

No. 775,153.

PATENTED NOV. 15, 1904.

R. H. STEVENS.
DUMPING APPARATUS.
APPLICATION FILED AUG. 9, 1904.

NO MODEL.

3 SHEETS—SHEET 1.

Fig. 1.

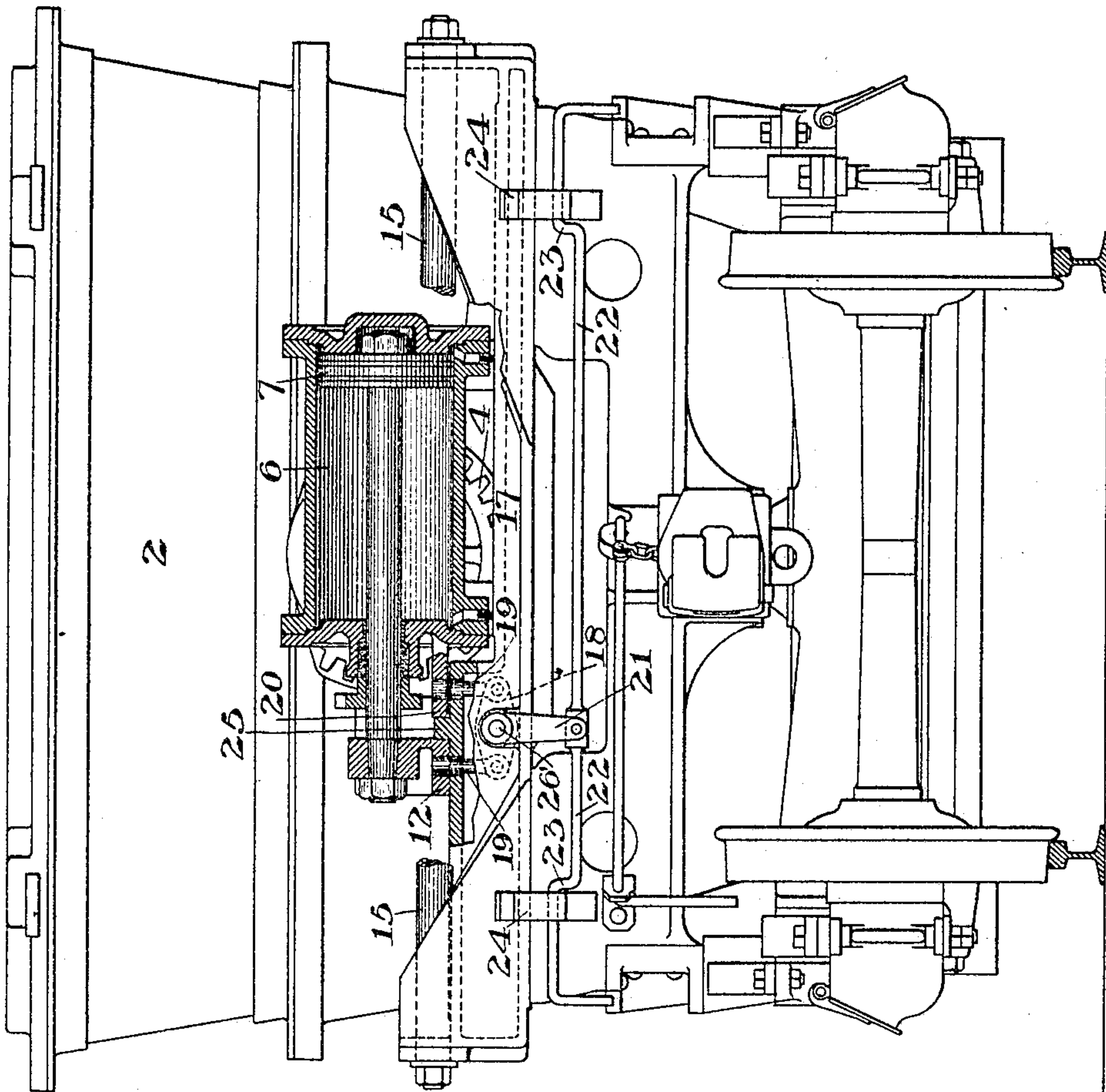
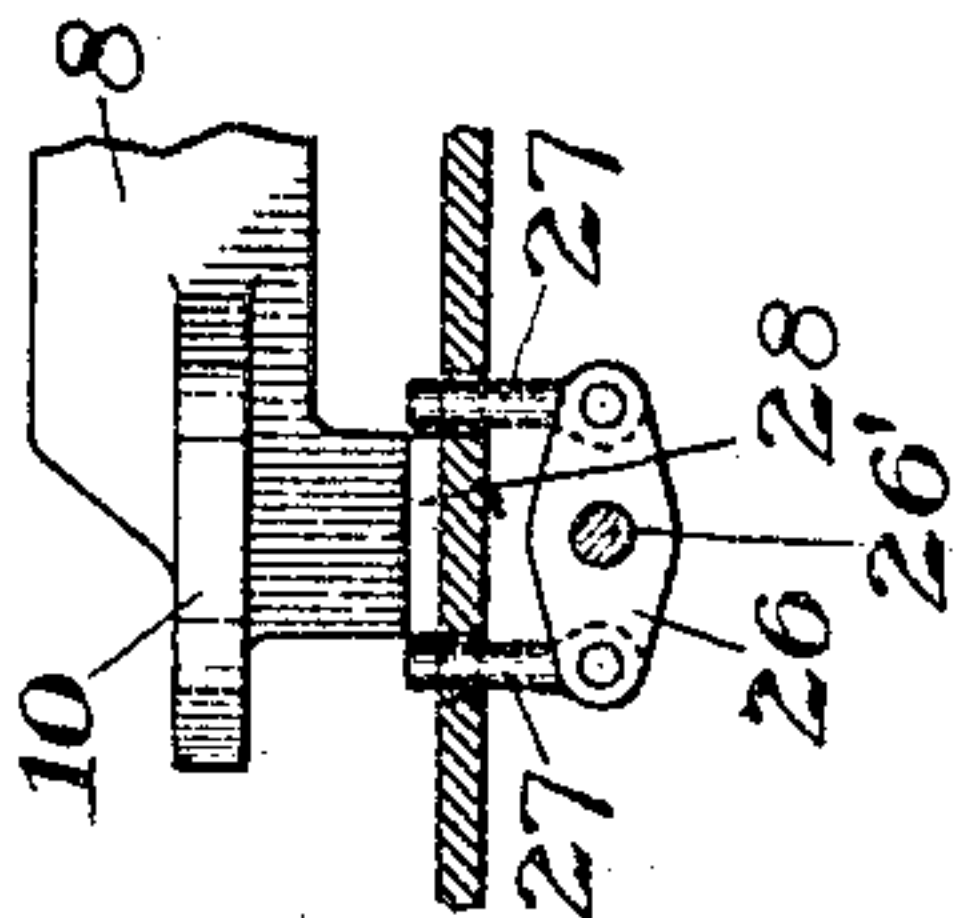


Fig. 4.



WITNESSES

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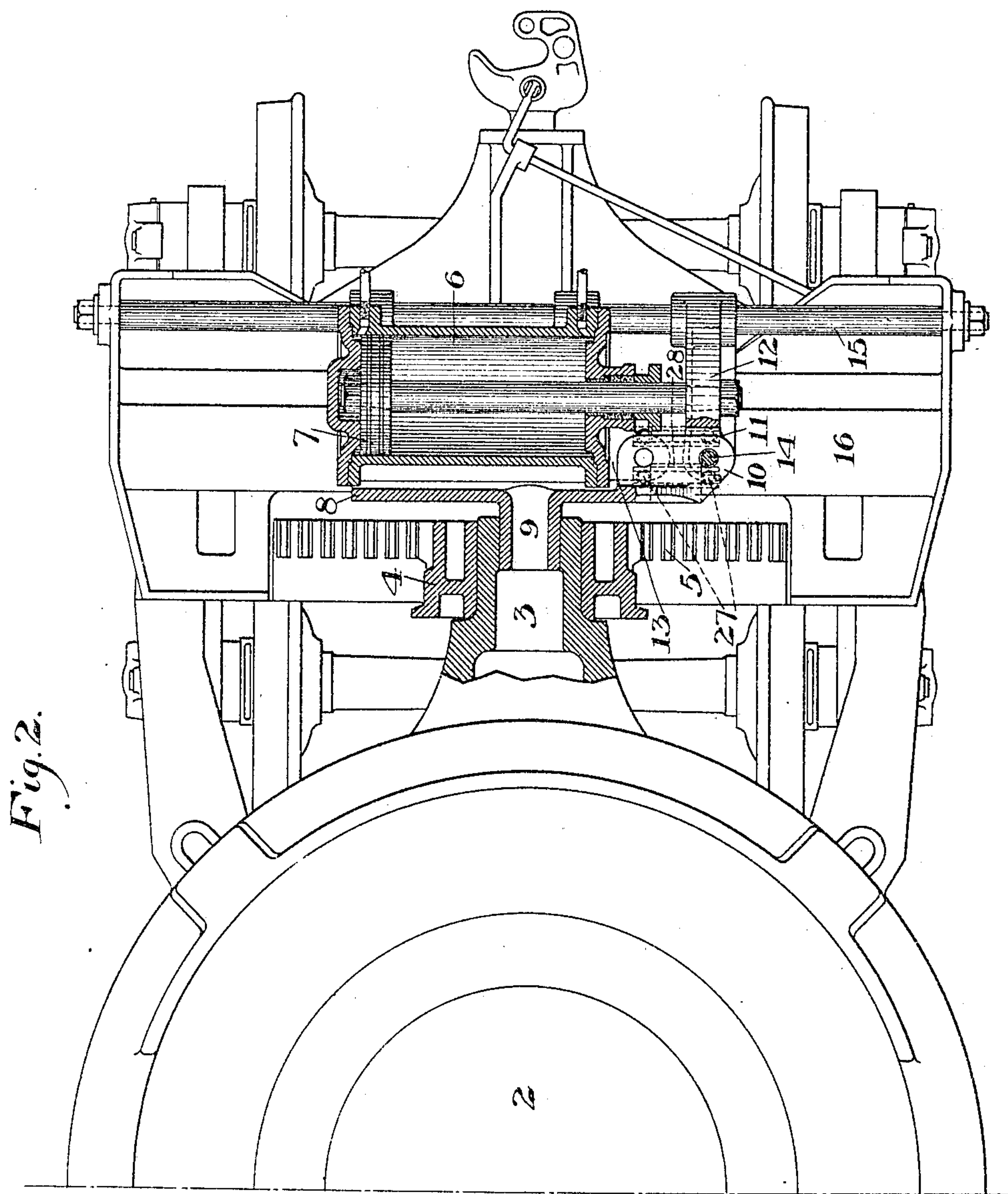
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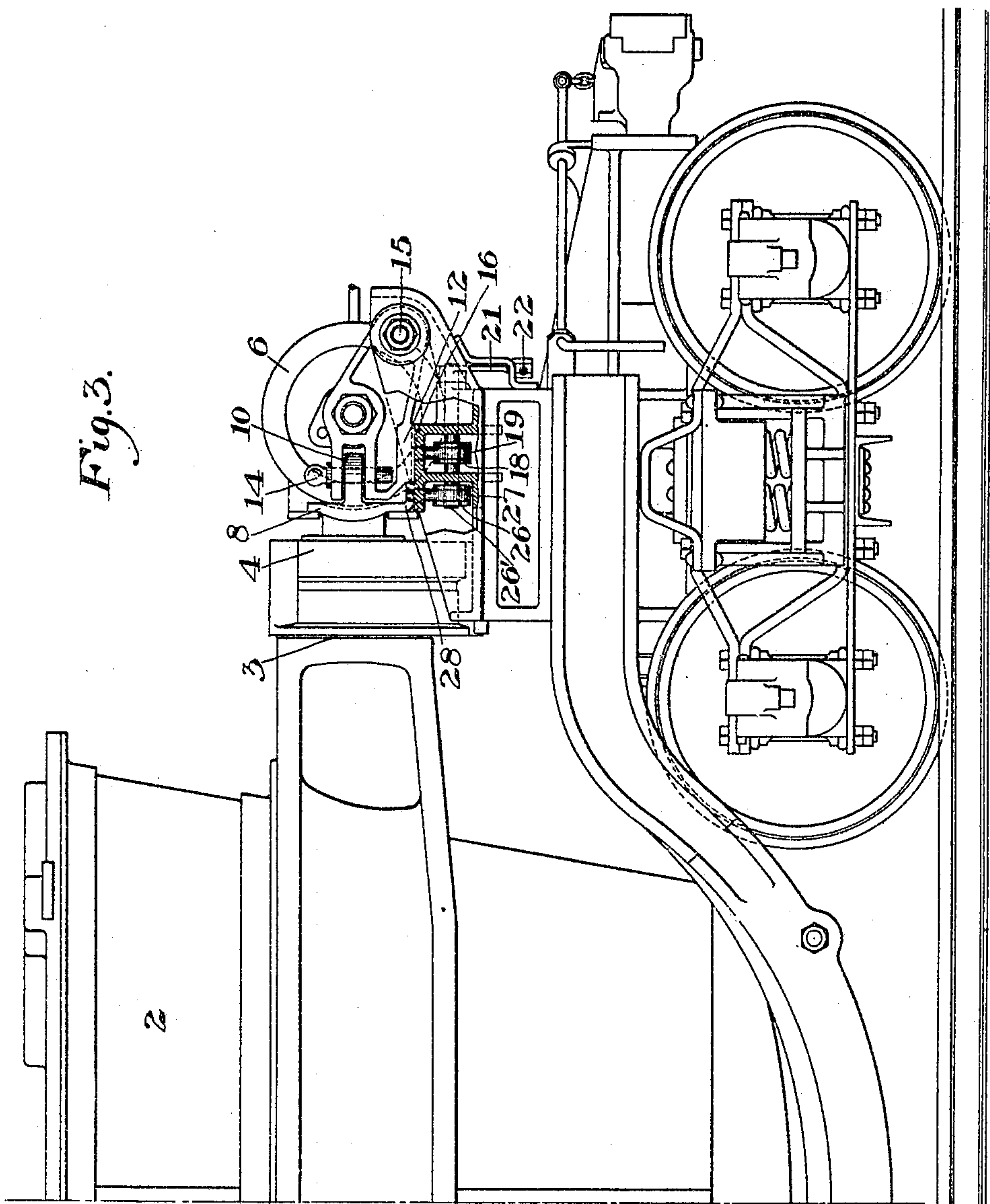
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

RICHARD H. STEVENS, OF MUNHALL, PENNSYLVANIA.

DUMPING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 775,153, dated November 15, 1904.

Application filed August 9, 1904. Serial No. 220,089. (No model.)

To all whom it may concern:

Be it known that I, RICHARD H. STEVENS, of Munhall, Allegheny county, Pennsylvania, have invented a new and useful Dumping Apparatus, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is an end elevation, partly in section, of a ladle-car provided with my dumping apparatus. Fig. 2 is a plan view, partly in section. Fig. 3 is a side elevation of part of the car, and Fig. 4 is a detail view showing means by which the ladle is locked in stationary position.

The purpose of my invention is to provide means by which in a simple and effective manner, without complication of the parts or such arrangement as would be liable to get out of order in the rough service to which ladle-cars are subjected, the ladles can be dumped in either direction and can be locked in stationary position while the car is being carried from place to place. Such ladles are used for transporting molten slag or molten metal, and it is important that the mechanism by which the dumping is effected should be reliable and should possess the qualities mentioned above.

My improved apparatus comprises, in connection with the ladle, a cylinder and piston connected with the ladle-trunnions and adapted to dump the ladle in either direction, these parts being provided with means by which either the cylinder or piston can be connected detachably with the ladle and by which the part not connected with the ladle can be held in stationary position. In this way I may use interchangeably either the piston or the cylinder as the moving element of the motor and the other as the stationary element of the motor, so that by thus changing the relation of the parts motion in either direction to the full extent of the desired stroke may be secured. The connection between the motor and the ladle is effected by an intermediate slide, which is connected with the trunnion of the ladle and is also connected with the movable element of the motor, as above explained.

In the drawings, 2 is the ladle, supported

at its ends on trunnions 3, to which are keyed gear-wheels 4, which mesh with stationary racks 5. The motor by which the ladle is dumped is applied at one end of the car only and consists of a cylinder 6 and a piston 7.

8 is a slide connected at 9 with the trunnion 3 and having a lug 10, which can be connected at 11 to a cross-head 12, which is attached to or forms part of the piston 7, or can be connected to a lug 13, which forms part of or is attached to the cylinder 6, these connections being made detachably by a coupling-pin 14. The cross-head 12 slides on a suitable guide 15 and slideway 16, and the cylinder 6, which is also movable horizontally, is carried by a slideway 17, as shown in Fig. 1.

For the purpose of holding stationary the part of the motor which is to be used as the stationary element thereof I employ holding mechanism, a convenient form of which is shown in Fig. 1 and which comprises a rock-arm 18, having pins 19, which move in opposite directions and are adapted, respectively, to engage the cross-head 12 of the piston and a projection 20 from the cylinder. This rock-arm is operated by a lever 21 and rods 22, provided, preferably, with stop-shoulders 23. A workman standing at either end of the car may lift the rod 22, thus releasing its stop-shoulder 23 from a bracket 24, and then by pulling the rod the pin 19 next to the workman is raised and is caused to engage the cross-head 12 or the cylinder at 20, as the case may be. The arrangement of the stop-shoulders 23 and brackets 24 is such that the rod 22 can only be pulled and cannot be pushed in the opposite direction, and the pulling of the rod at either end of the car will hold the appropriate element of the motor to cause the motor to dump the car at the opposite side from which the workman is standing. Thus the parts being in the position shown in Fig. 1, with the ladle in central horizontal position, if it is desired to dump the ladle to the left the workman standing at the right side of the car, as shown in Fig. 1, pulls the rod 22, which raises the pin 19 into engagement with the lug 20 of the cylinder and holds the cylinder stationary, leaving the piston free to move horizontally and to serve as the movable ele-

ment of the motor. The piston is connected by the coupling-pin 11 to the movable slide 10, as shown in Fig. 2. Then by admitting steam, compressed air, or other fluid to the cylinder by manipulation of the controlling-valve the piston is caused to move toward the left in Fig. 1, carrying with it the slide 10 and through the motion of the slide moving the trunnion 3 and by reason of the engagement of the gear-wheels 4 with the rack causing the ladle to tip as well as to move laterally, and thus to discharge its molten contents. The ladle is then righted by movement of the piston in the reverse direction. The motion of the piston or of the cylinder required to bring the ladle into central position is limited by an intermediate stop 25. (Shown in Fig. 1.)

If it is desired to reverse the direction of dumping of the ladle and to dump it to the right of Fig. 1, the operator shifts the coupling-pin 14, so as to disconnect the lug 10 of the slide 8 from the cross-head 12 and to connect said slide with the lug 13 of the cylinder. Then the operator standing at the left of the car in that figure raises and pulls lengthwise the rod 22, thus lifting the pin 19 into engagement with the cross-head 12 and holding the piston stationary and leaving the cylinder free to serve as the movable element of the motor. When motive fluid is admitted to the cylinder, the piston being held, the cylinder itself moves to the right of Fig. 1, thus through the slide 8 moving the trunnions of the ladle and by reason of the engagement of the gear-wheels 4 and racks 5 causing the ladle to tip. The reverse motion of the cylinder will bring the ladle again to the central position shown in the drawings. Merely shifting the connection of the ladle-trunnions from the cylinder to the piston, or vice versa, and holding the cylinder or piston stationary while the other is free to move will enable the operator to change the direction of dumping of the car without first shifting any of the parts of the motor.

While the ladle-car is being transported from place to place, it is necessary to lock the ladle stationary in its horizontal position in order to prevent it from dumping accidentally. For this purpose I employ a locking device applied to the slide 8, which is connected to and forms part of the ladle-trunnion. This locking device is shown in Fig. 4 and comprises a rock-arm 26, which is preferably applied to the same shaft as that which carries the rock-arm 18 and may be of like construction, having two upwardly-extending pins 27. When this rock-arm is in horizontal position, these pins engage opposite sides of a lug 28, which projects from the slide 8, and thus holds the slide against motion in either direction. If, however, the arm 26 be rocked in either direction, it will withdraw one of the pins 27 downwardly, leaving the slide free to

be moved to that side from which the pin has been drawn. The release of the slide, which will permit the ladle to be dumped, is effected automatically by mounting the rock-arm 26 on the same shaft 26' as that which carries the rock-arm 18—that is to say, the same motion of the shaft which is effected by the operator when he rocks the arm 18 in order to determine the direction of motion of the dumping-motor will also automatically release the slide, so as to leave the ladle free to be moved in the proper direction.

If desired, instead of locking the ladle automatically, as just described, a separate lock applied to the ladle or to the slide may be employed. A feature of safety in connection with this apparatus consists in the use of the stops on the rods 22, which prevent motion of the rods otherwise than in one direction (a pull) toward the operator standing at the side of the car. This prevents accidental dumping of the ladle in the wrong direction, which might result in very serious accident. Thus, if the piston of the motor is connected with the slide 8, so as to provide for the dumping of the car to the left, as shown in Fig. 1, and the operator standing at the left should pull the rod 22, so as to engage the pin 19 with the cross-head of the piston, and thus to set the motor for the dumping of the car in the other direction, the motor nevertheless will not dump the car because the cylinder, which is then the movable element, being unconnected to the slide 8 will move idly on the car without transmitting any motion whatever to the ladle. It is therefore necessary in order to dump the car that the slide 8 should be connected with the proper element of the motor and that the workman should stand at the correspondingly side of the car and pull the rod, in which case the dumping will be effected in the opposite direction. This is a feature of very great practical importance in the operation of the device, rendering it perfectly safe in use.

I claim—

1. A cylinder and piston, and means whereby either the cylinder or piston may be held and the other left free to serve as the moving element of the motor.

2. Means for tipping, comprising a cylinder and piston, and means whereby either the cylinder or piston may be held and the other left free to serve as the moving element of the motor.

3. Means for tipping, comprising a cylinder and piston, means whereby either the cylinder or piston may be held and the other left free to serve as the moving element of the motor, and means for detachably connecting either the cylinder or piston to the object to be tipped.

4. The combination of a tipping ladle, a motor comprising a cylinder and piston, and means for holding either of said parts stationary while the other is left free to move.

5. The combination of a tipping ladle, a motor comprising a cylinder and piston, means for holding either of said parts stationary while the other is left free to move, and an intermediate stop by which the motion of the parts of the motor is limited in central position.

6. The combination of a tipping ladle, a motor comprising a cylinder and piston, means whereby either of said parts may be held and the other left free to move, and means for detachably connecting one or the other of said parts to the ladle.

7. The combination of a tipping ladle, a motor comprising a cylinder and piston, means whereby either of said parts may be held and the other left free to move, and means for detachably connecting one or the other of said parts to the ladle, said means comprising a slide and a detachable coupling between the slide and the piston or cylinder.

8. The combination of a tipping ladle, a motor comprising a cylinder and piston, and means whereby either of said parts may be held stationary and the other left free to move, said means comprising shifting devices extending to opposite sides of the car, the device being adapted to be moved from one side of the car to hold the piston and from the other side of the car to hold the cylinder.

9. The combination of a tipping ladle, a motor comprising a cylinder and piston, means

whereby either of said parts may be held and the other left free to move, and a ladle-locking device connected therewith and adapted to be moved into locking position by the motion of said means which releases the cylinder and piston and to be unlocked by the motion required to hold either the cylinder or piston.

10. The combination of the cylinder and piston, means for holding one of said parts, comprising arms or pins adapted to move into engagement with the cylinder and piston respectively, and a second set of arms or pins adapted to lock the ladle when the first-named arms or pins are in middle position.

11. The combination of a cylinder and motor, and means for holding either of said parts stationary, comprising pins or arms adapted to move in opposite directions.

12. The combination of a tipping ladle, a motor comprising a piston and cylinder, wherein the piston is shifted from one end of the cylinder to the other at each working stroke, and means for reversing the direction of tipping without bodily moving the parts of the motor.

In testimony whereof I have hereunto set my hand.

RICHARD H. STEVENS.

Witnesses:

GEO. L. BULLIONS,

W. H. CORBETT.