F. H. FRENCH.

DISK HARROW.

APPLICATION FILED NOV. 27, 1916.

1,286,986.

Patented Dec. 10, 1918.

2 SHEETS—SHEET 1.

Fig. 1.

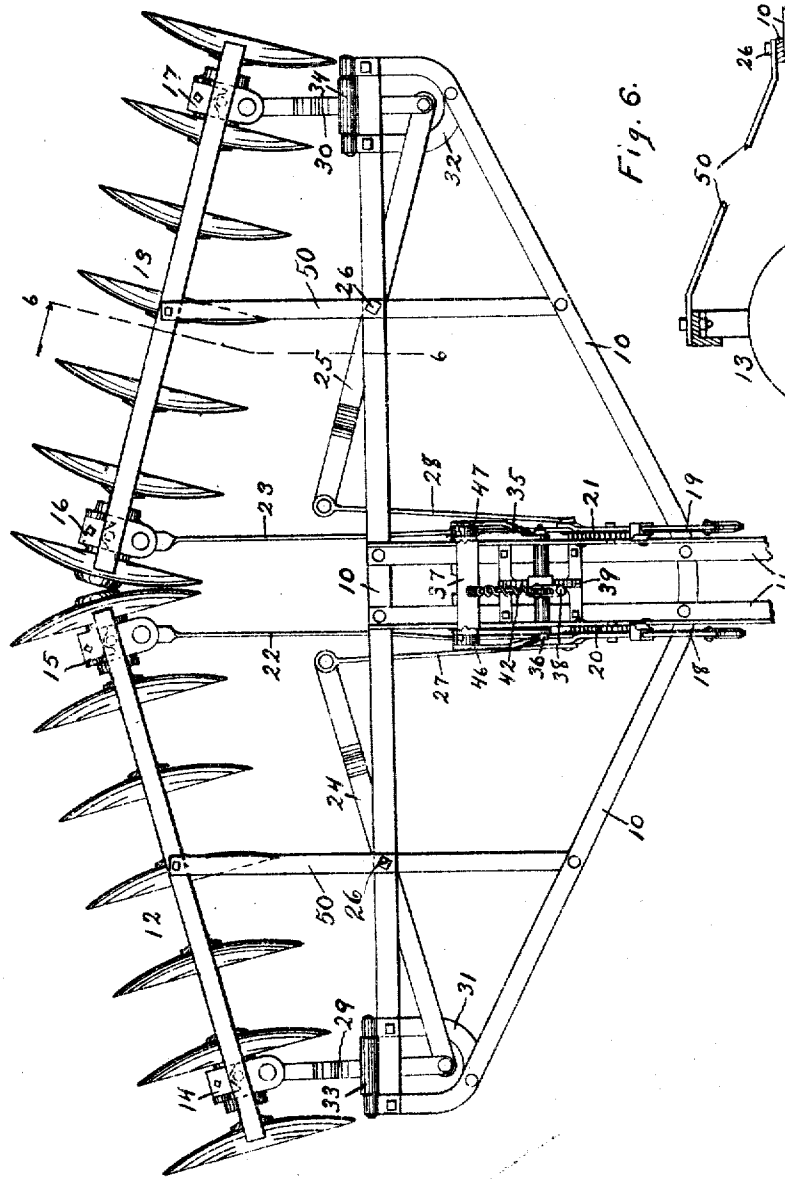
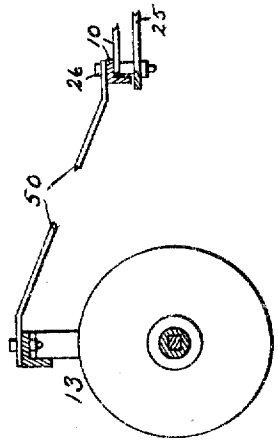


Fig. 6.



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2 SHEETS—SHEET 2.

Fig. 2.

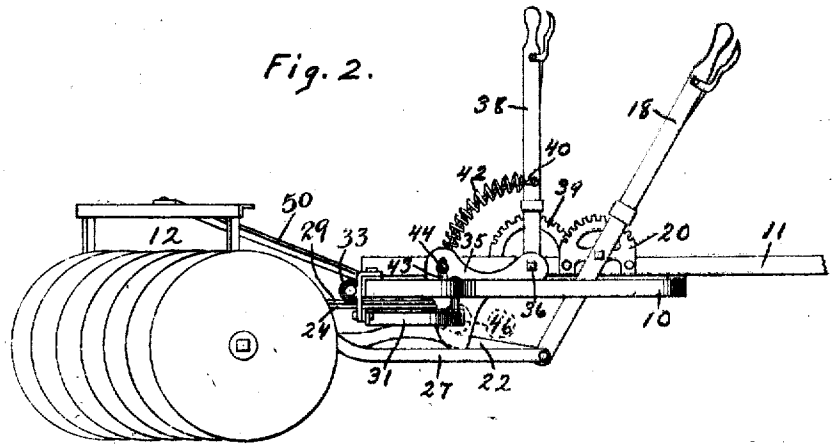


Fig. 3.

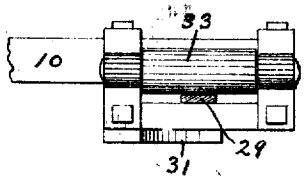


Fig. 4.

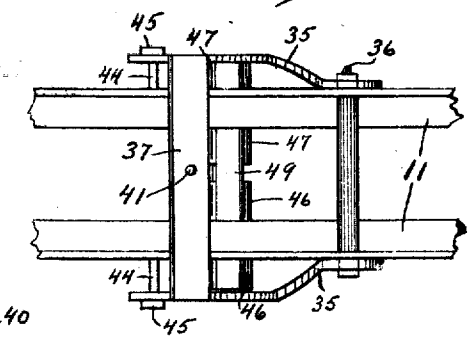
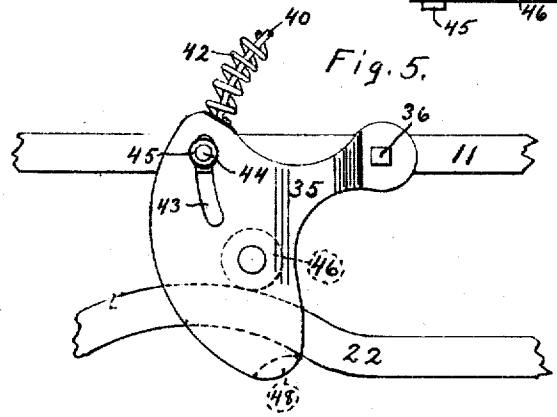


Fig. 5.



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UNITED STATES PATENT OFFICE.

FRANK H. FRENCH, OF PRESTON, IOWA.

DISK HARROW.

1,286,986. Specification of Letters Patent. Patented Dec. 10, 1918.

Application filed November 27, 1916. Serial No. 133,519.

To all whom it may concern:

Be it known that I, FRANK H. FRENCH, citizen of the United States of America, and resident of Preston, Jackson county, Iowa, have invented a new and useful Disk Harrow, of which the following is a specification.

The object of this invention is to provide an improved construction for disk harrows.

A further object of this invention is to provide an improved construction for disk harrows in which the outer bearings are attached adjacent the outer ends of the gangs, thereby preventing undesirable elevation of the outer ends of the gangs on rough surfaces.

A further object of this invention is to provide improved means for altering the inclination of the gangs relative to the main frame and to the line of draft.

A further object of this invention is to provide improved means for altering the elevation of the inner end portions of the gangs relative to the outer end portions.

My invention consists in the construction, arrangement and combination of elements hereinafter set forth, pointed out in my claims and illustrated by the accompanying drawing, in which—

Figure 1 is a plan of a portion of a disk harrow embodying my improvements. Fig. 2 is a side elevation of the same. Fig. 3 is a detail rear elevation, partly in section and on an enlarged scale, showing the means for mounting the draft links relative to the main frame. Fig. 4 is a detail plan, on an enlarged scale, showing the means for adjusting the elevation of the inner ends of the gangs through the curved set lever bars, and Fig. 5 is a side elevation of the same. Fig. 6 is a detail sectional elevation on the line 6—6 of Fig. 1.

In the construction of the device as shown the numeral 10 designates generally the main frame, preferably made of angle bars suitably secured together and braced, and 11 designates the pole bars attached to and crossing the central portion of said main frame and adapted to receive attachment of any suitable draft means. 12, 13 designate generally the gangs of disks mounted end to end at the rear of the main frame, the construction of which disks and the means for carrying same being wholly immaterial so far as my present invention is concerned. The main frame 10 preferably is of approximately the same length as the gangs 12, 13 combined, so that its ends extend approximately to the outer ends of said gangs. Bearings 14, 15, 16, 17 of any suitable construction are mounted on the gangs 12, 13, the bearings 15, 16 being adjacent the innermost disks of the respective gangs, and the bearings 14, 17 being adjacent the outermost disks of the respective gangs, preferably between the two outermost disks of each gang.

Set levers 18, 19 are fulcrumed intermediate of their ends on the pole bars 11, one of said levers being provided for each of the gangs 12, 13, for altering their inclination relative to the line of draft. The set levers 18, 19 are provided with devices for engaging segments 20, 21 mounted on the pole bars, to hold said levers in any position in which they may be placed manually. Set lever bars or links 22, 23 are pivoted to the lower ends of the levers 18, 19 respectively and extend rearwardly and receive pivotal connection to the innermost bearings 15, 16, thereby providing connections between the set levers and the innermost ends of the gangs 12, 13. Evener bars 24, 25 are provided and are pivoted at their centers by bolts 26 to the rear member of the main frame 10, one on each side of the median line of said frame, said pivot bolts being approximately midway between said median line and the outermost end of the said frame. The inner ends of the evener bars 24, 25 are connected by set lever links 27, 28 to the lower ends of the set levers 18, 19 respectively, the said links preferably being pivotally connected at their forward ends conjointly with the pivoting of the set lever bars 22, 23 to said levers. The outer ends of the evener bars 24, 25 are pivotally connected by links 29, 30 with the outermost bearings 14, 17 respectively, thereby connecting the set levers 18, 19 to the outer ends of the respective gangs. Forward movement of the upper ends of the levers 18, 19, either separately or conjunctively, results in rearward movement of the links 22, 23 and 27, 28. Rearward movement of the links 22, 23 results in a rearward movement of the inner ends of the gangs 12, 13; and rearward movement of the links 27, 28 results in an oscillation of the evener bars 24, 25, moving the outer ends of said bars forwardly and thereby effecting a forward movement of the outer ends of the gangs 12, 13, through the links 29, 30; the evener

bars 24, 25 being parallel at all times with the axes of the gangs 12, 13. In this manner the inclination of the gangs may be altered relative to the line of draft, an opposite inclination being given to the two gangs in a common manner. The provision of the evener bars 24, 25, effecting a reversal of movement of the links 29, 30 relative to the links 22, 23, provides for moving both the inner and outer ends of the gangs, rather than requiring either the inner ends or the outer ends to travel through a greater distance to effect the required adjustment. In this manner the gangs 12, 13 oscillate on vertical axes to effect any adjustment of their inclination, and such axes are very near the actual centers of the gangs, the inner and outer ends traveling equal distances. By this arrangement a decided advantage is gained over the common forms of adjusting means for the inclination of the gangs. As the bearings 14, 17 are adjacent the outer ends of the gangs, the weight of the frame members and devices carried thereby is evenly distributed on the gangs, and the outer ends as well as other portions are held into the earth and prevented from undesirably riding up or elevating themselves when rough or hard ground is encountered, as occurs when the outer bearings are materially removed from the outer ends of the gangs, as is common.

Longitudinal brace bars 31, 32 preferably connect the outer ends of the forward and rear members of the main frame 10 and underlie and support the outer ends of the evener bars 24, 25. Rollers 33, 34 preferably are rotatably mounted in outer ends of the main frame and overlie the links 29, 30, preventing upward movement of said links and providing an anti-friction surface for facilitating the movement of said links. The links 29, 30 pass beneath the rear member of the main frame and beneath the rollers 33, 34, and thus the outer ends of the gangs are prevented from rising.

A yoke 35 is pivoted through its forward open end by a bolt 36 to the pole bars 11 within the main frame 10, and said yoke is formed with a cross-bar 37 connecting the arms of the yoke and overlying the pole bars. An adjusting lever 38 is fulcrumed at its lower end on the bolt 36, and is provided with devices of common form for engaging a segment 39 carried by the pole bars, for holding said lever in any position in which it may be placed manually. An arcuate guide rod 40 is pivoted at one end to the lever 38, extends rearwardly and downwardly, and passes slidingly through an aperture 41 formed centrally of the cross-bar 37 of the yoke. An expansive coil spring 42 is coiled around the guide rod 40 and impinges at its ends the lever 38 and the cross-head 37 of the yoke, thus providing a yielding connection between said lever and yoke. The side members or arms of the yoke 35 are formed with arcuate slots 43 in their rear ends, through which project studs 44 formed on the pole bars 11, said studs having washers or heads 45 on their ends outside of the yoke members, to hold said yoke in place in its swinging movement. One of said slots, studs and washers is shown in Figs. 2 and 5. Rollers 46, 47 are journaled on the lower rear portions of the side members or arms of the yoke 35, and said rollers ride on the set lever links or bars 22, 23 respectively. The inner ends of the gangs 12, 13 may be raised or lowered relative to the outer ends thereof by manipulation of the adjusting lever 38. A forward movement of the lever 38 permits a raising of the yoke 35, and an elevation of the set lever bars 22, 23 and consequently of the inner ends of the gangs. A rearward movement of the lever 38 applies pressure to the yoke 35 through the spring 42, which is quite stiff, and lowers the set lever bars 22, 23 through the rollers 46, 47, thus lowering the inner ends of the gangs. This provides a means for accommodating the horizontal inclination of the gangs to the surface over which the machine is traveling. If the inner ends of the gangs strike an obstruction, they may be permitted to rise and pass over the same by compression of the spring 42. The set lever bars or links 22, 23 are bowed or curved upwardly intermediate of their ends to compensate for the arcuate movement of the lower ends of the set levers 18, 19, in a common manner, thereby normally keeping the gangs level at all angles of their inclination.

The side members of the yoke 35 preferably extend below the plane of the set lever bars 22, 23, and are connected by a cross-bar 48, shown by dotted lines in Fig. 5, extending beneath and limiting downward movement of the said set lever bars relative to the yoke. The yoke 35 also is formed with a lower cross-bar 49 (Fig. 4) beneath the pole bars 11, and adapted to engage said pole bars at times and limit upward movement of the yoke.

Braces 50 are connected at their forward ends to the main frame by the bolts 26, and at their rear ends to the central portion of the frames of the disk units 12, 13, pivotally, so as to provide additional draft and brace connection between the main frame and the several disk units. The braces 50 also tend to keep the disk units in proper position and furnish a center about which said units may oscillate, and further tend to prevent binding or friction of the bearings 14, 15, 16, 17 relative to the devices on which they are mounted.

The length of the main frame 10, extending as it does entirely across the front of

the disk members, is effective in preventing injury to draft animals by contact with the disks.

I claim as my invention—

1. A disk harrow, comprising a frame, disk gangs mounted end to end behind said frame, set levers fulcrumed on said frame, one of said set levers for each of said gangs, set lever bars pivoted to said levers and at their rear ends to inner ends of said gangs, evener bars pivoted on opposite sides of the frame, pivotal connections between said levers and inner ends of said evener bars, and links pivotally connecting outer ends of said evener bars to outer ends of said gangs, whereby the set lever bar and link of each gang may be simultaneously shifted longitudinally in opposite directions.

2. A disk harrow, comprising a frame, disk gangs mounted end to end behind said frame, levers fulcrumed on said frame, one of said levers for each of said gangs, lever bars pivoted at their forward ends to said levers and at their rear ends to said gangs, evener bars pivoted intermediate of their ends on opposite sides of said frame, pivotal connections between said levers and inner ends of said evener bars, and links pivotally connecting outer ends of said evener bars to said gangs in spaced relations to the connections thereto of said lever bars.

3. A disk harrow, comprising a frame, disk gangs mounted end to end behind said frame, levers fulcrumed on said frame, one of said levers for each of said gangs, lever bars pivoted at their forward ends to said levers and at their rear ends to said gangs, evener bars pivoted intermediate of their ends on opposite sides of said frame, pivotal connections between said levers and inner ends of said evener bars, links pivotally connecting outer ends of said evener bars to said gangs, and retaining means on said frame engaging said links.

4. In a disk harrow having a frame and a disk unit mounted therebehind, an evener bar pivoted intermediate of its ends on the frame, a link pivotally connecting one end only of said evener bar to said disk unit, a shifting member independent of said evener bar pivotally connected at its rear end to said disk unit in spaced relations to said link, and positive means for simultaneously shifting said shifting member and the opposite end of said evener bar in the same direction, whereby end portions of said disk unit are positively shifted in opposite directions.

5. In a disk harrow having a frame and a disk unit mounted behind said frame, an evener bar pivoted intermediate of its ends on said frame, a link pivotally connecting the outer end only of said evener bar to said disk unit, a lever fulcrumed on said frame, a shifting member pivotally connecting said lever to said disk unit in spaced relations to said link, said shifting member being disconnected from said evener bar, and a link pivotally connecting the inner end of said evener bar to said lever.

6. In a disk harrow having a frame, a disk unit mounted behind said frame and a set lever bar pivotally connecting said disk unit to said frame, means for adjusting the elevation of said disk unit, comprising a member pivoted on a transverse axis on said frame, a lever fulcrumed on the frame adjacent said pivoted member, yielding pressure devices interposed between said lever and pivoted member, and means on said pivoted member slidingly engaging the set lever bar; said pivoted member being provided with means for engaging said frame to limit oscillation of said member.

7. In a disk harrow having a frame, a disk unit mounted behind said frame and a set lever bar pivotally connecting one end of said disk unit to said frame, means for adjusting the elevation of said disk unit, comprising a yoke member pivoted at its forward end on a transverse axis on said frame, a lever fulcrumed on the frame adjacent to the pivoted yoke member, yielding pressure devices interposed between said lever and the rear end portion of said pivoted yoke member, and a roller journaled on said pivoted yoke member and engaging the set lever bar.

8. A disk harrow, comprising a main frame, disk units mounted end to end behind said frame, said frame extending substantially throughout the combined length of said disk units, pivotal connections between said frame and end portions of said units for oscillating said units on vertical axes adjacent their midlengths, and pivotal brace connections extending from points midway between the median line and outer ends of main frame to the said axes of said disk units.

9. A disk harrow, comprising a main frame, a disk unit mounted behind said main frame and adapted for oscillation on a vertical axis adjacent its midlength, an evener bar pivoted on said main frame, a link connecting one end of said evener bar to the outer end of said disk unit, a lever on the frame, pivotal connections between said lever and the inner end of said evener bar, pivotal connections between said lever and the inner end of said disk unit, and a brace member pivotally connecting the main frame from the pivot point of said evener bar to the vertical axis of the disk unit.

Signed by me at Des Moines, Iowa, this 20th day of November, 1916.

FRANK H. FRENCH.