(No Model.) 3 Sheets—Sheet 1.

E. F. STODDARD.

HARROW.

No. 347,744. Patented Aug. 17, 1886.

Fig. 1.

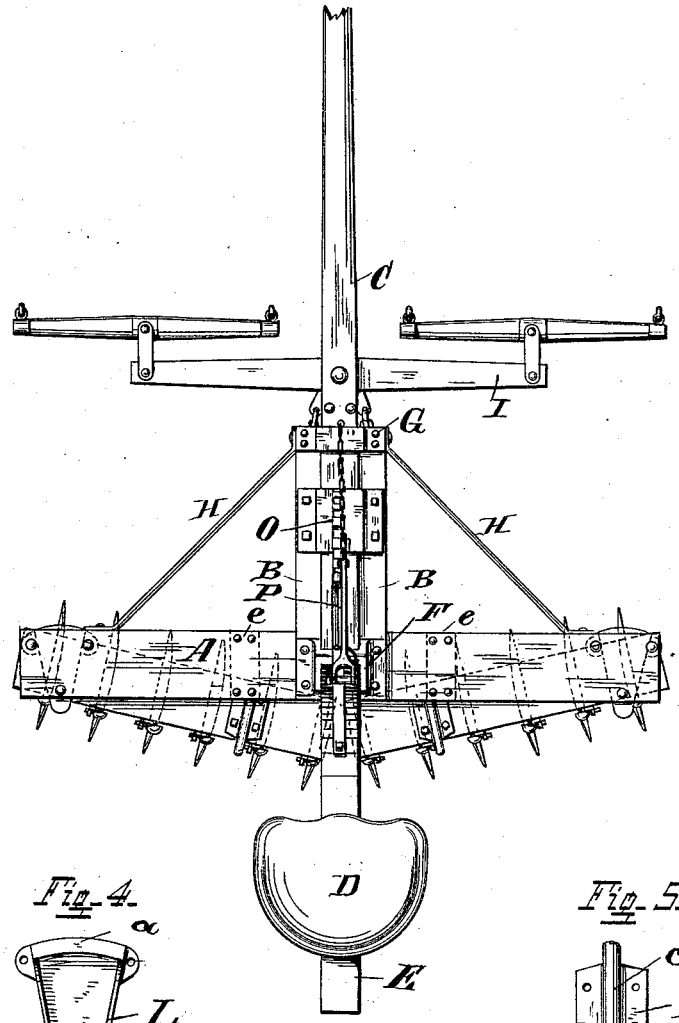

Fig. 4.

Fig. 5.

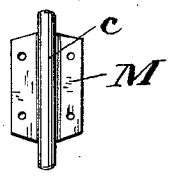

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Fig. 2.

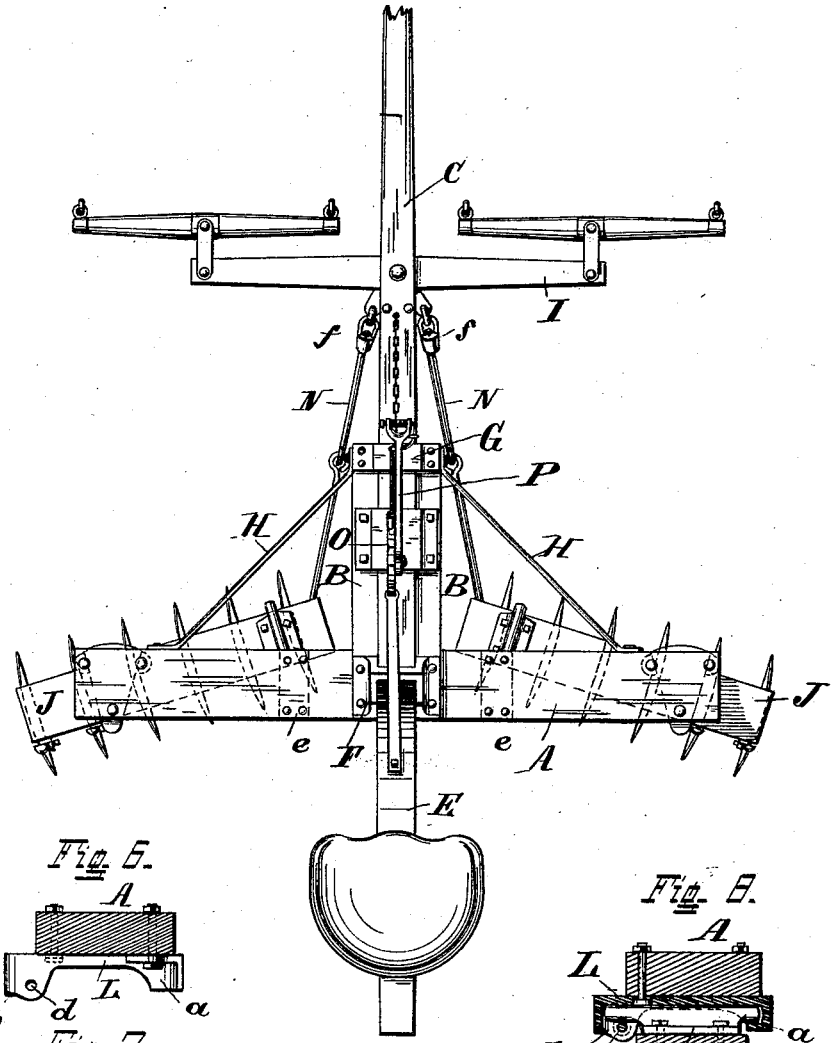

Fig. 6.

Fig. 7.

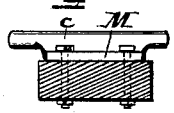

Fig. 8.

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No. 347,744. Patented Aug. 17, 1886.

Fig. 8.

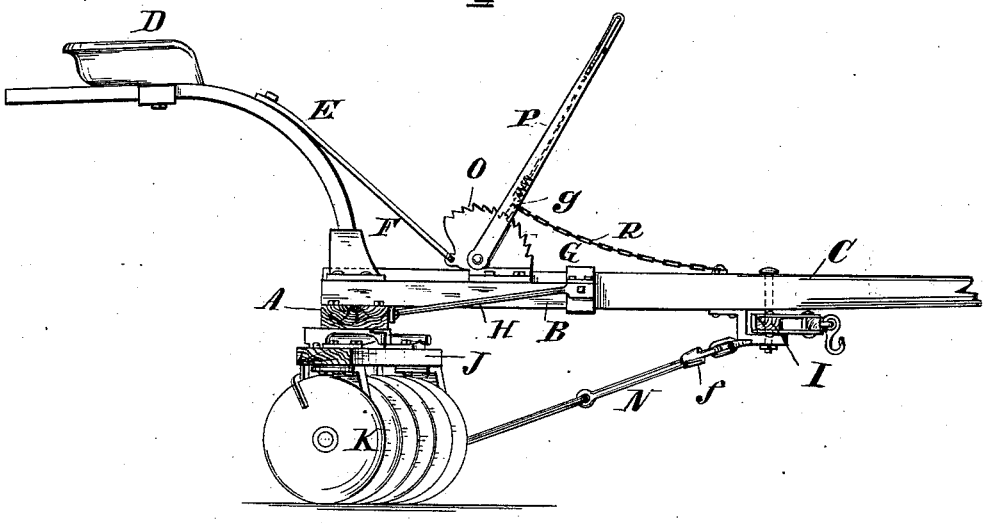


Fig. 9.

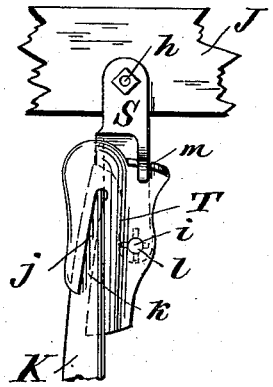
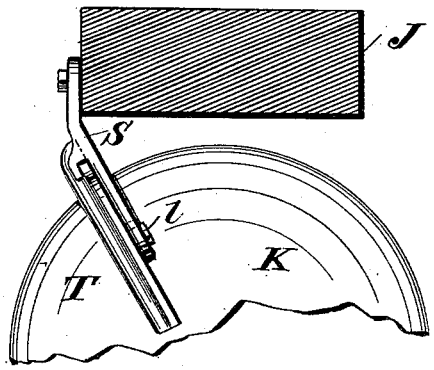


Fig. 10.



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UNITED STATES PATENT OFFICE.

E. FOWLER STODDARD, OF DAYTON, OHIO, ASSIGNOR TO THE STODDARD MANUFACTURING COMPANY, OF SAME PLACE.

HARROW.

SPECIFICATION forming part of Letters Patent No. 347,744, dated August 17, 1886.

Application filed December 15, 1884. Serial No. 150,389. (No model.)

To all whom it may concern:

Be it known that I, E. FOWLER STODDARD, a citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Harrows, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to that class of harrows or cultivators known as "rotary-disk harrows," and it is an improvement on my Patent No. 298,911, dated May 20, 1884. In that patent the pole in sliding backward or forward carried with it in both instances the disk-gangs, whose relative angles backward or forward were thus positively shifted through the force of the pole exerted directly upon them.

The object of my present invention is to utilize the resistance of the earth to cause the shifting of the gangs from a forward angle to a straight line or from a straight line to a rearward angle in a harrow having a sliding pole or tongue, and without imposing on the pole or tongue the strain and upon the team the backward labor of forcing the disk-gangs back, and which action of the pole or tongue while the angles of the gangs are being changed is always in a forward draft-line.

It has for a further object a general improvement and simplification both of the construction and operation of the harrow and its parts.

The novelty of my invention will be herein described, and distinctly pointed out in the claims.

In the accompanying drawings, Figure 1, Sheet 1, is a plan view of my improved harrow with the gangs angling backward. Fig. 2, Sheet 2, is a corresponding view with the gangs reversed and angling forward. Fig. 3, Sheet 3, is a side elevation of the machine. Fig. 4, Sheet 1, is a bottom plan view of the upper portion of the hinge-coupling. Fig. 5, Sheet 1, is a top plan view of the lower hinged coupling. Figs. 6 and 7, Sheet 2, are side elevations of both portions of the hinge-coupling detached. Fig. 8, Sheet 2, is a corresponding view showing the parts connected. Fig. 9, Sheet 3, is a detail view showing my improved scraper in rear elevation. Fig. 10, Sheet 3, is a corresponding view in side elevation.

The same letters of reference are used to indicate identical parts in all the figures.

A is the usual main beam, to which are bolted the two short forwardly-projecting beams B, between which the pole or tongue C is confined and slides.

The driver's seat D is supported upon the seat-beam E, which is secured in a socket, F, attached to the beam B, as shown, or in any other suitable manner. The forward ends of the beams B are connected by a strap, G, encircling the pole, and from which strap brace-rods H, made adjustable, if desired, extend back and are connected to the beam A, thus making a strong, well-braced frame-work.

The tongue, except as hereinafter explained, is free to slide backward or forward, and has secured to it, in the usual or any suitable manner, the double-tree I.

J are the gang-beams, with their sets of disks K connected thereto, as is usual in this class of machines. These gang-beams are hinged to the main beam A, preferably at or near their outer ends, and by the following simple construction of hinge, which forms practically a universal joint, to enable the gangs to swing backward and forward and to follow the inequalities of the ground.

Upon the under side of each end of the beam A is bolted a casting, L, Figs. 4, 6, and 8, having at its forward end a segmental recess, *a*, and at its rear end perforated ears or lugs *b*.

Upon the gang-beams at proper points are bolted the castings M, which are, essentially, flat plates with a superimposed transverse projecting spindle, *c*. To unite the disk-gangs to the beam A by means of these hinges it is only necessary to insert the forward projecting end of the spindle *c* into the recess *a* and the rear end between the lugs *b*, as seen in Fig. 8, whereupon, by inserting a key or pin, *d*, through the perforations in the lugs, a lock is effected between the parts, and at the same time, by the horizontal play of the spindle in the segmental slot *a*, the gang-beams can swing forward or backward, according to the degree of angling desired, while at the same time, by the oscillation of the spindle *c*, the gang-beams

can vibrate up and down to follow the inequalities of the ground, thus making the hinge a practical universal joint, so far as its use in a harrow is required. As will be observed, there are two of the spindle-plates M upon each gang-beam, the one of which is coupled to form the hinge with the beam A, while the other bears against a flat plate, *e*, or other suitable bearing-surface upon the under side of the beam A. By this construction I am enabled to transfer the gang-beams from one side of the harrow to the other, according as it is required that the concavities of the disks of the opposite gangs face each other or be opposed to each other, and this transfer can be readily effected by simply removing the pins *d*, to uncouple the hinge-connections, and by replacing them when the transfer and recoupling has been made. When the disk-gangs are hinged to the main beam at or near their outer ends, the draft-links N are united to the inner ends of the disk-gangs, preferably in line with their revolving axes, and extend forward and are connected to the pole or tongue, or a bracket attached to the pole or tongue, as may be desired. These draft-links should be flexible, and not rigid; and they may consist of chains or of separate hinged sections, as shown in the drawings, with adjustable shackle-nuts *f*. From this construction it will be readily understood that by drawing forward the pole the disk-gangs will be drawn from a rear angle to a straight line or points of adjustment between the two, or from a straight line to a forward angle or points of adjustment between the two. Upon sliding the pole back, however, no change in the position of the disk-gangs would be effected, on account of the slack caused in the draft-links, until, the pole having been set and locked to the frame, the starting forward of the machine would, owing to the resistance of the earth upon the disks, cause the gangs to swing back until the draft-links become taut, when the machine, as a whole, would proceed forward with the gangs in their backwardly-adjusted positions.

The mechanism for locking the pole to the main frame in any of its adjusted positions may be that shown in my patent before referred to, or may be any other suitable mechanism. I have, however, herein shown a mechanism which I prefer for this purpose, and which is as follows: Upon the beams B is secured a plate carrying a ratchet or toothed sector, O, with a hand-lever, P, pivoted thereto, and provided with any suitable locking-dog, *g*, actuated by a thumb-piece at the grasping extremity of the lever. A chain, R, extends from the hand-lever, and is connected to the pole, as shown. The hand-lever is within easy reach of the driver on the seat D, so that by grasping it he can vibrate the hand-lever and lock it to the sector O at any desired point. By drawing back the hand-lever the pole will be drawn back, and can be locked at any point desired, and by unlocking the hand-lever and throwing it forward and relocking it the team, in going forward, would draw forward the pole until the chain R became taut. Thus it will be seen that the shifting of the gangs, either backward or forward, is always accomplished by the forward draft of the pole, directly in one instance, and indirectly, through the machine, in the other instance, as before explained. It will also be further observed from this construction that the shifting of the disk-gangs either backward or forward can be effected by the driver from his seat while the machine is in motion, and without the necessity of stopping the team. This would be done, in the one instance, by drawing forward the main frame upon the pole, through the medium of the hand-lever, and, in the other instance, by permitting the main frame to slide back upon the pole, as will be readily understood. It is also apparent that practically the same results could be accomplished by hinging the disk-gangs to the main beam at their inner ends, and coupling them to the pole at their outer ends or points, outside of the hinging-points.

The remaining feature of my invention consists in the scrapers for the disks, which are illustrated in Figs. 9 and 10. My object is to provide independent automatically-acting scrapers for the disks, which will at all times remain in operating contact with the disk, to prevent the adherence or accumulation of earth upon them. Upon the rear side of each of the gang-beams are pivoted, as at *h*, a series of pendent arms, S, to whose lower ends are pivoted, in a manner to be presently explained, as at *i*, the scraper-blades T, with a slot, *j*, to straddle the disk, so that the scraping-surface *k* will bear lightly upon the concave side of the disk, and the opposite wall of the slot will bear slightly against the convex side of the disk. In this manner, by reason of the double pivotal points *h* and *i*, the scrapers will always accommodate themselves to the disks in their vibrations out of their normal position, and will thus prevent wearing or clamping or binding.

As the most convenient manner of removably uniting the scraper-blades to the pendent arms S, I form pins *l* upon the scraper-blades, which pins have T-headed extremities adapted to pass through and beyond corresponding slots in the perforations in the arms S, through which the pins are passed, the T-head being so arranged that the scrapers must be applied in a position out of their normal position, and when applied and turned around a self-locking coupling is formed, as will be readily understood. To aid the pins *l* in supporting the scrapers against strain upon the arms S, I provide an overlapping lip or lug, *n*, which bears against an upper flattened portion of the scraper-blade, as seen in Fig. 9. By this construction of scrapers I am enabled to dispense with oscillating or reciprocating bars to actuate the scrapers, and at the same time obtain all the advantages of such form of construction.

I am aware that independent straddling

scraper-blades in one unjointed piece are old, and therefore do not claim the same; but,

Having thus fully described my invention, I claim—

1. In a wheel or disk harrow, the universal-joint hinges, consisting of the recessed sector-plate L and spindle-plate M, the parts constructed and united in the manner and for the purpose specified.

2. In a wheel or disk harrow, the combination, with a series of rotating harrow-disks, of a series of independent pivoted rocking arms carrying self-adjusting scrapers, which straddle and bear on both sides of the disks.

3. In a wheel or disk harrow, the combination, with a series of rotating harrow-disks, of a series of straddling scraper-blades removably connected to a corresponding series of pendent rocking arms attached to the gang-beams.

4. The combination, with the main frame provided with an independently backwardly and forwardly sliding pole, of the toothed sector O, locking hand-lever P, connecting chain or link R, and sliding pole C, substantially as and for the purpose described.

5. The combination, with the main beam provided with two hinging-sockets, of the gang-beams, each provided with two hinging-spindles, one of which is adapted to engage with one of the aforesaid sockets, while the other forms a sliding bearing, and whereby the gang-beams can be transferred from one side of the harrow to the other, substantially as described.

E. FOWLER STODDARD.

Witnesses:
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WILLIAM J. JONES.