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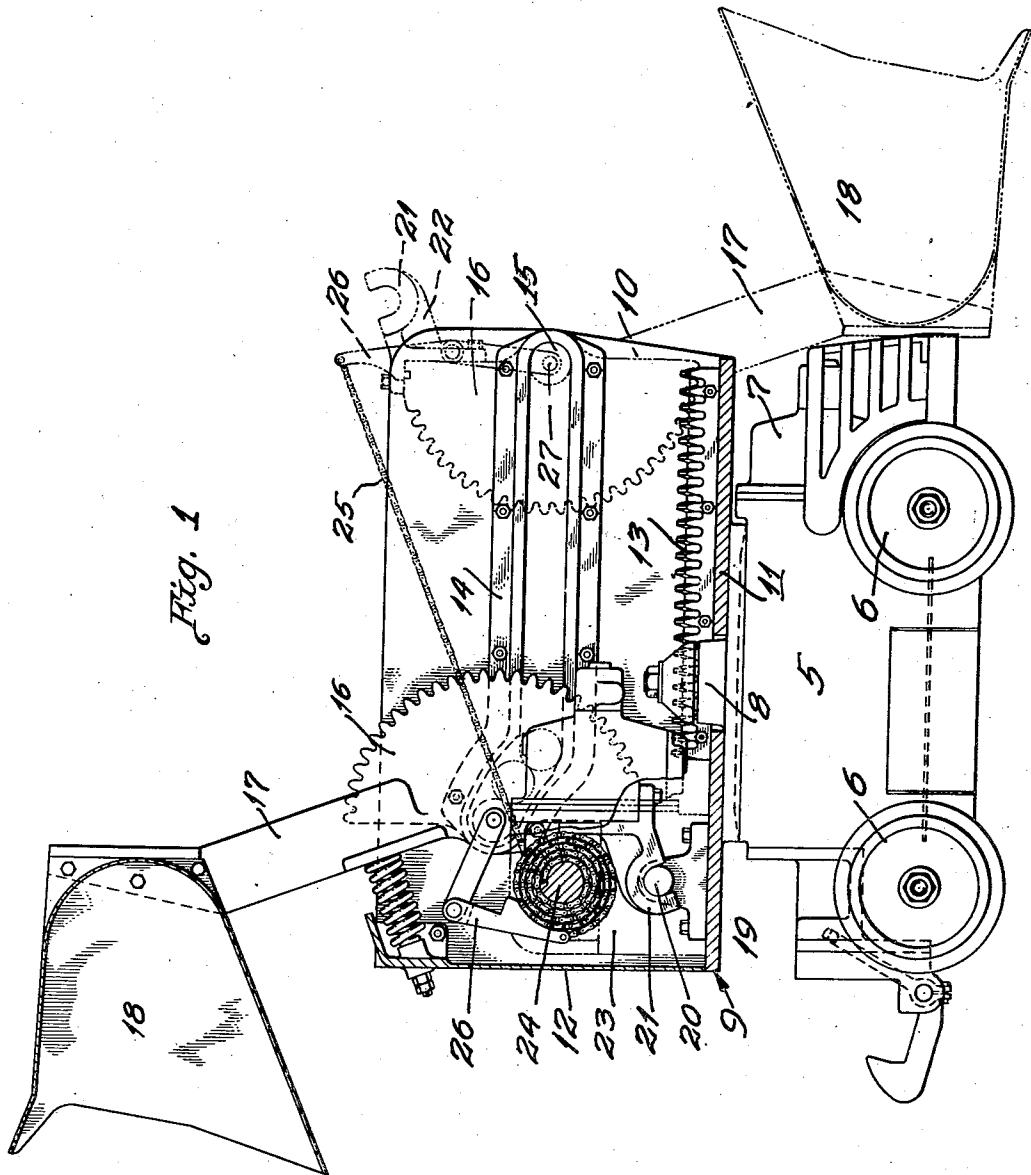
C. M. STEWART

2,255,398

LOADING MACHINE

Filed Feb. 29, 1940

2 Sheets-Sheet 1



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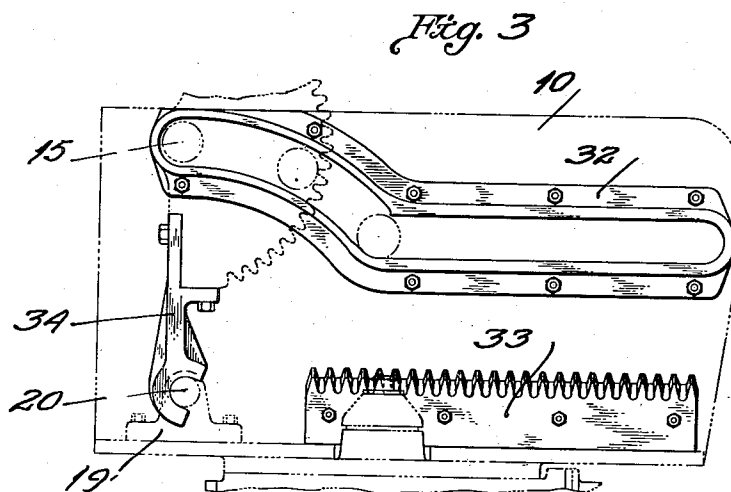
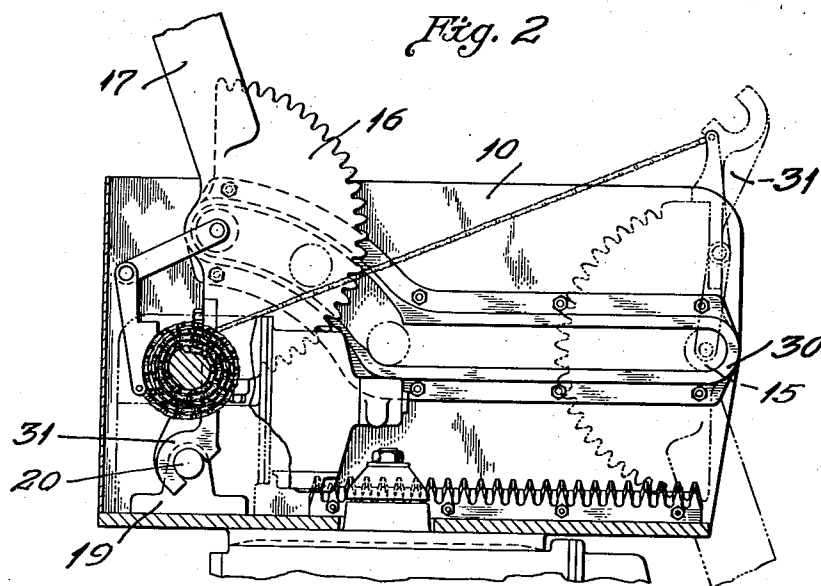
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LOADING MACHINE

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7 Claims. (Cl. 214—132)

My invention relates to improvements in mechanical loaders and is more particularly directed to that type of machine intended for loading material, such as mine ore, in cars.

The object of the invention is to provide a loader having a shovel mounted on a rocking support, said support being moved to and fro horizontally within a superstructure pivoted vertically upon a traction truck, and during such movement said rocking support causing the shovel to swing from loading to dumping positions.

Another object of the invention is to provide a loader whereby the shovel when assuming the dumping position might be elevated a desired height to compensate for cars of various heights and sizes.

Still another object of the invention is to provide a mechanical loader having means for accelerating the speed and elevating the shovel as it approaches the dumping position.

These and other objects of the invention will be apparent from the hereinafter specification when considered in view of the accompanying drawings, in which:

Figure 1 is a vertical sectional view taken longitudinally through the center of the superstructure of the loader showing certain parts thereof in elevation.

Figure 2 is a sectional view of the superstructure showing a modified form of the elevating means, and

Figure 3 is a further modified form of the same means.

Briefly, the invention herein about to be described is directed to a loading machine designed particularly for use in mine work and it naturally follows that such a machine must be small and compact in its structure and positive in its operation.

As is customary in a unit of this type, it includes a truck mounted upon suitable traction wheels operable upon the usual mine track and mounted upon this truck is a body or superstructure rotatable about a vertical axis and having the necessary driving means and controlling elements for moving a scoop shovel to a loading position and from the loading position to a dumping position, the dumping position being elevated a selective height above the loading position. Furthermore, as the shovel approaches the dumping position its speed of travel increases.

The unit as a whole includes a suitable motive means preferably of a type operated by compressed air, whereby the unit is operated back

and forth upon its track together with a second motive means for operating the shovel independently of the truck movement.

Specifically the invention disclosed hereinafter deals with a structure whereby the elevation at which the shovel dumps might be predeterminedly fixed to any desired height, thus permitting the loading of mine cars that vary in both height and size.

In the actual operation of loaders of this type, it has been found that where the dumping elevation of the shovel is fixed, it becomes impossible to load satisfactorily mine cars varying in both height and size. In some cases where the body structure of the car is rather low, satisfactory loading can be accomplished but when that same loader is used for loading cars the body of which is higher and longer, it is impossible to elevate the shovel and throw the ore backwardly in the car.

Therefore, the present invention deals with the provision of means whereby the shovel when dumping might be elevated to any desired height thus functioning properly with the size of car to be loaded.

Referring to the accompanying drawings in detail wherein like reference numerals denote corresponding parts throughout, the numeral 5 indicates in general a truck unit supported by traction wheels 6 for rail engagement, motive power to the wheels being supplied from a reversible driving motor 7 connected to the wheels in any desired manner, the motor being controlled in a manner common to units of this type.

Positioned upon the truck unit for pivotable movement about a vertical axis 8 is a body or superstructure 9 composed of side walls 10, a base plate 11 and an end wall 12. The superstructure is moved manually about its pivot 8 so that ore might be picked up from the sides of the track.

Positioned upon the base plate 11 and adjacent the inner face of each side wall 10 are longitudinally extending racks 13, the same being detachably secured in any desired manner to the side walls. Each side wall has further detachably secured thereto approximately midway of its height, a longitudinal guide element 14 having upper and lower bearing surfaces between which a rolling hub 15 of a gear segment 16 is positioned. The gears 16 are cut and shaped to intermesh with the stationary racks 13.

Each gear segment 16 has formed integrally therewith an outwardly extending arm 17 and

these arms form a support at their free ends for a suitable scoop shovel 18.

Positioned upon the base plate 11 of the superstructure and rearwardly of each rack 13 is a casting 19 having a horizontally disposed arm or bearing 20 elevated from the face of the base plate 11 and engageable with this arm or bearing 20 is a curved fork 21 formed at the free end of a projecting arm 22, detachably secured to one end of each gear segment.

As shown in Figure 1 the rear end of each elongated guide element 14 is inclined upwardly and as the hub 15, rolling horizontally throughout the major portion of the rack approaches the inclined portion, it moves upwardly thereof, due to the engagement of the fork 21 with the arm 20, lifting the gear segment from its engagement with the rack.

To move the gear elements 16 longitudinally of the guides and racks, there is provided a suitable operating motor, and while it may be of any desired type, one operated by pressure fluid is most preferred, such a motor is indicated at 23 and is mounted in any conventional manner upon the rear end of the base plate 11. The motor 23 is similar in structure to the driving motor 7 and operable by certain control means within convenient reach of the operator. The motor 23 is provided with a drive shaft 24 around which sprocket chains 25 are adapted to be wound, one end of each chain being secured to the furthestmost portion of each gear segment 16.

As disclosed in Figure 1 the sprocket chain 25 is connected to the gear segment 16 by means of a breakable lever 26, the same being pivoted as at 27 to the hub 15. A part of the lever 26 is engageable with the vertical face of the segment and extends upwardly thereabove. The purpose of such a structure is to provide an extension on the gear segment to which the chain is connected, increasing the leverage and the active force initially elevating the shovel from a loading position. It will be observed as the chain is wound upon the shaft, the lever 26 breaks and permits itself to form about the periphery of the wound chain.

From the structure herein described, it will be observed that when the motor 23 is operated, the chains 25 will be wound upon its drive shaft 24 and during the winding of the chains thereabout, the gear segments 16 will be moved rearwardly of the elongated guides 14. As the segments move with respect to their guides and racks, the shovel is elevated and ultimately assumes a dumping position such as shown in Figure 1. However, before the dumping position is reached, the forked portion 21 of the arm 22 carried by each segment will engage the horizontally disposed arms 20 of the castings 19 and further pull on the chains 25 will elevate the gears 16 about the arms 20 as a pivot, breaking their engagements with the racks 13 while the hubs 15 of the gears will move upwardly of the inclined portion of the guides. Thus it will be observed that the shovel in its actual dumping position is elevated a distance determined by the length of the forked arm 22 and the inclination of the guides 14.

It will be further observed that when the forked arms 22 engage the horizontally disposed arms 20, further pull on the chain will cause the gear segment to swing about the arms 20 as a pivot, thus increasing the arc upon which the gear moves with the result that acceleration is given to the shovel just prior to its dumping action thus throwing the ore contained therein well back within the car being loaded.

In Figure 2 a modification of the invention is disclosed wherein a greater inclination is given to the elongated guide 30 and it will be observed that the forked arm 31 secured to the gear segment is longer than that illustrated in Figure 1. Thus when the forked arm 31 engages the bearing surface 20 of the casting 19, the gear and the shovel move through a greater arc than that shown in Figure 1, elevating still higher the shovel in its dumping position and at the same time increasing the speed thereof.

In Figure 3 there is disclosed a further modified form wherein the elongated guide 32 is moved upwardly of the side walls 10 and in lieu of the rack 13 shown in Figure 1, there is substituted a larger rack 33. This is necessary inasmuch as the distance from the hubs of the gears to their peripheries is not changeable. It will be further observed that the inclination provided at the rear of the elongated guide 32 is greater than that shown in either Figure 1 or Figure 2 while the forked arm 34 secured to each gear is somewhat longer than those previously described. Thus when the forked portion of the arm 34 engages the bearing 20, the gears and shovel carried thereby are movable in a greater arc thus elevating to a greater height the shovel in its dumping position and at the same time increasing still further its speed of travel.

It will thus be apparent from the foregoing description that it is possible for the structure disclosed to vary the height at which the shovel dumps and such variance being accomplished principally by the length of the forked arm secured to each gear, the inclination of the elongated guide serving merely to support to the hub of each gear as it approaches the dumping position which is controllable by the end of the elongated guide.

From the foregoing, it is thought that the construction, operation and many advantages of the herein described invention will be apparent to those skilled in the art without further description, and it will be understood that various changes in the size, shape, proportion and minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

What I claim is:

1. In a shoveling and loading machine, the combination of a carriage and a shovel movable thereon, a rocker supporting the shovel, a guide element supporting the rocker and having a portion extending above the horizontal, power means for moving the rocker within the element, and adjustable means carried by the rocker and engaging a fixed element on the carriage to assist the power means in moving the rocker within said portion of the guide element.

2. In a shoveling and loading machine, the combination of a carriage and a shovel movable thereon, a rocker supporting the shovel, a guide element for the rocker, said guide element lying within a horizontal plane and having a portion extending thereabove, power means for moving the rocker from end to end of the guide element, and adjustable means carried by the rocker and engaging an element on the carriage to assist the power means in moving the rocker within said portion of the guide element.

3. In a shoveling and loading machine, the combination of a carriage and a shovel movable longitudinally thereof from loading to dumping positions, a rocker for swinging the shovel about a horizontally movable pivot during its movement

from one position to the other, a guide element for the pivot having at one end a curved portion permitting the shovel to assume the desired height when dumping, means for moving the pivot from end to end of the element, and an arm carried by the rocker and engageable with a fixed element to assist the pivot in following the curved portion of the element during the dumping period of the shovel.

4. In a shoveling and loading machine, the combination of a carriage and a shovel movably mounted thereon, means for moving the shovel from loading to dumping position, said means including a rocker and a pull cable connected thereto, an element pivoted to the rocker interposed between the rocker and cable, and said element bearing against the rocker to increase the force active thereupon in moving the shovel from its loading position.

5. In a shoveling and loading machine, the combination of a carriage and a shovel movably mounted thereon, means for moving the shovel from loading to dumping position, said means including a rocker and a pull cable, a pivoted element connecting the cable to the rocker, and said element bearing against the rocker to in-

crease the force of pull by the cable in initially moving the shovel from its loading position.

6. In a shoveling and loading machine, the combination of a carriage and a shovel movably mounted thereon, means for moving the shovel from loading to dumping position, said means including a rocker and a pull cable, a pivoted element connecting the cable to the rocker, and said element engageable with the rocker and extending above its peripheral face to increase the pull active through the cable to the rocker in moving the shovel from its loading position.

7. In a shoveling and loading machine, the combination of a carriage and a shovel movably mounted thereon, power means for moving the shovel from loading to dumping position, said means including a rocker and a pull cable, an element connecting the cable to the rocker, said element engageable with the rocker during part movement of the shovel to increase the pull active upon the rocker in moving the shovel from its loading position, and said element extending above the peripheral face of the rocker during a part of the shovel movement.

CHARLES M. STEWART.