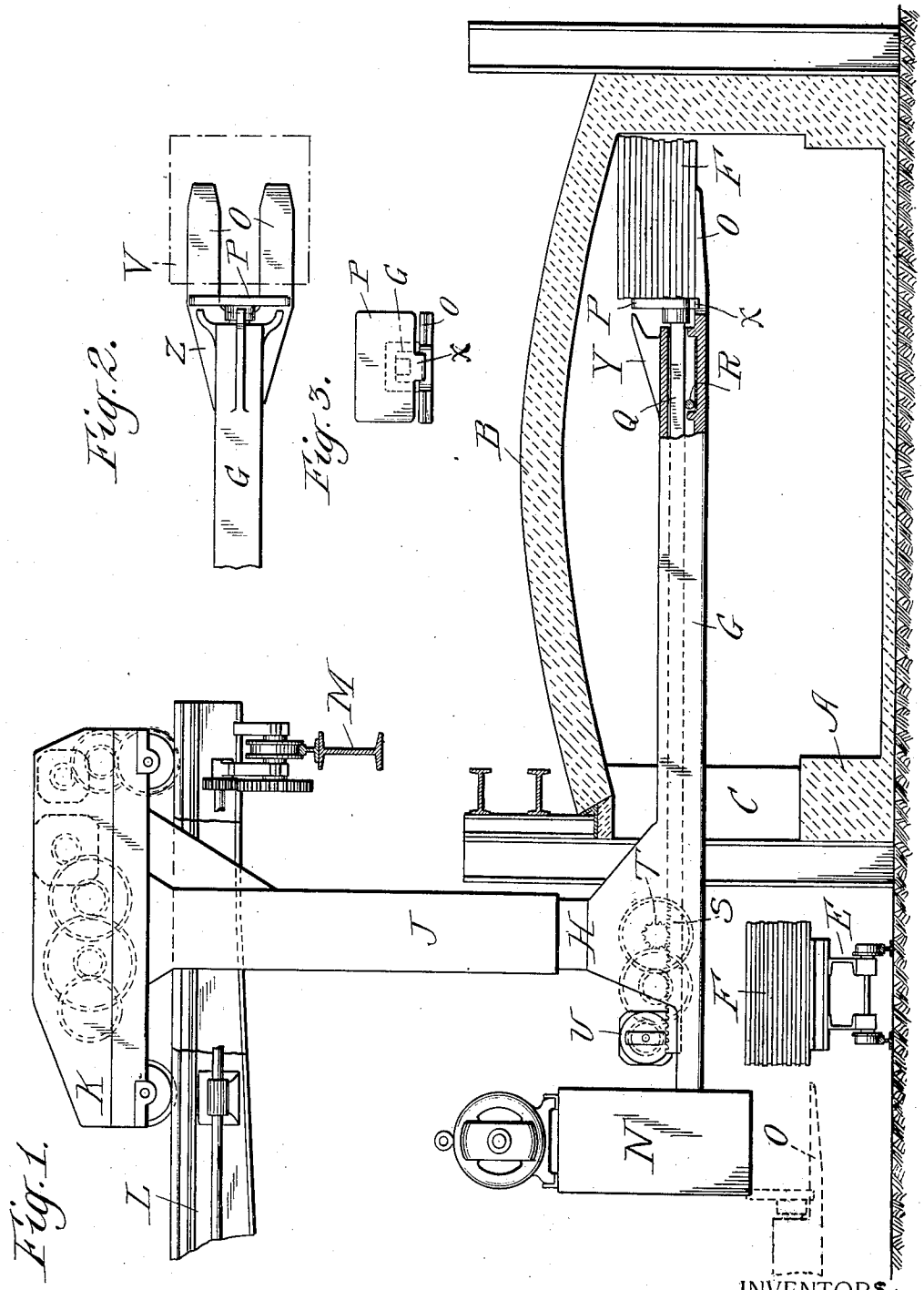
No. 894,392. PATENTED JULY 28, 1908.

H. A. PROSSER & J. B. LADD.

APPARATUS FOR CHARGING FURNACES.

APPLICATION FILED MAY 17, 1907.

3 SHEETS—SHEET 1.



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3 SHEETS—SHEET 2.

Fig. 4a.

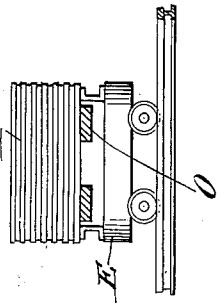
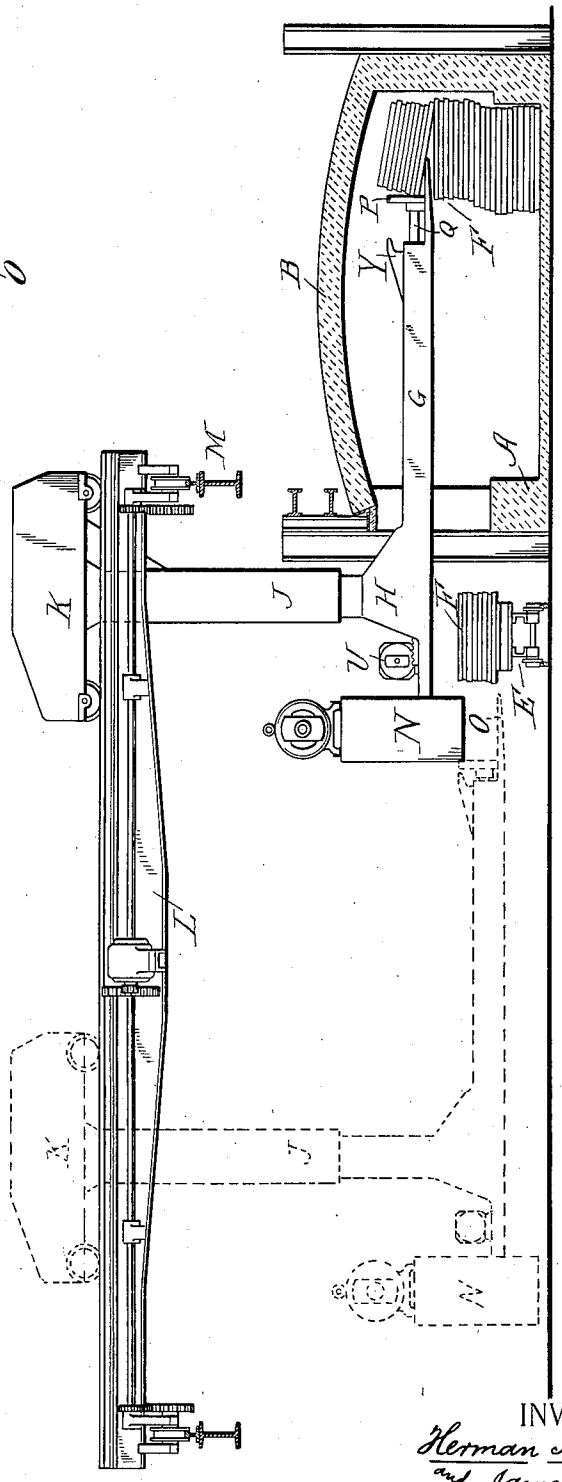


Fig. 4.



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3 SHEETS—SHEET 3.

Fig. 5.

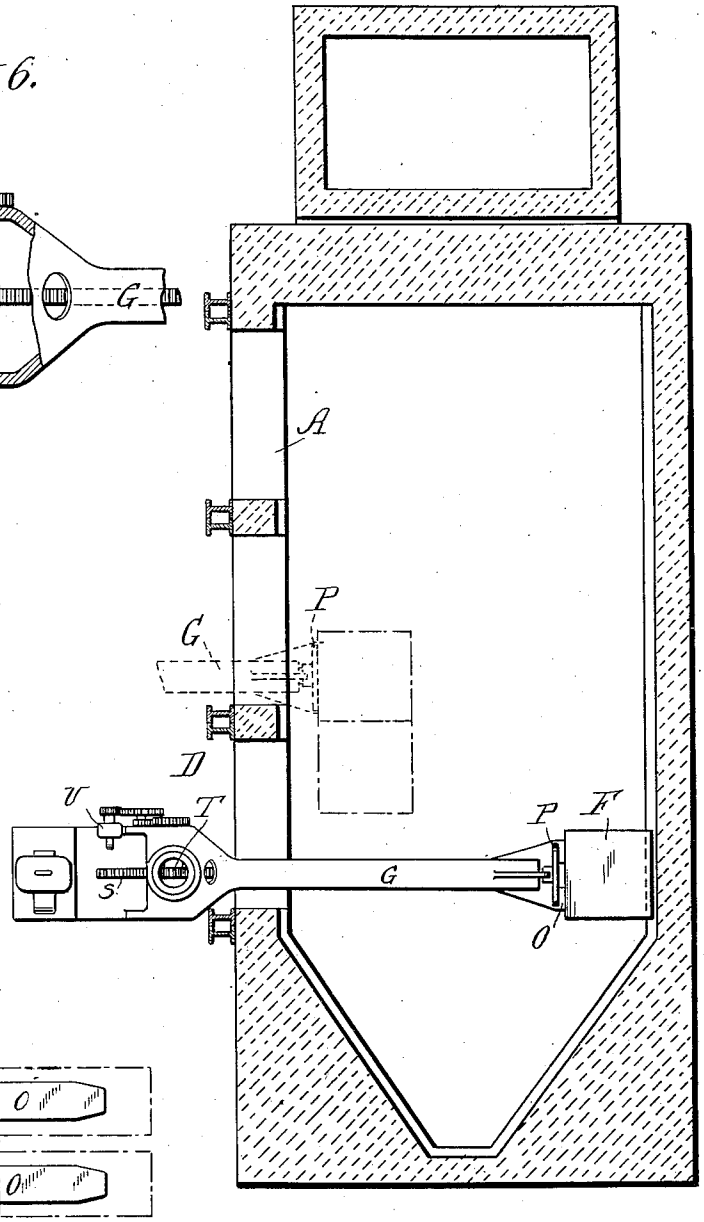


Fig. 6.

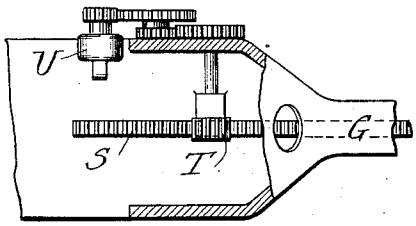
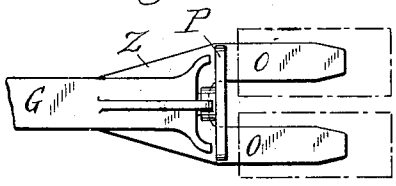


Fig. 7.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR CHARGING FURNACES.

No. 894,392. Specification of Letters Patent. Patented July 28, 1908.

Application filed May 17, 1907. Serial No. 374,252.

To all whom it may concern:

Be it known that we, HERMAN A. PROSSER, residing at Salt Lake City, in the county of Salt Lake and State of Utah, and JAMES B. LADD, residing in Ardmore, in the county of Montgomery and State of Pennsylvania, both citizens of the United States, have jointly invented certain new and useful Improvements in Apparatus for Charging Furnaces, of which the following is a specification.

This invention aims to provide an apparatus designed especially for feeding a charge of copper plates or pigs to a reverberatory furnace, and adapted also in its principal features to a variety of other uses.

An important feature of the invention is in the depositing of the successive loads which go to make up a charge in a position substantially parallel to its position upon the support on which it is introduced into the furnace. This makes possible the stacking of the charge accurately, and the filling of the furnace with a minimum air space between the sheets or other articles constituting the charge. The load is preferably removed from its support by a horizontal movement, and this makes possible the filling of the furnace substantially up to the roof so as to leave little or no space overhead. The preferably flat shape of the support for the load also facilitates the picking up of the load from a car by the automatic thrusting of the support under the load. The load when lifted from the car is freely movable laterally, longitudinally and vertically, so as to place it at any desired point in the furnace.

Various other features of improvement are referred to in detail hereinafter.

The accompanying drawings illustrate an embodiment of the invention.

Figure 1 is a side elevation partly in section of the principal parts of the apparatus; Figs. 2 and 3 are respectively a plan and end view of the support upon which the load is carried; Fig. 4 is a view similar to Fig. 1, illustrating more fully the several movements of which the apparatus is capable; Fig. 4ª is a side view of a car showing a support thrust under the load thereon; Fig. 5 is a horizontal section through the furnace and the principal parts of the charging apparatus; Fig. 6 is a horizontal section showing the mechanism on the rear end of the horizontal arm of the apparatus; Fig. 7 is a plan showing the adaptability of the apparatus to the handling of ingots.

Referring to the embodiment of the invention illustrated, the furnace A is of the reverberatory type with an arched roof B, and with doorways C between which are narrow posts D. A track is arranged along the front of the furnace on which run cars E carrying each a load F of the material to be charged into the furnace, each load being preferably of a convenient size to be picked up and transported into the furnace by charging apparatus. For the purpose of introducing the load well into the back of the furnace, the charging apparatus is provided with a long horizontal arm G, the rear end of which is provided with a post H telescoping into a leg J depending from a trolley K which runs back and forth in a longitudinal direction upon a bridge L, the ends of which are supported upon rails M, so that the bridge may be moved transversely. The operator sits in a cage N, and by operating suitable electric switches or other controlling devices, raises the arm (with the load carried at its end) and shifts it laterally or longitudinally at will. The mechanism for these several movements is not illustrated in detail, being familiar to those skilled in inventions of this class. Any one of numerous known systems may be used.

The support from which the load is carried is a flat fork O, rigidly carried upon the end of the arm G, so that the load may be picked up from the car E by simply thrusting the support O under the load F, the latter being blocked up to provide a space between the load and the platform of the car. This operation is very quickly accomplished by the operator in the cage N without outside assistance. The arm G, and with it the load, is then lifted slightly and shoved into the furnace and given the desired lateral, longitudinal or vertical movements until the load stands substantially at a point where it is to be deposited. The operator then brings into play the pusher P, which is forced outward in the manner shown in Fig. 4, and pushes the load off the support. As the load is pushed off its outer edge tilts downward and strikes the portion of the charge immediately below it, and it would be difficult to push it further. The operator very readily effects a compound movement, forcing out the pusher P and withdrawing the arm and support O

at the same rate of speed, so that the load is merely held stationary and its support withdrawn from beneath it. The load while carried on its support will therefore be first located immediately above its position of rest, and the subsequent operation will be substantially a withdrawal of the support from under it. The controlling mechanism may be so designed that when the load offers a determined resistance to the outward movement of the pusher P, the arm G and support will be automatically slipped backward by the pressure exerted by the pusher, so that the operator will not need to use any special care in obtaining the compound movement above referred to. This mode of operation, the ability to definitely place the load in substantially the final position which it is to occupy in the furnace, before withdrawing its support, is a very important advantage of this invention, making it possible to fill the furnace with the least air space between the parts of the charge and between the top of the charge and the roof, even though the latter be above the top of the door opening.

The movement of the pusher may be obtained by means of various mechanisms. For example in the embodiment of the invention illustrated, the pusher is a flat plate P mounted on the end of a square rod Q running through the hollow arm G and supported upon one or more antifriction rollers R. On its rear end the rod Q is provided with teeth to form a rack bar S, which is in engagement with the pinion T operated by means of any suitable train of gears from a motor U under control of the operator in the cage N. This mechanism permits a sufficiently rapid movement of the pusher and an accurate control of its position.

The support O is provided with two prongs as shown, so that it may carry plates or other articles extending across both prongs, as shown at V in Fig. 2; or so that each prong may carry a stack of smaller pigs W, Fig. 7. The pusher is provided with an extension X (Fig. 3) extending below the support O, preferably between the prongs thereof, so as to avoid plates or other thin articles catching between the pusher and the support, and so as at the same time to guide the pusher against lateral deflection.

The pusher extends somewhat above the top of the arm G, and a fin Y with an oblique upper edge is provided on the end of the arm for guiding the arm when it is being withdrawn through the door of the furnace. The support O also extends laterally beyond the sides of the arm G, and lateral fins Z with oblique edges are provided at the end of the arm for guiding the support laterally through the doors of the furnace.

The posts D between the door of the furnace are made of a width approximately twice the overhang of the plates V upon their support O, so as to secure the maximum strength for carrying the roof of the furnace, and at the same time to permit the plates to be stacked close to each other between the doors, as indicated in Fig. 5. The plate P and rod Q constitute in effect an abutment bar, and the plate O a carrying peel which moves on the abutment bar and is withdrawn from under the load by an outward movement relatively to the abutment bar.

We claim as our invention:—

1. In combination a car adapted to permit the thrusting of a support under a load carried thereby, and a charging apparatus including a flat support adapted to be thrust under the load on the car so as to pick it up and including also means for introducing the loaded support in a substantially horizontal position into the furnace and a pusher for pushing the load off said support.

2. An apparatus for feeding a charge into a furnace including in combination a support for a load of the charging material, means for introducing a loaded support into the furnace, means for pushing the load off the support while holding the support stationary in the furnace, and mechanism allowing the support to slip back from under the load when the latter meets with an obstacle to its being pushed off.

3. The combination with a furnace of an apparatus for feeding a charge thereinto, said apparatus having a narrow support over the sides of which its load overhangs, and said furnace having a plurality of doors with a post between each pair of doors, said post being approximately twice as wide as the overhang of the load.

4. An apparatus for feeding a charge into a furnace including in combination a flat support O, and a pusher P for pushing the load off said plate, said pusher having an extension below the level of the support to prevent any part of the load being caught between the support and the pusher.

5. A forked flat support O, and a pusher P having an extension X below the level of said support and lying between the prongs of said fork.

6. An arm G, a support, and means for removing the load from said support, said means extending above said arm, and there being a fin Y on said arm having an oblique edge for guiding the apparatus out through the furnace door.

7. An arm G carrying at its end a support extending laterally beyond the width of the arm, means for removing a load from said support extending vertically above the arm, and there being fins Y and Z extending obliquely outward from said arm and serving to guide the mechanism out through the furnace door.

8. In combination with a furnace, a track running alongside the door of the furnace,

a car for said track for conveying a load to a point adjacent to such door, said car being adapted to permit the thrusting of a support under the bottom of the load and the lifting of such load from the car, and a charging apparatus including a support adapted to be thrust under the load on the car and including means for lifting said support with its load and introducing the load into the furnace, and depositing it therein in a position substantially parallel with its position on the car.

9. The combination with a movable support and an abutment bar carried thereby, of a carrying peel mounted to move relatively to the abutment bar, and means for moving said abutment bar to push the load off the carrying peel while holding the latter stationary, said carrying peel also being movable outwardly to be withdrawn from under the load carried by same.

In witness whereof, I have hereunto signed my name in the presence of two subscribing witnesses.

HERMAN A. PROSSER.

Witnesses:
DOMINGO A. USINA,
FRED WHITE.

In witness whereof, I have hereunto signed my name in the presence of two subscribing witnesses.

JAMES B. LADD.

Witnesses:
LOUISE B. MORRIS,
HARRY W. GRANT.