

No. 667,235.

Patented Feb. 5, 1901.

Z. M. LINDLEY.  
FOLDING AND ADJUSTABLE HARROW.

(Application filed July 24, 1900.)

(No Model.)

Fig. 1.

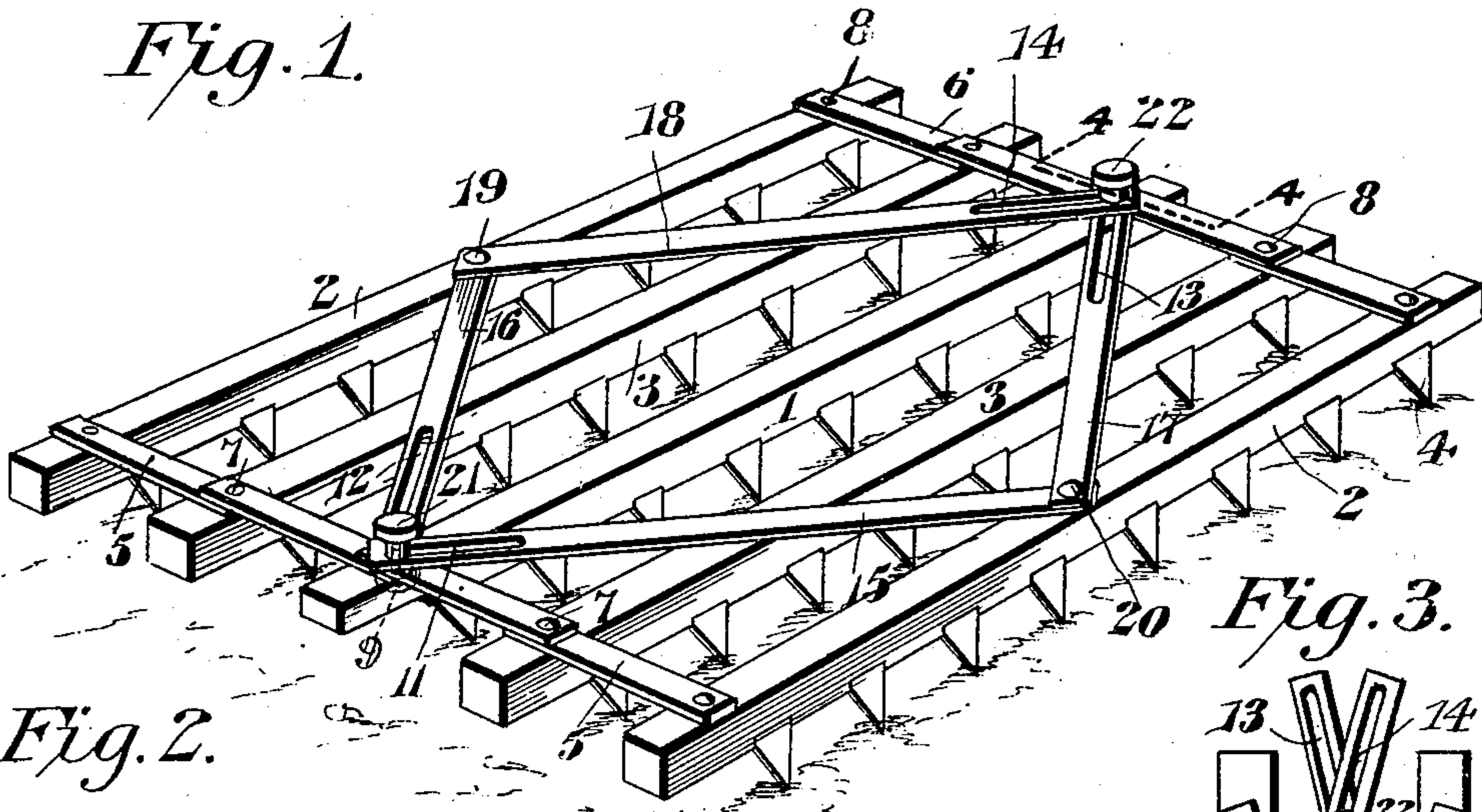


Fig. 2.

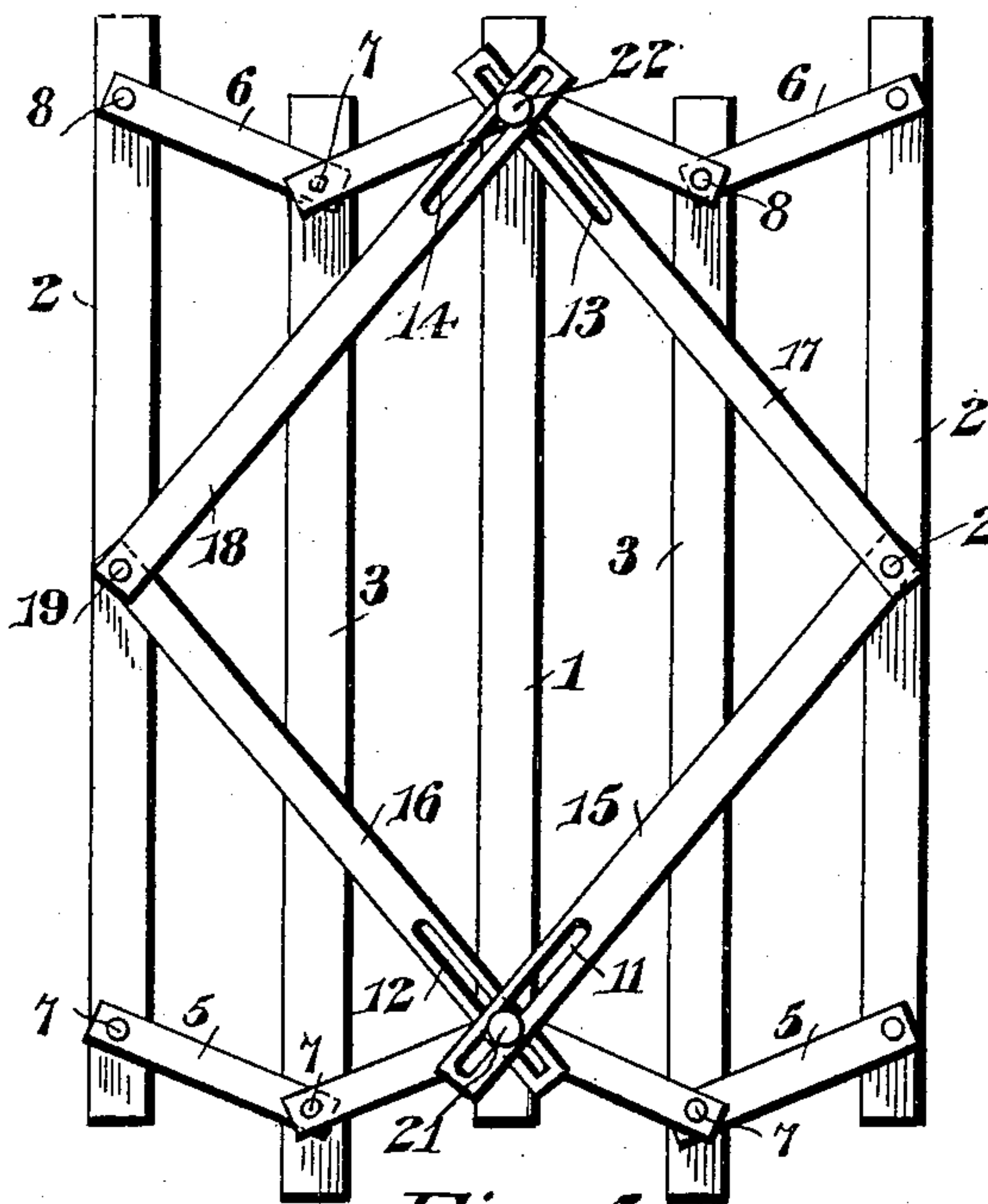


Fig. 4.

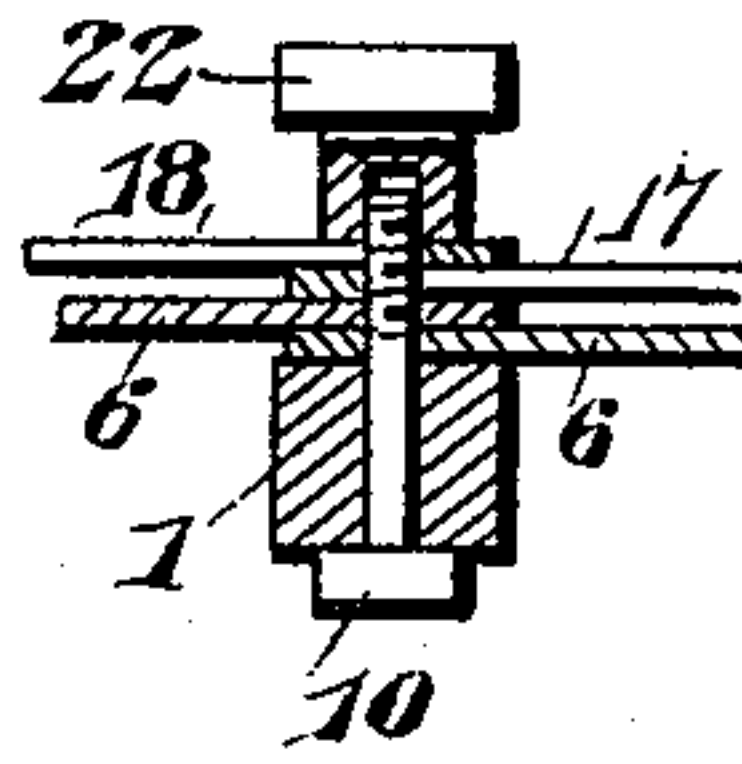


Fig. 3.

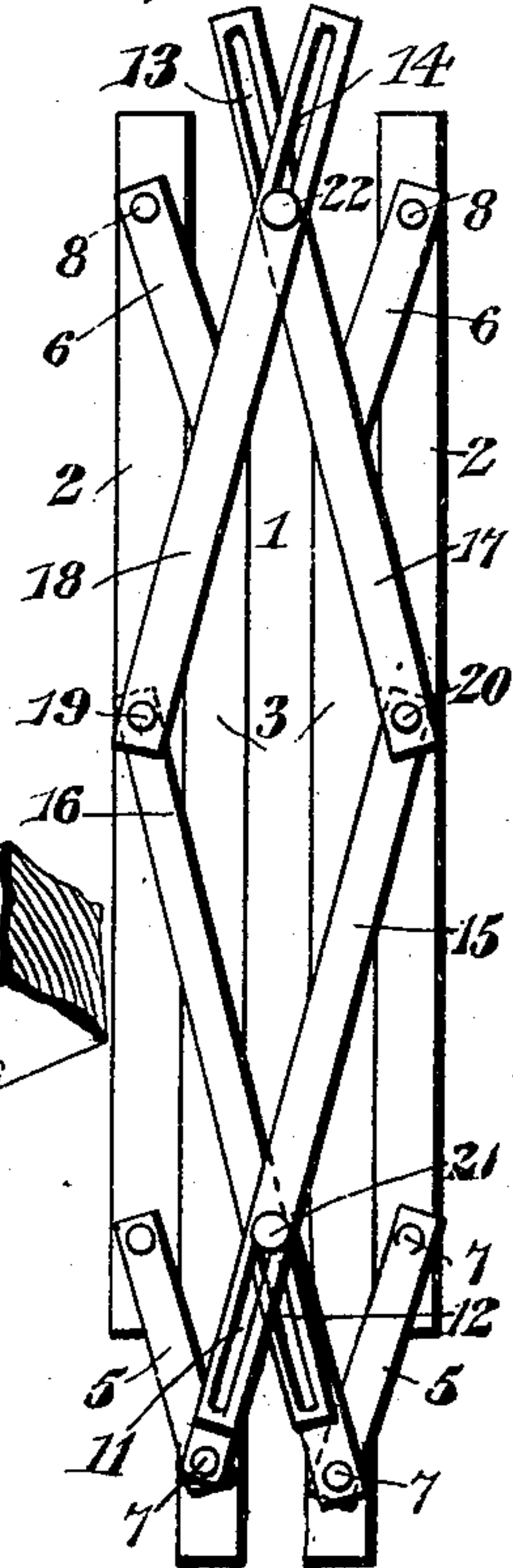


Fig. 6.

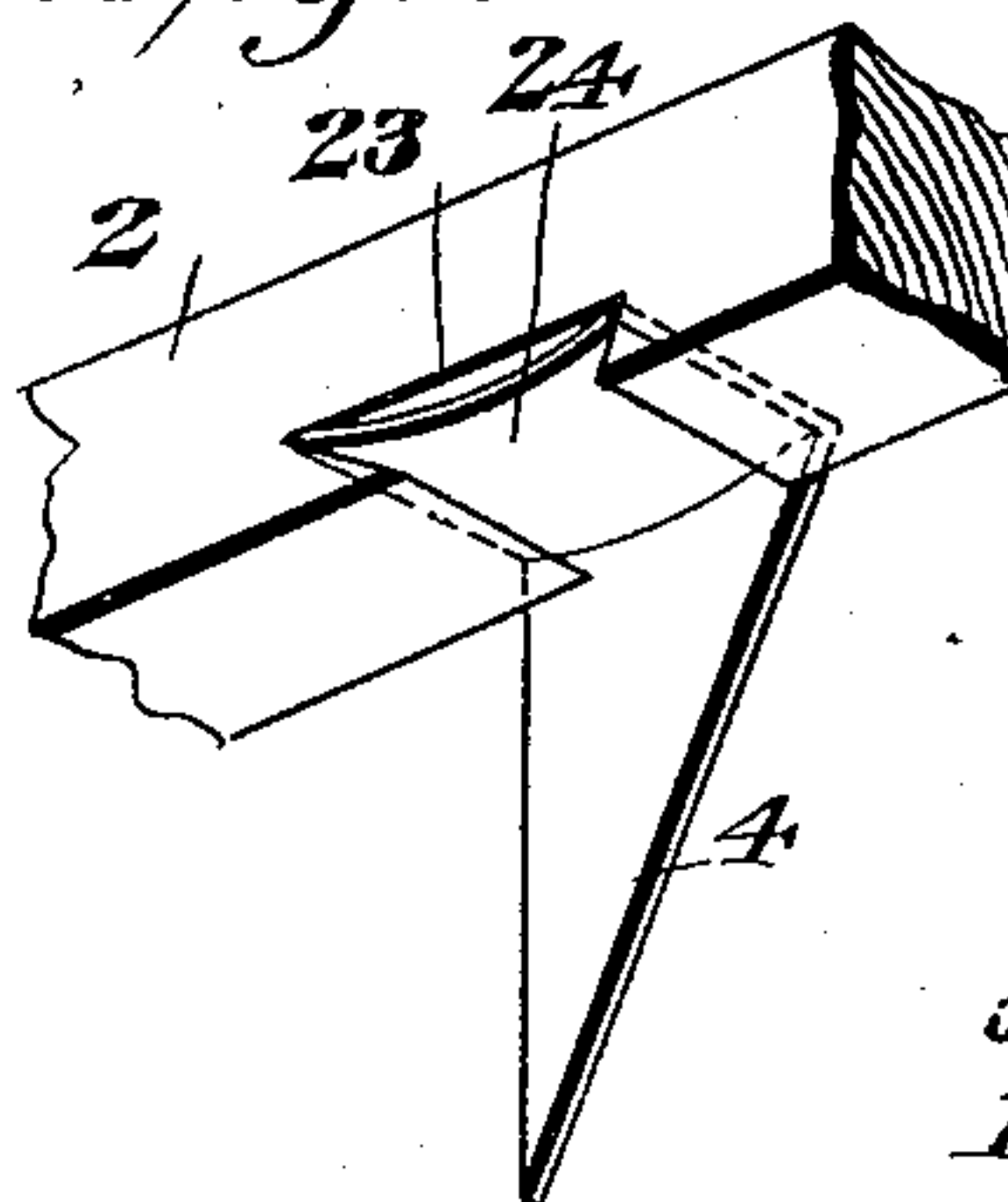
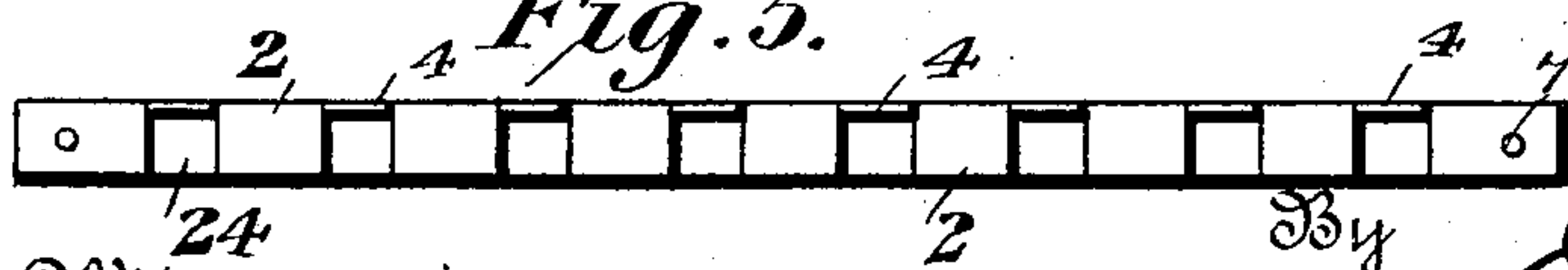


Fig. 5.



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# UNITED STATES PATENT OFFICE.

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## FOLDING AND ADJUSTABLE HARROW.

SPECIFICATION forming part of Letters Patent No. 667,235, dated February 5, 1901.

Application filed July 24, 1900. Serial No. 24,690. (No model.)

*To all whom it may concern:*

Be it known that I, ZACHARY M. LINDLEY, a citizen of the United States, residing at Carthage, in the county of Jasper and State of Missouri, have invented a new and useful Folding and Adjustable Harrow, of which the following is a specification.

My present invention relates to a novel folding and adjustable harrow, the particular object in view being to provide a harrow of durable and inexpensive construction composed of a series of tooth-carrying bars connected by links, permitting the harrow to be folded into compact form for transportation or adjusted to any desired width for adaptation to various uses, the bars being braced at all times and fixed in their adjusted positions by means of slotted braces constructed and arranged in a simple and effective manner and adjustably retained by adjusting devices, each of which serves to retain a plurality of braces and the contiguous ends of a plurality of tooth-bar-connecting links.

To the accomplishment of these ends the invention consists in the construction and arrangement of parts hereinafter more fully described, illustrated in the accompanying drawings, and succinctly defined in the appended claims.

In said drawings, Figure 1 is a perspective view of my harrow complete, showing the same adjusted to attain the greatest width. Fig. 2 is a top plan view showing the harrow contracted somewhat in order to obtain a closer relation of the teeth. Fig. 3 is a similar view showing the device completely folded or collapsed. Fig. 4 is a transverse sectional view on the line 4 4 of Fig. 1. Fig. 5 is a bottom plan view of one of the tooth-bars; and Fig. 6 is a detail perspective view of a fragment of one of the tooth-bars, showing the tooth attached thereto.

Referring to the numerals of reference employed to designate corresponding parts throughout these several views of the drawings, 1 indicates the center bar, 2 the outside bars, and 3 the intermediate bars of the harrow. Each of these bars carries a series of teeth 4, and it will therefore be seen that the lateral

adjustment of the tooth-bars 1, 2, and 3 will effect a corresponding relative adjustment of the series of teeth. The connection between the several bars is effected by means of a series of pivoted links at each end of the harrow, the links of one series being indicated by the numeral 5 and those of the other series by the numeral 6. These tooth-bar-connecting links are terminally pivoted to adjacent bars by pintles 7 and 8, the pintles extending from the intermediate tooth-bars 3, piercing the overlapped ends of the oppositely-extending links. It will be seen that as the several connecting-links are of the same length each pair of tooth-bars will be connected in a manner to permit of their relative adjustment without disturbing their parallelism—that is to say, the harrow may be expanded or contracted within limits prescribed by the links, but the latter will under all conditions maintain the several tooth-bars in parallel relation. The overlapping ends of the links extending from the intermediate bars 3 to the center bar 1 are pivotally retained by screw-studs 9 and 10, passed through the center bar adjacent to its ends and through the aligned openings in the links. Each of these screw-studs also passes through elongated slots 11 and 12 or 13 and 14, as the case may be, formed in the contiguous overlapping ends of diagonal braces 15, 16, 17, and 18, the braces 16 and 18 being pivoted at their contiguous ends at the center of one of the outside bars 2 by a common pintle 19 and the braces 15 and 17 being likewise pivoted at the center of the opposite outside bar 2 by the common pintle 20. It will thus be seen that the bars are connected by pivoted connecting-links arranged in series at the opposite ends of the harrow and that they are braced by adjustable diagonal braces arranged in pairs at the opposite sides of the harrow, each pair of braces being pivoted at their outer ends to the center of one of the outside bars and the braces of each pair being extended into operative relation with the screw-studs at the opposite ends of the center bar 1. Each of the studs 9 and 10 is preferably headed at the under side of the center bar, which is recessed to accommodate



them, and each stud is provided with a compression-nut 21 or 22, designed to be screwed thereon and to clamp the contiguous ends of the braces and links through which the studs project. It will now be seen that the swinging of the connecting-links will permit the tooth-bars to be adjusted to obtain any desired width of harrow and that the slotted braces will permit such adjustment by reason of their pivotal mountings and of their slotted connection with the screw-studs. As soon as the desired adjustment has been attained the compression-nuts 21 and 22 are screwed down to rigidly retain the braces in a manner to prevent further relative movement of the outside frame-bars with respect to the center bar, and as the intermediate bars are incapable of independent movement the entire harrow structure will be rigidly retained in the position to which it has been adjusted, as shown in the first three figures of the drawings.

In Figs. 5 and 6 of the drawings I have illustrated a novel form of tooth designed with special reference to its retention in the tooth-bars without necessity for the employment of separate tooth-retaining devices. This end is accomplished by providing the tooth-bars with dovetail tooth recesses or sockets 23 in their under faces, within which sockets are passed the slightly-bowed spring-shanks 24 of the teeth 4, the shanks and teeth being preferably formed from more or less resilient sheet metal and the shanks being disposed at right angles to the teeth in order that they may assume a horizontal position within the sockets 23, while permitting the teeth to depend vertically, as shown. If desired, the sheet metal of which the several teeth are composed may be doubled to insure sufficient rigidity; but ordinarily this is not necessary.

By reference to Fig. 6 of the drawings it will be seen that the shanks 24 may be readily slipped horizontally into the sockets 23 in a direction transverse to the tooth-bar and that when so positioned they will be rigidly retained to resist the strains to which the teeth are subjected in use.

From the foregoing it will be observed that I have produced a simple, durable, and inexpensive harrow which may be quickly folded into compact form for transportation or for use where exceedingly close relation of the teeth is desirable or which may be quickly adjusted to and rigidly retained in expanded form for open-work or in intermediate positions to obtain any desired relative adjustment of the teeth to adapt the harrow for use in various connections; but while the present embodiment of my invention appears at this time to be preferable I wish to reserve the right to effect such changes, modifications, and variations as may be comprehended within the scope of the protection prayed.

What I claim is—

1. A harrow comprising a series of parallel

longitudinally-disposed tooth-bars, means connecting said tooth-bars to permit their lateral adjustment and to maintain them in parallel relation to each other and to the line of draft during such lateral adjustment, and means for rigidly retaining said tooth-bars in their adjusted positions.

2. A harrow comprising a series of parallel longitudinally-disposed tooth-bars, and pivoted connecting-links arranged in series at the opposite ends of the harrow, each of said links being terminally pivoted to adjacent tooth-bars.

3. A harrow comprising a series of parallel longitudinally-disposed tooth-bars, a series of connecting-links disposed transversely at each end of the harrow, the individual links of each series being terminally pivoted to adjacent tooth-bars to permit relative lateral adjustment of the bars while maintaining their parallel relations, and adjustable braces for rigidly retaining the tooth-bars in their adjusted positions.

4. A harrow comprising a series of parallel longitudinally-disposed tooth-bars, a series of connecting-links at opposite ends of the harrow, the individual links of each series being terminally pivoted to adjacent tooth-bars, diagonal braces terminally pivoted to the outside tooth-bars, and means for adjustably retaining the opposite ends of said braces.

5. A harrow comprising a series of parallel longitudinally-disposed tooth-bars, and a transverse series of connecting-links at each end of the harrow, the individual links of each series being terminally pivoted to adjacent tooth-bars, diagonal braces slotted at their inner ends and pivoted at their outer ends to the middle of the outside tooth-bars, studs projecting from the center bar of the harrow and engaging the slotted ends of the contiguous braces, and means carried by said studs for clamping said braces against movement.

6. A harrow comprising a center bar, outside bars and intermediate bars disposed longitudinally and in parallel relation, connecting-links arranged in transverse series at opposite ends of the harrow, the individual links of each series being terminally pivoted to adjacent tooth-bars, screw-studs carried by the center bar adjacent to its opposite ends and each extending through the contiguous ends of two links, a pair of diagonal braces terminally pivoted to the middle of each outside tooth-bar and having their inner ends slotted for engagement with the studs carried by the center bar, and a compression-nut screwed upon each stud and designed to clamp the slotted ends of the two braces and the connected ends of the links against the face of the center tooth-bar, whereby the several bars may be relatively adjusted without disturbing their parallel relation and may be rigidly retained in their adjusted positions.

7. A harrow comprising a series of parallel



longitudinally-disposed tooth-bars and piv-  
oted links connecting the bars, said links be-  
ing disposed to permit the lateral adjustment  
of the bars and to maintain them parallel  
5 with the line of draft during such adjust-  
ment, and means for rigidly connecting the  
links and tooth-bars to retain the latter in  
their adjusted positions.

In testimony that I claim the foregoing as  
my own I have hereto affixed my signature in 10  
the presence of two witnesses.

ZACHARY M. LINDLEY.

Witnesses:

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T. K. WOOD.