(No Model.)

2 Sheets—Sheet 1.

E. A. OVENSHIRE.

DISK HARROW.

No. 511,273. Patented Dec. 19, 1893.

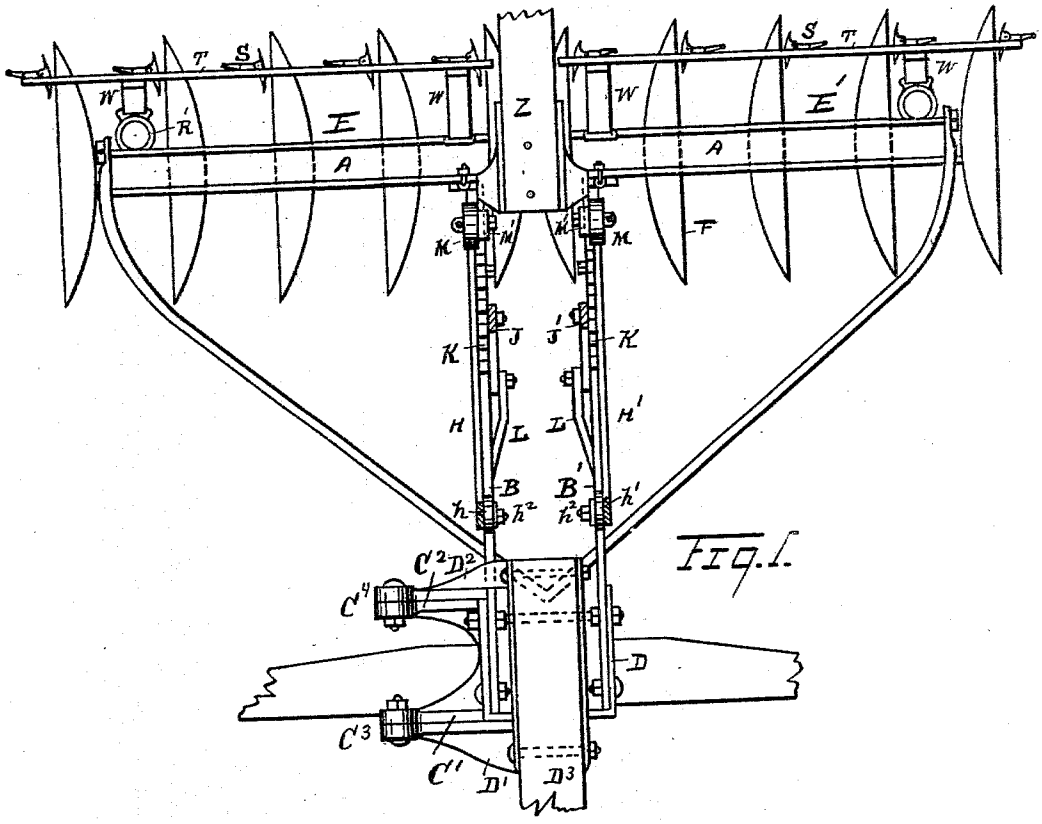

Fig. 1.

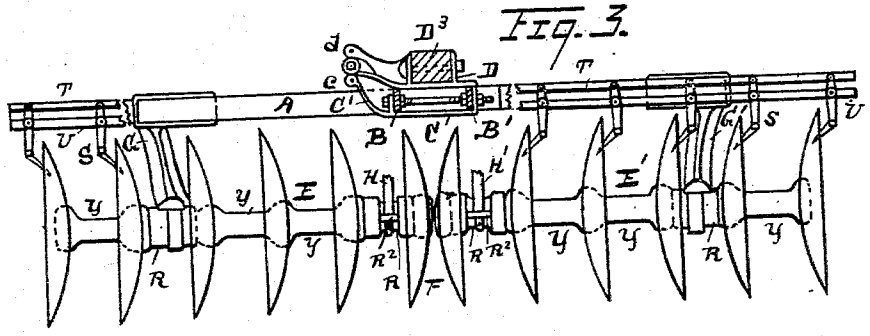

Fig. 3.

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John F. Miller

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(No Model.) 2 Sheets—Sheet 2.

E. A. OVENSHIRE.

DISK HARROW.

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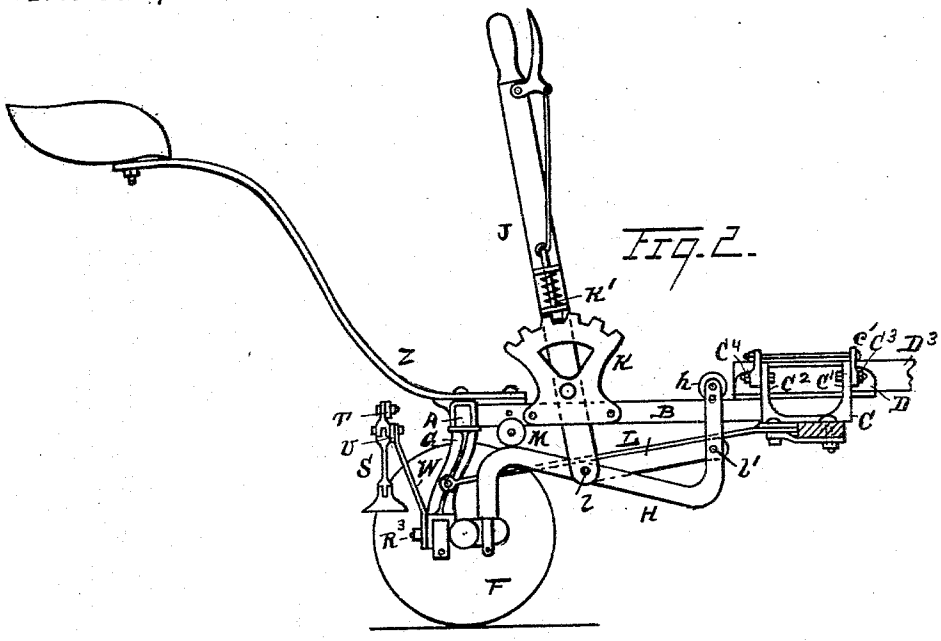

Fig. 2.

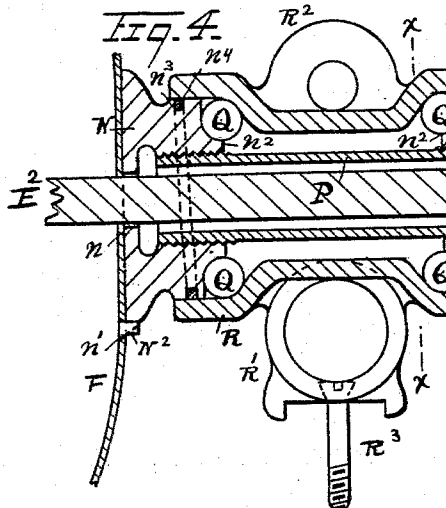

Fig. 4.

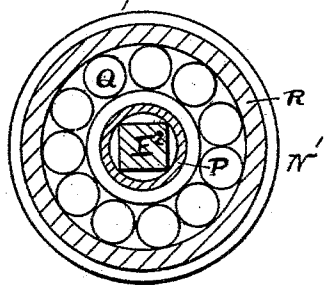

Fig. 5.

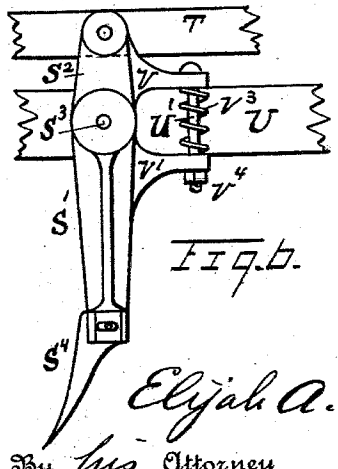

Fig. 6.

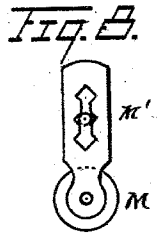

Fig. 8.

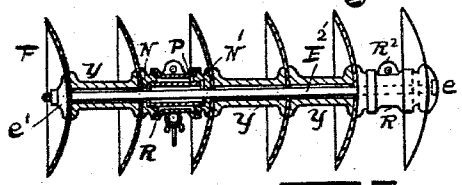

Fig. 7.

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THE NATIONAL LITHOGRAPHING COMPANY,
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UNITED STATES PATENT OFFICE.

ELIJAH A. OVENSHIRE, OF DETROIT, MICHIGAN, ASSIGNOR TO THE AMERICAN HARROW COMPANY, OF SAME PLACE.

DISK HARROW.

SPECIFICATION forming part of Letters Patent No. 511,273, dated December 19, 1893.

Application filed December 31, 1892. Serial No. 456,971. (No model.)

To all whom it may concern:

Be it known that I, ELIJAH A. OVENSHIRE, a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Disk Harrows; and I 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, which form a part of this specification.

My invention relates to certain new and useful improvements in a disk harrow, and has for its object the general construction, combination and arrangement of devices and appliances hereinafter specified and claimed, and illustrated in the accompanying drawings, in which—

Figure 1 is a plan view embodying features of my invention. Fig. 2 is a side elevation. Fig. 3 is a front elevation showing the tongue in section. Fig. 4 is a horizontal section through one of the ball bearings. Fig. 5 is a cross section thereof, on the line *x*—*x* Fig. 4. Fig. 6 is a detailed view of the scraper mechanism. Fig. 7 is a view of one of the axles and the disks mounted thereon, the view being chiefly in horizontal section. Fig. 8 is a view of one of the hangers for the rollers M.

My invention has more especial reference to the construction of the ball bearings, the self adjusting spring scraper, and the construction and arrangement of the forwardly projecting adjusting bars, although my invention is not limited to these features.

A represents the cross bar of the frame of the harrow.

B B′ represent forwardly projecting bars of the frame. The bars A, B, B′, are preferably made of metal. The bars B, B′ are attached to the cross bar A intermediate its extremities. To the ends of the bars B, B′ are attached an evener plate C, upon the under sides of said bars, said evener plate constructed with laterally projecting arms C′, C². Above said evener plate and on the top of the forward extremities of said bars B, B′, is attached a pole plate D, said pole plate being constructed also with laterally projecting arms D′, D², the arms D′, D² projecting laterally into proximity to the arms C′, C², their outer ends being hinged or jointed together, as shown at C³, C⁴. This jointed engagement of the evener plate and the pole plate, permits the pole D³ to be thrown over to one side the longitudinal center of the bars B, B′, where said arms may be securely fastened by a bolt or pin passed through additional lugs "*c*," "*d*," on each of said arms, as shown at "*c*′," so that when the pole is thrown over to one side, the bolt holes in said lugs coincide to receive the bolt, which locks the joint in position, making the same rigid.

This special feature above described and herewith illustrated is, however, made the particular subject matter of a separate application for Letters Patent, filed simultaneously herewith, inasmuch as it has a much wider utility than its use merely upon the disk harrow.

The object of throwing the pole over to one side is to avoid side draft, and to permit the attachment of three horses to the machine without a complicated three horse evener.

It will be understood that the harrow is constructed with two wings E and E′.

E² represents the axles of the harrow disks F, preferably provided with a head "*e*" at one end, and a nut "*e*′" at the other end.

G, G′ represent standards which may be made of malleable iron engaged at their upper ends with the cross bar A, and at their lower ends having a jointed connection upon the bearings or hubs of said axles, said jointed connections preferably being toward the outer extremities of said axles and permitting the shifting or oscillation of the axles of the two wings so as to bring the disks of each wing into desired position to cut the ground at any desired angle.

H, H′ represent shifter bars connected with the hubs of the axles at their rear or inner ends and bent upward therefrom and forward, their outer extremities being turned upward as shown and provided with rollers "*h*," "*h*′," respectively, arranged to travel to and fro upon the upper faces or edges of the bars B,

B′. The intermediate portions of these levers are constructed to project forward at a descending angle of suitable pitch, so that when the horses are attached to the pole or tongue and the forward end of the harrow frame is lifted in consequence, the intermediate portions of the shifter bars will be brought into a horizontal position, the bars B, B′, when the horses are attached being inclined downward toward the rear thereof. It will thus be observed that when the upper edges of the bars B, B′ are in a horizontal plane, the intermediate portions of the shifter bars H, H′ have a downward pitch in a forward direction, this pitch, as above observed, coinciding with the rearward pitch given to the bars B, B′, of the frame when the horses are attached, and so bringing the intermediate portions of the shifter bars into horizontal position. This construction permits the shifting back and forth of the disks of the harrow to change the angle of their cut, as desired, without liability of altering the depth of the cut of the disk, a point of material advantage.

J, J′ represent operating levers fulcrumed toward their lower ends, upon the adjacent forwardly projecting bars B, B′ of the frame.

K represents a rack bar, and K′ a pawl to lock the bar in any given position. The link L jointedly connects the lower end of each of the operating levers, as shown at "*l*," with the forward end of the adjacent shifter bar, as shown at "*l′*." By these means when it is desired to throw the axles of the disks forward or back to change the angle of the cut of the disks, a longitudinal travel is given to the shifter bars, their rollers "*h*," "*h′*" riding upon the bars, B, B′. The links L are preferably connected at their forward ends to the perpendicular ends of the shifter bars as shown. The bars B, B′ may be formed to provide any desired or suitable track for the rollers "*h*," "*h′*." The perpendicular portions of the shifter bars, preferably, are passed upward on the outside of the bars B, B′, to support the rollers "*h*," "*h′*," which are engaged therewith by a suitable journal "h^2." It is well understood that when the machine is at work, there is a heavy draft on the shifting mechanism, and the shifter bars being thus engaged by intervening rollers upon the bars B, B′, of the frame, permits the two sections of the harrow to be thrown at a desired angle with very little friction. Back of the ratchet mechanism, I also prefer to attach rollers M, on the under sides of the bars B, B′ upon which the top of the adjacent edge of the shifter bars may have a rolling contact. These rollers may be engaged with the bars B, B′ by means of a hanger M′, shown in Fig. 8, having an adjustable engagement with said bars.

When the sections of the harrow embodying the independent axles E^2 are desired to be thrown rearward at their inner ends, they may, by my invention, thus be thrown straight back without changing the depth of cut, instead of being thrown downward and thereby making a deeper cut at the inner ends of the sections, as has heretofore been found in other devices of this class. The adjustment of the rollers "*h*" "*h′*" may be effected by providing the upper ends of the bars H, H′, with two or more holes in which the journals of the rollers may be engaged.

I will next proceed to describe my improved ball bearing, more particularly illustrated in Figs. 4 and 5, in which N, N′ represent the cones forming the hubs of the adjacent disks. These cones at their inner ends have a screw-threaded engagement upon an inner tube P. The cone N, is constructed with a round orifice, as at "*n*," through which the axle may pass. By this construction it is evident that said cone may be adjusted so that it may be tightened or loosened as required, upon the tube P, and is held in proper position by a key N^2, engaging in suitable notches, as at "*n′*" in the edge of the cone, the key passing through the adjacent face of the disk to which the cone engages. The other cone may have a square hole for the axle to pass through, and is not adjustable upon the tube P. The inner ends of the cones are cut away as shown at "n^2," to form seats for the balls Q.

R is a hollow bearing or hub, one being located toward each extremity of each axle, and flanged outward at its extremities to form seats for said balls, the balls being held in position between said hub and the adjacent inner ends of the cones. The hub R is constructed with perforated ears R′, R^2. The standards G, G′ are connected with the ears R′ on one of the hubs at their lower ends. The rear ends of the shifter bars H, H′ may be connected with the ears R^2 of the other hubs. Upon the periphery of each of the cones N, N′ is constructed a groove as shown at "n^3" in which I engage a metal worm packing "n^4" arranged to revolve with the cone in the direction of the adjacent disk. Spools Y are located upon the axle, also between adjacent disks where the bearings R are not employed. By this construction the ball bearings are made dust-proof inasmuch as the worm packing thus rotating, works out any dust that might otherwise be liable to work thereinto. The ears R^2, are provided on the hub R for engaging the shifter bars with the corresponding hubs, and may be omitted from the other ball bearings.

S represents scrapers located adjacent to the disks. These scrapers are constructed of two arms S′, S^2, jointed together at their adjacent extremities, as shown at S^3. The upper arms S^2 of the scrapers S are jointedly secured upon a longitudinally movable adjusting transverse bar T. The lower arms S′ of the scrapers are secured upon a stationary transverse bar U. S^4 is a scraper blade having a swiveled connection upon the lower end of the arm S′. The swivel extends vertically

so as to allow the scraper blade S^4 to rotate horizontally. The two arms S', S^2, are constructed with offset arms V, V', the two being connected by a bolt U', provided with a spring V^3, the arm V' having a vertical movement upon said bolt. It will be perceived that the lower arm has a yielding movement upon its hinge, so as to allow the scraper blade to yield automatically, while also any suitable tension may be given thereto, by adjusting the nut V^4 upon the bolt U'. The bar U is supported by arms W, united thereto at the upper ends of the last named arms, the lower ends of said arms being engaged with the ears R^2, as by means of a connecting bolt R^3. It will be perceived by referring to Fig. 6 especially, that when the bar T is moved in the direction of the offset arms V V', the arm V will be depressed upon the spring V^3, thereby depressing the arm V' and throwing the lower end of the arm S' in the direction opposite said offset arm, thereby forcing the scraper blade S^4 into close contact with the adjacent disk. A reverse movement of the bar T will occasion a reverse movement of the scraper blade S^4 and carry it farther away from the adjacent disk.

Z is a support for the seat.

What I claim as my invention is—

1. In a disk harrow, the combination of a frame, provided with a cross bar A, harrow sections provided with independent axles E, E', having a jointed connection with said cross bar, forwardly projecting bars B, B' connected at their rear ends with said cross bar, shifter bars H, H' connected at their rear ends with said axles and having a longitudinally movable engagement upon the bars B, B' at their forward ends, operating levers to operate the shifting bars, and mechanism to hold the levers in given position, the shifter bars bent upward at their forward ends and bent downward at their rear extremities and constructed to permit the shifting of the axles horizontally without changing the depth of cut of the harrow disks, substantially as described.

2. In a disk harrow, the combination with a frame, of axles E, E' provided with cutter disks and jointedly connected with said frame, forwardly projecting bars B, B' shifter bars connected with said axles at their lower ends and having a movable engagement with the bars B, B', at their forward ends, operating levers connected with the shifting bars, the body of said shifter bars extending on a horizontal plane when the bars B, B' are raised to decline rearward, substantially as set forth.

3. In a disk harrow, the combination with a frame, of axles jointedly connected therewith, forwardly projecting bars B, B' forming a portion of said frame, shifter bars H, H' jointedly connected with said axles, operating levers connected with the shifter bars, rollers connecting the forward extremities of the shifter bars with the bars B, B', said shifter bars having a longitudinal movement upon the bars B, B', substantially as set forth.

4. In a disk harrow, the combination with a frame, constructed with a cross bar A and forwardly projecting portions B, B', axles carrying the disks having a jointed connection with the frame, shifter bars connected with the axles at their rear ends and upon said forwardly projecting bars at their front ends, rollers supporting the shifter bars upon the portions B, B', and operating levers engaged with the shifting bars, the engagement of the shifter bars upon the bars B, B' being vertically adjustable and longitudinally movable, the body of said shifter bars normally declining forward when the machine is at rest and extending horizontally when the bars B, B' are raised, substantially as described.

5. In a disk harrow, the scraper herein described consisting of two arms jointly connected at their adjacent ends, a scraper blade having a swiveled connection with the lower end of the lower arm, said arms provided with laterally extended arms united by a spring bolt, substantially as described.

6. In a disk harrow, the combination of transverse bars T and U, arms S', S^2, having a jointed connection and engaged upon said bars, a scraper having a swiveled engagement with the lower end of the arm S', the arms S', S^2 provided with arms V V', a spring bolt uniting the latter arms, and means to adjust the tension of the spring bolt, substantially as described.

7. In a disk harrow provided with an axle F^2, a ball bearing having in combination cones N, N' engaged upon the axle, an inner tube sleeved upon the axle, having a screw threaded engagement with said cones, a hollow bearing or hub R located over the adjacent ends of said cones, and balls intermediate the cones and hub, one of said cones being adjustable upon said inner tube, substantially as set forth.

8. In a ball bearing, the combination of the cones N, N', a tube having a screw threaded connection with said cones, a hub R surrounding the inner ends of said cones, and balls located between the inner ends of said cones and said hub, substantially as decribed.

9. In a ball bearing, the combination of the cones N, N', a connecting tube P, having a screw threaded engagement therewith, the hub R engaging the inner ends of said cones, said inner ends spirally recessed and provided with a worm packing in said recess, substantially as and for the purpose set forth.

10. The combination with a disk harrow, provided with a bar U and a longitudinally movable bar T, of an oscillatory arm S^2 engaged at its upper end upon the bar T, an oscillatory arm S' jointedly connected at its upper end with the lower end of the arm S^2 upon the bar U, and a horizontally rotatable scraper having a vertically swiveled connec-

tion with the lower end of the arm S′, whereby the scraper may be both rotated horizontally and oscillated laterally, said scraper having a spring tension upon the disk and made movable toward and from the disk by the movement of the bar T, substantially as described.

In testimony whereof I sign this specification in the presence of two witnesses.

ELIJAH A. OVENSHIRE.

Witnesses:
N. S. WRIGHT,
J. F. MILLER.