(No Model.)

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J. S. CORBIN.

DISK HARROW.

No. 273,966. Patented Mar. 13, 1883.

Fig. 1

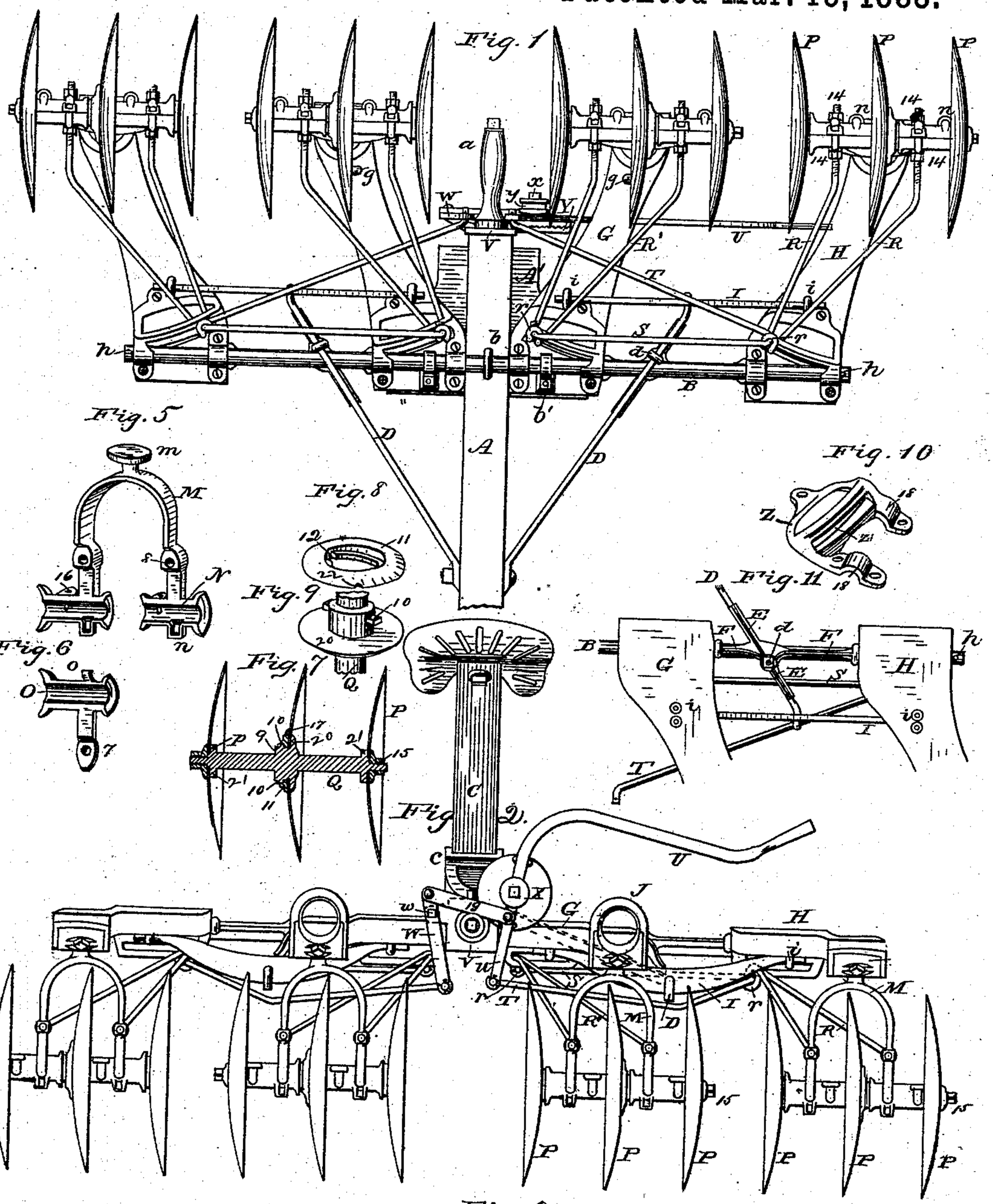

Fig. 5

Fig. 6

Fig. 8

Fig. 9

Fig. 7

Fig. 10

D Fig. 11

Fig. 2.

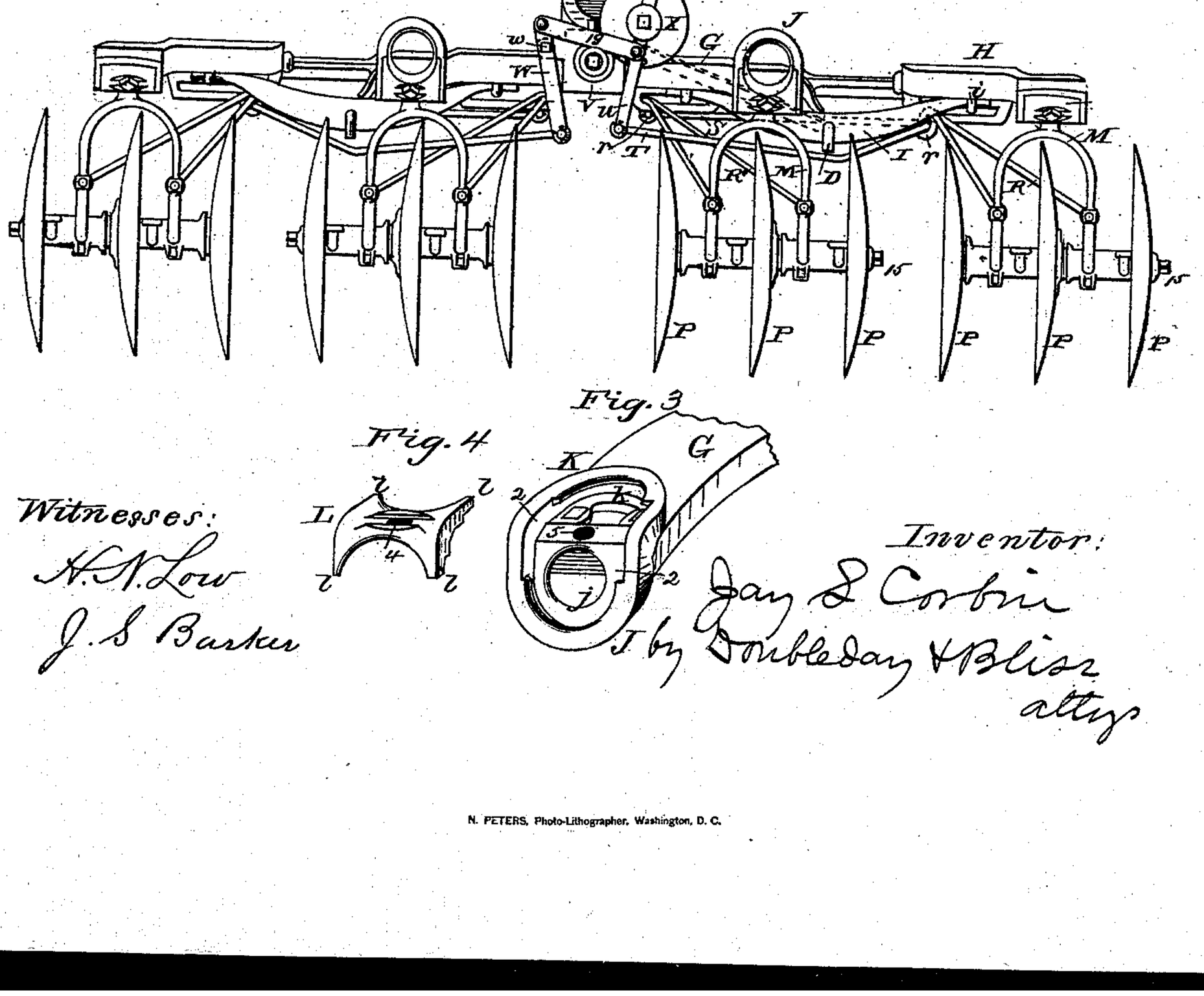

Fig. 3

Fig. 4

Witnesses:

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J. S Barker

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attys

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Fig. 12.

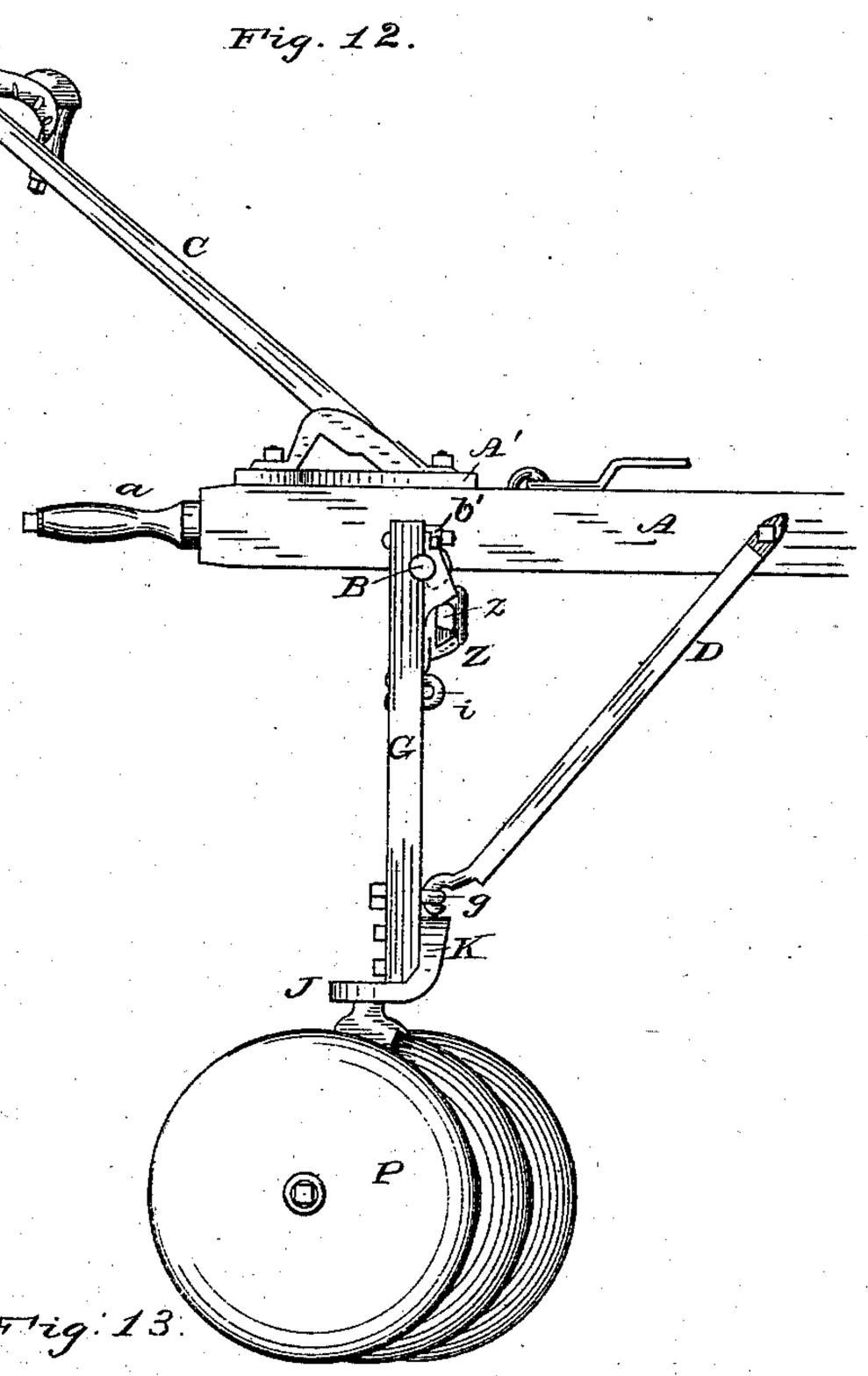
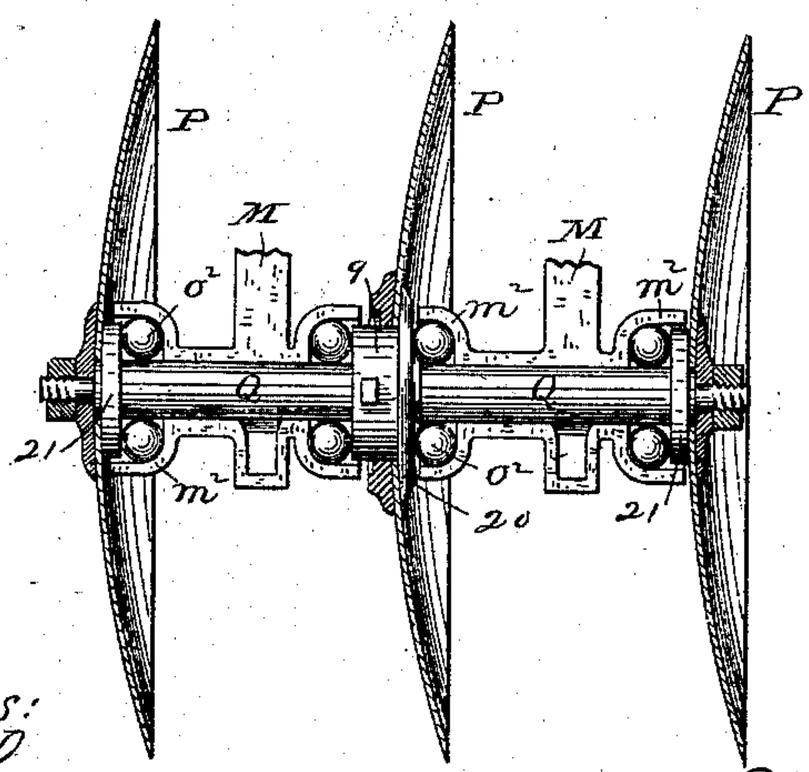


Fig. 13.



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(No Model.)

3 Sheets—Sheet 3.

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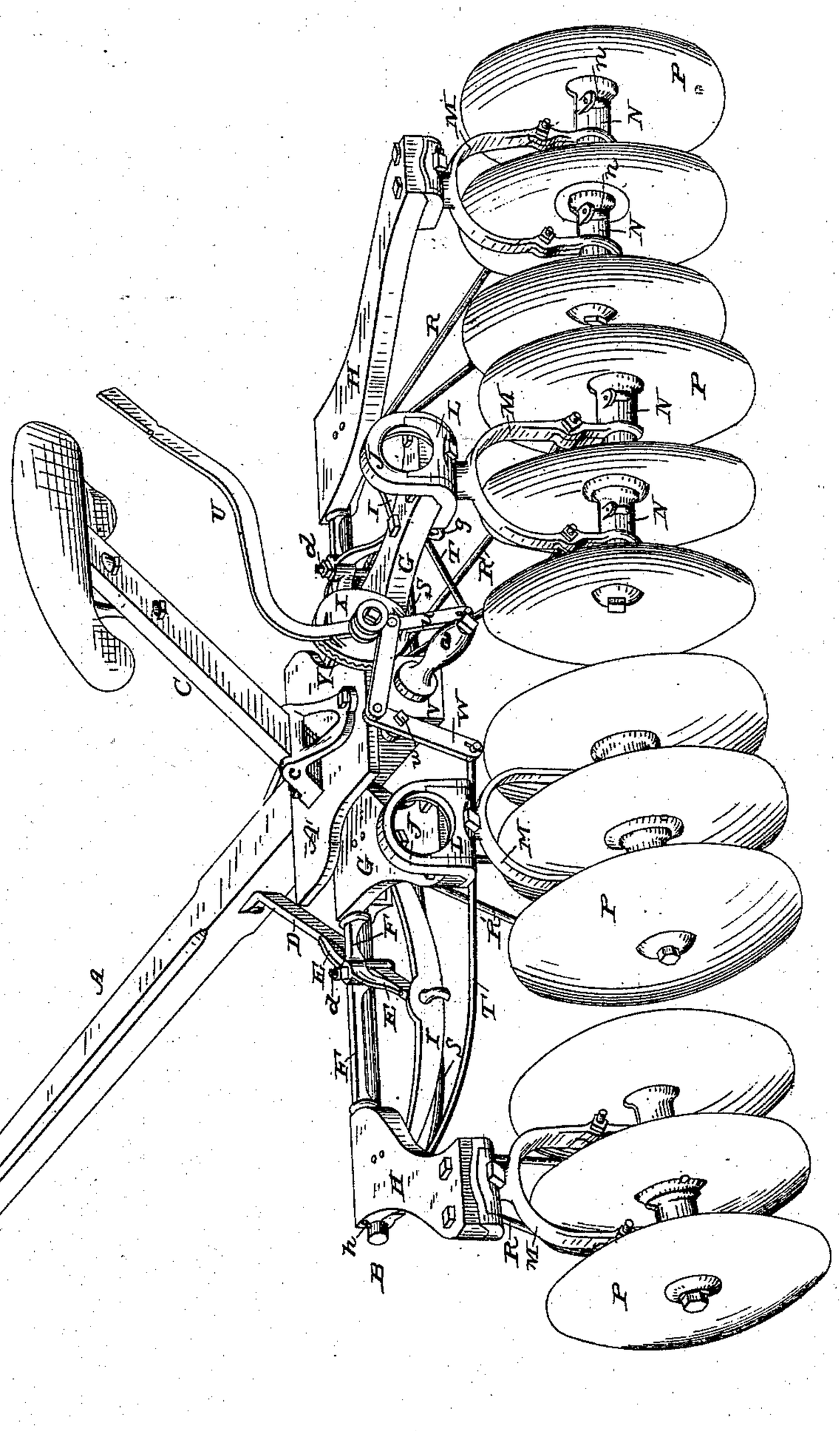

Fig. 1.

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UNITED STATES PATENT OFFICE.

JAY S. CORBIN, OF GOUVERNEUR, NEW YORK.

DISK-HARROW.

SPECIFICATION forming part of Letters Patent No. 273,966, dated March 13, 1883.

Application filed December 9, 1881. (No model.)

To all whom it may concern:

Be it known that I, J. S. CORBIN, a citizen of the United States of America, residing at Gouverneur, in the county of St. Lawrence and State of New York, have invented certain new and useful Improvements in Disk-Harrows; 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, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

Figure 1 is a bottom view of my improved harrow. Fig. 2 is a rear view. Fig. 3 is a bottom view of one of the vibrating carrier-arms, having the angular socket-iron attached. Fig. 4 is a perspective view of the locking cap-plate of the angular socket. Fig. 5 is a perspective view of the stirrup-hanger, having a part of each boxing removed. Fig. 6 is a reverse view of one of the removed parts of the boxing. Fig. 7 is a section of one of the axles and its attached disks. Figs. 8 and 9 are detached views, showing the manner of connecting the disks with the axles. Fig. 10 is a perspective view of one of the slotted carrier-arm bearings. Fig. 11 is a top view of a portion of the main axle and its attached carrier-arms and other devices. Fig. 12 is a side view of so much of the harrow as illustrates the method of converting it into a straddle-row corn-cultivator. Fig. 13 is a sectional view, enlarged, of a gang, showing the construction of the bearings. Fig. 14 is a perspective view of my harrow, taken from the rear, the disks being inclined to the line of draft.

In the drawings, A is the tongue, provided at its rear end with a lifting-handle, *a*, secured thereto preferably by means of a joint-bolt passing centrally through the handle and into the rear end of the tongue, where it engages with a hidden nut.

B is a cross-bar, round in cross-section, and attached to the tongue by means of a staple or eyebolt, *b*, about midway of its length.

C is a seat-spring, supported upon the tongue by means of a cast-metal socket, *c*, at its lower end.

D D are braces bolted at their forward ends to the tongue, and extending rearwardly and outwardly a short distance beyond the bar B and below said bar, and connected by means of eyebolts *d* to saddles E E F F. The part F F of each saddle is grooved on its under face to fit closely the upper side of bar B, the ends of the cross-arms E E projecting down below the horizontal plane of said cross-bar, and resting upon the upper edge of the brace D, the eyebolt *d* encircling the brace, and passing upwardly through the rear cross-arm, E, to which it is secured by a nut, as shown plainly in Fig. 11.

There are two carrier-arms, G H, upon each side of the tongue, these carrier-arms being duplicates and each secured to the bar B by means of a metal bearing, Z, having grooved parts 18, which are bolted to the carrier-arms and form therewith bearings in which the bar B is seated. As shown, each carrier is grooved upon its end face to form part of the bearing for the bar B; but, when preferred, such bearing may be formed entirely in the metal portion. Each of these bearings Z is provided with a slot, *z*, (see Figs. 1, 2, 10, 12,) for a purpose which will soon be explained.

I I are equalizing-bars, one for each pair of carrier-arms, each bar being provided with a central opening, through which the rear end of a brace, D, passes, the ends of the bars being supported in eyebolts or loops *i*, which depend from carrier-arms G H. Thus it will be seen that while these carrier-arms are free to vibrate about the bar B the weight of the tongue, the bar, the driver's seat, and the driver is transferred to the carrier-arms, and thence to the axles and disks, which are connected to the carrier-arms by devices which I will now proceed to describe.

Referring particularly to Figs. 2, 3, 4, 12, J K is an angular socket-iron, bolted firmly to the rear end of carrier-arm G, and provided with sunken circular recesses or sides *j k*, each provided with a semicircular overhanging rib. (See Fig. 3.) L, Fig. 4, is an angular cap-plate, provided with semicircular arms *l*, adapted to fit into recesses 2 in the bearing J K, and to be secured thereto by means of a bolt passing through an opening, 4, into a threaded hole, 5, whereby there is formed an inclosed bearing adapted to receive the circular head

m of a stirrup-hanger, Figs. 2 and 5, and it will be readily understood that said head *m* can be introduced into either of the sockets *j k*, the angular cap L being first removed, and can be firmly secured in position by bolting down the angular cap, after which the stirrup, though held firmly in place, can be rotated, but cannot be withdrawn from its seat. The iron bearing, which is attached to the rear of arm H, is substantially like the one shown in Fig. 3, except that the circular portion of the part J is dispensed with, as shown in Fig. 2. The cap, which secures the stirrup-head *m* in place, is correspondingly shaped, (see also Fig. 2,) it being intended that the stirrup shall be supported only in a position at right angles to the carrier-arm H as engaged in Figs. 1 and 2, while by the use of the construction of angular bearing attached to carrier-arm G the stirrup can be supported either in a position at right angles to said arm or substantially in a line with said arm. (See Fig. 12.)

Referring particularly to Figs. 5, 6, 7, 8, 9, M is a stirrup-hanger, each leg of which is provided at its lower end with elongated bearings N O, the parts N being cast in the same piece with the yoke portion M, the parts O being cast separately and provided with lugs *o*, which take into loops *n*, cast on the parts N, and with upwardly-extending arms 7, which are secured in place by means of bolts passing through them and through bolt-holes 8 in the stirrup-hanger. The parts N have each oil-holes 16. As shown in Figs. 1 and 2, the bolts which secure these parts O to the parts N are formed at the ends of shifting-levers R R′, each lever being formed of a rod doubled at the center to form arms which straddle the central disk of each gang, and are provided with nuts 14. The doubled end of each rod is turned down at about a right angle to the other portion of the lever, and is supported in a slot, *z*, of the carrier-arm bearing Z, Figs. 1, 10, and 12.

Returning again to Figs. 5, 6, 7, 8, 9, Q is the gang-axle, having a central hub or boss, 9, and flange 20, and two flanges, one at each end, which are of a little less diameter than the diameter of the hub 9. This axle has also projecting screw-threaded ends, which may be either cast in one piece with the axle, as are the hub and flanges—that is, they may be made of wrought-iron and inserted in the mold, so that the axle shall be cast upon them; or the axles may be made with a screw-threaded socket in each end and a bolt or securing-screw screwed therein, instead of the projecting bolt and nut 15, as shown in the drawings. The hub 9 has upon opposite sides studs 10.

11 is a collar of such size as to pass readily over the hub 9, and provided with interior semi-circular spiral ribs 12, having spaces between their ends to permit them to pass over the spurs 10. The center disk has a hole in its center large enough to pass over hub 9, and two notches, which permit it to pass the spurs 10 and rest against the flange 20. Collar 11 is then slipped over spurs 10 against the convex face of the disk, and then rotated until by contact of the ribs 11 with spurs 10 the disk is firmly clamped between said collar and flange 20, as will be readily understood without further explanation. A pin, 17, is then driven through a hole made in the disk, one side of the hole corresponding with the notch 22, Fig. 8, and by preference a corresponding notch in the periphery of the flange 20, whereby the disk and collar 11 are firmly locked to the axle. The outer disks are now slipped over the ends of the axle against flanges 21 and secured by nuts 15, or by bolts which enter the ends of the axle, as has been explained. The axle is then placed in the bearings N O, lateral movement of the axle being prevented by contact of the hub 9 and flanges 20 21 with the ends of the elongated bearings.

I am aware that a gang-axle has been supported against lateral movement or endwise thrust by means of a flange or collar fixed upon said axle and engaging with a groove formed for its reception in the bearing; but my construction possesses many advantages over any prior one of which I have knowledge, because I am enabled to use the hubs or flanges against which the disks are clamped to prevent endwise thrust; and, further, when it is desired to use anti-friction balls, it is much easier to construct these bearings with suitable chambers and to introduce balls into them than it would be if such chambers were located within the bearings, as will be seen by a description to be hereinafter given.

By an examination of Figs. 1 and 2 it will be seen that the inner faces of carrier-arms G rest against the tongue A, and that the carrier-arms G and H are properly spaced by means of the parts F F of the saddle, the arms H being secured from coming off the axle by means of pins *h*.

In order to change the angle of the disks relative to the line of draft, I mount the lever U, carrying a rose-plate, X, upon a stud, *x*, projecting rearwardly from a bearing-plate, V, which is mounted upon the rear end of the tongue. That portion of this plate which abuts against the tongue is provided with projecting flanges or lips, which form a rectangular socket, which receives the end of the tongue, and thus prevents the plate from turning, said plate being clamped to the tongue by the same bolt which passes through the handle *a*, as has been explained.

The pivot *x* is surrounded by a rose-plate, Y, a spring, *y*, surrounding the pivot and holding the rose-plate in close contact, so that the lever U is held firmly in such position as it may be placed, the spring U permitting rose-plate X to yield when the lever is forcibly moved.

The downward extension *u* of lever U is pivoted to a link, T. This link T is pivoted to the part *u* of the hand-lever, and runs thence to the outer lever, R, passing through the loop *r* of said outer lever, and returning thence to the loop *r* of the inner lever, R′, thus forming

a tie-bar, S, and insuring that when the position of one of the gangs is changed a corresponding change in the position of the other gang shall be effected.

Referring to Fig. 2, 19 is a link connecting lever U with lever W, which is pivoted at *w* to the bearing-plate V, said lever W being connected to the disk-gangs on that side of the tongue by means of a corresponding set of levers and links, whereby the position of all the gangs may be shifted simultaneously by the driver while riding on the harrow, the rose-plates X Y holding the gangs in the position to which they have been thus shifted.

When it is desired to convert the harrow into a straddle-row cultivator, I remove the outer pair of disks, the equalizing-bars, the shifting-levers, links, and saddles, and move the inner carrier-arms, G, outward and move them into a vertical position, fastening them to the bar B by means of clamps *b'* and braces D, the rear end of the braces being shifted so as to take into eyes *g*. I also remove the stirrup-hangers from the sockets *k* and put them into the sockets *j*, tightening up the plate L, so as to hold them at such angle relative to the line of draft as may be desired. (See Fig. 12.) The seat may also be removed, if desired, the handle *a* facilitating the guiding of the cultivator by the driver if it be found necessary.

It will be seen that each stirrup-hanger constitutes a gang-frame in which the gang is mounted, and which is capable of being oscillated relative to its carrier-arm by means of the lever and links.

It will also be seen that each axle is cast with supporting-flanges—one for each disk—and that the disks are placed on the axle solely by means of these permanently-attached flanges.

In Fig. 13 the axle Q is supported upon anti-friction balls o^2, which are seated in annular recesses formed by the flanges m^2, which project from and are cast with or upon the tubular bearings or boxes at the lower ends of the arms of the stirrup-hanger M. By an examination of this figure it will be seen that these anti-friction balls not only engage with the axle to prevent friction of said axle upon the inner walls of the tubular supports, but also engage with the hub 9 and flanges 20 21, thus to prevent undue longitudinal movement of the axle relative to the elongated tubular supports. Thus these anti-friction balls support the axle against the longitudinal thrust which is produced by the engagement of the disks P with the ground which is being pulverized, as will be readily understood without further explanation.

It will be understood that the foot-board A' may be used as a seat when the implement is converted into a straddle-row cultivator, as shown in Fig. 12.

I do not in this case claim any inventions except those which are specifically recited in the claims hereof, reserving to myself the right to claim any other patentable features, which are shown or described, in other applications heretofore filed or to be filed as divisions of this case.

What I claim is—

1. The combination, with the draft-frame and the transverse connecting-frame, of the braces D and carrier-arms G, hinged to the transverse frame so as to oscillate up and down, and having the clamps J K, whereby the gangs may be supported behind or beneath the main frame, substantially as set forth.

2. The combination, with the transverse frame, braces D, passing below said frame, carrier-arms G H, and cross-bar I, of the bearing or saddle E F, having the braces D suspended therefrom, substantially as set forth.

3. The combination, with the transverse frame, braces D, carrier-arms G and H, and cross-bar I, of the bearing or saddle E F, substantially as set forth.

4. In a revolving harrow, swinging gang-frames, in combination with means adapted to support them in a substantially horizontal position for harrowing, and also to support them in a substantially vertical position in order to convert the harrow into a cultivator.

5. The combination of the saddle or bearing E F and bolts *d*, for clamping the braces D to the transverse frame, distributing the weight of the machine upon said braces, and spacing the carrier-arms, substantially as set forth.

6. In a disk harrow, the angular socket-iron J K, adapted to receive and support the stirrup-hanger, substantially as set forth.

7. The means for supporting the gangs, consisting of the stirrup M, provided at its upper end with a circular head, *m*, and a metallic socket attached to the lower face of a vibrating arm, and adapted to receive and support the circular head, substantially as set forth.

8. The means for supporting the gang, consisting of the carrier-arm G, hinged to the main frame on a line horizontal and transverse to the line of draft, stirrup M, which supports the gang, and means for connecting said stirrup to the arm substantially at right angles thereto or in line therewith, as set forth.

9. The combination, with the gang, of the frame M *m*, carrier-arm G, and means whereby the gang may be mounted transversely to or in line with said arm, substantially as set forth.

10. The combination, with the transverse frame, carrier-arms G and H, and levers R R', of the plate Z, whereby said arms are hinged to the frame and the levers guided in their oscillation, substantially as set forth.

11. The means for securing the carrier-arms to the transverse frame and for guiding the oscillation of the gangs, consisting of the plate Z, constructed as shown and described.

12. The combination, with the carrier-arms G H, of the gang-axle supports pivoted to said arms so as to oscillate in substantially horizontal planes, levers R R', secured rigidly to and projecting forwardly from the gang-supports, and mechanism for moving the forward

ends of said levers transversely to the line of draft, substantially as set forth.

13. The combination, with the levers R R′, which operate the gangs, and eyes *r* on said levers, of the connecting-rods S T, and mechanism for reciprocating said rods, substantially as set forth.

14. The gang-axle having flanges at each end integral therewith, against which the end disks may be clamped, bearings for said disks adjacent to the flanges, a bearing for the middle disk of a diameter as great as that of an end flange, a flange against which the middle disk may be clamped, bearings for the axle-support, and means for securing the disks against the flanges, substantially as set forth.

15. The combination, with a gang-axle having a disk-bearing, and a flange larger than said bearing at each end, and a bearing, 9, for an intermediate disk equal in diameter to the end flanges, of a disk having an aperture for mounting equal in diameter to the end flanges, and means for clamping said disk, substantially as set forth.

16. The combination, with the gang-axle having three flanges, each adapted to receive one side of a disk, and removable flanges adapted to engage with the opposite sides of said disks, of the stirrup M, having elongated bearings N O of a length substantially equal to the distance between the flanges on the gangs whereby the ends of the bearings are adapted to receive and support the gang-axles against endwise thrust, substantially as set forth.

17. The combination, with the axle and flanges thereon, of the bearings N O, having chambers at their ends which are closed by the said flanges, and the anti-friction balls, substantially as set forth.

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

JAY S. CORBIN.

Witnesses:
A. G. HILL,
A. CULM, Jr.