(Model.)

J. S. CORBIN.

Disk Harrow.

No. 238,655. Patented March 8, 1881.

Fig. 1.

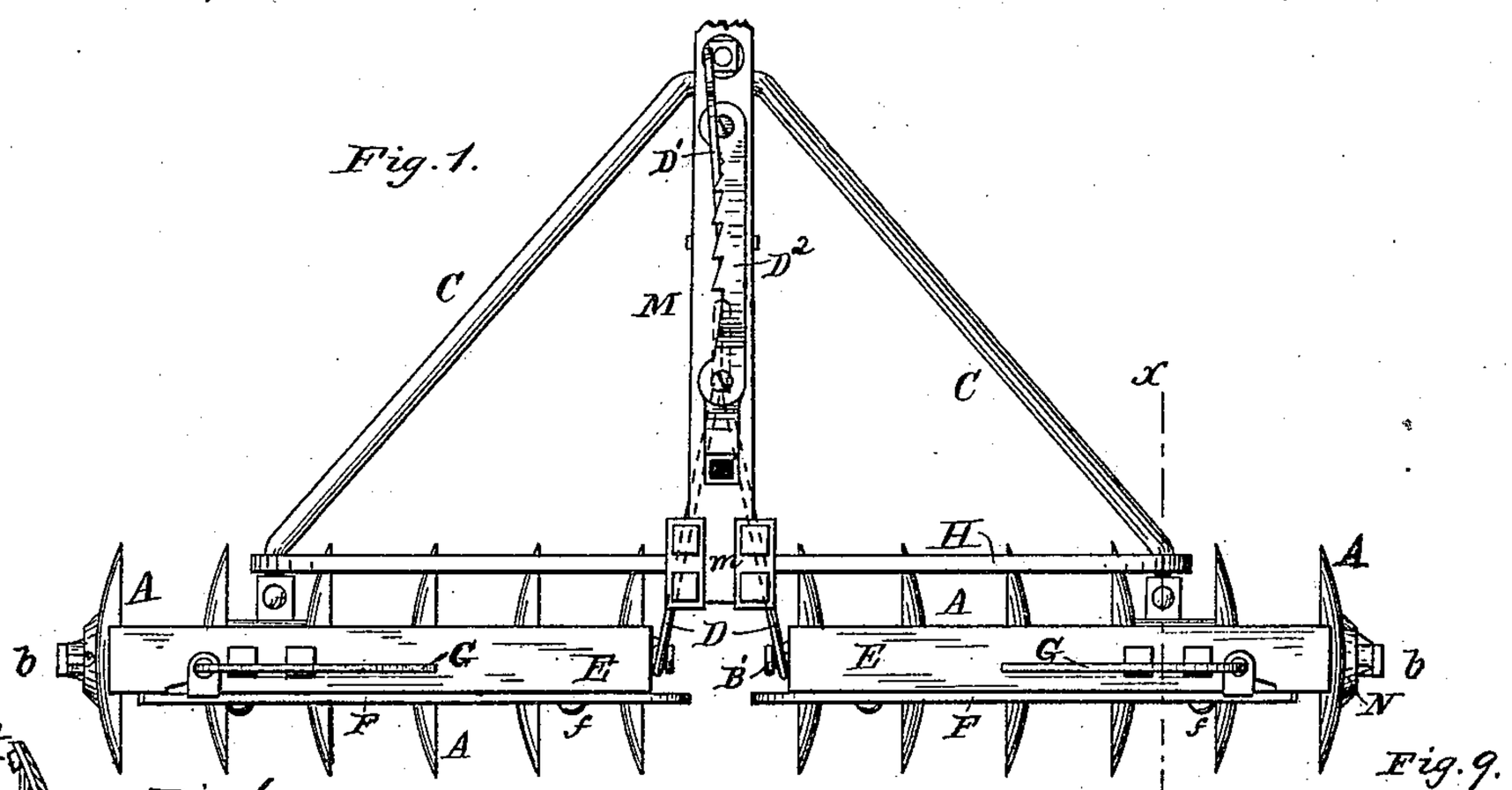
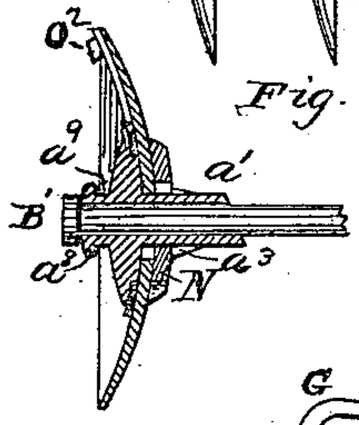


Fig. 6.



B Fig. 2.

Fig. 9.

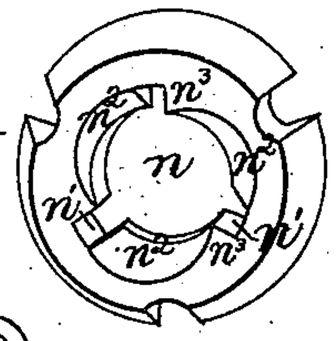


Fig. 3.

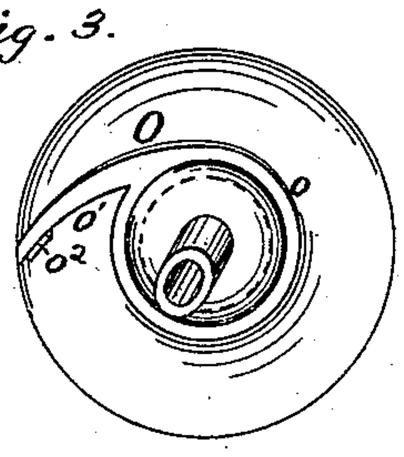


Fig. 4.

Fig. 7.

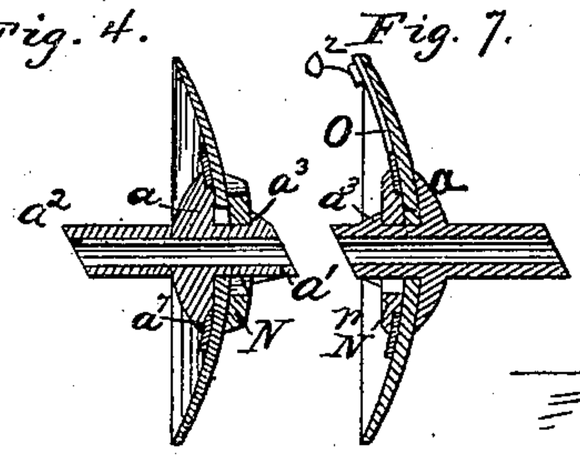


Fig. 8.

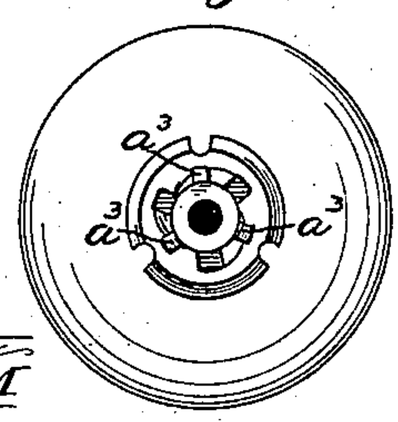
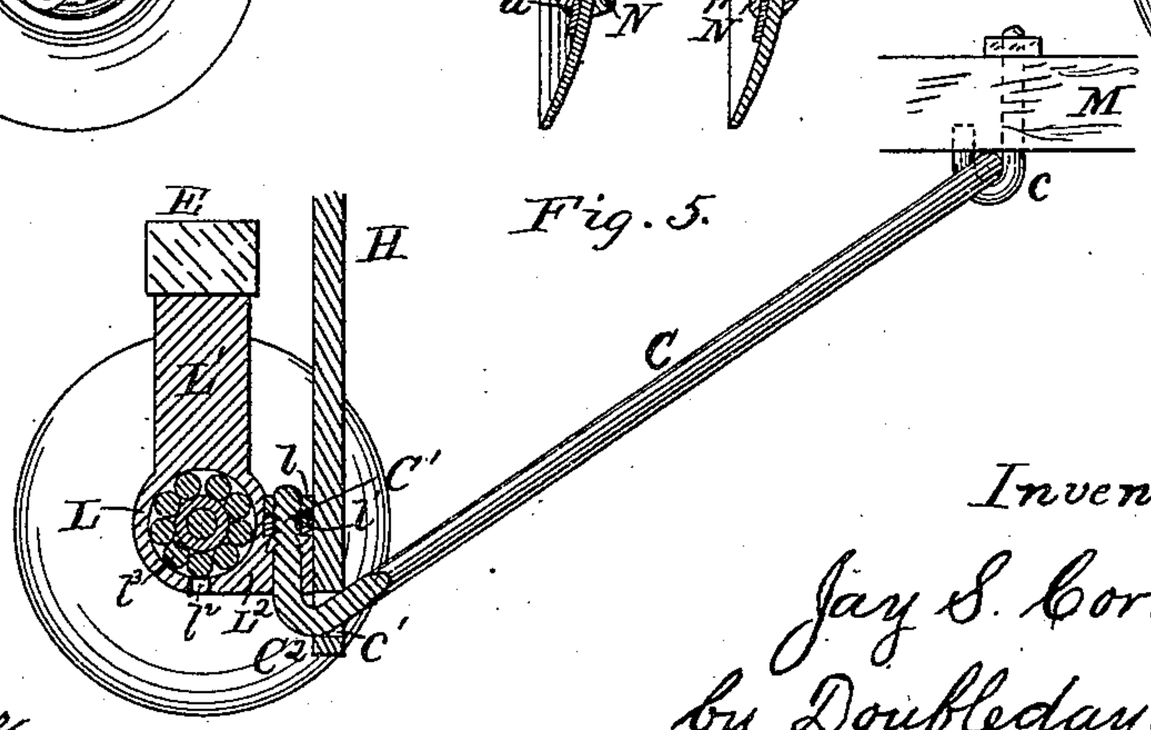


Fig. 5.



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UNITED STATES PATENT OFFICE.

JAY S. CORBIN, OF GOUVERNEUR, NEW YORK.

DISK-HARROW.

SPECIFICATION forming part of Letters Patent No. 238,655, dated March 8, 1881.

Application filed June 12, 1880. (Model.)

To all whom it may concern:

Be it known that I, JAY S. CORBIN, of 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 of reference marked thereon, which form a part of this specification.

Figure 1 is a top-plan view of my improved harrow when the disk-gangs are arranged in the same line. Fig. 2 is a rear elevation of the same. Fig. 3 is a perspective of one of the disks, its hub, and scraper. Fig. 4 is a vertical section of the same parts. Fig. 5 is a vertical section on line *x x* of Fig. 1. Fig. 6 represents the innermost disk-hub and the gang-axle, the latter being partly broken away. Fig. 7 represents a modification of the construction shown in Fig. 4. Fig. 8 is a side elevation of one of the disks and its clamping devices. Fig. 9 is a perspective of the clamping-ring detached and enlarged.

In the drawings the frame for mounting and supporting the harrow-disks is represented as being formed of a draft-tongue, M, a main transverse frame, H, main braces C C, supplemental frames or beams E E, pivotally connected to the frame H, axles B B, mounted in sleeve-bearings L, which are carried by brackets L′, secured to the beams E E, and connecting-rods D D, whereby the inner ends of the disk-axles are connected to the adjusting-lever.

The axle B is preferably formed with a head or flange, B′, at the inner end, against which the series of disks can be clamped.

The harrow-disks A are concavo-convex in form, and are mounted upon the axle B by means of a series of hubs, of which the innermost is represented by A′, the outermost by A^2, and the intermediate ones by A^3. Each of the intermediate hubs, consists of a collar, *a*, and two laterally-projecting bosses, a' a^2, cast in one piece, Figs. 4 and 7. Upon the boss a' there are two or more lugs, a^3. The ends of the bosses a' a^2 are beveled or inclined to the axis of the hub. The harrow-disk A is provided with a central aperture and passages that allow it to be passed over the boss a' and the lugs a^3, so that it may be placed against the collar *a*. After being so placed it is secured by means of a clamping-ring, N. This clamping-ring has a central aperture, *n*, and recesses n' n', that permit the ring to be passed over the lugs a^3. It is provided with faces n^2 n^2, situated around the central aperture and inclined relatively to the inner sides of lugs a^3. These inclined faces do not extend the full distance between the recesses n' n', but leave plain faces n^3 parallel with the inner sides of the lugs a^3. After the ring has been passed over the lugs it is turned part way around, and the lugs, engaging with the inclined faces n^2 n^2, force the disk tightly against the collar *a*, and when the lugs reach the faces n^3 the parts are permanently clamped.

a^7 represents an annular recess formed at the edge of the collar *a*, upon the side against which the disk A is placed, for a purpose to be described.

The innermost hub, A′, is similar to those described, except that the inner boss is not beveled, but squared at the end, as shown in Fig. 6, to fit against the head B′ on the axle B. a^8 is a flange on the last said boss, adapted to form a recess, a^9, to receive the rear end of the connecting-rod D.

The outermost hub, A^2, is similar to the intermediate ones, except that its outer boss is squared to receive a clamping-nut, *b*, by which nut the whole series of disks and hubs is held firmly on the axle. The collars which have been heretofore used for the purpose for which I use collars *a* and N have been subjected to the strain of the clamping-nut at the end of the axle and to the bending or lateral strain upon the gangs. By forming the hub as above set forth I relieve them of both of these strains. The ends of the hubs are beveled, as shown and described, so that when mounted upon the axle and secured by the nut *b* the disks are compelled to rotate together. As the holes through the hubs through which the axle passes are usually somewhat larger than the axle, the beveled ends of the hubs crowd them to one side and prevent their working upon the axle and wearing loose.

If desired, the lugs a^3 may be formed upon the concave side of the disks, the stationary collar *a* may be placed upon the convex side,

as shown in Fig. 1, and the clamping-ring N may be made to bear against the disk upon the concave side, in which case the clamping-ring must have a recess formed therein similar to that shown at a^7 to receive the scraper.

Each axle B, with the gang of disks supported thereon, is mounted in a sleeve-bearing, L, attached to a bracket or support, L′, depending from the beam B, to the under side of which it is firmly bolted. The bearings L are made somewhat larger than the hubs a' a^2 revolving therein, the space between said hubs and the bearing being filled with cylindrical pieces of metal l^3, preferably cut from ordinary iron rods. The sliding friction in the bearing is thus converted into a rolling friction, reducing the draft of the harrow and obviating the use of oil.

l^2 represents an aperture through the lower side of the bearing L, which serves as an outlet for soil or other foreign matter. Dirt is being continually raised by the disks, and tends to accumulate in the bearings L in the spaces formed by the rollers l^3. By combining with the axle and the anti-friction rollers the bearing L, perforated as described, I permit them to readily clear themselves of soil.

The inner ends of the disk-gangs are, by means of rods D D, connected with the adjusting-lever D′. The lever D′ is pivoted to the tongue, and has a rack, D^2, combined with it for holding it in any desired position.

I will now describe the improved means which I have devised for attaching the disk-gangs to the supporting-frame and draft-frame of the machine.

In using harrows of this class it is necessary to set the gangs of disks at an angle to the line of draft when in operation, and this necessitates the use of at least two gangs in order that the endwise pull of one may counteract that of the other, and one of the objects of this invention is to provide a simple but effective mechanism for connecting the gangs together, to take the place of the hangers and complicated frame-work that have heretofore been ordinarily used for this purpose.

I have succeeded in supporting the disk-gangs properly upon the draft-frame and connecting them together by means of a single bar extending from the outside bearing of one gang to the corresponding bearing of the other, and also extending upwardly to a sufficient height to be properly attached to the tongue or draft-frame. In the drawings this transverse connecting frame or bar, formed of a single piece, is represented by H, and is constructed to take the place of the transverse beams and hangers that have been heretofore used. It is formed of durable metal, shaped to have the downwardly-projecting arms H′ H^2 at the ends and the connecting part H^3 all in one piece. At the center it is attached to the draft-tongue M by means of U-shaped stirrups M′ and cross-plates *m*. The tongue is preferably recessed near its rear end to provide a more rigid fastening for the transverse bar.

C C represent braces rigidly fastened at their forward ends to the tongue by means of staples at *c*, or in any other suitable manner. They are made of metal, preferably round in cross-section, and adapted to have as great torsional force as possible. At their rear ends they are passed through apertures *c′* at the lower ends of the transverse bar H, and are bent upwardly immediately behind said transverse bar.

L^2 is a lug of suitable size attached to or cast with the sleeve-bearing L, and projecting from the forward side thereof. The upwardly-turned portion C′ of each brace C is passed through an aperture in the forwardly-projecting lug L^2. A thick washer, l', is placed around the part C′ above the lug L^2, and the parts are all secured together by means of a nut, *l*. The upwardly-turned part C′ of the brace C serves, as will be seen, as a vertical pivot, around which the sleeve-bearing L and the disk-gang carried thereby can oscillate on horizontal lines when the inner end of the gang is moved by means of the lever D′; and it will be moreover seen that a horizontal pivot is provided for each gang by the part C^2 of the brace C, it being that part situated in or immediately contiguous to the transverse bar H, and that the gang can be caused to oscillate more or less in vertical planes around this part C^2, such oscillation being restricted by the torsional resistance of the brace C. The pivot and the pivotal bearings about which the gangs vibrate are situated below the axle upon which the disks are mounted. By turning the nut *l* in one direction the part C^2 and the brace C can be forced upward, and with them the main frame H′ H^2 H^3, and by turning said nut in the opposite direction these parts can be lowered relatively to the disk-gangs, thus providing a means for adjusting the frame vertically.

Washers similar to that shown at l' may be placed below the lug l^2, if desired, to assist in making the gangs more easily adjustable vertically.

When the harrow is constructed in this manner the transverse connecting bar or frame and the draft-frame are supported upon the braces C, as will be readily seen.

It has been found that with this class of machines there is a constant tendency to cut deeper with the inner ends of the gangs than with the outer, and that the outer ends tend to rise above the surface, especially if the soil be hard, this being caused by the gangs being situated on lines inclined to the line of draft. This tendency is increased if the weight of the driver is lessened, or the disks be enlarged, or the inclination of the line of the gangs to the line of draft be increased. This great disadvantage I have succeeded in overcoming by means of braces having a torsional resistance, substantially as described, and by placing the pivotal bearings about which the gangs vibrate below the axle.

With a harrow constructed thus I am enabled to use much larger disks, to work the

gangs at any angle to the line of draft, and to cause them to work efficiently irrespective of the weight of driver, and maintain the even cut of the gangs.

The scraper for cleaning the concave side of the disks which I have devised is shown at O, Fig. 3. It is constructed with an annular part, *o*, and with an arm, *o'*, attached to and projecting outwardly from the annular part *o*. o^2 represents an ear or lug projecting outwardly from the arm *o'* at a point near the outer end of said arm. The scraper is held in place by means of the annular recess a^7, formed in the plate *a* on the disk-hub, or formed in the clamping-ring N, the disk fitting against the collar or ring to hold the scraper in proper place. The recess a^7 is made sufficiently large to permit the scraper to rotate freely around the hub. This scraper may be made of malleable iron, or it may be struck from sheet metal. It fits closely to the concave side of the disk, and extends from the hub to the circumference.

Upon the rear side of each gang-beam E a sliding bar, F, is mounted by means of screws *f*, fitting in slots formed in the bar, or by means of ways, or in any other preferred manner.

G is a lever, pivoted to the gang-beam E, and connected to the sliding bar F in any manner suitable to cause the reciprocation of said bar F by means of the lever.

i i are arms depending from the sliding bar F, situated so as to respectively engage with the lugs o^2 on the scrapers O, there being an arm, *i*, for each scraper.

When it is desired to scrape the disks the operator, by means of lever G and sliding bar F, draws the arms or stops *i* into such position that they shall engage with the lugs o^2, whereupon the scrapers are prevented from rotating with the disks, and the disks are each cleaned as they rotate. When the lever G is released the weight of its free end causes the stops to be disengaged, when the scrapers cease acting and revolve with the disks respectively.

Heretofore it has been customary to scrape only the outer portion of the disks; but by the devices described I am enabled to clean the entire exposed surface.

Owing to imperfections in casting, and to the necessity for putting up the various parts without finishing or lathe-work, it usually happens that the disks run more or less untruly, and it has been heretofore impossible to cause a series of scrapers to act simultaneously and press the disks uniformly; but it will be seen that by my construction and arrangement of parts each scraper acts independently of the others and is free to press its disk closely throughout its whole revolution.

What I claim is—

1. In a disk-harrow, the draft-tongue, two opposed disk-gangs, and the braces C C, secured directly to the disk-gangs and to the tongue, in combination with the transverse connecting-frame, situated in front of the gang-axles, and arranged to rest vertically upon the braces C C in front of said axles, and connected to the tongue above the disks, substantially as set forth.

2. In a disk-harrow, the combination, with the tongue and two opposing disk-gangs, arranged to vibrate vertically independent of each other, of a transverse frame formed of a single connecting cutting-bar shaped to have the downwardly-projecting arms H' H^2 respectively connected to the outer bearings of the gangs and the intermediate part, H^3, formed in one piece with arms H' H^2, substantially as set forth.

3. In a disk-harrow, the combination, with the draft-tongue and two opposed disk-gangs arranged to vibrate independently of each other, of a transverse connecting-bar, which is flexibly connected directly to the gangs by horizontal pivots and is rigidly connected to the tongue, substantially as set forth.

4. The combination, with the disk-gangs, of a transverse connecting bar or frame hinged to the disk-frames below the axles of the gangs, substantially as and for the purposes set forth.

5. The combination, with the transverse connecting-frame, of disk-gangs arranged to oscillate horizontally on a pivot situated below the axle of the gangs, substantially as and for the purposes set forth.

6. The combination, with the transverse connecting-frame, of disk-gangs arranged to oscillate vertically on pivots which are situated below the axles of the disks, substantially as set forth.

7. In a cutting-disk harrow, the combination, substantially as herein set forth, of the following elements, viz: a transverse connecting-frame, two or more opposing disk-gangs supported independently of each other on said transverse frame, and each provided with a separate through-axle, and separate springs connected to the gang-frames at points between the ends of said frames, to cause the gangs to oscillate in vertical lines.

8. The combination of the main frame, a disk-gang pivoted to the main frame at a point between the ends of the gang, and a spring, which is arranged to oscillate the gang vertically, and is situated at the center of oscillation of the gang.

9. The combination of the following elements, viz: the draft-tongue, the main frame attached to the tongue transversely, the disk-gangs pivoted horizontally to the transverse frame, and the metallic braces C, passing loosely through the transverse frame, and connected both to the disk-gangs and to the tongue in front of the transverse frame.

10. The combination, with the transverse gang-frame and the disk-gang, of devices arranged substantially as described to adjust said frame vertically upon the gangs, as set forth.

11. The combination, with a main frame and disk-gangs connected to said frames by verti-

cal pivots, of mechanism, substantially as described, arranged to adjust the main frame on said vertical pivots, as set forth.

12. The combination of the following elements, viz: the draft-tongue, the main frame attached to the tongue transversely, the disk-gangs pivoted to the main frame, the bearings L for the gang-axles, the lugs L^2, attached to the bearings L in front of the axles, and the braces C C, which pass loosely through the main frame and through the lugs L^2, and are bent upward to form the vertical pivots C^2 for the gang-frames.

13. In a disk-harrow, the combination, with a rotating disk, of a scraper surrounding the axle and rotated therewith, substantially as set forth.

14. The combination, with a rotating disk, of a disk-scraper which is supported at one end only, and has its fixed end at or near the center of the disk and its free end at or near the circumference of the disk, substantially as set forth.

15. In a disk-harrow, the combination of the following elements, viz: a series of rotating disks, a series of scrapers supported independently of each other and arranged to respectively engage with said disks, and a scraper-operating mechanism which engages with the scrapers to bring them into action, and which is entirely disengaged from the scrapers when they are idle, substantially as set forth.

16. The combination, with the rotating disks and the series of scrapers O, of the sliding bar F and arms *i i*, adapted to engage with said scrapers, substantially as and for the purposes set forth.

17. The combination, with the scrapers O and mechanism arranged to stop the rotation of said scrapers, of the levers G, arranged to automatically permit the further rotation of said scrapers, substantially as set forth.

18. In a disk-harrow, the combination, with a rotating cutting-disk, of a hollow hub which is beveled at both ends, to have the planes of said ends oblique to the plane of the disk and to the axis of rotation, substantially as set forth.

19. In a disk-harrow, the combination, with a through-axle, of disk-hubs which are arranged in contact in a continuous series along the axle and are beveled at their contiguous ends, to have the planes of said ends oblique to the axis of the hubs, substantially as set forth.

20. In a disk-harrow, the combination, with a series of rotating disks and the through-axle revolving continuously with said disks, of a series of contiguous disk-hubs, each having a disk rigidly secured to its outer face and each beveled at the end contiguous to the adjacent disk-hub, substantially as set forth.

21. The combination, with the rotating disk and a scraper for said disk, of the hub a' a^2, having the collar a formed with the recess a^7 to receive the scraper, substantially as set forth.

22. The combination, with the axle B, the connecting-rod D, and the series of disks, of the inner disk-hub, A′, provided with the flange a^8, whereby said hub is adapted to be loosely attached to the connecting-rod D, substantially as set forth.

23. The combination, with the axle B, the connecting-rods D D, and the gangs of disks separate from each other at their inner ends, of hubs respectively mounted upon the gang-axles and arranged to project inwardly from the innermost hub of each gang, to provide a fastening for the connecting-rods D D, substantially as set forth.

24. The combination, with the disk and the fixed stops a^3, of the ring N, having the inclined faces n^2 n^2 arranged to bear against the said stops, substantially as and for the purposes set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 8th day of June, 1880.

JAY S. CORBIN.

Witnesses:
A. G. HILL,
G. R. THOMSON.