

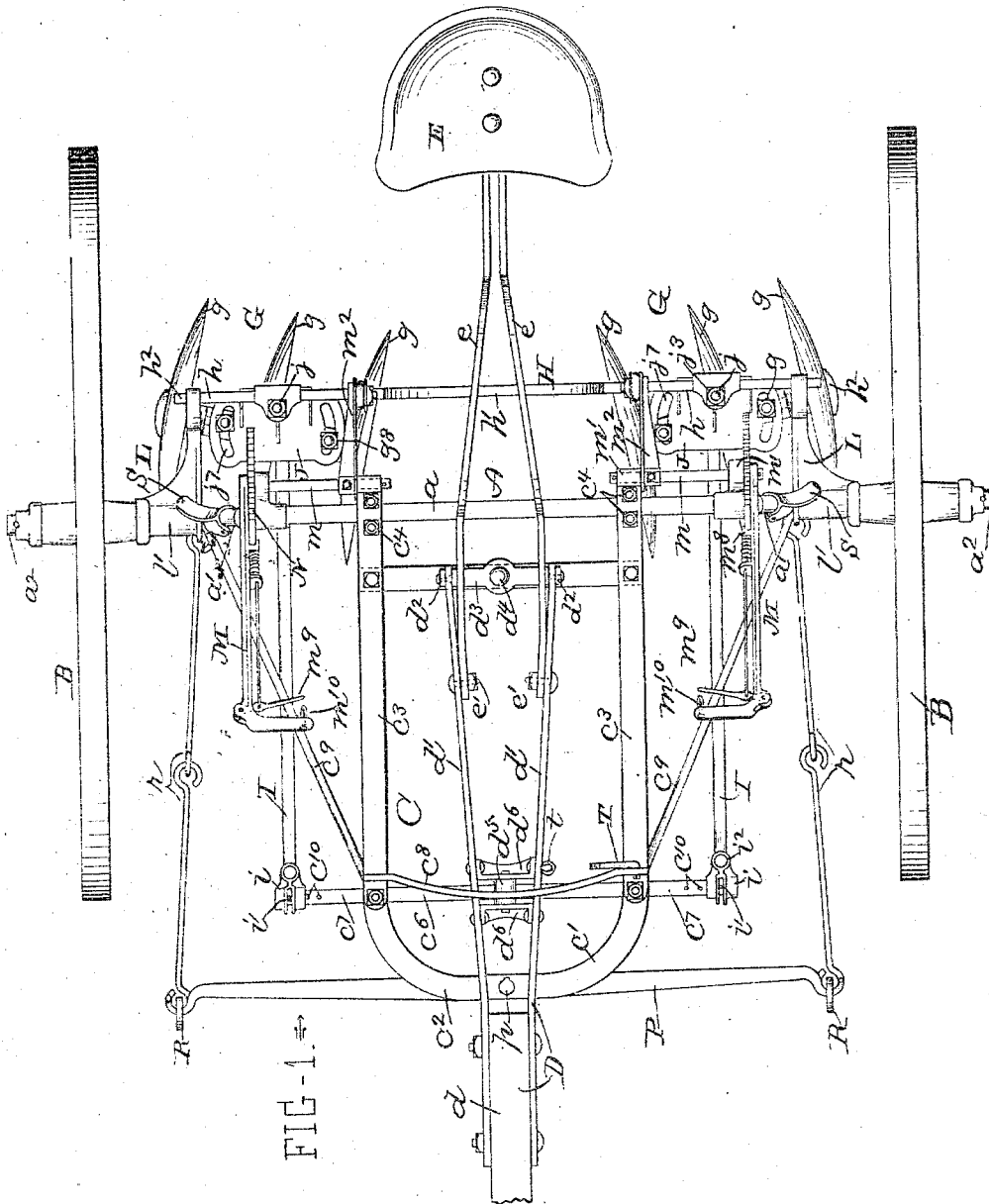
(No Model.)

7 Sheets—Sheet 1.

W. T. M. BRUNNEMER.
DISK CULTIVATOR.

No. 553,100.

Patented Jan. 14, 1896.



WITNESSES:-
Will L. Paul.
Geo. M. Rhein.

INVENTOR:
Wm. T. M. Brunnermer,
By O. F. Richards,
Att'y

(No Model.)

7 Sheets—Sheet 2.

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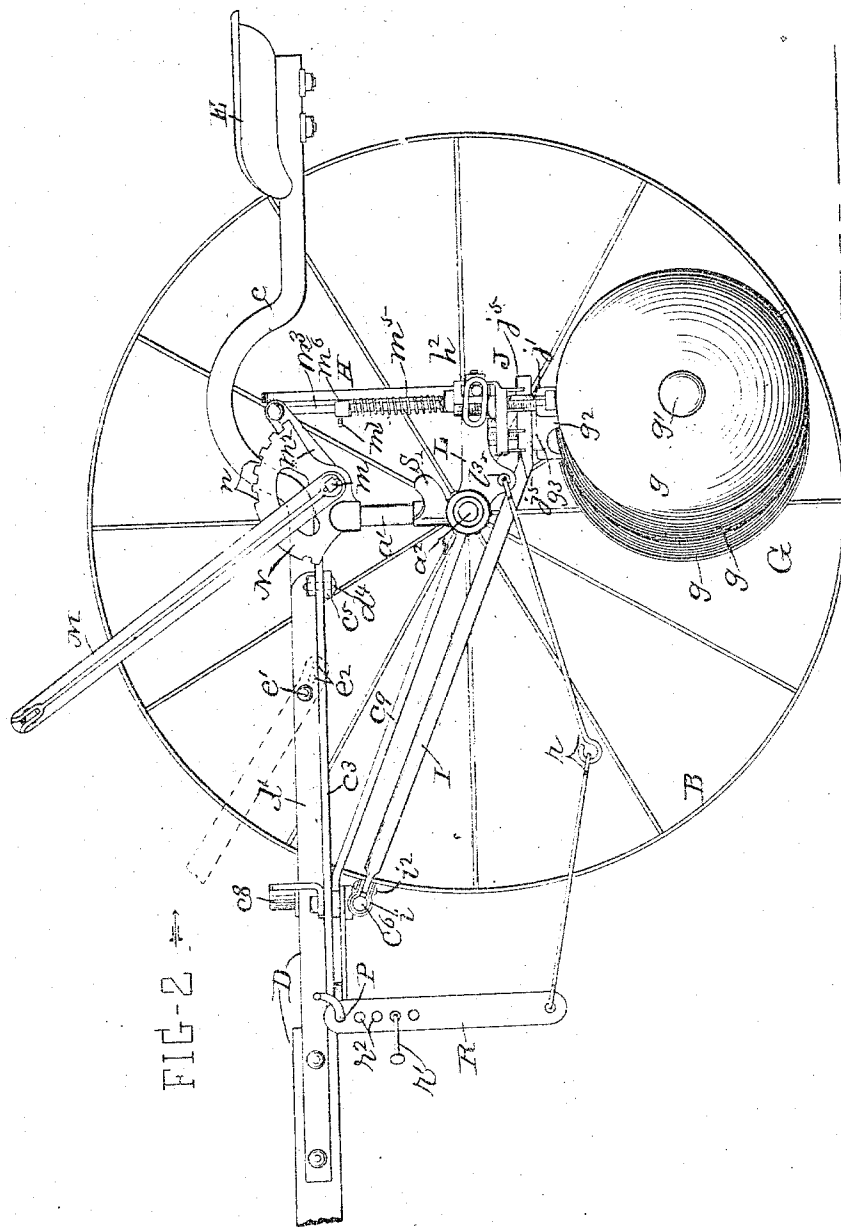


FIG-2

WITNESSES—

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Wm. M. Brunner

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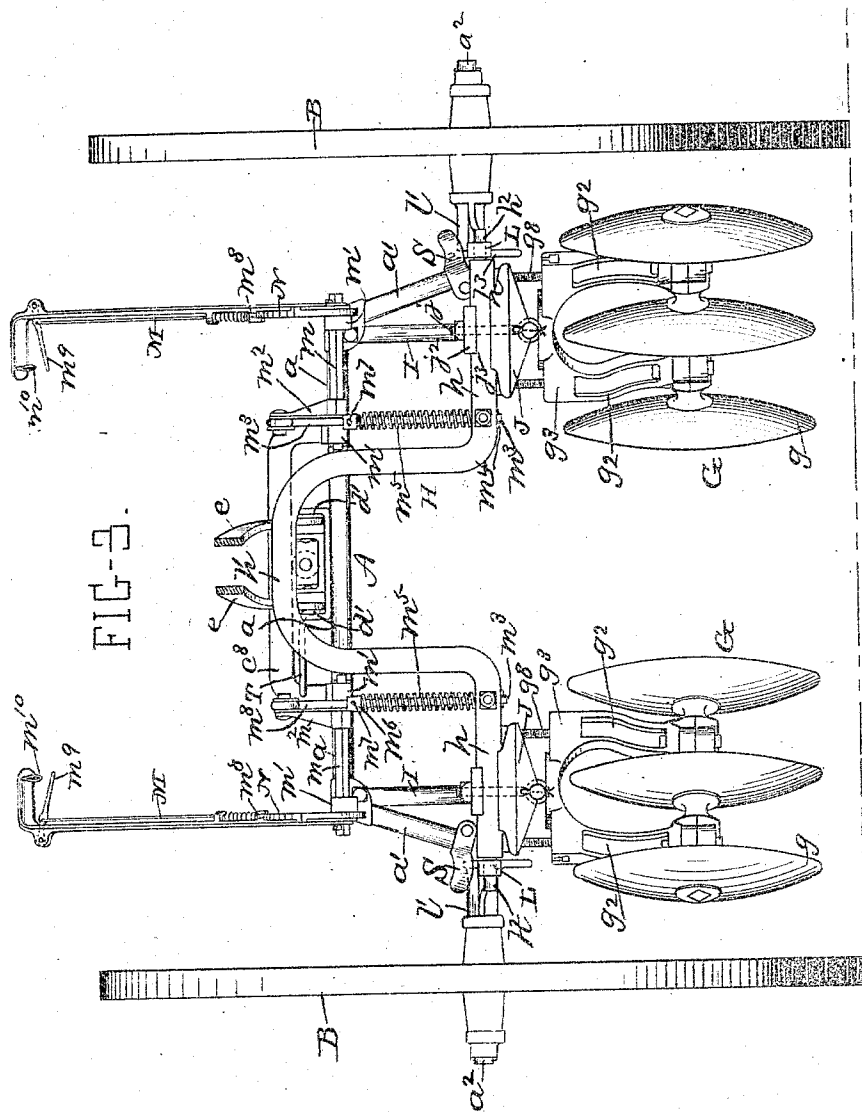
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W. T. M. BRUNNEMER.
DISK CULTIVATOR.

No. 553,100.

Patented Jan. 14, 1896.



WITNESSES:-

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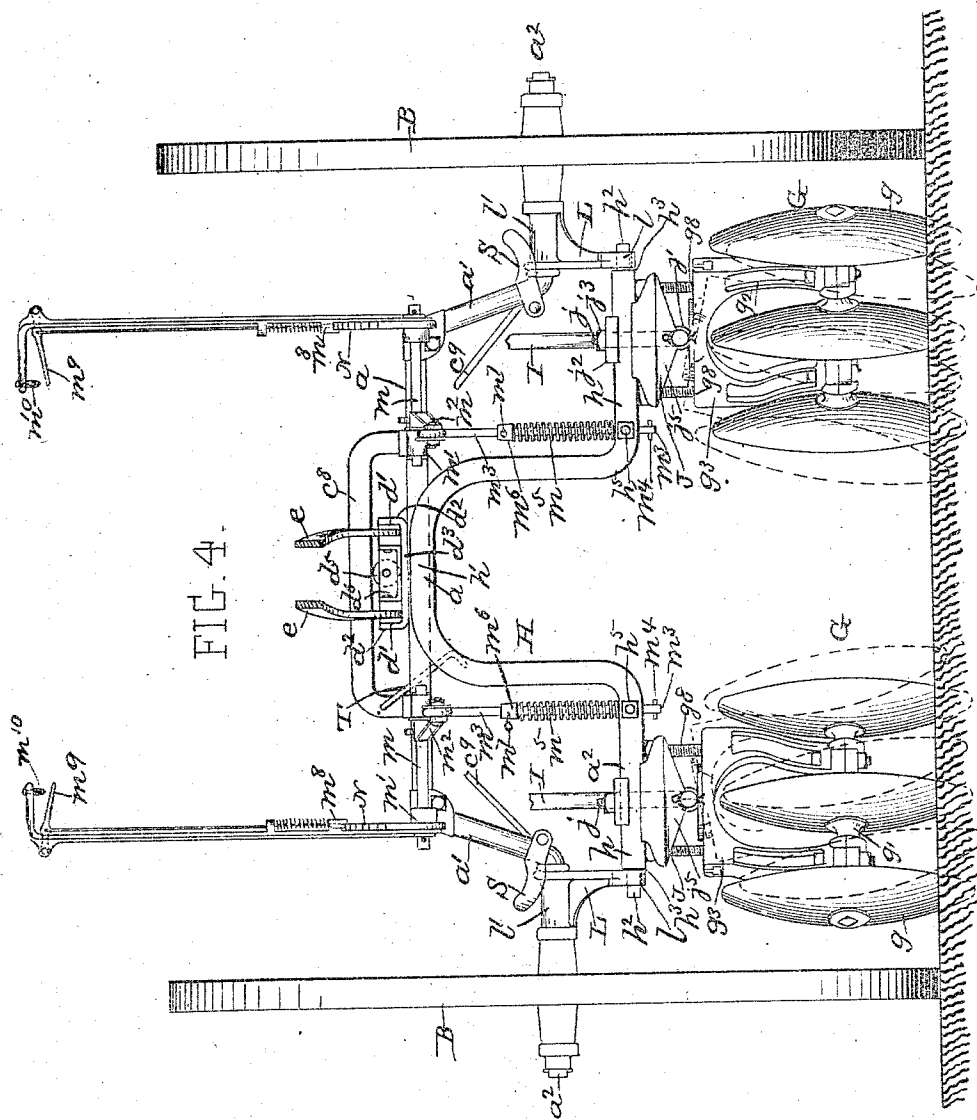
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W. T. M. BRUNNEMER.
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No. 553,100.

Patented Jan. 14, 1896.



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7 Sheets—Sheet 5.

W. T. M. BRUNNEMER.
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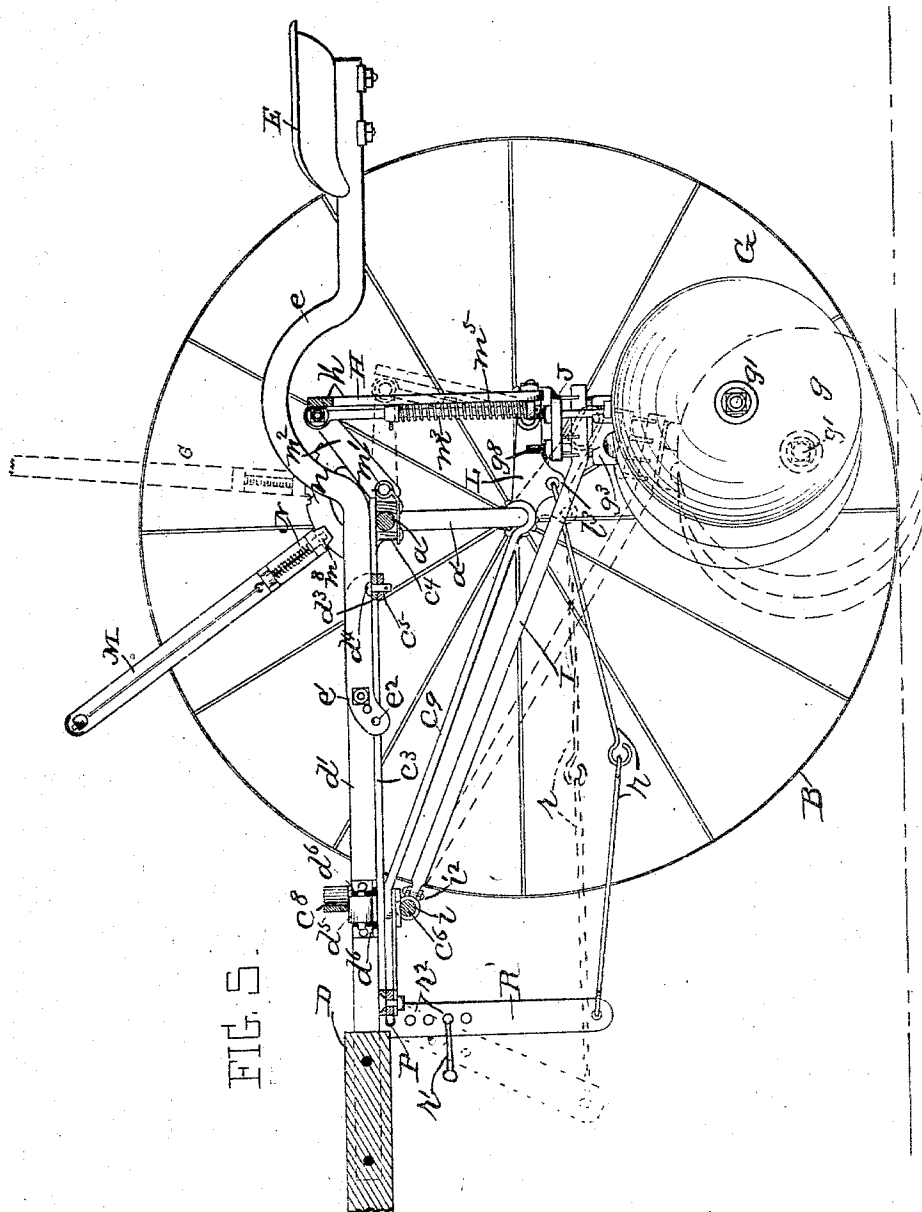


FIG. 5.

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(No Model.)

7 Sheets—Sheet 6.

W. T. M. BRUNNEMER.
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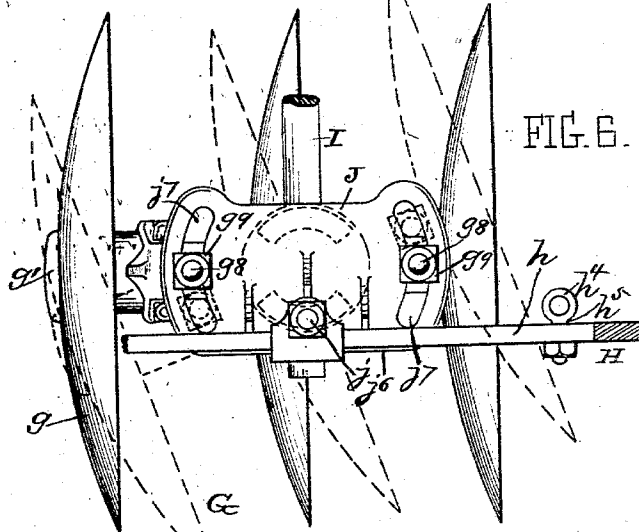


FIG. 6.

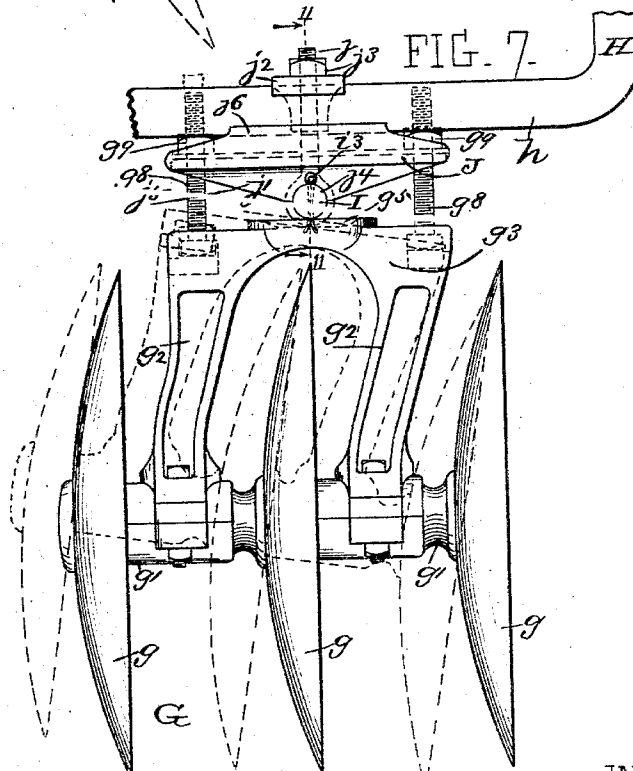


FIG. 7.

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(No Model.)

7 Sheets—Sheet 7.

W. T. M. BRUNNEMER.
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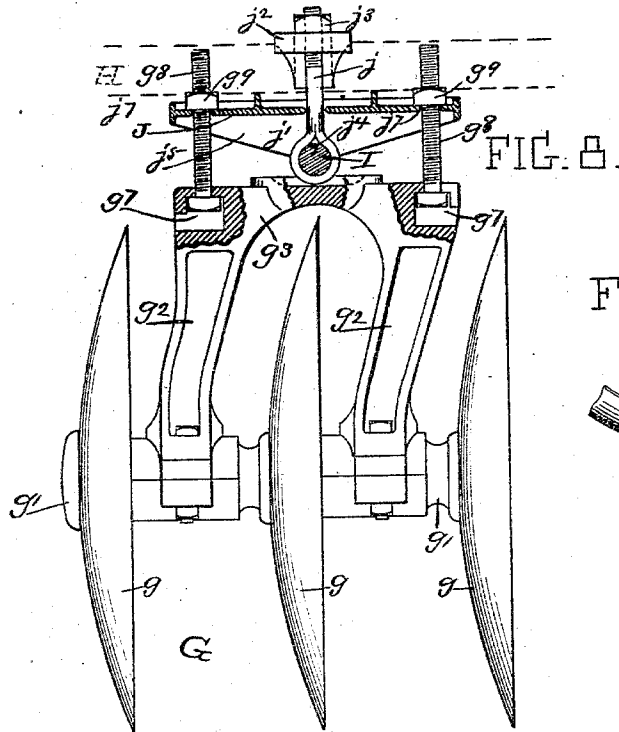


FIG. 9.

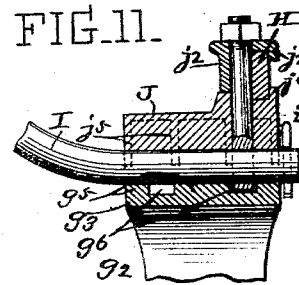
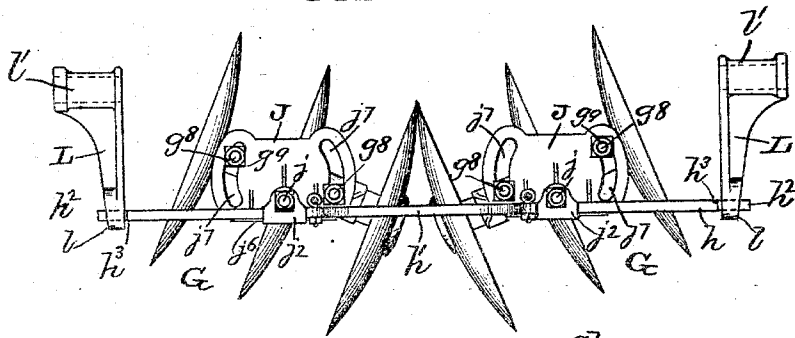


FIG. 11.



UNITED STATES PATENT OFFICE.

WILLIAM T. M. BRUNNEMER, OF MONMOUTH, ILLINOIS, ASSIGNOR TO THE
WEIR PLOW COMPANY, OF SAME PLACE.

DISK CULTIVATOR.

SPECIFICATION forming part of Letters Patent No. 553,100, dated January 14, 1896.

Application filed December 1, 1894. Serial No. 530,556. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM T. M. BRUNNEMER, a citizen of the United States, residing at Monmouth, in the county of Warren and State of Illinois, have invented certain new and useful Improvements in Disk Cultivators, of which the following is a specification.

A leading object of my present invention is to provide disk cultivators in which the disk gangs are connected with a main frame, comprising in its structure a rigid or non-flexible axle, which main frame is mounted on wheels and is pivoted to the rear end part of the tongue in such manner that said main frame and its supporting-wheels—or, as it may be termed, the “truck”—can be turned sidewise, shifted or deflected laterally in either direction from the path of movement or line of travel of the cultivator by simply forcing the forward end of the main frame and the rear end of the tongue laterally in the direction desired, and in which the disk gangs are connected with the main frame in such manner as to permit of the gangs being raised and lowered, while the connection at their front and rear ends to the main frame is such that they swing laterally with the main frame or move in unison with all lateral movements of the main frame, and such that their movements laterally are controlled by the lateral movement of the main frame and wheels or truck to evade plants or hills of plants out of line in the row of plants, and for other purposes; and another main object of my invention is to provide disk cultivators in which the disk gangs are connected with a main frame supported on wheels, by means whereby said gangs can be raised and lowered relatively to the main frame, and in which the series of connected disks of each gang are adjustable at different angles horizontally and relatively to the line of travel of the cultivator, and at different angles vertically and relatively to a line transversely of the cultivator, and in which the main frame is pivoted to the rear end part of the tongue in such manner that said frame and its supporting-wheels, or the truck, can be turned sidewise, shifted, or deflected laterally in either direction from the path of movement

or line of travel of the cultivator, for the purpose of guiding the main frame and wheels and thereby guiding the disk gangs to evade plants out of line in the row of plants, and for other purposes in the operation of the cultivator.

The foregoing stated leading objects and other objects of my invention are hereinafter described, and the preferred novel means employed in carrying out such objects of the invention, the preferred organization of the parts, the preferred structural peculiarities of the different parts, and the new combinations of parts, are also hereinafter described, and made the subject-matter of claims hereto appended.

A disk cultivator showing the novel means, the structural peculiarities, the organization of parts, and the new combinations referred to above, as embodied in the best form and manner at present known to me, is illustrated in the accompanying drawings, in which—

Figure 1 is a top plan showing the tongue partly broken away and the hand-levers thrown forward to support the disk gangs in their elevated positions above the surface of the ground; Fig. 2, a side elevation with the near supporting-wheel removed, the tongue partly broken away, and the hand-levers and disk gangs in same relative positions to the other parts, as at Fig. 1; Fig. 3, a rear elevation, showing the hand-levers and disk gangs in same relative positions to other parts, as at Figs. 1 and 2, and the rear part of the seat-supporting bars broken away; Fig. 4, a rear elevation showing the seat-supporting bars broken away and the hand-levers thrown rearward to lower the disk gangs into position for operation in the ground; Fig. 5, a central sectional elevation showing the hand-levers and disk gangs by full lines in the same relative positions to other parts as shown at Figs. 1, 2, and 3, and by dotted lines in same relative positions to other parts as shown at Fig. 4; Fig. 6, an enlarged top plan of a disk gang and a fragmental part of a disk-gang yoke or tie-arch located above said disk gang; Fig. 7, an enlarged rear elevation of a disk gang, part of the disk-gang yoke, and the intermediate parts by which the disk gang is adjustably fixed to the gang-yoke;

Fig. 8, an enlarged rear elevation of a disk gang partly broken away to show the parts between the disk gang and the disk-gang yoke and showing a part of said yoke by dotted lines; Fig. 9, a top plan of the two disk gangs, their connecting yoke or tie-arch, and of the arms which prevent endlong movements of the disk-gang yoke and lateral movement of the disk gangs, except as said parts move with the main frame and wheels; Fig. 10, an enlarged perspective of the beam or bar connecting the upper ends of the down-hangers which carry the disk-gang shaft; Fig. 11, an enlarged sectional elevation in the line 11 11 in Fig. 7.

The arched axle A has an upper horizontal part a^1 , depending side parts a^2 , and horizontal end parts a^3 , on the outer ends of which supporting wheels B are journaled. The parts a^1 , a^2 , and a^3 of the axle are rigidly and non-flexibly connected with each other.

What I herein term the "main frame" C, Fig. 1, consists principally of the axle and the U-shaped bar c^1 , the curved part c^2 of which is forward, and the rear end parts c^3 of which are fixed by clips c^4 to the part a^1 of the axle. A bar c^5 extending across the main frame and fixed thereto a short distance forward of the axle, a bar c^6 extending across the main frame with ends c^7 , Fig. 1, extending a short distance beyond each side thereof, and fixed thereto a short distance in rear of the forward end of said frame and below it, a bar c^8 extending across and above the forward part of the main frame, and braces c^9 may be said also to constitute parts of the main frame, which is rigidly fixed to the axle, and may be formed in various ways to accomplish the purposes of the main frame shown, the essential feature of which is that it is a frame comprising a rigid non-flexible axle with a forward rigid frame part rigidly connected with the axle.

The tongue D, Fig. 1, is formed of a forward part or pole d^1 , to which are fixed bars d^2 which constitute its rear part or end, and which are bolted or otherwise fixed at their rear ends to the upturned ends d^3 of a plate d^4 that is pivotally mounted on the bar c^5 by a bolt d^5 to permit the tongue being swung laterally at its forward end with reference to the main frame and wheels B, but more especially to permit of either wheel B being advanced relatively to the other wheel, and the main frame swung laterally at its forward end on the bolt d^5 as its center of motion in guiding the machine, as hereinafter more fully described. The friction between the tongue and the transverse bar c^8 is minimized by means of a roller d^6 beneath the bar c^8 , which is journaled in and supported by bars d^7 which are fixed to the bars d^2 or rear end of the tongue.

The operator's seat E is supported on the rear ends of bars e , which are pivoted at their forward ends, one to each bar d^2 by bolts e^1 which pass through either of a series of holes e^2 in each bar d^2 for the purpose of adjusting

the seat E forward or rearward to suit different operators. The seat-bars e and seat may be turned upwardly and forwardly on the bolts e^1 , as shown by dotted lines at Fig. 2, to turn it out of the way when desired.

The "disk gangs," as I have herein termed them, each consist of an ordinary disk gang G, formed of a series of disks g , mounted, as may be preferred, to rotate on or with a disk-gang axle g^1 ; which axle is carried by down-hangers or pendants g^2 from a connecting head or bar g^3 . The disk gangs are adjustably connected, as hereinafter described, one with each of the horizontal ends h of a yoke or tie-arch H, the central part h' of which is of arched form to pass over plants of some height, as does the arched axle A.

The draft rods or beams I are each provided with an eye i at its forward end, which eyes are seated one on each outer end, c^7 , of the bar c^6 and are each adjustable laterally of the draft-rod and lengthwise of the bar c^6 and are fixed in position after such adjustments by means of a pin or split key i^1 , which passes through a slot in the eye i , Fig. 1, and into either of a series of holes i^2 in the bar c^6 , thus fixing each draft-rod I against movement endlong of the rod c^6 , while allowing it to partially rotate thereon to permit of its rear end rising and falling for purposes hereinafter described. The eye i is preferably hinged or pivoted at i^3 to the draft-rod to facilitate adjusting it on the bar c^6 ; but this hinge is inoperative and the draft-rod practically a rigid rod in so far as lateral flexure thereof is concerned when the rear ends of said rods are held against relative lateral movements, as hereinafter described.

The rear end of each draft-rod I, as shown best at Figs. 6, 7, 8, 9, 10 and 11, is fixed between a head j^3 below said rod and another head J above it, and is held principally by an eyebolt j , in the eye j^1 of which the rod I is seated. The upper portion or body of the eyebolt j passes through the head J upwardly close to the end h of the disk-gang yoke and through a block j^2 , which rests over and upon the end h of the yoke H, above which block j^2 a nut j^3 on said eyebolt is used to fix the draft-rod I to the head J and both to the end h of the yoke H. The rear end of the draft-rod I is preferably seated in a groove j^4 in the ribs j^5 on the under side of the head J to fix these parts firmly to each other, and a split key j^6 may be used as an adjunct to prevent withdrawal of the draft-rod from the heads J and j^3 . A flange j^7 on the upper side of the head J rests against the rear side of the end part of the yoke H to firmly fix the head J in place against angular movement on the eyebolt j . The rear end of the draft-rod rests on a raised portion j^8 of the head j^3 , Figs. 10 and 11, on each side of which is a curved groove or recess j^9 , in one or the other of which the eye of the eyebolt I is seated, as hereinafter described. At each end of the block j^2 is a recess j^7 , Figs. 8 and 10, in which the head

of a bolt g^8 is seated and from which said bolts project upwardly, one through each of the curved slots j^7 in the ends of the head J, Figs. 6, 8 and 9, and have nuts g^9 on their upper ends.

The yoke II on which the disk gangs are mounted has a journal part h^2 at each of its ends, which are seated each in a bearing l in the distal end of a radius-bar L, the proximal end of which is in the form of a sleeve l' journaled on the end part a^2 of the axle A in such manner as to permit the radius-bar to oscillate on its bearing on the axle, but to prevent it moving lengthwise of the axle, or, in other words, laterally of the cultivator. The shoulders h^3 at each end of the yoke, abutting each against the adjacent radius-bar L, will prevent the yoke moving endlong of itself, or, in other words, laterally of the cultivator, and thus the radius-bars, while swinging on the axle A to permit of raising and lowering the yoke II with its disk gangs, will in operation in the field retain or hold the yoke and the disk gangs from either angular or lateral movement with reference to the axle A and wheels B, and thus cause the disk gangs to swing or turn with all swinging movements laterally of the main frame while held firmly at right angles with the axle and parallel with the wheels.

The disk gangs are raised and lowered, each gang to a certain extent independently of the other gang, by a hand-lever M. Each hand-lever is fixed on or to the end of a short rock-shaft m , one of which rock-shafts is journaled in suitable bearings m' at each end of the part a of the axle A. Each rock-shaft m has a radius-arm m^2 projecting therefrom, with the distal end of which the upper end of a link m^3 is pivotally connected, the lower end of which link passes loosely through an eye h^4 on the end of an eyebolt h^5 which passes through and is fixed to the end h of the yoke II. The projecting ends of a pin m^4 , which passes through the lower end of the link m^3 , contact with the eye h^4 when a lever M is thrown forward for elevating the disk gang connected therewith above the ground, as shown best at Figs. 2 and 3, and by the full lines at Fig. 5. When the hand-levers are swung to the rear and there locked, as hereinafter described, for regulating the depth of plowing for operation in hard soil, the disk gangs will be lowered into positions for operations in such soil, as shown best at Fig. 4, and by dotted lines at Fig. 5, with the pin m^4 forced out of contact with the eye h^4 , and the disk gangs forced and held down by a yielding spring-pressure force exerted by the springs m^5 , which are then each compressed between the eye h^4 and a stop-block m^6 , which is adjustably mounted on the link m^3 and held after adjustment by means of a set-screw m^7 . By adjustments of the stop-block m^6 the tension of the spring m^5 can be adjusted to exert a greater or less spring-pressure on the disk gang for operating in soils of different

degrees of hardness, while of not too great tension to prevent the gangs rising to pass over obstacles which they cannot cut through.

The hand-levers M are each provided with an ordinary spring-actuated dog or catch m^8 , which is operated by a thumb-lever m^9 to draw the dog out of engagement with either of the series of notches or depressions n in the curved rack-bar N, with which it has been engaged to lock the hand-levers, for plowing in hard soil, as hereinbefore described. By engaging the links or eyes m^{10} each with the adjacent coacting thumb-lever m^9 the dogs m^8 can be held out of engagement with the depressions in the curved rack-bars N, whereby the disk gangs will be permitted, for use in ordinary mellow soil, to rise and fall to pass over obstructions and will not be held or forced down by the weight of the driver, the wheels, the main frame and the intermediate springs, as is the case when the hand-levers are locked to the rack-bar by the dogs m^8 for operation of the disk gangs in hard soil, as hereinbefore described.

A pivot-bolt p , Fig. 1, through the equalizer-bar P, mid-length thereof, connects said bar with the central part of the forward end c^2 of the U-shaped bar C. A pendant R is pivotally mounted at its upper end on each end of the equalizer-bar P, so that they can swing forwardly at their upper ends, as shown by dotted lines at Fig. 5. The lower end of each pendant R is connected by a jointed link-rod r with a lug r^1 which projects downwardly from the radius-bar L at the same side of the cultivator as the pendant R with which it is so connected. A draft animal is hitched to each pendant R by a clevis r' , which can be engaged with either of the series of holes r^2 to cause a greater or less portion of the force of the draft to act on the radius-bars L. This force action of the draft on the radius-bars L, especially when the rear ends of the radius-bars are lowest, as when the disks are lowered to work, and as shown by dotted lines at Fig. 5, will tend to draw the rear ends of said radius-bars downwardly and thereby tend to force the disks into the ground. For operation in hard ground the clevises r' can be lowered in the series of holes r^2 to secure a maximum effect of the draft in forcing the disks into the ground, and the clevises can be adjusted in higher positions to secure a reduced force action of the draft in forcing the disks into the ground.

By loosening the nuts j^3 the heads J and blocks j^2 can be adjusted in different positions on the ends h of the yoke II, and the disk gangs be thus readily adjusted at different distances apart. When such adjustments are made, the forward ends of the rods I should be correspondingly adjusted.

At Figs. 4 and 7 the dotted lines show different adjustments of the disk gangs, for the purpose of raising or lowering either the outer or the inner ends of the disk gangs, as may be desired for different kinds of culti-

vation, in different methods of planting, and in different soils. These adjustments last referred to are effected by means of raising the nut g^b on one of the bolts g^a and lowering the nut g^b on the other bolt, thus tilting or turning the head g^b on the draft-rod I, as may be desired, at greater or less angles to a horizontal line and transversely of the cultivator. By turning the nuts g^b to tighten them up closely after these adjustments are effected, the parts will be fixed firmly and securely in place and to each other.

At Fig. 6 the dotted lines show one adjustment of a disk gang angularly with reference to the line of travel of the cultivator. This adjustment is effected by loosening the nuts g^b on the bolts g^a , when the head g^b and the disk gang may then be swung to any angle desired, by moving the bolts g^a to different positions in the curved slots j^c . After such adjustments, by tightening up the nuts and drawing the parts g^b of the head g^b tightly against the rear end of the draft-rod I, the parts will be again secured firmly in place and to each other. In making these adjustments last referred to the eye j^c of the eyebolt j moves in the curved recess in which it is located. As shown in all of the drawings except Fig. 9, the disk gangs are in positions to throw or move the soil toward each other, or toward the row of plants being cultivated between the two disk gangs. The disk gangs may be reversed to throw the soil in opposite directions from each other, or from the row of plants between them, by changing them and placing the right-hand disk gang with its head g^b and hangers g^2 where the left-hand disk gang is located, and vice versa.

At Fig. 9 the disk gangs are shown as adjusted on the yoke II to their locations nearest to each other, and as adjusted angularly to the line of travel of the cultivator in such positions that the forward parts of the adjacent disks of the two gangs thereof will touch or approximately touch each other. With the disk gangs adjusted as last described, the cultivator can be used for fallow plowing, and where such plowing is done in stalk-fields the two middle disks will separate the stalks in a row thereof and force them downwardly and outwardly to be severed into short lengths by the other disks.

By use of the means herein shown and described for quickly and easily moving the disk gangs laterally to evade plants out of line in the row of plants and for other purposes, and by the organization and combination of disk gangs with such means and in such manner as to produce a thoroughly practical working cultivator of the disk gang type, a great desideratum has been attained.

As is well known, disk gangs as ordinarily operated are difficult to move sidewise readily and quickly when in operation in the field. This difficulty is overcome with my cultivator, as the driver with his feet on the foot-plates S, which are fixed, one to each end part of

the axle A, can easily force either wheel B forwardly and thereby sway or turn the forward part of the main frame to one side, and cause the wheels to carry the main frame and the disk gangs over to one side, not by forcing the disks laterally against the soil, but by changing their line of travel, coincidently with the wheels, so that they will offer but little resistance to such lateral movement. By this means, especially by reason of simply turning the carrying-wheels out of the line of draft, while the disk gangs are held parallel and turned therewith the disk gangs are easily and quickly moved sidewise, even in very hard soil, and in all of such operations the path of the draft animals need not be changed to guide the cultivator, and said animals can travel in lines paralleling the row of plants being cultivated. After such deflection laterally of the cultivator, it will be brought back quickly into line by the draft acting on the forward end of the lengthy main frame, while the tongue is pivoted at its rear end to said main frame near the axle, on the cessation of pressure by the driver's foot, which return movement into line may be facilitated by slight pressure with his other foot on the other end of the axle.

An essential feature in causing the disk gangs to swing laterally with the main frame and wheels is the connection of the disk gangs with the main frame in such manner that they swing positively with the laterally swinging and laterally advancing movements of the main frame and wheels, or with the truck, and have not any, or approximately not any, lateral movement except as they so move with the main frame and wheels; and this feature is accomplished or accompanied by means which, while preventing lateral movement of the disk gangs relatively to the main frame, will permit of the disk gangs being raised and lowered for governing and controlling the depth of cultivation, and for other purposes.

By engaging the hook T, Fig. 3, which is hinged to the bar c^3 of the main frame, with the eye l fixed to the tongue, the pivotal connection between the main frame and tongue will cease and become rigid for use in moving the cultivator from place to place on its own wheels. When this hook is disengaged from the tongue, as shown best at Fig. 4, then the pivotal connection between the main frame and tongue is operative.

The nature and advantages of the invention will be apparent and the principle or mode of operation will be understood from the foregoing description. It will be evident, however, that the invention may be embodied in different forms from what I have shown and described without departing materially from the general idea involved.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a disk cultivator, in combination, a main frame comprising a rigid non flexible

axle, and rigid frame part rigidly connected therewith mounted on wheels, a tongue pivoted at its rear end to the main frame near the axle part thereof, whereby said main frame and wheels can be guided laterally substantially as described, disk gangs, the beams of which are attached at their forward ends to the forward end parts of the main or swing frame; a yoke to which the disk gangs are connected, in rear of the axle pivoted radius arms which carry said yoke and while permitting it to rise and fall with the disk gangs, hold it from lateral movement otherwise than with said radius arms, substantially as described.

2. In a disk cultivator, in combination, a main frame comprising a rigid nonflexible axle, and rigid frame part rigidly connected therewith mounted on wheels, a tongue pivoted at its rear end to the main frame near the axle part thereof, whereby said main frame can be guided laterally substantially as described, disk gangs, a yoke connecting said disk gangs, radius arms pivotally mounted on the axle and journaled to said yoke to permit it to rise and fall with the disk gangs, but to prevent lateral movement of the yoke and disk gangs independent of the axle and main frame, and hand levers mounted on the main frame and connected with the yoke by links whereby the yoke and disk gangs may be raised and lowered, substantially as described.

3. In a disk cultivator, in combination, a main frame comprising a rigid nonflexible axle, and rigid frame part rigidly connected therewith, mounted on wheels, a tongue pivoted at its rear end to the main frame near the axle part thereof, disk gangs, a yoke connecting said disk gangs, radius arms pivotally mounted on the axle and journaled to said yoke, whereby they rise and fall with the yoke and its connected disk gangs, while they hold the yoke and disk gangs against any lateral movement independently of the main frame, locking hand levers mounted on the main frame and connected loosely with the yoke by link rods with stop pins at their lower ends, and springs interposed between the yoke or a projection therefrom and stop blocks on said link rods, whereby the disk gangs are held down with a yielding spring pressure force, substantially as described.

4. In a disk cultivator, in combination, a main frame comprising a rigid nonflexible axle, and rigid frame part rigidly connected therewith; mounted on wheels, a tongue pivoted at its rear end to the main frame near the axle part thereof, disk gangs, a yoke connecting said disk gangs, radius arms pivotally mounted on the axle and provided with bearings for the yoke, hand levers mounted on the main frame and connected with the yoke by means of link rods, and draft bars connected with said radius bars, whereby a portion of the draft force is made to exert a downward pressure on the disk gangs, substantially as described.

5. In a disk cultivator, in combination, a main frame mounted on wheels and pivoted to the tongue, whereby said main frame can be guided laterally, disk gangs, a yoke connecting said disk gangs, radius arms pivotally mounted on the axle and journaled to said yoke to permit it to rise and fall with the disk gangs, but to prevent lateral movement of the yoke and disk gangs independent of the main frame, hand levers mounted on the main frame and connected with said yoke by link rods, and draft rods fixed at their forward ends to a bar mounted on the forward end of the main frame, and at their rear ends connected one with each disk gang, substantially as described.

6. In a disk cultivator, in combination, with a yoke H connecting the disk gangs, a draft rod I, head g^s with pendants carrying the disks, a head J having curved slots j^7 and bolts g^s , with their heads seated in recesses in the heads g^s and their body portions in the curved slots, whereby the angular positions of the disk gangs may be adjusted, both with reference to the line of travel of the cultivator, and laterally of the cultivator, substantially as described.

7. In a disk cultivator, in combination, a yoke H, eye bolt j , draft rod I, block j^2 , head g^s with elevation g^s and pendants carrying the disks, a head J having curved slots j^7 and eye bolts j^4 , substantially as described.

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

WILLIAM T. M. BRUNNEMER.

Witnesses:

EDWIN HEMERWOER,

L. S. KINGMAN.