

P. C. PATTERSON.  
PLATE CHARGING MECHANISM.

APPLICATION FILED DEC. 14, 1903.

NO MODEL.

3 SHEETS—SHEET 1.

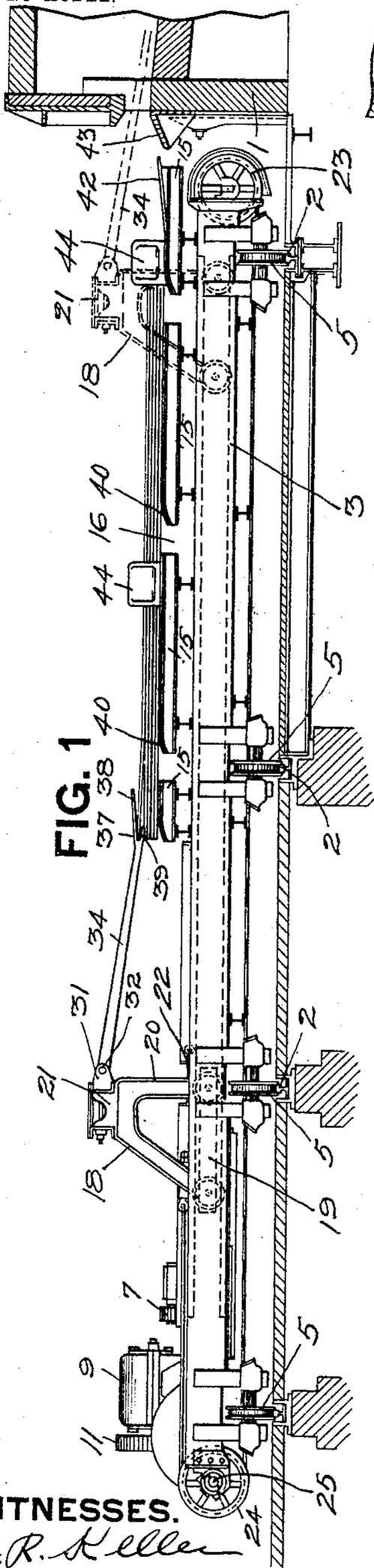


FIG. 1

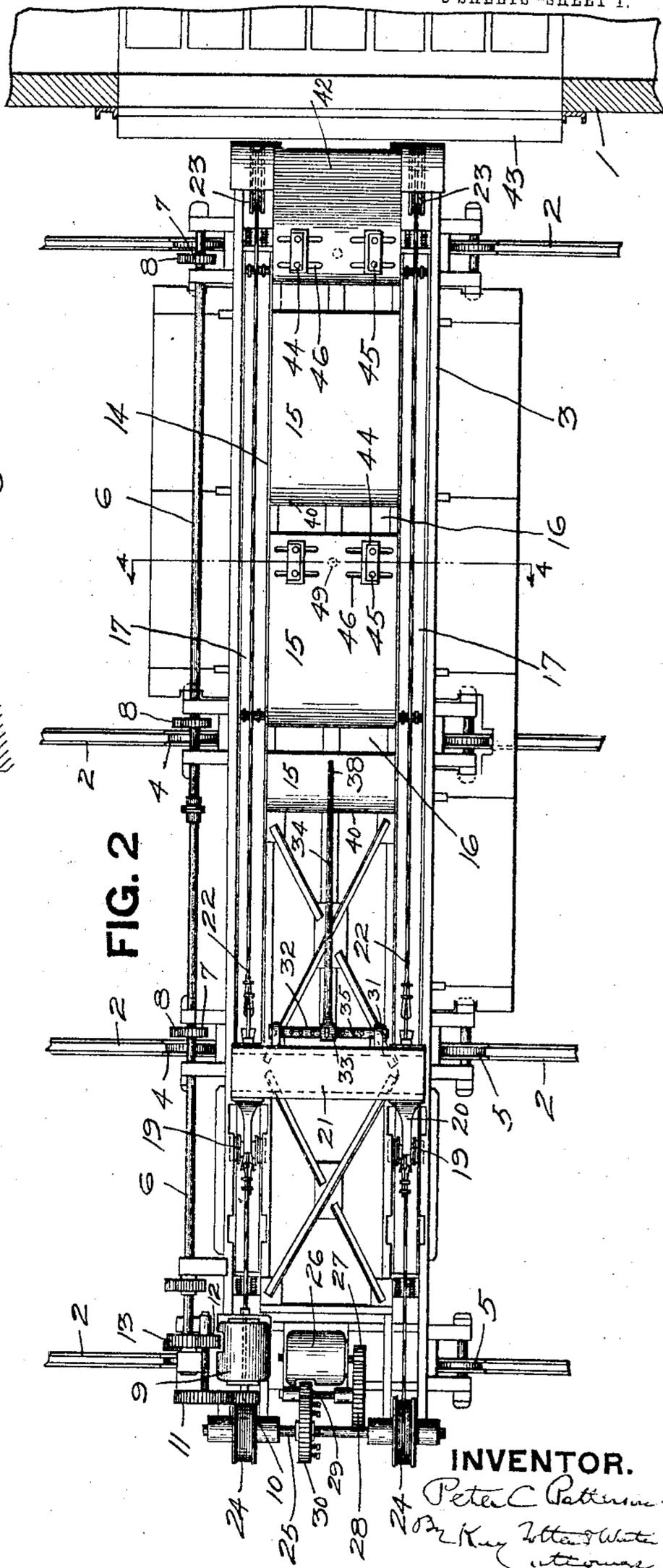


FIG. 2

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*Peter C. Patterson*  
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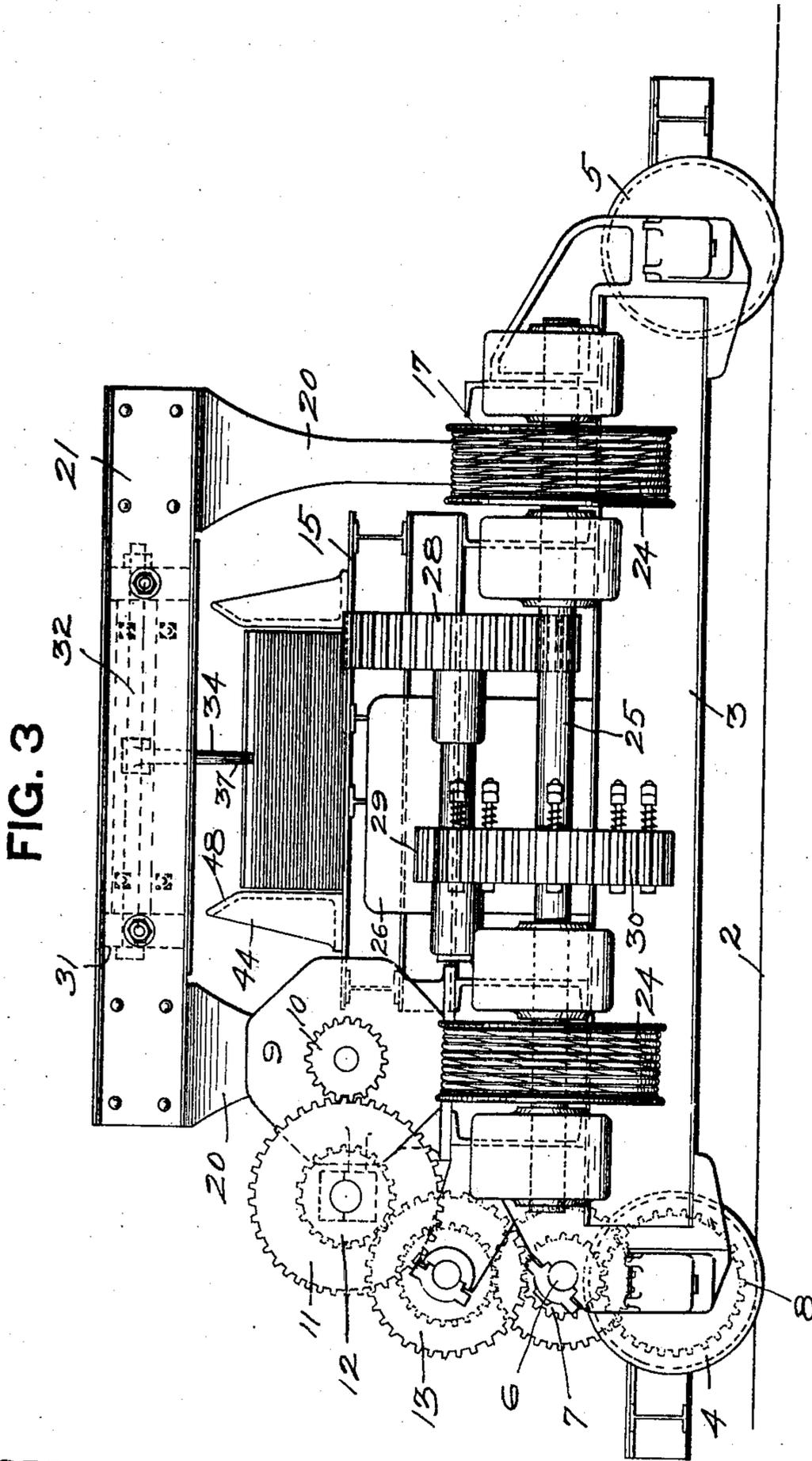


FIG. 3

WITNESSES.

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No. 771,493.

PATENTED OCT. 4, 1904.

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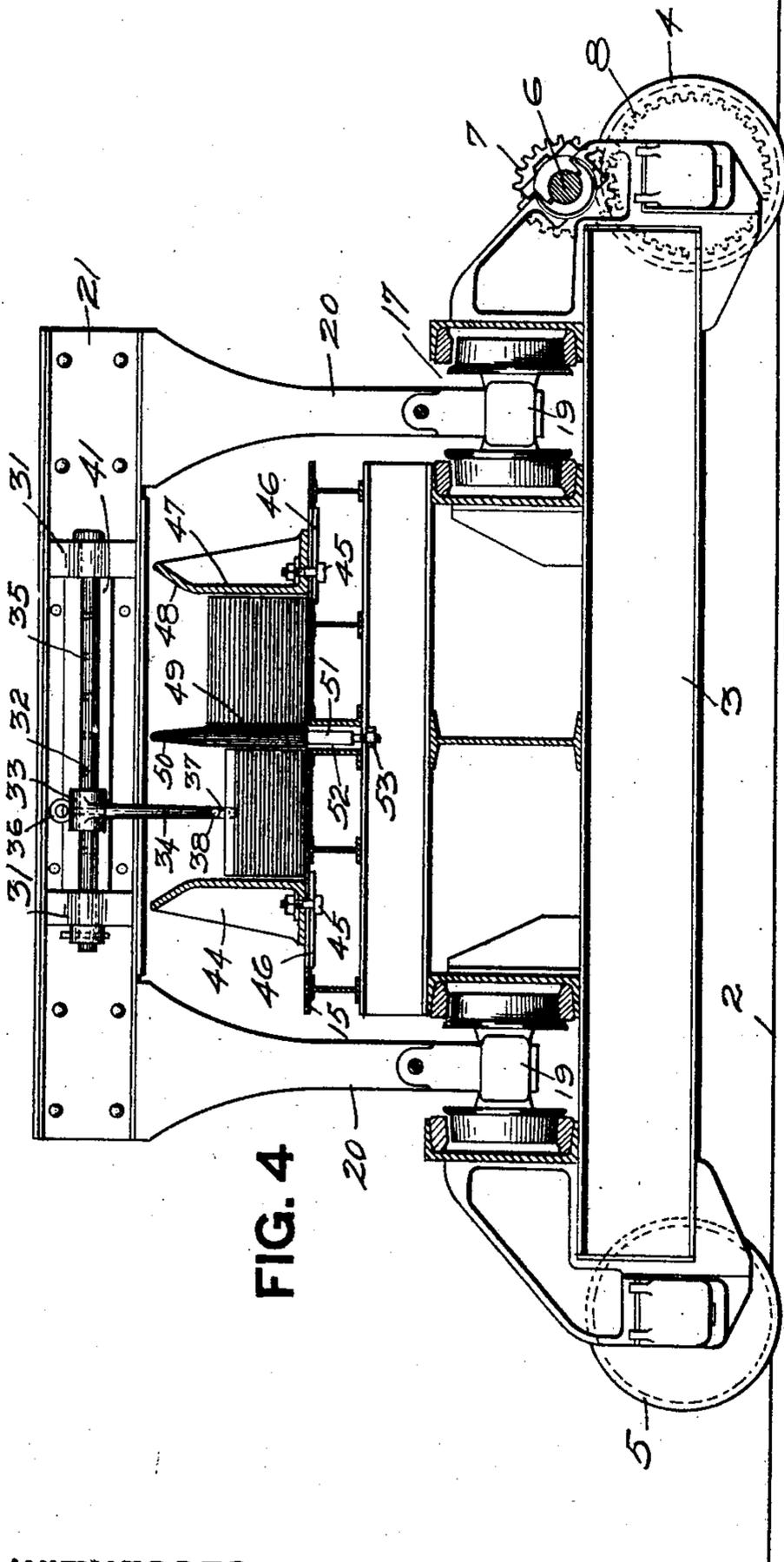


FIG. 4

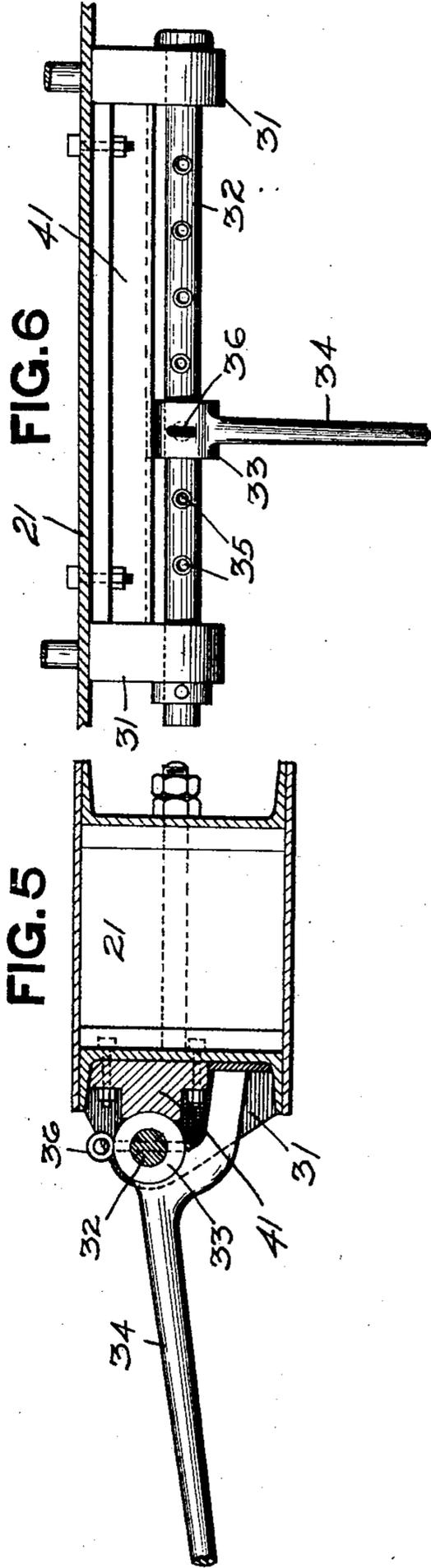


FIG. 5

FIG. 6

WITNESSES.

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# UNITED STATES PATENT OFFICE.

PETER C. PATTERSON, OF McKEESPORT, PENNSYLVANIA, ASSIGNOR TO NATIONAL TUBE COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

## PLATE-CHARGING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 771,493, dated October 4, 1904.

Application filed December 14, 1903. Serial No. 185,109. (No model.)

*To all whom it may concern:*

Be it known that I, PETER C. PATTERSON, a resident of McKeesport, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Plate-Charging Mechanism; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to furnace-charging apparatus, and is especially applicable to the charging of plates or skelps into the heating-furnace preparatory either to bending or welding. It is particularly designed for the charging of very heavy and wide plates or skelps, which in some cases weigh as much as a ton and are over four feet wide.

One object of the invention is to provide for the charging of such plates one at a time from a pile of plates delivered onto the charging-machine and to provide sufficiently strong and rigid mechanism for the handling thereof.

In previous constructions of plate-charging machines where the individual plates were charged from a pile of plates the traveling support for the pusher arm or bar has been located at one side of the pile of plates and the bar is extended out at the side thereof, so as to bring it to the center of the pile of plates, this being necessary or desirable in order to cause the individual plates to enter the furnace in a straight line. With the very heavy and wide plates to which the present machine is adapted the heavy torsional strain on such arm at the side of the pushing-carriage causes the tilting or twisting of the carriage or twisting of the bar and gives difficulty in the travel of the pushing-carriage on its track.

The object of the present invention is to overcome these difficulties and to improve this class of machinery in other particulars; and it consists, generally stated, in the combination of a central supporting table or frame, tracks on each side of the same, and a pushing-carriage traveling on said tracks and having a transverse body portion extending across above the supporting-table and carrying a pusher.

It also consists in providing such carriage

with a laterally-adjustable pusher, so that the carriage can be arranged either for charging extremely wide or heavy plates, in which case the pusher is located centrally of the table or from different piles on the table, as may be desired.

It also consists in providing such pushing-bar with a long upper finger or prong adapted to rest upon the pile of plates, and so hold the pusher in proper position for engaging with the next lower plate of the pile.

It also consists in certain guide mechanism adapted both for the entrance of the plate into the furnace and for holding plates of different widths or different piles of plates in proper position for such feeding.

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

In the accompanying drawings, Figure 1 is a side view of apparatus embodying the invention. Fig. 2 is a top or plan view thereof. Fig. 3 is a rear end view. Fig. 4 is a cross-section on the line 4 4, Fig. 2, looking in the opposite direction and showing the apparatus arranged for the handling of two piles of plates; and Figs. 5 and 6 are detail views showing the mounting of the pusher-bar on the pusher-carriage.

In the accompanying drawings, the rear end of the furnace is shown at 1, the furnace-hearth in charging these heavy plates for bending being made sufficiently wide to receive several plates, as indicated in plan view. In front of this furnace are a series of tracks 2, supporting the main carriage or frame 3, which may be of any suitable construction, being shown in the drawings as made of structural shapes. This carriage is provided with wheels traveling on the tracks, having on one side of the carriage the power-driven wheels 4 and on the other side the trailer-wheels 5.

As illustrated in the drawings, the carriage is moved transversely on the tracks across the mouth of the furnace through the medium of the longitudinal shaft 6, carrying pinions 7, meshing with gear-wheels 8, carried on the same axles as the driving-wheels 4. This

shaft extends to the rear of the machine, where it is driven by the motor 9, through gear connections 10 11 12 13. The shaft can of course be driven in any suitable way. The main frame carries the supporting-table 14, which, as shown in the drawings, is formed in different sections 15, these sections being separated by transverse slots or openings 16, which are provided to permit passage of the depending hooks or other mechanism of the overhead crane carrying the pile of plates, it being necessary that there should be several such transverse slots on account of the weight of the pile of plates handled. On each side of the table 14 is the longitudinal track or way 17, extending for practically the full length of the machine, and mounted on the same is the pushing-carriage 18, formed of the truck 19, from which extend upwardly the standards 20, one on each side of the central table, these standards supporting the transverse body portion 21.

As shown in the drawings, the trucks and standards of the carriage may be formed of castings, while the transverse body portion is built up of channels, a very strong structure thus being arranged to straddle or pass over the main frame or table. The machine is arranged to receive a large pile of plates fifteen to eighteen (15 to 18) inches high, and the transverse body portion of the pusher-carriage extends above the table a sufficient distance to permit of the passage of the carriage over such pile. I prefer to employ for imparting motion to the carriage a rope drive and for that purpose have shown the same in the drawings, the ends of the ropes 22 being connected one to each truck and passing forward around pulleys 23 and thence back to the drums 24 and from said drums forward to the rear end of the trucks. The two drums 24 are carried on the shaft 25, which is driven by the motor 26 through gear connections 27, 28, 29, and 30, the gear 30 being arranged as a slip-gear to guard the mechanism against too heavy strains. Such slip-gear is desirable in such machine on account of the sudden strains which may be brought upon the pushing-carriage and its mechanism, as it guards the motor and other mechanism from undue strain.

The machine, as above stated, is arranged for pushing from a single pile of very wide plates or from two piles of narrower plates one plate at a time. In order to arrange the pushing mechanism to this end, I mount on suitable bearings 31, secured to the forward face of the transverse body 21 of the pushing-carriage the transverse shaft 32, over which fits the sleeve 33 of the pushing-bar 34. This bar 34 is made laterally adjustable upon the shaft 32 in any suitable way, the drawings showing the shaft having a series of holes 35 drilled through the same to receive the adjusting-pin 36, locking the pushing-bar sleeve in any desired position, and the pushing-bar extends

forward from its sleeve in position to travel over the table supporting the plates, this mechanism providing for the locking of the pushing-bar in proper line with the center of the plate to be charged, so overcoming any tendency of the plate to travel out of the straight course in entering the furnace.

As the transverse shaft 32 is necessarily of some length to provide for the lateral adjustment of the pusher-bar to suit the different plates, it is evident that if it were required to sustain the entire strain of pushing the heavy or wide plates into the furnace it would be liable to bend under this strain, especially if weakened by the adjusting-holes above referred to. To guard against this, I place upon the transverse body portion of the pushing-carriage directly back of the sleeve 33 and extending for the full width of the adjustment of the pusher-bar the supporting-bearing 41, which receives the thrust upon said bar, relieving the shaft 32 from transverse strain, transmitting said strain through the sleeve of the pusher-bar directly to the body portion of the pushing-carriage.

As shown in the drawings, the pushing-bar 34 is provided at its forward end with a fork 37, which is adapted to engage with the rear end of the plate and push it into the furnace. This fork has a long upper finger or prong 38, which extends a considerable distance in front of the lower prong 39, so that when the pusher is drawn back this long upper prong will rest upon the upper plate of the pile after the lower prong is drawn past the same, and so support the pusher in position to engage with the upper plate of the pile, as illustrated in the drawings. As the lower prong necessarily extends below the plate with which the fork engages, (the rear end of the top plate being lifted slightly by the operator as the fork is pushed forward to engage therewith,) it is evident that in pushing the lowest or last plate of the pile into the furnace this lower prong of the fork in passing over the transverse slots 16, formed in the table 14, would strike against the rear portion of the section 15 in front of such transverse slots, and so be prevented from forward travel. To overcome this difficulty, as shown in the drawings, the rear portion of each section 15 of the table is formed downwardly inclined, as at 40, forming an inclined guideway for the fork and overcoming this difficulty.

As shown in the drawings, the top of the table 14 is arranged on a lower level than the furnace-hearth. The table is so constructed for two reasons. In the first place, where a high pile of plates is employed it is not desirable that the plates should drop a great distance onto the hearth, and so cause undue wear of the bottoms. By employing a table on a lower level the upper plates are entered into the furnace without requiring any very high door or opening.

As shown in the drawings, the table is provided with the upwardly-inclined guideway 42, which extends up toward the mouth of the furnace and directs the plates in the lower part of the pile upwardly into the same, the furnace having also the inclined guideway 43 along its mouth, which coöperates therewith. This forward inclined guideway raises the forward ends of the plates in the lower part of the pile and also performs another function, especially if the machine is employed in the charging of plates in butt-welding. The plates for such purpose have the corners trimmed from the forward ends, and such forward ends are also bent to peculiar shape, being raised to travel over the furnace-bottom and slightly curved transversely to impart a tendency to turn in proper tubular shape in the welding-bell. In pushing such plates into the furnace with the table depressed below the furnace-mouth as the forward end of the plate is pushed up the upwardly-inclined guideway 42 it lifts the body of the plate above the upwardly-bent forward ends of the other plates in the pile and provides for the proper guiding of such plates into the furnace without interference of the plates under the same.

In arranging the apparatus for the charging of single plates and in order to hold the plates in proper alinement I provide the side guides 44 at intervals on the table, such guides being supported thereon by means of bolts and nuts 45, connecting with transverse slots 46 in the table. These guides have inner vertical walls 47, adapted to bring the pile of plates into proper alinement, and above the same the outwardly-flaring top portions 48 to receive the plates as they are lowered by the crane and direct them into the lower portion of the guideways. In working with wide plates it is only necessary to employ these side guides; but where narrower plates are used and the table is adapted to receive two piles at one time, as the crane can carry such loads, in order to separate the piles of plates upon the table I provide the central guide-pins 49, secured to the table at intervals along its central line, these pins having the upper tapering end portions 50, as shown. These pins can be secured in place in any suitable way, being shown as provided with shafts 51, extending down through holes or slots 52 in the frame of the machine and secured in place by bolts 53.

In the operation of the apparatus above described the pile of plates is brought to the mill on suitable cars, and by means of an overhead crane the pile of plates is lifted from the car, the several hooks of the crane passing under the same and the pile is carried over the charging-machine and lowered down into the same, the hooks passing through the slots 16 of the table. As the pile of plates is lowered onto the table by the crane the flaring upper por-

tions 48 of the side guides engage with the same and draw the plates into proper alinement, directing the plates down between the vertical walls 47 of such side guides, which are adjusted to make an easy fit for the plate, the plates being in this way brought to proper alinement and proper position for charging. The operator then through suitable levers causes the advance of the transverse pushing-carriage 18 until the long prong or finger 38 of its pushing-bar 34 rests on the top plate of the pile, and the operator at the side of the pile by means of a suitable tool lifts this top plate slightly and holds it in that position until in the advance of the pusher-bar the lower prong 39 passes onto the top of the next lower plate, which forms a surface for the support of the same as the top plate is entered into the furnace. The charging-machine is adjusted into proper line with the part of the hearth onto which the plate is to be charged, and the pushing-carriage is then drawn forward, pushing the top plate between the guides 44 into the mouth of the furnace, the pushing-bar traveling the proper distance into the furnace to bring the plate to the desired longitudinal position therein. In charging from a single pile of plates the pushing-bar 34 is adjusted to the center line of the pile and held in that position, it being important to so locate the same that it will exert a direct pushing action and cause no tendency for the plate to travel to either side, as would be the case if it engaged with the plate on either side of the center line thereof. The operation proceeds in this way, the plates in the upper part of the pile dropping easily onto the hearth, while as the pile is diminished the plates in the lower part of the pile pass up the inclined forward guideway 42 of the table and are fed in this way properly into the furnace. In these operations the pusher-bar is drawn back until its lower prong passes the rear end of the next plate, while the long top finger of the same rests on the plate, and the pusher-bar being thus supported in proper position to engage with the next plate. In case it is desired to work the machine with two piles of plates, such as in the charging of narrower plates, the central pins 49 are secured in position along the center line of the table, a suitable number of the same being employed, and the side guides are adjusted to provide the proper spaces between the pins and the guides for the reception of the plates, and as the plates are lowered onto the table the tapering upper ends of the pins with the flaring upper edges of the side guides guide them laterally to proper position on the table. The pushing-arm is then adjusted laterally on the shaft 32 to bring it into the central line of one of the piles and secured in that position, and that pile is charged into the furnace one plate at a time, when it can be quickly adjusted in proper relation with the other pile of plates and that

pile of plates so charged in the furnace, provision being thus made for the handling of a large number of narrow plates.

It is evident that in the operation of the machine, as the pushing-carriage is supported on both sides of the table and as the power connections are made with the carriage on both sides of the same, the carriage is adapted to push very heavy or wide plates into the furnace, while it is relieved from any torsional strain, and a rigid and durable construction adapted to handle large or small plates, as may be desired, is provided. Where the pushing-bar engages with the lowest plate of the pile in traveling along the different sections of the table formed by the transverse slots 16, it passes up the inclined rear ends of such plate-sections, and liability of its catching or holding to the same is thus overcome.

What I claim is—

1. In furnace-charging mechanism, the combination of a supporting table or frame, tracks on each side thereof and a pushing-carriage traveling on said tracks and having a body portion extending transversely across and above the table and carrying a pusher.

2. In furnace-charging mechanism, the combination of a supporting table or frame, tracks on each side thereof, a pushing-carriage having trucks traveling on said tracks, standards extending up from said trucks, a transverse body portion extending across from the trucks above the supporting-table, and a pusher carried by said transverse body portion.

3. In furnace-charging mechanism, the combination of a supporting table or frame, tracks on each side thereof, a pushing-carriage having trucks traveling on said tracks, and a body portion extending across above the supporting-table and carrying a pusher, and power connections for imparting motion to the pushing-carriage connected to both trucks.

4. In furnace-charging mechanism, the combination of a supporting table or frame, tracks on each side thereof, and a pushing-carriage traveling on said tracks and having a transverse body portion extending above the table and carrying a pusher, and driving-ropes or like means connected to both trucks and extending forward over pulleys and to drums mounted on a single power-shaft.

5. In furnace-charging mechanism, the combination of a supporting table or frame, tracks on each side thereof, a pushing-carriage traveling on said tracks and having a body portion extending across above the supporting-table, and a pusher-bar mounted so as to be laterally adjustable on said body.

6. In furnace-charging mechanism, the combination of the supporting table or frame, a pushing-carriage having a body portion extending over the same, a transverse shaft mounted on said body portion, a pusher-bar having a sleeve fitting around and laterally ad-

justable on said shaft, and a supporting-bearing on said body portion back of said sleeve and adapted to receive the thrust thereof.

7. In furnace-charging mechanism, the combination of a supporting table or frame, and a pushing-carriage provided with a pushing-bar adapted to travel along the table, the supporting-table being divided transversely into sections and the rear ends of the sections being formed downwardly inclined.

8. In furnace-charging mechanism, the combination of a supporting table or frame, and a pushing-carriage having a pushing-bar traveling along the same, said pushing-bar having a forked forward end, the upper prong of which fork is made long to rest upon the pile of plates.

9. In furnace-charging mechanism, the combination with the furnace, of a supporting table or frame on a lower level than the furnace-mouth and having an upwardly-inclined forward end, and a pushing-carriage having a pusher traveling along the table.

10. In furnace-charging mechanism, the combination of a supporting table or frame, and a pushing-carriage having a pusher traveling along the same, and side guides supported on the table having vertical guiding-walls with flaring upper ends.

11. In furnace-charging mechanism, the combination of a supporting table or frame, a pushing-carriage having a pusher traveling along the same, side guides secured to the table, and removable center guides adapted to be secured to the table between the same.

12. In furnace-charging mechanism, the combination of a supporting table or frame, a pushing-carriage having a pusher traveling along the same, side guides secured to the table, and removable center guides adapted to be secured to the table between the same, the side guides having flaring upper ends and the center guides having tapering upper ends.

13. In furnace-charging mechanism, the combination of a supporting table or frame, a carriage carrying a pusher traveling on the same, side guides secured to the table and removable center guides adapted to be secured between the side guides, the pusher being laterally adjustable on the pushing-carriage.

14. In furnace-charging mechanism, the combination of a supporting table or frame, tracks on each side thereof, and a pushing-carriage traveling on said tracks and having a body portion extending across above the supporting-table, a laterally-adjustable pusher carried by said carriage, and side guides and removable center guides secured to said table.

In testimony whereof I, the said PETER C. PATTERSON, have hereunto set my hand.

PETER C. PATTERSON.

Witnesses:

ROBERT C. TOTTEN,  
G. C. RAYMOND.