

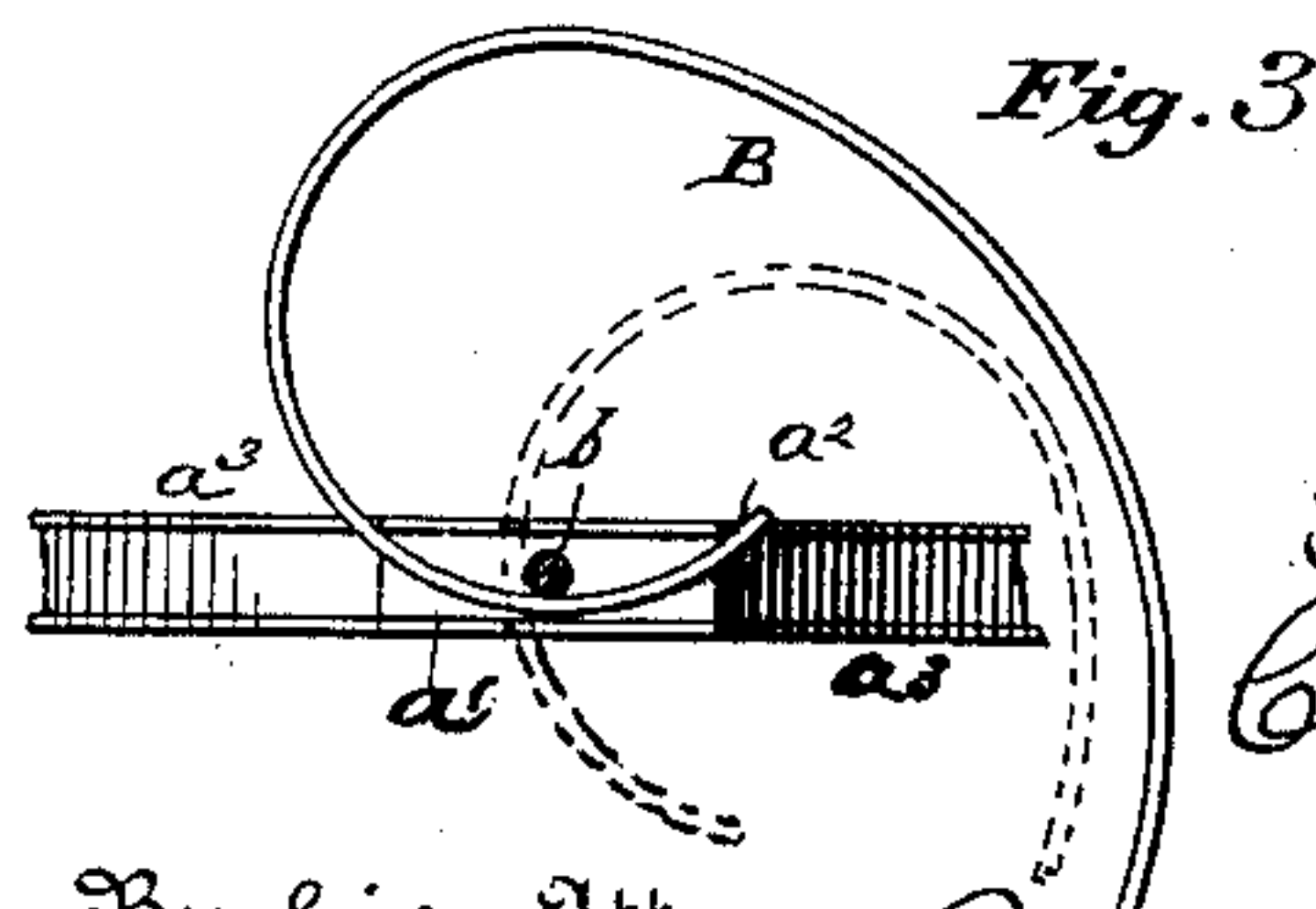
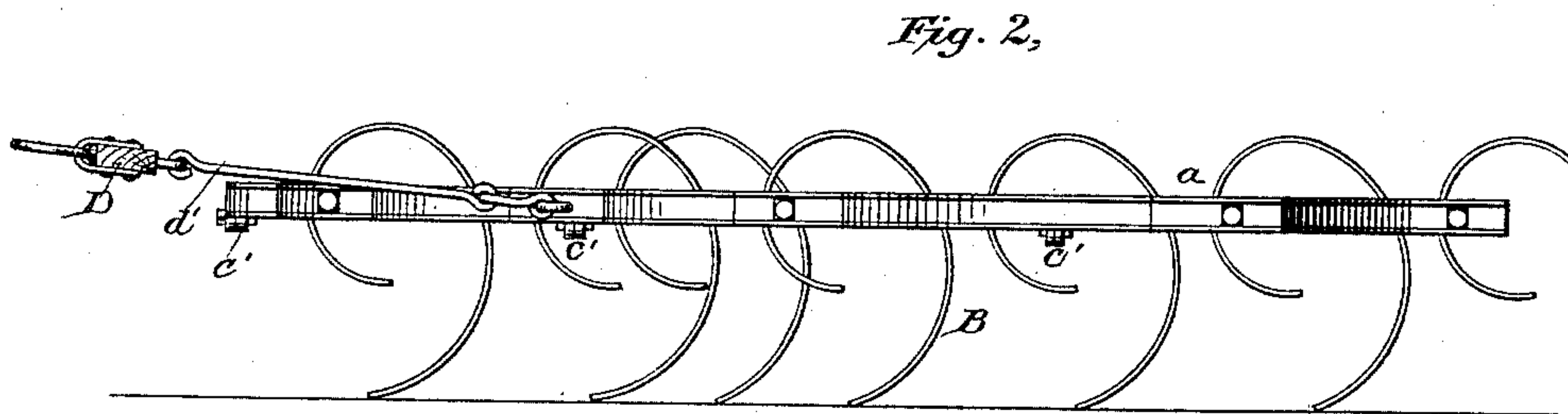
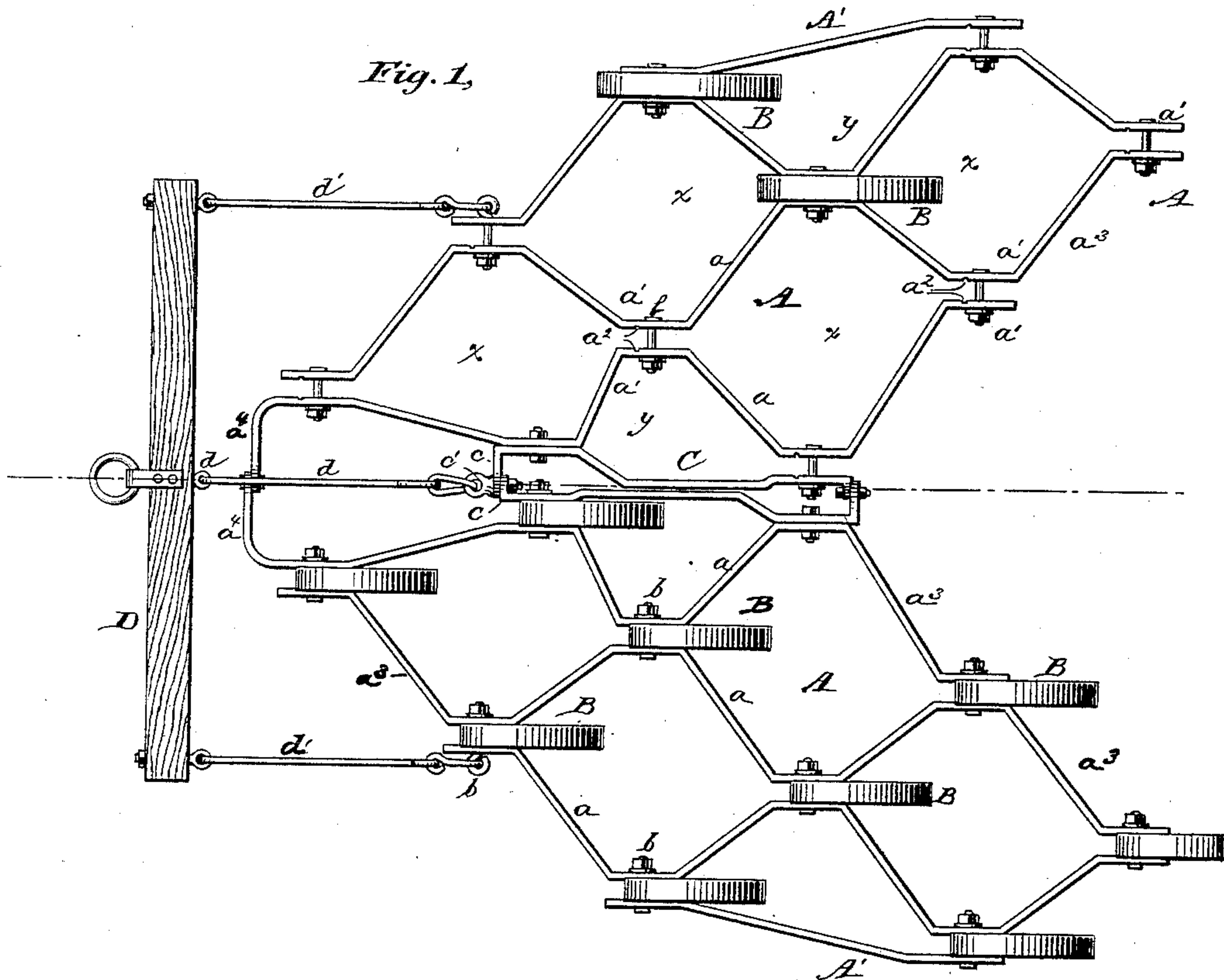
(No Model.)

2 Sheets—Sheet 1.

C. LA DOW.
HARROW.

No. 450,964.

Patented Apr. 21, 1891.



Witnesses
Geo. W. Dreck.
Edward Thorpe.

By his Attorneys

Inventor
Charles La Dow
Baldwin, Davidson & Wright

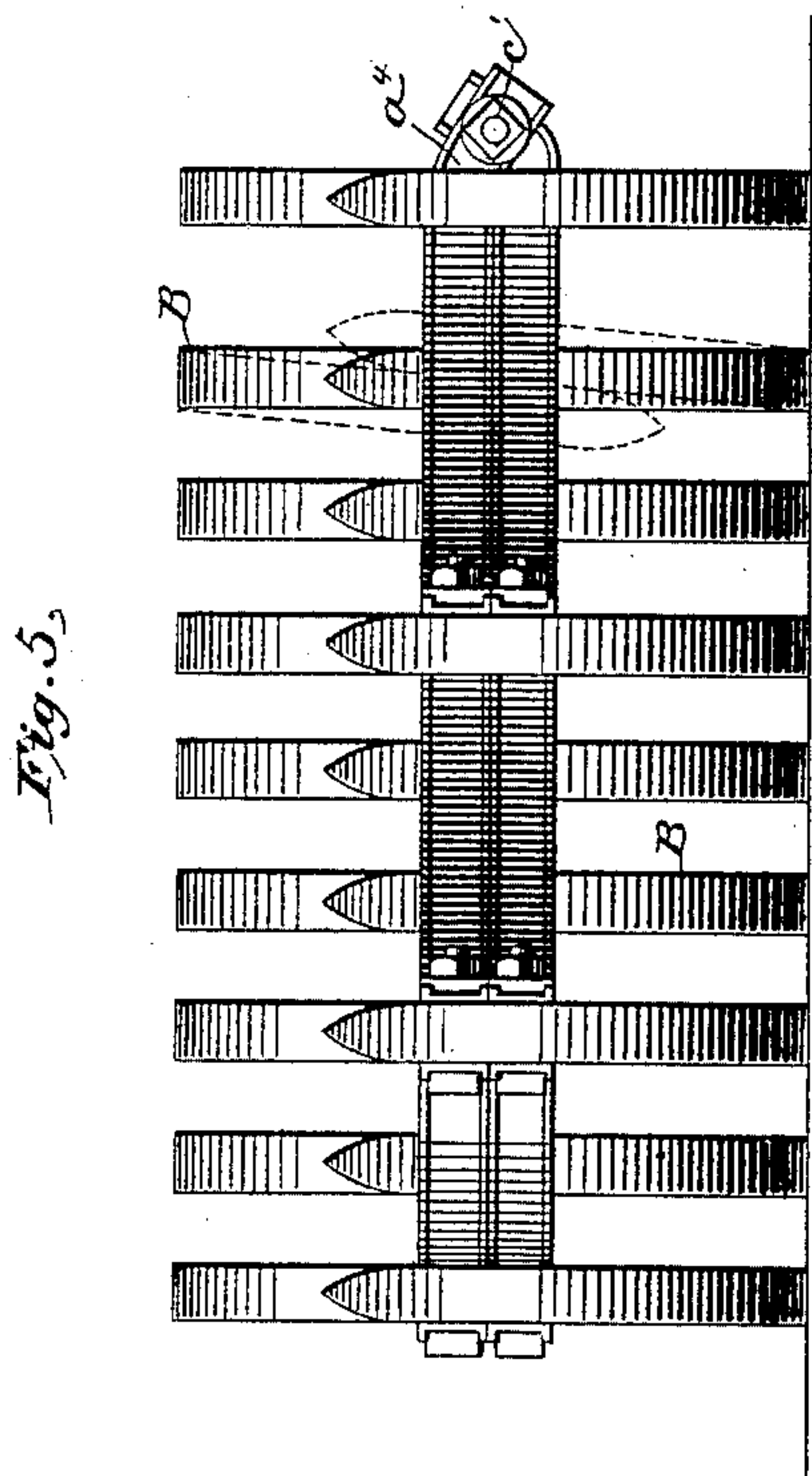
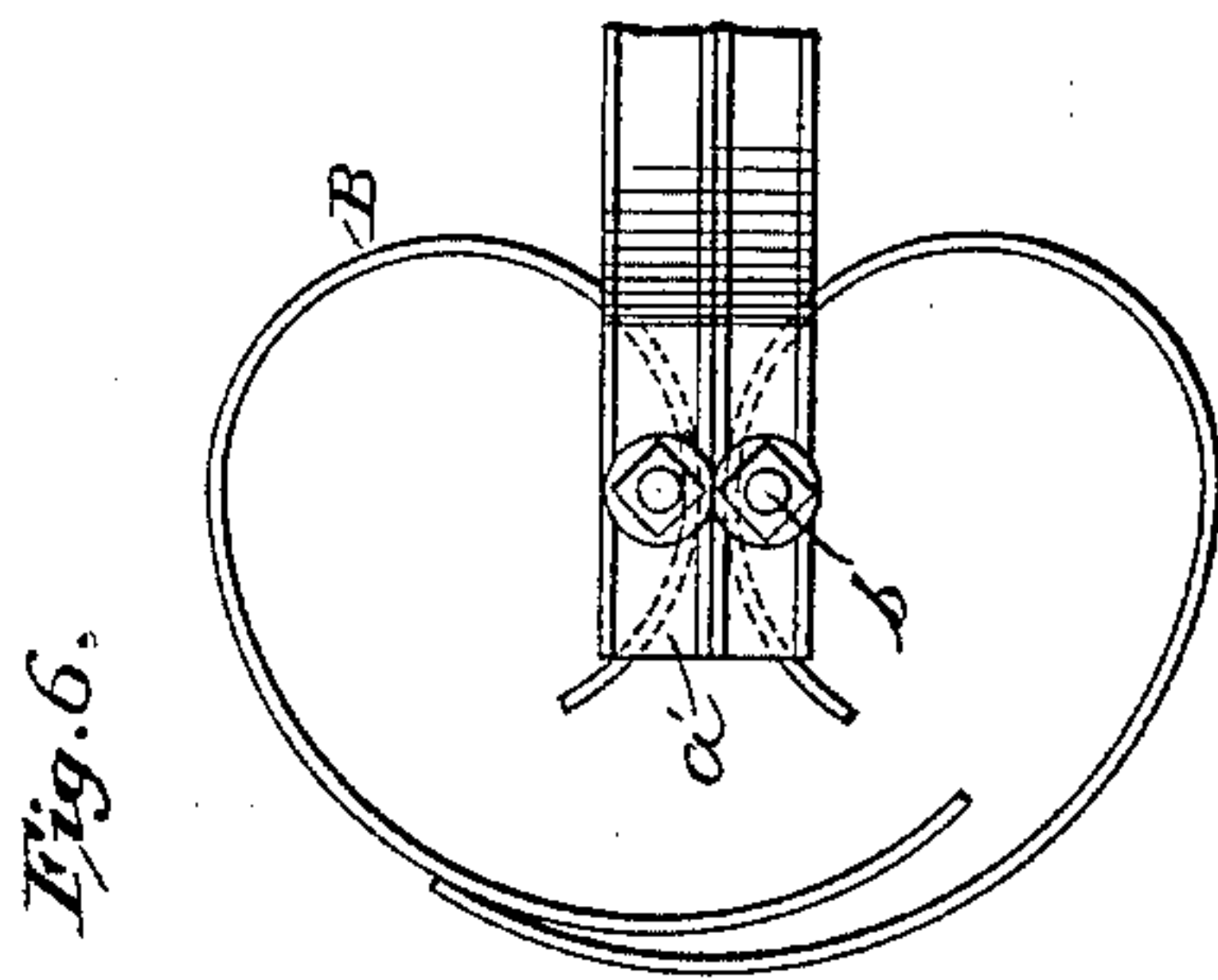
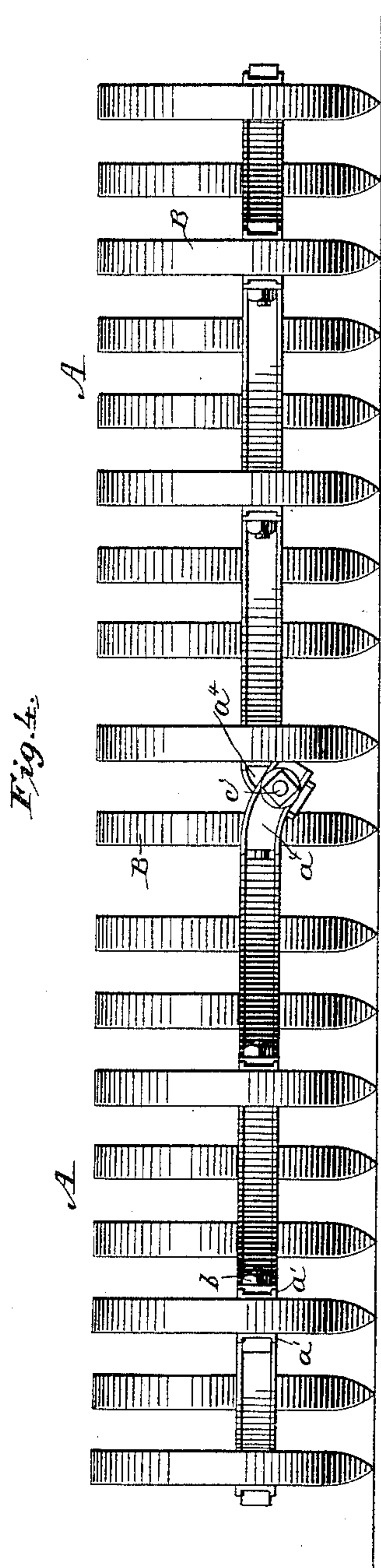
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UNITED STATES PATENT OFFICE.

CHARLES LA DOW, OF ALBANY, NEW YORK.

HARROW.

SPECIFICATION forming part of Letters Patent No. 450,964, dated April 21, 1891.

Application filed May 9, 1889. Serial No. 310,088. (No model.)

To all whom it may concern:

Be it known that I, CHARLES LA DOW, of Albany, in the 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 to that class of harrows in which spring-teeth are employed.

The advantages and general characteristics of my invention will be understood after an examination of the specification and drawings, in which—

Figure 1 is a plan view with some of the teeth in one-half of the harrow removed; Fig. 2, a side elevation; Fig. 3, a detail sectional view showing the adjustment for a low frame; Fig. 4, a rear view; Fig. 5, a rear view showing the harrow folded, and Fig. 6 a detail view illustrating the interlocking of the teeth when the harrow is folded.

In general outline the harrow shown is somewhat heart or V shaped, and consists of two side sections A hinged together. Each section is composed of bars or straps *a* staggered or of zigzag shape. At the angles or bends of the bars or straps as well as their ends there are portions *a'*, which are shown as parallel, or substantially so, with the draft-line, and such portions of each bar or straps are adjacent or contiguous to similar portions of another bar, and at or between the faces of such adjacent portions the teeth B are held or clamped by the bolts *b* that also unite the frame-bars. Each side section A is in this instance shown as composed of three staggered or zigzag bars or straps *a* and a straighter outside bar *A'*, and when assembled, as shown, they are so related to each other as to leave openings *x*, as well as inner and outer openings *y*. The teeth are of the well-known Garver type, and can be arranged with their upper curved ends in a horizontal position or in a vertical position to give a high or low frame. One way of giving this adjustment is afforded by the particular kind of frame-bars—*i. e.*, channel or I bars—and such bars are preferably of steel. In Fig. 3 the upper part of the tooth lies horizontally in the channels of adjacent bars, and is clamped by its edges between the bars by the bolt *b*. The tooth has, therefore, an elon-

gated or longitudinal bearing. In this instance the upper surfaces of the shanks of the teeth are in contact with the frame-bars at the front and rear ends of the adjacent portions, which afford additional means of preventing them from slipping. It will be observed that there are longitudinal openings between the frame-bars at the angles or adjacent portions thereof, and that these openings are in line with the draft. The curved inner ends of the teeth have longitudinal portions placed in said openings and have direct contact with the frame. The inner ends of the teeth form fenders for the openings between the frame-bars. It will also be observed that each frame-bar has a longitudinal portion *a'*, arranged in line with the draft, a bend extending rearwardly and sidewise from said longitudinal portion to and connecting with another longitudinal portion of the same bars, and that the spring-teeth are mounted on the longitudinal portions of the bar, and that horizontal bolts are employed for securing the teeth in their seats on the bars, and that the teeth are adapted to be adjusted relatively to the bolts.

In Fig. 3 the clamped part of the tooth is shown by dotted lines as standing somewhat vertically, and its edges lie in notches *a²* in the flanges, ribs, or edges of channel-bars, and are clamped therein by the horizontal bolt *b*. In the first case the adjustment gives a low frame, in the latter a high frame, the frame being then raised on and supported by the runner ends of the teeth, and in either case it is obvious that the tooth may be adjusted to any desired position by loosening the bolt *b* and moving the tooth. The contiguous parts of the frame-bars, as well as the oblique portions, might of course be curved, instead of being straight, as shown. The portions *a³* of the frame-bars are oblique to the draft-line, and consequently act as scrapers or clod-crushers with a draw cut.

At the inner edge of each section a short longitudinal bar C is bolted. Each of them has at front and rear lateral inward projections *c*, overlapping each other and bolted together by horizontal hinge-bolts *c'*, and upon the hinge thus formed the harrow may be folded for transportation, as shown in Fig. 5;

the teeth of one section springing past those of the other and interlocking with them, as seen also in Fig. 6. The axis or center of the hinge is in line with the under face of the harrow-frame, as shown in Fig. 4, and in folding the hinge is raised, the side sections turning downward—or, in other words, the harrow may be turned upon its back and one section then folded over upon the other. When folded, the curved faces of the teeth may of course be used as runners upon which to transport the harrow. The front ends a^4 of the inner zigzag bars a of each frame may also be extended, depressed, overlapped, and united, as shown, by a hinge-bolt in the same line with the other bolts c' .

The central draft-rod d , connected with the center of the whiffletree D , is preferably connected with the front overlapping ends c of the bars C , while the outer draft-rods d' are connected with the bolt b , which connects the front end of the outer frame-bar with the first angle or bend of the middle bar, and all three of these connections are preferably in the same transverse line. The harrow will run level with the ground and conform to all the undulations and unevenness of the surface. So far as I am aware I am the first to provide a harrow-frame with two distinct positions for the spring-teeth, whereby either a high or low frame may be used and the angular relation of the teeth to the ground varied. I am also the first to make a harrow-frame the adjacent vertical faces of whose bars have channels that form bearings for the teeth.

The frame is jointed centrally in line with the draft, so that it may be folded upon itself for transportation, and the frame-bars being in the same horizontal plane permit of their being folded closely together. The whiffletree is connected with the harrow by three draft rods or links, one being applied centrally in the line of the central hinge, and one to the front of each side section of the harrow, preferably about in line with its middle. The harrow is therefore perfectly flexible, and is free to follow furrows and ridges and yet run level with the ground, whether the teeth are set to cut deep or shallow.

The channel-iron frame-bars give strength and stiffness with a minimum of metal, and at the same time afford a most simple, cheap, and effective means of adjustably securing the teeth.

In an application filed by me March 31, 1891, Serial No. 387,143, which is a division of this case, I have shown a harrow somewhat similar to that herein shown, but in which I have shown and described the inner curved ends of the teeth arranged vertically between the frame-bars, and arranged to form runners for raising the longitudinal openings between the bars above the ground.

What I claim as my invention is—

1. A harrow-frame composed of zigzag bars having the longitudinal portions- a' of adjoining bars adjacent to each other, in com-

bination with curved spring harrow-teeth arranged in the openings between the parts a' of the frame-bars, and devices for securing the frame-bars together and for holding the teeth with their inner ends arranged to form fenders for the openings between the frame-bars.

2. A harrow-frame composed of zigzag bars of channel-iron with the parts a' of adjoining bars adjacent to each other, in combination with curved spring-teeth held between the parts a' and lying in the channels in the bars, and bolts passing through the parts a' to secure the bars together and hold the teeth, substantially as set forth.

3. In a harrow, metal frame-bars having longitudinal portions arranged in line with the draft, bends in said bars extending rearwardly and sidewise from said longitudinal portions to and connecting with other longitudinal portions of the same bars, a spring-tooth having its curved horizontal inner end mounted between longitudinal portions of said bars, and a horizontal bolt for securing the tooth in its seat between the bars and adapting the tooth to be adjusted relatively to said bolt.

4. A harrow-frame having two seats for a curved spring-tooth, one in which the curved upper part of the tooth has a horizontal or longitudinal bearing in the frame and another in which said part of the tooth has a vertical bearing, whereby the frame may be given either a high or low position relatively to the ground, in combination with a curved spring-tooth adapted to be seated in either bearing, substantially as set forth.

5. The zigzag frame-bars having the adjacent vertical faces of adjoining bars formed with horizontal channels or grooves that form bearings for curved spring-teeth, in combination with curved spring-teeth seated in said channels, and devices for securing the bars together and holding the teeth, substantially as set forth.

6. The combination, substantially as set forth, of the channel-iron frame-bars, curved spring-teeth resting lengthwise in the channels of said bars, and transverse clamping-bolts inserted through the frame-bars and above the curved teeth lying between the bars, as shown.

7. A harrow-frame composed of zigzag bars having portions a oblique to the line of draft and adjacent portions a' in line with the draft, in combination with curved spring harrow-teeth having their upper curved ends arranged longitudinally between the portions a' of the frame-bars.

8. The combination of frame-bars, harrow-teeth arranged between adjacent frame-bars and having the upper surfaces of their shanks in contact with the frame-bars at the front and rear ends of the adjacent portions, and bolts for securing the frame-bars and teeth together.

9. In a harrow, a frame composed of bars

of substantially zigzag form having longitudinal openings between said bars in line with the draft and spring-teeth having longitudinal portions at their curved inner ends placed
5 in said openings and having direct contact with the frame, in combination with bolts for securing the bars and teeth together.

In testimony whereof I have hereunto subscribed my name.

CHARLES LA DOW.

Witnesses:

EDWARD C. DAVIDSON,
LLOYD B. WIGHT.