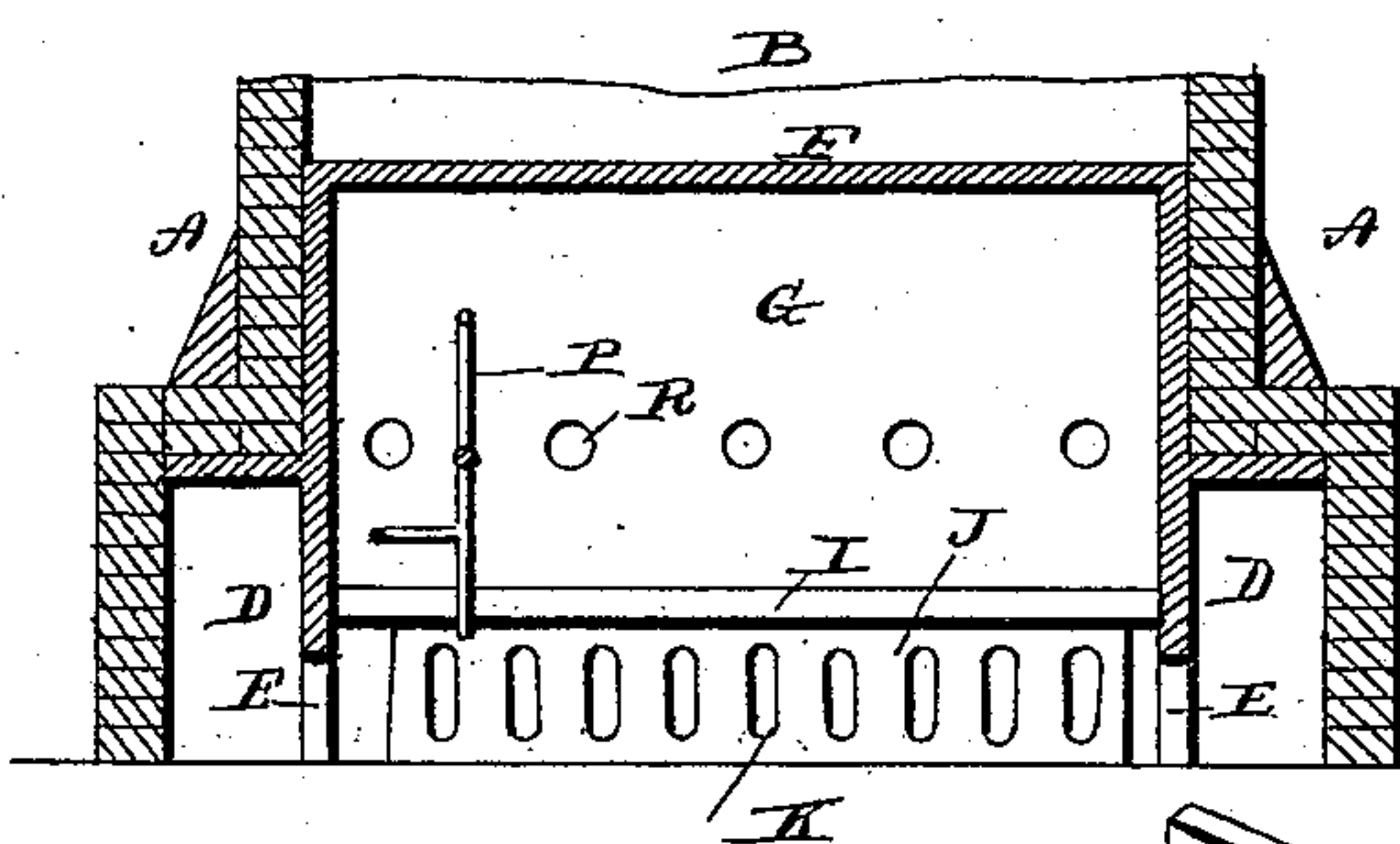


Fig 4

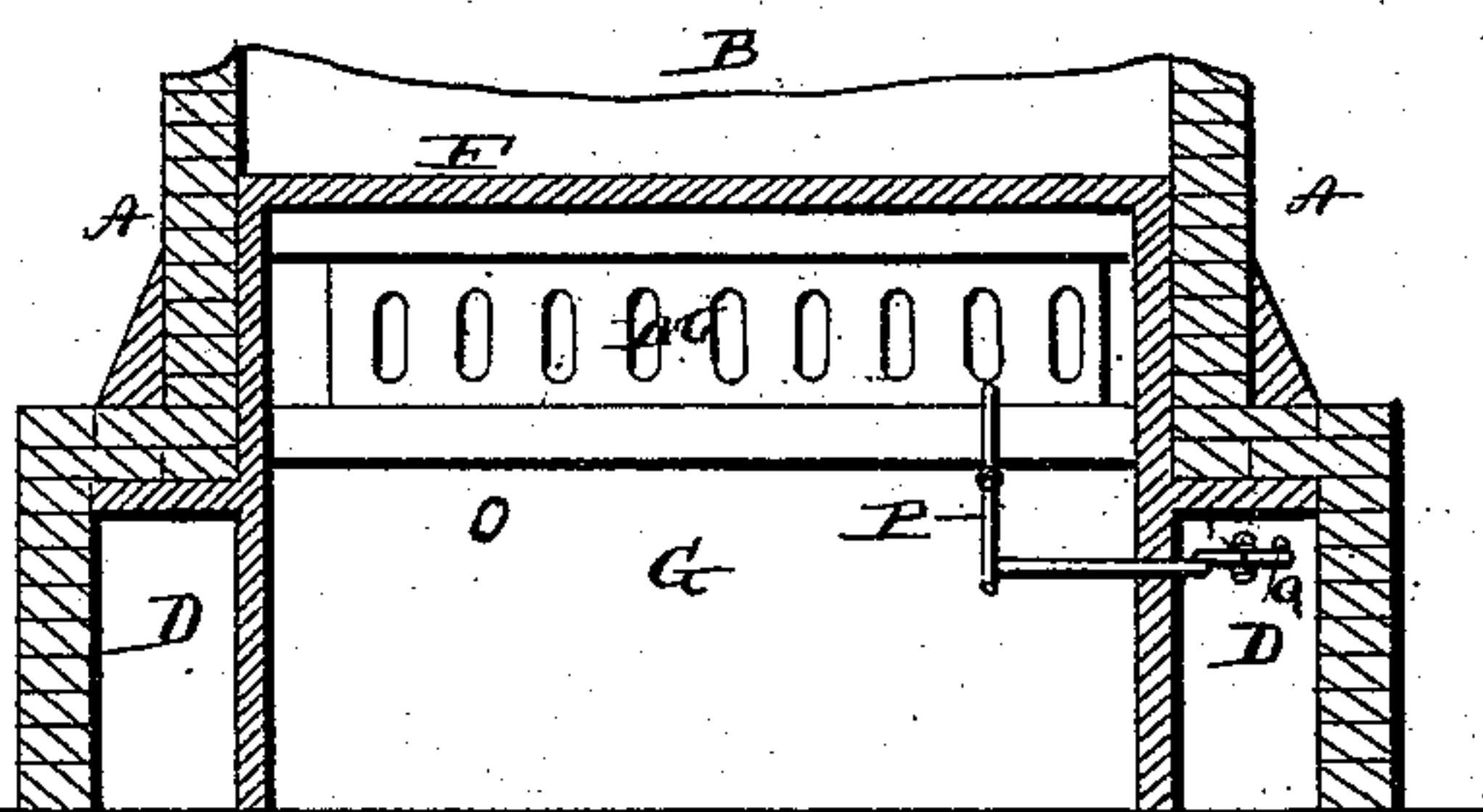
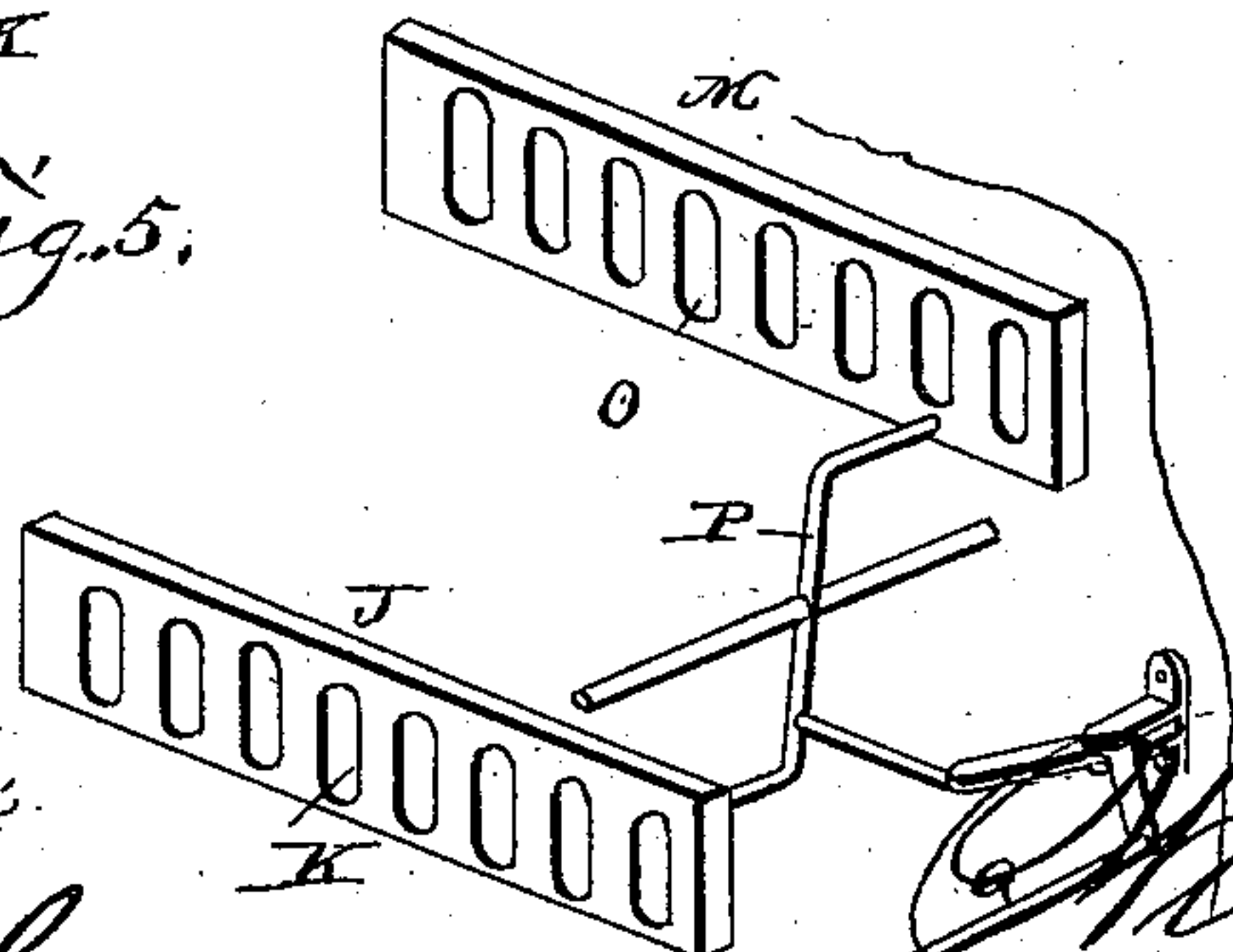


Fig. 5.



Witnesses  
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Inventor

Subscribed  
 William H. Nelson  
 By his Attorney  
 Louis Dwyer & Co.



# UNITED STATES PATENT OFFICE.

WILLIAM HENRY HEESON, OF BALTIMORE, MARYLAND.

## SMOKE-CONSUMING FURNACE.

SPECIFICATION forming part of Letters Patent No. 378,006, dated February 14, 1888.

Application filed July 11, 1887. Serial No. 243,920. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM HENRY HEESON, a citizen of the United States, and a resident of Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Smoke-Consuming Furnaces; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification, and in which—

Figure 1 is a perspective view of a furnace provided with my improved smoke-consumer. Fig. 2 is a central longitudinal vertical sectional view of the same. Fig. 3 is a vertical sectional view taken on the plane indicated by line *x x* in Fig. 2, looking in the direction indicated by the arrow 1 in the said view. Fig. 4 is a similar view, looking, however, in the direction indicated by the arrow 2 in Fig. 2; and Fig. 5 is a detail view, the nature of which will be hereinafter described.

The same letters of reference indicate corresponding parts in all the figures.

My invention consists in a new and improved apparatus or device for consuming the smoke of furnaces and stoves and the like and preventing the same from escaping out into the open air; and my invention will be hereinafter fully described and claimed.

Referring to the several parts by letter, A A indicate the sides, and B B the ends, of the furnace, to which my invention is shown as applied; and C indicates the furnace-grate, which may be of any desired or suitable construction, although I prefer to use the form of grate here shown, which I will not, however, describe in detail, as it forms the subject-matter of another and separate application for Letters Patent of the United States, and, as above stated, any form of grate may be employed with the furnace provided with my improved smoke-consumer.

On each side of the furnace is formed an air inlet or duct, D D, the said air-inlets extending along parallel with the outer sides of the sides of the furnace, as shown, leading from the outer end or front of the furnace, where their ends are

open for the free admission of air, back along the outer sides of the side walls of the furnace to the back of the same, where they lead through openings E E, made in the lower rear corners of the sides of the furnace, into the space back of the rear end of the furnace. The space back of the furnace proper is inclosed in a casing, F, so as to form a large air-chamber, G, as shown, into the lower forward ends of which the rear ends of the side ducts or inlets, D D, open.

The rear end, B, of the furnace is formed with a series (a horizontally-arranged series) of slots or inlet-apertures, H, extending transversely through it, this series of slots or openings being formed in the rear end of the furnace near the bottom edge, in the lower part of the same, below the grate C, so that the air entering through the said apertures will fill the lower part of the furnace-space and pass up evenly through the grate C, causing the fire to burn brightly and evenly. Against the rear lower side of this rear end of the furnace is arranged and slides in bearings I a long slide-valve, J, which is formed with a series of transverse slots or apertures, K, of the same size and shape as the inlet-apertures H in the rear end of the furnace, the slide-valve being so arranged and the series of apertures K so arranged in it that the slide-valve can be moved or slid to one side, so as to cause all of its apertures to register with those of the end of the furnace, so as to admit of the air which enters the air-chamber G through the side ducts, D D, entering into the lower part of the furnace below the grate thereof, while when the slide is moved in the opposite direction the inlet-apertures H of the furnace are closed.

The rear wall, G', of the air-chamber G is formed with a series of outlet-apertures, L, arranged as shown, and a long slide-valve, M, is arranged in bearings N on the inner side of the rear wall of the air-chamber to slide across these slots or apertures, as shown, this slide-valve M being formed with a series of transverse slots or apertures, O, of the same size and shape as the apertures L, and adapted to register with the same when the slide-valve M is moved to one side, while by sliding the valve in the other direction the apertures L



are closed and the egress of air, &c., from the air-chamber stopped.

The right-hand ends of the lower slide-valve, J, and the upper slide-valve, M, are connected by a centrally-pivoted pitman or lever, P, from which a rod, Q, leads along the side of the furnace out to the front or outer end of the same, so that the said two valves can be manipulated or adjusted from the front of the furnace, where the front end of the rod Q projects, as shown; and it will be seen that, as the two slide-valves are connected together, as set forth, when one valve is moved to open the series of apertures which it controls, the other slide-valve will by the same movement be moved to close the series of apertures which it controls, and vice versa, the two slide-valves being thus adjusted, opened, and closed with a single rod and a single movement.

In operation, the fire having been lighted on the grate in the furnace, the rod Q is pulled out, so as to move the lower slide-valve, J, to one side, so that its series of openings register with the series of apertures H in the lower part of the rear end wall of the furnace, thus opening the said openings, while by the same movement the upper slide, M, is slid to one side to close the upper series of apertures or slots in the upper part of the rear wall of the air-chamber G, and the air will then enter and pass through the two inlet spaces or ducts D D on each side of the furnace, and, entering the air-chamber G at the rear of the furnace, will then pass through the series of apertures or slots H in the lower part of the rear end wall of the furnace, and the air thus admitted will pass up through the grate and the fuel resting upon the same, furnishing a fine draft for the fire. When the fire is burning well and the furnace full of smoke, when the fire has ceased to throw off heavy smoke, the rod Q is pushed in, so as to slide both of the slide-valves, this movement closing the series of inlet-apertures in the lower part of the rear end wall of the furnace and opening the series of openings or slots in the upper part of the rear wall of the air-chamber, and the smoke will then pass from the interior of the furnace through the openings R into the air-chamber, where it will meet and be mingled thoroughly with the air which enters the air-chamber through the long side ducts, D D, as will be clearly seen, when the air will finally pass out through the open series of apertures L in the upper part of the rear wall of the air-chamber, the current of air through the side ducts, D D, and out through the top openings in the rear wall furnishing a fine draft.

From the foregoing description, taken in connection with the accompanying drawings, the construction, manner of operation, and many advantages of my invention will be readily understood and appreciated.

It will be seen that the apparatus is very simple in construction, and that it will effectu-

ally consume the smoke and prevent its escape out into the open air. It can be applied to any furnace at a small cost, and will always effect the object for which it is designed. The slide-valves can be operated with great ease with the single operating-rod from the front of the furnace, the lower valve being moved to open the lower series of openings when the fire is first lighted, to furnish a draft for the fire until it is burning brightly, and the upper series of openings in the rear wall being opened and the lower apertures in the rear end of the furnace being closed at the same time, to permit of the smoke being thoroughly mingled with the air in the air-chamber before the air passes out through the said upper openings.

The whole apparatus can be manufactured at a small cost, and is exceedingly efficient in operation, thoroughly preventing the escape of smoke from the furnace into the open air. Various minor changes may be made without departing from the spirit of my invention.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. The combination, with a furnace having a series of air-inlet openings formed in the rear end of the ash-pit and the perforated slide-valve controlling the said openings, of the side inlet-ducts, the air-chamber G in the rear end of the furnace, having a series of air-outlet openings formed in it near its upper end, and a perforated slide-valve controlling the said outlet-openings, substantially as and for the purpose set forth.

2. The combination, with a furnace having a series of air-inlet openings formed in the rear end of the ash-pit and the perforated slide-valve controlling the said inlet-openings, of the side air-inlet ducts, the air-chamber having a series of outlet-openings formed in it near its upper end, the perforated slide-valve controlling the said outlet-openings, and the centrally-pivoted pitman connecting the said slide-valve and the operating-rod, substantially as and for the purpose set forth.

3. The combination, with a furnace having a series of air-inlet openings formed in the rear end of the ash-pit, and having the upper openings, R, through which the smoke escapes into the air-chamber, and the perforated slide-valve controlling the said inlet-openings, of the side air-inlet ducts, the air-chamber having a series of outlet-openings formed in it near its upper end, the perforated slide-valve controlling the said outlet-openings, and a centrally-pivoted pitman connecting the said slide-valve and the operating-rod, substantially as and for the purpose set forth.

4. The combination, with a furnace having a series of air-inlet openings formed in the rear end of the ash-pit, and having the upper openings, R, through which the smoke escapes



into the air-chamber, of the perforated slide-valve controlling the said inlet-openings, the sideair-inlet ducts, and the air-chamber having a series of outlet-openings formed in it near its  
5 upper end, having a perforated valve controlling the said outlet-openings, substantially as and for the purpose set forth.

In testimony that I claim the foregoing as my own I have hereunto affixed my signature in presence of two witnesses.

WILLIAM HENRY HEESON.

Witnesses:

HARRY G. RUTTER,  
GEO. H. ROGERS.