

(No Model.)

W. E. ROCHE.
POTATO DIGGER.

No. 454,919.

Patented June 30, 1891.

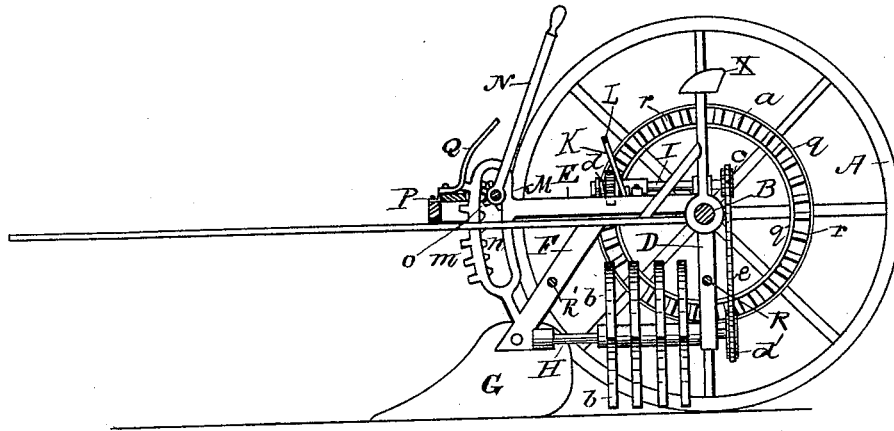


Fig. 1.

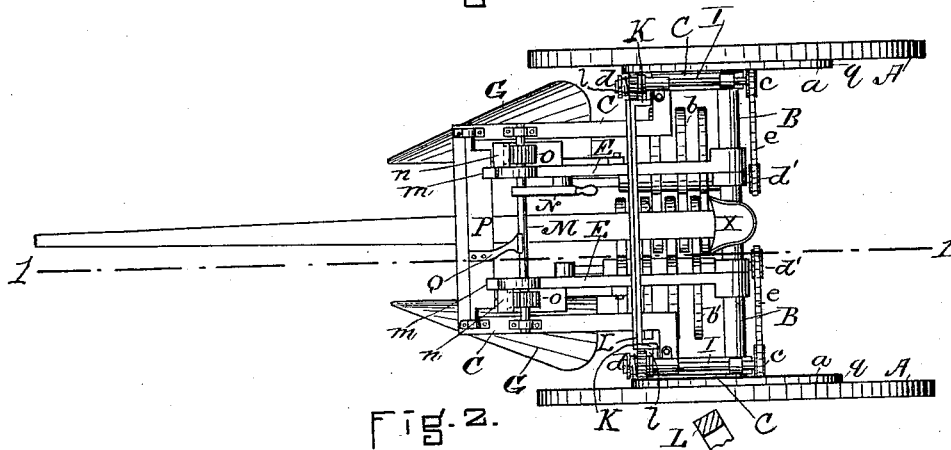


Fig. 2.

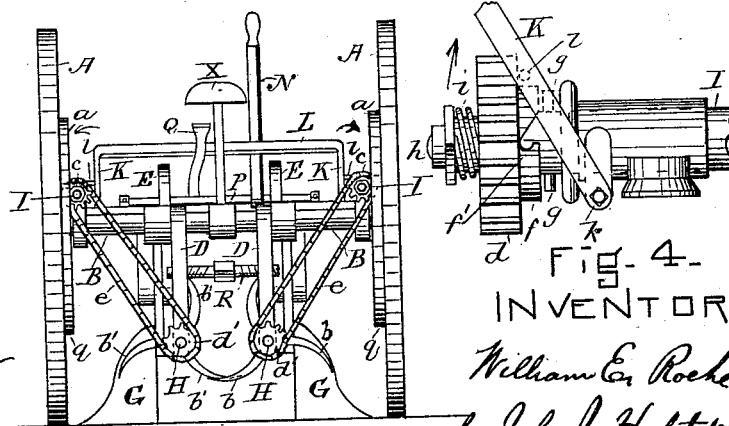


Fig. 4.

INVENTOR.

William E. Roche
by John J. Habstedt
his Atty

WITNESSES.
Franklin Parker
Hudson Bates

Fig. 3.

UNITED STATES PATENT OFFICE.

WILLIAM E. ROCHE, OF PEABODY, MASSACHUSETTS.

POTATO-DIGGER.

SPECIFICATION forming part of Letters Patent No. 454,919, dated June 30, 1891.

Application filed August 18, 1890. Serial No. 362,308. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM E. ROCHE, of Peabody, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Potato-Diggers; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

My invention relates to potato-diggers; and my improvements consist, generally, in an apparatus having the usual traction-wheels, the forward part of the apparatus being furnished with plows for breaking up and throwing off the soil on each side of the potato-row and revolving teeth or fingers located in the rear of said plows and deriving their motion from the traction-wheels and for picking the potatoes out of the row and throwing them off from the same.

In the accompanying drawings, Figure 1 illustrates a longitudinal vertical section of my improved machine, taken through the line 11 of Fig. 2. Fig. 2 illustrates a plan of the machine. Fig. 3 is a rear view. Fig. 4 is a detail.

Similar letters represent like parts in all the figures.

A A are the traction-wheels of the machine, and a a are crown-gears secured to the inner side of said wheels.

B is the axle, and C is the frame secured or pivoted at its rear end to said axle.

D D are two hangers suspended from and extending below the axle B.

E E are two arms secured to the hangers D D at their axial or fulcrum points and extending forward from the axle B, forming with said hangers a right-angled or bell-crank lever.

F F are two hangers extending down from the arm E, and G G are two plows having vertical inner sides secured to the lower ends of said hangers.

H H are two parallel shafts extending longitudinally with the machine and supported in bearings in the hangers D and F. Keyed upon each of the shafts H H is a series of radial curved teeth or fingers b b', with the teeth

of each series extending from its shaft at short distances apart and in parallel planes with each other and with the teeth of both series curving in opposite direction and arranged alternately, so that teeth of one series will overlap those of the other series, as shown in Figs. 2 and 3.

I I are two shafts supported in journal-bearings a little above the sides of the frame E, and with their rear ends extending a little back of the axle B, and to this rear end is keyed a sprocket-wheel c. To the forward end of the shafts I I are loosely journaled pinions d d, which engage with the crown-gears on the traction-wheels A A. The rear ends of the shafts H H are furnished with sprocket-wheels d' d', and sprocket-chains e e connect said wheels with the wheels c c on either side of the machine. Secured to the rear surface of each of the pinions d d is an annular flange f, having two or more inclined or oblique slots f', and the shafts I I are provided with an equal number of lateral pins g for entering said slots. The forward end of the shaft I, beyond the pinion d, is provided with a nut h, and between said nut and pinion a coil-spring i encircles the shaft I and tends constantly to bear the pinion d backward. A slight revolution forward of the traction-wheels A A and of the gears a a and the revolution given thereby to the pinions d d (shown by the arrows in Figs. 3 and 4) will cause the springs i i to force the pinions back, so that the slots f' f' will engage with the pins g, and a further revolution of said pinions will cause the shafts I I to revolve as well as the sprocket-wheels c c and d' d', the shafts H H, and teeth b b'. The above-described revolutions will be primarily given by the forward movement of the traction-wheels and the machine. When the machine is backed and the wheels A A rotate in the reverse direction, the crown-wheels a a will revolve the pinions d d, so that the slots f' f' will release themselves from the pinions g g, and the pinions will revolve free from the shafts I I, and said shafts will be stationary.

A yoke-lever composed of two parallel arms K K and a cross-bar L, connecting said arms, is pivoted at the lower ends of said arms to lateral studs k k, which extend outward from a downward extension of the journal-bearings

of the shafts I I, and two lateral pins *l l* extend outward from the arms K K and rest against the rear surfaces of the pinions *d d*. During the forward movement of the machine and traction-wheels A A, as before stated, the normal action of the pinions *d d* will be to engage the slots *f' f'*, with the pins *g g* to rotate the shafts I I; but whenever it is desired to release said pinions from the shafts so as to stop the revolution of the teeth *b b'* this can be done in an instant by pressing down the bar L and arms K K, when the pins *l l* will press the pinions forward with the slots *f' f'* out of engagement with the pins *g g*, and when said pressure on the bar L and arms K K is removed the spring *i i* will act upon the pinions *d d*, as before described.

The forward ends of the arms E E are provided each with a double segmental rack with large teeth *m* upon its outer surface and smaller teeth *n* upon its inner surface.

M is a rock-shaft journaled transversely with the machine upon the frame C, and to said shaft are keyed pinions *o o*, which engage with the inner racks *n n*.

N is an arm or handle keyed to the shaft M and extending obliquely upward and backward and by which the shaft M is rocked, a drawing backward of said arm serving to rotate the pinions *o o* and thus raise the racks *n n*, the arms E E, the hangers F D, the plows G G, and the teeth or fingers *b b'*, swinging up said parts upon the axle B, upon which the supporting-hangers D F are pivotally hung.

P is a flat bar or board hinged or pivoted near its front edge and, preferably, at its ends, to the front of the frame E, and with the back edge of said bar or board adapted to engage with the racks *m m*.

Q is an arm extending upward from the bar P and provided with a foot-rest on its upper end. When the arms E E, hangers D F, and the other parts above described are raised by the pinions *o o* and racks *n n*, the racks *m m* will throw up the bar P, the teeth of the racks striking the edge of said bar, which will allow an upward play to the racks; but when the handle N is released, so as to allow the raised parts to drop by gravity, the back edge of the bar or board P will drop between the teeth *m m* and retain the parts in substantially the same position in which they were raised. If the back edge of the bar P be raised by pressing forward the arm Q or by any other means, the racks *m m* will be released and the parts will drop by gravity until the plows strike the ground.

The two hangers D D and the two hangers F F are adjusted nearer to or farther apart from each other by two double screws R R', each having a right and left hand screw-thread extending, respectively, from opposite ends to a point between the same. The screw R connects the hangers D D with the right-hand thread of the screw R, passing through one of said hangers, and the left-hand thread passing

through the other hanger. The hangers F F are connected in a similar manner by the screw R'.

I have shown in the drawings a very simple form of the crown-wheel *a*, and it is constructed as follows: Two rings *q q* are secured edgewise to the inner surface of the traction-wheel A, concentric with said wheel and with each other, and short cylinders *r*, of a length equal to the distance between said rings, are secured radially between the same and at equal distances apart all around the annular space between the rings. The teeth of the pinions *d d* must also be correspondingly apart, in order that said pinions may properly engage with the crown-wheels *a a*.

The operation is as follows: The plows G G and teeth or fingers *b b'* are adjusted by the screws R' R, so that the plows will be about the same distance apart as the width of the potato-row. The driver, then sitting upon the seat X between the traction-wheels A A, the machine is drawn along the row, with the two plows spanning the same and with a point midway between said wheels being substantially over the center of the row. The plows G G will then separate the soil, throwing it outward and making two parallel trenches on either side of the row and leaving the latter in the form of a ridge intermediate between and parallel with said trenches. The revolution of the traction-wheels A A will cause the curved teeth or fingers *b b'* to revolve by the means above described, and the teeth or fingers will break up the soil in the ridge row and pick up the potatoes, this latter action being facilitated by the radial sweep of the fingers of the two series *b b'* crossing each other, and being curved in the direction of their sweep will throw them up and outward beyond the row. If at any time it be desired to stop the collecting of the potatoes or the revolution of the fingers *b b'*, it can be done in an instant by the driver pressing his foot against the bar L, when the shafts I will be released from the action of the traction-wheels A A, as above described. When the pressure on said bar is relieved, the springs *i i* will lock the pinions *d d* to the shafts I I, and the fingers *b b'* will be again rotated. If it be desired to raise the plows G G and fingers *b b'*, it can be done by the lever-handle N operating the pinions *o* upon the segmental rack *n*, the bar P engaging with the rack *m*, serving to lock the parts in their raised positions. The adjusting-screws R R' are particularly adapted for adjusting the plows G G and fingers *b b'* to suit different widths of potato-rows.

What I claim as new, and desire to secure by Letters Patent, is—

1. In combination with the axle B, two arms pivoted to said axle and extending forward from the same, the hangers D F, the plows, and revolving teeth supported by said hangers and means for raising said arms and hangers, all as and for the purposes set forth.

2. In combination with the axle B, the arms E, pivoted to said axle and extending forward from the same, hangers F, the concave racks *n*, secured to the forward ends of said arms and hangers and adapted to rise and fall with the same, pinions *d*, journaled in stationary bearings and engaging with the racks *n*, and means for rotating said pinions, all as and for the purposes set forth.

3. In combination with the axle B, the arms E, pivoted to said axle and extending forward from the same, hangers F, the double rack *m*, secured to the forward ends of said arms and hangers and adapted to rise and fall with the same, pinions *d*, journaled in stationary bearings and engaging with the inner concave rack *n*, means for rotating said pinions, a bar or board hinged or pivoted transversely to the machine-frame and with its free edge adapted to engage with and lock the outer convex rack *m*, and means for raising said bar or board on its pivots or hinges, all as and for the purposes set forth.

4. In a potato-digger, the combination of the two parallel shafts H H, extending longitudinally with the machine and in the line of draft of the same, the two series of radial teeth *b b'*, secured to said shafts, with the teeth of each series extending from its shaft at short distances apart and in parallel planes with each other, and the teeth of both series also curving in opposite directions and adapted to revolve in opposite directions in the directions of their curves inward to the center of the machine and up and outward from the same, all as set forth.

5. The combination, with the traction-wheel, of a crown-gear secured concentrically to the inner surface of the wheel, a shaft supported in bearings on the frame of the machine, a pinion loosely journaled on said shaft and adapted to be readily keyed or unkeyed in a moment from said shaft, the revolving teeth *b* or *b'*, the shaft for supporting the same, and intermediate mechanism between said shaft and the shaft bearing the pinion for transmitting the rotary motion from one shaft to the other, all as and for the purposes set forth.

6. In combination with the shaft I, having the lateral pins *g g*, the pinion *d*, loosely journaled on said shaft and having the flange or collar *f*, with the inclined slots *f'*, the coil-spring *i*, encircling the outer end of the shaft I and bearing against the surface of the pinion *d* opposite the flange *f* and pins *g*, a gear for engagement with said pinion, and means for forcing the pinion away from the pins *g* and against the action of the spring *i*, all as and for the purposes set forth.

7. The crown-gear *a*, constructed of two concentric rings of different sizes, and short cylinders of a length equal to the distance between said rings radially secured between and to the same at equal distances apart the entire distance around said rings, all as set forth.

WILLIAM E. ROCHE.

Witnesses:

WILLIAM W. LEIGHTON,
GEO. H. POOR.