(No Model.) 2 Sheets—Sheet 1.

C. LA DOW.

SPRING TOOTH HARROW.

No. 354,557. Patented Dec. 21, 1886.

Fig. 1.

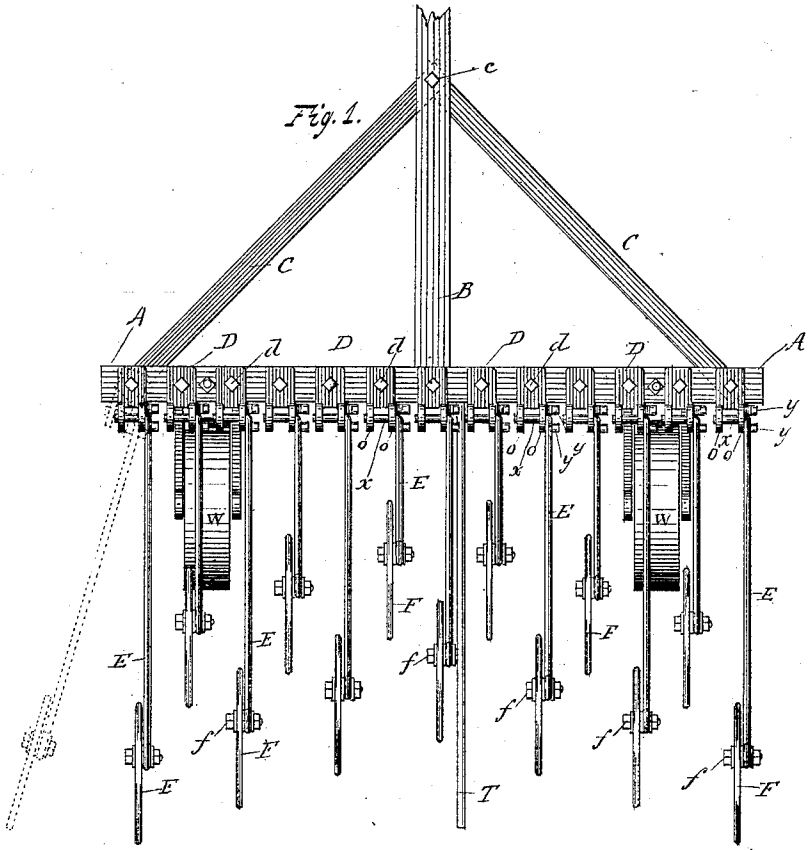
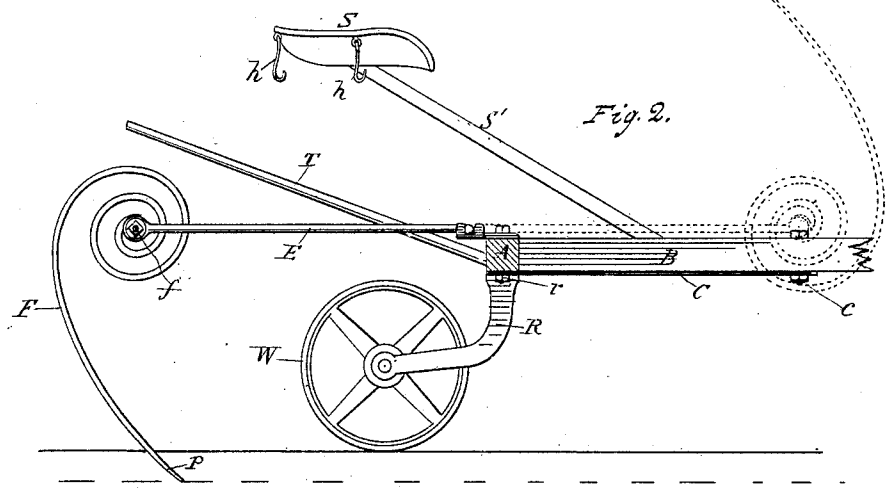


Fig. 2.



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(No Model.) 2 Sheets—Sheet 2.

C. LA DOW.

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Fig. 3.

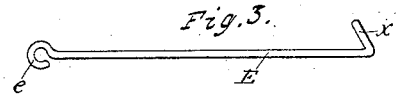


Fig. 4.



Fig. 6.

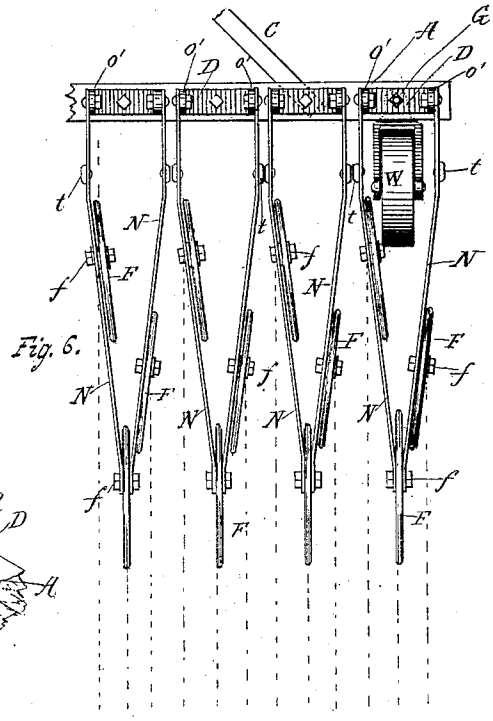


Fig. 5.

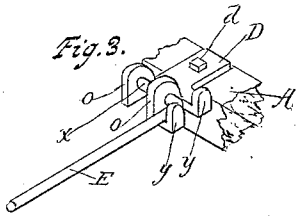
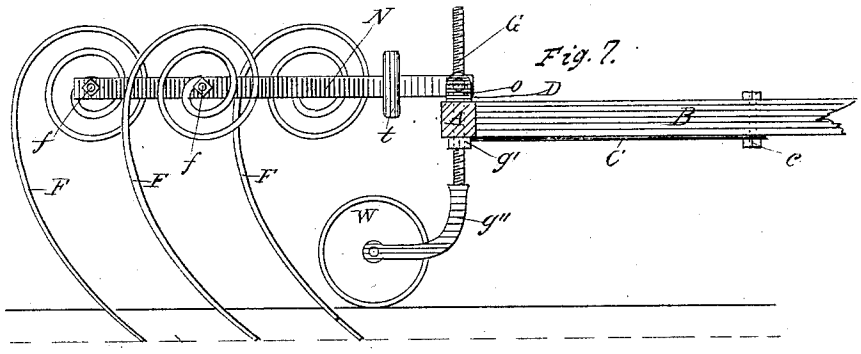


Fig. 7.



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UNITED STATES PATENT OFFICE.

CHARLES LA DOW, OF ALBANY, NEW YORK.

SPRING-TOOTH HARROW.

SPECIFICATION forming part of Letters Patent No. 354,557, dated December 21, 1886.

Application filed March 23, 1882. Serial No. 56,187. (No model.)

To all whom it may concern:

Be it known that I, CHARLES LA DOW, a citizen of the United States, and a resident of the city and county of Albany, in the State of New York, have invented certain new and useful Improvements in Spring-Tooth Harrows, of which the following is a specification.

This invention relates to that class of harrows which employ vibratory spring-teeth for working the soil, and which have the teeth preferably connected to drag bars or arms, which allow the teeth to rise and fall when passing over uneven surfaces.

The invention consists in providing a draft-frame with drag-bars adapted to play laterally and vertically and carrying spring-teeth; also, in providing caster-wheels for supporting the draft-frame, and a lever for guiding the course of the implement.

The invention further consists in providing novel devices for connecting the drag-bars to the draft-frame.

The invention further consists in hinging the drag-bars to the draft-frame, so that they may be reversed or laid over on the frame for transportation, and in providing hooks on the seat for supporting the drag-bars.

The invention further consists in providing the draft-frame with caster-wheels, and in connecting the drag-bars (which carry spring-teeth) to the draft-frame by means of clamping-bolts, whereby the angular relation of the drag-bars to the frame may be regulated.

The invention further consists in hinging sectional drag-frames to a draft-frame, each section carrying spring-teeth and adapted to have both lateral and vertical movement relatively to their draft-frame.

Referring to the drawings, Figure 1 represents a top view of my invention, showing by dotted lines the position of the teeth when the machine is being turned around. Fig. 2 represents a side view of my invention, showing the normal position of the drag-bar and tooth by shaded lines, and showing the position of the tooth by dotted lines when reversed on the draft-frame for transportation. Fig. 3 represents a section of the cross-bar of the draft-frame A, the drag-bar connection D, and the method of hinging the drag-bar E to said connection. Fig. 4 represents a section of a tooth and its cutting-point. Fig. 5 represents one of the drag-bars. Fig. 6 represents a top view of a modification of my invention, in which the drag-bars are made of flat metal straps, each pair of drag-bars carrying three teeth, the said drag-bars being capable of rising and falling, swerving to the right or left, and of being overbalanced or reversed on the draft-frame for transportation. Fig. 7 represents a side view of said modification of my invention, in which the draft-frame is supported by caster-wheels having screw-threaded shanks and check-nuts for adjusting the height of the draft-frame and the forward ends of the drag-bars at any desired distance above the ground for the purpose of securing a uniform depth of penetration to the front, rear, and intermediate teeth on the drag-bars.

In the drawings, Fig. 1, A is the cross-bar of the draft-frame. B is the pole. C C are the braces.

D D are the connections for attaching the drag-bars E E to cross-bar A. These drag-bars, at their forward ends, are bent at a right angle, (shown at *x*,) which angle passes through holes of the ears *o o* of the connection D. The angle *x* forms a hinge for the drag-bar, allowing it to work up and down freely.

y y are upwardly-projecting lugs on the connection D for keeping the angle of the tooth in its hinged connection. When the drag-bars E are raised vertically the angle may be withdrawn from between the lugs *y y*. One of said lugs *y* holds the tooth in place when at work, and the other, when reversed, for transportation.

F F are the teeth, made of spring-steel and formed with a volute curve to give greater elasticity, the inner portions of said curve forming an eye, which is used for attaching the tooth to the eye on the drag-bar by means of a clamping-bolt, *f*, the clamping-bolt allowing the tooth to be set at any desired angle relatively to the drag-bar, and holding it firmly, as set, by frictional contact between the tooth and bar.

W W are wheels placed in the fork of a caster-shank, R, which is secured to the cross-bar by a pivot-bolt, *r*. This bolt may be clamped so tightly that the caster-shank may be held rigidly in any position desired relatively to the line of draft; but in ordinary use the nut on bolt *r* is not clamped tightly, ena-

bling the wheel to perform the functions of a caster-wheel.

The drag-bar connections D D may also be clamped so tightly to the draft-frame by their bolts *d d* that said connections will hold the teeth and their drag-bars from swerving from a direct line of travel and at regulated distances apart; but in ordinary use the connections D D are not rigidly clamped to the draft-frame, but allow the teeth and bars to swing either to the right or left when the machine is to be turned around, and also coact with the caster-wheels to vary the course of the machine, by means of the hand-lever T, from a direct line, in order to dodge plants that may be out of line in a row when the machine is used as a straddle-row cultivator. For this last-named purpose the teeth at the middle of the machine may be attached to hooks *h h*, supported from the seat S, mounted on the seat-standard S′, above the pole B, and other drag-bars may be reversed on the draft-frame, as shown by dotted lines in Fig. 2. When the machine is to be drawn from field to field, all the teeth may be reversed upon the draft-frame.

It will be observed that the teeth F F and their drag-bars E E are arranged to present a dished or concave form at the rear, so that as the attendant walks behind the machine to guide its course while cultivating rowed crops he can get nearer to the working parts of the implement and the lever than if the middle drag-bars were as long as the outer ones.

The points of the teeth are flattened and sharpened, as shown at P, Fig. 4, so as to present a cutting and turning surface across the line of draft wider than that portion of the tooth which remains above the surface of the ground, (shown at F, Fig. 4,) allowing the earth to be moved sidewise and returned nearly to its normal position, leaving the ground with shallower furrows than if the teeth were of uniform width their entire length.

As many teeth as desired may be mounted on the drag-bar, and when flat drag-bars N N are used, as shown in Figs. 6 and 7, they are preferably hinged in pairs by means of pivot-bolts *o′ o′* to the connections D D. *t t* are buffers, which serve to keep the drag-bars and teeth at regulated distances apart when the tooth-connections are not rigidly clamped to draw-bar A. These buffers may be used on drag-bars E E, if desired.

When several teeth are arranged to rise and fall together on a pair of drag-bars, I have found it advisable to adjust the height of the draft-frame at different distances from the ground in order to obtain a uniform depth of penetration to the front and rear teeth mounted on said pair of drag-bars. This may be accomplished by the caster-wheel shank *g″* and check-nut *g′*, as shown in Fig. 7. Other modifications for accomplishing said result will, however, suggest themselves.

The teeth are in no danger of breaking or of being unduly strained, as they are springs within themselves. The bars to which they are attached can rise over obstructions, and the teeth are held to their bars by frictional contact, which can be regulated by the clamping-bolts, and can be arranged to allow the tooth to slip or turn on its pivot-bolt before it would be overstrained.

I am aware that, broadly, the combination of a main frame with independently rising and falling tooth-arms or drag-bars carrying spring-teeth is old.

I am also aware that machines in which cultivating devices are carried upon rearwardly-extending bars have been provided with a lever for guiding the course of the machine; and I therefore make no claim to such subject-matter.

I am also aware that it is not new to provide hooks or supports on the frames of machines having rearwardly-extending drag-bars for the purpose of supporting some of the drag-bars in an elevated position on such hooks.

I am also aware that supporting-hooks have been placed upon the driver's seat, but in an organization different from that herein claimed.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a harrow, the combination of a draft-frame, drag-bars adapted to play laterally and vertically, spring-teeth on the drag-bars, caster-wheels supporting the draft-frame, and a lever for guiding the course of the implement.

2. In a harrow, the combination of a draft-frame, drag-bars pivoted thereto and having angular ends, and the connections between the bars and frame having ears *o*, in which the bent ends of the drag-bars have their bearings, and lugs *y*, with the openings between them, through which the ends of the drag-bars are passed in inserting and withdrawing them.

3. In a harrow, the combination of a draft-frame, a driver's seat, drag-bars hinged to the frame so as to be reversed or laid on the frame for transportation, and supporting-hooks on the seat, in which hooks the central drag-bars are carried.

4. In a harrow, the combination of a draft-frame, caster-wheels, tooth-connections, a series of drag-bars, spring-teeth, and clamping-bolts connecting the drag-bars and frame for regulating the angular relation of the drag-bars to the frame when desired, substantially as described.

5. A spring-tooth harrow composed of a draft-frame sectional drag-frames hinged to the draft-frame, each section carrying spring-teeth, and adapted to have both lateral and vertical movement relatively to their draft-frame.

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