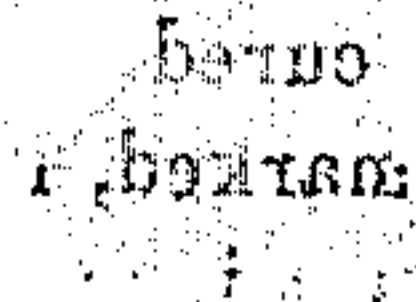


Potato Digger.

Patented Feb. 12, 1867.



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BENJAMIN O. WARREN, OF ELKHART, INDIANA.

Letters Patent No. 61,963, dated February 12, 1867.

IMPROVEMENT IN EXCAVATOR AND POTATO-DIGGER.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, BENJAMIN O. WARREN, of Elkhart, Elkhart county, and State of Indiana, have invented new combined and improved Machinery for Excavating, Elevating, and Depositing Dirt, and Digging and Gathering Potatoes; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a top view of my improved machine.

Figure 2, longitudinal section, taken in the plane xy in fig. 1.

Figure 3, transverse section, taken in the plane vp in fig. 1.

Figure 4, sectional view in detail of endless-belt carrier.

Figure 5, view in detail of two boards detached from bottom of dirt-box in my machine, showing fully their arrangement with pivoted ends.

Figure 6, view of bar or slat-frame applied to dirt-box, when machine is used for gathering potatoes.

Like letters in the different figures of the drawings indicate like parts.

My improved machinery has reference particularly to excavating and building embankments, or such places where it can be used to advantage. It elevates and deposits the dirt into a body or box, so that it may be carried and discharged therefrom at any point that may be desired, the whole requiring but the attendance of two persons in the management of the machine. By simply removing the excavating shovel, and substituting in its stead a broader-scooped shovel, potatoes may be gathered and deposited in the same body or box, requiring but the addition therein of a slat or bar-frame to receive the potatoes and permit the dirt that may be drawn up to pass through its intervening spaces, and be discharged from the box as if used for an excavator. My invention embraces four distinctive features. The first is, by a narrow, endless-belt carrier, moving over and in the same plane with another carrier, enlarged in width, and so arranged relatively to the inclined plane of the shovel, as to enable the dirt to be drawn up more freely than in those machines heretofore used, consequently preventing any clogging or choking of the dirt on the carrier at the point where the elevation of the dirt begins. This difficulty just mentioned frequently happens where the single carrier is used, the reason being that by virtue of the width of the carrier and its sides, it cannot be made to reach the plane of the shovel sufficiently to catch the dirt and draw it up; therefore, in consequence of the clogging, friction is caused to the carrier, and the freedom of the movement of the same is thereby interfered with. To remedy this, the narrow carrier herein referred to is used, centrally arranged over and combined with the larger one, and conforming in width and reaching to the plane of the shovel—the larger carrier catching the dirt not retained on the smaller, on its elevation to the dirt-box, thus dispensing with movable, cumbersome sides, and overcoming, of course, the weight and friction thereby caused; reference will be had to this particularly in the drawings hereafter. The longitudinal frame to which the shovel is attached having its bearing against the front side of the hind axle, and the weight of it supported by the front axle, may be deemed to have its connection with the first feature, from its sustaining the carrier. The object of this arrangement is to give firmness to the beams of the frame when the shovel is projected forward, as well as to give sufficient leverage to the beams, so that an easy and gradual inclination will be given to the frame, and consequently expedite the passage of the dirt on its elevation by the carrier, and also enable the shovel to be operated to advantage. The second feature is, by a lateral movement given to an upright guide-lever attached to the frame, to which the shovel is attached, the shovel may be guided to clear any obstruction that may be met with. The third feature is, by means of a windlass, and lever having an elongated hooked spring or its equivalent, and the lever so arranged relatively to a semicircular plate, having three or more perforations, and attached to one of the axle-beams of the machine, that, on a forward or backward movement given to the lever, and the insertion of the hook of the spring into a perforation, the shovel may be gauged to the depth desired. The fourth feature is the construction of a body or box, suspended from the axle-beams back of the endless carrier, in combination therewith, to receive the dirt therefrom; and also to the manner in which the dirt is discharged from the box, by means of the ends of the boards of the bottom being eccentrically pivoted to the ends of the box, and dropping by their own gravity edgewise, when released by a lever and windlass unwinding a chain connecting with chain couplings affixed near the edges of the boards.

My machine is constructed and operated as follows: A represents the longitudinal beams which form connection between the axles *a*. B, longitudinal frame, secured, immediately under the beams above, to the front side of the rear axle. Attached to the front end of the frame is the excavating shovel *b*. C' is the central belt-carrier, embracing the larger carrier C, (see clearly figs. 1 and 4.) The larger carrier encompasses the two rollers fixed to shafts *c'* and *c*, (see fig. 4;) the upper shaft *c'* of which has a pulley, D', geared to a larger one, D, fixed to hind wheel by a suitable chain or belting. The central carrier extends below the termination of the larger one, and moves on a roller fixed to the shaft *d*, independent of the other two. This shaft is secured under and between the sides of the shovel. By this arrangement of the central carrier, as before remarked, it will be brought closer to the shovel than the larger, so as to reach and take hold of the dirt as soon as it is on the shovel. The combined carrier is provided with side-pieces, E, for keeping it and the rollers in their proper places on the shafts. F is the windlass, secured at the front and at the top of axle-beams, with a lever, *e'*, attached thereto, and having a hooked spring, *e*, (see fig. 1 and dotted lines in fig. 2.) On the side of the beam, and secured to same between lever and end of windlass, is the semicircular plate *f'*, which has three or more perforations, 1, 2, and 3. The windlass connects with the frame B below, by a chain, *f*, (see dotted lines in fig. 2.) Into one of the perforations of the plate in fig. 2, may be seen the hook of the spring, showing the shovel gauged to the depth desired; now, by removing the hook, and carrying the lever backward, and inserting the hook at 1, the shovel will be elevated; and, by moving the lever forwards, and the insertion of the hook at 3, it will be depressed or let down. G is the guide-lever, attached to the front cross-piece of the frame B, for guiding the shovel, as herein mentioned. H is the windlass, secured to the rear, and on the top of the axle-beams, with a lever, *g*, attached thereto, (see clearly figs. 1 and 3.) I is the dirt-box, suspended from axle-beams by the rods *h*, (see clearly figs. 2 and 3.) The bottom of this box is composed of movable boards, *i*, of the same width, and provided with pivots, *j*, on their corner ends, (see two boards in detail in fig. 5.) Holes are made in the ends of the box to receive the pivots of the boards. Now, it will be observed that, with the bottom arranged with the boards to swing freely from the pivots in the holes, the weight of their proximate edges will impel them to hang edgewise, which will be the position desired to admit the discharge of the dirt from the box through the openings thus formed; therefore, to bring them together, and close the bottom, the boards are provided with chain couplings, *k*, to the centres of which are attached the ends of the chain *l*, which is looped up over the windlass, and fastened on the front side, the lever being brought down from its present upright position (seen in the figures) to a horizontal one, and thereby causing the chain to be taken up on the windlass sufficiently for the purpose above stated, (see red lines in fig. 3.)

Operation: As the machine moves forward, the dirt is excavated and drawn up by the carrier, motion being given to it by the gearing in the manner herein described, consequent upon a revolution of the hind wheel—the dirt falling into the box as fast as it is brought up. When full, the machine is taken to a suitable place, and the box emptied from the bottom through the openings made by the boards dropping down, from an elevation of the lever by an attendant whose business it shall be to attend to this. The control of the shovel by the guide-lever, as well as the lever for regulating the depth of the same, is at the option of the driver, who can attend to this at the same time while looking after his horses. When the machine is used for digging and gathering potatoes, a slat or bar-frame, J, (represented in blue lines in fig. 1,) is placed down in the box to receive the potatoes as they are brought up on the carrier, and as they fall down on the bars of the frame, the dirt becoming loose from them, and that which is drawn up passing through the spaces intervening between the bars on to the bottom of the box, whence it is discharged in like manner as if used for an excavator; or the bottom may be left open for the dirt to pass through entirely.

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

1. The central carrier C', as arranged relatively to the inclined plane of the shovel *b*, in combination with the larger carrier C, substantially in the manner and for the purpose as herein set forth.
2. The longitudinal frame B, arranged in combination with the beams A, axles *a*, and carrier C, substantially in the manner and for the purpose as herein set forth.
3. The guide-lever G, in combination with the frame B, and shovel *b*, substantially in the manner and for the purpose as herein set forth.
4. The semicircular plate *f*, lever *e'*, hooked spring *e*, and windlass F, as arranged in combination with beams A and frame B, substantially in the manner and for the purpose as herein set forth.
5. The box I, provided with a movable bottom, in combination with the double carrier C' and C, substantially in the manner and for the purpose as herein set forth.
6. The boards *i* of the bottom of the box I, having eccentrically constructed pivots *j* on their ends, and so arranged as to drop by their own gravity, substantially in the manner and for the purpose as herein set forth.
7. The lever *g*, windlass H, and looped chain *l*, in combination with the chain-couplings *k* of the boards *i* of the box, substantially in the manner and for the purpose as herein set forth.

BENJ. O. WARREN.

Witnesses:

JESSE ZEPP,

HENRY R. SEARLE.