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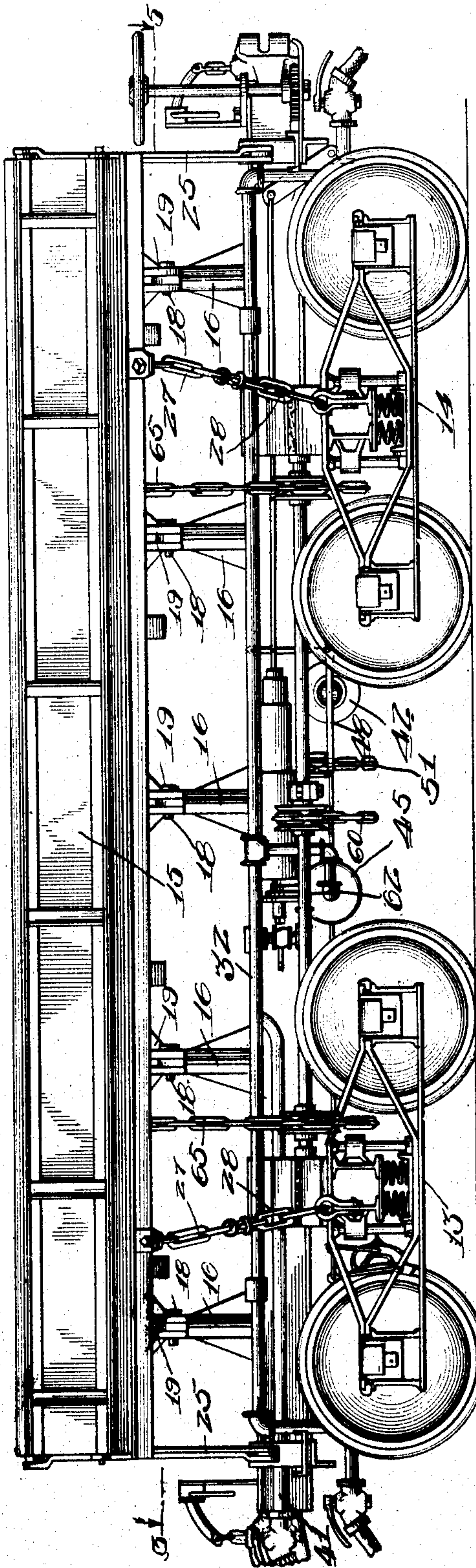
PATENTED MAR. 12, 1907.

T. R. McKNIGHT.
DUMP CAR.

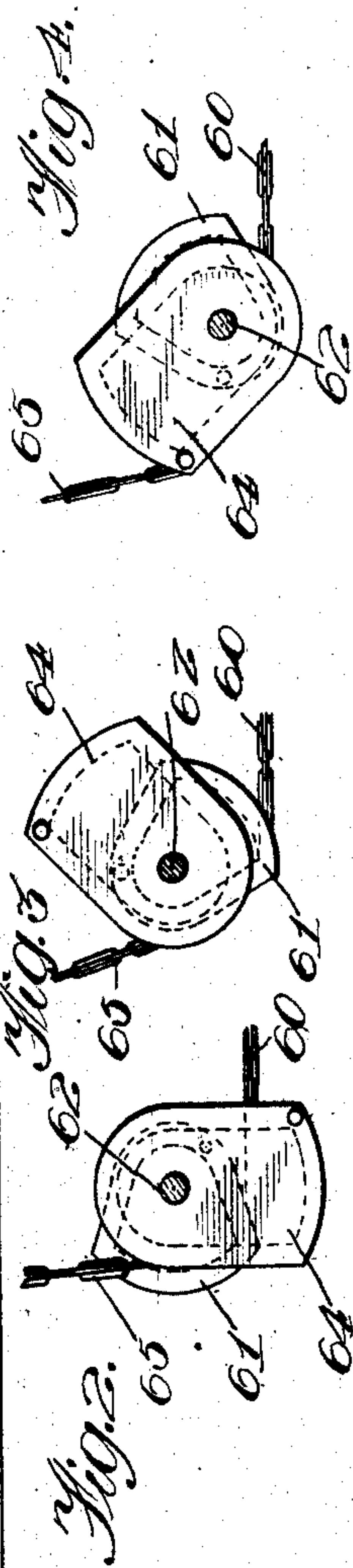
APPLICATION FILED JAN. 26, 1905.

5 SHEETS—SHEET 1.

Fig. 1.



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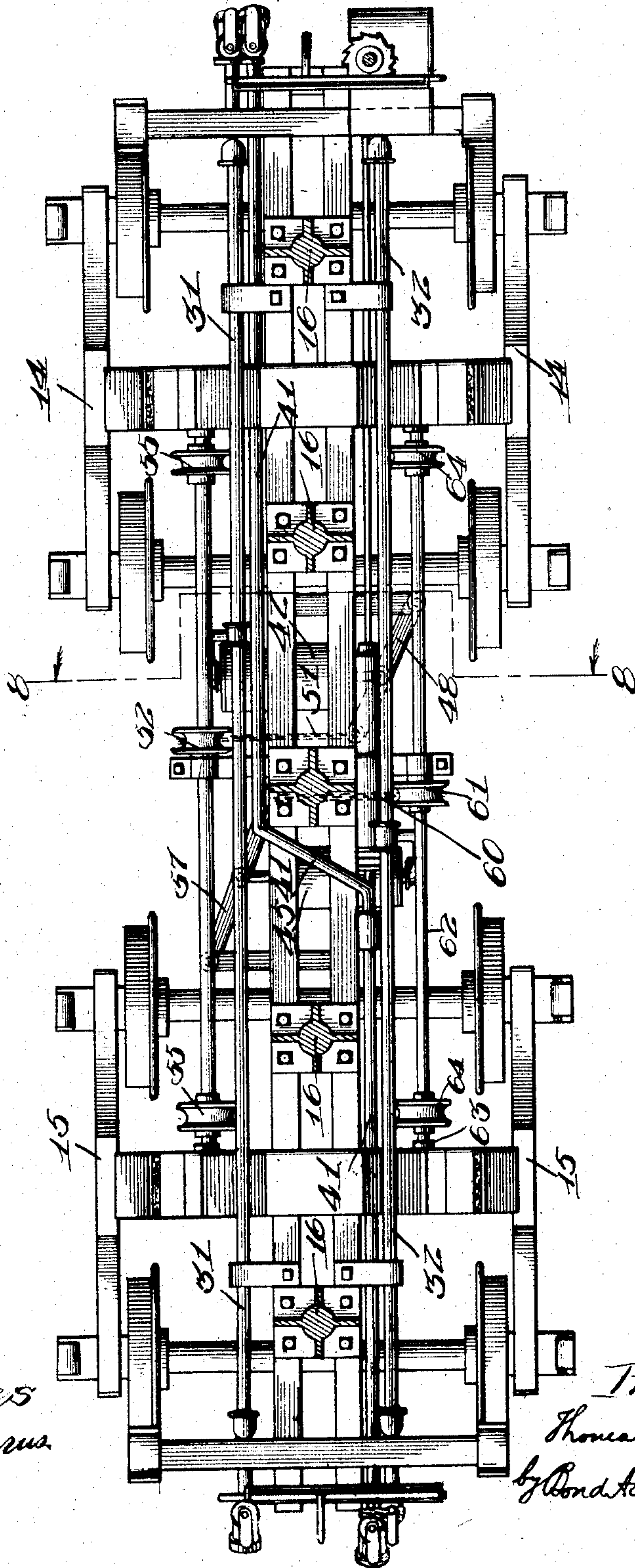
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5 SHEETS—SHEET 2.

Fig. 5.



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5 SHEETS—SHEET 3.

Fig. 6.

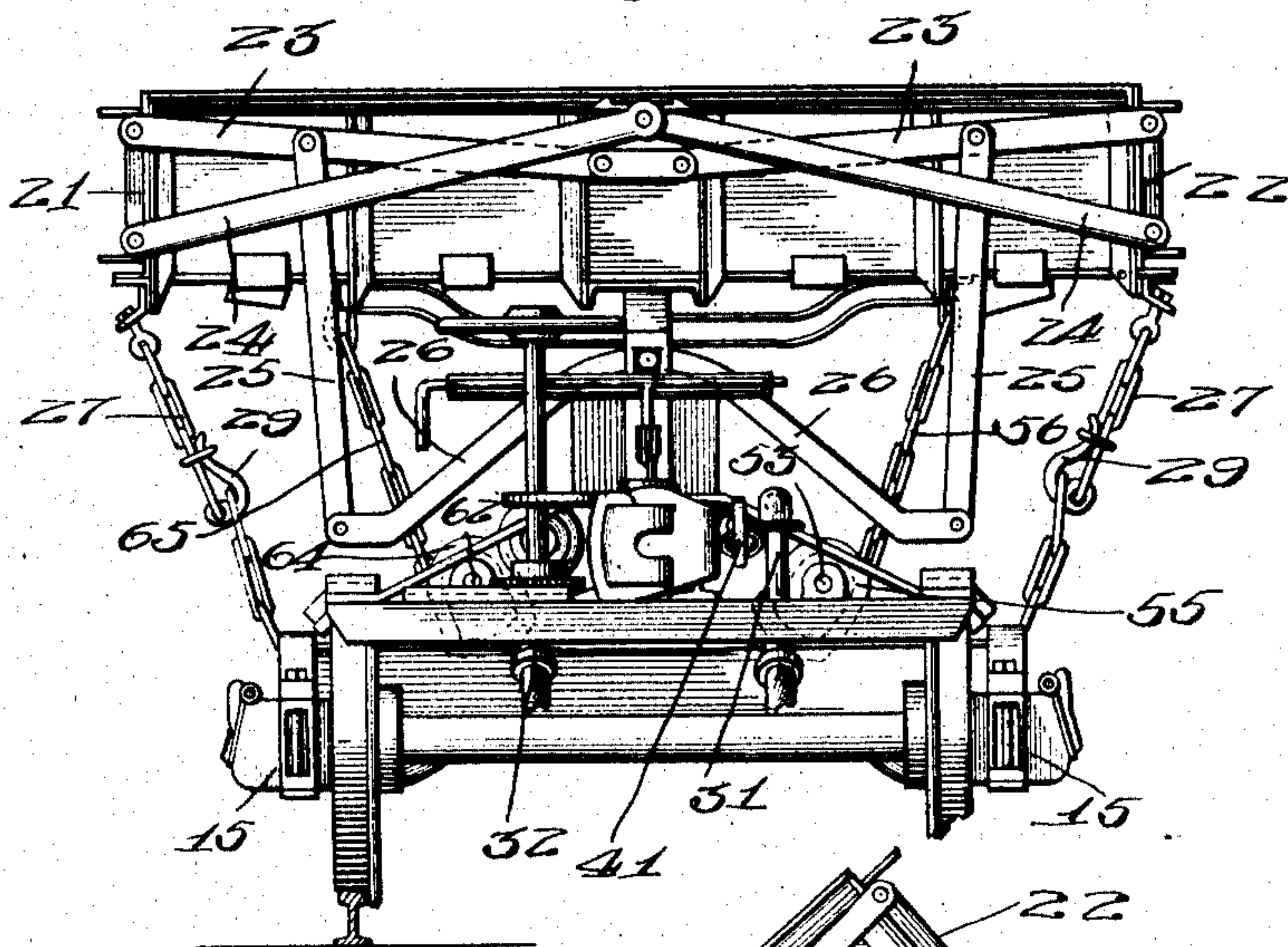
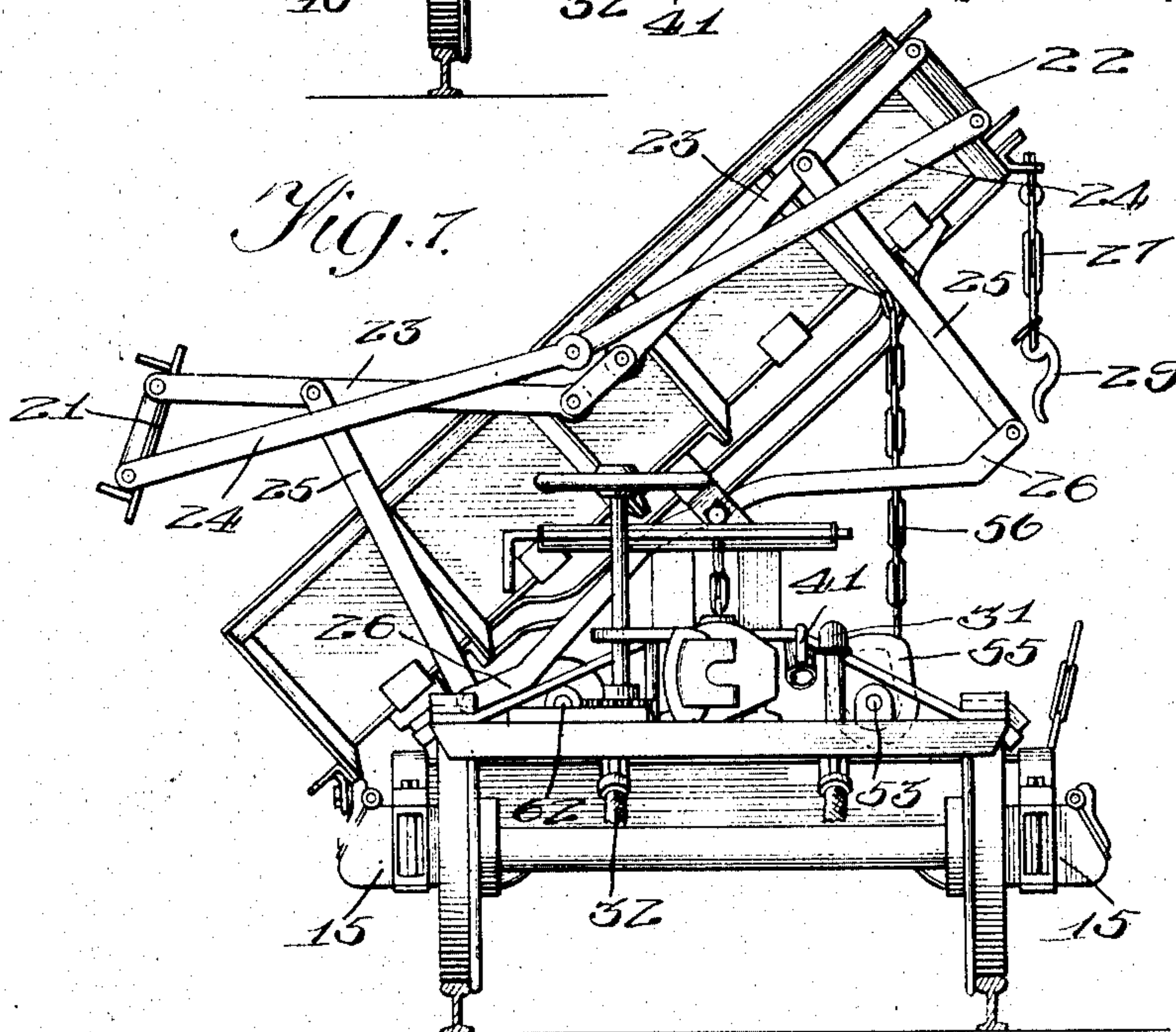


Fig. 7.



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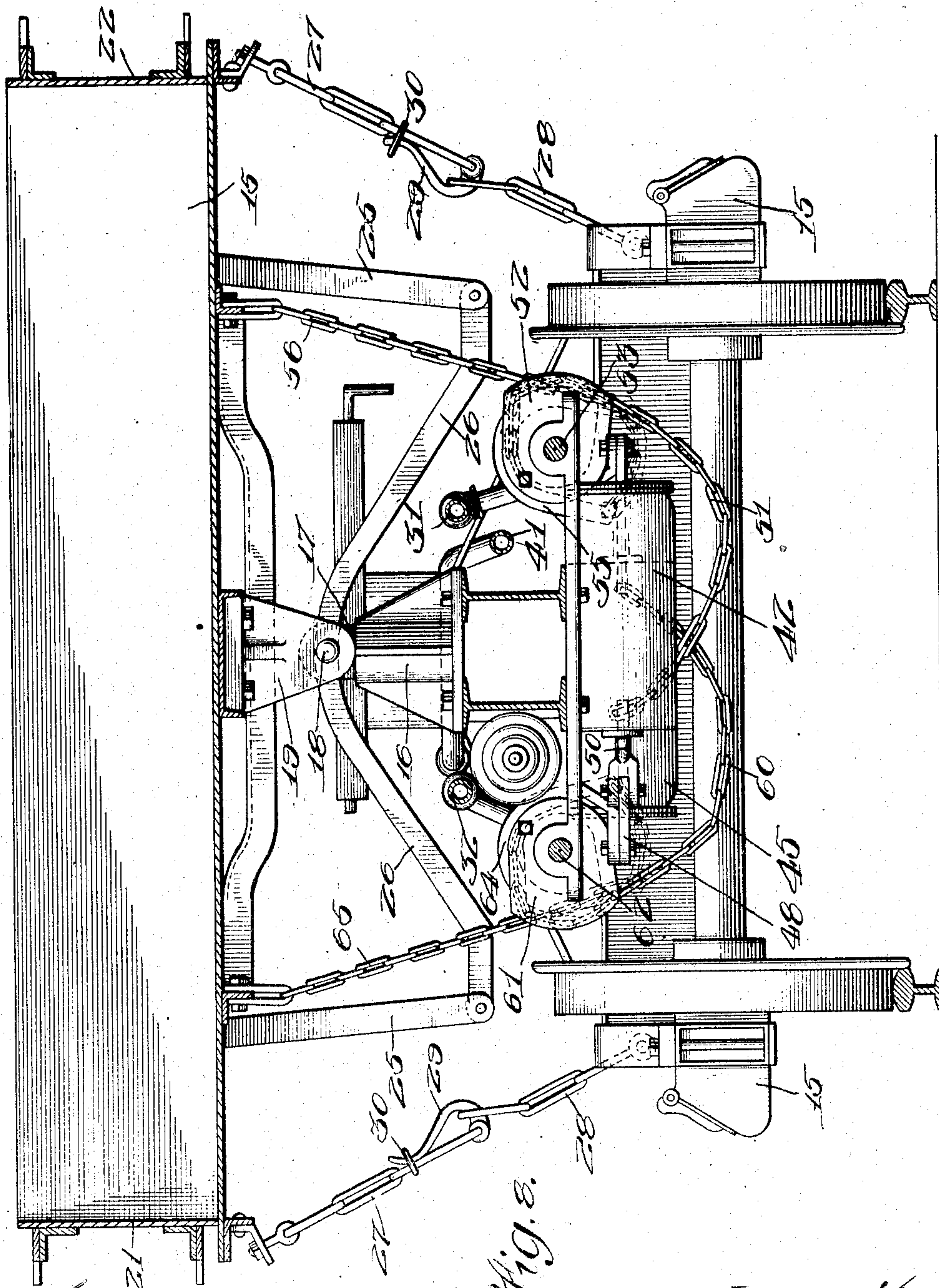
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5 SHEETS—SHEET 4.



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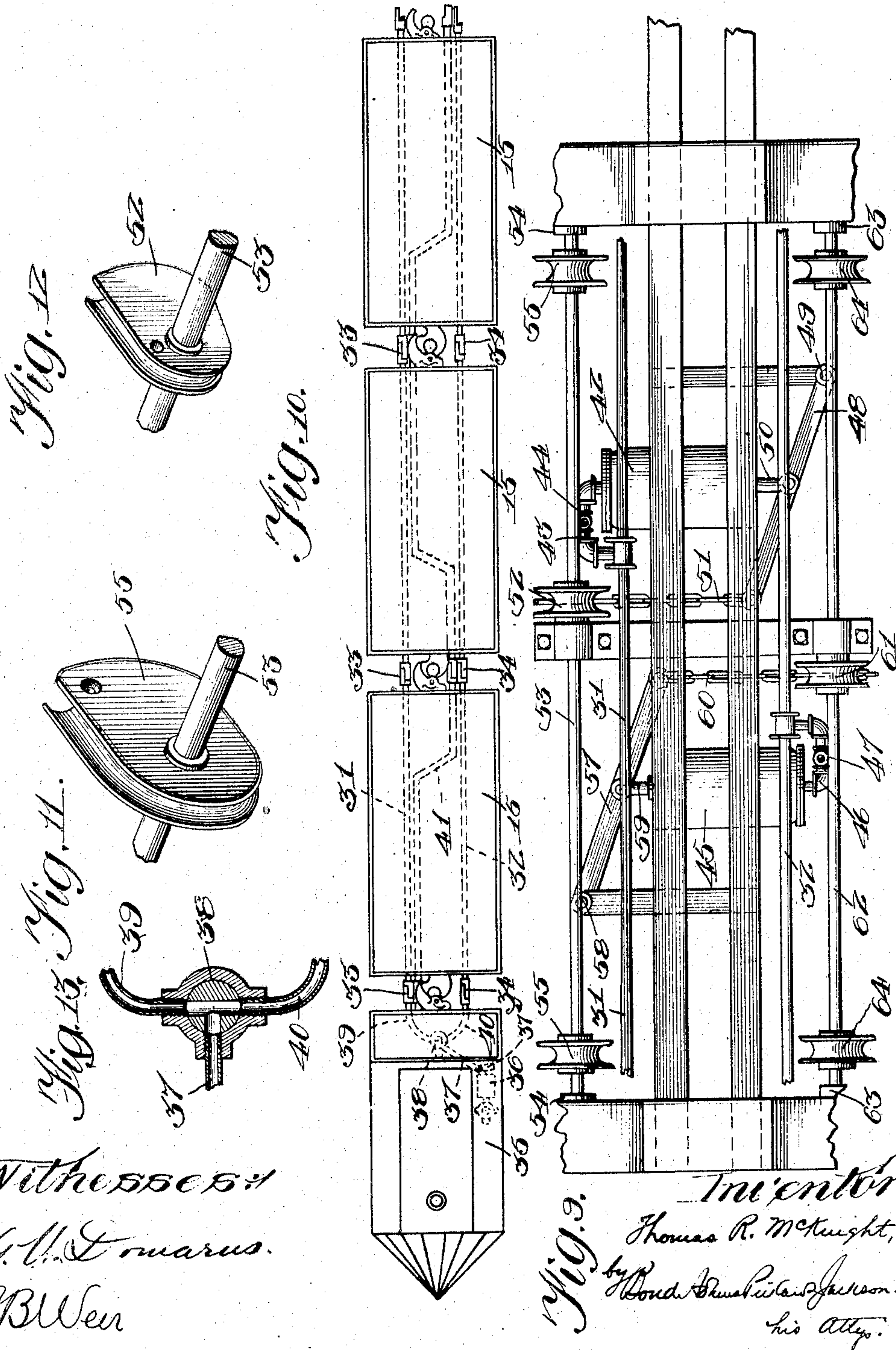
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UNITED STATES PATENT OFFICE.

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DUMP-CAR.

No. 846,501.

Specification of Letters Patent.

Patented March 12, 1907.

Application filed January 26, 1905. Serial No. 242,763.

To all whom it may concern:

Be it known that I, THOMAS R. McKNIGHT, a citizen of the United States, residing at Aurora, in the county of Kane and State of Illinois, have invented certain new and useful Improvements in Dump-Cars, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to dump-cars, and has particularly to do with cars arranged to be operated to dump a load or to return the car-body to its normal or operative position by the use of compressed air.

The objects of my invention are to provide air-operated mechanism for dumping the load at either side of the car and for restoring the car-body to its normal or carrying position, to provide air-operated mechanism so arranged that any car in a train may be dumped at either side at pleasure independently of other cars in the train, to provide improved air-operated mechanism so arranged that the power employed in dumping the car-body or restoring it to its normal position is most advantageously applied, to provide improved means by which the dumping of the various cars or their restoration to carrying position may be controlled by an operator located in the engine or at any other suitable point, and in other respects to improve the construction of cars of this class. I accomplish these objects as hereinafter described, and as illustrated in the drawings.

What I regard as new will be set forth in the claims.

In the accompanying drawings, Figure 1 is a side elevation of my improved car. Figs. 2, 3, and 4 are detail views illustrating different positions of the cams through which the compressed-air-operating mechanism for dumping and returning the car-bodies acts. Fig. 5 is a horizontal section on line 5-5 of Fig. 1. Fig. 6 is an end view showing the car-body in its normal or carrying position. Fig. 7 is a similar view showing the car-body dumped. Fig. 8 is a cross-section on line 8-8 of Fig. 5. Fig. 9 is a view showing certain parts of the operating mechanism in plan. Fig. 10 is a diagrammatic view showing the arrangement of the cars in train. Fig. 11 is a perspective view illustrating one of the cams through which the car-body is connected with the operating rock-shaft. Fig.

12 is a similar view showing one of the cams through which the levers of the air-cylinders are connected to said rock-shaft, and Fig. 13 is a detail of one of the controlling-valves.

In the construction illustrated each dump-car consists of a suitable car-body pivoted centrally on a pair of trucks so as to rock or tilt toward either side of the track to discharge its load. The car-body is provided with swinging sides constructed so that when the car-body is tipped to either side the side board at the side toward which the car-body is tilted is held up or elevated, so that the load can be freely discharged. It will be understood that while I prefer to employ the construction shown for pivoting the car-body upon the trucks and for operating the side boards of the car my present invention is not restricted to such features, as any other suitable construction may be employed. In fact, so far as my present invention is concerned it has nothing to do with the manner of pivoting the car-body or the construction and arrangement of the parts of the car-body other than that the car-body must be capable of being tipped to either side to discharge its load if all the features of invention hereinafter set forth are to be realized.

Each car may be provided with the usual air-brake mechanism, and suitable couplers and draft connections are provided, so that the several cars may be coupled in train. Each car is further provided, preferably at opposite sides, with longitudinally-extending train-pipes arranged to be coupled successively with corresponding train-pipes of the adjacent cars, so that when the cars are coupled to form a train there are two train-pipes extending the full length of the train. These train-pipes are connected by a three-way cock with an air-pump or other equivalent means of supplying them with compressed air, so that by operating said cock compressed air may be supplied to either of said train-pipes alone. Said cock is preferably located at the engine, which also supplies the compressed air; but it may be otherwise placed, if desired. Each car carries in addition to said train-pipes a pair of compressed-air cylinders which are connected, respectively, to the train-pipes, so that the compressed air passes freely from said train-pipes to said cylinders. Within each cylinder is a piston connected, through a piston-rod, pivoted le-

ver, and other suitable connections, with a rock-shaft connected with one side of the car in such manner that when said shaft is rocked in the proper direction the car-body is tilted.

5 The two rock-shafts are connected with opposite sides of the car, so that by rocking the appropriate shaft the car-body may be tilted in the desired direction.

The train-pipes which supply compressed
10 air to the dumping mechanism are in addition to the usual air-brake train-pipe, which has nothing to do with my present invention. For convenience and description therefore the term "train-pipe" without qualification,
15 as hereinafter used, refers to the train pipe or pipes which control the actuation of the dumping mechanism as distinguished from the air-brake train-pipe.

Between each train-pipe and the cylinders
20 with which it is connected a cut-out valve is provided, so that when necessary or desirable the cylinder or cylinders of any car may be cut out from the train-pipe or train-pipes without, however, interfering with the operation of the connections between other cars
25 and said train-pipe or train-pipes.

The connections between each rock-shaft and the operating-lever through which it is connected with the compressed-air cylinder
30 comprise a cam-lever fixedly secured to the rock-shaft and a chain running over said cam and connected with said lever, the arrangement being such that when said lever is positively actuated by the admission of compressed air to the appropriate cylinder the chain or other flexible connection acts, in connection with said cam-lever, to rock the rock-shaft. Similarly the rock-shaft is connected
40 with one side edge of the car-body through chains or other flexible connections and cam-levers placed near the ends of the car and so arranged that when the rock-shaft is rocked, as above described, to tilt the car-body said latter chains are wound upon their respective
45 cam-levers, thereby drawing the car-body down at that side into position for the discharge of its load. The various chains are so arranged as to provide slack enough so that the chains at one side of the car do not interfere with the tilting of the car-body toward the opposite side, as will be hereafter more specifically described. Suitable stays or chains are provided at each side of the car to hold it in its normal or carrying position.
55 The stays at the side opposite that at which the load is to be dumped are disconnected before the dumping operation, those at the other side acting to prevent the car-body going too far when returned to its carrying position.
60

The foregoing explanation, it is believed, will be sufficient to give a general idea of the construction of my improved dump-car and the manner in which it is used either alone or
65 in connection with other cars. I will now de-

scribe more specifically the construction illustrated in the accompanying drawings, which illustrate one of the various forms in which my invention may be applied.

Referring to the drawings, 13 14 indicate
70 trucks, and 15 the car-body. As best shown in Figs. 1 and 18, the trucks carry a number of sockets 16, which receive pivot-plates 17, pivotally connected by pivots 18 with suitable brackets 19, secured centrally to the
75 under side of the car-body, as shown. The arrangement is such that the car-body may be tilted toward either side of the truck, as indicated in Fig. 7.

21 22 indicate the movable side boards of
80 the car-body, which, as shown in Figs. 6 and 7, are connected with the ends of the car-body by straps 23 24, arranged to operate in connection with straps 25 26 to hold the said side boards up and turn their lower edges
85 outward when the car-body is tilted, as shown in Fig. 7. The side boards may, however, be operated in any other suitable way, and as these parts have nothing to do with my present invention a further description
90 thereof is believed to be unnecessary.

27 28 indicate the upper and lower members of stays which are provided at each side of the car, preferably near the ends thereof, and 29 indicates hooks which connect the
95 members of said stays, as is shown in Fig. 8. Said hooks are pivoted to the lowermost links of the upper members 27 and are adapted to engage a link of the lower member of the stay, as shown. The rings 30 serve to
100 lock the hooks 29 in operative position. Said hooks may be released by sliding the rings up beyond the ends of said hooks, so that the hooks may swing so as to release the lower members of the stays, as shown at the
105 right in Fig. 7. Obviously when the stays at both sides of the car are operative the car-body is held in its normal or horizontal position, as shown in Fig. 8, but by releasing the stays at either side the car-body may be tilted
110 toward the opposite side of the car.

31 32 indicate the train-pipes, which, as best shown in Figs. 8 and 9, are arranged at the opposite sides of the car and extend longitudinally thereof. Said train-pipes are
115 arranged to be coupled up by couplings 33 34, as shown in Fig. 10, so that all the train-pipes at the same side of the car are in communication with one another.

35 is a diagrammatic representation of
120 a locomotive which is provided with compressed-air-supplying mechanism 36, connected by a pipe 37 with a cock 38, the latter being connected by branch pipes 39 40 with the train-pipes 33 34, respectively, as shown in
125 Fig. 10. The cock 38 is a three-way cock arranged so that air may be admitted to either train-pipe alone. The cock 38 is constructed as to provide also for admitting air to both train-pipes at the same time, as
130

shown in Fig. 13, when, as hereinafter described, by making proper connections the different cars may be dumped simultaneously in opposite directions. The pipe 37 is provided with a valve 37^a, as shown in Fig. 10, of the type commonly used for controlling air-brakes.

41 indicates the usual air-brake train-pipe.

42 indicates a series of compressed-air cylinders connected by connecting pipes 43 with the train-pipe 31.

44 indicates valves in the pipes 43 for cutting out any of the cylinders 42 from said train-pipes. (See Fig. 9.)

45 indicates a series of compressed-air cylinders connected by pipes 46 with the train-pipe 32, said pipes 46 being also provided with cut-out valves 47.

48 indicates a series of levers operated by the admission of air to the cylinders 42. Said levers are fulcrumed at 49 to a suitable fixed support and are connected with the piston of the cylinder 42 by a piston-rod 50.

At the ends opposite the fulcrum 49 the levers 48 are connected by chains 51 or other equivalent connection with cam-levers 52, mounted upon rock-shafts 53, which extend longitudinally of the various cars at one side thereof, their ends being mounted in suitable bearings 54, as shown in Fig. 9. The arrangement is such that when compressed air is admitted to the cylinder 42 the piston-rod 50 thereof is forced out, moving the lever 48 accordingly, thereby causing the chain 51 to rock the cam-lever 52 and rock-shaft 53.

55 indicates cam-levers, which are also mounted on the rock-shaft 53, preferably near the ends thereof, and are connected with the car-body, near one side edge thereof, by chains 56 or other equivalent connections, so that when the shaft 53 is rocked by the actuation of the lever 48 in the manner described the cam-levers 55 are also rocked to wind the chain 56 upon them, and thereby pull down upon that side edge of the car to which the chains 56 are attached, consequently dumping the contents of the car-body at that side.

57 indicates a lever for the cylinder 45, similar to the lever 48, the lever 57 being fulcrumed at 58 and being connected to a piston-rod 59, operated by the compressed air in the cylinder 45. The lever 57 is connected by a chain 60 or other equivalent connection to a cam-lever 61, mounted upon a rock-shaft 62, arranged at the opposite side of the car from the rock-shaft 53 and mounted in suitable bearings 63. Said rock-shaft 62 also carries cam-levers 64, similar to the cam-levers 55 and connected by chains 65 or other equivalent connections with the car-body near the opposite side edge thereof.

As best shown in Figs. 2, 3, and 4, the cam-levers 52 and 55, carried by the shaft 53, or the corresponding levers carried by the shaft 62, are set substantially at right angles with

each other, the object of which is to give the operating-lever greater leverage when dumping the load. The position of said cam-levers when the car-body is in its normal or carrying position is shown in Fig. 2, from an inspection of which it will be seen that the chain 60, connecting the operating-lever with the cam-lever 61, acts at a greater distance from the rock-shaft 62, while the chain 65 acts upon the cam-lever 64 at a less distance from the rock-shaft 62. Consequently the leverage of the operating-lever upon the cam-lever 61 is at or almost at the maximum in dumping, while at that time the leverage of the load upon the cam-levers 64 is almost or quite at the minimum. The position of the same parts when the load has been dumped is shown in Fig. 3, and Fig. 4 illustrates the positions of said parts when the load has been dumped at the opposite side. After the load has been dumped at either side the cam-levers at the opposite side come into play for restoring the car-body to its normal position, and as after dumping the car-body is light, and consequently less power is necessary and greater speed is desirable in order to quickly restore the car-body to its operative position, I provide for reducing the leverage of the mechanism by which the car-body is returned and increasing the speed of the movement. As will be seen from an inspection of Fig. 4, at this time the chain 60 acts upon the cam-lever 61 at a point nearer the rock-shaft 62, while the chains 65 acts upon the cam-levers 64 at a greater distance from the shaft 62. Consequently the operation of returning the car-body is more quickly accomplished.

The operation is as follows: Assuming the cars to be connected in train, while they are being loaded the stays at both sides will be operatively connected, so as to hold the several car-bodies in normal position. If it be desired to dump all the cars at the same time, the stays at the opposite side are released, and air is admitted to the train-pipe at the side at which the cars are to be dumped, all the cut-out valves at the same side being open. The compressed air so admitted enters the several cylinders 42 or 45, as the case may be, rocking the appropriate series of rock-shafts and dumping all the cars. The cylinders which control the rock-shafts at the opposite side remain unaffected. As shown in Fig. 8, when the car-body is in its normal position the chains 51-60 have considerable slack, the amount of slack being such that it is just taken up by the tilting of the car-body in dumping at the opposite side. Consequently whenever a car is dumped the chains connecting its higher side edge with the air-cylinders are drawn taut and made ready to operate to return the car-body to its normal position. The car-body is returned by admitting air to the train-pipe at the opposite side from that at which the car

or cars were dumped, thereby pulling down the elevated side edges of the car-bodies and restoring them to their former position, the stays at the opposite side serving to stop the car-bodies when they reach their normal position. The disconnected stays are then connected, and the car-bodies are in readiness for another load. If it be desired to dump only a part of the cars at the same time, the cars which are not to be dumped are cut out by closing the cut-out valves 44 or 47, as the case may be. Again, if it be desired to dump certain cars at one side and other cars at the other side the stays are properly arranged and the cut-out valves corresponding adjusted. Air is then admitted to both train-pipes at the same time, when the cars will be dumped accordingly. To restore the car-bodies when so dumped, the cut-out valves are reversed and air again admitted to both train-pipes. In practice the valve 38 is first set to properly direct the air-supply, and the air-pressure is then controlled by operating the valve 37^a. In this manner the air-pressure may be applied, released, or otherwise controlled at pleasure by the engineer in the cab.

While I have described specifically the embodiment of my invention illustrated in the accompanying drawings, I wish it to be understood that my invention is not restricted to the details of the construction shown and described, except in so far as they are particularly claimed, but includes generically the subject-matter of the broader claims. I wish it to be understood, further, that the term "compressed air," as herein employed, is used in a generic sense to include any equivalent fluid.

That which I claim as my invention, and desire to secure by Letters Patent, is—

1. In a dump-car, the combination of a tilting car-body, a plurality of compressed-air cylinders, lever mechanism connected to the car-body near one of the side edges thereof and operated by one of said cylinders for tilting the car-body in one direction, lever mechanism connected with the car-body near the opposite side edge and operated by the other cylinder for returning the car-body to its normal position, and means for controlling the admission of compressed air to said cylinders.

2. In a dump-car, the combination of a tilting car-body, a compressed-air cylinder, a piston operated by the admission of compressed air thereto, a lever actuated by said piston, and means connected with the car-body near one of the side edges thereof and actuated by said lever to effect the tilting of the car-body when said lever is actuated by the admission of compressed air to said cylinder.

3. In a dump-car, the combination of a tilting car-body, a compressed-air cylinder,

a piston operated by the admission of compressed air thereto, a lever actuated by said piston, a rock-shaft, means for rocking said shaft by the actuation of said lever, and means connecting said rock-shaft with the car-body so that the rocking of said shaft effects the tilting of the car-body.

4. In a dump-car, the combination of a tilting car-body, a rock-shaft, means connecting said rock-shaft with the car-body at one side of the center thereof so that the rocking of said shaft effects the tilting of said car-body, and compressed-air mechanism for rocking said shaft.

5. In a dump-car, the combination of a tilting car-body, a plurality of rock-shafts, means connecting one of said rock-shafts with said car-body for tilting it in one direction, means connecting the other rock-shaft with the car-body for tilting it in the opposite direction, and compressed-air mechanism for rocking said shafts.

6. In a dump-car, the combination of a tilting car-body, a plurality of rock-shafts, means connecting one of said rock-shafts with said car-body for tilting it in one direction, means connecting the other rock-shaft with the car-body for tilting it in the opposite direction, a compressed-air cylinder connected with one of said rock-shafts for operating the same, a compressed-air cylinder connected with the other rock-shaft for operating the same, and means for admitting compressed air to either of said cylinders at pleasure.

7. In a dump-car, the combination of a tilting car-body, a rock-shaft, one or more cam-levers mounted on said rock-shaft and connected with said car-body at one side of the center thereof for tilting the same, and means for rocking said shaft.

8. In a dump-car, the combination of a tilting car-body, a rock-shaft, one or more cam-levers mounted on said rock-shaft and connected with said car-body for tilting the same, a compressed-air cylinder, a cam-lever carried by said rock-shaft and connected with said compressed-air cylinder for rocking said shaft, and means for controlling the admission of compressed air to said cylinder.

9. In a dump-car, the combination of a tilting car-body, a plurality of compressed-air cylinders, a plurality of rock-shafts connected, respectively, with opposite side edges of the car-body for tilting the same in either direction, pistons operating in said cylinders, and cam-levers carried by said rock-shafts and connected, respectively, with said pistons.

10. In a dump-car, the combination of a tilting car-body, compressed-air motor mechanism for tilting the car-body, and intermediate mechanism connecting said motor mechanism with the car-body and arranged to give said motor mechanism greater lever-

age during the early part of the dumping operation.

11. In a dump-car, the combination of a tilting car-body, a rock-shaft, cam-levers carried by said rock-shaft, one of said cam-levers being connected with the car-body and arranged to tilt the same when said rock-shaft is rocked in the proper direction, and compressed-air actuating mechanism connected with the other cam-lever, said cam-levers being arranged relatively to each other so as to give the compressed-air-operating mechanism greater leverage during the early part of the dumping operation.

12. In a dump-car, the combination of a tilting car-body, a plurality of train-pipes, means controlling the admission of air to said train-pipes, compressed-air cylinders connected with said train-pipes, lever mechanism operated by the admission of compressed air to one of said cylinders for swinging the car-body in one direction, and lever mechanism operated by the admission of compressed air to the other cylinder for swinging the car-body in the opposite direction.

13. In a dump-car, the combination of a car-body adapted to tilt laterally in either direction, a plurality of air-pipes, means for admitting air under pressure to either of said pipes, lever mechanism actuated by compressed air from one of said air-pipes for tilting the car-body in one direction, and lever mechanism actuated by compressed air from the other of said air-pipes for tilting the car-body in the opposite direction.

14. In a dump-car, the combination of a tilting car-body, a truck, compressed-air cylinders, means operated by the admission of compressed air to one of said cylinders for tilting the car-body in one direction, means operated by the admission of compressed air to the other of said cylinders for tilting the car-body in the opposite direction, and detachable stays connected with the opposite side edges of the car-body and with the truck.

15. A dump-car having a truck, a pivotally-mounted car-body, one or more pivots centrally disposed under the car-body for pivotally supporting the same on said truck, a stationary fluid-pressure cylinder secured to said truck, a lever actuated by said cylinder, and intermediate means connected with

said lever and with the car-body and actuated by said lever to tilt the car-body to dump the car.

16. A dump-car, having a pivotally-mounted car-body, a fluid-pressure cylinder, lever mechanism actuated from said cylinder means actuated by said lever mechanism and connected with the car-body at one side of the center thereof for swinging said car-body, and means for supplying fluid-pressure to said cylinder.

17. A dump-car having a tilting car-body, a rock-shaft connected with said car-body whereby by rocking said shaft the car-body may be tilted, and fluid-pressure-actuated mechanism for rocking said shaft.

18. A dump-car having a tilting car-body, a rock-shaft mounted independently of said car-body, means connecting said rock-shaft with said car-body whereby by rocking said shaft said car-body may be tilted, and fluid-pressure-actuated mechanism for rocking said shaft.

19. A dump-car having a truck, a pivotally-mounted car-body, one or more pivots centrally disposed under the car-body for pivotally supporting the same upon said truck, a stationary fluid-pressure cylinder secured to said truck, lever mechanism actuated by said cylinder, and intermediate means connected with said lever mechanism and with the car-body at one side of the axis thereof and actuated by said lever to tilt the car-body to dump the same.

20. A dump-car having a truck, a tilting car-body mounted on said truck, a fluid-pressure cylinder horizontally disposed and secured to said truck, a lever fulcrumed on said truck and actuated by said cylinder, and means actuated by said lever for tilting the car-body.

21. A dump-car, comprising a truck, a car-body pivotally supported thereon, a fluid-pressure cylinder, a lever actuated by said cylinder, and flexible means connected with said lever and with the car-body for tilting the car-body.

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Witnesses:

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