2 Sheets—Sheet 1.

D. & J. HALL.

Puddling Furnance.

No. 50,929. Patented Nov. 14, 1865.

Fig. 2.

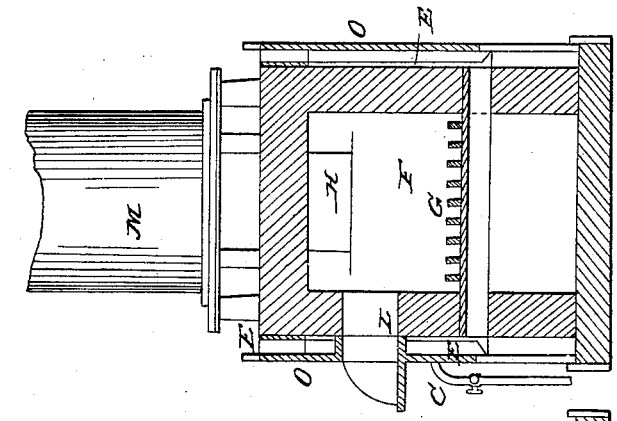
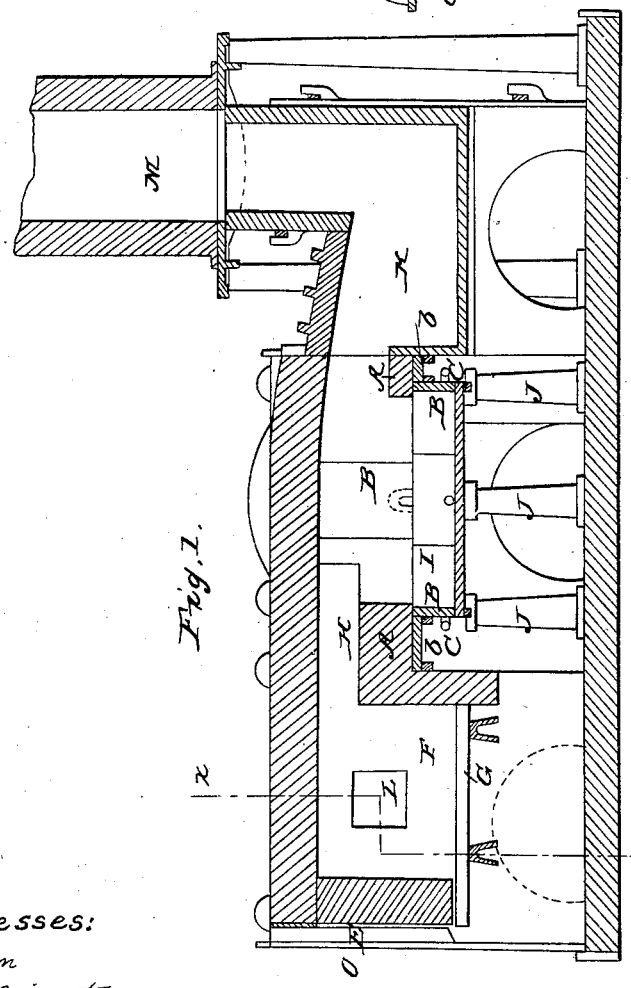


Fig. 1.



Witnesses:
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Inventor:
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2 Sheets—Sheet 2.

D. & J. HALL.

Puddling Furnance.

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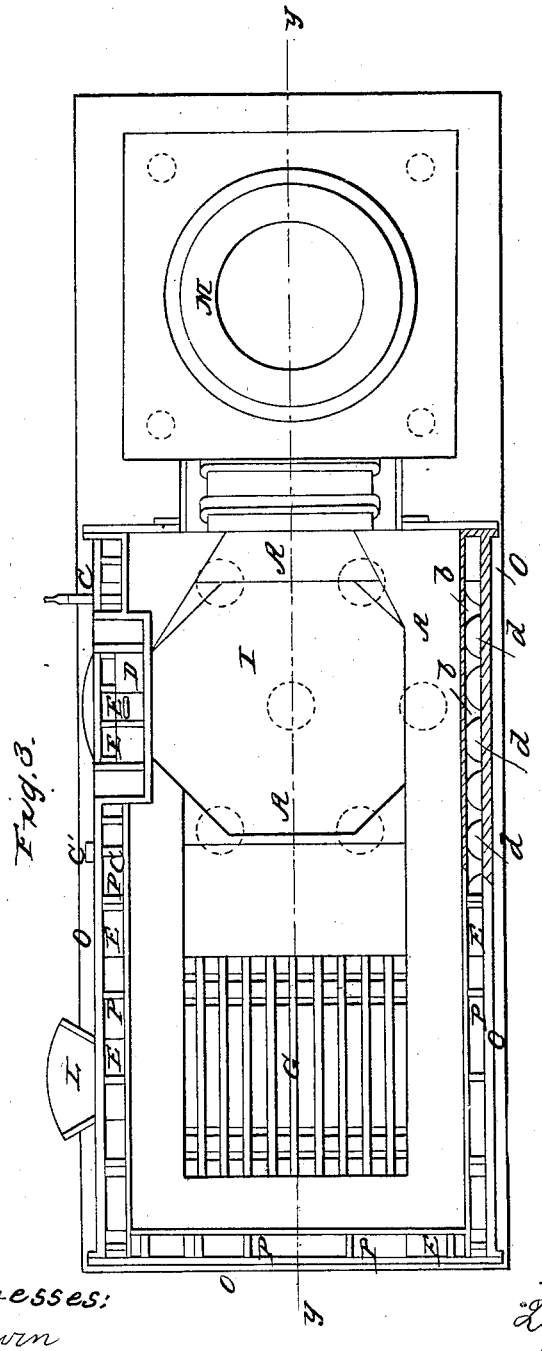

Fig. 3.

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UNITED STATES PATENT OFFICE.

DANIEL HALL AND JOSEPH HALL, OF WHEELING, WEST VIRGINIA.

IMPROVEMENT IN PUDDLING-FURNACES.

Specification forming part of Letters Patent No. **50,929**, dated November 14, 1865.

To all whom it may concern:

Be it known that we, DANIEL HALL and JOSEPH HALL, of Wheeling, in the county of Ohio and State of West Virginia, have invented a new and useful Improvement in Puddling and other 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 make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 represents a longitudinal vertical section of a furnace made according to our invention, the plane of section being seen at *y y*, Fig. 3. Fig. 2 is a cross-section on the line *x* of Fig. 1. Fig. 3 is a plan.

The object of this invention is the improvement of furnaces for boiling, puddling, and heating iron and other metals. It consists in several novel features, among which are surmounting the usual iron basin with fire-brick; also, surrounding the exterior of the basin with a perforated water-tube, from which water is ejected or thrown against the sides of the basin at the pleasure of the workman; also, forming air-flues around a furnace between the outside plates and the brick walls by making vertical ribs on the inside of the plates.

The letter I designates a puddling-furnace.

F is the fire-chamber, with grates G and a door, L.

H designates the flue which leads from the fire-chamber.

K is the flue beyond the basin, which flue leads to the stack M. The basin is properly supported on pillars J.

B designates the metallic basin, which is surmounted by brick-work A, which rests mostly upon flat metallic plates *b*.

C is a water-pipe that is led around the basin so as to encircle it on all sides except the front. Its ends project through the wall on either side of the door D, one end being fitted with a stop-cock and the other being closed by a cap, C′, which is made removable, so that the pipe may be flushed and cleaned when foul. That side of the pipe C which is adjacent to the basin is perforated to allow the water forced into the pipe to escape and be thrown against the outside of the basin for the purpose of controlling its temperature, in this office assisting the currents of air which are ordinarily made use of for the same purpose. A trough may be placed beneath the furnace to catch the water, which may be carried thence into the bosh used for cooling the tools.

The plate *b*, upon which the brick-work A above the basin rests, is carried beyond the back line of the brick wall A on the back side of the furnace up to the outer plates, O, as seen in Fig. 3, and said plate *b* has semicircular holes *d* cut in its edge to allow air from beneath the furnace to pass upward and escape. That part of the plate *b* which extends along the front side of the furnace on either side of the place of the door has like semicircular holes to allow air from beneath the furnace to escape into the flues E on the front side.

The furnace-plates O, forming the outside of the furnace, are made with vertical ribs P, projecting inwardly toward and against the brick wall for the purpose of forming air-flues, E, through which currents of air are free to pass. The arched openings in the outside plates (see Fig. 1) allow the air-flues to have free communication with the atmosphere from below, and the upper ends of the said flues are left uncovered, as seen in Figs. 2 and 3. This construction of the furnace-plates is continued along both sides of the flue K, and also on both sides of the lower part of the stock, so as to leave air spaces or flues E open both at top and bottom around the brick-work. The effect of this construction of the furnace plates is to prevent the furnace from being burned out as rapidly as they usually are under other modes of construction, the brick and the plates being both greatly protected by means of this mode of construction; and in addition to this benefit, the plates themselves are less liable to be broken, because they are stronger by reason of the ribs P. The brick-work is seen in red color in the drawings.

It will be observed that the plates are ribbed on the back side of the furnace, as well as on the other parts.

In building two furnaces we place them back to back, in that case using the same furnace-plate for the back of each, and putting vertical ribs P on each side of the plate. We are thus enabled to save one range of back furnace-

plates, and the furnaces will be equally as good as if built singly.

Furnaces built according to this mode can be erected with about half the number of fire-brick usually required, and a saving is also effected in the weight of the plates to the extent of about one-fourth of the weight usually required. Our furnace will last longer than the furnaces built according to the modes now used, and will require less fixing and repairing and will produce better iron. The frame for the door D of the furnace is set inwardly, as seen in Fig. 3, so as to bring its outside and the outer face of the door in line with the outside of the furnace-plates, in order to bring the iron chamber or basin B in range with the fire-chamber. The door D is also made with vertical air-flues between the brick and plate, such flues being made by vertical ribs on the inside face of the plate of the door on the same principle of construction as that used in the furnace-plates O.

It will be observed that the whole of the basin B, saving the part where the door-frame is placed, is surmounted by brick-work A. More than one water-tube C may be used around the basin, if desired.

We claim as new and desire to secure by Letters Patent—

1. In furnaces for boiling and puddling iron and other metals, surmounting the iron chamber or basin with fire-brick, substantially as above shown.

2. Surrounding the basins of iron-furnaces with a tube or tubes, through which water is forced against the exteriors of the basins, substantially as and for the purpose above described.

3. Placing the door-frame of the furnace inwardly, as above shown, whereby the iron chamber or basin is made to be in range with the fire-chamber, substantially as described.

4. Placing ribs, vertical or otherwise, on the inside of the inclosing or outside plates of iron-furnaces so as to form air-flues for the purpose of keeping the bricks and plates cool and for strengthening the plates and for preserving the furnace, substantially as described.

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JOSEPH HALL.

Witnesses:
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