(No Model.)

P. KIRK.

OVEN OR FURNACE FOR HEATING INGOTS AND BLOOMS.

No. 343,820. Patented June 15, 1886.

FIG. 2.

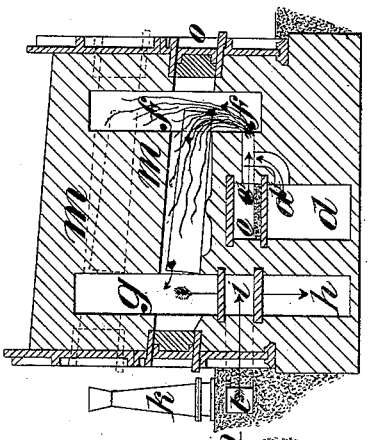


FIG. 4.

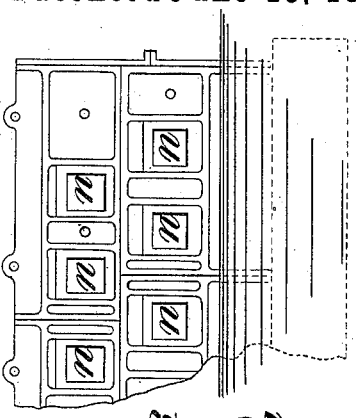


FIG. 1.

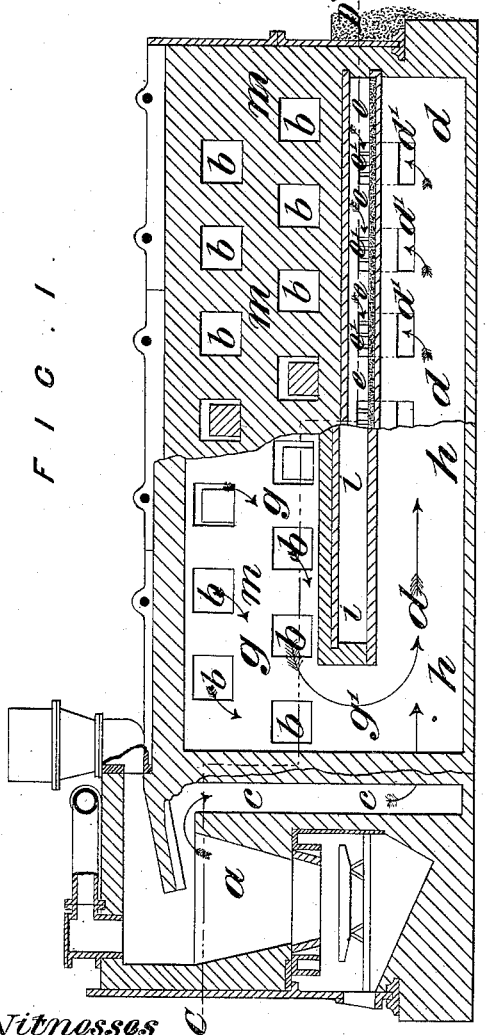
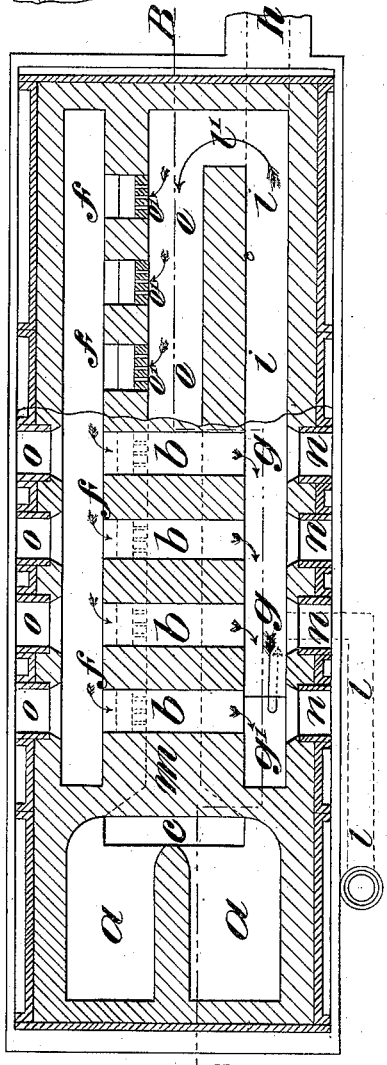


FIG. 3.



Witnesses
George E. Gibson
Mary Drury

Inventor. Peter Kirk
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UNITED STATES PATENT OFFICE.

PETER KIRK, OF WORKINGTON, COUNTY OF CUMBERLAND, ENGLAND.

OVEN OR FURNACE FOR HEATING INGOTS AND BLOOMS.

SPECIFICATION forming part of Letters Patent No. 343,820, dated June 15, 1886.

Application filed June 23, 1885. Serial No. 169,515. (No model.) Patented in England November 25, 1884, No. 15,497; in France March 16, 1885, No. 167,722; in Belgium March 19, 1885, No. 68,227, and in Germany March 25, 1885, No. 33,323.

To all whom it may concern:

Be it known that I, PETER KIRK, a subject of the Queen of Great Britain and Ireland, and residing at Workington, county of Cumberland, England, have invented certain Improvements in Ovens or Furnaces for Heating Ingots and Blooms or for Maintaining the Heat Thereof, for which I have obtained a patent in Great Britain, No. 15,497, November 25, 1884, of which the following is a specification.

My invention relates, principally, to the keeping hot of ingots of steel or Bessemer metal after they have been withdrawn from the molds. I construct a cellular furnace, having ovens or cells built in one, two, or more ranges in height, each cell by preference holding only one ingot. To heat the furnace preparatory to the introduction of the ingots, and subsequently to maintain a suitable degree of heat, I arrange for hot currents to flow through the cells, the ingots being by preference so placed in the cells as that the said currents shall flow from the tips toward the bases of the ingots.

My improved oven or furnace is illustrated in the accompanying drawings, wherein Figure 1 is a sectional elevation on the line A B, Fig. 3. Fig. 2 is a vertical cross-section. Fig. 3 is a sectional plan on the line C D, Fig. 1; and Fig. 4 is an outside front elevation of one end of the furnace.

In these figures *a a* are two gas-producers, and *b b* are the cells to contain the ingots. The gas-producers may be of any suitable construction, and may be built at one end of the heating-furnace, as in the example; or the gas may be derived from a more distant source. The gases generated in the producers pass through the down-flues *c* into the gas-flue *d*, which extends from end to end of the furnace below the cells *b;* or the gas is otherwise suitably conveyed into the flue *d*. Above the gas-flue *d* is an air-flue, *e*, the two being separated by means of metal, or fire-clay plates, or slabs. From the gas-flue the gas flows through passages *d'* into a chamber, *f*, which extends along the back end of all the cells *b*. As the gas flows through the passage *d'*, it meets with currents of air which are discharged from the air-flue *e* through openings at *e'*, and the mixture of gas and air is burned in the chamber *f*. The flames and heated gases flow from the chamber *f* through the cells *b* into a front chamber, *g*, which communicates by means of an opening, *g'*, at one end of the furnace, with a bottom waste-flue, *h*, which communicates with the chimney.

Between the chamber *g* and the flue *h* is a second air-flue, *i*, which communicates at one end by means of a cross-flue, *i'*, with the air-flue *e*, and supplies the latter with air. In the example air is forced into the flue *i* by means of an air-injector, *k*, (seen in Fig. 2,) the air being injected by means of a jet of steam. From this injector a flue, *l*, leads into the flue *i*. A fan or any other suitable means may be used to obtain the supply of air. The air becomes heated by flowing through the flue *i*, and is still further heated in the flue *e*. The cells *b* are formed in a central wall, *m*, which is built of fire-brick or refractory material, each cell in the example being of a size suitable to contain a single ingot and to leave a suitable amount of space for the passage of the flames or heated gases from the chamber *f* into the chamber *g*. By preference the cells are inclined from one chamber to another, so as to facilitate the discharge of melted cinder, which flows down the floors of the cells into the chamber *f*, from which it can be removed at intervals.

To still further provide for the discharge of the cinder, I make a channel, or two or more channels in the floor of each cell, and I so form the said floor as that the ingot touches the same at two or more points only, as indicated in Fig. 2. This construction of the floor also tends to the more uniform heating of the ingot owing to the heated gases being permitted to pass below the ingot. The outer walls of the furnace are inclosed within an iron shell, as is usual, and in the front and back walls and plates openings *n o* are formed, which are in line with the cells. The openings *n* are for the introduction of the ingots, and the openings *o* for the withdrawal of the same. The sloping formation of the cells facilitates the introduction and withdrawal of the ingots. The mouths of the said openings are a little tapered and are closed by means of metal plugs, which are tapered to fit the mouths of the opening, and are filled or lined with fire-clay or refractory material. In lieu of these

plugs the mouths of the openings may be fitted with hinged or sliding doors, or may be closed by other suitable means. I prefer that the charging-openings *n* shall be within the range of the ingot-crane, so that it will not be necessary to use bogies to convey the ingots to the oven or furnace. I may dispense with the withdrawing-openings *o*, and both charge and withdraw through the openings *n*. The ingots, if at once placed in the cells of the furnace after withdrawal from the molds, can be kept for a considerable length of time with a comparatively small consumption of gas, and the heat can be better regulated than in the ordinary heating furnace, so as to do little more than conserve the contained heat of the ingot and to render the heat more uniform throughout the mass. It will be seen that the tips of the ingots, which are usually colder than the bases, are exposed to the greatest heat, so that they receive a little excess of heat, which enables them to bear the transport to the rolls better than when the tips are cooler than the rest of the mass, and the ingots also roll down easier. The oven or furnace may also be used in the heating of blooms, although it has been designed more particularly for ingots.

I do not confine myself to the precise formation and arrangement of the air and gas flues, nor to the general construction of the furnace so long as the important feature is retained—namely, the horizontal or sloping cells to contain the ingots, communicating at each end with chambers or flues, in combination with means for causing a flow of heated or burning gases through the cells.

I do not confine myself to the formation of the furnace two cells in height.

I am aware that furnaces have heretofore been constructed with cells for the reception and heating of ingots. This, therefore, I do not claim broadly; but

What I claim is—

1. The combination of a gas-producer with a furnace having chambers or flues along opposite sides thereof, and a number of transverse connecting-cells, *b*, for the reception of ingots or blooms, substantially as set forth.

2. The combination of a gas-producer with a furnace having chambers *f g* along opposite sides thereof, transverse connecting-cells *b*, and openings with doors in one or both of the outer walls for the introduction and withdrawal of the ingots.

3. The combination of a gas-producer with a furnace having chambers *f g* along opposite sides thereof, transverse sloping cells *b*, and openings *l* and *o*, with doors in the opposite walls in line with the said cells, substantially as and for the purpose described.

4. The combination of a gas-producer with a furnace having chambers *f g* along opposite sides thereof, transverse connecting-cells *b*, and corresponding openings and doors in the outer walls, with a communicating gas-flue, *d*, and air-flue *e*, all substantially as specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

PETER KIRK.

Witnesses:

DAVID FULTON,

CLIFFORD CHADWICK.