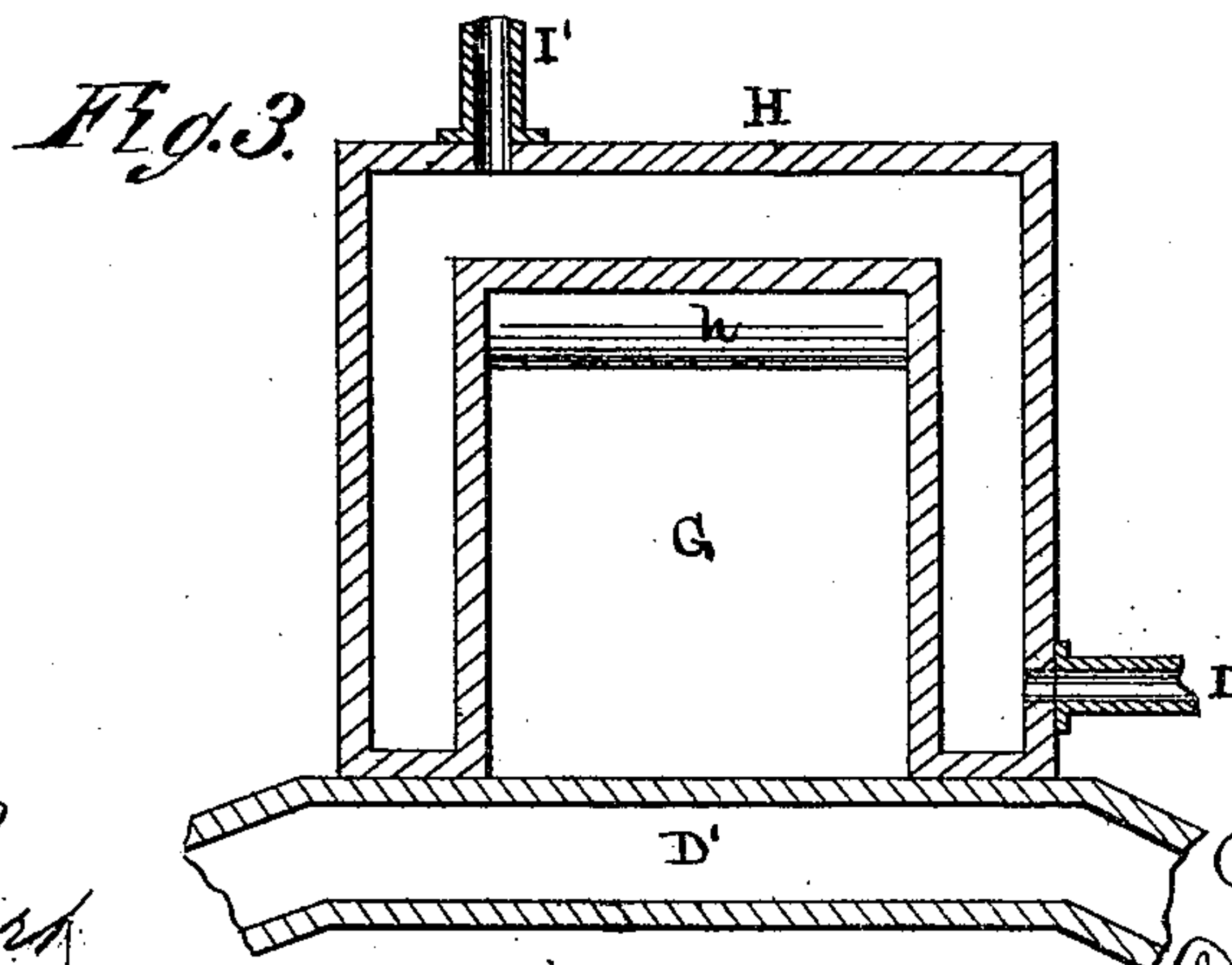
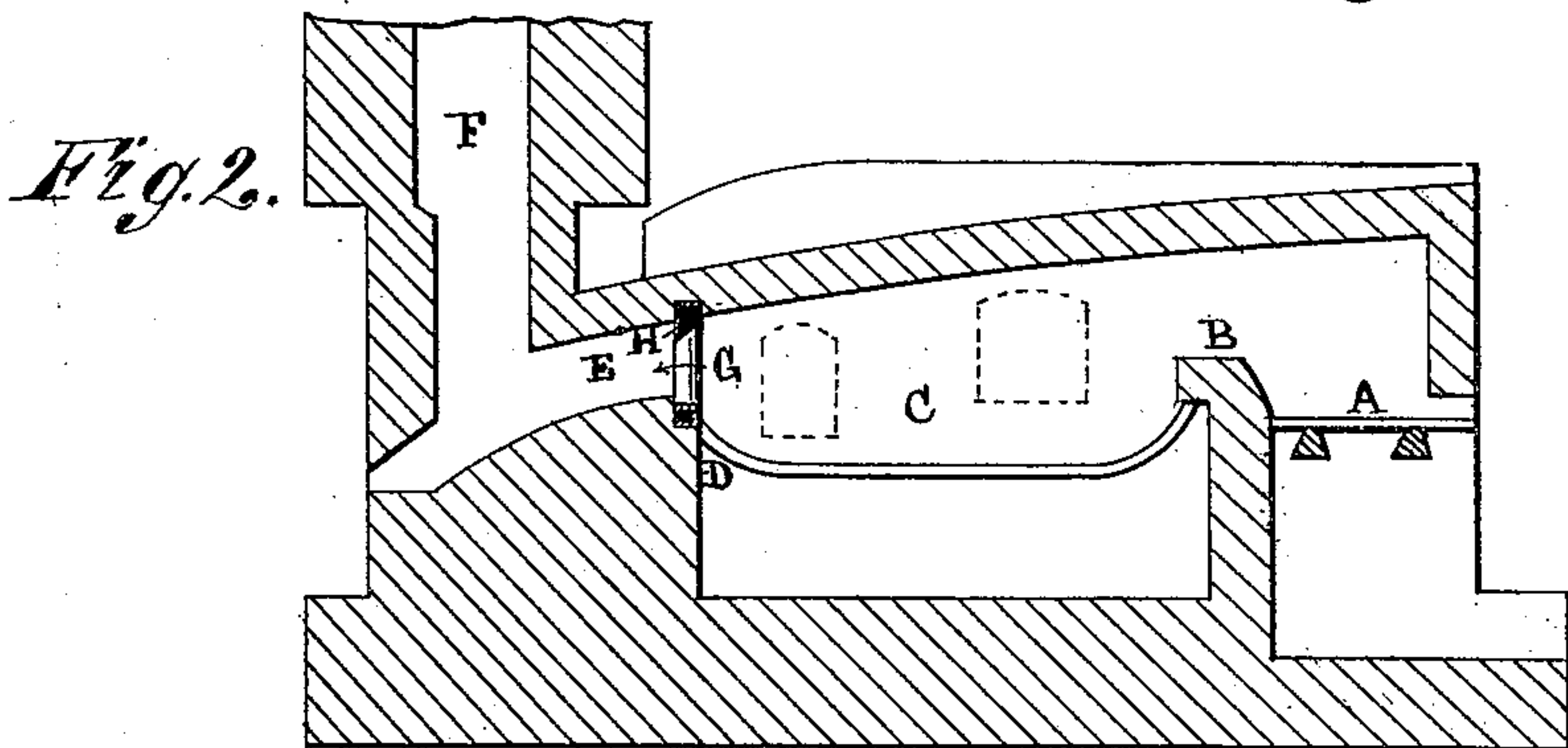
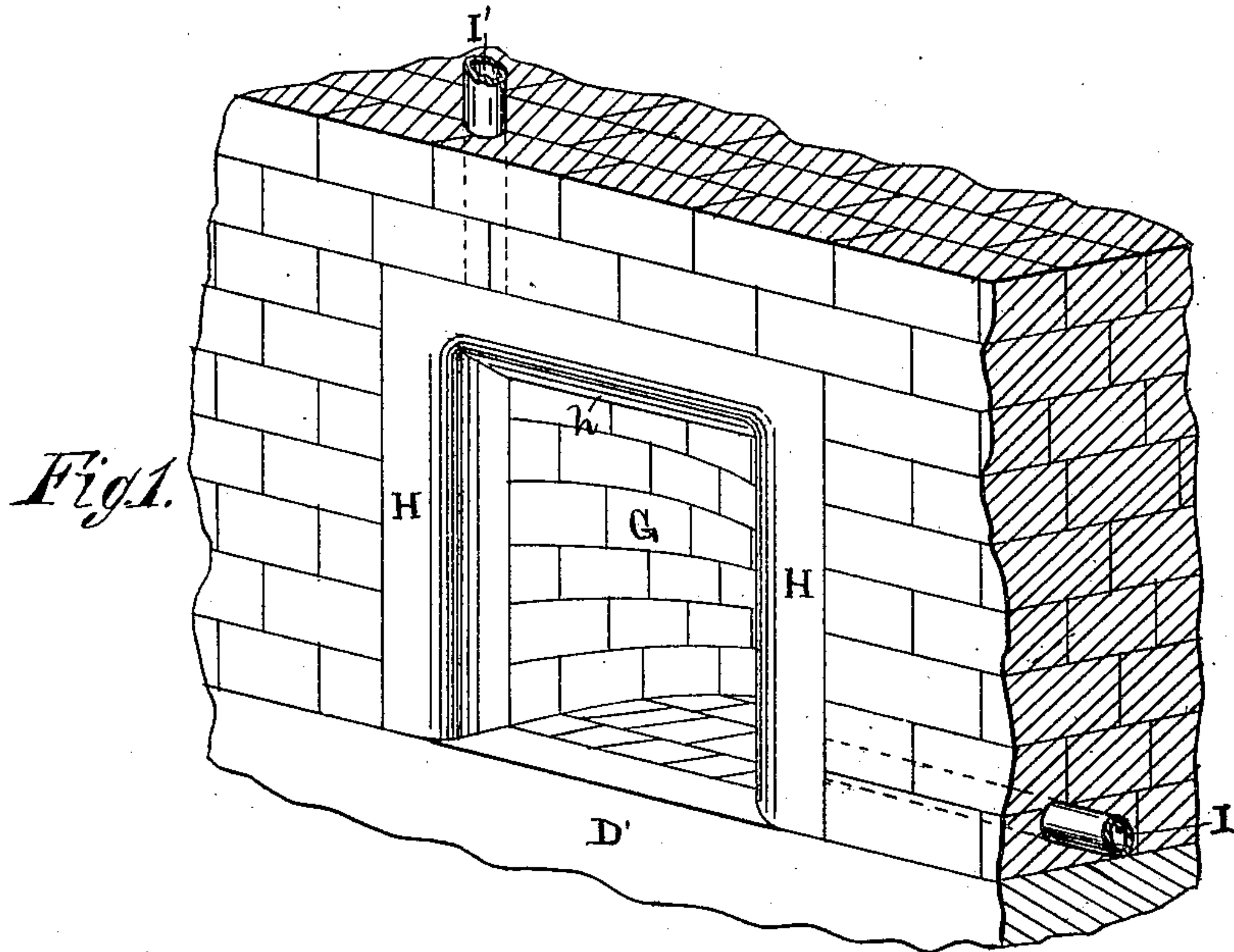


T. DAVIS & W. ROBERTS.

WATER-CHILLS FOR PUDDLING FURNACE-THROATS.

No. 178,513.

Patented June 13, 1876.



Witnesses.
D. G. Stuart
J. Hannay

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William Roberts
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Att'y

UNITED STATES PATENT OFFICE.

THOMAS DAVIS AND WILLIAM ROBERTS, OF SHARON, PENNSYLVANIA.

IMPROVEMENT IN WATER-CHILLS FOR PUDDLING-FURNACE THROATS.

Specification forming part of Letters Patent No. 178,513, dated June 13, 1876; application filed November 11, 1875.

To all whom it may concern:

Be it known that we, THOMAS DAVIS and WILLIAM ROBERTS, of Sharon, in the county of Mercer, and State of Pennsylvania, have invented certain new and useful Improvements in Water-Chills for Puddling-Furnaces; and we do hereby declare that the following is a full, clear, and exact description thereof, 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, and to the letters of reference marked thereon, which form a part of this specification.

Our invention relates to improvements in furnaces for puddling and heating iron, and other like purposes—more particularly to that part of the furnace technically known as the “fore part,” the part where the furnace proper joins to the neck or entrance to the flue.

Heretofore great difficulty has been experienced in the management of the draft of these furnaces, because of the gradual enlargement of the opening leading from the furnace to the flue, caused by the eating away of the brick-work at that point by the intense heat of the ignited gases which pass through it.

The object of our invention is to prevent this enlargement or change in the size of the opening, and thereby insure an even draft, or confine it to a fixed limit, which can be depended on at all times. We accomplish this by protecting the brick-work which composes the roof and walls of the furnace at this point by a hollow metallic lining or box supplied with a constantly-circulating current of cold water passing through it, to protect the metal of the box. This water-box is built into the roof and walls of the furnace, and rests upon the top of the water liner or box which protects the flue-bridge, as seen in the accompanying drawings, in which—

Figure 1 is a perspective view, showing the opening into the neck of the furnace, protected by our water box or liner. Fig. 2 is a sectional view of a puddling-furnace having our improvement. Fig. 3 is a vertical sectional view of the water-box.

Referring to the parts by letters, A represents the grate; B, the fire-bridge; C, the furnace; D, the flue-bridge; E, the neck, and F

the flue or smoke-stack of a reverberatory or puddling furnace. G is the opening, the walls of which our device is designed to protect, it being the point of connection between the furnace with the neck. H is a hollow metallic water box or liner, built into the walls of the furnace at this point, its base resting on the flue-box D'. The inner sides of the box H are beveled, as clearly shown in Fig. 1 of the drawings, and the upper inner side *h* is inclined downward from front to rear, so as to correspond with the downward pitch or inclination given to the neck of the furnace.

In this way it will be seen that no angular portion of the box H is presented to the action of the flame or ignited gases passing through the opening G. The outer and rear sides of the box may be angular in form, as these parts are not exposed to the direct action of the flame as carried through the neck by the draft. I is a water-pipe conducted through the wall of the furnace and connected with the box H; and I' is a similar pipe connected with the upper side of the box and leading through the roof of the furnace. These pipes connect with a suitable reservoir of cold water; or a stream of cold water is made to pass in through the pipe I to the interior of the box H, and from thence out through the pipe I', a continuous flow of cold water being maintained through the box H in this way, the water protecting the metal of the box from the action of the flame or ignited gases passing through the openings E.

By means of this device the size of the opening into the neck of the furnace is maintained, and, being known, the draft of the furnace can be regulated, as required, with exactness and precision—a result which it is the object of our invention to accomplish.

The size of the water box or liner will of course be varied to suit the requirements of the different furnaces to which it is applied, and the different fuels employed in such furnaces.

We are aware that water-liners have been used for protecting the boshes and other parts of furnaces, and do not, therefore, claim the principle or method of protecting the walls of a furnace by this means.

What we do claim as our invention, and desire to secure by Letters Patent, is—

A water-liner for puddling-furnace throats, consisting of the hollow rectangular metallic box H, provided with ingress and egress pipes I I', and arranged transversely to and internally encompassing the exit of the puddling-chamber, whereby the destructive widening of the throat is prevented, substantially as and in the manner set forth.

In testimony that we claim the foregoing as our own, we affix our signatures in presence of two witnesses.

THOMAS DAVIS.
WM. ROBERTS.

Witnesses:

ABNER APPLEGATE,
N. P. BRYDEN.