

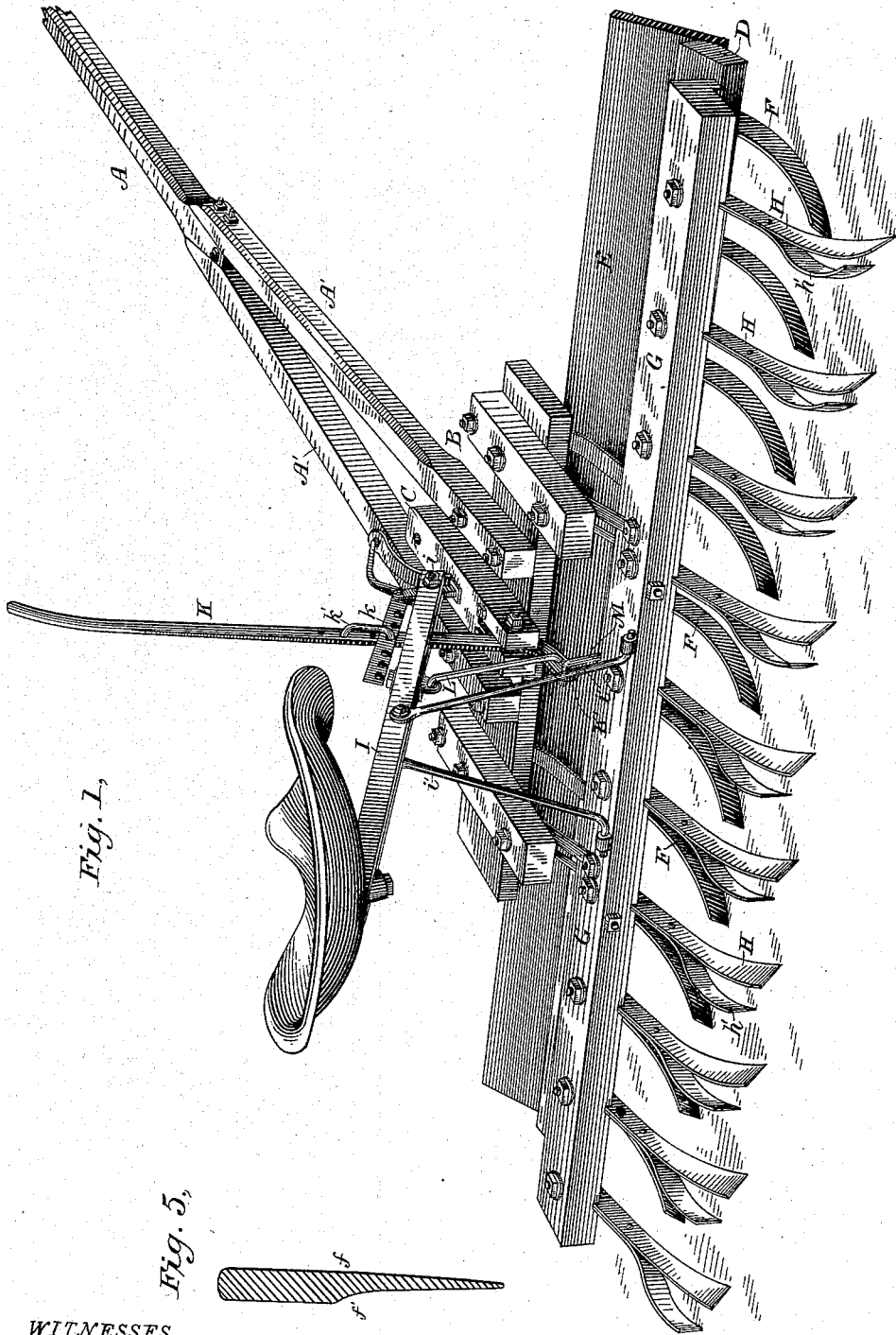
(No Model.)

F. NISHWITZ.
HARROW.

2 Sheets—Sheet 1.

No. 262,975.

Patented Aug. 22, 1882.



WITNESSES
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Edwin A. Newman.

INVENTOR
Frederick Nishwitz,
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Baldern, Hopkins, & Bedford.

(No Model.)

2 Sheets—Sheet 2.

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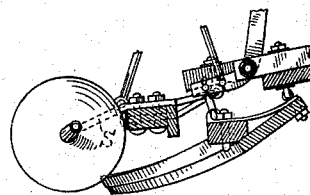
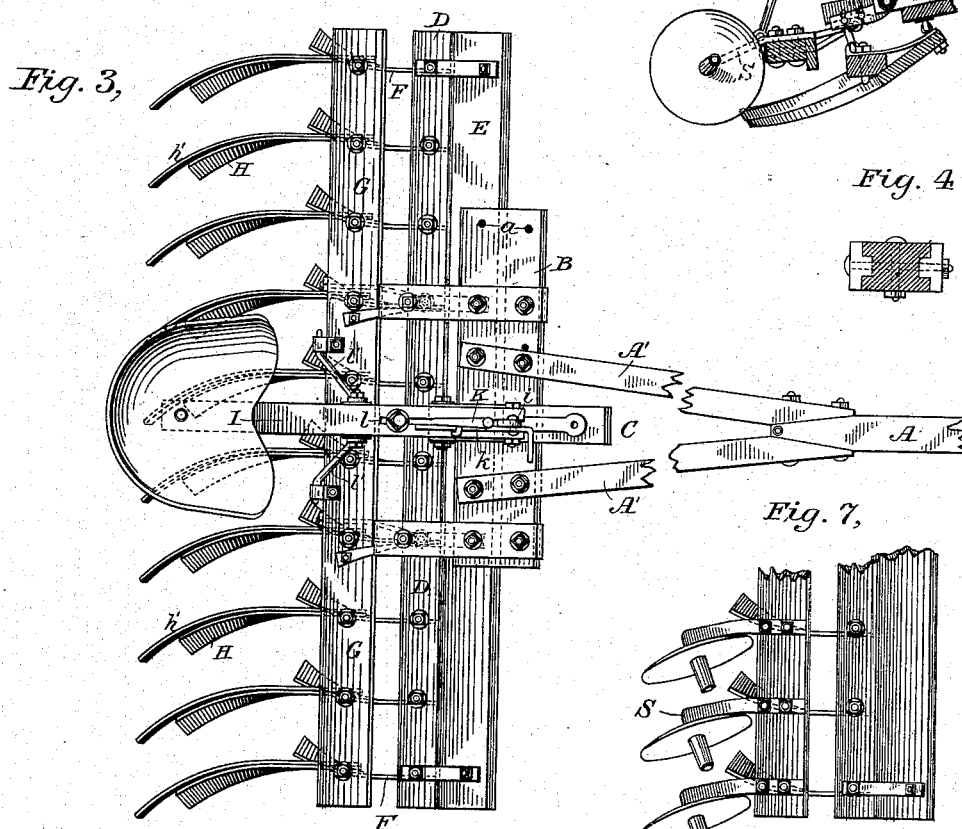
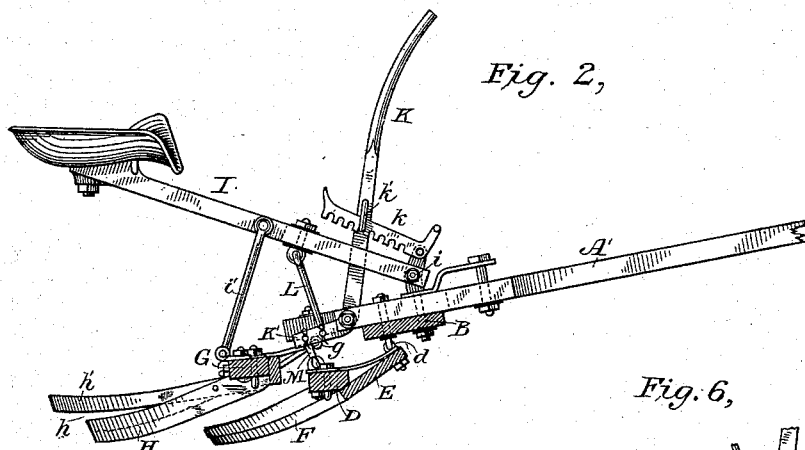


Fig. 4

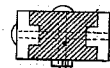
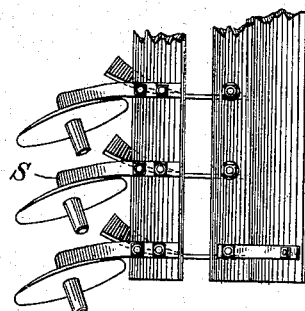


Fig. 7,



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UNITED STATES PATENT OFFICE.

FREDERICK NISHWITZ, OF MILLINGTON, NEW JERSEY.

HARROW.

SPECIFICATION forming part of Letters Patent No. 262,975, dated August 22, 1882.

Application filed February 3, 1882. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK NISHWITZ, of Millington, in the county of Morris and State of New Jersey, have invented certain new and useful Improvements in Harrows, of which the following is a specification.

The invention consists in certain novel features and organizations, the details and operations of which will be fully set forth and claimed hereinafter.

In the accompanying drawings, Figure 1 is a perspective view; Fig. 2, a vertical sectional view; Fig. 3, a plan view; Fig. 4, a section taken at the joint of the tongue; Fig. 5, a cross-section of the blade of a harrow-tooth; Fig. 6, a detail sectional view, showing disk-cutters on the rear gang-bar; and Fig. 7, a detail plan view, also showing disk-cutters.

The tongue A is rigidly bolted to the main or coupling frame B, and the short draft-bar or stub C is secured to the frame between the hounds or branches A' A' of the tongue.

The forward gang-bar, D, carries at its front an upwardly-inclined leveler or clod-crusher bar, E, the two being firmly secured together by suitable straps or angle-irons. This combined leveler and gang-bar is hinged at *d* to the coupling-frame. The leveler may or may not be used so far as part of my invention is concerned, though I prefer to employ it. Harrow teeth or devices F, which will be described in detail hereinafter, are secured upon this gang-bar. They are shown as socketed in transverse cuts or slots on the under side of the bar, and are securely held by hooked or looped bolts, which pass through apertures in the teeth and up through the bar, and are held by a screw-nut, as will be well understood. The teeth may of course be secured in other ways.

The rear gang-bar, G, is hinged to the coupling-frame at *g*, as shown in the drawings, leaving a space between it and the front gang-bar. This bar also carries teeth H, hereinafter to be described in detail, which are attached thereto, as above described. The lower edge of the leveler extends somewhat below the under face of the forward gang-bar, so as to form an offset, and the cutting-edge of the downwardly-extending harrow-tooth is flush with the face of the leveler. A similar offset is formed on the rear gang-bar, and the teeth are similarly secured in relation to it. The

teeth on the forward bar are uniformly laterally curved in one direction, while those on the rear bar are uniformly curved in the opposite direction to insure the rectilinear motion of the machine. The two series or gangs of teeth are so curved and arranged in relation to each other that those in the rear gang completely cut out the spaces left by the teeth of the forward series, as will be clear upon reference to Fig. 3. The trailing or dragging teeth which I employ are very effective in a machine of this character, and thoroughly cut, break up, and treat the soil, and where the leveler is used with the two gangs very perfect work is done.

Instead of having harrow-teeth on the forward gang-bar, that bar may be used as a leveler or crusher only, so far as part of this invention is concerned, in which case the teeth on the rear gang should be arranged in two series on opposite sides of the draft-line and curved in reversed directions to insure the rectilinear motion of the machine; or teeth so formed as to cause the machine to move straight when they are arranged in a uniform series may be employed, if preferred.

The seat-standard I is pivoted at *i* on the coupling-frame or tongue, and is supported in part upon the rear gang-bar by pivoted links *j*. An adjusting-lever, K, is pivoted on the coupling-frame, and is preferably arranged to work in a longitudinal slot in the seat-standard. The angular extension or rearwardly-bent end K' of this lever is connected at different points by a link, L, with the seat-standard, and by a link, M, with the forward gang-bar. The lever is held in any desired position by a notched dog or detent, *k*, pivoted on the frame or seat-standard, which is operated by the foot of the driver, and engages with a loop or eye, *k'*, on the lever. The weight of the driver is also supported upon the forward gang-bar through the lever and links L and M. The weight is thus distributed over both gangs. By operating this lever the gangs may be swung upon their hinge connections with the frame, so as to depress the teeth or cause them to assume a more angular or upright relation to the soil; or the frame may be allowed to come down upon the gang-bars, allowing the teeth to rise, and thus decrease the angle of the teeth to the soil, and cause them to trail or drag

more. Thus by drawing the lever toward him the driver may press down upon the forward gang by means of the thrust-link connecting it and the lever, and increase the angular or upright position of the teeth relatively to the soil, and at the same time draw down the seat-standard, and through the pivoted seat-supporting bars correspondingly depress the rear gang-bar and increase the angular or upright position of its teeth relatively to the ground. The parts are rigidly held in any adjusted position by the notched dog or detent on the frame which locks the lever. By vibrating the lever, therefore, the gangs are operated in unison to correspondingly vary their relation to the soil.

In adjusting the machine, as above mentioned, the harrow-teeth constitute the main fulcrum, upon which the entire machine rocks. The seat-standard and the pivoted rods resting upon the rear gang-bar constitute a pivoted coupling, brace, or arched connection between that bar and the frame, aside from the function of being a seat-support. It may or may not serve as a seat-support; and I do not wish to limit it to such a function.

The link *I*, which connects the lever and seat-standard, is adjustable by means of a set-screw in the slot *l* in the seat-standard. By this means the forward gang may be raised or depressed relatively to the rear one and to the frame, as may be desired.

In transporting the machine from place to place the lever is allowed to move forward to its utmost limit, so as to bring the crusher-bar down on the ground. Upon reference to Fig. 2, where this feature is clearly shown, it will be seen that the rear gang-bar is held at a greater height from the ground than the forward one, and this is so, no matter what the adjustment or positions of the gangs may be. The purpose of this construction is to provide a large area of discharge for the loose earth and debris which is turned up by the first gang of cutters, in order to prevent the earth from packing between the gang-bars and discharging over the rear gang-bar. In order to compensate for the different levels of the gang-bars and secure a uniform depth of cut, the teeth upon the rear bar may be longer than those in the forward gang, as shown in the drawings. I consider this an important feature in the organization of the machine.

The tongue is formed in section, as shown in the drawings, the length of the hounds *A' A'* and the tongue proper, *A*, being about the same as that of the gang-bars of the machine. By thus proportioning the parts the machine and tongue may be conveniently packed together and handled with facility. The way of uniting the hounds and straight portion of the tongue is clearly shown in Fig. 4. The tongue proper, *A*, is dovetailed or mortised to receive the tenons or tongues on the hounds *A' A'*, and the parts are securely bolted together by horizontal and vertical bolts, as shown.

The short stub or draft-bar *C*, which is cen-

trally attached to the machine, is entirely distinct from the hounds *A' A'*, and is straddled by them when the machine is to be drawn by a two-horse team. In order to adapt the machine to a three-horse team, the tongue is shifted laterally on the frame. The means for this adjustment are clearly illustrated in Fig. 3, where additional bolt-holes, *a*, for attaching the hounds, are shown in the cross-plank of the coupling-frame.

The harrow-teeth or cutters *F* on the forward gang-bar and the cutting-blades *H* of those on the rear bar are made of steel, which is rolled to an edge.

Fig. 5 is a cross-section showing the preferred form of tooth. In that figure the straight side *f* is the face which bears against the soil, and the opposite side, *f'*, is "hollow" rolled to form the cutting-edge. The advantage of such a cross-section is that the wearing of the edge does not dull it, as is the case when the teeth are beveled to an edge. The teeth may be hollow-rolled upon either or both faces; and I do not limit myself to the special rolling shown. By rolling the teeth to an edge in suitable lengths by a proper mill they can be produced with economy and facility, and they are made harder and more durable and satisfactory. The blanks are cut into lengths and shaped in a die, as will be well understood by those skilled in the art. The teeth on the rear gang-bar are formed with open slots *h*. The purpose of this formation is to prevent the clogging in the curved faces of the teeth necessary to turn the earth, which might otherwise occur. Any accumulation upon teeth of this character is impossible, and they keep themselves clean and free. They are shown as formed of two parts—a wing or upper earth-turning portion, *h'*, and the main portion or blade, to which the wing is secured. This is the most economical, convenient, and practical way of making them; but they may be made in one piece. I do not limit myself to any special detail, but desire to claim the curved trailing or dragging open-slotted tooth, broadly. The wing *h'* is longer than the cutting-blade, and is made so in order to turn the earth more perfectly.

In order to organize the machine in the most compact and efficient manner, so that it may be transported and handled with ease, I combine the frame and gang-bars so that the rear bar will overlap the trailing teeth in the forward gang, as shown in the drawings.

In Figs. 6 and 7 disk-cutters are shown on the rear gang-bar. Such cutters may be used with advantage in this machine. They are attached to the gang-bar by rearwardly-projecting bars *S*, and are set by preference at an angle both to the line of draft and the horizon, as is well understood. The operation of a machine thus equipped is like that before described.

The organization, operation, and advantages of the machine herein described have been sufficiently indicated, and do not need any further elaboration.

It will be obvious that the tongue or pole

may be hinged to the frame instead of being rigidly connected therewith, or might be dispensed with altogether. The machine, resting upon the two gangs, is sufficiently supported to maintain its working position irrespective of the tongue, and the weight of the driver may of course be adjusted to balance the machine. I prefer to use the tongue, however, as in my opinion it makes a better and more practical machine.

Instead of having the link-connection from the lever to the seat-standard, it might connect the lever directly to the rear gang-bar or a post thereon, and be so arranged as to rigidly hold the parts in the manner above set forth. Other variations of the details will doubtless occur to those familiar with this class of machinery.

I am aware that heretofore in a machine supported by carrying-wheels, and having two gang-bars arranged above the level of the axle, and carrying harrowing devices, the rear gang-bar has been placed on a higher level than the front bar. I therefore make no claim to such an organization.

I claim as my invention—

1. The combination, substantially as set forth, of the coupling-frame, the forward gang-bar or crusher and the rear gang-bar, both hinged thereto, connecting mechanism between the gang-bars and frame, and a lever for varying the relation of the gangs to the frame and to the soil.

2. The combination of the frame, the forward gang-bar or crusher and the rear gang-bar, both hinged thereto, a lever, and a connection or connections between the gang-bars and lever, whereby the relation of the gangs to the frame and to the soil may be varied.

3. The combination of the coupling-frame, the forward gang-bar or crusher and the rear gang-bar, both hinged thereto, harrowing devices on the gang-bars, a pivoted brace or connection between the rear gang-bar and frame, and a lever on the frame connected by links with the pivoted brace and forward gang-bar or crusher for adjusting the gangs, substantially as set forth.

4. The combination, substantially as set forth, of the coupling-frame, the forward gang-bar or crusher and rear gang-bar, both hinged thereto, harrowing devices on the gang-bars, a brace or coupling pivoted on the rear gang-bar and on the frame, a lever on the frame, the link-connections between the lever and the coupling and forward gang-bar or crusher, and a detent for holding the lever and gangs in their adjusted positions.

5. The combination, substantially as set forth, of the frame, the forward gang-bar or crusher and the rear gang-bar, both hinged thereto, the seat-standard pivoted on the frame and supported upon the rear gang-bar, the lever, and the link-connections between the lever and the seat-standard and forward gang-bar or crusher.

6. The combination, substantially as set forth, of the frame, the forward gang-bar or crusher and the rear gang-bar, both hinged thereto, the coupling-brace between the rear gang-bar and frame, a lever on the frame, a connection between the lever and forward gang-bar or crusher, and a link-connection between the lever and coupling-brace, which can be adjusted on the brace to raise or lower the forward gang-bar or crusher relatively to the rear one.

7. The combination of a frame or tongue, the forward gang-bar or crusher and the rear gang-bar, both hinged thereto, harrowing devices on the bars, and mechanism for adjusting the forward bar independently of the rear one to vary its relation to the soil, substantially as set forth.

8. The combination, substantially as set forth, of the tongue, the frame, the forward gang-bar or crusher and the rear gang-bar, both hinged to the frame, the connecting-brace between the rear gang-bar and frame, the lever for adjusting the gangs, the link-connections with the lever, and a detent.

9. The longitudinally open slotted curved trailing or dragging harrow-tooth herein described.

10. The longitudinally open slotted curved harrow-tooth, the upper side or wing of which is longer than the lower cutting portion, for the purpose set forth.

11. In a drag-harrow, the combination, substantially as set forth, of the front transverse gang-bar, harrow-teeth thereon, the rear transverse gang-bar, and harrow-teeth thereon, the rear bar being supported above the earth and on a higher plane than the front bar to afford a large area of discharge for the earth cut up by the first gang of teeth, as set forth.

12. The herein-described rolled-steel harrow-tooth, which is hollow-rolled to a cutting-edge, as set forth.

13. In a harrow in which the gang-bars are close to the surface of the ground and are supported by the harrow-teeth, the combination, substantially as set forth, of a frame or tongue, a gang-bar or crusher connected therewith, trailing or dragging harrow-teeth carried by this gang-bar, a rear gang-bar arranged above and to overlap the trailing teeth in the front gang, and teeth on the rear bar.

14. The combination of a frame, opposing series or gangs of harrow-teeth or earth-treating implements disposed on the opposite sides of the draft-line, an independent stationary draft-connection in the draft-line, and a laterally-shifting tongue, for the purpose set forth.

In testimony whereof I have hereunto subscribed my name this 2d day of February, 1882.

FREDERICK NISHWITZ.

Witnesses:

GEO. T. PINCKNEY,
DUANE H. NASH.