

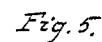
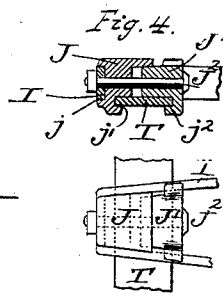
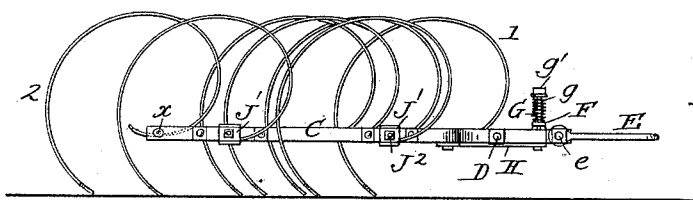
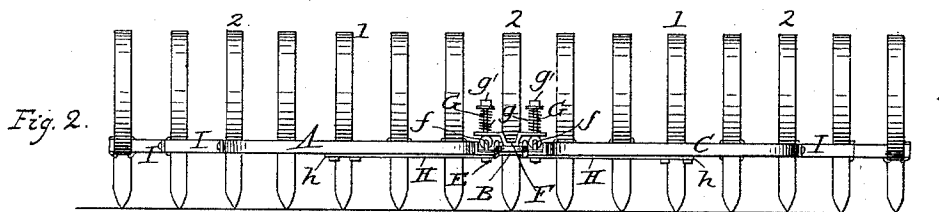
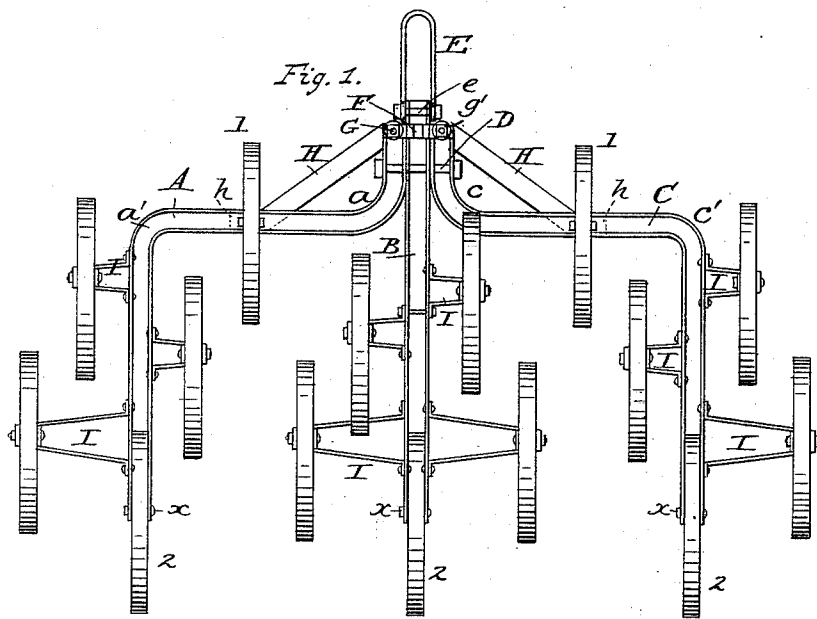
(No Model.)

2 Sheets—Sheet 1.

C. LA DOW.
HARROW.

No. 488,942.

Patented Dec. 27, 1892.



Witnesses
Washington Miller
W. Arthur Davis

Inventor
Charles La Dow
by his attorneys
Baldwin, Lindson & Light.

(No Model.)

2 Sheets—Sheet 2.

C. LA DOW.
HARROW.

No. 488,942.

Patented Dec. 27, 1892.

Fig. 6

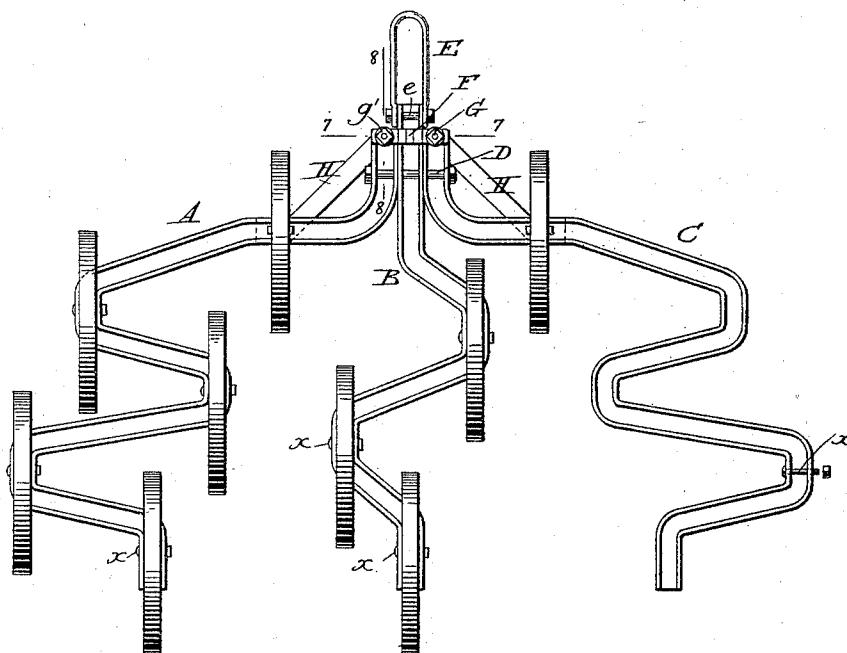


Fig. 7.
ON LINE 7-7

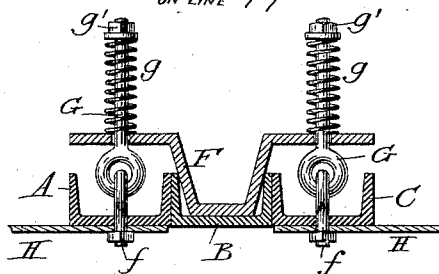
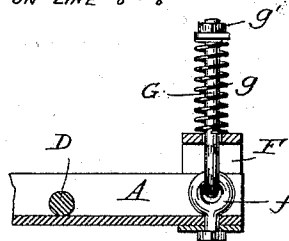


Fig. 8.
ON LINE 8-8



Witnesses

Sidney P. Peirce
Washington Miller

Inventor

Charles La Dow
by his attorneys

Baldwin, Davidson & Knight

UNITED STATES PATENT OFFICE.

CHARLES LA DOW, OF ALBANY, NEW YORK.

HARROW.

SPECIFICATION forming part of Letters Patent No. 488,942, dated December 27, 1892.

Application filed June 29, 1891. Serial No. 397,886. (No model.)

To all whom it may concern:

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

My invention relates particularly to spring-tooth harrows.

The object of my invention is to construct a frame less liable to drag rubbish than those heretofore made, and to which the teeth may be readily attached.

The special organizations which I employ, and the details of construction will be hereinafter fully set forth.

In the accompanying drawings: Figure 1 is a plan view of a harrow embodying my invention; Fig. 2 is a front elevation of the same; Fig. 3 is a side elevation; Figs. 4 and 5 are detail views of the tooth seats employed; Fig. 6 is a plan view of a modified form of frame with some of the teeth removed; Fig. 7 is a sectional view on an enlarged scale, on the line 7—7 of Fig. 6; Fig. 8 is a sectional view on an enlarged scale, on the line 8—8 of Fig. 6.

I prefer to construct the main frame bars or beams of angle iron or channel iron, as this material gives greater strength and rigidity and affords a convenient means of attaching the teeth.

In Fig. 1, I have shown the frame as composed of three main frame bars A, B and C. The bar B is straight, and is arranged in the central line of draft. The bars A and C are similarly shaped and are of a bent or zig-zag form, the front ends being secured to the front of the bar B, by a transverse pivot bolt D, extending through the flanges of the channel iron. From their front ends, the bars curve at *a* and *c*, and extend laterally or obliquely in opposite directions, and are then bent at *a'* and *c'*, and extended backwardly in straight lines, terminating on a line with the end of the bar B. The front of the bar B, extends a short distance beyond the front ends of the bars A and C, and to this extended end is attached by a pivot-bolt *e*, a draft link E. By connecting the frame bars with transverse horizontal bolt D, they may swing vertically, independently of each other. Heretofore it has been usual to hinge the sections of a har-

row-frame together by means of a series of pivot-bolts arranged in line with the draft.

In order to keep the frame bars in substantially the same plane, I provide yielding compensating devices for connecting them at their front ends in advance of the bolt D. These devices are shown as consisting of a yoke F, resting in the channel of the central bar B, and extending over the front ends of the bars A and C. Eye-bolts *f*, are secured to the bars A and C, and are connected with eye-bolts G, which extend upwardly through the laterally-projecting arms of the yoke, and carry coiled springs *g*, the upper ends of which rest against the nuts *g'*. The springs tend to lift the bolts, and hence to lift the front ends of the bars A and C. In like manner, the springs tend to force downwardly the front end of the bar B, but the adjustments are such that the bars are maintained in substantially the same plane.

In order to brace the frame at its front end, I provide diagonal brace-bars H, which have lateral offsets *h*, secured to the undersides of the bars A and C. The front ends of the brace bars are secured to the bars A and C, at their front ends by the eye-bolts *f*. The teeth are dispersed over the harrow-frame in such manner that they work on the soil out of line with each other, at equal distances apart. In Fig. 1, the teeth are held away from the main frame-bars or beams. I have shown fifteen teeth, five carried by each frame-bar, and they are so arranged as to work most effectually on the soil. Five of the teeth are secured directly to the bars A, B and C. The teeth numbered 1, are secured to the front transverse portions of the bars A and C, between the lateral offsets *h*, of the brace bars H, and the under sides of the frame-bars. The teeth numbered 2 are secured to the rear ends of the frame-bars or beams A, B, and C, their upper curved ends or shanks lying in the channels of the bars, as shown in Fig. 3, and transverse bolts *x*, extend through the flanges of the bars over the teeth to draw the flanges together and clamp the teeth in place. By loosening the bolts, the flanges spring apart, and the teeth may be adjusted in any desired position. The remaining teeth are secured to single zig-zag bars, arms or beams I, secured by their inner

ends only to the main frame-bars A, B and C. These zig-zag bars are of different lengths so as to hold the teeth at different distances from the main frame-bars to effect the equal distribution of the teeth, so that they shall work on the soil out of line with each other, and at equal distances apart.

Referring to the arrangement at the right-hand side of Fig. 1, for instance, it will be observed that the tooth numbered 1, is at the left of the series of teeth on the bar C. The next tooth is carried at the right-hand side of the bar on a short zig-zag bar I. The next is carried by a zig-zag bar of about the same size on the opposite side of the bar C, and in rear of the one just mentioned. The next tooth is carried by a zig-zag bar of a greater length than the other two on the right-hand side of the bar C, while the tooth numbered 2, is carried in the channel of the bar C, and in line between the other teeth. The arrangement on the left-hand side of Fig. 1 is the same as that just described in connection with the bar C. The arrangement on the bar B, is also substantially the same.

The teeth may be secured to the zig-zag bars or arms in any suitable way, preferably by two-part tooth-seats, as shown in Figs. 4 and 5, consisting of a casting J, having a recess j , to receive the longitudinal portion of the zig-zag bar I, and a recess j' , to receive the edge of the spring-tooth T. The corresponding casting J' , is provided with a recess j^2 , for the edge of the tooth. A bolt J^2 , extending through the bar I, and the castings J and J' , secures them together, and also clamps the tooth in place. The tooth may be readily adjusted to vary its pitch or depth of cut. A tooth encircles the zig-zag bend on which it is supported, and as said support projects into the circle of the tooth from one side only, rubbish raked up by the tooth readily drops off on the side opposite the tooth-support, the result being that circular teeth clear themselves best when supported from one side of the tooth only.

In Fig. 6, I have shown a frame of a construction the same in principle as that illustrated in Fig. 1. Instead of providing supplemental zig-zag bars, arms or tooth-supports I, I bend the main frame-bars A, B and C, into zig-zag form, as shown in Fig. 6. It will be observed that the teeth are located in substantially the same positions as those shown in Fig. 1, but I have so bent the central bar B, that three teeth may be made to do the work instead of five, as shown in Fig. 1. The connections for the front ends of the bars and the means for bracing them, are the same as that before described. The central bar or beam B, is straight at its front end, and is then bent in opposite directions in a zig-zag form to form tooth-seats equal distances apart. The bars A and C, are of the same shape, diverging in opposite directions rearwardly, and are so bent as to form longitudinal portions or tooth-seats to hold the teeth equal distances

apart, and out of line with each other. I may employ separable castings or tooth-seats in this form of frame, but I have shown the teeth as mounted in the channels of the bars, their upper ends or shanks being arranged between the flanges of the bars; and bolts z , are employed for drawing the flanges together and clamping the teeth in position. It will be observed that the zig-zag bars are single and are supported at their ends only. They are of sufficient strength and rigidity to maintain their bent or zig-zag form, and the circular teeth are held in correct working positions relatively to said bars. It will also be observed that the teeth encircle said single zig-zag bends in such manner that rubbish may drop off and not be carried by the frame, and I claim these features broadly. The metal frame beams have wide surfaces next to the ground so as not to sink deeply therein or become clogged and their bottoms are unpunctured, making them more durable and of lighter draft than if punctured, and the vertical side walls of the beams afford ready means for supporting the teeth or teeth-supporting devices securely relatively thereto.

In a division of this case filed December 7, 1892, Serial No. 454,376, I have claimed the following subject-matter.

"In a harrow, the combination of a pair of sections pivotally connected together at their adjacent edges and having a series of oblique tooth bars, each of said bars being provided with a series of integral rearwardly extending arms projecting away from the bars, and spring-teeth secured to the rear ends of said integral arms, as and for the purposes described."

I reserve the right to prosecute said subject-matter in said divisional application.

I claim as my invention—

1. In a harrow, a metal frame beam having a wide surface next the ground so as not to sink deeply therein, combined with an angular flange forming a vertical side wall attached to said wide under portion, tooth supports projecting from said beam, and teeth carried by said supports.

2. In a harrow frame, metal beams having wide under portions combined with angle or flanged vertical side portions, tooth supports projecting from said side portions, and teeth mounted on the tooth supports.

3. In a harrow, a single bar having right and left zig-zag bends and each bend forming the sole support for circular spring teeth mounted at the longitudinal parts of said bar, and on opposite sides thereof.

4. In a harrow, circular teeth in combination with a draft bar having zig-zag bends in different draft lines, and each of said bends forming the only support for a tooth, said teeth being located on opposite sides of said bar.

5. In a harrow, beams having zig-zag bends projecting therefrom, circular teeth thereon having curved or arched shanks, and each

tooth supported at its shank by only a single beam, whereby one side of the tooth may be maintained at a distance from any other frame beam, so that rubbish may freely work backwardly among the teeth and they may vibrate and also be adjusted without striking the obliquely inclined parts of the zig-zag beam, in combination with devices for adjusting and holding the teeth in the desired position.

6. In a harrow, a frame having a section with side and front bars, so combined as to form a closed front for the section in one piece of metal, and a flange, or angle, or rib thereon affixed to said bars, in combination with curved teeth, adjustable as to pitch, and draft devices.

7. In a harrow, the combination of sections made of angle or ribbed metal bent to form a closed front and side in one piece for each section, transverse bars and curved teeth carried thereby, and adjustable as to pitch.

8. In a harrow, a metal beam having a flat bottom side, and two vertical sides affixed thereto, constituting substantially a hollow beam having corners, and one which is light and also stiff in every direction, in combination with spring teeth supports projecting from said beam, the angle shape of the beam adapting it to withstand the vibrations of the teeth and affording a base for the tooth supports on which they are not liable to rock.

9. In a harrow, a metal beam having a flat bottom side, adapted to run on the ground and not sink therein, and a vertical side rib made in one piece therewith, making the beam light and also stiff in every direction, in combination with curved spring teeth supported by said beam, and held at a distance therefrom.

10. In a harrow, a zig-zag bar, a projection planted against one side of said bar and forming a support upon which a curved spring tooth may be held at the desired distance from the bar so that the tooth may vibrate and not come into contact with the bar, in combination with a similar projection planted against the opposite side of the same zig-zag bar for supporting a similar tooth thereon.

11. In a harrow, a zig-zag beam and an arm supported thereby, in combination with a curved spring tooth supported by said arm at a distance from the zig-zag beam.

12. In a harrow, angle frame beams having vertical side walls, in combination with tooth bearing devices supported by said vertical side walls.

13. In a harrow, a front and side beam in one piece, made of angle or channel metal so as to be comparatively light and stiff, tooth supporting devices attached thereto, and teeth adapted to be adjusted relatively to said supporting devices.

14. In a harrow, a front and side frame beam in one piece made of metal having a vertical

and also a horizontal wall, in combination with transverse arms, beams or supports which carry teeth, and which are attached to said frame-beam.

15. In a harrow, an angle frame beam, a tooth support mounted thereon at only one end, and a tooth adapted to rock or be adjusted from the other end of said support.

16. In a harrow, zig-zag frame beams, in combination with curved spring teeth each attached by its shank to only one of said single frame beams.

17. In a harrow, a frame bar having two oblique portions supporting a longitudinal portion of the same bar, separate from any other portion of the frame, in combination with a curved tooth attached by its inner end to said longitudinal portion of the bar, whereby rubbish may pass by the open side of the tooth.

18. In a harrow, a frame having oblique and longitudinal bends, in combination with spring teeth mounted on said longitudinal bends and each tooth supported solely by a single longitudinal part of the frame.

19. In a harrow, rigid sections hinged together constituting a draft frame closed at its front and open at its rear, in combination with adjustable teeth carried by the frame.

20. In a harrow, a front metal frame bar, and a side bar in one piece, forming a rigid section, and two of said sections placed in such relation as to form a pointed frame, and hinged together to conform to uneven surfaces, in combination with metal teeth adjustably secured directly to said metal beams.

21. In a harrow, metal frame bars having flat bottoms adapted to run on the ground, and tooth bearing devices planted on the vertical side walls of the frame-bars without puncturing the bottoms thereof, in combination with teeth carried by the tooth-bearing devices.

22. In a harrow, a metal frame bar adapted to run on the ground, tooth-bearing devices secured to one side wall of said frame bar, a similar device secured to the opposite side wall of the same bar, in combination with teeth supported by said devices out of direct contact with the frame-bars.

23. In a harrow, the combination of a pair of sections pivotally connected together at their adjacent edges and having a series of oblique tooth bars, each of said bars being provided with a series of removable arms projecting away from the bars and spring teeth secured to the rear ends of said removable arms, as and for the purposes described.

In testimony whereof I have hereunto subscribed my name.

CHARLES LA DOW.

Witnesses:

JAMES M. RUSSO,
J. E. HOLMES.