(No Model.) 2 Sheets—Sheet 1.

E. D. & O. B. REYNOLDS.

HARROW.

No. 346,315. Patented July 27, 1886.

Fig. 1.

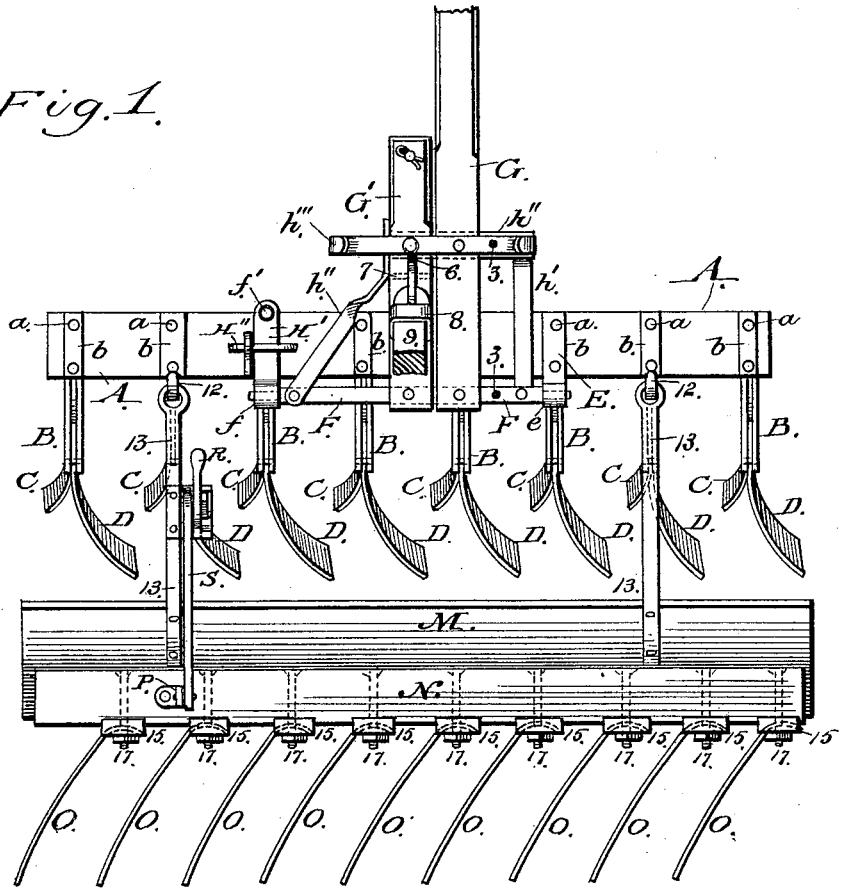


Fig. 6.

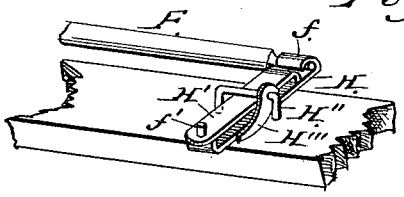
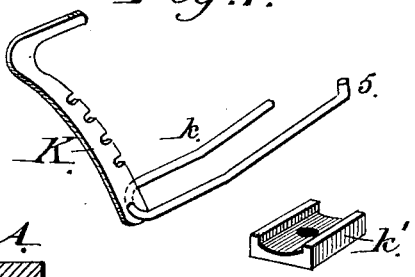
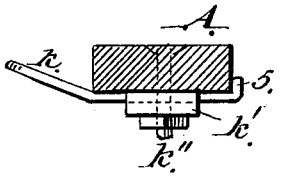


Fig. 7.





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(No Model.) 2 Sheets—Sheet 2.

E. D. & O. B. REYNOLDS.

HARROW.

No. 346,315. Patented July 27, 1886.

Fig. 2.

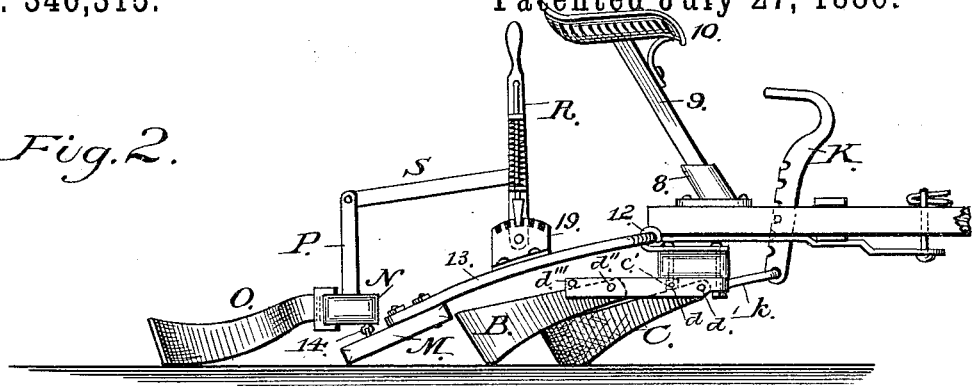


Fig. 3.

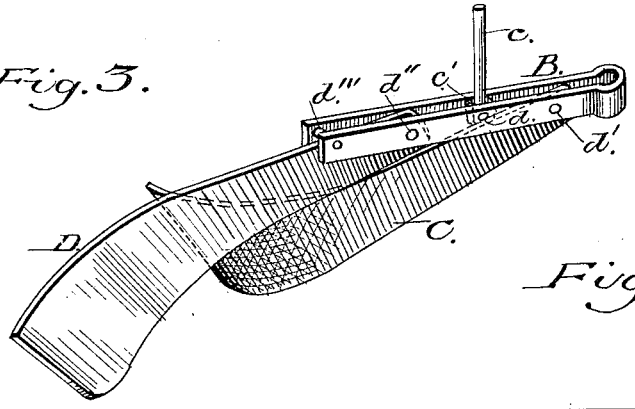


Fig. 4.

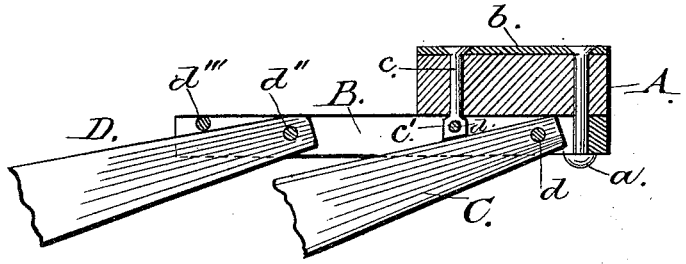
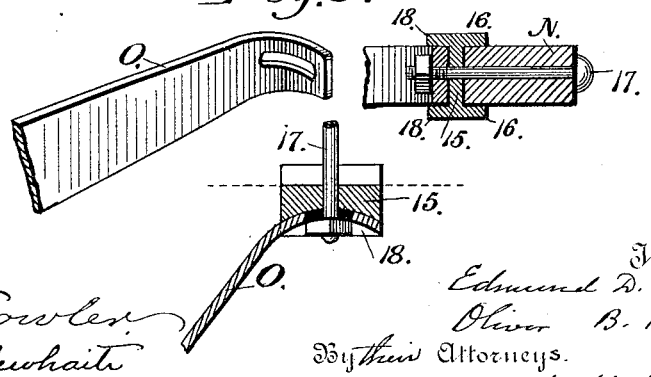


Fig. 5.



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UNITED STATES PATENT OFFICE.

EDMUND D. REYNOLDS AND OLIVER B. REYNOLDS, OF BROCKTON, MASS.

HARROW.

SPECIFICATION forming part of Letters Patent No. 346,315, dated July 27, 1886.

Application filed November 24, 1885. Serial No. 183,849. (No model.)

To all whom it may concern:

Be it known that we, EDMUND D. REYNOLDS and OLIVER B. REYNOLDS, citizens of the United States, residing at Brockton, in the county of Plymouth and State of Massachusetts, have invented certain new and useful Improvements in Harrows, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 represents a plan view of a harrow embodying our improvements. Fig. 2 represents a side elevation of the same. Fig. 3 is detail in perspective showing one of the arms with the teeth secured therein. Fig. 4 is a sectional view of Fig. 3. Fig. 5 represents views of one of the rear teeth, O, and the means for securing the same. Fig. 6 represents the means for detachably securing the rock-shaft. Fig. 7 shows the latching-lever and means for securing the same.

Our invention relates to that class of harrows having gangs of teeth and carrying a driver's seat; and the same consists in the construction and combination of devices, which we will hereinafter fully describe, and point out in the claims.

To enable others skilled in the art to which our invention appertains to make and use the same, we will now describe its construction and the manner in which we have carried it out.

In the said drawings, A represents a single harrow-beam having a series of arms, B, secured thereto and carrying the teeth C and D in a manner we will describe. The arms B are preferably bifurcated or slotted nearly their entire length, their forward ends being perforated to receive bolts *a*, which pass upward through the beam and through plates *b* upon the upper surface of the beam, to which they may be riveted or otherwise secured.

To securely hold the arms B in contact with the under surface of the beam I employ another series of bolts, *c*, provided with flattened portions *c'*, which fit into the slotted portion of the arms B, and are rigidly held therein by short pins or rivets *d*. (See Figs. 2, 3, and 4.) The front row of teeth, C, engage and are firmly held within the slotted portions of the arms by rivets *d'*, which pass transversely through the arms and through the front portion of said teeth, the upper edges or backs of the teeth bearing against the lower ends of the bolts *c*, thereby preventing upward motion. At the same time this arrangement of the teeth greatly strengthens and braces the arms B, while the said teeth themselves are braced by being secured between the sides of said arms. The rear series of teeth are bolted to the arms by rivets *d''* in a manner similar to the front teeth, and are prevented from upward movement by bearing against pins *d'''*, which pass through the rear of said arms.

A harrow when constructed as described can not only be made cheaper, but is superior to many of those now in use, inasmuch as fewer pieces are employed, and the several parts are firmly united together, thereby giving increased strength and rigidity to the working parts of the device, and also, by employing but a single beam, all danger of clods or rubbish clogging beneath the ordinary rear beam is obviated, while in our case these obstructions will pass between or over the rear portion of the teeth. A metal plate, E, is secured to the beam A, and is provided with an eye, *e*, in which is pivotally secured one end of a rock-shaft, F, the said rock-shaft being firmly attached to the pole G and pole-stub G', as shown in Fig. 1. The opposite end of the rock-shaft F is mounted in the hook-shaped end *f* of a metal plate, H, the forward end of said plate being bent upward and terminating in a pintle, *f'*, upon which a swinging plate, H', is mounted, the rear portion of said plate being bent downward, resting upon the plate H, the end of the rock-shaft being confined between this bent end and the hook-shaped end of the plate H, thereby enabling us to readily detach from the beam the rock-shaft and with it the pole and pole-stub, and accomplish this important feature without the removing of a single bolt, this itself being an important feature, as it is obvious the device may be taken to pieces or put together with but little trouble or inconvenience.

To secure the swinging plate in its proper position and prevent it from having too great movement I employ a staple, H'', which straddles the plates H H', and is provided with a

swinging lever, H‴, which is adapted to bear against the side of the plate H′, thereby retaining the said plate in its proper position and securely holding the rock-shaft within its bearings. To the rock-shaft is securely bolted the pole-frame, consisting of braces *h h′ h″*, the brace *h′* passing under and supporting the pole and pole-stub, and the brace *h″* being secured to the side of the pole-stub. Above the brace *h′*, and secured to the pole and pole-stub, is a tie-plate, *h‴*, this plate, the brace *h′*, and rock-shaft G being perforated at 3 with a view to securing lateral adjustment to the pole toward and from the pole-stub. To the outer end of the brace *h′* is secured a suitable draft attachment, I. The notched latching-bar K, which adjusts the position of the beam A and teeth B and C, is loosely attached to a U-shaped bar, *k*, which is held against the lower face of the beam A by a plate, *k′*, and securing-bolts *k″*. It will be observed the forward end of the bar *k* has a slight upward inclination, while one of its side arms is extended and bent upward to form a lip, 5, which engages the rear portion of the beam. This construction effectively prevents the liability of the bar *k* working loose or having a longitudinal movement, and also permits the latching-bar to be swung around against the beam and out of the way when being packed for transportation. A longitudinal slot, 6, is formed in the pole-stub, and through the said slot passes the free end of the latching-bar, it being retained in its adjusted position by the notches engaging a transverse pin, 7, as shown in Figs. 1 and 2. The pole-stud also carries a casting, 8, in which the standard 9, that carries the seat 10, is detachably secured. It is now manifest the several parts of the harrow are readily detachable. The pole-stub and pole with its series of braces and rock-shaft are disconnected with the beam, and the seat-standard and seat removed from the pole-stub, thereby enabling the entire device to be packed in a comparatively small space. Certain of the plates *b* are extended and formed with eyes, as shown at 12, and to the eyes thus formed are secured curved rods 13, their lower ends being bolted to a transverse board or leveler, M, located slightly in the rear of the harrow-teeth, and to this board M is attached, by means of a loose connection, 14, a beam, N, arranged slightly above and running parallel with the board M. The beam N carries a series of teeth, O, arranged diagonal to the line of draft, and these teeth have a lateral adjustment for a purpose we will now describe.

To better define this feature of our improvements, we will now minutely describe the several devices, whereby this adjustment is accomplished. It will first be observed the inner end of the teeth O are curved, and are adapted to fit within a correspondingly-curved portion formed in the rear of a series of blocks, 15, the front faces of which are provided with lips or flanges 16, which pass upon the sides of the beam N, and are thereby prevented from turning. Suitable bolts, 17, pass through the beam N, the block 15, and thence through elongated slots formed in the curved ends of the teeth O, and may be secured by suitable nuts and washers. From this description it is manifest the angle of the teeth O with relation to the line of draft may be changed by loosening the securing-nuts and moving the teeth in the desired direction. While these teeth O have a lateral adjustment, it is necessary that they should be prevented from vertical movement, and this latter object we accomplish by means of flanges 18 on the rear or curved side of the blocks, which confine the curved ends of the teeth between them. One of the curved rods 13 carries a rack-segment, 19, to which is pivoted the lower end of a lever, R, provided with suitable means for engaging the rack, and the bar N has a standard, P, projecting from its upper side, which is attached to the lever R by means of a connecting-bar, S. By this arrangement of parts it is evident the teeth O may be forced deeper into the ground, or be raised entirely out of the same, this being left to the option of the operator.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a harrow, a single beam, A, in combination with a series of slotted arms bolted to said beam and projecting rearwardly, and a double series of teeth or blades supported and braced within the slotted portion of said arms, substantially as herein described.

2. In a harrow, the beam A, in combination with the slotted arms B, the teeth C and D, suitable rivets, *a d d′*, whereby the bars and the teeth are secured, and pins *c d″*, which serve as stops and prevent upward movement of the teeth, substantially as described.

3. In a harrow, the beam A, the arms B, the teeth C and D, riveted to and within the arms, in combination with the plates *b*, the bolts *c*, and the pins *d″*, the upper edge or back of the teeth abutting against the pins *d″* and lower end of the bolts *c*, substantially as and for the purpose described.

4. In a harrow, the combination, with the beam, the pole, and the pole-stub, of a rock-shaft secured to the pole and pole-stub, and a mechanism comprising a locking-latch, whereby the rock-shaft may be readily detached from the beam, substantially as herein described.

5. In a harrow, a means for securing the rock-shaft, and a pole and its connection to the beam, comprising a swinging plate on the beam, and a lever adapted to lock the plate and secure the rock-shaft, substantially as described.

6. In a harrow, the beam A, in combination with a rock-shaft, a pole and pole-stub secured thereto, and a means comprising a pivoted laterally-swinging plate, H′, a staple, H″, and a gravity-lever, H‴, whereby said plate is retained in position and detachably

secures the rock-shaft, substantially as herein described.

7. In a harrow, the beam A, provided with the plates E H, having eyes *e f*, in combination with a swinging plate, H′, pivoted to the plate H, and having a downwardly-turned end between which and the eye *f* one end of the rock-shaft G is detachably secured, and a gravity-lever, H‴, supported above and adapted to bear against and lock the plate, substantially as described.

8. In a harrow, the beam A, provided with the plates *b*, in combination with the rods 13, loosely connected with the beam, the leveler-board M on the ends of the rods, a bar, N, a loose connection between the bar and board, suitable teeth, O, upon the bar, and a lever and connection, whereby the teeth are vertically adjusted, substantially as herein described.

9. In a harrow, the beam A, the rods 13, connected therewith, a leveler-board, M, attached to the rods, and a bar, N, loosely connected to the board, in combination with teeth O, arranged diagonal to the line of draft and adapted to have a lateral adjustment, substantially as herein described.

10. In a harrow, the beam N and means whereby this beam is connected to the main beam of the harrow, in combination with teeth O, having curved ends with elongated slots formed therein, a flanged block, 15, having a curved seat for the end of the teeth, and washers, bolts, and nuts whereby the teeth are secured to the beam, substantially as herein described.

11. As an improvement in harrows, the teeth O, arranged diagonal to the line of draft and having curved ends with elongated slots formed therein, in combination with flanged blocks 15 and securing-nuts, whereby lateral adjustment is secured, but vertical adjustment prevented, substantially as herein described.

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OLIVER B. REYNOLDS.

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