

W. D. ALLEN.

Furnace for Heating Ingots, Blooms, &c.

No. 234,162.

Patented Nov. 9, 1880.

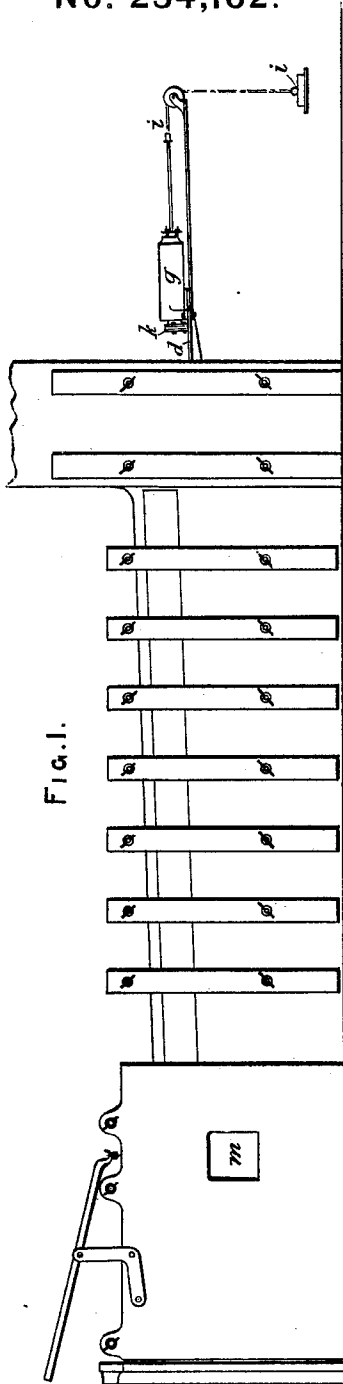


Fig. 1.

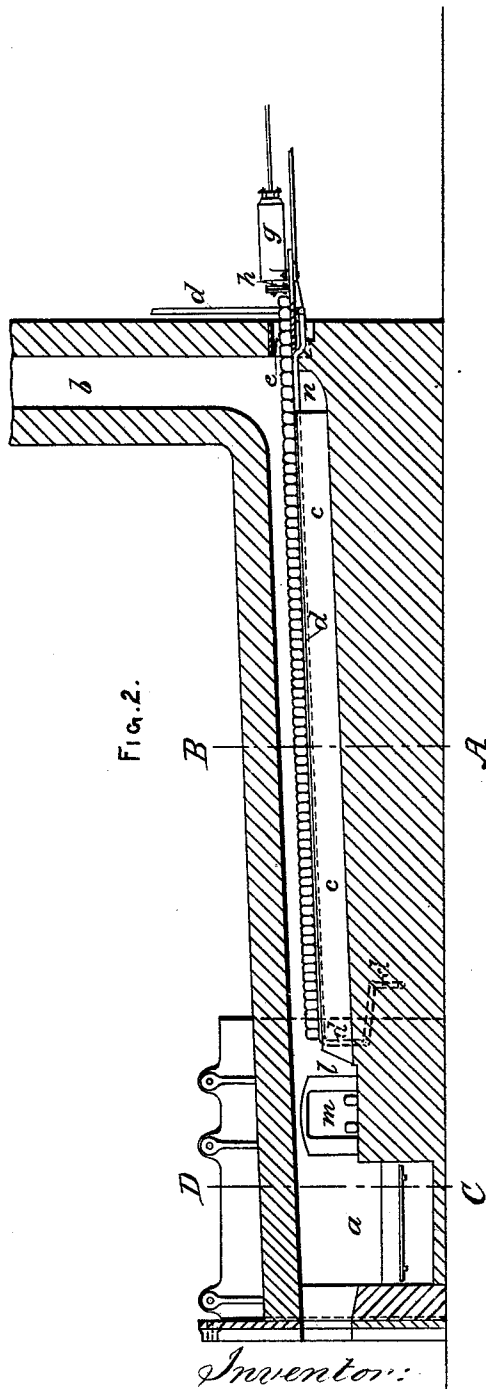


Fig. 2.

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 Charles C. Stetson

Inventor:
 W. D. Allen
 by his attorney, C. Stetson

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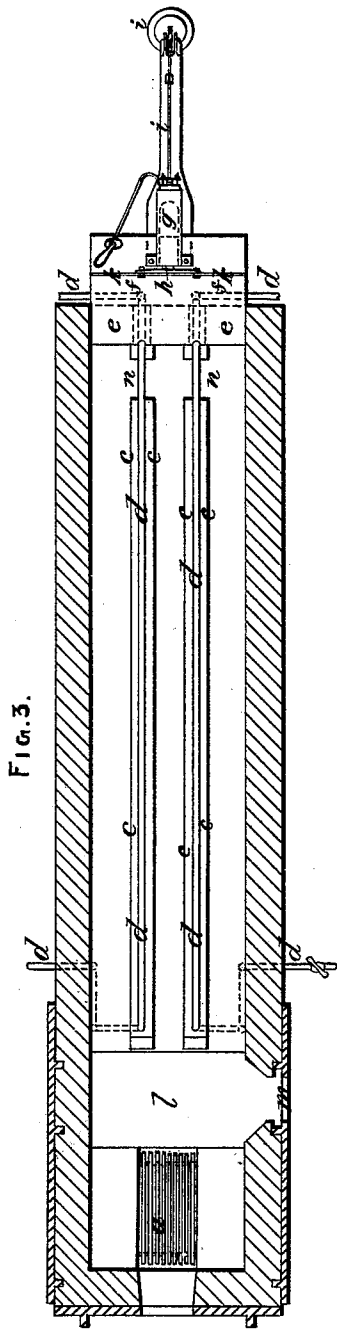


FIG. 3.

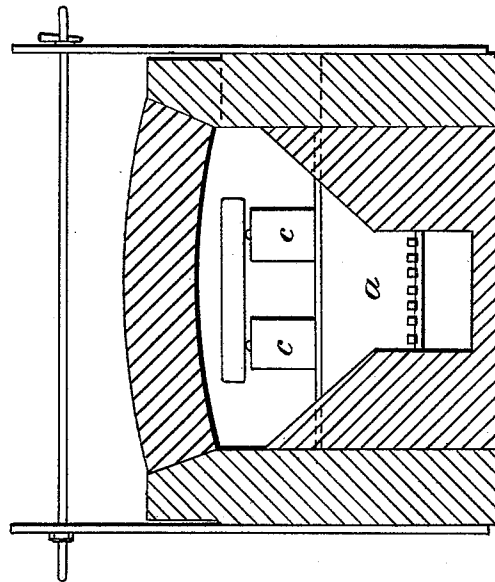


FIG. 5.

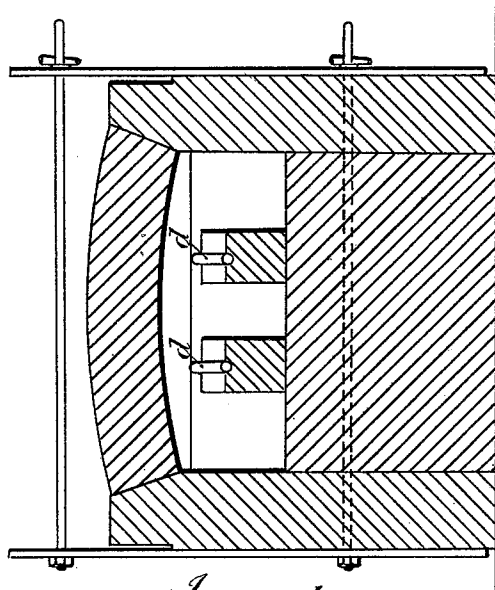


FIG. 4.

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UNITED STATES PATENT OFFICE.

WILLIAM D. ALLEN, OF SHEFFIELD, GREAT BRITAIN.

FURNACE FOR HEATING INGOTS, BLOOMS, &c.

SPECIFICATION forming part of Letters Patent No. 234,162, dated November 9, 1880.

Application filed November 25, 1879.

To all whom it may concern:

Be it known that I, WILLIAM DANIEL ALLEN, of Sheffield, in the county of York, Kingdom of Great Britain and Ireland, have invented new and useful Improvements relating to Heating Metals, of which the following is a specification.

My improvements are designed to economize fuel and obtain a regular supply of hot ingots, blooms, or billets practically without intermission. For this purpose I charge the ingots, blooms, or billets at the cool end of the furnace, and by mechanical or other means advance them consecutively toward the fire, and as one or more of the heated ingots, blooms, or billets is or are withdrawn from the hot end of the furnace I charge another or others at the cool end. I arrange the ingots, blooms, or billets side by side in and crosswise of the furnace on longitudinal ridges or supports so arranged that the heat and flame may act on the under sides of the ingots, blooms, or billets, as well as on other parts thereof; and in carrying out my invention a full charge may be constantly kept in the furnace in such manner that, as the ingots, blooms, or billets are advanced consecutively toward the fire, each in turn will become sufficiently heated, and a continuous supply of hot ingots, blooms, or billets will be maintained. The furnace may, with advantage, be of the reverberatory kind, with a fire-grate at one end and a chimney at the other.

Along the body of the furnace I make two parallel walls or ridges extending from the chimney to a point near the fire-grate. Embedded in or on the upper parts of these walls, and projecting slightly above their upper surfaces, I fix two wrought-iron or steel pipes or hollow bars, in which I cause water to pass for the purpose of preventing them from acquiring too high a temperature. Upon these tubes or hollow bars the ingots, blooms, or billets are placed crosswise, side by side, and if the tubes or hollow bars incline or fall toward the fire the whole of the ingots, blooms, or billets will slide easily along the tubes or hollow bars toward the fire, each one when moved pushing those in advance of it, so that each time a hot ingot, bloom, or billet is withdrawn at the fire end of the furnace, and another in-

serted at the cool or chimney end, the whole charge in the furnace may be, by thrusting or pushing, caused to slide along the tubes or hollow bars one stage toward the fire. The pushing along may be done either by hand or other power, by a rack, a lever, or some such means, or a small hydraulic cylinder will be found a very convenient method of pushing them along, or the tubes or hollow bars may be placed at an angle or inclination to the horizontal, such as will cause the ingots, blooms, or billets to slide forward of their own gravity.

The fire-bricks for supporting the tubes or hollow bars extend above the bed of the furnace sufficiently high to allow the heat and flame to pass below the ingots, blooms, or billets and act on their under sides, as well as on their upper sides. The fire-bricks for supporting the hollow bars or tubes may be grooved, and the tubes or hollow bars be partly bedded in the grooves, so that only a small portion of each tube or hollow bar will project above the top side of the bricks supporting it, and the embedded portion will be somewhat protected from the full action of the fire.

When good hard fire-lumps can be obtained, if the tops of the ridges or walls be made semi-circular in cross-section, the ingots, blooms, or billets will slide upon them without the assistance of the tubes or hollow bars, the use of which will, however, in any case, be found to add greatly to the durability of the furnace.

In heating ingots or blooms of such sizes, for instance, as are commonly used for making rails, and which involve the use of a furnace of greater length than required for heating comparatively small ingots, blooms, or billets, the tubes or hollow bars, instead of being made to extend the whole length of the furnace, may be employed for a part of the length only. In some cases the cooler portion of the furnace may be laid with ordinary railway or other iron bars.

I would observe that when ingots of a more or less conical or tapering form are to be heated it will be necessary to arrange them with their larger and smaller ends alternating, to maintain parallelism of the mass.

As the tubes or hollow bars, by being cool, will abstract some heat from those parts of the in-

gots, blooms, or billets in contact with them, it may, in cases where it is important they should be very uniformly heated, be necessary to leave a space in the furnace between the 5 ends of the tubes or hollow bars and the fire. This space may be large enough to hold, say, three or more of the ingots, blooms, or billets, and to allow of their being turned over, so as to expose the cool part to the fire, and in a 10 short time they will become of a uniform heat.

And in order to a full understanding of my invention, I now proceed to more particularly describe the same by reference to the accompanying drawings, whereof—

15 Figure 1 is an elevation of a furnace. Fig. 2 is a sectional elevation of the same charged with blooms. Fig. 3 is a sectional plan; Fig. 4, a cross-section in the line A B, and Fig. 5 a cross-section in the line C D, showing the position of a bloom.

20 *a* is the fire-place; *b*, the chimney. *c c* are the walls or ridges; *d d*, the tubes. *e* is the opening or doorway through which the ingots, blooms, or billets are supplied to the furnace, and *f* a sole-plate upon which they are laid for 25 that purpose, and to which is attached a hydraulic cylinder, *g*, with its plunger *h* worked by the water-pressure up toward the furnace, and drawn back by means of a chain and counterbalance-weight, *i*. *k* is a plate of iron at-

tached to the plunger, forming a door to close the opening *e* after thrusting the ingots, blooms, or billets into the furnace. *l* is a space in the furnace to receive the ingots, blooms, or bil- 35 lets as they are thrust forward and roll and fall off the top of the walls or ridges. *m* is the door through which the ingots, blooms, or billets are withdrawn from the furnace when heated. *n* is a break or gap in the walls or 40 ridges made to allow a draft of the fire or heated gases to pass between the walls or ridges and under the center part of the ingots, blooms, or billets.

What I claim is—

In a furnace for heating ingots of iron and 45 steel, the combination of the ridges or ways *c*, raised above the bed of the furnace to allow heated gases to pass under the ingots, with the hollow pipes or bars *d*, which serve as a bearing for the ingots and are protected from 50 being destroyed by the heat by the water flowing through them, substantially as herein specified.

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