

(No Model.)

2 Sheets—Sheet 1.

M. J. TODD.
SPRING TOOTH HARROW.

No. 517,672.

Patented Apr. 3, 1894.

Fig. 1.

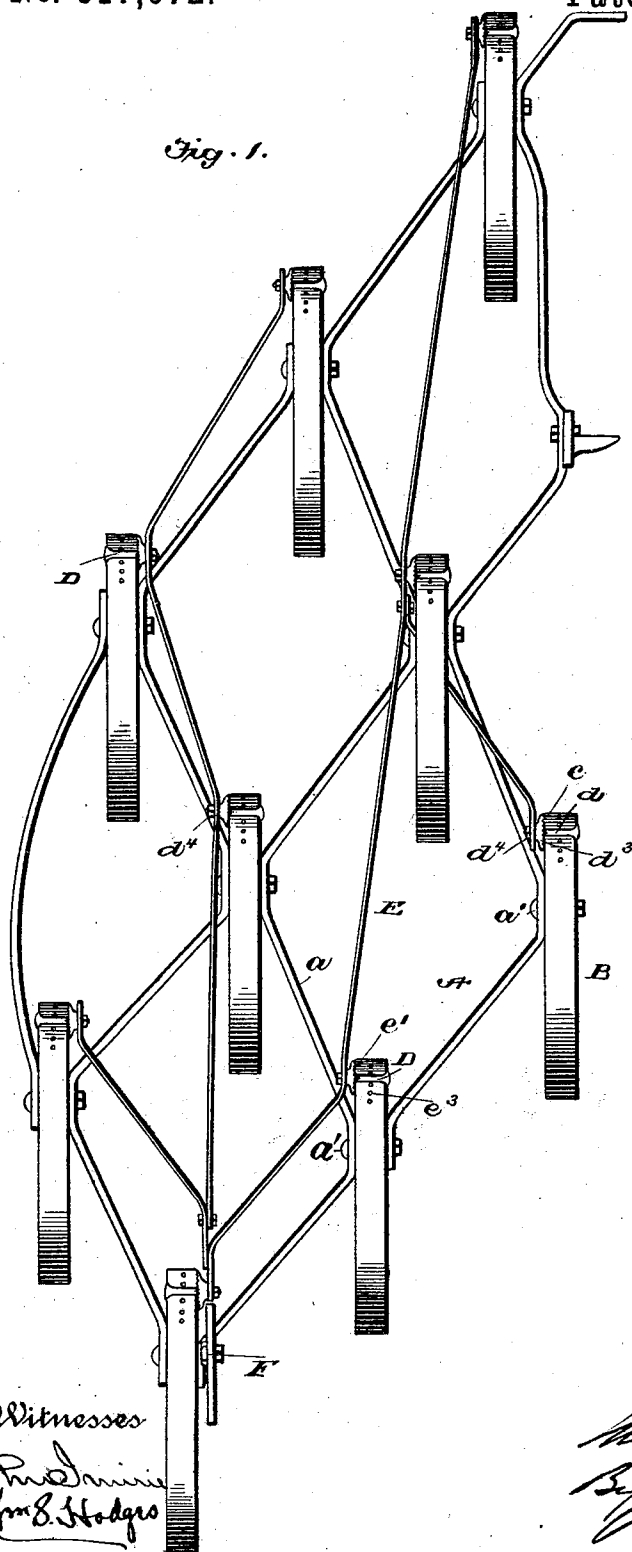
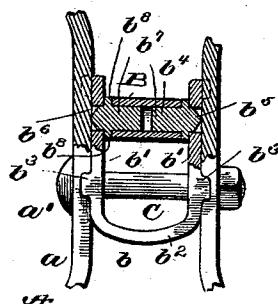


Fig. 4.



Witnesses
John D. ...
Am. S. Hodges

Inventor
M. J. Todd
By J. ...
Attorney

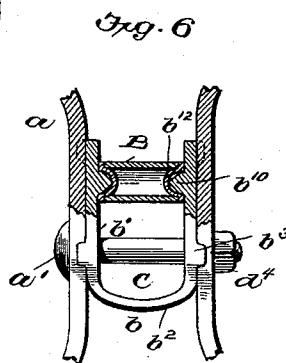
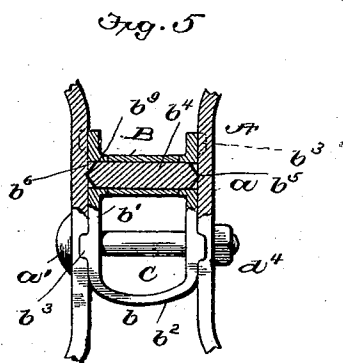
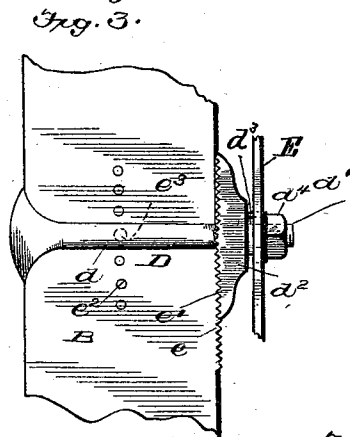
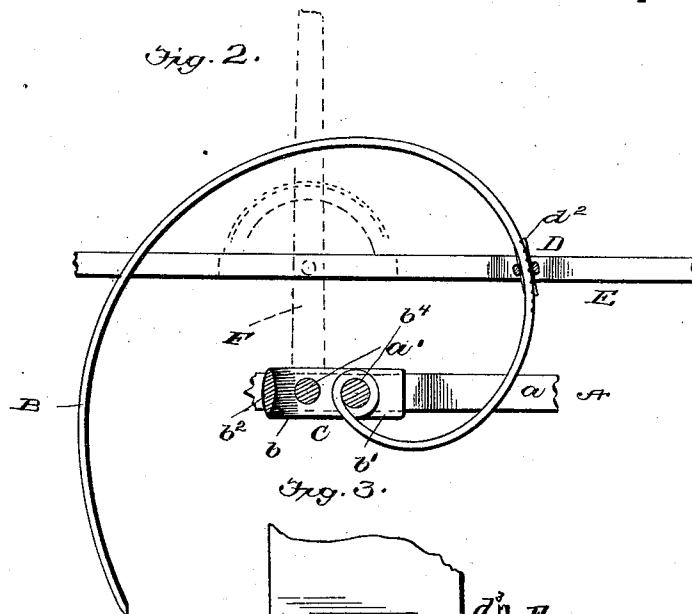
(No Model.)

2 Sheets—Sheet 2.

M. J. TODD.
SPRING TOOTH HARROW.

No. 517,672.

Patented Apr. 3, 1894.



Witnesses
John Conner
Jm S. Hodges

Inventor
Marquis J. Todd,
By J. H. M. Whit.
Attorney

UNITED STATES PATENT OFFICE.

MARQUIS J. TODD, OF BUFFALO, NEW YORK.

SPRING-TOOTH HARROW.

SPECIFICATION forming part of Letters Patent No. 517,672, dated April 3, 1894.

Application filed May 8, 1893. Serial No. 473,461. (No model.)

To all whom it may concern:

Be it known that I, MARQUIS J. TODD, of Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Spring-Tooth 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.

This invention relates to certain new and useful improvements in harrows, having reference to the class employing spring teeth.

The object of the invention is to provide a harrow of this class with improved simple and efficient means whereby the harrow teeth can be readily and easily adjusted as to pitch, and a great saving is effected in the cost of construction and material employed.

The invention consists, broadly, of a harrow having its teeth loosely or pivotally secured at their inner ends, and means for adjusting said teeth attached thereto at a point between the secured and free ends thereof.

The invention further consists of a harrow having its teeth loosely or pivotally secured at their inner ends, a series of straps for simultaneously adjusting all of said teeth, and a series of clips extending from said straps and engaging and binding said teeth at points intermediate of their secured and free ends.

The invention also consists of a new and improved form of clip for connecting the series of straps to the teeth, and also of a pivot bearing or connection for the inner end of the teeth, said bearing having reduced points of contact.

The invention also comprises the details of construction, combination and arrangement of parts, substantially as hereinafter fully set forth and particularly pointed out in the claims.

In the accompanying drawings:—Figure 1 is a plan view of a section of a harrow constructed in accordance with the specified improvements. Fig. 2 is a vertical longitudinal sectional view taken through one of the teeth, its clip and holder. Fig. 3 is a view of said clip with a portion of a tooth. Fig. 4 is a horizontal sectional view of the tooth holder. Figs. 5 and 6 are similar views of slightly modified forms thereof.

Referring to the drawings, A designates the harrow-frame composed of zig-zag bars *a* having parallel portions held in fixed relation by nutted bolts *a'*.

B designates the harrow teeth which are loosely secured at their inner ends between the adjacent portions of bars *a*, by tooth holders C, while at points intermediate of their secured and free ends said teeth are connected by clips D to a series of connecting straps E, all of which latter are under the control of a single operating lever F.

The tooth holder C preferably comprises a yoke *b* having parallel sides *b'* and a curved connection *b²*, said sides *b'* having upper and lower flanges *b³* between which the bars *a* are designed to fit. Through holes in the sides *b'* the bolt *a'* is passed. A pivot bolt *b⁴* having outer pointed or cone-shaped ends *b⁵* is passed through openings *b⁶* also formed in the sides of the yoke, said ends being held in contact with the inner sides of the parallel portions of bars *a* and on this bolt the harrow tooth secures its pivotal bearing, the end of said tooth being coiled around the same. This bolt is preferably composed of two parts or sections *b⁷* having flanges *b⁸* between which the coiled end of the tooth fits, said flanges binding against said end when the parts are fully drawn together.

In lieu of making the pivot-bolt in two parts or sections, the same may be made in one continuous piece as shown in Fig. 5, and the coiled end of tooth will fit between flanges *b⁹* extending inwardly from the sides of the yoke. Or, as shown in Fig. 6, cone shaped lugs *b¹⁰* may be projected inwardly from the sides of the yoke, and cup-shaped bushings *b¹²* placed in the coiled ends of the tooth to receive said lugs and form the pivot bearings for the tooth.

The clips D comprise a loop *d* and a threaded rod or extension *d'* on which fits a collar *d²* having a central opening and hub *d³*, the latter being extended through a loose fitting opening in the connecting strap E. A nut *d⁴* on extension *d'* will hold the clip and the clamping collar to their positions. The outer end of the loop *d* is widened or elongated to form an extended bearing for the edge of the harrow tooth. The latter along its other edge has a series of teeth *e* with which are de-

signed to engage corresponding teeth e' on the inner face of clamping collar d^2 , said teeth being in engagement with those of the tooth between the clip and the pivoted end of the tooth, so as not to weaken the latter between the clip and the outer free end. By this means all slipping of the tooth longitudinally through the loop of the clip is avoided. To further aid in preventing slipping of the tooth I preferably provide the latter with a central row of recesses or indentations e^2 into any one of which is designed to project a lug e^3 extending inwardly from one side of the loop. It will be seen that each tooth is capable of individual adjustment and that the clip can be firmly attached thereto at any desired point. The series of connecting straps are under the direct control of a lever F, which is fulcrumed on the bolt a' of the rear-most tooth. By operating this lever all of the teeth of one section of the harrow will be simultaneously operated.

From what has been said it will be seen that I have provided simple and inexpensive means for effecting the simultaneous adjustment of all the harrow teeth; that the latter are loosely pivoted at their inner ends and connected by the clips to the series of straps at points intermediate of their lengths, whereby the strain on the teeth is removed from the inner holders thereof, and sufficient material is left between the clips and the free ends of the teeth to provide the latter with all requisite elasticity.

I claim as my invention—

1. A harrow, spring teeth therefor loosely or pivotally secured at their inner ends, a series of connecting straps for operating said teeth, and adjustable connections between said straps and said teeth at points between the secured and free ends of the latter, substantially as set forth.

2. A harrow, spring teeth therefor loosely or pivotally secured at their inner ends, a series of connecting straps for simultaneously operating all of said teeth, a lever to which said straps are connected, and adjustable connections between said straps and said teeth at points between the secured and free ends of the latter, substantially as set forth.

3. A harrow, spring teeth therefor loosely or pivotally secured at their inner ends, a series of connecting straps, and adjustable clips engaging said teeth at points between their secured and free ends and carried by said straps, substantially as set forth.

4. The frame having adjacent portions, the yokes, the spring teeth, and pointed or reduced bearings for the latter between said adjacent portions, as set forth.

5. In a harrow, the frame having adjacent portions, the spring teeth having inner coiled ends, and the pivot-bolts therefor having pointed or reduced ends in contact with said adjacent portions, said bolts being encircled by said coiled ends of the teeth, substantially as set forth.

6. In a harrow, the frame having adjacent portions, the spring teeth, the pivot bolts therefor having their ends in contact with said adjacent portions, and the yokes supporting said pivot bolts, substantially as set forth.

7. In a harrow, the frame having adjacent portions, the spring teeth, the pivot bolts therefor having their ends in contact with said adjacent portions, and the yoke located between said adjacent portions and having openings in their sides to accommodate said pivot bolts, substantially as set forth.

8. In a harrow, the frame having adjacent portions, bolts between said portions, the yokes having openings for said bolts and engaging said adjacent portions, the spring teeth, and pointed or reduced bearings for the inner ends of the latter, substantially as set forth.

9. In a harrow, the frame having adjacent portions, bolts between said portions, the yokes having openings in their sides for said bolts, the pivot bolts supported by said yokes and having pointed or reduced ends in contact with said adjacent portions, and the spring teeth having their inner ends encircling said pivot bolts, substantially as set forth.

10. In a harrow, the frame, the spring teeth loosely secured thereto at their inner ends, the clips, the connecting straps carrying said clips, and the clamping collars on said clips for binding said teeth, at their edges substantially as set forth.

11. In a harrow, the frame, the spring teeth loosely secured thereto at their inner ends, the series of connecting straps for adjusting said teeth, and the looped clips carried by said straps and having each a binding collar and nut for holding said clips to said teeth, at points between the ends of the latter, substantially as set forth.

12. The frame, the pivoted teeth having toothed edges, the clips engaging said teeth having toothed clamping collars engaging said toothed edges, and the connecting straps carrying said clips, substantially as set forth.

13. The frame, the pivoted teeth having recesses or indentations therein, the clips having loops and an inner lug to engage said recesses or indentations, and the straps carrying said clips, substantially as set forth.

14. The frame, the pivoted teeth having toothed edges and recesses or indentations, the clips having loops and an inner lug, the clamping collar having teeth, the connecting straps, and the nuts on said clips for binding said collars against said toothed edges, substantially as set forth.

15. The frame, the pivoted teeth having toothed edges, the series of connecting straps for operating said teeth having holes therein, the clips having loops for said teeth and inner threaded ends, the clamping collars having hubs fitting the holes in said straps and also having teeth for engaging said toothed edges, and the nuts on said threaded ends, substantially as set forth.

16. The herein-described improved harrow, comprising the frame having adjacent portions, the bolts therefor, the yokes located between said adjacent portions and having ears or flanges overlapping the same, the pivot bolts supported by said yokes having reduced ends in contact with said adjacent portions, the spring teeth encircling said pivot bolts, the series of connecting straps, the operating lever therefor, the clips carried by said straps

having loops for said teeth, the clamping collars, and the nuts for binding the latter against said teeth, substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

MARQUIS J. TODD.

Witnesses:

J. NOTA MCGILL,
WM. S. HODGES.