

M. H. TREADWELL & C. P. ASTROM.

DUMPING CAR.

APPLICATION FILED MAR. 4, 1908.

903,245.

Patented Nov. 10, 1908.

2 SHEETS—SHEET 1.

Fig. 1

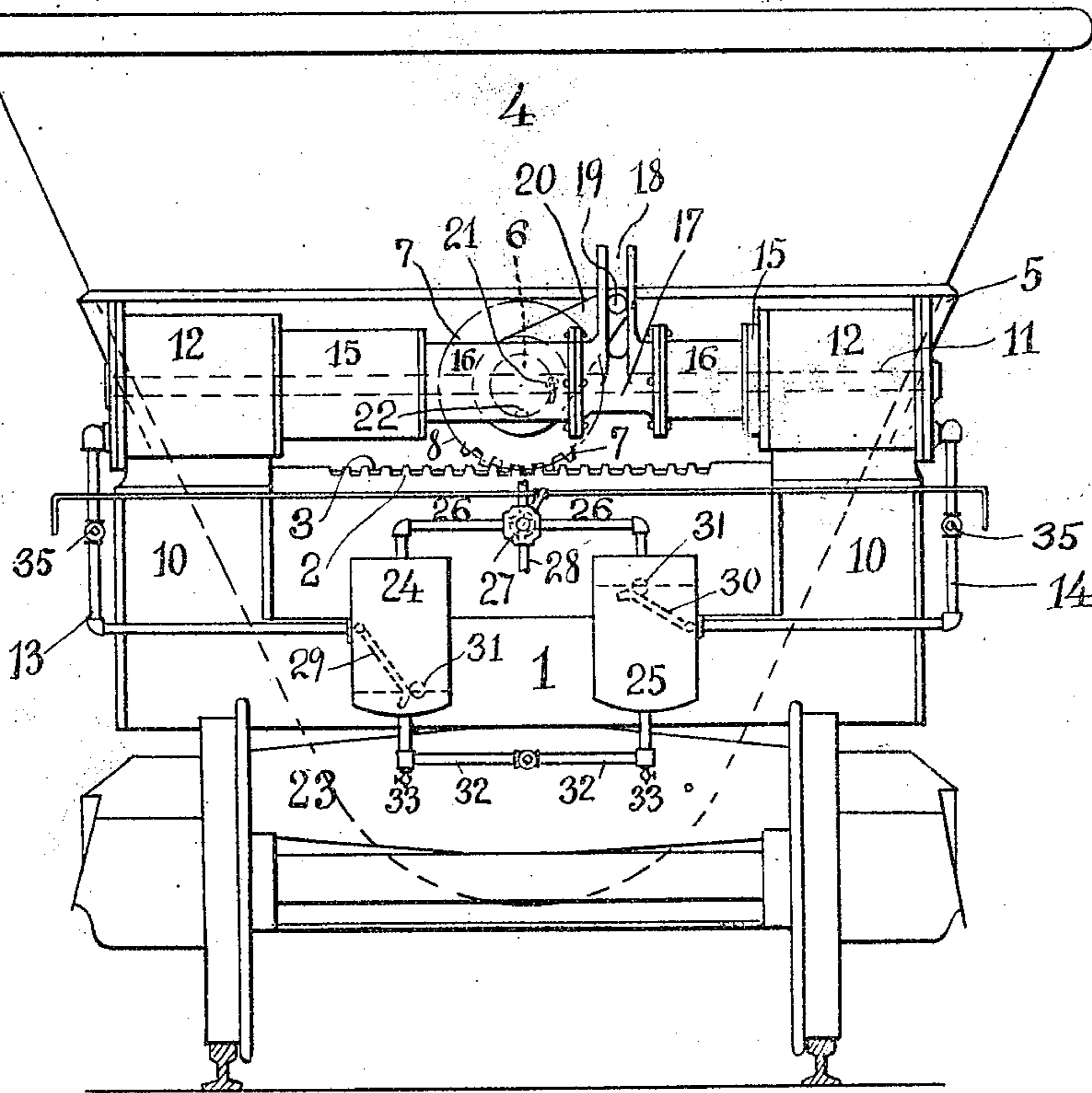
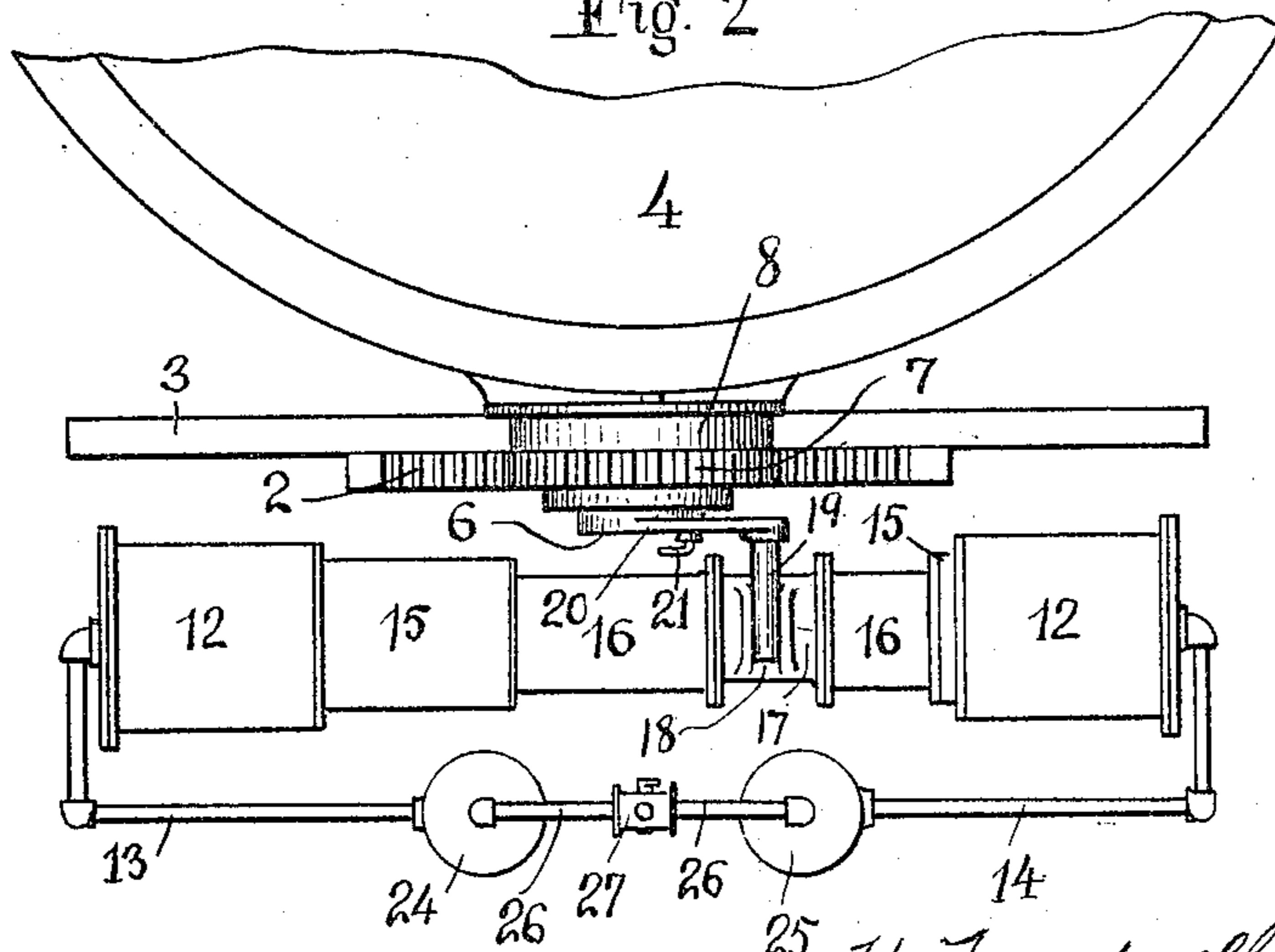


Fig. 2



Witnesses  
Geo. Hoffman  
Geo. W. Kern

Munson H. Treadwell  
and Carl P. Astrom Inventors  
By his Attorneys  
Edwards, Sager & Wooster.

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Fig. 3

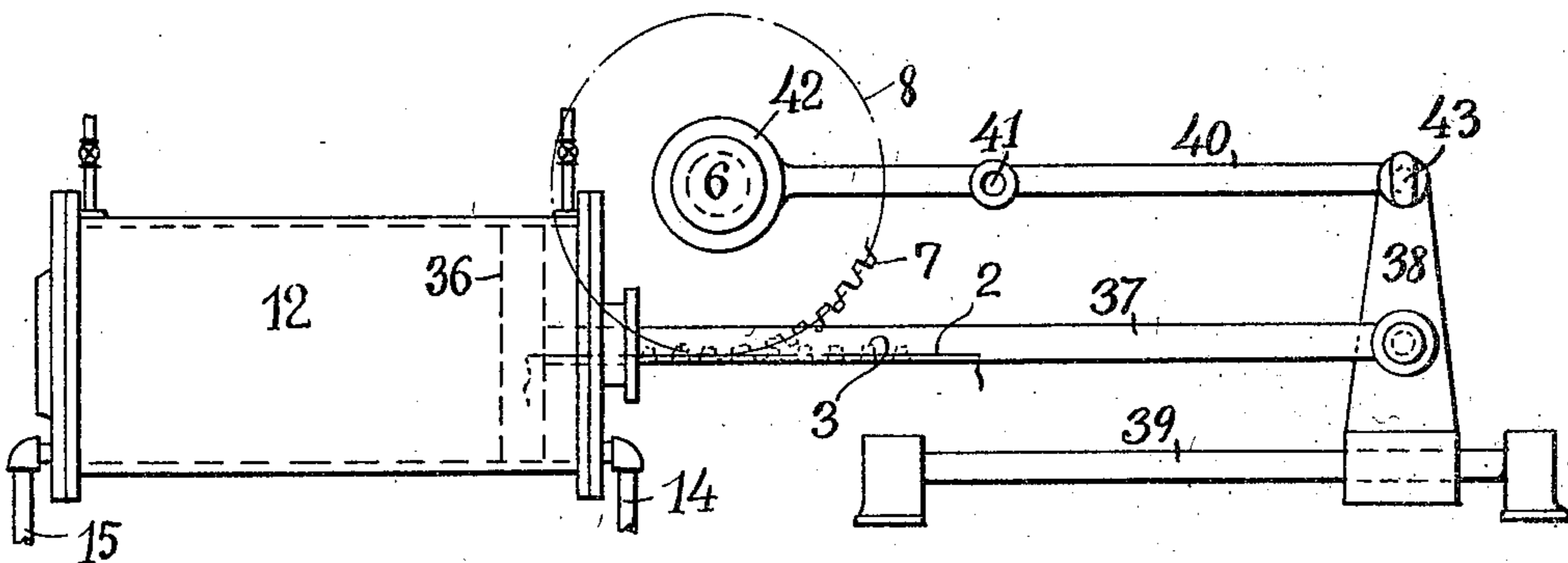


Fig. 4

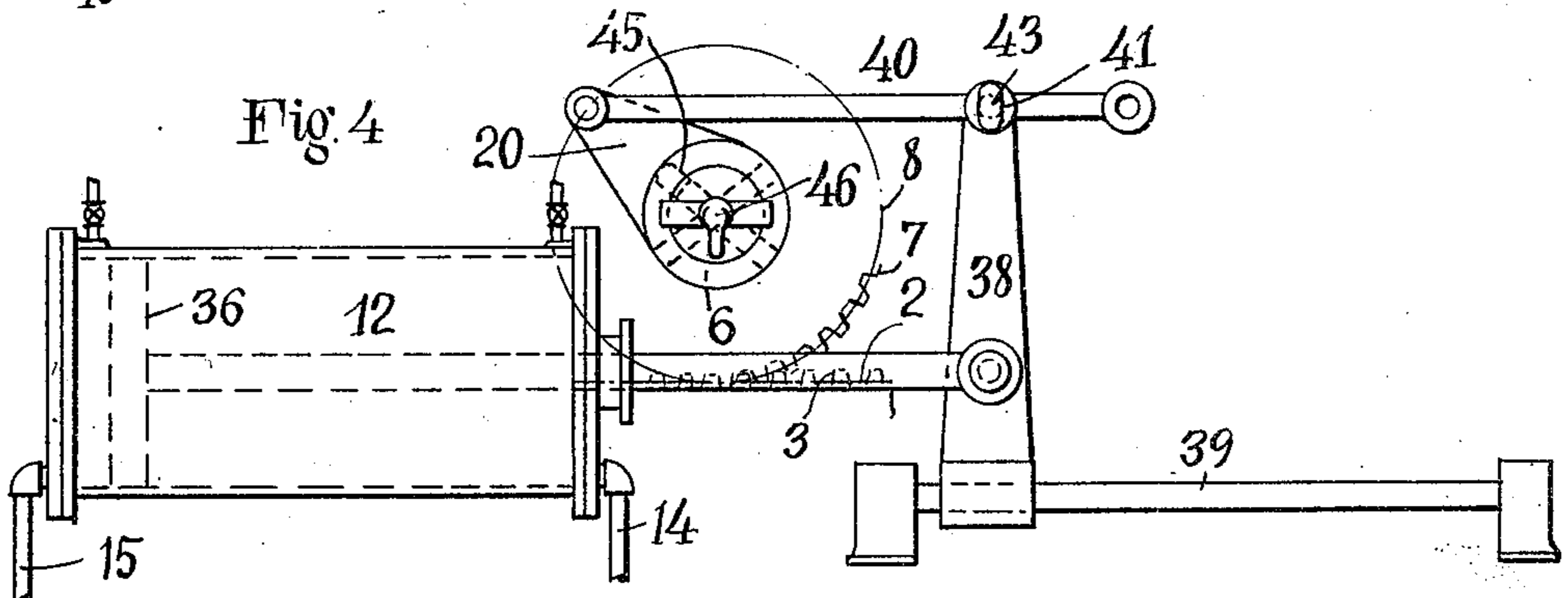


Fig. 5

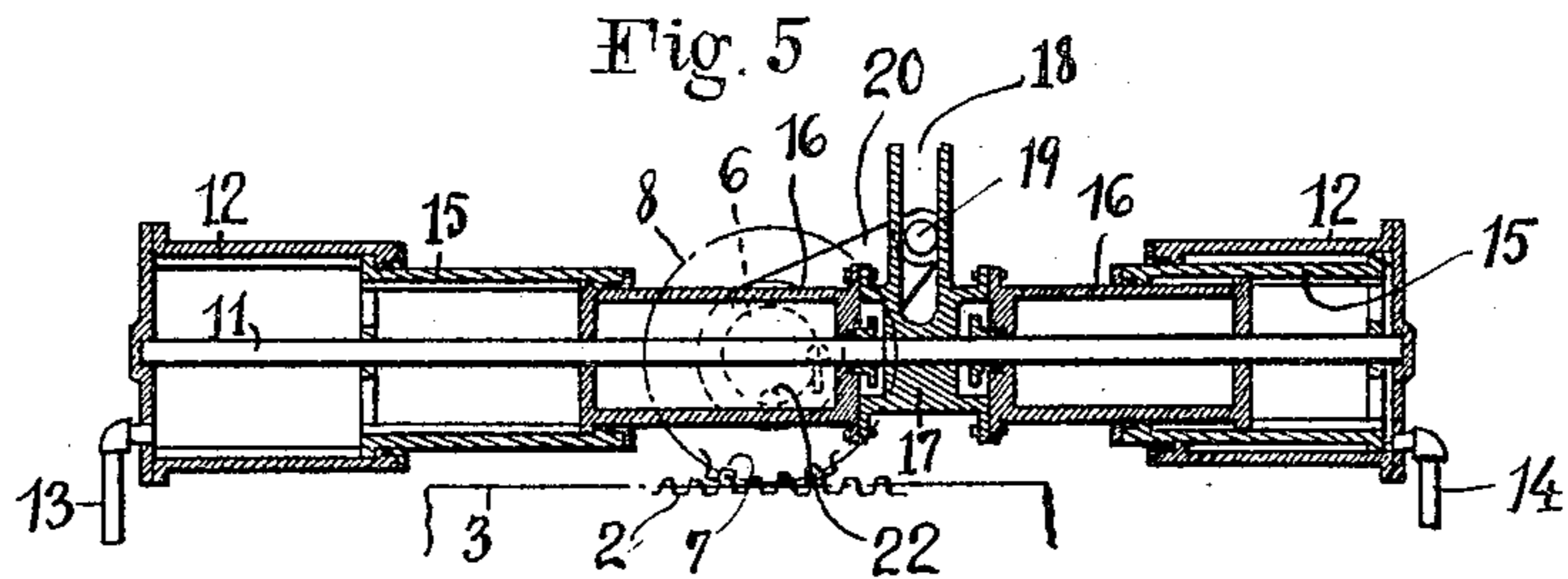
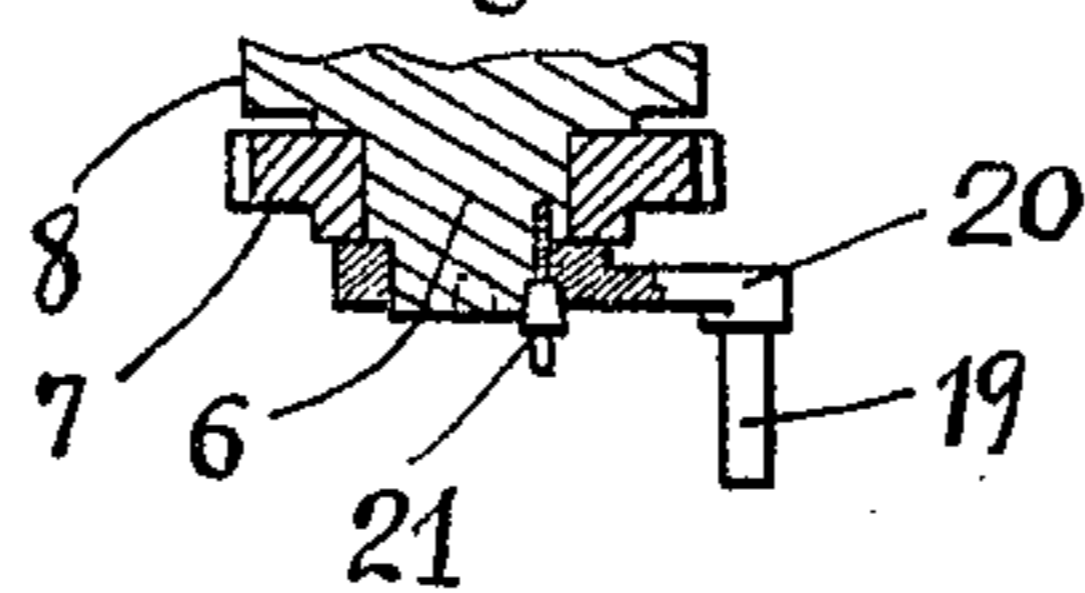


Fig. 6



Witnesses  
Geo. Hoffman  
Geo. Kern

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By his Attorneys  
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# UNITED STATES PATENT OFFICE.

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## DUMPING-CAR.

No. 903,245.

Specification of Letters Patent.

Patented Nov. 10, 1908.

Application filed March 4, 1908. Serial No. 419,112.

*To all whom it may concern:*

Be it known that we, MUNSON H. TREADWELL and CARL P. ASTROM, citizens of the United States, residing at New York, in the county of New York and State of New York, and East Orange, in the county of Essex and State of New Jersey, respectively, 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 has particular reference to reversible actuating mechanism for cinder cars or the like, wherein a tilting and laterally movable car body is mounted to be dumped in opposite directions from a central upright position.

More particularly, the invention comprises a power actuated trunnion-supported dumping car wherein the motor may be disconnected from the car body for the purpose of reversing the operation, that is to say, when it is desired to dump the car body on one side instead of on the other. According to this invention, there are preferably provided between the motor and the trunnion of the car body adjustable crank connections adjusted from one position to another according to the side on which the car body is to be operated, whereby the motor has a greater travel than the car body and the power is applied at greater leverage.

A further feature of the invention comprises a combined hydro-pneumatic apparatus for supplying the actuating pressure, whereby the motor is actually moved by hydraulic pressure, but which hydraulic pressure is supplied by pneumatic pressure, such for instance as air or steam. The advantage of such a system of actuation is that better control of the movement of the car body can be attained with a hydraulic motor than where the motor is actuated directly by the steam or air, it being possible with such a motor to control the speed by regulating the exhaust discharge while pressure is being applied on the supply side to move the car body. By the hydro-pneumatic system herein described, steam or air pressure is caused to act upon a body of oil or other liquid in a suitable reservoir carried on the car, which liquid operates the motor on one

side to move the car body, and its escape from the other side controls the movement of the car body during its travel.

A still further feature of improvement resides in the provision of an actuating cylinder such that while one side is receiving hydraulic pressure to move the car body, the other side is acting as a dash-pot controlling the discharge of its contained liquid to regulate the movement of the car body, and as herein specifically described, the power cylinder is composed of telescopic sections.

The invention will be more fully understood in connection with the description of the accompanying drawings, wherein—

Figure 1 is an elevation of one end; Fig. 2 is a detail plan view; Figs. 3 and 4 are detail views of modified actuating connections, and Figs. 5 and 6 are details of the telescopic actuating cylinder.

The car frame comprises the usual under frame carried by end bolsters 1, the under frame not being herein shown, and it is supported at the ends on trucks 23, which will not be particularly described as these may be arranged according to particular necessities. The bolsters 1 each have a stationary rack 2 and a track 3, and the car body 4 is preferably secured to a bail 5 which is provided with trunnions 6 at diametrical points. Rigidly secured to the trunnions 6 are gears 7 adapted to mesh with the racks 2 (at each end of the car body) and rollers 8 which roll on the tracks 3 the parts thus far described being of a well known construction.

In order to actuate the car body, there is mounted between the upright ends 10 of the bolster 1 a fixed plunger rod or guide rod 11, and at each end of this rod is a fixed cylinder 12, having respectively pipes 13, 14 for admitting and exhausting the motor fluid therefrom. Telescoping within the cylinders 12 are cylinders 15, and similarly telescoping within the cylinders 15 are cylinders 16, these respective cylinders being suitably packed to prevent leakage. The cylinders 16 are each secured to a cross head 17, with which cross head actuating connection with the end of the trunnion 6 carried by the car body is made. As shown in Fig. 1, the cross head 17 is vertically slotted at 18, and in this slot there is a crank pin 19 carried by a

crank 20, which crank 20 is adjustably secured to the trunnion 6. As herein shown, a removable key 21 is inserted between the trunnion and the crank, the crank having a second hole 22 so that when the key is removed it may be shifted angularly when it is desired to reverse the operation of the car body, as will be more fully explained. By the provision of telescopic cylinders, in combination with the detachable connection permitting shifting of the cylinders independently of the car body for reversing the operation of the car-body, the cylinders come well within the lines of the car, forming a more compact mechanism with better distribution of weights, and also permitting a greater movement of the motor, with consequently less expenditure of power to do the same amount of work.

In order to operate the motor by hydraulic pressure, a pair of tanks 24, 25 are mounted on the car body, each of these tanks being of a capacity to somewhat exceed that of the total capacity of the telescopic cylinders 12, 15, 16. The pipe 13 is connected with tank 24 and the pipe 14 with tank 25, and these tanks are each provided with to-and-from pipes 26 which are controlled by a valve 27, the valve 27 being a four-way valve which admits air or steam pressure from pipe 28 to one of the tanks while opening the other to the exhaust.

As will be seen from Fig. 1, the pipes 13 and 14 lead respectively into the tanks 24, 25 about mid-way of their height, and within each tank are extensions 29, 30 of the pipes 13, 14, respectively hinged thereto and carrying floats 31, the purpose of these floats being to move the pipes 29, 30 as the fluid level in the tanks varies. It is contemplated that these tanks will be filled with oil, which will not freeze in cold weather, and to apply pressure to the oil by means of steam or air through the pipes 26, and valve 27. As the steam condenses, the water thus formed will sink to the bottom of the oil so that by throwing the nozzles 29, 30 it is insured that oil and not water will always be transmitted to the cylinders.

In order to draw off the water each tank is provided with a drain pipe 32 and pet cocks 33, as shown. If air should be used instead of steam the floats and hinge joints can be eliminated. If, by reason of leakage the quantity of liquid in one tank should be insufficient to fill the cylinder, liquid can be drawn from the other through pipe 32, which has a cock for this purpose.

As shown in Fig. 1, the parts are in position to dump the car body to the left, and the valve 27 will be thrown so as to connect the tank 25 with the steam pressure, which will force the oil therein through pipes 30 and 14 into the right hand set of cylinders

on the crank pin 19, crank 20 and trunnion 21 to tilt the car body to the left. At the same time, the valve 27 opens the top of tank 24 through pipe 26 to the exhaust, and the oil which was already in the left hand set of cylinders is forced out through pipe 13 into tank 24, rising therein and forcing the contained air out through pipe 26.

It will readily be seen that the speed of the car body can be controlled as desired by restricting the discharge of the oil from the left hand cylinders through pipe 13, either by providing therein a hand valve as 35, or an automatic check valve which will open freely to admit oil to the cylinders for actuating pressure and partially closed when the oil is to be discharged for checking pressure, thus controlling the movement and actuating the car body by a single device.

In Fig. 3, a stationary cylinder is shown in which the piston 36 is connected to a movable piston rod 37, which latter is connected with the cross head 38 sliding on a pair of fixed guides 39 carried by one of the end bolsters. The cross head 38 is forked at its upper end and between the parts is connected a link 40 having a hole 41 with a strap 42 which engages the trunnion 6. In the position shown, the parts are in position to dump to the left when pressure is admitted through the pipe 14 against the piston 36, the cross head and links moving likewise to the left. In case it is desired to dump the car to the right, the pin 43 connecting the cross head 38 and the link 40 will be disconnected and the cross head and piston run to the left until the pin 43 can be inserted through the hole 41 of the link 40. This brings the piston 36 at the left end of the stationary cylinder 12 and upon admitting pressure the piston will move to the right in the same manner as before described. It will be understood that pipes 13 and 14 will be connected to the tanks 24, 25 in the same manner as before described, or they may be connected to some other source of actuating power, as is well understood. In this case also, one side supplies power, while the other side controls the movement, or separate fixed cylinders and two pistons on a common movable rod could be used, acting similarly to Fig. 1. By this link construction, the power to tilt the car body is exerted directly across the axis of the trunnion 6 and by reason of the forked cross head 38 and the pin 43 there is less tendency to bending of the pin or shearing it off.

In Fig. 4, the cross head 38 is connected with the trunnion 6 by means of an adjustable crank 20 similar to that before described, the crank being connected with the forked cross head 38 by means of a link 40, as before described. Instead of the key 21 for locking the crank the crank is provided with a lug

45, and the end of the trunnion is provided with two notches set at an angular distance apart approximately equal to the tilting angle of the car body, and a clamp 46 threaded into the trunnion locks the crank in one or the other of the notches according to the direction in which the car body is to be tilted. In this form, as well as in the other forms before described, it will be advantageous to use the hydro-pneumatic actuating system such as shown in Fig. 1 though it is not essential to the carrying out of the features of the invention shown in Figs. 3 and 4 that such specific system be used, as various forms of fluid pressure arrangements for actuating the piston and the cylinder, as the case may be, may be provided. In the constructions showing a crank connection between the motor and the car body, it will be seen that the motor has a greater travel than the car body, and this is advantageous both because the applied power can thus act through a greater distance, and also the checking force on the opposite side of the cylinder, whereby better control will be secured, with less strain on the parts.

From the foregoing description it will be seen that a dump car actuating mechanism is provided by this invention which will be simple in operation and not liable to breakage or disarrangement. Furthermore, by the use of the hydro-pneumatic actuating system herein described the movement of the car body can be effectually controlled and the actuating pressure supplied by steam or compressed air while at the same time a fluid check is provided.

In case oil is used for transmitting the hydraulic pressure, the arrangement herein described for preventing the admission of water to the power cylinder is advantageous, in that it is insured that the water of condensation from the steam will be separated and not liable to enter the cylinder. Where the water is liable to freeze it is permitted to be drawn off when a sufficient quantity has accumulated.

Modifications and changes in the specific construction herein described can be made without departing from the scope of the invention, as it will be seen that various forms of apparatus can be devised which will embody the principles of the invention.

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

1. The combination with a dumping car body, and an actuating motor, of means for actuating said motor by hydraulic pressure, and means for applying fluid pressure to the actuating fluid.

2. The combination with a dumping car body, and an actuating cylinder and piston having liquid on both sides, of means for

side to actuate the car body, and for controlling the escape of liquid on the other side to regulate the speed.

3. The combination with a dumping car body, and an actuating cylinder and piston having liquid on both sides, of means for applying fluid pressure to the liquid on one side to actuate the car body, and for controlling the escape of liquid on the other side to regulate the speed, and a plurality of liquid reservoirs, one for supplying actuating liquid under pressure, and the other for receiving the exhaust liquid.

4. The combination with a dumping car body, and an actuating cylinder and piston having liquid on both sides of means for applying fluid pressure to the liquid on one side to actuate the car body, and for controlling the escape of liquid on the other side to regulate the speed, and a plurality of liquid reservoirs, one for supplying actuating liquid under pressure, and the other for receiving the exhaust liquid, and a controlling valve adapted to connect one reservoir to a source of fluid pressure, and the discharge reservoir to exhaust.

5. The combination with a movable car body, an actuating cylinder and piston, means whereby one side of the cylinder acts as a hydraulic check cylinder while the other side acts as a hydraulic power cylinder, a plurality of liquid containing tanks, and means for admitting fluid pressure to one and opening the other to exhaust to actuate the car body.

6. The combination with a tilting and bodily movable car body, and a telescopic actuating cylinder, of means whereby one side of the cylinder acts as a hydraulic checking cylinder while the other side acts as a hydraulic power cylinder.

7. The combination with a dumping car body, and an actuating cylinder, of means whereby one side of the cylinder acts as a hydraulic checking cylinder while the other side acts as a hydraulic power cylinder.

8. The combination with a tilting and bodily movable car body, and a duplex actuating cylinder, of means whereby one side of the cylinder acts as a hydraulic checking cylinder while the other side acts as a hydraulic power cylinder.

9. The combination with a tilting and bodily movable car body movable in opposite directions from a central upright position, of a duplex telescopic actuating cylinder, and a connection between the cylinder and the car body adjustable to permit movement in one or the other direction from the center.

10. The combination with a car body movable in opposite directions from a central position, and an actuating motor, of an angularly adjustable crank pin carried by the car body and movable relatively thereto to permit operation in one or the other direction.

11. The combination with a tilting and bodily movable car body movable in opposite directions from a central position, and a telescopic actuating motor, of an angularly adjustable crank pin carried by the car body and movable relatively thereto to permit operation in one or the other direction.

12. The combination with a tilting and bodily movable car body movable in opposite directions from a central position, and an actuating motor, of an angularly adjustable crank pin carried by the car body and movable relatively thereto to permit operation in one or the other direction, and hydraulic means for actuating said car body.

13. The combination with a tilting and bodily movable car body movable in opposite directions from a central position, and a duplex telescopic actuating cylinder, of means for disconnecting the cylinder from the car body to permit independent movement to a predetermined position, and for reconnecting it, when the operation is to be reversed.

14. The combination with a dumping car, and an oil hydraulic actuating cylinder, of means for applying steam pressure to the oil, an oil reservoir connected with the cylinder, and means for preventing the water of condensation from the steam from being admitted to the power cylinder.

15. The combination with a dumping car body, and an actuating cylinder and piston having liquid on both sides, of means for applying fluid pressure to the liquid on one side to actuate the car body, and for controlling the escape of liquid on the other side to regulate the speed, and an adjustable connection between the movable part and the car body to permit reversing the operation of the car body.

16. The combination with a dumping car, of a telescopic actuating cylinder comprising a plurality of sections, and a cross head having actuating connection with the car body.

17. The combination with a dumping car,

of a telescopic actuating cylinder comprising a plurality of sections, and a cross head having actuating connection with the car body, said connections being reversible to permit reversal of the operation of the car body.

18. The combination with a dumping car, of a telescopic actuating cylinder and a telescopic checking cylinder having a common connection with the car body.

19. The combination with a dumping car, of a telescopic actuating cylinder and a telescopic checking cylinder having a common connection with the car body, and means whereby the relation is reversed upon reversing the direction of movement of the car body.

20. The combination with a movable car body, of an actuating motor and piston having a greater movement than the car body, and means whereby one side of the motor acts as a check while power is applied to the other side.

21. The combination with a movable car body, of an actuating motor and piston having a greater movement than the car body, means whereby one side of the motor acts as a check while power is applied to the other side, and means for changing the actuating connection whereby to reverse the operation of the car body.

22. The combination with a movable car body, of a hydraulic actuating motor and piston having liquid on both sides and having a movement greater than that of the car body, and means for applying fluid pressure to the liquid on one side and regulating the discharge of liquid on the other side to actuate the car body and control the movement.

In testimony whereof we affix our signatures, in presence of two witnesses.

MUNSON H. TREADWELL.  
CARL P. ASTROM.

Witnesses:

JULIAN S. WOOSTER,  
GEO. A. HOFFMAN.