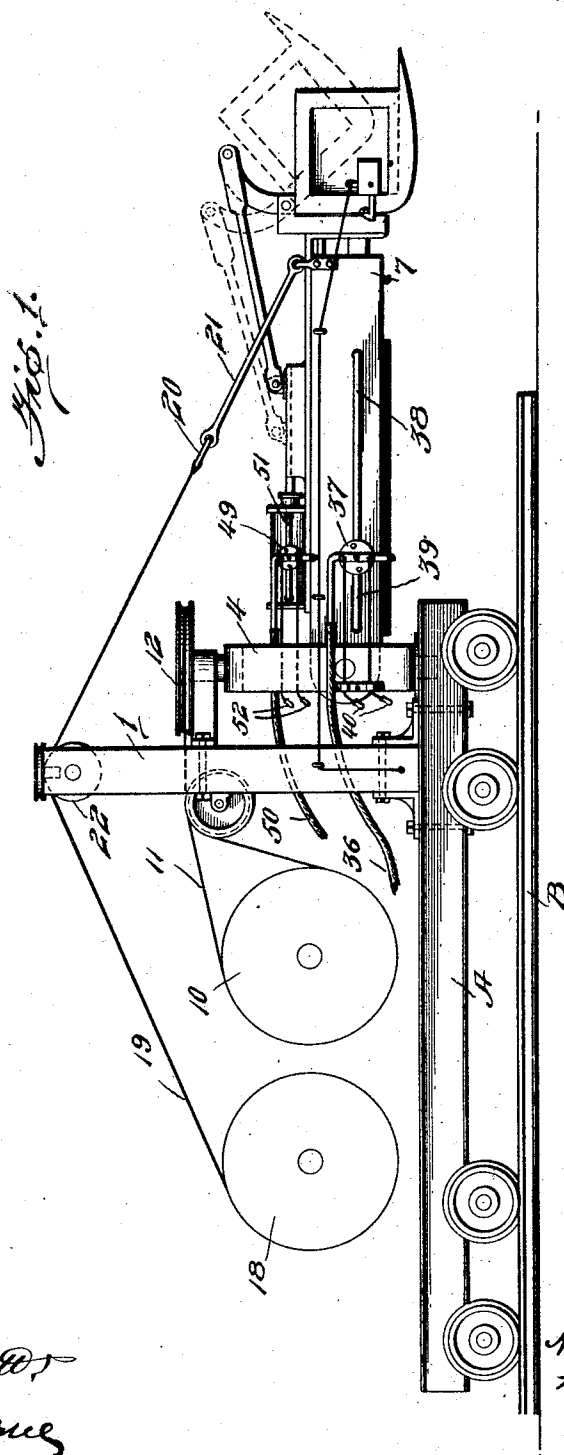


H. F. DOLAN.
EXCAVATOR AND LOADER,
APPLICATION FILED APR. 30, 1912.

1,064,456.

Patented June 10, 1913.

6 SHEETS—SHEET 1.



Witnesses
B. M. Offutt
H. H. Byrne

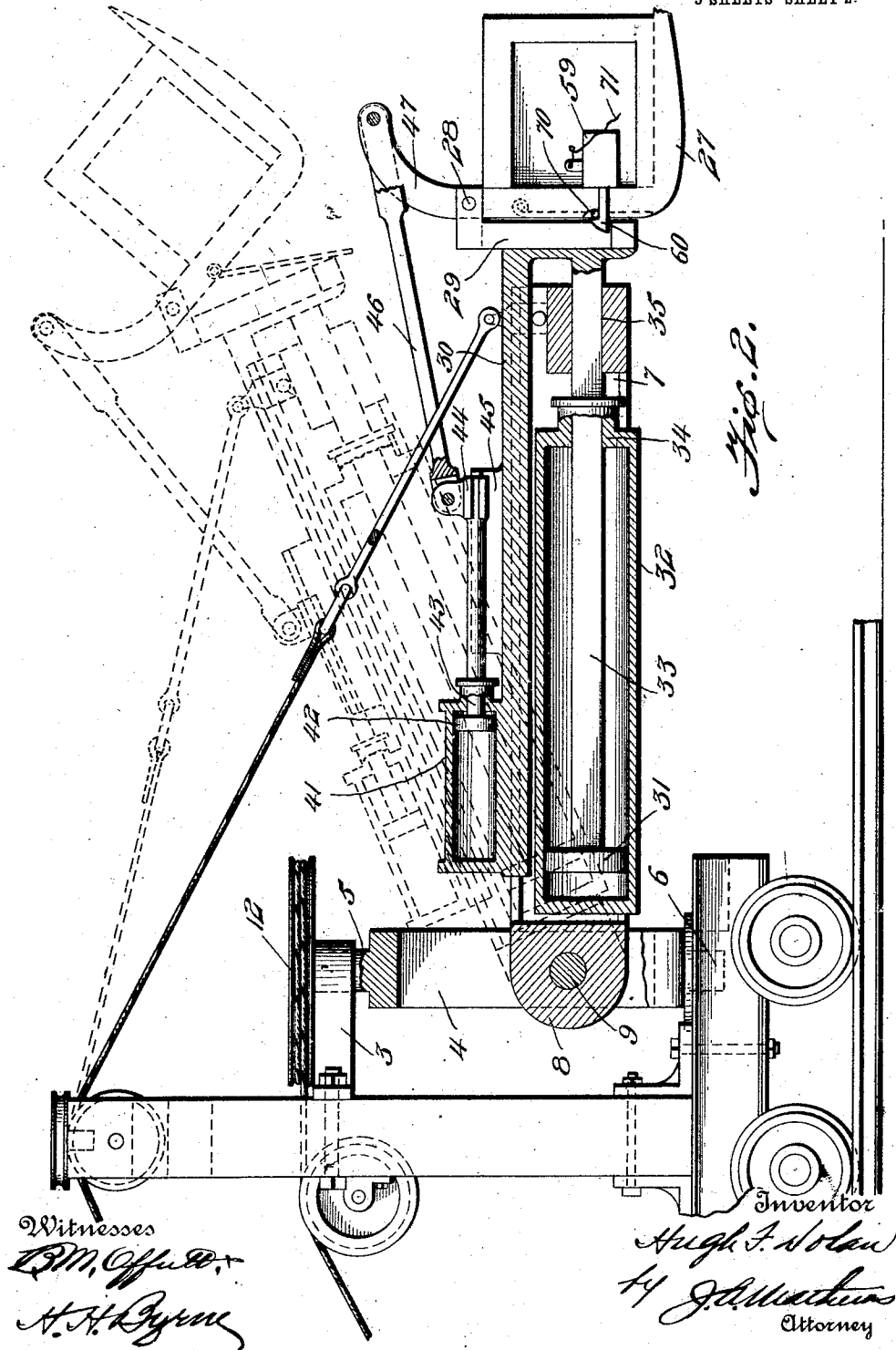
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5 SHEETS-SHEET 2.

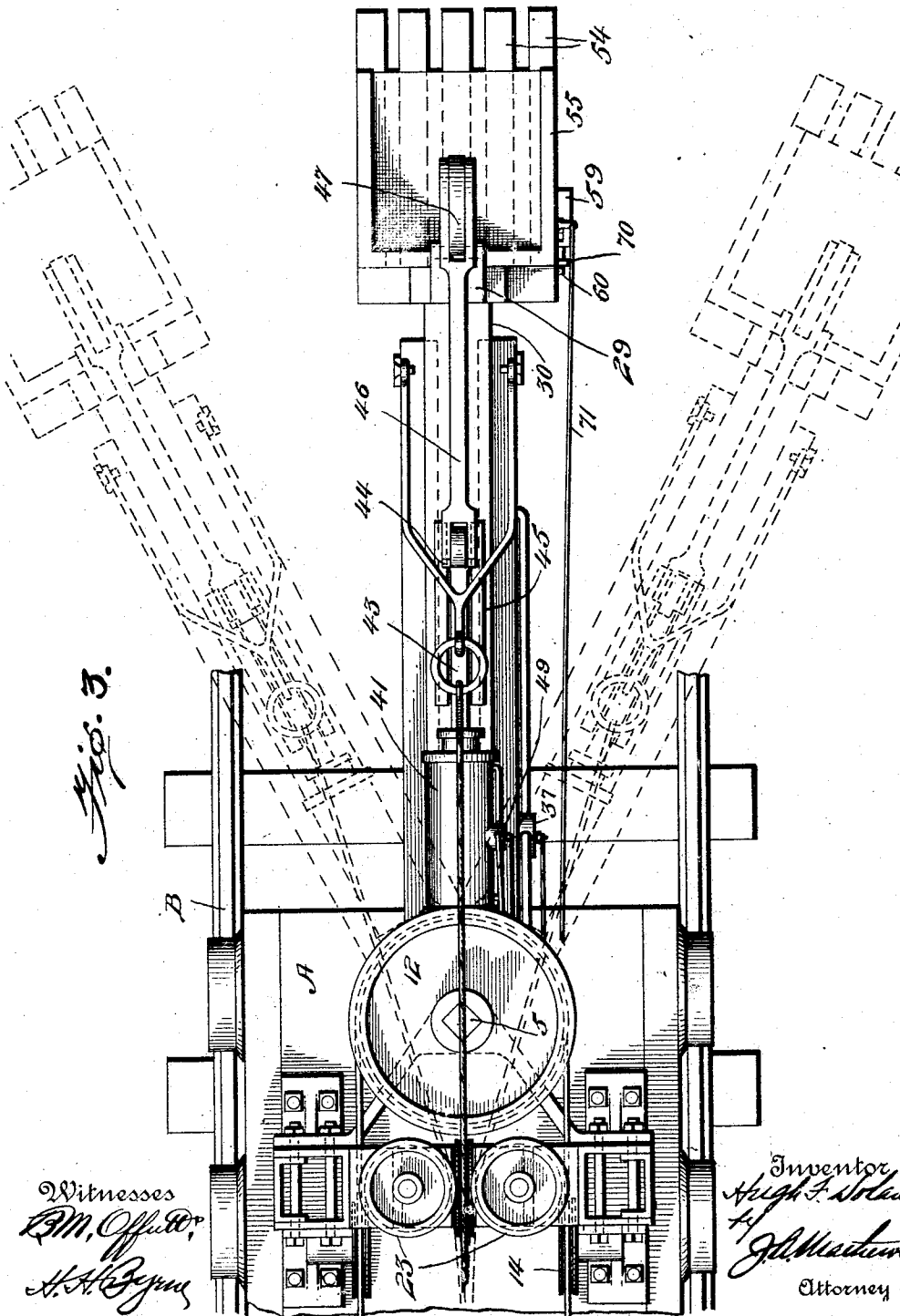


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5 SHEETS—SHEET 3.

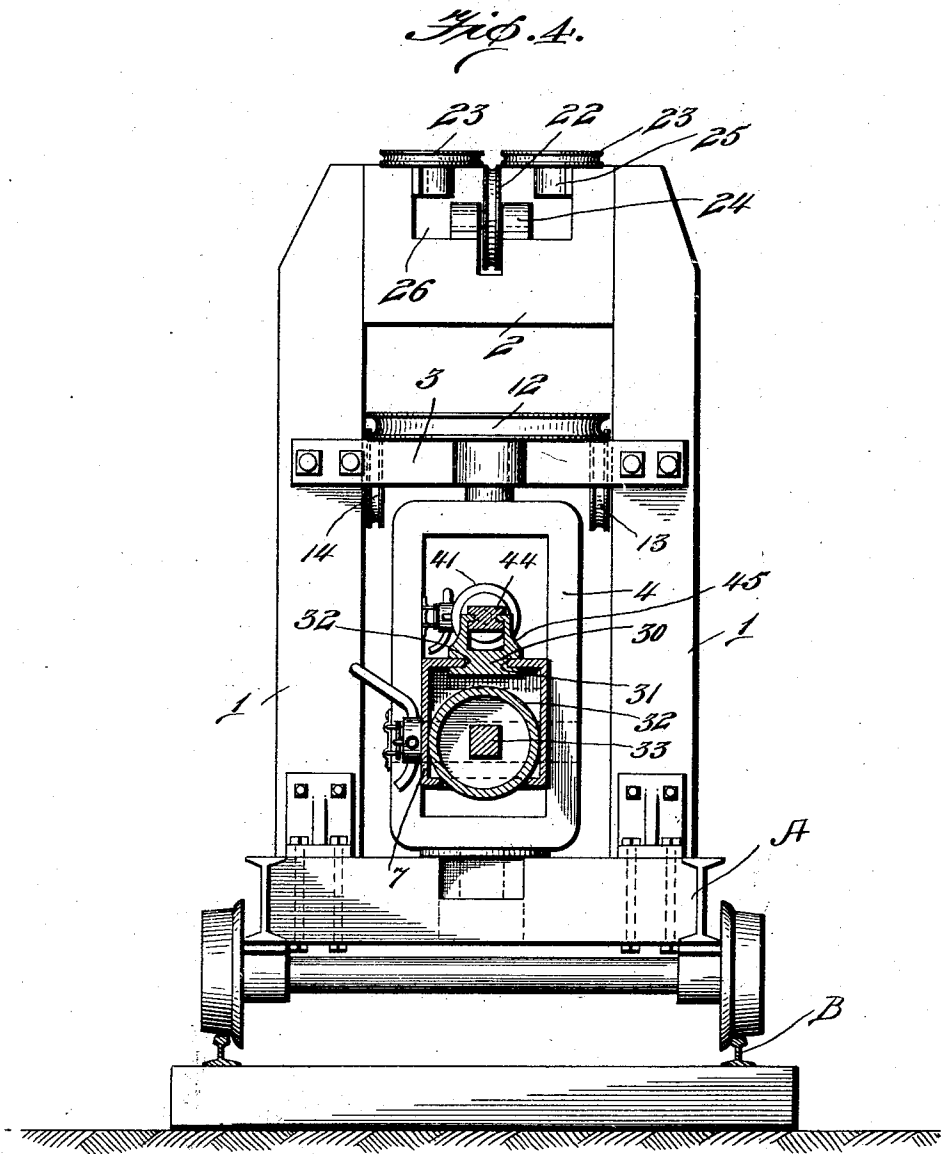


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Witnesses
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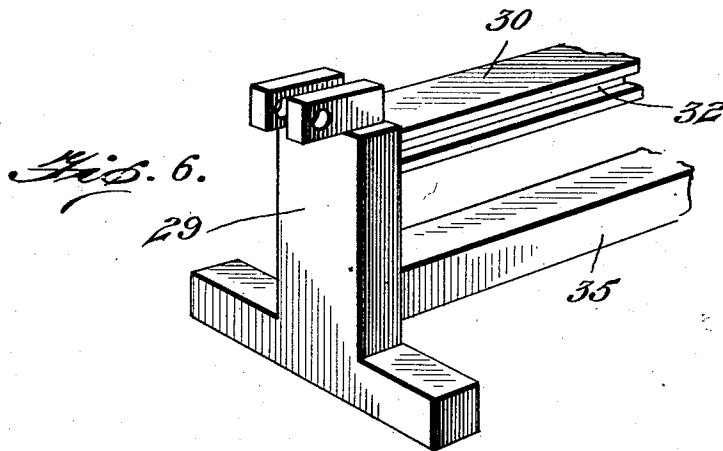
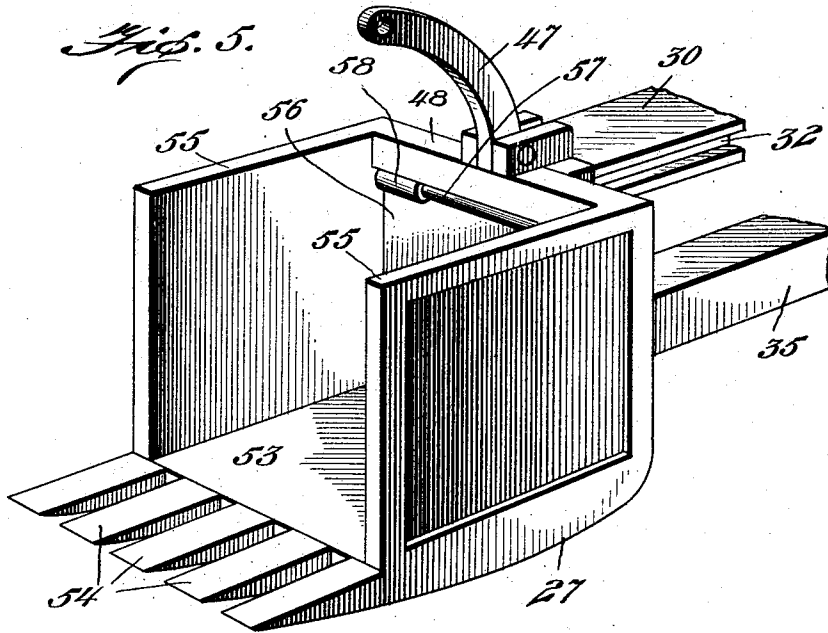
Inventor
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5 SHEETS—SHEET 5.



Witnesses
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UNITED STATES PATENT OFFICE.

HUGH F. DOLAN, OF POTTSVILLE, PENNSYLVANIA.

EXCAVATOR AND LOADER.

1,064,456.

Specification of Letters Patent.

Patented June 10, 1913.

Application filed April 30, 1912. Serial No. 694,245.

To all whom it may concern:

Be it known that I, HUGH F. DOLAN, a citizen of the United States, residing at Pottsville, in the county of Schuylkill and State of Pennsylvania, have invented certain new and useful Improvements in Excavators and Loaders, of which the following is a specification.

The present invention relates to excavators and loaders, and consists in the combinations and arrangements of elements hereinafter disclosed and set forth in the accompanying claims.

The invention has for its purpose to provide an excavator and loading machine which will be positive and accurate in operation, one which will readily respond through a convenient system of control, and one wherein the construction will ably withstand heavy and rough usage.

With these and other objects in view, the invention consists in the arrangement and combination of parts hereinafter claimed and, while the invention is not restricted to the exact details shown and described, still, for the purpose of disclosure, reference is had to the accompanying drawings, in which like reference characters designate the same parts in the several views, and in which,

Figure 1 is a side elevational view of the machine complete; Fig. 2 is an enlarged side elevational view, partly in section, and disclosing the excavator and loader *per se*; Fig. 3 is a top plan view of Fig. 2; Fig. 4 is a front elevational view of the machine with parts in section, and parts omitted for clearness; Fig. 5 is a detail perspective view of the shovel; and Fig. 6 is a detail perspective view of one end of the shovel supporting arm.

Referring to the construction in further detail, the same consists of an ordinary flat car A adapted to be secured to the rails B in any appropriate manner for stabilizing the machine. At one end, the car A has suitably mounted thereon a vertically disposed frame (see Fig. 4) comprising uprights 1 connected by cross heads 2 and 3 and which, with the car platform, suitably supports an arm adapted to have lateral and vertical movement and on the free end of which is carried the shovel. The connection between said arm and its supporting elements consists of a vertically disposed yoke 4 having pivot bearings 5 and 6 journaled respectively in the cross head 3 and

car platform, as clearly illustrated in Fig. 2. The arm, designated by the character 7, is journaled at its end 8 on the pivot 9 between the sides of the yoke 4 (see Fig. 4), and said arm is adapted to be swung laterally with the yoke 4 through the medium of a suitable mechanism shown herein as consisting of a drum 10 having wound thereon a cable 11 that coöperates with the grooved pulley 12 carried by the member 5 of the yoke 4, and passing over a pair of grooved pulleys or sheaves 13 and 14 journaled respectively on the uprights 1 of the vertical frame, as illustrated in Fig. 4. The vertical or lifting and lowering movement of the shovel carrying arm is effected through a similar mechanism comprising a drum 18 having a cable 19 that connects with the outer end of said arm through the medium of a link 20 and yoke frame 21. The cable 19 passes over a grooved pulley 22 and between guide pulleys or sheaves 23 that are mounted respectively on suitable journal bearings 24 and 25 located within the cut-away portion 26 of the cross head 2.

The shovel 27 (see Fig. 5) is pivotally mounted at 28 on a head 29 that is secured to the outer end of a slidable section or carriage 30 that has reciprocating movement on the arm 7 and for which purpose said arm has flanges 31 (see Fig. 4) engaging within grooves or guideways 32 with which the carriage 30 is provided.

The carriage 30 is reciprocated on the arm 7 through the medium of a piston 31 which operates within the cylinder 32 that is suitably secured within the arm 7. The piston 31 is connected to the carriage 30 through the medium of the piston rod 33, and said rod is shown as being square in cross section to operate within bearings 34 and 35, of similar cross sectional design, on the cylinder head and arm 7 respectively, whereby said rod 33 is prevented from having angular movement for holding the shovel against lateral tilting. The fluid pressure for operating the piston 31 within the cylinder 32 is supplied from a suitable source through the pipe 36 leading to a four-way valve 37 that communicates with either end of said cylinder by pipes 38 and 39. An appropriate valve actuating means 40 is located adjacent the yoke frame 4 within convenient reach of the operator.

The mechanism just described serves for driving the shovel within the embankment

or material to be excavated, and it will be readily appreciated that, by reason of the direct drive which is obtainable, said shovel will receive the mechanism driving power and that, furthermore, the head 29 offers an abutment or reinforcing element for said shovel and thus relieves the same of undue strain.

The mechanism for tilting the shovel on its pivot 28 consists of a cylinder 41 that is secured to the carriage 30 and located at the inner end thereof. A piston 42, operable in the cylinder 41, has its rod 43 connected with a cross head 44 that is slidably mounted on suitable guideways 45, likewise carried by said carriage 30. The cross head 44 is connected by a link 46 with an upwardly disposed and curved arm 47 that is secured to the back 48 of the shovel, as clearly shown in Fig. 5. The operating fluid for the piston 42, within the cylinder 41, is admitted thereto through a four-way valve 49 which communicates with the supply pipe 50 and pipes 51 entering the cylinder. A suitable valve-actuating mechanism 52 is located in convenient reach of the operator, and adjacent the valve-control 40 of the cylinder 32.

The shovel consists of a bottom section 53 having the usual teeth 54 providing the cutting edge, and side sections 55 united by the back section 48. A door 56 is swingingly mounted within the back section 48 on a suitable bar and sleeve bearing 57 and 58 respectively. A suitable door control 59 is provided, and has a latch 60 adapted to have releasing engagement with a stud 70 carried by the door. A lanyard or releasing cord 71 is provided for effecting the actuation of the latch 60, as will be understood.

The operation of the excavator and loader is as follows: The arm 7 is lowered to the desired position through the medium of the drum 18 and cable 19, and steam or air is admitted behind the piston 31 which, through the medium of the piston rod 33, advances the carriage 30 forward and the shovel 27 into the embankment or material to be excavated. This operation of the shovel into the material entirely or partially fills it, such filling being facilitated by the teeth 54 which are constructed in the manner best suited for operating on the material to be handled. When the shovel is filled, air or steam is then admitted into the piston rod side of the cylinder 41 which, by means of the piston rod 43 and link 46 tilts the shovel to an upright position relatively to the head 29, as in the manner indicated in Fig. 1. The hoisting drum 18 then raises the arm 7 to a position high enough to clear the top of the car or other receptacle in which the contents of the shovel is to be emptied. The arm is then swung laterally through the drum and cable 10 and 11 to the point

for releasing the load when, through the lanyard 71, the latch 60 is released and the door 56 opened under the weight of the contents of the shovel. The shovel may then be moved to its normal position, as shown in full lines in Fig. 1, and the arm 7 swung laterally and lowered, as desired.

With the construction described and disclosed herein it will be apparent that the excavator may be conveniently operated at any desired angle and that the successive digging and carrying operations of the shovel may be effected with great rapidity.

It is obvious that those skilled in the art may vary the details of construction and arrangement of parts without departing from the spirit of my invention, and therefore I do not wish to be limited to such features except as may be required by the claims.

Having thus described my invention, what I claim as new and desire to protect by U. S. Letters Patent, is:

1. In an excavator and loader, the combination of a support; an arm mounted to have movement on said support; means for actuating the arm; a cylinder mounted on the arm; a piston operable in said cylinder; a shovel carried by the piston; a second cylinder carried by the piston of the first-named cylinder; a piston operable in said second cylinder; means connecting said second piston with the shovel to actuate the latter; and means for emptying the contents of the shovel, substantially as described.

2. In an excavator and loader, the combination of a support; an arm mounted to have movement on said support; means for moving said arm; a cylinder mounted on the arm; a piston operable in said cylinder; a carriage connected to move with said piston; a shovel carried by said carriage; a second cylinder carried by the carriage; a piston operable in said second cylinder; means connecting said second piston with the shovel to actuate the latter; and means for emptying the contents of the shovel, substantially as described.

3. In an excavator and loader, the combination of a support; an arm mounted to have movement on said support; means for moving said arm; a cylinder mounted on said arm; a piston operable in said cylinder; a carriage connected to be actuated by said piston; a shovel pivotally mounted on said carriage; a second cylinder mounted on the carriage; a piston operable in said second cylinder; a piston rod and link connection between said second piston and the shovel adapted to swing said shovel on its pivot; and means for emptying the contents of the shovel, substantially as described.

4. In an excavator and loader, the combination of a support; an arm movably mounted on said support; means for moving

said arm on its support; a cylinder mounted on said arm; a carriage mounted to reciprocate on said arm; a piston operable in said cylinder; a piston rod connecting said piston with said carriage; a shovel pivotally mounted on said carriage; a second cylinder carried by the carriage; a cross head mounted to reciprocate on said carriage; a piston operable in said second cylinder; a piston rod connecting said piston and said cross head; a link connecting said cross head with said shovel to turn the latter on its pivot; and means for emptying the contents of the shovel, substantially as described.

5. In an excavator and loader, the combination of a support; an arm movably mounted on said support; means for moving said arm; a cylinder mounted within said arm; a carriage mounted to reciprocate on said frame above said cylinder; a piston operable in said cylinder; a piston rod connection between said piston and said carriage, said carriage provided with a head at its outer end; a shovel pivotally mounted on said head and adapted to be reinforced thereby; a second cylinder mounted on and carried by said carriage; a cross head mounted to reciprocate on said carriage; a piston

operable in said second cylinder; a piston rod connection between said piston and said cross head; a link connection between said cross head and said shovel adapted to actuate the latter on its pivot; and means for emptying the contents of the shovel, substantially as described.

6. The combination with a rigid support; of an excavator shovel pivotally mounted on said support; a door swingingly mounted within the wall of said shovel immediately adjacent said support; and means for securing and releasing said door, substantially as described.

7. The combination with rigid supporting members having a head; of an excavator shovel pivotally mounted on said head; a door swingingly mounted within one wall of the shovel and disposed against and adapted to be reinforced by said head; and means for securing and releasing said door, substantially as described.

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

HUGH F. DOLAN.

Witnesses:

WM. H. ENT,
PATK. FOX.