

(No Model.)

2 Sheets—Sheet 1.

T. MURPHY.

AIR AND STEAM FEEDING DEVICE FOR FURNACES.

No. 547,670.

Patented Oct. 8, 1895.

Fig. 1.

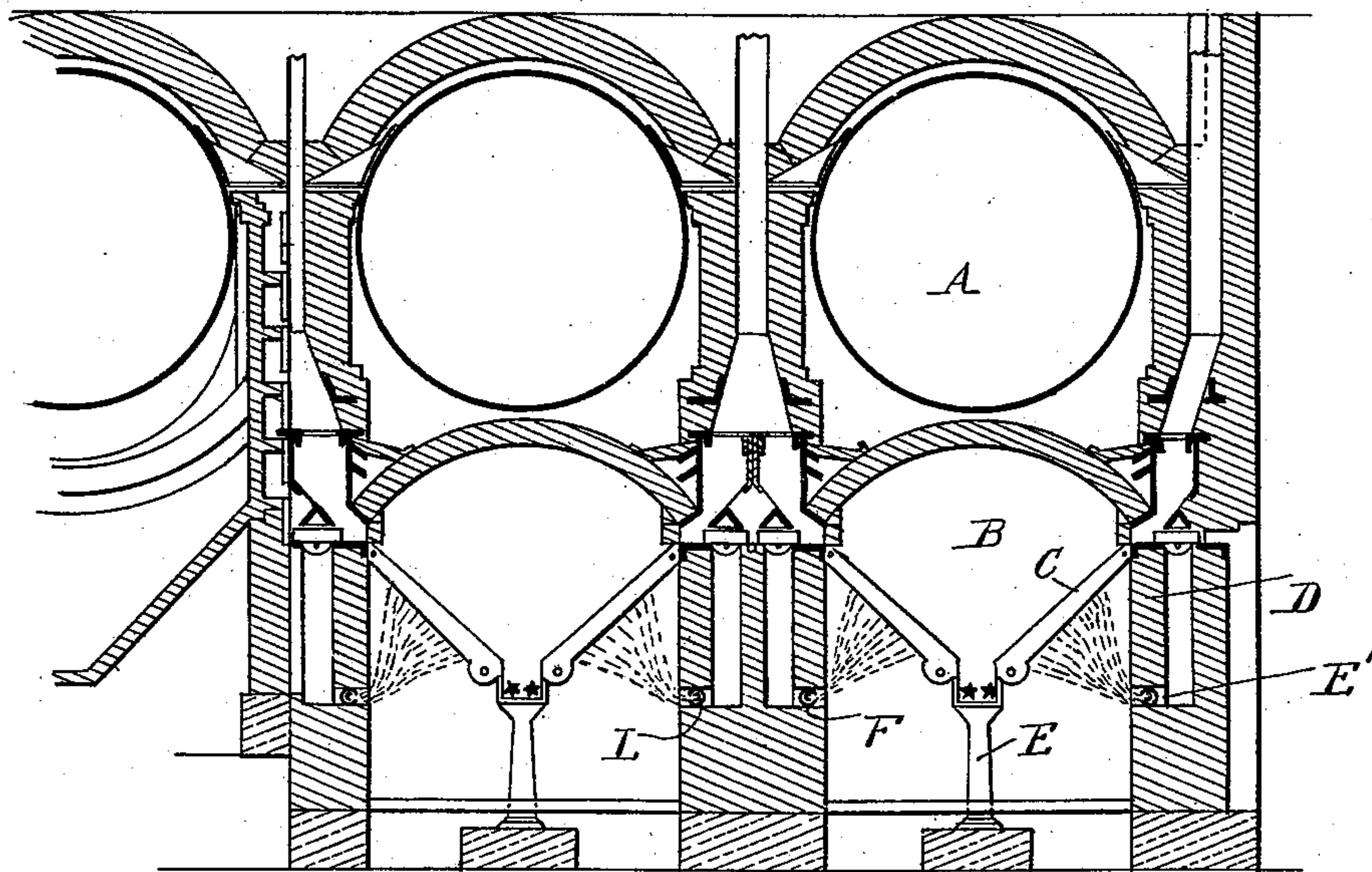
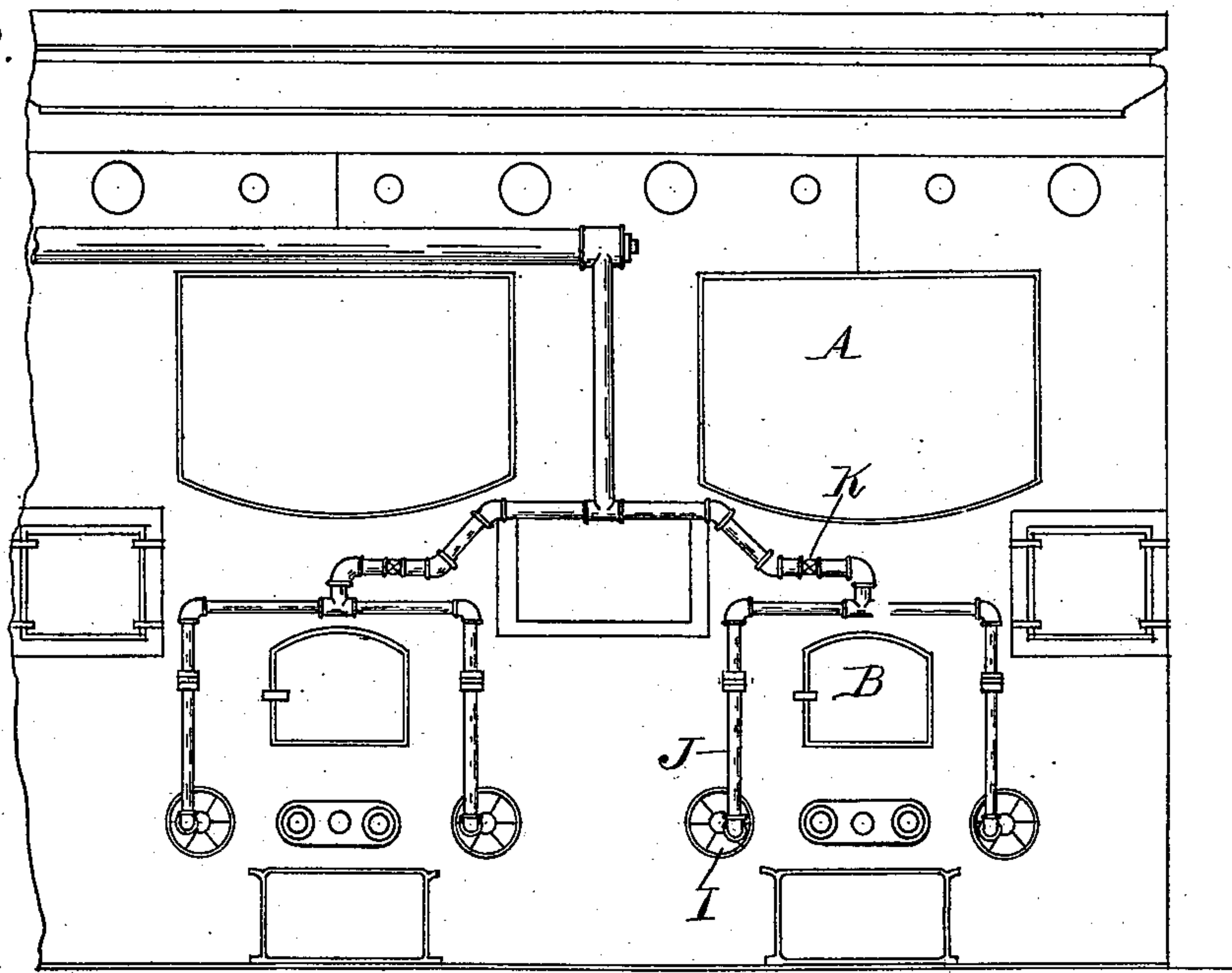


Fig. 2.



Witnesses

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(No Model.)

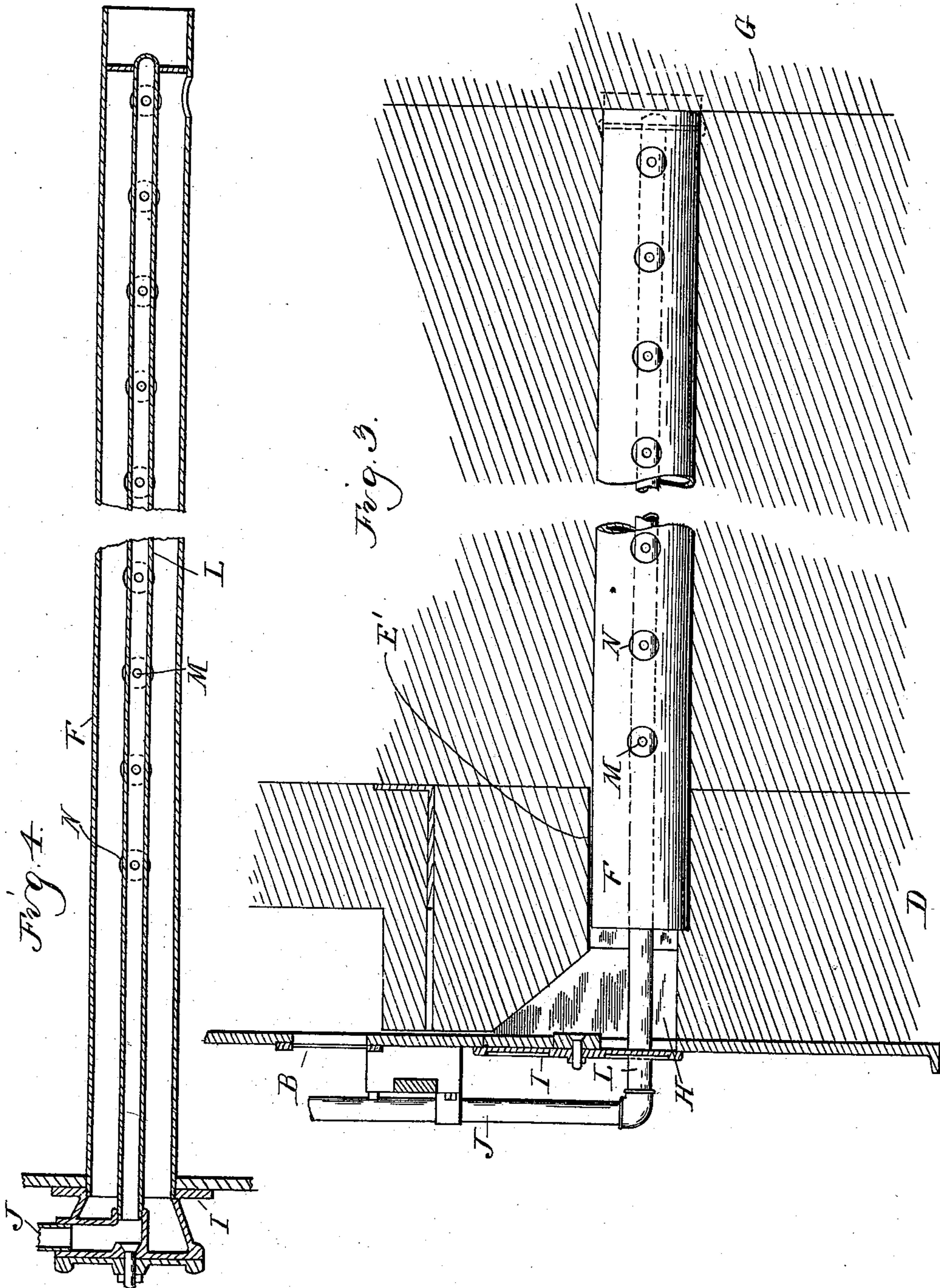
2 Sheets—Sheet 2.

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UNITED STATES PATENT OFFICE.

THOMAS MURPHY, OF DETROIT, MICHIGAN.

AIR AND STEAM FEEDING DEVICE FOR FURNACES.

SPECIFICATION forming part of Letters Patent No. 547,670, dated October 8, 1895.

Application filed January 14, 1895. Serial No. 534,899. (No model.)

To all whom it may concern:

Be it known that I, THOMAS MURPHY, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Air and Steam Feeding Devices for Furnaces, of which the following is a specification, reference being had therein to the accompanying drawings.

10 The invention consists in the peculiar construction of an air and steam feeding device for furnaces; and it consists particularly in the construction of the various parts whereby an even distribution of the steam and air is
15 obtained not only the whole length from front to rear of the grate, but also the whole width of the grate, thereby making more perfect combustion, economizing in fuel, and preventing the burning out of the grates at points
20 where heretofore they have received an inadequate supply of air or steam, all as more fully hereinafter described.

In the drawings, Figure 1 is a vertical central section through a furnace, showing my
25 invention applied thereto. Fig. 2 is a front elevation of the furnace, showing my invention applied thereto. Fig. 3 is a longitudinal section through one of the side walls. Fig. 4
30 is an enlarged section through the air and steam supply pipes.

A is the steam-generator, beneath which is the furnace B, provided with the grates C. I prefer to use inclined grates, and have shown a construction embodying oppositely-inclined
35 grates extending from the side walls D to at or near the middle of the furnace-chamber, where they are supported on a suitable pedestal E, this furnace being of well-known construction. In furnaces of this kind heretofore
40 it has been customary to supply the draft for the combustion through the usual doors and dampers beneath the ash-pit at the front end. This produces a longitudinal draft through the furnace, which will create a much
45 hotter fire at the rear of the furnace than at the forward end thereof, with much less perfect combustion at the front than the rear portion thereof. Where I employ the double inclined grates, as shown in the drawings, not
50 only is the fire greatest at the rear, but it is greatly increased at the bottom of the grates, and so little air is drawn through the upper

side portions thereof that the grates burn out more rapidly at their upper ends than at any other portion. It has also been proposed to
55 inject air and steam at the front end of the furnace above the grates, but such construction has the objection that it produces a strong longitudinal draft and creates an uneven combustion over the grate-surface. By
60 my construction these objections are overcome and a fire is produced with even combustion in all parts of the grates and without danger of burning them out more rapidly in
65 one place than in another.

In building new furnaces in which my improvement is to be applied I form in each side wall of the furnace beside the bottom of the grates a longitudinal air-chamber E', which forms or in which is supported an air-
70 pipe F of a size to supply an abundance of air for the grates. At its rear it is capped or supported in the bridge-wall G to close that rear end, while its forward end is open and
75 freely communicates with an air-chamber H in the front wall of the furnace within the boiler-front. In the boiler-front and opposite this air-chamber is a damper or valve I for
80 controlling the amount of air to be admitted into the chamber H.

J is a steam-supply pipe provided with a suitable controlling-valve K. This pipe at its lower end communicates into the jet-pipe L, which passes through the air-space H and
85 through the air-pipe F, being supported free from the sides thereof, its rear end being closed. The jet-pipe is provided with a series of horizontal apertures or jets M, arranged centrally beside enlarged apertures N on the
90 inner face of the air-pipe.

The parts being thus constructed and arranged, their operation is as follows: The fire being started in a furnace of this kind and the ash-pit doors closed partially or entirely, the grates are properly covered with coal, the
95 steam being turned on and the dampers I being partially opened to give the desired amount of air, the steam from the jets M will be discharged through the apertures N and draw with it the air heated by the steam from
100 the air-pipe, the mingled air and steam being discharged horizontally beneath the grates the whole length thereof and at substantially right angles to the bed of fuel upon the grates.

In practice the effect of this construction is to produce a fan-shaped blast of mingled air and steam, the lower limb of which is substantially horizontal, owing to the upward draft of the furnace, while the upper section will spread out over almost the entire width of the grate, distributing the air and steam evenly over all parts, slightly more air and steam being discharged at the bottom of the inclined grates than at the top, and this is desirable as the hottest fire is at the lowest point. The shape of the blast is shown by the dotted lines in Fig. 1. Inasmuch as the ash-pit chamber has no draft through it except that created by this air-feeding device, there is no longitudinal draft therein, so that there is no tendency for the air to be carried to the rear of the furnace until after it has passed through the grate. Thus I obtain an absolutely perfect distribution of the combustion, not only the whole length, but the whole width of the grate-surface.

What I claim as my invention is—

1. The combination with the side walls and oppositely inclined grates of an air supply passage along or in the walls opposite the lower ends and beneath the upper ends of the

grates having a series of horizontal apertures therethrough, a valve controlling the end of said pipe located outside of the furnace and a steam pipe passing through the air pipe and having a series of discharge jets arranged opposite the apertures in the air pipe, substantially as described.

2. The combination in a frame, of oppositely inclined grates inclined from their upper ends downward toward the middle, air passages formed in the side walls opposite the lower end of the grates, air supply tubes in such passages, having a series of horizontal apertures on the inner face and their outer ends extending to the outside of the furnace, a damper controlling the outer end of the air pipe, a steam supply pipe passing centrally through the air pipe and having a series of jets smaller than the apertures in the air pipe, arranged centrally beside said apertures, substantially as described.

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

THOMAS MURPHY.

Witnesses:

M. B. O'DOHERTY,
L. J. WHITEMORE.