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Patented July 25, 1899.

J. A. UNDERWOOD.
HARROW AND CULTIVATOR.

(Application filed Mar. 16, 1899.)

(No Model.)

2 Sheets—Sheet 1.

FIG. 1.

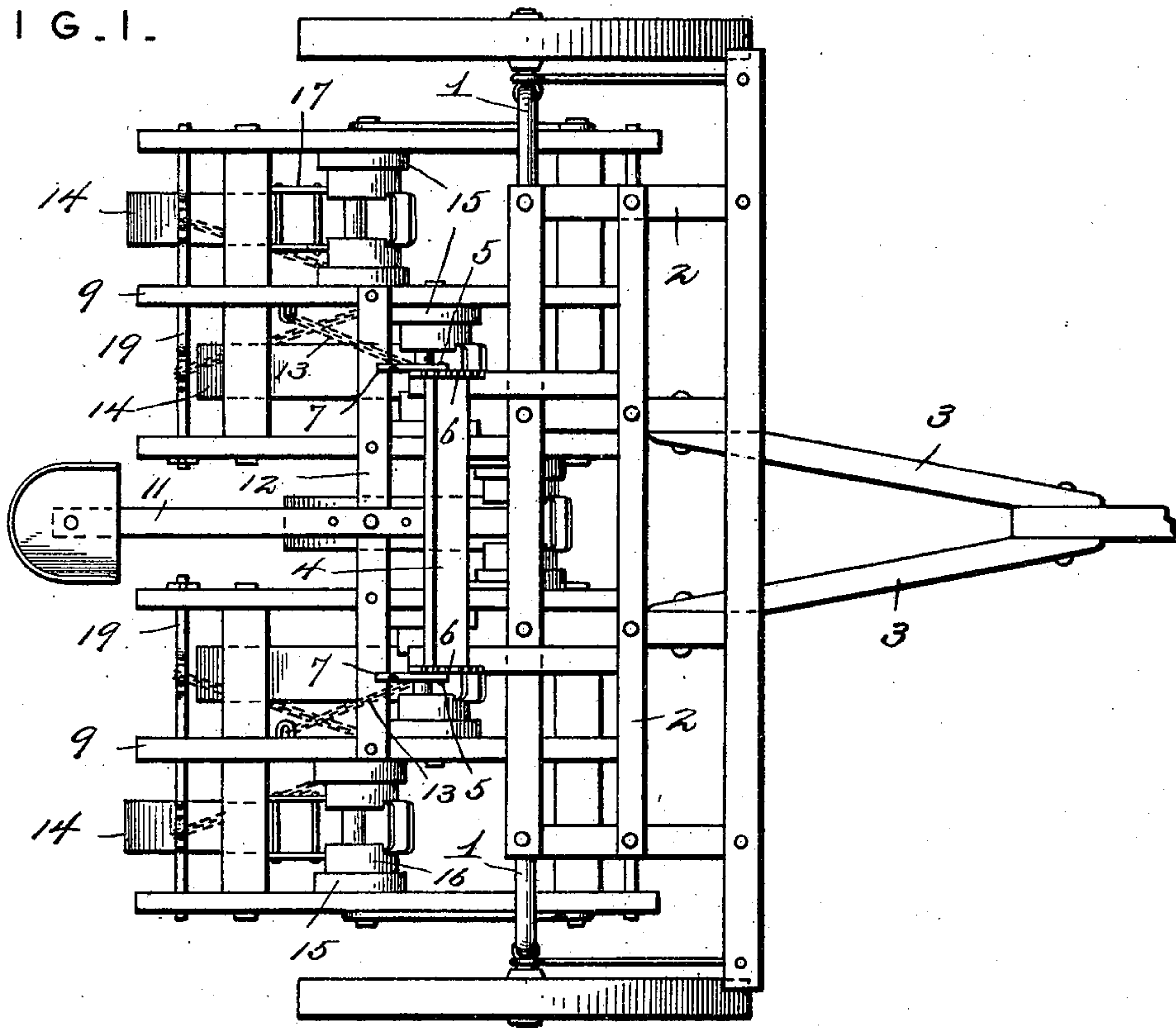
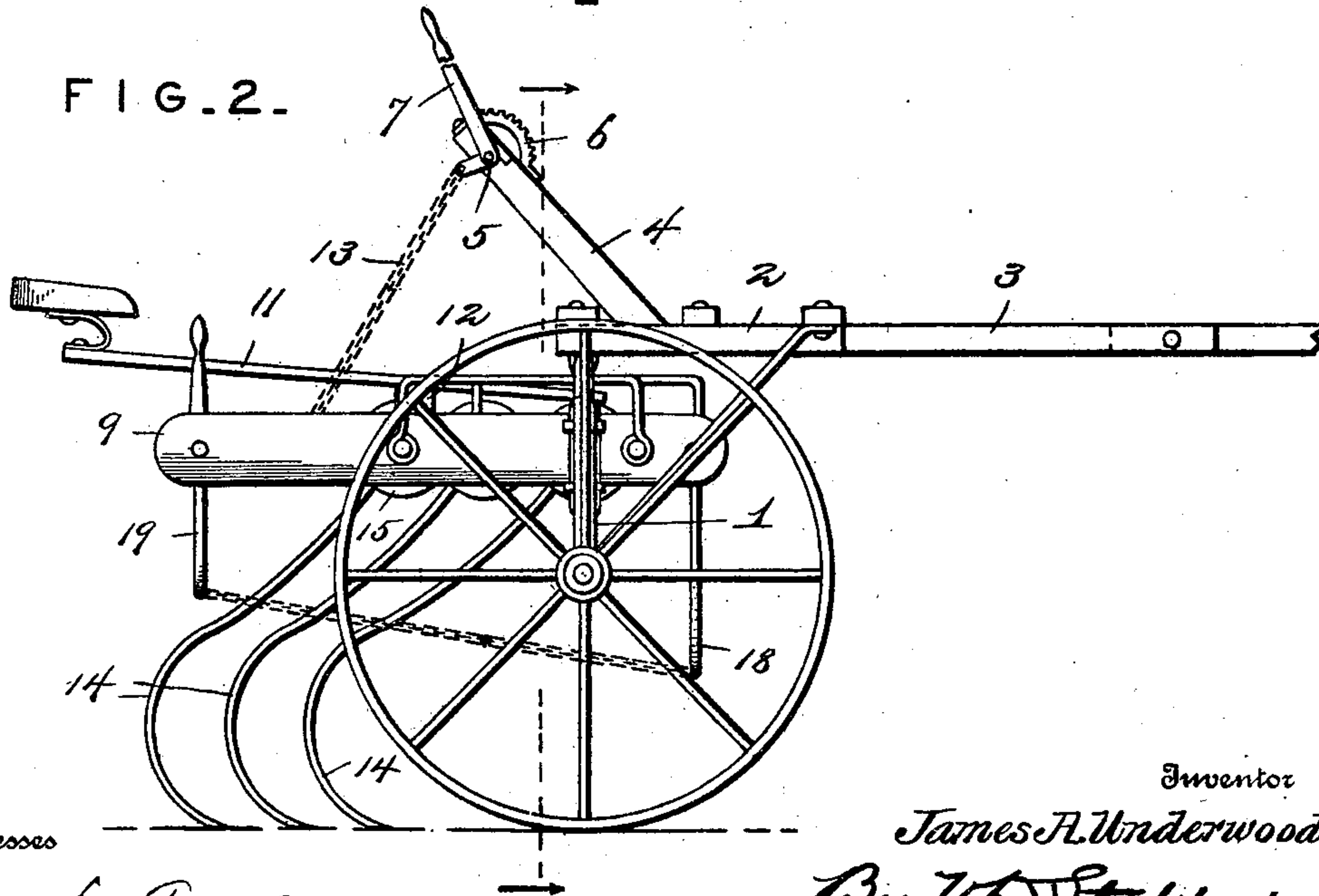


FIG. 2.



Witnesses

Harry L. Amer.
H. A. Nave

Inventor

James A. Underwood.

By V. D. Stockbridge.

Attorney

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J. A. UNDERWOOD.
HARROW AND CULTIVATOR.

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(No Model.)

2 Sheets—Sheet 2.

FIG. 3.

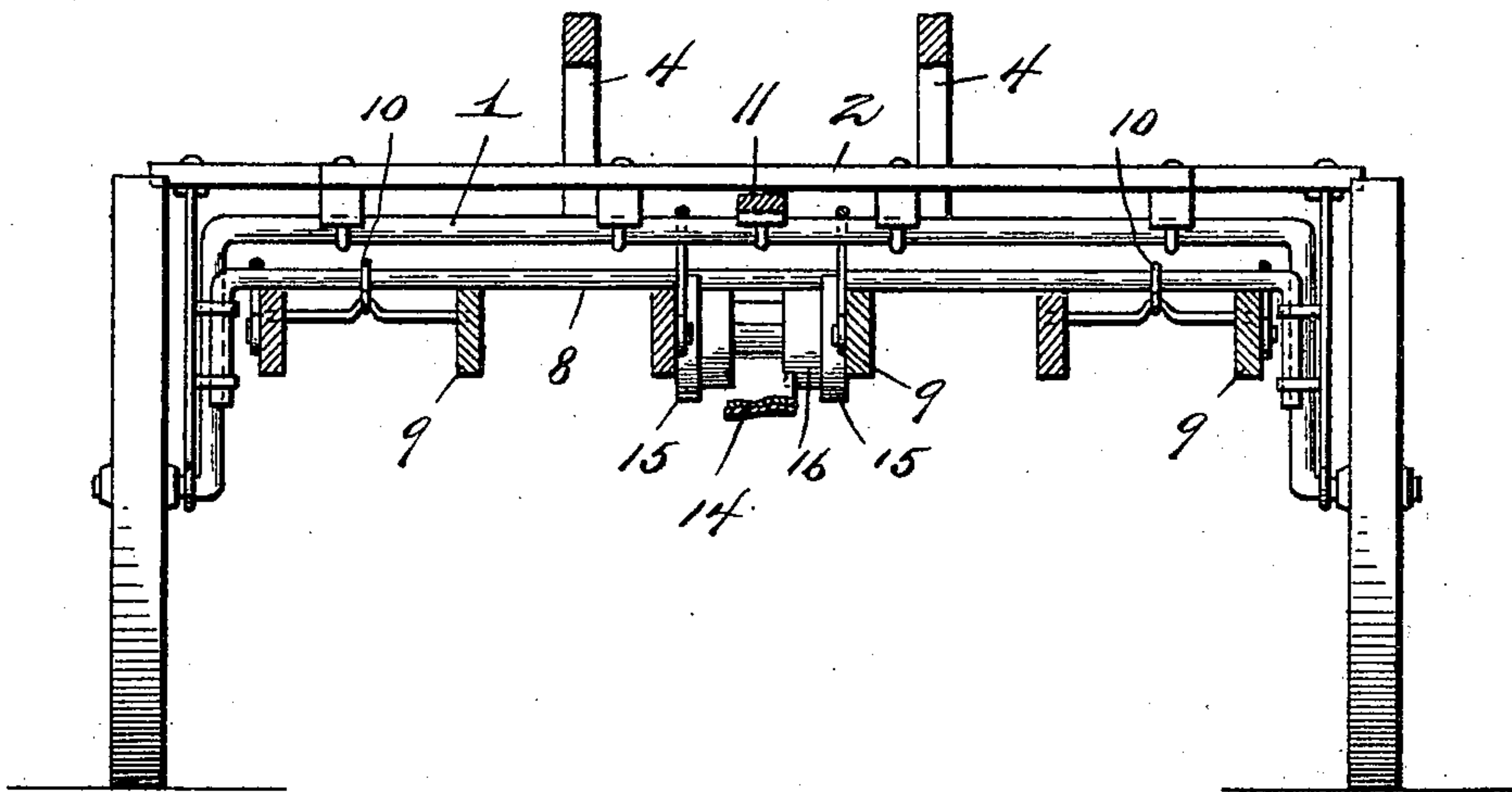


FIG. 4.

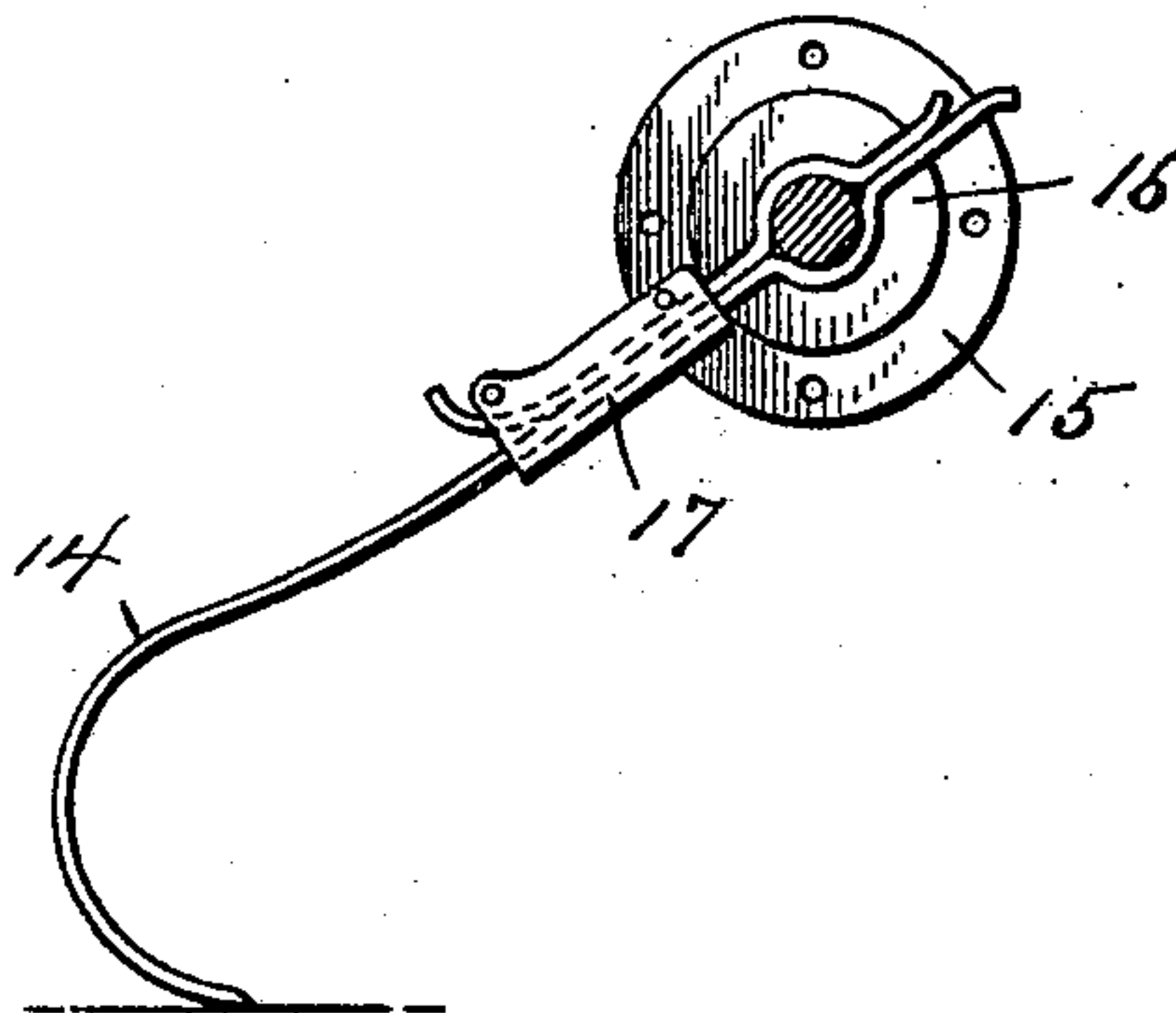
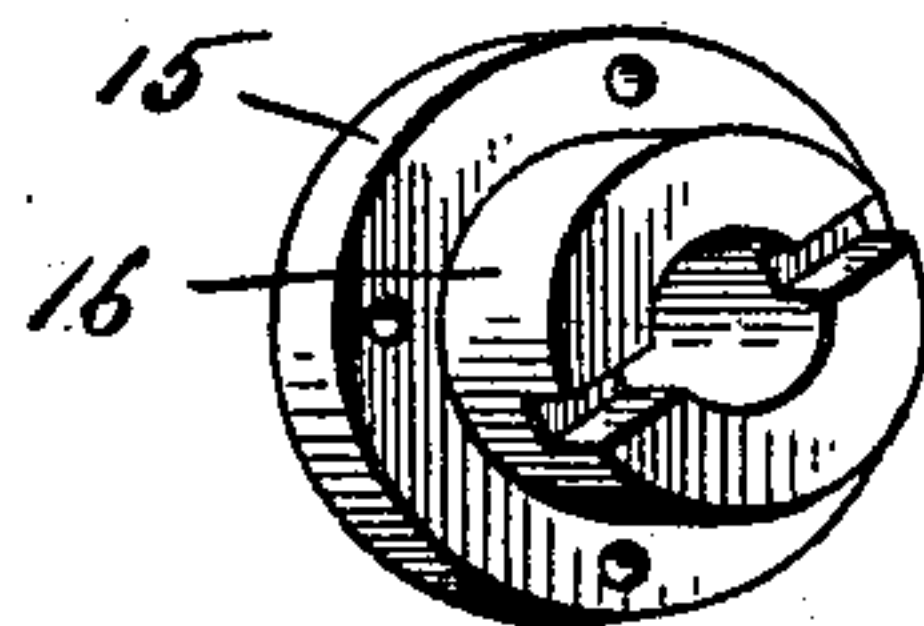


FIG. 5.



Witnesses
Harry L. Amer.
H. A. Fran

Inventor
James H. Underwood
By V. D. Stockbridge,
Attorney

UNITED STATES PATENT OFFICE.

JAMES ANDREW UNDERWOOD, OF CONDRAY, MISSOURI.

HARROW AND CULTIVATOR.

SPECIFICATION forming part of Letters Patent No. 629,629, dated July 25, 1899.

Application filed March 16, 1899. Serial No. 709,288. (No model.)

To all whom it may concern:

Be it known that I, JAMES ANDREW UNDERWOOD, a citizen of the United States, residing at Condray, in the county of Dent and State of Missouri, have invented certain new and useful Improvements in Harrows and Cultivators; 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 spring-teeth cultivators and harrows.

The object of the invention is to provide a convertible cultivator and harrow having spring-teeth that will be economical in construction and may be readily adjusted so as to work deep or shallow in the soil and so that the teeth-frames and teeth may be swung laterally and wherein a draft may be applied to the rear of the teeth-frames, while providing for the free elevation of said frames and withdrawing the teeth from the earth.

The invention consists in combinations of instrumentalities hereinafter described, and specifically pointed out in the claims.

In the drawings, Figure 1 is a plan view of my improved machine. Fig. 2 is a side elevation thereof. Fig. 3 is a transverse section showing the axle and the means of suspending the teeth-frames from said axle. Fig. 4 is an enlarged elevation showing one of the teeth, the tooth fasteners or clamps, a tooth-support, and a shoe. Fig. 5 is a detail perspective of one of the teeth holders or clamps.

1 is an arched axle carried by suitable wheels or trucks and to which is rigidly attached a wooden frame 2, with hounds 3 3 for carrying a suitable pole or tongue. Mounted upon this wooden frame is what I term a "ladder" or support 4, which carries a crank-shaft 5, a quadrant 6, and a lever 7 for operating the crank-shaft. Adjustably connected with the arched axle is what I call a "false" axle or counter-shaft 8, arranged parallel with the parts of the axle and adapted to be adjusted up and down upon or with relation to said axle. Suspended from the false axle or counter-shaft are teeth-frames 9 9, preferably made of steel or iron, as shown in the drawings, the forward ends of these frames being suspended from the false axle by means of links or sta-

ples 10 10. By hanging the teeth-frames in this way they are permitted to have a free lateral movement to the right and left. Piv- otally connected with the false axle is a seat-standard 11, which is supported by a cross-bar 12, carried upon the teeth-frames. The rear ends of the teeth-frames are adjusted up and down, so as to bring them to any desired position with relation to the wooden frame by means of chains or connections 13 13 between said frames and the cranks on shaft 5.

14 14 are spring harrow or cultivator teeth, made in substantially the form shown in Fig. 4 of the drawings—that is, having a concave or bend at the forward end, then running back straight for ten or twelve inches, then with a gradual curve for eighteen or twenty inches, and then with a sharp or approximately circular curve to the point, making the length altogether fifty inches, more or less. Above or on the back side of the teeth I provide what I call "tooth-supports," which extend parallel with the shank of the teeth for eight or ten inches and then curve upward, leaving the teeth-shanks free to bend, the support acting in the manner of a fulcrum around which the shank of the tooth bends. The teeth and their supports are conveniently coupled with the longitudinal bars of the teeth-frames by means of holders or clamps 15, one of which is shown in detail in Fig. 5. These holders or clamps consist of castings having a central perforation for receiving a bolt with crown-flanges 16, having notches diametrically opposed to each other and with a disk-like body having perforations through which they may be adjusted with relation to the bars of the frames to give any required angle to the teeth with relation to the frames.

To assemble the teeth, the teeth-supports, and the teeth-holder, the two parts of the holder are adjusted so that the notches in the flanges will engage the edges of a tooth and its support. The holder-castings are then interposed between a pair of longitudinal bars, and a bolt is then passed through the axial openings in the holders and between a tooth and its support. In this way the teeth and their supports and the holders are coupled together and also coupled with the frame in a convenient and ready manner.

In order to prevent the reaction of a spring-

tooth from carrying it too far or striking too deep into the ground after it has passed over an obstruction, I provide a gage or limiting-shoe 17. This shoe is made to embrace the shank of a tooth and operates in the nature of a stirrup to catch the tooth on its rebound. The draft-chains or whiffletrees are connected with an arched bar 18, connected with the front end of the swinging teeth-frames, the draft-chains extending backward from the arched bar to a crank or lever 19 at the rear end of the teeth-frames 9, which in normal position will hold the arched draft-bar in a vertical position, but when turned down gives slack in the draft-chain, so that the teeth-frames may be readily lifted to raise the teeth out of the ground. The crank or lever 19 is arranged in easy reach of the rider's seat, as shown, for convenient manipulation.

In Fig. 1 of the drawings I have shown my invention with a tooth arranged between the teeth-frames, and in this condition the device is used as a harrow. By the removal of the middle or central tooth I have two independently-suspended teeth-frames, and the machine is in this form adapted for a walking or straddle-row cultivator, and as a cultivator there would be provided a handle for each one of the teeth-carrying frames.

As shown, the cultivator is a five-tooth cultivator. Obviously any additional number of teeth may be provided for making either a seven or nine tooth cultivator, as may be desired.

Having described my invention, I claim—

1. In a cultivator, the combination of a vertically-adjustable beam or false axle, a plurality of teeth-frames, and staples or links for flexibly connecting the frames with the beam or axle, substantially as described.
2. In a cultivator, the combination of a ver-

45 tically-adjustable beam or false axle, a plurality of teeth-frames, staples or links for flexibly connecting the teeth-frames with the beam, a seat-frame and seat carried by the teeth-frames, and means for holding the teeth-frames in a horizontal position, substantially as described.

3. In a cultivator having teeth-frames flexibly connected with the adjustable beam or false axle, the combination with said frames of a lever or crank and a draft-chain leading from said lever or crank, and means for lifting or raising the teeth-frames, substantially as described.

4. In a cultivator, the combination of a vertically-adjustable beam or false axle, a plurality of teeth-frames flexibly connected with said beam, a seat-frame and seat carried by the teeth-frames, means for adjusting the teeth-frames in horizontal position, a crank or lever connected with the rear end of the teeth-frames, and a draft-chain coupled with said crank or lever, substantially as described.

5. In cultivators, the combination of a tooth-holder having central perforation, crown-flange and notches in said flange, a spring-tooth, and a bolt for coupling the holder and the tooth, substantially as described.

6. In cultivators, the combination of a teeth-frame and teeth-holder, substantially as described, a tooth-support, a bolt for coupling the holder, teeth and frame, and a shoe or stirrup for taking rebound, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

JAMES ANDREW UNDERWOOD.

Witnesses:

E. J. YELTON,
JOS. CAMPBELL.