March 31, 1925. 1,531,682

C. C. AVERY

HOISTING MECHANISM FOR DUMP VEHICLES

Filed July 9, 1921 4 Sheets-Sheet 1

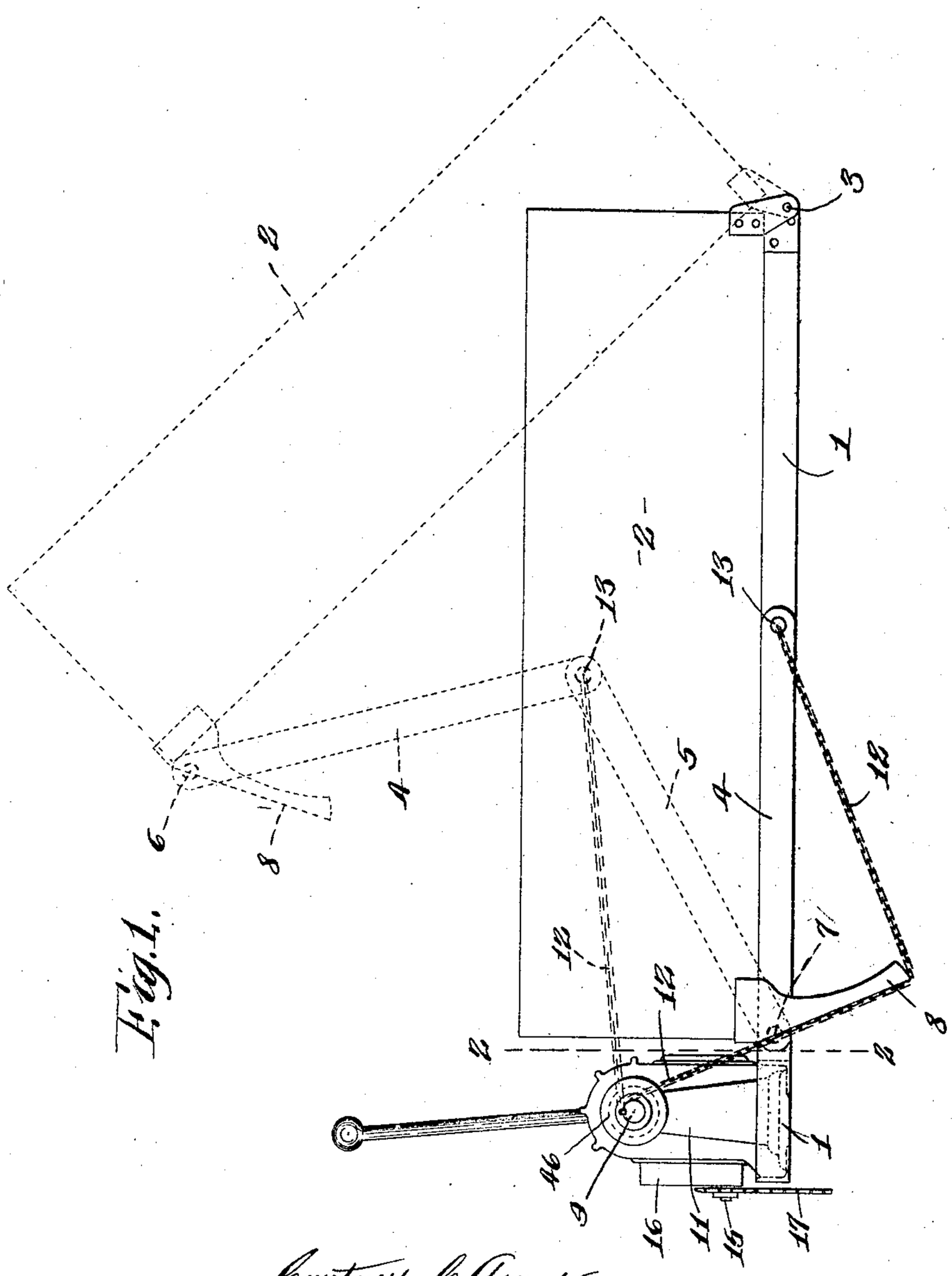

Fig. 1.

Courtney C. Avery. INVENTOR.

BY

Parsons & Bodell. ATTORNEYS.

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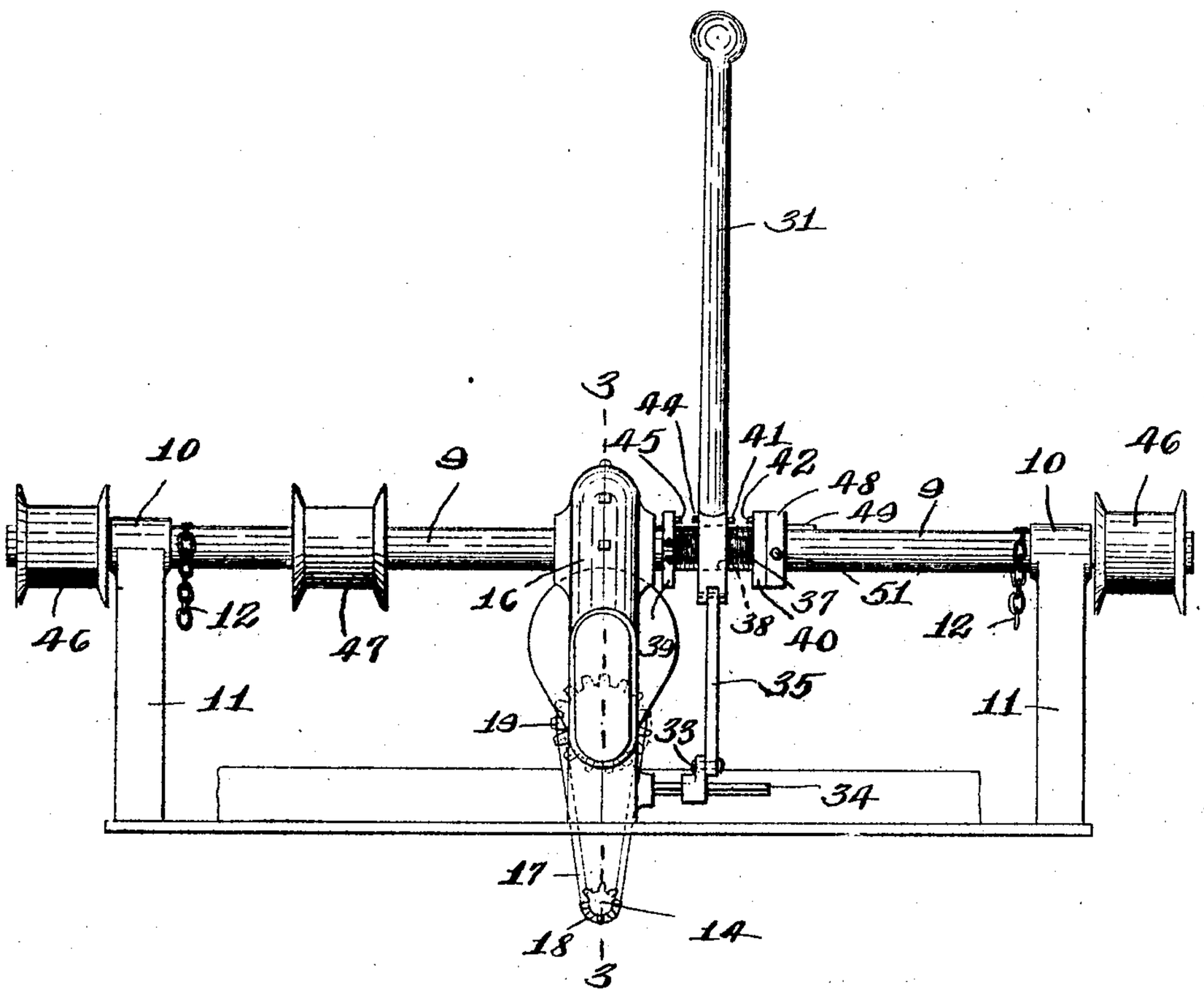

Fig. 2.

Courtney C. Avery. INVENTOR.

BY

Parsons & Bodell. ATTORNEYS.

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C. C. AVERY

HOISTING MECHANISM FOR DUMP VEHICLES

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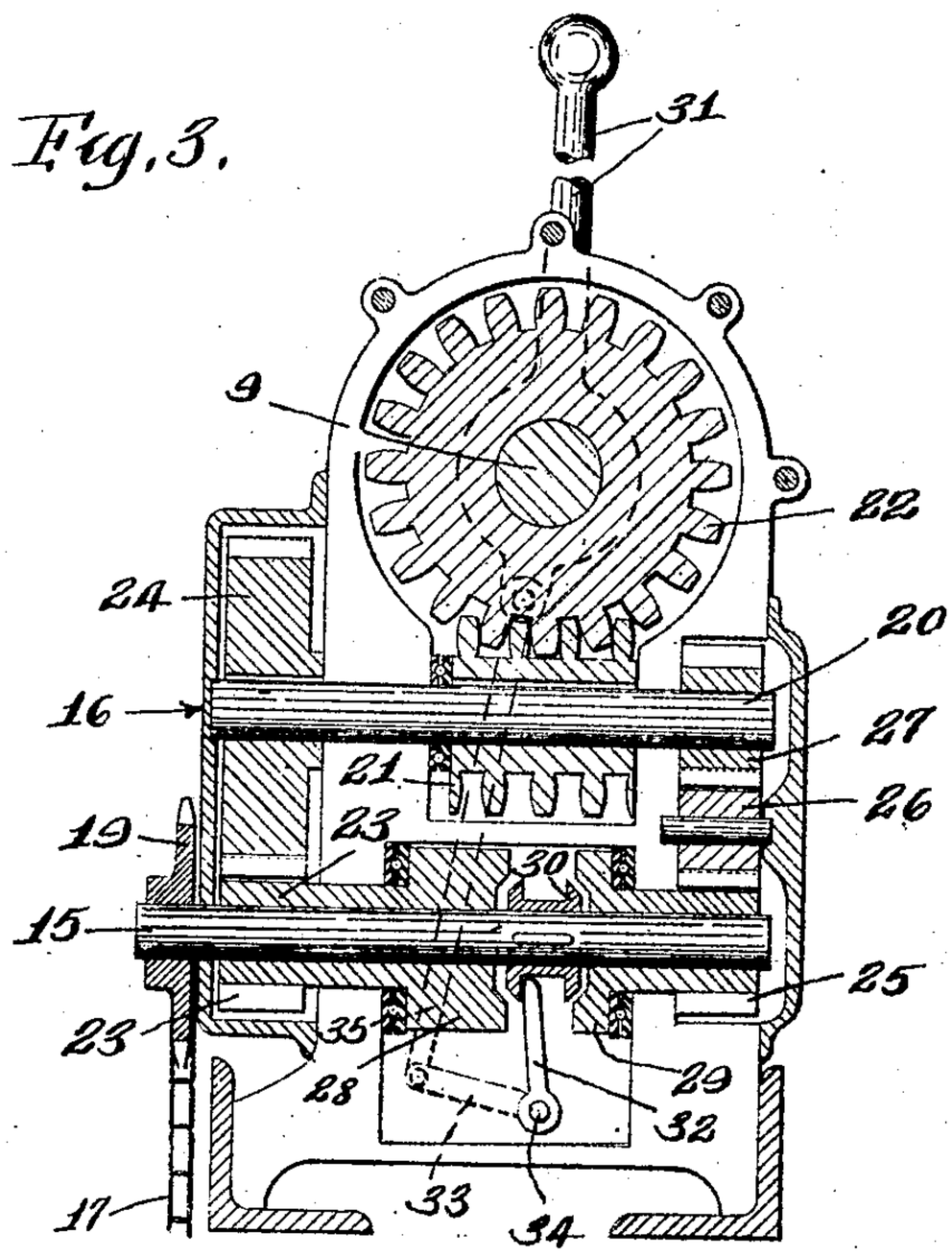
Fig. 3.



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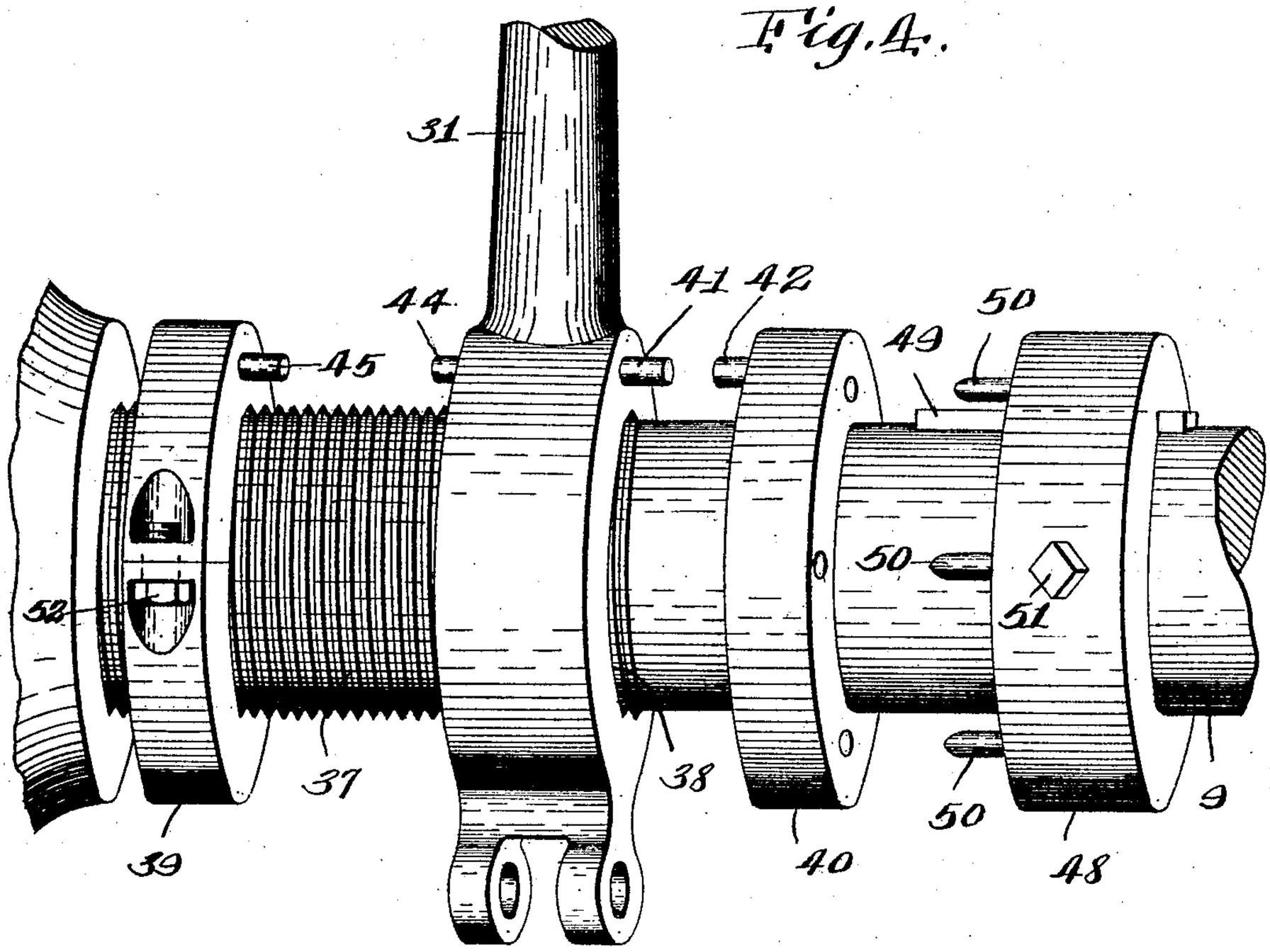
HOISTING MECHANISM FOR DUMP VEHICLES

Filed July 9, 1921 4 Sheets-Sheet 4

Fig. 4.



Courtney C. Avery. INVENTOR.

BY

Parsons & Bodell ATTORNEYS.

Patented Mar. 31, 1925. 1,531,682

UNITED STATES PATENT OFFICE.

COURTNEY C. AVERY, OF AUBURN, NEW YORK, ASSIGNOR TO EAGLE WAGON WORKS, OF AUBURN, NEW YORK, A CORPORATION OF NEW YORK.

HOISTING MECHANISM FOR DUMP VEHICLES.

Application filed July 9, 1921. Serial No. 483,387.

To all whom it may concern:

Be it known that I, COURTNEY C. AVERY, a citizen of the United States, and a resident of Auburn, in the county of Cayuga and State of New York, have invented a certain new and useful Hoisting Mechanism for Dump Vehicles, of which the following is a specification.

This invention relates to a power hoisting apparatus for the dumping bodies of vehicles as motor vehicles having dumping bodies, and has for its object a hoisting mechanism which is particularly simple and economical in construction and highly efficient and durable in use.

It further has for its object a particularly simple, efficient power means for loading and unloading heavy articles and for drawing the vehicle out of holes and bad spots when stuck on the road.

It also has for its object a windlass for loading and unloading heavy articles which is interchangeably connectable to the dumping vehicle body to be used as a hoisting apparatus or a loading or pulling apparatus.

The invention consists in the novel features and in the combinations and constructions hereinafter set forth and claimed.

In describing this invention, reference is had to the accompanying drawings in which like characters designate corresponding parts in all the views.

Figure 1 is a fragmentary side elevation of a dumping vehicle embodying my invention.

Figure 2 is an enlarged sectional view taken on the plane of line 2—2, Fig. 1.

Figure 3 is an enlarged sectional view on line 3—3, Fig. 2.

Figure 4 is an enlarged fragmentary perspective view of the intermediate part of the windlass shaft and contiguous part.

The hoisting apparatus comprises generally, one or more pairs of toggle links pivoted respectively to the dumping body and to the vehicle frame, and means for first elevating the body by applying the lifting force directly thereto to partly unfold the toggle and then completing the hoisting operation by applying power directly to the toggle, in contradistinction to the dumping body to extend the toggle. The mechanism for hoisting the body and extending the toggle in the illustrated embodiment of my invention includes a winding drum, cables winding on the drum and coacting with the dumping body to first apply a lifting force directly thereto, the cables being connected to the toggle so that additional winding of the cable or cables on the drum extends the toggle or toggles and completes the hoisting operation.

1 designates the frame which may be of any suitable form, size and construction. 2 is the dumping body which is here shown as pivoted at 3 to the rear end of the frame. 4 and 5 are toggle links pivoted respectively at 6 and 7 to the dumping body near the front end thereof and to the frame, there usually being a pair of links on each side of the dumping body. The links 4, 5 are normally folded and lie side by side when the dumping body is down.

8 is an arm or brace depending from the front end of the dumping body on each side thereof providing a bearing surface for the cable to be hereinafter described, to normally hold the cable out of a straight line while the dumping body is being elevated to start the unfolding action of the toggle.

9 designates winding drums which are here shown as portions of a shaft extending crosswise of the frame in front of the body 2 and above the arm 8, the shaft being carried in suitable bearings 10 at the upper ends of standards 11 rising from the frame 1.

12 is a cable winding on each drum or end portion of the shaft 9, the cable extending downwardly from the drum under the arm or brace 8 and being connected at its rear end to the toggle links and preferably to the joint 13 of the toggle.

To hoist the dumping body, the drums are actuated to wind the cables thereon so that the cables initially pull upwardly on the arms 8 and hence move the front end of the dumping body upwardly about the pivot 3. During such winding operation, the cables gradually pull toward a straight line and when they reach or approach a straight line the lifting force directly on the wagon body ceases; also, when the cables are moving into a straight line the toggle links are unfolding. When the cables approach or reach a straight line so that the lifting force is no longer applied by the cable to the front end of the dumping body the toggle links are unfolded to such an angle that the pull of the cables thereon acts directly on

the toggle and further unfold or extend the toggle links, thus elevating the front end of the dumping body.

The drums 9 may be operated from any power take-off shaft associated with the power plant or transmission mechanism of the motor vehicle as a shaft 14, through suitable motion transmitting mechanism. This mechanism is shown as a shaft 15 journaled in a suitable casing or support 16 supported by the frame 8 and connected to the power take-off shaft 14 in any suitable manner as by a sprocket chain 17 running over a sprocket wheel 18 on the shaft 14 and a sprocket wheel 19 on the shaft 15, a second shaft 20 journaled in the casing and having a gear as a worm 21 thereon meshing with the worm wheel 22 mounted on the shaft of the winding drums 9, a gear 23 mounted on the shaft 15 and meshing with the gear 24 on the shaft 20, a second gear 25 mounted on the shaft 15 and meshing with an idler gear 26 which in turn meshes with a gear 27 on the shaft 20, and means for connecting either gear 23 or 25 to the shaft 15. This means as here illustrated, comprises clutch sections 28, 29 fixed relatively to the gears 23, 25 respectively, a shiftable clutch section 30 movable from neutral position into engagement with either of the sections 28, 29, the shiftable clutch section 30 being slidably keyed to the shaft 15 and an operating lever 31. The lever 31 is connected to a shifter fork 32 by means of a rock arm 33 mounted on the shaft 34 of the shifter, and a link 35 connected to the rock arm 33 and to the lever 31. These connections are such that movement of the lever 31 in one direction shifts the clutch section 30 as into engagement with a clutch section 28 and in the other direction shifts the clutch section 30 either into neutral position or into engagement with the clutch sections 29.

Means is provided for operating the lever 31 to shift the clutch section to neutral position when the body has been elevated to the limit of its movement and when the body has been returned to its normal or lower position. As here shown, this means consists of a screw or threads 37, rotatable with the drums 9 and preferably provided on the shaft and arranged in a threaded passage 38 in the lever 31 and shifting or knock-off devices 39, 40 rotatable with the drum and located at the ends of the screw 37, respectively.

Assuming that the dumping body is to be elevated, the lever 31 is operated to shift the clutch section 30 into engagement with the section 28 and when these sections 30 and 28 are engaged, the drum 9 is actuated from the power take-off shaft 14 through the sprocket chain 17, sprocket wheel 19, shaft 15, gears 23 and 24, shaft 20, worm 21 and worm wheel 22 to wind the cables thereon. During this winding operation, the lever is fed along the screw threads 37 until the shoulder or tooth 41 thereon comes into the path of a shoulder or tooth 42 on a knock-off device 40 whereupon the lever is shifted to carry the clutch section 30 to neutral position.

When the dump body is being lowered its movement is controlled from the power take-off shaft 14 through the sprocket chain 17, sprocket wheel 19, shaft 15, gear 25, reversing gear 26, shaft 20, worm 21 and worm wheel 22, and as it is moving toward its lowermost position the lever 31 is moving to the left along the threads 37 to carry a shoulder or tooth 44 on the lever into engagement with the shoulder or tooth 45 on the knock-off device 39. The worm 21 acts automatically to hold the dump body in any elevated position.

I have here illustrated additional drums or pulleys 46 mounted on the end of the shaft 9 and also a third pulley 47 mounted on the intermediate part of the shaft 9. The pulleys 46 are used to pull the vehicle out of a depression or rut by attaching one end of a cable to one of the pulleys to be wound thereon and the other end to a post or tree and then applying the power to the shaft 9.

The pulley 47 or the pulleys 46, 47 may be used as a windlass to load and unload heavy articles. When the pulleys 46, 47 are used the cables 12 are unhooked or disconnected from the toggles or from the drums 46, 47 it being understood that the drums 46, 47 are secured to or are integral with the shaft 9. If desired, these drums may be loosely mounted on the shaft 9 and connected thereto by suitable clutches.

The drum shaft 9 and parts thereon thus constitute a windlass connectable to the dumping body to control the hoisting and lowering thereof, and disconnectable therefrom to load and unload articles or to draw the vehicle out of deep ruts or soft spots in the road where the driving wheels cannot get sufficient traction to move the vehicle. The cables 12 which operate the dumping body wind on the shaft 9 and over cables used for pulling the load into the wagon body or for any other purpose wind on the drums 46 or 47.

In order to prevent the shifting of the lever 31 along the threads as 37 into engagement with the knock-off device 40 from stopping the rotation of the shaft 9 when the drums 46 or 47 are being used, means is provided for rendering the knock-off device inoperative. As here illustrated, the knock-off device 40 is a collar slidable on the shaft 9, and normally held in position by a clutch collar 48 slidable on the shaft 9 and keyed thereto at 49 and having teeth or pins 50 for interlocking with the knock-

off device 40. The collar 48 is normally held from sliding by suitable means as a set screw 51.

When either of the drums 46, 47 is to be used the set screw 51 is loosened and the clutch collar 48 slid along the shaft out of engagement with the knock-off device 40, and the knock-off device slid along the shaft 9 a sufficient distance to permit the lever 31 to feed to the right off the end of the threads 37 so that the shaft 9 can rotate therein in either direction. To restore the parts to their normal position after using the pulleys 46, 47, the lever 31 is operated to shift the clutch 30 to cause the shaft 9 to rotate in such direction as to feed the lever to the left, Fig. 4, along the threads 37 until it reaches the middle of the screw or threads 37, the levers being started on the threads 37 by pressing it to the left. The lever 31 is then operated to shift the clutch 30 to neutral position.

The knock-off collar 40 is then slid to the left to the end of the screw 37 and the clutch collar 48 again interlocked therewith and locked from sliding movement by the set screw 51.

The knock-off device or collar 39 threads on the screw 37 and is here shown as split and as clamped on the screw 37 by a screw or bolt 52.

Thus, one windlass is used to hoist the dumping body to load and unload heavy articles and pull the vehicle when the wheels have lost traction on the ground.

What I claim is:

In a dumping vehicle, a frame, a dumping body mounted on the frame, a hoisting apparatus comprising a winding drum carried by the frame, a power shaft, power transmitting mechanism between the shaft and the drum including reversing mechanism, said mechanism comprising a clutch section normally in neutral position, an operating lever for shifting the clutch, and means operated by the drum for automatically operating the clutch into neutral position, said means comprising a screw rotatable with the drum and arranged concentric therewith, a knock-off device rotatable with the screw at one end thereof, the lever being mounted with its axis substantially coincident with the drum and the screw and having a threaded passage associated therewith for receiving the screw whereby the lever is fed along the screw in engagement with the knock-off device during rotation of the drum.

In testimony whereof I have hereunto signed by name, at Auburn, in the county of Cayuga and State of New York, this 28 day of June, 1921.

COURTNEY C. AVERY.