(No Model.) 3 Sheets—Sheet 1.

B. S. BENSON.

PLOW.

No. 252,991. Patented Jan. 31, 1882.

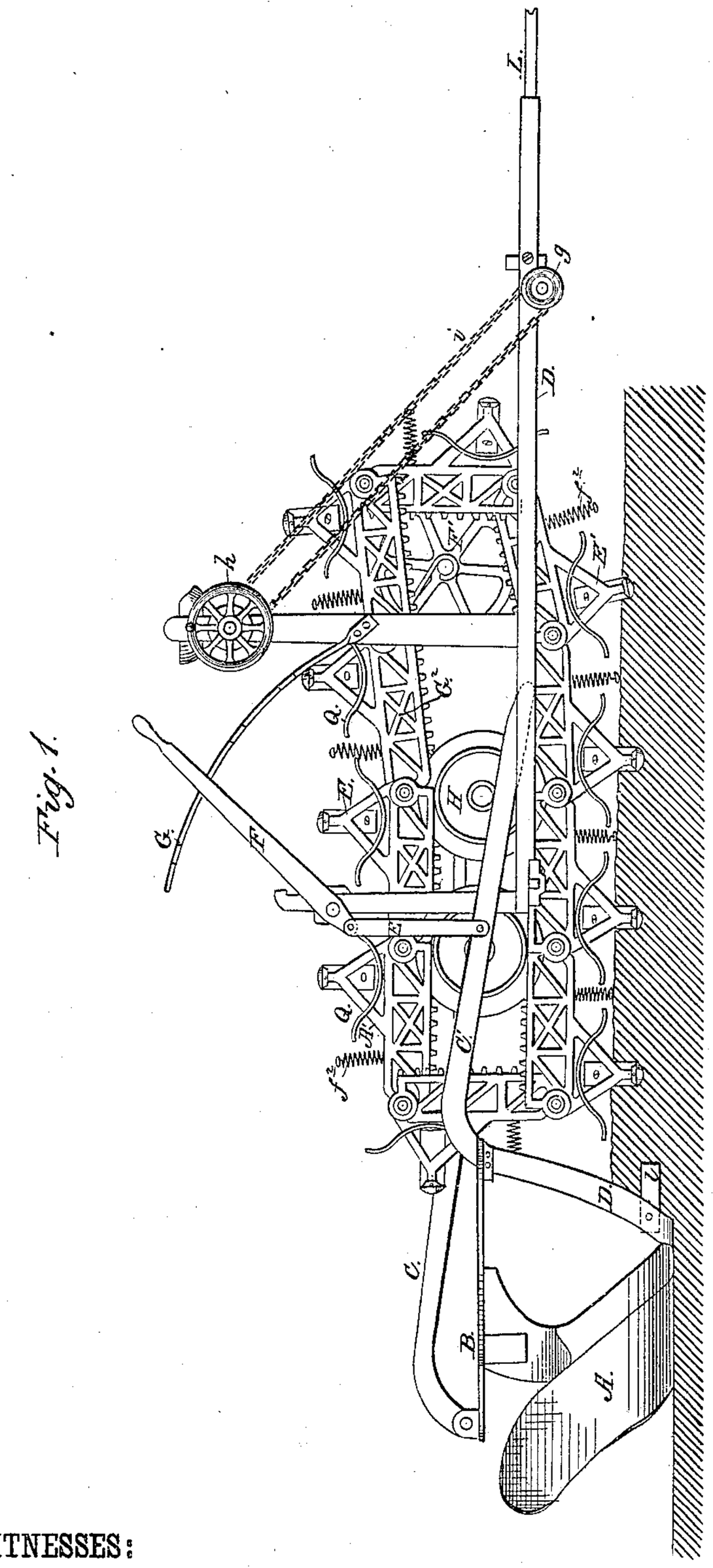


Fig. 1.

WITNESSES:

J. Kennon

Edw. C. Byrn

INVENTOR:

B. S. Benson

BY Munn & Co

ATTORNEYS.

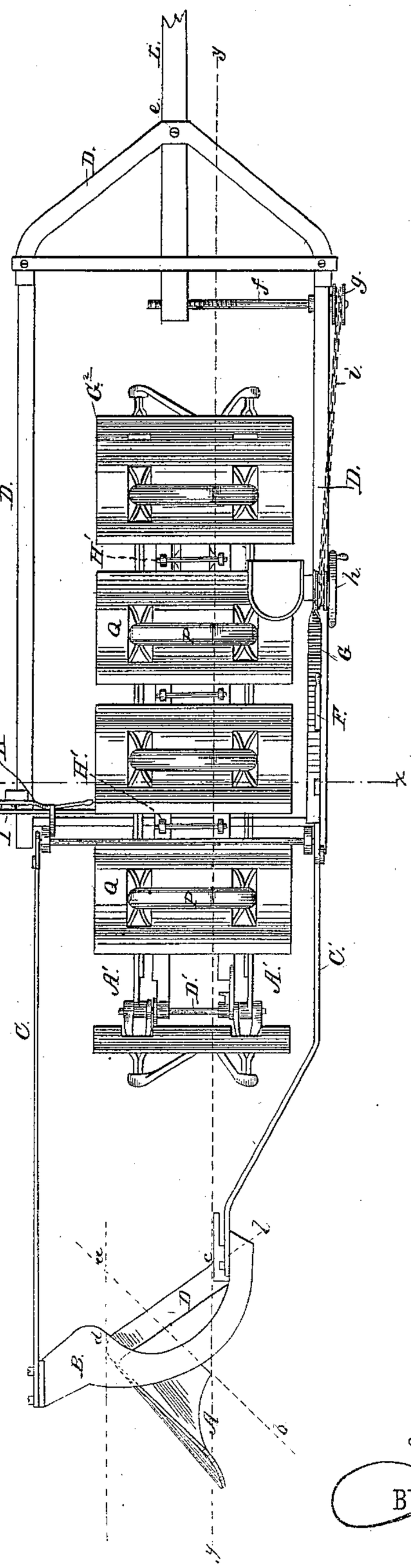
(No Model.) 3 Sheets—Sheet 2.

B. S. BENSON.

PLOW.

No. 252,991. Patented Jan. 31, 1882.

Fig. 2.



WITNESSES:

J. C. Kennon

Edw. W. Byrn

INVENTOR:

B. S. Benson

BY Munn & Co

ATTORNEYS.

(No Model.) 3 Sheets—Sheet 3.

B. S. BENSON.

PLOW.

No. 252,991. Patented Jan. 31, 1882.

Fig. 3.

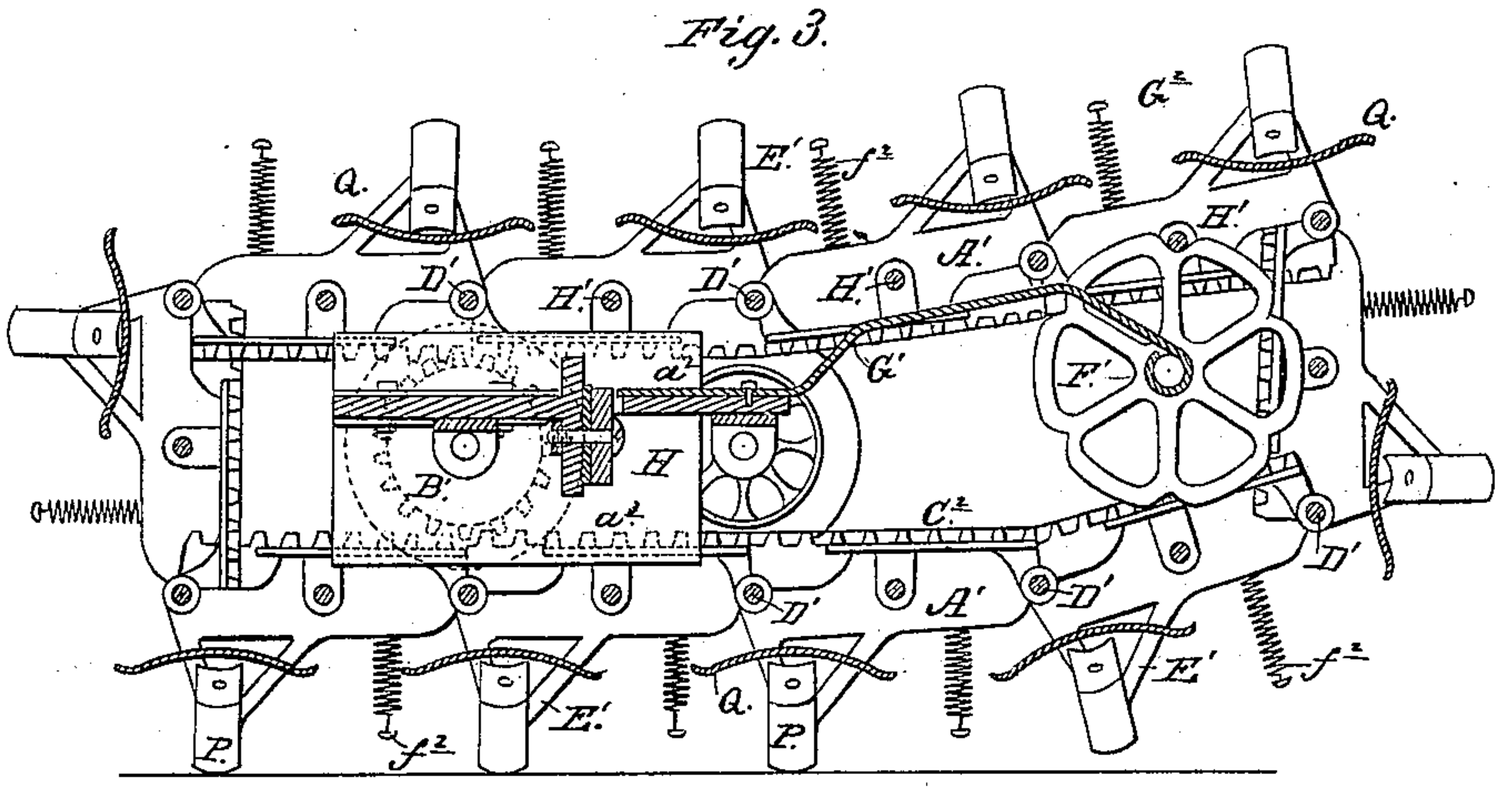


Fig. 5.

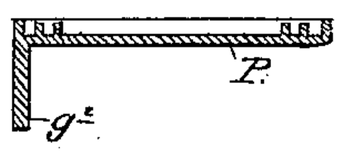
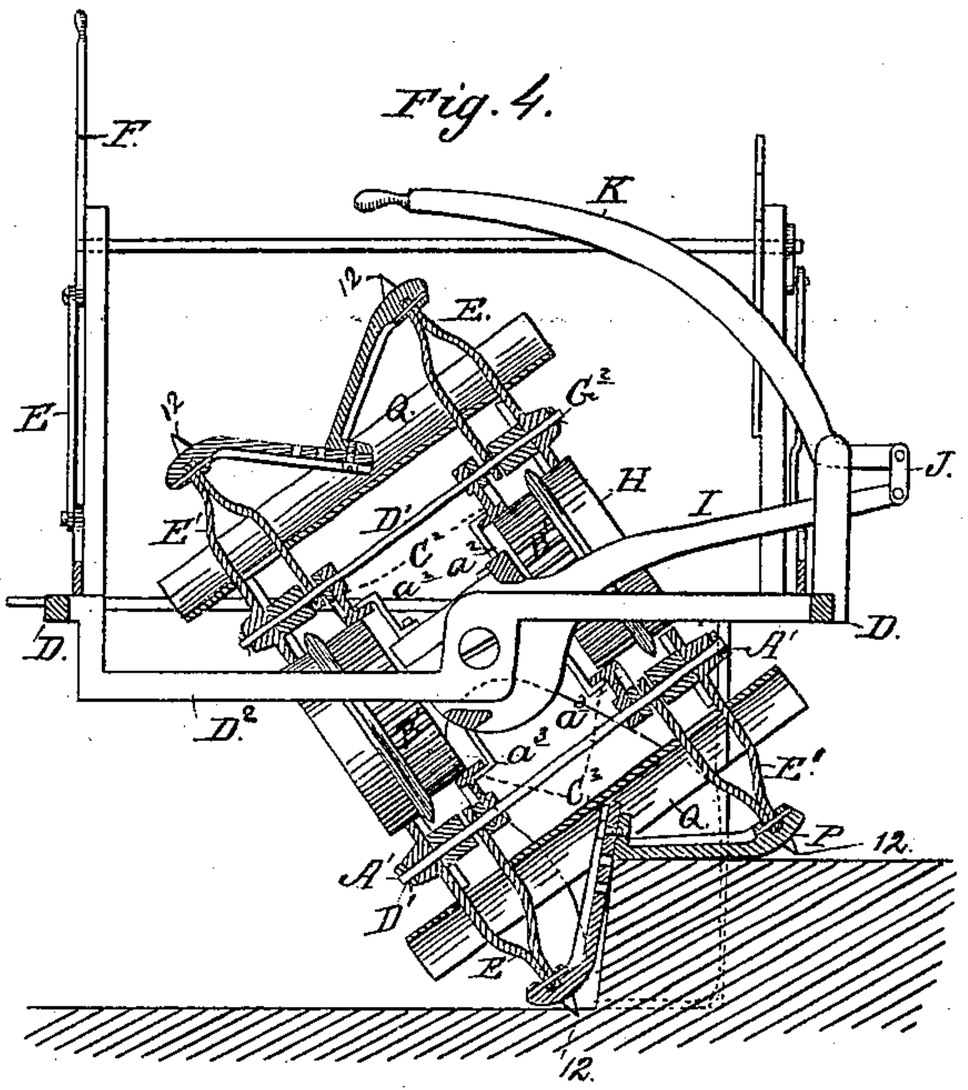


Fig. 4.



WITNESSES:

J. C. Kennon.

Edw. T. Byrn.

INVENTOR:

B. S. Benson

BY Munn & Co

ATTORNEYS.

UNITED STATES PATENT OFFICE.

BENJAMIN S. BENSON, OF BALTIMORE, MARYLAND.

PLOW.

SPECIFICATION forming part of Letters Patent No. 252,991, dated January 31, 1882.

Application filed January 6, 1881. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN S. BENSON, of Baltimore city, State of Maryland, have invented a new and useful Improvement in Plows; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to certain improvements in plows, which improvements are designed mainly to lighten the draft and reduce the friction.

In the ordinary form of mold-board plow the front edge of the share inclines as it extends to the rear from the point in front (which is embedded in the earth) to the landside of the previous furrow, and with this construction the point is jammed as the plow advances like a wedge into the solid earth, making the draft very great, for the reason that the point is far in advance of the relieving cutting-edge which loosens and turns over the slice. To obviate this difficulty I reverse the inclination of the share of the plow, and make its forward edge first cut the slice at the wall of earth left by the previous furrow, the share then inclining to the rear deeper into the wall of earth, so that the cut is a share cut which constantly relieves itself instead of a wedging action which creates a constant jam.

Another prominent feature of my invention consists in means for avoiding the friction and heavy draft strain involved in the use of sulky-wheels for sustaining the plow, or wheels for preventing the side thrust of a gang of plows. When simple wheels are used for this purpose they sink into the soft earth to such an extent that when the plows move forward the wheels have to encounter a rise in the earth, which is equivalent to an uphill draft, and makes a very heavy and unnecessary traction. To avoid this objection I provide a species of walking railway, which is laid down in front of and taken up behind a wheeled truck, so that no matter how soft the land may be the wheels run upon a metal track, and do not have to encounter the strain involved in the burying of the wheels in the earth. This construction of device I design more particularly for plows when arranged in gangs, or steam-plows where some special devices are necessary to sustain the gang and prevent them from moving laterally from the side thrust.

My invention also consists in other details of construction, which can be better described in connection with the drawings, and will be afterward pointed out in the claims.

Figure 1 is a side view of the whole device, looking at it from the mold-board side. Fig. 2 is a plan view. Fig. 3 is a vertical longitudinal section of the traveling railroad and truck for carrying the weight of the plows and resisting side thrust. Fig. 4 is a vertical transverse section through the line *x x* of Fig. 2, looking in the direction of the arrow, and showing the traveling railroad tilted so as to straddle the projecting edge of the unbroken land. Fig. 5 is a detail sectional view of a modification of the foot-plate of the railway.

As I propose to use the plow proper independently of the traveling railway in many cases—as, for instance, when used for ordinary horse-plows—I will first describe it without reference to the railway.

Referring to Fig. 2 of the drawings, A represents a mold-board or turn-plow, which, as shown, is applied to the cross-bar B, attached to the rear ends of beams C C′, but which may be attached to the single beam of any ordinary horse-plow. In the ordinary form of plow the cutting-edge of the share is on the incline of the line *a b*, and as the point is at *a* it enters the compact earth with a wedging action that is not relieved by the turning of the slice, and the result is that a great draft strain is required to draw the plow.

I make the plow with a share, D, whose cutting-edge *c d* is at a reverse inclination to *a b;* and I make the share to be attached to a rabbet in the front edge of the mold-board extending from the top of the front edge of the mold-board down to the lowest level of the plow, and then out to the previous furrow and then up again to the beam C′ or other suitable support.

The object in having the share of the plow to cut on the line *c d* instead of *a b* is to avoid the wedging and unrelieved jamming action at the point when at *a*, and to make the draft easier by making the cut a share cut, the front edge, *e*, of the share cutting first into the wall of the preceding furrow, (indicated by line *y y*,)

and the portion of the share in the rear of this sinking a little deeper into the furrow-slice, and so on giving the cutting-edge constant relief as the cutting proceeds and making the draft of the plow very much lighter. The making of the inclination of the share reverse to the inclination of the mold-board secures the desirable result also of neutralizing the side thrust of the mold-board, so as to reduce the necessity for a landside.

When a landside is required one may be attached at *l* to the share so as to bear against the wall left by the previous furrow. In such case, however, the part *l* is rather more in the nature of a gage than what is usually known as a "landside."

When the plow is to be used in connection with the traveling railway, as shown, the beams C C′ of the plow are jointed in front to a frame, D, and the beams are raised and lowered (see Fig. 1) by a link, E, and lever F held to its adjustment by a notched bar, G. Within this frame are arranged the traveling railway G^2 and truck H. (Shown detached in Fig. 3.) This truck is provided with four or more wheels and a body portion, which latter is jointed in its middle to a cross-bar, D^2, of the frame D, (see Fig. 4,) so that the truck and traveling railway may be rocked sidewise, so as to occupy the tilted position shown in Fig. 4 or to rest at a level or horizontal position, such adjustment being effected by a lever, I, which is rigidly connected to the body of the truck, a link, J, and a lever, K.

To economize space the axis upon which the truck tilts is a short stout bolt, as in Fig. 3. Broad bearing-plates are employed at the joint, however, to prevent looseness. When the railway is in its tilted position it is held steady and prevented from tipping over by the natural side thrust of the gang of plows on frame and the strain on the frame D due to the traction at one end and the resistance of the plows at the other.

To the front part of the frame D is pivoted upon a vertical bolt, *e*, a horizontally-swinging tongue, L. (See Fig. 2.) Through the rear end of this tongue is passed the screw-threaded end of a shaft, *f*, which is journaled in bearings in the frame D, and has a chain-wheel, *g*, that connects with a corresponding chain-wheel, *h*, near the driver's seat by a chain, *i*, so that by turning the wheel *h* the tongue may be swung from one side to the other to guide or adjust the plows to their proper position.

I will now proceed to describe more particularly my improved traveling railway and truck.

The truck is provided, as before stated, with four flanged wheels, which run upon a track formed by the two endless chains A′ A′, which pass around the truck, and two of said wheels have cog-wheels B′, Figs. 3 and 4, at their inner edges, which engage with hinged rack-bars C^2, so as to cause the truck when pushed or pulled forward to push that portion of the railway resting on top of the wheel forward and lay it down as a track upon which the truck runs.

The two endless chains A′ A′ are composed of links jointed upon cross-rods D′, which cross-rods separate the two chains the distance of two or three feet, and the links are preferably about fourteen inches long, and are provided with feet E′, with plates at their extremities of such area as to withstand sinking into the ground. Just inside the links of these two chains are the rack-bars C^2, which are jointed on the same cross-rods as the links of the chain, and serve, in connection with the cog-wheels on the truck, to revolve the railway about the trucks, or, in other words, lay the railway down in front of the truck to form the track and pick it up behind said truck. To secure this action it is necessary that the cog-wheels of the truck and the racks should always be engaged both underneath and above the wheels, and for this purpose flanged guides a^2 (see Figs. 3 and 4) are attached to the body of the truck and rest above ribs on the sides of the racks to hold them down to the cog-wheels of the truck, and corresponding flanged guides, a^3, beneath the truck-body rest beneath ribs on the sides of the racks and hold the cog-wheels and racks engaged at this point.

The inner edges of the links of the chain form the track for the plain wheels of the trucks, and the said wheels are kept in place thereupon and prevented from slipping off sidewise by flanges like ordinary car-wheels, but deeper. As the railway is laid down in front of the truck it is necessary that it should be carried some distance in advance of the truck, in order that it may have room to adjust itself to a straight line before the truck gets on it; and to prevent the chains from falling down and becoming displaced the upper section of the chain is held up in advance of the truck by sprocket-wheel F′, Fig. 3, mounted upon the end of a support, G′, attached to the truck and extending forward between the chains. This sprocket-wheel is provided with notches, which receive the cross-rods of the chains, and to hold up the chains between these cross-rods shorter supplemental cross-rods H′, Figs. 2 and 3, are made to connect the rack-bars on opposite sides and rest in every alternate notch of the sprocket-wheels. The feet of the chains are located at one end of the links, while the other ends are sustained and steadied by spring presser-feet f^2. The plates P on the bottoms of the feet I make with an angle in them, and I may employ either the form shown in Fig. 5, in which the angle is at the end, or like those shown in Fig. 4, in which the angle is in the center. When made as in Fig. 5, the rib or flange g^2 being parallel with the line of draft, it laps over the projecting edge of the wall left by the previous furrow and prevents the side thrust of the plows. With this form of plate the trucks and railway need not be tilted; but when made as in Fig. 4 the truck and railway

are tilted, as shown, to straddle the projecting edge of the earth.

Q are plates or shields placed between each foot and the truck, which catch the dirt that adheres to the feet and prevent it from dropping into the working joints of the devices as the feet pass over.

In describing the function of the traveling railway and truck I would state that the railway has no active effect in producing or influencing the traction, but is passive in its movement; and it is designed to take the place of wheels which have heretofore been used to sustain the weight of the plow, and prevent the lateral thrust which manifests itself when a gang of plows are drawn through the earth. Wheels, as I have before stated, are not equal to this task, especially in steam traction, by reason of burying in the earth, and notwithstanding the complications which the endless chain involves I have found by practical experiment that the draft is very materially lightened by the use of this device, and a sufficient purchase may be obtained against the wall of earth left by the previous furrow to resist the lateral thrust of a large gang of plows, such as are contemplated in a steam plowing-machine.

In constructing the plates P on the feet I also form them with floats or cleats 12 on the bottom of them, running lengthwise of the furrow to catch in the ground to prevent the truck being slewed around when the plow is making the furrow.

With respect to the subject-matter contained in claims 4, 5, 7, 9, 10, 12, and 13 in another pending application for steam-plow filed originally March 3, 1880, allowed June 8, 1880, forfeited, and renewed October 24, 1881, I would state that I do not claim such subject-matter in this case, although more or less of the same may be shown herein.

Having thus described my invention, what I claim as new is—

1. A mold-board plow having its share or front cutting-edge inclined, as described, reversely to the general inclination of the mold-board, and extending forwardly from the plow-standard to the previous furrow, as and for the purpose set forth.

2. The combination, with a mold-board plow, of a detachable share, D, inclined reversely to the general inclination of the mold-board, as described, and attached to the front edge of the same, and extending forwardly to the land-side of the previous furrow, and then up to a support, as described.

3. The combination, with one or more plows, of a passively-moving railway having presser-feet with an inwardly projecting angle adapted to fit over the edge of the unplowed ground, and a flanged-wheel truck located within the traveling railway and attached to and supporting the plows, so as to cause the weight and lateral strain of the plows to be constantly sustained upon the railway, as described.

4. The combination of the plow-beam B, mold-board A, share D, and the two beams C C′, connected to the beam B and jointed to a frame in front, as described.

5. The combination, with a mold-board plow having a share, D, slanted forward from the mold-board to the previous furrow, of a landside or gage, *l*, fixed to said share and adapted to bear against the wall of the previous furrow, as described.

6. The combination, with one or more plows, of a traveling railway and a flanged-wheel truck running within the same, connected to the plow-frame by a pivotal joint, which permits the railway to rock sidewise, substantially as described.

7. The combination, with the tongue L, pivoted upon a vertical bolt, of a screw-shaft, *f*, extending through said tongue and bearing chain-wheel *g*, the chain *i*, and the chain-wheel *h*, located near the driver's seat, as described.

8. The truck H, having running wheels, with gear-wheels B′, and flanged guides a^2 a^3, in combination with the endless chain A′ A′ and the jointed racks C^2, substantially as and for the purpose described.

9. A traveling railway having feet with an angle in the same adapted to straddle or lap over the projecting edge of the previous furrow, substantially as described.

10. The cleat on the bottom of the foot, arranged longitudinally or in line with the draft, so constructed as to take hold in the ground to prevent the track from slewing when the truck is not tilted over the wall left by the furrow, in combination with the railroad-track on the feet and the flanged truck-wheels.

BENJAMIN S. BENSON.

Witnesses:
A. C. LEIGHTON,
J. C. BENSON.