

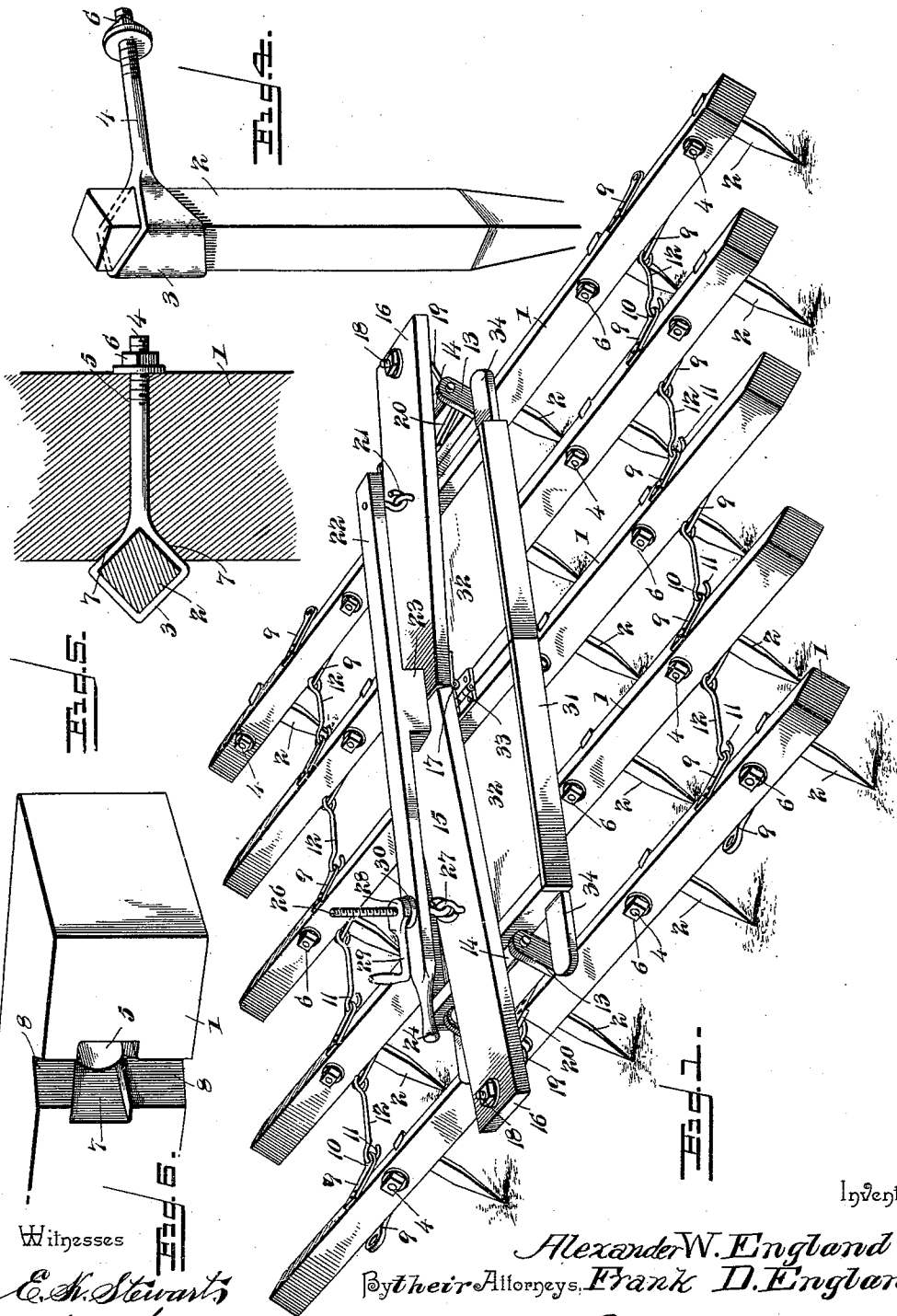
(No Model.)

2 Sheets—Sheet 1.

A. W. & F. D. ENGLAND.
HARROW.

No. 578,224.

Patented Mar. 2, 1897.



Inventors

Alexander W. England

By their Attorneys, Frank D. England

C. Snow & Co.

Witnesses

E. H. Stewart

S. P. McNamee

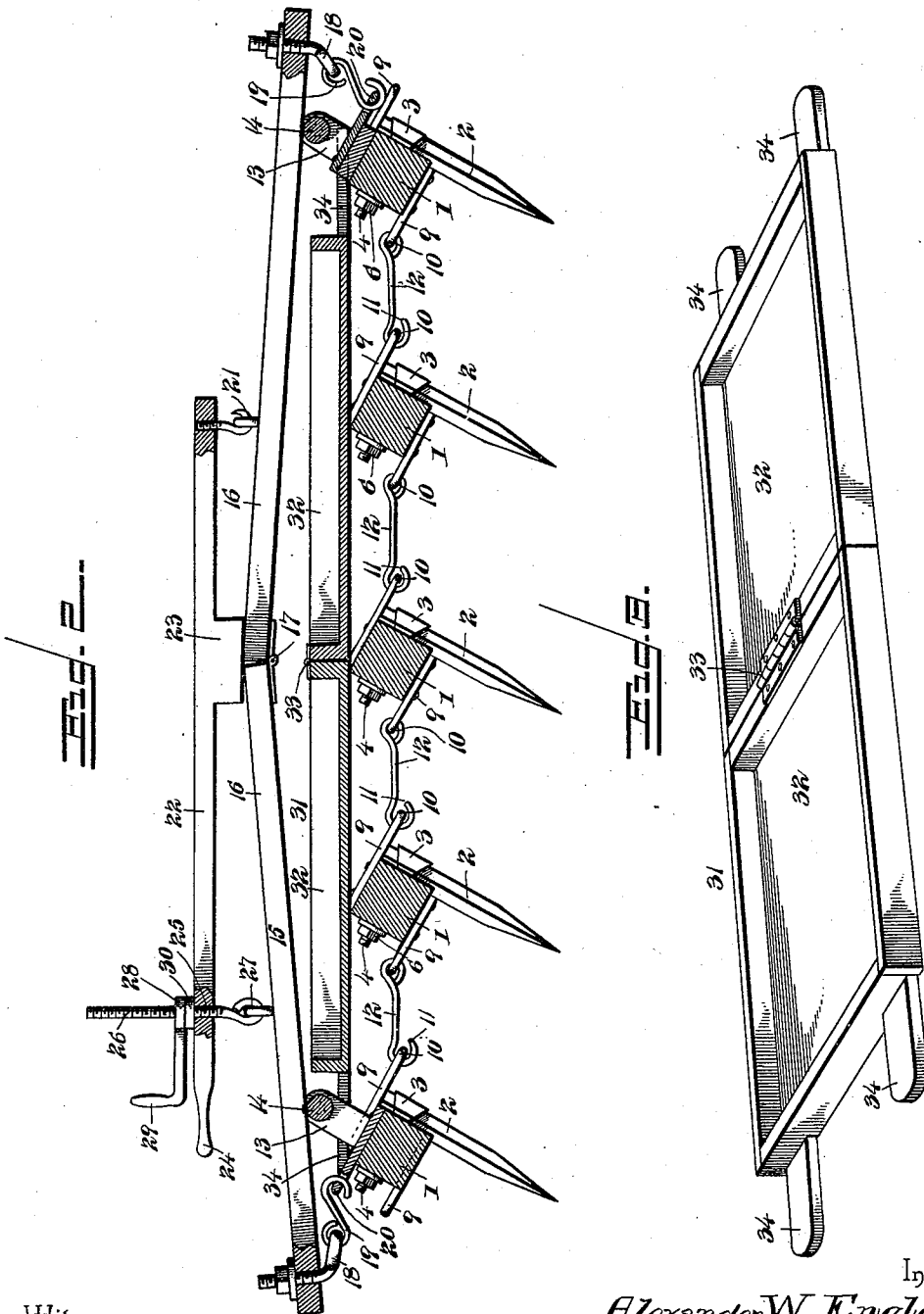
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S. J. Spencer

By their Attorneys,

Inventors
Alexander W. England
Frank D. England

Cash & Co.

UNITED STATES PATENT OFFICE.

ALEXANDER W. ENGLAND AND FRANK D. ENGLAND, OF POSEYVILLE,
INDIANA.

HARROW.

SPECIFICATION forming part of Letters Patent No. 578,224, dated March 2, 1897.

Application filed November 29, 1895. Serial No. 570,514. (No model.)

To all whom it may concern:

Be it known that we, ALEXANDER W. ENGLAND and FRANK D. ENGLAND, citizens of the United States, residing at Poseyville, in the county of Posey and State of Indiana, have invented a new and useful Harrow, of which the following is a specification.

This invention relates to harrows; and it has for its object to provide a simple and efficient construction of flexible harrow that will readily adjust itself to unevennesses of the soil, while at the same time providing means for thoroughly pulverizing the soil; and in the accomplishment of this result the invention also contemplates simple and efficient means for weighting the harrow and for regulating the tension thereof, whereby the degree of flexibility may be properly adjusted to suit different conditions of ground to be pulverized.

With these and other objects in view, which will readily appear as the nature of the invention is better understood, the same consists in the novel construction, combination, and arrangement of parts hereinafter more fully described, illustrated, and claimed.

In the drawings, Figure 1 is a perspective view of a flexible harrow constructed in accordance with this invention. Fig. 2 is a central longitudinal sectional view thereof. Fig. 3 is a detail in perspective of the self-adjusting jointed weight-frame. Fig. 4 is a detail in perspective of the fastening for each harrow-tooth. Fig. 5 is a detail sectional view illustrating the position of the tooth-fastening in each harrow-bar. Fig. 6 is a detail in perspective of a section of a harrow-bar.

Referring to the accompanying drawings, the numeral 1 designates the harrow-bars, which are arranged in series in any desired number and parallel with each other to complete the main body of the harrow. The bars 1 are preferably made of wood and are rectangular or square in cross-section, and each of said bars has adjustably and removably fitted to one side thereof a series of pointed harrow-teeth 2. The harrow-teeth 2 are also preferably rectangular in cross-section and are fitted at their upper ends in the polygonal clamp-loops 3, formed at one end of the fastening-bolts 4, which are passed transversely

through the transverse openings 5 in the harrow-bars and are engaged at the side of the harrow-bars opposite the loops 3 by the nuts 6, which serve to tighten the bolts and draw the clamp-loops 3 inward, whereby the teeth 2 will be clamped tight against one side of the harrow-bars. The harrow-bars are provided in one side with enlarged loop-recesses 7 and the V-shaped grooves 8, intersecting said loop-recesses, said loop-recesses being designed to receive the inner sides of the polygonal loops 3 when the bolts are tightened, so that one corner of the teeth 2 will be clamped tight in the grooves 8, whereby such teeth will be held firmly in position and be prevented from turning, and in connection with this construction it will also be noted that the teeth can be readily removed and replaced at any time without disturbing the other portions of the harrow.

The harrow-bars 1 have fitted thereto near each end a pair of upper and lower draft-plates 9, respectively fastened to the upper and lower sides of the bars and provided at one end with the engaging eyes 10, disposed in reverse directions, or, in other words, the engaging eye of the upper draft-plate of each pair of said plates projects beyond one side of the harrow-bar and the eye of the lower draft-plate projects beyond the directly opposite side of the harrow-bar. The adjacent eyes of the draft-plates of the several harrow-bars loosely receive the hook extremities 11 of the connecting-links 12 between each pair of harrow-bars, and which provide for flexibly connecting the several bars together to admit of their self-adjustment to unevennesses of the soil. By reason of the reverse disposition of the upper and lower draft-plates on each harrow-bar it will be observed that each connecting-link engages with an upper draft-plate of one harrow-bar and with a lower draft-plate of the adjacent harrow-bar, thereby disposing the several harrow-bars cornerwise toward the front and rear of the harrow, so that the harrow-bars will have the greatest possible play to insure their proper adjustment to all conditions of the soil, and while the harrow is being drawn over the ground the disposition of the plates 9 provides for a pull or draft on both the upper and lower

sides of the harrow-bars, which insures steadiness in operation and the maintaining of the bars in their proper relative positions.

The front and rear of the harrow-bars are each necessarily provided with a pair of draft-eyes formed at the outer ends of the draft-plates 9, having no link connection therewith, so it will therefore be obvious that either side of the harrow may be used as the front thereof, so that the same can be readily drawn over the ground in either direction. The said front and rear harrow-bars have fitted centrally on the upper sides thereof a pair of angled bearing-plates 13, between which bearing-plates is journaled a supporting-roller 14. The supporting-rollers 14, mounted, respectively, over the front and rear harrow-bars, provide an antifriction-support for the opposite sections of the jointed tension-bar 15. The tension-bar 15 is arranged above the entire series of harrow-bars and consists of the separate aligned bar-sections 16, hinged together at their inner ends, as at 17, by a hinge-joint, which hinge-joint breaks in an upward direction.

The separate sections 16 of the jointed tension-bar 15 have fitted to their outer ends the eyebolts 18, to which are loosely connected one end of the coupling-hooks 19, the other ends of which connect with the eye-plates 20, fastened on the upper sides of the front and rear harrow-bars between the plates 13 and directly under the supporting-rollers 14, mounted in said plates. The combined length of the tension-bar sections 16 is greater than the distance between the front and rear harrow-bars, and pivotally connected at one end, as at 21, to the upper side of one of the tension-bar sections 16, is an adjusting-lever 22.

The adjusting-lever 22 lies longitudinally above the tension-bar 16 and is provided at an intermediate point on its under side with a joint-block 23, which bears on the bar 15 directly over the upwardly-breaking hinge-joint thereof. Opposite its pivotal end the lever 22 is provided with a reduced handle portion 24, which may be grasped for steadying the handle, and adjacent to said handle portion with a bolt-opening 25, through which loosely passes an eyebolt 26, the eye of which has a loose connection 27 with the upper side of the tension-bar section 16, opposite the section to which the lever 22 is connected. Above the lever 22 the bolt 26 receives thereon an adjusting-nut 28, having a crank-arm 29 for turning the same and working on top of a washer 30, interposed between the lever 22 and the said nut. Normally the joint of the tension-bar is broken upwardly, so that the bar-sections 16 are disposed at an angle to each other, and by unscrewing the adjusting-nut 28 it will be obvious that the outer end of the bar-sections 16 will be allowed to come closer together, whereby the tension of the harrow will be slackened and will permit the harrow-bars to have a greater degree of play, or, in other words, to have a greater flexibility to adjust themselves to unevennesses of the

soil. On the other hand, by screwing the nut 28 down on the bolt 26 the lever 22 will be lowered, and the block 23 bearing on the joint 17 will tend to close said joint and straighten out the bar-sections 16, thereby exerting a pull on the front and rear harrow-bars and tightening up the entire series of such bars to make the same as rigid as desired, as will be well understood by those skilled in the art.

A sufficient weight is given to the harrow by arranging on the harrow-bars under the tension device described a self-adjusting weight-frame 31. The weight-frame 31 consists of the separate shallow weight-boxes 32, hinged together at their inner meeting ends, as at 33, and provided at their outer ends with a pair of short offstanding retaining-arms 34, which embrace the pairs of bearing-plates 13 on the front and rear harrow-bars, and thereby serve to retain the weight-frame properly in position. The separate boxes 32 of the weight-frame may be filled with dirt or other weights to properly weight the harrow, and by reason of the hinge-joint 33 it will be obvious that the said weight-frame will readily adjust itself to the movement of the harrow-bars.

Changes in the form, proportion, and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention.

Having thus described the invention, what is claimed, and desired to be secured by Letters Patent, is—

1. In a harrow, a series of flexibly-connected parallel harrow-bars carrying teeth, a tension-bar arranged above the entire series of harrow-bars and flexibly connected at its opposite ends respectively to the front and rear of the said harrow-bars, said tension-bar being provided at an intermediate point with a normally upwardly-broken hinge-joint, a lever pivotally connected at one end to the tension-bar at one side of its hinge-joint and bearing directly on the bar over the hinge-joint, and an adjustable connection between the lever and the tension-bar at the side of the hinge-joint opposite the pivotal connection of the lever with the bar, substantially as set forth.

2. In a harrow, a series of flexibly-connected parallel harrow-bars carrying teeth, and the front and rear of which bars are provided on the upper sides with projections, and a self-adjusting weight-frame arranged on top of the harrow-bars and consisting of separate shallow weight-boxes hinged together at their inner meeting ends and provided at their outer ends with offstanding retaining-arms engaging at one side of said projections, substantially as set forth.

3. In a harrow, a series of flexibly-connected harrow-bars, the front and rear of which bars carry on their upper sides supporting-rollers, a tension-bar resting on said supporting-rollers and flexibly connected at its opposite ends

respectively to said front and rear harrow-bars and provided at an intermediate point with a normally open hinge-joint, and means for closing the hinge-joint of said bar to straighten the same, substantially as set forth.

4. In a harrow, a series of flexibly-connected parallel harrow-bars, a tension-bar flexibly connected at its opposite ends respectively to the front and rear of said harrow-bars and consisting of separate bar-sections hinged together at their inner meeting ends, which hinge-joint is normally broken upwardly, an adjusting-lever arranged above the tension-bar and pivotally connected at one end to one of the sections thereof, said lever being provided at an intermediate point with a

block bearing on the tension-bar over the joint thereof, and near the end opposite its pivoted end with a bolt-opening, a bolt arranged in said bolt-opening and loosely connected with the tension-bar section immediately therebelow, and an adjusting-nut mounted on said bolt above said lever, substantially as set forth.

In testimony that we claim the foregoing as our own we have hereto affixed our signatures in the presence of two witnesses.

ALEXANDER W. ENGLAND.

FRANK D. ENGLAND.

Witnesses:

J. L. WOODS,

W. R. HILL.