

(No Model.)

W. S. LAWRENCE.  
SPRING TOOTH HARROW.

No. 359,539.

Patented Mar. 15, 1887.

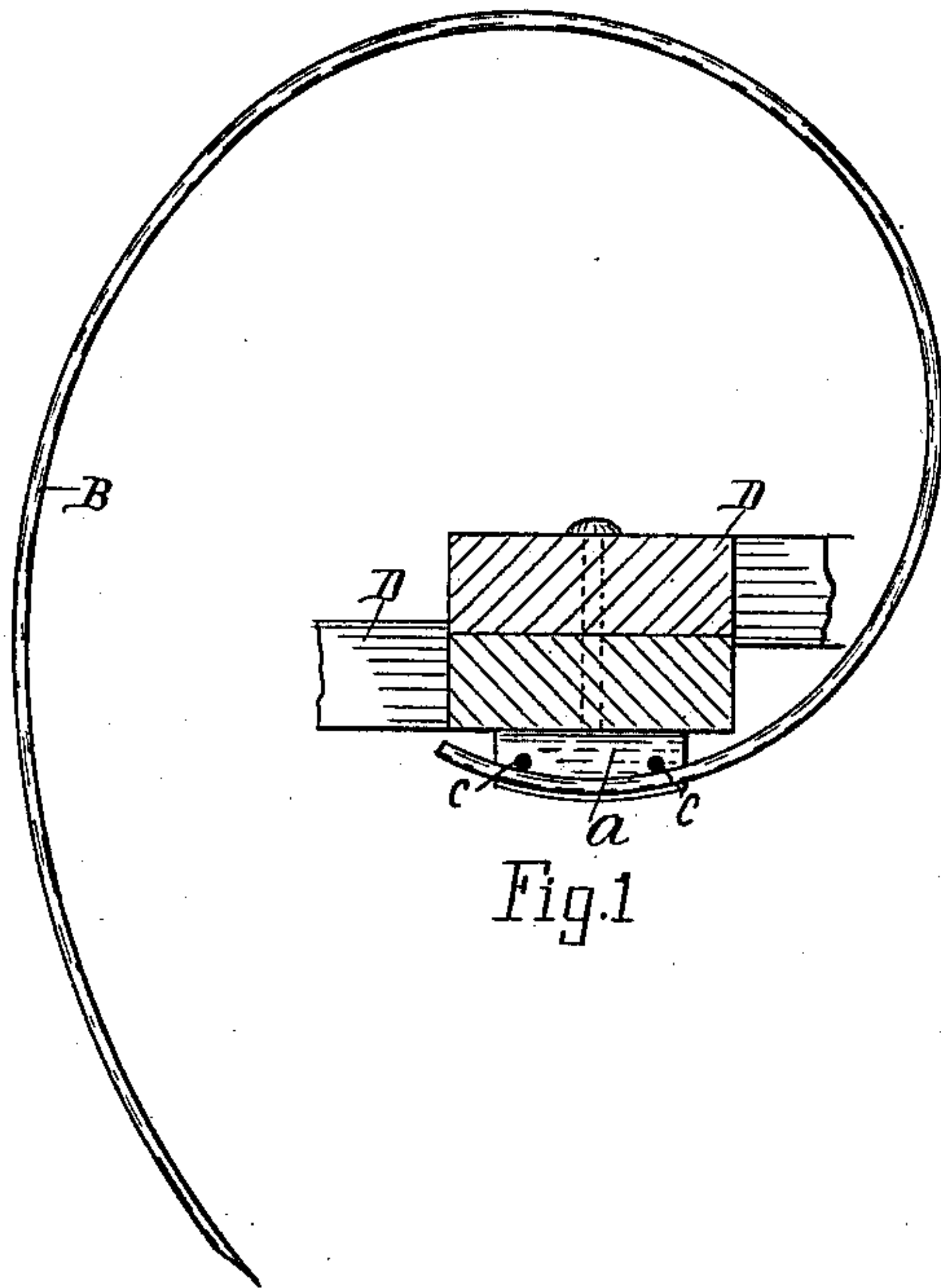


Fig. 1

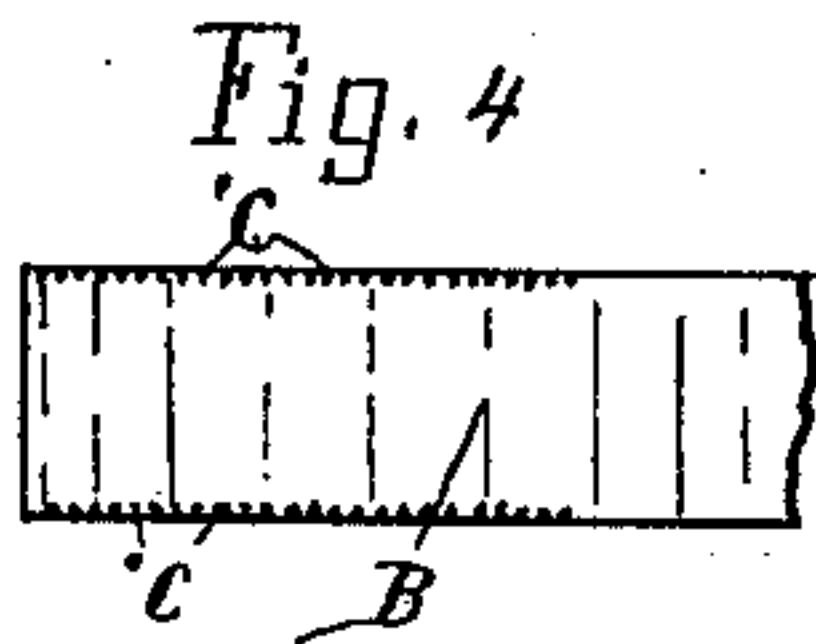


Fig. 4



Fig. 5

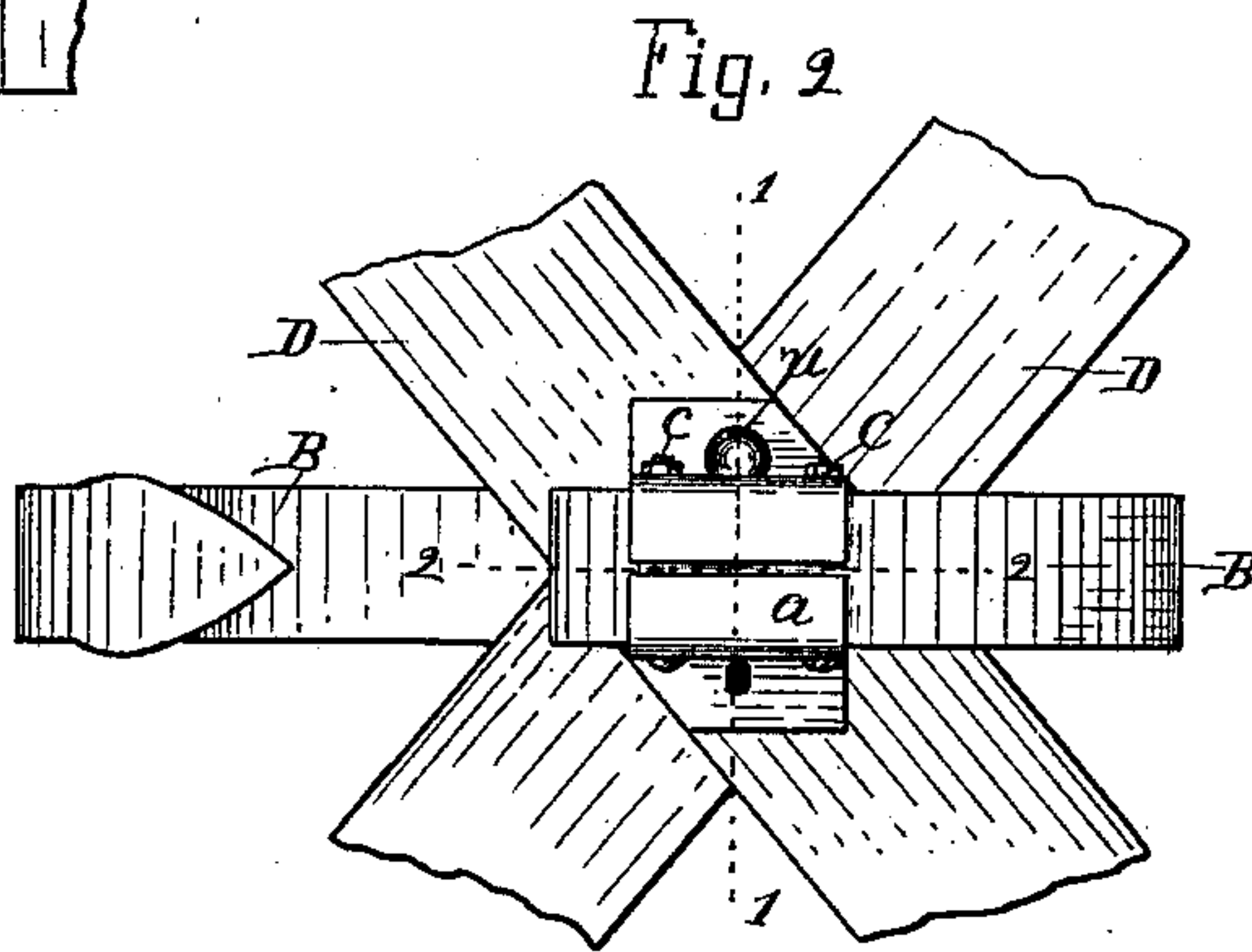


Fig. 2

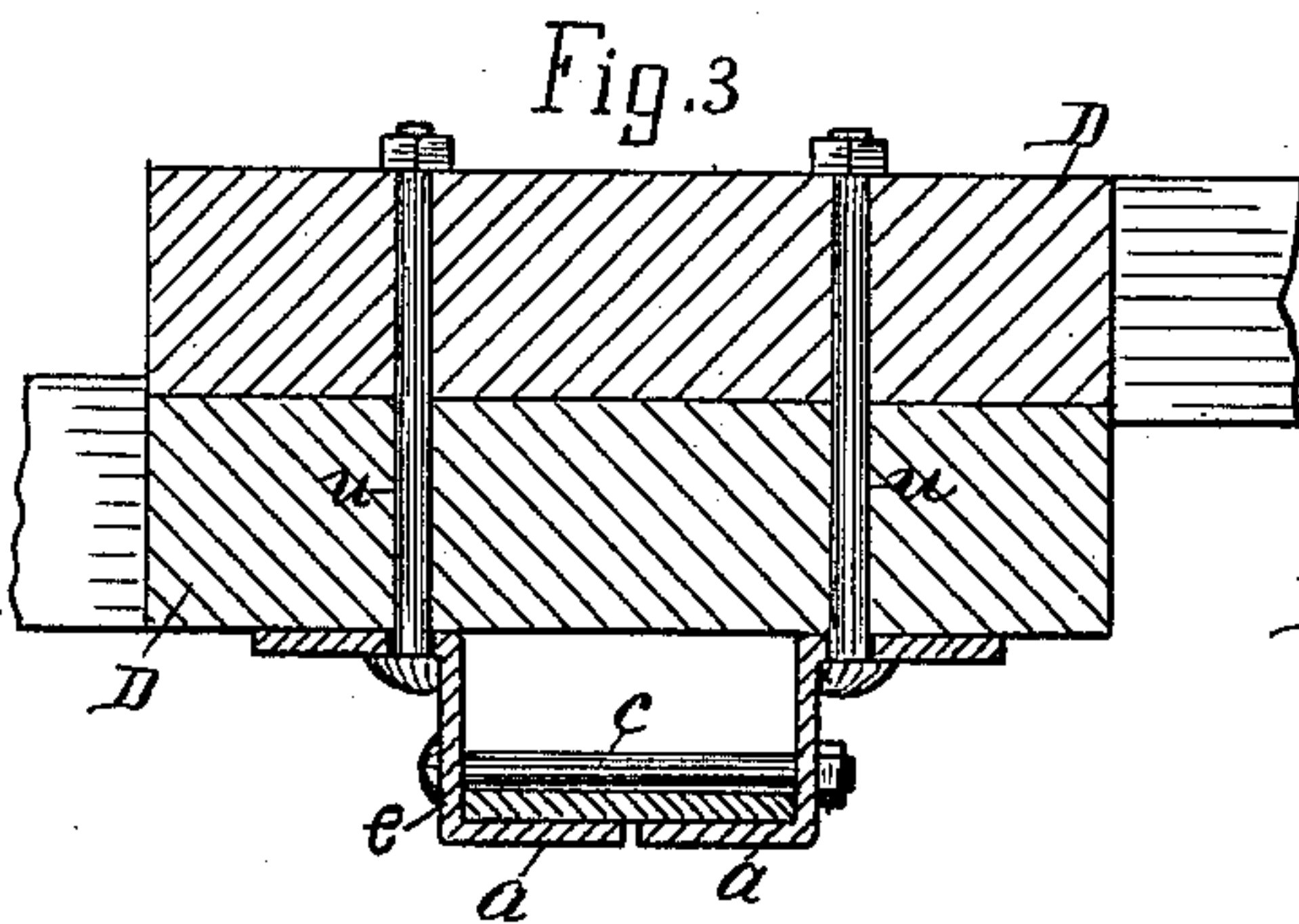


Fig. 3

Witnesses,

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# UNITED STATES PATENT OFFICE.

WILLIAM S. LAWRENCE, OF KALAMAZOO, MICHIGAN.

## SPRING-TOOTH HARROW.

SPECIFICATION forming part of Letters Patent No. 359,539, dated March 15, 1887.

Application filed January 3, 1887. Serial No. 223,238. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM S. LAWRENCE, a citizen of the United States, residing at Kalamazoo, county of Kalamazoo, State of Michigan, have invented a new and useful Spring-Tooth Harrow, of which the following is a specification.

This invention relates to that class of harrow-tooth holders which clamp the edges of the tooth. While my holder may be employed for attaching various styles of teeth and shares to the beam or frame, the leading object of the invention is to construct a holder and combine the same with the bowed spring-tooth herein illustrated and known as the "Garver Tooth," all substantially as below described and claimed.

In the drawings forming a part of this specification, Figure 1 is a side elevation, with the harrow-beams in section on the dotted lines 2 2 in Fig. 2; Fig. 2, an under view of parts in Fig. 1; Fig. 3, a cross-section enlarged on dotted lines 1 1 in Fig. 2; Fig. 4, a broken part of a tooth, below described; and Fig. 5 a part of the holder, showing a change in construction.

Referring to the lettered parts of the drawings, D are the ordinary crossed beams of a harrow-frame, and B is the Garver tooth curving from beneath the beams forward and thence upward over the beams and down in the rear thereof into the soil. An ordinary manner of attaching these teeth to the frame has been to embed them in a concave recess in the under side of the beam and confine them therein with a transverse clip-plate.

The holder herein shown consists of two parts, Z-shaped in cross-section, *a a*, and the clamping-bolts *c*. The lower flange of the parts *a a* is of course longitudinally curved to conform to the curvature of the secured end of the tooth B, Fig. 1. The tooth is passed closely between the lower flanges of the holder and the bolts *c*, Fig. 3. By this means the holder is simplified, as compared to those having grooves to receive the edges of the tooth, and the tooth is prevented from tilting vertically in the holder by the bolts *c c*. The engagement of the vertical walls *e* of the parts *a* with the edges of the tooth when firmly

clamped by tightening the nuts of the bolts *c* prevents the tooth from longitudinal displacement in the holder.

Referring to Fig. 3, it will be seen that the bolts *u*, which secure the beams D together, also secure the holder parts *a* to the under side of the beam by said bolts being passed up through their upper flange. Thus the harrow-frame is well above that part of the tooth at the lower flanges of the holder which contacts with the surface of the soil. By this means the beams D do not unduly hug the soil and drag the same, as heretofore in this style of float-harrows, and the lower flanges of the holder beneath the secured end of the tooth constitute shoes to protect the tooth from wear. The lower flange of the holder is supposed to be on the same plane as the surface of the soil. The holes in the upper flanges, through which the bolts *u* pass, are laterally elongated in Figs. 2 and 3; but ordinarily the parts *a* will yield laterally enough to admit the tooth after the bolts *u* have been loosened, whether said holes are elongated or not. This holder for various styles of teeth may be attached to the front, rear, or top side of the beam, or on the under side, as herein shown, according to the requirements in given instances; but it is only in substantially the relation shown that the holder serves as a protection-shoe. In Figs. 4 and 5 is shown how the engaging-surfaces of the tooth, at *c'*, and of the holder, at *a'*, may be serrated or corrugated, by which means not so firm a clamping of the bolts *c* is required; but this is a matter of choice. The ends of these bolts *c* and bolts *u* are protected from the soil.

By thus combining this style tooth and holder with the beam I am enabled to supply the trade with what I deem to be a more practical and useful harrow than those heretofore disclosed which employ this particular tooth.

Having thus described my invention, what I claim is—

1. The combination of the spring-tooth herein shown, a harrow-beam, the ungrooved holder parts on the under side of the beam, and the transverse clamping-bolts near each end of the holder and immediately above the face of the secured end of the tooth to contact



therewith, preventing the tooth from tilting vertically in its holder, substantially as set forth.

2. The combination of a harrow-beam, the  
5 two-part holder, each part Z-shaped in cross-section, the bolts passed through the outer flanges of said parts and through the beam, the clamping-bolts at the ends of the holder, and a tooth between the holder flanges and the  
10 bolts and contacting the latter, preventing the tooth from tilting vertically, substantially as set forth.

3. The combination of a harrow-beam, the

flanged ungrooved holder parts, a harrow-tooth, and the transverse bolts at the ends  
15 contacting the secured end of the tooth to prevent it tilting vertically in the holder, substantially as set forth.

In testimony of the foregoing I have here-  
unto subscribed my name in presence of two  
20 witnesses.

WM. S. LAWRENCE.

Witnesses:

C. H. LAWRENCE,

H. WILLIAMS.