A. J. VIVIAN.

BOX CAR LOADER.

APPLICATION FILED APR. 8, 1912.

1,073,376.

Patented Sept. 16, 1913.

4 SHEETS—SHEET 1.

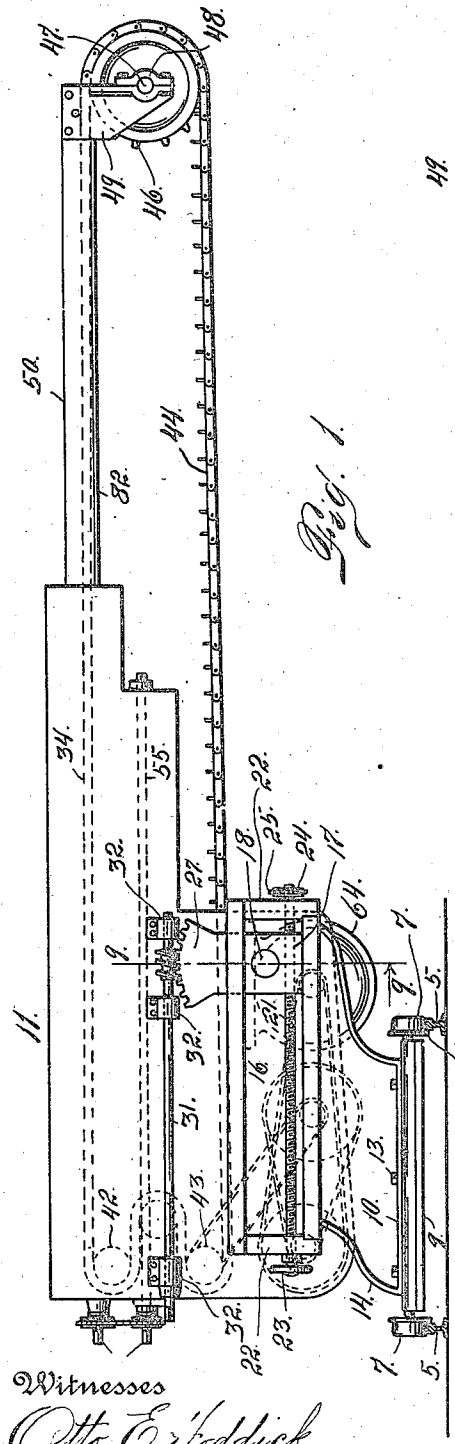


Fig. 1.

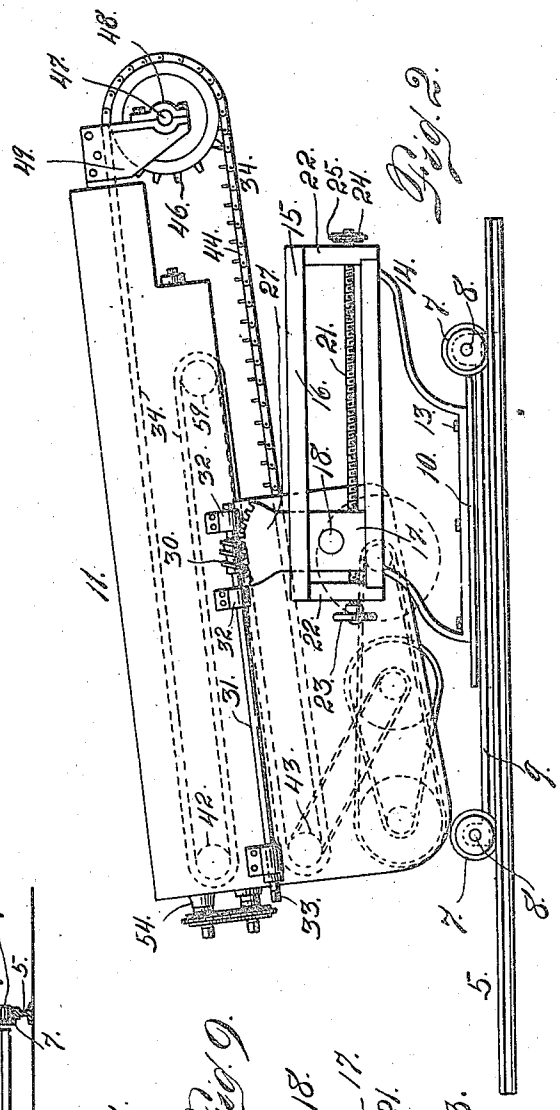


Fig. 2.

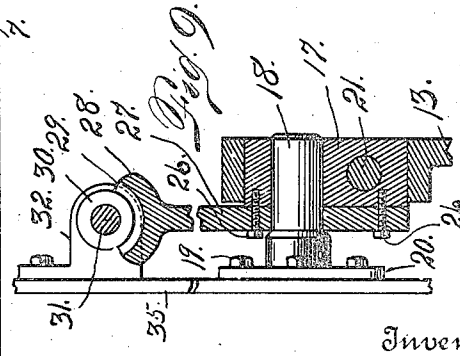


Fig. 3.

Witnesses

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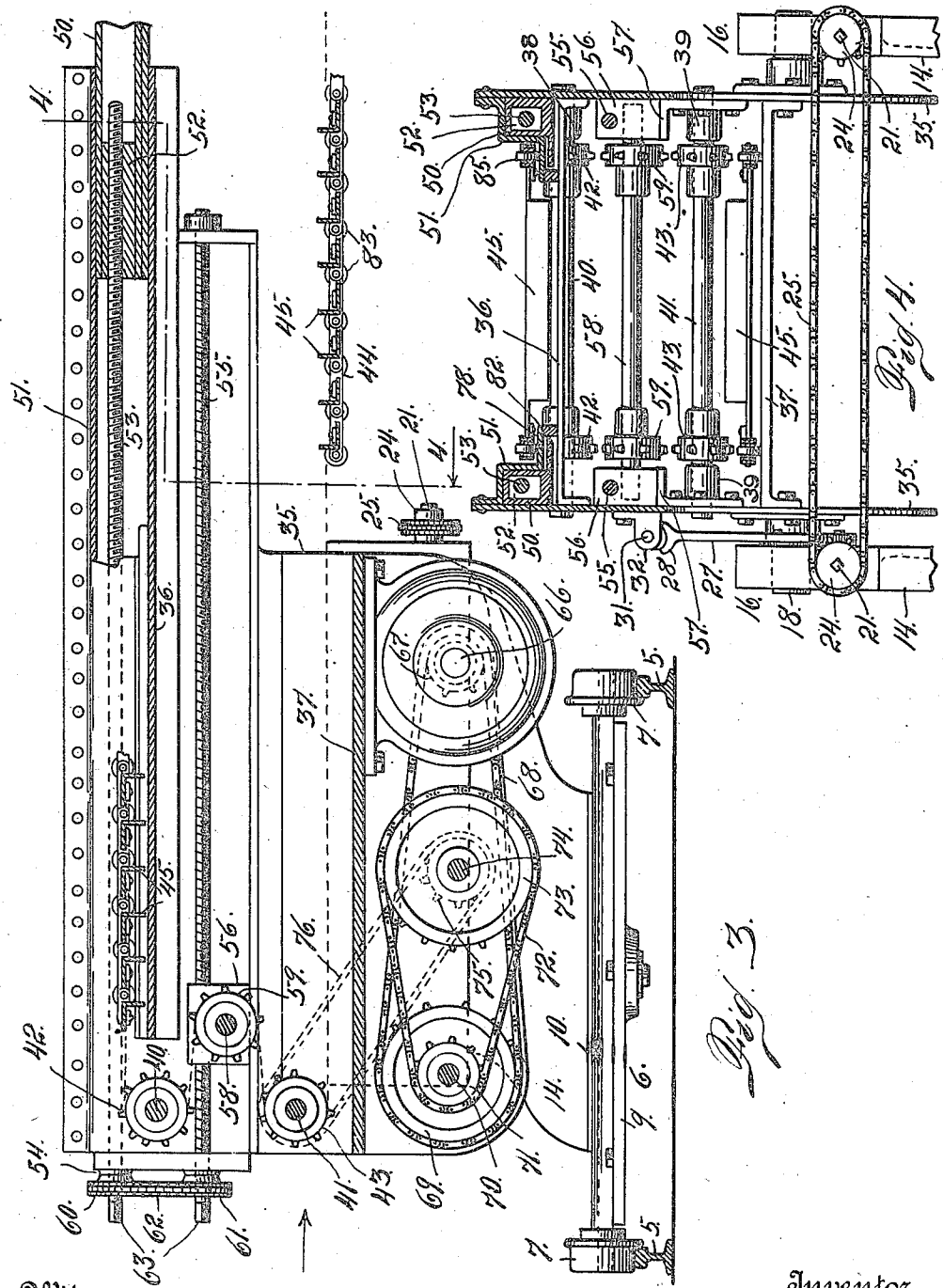
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4 SHEETS—SHEET 2.



Witnesses

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4 SHEETS—SHEET 3.

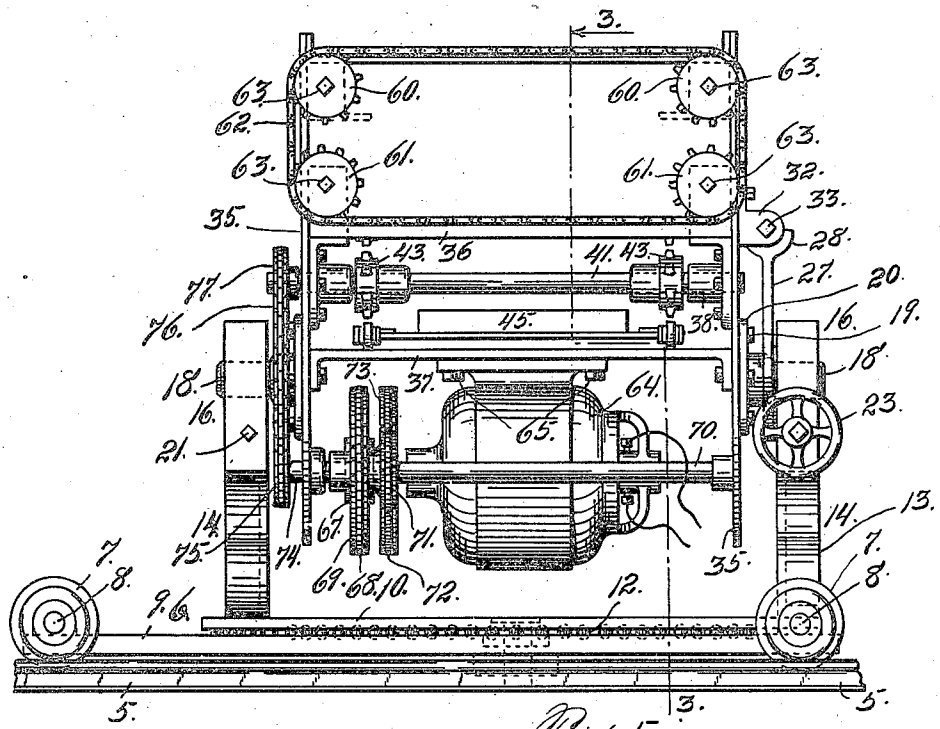


Fig. 5

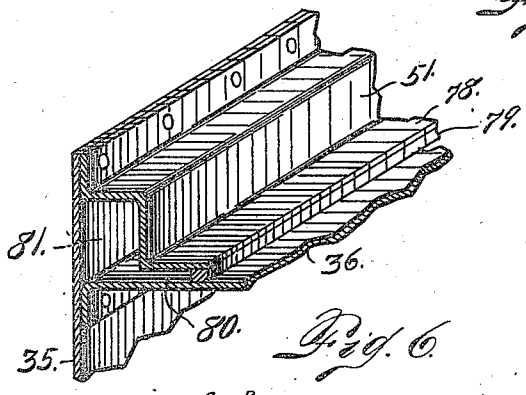


Fig. 6

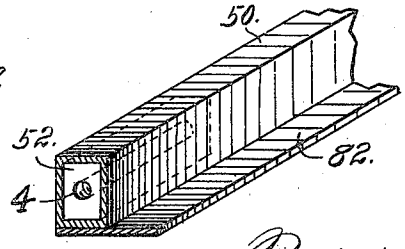


Fig. 7

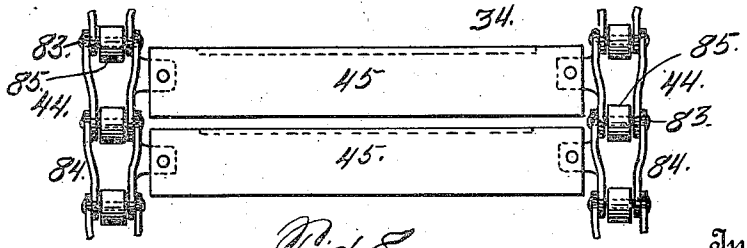


Fig. 8

Witnesses

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4 SHEETS—SHEET 4.

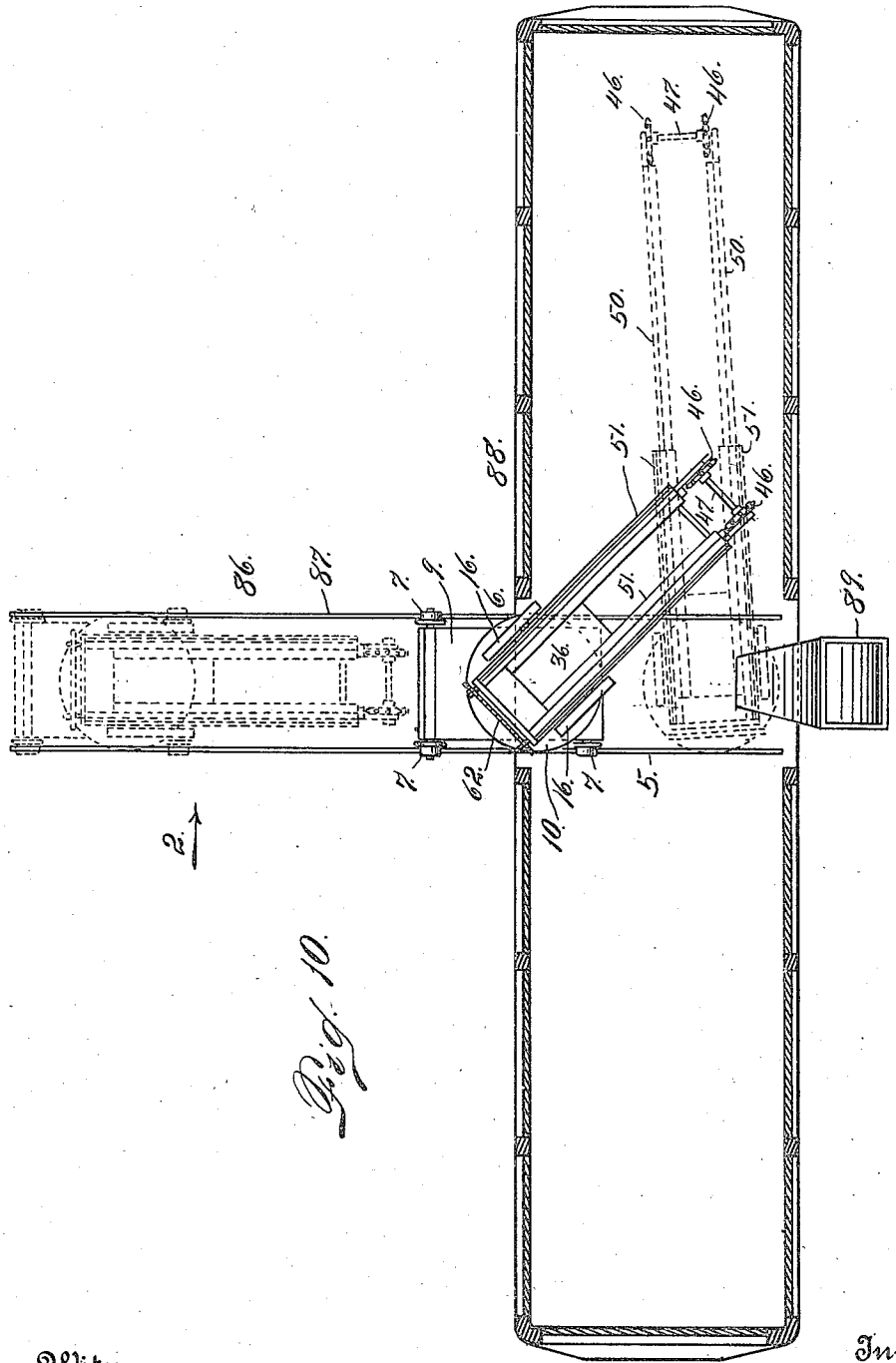


Fig. 10.

2.

Witnesses

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UNITED STATES PATENT OFFICE.

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BOX-CAR LOADER.

1,073,376. Specification of Letters Patent. Patented Sept. 16, 1913.

Application filed April 8, 1912. Serial No. 689,134.

To all whom it may concern:

Be it known that I, ALFRED J. VIVIAN, citizen of the United States, residing in the city and county of Denver and State of Colorado, have invented certain new and useful Improvements in Box-Car Loaders; 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 characters of reference marked thereon, which form a part of this specification.

My invention relates to improvements in box car-loaders, my object being to provide an apparatus of this character which shall be comparatively simple in construction, economical in cost, reliable, durable and efficient in use.

My improved apparatus includes a longitudinally-movable conveyer-frame-member which telescopes in the main frame of the loader, the resulting slack in the conveyer being taken up by a second member slidable on the main frame and moved simultaneously in the reverse direction, the said slidable member for taking up the slack being interposed between the upper and lower sprockets carried by shafts journaled in the main frame. Hence, as the telescoping conveyer-frame-member moves rearwardly, the slidable member which is engaged by the conveyer, moves forwardly, and being located between the upper and lower shafts carrying sprockets engaged by the conveyer, doubles the conveyer-run between the slidable member and the two sprocket-carrying shafts, thus taking up the slack in the conveyer simultaneously with the rearward travel of the latter. By virtue of this construction, the conveyer may be extended and shortened within a considerable range of adjustment, thus making it practicable to extend the free end of the conveyer to either end of the car, or as near thereto as is desirable for loading purposes, and then gradually move the free end of the conveyer toward the center of the car as the latter is filled. Provision is also made for bodily moving the main frame-work on an auxiliary frame-work mounted on a turn-table carried by a truck, the truck being equipped with wheels adapted to engage a track suitably arranged for introducing the apparatus to a car. The entire apparatus rotates freely with the turn-table. The main frame-work, however, is longitudinally movable on the auxiliary frame carried by the turn-table and relatively stationary therewith. Provision is also made for tilting the main frame-work together with the conveyer whereby the free or discharge end of the latter may be lowered and raised at will.

Having briefly outlined my improved construction, I proceed to describe the same in detail, reference being made to the accompanying drawing in which is illustrated an embodiment thereof.

In this drawing: Figure 1 is a side-elevation of my improved box-car loader showing the conveyer extended, the whole apparatus occupying a position at right angles to the longitudinal direction of the truck. Fig. 2 is a side-elevation showing the conveyer retracted, the apparatus in this case occupying a position parallel with the longitudinal direction of the truck. This view would be obtained by looking in the direction of the arrow 2 Fig. 10, assuming that the apparatus is occupying the dotted-line position, but shown on a larger scale. Fig. 3 is a sectional view taken on the line 3—3 Fig. 5, being a longitudinal section of the apparatus with its forward extremity partly broken away. In this view, the apparatus is shown on a larger scale than in Figs. 1 and 2. Fig. 4 is a cross-section taken on the line 4—4 Fig. 3 looking toward the left. Fig. 5 is an end elevation of the apparatus or a view looking in the direction of arrow 5 Fig. 3. Fig. 6 is a fragmentary perspective view illustrating the telescoping member of the main frame. Fig. 7 is a similar view illustrating the coöperating telescoping member of the conveyer frame. Fig. 8 is a fragmentary detail view of the endless conveyer shown on a larger scale than in the other views. Fig. 9 is a section taken on the line 9—9 Fig. 1, the parts being shown on a larger scale. Fig. 10 is a top-plan view of the apparatus shown in connection with a box-car, the latter being illustrated in horizontal section.

The same reference characters indicate the same parts in all the views.

Let the numeral 5 designate a track upon which is mounted a truck 6 having wheels 7 mounted on axles 8, the latter carrying

a platform 9 upon which is mounted a turn-table 10, the platform and turn-table having coöperating circular race-ways engaged by bearing-balls 12 whereby the turn-table moves freely upon the platform of the truck and is capable of manual manipulation or adjustment.

Secured to the turn-table by suitable fastening devices 13 and extending upwardly therefrom, is a frame 14 upon which are mounted and made fast two members 15, constituting an auxiliary frame 16, upon which the main frame is longitudinally and tiltably adjustable. The longitudinal adjustment is effected by means of two blocks 17 freely slidable in the frame-members 15, the said blocks forming bearings for trunnions 18 secured to the main frame by means of suitable fastening devices 19 passed through flanges 20 formed at the base or inner extremities of the trunnions. Each block 17 is freely slidable in its corresponding auxiliary frame-member 15 and is actuated to carry the main frame in either direction by means of a screw 21 journaled in the opposite ends 22 of each auxiliary frame-member. At the forward extremity of one of these screws is applied a hand-wheel 23 for manually rotating the screw. The rear extremities of the two screws are equipped with sprocket-wheels 24 connected by a chain 25 whereby, as one screw is turned, both screws will be rotated and impart uniform travel to the blocks 17 whereby the main frame is moved bodily either forwardly or rearwardly with reference to the turn-table.

The manner of tilting the main frame upon the blocks 17 or with reference to the auxiliary frame will now be described. Secured to one of the blocks 17 by means of suitable fastening devices 26 is a vertically-disposed plate-arm 27 whose upper extremity is transversely reinforced as shown at 28, this transverse portion being concaved and toothed as shown at 29 to receive a worm 30 formed on a shaft 31 journaled in bearings 32 formed on one side of the main flange. The toothed upper extremity of the plate-arm 27 lies in an arc struck from the center of the trunnions 18. The forward extremity of the worm shaft 31 extends beyond the main frame-work and is fashioned as shown at 33 to receive a crank or hand-wheel to facilitate manipulation. As this shaft is turned, it is evident that the worm will follow the arc of the toothed extremity of the plate-arm whereby the main frame may be tilted to throw the forward extremity of the conveyer 34 either upwardly or downwardly within the car as may be desired.

As illustrated in the drawing, the auxiliary frame 16 is composed of vertically-arranged suitably-supported parallel steel side-plates 35 connected by upper and lower platforms 36 and 37 giving the said frame the necessary rigidity and stiffness for all practical purposes. Journaled in suitable bearings 38 and 39 with which the side-plates 35 are equipped, are upper and lower shafts 40 and 41 which are equipped with sprocket-wheels 42 and 43 adapted to receive chains 44 connected by transversely arranged angle-iron members 45 forming a conveyer for the coal during the loading operation. These shafts and their respective sprocket-wheels constitute upper and lower supports at the rear extremity of the apparatus for the endless conveyer; while the forward extremity of the conveyer is supported on sprocket-wheels 46 fast on a shaft 47 journaled in bearings 48 carried by depending brackets 49 mounted on the forward extremities of two hollow bars 50 which telescope freely in hollow coöperating members 51 secured to the inner surfaces of the opposite side-plates 35 of the main frame. The rear extremity of each telescoping member 50 contains a solid block 52 having a threaded opening 4 in which is threaded a longitudinally disposed screw 53 which is journaled in the rear extremity of the main frame as shown at 54. Similar screws 55 are journaled in the lower part of the main frame and are threaded in blocks 56 slidably mounted on tracks 57 secured to the inner surfaces of the opposite side-plates of the main frame. Journaled in these blocks is a transverse shaft 58 carrying sprocket-wheels 59 which are engaged by the conveyer-chains 44, the said sprockets 59 engaging the conveyer-chains intermediate the engagement by the sprockets mounted upon the upper and lower shafts 40 and 41. The upper screws 53 and the lower screws 55 on opposite sides of the main frame-work extend rearwardly beyond the same and are equipped with sprocket-wheels 60 and 61, the four sprocket wheels being engaged by a chain 62 to cause the four screws to operate in harmony. Each screw extends rearwardly beyond its sprocket-wheel as shown at 63 and is formed polygonal, preferably square, in cross-section whereby it is adapted to receive a hand-wheel or crank for simultaneously operating the four screws of the apparatus.

The upper screws 53 as illustrated in the drawing are right-hand screws, while the lower screws 55 are left-hand screws, consequently when the upper screws are rotated in a direction to cause the telescoping-members 50 to travel rearwardly, the bearing-blocks carrying the shaft 58 with the sprocket-wheels 59 will be carried forwardly to take up the slack in the conveyer caused by the rearward movement of the telescoping members 50.

Suspended from the lower platform 37 of

the main frame is a motor 64 (preferably electric) which is secured to said platform by suitable fastening devices 65. The armature shaft 66 of this motor is equipped with a sprocket-wheel 67 engaged by a chain 68 leading to a larger sprocket-wheel 69 fast on a shaft 70 journaled in the lower part of the main frame. Upon this shaft is also mounted a smaller sprocket-wheel 71 connected by means of a chain 72 with a larger sprocket-wheel 73 fast on a shaft 74 intermediate the shaft 66 and the shaft 70. Upon the outer extremity of the shaft 74 is a smaller sprocket wheel 75 which is connected by means of a chain 76 with a sprocket wheel 77 fast on one extremity of the shaft 41, whereby power is applied to the endless conveyer for imparting the necessary movement thereto for carrying the coal during the loading operation.

The telescoping member 51 connected with each side-plate 35 of the frame, is provided with a flange 78 supported by a cleat 79 in a position slightly above the upper platform 36 of the frame whereby a space 80 is left below the flange 78 and communicating with the opening 81 which is adapted to receive the telescoping member 50 connected with the conveyer as heretofore explained. This telescoping member 50 has a flange 82 adapted to enter the space 80 and slide freely therein during the endwise adjustment of the conveyer.

The telescoping member 51 extends the entire length of the upper portion of the main frame 16 and the flanges 78 of the two telescoping members 51 form a support for the chains 44 of the conveyer, the hinge-pins 83 of the links 84 carrying rollers 85 which travel upon the flanges 78 until the end of the main frame is reached, when the said rollers engage the flanges 82 of the telescoping members 50, which flanges support the conveyer until the forward extremity of the members 50 is reached when the conveyer passes downwardly around the sprockets 76 of the shaft 47.

From the foregoing description, the use and operation of my improved car-loader will be readily understood.

In order to use the loader it is first mounted on a support 86 located outside the car and provided with tracks 87 which the wheels 8 of the truck engage, the said rails of the track being extended into the box car 88. The loader which is in the condition indicated by dotted lines, outside the car, in Fig. 10—that is to say, with its conveyer adjusted to reduce the machine to its minimum length—is then run into the car and turned upon the turn-table during its entering movement, after which the conveyer is extended until its forward end occupies a position close to one end of the car. This is accomplished by turning the screws 53 and 55 in a direction to cause the structure composed of the telescoping members 50 to travel forwardly, while the structure including the slidable blocks 56 travel rearwardly. In order to effect this result, it is only necessary to apply a crank or hand-wheel to one of the projections 63 of one of the screws 53 or 55. The turning of one of these screws in the proper direction will turn all the screws in a direction to accomplish the aforesaid result by virtue of the connection of the four sprocket-wheels 60 and 61, by means of the chain 62. The forward extremity of the conveyer is then lowered to a position close to the bottom of the car. This is accomplished by turning the shaft 31 whereby the worm 30 is caused to travel on the curved toothed upper extremity of the plate-arm 27, in the proper direction. During this operation, the trunnions 18 of the main frame turn in the blocks 17 of the auxiliary frame by virtue of the construction heretofore described. As soon as this is accomplished, the motor 64 may be set in motion whereby motion is communicated to the endless conveyer. The coal or other material to be loaded into the car is then discharged upon the rear end of the conveyer from a chute 89. The coal may be continuously fed through the chute to the conveyer, which, being in constant motion, carries it to the end of the car and delivers it to the floor thereof. In this manner the coal is carefully deposited in the car without any opportunity for breakage or the production of slack. As the end of the car fills, the forward extremity of the conveyer is gradually raised and when the coal has been deposited in the car end to the desired depth, the forward extremity of the conveyer is retracted or withdrawn. In this manner the car is gradually filled from the end toward the center until the forward extremity of the conveyer has, by virtue of the adjustment heretofore explained, reached its rearward limit of movement. The main frame may then be retracted bodily or moved rearwardly upon the auxiliary frame 16 mounted on the turn-table, this operation being accomplished by turning one of the screws 21 whereby motion is imparted to both screws through the instrumentality of the connecting chain 25. As these screws 21 are turned in the proper direction, the main frame-work, together with the mechanism mounted thereon, is caused to travel rearwardly on the auxiliary frame 16 to the position shown in Fig. 2, thus making it practicable to deposit the material in the car quite closely to the center thereof.

After the filling of the car from one end to the central part is accomplished, the apparatus is moved to its original position while entering the car-door and is turned in a direction to fill the opposite end of the car, when the operation heretofore described

is repeated, after which the loader may be removed from the car and the central portion, which has been occupied by the loader, filled if desired by the direct action of the chute 89.

The upper platform 36 occupies a position just below and in close proximity to the depending parts of the angle-iron conveyer slats whereby the said platform is adapted to catch any fine coal that may escape between the slats or bars connecting the chains of the conveyer, thus preventing any fine coal from passing downwardly and interfering with the operating parts of the machine. Furthermore, by virtue of the arrangement of the upper run of the traveling conveyer with reference to the upper platform, the slats or bars of the conveyer are adapted to scrape any fine coal that otherwise would accumulate thereon, forwardly when the conveyer is in operation, the said coal being carried as far as the forward extremity of the main frame when it drops into the car beyond the operating mechanism of the loader.

Having thus described my invention, what I claim is:

1. The combination with a truck and a turn-table mounted thereon, of a frame carried by the turn-table and longitudinally adjustable thereon, and an endless traveling conveyer connected with the frame and longitudinally extensible thereon.

2. The combination with a truck and turn-table mounted thereon, of a frame tiltably mounted and longitudinally movable on the turn-table, and an endless traveling conveyer extensibly mounted on the frame.

3. The combination with a supporting base of an auxiliary frame mounted thereon and comprising two sets of horizontal separated members, a block slidable in each set of said members, a main frame trunnioned in the blocks, screws journaled in the auxiliary frame-members and threaded in the blocks, an operative connection between the two screws, whereby a movement in one will cause a like movement in the other, means for rotating either screw, and a conveyer mounted on the main frame.

4. The combination with a supporting base, of an auxiliary frame mounted thereon comprising two separated members, blocks slidable in said members, a main frame trunnioned on the blocks, screws journaled in the auxiliary frame members and threaded in the blocks, an operative connection between the two screws, means for rotating either screw, a conveyer mounted on the main frame, a plate-arm secured to one of the said blocks and having a toothed upper extremity curved in an arc struck from the trunnion axis as a center, and a shaft journaled in the main frame and carrying a worm engaging the toothed extremity of the plate-arm for tilting the frame, substantially as described.

5. The combination with a main frame, of two members telescopically mounted thereon, a shaft connecting the forward extremities of the two members, wheels mounted on the said shaft, an endless traveling conveyer whose forward extremity is supported by said wheels, screws journaled in the main frame and threaded in the said members for imparting longitudinal movement thereto for the purpose of extending or retracting the forward end of the conveyer, upper and lower shafts journaled in the rear extremity of the frame and carrying wheels which are engaged by the conveyer in the rear, blocks slidably mounted on the main frame and carrying wheels which engage the conveyer intermediate the wheels of the upper and lower shafts, and screws connected with the said blocks and journaled in the main frame to impart movement to the blocks lengthwise of the frame, the two sets of screws respectively connected with the telescoping members and the two blocks being reversely threaded and connected in operative relation whereby when any screw is rotated the two sets of screws will be actuated to move the said blocks and the telescoping members in reverse directions, substantially as described.

6. In a car-loader, the combination of a frame having hollow members aranged on opposite sides, members arranged to telescope within said hollow members and extend forwardly therefrom, an endless traveling conveyer engaging flanges formed on the hollow members of the frame, the telescoping members being also provided with flanges and the hollow members having spaces to receive the said flanges beneath the flanges of the hollow members of the frame, the flanges of the telescoping members where the latter extend forwardly from the frame being adapted to support the conveyer beyond the frame, the forward extremities of the telescoping members being connected to support the forward extremity of the conveyer, substantially as described.

7. The combination with a frame and an endless traveling conveyer of a support for the forward end of the conveyer, said support being movably connected with the frame to travel in either direction, two separated supports mounted in the frame in a position to be engaged by the rear end of the conveyer, a member movable upon the frame and engaging the conveyer between the said separated supports, and means for simultaneously actuating in opposite directions the forward support and the rear movable member, substantially as described.

8. In combination, a frame having two parallel hollow guide members open only at their ends, comparatively long correspond-

ingly shaped members arranged to slide longitudinally within said guide members, a shaft connecting the forward extremities of the sliding members and an endless carrier supported partly upon said shaft.

9. In combination, a frame having a plurality of parallel polygonal hollow guide members open only at their ends, comparatively long correspondingly shaped members arranged to slide longitudinally within said guide members, a shaft mounted upon the forward extremity of the sliding members, and an endless carrier supported partly upon said shaft.

10. The combination with a main frame of two members longitudinally extensible thereon, a support connecting the forward extremities of the two members, an endless traveling conveyer whose forward extremity is arranged to run over said support, a means for imparting longitudinal movement to the aforesaid extensible members, upper and lower supports mounted in the rear extremity of the frame for engaging the conveyer in the rear, blocks slidably mounted on the main frame and carrying a support adapted to be engaged by the conveyer intermediate the upper and lower supports, means for imparting motion simultaneously to the said blocks lengthwise of the frame, the last named means and the means for imparting motion to the two extensible members being so interconnected that when the forward extremity of the conveyer or the intermediate support therefor is moved in one direction, the other of said two last named elements will automatically move in the opposite direction.

11. In a car-loader, a conveyer mounted thereon in substantially horizontal position, a movable support for the forward end of the conveyer, two spaced fixed supports for the rear end of the conveyer, a movable intermediate support engaging the conveyer between the fixed supports and means for imparting motion in opposite directions to said forward and intermediate supports simultaneously.

12. In a car-loader, a frame mounted upon a horizontal pivot, an endless conveyer carried by the frame, a movable support for the forward end of the conveyer, two spaced fixed supports for the rear end of conveyer, a movable intermediate support engaging the conveyer between the fixed supports and means for imparting motion in opposite directions to said forward and intermediate supports simultaneously.

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

ALFRED J. VIVIAN.

Witnesses:
A. J. O'BRIEN,
A. E. ADAMS.