

(No Model.)

3 Sheets—Sheet 1

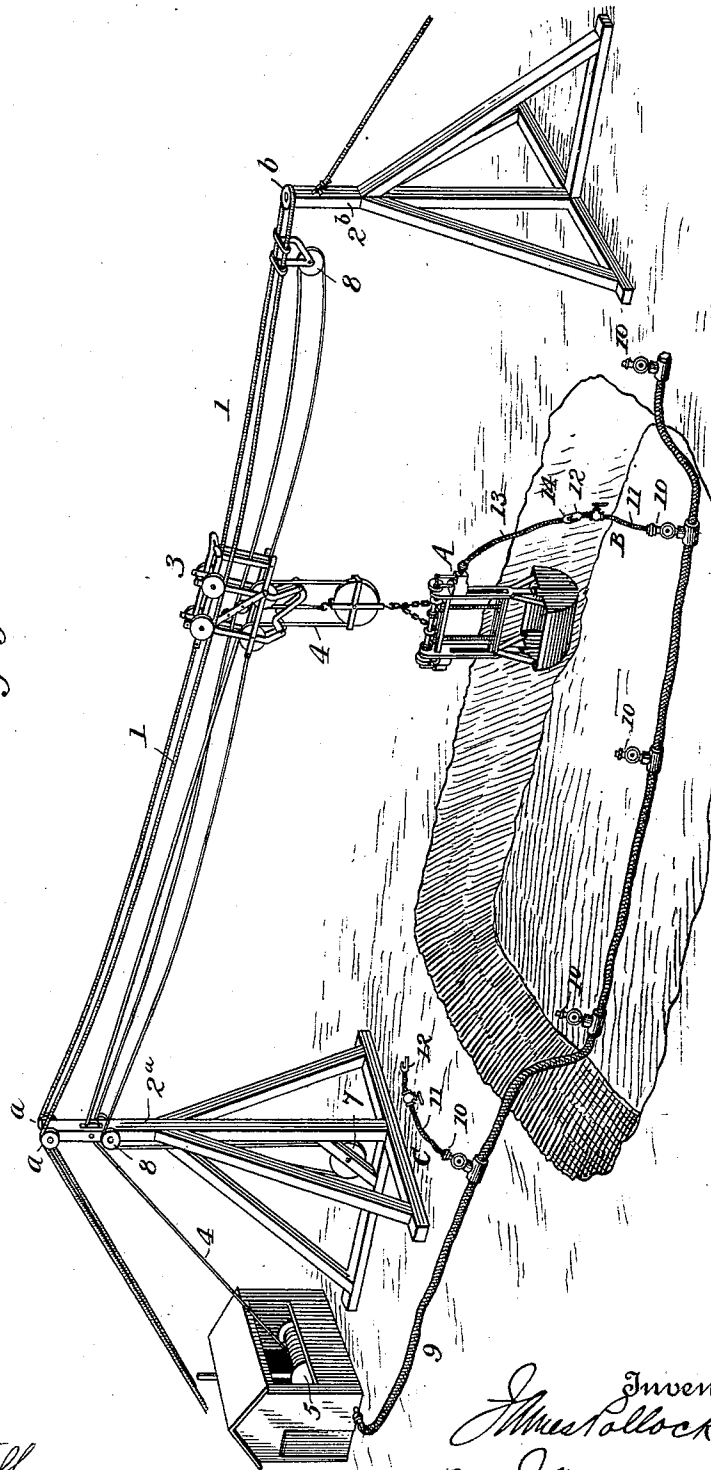
J. POLLOCK.

POWER OPERATED BUCKET AND TRANSPORTING APPARATUS.

No. 538,121.

Patented Apr. 23, 1895.

fig. 1.



Witnesses
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(No Model.)

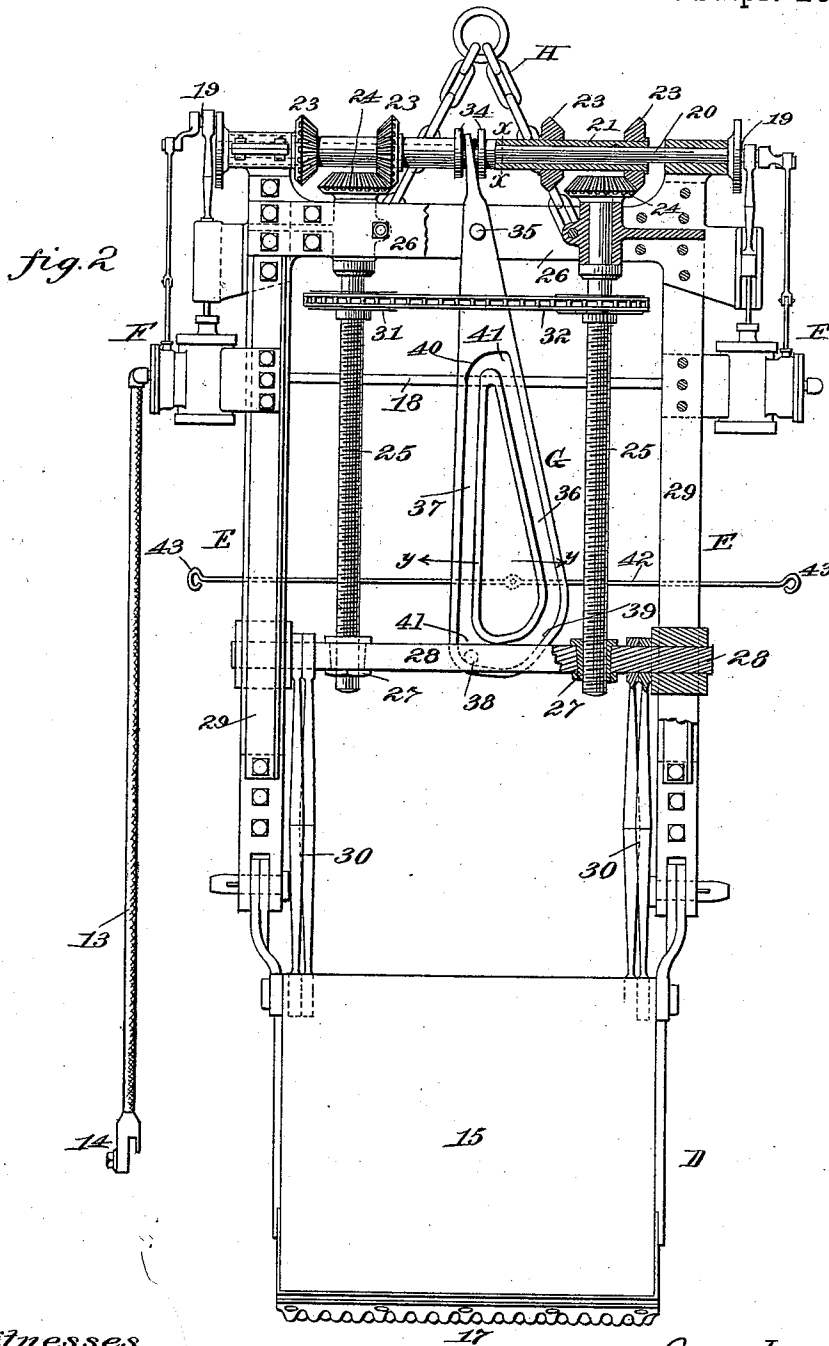
3 Sheets—Sheet 2

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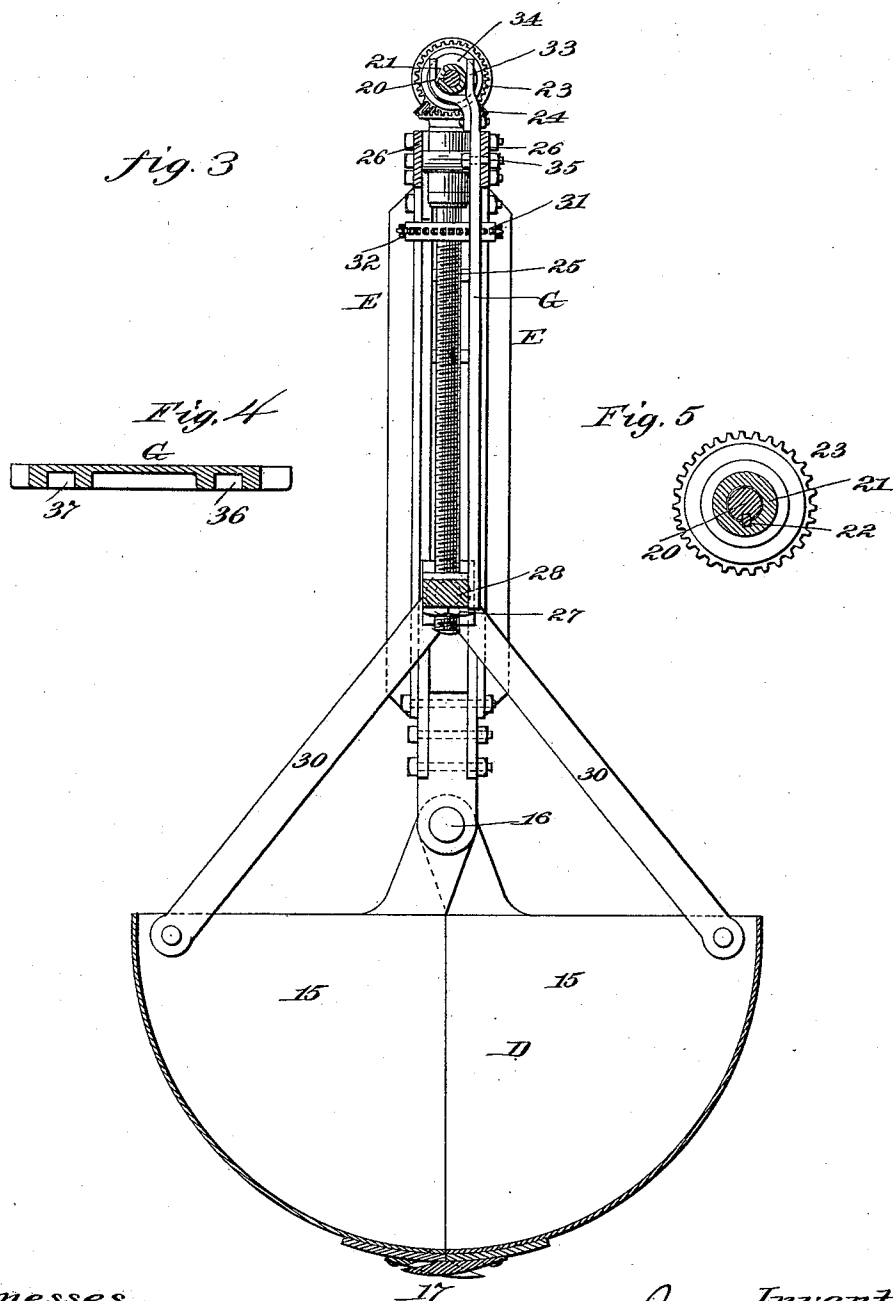
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UNITED STATES PATENT OFFICE.

JAMES POLLOCK, OF WILKES-BARRÉ, PENNSYLVANIA.

POWER-OPERATED BUCKET AND TRANSPORTING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 538,121, dated April 23, 1895.

Application filed March 2, 1896. Serial No. 540,338. (No model.)

To all whom it may concern:

Be it known that I, JAMES POLLOCK, a citizen of the United States, residing at Wilkes-Barré, in the county of Luzerne and State of Pennsylvania, have invented certain new and useful Improvements in Power-Operated Buckets and Apparatus for Transporting Materials, of which the following is a specification.

This invention has for its objects to provide an automatic power operated bucket of great strength and efficiency for excavating and transporting materials, such as earth, loose rock and coal, and to provide means whereby the bucket may be opened or closed positively and by power at any point of the system of cables or tramways upon which it is designed to travel.

To these ends the invention consists in providing a bucket with an engine or engines mounted thereon and connected with the members of the bucket proper by means of suitable gearing and screws so arranged that the members of the bucket cannot be moved either to open or close unless moved positively by the engines.

The invention further consists in providing automatic means for disconnecting the bucket operating gearing from the engine or engines when the bucket members are fully opened or fully closed; and it further consists in providing a system of pipes for steam or other fluid under pressure, with branches convenient to the several points along the tramway at which it is desired to load and unload the bucket.

I shall now proceed to describe the preferred embodiment of the invention, reference being had to the accompanying drawings, in which—

Figure 1 is a general view of a rope tramway or "cable-way," showing my improved bucket and the manner of supplying it with power for loading and unloading. Fig. 2 is a side elevation of the bucket and its operating machinery. Fig. 3 is a vertical central section through Fig. 2; and Figs. 4 and 5 are sections respectively on the lines $y-y$ and $x-x$ of Fig. 2.

The system of cables, shown in Fig. 1, illustrates one of many means which may be employed for transporting the bucket back and

forth from the place of loading to the point of unloading. As shown, there is a main cable or standing rope 1 passing over pulleys a upon a suitable support 2^a and around a horizontal sheave or pulley b upon a support 2^b, said cable being moored or anchored at its ends. The bucket is supported from a carriage 3 adapted to travel on the cable 1 and it is raised or lowered and transported by a rope 4 passing around suitable sheaves on the carriage and extending to the drum 5 of a hoisting engine. As shown, the carriage 3 moves away from the engine by gravity and is drawn toward it by power. A third rope 6 is connected with the carriage and passes around a brake wheel 7 and pulleys 8. When the wheel 7 is stopped by the brake, the carriage will be held in a fixed position upon the cable and the bucket may then be raised or lowered by manipulating the rope 4. By passing the cable around the pulley b , I am enabled to employ a double cable and to divide the weight and strain equally between the two branches or strands thereof.

To provide power for operating the bucket I preferably use a steam main 9 having branches 10 at suitable distances and convenient to the points at which the bucket is to be loaded and unloaded. The branches at these points are provided with sections of steam hose 11 having couplings 12. The bucket 2 is also provided with a short section of hose 13 having a corresponding coupling 14.

Assuming the bucket A to be provided with an engine or engines, as will be hereinafter explained, and that it is desired to move material from a quarry B and deposit it at a dump C, the bucket is first permitted to run down to the quarry B and is then lowered to the surface. The steam hose 13 attached to the bucket is then coupled to the branch 11 at the quarry and upon turning on the steam the bucket is closed and loaded by the engine. The hose at the quarry is then disconnected from the bucket and the latter is raised and transported in the usual manner to the dump C, at which point the power is again connected to the bucket and it is positively opened and the contents discharged, all of which will be hereinafter more fully explained.

It may be stated here that the steam or other motor fluid may be supplied at the dump and the quarry from different sources, although it will usually be most economical to convey the fluid from a single source as shown in the drawings.

Referring to Figs. 2 and 3, D indicates the bucket proper composed of two sections 15 pivoted to the main frame E at 16. The sections 15, taken together, preferably form a half cylinder. At the lower meeting edges of the sections I provide two series of interlocking teeth 17 which are preferably made of hardened steel, to facilitate penetrating the material to be transported. On the frame E is mounted an engine or engines F which are supplied with motor fluid through the hose 13 and a connecting pipe 18. As shown, there are two engines of ordinary construction operating upon crank pins 19 upon opposite ends of a crank shaft 20 which is mounted in bearings at the top of the frame E. Upon the crank shaft is a sleeve 21 which is arranged to slide upon the shaft but compelled to turn with it by means of a feather 22 or other equivalent device. The sleeve 21 carries two pairs of bevel-gears 23 which alternately mesh with bevel gears 24 upon the ends of threaded shafts or screws 25. These screws 25 are journaled in transverse pieces 26 at the upper portion of the frame and their lower ends work in threaded nuts 27 which are fixed in a beam 28. The beam 28 slides vertically in guides 29 at each side of the frame. The beam 28 is connected with the outer portions of the ends of the bucket sections 15 by links 30. To insure the screws working simultaneously, and thus to prevent any jamming of the screws in the nuts 27, I provide each of the screw shafts with a sprocket wheel 31 and connect the wheels by a chain 32.

The sleeve 21 may be thrown to the right or left, to reverse the motion of the screw shafts, by any suitable means, such as a hand lever; but in order to prevent the beam from being pressed too low or drawn up too high I provide automatic means for throwing the sleeve out of gear with the screw shafts. This, as shown, consists of a lever G which is pivoted to the upper transverse portion 26 of the frame and has a yoke 33 embracing the sleeve between two projecting ribs or collars 34. The lever is provided below the pivot with guides 36, 37, which, as shown, are grooves in the lever. These grooves are throughout most of their length radial to the pivot 35, that is to say, if prolonged, they would pass through the pivot. Upon the beam 28 is a pin or roller 38 adapted to run in the grooves 36, 37. At its lower end, the groove 36 is bent inward as at 39 forming a cam surface which throws the lever to central position as the pin 38 travels over it. A similar cam surface 40 is provided at the upper end of the groove 37, although the extent of this cam surface is not so large as the one at the lower end of the lever on

account of being nearer to the fulcrum 35. Opposite the cam surfaces 39 and 40, the grooves or slots 36, 37, are widened and horizontal as at 41 to permit the lever to be moved by hand to throw the gears into mesh. A rod 42 with handles 43 is provided for this purpose.

H indicates a pair of chains or other suitable device for suspending the bucket frame. The operation is as follows, assuming the lever to be in central position, the bucket closed, and the gears 23 out of mesh with the gears 24: To open the bucket, the steam is first turned on and the engine started, and afterward the lever G is thrown from the central position to that shown in Fig. 2, thus throwing the gears of the screw shafts in mesh with one pair of gears on the sleeve upon the crank shaft which drives the screw shafts in the direction necessary to raise the beam 28 and open the bucket through the medium of the links 30. During this operation, the pin or roller 38 travels up the groove or guide 37 and finally engages the cam surface 40 and throws the lever to central position, again throwing the gears out of mesh. When it is desired to close and load the bucket it is lowered onto the material and, with the engines running in the same direction as before the lower end of the lever is thrown to the left and the gears of the screw shafts are thus engaged with the second pair of gears 23 upon the sleeve, thus driving the screws in the reverse direction and forcing the beam down to close the bucket. As the beam moves, the pin 38 travels down the guide 36 and finally encounters the cam 39 with the effect of throwing the lever again to the central position and throwing the gears out of mesh just as the bucket is closed.

My improved bucket is so arranged that it is practically locked when it is closed and there is no danger of the contents being accidentally discharged. After it is loaded the hose which supplies the motor fluid is disconnected and the engines cannot be started until the hose is again connected at the point for discharging the bucket. By using the reversing arrangement shown, or its equivalent, for reversing the motion of the screw shafts I am able to dispense with reversing gear for the steam engines and thus their construction is greatly simplified and cheapened. The automatic reversing lever G insures the screw shafts being disconnected from the engines at proper times and precludes the possibility of any of the parts being unduly strained.

The above description of the bucket and its operation, taken in connection with the previous description of the tramway and the means for supplying motor fluid at different points, explains fully the mode of operation of my improved system of transporting materials. Heretofore, as far as I am aware, buckets which have been arranged to travel upon elevated railways or cable-ways have been either closed and opened with power

supplied by means of a cable or rope; or they have been permanently connected with some sort of steam supply, as by a long flexible hose. I believe I am the first to employ in
 5 such a system of transportation, a main for the supply of motor fluid having branches at different points, in connection with a bucket and its operating machinery adapted to be coupled to any of said branches. It will be
 10 evident that various changes in the details of construction may be made without departing from the spirit of my invention. Thus instead of using the bevel gears on the sleeve in conjunction with like gears on the screw
 15 shafts, I might substitute any other well known form of reversing clutch mechanism. The construction of the lever and the means for throwing it may also be varied, and in some instances I may use a single screw shaft
 20 instead of two.

Without, therefore, limiting myself to the precise construction and parts shown and described, I claim—

1. In apparatus for transporting materials
 15 the combination with an elevated cable or railway, and a carriage arranged to travel thereon, of a motor-operated bucket suspended from the carriage, a fluid pressure main having branches convenient to the places of
 30 loading and discharging the bucket, and hose sections provided with detachable couplings arranged for temporarily connecting the bucket motor with any of said branches, substantially as described.

2. In apparatus for transporting materials,
 35 the combination with an elevated cable or railway, and a carriage arranged to travel thereon, of a bucket frame suspended from the carriage, bucket operating mechanism
 40 and a fluid pressure motor for moving said mechanism to positively open or close the bucket sections, said mechanism being so constructed as to remain immovable except when positively moved by the motor, a fluid pressure
 45 main having branches convenient to the places of loading and discharging the bucket, and hose sections provided with detachable couplings arranged for temporarily connecting the bucket motor with any of said
 50 branches, substantially as described.

3. In a power-operated bucket the combination with the frame, the pivoted bucket sections, the beam movable in guides in the frame, and the links connecting the beam with the
 55 bucket sections, of a power shaft mounted in the frame, a motor or motors for driving said shaft, mechanism for raising and lowering the beam, and means for connecting or disconnecting said mechanism with the power
 60 shaft, substantially as described.

4. In a power-operated bucket the combination with the frame, the pivoted bucket sections, the beam movable in guides in the frame, and the links connecting the beam with the
 65 bucket sections, of a screw shaft or shafts mounted in the frame and engaging the beam to raise and lower it, a power shaft and a mo-

tor or motors for driving the same, and mechanism for engaging and disengaging the power shaft and the screw shafts, whereby the latter
 70 may be stopped and started while the power shaft is running, substantially as described.

5. In a power-operated bucket the combination with the frame, the pivoted bucket sections, the beam movable in guides in the frame, and the links connecting the beam with the
 75 bucket sections, of a pair of vertical screw shafts mounted in the frame and engaging threaded openings in the beam, a horizontal power shaft and a motor or motors for driving the same, a sleeve arranged to slide upon and turn with the power shaft, and beveled
 80 gears upon the sleeve and the screw shafts, said gears being so arranged that the screw shafts may be run backward or forward, or
 85 may be stopped without stopping the power shaft, substantially as described.

6. In a power-operated bucket the combination with the frame, the pivoted bucket sections, the beam movable in guides in the frame, and the links connecting the beam with the
 90 bucket sections, of a pair of screw shafts mounted in the frame and engaging threaded openings in the beam, a power shaft and a motor for running said shaft, sprocket wheels
 95 upon the screw shafts and a chain connecting said wheels, and means for engaging and disengaging the power shaft and screw shafts whereby the latter may be stopped and started while the power shaft is running, substantially
 100 as described.

7. In a power-operated bucket the combination with the frame, a motor mounted on the frame, a bucket comprising sections pivoted to the frame, mechanism for opening and closing
 105 said bucket sections, and means for engaging or disengaging said mechanism and the motor, whereby the bucket operating mechanism may be stopped or started while the motor is running, substantially as described.

8. In a power-operated bucket the combination with the frame, a motor mounted on the frame, a bucket comprising sections pivoted to the frame, mechanism driven by the motor for opening and closing the bucket sections,
 115 and means for automatically throwing said mechanism out of engagement with the motor when the bucket is fully opened or closed, whereby the bucket operating mechanism may be stopped at the proper times without
 120 stopping the motor, substantially as described.

9. In a power-operated bucket, the combination with the frame, of a power shaft and a motor mounted on the frame, a bucket having movable sections, a movable beam, connecting links to the beam and the bucket sections, screw shafts engaging threaded openings in the beam, the stopping and reversing mechanism between the power shaft and the screw shafts, a lever for operating said mechanism and means for throwing the lever to
 130 stop the screw shafts when the bucket is fully opened or closed, substantially as described.

10. In a power-operated bucket, the combination with the frame, of a power shaft and a motor mounted on the frame, a bucket having movable sections, a movable beam, connecting links to the beam and the bucket sections, screw shafts engaging threaded openings in the beam, the stopping and reversing mechanism between the power shaft and the screw shafts, a lever for operating said mechanism and means for throwing the lever to stop the screw shafts when the bucket is fully opened or closed, substantially as described.

nation with the frame, the bucket sections
pivoted to the frame, the movable beam, and
the links connecting the beam with the sec-
tions, of the screw shafts for operating the
5 beam, the power shaft and motor mounted on
the frame, mechanism for connecting and dis-
connecting the power shaft and screw shafts,
and the lever for operating said mechanism,
said lever being provided with cams and
10 guides, and said beam being provided with a

pin or roller adapted to run in the guides and
engage with the cams, substantially as and
for the purpose described.

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

JAMES POLLOCK.

Witnesses:

DAVID COTTLE,
HARRY S. ROBINSON.