(No Model.) 4 Sheets—Sheet 1.

H. KREBS.

POTATO DIGGER.

No. 492,332. Patented Feb. 21, 1893.

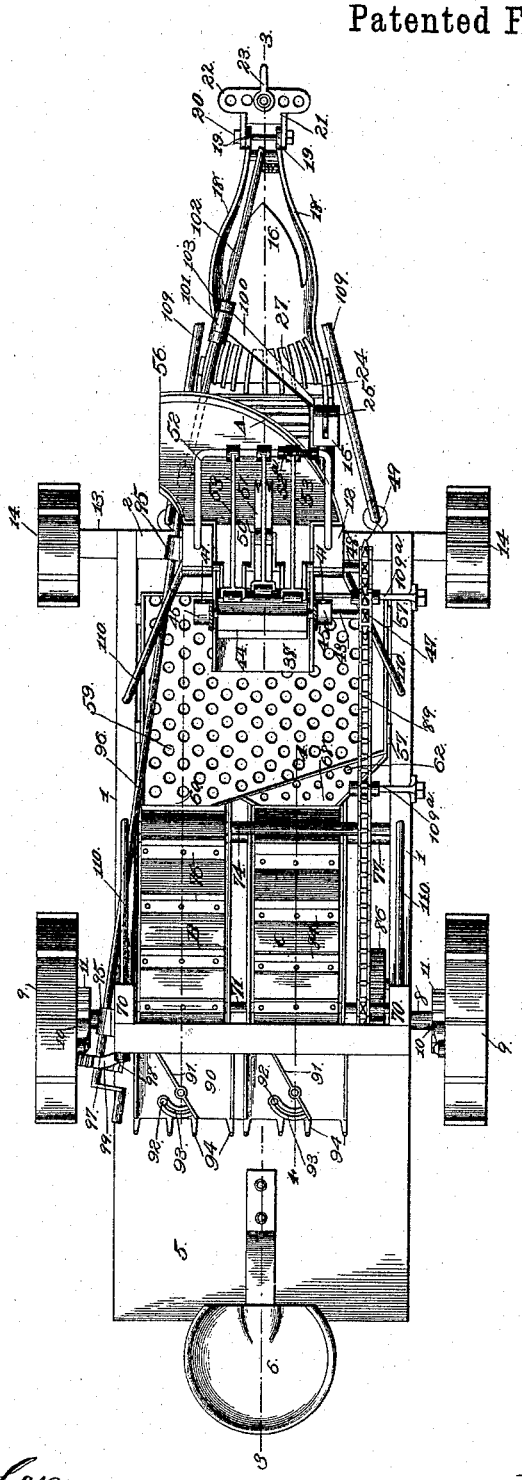

Fig. 1.

Witnesses
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(No Model.)

4 Sheets—Sheet 2.

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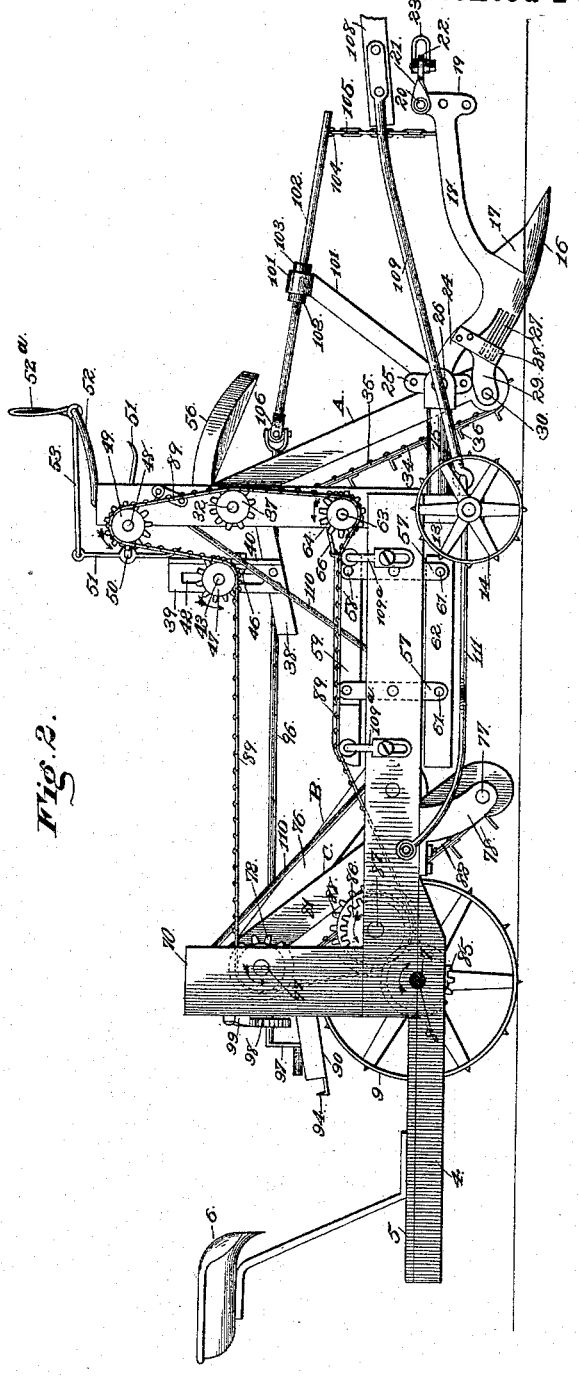

Fig. 2.

Witnesses
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(No Model.)

4 Sheets—Sheet 3.

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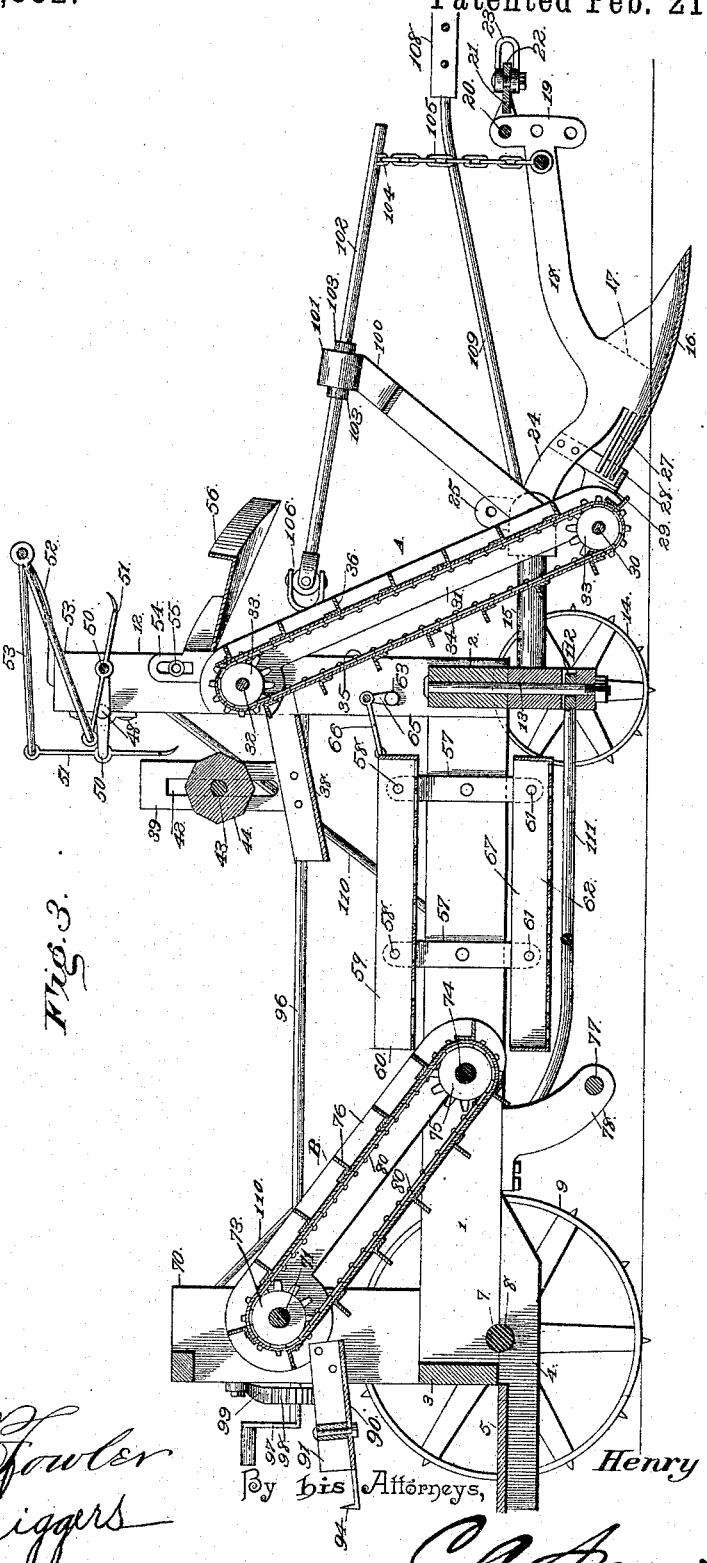

Fig. 3.

Witnesses

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(No Model.)

4 Sheets—Sheet 4.

H. KREBS.

POTATO DIGGER.

No. 492,332. Patented Feb. 21, 1893.

Fig. 4.

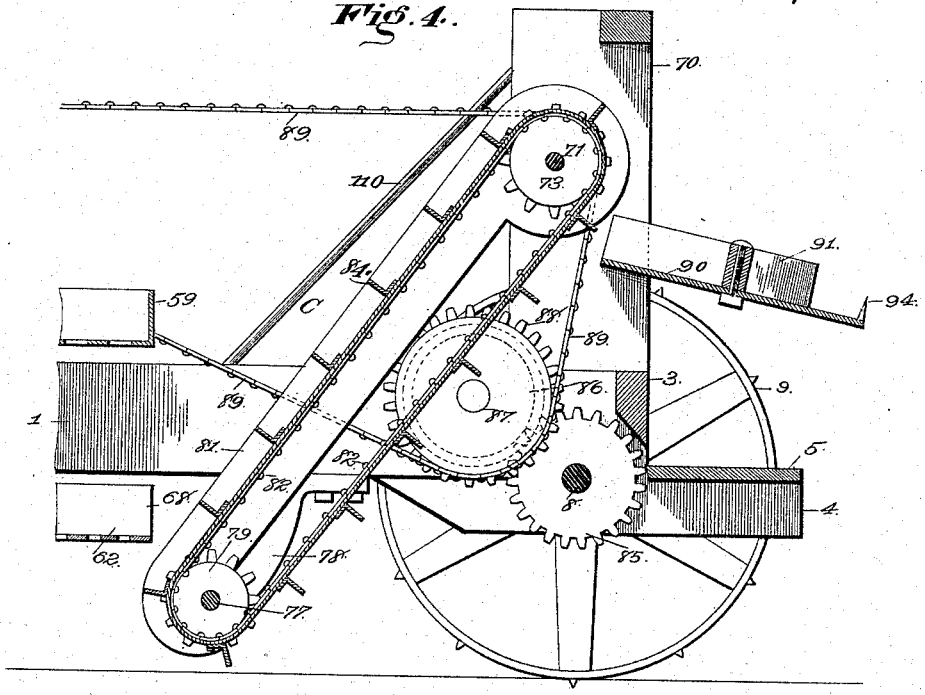
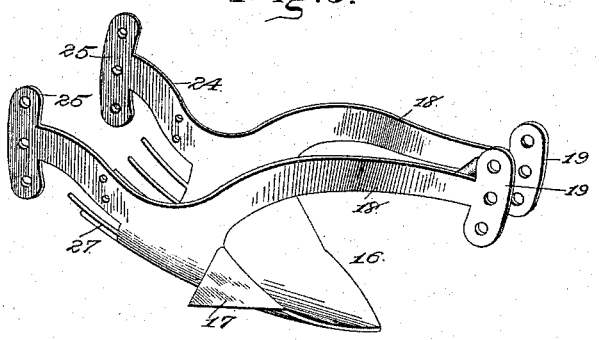


Fig. 5.



Witnesses

M. E. Fowler

J. F. Giggers.

Inventor

Henry Krebs

By his Attorneys,

C. A. Snow & Co.

UNITED STATES PATENT OFFICE.

HENRY KREBS, OF WADENA, IOWA.

POTATO-DIGGER.

SPECIFICATION forming part of Letters Patent No. 492,332, dated February 21, 1893.

Application filed May 31, 1892. Serial No. 435,057. (No model.)

To all whom it may concern:

Be it known that I, HENRY KREBS, a citizen of the United States, residing at Wadena, in the county of Fayette and State of Iowa, have invented a new and useful Potato-Digger, of which the following is a specification.

My invention relates to improvements in potato-diggers and the objects in view are to provide a machine adapted to be driven over a field of potatoes, and which is provided with mechanism for removing the potatoes from the ground, separating the tops therefrom, and discharging said tops at one side of the machine; which will knock the dirt from said potatoes, return the dirt to the ground, will separate the potatoes, that is the large from the small, and finally will separately bag the same.

With the above objects in view the invention consists in certain features of construction hereinafter specified and particularly pointed out in the claims.

Referring to the drawings:—Figure 1 is a plan view of a potato-digging machine constructed in accordance with my invention. Fig. 2 is a side elevation of the same. Fig. 3 is a vertical longitudinal section thereof. Fig. 4 is a vertical longitudinal section on line 4—4 of Fig. 1. Fig. 5 is a detail in perspective of the shovel.

Like numerals and letters of reference indicate like parts in all the figures of the drawings.

In practicing my invention, I construct a rectangular framework of wood or iron, and the same consists of the opposite longitudinal side-bars or beams 1, the front cross bar 2, and the rear cross-bar 3. The bars or beams 1 are provided with rear extensions 4, and the same supports a platform 5, from which rises a standard for supporting a seat 6 for the accommodation of the driver.

In bearings 7, formed in the side-bars or beams 1, a main or rear axle 8 is journaled, the same being provided with a pair of ground-wheels 9. Each ground-wheel is provided with a spring-pressed pawl 10, adapted to engage with the teeth of ratchet-wheels 11, made fast upon the shaft; so that in backing the machine the ground-wheels will rotate idly upon the axle and in moving forward the pawls engaging with the ratchet-wheels will cause the axle to rotate with the wheels.

From the cross-bar 2 at the front of the framework, rises a pair of vertical standards 12, and between the same is located the king-bolt, upon which is pivoted the front axle 13, having the ground-wheels 14. A pair of bifurcated arms 15 extend forwardly from the front axle, and each is provided with a bolt-hole formed through its bifurcations.

16 designates the shovel, and the same has its upper side concaved, and is provided at each side of its point with the downwardly-disposed wings or what might be better termed runners 17. A pair of draft-bars 18 rise from the opposite sides of the shovel and terminate at their front ends in clevises 19. These clevises have opposite perforations, and by means of a bolt 20, which may be located in any pair of perforations, a shackle 21 is connected. The shackle 21 is provided at its front end with a transversely-disposed perforated plate 22, and a D 23 is adjustably mounted thereon, and may be moved for lateral draft. To this D the draft animals are hooked. It will be seen that by such an arrangement I provide for both a vertical draft and a lateral draft. By the former the shovel may be made to run a desired depth. Arms 24 extend rearwardly from the shovel at the opposite corners of the same, and these arms terminate in perforated adjusting-plates or heads 25, which take between the bifurcations of the arms 15. By means of bolts 26 the heads may be adjusted between the bifurcations, so that the rear end of the shovel may be raised and lowered and combine with the adjusting of the shackle to secure the proper depth of penetration of the shovel. The rear edge of the shovel is provided with a series of inclined tines 27, spaced apart and adapted to permit of the passage thereover of the potatoes as they are removed from the soil and to permit of the passage therethrough or therein between of the soil or dirt, as it separates from the potatoes. A cross-bar 28 connects the arms 24 of the shovel, and bearing-brackets 29 extend rearwardly from the cross-bar and accommodate a short transverse shaft 30. This shaft 30 has its ends passed through and supports the opposite side-walls 31 of an endless car-

rier or elevator A, the upper ends of the side-walls being secured to the inner sides of the standards 12. A shaft 32 is journaled transversely in the standards 12, near their middles, and upon this shaft and the transverse shaft 30 are mounted sprocket-wheels 33 over which passes the endless apron 34 and its sprocket-chains 35, the apron having transverse cleats 36 secured thereto, the whole comprising the endless elevator A, which is intended primarily to elevate the potatoes, together with their tops. The shaft 32 is provided with a sprocket-wheel 37, whereby the shaft and elevator are operated in a manner hereinafter specified.

An inclined chute or delivery-spout 38 extends from between the standards 12, immediately below the upper end of the elevator A, and from the opposite sides of said elevator rise vertical standards 39. These standards have right-angularly-disposed flanges 40, provided with a series of perforations 41, and the standards are further provided with vertical slots 42. In these slots a shaft 43 is mounted for vertical movement, and the same is provided at its center with a cylindrical enlargement 44. Vertically sliding boxes 45 are mounted in the slots for the bearings of the shaft, and by adjusting-bolts 46 passed through the perforations of the flanges and into the boxes, the latter, together with the shaft may be vertically adjusted. The outer end of the shaft 43 has a sprocket-wheel 47.

In bearings formed near the upper ends of the standards 12, there is journaled a transverse shaft 48, and this shaft is provided at its outer end with a wheel 49, and between its bearings with a pair of cranks 50. Each of the cranks has pivotally mounted thereon a picker-arm 51, which terminates at its lower end in claws or spurs. An inverted U-shaped frame 52 having a line holder 52^a extends forwardly from the upper ends of the standards, and connecting-rods 53 have their outer ends loosely connected with the transverse portion of the frame and their rear ends loosely connected with the upper ends of the picker-arms, so that as the picker or crank-shaft is revolved the picker-arms will be oscillated. A pair of slotted plates 54 are adjustably connected to the inner sides of the standards 12, by bolts 55, and from said slotted plates there extends forwardly and to one side of the machine, an inclined discharge-trough 56, the rear edge of which is directly over and in front of the upper end of the primary elevator or carrier A.

To the opposite side-bars or beams 1 pairs of pivoted oscillating levers 57 are connected. Pivotally connected by bolts 58 to the upper ends of these four levers, is a screen-frame 59, having openings or in other words provided with a foraminous bottom. This frame is surrounded by a flange provided at one side and at its rear end with an exit or opening 60. Pivotally connected by bolts 61 to the lower ends of the levers 57, is a bottom-screen 62, the bottom of which is foraminous, but more finely perforated than that of the upper screen. A crank-shaft 63 is journaled in bearings near the lower ends of the standards 12, is provided at one of its ends with a sprocket-wheel 64 and between its ends with a crank-arm 65, which is connected by a link 66 to the front end of the upper screen. By this means it will be seen that the screens are agitated by the rotations of the shaft, which is accomplished in a manner hereinafter described, and the result of such agitation is that the potatoes, with whatever soil that adheres to them, will fall upon the upper screen and that through the openings in the bottom of said screen will pass all loose dirt together with the small potatoes, the same dropping upon the screen below. The lower screen being more finely perforated retains the small potatoes, and discharges the dirt. The lower screen is provided with a surrounding flange 67, and the same is provided at its rear corner with a discharge-opening 68, which is out of vertical alignment of the discharge-opening of the upper screen.

From the rear ends of the side-bars or beams 1 rise vertical standards 70, provided near their upper ends with bearings 71. A sprocket-wheel 72 is mounted on the shaft, near one of the standards, and pairs of small sprocket-wheels 73 are also located upon said shaft. A shaft 74 is mounted in the beams 1, between the screens, and upon this shaft a pair of sprocket-wheels 75 is mounted. Chains 80 connect the sprockets 75 with the sprockets 73; an endless belt or apron is secured to the chains and is provided with cleats and side-walls 76, these elements constituting the endless carrier or elevator B. A shaft 77 is journaled in a pair of hangers 78, depending from the side-bars or beams 1, below the shaft 74; and a pair of sprockets 79 is mounted on said shaft. Side-walls 81 connect the shafts 79 and 71, and endless chains 82 connect the sprockets of said shafts. These chains are connected by an endless apron 82, having cleats 84, the whole constituting the third elevator C.

A gear-wheel 85 is mounted on the axle, and the same engages and operates a gear-wheel 86, which is mounted on a shaft 87, connecting the side-bars or beams 1, and upon this shaft a master-sprocket wheel 78 is mounted. An endless sprocket-chain 89 passes around the wheels 47, 37, 49, 64 72 and 88, thus giving motion to the various parts, as will be readily observed.

Immediately in rear of the pair of elevators or carriages B and C a transverse plate 90 is supported by the standards 70, and this transverse plate is provided with pairs of pivoted L-shaped guide-plates 91, set-bolts 92 being passed through the rear ends of the guide-plates, and through slots 93. By this means the spaces between each pair of guides, which in fact constitute chutes may be increased or diminished at their rear ends so

as to accommodate different sizes of sacks, the mouths of which are to be engaged by fingers 94, with which the plate is provided in rear of the chutes. In this manner the sacks are supported upon a platform 5, the small potatoes falling into one sack and the large ones into another sack. As the sacks become filled, they are tied and removed by the operator, who may deposit them upon the ground, to be subsequently collected. In bearings 95 located upon the outer sides of corresponding standards 12 and 70, a longitudinal shaft 96 is journaled. The rear end of the shaft is provided with a crank-handle 97, and a ratchet-wheel 98, the teeth of which are engaged by a gravity-pawl 99. A bracket 100 extends upwardly from the bifurcated arms 15 of the front axle, and is provided with a bearing eye 101. An inclined shaft 102 is journaled in the bearing-eye of said bracket, is provided at each side of said eye with bearing-shoulders 103, at its front end with an eye 104, which is connected by a chain 105, adapted to wind upon the shaft and connected at its lower end to the pair of forwardly-disposed beams of the shovel. The inclined shaft and the longitudinal shaft have their ends connected by a gimbal-joint 106, so that rotation of the shaft 96 will be imparted to the inclined shaft and the chain will be wound thereon so as to raise and lower the shovel into and out of contact with the ground, whereby the machine is thrown into and out of operative position.

108 designates the draft-pole or tongue, and 109 the hounds that lead from the front axle thereto. Belt-tighteners 109^a are employed at suitable points for maintaining the sprocket-chain for giving motion to the various shafts in engagement with the various sprocket-wheels of said shafts. Opposite brace-rods 110 are secured to the side-beams 1 near the centers thereof, and have their front and rear ends bolted to the front and rear standards 12 and 70.

111 designates a reach, the front end of which has an eye 112 which engages the king-bolt, and the rear end of which is bifurcated, each of the bifurcations being connected with one of the side-beams 1. From this it will be seen that as the potatoes and their tops are elevated, they will be caught by the primary elevator A, and at the top of the same will have their tops removed by the picker-arms, which are being rapidly rotated and oscillated and serve to remove and cast the tops into the inclined discharge-chute 56. The potatoes will then pass under the roller, whereby any clods of dirt are crushed and from the upper end of the elevator the potatoes and all adhering or loose dirt are directed by the chute 60 into the upper screen-frame. Here the potatoes are agitated so as to thoroughly loosen the dirt, and it, together with the small potatoes, falls through the perforations in the bottom of the upper screen, onto the lower screen, where the potatoes are further agitated and all dirt discharged from said lower screen. The screens are slightly inclined to the rear and the potatoes are guided through the outlets of the screens, the large potatoes being caught by the elevator B, and the small potatoes being caught by the elevator C, said elevators discharging into the chutes in rear of the same from which the potatoes fall into their respective bags.

From the foregoing description, in connection with the accompanying drawings, it will be seen that I have provided a machine complete in all its details, and adapted to effectually dig and remove the dirt and tops from potatoes, separate the same as to their size, and deliver them into bags which are supported for their reception.

Having described my invention, what I claim is—

1. In a potato-digger, the combination with the frame-work, of the shovel located at the front end thereof, an elevator leading from the shovel, a spout below the elevator, a top-separating device located above and between the spout and elevator, a trough leading from the separating device to the side of the machine, a clod-crusher located in rear of the top-separator, a screen located in rear of the clod-crusher, and an endless carrier located in rear of the screen, substantially as specified.

2. In a potato-digger, the combination with the framework, the shovel located at the front end thereof, the standards rising from the front end of the frame, the spout extending rearwardly from the standards, of an elevator leading from the shovel to the spout, slotted standards mounted on the spout and provided with lateral flanges having perforations, boxes mounted in the slots, pins passed through the perforations and into the boxes, a shaft journaled in the boxes and provided with a roller, and delivery-devices leading from the spout, substantially as specified.

3. In a potato-digger, the combination with the framework, of a shovel at the front end of the same, an upper and lower screen mounted in the framework in rear of the shovel, and provided at their rear ends with discharges which are out of vertical alignment, the upper screen being provided with perforations larger than those of the lower screen and both screens being inclined, an elevator leading from the discharge in each screen and an elevator leading from the shovel to and above the front end of the upper screen, substantially as specified.

4. In a potato-digger, the combination with the framework and the shovel, the latter being located at the front end of the framework, of a pair of posts rising from the framework in rear of the shovel, an elevator leading from the shovel to a point between the posts, potato-delivering mechanism in rear of the elevator, an inverted U-shaped rigid frame mounted on the post, a crank-shaft journaled in the posts above the upper end of the elevator, means for giving motion to the shaft,

a series of pickers pivotally connected with the cranks of the shaft, connecting-rods between the upper ends of the pickers and the rigid U-shaped frame, and an inclined laterally-disposed discharge chute leading from the pickers, substantially as specified.

5. In a potato-digger, the combination with the framework, the front axle, and the bifurcated arms extending from the latter, of the shovel having rearwardly and forwardly-extending arms or beams, terminating in vertically-perforated heads, the heads of the rear arms taking between the bifurcations of the arms of the axle and adjustably connected thereto by bolts, a shackle adjustably connected by a bolt to the front arms, said shackle being provided with a transverse perforated draft-plate and a D adjustably mounted in the perforations of the plate, substantially as specified.

6. In a potato-digger, the combination with the framework, the front axle, the shovel having front and rearwardly extending beams, the latter being pivotally connected to the framework, of a bearing-bracket extending from the framework, a winding-shaft journaled in the bracket, a chain connected to the winding-shaft and to the front arms or beams of the shovel, a longitudinal shaft journaled in the framework, a gimbal-joint connection between the front end of the same and the rear end of the winding-shaft, means for locking the longitudinal shaft, and a crank for operating the same, substantially as specified.

7. In a potato-digger, the combination with the framework, the rear standard, the potato-harvesting mechanism, and an elevator terminating between the standards and leading from such mechanism, of an inclined plate, located in rear of the elevator between the standards, a pair of pivoted L-shaped flanges mounted on the plate and combining to form a spout, slots formed in the plate concentric with the pivots, and adjusting-bolts passed through the flanges and slots, substantially as specified.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

HENRY KREBS.

Witnesses:
CHRISTIAN HERRLING,
HENRY KUHN.