(No Model.)

J. FLANNERY.

FURNACE.

No. 270,773. Patented Jan. 16, 1883.

Fig. 1.

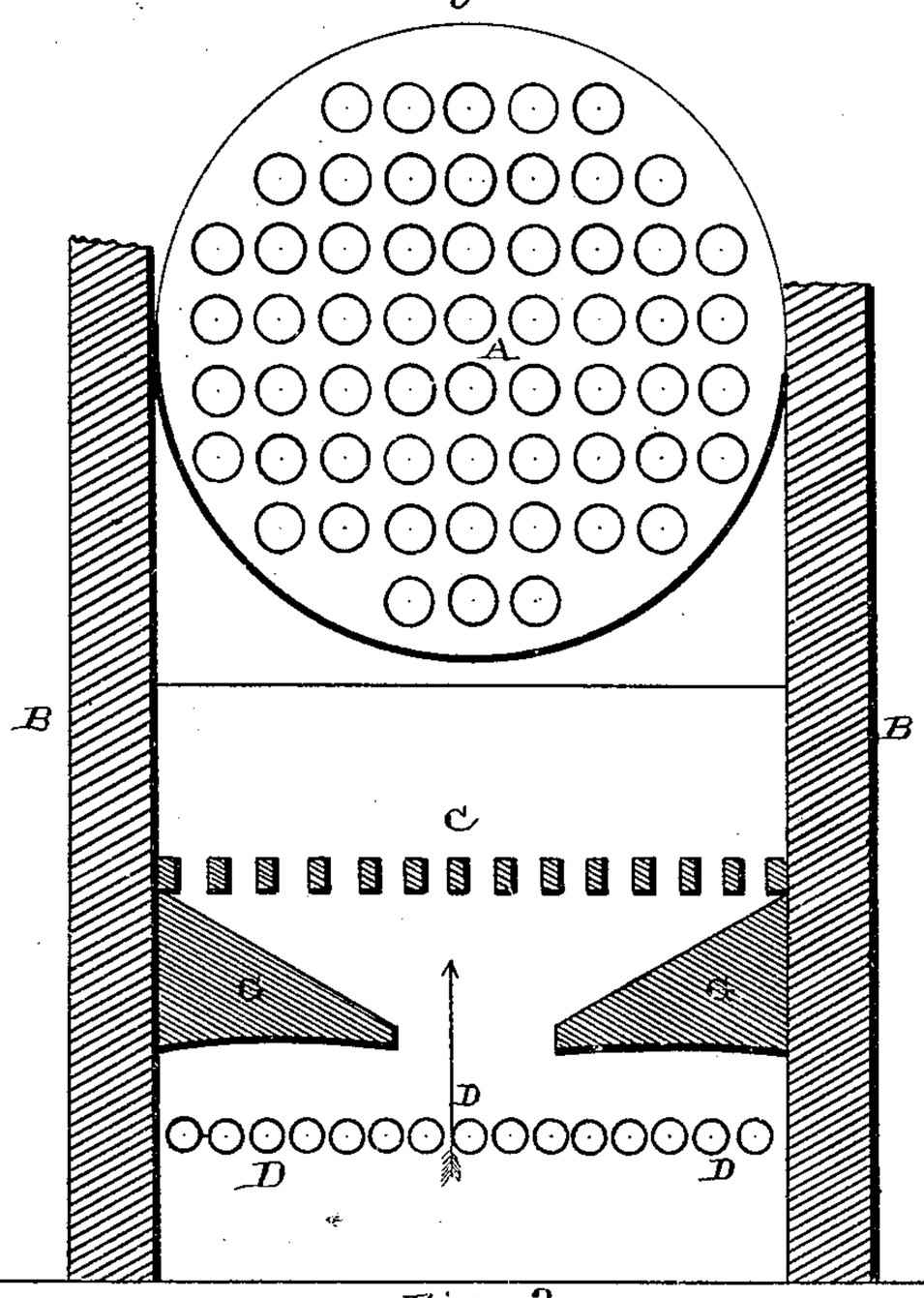
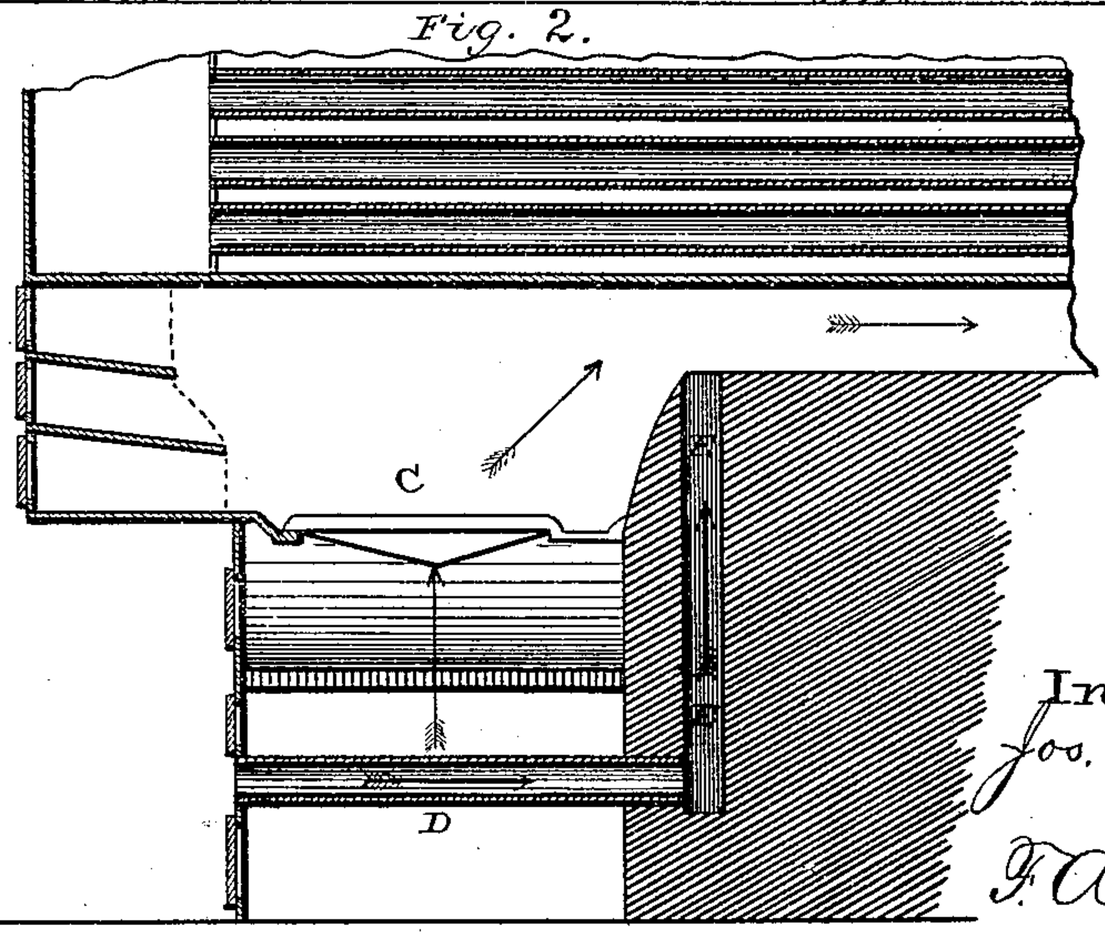


Fig. 2.



Witnesses.
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UNITED STATES PATENT OFFICE.

JOSEPH FLANNERY, OF PHILADELPHIA, PENNSYLVANIA.

FURNACE.

SPECIFICATION forming part of Letters Patent No. 270,773, dated January 16, 1883.

Application filed July 24, 1882. (No model.)

To all whom it may concern:

Be it known that I, JOS. FLANNERY, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Furnaces; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to an improvement in steam and other furnaces; and it consists in the combination of an upper set of grate-bars, upon which the main fire is made, a lower set, which is made of tubes and connected at their inner ends with an air-chamber, into which the heated air passes, and arches which extend toward each other from opposite sides, so as to lessen the air-passage between the two sets of grates, as will be more fully described hereinafter.

The object of my invention is to place a smaller grate below the ordinary one for the purpose of catching all of the droppings from the main fire, and then causing all of the air which is to support combustion upon the upper grate to pass through or over the fire and the hot cinders which have accumulated upon the lower grate, and thus heat all of the air that is fed to the main fire.

Figure 1 is a vertical cross-section of a steam-boiler to which my invention has been applied. Fig. 2 is a horizontal vertical section of the same.

A represents an ordinary tubular boiler, and B the brick-work in which the boiler is set. Under the front end of this boiler is made, in the usual manner, a furnace, C, and at any suitable distance below this main furnace is formed a smaller one, D, which is preferably made of pipes, through which air will pass to the chamber E, formed in the breech-wall, and from which chamber it will mingle with the products of combustion. This lower set of grate-bars is smaller than the upper one, and upon this smaller set will drop all of the ashes and cinders caused by raking or stoking the upper fire. These hot ashes and cinders cover these hollow bars, so that all of the air which is fed to the upper furnace must pass either directly through or over the hot ashes and cinders, so as to become thoroughly heated before it reaches the upper furnace. In between the two sets of grate-bars will be formed the inclined walls or arches G, which will serve to narrow the passage through which the heated air is to pass, and thus cause a hot blast to be formed. This hot blast serves to greatly auxiliarate combustion, and to produce a much more intense heat than can be done where the air is allowed to flow in through the ash-pit in the ordinary manner. The air may either flow quietly through the grate-bars, or it may be forced in any suitable manner so as to create a draft of any desired force. As the ashes and hot cinders fall from the upper grate they will be guided by the arches so as to drop along the center of the lower grate, where they may be allowed to remain either in a solid pile, or may be scattered over the entire top of the grate. By thus passing the air over or through the accumulations of the upper fire not only is an absolutely smokeless fire produced, but a great economy in the cost of fuel is obtained. By this construction a hot blast is obtained in its simplest form and at the least possible cost.

This invention is equally adapted to heat stoves and furnaces of different kinds.

The invention is here shown in connection with a steam-boiler as simply a means of illustrating one of its uses; but it need not be confined to a steam-boiler alone.

The grate-bars of the upper grate will be made of fire-clay, which are braced or strengthened by an iron rod or tube which runs through each bar, or they may be formed of water-tubes, as may be preferred. I do not limit myself to the construction of these bars, as they will be constructed in any way which will best answer the purpose.

Having thus described my invention, I claim—

In a furnace, the combination of the upper grate, C, lower grate, D, made of tubes, and having their inner ends connected with the air-chamber E, and the intervening arches G, for contracting the air-passage between the two sets of grates, substantially as shown.

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

JOSEPH FLANNERY.

Witnesses:
F. A. LEHMANN,
W. H. KERN.