2 Sheets—Sheet 1.

D. H. LANE.
Rotary-Plow.

No. 208,246. Patented Sept. 24, 1878.

Fig. 1

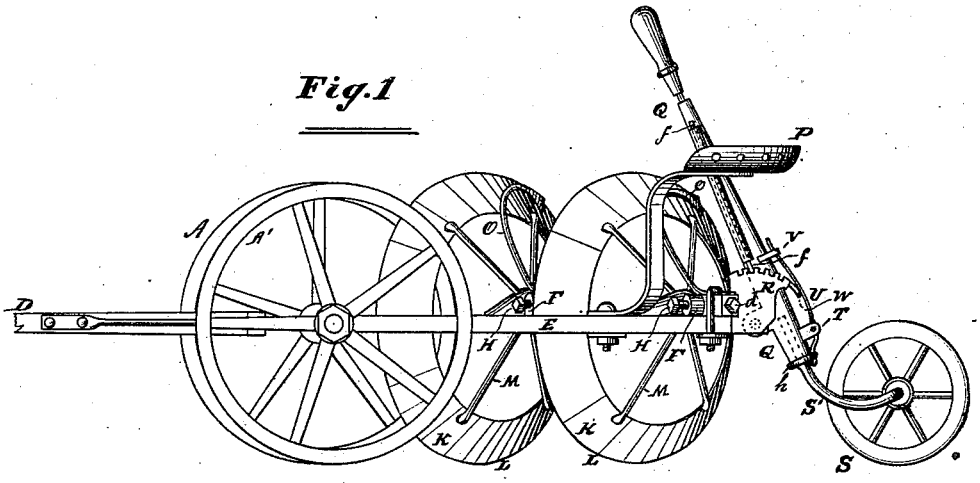


Fig. 2

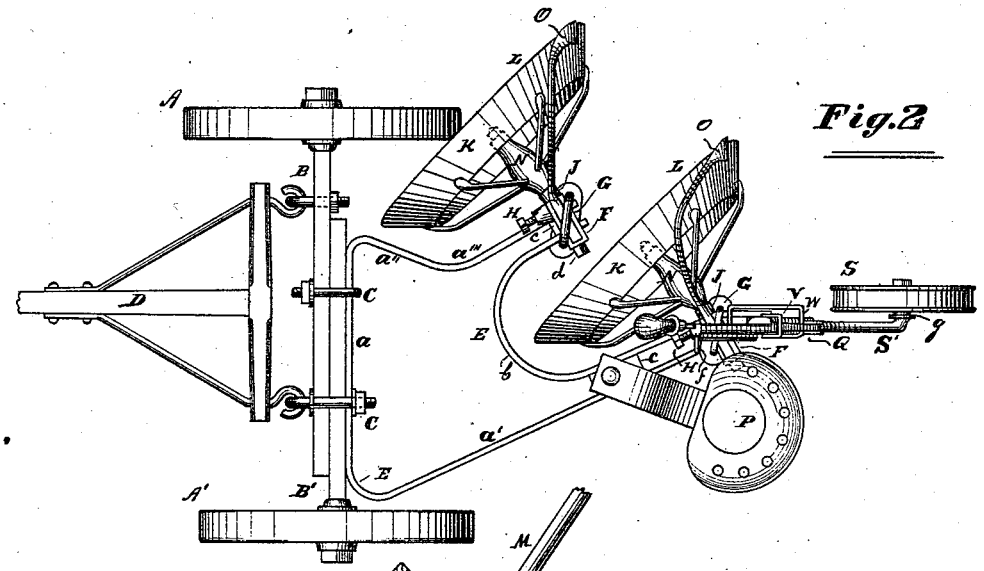


Fig. 3

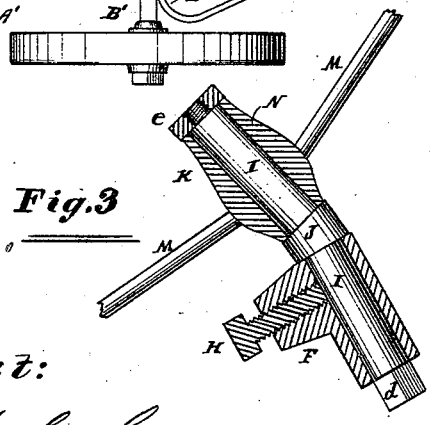
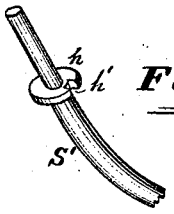


Fig. 4



Attest:

Wm. F. Harbach

Charles A. Schoff

INVENTOR:

David H. Lane

By F. F. Warner his Attorney.

2 Sheets—Sheet 2.

D. H. LANE.
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Fig. 5

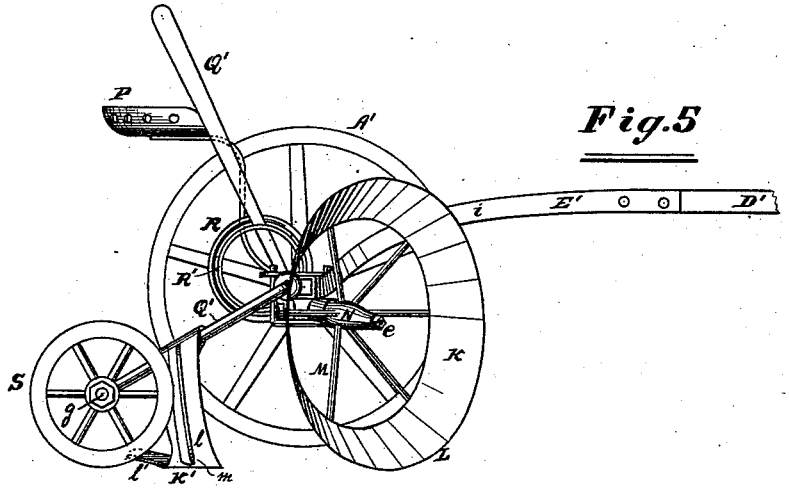
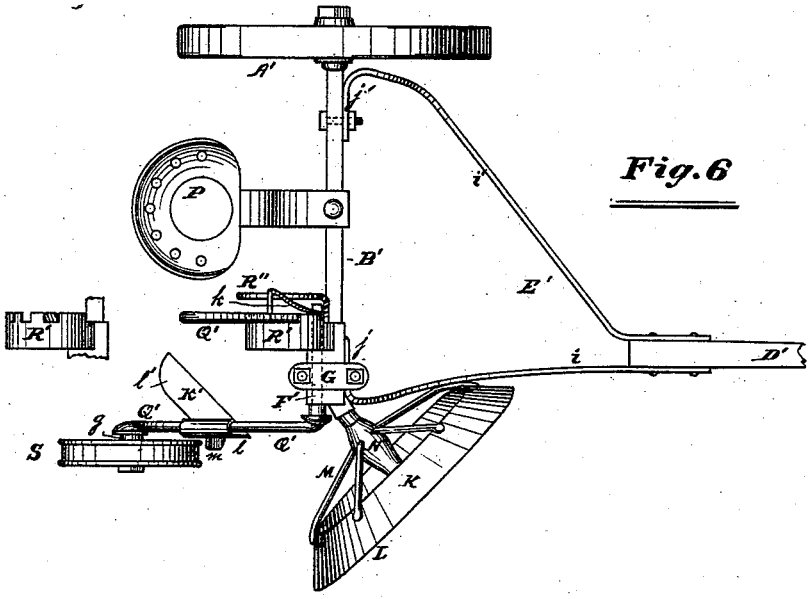


Fig. 6



Attest:

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INVENTOR:

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UNITED STATES PATENT OFFICE.

DAVID H. LANE, OF ANOKA, MINNESOTA.

IMPROVEMENT IN ROTARY PLOWS.

Specification forming part of Letters Patent No. **208,246**, dated September 24, 1878; application filed June 13, 1878.

To all whom it may concern:

Be it known that I, DAVID H. LANE, of Anoka, in the county of Anoka and State of Minnesota, have invented certain new and useful Improvements in Rotary Plows, of which the following, in connection with the accompanying drawings, is a specification:

Figure 1 in the drawings is a side view or perspective of a rotary plow embodying my invention; Fig. 2, a top or plan view thereof; Fig. 3, a horizontal central section through the bent axle and the parts mounted thereon; Fig. 4, a perspective of a part of the means employed to lock and release the caster-wheel; Fig. 5, a side view of the parts arranged together to constitute a sulky-plow, and Fig. 6 a top view thereof.

Like letters of reference indicate like parts.

In the drawing, A A′ represent the draft-wheels. B is an axle on which the wheel A is mounted, and B′ an axle on which the wheel A′ is mounted. These axles are arranged to lap each other, as is clearly shown in Fig. 2, and the parts in junction with each other are bound together by means of clips C C, which may be tightened and loosened at will, thus admitting of the wheels A A′ being set a greater or less distance apart, as may be desirable or necessary. D is the draft-tongue, which may be connected to the axle B B′ in any well-known or suitable way. E is the frame, to which the remaining parts of the plow are connected. The forward part of this frame is straight, as shown at *a*, and is clamped to the draft-wheel axle by means of clips, and the clips C C may be used for that purpose. The side bars of the frame extend rearward, one side, *a′*, diagonally, and the other, *a″*, in the same direction, after being bent inwardly toward its fellow, as shown at *a‴*. The rear ends of the bars *a′ a″* are connected to each other by means of a U-shaped piece, *b*, the concavity of which is rearward, as shown—that is, the rear side or face of the piece *b* is concave or bent, so that its open end is rearward. The piece *b* may be connected to the parts *a′* and *a″* in any suitable way, preferably by means of bolts or rivets passing through them and intervening blocks *c c*, or by means of clamps employed for that purpose.

The parts *a a′ a″* may be made in one piece of wrought-iron, and the whole frame E may be so made if that method is deemed best. The frame as a whole should be stout, rigid, and simple in construction.

F F are head-blocks or axle-boxes, clamped rigidly to the rearwardly-projecting arms or ends of the frame E by means of clips or clamps G G. H H are set-screws entering the boxes F F. I I are axles journaled in the boxes F F, and capable of being turned therein, and also of being held rigid by means of the screws H H. In order that these axles may be turned with facility, for the purpose hereinafter mentioned, I form one end of each to receive a wrench, as shown at *d*, and the parts *d d* extend beyond the boxes F F far enough to admit of the use of a wrench, for the purpose set forth. The other ends of these axles are adapted to receive the hubs of the plow-disks, hereinafter described, and the parts of the axles intended to lie within these hubs are made to stand at an angle to the parts resting in the boxes F F, as is clearly shown in Fig. 3, the central part of the axles being bent to produce such angle. J J are rigid collars on the axles I I, and are arranged at the central parts thereof. The lateral faces of each collar converge toward each other, the plane of each face intersecting the axles at right angles to the part of the axle meeting it, as shown.

K K are the plow-disks or plows proper. These plows belong to a class having concavo-convex cutting-edges, usually made annular and mounted on hubs, being connected thereto by means of spokes. L L are the cutting-edges; M M, the spokes, and N N the hubs. The plows K K are mounted on the axles I I, being set up to or against those faces of the collars J J which are not in contact with the boxes F F; and *e e* are nuts for retaining the plows upon the axle, the nuts being run for that purpose upon the axles. The plows K K are thus rotary upon their axles, and are set diagonally or at an angle to the line of draft. The purpose of bending the axles and making them loose in their boxes and of furnishing means for turning them therein, and for rendering them rigid or tight at will, is to render it easy to vary the position of the plows with

relation to the line of draft, so that they may thereby be adapted to different kinds and conditions of soil, it being understood that the implement would not work equally well on all kinds and conditions of soil, if the plows remain set at the same angle to the line of draft.

To vary the angle of the plows with relation to the line of draft, it is only necessary to loosen the screws H H and turn the axles in their boxes until the proper angle is produced, and then set the screws down upon the axles. The plows are therefore adjustable with relation to the line of draft, for the purpose of thereby securing the advantages above enumerated.

It will be perceived that the bent parts of the frame E admit of the position of the plows being shifted or changed in the manner described, and that the means employed for adjusting the plows are simple in construction and operation.

O O are scrapers, consisting of long, bent, and yielding arms, the outer ends of which are arranged to rest on the convex faces of the plows, and are there either flattened or provided with blades to serve as scrapers, and the inner ends of which are clamped underneath the clamps G G. P is the driver's seat, which is attached to the rear part of the frame, as represented.

Q is a lever, pivoted to the rearmost end of the frame E. This lever terminates at its upper end in a handle within the driver's reach, and carries a sliding bar, *f*, arranged longitudinally thereon, and the upper end of which is also within the driver's reach.

R is a serrated plate, rigidly attached to the frame E, and so arranged that the lower end of the bar or catch *f* may rest in the serrations or notches. The lever Q may thus be vibrated back and forth, so as to either lower or raise its lower end, and it may be held in any position in which it may be placed by means of the engagement of the catch or bar *f* with the notched edge of the plate R, it being understood that the bar *f* is under the control of the driver, and may be raised or lowered at will, and that he may also control the position of the lever.

S is a caster, mounted on axle *g*, extending laterally from the lower or rear end of a bent stock or carrier, S′, the upper end of which enters and turns freely in a socket in the lower end of the lever Q. On the part S′ is a rigid collar, *h*, arranged considerably below the upper end of the said part S′, and having therein the notch *h′*.

T is a small post or standard, near the lower end of the lever Q, to which it is attached.

U is a lever, pivoted to the post T, and the lower end of this lever is adapted to enter the notch *h′*.

V is a loop on the lever Q, into which loop the upper end of the lever U extends.

W is an arm, extending laterally from the plate R, and supporting the lever U when the handle of the lever Q is pushed forward. To avoid nicety of construction, the lever U may be made somewhat flexible between the post T and the loop V.

I employ this method of connecting the caster-wheel to the implement in order that the plows may be raised and lowered by vibrating the lever Q, in the manner described. It will be perceived that, when the lever Q is thus vibrated, the caster will be either raised or lowered, according to the direction in which the lever is moved.

When the caster-wheel is lower than the plows the latter will be raised from the ground; but when the caster is the highest the plows will be in position for work, and the furrows may be made either deep or shallow, according to the relative height of the caster. When the desired height is obtained, the caster may be there held by means of the locking-bar or catch *f*.

The caster should roll in, or nearly in, the line of draft; and to produce this result, and yet admit of the position of the caster being changed with facility at the proper time, I employ the lever U and the notched collar *h*.

When the lever Q is pushed forward sufficiently to render the plows operative, the arm W throws the lower end of the lever U into the notch *h′*, and the arm or stock S′ is thus prevented from turning in its socket, and the caster is thereby made to roll in the line of draft.

When the lever Q is pushed rearward sufficiently to raise the plows from the soil, the lever U is carried from the arm W, and the upper or forward end of the lever last named will then either fall sufficiently, or may be sufficiently depressed, to lift its lower end from the notch *h′*, thus releasing the stock S′ and allowing it to turn in its socket. The implement may then be readily turned, and the caster will roll freely in the curved line of draft without dragging.

It will be observed that the caster-wheel, the plows, the bent axles, the axle-boxes, the clamps, and either draft-wheel and its axle may be readily removed. The driver's seat is also detachable, and so are the scrapers O O.

I make various parts of the implement removable, in order that they may be mounted on a supplementary frame and used as a sulky-plow.

E′ is the supplementary frame, consisting of two bars or rails, *i* and *i′*, attached at their forward ends to a draft-tongue, D′, and extending thence rearwardly, one in or nearly in a straight line, and the other diagonally, as shown. The rear ends of the bars *i i′* are bent inwardly, to form the arms *j j′*.

F′ is an axle-box, attached to the arm *j*. Q′ is a bent lever, turning in a box also attached to the arm *j*. The rear end of the lever Q′ is adapted to receive the caster S. The upwardly-extending or inward arm of the lever Q′ is provided with a yielding bar, *k*, raised a little from the arm to which it is applied, and ar-

ranged longitudinally in the direction of the arm, as shown.

R′ is a serrated plate, notched or serrated on its edge; and R″ is a guard, attached to the plate R′. The lever Q′ and its bar *k* pass between the serrated edge of the plate R′ and the guard R″, as indicated in Fig. 6. The bar *k* holds the lever Q′ in the serrations or notches of the plate R′; but, as the bar *k* is yielding, the lever may at any time be disengaged from any notch by pressing the lever toward the guard R″. In this way the lever may be rocked back and forth and locked in any position, it being understood that it may rest in any serration or notch in the plate R′, and be shifted from one to the other. To admit of this result, the upper or inner arm of the lever Q′ should be either laterally-yielding or made in a separate piece from the remaining part, and allowed to rock laterally to some extent on the horizontal arm of the lever, in which case the lower end of the bar *k* may enter the horizontal arm of the lever. The lower end of the lever Q′ may thus be raised and lowered at will.

K′ is a share, applied to the outer or descending arm of the lever Q′. This share consists of a vertical, or nearly vertical, blade, *l*, and of an upwardly, rearwardly, and inwardly extending blade, *l′*, projecting from the bottom of the blade *l*.

When the caster-wheel is lowered to ride on the soil while the plow is in operation, the shear K inclines forward, so that its lower end or point strikes the soil first, and the point is then low enough to enter the soil to about the depth of the furrow. This share is arranged to cut under the land next to the furrow being laid. It also cuts the sod and soil for each furrow in advance of the laying of the furrow.

m is a small wing, extending laterally from the outer face of the share, to loosen or partly loosen the sod, all of which will be hereinafter more fully explained.

In order to apply to the frame E the parts of the gang-plow necessary in the construction of the sulky-plow, I remove one of the draft-wheels, with its axle, and pass the latter into the axle-box F′, the axle and box both being rigid. I then remove one of the plows K K and its box F, together with the bent axle therein, as well as the clasp which connects the box with the frame. This box F and the parts remaining connected therewith I clamp to the box F′ by means of the clamp removed on removing the box F, placing underneath this clamp, if so desired, the scraper O, also removed on removing the clamp from the gang-plow. I then remove the caster-wheel and the driver's seat, and apply the former to the lower or rear end of the lever Q′, and the driver's seat I apply to the axle already arranged in the box F′, as shown in Figs. 5 and 6, thus making a sulky-plow by the aid of the parts removed from the gang-plow.

The mode of causing the single plow in the sulky-plow to run deep or shallow is substantially the same as that employed to make a deep or shallow furrow when a gang of plows are employed—that is, by raising or lowering the caster-wheel in the manner already described. The same means are also employed to turn the single plow to a greater or less angle to the line of draft in the sulky-plow as in the double plow. In other words, the operation and the mode of working the single plow are the same as in the double plow, with the exception that the former turns only one furrow and the latter plow two. The share K′ is employed on the sulky-plow for the purposes already stated, and also to aid in preventing a laterally-sliding movement of the plow. The share facilitates the turning of the furrow by the plow K after the first furrow is cut.

It will be perceived that if I furnish with a gang-plow one of the frames E′, provided with a lever, Q′, and the means of adjusting it, and with a box, F′, the purchaser may very readily supply himself with a sulky-plow by transferring to the frame E′ parts found in the gang-plow, and that both plows will be substantially the same in their principal features of construction, excepting that one is adapted to turn only one furrow at a time and the other two. The share may also be employed on the gang-plow, for the purposes set forth.

I am aware that crank-axles, or axles bent at right angles, and having draft-wheels mounted on the bent arm, have heretofore been used in gang-plows mounted on trucks, and in connection with levers for rotating the axle in its bearings, so that the draft-wheels could thereby be either raised or lowered for the purpose of thus regulating the depth of the furrows, and to render the plows inoperative, as might be either necessary or desirable; but I make no claim thereto, for the plow-disks herein shown and described, if mounted on such an axle, would be merely raised and lowered without being thereby set at various angles to the line of draft, whereas the latter result, which is one of the leading features of my invention, is accomplished by mounting them on the obtusely-bent axles I have now described.

I am also aware that colters have heretofore been mounted directly upon obtusely-bent axles, so that the plows could be carried to or from the land by turning the said axles so as to set the colters to run more or less toward the land, and thereby hold the plows thereto with greater or less force; but I do not claim such combination of parts, as I mount the plows themselves directly upon such axles, and prevent the plows from moving laterally by mounting them on a truck. As the plows I employ are dish-shaped, this adjustment is necessary in order to so set them that they will turn the furrows with the greatest advantage in different soils, and at the same time they are prevented by the truck from moving forward in the direction of rotation.

I am further aware that revolving mold-boards have been heretofore rendered adjustable with relation to plows rigidly attached to

their beams, so that the soil will be shed with certainty after being cut by the plows; but this adjustment I do not claim, as it is not within the scope of my invention.

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

1. In a rotary plowing implement carried on draft-wheels, the combination of a rotary plowing-wheel, K, having a concavo-convex cutting-edge arranged next to the soil, and without the interposition between it and said wheel of other parts, and for traveling on the bottom of the furrow, and having its flaring concavity turned partly forward, the rotatively-adjustable and obtusely-bent axle I, carrying the said plowing-wheel, and having thereon the tapering collar J, and adapted at one end to receive a wrench, and the axle-box F, vertically adjustable with relation to the said draft-wheels, the said box being provided with a clamp for rendering the said axle either loose or rigid therein, substantially as and for the purposes specified.

2. In combination, the caster-wheel S, mounted on the rotary stock or carrier S′, having thereon the rigid notched collar *h*, the pivoted lever Q, applied to the frame carrying the plow-disks, the bolt or slide *f*, carried by the said lever, the fixed serrated plate R, the lever U, pivoted to the lever Q, and the fixed loop V, substantially as and for the purposes specified.

3. In combination, the supplemental frame E′, provided with an axle-box, F′, and carrying a vibrating lever, Q′, having on its lower end the caster S, the removable half-axle B and its draft-wheel, the removable dish-shaped plowing-wheel K, the removable axle-box F and its clamps, the removable obtusely-bent axle J, and a locking device for engaging the lever Q′, substantially as and for the purposes specified.

4. The share K′, arranged behind a rotary concavo-convex or dish-shaped plow-disk, and placed for cutting through and under the sod or land next to the furrow turned therefrom by the disk, substantially as and for the purposes specified.

5. A cutting blade or share mounted on a vertically-vibrating caster-stock or carrier, in combination with a rotary concavo-convex or dish-shaped plow-disk, the said share being arranged to cut under the sod or land before the sod or land so cut is turned by the said disk, substantially as and for the purposes specified.

DAVID H. LANE.

Witnesses:
I. W. STEED,
A. A. ALLAN.