(No Model.)

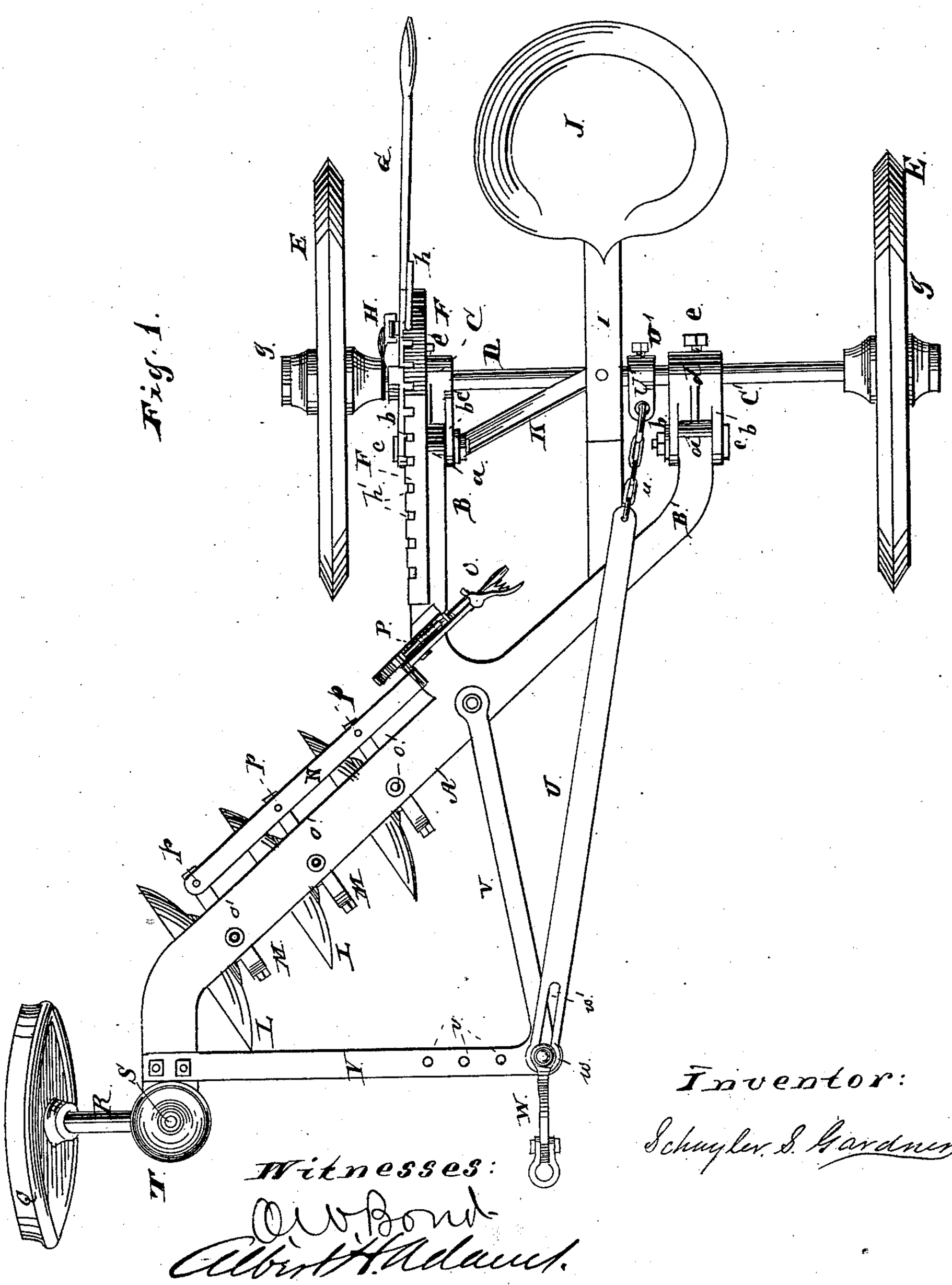
4 Sheets—Sheet 1.

S. S. GARDNER.

ROTARY PLOW.

No. 285,809. Patented Oct. 2, 1883.

Fig. 1.



Witnesses:
C. W. Bond.
Albert H. Adams.

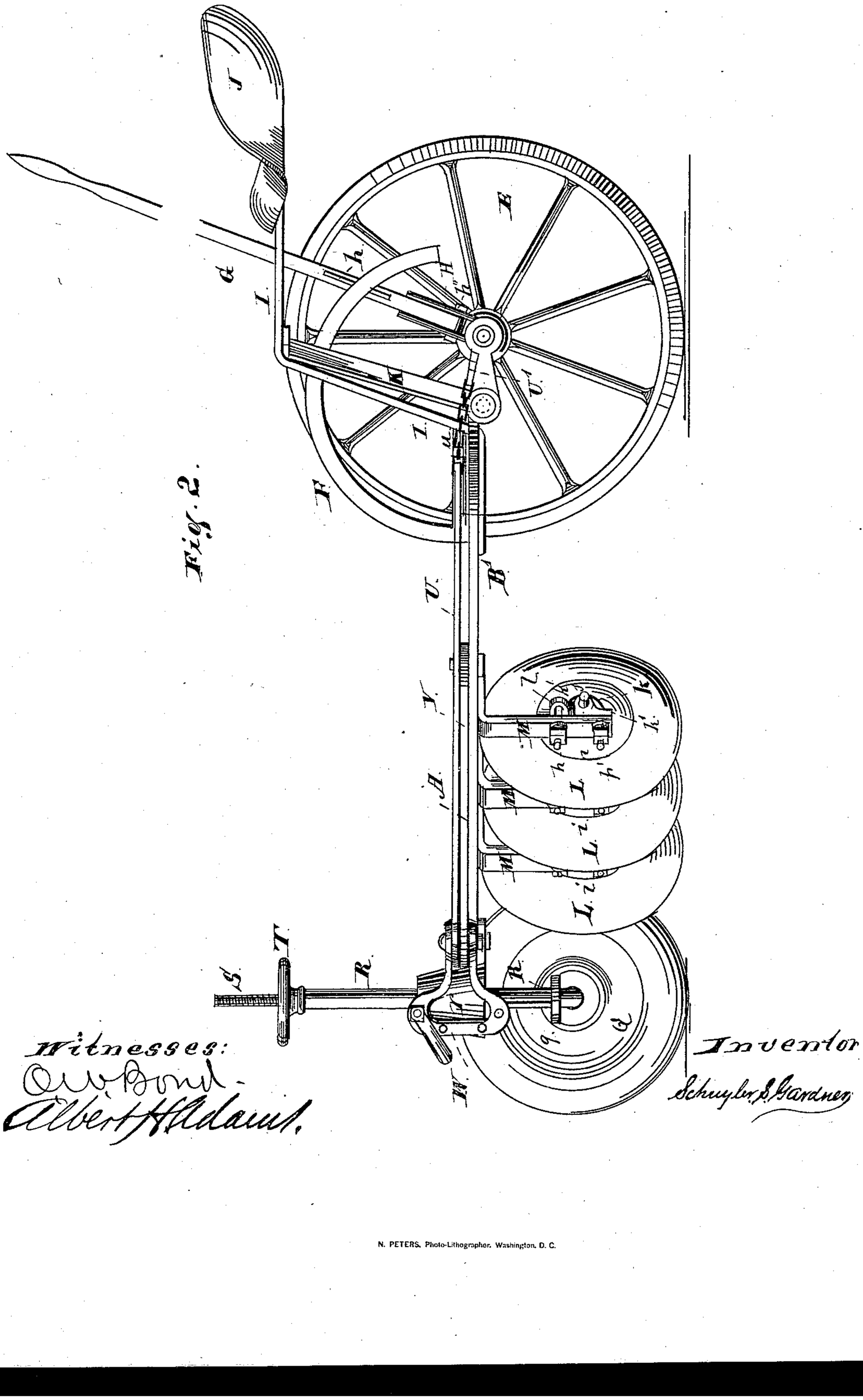
Inventor:
Schuyler S. Gardner

(No Model.) 4 Sheets—Sheet 2.

S. S. GARDNER.

ROTARY PLOW.

No. 285,809. Patented Oct. 2, 1883.



Witnesses:
C. W. Bond.
Albert Helderman.

Inventor
Schuyler S. Gardner

(No Model.)

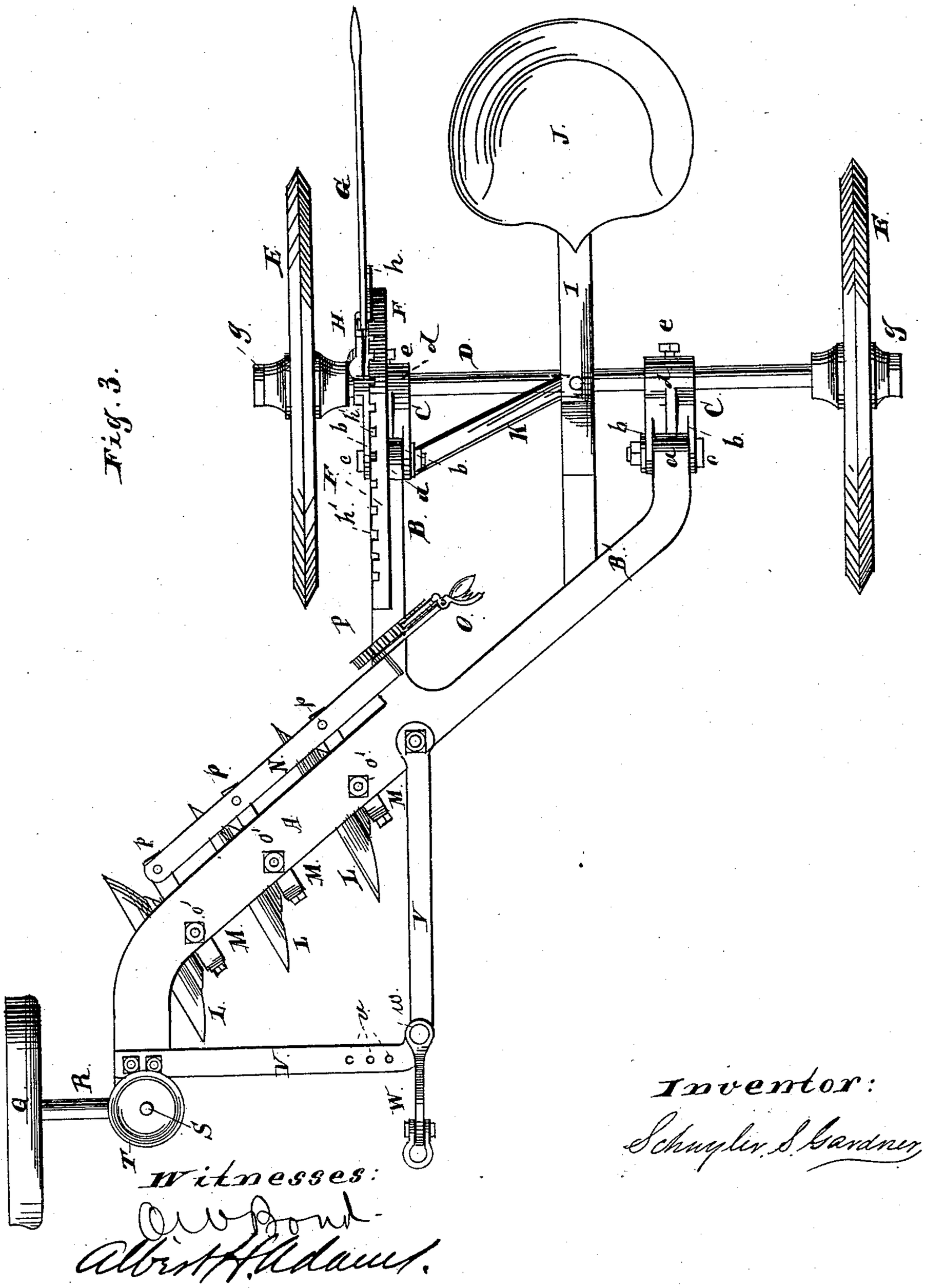
4 Sheets—Sheet 3.

S. S. GARDNER.

ROTARY PLOW.

No. 285,809. Patented Oct. 2, 1883.

Fig. 3.



Witnesses:

C. W. Bond.

Albert H. Adams.

Inventor:

Schuyler S. Gardner

(No Model.) 4 Sheets—Sheet 4.

S. S. GARDNER.

ROTARY PLOW.

No. 285,809. Patented Oct. 2, 1883.

Fig. 4.

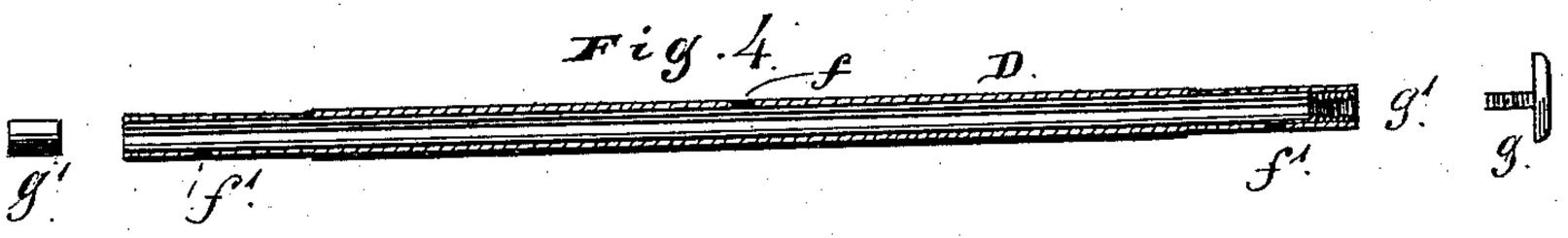


Fig. 8.

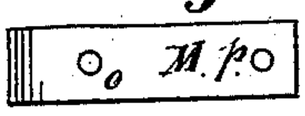


Fig. 7.

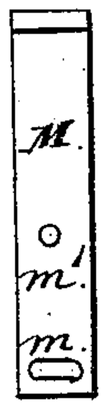


Fig. 6.

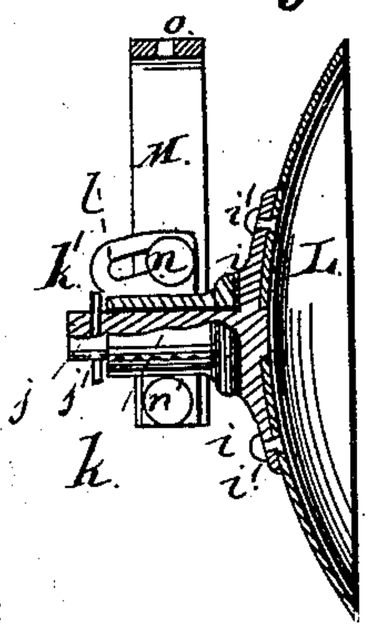


Fig. 5.

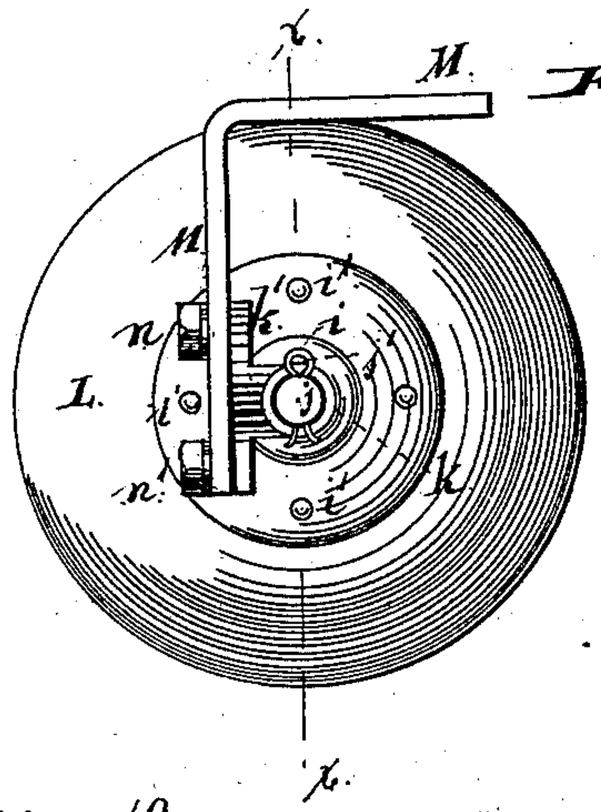


Fig. 14.

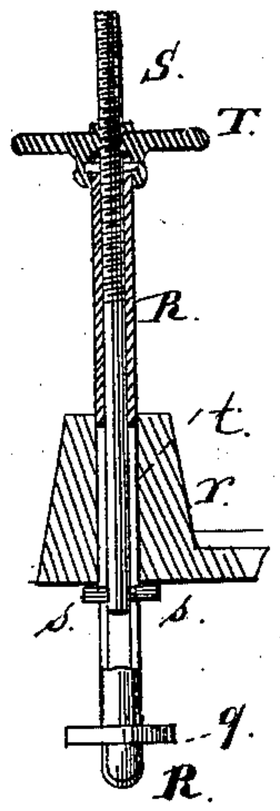


Fig. 10.

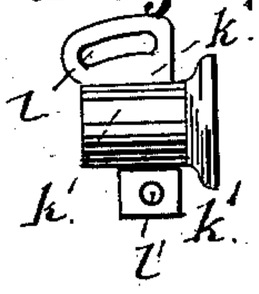


Fig. 9.

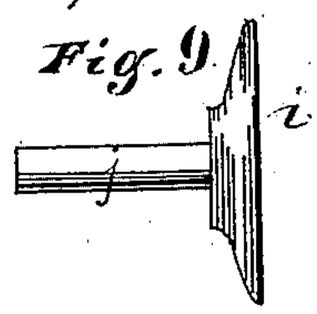


Fig. 11.

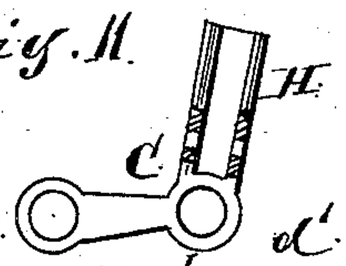


Fig. 12.

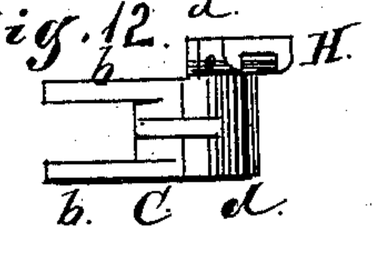
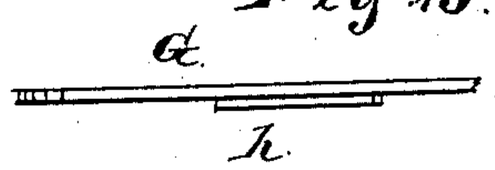


Fig. 13.



Witnesses:
C. W. Bond.
Albert H. Adams.

Inventor:
Schuyler S. Gardner

UNITED STATES PATENT OFFICE.

SCHUYLER S. GARDNER, OF CHICAGO, ILLINOIS.

ROTARY PLOW.

SPECIFICATION forming part of Letters Patent No. 285,809, dated October 2, 1883.

Application filed September 18, 1882. (No model.)

To all whom it may concern:

Be it known that I, SCHUYLER S. GARDNER, residing at Chicago, in the county of Cook and State of Illinois, and a citizen of the United States, have invented new and useful Improvements in Rotary Plows, of which the following is a full description, reference being had to the accompanying drawings, in which—

Figure 1 is a top or plan view; Fig. 2, a side elevation, with the raising and lowering lever broken and one of the carrying-wheels removed; Fig. 3, a top or plan view, showing a modification of the draft-connection; Fig. 4, a detail in section, showing the manner of constructing the axle; Fig. 5, a rear elevation of one of the disks and its supporting arm or bracket; Fig. 6, a section on line *x x* of Fig. 5; Fig. 7, a side elevation of the disk-supporting arm or bracket; Fig. 8, a top or plan view of the same; Fig. 9, a side elevation of the journal and boxing-plate for supporting the cutting-disk; Fig. 10, a front elevation of the bearing or support for the journal of the cutting-disk; Figs. 11 and 12, side elevation and a top view of the beam bracket or support, to which the raising and lowering lever is attached; Fig. 13, an edge view of a portion of the raising and lowering lever; Fig. 14, a detail showing the devices for raising and lowering the front end of the frame.

This invention relates to what are known or termed "rotary disk-plows," or plows using a rotating cutting-disk to perform the plowing, and has for its objects to improve the construction, arrangement, and operation of the rotary disks and their location and arrangement in relation to the supporting frame and wheels and the draft, to enable the draft to be readily and quickly changed to adapt it to the number of disks used, and at the same time overcome the natural tendency of the draft to raise the plows in use, to enable the frame and plows to be readily and quickly raised or lowered to travel from place to place or enter the ground, as required, and to improve generally the construction, arrangement, and operation of the devices forming the plow as a whole; and its nature consists in the devices and combination of the devices by which the above-named objects are attained, which are hereinafter specifically described and pointed out in the claims.

In the drawings, A represents the main frame, which carries the rotary disk; B B′, extensions of the main frame, by which it is connected to the axle. These parts A B B′ may be made of wrought-iron or other suitable material, formed as shown, so as to somewhat resemble a Y shape, and so that the portions A B′ will stand in a diagonal line in relation to the axle, while the portion B will stand at right angles, or nearly so, to the axle when the parts are together. These parts composing the axle are so formed that the part B acts as a brace against back strain or pressure, and the part B′ as a brace against side strain or pressure of the plows.

C C′ are arms or brackets, made of malleable iron or other suitable material, and each having at its forward end ears or plates *b*, between which the ends *a* of the extensions B B′ are placed, and the connection is completed by a pin or bolt, *c*, passing through the plates or ears *b* and the ends *a*, forming a pivotal connection for the frame with the axle. Each bracket or arm is provided with a socket or sleeve portion, *d*, having a suitable opening, *d′*, for the passage of the axle, and secured to the axle by a set bolt or screw, *e*, as shown, or in some other suitable manner that will permit of an adjustment of the brackets or arms on the axle and lock them fast thereto, when adjusted both longitudinally and vertically to set the frame and the rotary disks carried thereby in proper relation with the carrying-wheels for the draft and the cutting depths.

D is the axle, made of a piece of gas-pipe or other tubing of the required length, and having its ends suitably formed as spindles for the wheels. This axle, as shown in Fig. 4, has an opening, *f*, on its upper side, and an opening, *f′*, at each end, by means of which oil or other lubricant can be distributed to the spindles for lubricating purposes, the oil being injected into the axle through the opening *f*, and passing from the interior of the axle through the opening *f′* to the respective spindles. As shown, the jam-nut for holding the wheels on the spindle is in the form of a large-headed screw, *g*,

the stem or shank of which enters a screw-threaded bushing or box, *g'*, inserted in each end of the axle. (See Fig. 4.)

E represents the carrying-wheels, which may be of the form shown, or of some other suitable and well-known form, and are held on their respective spindles by the jam-screws *g*.

F is a segmental rack, secured at its forward end by bolts or otherwise to the brace or extension B, and having, as shown, its outer edge provided with a series of notches, *h'*.

G is a lever located within reach of the driver, and arranged to engage with the rack F, as shown, through a spline or catch, *h*, on its inner face.

H is an arm or bracket formed with and secured to the arm or bracket C. This arm or bracket H has, as shown, side flanges, forming an opening, in which is inserted the lower end of the lever G, which is fastened in place, as shown, by a bolt, *h''*, passing through its end, and the side flanges of H forming a pivotal connection to permit of sufficient side movement of the lever to engage the catch *h* with or disengage it from the notches *h'* in the rack F. By means of this lever G the driver or operator can raise or lower the front ends of the arms or brackets C C', raising or lowering the rear end of the frame to throw the disks out of the ground or into use.

I is a seat-supporting bar, attached at its forward end to the bar B' of the frame, and bent, as shown in Fig. 2, to support the seat at the proper height.

J is the seat, attached to the rear end of the bar I.

K is a brace-bar attached at its lower end to the bracket or arm C by the pivot-bolt *c*, and at its upper end secured to the under seat of the supporting-bar I.

L represents the cutting-disks, each formed of a dishing or concave shape, that will cause its periphery to cut the sod and turn the same, as the disks revolve, over and under. These disks may be of various diameters, according to the depth of plowing required. For ordinary use a disk of from thirteen to twenty inches in diameter will be sufficient. Each disk is attached to a backing-plate, *i*, of a concave or dishing form, by suitable rivets, *i*, and each backing-plate has at its center a pin or journal, *j*, as shown in Fig. 9.

M represents the standards or supports for the disk, each formed of a single piece of wrought-iron or other suitable material, bent to have the arms standing at right angles, or nearly so, with each other, so that when in position one arm will stand vertical and the other horizontal. The journal or pin *j* for each disk enters a socket or bearing, *k*, on a plate, *k'*, which plate, at one end, is provided with a slot, *l*, and at the other with a hole, *l'*, and the vertical portion of each arm or bracket M is provided with a slot, *m*, and a hole, *m'*, located at a corresponding distance apart to the slot *l* and hole *l'* in the plate *k'*, so that by passing bolts *n n'* through these slots and holes in the plate *k'* and arm or bracket M the disk is attached to the arm or bracket. Each journal or pin *j*, as shown, is held in its bearing or socket by a spring-pin, *j'*, but could be held in place in some other suitable manner. The arms or brackets M have in each horizontal portion a hole, *o*, through which a bolt, *o'*, passes for attaching the bracket to the frame A, the connection being a pivotal one, to allow each bracket or arm to be turned to set the disk at a different inclination in relation to the land for cutting different widths, and the length of each horizontal portion of the arm or bracket is greater than the width of the frame A, so that the ends will project beyond the rear edge of the frame.

N is a bar connected by suitable pins or pivots, *p*, with the horizontal portion of each arm or bracket at the projecting end.

O is a lever pivotally connected at its lower end in any suitable manner to the inner end of the bar N, and pivotally supported in any suitable manner from the frame A.

P is a segmental rack, with which the lever O engages for holding such lever in any position in which it may be set. This arm or lever O is arranged to be within the reach of the driver or operator, so that by taking hold thereof and moving it in or out the set of the disks can be changed or varied, as required for the cutting.

Q is a caster-wheel for supporting the forward end of the frame, and traveling outside of the line of the outer rotary disk. This wheel, by preference, is to be mounted on an inclined spindle, so as to stand inclined inward, to resist the tendency of the outward action of the disks.

R is the axle or standard, the end of which is provided with a spindle for the caster-wheel Q. This standard or axle is made of a piece of gas-pipe or other metal tubing, and, as shown, at the point where turned to carry the spindle, is provided with a ring or collar, *q*, forming a rest for the limit of the downward movement of the frame. This standard or axle passes up through a bearing or socket, *r*, secured to the forward end of the frame A.

S is a rod located within the standard or axle R, and extending some distance above such standard or axle, and having its upper end screw-threaded. The lower end of this rod has projecting pins *s*, which enter slots *t* in the standard or axle.

T is a hand-wheel loosely mounted on the upper end of the standard or axle R, and having its hub or center provided with a screw-threaded opening to receive the screw-threaded portion of the rod S. The forward end of the frame A rests on the pins *s*, and by turning the wheel T forward or back the rod S will be carried up or down, causing the pins *s* to raise or lower the frame to adjust the forward end in position to travel from place to place for operation in the ground, and when adjusted the

frame will be held by the hand-wheel through the rod S, and will also be supported on the standard or axle, so as to be carried by the caster-wheel.

U is a draft-bar, the rear end of which is connected by a pin, *u*, with a clip or socket, *u'*, located on the axle D, which socket is loose on the axle, so as to be adjusted longitudinally or vertically; but when adjusted is locked to the axle by a set bolt or screw, *u*, or in any other suitable manner. This adjustment of the clip or socket *u'* on the axle is necessary to change the point of draft as required in use.

V is a guard-bar located in front of the disks, and secured to the frame A by bolts or otherwise for preventing injury to the team in case of backing and coming in contact with the disks, and also, as shown in Fig. 1, furnishing a support for the forward end of the draft-rod U. As shown in Fig. 3 the attachment for the horses is made direct to this guard-bar V, and where the draft is light this attachment will work practically; but where the draft is heavy the tendency, when the draft is as shown in Fig. 3, will be to raise the forward end of the machine, lifting the disks out of the ground, so that for heavy draft the bar U should be used. The guard rail or bar V is provided with a series of holes, *v*, by means of which the point of attachment of the draft can be varied longitudinally to suit the work.

W is a clevis, of the usual construction, attached by a bolt, *w*, to the draft bar or guard. The forward end of the bar U has a slot, *w'*, for the passage of the bolt *w*, which slot permits the self-adjustment of the bar to the location of the frame A, out of use or in use.

The brace-bar K is located and connected, as shown and described, to transfer the weight of the driver to the bar B, and furnish additional weight for holding the disks down to their work. The slot *l* in the plate *k'*, and a slot, *m*, in the bracket M enable the disks to be set at different inclinations to suit the lay of the ground, as by turning the disks so that their lower edges will be in or out the plow can be made to work on side hills or inclined places without any trouble; and by providing two slots a wider range of inclination can be attained; but a single slot would produce the same result to the extent of the length of the slot. With the form of bracket shown the disks are located beneath the frame, so that the weight of the frame will bear in a direct line, or nearly so; but the bracket might be a straight piece of material extending out horizontally, with the disks attached to the outer end, in which case the frame would be in a horizontal plane, or nearly so, with the center of the disks. It will be noticed that the length of axle is greater than the width of the frame, which construction is for the purpose of enabling the travel of the furrow-wheel to be changed to suit the number of disks used. Such travel, for the best results, should be in line, or nearly so, with the inner disk. As shown, three disks are used, and the furrow-wheel is located in line with the inner disk. If two disks were used, this wheel would be too far in, so that it would ride on the unplowed ground. To change it to a proper line of travel the set-screws *e* of the boxes C C' are loosened, and the axle pushed to bring the wheel farther out and in line, or nearly so, with the second disk, after which the set-screws are tightened, the brackets or boxes C C' having been properly adjusted, and the machine is ready for use as a two-disk plow. This construction is very simple, and by its use the change to a two or three disk plow, or vice versa, can be readily and quickly made. When two disks are used, the draft must be changed accordingly, and this can be readily done by slipping the box U' on the axle to the proper point and again securing it in position.

Instead of using a box U' and a chain-connection, the rear end of the draw-bar U might be pivoted to a bracket or box similar to the brackets or boxes C C', and in the same manner, the pivot allowing of the necessary vertical movement to suit the location of the frame when the plow is in or out of use.

The screw-threaded portion of the rod S is to be of a sufficient length to produce the required amount of vertical movement for the forward end of the frame, and this rod need only be a trifle longer than the length of the vertical portion of the spindle or axle; and instead of a hand-wheel, some other means could be used for operating a nut to coact with the screw-threaded end of the rod S and raise and lower such rod.

By making the axle D of tubing and plugging its ends with screws, which form means for holding the wheels in place, and providing openings *f f'* for the passage of oil or other lubricant to the spindles, a simple and reliable means is provided for lubricating the wheels.

The operation is as follows: When moving a plow from place to place, the lever G is thrown back, raising the forward ends of the brackets or boxes C C' and the rear end of the frame, while the forward end is raised through the hand-wheel T and rod S, raising the disks clear of the ground, so that the machine can travel on the wheels E and caster-wheel Q. When in use the lever G is thrown forward, depressing the forward ends of the boxes or brackets C C' and the rear end of the frame the distance required for the disks to enter the ground the desired depth, and the forward end of the frame is lowered by a backward movement of the wheel T the distance required to level the machine, so that as the machine is carried forward by the teams the disks will act to cut and turn the sod. The disks are changed through the bar N and lever O to suit the condition of the soil, as before described, and the said disks being carried by the slotted supports before described, it will be obvious that the disks can be caused to in-

cline out of a true perpendicular position, thus providing for adjusting the vertical inclination of the disks, so that their top edges can be thrown toward or from the ground, thereby causing the lower portion or cutting-edge to cut slices of greater or less width, as required by the nature of the soil.

A pole or tongue can be pivotally attached to an adjustable bracket, located on the axle or standard R above the frame, for guiding and steering purposes.

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with the disk-carrying frame A, having extensions B B′, of the boxes or brackets C C′, the carrying-wheels and the axle D, capable of longitudinal adjustment in the boxes or brackets for changing the location of the carrying-wheels with relation to the number of plow-disks employed, substantially as described.

2. The combination, with the disk-carrying frame A, provided with the extensions B B′ and the boxes C C′, with which the extensions are connected, of the wheeled axle D, passing through the boxes and capable of longitudinal adjustment therein, and means for rigidly securing the boxes and axle together when adjusted, as desired, whereby the furrow-wheel of the axle can be brought into line with any one of the disks carried by the frame, substantially as described.

3. The frame A, having extensions B B′, forming braces, boxes, or brackets C C′, and axle D, in combination with seat-support I, the seat J, and diagonal brace K, for transferring the weight of the driver to assist in holding the machine down to its work, substantially as specified.

4. The frame A, disk L, backing-plate *i*, and journal or pin *j*, in combination with a slotted plate *k′*, and bracket or support M, substantially as and for the purposes specified.

5. The frame A, disk L, backing-plate *i*, and journal or pin *j*, in combination with the slotted plate *k′* and slotted hanger or bracket M, substantially as and for the purposes specified.

6. The combination, with the disk L, of rocking or swinging hangers or brackets M, bolts *o′*, to which the hangers or brackets are swiveled, the connecting-bar M, and an operating-lever for the bar N, for changing the set of the disks, substantially as and for the purposes specified.

7. The hangers or brackets M and plate *k′*, either or both having slots, in combination with the disk L, backing-plate *i*, and journal or pin *j*, for furnishing an adjustable support for the disks when attached, substantially as and for the purposes specified.

8. The disk L, backing-plate *i*, and journal or pin *j*, in combination with the plate *k′*, having a bearing, *k*, for attaching the disk to an arm or support, substantially as described.

9. The tubular axle or standard R, having slots *t*, in combination with the rod S, having pins *s* and a means for raising and lowering the rod, substantially as and for the purposes specified.

10. The axle or standard R, having slots *t*, rod S, having pins *s* and hand-wheel T, in combination with the frame A, for raising and lowering the forward end of the frame, substantially as and for the purposes specified.

SCHUYLER S. GARDNER.

Witnesses:
ALBERT H. ADAMS,
O. W. BOND.