(No Model.)

# W. S. A. GRAHAM.

## HARROW.

No. 346,744. Patented Aug. 3, 1886.

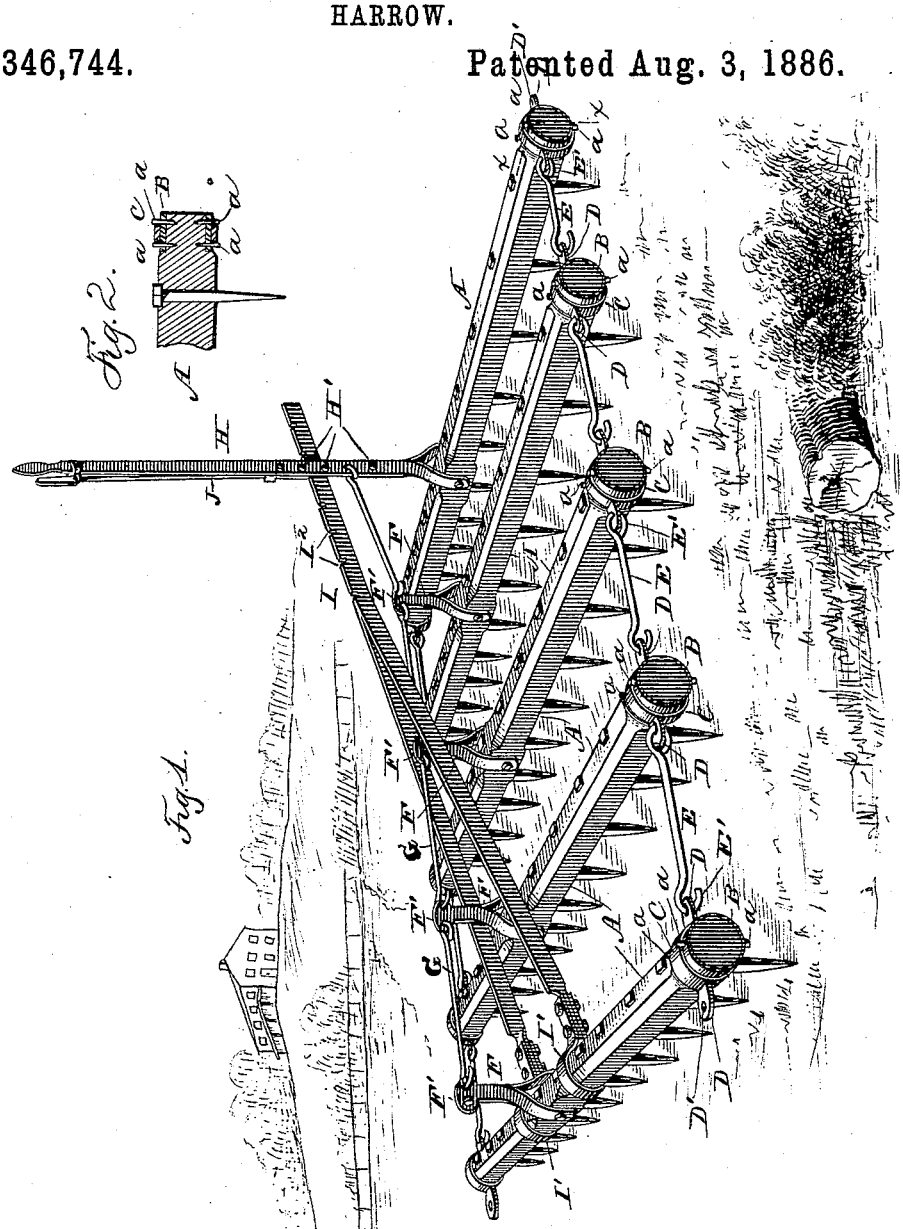

Fig. 2.

Fig. 1.

Witnesses:
William R Mathews
Chas. A. Graham.

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# UNITED STATES PATENT OFFICE.

WILLIAM S. A. GRAHAM, OF LANCASTER, WISCONSIN.

## HARROW.

SPECIFICATION forming part of Letters Patent No. 346,744, dated August 3, 1886.

Application filed August 7, 1885. Serial No. 174,048. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM S. A. GRAHAM, a citizen of the United States, and a resident of Lancaster, in the county of Grant and State of Wisconsin, have invented certain new and useful Improvements in Harrows; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to that class of harrows which are constructed with pivoted tooth-bars which are flexibly or movably connected together; and it consists in the improved construction, arrangement, and combination of parts of a harrow of this class, in which the tooth-bars may be adjusted at any desired angle and secured in their adjusted position by means of the improved mechanism which will be hereinafter fully described and claimed.

Referring to the annexed drawings, Figure 1 is a perspective view of my improved adjustable harrow, and Fig. 2 is a sectional detail view taken on line *x x*, Fig. 1.

The same letters of reference indicate corresponding parts in both the figures.

Referring to the several parts by letter, A A represent the transverse tooth-bars, the ends of which are rounded, and have preferably a smooth metal band, B, shrunk tightly on them, as shown, while a looser metal band or collar, C, is placed upon the rounded ends of the tooth-bars, encircling the tight band B, and being held in place on the ends of the bars by means of pins *a*. These collars C (which are of such a size as to adapt them to turn readily on the ends of the tooth-bars) are formed on diametrically-opposite sides with projecting lugs D, having perforations D′, and the ends of the several tooth-bars are connected movably together by rods E, having hooks E′ formed at each of their ends, which are inserted or hooked through the perforated lugs D, this arrangement serving to connect the several tooth-bars securely, yet movably, together.

F F represent short posts, which are bifurcated at their lower ends to adapt them to be secured rigidly in a vertical position to the center of each of the transverse tooth-bars, except the rear bar, to which the operating or adjusting lever is secured, the said short vertical posts having their upper ends flattened to form heads F′, which lie in a longitudinal plane with respect to the length of the harrow, and are provided with a front and rear perforation, through which fit the hooked ends of coupling-rods G, which connect the upper ends of the vertical central posts together, as shown.

H indicates the operating or adjusting lever, the lower end of which is bifurcated, to permit of the lever being secured rigidly in a vertical position to the center of the rear tooth-bar of the harrow, the lever being provided above its bifurcated lower portion with a series of transverse perforations, H′, in any one of which may be hooked the rear hooked end of the coupling-rod which connects the lever with the top of the vertical post on the tooth-bar which is next to the rear bar.

I indicates a long adjusting-bar, the rear bifurcated end of which is movably secured by means of collars I′, secured to the said ends, to the central portion of the first or forward tooth-bar of the harrow, the adjusting-bar being supported upon the upper side of the tooth-bar next to it, over which it passes, and its rear end, which is provided on the upper edge with a series of notches, $I^2$, extending against the side of the lever H on the rear tooth-bar, so that the said notches may be engaged by a spring-actuated catch, J, secured upon the side of the said lever.

From the foregoing description, taken in connection with the accompanying drawings, the construction of my improved harrow will be readily understood. To incline the harrow-teeth backward, all that is necessary is to take the upper end of the lever in the hand, and, by pressing the upper end of the handle of the spring-actuated catch, release the catch from the notch $I^2$ in which it may be resting, when the lever is thrown forward, thereby, through the links G, connecting the tops of the vertical central posts and the lever, turning the tooth-bars to the required backward angle, their smooth rounded ends turning readily in the loose collars C, as will be readily understood; and when the teeth are at the required inclination the spring-actuated lever is released

and allowed to engage with the registering-notch in the rear end of the adjusting-bar. To incline the harrow-teeth forward, the lever is pulled backward.

It will be seen that by means of the spring-actuated catch J engaging with the notches $I^2$ in the rear end of the bar I the harrow may be readily secured in its adjusted position, while by removing the rear end of the rod which connects the lever to the last of the vertical central posts on the tooth-bars from one to the other of the series of transverse apertures H′ in the lever a nice adjustment of the angle at which it is desired to secure the tooth-bars can be effected. By providing the ends of the tooth-bars with the tight metal bands, and the loose metal collars encircling the said bands and connected by the coupling-rods E, the bars can turn smoothly and with little friction when moved by the lever H, and there will be no danger of their binding or sticking.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

The combination, in a harrow, of a series of beams secured at their ends within loops and having an upright secured to the middle portion of each beam, the rear upright being longer than the others, and having a series of holes at its lower portion and a spring-catch secured to its upper portion, links connecting the tops of the uprights with each other and with the longer upright, and a brace-rod having a series of notches upon its rear portion, and having its front end bifurcated and each bifurcated portion pivotally connected with the front beam, as shown and described.

WILLIAM S. A. GRAHAM.

In presence of—
CHAS. N. GRAHAM,
WM. A. MATHEWS.