

No. 780,295.

PATENTED JAN. 17, 1905.

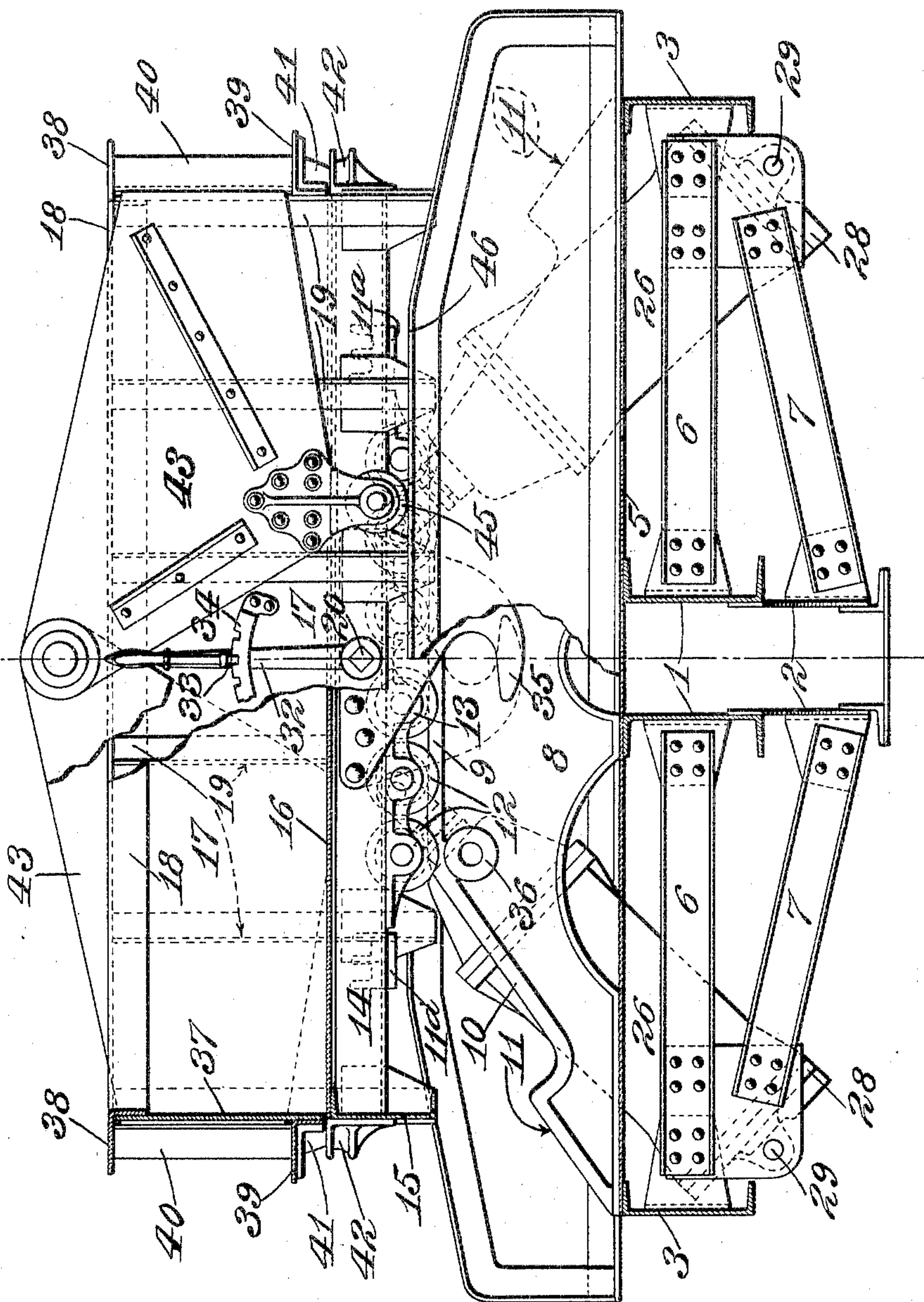
G. I. KING & T. LAWSON.

DUMP CAR.

APPLICATION FILED SEPT. 1, 1904.

4 SHEETS—SHEET 1.

Fig. 1.



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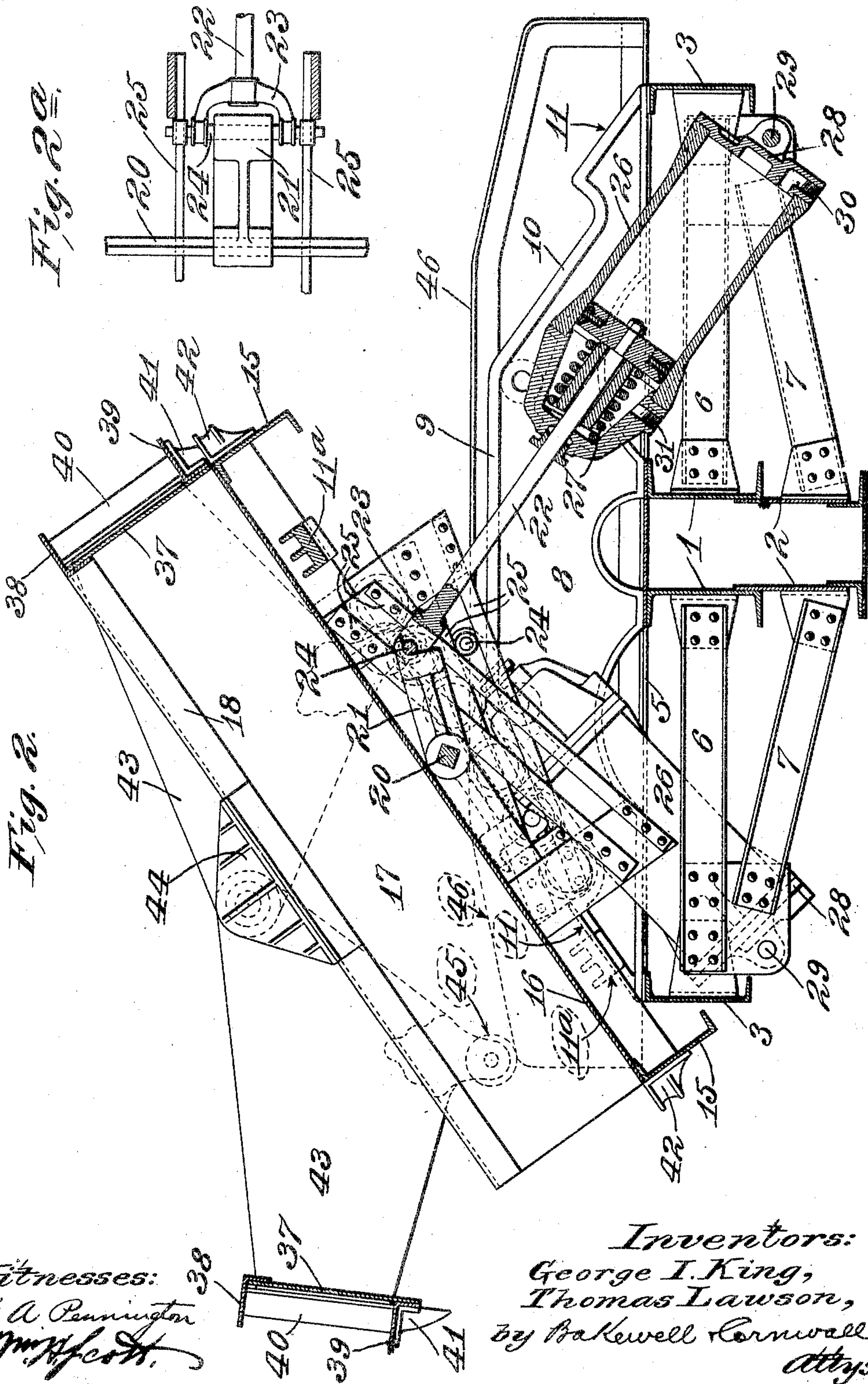
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APPLICATION FILED SEPT. 1, 1904.

4 SHEETS—SHEET 2.



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4 SHEETS—SHEET 3.

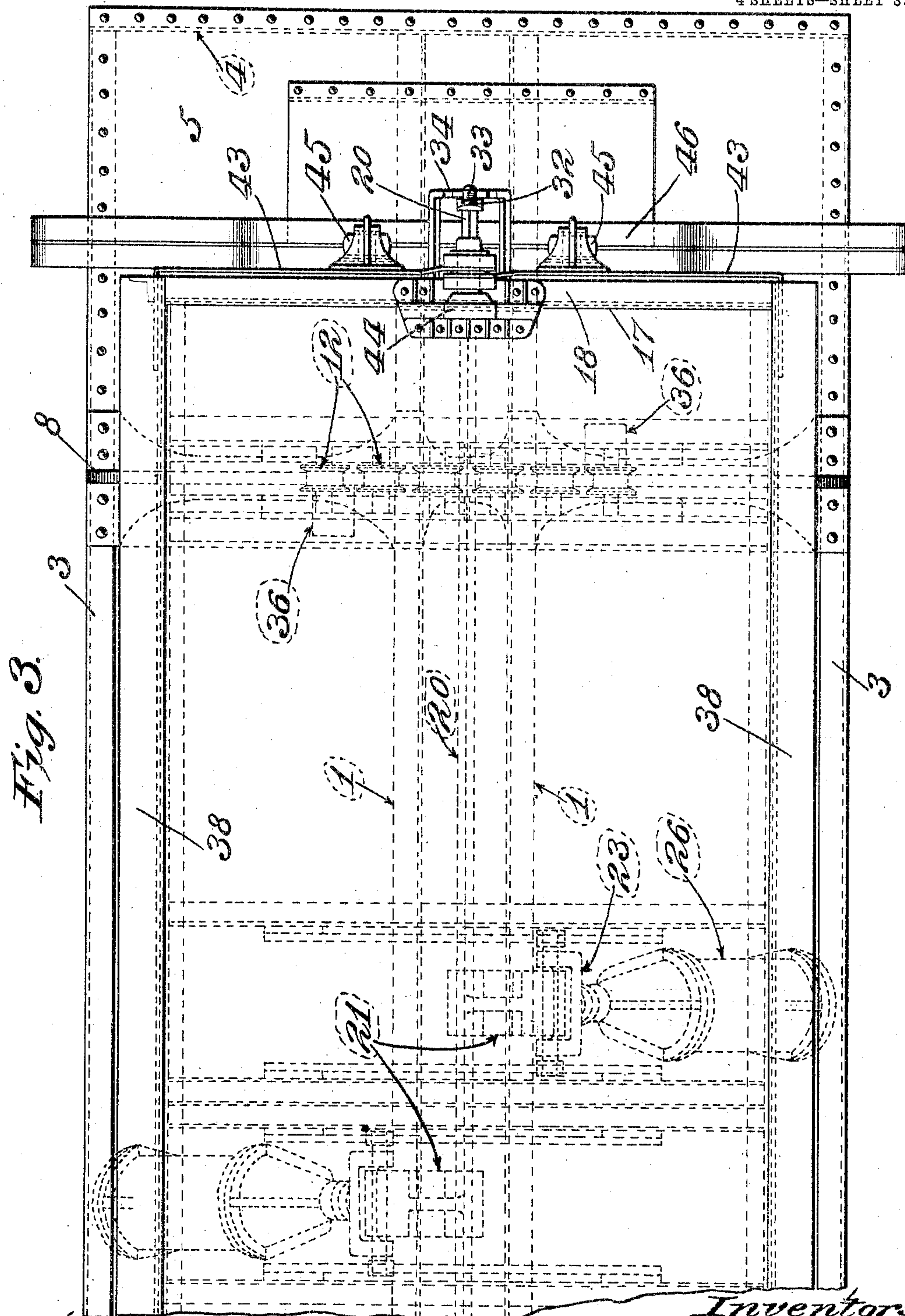


Fig. 3.

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4 SHEETS—SHEET 4.

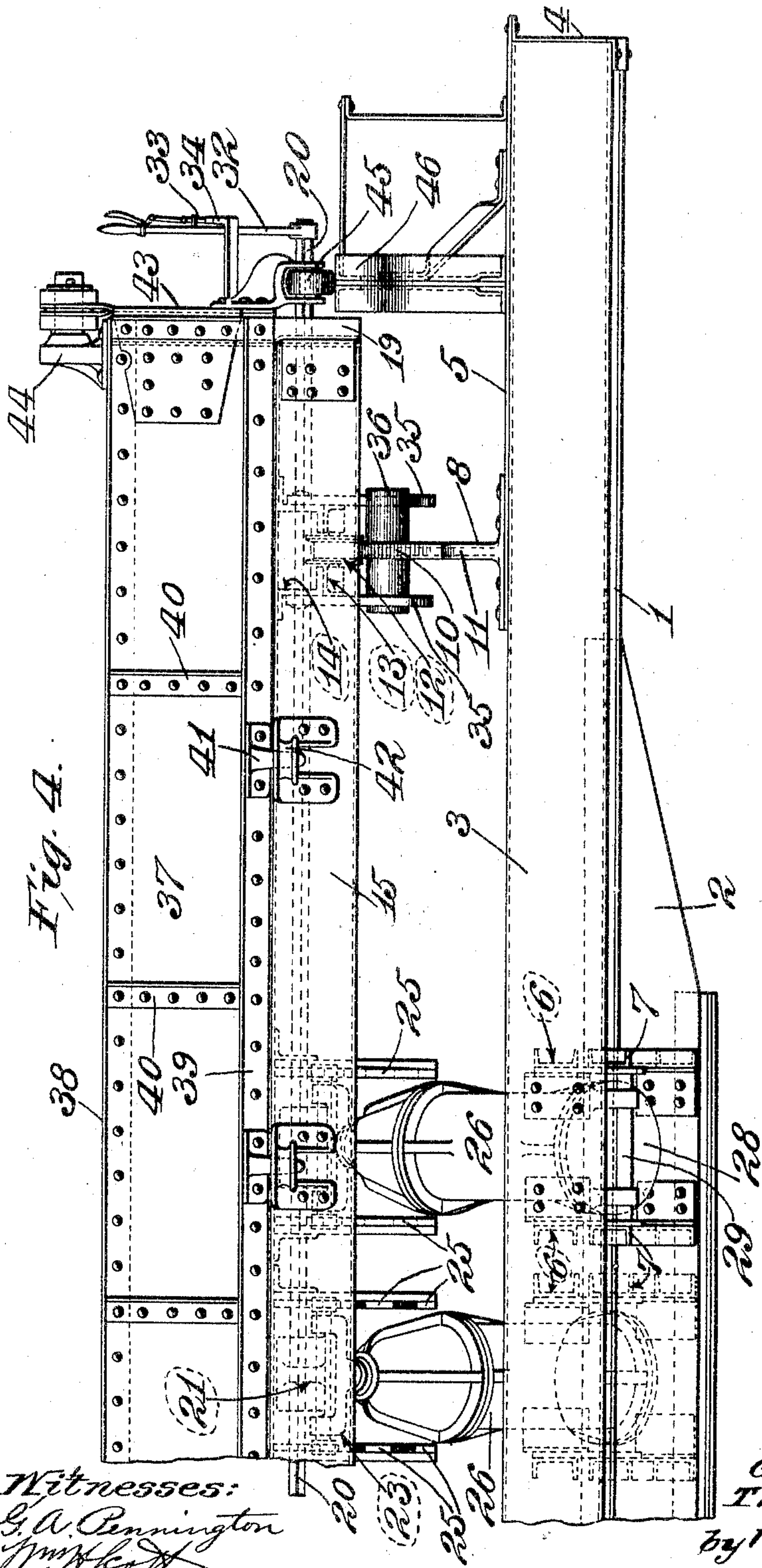


Fig. 4.

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G. A. Pennington  
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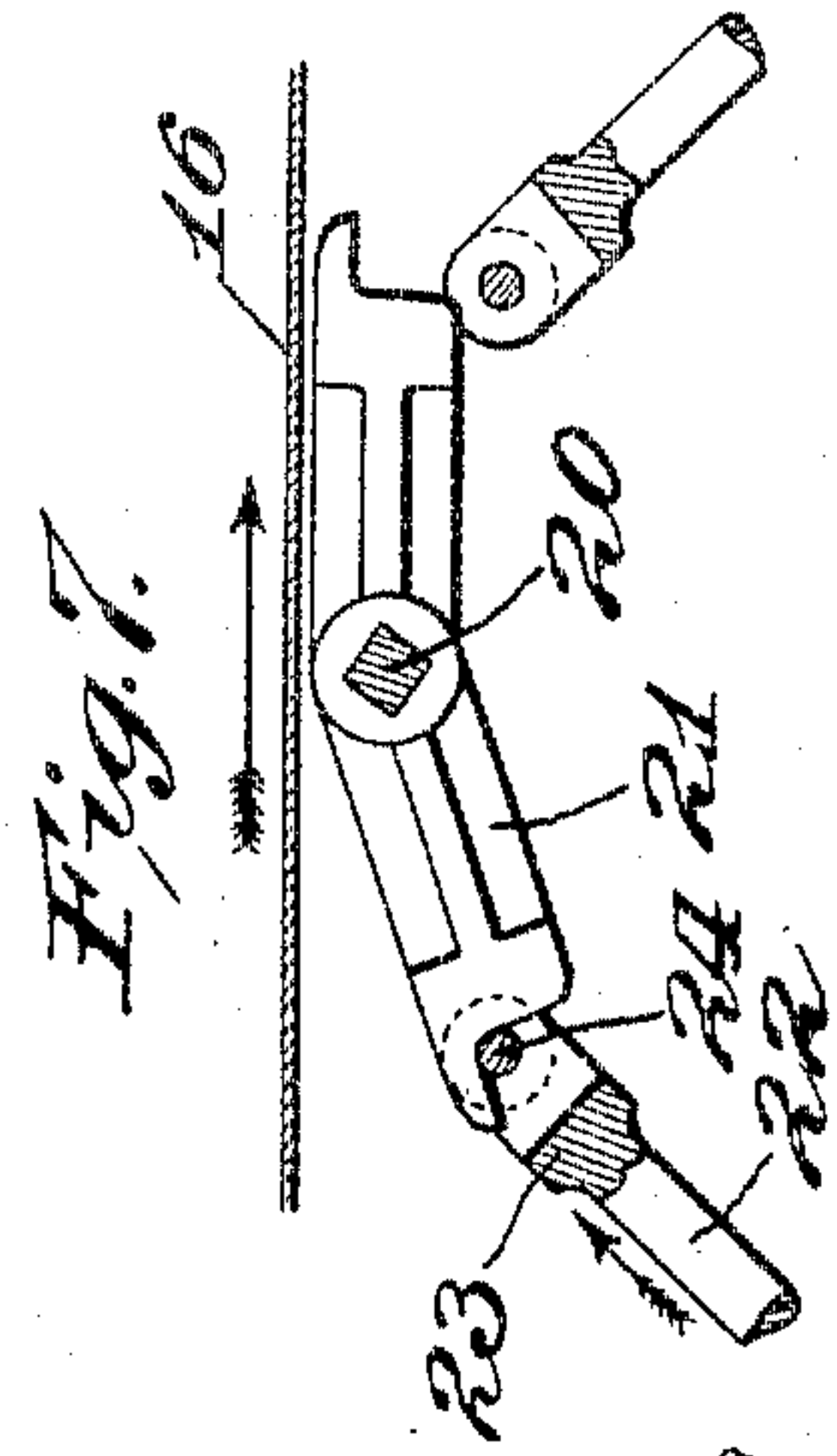


Fig. 7.

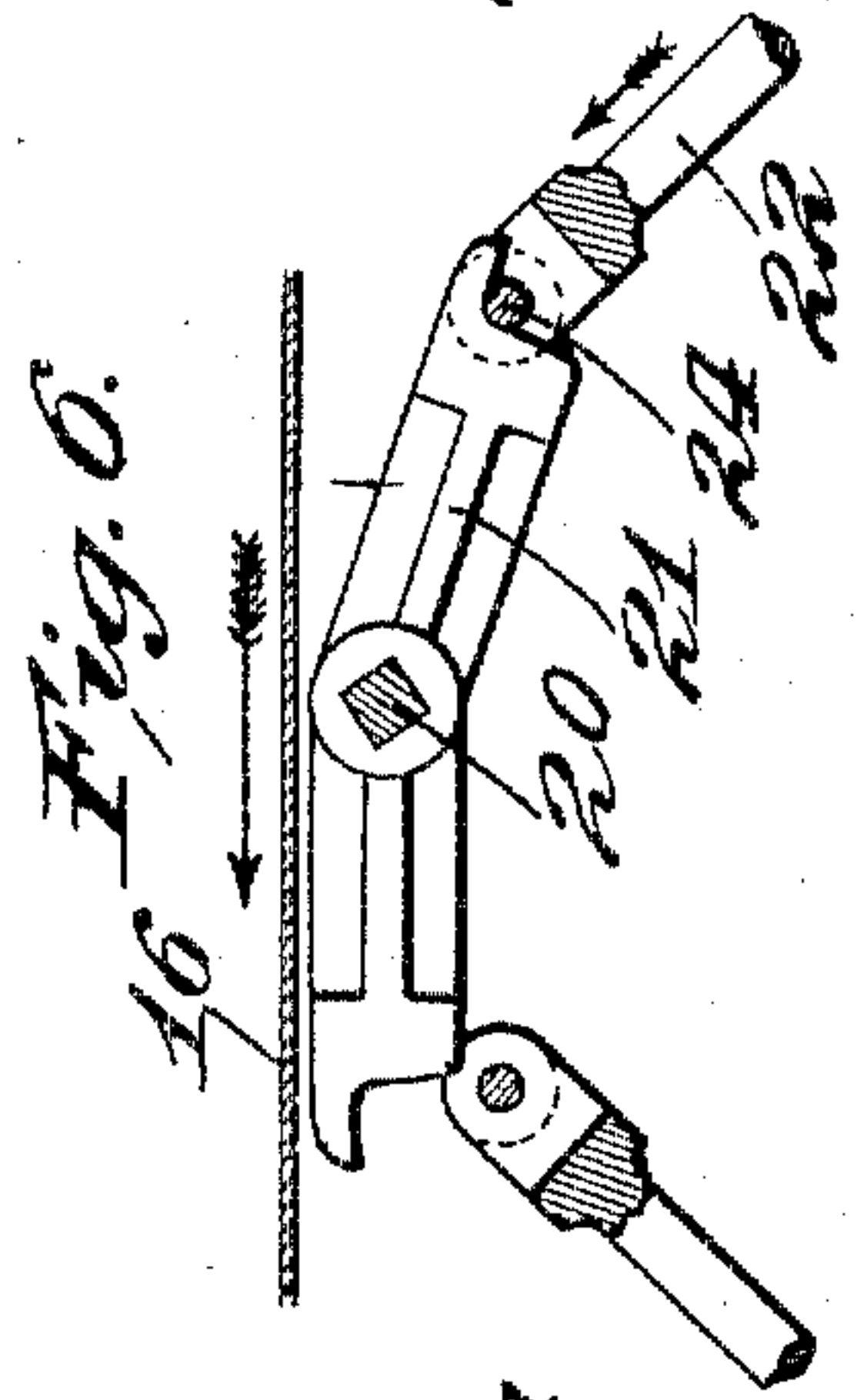


Fig. 6.

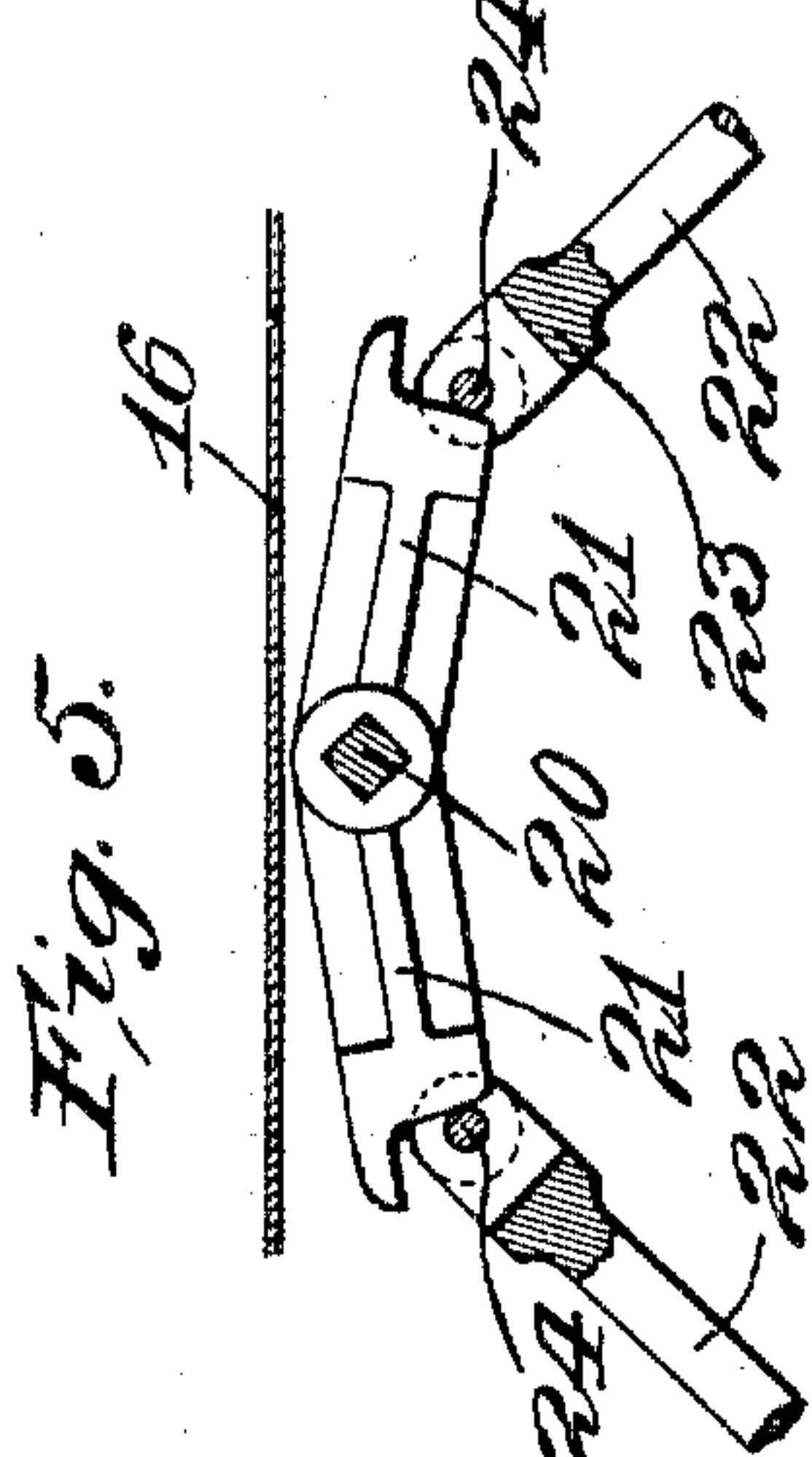


Fig. 5.

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# UNITED STATES PATENT OFFICE.

GEORGE I. KING, OF MIDDLETOWN, PENNSYLVANIA, AND THOMAS  
LAWSON, OF NEW YORK, N. Y.

## DUMP-CAR.

SPECIFICATION forming part of Letters Patent No. 780,295, dated January 17, 1905.

Application filed September 1, 1904. Serial No. 223,029.

*To all whom it may concern:*

Be it known that we, GEORGE I. KING, residing at Middletown, Dauphin county, Pennsylvania, and THOMAS LAWSON, residing at New York, New York county, State of New York, citizens of the United States, have jointly invented a certain new and useful Improvement in Dump-Cars, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is an end elevational view, partly in vertical section, showing our improved single-box dump-car in normal position. Fig. 2 is a vertical sectional view showing the box dumped to one side. Fig. 2<sup>a</sup> is a fragmentary detail view showing the piston cross-head and the guides. Fig. 3 is a top plan view of one end of our improved dump-car. Fig. 4 is a side elevational view of one end of our improved dump-car. Figs. 5, 6, and 7 are detail views.

This invention relates to a new and useful improvement in dump-cars, the object being to utilize the air-pressure from the air-brake system or other source to actuate one or more pistons located in appropriate cylinders and connected, through their carried cross-heads, with the box so that the box may discharge its load on either side, as desired. After the load is dumped pressure is reversed and the box restored to its normal horizontal position. The side walls of the box, which assist in retaining the load therein, serve as gates or doors, one of which is lifted in the dumping movement of the box to permit delivery of the load, after which when the box is restored to normal position this door is closed.

There are various details of novel construction and arrangement of parts employed in carrying out our invention, all of which will be hereinafter set forth and afterward pointed out in the claims. However, we do not wish to be understood as limiting our invention to the exact construction and arrangement of parts herein shown and described, as the same may be varied or changed according

to the tastes of the designer and come within the scope and principle of our invention.

In the drawings the frame of the car is supported at each end by trucks, as is usual in ordinary car construction, and this frame consists of any ordinary arrangement of center, side, and end sills, as may prove most suitable. We have shown center sills 1 in the form of channels with their flanges presented outwardly and extending from end sill to end sill, said channels being reinforced at the center of the car by truss-plates 2, preferably having strengthening-angles riveted to the lower edges thereof.

3 indicates the side sills, which are preferably in the form of channels with their flanges presented inwardly, said side and center sills being connected together at the ends of the car by end sills 4 and near the ends of the car by the body-bolsters, which are not shown.

5 indicates a cover-plate riveted to the top flanges of the center, side, and end sills and extending inwardly to or slightly beyond the body-bolster, which cover-plate serves to add rigidity to the structure and also acts as a platform-plate. Intermediate the bolsters and preferably adjacent the cylinders hereinafter described are trussing members 6 and 7, whose inner ends are attached, by means of connection-plates, to the center sills and their strengthening-plates 1 and 2, respectively, the outer ends of said trussing members 6 and 7 converging and being attached by suitable connection-plates to the side sill 3. In this way a trussed support is provided to take up the end thrust of the cylinders, the framing being made amply rigid by these trusses for this purpose. The center sills may contain fillers and top and bottom cover-plates for well-understood purposes.

Supported by the underframe and preferably in the vertical planes of the body-bolsters and at the center of the car are castings 8, which castings are firmly secured in position by means of suitable rivets. The upper faces of these castings provide tracks or ways upon which the rollers which support the tilting body are designed to run. For sake of distinction we will designate these tracks by



the numerals 9 and 10, section 9 being horizontally disposed and designed to support the box in its normal position, while sections 10 are inclined downwardly and support the box in its tilted position. At the lower ends of each section 10 are abutments 11, which abutments cooperate with stops 11<sup>a</sup>, carried by the underframe of the box to arrest the tilting movement of the box, as will be readily understood. The construction of these parts is such that as the box is tilted, as shown in Fig. 2, the stop 11<sup>a</sup> will strike against the abutment 11 and protect the rollers from hitting upon the inclined portion of the track 10. In fact, the inclined portion 10 of the track might be considered as a recess to receive the rollers, said inclined portion not cooperating with the rollers when the box is tilted and the stop 11<sup>a</sup> strikes the abutment 11; but when the box is returned to normal position and the stop passes the abutment the rollers ride over the inclined portion 10 and upon the horizontal portion 9.

12 indicates rollers, there being preferably six of said rollers mounted in suitable bearings under the box, said rollers having side flanges to guide them in their movements over the track-sections 9 and 10. The bearings 13 for the rollers are preferably in the form of castings appropriately secured to the floor-beams 14 of the box. The ends of these floor-beams are riveted by suitable connection-plates to the side members 15 of the box-underframing, said floor-beams and side members affording a support for the floor-sheets 16 of the box.

17 indicates the end walls of the box, which end walls are strengthened by appropriate flanges 18 at their upper edges in addition to vertical posts 19.

20 indicates a shaft mounted in suitable bearings under the box, said shaft being non-circular throughout its length and carrying cross-head interlocking rock-arms 21, said arms projecting on opposite sides of the rock-shaft and being arranged at angles to each other.

22 indicates a piston-rod whose outer extremity carries a cross-head 23, said cross-head being provided with a pin 24, which pin extends beyond the cross-head and is guided in its movement by guides 25, riveted to plates depending from the underframing of the box. There are separate guides for each cross-head pin, and, as shown in the drawings, the guides for the cross-heads are obliquely disposed with relation to the box in order that the idle cylinders will not interfere in any way with the floor of the box when it is in its inclined positions.

Each piston-rod 22 carries a piston-head on its inner end, which piston-head operates in the bore of a cylinder 26. A buffer-spring 27 is arranged to cushion the outward movement of the piston when the center of gravity

has been passed by the box and the box becomes free to move under the action of gravity or otherwise to its extreme dumping position. The lower cylinder-head 28 is provided with ears through which passes a rod 29, said rod finding bearings at each end in the castings secured to the main underframing and the trussing members 6 and 7 or plates.

Ports 30 and 31 are provided in the cylinders for the connection of flexible air-supply pipes. When pressure is admitted under the piston-head through port 30, air above the piston is permitted to exhaust through port 31 until the piston has made a full stroke, in which case the box has been tilted, and when it is desired to restore the box to normal position the air is permitted to exhaust through port 30 and pressure is admitted through port 31 to restore the piston and its connected box to normal position.

We will now describe how the box may be tilted to either side at the will of the operator. The cylinders and pistons and their pressure connections on each side of the underframing are similar; but of course the valves which control the pressure are independently operable, so that the operator may direct the pressure to the cylinders at one side or the other of the car at will. The rock-shaft 20, to which we have before referred, extends beyond the ends of the box, preferably at one end only, and is provided with a lever having a dog engaging one or the other of three notches in a segment arranged on the end wall of the box. The lever is indicated at 32, the dog at 33, and the notched segment at 34. When the dog or detaining-pawl is in the central notch, the arms 21 are in an intermediate position, their ends being in the paths of movement of the piston-rod pins 24, so that it is impossible for the box to become dislodged from its normal position even though pressure be admitted to the cylinders.

If it is desired to tilt the box and dump the load to the left, rock-shaft 20 is rotated by moving the lever 32 to the right, which depresses the arm 21 at the right of the shaft and elevates the arm 21 at the left. The right (depressed) arm 21 is by this action thrown into engagement with the pin 24, carried by the piston cross-head of the cylinder at the right-hand side of the frame, while the opposite arm 21 is elevated out of the path of its cooperating piston-pin 24. Pressure being now admitted through the port 30, it is obvious that as the piston moves upwardly and inwardly it will exert a lifting and a horizontal pressure upon the box through the arm 21, the shaft 20, and the guides 25, the resultant motion of the box being along the path of easiest resistance, which is in a horizontal direction toward the left. The anti-friction-rollers 12 readily accommodate this movement, and the box will thus be moved



toward the left until the hook 35 engages the stud 36, when the box will start to tilt under the combined action of gravity and the piston-rod push or by means of the latter alone.

5 In order to avoid the shock of this sudden movement being communicated to the piston and cylinder, the spring 27 is placed under compression, and to avoid the shock being communicated to the rollers we provide stops  
10 11<sup>a</sup>, riveted to the floor-beams 14, which strike against the raised portions 11 of the tracks 8 before the rollers reach the inclined track 10. The projections 36 act as centers about which the box turns.

15 It will be observed with relation to the hook 35 that it is centrally located, so far as its engaging face is concerned, with respect to the box and in a horizontal plane beneath that where the piston-pin 24 engages the box.  
20 Thus in the tilting action under consideration if the box were moving toward the left and the load were entirely upon the right-hand side of the box, so that the box would not become overbalanced by the action of  
25 gravity, the relation of the hook 35 and its projection 36 is such that as the box approaches the extremity of its horizontal movement the hook 35 engages the projection 36 and becomes the axis about which the box  
30 will move, and this will be in an arc of a circle under the conditions we are now considering, the power being applied to the box at a point above and to the side of its axis of movement.

35 The end walls of the cross-head guides so engage the pin 24 that after the load is discharged from the box and pressure is applied to the upper face of the piston the piston will return the box to its normal horizontal position.  
40 When in its horizontal position, the restoration of the arm 32 to its central position will lock the box home.

To tilt the box to the right, which will result in dumping the load at the right-hand  
45 side of the car, the lever 33 is moved to the left so as to force the other hooked arm 21 into engagement with the pin 24 of the opposite cross-head, when the same cycle of operations above described will result when  
50 pressure is applied first below and then above the piston, as has just been described.

The doors, which form the side walls of the car, are coextensive in length with the box and are pivotally mounted so as to swing in an  
55 arc of a circle described from a point approximately at the medial line of the box and above its top.

37 indicates the sheets which make up the panels of the doors, which sheets are reinforced  
60 by angles 38 and 39 and their upper and lower edges, respectively, in addition to which there are vertically-disposed angles 40. To confine the lower edges of the doors and prevent their outward bulging under load, each door is pro-  
65 vided with one or more castings 41, riveted

to its lower angle, said castings having entering points which coöperate with recesses in castings 42, which serve as keepers for said entering points, said castings 42 being riveted to the side member 15 of the box-underframe. 70

43 indicates end plates arranged at the ends of the doors and preferably exterior the box, said end plates carrying castings containing eyes or trunnions coöperating with trunnions or eyes, as the case may be, in or forming part  
75 of castings 44, riveted to the top flange of the end walls at the center of the box ends.

The doors are provided at each end with rollers 45, which rollers coöperate with suitable tracks 46, carried by the main under-  
80 framing. The operation of these doors is as follows: In the tilting action to the left above described as the body of the car moves horizontally the rollers 45 on the left-hand door ride outwardly upon their tracks 46, and as  
85 the body of the car starts to tilt the efforts of the left-hand door to travel with the box are resisted by the rollers 45 forcing the doors to move upwardly and outwardly with respect to the box, so that the load can readily dis-  
90 charge. It will be noted that track 46 is arched or crowned, so that the roller 45 will travel along a horizontal section of the track for a short distance and then along the in-  
95 clined portion of track 46 for the remaining portion of the distance; but the inclined portion of track 46 is less abrupt than the inclined portion 10 of the track upon which the rollers 12, supporting the box, are mounted. The result is that the door is maintained in  
100 substantially the same horizontal plane, while the box is permitted to tilt. It makes no difference at what point in its movement the box starts to tilt, as soon as the track 46 arrests the door the box continues its tilting move-  
105 ment, and any portion of the load adjacent the opening so provided will be discharged before the box reaches its fully-tilted position. In this way the shock of the box sud-  
110 denly moving to its fully-tilted position is reduced by the load being thus diminished. The lateral horizontal movement of the box is limited by the stop 36, which forms an axis about which the box must positively rotate under the action of the pressure applied to  
115 the piston cross-head. In ordinary loading the box would not dump by gravity alone; but of course where the load is to the side upon which the box is dumped gravity would assist the dumping action. 120

In the ordinary single-box dump-cars on the market the box moves about a fixed pivot or longitudinal axis in the center of the car-body, and consequently the load is dumped close to the rails. This is true whether the dumping  
125 power is manual or by fluid-actuated pistons. In our construction the lateral movement of the box before reaching its dumping position so locates it that when tilted the load is discharged a foot or more outside of the rail, 130



which enables the car to be promptly moved and reloaded. In ordinary dump-cars which discharge the material close to the track it frequently happens that part of the load covers the rails, which necessitates clearing of the track before the cars can be moved and again loaded. We are also aware of the Lawson patents, Nos. 682,206 and 682,329, dated September 10, 1901, which show a construction of a two-box dump-car the individual boxes of which are laterally movable before reaching their tilting position. These two-box dump-cars are satisfactory for trestle building or extending a single-track fill, but are ill adapted to one-side work, which is more frequently met than the other conditions. For instance, where a railroad is to be double-tracked and an existing line is already in operation all fills must be made on one side only unless half the material which is discharged from a two-box car like that illustrated in the Lawson patents referred to is shoveled to the outside of the fill.

As a matter of fact in the operation of the Lawson two-box dump-car it has been found in service that in some cases only one box could be loaded, and consequently only one-half the carrying capacity was available. The two-box dump-car is very heavy, weighing fifty thousand pounds or more, and is therefore quite expensive.

We are aware that minor changes in the construction, arrangement, and combination of the several parts of our device can be made and substituted for those herein shown and described without in the least departing from the nature and principle of our invention.

Having thus described the invention, what is claimed as new, and desired to be secured by Letters Patent, is—

1. In a single-box dumping-car, the combination with a supporting-frame, tracks carried thereby, said tracks having inclined ends connected by horizontal portions, a box having rollers coöperating with said tracks, and fluid-actuated pistons for operating the box; substantially as described.

2. In a dumping-car, the combination with a tilting box, of a fluid-actuated piston co-operating therewith, a cross-head carried by the piston-rod, and a guide for the cross-head, said guide being carried by said box; substantially as described.

3. In a dumping-car, the combination with a tilting box, of oppositely-disposed fluid-actuated pistons, piston-rod cross-heads, and means for connecting one or the other of said cross-heads with the box; substantially as described.

4. In a dumping-car, the combination with a tilting box, of oppositely-disposed pistons, piston cross-heads, and means for locking both said cross-heads against movement, said means holding the tilting box in its normal position; substantially as described.

5. In a dumping-car, the combination with a tilting box, oppositely-disposed fluid-actuated pistons, means for locking said box in its normal position and said pistons against movement, said means being capable of releasing either one of said pistons at the will of the operator; substantially as described.

6. In a dumping-car, the combination with a tilting box, supports for the same, means for moving the box horizontally on said supports before the box is tilted, of a hinged door forming the side wall of said box, a roller on said door, a track upon which said roller operates for lifting the door when the box is tilted; substantially as described.

7. In a dumping-car, the combination with a double inclined track on which the box is mounted, a hinged door forming the side wall of the box, a roller on the lower inner edge of said door, and an arched track on which said roller is mounted; substantially as described.

8. In a dumping-car, the combination with a tilting box, a track upon which said box is supported, said track having a horizontal portion and an inclined portion, a fixed abutment, and a hook on the box for engaging said abutment which forms the axis for the tilting movement of the box; substantially as described.

9. In a dumping-car, the combination with a double inclined track upon which the box is mounted, a fixed abutment, a hooked projection carried by the box for engaging said fixed abutment, whereby said fixed abutment becomes the axis for the tilting movement of the box, and a fluid-actuated piston for operating the box; substantially as described.

10. In a dumping-car, the combination with a tilting box having oppositely-inclined guideways, pivotally-mounted cylinders whose pistons are connected to cross-heads having pins adapted to travel in said inclined guideways, a rock-shaft, and oppositely-disposed arms on said shaft arranged at angles to each other, whereby when said arms are centrally positioned they engage the pins of both cross-heads and prevent movement thereof, and when said shaft is rocked in one direction or the other, one of said arms becomes disconnected from its pin and the other of said arms remains engaged with its cross-head pin; substantially as described.

11. In a dumping-car, the combination with a box capable of dumping on either side, of doors forming the side walls of said box, said doors moving about a coincident axis, rollers on the lower inner edges of said doors, an arched track with which said rollers coöperate, locking projections carried by the lower edges of the doors, and keepers mounted on the box-underframe for coöperating with said locking projections; substantially as described.

12. In a dumping-car, the combination with



a main underframe having truss-supports intermediate the bolster-points, cylinders pivotally mounted upon said underframe adjacent to said supports, and a tilting box which is operated by the pistons in said cylinders; substantially as described.

13. In a dumping-car, the combination with a main underframe comprising center, side and end sills, and bolsters, of truss-supports at points intermediate said bolsters, cylinders pivotally mounted in said underframe adjacent to said truss-supports, track-castings carried by said underframe in the vertical plane of the bolsters, a tilting box having rollers mounted on said track-castings, pistons in said cylinders and cross-heads operating in guides depending from said box, means for actuating one or the other of said pistons with said box, and abutments which are effective to restrain excessive tilting action of the box; substantially as described.

14. In a dumping-car, the combination with a tilting box, of a cylinder and piston for tilting said box, and a spring carried by the piston for cushioning the shock of the tilting movement; substantially as described.

15. In a dumping-car, the combination with a tilting box, a pivoted cylinder whose piston is designed to cooperate with said tilting box, and a spring carried by said piston and designed to engage the end of the cylinder when the piston approaches the limit of its movement, cushioning the tilting action of the box; substantially as described.

16. In a single-box dump-car, the combination of suitable supports, oppositely-disposed fluid-actuated pistons for moving the box laterally on said supports before tilting the same in either direction at the will of the operator, and means for rendering the pistons on either side operative or inoperative, said pistons on one side when operatively connected with the box rendering the pistons on the other side inoperative, substantially as described.

17. In a single-box dump-car, the combination with suitable supports upon which the box is mounted, of oppositely-disposed fluid-actuated pistons for moving the box laterally, means for rendering the pistons on either side operative or inoperative at the will of the operator, said pistons on one side when operatively connected with the box rendering the pistons on the other side inoperative, and means for arresting the box in its outer position, whereby the continued application of power in a lateral direction causes the box to tilt; substantially as described.

18. In a single-box dump-car, the combination with an underframe provided with ways, of a box mounted to move laterally upon said ways, oppositely-disposed fluid-actuated pistons for moving the box laterally, means for rendering the pistons on either side operative or inoperative at the will of the operator, said pistons on one side when operatively connect-

ed with the box rendering the pistons on the other side inoperative, a fixed abutment, and a projection carried by the box to engage said fixed abutment, whereby the continued application of power causes the laterally-moving box to move about said fixed abutment; substantially as described.

19. In a single-box dump-car, the combination with an underframe provided with ways, of oppositely-disposed fluid-actuated pistons for moving the box laterally in either direction upon said ways, means for rendering the pistons on either side operative or inoperative at the will of the operator, said pistons on one side when operatively connected with the box rendering the pistons on the other side inoperative, and fixed studs in the paths of projections extending from said box, whereby when the box is moved laterally in either direction and said projections engage said studs, the studs arrest the lateral movement of the box and cause said box to tilt; substantially as described.

20. In a single-box dump-car, the combination with an underframe provided with ways, a box mounted upon said ways and capable of lateral movement, antifriction devices interposed between said box and ways, fluid-actuated pistons for moving the box laterally in either direction, and means for engaging the box at the extremity of its movement in either direction and providing an axis about which the box is forced to rotate; substantially as described.

21. In a single-box dump-car, the combination with ways upon which the box is mounted, rollers carried by the box and running upon said ways, said ways having a central horizontal portion and recesses at their ends for receiving the rollers in the tilted position of the box, abutments at the ends of the ways for cooperating with the stops carried by the box to relieve the rollers from the shock resulting from the tilted movement of the box, fluid-actuated pistons for moving the box laterally in either direction, means for rendering the pistons on either side operative or inoperative at the will of the operator, fixed studs forming axes about which the box turns, and means carried by the box for engaging the studs when at the outer extremity of its movement in either direction; substantially as described.

22. In a single-box dump-car, the combination with an underframe provided with ways, of a laterally-movable box mounted upon said ways, and oppositely-disposed fluid-actuated pistons for moving the box laterally in either direction and tilting said box when at the extremity of its outer position, so that the load will be discharged outside of the rail, said pistons on one side when operatively connected with the box rendering the pistons on the other side inoperative; substantially as described.

23. In a single-box dump-car, the combina-



tion with an underframe, of ways carried thereby, a laterally-movable box mounted on said ways; oppositely-disposed fluid-actuated pistons for moving the box laterally in either direction and tilting the box on either side when said box reaches the extremity of its outward movement, whereby the load may be discharged outside of the rails on either side, doors for retaining the load in the box, and means for automatically opening said doors as the box starts to tilt; substantially as described.

24. In a single-box dump-car, the combination with an underframe having ways upon which the box is mounted and laterally movable, doors forming the side walls of the box, and oppositely-disposed fluid-actuated pistons for moving the box laterally, said pistons also tilting the box and causing the door on the low side of the box to open in its tilted position about the time that the box commences its tilting movement, said pistons on one side when operatively connected with the box rendering the pistons on the other side inoperative; substantially as described.

25. In a single-box dump-car, the combination of a laterally-movable box, oppositely-disposed fluid-actuated pistons for initially moving the box horizontally and laterally causing it to tilt in its outer position, means whereby when the pistons on one side are operatively connected with the box the pistons on the opposite side are inoperative, doors forming the side walls of the box and means for opening the door on the low side of the box when it commences its tilting movement, substantially as described.

26. In a single-box dump-car, the combination with an underframe having ways, of a box mounted upon said underframe and later-

ally movable on said ways, studs forming axes about which the box rotates in its outer position on either side, and oppositely-disposed pistons for moving the box laterally in either direction, and means for rendering the pistons on either side effective or ineffective at the will of the operator; substantially as described.

27. In a single-box dump-car, the combination with an underframe provided with tracks upon which the box is mounted so as to initially move in a horizontal direction and then tilt, oscillatory cylinders having pistons, said cylinders being mounted on the underframe, and means mounted on the box for engaging said box with the pistons simultaneously or separately at the will of the operator; substantially as described.

28. In a single-box dump-car, the combination with an underframe provided with ways, of a laterally-movable box mounted on said ways, oppositely-disposed pistons mounted on the underframe and connected to the cross-heads, guideways carried by the box in which said cross-heads are slidingly mounted, means for engaging and disengaging said cross-heads with and from the box, at the will of the operator, and means whereby when either piston is rendered operative and the box moves laterally, said box will, upon reaching the extremity of its movement, be caused to move about a fixed axis carried by the underframe; substantially as described.

In testimony whereof we hereunto affix our signatures, in the presence of two witnesses, this 13th day of August, 1904.

GEORGE I. KING.  
THOMAS LAWSON.

Witnesses:

WM. A. CROLL,  
JOHN H. FRANK.