

No. 789,767.

PATENTED MAY 16, 1905.

G. T. SNYDER.

APPARATUS FOR CHARGING PLATES INTO FURNACES.

APPLICATION FILED JAN. 29, 1904.

2 SHEETS—SHEET 1.

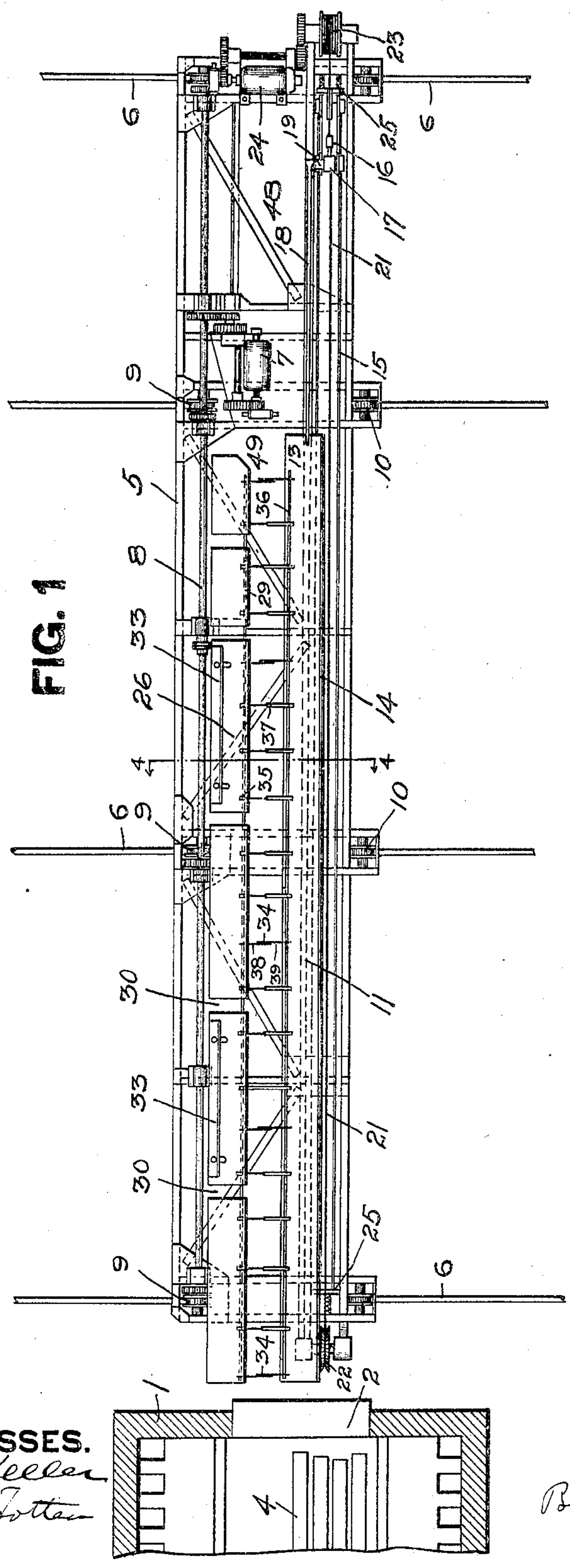
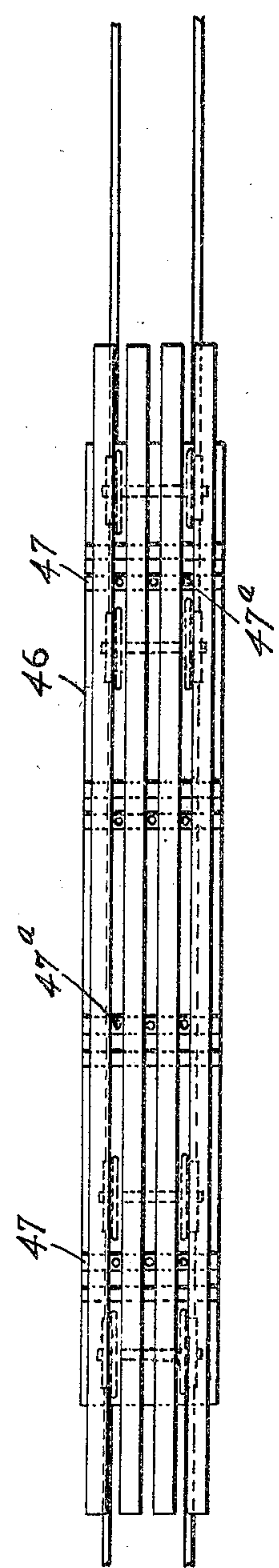


FIG. 1

WITNESSES.
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3 SHEETS—SHEET 2.

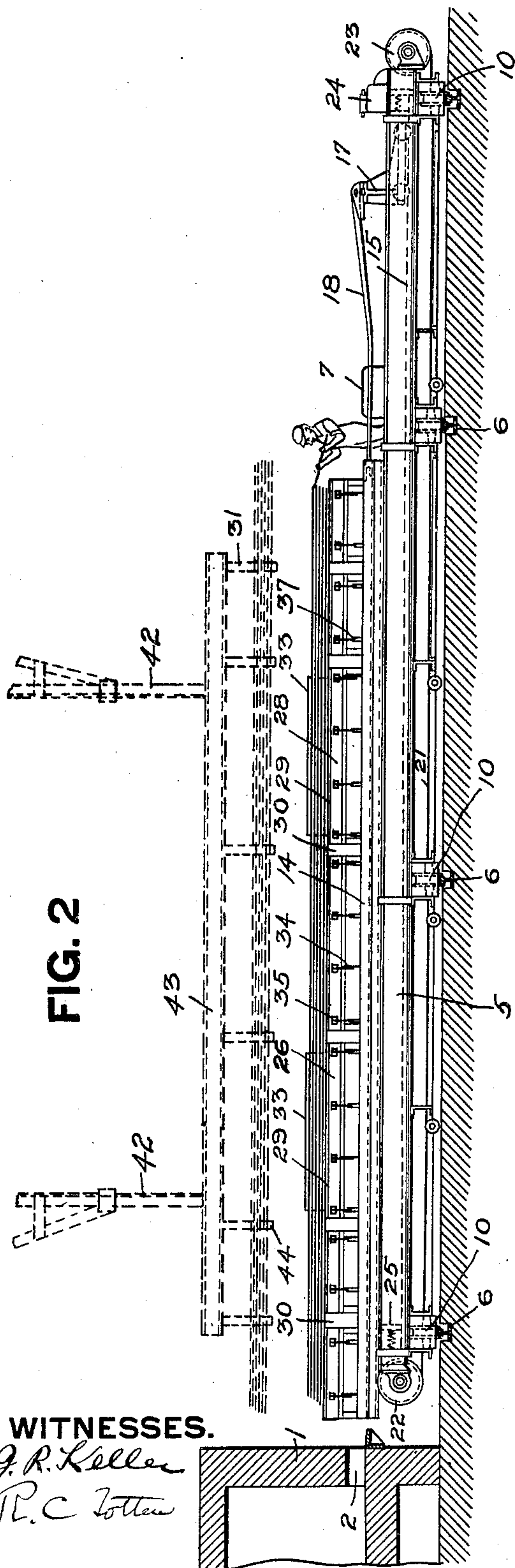


FIG. 2

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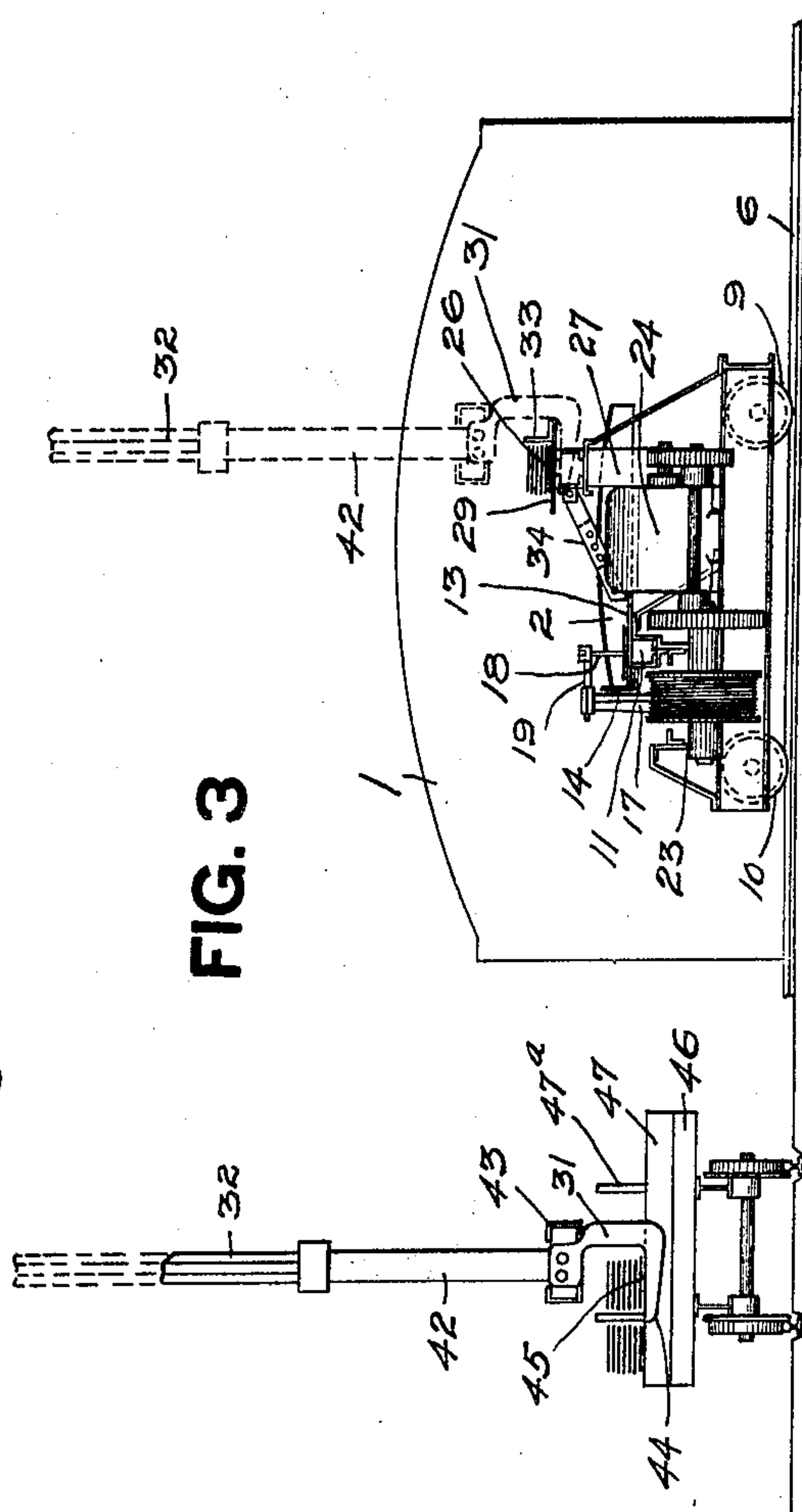


FIG. 3

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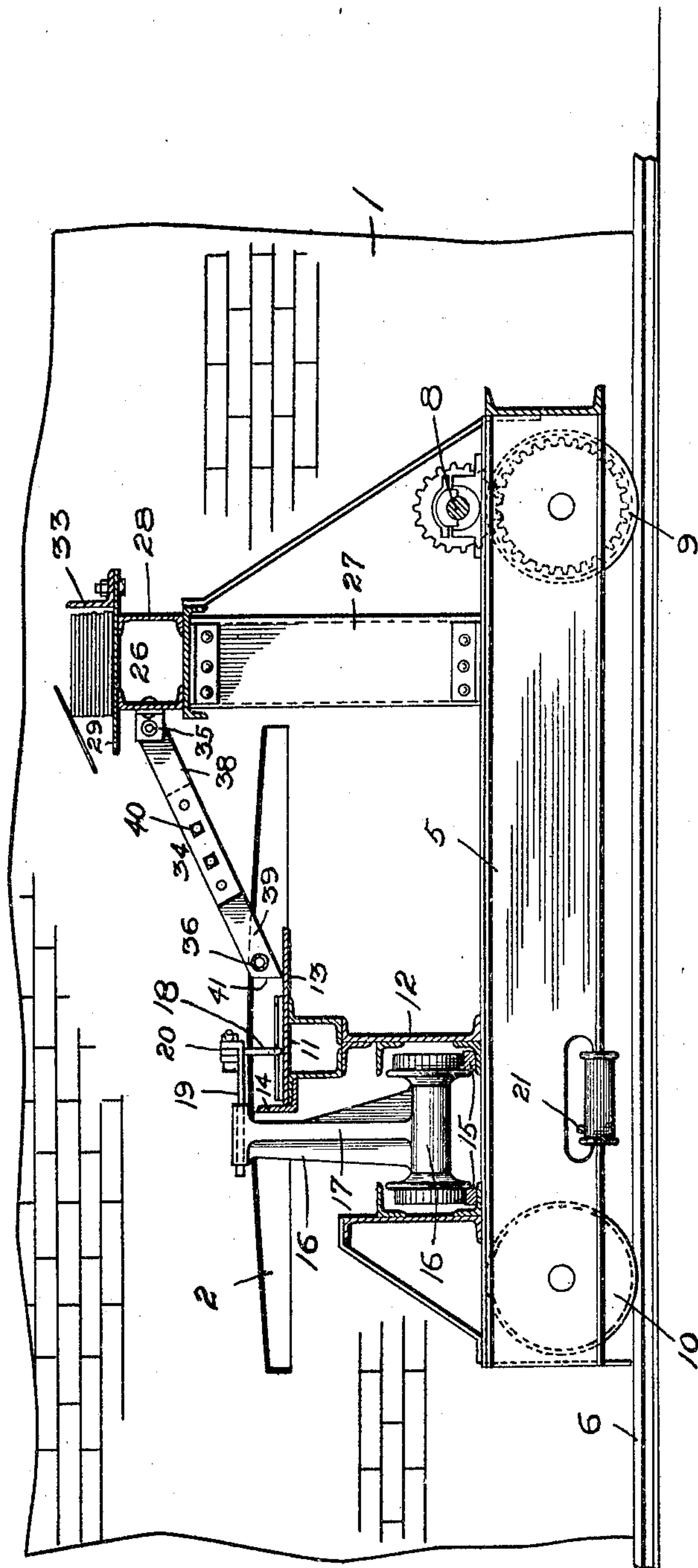
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3 SHEETS—SHEET 3.

FIG. 4



WITNESSES.

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UNITED STATES PATENT OFFICE.

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APPARATUS FOR CHARGING PLATES INTO FURNACES.

SPECIFICATION forming part of Letters Patent No. 789,767, dated May 16, 1905.

Application filed January 29, 1904. Serial No. 191,163.

To all whom it may concern:

Be it known that I, GEORGE T. SNYDER, a resident of McKeesport, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Apparatus for Charging Plates into Furnaces; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to apparatus for charging plates into furnaces—such, for example, as the charging of flat plates into bending or welding furnaces—either for the manufacture of tube-skelp or of tubing. Its main object is to provide for the carrying of a large number of plates on the charging-machine, so that the charging can be made continuous, while each plate can be so supported in the charging-machine that it will be fed under practically like conditions into the furnace-chamber.

The invention relates to the same general class as that shown in Letters Patent to P. C. Patterson, No. 715,852, of December 16, 1902. In said Patterson patent a series of plates, enough to charge a full hearth, were placed by the transfer mechanism directly on the support or guideway, from which they were charged into the furnace, and after the charging of these plates it was necessary to recharge the machine—that is, to feed to the machine the exact number of plates necessary for charging the full hearth—and for this reason the transfer mechanism had to be worked with great regularity, while it was necessary to separate the piles carried on a transfer-car into separate charges for feeding to the charging-machine. The feeding of the several plates from different levels into the furnace-chamber also raised difficulties, especially where the forward ends of the plates were bent into peculiar shape in the manufacture of butt-weld tubing. By this invention these difficulties are overcome.

It consists, generally stated, in the combination, with the furnace having a charging-opening, of a charging-bench having a guideway in line with the charging-opening, a pusher traveling longitudinally along the same, and a reservoir for the plates at the side

of and on a higher level than said guideway, such reservoir being adapted to receive and carry a large pile of plates—for example, much larger than that necessary for a full charge to the furnace—from which pile single plates can be fed to the guideway, so that each plate can be charged into the furnace under like conditions and while resting on the guideway instead of being charged while resting upon a pile of plates.

It also consists in certain other improvements hereinafter more fully set forth and claimed.

In the accompanying drawings, Figure 1 is a top or plan view of the apparatus. Fig. 2 is a side view thereof. Fig. 3 is an end view. Fig. 4 is a cross-section of the charging apparatus on the line 4 4, Fig. 1.

The furnace 1 may be of any suitable construction, either for heating plates for bending or heating plates for welding. It is provided with a suitable charging-opening 2, which, as shown, extends across the hearth of the furnace. The plates charged into the furnace are shown at 4, the furnace-hearth being arranged to receive a number of plates side by side, as illustrated, the furnace shown being adapted to receive about seven plates. The charging mechanism is shown in the form of a carriage 5 traveling laterally across the furnace on suitable tracks 6 in order to charge the plates in the different positions desired. I prefer to make this charging-carriage entirely self-contained, and for the purpose of moving the carriage laterally across the furnace-hearth I provide the reversing electric motor 7, which by suitable gearing drives the shaft 8, extending longitudinally of the charging-carriage, and turning the wheels 9, running on the tracks 6, the other supporting wheels, 10, being mounted loosely in bearings, so that by said motor the carriage may be moved into any desired position. The carriage is provided with the charging-platform or guideway 11, supported on standards 12, such guideway having a top plate 13 extending continuously for the necessary length for charging the plates and having the wall or flange 14 extending

along the same to hold the plates in proper line during charging. Extending longitudinally of the carriage are suitable tracks 15, on which runs the buggy 16, provided with the upright standard 17, carrying the pusher or picker arm 18, the support 19 of which extends laterally from the upright 17 above the guideway wall 14 and the picker-rod being pivoted, as at 20, so as to bring the picker-rod in position to travel longitudinally along the top plate 13 of the guideway 11. Any suitable mechanism may be employed for propelling the pusher, the drawings showing a chain or cable 21 connected to the buggy and passing around the grooved wheel or sheave 22 at the forward end of the carriage and extending back to the grooved drum 23, which is driven by the motor 24 through suitable gearing, as shown, said motor 24 providing for the longitudinal travel of the buggy 16 in either direction and the carriage being provided with the buffers 25 at each end to check the movement of the buggy on the carriage. At the side of the guideway is the plate-reservoir 26, which, as shown, is supported on the carriage by means of suitable standards 27, the reservoir being preferably formed of the channel-bars 28, resting on the standards and supporting the plates 29, the plates and their supporting-channels being formed in sections, so as to leave spaces 30 to receive the transfer-hooks of the overhead crane 32, by which the plates are carried to and delivered upon the plate-reservoir. This plate-reservoir is made of suitable width to receive different sizes of plates and has on its outer side—that is, the side farthest from the guideway 11—the side wall 33, formed of suitable angles bolted to the plates 29. The plate-reservoir 26 is preferably on a higher level than the guideway 11, and to provide for the delivery of the plates from the reservoir to the guideway I provide a suitable inclined way 34, shown in the form of a skid-frame pivoted to the plate-reservoir, as at 35. This skid-frame is made up of a series of inclined bars connected at their bases to the longitudinally-extending bar 36, and to arrange the charging apparatus for plates of different width the skid-frame is made adjustable, being formed of telescoping bars and tubes 37 and of adjusting-bars 38 39, fitting side by side and connected by suitable bolts 40, these bars having a series of adjusting-holes, so that the skid-frame may be adjusted to different widths, and so provide different widths of guideway for the charging of the plates, the plates resting between the wall 14 of the guideway 11 and the ends 41 of the adjusting-bars 39.

The overhead transfer-crane 32 may be of any suitable construction, the parts thereof illustrated having the depending arms 42, carrying the longitudinal beam 43, from which the hooks 31 depend, said hooks having the

laterally-extending arms 44, having horizontal upper supporting edges 45 of suitable width to receive the pile of plates from the transfer-car 46 and lift the same therefrom and carry them to the reservoir. For the support of the plates the car 46 has a series of transverse bars 47 and may have the upright separating-pins 47^a thereon, the piles of plates resting on the car, as illustrated in Fig. 3, so that the hooks of the transfer-crane may pass under the pile of plates and may raise the plates therefrom and carry them over and deposit them upon the reservoir 26, the depending hooks 31 passing within the spaces 30 between the sections of the reservoir.

In the operation of the apparatus above described a pile of plates, the number of which will of course vary according to the thickness thereof, but which can be sufficient in number for forming two or more charges for the furnace, is carried from the transfer-car and deposited upon the reservoir, as shown. For the charging of the furnace two operators are employed, one of whom stands on the working platform 48 and moves the charging-platform 11 of the carriage into line with the different charging-spaces in the furnace and operates the pusher 18, while the other stands on the platform 49, as illustrated in Fig. 2, and by means of a suitable tool lifts the rear end of the top plate on the reservoir and slides the plate down onto the skid-platform, from which it drops onto the charging-platform or guideway 11. The pusher is then advanced, its forked end catching the plate and pushing it along the charging-platform into the furnace, and as soon as the plate is so charged, and, if desired, before the pusher-bar is withdrawn from the furnace, the top plate on the reservoir is lifted in like manner and slid down into position for the next charging operation, during which time the charging-machine is brought into line with the next space in the furnace to which the plate is to be charged. The pusher-bar can travel over such plate in returning to position for the next charging stroke. As the plate is pushed into the furnace the wall 14 and the inner ends 41 of the skid-frame form the guide means, said ends 41 being sufficiently close for the proper guiding of the plate. The charging-platform or guideway can be made of any desired width, according to the width of the plates to be charged, and for that purpose its top plate 13 is made of greater width and provides for the adjustment of the skid-platform to utilize different widths of plates, such top plate 13 supporting the lower end of the skid-frame. As the charging-platform or guideway 11 is made of proper height for the charging of the plates through the charging-opening and onto the hearth, it is evident that each plate is charged under like conditions and that the difficulties of charging the top plate of a pile resting on the charging-platform are thus

overcome. As the reservoir can hold a large number of plates, the difficulties experienced in the operation of the charging-crane are overcome as to the necessity for charging the reservoir with plate after each transverse movement of the charging apparatus across the furnace is done away with. The reservoir can be recharged with a pile of plates during the time that a plate is being fed along the guideway into the furnace, so that no time need be lost in recharging.

For the charging of smaller and light-weight plates, and especially for the charging of plates for the manufacture of double-length butt-weld tubing, the apparatus has been found very efficient.

What I claim is—

1. In plate-charging apparatus, the combination with a furnace having a charging-opening, of a charging-platform in line with the charging-opening, a pusher traveling longitudinally thereof, a plate-reservoir at the side of and on a higher level than said charging-platform, and inclined guides connecting the reservoir and charging-platform.

2. In plate-charging apparatus, the combination with a furnace having a charging-opening, of a charging-platform in line with the charging-opening, a pusher traveling longitudinally thereof, a plate-reservoir at the side of and on a higher level than said charging-platform, and a laterally-adjustable inclined skid-frame connecting the reservoir and charging-platform.

3. In plate-charging apparatus, the combination with a furnace having a charging-opening, of a charging-platform in line with the charging-opening, a pusher traveling longitudinally thereof, a plate-reservoir at the side of and on a higher level than said charging-platform, said charging-platform having a vertical wall at the side farthest from the reservoir, and inclined guides connecting the reservoir and charging-platform, the lower ends of which limit the side movement of the plates.

4. In plate-charging apparatus, the combination with the furnace having a charging-opening, of a charging-carriage in front of said furnace, a plate-support on the charging-carriage formed of separate sections having

transverse spaces between the same, a transfer-car having transverse plate-supports, and an overhead crane having plate-carrying hooks with horizontal upper supporting edges adapted to pass between the plate-supports of the car and between the separate sections of the plate-support on the carriage and so transfer the plates to the carriage.

5. In plate-charging apparatus, the combination of a laterally-traveling carriage having a charging-platform thereon, a pusher traveling longitudinally thereof, and a plate-reservoir supported on the carriage at the side of the charging-platform, said reservoir having a vertical wall at the side farthest from the charging-platform.

6. In plate-charging apparatus, the combination of a laterally-traveling carriage having a charging-platform thereon, a pusher traveling longitudinally thereof, and a plate-reservoir on the carriage at the side of and at a higher level than the charging-platform, said reservoir having a vertical wall at the side farthest from the charging-platform.

7. In plate-charging apparatus, the combination of a charging-platform having a top plate, a plate-reservoir at the side of and on a higher level than the charging-platform, and an inclined skid-platform pivoted to the reservoir and having its lower edge resting on the platform and formed of a series of telescoping bars connected to a longitudinally-extending bar at the lower edge of the frame.

8. In plate-charging apparatus, the combination of a charging-platform having a top plate, a plate-reservoir at the side of and on a higher level than the charging-platform, and an inclined skid-platform pivoted to the reservoir and having its lower edge resting on the platform and formed of a series of telescoping bars connected to a longitudinally-extending bar at the lower edge of the frame, and means for the lateral adjustment of said bars.

In testimony whereof I, the said GEORGE T. SNYDER, have hereunto set my hand.

GEORGE T. SNYDER.

Witnesses:

F. W. WINTER,
ROBERT C. TOTTEN.