

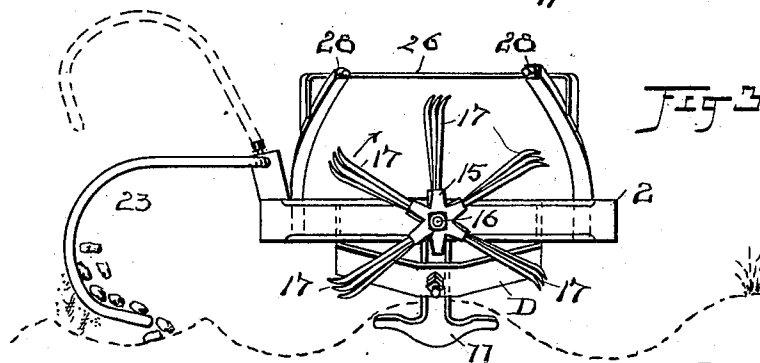
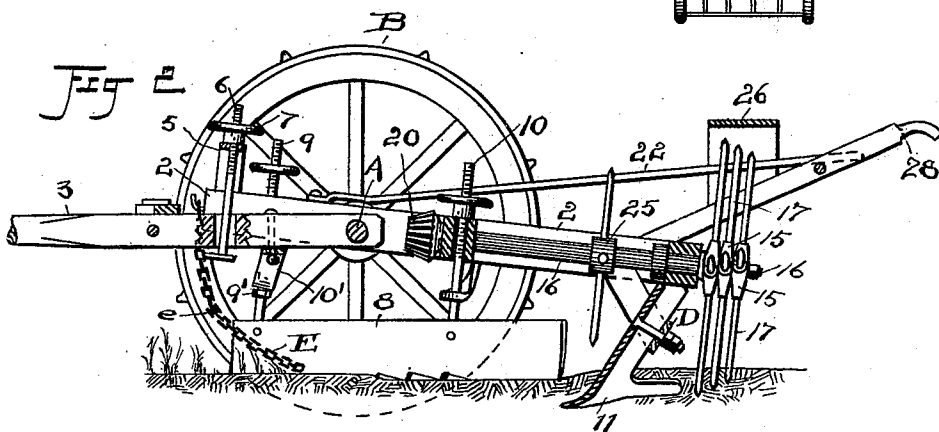
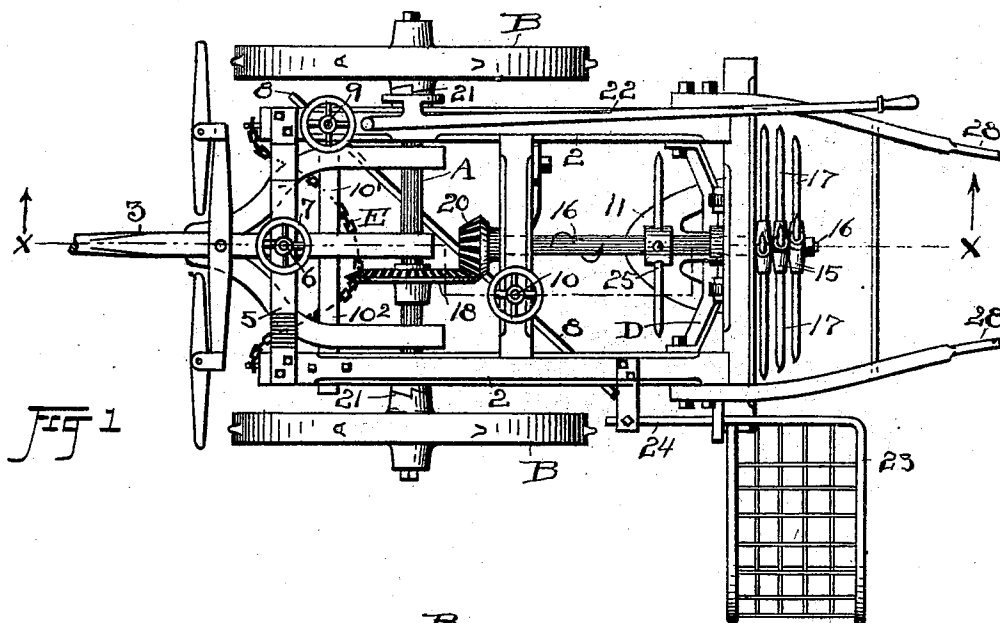
(No Model.)

2 Sheets—Sheet 1.

G. H. KIDNEY.
POTATO DIGGER.

No. 510,070.

Patented Dec. 5, 1893.



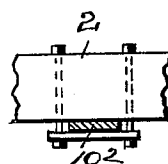
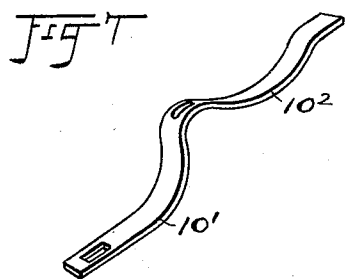
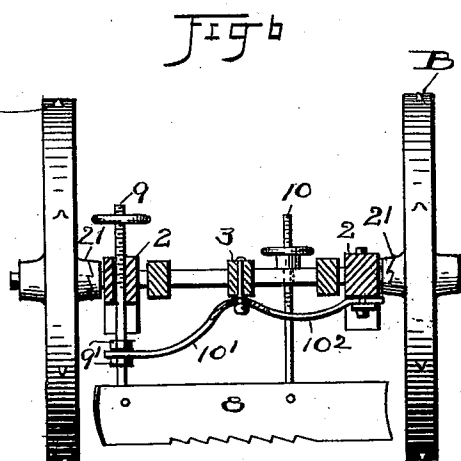
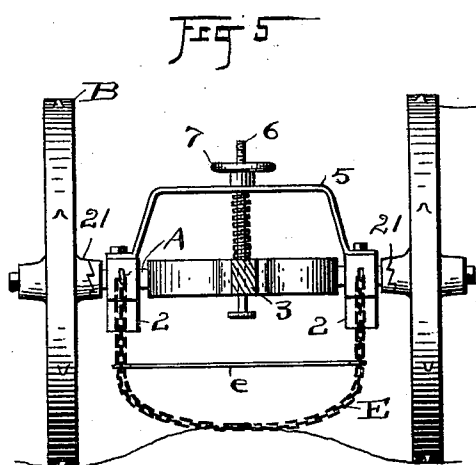
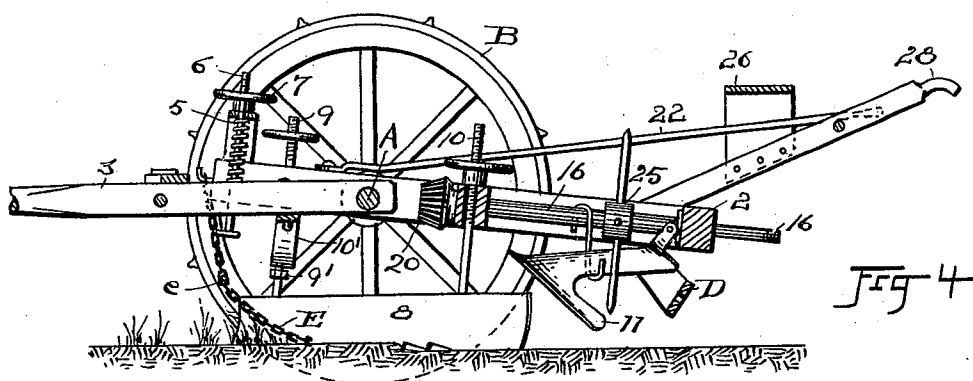
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2 Sheets—Sheet 2.

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ATTEST.

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GEORGE H. KIDNEY, OF CLEVELAND, OHIO.

POTATO-DIGGER.

SPECIFICATION forming part of Letters Patent No. 510,070, dated December 5, 1893.

Application filed June 26, 1893. Serial No. 478,809. (No model.)

To all whom it may concern:

Be it known that I, GEORGE H. KIDNEY, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, 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.

My invention relates to improvements in potato diggers, and the invention consists in the construction, combination and arrangement of parts substantially as shown and described and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a plan view of my improved machine. Fig. 2 is a longitudinal vertical central section thereof taken substantially on line *x, x*, Fig. 1. Fig. 3 is a rear elevation of a portion of the rear of the machine, as hereinafter more fully described, and serves to show, especially, the relation of the active parts of the machine to the row of potatoes which is being dug, and to the rows on either side thereof. Fig. 4 is a longitudinal central sectional elevation corresponding to Fig. 2, but with the rotary digger removed and the plow or lifter swung up out of the way so that the machine is converted into a row scraper or cleaner. Fig. 5 is a front elevation of so much of the machine, especially as is connected with the drag chain, to show the arrangement of said chain and its relation to other parts. Fig. 6 is a front elevation of the machine in so far especially as the scraper blade and its means of support are concerned, and omitting other parts not associated with the scraper. Fig. 7 shows the scraper carrying bar, and Fig. 8 its end support.

This machine is of the variety in which horse power is employed to draw the same, and is designed to dig a row of potatoes at a time as rapidly as a team will ordinarily travel in field work. I therefore employ an axle A, and a pair of wheels B which are arranged to run in the furrow at either side of the row, and upon this axle are pivotally hung

the main frame 2, and the tongue 3, each of which is independent of the other except as they are connected by adjustable mechanism, whereby the elevation of the rear of the frame may be determined and controlled, if desired. For this purpose as well as other purposes the side bars of the frame 2 extend forward nearly or quite one-third of their length in front of the axle A, and the overhanging yoke 5 connects the front extremities of these side bars. This yoke is raised at its center a sufficient distance above the tongue to give the desired room for adjustment of the said parts in relation to one another, and a threaded rod or bolt 6 extends through the said tongue and the center of said yoke, and a hand wheel 7 serves to effect the adjustment on said bolt. That is to say, assuming that the tongue sustained a certain normal elevation when the machine is at work, a sort of counter-balance can be established between the tongue and the weight on frame 2, by the adjustment just described, and the man holding the handles of the machine can then determine the depth which the parts shall work.

In transporting the machine from place to place the rear of the machine may be lightened in this way, and a shoe for the plow may be employed to sustain the parts. But for ordinary work I prefer to leave the rear frame 2 free to play up and down with the surface over which it travels and in this case the rod is lowered so that the tongue does not bear on the head thereof, as seen in Fig. 2.

The working mechanism is all supported upon the frame 2, and this mechanism consists, essentially, in three leading parts, each of which performs an important office in the process of digging the potatoes. The first of these elements or parts is the scraper or scalper 8, which is set across the path of the machine at an angle of about forty-five degrees to its direction of travel, and is straight or substantially straight from end to end. This scraper or scalper is slightly curved to the front along its lower edge and has inclined teeth or serrations along its edge which serve a better purpose than a straight edge in cut-

ting the roots and clearing the soil, and being inclined back toward the rear end of the scraper will clear themselves and avoid obstruction while they are doing this improved work.

I have found that to utilize a machine of this kind in a weedy or grassy field, the weeds and grass must be shorn off the row, and the row must be cleaned before successful digging can be done. I have also found that with a machine of the kind here described, such cleaning of the row can be accomplished, however dense and heavy the growth of weeds and grass in the patch may be. This scraper is designed to work just beneath the surface of the earth in the roots of the plants or weeds, and it is supported upon the main frame 2 in front of the axle by the threaded rod 9 and at the rear of the axle by the threaded rod 10. This throws said blade or scraper across beneath the axle diagonally thereto, and since when the frame 2 rises at one end it falls at the other, the said scraper would rise and fall in like manner if it were rigid with said frame at its ends, and this would prevent even and uniform work by the scraper. Therefore, to overcome this difficulty and to insure a uniform shear cut by the scraper notwithstanding the undulations of the surface, and to hold the scraper to its work at both ends alike, I give the rod 9 free up and down play in the frame and make the frame serve chiefly as a guide for the rod while really the scraper is supported at its front by means of the bar 10'. The said bar is constructed to make the tongue a fulcrum or pivot point, and in this instance is rounded and has an oblong hole for the bolt securing it loosely to the tongue. Then at the other end the said bar 10' is held as seen in Fig. 8, so as to be free to slide in its support, and is held adjustably and loosely on the rod 9 by set nuts 9'. Said bar is therefore practically free or loose at all three points, and has the tongue, which always keeps the same level, as its fulcrum to adapt it to the movements of the main frame. It follows that the scraper is held level its full length all the time however much the main frame plays up and down. Thus, suppose the said frame to rise at its rear; this will depress the front of the frame before the axle and hence move the end 10' of the bar 10' downward. Now the tongue being unaffected by this movement and the bar 10' tilting thereon, it follows that the front of the scraper will be raised exactly as much as the rear of the frame and scraper have risen, and all the up and down movements of the rear of the frame, with which the rear end of the scraper is rigid, will be in like manner imparted to the front of the scraper. Next in order behind this scraper is the doubled winged lifting and loosening plow 11. This plow is so constructed and arranged as to pass easily beneath the bed of potatoes and raise them toward the

surface, as well as to loosen the earth about them, so that they may be easily lifted out. The standard of this plow is comparatively narrow in cross section, as seen in Fig. 3, but its wings extend laterally a sufficient distance to reach the width of the bed and move the potatoes up toward the surface. If this plow be kept at the proper depth during the work the point and edge will always enter beneath the potatoes, so that none of them will be injured by the plow, and the depth at which the plow runs must be determined by the depth of the potatoes in the ground. Now having thus loosened and raised the potatoes in the earth, it remains only to dig and separate them from the earth so that they can be gathered, and this is accomplished by means of the rotating toothed digger arranged immediately behind the plow 11. This digger has a series of independently adjustable hubs 15 on the shaft 16 extending back through the center of frame 2 from axle A from which it is geared to rotate with power. The hubs 15 have each a series of teeth 17 and are so arranged on the shaft 16 that the teeth of each succeeding hub come back of the next preceding one more or less, thereby giving them a retreating and diagonal position as compared with the line of travel. One advantage of this arrangement of the teeth is to easily get rid of heavy stones by rolling them out of the way instead of picking them up and throwing them as would occur if all the teeth were in line with the line of travel. This does not however affect the potatoes, which are lighter and are caught by the teeth in such way as to be thrown into rows as seen in Fig. 3. The hubs 15 are held in their adjusted position by any suitable means, and the teeth 17 will in all cases be arranged according to the conditions of the soil and the work. Said teeth 17 are set apart from one another sufficiently in the rows not to catch the loosened soil, and yet are close enough to catch or gather the potatoes, and the rows of teeth are just sufficient in number, and the digger revolves just fast enough, not to let any portion of the soil go unworked. There might be more hubs and teeth if desired, and then the digger might run slower. The gear wheel 18 on shaft A and the miter gear 20 on shaft 16 are thrown constantly in gear and the clutches 21 operated by lever 22 serve to make engagement between the wheels and the axle. Obviously, this or any equivalent clutching mechanism may be employed.

The machine here shown is arranged to cast the potatoes to the left, and hence the machine should travel around the patch of potatoes to the right and work toward the center. I might, however, without changing the plan of the invention at all, make the machine so that it could as well travel back and forth upon the same side of the potato patch or field, taking row after row, by simply duplicating the miter-gear on the axle 4 and providing means to

throw one or the other gear into action according as the machine was going one direction or the other. Then a mere change of gears at the end of the row would serve the purpose and the machine could travel back and forth over rows side by side.

In the operations of the rotary digger the potatoes are thrown against the screen 23. This screen or stop has an arm 24 held in brackets upon the main frame and means to lock the said arm and hold the screen at any desired elevation. It should travel free of the earth and yet be low enough to prevent the potatoes from being thrown through beneath it. The curved rods or wires, or other material, of which the screen is formed, serve to drop the potatoes in a line or row on the surface of the earth along where the last preceding row of potatoes was dug. In this way I throw the potatoes from one row into another row, and over the weeds and grass which are deposited between the rows by the scraper 8. When the machine is not in use and is carried from place to place, the screen 23 is raised as shown in dotted lines, Fig. 3. This screen may be made of soft or yielding material so as not to injure the potatoes, if there be danger of injury.

A revolving toothed cleaner 25 is fixed to the shaft 16 in front of the plow 11, and serves to keep said plow clean from clods and trash, otherwise the plow would become clogged.

To prevent possible annoyance from dust or trash thrown up by the rotary digger I employ a hood or shield 26, arranged over the said digger. This hood may be made wider than here shown, if desired.

The main frame has handles 28 by which the operator governs the operations of the machine very much as he would a plow, and controlling the depth at which the machine works and generally regulating the operations of the machine.

The relative depths at which the several parts work are illustrated in Fig. 2, but these may be varied by adjustment according to conditions of soil or the like.

Sometimes it occurs that the weeds and grass are so heavy that it becomes impracticable to clean and dig the row at the same time, and so I have arranged the machine to meet this condition. To this end I have made the rotary digger removable from the end of shaft 16, which extends to the outside of frame 2, and have pivoted the plow on the cross bar of the frame so that it is adapted to be swung up out of working position, as seen in Fig. 2. The scraper then alone is at work, and can be used this way for as many rows as may be desired. After scraping the digging will follow by going over the ground a second time, and the plow and rotary digger are again restored to working position. The standard of the plow rests against the cross-piece D and is temporarily secured to said cross piece by a bolt and nut, Fig. 2.

In tall weeds particularly it is desirable to have something to drag the weeds down before they come to the scraper, and for this purpose I employ a suitable chain E, fixed at its ends to the front of the machine and having a spreader, rod or bar —e— to keep it in good working position. This materially helps the scraper in its work.

Having thus described my invention, what I claim is—

1. In a potato digger, the main frame pivoted on the axle, the scraper diagonal to the line of draft and extending across beneath the axle from front to rear, the double winged lifting plow supported centrally at the rear of the main frame behind said scraper, and a rotating digger directly behind said plow supported on a shaft in line with the direction of travel, substantially as described.

2. In a potato digger, the main frame pivoted on the axle, a scraper arranged diagonally to the line of draft and mechanism at its ends to hold the scraper in a level position independently of the movements of the said frame, the lifting plow behind the scraper and the rotary digger behind said plow, substantially as described.

3. The wheel supported frame, a scraper extending diagonally across beneath the axle thereof and means to support the scraper from the said frame at its rear end and from the tongue at its front end, substantially as described.

4. The digger described and a frame extending forward of the axle, in combination with a scraper supported from the said frame behind the axle, and means connected with the tongue of the digger to automatically hold the front end of the scraper level with the rear end, substantially as described.

5. The main frame extending in front of the axle and pivoted thereon and the tongue pivoted on the axle independently of said frame, in combination with the scraper supported on said frame at its rear and guided therein at its front, and a support for the front end of the scraper fixed to the tongue, whereby the scraper is held level, substantially as described.

6. The machine having a diagonally-arranged scraper, and a drag chain with a spreader engaging its links, substantially as set forth.

7. The digger having the main frame pivoted on the axle, the scraper beneath said frame, the lifting plow supported on said frame to be swung out of working position and the removable rotary digger behind said plow, substantially as described.

8. The main frame pivoted on the axle independent of the tongue and the central shaft driven from the axle and having its end extending through the rear of said frame, a removable rotary digger on the end of said shaft behind said frame, and a lifting plow in front of said digger having its standard pivoted on

said frame to be raised and thrown out of use, and a diagonal scraper in front of the plow, substantially as described.

9. The potato digger described consisting
5 of the main frame pivoted on the axle, the diagonal scraper, the lifting plow, the power shaft having a toothed cleaner in front of the plow and a toothed digger in rear of the plow, substantially as described.

10 10. In a potato digger, a lifting plow and a

rotary digger behind said plow consisting of a series of independently movable hubs and each hub provided with a series of teeth, substantially as described.

Witness my hand to the foregoing specification. 15

GEORGE H. KIDNEY.

Witnesses:

H. T. FISHER,

GEORGIA SCHAEFFER.