

No. 721,300.

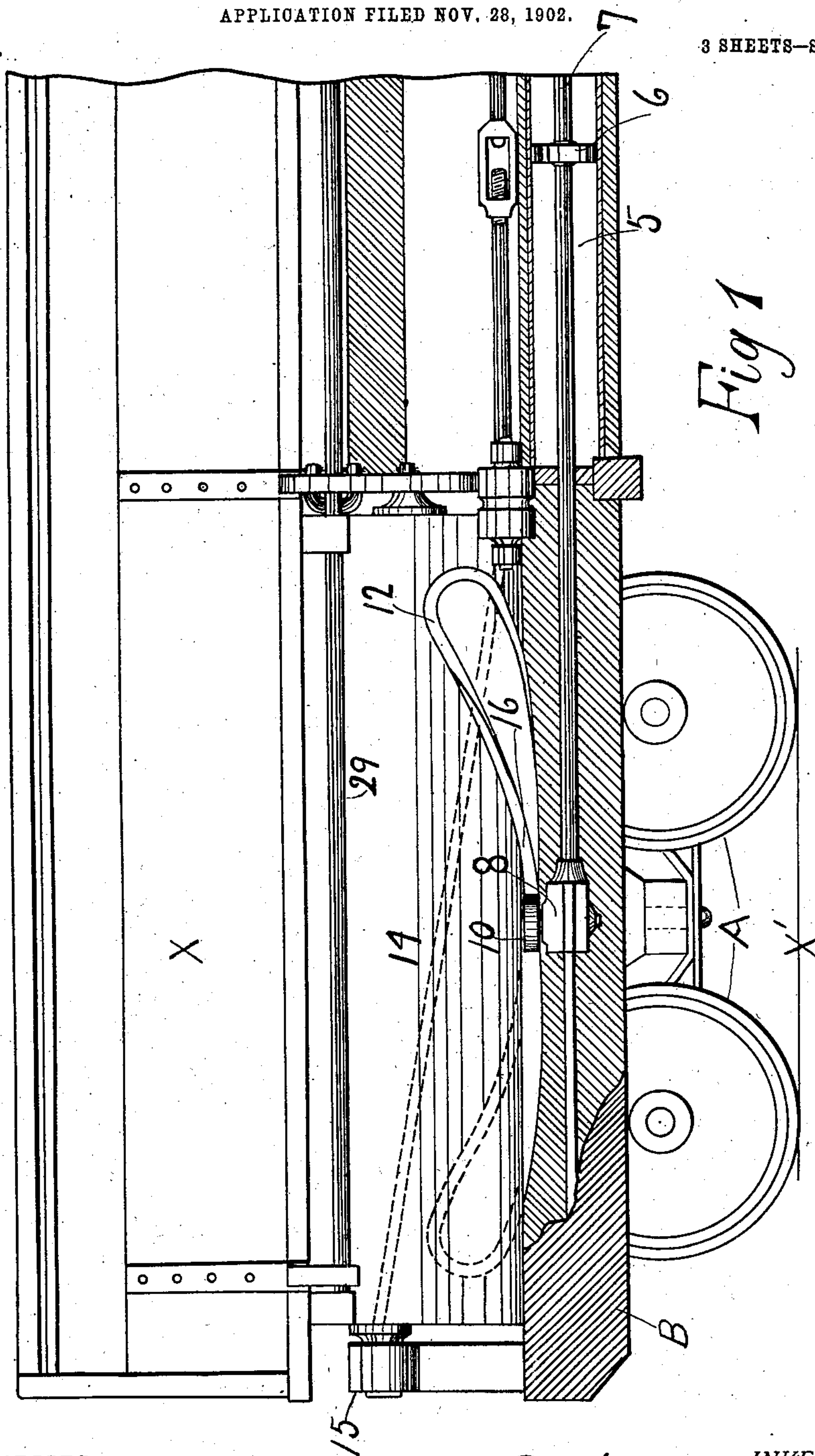
PATENTED FEB. 24, 1903.

E. D. HAVEN.  
DUMP CAR.

APPLICATION FILED NOV. 28, 1902.

NO MODEL.

3 SHEETS—SHEET 1.



WITNESSES:

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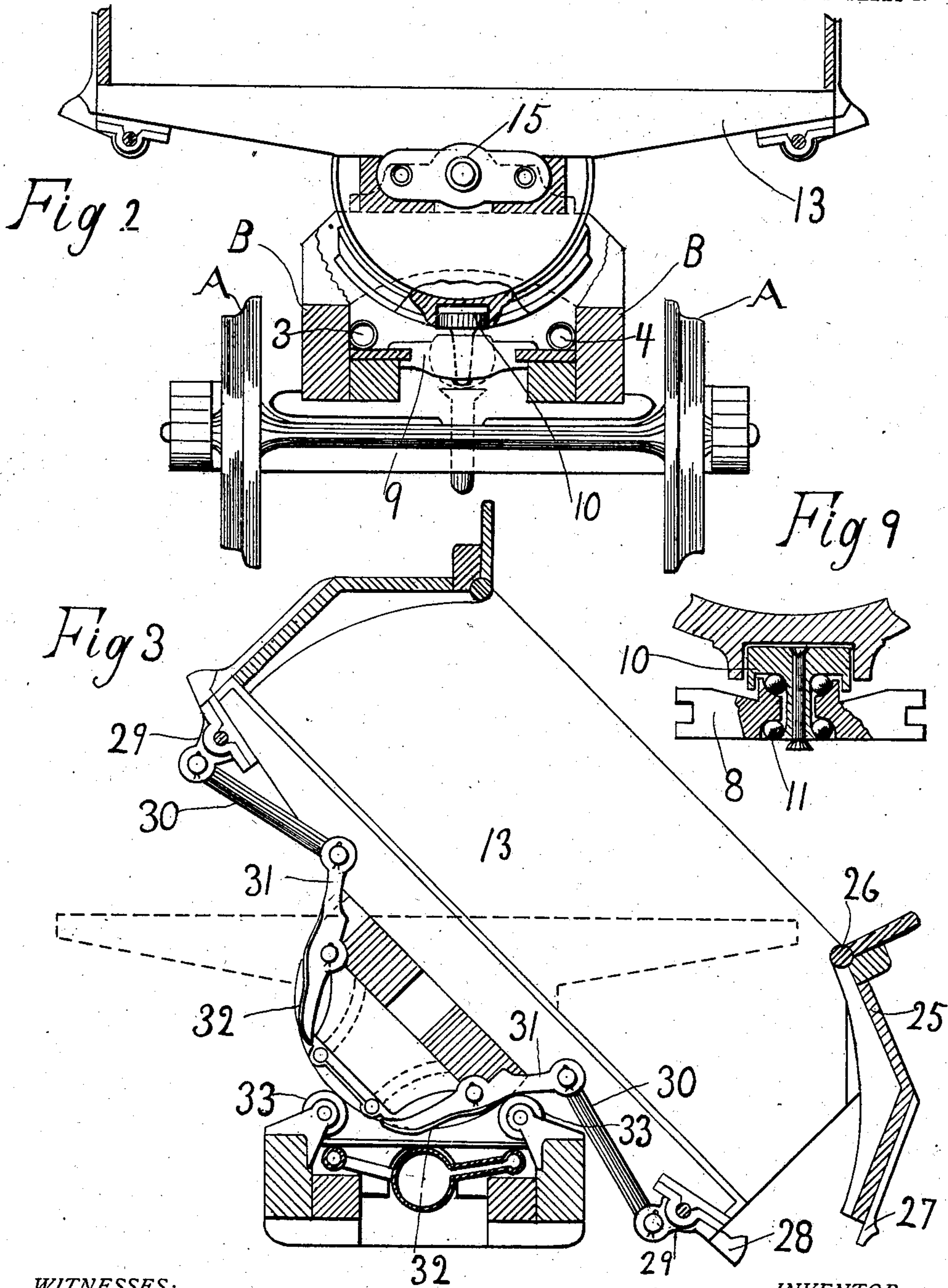
ATTORNEYS.

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3 SHEETS—SHEET 2.



WITNESSES:

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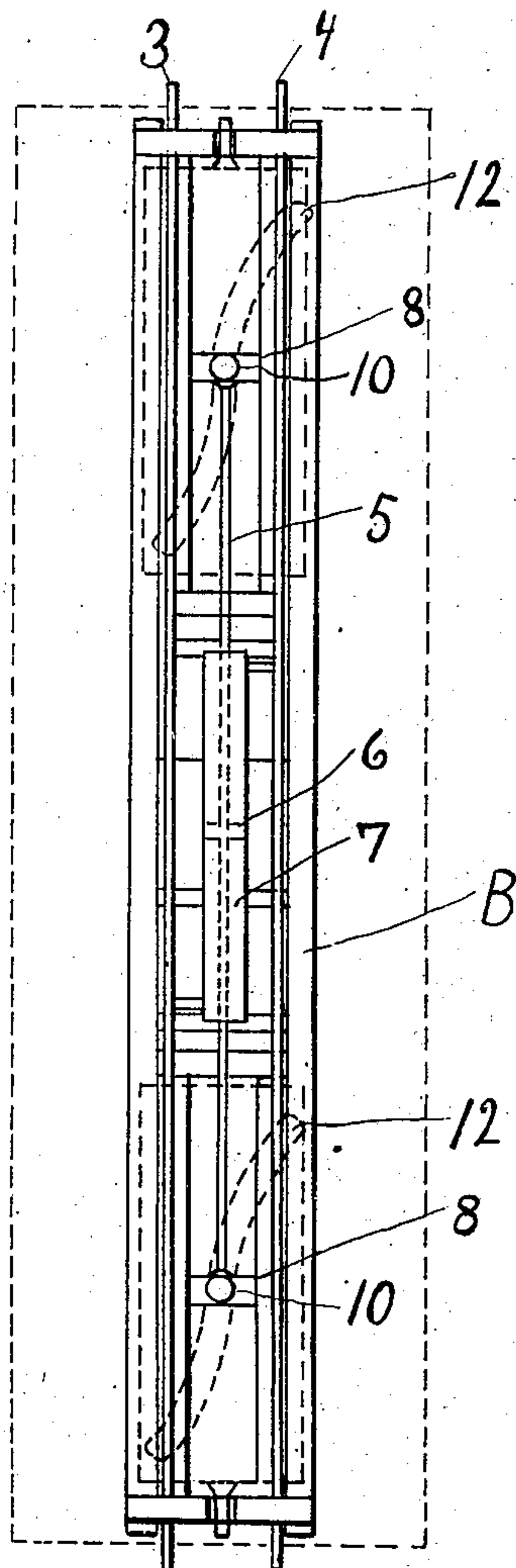
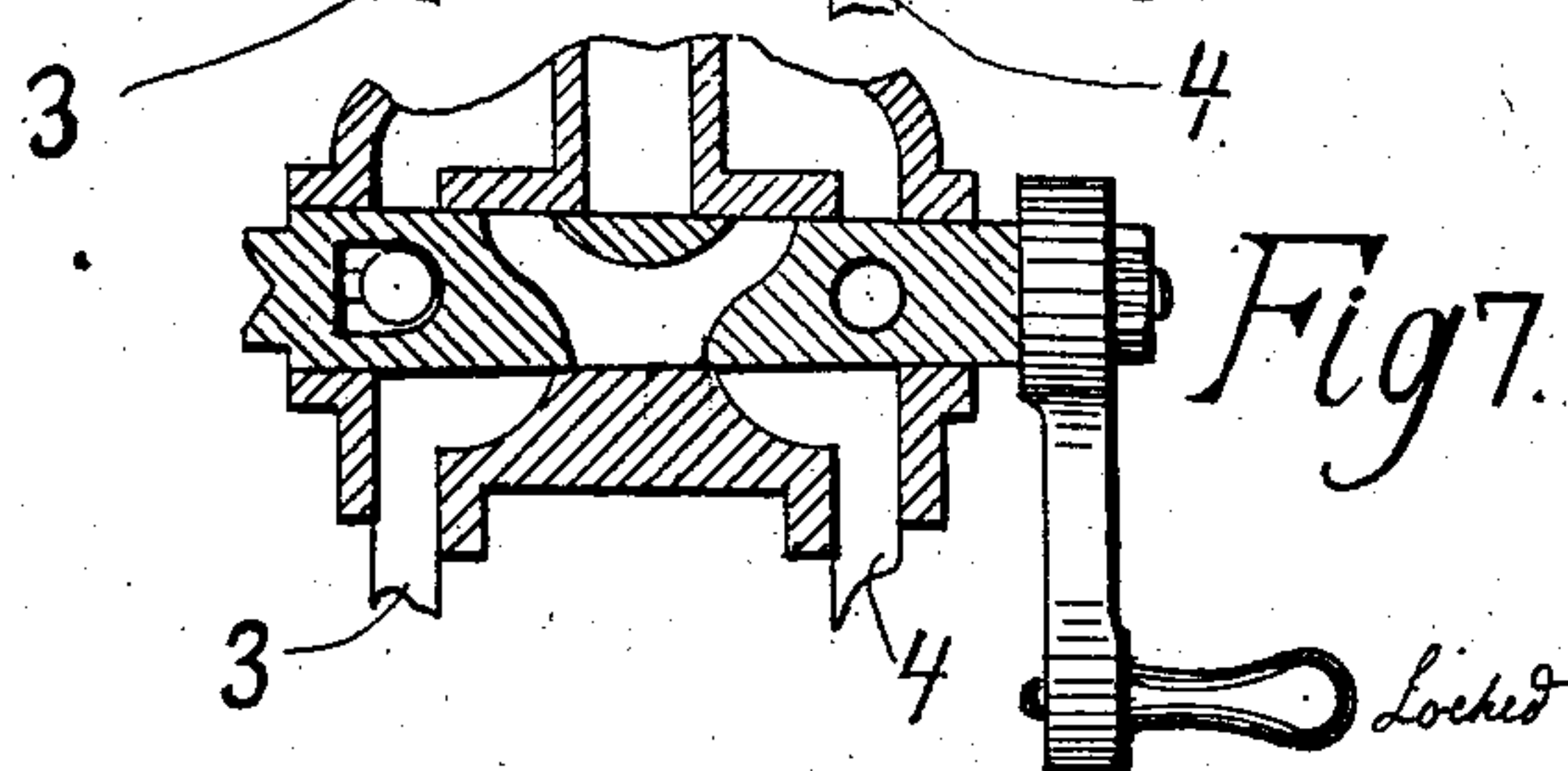
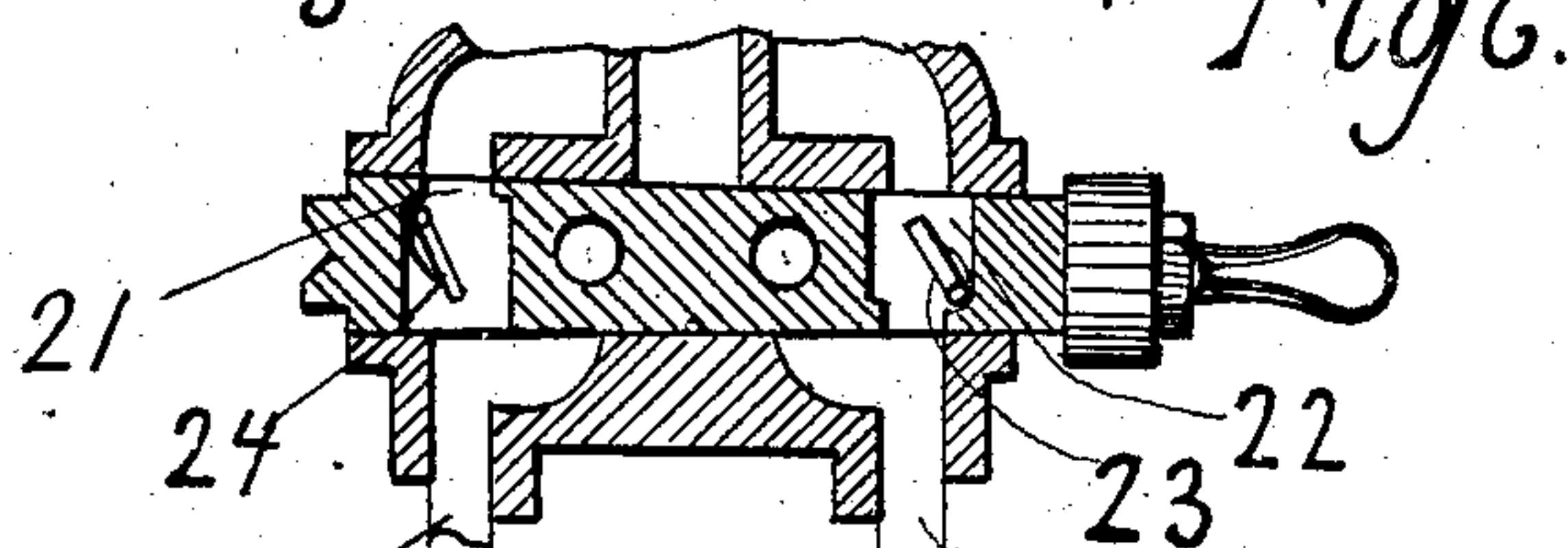
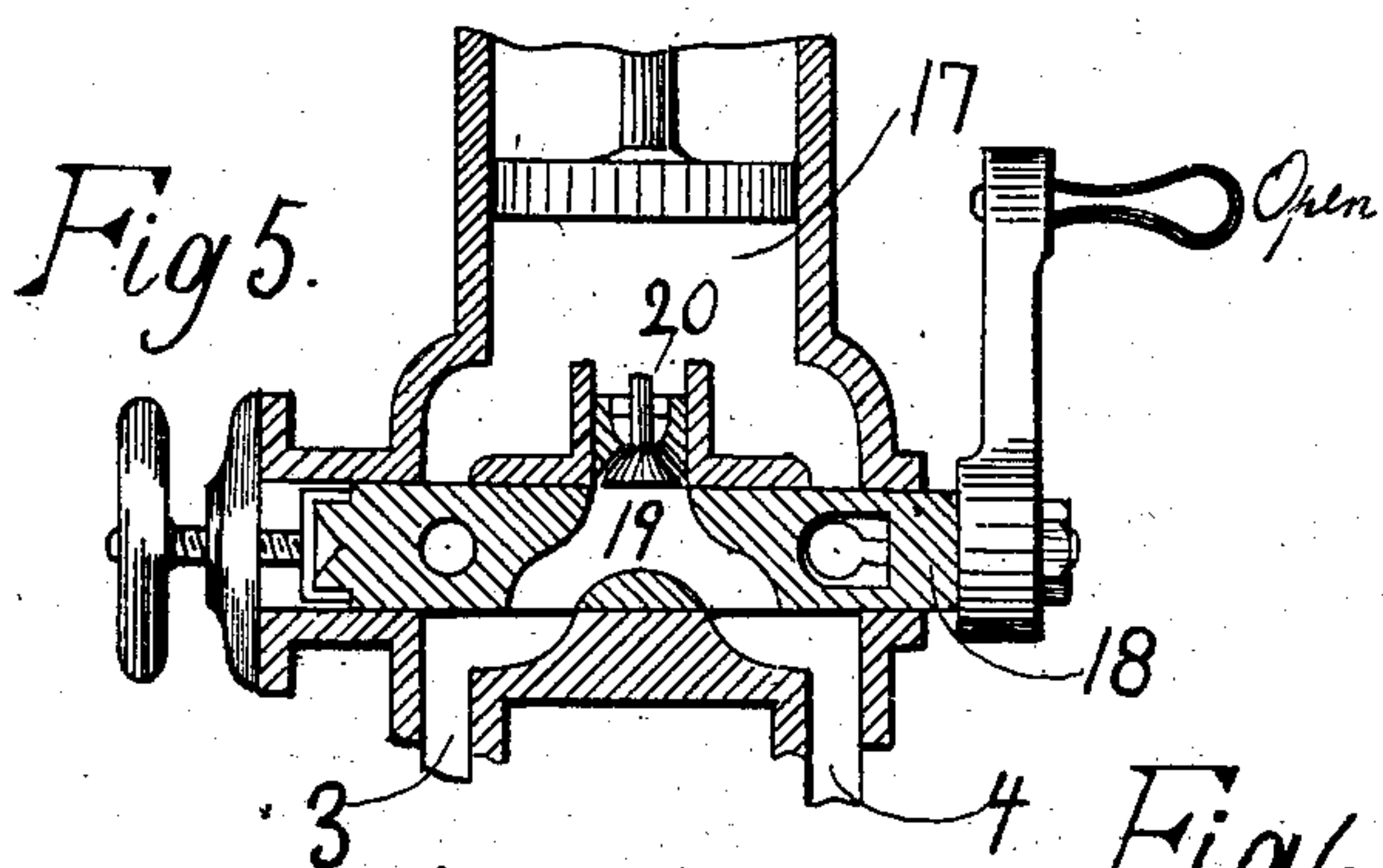
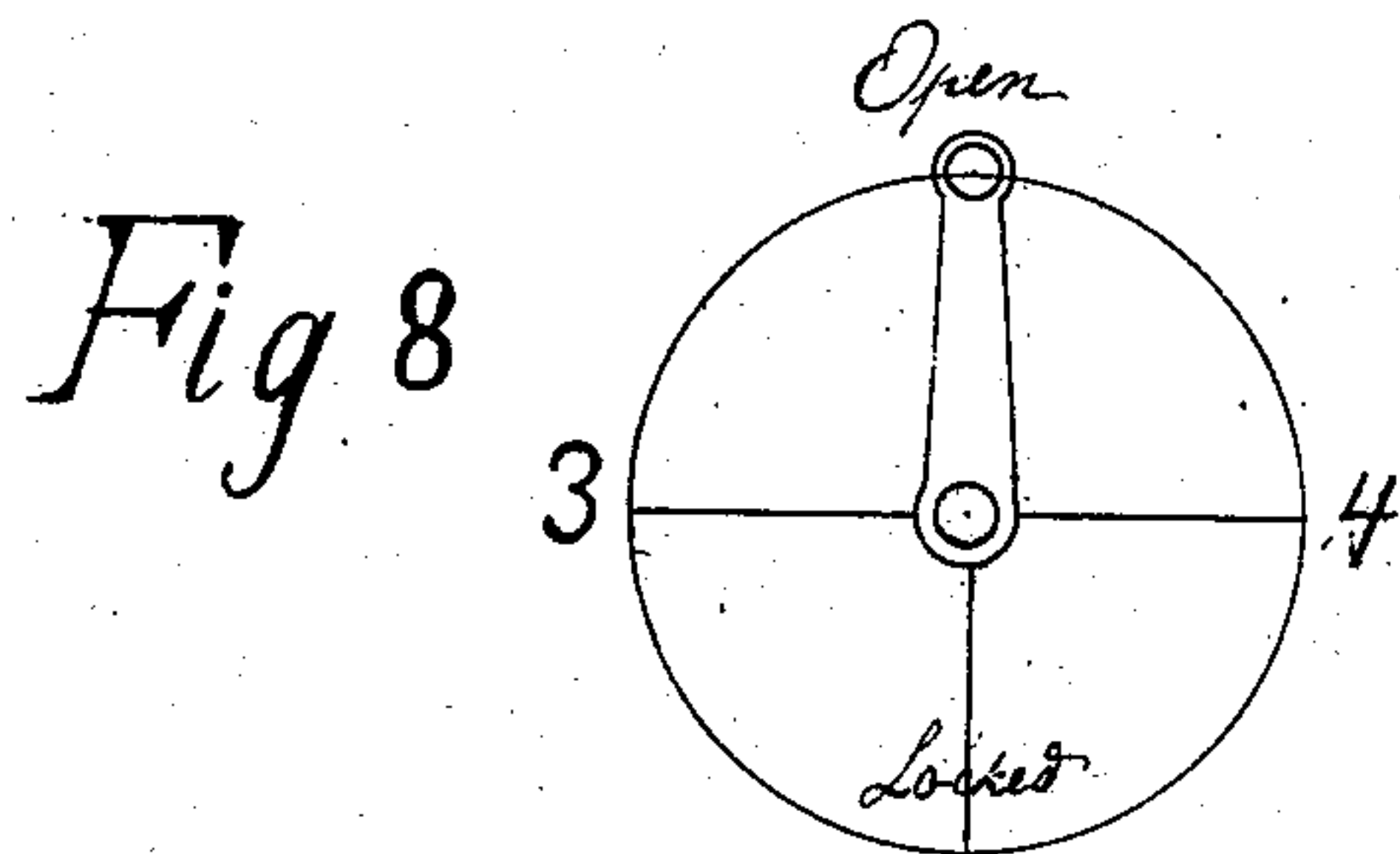


E. D. HAVEN.  
DUMP CAR.

APPLICATION FILED NOV. 28, 1902.

NO MODEL.

3 SHEETS—SHEET 3.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

EGBERT D. HAVEN, OF SAN JOSE, CALIFORNIA, ASSIGNOR OF ONE-HALF  
TO JAMES H. CROSETT, OF SAN JOSE, CALIFORNIA.

## DUMP-CAR.

SPECIFICATION forming part of Letters Patent No. 721,300, dated February 24, 1903.

Application filed November 28, 1902. Serial No. 132,996. (No model.)

*To all whom it may concern:*

Be it known that I, EGBERT D. HAVEN, a citizen of the United States, residing at San Jose, county of Santa Clara, State of California, have invented an Improvement in Dump-Cars; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to apparatus connected with tilting or dumping cars and controlled by any operator by means of air passing through suitable train-pipes, so that the cars may be tilted or dumped to either side or righted into a horizontal position.

It consists in an arrangement of longitudinally-supported spiral channels or grooves fixed to each car, rollers or travelers adapted to move in said grooves and guided so as to travel in straight lines, and pistons moving in cylinders, with means for applying air-pressure to one side or the other of the piston, so that when moved in one direction the spiral will be compelled to follow the roller, and thus tilt the car to one side, and when moved in the opposite direction to tilt it to the opposite side. In conjunction with this are mechanisms for automatically unlatching the discharge-gates when the car is dumped and latching them again when it is restored to its normal position and pipes or passages connecting said pipes with opposite ends of the cylinders, with means for transferring the air from one side to the other of the pistons to actuate them and dump the car.

My invention also comprises details of construction, which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a side elevation of one end of the car with my attachment. Fig. 2 is a transverse section taken through  $x x$ , Fig. 1. Fig. 3 is a transverse section showing the gate-latching devices. Fig. 4 is a bottom view showing the position of the spiral channels and connections. Figs. 5, 6, and 7 are views of the air-transferring valve and connections between the pump and the cylinders. Fig. 8 is a diagrammatic view showing different positions of valve-actuating lever. Fig. 9 is a section showing bearings for roller 10.

It is the object of my invention to enable

the engineer of a train of dumping-cars to tilt the cars and discharge the load and to again place them in the normal position by means of air-pressure under his personal control. The cars may be of any desired length, having either two pairs of wheels or double trucks beneath them, according to the size. For economy it is preferable to use long cars. If short cars are used, a single dumping device may be employed. With the longer cars it is preferable to use two of these devices, one at each end of the car.

As here shown, A represents the wheels, upon which the car is carried, and B is a stout frame extending from end to end of the car, serving to support the train air-pipes 3 and 4, which extend through the train with proper couplings between the cars. I have here shown these pipes arranged upon the right and left for convenience, and these pipes are connected with opposite ends of cylinders 5, fixed beneath the longitudinal body of the car and having pistons 6 movable within them. On each car these pistons are mounted upon piston-rods 7, which extend through the cylinder-heads and are connected with slides, as at 8. These slides travel upon guides mounted upon the frame-timbers, as shown at 9, and thus compel the slides and piston-rods to travel in straight lines when the piston is moved. These slides carry rollers 10, journaled upon stout vertical pins, and for the purpose of reducing friction they may be mounted upon antifrictional bearings, as shown at 11. These rollers travel in spiral grooves or channels 12, which are in the form of cylindrical segments. The grooves or channels may be supported by stout arms fixed to the bottom of the tilting portion 13 of the car-body; but a convenient way is to fix or form the channels upon cylindrical segments 14, so that the spirals extend in diagonal curved lines around the segments. These segments have their centers in the line of center of oscillation of the car-body 13, and they are suitably supported on their lines of oscillation by journal-boxes, as at 15. The spiral grooves are preferably made with an approximately straight connecting portion at the center, as shown at 16, the object being to have the actuating-rollers



10 stand between the comparatively straight sides of the groove or channel when the car-body is in its normally horizontal position and to thus assist in keeping it in its position with as little other aid as possible.

The operation will then be as follows: Air under pressure is admitted to both ends of the cylinders, which are thus charged with any desired pressure, as sixty or one hundred pounds, and being evenly balanced the pressure upon each side of the piston, in conjunction with the straight portion between the ends of the spiral channel, will serve to maintain the car in position without any other locks. When it is desired to dump the car, by means of a valve under the control of the engineer, to be hereinafter described, air is transferred from one side of the piston to the other, the increase in pressure being effected by means of a suitable pump, and this forces the piston toward the side from which the air is being moved. This causes the slide 8 to travel upon its fixed guides 9, and the roller 10 moving in the channel will as soon as it enters the spiral portion compel the cylindrical segment to turn upon its bearings and carry with it the car-body to which it is secured, thus tilting the latter to such an angle as to allow the contents to be discharged when the gate on the discharge side is opened. After the discharge has been effected air is pumped back again to the opposite side with sufficient increased pressure to force the piston back to the center of the cylinder, and the roller 10 partaking of this movement will follow the spiral groove 12 until the car has been returned to its normal position. These operations are effected by means of a pump 17, having a plunger working therein and operated by a suitable engine or mechanism under the control of the engineer. This pump connects with the train-pipes 3 and 4, before described, by passages, which are controlled by a valve or cock which is turnable, so as to connect both train-pipes with the pump to allow them to be simultaneously charged with air to the required pressure, or after being thus charged the valve may be so moved as to allow the pump when working to withdraw the air from one train-pipe and force it into the other, thus increasing the pressure upon one side of the pistons 6 and correspondingly decreasing it upon the other side. By moving the valve to still another position all communication between the pump and the train-pipes is cut off, and the pressure being then equal upon each side of the piston 6 they will be locked in their central position, as previously described. Various forms of valves may be employed for this purpose. I have here shown the valve in the form of a plug-cock 18, having passages through it in one direction, as at 19, which connect the pump 17 with both train-pipes 3 and 4, so that air can then be pumped into both pipes. A suitable check-valve, as at 20, prevents the return of the air. The train-pipe and the

cylinders being thus charged, by turning the cock around in the position shown in Fig. 7 all communication between the train-pipes and with the pump will be cut off. By turning the cock one-quarter of a revolution in one direction from its locked position it will bring the passages 21 and 22 into open communication with the train-pipes 3 and 4 and also into communication with the pump-cylinder 17. These passages 21 and 22 are provided with valves 23 and 24, which open in opposite directions, so that when the cock is in this position one valve will open inwardly to one of the train-pipes, as shown in Fig. 6, and the other will open into the pump. Thus when the pump is in motion air will be drawn from the train-pipe, as 4 in Fig. 6, and transferred into the train-pipe 3, thus charging the end of the car-cylinders with which the train-pipe 3 is connected and reducing the pressure in the opposite ends of said cylinders with which train-pipe 4 is connected. This moves the slide 8, and with it the roller 10, of all the cars, and they will all be tilted simultaneously and their contents discharged. If the dumping is to take place to the opposite side, the cock is turned to a position opposite to that shown in Fig. 6, in which the valve 21 will close toward its pipe 3 and the valve 22 will open toward its pipe 4. The movement of the pump will then reverse the movement of the air through the train-pipe and cylinders, moving the slide 8 and rollers 10 in the opposite direction, and following the spiral it will cause the car to dump to the opposite side. Thus the load can be discharged to either side by the simple movement of the valve or cock 18.

In order to automatically open or close the gates 25 upon opposite sides of the car, I have shown these gates as hinged at 26 on a line with the top of the car and nearer to the center than the bottom portion of the gates. The object of this is to insure the gate which has been opened by the tilting of the car being closed in time for the locking mechanism to act upon it before the car-body has returned to a horizontal position. The catches 27 on the gates project below the lower edges of the doors and are engaged by latches 28, which are fulcrumed to the bottom of the car, as at 29, and the opposite projecting ends of these latches are connected by rods or links 30 with the ends of lever-arms 31, which are fulcrumed, as shown at 32. The lower ends of these arms interior to the fulcrums 32 are curved toward the center.

33 represents rollers so fulcrumed with relation to the arms 31 that when the car is in its horizontal position the inner ends of the arms 31 will contact with the rollers 33, so as to keep the upper ends of the arms pressed outward, and through the connecting-rods 30 the latches 28 will be held in engagement with the catches 27 of the doors to prevent them being opened. As soon as the car-body commences to tilt the levers 31 will move



along the rollers 33 until the fulcrum-points 32 have passed the rollers. Then the pressure of the rollers upon the outer ends of the lever-arms will force them toward the center, pulling upon the rods 30 and the connected ends of the latches 28, thus disengaging the outer ends of the latches from the catches 27 of the gates on the car, so that the latter will swing open to discharge the load. No attention to these devices is necessary, as they will operate automatically by the tilting of the car-bodies. When several latches are used on each door, they may be connected with the one provided with the actuating mechanism by extending the fulcrum-shaft 29. The cylindrical segments 14, which carry the spiral grooves or channels 12, may also serve to contain ballast which will partially counterbalance the weight of the upper portion of the car-body and make it easier to turn. When the valve or cock is in position, (shown in Fig. 5,) it provides an open communication between the two train-pipes and between opposite ends of the cylinder, so that there will be a free movement of air, and this allows the car-body to be returned to its normal position by the weighted segments after the load has been discharged.

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

1. A car-body pivoted and tiltable from side to side upon its truck or wheeled frames, longitudinally-disposed spiral channels fixed to the car-body and having the same center of motion, slides and guides upon which said slides are movable longitudinally with relation to the spiral grooves, rollers carried by the slides adapted to travel in the grooves and means for moving the slides and rollers longitudinally to move the spirals and tilt the car-body.

2. A car-body pivoted and turnable upon longitudinally-disposed bearings, spirally-grooved cylindrical segments fixed to the car-body having the same center of motion, rollers fitted to travel in the spiral grooves, slides upon which the rollers are carried, and guides located upon the frame-timbers of the car upon which the slides are movable in a straight line whereby motion is transmitted through the spirals to tilt the car-body, mechanism connected with the slides whereby the latter may be reciprocated in either direction.

3. A longitudinally-pivoted tiltable car-body, a spirally-grooved cylindrical segment fixed thereto having the same center of oscillation, said spiral groove having an approximately straight portion central between its ends, a roller adapted to travel in the groove and to act as a lock when standing in the straight portion thereof, a slide movable upon longitudinally-disposed guides beneath the segment and upon which slide the roller is carried, and mechanism by which the slide and roller may be moved in either direction

from the central position whereby the car may be tilted and dumped to either side.

4. A car-body longitudinally pivoted and tiltable from side to side, a cylindrical segment fixed and turnable therewith and having a spirally-disposed groove or channel on its curved surface, a roller adapted to travel in said channel, a slide and fixed guides on the truck or frame timbers of the car upon which slide the roller is carried, a cylinder having a piston movable therein and piston-rod connecting with the slide, means for supplying air under pressure upon opposite sides of the piston, and means for transferring the air from one side of the piston to the other whereby the latter is moved and motion transmitted to the slide and roller.

5. A longitudinally-pivoted tiltable car-body having a cylindrical and spirally-grooved segment fixed and turnable therewith, a longitudinally-movable slide and guides upon which it travels and connections between the slide and the spiral groove, a cylinder disposed lengthwise of the car having a piston movable therein, a piston-rod connecting with the traveling slide, train air-pipes extending upon either side of the cylinder, one having connection with one end of the cylinder and the other with the other, a pump under control of the engineer and a cock or valve whereby communication may be opened to charge the train-pipes and both ends of the cylinders equally.

6. A longitudinally-pivoted and tiltable car-body, a cylindrical and spirally-grooved segment fixed and turnable therewith, a longitudinally-guided traveling slide and connections whereby motion is transmitted from it to the spirally-grooved segment, a cylinder having a piston movable therein, a piston-rod connecting with the traveling slide, a pump under the control of the engineer, passages and train-pipes extending upon either side of the cylinder, one of said pipes connecting with one end of each cylinder, and the other with the opposite end, passages connecting the pump with both of said pipes whereby the pipes and cylinders may be charged with air, a valve or cock having ports whereby communication may be established between the train-pipes and the cylinder and valves whereby the air may be drawn from one train-pipe and forced into the other to move the pistons in the car-cylinders in either direction.

7. A longitudinally-pivoted and tiltable car-body, a spirally-channeled cylindrical segment fixed and turnable therewith, a longitudinally-guided and movable slide and connections between said slide and the spiral groove and mechanism whereby the slide is moved to turn the cylinder and tilt the car, said segment being adapted to contain ballast to counterbalance the weight of the car.

8. A longitudinally-journaled and tiltable car-body, a cylindrical spirally-grooved segment fixed and turnable therewith, a longi-



itudinally-movable slide and connections between it and the spiral groove whereby the cylinder is turned and the car-body tilted, swinging gates hinged at the upper part of  
5 the sides of the car-body having catches fixed thereto, latches fulcrumed to the sides of the car-body to engage said catches, fulcrumed levers and connecting-rods by which the latches are moved in unison with the levers,  
10 and stationary journaled rollers over which the fulcrumed levers pass when the car-body

is tilted whereby the latches are caused to engage and lock the gates or to disengage and allow the gates to open when the car-body is tilted. 15

In witness whereof I have hereunto set my hand.

EGBERT D. HAVEN.

Witnesses:

S. H. NOURSE,  
JESSIE C. BRODIE.