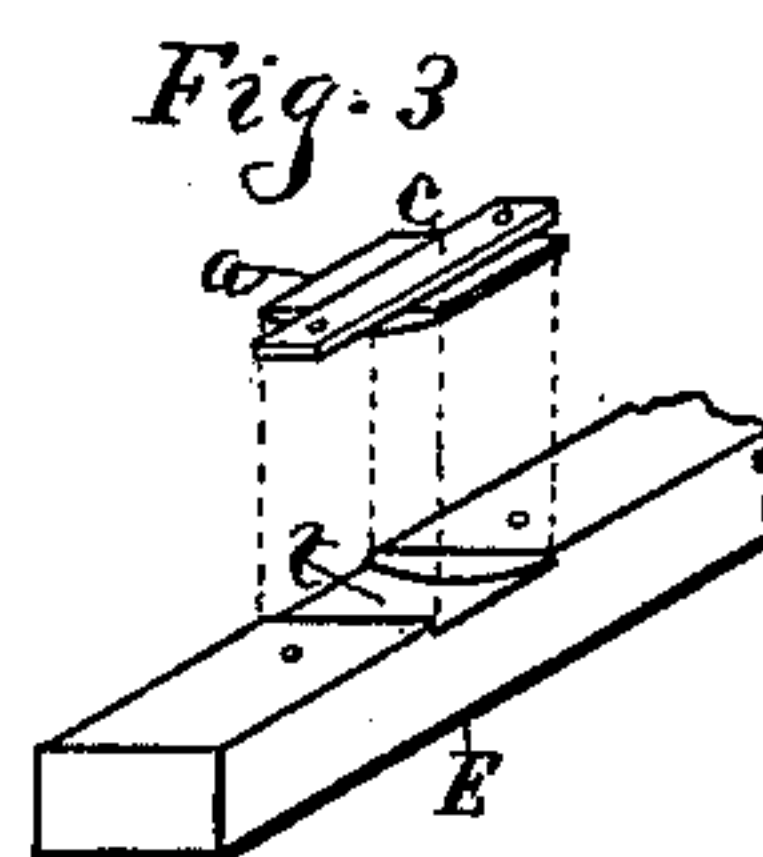
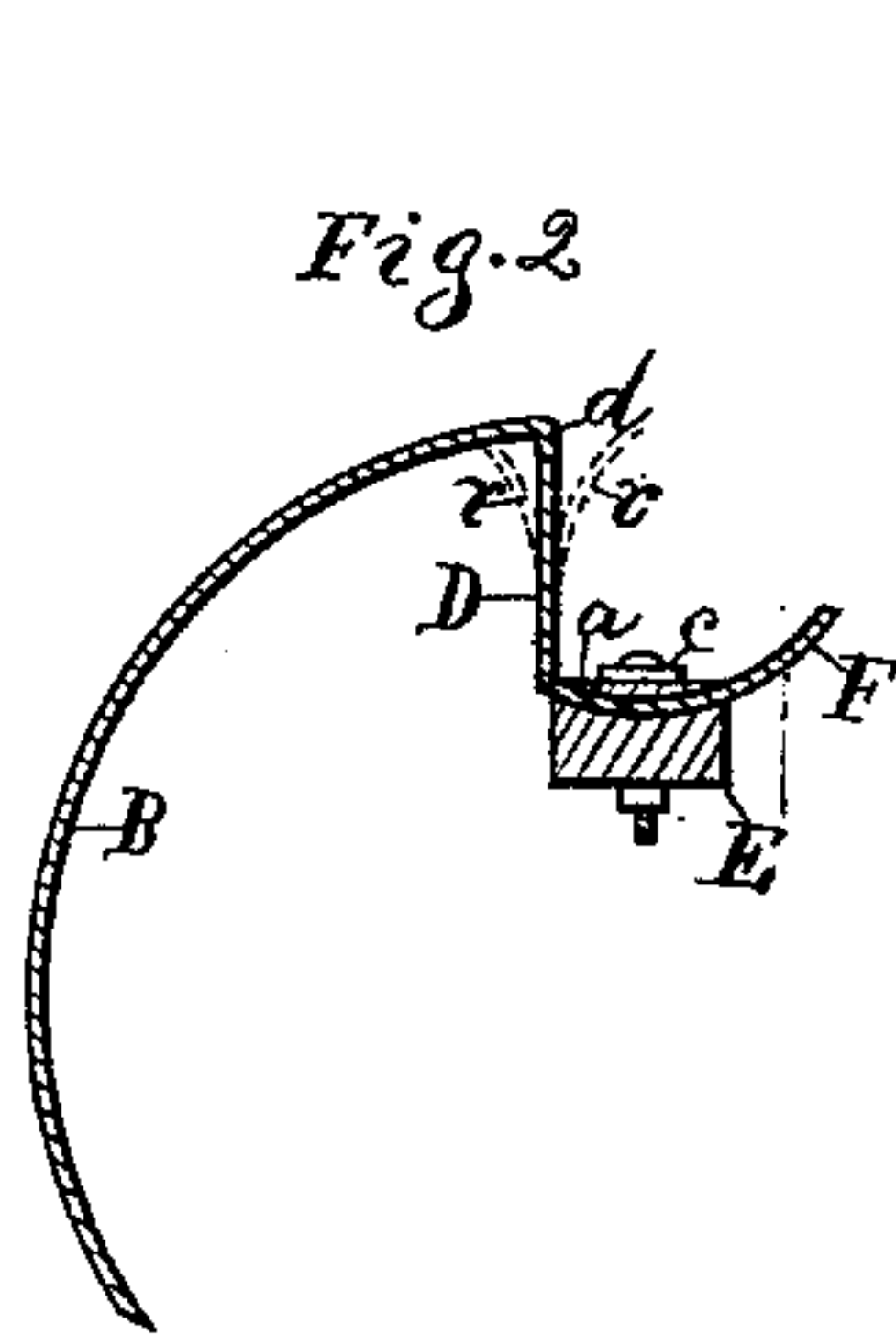
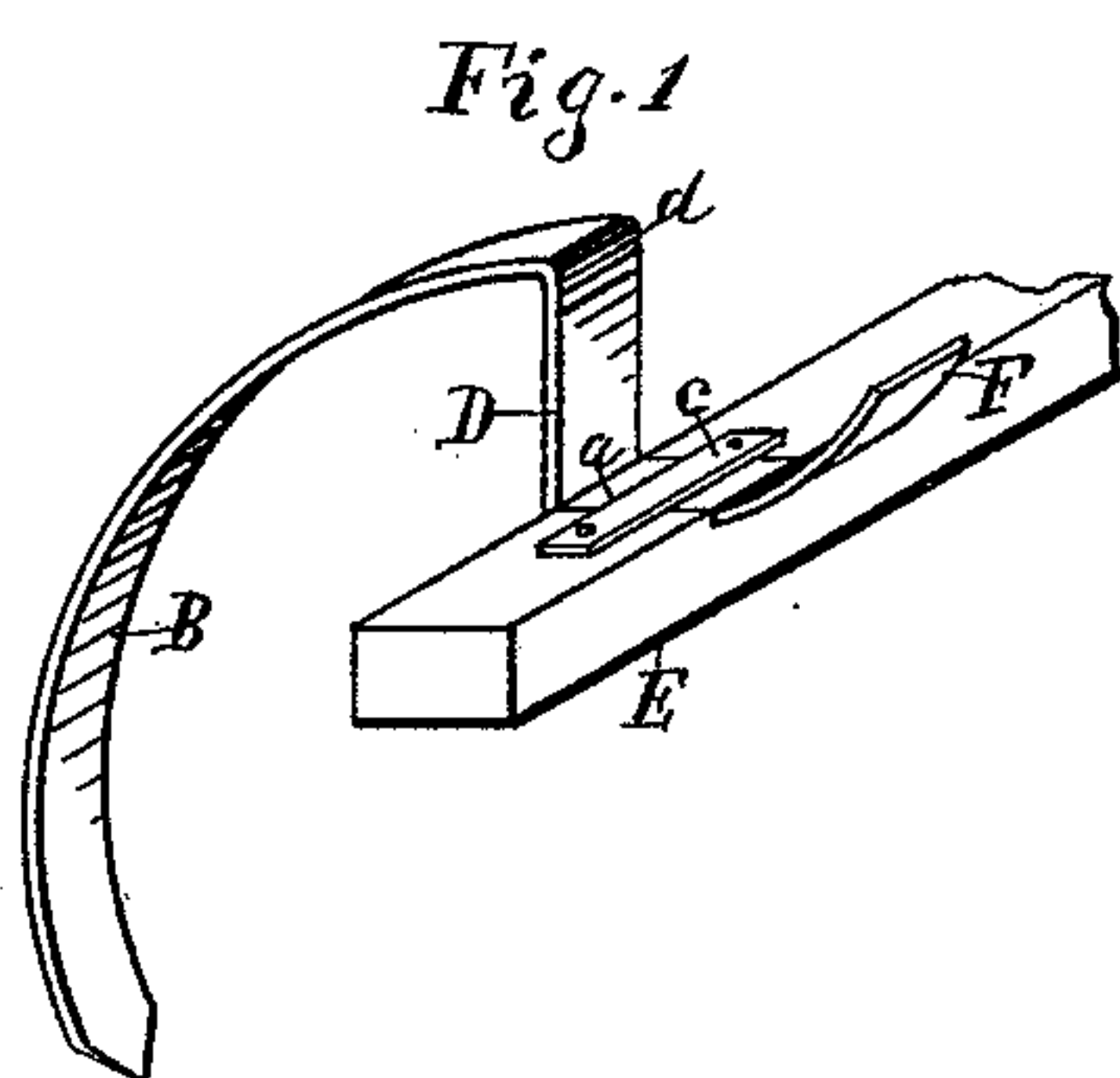


(No Model.)

H. A. KILTZ.
Spring Tooth Harrow.

No. 231,175.

Patented Aug. 17, 1880.



Attest.

J. C. Perkins.

John B. Chase.

Inventor.

Henry A. Kiltz

Per: Lucius C. West.

Atty-

UNITED STATES PATENT OFFICE.

HENRY A. KILTZ, OF KALAMAZOO, MICHIGAN.

SPRING-TOOTH HARROW.

SPECIFICATION forming part of Letters Patent No. 231,175, dated August 17, 1880.

Application filed May 8, 1880. (No model.)

To all whom it may concern:

Be it known that I, HENRY A. KILTZ, of Kalamazoo, Michigan, have invented new and useful Improvements in Spring-Tooth Harrows, of which the following is a specification.

My invention has for its object the construction of an improved harrow-tooth, whereby a free oscillation or spring with less amount of steel is produced in a curved tooth over former styles.

I have found by long experience in the use of harrows that the most successful yet known are those with spring-teeth having a curved C-shaped base engaging the soil, and that the many styles of this class of teeth already in use are faulty from the fact that a great amount of steel is necessitated to be used in their construction in forming a curve to effect a sufficient oscillation of the tooth to do effectual work, especially in mellow and sandy soil free from stone or other obstructions, and at the same time have the tooth of sufficient strength to resist breakage of the same.

In curving the tooth the bar of steel of which it is made is greatly stiffened, owing to the breaking, contracting, and expanding of the grain of the metal; hence its springing or oscillating capacity is greatly reduced.

To obviate these objections, and still use the curved portion which engages the soil, and effect my purpose with the least amount of steel to each tooth, I have constructed the teeth with a perpendicular straight portion, the balance of the tooth being so formed and the whole so connected and adjusted with its supporting girt or beam that the spring of the tooth is largely in said straight portion, at whatever depth or angle it may be set to work. This principle has previously been carried into effect, but by a substantially-different construction, requiring a greater amount of metal and the placing of the girts of the frame to which they are connected a greater distance apart, thus making a frame of unusual and inconvenient length.

Another object of my invention, for the most effectual working of my tooth, is the construction of a concave mortised girt and a convex clip, into the former of which I insert my

tooth at its point of attachment with its girt, and the latter being placed above the tooth and fitting into the mortise, that portion of the tooth which fits into the mortise being curved for this purpose, whereby the tooth is prevented from lateral displacement and an equal bearing is brought to bear on its upper and under face.

The concave mortise and the clip are not regarded in this case as new.

In the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate like parts, Figure 1 is a perspective view of my improved harrow-tooth attached to its mortised girt. Fig. 2 is a longitudinal and cross-sectional cut of the same, and Fig. 3 shows the girt with its mortised clip.

I construct the teeth from a straight strip of steel by bending it from the point indicated at *d* in a downwardly-inclined curve, *B*, on the left arc of a circle to the soil, bringing the larger portion of the tooth below the girt. I then bend the other end of the tooth from the angle near *a* in the draft in a short horizontal and upwardly-inclined curve or convex shank, forming the portion *F* for effecting an adjustable connection of the tooth with the girt *E*. In the straight portion *D* comes the spring or oscillation of the tooth, the dotted curved lines in Fig. 2 showing the plane traversed by the upper portion of the tooth when in use.

By this construction all of the curved portion *B* of the tooth may be made stronger for heavy work, if desired.

The dotted lines in Fig. 3 show the position and relation of the clip, with its convex portion *a*, with the concave mortise in the girt *E*.

The clip *c* is held by bolts, shown in Fig. 2, which figure also shows the position of the tooth when set at its lowest depth of harrowing.

To raise the tooth I move it in the mortise to the left, bringing the end of the portion *E* nearer the clip *c*.

What I claim and desire to secure is—

1. A spring harrow-tooth having a straight

portion, D, extending upward from its point of attachment to the tooth bar or frame, and curved portion B, substantially as shown and described.

- 5 2. A spring harrow-tooth having straight portion D, curved portion B, and curved shank F, in combination with a tooth-bar having a

concave mortise in its upper side to receive the shank of the tooth and clip c, substantially as set forth.

HENRY A. KILTZ.

Witnesses:

JAMES W. HOPKINS,
W. McDONALD.