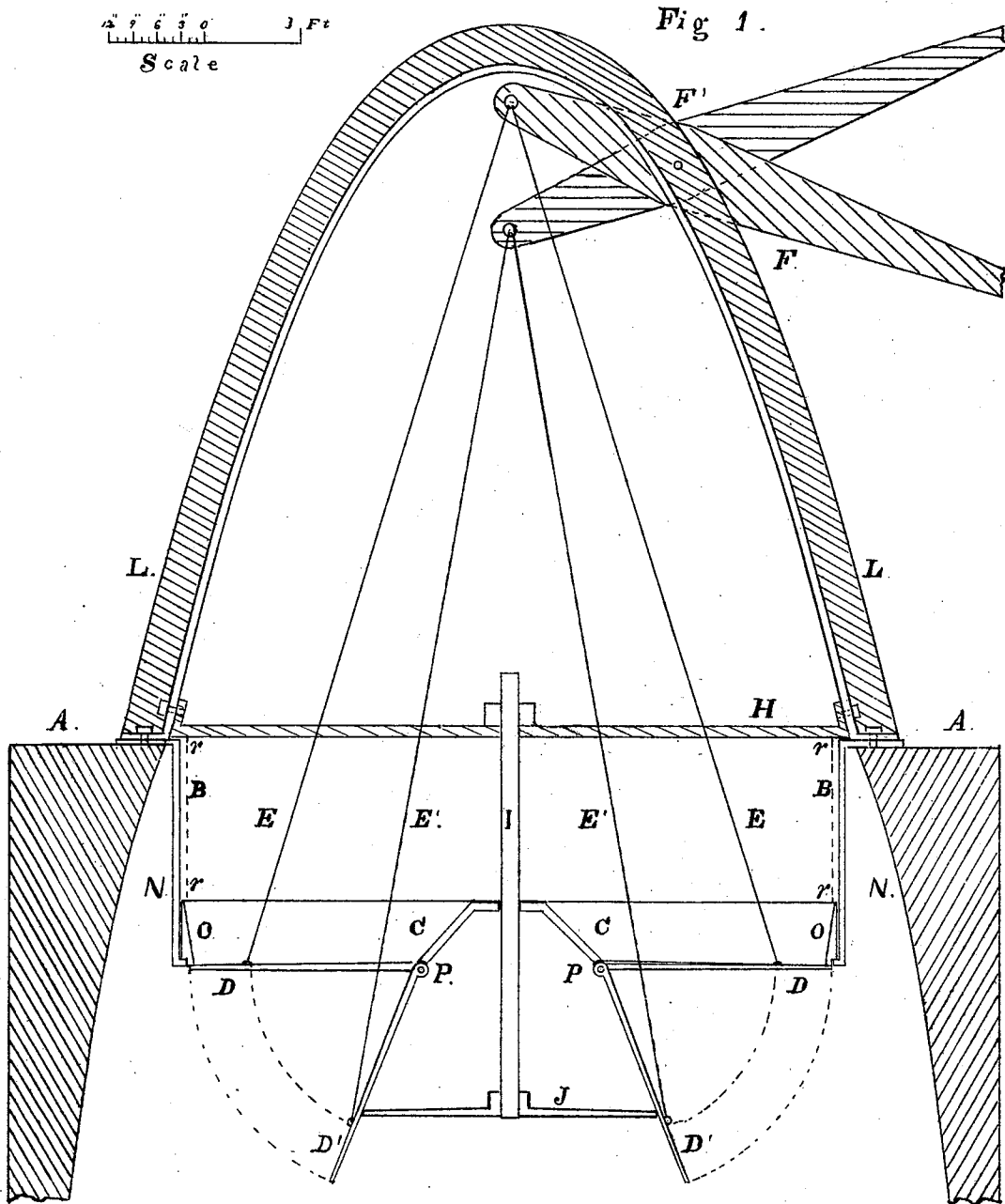


J. F. HARRIS.

Improvement in Blast-Furnaces.

No. 128,304.

Patented June 25, 1872.



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Fig 3.

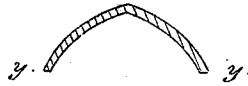


Fig 5

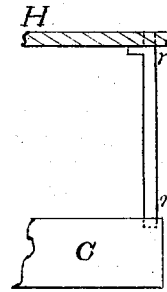


Fig 4.

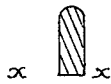
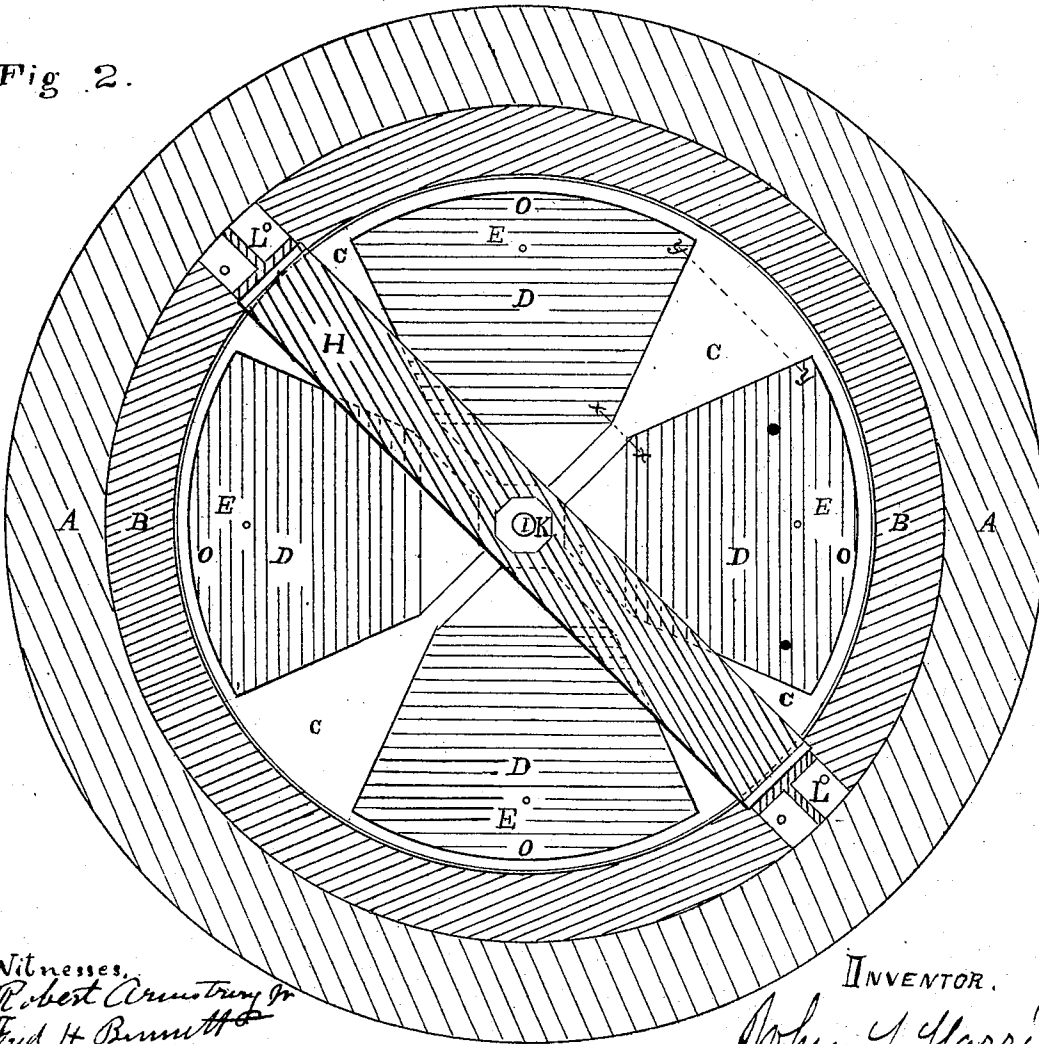


Fig 2.



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UNITED STATES PATENT OFFICE.

JOHN F. HARRIS, OF FORT EDWARD, NEW YORK.

IMPROVEMENT IN BLAST-FURNACES.

Specification forming part of Letters Patent No. 128,304, dated June 25, 1872.

Specification describing certain Improvements in Smelting or Blast Furnaces, invented by JOHN F. HARRIS, of Fort Edward, Washington county, New York.

My invention consists of, first, a spider bottom and arms, fitted with adjustable valves attached by hinges or joints to the center piece thereof, opening downward, and resting, while open, upon a circular wheel or stop; second, a circular wheel or rest, located under the valves, and governing their position, when opened, and operated by means of a piston-rod and screw attachment running through spider bottom and a cross-bar; third, an iron cylinder with a flange at top extending outward, a projection or ledge at bottom extending inward, of sufficient width to sustain spider bottom, and of sufficient size to hold a charge of stock for furnace, with a cross-bar at top, through which piston-rod passes, and with rods or screw-bolts extending downward at each end of cross-bar, for the purpose of holding spider bottom in place; fourth, an adjustable combination to be inserted in top for supplying stock to and distributing stock in smelting or blast furnaces for the manufacture of iron.

The object of my invention is to properly and uniformly distribute stock in furnaces. The result of such distribution is a great saving of fuel, giving an increased quantity of iron from a given amount of fuel used; the production of a more uniform and better quality of iron; and the better protection of the lining and walls of furnaces, by equalizing the circulation through the entire furnace and relieving the walls from the intense heat caused by the old method of supply.

Reference is hereby made to the accompanying drawing and model.

Figure 1 is an elevation of a section through the center or axis of the furnace. Fig. 2 is a plan of my improvement as applied in the top of the furnace. Fig. 3 is a cross-section of one of the arms of the spider. Fig. 4 is another cross-section of the same arm nearer the center of spider. Fig. 5 is a rod with screw to hold the spider down.

In Fig. 1, (for the purpose of showing all the parts on a scale on one view,) the valves, as seen at D D, and the lifting-rods, as seen at E E, are not in their relative position hori-

zontally, but are turned forty-five degrees from the other parts of the Fig. 1; but at Fig. 2 they are seen in their true position with the other parts.

A is the walls of a blast-furnace in the usual mode of construction. B is an iron cylinder, with its upper flange resting upon the walls of the furnace, and its lower flange or ledge projecting inward from the lower edge, on which the spider C rests. C is a spider nearly filling the inner diameter of the cylinder B, and resting on a projection at the bottom of the cylinder B. The spider has four openings for valves, as seen at D D D D, Fig. 2, and has an opening at its center through which the piston-rod I passes, and connecting segments at o. D D D D are valves, and are attached to the spider C by joints or hinges, as seen at P P. The valves are operated by the rods or chains E, and by the movement of the lever F are opened and closed. When closed they closely fit the under side of the spider C, and when open they rest on the stopper J. E are lifting-rods or chains, by which the valves are opened and closed. F is a lever for moving the rods E by a rack and pinion, or other mechanical power, as may be desired. H is a strong bar of iron crossing the center of the top of and resting on B. I is a piston-rod with a screw at the top end, fitted to the nut K, by which it is held in its place or moved up and down. It has a circular wheel, J, attached to its bottom end which acts as a stopper to the valves D. K is a nut fitted to the screw on the piston-rod I, and by turning the nut K the stopper J can be raised or lowered, as may be desired, to open the valves more or less. L is the frame supporting the lever F. N is a space between B and the walls of the furnace which is annular. O is that part of the spider C connecting the arms and filling the four spaces between the arms, and is that part of the spider on which the outer diameter of the valves touch when shut or closed. P is the joint or hinge by which the valves are attached to the spider. r r is the place or places where the rod r r is placed to prevent the spider from being lifted by the pressure of the valves. The rod r r is seen at Fig. 5.

In order to operate the distributor close the valves D D D D; fill the iron cylinder B with

the required amount of stock for a charge; drop the valves until stopped by the circular rest J. By this action the charge or contents are precipitated in furnace, and valves are immediately closed, when the same operation may be repeated. The action of the rest J directs the stock to any desired point in the furnace at the will of the operator, who controls the whole movement by the nut K.

Facilities are offered by my invention to prove by actual test the proportion, order, and proper point of discharge of stock, so as to produce the best results. By the use of the circular stopper the valves can be adjusted at an inclination of from forty-five degrees to seventy degrees or more.

My combination stock-distributor is easily adjusted to and in top of furnace, and can be easily applied to or detached from furnace while in blast. The spider bottom and its at-

tachments are so constructed that by removing the two rods holding it in place they can be easily taken out for repairs.

When valves are closed the whole adjustment prevents the escape of gas from top of furnace. The gas may be taken off for purposes of heating ovens, boilers, escape, &c., in the usual manner, by means of flues or pipes inserted through lining below top of furnace to the space back of iron cylinder N.

Claim.

The spider bottom C supplied with valves, in combination with iron cylinder B, and adjustable rest J, applied to smelting or blast furnaces, as and for the purposes set forth.

J. F. HARRIS.

Witnesses:

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FRED. H. BENNETT.