(No Model.) 2 Sheets—Sheet 1.

G. R. WARD.

APPARATUS FOR CHARGING FURNACES.

No. 457,063. Patented Aug. 4, 1891.

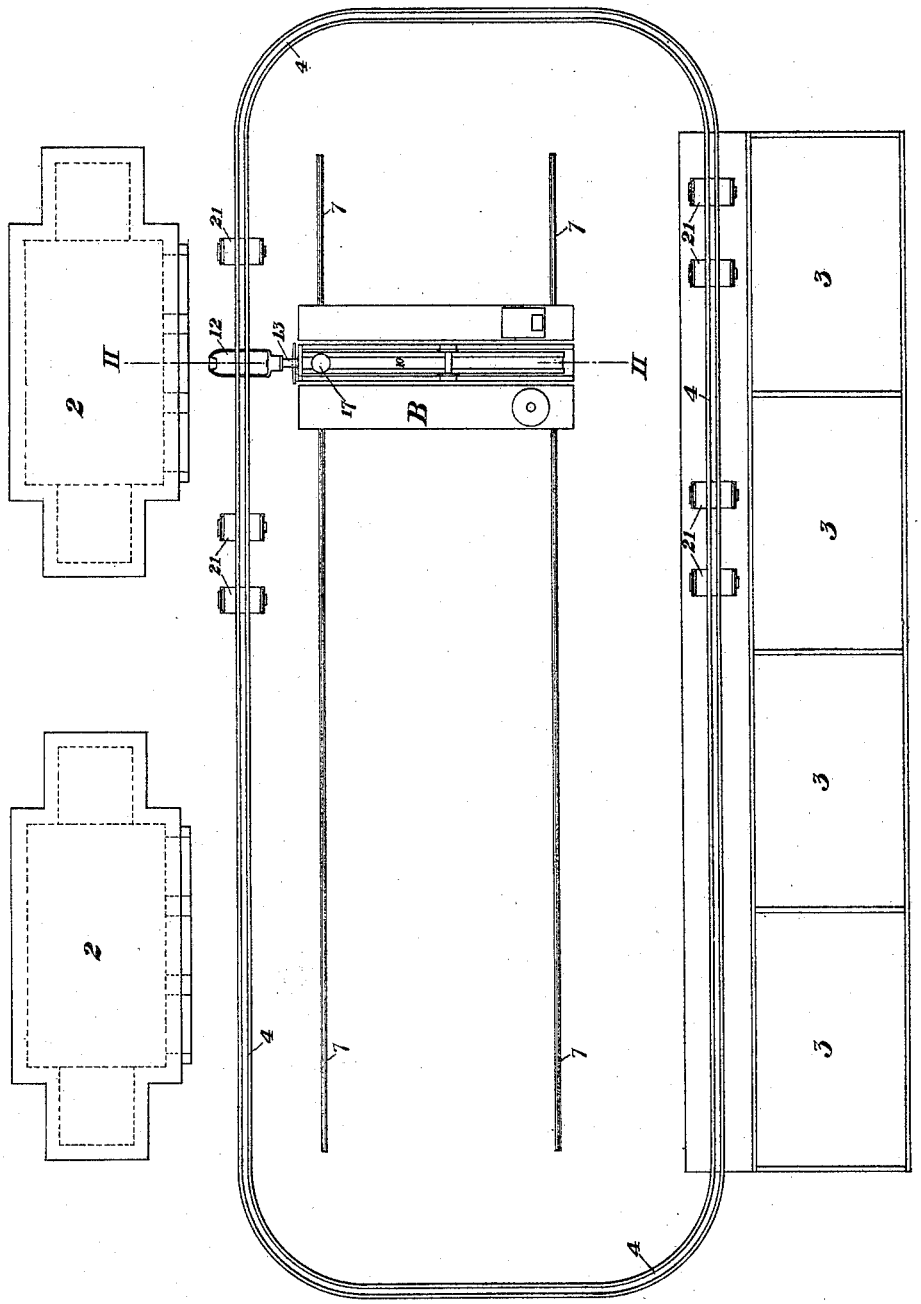

Fig. 1.

WITNESSES

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N. L. Gill

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George R. Ward

(No Model.) 2 Sheets—Sheet 2.

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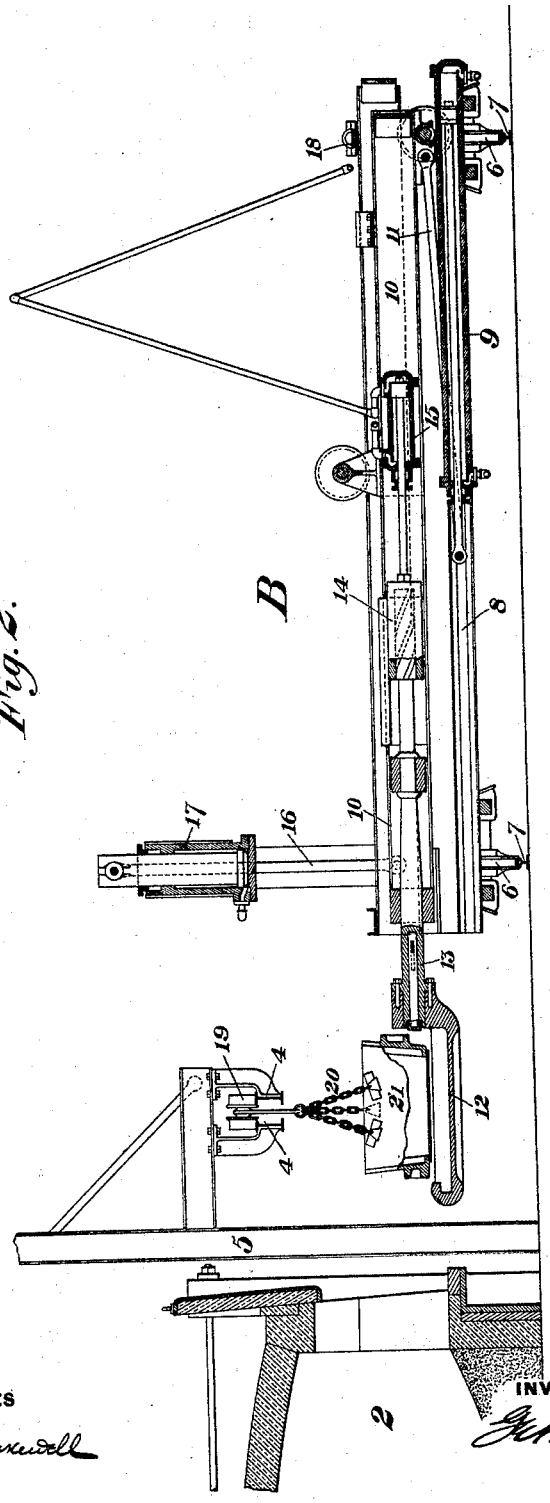

Fig. 2.

WITNESSES

Thomas W. Barwell

H. C. Gill

INVENTOR

George R. Ward

UNITED STATES PATENT OFFICE.

GEORGE R. WARD, OF MUNHALL, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO JAMES PURVES, OF SAME PLACE.

APPARATUS FOR CHARGING FURNACES.

SPECIFICATION forming part of Letters Patent No. 457,063, dated August 4, 1891.

Application filed January 26, 1891. Serial No. 379,179. (No model.)

To all whom it may concern:

Be it known that I, GEORGE R. WARD, of Munhall, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Apparatus for Charging Furnaces, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a plan view showing a mill plant provided with my improved apparatus. Fig. 2 is an enlarged vertical section on the line II II of Fig. 1.

Like symbols of reference indicate like parts in each.

The object of my invention is to improve the construction of apparatus used for charging metallurgical furnaces, principally open-hearth furnaces. The labor of introducing the heavy charge of metal into such furnaces by hand has led to the adoption of machines by which boxes containing the charge are introduced into the furnace and discharged therein. The contents of a number of such boxes must be used to make up a furnace-charge, and in the appliances heretofore used it has been found that much time is lost and labor unprofitably spent in handling the boxes, bringing them full to and removing them empty from the machine. My invention reduces such labor and makes the handling of the boxes easy and rapid.

Referring now to the drawings, 2 2 represent open-hearth furnaces, which may be of any suitable construction, and 3 3 are the bins in which the material to be charged into the furnaces is stored.

4 is a continuous overhead track which extends from the bins in front of the furnaces, and is supported by posts 5 or other suitable means. On this track are a number of trolleys 19, each provided with devices—such as tongs or hooks and chains 20—by which the charge-boxes 21 may be suspended and carried.

The charging-machine B is mounted on wheels 6, and is adapted to be moved on a track 7 back and forth in front of the furnaces.

The special form of machine shown in the drawings is not of my invention and is not claimed specifically herein apart from the combination with the other parts of the apparatus. Machines of other construction and operating in like manner may be substituted for it. The machine comprises a truck 8, on which is a power-cylinder 9, and a sliding carriage 10 is mounted on the truck and is connected by rods 11 with the plunger of the cylinder, so that by operation of the cylinder the carriage may be moved to and from the furnace.

12 is a cradle or box-holder carried by a rotary shaft 13, which projects from the front of the machine. This shaft is journaled in bearings on the carriage, and at its rear end has a threaded portion, on which is fitted a nut 14, connected with the plunger of a hydraulic cylinder 15, on projecting which the nut is moved longitudinally on the shaft, thus giving the latter a rotary motion designed to overturn the cradle and to empty the contents of a box carried thereby. The cradle is adapted to be moved vertically by the following means: At its rear end the carriage 10 is connected pivotally at 18 with its slide-bearing, which supports it on the truck, and at its front end the bearings on which the carriage moves are suspended by hangers 16 from the plunger of an upright lifting-cylinder 17, which is mounted on the truck. By admitting motive fluid to this cylinder the carriage and the cradle carried thereby may be raised or lowered on the pivot 18, as may be desired, for the purposes hereinafter stated. The cradle 12 is of proper construction to receive a box containing the metal charge, and is provided with suitable appliances, by which such box may be locked in place.

The operation of my improved apparatus, when constructed as above described, is as follows: A suitable number of boxes containing the material to be charged are suspended from the trolleys and are moved from the bins along the overhead track to positions in front of the furnaces. The charging-machine is moved on its track into position opposite to the furnace to be charged, and the cradle is brought directly beneath the overhead track. A trolley carrying a full box is then brought directly over the cradle, and by the action of the lifting-cylinder 17 the cradle is raised up to the box, and the box is lifted thereby so that the chains 20 can be disen-

gaged. The box is then locked in the cradle, and by projecting the carriage is introduced into the furnace. By action of the cylinder 15 the cradle can be upturned so as to empty the contents of the box upon the furnace-hearth, and then can be righted, withdrawn from the furnace, and brought again under the trolley. Then by raising the cradle, as above described, the chains can be connected to the box, the box unlocked from the cradle, and by dropping the cradle again the box is left suspended from the trolley and free to be moved away on the track to the bins for reloading. The next trolley and box may then be moved over the cradle, the box received by the cradle and put into the furnace, as described above. The work of handling the boxes is thus made very simple, since they may be run on the track close to each other and but a small moment of time taken in setting and removing them in and from the cradle. I obtain advantage also in saving of labor and in dispensing with the necessity for the use of locomotives and cars or traveling cranes for handling the boxes.

I claim—

In apparatus for charging furnaces, the combination, with a charging-machine having a box-support or cradle and means for delivering the same to the furnace, of an overhead track, trolleys mounted thereon, boxes suspended from the trolleys, and means for causing the vertical approach of the cradle and box, substantially as and for the purposes described.

In testimony whereof I have hereunto set my hand this 9th day of January, A. D. 1891.

GEORGE R. WARD.

Witnesses:
THOMAS W. BAKEWELL,
F. K. MCCANCE.