

(No Model.)

A. DOWNWARD.

HARROW.

No. 413,498.

Patented Oct. 22, 1889.

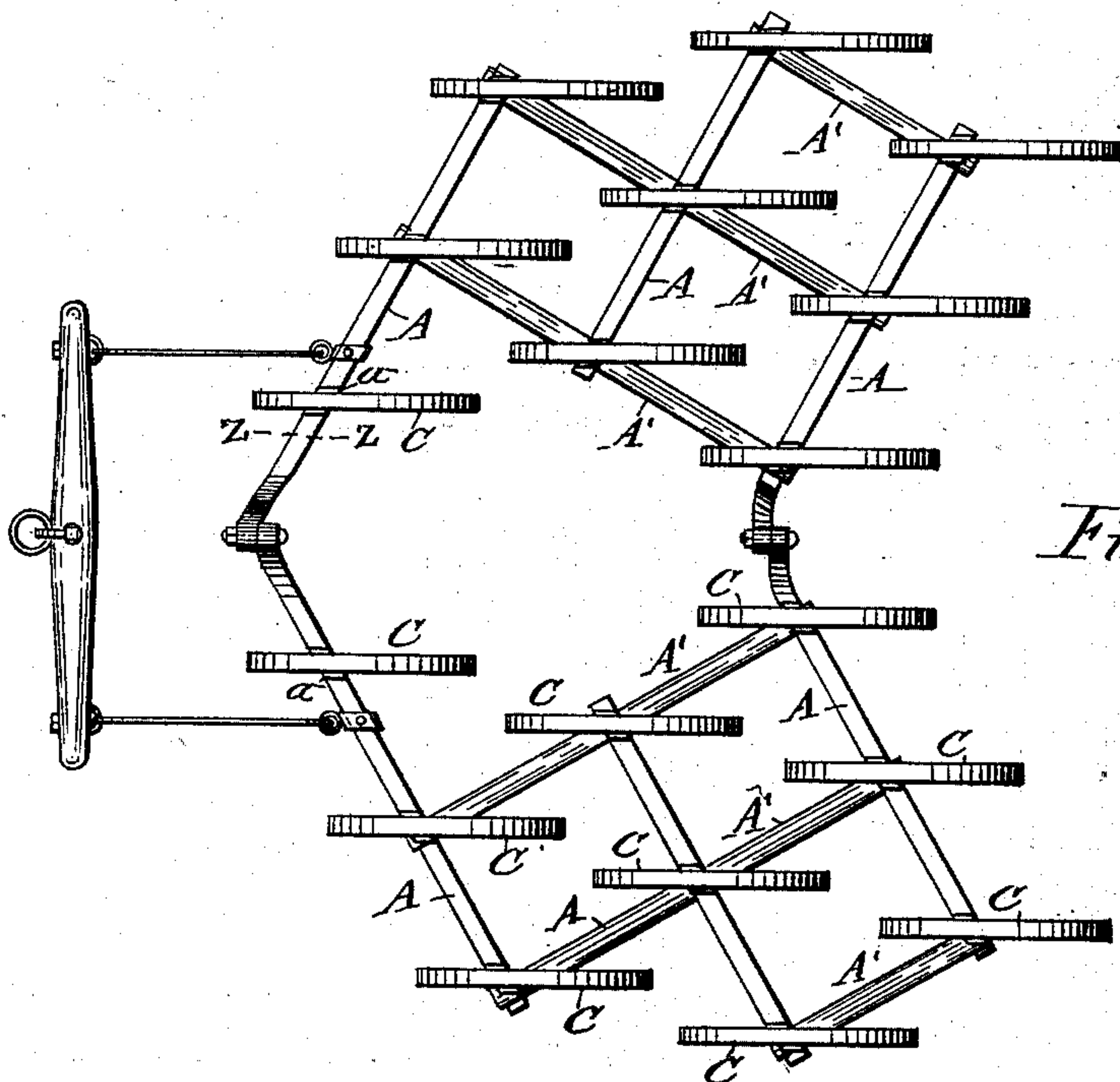


Fig. 1

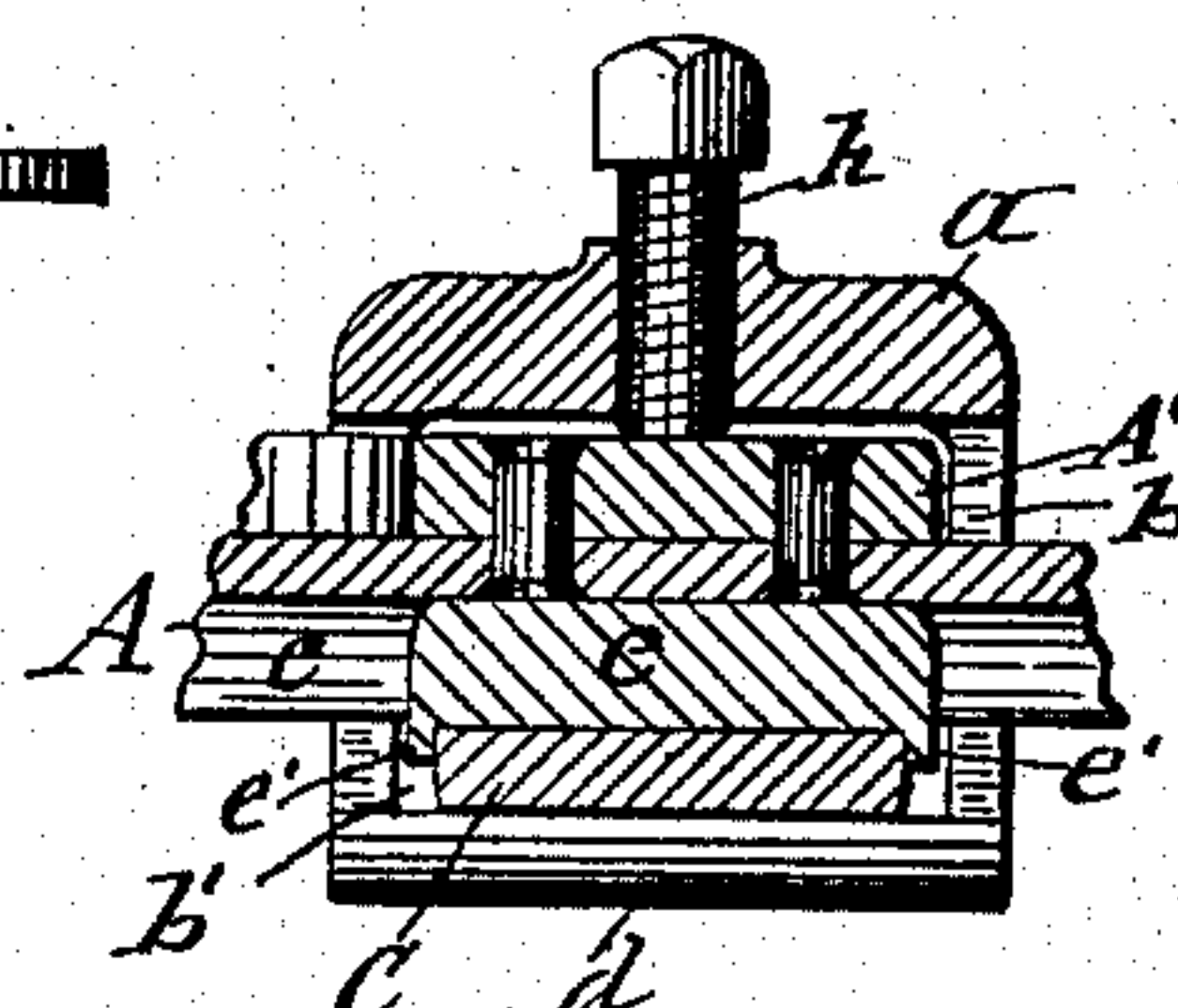


Fig. 7

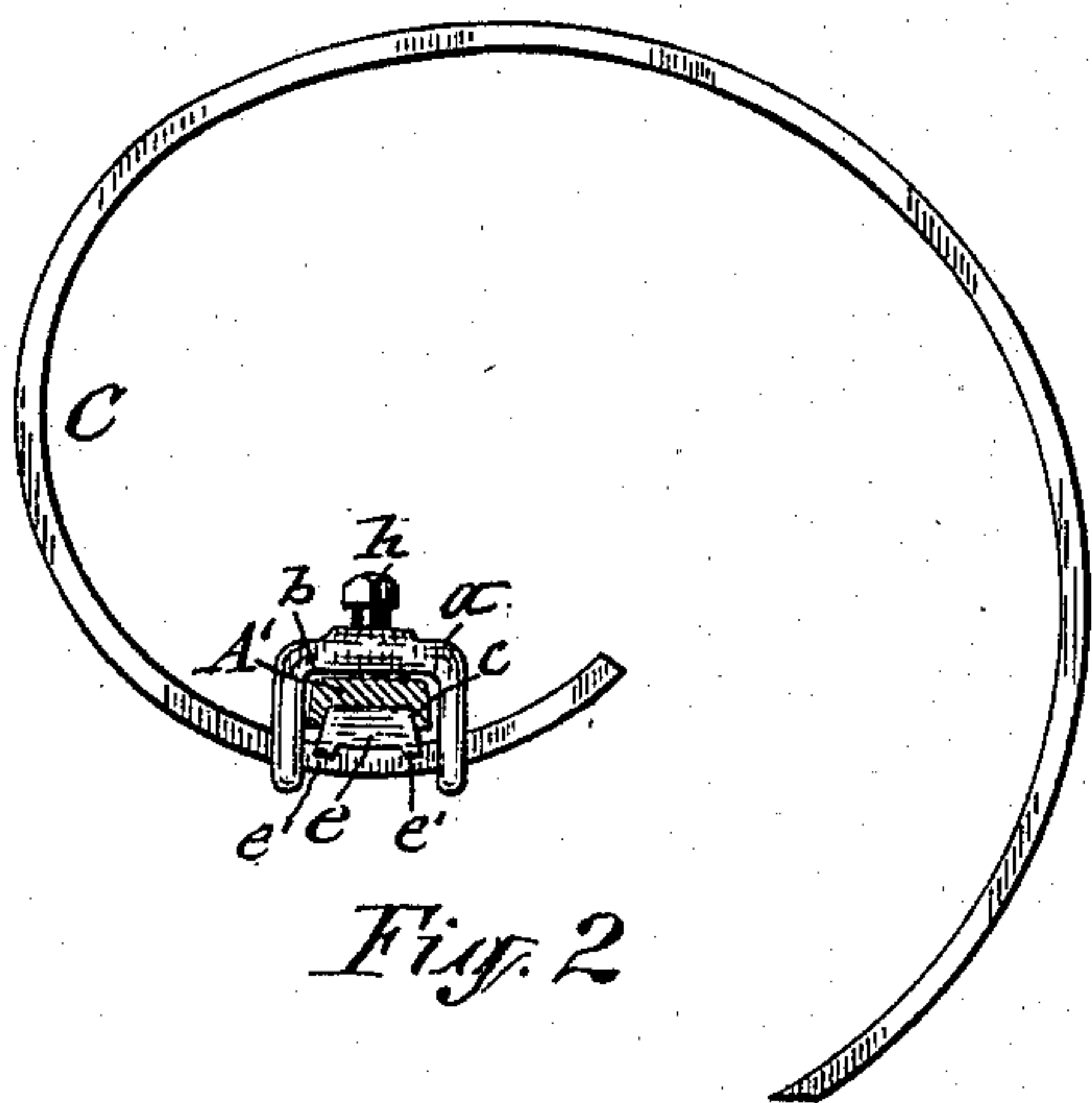


Fig. 2

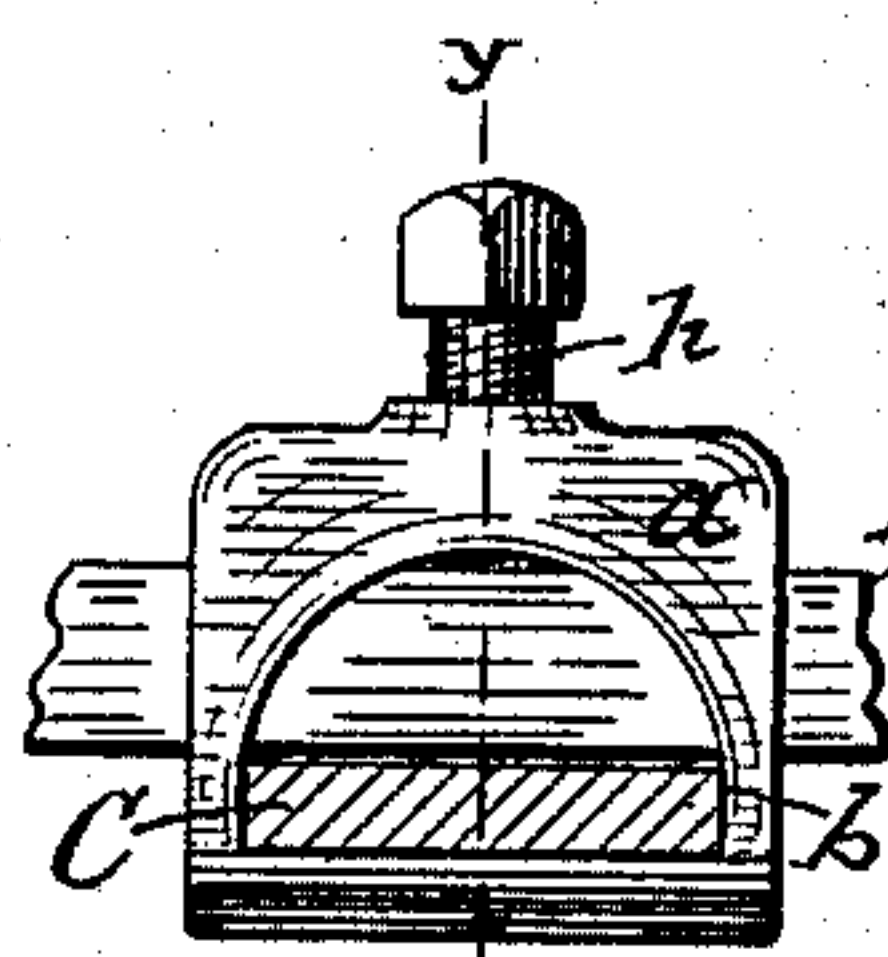


Fig. 4

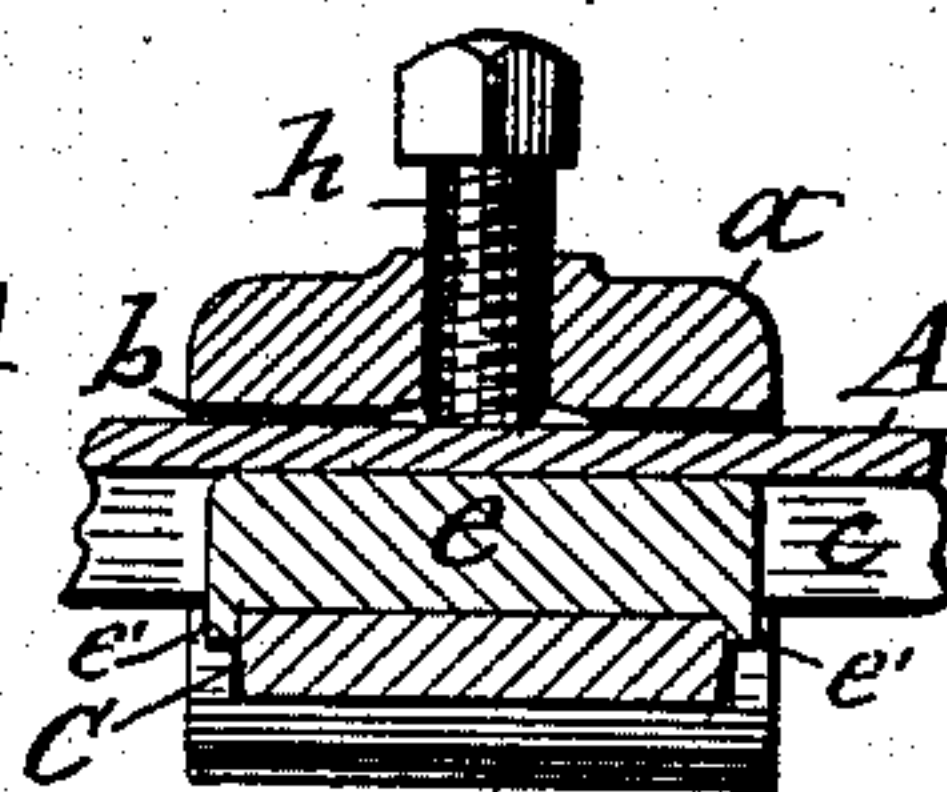


Fig. 5

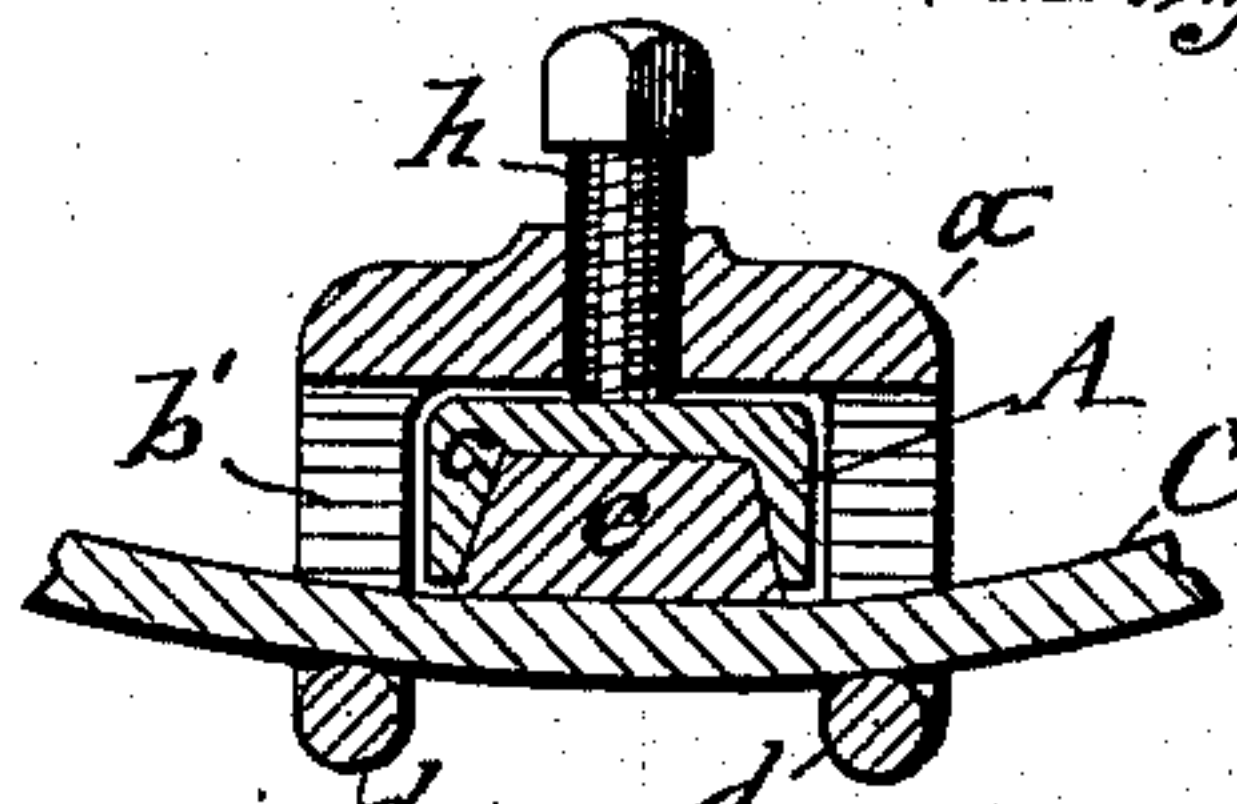


Fig. 6

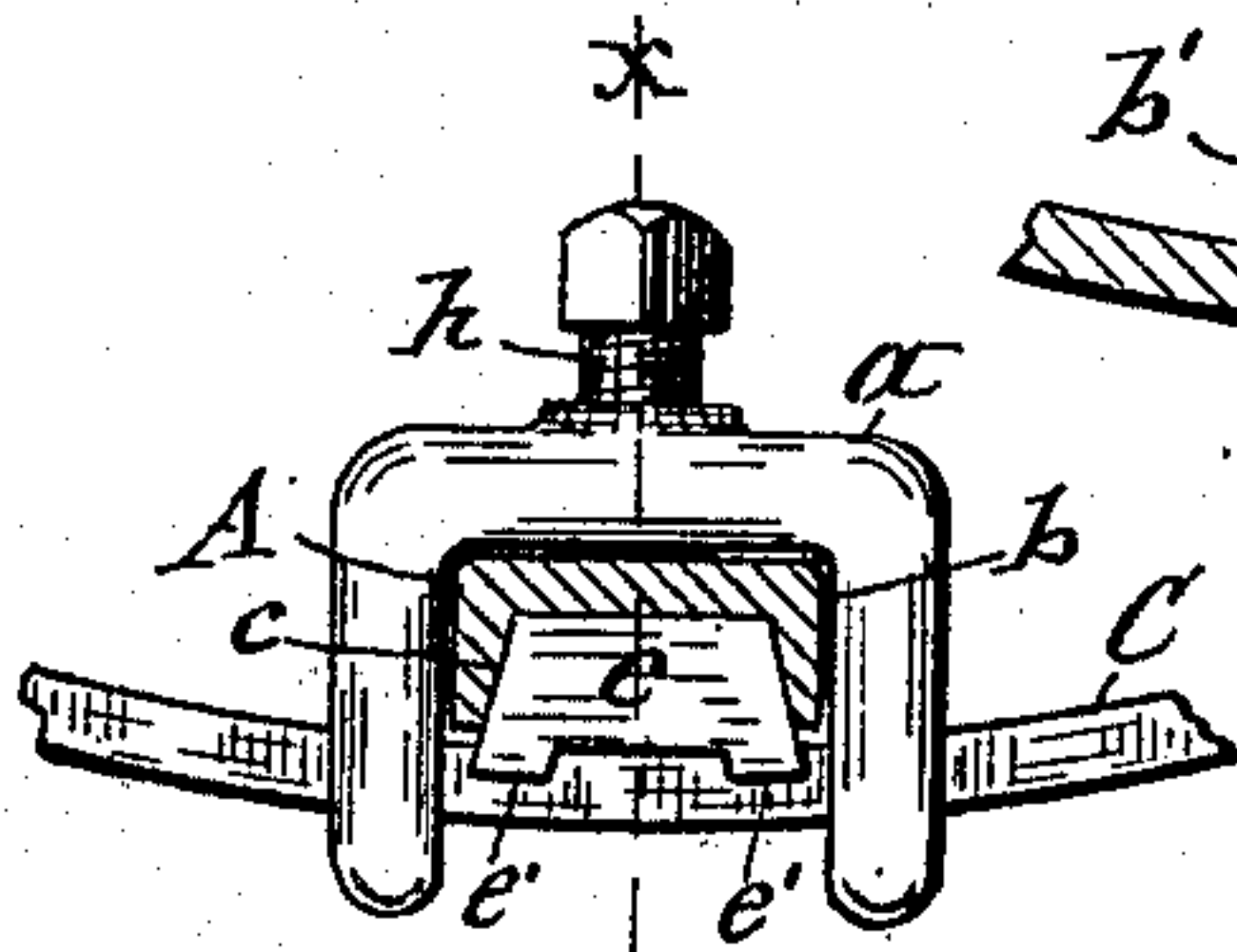


Fig. 3

WITNESSES:

A. F. Walz,
Mark W. Dewey

INVENTOR

Andrew Downward
BY
Hull, Leason & Hull
his ATTORNEYS

UNITED STATES PATENT OFFICE.

ANDREW DOWNWARD, OF UTICA, NEW YORK, ASSIGNOR TO THE EUREKA
MOWER COMPANY, OF SAME PLACE.

HARROW.

SPECIFICATION forming part of Letters Patent No. 413,498, dated October 22, 1889.

Application filed May 20, 1889. Serial No. 311,352. (No model.)

To all whom it may concern:

Be it known that I, ANDREW DOWNWARD, of Utica, in the county of Oneida, in the State of New York, have invented new and useful
5 Improvements in Harrows, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to the class of harrows
10 which are equipped with curved spring-teeth; and the invention consists in improved means for attaching said teeth to the frame, as hereinafter fully described, and specifically set forth in the claims.

15 In the accompanying drawings, Figure 1 is a plan view of a harrow pertaining to the class hereinbefore mentioned. Fig. 2 is an enlarged vertical longitudinal section on line *z-z*, Fig. 1. Fig. 3 is a further enlarged side view of
20 the attachment of the tooth to the frame. Fig. 4 is a view of the aforesaid attachment, taken in a plane at right angles to that represented in Fig. 3. Figs. 5 and 6 are vertical transverse sections, respectively, on lines *x-x*, Fig.
25 3, and *y-y*, Fig. 4; and Fig. 7 is a longitudinal vertical section of the attachment of the tooth to the harrow-frame at the point of the crossing of the draft-bars and the bed-pieces of the frame.

30 Similar letters of reference indicate corresponding parts.

A *A'* represent, respectively, the draft-bars and so-called "bed-pieces," which are firmly secured to each other in the usual manner to
35 form the frame of the harrow. The draft-bars *A A'*, I prefer to form of metal and with longitudinal channels *c* in their under sides for the purpose of obtaining maximum rigidity with minimum weight of metal.

40 The attachment of the tooth consists, mainly, of a shoe *a*, preferably cast in one piece of metal and formed with transverse passages *b b'*, extending through the shoe and intersecting each other inside of said shoe. Through
45 the passage *b* of the shoe passes the draft-bar *A*, and through the passage *b'* passes the attaching-shank of the tooth *C*, the passage *b* being extended through the bottom of the shoe, so as to leave two cross-bars *d d* at op-
50 posite ends of the shoe, upon which cross-bars

the tooth-shank rests, as illustrated in Fig. 6 of the drawings.

Between the bar and underlying tooth-shank I interpose a block *e*, which is seated in the longitudinal channel *c* of the draft-bar and
55 bears on the tooth-shank between the aforesaid cross-bars *d d*.

In order to prevent the said block from slipping laterally on the tooth-shank, I form said block with downward projections *e' e'*, which
60 abut against opposite edges of the tooth-shank. The shoe is also formed with a screw-threaded eye through its top and at right angles to the plane of the passages *b b'*, and in said eye is inserted a set-screw *h*, which bears upon the
65 top of the inclosed portion of the draft-bar *A* and presses the block *e* firmly upon the tooth-shank, while the latter rides on the cross-bars *d d* of the shoe, and thus said tooth-shank is firmly clamped in the shoe.
70

For attaching the tooth to the harrow-frame at the crossings of the bed-pieces and draft-bars, I form the shoe *a* of a sufficient depth to receive through it the aforesaid portions of the frame with the block *e* and underlying
75 tooth-shank *C*, as represented in Fig. 7 of the drawings. All of said parts are clamped in the shoe by the set-screw *h* in the manner hereinbefore stated.

What I claim is—

1. In combination with the frame-bar and tooth, a block interposed between said parts and rigidly confined on the frame-bar, a shoe embracing said frame-bar, tooth, and block,
80 and a set-screw connected to the shoe and clamping therein the aforesaid parts, as set forth.
85

2. In combination with the curved spring-tooth, a block interlocked with the edges of said tooth, the frame-bar interlocked with the
90 said block at the edges at right angles to the edges of the tooth, a shoe embracing said parts, and a set-screw connected to the shoe and clamping therein the aforesaid frame-bar, tooth, and intervening block, substantially as
95 set forth.

3. The combination of a harrow-frame having draft-bars channeled longitudinally in their under sides, shoes encompassing said
100 bars, teeth inserted with their attaching-

shanks in the shoes beneath the aforesaid bars, blocks interposed between the bars and tooth-shanks and seated in the channels of the said bars, and set-screws connected to the shoes and clamping therein the aforesaid encompassed parts, substantially as set forth and shown.

4. The combination of a harrow-frame having draft-bars channeled longitudinally in their under sides, a shoe formed in one piece with passages extending transversely through it and with a screw-threaded eye through its top, one of the channeled draft-bars extending through one of the passages of the shoe, a tooth having its attaching-shank extending

through the other of the aforesaid passages, a block seated in the channel of the draft-bar and interposed between said bar and tooth-shank and formed with downward projections at opposite edges of the tooth-shank, and a set-screw inserted in the screw-threaded eye of the shoe and clamping in said shoe the parts encompassed therein, substantially as described and shown.

In testimony whereof I have hereunto signed my name this 14th day of May, 1889.

ANDREW DOWNWARD. [L. s.]

Witnesses:

M. W. ROSS,

A. E. COLE.