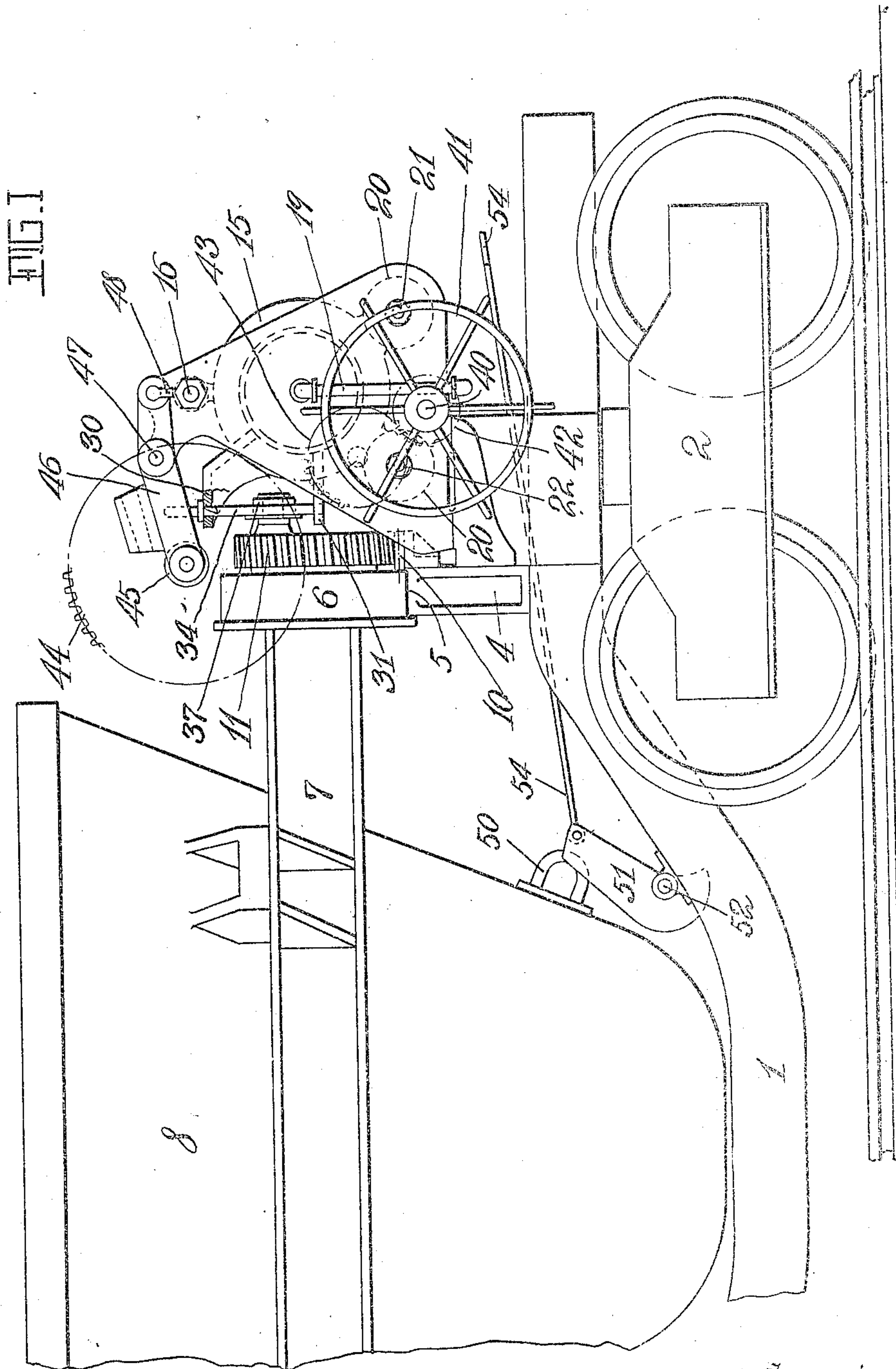


No. 889,866.

PATENTED JUNE 2, 1908.

C. P. ASTROM.  
DUMPING CAR.  
APPLICATION FILED JUNE 10, 1907.

3 SHEETS—SHEET 1.



Witnesses:  
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Edmund W. Duborg.

Inventor  
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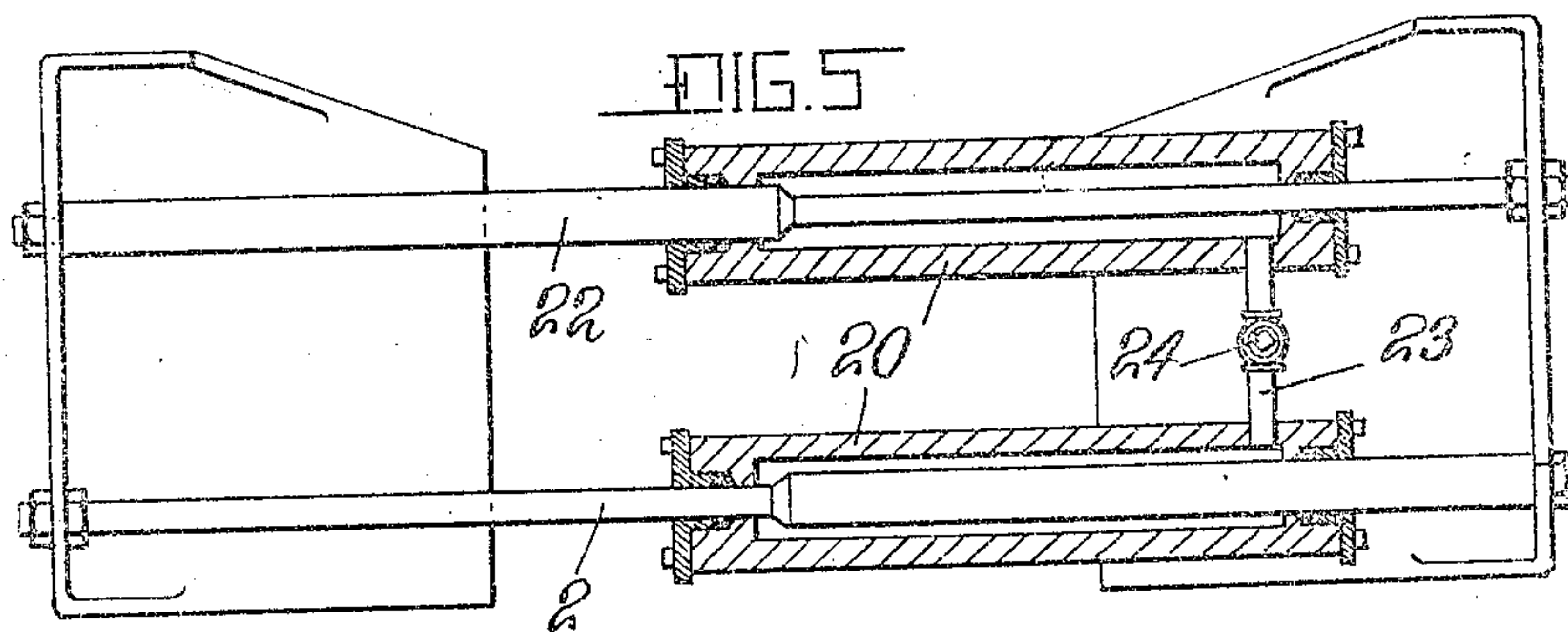
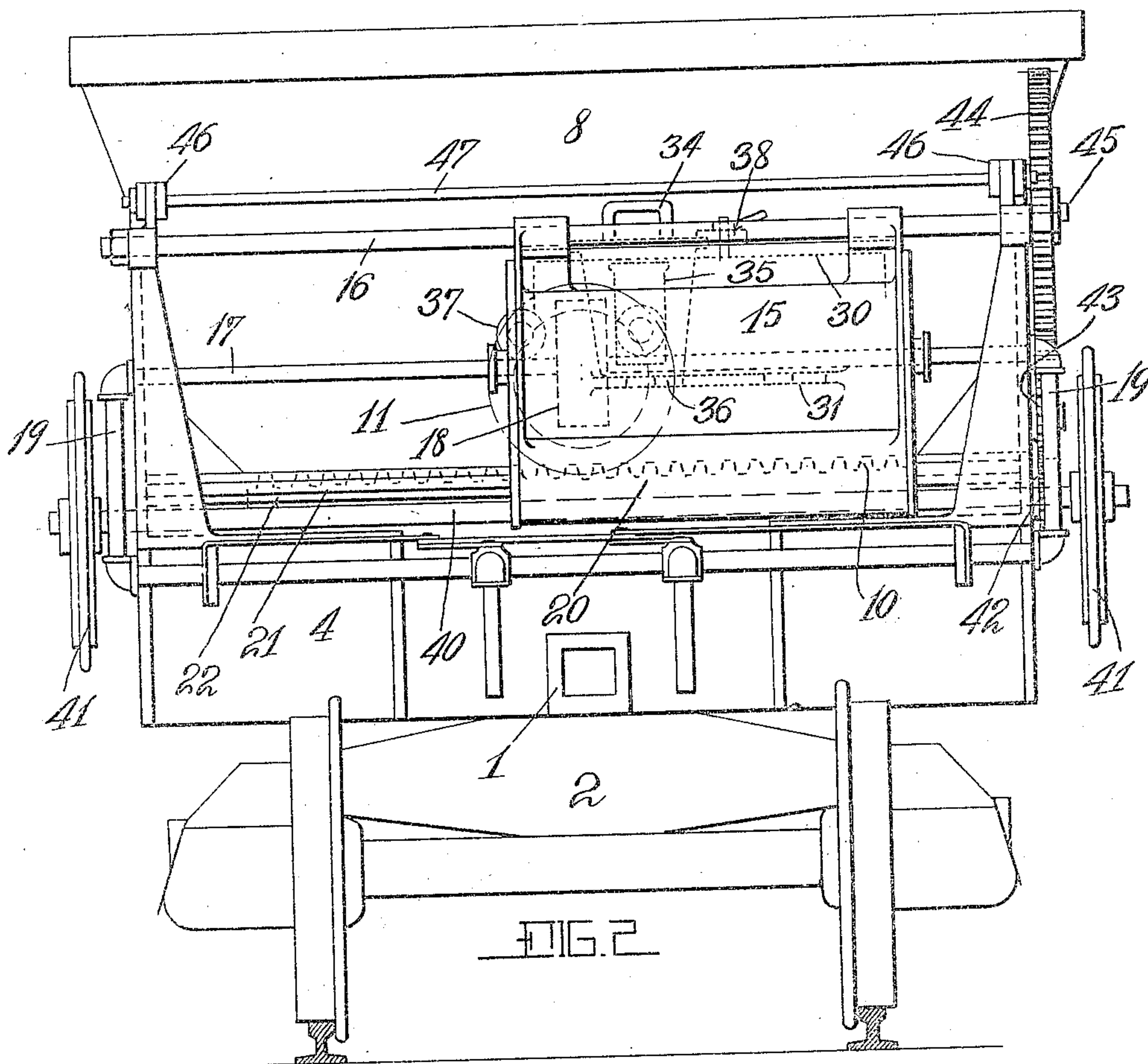
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3 SHEETS—SHEET 2.



Witnesses:  
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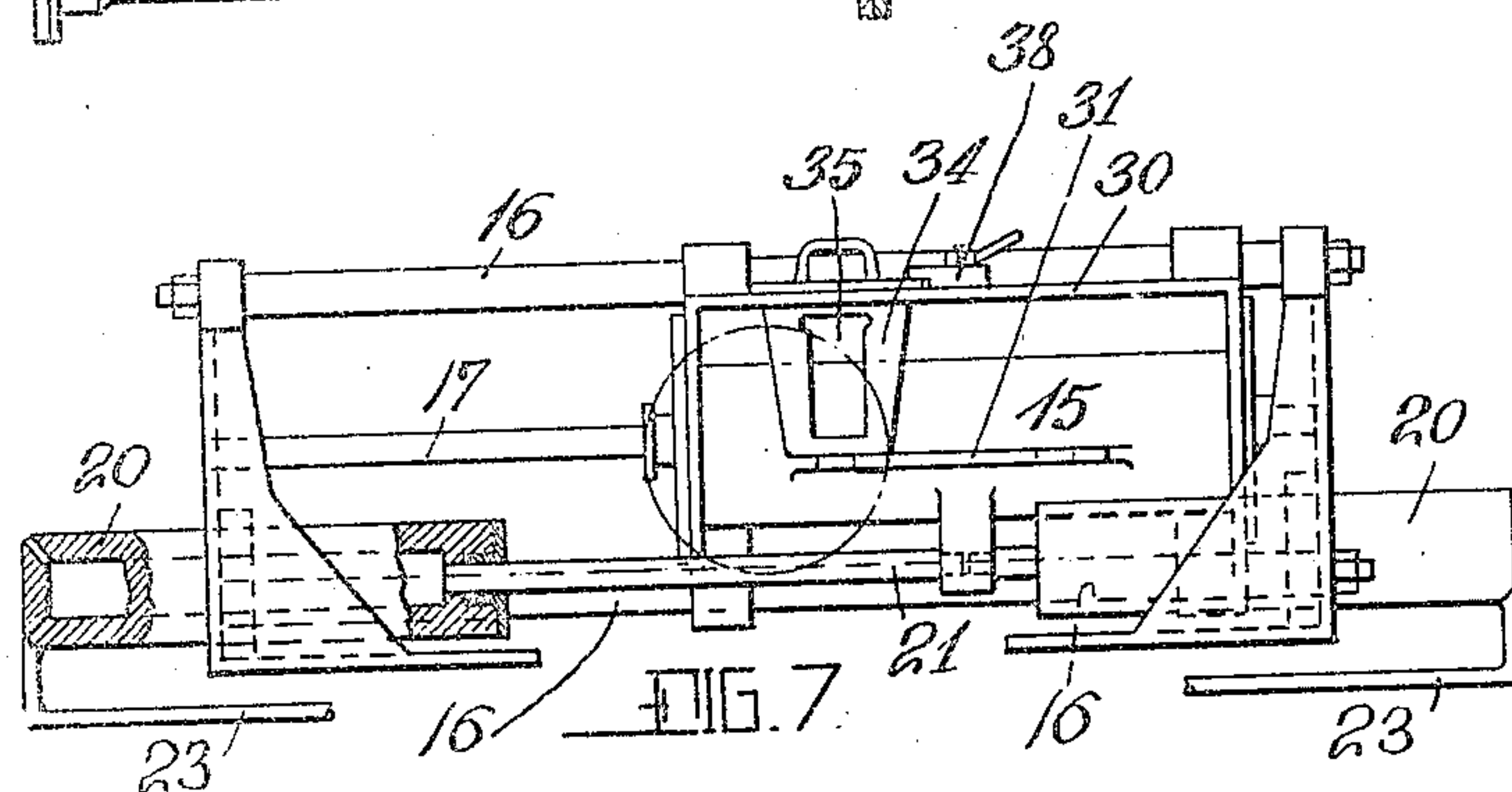
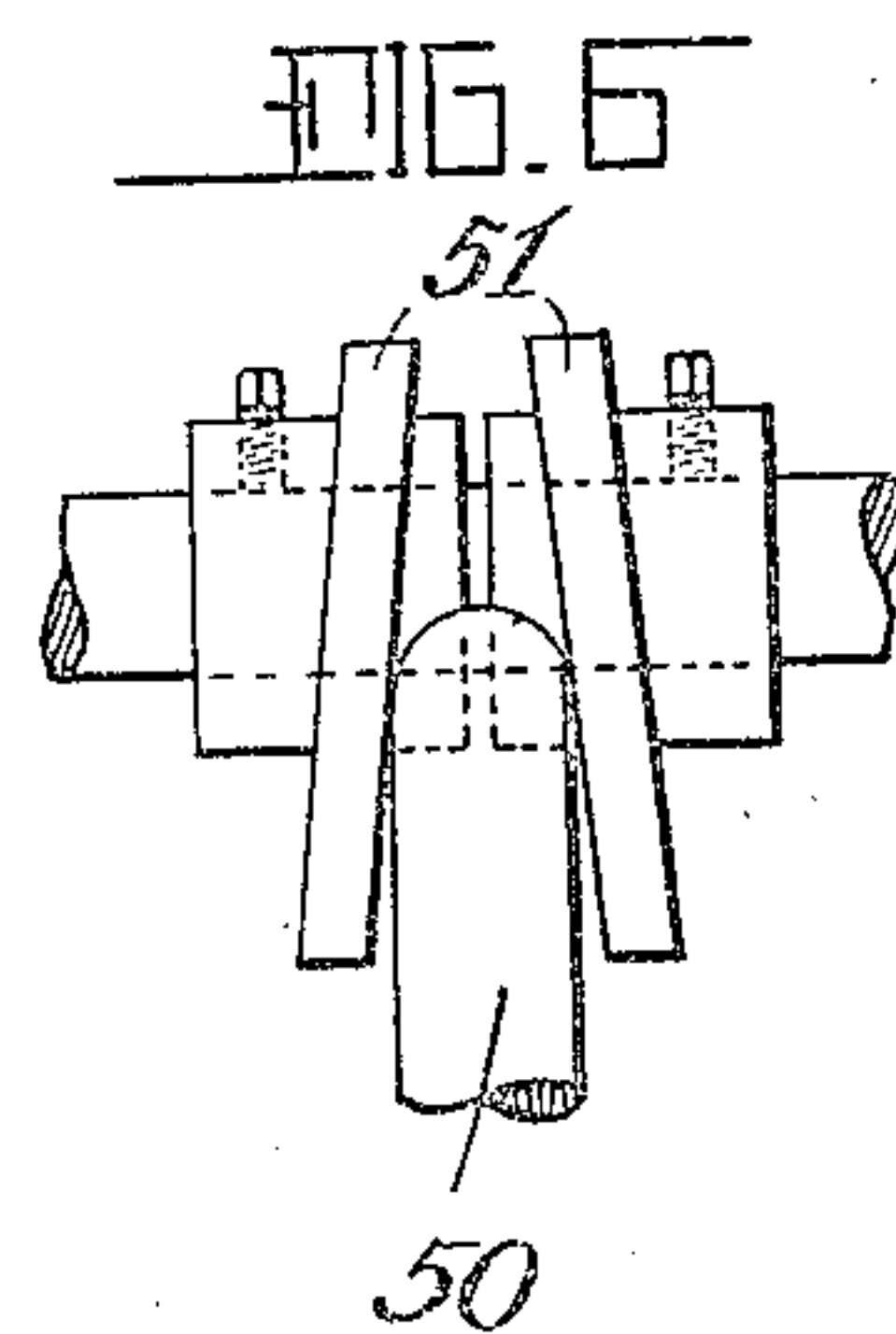
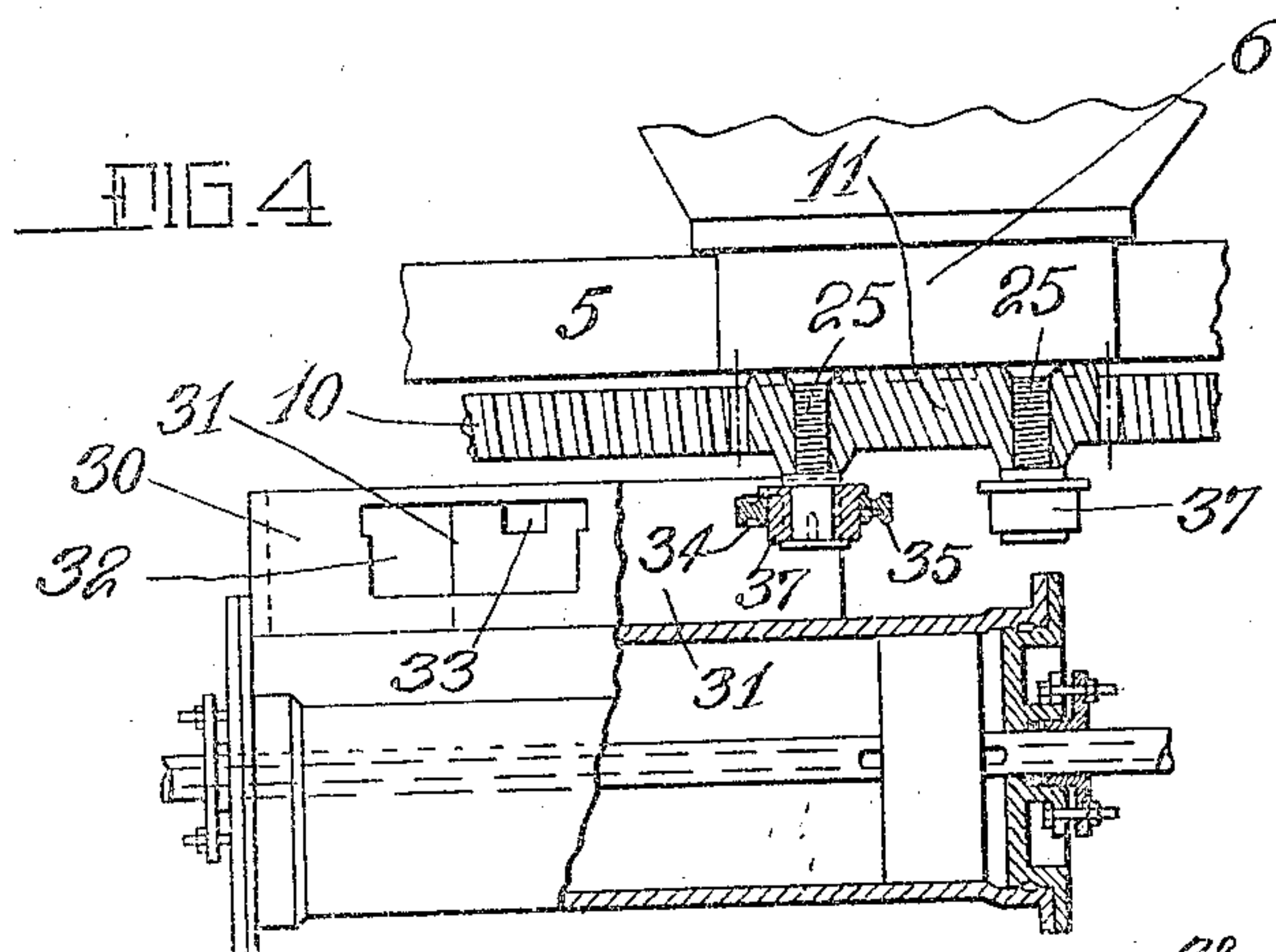
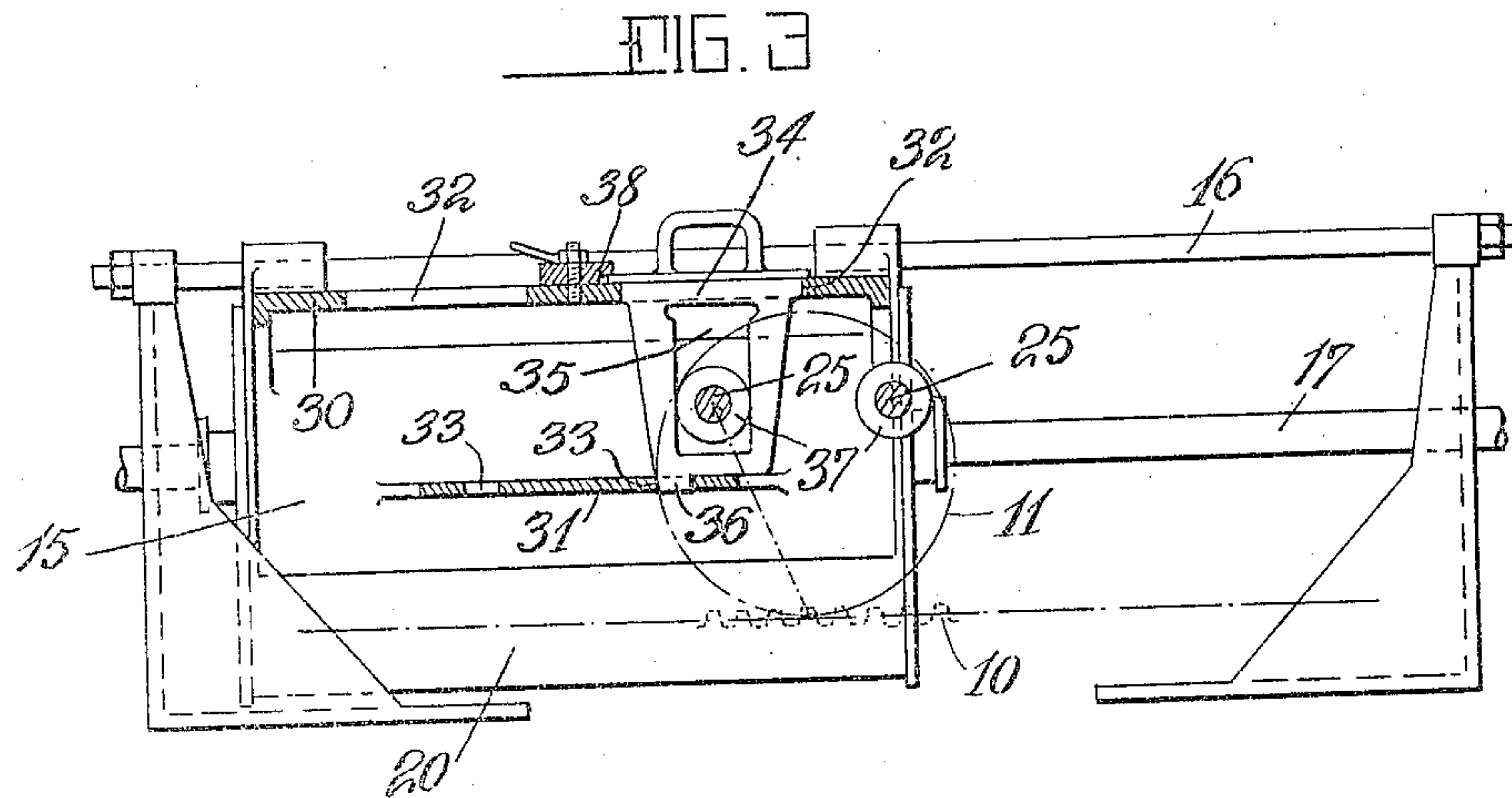
No. 889,866.

PATENTED JUNE 2, 1908.

C. P. ASTROM.  
DUMPING CAR.

APPLICATION FILED JUNE 10, 1907.

3 SHEETS—SHEET 3.



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# UNITED STATES PATENT OFFICE.

CARL P. ASTROM, OF ORANGE, NEW JERSEY, ASSIGNOR TO M. H. TREADWELL COMPANY, A CORPORATION OF NEW YORK.

## DUMPING-CAR.

No. 688,866.

Specification of Letters Patent.

Patented June 2, 1903.

Application filed June 10, 1907. Serial No. 378,056.

*To all whom it may concern:*

Be it known that I, CARL P. ASTROM, a subject of the King of Sweden, residing at Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Dumping-Cars, of which the following is a full, clear, and exact specification.

This invention relates to dumping cars, and more particularly has reference to cars of the type wherein the body moves outwardly and tilts at the same time, such as is described in Patent No. 755,207, dated March 22, 1904. In this type of car, the car body is supported at opposite ends on trunnions which bear on tracks, and a motor is provided having actuating connection with the trunnions to roll them back and forth on the tracks and simultaneously move and tilt the car body. The motor comprises a cylinder reciprocating between fixed guides, and having a fixed piston rod, the motor being connected with the trunnions of the car body through a rack and gear, whereby to tilt the car body during the rolling movement of the trunnions. In the particular construction of car body described in the aforesaid patent, the power is applied to the trunnions through the axis, so that the leverage is equal to the distance from the axis of the trunnions to the pitch line of the fixed rack. In order to increase the leverage in this construction, it is necessary to increase the diameter of the gear which rolls on the rack, but the objection to this is, that a much greater movement of the car body is necessary in order to tilt it through the angle necessary to dump it, and would thus carry it outside the wheels, tending to tip over the whole car. In order to obtain an increased leverage without increasing the outward travel of the car body beyond the wheels and to secure the desired angle of tilting, I have devised an improved form of actuating connection whereby the stroke and leverage of the motor is increased without carrying the car body outside the wheels or increasing its travel. In such constructions, it is desirable to provide means for controlling the rate of movement of the car body in order to prevent it from acquiring such momentum as to become uncontrollable, and a further object of the invention is to provide a fluid check connection between the motor and the car body and at all times controlling its movement to any

desired extent, the fluid checking means comprising connected cylinders and piston rods operating in such manner as to at all times control the movement, either by the cylinders moving on the rods or the rods moving in the cylinders.

A further object of the invention comprises a novel form of interchangeable connection between the power cylinder and the trunnion of the car body, and adapted to tilt the car body on one or the other side as required.

A still further object of the invention relates to latching means for holding the car body in upright position during transportation, and further features and advantages of the invention will appear in connection with the accompanying drawings, which will more fully appear hereinafter.

In the drawings, Figure 1 is a side elevation of a car embodying the invention, Fig. 2 is a front end view, Fig. 3 is an elevation showing in detail the interchangeable actuating connection, Fig. 4 is a detail plan view, partly in section, Fig. 5 is a detail of the fluid checking cylinders and guides, Fig. 6 is a detail view of the latching mechanism for the car body, and Fig. 7 shows a slightly modified checking construction.

1 represents an under frame mounted on railway trucks 2, and provided with the usual coupling equipment used on cars of this type. At each end of the under frame are supporting pedestals 4, having their upper faces 5 formed as transverse tracks, on which trunnions 6 carried by a yoke 7 roll. The yoke 7 is constructed to hold a cinder pot 8 of any desired construction, the cinder pot 8 being the tilting car body. This is shown by way of example only, as various forms of car body may be used in connection with this invention. As herein shown, the car body 8 is constructed to discharge on either side, but a car body might also be transversely pivoted to discharge on the end should it be so desired. In order to roll the trunnions 6 on the track 5 and thereby simultaneously tilt the car body, each pedestal is provided with a rack 10, with which gears 11 preferably having inclined or skew teeth, mesh.

The power mechanism for operating the car body comprises a reciprocatory cylinder 15 mounted on the pedestal 4 and running on an upper guide 16 and a hollow stationary



piston rod 17 provided with a stationary piston 18 (Fig. 4). The piston rod 17 is provided with ports opening on either side of the piston 18 and is connected by outside pipes 19 with a source of fluid pressure, such as air or steam, a suitable controlling valve being provided for operating the movable cylinder in either direction. Carried by the cylinder 15 are a pair of controlling cylinders 20 moving therewith relatively to fixed piston rods 21, 22 held between the side frames similarly to the piston rod 17 of the actuating cylinder. In Fig. 5, it will be observed that the piston rods 22 are larger at one end than at the other, forming plungers, the larger end of one piston being opposite the smaller end of the other. The cylinders 20 being secured to the moving cylinder 15, move with the latter, and in this movement the fluid contained in one cylinder 20 is forced out through a by-pass 23 into the other cylinder by reason of the fact that the plunger portion of one of the rods 22 is uncovered by one cylinder, while the plunger portion of the other rod is covered so that the total displacement of the two plungers remains constant but varies simultaneously in each cylinder, the excess flowing from one cylinder into the other through the by-pass 23. It will thus be seen that the velocity of flow will control the movement of the car body, and the by-pass has a controlling cock 24, which is set by the operator. Preferably, the cylinders 20 will contain oil or glycerin, though air or gas might be used with the same result. In this construction, the pistons of the checking cylinders act as lower guides for the power cylinder 15, and thereby the use of a separate guide in the frame is dispensed with. In Fig. 7, the plungers move, and the cylinders are carried at opposite sides of the pedestals in alignment. The improved form of actuating connection whereby increased leverage is applied to the trunnions of the car body without increasing the traverse of the car body will now be described. Mounted on the gear 11, which, as before stated, is rigidly fixed to the trunnions 6, are two pins or studs 25 threaded or otherwise fastened into the gear 11 at opposite sides of its vertical diameter when the car body is in its central position. The angle between the center and these two pins preferably equals the tilting angle. The power cylinder will be operatively connected with one or the other of these pins, according to the direction in which the car body is to be dumped from its upright position. It will be seen that the distance from the center of the pins 25 to the pitch line of the rack 10 is greater than the radius of the gear 11. Consequently, a greater leverage will be applied to the trunnion if the cylinder 15 is operatively connected with one of the pins 25 than if the cylinder is operatively connected at a point in the axis of the trunnion or the center

of the gear 11. In this connection, it may be observed that in both cases the point of application of the power to the rack, or the fulcrum point, is the pitch line of the rack, so that by applying the power to one of the pins, located above the center of the gear a longer leverage is secured and thus a less starting moment required. Inasmuch as the are traversed by the gear in completely dumping the car body, and particularly in cinder cars, is considerably over ninety degrees, it will be seen that a single pin disposed in the vertical diameter of the gear 11 when the car body is at center position would only have a movement of ninety degrees, which in some instances would be insufficient to tilt the car body to the desired extent without reversing the cylinder. Accordingly, the two pins are provided, and actuating connections are provided so that the car body can be turned to a sufficient angle by causing the right hand pin to move to the left in dumping the car body and the left hand pin to move to the right. It will be seen that by this construction it will be possible to secure a longer stroke of the cylinder without causing the trunnions to move outside the wheel line, than where the motor is connected at the center of the trunnion. This is due to the fact that the pin moves laterally further than the center of the trunnion to which it is fastened. The cylinder 15 is provided with separate, preferably integral lugs 30, 31 cast thereon, the lug 30 having slots 32 and the lug 31 having smaller slots 33.

34 is a key having a vertical slot 35 and adapted to engage at its upper end one of the slots 32, and having an extension 36 which will engage one or the other of slots 33 and lug 31.

37 are rollers mounted on the pins 25.

38 is a pivoted block for locking the key 34 in the slots 32, 33.

Fig. 2 shows the car body in central position and the key 34 engaged with the right hand pin 25 in position for dumping the car body on the left. If now the power be admitted on the left side of fixed piston 18, the cylinder 15 will move to the left carrying the car body with it and tilting it at the same time, the slot 35 of the key 34 permitting the necessary vertical travel of the pin 25 while it moves laterally with the car body. While the right hand pin 25 is moving vertically and then downwardly, the other idle pin is moving in an opposite direction, and it is therefore necessary to shorten the lower lug 31 so that this descending pin can clear the end thereof. After the car body has been completely tilted, it can be returned to its central position by admitting power on the right hand side of piston 18 and moving the cylinder 15 to the right. During these movements of the cylinder and car body in and



out, the movement will be controlled by the by-pass 23, as before stated.

If it be desired to dump the car body on the right in Fig. 2, it will be necessary to move the cylinder 15 to its extreme left position without tilting the car body, which can be done by disconnecting it upon removing the key 34. When this movement has taken place the key 34 will be replaced in the slots 32 and 33 in such manner as to engage the left hand pin 35, whereupon the cylinder 15 will move to the right and tilt the car body when power is admitted upon the right hand side of piston 18. In the action of the foregoing parts, it will be seen that the leverage increases as the pin rises in the slot 35 until it reaches the highest point of its arc and then decreases as it moves downward in the slot after having passed the high point of the arc. By suitably positioning the pins and calculating the diameters of the gears relatively to the desired traverse of the car body, it will be seen that the leverage can be varied within considerable limits.

It is at times impossible to secure fluid power to operate the car body, and accordingly means is provided for dumping the car body manually.

40 is a shaft mounted in the framework having hand wheels 41, 41 and connected by gears 42, 43 with a gear 44 mounted on a worm shaft 45, which latter shaft is mounted in a swinging frame 46 pivoted at 47 on the pedestals which carry the fixed pistons of the power cylinder and the controlling cylinder. Normally, the frame 46 is swung up so that the gear 44 is disengaged from the gear 43 and the worm 45 from the gear wheel 11, but when it is desired to actuate the car by hand the pin 48 is removed allowing the frame 46 to drop down and engage the worm 45 with gear 11 and the gear 44 with gear 43, and the pin 48 engaging in another hole. When in this position, by turning the hand wheels 41 the gear 11 will be turned and thus the car body tilted. Also, the checking cylinders will act to control the movement in the same manner as when the power cylinder is used, in case the gears should break.

In order to positively lock the car body in central position it is provided with a lug 50, which is engaged on opposite sides by a latch 51 (Figs. 1 and 6) pivoted on the frame 1 at 52. The latch is made of two parts so as to be adjustable on the shaft 52 towards and from each other. Preferably, the latch 51 is over-weighted, and has two jaws inclined towards each other so that it will drop until the inclined jaws engage the lug 50. The latch is adjustable so as to take care of variations in the size and position of the lugs on the ladle. To operate the latch 51 a hand rod 54 is provided extending rearwardly for convenient actuation by the operator.

From the foregoing description it is

thought that the nature and advantages of the invention will be clear, and it will be seen that by means of the improved actuating connections between the motor and the trunnions an increased leverage is secured without increasing the distance the car body has to travel, and thereby enabling the power to be more effectively applied. Also, the stroke of the motor being longer than the bodily movement of the car body, there will be less power required to secure the same result, by reason of the fact that the power acts through a greater distance as well as leverage. By the construction of checking apparatus herein described, an advantageous result in controlling the movement of the car body is also secured, since the movement of the checking devices is likewise greater than the bodily movement of the car body, so that the retardation takes place through a greater distance. It will also be seen that by means of the two pins and the interchangeable locking key, the body can be dumped on either side, but it should be understood that the invention is not to be confined to such a construction, as it is equally applicable to cars of this general type dumping on one side only.

The construction herein described is susceptible of various modifications and changes without departing from the scope of the invention, which is not to be restricted to the precise form and detail herein illustrated.

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

1. The combination with a car body and a supporting frame provided with racks for tilting the car body as it travels transversely of the support, of a motor mounted to actuate the car body, a gear carried by the car body and engaging one of said racks, and a pin carried by the gear and engaged by said motor, said pin being eccentrically located with respect to the axis of the said gear, and moving in a vertically slotted part of said motor.

2. A car body mounted to tilt and travel laterally, in combination with a laterally traveling motor for imparting to the car its laterally traveling movement, means for tilting the car during its traveling movement, and a plurality of eccentric actuating connections carried by the car body, and interchangeable slotted means for directly connecting the motor with one or the other of said actuating connections, according to the direction in which the car body is to be moved from a central position.

3. The combination with a tilting car body and motor means for actuating the car body comprising a reciprocatory motor, of fluid checking means independent of the motor and effective throughout the entire movement of the car body, said fluid check-



ing means comprising a plurality of reversely arranged interconnected cylinders and plungers.

4. The combination with a tilting and laterally movable car body and motor means for actuating the car body comprising a reciprocatory motor, of a guide bar for one side of the motor and a second guide for the other side of the motor, said second guide being formed as a stationary plunger and cooperating with a movable checking cylinder carried by the motor.

5. The combination with a movable car body and a reciprocatory motor cylinder for actuating the car body, of a pair of interconnected cylinders, and plungers cooperating with said cylinders to control the movement of the car body independently of the motor.

6. The combination with a reciprocatory motor operating between stationary side frames and a guide carried by the pedestals above the motor, of a plurality of stationary plungers carried by said side frames below the motor, and auxiliary cylinders carried by said motor and cooperating with said plungers to guide the motor and check the movement of the car body.

7. The combination with a tilting and laterally movable car body, of an actuating pin carried thereby, a motor, and a key for engaging the pin and the motor.

8. The combination with a tilting and laterally movable car body, of an oscillatory actuating pin, a motor, a key for engaging the pin and the motor, and means permitting lost motion of the pin relatively to the key without affecting the actuating connection.

9. The combination with a tilting and laterally movable car body, and an actuating pin carried thereby, of a slotted key carried by the motor and engaging the pin.

10. The combination with a car body mounted to tilt and move laterally in both directions from a central position, of engageable actuating means carried by the car body for operating it in either direction, said means comprising a crank, a motor, and a key on a moving part of the motor for engaging said means carried by the car body, and having a plurality of positions according to the direction in which the car body is to be moved.

11. The combination with a pivoted and laterally movable car body, of a reciprocating actuating cylinder, and connections whereby the cylinder has a greater movement of translation than the lateral movement of car body.

12. The combination with a bodily movable car body, of fluid checking means mov-

ing with the car body and having a greater movement than the car body.

13. The combination with a pivoted and bodily movable car body, of fluid checking means moving with the car body and having a greater movement than the car body.

14. The combination with a pivoted and bodily movable car body, and a reciprocatory motor having a greater movement than the bodily movement of the car body, of fluid checking means moving with the car body and also having a greater movement than the car body.

15. The combination with a pivoted and bodily movable car body, and a reciprocatory motor having a greater movement than the car body, of fluid checking means moving with the motor and having an equal movement.

16. The combination with a pivoted and bodily movable car body, of a reciprocating actuating motor, crank connections between the motor and the car body whereby the movement of the motor is greater than that of the car body, and fluid checking means moving with the motor through an equal distance.

17. The combination with a car body mounted on a rolling support to tilt and move bodily, of an oscillatory actuating pin carried by the rolling car body support, a motor, and a movable part connecting the motor and the pin and slotted transversely of the direction of movement of the motor.

18. The combination with a tilting and bodily movable car body, and motor actuating means, of an oscillatory actuating connection between the car body and the motor having an angular movement equal to the tilting angle of the car body, and a reciprocatory actuating part carried by the motor, one of said parts being slotted to permit relative movement at the actuating connection transversely of the direction of movement of the motor.

19. The combination with a tilting and laterally movable car body having an actuating crank, and reciprocatory motor actuating means therefor, of actuating connections between said crank and the movable part of the motor, and movable checking means independent of the motor but moving simultaneously therewith for controlling the movement of the car body.

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

CARL P. ASTROM.

Witnesses:

JULIAN S. WOOSTER,  
GEO. A. HOFFMAN.