

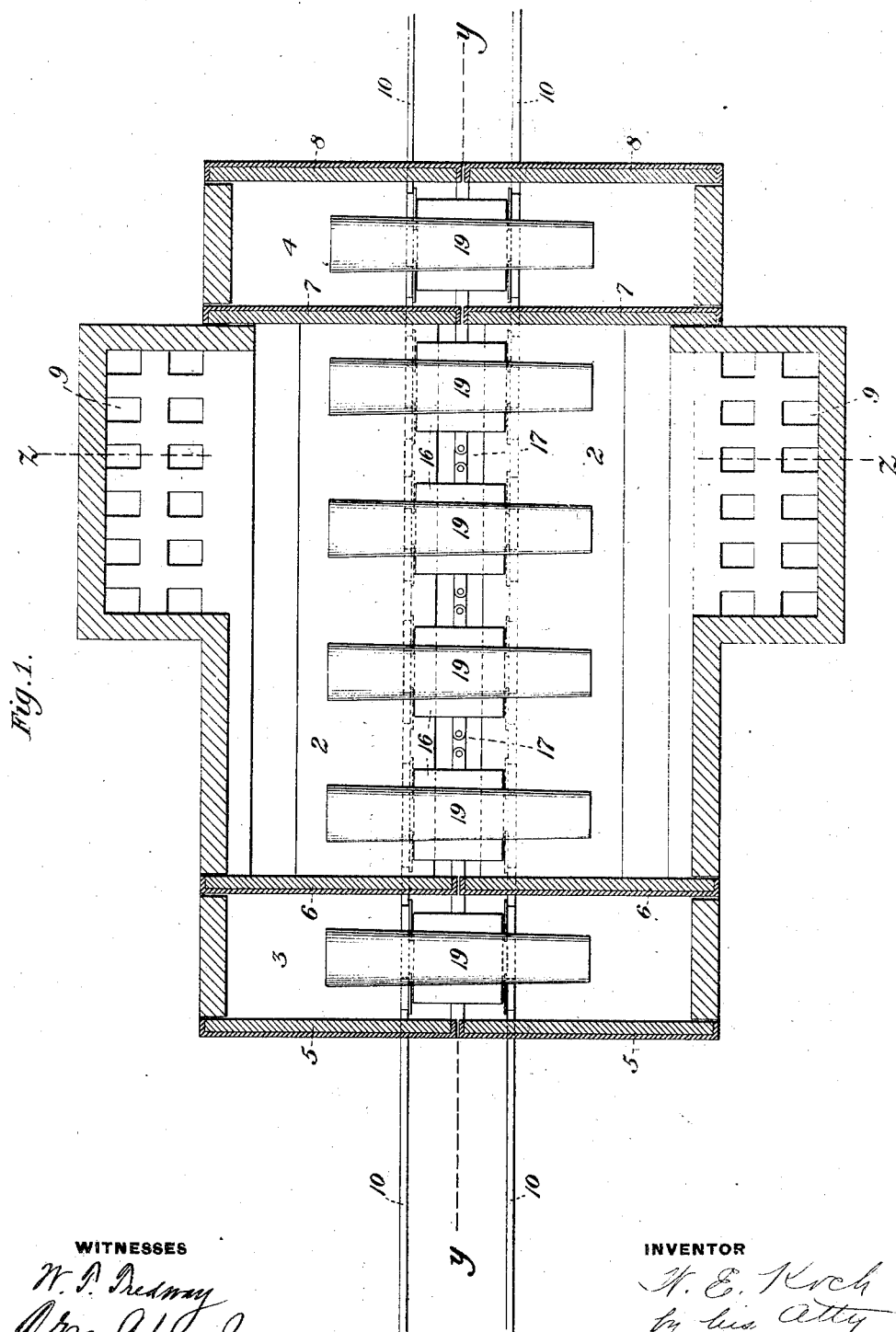
(No Model.)

3 Sheets—Sheet 1.

W. E. KOCH.
FURNACE FOR HEATING STEEL INGOTS.

No. 489,017.

Patented Jan. 3, 1893.



(No Model.)

3 Sheets—Sheet 2.

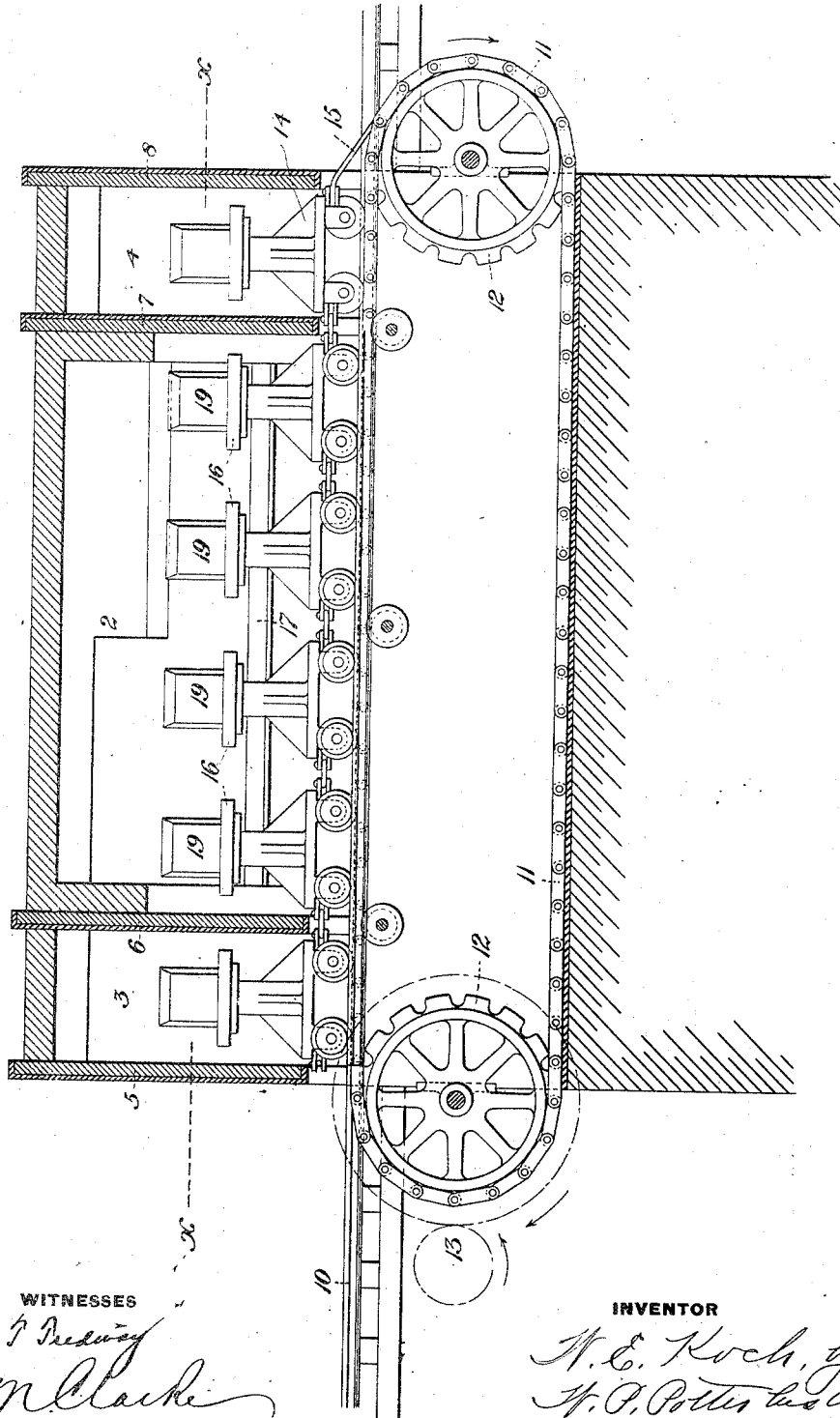
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Fig. 2



WITNESSES

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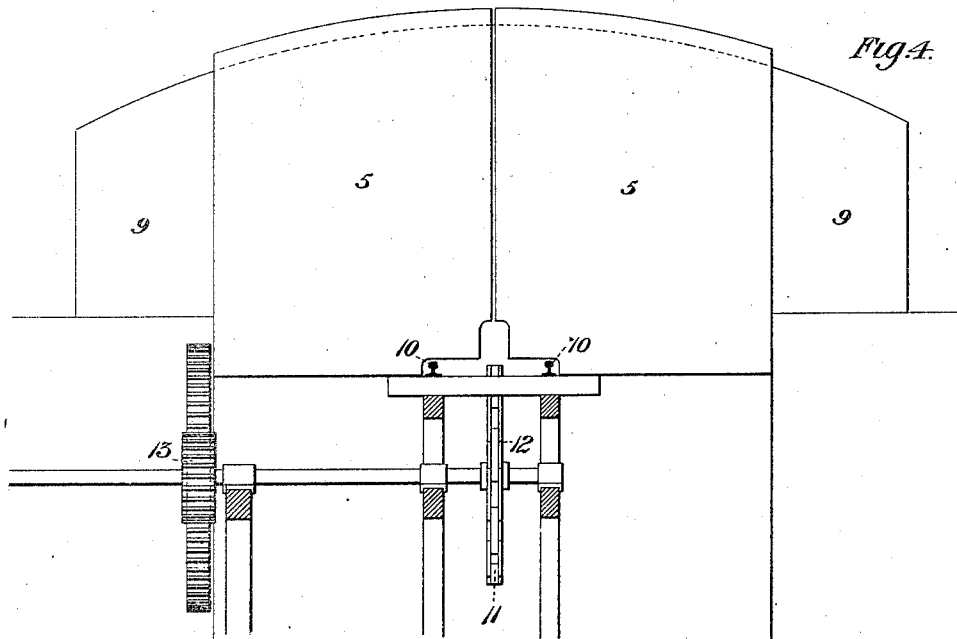
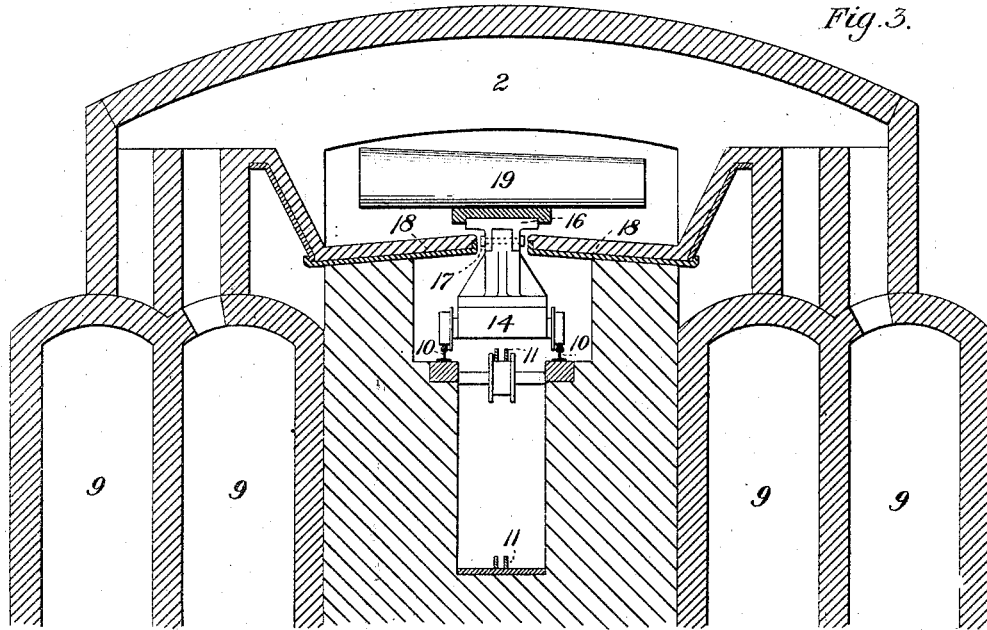
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WITNESSES

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UNITED STATES PATENT OFFICE.

WALTER E. KOCH, OF PITTSBURG, PENNSYLVANIA.

FURNACE FOR HEATING STEEL INGOTS.

SPECIFICATION forming part of Letters Patent No. 489,017, dated January 3, 1893.

Application filed May 13, 1892. Serial No. 432,888. (No model.)

To all whom it may concern:

Be it known that I, WALTER E. KOCH, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Furnaces for Heating Steel Ingots; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The object of my invention is to provide a furnace for heating steel ingots in which the ingots may be acted upon in a continuous operation and in which the maximum amount of the surface of the ingot will be exposed to the action of the heat while all cooling drafts will be prevented. This object I accomplish by the use of a furnace constructed as illustrated in the accompanying drawings and the invention consists in certain novel features of the same as will be hereinafter first fully described and then pointed out in the claims.

Heretofore, steel ingots have been heated in one of two ways, either by being placed on their sides in heating furnaces or by being placed erect on ends in pits, both of which methods produce unsatisfactory results and require much handling and many furnaces. In the horizontal position only three sides are presented to the flame, the fourth side receiving heat only from the furnace bottom or by turning over the ingots, hence the ingot is unevenly heated and proper treatment in the rolling mill is rendered impossible. In the vertical position, the top of the ingot is liable to be heated to a greater degree than the bottom or thicker end and this uneven heating also gives trouble in the rolling process. Moreover, in both these methods there is incurred an expense in handling and an unnecessary waste in cinder caused by undue heating of one part of the ingot and by impinging currents of air through the furnace doors. Furthermore, so far as I am aware, no furnace has been heretofore produced which would operate continuously, the ingots being either taken out singly and another ingot slipped into the vacant place, or the entire heat of ingots is taken from the furnace and the furnace then re-charged. This operation is objectionable for the reason that

the ingot is suddenly put into a very hot place and the steel frequently injured by too sudden expansion.

In the furnace designed by me, the ingots are acted upon in a continuous operation and are gradually heated while the maximum amount of their surfaces is exposed to the direct action of the heat; moreover I can heat the ingot just when and where required and I consequently overcome all the objections heretofore found to exist.

In the accompanying drawings, which fully illustrate my invention, Figure 1 is a horizontal section taken on the line $x-x$ of Fig. 2; Fig. 2 is a vertical longitudinal section taken on the line $y-y$ of Fig. 1; Fig. 3 is a transverse section on the line $z-z$ of Fig. 1, and Fig. 4 is an end elevation.

In carrying out my invention, I employ a furnace 2 which may be of any desired form. In the drawings I have illustrated a form of the Siemens furnace provided with regenerative chambers 9. This furnace is provided with the central depressed floor 18 having a central longitudinal slot 17 and inclined from said slot toward each side. Doors 6 and 7 are provided at the ends of the furnace and separate the same from the ante-chamber 3 and the post-chamber, 4, as clearly shown. The said chambers 3, 4 are provided with doors 5 and 8, as shown, so that all detrimental air drafts will be cut off. Extending through the furnace, below the floor of the same, is a track 10 which also extends through the chambers 3, 4 and beyond the ends thereof. An endless chain 11 runs between the rails of the said track and in a recess prepared therefor in the foundation of the furnace. This belt or chain is driven by sprocket wheels 12 and gearing 13 in the direction indicated by the arrows in Fig. 2. Riding upon the track 10 is a series of cars 14 which are connected together by links and pins or any other readily detachable means and connected with the endless chain by a link 15 so that as the chain moves the cars will be drawn through the furnace. It will be understood, of course, that a number of the links 15 are provided and that as the cars leave the furnace and are discharged of their loads they are run upon the tracks 10 back to the entrance of the furnace to be again passed through the same.

These cars 14 are provided with narrow standards which project up through the slots 17 and support small tables or slabs 16 which are faced with fire-clay.

5 In practice, the ingot or bloom 19 is taken from the casting pit or mold by suitable mechanism and placed on the first car. The gearing is then permitted to move the car a distance sufficient to carry the bloom or ingot
10 into the ante-chamber 3. A second bloom is then placed on the succeeding carriage or car and the doors 5 and 6 opened to permit the passage of the two ingots into the ante-chamber and the cooler portion of the furnace, respectively. This operation is repeated until
15 the entire quantity of ingots has been passed through the furnace. As each ingot leaves the furnace it is fed into the rolling mill as will be readily understood.

20 From the foregoing description, taken in connection with the accompanying drawings, it will be seen that I have provided a furnace in which the ingots will be continuously fed into the furnace and will be passed through
25 the same so as to be gradually heated. It will be observed that the ingot first passes into the ante-chamber and that the doors of the same are closed so as to prevent the access of air to the furnace and that after the
30 ingot enters the furnace it is not at once subjected to an intense heat but enters the furnace at a point remote from the source of heat and is moved gradually toward the heat and is not subjected to the most intense heat until
35 it reaches a point between the regenerative chambers 9, by which time its temperature will have been raised. It will furthermore be noticed that the butt end of the ingot can be heated as thoroughly as the top and that the

whole ingot or bloom will be evenly heated 40 and delivered to the rolling mill in the best possible condition for treatment. The doors effectually prevent the entrance of detrimental air drafts and hence cinder and loss will be reduced to a minimum.

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

1. The combination with a furnace for heating ingots, provided with a central longitudinal slot in its floor, of a series of cars arranged below the floor and adapted to move through the furnace and provided with standards projecting through the said slot and carrying the ingots above the floor, and mechanism for
55 moving the said cars continuously through the furnace.

2. The combination with a furnace having its floor provided with a central longitudinal slot and inclined from said slot toward the sides, of a series of cars arranged below the floor and having standards projecting through the slot and provided with means, above the floor, for carrying the ingots.

3. The combination with the furnace having a slotted floor, of a track running through the furnace below the said floor, an endless chain moving between the rails of the said track, a series of cars mounted on the track and connected with said endless chain and having
65 standards projecting through the slot in the floor, and means for moving the endless chain.

In testimony whereof I affix my signature in presence of two witnesses.

WALTER E. KOCH.

Witnesses:

W. P. POTTER,
E. D. MCCORKLE.