4 Sheets--Sheet 1.

H. B. NORTON.

Potato-Diggers.

No. 136,536. Patented March 4, 1873.

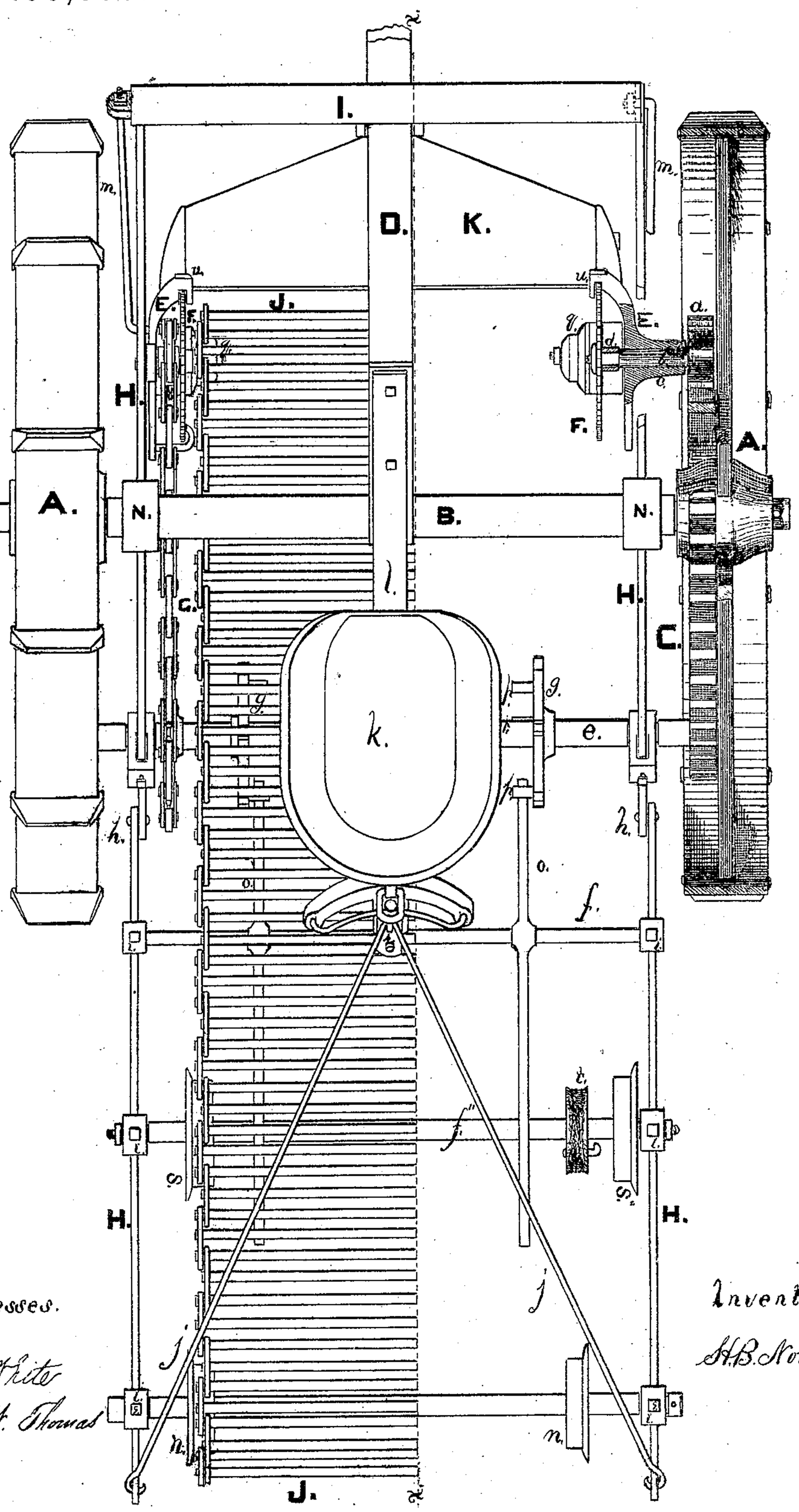

Fig. 1.

Witnesses.

Wm. H. Hite

Chas W. Thomas

Inventor.

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4 Sheets--Sheet 2.

H. B. NORTON.

Potato-Diggers.

No. 136,536. Patented March 4, 1873.

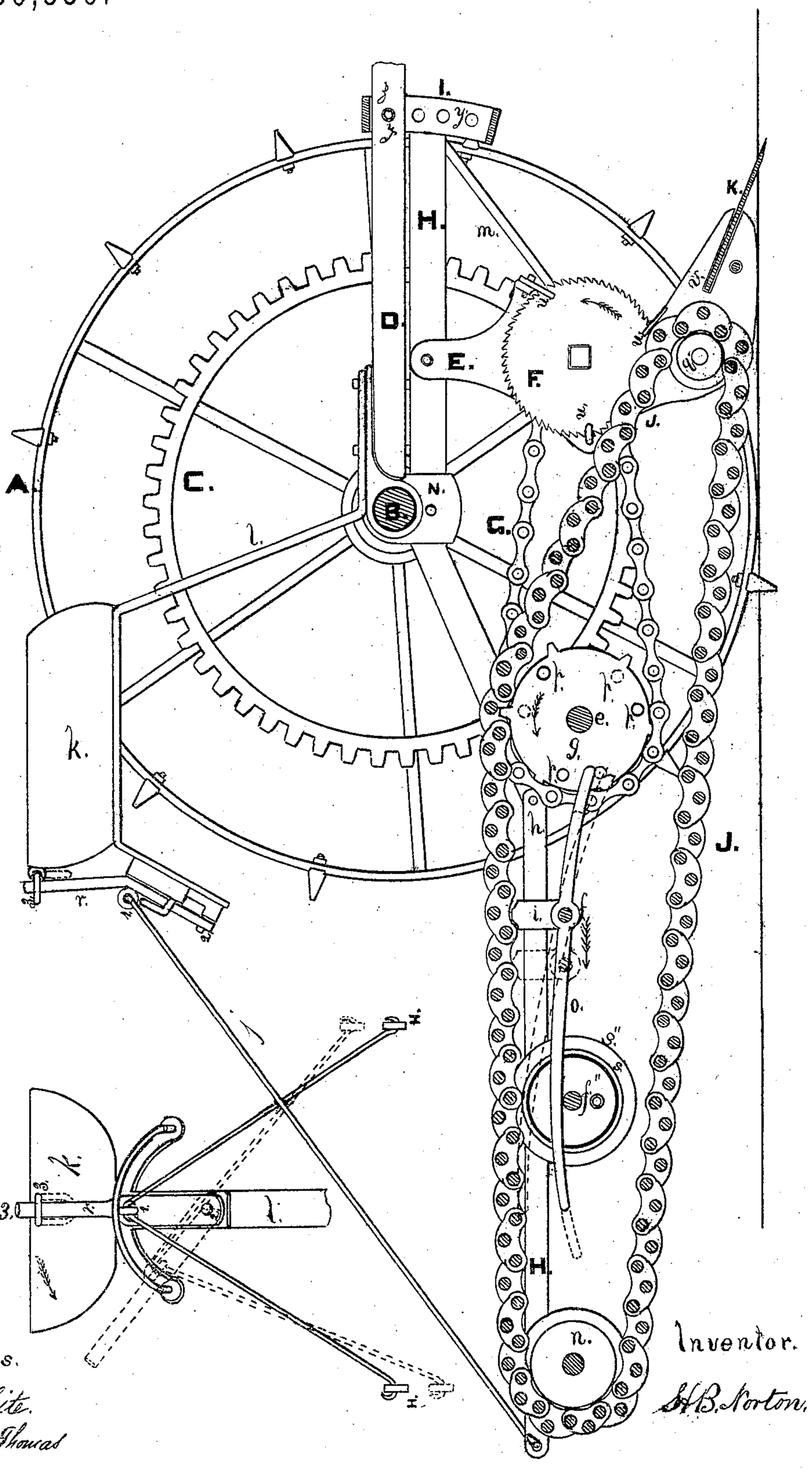

Fig. 2.

Fig. 3.

Witnesses.

Wm. H. White.

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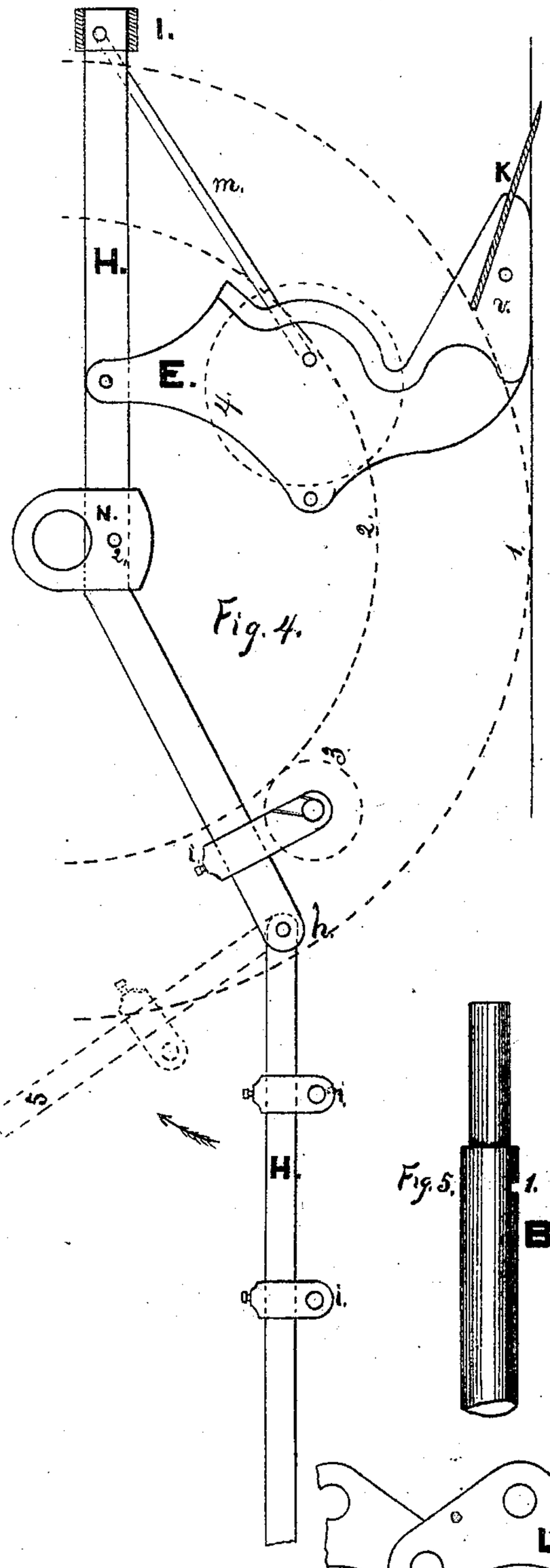
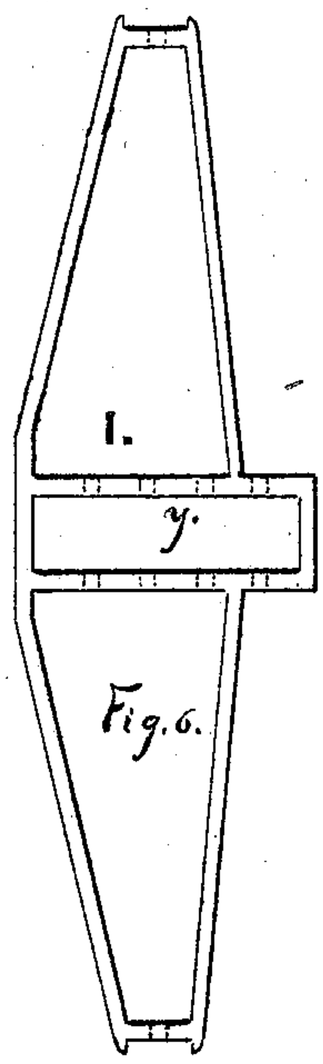
4 Sheets--Sheet 3.

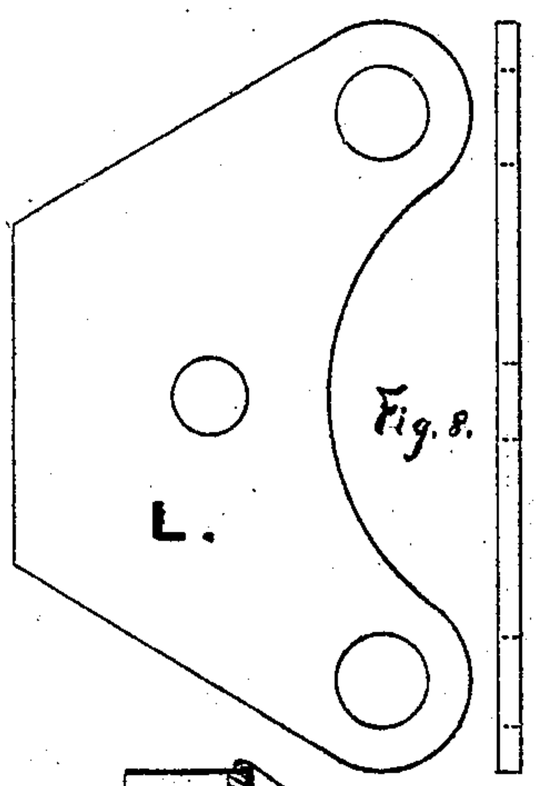
H. B. NORTON.

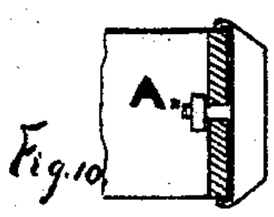
Potato-Diggers.

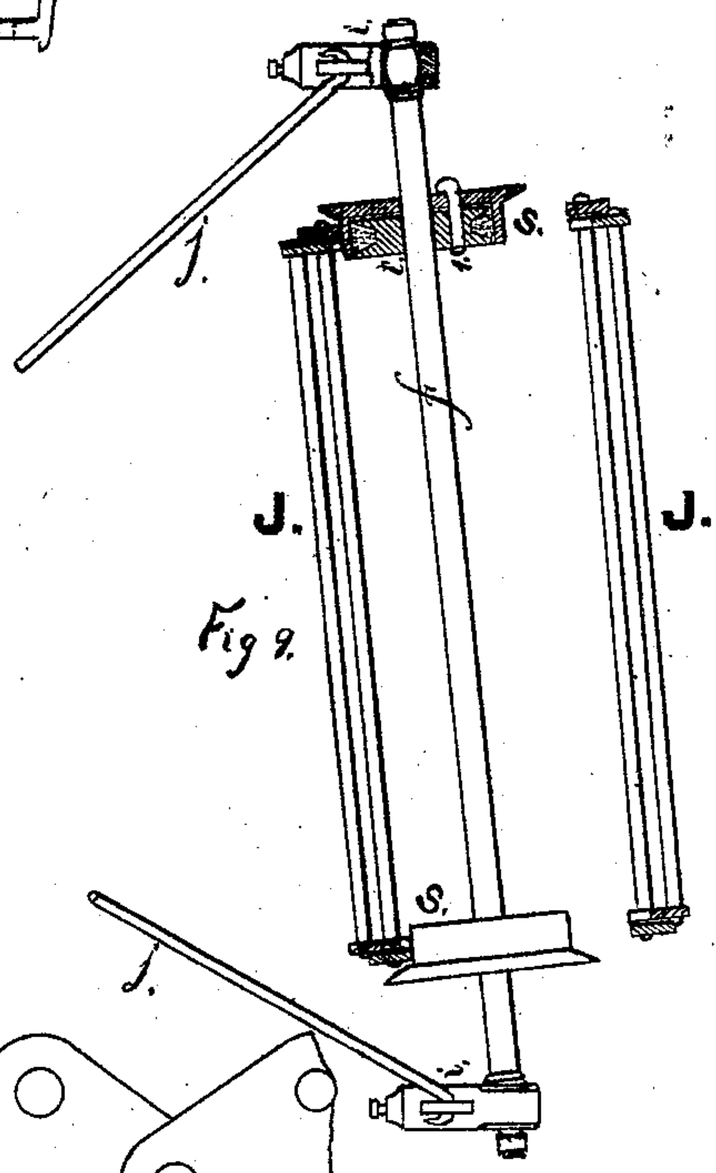
No. 136,536. Patented March 4, 1873.

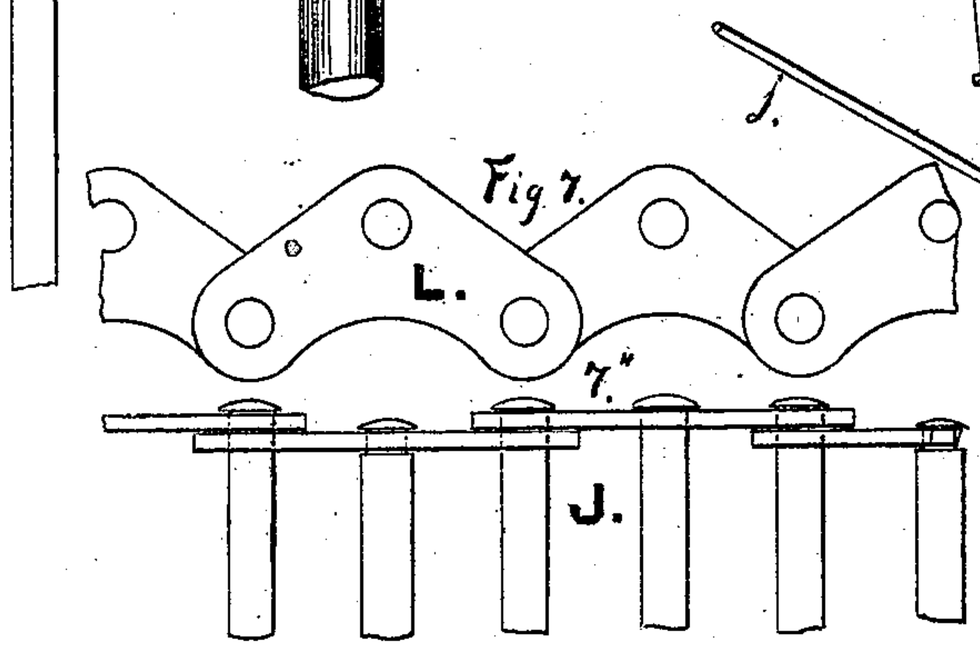












Witnesses.

Wm. H. White.

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4 Sheets--Sheet 4.

H. B. NORTON.

Potato-Diggers.

No. 136,536. Patented March 4, 1873.

Fig. 14.

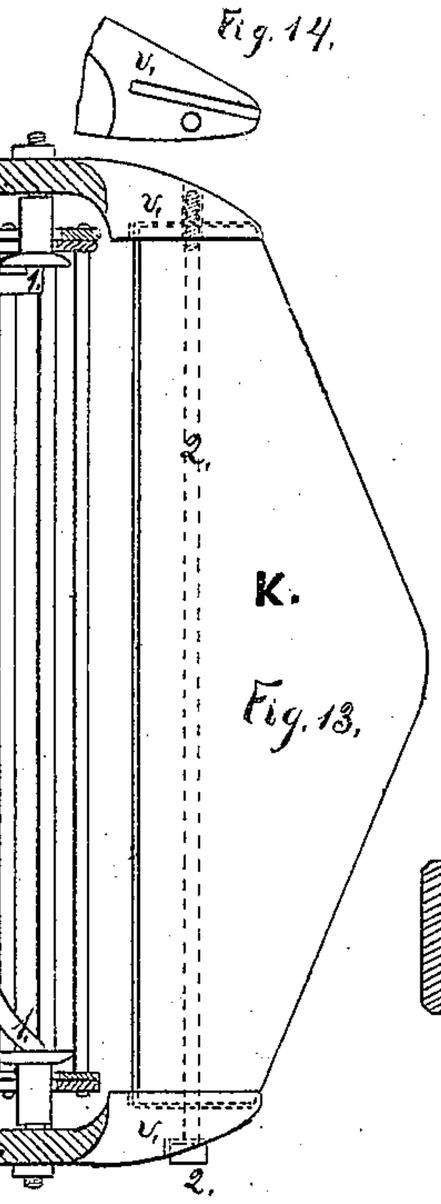

Fig. 13.

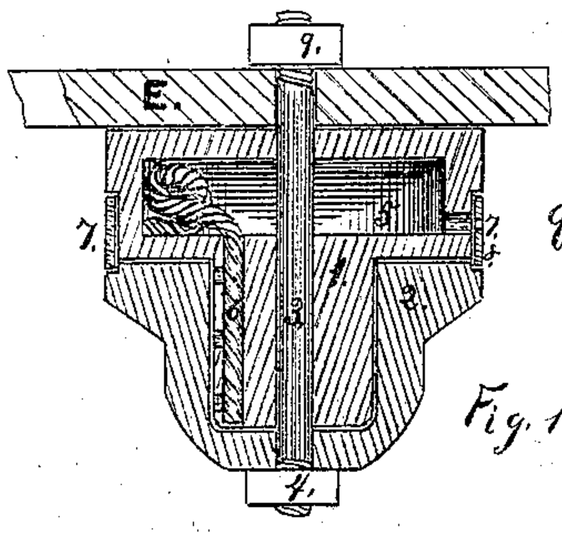

Fig. 12.

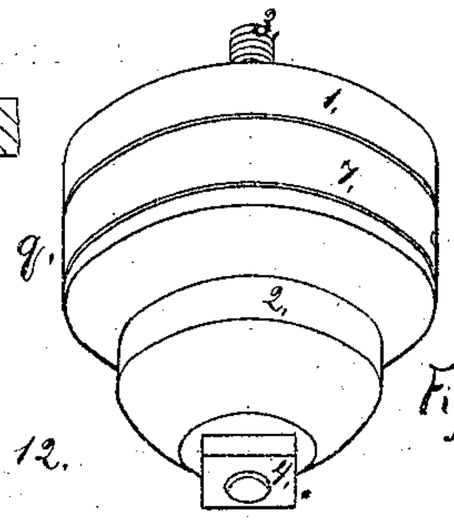

Fig. 11.

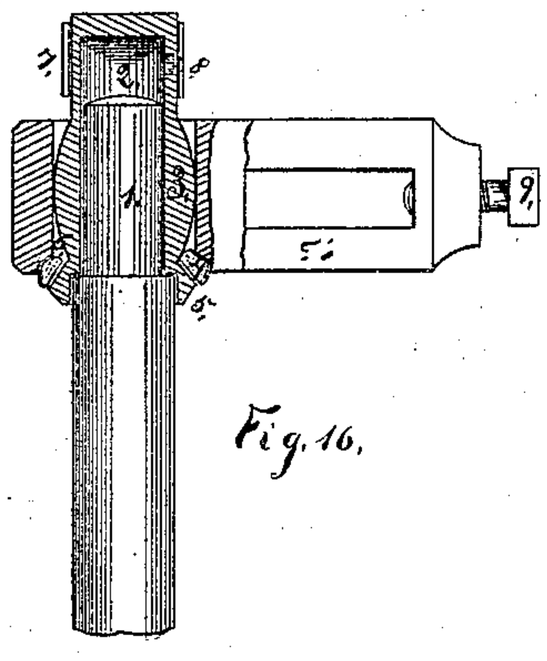

Fig. 16.

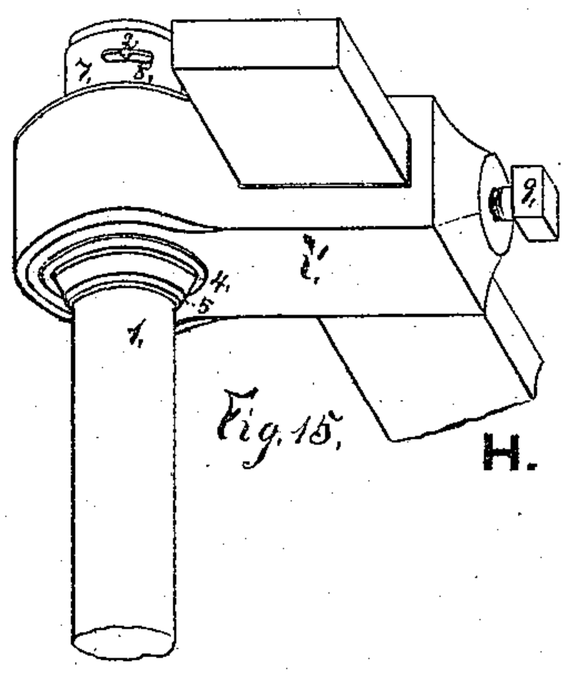

Fig. 15.

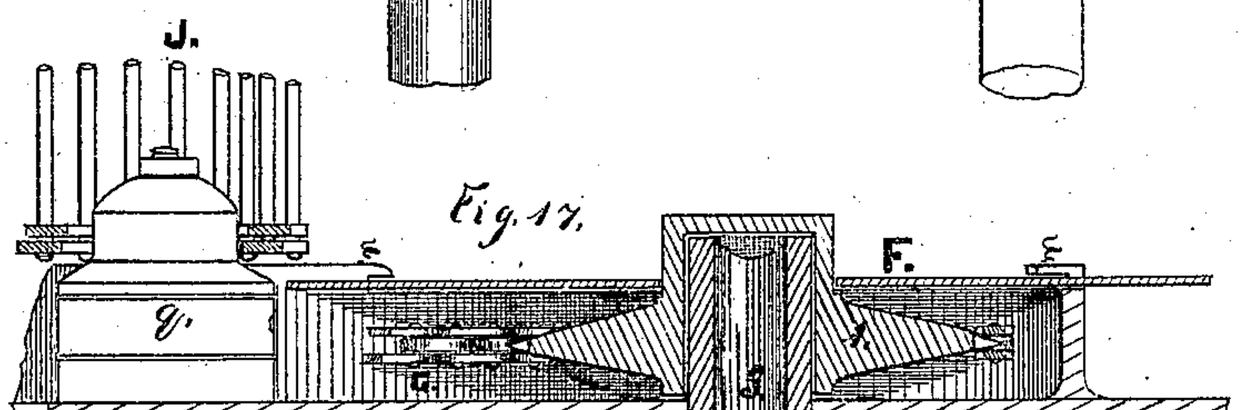

Fig. 17.

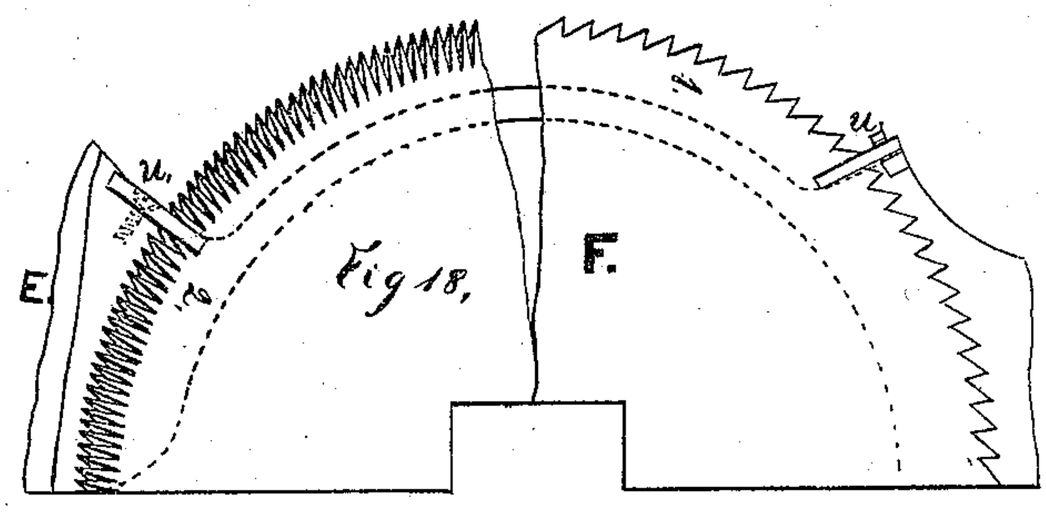

Fig 18.

Witnesses.

Wm. H. Wells

Chas W. Thomas.

Inventor.

H. B. Norton.

UNITED STATES PATENT OFFICE.

HENRY B. NORTON, OF ROCHESTER, NEW YORK.

IMPROVEMENT IN POTATO-DIGGERS.

Specification forming part of Letters Patent No. **136,536**, dated March 4, 1873.

To all whom it may concern:

Be it known that I, HENRY B. NORTON, of Rochester, in the county of Monroe and State of New York, have invented certain Improvements in Potato-Diggers, of which the following is a specification:

This invention has for its object to furnish a machine which shall be simple in construction, light and efficient in operation, and durable in use; and consists in the construction and combination of parts, as hereinafter described and pointed out by the claims.

Description of Accompanying Drawing.

Figure 1, Sheet A, is a plan of a machine embodying my invention. Fig. 2, Sheet B, is a longitudinal vertical section of same in plane *x x* of plan. Sheets C and D, together with Fig. 3, Sheet B, are detail views of parts of the machine.

Like letters of reference indicate corresponding parts in all the figures.

I obtained a patent dated October 22, 1867, also one dated June 2, 1868, for improvements in potato-diggers. The present invention has some resemblance to those in principle, but the general details are entirely different.

In the drawing, Sheet A, Fig. 1, A A represent the driving-wheels; B, the axle; C, a spur-gear wheel meshing into a pinion on shaft *e*, driving the endless carrying apron or belt J J by means of lugged wheels *g g*, placed in position shown. The vine-cutters F F, attached to standards E E, are driven by means of chain G, or, as shown on the opposite side of the machine, by direct gearing to main wheel C by pinion *a*, through shaft *b*, having a square or flattened portion fitting into a collar, which carries cutter F, all supported by a stud forming part of standard E. The main frame consists of the side pieces H H, connected at the front end by cross-piece I, having a slotted opening, *y*, Sheet C, Fig. 6, for the pole D attached to the axle B to pass through. This frame is more clearly indicated in Sheet B, Fig. 2, and carries all the working parts of the machine. The standards E E are attached to the side pieces H H in front of the axle B, and held in position by brace-rods *m m*. These standards carry the vine-cutters F F, the scoop K, and forward part of endless belt J J. By this arrangement of parts the depth required is given to the scoop K by tilting the machine on the axle B till the scoop is brought to its proper position and secured in place by means of the pin *z* passing through corresponding holes in the sides of slotted opening *y* in the front piece I and through the pole D. In order to adjust the machine to the ground in this manner, the standards E E must be placed in front of the axle B far enough for the scoop K to receive the necessary range of movement by tilting the frame on the axle B the length of the slot *y* in the front piece I to give the scoop full depth and throw the point clear of obstructions when raised for the purpose of transporting the machine, yet not far enough to bear heavily on the pole or throw the point of the scoop out of the ground, or bury it too deep in working on uneven ground. Another object in placing the standards E E where I do is to bring the forward end of the endless belt J so near the center of drive-wheels A A that potatoes will not fall over the sides of the belt and be injured by the drive-wheels. By this arrangement the potatoes are carried beyond the drive-wheels before they can leave the belt, thereby dispensing with side pieces to the endless belt. On the inside of the endless belt J, in rear of shaft *e*, is placed a shaft, *f*, supported on the frame H H by means of a pair of sliding bearings, *i i*, and carrying a pair of rocking levers, *o o*. These levers are attached to shaft *f* so as to present their short arms in the direction of the shaft *e* and carrying-wheels *g g*, having pins inserted in their sides. By means of sliding bearings *i i* the short arms of levers *o o* are brought in contact with pins *p p p* in the wheel *g*, and are thus made to strike with their longer arms upon the under side of the upper part of the endless belt J, for the purpose of jarring the belt and separating the dirt from the potatoes as they are carried back by the endless belt. These levers can be made to strike simultaneously or alternately by placing the pins *p p p*, which form a triangle by their position in wheels *g g*, so that the point of one triangle is opposite the base of the other. In light soil these levers are not used, but slid back, as shown by dotted lines, in the direction of the arrows by means of the sliding

bearings *i i* on the frame H H, and remain idle, the endless belt passing over without touching them. In the rear of the shaft *f* is a shaft, *f''*, supporting the long arms of levers *o o*, and carrying two grooved wheels, *t t*, covered by two flanged caps, S S. These wheels support the central part of the endless belt, keeping it in position to receive the strokes of the levers *o o*, as described, and consist of a flanged cap, S, covering a grooved wheel, *t*, shown in Sheet A, Fig. 1. This groove is filled with cotton-waste or other absorbent material, which is kept saturated with oil. Its object is to lubricate the joints of the endless belt, and when used the cap S is removed, letting the side pieces of the endless belt drop into the groove in the wheel *t*, and by the motion of the machine the joints become oiled in passing over the wheel. The ends of the shaft *f''* pass through the bearings *i i*, and are furnished with a nut and thread, by which all the shafts in the rear part of the machine are kept tight at the shoulders, with bearings *i i* on frame H H. The rear end of endless belt J is supported on flange-wheels *n n*. These flanges keep the belt in position, preventing any lateral shifting. The required tension is given to the endless belt by means of the sliding bearings *i i* on the frame H H, held in place by set-screws. The side pieces H H are hinged at *h h*, so that the rear end of frame carrying the endless belt can be raised and lowered or given a side inclination. The ends of the frame H H are supported by rods *j j*, attached to the lever *r* on the rear end of the seat-support *l*. Fig. 3 is an end view showing its manner of operating. The rods *j j* are attached to an eye in lever *r* above its point of support, 2. By throwing the top of the lever *r* to one side, as shown by dotted lines, in direction of the arrow, the center of support for rods *j j* is shifted, thereby raising one side of the frame H H and lowering the other, as shown.

The object of this arrangement is to give a side inclination to the rear part of the endless belt, for the purpose of delivering the potatoes from one side or corner of the belt, so that they will not be injured at the next passage of the machine; also to facilitate their being gathered by depositing them in a row of less width than if delivered from the rear end of endless belt.

The lever *r* is placed within easy reach of the driver, and can be reversed at the ends of rows so as to deliver the potatoes from each side of the machine alternately, allowing the machine to be operated forward and back on one side of a field. By means of a ring or loop, 3, thrown over top of the lever *r*, the endless belt is held in a horizontal position, as found convenient in working on sideling ground, or when desirable to deliver the potatoes behind the machine.

Sheet C, Fig. 4, represents the position of several parts of the machine. The dotted line 1 shows the drive-wheel A; dotted line 2, the pitch line of the gear-wheel C; dotted line 3, the pinion on the shaft *e;* dotted line 4, position of vine-cutter F. Dotted line 5 shows end of frame H, raised for the purpose of making the machine more compact for transporting. N is a cast-iron lock or clip having a circular opening to receive the shaft B, and a rectangular slot at right angles for the side piece H, slightly cutting into each other, as shown. The shaft B is inserted till the notch 1, Fig. 5, comes over the rectangular slot for the frame H, which is inserted, and all secured in place by pin 2, as shown.

Fig. 6 shows the front piece I, having slot *y* for the pole to pass through. The side pieces H H fit into the notches at the ends, and are held in place by a bolt or by the ends of brace-rods *m m*, as shown in Fig. 4, and by dotted lines in plan, Sheet A. These brace-rods *m m* are placed so as to break down any vines or weeds that come above the vine-cutters, bringing the same to the cutter-edges by sliding or forcing them downward. The sloping points *v v* of side standards E E are to lift the vines and weeds that lie close to the ground and bring them to the cutter-edges.

Fig. 7 shows the manner of constructing the endless belt J, representing an elevation of the side pieces. These pieces are made of cast or wrought iron, in the shape shown, the under side being cut away to facilitate the passage of the belt over the small pulleys supporting the forward end of the same. Each alternate rod is raised to form buckets or valleys, so that the belt can be run at a greater inclination and carry its contents. Alternate rods are made the hinges or turning-joints of the belt, thereby lessening the number of wearing parts and saving one-half the rods in reconstructing the belt; also lessening the first cost by shouldering only one-fourth of the rods, the remaining three-fourths being inserted full size; all being headed down to complete the fastening, as shown. The tops of the side pieces L are cut away, as shown, to save material and to facilitate the discharge of potatoes over the sides of the belt, for the purpose described.

Fig. 8 shows another form of side piece for the endless belt. In this the side is carried up above the rods, making a side that moves with the belt, as fixed sides cannot be used on account of the friction caused by the contents of the endless belt against the sides when in motion.

Fig. 9 shows the position and inclination of endless belt J when tilted by the action of the lever *r* and rods *j j*, as described, the action of shaft *f* and bearings *i i* (more fully shown in Sheet D, Fig. 16) also showing a section of cap *s* and oiling-wheel *t*, and the manner of fastening the cap *s* to the wheel *t*. Pin 1, fitting loosely in the wheel *t*, has a notched head in shape of the letter J, which passes through a slot in the cap *s*, and, by slightly turning the hook, holds the cap in place.

Fig. 10 shows a section of the drive-wheel A with lug attached. I prefer to make the drive-wheels A A with wrought-iron rim and spokes, casting on the hub; and to give the wheels sufficient traction power I put on cast-iron lugs, as shown. These lugs are cast with ends to overlap the sides of the tire so that the lugs can be secured in place by a single bolt, as shown. The object of these removable lugs is to facilitate the transportation of the machine. The lugs can be quickly removed, the rear end of frame H H swung up, and scoop K raised by tilting the machine on the axle B, as described; the machine can then be driven over a hard road or pavement without injury.

Sheet D, Fig. 11 is a perspective view of one of the pulleys *q q*, which support the forward end of endless belt J. Fig. 12 is a section of same, showing it attached to a section of the standard E. 1 is a stud cast with a chamber, 5, having a small hole on one side. Upon this stud is placed a capped wheel, 2, having a straight face to support the side of the endless belt, as shown in Fig. 17, and flange to keep the belt in place. The cap is finished with a rounded end to guard off stone or other impediments that might be brought against it by being lodged in the interior of the endless belt, and is held in place on the stud 1 by means of a rod, 3, cast in stud 1 and finished with a nut and thread, 4, as shown. A small hole is drilled through the stud 1 longitudinally into the chamber 5, which is used as an oil chamber or reservoir. This small hole is filled with a wick, 6, by which oil is brought to the bearing-surface of the stud and cap-wheel. 7 is a band fitted over the joint of the stud and wheel, having a small hole, 8, through which the reservoir 5 is filled with oil, and closed by giving the band a partial turn.

Fig. 13 shows the manner of fastening the scoop K into side standards E E.

Fig. 14 is a view of the end or point *v* of standard E, turned down to show the slot or jaw which receives the end of scoop K. 2 is a rod, of iron, connecting the standards E E through their points *v v*, passing underneath the scoop K, as shown. The scoop is a straight steel blade, pointed, as shown.

This arrangement of parts makes a cheap and strong fastening, and one easily unfastened to repair or exchange blades or scoops.

Fig. 13 also shows the manner of connecting pulleys *q q*, which support the front end of endless belt J, by means of a shaft having an offset, either direct or gradual, as shown at *i i*, to facilitate the passage of stone or other obstructions which might be brought against it by the endless belt, as has been described in regard to pulleys *q q*.

Fig. 15 is a perspective view, showing an end of the frame H, sliding bearing *i* held in position by set-screw 9, and shaft attachments. Fig. 16 is a section of the same. 1 is the shaft; 2, an oil-chamber in bearing 3, made by cutting the shaft shorter than the bearing. The bearing 3 has an oval or elliptical exterior, resting on straight bed of bearing *i*, to allow the shaft to be tilted in the bearing without cramping when the endless belt is inclined, as described. The bearing 3 has a neck, 5, projecting from the bearing *i*, and covering the shoulder of the shaft 1. Between the neck 5 and bearing *i* is an annular space filled with a rubber band, 4, for the purpose of keeping dirt out of the space 6, and to keep the shaft from cutting at the shoulders when tightened up by nuts on shaft *f''*, as described. The end of bearing 3 is covered with a band, 7, having a small hole to fill the oil-chamber, which is closed by slightly turning the band. The band is held in place by pin 2 and slot 8, Fig. 15.

Fig. 17 is a section of vine-cutter F—chain-wheel 1, which drives the cutter-supporting chain G, and resting on the stud 2 attached in place to a section of standard E. 3 is an oil-chamber, covered by the band 4. The cutter F runs loosely on the square end of the chain-wheel 1, and is held on by forks *u u*. This figure also shows the pulley *q* fastened in place, and carrying the front end of the endless belt J. The chain-wheel G, which drives the cutter, is driven by means of a wheel having teeth or pins, which insert themselves between the two outside links, instead of the usual grooved wheel. The object is to prevent the chain and wheel from becoming clogged with dirt or other obstructions, the teeth acting as punches to any obstruction on the chain, clearing the links, and the thin edge of the wheel at the roots of the teeth preventing dirt from packing on and tightening the chain, as would be the case with the ordinary wheel.

Fig. 18 is a portion of the vine-cutter F, showing its projection in front of the side standard E, indicated by dotted lines, and the manner of cutting the teeth, 1 showing saw-teeth, and 2 sickle-teeth. I prefer to use the saw-teeth, as the expense is less to manufacture. This figure also shows, *u u*, two of the three points or guards that keep the cutter F in place on the standard E; the remaining one is shown in plan and section of machine, Sheets A and B, Figs. 1 and 2.

Claims.

1. The endless belt J, constructed to swing up at the rear end, as shown, and supported by rods *j j* to seat-rest *l*.

2. The sliding bearings *i i i i*, in combination with frame H H, operating as shown in Figs. 1 and 2.

3. The special construction of sliding bearings *i i*, as shown in Figs. 15 and 16.

4. The combination of vine-cutters F F, brace-rods *m m*, and points *v v* of standards E E, as shown, for the purpose set forth.

5. The arrangement of rocking levers *o o*, as shown, to strike alternately, as shown and described.

6. The shaft 1, supporting the pulleys *q q*, constructed with an offset, direct or gradual, in combination with the endless belt J, as shown and described, for the purpose set forth.

7. The pulleys *q q*, constructed as shown in Figs. 11 and 12, for the purpose set forth.

8. The scoop K, attached to standards E E by means of jaws and rod, as shown in Fig. 13.

9. The arrangement of oiling-wheels *t t*, for the purpose of oiling the joints of the endless belt J, as shown and described, for the purpose set forth.

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Witnesses:
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J. R. TREMBLY.