

H. H. HOFF.  
Forge.

No. 198,387.

Patented Dec. 18, 1877.

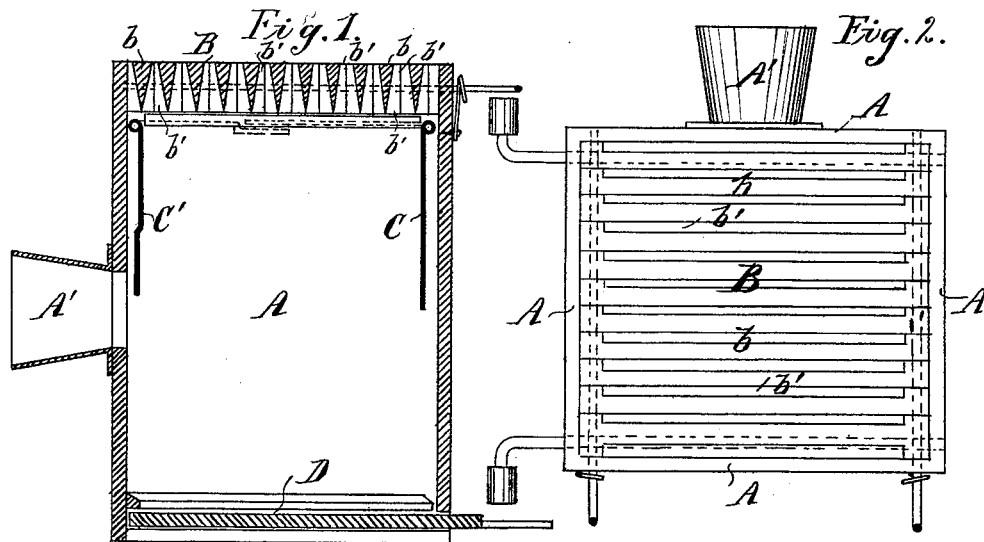


Fig. 3.

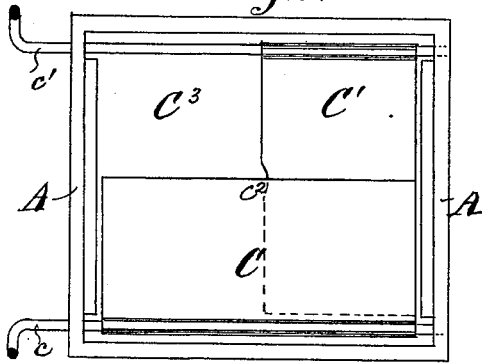


Fig. 5.

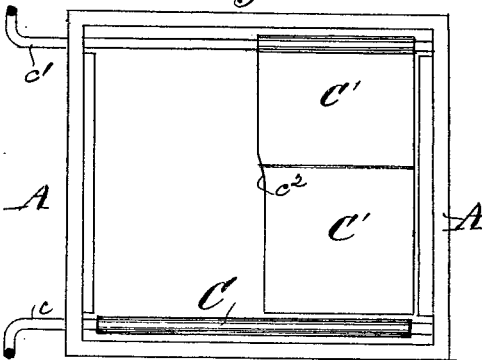


Fig. 4.

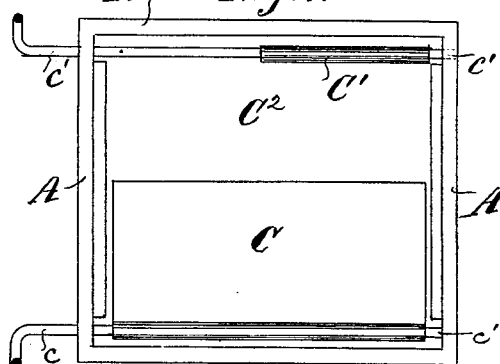
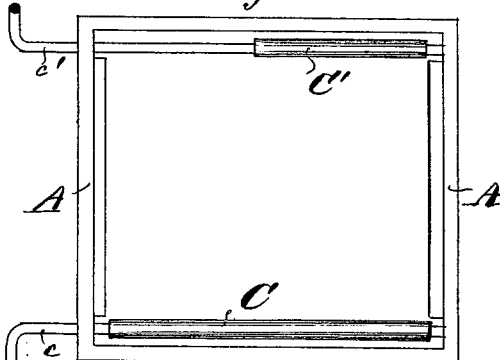


Fig. 6.



Witnesses;  
J. H. Herthel.  
Chas Herthel

Inventor;  
Hans Heinrich Hoff  
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# UNITED STATES PATENT OFFICE.

HANS H. HOFF, OF ST. LOUIS, MISSOURI, ASSIGNOR TO HIMSELF AND DANIEL J. DONOVAN, OF SAME PLACE.

## IMPROVEMENT IN FORGES.

Specification forming part of Letters Patent No. **198,387**, dated December 18, 1877; application filed June 6, 1877.

*To all whom it may concern:*

Be it known that I, HANS HINRICH HOFF, of St. Louis, in the county of St. Louis and State of Missouri, have invented an Improvement in Smiths' Forges, of which the following is a specification:

This invention will first be fully described, and hereinafter pointed out in the claim.

Of the drawings, Figure 1 is a sectional elevation. Fig. 2 is a top plan. Figs. 3, 4, 5, 6 are, respectively, top plans, showing different positions the dampers can be made to assume, for the purpose hereinafter to appear.

A represents an ordinary tuyere-box, which is built in the wall that exists in front of the chimney. This box is to receive the air-blast, hence has the tuyere-pipe A' connected thereto, (see Fig. 1,) and to said tuyere-pipe the blast is connected as usual.

My improved features are as follows: I provide the top of the tuyere-box with a detachable grate, B. This grate is composed of bars *b*, having the intervening openings or spaces *b'* between each bar. (See Figs. 1 and 2.) It is on the top of the grate B that the fire is built, the blast being fed to the fire by passing through the open spaces *b'*. Further, in order that the blast can pass through the grate-openings *b'* with the least resistance, I form the bottom edge of each bar *b* with beveled sides, presenting the V-edge shown in Fig. 1. This feature lessens the power required to work the blast, and the blast can be continued with the greater force.

The grate-bars can be made sectional; if so, they will be strung alongside of each other on the rods or side pieces, the ends of which engage the top of the box A; otherwise, as apparent, the grate B can be cast in one piece.

My further improvements relate to the dampers, that enable me to control the blast to the fire and the locality for the fire.

C C' are the dampers. Each consists of a plate, one side of which is lapped rigidly round a turn-rod, *c c'*, the outer end of which extends without and within the operator's reach, while the inner end turns in one side of the tuyere-box. (See figures.) The damper C closes, say, one-half of the area, in a horizontal direction,

of the opening presented by the tuyere-box. (See Figs. 3 and 4.) The damper C' extends at right angles to that of the damper C, and in area covers, say, one-half of the opening of the tuyere-box, but in a transverse direction to that of C. (See Figs. 3 and 5.) By this manner of arranging the dampers, each can be manipulated to control the blast, and to create a different opening for the blast, and a different location for the fire. Thus, the different positions and functions accomplished by manipulating the dampers is illustrated in Figs. 1, 3, 4, 5, 6. In Figs. 1 and 6 both dampers are dropped or hang down the opposite sides of the tuyere-box. The entire grate-surface is therefore presented to the action of the blast, and said entire surface can be used for the fire.

In Fig. 4 the damper C is raised horizontal, while that of C' remains vertical. By this position of the dampers, C closes its area to the fire and to the blast, exposing only the area C<sup>2</sup> for the position of the fire on the grate, and for that fire only the same area of blast. The fire can be shifted to occupy a still smaller space by raising the damper C' to a horizontal position, so that the area C<sup>2</sup> is reduced to the area C<sup>3</sup>, and that area utilized for the fire and exposed to the blast. (See Fig. 3.) Again, the damper C can be hung vertical, and only that of C' kept horizontal, and the fire can be shifted again, and the blast closed to all other points but that where the fire exists. In each of the different positions for the use of the fire the same force of blast is utilized. The advantages resulting from this changing of the positions of the dampers are that the fire can be used, large or small, and can be directed to the point required; also the blast, with its full force, can be directed to any change of fire, and concentrated at the point required. The fire and the blast can thus be suited to the nature of the work, resulting in an improved quality of work, retaining the greater strength and weight of metal, avoiding the contact of sulphur, fire, cinders, slag, &c., all of which results cannot be achieved by the use of the ordinary smithy.

The portion at *c<sup>2</sup>* cut away from the damper C' is to make allowance for the tuyere-open-

ing. The damper-rods can be balanced by counter-weights.

D is simply a slide to close the bottom of the tuyere-box, and which enables the bottom to be opened to remove whatever cinders, ashes, &c., accumulate in the box.

By my improvement the blast can be operated most easily, and the fire quickly kindled to a white heat, and there is also accomplished, in all respects, a saving of time, labor, and expense.

What I claim is—

The combination of the dampers C C', ar-

ranged with relation to each other, the tuyere-box A, tuyere-pipe A', the grate B, consisting of bars *b*, having open spaces *b'*, and V-edge bottoms, all said parts operating substantially as set forth.

In testimony of said invention I have hereunto set my hand.

HANS HINRICH HOFF.

Witnesses:

WILLIAM W. HERTHEL,

DANIEL J. DONOVAN.