No. 609,333.

Patented Aug. 16, 1898.

H. W. EISENHART.

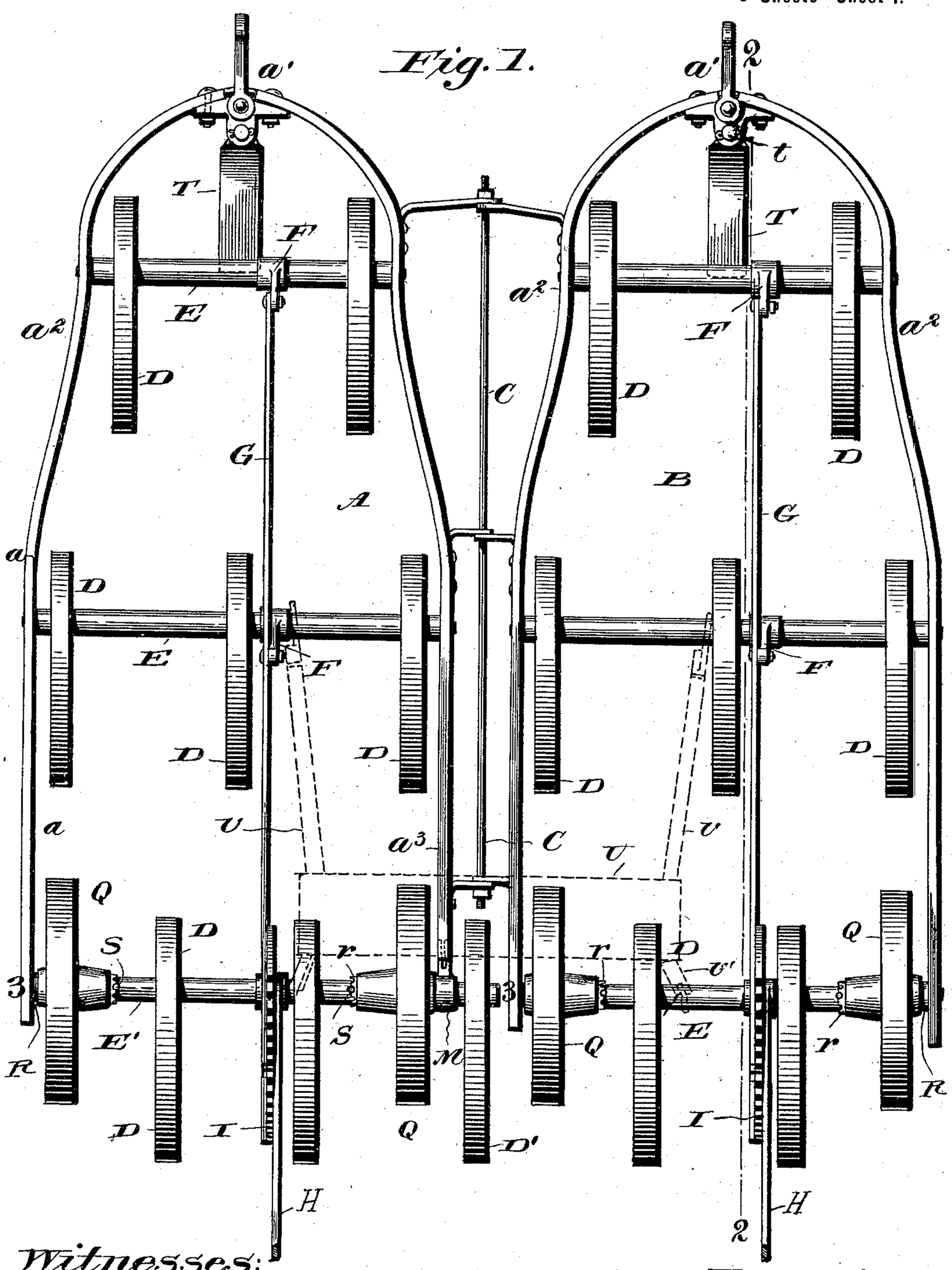
HARROW.

(Application filed Dec. 30, 1897.)

(No Model.)

3 Sheets—Sheet 1.

Fig. 1.



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3 Sheets—Sheet 2.

Fig. 1.

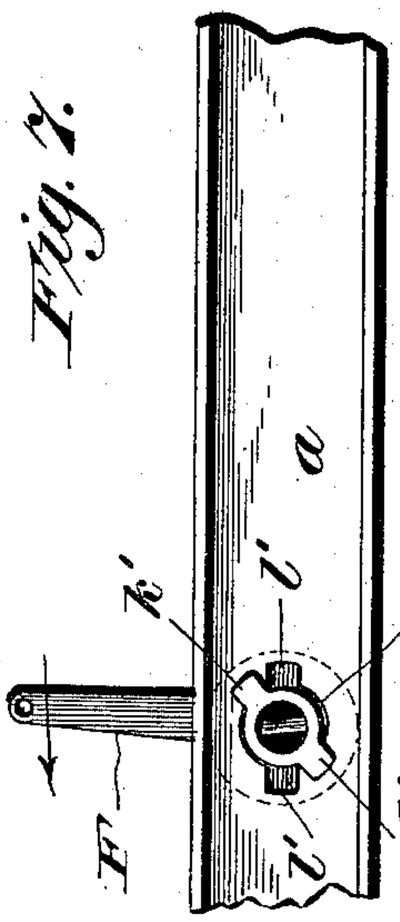


Fig. 2.

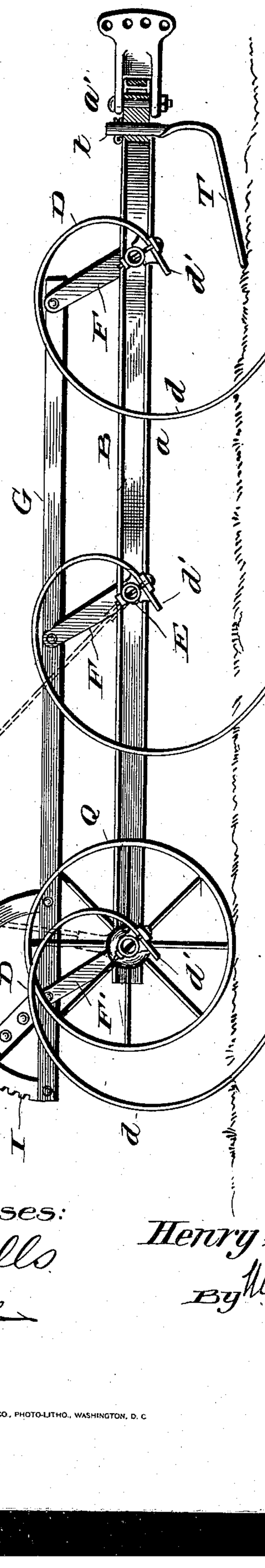
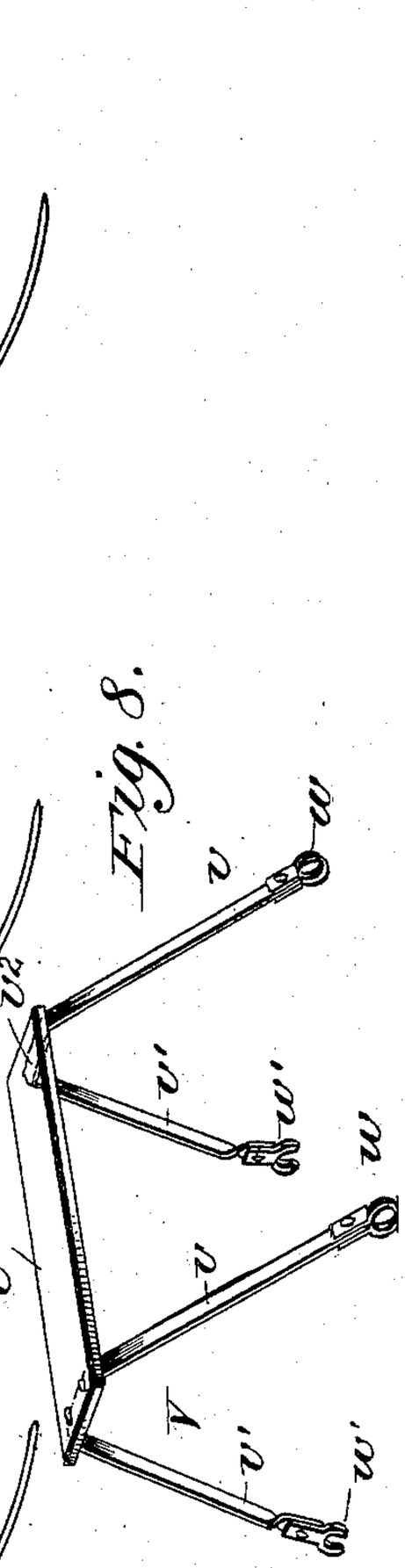


Fig. 3.



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(No Model.) (Application filed Dec. 30, 1897.) 3 Sheets—Sheet 3.

Fig. 3.

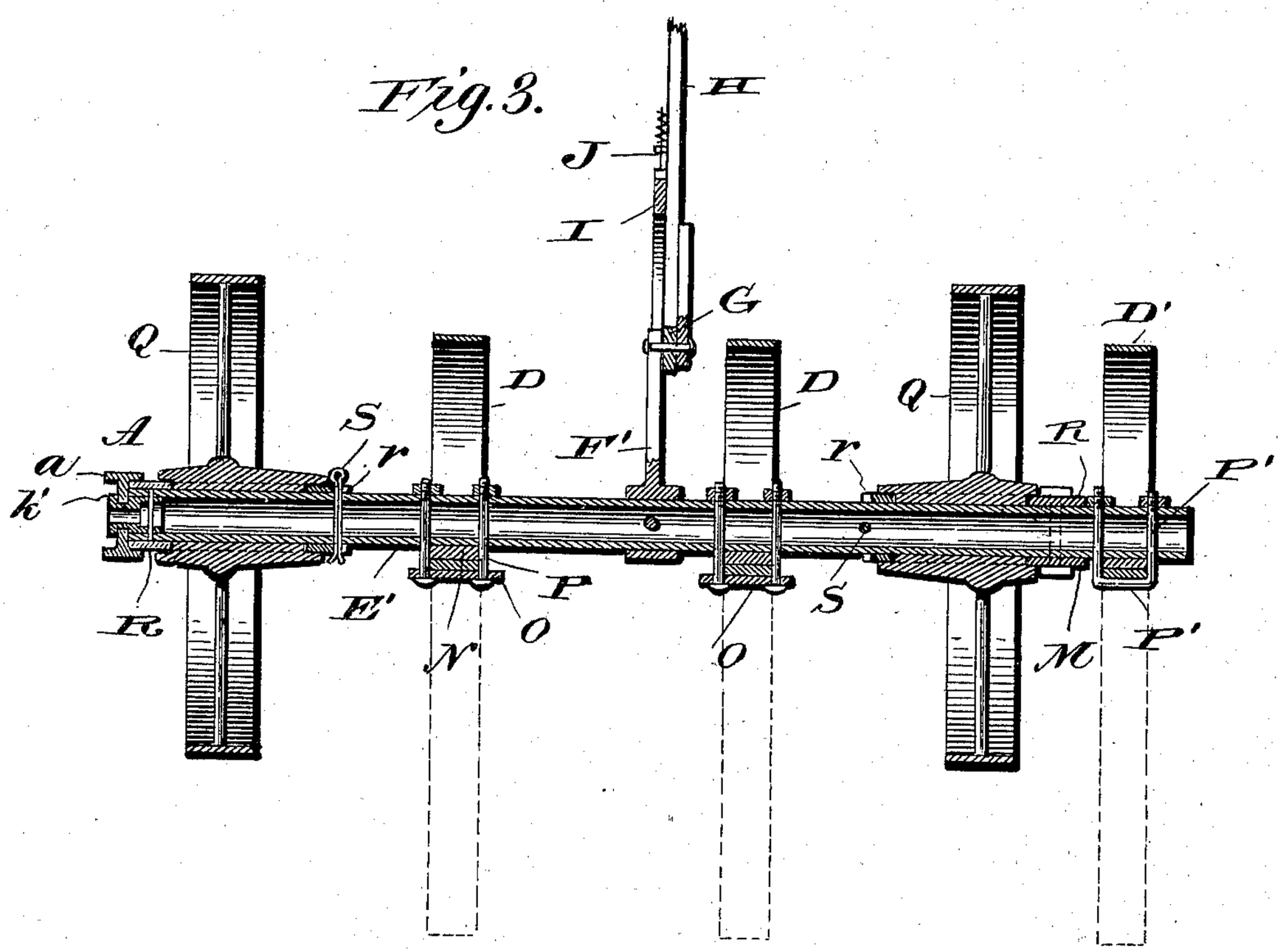


Fig. 4.

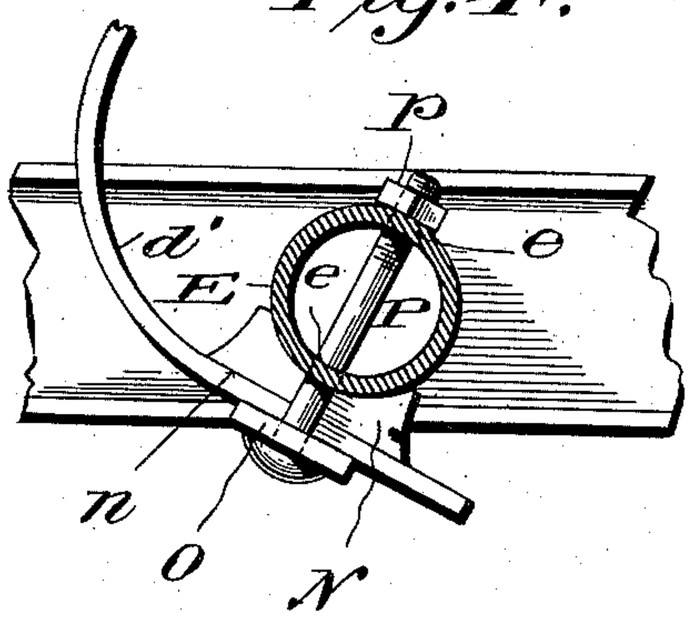


Fig. 5.

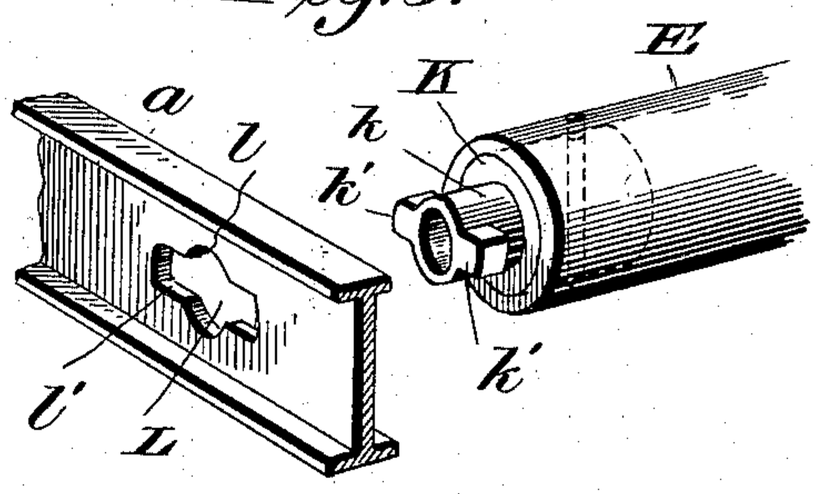
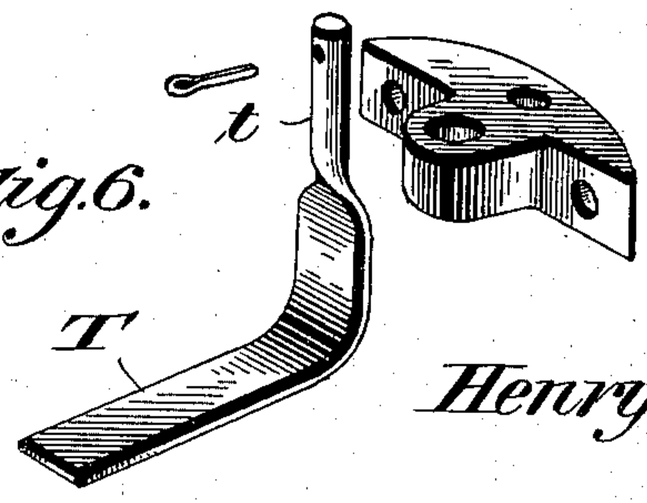


Fig. 6.



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UNITED STATES PATENT OFFICE.

HENRY W. EISENHART, OF YORK, PENNSYLVANIA, ASSIGNOR TO THE A. B. FARQUHAR COMPANY, LIMITED, OF SAME PLACE.

HARROW.

SPECIFICATION forming part of Letters Patent No. 609,333, dated August 16, 1898.

Application filed December 30, 1897. Serial No. 664,545. (No model.)

To all whom it may concern:

Be it known that I, HENRY W. EISENHART, a citizen of the United States, and a resident of York, in the county of York and State of Pennsylvania, have invented a new and useful Improvement in Harrows, of which the following is a specification.

My invention relates especially to spring-tooth harrows; and it consists in certain improvements in machines of that kind which are illustrated in the accompanying drawings and which I will hereinafter describe.

In the drawings, Figure 1 is a top plan view of a harrow embodying my invention. Fig. 2 is a longitudinal vertical sectional elevation on line 2 2, Fig. 1, the hand-lever H being there shown on the side of the segment I opposite that on which it is shown in Fig. 1. Fig. 3 is a transverse section taken on line 3 3 of Fig. 1 through one of the rear tooth-carrying shafts. Fig. 4 is a detail cross-sectional view, enlarged, through one of the tooth-carrying bars. Fig. 5 is a detail perspective view illustrating the manner of mounting and locking the tooth-carrying bars in the frame. Fig. 6 is a detached perspective view of the depth-gage and its support. Fig. 7 is a detail view of one of the side frame-pieces, illustrating the method of mounting the tooth-bar therein. Fig. 8 is a detached perspective view, on a smaller scale, of the seat and its carrying-standards.

The harrow consists of two frames A and B, which are connected by a longitudinal pivotal rod C, and each of which frames carries a set of spring-teeth D and adjusting mechanism, whereby the depth to which the teeth shall cut is regulated. The frames are preferably constructed of I-shaped iron, each being substantially U-shaped, the bend of the U being toward the front, where it is strengthened, as at a', for the attachment of the draft devices. In the side bars a of the frames are mounted the pipes or shafts E, to which the spring-teeth are secured. I prefer that there shall be three of these shafts or pipes in each frame and that the forward one shall be somewhat shorter than the other two, the frame being narrowed toward its front end to receive this shorter shaft, as represented at a^2.

The shafts E are rotatable in their supporting-frames to an extent sufficient to give the teeth the required adjustments, and in order that the several shafts of each frame may be turned together each shaft is provided near its center with a short crank-arm F, which arms are connected by a rod or bar G. The arm F′ of the rear shaft E is extended above the connection with the bar G and has secured to it the hand bar or lever H, which the operator grasps in making the adjustments of the teeth. The hand-lever is provided with a spring-latch J, of usual construction, which engages with a toothed segment I, which is secured to the connecting-bar, so that it spans the pivotal connection thereof with the rear arm F′.

The manner in which the teeth-carrying shafts are mounted is novel and possesses advantageous features in that not only are the shafts rotatably supported in the frame, but they are also easily detachable or removable therefrom, and at the same time they are locked or securely held in the frame when the implement is assembled and the parts are in their ordinary or working positions.

The preferred manner of mounting the shafts when they are hollow or of pipe form is as follows: In each end of the shaft there is secured a plug K, of smaller diameter than the shaft and extending beyond its end. This extension-piece has a cylindrical journal portion k, which is concentric with the shaft, and an eccentric head k'. The bearings in the frame for the shafts, when the latter are constructed as above described, consist of apertures L, formed in the side bars of the frame, partly cylindrical, as at l, and of a size to receive journals k of the shafts, and partly eccentric, as at l', to correspond with the eccentric heads k'. It will be readily understood that if the teeth-carrying shafts are so turned that the heads k' and the eccentric parts of the apertures L register the shafts may be inserted into or withdrawn from the apertures, and likewise when the shafts are turned so that the heads k' lie transverse to the eccentric portions of the apertures the shafts will be locked in the frame and will also serve to unite the opposite side bars of the frame and prevent them from springing apart. The crank-arms F are so inclined

relative to the heads *k'* that the latter can never register with the apertures when the machine is set up in working relation, and hence accidental displacement of the teeth-bars is rendered practically impossible. Should it become, from any cause, necessary to take out a shaft E, the connecting-bar G should be removed and the shaft or shafts turned so that the heads *k'* and apertures L register, when the shafts may be removed either by springing apart the side bars of the frame or by removing one of them when they are separate from each other. It will be seen, particularly by reference to Figs. 3 and 5, that the top and bottom flanges of the side frame-pieces *a* serve to protect the eccentric head *k'* of the bearing for the tooth-carrying shaft, and they tend to prevent grass, weeds, or other material from catching upon and winding around the journals of the shaft, and thus interfering with the easy adjustment of the teeth. While I have described this part of my invention as applied to a hollow shaft or pipe, which is the form I prefer to use in practice, yet it is evident that this feature is equally applicable to a solid shaft and where the extension-pieces K are in one with the main body of the shaft.

I prefer that the rearmost shaft E' in one of the frames should extend beyond that side bar a^3 which is next to the adjacent frame and that upon this extended end of the shaft a tooth D' should be mounted. When thus made, the side bar a^3 is provided with a cylindrical bearing M for the extended end of the shaft. By this arrangement the tooth D' follows directly in the line of the connecting-rod which unites the two frames A and B.

It is evident that the shafts which support the teeth may be supported rotatably and detachably in the frame and yet be locked therein when in all working positions without requiring a locking device at each end of the shaft—an example being the shaft E'—when the locking-head *k'* is at one end only. It is also evident that the bearing in which the shaft turns and the frame member of the locking device might be separate one from the other.

The teeth are preferably of any common form for spring-tooth harrows, having each a spiral curved portion *d* and an inward-turned substantially straight portion *d'* at the inner or attached end.

N represents a bearing-block on one face shaped to fit the shaft E and on its opposite face formed with a seat *n* for the end *d'* of the tooth.

O represents a clamping-plate adapted to be secured to the shaft E by bolts P, which pass through it and through holes *e* in the shafts and are to be drawn by the action of the bolts P and the nuts *p* thereon close against the portion *d'* of the tooth, holding it securely in the seat *n* in the bearing-block. In place of the clamping-plate O and the separate bolts P a U-shaped bolt P' (shown on the right of Fig. 3) might be used. This method of mounting the teeth permits them to be easily applied and removed, enables the tooth to be easily adjusted upon the shaft, and permits the use of a form of tooth which when separate from the frame may be bundled together in a compact manner to facilitate shipment.

I prefer to provide each frame with a pair of wheels upon which the implement may be transported when the teeth are adjusted to their upper or inoperative position. These wheels Q are preferably mounted upon one of the tooth-carrying shafts E, the rear one being usually chosen to receive them. The hubs of the wheels are undercut near their ends, as represented in Fig. 3, so as to overhang the thrust-bearings, which serve to keep the wheels in place upon the shafts. As represented, these bearings may consist of cylindrical bearings R, arranged on the inner sides of the frames and secured either thereto or to the tooth-carrying shafts, and loose bearing-sleeves *r*, which are held in place on the inner sides of the wheels by split keys S, passing through the shafts and engaging with notches in the edges of the sleeves *r*, or by other well-known means. By arranging and supporting the wheels as I have just described I am enabled to mount them between the teeth, so that the size of the frame does not have to be increased to provide for them and whereby separate bearings and mountings for the wheels are rendered unnecessary.

At the forward end of the frame I arrange a preferred form of depth-gage by means of which the depth to which the teeth shall cut into the soil is regulated. It consists of a trailing plate or shoe T, which is inclined at a small angle to the horizon and is adapted to drag upon the surface of the soil. It is swiveled upon a vertical bearing *t*, arranged at its forward end and suitably mounted in the frame, so that it is free to turn and adjust itself to the movements of the harrow.

U represents the seat, supported at each end upon a standard V, each standard being carried by one of the harrow-frames, so that the seat is over the central longitudinal line of the harrow. Each standard consists of a forward-inclined leg *v*, having at its lower end an eye *w*, adapted to encircle the middle tooth-carrying shaft E, and a rear leg *v'*, provided at its lower end with a fork *w'*, adapted to straddle the rear tooth-carrying shaft. The legs *v* and *v'* are preferably united by the bearing-pieces v^2, to which the seat proper is secured. The seat may be swung forward, turning on the shaft to which the legs *v* are secured, should it be desirable to displace the seat in order to have better access to any of the rear parts of the machine, and by making the forward inclination of the legs *v* greater than the rearward inclination of the legs *v'* and connecting them to their respective supporting-shafts, as described, it is practically impossible for the seat to jolt loose under any circumstances of ordinary use. The driver

may by shifting his position upon the seat throw a greater or less proportion of his weight upon one frame or the other, as may be found desirable.

A harrow such as I have described is simple in construction and not likely to get out of order, and may be easily taken apart and compactly packed for shipment or storage and easily assembled when required for use.

Without limiting myself to the precise construction and arrangement of parts which I have shown and described, what I claim is—

1. The combination, in a harrow, of the tooth-carrying shafts provided with journals which are concentric with the axes of the shafts, and each shaft having at one end an eccentric head, and the frame provided with bearings in which the said journals of the shafts are mounted, and having eccentric-shaped openings through which the eccentric heads of the shafts are adapted to pass when the shafts are turned into certain unusual positions, substantially as set forth.

2. In a harrow, the combination of the frame having apertures with eccentric portions in its side bars, the hollow shafts or pipes to which the teeth are secured, and the plugs which are inserted into the ends of the shafts or tubes and there secured, such plugs being formed with cylindrical journal portions k and eccentric heads k', substantially as set forth.

3. In a harrow, the combination of the frame having side bars formed with flanges, and provided with bearing-apertures between the flanges, and the teeth-carrying shafts mounted in the apertures of the said frame-pieces and provided with eccentric heads which are situated adjacent to the flanges of the side frame-pieces and are protected thereby, substantially as set forth.

4. In combination with a spring-tooth harrow, a seat and supporting-standards therefor, each standard having a forward-inclined leg with an eye at its end adapted to encircle a shaft on the harrow, and a rear leg with a fork at its end adapted to straddle another shaft on the harrow, substantially as and for the purposes hereinbefore set forth.

In testimony whereof I have hereunto set my hand this 6th day of November, 1897.

HENRY W. EISENHART.

Witnesses:
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C. B. FREY.