

No. 685,387.

Patented Oct. 29, 1901.

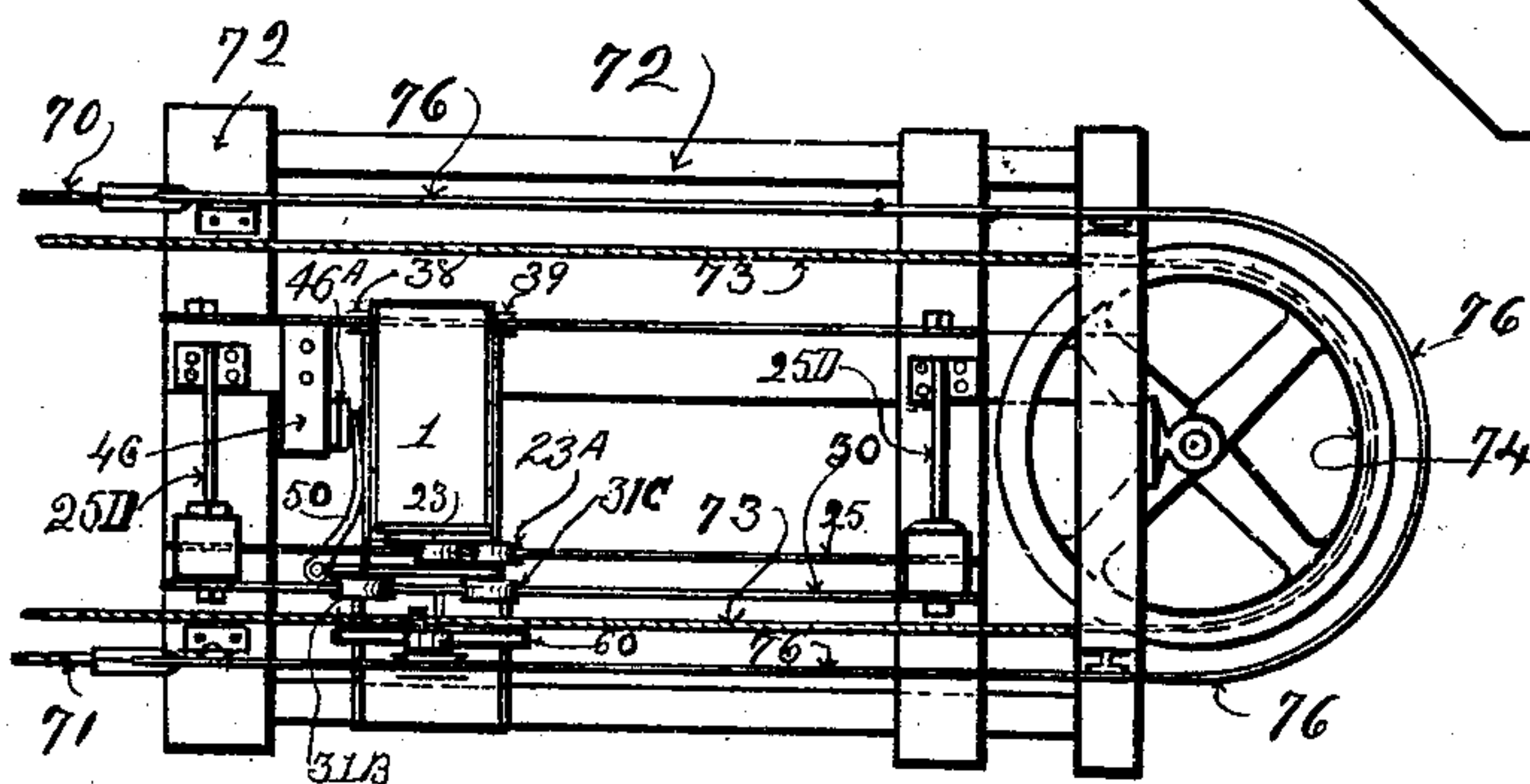
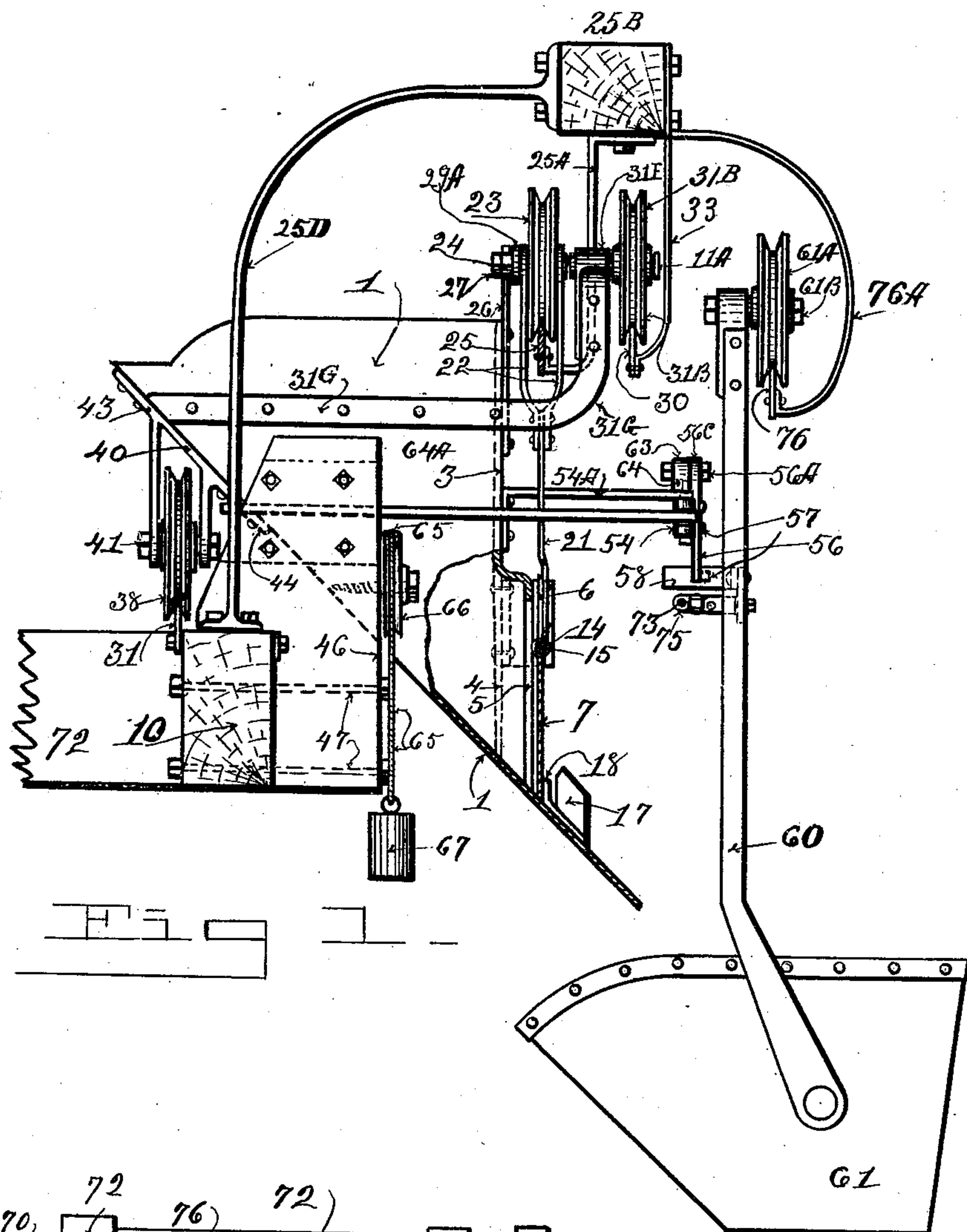
B. C. RIBLET.

AUTOMATIC BUCKET LOADER FOR WIRE ROPE TRAMWAYS.

(Application filed Feb. 23, 1901.)

(No Model.)

4 Sheets—Sheet 1.



WITNESSES:

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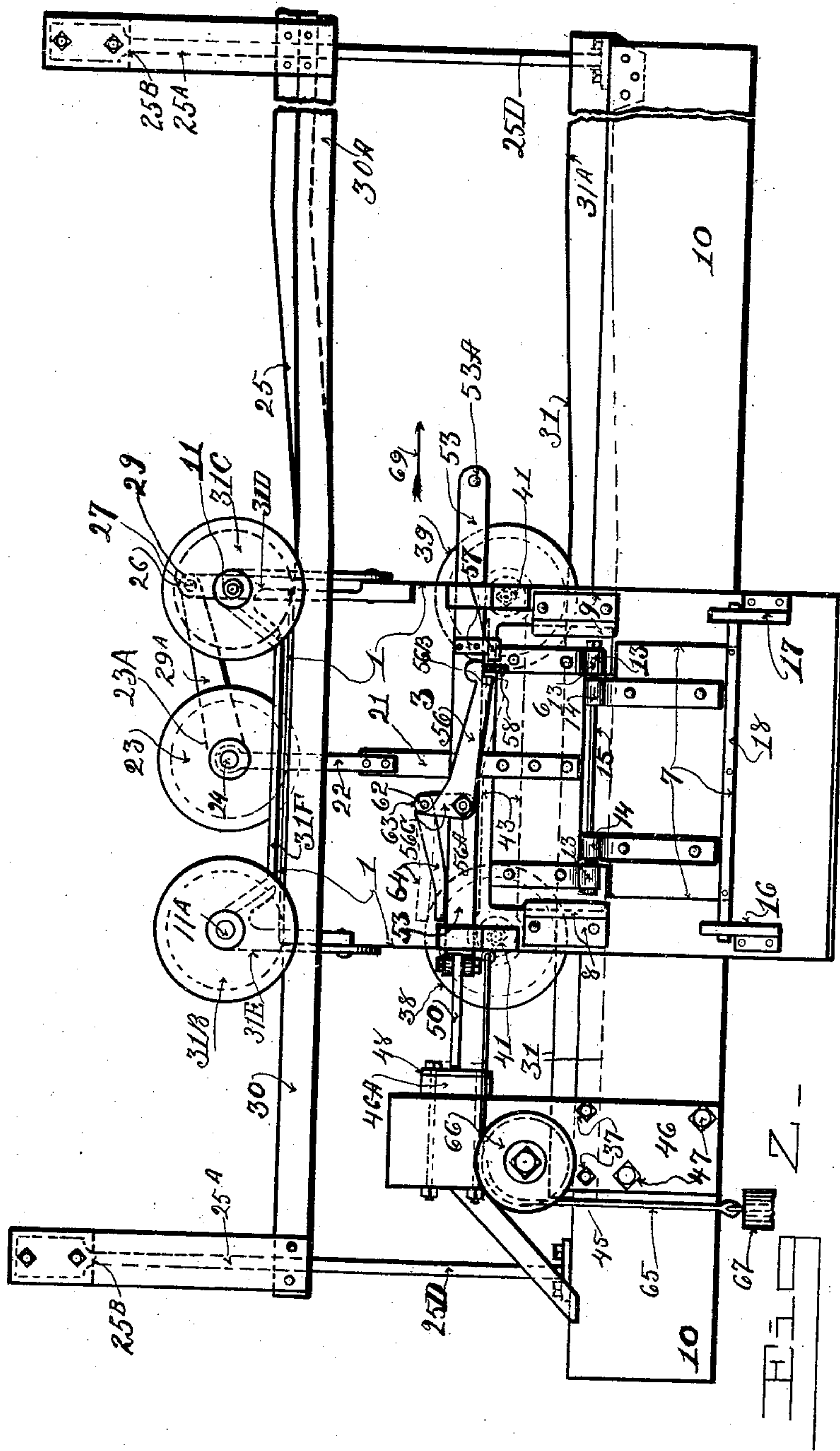
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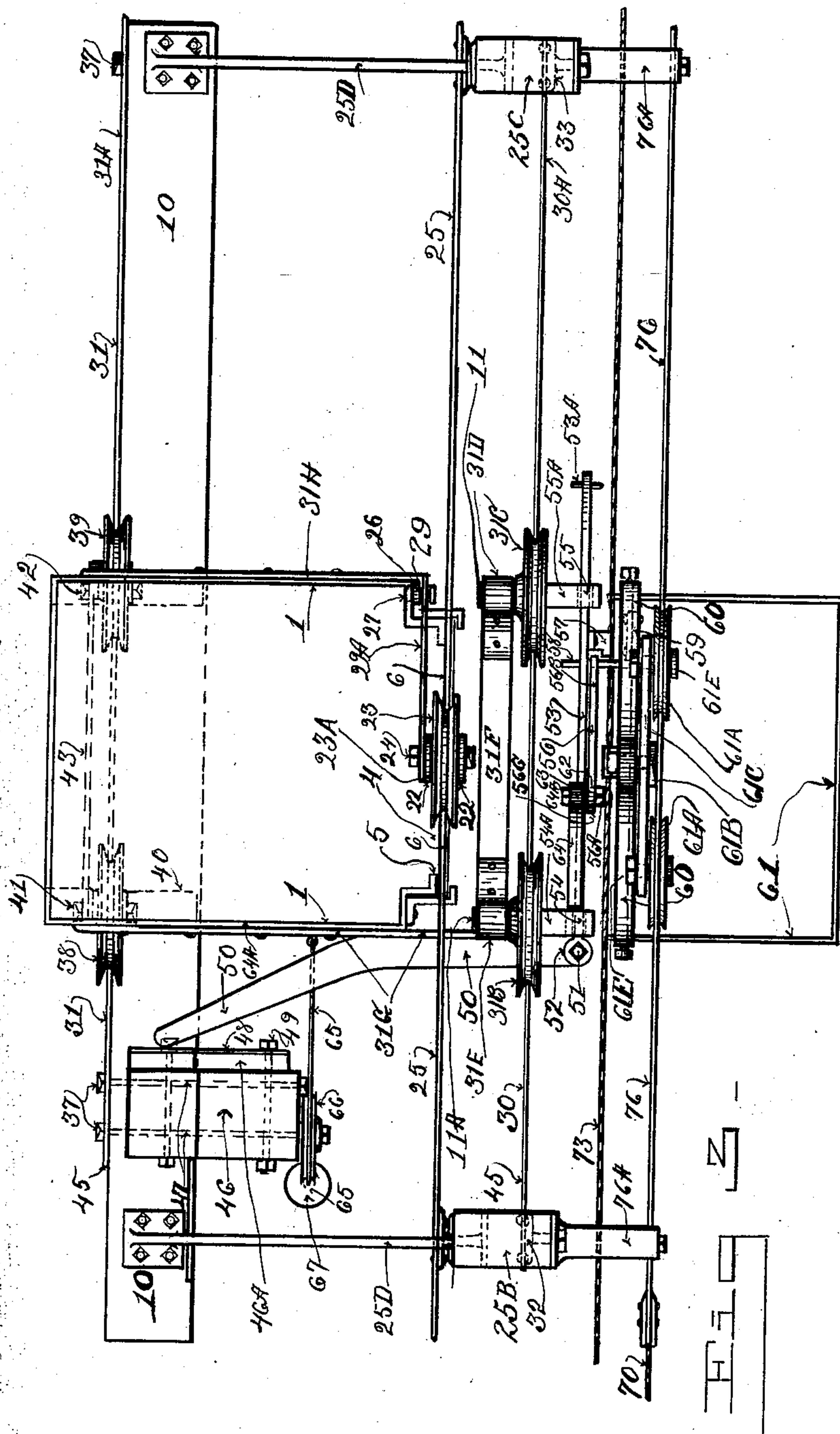
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4 Sheets—Sheet 4.

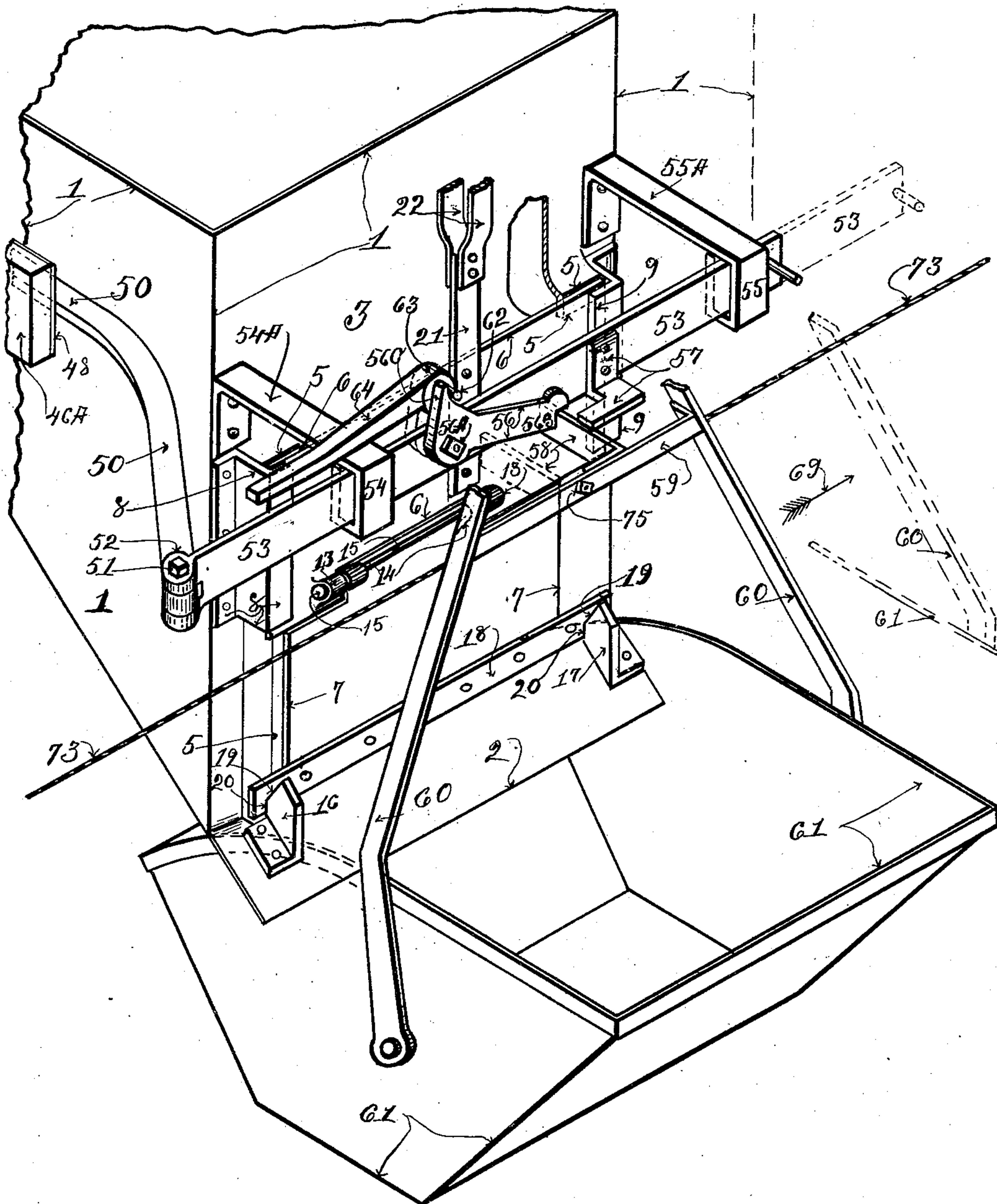


Fig 4

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UNITED STATES PATENT OFFICE.

BYRON C. RIBLET, OF NELSON, CANADA.

AUTOMATIC BUCKET-LOADER FOR WIRE-ROPE TRAMWAYS.

SPECIFICATION forming part of Letters Patent No. 685,387, dated October 29, 1901.

Application filed February 23, 1901. Serial No. 48,494. (No model.)

To all whom it may concern:

Be it known that I, BYRON C. RIBLET, a citizen of the United States of America, residing at Nelson, in the Province of British Columbia, Canada, have invented certain new and useful Improvements in Automatic Bucket-Loaders for Wire-Rope Tramways; and I do 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, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in automatic bucket-loadings for wire-rope tramways; and the objects of my invention are, first, to provide a loading-hopper that can be caught up by the traveling buckets at the loading-station and be carried along by the buckets a predetermined distance and that will load the buckets during their traveling movement; second, to provide means by which the bucket starts the loader from a dead stop and gradually accelerates its traveling movement until it is moving at the same speed as the bucket and the running rope, and, third, to provide means for automatically opening the hopper-discharging gate. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is an end elevation of my automatic loader, partially in section. Fig. 2 is a front elevation of Fig. 1 with the bucket left out. Fig. 3 is a plan view of the hopper, showing a fragment of the bucket. Fig. 4 is a fragmentary perspective view of my automatic loader, and Fig. 5 is a small fragmentary plan view of a tramway-terminal.

Similar numerals of reference refer to similar parts throughout the several views.

Referring to the drawings, the numeral 1 designates the loading-hopper. It comprises a square-shaped receptacle having a sloping bottom which extends beyond the body of the hopper at its lowest end, forming a discharge-spout 2. The front side 3 of the hopper faces this spout and contains in its lower half an opening 4, which is surrounded by a projecting flange 5 at the top and sides, which forms a seat for the doors 6 and 7, which are con-

finied slidably against it by the guideways 8 and 9, in which the door 6 is free to move vertically. The guideways 6 and 7 are formed by the Z-shaped angled members 8 and 9, which are secured to the face of the hopper around the projecting flanged edge of the opening and extend over the face of the flanges, starting at a suitable distance from them and forming guide slots or ways for the side edges of the door.

The doors 6 and 7 comprise a double door. The door 6 is the upper door and slides vertically up and down in the guideways, as will be explained hereinafter. The door 7 is hinged to the lower edge of the door 6 by the hinge-lugs 13 and 14, formed on the doors 6 and 7, respectively, and the pin 15, which passes loosely through them. The door 7 is made enough narrower than the door 6 so that it does not extend to the guideways, and consequently is free to swing out from the face of the flange 5 around the discharge-opening of the hopper, against which it also stands normally. Its lower edge is held close against the seat to prevent leakage of ore or other similar material by beveled-edge keepers 16 and 17, one of which is secured to each corner of the discharge-spout at each side of the swinging door, which contains at its lower edge a bar 18, that is secured to it and that extends beyond the side edges of the door to beyond the beveled-edge keepers. These keepers comprise vertically-projecting blocks of metal secured to the discharge-spout and having a short vertical straight side 20. The block is placed at a sufficient distance from the face of the hopper to allow the ends of the bar 18 to fit loosely between it and the face of the flange 5 of the hopper. From the top of the straight side 20 of the block a beveled portion 19 is formed, that extends upward and backward from the vertical side and from the bar 18 and forms an inclined guide for the ends of the bar to slide down on, and thus close the door as it is lowered after the hopper has discharged its bucketful of ore and the swinging door has swung down against the face of the flange of the discharge-opening, as will be more fully described hereinafter.

To the center of the door 6 a vertical bar 21 is secured. This bar extends above the door a short distance and is secured between

two pendant-pieces, which form a yoke 22, that straddles and extends to the center of a sheave-wheel 23, which is revolubly mounted on a bolt 24, that extends loosely through the ends of the yoke. This wheel is mounted on a short length of track 25, which is supported at its ends by braces 25^A, that are attached to the blocks 25^B and 25^C, which are supported by brackets 25^D, that extend from the terminal timbers 10. The rear end of this track 25 is inclined upward for a short distance and then extends for a short distance at a higher level. The upward-inclined portion is adapted to raise the wheel, and consequently both doors, as they are moved along with the ore-hopper enough higher than the ore-hopper is moved on its inclined tracks to open the doors by raising them enough to discharge the contents of the hopper into the ore-bucket. In order to hold this sheave in a central position without cramping the top door in the guides, I attach it to one end 23^A by a bolt 24 to one end of an arm 29^A, the opposite end of which is pivotally secured by a bolt 27 to the support 26, which is secured to the adjacent corner of the hopper, thus connecting the sheave 23 to the hopper in such a manner that it is drawn along by the hopper and at the same time is free to run up the incline track, on which it is mounted, and thus raise the gates.

The hopper is supported on two tracks 30 and 31, both of which are upwardly inclined at their rear terminal ends 30^A and 31^A. The track 30 is placed at the front of the hopper and at its top and is supported by the pendants 32 and 33, which are secured to suitable supporting-blocks 25^B and 25^C at each end of the track. All the tracks are made long enough to allow the hopper to travel far enough to be caught by the traveling buckets and accelerated to their running speed and to raise the doors to load the buckets and to release the hopper from the buckets. The hopper is supported on the track 30 on sheave-wheels 31^B and 31^C, which are revolubly secured to castings 31^D and 31^E by bolts 11 and 11^A. The castings are connected together by a bar 31^F and are also connected to the arms 31^G and 31^H, which are riveted to the sides of the hopper.

The track 31 is placed under the rear edge of the downward-sloping edge of the hopper and is secured to the upper edge of the terminal timber 10 by bolts 37. Sheave-wheels 38 and 39 are mounted on the track and are pivotally secured to yoke-shaped castings 40 by bolts 41 and 42. The yoke-shaped casting extends along the under side of the ore-hopper and is provided with side flanges 43 and 44, that are riveted to the under side of the ore-hopper.

The hopper normally rests at the front end 45 of the tracks and at this end an abutment-block 46 is secured, it being preferably secured to the track-supporting block by the bolts 47. Between the abutment-block and

the hopper I secure a block of rubber 46^A or other resilient material, which is shielded by a buffer-plate 48, that is bolted with the rubber to the block by the bolts 49. A lever 50, which I term the "accelerator," rests with the face of one edge at one end against the buffer-plate and its opposite edge bears against the adjacent side of the hopper. Consequently the lever rests against the buffer-plate and the hopper rests against the lever. (See Fig. 4.)

The accelerating-lever is pivotally attached at one end by a bolt 51 to the lugs 52, that are formed in one end of a lever 53, which I term the "actuating-lever." The accelerating-lever is curved at such a radius that it operates to push the ore-hopper along, starting it slowly at first and gradually accelerating its speed to about that of the buckets.

The actuating-lever 53 is reciprocally journaled in the boxes 54 and 55, formed in the ends of the brackets 54^A and 55^A, which are secured to the side edges of the front end of the ore-hopper. (See Fig. 4.) A pin 53^A is placed in the free end of the actuating-lever, which defines its backward movement. To the central portion of the actuating-lever I pivotally secure a lever 56, which I term a "keeper-lever," by a bolt 56^A. This keeper-lever comprises a two-armed lever, one arm 56^B of which is longer than the other and extends to a boss or lug 57, that is secured at one end to the actuating-lever as near the box 55 as will allow the actuating-lever the amount of stroke through the boxes necessary to allow the accelerating-lever to start and move the hopper to the speed of the traveling buckets. The opposite end of the lug projects laterally out from the side of the actuating-lever and away from the hopper to a short distance beyond the keeper-lever and the boxes, and its extreme end is turned in the direction the traveling buckets approach the hopper from, and it lies in the path of an arm 58, that is secured to a cross-tie member 59 of the pendants 60 of the bucket 61. The bucket is supported on a track 76 by two trolley-wheels 61^A, that are revolubly secured to the walking-beam 61^C by bolts 61^E. The walking-beam is pivotally bolted to the pendants by a bolt 61^B. The end 56^B of the keeper-lever contains a stepped portion that fits over the top edge of and against the sides of the arm 58 of the bucket's pendants and is arranged to confine the arm loosely between the step of the keeper-lever and the end of the lug 57. Consequently the bucket is securely locked between the two after it has reached the lug. The opposite arm 56^C of the keeper-lever projects vertically for a short distance above its pivotal bolt and is tapered off on the edge toward its other arm, and a seat is formed in this edge for a pin 62, that projects from the top end of a crank-arm 63, that is pivotally secured on the opposite side of the actuating-lever to the same bolt that the keeper is secured to. The short arm of the keeper normally bears

against this pin as the weight of the keeper's long arm carries the short arm against it.

The top of the crank-arm 63 is formed into a lever 64, that extends over the top edge of the actuating-lever and lies normally on top of the box 54 of the bracket 54^A; but when the actuating-lever is moved forward by a traveling bucket striking its lug 57 in the direction of the arrow 69 in Figs. 2 and 4 this lever drops down behind the edge of the box 54 and prevents or locks the actuating-lever from moving backward until the traveling bucket has moved the ore-hopper the full length of its travel on the tracks and has been filled with ore from the hopper and has then been released. To the side 64^A of the hopper a rope 65 is attached, that extends over a pulley 66, that is attached to the side of the bumper-block. A weight 67 is attached to the rope and acts to draw the hopper back to the bumper when it is released from the hopper.

The operation of my improved automatic loader is as follows: The buckets 61, of which there are always a number, run on two stationary ropes 70 and 71, which are secured to the ends of a track 76, that curves around the end of the upper and lower terminals 72. This track is supported by brackets 76^A, that extend to and are secured to the blocks 25^A and 25^B, and also by clips 79 to joists 80 of the terminals. The terminals are the ends of the tramway. They are timber structures and are arranged so that the buckets can pass around one end on the curved track 76. The upper terminal is almost always the loading-terminal and the lower terminal is the dumping-terminal. Consequently my automatic loader would most generally be attached to the upper or loading terminals of tramways, and it may be arranged to load the buckets as they come in from the line or after they turn around the end of the terminal and start to go out. The running rope 73, which is an endless rope, passes around the terminals on large rope-sheaves or grip-wheels 74, and the buckets are attached to the running rope by rope-clips 75. A type of clip which I preferably use on tramways is illustrated in my application for a patent, Serial No. 10,028, filed March 24, 1900. The terminals and running and stationary ropes are not fully illustrated in my present application, as their arrangement and construction are well known and do not directly affect my invention, which is applicable to all types of continuously-running wire-rope tramways, consequently assuming that the fragments of a rope 70, which connects with the track 76, designate the stationary ropes of a tramway and the fragment 73 an endless rope that connects by the clip 75 with the bucket, and that this rope is running continuously in front of the loading-hopper, and that the buckets are carried along by it. Then as each bucket passes along the front of the hopper in the direction of the arrow 69 its projecting

arm 58 runs under and raises the keeper-arm until it reaches the step in its end and the boss 57, when the keeper drops down behind the projecting arm of the bucket and it is held between the arm and the boss, and as the bucket moves continuously it bears against the lug and moves the actuating-lever through its supporting-boxes, which pulls on the actuating-lever, the free end of which bears and slides on the buffer-plate, while its back edge fulcrums against the ore-hopper and pushes it along, starting it slowly at first and gradually increasing its speed until it is traveling along its tracks at substantially the speed the bucket is moving at by the time the actuating-lever has completed its forward stroke, when the bucket pushes the ore-hopper directly to the end of its travel on its tracks. As the ore-hopper moves along its tracks the sheaves 23 and 23^a run up the inclined track on which they are mounted, which raises both doors; but the swinging door after it is raised two or three inches is free of its keepers, and under the pressure of the ore in the hopper swings out at the same time the upper door is being raised, which increases the ore-discharge opening. This arrangement allows the ore to flow into the bucket, slow at first, but with an increasing volume until the bucket is fully loaded, the hopper holding only sufficient ore at a time to load a bucket, and is loaded manually from a larger bin, which is not shown. As the ore-hopper approaches the end of its tracks it runs up the incline, which raises it and its actuating-lever and its lug 57 above the projecting arm of the bucket, which releases the hopper from the bucket, which passes on around the terminal and out over the tramway. The instant the hopper is released it starts back under the action of its returning-weight 67 to the bumper. At the same time that the projecting arm of the bucket is released from the hopper the keeper 56 drops down to substantially the position indicated by the dotted lines 77 in Fig. 2, which causes its short arm to bear against the pin 62 and raise the locking-lever 64 above the box 54. Then when the hopper runs back to the buffer the free end of the accelerator strikes the buffer-plate first, and as the hopper closes against the accelerator-lever and buffer-plate the accelerator draws the actuating-lever through its boxes, and the locking-lever, which has been raised up by the dropping of the keeper-lever, rides over the top of the box 54 and the hopper-accelerator, the actuating-lever assumes substantially the positions, shown in Fig 4, ready to receive the next bucket.

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

1. In an automatic bucket-loader for aerial wire-rope tramways, the combination with the terminal, the ropes and the bucket having a projecting arm secured to its pendants, with

an ore-hopper reciprocally mounted on tracks inclined upward at one end and adapted to raise said hopper above the engaging plane of the projecting arm of said bucket, a buffer-block at one end of said tracks, a lever reciprocally attached to said hopper, a lug secured to said lever and arranged in the path of said projecting arm of said bucket, a curved lever pivotally attached at one end to said reciprocating lever and having one edge of its free end arranged to rest on said buffer-block and the opposite edge of its body portion arranged to bear on the adjacent side of said hopper, substantially as described.

2. In an automatic loader for tramways, the combination with the terminals, the wire ropes and the bucket having a projecting arm, of tracks attached to said terminal, and having their rear ends inclined upward and raised above the body of the track and adapted to raise said hopper out of the path of and out of engagement with said bucket, a buffer on said terminal at the front end of said track, a weight arranged to move said hopper in the return direction of its reciprocative movement, a lever reciprocally mounted on the discharge side of said hopper and containing a projecting lug arranged to extend into the path of said projecting arm of said bucket, a curved lever pivoted at one end to the front end of said actuating-lever and arranged to bear with its opposite end against said buffer and arranged to bear with its curved portion and intermediate ends against the front end of said hopper, substantially as described.

3. In an automatic loader for wire-rope tramways, the combination with the terminal, the ropes and the bucket, of tracks secured thereto having one end upwardly inclined, a hopper arranged to roll reciprocally on said track, an abutment on said track at the normal standing end of said bucket, a weight arranged to return said hopper to its normal position an accelerating device attached to said bucket and arranged in the path of and to be engaged by said buckets, and comprising a reciprocating lever adapted to be engaged by said buckets, and a curved lever pivoted at one end to said reciprocating lever and having its opposite end and body portion arranged to rest against said abutment and the adjacent side of said hopper, and arranged and adapted when a bucket engages said reciprocating lever to push against said hopper and to start and accelerate its movement on its tracks until it has attained substantially the speed of said buckets, substantially as described.

4. In an automatic loader for tramways the combination with the terminal, the ropes and the bucket having a laterally-projecting arm, of the tracks having an upwardly-inclined portion, the hopper arranged to roll thereon, the actuating-lever reciprocally mounted on said hopper, the accelerating-lever, the keeper-lever, the locking-lever and the projecting lug arranged on said actuating-lever

to receive and engage the projecting arm of said bucket, with an ore-discharge opening in said hopper, a suitable door arranged to normally close said ore-discharge opening, a track above said door having its end farthest from the normal resting-place of said hopper upwardly inclined, a supporting-arm at one end of said hopper, a trolley-wheel mounted on said track and revolvably connected to said supporting-arm, a second trolley-wheel on said track pivotally connected to the trolley-wheel of said supporting-arm, a pendant pivotally attached to said second trolley-wheel and operatively connected to the central portion of said door, substantially as described.

5. In an automatic loader for wire-rope tramways the combination with the buckets, the hopper, the hopper-tracks, the actuating and accelerating levers, of the ore-discharge chute extending from the bottom of the hopper over the bucket, the ore-discharge opening in said hopper adjacent to said actuating-lever, a door over the upper portion of said ore-discharge opening and arranged to slide vertically in guideways, a swinging door hinged to the lower edge of said sliding door, a bar across the lower edge of said swinging door extending beyond the side edges of said swinging door, and keepers comprising inclined blocks secured to said discharge-spout and arranged to guide and hold said swinging door normally against its seat, and with an inclined track supported above said vertically-sliding door, two trolley-wheels mounted on said track and revolvably connected together, a supporting-arm attached to one trolley-wheel and secured to said hopper, and a pendant pivotally secured to the other trolley-wheel at one end and secured to the central portion of said vertically-sliding door, substantially as described.

6. In an automatic loader for tramways, the combination of the inclined hopper-tracks, the hopper, the abutment-block having a resilient bumper attached to it, the actuating and accelerating levers operatively attached to said hopper, the projecting lug, the keeper and the locking-lever on said actuating-lever, with the running and stationary ropes, the terminal and the bucket having a projecting arm adapted to engage the projecting lug of said actuating-lever, substantially as described.

7. In an automatic bucket-loader for wire-rope tramways, the combination with the terminal, the timbers, the ropes and the bucket having a projecting arm, of the hopper, the inclined tracks on which said hopper runs, the abutment-block at the starting end of said inclined tracks, the elastic buffer and shield secured to said abutment-block, the actuating-lever reciprocally mounted in brackets, the curved accelerating-lever pivotally secured at one end to said actuating-lever and arranged to start and move said hopper, and the projecting lug, the keeper and the locking-lever arranged on said actu-

ating-lever to engage and secure said hopper to the projecting arm of said bucket, substantially as described.

8. In an automatic bucket-loader for wire-rope tramways, the combination with the bucket having a projecting arm, the ropes and the terminal timbers, of the inclined tracks secured to said terminal timbers, the hopper mounted to roll reciprocally on said tracks, and adapted to be raised by them above the engaging plane of the projecting arm of said bucket, and having a downwardly-inclined bottom, a discharge-chute extending from said bottom, a discharge-opening in said hopper above said discharge-chute, guideways arranged on the sides of the upper portion of said opening, a door arranged to slide vertically in said guideways, a swinging door hinged to the lower edge of said vertically-sliding door, and arranged in operative relation to said opening, an inclined track above

said doors, a supporting-arm secured at one end to said hopper, the trolley on said track above said doors pivotally and operatively secured to said supporting-arm by a connecting-arm and the pendant-levers pivotally connected to said second-named trolley and to said vertically-sliding door, and having said door-track inclined upward higher than the inclined tracks of said hopper and at a steeper incline whereby as both the hopper and its doors travel on their respective tracks forward and backward the doors will be raised and lowered to open and close the discharge-opening of said hopper, substantially as described.

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

BYRON C. RIBLET.

Witnesses:

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