

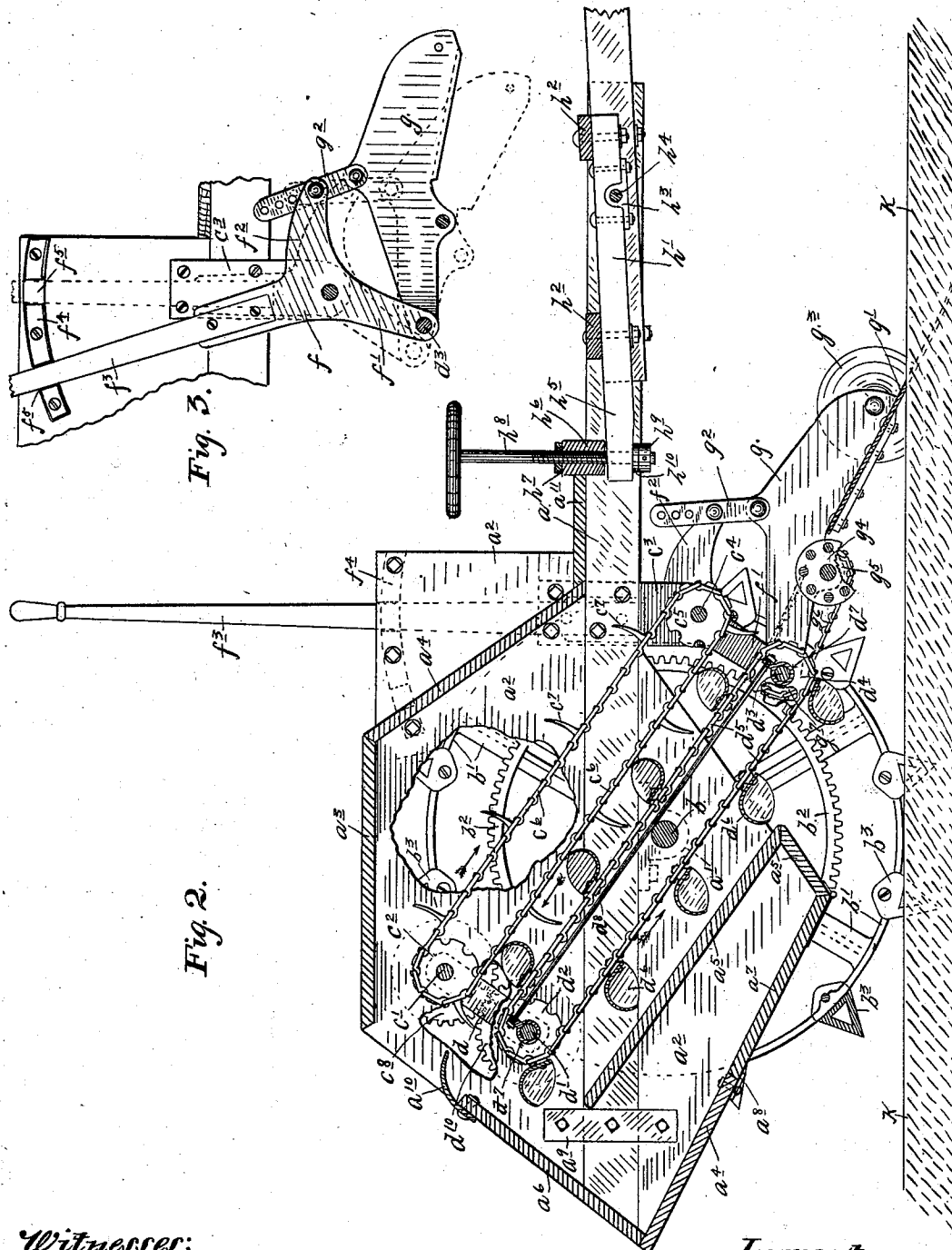
(No Model.)

2 Sheets—Sheet 2.

H. M. GROVER.
POTATO DIGGER.

No. 572,511.

Patented Dec. 1, 1896.



Witnesses:
E. F. Elmore
C. F. Kilgore

Inventor.
Henry M. Grover
By his Attorney, Jas. F. Williamson

UNITED STATES PATENT OFFICE.

HENRY M. GROVER, OF ANOKA, MINNESOTA, ASSIGNOR OF ONE-HALF TO
JOHN H. NILES, OF SAME PLACE.

POTATO-DIGGER.

SPECIFICATION forming part of Letters Patent No. 572,511, dated December 1, 1896.

Application filed March 21, 1895. Serial No. 542,589. (No model.)

To all whom it may concern:

Be it known that I, HENRY M. GROVER, a citizen of the United States, residing at Anoka, in the county of Anoka and State of Minnesota, have invented certain new and useful Improvements in Potato-Diggers; 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 appertains to make and use the same.

My invention has for its object to provide an improved potato-digger; and the invention consists in the novel features of construction which will be hereinafter described, and be defined in the claims.

The accompanying drawings illustrate the invention, wherein, like letters referring to like parts—

Figure 1 is a plan view of the machine with some parts broken away. Fig. 2 is a longitudinal vertical section of the same, approximately on the line $x'x'$ of Fig. 1, with some parts shown in elevation and others broken away; and Fig. 3 is a detail of the right-hand lever for raising and lowering the scoop-shovel and shifting the lower member of the double-carrier elevator for throwing the driven parts in and out of gear with some parts broken away.

a represents the main frame of the machine, and is provided with bearings a' , through which passes the axle b , having loosely mounted thereon the supporting-wheels b' . The supporting-wheels b' are provided with driving-gears b^2 , formed integral with the said wheels, and are also provided with angular or pointed traction shoes or claws b^3 , which are removably secured to the rims of the wheels in any suitable way which will render the same rigid therewith.

To the frame-timbers a are fixed sidings a^2 , which are connected by a top cross-deck or cover $a^3 a^4$ by an underneath cross-plate a^4 and a box-body a^5 and by an end cross-plate or box-head a^6 . A hinged plate a^7 coöperates with the parts a^5 to complete the box or receptacle which receives and carries the potatoes, as will subsequently be seen, until they are dropped on the ground. The said hinged plate or box-gate a^7 is held in its closed position by a button a^8 , as shown, but in prac-

tice would be provided with connections (not shown) under the control of the driver seated on the angular top deck $a^3 a^4$. The siding-pieces a^2 are shown as reinforced by straps a^9 , fixed to the said siding-plates and the frame-timbers a by bolts or in any other suitable way. The inside box-plate a^5 does not extend to a union with the back cross-plate a^6 , but stops short thereof to afford a mouth or entrance-way into the box or receptacle $a^5 a^7$. The rear end cross-plate a^6 also stops short of the top-deck plate a^3 , so as to afford a passage-way for permitting the outward movement of the vines and other foreign materials under the action of the elevator, as will more fully later appear; and the said rear end cross-plate a^6 is provided with a dividing-guard a^{10} , which projects inward to the proper point for coöperation with the elevator members to separate the vines and potatoes at the point of their delivery.

In the sidings a^2 is mounted a carrier-shaft c' with sprockets c^2 , and in bearings c^3 , depending from the frame-timbers a or the said sidings a^2 , is mounted a carrier-shaft c^4 with sprockets c^5 . On the said sprockets c^2 and c^5 , carried by the said respective shafts c' and c^4 , are mounted chains c^6 with teeth c^7 , which shafts, sprockets, and toothed chains constitute and operate the upper endless carrier, which coöperates with the lower endless carrier, as will presently be noted, to form the elevator.

On the shaft c' are pivoted hanger-arms d , in the lower ends of which are mounted a shaft d' , having sprockets d^2 . To each of the bearings c^3 is pivoted a three-armed casting $f f' f^2$. To the arm f of this casting is attached a hand-lever f^3 . In the arms f' of the said angular castings is mounted a shaft d^3 , having sprockets d^4 . On the sprockets d^2 and d^4 , carried by the shafts d' and d^3 , respectively, are mounted chains d^5 , having fixed thereto buckets d^6 , which parts coöperate to form and operate an endless carrier, constituting the lower carrier of the elevator. On the said shafts d' and d^3 are mounted sleeves d^7 , which are connected by rods d^8 , suitably spaced from each other for forming an open deck for the said carrier $d^5 d^6$.

The lower-carrier shaft d^3 extends outward

beyond its bearings in the lever-arms f' and is provided with pinions d^9 , which may be made to engage with the driving-gears b^2 on the supporting-wheels b' , or may be thrown out of engagement with said driving-gears b^2 by simply rocking the hand-levers f^3 backward. The upper shaft d' of the lower carrier is provided with a gear d^{10} on its left end, which is in mesh with a gear c^8 on the shaft c' of the upper carrier. Hence the motion imparted from the driving-gears b^2 on the supporting-wheels b' to the pinions d^9 and the shaft d^3 will drive, through the connections hitherto named, the two cooperating endless carriers c^6 and d^5 , so that their opposing surfaces or faces will both run in the same direction and cooperate in the elevating action. In this connection it may be further noted that the teeth c^7 on the upper carrier c^6 and the buckets d^6 on the lower carrier d^5 are so related that the said teeth c^7 will work between the buckets d^6 throughout the cooperating portion of their travel.

To the carrier-shaft d^3 are pivoted the upper arms of the side bars g of the unearthing scoop-shovel g' . The said side bars g are also connected by links g^2 to the forward arms f^2 of the lever-castings $f'f^2$, hitherto noted. At their forward ends the side bars g are provided with colters g^3 , and between the said side bars g , at their forward ends, is removably secured the shovel g' . In the said side bars g of the scoop, directly back of the shovel g' , is mounted a trundle-wheel g^4 , the shaft of which wheel is provided with sprockets g^5 , connected by chains g^6 with sprockets g^7 on the shaft d^3 . The said parts $g^5 g^6 g^7$ impart to said trundle-wheel g^4 motion in the same direction as the travel of the carrier d^5 . In virtue of the pivotal connection of the scoop-shovel g' to the carrier-shaft d^3 and the connections through the links g^2 with the forward arms f^2 of the lever-castings, which are under the control of the hand-levers f^3 , it is obvious that by the said levers f^3 the scoop-shovel g' and all the parts carried thereby may be raised and lowered into or out of their working position by the same movement which swings the lower carrier of the elevator forward or backward, so as to throw the pinions d^9 into or out of gear with the drivers b^2 on the supporting-wheels b' . The levers f^3 are of such construction and so set as to bear against lock-segments f^4 and spring into engagement with either one of two lock-notches f^5 therein for holding the said levers in either one of their two extreme positions, as may be required for holding the working parts in their idle and in their operative positions, respectively.

The tongue-base or draft attachment $h' h^2 h^3$ is pivoted to a cross-rod h^4 , secured to the forward portions of the frame-timbers a . The said tongue-base is provided with a rearward extension h^5 , which underreaches a cross-bar h^6 , fixed to the top of the frame-timbers a . The said cross-bar h^6 is provided with a fixed

nut h^7 , in which works a hand-screw h^8 , extending through the part h^5 of the tongue, and provided, as shown, with a pinned or fast collar h^9 and a washer h^{10} , underneath the tongue part h^5 . With this construction the outer end of the tongue may be adjusted in respect to the main frame by manipulating the hand-screw h^8 . Under the distribution of the weight from the forward end of the main frame on the tongue and under the strain on the shovel when in working position the tendency will be to pull down the lower end of the tongue on the hand-screw h^8 . Hence by raising or lowering the said hand-screw h^8 the angle of the tongue to the main frame may be fixed as desired. The frame-timbers a are shown as connected directly behind the cross-bar a^6 by a foot-board a^{11} . The driver is supposed to occupy the top section a^8 of the deck as a seat, with his feet on the cross-board a^{11} , so as to be within reach of the hand-levers f^3 and the hand-screw h^8 .

Having regard to the operation the action is probably clear from an inspection of the drawings and the statements made in connection with the detailed description of the parts. However, the said action of the machine as an entirety may be briefly summarized as follows:

When in working position, the parts will appear substantially as shown in Fig. 2, with the shovel extending into the ground k to unearthe the potatoes, and the traction claws or shoes b^8 also extending into the ground under the weight of the machine to prevent slippage of the wheels under the driving strain required therefrom to run the elevator-carriers and the trundle-wheel. Supposing the parts to be thus set, then under the forward motion of the machine the scoop-shovel will unearthe the potatoes and deliver the same, together with the vines and more or less of the earth, to the trundle-wheel. The trundle-wheel will receive these materials from the shovel and, separating out a large part of the earth, will deliver the potatoes to the buckets d^6 of the lower carrier d^5 and will throw the vines and other foreign materials between the two carriers of the elevator. Under the cooperating action of the elevator-carriers the vines will be engaged by the teeth c^7 of the upper carrier c^6 and be thrown out to the rear of the machine over the guard a^{10} , and the potatoes will be carried upward by the buckets d^6 of the lower carrier d^5 and delivered from the said buckets at their turn over the upper sprockets d^2 into the mouth of the box or receptacle $a^5 a^7$. When the box is loaded to its capacity or any desired extent, the door or gate a^7 will be lowered and the potatoes emptied into a pile on the ground or into any receptacle desired. When it is desired to turn the machine or throw the same into an idle position, the levers f^3 are drawn backward by the driver, which, as hitherto noted, will swing the lower carrier forward, so as to throw the pinions d^9 out of gear with the

drivers b^2 and will raise the scoop-shovel into the full-line position shown in Fig. 3, so that the shovel or blade g' will stand above the level of the ground.

5 From the foregoing description it is obvious that my machine is of comparatively simple and cheap construction. By actual experience I have demonstrated the efficiency of the machine for the purposes had in view.

10 It will be understood that changes might be made in the details of construction without departing from the spirit of my invention.

In respect to the action it should be further noted that while subject to the elevating-carriers the chunks of dirt will be broken up and to a large extent dropped out in the progress up the elevator, or at the turn of the lower carrier at the upper or delivery end of the same.

20 What I claim, and desire to secure by Letters Patent of the United States, is as follows:

1. In a potato-digger, the combination with supporting and driving wheels, of an endless elevator having a pair of carrier-shafts spaced apart by a swinging frame, one of which shafts is provided with a driven gear-wheel that receives motion from said driving-wheel and

serves also as the counter-shaft for imparting motion to other parts of the machine, and parallel pivoted hangers, supporting said carrier-frame for permitting the driven gear-wheel carried thereby to be swung into and out of gear with said driving-wheels, substantially as described. 30

2. The combination with the supporting and driving wheels $b' b^2$, of the elevator having the carrier-shaft d^3 with pinions d^9 engageable with the driving-gears, the scoop-shovel g' pivoted to said shaft d^3 , the pivoted hanger d' supporting the shaft d' , the sprockets d^2 and d^4 on said shafts d' and d^3 , the carrier d^5 with buckets d^6 mounted on said sprockets, the pivoted castings $f' f^2$ with hand-lever f^3 , in the arms f' of which is mounted the shaft d^3 and the other arms f^2 of which are connected by the links g^2 to said scoop g' , substantially as described. 35 40 45

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

HENRY M. GROVER.

Witnesses:

JAS. F. WILLIAMSON,
J. H. NILES.