No. 625,764. Patented May 30, 1899.

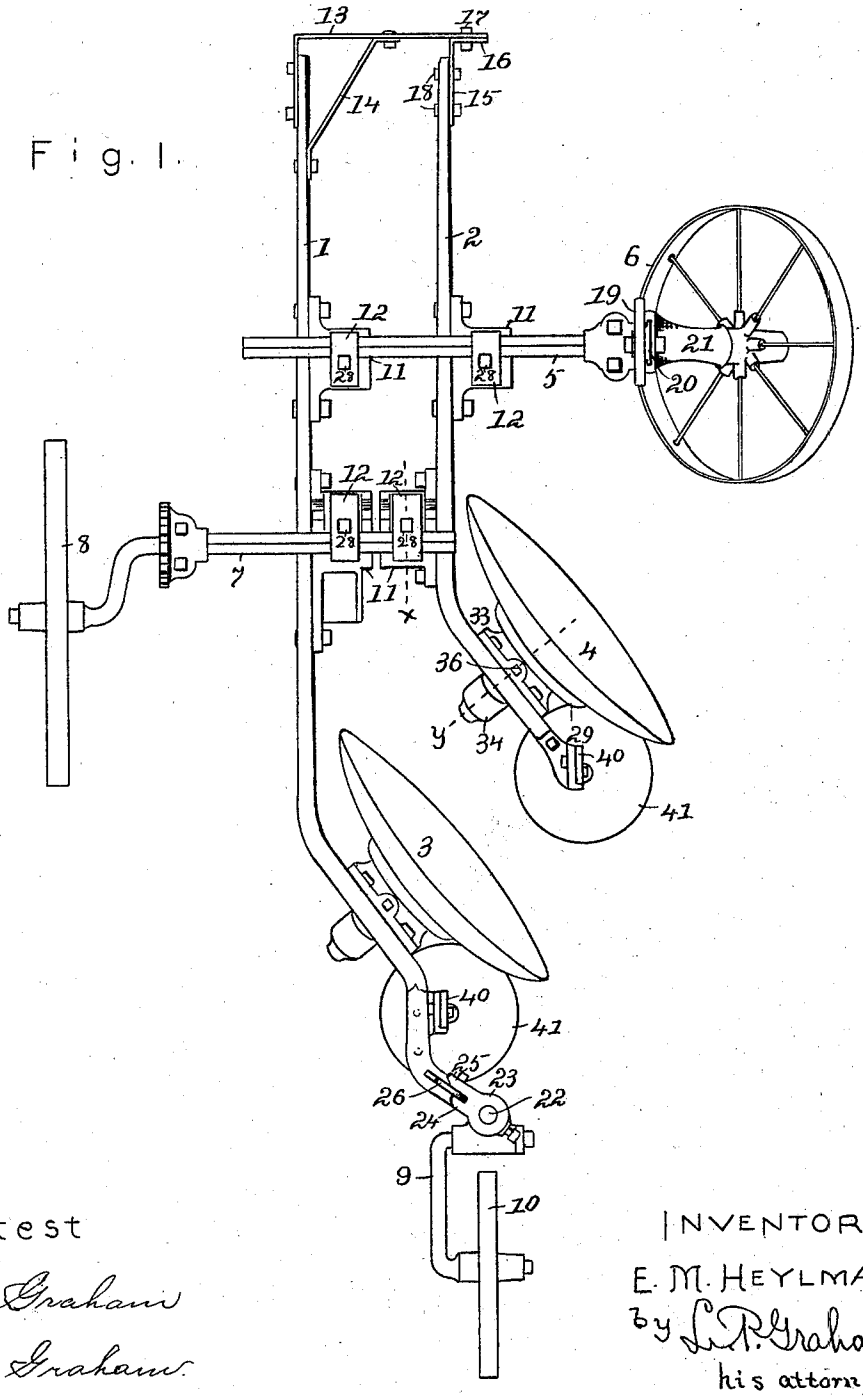
E. M. HEYLMAN.

DISK PLOW.

(Application filed July 28, 1898.)

(No Model.) 4 Sheets—Sheet 1.

Fig. 1.



Attest

Nora Graham

Ina Graham.

INVENTOR

E. M. HEYLMAN

by L. R. Graham

his attorney

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 625,764.

Patented May 30, 1899.

E. M. HEYLMAN.

DISK PLOW.

(Application filed July 28, 1898.)

(No Model.)

4 Sheets—Sheet 2.

Fig. 3.

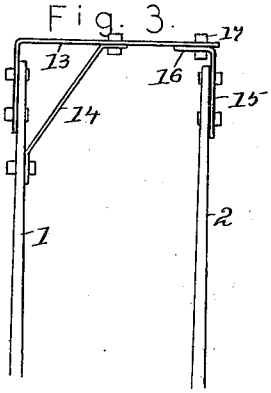


Fig. 2.

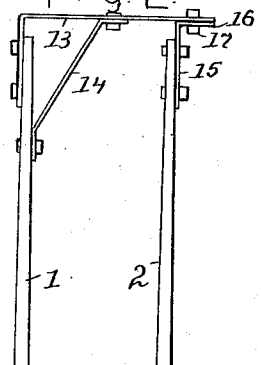
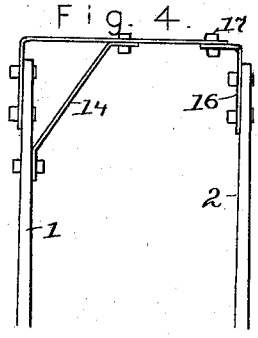


Fig. 4.



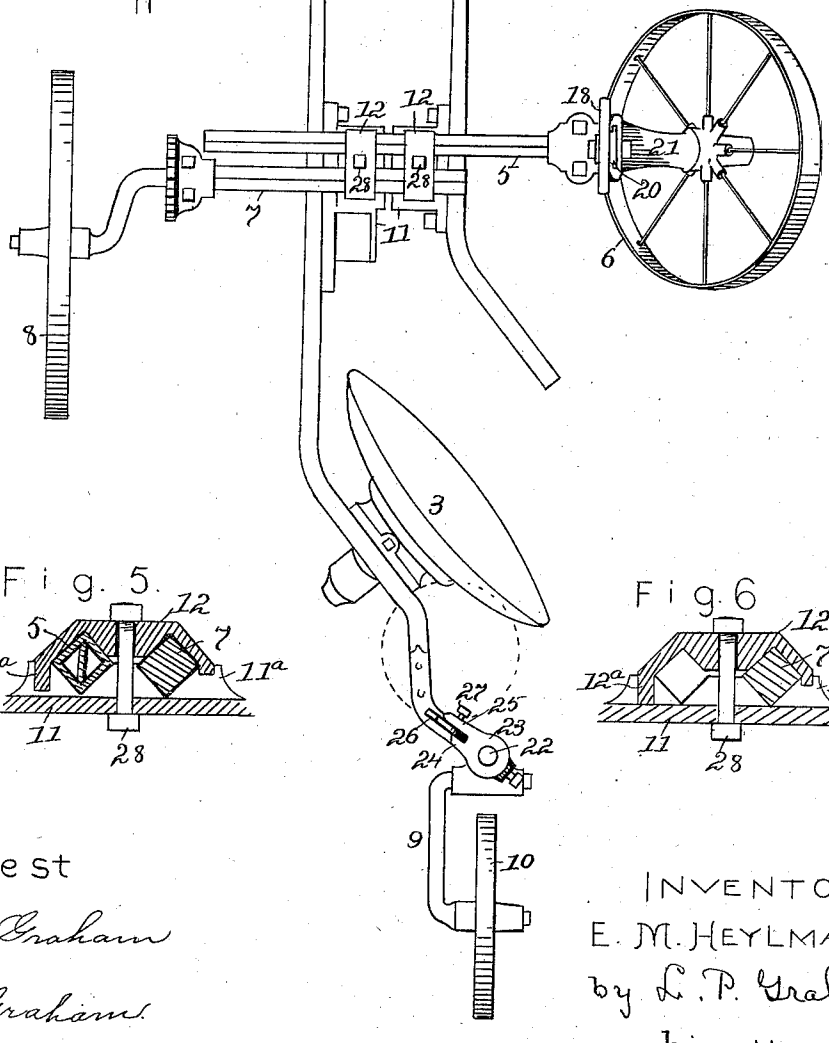


Fig. 5.

Fig. 6

Attest

Nora Graham

Ina Graham.

INVENTOR

E. M. HEYLMAN

by L. P. Graham

his attorney

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 625,764. Patented May 30, 1899.

E. M. HEYLMAN.

DISK PLOW.

(Application filed July 28, 1898.)

(No Model.) 4 Sheets—Sheet 3.

Fig. 7.

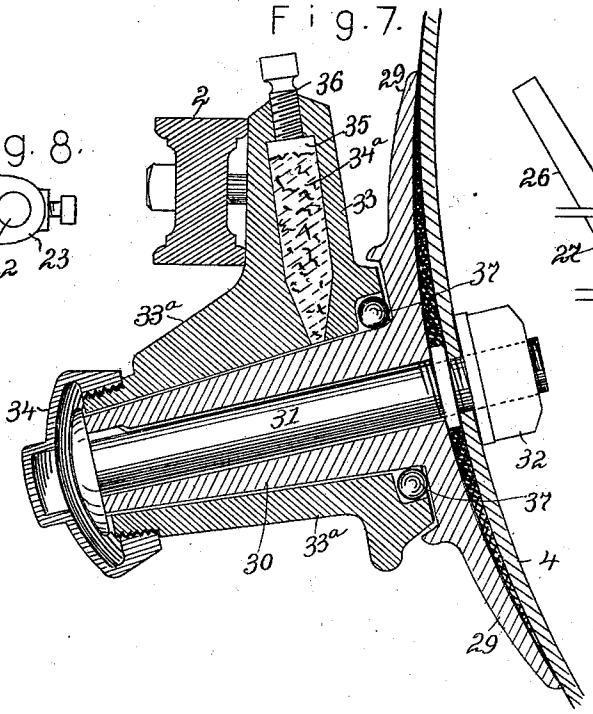


Fig. 8.

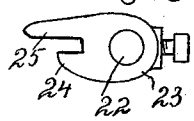


Fig. 9

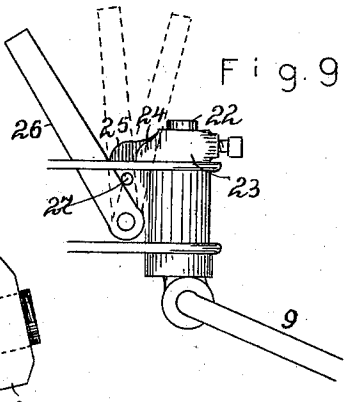


Fig. 10.

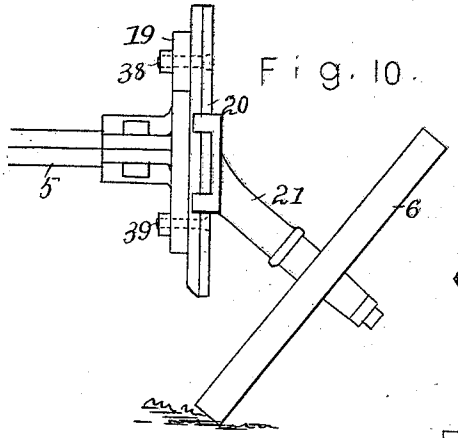


Fig. 11.

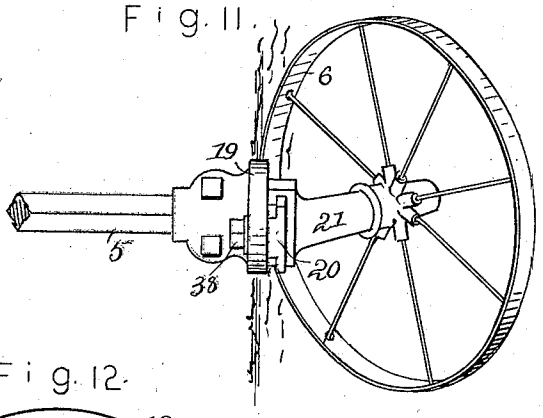
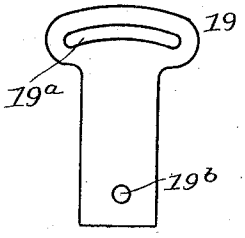


Fig. 12.



Attest.

Nora Graham

Ina Graham.

INVENTOR

E. M. HEYLMAN

by L. P. Graham

his attorney

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 625,764. Patented May 30, 1899.

E. M. HEYLMAN.

DISK PLOW.

(Application filed July 28, 1898.)

(No Model.) 4 Sheets—Sheet 4.

Fig. 13.

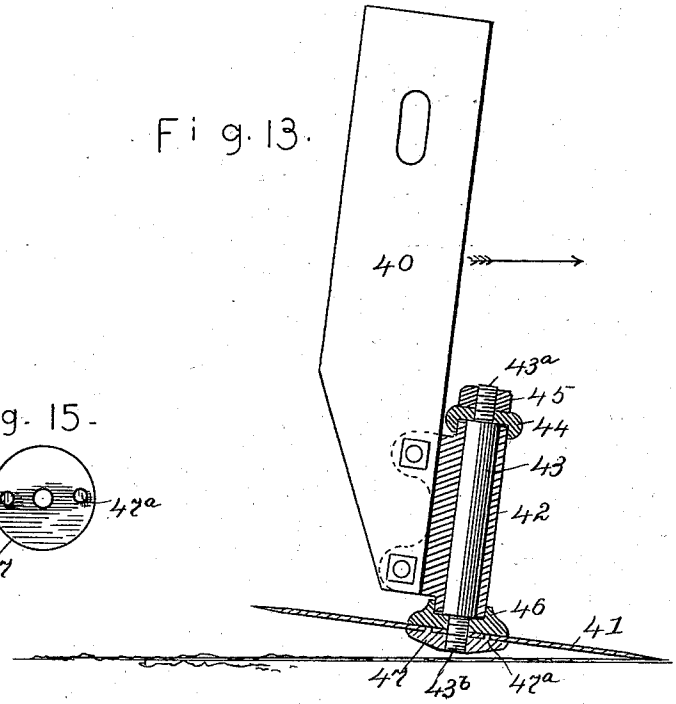
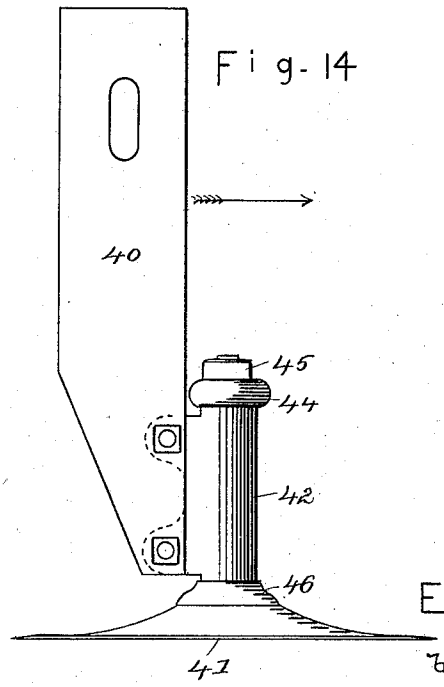


Fig. 15.

Fig. 14



Attest

Nora Graham

Ina Graham

INVENTOR

E. M. HEYLMAN

by L. P. Graham

his attorney

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

EDWARD M. HEYLMAN, OF CANTON, ILLINOIS, ASSIGNOR TO THE PARLIN & ORENDORFF COMPANY, OF SAME PLACE.

DISK PLOW.

SPECIFICATION forming part of Letters Patent No. 625,764, dated May 30, 1899.

Application filed July 28, 1898. Serial No. 687,152. (No model.)

To all whom it may concern:

Be it known that I, EDWARD M. HEYLMAN, of Canton, in the county of Fulton and State of Illinois, have invented certain new and useful Improvements in Disk Plows, of which the following is a specification.

The invention relates to means for converting a two-disk plow into a single-disk plow, to means for widening and narrowing the plow-frame, to means for providing the disks with ball-bearings, to means for changing the direction of travel of the oblique furrow-wheel, to means for controlling the swing of the rear caster-wheel, and to the horizontal cutters and furrow-levelers.

In the drawings forming part of this specification, Figure 1 is a plan of a two-disk plow. Fig. 2 is a plan of the same structure converted into a single-disk plow. Figs. 3 and 4 are details illustrative of the manner in which the plow-frame is widened. Figs. 5 and 6 are details of the clamps used to fasten the wheel-axles to the frame. Fig. 7 is a section through a disk-spindle. Fig. 8 is a detail of a stop-arm used on the vertical shaft of the rear caster-wheel. Fig. 9 is a side elevation of the mechanism used to control the side swing of the caster-wheel. Fig. 10 is an elevation of the means employed to change the direction in which the oblique furrow-wheel tends to travel. Fig. 11 is a plan of the means illustrated in Fig. 10, showing the wheel turned aside. Fig. 12 is a detail of the mechanism shown in Figs. 10 and 11. Fig. 13 is a side elevation of the horizontal cutter. Fig. 14 is an elevation of a modification of the horizontal cutter. Fig. 15 is a detail of same.

The frame of the plow comprises two beams 1 and 2, each of which is adapted to carry a disk and one of which is provided at its rear end with a caster-wheel. The beams are secured together at their front ends by means of bars of peculiar construction and correlation, and between their ends they are secured together by means of the transverse wheel-axles or sustaining-bars 5 and 7. The sustaining-bars 5 and 7 are prismatic in cross-section, preferably square, and they are preferably made of internally-braced tubes, as shown at 5 in Fig. 5. They are fastened to the frame-bars 1 and 2 by means of clamps composed of brackets 11, clamp-blocks 12, and bolts 28, and are therefore shiftable and removable. There are two pairs of brackets, one of which is fastened to the frame-bars at the position the front cross-bar 5 occupies when the plow is used as a gang-plow and the other of which is fastened to the frame-bars at the position the rear cross-bar 7 occupies at all times and the front cross-bar occupies when a single disk is used. The rear brackets are fastened to the inner surfaces of the frame-bars and extend one toward the other, while the forward brackets are fastened one to the inner surface of one bar and the other to the outer surface of the other bar, and both extend toward the oblique furrow-wheel, sustained by cross-bar 5. The rear brackets have upward-extended ledges 11^a in Figs. 5 and 6, and in these ledges are formed two sets of depressions or notches, corresponding to the contour of the under surfaces of the cross-bars. The clamp-blocks 12 have notches or depressions corresponding with the contour of the upper surfaces of the cross-bars and coinciding with the notches or depressions of the ledges of the brackets. The clamp-blocks fit between the ledges of the brackets. They are held in position by bolts 28, which extend through the brackets and through the blocks, and the rear clamp-blocks at least are provided with downward extensions 12^a, which rest on the brackets when the plow is used as a gang-plow. For convenience in manufacture the front clamps and brackets are made the same as the rear ones; but it is not necessary that they have more than one set of notches or depressions.

The plow is made, as shown in Fig. 1, with the front cross-bar clamped in the front brackets, the rear cross-bar clamped in the rear brackets, and each frame-bar 1 and 2 provided with a disk plow 3 and 4. Under these conditions the front ends 12^a of the rear clamp-blocks rest against the brackets, while the rear cross-bar is clamped by their rear ends, as shown in Fig. 6. Whenever the user desires to dispense with one of the disks, the disk 4 is removed and the front cross-bar 5 is detached from the front brackets, placed in the front notches of the rear brackets with wheel 6 in proper correlation with disk 3, and

is held firmly in place by the clamp-blocks and bolts. To make this operation practical, the extensions 12^a of the rear brackets are made so short as not to bear against the bracket when the front cross-bar is clamped, as shown in Fig. 5.

The means employed to connect the cross-bars with the frame-bars offers no hindrance to widening or narrowing the frame to suit different widths of cut, and to facilitate such adjustment the front ends of the frame-bars are connected together by means of the cross-bar 13, which is fastened to one of the frame-bars, and the L-shaped bar 15 16, which is connected at one end with the other frame-bar and at the other end with the cross-bar 13. The member 15 of the L-shaped bar is fastened to the frame-bar by means of removable bolts 18, and the member 16 is fastened to the cross-bar 13 by means of a removable bolt 17. The bar 13 and the member 16 of the L-shaped bar may be provided with a plurality of bolt-holes for small degrees of adjustment, and larger degrees of adjustment may be obtained by turning the L-shaped bar over, as shown in Fig. 2, and by shifting it to the opposite side of the frame-bar, as shown in Fig. 3.

The rear caster-wheel is at times required to swing freely in both directions. At other times it is required to swing freely in one direction only, and at still other times it should be held against all side swing. To provide for all these different conditions, the vertical shaft 22 of the caster-wheel 10 is provided at its upper end with a forked arm 23, one of the forks of which is longer than the other, and a lever 26 is pivoted in the bracket, in which shaft 22 journals in position to swing into the crotch of the bifurcation. The longer fork of the arm is designated by 25 and the shorter one by 24. At 27 is shown a set-screw, by means of which the lever 26 may be held at different positions.

When it is desired to give the caster-wheel free swing, the lever 26 is moved out of the path of the arm, as shown in solid lines in Fig. 9. When it is desired to hold the wheel against swing in one direction, the lever is set to engage the long fork of the arm, and when it is desired to hold the wheel against swing in both directions the lever is swung into the space between the forks. The different positions are all illustrated in Fig. 9.

The wheel 6, which travels in the furrow last completed, requires to be adjusted at times in order to throw the plow to or from the land and to provide for variations in adjustment arising from differing conditions of the soil. In this instance the change in the direction of the wheel is made by the simple expedient of swinging the wheel-spindle forward or backward in a line parallel with the direction of travel of the plow, or, in other words, the equivalent of side turn is obtained by a forward-and-backward swing. To provide for this result, a bracket 19, having considerable vertical extension, is fastened to cross-bar 5. The bracket 19 has a pivot-hole 19^b near its lower end and an arc-formed slot 19^a, concentric with the pivot-hole, near its upper end. (See Fig. 12.) A standard 20 is swung on a bolt 39, which extends through pivot-hole 19^b and on a bolt 38, which extends through the slot 19^a. A spindle 21 extends obliquely downward from the standard, and on this standard, at right angles therewith, is journaled wheel 6.

When the spindle points as nearly as possible directly downward, as shown in Fig. 1, the tendency of the wheel is to run directly forward. When the spindle is pointed forward, as shown the wheel tends to run to land, and if the spindle should be pointed backward the wheel would tend to run away from the land. The different positions of the wheel and spindle are obtained by rocking the standard 20 backward or forward on bolt 39 and fastening it in any desired position by bolt 38; but in the broadest sense of the invention it is immaterial by what means the spindle is adjusted backward or forward.

The disks are inclined forward at their lower edges, which gives the spindles a downward and backward inclination, and the stress on the plow is all backward and sidewise. These conditions make it possible to provide ball-bearings and a lubricator therefor in an effective and inexpensive manner, as follows:

The spindles 30 of the disks have flanges 29, which bear against the disks. Bolts, as 31, extend through the spindles and bind the disks thereto. Brackets 33 are fastened to the frame-beams and form journal-boxes 33^a for the spindles of the disks. A ballway is formed in the front end of each journal-box, and such way is supplied with a set of balls 37. A cap 34 is screwed onto the rear end of the journal-box, thus forming a complete closure for the lower end of the spindle, and an oil-chamber 35 is formed in the bracket 33. The oil-chamber may be provided with an absorbent, as suggested at 34^a, and it is closed by a set-screw 36 or other suitable closure. The balls take nearly all the stress developed in the operation of the plow. The head of bolt 31 is large enough to keep the spindle in the journal-box, and the oil travels from chamber 35 down around the spindle and upward to the balls. The depressed and closed rear end of the spindle forms an oil-receptacle up to the level of the ballway, and it is impossible that the travel of the balls can rob the spindle of oil or draw directly on the oil-chamber.

The means employed to cut away the ridges of the furrows and to hold the furrow-forming disks down to their work consists, broadly, of a rotary disk in a generally horizontal position, having its upper surface, at least, inclined downward and forward, so as to exert downward pull on the plow. In Fig. 13 the

preferred form of horizontal cutter is shown in detail, the construction being as follows: The shank 40 is fastened to the plow-beam in any desired manner, as suggested in Fig. 1, and is inclined slightly backward at its lower end. A bearing-box 42 is fastened to the lower end of the standard, parallel therewith. A pivot-bolt 43 has reduced and threaded ends 43^a, and sand-bands 44 and 46 fit against the shoulders of the bolt and extend around the ends of the bearing-box. A nut 45 is screwed onto the upper end of the pivot-bolt and against the sand-box 44, while the nut 47 is screwed onto the lower end of the pivot-bolt and against the circular cutter-disk 41, which is mounted on the pivot-bolt between the sand-box 46 and the nut 47. The nut 47 has studs 47^a or other projections extending from its inner face, and these projections engage corresponding recesses in the cutter-disk and hold the disk from rotating independent of the nut. The threads of the nut and the pivot-bolt are so cut that the rotation of the disk tends to tighten the nut on the bolt, and so it is impossible for the disk to turn independent of the pivot-bolt. The sand-boxes are clamped against the shoulders of the pivot-bolt instead of against the ends of the bearing-box, and so the nuts may be set up as firmly as desired without interfering with free rotation of the pivot-bolt and the disk thereon. In this instance the downward pitch of the plane disk is depended on to give suction or downward pull on the plow; but this result may be attained by inclining the upper surface of the disk somewhat as shown in Fig. 14 and fastening the shank in a perpendicular position. In both instances it is the action of a downward-presented incline that tends to draw the plow downward; but it is a rolling incline in place of a sliding incline, and the action is correspondingly facilitated and improved. The disk is fastened to the plow in position to cut sidewise into the land at or near the bottom of the furrow, thus cutting away the ridge that would be left by the furrow-forming disks.

What I claim is—

1. In a plow, the combination of two plow-beams, plows on the beams, and a pair of transverse wheel-carrying bars clamped detachably onto the beams, and independently adjustable lengthwise thereof.

2. In a plow, the combination of two plow-beams, plows on the beams, a cross-bar carrying the furrow-following wheel, a cross-bar carrying the land-wheel, forward clamp-brackets connecting the cross-bar of the furrow-following wheel to the plow-beams and rearward clamp-brackets adapted to hold both cross-bars in connection with the beams.

3. In a plow, the combination of beams 1 and 2, cross-bar 5 carrying wheel 6, cross-bar 7 carrying wheel 8, clamps connecting cross-bar 5 with the beams and other clamps connecting cross-bar 7 with the beams and adapted to hold the cross-bar 5.

4. In a plow, the combination of a frame, a caster-wheel having a vertical pivot in the frame, a forked stop-arm fixed on the vertical shaft and having one fork longer than the other, and a lock movable to and from the shaft and adapted to engage the crotch of the fork.

5. In a disk plow, the combination of a frame, a downward and rearward inclined journal-box fastened to the frame and having a ballway in its upper, forward end, a disk having a spindle journaled in the journal-box, balls in the ballway receiving the thrust of the spindle, a cap on the lower end of the journal-box forming a closure therefor, and an oil-chamber in the boxing above the spindle and back of the balls, whereby the oil is fed to the balls through the lowered and closed end of the journal-box, substantially as described.

6. In a disk plow, the combination of a downward-extended shank, a bearing-box on the shank, a pivot-bolt in the bearing-box having reduced and threaded ends extending beyond the ends of the bearing-box, sand-bands on the reduced ends of the pivot-bolt bearing against the shoulders thereof, nuts to hold the sand-bands against the shoulders of the pivot-bolt, and a disk held approximately horizontal between the lower sand-band and its nut, substantially as set forth.

7. In a disk plow, the combination of a downward-extended shank, a bearing-box on the shank, a pivot-bolt in the bearing-box having reduced and threaded ends extending beyond the ends of the bearing-box, sand-bands on the reduced ends of the pivot-bolt bearing against the shoulders thereof, nuts to hold the sand-bands against the shoulders of the pivot-bolt, a disk held approximately horizontal between the lower sand-band and its nut and studs on the binding-nut of the disk engaging the disk and preventing independent rotation therein, substantially as set forth.

In testimony whereof I sign my name in the presence of two subscribing witnesses.

EDWARD M. HEYLMAN.

Witnesses:

LUTHER MASON,

U. G. ORENDORFF.