(Model.)

G. W. MILLER.

SULKY HARROW.

No. 246,332. Patented Aug. 30, 1881.

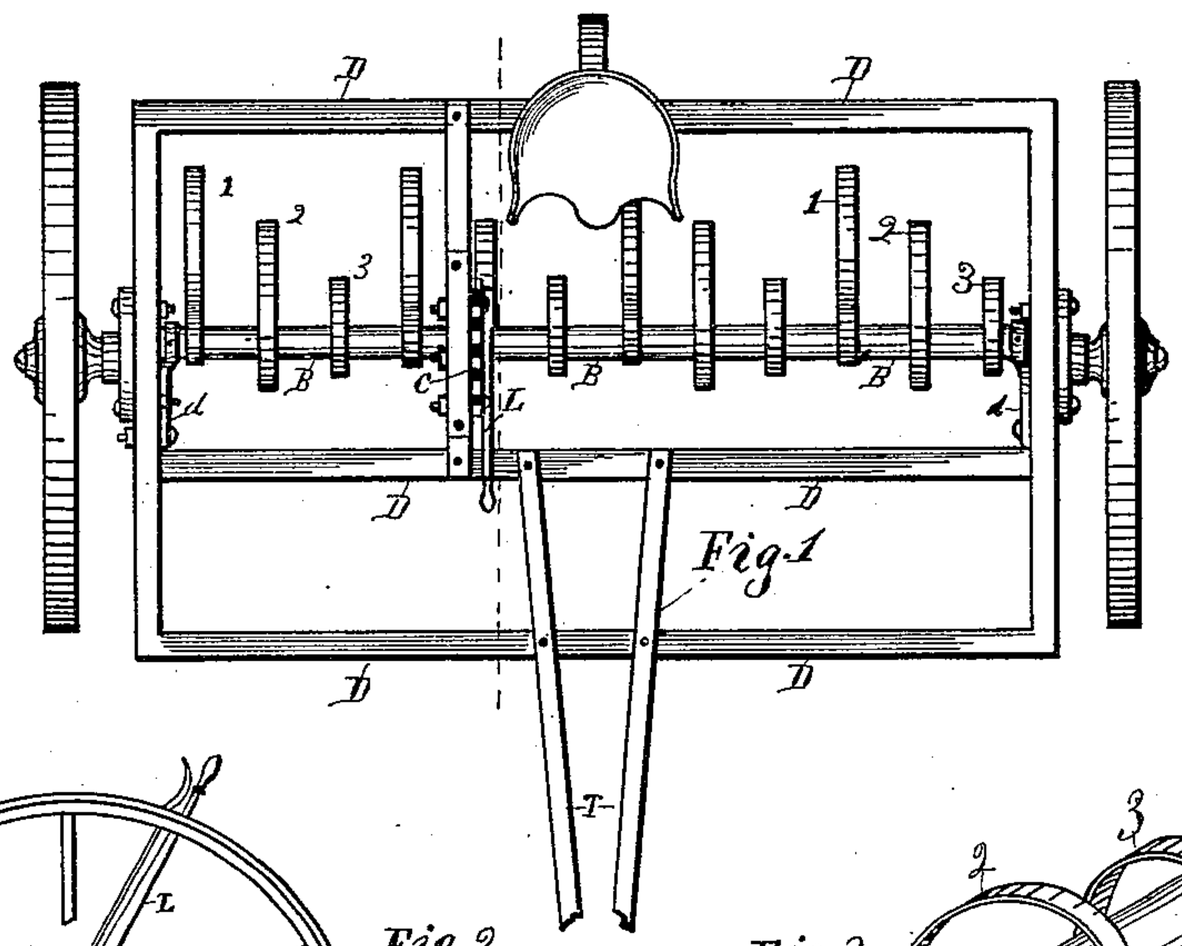

Fig. 1

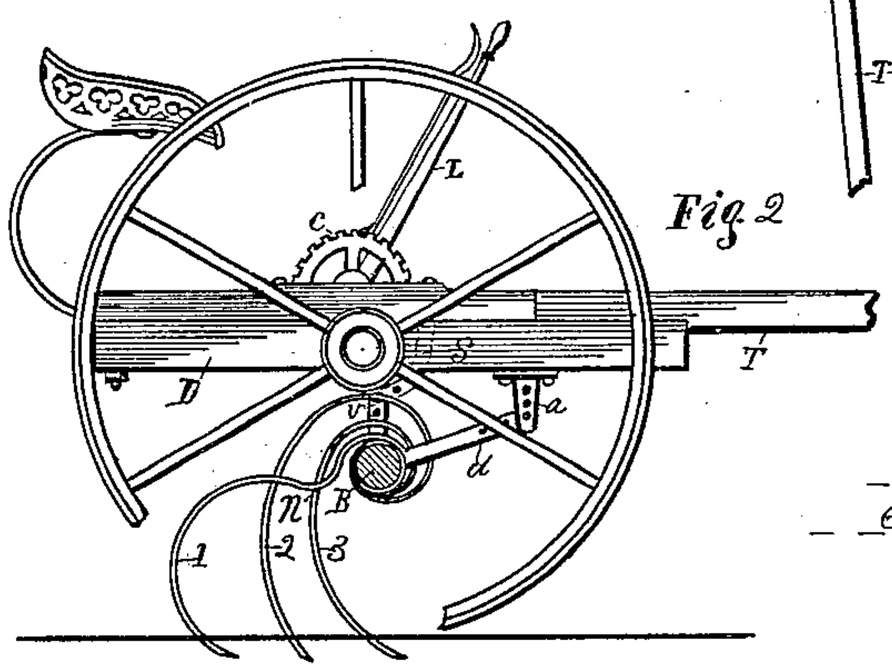

Fig. 2

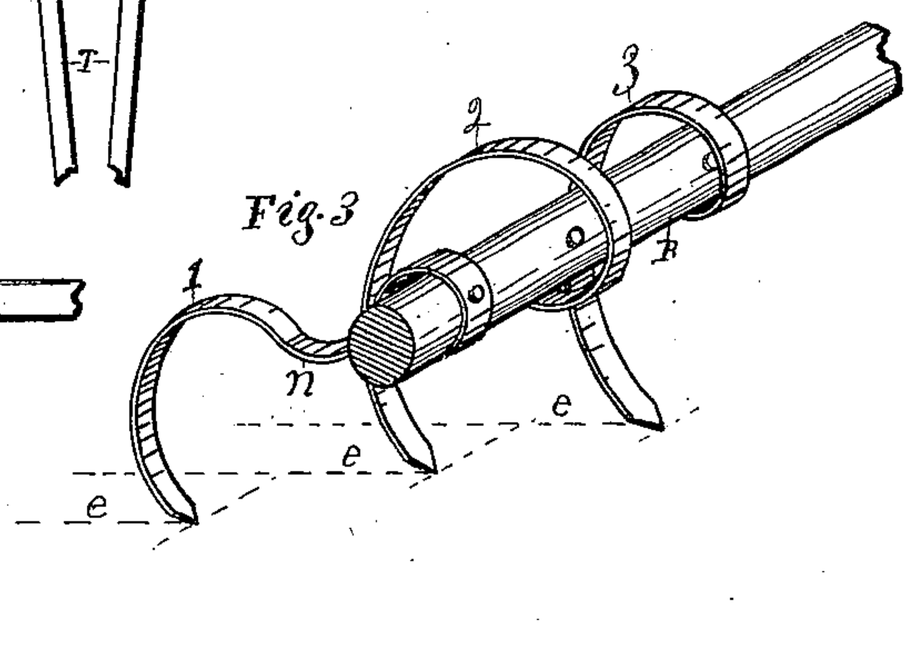

Fig. 3

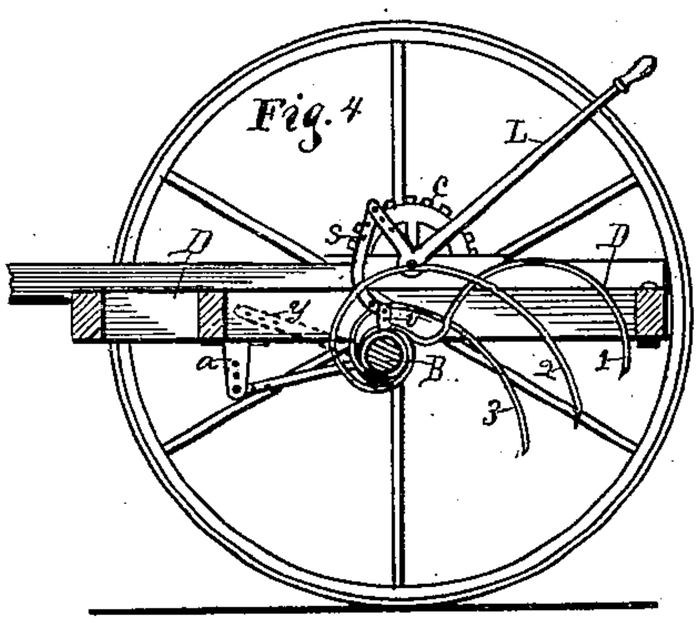

Fig. 4

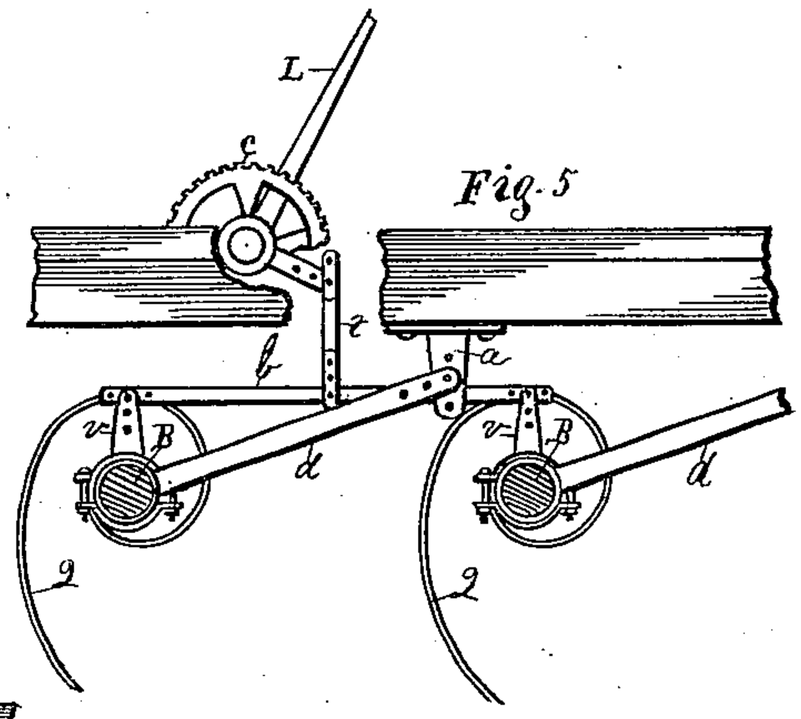

Fig. 5

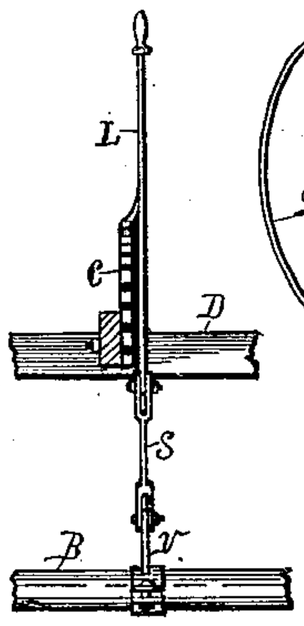

Fig. 6

Witness.
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UNITED STATES PATENT OFFICE.

GEORGE W. MILLER, OF KALAMAZOO, MICHIGAN.

SULKY-HARROW.

SPECIFICATION forming part of Letters Patent No. 246,332, dated August 30, 1881.

Application filed April 23, 1881. (Model.)

To all whom it may concern:

Be it known that I, GEORGE W. MILLER, a citizen of the United States, residing at Kalamazoo, county of Kalamazoo, State of Michigan, have invented a new and useful Sulky-Harrow, of which the following is a specification.

My invention relates to that class of sulky-harrows which are provided with spring-teeth for agitating and pulverizing the soil.

The objects of my invention are to greatly lessen the expense, weight, and draft of such devices, and to facilitate their capacity for accomplishing desired results in the soil in the use of spring-teeth.

To this end a construction embodying my invention consists in the usual rectangular wheel-supported frame, with lifting-lever and ratchet device, to which frame the elements of my invention are connected.

In lieu of the usually-constructed share-beams and cumbersome frame bearing share-beams, I locate an independent tooth-beam below the wheel-frame and connect it therewith by means of studs and bars, substantially as hereinafter set forth. To this beam I secure clusters of spring-teeth, graduated both as regards the location of their working-points in the soil and their degree of elasticity or stiffness, said teeth being made from strips of metal, all of same length.

In the drawings forming a part of this specification, Figure 1 is a top view of my device; Fig. 2, end view; Fig. 3, end of tooth-beam bearing a cluster of graduated teeth in perspective; Fig. 4, cross-section on dotted line in Fig. 1; Fig. 5, my mode of connecting and operating more than one beam, and Fig. 6 edge view of lever device and connections.

B is the independent tooth-beam, with stud *v* rigidly secured thereto by the clamp-casting terminating its lower end, or by other practical means. I form this stud *v* with a number of holes in its upper end for adjustably pivoting it with the recessed perforated end of bar *s*. This bar *s* is also adjustably pivoted with the angled extension of lever L, each of which are provided with the perforations for the change in the angle and location of parts.

a is a pendent stud on the sides of the wheel-frame, with which connecting draft-bars *d* are pivoted. These bars *d* are rigidly secured to each end of beam B. Bars *d* and studs *a* are also provided with the extra perforations in their pivotally-connected ends. If preferred, bars *d* may be pivoted directly to the beam of the wheel-frame, as shown at *y* in Fig. 4.

In lieu of bars *d* and studs *a*, an obliquely-angled camway might be secured to the sides of the wheel-frame and the ends of beam B enabled to move up and down therein; but I prefer the construction shown.

To the beam B, I secure the clusters of graduated teeth. The degree of stiffness in contrasting Nos. 1 and 3 of the teeth is as one is to three, tooth No. 2 taking the intermediate degree, or in the nature of one to two, when contrasting teeth Nos. 1 and 2. In their graduation in relation to position in the soil, No. 3 stands twice as far in advance of No. 1 as does No. 2. These graduations are effected not by using strips of metal of different lengths and multiple rows of share-beams, but by the form in which they are respectively bent and associated on one beam. The form of No. 1 makes it very elastic, and said tooth, owing to the downward bulge of its neck at *n*, constitutes a guard, preventing stalks, straw, and like litter from working up between the other teeth and beam B. By this construction of a sulky-harrow the teeth extend but a little distance in the rear of the axle, thus greatly lightening the draft, and teeth No. 3, being stiffer than the others, first break the soil, and the others follow in their respective order, their graduated degree of elasticity conforming them to the work required in the varying consistency of the soil.

In Fig. 5 my plan of operating two beams, B, is shown. In this association of parts I pivotally connect bar *b* at each end with studs *v*, and to the center of said bar *b*, I pivot bar *t*, connecting with lever L. Thus in a construction using two beams B B, each bearing three rows of teeth, graduated as regards the position of their working ends in the soil in advance of each other, four cumbersome tooth-beams are dispensed with. By the adjustable capacity of bars *b d* and studs *v a* the rear beam may be set to run lower than the forward one, by which means the teeth on the forward beam first act slightly on the soil in the respective

degrees of their graduation, as before set forth, and the teeth on the rear beam thus graduated follow still deeper in the soil, effecting an action on the same which, it is estimated, would compare with that effected by other devices after a number of passes over the same ground, and with one-half the draft-power required.

The beams B in my construction are rigidly secured; but teeth thus graduated might be used with pivoted beams with similar advantages in leverage in the use of the lifting-lever L, as it will appear obvious to those skilled in the art that a number of rows of graduated teeth on a single beam can be raised with much less exertive power than would be required if a beam were provided for each row, whether said beams were pivoted or otherwise.

In the operation of raising the teeth, referring to Figs. 2 and 4, it will be observed that the teeth rise in the arc of the same circle at which they enter the soil.

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

1. In a sulky harrow or cultivator, the wheel-frame having the pendent perforated studs *a*, the tooth-beams with perforated studs *v*, pivoted to bar *b*, and the draft-bars pivoted adjustably to studs *a*, and the lifting-lever with angled extension, pivotally connecting with bar *b* by means of bar *t*, all in combination, substantially as described and shown.

2. In a sulky-harrow, a tooth-beam provided with multiple rows of graduated teeth in clusters, each cluster provided with the guard-tooth having the downwardly-bulging neck, substantially as shown and described, for the objects specified.

GEORGE W. MILLER.

Witnesses:
A. SYDNEY HAYS,
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