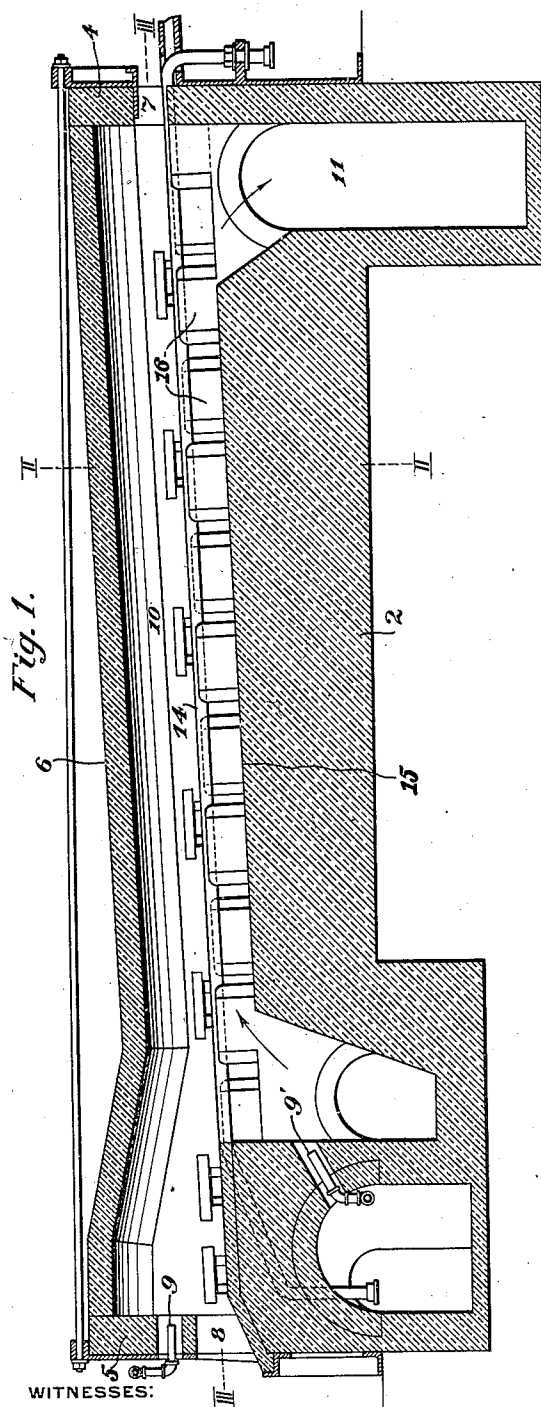


F. MERIAN.
FURNACE.
APPLICATION FILED SEPT. 12, 1911.

1,058,191.

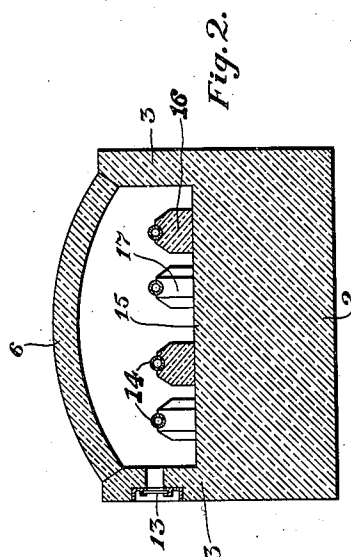
Patented Apr. 8, 1913.

2 SHEETS—SHEET 1.



WITNESSES:

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2 SHEETS—SHEET 2.

1,058,191.

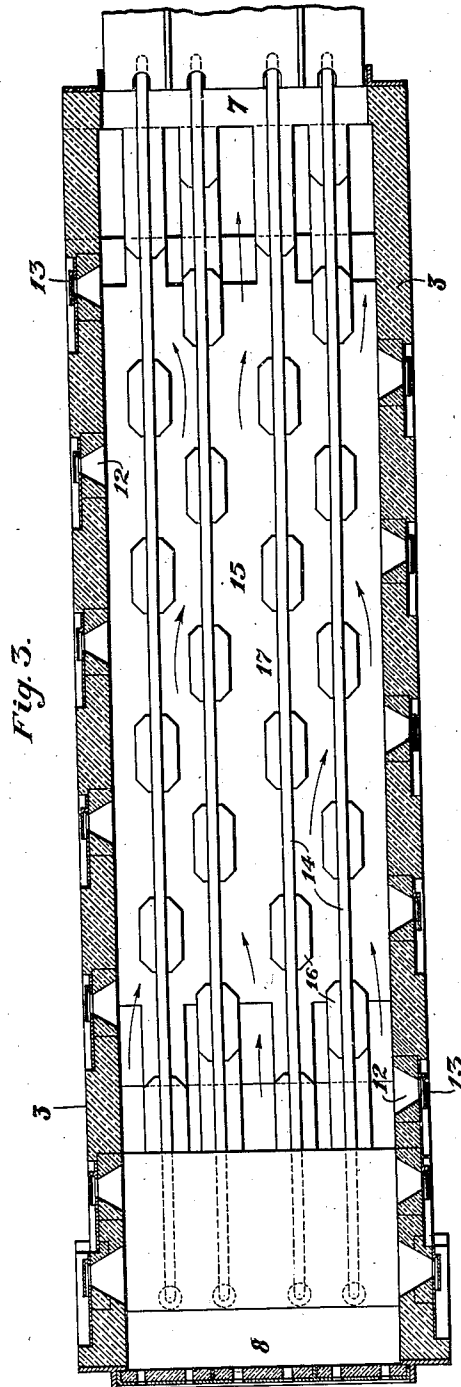


Fig. 3.

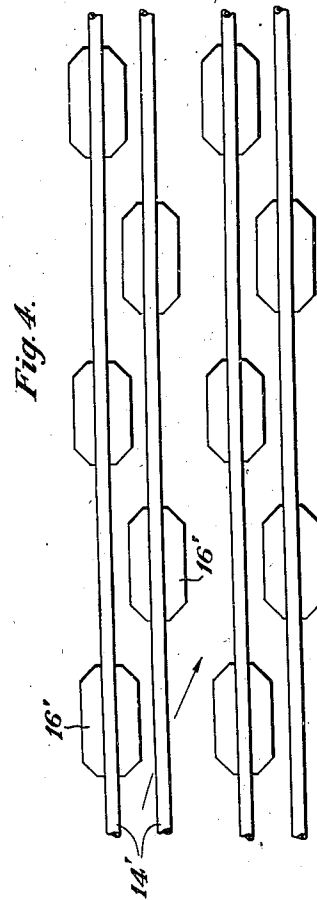


Fig. 4.

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FURNACE.

1,058,191.

Specification of Letters Patent.

Patented Apr. 8, 1913.

Application filed September 12, 1911. Serial No. 648,990.

To all whom it may concern:

Be it known that I, FREDERIC MERIAN, a citizen of the Republic of Switzerland, residing at Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Furnaces, of which the following is a specification.

My invention consists of an improvement in furnaces for billets, blooms, etc., and is of the continuous type. In such furnaces the articles to be heated are charged into the furnace at one end and thence throughout the longitudinal interior thereof, being submitted to the action of the heating gases, and finally discharged at the other end of the furnace.

The objects of the present invention are to provide, in such a structure, means for complete enveloping circulation of the gases of combustion, avoidance of any interior fluid circulation connections, and for discharging the accumulated scale, cinder, and other material which constantly accumulates in the bed of the furnace.

In the drawings: Figure 1 is a central longitudinal sectional view of the furnace. Fig. 2 is a transverse sectional view indicated by the line II. II. of Fig. 1. Fig. 3 is a horizontal sectional view indicated by the line III. III. of Fig. 1. Fig. 4 is an enlarged detail plan view of a portion of the ingot supporting construction, showing a modified arrangement.

The furnace, as a whole, is of the usual or any desired construction having the main foundation base 2, side walls 3, 3, end walls 4 and 5, and roof 6, said parts being constructed of brickwork and braced and stayed in the usual manner customary with furnaces of this type. A charging opening or door 7 is provided at one end of the furnace and a discharging opening 8 at the other end, preferably somewhat lower, whereby the ingots, etc., may be advanced by suitable pushing mechanism along through the furnace. Fuel for combustion, preferably in gaseous form, is supplied at the rear end of the furnace through ports 9 and 9', the fuel in combustion traversing the length of the furnace throughout its interior 10 and passing downwardly through suitable ports to an outlet or stack connec-

tion 11. Openings 12, preferably provided with closing doors or covers 13, are provided at intervals along one or both of the side walls 3, for inspection of the interior, etc. The ingots rest upon longitudinal supports 14, of any suitable type but preferably of the well-known tubular skid pipe form, whereby to provide for circulation of water therethrough, said pipes being connected at each end with suitable supply and waste pipes, as will be readily understood. These supports or pipes are held in position upwardly above the main floor level 15 of base 2 by series of individual piers or abutments 16, of brickwork or other refractory material. These piers are of comparatively short length but arranged in continuous series longitudinally and in alignment throughout the furnace, a series of such piers being provided for each of the individual supports or pipes 14. The piers 16 of one such series alternate in position with those of the next adjacent series, such arrangement being maintained throughout the entire width of the furnace. Likewise the ends of the piers 16 are preferably beveled or rounded off at the corners, as indicated in Figs. 3 and 4, and the top faces are beveled downwardly from the skid pipes, as shown in Fig. 2. By such arrangement the circulation of the gases of combustion so as to surround practically all of the surfaces of the ingots is facilitated, the gases circulating underneath the supports 14 through the spaces 17 between the ends of the adjacent piers of each longitudinal series and also transversely in a tortuous path as indicated by the arrows in Fig. 3, as well as throughout the entire upper portion of the furnace chamber for its full length to the outlet opening 11. By this arrangement the even and continuous heating of the ingots in a furnace of this type is greatly facilitated and the fuel utilized to the best advantage.

A further feature of value and advantage is that the floor of the furnace bed is continuous, with the exception of the intermittently and alternately arranged piers 16, and facilitates the easy and rapid removal of accumulated scale, etc. The circulation space of the gases is easily maintained open and is not subject to being clogged or filled

up as is frequently the case with furnaces of the same general type where the ingot-supporting bars, rails, or pipes are mounted upon continuous upwardly extending ridges
5 or piers.

A further feature of advantage is that, in the case of a furnace designed for heating short billets, etc., requiring two closely adjacent longitudinal supporting rails, the
10 piers cannot be made continuous without being located so closely together as to practically close the circulation space for the gases. It becomes also necessary to either make the piers very thin or to lay the two
15 rails or pipes on one sufficiently wide pier. Such construction is undesirable as the piers, if thin, will break or crush under the weight of the billets, and if made of sufficient width, the intervening narrow space
20 will soon fill up with refuse, preventing circulation of the gases. If two rails are laid on a single wide pier, there is no circulation space, or if a circulating channel is originally provided, it will soon fill up with
25 seale and slag. These objections are entirely overcome. It will also be seen that, when a furnace is constructed in accordance with my invention, ample gas circulation space may be provided with an increased number
30 of billet supporting rails or pipes in a furnace of any given width. Thus in Fig. 4 I have shown an arrangement which permits the placing of the pipes 14' somewhat closer together, the alternating arrangement of the
35 short piers 16' permitting the outer edges of said piers to be located even beyond the longitudinal line of the confronting face of the next adjacent series of piers. By this arrangement the same facility and space for
40 the circulation of the gases is provided, without impairment of the utilization of their heating efficiency.

By staggering the piers, as shown, the circulation area for the gases, transversely
45 of the furnace, is maintained at a maximum,

thereby improving the draft conditions and producing a slower flow.

The supporting piers are made of the same material as the furnace, *i. e.* brick or other refractory material, capable of being
50 built of the desired size, shape and proportions, and providing a satisfactory and durable support for the pipes.

It will be understood that the arrangement, number, size, design, etc., of the piers; 55 the construction of the furnace as a whole or as to its several parts; or other features or details of the same may be variously changed or modified by the skilled mechanic or furnace builder, but all such changes, in 60 so far as they relate to the matter claimed, are to be considered within the scope of the following claim.

What I claim is:

In a continuous heating furnace having a 65 longitudinal heating chamber and provided with a charging opening at one end and a discharging opening at the other end and means for establishing a circulation of gases of combustion through the heating chamber; 70 the combination with a plurality of longitudinally arranged skid pipes located upwardly above the bed of the furnace, of a series of supporting piers for each pipe of refractory material extending upwardly 75 from the bed of the furnace, the piers of adjacent series being in staggered relation and having their corners and upper side faces beveled to facilitate circulation of the gases of combustion, the side faces of some of said 80 piers extending inwardly beyond the side faces of the next adjacent series, substantially as set forth.

In testimony whereof I hereunto affix my signature in the presence of two witnesses. 85

FREDERIC MERIAN.

Witnesses:

PETER GLICK,
C. M. CLARKE.