(No Model.) 2 Sheets—Sheet 1.

C. LA DOW.

SPRING TOOTH HARROW.

No. 455,260. Patented June 30, 1891.

Fig. 1.

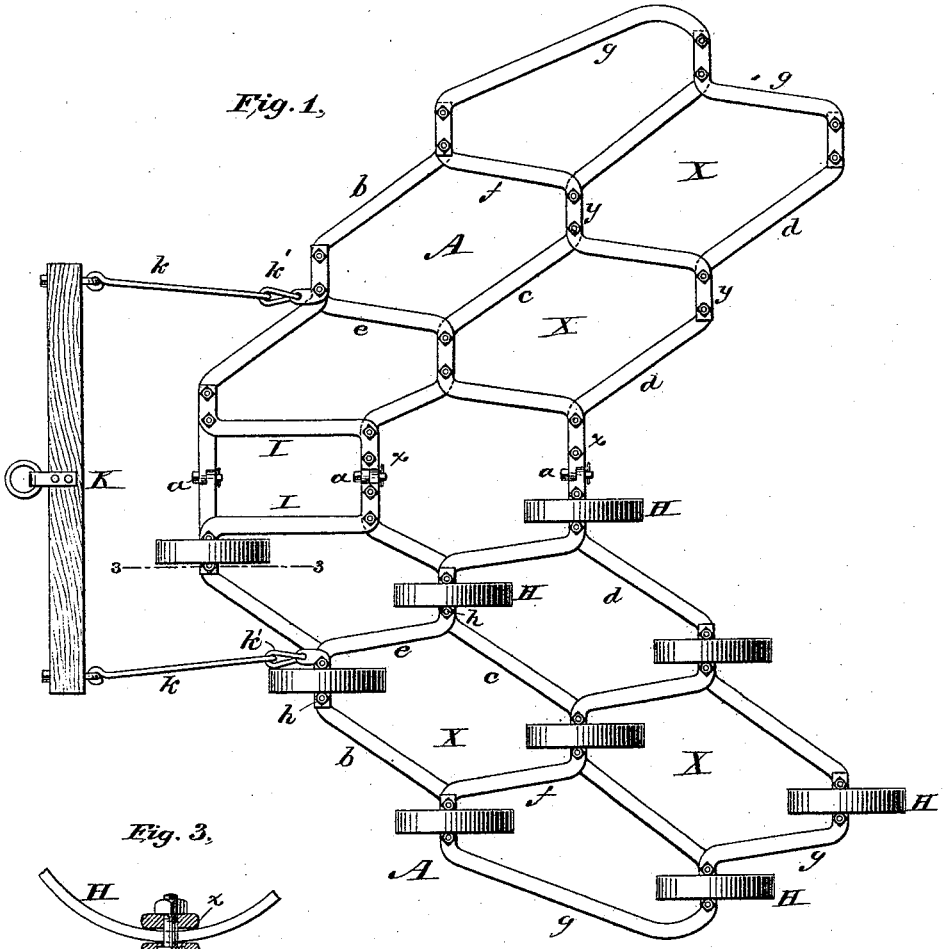
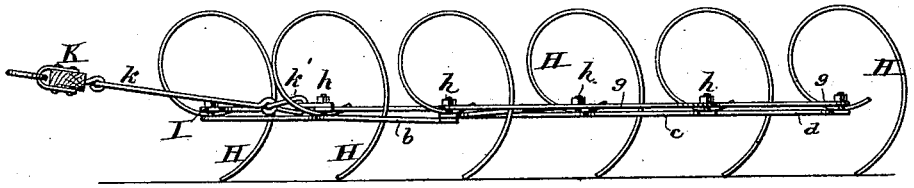


Fig. 3.

Fig. 2.



Witnesses
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Edward Thorpe.

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(No Model.) 2 Sheets—Sheet 2.

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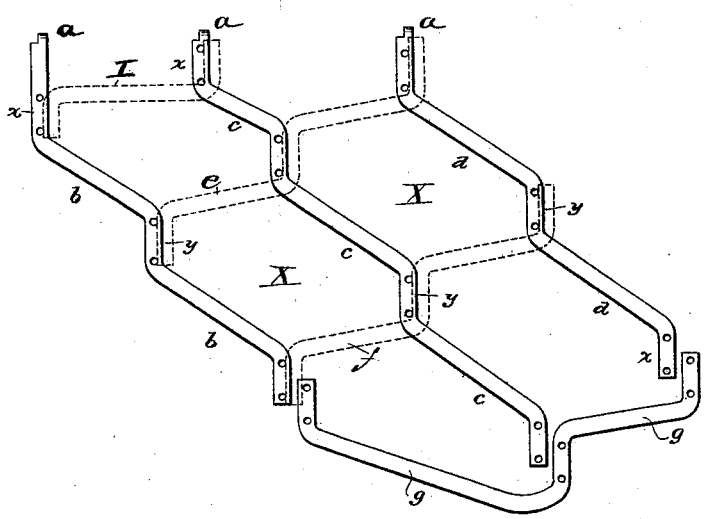
Fig. 4.



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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. 455,260, dated June 30, 1891.

Application filed June 20, 1889. Serial No. 314,916. (No model.)

To all whom it may concern:

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

The object of my invention is to economically construct a strong, simple, and durable harrow the teeth of which may readily be adjusted; and to this end I employ frame-bars, preferably flat and bent into angular shape. The frame-bars are arranged diagonally across the machine and have transverse portions or offsets, on which curved spring-teeth are supported. The teeth may be adjusted on said transverse portions or offsets to vary the vertical pitch of the cutting portions thereof. The harrow-frame has a series of tooth-bearing parts transverse to the path of the machine, and a series of oblique parts which connect the tooth-bearing parts, and another series of similar frame-bars is arranged in rear of the first series, with the tooth-bearing parts in one series out of the draft-line of similar parts in the other series. In the construction the harrow presents a number of approximately diamond-shaped openings having flattened ends with spring-teeth clamped at the angles.

In the accompanying drawings, Figure 1 is a plan view with the teeth on one side of the harrow removed; Fig. 2, a side elevation; Fig. 3, a detail sectional view showing the manner in which the teeth are clamped, and Fig. 4 is a view of some of the frame-bars detached.

Two side sections A A are shown hinged together in the central line of the harrow upon hinges *a*, so that the harrow may be folded upon itself for transportation. The two sections thus hinged together form a substantially A-shaped frame. Each side section is composed of bars *b c d*, shown detached in Fig. 4, and shaped as follows: Near the end *x* each bar is bent and extends obliquely to the part *y*, which is parallel with *x*. From *y* extends a second oblique part parallel with the first, and so on until the desired number of steps or offsets *x y* are formed. These bars are cross-connected by similarly-shaped bars *e f*, and where the parts *x y* of the bars *b c d* are crossed or overlapped by the corresponding parts of the cross-bars *e f* they are bolted together. The rear end of the outer bar *b* is connected by an irregularly-shaped bar *g* with the rear ends of the central frame-bar *c* and the inner frame-bar *d*. A number of approximately diamond-shaped openings X are thus formed, and at each angle thereof, or where the frame-bars overlie or overlap each other curved, flat spring-teeth H are clamped between the horizontal faces of the bars by vertical bolts *h*. The inner ends of the bars *b c d* of the two side sections of the harrow are connected by hinges *a*. Straight bars I, having their ends turned at right angles in opposite directions, connect the front end of the bar *b* with the front end of the bar *c* and brace that part of the harrow.

A harrow thus constructed is light, strong, simple, and durable. The pitch of the teeth clamped between the overlapping horizontal faces of the flat bars may be readily adjusted by loosening the bolts *h* and shifting the teeth endwise. The draft devices may consist of the whiffletree K, from each end of which draft-links *k* connect with straps *k'*, held by the bolts which connect the front ends of the transverse bars *e*. Any other suitable draft devices might be employed. The sections of the harrow may be folded one upon the other for transportation, in which event the teeth on one section pass through openings X in the other, and the harrow may, if desired, be transported upon the teeth, which serve as runners.

So far as I am aware I am the first to clamp the teeth directly between overlapping horizontal frame-bars without the intervention of special tooth clamps or seats, and I consider such an arrangement as included within the broad scope of my invention, irrespective of the peculiar formation of the bars which I prefer to employ. The bars are preferably of metal and may be either elastic or rigid, as may be desired. They are preferably formed with rounded edges, as shown in Fig. 3, so not to injure the faces and thereby diminish strength of the teeth clamped between them.

I do not herein claim frame-bars formed with rounded or runner-shaped edges, as such subject-matter is included in a divisional application, Serial No. 394,242, filed May 27, 1891.

I reserve the right to claim in said application any patentable subject-matter herein shown, but not claimed.

While I have shown the frame-bars as overlapping and the teeth clamped between the overlapping portions of the bars, I do not limit myself to this specific construction, but, so far as I am aware, I am the first to form frame-bars into sections which maintain rows of teeth on one plane, and which have portions of a bar arranged transverse to the line of draft, with other portions of the same bar oblique to the transverse portions, and harrow-teeth supported on said transverse portions in any way that permits the vertical pitch of the working ends of the teeth to be varied.

I claim as my invention—

1. The combination of a harrow-frame made up of rigid sections with their frame-bars arranged diagonally across the machine, and having transverse portions with a series of transverse rows of curved spring-teeth attached to said transverse portions and adapted to be adjusted thereon, so as to vary the vertical pitch of the cutting parts of the teeth.

2. An A-shaped harrow-frame composed of diagonally-arranged bars having steps or offsets formed therein and a series of rows of spring-teeth mounted on said offsets, in combination with means for adjusting the pitch of the teeth around said offsets.

3. A harrow-frame bar having a series of tooth-bearing parts thereon arranged transverse to the path of the machine, and a series of oblique parts which connect the tooth-bearing parts, in combination with a series of similar frame-bars arranged in rear of the first bar with the tooth-bearing parts in one bar out of the draft-line of similar parts in the other bar, spring-teeth on said tooth-bearing parts, and means whereby the vertical pitch of the teeth may be varied on the transverse tooth-bearing portion.

4. In a harrow-frame, bars diverging rearwardly and outwardly from the line of draft and having two or more portions of each bar arranged transverse to the line of draft, with other portions of the same bar oblique to the transverse portions, and teeth supported by said transverse portions, in combination with means whereby the vertical pitch of the working ends of said teeth may be varied.

5. The combination of the flat angular frame-bars formed with portions x y, connected by oblique portions crossing or overlapping each other, as described, and spring-teeth adjustably clamped between the overlapping parts of the bars.

6. The combination of bars b c d, shaped substantially as described, similarly-shaped transverse bars d f, and spring-teeth clamped between the overlapping portions x y of said bars.

7. The combination of two like frame-sections hinged together in the central transverse line, each section being composed of bars formed integrally with steps or offsets and overlapping each other so as to form a series of approximately diamond-shaped openings, and harrow-teeth at the angles of such openings clamped between the overlapping portions of the frame-bars.

8. A harrow-frame composed of a series of frame-bars so shaped as to form a series of approximately diamond-shaped openings having flattened ends and overlapping or crossing each other at the angles of said opening, in combination with harrow-teeth clamped between the bars.

9. The combination of frame-bars shaped substantially as described and crossing and overlapping each other to form a series of approximately diamond-shaped openings, at the angles of which the overlapping parts of the bars are parallel and transverse to the line of draft, harrow-teeth clamped between the bars, and bolts h, which serve both to unite the frame-bars and clamp the teeth.

10. The combination of crossing overlapping frame-bars formed substantially as shown, with parts x y and oblique connecting parts, whereby a series of approximately diamond-shaped openings are formed, at the angles of which the overlapping parts of the bars are parallel and transverse to the line of draft, and spring-teeth secured at the angles of said openings.

11. The combination of the frame-bars having transverse steps or offsets therein, devices for securing the offsets of different frame-bars together, and harrow-teeth secured at the offsets, substantially as set forth.

12. The combination of crossing frame-bars crossing each other and having overlapping steps or offsets and harrow-teeth clamped between the bars at such offsets, substantially as set forth.

In testimony whereof I have hereunto subscribed my name.

CHARLES LA DOW.

Witnesses:
EDWARD C. DAVIDSON,
M. J. KELLEY.