S. J. RUSSELL.

TRUCK POWER SHOVEL.

APPLICATION FILED MAY 13, 1918.

1,359,841. **Patented Nov. 23, 1920.**

6 SHEETS—SHEET 1.

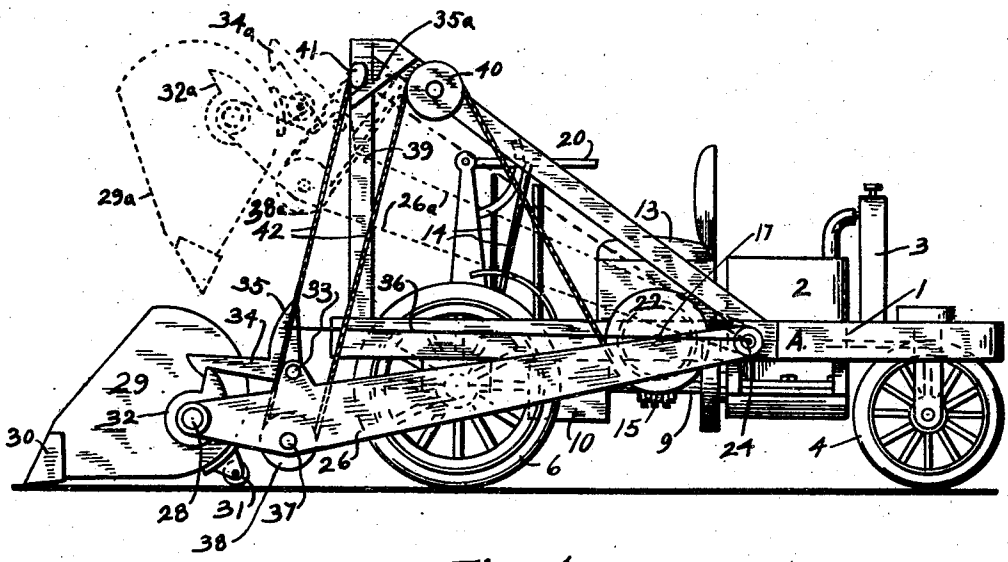


Fig. 1.

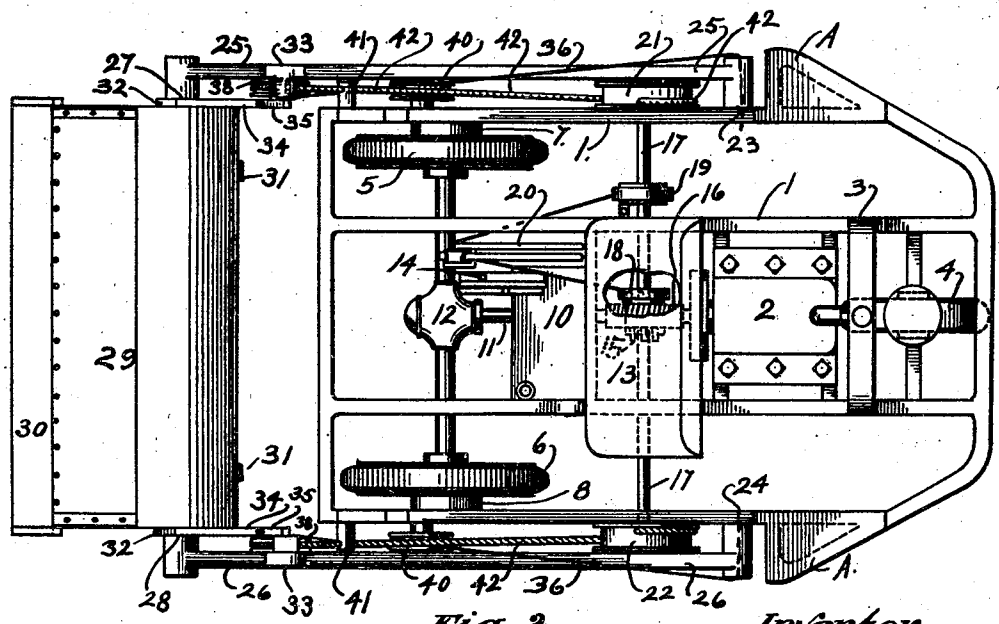


Fig. 2.

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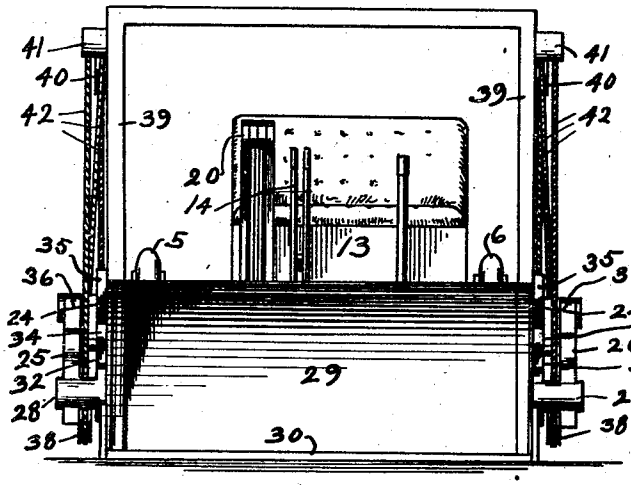


Fig. 3.

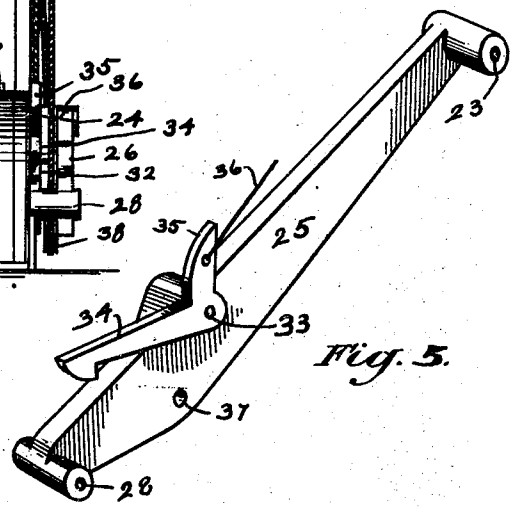


Fig. 5.

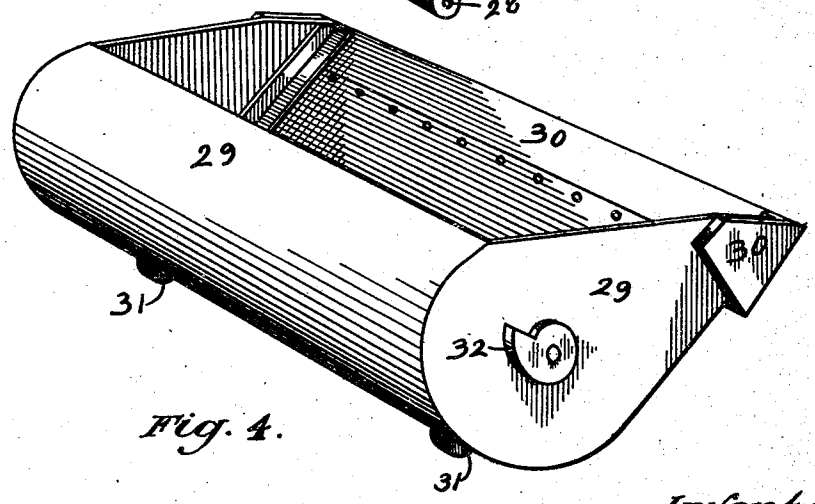


Fig. 4.

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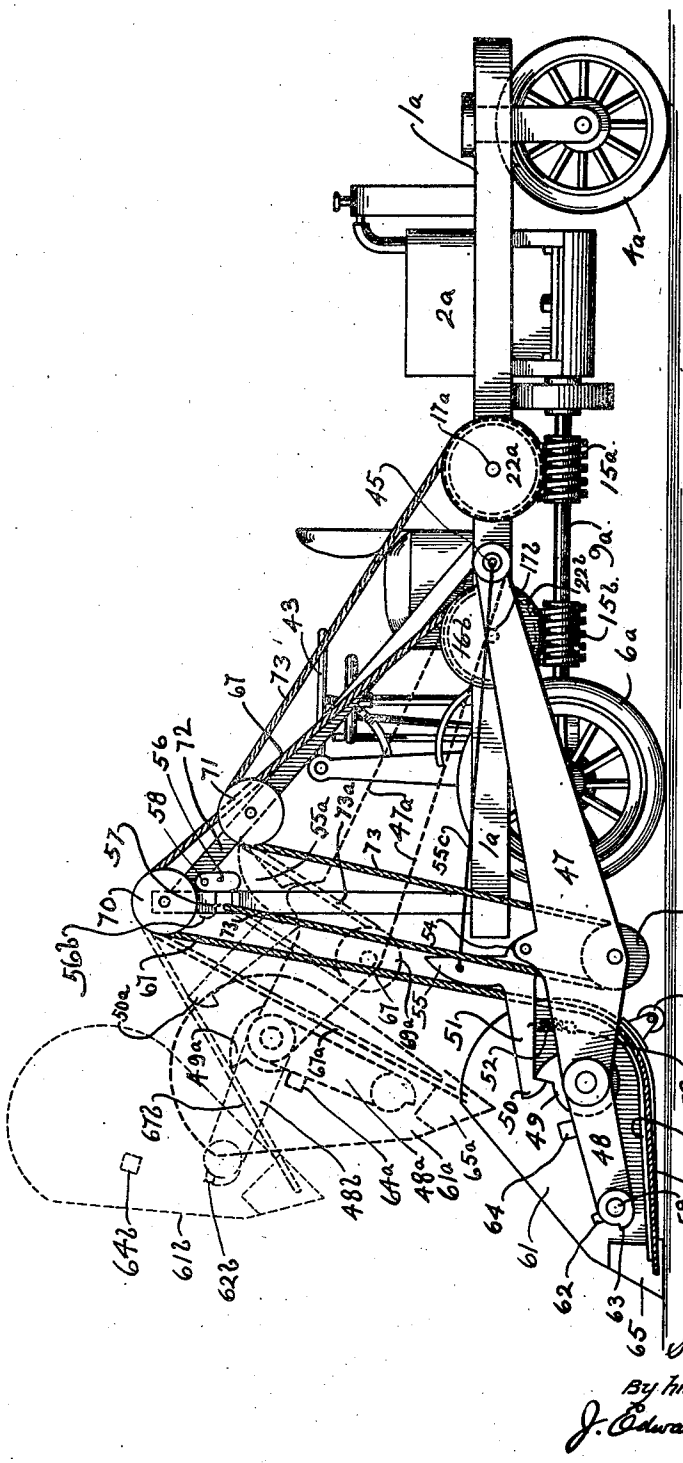


Fig. 6.

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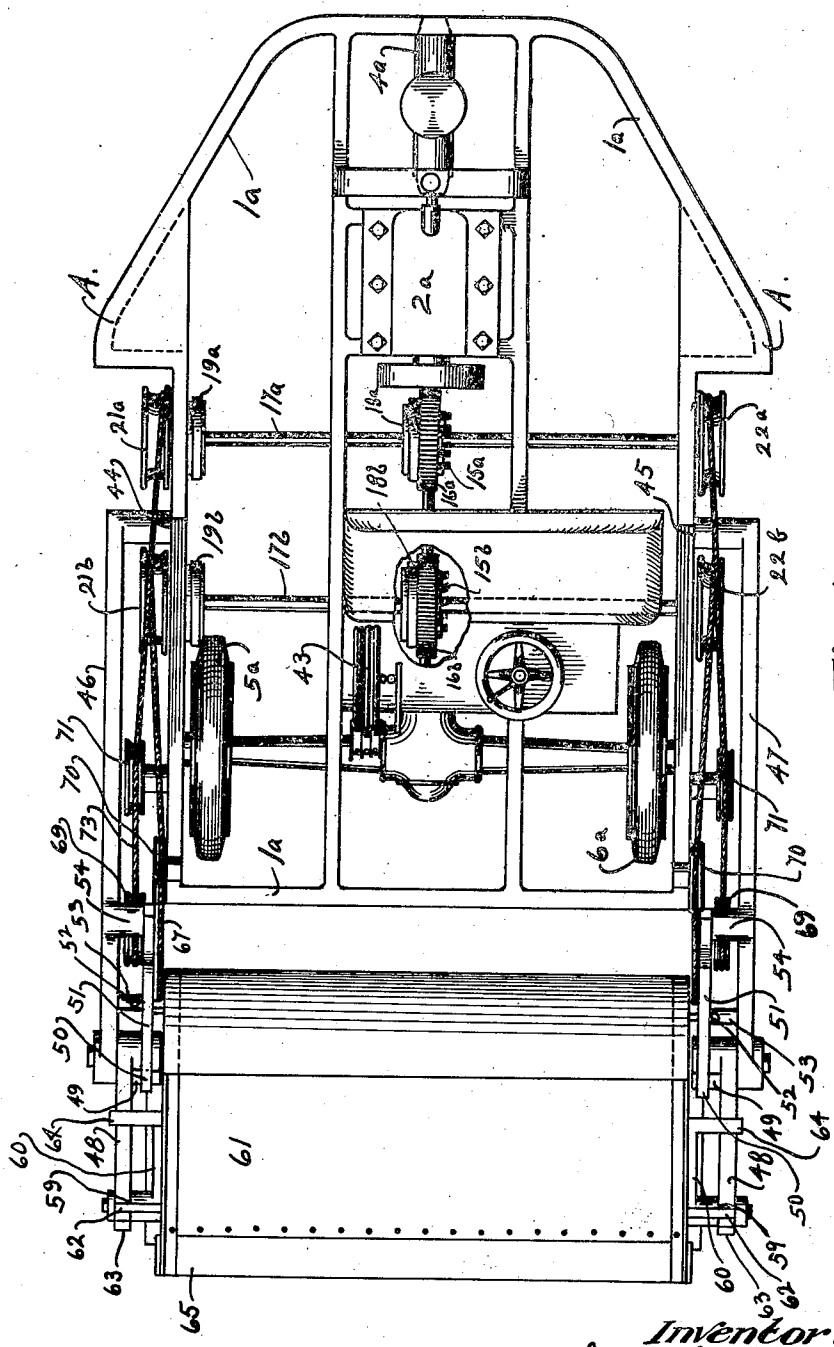


Fig. 1.

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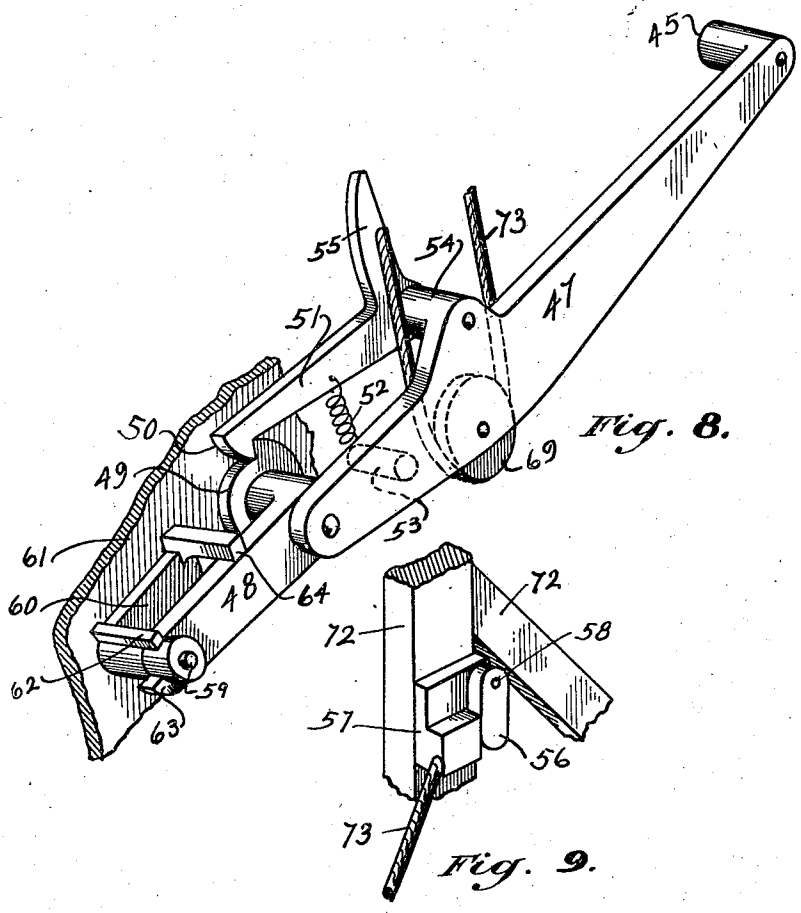


Fig. 8.

Fig. 9.

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6 SHEETS—SHEET 6.

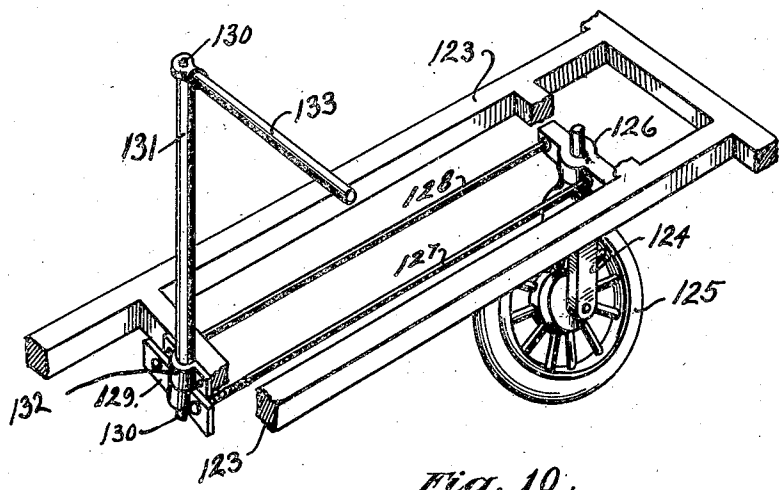


Fig. 10.

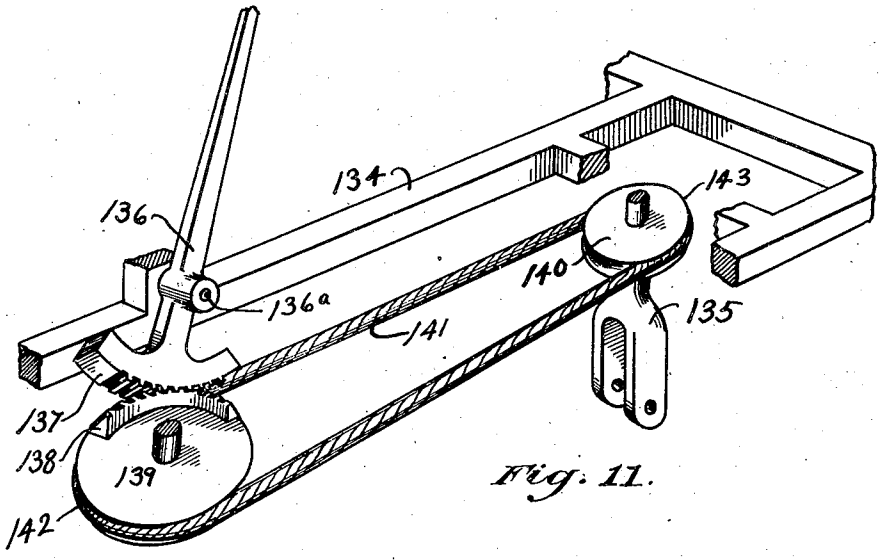


Fig. 11.

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UNITED STATES PATENT OFFICE.

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TRUCK POWER-SHOVEL.

1,359,841. Specification of Letters Patent. Patented Nov. 23, 1920.

Application filed May 13, 1918. Serial No. 234,172.

To all whom it may concern:

Be it known that I, SAMUEL J. RUSSELL, a citizen of the United States, residing at Williamsville, in the county of Erie and State of New York, have invented certain new and useful Improvements in Truck Power-Shovels, and do hereby declare the following to be a full, clear, and exact description of my invention, 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.

Like figures of reference refer to like parts.

This invention relates to truck power shovels, particularly to that class thereof adapted for handling ore, coal, etc.

The requirements of a shovel of this class include the accumulation of loose material into piles to feed hoisting buckets, particularly in the hold of a vessel where the material must be brought from the different parts of the hull and piled beneath the hatchway, through which the hoisting bucket operates. In accumulating loose material into piles, shovelfuls thereof must be carried some distance and then dumped into a pile.

The objects of this invention are to provide vehicle means with a power operated shovel and to include means for controlling the movements of the shovel.

Another object is to provide dumping mechanism with the shovel so constructed that the load, carried by the shovel can be dumped at the desired height according to the size of the pile accumulated.

A further object is to provide transmission mechanism for operating the shovel which can be thrown in and out of connection with the motor of the vehicle.

With these and other objects, my invention includes mechanism for operating the power shovel in conjunction with a motor vehicle. Various embodiments of my invention are illustrated in the drawings and are hereinafter described, their operation is explained and what I claim is set forth.

In the drawings:—

Figure 1 is a side elevation of a motor vehicle having mechanism thereon adapted to operate a shoveling bucket for accumulating and dumping shovelfuls of material, and embodies one form of my invention.

Fig. 2 is a plan of the motor vehicle and mechanism shown in Fig. 1.

Fig. 3 is a front elevation of the same.

Fig. 4 is a perspective view of the shoveling bucket.

Fig. 5 is a perspective view of one of the pivotal side arms with pawl attached used in positioning the shoveling bucket.

Fig. 6 is a side elevation of modified form of operating mechanism on a motor truck, differing from that shown in Figs. 1, 2, and 3, by having an extended operating link to the pivotal arms for dumping the shovel above higher piles, than is possible with the form shown in Figs. 1 and 2.

Fig. 7 is a plan of the truck and mechanism shown in Fig. 6.

Fig. 8 is a perspective view of one of the pivotal operating arms of the bucket illustrating the link extension and pawl connected therewith.

Fig. 9 is a perspective view of a fragment of the frame shown in Fig. 6, illustrating the positioning of the pivotal cam-block and cable connection.

Fig. 10 illustrates a fragment of the frame of the motor truck and one form of steering device connected therewith.

Fig. 11 illustrates a different form of steering device to that shown in Fig. 10.

In the figures:—

Referring to Figs. 1, 2, 3, 4 and 5, there is shown fixed upon the frame 1, various parts which go to make up a motor truck, including the engine 2, the radiator 3, the steering wheel 4, the driving wheels 5 and 6, with their respective brakes 7 and 8, the engine shaft 9, the shift gear box 10, the driving shaft 11, the differential casing 12, seat 13, the operating levers 14. Upon the engine shaft 9 is fixed a worm 15, which meshes with the gear 16, on the drum shaft 17. A clutch 18 is provided for communicating the rotation of the gear 16 to the shaft 17. A brake 19, on the shaft 17, having connections with the hand lever 20, serves to control the respective cable drums 21 and 22. Pivoted at the respective points 23 and 24 on the frame 1, are the pivotal arms 25 and 26, having pivotal connection at the points 27 and 28, with the shoveling bucket 29. The shoveling bucket 29 is provided with an edged nose-piece 30, riveted to the body of the bucket 29. In the lower part of the rear of the bucket 29 are rollers 31, 31. Fixed to each end of the bucket 29, is a pawl catch 32. Pivoted to each of the arms 25 and 26 at the points 33, 33, are pawls 34, 34. Each

pawl 34 has an upstanding arm 35 from which leads a line 36; that which has connection with the side arm 25, passes through a hole at 23, and that which has connection with the arm 26 passes through a hole at 24. Both lines 36, 36 have connection with a suitable controlling and operating device or lever, not here shown. Each of the arms 25 and 26, has a fixed pin 37, upon which is journaled a pulley 38. A frame 39 standing on and fixed to the frame 1, has a braced part on each side, adjacent one of the arms 25, 26, and has pivoted thereon, a pulley 40. A post 41 projects outward from each side of the frame 39, and is positioned to engage the arm 35 of each pawl 34. Fixed to each post 41, is a cable 42, which passes down and around the pulley 38, and up and around the idler pulley 40, and down and around the respective cable drums 21 and 22. In order to protect the pivotal ends of the arms 25 and 26, there is provided a guard shoulder A on each side of the frame 1.

Referring now to Figs. 6, 7, 8 and 9, there is shown attached to the frame 1^a, the various parts of the motor truck, including the engine 2^a, the steering wheel 4^a, and the driving wheels 5^a and 6^a, and the engine-shaft 9^a, upon which are shown two worms 15^a and 15^b. The worm 15^a meshes with the gear 16^a and the worm 15^b meshes with the gears 16^b. These worm gears 16^a and 16^b are journaled on the respective shafts 17^a and 17^b, and are connected therewith by the respective clutches 18^a and 18^b. Brakes 19^a and 19^b are provided on the respective shafts 17^a and 17^b. Fixed to the ends of the shaft 17^a, are the cable drums 21^a and 22^a, and fixed to the shaft 17^b are the cable drums 21^b and 22^b. Suitable connections between a group of levers 43 and the clutches 18^a and 18^b, and the brakes 19^a and 19^b are provided, but not here shown. Pivoted at the points 44 and 45 on the frame 1^a, are the pivotal arms 46 and 47. To the outer end of each arm 46 and 47 is pivotally mounted an extension link 48, having a pawl catch 49 integral therewith, and positioned for engagement with the hook end 50 of the pawl 51. A tension spring 52 connects the pawl 51 with the post 53 integral with the pivotal arm. The pawl 51 is pivoted on an extension 54, of the pivotal arm, and has an upstanding curved arm 55 adapted for engagement with the cam-block 56, shown in Figs. 6 and 9, resting against a lug 57 on the frame of the machine. A cable 55^c connects the arm 55 to each of the arms 46 and 47 through their respective center holes at 44 and 45 with suitable manually operated means, not here shown. The cam-block 56, pivoted at 58 can be swung out of the way, to rest upon the top of the lug 57. Pivoted at 59 to the outer end of each link 48 is a stop-piece 60, fixed to the shoveling bucket 61. The stop-piece 60 has a finger 62 adapted to contact the tooth 63, upon a partial rotation of the bucket 61. A finger 64 integral with the stop-piece 60, limits the rotation of the bucket 61 in the opposite direction. The shoveling bucket 61 has a nose-piece 65, extending across the face thereof, and also has a cable guide 66 at each end of the bucket, against which rests a cable 67; there being one cable for each end of the bucket 61. Each cable is fixed to the nose-piece 65. In the rear of the bucket 61, are two rollers 68, 68, which support the lower rear end of the bucket 61. Journaled upon each of the arms 46 and 47 is a pulley 69. Pulleys 70 and 71 are journaled on each side of the upright frame-work 72. The cable 67 passes up around the pulley 70 and down around the drum 22^b. Attached to the lug 57, is a cable 73, which passes down around the pulley 69 and up around the pulley 71, then down around the cable drum 22^a. The cables 67 and 73 with their various pulleys and connections are duplicated on the opposite side of the machine, in connection with the arms 46.

Referring now to Figs. 10 and 11, which illustrate forms of steering mechanism adapted for use in the motor vehicle, shown in the other figures, referring particularly to Fig. 10, there is shown positioned for pivotal connection, with the fragment of frame 123, which is similar to the chassis frame shown in the previously mentioned figures, a forked member 124, having journaled therewith a wheel 125. In the upper end of the member 124 is fixed a yoke 126, having connected with each end thereof, rods 127 and 128, which are connected with a yoke 129, fixed to a vertical steering shaft 130, passing down through a steering post 131, fixed by the clamp 132 to the frame 123. The upper end of the shaft 130 has fixed thereto, a handle 133, for turning the shaft 130 of the steering wheel 125.

Referring now to Fig. 11, upon the fragment of the frame 134 is shown positioned for journaling on said frame, the forked member 135, adapted to hold a steering wheel such as 125 of Fig. 15. On the pin 136^a, the frame 134, is pivoted a lever 136, having integral therewith a segmental beveled rack 134, meshing with a segment 138 of a beveled gear mounted upon the pulley 139, which is adapted for pivotal engagement with the frame 134. Fixed to the member 135 is a pulley 140, which is connected with the pulley 139, by the cable 141 which is fixed at mid points 142, 143, to the respective pulleys 139 and 140.

Considering now the construction and operation of the various embodiments of my

invention illustrated in the figures, referring first to the truck power shovel shown in Figs. 1, 2, 3, 4 and 5, in operation, the bucket 29 is permitted to rest upon the ground by letting out the cable 42, upon releasing the brake 19. With the clutch 18, released from connecting the gear wheel 16 and the shaft 17, the motor vehicle is moved forward to force the bucket 29 into the pile of loose material to be transferred. The vehicle is then stopped and the clutch 18 is thrown in to rotate the shaft 17 and cause the drums 21 and 22 to wind up each of the cables 42, 42 simultaneously and raise the pivotal arms 29 and 30, with the loaded bucket 29, into a position, just below that shown by the dotted lines 26^a, 29^a and 34^a, representing the respective side arm 26, bucket 29 and pawl 34 in dumping position. The vehicle is then backed away from the pile of material to be removed, and taken to the site at which the material is to be dumped. The drums 21 and 22 are further caused to wind the cables 42, 42, raising the side arms 25 and 26, with the bucket 29, into the position illustrated by the dotted lines in Fig. 1, approaching which position, the arm 35, of the pawl 34, rubbing on the post 41, causes a movement of the pawl 34, to release the same from the pawl catch 32, permitting the bucket 29 to drop down, seeking a position, having its center of gravity directly below its pivotal connection 28, with the arms 25 and 26, thus dumping the load.

Considering the type of truck power shovel shown in Figs. 6, 7, 8 and 9, using an extended link to each of the pivotal arms, the operator has the choice of two dumping positions for the bucket 61. The material is gathered in the manner explained for the type of truck power shovel shown in Figs. 1 to 5 inclusive. When dumping at the position of the bucket marked 61^a, the upward movement of the arm 47, approaching the position 47^a, by means of the winding of the cable 73 on the drum 22^a, causes the unlocking of the hook 50 of the pawl 51, by the rubbing of the arm 55, on the pivotal cam-block 56, causing the arm 55 to take the position 55^a. The finger 64^a remains in contact with the link 48^a as shown by heavy broken lines. When it is desired to dump at the position 61^b, the cam-block 56 is previously thrown out of the path of the arm 55 on its pivot 58, to rest in the horizontal position 56^b, so as to retain the hook 50 in locking engagement with the pawl-catch 49, and maintain the link 48, extended in the position 48^b. To dump the bucket 61 into the position 61^b, the cable 67 is drawn onto the drum 22^b by throwing in the clutch 18^b, while the engine 2^a is running, and by means of the guide 66 and the anchorage of the cable 67, in the nose-piece 65, the bucket 61 is turned into the position 61^b and with it the finger 64, leaves the link 48 to take the position 64^b. The bucket 61 will upon the release of the cable 67, from the drum 22^a, resume its resting position on the link 48, having the finger 64 in contact with the link 48. Upon the release of the cable 73, from the drum 22^b, the arms 46 and 47 will drop into the full line positions shown in the figures.

In the case of the position of the bucket 61, 61^a and the position 29^a of the bucket 29, shown in Fig. 1, the buckets 61 and 29 must be manually turned to hook the pawls upon their respective pawl-catches 49 and 32, ready for the next shovelful.

In order to give the operator more freedom in manipulating the various levers, I provide a steering device for the truck, having a hand lever such as 133 or 136 of the respective Figs. 10 and 11, requiring the use of only one hand. In operating the form shown in Fig. 10, any angular movement given to the lever 133 is communicated through the shaft 130, to which it is fixed and the yoke 129, to the connections 127 and 128, to the yoke 126, giving an angular movement to the wheel 125, journaled in the fork 124. In manipulating the form of steering device shown in Fig. 11, any angular movement given to the lever 136, pivoted upon the pin 136^a, causes a partial rotation of the pulley 139, through the meshing of the segmental beveled racks 137 and 138, and the angular movement of the pulley 139 is communicated to the pulley 140, and the fork 135, through the cable 141, fixed to the pulley 139 at the point 142, and fixed to the pulley 140 at the point 143.

Either of these forms of steering device may be used in connection with the truck construction, including means for operating the shovel shown in the various figures. The lever form of steering device is indicated in Figs. 1 and 2.

Modifications of the embodiment of my invention illustrated in the figures and above described may be made without departing from the scope and spirit of my invention. I therefore, do not wish to be confined to the details thereof herein illustrated and described.

I claim,

1. In a truck shoveling device, including a motor truck having a frame, a motor and a steering device, the combination with said truck, of a shovel positioned at one end thereof, a pair of arms pivoted to said frame and connected with said shovel, to include the same between their swinging ends, intervening mechanism connecting said arms with said motor to lift the same, controlling means for throwing said mechanism in and out of connection with said motor, and supporting rollers upon said shovel near its

rear end, whereby said shovel is supported off the ground by said rollers and its front end.

2. In a shoveling device, including a wheeled truck, a motor and a frame, swinging arms pivoted on said frame, a shovel pivoted on and between said swinging arms at their swinging ends, hoisting means connecting said motor with said arms, holding means for releasably fixing said shovel upon said arms, a tripping stop fixed in position relative to said frame, to engage said holding means and to release its connection with said shovel, as said holding means are brought into contact with said tripping stop, during the upward movement of said arms, whereby said shovel is automatically released to swing and dump its load from its elevated position.

3. In a truck shoveling device, a frame, a pair of arms pivoted to said frame and pivoted to said shovel to include said shovel between their swinging ends, a pawl catch fixed to said shovel on each side thereof at the pivotal points of said shovel with said arms, a pawl pivoted on each of said arms in position to engage a pawl catch, a cam extension on each of said pawls, a cam post fixed to said frame and positioned to rub on said cam extension at the upper end of the upward swing of said arms to release said pawl from said pawl catch, and means for lifting said arms to raise said shovel.

4. In a truck shoveling device, a frame, a pair of arms pivoted to said frame, an extension pivoted to each of said arms at their swinging ends, a pawl catch fixed to each of said extensions at their pivot points with said arms, a pawl pivoted on each of said arms and positioned thereon, to engage and releasably hold said pawl catch, said shovel being positioned between said arm extensions and pivoted thereto, means for releasably holding said shovel from turning on said extensions, hoisting means connecting said arms with said motor, and means for turning said shovel on said extensions.

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