

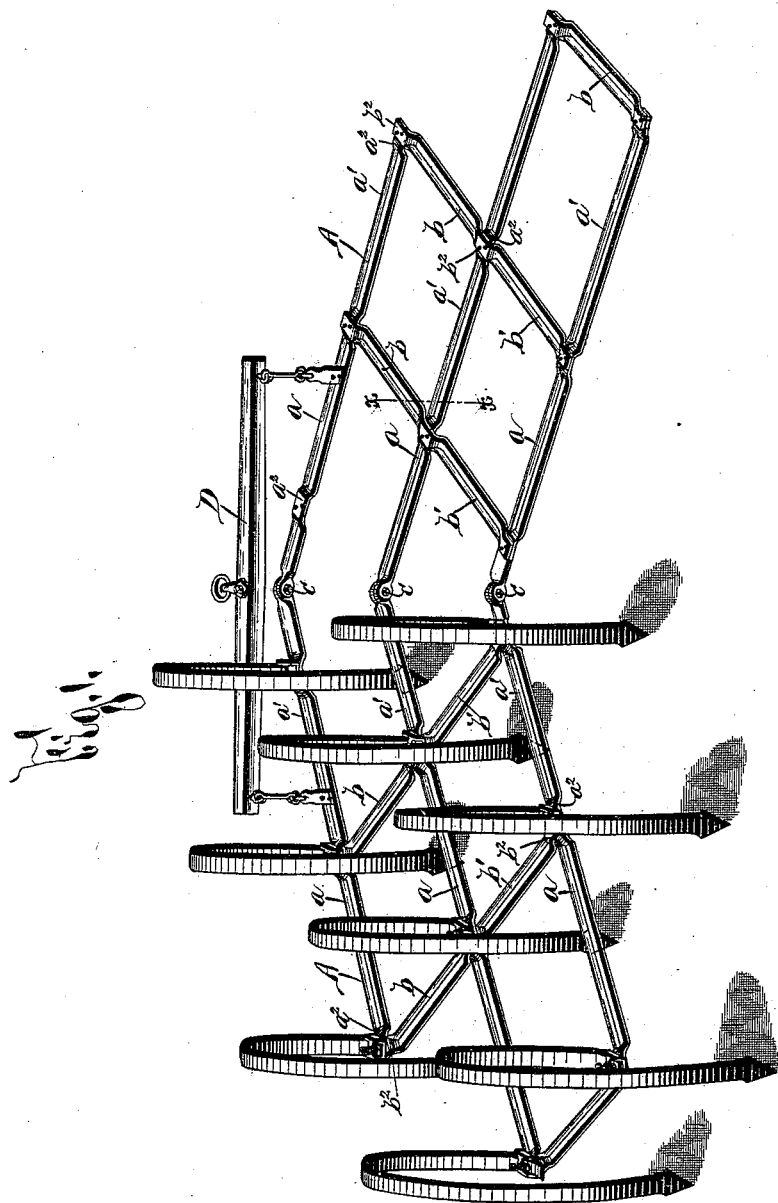
(No Model.)

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HARROW.

2 Sheets—Sheet 1.

No. 420,848.

Patented Feb. 4, 1890.



WITNESSES:

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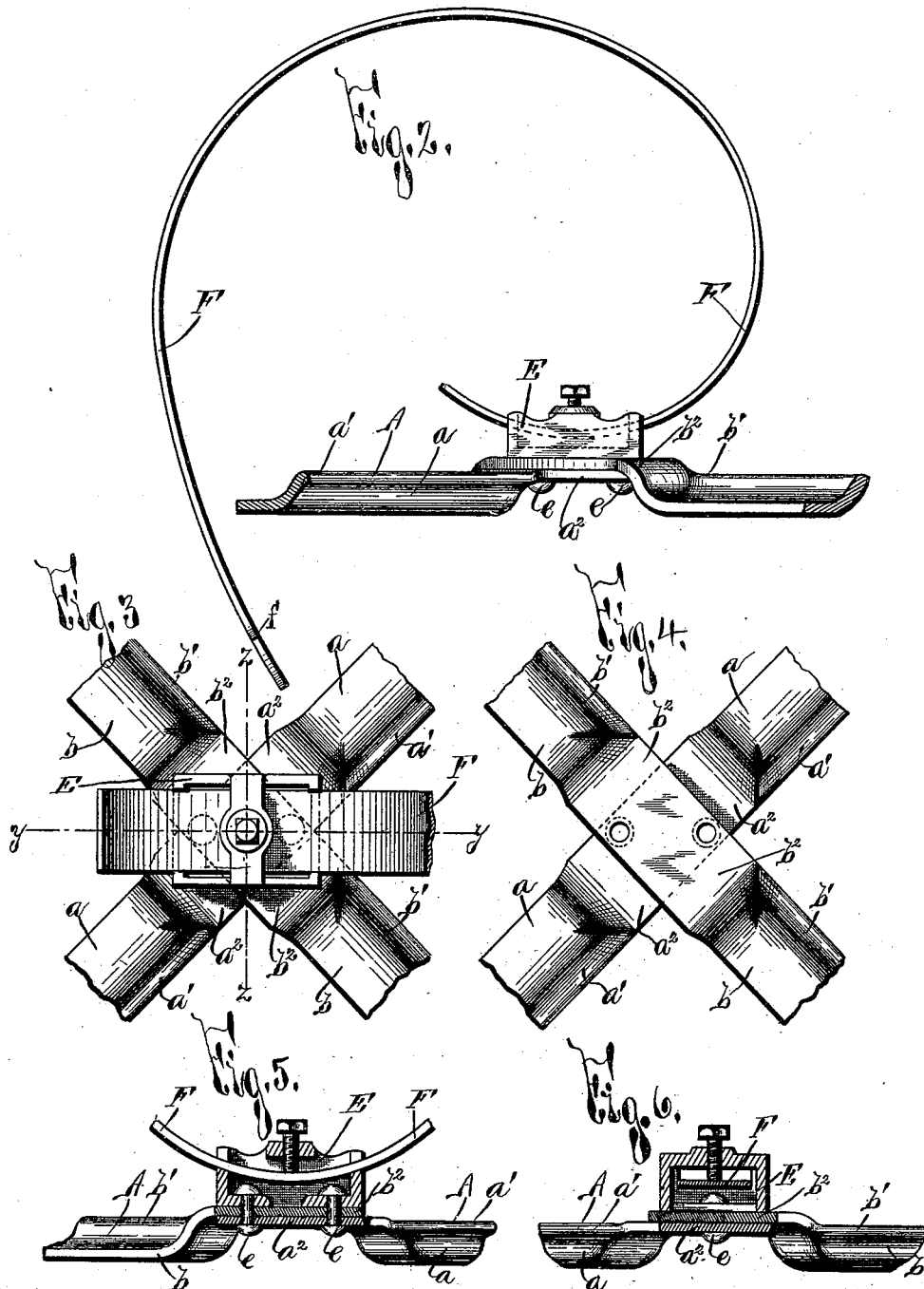
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# UNITED STATES PATENT OFFICE.

HARRY WIARD AND JAMES L. JUDD, OF SYRACUSE, NEW YORK.

## HARROW.

SPECIFICATION forming part of Letters Patent No. 420,848, dated February 4, 1890.

Application filed April 29, 1889. Serial No. 308,972. (No model.)

*To all whom it may concern:*

Be it known that we, HARRY WIARD and JAMES L. JUDD, of Syracuse, in the county of Onondaga, in the State of New York, have invented new and useful Improvements in Harrows, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

Our invention relates to an improved harrow, and has for its object the production of a simple and effective harrow of novel and peculiar construction, allowing the same to be readily and economically manufactured and insuring great durability of wear and efficiency in use; and to this end it consists, essentially, in a harrow-frame composed of draft and cross bars secured together, either or both of said bars being formed with their rearward edge depressed and their forward edge upturned or runner-shaped.

It also consists in so constructing the draft and cross bars of the harrow that, although either or both of them are provided with their rearward edge depressed below the forward upturned or runner-shaped edge, yet the points or surfaces where they are secured to each other lie snugly one upon the other, in order that they may be readily secured; and it furthermore consists in depressing said rearward edge or wearing-surface below these intersecting points of the harrow-bars, so that the securing means, whether rivets or bolts, will be protected from wear during the use of the harrow.

It still further consists in causing the wearing-surfaces of the draft and cross bars to be in the same plane and also in the detail construction and arrangement of the parts of our harrow, all as hereinafter more fully described, and pointed out in the claims.

In describing our invention reference is had to the accompanying drawings, forming a part of this specification, in which like letters indicate corresponding parts in all the views.

Figure 1 is a perspective view of our improved harrow, the teeth being removed from one view thereof in order to more clearly illustrate the construction of the frame. Fig. 2 represents a sectional view on line *xx*, Fig. 1, clearly illustrating the manner in which the draft and cross bars are imposed or lapped

one above the other, and also illustrating the tooth operatively secured upon the frame. Fig. 3 is a top plan view of the parts illustrated in elevation in Fig. 2. Fig. 4 is a like view to Fig. 3, the tooth being removed from the frame for the purpose of more clearly illustrating the union of the draft and cross-bars. Fig. 5 is a sectional view taken on line *yy*, Fig. 3, still further illustrating the construction of the parts illustrated in said figure; and Fig. 6 is a cross-section taken on line *zz*, Fig. 3.

The frame A is composed of draft-bars *a* and cross-bars *b*, and is preferably formed of two like halves, the draft-bars *a* of which meet each other at an angle, and are preferably hinged together at their forward extremities by a bolt *c* or other suitable means.

Secured to the frame in any desirable manner is the evener or draw-bar D of suitable form and construction.

It is well known that a harrow, in order to be efficient in use, must be so constructed that it shall present the least amount of resistance to the soil over which it is drawn, and this desirable result we obtain by depressing the rearward edge of either or both of the draft and cross bars and causing the forward edge *a'* to be turned upward from the rearward edge in the form of a runner. This upturned or runner-shaped edge preferably rises from the rearward edge in a curve and allows the harrow to ride over the earth or other substance with which it is contacted, and entirely prevents the frame burying itself, which would otherwise be the case when tilling mellow ground. By this means we obtain a harrow which can be drawn with the least amount of force, and which thus possesses a feature of great desirability. Moreover, as the rearward edge is depressed below the forward edge, any material which may be forced over the forward edge will readily pass rearwardly from the harrow-frame and will not remain thereupon. The cross-bars, which are also preferably provided with their rearward edge depressed below the forward edge and the forward edge *b'* upturned or runner-shaped, are secured to the draft-bars and preferably on top thereof.

In order to facilitate the securing together of

the draft-bars  $a$  and the cross-bars  $b$ , we form the same at their securing-points with the flat surfaces  $a^2$  and  $b^2$ , preferably in a horizontal plane, with the rearward edge of either or both of said bars depressed below said securing-surface. By this means the harrow-bars can be readily secured together by rivets or other suitable means, since the flat surface  $b^2$  of the cross-bars lies snugly upon the flat surface  $a^2$  of the draft-bars. Moreover, by depressing the plane of the wearing-surface or lower edge of the harrow-bars below these securing-surfaces, the rivets, bolt-heads, or other securing devices are raised above the earth, and their contact therewith is thus obviated, preventing wear thereupon and greatly lengthening the life of the harrow, since where the said securing means are so placed that they contact with the ground the friction incidental to the operation of the harrow soon wears the said parts away and necessitates their replacement. It will also be understood that if the draft and cross bars were not provided with these flat securing-points or surfaces  $a^2$  and  $b^2$  it would be necessary in securing the same together to insert a filling-piece between them, in order that there should be no rattling of the parts and that they should be securely held together, which construction would greatly increase the cost of manufacture.

By reference to the drawings it will be seen that the securing-surface of the cross-bar is raised its own thickness higher than the plane of the draft-bar, which arrangement is caused by lapping said securing-surface  $b^2$  over the like surface  $a^2$ . If desired, however, the surface  $a^2$  might be depressed the thickness of the surface  $b^2$  below the plane of the forward edge  $a'$  or the highest point of the draft-bar, and then when the cross-bar was secured thereto the plane of the securing-point  $b^2$  would be the same as that of the draft-bar.

As preferably constructed, the wearing-surfaces of the draft and cross bars of our harrow-frame are in the same plane, so that both bars are subject to wear or friction, thus evenly wearing the harrow-frame, lengthening its life, and also further preventing the burying thereof.

The bars  $a$  and  $b$  of the harrow-frame may be readily formed in the desired shape from sheet metal of the required thickness by means of suitable dies or a suitable bending-machine, thus producing a bar at a slight cost of production.

Instead of depressing the rearward edge of either or both of the draft and cross bars of the frame, so that the forward edge rises from the depressed edge in a curve, it will be evident that the said edge might be depressed so that the forward edge would rise therefrom with a straight incline without changing the operation of the harrow or altering the construction of the securing-points of the harrow-bars. It will also be evident that the

draft and cross bars could be lapped one above the other, so that their wearing-surfaces were in substantially the same place, without providing the said bars with the upturned forward edge. This arrangement would produce a very effective harrow, but would not be as desirable as if either or both of said bars were provided with an upturned forward edge.

As shown in Figs. 3, 5, and 6, a socket  $E$  is secured to the harrow-frame, and preferably to the points  $a$  and  $b^2$  thereof, by means of a suitable securing means, which preferably consists of rivets  $e$ , which, as illustrated, may also serve to secure together the draft-bars  $a$  and the cross-bars  $b$ . Mounted in said socket  $E$  are the harrow-teeth  $F$  of spring metal, with their free extremities passed over the forward edge of the socket  $E$ , then bent upward, backward, and then downward, with their free extremities  $f$  at the desirable distance below the harrow-frame.

The socket  $E$  forms the subject-matter of an application of even date herewith, and consequently in our present invention a description of the same is unnecessary. Although the rivets  $e$ , which secure the socket  $E$  to the harrow-frame are the preferable means of securing together the draft-bars and cross-bars, we do not wish to be restricted thereto, since other securing means may be employed; neither do we restrict ourselves to depressing the rearward edges of both the draft and cross bars, since a desirable form of harrow may be produced by depressing either or both of said bars. It will also be observed that the form of the runner edge and the securing-points of the harrow-frame may be somewhat varied from the above description without departing from the spirit of our invention.

Having thus fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. A harrow-frame having draft and cross bars secured to each other, the draft-bar being formed with a rearward wearing-surface and an upturned forward edge raised above the rearward or wearing edge, and a securing-point provided upon said draft-bar and formed by bending upward a portion of the rearward wearing-surface of the harrow-bar, substantially as and for the purpose described.

2. A harrow-frame bar composed of draft and cross bars overlapping one another, one of said bars having a downward bend adjacent to said lap and having the rearward portion thereof disposed in a horizontal plane and the forward remaining portion bent or rounded upward above the plane of said rearward portion, substantially as specified.

3. A harrow-frame bar having its wearing-surface depressed below its forward edge and having a portion of the depressed surface bent upward for forming a tooth-supporting surface, substantially as and for the purpose described.

4. A harrow-frame having draft and cross bars secured to each other, the securing-point of one of said bars being bent up above the rearward or wearing surface thereof, and a  
5 harrow-tooth supported upon said upturned points, substantially as and for the purpose specified.

5. A harrow-frame composed of intersecting bars having the portion thereof interposed between said intersections bent downward into substantially the same plane with each other and below the plane of said intersecting points, substantially as and for the purpose set forth.

15 6. A harrow-frame composed of intersecting bars having the portion thereof interposed between said intersections bent downward into substantially the same plane, one of said bars having the rearward part of said  
20 interposed portion disposed in a horizontal plane and having the remaining portion bent or rounded above the plane of said rearward portion, substantially as specified.

7. A harrow-frame bar having the rearward  
25 portion thereof disposed in one plane and the forward portion rounded or curved above said plane and having a securing-point bent upward above said forward elevated portion of the harrow-bar, substantially as and for the  
30 purpose set forth.

8. The combination of the bar *a*, having the upturned or runner-shaped edge *a'* and securing-surface *a''*, the bar *b*, having the upturned or runner-shaped edge *b'* and securing-surface *b''*, with a tooth-socket secured to  
35 the point of union of the bars *a* and *b*, substantially as and for the purpose described.

9. The combination of the bar *A*, having the upturned or runner-shaped edge *a'* and securing-surface *a''*, with the bar *b*, having the  
40 upturned or runner-shaped edge *b'* and the securing-surface *b''*, substantially as and for the purpose described.

10. A harrow-frame composed of intersecting bars having their lower or wearing sur-  
45 faces in substantially the same plane, one of said bars being formed with its wearing-surface bent upward at the point of intersection with the other bar for lapping thereupon, substantially as and for the purpose specified. 50

In testimony whereof we have hereunto signed our names, in the presence of two attesting witnesses, at Syracuse, in the county of Onondaga, in the State of New York, this 26th day of April, 1889.

HARRY WIARD.  
JAMES L. JUDD.

Witnesses:

JAMES MANNING,  
ARTHUR E. PARSONS.