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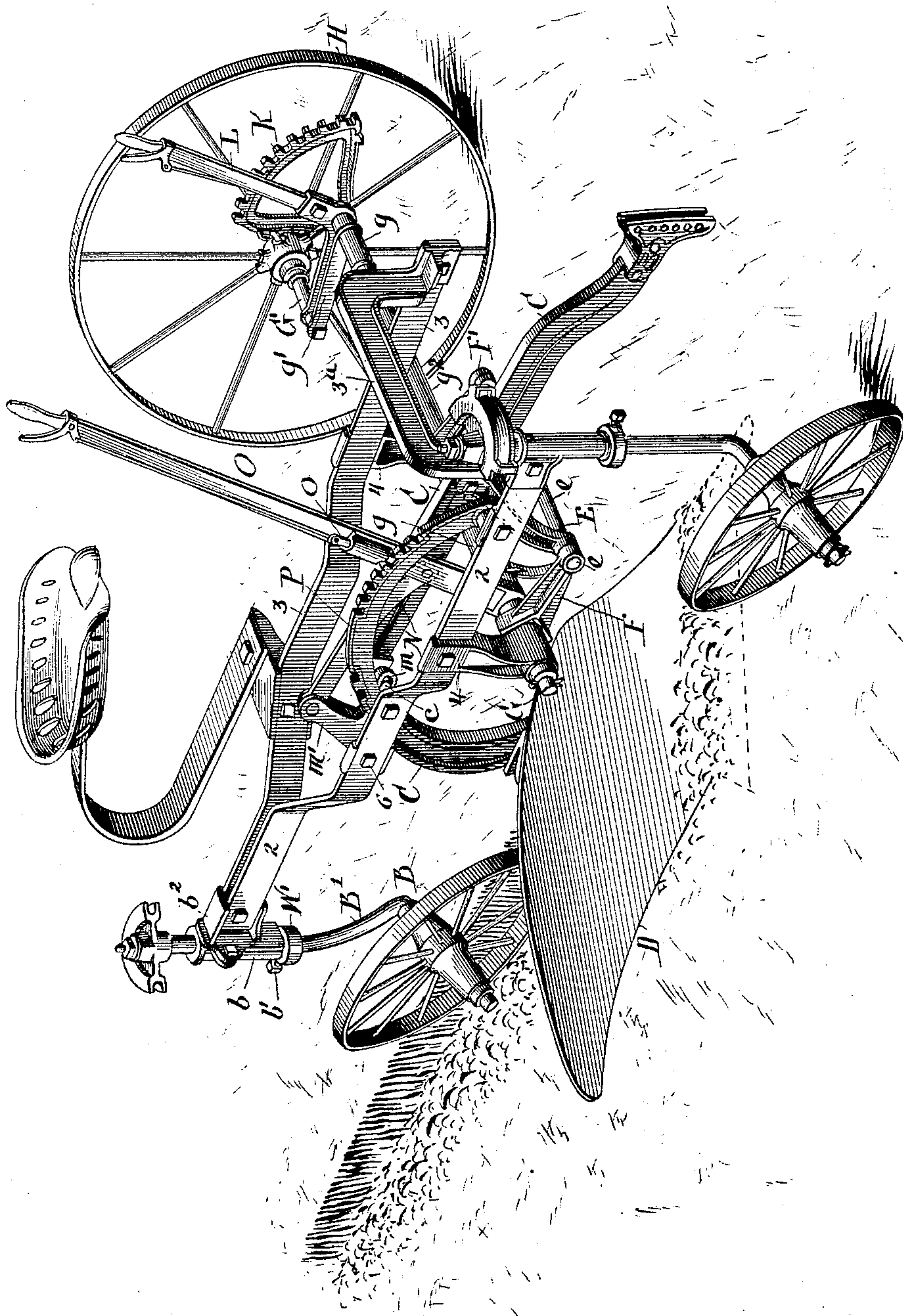
3 Sheets—Sheet 1.

W. SOBEY.  
SULKY PLOW.

No. 462,416.

Patented Nov. 3, 1891.

Fig. 1.



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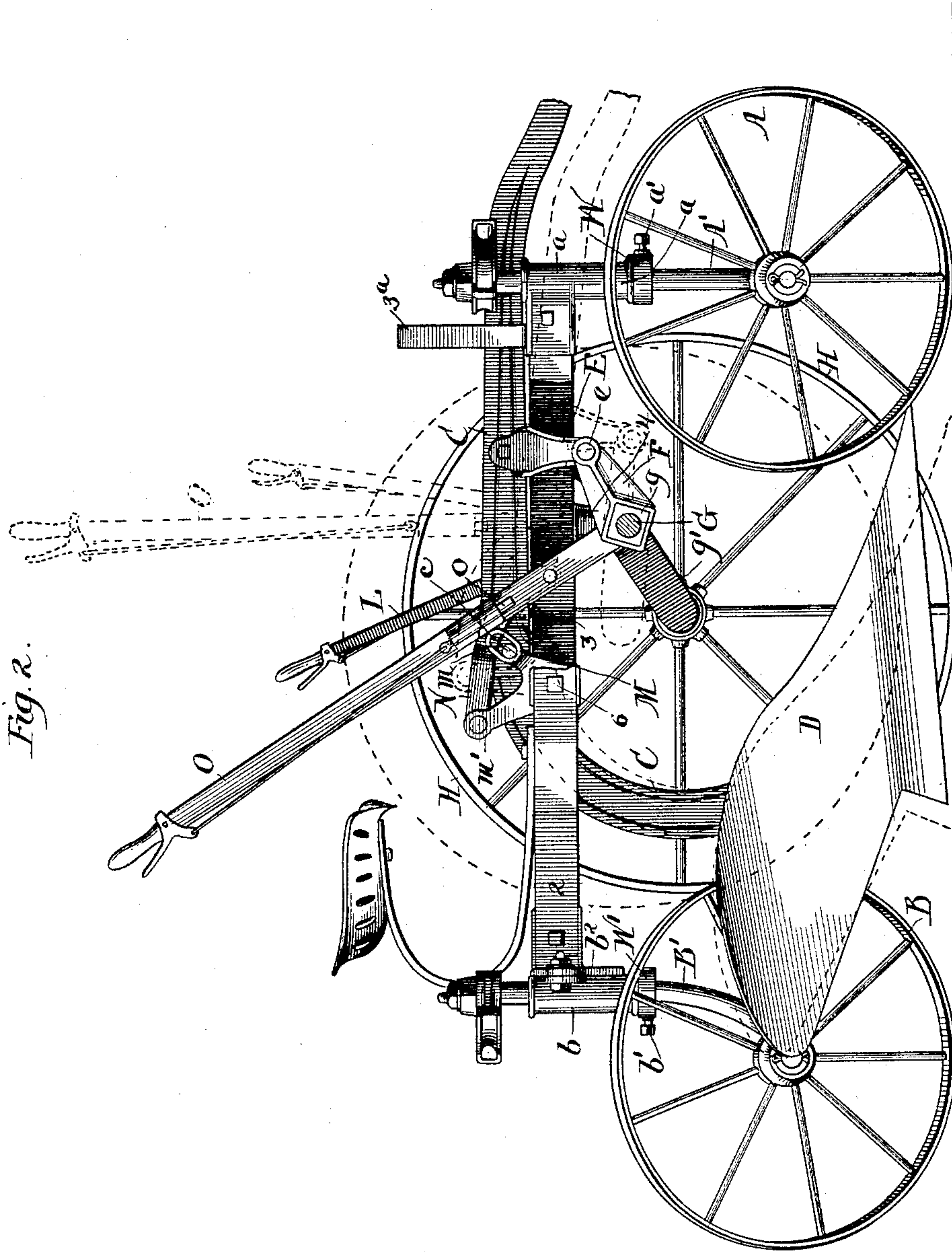
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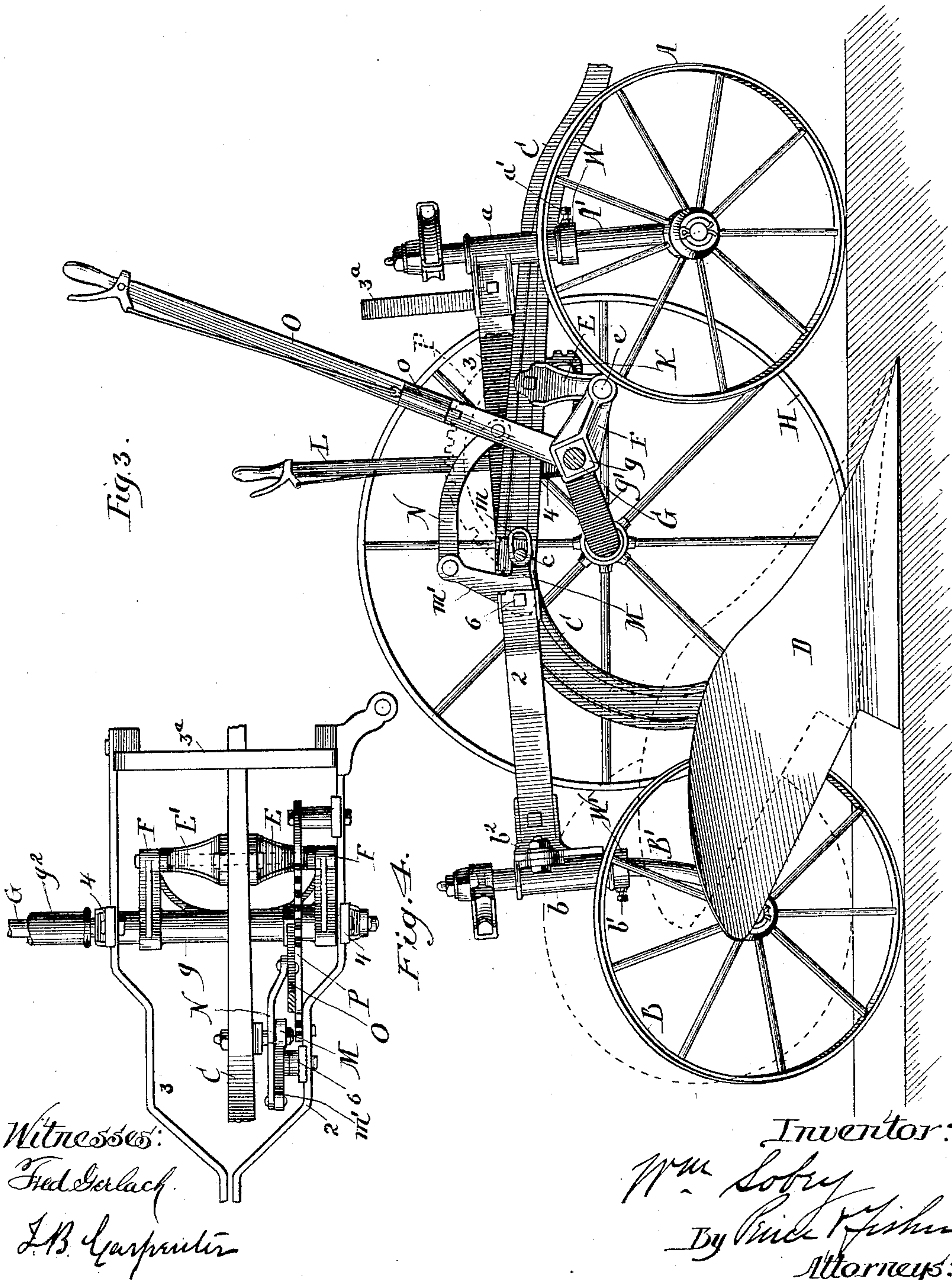
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3 Sheets—Sheet 3.

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# UNITED STATES PATENT OFFICE.

WILLIAM SOBEY, OF RACINE, WISCONSIN, ASSIGNOR TO THE J. I. CASE PLOW WORKS, OF SAME PLACE.

## SULKY-PLOW.

SPECIFICATION forming part of Letters Patent No. 462,416, dated November 3, 1891.

Application filed November 26, 1890. Serial No. 372,723. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM SOBEY, a citizen of the United States, residing at Racine, in the State of Wisconsin, have invented certain new and useful Improvements in Sulky-Plows, of which I do declare the following to be a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My present invention has relation more particularly to that class of sulky-plows known as "three-wheel plows," two of the wheels being furrow-wheels and the third wheel being the "land-wheel." In the construction of this class of plows it has been heretofore proposed to mount the plow-beam upon its sustaining-frame by means of two cranks or links interposed between the plow-beam and the frame. These cranks or links have been of uniform length and have been set in such position with respect to each other as to move in unison and produce a straight vertical lift of the plow—that is to say, an equal movement of the toe or point and heel of the plow. An objection incident to this construction is that, inasmuch as both the toe or point and heel of the plow had imparted thereto the same degree of vertical movement, the point of the plow was presented to the ground at such a slight inclination that it did not readily enter the soil. If in order to overcome this difficulty the plow was set with its point at such inclination or angle as to cause it to quickly enter the soil, then when both the furrow-wheels dropped into place it was found that the inclination of the point of the plow was so great as to cause an excessive wear upon the plow-point and an undue strain upon the team. Moreover, with such old construction it was found that when it was desired to withdraw the plow from the ground the upward lifting of the plow from the furrow could not be quickly effected and was attended with considerable exertion upon the part of the operator, the tendency of the plow being to remain in the ground.

One of the objects of my present invention is to sustain the plow-beam in such manner that the point or toe of the plow will be caused to move more rapidly than the rear portion or heel of the plow, so that when the operating-lever is shifted to produce the downward movement of the plow, the point of the plow

traveling faster than the heel shall be first presented to and caused to quickly enter the soil, and then as the rear furrow-wheel drops into the furrow the bottom edge of the plow will be brought to the desired working inclination. Moreover, as the point of the plow travels faster than the heel of the plow, when the operating-lever is reversely shifted to raise the plow from the ground the point will be given an upward inclination that will cause the plow to rise quickly from the furrow.

A further objection incident to the prior constructions of this class of plows in which the uniform vertical movement is imparted to the plow is that if the plow is set with its bottom edge at the proper angle for plowing (and this angle will be very slight for plowing certain kinds of soil) the point of the plow is presented to the soil at such a slight inclination that it is necessary for the operator to use much greater force than would be required if the point of the plow were presented at a greater inclination, so as to cause it to first enter the ground. By my present invention in providing that the plow-point shall be first presented to the soil and at an inclination considerably in excess of that at which the plowing is to be done I avoid the necessity of using so great force as would be otherwise necessary, since the plow-point when presented at a considerable inclination tends to run speedily into the ground and to its working position as the plow is drawn forward by the team. Moreover, with the prior constructions of plows hereinbefore referred to, if the plow be set with its bottom edge at the proper angle for working, then when the rear furrow-wheel drops into the furrow in turning the first furrow it will be found that the point of the plow will be lifted above the horizontal or at least will be lifted above the proper angle for plowing unless some provision is made for shifting the position of the sustaining-frame vertically with respect to the front furrow-wheel.

A further object of my invention is to provide means whereby the sustaining-frame can be adjusted upon the standards of the front and rear furrow-wheels, so that the angle or inclination from front to back of the bottom edge of the plow can be varied according to the character of the soil wherein the plow is to work.



My invention consists, primarily, in mounting the plow-beam upon its sustaining-frame in such manner that in the shifting of the plow-beam the point or toe of the plow shall be caused to travel faster than the rear portion or heel of the plow, so as to cause the point to more quickly enter the ground to reach the working position and to cause it also to more rapidly rise from the ground when it is desired to lift the plow therefrom.

My invention further consists in sustaining the plow-beam by means of differential cranks or links, whereby a more rapid movement shall be imparted to the point or toe of the plow than to its rear portion or heel.

My invention also consists in adjustably mounting the plow-frame upon the standards of the front and rear furrow-wheels, so that the degree of inclination given to the body of the plow can be readily controlled.

My invention further consists in certain details of construction hereinafter described, illustrated in the accompanying drawings, and particularly pointed out in the claims at the end of this specification.

Figure 1 is a perspective view of a plow embodying my improvements. Fig. 2 is a side view, parts being broken away. Fig. 3 is a view similar to Fig. 2, but showing the parts in different positions. Fig. 4 is a plan view, partly in section, of certain of the parts upon a reduced scale.

A and B denote, respectively, the front and rear furrow-wheels of the plow. The front wheel A is carried upon a standard A', that is journaled within a vertical box *a*, bolted to the arm 2 of the sustaining-frame of the plow. At the bottom of the box *a* is a collar W, provided with a set-screw *a'*, whereby the position of the sleeve *a* upon the standard A' can be controlled. In like manner the rear furrow-wheel B is journaled upon the lower end of a standard B', that passes through a vertical box *b*, the position of the box upon the standard B' being controlled by means of a set-screw *b'*, carried by the adjustable collar W'. The standards A' and B' are preferably bent in such manner as to angle the furrow-wheels A and B, and at the tops of the standards A' and B' are attached suitable segment-plates, which, however, form no part of my present invention, these plates relating to the invention set forth in my patent dated September 30, 1890, No. 437,666. The sleeve *b* is bolted to a plate *b*<sup>2</sup>, to which is fastened the converging rear ends of the arms 2 and 3 of the plow-frame, the front ends of these arms being connected by an arch-bar 3<sup>a</sup>.

C designates the plow-beam, bent in the usual manner and carrying at its lower end the plow D. This plow-beam C has connected to its forward portion two brackets E and E', one on each side of the plow-beam, (see Fig. 4,) and through the lower ends of these brackets passes a pivot-rod *e*, upon the outer ends of which are pivotally sustained the cranks or links F, the opposite ends of these

cranks or links F being fixed upon or cast in piece with a sleeve *g* upon the main axle G of the machine. The sleeve *g* is fixed to the axle G, that is, held within the hangers 4, bolted to the sustaining-frame, and to the crank-arm *g'*, pivotally held on the axle G adjacent to the collar *g*<sup>2</sup>, is fixed the stud G', whereon is journaled the land-wheel H. Upon the end of the main shaft G is fixed the segment-rack K, with which engages the catch of the lever L, whereby the leveling of the plow is effected, as well understood in the art.

The rear portion of the plow-beam C is provided with a stud or pin *c*, projecting laterally therefrom, this pin *c* entering an elongated slot or hole *m*, formed in the end of the crank or link M, that is journaled upon a stud 6, projecting inwardly from the side bar 2 of the sustaining-frame. This crank M is preferably a bell-crank lever, to the arm *m'* of which is pivotally connected a connecting-rod N, that unites the crank M to the operating-lever O, whereby the raising and lowering of the plow-beam and the plow is effected. This lever O is fixed to the sleeve *g* of the main shaft and is provided with a suitable grip-catch *o*, that engages with a segment rack-bar P to hold the operating-lever in any desired position.

It is manifest that when the operating-lever O is shifted it will cause the crank F to swing, as both the lever and crank are attached to the same sleeve *g*, and it will also impart a swinging movement to the crank M through the medium of the connecting-rod N. As a consequence, the plow-beam C and plow D will be raised or lowered, according to the shift of the lever O; but inasmuch as the forward crank or link F is longer than the rear crank M it is obvious that the forward portion of the plow-beam will be moved more rapidly than the rear portion, and as a consequence the toe or point of the plow will travel more rapidly and a greater distance than its heel. Hence it is plain that in lowering the plow to its work by the forward movement of the operating-lever O the plow will be presented to the ground point first and with its bottom at a considerable angle to the horizontal plane. So, also, in reversely moving the operating-lever to raise the plow the point of the plow will be given an upward inclination, which will cause it to quickly rise from out the soil.

It will be observed by reference more particularly to Fig. 2 of the drawings that when the plow is elevated to the riding position, as shown by full lines, or is in the working or plowing position, as seen by dotted lines, the crank M stands nearer to the vertical than does the crank F, and hence aside from its greater length the position of the crank F is such as to cause a greater vertical movement of the plow-beam than is produced by the crank M in its less effective position. Indeed it is plain that the differential move-



ment of the plow-beam could be effected entirely, if desired, either as a result of the difference in the relative positions of the front and rear cranks or links or as the result of the difference in the lengths of the cranks, and either construction I regard as within the scope of my invention, although I prefer to secure the differential movement by reason both of the difference in lengths and positions of the cranks. In any event it is desirable that there shall be a slot similar to the slot *m* of the crank or some like provision of a loose or free connection, so as to better allow for the different movements of the cranks.

From the foregoing description the operation of my improved plow will be seen to be as follows: When the parts are in the position seen in full lines in Fig. 2 of the drawings, the plow is raised above the ground and can be then readily transported from point to point, the position of parts being at such time in "riding position." If now it is desired to break ground, the operating-lever *O* will be moved forward to the position shown in Fig. 3 of the drawings. This shifting of the operating-lever *O* at the very beginning of the plowing operation will cause the plow *D* to be brought to the position seen by dotted lines in Fig. 3 of the drawings, and the point of the plow being caused to move downwardly at a greater speed than the heel of the plow will present the plow at such an angle as to cause the point to speedily enter the ground. As the team now advances, causing the turning of the furrow, the rear furrow-wheel will drop into the furrow and the plow will be brought with its bottom at the desired working angle, as seen by full lines in Fig. 3. The operator will then shift the lever *L*, if desired, in order to insure the transverse leveling of the plow and frame. At the completion of the first furrow and as the second furrow is begun the operator will shift the operating-lever *O* from the position seen in Fig. 3 to the position shown by dotted lines in Fig. 2, this being the normal working position of such lever. This shift of the operating-lever will compensate for the dropping of the front furrow-wheel into the furrow that has been already turned, since if no such shift were made the bottom edge of the plow would be presented to the soil at too great an angle for proper working and the point of the plow would be below the line of the furrow-wheels. When the second furrow has thus been begun, the operator will set the lever *L* to proper position for leveling the plow. It is manifest that when it is desired to lift the plow *D* from the ground it is only necessary to move backward the operating-lever *O* the proper distance, and in doing so the point of the plow, being raised more rapidly than the heel, will cause the plow to quickly and easily pass from out the soil. It will be observed that when the plow is raised from the ground, as seen in full lines, Fig. 2, the point will be at such distance above the ground as to enable

the plow to clear or pass over any trash or like obstructions upon the surface of the ground. It is manifest, also, that inasmuch as the operating-lever *O* is attached to the axle *G* the movement of the operating-lever will not only effect the operation of the cranks or links that sustain the plow-beam, but will also at the same time cause the shifting of the land-wheel *H*, thereby securing a more speedy and effective raising and lowering of the plow.

In plowing very hard and dry soil it is desirable that the point of the plow shall be presented to the soil at a considerably greater inclination than when the plow is operating in soft ground. By my improved construction this change in the angle of the plow is effected by adjusting the plow-frame up and down upon the standards of the front and rear furrow-wheels by means of the collars *W W'*. Thus, for example, if the plow in the position seen in Fig. 3 is at the proper angle for turning soft ground, and it is desired to increase this angle in order to adapt the plow for work in hard soil, it is only necessary to adjust the collars *W W'* with respect to each other in such manner as to bring the bottom edge of the plow at the desired angle and at the same time insure that the point of the plow shall be at the proper position with respect to the furrow-wheels.

From the foregoing description it is manifest that by the use of differential mechanism for raising and lowering the plow not only is the point of the plow caused to travel more quickly into and out of the furrow, but the bottom of the plow is held at the proper working angle not merely when the plow is running with the rear furrow-wheel in the first furrow that has been turned, but by shifting the differential mechanism the proper working angle of the plow is maintained even after the front furrow-wheel has dropped into the furrow. Obviously, if uniform link mechanism were employed for raising and lowering the plow-beam it would be found that if the plow were set at such an angle as to enable it to speedily enter the soil, then when the rear furrow-wheel dropped to the position seen by full lines in Fig. 3 the plow would be brought to the proper working angle; but as soon as the front furrow-wheel dropped into the furrow, as seen by dotted lines in Fig. 2, the inclination of the plow would again become too steep and manifestly no mechanism for simply imparting a uniform lift to the front and rear of the plow could cure this defect or change the angle of inclination of the bottom of the plow. The advantage, therefore, of providing a three-wheel plow—that is to say, a plow having front and rear furrow-wheels—with a differential mechanism for raising and lowering the plow is most important.

The details of construction above set out may be varied by the skilled mechanic within wide limits without departing from the



spirit of my invention, and certain features thereof may be employed without its adoption as an entirety.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a sulky-plow, the combination, with a sustaining-frame and three carrying-wheels for said frame and a plow-beam supported by said sustaining-frame, of differential mechanism for connecting the plow-beam with the sustaining-frame and for raising and lowering the front and rear portions of the plow-beam to different extents to impart differential movements to the point and heel of the plow, substantially as described.

2. In a sulky-plow, the combination, with a sustaining-frame and three carrying-wheels for said frame and a plow-beam supported by said sustaining-frame, of differential mechanism connecting the plow-beam with the sustaining-frame, said differential mechanism comprising cranks extending between the plow-beam and the sustaining-frame and arranged to impart differential movement to the front and rear supports of the plow-beam, whereby the point of the plow may be caused to travel faster than its heel, substantially as described.

3. In a sulky-plow, the combination, with a sustaining-frame and three carrying-wheels for said frame and a plow-beam supported by said sustaining-frame, of differential mechanism for raising and lowering the plow-beam, said differential mechanism comprising two cranks or links of different lengths serving to connect different points of the plow-beam with different points of the supporting-frame and whereby the front and rear portions of the plow-beam may be raised and lowered to different extents, substantially as described.

4. In a sulky-plow, the combination, with a sustaining-frame and three carrying-wheels for said frame and a plow-beam supported by said sustaining-frame, of differential mechanism for raising and lowering the plow-beam, said differential mechanism comprising two cranks or links connecting the plow-beam and the sustaining-frame, said cranks or links being set at different angles, whereby a differential movement is imparted to the front and rear portions of the plow-beam, substantially as described.

5. In a sulky-plow, the combination, with a sustaining-frame and three carrying-wheels for said frame and a plow-beam supported by said sustaining-frame, of differential mechanism for raising and lowering the plow-beam, said mechanism comprising two differentially-operating cranks, one of said cranks affording a loose connection—as, for example, by a stud and slot—between the plow-beam and the supporting-frame, substantially as described.

6. In a sulky-plow, the combination, with a sustaining-frame and three carrying-wheels and a plow-beam supported by said sustaining-frame, of cranks or links for sustaining

said plow-beam, said cranks or links being set at different angles and being of different lengths, whereby a differential movement will be imparted to the front and rear portions of the plow-beams, substantially as described.

7. A sulky-plow comprising a sustaining-frame and wheels, a plow-beam supported thereby, a long crank F, connected with the front portion of the plow-beam, a shorter crank M, connected with the rear portion of the plow-beam, said shorter crank having its end provided with a slot  $m'$ , and an operating-lever suitably connected with the front and rear cranks, substantially as described.

8. In a sulky-plow, the combination, with a sustaining-frame and three carrying-wheels and a plow-beam supported by said sustaining-frame, of a differential mechanism for raising and lowering said plow-beam, said mechanism comprising a long crank F, connected with the front portion of the plow-beam, a shorter crank M, connected with the rear portion of the plow-beam, and a single operating-lever suitably connected with the front and rear cranks, substantially as described.

9. In a sulky-plow, the combination, with a sustaining-frame and three carrying-wheels for said frame and a plow-beam supported by said carrying-frame, of differential mechanism connecting the plow-beam with the sustaining-frame, said mechanism comprising two differentially-operating cranks or links, a connection between said cranks or links, and a single lever for operating said cranks or links to raise and lower the plow, substantially as described.

10. In a sulky-plow, the combination, with a sustaining-frame and carrying-wheels for said frame and a plow-beam supported by said sustaining-frame, of differential mechanism for raising and lowering said plow-beam, comprising the cranks F and M, a single operating-lever O, and a connecting-rod N, uniting said crank M with said lever O, substantially as described.

11. In a sulky-plow, the combination, with a main frame and with the front and rear furrow-wheels and the land-wheel for supporting said frame, of a plow-beam, front and rear cranks or links connecting said plow-beam with the sustaining-frame, a single operating-lever for shifting said cranks or links, a suitable connection—such, for example, as a rod—for securing the movement in unison of said cranks or links, and a crank-axle for the land-wheel suitably connected with the operating-lever, whereby the said lever will serve to effect the movement both of the cranks or links and of the land-wheel with respect to the main frame, substantially as described.

WILLIAM SOBEY.

In presence of—

CHARLES H. LEE,  
HENRY M. WALLIS.