

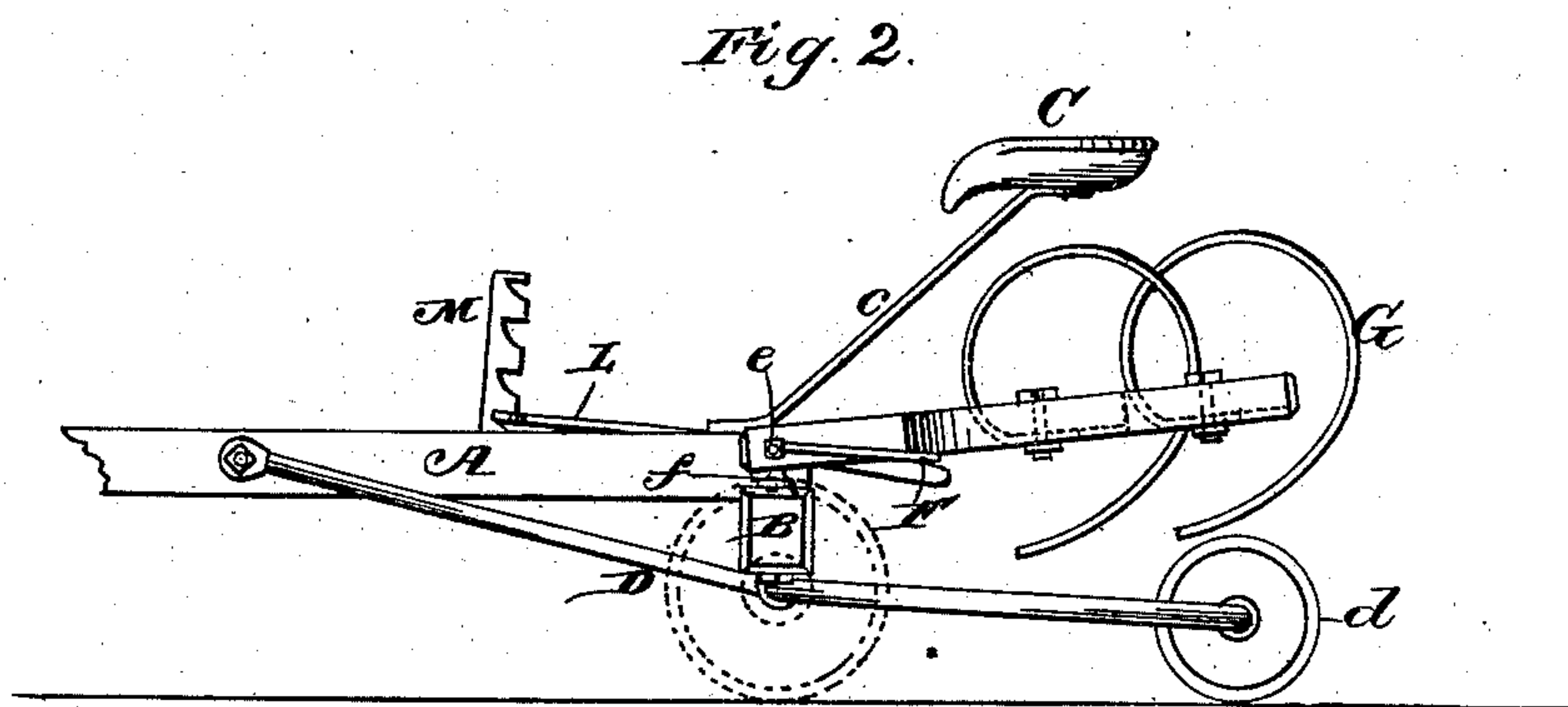
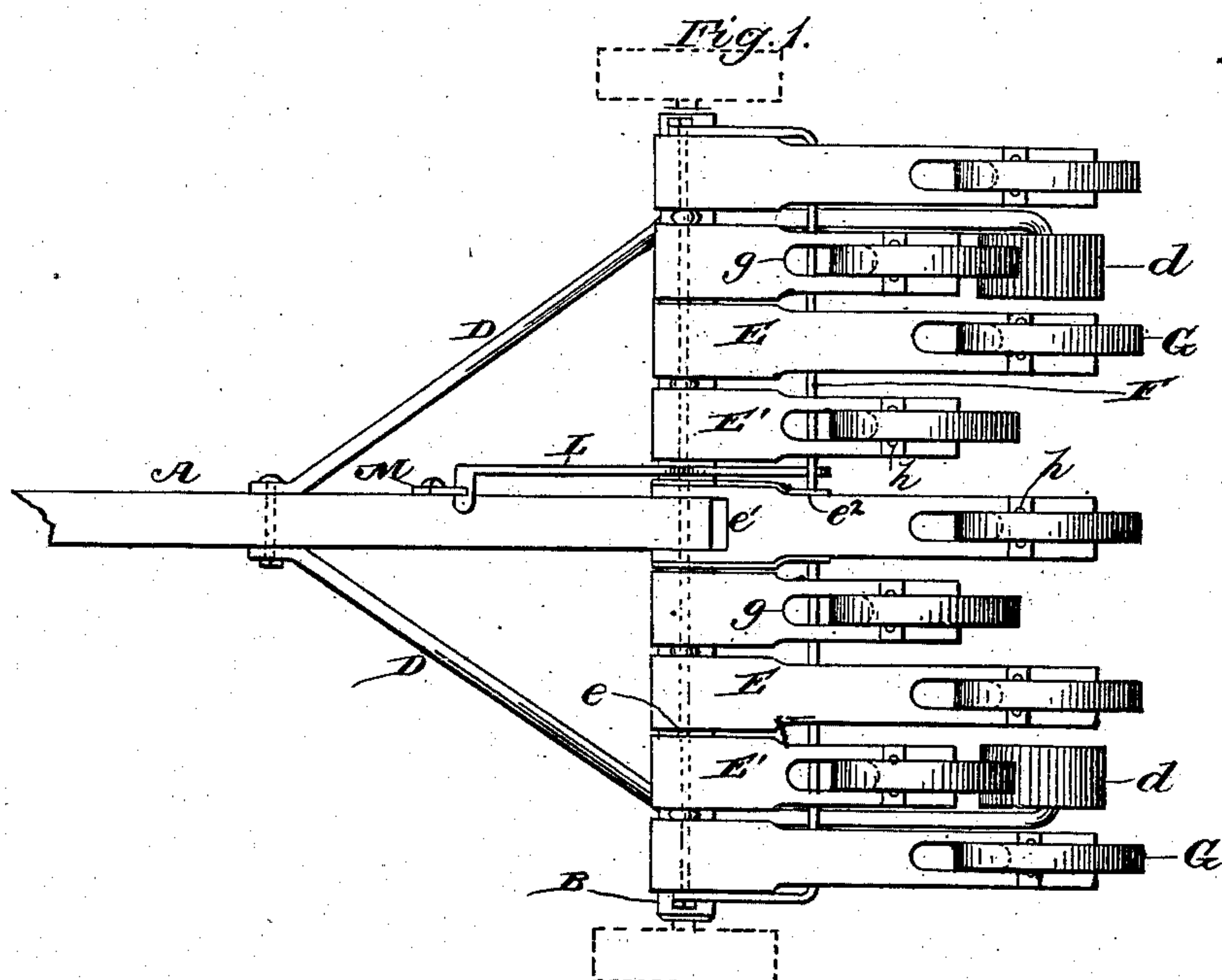
(Model.)

2 Sheets—Sheet 1.

C. LA DOW.  
SULKY HARROW.

No. 258,081.

Patented May 16, 1882.



Witnesses:

Jas. E. Hutchinson.  
J. A. Rutherford.

Inventor.

Chas. La Dow,

by James L. Norris.

Atty.

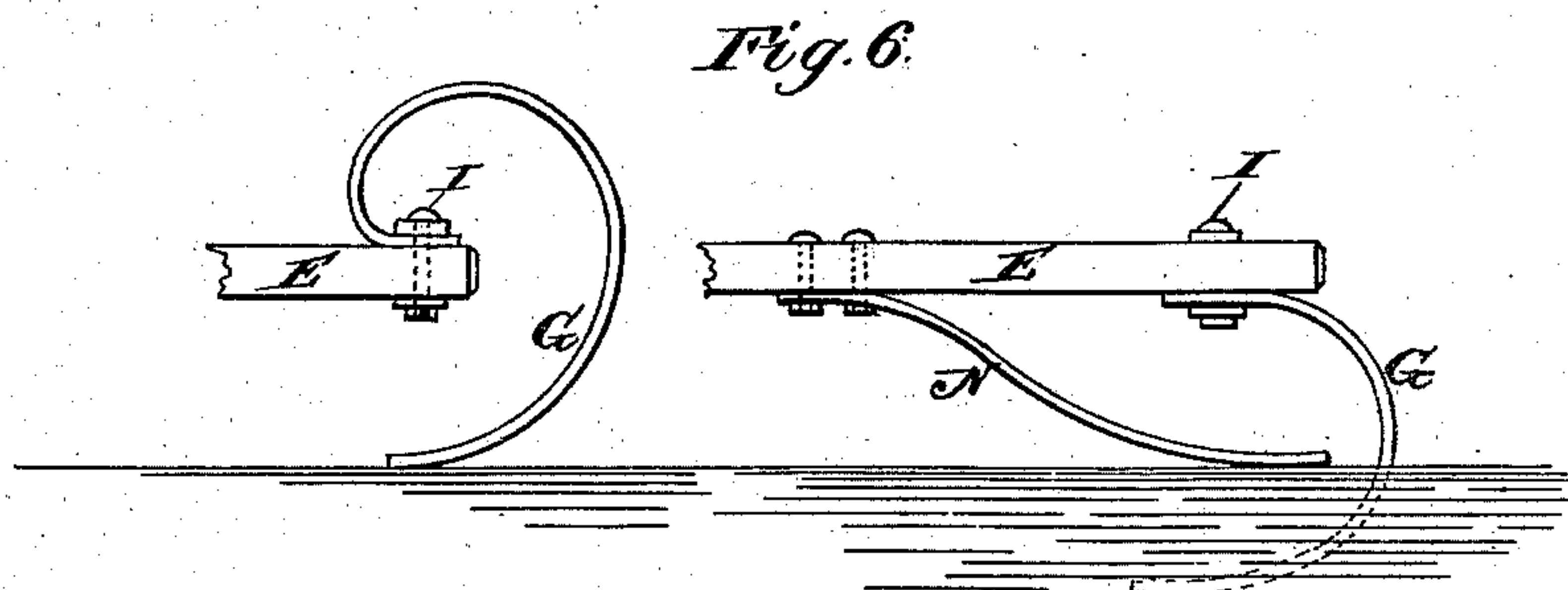
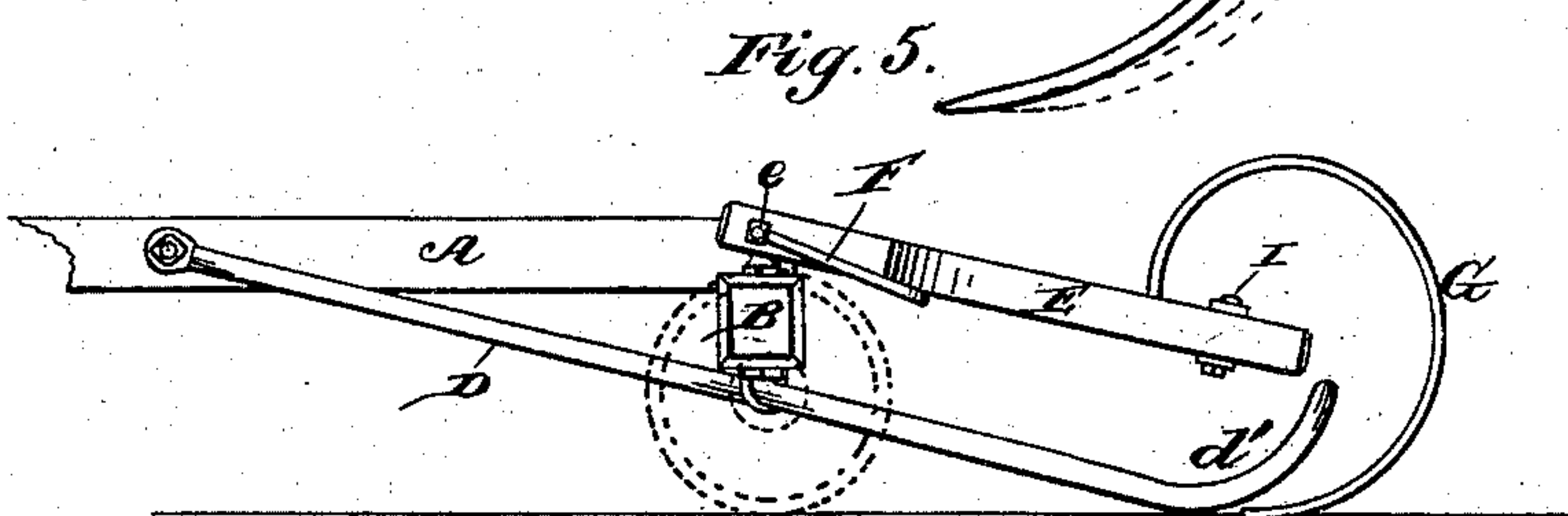
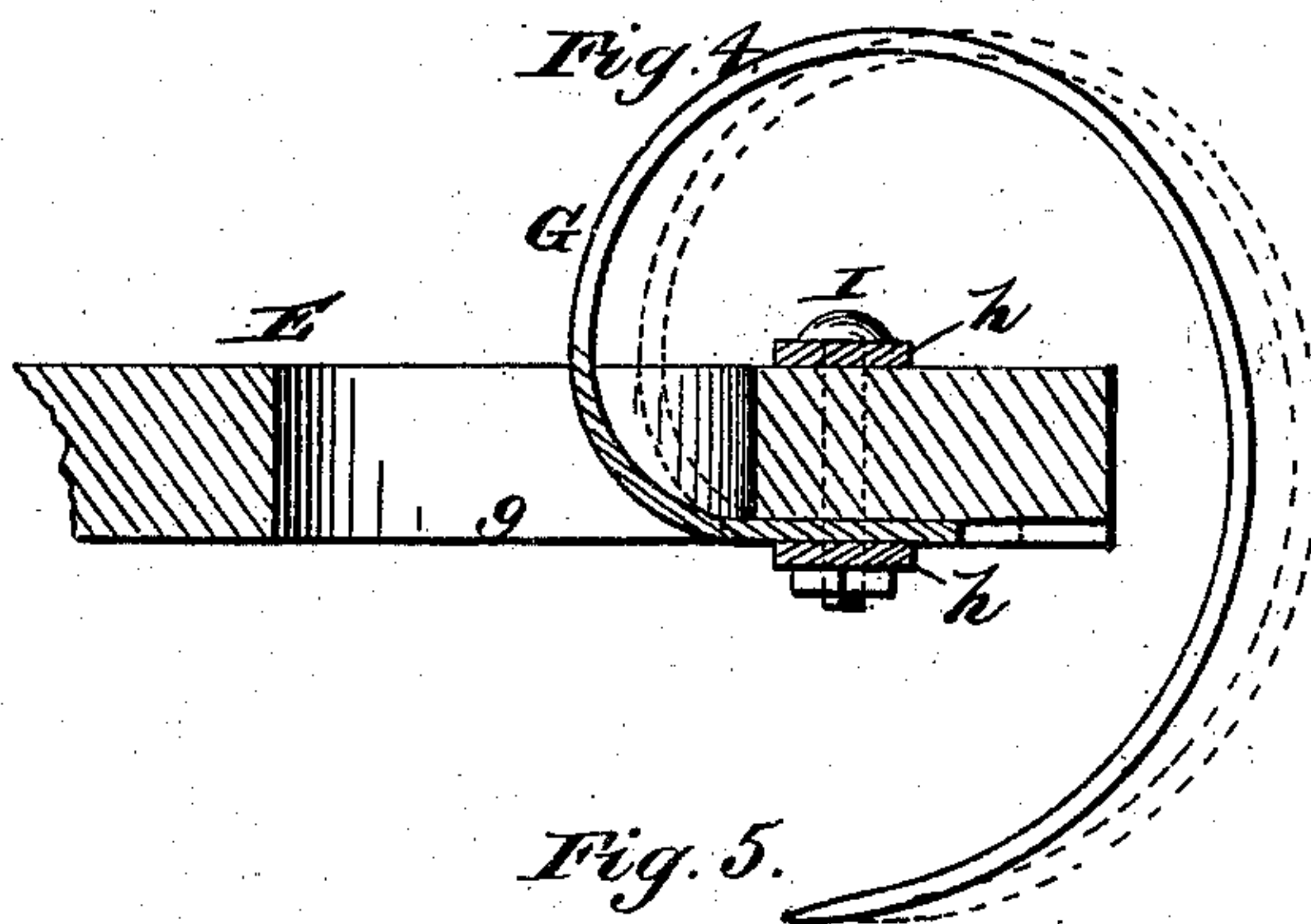
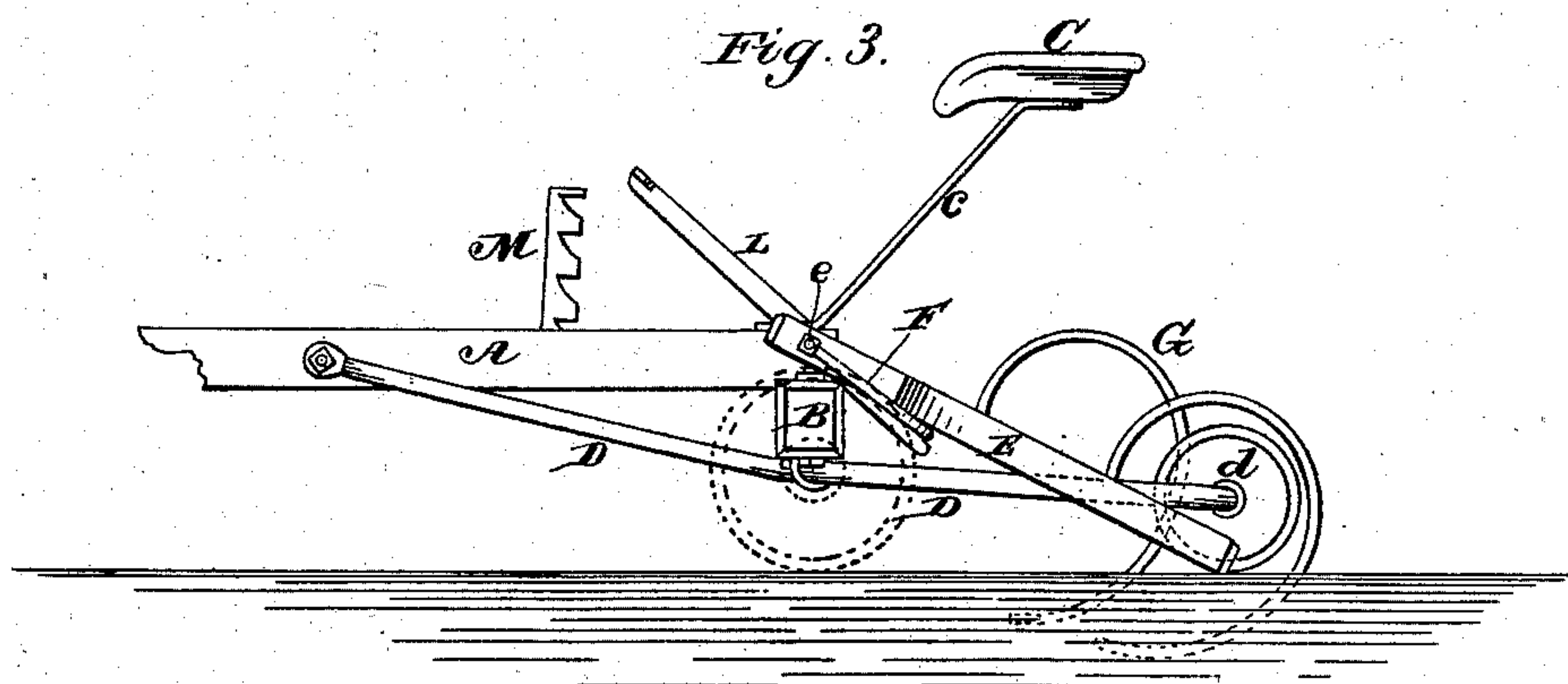
(Model.)

2 Sheets—Sheet 2.

C. LA DOW.  
SULKY HARROW.

No. 258,081.

Patented May 16, 1882.



Witnesses:

Jas. E. Hutchinson.  
J. A. Rutherford

Inventor.

Chas. La Dow,  
by James L. Norris. atty



# UNITED STATES PATENT OFFICE.

CHARLES LA DOW, OF ALBANY, NEW YORK.

## SULKY-HARROW.

SPECIFICATION forming part of Letters Patent No. 258,081, dated May 16, 1882.

Application filed July 26, 1881. (Model.)

*To all whom it may concern:*

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

This invention relates to that class of sulky-harrows that are provided with vibratory spring-teeth and with means for adjusting the same to any desired depth of penetration in the ground.

Under my present improvement the spring-teeth are broad and flat, so that they can spring rearwardly, but not sidewise or laterally with reference to the line of draft, and they have a free up-and-down movement in order that they may closely follow uneven surfaces and at the same time maintain their individual vibratory action. Lifting and gaging devices are provided for limiting the downward movement of the teeth, whereby the depth of their penetration into the ground can be regulated, and also whereby they can be raised entirely clear of the ground at the will of the driver. Novel devices are also provided for supporting the main frame and means devised for securing the teeth to the vibratory tooth-arms, whereby the teeth will be firmly held in connection therewith, and any swerving or side movement of the teeth avoided. These features are fully set forth in the following description and illustrated in the annexed drawings, in which—

Figure 1 is a top or plan view of a sulky-harrow constructed in accordance with my invention. Fig. 2 is a side elevation thereof with the spring-teeth raised clear of the ground. Fig. 3 is a like view with the spring-teeth penetrating the ground. Fig. 4 is a section of a portion of one of the tooth-bars on an enlarged scale, and illustrates the manner of securing the tooth thereto. Fig. 5 is a side elevation of a portion of the harrow, and illustrates a modification of the device for supporting the main frame. Fig. 6 embraces two detail views, one illustrating the spring-tooth attached to the under side thereof, with an auxiliary arm also attached to the tooth-arm for the purpose of holding down clods or sods.

In the present instance the tongue or pole A is secured at its rear end to a cross-bar, B, which extends the entire width of the body of

the machine and constitutes the upper portion of the main frame.

The driver's seat C is constructed as usual, and is supported by the rearwardly-inclined seat-standards c, firmly bolted at the base to the pole.

The braces D are secured at their forward ends to the pole and diverge rearwardly so as to pass under the cross-bar near the outer ends of the latter, at which point they are secured to the same by means of clips, staples, or in any other suitable manner. These braces are extended back from the cross-bar in lines that are parallel to each other, and at their rear extremities they carry the supporting wheels or rollers d, which are arranged in the spaces between the back series of teeth. It is not absolutely essential, however, that these supporting-rollers should be employed, since the rear ends of the brace-bars can be bent in order to constitute runners, as illustrated at d', Fig. 5. In either instance it will be seen that the rear ends of the braces constitute the supporting media for the main frame. These supporting devices can be attached to the outer ends of the cross-bar, if desired, as illustrated by dotted lines in Figs. 1 and 3, and in that case the braces need not extend back of the cross-bar.

E refers to a series of long, and E' to a series of short, arms, designed for carrying the spring-teeth at their rear ends, said long and short arms alternating with each other, so that there will be two rows or sets of teeth, one of which sets will be in advance of the other. These arms E E' are all hung or hinged at their forward ends upon a horizontal rod, e, that constitutes a portion of the main frame, and which is arranged parallel with the cross-bar B, and supported above the same by means of a suitable number of short standards, f, secured to the said cross-bar. It will be observed that the central one of the series of vibratory tooth-arms is slotted or recessed at one end, as at e', in order to receive the rear end of the pole that is secured upon the cross-bar B, the prongs of the said recessed tooth-bar being hung upon the rod e, so that the arm can be swung up or down in the same way as the remaining arms of the series. In order to compensate for this reduction of the material of said end of the central vibratory tooth-arm, I secure the strength-



ening-plates  $e^2$  to the sides thereof at its upper forward recessed end.

The spring-teeth G are broad and flat, and are secured to these hinged bars E E', and each tooth formed on a volute curve, and preferably made of spring-steel. Each tooth is adjustably secured to the flat under side of its arm by means of a clamp-plate, h, that is held in place by means of the bolts I, that pass through the arm, and also through a similar clamp-plate located upon the upper side of the arm, so that the position of the tooth can be varied thereon, thus rendering the tooth more or less vibratory according as the length between its cutting-point and its fastening to the arm is shortened or lengthened. (See Fig. 4.) It will be evident that the greater the distance between the cutting-point of the tooth and its point of attachment to the bar the greater will be its vibration, and vice versa, and this is of considerable importance in this class of machines. The tooth extends from the point where it is thus secured forward and upwardly through a slot, g, that is formed through the arm, as best illustrated in the enlarged view, Fig. 4. By this mode of securing the tooth any swerving or side shifting thereof during its vibratory action will be prevented. That portion of the arm in rear of said slot is of such length that it will extend over and back of the point of the spring-tooth, its distance above said point being such that it will hold down and prevent the turning over of sods and large clods while the tooth is cutting through the same. As a modification of the above, however, I can employ the arm N, (shown in Fig. 6,) said arm being secured to the under side of the tooth-arm E, and extended back over the point of the tooth. In this instance the tooth might be secured to the under side of the tooth-arm, at the end of the latter, or it could be secured to the upper side of the tooth-arm, as illustrated in the same figure.

In order to provide for the rising of the arms and carrying the spring-teeth so as to vary the angle at which the teeth enter the ground, and also so as to raise the teeth entirely clear of the ground when desired, I provide a swinging bail, F, that passes transversely under the entire series of the tooth-arms, and is hung at its upturned ends upon the rod e, on which the tooth-arms are hinged. Upon this rod I likewise fulcrum a lever, L, the upper or handle end of which is extended to within convenient reach of the driver's foot, while its lower end is extended under the bail.

By depressing the handle end of the lever it is evident that its arm, which is under the bail, will elevate the same, and thus simultaneously raise all of the tooth-arms, together with the teeth carried thereby.

It will also be observed that while this lifting mechanism regulates the depth of the cut it admits of the free, independent upward vibration of the tooth-arms, thus allowing one

or all of the spring-teeth to rise or fall with respect to the irregularities of the ground, and hence to closely follow the surface thereof. In this way, while the teeth may have an independent up-and-down motion, at the same time their individual vibratory action will be maintained during all of the stages of the above-mentioned movement.

M indicates a rack-bar connected with the pole and arranged to engage the lever L. This constitutes a gage for maintaining the bail at the required degree of elevation, and by means of the lifting and gaging mechanism the vibratory action of the spring can be increased or diminished, it being understood that the deeper the cut the greater will be the vibration of the tooth.

The tooth-arms E and E' are all enlarged at their forward ends, whereby elongated bearing-surfaces will be provided for the rod which passes through, and thus there will be no liability of a twisting movement of the same upon the rod or pintle e. By forming the tooth-arms of different lengths, as before described, the teeth will be arranged at different distances from the rod or pintle upon which the tooth-arms are hinged, and hence the teeth in one series will not be disturbed by either the vibrations or oscillations of the teeth in the other series.

By the combination of long and short arms carrying vibratory spring-teeth the teeth are not liable to clog when vibrating vertically, and by forming said spring-teeth broad and flat, as hereinbefore stated, they are adapted to spring rearwardly, but not sidewise or laterally with relation to the line of draft, and they can therefore freely vibrate in vertical planes without liability of interfering with each other, all of which is due to the flat form of the teeth and their combination in the described relation on hinged arms.

I am aware that hay-rakes have been provided with a series of independently-hinged spring-teeth, and also others with a series of teeth that are not hinged; also, that grain-drills have been constructed with two or more series of independently-hinged teeth either rigid in themselves or made somewhat elastic by means of joints and elastic springs; also, that harrows have been provided with two or more series of spring-teeth attached to rigid frames, which in some instances have been hinged together. Hence I do not wish to be understood as claiming any such devices; but

What I do claim is—

1. In a harrow, the combination of the main frame, the long and short independently and vertically vibrating tooth-arms hinged thereto, and spring-teeth connected to said arms, said teeth being constructed to yield rearwardly and recoil without side vibration, substantially as and for the purpose described.

2. In a harrow, the combination of a draft frame, an arm attached thereto and adapted to conform to the surface traversed, and a flat



spring-tooth adjustably connected to said arm, substantially as described, whereby the extent of vibration of the tooth can be varied.

3. The combination, in a harrow, of the main frame, with a vibratory tooth-arm hinged thereto, and the broad and flat spring-tooth carried by the vibratory tooth-arm, said arm being arranged to extend over the cutting-point of the tooth, substantially as and for the purpose described.

4. The combination, in a harrow, of the pole with the cross-bar B, the braces D, extending rearwardly from the cross-bar to provide supports for the main frame, and the spring-teeth G, secured to the hinged tooth-arms, substantially as described.

5. In a harrow, the combination of the pole, the cross-bar B, the braces D, the hinged tooth-arms, the flat spring-teeth G, secured to the latter, and lifting mechanism for raising and

supporting the teeth, the points of the said spring-teeth being constructed and arranged to act on the soil in different vertical planes transversely to the line of draft, substantially as and for the purposes described.

6. In a harrow, the combination of the main frame, the independently-articulating tooth-arms hinged thereto and provided with slots, and the flat spring-teeth vibrating within the slots in the tooth-arms, said members being organized for operation substantially as and for the purposes described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

CHARLES LA DOW.

Witnesses:

E. WACKERHAGEN,  
JNO. WOLFF.