

No. 712,951.

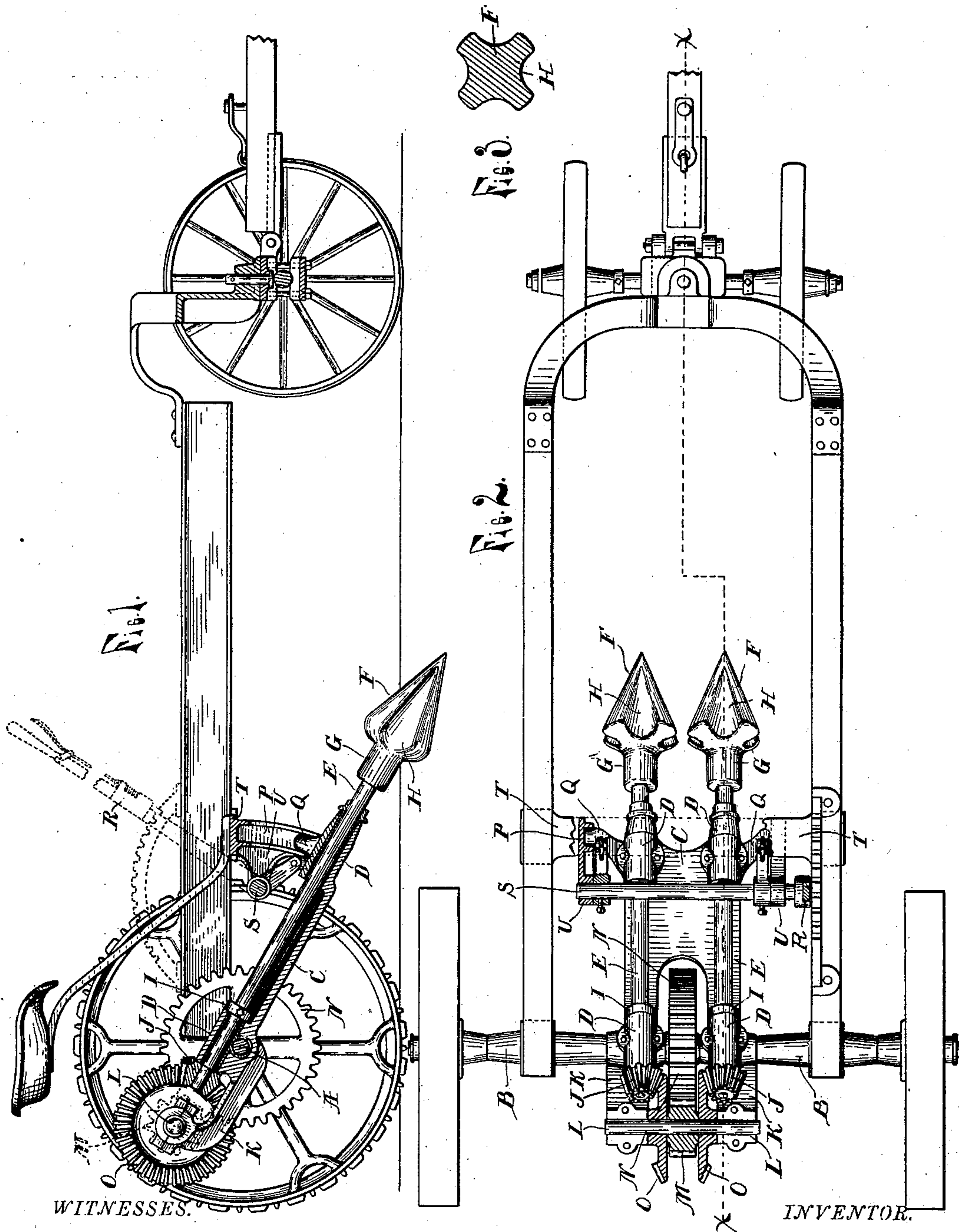
Patented Nov. 4, 1902.

A. MORISON.

BEET DIGGER.

(Application filed Jan. 13, 1902.)

(No Model.)



WITNESSES.

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BEET-DIGGER.

SPECIFICATION forming part of Letters Patent No. 712,951, dated November 4, 1902.

Application filed January 13, 1902. Serial No. 89,401. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER MORISON, a citizen of the United States of America, residing at Saginaw, in the county of Saginaw and State of Michigan, have invented certain new and useful Improvements in Beet-Diggers, of which the following is a specification, reference being had therein to the accompanying drawings.

10 The principal object of this invention is to produce a machine which will dig the beets out of the ground in such a manner that the beets will not be bruised or marred in the slightest and will be left on the surface of the ground
15 free of dirt and ready to be gathered up.

To this end my invention consists in the specific construction and arrangement of two beet-shaped digging members and of other parts coöperating therewith to produce a light-draft machine of simple construction and adapted to the needs of the beet-grower as a labor-saving device, all as more fully hereinafter described, and shown in the accompanying drawings, in which—

25 Figure 1 is a vertical longitudinal section substantially on line *xx*, Fig. 2. Fig. 2 is a plan with parts broken away, and Fig. 3 is a cross-section through one of the digging members.

30 The machine consists of a four-wheeled supporting-frame provided with a central draft-tongue for drawing the machine with a team of horses, which, together with the front wheels, travel in the spaces between the row
35 of beets to be dug and the next adjacent row, while the hind wheels are preferably more widely separated and travel in the spaces between the next adjacent rows, thus giving increased stability and preventing possible injury to the beets which might be thrown side
40 wise. The hind wheels are so-called "traction-wheels," which impart motion to the rear axle A through the medium of ratchets in the usual manner. The rear axle is journaled in
45 bearings B, secured to the longitudinal side bars of the frame, and between the inner ends of these bearings is pivotally supported upon the axle the tilting frame C. This tilting frame extends forwardly and rearwardly of
50 its pivotal connection with the axle and is provided at its opposite ends with bearings D,

arranged in pairs on opposite sides of the center. In these bearings are journaled the shafts E, which carry at their front ends the revolving digging members F.

55 The digging members are alike in shape and size, the general outline being that of a true cone, which at its base assumes a somewhat beet-shaped outline, which falls away to a contracted hub G. This general outline
60 is, however, greatly modified by having considerable portions of the body gouged out, so as to form large indentations H, extending from near the point to the hub, the concave portions becoming deeper and wider with the
65 increase in the diameter.

In the drawings the number of indentations shown is four; but this number may be varied within certain limits.

As shown, the digging members leave an
70 open space between them which at the point is equal to the width of the row, which at the present method of culture is about eight inches, while at the base they are left about one inch apart, which is that of about the
75 smallest root to be pulled.

The shafts E are held against end motion by means of collars I, and at their rear ends, which project out through the bearings, they carry the bevel drive-pinion J.

80 The tilting frame C is provided with rearwardly-extending brackets K, in which is transversely journaled a shaft L, carrying a pinion M, which receives motion from a gear-wheel N upon the rear axle and transmits motion to the bevel-pinions J through bevel
85 gear-wheels O, meshing with these pinions, all so arranged as to impart a rotary motion to the digging members at a relatively high speed and in the direction required to dig the
90 beets.

The forward end of the tilting frame is provided with means for supporting it at a variable incline to permit of adjusting the digging members to enter the ground to a greater
95 or lesser depth or of raising them clear of the ground when not in use. This is accomplished by guiding the forward end of the tilting frame in vertical segmental guide-grooves P by means of arms Q, extending
100 from the tilting frame laterally into said guide-grooves, and by means of a hand-lever R, ar-

ranged to one side of the driver's seat. This lever is pivotally secured upon a transverse shaft S and connected through suitable intermediate connections with the forward end of the tilting frame, as in the usual manner of arranging such levers.

The guide-grooves P are formed in a casting depending from a cross-bar T, which extends between the side bars of the frame, and this cross-bar also supports the shaft S by means of suitable brackets U.

In operation the shafts E, with their cones F, are adjusted by the lever R to the desired inclination in order that the cones will engage in the ground at the desired depth, and when the machine moves forward these cones are revolved through the medium of the gearing connecting with the axle. These cones, it will be observed, revolve away from each other, and the cones do their work by rolling out the ground in which the beets grow, thereby causing the beets to come out of the ground without any contact of the cones with the beets themselves. This is a particular advantage in machines of this character, as the beets are not bruised, which injures their quality and prevents their being stored for any length of time. The cones in my device are enabled, by reason of their cross-section and proximity to each other, to act like the two jaws of a tongue to seize upon the entire body of the ground which enters between the cones and lift the whole portion, which is done before any beet actually comes in contact with the cones. The earth thus forms a cushion around the beet while the ground is thus lifted up and rolled out, and while the ground will in a measure fall back again into the furrow which the cones have plowed the beets will remain on top, as the loose earth fills in the holes from which the beets have been extracted. The function of the cones or digging members is thus primarily to roll out the dirt in which the beets grow, and the digging out of the beets is incidental thereto. This will be evident, since the cones as constructed have no sharp corners, these being all rounded off, and particularly the corners where the concave and convex portions join each other. Further, as the angle of the cone of each member is about forty-five degrees the opening or space between the conical portions presents a much larger angle than in preceding machines of this character. In fact, by this construction it is impossible for the members to nip the beet hard enough to bruise it, as it is only by the resistance of the ground that the members are enabled to take hold of the beets enough to pull them after they are slightly loosened in the ground. The large indentations in the cones provide for gripping the beets at different and widely-separated points of their length instead of only at one point, as plain cones would do, and the indentations in the cones permit the raising of the beet from the ground sur-

rounding it, as the ground can pass through in the indentations without following the beets. The members can thus be placed close together to catch even the smallest beet. It will be understood that to obtain this operation the cavities of one cone must cooperate with the cavities in the other cone, and they must be wide and deep enough to get a firm hold on opposite sides of the body of the ground in which the beets are rooted to exert enough pull to overcome the resistance of the bottom roots, which are below the influence of the cones. This principle of digging beets in general I believe to be new, and I do not, therefore, wish to restrict the invention to the exact mechanical device which I have shown and described, nor to its use in a beet-puller alone, as other root crops may be harvested with the machine.

What I claim as my invention is—

1. In a beet-digging machine, a pair of revolving digging members, of a generally conical shape and formed upon their conical faces with indentations increasing in depth and width toward the base of the cones and dividing the surface of the cones into alternate concave and convex portions whereby the concave portions receive a quantity of earth and prevent the members coming in direct contact with the beets.

2. In a beet-digging machine, a pair of revolving digging members having a general conical shape supported at their base on shafts and unsupported at their forward ends, the surface of said members provided with indentations increasing in depth and width toward the base whereby a quantity of earth is received and held in the indentations to prevent direct contact of the members with the beets.

3. In a beet-digging machine, a pair of revolving digging members substantially cone-shaped and formed on their conical faces with longitudinal indentations increasing in depth and width toward the base of the cones and dividing the surface of said cones into alternate concave and convex portions whereby the concave portions receive a quantity of earth and prevent the members coming in direct contact with the beets, and means for imparting rotary movement to said members.

4. In a beet-digging machine, the combination with supporting-wheel frame, of a tilting frame centrally pivoted upon the drive-axle, and extending forwardly, a pair of shafts journaled upon said tilting frame on opposite sides of the center, means for transmitting motion to said shaft from the drive-axle, a lever connected to the forward end of the tilting frame for raising and lowering said frame and a pair of digging members secured to the forward ends of the shafts, said digging members having conical forward ends formed with indentations extending longitudinally of the members and increasing in depth and width toward the base whereby a

quantity of earth is held within the indentations and the members prevented from direct contact with the beets.

5. In a beet-digging machine, the combination with a supporting-frame, of two revolving cone-shaped digging members formed with indentations increasing in depth and width and extending from the point of the cones to the base thereof, said members adapted to compact the ground between them and lift

the compacted ground and the beets, the ground compacted around the beet serving to prevent direct contact of the digging members with the beets.

In testimony whereof I affix my signature 15
in presence of two witnesses.

ALEXANDER MORISON.

Witnesses:

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