

G. A. ROBERTS & J. DONOVAN.
POTATO DIGGER.

No. 535,080.

Patented Mar. 5. 1895.

Fig. 1.

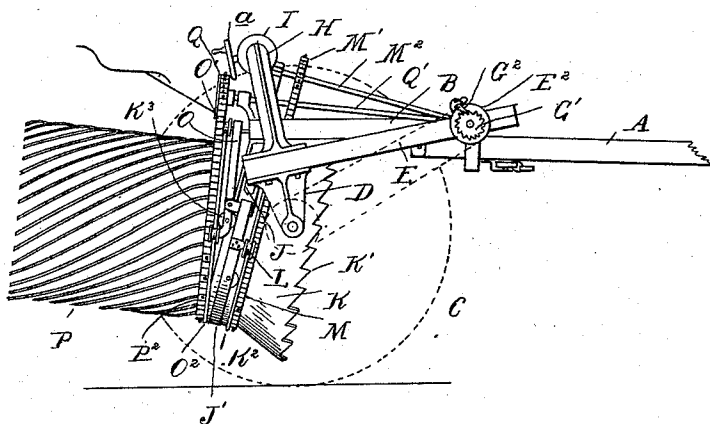


Fig. 2.

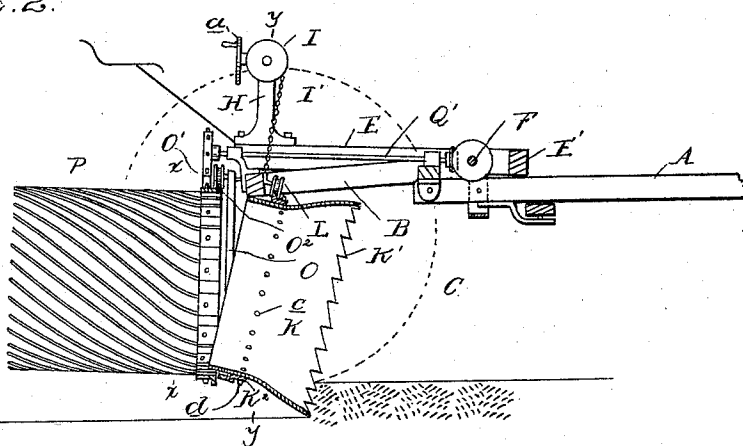
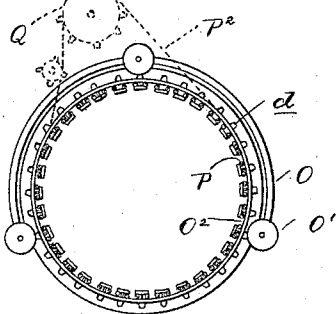


Fig. 3.



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(No Model.)

2 Sheets—Sheet 2.

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Fig. 4.

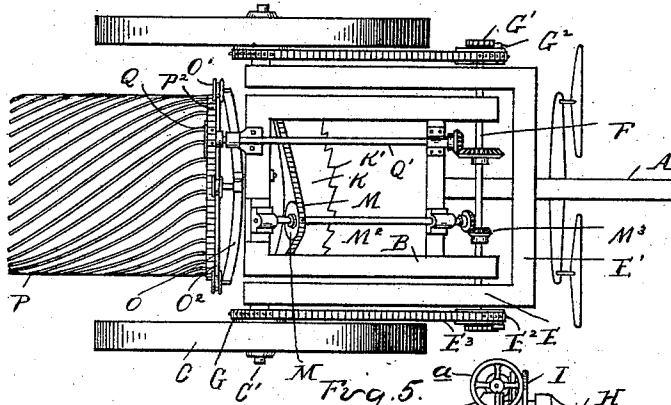


Fig. 8.

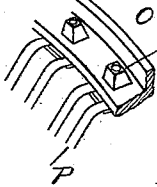


Fig. 9.

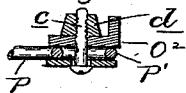


Fig. 10.

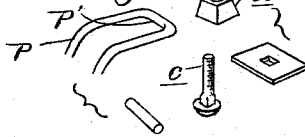


Fig. 7.

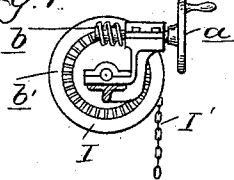
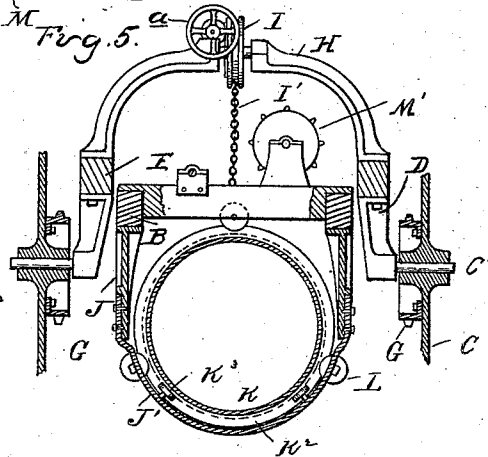
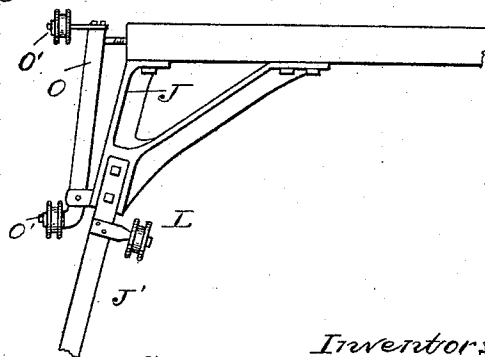


Fig. 6.



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UNITED STATES PATENT OFFICE.

GEORGE A. ROBERTS AND JAMES DONOVAN, OF THREE RIVERS, MICHIGAN,
ASSIGNORS TO THE ROBERTS, THROP & COMPANY, OF SAME PLACE.

POTATO-DIGGER.

SPECIFICATION forming part of Letters Patent No. 535,080, dated March 5, 1895.

Application filed February 5, 1894. Serial No. 499,226. (No model.)

To all whom it may concern:

Be it known that we, GEORGE A. ROBERTS and JAMES DONOVAN, citizens of the United States, residing at Three Rivers, in the county of St. Joseph and State of Michigan, have invented certain new and useful Improvements in Potato-Diggers, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention consists in the peculiar construction of a rotary digging plow, the means for supporting and driving the same and the raising and lowering device therefor; further, in the combination with such a plow of a rotary cage for pulverizing the earth and separating the potatoes therefrom; further, in the peculiar construction, arrangement and combination of the various parts.

In the drawings, Figure 1 is a side elevation of our improved machine, showing the plow raised. Fig. 2 is a vertical, central, longitudinal section therethrough showing the plow lowered as in operation. Fig. 3 is a section on line *x x* in Fig. 2, the raising and lowering device and the frame being omitted. Fig. 4 is a top plan view with the raising and lowering device omitted. Fig. 5 is a section on line *y y* Fig. 2. Fig. 6 is a side elevation of the rear end of the inner or draft frame showing the supporting devices for the plow. Fig. 7 is a detail side elevation of the actuating devices for raising and lowering the plow. Fig. 8 is a perspective view of a portion of the annular head of the cage. Fig. 9 is a section therethrough, centrally through one of the clamping bolts. Fig. 10 shows in perspective the construction of the forward end of the tines in forming the cage and the parts employed in clamping it thereon.

A is the tongue or other suitable draft connection. B is a frame secured thereto and forming a rear extension thereof.

C are the ground wheels journaled on stub axles C' in the brackets D.

E are side bars of a frame support on the brackets D at their rear ends and at their forward ends connected by a cross-bar E'.

F is a shaft passing through the forward end of the two frames, as shown in Fig. 4.

This shaft near its ends is provided with

sprocket wheels E² sleeved on the shaft and driven by means of sprocket chains E³ from sprocket wheels G on the hubs of the ground wheels. Beside each of the sprocket wheels E² and keyed to the shaft is the ratchet wheel G'. Each of the sprocket wheels E² carries a dog or pawl G², by means of which the shaft F may be driven, in the forward movement of the machine, or, by moving the dogs out of engagement therewith, the drive shaft F may be thrown out of operation.

At the rear end of the ground wheel frame is an arch H centrally of which is the chain wheel I, to which one end of the chain I' is secured, the lower end thereof being connected to the lower end of the draft frame B. The chain wheel may be turned to raise and lower the rear end of this frame by means of the hand wheel *a* on the worm shaft *b*, which meshes with the worm wheel *b'* formed on one side of the chain wheel I, as shown in Fig. 7.

Depending from the inner frame at the rear, at each side are the hangers J, to the lower end of which is secured the semicircular strap J', of a shape corresponding to the shape of the annular plow K. This plow is preferably of the shape shown in Fig. 2, that is, flaring outwardly toward its forward end, and is also preferably provided with a suitable cutting edge such as the teeth K' at its forward edge.

K² is a flanged ring secured on the outer face of the plow, as shown in Fig. 2.

L are grooved rollers supported on the strap J' below the center of the plow on each side, and in which the flange of the ring K² engages.

K³ are rollers on the inner face of the strap J' bearing against the rear face of the flange and adapted to take the end thrust of the plow, in use.

The ring K² is secured to the plow by suitable bolts *c* and nuts *d*, as shown in Fig. 10, the nuts being on the outside and serving as sprocket teeth, the whole, thus forming a peripheral sprocket wheel, by means of which the plow may be driven.

M is a sprocket chain passing around the plow, and engaging with the sprocket wheel described, and passing over a sprocket wheel

M' on the shaft M², journaled on top of the frame B and adapted to be driven by suitable bevel gears M³ from the shaft F.

On the rear end of the frame B is an arched strap or arm O, upon which are secured the grooved wheels O', one of these wheels being preferably arranged centrally at the top and the other two at the lower ends. O² is a flanged ring supported in these wheels or rollers, the two lower rollers being below the center of the ring or head O², as plainly shown in Fig. 3. This ring forms the head of the pulverizing or separating cage, comprising this head and the rearwardly extending spirally bent tines P. These tines we preferably make in pairs, by bending a single piece of metal centrally to form the loop P' which is clamped to the head by a bolt c and nut d, the nut being on the outside and preferably forming a tooth with which the sprocket chain P² is adapted to engage. This sprocket chain passes around beneath the sprocket wheel, thus formed, and over a sprocket wheel Q on the shaft Q', journaled on top of the frame B and adapted to be driven by suitable gears from the shaft F.

The parts being in the position shown in Fig. 1, the machine may be taken to any desired point and if the pawls G² are thrown out of engagement with the ratchet wheels G', the forward motion of the ground wheels will not rotate the plow, which, as will be seen, is raised clear of the ground.

If it is desired to use the machine for digging potatoes, the pawls G² are thrown into engagement with their ratchet wheels, and the rear end of the frame B is lowered by turning the wheel a which allows the chain to unwind from the chain wheel I, permitting the plow to enter the ground. The forward motion of the ground wheels will rotate the shaft F and through the shafts M² and Q' will impart motion to the sprocket chains M and P². The chain M passing around the plow engaging the sprocket wheel thereon will rotate the plow which will cut into the ground and the forward motion will force the dirt therethrough and onto the forward end of the cage to which a rapid rotation will be imparted through the mechanism described. The dirt falling into the cage will be broken up and sifted through between the tines, while the potatoes will be delivered at the rear end of the machine and may readily be gathered up.

It will be seen that the axis of the plow and the axis of the cage are at a slight angle to each other, which enables us to engage the rear lower edge of the plow over the front edge of the cage and thus deliver the dirt from the plow well into the cage without danger of clogging. We also preferably speed the cage at a greater speed than the plow and find this gives better effect in breaking up the dirt than where they are run at the same speed.

The annular flaring or tapering plow in prac-

tice takes less dirt through the plow and cage than a cylindrical plow, for the reason that a great deal of the dirt at the edges will drop out because of the inclination of the plow while the dirt in the middle is of sufficient volume to be forced through and into the reel or cage.

What we claim as our invention is—

1. In a potato digger, the combination with a wheeled frame, of a ring-shaped tapering rotary plow, enlarging toward its forward edge and provided with a cutting edge thereon, substantially as described.

2. In a potato digger, the combination with a wheeled frame, of an annular rotary plow, a flange on its periphery near the rear end, grooved wheels on the frame below the center of the plow, in which said flange engages, a peripheral sprocket wheel, a sprocket chain engaging said wheel a drive sprocket on the frame for driving said sprocket chain, and a rotary cage independent of the plow substantially as described.

3. In a potato digger, the combination with a wheeled frame, of an annular plow, a peripheral flange thereon beneath the rear edge of the plow, grooved wheels on the hanger below the center of the plow, in which said flange engages, rollers on the hanger, in rear of the flange to take the end thrust in digging, drive mechanism for the plow, and a rotary cage independent of the plow substantially as described.

4. In a potato digger, the combination with movable separating means, of a ring-shaped plow independent of the separating means, and independent means for driving the plow, substantially as described.

5. In a potato digger, the combination with a frame, of a separating means, an annular tapering plow independent of the separating means, independent means for adjusting the plow and independent means for rotating the plow, substantially as described.

6. In a potato digger, the combination of a wheeled frame, the annular, rotary plow, the rotary cage, the axes of the cage and plow being at an angle, the lower edge of the plow overlapping the edge of the cage, and drive mechanism for the cage and for the plow, substantially as described.

7. In a potato digger, the combination of a wheeled frame, the annular, rotary plow, the rotary cage, and independent drive mechanism for the two adapted to drive them at different speeds, substantially as described.

8. In a potato digger, the drive mechanism comprising a shaft driven from the ground wheels, a sprocket wheel thereon, a sprocket chain engaging therewith and engaging a sprocket wheel on the plow or separator, said sprocket wheel formed by an exterior annular ring, clamping bolts and nuts forming the teeth of the sprocket wheel, substantially as described.

9. In a potato digger, the combination with a wheeled frame, of an annular rotary plow, a

rotary cage in rear of the plow, means for driving the plow and independent means for driving the cage, substantially as described.

5 10. In combination the wheels, the frame supported thereon, a shaft at the forward end thereof, driven from the ground wheels, a draft frame, through the forward end of which the shaft extends, an adjustable, flexible support between the rear end of the wheeled
10 frame and the rear end of the draft frame, and the plow on the draft frame, substantially as described.

11. In a potato digger, the combination with a rotary cage, of an annular tapering plow independent of the cage, and means for rotating the plow, substantially as described. 15

In testimony whereof we affix our signatures in presence of two witnesses.

GEORGE A. ROBERTS.
JAMES DONOVAN.

Witnesses:

JAMES E. BUNN,
MARVIN H. BUMPHREY.