

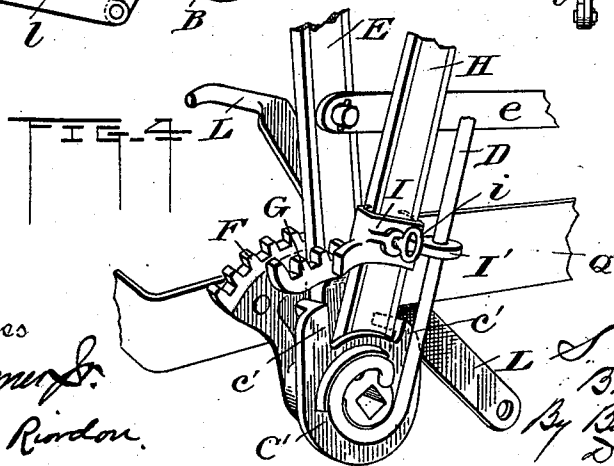
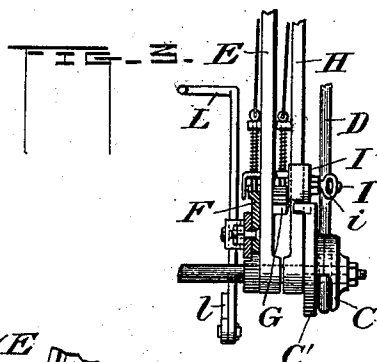
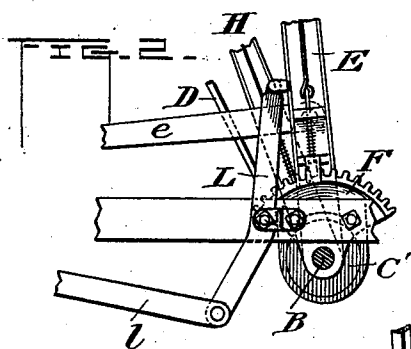
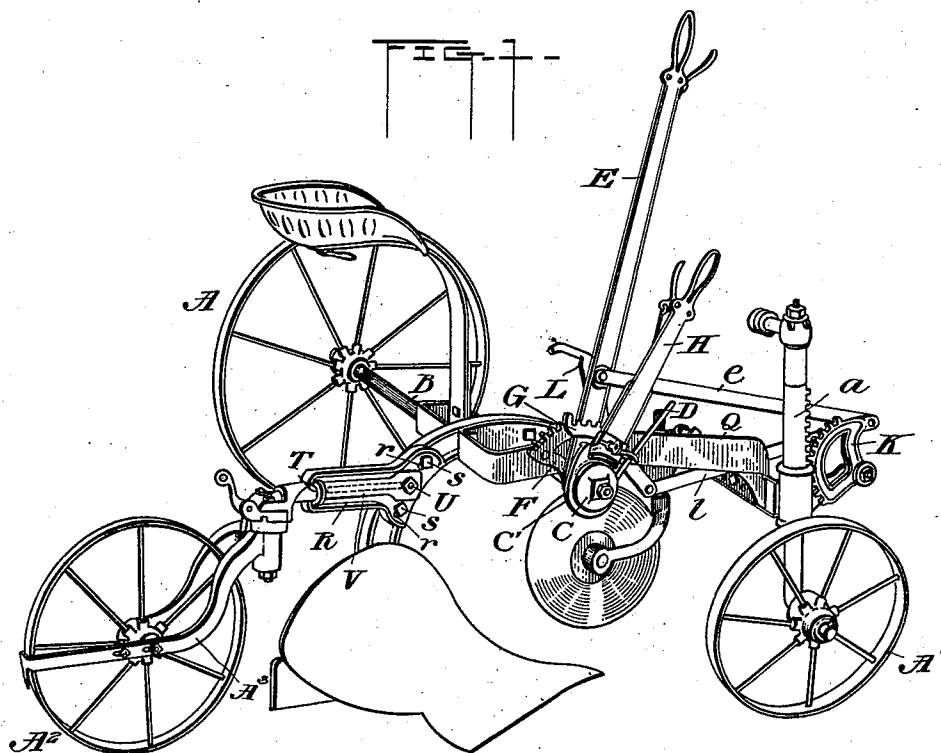
(No Model.)

2 Sheets—Sheet 1.

S. D. POOLE & B. CROSS.
SULKY PLOW.

No. 510,363.

Patented Dec. 5, 1893.



Witnesses
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(No Model.)

2 Sheets—Sheet 2.

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FIG. 5.

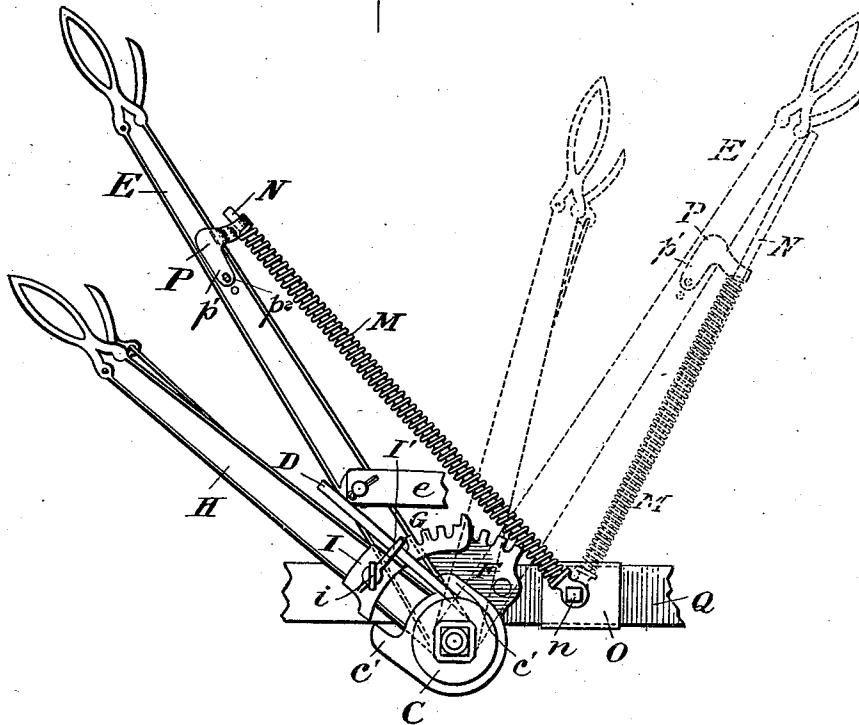


FIG. 6.

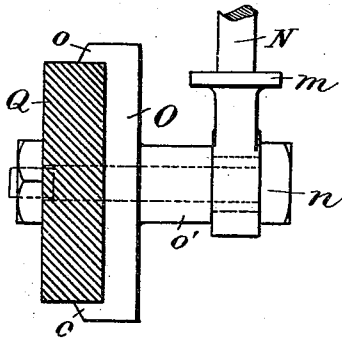
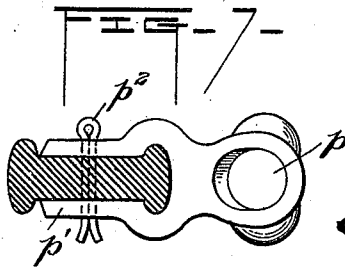


FIG. 7.



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UNITED STATES PATENT OFFICE.

STALEY D. POOLE AND BRADFORD CROSS, OF MOLINE, ILLINOIS, ASSIGNORS
TO THE DEERE & COMPANY, OF ILLINOIS.

SULKY-PLOW.

SPECIFICATION forming part of Letters Patent No. 510,363, dated December 5, 1893.

Application filed July 19, 1893. Serial No. 480,934. (No model.)

To all whom it may concern:

Be it known that we, STALEY D. POOLE and BRADFORD CROSS, citizens 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-Plows; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in plows, but more particularly to a class of riding or sulky plows.

The objects of the invention are to provide improved means for raising and lowering the plow by the action of a foot and hand lever working together so as to constitute in effect a one-lever movement, thus lightening the labor in elevating the plow and controlling its movements; and also to provide improved evening devices, whereby the plow is caused to run smoothly and evenly through the soil while the supporting wheels run over corn rows, obstructions and irregularities upon the surface.

The invention will first be described with reference to the accompanying drawings, and then pointed out in the claims at the end of this description.

Referring to the drawings, which form a part of this specification, and in which similar letters are used to denote similar parts of the machine in each of the several views, Figure 1 represents a perspective view of a sulky plow embodying our invention. Fig. 2 is a detached side view of a part of the machine, showing the arrangement of the hand and foot levers and attached parts. Fig. 3 is a rear view of the same; and Fig. 4 a perspective view thereof. Figs. 5, 6, and 7 are detached views showing a spring attachment.

The plow-frame may be of the form shown or of any preferred construction, and may be supported upon the wheels A, A', A², arranged as shown, or in any proper manner. The land-wheel A, is journaled upon a crank axle B, which is fitted in bearings in the main frame of the machine, transversely thereof, and has firmly secured to its opposite end two metallic or other suitable clamping plates C,

C', between which is fitted a stout steel rod or other suitable spring D, for a purpose to be described. A hand lever E, is fitted so as to swing loosely on the axle B, and is held in any desired position by means of the rack F, and pawl engaging therewith, the rack being secured to the frame of the machine. The lever E, carries a second rack G, which controls the movement of a short hand lever H. The lever H, is not fastened directly to the axle, but indirectly thereto, by means of the plates C, C', and spring D, the latter being clamped between said plates and having its free end passed through a loop or eye I', projecting from an adjustable slide or clamp I, which may be adjusted and held in any desired position upon the lever by means of a set screw i, or other proper fastening. The lug or projection I', upon the slide I, has a suitable opening therethrough to receive and permit the upper end of the spring D, to slide therein so that the clamp may be moved up or down the lever and secured in the desired position so as to vary the tension of the spring at will. A flexible connection is thus provided between the land-wheel A, and the elevating mechanism which permits the land-wheel to ride over corn rows, obstructions, or irregularities in the surface of the soil, and to accommodate itself to the uneven surface or roughness of the ground without affecting the plow; the weight on the axle being thrown upon the spring D, so as to allow the plow to run evenly through the soil. The furrow-wheel A', is made vertically adjustable preferably by means of a sliding rack-bar a, the teeth of which engage a toothed segment K, pivoted to the forward part of the frame of the machine. A connecting rod or bar e, extends from the hand-lever E, to the segment K, and a second rod l, connects the depending end of a foot-lever L, with said segment; said lever L, being fulcrumed upon the frame of the machine in close proximity to the hand-lever E, and the pivotal connections of the two rods e, l, with the segment K, being coincident, so that said levers may work in unison for the purpose of raising the plow. The foot-lever and the long hand-lever being thus made to act together, enable the plowman to easily raise the plow and requires but

little exertion. The slide or clamp I, may be moved down upon the lever H, until it rests between two lugs c' , c' , on the plate C', whereupon it becomes rigid with the axle; but when the clamp is slid up, the weight on the axle falls on the spring D, and the leverage of the spring may be increased or decreased at will by moving the clamp and securing it in different positions upon the lever. It will be observed that when the short lever is set in a given position with its pawl in the rack fastened to the long lever, if the long lever be moved the short lever will move therewith, the two levers moving as one, but they are also independently movable. It will also be observed that when the hand-lever E, is drawn backward and pressure is simultaneously applied to the foot-lever L, so as to push the long arm thereof forward, the connecting rods e , l , will be simultaneously pulled backward so as to lower the wheels A, and A', and thereby raise the plow; the arrangement being such that the point of the plow is first lifted so that the team also aids in bringing it out of the ground. The short lever H, moves with the long lever E, so that in the ordinary manipulation of the plow the two levers serve practically as one, but the short lever has in addition an independent action and is used to regulate the position of the land-wheel. The weight of the frame aids in lowering the plow, so that pressure upon the foot-lever is relieved; but to prevent too sudden movement of the hand-lever, pressure may be applied to the foot-lever when the hand-lever is thrown forward, so that one lever will pull against the other and thereby steady the movement of the parts in lowering the plow. It will also be observed that the front end of the main frame is lifted above the furrow-wheel so that the latter may be turned clear under the plow without striking the frame and without interference with other parts of the machine, which is a decided advantage in turning short corners.

While we preferably employ the vertically adjustable rack-bar and segment engaging therewith for the purpose of adjusting the furrow wheel, it is obvious that other means may be employed and instead of the segment, a bell-crank having one end pivoted to a vertically sliding rod or spindle supporting the wheel and the other end thereof pivoted to the connecting rods e , l , might be substituted for the segment and rack. It is also apparent that other means may be employed for adjusting and securing the lever H, in a fixed position in respect to the sulky frame, and other parts may be modified without departing from the spirit of the invention; hence we do not desire to be limited to the exact construction and arrangement of parts described and shown.

The invention as thus far described is capable of use independently of the spring attachment which assists in raising the plow (and which is illustrated in Figs. 5, 6 and 7) as will now be described. But this attach-

ment is preferably employed in connection with the hereinbefore described lifting mechanism. The essential feature of this attachment resides in a counter-balancing power-storing spring which is adapted to assist in raising the plow, and is so arranged in respect to the lifting lever that when the latter is moved so as to lower the plow the force of the spring will gradually increase tending to resist the movement of the lever, which is compensated by a corresponding gradual increase in the leverage. Springs of different kinds may be arranged in different ways to accomplish the desired result; but a preferred arrangement is illustrated in the accompanying drawings wherein we have shown a coiled spring M, fitting upon a rod N, which may be pivoted at one end, as at n , to a bracket or casting O, or any suitable part of the frame, while its free end is adapted to slide in an opening or eye p , of a bracket or casting P, attached to the lifting lever E. The brackets or castings O, P, are preferably adjustably secured, so that the one (O) may be moved horizontally and the other (P) vertically, for the purpose of varying the tension of the spring which is interposed between the bracket P and a collar or shoulder m , on the rod N, so that when the lever is thrown forward the spring will be gradually compressed and resist the forward movement. The bracket or casting P, may consist of an angle iron having a bifurcated portion p' , with perforated arms straddling the lever E, as shown more clearly in Fig. 7, and secured thereto by a suitable key or pin p^2 . The casting or bracket O, may consist of a suitable plate having flanges o , overlapping the edges of the frame bar Q, and provided with a hub-portion or boss o' , through which and through the eye of the rod N, the pivot bolt n , may pass, so as to clamp the eye or head of the rod between the head of said bolt and said boss. As will be seen, the pivot of the lever E, is below the plane of the pivot of the rod N, and in the extreme forward and back positions of the lever and rod, indicated in dotted and full lines, respectively, in Fig. 5, the angle of inclination between the spring and lever will be less than in the intermediate position slightly back of a perpendicular line passing through the pivot of the lever, and this angle will gradually decrease as the lever is moved either forward or back of this intermediate point. The effect is that on the forward movement of the lever the spring, being gradually compressed, will gradually increase in power and the power of the lever will also be correspondingly increased. The pivot of the lifting lever being fixed relatively to the pivot of the rod which supports the counterbalancing spring, a part of the force exerted by the spring is resisted and nullified by the inability of the lever to move in the direction in which the force is applied. The force exerted by the spring in lifting the plow will depend upon its tension and the an-

gle of inclination between its supporting rod and the lifting lever. The angle of inclination attained by the spring and rod is least when in the position shown in dotted lines in Fig. 5, while the tension of the spring is at its maximum. But the point of maximum advantage is attained after the lifting lever on its rearward movement passes a perpendicular line cutting its pivot, at which point there is the greatest angle of inclination between the spring and lever; and the percentage of power exerted by the spring and available in lifting the plow varies between these two points, gradually increasing from the position or point of least advantage, from which the lever is moved backward in raising the plow, until the point of maximum advantage is reached, at which point the angle between the lever and rod being greatest the greatest percentage of the force of the spring is available for lifting the plow. The spring, however, does not exert its greatest power at this particular point, but exerts its power to the greatest advantage for lifting. The tension of the spring constantly decreases during its travel from the foremost to the rearmost position of the lever, while its capacity for work increases until the point of greatest advantage is reached, from which point it constantly loses both in tension and in the advantage under which it acts, to the limit of its rearward movement. After passing the point of greatest advantage, however, the loss of power is compensated by the fact that the plow will have about reached the end of its lift. By moving the pivot of the spring-supporting rod toward or from the pivot of the lever, the leverage may be varied, and as these centers are made to approach each other, the point of maximum advantage recedes from the point of maximum tension, or, in other words, the arc of compensation is increased. After passing the point of maximum advantage in its rearward movement, the spring rapidly loses its effect as an aid in lifting the plow, but, as stated above, in this part of the travel of the spring its power is not needed, as the plow has been lifted. By this arrangement of differential leverages, the lifting power of the spring is approximately equalized throughout a large portion of its travel over the arc described by the point of attachment thereof to the lever E, and the adjustability of the brackets O, and P, or its pivotal connections, permits of the utmost nicety of adjustment for the purpose of varying the tension of the spring and the advantage under which it acts. It is apparent, of course, that the action of the spring would be the same if the spring-supporting rod were pivoted at one end to the bracket P, or the lifting lever, with its free end arranged to slide in an eye or opening in the bracket O, or other suitable part or fixture of the frame; this latter arrangement being an obvious modification of the arrangement described and shown.

The rear wheel A², may be journaled in a

suitable yoke or frame A³, which is adjustably connected with the plow beam preferably as follows:—A bracket or casting R, has slots r, r, which receive the fastening bolts S, S, by which the casting is secured to the beam in such manner as to permit an adjustment along the same to change the suck of the plow. A rod or bar V, extends lengthwise of the bracket and is secured thereto by a clip T, and bolt U, the casting being slotted longitudinally to receive the bolt U, so that the rod or bar may be moved either forward or back for the purpose of shifting the position of the rear wheel, as in case of using a moldboard of considerable length and for the purpose of preventing the wheel from striking the moldboard when the machine is turned. This adjustment is accomplished by loosening the clip T, and bolt U, whereupon the rod or bar V, may be slid either forward or back and secured in the desired position by tightening the clip and bolt.

The yoke or frame A³, may be pivoted or otherwise secured to the rear end of the rod V, in any proper manner, according to requirements or the desires of the manufacturer.

Having thus fully described our invention, what we claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a wheel plow, the main frame, the plow, the hand-lever and means connected therewith for raising and lowering said plow, in combination with the co-acting foot-lever and connections between the same and said plow independent of said hand-lever, whereby the hand and foot levers are adapted to operate conjointly in raising the plow, substantially as described.

2. In a wheel plow, the main frame, the plow, the hand-lever pivotally supported on said frame, and intermediate mechanism connecting said lever and plow for the purpose of raising the plow, in combination with a foot-lever also fulcrumed on said frame adjacent to said hand-lever and independently connected with said intermediate mechanism; the connection with one of said levers being made above the fulcrum thereof and that of the other below its fulcrum; whereby both levers are adapted to operate together in raising the plow by the conjoint action of the hand and foot of the operator pulling and pushing in opposite directions, substantially as described.

3. In a riding or sulky plow, the combination with the sulky frame, of the crank axle, the pivoted hand-lever having the rack supported thereon, means for adjusting and locking said lever in various positions, a second lever fitted loosely on said axle, means for locking said second lever to said rack, a spring having one end fixed to the axle and the opposite end thereof extending in the plane of said second lever, and an adjustable clamp connecting the lever and spring, substantially as described.

4. In combination with the plow beam, the

crank axle, the hand-lever fitting loosely on said axle, a rack carried thereby, means for locking said lever and rack in the desired position, a second hand-lever also fitted loosely on said axle and means for locking the same in engagement with said rack, a spring fixed to said axle and connected to the last named lever so as to form a yielding connection between said parts, and means for varying the force of the spring, substantially as described.

5. The combination with the sulky frame, the plow, and the crank axle having the land wheel journaled thereon, of the evener comprising a lever fitting loosely on said axle, means for adjusting and locking said lever to said frame, and a spring fixed to said axle and having one end secured to said lever, whereby the land wheel may follow irregularities on the surface of the ground without affecting the plow, substantially as described.

6. In a sulky plow, the combination with the plow frame, of a crank axle and wheel journaled thereon and the evener comprising a lever loose on said axle, means for securing said lever in a fixed position in respect to said frame, and a resilient coupling between said axle and lever, whereby said axle and wheel are adapted to conform to any unevenness in the surface of the ground without affecting the plow, substantially as described.

7. In combination with the sulky frame, the crank axle having the land wheel journaled thereon, the lever fitting loosely on said axle, means for adjusting and locking said lever in various positions in respect to the frame, and a variable resilient coupling between said axle and lever adapted to permit the land wheel to follow irregularities upon the surface of the soil without affecting the plow, substantially as described.

8. In combination with the plow frame having the crank axle journaled thereon, the lever loose on said axle, the clamp rigidly secured to the axle beside said lever and having the lugs or ears projecting therefrom, the spring having one end secured to said clamp and its opposite end extending in the plane of the lever, and the adjustable clip connecting the lever and spring, whereby the force of the spring may be varied or the lever locked to the axle as may be desired, substantially as described.

9. In combination with the sulky frame supporting the plow beam, the crank axle having the land wheel journaled thereon, the vertically adjustable spindle carrying the furrow wheel, the hand-lever pivotally supported on said frame, the co-acting foot-lever also fulcrumed on the frame, the rods independently connecting said levers with the adjusting mechanism of the furrow wheel; the connection with one of said levers being above its fulcrum and that of the other below the same,

and means for locking said hand-lever to said crank axle, substantially as described.

10. In combination with the lifting lever, the pivoted spring-supporting rod and the counter-balancing spring placed on said rod and adapted to be compressed on the forward movement of the lever so as to store power for use in raising the plow; the fulcrum of the lever being eccentric to the pivot of the rod so as to gradually increase the leverage as the power of the spring is increased and vice versa, substantially as described.

11. In combination with the plow, the elevating mechanism, comprising the lifting lever connected to said plow and the counter-balancing spring connected to said lever so as to operate with a constantly increasing advantage in raising the plow but with gradually diminishing force while the leverage gradually decreases, whereby the power of the spring is equalized throughout the movement of the lever, substantially as described.

12. In combination with the plow, the lifting lever fulcrumed upon the frame of the machine, the pivoted rod having its fulcrum or pivotal support above that of said lever and eccentric thereto, with its free end arranged to slide in a bracket or support fixed upon said lever, and a coiled spring placed on said rod and adapted on the forward movement of the lever to gradually store power and resist the movement of the lever while the leverage of the latter increases, and to aid in lifting the plow on the reverse movement, substantially as described.

13. In combination with the plow and the lifting lever, the bracket adjustably secured to said lever, the bracket adjustably secured to the frame of the machine, the rod pivoted at one end to one of said brackets and having its opposite end arranged to slide in an opening of the other bracket, and a coiled spring interposed between said brackets on said rod, whereby the tension of the spring and the leverage may be varied by adjusting said brackets, substantially as described.

14. In combination with the plow beam and the rear wheel support, the bracket or casting adjustably secured to said beam and provided with a longitudinal slot, the wheel-supporting rod or bar extending lengthwise of said casting and having a fastening bolt working in said slot, and means for securing said parts in the desired position, substantially as described.

In testimony whereof we affix our signatures in presence of two witnesses.

STALEY D. POOLE.
BRADFORD CROSS.

Witnesses:

WM. BUTTERWORTH,
FRED H. COOPER.