

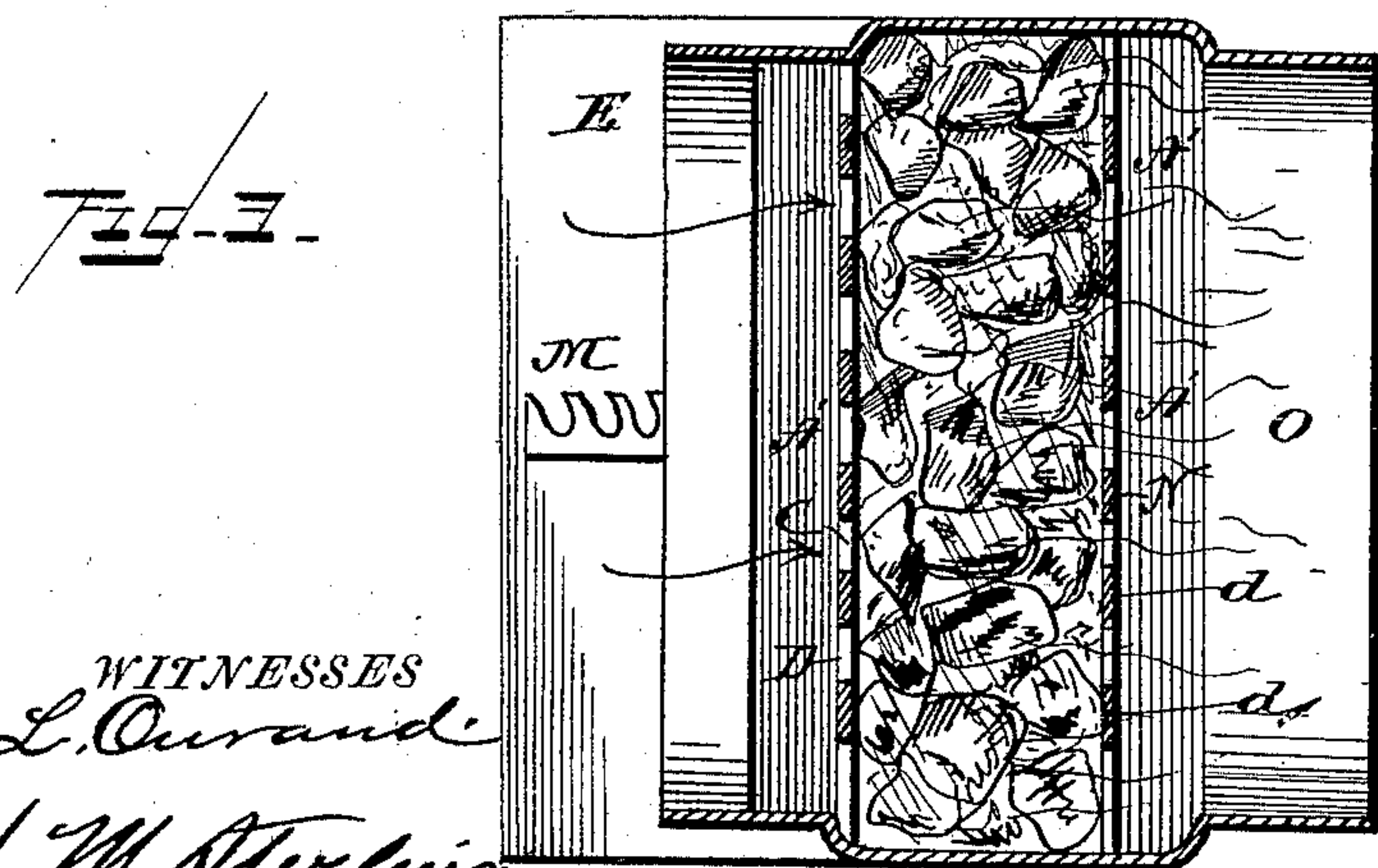
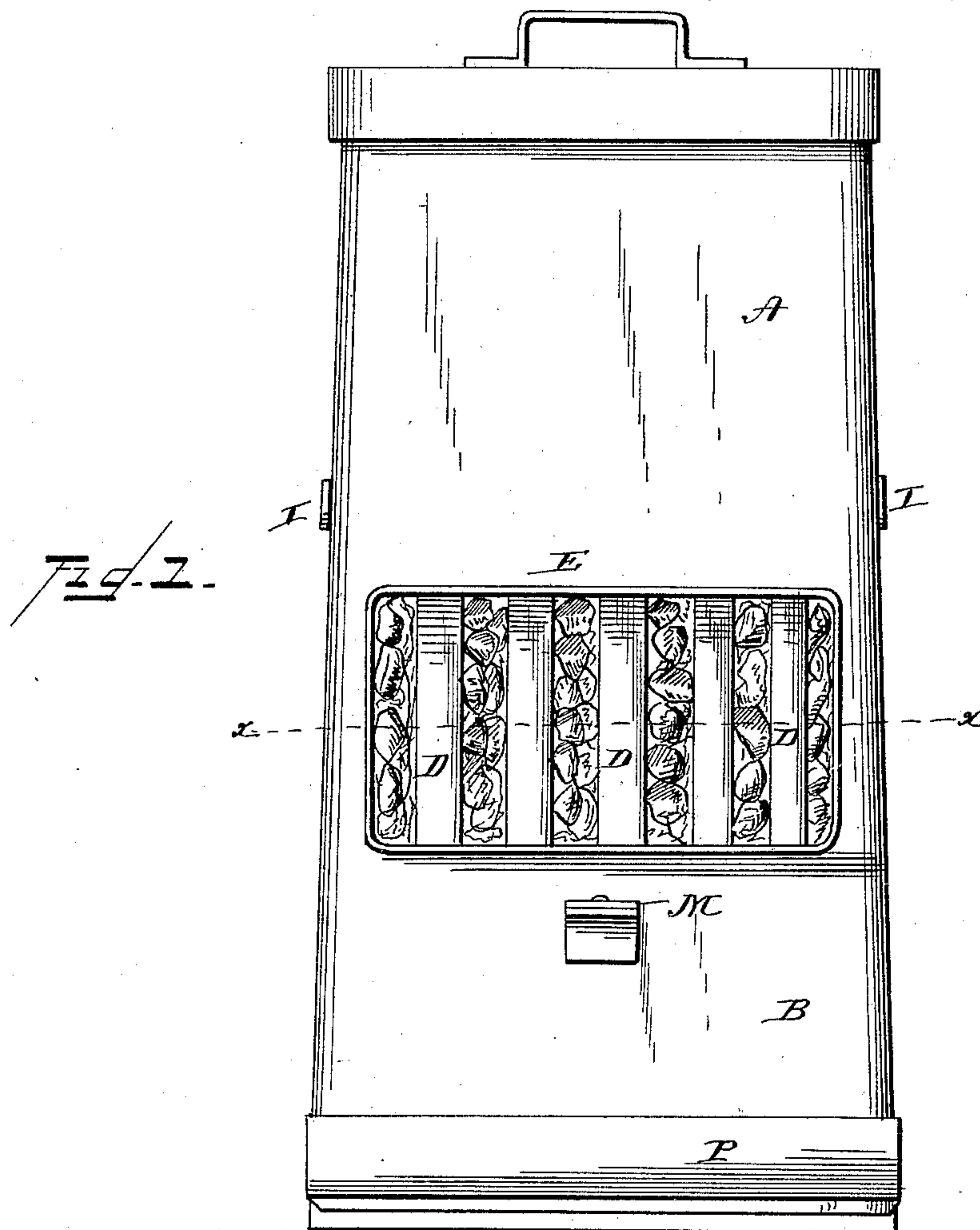
(No Model.)

2 Sheets—Sheet 1.

E. FALES.
FURNACE FOR STEAM BOILERS.

No. 415,627.

Patented Nov. 19, 1889.



WITNESSES
A. L. Curand
H. M. Sterling

INVENTOR
Edward Fales
E. J. Gussabauer
Attorney

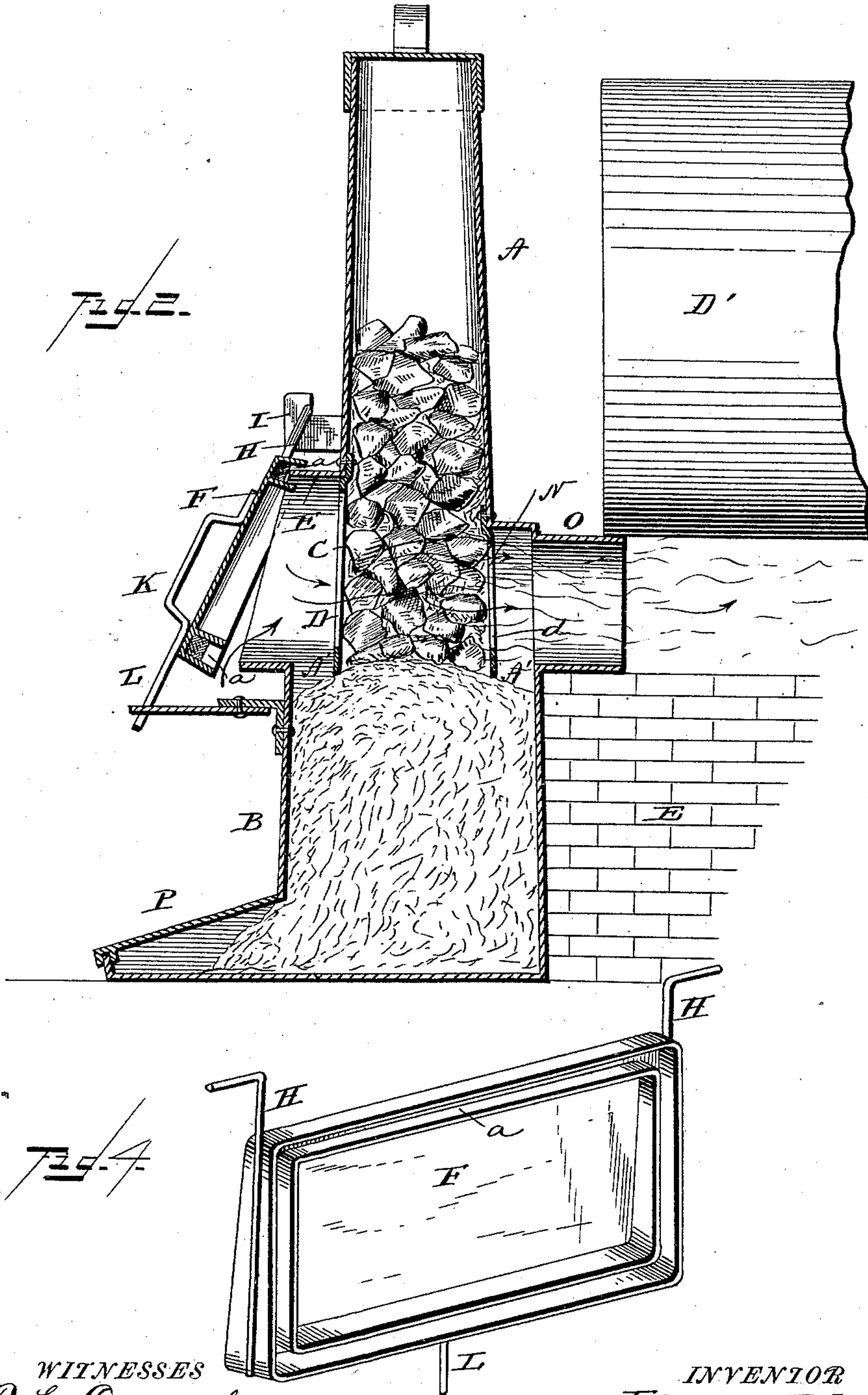
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S. M. Gensbach
Attorney

UNITED STATES PATENT OFFICE.

EDWARD FALES, OF PHILADELPHIA, PENNSYLVANIA.

FURNACE FOR STEAM-BOILERS.

SPECIFICATION forming part of Letters Patent No. 415,627, dated November 19, 1889.

Application filed May 6, 1889. Serial No. 309,812. (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 Furnaces for Steam-Boilers and other Purposes; 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 or figures of reference marked thereon, which form a part of this specification.

My invention relates to a new furnace or burner for steam-boilers and other purposes.

The object of my invention is to provide a device for burning coal and other fuel, which will be simple in its parts and at the same time effect a complete combustion of the gases and smoke.

My invention consists of a grateless furnace in which the fuel is fed by gravity, the incandescent mass of fuel resting on the ashes in the lower part of the furnace, and the air for supporting combustion being passed into and through the incandescent fuel and furnace in a horizontal direction, or in a direction at right angles to the vertical length of the furnace.

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 of the door.

A indicates the upper portion of the furnace secured to or cast with the ash receptacle 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, being 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 the 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 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 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 openings
 5 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, when the coal will descend a distance corresponding to the amount
 10 of ashes removed.

The front portion of the ash-pan 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
 15 packed 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.

As before stated, the opening C is longer in
 20 a vertical direction than the opening N, 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 so that the gases will have
 25 to travel downwardly through the incandescent fuel and are consumed. It will also be noticed that the air for supporting combustion passes through the incandescent fuel, and that the fuel is fed down by gravity from
 30 the upper part or magazine of the furnace, so that the heat under the boilers always 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
 35 observed that the incandescent fuel 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
 40 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, and desire to secure by Letters Patent, is—

1. A grateless furnace for steam-boilers and other purposes, consisting of a vertical chamber in which the fuel being burned is supported by a bed of ashes in the lower portion
 50 of the vertical chamber, as set forth.

2. A grateless furnace for steam-boilers and other purposes, consisting of a vertical chamber in which the fuel being burned and the fuel to be burned is supported by a bed of
 55 ashes in the lower portion of the vertical chamber.

3. A grateless furnace for steam-boilers, consisting of a vertical chamber in which the fuel is fed by gravity, the air to support
 60 combustion being admitted at right angles to the travel of the fuel through an opening in the side of a vertical chamber, as set forth.

4. In a gravity-feeding furnace for steam-boilers and other purposes, the main body A,
 65 provided with the grated openings in the front and rear sides thereof, one of said openings communicating with the space below the boilers, and the other being provided with an adjustable door for regulating the amount of
 70 air admitted to the fire.

5. In a gravity-feeding furnace, the main body A, provided with the openings in the front and rear sides thereof, the front opening being vertically longer than the rear
 75 opening, as and for the purpose set forth.

6. In a furnace of the character described, the grated openings in the vertical walls thereof, in combination with the spaces A outside of the grated openings, whereby the
 80 ashes falling through the side bars will pass down into the ash-chamber.

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

EDWARD FALES.

Witnesses:

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