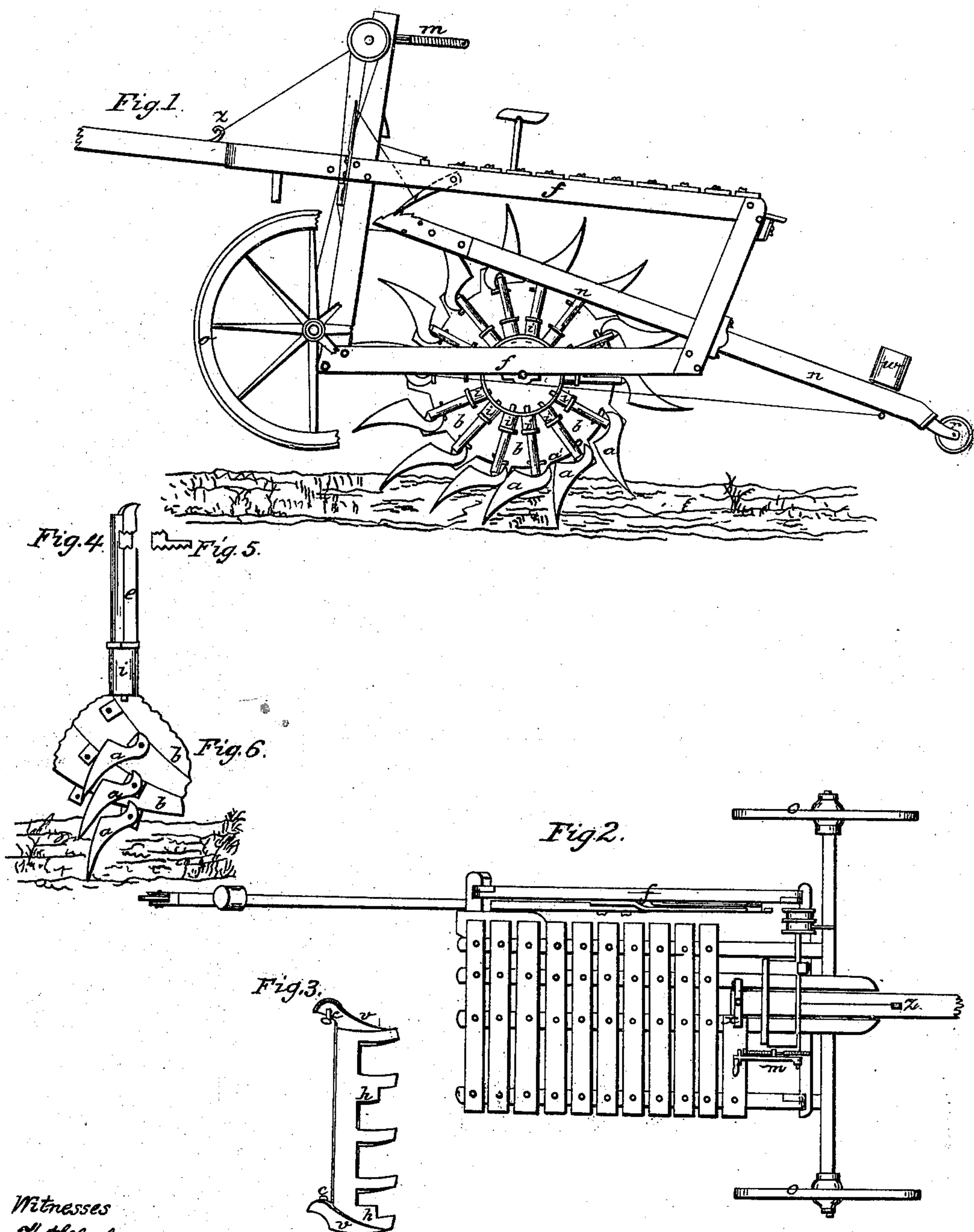


F. L. CAGWIN.
Rotary Cultivator.

No. 83,456.

Patented Oct. 27, 1868.



Witnesses
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FRANCIS L. CAGWIN, OF JOLIET, ILLINOIS.

Letters Patent No. 83,456, dated October 27, 1868.

IMPROVEMENT IN AUTOMATIC SPADING-PLOW.

The Schedule referred to in these Letters Patent and making part of the same.

Be it known that I, FRANCIS L. CAGWIN, of the city of Joliet, in Will county, and State of Illinois, have invented a new and useful Automatic Spading-Plow and Stalk-Cutter; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1 is a side elevation;

Figure 2, a plane view on the top;

Figure 3, a perspective view of a single spade;

Figure 4, a perspective view of the upright lever *e*, with rubber spring;

Figure 5, a perspective view of the serrated stop; and

Figure 6, a diagram, showing the several positions of the spades on entering the ground.

The nature of my invention consists in the discovery of a new principle, as well as in the use and combination of certain mechanical devices, to overcome the difficulties heretofore experienced in the construction of rotary plows or spades, consisting chiefly in the resistance caused by the spades wedging each other out of the ground, especially if it be a little hard.

Now, in order to overcome that difficulty, and to thoroughly pulverize and overturn the soil, I use the spades *a*, fig. 1, hinged to the periphery of the disk or drum *b*, as shown by the axles at *c*, in fig. 3, and held out in place by the upright levers *e* with springs *i*.

These spades are nearly in the shape of a right angle, shaped to answer the required cut to be made in the earth, and are set in such an attitude on said drum or disk, at its periphery, as to cut or enter into the ground on what I term the cycloid line of the heel of the spades, entering the ground at all points of contact on said cycloids, the radius entirely discontinuing at the heel or hinge-line, so that the cut of ground between any two spades will be about the same width at the point of the spades as at the heel or entering line.

The point of entry governs; therefore any considerable departure of it from the cycloid of the heel or surface to or from a radius line of the heel would be fatal to give good work, or any work at all, because it is almost an impossibility to force points on a radius far into the ground, as they form an adverse Λ -shaped wedge.

In conjunction with the said cycloid entry into the ground, there is another thing necessary to be done in order to insure work, or turning over the ground, which I call regaining or reinstating the radius of the spades with the centre line of the main drum or disk, which is done by the traction of the machine, in conjunction with the automatic action of the lever *e*, operated by the rubber spring *i*, after the spade has passed the centre, reached its radii, and changed the periphery from the ground-line or heel of the spades to their point, after the heel of the spade has reached its rest up

in the drum or disk, as shown at *a'*, fig. 1, and the point let loose from the bottom of the furrow, and is forced around to its original cycloid line, which turns the ground over, as shown in fig. 1.

Fig. 6 is a diagram illustrative of the several positions of the spades, both before their entry into the ground, and after. It will be noticed that they retain the same position with respect to the ground until the traction of the machine has left them past the centre of the drum or disk, when they operate as before described.

The frame *f*, fig. 1, is so arranged as to rest, at its centre, on the axle of the drum, and is so constructed as to raise the drum, with its spades, out of the ground, when desired.

It will be seen that by winding upon the windlass *m*, a leverage is established by the horses pulling on the tongue, the trucks *o* acting as a fulcrum, which changes the draught-line to any point between the shaft of the windlass and hinge of the tongue, which has the effect to elevate the rear end of the machine, causing the spades to enter hard soil better, or, when raised far enough, causes the machine to rest upon the trucks *o*, and lightly on the caster *r*, at the rear end of the lever *n*, which raises the spades entirely out of the ground, the lever *n* being used more for the purpose of carrying the weight *w* than to sustain the weight of the machine.

The top of the main frame is floored over, and furnished with a seat, hung between two upright standards, so as to retain a horizontal position at all times. Otherwise a side seat on the plow-side, with a platform for the operator to stand on, may be used in place of the seat.

The part *t* is used with the ratchet on the inner end of the lever *n*, to hold the same from the ground while in operation, the pawl being operated by the button *x*, attached by means of a cord. Said button is used to keep the inner end of the tongue in place, so the main frame will not tip over too far forward when not desired.

Fig. 2 is a plane view of the top of the frame, showing its general construction and appearance.

The weight *w*, on the outer end of the lever *n*, is used to bear down on the back end of the frame, which, together with the operation of the windlass, as described, has a tendency to pull in the spades into the ground. The weight may be moved along on said lever to or from the frame, so as to lessen or increase the weight on the spades.

Fig. 3 is a view of a single spade, shaped as before described, and sharp on the inner edge of the ends, as shown at *v*, for the purpose of acting as a coulter, to cut grass or stubble, &c. The prongs or points are bevelled on the ends, to better facilitate their entry into the ground, and to cut stalks or stubble better than if they were square on the ends. The offsets at

p alternate on every spade, so as to cut the space between the prongs.

Fig. 4 is a perspective view of the upright levers *e*, with the rubber springs *i*. The serrated stop, fig. 5, sets in the corresponding recess in said lever, near the end toward the spades, and is used to set the spade at any desired angle on the drum, the inner points of the heel resting in the angle of the stop; so, as it is set in or out, of course changes the position of the spade.

By turning the said stop around, the longest angle of the same will rest against the triangular guide at the back of the upright lever *e*, thereby affording a means of preventing the spades from turning further back than desired.

Claims.

Having thus described my invention,

What I claim as new, and desire to secure by Letters Patent, is—

1. The spades *a*, when operating in the manner and by the devices described, so as to enter the ground on the cycloid line, as set forth.

2. The maintaining of the parallel between the spades *a*, from the time of their entry into the ground until the heel of the spades come to a rest up against the drum or disk *b* to any given point, either before

or past the hinge-line, by means of the traction and weight of the machine causing them to turn on their hinge, as described.

3. The backward turn of the spades *a* from the cycloid entry-line to their original position, as described, by means of the upright lever *e* and spring *i*, as set forth, regulated to stop at any given cycloid point by means of the device shown in fig. 5, or its equivalent.

4. The spades *a*, constructed with a crank and hinge, when attached, as set forth, to the periphery of the drum or disk *b*, in combination with the upright lever *e* and spring *i*.

5. A rotary spader or plow, constructed with spades *a*, hinged to the drum or disk *b*, as shown, in combination with a frame, constructed and operating substantially as set forth.

6. The mode of leverage, substantially as described, to force the spades into the ground, and to raise them out of the ground, when desired, as set forth.

7. The combination of all the parts described, when arranged and operating as set forth.

FRANCIS L. CAGWIN.

Witnesses:

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