

D. MANUEL.
HARROW.

No. 490,294.

Patented Jan. 24, 1893.

Fig. 3.

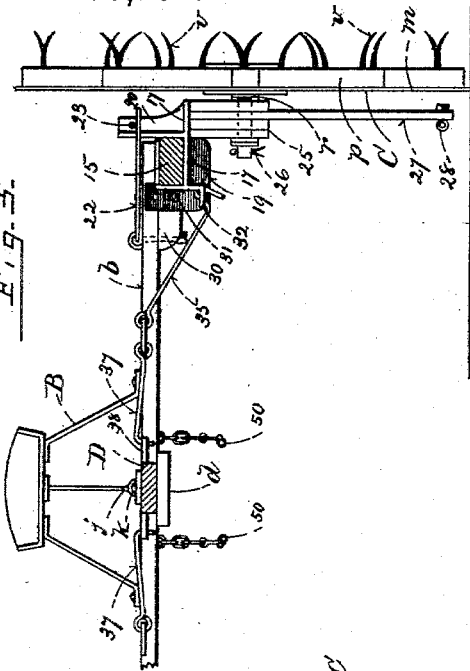


Fig. 2.

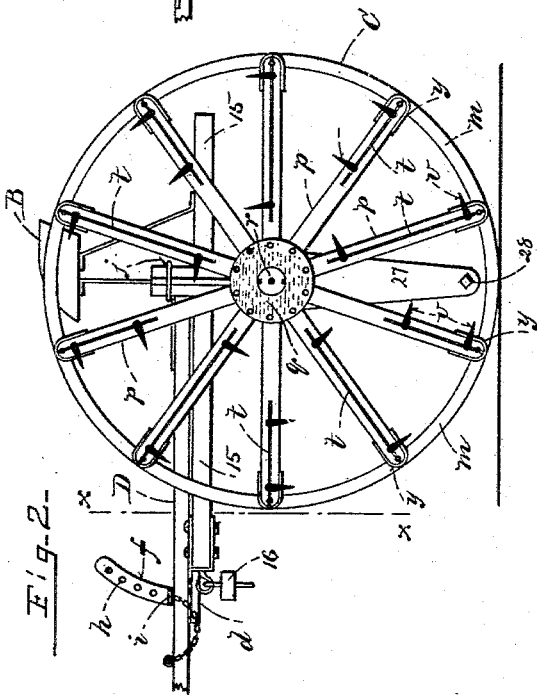


Fig. 12.

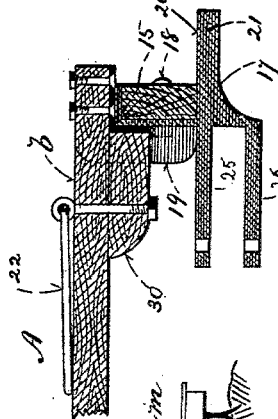
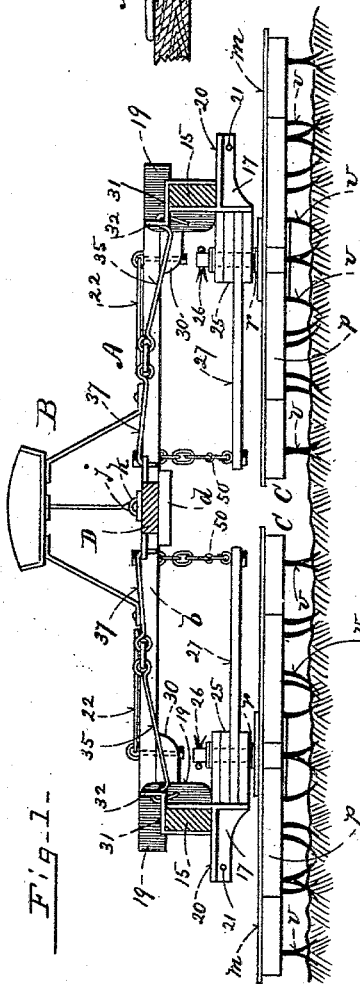


Fig. 1.



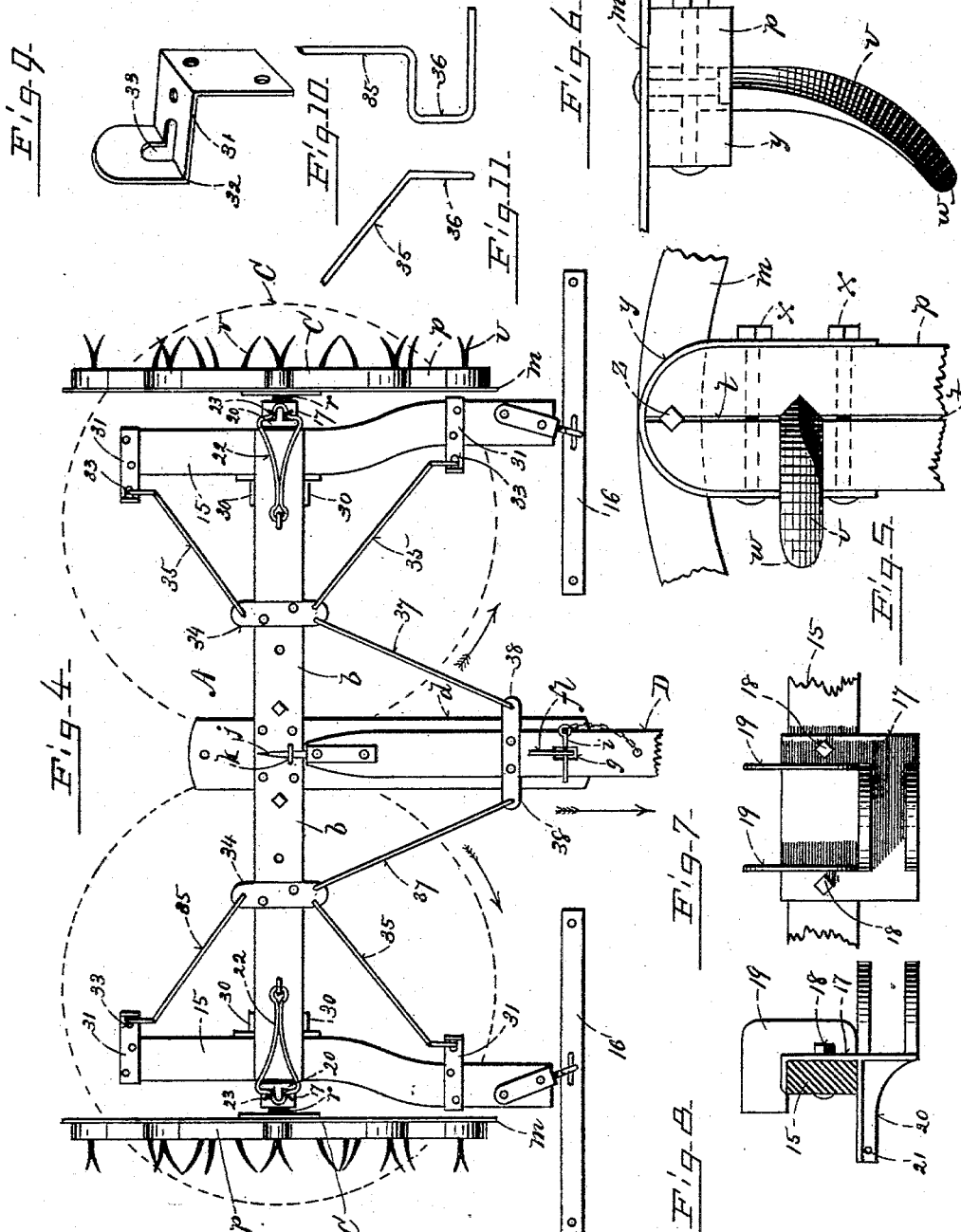
WITNESSES:
J. M. Nicholson
S. Durfee

INVENTOR=
D. Manuel
PER C. A. Shawles,
ATTY-S.

D. MANUEL.
HARROW.

No. 490,294.

Patented Jan. 24, 1893.



WITNESSES:
Wm. H. Brown
St. Durfee

INVENTOR:
David Manuel
PER *C. A. Shaw* ATTYS.

UNITED STATES PATENT OFFICE.

DAVID MANUEL, OF HYDE PARK, MASSACHUSETTS, ASSIGNOR OF ONE-HALF
TO BENJAMIN E. PHILLIPS, OF SAME PLACE.

HARROW.

SPECIFICATION forming part of Letters Patent No. 490,294, dated January 24, 1893.

Application filed October 27, 1891. Serial No. 409,949. (No model.)

To all whom it may concern:

Be it known that I, DAVID MANUEL, of Hyde Park, in the county of Norfolk, State of Massachusetts, have invented certain new and useful Improvements in Harrows, of which the following is a description sufficiently full, clear, and exact to enable any person skilled in the art or science to which said invention appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a front elevation of my improved harrow, a portion of the frame being shown in cross-section; Fig. 2 a side elevation of the harrow, the members or sections being represented as in vertical position and in use as vehicle-wheels; Fig. 3 a front elevation of the same; Fig. 4 a top plan view; Fig. 5 a face view of a portion of one of the spokes, showing a harrow tooth in position; Fig. 6 an end elevation of the same; Figs. 7 and 8 respectively, front and side elevations of the pivot-plate; Figs. 9, 10, and 11 views illustrating certain details of construction; and Fig. 12 a sectional elevation showing the pivot-plate and axle-bearing in position assumed when the members are employed for harrowing.

Like letters and figures of reference indicate corresponding parts in the different figures of the drawings.

My invention relates especially to that class of harrows known as rotary harrows; and it consists in certain novel features hereinafter fully set forth and claimed, the object being to produce a simpler, cheaper, and more effective device of this character than is now in ordinary use.

The nature and operation of the improvement will be readily understood by all conversant with such matters from the following explanation:

The body or frame, A, of the harrow consists of a horizontal bar, *b*, centrally from which a pole-supporting bar, *d*, projects. The seat, B, is disposed centrally on the bar, *b*. The pole, D, is detachable. A vertically arranged curved bar or segment, *f*, is secured to the outer end of the bar, *d*, and passes through a slot, *g*, in the pole, D. The segment is provided with a series of holes, *h*, (see Fig.

2) and a pin, *i*, (see Fig. 4) passes through said openings to restrict the vertical movement of the pole. The inner end of the pole is provided with a pin, *j*, which works in an eye, *k*, on the bar, *b*.

The harrow members or wheels, C, comprise a felly, *m*, which consists of a flat, metallic ring and a metallic hub, *q*, in which a short axle, *r*, is secured. The hub comprises two circular plates or disks in which the spokes, *p*, are secured. Said spokes are slotted longitudinally from their outer ends at, *t*, as best shown in Fig. 5. In said slots the harrow teeth, *v*, are secured. Said teeth are rectangular in cross-section in their upper portions and are curved laterally and diagonally in relation to the spokes as shown in Fig. 6, their edges being beveled longitudinally. Bolts, *x*, passing through the spoke sections clamp the teeth, *v*, in the slots thereof, a U-shaped plate, *y*, being disposed over the end of said spoke. The spoke is secured to the felly by means of a bolt, *z*, which passes through the slot, *t*. On each end of the body bar, *b*, a transversely arranged draw-bar, 15, is mounted, the whiffle-trees, 16, being disposed at the outer end of said bars. On said bars angle-iron, 17, (see Figs. 7 and 8) is secured by bolts, 18, said plates being provided with two laterally projecting flanges, 19. One arm, 20, of the angle-iron, 17, is provided with a pin-hole, 21. Said arm is T-shaped in cross-section as shown in Fig. 4. A link, 22, pivoted on the body bar, *b*, is adapted to encircle the outer end of said arm and is secured thereto by a pin, 23, (see Fig. 3) passing through said opening, 21.

Secured to the angle-iron, 17, there is a series of lugs, 25, which form a box or bearing for the axle, *r*, said axle being held therein by a split pin, 26. Between two of said lugs an arm, 27, is rigidly secured, said arm being provided with an eye, 28, in its outer end.

At each end of the body bar, *b*, vertical plates, 30, are secured, the plates, 19, on the angle-iron, 17, being in sliding contact therewith and said plates holding the draw-bars, 15, against longitudinal movement. At each end of the bars, 15, an angle-plate, 31, is secured, said plate being shown in detail in Fig. 9. In the vertical bend, 32, of said plate an L-shaped opening, 33, is formed. Lugs, 34,

are secured to the body bar, *b*, and rods, 35, are pivoted by an end in said lugs. Said rods are provided with an eccentric hook-shaped end, 36, shown in detail in Figs. 10, and, 11; said ends being inserted in the openings, 33, on the angle-plates, 31, form a hinge therefor and lock the draw-bars, 15, against lateral movement. Brace-rods, 37, connect the lugs, 34, with the lugs, 38, on the pole, *D*. The slots, *t*, in alternate spokes of the harrow members are longer than the slots in the remaining spokes and the teeth, *v*, in the respective spokes are arranged to alternate as best shown in Fig. 2, the said teeth all having a common pitch in the same direction.

In the use of my improvement, the harrow members in vertical position, as shown in Figs. 2, 3, and 4, serve as wheels for transporting the vehicle, said members being locked by the links, 22, and rods, 35, and the arm, 27, being pendent as shown.

To employ the device as a harrow, the links, 22, are thrown backward releasing the arm, 20, of the angle-iron, 17, and the wheels, *C*, turned inward in a horizontal position, as shown in Fig. 1, the bars, 15, swinging on the hook ends of the rod, 35, as pivots. The rod arms, 27, are then secured to the body bar, *b*, by chains, 50, passing through the eyes, 28, on said arms. The pin, *i*, is removed from the segment, *d*, and inserted in one of the upper openings thereof, permitting free vertical play to the pole, *D*, to compensate for the movement of the harrow wheels in passing over obstructions. As the harrow advances the draw-bars, 15, being disposed in a vertical plane parallel with the plane of the axle causes the wheels, *C*, to rotate, the teeth being in contact with the ground. The beveled and curved shape of their teeth and their disposition in the spokes tend to aid such rotation. The wheels are prevented from being thrown outward by the arms, 27.

Either draw-bar, 15, and its wheel may be detached from the body-bar, *b*, by unfastening the arm, 27, and rods, 35, and employed as a single rotary harrow. Said wheel being journaled at one side the line of draft will be rotated by contact of its teeth with the ground in the manner described. By removing the plate, *y*, and bolts, *x*, a broken tooth may readily be replaced without detaching the spoke.

It will be seen that by removing the split-pin, 26, the wheels may be readily detached from the body of the vehicle and the side-bars, 15, removed from the supporting bars, 35. The pole, *D*, may be also detached by unhooking the rods, 37, from their lugs enabling the machine to be stored in very compact space.

Having thus explained my invention what I claim is—

1. In a harrow, the combination of a vehicle body, horizontal draw bars detachably hinged thereon provided with axle bearings as 25 and with whiffle trees at their front ends, axles

journaled in said bearings and mechanism for locking the draw bars and body together.

2. In a harrow, the combination of a body, provided with an eye, a supporting bar thereon, a vertically arranged segment on said bar provided with pin openings, a pole resting on said bar provided with an opening for said segment, a pin adapted to be inserted in the segment openings and a horizontal pin projecting from the end of said pole and working in the eye on said body, substantially as described.

3. In a rotary harrow, a wheel journaled on the harrow body and having longitudinal slots opening through the outer ends of its spokes, curved harrow teeth rectangular in cross-section disposed in said slots and a binding-plate clamping the outer ends of said spokes, substantially as specified.

4. In a harrow, the wheel, *C*, provided with the felly, *m*, and hub-plates, *g*, the spokes, *p*, slotted at, *t*, and secured in said plate, the bolt, *z*, passing through the outer end of said slot into said felly; the harrow teeth, *v*, disposed in said slot, the binding-plate, *y*, and bolts, *x*, for clamping the slot ends of said spokes together.

5. In a harrow, the body in combination with the draw-bars, 15, provided with the angle-plates, 31, near its front and rear ends and hinged plates, 17, in combination with the rods, 35, provided with hooks, 36, connecting said body and angle-plates and a harrow-wheel journaled in bearings on said hinged plate, substantially as specified.

6. In a harrow, the body and pole in combination with the hinged draw-bars provided with plates, 17, having the flanges, 19; the guide-plates, 30, on said body, harrow wheels journaled in lugs on said plates, 17; arms on said plate and chains for securing the free end of said arms to said body, all being arranged substantially as specified.

7. The body in combination with the rods, 35, having the eccentric hooks, 36; the draw-bars, 15, provided with angle-plates, 31, having the L-shaped openings, 33, for receiving said hooks; a harrow-wheel journaled to said side-bars and mechanism for locking said bars to said body.

8. In a rotary harrow, the body provided with the swinging draw bars 15, having dependent lugs 25, and with whiffle trees at their front ends in combination with the axles journaled in said lugs, substantially as described.

9. In a harrow, the combination of a body, laterally swinging draw bars thereon, provided with the angle irons 17, having downwardly projecting lugs, an axle journaled in said lugs, a wheel on said axle, the upper end of said angle iron being provided with an eye, and a fastening device adapted to encircle the upper end of said angle iron and being held thereto by a pin projecting through the eye.

10. In a harrow, the combination of a body,

laterally swinging drawbars, an angle iron
connected to said draw bars, an axle journaled
in said angle iron, a wheel on said axle, pro-
vided with spokes having longitudinal slots,
5 the slot of each alternate spoke being shorter
than the slots in the other spokes, said spokes
being connected to the sides of the wheel

and having U-shaped plates disposed over the
ends thereof.

DAVID MANUEL.

Witnesses:

CHARLES E. PALMER,
JOHN M. BROWN.