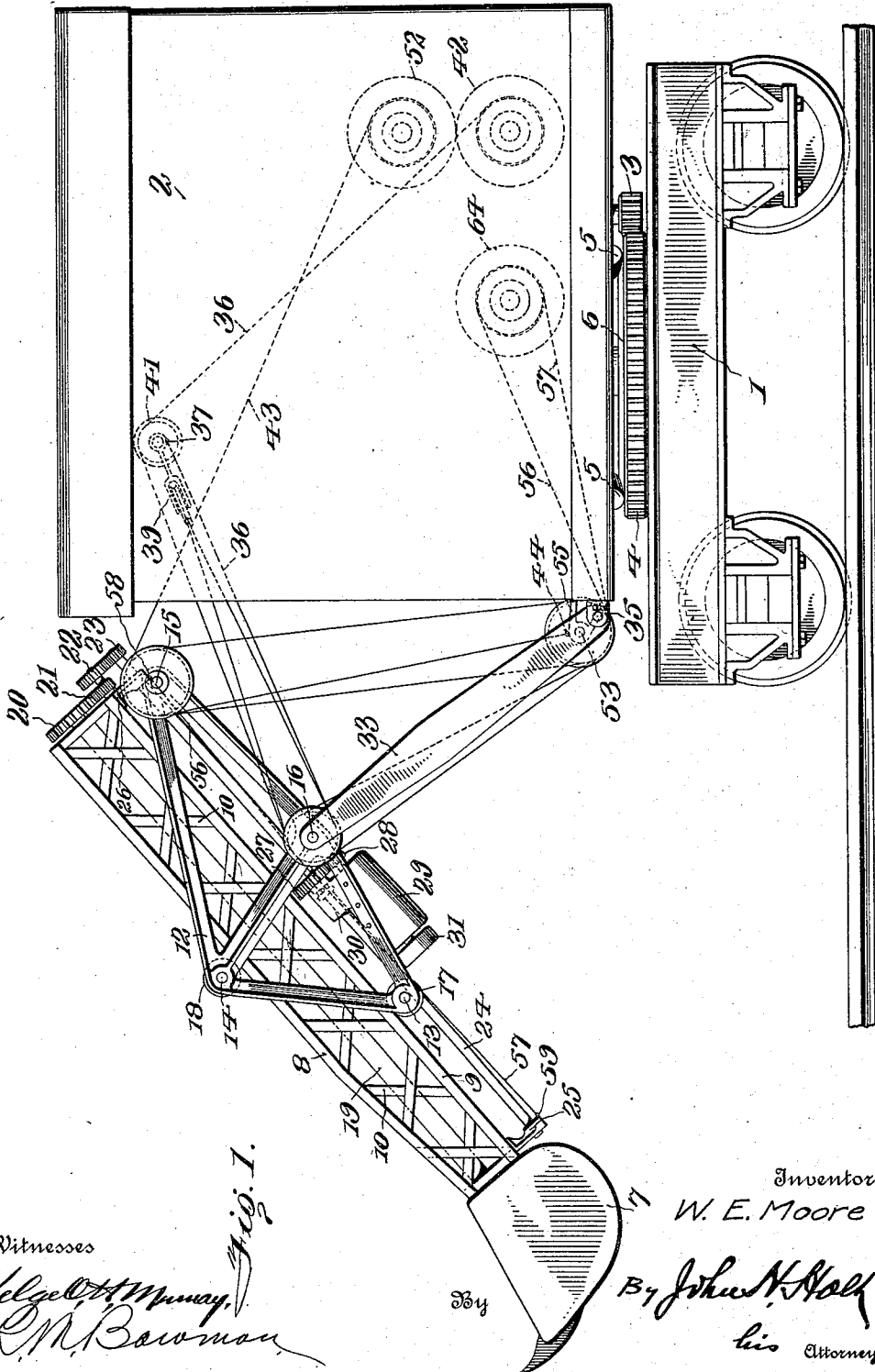


W. E. MOORE.  
POWER SHOVEL.  
APPLICATION FILED SEPT. 3, 1912.

1,185,427.

Patented May 30, 1916.

2 SHEETS—SHEET 1.



Witnesses  
*Helge A. Murray*  
*R. M. Barman*

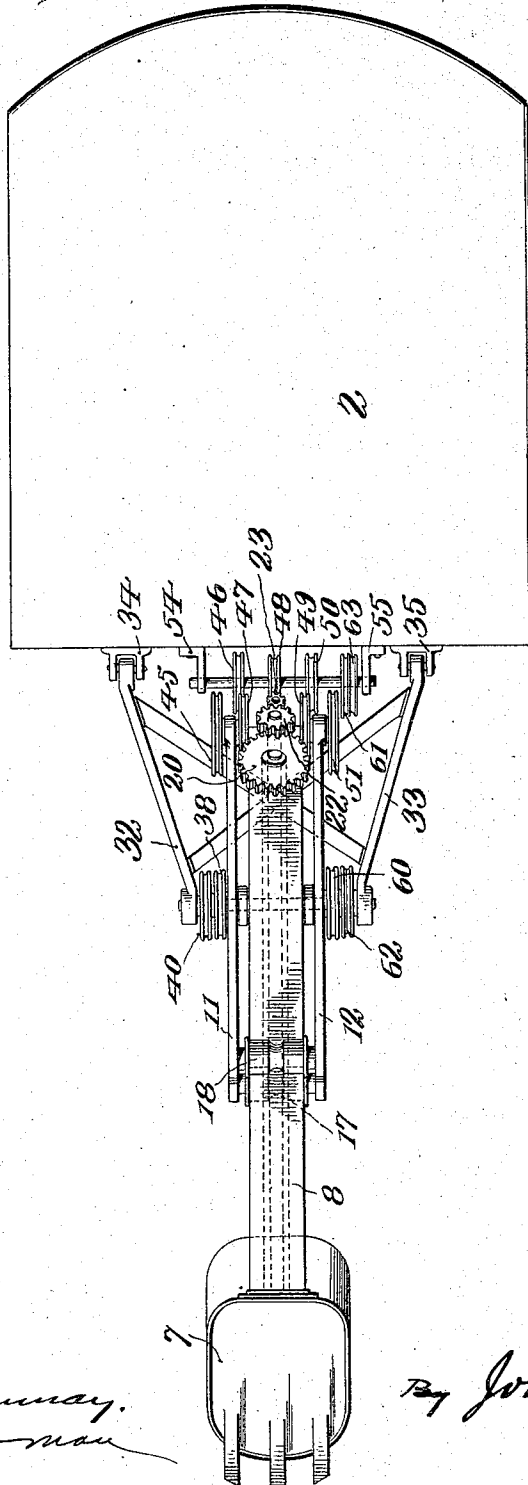
Inventor  
W. E. Moore

By *John N. Hall*  
his Attorney

W. E. MOORE.  
 POWER SHOVEL.  
 APPLICATION FILED SEPT. 3, 1912.

1,185,427.

Patented May 30, 1916.  
 2 SHEETS—SHEET 2.



*Fig. 2.*

Witnesses  
*Helge A. Munnay.*  
*R. M. Bowman*

Inventor  
 W. E. Moore

By *John H. Volk*  
 his Attorney

# UNITED STATES PATENT OFFICE.

WILLIAM E. MOORE, OF PITTSBURGH, PENNSYLVANIA.

## POWER-SHOVEL.

1,185,427.

Specification of Letters Patent.

Patented May 30, 1916.

Application filed September 3, 1912. Serial No. 718,436.

*To all whom it may concern:*

Be it known that I, WILLIAM E. MOORE, a citizen of the United States, residing at Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Power-Shovels, of which the following is a specification.

This invention has for its object the provision of improved means for supporting and manipulating the scooping member of the shovel known in practice as the "dipper," whereby a wider range of operations, greater nicety of control, ease of transportation, and celerity of movements may be attained, the said shovel being capable of working in an extremely limited radial and vertical clearance.

Other objects and advantages of the said invention will more fully appear from the following description, in which reference will be had to the accompanying drawings, wherein, Figure 1 is a side elevation showing one embodiment of my said invention, and Fig. 2 a top plan view thereof.

In the accompanying drawings, 1 represents a car truck or running gear of any desired description on which is mounted a rotatable cab 2, which we may assume is of well known construction, being rotatable by means of power driven pinion 3 meshing with a circular rack 4, the said cab resting on rollers 5 which travel on a circular track 6.

The present invention is not concerned with the construction of the cab or the mode of manipulating the same, so that these features need not be here described in detail.

Referring now to the parts which have more particularly to do with my invention, these include in the case shown, among other parts, a dipper 7, which, having no need for a swinging bottom, is preferably permanently closed, except at its upper opening or mouth. This dipper is carried by a dipper handle which comprises two channel irons 8 and 9 rigidly connected by side lattice braces 10, and this handle is in turn supported for longitudinal or telescopic movement in a rocking cradle or cantaliver frame comprising two parallel side frames 11 and 12 suitably braced at four points by shafts or rods 13, 14, 15 and 16 as shown.

The dipper handle travels longitudinally

between two rollers 17 and 18 mounted respectively on the shafts 13 and 14 of the tilting cradle, the dipper handle resting and traveling upon the roller 17 alone. The weight of the dipper and other parts on the left (Fig. 1) of the pivoted point of the cradle is sufficient, however, to prevent an overbalancing of the dipper on said pivot in the wrong direction. This cradle itself is mounted between its ends to rock on shaft 16 as a pivot, and this shaft is mounted at or near the outer ends of two arms 32 and 33, which together we shall call the "boom" of the shovel. These arms are pivotally supported in two brackets 34 and 35 respectively, made fast to the cab 2, and may be cross braced as shown.

Unlike other shovels of which applicant is aware, the dipper of the present one is angularly movable around an axis extending longitudinally of its handle, so that it may be rotated to dump its contents or to any angle to accommodate it to a desired cut. For the purpose of thus manipulating the said dipper, the same is made fast to a shaft 19 extending, in the case shown, the length of the dipper handle and carrying at its end opposite said dipper, a gear 20 fast thereon, which meshes through suitable intermediate gears 21 and 22 with a pinion 23 fast on a shaft 24, journaled in suitable brackets 25 and 26 mounted on the dipper handle at or near each end thereof as shown. This shaft 24 is square in cross section between its bearings, and extends through a square opening in gear 27 which it fits in such manner as to permit relative movement between the gear and shaft longitudinally of the latter, but so as to prevent relative rotary movement between these parts. The gear 27 meshes with a pinion 28 on the armature shaft of an electric motor 29, made fast in any suitable way to the tilting cradle. The gear 27 may be held against movement longitudinally of shaft 24 by being mounted to rotate in a bracket 30, forming a part of the frame of the motor 29, or otherwise made fast to the rocking cradle. It will therefore be seen that by means of the motor 24, operating through the train of gears described, any desired angular movement may be imparted to the dipper about the longitudinal axis of its stem 19.

For the purpose of instantly stopping

the motor 29 at the desired point, it may be provided with any suitable brake mechanism which I have indicated at 31, which we may assume is of several well known forms of electro-magnetic brakes. The motor 29 would in practice, be operated from a controller located in the cab, but since no specific arrangement of these circuits is hereby claimed as a part of this invention, these need not be shown nor further described. I do not, however, limit my invention to an electric motor for driving shaft 24, since this may be driven by any desired form of motor or engine.

The boom is held up, raised and lowered on its pivot, by means of a cable 36, the end of which is made fast in any suitable way on sheave support 37 the cable passing thence over sheave 38 (Fig. 2) on shaft 16, sheave 39 anchored within the cab (Fig. 1) thence over sheave 40 also on the shaft 16, sheave 41 in the cab, to the winding drum 42 in the cab.

The cradle is rocked on its pivot 16 by a cable 43 made fast at one end as at 44, then passing successively over sheaves 45, 46, 47, 48, 49, 50 and 51, thence to winding drum 52. The sheaves 45, 47, 49 and 51 are mounted on shaft 15, while sheaves 46, 48 and 50 are mounted on shaft 53 mounted in brackets 54, 55 fast to the lower portion of the front of the cab.

The dipper handle is moved longitudinally in the cradle or "racked" by means of two cables 56 and 57 made fast respectively to opposite ends of the dipper handle as at 58 and 59 and passing over sheaves 60, 61, 62 and 63 to a winding drum 64 in the cab. When this drum is rotated in one direction, it will wind in on one of said cables and to a corresponding extent wind out on the other, thereby pulling on the points 58 and 59 to impart longitudinal movement to the dipper handle in the cradle in either direction depending on the direction of rotation of the drum 64.

The drums 42, 52 and 64, I have indicated merely in outline, since these may be of any well known or desired kind, and may be operated by steam or electric power in the usual or any desired way. In Fig. 2, the cables are omitted for the sake of clearness in the drawing.

The mechanism herein shown and described for supporting and manipulating the dipper possesses many practical advantages. The cantaliver mechanism and unusually short boom permit the shovel to be worked within very narrow or limited radial and vertical clearances, which is a great advantage especially when the device is employed as a ditcher on trolley lines where the overhead trolley wire or other wires often limit the operation of long boom shovels.

If used in loading ballast or excavating cuts, my improved shovel may be operated in much narrower cuts and more confined or restricted places than may be done with the usual long boom shovel.

The rotary tilting of the dipper is advantageous not only in providing a simple and expeditious way of dumping the material, but it has the additional advantage that when the cab is turned to an angle with the track, as for example, when the shovel is being used to scoop out a ditch along a railway track, the dipper may be so rotated as to cut parallel to the track, something which cannot be done with the common form of ditcher.

This shovel is also admirably adapted to be driven under its own power from place to place and to drive and load cars on both sides of it, that is, the shovel may be coupled in between the cars; its dipper supporting mechanism being such as to form no obstruction to the adjacent cars, and when traveling from place to place on a railway track, for example, the boom may be swung into line with the track so as to clear obstacles along the right of way, but even if allowed to remain at an angle to the track, the boom is so short that this may be done in many instances with safety. With an arrangement of this kind, the boom may be raised vertically and the dipper handle run back substantially horizontally into the cab, thereby not only housing a considerable portion of the mechanism, but this gets it well out of the way when unloading or when traveling for any considerable distance along the track.

The propelling of power shovels under their own power from place to place is an old and well known expedient in the art, so need not be here described in detail.

While I have herein shown but one specific embodiment of my invention, it should be understood that various structural modifications thereof may be made without departing from the spirit of the invention and I do not therefore confine myself to the specific constructional details shown.

What I claim is:

1. A power shovel comprising a supporting structure, a boom pivotally connected thereto, a cradle pivotally mounted intermediate of its ends upon the outer end of said boom, said cradle comprising two side frames and upper and lower cross members embraced between said side frames, the lower of said cross members being located in advance of the upper one, a dipper, a handle for said dipper extending between said upper and lower cross members and between said side frames, and supported upon the lower of said cross members, and means attached to said cradle on the opposite side of its pivotal point of support from the for-

ward of said cross members, for rocking said cradle on its pivotal support, substantially as described.

2. A power shovel comprising a supporting structure, a boom pivotally connected thereto, a cradle pivotally mounted intermediate of its ends upon the outer end of said boom, said cradle comprising two side frames and upper and lower rollers embraced between said side frames, the lower roller being located in advance of the upper one, a dipper, a handle for said dipper extending between said upper and lower rollers and between said side frames, and supported upon the lower of said rollers, and means attached to said cradle on the opposite side of its pivotal point of support from the forward roller for rocking said cradle on its pivotal support, substantially as described.

3. A power shovel comprising a supporting structure, a boom pivotally mounted

thereon, a cradle pivoted on said boom, a dipper, a handle for said dipper, a shaft supported in said handle and connected to said dipper for rotating the same around an axis extending longitudinally of said handle, a driving shaft connected to said handle and adapted to move therewith longitudinally of said cradle, gearing forming a driving connection between said shafts, a gear connected to said driving shaft to positively rotate therewith, but permitting said shaft to move longitudinally thereof, and a motor mounted on said cradle and adapted to drive said gear for rotating said dipper.

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

WILLIAM E. MOORE.

Witnesses:

H. L. MITCHELL,  
E. M. BALSINGER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."