(No Model.) 4 Sheets—Sheet 1.

L. E. WATERMAN.

SULKY LISTER PLOW CORN PLANTER.

No. 385,738. Patented July 10, 1888.

Fig. 2

Fig. 3

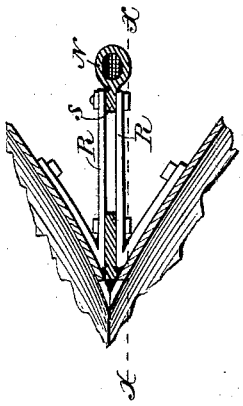
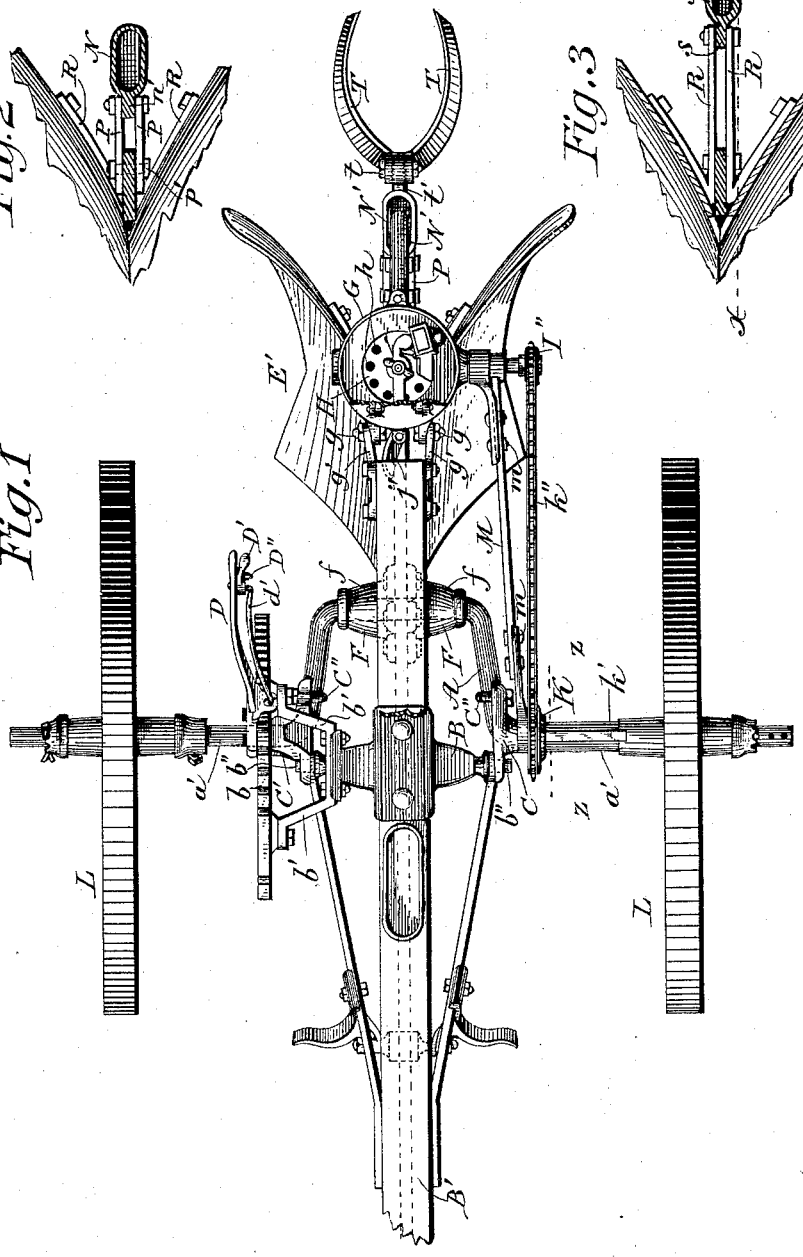


Fig. 1



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Atty.

(No Model.) 4 Sheets—Sheet 2.

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SULKY LISTER PLOW CORN PLANTER.

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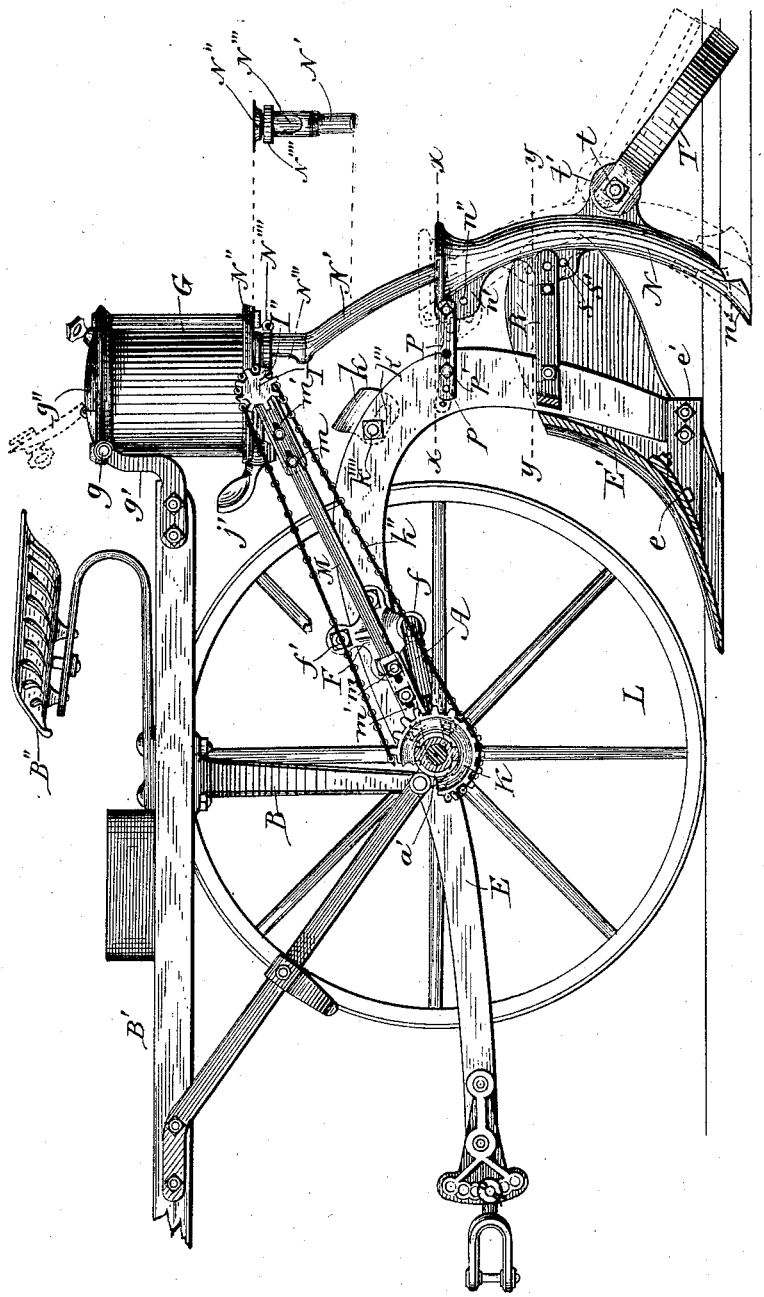

Fig. 4

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SULKY LISTER PLOW CORN PLANTER.

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Fig. 5

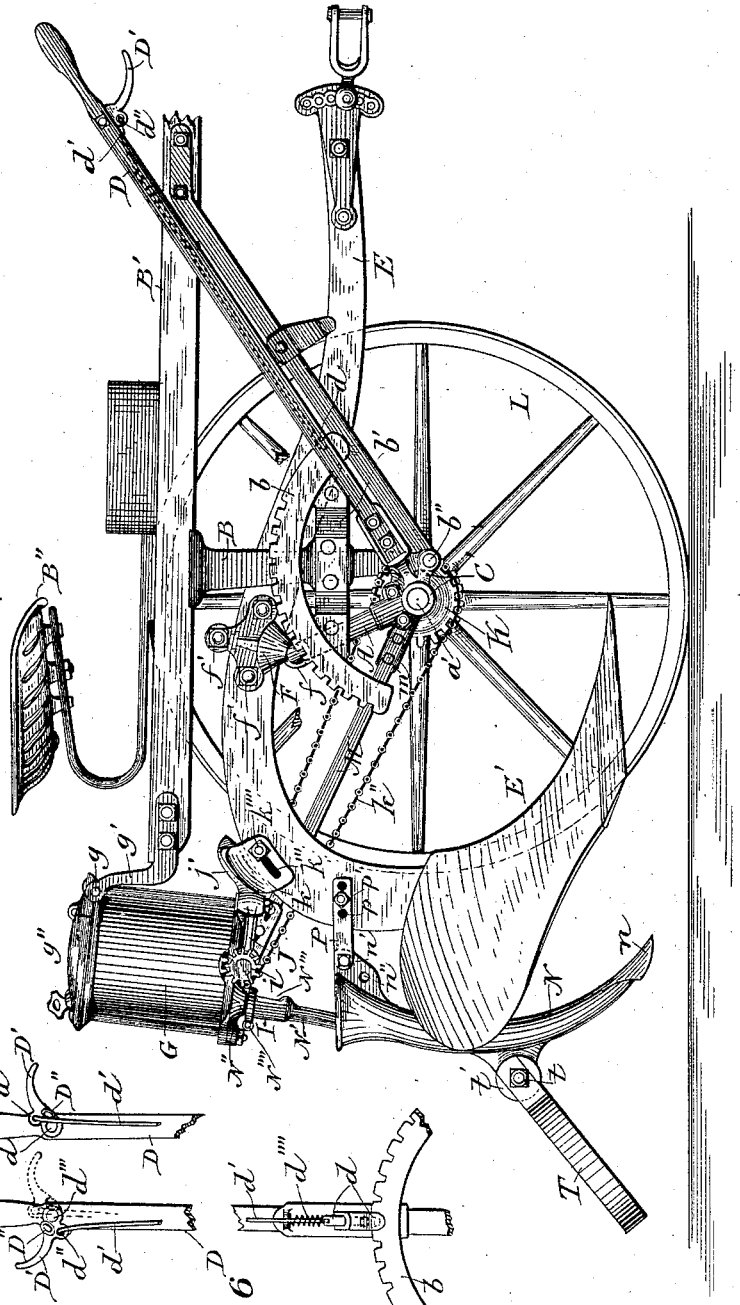


Fig. 7

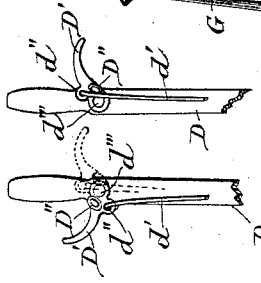
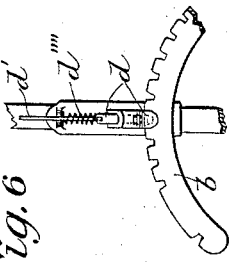


Fig. 6



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SULKY LISTER PLOW CORN PLANTER.

No. 385,738. Patented July 10, 1888.

Fig. 8

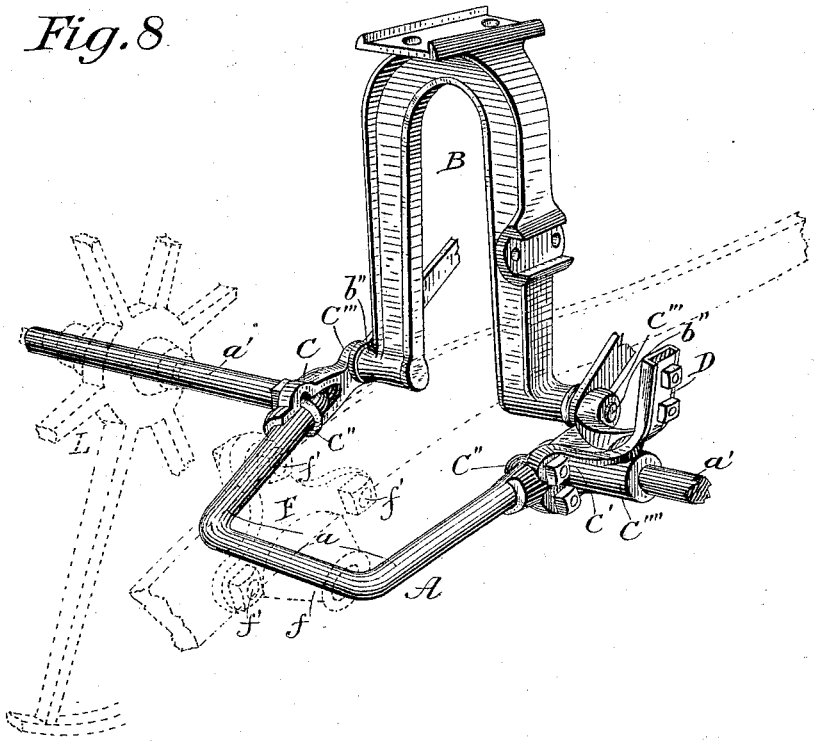
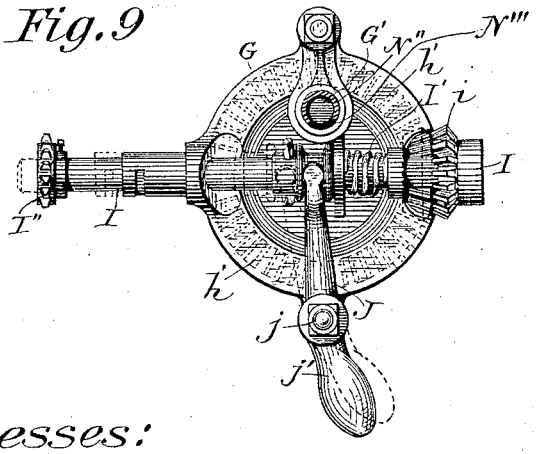


Fig. 9



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UNITED STATES PATENT OFFICE.

LEWIS E. WATERMAN, OF MOLINE, ILLINOIS, ASSIGNOR TO THE DEERE & MANSUR COMPANY, OF SAME PLACE.

SULKY LISTER-PLOW CORN-PLANTER.

SPECIFICATION forming part of Letters Patent No. 365,738, dated July 10, 1888.

Application filed March 24, 1886. Serial No. 196,351. (No model.)

To all whom it may concern:

Be it known that I, LEWIS E. WATERMAN, a citizen of the United States, residing at Moline, in the county of Rock Island and State of Illinois, have invented certain new and useful Improvements in Sulky Lister-Plow Corn-Planters, of which the following is a specification.

This invention relates to sulky lister-plow corn-planters or seed-planters of that class in which a seed-planting apparatus is combined with a sulky or wheel plow in which the plow proper is preferably a lister or double-moldboard plow; and the improvements hereinafter described and claimed refer to constructions and combinations in the sulky plow; to means for throwing the seeding devices into gear when the plow is lowered to work and out of gear when the plow is raised above the ground; to the means used for tightening the chain belt which drives the seed-droppers when the plow is lowered for planting; to the means used for adjusting the inclination of the seed tube; to the means used for securing the plow-beam to the swinging bail of the sulky, and to the means used for locking the pawl carried by the plow-raising lever.

The means hereinbefore recited and others embodied in my invention are hereinafter fully described, and are summarized in the claims herewith.

In the accompanying drawings, which illustrate my invention, Figure 1 is a top plan showing the sulky lister-plow and the seeding devices, the seed-box shown with the greater part of its lid or cover removed to show its interior; Fig. 2, a sectional plan of the plow in the line *x x* in Fig. 4; Fig. 3, a sectional plan in line *y y* in Fig. 4; Fig. 4, a side elevation showing the apparatus seen at its left-hand side, the near wheel removed, the axle in section in line *z z* in Fig. 1, and the plow in section in line *x x* in Fig. 3. This figure also shows a front elevation of the upper end of the seed-tube; Fig. 5, a side elevation of the apparatus, seen at its right-hand side, the near wheel removed; Fig. 6, a side elevation of the lever for raising and lowering the plow and the toothed rack-bar which holds it; Fig. 7, a side elevation of the upper end of the lever shown at Fig. 6; Fig. 8, a perspective showing the seat and guide-pole-supporting arch, a part of the axle, and the means for connecting it with said arch in full lines, and a part of the plow-beam, the means for securing it to the axle, and a part of one wheel in section; Fig. 9, a plan of the seed-box and some of the adjacent parts thereto, seen from below.

In all of the figures of the drawings where shown the guide-pole is shown broken away.

Referring to the drawings by letter, the same letter indicating the same part in the different figures, A represents an ordinary sulky-plow axle, bent or formed in an ordinary manner, with a double crank central part, *a*, and end parts, *a'*.

B is an ordinary arch, secured to the axle and adapted to support the guide-pole B', seat B'', and arc-shaped rack-bar *b* in an ordinary mannner.

I have shown the arch B mounted on the axle and secured thereto in the following-described improved manner.

C C' are plates bolted one to each angle formed by the bend of the axle at the inner ends of its horizontal parts by staples C'', as shown plainest at Fig. 8. Each plate C and C' projects forward from the horizontal part *a'* of the axle and has a bearing-hole, C''', at its forward end, in which rests a stud, *b''*, which projects from the lower end of the arch B. This connection of the arch B to the axle forms a strong, simple, and cheap connection and locates the arch B forward of the axle and in such relation thereto that the weight of the arch and parts connected therewith and of the driver will aid in raising the plow when the crank part of the axle is turned upward for that purpose. One end, C'''', of the plate C' is extended to strengthen and stiffen the axle at the part where the plate is located and to form a support for the lever D, which is bolted to a projection therefrom, which projection forms a part of said lever.

The arc-shaped rack-bar *b* is provided with ordinary teeth, and is secured to the arch B by brackets *b'*. The end *a'* of the axle is the fulcrum for the lever D, and it will be evident that when the lever is swung to turn the axle

the rack-bar *b* will move with the arch B in such manner that the rack-bar will not operate well, if at all, with the pawl *d* carried by the lever D if the curved rack-bar is concentric with the fulcrum of said lever. To make these parts operative to the best advantage, I make the curved rack-bar concentric with the fulcrum *b''* of the arch B to the extended forward end of the plate C'. The pawl *d* is fixed to the lower end of a rod, *d'*, which extends to a projection, *d''*, from the ordinary thumb-lever, D', which is pivoted at *d'''* to the lever D. The thumb-lever D' is drawn by the hand to retract the pawl *d* from the teeth of the rack-bar, and is moved into engagement therewith by a spring, *d''''*, in the ordinary manner, and my improvement in this connection is in the use of a lug, D'', which projects from the side of the thumb-lever D', and with which the rod *d'* will come in contact when the thumb lever is thrown over into the position shown by dotted lines at Fig. 6 and full lines at Fig. 7, and thereby lock the parts and hold the pawl *d* out of engagement with the rack-bar when desired, thus forming a lock for the pawl without the use of links or other agencies which require to be operated by hand when the thumb-lever is operated.

E is the beam, and E' the double-mold board plow—an ordinary lister-plow. A frog, *e*, is bolted in the lower part of the plow and carries a rearwardly-extending arm, *e'*, to one side of which the end of the plow-beam is bolted.

F F are clamp-plates, each provided with a projecting boss, *f*, on one side, which is suitably perforated to receive the crank-arm *a* of the axle. The clamp-plates thus constructed can be slipped over the ends of the axle and into place when the axle is free of the plates C C', and are then bolted to the plow-beam by bolts *f'*. The bosses *f* are free to turn on the crank-arm *a* of the axle. The draft-animals are hitched to the forward end of the plow-beam. The plow is raised and lowered and locked at different heights by the lever D in an ordinary manner.

G is the seed-box, hinged at *g* to arms or brackets *g'*, which project from the rearwardly-extended end of the guide-pole, so that the seed-box is carried on the guide-pole. If the frame of the sulky is otherwise constructed, the seed-box can be secured to any suitable part of said frame. The hinge *g* permits the seed-box to swing rearwardly at its lower end in a vertical plane. This seed-box has a hinged lid, *g''*, and is provided with an ordinary seed-dropping wheel, H, having seed-cups *h*. The seed-cup wheel H has a bevel-pinion, *h'*, which gears with a bevel drive-pinion, *i*, carried on a shaft, I, which is located transversely to and beneath the seed-box and has suitable bearings thereon. (See Fig. 9.) The shaft I has a limited endwise movement, which movement is given it by a lever, J, pivoted at *j*, its inner end resting in a groove in the shaft I and its outer end formed into an inclined cam-plate, *j'*, which, when the plow-beam is raised, as shown at Fig. 5, is struck by an inclined cam-plate, *k*, carried on the plow-beam. The cam-plate *k* will in striking the cam *j'*, as last described, swing the lever J and force the shaft I into the position shown by full lines at said figure and out of gear with the seed-wheel, thereby stopping the rotation of the seed-wheel. When the plow is lowered into the working position shown at Fig. 4 the spring I' will force the shaft I in the direction shown by dotted lines at same figure, and thereby bring the pinion *i* into gear with the teeth *h'* on the seed-wheel.

K is a sprocket-wheel, which is loosely mounted to turn on an end, *a'*, of the axle, and which I have shown as fixed to a sleeve, *k'*, which is connected with and rotates with the hub of one of the supporting-wheels L. It will be evident that the sprocket K may be secured to the wheel-hub direct. A chain belt, *k''*, gears the sprocket K with a sprocket-wheel, I'', on the outer end of the shaft I.

In raising and lowering the plow the guide-pole and arch B will change their distance from the arm *a'* of the axle on account of the arch being carried on the arms of the plates C C' forward of the axle, and thus the distance between the seed-box and arm *a'* will be variable and the chain belt *k''* sometimes slackened. To keep the chain at all times in proper taut working order, I use the bar M, which is seated loosely on the arm *a'* of the axle at one of its ends, and at its other end loosely connected with the shaft I, and this bar, when the seed-box tends to approach the arm *a'*, will swing the seed-box on the hinge *g* and preserve an unvarying distance between the arm *a'* and the shaft I, and will thus keep the belt tight. The arm M is adjustable in length to properly tighten the belt as it becomes worn or for any other purposes found necessary, being formed of two end parts and a central part connected by bolts and slots *m m'*, respectively, whereby the length of the arm M may be adjusted and fixed after adjustment in an evident manner.

N is the seed-tube, provided at its lower end with a suitable shoe or opener, *n*. The tube N is adjustably held in rear of the plow by bars P and R. The bars P (see Fig. 2) are located near the top of the tube N, one on each side of the plow-beam at one of their ends, and at their other ends on each side of a tongue or plate, *n'*, which projects from the tube N. The plate *n'* has holes *n''* for said connection, and the bars P have holes *p* for the bolt *p'*. The bars R are bent and fitted to the mold-board and to the plow-beam, (see Fig. 3,) and extend rearwardly one on each side of a tongue or plate, *s*, which projects from the tube N. The plate *s* has a series of holes, *s'*. By means of the holes *s'* and *n''* and their respective bolts the tube N may be adjusted and fixed after adjustment at different heights relatively to the plow, as indicated by dotted lines at Fig. 4, to regulate the depth of planting below the furrow made by the lister-plow, and by means

of the series of holes *p* and bolt *p'* the inclination of the tube N may be adjusted and fixed after adjustment to suit its operation in different soils.

The covering-blades T are fixed in rear of the tube N by a bolt, *t*, which passes through the head ends of said blades and through a plate, *t'*, which projects in rear of said tube. The adjacent faces of the blades T and plate *t'* are serrated to hold the blades T firmly after adjustment to change their depth of penetration of the soil or to lower them as they become worn, or for other purposes.

The cam-plate *k* is located on the inclined part of the plow-beam, as shown, and has a slot, *k'''*, through which a bolt, *k''''*, passes to secure it to the plow-beam. Should the plate *k* or other parts of the device become so worn as to interfere with the operation of the plate, it can be adjusted in a higher position on the plow-beam, and can be held after adjustment by the bolt *k''''* to compensate for the wear and to cause it to operate effectually.

N' is a flexible tube fitted over and held by a band, N'''', on a tubular projection, N'', which connects with the discharge-opening G' in the bottom of the seed-box. The tube N' extends into the tube N. (See Fig. 4.) In this class of planter, in which the driver's seat is located in front of the seed-dropping mechanism, it is very desirable that the driver know with certainty that said seed-dropping devices are operating effectively, and to provide means whereby he may know this with certainty I provide an opening, N''', through the front side of the tubular projection N'' and through the tube N', which can either be left open or covered with any suitable transparent covering. The driver, by leaning in a suitable manner, can see this opening, and thus know when the seed is dropping properly. In planters of that class in which the driver is in rear of the seed-dropping mechanism means have been provided whereby he may see the seed as it falls to the ground; but none of these means would be operative with my device, in which the rear parts of the seeding mechanism are invisible to the driver from his seat in front of the seed-dropping mechanism.

The plow E' may be set to run at different depths to suit different kinds of soil by adjusting the hand-lever D on the rack-bar *b* in the evident manner, and by locking the pawl *d* out of engagement with the rack-bar the plow will be free to rise and fall when desired to run it in that way, and at whatever depth the plow may be adjusted to run the bar M will, in connection with the swinging seed box, keep the drive-belt taut. The seed-box, being carried on the sulky-frame, will not be tilted and shaken as if carried on the plow, nor otherwise affected by raising and lowering the plow, and when the plow is raised above the ground the seed-dropping will be stopped, as described.

Having now described my invention, the combinations which I claim as new are set forth in the following claims, viz:

1. In combination, an axle having a double-crank central part and horizontal end parts, wheels journaled on said end parts, a plow mounted on said crank part of the axle, plates bolted to the axle and extended forward of its horizontal end part, and an arch pivoted to and supported upon the forward ends of said plates and adapted to support the driver's seat and other parts, substantially as and for the purpose specified.

2. In combination, an axle having a double-crank central part and horizontal end parts, *a'*, wheels L, a plow mounted on said crank part of the axle, plates C C', bolted to the axle by staples C'' and having extended forward ends, and an arch, B, journaled to and supported upon the extended forward ends of the plates C C', substantially as and for the purpose specified.

3. In combination, an axle having a double-crank central part and horizontal end parts, wheels journaled on said end parts, a plow mounted on said crank part of the axle, plates bolted to the axle and extended forward of its horizontal end parts, an arch pivoted to the extended ends of said plates, a hand-lever fixed to a horizontal end of the axle and provided with a locking-pawl, and a curved rack-bar concentric with the pivot of the arch to the extended plates, substantially as and for the purpose specified.

4. In combination, supporting-wheels, a swinging crank, a plow mounted on said crank, a curved rack-bar, a hand-lever adapted to operate the swinging crank, and a spring locking-pawl operated by a thumb-lever, having a projecting stop, D'', adapted to come in contact with the rod *d'* to hold the pawl out of contact or engagement with the rack-bar, substantially as and for the purpose specified.

5. In combination, an axle having a double-crank central part and horizontal parts *a'*, supporting-wheels, an operating hand-lever, plow and beam, and plates F, constructed substantially as described, journaled on the axle, and bolted to the plow-beam, substantially as and for the purpose specified.

6. In combination, supporting-wheels, a swinging crank operated by a hand-lever, a lister-plow mounted on said crank, an arch and a guide-pole mounted thereon, and a seed-box mounted on said guide-pole and connected by a flexible tube with a furrow opening tube fixed in rear of the lister-plow, substantially as and for the purpose specified.

7. In combination, supporting-wheels, a swinging crank operated by a hand-lever, a lister-plow mounted on said crank, an arch and a guide-pole mounted thereon, and a seed-box mounted on said guide-pole and connected by a flexible tube with a furrow-opening tube adjustably fixed in rear of the lister-plow, substantially as and for the purpose specified.

8. In a sulky lister planting-plow, in combination with a seed-box mounted on the guide-pole or frame and a lister-plow hinged to the swinging crank or axle, a pinion carried on a

sliding shaft and gearing with the seed-cup wheel, a lever for sliding said pinion shaft, adapted to be operated by a cam-plate on the plow-beam, substantially as and for the purpose described.

9. In a sulky lister planting-plow, a seed-box mounted on the frame or guide pole, a sliding shaft carrying a pinion gearing with the seed-cup wheel, a cam-lever for operating said pinion and shaft, and a spring for moving the cam-lever in one direction, in combination with a cam-plate on the plow beam, adapted to act on the cam-lever and throw the seeding devices out of gear when the plow is elevated, substantially as and for the purpose specified.

10. In combination, an axle with double-crank part and horizontal arms a', arch B, journaled to the extended forward ends of plates fixed to the axle, wheels L, a lister-plow mounted on the crank part of the axle, a seed-box hinged to the guide-pole or sulky-frame, a sprocket connected with one of the wheels L to turn therewith and geared by a chain belt with a sprocket which drives the seed-wheel, and an arm, M, extending from the arm a' of the axle to the seed-box, substantially as and for the purpose specified.

11. In a sulky lister-plow planter, in combination with a sulky which carries the lister-plow, a seed-box hinged to the guide-pole or sulky-frame, substantially as and for the purpose specified.

12. In combination, an axle, a frame or guide-pole supported on an arch pivoted to forward extensions from the axle, a chain belt gearing a sprocket on the axle, with a drive-sprocket at the seed-box, and an arm secured at one end to the axle and at its other end to the seed-box and adapted to prevent slack in the drive belt, substantially as and for the purpose specified.

13. In combination, a forwardly-tilting guide-pole mounted on an arch-supporter forward of the wheel journals, a hinged seed-box, a belt gearing between a sprocket-wheel on the axle and a sprocket on the seed-box, and a belt-tightener bar connecting the axle and the seed-box, substantially as and for the purpose specified.

14. In combination, a forwardly-tilting guide-pole mounted on an arch-shaped supporter forward of the wheel-journals, a hinged seed-box, a belt gearing between a sprocket-wheel on the axle and a sprocket on the seed-box, and an adjustable belt-tightener bar connecting the axle and the seed-box, substantially as and for the purpose specified.

15. In a sulky lister planting-plow, in combination with a seed-box mounted on the frame or guide-pole and having a swinging cam-lever for throwing the seed-plate into and out of gear with its actuating mechanism, a cam adjustably fixed to the plow-beam and adapted to actuate said cam-lever when the plow is elevated, substantially as and for the purpose specified.

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

LEWIS E. WATERMAN.

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