

J. H. BOYD.
Apparatus for Feeding Fuel to Ore-Reducing
Furnaces.

No. 144,185.

Patented Nov. 4, 1873.

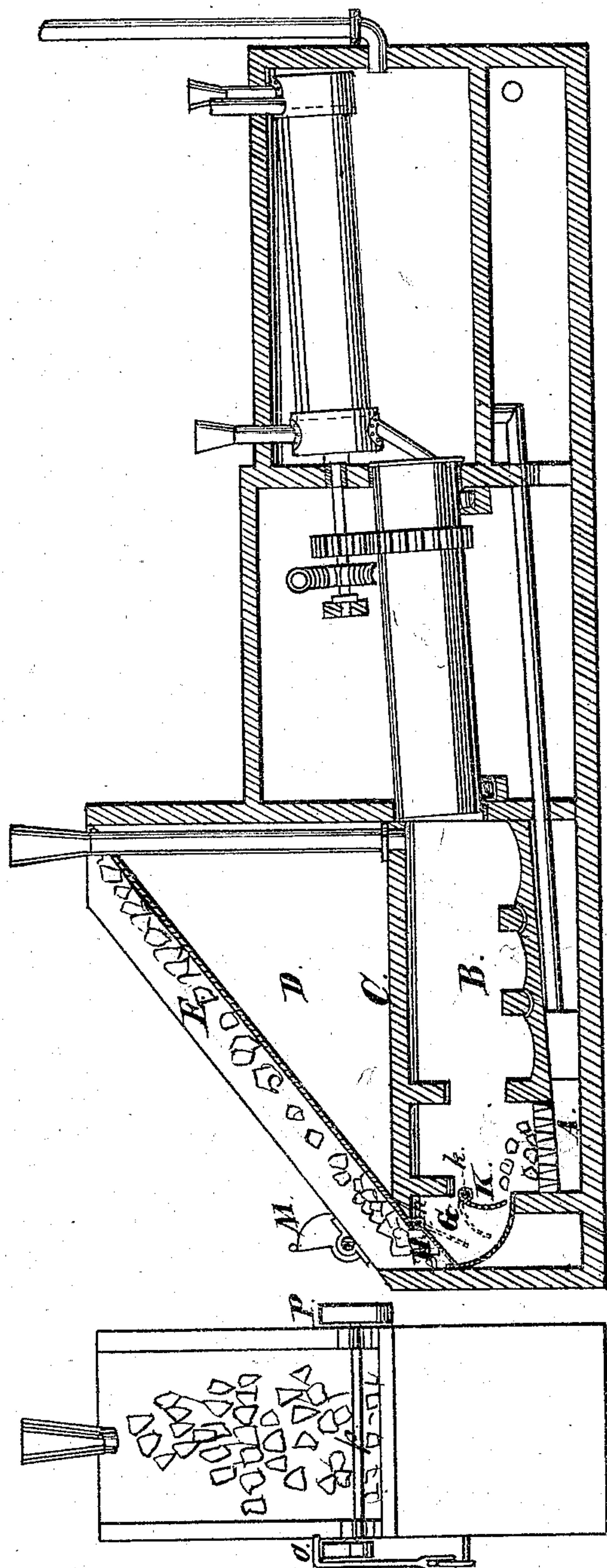


Fig. 1.

Fig. 2.

Witnesses:

Henrich L. Bruns.
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UNITED STATES PATENT OFFICE.

JAMES H. BOYD, OF CHICAGO, ILLINOIS.

IMPROVEMENT IN APPARATUS FOR FEEDING FUEL TO ORE REDUCING FURNACES.

Specification forming part of Letters Patent No. 144,185, dated November 4, 1873; application filed October 14, 1873.

CASE B.

To all whom it may concern:

Be it known that I, JAMES H. BOYD, of Chicago, in the county of Cook and State of Illinois, have invented certain Improvements in Arrangement and Mechanism for Feeding Fuel to Furnaces for Reducing Ores, of which the following is a specification:

In furnaces for reducing ores it is necessary that an intense, prolonged, and uniform heat be preserved. The fuel must, therefore, be supplied to the grate continually in small quantities, and should be always spread or cast over the fire, so as to not check the combustion. It is also desirable that the fuel be somewhat warmed and partially coked before it is fed to the grate, to save damping the fire and to prevent too great an amount of smoke in the reducing-chamber, which would hinder the operator from seeing the condition of the metal, and produce other injurious results.

The object of the present invention is such a mechanism as shall warm the fuel—partially coke it, if desired—and feed it to the grate automatically in a more favorable manner, as is believed, than has hitherto been accomplished by feeding mechanisms. And to this end the invention consists in applying to the furnace above the grate and reducing-chamber an inclined feedway heated by the waste heat which rises from the furnace, and leading down to a small chamber on a level with the grate, where is placed a trap or valve to regulate the flow of coal upon this incline, and a rocker-arm or grate suspended before the fire and fitted with curved fingers, so actuated by a proper mechanism as to swing with a sudden drop motion toward the fire at intervals, by which means the coal crowding down behind it is thrown at intervals quickly, so as to scatter it across the fire. The chamber, being in close proximity to the fire, serves as a coking-chamber to partially coke the fuel before it is cast upon the fire.

In the accompanying drawing which forms a part of this specification, Figure 1 represents a longitudinal vertical section of a reducing-furnace provided with this improved apparatus. Fig. 2 is an end view of the same from the left hand; and Fig. 3 is a rear view

of a portion of the same, showing the cam mechanism for operating the throwing-fingers.

Like letters of reference made use of in the several figures indicate like parts wherever used.

In the said drawing, A represents the fire-grate. B is the reducing-chamber. The other parts of the furnace are shown, as, for example, the roasting and desulphurizing cylinders, but it will not be necessary to describe them. Above the roof or arch C, which covers the grate and reducing-chamber, is erected a warm-air space, D, inclosed by the walls of the furnace and covered by the inclined way E, the flooring of which may preferably consist of metal. This way E leads down to and empties into a small chamber, G, which is guarded by the trap or valve H, swung to a shaft, *h*, which is fitted at the back of the furnace with a lever, *i*, and quadrant *j*, by means of which said trap may be set and held at any point closed or open, or partly open, as the case may require, thus governing the flow of the coal into the small coking-chamber G. At the gate or opening between the coking-chamber G and the grate A are swung a number of curved fingers, K, from the rock-shaft *k*. To the end of this rock-shaft *k*, upon the outside and at the rear of the furnace, is attached a crank-piece, *m*, connected with the vertical bar *u* by a joint. This vertical bar, bent at the top into the hook or L-piece O, rests upon the periphery of the spiral cam M hung upon the shaft *p*, and revolved in the direction of the arrow by the agency of the driving-pulley P.

As the cam revolves the rod *u* and crank-piece *m* are alternately lifted slowly and caused to drop with a quick motion, causing the fingers K to draw back slowly and return suddenly with a jerk, thus casting the coal in a scattering manner across the grate.

To assist the sudden return motion a weight, *w*, may be attached to the crank-piece *m*.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination and arrangement of the hot-air chamber D above the grate A, and re-

ducing-chamber B, the incline E, coking-chamber G, and a mechanism for casting the fuel from the chamber G upon the grate, substantially as specified.

2. The combination of the curved fingers K, shaft *k*, crank-piece *m*, bar *n o*, and cam M, substantially as specified.

3. The combination of the curved fingers

K, trap H, chamber G, inclined way E, and mechanism M *o n m k i j*, substantially as specified.

JAMES H. BOYD.

Witnesses:

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