Oct. 25, 1932. E. C. SANDEEN 1,884,273

DISK PULVERIZER

Filed April 2, 1930 2 Sheets-Sheet 1

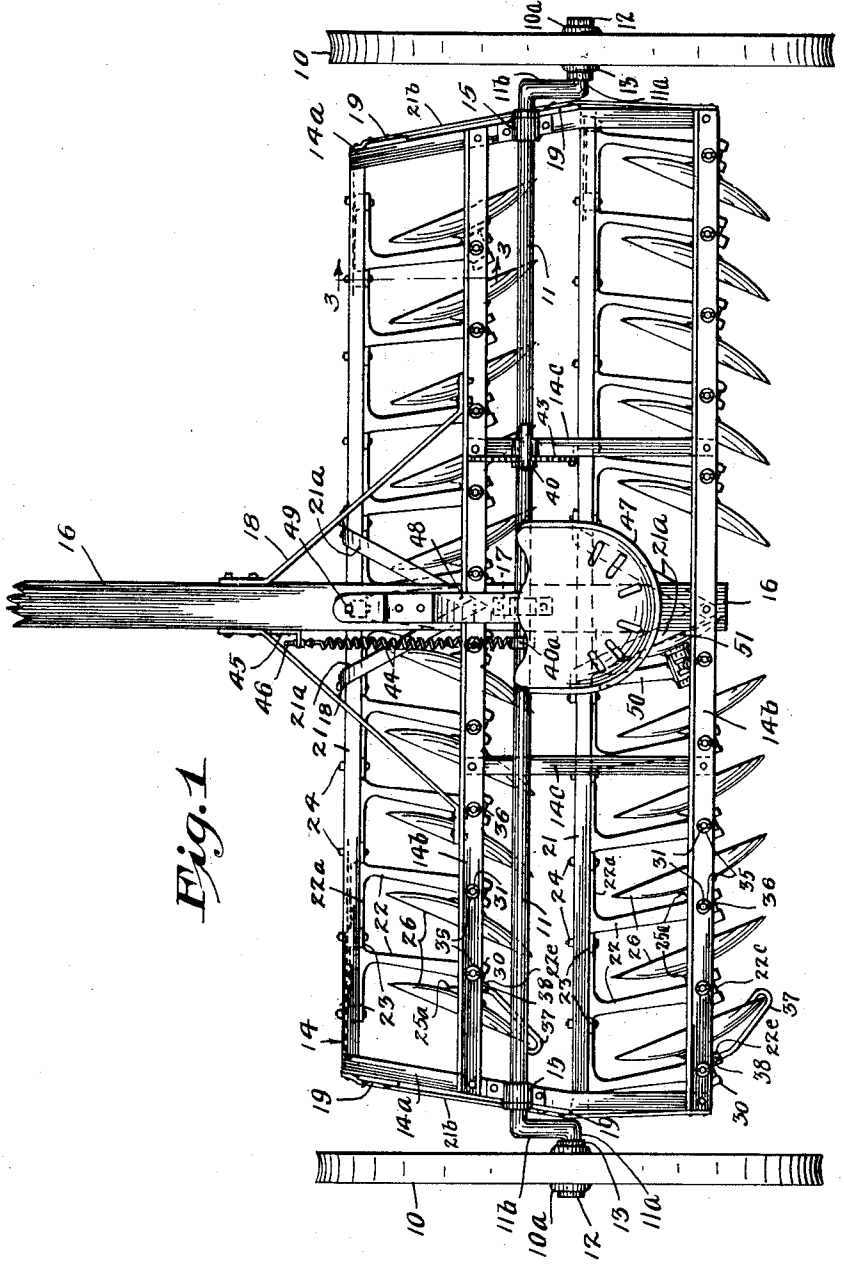


Fig. 1

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Fig. 2

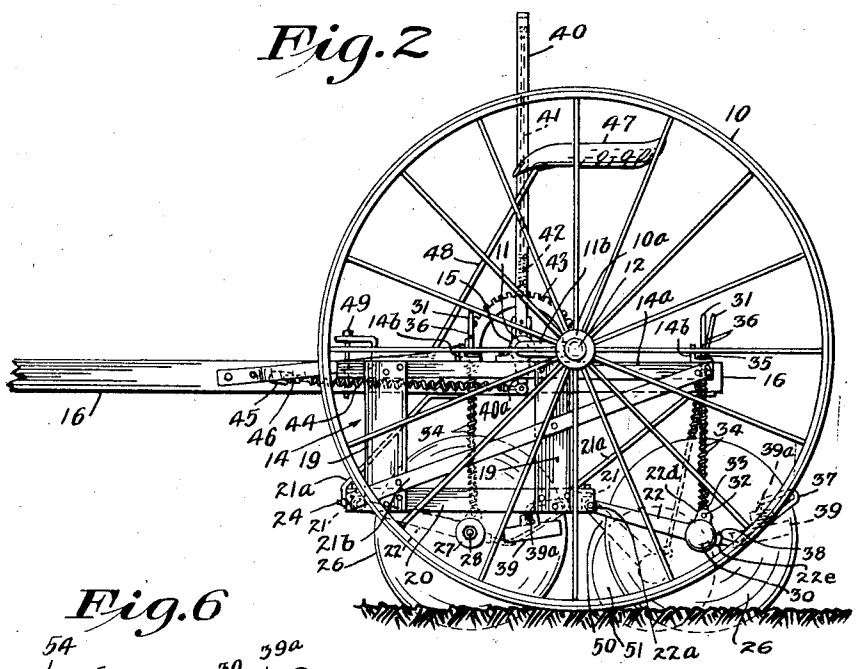


Fig. 6

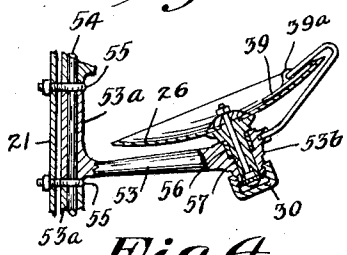


Fig. 4

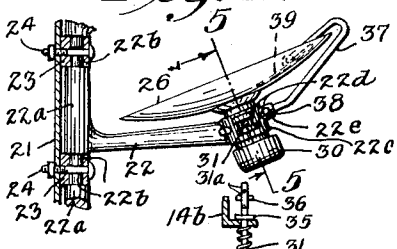


Fig. 5

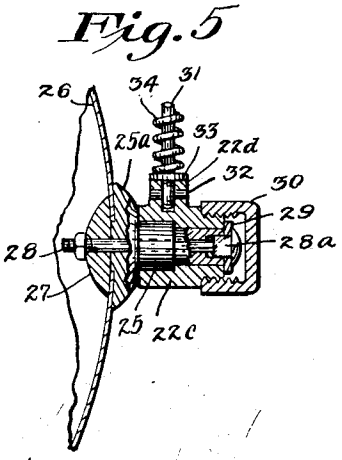
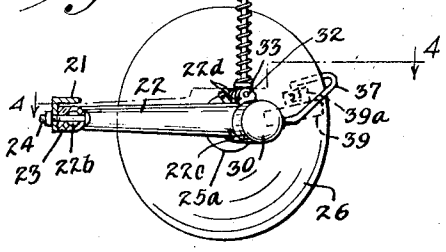


Fig. 3



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UNITED STATES PATENT OFFICE

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DISK PULVERIZER

Application filed April 2, 1930. Serial No. 440,955.

This invention relates to a pulverizer or harrow and particularly to a pulverizer of the disk type. It is desirable in such a machine to have the same constructed so that the ground will be thoroughly worked over and pulverized by the disks, to have the disks mounted so that they will operate efficiently and so that they can be easily removed if repairs or change are necessary. It is also desirable to have the machine simple in construction and arranged so that the disks can be adjusted as to height.

It is an object of this invention therefore to provide a disk pulverizer having forward and rear rows of disks disposed substantially in the same horizontal plane, said disks being concavo-convex in form, the disks in the front row inclining longitudinally in one direction and the disks in the rear row inclining longitudinally in the opposite direction and being oppositely disposed, the rear disks also preferably being staggered with relation to the front disks.

It is a further object of the invention to provide a disk pulverizer comprising a front row of concavo-convex disks, the disks at one side of the center of the machine facing one way and the disks at the other side of the center facing in the opposite direction, said disks being longitudinally inclined so that their rear sides extend away from the center, said machine also having a rear row of similar disks, the disks at each side of the center facing in opposite directions, each of said latter disks, however, being inclined oppositely to the corresponding front disk and facing in the opposite direction.

It is also an object of the invention to provide such a structure as set forth in the preceding paragraph, a small disk being used at the center of the rear row disposed longitudinally in line with the space between the central disks of the front row.

It is still another object of the invention to provide a disk cultivator having a frame, a member extending transversely of the frame, a series of disk-carrying brackets disposed along said member and means securing said brackets to said member so that said brackets may swing vertically.

It is still another object of the invention to provide a simple and efficient structure for revolubly mounting a disk on each of said brackets.

These and other objects and advantages of the invention will be fully set forth in the following description made in connection with the accompanying drawings, in which like reference characters refer to similar parts throughout the several views, and in which:—

Fig. 1 is a top plan view of the machine;

Fig. 2 is a view in side elevation thereof;

Fig. 3 is a vertical section taken on line 3—3 of Fig. 1 as indicated by the arrows;

Fig. 4 is a horizontal section taken on line 4—4 of Fig. 3 as indicated by the arrows;

Fig. 5 is a partial vertical section taken substantially on line 5—5 of Fig. 4, and

Fig. 6 is a view similar to Fig. 4 showing a modification.

Referring to the drawings, a machine is shown comprising the side supporting wheels 10. Wheels 10 have hubs 10*a* in which are journaled the ends 11*a* of an axle 11, said axle having the portions 11*b* adjacent its end bent substantially at right angles so that portions 11*a* are in effect crank arms. The wheels 10 are retained on the ends of portions 11*a* by any suitable cap members 12 secured to the ends of the axle and by collar members 13 also secured to or formed on members 11*a* at the inner sides of the wheels. A frame 14 is provided having end members 14*a* to which are secured the bars 15 in which axle 11 is journaled. Each member 14*a* has a rear portion extending substantially parallel to the wheels 10 and a forward portion sloping inwardly slightly toward the center of the machine. The members 14*a* are connected by spaced longitudinal members 14*b* rigidly secured to members 14*a* at their ends. The members 14*b* are disposed over and bolted to a tongue member 16 disposed centrally of frame 14 and extending forward therefrom. Forwardly and rearwardly extending bars 14*c* are secured at their ends to members 14*b* and extend therebetween. Crank shaft 11 is also jour-

naled in another bearing 17 secured to the top of tongue 16. Brace members 18 are respectively secured at each side of tongue 16 and also rigidly secured to front member 14*b*. While members 14*b* could be made of various material, in the embodiment of the invention illustrated they are shown as made of angle bars with one flange disposed vertically and at the forward side. Members 14*a*, which in the embodiment of the invention illustrated are also made of angle bars with the vertical flanges disposed at the outer side and another flange horizontal and at their top sides, have flat bars 19 bolted thereto and depending therefrom. Bars 19 at their lower ends are rigidly connected by longitudinally extending angle bars 20 having an outer vertical flange and a top horizontal inwardly extending flange. Members 21 extend transversely of the machine between the bars 20 and while these members 21 could be variously made, they are shown as made of angle bars, the same having a forward vertical flange and a top horizontal rearwardly extending flange. Brace members 21*a* extend from the rear sides of bars 21 upward to the under side of tongue 16, said bars converging and being secured to said tongue, it being understood, as shown in Fig. 1, that there are a pair of braces 21*a* for each bar 21. Brace members 21*b* also extend from the forward ends of plates 20 rearwardly and upwardly to the rear ends of bars 14*a*, said braces also being bolted to one of the depending bars 19. A plurality of brackets 22 are provided having end portions 22*a* of substantially cylindrical form from the ends of which project trunnions 22*b*. Said trunnions are received and journaled in small brackets 23 having flat sides disposed against the vertical flange of bars 21 and secured thereto by headed and nutted bolts 24, said bolt in each bracket passing between the ends of the trunnions 22*b*. Brackets 22 extend rearwardly substantially horizontally and have hubs 22*c* at their rear ends bored to receive bearings 25 secured to and projecting from the convex side of the disks 26. Said bearings 25 have enlarged end portions 25*a* with a central projection extending into a central hole in the disk 26, said members fitting the convex side of the disk. A washer 27 of segmental form is disposed at the concave side of the disk at the center thereof and a headed and nutted bolt 28 extends through members 27 and 25, the same having an angular or squared portion 28*a* adjacent its head received in a socket of angular or square shape in cross section formed in the end of member 25. A washer 29 is disposed between the head of bolt 28 and the end of bearing 25. Bearing 25 as clearly shown in Fig. 5 is of two diameters within hub 22*c*. Hub 22*c* is reduced in diameter at its outer end and threaded to receive a covering cap 30 screwed thereon. Hub 22*c* has upwardly projecting spaced ears 22*d* between which is disposed the lower eyelet end of a rod 31 which end is pivoted to ears 22*d* by a suitable pin or bolt 32. A washer 33 rests on top of ears 22*d*, the top surface of which is engaged by the lower end of a compressed coiled spring 34 surrounding rod 31 and having its top end engaging the lower side of the horizontal flange of one of the bars 14*b*. A washer 35 surrounds rod 31 above the horizontal flange of bar 14*b* and a pin 36, which may be a split cotter key, extends through rod 31 above washer 35. Rod 31 is provided with a plurality of holes 31*a*, any one of which is adapted to receive the pin 36.

Hub 22*c* has a rearwardly projecting boss 22*e* bored to receive the end of a rod 37 held in said boss by a set screw 38. Rod 37 is bent to extend around the edge of disk 26 and has its end bent downwardly and secured in an apertured lug 39*a* of a scraper member 39 in the form of a narrow plate disposed against the concave side of disk 26. A short bracket 50 is attached to rear bar 21 in the same manner as brackets 22 and has a similar hub thereon at its rear end in which is journaled a small disk 51. Disk 51 faces and is inclined similarly to the adjacent disk to its left as seen in Fig. 1 and is disposed in the rear of the two central disks 26 in the front row of disks.

Axle 11 has secured thereto the lower end of a hand lever 40, said hand lever having guided in lugs at one side thereof a pawl rod 41 normally urged downwardly by a spring 42, which rod is adapted to seat between the teeth of a toothed segment 43 secured to one of the bars 14*c*. Said lever has an arm 40*a* projecting downwardly therefrom below axle 11 to which is secured one end of a strong tensile spring 44, the other end of said spring being secured to an angle bracket 45 secured to one side of tongue 16. Said spring is shown as secured by a threaded eye bolt 46 passing through bracket 45 and being provided with rods at each side of said bracket. A seat 47 is carried on a bar 48 extending forwardly and downwardly and secured to the top of tongue 16, said seat being disposed centrally over the tongue and just to the rear of axle 11 in convenient position for the operator to manipulate lever 40. The bar 48 in front of the point where it is bolted to tongue 16 is bent upwardly and then forward horizontally at a right angle so as to be spaced from tongue 16 and a bolt 49 extends downwardly through the same and through the tongue forming an attaching means for a double-tree.

In Fig. 6 a modified form of the invention is shown in which brackets 53 are used having portions 53*a* adapted to be attached to bar 21, said portions 53*a* being apertured

to receive a rod 54 which extends through all of the brackets, said rod 54 being secured to bar 21, the eyelet bolts 55 embracing rod 54 between the ends of the portions 53*a* and passing through the vertical flange of bar 21, said bolt 55 having a nut thereon at the outer side of said flange. Bracket 53 is provided with a hub 53*b* similar to the hub 22*c*, said hub, however, receiving a bushing 56. While bushing 56 may be made of various materials, it preferably is made of wood. The bearing bracket 57 is similar to bracket 25 except that it is of uniform diameter in the portion disposed in hub 53*b*, said bearing bracket rotating in hub 53*b* and bushing 56.

In operation the machine will be drawn forwardly by a tractor or team and disks 26 will roll in their bearings in brackets 22, the disks moving in the earth at their lower portions as shown in Fig. 2. The depths to which the disks penetrate can be regulated by moving lever 40. This lever rotates axle 11 and raises the frame 14 and the disks by rotating the axle about the portions 11*a*. The disks can be raised entirely out of the ground as when it is desired to transport the machine and they can be let into the ground different distances. The spring 44 assists in the movement of lever 40. The tension of this spring can be adjusted somewhat by adjustment of bolt 46. The lever 40 is held in the various positions by pawl 41 engaging segment 43 and the frame 14 is thus held in various heights. As the machine moves forwardly the disks 26 in the front row will engage the earth and cut it up and since said disks are inclined forwardly and rearwardly, the dirt will be thrown outwardly from the center of the machine at both sides thereof. This dirt that is thrown outwardly will be engaged by the rear disks 26 which move in a line passing substantially midway between the front disks and the dirt will be again thrown inwardly. The small disk 51 will move over the path between the two central disks of the front row so that the ground between these disks will be cut up. The disks are held down yieldingly in the ground by the springs 34 and can of course yield upwardly to pass over some obstruction, such as a stone. When the frame 14 is elevated to lift the disks 26 from the ground, rod 31 will drop until pin 36 engages washer 35 and the disks will then be suspended from rod 31 and pins 36. The disks will be kept clean by scrapers 39 disposed at the inner sides thereof. Should it be desired to remove one of the disks, this could be done by removing several of the bolts 24 and bearing brackets 23. The portions 22*a* can be moved outwardly or downwardly sufficiently to disengage them from the brackets 22*b*.

In the modification shown in Fig. 6 it would be necessary to withdraw the rod 54 from the bracket portion 53*a* in order to remove the bracket. The disks are held accurately in position and yet turn freely in the hubs of the supporting brackets. It will be obvious that a disk can be easily and quickly removed from its bracket.

From the above description it is seen that applicant has provided a simple and efficient soil pulverizer or disk harrow and one in which the soil will be effectively worked. The device is easily made and assembled, it is simple in operation and can be made quite durable. It has been amply demonstrated in actual practice and found to be very successful and efficient.

It will, of course, be understood that various changes may be made in the form, details, proportions and arrangement of the parts without departing from the scope of applicant's invention, which, generally stated, consists in a device capable of carrying out the objects above set forth, in the novel parts and combinations of parts disclosed and defined in the appended claims.

What is claimed is:—

1. A farm implement, comprising a frame, a pair of crank axle members mounted thereon, wheels carried by said axle members, manual adjusting means controlling said axle members to vary the height of said wheels with respect to said frame, a plurality of aligned discoid soil working members mounted forwardly of said axle and resiliently connected to said frame for vertical movement with respect thereto, a second aligned row of discoid soil working members similarly connected to said frame rearwardly of said axle and oppositely disposed with respect to said forward row of aligned discoid soil working members.

2. A disk pulverizer having in combination a frame, a front row of concavo-convex disks mounted in said frame, the disks at opposite sides of the center of said frame having their concave sides directed respectively outwardly, a second row of disks in the rear of said first mentioned disks, the disks at either side of the center of said frame in said rear row having their concave sides directed inwardly respectively, the disks in said front row inclining outwardly toward their rear edges and the disks in said rear row inclining inwardly toward their rear edges, and a smaller concavo-convex disk disposed between the two central disks of said rear row and in the rear of the two central disks of said front row.

3. A disk pulverizer having in combination a frame, a disk-carrying bracket mounted in said frame, having a hub portion with a bore therethrough, a concavo-convex disk, a bearing bracket secured to the convex side of said disk and having a projecting bearing portion, a washer at the concave side of said disk, a headed and nutted bolt passing through said bracket and washer and having a portion angular in cross section fitting a

recess of similar cross section in said bearing bracket, said bearing portion of said bracket being journaled in the bore of said hub, and said hub having a reduced exterior threaded end portion and a cup-like cap screwed onto said end portion.

4. A disk pulverizer having in combination, a frame, a bar extending horizontally transversely of said frame, a bracket secured to said bar and swingable about a horizontal axis extending close to said bar, said bracket extending from said bar and having a hub portion at its outer end, a disk journaled in said hub portion, a bar disposed above said hub portion extending transversely of said frame, a rod secured to said hub portion and extending through said last mentioned bar and a compression spring between said hub portion and last mentioned bar, said hub portion having projecting apertured ears at its top portion, said rod having an eyelet disposed between said ears, and a pivot member extending through said ears and eyelet and pivotally connecting said rod and hub portion.

In testimony whereof I affix my signature.

ERNEST C. SANDEEN.