

No. 777,450.

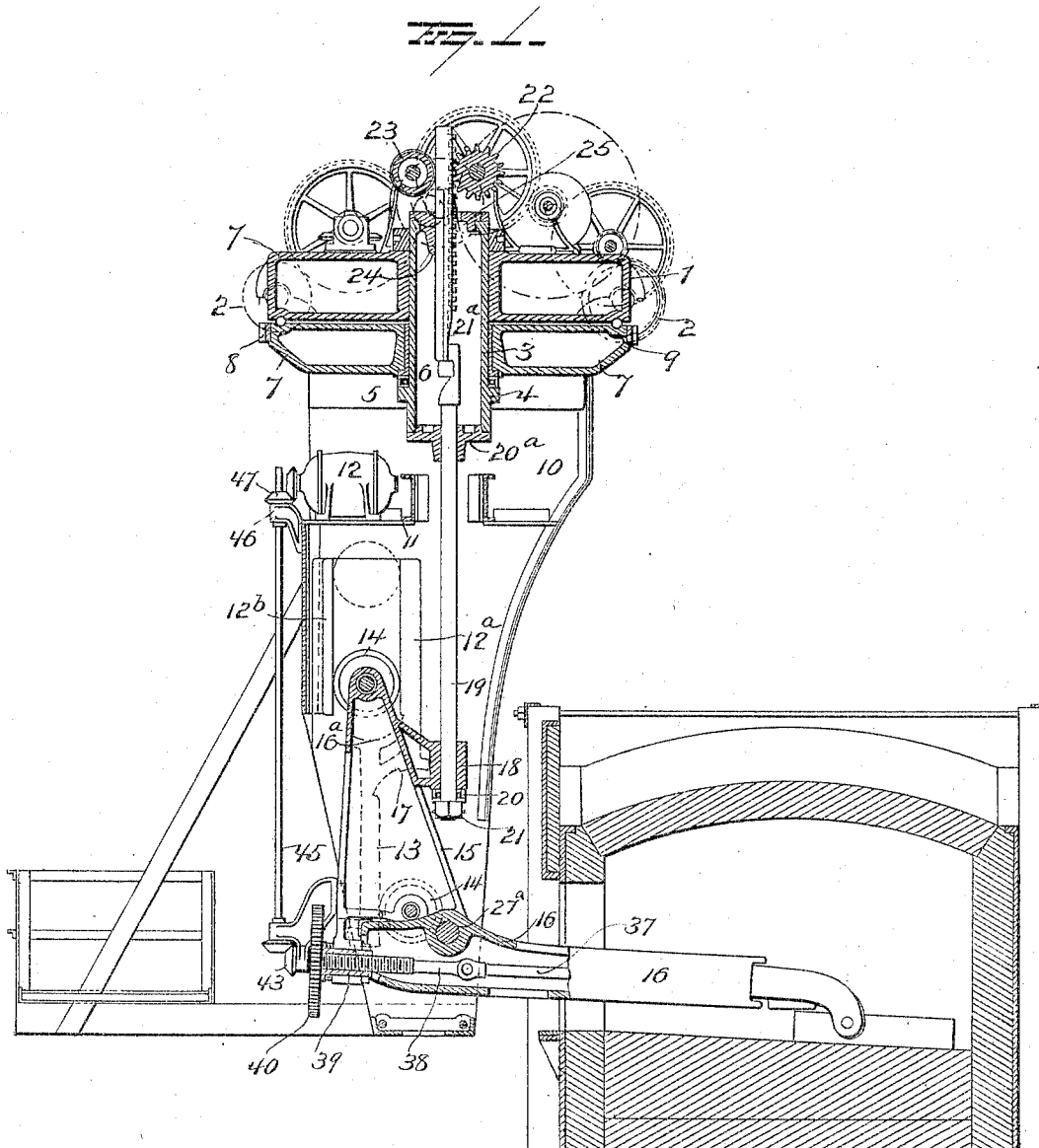
PATENTED DEC. 13, 1904.

C. L. TAYLOR.
FURNACE CHARGING CRANE.

APPLICATION FILED APR. 27, 1903.

NO MODEL.

3 SHEETS—SHEET 1.



WITNESSES

E. Nottingham
J. W. Foster

INVENTOR

Clarence L. Taylor,
By H. A. Seymour,
Attorney

No. 777,450.

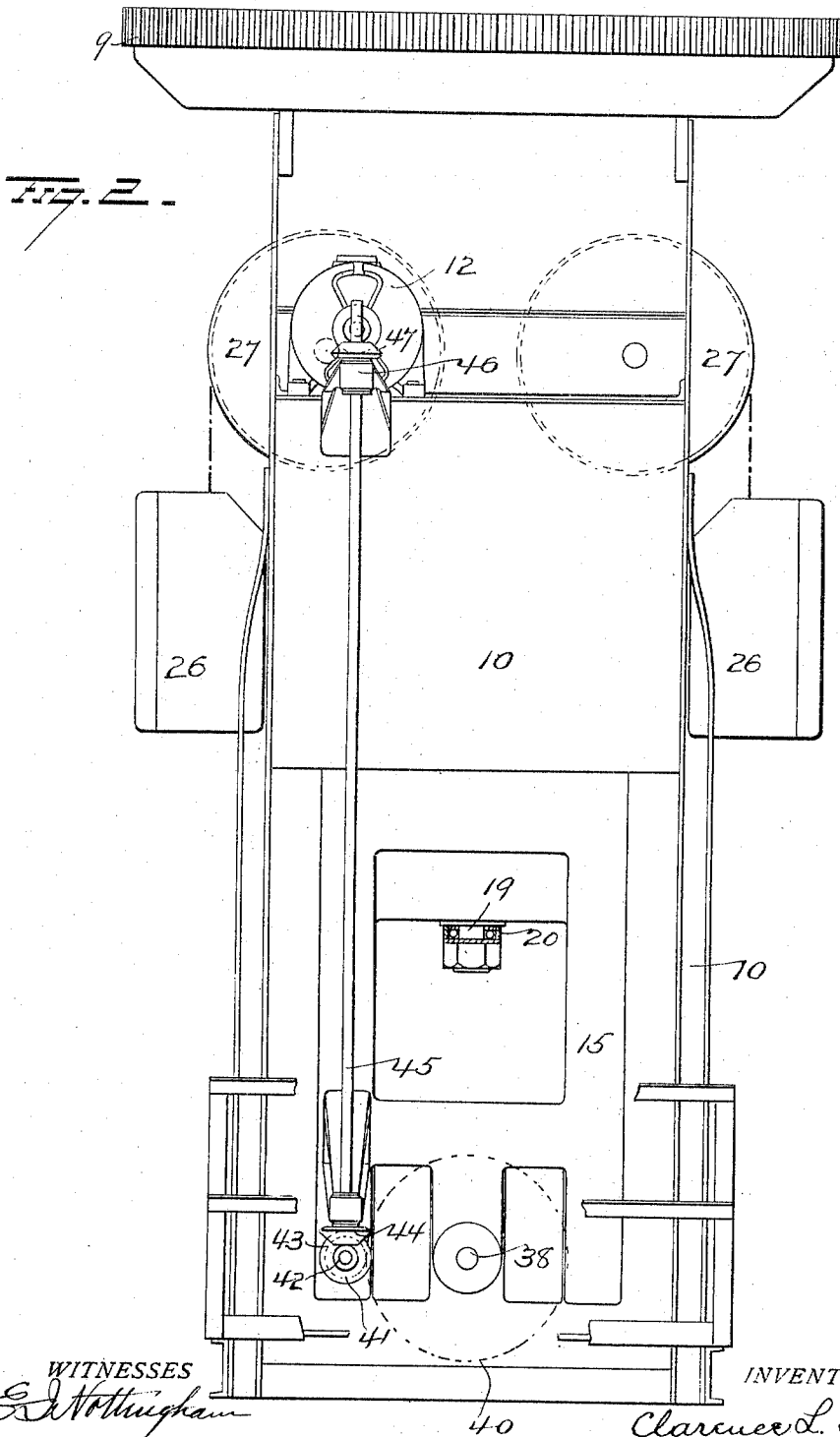
PATENTED DEC. 13, 1904.

C. L. TAYLOR.
FURNACE CHARGING CRANE.

APPLICATION FILED APR. 27, 1903.

NO MODEL.

3 SHEETS—SHEET 2.



WITNESSES

E. Nottingham

J. W. Foster

INVENTOR

Clarence L. Taylor
By H. A. Seymour
Attorney

No. 777,450.

PATENTED DEC. 13, 1904.

C. L. TAYLOR.
FURNACE CHARGING CRANE.

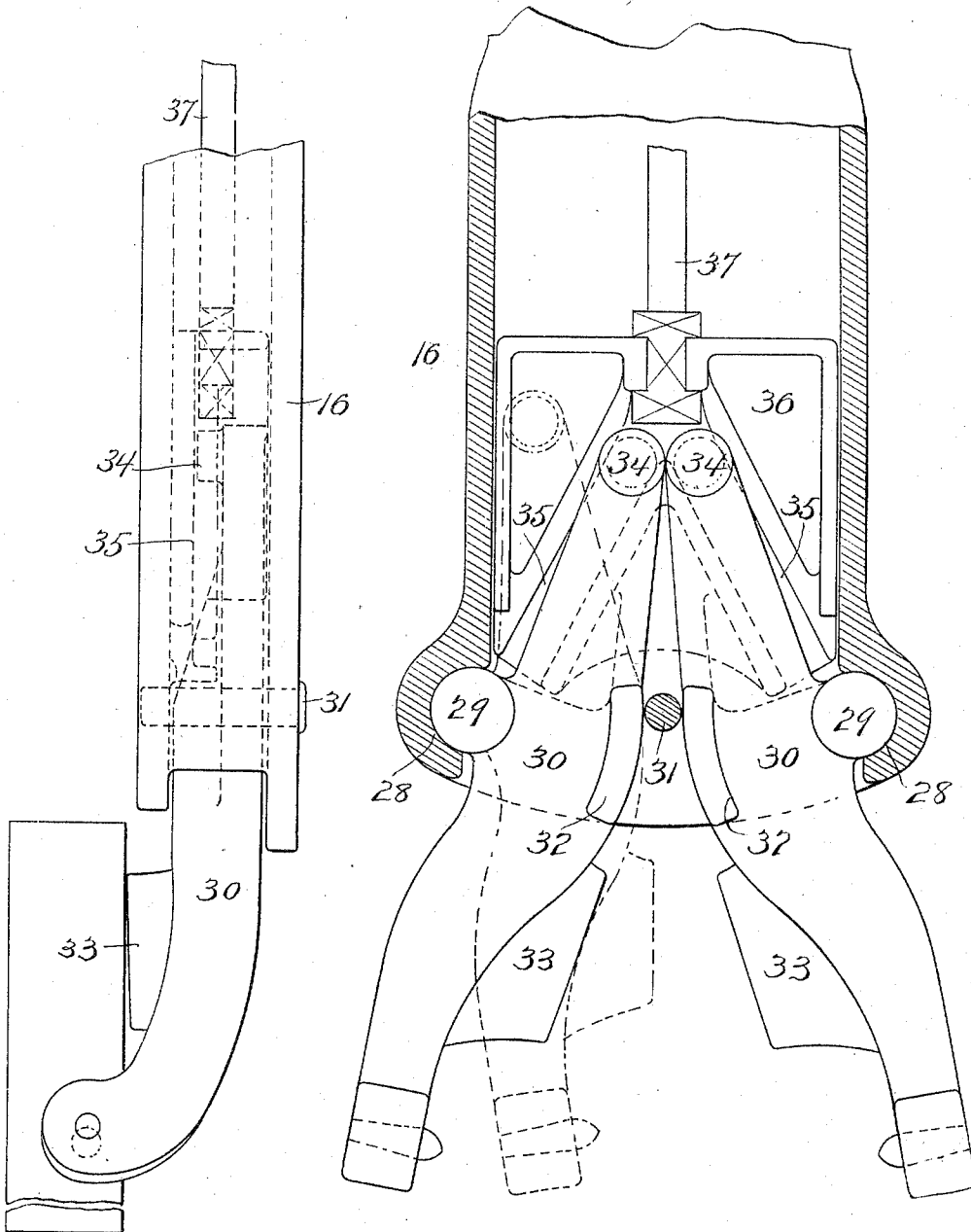
APPLICATION FILED APR. 27, 1903.

NO MODEL.

3 SHEETS—SHEET 3.

~~Fig. 4~~
NO MODEL.

~~Fig. 3~~



WITNESSES

Ed. Nottingham
A. W. Foster

INVENTOR

Clarence L. Taylor
By H. A. Seymour
Attorney

UNITED STATES PATENT OFFICE.

CLARENCE L. TAYLOR, OF ALLIANCE, OHIO, ASSIGNOR TO THE MORGAN ENGINEERING COMPANY, OF ALLIANCE, OHIO.

FURNACE-CHARGING CRANE.

SPECIFICATION forming part of Letters Patent No. 777,450, dated December 13, 1904.

Application filed April 27, 1903. Serial No. 154,451. (No model.)

To all whom it may concern:

Be it known that I, CLARENCE L. TAYLOR, of Alliance, in the county of Stark and State of Ohio, have invented certain new and useful Improvements in Furnace-Charging Cranes; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an improvement in charging and discharging cranes designed more particularly for placing slabs into and removing them from furnaces; and it consists in the parts and combination of parts, as will be more fully described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a view in vertical section of my improved apparatus. Fig. 2 is a view in rear elevation of the depending frame, showing the counterweights. Fig. 3 is a view in section of a portion of the tongs-carrying frame, showing the tongs in elevation; and Fig. 4 is a side view of a portion of the tongs-carrying frame and the tongs.

1 represents a trolley having track-wheels 2, designed to travel on the rails of an overhead-traveling-crane bridge. (Not shown.) This trolley may be of any approved construction and is provided with a motor and gearing for imparting lengthwise travel of the trolley on the bridge, a motor and gearing for imparting a turning or rotary motion to the turn-table carrying the depending frame, and a motor and gearing for moving the rack-bar vertically. Instead, however, of employing a motor and gearing for each of the movements above referred to these several motions may be transmitted from a lesser number of motors by the interposition of suitable clutches.

Passing centrally through the trolley is the hollow post 3. This post is secured to the trolley and depends below same and is provided at a point just above its lower end with a shoulder 4, carrying the grooved ring 5, in which are mounted the antifriction rollers or balls 6.

7 is the turn-table, circular in form and

provided centrally with an opening to receive the post 3. This table rests on the antifriction-balls 6, and similar balls 8 are interposed between the lower face of the trolley and the upper face of the table near the outer edge of the latter, so as to prevent frictional contact between the table and the trolley.

The turn-table 7 is provided on its periphery with the rack-bar 9, with which a pinion actuated by the table-operating motor meshes and which operates to rotate the table and the parts carried thereby.

Depending from the table 7 is the hollow frame 10, which latter is provided at a point near its upper end with a horizontal seat or support 11 for the motor 12, which latter actuates the tongs, as will be hereinafter explained, and at its opposite sides with the guides or tracks 12^a and 13, against which the wheels 14 on the truck 15, carrying the tongs-carrier 16, rest and move and by which truck 15 is caused to move and be maintained in approximately vertical position. The wheels 14 at the upper end of the truck bear against the rearwardly-facing track 12^a and are maintained thereagainst by the guides 12^b, while the lower wheels 14 rest against the forwardly-facing track 13, and as the weight is sustained by the lower forward end of the truck it will be seen that the arrangement of tracks and wheels prevent any tilting of the truck.

Each trackway 12^a terminates below in a curved seat 16^a, which form an abutment for the wheels 14 and limit their downward movements, while the lower tracks are provided at their upper ends with similar abutments 17, which limit the upward movement. The truck 15 is triangular shape in side elevation, as shown in Fig. 1, and is of such size as to permit it to freely move up and down within the frame 10 and is provided on its front face at a point near its upper end with the forwardly-projecting bracket 18, through which the rod 19 passes. The opening in this bracket is in line with the axis of the turn-table 7, so as to permit the truck 15 to turn on the rod 19 as the turn-table turns, the antifriction rollers or balls 20 being introduced between the nut 21 on the rod 19 and the

lower face of bracket 18, so as to reduce friction. The upper end of rod 19 passes through the head 20^a of the post 3 and is connected to the rack-bar 21^a, which latter engages pinion 22, connected up by gearing to a suitable motor, the rack-bar being supported at its rear side by the roller 23, located in a plane with pinion 22, and by the flange 24, depending from the upper head 25 of post 3. From this it will be apparent that as the rack-bar is carried by the trolley it does not rotate with the table, but is connected through bar 19 with the truck 15, so as to permit the latter to revolve freely.

The weight of the truck 15 is counterbalanced by the weights 26, which latter are connected by cables or chains with the truck, the cables or chains passing over the pulleys 27, (see Fig. 2,) carried in the sides of frame 10 near its upper end and connected to the track near the vertical center of the latter. These weights 26 are designed to approximately counterbalance the weight of the truck and its connected parts, thus imposing on the rack and motor but little weight in excess of the slab or article engaged by the tongs.

The tongs-carrying frame 16 is pivoted at 27^a to the truck 15 by a pin and projects forwardly well in advance of the frame 10, so as to permit the frame 16 to pass the necessary distance into a furnace, and is so attached in order to be easily removable in case of injury to same from exposure to the heat of the furnace.

The free or outer end of the tongs-carrying frame is open, as shown in Figs. 3 and 4, and is provided near its free end with the curved seats 28 for the reception of the curved bearings 29 on the tongs-levers 30, the said bearings 29 being retained in their seats by the removable pin 31, interposed between the levers and passing through holes in the top and bottom plates of the frame 16. The inner surfaces of the levers adjacent to the pin 31 are provided with the hardened wearing plates or surfaces 32, which moving or rubbing against the pin 31 prevents undue wear. To release either or both levers it is simply necessary to remove the pin 31, move the lever 30 inwardly to disengage its bearing from the seat, and then withdraw it.

Each lever 30 is provided at its inner lower edge with an inwardly-projecting block 33, both of which latter form rests for the end of the slab when the latter is engaged by the tongs. These blocks hold the hot slab away from the frame 16, and thus prevent the injury that would necessarily result from the repeated contacts of the hot slabs with the frame.

Each tongs-lever 30 is provided at its inner end with a stud 34, which rests in a groove 35 in the sliding head 36. The two slots in this head diverge outwardly. Hence a rearward

movement of the head closes the tongs-lever, 65 while the reverse movement opens them.

Projecting rearwardly from the head 36 is the bar 37, the latter being pivotally connected at its rear end to the screw 38. This screw passes through the nut 39, journaled in lower rear end of the truck 15, and the latter is provided at its rear end with the pinion 40, the screw 38 passing through the nut and through the pinion carried by the latter. The pinion 40 meshes with a similar pinion 41 on short shaft 42, which latter also carries the bevel-pinion 43, meshing with bevel-pinion 44 on shaft 45. This shaft, which is preferably angular, passes up through the bracket 46 and through the bevel-pinion 47, geared up to the motor 12, and is adapted to slide through pinion 47, but being angular or connected by spline-and-groove connection it follows that the shaft is rotated by motor 12, but is free to move vertically with the truck. By rotating shaft 45 nut 39 will be rotated and the screw moved longitudinally, thus opening or closing the tongs.

By pivotally connecting the screw 38 and bar 37 a point of flexure is introduced in said bar, so that it will not be injured by any bending or sagging downward of tongs-carrying frame 16 which may be caused by its exposure to the heat of the furnace. It is evident that the tongs-carrying frame 16 will be free to rock on its pivot 27 without unduly straining the screw or the parts carrying the latter.

With this improved machine a slab or other article can be grasped by the tongs-lever and the whole apparatus then moved to a position opposite the furnace, and by the cross travel of the trolley on the bridge the slab or other article can be charged into the furnace, and by mounting the tongs-carrying frame on a rotatable turn-table it is possible to move the tongs to any position within the space traversed by the crane.

It is evident that many slight changes might be resorted to in the relative arrangement of parts shown and described without departing from the spirit and scope of my invention. Hence I would have it understood that I do not wish to limit myself to the exact construction herein shown and described; but,

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

1. In a charging and discharging apparatus, the combination with a trolley, of a frame depending therefrom, a truck mounted on wheels the latter having bearing on vertical tracks on the frame, means for moving said truck vertically, tongs-carrying frame pivoted to the truck so as to have a rocking movement thereon, and means for actuating said tongs.

2. In a charging and discharging apparatus, the combination with a trolley and a turn-table carried thereby, of a frame depending from

the table, a truck mounted to move vertically on the frame, means for moving the truck, a counterweight for the latter, tongs-carrying frame mounted on the truck, and means for actuating the tongs.

3. In a charging and discharging apparatus, the combination with a trolley and a turn-table carried thereby, of a frame depending from the table, a truck mounted to move vertically on the depending frame, means loosely connected to the truck for moving the latter vertically, counterweights connected to the truck, tongs-carrying frame pivoted to the truck, and means for actuating the truck.

4. In a charging and discharging apparatus, the combination with a trolley, a post depending therefrom, a turn-table mounted on the post below the trolley, a frame depending from the table and a tongs-frame-carrying truck adapted to move vertically on the frame, of a rack-bar located within the post, and a rod secured to the rack-bar and loosely connected to the truck.

5. In a charging and discharging apparatus, the combination with a trolley, a hollow post depending therefrom, a turn-table on the post below the trolley and a frame depending from the table, of a rack-bar passing into the post, means for actuating the rack-bar, a rod connected to the bar and located in line with the vertical axis of the table, and a vertically-moving truck mounted on the frame and loosely connected to the bar.

6. In a charging and discharging apparatus, the combination with a trolley, of a frame depending therefrom and having vertical guides, a truck mounted to move vertically and supported by said guides, means for moving the truck vertically, tongs-carrying frame pivoted to the truck so as to have a rocking move-

ment thereon and means for actuating said tongs.

7. The combination with a frame having vertical guides, a truck mounted to move vertically within said frame and supported by said guides, a nut carried by said truck, a screw engaging the nut and means for rotating the nut, of a tongs-carrying frame pivoted to the truck, tongs carried by said frame, and a loose connection intermediate the screw and tongs.

8. The combination with a depending frame, a motor carried thereby, a vertically-movable truck mounted on said frame, a nut mounted in the truck a screw in the nut, a pinion secured to the nut, gearing carried by the truck for actuating the pinion and a shaft also carried by said truck and having a sliding connection with a pinion actuated by the motor, of a tongs-carrying frame pivoted to the truck, tongs carried by said latter frame and a rod for actuating the tongs said rod having a pivoted connection with the screw.

9. The combination with a trolley, a turn-table located under the trolley and carried thereby, a frame depending from said turn-table, a vertically-movable truck on the frame and a pivoted tongs-carrying frame carried by the truck, of truck hoisting and lowering devices carried by the trolley and engaging the truck and tongs-actuating devices carried by the pivoted tongs-carrying frame, the truck and the depending frame.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

CLARENCE L. TAYLOR.

Witnesses:

NORMAN C. FETTERS,
A. L. ROBERTS.