

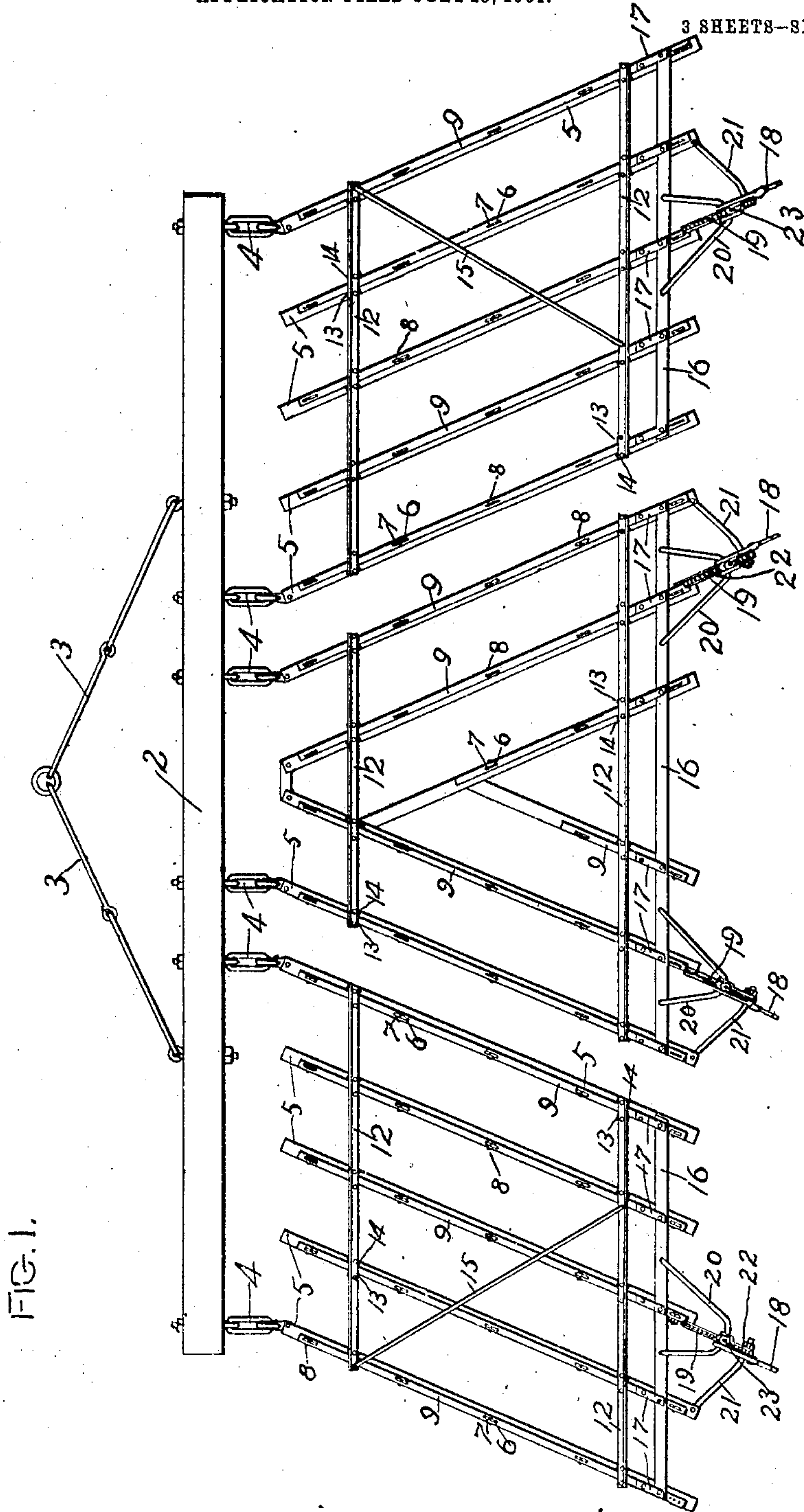
No. 844,764.

PATENTED FEB. 19, 1907.

J. L. WARE.
HARROW.

APPLICATION FILED JULY 25, 1904.

3 SHEETS—SHEET 1.



WITNESSES.

E. G. Stande
M. Hagerty

INVENTOR

JOSEPH L. WARE

BY *Paul Paul*
HIS ATTORNEYS

No. 844,764.

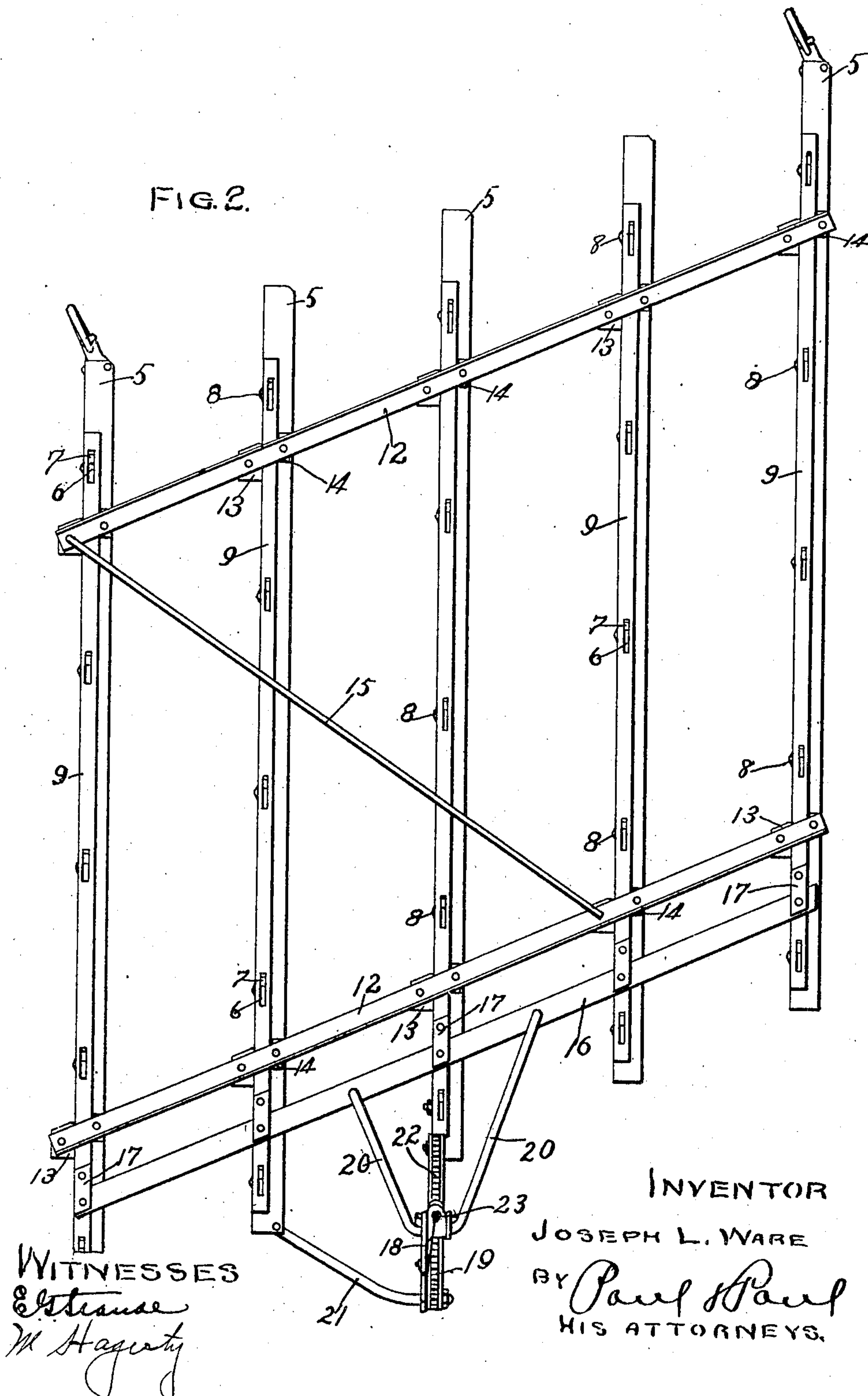
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3 SHEETS—SHEET 2.

FIG. 2.



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3 SHEETS—SHEET 3.

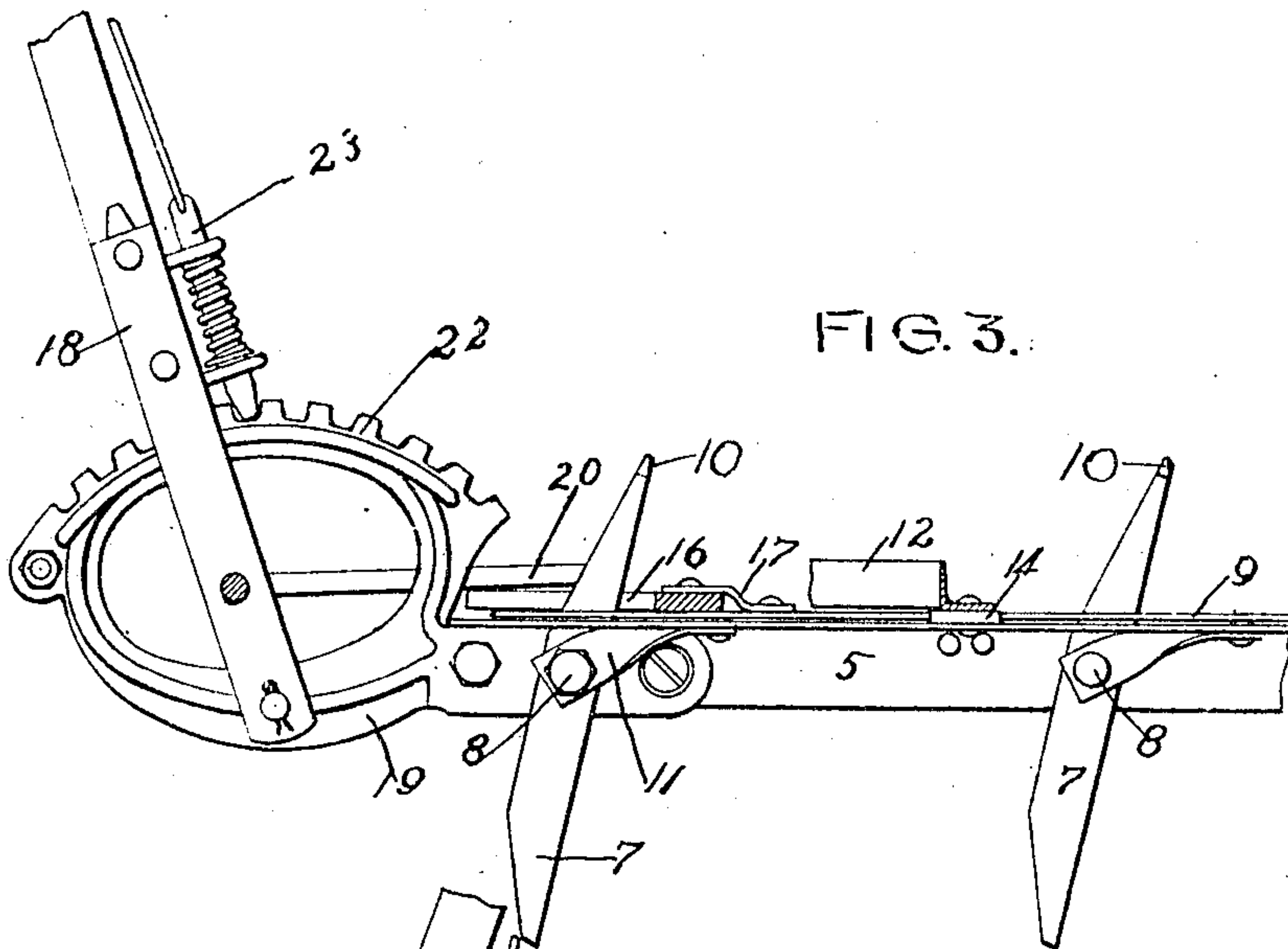


FIG. 3.

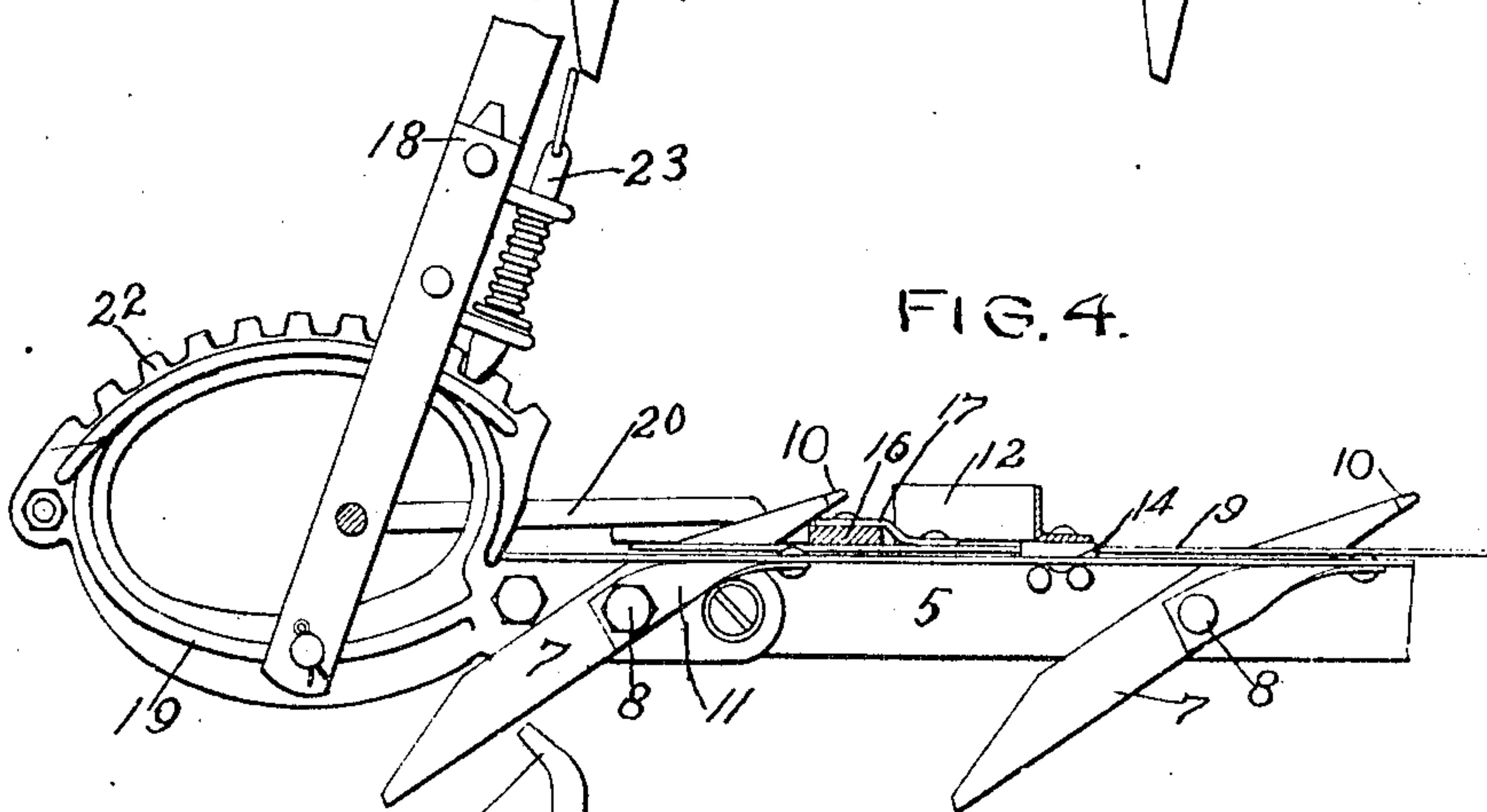


FIG. 4.

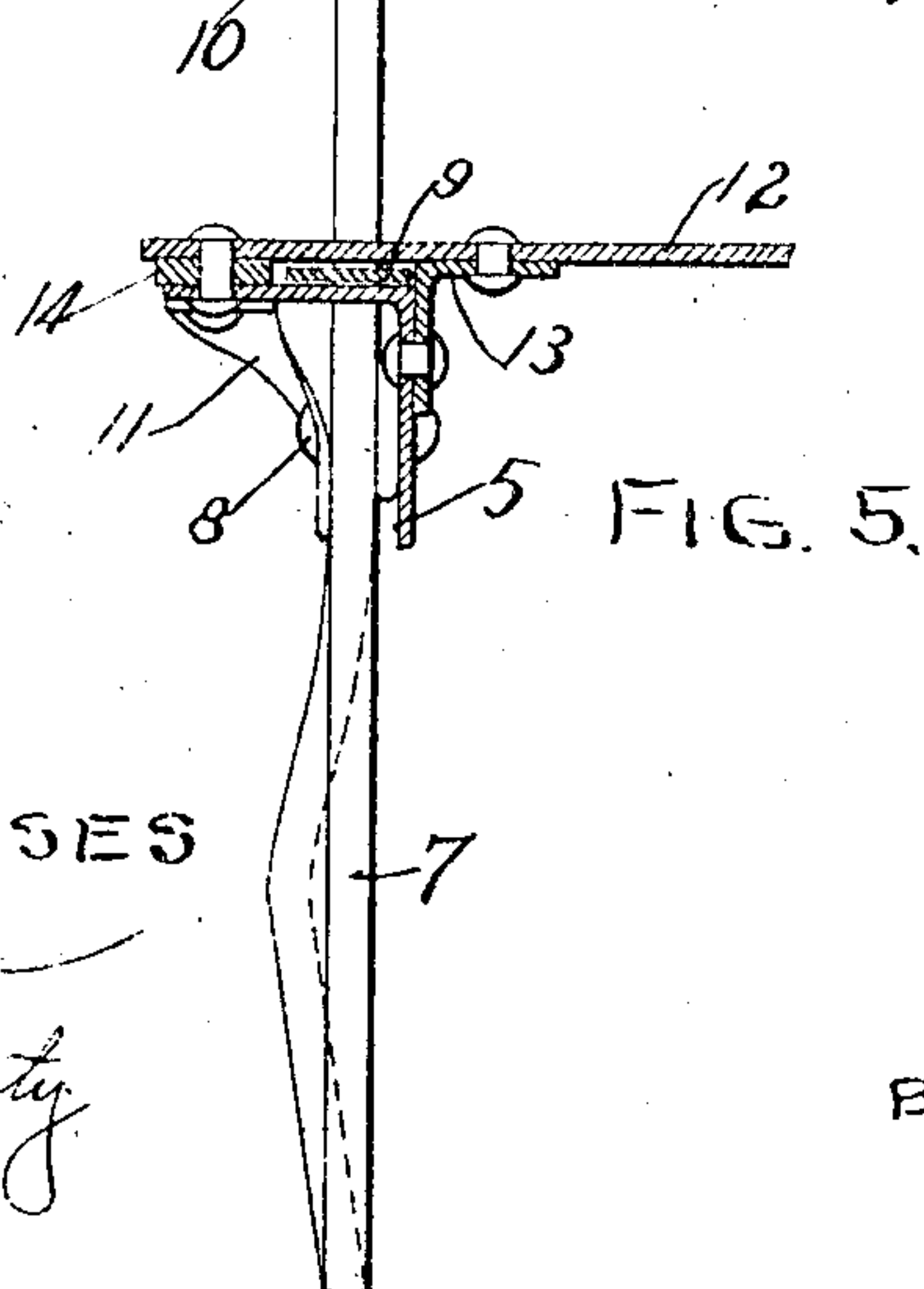


FIG. 5.

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UNITED STATES PATENT OFFICE.

JOSEPH L. WARE, OF ST. PAUL, MINNESOTA.

HARROW.

No. 844,764.

Specification of Letters Patent.

Patented Feb. 19, 1907.

Application filed July 25, 1904. Serial No. 217,916.

To all whom it may concern:

Be it known that I, JOSEPH L. WARE, of St. Paul, Ramsey county, Minnesota, have invented certain new and useful Improve-
5 ments in Harrows, of which the following is a specification.

My invention relates generally to harrows made up of several independent sections or frames, and particularly to that class known
10 as "lever-harrows."

The object of my invention is to provide a harrow of light but strong and durable construction and one that will spring and yield upon striking an obstruction, and thereby
15 lessen the danger of breakage.

A further object is to provide improved means for bracing the harrow-teeth which will not clog with grass or roots.

A further object is to provide means for
20 protecting the pivots of the teeth and preventing the dirt and refuse of the field from clogging therein.

A further object is to improve a harrow of similar type shown and described in Letters
25 Patent of the United States No. 640,722, issued to me January 2, 1900.

The invention consists generally in various constructions and combinations, all as hereinafter described, and particularly point-
30 ed out in the claims.

In the accompanying drawings, forming part of this specification, Figure 1 is a plan view of a harrow embodying my invention and composed of three independent sections.
35 Fig. 2 is a plan view of one of the end sections. Fig. 3 is a sectional view of the rear portion of the harrow, showing the mechanism employed for tilting the teeth either backward or forward. Fig. 4 is a similar
40 view with the teeth thrown back to the limit of their movement. Fig. 5 is a cross-section of one of the harrow-bars, showing the manner of supporting the teeth thereon.

In the drawings, 2 represents a harrow
45 head or draft-beam provided with the usual draft-rods 3 3. The sections of the harrow are connected with the draft-beam by links 4. These sections are of similar construction, but different in shape, those at the ends be-
50 ing in the form of diamonds, while the middle section is A-shaped. The details of construction of the harrow-frames of all the sections are the same, and similar means are employed for operating the pivoted teeth,
55 and it will only be necessary, therefore, to explain one section in detail.

5 represents the bars of the harrow-section, of which there may be any suitable number, according to the size of the harrow. I have shown five bars in Fig. 2, composed of
60 angle-iron on account of its strength and rigidity in comparison to its weight, and these bars are arranged, as shown in Fig. 1, at an angle on the draft-line of the harrow and described in my former patent above re-
65 ferred to. Each of the bars 5 is provided at intervals with a slot 6 to receive a tooth 7, mounted on a pivot 8, that is secured to the vertical flange of the bar. A flat bar 9 is
70 provided on each of the bars 5, having slots that coincide with those in the angle-bars and adapted to receive the upper ends of the teeth and allow them to swing forward and
75 back and permit the teeth to be adjusted at different angles with respect to the frame of the harrow. The teeth are twisted at their
lower ends for the purpose described in my patent above referred to and are provided
80 with laterally-turned upper ends 10, which prevent said ends from working in under the bars 9 when they are thrown forward to the limit of their movement, as shown in Fig. 4.

The pivots of the teeth on the vertical flanges of the angle-bars are strengthened and braced by means of clips 11, that are se-
85 cured at one end to said pivots and at their other end to the horizontal flanges of the angle-bars. (See Fig. 3.) This arrangement of these clips forms a right-angle brace to the teeth and pivots and greatly strengthens the
90 same, preventing breakage should the teeth be brought with considerable force against a stone, root, or other obstruction.

The slots in the angle-bars, as will be noted from an examination of Figs. 1 and 2, are
95 near the vertical flanges 7 at the outside, which as the harrow is moved over the field will act as shields for the teeth-pivots, preventing dirt and refuse from collecting and clogging the teeth. The bars 9 are adapted
100 to slide longitudinally on the angle-bars 5 and are held in place thereon by cross-bars 12, also preferably angled in form and secured to the brackets 13 on the vertical flanges of the
105 angle-bars and also to the horizontal flanges of said bars through blocks 14. I prefer to provide two of the brace-bars 12, connected by a rod 15. For convenience I prefer to utilize the same pivot that secures the end of the brace 11 to the horizontal flange for se-
110 curing the cross-bar 12 thereto. Near the rear ends of the bars 9 I provide a cross-bar

16, secured to said bars 9 by clips 17 and connected to an operating-lever 18, that is pivoted on a quadrant 19 by suitable pivot-links 20. The quadrant 19 is bolted at its forward end to the middle angle-bar and connected at its rear end to one of the adjoining bars by a brace-rod 21. A series of teeth 22 are provided on the quadrant adapted to be engaged by a spring-pressed latch 23, mounted on the lever 18.

The movement of the lever forward or back will slide the bars 9 on the angle-bars 5 and oscillate the teeth on their pivots and permit the operator to adjust them at any desired angle with respect to the supporting-frame. While in use the teeth will usually be adjusted, as shown in Fig. 3, in a substantially upright position; but after a few turns around the field and grass, roots, and other refuse have been collected the operator will throw the lever 18 forward, tilting the teeth backward so that they will clear. They can then be returned to their normal position.

When the teeth strike an obstruction, the bars 9 and their connections with the operating-lever will yield slightly, the links 20 turning slightly on their pivots, and cause the teeth to rebound and have a resilient action that permits the use of much lighter material in the construction of the harrow than would be practicable if the teeth were rigidly supported and were unyielding upon striking an obstruction. The frame of the harrow will also yield laterally and allow the teeth to slip by an obstruction that would, if the frame were rigid, be apt to cause a breakage or stop further movement altogether.

The middle section is substantially the same as the one heretofore described, except that the angle-bars are inwardly inclined, giving the section the form of the letter A, the two inner bars being shorter than those at the outside. The teeth are supported in a similar manner. Light angle-bars are provided to connect and strengthen the teeth-supporting bars and a double-lever mechanism is provided on each side of the center of the A for tilting the teeth.

I claim as my invention—

1. A lever-harrow comprising a series of angle-bars having their vertical flanges on the outer side and depending below the hori-

zontal flanges of said bars, a series of teeth pivotally secured on the inner faces of said vertical flanges and projecting upwardly through slots in said horizontal flanges, a bracing means for said teeth and means for tilting them, substantially as described.

2. The combination, with angle-bars, of a series of teeth pivoted on the vertical flanges thereof and projecting through slots in the horizontal flanges, and clips connecting the pivots of said teeth and said horizontal flanges at right angles substantially to said pivots.

3. In a harrow, the combination, with the angle-bars, of teeth pivoted on the vertical flanges thereof and projecting through slots in the horizontal flanges, operating-bars slidably arranged on said horizontal flanges and having slots to receive the upper ends of said teeth, a lever mechanism connected with the said operating-bars, cross-bars connecting said angle-bars and secured to the vertical and horizontal flanges thereof, and between which cross-bars and horizontal flanges said operating-bars are slidable.

4. In a harrow, the combination, with the angle-bars, of a series of teeth pivotally secured to the vertical flanges thereof, operating-bars mounted on the horizontal flanges of said angle-bars and engaging the upper ends of said teeth, brackets secured to the vertical flanges of said angle-bars, and cross-bars secured to said brackets and also to said horizontal flanges, and means for reciprocating said operating-bars, substantially as described.

5. A harrow comprising a series of angle-bars, a series of teeth pivoted on the vertical flanges of said bars which depend below the horizontal flanges, the upper ends of said teeth projecting through slots provided in said horizontal flanges, operating-bars resting upon said horizontal flanges and engaging said teeth, and cross-bars secured to said vertical and horizontal flanges and forming guides for said operating-bars, substantially as described.

In witness whereof I have hereunto set my hand this 16th day of January, 1904.

JOSEPH L. WARE.

In presence of—

RICHARD PAUL,
M. HAGERTY.