(No Model.) 2 Sheets—Sheet 1.

N. O. STARKS.

HARROW.

No. 521,392. Patented June 12, 1894.

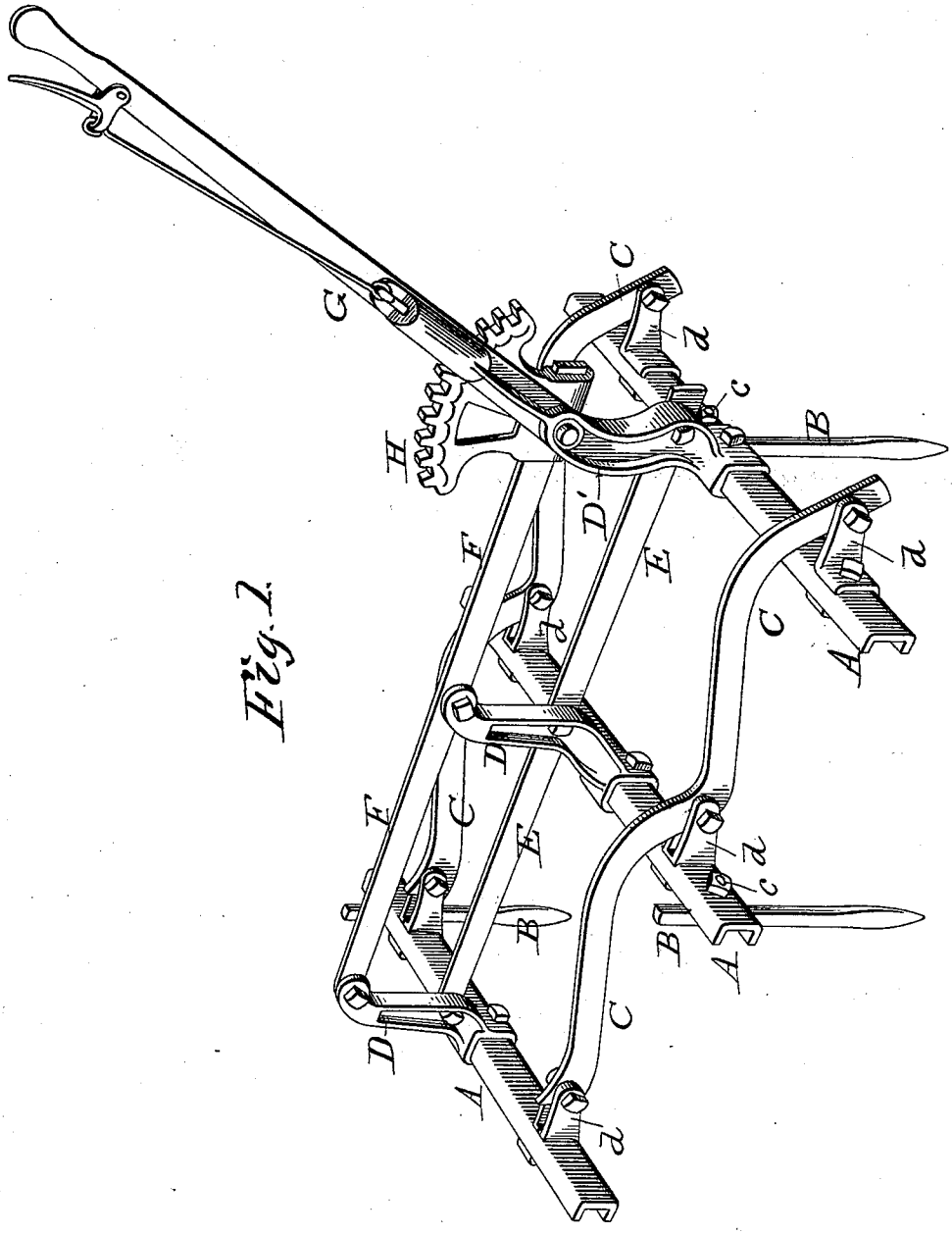

Fig. 1.

Witnesses:
James F. Duhamel.
Horace A. Dodge.

Nils O. Starks
Inventor:
by Dodger Sons,
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THE NATIONAL LITHOGRAPHING COMPANY,
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(No Model.)

2 Sheets—Sheet 2.

N. O. STARKS.

HARROW.

No. 521,392. Patented June 12, 1894.

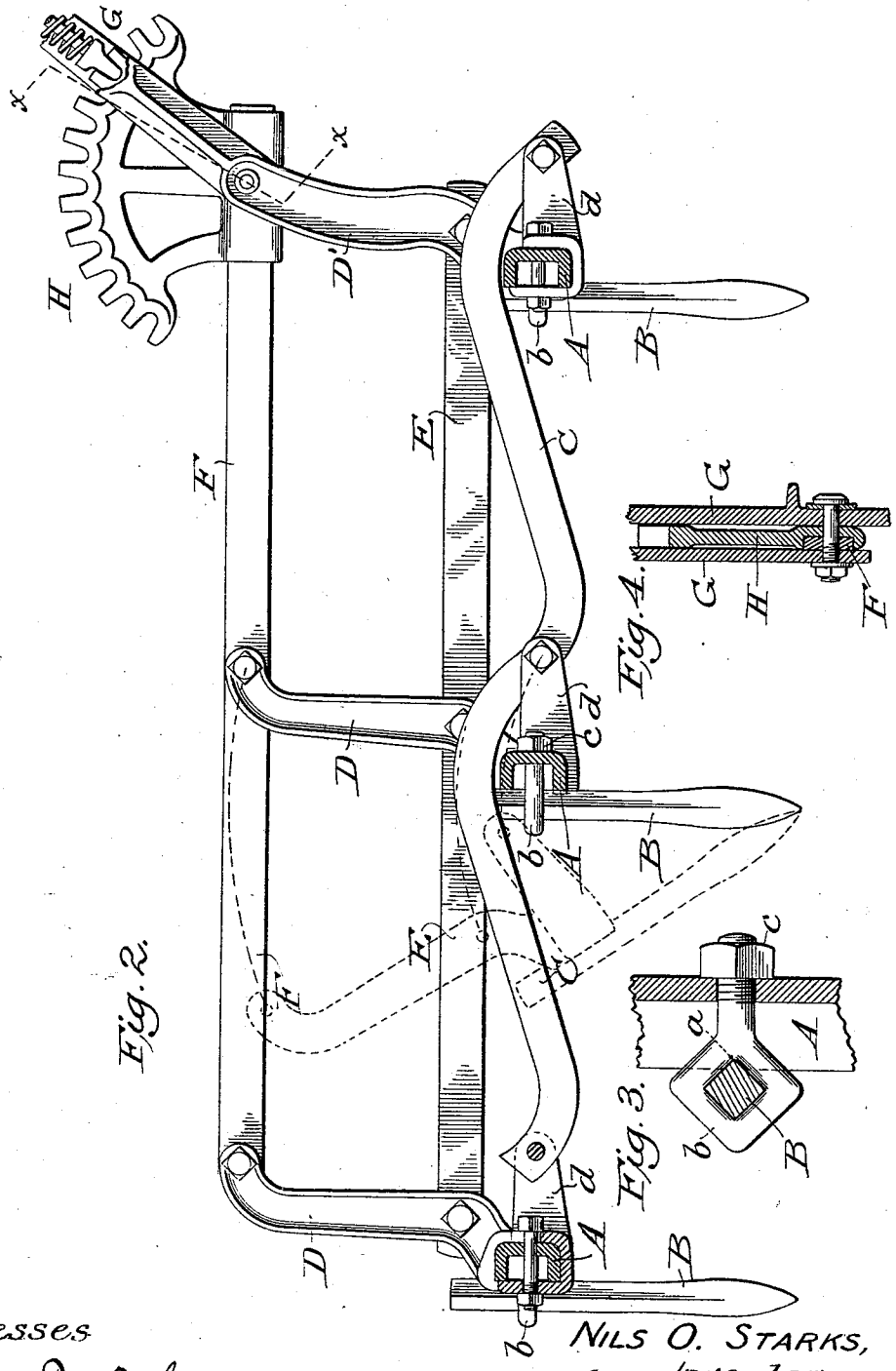

Fig. 2.

Fig. 4.

Fig. 3.

Witnesses

James F. Duhamel.

Horace A Dodge.

NILS O. STARKS,
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UNITED STATES PATENT OFFICE.

NILS O. STARKS, OF MADISON, WISCONSIN.

HARROW.

SPECIFICATION forming part of Letters Patent No. 521,392, dated June 12, 1894.

Application filed March 28, 1893. Serial No. 468,026. (No model.)

To all whom it may concern:

Be it known that I, NILS O. STARKS, a citizen of the United States, residing at Madison, in the county of Dane and State of Wisconsin, have invented certain new and useful Improvements in Harrows, of which the following is a specification.

My invention relates to harrows, and consists in a novel means of mounting the teeth, and in connecting and operating the various bars or beams and the teeth.

In the drawings,—Figure 1 is a perspective view of a portion of my improved harrow; Fig. 2, side elevation of the same; Fig. 3, a sectional view showing the manner of attaching the teeth. Fig. 4 is a section on the line *x*—*x*, Fig. 2.

A A indicate the tooth-beams or bars which are preferably ⊐-shaped in cross section, and which extend transversely parallel to each other. These beams are notched on the front edges of their flanges as at *a* to receive the edge or corner of the angular tooth B, as shown in Fig. 3, and the said tooth is held in proper position relative to the bar or beam by means of an eye-bolt *b* encircling the tooth and fastened to the beam by nut *c*. Secured to and projecting horizontally from the rear face of each beam, is an arm *d*,—two or more,—the arms of the respective beams being connected by means of rods or bars C which are curved where they pass over the respective beams, so as to permit the beams to be tipped or rocked. The number of arms *d* and connecting rods C will be varied according to the width of the harrow.

Secured to each of the beams or bars and projecting upwardly therefrom, is a bracket D,—the brackets on the respective beams being connected by means of parallel bars E and F as shown in Figs. 1 and 2. One of these brackets, D′, is extended upward to form a handle or lever G which carries a pawl to engage a rack H, which latter is made fast to the rear end of bar F. Now when the dog of the lever G is released from the rack, the lever may be swung forward, and in thus swinging forward it will act directly upon the rear beam and tip or rock it, and, acting through the connecting bars E F and brackets D, will effect a corresponding rocking of the remaining beams; the connecting rods C at or near the ends of the beams insuring their parallelism throughout their various adjustments. By means of the lever and the connections, any desired inclination may be given to the teeth.

From the foregoing description, it will be seen that I have an exceedingly compact and strong harrow, and one that is quickly and easily adjusted to vary the inclination of the teeth. When the teeth are adjusted they cannot be thrown out of adjustment so long as the pawl or dog on lever G remains in engagement with the rack bar, because the latter is fast to the bar F, thereby preventing any movement of the lever relatively to the said bar.

In small, light harrows, the lower bar E might be omitted, but it will generally be found advisable to employ it, as it lessens the strain on the other parts and may be used in emergencies in case the bar F should be rendered useless from any cause.

The arms and brackets secured to the beams may be variously constructed without departing from the invention.

Having thus described my invention, what I claim is—

In a harrow, the combination with two or more beams and their teeth; of means for connecting and for rocking the beams; an arm *d* projecting from each beam; and the rods C extending from one beam to the next and connected with the arms *d*; said rods C being curved or arched where they pass over the beams.

In witness whereof I hereunto set my hand in the presence of two witnesses.

NILS O. STARKS.

Witnesses:
EDWARD F. APPLEBY,
W. R. BAGLEY.