(No Model.)

L. FRANCISCO.

ADJUSTABLE HARROW.

No. 303,274. Patented Aug. 12, 1884.

Fig. 1.

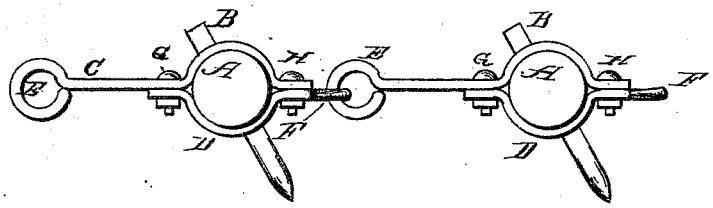


Fig. 2.

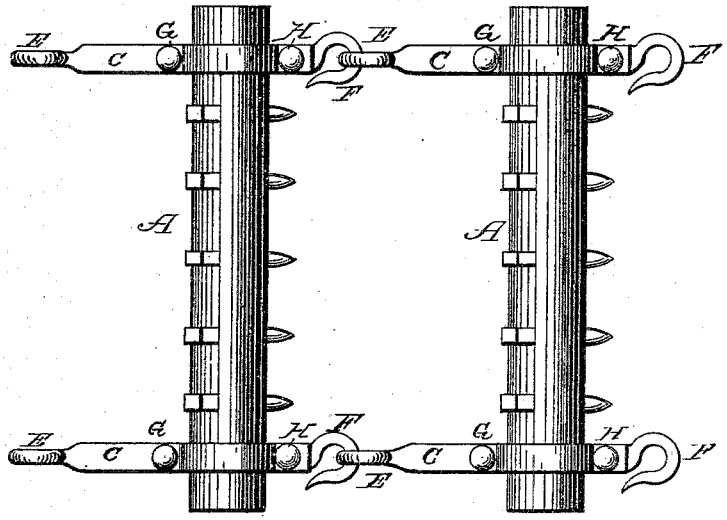
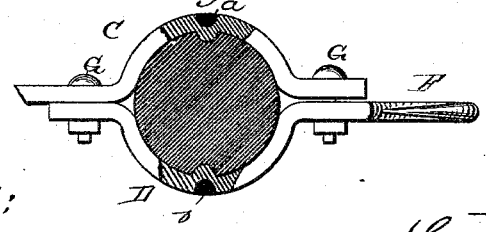


Fig. 3.



Witnesses;
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UNITED STATES PATENT OFFICE.

LEVI FRANCISCO, OF OAKLAND, WISCONSIN.

ADJUSTABLE HARROW.

SPECIFICATION forming part of Letters Patent No. 303,274, dated August 12, 1884.

Application filed May 1, 1883. (No model.)

To all whom it may concern:

Be it known that I, LEVI FRANCISCO, a citizen of the United States, residing at Oakland, in the county of Jefferson and State of Wisconsin, have invented certain new and useful Improvements in Adjustable Harrows; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in flexible harrows, and pertains to that class in which the teeth are adapted to be adjusted at various angles of the draw-bars, as may be desired.

My improvement consists in the device by which the cross-bars through which the teeth are inserted are secured to the draw-bars and retained at the several points of adjustment at which it may be desired to secure the teeth.

My invention is further explained by reference to the drawings, in which Figure 1 represents a side view. Fig. 2 is a top view of one of the sections of the harrow, two or more similar sections being arranged alongside of each other. Fig. 3 is a detail view.

Like parts are represented by the same reference-letters throughout the several views.

A represents the cross-bars, which are preferably made cylindrical in shape. B represents the teeth. C and D are the draw-bars by which the several cross-bars A are connected together. The forward end of the upper bar, C, is longer than the rear end, and is provided with a hook, E, which is adapted to engage in the next succeeding lower bar, D, which is provided with a hook, F. The bars C and D are curved conversely to each other, as shown in Fig. 1, whereby they are adapted to fit the rounded bar A. The bars C and D are secured together around the bar A by bolts G and H. The annular space between the bars C and D, when said bars are bolted together, is slightly less than the circumference of the cross-bars A, so that when said cross-bar is secured between said draw-bars there is a small space left between said draw-bars, which permits said draw-bars to be drawn toward each other around said cross-bars without coming in contact, whereby said rounded bars A are prevented from turning in their bearings in the draw-bars, and whereby ample space is allowed for shrinkage of said rounded bars, and provision made for drawing said draw-bars together around them when shrunken. The bars C and D may be made of ordinary flat bar-iron, which is readily forged into the shape shown, and secured together with ordinary bolts around the cross-bars. The teeth may be inclined forward, rearward, or adjusted at any intermediate angle desired.

When desirous to change the angle of adjustment of the teeth, one or both of the bolts G and H may be slackened, when the rounded bars are readily turned in their bearings until the teeth are brought to their desired angle of adjustment. This done, the bolts G and H are again tightened, when the rounded bars are rigidly secured and the teeth retained at the desired angle of adjustment.

To increase the friction of the draw-bars upon the cross-bars, one or more small burrs, *a* and *b*, are formed by indenting the said draw-bars C and D, whereby a small burr is caused to project from the inner annular surface of the draw-bars, which engages in the surface of the rounded bars A and prevents them from turning in their bearings.

I am aware that the toothed bars of a harrow have heretofore been connected together by draw-bars fitted to their upper surfaces, against which they are held by U-shaped clips beneath their lower surfaces, as shown in Patent No. 162,306, and in Patent No. 166,763, and I make no claim to the devices as shown and combined in those patents; but I believe myself to be the first to produce a flexible harrow with adjustable toothed bars, having the bars clasped and held by conversely-bent draw-bars, made rigid and held together by simple and cheaply-made bolts and nuts, as described.

Having thus described my invention, what

I claim as new, and desire to secure by Letters Patent, is—

In an adjustable toothed harrow, the combination, with the respective toothed bars A, of upward-curved draw-bar C, downward-curved draw-bar D, and binding-bolts G and H, said downward and upward curved draw-bars being provided at their respective free ends the one with a hook and the other with an eye, adapted thereby to attach the several sections of the harrow together flexibly, substantially as and for the purpose specified.

In testimony whereof I affix my signature in presence of two witnesses.

LEVI FRANCISCO.

Witnesses:

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