

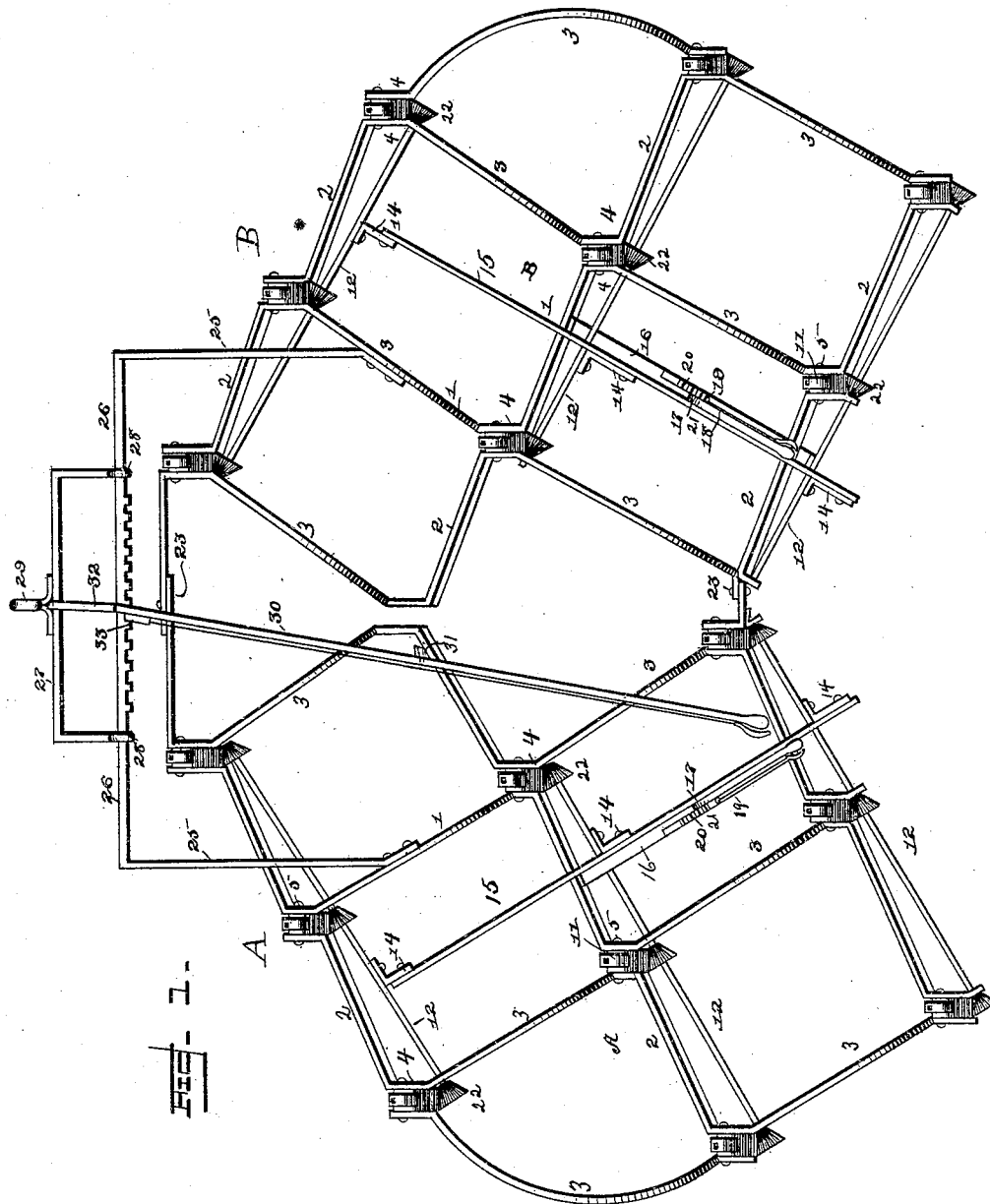
(No Model.)

2 Sheets—Sheet 1.

J. S. KURTZ.
SPRING TOOTH HARROW.

No. 489,417.

Patented Jan. 3, 1893.



Witnesses

E. S. Duvall Jr.
W. S. Duvall

By his Attorneys,

C. A. Snow & Co.

Inventor

John S. Kurtz

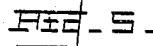
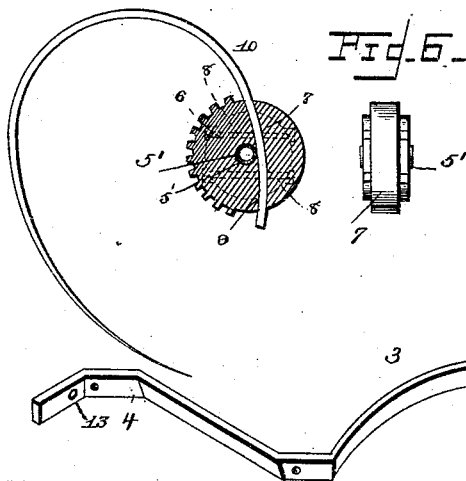
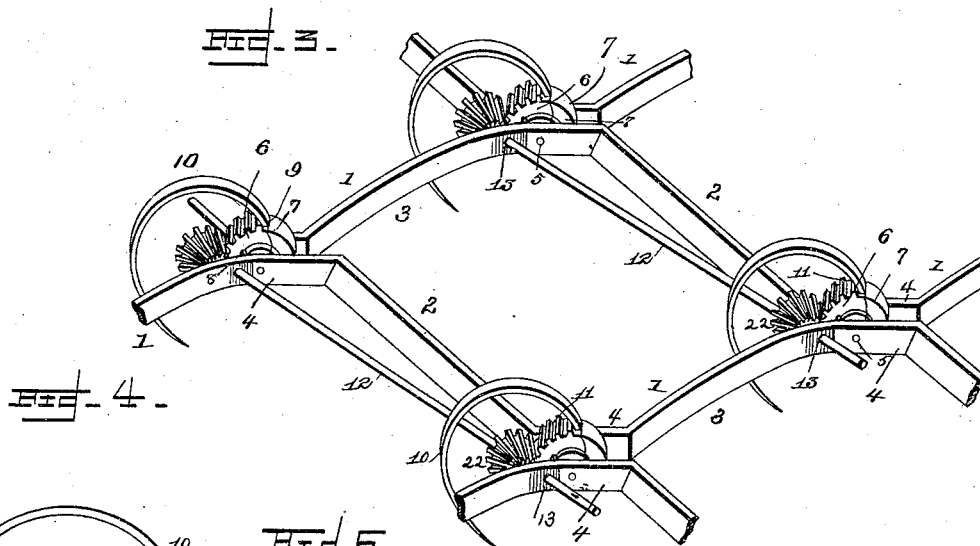
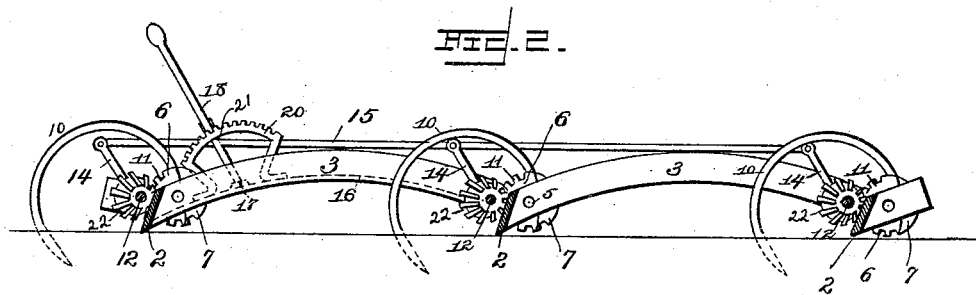
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UNITED STATES PATENT OFFICE.

JOHN S. KURTZ, OF RICHFIELD, PENNSYLVANIA, ASSIGNOR TO CHARLES
LA DOW, OF ALBANY, NEW YORK.

SPRING-TOOTH HARROW.

SPECIFICATION forming part of Letters Patent No. 489,417, dated January 3, 1893.

Application filed July 15, 1890. Serial No. 358,825. (No model.)

To all whom it may concern:

Be it known that I, JOHN S. KURTZ, a citizen of the United States, residing at Richfield, in the county of Juniata and State of Pennsylvania, have invented certain new and useful Improvements in Harrows, of which the following is a specification.

My invention relates especially to harrows in which circular teeth are adjustable about their hinge connections with the frame to vary the pitch or depth of cut of their working ends.

The primary object of my invention is to simultaneously adjust two or more teeth, or all the teeth on a section, simultaneously.

My invention also has in view certain improvements in the details of construction and the general organization of the teeth and frame, and my invention consists in improved means, devices and constructions for carrying out the objects of my invention.

In the accompanying drawings,—Figure 1 is a plan view of a harrow embodying my improvements. Fig. 2 is a transverse section. Fig. 3 is a detail view in perspective showing particularly the manner of connecting the frame-bars and mounting the teeth. Fig. 4 is a detail view, in longitudinal section, showing the manner of securing a tooth to its holder. Fig. 5 is a perspective view in detail of one of the frame bars. Fig. 6 is a detail view showing the tooth-supporting devices.

I preferably construct each section of the frame as follows: A series of bars 1, formed of light steel or iron are bent in reverse directions in zig-zag lines to form transverse portions 2 oblique to the line of draft, and other portions 3, also oblique to the line of draft, but extending rearwardly in a different direction from that of the portions 2. The bars are also formed with longitudinal portions 4 and these portions are arranged side by side, the teeth being mounted between them. The oblique portions 2, of the frame bars are inclined laterally on their under sides, so as to present a beveled or inclined pulverizing surface for the soil, and also to provide means for guiding rubbish laterally to the outer sides of the frame. The portions 3, of the frame bars, are arched or bent up-

wardly, as shown, so that rubbish may escape readily at the outer sides of the frame.

The harrow is preferably formed in two sections A and B, hinged together, as shown in Fig. 1. Each of said sections comprises as many series of bars as is necessary to form a frame of the requisite size to support a suitable number of teeth, and, as before stated, the bars are preferably zig-zag. But so far as some features of my invention are concerned, frame bars shaped in other ways may be employed.

I preferably employ circular or curved teeth which may be spring teeth of the Garver type, and mount them in tooth seats or holders. Each tooth seat or holder, is shown as consisting of two clamping sections 6 and 7, connected by means of binding bolts 8, passing transversely through them. The section 7 may be dishd or concaved, while the adjacent face of the section 6 may be convexed in order to fit snugly the concavity of the section 7. The shank of the tooth is shown as being seated in a recess 9, in the clamping sections, and a sleeve 5' extends through each clamping section, and this sleeve serves to hold at a proper distance apart, the adjacent portions of different frame bars. A bolt 5, extending through the sleeve serves to secure the sleeve and frame bars firmly together. The construction is such that the tooth seat with the tooth may be rocked or be adjusted about the sleeve. It will also be observed, that the frame is so formed as to provide openings substantially diamond-shaped, one for each tooth, and each tooth is mounted on a separate pivot or hinge connection, each pivot being at right angles to the line of draft, or substantially so, and each tooth has its trailing end adapted to dig the ground in rear of its fastened portion. The construction is such that the front and rear portions of the teeth are maintained in the line of draft, and the teeth are guided squarely in the line of draft, while being rocked, the soil-working portion of each tooth being maintained in the same plane and parallel with the line of draft at all times. The arched frame bars span different series of teeth, so that rubbish accumulating between the series may escape under the arches.

Each tooth 10, is provided with a curved toothed portion or segment 11, concentric with the axis of the sleeve 5', about which the tooth rocks.

5 A series of rods 12, journaled to rotate in openings 13, in the frame bars, are provided with gears, pinions or segments 22, which engage with the toothed portions 11 on the tooth holders. The rods 12, are arranged obliquely
10 to the line of draft, in rear of a front portion of the frame, which is arranged in advance of the front teeth, and which guards both the front teeth and the rods. Arms 14, rigidly secured to the rods, are connected to bars 15,
15 so that by moving the bars 15, a rocking or rotating movement is given to the rods 12, and an adjustment of the teeth is effected. A lever 18, on each section of the harrow is pivoted at 17 to a bar 16 of the frame, and
20 this lever has a spring-bolt or detent 19, engaging with a sector 20, located at the side of the lever on the bar 16. The lever 18 is pivoted at 21, to the connecting bar 15, so that by operating the lever the entire series of
25 rock shafts or rotary rods 12, in the harrow section, may be simultaneously operated to simultaneously adjust all the teeth.

The two sections of the harrow are hinged together in the central draft line, as indicated
30 at 23. A pair of draft bars 25, are connected at their rear ends with the frame bars, and the front ends of the draft bars are connected by a toothed rack bar 26, the teeth of which are located near the center of the bar. A
35 draft bail 27, having eyes 28 engaging at each side of the bar 26, and adapted to slide laterally upon the bar, has secured to it a clevis 29. A long lever 30, pivoted near its center upon a standard 31, and having its front end
40 loosely connected by a link 32, with the draft bail 27, is provided with a spring bolt 33, which engages the teeth of the rack bar 26. By disengaging the bolt and operating the lever back and forth in either direction, the
45 draft bail may be correspondingly moved, and thus the line of draft changed at pleasure. I wish it understood, however, that I do not limit myself to the form of draft devices herein shown and described. They form no part
50 of my present invention, and they may be varied or attached in other ways.

It will be observed that the teeth adjusting devices are arranged within and guarded or protected by the curved portions of the
55 teeth, and that the teeth as adjusted are braced during their rocking movements by the frame bars. The bars are so arranged as to surround diamond-shaped openings, in which the teeth operate, and these bars form
60 strippers for the teeth, whereby rubbish is pushed from the bosoms of all the teeth when they are simultaneously adjusted.

I claim as my invention—

1. In a harrow, a frame having circular
65 teeth hinged on pivots or axes at right angles with the line of draft, or substantially so, and rotary rods oblique to the line of draft, opera-

tively connected with the teeth to simultaneously adjust them.

2. A harrow having a frame with circular 70 teeth secured thereto in zig-zag lines and moving about separate centers or hinges, and rotary rods operatively connected with the teeth for adjusting their pitch.

3. In a harrow, a frame having circular 75 teeth hinged to it, each on a separate pivot or hinge connection, and rods having gears operatively connected with the teeth to adjust two or more of them simultaneously.

4. In a harrow, a frame, circular teeth hav- 80 ing trailing ends adapted to dig the ground in rear of their fastened portions, and rocking on pivots at right angles to the line of draft, or substantially so, tooth supports adapted to maintain the front and rear por- 85 tions of each tooth in the line of draft, and obliquely inclined rods adapted to change the pitch of teeth in different transverse planes.

5. In a harrow, the combination of the fol- 90 lowing elements: circular teeth adapted to be rocked, supports which guide the teeth squarely in line with the draft while being rocked, obliquely inclined rotary rods connect- 95 ing the teeth, and means for rotating said rods and for holding them as adjusted, whereby teeth in different transverse planes may be simultaneously rocked with the front bow 100 portion and the rear soil-working portion of each tooth maintained in the same plane and parallel with the line of draft.

6. In a harrow, the combination of teeth 105 guarded by a front portion of the frame arranged in advance of the front teeth, and rotary transverse rods obliquely inclined, also guarded by the frame.

7. In a harrow, the combination of two or 110 more series of circular teeth, a frame having arched bars spanning the series of teeth, and means for operating two or more series of teeth simultaneously, whereby rubbish de- 115 tached from the teeth may escape under the arched bars.

8. A harrow frame having sections with 115 transverse bars obliquely inclined in each section, and having their front under surfaces inclined rearwardly, whereby said transverse bars are adapted to deflect rubbish laterally and also rearwardly, in combination 120 with arched draft bars adapted to permit any rubbish which may be laterally deflected to escape under the arches at the outer sides of the harrow, circular teeth carried by the frame, and devices operatively connected with the 125 teeth for simultaneously adjusting them.

9. A harrow frame made up of zig-zag bars, 125 sleeves for holding different bars at proper distances apart, bolts passing through the sleeves for securing them to the bars, curved teeth adjustable about the sleeves, and means 130 connected with the teeth between the bars for adjusting the teeth simultaneously.

10. In a harrow, a frame in combination 135 with circular teeth, adjustable as to pitch secured to the frame, adjusting devices within

and protected or guarded by the curved portions of the teeth, and means for operating said devices to adjust two or more teeth simultaneously.

5 11. A harrow having its frame made up of straps of metal set vertically edgewise and bent to form openings, substantially diamond-shaped between the bars, circular teeth having trailing soil-working ends operating in
10 said openings, in combination with rotary rods adapted to simultaneously adjust the working ends of two or more teeth upwardly and downwardly within said openings.

12. In a harrow, zig-zag bars, teeth hinged
15 loosely between adjacent parts of different

bars in such manner as to be adapted to be rocked simultaneously, in combination with devices operatively connected with the teeth, whereby teeth distributed substantially as described on the frame, may be adjusted at 20 one time and braced during their rocking movements by said adjacent portions of the frame.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in 25 presence of two witnesses.

JOHN S. KURTZ.

Witnesses:

SAMUEL C. MYERS,
G. W. BURCHFIELD.