

No. 638,769.

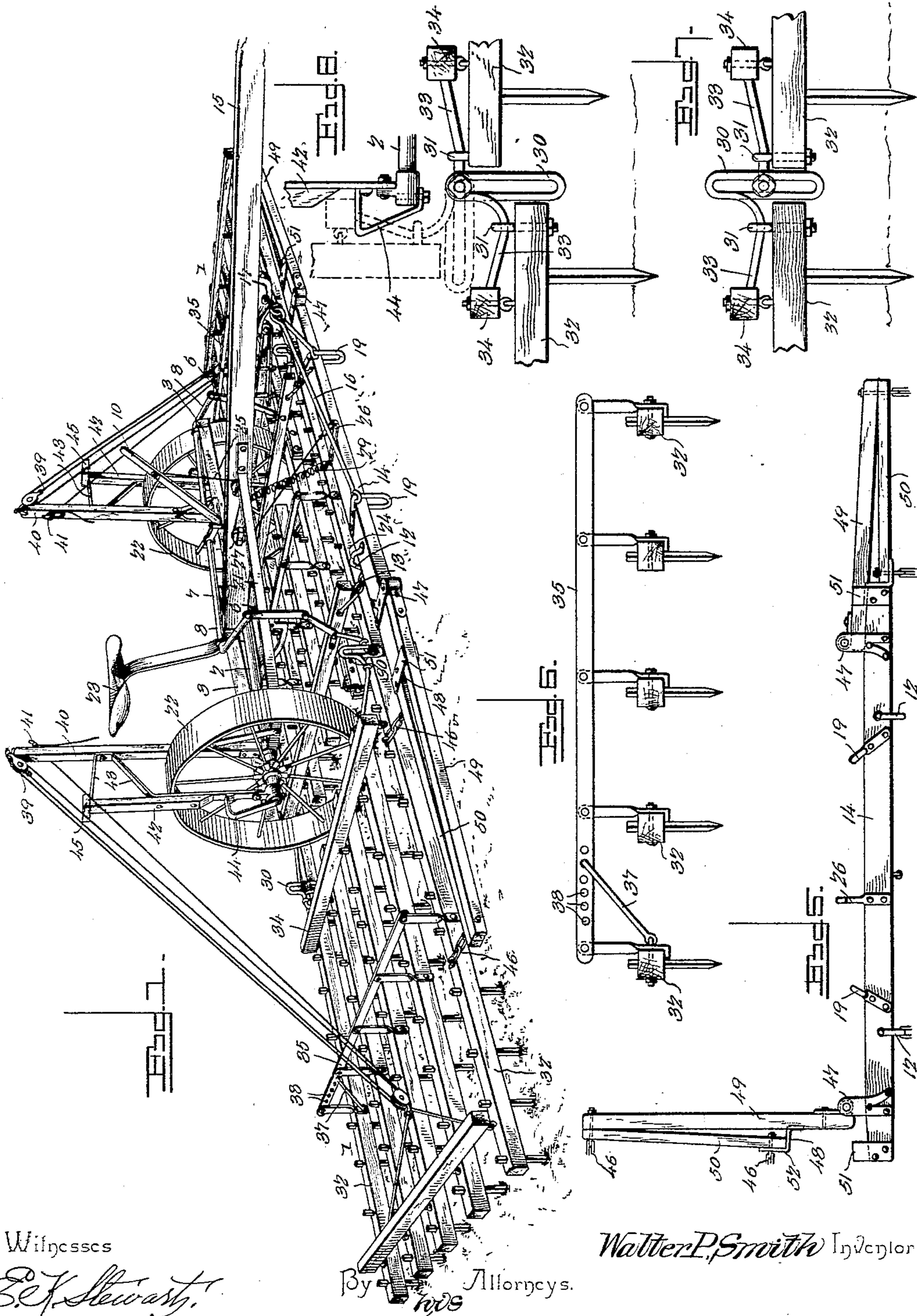
Patented Dec. 12, 1899.

W. P. SMITH.  
HARROW.

(Application filed Aug. 7, 1899.)

(No Model.)

3 Sheets—Sheet 1.



Witnesses

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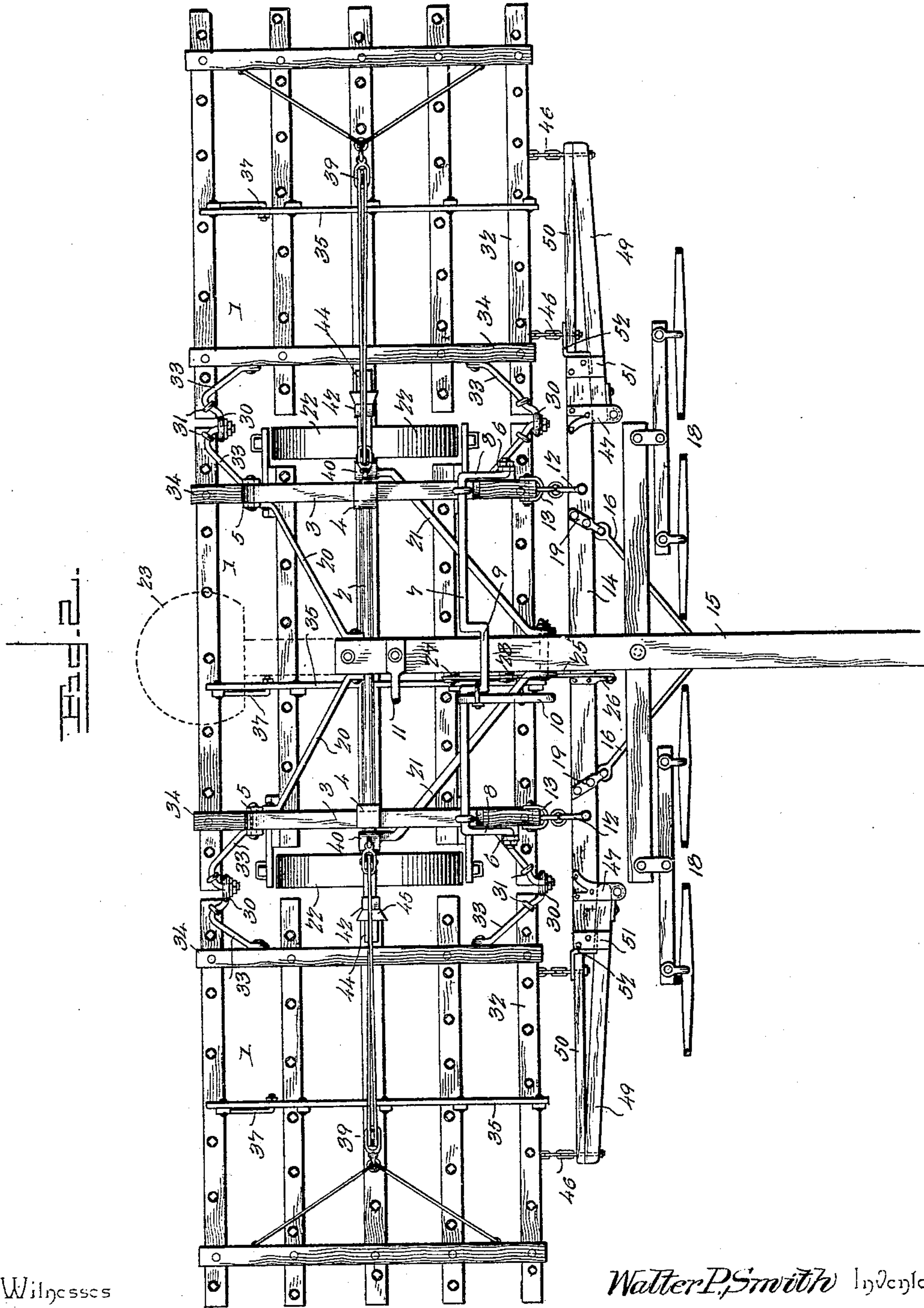
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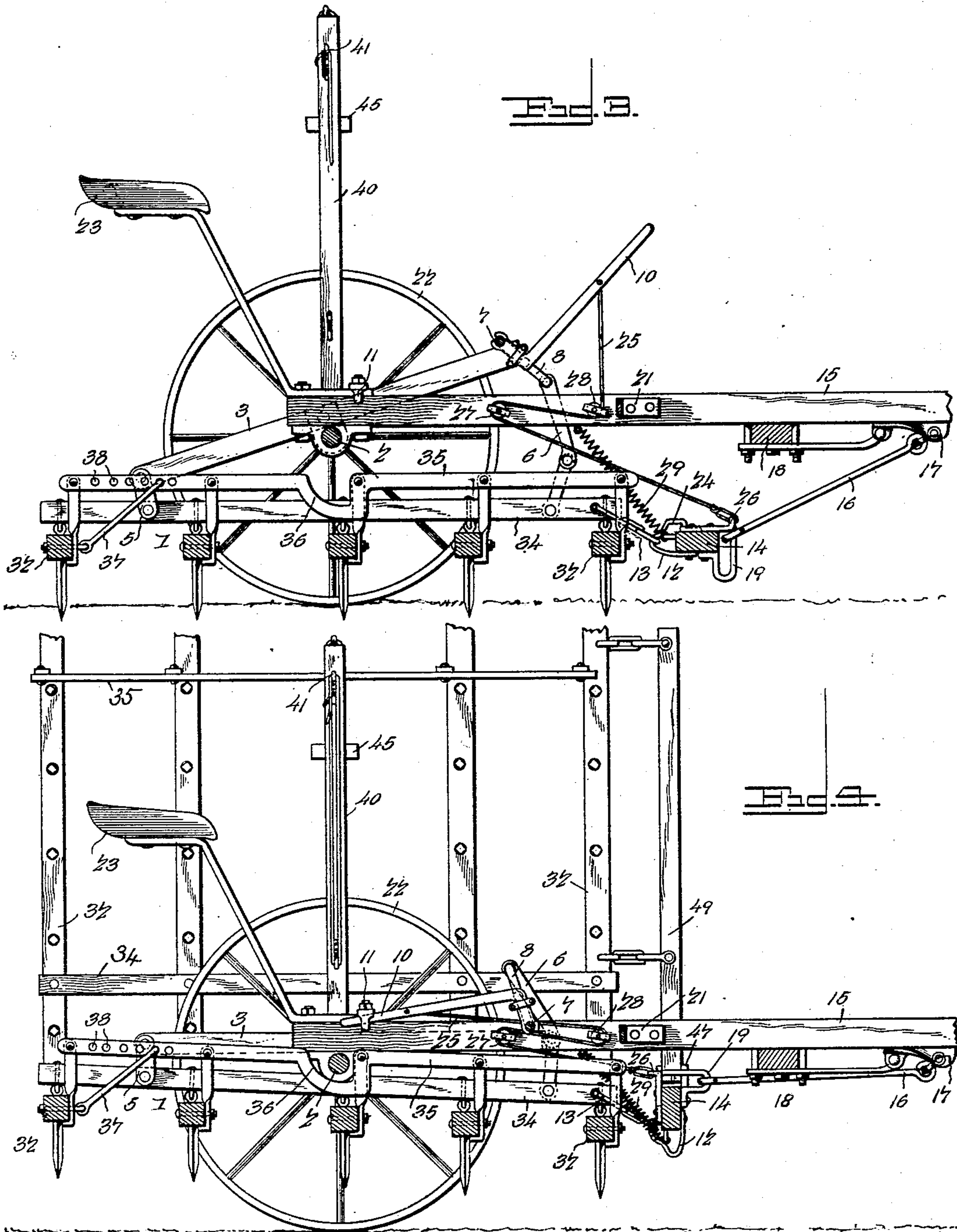
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# UNITED STATES PATENT OFFICE.

WALTER PRENTIC SMITH, OF CLARKSVILLE, IOWA.

## HARROW.

SPECIFICATION forming part of Letters Patent No. 638,769, dated December 12, 1899.

Application filed August 7, 1899. Serial No. 726,444. (No model.)

*To all whom it may concern:*

Be it known that I, WALTER PRENTIC SMITH, a citizen of the United States, residing at Clarksville, in the county of Butler and State of Iowa, have invented a new and useful Harrow, of which the following is a specification.

My invention relates to harrows, and has for its object to produce a riding-harrow of extreme width, which will be flexible to operate upon uneven ground and which can be folded into a compact form to pass through the ordinary farm-gate.

The invention consists in the combination and improved construction of parts of a harrow, as will be hereinafter more particularly set forth.

In the accompanying drawings, in which the same reference-numeral indicates a corresponding part in each of the views in which it occurs, Figure 1 is a perspective view of my improved harrow ready for use. Fig. 2 is a plan view of the same. Fig. 3 is a central sectional view from front to rear. Fig. 4 is a similar view showing the end section in its folded or elevated position. Fig. 5 is a plan view of the draw-bar. Fig. 6 is an end view of one section of the harrow, showing the means for adjusting the position of the teeth; and Figs. 7 and 8 are broken detail views of the connected ends of two sections.

Referring more particularly to the drawings, 1 indicates the sections of my improved harrow, the middle one of which is suspended from the wheeled axle 2 by means of the beams 3 3, each of which beams is pivotally secured to the axle intermediate of its ends by means of suitable boxing 4. The ends of the beams are pivotally connected with the harrow-section by means of the links 5 and 6, the links 6 being much longer than the links 5 and jointed to permit of their being folded up when it is desired to elevate the section and unfolded when it is to be lowered. In this manner the beams act as levers for raising the section and also as equalizing-supports for causing the weight of the section to be borne on the axle instead of upon the necks of the horses.

The beams are rocked upon the axle by means of a cross-rod 7, each end of which is mounted on the forward end of its respective beam and bent at an angle, as shown at 8,

and connected to one end of the link 6. The middle portion of the rod is provided with a substantially U-shaped bend 9 for straddling the tongue and with a lever 10, by means of which the rod may be rotated. One end of the lever is preferably formed into an L, which is bolted or otherwise secured to one side of the U-shaped bend, and the other end is adapted to be engaged by a latch 11 on the tongue to hold the harrow in its raised position.

Loosely connected with the front portion of the middle section of the harrow by means of the clevises 12 12 and the links 13 13 is a draw-bar 14, the ends of which are jointed and project beyond the ends of the middle sections and form means of attachment for moving the end sections forward. The middle portion of the draw-bar is connected with the tongue 15 by means of the draft-rods 16, the front ends of which engage with a clevis 17 in front of the doubletrees 18, and the rear ends engage with the clevises 19 19 upon the draw-bar.

The rear end of the tongue is secured to the axle midway of the beams 3 and held in that position by the diagonally-arranged brace-rods 20 20, the rear ends of which are rigidly secured to the beams. Two other brace-rods 21 21 are connected to the sides of the tongue to the rear of the doubletrees and extend rearwardly to the axle adjacent to the wheels 22 22. This construction and arrangement of parts makes a very strong frame for the support and operation of the harrow, and the weight of the driver upon the seat 23 will substantially balance the tongue and its attachments upon the axle, thereby removing all weight from the necks of the teams. I propose making the harrow of such width (preferably about eighteen feet) that it will require two teams to pull it, thereby saving the labor of one man in driving one of the teams besides the saving of time in manipulating the harrow.

The draw-bar is connected with the sections and with the tongue in such manner that it may be axially oscillated—that is, turned up edgewise—when it is desired to raise the sections. To accomplish this, the clevises 12 are substantially P-shaped—that is, one side is bulged outwardly, as shown at 24, so that the links 13 will slip around into the



bulged portion when the bar is turned up on edge—and the clevises 19 are substantially L-shaped—that is, the closed end is bent at an angle to the open end, so as to stand across the edge of the bar and permit of the draft-rods moving from directly in front of the bar when the harrow is in its operative position, as shown in Fig. 3, to the extreme end of the loop at one side of the bar, as shown in Fig. 4. This oscillation or movement of the bar may be effected simultaneously with the raising and lowering of the middle section by means of the cord 25, one end of which is connected with a handle or projection 26 on the bar, and the other end is connected with the lever, and the intermediate portion is passed over the pulleys 27 and 28 upon one side of the tongue. A spring 29 is connected with the tongue and with the edge of the bar opposite the projection 26, which will automatically turn the bar flatwise as soon as the lever is operated to lower the middle section.

Each of the end sections is loosely pivoted to the end of the middle sections by means of the eyes 30, the ones upon the end sections being elongated to form loops which stand vertically when the sections are lowered, thereby permitting of sufficient vertical movement of the sections independently of each other to accommodate the harrow to any unevenness of the surface over which it may pass. The shorter eye normally occupies a position substantially midway of the length of the loop of the other eye, as shown in Fig. 7. Each eye is secured to its respective section by the staple or eyebolt 31 in one of the tooth-bars 32, which engages with the tail or extended portion of the eye, the extreme end of the tail being secured to one of the cross-beams 34 of the harrow in any suitable manner. This construction permits of the oscillation of the tooth-bars to adjust the pitch of the teeth without affecting the operation of the vertical movement of the sections. The oscillation of the bars is preferably effected by the connecting-bars 35, which are connected with the tooth-bars in the usual manner, the one upon the middle section being provided with a notch or recess 36 to prevent its engagement with the axle when the section is raised to its full limit. The bars are held in their adjusted positions by means of the brace 37, one end of which is pivotally secured to one of the bars, and the other end is adjustably secured to the brace by means of the holes 38. If desired, the bars could be adjusted by means of the ordinary lever and rack; but I have not thought it necessary to show such a construction.

The end sections are changed from a horizontal to a vertical position by means of a block-and-tackle mechanism 39, one end of which is secured to its respective end section and the other end is secured to a standard 40, adjacent to the driver's seat. The free end of the rope is secured in any desired manner, as by looping it over the belaying-pin 41.

The lower end of the standard is secured to the frame upon the axle in any suitable manner within the wheels, and the upper end is braced against outward movement by the auxiliary standard 42 and the cross-braces 43. The lower end of the auxiliary standard is secured to the end of the axle outside of the wheels and is provided with a step 44, and the upper end is provided with a block 45. The step 44 is of such a height that when the end section is raised into its vertical position the cross-bar 34 at the inner end of the section will just slip onto the step and take the weight of the section off the connections between it and the middle section. One of the tooth-bars of the harrow will bear against the block 45 to steady the section in its vertical position.

By extending the ends of the draw-bar beyond the ends of the inner section and connecting the end sections thereto by means of the links 46 it is necessary that the extensions of the bar be pivotally connected with the main portion to permit of their being turned into a vertical position when the end sections are elevated. To make as strong and rigid a joint as possible between the extensions and the main frame and at the same time make the entire bar as strong and light as possible, I have found it desirable to partially rotate the bar on its axis, as hereinbefore described, and to connect the extensions to the main portion of the bar.

Each extension is pivotally secured to the front edge of the bar near the end by means of the bracket 47, which is located substantially in alinement with the eyes 30, so that the parts may move upon their respective pivotal points without binding. At the end of the middle portion of the bar the extension is provided with a shoulder 48, which is adapted to engage with the end of the middle portion and form a very rigid construction, and by making the extension out of two pieces 49 and 50 it will be correspondingly lighter than if it were made solid. The front or longer piece 49 is preferably inclined to the rear and adapted to fit between two plates 51 51 on the end of the middle portion, while the inner end of the shorter piece 50 is secured to the other piece by an angled piece of strap-iron 52 and is adapted to lie in a straight line with the middle portion of the bar and abut against the end thereof when the harrow is in its operative position and the bar is lying flatwise.

When it is desired to use the harrow in the ordinary manner as a drag, the wheel and tongue may be quickly removed and the teams hitched directly to the draft-rods of the draft-bar; but when the wheels are in position I prefer to locate one or more of the teeth in the rear tooth-bar in such a position that they will engage with the soil over which the wheels have traveled and break it up, thus leaving no wheel-marks upon the ground after the harrow has passed over it.

By connecting the draw-bar with the lever



10 by means of the cord 25 and subjecting it to the tension of the spring 29 the action of the bar is rendered automatic in manipulating the harrow. When it is desired to fold the harrow, the driver first draws back the lever 10, which raises the middle section and oscillates the draw-bar and secures the lever at the side of the tongue by the latch 11. He then draws upon the free end of the rope of the block and tackle until the end section has been raised into a vertical position and is supported on the step on that side of the harrow. He then raises the other end section in like manner, when the harrow is ready for transportation. The reverse operation renders the harrow ready for use in the field. The rotation of the draw-bar automatically locks the hinge or joint between the extensions and the main portion when the bar is flatwise.

Having thus described my invention, what I claim is—

1. In a harrow, the combination with hinged sections, of a wheeled support, an axially-rotatable and sectional draw-bar having its members connected individually with said harrow-sections, and mechanism for rotating said draw-bar and elevating the harrow-sections, substantially as described.

2. In a harrow, the combination with a wheeled support, of hinged sections suspended therefrom, a jointed draw-bar secured to the sections, and means for automatically locking the joints by the rotation of the bar.

3. In a harrow, the combination with a support, of hinged sections suspended therefrom, a jointed draw-bar provided with P-shaped clevises on one side and L-shaped clevises on the opposite side, the middle harrow-section being connected with the P-shaped clevises, draft-rods engaging with the L-shaped clevises and with the tongue of the support, and means for rotating the bar axially.

4. In a harrow, the combination with a support, of hinged sections suspended therefrom, an axially-rotatable draw-bar for connecting the sections with the tongue of the support, a lever, a cord between the lever and the bar for rotating the bar in one direction, and a spring for engaging with the bar and returning it to its normal position.

5. In a harrow, the combination with a support, of hinged sections suspended therefrom, the middle one of which is movable vertically, a rotatable draw-bar connected with the sections and with the tongue of the support, and means for simultaneously raising the middle section and rotating the bar.

6. In a harrow, the combination with a support, of hinged sections suspended therefrom, a rotatable draw-bar, each end of which is provided with an extension, said extension being provided with a shoulder that is adapted to abut against the end of the main portion of the bar, means for rotating the bar and means for raising the end sections into a vertical position.

7. In a harrow, the combination with a support, of hinged sections suspended therefrom, a rotatable draw-bar secured to the sections, each end of which is provided with plates and a bracket adjacent thereto, an extension pivotally secured to each bracket and adapted to fit between the plates, a lever for rotating the bar axially, and means for raising the end sections into a vertical position.

8. In a harrow, the combination with a support, of hinged sections suspended therefrom, a rotatable draw-bar secured to the sections, an extension pivotally secured to the forward edge of the bar near each end, said extension comprising two pieces, one of which is longer than the other and is inclined, and the shorter one lies in a line with the main portion of the bar and abuts against its end, a plate for connecting the inner end of the shorter bar with the longer bar, a lever for rotating the bar, and means for raising the end sections.

9. In a harrow, the combination with a wheeled support, of beams pivotally secured thereto, an angled shaft mounted on the forward ends of the beams and provided with means for rotating it, hinged harrow-sections, links for suspending the middle section from the rear ends of the beams and the ends of the shaft, the links at the ends of the shaft being longer than the other ones, and a jointed draw-bar secured to the sections and to the tongue of the support.

10. In a harrow, the combination with a wheeled support, of beams pivotally mounted on the axle, a shaft mounted on the forward ends of the beams, each end of which is bent at an angle and the central portion is provided with a bent portion to straddle the tongue, a lever secured to said bent portion, the free end of which is adapted to be secured at the side of the tongue, hinged harrow-sections, links for suspending the middle section from the rear ends of the beams and from the angled ends of the shaft, the links at the end of the shaft being longer than the other ones, and jointed, and a jointed draw-bar secured to the sections and to the tongue of the support.

11. In a harrow, the combination with a middle section, of end sections, the adjacent ends of which are provided with eyes, the ones upon the end sections being elongated to form vertical loops, each eye being provided with a tailpiece which is rigidly secured to a cross-bar of the harrow, a staple on the tooth-bar adjacent to each eye, the tailpiece passing through the staple, a hinged draw-bar secured to the sections, and means for manipulating the harrow.

12. In a harrow, the combination with a wheeled axle, of hinged sections suspended therefrom, each section comprising a series of rotatable tooth-bars, a connecting-bar for each section provided with holes, the bar for the middle section being notched, a brace for each section, one end of which is secured to one of the tooth-bars and the other end is adjustably connected with the perforated por-



tion of the connecting-bar, and means for manipulating the harrow.

13. In a harrow, the combination with a wheeled support provided with a standard at 5 each wheel, of a step on the outer portion of each standard, hinged sections suspended from the support, the end ones being each provided with a cross-beam in position to rest upon the step when the section is in a vertical 10 position, and a block and tackle for raising each end section.

14. In a harrow, the combination with a wheeled support, of two standards secured to the support within the wheels, an auxiliary 15 standard outside of the wheels, the lower portion of which is provided with a step and the top is provided with a stop, braces between the standards above the wheels, hinged sections suspended from the support, and a block

and tackle from the top of each inner standard 20 to its respective end section.

15. In a harrow, the combination with a wheeled support, of a standard mounted on said support and provided with a step, the hinged sections, one of which is adapted to rest 25 upon the step when raised to a substantially vertical position alongside of the wheeled support, and mechanism for raising the adjustable harrow-section, substantially as described. 30

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

WALTER PRENTIC SMITH.

Witnesses:

F. M. FORNEY,  
JOHN J. WOOD.