Mar. 3, 1925. 1,527,995

C. A. PARKS

MECHANICAL SHOVEL

Filed May 12, 1924 2 Sheets-Sheet 1

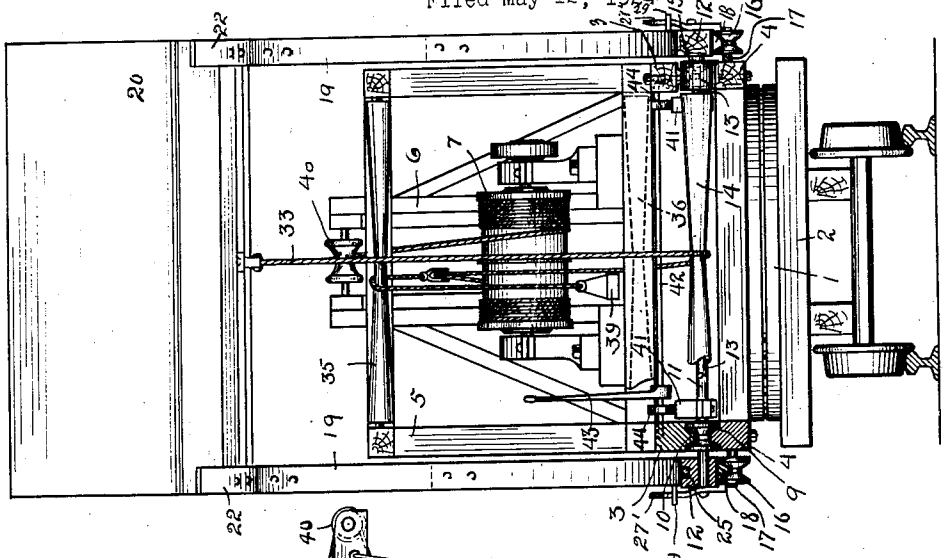


Fig. 2.

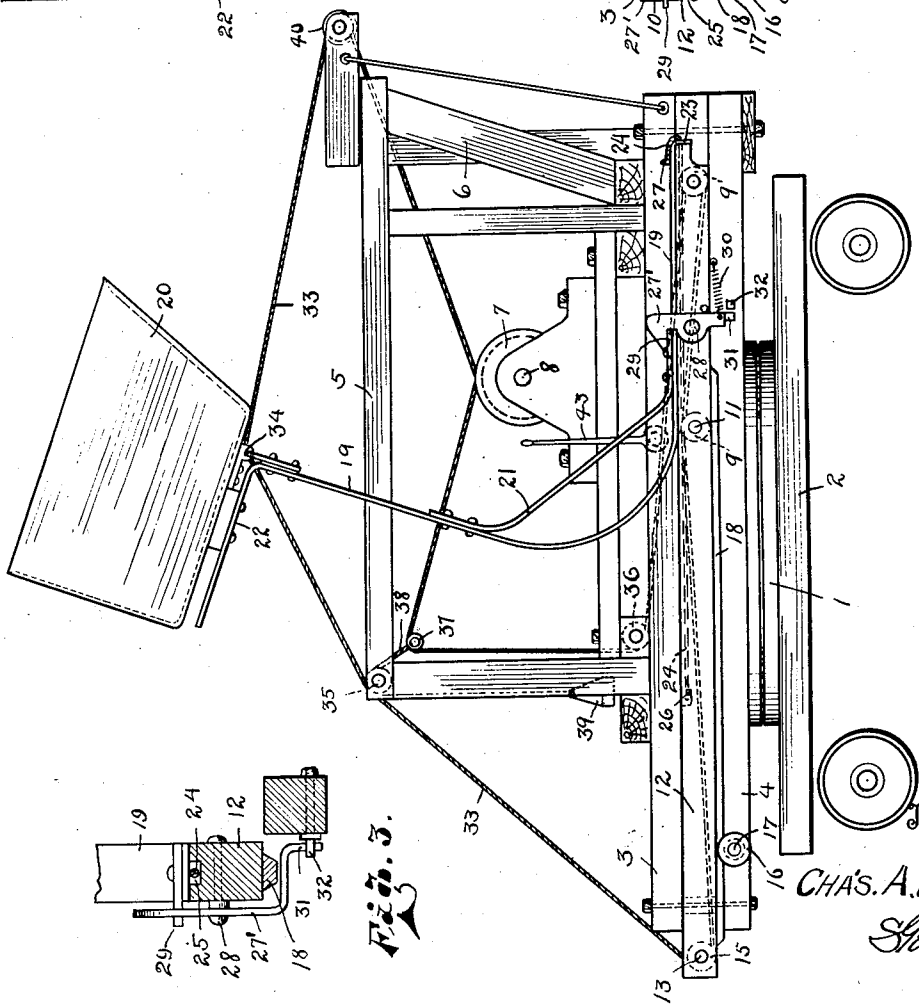


Fig. 1.

Fig. 3.

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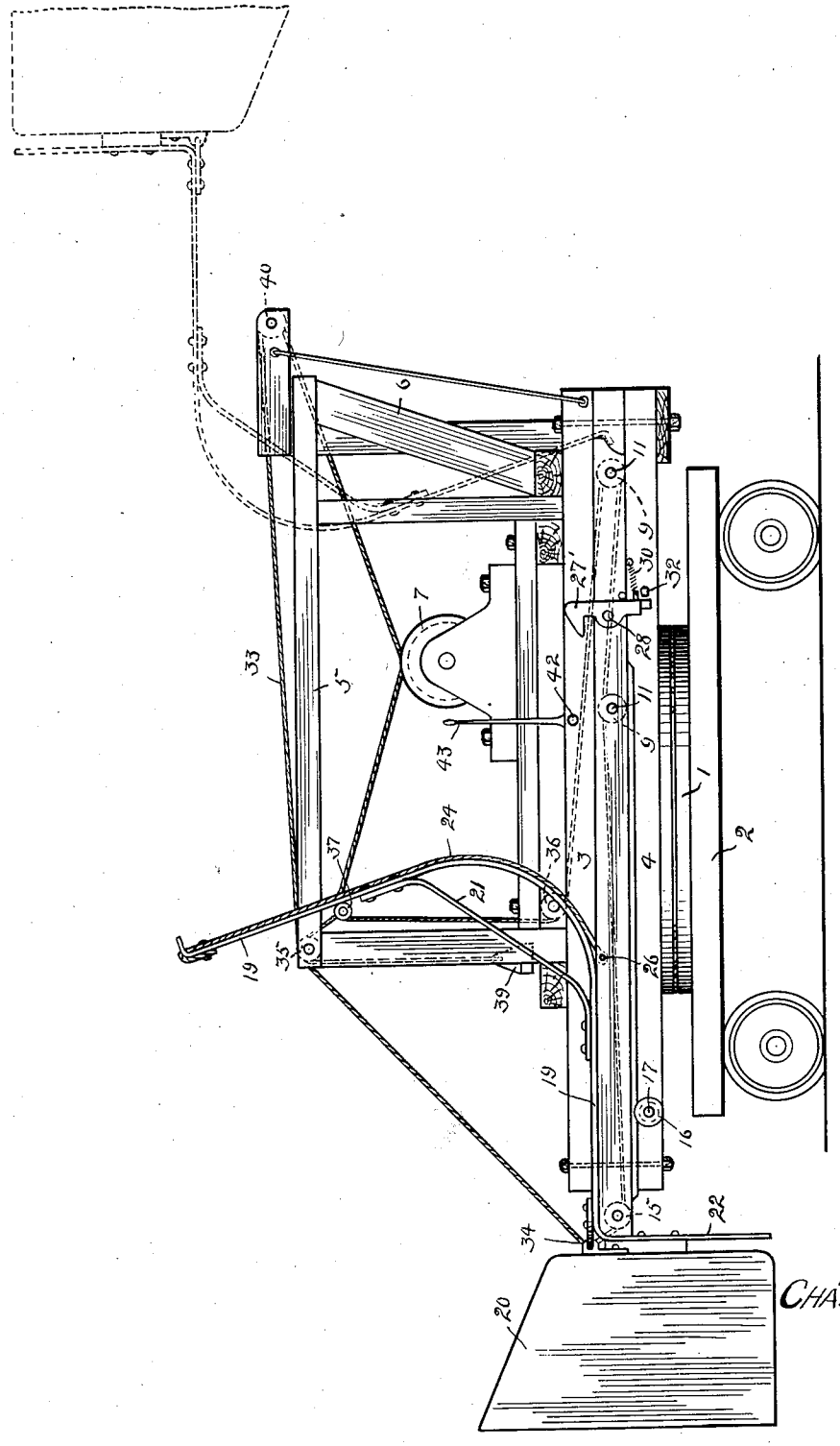


Fig. 4.

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UNITED STATES PATENT OFFICE.

CHARLES A. PARKS, OF CHISHOLM, MINNESOTA.

MECHANICAL SHOVEL.

Application filed May 12, 1924. Serial No. 712,524.

To all whom it may concern:

Be it known that I, CHARLES A. PARKS, a citizen of the United States, residing at Chisholm, in the county of St. Louis and State of Minnesota, have invented certain new and useful Improvements in Mechanical Shovels, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to mechanical shovels such as used in mining operations in tunnels or the like, and refers particularly to that type of shovel which discharges its burden overhead into a car or other receptacle at the rear of the shovel.

The principal object is to produce a more practical and efficient device of this character than heretofore known.

Other objects and advantages will appear in the further description of the invention.

Referring now to the accompanying drawing in which like reference characters indicate like parts:

Figure 1 is a side elevation of one of the improved machines with the shovel proper or dipper shown as being locked in vertical position;

Figure 2 is a front elevation of the machine, showing a portion of one side thereof in section;

Figure 3 is an enlarged sectional view of a fragmental portion of one side of the machine; and

Figure 4 is a side elevation of the machine showing the dipper in digging position, and in dotted lines the dipper in discharging position.

The machine is pivotally supported upon a turntable 1, mounted upon a truck 2, as is customary in such devices, and may be operated pivotally upon the table in any well known manner, the same not forming part of my present invention; nor does the specific arrangement of power unit, not shown, enter into the invention.

Upon the turntable is mounted a frame structure including the horizontally disposed and vertically spaced side beams 3 and 4, there being a pair of these upon either side which may be securely united in any manner desired.

A rectangularly shaped superstructure indicated at 5 is supported above the frame, and at the rear of the machine is a centrally positioned upright superstructure 6 the principal object of which is to support operating mechanism, such as sheaves, rollers, or the like. Within and substantially centrally of the superstructure is located a double line winding drum 7, it being mounted upon a suitable shaft 8 and provided with any desired form of power controlling mechanism not shown. Intermediate of the side members 3 and 4 are a set of carriage supporting rollers or wheels indicated at 9, they being of V-shape circumferential form so as to fit the V-shaped edge 10 of the beams 3 and 4, this shape being to provide against lateral dislodgment of the rollers. The axles or shafts 11 of the rollers extend wholly transverse the frame of the machine and protrude at both sides thereof extending into and supporting the side members 12 of the carriage, that is at the rearmost end thereof, while the forward ends of the side members 12 of the carriage are united by a through shaft 13, similar to the shafts of the rollers 9. The shaft 13 carries intermediate of the side beams of the frame a longitudinally tapered roller 14 intermediate of the ends of which and the beams 12 are short flat rollers 15 which simply form spacers between the side beams 12 and the ends of the tapered roller. The forward ends of the carriage 12 are supported by V-shaped rollers 16 mounted upon the protruding ends of the through shaft 17, which shaft is fixed within the side beams 4, thus forming a permanent non-frictional support for the reciprocable carriage. There are V-shaped tongues or webs 18 on the lower face of the beams 12 to fit within the correspondingly shaped faces of the rollers 16, the same being to provide against lateral objectionable movement of the carriage, but to permit of the free reciprocation thereof.

The shovel proper of the machine is indicated at 20 and preferably is elongated laterally of the machine to provide the greatest capacity possible and is so shaped to load to the best advantage when being forced longitudinally of the floor of the tunnel. The shovel is supported at either end thereof by a U-shaped, rocking, dipper stick 19, the same being composed preferably of strong flat steel bars reinforced transverse their arched portion by braces 21. These rockers are in length just equal to the length of the carriage beams 12, and are turned at right angles as at 22 on the shovel support-

ing end, and as at 23 on the opposite end; these angled ends being designed to overlap the ends of the carriage beams when brought into contact therewith, and being of sufficient length to provide for variable adjustment of the dipper 20 thereupon. The overlapping engagement of the shovel end of the rockers is for the purpose of providing positive forcing connection with the carriage for the shovel, as by the action of the carriage the shovel is forced into the matter being shovelled, while the engagement of the opposite angled ends of the rockers is for the purpose of preventing slipping backwardly of the rockers when the shovel is discharging at the rear of the machine.

Further securing means for the rockers is provided in the way of a wire rope or line 24 lying within the suitable channel 25 for the purpose in the upper face of the carriage beams 12; these ropes or chains if preferred being securely fastened at one end as at 26 in the beam 12, while the other end is securely attached as at 27 in any desired manner to the extreme rearmost end of the rockers 19, the rockers being thus held against backward sliding motion when the dipper 20 is being raised with its load, the lines 24 lying prone in the slots 25 when the dipper is being discharged, and rising with the rear ends of the rockers when the dipper is being rocked to its digging position.

Intermittent locking means is provided for the rockers 19 in the form of upright dogs 27′ pivoted at 28 on the sides of the carriage beams 12, the rockers having a laterally protruding catch 29 just at the junction of the brace 21 with the rearmost portion of the rocker, and which catch, when the rockers are in the position shown in Figure 1, are engaged by the dog, the tail of the latter having a contractile spring 30 attached thereto for the purpose of insuring such engagement automatically when the dipper is raised. This intermittent locking device upon either side of the carrage is essential in that in the event of the carriage being extended forwardly somewhat and draft is applied to the lifting line of the shovel until the same is elevated to the position shown in Fig. 1 of the drawings, it will automatically become locked in that position, and there retained until a continued draft upon the operating line will cause the carriage to be fully retarded until at least the tail 31 of the dog engages the end of the laterally projecting pin 32 mounted within the beam 4. It is apparent that the positioning of the pins 32 will determine the duration of locked relation existing between the rockers and the carriage beams.

Thus it will be seen that when the shovel is fully raised, or at least to the position shown in Fig. 1 of the drawings, and the carriage fully retarded, the locks will be released, and a further stress upon the operating line will cause the shovel or dipper to continue its travel to the rear of the machine and dump; it being pivotally supported at the extreme junction of the rear end of the rockers 19 over the rearmost end of the carriage beams.

But a single line 33 is used for operating the shovel or dipper, both ends of which are suitably connected as at 34 to the under side of the dipper. Forwardly of the dipper the line passes over an elongated spool like roller 35, it being less in diameter centrally than at the two ends so as to cause the line to pull centrally as much as possible; thence downwardly to the similarly shaped roller 14, around it to the back of the machine, around a similarly shaped roller upon the same shaft that supports the rearmost rollers 9, thence forwardly again to a similarly shaped roller 36 in the forward end of the superstructure, thence upwardly to the snatch block 37 and from there to the left side of the drum 7 as viewed from the front of the machine.

The snatch block 37 is yieldably supported by a line 38 hanging over the roller 35 and having a suitable weight 39 attached thereto, the same being to compensate for any undue slack occurring in the operating line.

While I have stated that but a single line is used two short ones may be employed in preference thereto but the action is the same as a single line for the opposite end is wound in the opposite way around the right hand end or section of the drum 7 so that when one end is wound up the other is unwound and this end of the line leads from the dipper 20 to and around the small tapered roller 40 mounted in the central upright frame 6, thence directly to and around the right section of the drum, as clearly shown in Figure 2.

Just inside of each pair of side members 3 and 4 and mounted upon the shafts 11 are fixed the beams 41, which, as is evident, travel back and forth with the carriage. Directly over these beams is mounted a transverse shaft 42 rockably controlled by the lever 43 which is placed conveniently for the operator, and this shaft carries eccentrics 44 directly over the beams 41 and engageable therewith when the shaft 42 is suitably rocked or rotated for such purpose. This is to act as a brake or holding means for the carriage so that in the event of wishing to hold the dipper up against the work the carriage may be held stationary while the dipper is raised to the desired position when the carriage may be released to act in conjunction with the positioning of the dipper as heretofore described.

The operation of the device is as follows:

Assuming the position of the dipper to be as shown in Figure 1 of the drawings, if it is desired to operate same as a shovel, the drum 7 is rotated in clockwise direction, which will cause stress to be put on the line leading to the forward end of the machine and slacken the line leading to the rear when the dipper will be drawn in an arcuate course downwardly in front of the forward end of the carriage, the rockers 19 rolling upon and traversing the upper surface of the beams 12, which motion it is obvious will automatically unlock the dogs 27′, it being impossible for them to function as a lock during such motion of the rockers. The shovel will then assume a position of rest if desired with the straight portion of the rockers lying upon the forward portion of the carriage beams 12 when a continued stress upon said line will cause the carriage to advance due to the fact that the pulling line passes around the extreme rearmost roller on the axle 11 of the carriage. Thus the shovel may be forced into the muck or face of the material being engaged. Then when desired to lift same up and over the machine for dumping the drum 7 is turned in anti-clockwise direction when stress is put upon the opposite end of the line, and the first tendency is for the carriage to recede until that point is reached when the dipper will be raised more readily than the backing up of the carriage, or, as before stated, the carriage may be held at any desired point by the friction eccentrics 44 being applied thereto. In either event the dipper will eventually rise to the position shown in the drawing, Figure 1, when the dogs 27′ will function to hold the dipper in such relation to the carriage until at least the latter has become sufficiently retracted for the tail of the dogs to engage the pins 22 which releases their hold upon the dipper rockers, when the dipper may be further drawn backwardly into dumping position.

It is evident that I have shown but a single embodiment of the invention, the details of which may be considerably varied without departing from the spirit of the invention.

Having thus described my invention, what I claim and desire to secure by Letters Patent, is:

1. A mechanical shovel of the type described comprising an upright frame structure, a horizontally reciprocable carriage in the base of the structure, a dipper, rocker arms rigidly attached to the dipper wholly supported and rockably carried upon the carriage, and means for operating said arms.

2. A mechanical shovel of the type described comprising an upright frame structure, a horizontally reciprocable carriage in the base of the structure, a dipper, rocker arms rigidly attached to the dipper and rockably carried upon the carriage, and a single line and drum for selectively or simultaneously operating the carriage and dipper.

3. A mechanical shovel of the type described comprising an upright frame structure, a horizontally reciprocable carriage in the base of the structure, a dipper, rocker arms rigidly attached to the dipper and rockably carried upon the carriage, a single line and drum for selectively and simultaneously operating the carriage and dipper, and cooperative means upon the carriage and arms for automatically locking said arms to the carriage when the dipper is in its extreme uppermost position.

4. A mechanical shovel of the type described comprising an upright frame structure, a horizontally reciprocable carriage in the base of the structure, a dipper, rocker arms rigidly attached to the dipper and rockably carried upon the carriage, a single line and drum for selectively and simultaneously operating the carriage and dipper, cooperative means upon the carriage and arms for automatically locking said arms to the carriage when the dipper is in its extreme uppermost position, and means for automatically releasing said locking engagement for discharging the contents of the dipper.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

CHARLES A. PARKS.

Witnesses:
JOHN FRANK MCDONALD,
FRANK R. ZIMMERMAN.