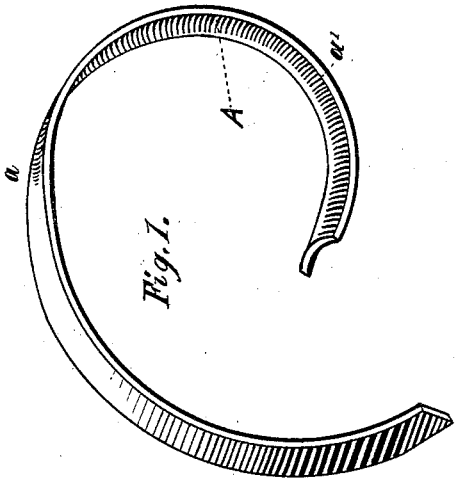
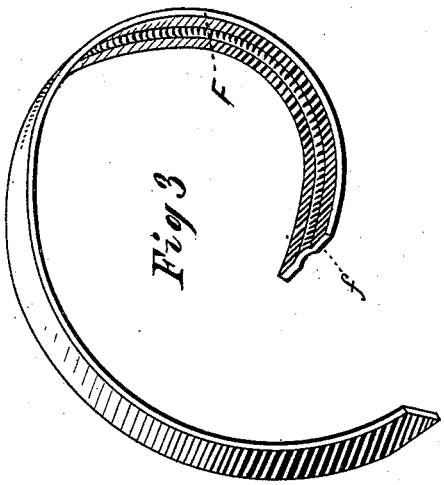
(No Model.)

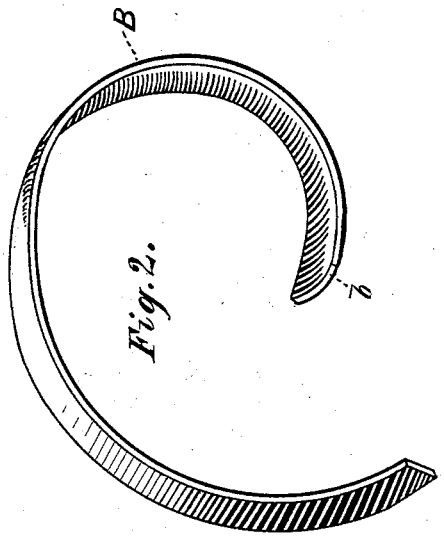
R. W. HARDIE.

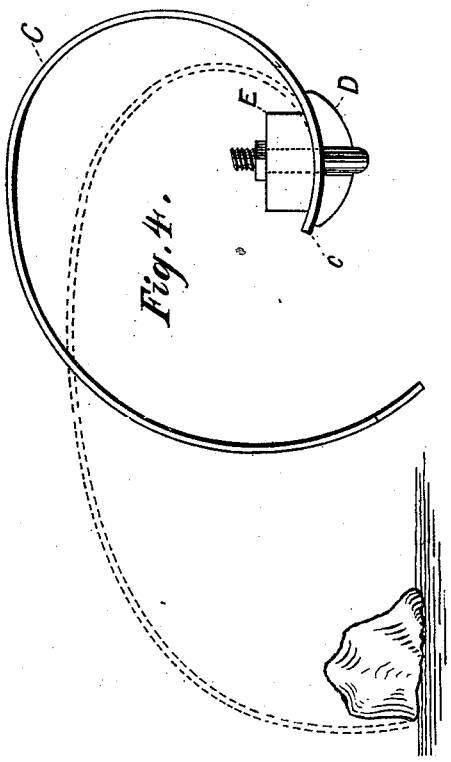
HARROW.

No. 422,406. Patented Mar. 4, 1890.









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HARROW.

SPECIFICATION forming part of Letters Patent No. 422,406, dated March 4, 1890.

Application filed June 25, 1889. Serial No. 315,521. (No model.)

To all whom it may concern:

Be it known that I, ROBERT W. HARDIE, a citizen of the United States, residing at 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.

The object of my invention is to raise the bending-point of a curved spring harrow-tooth of the class illustrated herein, so that when the working end of the tooth comes in contact with an obstacle in its path it will rise upward in the arc of a circle over the obstacle and immediately descend on the other side, instead of being drawn backward in a straight line. This I accomplish by the means illustrated in the accompanying drawings, in which—

Figure 1 represents a perspective view of a spring harrow-tooth embodying my invention. Fig. 2 represents a perspective view of a harrow-tooth embodying a modification of my invention. Fig. 3 represents a spring harrow-tooth curved transversely at the central longitudinal line. Fig. 4 represents a spring harrow-tooth of ordinary construction attached to a bar of a harrow-frame.

A represents a spring harrow-tooth constructed of broad flat spring metal provided on its fastening end with a transverse curvature, which gradually diminishes into a straight transverse line. I prefer to begin to decrease the depth of said curvature at a point just beyond the fastening-point of the tooth, (represented by a' in Fig. 1.) This transverse curvature makes the tooth rigid in proportion to the depth of said curvature, and the flexibility of the tooth is thereby varied at different points. When a tooth of ordinary construction—such as is represented by C in Fig. 4—meets an obstacle in its path, the working end of the tooth is drawn backward a considerable distance in a substantially horizontal plane, as indicated by the dotted lines in said figure, thereby causing a useless strain upon the team, and when the working end is finally released it springs back again in substantially a horizontal line to compensate for the previous backward pull on the point, and in so doing the tooth skips over a considerable portion of the ground without cultivating it. When the shank is stiffened by the transverse curvature, the tooth does not bend from a point low down, as indicated by the dotted lines in Fig. 4, but at a more flexible point located higher up on the tooth, and a backward pull on the free end of the tooth does not in such instances cause a backward movement of the point; but instead of this the point moves vertically in the arc of a circle with the bending-point as a center, and thereby rides over the obstacle without any unnecessary backward pull on the team and downward into the ground as soon as it has passed over the obstacle, leaving no portion of the ground uncultivated.

The shape of the transverse curvature and the point at which it merges into a straight transverse line may be modified without departing from my invention, and said curvature may, if desired, be narrower than the tooth, as shown in Fig. 3.

The essential features of my invention are that the transverse curvature shall be located on the fastening end of the tooth and shall gradually diminish into a straight transverse line.

What I claim is—

1. A harrow-tooth made of spring metal curved upward from its point of attachment to the harrow-frame, then rearward and downward to its point of contact with the ground, and having the bending-point nearest the fastening end elevated above the horizontal plane of the tooth's attachment to the harrow-frame by means of a gradually-decreasing transverse curvature formed on the fastening end of the tooth, substantially as shown and described.

2. A harrow-tooth of spring metal curved so that the main portion of the tooth shall be located above the horizontal plane of the tooth's attachment to the harrow-frame, and provided with a transverse curvature extending from the point of the tooth's attachment to the harrow-frame well into the bending portion of the tooth and gradually diminishing into a straight transverse line, substantially as shown and described.

3. A harrow-tooth made of spring metal curved upward from its point of attachment to the harrow-frame, then rearward above said frame and downward to its point of con-

tact with the ground, and provided with a transverse curvature extending from the fastening end of the tooth well into the bending portion thereof, said transverse curvature being gradually diminished from the point of the tooth's attachment to the harrow-frame upward and backward into a substantially straight transverse line, substantially as shown and described.

ROBERT W. HARDIE.

Witnesses:
CHAS. B. TEMPLETON,
MARIA L. DORIS.