

No. 677,718.

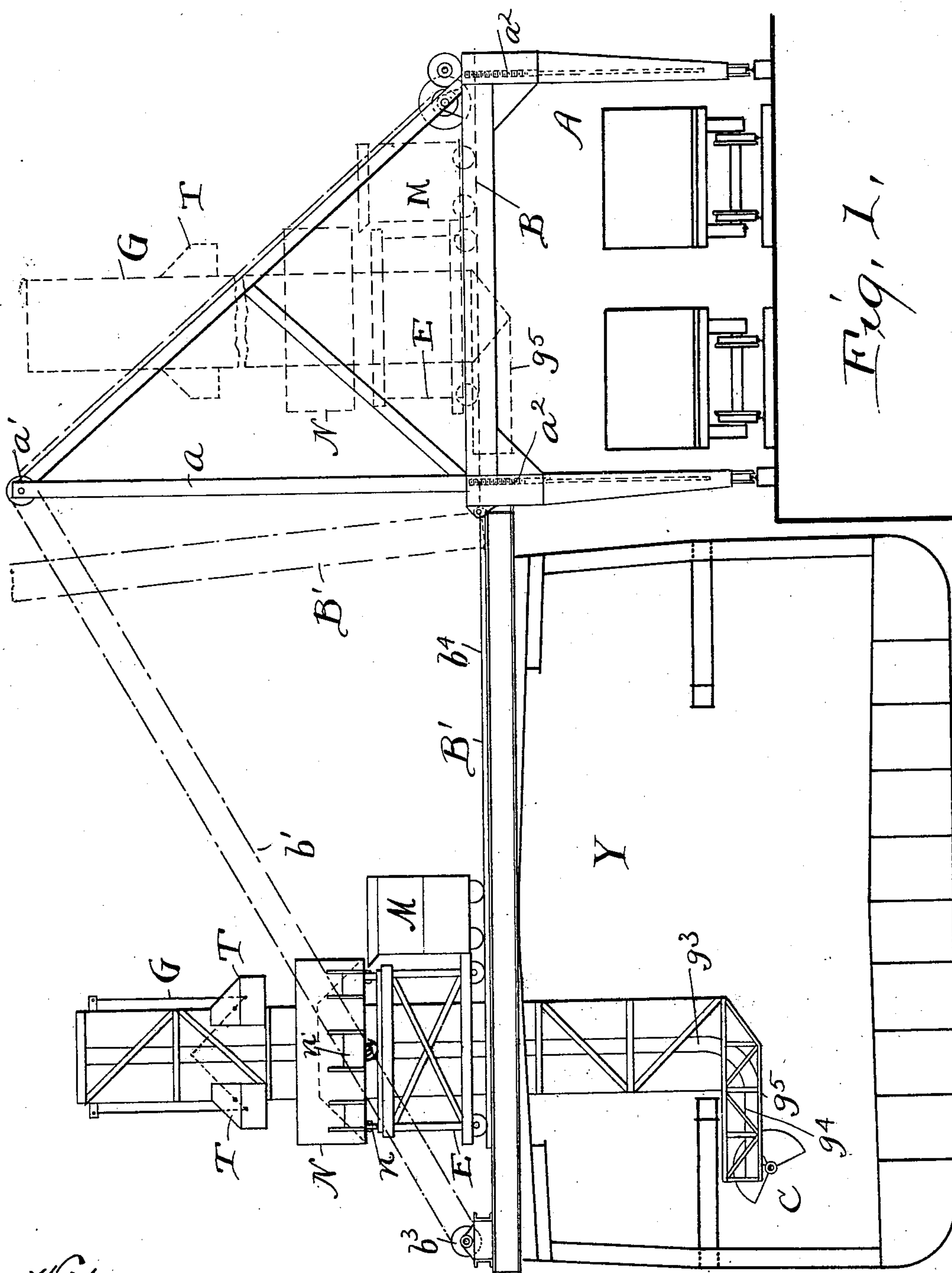
Patented July 2, 1901.

G. E. TITCOMB.
UNLOADING APPARATUS.

(Application filed Aug. 9, 1900.)

(No Model.)

4 Sheets—Sheet 1,



Witnesses.

H. D. Ammen
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Inventor,

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By his Attorneys,
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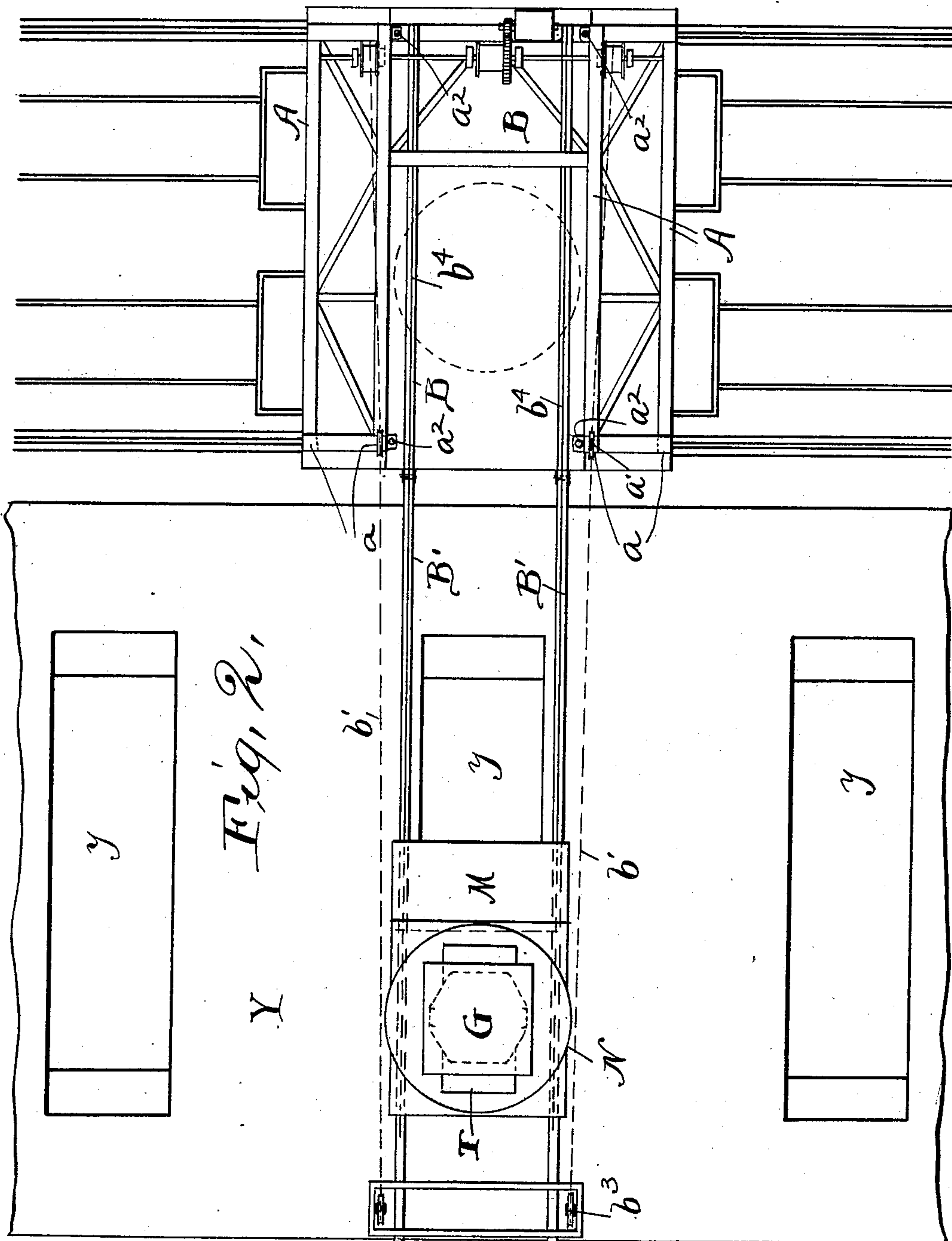
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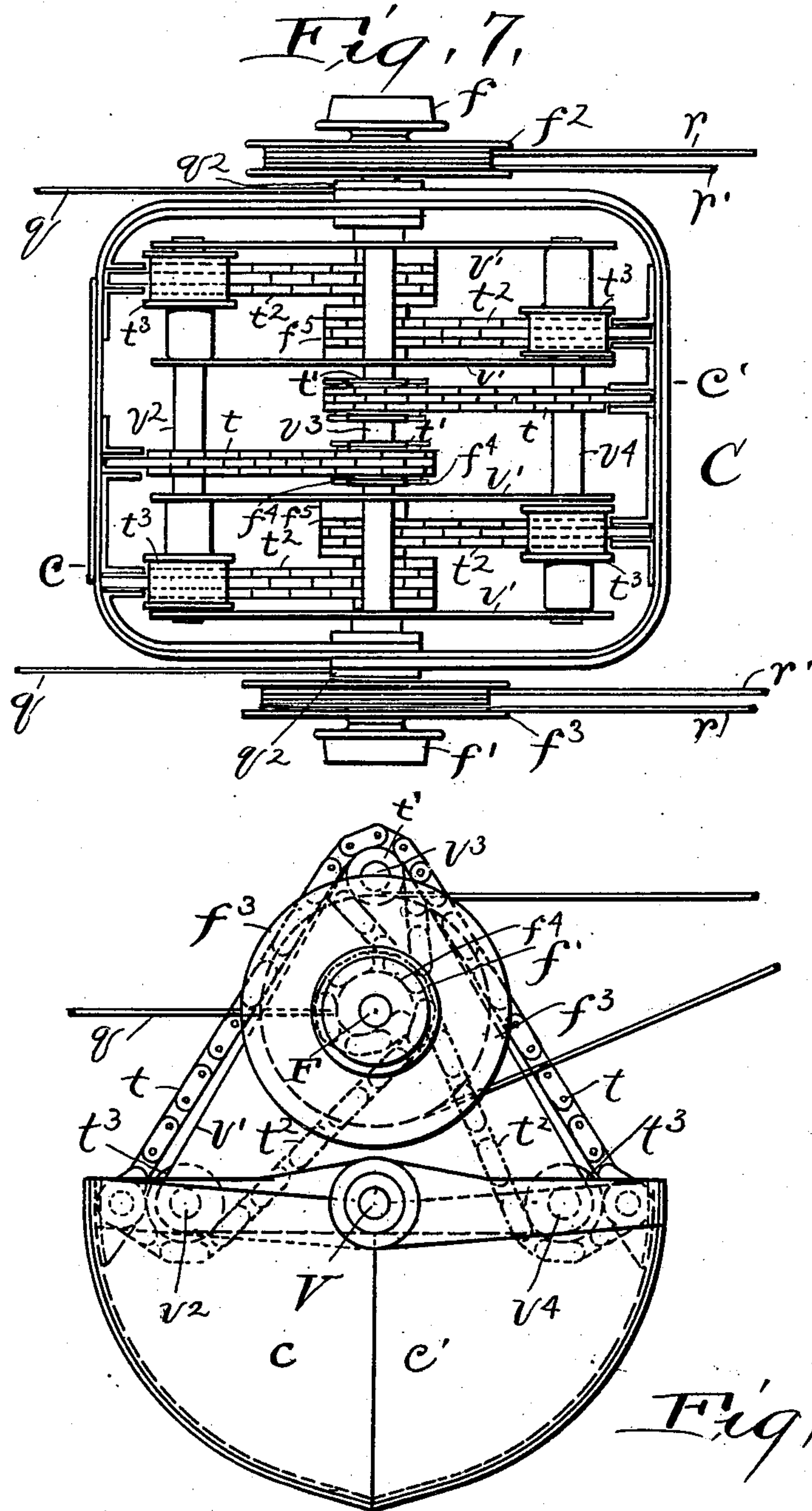
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4 Sheets—Sheet 4.



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UNITED STATES PATENT OFFICE.

GEORGE E. TITCOMB, OF CLEVELAND, OHIO.

UNLOADING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 677,718, dated July 2, 1901.

Application filed August 9, 1900. Serial No. 26,333. (No model.)

To all whom it may concern.

Be it known that I, GEORGE E. TITCOMB, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Unloading Apparatus, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

10 The invention relates to unloading apparatus which is especially adapted for transferring ore from the holds of vessels to cars or a stock-pile.

15 The object of the invention is to reduce both the time occupied and the cost involved in unloading ore-boats, and these results are attained in the manner and by the means substantially as hereinafter described.

20 The invention consists in the combination of parts as shown and described, and definitely set forth in the claims.

In the drawings, Figure 1 is a side elevation of the apparatus in position to unload an ore-boat, which is shown in vertical section. Fig. 2 is a plan view of the same apparatus. Fig. 3 is a central vertical sectional view through the wheel-truck and the member G, which carries the bucket-track and other mechanism which will be described. Fig. 4 is a top plan view of this member. Fig. 5 is a sectional plan view on line 5 5 of Fig. 3. Fig. 6 is a sectional plan on line 6 6 of Fig. 3. Fig. 7 is a plan view of the bucket, and Fig. 8 is a side elevation of the bucket.

35 The apparatus includes in its most approved form, as shown, a supporting-frame A, which is to be located on the dock. It may be of any suitable construction; but preferably it is movable along tracks on the dock and is of skeleton form, so that cars to receive the ore may pass beneath it. This frame supports a horizontal skeleton platform B, which may be adjusted vertically, preferably by means of four screws a^1 a^2 at its corners. An extension skeleton platform B' is hinged at its rear edge to the front edge of this platform B and is adapted when the apparatus is in operative position to rest upon the deck of the boat Y and over the hatch-way y through which the boat is being unloaded. When the apparatus is not in use, this extension-platform may be swung on its

hinge up into the position substantially as indicated by dotted lines in Fig. 1. It is so swung by means of cables b^1 b' , secured to an upward extension a of the frame A, which cables pass down around sheaves b^3 on the outer end of the extension-platform, then up and over sheaves a' at the top of this upward extension a , and down to winding-drums carried on the vertically-adjustable platform B. Tracks b^4 are laid on the platform B and its horizontal extension B'. On these tracks a suitable dump-car M may travel, and so, also, may a wheel-truck E, which supports the unloading mechanism. The wheel-truck is provided with an electric motor e^4 , by which, through suitable intermediate mechanism, it is propelled along the tracks b^4 . This wheel-truck is provided with two concentric circular tracks e e' , and a circular wheel-truck H rides upon the inner track e , and a ring J is mounted upon the wheels h of this truck H, which ring has gear-teeth j on its outer periphery. A pinion k engages with these gear-teeth, and this pinion is attached to a shaft K, suitably mounted on the truck E. A bevel-gear k' , secured to this shaft, meshes with a bevel-gear e^6 on the shaft e^7 of an electric motor e^8 , carried by the truck E. Thus by the operation of this motor this ring J may be turned in either direction. A vertically-movable member G passes through this ring J and has vertical grooves g g , formed by angle-irons g^1 g' , secured to its sides. Tongues j^2 , fast to the ring J, enter these grooves and, while permitting vertical movement of this member relative to the ring, prevent any relative rotation of the said two parts. This member G is of tubular character, although it is of skeleton formation, built up of iron bars and beams bolted or riveted together. It has two internal bucket tracks or guides g^3 , placed at diametrically opposite points, which tracks extend vertically downward and then are curved around into horizontal position, the horizontal parts g^4 of said tracks being fast to and supported by a horizontal extension g^5 of the member G at its lower end. Surrounding this member is a ring-shaped hopper N, which is provided with wheels n , and these wheels ride upon the outer circular track e' , carried by the truck E. This hopper has a plurality of doors n' in its outer face, and the hopper

may be turned upon said track e' to bring any of said doors into proper relation to the dump-car M. This vertical member has mounted on its upper end a motor P, preferably an electric motor, and a plurality of drums Q Q, R R, R' R', and S, upon which cables may be wound and which may be driven by said motor, intermediate mechanisms, and clutches.

Two cables U U', which are attached, respectively, to diametrically opposite sides of the ring J, pass down under sheaves g^6 , mounted on the vertically-movable member G near its lower end, and then up over sheaves S' S² to the winding-drum S on the top of said member. These cables are wound up or unwound, as the case may be, with the result of lifting or lowering said movable member G to bring its lower end to the proper elevation relative to the ore in the hold.

The bucket C, as shown, for elevating the material is of the clam-shell variety. The two shells $c c'$ are rotatably mounted on a horizontal bar V, which is a rigid part of the bucket-supporting frame. This frame consists of a plurality of triangular plates v' , which are fastened together and held in proper relation by said bar v and by three other bars $v^2 v^3 v^4$, located at the corners of said plates. A horizontal shaft F, parallel with said bars, is mounted in this frame in about the middle of said triangular plates. On the projecting ends of this shaft are loosely mounted friction-rollers $f f'$, which fit in the bucket-tracks g^3 , carried by said member G. Secured to this shaft between these friction-rollers and the bucket-shells are two sheaves $f^2 f^3$. To each end of these sheaves the cables $r r'$ are fastened and wound in opposite directions, and the upper ends of said cable are connected, respectively, to the winding-drums R R'. When the four drums R R' R' R' are simultaneously turned in one direction, the bucket and its frame may be raised through the tubular member G, being guided by the bucket-tracks g^3 .

Two cables $q q$ are attached, respectively, to rings q^2 , which loosely embrace the shaft F, which cables pass around sheaves g^8 at the outer end of the horizontal extension g of the member G, then under sheaves g^9 , placed near the angle between said extension and the vertical member, and thence up to winding-drums Q Q at the top of the member.

The shells of the bucket are opened and closed by the following mechanism: Chains attached to the top edge of said bucket-shells pass up and over idler-pulleys t' , mounted on the upper bar v^3 , and thence down to sheaves f^4 , attached to said shaft. The chains $t t$, coming from both sides of the bucket, are attached to the corresponding side of said sheaves f^4 . It is therefore apparent that by turning said shaft F in one direction these chains are wound up and the bucket-shells are compelled to swing away from each other. In other words, the bucket is opened. Other chains $t^2 t^2$ are likewise attached to the top

edge of said bucket-shells and pass under idler-pulleys $t^3 t^3$, loosely mounted on the two bars $v^2 v^4$, and thence up to other sheaves f^5 , attached to said shaft F. These are the closing-chains, and they are attached to corresponding sides of their respective sheaves f^5 . By turning said shaft F so as to wind up chains t^2 the other chains t are unwound, and vice versa.

It will be observed that in the hoisting operation the bucket alone moves up and down. The vertically-movable member is, strictly speaking, a vertically-adjustable member, because it is not moved except for the purpose of adjusting its position relative to the ore-pile in the boat, and it may be moved up or down through the ring J, or the said ring and said member may be turned to effect this result. When the apparatus is not in use, the said member is drawn up so that its lower end is above the platform on which the truck E is supported. Said truck is moved inward onto the platform B and the platform is swung up into the position indicated by the dotted lines in Fig. 1.

When a boat to be unloaded ties up to the dock, the frame A is moved along the dock-tracks to the proper position, the platform B is lowered so that it rests upon the deck of the boat, but over one of the hatchways, the truck E is moved out onto the platform B', and the member G is lowered through the hatchway and turned, if necessary, to bring its lower end into proper relation with the ore-pile in the hold of the boat. The bucket is during these movements in its elevated position and is preferably open, as shown in Fig. 3. The bucket is lowered by unwinding equally the cables $r r' r' r'$, and at the same time the cables $q q$ are wound up. The bucket is drawn by these cables around the curve in the bucket-track and along the horizontal part thereof up to the ore. Then without loosening up on the cables q the cables $r r$ are taken in and the cables $r' r'$ slacked up, which results through the described mechanism in closing the bucket-shells over a load of the ore. The cables $r r'$ are now wound up equally, and thereby the bucket is raised, the cables q being unwound to permit such movement. When the bucket is near the top of its movement, its frame strikes a horizontal beam W and lifts it. This beam is suitably guided, and its ends are attached by links $w w$ to arms o , which extend outward from two deflecting-plates O O, which are hinged to said member and are adapted to swing inward beneath the bucket until their inner edges come together, at which time both plates are inclined outward, as shown in Fig. 3. The lifting of the bar acts through said links to swing said plates into the position shown in Fig. 3. The bucket is then opened by taking in the cables and slacking up on the cables. The load falls onto these deflecting-plates and slides outward and then down into the hopper N. The guide-boxes T T, consisting of inclined plates above the plates

O and with vertical end plates or flanges *t*, prevent the ore falling out beyond the hopper. The plates O are wide enough and steep enough so that the ore will not pass over the side edges before it comes under the guiding influence of the flanges *t*. Then, as first stated, the bucket is lowered by equally unwinding the cables *r r'*. The downward movement of the bucket permits the bar W to descend, thereby, through the links, &c., swinging the deflecting-plates O O into vertical position, as shown by dotted lines in Fig. 3, which permits the bucket to descend. The ore in the hopper is allowed to fall, as desired, through the doors into the dump-car, by which it is carried inward over the cars and dumped. The hopper N may be turned to bring any door therein in proper relation to the said dump-car.

Having described my invention, I claim—

1. In unloading apparatus, the combination of a vertically-adjustable member capable of extending down into the hold of a boat and having its lower end extended laterally, continuous bucket-guides carried by said member and its lateral extension, and means for rotating said member on a substantially vertical axis, with a bucket movable in said guides, and means for moving said bucket in both directions along said guides, substantially as specified.

2. In an unloading apparatus, the combination of a wheel-truck, a member supported thereby and horizontally rotatable thereon and having a vertical opening through it, a vertical guide member adjustably supported by said rotatable member in said opening, bucket-guides carried by said guide member, a bucket, and means for causing it to travel along said guides, substantially as described.

3. In an unloading apparatus, the combination of a wheel-truck, a horizontally-rotatable member supported by said wheel-truck, a vertical guide member housed in said horizontally-rotatable member and vertically adjustable therein, said guide member having its lower end extended laterally, a bucket, and means for causing it to travel along the lateral extension and up the guide member, substantially as described.

4. In unloading apparatus, the combination of tracks adapted to support a wheel-truck over the hold and in line with the hatchway of a boat, a wheel-truck movable thereon, a vertically-adjustable member supported by said wheel-truck and capable of extending through the hatchway into the hold of said boat, and bucket-guides carried by said member, with a bucket bodily movable in said guides, and means for raising and lowering said bucket along said guides, substantially as specified.

5. The combination, with a support, of a skeleton platform pivoted thereto and adapted to project substantially horizontally therefrom or be tipped up, a self-contained excavating, elevating and discharging apparatus

adapted to be supported on said platform when horizontal or bodily shifted onto said support to allow the platform to be tipped up, and an ancillary conveyer for receiving the discharge of said self-contained apparatus without requiring its said bodily shifting, substantially as described.

6. The combination with a support, a skeleton platform pivoted thereto and adapted to project substantially horizontally therefrom, cooperating tracks on said platform and support, an excavating and elevating apparatus supported on said tracks and adapted to be moved bodily in and out thereon, and an ancillary conveyer supported on a track on said platform and adapted to receive the discharge of said elevating apparatus without requiring its said bodily movement, substantially as described.

7. In unloading apparatus, the combination of a skeleton platform adapted to be supported over the boat to be unloaded, a wheel-truck movable upon said platform, a vertically-adjustable member supported by the said truck and having a laterally-extended foot on its lower end, continuous bucket-guides carried by said member and its foot, a bucket, and means for moving said bucket in both directions along said bucket-guides, substantially as described.

8. In unloading apparatus, the combination of a skeleton platform, a wheel-truck movable upon the same, a rotatable ring carried by said truck, a tubular member which is vertically adjustable through said ring and has a laterally-extended foot on its lower end, internal bucket-guides carried by said member and its foot, and means for moving a bucket in both directions along said guides, substantially as specified.

9. In unloading apparatus, the combination of a skeleton platform, a wheel-truck movable thereon, a tubular member which is supported by the said truck and is vertically adjustable through said truck and has a laterally-extended foot on its lower end, a rotatable annular hopper surrounding said member, internal bucket-guides in said member and its foot, and means for moving a bucket in both directions along said guides, substantially as specified.

10. In unloading apparatus, the combination of a skeleton platform, a wheel-truck, a rotatable ring carried by said truck, a tubular member which is vertically adjustable through said ring and has a laterally-extended skeleton foot on its lower end, internal bucket-guides in said member and its foot, a bucket, a set of cables for moving said bucket inward on the horizontal track and upward through said tubular member, other cables for moving the bucket downward and outward along said foot, and winding-drums for taking in and paying out said cables located on the top of said tubular member, substantially as specified.

11. In unloading apparatus, the combina-

tion of the wheel-truck, a vertically-adjustable tubular member supported by said truck, a bucket, means for raising and lowering the bucket through said member, an annular hopper surrounding said member, deflecting-plates hinged to said member, and means for moving them out of the way of the upwardly-moving bucket and then into inclined position beneath said bucket, substantially as specified.

12. In unloading apparatus, the combination of the wheel-truck, a vertically-adjustable tubular member supported by it, a bucket, means for raising and lowering the bucket through said member, an annular hopper surrounding said member, and deflecting-plates hinged to said member and having outwardly-extended arms, a vertically-movable beam, means for raising the same when the bucket is near its top position, and links connecting said beam with the arms on said deflecting-plates, substantially as described.

13. In unloading mechanism, the combination of a frame, a vertically-adjustable skeleton platform supported thereby, an extension skeleton platform hinged to said platform, means for swinging said extension-platform on its hinge, tracks on said two platforms, a wheel-truck movable on said tracks, a vertically-adjustable tubular member supported by said truck and having a laterally-extended foot, bucket-guides in said member and its foot, a bucket movable in said guides, means for moving the bucket from one end to the other of said guides, and means for opening and closing the bucket, substantially as specified.

14. In unloading mechanism, the combination of a frame, a vertically-adjustable skeleton platform supported thereby, an extension skeleton platform hinged to said platform, means for swinging said extension-platform on its hinge, tracks on said two platforms, a wheel-truck movable on said tracks, a rotatable ring mounted upon said truck, a vertically-adjustable tubular member movable through said ring, and having a laterally-extended foot, bucket-guides in said member and its foot, a bucket movable in said guides,

means for moving the bucket from one end to the other of said guides, and means for opening and closing the bucket, substantially as specified.

15. In unloading mechanism, the combination of a frame, a vertically-adjustable skeleton platform supported thereby, an extension skeleton platform hinged to said platform, means for swinging said extension-platform on its hinge, tracks on said two platforms, a wheel-truck movable on said tracks, a rotatable ring mounted upon said truck, a vertically-adjustable tubular member movable through said ring, and having a laterally-extended foot, bucket-guides in said member and its foot, a bucket movable in said guides, means for moving the bucket from one end to the other of said guides, and means for opening and closing the bucket, an annular hopper surrounding said member and supported by said truck, substantially as specified.

16. In unloading mechanism, the combination of a tubular member having a laterally-extended foot on its lower end, bucket-guides in said member and its foot, a bucket-supporting frame, a horizontal shaft mounted in said frame, rolls on the ends of said shaft for engagement with said bucket-guides, sheaves secured to said shaft, cables wound in opposite directions on said sheaves, winding-drums on the top of said members and capable of independently taking up and paying out said cables, other cables secured to rings loose on said shaft, sheaves at the outer end of said foot around which said cables pass, winding-drums on the top of the member for taking in and paying out said cable, two bucket-shells hinged to said frame, two sets of chains secured to the edges of said shells, two sets of idler-sheaves for guiding said chains, and sheaves secured to said shaft for winding up and unwinding said chains, substantially as specified.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

GEO. E. TITCOMB.

Witnesses:

E. B. GILCHRIST,
ALBERT H. BATES.