June 10, 1930. R. S. BOLGER 1,763,499

LOADING APPARATUS

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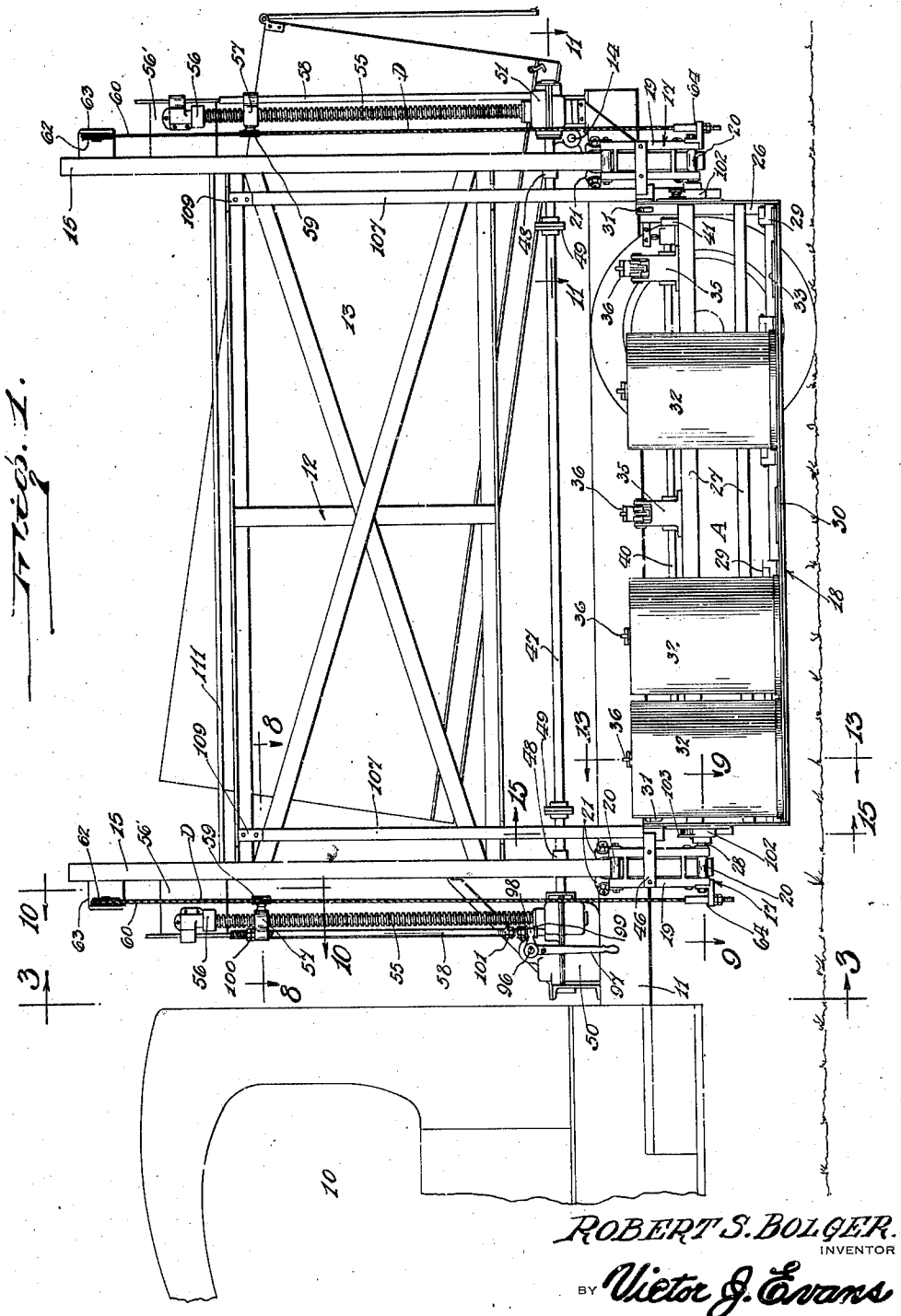

Fig. 1.

ROBERT S. BOLGER.
INVENTOR

BY Victor J. Evans
ATTORNEY

WITNESS:

June 10, 1930. R. S. BOLGER 1,763,499

LOADING APPARATUS

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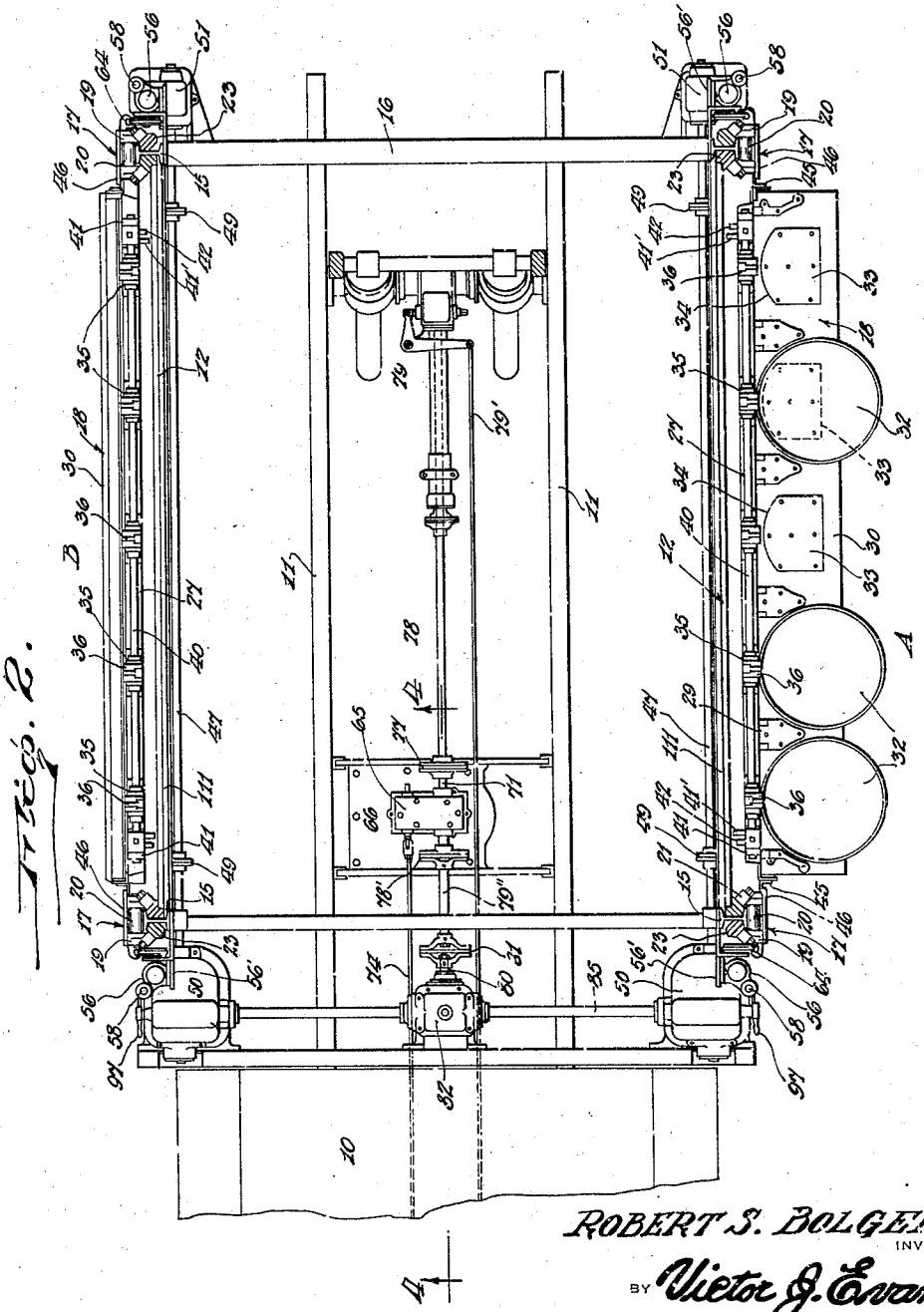

Fig. 2.

ROBERT S. BOLGER
INVENTOR

BY Victor J. Evans
ATTORNEY

WITNESS: D. Walter Lusby

June 10, 1930. R. S. BOLGER 1,763,499

LOADING APPARATUS

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Fig. 3.

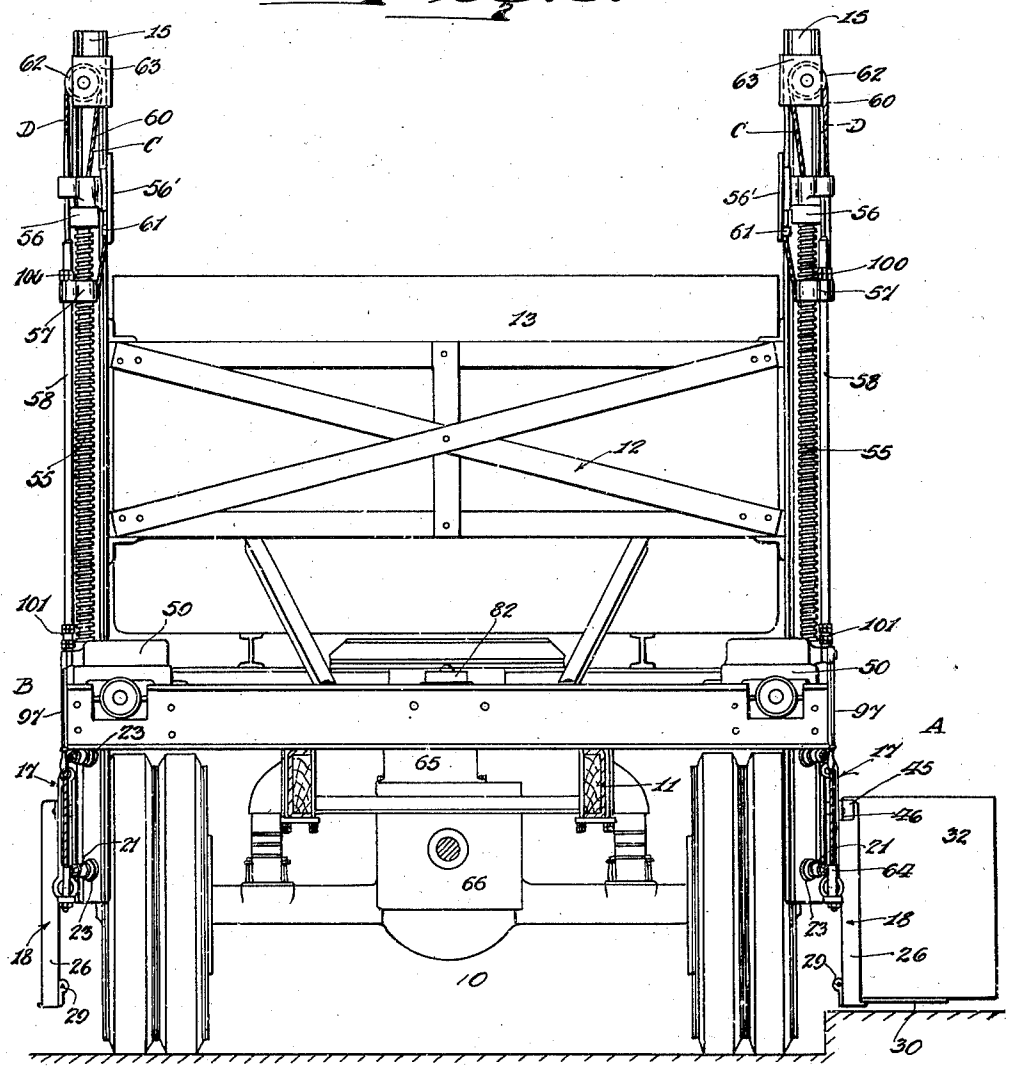
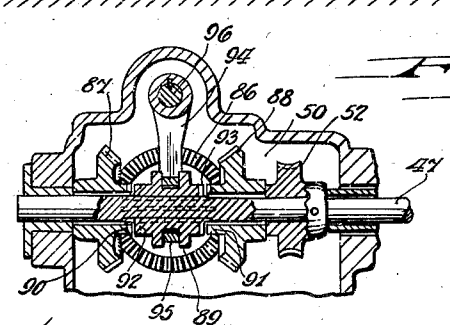


Fig. 12.



ROBERT S. BOLGER
INVENTOR

BY Victor J. Evans
ATTORNEY

WITNESS: Newton Lusby

June 10, 1930. R. S. BOLGER 1,763,499

LOADING APPARATUS

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Fig. 4.

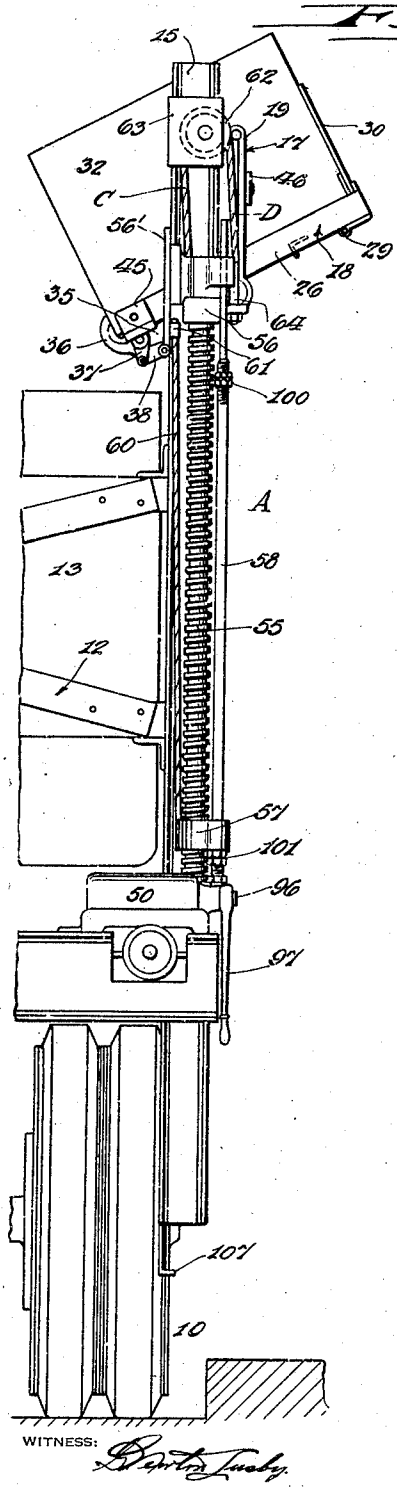
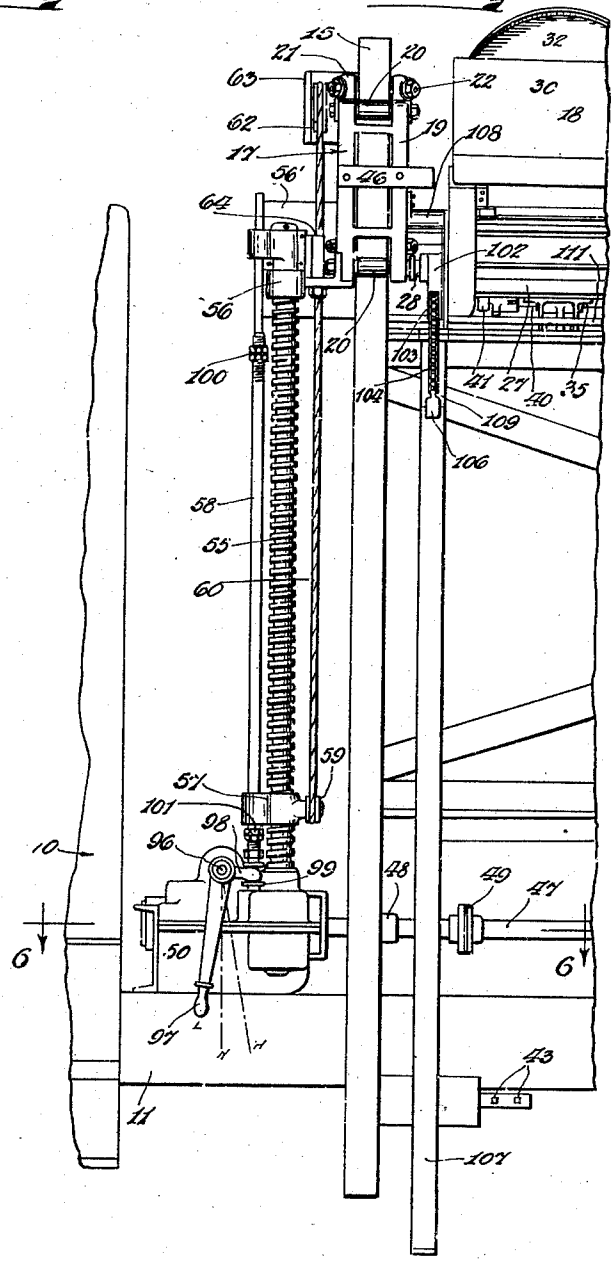


Fig. 5.



WITNESS:

ROBERT S. BOLGER. INVENTOR

BY Victor J. Evans

ATTORNEY

June 10, 1930. R. S. BOLGER 1,763,499

LOADING APPARATUS

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Fig. 10.

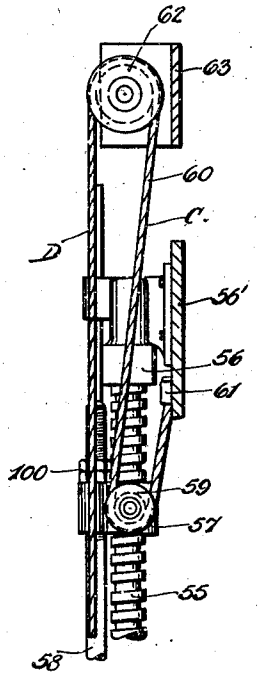


Fig. 6.

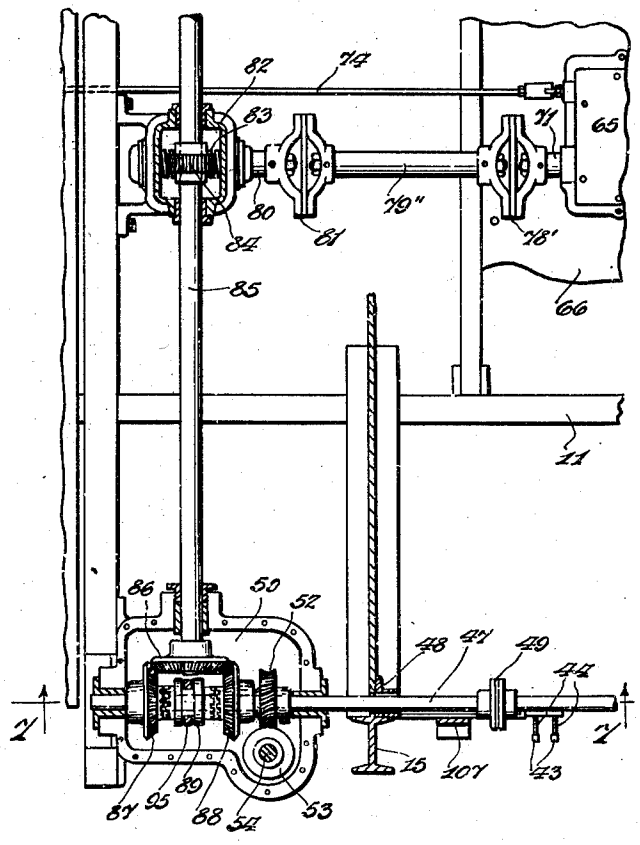
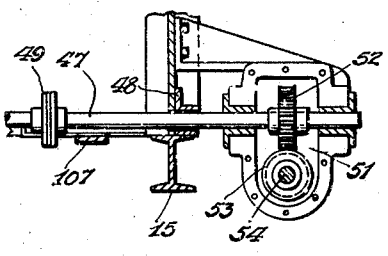
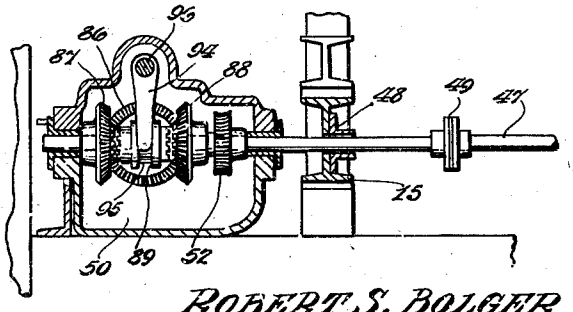


Fig. 7.

Fig. 11.





ROBERT S. BOLGER
INVENTOR

BY Victor J. Evans

ATTORNEY

WITNESS:

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LOADING APPARATUS

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Fig. 8.

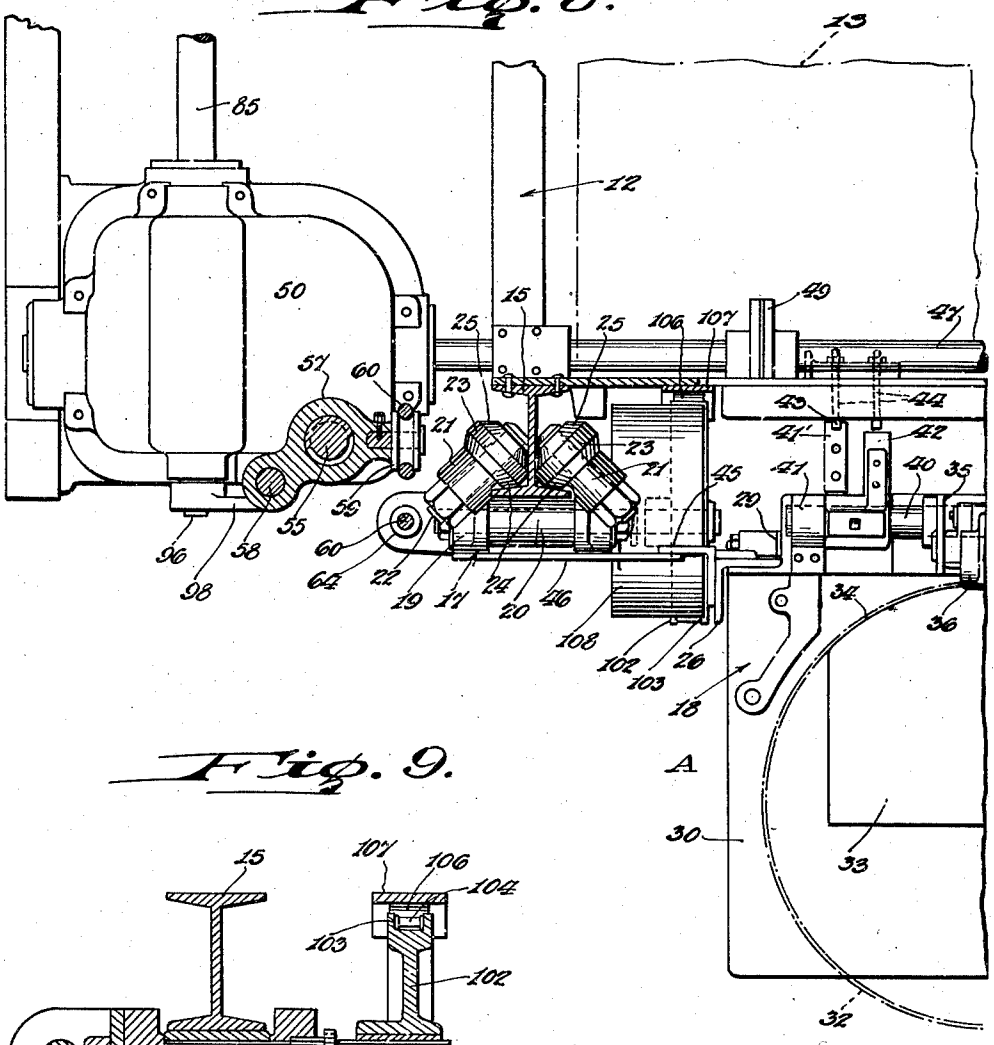
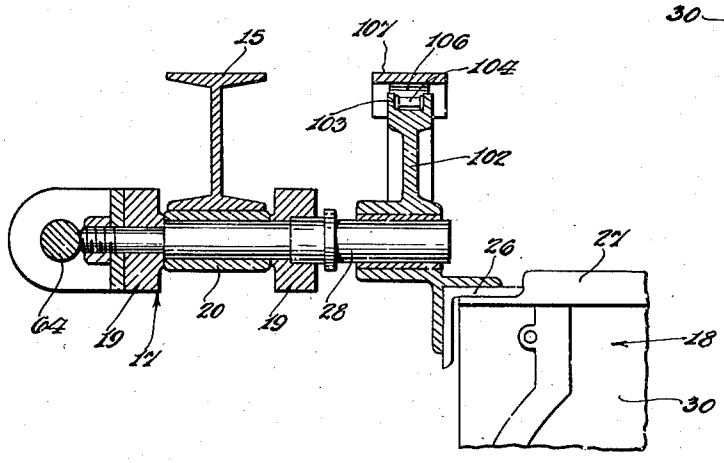


Fig. 9.



ROBERT S. BOLGER
INVENTOR

BY Victor J. Evans
ATTORNEY

WITNESS: [illegible]

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LOADING APPARATUS

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Fig. 14.

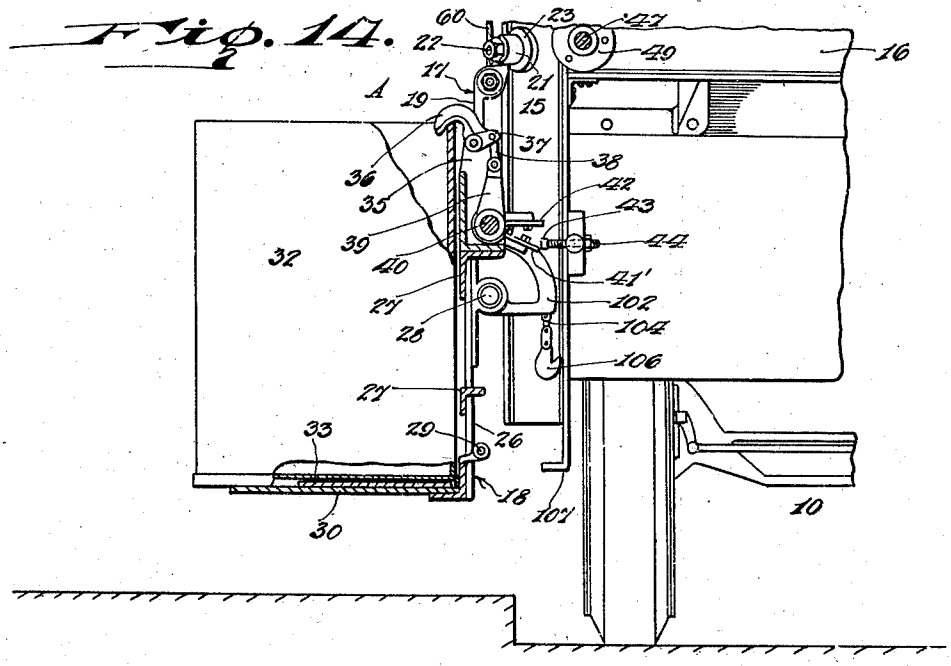
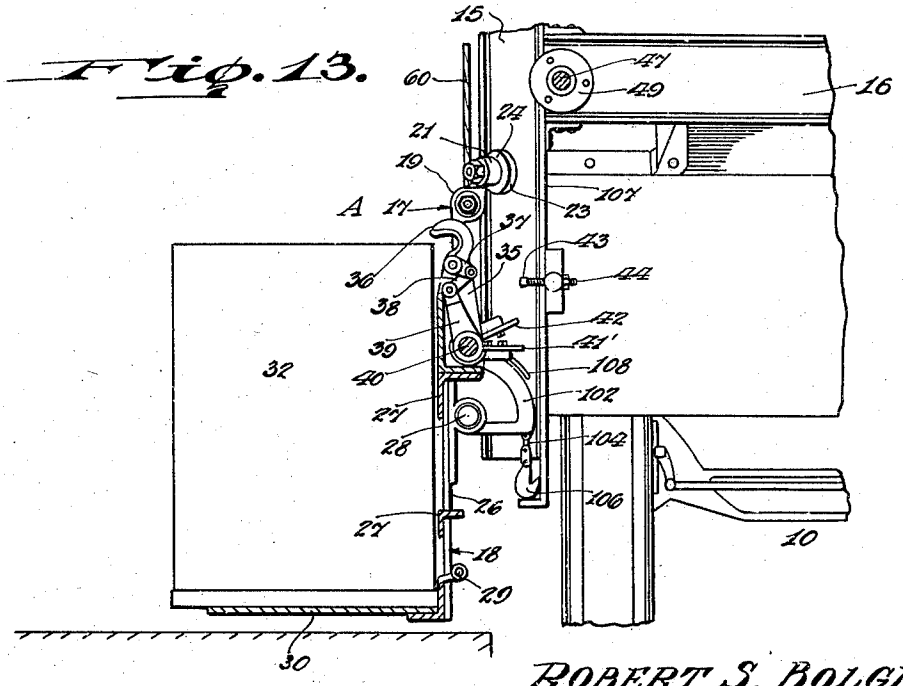


Fig. 13.



ROBERT S. BOLGER
INVENTOR

BY Victor J. Evans
ATTORNEY

WITNESS: B. Horton Lusby

June 10, 1930. R. S. BOLGER 1,763,499

LOADING APPARATUS

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Fig. 15.

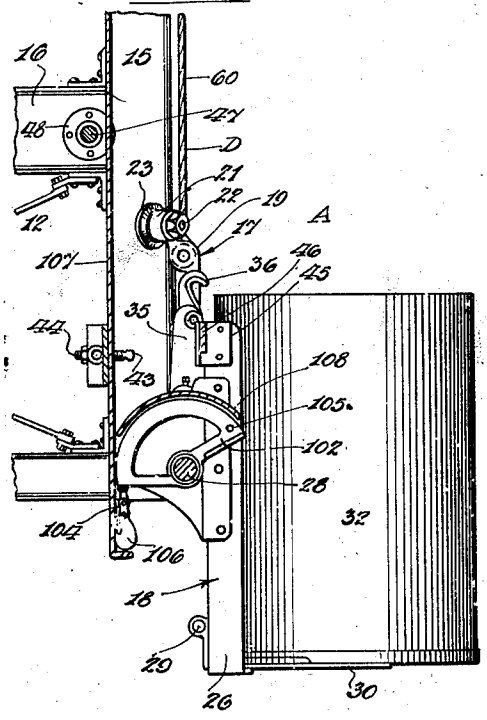


Fig. 16.

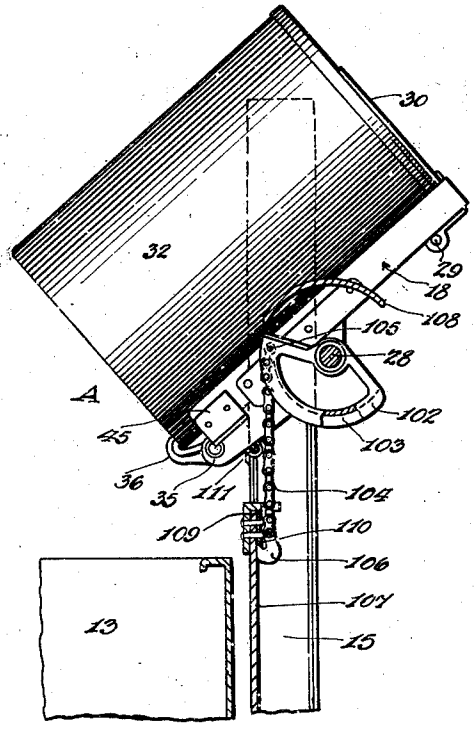


Fig. 17.

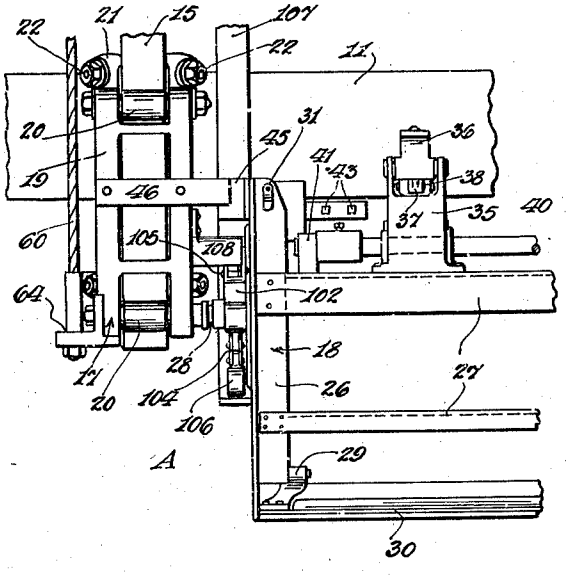
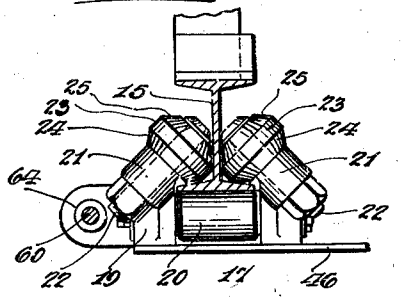


Fig. 18.



ROBERT S. BOLGER
INVENTOR

BY Victor J. Evans

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WITNESS

June 10, 1930. R. S. BOLGER 1,763,499

LOADING APPARATUS

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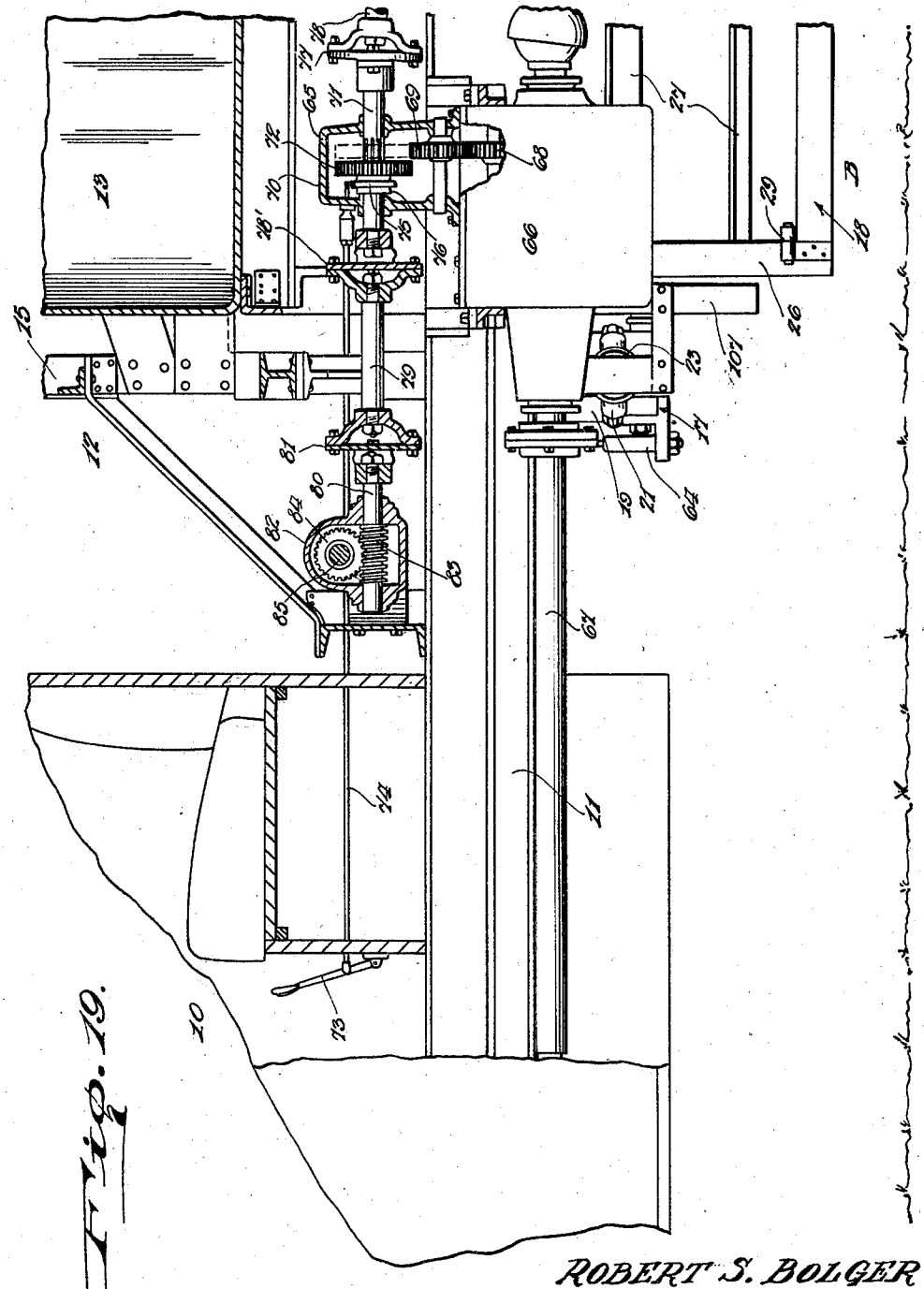

Fig. 19.

ROBERT S. BOLGER
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BY Victor J. Evans
ATTORNEY

WITNESS: D. Newton Lucky

Patented June 10, 1930 1,763,499

UNITED STATES PATENT OFFICE

ROBERT S. BOLGER, OF JAMAICA, NEW YORK, ASSIGNOR TO JOSEPH AMENDOLARA, OF NEW YORK, N. Y.

LOADING APPARATUS

Application filed October 27, 1928. Serial No. 315,452.

This invention relates to improvements in loading apparatus for motor dump trucks of the kind used in the collection of ashes, garbage and other refuse, which requires the lifting and dumping of cans from the street level into the truck. The principal object therefore, is to provide apparatus for lifting and dumping the cans to avoid the strenuous manual labor commonly resorted to, and the loss of time required thereby.

Another object of the invention resides in the mounting of the apparatus free of the body of the truck to avoid manual operation of parts to disconnect certain other working parts in order to effect a dumping of the body to empty the contents thereof.

Another object of the invention is the provision of a loading apparatus including can carriers mounted on opposite sides of truck on which the cans to be dumped are placed, and automatic means for locking the cans upon the carriers at the start of their upward movement and for releasing the cans just prior to their return to the limit of their downward movement, whereby it is only necessary for an operator to set the loaded cans in position, place the hoisting and lowering mechanism in operation and remove the empty cans therefrom.

With these and other objects in view, the invention resides in certain novel construction and combination and arrangement of parts, the essential features of which are hereinafter fully described, are particularly pointed out in the appended claims, and are illustrated in the accompanying drawing, in which:—

Figure 1 is a side elevation of my improved loading apparatus in position upon a motor truck showing the body in a slightly tilted position.

Figure 2 is a top plan view with the body removed.

Figure 3 is a vertical transverse sectional view on the line 3—3 of Figure 1.

Figure 4 is an enlarged fragmentary end elevation showing one of the can carriers in a dumping position.

Figure 5 is a fragmentary side elevation looking at right angle at Figure 4.

Figure 6 is an enlarged horizontal sectional view on the line 6—6 of Figure 5.

Figure 7 is a vertical longitudinal sectional view on the line 7—7 of Figure 6.

Figure 8 is a horizontal sectional view on the line 8—8 of Figure 1.

Figure 9 is a similar view on the line 9—9 of Figure 1.

Figure 10 is a detail vertical sectional view on the line 10—10 of Figure 1.

Figure 11 is a detail horizontal sectional view on the line 11—11 of Figure 1.

Figure 12 is an enlarged detail vertical longitudinal sectional view through one of the screw driving transmissions.

Figure 13 is a detail vertical transverse sectional view on the line 13—13 of Figure 1.

Figure 14 is a similar view but showing the can carrier in a partially raised position.

Figure 15 is a detail vertical sectional view on the line 15—15 of Figure 1.

Figure 16 is a similar view showing the can carrier in dumping position.

Figure 17 is a fragmentary elevational view of one of the can carriers.

Figure 18 is a horizontal sectional view through one of the I beams showing the manner of slidably mounting a carriage thereon.

Figure 19 is a vertical horizontal sectional view through the power take-off and its driven parts.

Referring to the drawings by reference characters, the numeral 10 designates a motor truck including a chassis 11 upon which a metal frame structure 12 is supported and which rises therefrom. The chassis supports a tiltable dump body 13 pivoted thereto at the rear as at 14. Arranged along opposite sides of the chassis are hoisting and dumping mechanisms A and B, each independently operable with respect to the other and of identical construction. For the sake of clearness, only one of the hoisting and dumping mechanisms will be described wherein I-beams 15 are bolted to the cross rails 16 supported by the chassis and rise vertically therefrom above the top of the frame structure 12.

Slidable vertically upon the I-beams are carriages 17 which turnably support a can

carrier 18. Each carriage includes a frame casing 19 provided with bearings for rollers 20 which ride against the outer base flange of the I-beam, while mounted in angularly disposed bearings 21 are stub shafts 22 on which guide rollers 23 are turnably mounted. The guide rollers are provided with bevelled faces 24 which engage the inner sides of the outer base of the I-beam while bevelled faces 25 thereon bear against and ride over the web of the beam as clearly shown in Figures 8 and 18 of the drawings. From the description thus far, it will be seen that the rollers 20 and 23 co-act to mount the carriage on the I-beam for free sliding movement along the length thereof for lifting and lowering the can carrier 18 with respect to the body of the truck.

The can carrier 18 above referred to includes a U-shaped frame 26 constructed of angle bar metal having longitudinal brace strips 27 extending the length of the same. The frame has trunnions 28 extending from opposite ends thereof which have their bearings in the lower ends of the carriage frames 19 for turnably supporting the carrier frame thereon.

Hingedly connected to the carrier frame 26 as at 29 is a platform 30 which when lowered for use extends horizontally from the frame, but which may be swung to a vertical inoperative position when not in use as shown at the left in Figure 3 of the drawings so as not to project needlessly from the side of the truck. Clips 31 are pivotally mounted at the top of the carrier frame for engaging the upper edge of the platform to support the same in a raised position. The lowermost level of the can carrier is such that the platform clears the top of an average height street curb when in horizontal position as shown at the right in Figure 3 of the drawings, to enable a loaded can to be placed on the platform with little effort on the part of a truckman.

For properly seating the loaded cans or receptacles 32 upon the platform, I provide the same with equi-distantly spaced plates 33 having their inner edges arcuate shape as at 34 to conform to the curvature of the bottom rim of the cans. The cans are slid inwardly over the platform until the inner edge clears the bottom rim which locks therebehind against accidental shifting.

The can carrier 18 is provided with automatic individual can clamping means which embodies individual bearings 35 mounted upon one of the longitudinal brace angle bars 27 in alignment with the respective can seats. Pivoted in each bearing is a can engaging hook 36 having a rearwardly extending arm 37 to which a link 38 is pivotally connected, which in turn is pivotally connected to an arm 39. The arms 39 of all of the individual clamping means are fixedly mounted on a single shaft 40 journalled in bearings 41 provided on one of the brace bars 27. All the hooks 36 are operable simultaneously by the actuation of the shaft 40 to engage the top rims of the cans as the carrier starts its upward movement and release the same just prior to the limit of its downward movement. The shaft is actuated by imparting reverse turning movements thereto which is caused by a pair of diverging tongues 41′ and 42 of equal length extending from the shaft and fixedly connected thereto. Mounted in the path of upward and downward movements of the respective tongues is the head 43 of a threaded adjustable pin 44. Normally, when the carrier is in its lowered position to receive the load, the hooks 36 are disposed in a swung back position as shown in Figure 13 of the drawings, and as the carrier is lifted upward by the hoisting mechanism presently to be described, tongue 41′ strikes the pin 44 and is depressed thereby until the same moves to a position to clear the same. The depression of the tongue 41′ causes the hooks 36 to be swung forward into locking engagement with the respective cans. When the carrier is lowered after the contents of the cans has been emptied, the tongue 42 being in the path of the pin 44 will return the shaft to its former position and reversely actuate the hooks to swing them simultaneously to a position free of the open top edges of the cans to enable an operator to lift them from their supporting platform. The pin 44 is made adjustable to compensate for any wear between the head of the same and the tongues 41 and 42 and for regulating the extent of turning movement imparted to the shaft 40.

For preventing the weight of the cans contained on the platform 30 from tilting the same outward, I employ suitable stop means which embodies angle plates 45 riveted to the front end of the carrier frame and which strikes against co-acting stop plates 46 bolted to the frame 19 of the carriages 17. The carrier is free to swing inward but is held against outward swinging movement.

Having specifically described the details of construction and operation of the can carrier and its supporting carriages, I shall now set forth the means by which the carriages are simultaneously lifted and lowered by sliding over the I-beams 15. For this purpose, I provide driven shafts 47 journalled in suitable bearings 48 supported in the cross rails 16 and which shafts are arranged parallel to the side rails 11 of the chassis. The shafts 47 on opposite sides of the chassis operate in connection with the respective loading mechanisms A and B so that a description of the operative connections of one will suffice for the other. The shaft 47 has flexible universal joints 49 adjacent its respective ends, while the front end of the shaft extends into a gear housing 50 and the

rear end into a gear housing 51, both housings being securely bolted to the frame structure 12. Fixed to the shaft 47 and contained within the housings 50 and 51 are gears 52 which constantly mesh with worms 53 journaled by shafts 54 in the walls of the housings. Fixed to the worm shafts 54 and rising therefrom just short of the tops of the I-beams 15, are screws 55, journaled at their top ends in bearings 56 mounted on brackets 56′ extending outwardly from the sides of the I-beams. From the limited description thus far, it will be seen that rotation of the driven shaft 47 will impart simultaneous rotation to the front and rear screws to cause vertical movement of nuts 57 threaded thereon. Reverse rotation of the driven shaft imparts reverse rotation to the screws and like reverse movements to the nuts 57. Guide rods 58 are mounted in the bearings 56, the rear one of which may be stationary while the front one is slidable. The rods 58 pass through the nuts to prevent rotation of the same during turning of the screws.

The nuts 57 have pulleys 59 turnably mounted on the inner sides thereof over which cables 60 are trained. One end of the cables are fixedly connected to the brackets 56′ as at 61, while the other ends are passed over pulleys 62 journalled in brackets 63 mounted at the tops of the I-beams 15, and brought down and fixedly connected to the frames of the carriages 17 as at 64. When the can carrier is in lowered position, the nuts 57 are adjacent the top ends of the screws 55 at which time the leads C of the cables 60 between pulleys 59 and 62 are relatively short, while the leads D of the cables between pulleys 62 and their point of connection 64 are relatively long. However, upon rotation of the screws in one direction by reason of their operative connection with the driven shaft 47, the nuts 57 will be fed downward causing the lengthening of the leads C and the shortening of the leads D, which results in the upward movement of the can carrier 18.

The driven shafts 47 derive their power from a power take-off 65 operatively connected with the usual transmission 66 of the motor truck. The engine shaft 67 (see Figure 19) drives the transmission in the usual manner which when rotating drives a gear 68 in the transmission which meshes with a gear 69 journalled in the housing 70 of the power take-off, which housing is securely bolted to the transmission housing. Journalled in the walls of the housing 70 and extending therethrough is a shaft 71 having a gear 72 splined thereon for sliding into and out of engagement with the constantly driven gear 69. The sliding movement of the gear 72 is controlled by the actuation of a hand lever 73 within reach of the driver of the truck, from which a rod 74 leads to a yoke 75 engaging a collar 76 on the gear 72. By operating the lever back and forth the gear 72 may be moved into mesh with the gear 69 to derive power therefrom.

Coupled to one end of the shaft 71 by a universal joint 77 is a shaft 78 which extends rearwardly for operative connection with the body raising and lowering mechanism 79. This mechanism 79 is old in the art and it is not believed necessary to go into detail regarding the construction and operation of the same, other than to say that the shaft 78 drives the mechanism which is controlled by suitable manual control means 79′ operable from the driver's seat of the vehicle. The body raising and lowering mechanism has merely been shown to illustrate that the power for operating the same is taken from the power take-off 65.

Coupled to the forward end of the shaft 71 by a universal joint 78′ is a shaft 79, which shaft is in turn coupled with a shaft 80 by a universal joint 81. The shaft 80 is journalled in a housing 82 and has a worm 83 thereon for constant meshing engagement with a gear 84 also contained within said housing and mounted on a transverse shaft 85 which extends therethrough with its ends extending into the housings 50 on opposite sides of the chassis. This transverse shaft 85 constitutes the means by which power is transmitted to the hoisting and lowering mechanisms A and B on opposite sides of the truck. Each end of the said shaft 85 carries a bevel gear 86 which constantly meshes with bevel gears 87 and 88 freely rotatable upon the shaft 47 (see Figures 6 and 7) whereby rotation of the gear 86 will impart simultaneous reverse rotation to the gears 87 and 88, but in view of the fact that they are freely rotatable on their supporting shaft, no power will be transmitted to the shaft unless some operative connection is provided between the same. For this purpose, I provide a slidable clutch sleeve 89 which is splined to the shaft 47 intermediate the gears 87 and 88. The inner side of the gears 87 and 88 are provided with clutch surfaces 90 and 91 respectively for selective engagement with mating surfaces 92 and 93 on opposite ends of the clutch sleeve.

For manually shifting the clutch sleeve into selective engagement with either gear, I provide a yoke lever 94 which engages a collar 95 on the clutch sleeve. The yoke lever is fixedly mounted on a shaft 96 journalled in the housing 50 and projecting beyond the outer side thereof to receive a control handle 97 provided with a right angularly disposed yoke 98 which engages a collar 99 fixed to the lower end of the front guide rod 58. Spaced upper and lower stops 100 and 101 are provided on the front guide rod for engagement with the nut 57 upon the limit of its upward movement in opposite directions. When the lever or control handle 97 depends in a ver-

tical position as shown in Figure 1 of the drawings, the clutch 89 is in neutral position, but when moved toward the right, the gear 88 is operatively connected with the shaft 47 through the clutch sleeve 89 which rotates the screws 55 to cause the nuts 57 to move downward to raise the can carrier 18 through the arrangement of cables and pulleys. Movement of the handle to the right causes the arm 98 thereof to raise the forward guide rod 58 so that when the nut strikes the stop 101 it moves same downward which automatically returns the control handle to neutral position, thus disengaging the clutch 89 and gear 88 which stops rotation of the screws 55. Assuming that the nuts 57 are in a lowered position as shown in Figure 5 of the drawing and the can carrier is in raised position, and it is desired to lower the can carrier, the control handle 97 is moved to the left causing the arm 98 to depress the guide rod 58 which lowers the upper stop 100 in the path of upward movement of the nut 57. The movement of the lever toward the left shifts the clutch sleeve 89 into clutching engagement with the bevel gear 87 which in turn transmits a reverse turning movement to the screws 55 to feed the nuts upward. Just before reaching the extreme upward movement, the nut on the forward guide rod strikes the stop 100 and lifts the said rod to return the lever and clutch collar to neutral position to prevent turning of the screws. It will therefore be seen that the raising and lowering of the can carrier is automatically controlled after the lever 97 has been manually moved to a selected position to either raise or lower the carrier.

Having described all of the different constructions of mechanisms and their respective operations, I shall now proceed to explain the means by which the can carrier is automatically tilted to empty the contents of the cans upon reaching the top, and returned to normal position as the can carrier begins its downward movement. Fixedly mounted on the trunnions 28 of the can carrier are segmental members 102 provided in their curved edges with grooves 103 in which sprocket chains 104 seat, and which have one of their ends fixedly attached thereto as at 105 and their other free ends carry hooks 106, the bills of which face inwardly and ride against vertical rails 107 mounted on the frame structure 12 to prevent accidental inward swinging of the hooks during travel of the truck. Guard plates or shields 108 are mounted on the carriage 17 to overlie the segmental members as shown in Figure 17 of the drawings for excluding dust and dirt from the chain grooves in the segmental members. Provided at the tops of the rails 107 are hook engaging shoulders 109 which are formed by securing plates to the outer faces of the rails and which shoulders are undercut as at 110 to allow the bills of the hooks 106 to seat thereagainst just prior to the limit of upward movement of the can carrier, it being appreciated that the shoulders 109 are directly in the path of upward movement of the hooks. In operation of this tilting mechanism, the can carrier rises vertically from the lowered position shown in Figure 15 by the driving mechanism hereinbefore described, and as it nears the top, the hooks engage beneath the shoulders 109 and further upward movement causes a pull upon the chains 104 which imparts a turning movement to the segmental members and consequently to the can carrier, which swings the carrier inwardly to a tilted position above the truck body 13, whereupon the contents of the cans 32 are simultaneously emptied. The inward swinging movement of the can carrier is limited by a longitudinal bar 111 mounted in the frame structure and which relieves the strain of the weight of the carrier and loaded cans from the trunnions of the carrier during the brief dumping operation. The can carrier is so pivoted that after the cans have been emptied of their contents and the lowering mechanism is put in operation so that the hooks 106 disengage the shoulders 109, and the bar 111 has turned the can carrier past the center of its axis, the weight of the lower ends of the carriers will cause them to swing down to normal position.

From the foregoing description, it will be seen that I have provided a self loading truck in which the ash or refuse cans may be placed upon a carrier lowerable to a position within a short distance of a curb or street level, and which cans are automatically locked upon raising of the carrier by an operator placing the mechanism in operation, which carrier is automatically tilted upon reaching a point above the truck body to empty the contents of the cans, and the operating mechanism automatically shut off. To return the empty cans to the street level, the operator again places the operating mechanism in motion, and the carrier returns to its lowered position, and automatically unlocks the cans from the carrier to permit an operator to remove the same therefrom with little or no effort.

It will be appreciated that I have constructed a self loading vehicle in which all of the mechanism is supported upon the chassis instead of on the body, which relieves the body of excess strain, and does not interfere with the movement of the body dumping mechanism.

While I have described what I deem to be the most desirable embodiment of my invention, it is obvious that many of the details may be varied without in any way departing from the spirit of my invention, and I therefore do not limit myself to the exact details of construction herein set forth nor to any-

thing less than the whole of my invention limited only by the appended claims.

What is claimed as new is:—

1. In a can loading apparatus for trucks, a pair of rails, vertical movable carriages slidable over said rails, a can carrier journalled for turning movement in said carriages, co-acting means between said carriages and said can-carrier for limiting outward tilting of said can-carrier, and automatic means for tilting said can carrier inwardly upon reaching the limit of its upward movement, said automatic means including segmental members fixedly carried at the ends of said can-carrier, and chains having one of their ends fixedly connected to said segmental members and their other ends provided with hook elements adapted to engage a stationary part in the path of upward movement of the same.

2. In a truck having a chassis and a body supported thereby, a frame structure supported by said chassis beyond the side of said body, a vertically movable inwardly tiltable can-carrier, raising and lowering means for said can-carrier, segmental members fixedly mounted on said can-carrier, chains having one of their ends fixedly connected to said segmental members and engageable with the arcuate face of said segmental members with their other ends depending therefrom, hooks provided on the depending ends of said chains, and hook engaging elements mounted on said frame structure in the path of upward movement of said hooks for engagement thereby to cause the inward tilting of said can-carrier upon the extreme upward movement of the same.

3. In a truck having a chassis and a body supported thereby, a frame structure supported by said chassis beyond the side of said body, a vertically movable inwardly tiltable can carrier, raising and lowering means for said can-carrier, segmental members fixedly mounted on said can carrier, chains having one of their ends fixedly connected to said segmental members and engageable with the arcuate face of said segmental members with their other ends depending therefrom, hooks provided on the depending ends of said chains, and hook engaging elements mounted on said frame structure in the path of upward movement of said hooks for engagement thereby to cause the inward tilting of said can-carrier upon the extreme upward movement of the same, and a longitudinal bar mounted on said frame structure for striking engagement by said can-carrier for limiting inward tilting movement thereof.

4. In a truck having a body, a can carrier vertically movable with respect to said body, individual can clamping means on said can carrier, each including a pivoted hook engageable with the upper edge of a can to be held thereby, and automatic means for simultaneously actuating the hooks of all the can clamping means into locking position upon upward movement of said can carrier and for releasing said hooks prior to the limit of downward movement of said can-carrier, said automatic means including a rock shaft operatively connected to all of said hooks, divergent tongues extending outwardly from said rock shaft, and a fixed actuating pin extending into the path of upward and downward movement of the respective tongues.

5. In a truck having a chassis, vertically disposed screws rotatably mounted thereon, load supporting means including a vertically movable carriage, means rigid with said chassis and providing top bearings for said screws, nuts mounted on said screws, guides for said nuts between said chassis and said rigid means, said nuts vertically slidable on said guides, revolvable means carried by said nuts, rotatable means carried on said rigid means, and flexible means fixedly attached at one of their ends to said rigid means, said flexible means passing over the rotatable means on said nuts and over the rotatable means on said rigid means, the other ends of said flexible means adapted to be attached to said carriage for moving a load vertically during rotation of the screws.

In testimony whereof I have affixed my signature.

ROBERT S. BOLGER.