(No Model.) 2 Sheets—Sheet 1.

J. A. BOYER & G. E. BENTLEY.

LISTING HARROW.

No. 427,731. Patented May 13, 1890.

Fig. 1.

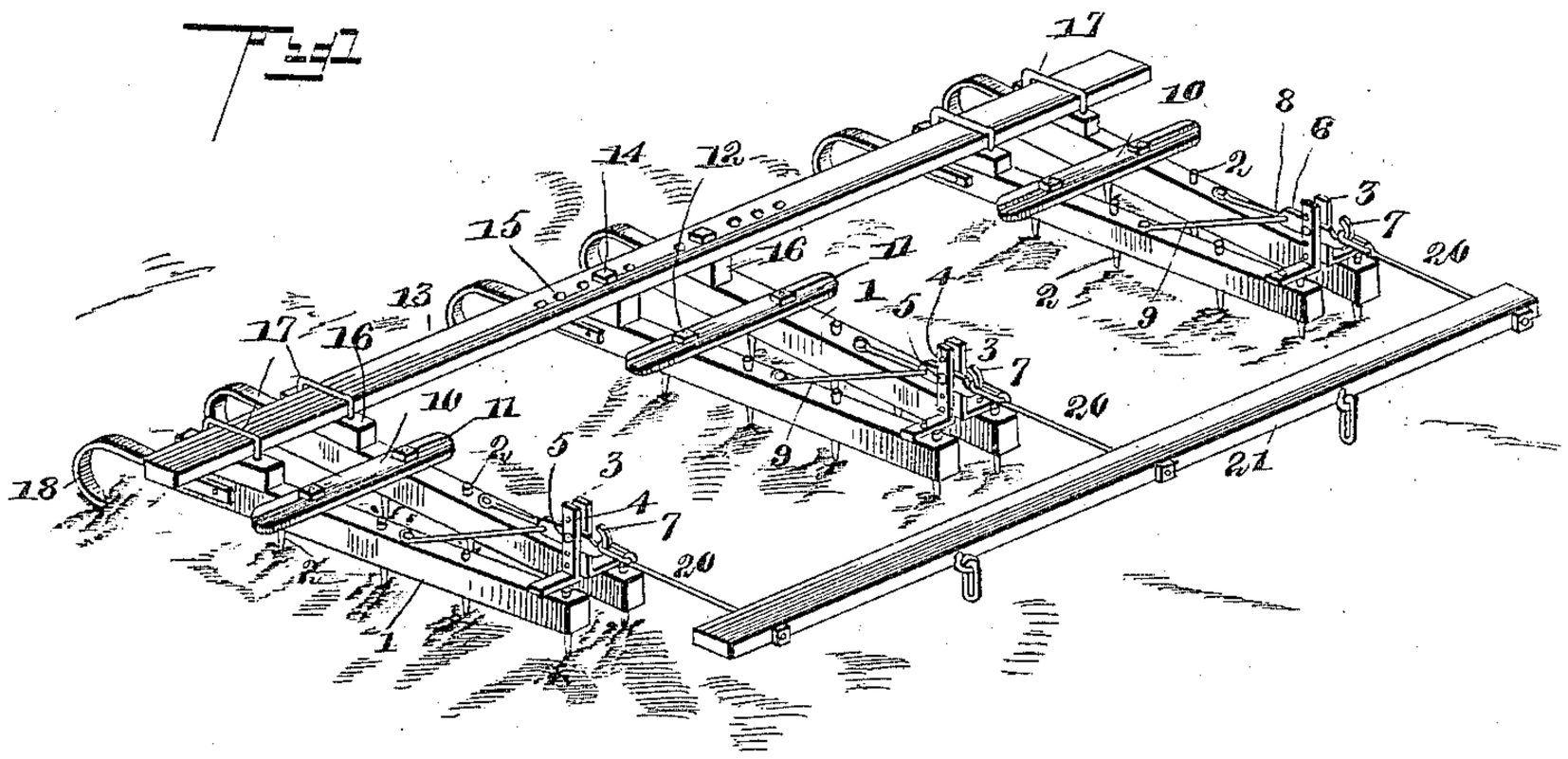
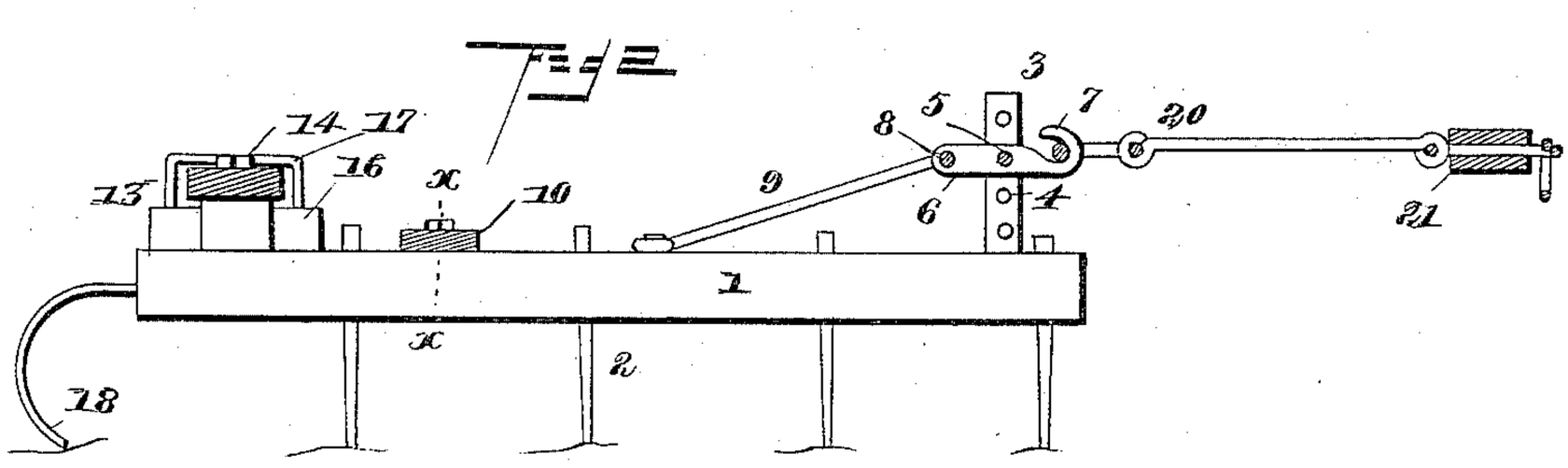


Fig. 2.



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(No Model.) 2 Sheets—Sheet 2.

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LISTING HARROW.

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Fig 3

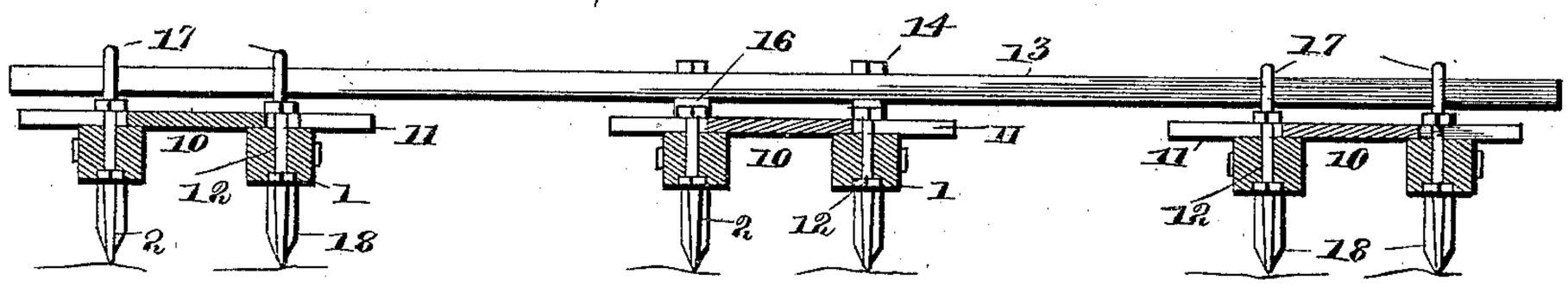


Fig 5

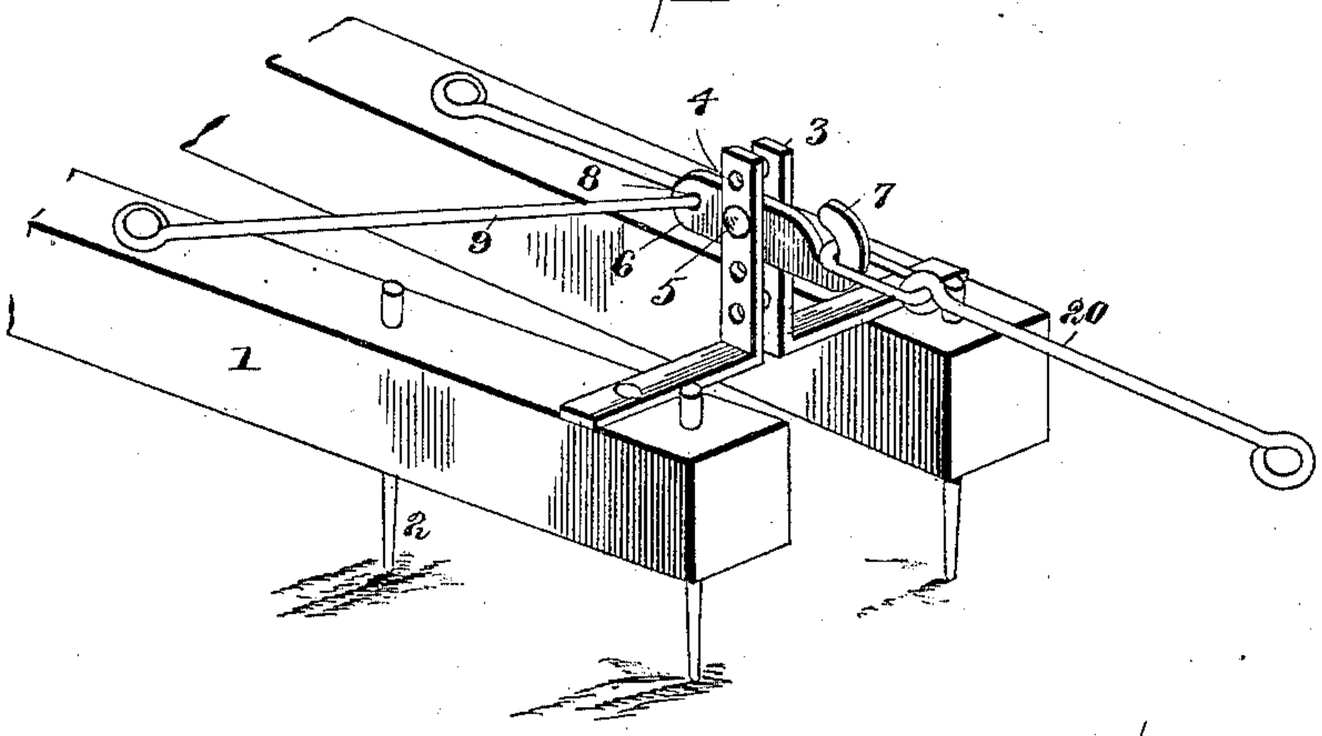
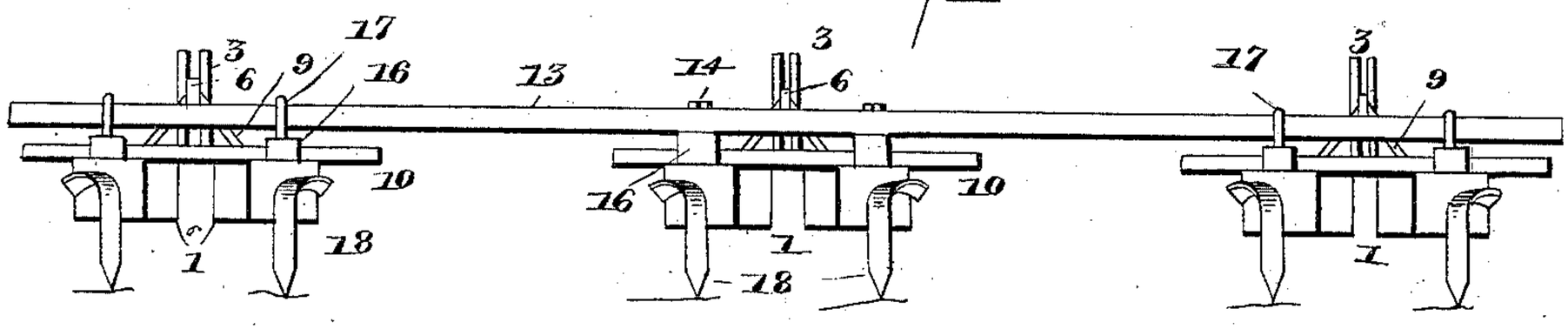


Fig 4



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UNITED STATES PATENT OFFICE.

JOHN A. BOYER AND GEORGE E. BENTLEY, OF BURR OAK, KANSAS.

LISTING-HARROW.

SPECIFICATION forming part of Letters Patent No. 427,731, dated May 13, 1890.

Application filed February 13, 1890. Serial No. 340,312. (No model.)

To all whom it may concern:

Be it known that we, JOHN A. BOYER and GEORGE E. BENTLEY, citizens of the United States, residing at Burr Oak, in the county of Jewell and State of Kansas, have invented a new and useful Listing-Harrow, of which the following is a specification.

This invention relates to that class of harrows which are known as "listing-harrows;" and it has for its object to provide a machine of this class which shall be exceedingly simple in construction, durable, and easily manipulated, and which may be readily adjusted to work deep or shallow in the ground, as required, and which may likewise be adjusted laterally, so as to cultivate in strips of any desired width.

With these ends in view the invention consists in the improved construction, arrangement, and combination of parts, which will be hereinafter fully described, and particularly pointed out in the claims.

In the drawings hereto annexed, Figure 1 is a perspective view of our improved harrow. Fig. 2 is a longitudinal sectional view taken through the frame-bar of the harrow. Fig. 3 is a vertical sectional view taken on the line $x\,x$ of Fig. 2. Fig. 4 is a rear elevation. Fig. 5 is a detail view on a larger scale, illustrating the front end of one of the harrow-sections and the means for connecting the same with the coupling-bar or evener.

Like numerals of reference indicate like parts in all the figures.

Our improved harrow may be composed of any desired number of sections, although three is the number preferably employed and which is the number illustrated in the drawings hereto annexed. The several sections are all constructed alike, and each of said sections is composed of two longitudinal beams 1 1, having any desired number of vertically-arranged harrow-teeth 2, extending vertically through the said beams and secured therein in any suitable manner. Each of the beams 1 is provided at its front end with an angular upwardly-extending bracket 3, having a series of transverse perforations 4. Mounted adjustably between the brackets 3 3 upon a transverse bolt 5 is a plate 6, the front end of which is formed with a hook 7 and the rear end of which has a perforation 8, which is connected by brace-rods 9 9 with the harrow-bars 1 1. The bolt 5 thus serves to connect the front ends of the harrow-bars 1 1. The said harrow-bars are connected near their rear ends by means of transverse braces 10, having slots 11 to receive the bolts 12, which latter connect the harrow-bars adjustably to the said braces. The rear ends of the harrow-bars may thus be adjusted laterally or spread apart to any desired extent, limited only by the length of the slots 11.

The central harrow-section is secured to the under side of the frame-bar 13 by means of bolts 14, for the passage of which a series of perforations 15 are provided in the said frame-bar. Provision is thus made for the lateral adjustment of the rear ends of the central harrow-section. Spacing-blocks 16 are interposed between the harrow-bars and the frame-bar. The outer harrow-sections are mounted loosely upon the frame-bar, the harrow-bars of said outer sections being provided at their rear ends with yokes or bails 17, that embrace the frame-bar 13 loosely. Spacing-blocks 16 are also interposed between the rear ends of the outer harrow-sections and the frame-bar, said spacing-blocks being mounted upon the yokes or bails, as clearly shown in the drawings.

The rear ends of the harrow-bars of the several sections carry the shovels 18, which may be of any suitable construction. The hooks at the front ends of the several harrow-sections are connected by link-rods 20 with the evener-bar 21, to which the draft is attached in the usual manner.

The operation of this invention will be readily understood from the foregoing description, taken in connection with the drawings hereto annexed. The outer harrow-sections, being connected loosely with the frame-bar, will readily adapt themselves to any inequalities in the ground. By loosening the bolts 12 the rear ends of the harrow-bars of the outer sections may be adjusted laterally, and the harrow-bars of the central sections may likewise be adjusted by the bolts 14, for the reception of each of which a series of perforations is provided. The depth to which the harrow shall be permitted to work in the

ground may be regulated by vertically adjusting the hook-plates 6 at the front ends of the harrow-sections.

The general construction of the harrow is exceedingly simple and inexpensive and it is durable and efficient in operation.

Having thus described our invention, what we claim is—

1. In a listing-harrow, the harrow-sections composed each of two toothed bars, the front ends of which are provided with angular brackets having series of transverse perforations, a hooked plate mounted adjustably between said brackets upon a transverse connecting-bolt, brace-rods connecting the rear end of said hooked plate with the harrow-bars, and a transverse bar or brace connecting the said harrow-bars near their rear ends and having slots for the reception of the connecting-bolts, substantially as and for the purpose set forth.

2. The combination, with the frame-bar, of the central harrow-section, the toothed bars of which are connected adjustably with said frame-bar by means of vertical bolts, and the outer sections, the toothed bars of which are provided with yokes or bails loosely embracing the said frame-bar, and spacing-blocks interposed between the toothed bars and the frame-bar, substantially as herein set forth.

3. The combination, with the frame-bar, of the central harrow-section, the toothed bars of which are connected adjustably to said frame-bar, the outer sections, the toothed bars of which are connected loosely with the frame-bar by means of yokes or bails, the vertically-adjustable hooked plates at the front ends of the harrow-sections, the evener, and the link-rods connecting the latter with the hooked plates at the front ends of the several harrow-sections, substantially as and for the purpose set forth.

4. The harrow-sections composed each of two toothed bars, the front ends of which are provided with angular brackets having series of transverse perforations, a hooked plate mounted adjustably between said brackets upon a transverse connecting-bolt, brace-rods connecting the rear end of said hooked plate with the harrow-bars, a transverse bar or brace connecting the said harrow-bars near their rear ends and having slots for the reception of the connecting-bolts, and the shovels at the rear ends of said harrow-bars, in combination with the frame-bar, bolts connecting the latter adjustably with the bars of the central harrow-section, yokes or bails connecting the bars of the outer harrow-sections loosely with the said frame-bar, spacing-blocks mounted upon the connecting bolts and bails, the evener-bar, and the link-rods connecting the latter with the vertically-adjustable hooked plates at the front ends of the several harrow-sections, all arranged and operating substantially as and for the purpose set forth.

In testimony that we claim the foregoing as our own we have hereto affixed our signatures in presence of two witnesses.

JOHN A. BOYER.
GEORGE E. BENTLEY.

Witnesses:
A. C. COX,
WM. BENBOW.