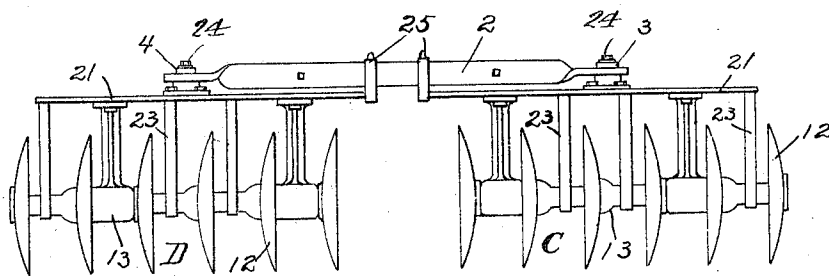
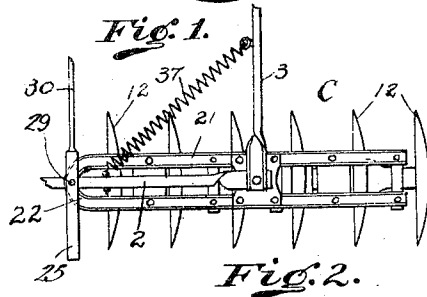
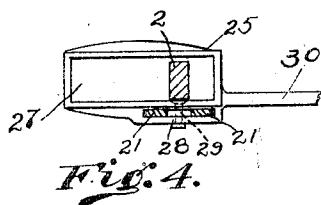
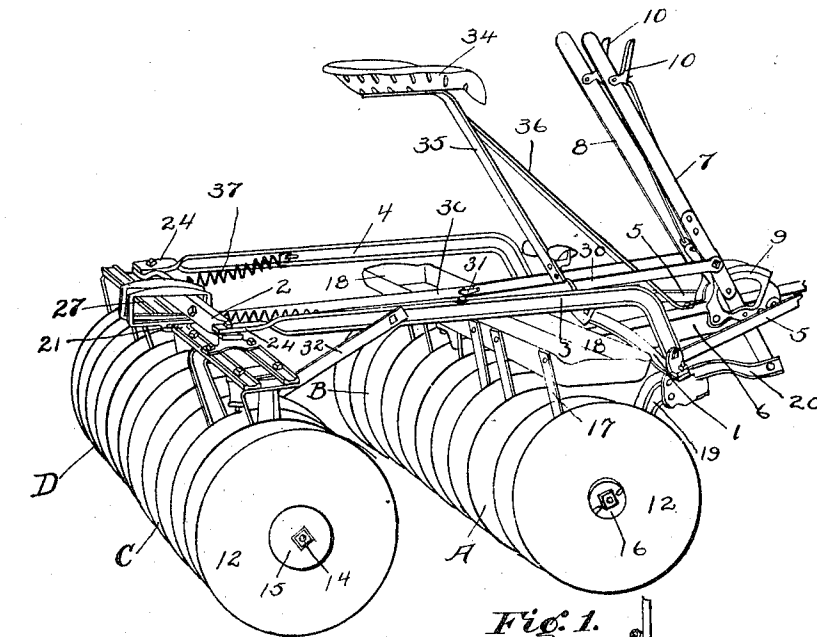


F. K. LATHROP.
DISK HARROW.
APPLICATION FILED JULY 6, 1910.

1,036,652.

Patented Aug. 27, 1912
2 SHEETS—SHEET 1.



Witnesses
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Fig. 3

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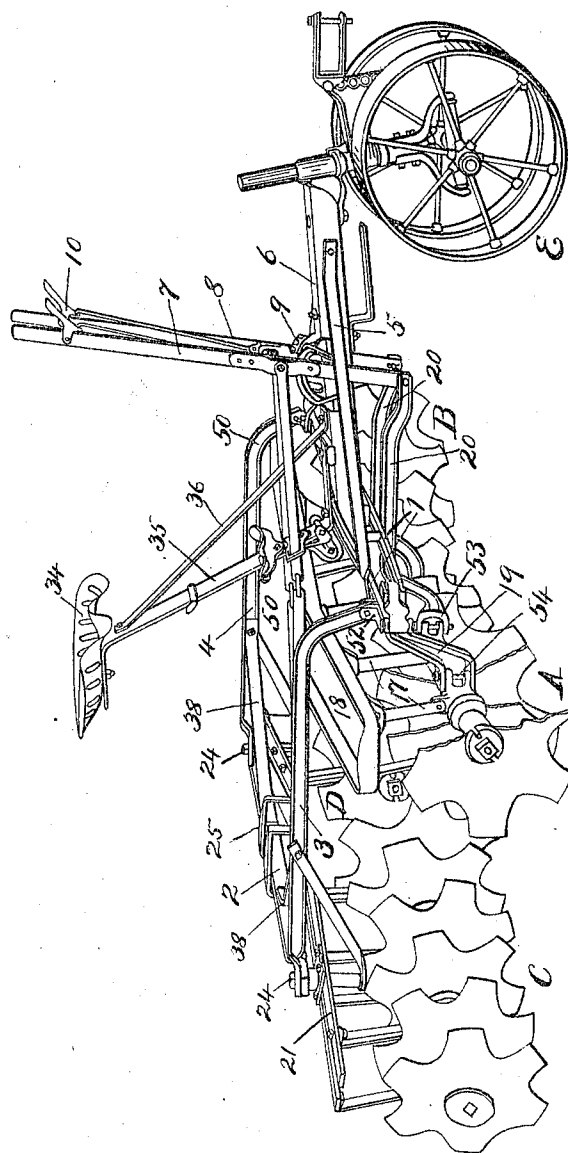


Fig. 5.

Witnesses
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UNITED STATES PATENT OFFICE.

FRANK K. LATHROP, OF DAYTON, OHIO, ASSIGNOR TO THE OHIO RAKE COMPANY, OF DAYTON, OHIO, A CORPORATION OF OHIO.

DISK HARROW.

1,036,652.

Specification of Letters Patent. Patented Aug. 27, 1912.

Application filed July 6, 1910. Serial No. 570,864.

To all whom it may concern:

Be it known that I, FRANK K. LATHROP, a citizen of the United States, and a resident of the city of Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Disk 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 improvements in disk harrows provided with two sets or gangs of rotary disks or cutters arranged one in front of the other, and in which the round or cut disks of each gang are usually turned in opposite directions so that the rear set will level off and thoroughly pulverize the ground thrown up by the forward set and the ground thus effectively treated in one operation. Heretofore in such constructions the frames carrying the two gangs of disks have either been rigidly connected together to form a single rigid frame or the frames for the two gangs have been separate and merely coupled together in tandem, by a central coupling bar. In the former case the rigidity of the single frame presents difficulties in turning corners, while in the latter difficulty is experienced in keeping the two sets of gangs in line while traversing the field. It is to obviate both of these objections that my invention is directed, and the invention consists of that novel construction of frame and arrangement of parts whereby sufficient rigidity is maintained in the support of the sets of gangs to avoid the latter objection, at the same time that sufficient flexibility of frame is provided to avoid the trouble experienced in turning corners.

Other features of novelty and arrangement will also be hereinafter particularly pointed out and claimed.

In the drawings, Figure 1 is a perspective view of my improved harrow. Fig. 2 is a top plan view of one of the rear gangs of disks. Fig. 3 is a rear elevation of the two sets of rear gangs of disks. Fig. 4 is a detail side view of the coupling block for supporting and connecting the inner end of each rear gang to the adjusting lever. Fig. 5 is a perspective view of the harrow in which cut disks are employed, illustrating

a modified brace construction for the main frame.

The main frame for the two sets of gangs is comprised of a front cross frame 1, 1, of two flat parallel bars in the same vertical plane, a single rear cross bar 2, arranged on edge and given a quarter turn at the ends to form flat horizontal portions for convenient attachment to the similarly twisted side bars 3, 4, of the main frame. These side bars are pivoted to the rear cross bar by the vertical bolts 24 and are disposed on edge and bent downwardly at their forward ends 50, 50, and pivotally secured to the angle plates 52, on the upper cross bar 1, so as to swing vertically. In this way, a main frame is provided that is susceptible of vertical play for the rear of the frame to allow for any vertical movement of the two sets of gangs with reference to each other, and in which by the pivotal connection at the rear corners allows a lateral horizontal movement for the rear of the frame within the bending limits of the side bars and the yielding of the cross braces and springs to be hereinafter described.

Securely bolted to the front cross bar at the middle and braced by the side braces 5, 5, is the tongue 6 of the harrow. Upon each side of this tongue is pivotally mounted a hand lever 7, 8, provided with the usual notched segments 9 and the hand latches 10, for locking the levers and the disk gangs in any desired angular position to the line of draft.

The disk gangs are arranged in two sets, two gangs A, B, in front and two gangs C, D, in the rear, one gang of each set on one side of the line of draft, and the other gang on the other side of the line of draft, and with the disks or cutters turned in opposite directions so that the rear gangs will throw the dirt in a direction opposite to the throw of the front gangs. Either round or cut disks can be employed, and in Figs. 1 to 4, I have illustrated the construction with round disks, and in Fig. 5 I have illustrated the harrow provided with cut disks. In Fig. 5 I have also illustrated a two wheel truck E, for supporting the short tongue of the implement, although this truck construction forms no part of my present invention.

The disks 12 of each gang are strung together on a gang shaft 14, with spools or

sleeves 13 to separate the disks, the gang shaft having a head 15 at one end and being screw threaded at the other with the disks and sleeves drawn together and held by a nut 16.

Each of the front gangs is secured by hangers or straps 17 to a separate gang frame 18 in the usual way and each of these gangs is suspended and supported from the main frame by a hanger 19 to which the gang is pivotally secured by coupling 54 so as to swing in a horizontal plane. The inner ends of each of these two front gangs are separately connected by the connecting bars 20 to the lower ends of their respective adjusting levers 7, 8, by the swivel connection 53 whereby upon shifting the lever the proper angle to the line of draft may be given to the gang in the usual way. Each of the rear gangs is also mounted in a separate gang frame made up of two parallel bars 21, preferably integrally connected at the inner ends by the curved transverse portion 22, and each gang is supported from its gang frame by hangers 23 in which the gang shaft is properly journaled. The gang frames 21 are pivotally secured to the main frame to swing in a horizontal plane about midway of their length by the same bolts 24 which pivotally connect together the rear cross bar 2 with the side bars 3, 4, and the inner ends of these two gangs are held in a horizontal plane and adapted to be adjusted angularly to the line of draft by the coupling blocks 25, 25.

One coupling block is provided for each gang and it consists of a rectangular loop and an opening 27 of a height to loosely embrace the transverse cross bar 2 of the main frame and to allow free movement back and forth of the loop on the cross bar. The base of this loop or coupling block is provided with a horizontal slot 28 formed integrally or by means of a strap, and into this slot 28 the inner end of the gang frame 22 is inserted and pivotally secured therein by a pivot pin 29. Each loop 25 is connected by its connecting bar 30 to its respective adjusting lever 7, 8, so that the gangs may be properly adjusted at the desired angle to the line of draft for the varying conditions of soil and these connecting bars are preferably made in sections hooked together by the hooks 31. As the disks of the front gang are set in opposite direction to the disks of the rear gang, the desired angular adjustment of the front and rear gangs will be in opposite directions so that the connecting bars 30 for the rear gangs are pivotally mounted to the levers 7, 8, above the pivots of the levers to the tongue and the connecting bars 20 for the front gangs are mounted at the lower ends of these levers below the tongue pivots.

In order to provide for sufficient rectan-

gular rigidity of the main frame when the harrow is in use to maintain the alinement of the disk gangs, and at the same time to provide sufficient lateral flexibility for the frame to permit turns to be made and thus to obtain the benefits both of the rigid frame structure for both sets of gangs and the loosely coupled tandem construction, heavy coiled springs 37 are attached between the rear cross bar and each side bar 3, 4, as shown in Fig. 2, which springs exert a force to maintain the rectangular shape of the main frame and to keep the two rear gangs central with the front gangs when going forward on a straight line. These coiled springs, however, are not always necessary, and with the construction of side bars illustrated, in which the side bars are bent downwardly at their forward ends, ordinary stiff braces 38, 38 may be substituted for the coiled springs, in which event the side bars themselves are sufficiently flexible to allow for the lateral movement of the frame in turning corners.

It will be evident that when it is desired to use the front harrow alone, the rear harrow can be readily and easily removed by disconnecting the side bars 3, 4, in front and separating the lever bars 30.

The front gang frames are preferably provided with weight pans as shown, for weighing down the front gangs and of course when desired, similar weight pans can be provided for the rear gangs.

The usual driver's seat 34 is provided, supported by a standard 35 bolted on the rear end of the tongue and suitably braced by the rod 36.

As illustrated the harrow is provided with either round disks, or cut disks, and for many varieties of soil the cut disks are preferable owing to their spading action.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. In a disk harrow, the combination with front and rear gang frames, of a main frame, to which the gang frames are pivotally secured, said main frame comprising a front and a rear transverse bar with side bars adapted to flex in a horizontal plane, whereby the main frame will flex laterally under side strains in turning corners without affecting the rigidity of the main frame during the forward progress of the machine.

2. In a disk harrow, the combination with front and rear gang frames, of a main harrow, to which the gang frames are pivotally secured, said main frame comprising a front and a rear transverse bar with side bars adapted to flex in a horizontal plane, with coiled springs intermediate the rear portion of the side bars and the rear cross bar, whereby the main frame will flex laterally under side strains in turning corners and at the

same time the rigidity of the main frame during the forward progress of the machine will be maintained.

3. In a disk harrow, the combination with 5 front and rear gang frames, of a main frame, to which the gang frames are pivotally secured, said main frame comprising a front and a rear transverse bar with side bars 10 adapted to flex in a horizontal plane, loops mounted loosely on the rear cross bar and pivotal connection for said loops, with the inner ends of said rear gang frames, with 15 adjusting levers and connecting bars to said loops whereby the rear gang frames will be held in horizontal position and at the same time angularly adjusted.

4. In a disk harrow, the combination with front and rear gang frames, of a main frame, to which the gang frames are pivotally secured, said main frame comprising 20 a flexible framework of side and front and rear cross bars with loops mounted loosely

on the rear cross bar and pivotal connection for said loops with the inner ends of said rear gang frames, with adjusting levers and 25 connecting bars to said loops, whereby the rear gang frames will be held in horizontal position and at the same time angularly adjusted.

5. In a disk harrow, the combination with 30 front and rear gang frames, of a main frame, to which the gang frames are pivotally secured, said main frame comprising a front and a rear transverse bar with side bars adapted to flex in a horizontal plane, 35 with removable bolts for securing the same to the front cross bar whereby the removal of the bolts will detach the rear gangs from the harrow and convert the harrow into a single machine.

FRANK K. LATHROP.

Attest:

W. H. H. ECKI,
J. B. HORSTMAN.