

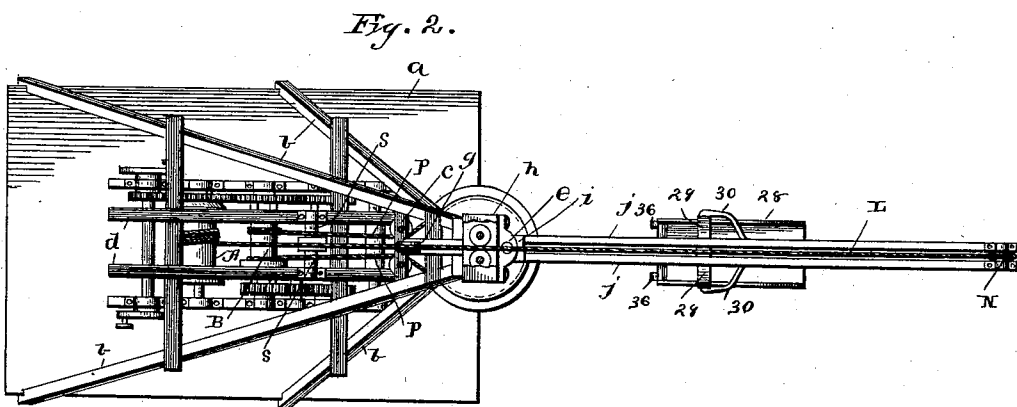
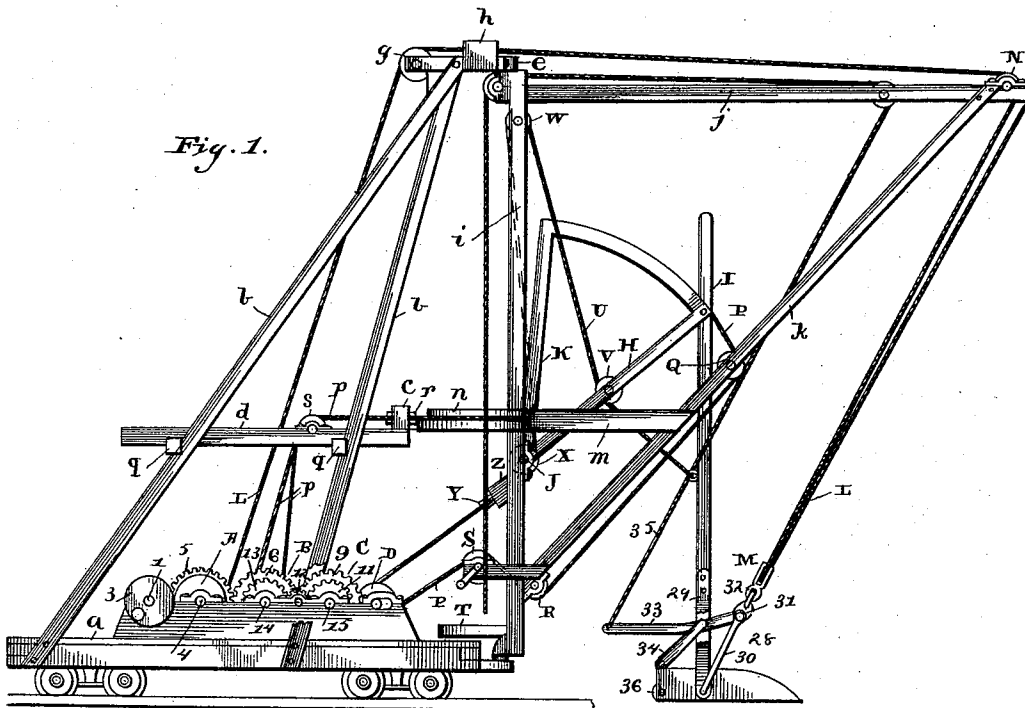
(No Model.)

2 Sheets—Sheet 1.

E. HENNEBERY.
EXCAVATING AND SHOVELING MACHINE.

No. 477,933.

Patented June 28, 1892.



WITNESSES

Geo. E. Frick,
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per
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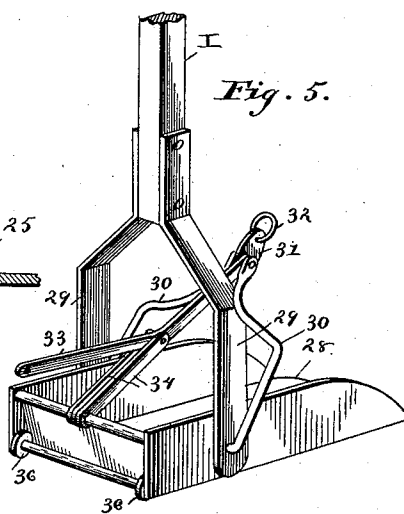
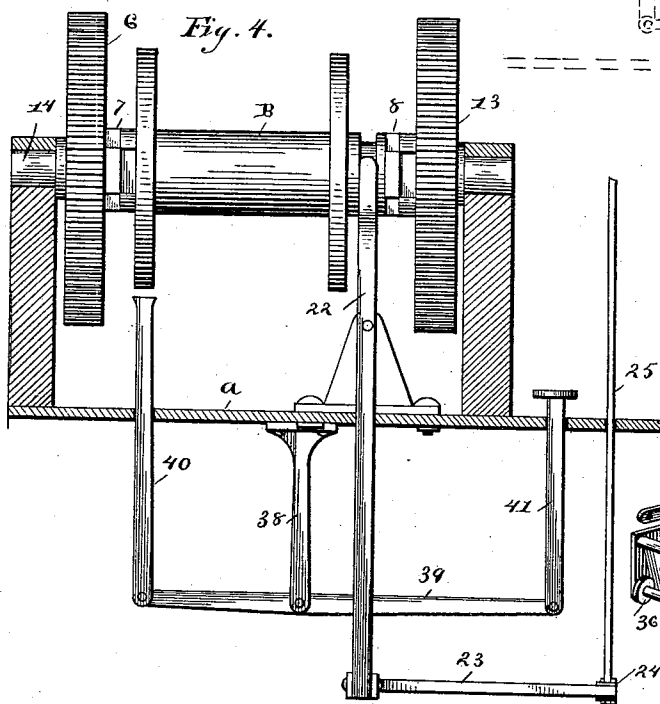
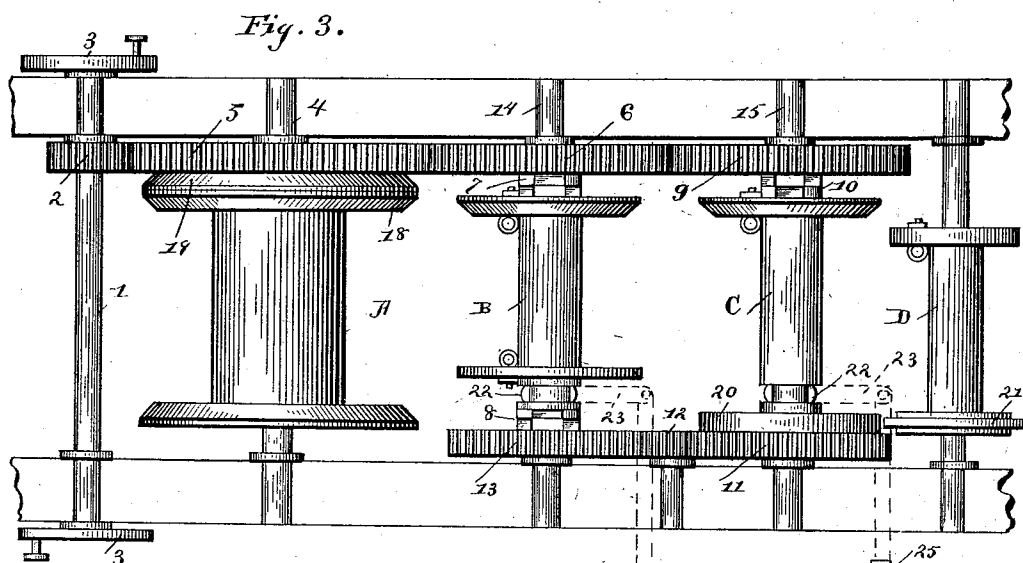
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UNITED STATES PATENT OFFICE.

EDWARD HENNEBERY, OF DULUTH, MINNESOTA.

EXCAVATING AND SHOVELING MACHINE.

SPECIFICATION forming part of Letters Patent No. 477,933, dated June 28, 1892.

Application filed February 1, 1892. Serial No. 419,949. (No model.)

To all whom it may concern:

Be it known that I, EDWARD HENNEBERY, of Duluth, in the county of St. Louis and State of Minnesota, have invented certain new and useful Improvements in Excavating and Shoveling 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 pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to improvements in excavating and shoveling machines; and it consists in the construction, arrangement, and combination of parts, which will be fully described hereinafter, and particularly pointed out in the claims.

The object of my invention is to provide a shoveling or excavating machine which is adapted to be used for shoveling coal or other material upon a wharf or for excavating purposes and which can be placed upon wheels, if desired, the parts being so constructed and arranged that they can be reversed and all of the parts operated without reversing or stopping the driving-power or engine.

In the drawings, Figure 1 is a side elevation of an apparatus which embodies my invention. Fig. 2 is a plan view of the same. Fig. 3 is an enlarged plan view of the driving mechanism. Fig. 4 is a detached view of one of the spools, showing the mechanism used to shift the same, and also the brake mechanism. Fig. 5 is an enlarged detached view of the bucket and the mechanism for dumping the same.

a indicates a platform, which is placed upon casters to be moved around or secured to any desired object or upon the ground stationarily, or which can be placed upon wheels to run upon a track, as will be readily understood.

Extending upward and inclined forward to have their front ends over the front edge of the platform are four uprights *b*, which have their upper ends connected by means of a cross-block *h*. Extending outward horizontally from the front of this cross-block *h* is a block *e*, which forms a journal or pivotal point for the upper end of a crane, the lower end of the crane being pivoted to a block or extension of the platform, as shown. This crane

is composed of a vertical standard *i*, comprising two pieces, a horizontal arm *j*, and the diagonal arm *k*. Each of these is composed of two parallel bars, as shown, and the bars forming the diagonal arm or brace *k* have their upper ends connected to the horizontal bars *j* near their outer ends and to the vertical standards *i* near their lower ends. Connecting the bars *k* and the standards *i* between their ends are the horizontal braces *m*, and at the junction of these bars with the standards is an inwardly-extending horizontal circular disk or platform *n*, which has a groove around its periphery to receive operating chains or ropes *p*. Connecting the standards *b* are the horizontal bars *q*, and resting upon these bars *q* are the bars *d*. Supported at the inner ends of these bars *d* is a block *c*, which carries two horizontal sheaves or guiding-wheels *r*, between which the ropes or chains *p* pass. These ropes *p* then pass over sheaves *s* down to an operating-spool B, around which they are wound in opposite directions, so that when one rope is winding up the other is unwinding for a purpose to be fully set forth hereinafter.

Pivoted between the standards *i* by means of a short shaft J, to which their ends are rigidly secured, are two arms H. The outer ends of these arms are pivoted to opposite sides of a bucket-arm I near its outer end. Also rigidly connected to the short shaft J is arm K, which extends upward, as shown, and owing to the fact that the arms H and K are rigidly secured to the shaft J, which forms a pivotal point for them, they both move together. A rope L is connected to the bail of the bucket and has one end connected to the outer ends of the arms *j*, then passes downward around a pulley M, which is connected with the bail, then up around a pulley N, then through between the pulleys in the block *h* and over a pulley *g*, and is connected with the spool A. A rope P is connected at one end to the upper and outer end of the arm K, passes down around a pulley Q, journaled in the arms *k*, then around a pulley R and to a spool D, if it is to be operated by the gearing. On the other hand, if the rope P is to be operated by hand it will have its lower end connected to a spool S, which is journaled

upon the lower ends of standards *i*. In this instance a platform T will be secured to the standards for the operator to stand upon.

Connected to the bucket-arm I between its ends is a rope U, which passes under a pulley V, journaled between the arms H, then up over a pulley W, journaled in the upper ends of the standards *i*, then down around a pulley X, which is upon the shaft J, between pulleys Y, journaled in the horizontal block Z, and then to and around its operating-spool C.

Journaled in a suitable frame-work upon the platform *a* are the operating-shafts 1, 4, 14, and 15, which carry the operating-spools. The shaft 1 is what may be termed the "driving-shaft," and is connected with a suitable engine through the medium of the wrist-pins or cranks 3. Secured rigidly to the shaft 1 is a gear-wheel 2, which meshes with a large gear-wheel 5, that is rigidly secured to the shaft 4. This gear-wheel 5 in turn meshes with the gear-wheel 6, which is rigidly secured to a shaft 14, and the gear-wheel 6 with a gear-wheel 9, which is rigidly secured to a shaft 15. Rigidly secured to the opposite end of this shaft 15 is a gear-wheel 11, and loosely placed upon the same end of the shaft 14 is a gear-wheel 13. Placed between these gear-wheels 11 and 13 is an idler 12, by means of which the wheel 13 is given a reverse revolution to the wheel 6, as will be understood, as the wheel 13 is loose upon its shaft.

The spool B is placed loosely upon the shaft 14 and is provided with clutches 7 and 8, which engage similar clutches upon the inner sides of the wheels 6 and 13. Owing to the fact that the wheels 6 and 13 upon the shaft 14 are revolving in opposite directions in order to change the direction of the revolution of the spool B, to which the chains or ropes *p* are connected, as before described, it is only necessary to slide the spool endwise upon the shaft 14, so that the clutch upon one end will engage the clutch upon the inner side of either the wheel 6 or 13, while the clutch at the other end is disengaged from the clutch of the opposite wheel, as will be readily understood. In this manner the crane is revolved in either direction, as the operator may desire, to bring the bucket at the desired point. The spool B is made sufficiently shorter than the distance between the wheels 6 and 13 to allow it to be stopped with its clutches at each end out of engagement with the clutches of the wheels, so that the crane will be allowed to remain still while the other mechanism is at work.

At one end of the spool A is a friction-disk 18, which engages a friction-disk 19 upon the inner side of the gear-wheel 5. The spool A is made loose upon the shaft 4, so that it can be moved endwise by means of a suitable mechanism and made to engage with the friction-disk of the wheel 5 or be moved in the opposite direction to be disengaged therefrom. In this way the spool A can be made to revolve or stand still, as the case may be. The hoist-

ing-rope L, that is connected with the bucket, is operated by the spool A, so that by moving the spool A endwise the bucket can be raised or allowed to drop down, as may be desired.

As before stated, the spool C is loosely placed upon its shaft, and by this means it is given an endwise movement in relation thereto. At one end this spool C is provided with a clutch 10 and the wheel 9 with a similar clutch, which engages therewith. With this spool the rope P, that is connected with the arm K, is connected, and the rope thereby wound up or allowed to be slack by the endwise movement of the said spool.

Secured to the opposite end of the spool C from its clutch is a friction-disk 20, which engages and operates in connection with the friction-disk 21 of the spool D for revolving the last-mentioned spool. This spool D is journaled in eccentric boxes, and is thereby moved toward or away from the disk 20, and thereby made to engage for operating it or disengaged for the purpose of allowing its rope to unwind.

Each of the spools A, B, and C are moved endwise upon their shafts by means of levers 22, which are pivoted between their ends and extend under the platform *a*. The upper ends of these levers 22 engage with grooves in the spools, and connected to their lower ends are bell-crank levers 23, which are in a horizontal position. A rod 24 has one end connected with the opposite end of these bell-crank levers, and the opposite ends of these rods are connected to the lower ends of levers 25. By means of these levers 25 the movements of all of the spools are under the control of the operator.

By means of the above-described construction the movements of the bucket through its arm or lever are entirely under the control of the operator, and this without stopping or reversing the motion of the engine or the source of power.

The bucket or shovel 28 is pivoted between two arms 29, which extend outward from its arm by means of the bail 30, which has its ends bent inward through the arms 29 and the sides of the shovel 28. Pivoted between the upper ends of the bail 30 is a plate 31, which is provided with a perforation to receive a ring 32, to which the hoisting-rope is connected. Also pivoted between the upper ends of this bail is a lever 33, which extends rearward and is pivotally connected between its ends to the upper ends of two bars 34. These bars 34 have their opposite and lower ends pivotally connected with the rear end of the shovel in any suitable manner. A tripping or operating rope 35 is connected to the inner and free end of the operating-lever 33. Friction-wheels 36 are placed under the rear end of the shovel, so that when it is being forced along upon any surface for entering a pile of material it will move easily and without any unnecessary friction.

As the spools A, B, and C are loose upon

their shafts, it is necessary to provide for each a friction device or brake, so that they will not allow their ropes or chains to unwind too rapidly when they are out of engagement with their operating-wheels. So, also, the wheel D has a free movement when it is not in engagement with the friction-disk of the spool C, and it is necessary to provide a brake for it also. The brake mechanism for each of these spools consists of a vertical foot-bar 41, which extends up through the platform within reach of the operator, and connected at one end to the lower end of the bar 41 is a horizontal lever 39. This lever 39 is pivoted between its ends to a depending standard 38, and connected to the opposite end of the lever 39 is a vertical friction bar or brake 40, which extends upward through the platform and engages a friction-disk upon the spool. In this manner the unwinding movements of the spools are under the control of the operator, as will be readily understood.

The object of the rope U is to pull the bucket-lever down and in toward the standards i, while the object of the lever K and the rope attached thereto is to hold the bucket down in contact with the object or material being operated upon by the shovel or bucket, thus causing it to enter the material when it is being raised by the hoisting-rope L.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In an apparatus of the character described, a bucket-lever mechanism, combined with an operating mechanism comprising three spools, shafts upon which they are placed, the gear-wheels 5, 6, and 9, rigidly secured to their shafts and intermeshing, and the gear-wheels 11 and 13 and an idler between them, the gear 11 being fast upon its shaft and the gear 13 loose, whereby the gears 6 and 13 upon the same shaft have reverse revolutions, and an endwise-sliding spool upon the shaft of the wheels 11 and 13, provided with clutches for engaging and disengaging alternately clutches upon the wheels 6 and 13, and ropes running to the said spools from different parts of the bucket mechanism, substantially as described.

2. In an apparatus of the character described, a bucket-lever mechanism and a crane, combined with an operating mechanism comprising three shafts carrying gear-wheels upon one end, which intermesh and are rigidly secured to their shafts, the wheels 11 and 13 upon the opposite ends of two of the said shafts, an idler between them, one of the last said gear-wheels being loose upon its shaft for the purpose described, spools upon the shafts 14 and 15 of the said mechanism, which have endwise movements, and clutches for engaging the ends of the spools with their

adjacent gear-wheels, substantially as set forth.

3. In an apparatus of the character described, the combination, with a bucket-lever mechanism and a laterally-swinging crane, of an operating mechanism comprising shafts 4, 14, and 15, the gear-wheels 5, 6, 9, and 11, rigidly secured thereto and the first three intermeshing, a gear-wheel 13, loosely placed upon the opposite end of the shaft 14, and an idler placed between gears 11 and 13 and meshing therewith for the purpose described, spools A, B, and C, placed upon the shafts 4, 14, and 15 and operating substantially as described, the spool C having a friction-disk, and a spool D, journaled in movable bearings and provided with a friction-disk engaging the friction-disk of spool C, all combined to operate substantially as and for the purpose set forth.

4. The combination, with a bucket-lever mechanism and a laterally-swinging crane, of an operating mechanism comprising three shafts having gear-wheels rigidly secured to one end and intermeshing, a gear-wheel upon the opposite end of one of the shafts and rigidly secured thereto, and a gear loosely placed upon the same end of an adjacent shaft, an idler between the two for the purpose described, spools placed loosely upon the shafts and having an endwise movement, as set forth, clutches and friction-disks, as described, and a means for moving the spools endwise, and a brake mechanism for the spools, substantially as specified.

5. A bucket for an excavating-machine, comprising a bucket pivoted between arms of a bucket-lever, a bail at the pivotal point to which an operating-rope is attached, arms pivoted to the bucket in rear of the bail, and an operating-lever pivoted at its forward end to the bail and to the arms between its ends, and an operating-rope connected to the free end of the lever, substantially as set forth.

6. In an excavating-machine, a bucket-lever and a means for operating it, arms extending outward from the outer end of the bucket-lever, a bucket pivoted between the arms by means of a bail which passes through the arms and the bucket, a lever pivotally connected at its forward end to the upper end of the bail, arms pivoted at their lower ends to the bucket in rear of the bail and at their upper ends to the lever between its ends, and an operating-rope connected with the free end of the lever, substantially as described.

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

EDWARD HENNEBERY.

Witnesses:

ROBERT FORBES,

WILLIAM H. TRESCOTT.