

No. 689,372.

Patented Dec. 17, 1901.

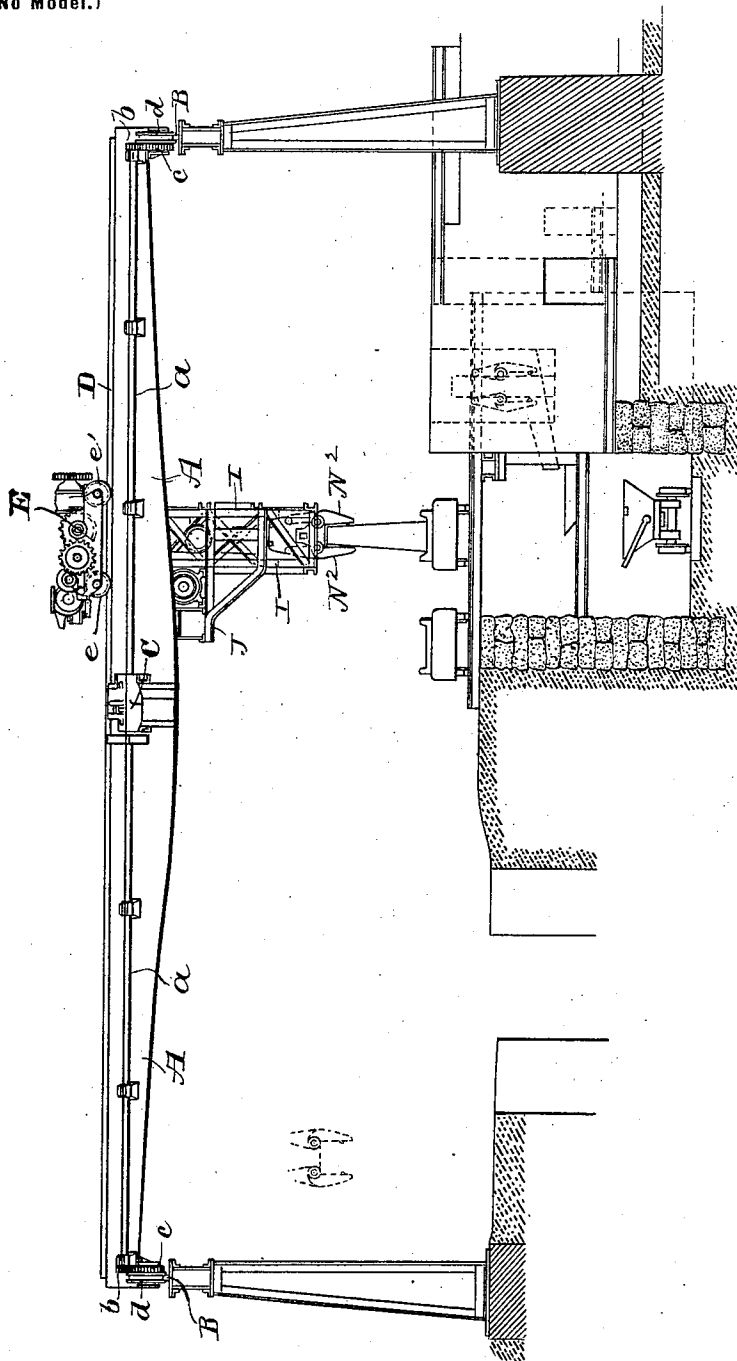
C. L. TAYLOR.

VERTICAL CHARGING CRANE.

(Application filed June 28, 1899. Renewed Oct. 15, 1901.)

(No Model.)

4 Sheets—Sheet 1.



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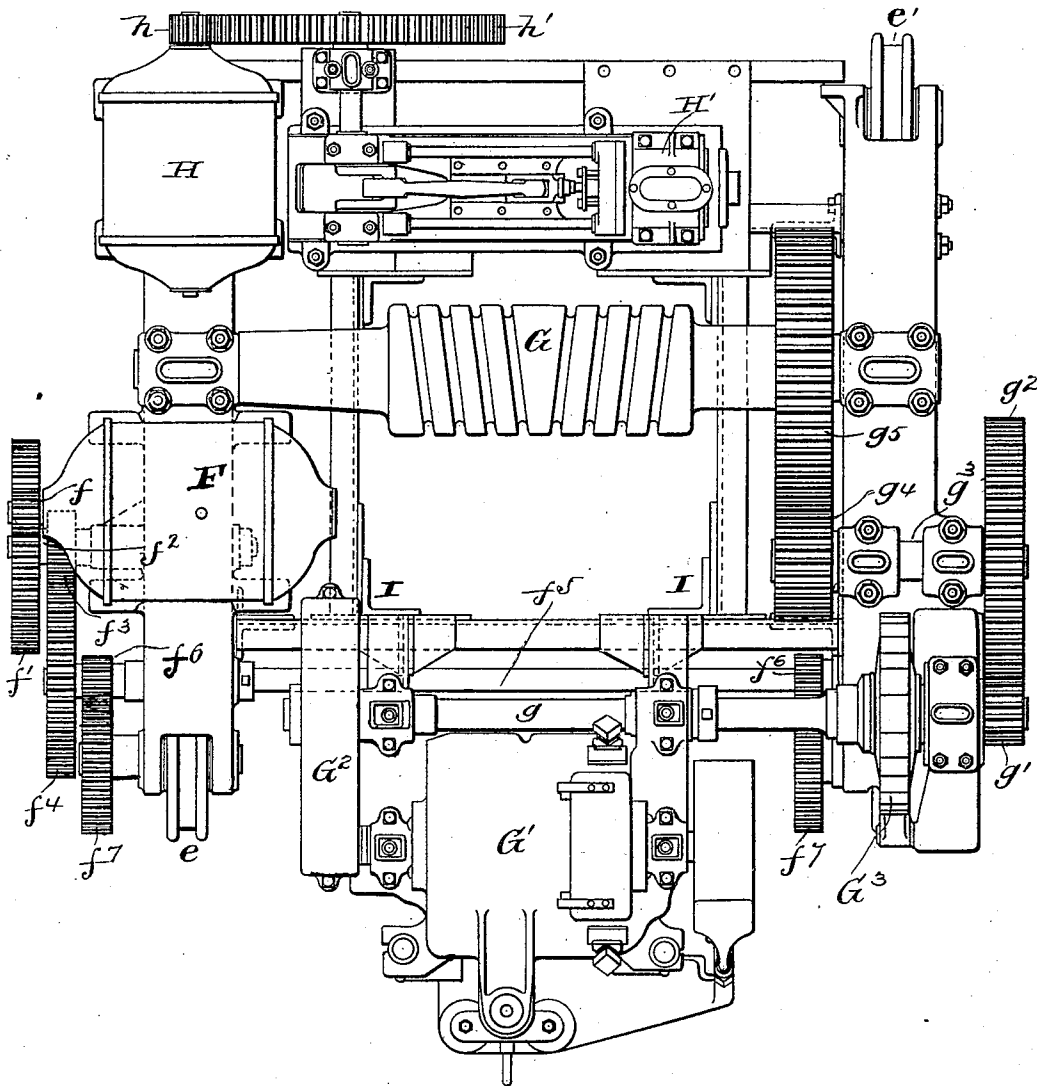
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Fig. 2 -



WITNESSES

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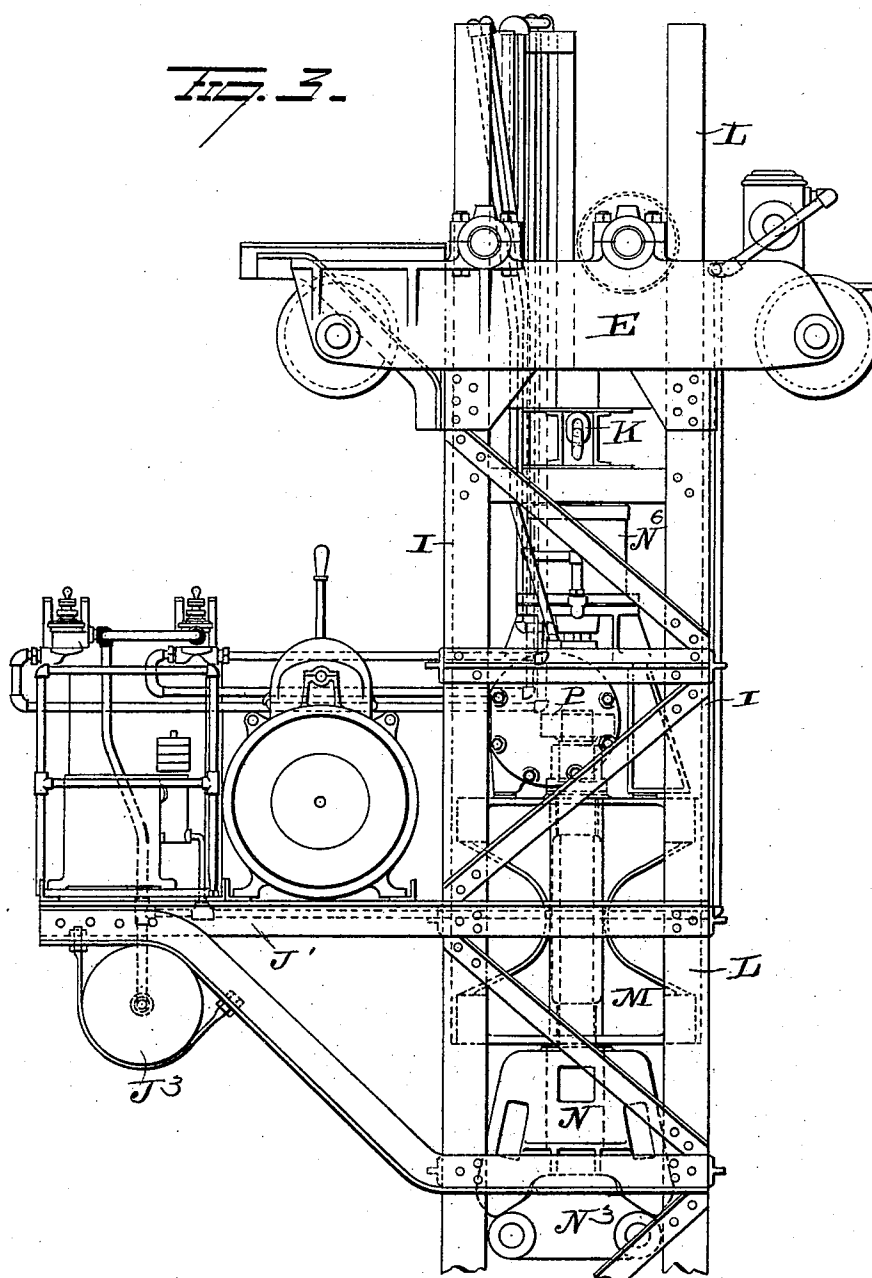
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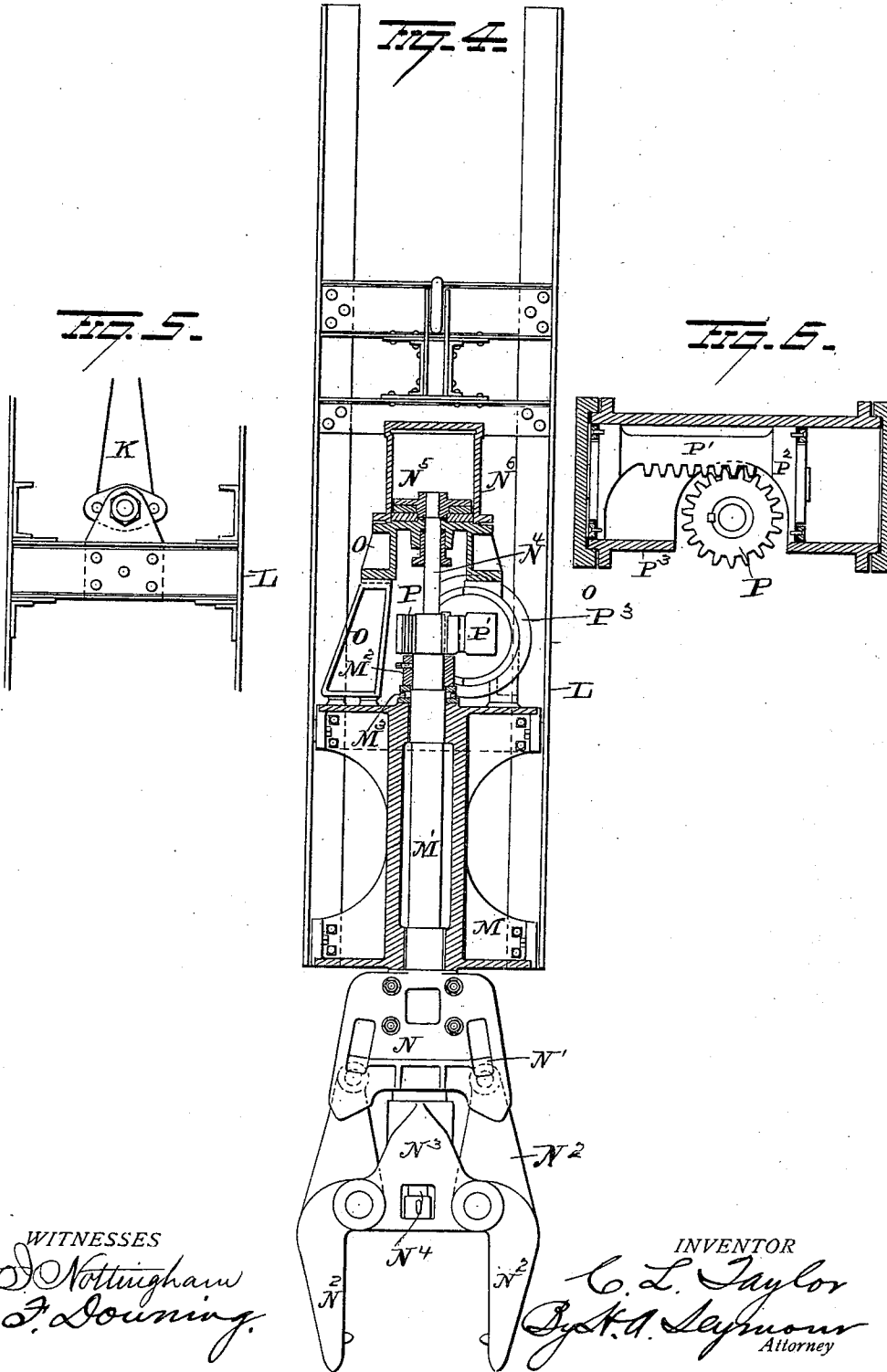
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4 Sheets—Sheet 4.



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UNITED STATES PATENT OFFICE.

CLARENCE L. TAYLOR, OF ALLIANCE, OHIO, ASSIGNOR TO THE MORGAN
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VERTICAL CHARGING-CRANE.

SPECIFICATION forming part of Letters Patent No. 689,372, dated December 17, 1901.

Application filed June 28, 1899. Renewed October 15, 1901. Serial No. 78,740. (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
5 Improvements in Vertical 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
10 use the same.

My invention relates to an improvement in vertical charging-cranes, the object of the invention being to provide an ingot-crane capable of being used in any building with roof-chords sufficiently high to permit of the free
15 and unobstructed movements of a bridge carrying a trolley; and the invention consists in a traveling bridge and trolley thereon and telescopic tongs-carrying devices carried by
20 the trolley.

My invention further consists in the parts and combinations of parts, as will be more fully described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is
25 a view in side elevation of an overhead traveling crane embodying my invention. Fig. 2 is a plan view of the trolley. Fig. 3 is a view in side elevation of the trolley, showing the depending frame rigid therewith and the
30 tongs-carrying frame within the rigid frame. Fig. 4 is a detached view of the tongs-carrying frame. Fig. 5 is a view of a portion of the tongs-carrying frame, and Fig. 6 is a sectional view of the double cylinder and rack
35 for turning the tongs.

A represents an overhead traveling bridge mounted at its ends on the elevated rails B and propelled back and forth on the bridge by an electric motor C, carried on the bridge,
40 through the shaft *a*, which latter is provided at its ends with pinions *b*, engaging the toothed wheels *c*, fast to the flanged track-wheel *d*.

Secured on the upper faces of the bridge-girders are the rails D, on which the trolley E
45 travels. This trolley, which is shown in Fig. 2, is mounted on the flanged track-wheels *e* and *e'*, the former of which are the driving-wheels.

The driving or propelling motor F of the
50 trolley is provided on its armature-shaft with

a small pinion *f*, which latter meshes with a larger pinion *f'* on shaft *f*². This shaft *f*² carries a pinion *f*³, meshing with a larger pinion *f*⁴ on shaft *f*⁵, which extends transversely across the trolley and carries the two pinions
55 *f*⁶, each of which meshes with a pinion *f*⁷, rigidly secured to the axle of its respective driving flanged wheel *e*. The trolley E also carries the drum G, which latter sustains the movable section of the gripping-tongs support. This drum is actuated through the
60 motor G', located on the trolley E, and the following described mechanism. The armature-shaft of the motor G' carries a small pinion which meshes with a larger pinion, both
65 of which are inclosed within the casing G². This larger pinion is keyed to the shaft *g*, which latter carries at its opposite end the pinion *g'*. The shaft *g* also carries the clutch
70 G³, designed to prevent the load from racing. This clutch forms the subject of a separate application, Serial No. 721,109, filed by me
June 19, 1899, and hence is not fully illustrated or claimed herein. The pinion *g'*
75 meshes with the larger pinion *g*² on shaft *g*³, and the latter carries at its inner end a pinion *g*⁴, which meshes with the larger wheel *g*⁵ on the drum G.

The trolley E in addition to the motors F and G' and their gearing also carries the motor H, which latter actuates the air-compressing pump H' through the gear-wheel *h* and *h'*.

The trolley E is provided at the four corners of its central open portion (shown in Fig. 2) with the L-shaped angle-irons I, which
85 latter, as shown in Fig. 3, depend from the trolley between the bridge-girders and form guides for the movable section L of the tongs-support. These angle-irons I are suitably
90 braced together to form a rigid support for the movable section L and also carry and support the operator's cage J', in which are located the several valves for controlling the admission and escape of air from the several
95 cylinders and controllers for regulating the motions of the several motors on the bridge and trolley and under which is carried the compressed-air tank J³.

Suspended by cables K from the drum G is
100 tongs-carrying frame L. This frame is com-

posed of L-shaped irons suitably braced, forming an open rectangular frame adapted to rest and move vertically within the supporting-frame I, the angle-irons composing frame L resting against and within the angles of the irons composing the frame I. Located within the lower end of the frame L is the bearing M. This bearing is secured at its upper and lower ends to said frame and carries the tongs-supporting shaft M', which latter is mounted to turn in said bearing and is supported in said bearing by the nut M², resting on the washer M³, the latter resting on the top of the bearing. Rigidly secured to the lower end of shaft M' is the head N, provided at its sides with inclined grooves, within which rest the blocks N', carrying the tongs-arms N². These arms N² are pivoted at a point between their ends to the cross-head N³, carried by the lower end of the actuating-rod N⁴. This rod passes upwardly through the shaft M' and is provided at its upper end with a piston N⁵, located within the cylinder N⁶, mounted on supports O, carried by the bearing M. With this arrangement it will be seen that when the piston is in its lowest position, as shown in Fig. 4, the blocks N', carrying the tongs-arms N², rest in the lower ends of the slots in the head N, and as the slots diverge downwardly the lower ends of tongs-arms are as close together as they ever get and are of course sufficiently close to engage the end of any ordinary size ingot. By now introducing air below piston N⁵ the latter with its rod N⁴ are raised and carry with them the cross-head N³ and tongs-arms. As the latter rise the blocks N' on the upper ends thereof are forced upwardly in the converging slots and the outer or lower ends of the tongs opened. Hence when it is desired to grasp an ingot the piston N⁵ is elevated and held so until the tongs arms or jaws N² are on opposite sides of the end of the ingot, and then by releasing the piston and allowing same to descend the arms N are closed against the ingot. As the weight of the ingot and tongs is borne by the blocks N', it will be seen that as soon as the tongs arms or jaws begin to lift the ingot the weight of the latter falling on the blocks causes the latter to move down the diverging slots, and thus close the tongs more tightly against the ingot. When the ingot has been deposited, a pull upon the cross-head N³ releases the tongs from the ingot.

Secured to the extreme upper end of shaft M' is a toothed wheel P. This wheel is engaged by the rack-bar P', formed on the piston-rod connecting the two pistons P². These pistons operate in the cylinders P³, which, as shown in Fig. 4, are carried on the upper end of bearing K. By introducing air into one cylinder and exhausting any air that may be in the other the rack-bar P' is moved longitudinally, thus rotating shaft M' and the ingot-tongs carried thereby, thus permitting

the tongs to be turned so as to squarely engage the opposite sides of the ingot. By rotating the drum G, so as to lower the cable K, it will be seen that the tongs-carrying frame can be lowered into a soaking-pit sufficiently for the tongs to engage an ingot and can then be elevated sufficiently for the ingot to be moved clear of the floor. The weight of the movable frame and tongs carried thereby is sufficient for the tongs to operate as a wedge to separate ingots in the soaking-pit, and as the frame L fits snugly within the frame I the two parts form a structure practically as rigid as a rack-bar would be, and as the structure is a telescopic one and located below the bridge it will be seen that it can be used in mills where it would be impossible to use the rigid rack-bar crane.

Air-pipes leading from the pump to the tank and from the latter to the valves and several cylinders are necessarily employed; but as I make no claim to any particular form or arrangement of pipes I have not described them.

It is evident that many slight changes might be made in the relative arrangement of parts herein 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 confine myself to the exact construction herein described; but,

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

1. In a charging-crane, the combination with a traveling trolley and a depending frame angular in cross-section depending from said trolley, of a movable frame also angular in cross-section and telescoping with said rigid frame, a flexible device leading from a drum on the trolley directly to the upper end of the movable frame for vertically supporting the latter, and means carried by said movable frame for opening the tongs.

2. In a charging-crane, the combination with a traveling trolley, of a rigid frame depending from the trolley, an operator's cage carried by said depending frame, and a movable frame suspended from the trolley and telescoping with the rigid frame and ingot-tongs carried by the movable frame.

3. In a charging-crane, the combination with a traveling bridge and a traveling trolley thereon, of a rigid frame depending from the trolley, a drum on the trolley, a movable frame located within the rigid frame and below the trolley, a flexible device connecting the drum on the trolley with the movable frame whereby the latter may be moved vertically, ingot-tongs carried by the movable frame, and means carried wholly by the movable frame for actuating the tongs.

4. In a charging-crane, the combination with a bridge, and a traveling trolley thereon, of a rigid frame depending from the trolley and projecting below the bridge-girders,

a vertically-movable frame telescoping with and supported laterally at its upper end by said rigid frame, ingot-tongs carried by said movable frame and a motor on the movable frame for turning the tongs.

5 5. In a charging-crane the combination with a traveling bridge and a traveling trolley thereon, of a rigid frame depending from the trolley and projecting below the bridge-
10 girders, a vertically-movable frame suspended from the trolley, a motor carried by the movable frame for opening and closing the tongs, and an independent motor carried by the movable frame for turning the tongs.

15 6. In a charging-crane, the combination with a traveling bridge and a traveling trolley thereon, of a rigid frame depending from the trolley, a drum on the trolley, means for rotating the drum, a movable frame telescoping
20 with the rigid depending frame and adapted to project below said rigid frame, a cable carried by the movable drum and supporting the movable frame, and ingot-tongs on the lower end of said movable frame.

25 7. In a charging-crane, the combination with a trolley and a rigid frame depending therefrom, of a vertically-movable frame suspended by flexible devices from the trolley and telescoping with the rigid frame, a vertical shaft journaled in a bearing carried by
30 the movable frame, ingot-tongs carried by

said shaft, and means carried by the movable frame for rotating the shaft.

8. In a charging-crane, the combination with a trolley and a frame rigid with the trolley and depending therefrom, of a vertically-
35 movable frame telescoping with the rigid frame, a flexible device leading from the movable frame to a drum on the trolley, a bearing within the lower end of the movable frame,
40 a vertical shaft mounted in said bearing, ingot-tongs carried by said shaft, and means carried by said movable frame for opening and closing the tongs.

9. In a charging-crane, the combination 45 with a traveling trolley and a rigid frame depending therefrom of a vertically-movable frame suspended from the trolley and telescoping with the rigid frame, a shaft journaled in the movable frame and carrying in-
50 got-tongs, a motor carried by the movable frame for opening and closing the tongs and an independent motor carried by the movable frame for rotating the ingot-tongs shaft.

In testimony whereof I have signed this 55 specification in the presence of two subscribing witnesses.

CLARENCE L. TAYLOR.

Witnesses:

DAVID FORDING,
A. W. BRIGHT.