

J. C. BRACKETT.
SHOVELING AND LOADING MACHINE.
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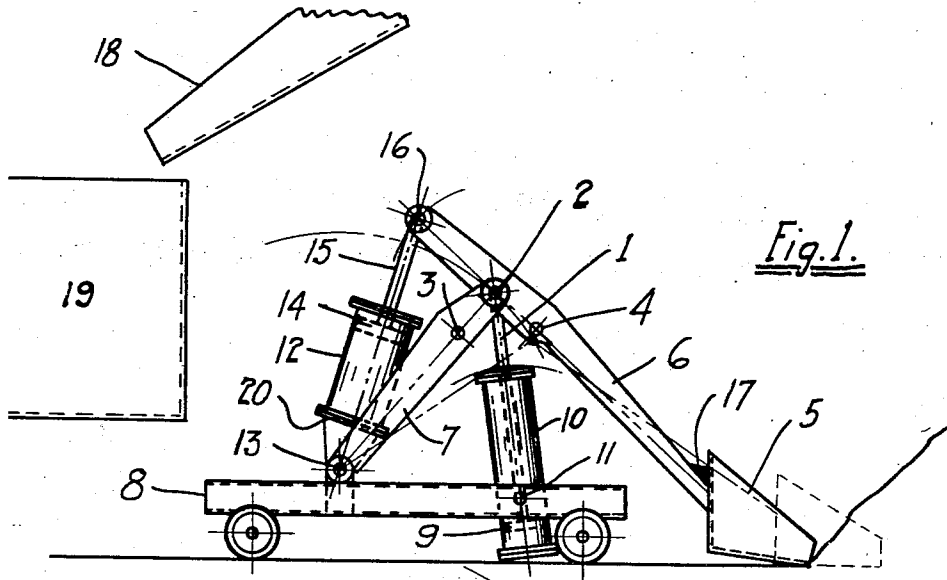


Fig. 1.

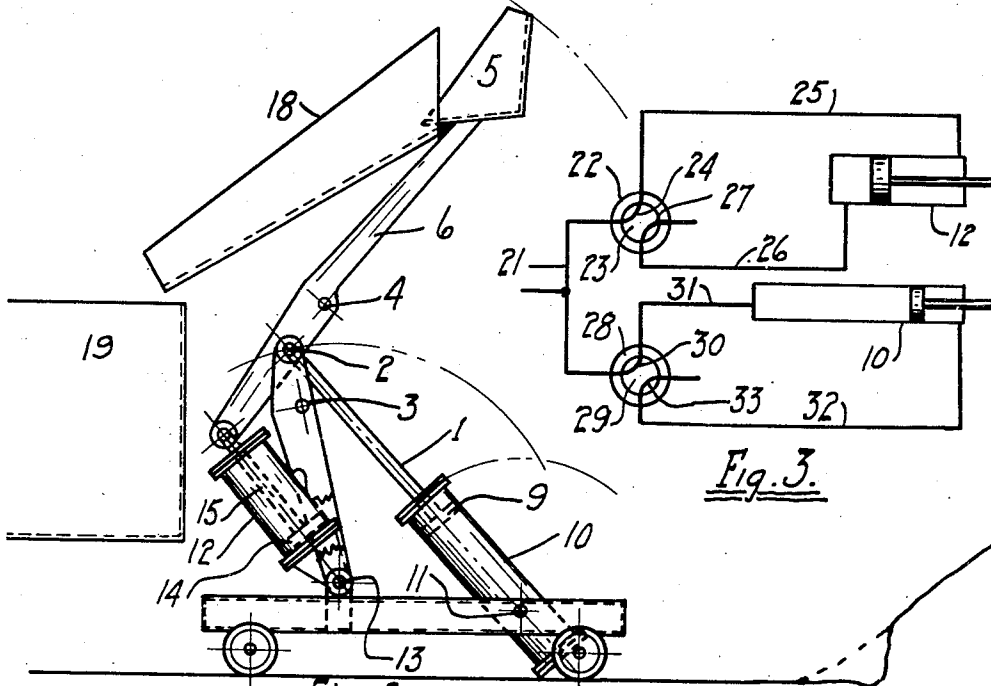


Fig. 3.

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

SHOVELING AND LOADING MACHINE.

1,371,344.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JOHN C. BRACKETT, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, 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 the construction of shoveling machines adapted to work in locations having restricted head room such as is ordinarily the case in underground mines.

I have illustrated an embodiment of my invention which comprises a machine of the swinging lever type adaptable for overhead or lateral delivery of material which, while illustrated in a hand-operated embodiment, may readily be arranged for automatic action. In the design shown the operating cylinders are connectible in various manners to permit alteration of a given machine for separate conditions of operation, and for permitting manufacture from a nearly standard design of a varied line of apparatus comprising types of quite different characteristics; each adaptable for different classes of work.

My invention has for its object the combination with a main powerful digging cylinder with a single cylinder arranged by connecting mechanism to give a powerful lifting and transferring stroke as when piston 1 is connected to pin 2 as hereinafter described.

My invention has for its further object the construction of a machine for lighter work in which one cylinder or equivalent mechanism is arranged for effecting a digging stroke, and at the same time lifting the shovel clear of the mass of material, while a second cylinder effects a swinging transferring movement of the shovel as is the case when piston 1 is connected at pin 3.

My invention has for its further object the construction of a shoveling machine in which a single cylinder digs, lifts and transfers the

load resulting in an economical air consumption in a machine adapted for cleaning up and for work in light cuts. This action takes place when the piston 1 is connected to pin 4, as hereinafter described.

A further object of my invention is the construction of a single machine adaptable to any of the previously described operating combinations.

A further object of my invention is the design of a simple overhead transferring movement which by a lateral inclination of the cylinders and bearings may readily be adapted to the loading of a car placed along side of the machine instead of in a position directly in line with the main axis of the machine, as shown.

A further object of my invention is to provide an arrangement of valves which, while adaptable to manual operation, are of a nature which may readily be adapted to automatic operation.

It will be understood that while I have shown a definite embodiment of my invention, its practical design is not restricted to the type of stationary bucket illustrated, as any of the common types of hinged or drop bottom buckets may be used. The bucket may be dumped into a car directly, as shown, or onto an auxiliary conveyer, if required.

Referring to the drawings,

Figure —1— shows the machine in position ready for the digging stroke.

Fig. —2— illustrates the same at the completion of the overhead transferring stroke.

Fig. —3— is a diagram of fluid-pressure connections for actuation of the motive elements.

Referring to the drawings, 5 is a shoveling element mounted on a lever arm 6 pivotally connected and coacting with levers 7 mounted on movable truck. Pin connections 2, 3 and 4 are provided to any of which piston 1 may be attached. Pin 2 in all cases provides the connection between levers 6 and 7.

Piston rod 1 is connected to piston 9 which operates in pivotally mounted cylinder 10 connected to frame 8 by pin 11. A second cylinder 12 is in common with lever 7 pivotally connected to frame 8 at point 13. Cyl-

inder 12 is provided with a piston 14 connected to a piston rod 15 which in turn is pin-connected at 16 to lever 6.

In the operation of the assembly shown, 5 air is admitted simultaneously above pistons 9 and 14. This results in a crowding forward into the mass of material of shoveling element 5, and a subsequent upward swing around point 2 due to the continued 10 downward action of piston 14. This movement projects the shoveling element into the mass of material and lifts it clear of the pile. Air is then admitted below piston 9 causing the linkage to revolve around point 15 13 to the position shown in Fig. —2—. At this point contact is made by rubber bumper 17 with the edge of the chute 18 through which material is delivered into car 19. This checking of the movement of shoveling 20 element 5 discharges the contents of the shovel in an obvious manner. Air is then released from cylinders 12 and 10 successively causing lever 6 first to drop around pin 2, and subsequently permitting the assembly 25 to revolve clockwise around pin 13 to the normal position shown in Fig. —1—. The machine is then ready for a repetition of the digging and transferring cycle.

A modification of this action is secured 30 when piston rod 1 is connected at pin 3 instead of at pin 2. In this position the toggle effect of cylinder 10 on the forward motion of shoveling element 5 is practically nullified, and the entire digging and 35 lifting stroke is imparted to the shovel by the action of cylinder 12, cylinder 10 being used subsequently to swing the assembly overhead to the discharging position. With this set of connections air is first admitted 40 above piston 14 causing shoveling element 5 to swing upwardly around point 2 in the manner of the swing stroke ordinarily employed in steam shovel practice. This swing stroke is particularly adapted to 45 under-cutting a high bank where a small advance per stroke is permissible. When this upward swing stroke is completed air is admitted below piston 9 forcing pin 3 and the assembly anti-clockwise around 60 point 13 completing the overhead delivery stroke as previously described. Air is then released from cylinders 12 and 10 successively permitting the mechanism to return to the normal position shown in Fig. —1— 55 ready for the beginning of the second digging stroke.

A separate action of the machine is secured when piston 1 is connected at pin 4. In this case cylinder 12 is connected free to 60 the atmosphere and used only as a stop, or in the case of machines designed solely for this action cylinder 12 is removed entirely and replaced by a plunger, the equivalent of piston 15, adapted to operate against a stop. 65 the equivalent of lower cylinder head 20 of

cylinder 12. With this set of connections all of the digging and transferring stroke is effected by the action of cylinder 10. For work in very light cuts and in cleaning up 70 work, this linkage is adequate and results in marked economy in air or steam consumption.

In the apparatus connected as last above described, air is admitted above piston 9 effecting a slight forward crowding motion 75 of the shoveling element 5. When piston 9 has reached the bottom of its stroke air is released in the space above the piston and air pressure is introduced below the piston, causing the lever 6 to swing upwardly 80 around point 2 until piston 14 comes in contact with lower cylinder head 20 of cylinder 12. This locks the levers 6 and 7 against further angular motion in this direction, and continued vertical movement of 85 piston 9 causes the entire assembly to swing vertically upward around pin 13 completing the overhead swinging and transferring movement as previously described.

Subsequent release of the air pressure below piston 9 permits shovel 5 to drop downwardly around pin 2; this motion being accompanied by a clockwise rotation of the entire assembly around pin 13; this compound motion serving to return shovel 5 to 95 the initial position shown in Fig. —1— ready for a subsequent digging and transferring stroke.

Referring to Fig. —3— in which I have illustrated air or steam connections necessary for the operation of the two cylinders, 100 21 is a branched supply pipe conducting air or steam pressure to casing 22 of a plug cock 23. With the plug 23 in the position shown fluid pressure is conducted from pipe 105 21 through port 24 and pipe 25 to the forward or upper end of the cylinder 12, and at the same time the lower or rearward end of cylinder 12 is connected to the atmosphere through pipe 26 and port 27. Rotating 110 plug 23 ninety degrees clockwise connects forward end of cylinder 12 to the atmosphere through pipe 25 and port 24, and at the same time admits fluid pressure to the rear or lower end of cylinder 12 through 115 pipe 21, port 27 and pipe 26.

Supply pipe 21 also connects to casing 28 of plug 29. With the plug in position shown fluid pressure is carried to the rear or lower end of cylinder 10 through port 30 120 and pipe 31. At the same time the upper or forward end of cylinder 12 is connected to the atmosphere through pipe 32 and port 33. Rotation of plug 29 clockwise through 125 ninety degrees connects the lower portion of cylinder 12 to the atmosphere through pipe 31 and port 30 and at the same time connects the upper end of cylinder 12 to the source of fluid pressure through pipe 21, port 33 and pipe 32. 130

The four-way cocks thus illustrated are arranged for hand operation, but may obviously be linked to moving portions of the mechanism so as to effect an automatic manipulation of the air or steam pressures.

I claim as my invention:

1. A shoveling machine comprising a carriage, two motive elements pivotally mounted thereon, an actuating element associated with each motive element and adapted to move simultaneously in opposite directions, a shovel engaged with both said actuating elements, and means connecting the shovel with the carriage, said last-named means acting to cause the motive elements to turn on their pivots at the same time that the actuating elements impart movement to the shovel.

2. A shoveling machine comprising a carriage, two motive elements pivotally mounted thereon, an actuating element associated with each motive element and adapted to move simultaneously in opposite directions, a shovel engaged with both said actuating elements, a link connecting one of said actuating elements and the shovel with the carriage whereby said motive elements with their actuating elements are caused to turn on the pivots of the motive elements simultaneously to impart a substantially reciprocating movement to the shovel, the other of said actuating elements acting to impart swinging movement to the shovel.

3. In a shoveling machine, a carriage, a link pivotally secured thereto, a shovel carrying lever pivotally secured to the other end of said link, a motive element pivotally mounted on the carriage, a reciprocating actuating element associated with said motive element and pivotally secured to the said link for imparting thrust movement to the shovel and a second motive element pivotally mounted on the carriage, a second actuating element associated with said secured motive element and pivotally connected with said lever for imparting swinging movement to the shovel.

4. A shoveling machine comprising a carriage, a member mounted thereon to swing in a vertical plane, a lever provided at one end with a shovel pivotally mounted between its ends on said member, a motive element on the carriage and an actuating element associated therewith for imparting rocking movement to said member to reciprocate said shovel, and a second motive element on the carriage and a second actuating

element associated therewith engaged with said lever for imparting swinging movement to the shovel.

5. A shoveling machine comprising a carriage, a member mounted thereon to swing in a vertical plane, a lever provided at one end with a shovel, said lever pivotally mounted between its ends on said member and two independently and simultaneously operable motive elements and actuating elements associated with said member and said lever for actuating the same to reciprocate and swing the shovel to first load the same and thereafter project the load therefrom.

6. A shoveling machine comprising a carriage, a member mounted thereon to swing in a vertical plane, a lever provided at one end with a shovel, said member pivotally mounted between its ends on said member and two independently and simultaneously operable extensible and contractible motive devices associated with said member and said lever, one of said motive devices adapted to reciprocate said shovel, and thereafter to co-act with the other motive device to swing said shovel in a curve to discharge the load.

7. In a shoveling machine, a shovel, a pivotally mounted motive device pivotally connected to the shovel and adapted to be extended to develop a digging and transferring motion of the shovel, and a second pivotally mounted motive device also pivotally connected with the shovel and adapted to be contracted to generate a lifting motion of the shovel.

8. In a shoveling machine, a carriage, a link pivotally mounted at one end on the carriage, a lever provided at one end with a shovel and pivotally mounted between its ends on the free end of the link, means for giving the shovel a thrust movement and thereafter a lifting discharge movement in a vertical plane, comprising a motive device connecting the opposite end of the lever with the carriage and a second motive device connecting the free end of the link and the lever with the carriage, said motive devices arranged for simultaneous action to impart the desired movement to the lever.

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

JOHN C. BRACKETT.

Witnesses:

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