

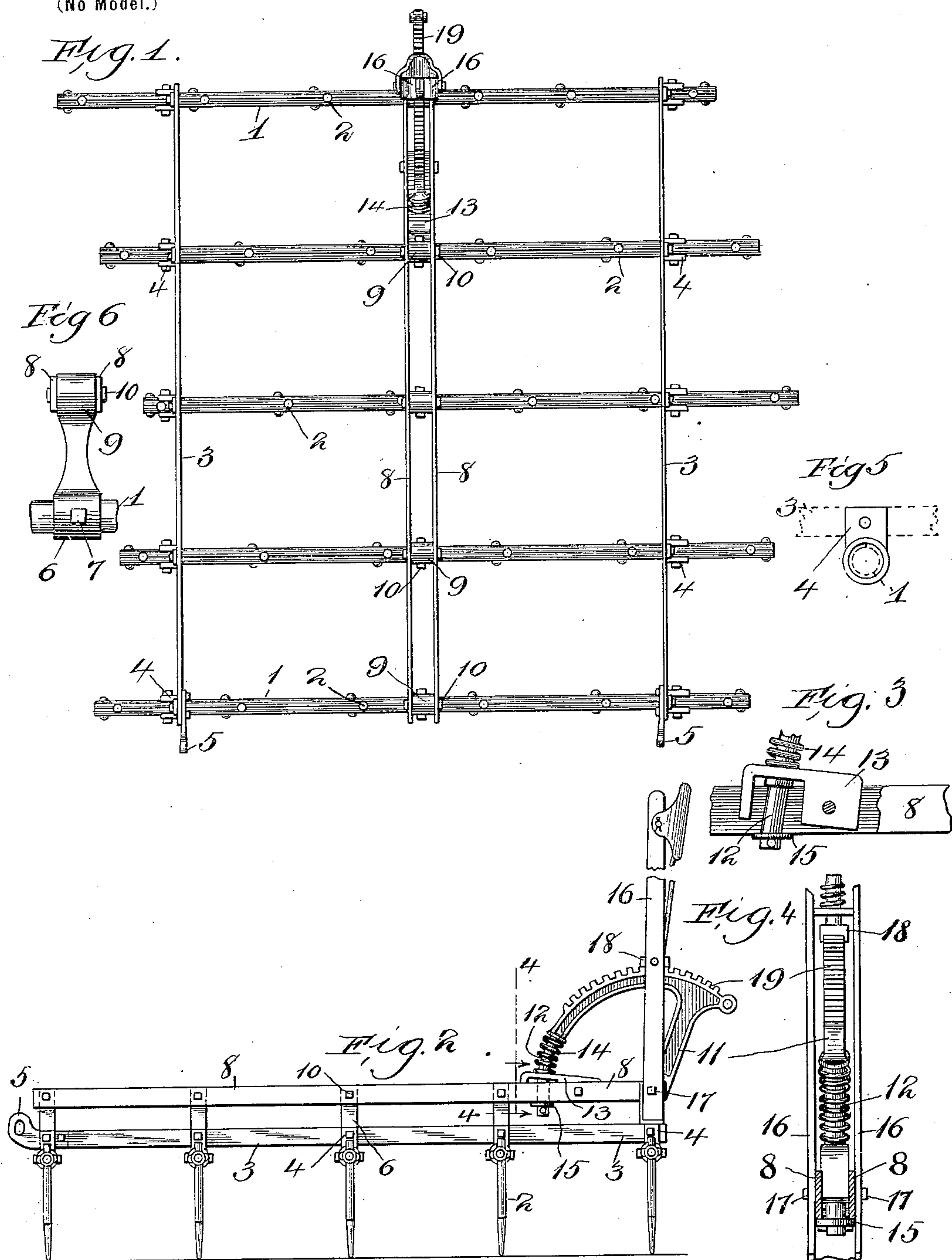
No. 631,047.

Patented Aug. 15, 1899.

J. MACPHAIL.  
HARROW.

(Application filed Oct. 14, 1898.)

(No Model.)



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# UNITED STATES PATENT OFFICE.

JAMES MACPHAIL, OF BLUE ISLAND, ILLINOIS.

## HARROW.

SPECIFICATION forming part of Letters Patent No. 631,047, dated August 15, 1899.

Application filed October 14, 1898. Serial No. 693,537. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES MACPHAIL, residing at Blue Island, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Harrows, of which the following is a specification.

My invention has relation to a harrow; and its object is to provide a durable, serviceable, and inexpensive harrow and one embodying means for permitting a yielding movement of the teeth against unusual or sudden strain caused by striking obstructions—rocks or the like.

In the drawings, Figure 1 is a plan view of my harrow; Fig. 2, a side elevation thereof; Fig. 3, a detail of a part of the shifting lever device; Fig. 4, a sectional elevation on line 4 of Fig. 2; Fig. 5, a detail view showing the means of attachment of the harrow-tooth bars to the connecting side bars; Fig. 6, a detail view showing the connection between the shifting arms or bars and the tooth-bars.

My harrow in the form shown in the drawings comprises a series of harrow-tooth bars or pipes 1, having harrow-teeth 2. These bars are held in their proper relative position by means of connecting side cross-bars 3, having depending castings 4, which form a sleeve and bearing for the harrow-tooth bars 1. The preferable form of construction of these castings is shown in Fig. 5. These castings may be secured to the side bars by means of bolts or any other suitable fastening. The forward end of the cross-bars may be provided with draft-loops 5, as shown in Figs. 1 and 2.

To each of the parts 1 is secured a post 6, attached thereto substantially along the central line of the harrow-frame by means of bolts 7 or otherwise. As shown particularly in Fig. 1, parallel shifting arms or bars 8 extend from the front to the rear of the harrow and are connected to the upper portion 9 of the post 6, said bars 8 being pivoted thereto on the bolts or pins 10.

Upon the rear ends of the bars 8 is pivoted a sector or quadrant 11, whose forward end 12 extends downwardly between the bars 8, as seen in Figs. 2 and 3. Between such parts is secured a stop or abutment 13, (see Fig. 3,) against which a coiled spring 14 around the end 12 of the quadrant presses to normally hold the quadrant in the position shown. A

collar or washer 15 is arranged at the lower end of the quadrant and serves to limit the backward yielding movement of such quadrant.

The shifting-lever comprises, preferably, a pair of lever-arms 16, secured by bolts 17 or otherwise to the bars 8. The usual dog or latch 18 is provided to engage the teeth 19 of the sector or quadrant.

My harrow is operated as follows: In order to adjust the angle of the teeth, the lever may be shifted forward, for instance, after the disengagement of the latch, and the bars 8 will then be thrown forward, causing the bars 1, through their connections 6 and 9, to be partially rotated or rocked, consequently inclining the teeth backward. When the lever is thrown forward its full extent, the teeth are thrown backward, so that they will drag upon the ground, which is the position desired in going to and from the field. It is obvious that any desired angle of adjustment may be secured for tilling purposes, depending upon the amount of throw or shift given to the lever. In case the teeth, or any of them, should strike an unyielding object or obstruction the strain is communicated to the bars 8, which would be drawn forward and the lever-arms rocked, thereby drawing the sector forward and downward against the tension of the spring. The teeth will be inclined so as to pass over the obstruction without breaking or injuring the teeth or any parts of the harrow, and the parts will be restored by the spring to normal position after the obstruction is passed.

Although I have described more or less precise forms and details of construction, I do not wish to be understood as limiting myself thereto, as I contemplate changes in form, the proportion of parts, and the substitution of equivalents as circumstances may suggest or render expedient and without departing from the spirit of my invention.

I claim—

1. A harrow comprising a series of tooth-bars, harrow-teeth secured thereto, cross-bars having bearings in which the tooth-bars are supported and turn, and means for shifting the angle of inclination of the teeth and permitting a yielding of the parts comprising a pair of shifting-arms extending transversely



of the tooth-bars, links or posts between said arms and the tooth-bars, such links being secured to the tooth-bars and pivoted to said arms, a quadrant pivoted to said arms, a shifting-lever secured to the arms and adapted to engage the quadrant and a spring bearing against the quadrant to hold the parts in normal position but adapted to yield when an obstruction is encountered.

2. A harrow comprising a series of tooth-bars, harrow-teeth secured thereto, cross-bars having bearings in which the tooth-bars are supported and turn, and means for shifting the angle of inclination of the teeth and permitting a yielding of the parts comprising a pair of parallel shifting-arms extending transversely of the tooth-bars, cross-pins 10 in the arms, a series of links or posts, one of whose ends 9 is pivoted on the pins and whose other end is secured to the tooth-bars respectively, a quadrant pivoted between said arms, a shifting-lever secured to the arms and adapted to engage the quadrant and a spring bearing against the quadrant to hold the parts in normal position but permit a yielding when an obstruction is encountered.

3. A harrow comprising a series of tooth-bars, harrow-teeth secured thereto, side bars having bearings for the tooth-bars, a pair of shifting-arms pivotally connected to each of the tooth-bars, a quadrant pivoted between said arms, a shifting-lever secured to the arm and adapted to engage the quadrant, a stop or abutment between said arms, the quadrant having an end extending downwardly between said arms and a spring around said end and bearing respectively against the quadrant and the abutment.

4. A harrow comprising a series of harrow-tooth bars, harrow-teeth secured thereto, side bars having bearings for the harrow-tooth bars, a pair of parallel shifting-arms pivotally connected to each of said series of bars, a quadrant pivoted between said arms, a shifting-lever secured to the arm and adapted to engage the quadrant and means for retaining the quadrant in normal position.

5. A harrow comprising a series of harrow-tooth bars, harrow-teeth secured thereto, side bars having bearings for the harrow-tooth bars, a pair of shifting-arms pivotally con-

nected to each of said series of bars, a quadrant pivoted between said arms, a shifting-lever secured to the arm and adapted to engage the quadrant and a spring interposed between said arm and one end of the quadrant to keep the quadrant in normal position but adapted to yield against unusual strain on the teeth.

6. A harrow comprising a series of harrow-tooth bars, harrow-teeth secured thereto, side bars having bearings for the harrow-tooth bars, posts 6 secured to the series of bars, shifting-arms 8 pivoted thereto, a quadrant 11 pivoted upon the arms 8 and having a projecting end 12, a spring 14 abutting against said end and the arms 8 respectively and adapted to hold the quadrant in normal position, and a shifting-lever device connected to the arms 8 and cooperating with the quadrant to adjust the angle of inclination of the harrow-teeth and to secure a yielding of the teeth when an obstruction is encountered.

7. A harrow comprising a series of bars 1, teeth secured thereto, side bars 3 having bearings 4 for said series of bars 1, posts 6 upon the series of bars, shifting-arms 8 pivoted to the posts, a quadrant 11, pivoted upon the arms 8 and having an end 12 projecting forwardly and downwardly, a stop 13 secured to the arms 8, a spring 14 around said end 12 and abutting against the stop 13 and the quadrant respectively, and a shifting-lever secured to the arms 8 and cooperating with the quadrant.

8. A harrow comprising a series of tooth-bars, harrow-teeth secured thereto, side bars having bearings for the tooth-bars, a pair of shifting-arms pivotally connected to each of the tooth-bars, a quadrant pivoted to said arms and having an end or portion extending between and below said arms, a washer on the end of such extended portion engaging on the under side of the arms to limit the upward movement of the quadrant and a spring bearing against the quadrant to permit the tooth-bars to yield when an obstruction is encountered.

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Witnesses:

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