

(No Model.)

2 Sheets—Sheet 1.

E. FALES.

METHOD OF BURNING COAL IN FURNACES.

No. 415,626.

Patented Nov. 19, 1889.

Fig. 1

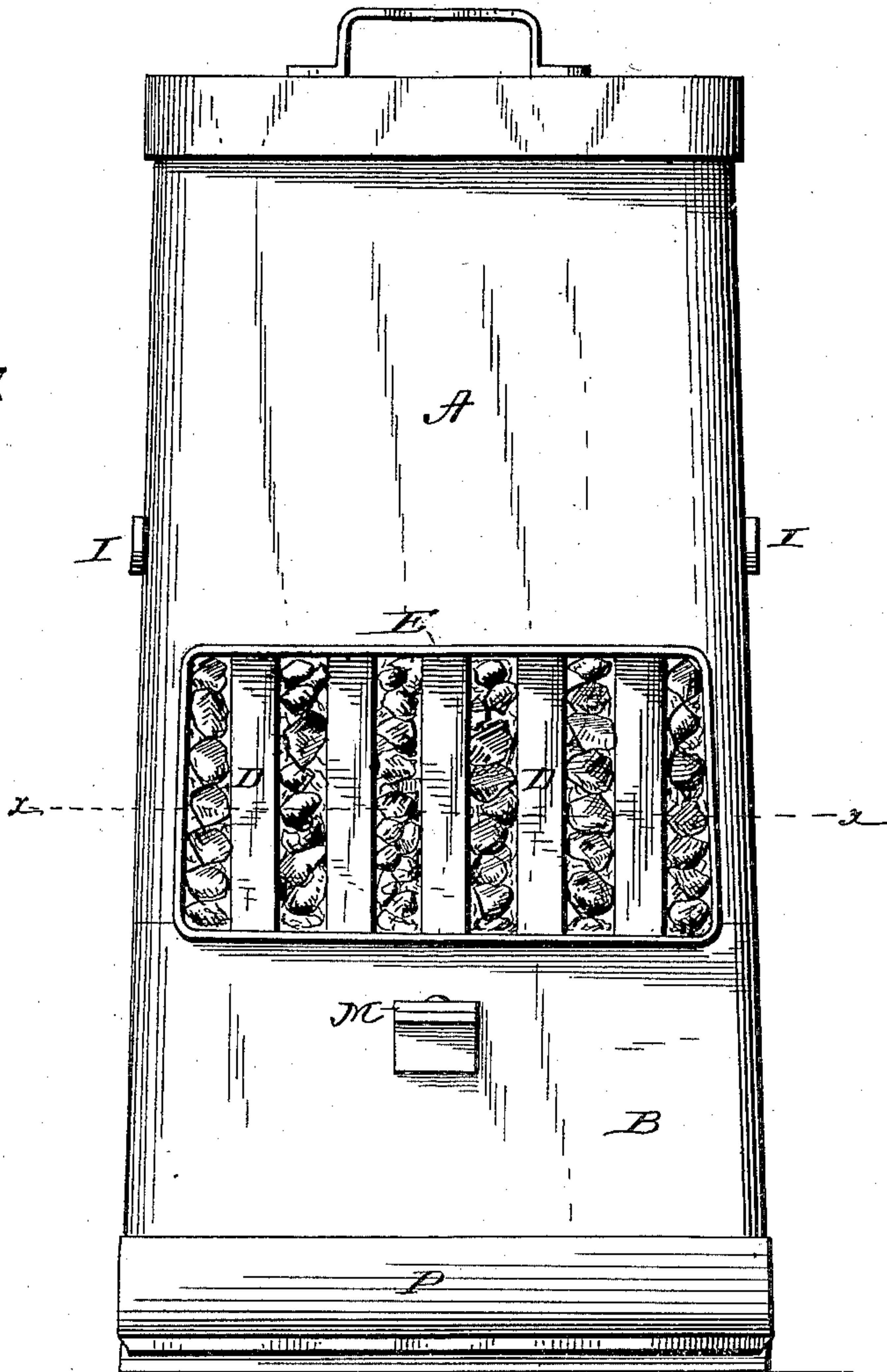
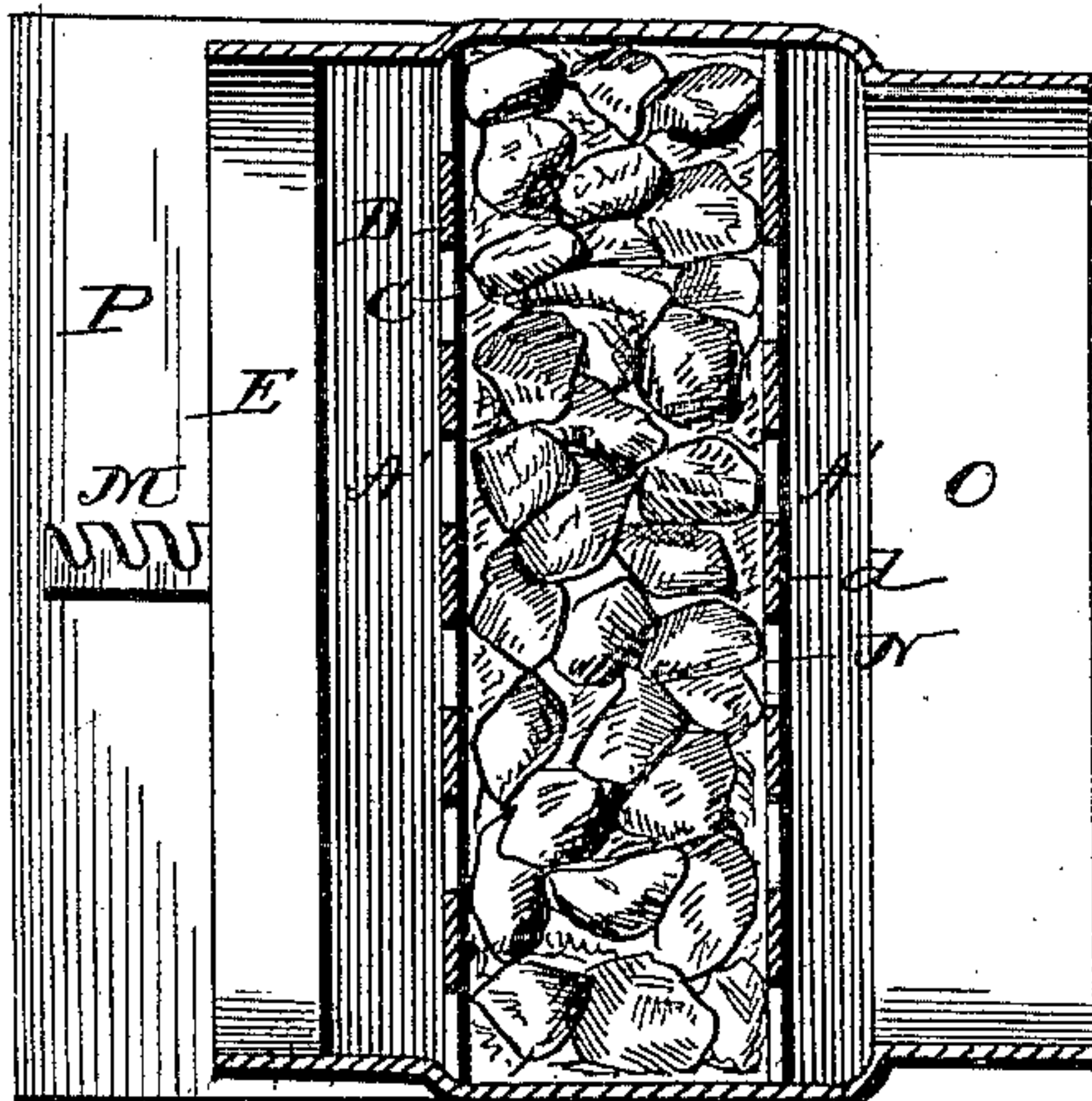


Fig. 2



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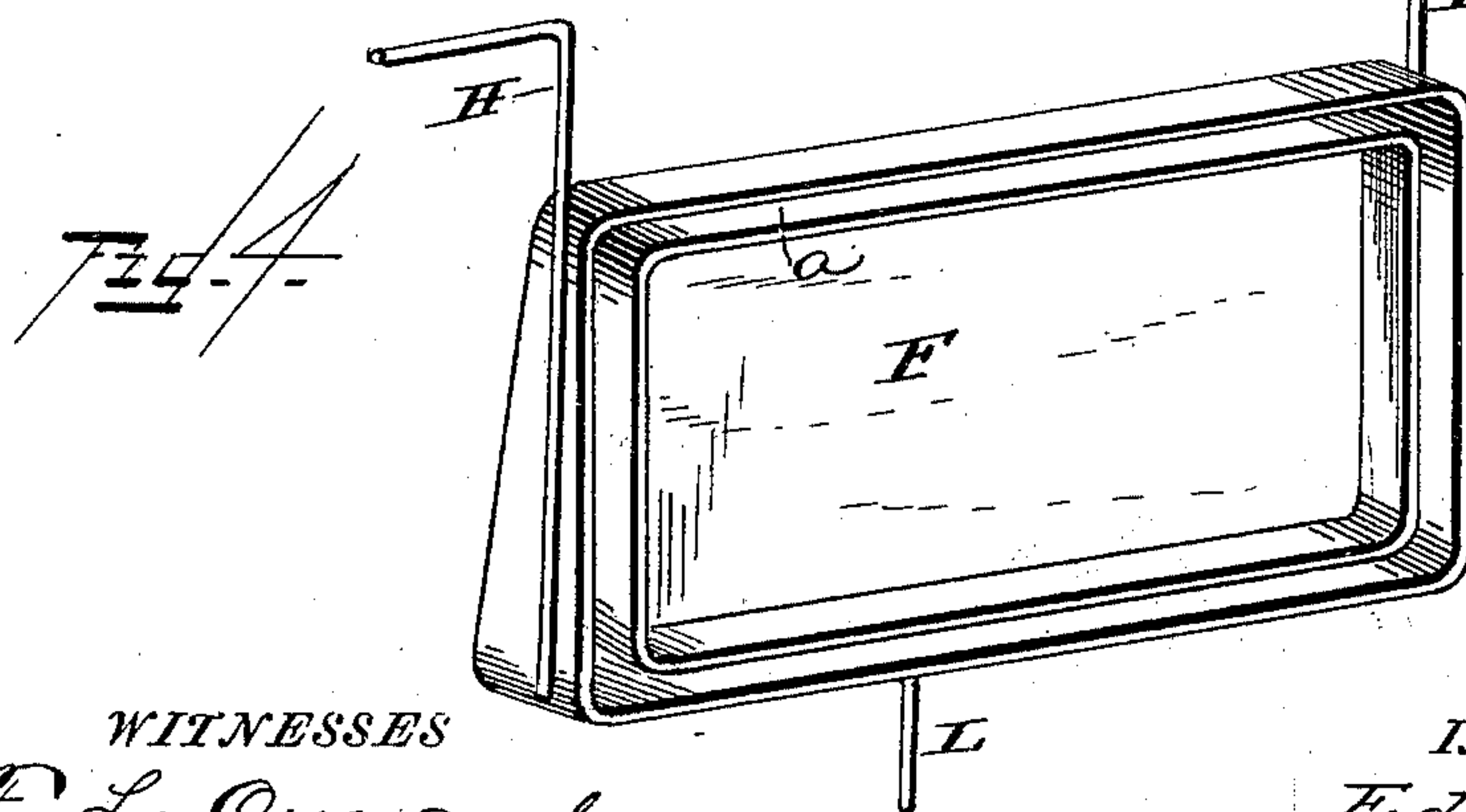
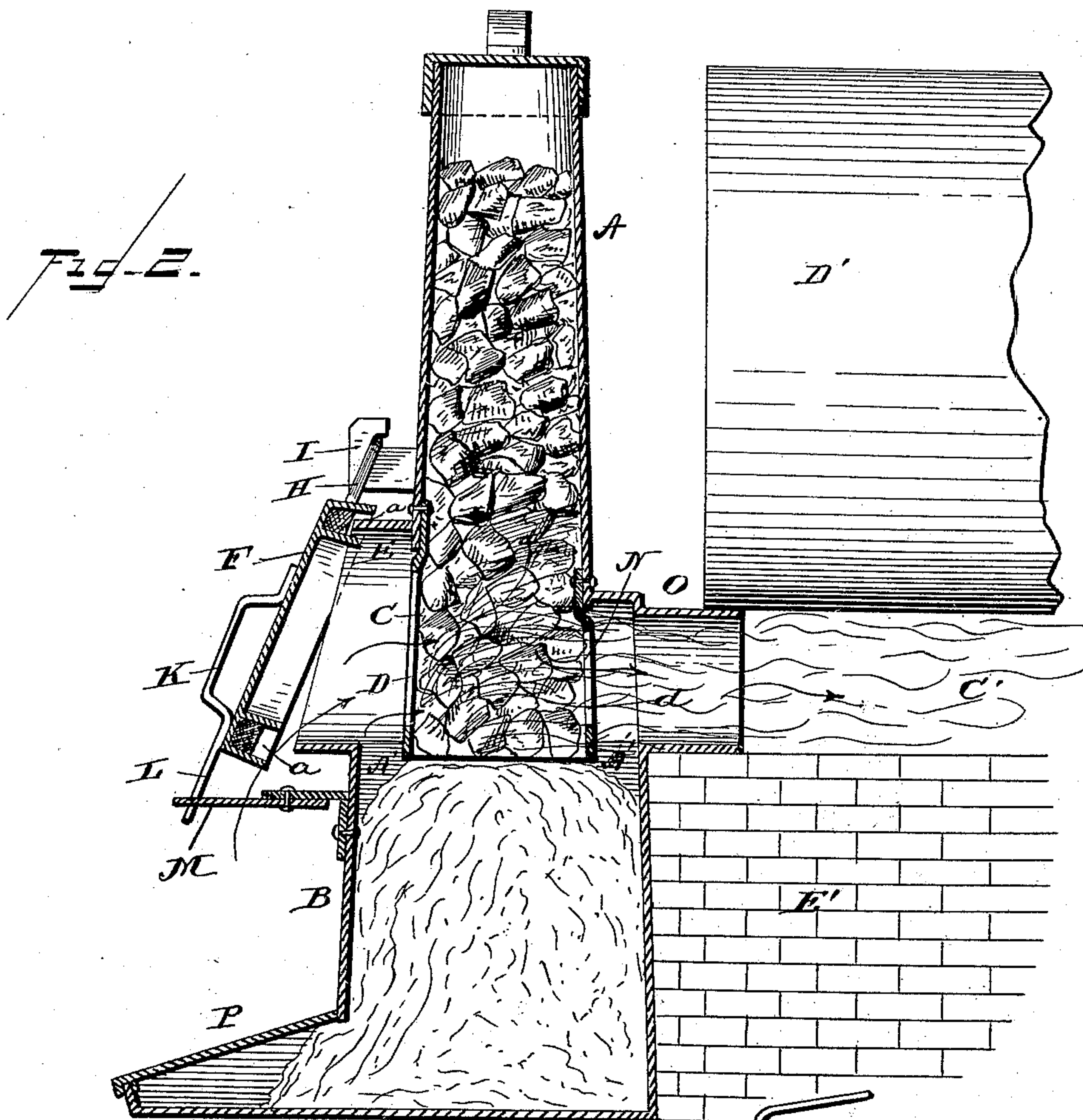
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UNITED STATES PATENT OFFICE.

EDWARD FALES, OF PHILADELPHIA, PENNSYLVANIA.

METHOD OF BURNING COAL IN FURNACES.

SPECIFICATION forming part of Letters Patent No. 415,626, dated November 19, 1889.

Application filed May 6, 1889. Serial No. 309,811. (No model.)

To all whom it may concern:

Be it known that I, EDWARD FALES, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented new and useful Improvements in the Method of Burning Coal and other Fuel in Steam-Boilers and other Furnaces; and I do hereby declare the following to be a full, clear, and exact description of said invention, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My invention relates to a new and useful method of burning coal and other fuel in furnaces for steam-boilers and other purposes.

The class of furnaces to which my invention applies is known as the "magazine-furnaces," in which the green fuel is fed down on and into the bed of incandescent fuel by gravitation, and my invention embraces the method hereinafter described of burning and feeding the fuel to the combustion-point in this class of furnaces, which consists in storing and feeding the fuel in a vertical chamber supported by a bed or pile of ashes in the bottom of the furnace, igniting the fuel at a point above the ashes and below the green coal, and in drawing off the products of combustion and supplying the air which supports combustion at right angles to the vertical body of coal in the upper portion or magazine of the furnace.

My invention consists, further, in the method of feeding the green fuel to the point of combustion by supporting the green fuel and the incandescent fuel on a bed of ashes and feeding the fuel down by gravity to the point where it is consumed by removing the ashes from the lower end of the furnace or from the bottom of the ash-pit.

In an application filed by me of even date herewith, Serial No. 309,812, I have claimed the apparatus.

Referring to the drawings, Figure 1 is a front view of my improved furnace with the door removed. Fig. 2 is a vertical sectional view. Fig. 3 is a horizontal sectional view taken on the line *xx* of Fig. 1. Fig. 4 is a perspective view of the door.

A indicates the upper portion of the furnace, secured to or cast with the ash-recep-

tacle or base B, said base being of greater width than the upper portion to catch and retain a considerable quantity of ashes, for a purpose which will be more fully described hereinafter. The upper portion A is made tapering down to the bottom of the side openings, so that it is slightly wider and thicker at this point than at the top, in order that the fuel which is fed in at the top, similar to magazine-furnaces, will more readily descend to the point where combustion takes place. The main body A is, by preference, about four inches thick—i. e., from front wall to back wall—and may be of any desired width to meet the requirements of the case. The object of making the main body of the furnace so thin is to present a comparatively thin sheet or body of incandescent fuel between the openings C and N, so that the air will pass readily through the same and produce a complete combustion of the fuel. The front portion of the main body A is provided with an opening C, in which are placed a series of bars D, which prevents the incandescent fuel from falling out and allows the air to pass freely through the incandescent bed of coal into the main body of the furnace. Spaces A' are left at the bottoms of the openings, so as to allow the ashes which come through the bars to fall down into the ash-pit, and should any of the ashes fall over on the ledges or flanges which surround the openings they can be readily pushed off through the spaces A'.

E is a metallic flange, narrower at the top than at the bottom, and is designed to fit in a groove *a*, formed on the under side of the door F, said groove being partially packed with asbestos or other soft fire-proof material, so as to form a tight joint and prevent the air from entering the combustion-chamber when so desired.

At each end of the door F are secured rods or bars H, which are bent outward at right angles at their upper ends to engage with hooks *i*, secured to the main body, and by which the door is held or supported.

K indicates the handle, secured to the outside of the door, and is provided with an extension L to engage the teeth on the pivoted bar M, so as to support the door at any desired point when it is desired to regulate the

amount of air admitted to the fuel to insure a greater or less amount of combustible energy. The rear portion of the body A is also provided with an opening N, somewhat shorter
5 than the opening C, said opening being also provided with bars or rods *d* to prevent the fuel from falling out, and also to allow the hot air and flame to pass therethrough.

O is a pipe or flue surrounding the opening N, and projects into the space or chamber C' under the boiler D', so as to carry the flame thereto to generate the steam, a wall of masonry E' being built up under the flue O.

It will be noticed that the furnace has no
15 grate or grate-bars for the vertical support of the fuel, but that the fuel is supported by the bank of ashes F', which lies below the openings C and N, and that when it is desired to feed fresh fuel down in front of the
20 openings to bring it into the proper position to be burned all that is necessary to be done is to remove a portion of the ashes from the bottom of the main body or ash-pit, when the coal will descend a distance corresponding
25 to the amount of ashes removed. The front portion of the ash pan or pit is closed by a cover P, so as to conceal the ashes from view, no other function being performed by it, for the reason that the ashes are so firmly packed
30 in the lower portion of the furnace that no air can pass therethrough, so that the cover does not form a factor in admitting air to the fire or combustion chamber. As before stated, the opening C is longer than the opening N,
35 and as a consequence the bars are longer in the opening C than in the opening N, so that the incandescent fuel will be above the bars in the opening N, and that the gases will have to travel downwardly through the

incandescent fuel and are consumed. It will
40 also be noticed that the air for supporting combustion passes through the incandescent fuel, and that the fuel is fed down by gravity from the upper part or magazine of the furnace, so that the heat under the boilers al-
45 ways remains the same, and no cold drafts of air are admitted, as is the case where doors have to be opened to admit the fuel. It will also be observed that the incandescent fuel
50 being presented in a comparatively thin body, allows a greater amount of air to pass through or be mingled with the gases of the fuel, and that a more perfect combustion takes place
55 in this furnace than in furnaces where the air has to pass through a larger body of incandescent fuel. The top of the furnace is closed with a lid or other suitable device.

What I claim is—

The method herein described of burning fuel in furnaces for steam-boilers and other
60 purposes, which consists in storing and feeding the fuel in a vertical chamber having grated side openings, supporting from lateral displacement the burning fuel and the fuel
65 to be burned on a bed or bank of ashes in the lower portion of the furnace, igniting the fuel lying between the grated side openings, and drawing off the products of combustion and supplying the air which supports com-
70 bustion at right angles to the vertical body of the furnace, as set forth.

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

EDWARD FALES.

Witnesses:

L. W. SINSABAUGH,
H. M. STERLING.