Jan. 8, 1929.

G. KEHREN

1,698,367

PIT FURNACE

Filed June 23, 1927

Fig.1.

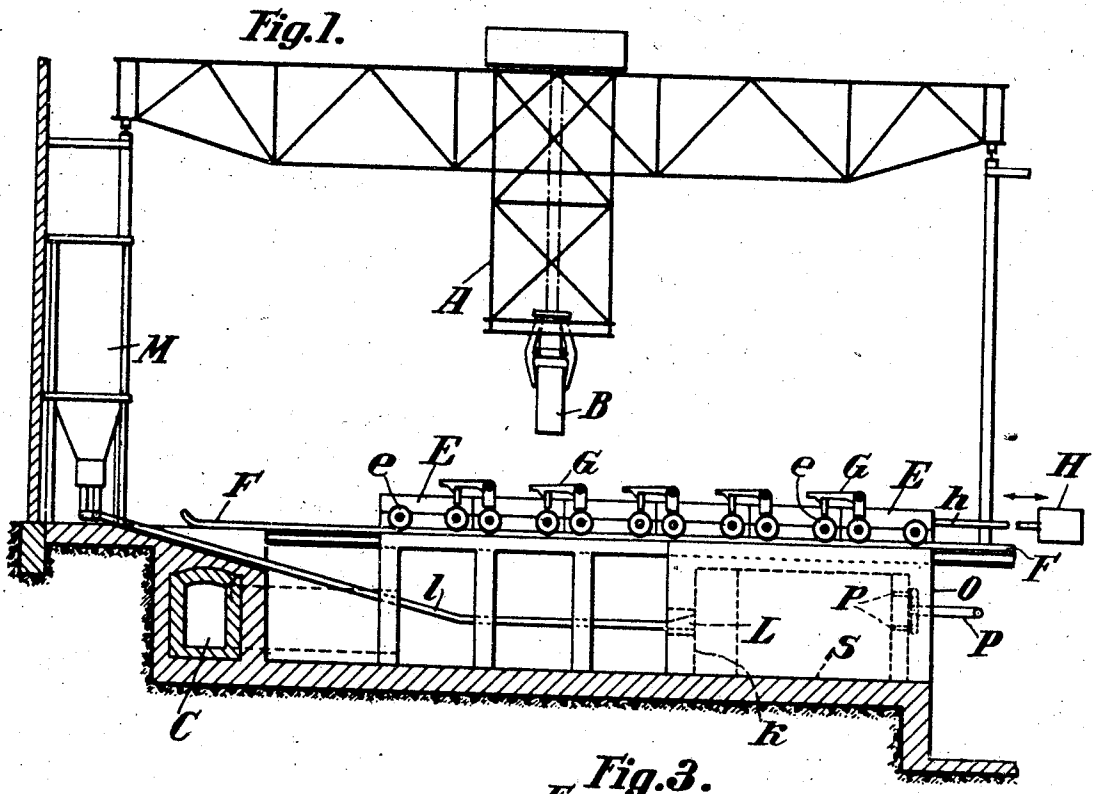


Fig.3.

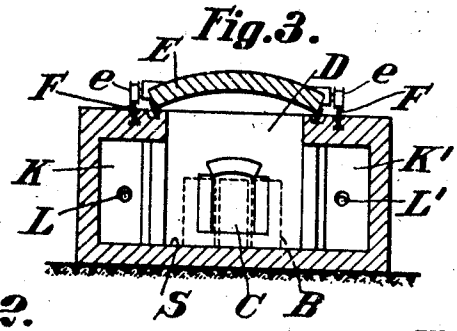


Fig.2.

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UNITED STATES PATENT OFFICE.

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PIT FURNACE.

Application filed June 23, 1927, Serial No. 200,912, and in Germany June 30, 1926.

This invention relates to pit furnaces and has for its object to provide an improved construction for furnaces of this character.

For this purpose it is known to employ coal dust firing for the usual push and roll or continuous furnaces, wherein said ingots are moved forward from behind by mechanical devices or are rolled forward by hand. The rolling of large cast ingots has proved however to be attended by considerable difficulties and for this reason it has become customary to heat the ingots standing upright in pit furnaces. In these furnaces the use of coal dust firing was found to be difficult in that it was not possible to obtain full development of the flame.

This invention obviates these difficulties and provides a pit furnace with coal dust firing wherein heating of the ingots is achieved with satisfactory utilization of the heat contents of the flame. According to the invention at least one combustion chamber is arranged laterally beside the heating hearth, the lateral wall opposite to the said hearth heating by direct radiation ingots situated on said hearth.

The invention is illustrated by way of example in the accompanying drawings in which:

Fig. 1 is a side elevation of the new pit furnace, partially in section.

Fig. 2 a plan view thereof, the cover closing the same being shown removed for the sake of clearness, and

Fig. 3 is a section on the line III—III in Fig. 2.

The heating of the ingots B in the pit furnace according to the invention is effected in a longitudinal furnace chamber D on the bottom S of which the ingots rest. The said ingots are brought in a comparatively cool condition by a crane A to that end of the chamber D at which is situated the discharge conduit C for the heating gases (to the left hand in the drawings) and, when they have been sufficiently preheated at the point of entry, are moved by the crane A gradually further and further towards the end where the combustion gases are introduced (to the right in Figs. 1 and 2) that is, in the direction of the so-called re-heating hearth D'; thence they are removed in a highly heated white-hot condition and treated in known manner.

The top of the chamber D is closed by an arched cover E which can travel on wheels *e* on rails F. Each cover E forms a carriage of comparatively inconsiderable width, the separate carriages being connected in a releasable manner by coupling devices G. Operating means, for example a compressed air piston H, provided on one side of the furnace is connected to the last carriage E by a rod *h* and is adapted to retract the same from over the furnace or to push it back thereover. By coupling one or more of the other travelling carriages E with the last carriage by means of the coupling devices G any desired number of arched covers may be moved aside simultaneously so that the hearth can be uncovered at any desired point for the purpose of introducing or removing the ingots B.

K is a combustion chamber disposed at one side of the hearth D' at the end of the furnace opposite to that of the outlet C. K' is a second such combustion chamber which is arranged on the other side symmetrically to the longitudinal axis of the furnace. It is clear that the furnace might also be furnished merely with one combustion chamber arranged on one side. The combustion chambers are comparatively narrow and extend in the longitudinal direction of the furnace and of the hearth D'. Nozzles L, L' to which conduits *l*, *l'* are connected are provided in those end walls *k*, *k'* of the chambers K, K' which are towards the centre of the furnace. Coal dust is introduced into these conduits from a container M with the assistance of compressed air supplied by a blower N by well known means which are indicated diagrammatically only in the drawing.

The mixture of coal dust and air emerging from the nozzles L, L' burns in the combustion chambers K, K' which offer the flame full opportunity for developing. The combustion gases flow from the chambers K, K' through the chamber D (in the drawing from the right to left) and pass through the outlets C into the stack. The radiant heat of the flame between the end walls *k*, *k'* and the radiant heat of the highly heated lateral walls of the chambers acts directly upon the ingots situated at the right hand end of the chamber D and already strongly pre-heated; said ingots are thus brought to the desired temperature and the heating gases passing on to the outlet preheat the ingots to be treated which are moved

forward, as described, in the opposite direction.

The expression "reheating hearth" as employed in the present specification as well as in the claims, will be understood to refer more especially to that portion of the heating hearth upon which the blanks to be heated are subjected to the highest temperatures produced within the heating chamber. The blanks which have reached the reheating hearth are thus exposed to the inflowing burning gases from oppositely arranged combustion chambers and hence become intensely and uniformly heated in preparation, for example, of the rolling process which follows.

If it appears to be necessary compressed air may be supplied by way of a conduit P in the end wall O of the furnace opposite to that of the outlet C and may be introduced for mixture with the combustion gases by means of outlet-passages *p*.

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

1. In a pit furnace, the combination of an elongated heating chamber provided with a discharge outlet at one end and a closed end wall at the opposite end, an elongated combustion chamber arranged adjacent to said closed end wall and opening laterally into said heating chamber, a fuel inlet arranged in the end wall of said combustion chamber farthest from said closed end wall and discharging along the inner lateral wall of said combustion chamber toward said closed end wall of the heating chamber, the inwardly-presented lateral wall of said combustion chamber and the closed transverse end wall of said heating chamber being adapted and arranged to radiate heat to ingots disposed adjacent thereto and means for moving said ingots from the outlet end of said heating chamber toward the closed end thereof and into position adjacent to said combustion chamber.

2. In a pit furnace, the combination of an elongated heating chamber provided at one end with a discharge outlet and at its opposite end with elongated combustion chambers arranged on opposite sides of and opening laterally into said heating chamber, a closed transverse wall extending across said heating chamber and said combustion chambers, fuel inlets arranged in the inner end walls of said combustion chambers and discharging over the inner side walls of said combustion chambers toward said closed transverse end wall, the inwardly-presented lateral walls of said combustion chambers and said closed transverse end wall constituting heat-radiating walls for ingots arranged adjacent thereto, and means for moving said ingots from the discharge outlet end of said heating chamber toward the closed end thereof.

3. In a pit furnace, the combination with heating chamber provided at one end with an outlet conduit, of combustion chambers arranged on opposite sides of said heating chamber at the other end thereof and opening thereinto through the side walls of said heating chamber, a fuel-conduit discharging into each of said combustion chambers in a direction away from said outlet conduit, a closed transverse wall extending across said combustion chambers and the heating chamber at the end farthest from said outlet conduit, and a conduit for compressed air discharging through said closed transverse wall into said combustion chambers and heating chamber.

In testimony whereof I have affixed my signature.

GOTTFRIED KEHREN.