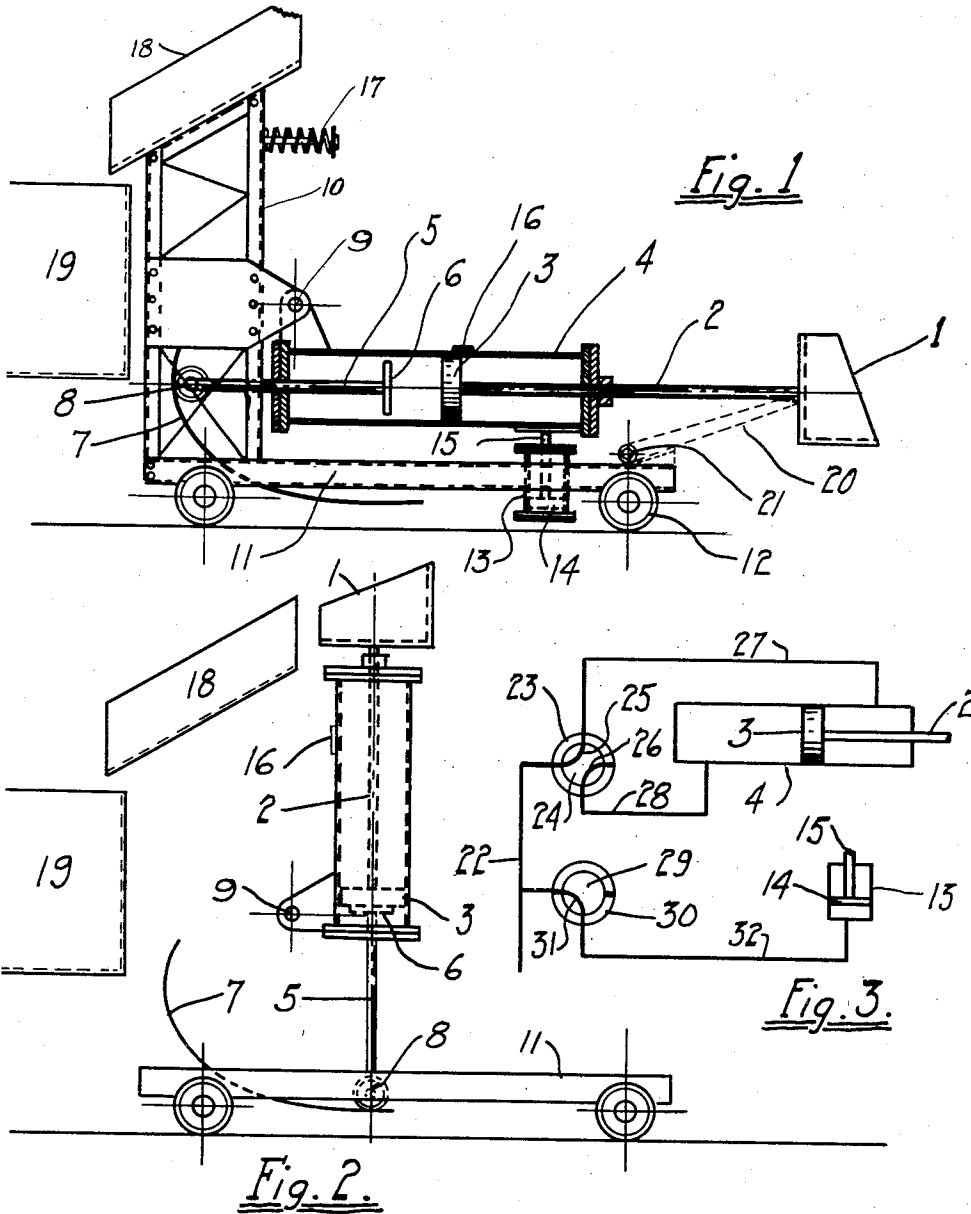


J. C. BRACKETT.
SHOVELING AND LOADING MACHINE.

APPLICATION FILED MAY 15, 1917. RENEWED JAN. 13, 1921.

1,371,293.

Patented Mar. 15, 1921.



WITNESSES:
M. M. Boyle
Irving Cowles

INVENTOR
John C. Brackett.
BY
Rudolph M. [Signature]
ATTORNEY

UNITED STATES PATENT OFFICE.

JOHN C. BRACKETT, OF MILWAUKEE, WISCONSIN, ASSIGNOR TO MIDDLEMISS AND BRACKETT, OF MILWAUKEE, WISCONSIN, A COPARTNERSHIP COMPOSED OF BRUCE A. MIDDLEMISS AND JOHN C. BRACKETT.

SHOVELING AND LOADING MACHINE.

1,371,293.

Specification of Letters Patent.

Patented Mar. 15, 1921.

Application filed May 15, 1917, Serial No. 168,689. Renewed January 13, 1921. Serial No. 437,128.

To all whom it may concern:

Be it known that I, JOHN C. BRACKETT, citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Shoveling and Loading Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to loading and shoveling machines of a type adapted to handle quickly detached masses of material individually small but of large aggregate tonnage. In this class of machine it is necessary to construct apparatus which can readily be moved, and which is light and powerful in its action.

The particular type of machine illustrated employs tail rod construction for the motions auxiliary to the digging stroke, and is generally of the single cylinder overhead swinging type subject, however, to the obvious alternatives of design which I will enumerate in the following. This type of shovel, while it is designed for manual operation, can obviously be made automatic in its action.

My invention has for its object the construction of a shoveling machine employing a powerful digging cylinder which may be combined with an auxiliary cylinder for breaking the shovel upward vertically from its pile of material subsequently to the digging stroke. This auxiliary lifting motion may also be accomplished by a simple linkage.

A further object is the designing of a loading machine primarily adapted for overhead delivery into a car directly in line with the principal axis of the machine, but which is readily adaptable by giving a lateral inclination to the main bearings of the machine to load cars on a parallel track alongside of the machine.

A further object of my invention is to provide a reciprocating cylinder type of machine adaptable for doing work exclusively by means of a single cylinder, or which may for heavy work be operated by a heavy cylinder which reciprocates the shoveling element, and finishes the overhead transferring movement in combination

with an auxiliary cylinder which assists the early stages of the lifting stroke.

It is obvious that automatic operation of the valves may be effected by the necessary linkages between the cylinders and the stationary portions of the machine; that the particular type of stationary bucket employed may be, if advantageous, replaced by a drop bottom or equivalent bucket, and that the bucket may be dumped directly into a car, as shown, or into an auxiliary conveyer adaptable for carrying material to a position farther from the digging element.

In the accompanying drawings illustrating, more or less diagrammatically, a suitable embodiment of the invention,

Figure —1— is a side view of the loading machine in the lowered or digging position.

Fig. —2— is a diagram of the apparatus in the raised or discharging position.

Fig. —3— indicates the necessary air or steam piping for actuation of the reciprocating elements.

Referring to the drawings, 1 is a bucket or shovel mounted on a piston rod 2 which is rigidly connected to a piston 3 operating in an air or steam cylinder 4; at the rear of the cylinder a tail rod 5 equipped with a buffer plate 6 is arranged to coact with a curved parabolic guide 7 through the medium of an anti-friction roller 8. The cylinder 4 is pivotally secured to the steel frame of the machine by pin 9 supported on a steel structure 10 which forms part of the truck frame 11. The truck frame is mounted upon wheels 12 arranged for transportation on the standard narrow gages prevalent in underground mining.

With the machine in the lowered position, shown in Fig. —1—, air is admitted behind the piston 3, forcing the shovel into the mass of material to be attacked. As the shovel is driven into the material air is admitted into auxiliary cylinder 13 driving piston 14 vertically upward causing piston rod 15 to raise cylinder 4 and shovel 1 vertically through a small travel sufficient to break the shovel loose from the pile of the material.

Air is then admitted to the front of the piston, that is to say, the space between the piston and the cylinder head adjacent to the shovel, and at the same time the air pres-

sure behind the piston 3 is released, this causes the piston and shovel to travel backward until it comes in contact with buffer 6 on tail rod 5. Further travel of the piston 5 in this direction causes cylinder 4, shovel, etc., to travel vertically overhead because of the turning moment generated around pin 9 due to the position of the pin above the tail rod 5. Guide 7 is constructed so as in all 10 positions of the cylinder 4 to offer a resisting surface normal to the center line of tail rod 5; thus it will be seen that continued rearward motion of piston 3 results in a steady backward and overhead motion of 15 the shovel 1 until the vertical position, shown in Fig. —2—, is reached.

At this point pad 16 on cylinder 4 comes into contact with spring bumper 17 mounted on frame 10 effecting a cushioned stop of the 20 travel of the cylinder whereby its contents is discharged into chute 18 thence into car 19. As the center of gravity of cylinder 4 and its adjoining mechanism is well outside of pin 9 release of the air pressure between piston 3 and the cylinder head adjacent to the 25 shovel now permits cylinder 4 to drop back into the horizontal position, the rate of its drop being regulated by the suddenness with which the air pressure is released. When 30 the piston and shovel have traveled about half of the stroke forward the cylinder 4 will again have resumed its normal horizontal position, air in the meantime having been released from cylinder 13 permitting piston 35 15 to drop back to its lower position. Admission of air to the left hand side of piston 3 and release of air pressure on the other side of the said piston now causes shovel 1 to repeat its digging stroke.

At 20 I have indicated a link which for 40 light work may be used to replace the action of cylinder 13 as a means for assisting the initial lift of the shovel away from the material. Link 20 is pivotally mounted at 21 45 an appreciable distance below the center line of piston 2. Retraction of piston 2 and shovel 1 beyond a point where the shovel engages the outer extremity of link 20 generates a turning moment around pin 21 serving 50 to assist the initial lift of the shovel.

Referring to Fig. —3— in which are illustrated the necessary air or steam connections for actuation of the cylinders 22 is a source of supply for fluid pressure 23 and 24 the 55 housing and plug respectively of a standard four-way cock which controls the inlet and exhaust connections to the cylinder 4. With the plug in the position shown air is admitted from pipe 22 through port 25 and 60 pipe 27 to the forward end of the cylinder; the rear end of the cylinder in the meantime being connected through pipe 28 and port 26 to the atmosphere.

Rotating plug 24 ninety degrees clockwise 65 connects the rear end of cylinder 4 to

the source of fluid pressure through pipe 22, port 26 and pipe 28, and at the same time connects the forward end of the cylinder freely to the atmosphere through pipe 27 and port 25. 29 and 30 are the plug and 70 casing respectively of a three-way cock operating auxiliary cylinder 13. With the plug in position shown fluid pressure is admitted to the bottom of cylinder 13 through pipe 22, port 31 and pipe 32. With plug 29 75 rotated ninety degrees anti-clockwise cylinder 13 is connected free to the atmosphere through pipe 22 and port 31.

I claim as my invention:

1. A shoveling machine including a pivotally 80 mounted cylinder, a piston therefor, a shovel adapted to be reciprocated by the piston, a rigid parabolic guide disposed opposite one end of the cylinder, and a reciprocable element associated with the said cylinder and the said guide and adapted to be 85 actuated by the piston as the latter moves in one direction for effecting a swinging movement of the cylinder to effect delivery of load from the shovel. 90

2. A shoveling machine including a pivotally 95 mounted cylinder, a piston therefor, a shovel adapted to be reciprocated by the piston, a rigid parabolic guide disposed opposite one end of the cylinder, and a reciprocable element associated with the said cylinder and the said guide and adapted to be 100 actuated by the piston as the latter moves to retract the shovel for effecting a swinging movement of the cylinder to effect delivery of load from the shovel.

3. A shoveling machine comprising a carriage, a motive element pivotally mounted thereon, a reciprocable element adapted to be actuated by said motive element, a shovel 105 carried by said reciprocable element and adapted to be projected into the pile and retracted therefrom when loaded, a fixed guide element, and means associated with said reciprocable element for converting retractive 110 movement of said shovel into swinging movement thereof to load delivery position.

4. A shoveling machine including a shoveling element, arranged for reciprocation by a fluid-actuated piston, a piston rod, a cylinder casing, an auxiliary piston rod, and 115 means whereby the said piston coacts with the said auxiliary piston rod to modify the reciprocative action of the shovel.

5. A shoveling machine including a shoveling element, arranged for reciprocation by a fluid-actuated piston, a piston rod, a cylinder casing, an auxiliary rearwardly extending rod, and means whereby the said piston coacts with the said auxiliary piston 120 rod to modify the reciprocative action of the shovel. 125

6. A shoveling machine including a shoveling element, arranged for reciprocation by a fluid-actuated piston, a piston rod, a 130

cylinder casing, an auxiliary piston rod, a stationary guide therefor, and means whereby the said piston coacts with the said auxiliary piston rod to modify the reciprocative
5 action of the shovel.

7. A shoveling machine including a pivotally mounted cylinder, a piston therefor, a shovel adapted to be reciprocated by the piston, means associated with the cylinder and
10 piston for resisting movement of the piston in one direction whereby to cause the cylinder to swing pivotally during said

movement of the piston, said means adapted to effect movement of the piston in the opposite direction as the cylinder returns to
15 its normal position.

In testimony whereof I have signed my name in presence of two subscribing witnesses.

JOHN C. BRACKETT.

Witnesses:

M. M. BOYLE,
C. L. BALDWIN.