

Dec. 24, 1946.

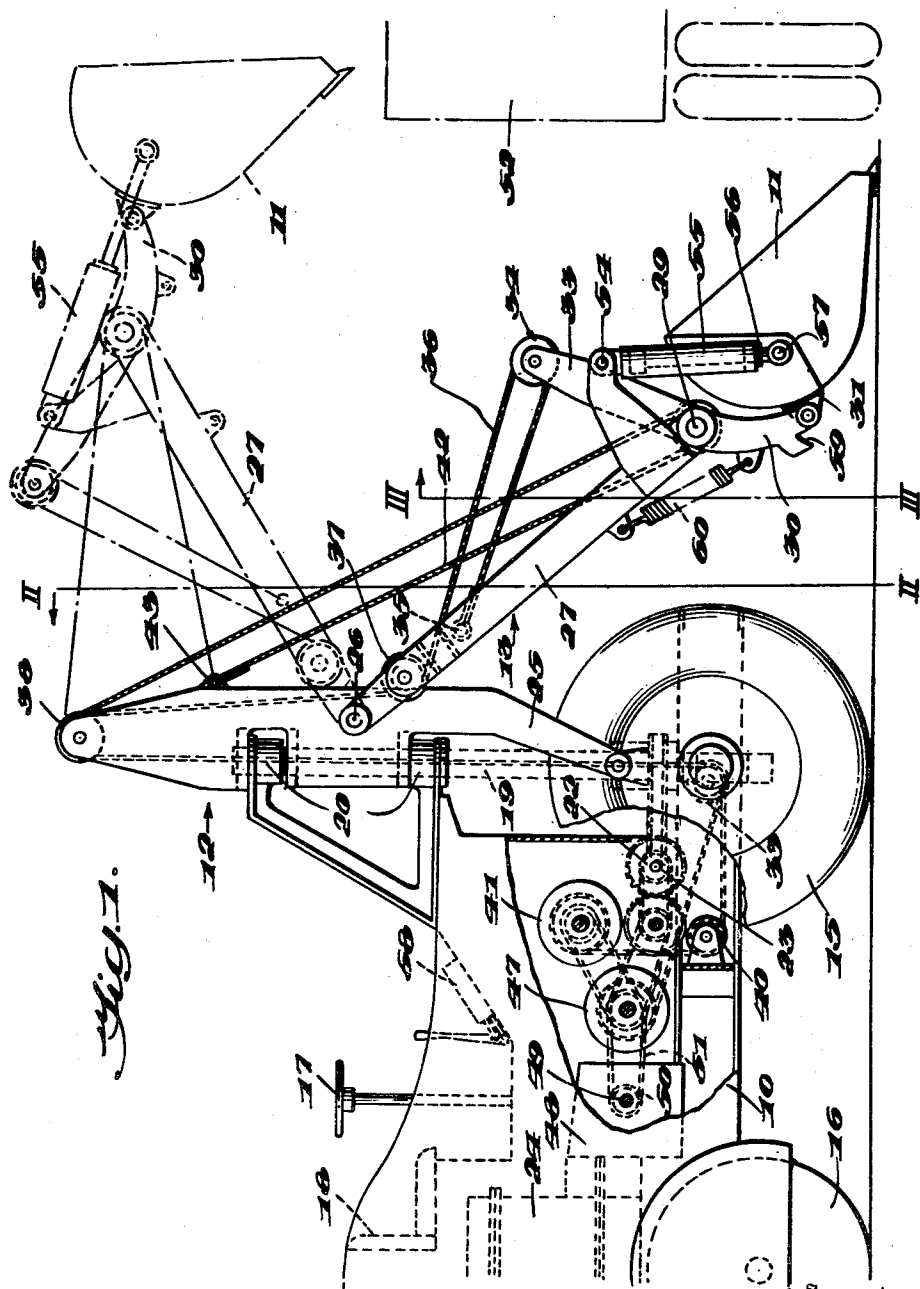
E. BARKER

2,413,097

PORTABLE LOADING MACHINE

Filed Oct. 9, 1944

3 Sheets-Sheet 1



Inventor

Eugene Barker,

By *W. S. McLowell*

Attorney

Dec. 24, 1946.

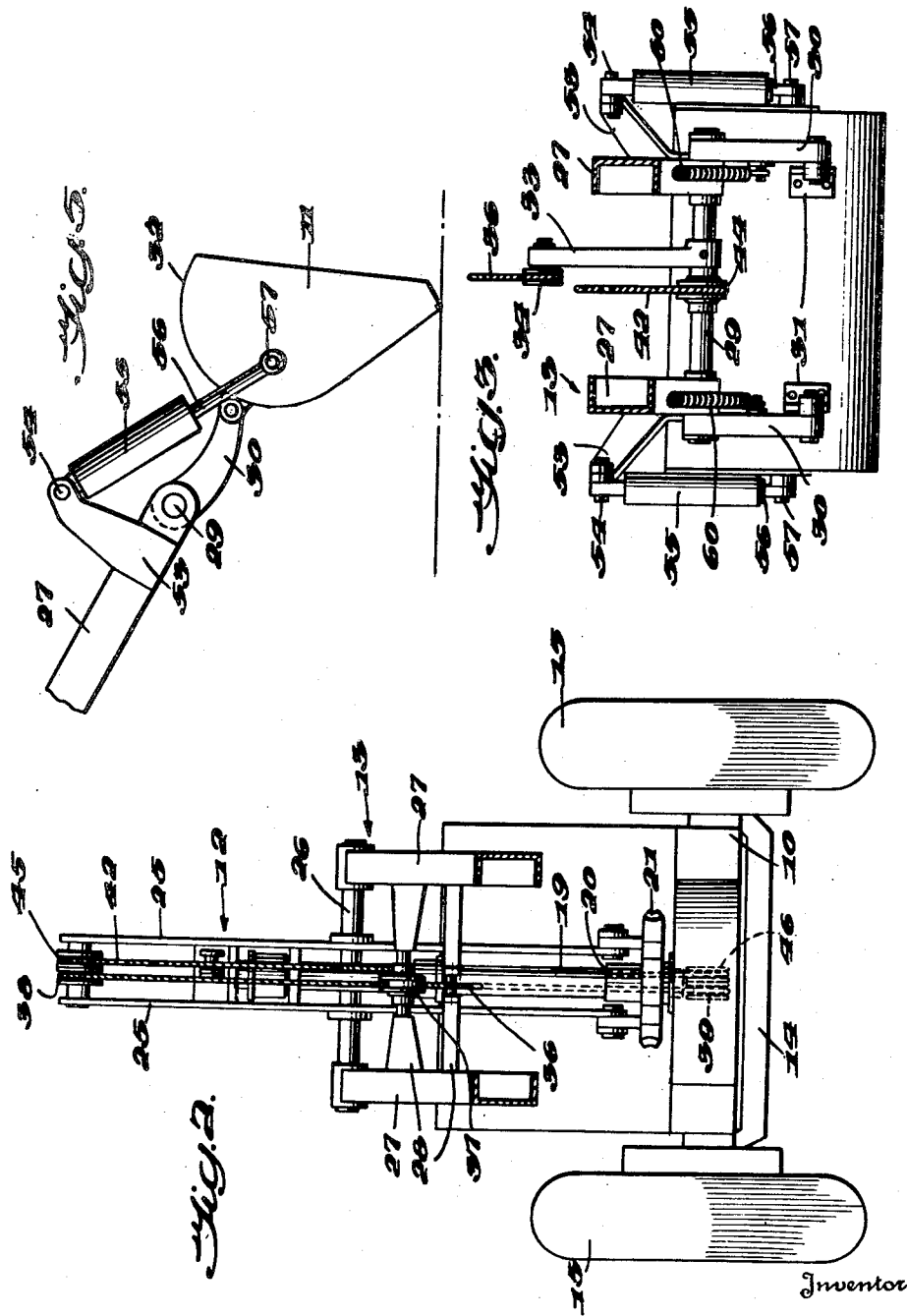
E. BARKER

2,413,097

PORTABLE LOADING MACHINE

Filed Oct. 9, 1944

3 Sheets-Sheet 2



Eugene Barker,

By *W. D. McElwain*
Attorney

Dec. 24, 1946.

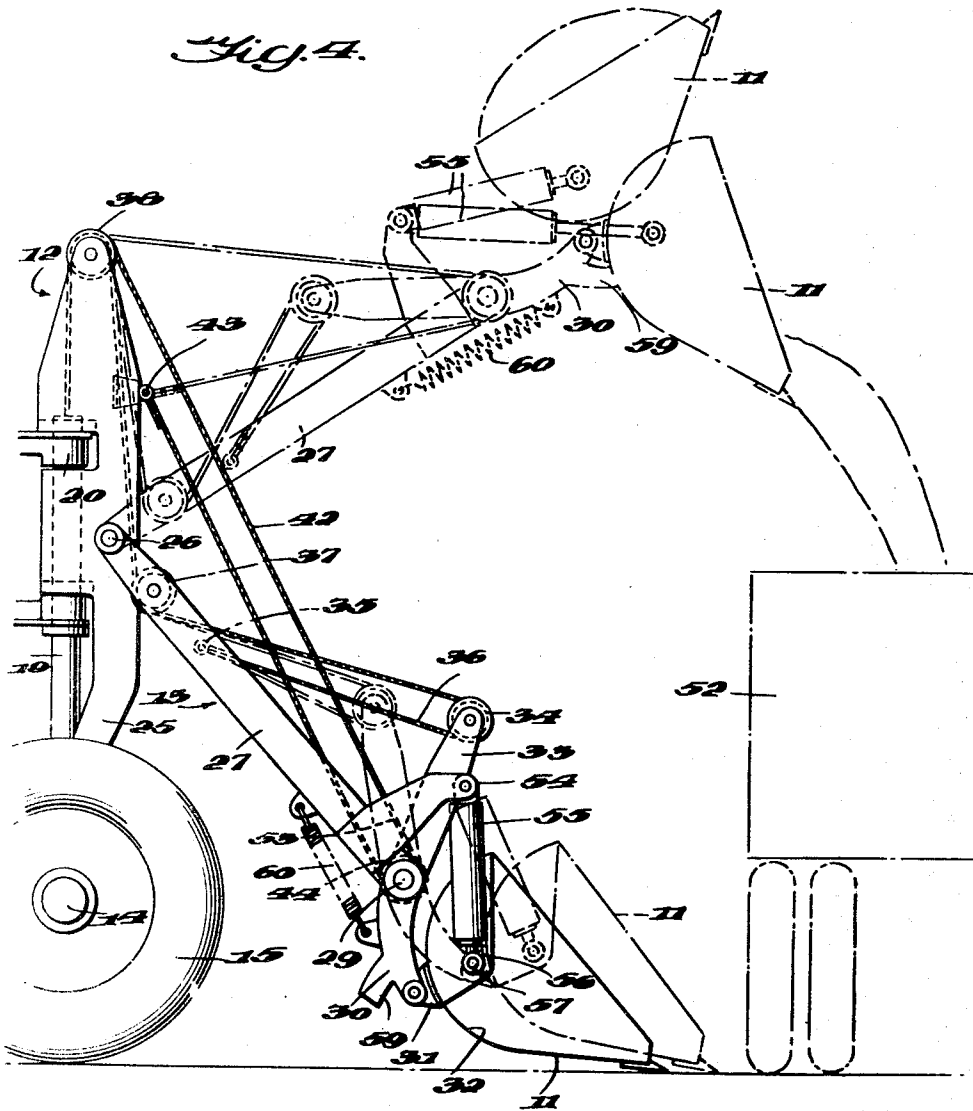
E. BARKER

2,413,097

PORTABLE LOADING MACHINE

Filed Oct. 9, 1944

3 Sheets-Sheet 3



Eugene Barker, ^{Inventor}

W. D. McElwain

Attorney

UNITED STATES PATENT OFFICE

2,413,097

PORTABLE LOADING MACHINE

Eugene Barker, Columbus, Ohio, assignor to The
Jaeger Machine Company, Columbus, Ohio, a
corporation of Ohio

Application October 9, 1944, Serial No. 557,762

4 Claims. (Cl. 214—132)

1

This invention relates to loading machines, and has to do particularly with loading machines of the type utilizing an automotive base vehicle upon which is mounted a power actuated scoop, the latter being adapted for swinging movement about vertical and horizontal axes for receiving, lifting and swinging to discharge positions materials contained therein.

It is an object of the invention to provide a loading machine of this character wherein improved power-actuated means are provided for advancing or thrusting the scoop, when in a lowered position, into the material to be loaded, and thereafter to raise and swing the scoop in vertical and horizontal arcs to cause it to assume a desired position of horizontal elevation and material discharge.

It is another object of the invention to provide the scoop with means for tilting the same about a horizontal axis, whereby to downwardly tilt the same to provide for the gravitational discharge of materials therefrom.

It is a further object of the invention to provide a loading machine of this nature wherein the scoop is pivotally mounted on the outer end of a horizontally and vertically turnable boom structure, improved means being provided for effecting a forced advance or crowding movement of the scoop into the materials to be loaded, to the end of filling the scoop with such materials independently of forward movement of the base vehicle on which the boom structure is mounted.

It is another object of the invention to provide a machine for gathering and loading loose bulk materials comprising an automotive base vehicle having mounted on the forward end thereof an upright mast, a boom being provided having its inner end joined with the mast for turning movement about both horizontal and vertical axes, the outer end of the boom being equipped with a rock shaft carrying a pair of crank arms, a scoop being pivotally connected with the outer ends of the crank arms for turning movement about a horizontal axis, power actuated means being provided for controlling the turning movement of the scoop about said axis and for oscillating the rock shaft, the oscillation of said rock shaft serving through the crank arms to effect a forward crowding movement of the scoop into the materials to be gathered, such movement being independent of corresponding forward movement on the part of the base vehicle, the latter being provided with additional power-actuated means for raising and lowering the boom and scoop and for swinging the same horizontally.

2

Still another object of the invention is to provide a loading machine of the type set forth characterized by the simplicity of its mechanical construction, the ease and convenience by which its operation may be governed and its compact and sturdy mechanical design by which the machine is adapted for hard usage and extended service without encountering mechanical difficulties.

For a further understanding of the invention, reference is to be had to the following description and the accompanying drawings, wherein:

Fig. 1 is a side elevational view of a loading machine formed in accordance with the present invention, the material handling scoop of the machine being shown in full lines in its lowered position and broken lines in its elevated position of material discharge;

Fig. 2 is a vertical sectional view on the plane indicated by the line II—II of Fig. 1;

Fig. 3 is a similar view on the line III—III of Fig. 1;

Fig. 4 is a side elevational view of the forward end of the machine, disclosing in broken lines different operational positions of the scoop;

Fig. 5 is a detail elevational view disclosing the scoop when positioned for use as a bulldozer.

Referring more particularly to the drawings, the numeral 10 designates the chassis or frame of my improved loading machine, 11 the material-handling scoop, shovel or other load carrier, at 12 the turnable mast, and at 13 the boom structure, to the outer end of which the scoop is pivotally connected.

The mast 12 is carried by the frame 10 at its forward or material-handling end, being disposed preferably immediately over the axle 14 of a pair of traction wheels 15. At the other end of the vehicle, one or more ground-engaging steering wheels 16 is provided, the operating positions of which may be controlled by the manually turned wheel 17 located contiguous to the machine operator's position 18.

The mast structure includes a vertically disposed tubular column 19, which is journaled for rotation in bearings 20 carried by the base vehicle. Secured to the lower end of the column 19 is a worm gear segment 21, the teeth of which mesh with a worm 22 carried by a shaft 23, the latter being suitably journaled in bearings on the frame 10, said shaft being suitably rotated by power obtained from the operating engine 24 of the base vehicle, said engine being also employed to drive the traction wheels 15.

Rotatable with the gear segment 21 and the

3

column 19 is a mast frame composed of vertically extending, transversely spaced plates 25. These plates carry a cross shaft 26, and the outer end of the latter pivotally receives the inner ends of a pair of parallel forwardly extending boom arms 27, the latter being joined at intervals by transversely extending uniting braces 28. The outer ends of the boom arms carry journals for the support of a rock shaft 29 and the latter, in turn, carries at its outer ends, a pair of depending crank arms 30. The lower ends of these arms are pivotally attached to brackets 31 carried by the curved rear end 32 of the scoop 11.

The center of the rock shaft has secured thereto the hub of an upstanding crank arm 33, the latter carrying at its upper end a sheave 34. Secured as at 35 to one of the cross braces 28 of the boom arms 27 is one end of a cable 36. From its point of attachment to the boom structure, the cable 36 extends around the sheave 34 and is then trained rearwardly, passing over a sheave 37 carried by the boom structure contiguous to its point of attachment with the mast frame plates 25. The cable 36 is then directed upwardly, passing over a sheave 38 journaled at the top of the mast frame. The cable 36 then depends vertically, extending through the tubular column 19, and at the lower end of said column, the cable passes around a sheave 39, a frame-carried sheave 40 and is attached to and retained about the body of a drum 41, driven by the engine 24.

It will be manifest that when the effective length of the cable 36 is shortened by winding one end thereof about the drum 41, such shortening of the cable will cause oscillation of the rock shaft 29 and its associated crank arms 30. Thus when the scoop 11 is in its lowered or material-receiving position, as shown in Fig. 4, the shortening of the effective length of the cable 36 oscillates the crank arm 33 and with it the crank arms 30, whereby to move or crowd the scoop forwardly until it assumes the broken line position shown at the bottom of Fig. 4. This movement advances the scoop into the materials to be gathered, filling the scoop with such materials but without requiring forward advance of the base vehicle, thus enabling materials to be gathered in a quickly executed and effective manner without undue manipulation in the positions of operation of the base vehicle.

To raise and lower the boom structure and the scoop carried thereby, use is made of a second cable shown at 42. This cable has one end thereof fastened as at 43 to the mast plates 25. From this position of anchorage, the cable 42 extends downwardly, passing around a sheave 44 rotatably mounted on the rock shaft 29. From the sheave 44, the cable is extended upwardly and is trained over a second sheave 45 mounted on the top of the mast plates. From the shaft 45, the cable 42 depends vertically, passing through the tubular column 19 and around a sheave 46 at the bottom of said column to the body of a drum 47 rotatably supported on the vehicle base frame 10.

The transmission casing 48 of the engine 24 is provided with a power take-off shaft 49 which is provided externally with a sprocket 50 around which is passed an endless chain 51 for use in rotating the drums 41 and 47 and in applying rotative power to the drums 41 and 47. These drums may be equipped with customary manually operated clutches for engaging and disengaging the same with the rotating elements driven from the engine 24 and, also, may be provided

4

with the customary brake devices for governing the rotation of such drums when the latter are declutched from their driving source of energy. Thus, when the cable 42 is wound about the drum 47, the boom structure will be raised, turning about its pivotal connection with the cross shaft 26 of the mast, and lifting with it the material-filled scoop. Such elevation of the scoop is often desirable in order that its contents may be deposited into the body of an automotive truck, such as that indicated at 52.

To admit of the gravitational discharge of the contents of the scoop when the latter is in an elevated position, the boom arms 27 are equipped with stationary brackets 53 which are pivoted as at 54 to a pair of hydraulic jacks 55. The exteriorly-projecting piston rods 56 of these jacks have their outer ends pivotally united as at 57 with the sides of the scoop 11. By the operation of a control valve 58, arranged adjacent to the driver's position 18, fluid, obtained under pressure from a pump (not shown) driven by the engine 24, may be admitted simultaneously into the cylinders of the jacks 55 to force the piston rods outwardly, thereby swinging the scoop until the bottom thereof is tilted downwardly to such an angle as to provide for the complete gravitational discharge of its contents.

The crank arms 30 may be provided with abutments 59 for limiting the downward tilting movement of the scoop. Following the discharge of its contents, fluid is admitted into the outer ends of the jack cylinders 55, forcing the piston rods inwardly and thereby returning the scoop to a gathering position. Coil springs 60 have their ends connected with the boom arms 27 and with the crank arms 30 in order to return said crank arms and scoop to normal positions when the cable 36 is unwound from its drum 41.

To provide for lateral swinging movement of the boom structure and scoop, the mast 12 turns about its vertical axis and this turning movement may be power effected through the use of the gear segment 21, the worm 22 and the power-transmitting connections leading to the shaft 23 from the engine 24. If desired, as shown in Fig. 5, the scoop 11 may be used in the capacity of a bulldozer by projecting the piston rods 56 of the jacks 55 outwardly to their fullest extent of movement.

In view of the foregoing, it will be seen that the present invention provides an improved loading machine for use in many industrial capacities where bulk materials of various kinds are required to be gathered from the ground or other base surface, elevated and otherwise transferred from one location to another. A practical advantage of the present invention resides in pivotally mounting the scoop on the outer end of the boom structure so that through the actuation of suitable controls, the scoop may be thrust forwardly, without movement of the base vehicle, into the materials to be gathered. This arrangement enables the scoop to operate efficiently in its material-gathering function and minimizes manipulation on the part of the base vehicle in such scoop-loading operations. When the scoop is loaded, the same may be raised to a desired position, within the working limits of the machine, of material discharge and also, when so elevated, it may be swung horizontally to positions lateral of the base vehicle where receiving trucks for the material are usually located.

While I have illustrated a single preferred embodiment of the present invention, nevertheless,

5

it will be understood that the same is subject to certain modification without departing from the scope of the following claims.

I claim:

1. In a loading machine, a portable base vehicle having a power-furnishing and propelling engine, an upright mast structure supported on and adjacent to one end of said vehicle for turning movement about a substantially vertical axis, means driven by said engine for imparting controlled turning movement to said mast structure, a boom having its rear end pivotally connected with said mast structure for turning movement about a substantially horizontal axis and lateral swinging movement in unison with the turning of said mast structure, a rock shaft pivotally carried by the outer end of said boom, thrust-imparting arms movable with said rock shaft, a scoop pivotally connected with the outer ends of said arms, means actuated by said vehicle engine for oscillating said rock shaft and thereby imparting forward thrusting movement to said scoop, means actuated by power derived from said engine for raising and lowering said boom and scoop, and means actuated by power derived from said engine for turning said scoop about the pivotal connections thereof with said boom to tilted positions of material discharge.

2. A loading machine comprising a portable base vehicle having a power-furnishing and propelling engine, an upright mast structure supported on and adjacent to one end of said vehicle for turning movement about a substantially vertical axis, means driven by said engine for imparting turning movement to said mast structure about said axis, a boom having its rear end pivotally connected with said mast structure for raising and lowering movement about a substantially horizontal axis and lateral swinging movement in unison with the turning of said mast structure, a drum mounted on said base vehicle mounted on said engine, cable means connected with said drum passing through said mast structure and joined with said boom for imparting raising and lowering movement thereto, a scoop, arms pivotally carried by the outer end of said boom, pivotal connections between the outer ends of said arms and said scoop, a second drum mounted on said base vehicle and driven by said engine, a second cable means connected with said second drum and passing through said mast structure for imparting oscillatory movement to said arms, whereby to impart linear movement to said scoop independently of corresponding movement on the part of said base vehicle, and means uniting said boom with said scoop to produce tilt-

6

ing movement thereof about its pivotal connections with said arms.

3. A loading machine comprising a portable base vehicle having a power-furnishing and propelling engine, an upright mast structure supported on and adjacent to one end of said vehicle for turning movement about a substantially vertical axis, means driven by said engine for imparting turning movement to said mast structure about said axis, a boom having its rear end pivotally connected with said mast structure for raising and lowering movement about a substantially horizontal axis and lateral swinging movement in unison with the turning of said mast structure, a drum mounted on said base vehicle mounted on said engine, cable means connected with said drum passing through said mast structure and joined with said boom for imparting raising and lowering movement thereto, a scoop, arms pivotally carried by the outer end of said boom, pivotal connections between the outer ends of said arms and said scoop, a second drum mounted on said base vehicle and driven by said engine, a second cable means connected with said second drum and passing through said mast structure for imparting oscillatory movement to said arms, whereby to impart linear movement to said scoop independently of corresponding movement on the part of said base vehicle, means uniting said boom with said scoop to produce tilting movement thereof about its pivotal connections with said arms, said last-named means embodying a pair of fluid-receiving cylinders, pivotal connections uniting said cylinders at one end of each thereof with said boom, movable piston rods carried by said cylinders, and pivotal connections between the outer ends of said piston rods and said scoop.

4. In a loading machine; a vertically swinging shovel boom; a pair of crank arms mounted for oscillation on the outer end of said boom; a scoop pivotally connected at its rear with the outer ends of said arms, means for oscillating said arms to impart forward thrusting movement in a linear direction to said scoop, whereby to cause the same to penetrate and receive the materials to be loaded thereby, fluid-actuated means carried by said boom and connected with said scoop for rocking the latter about its pivotal union with the outer end of said boom between material-handling and discharging positions, and stop means formed with said arms and disposed for engagement with said scoop to limit its rocking movement in a material-discharging direction.

EUGENE BARKER.