

(No Model.)

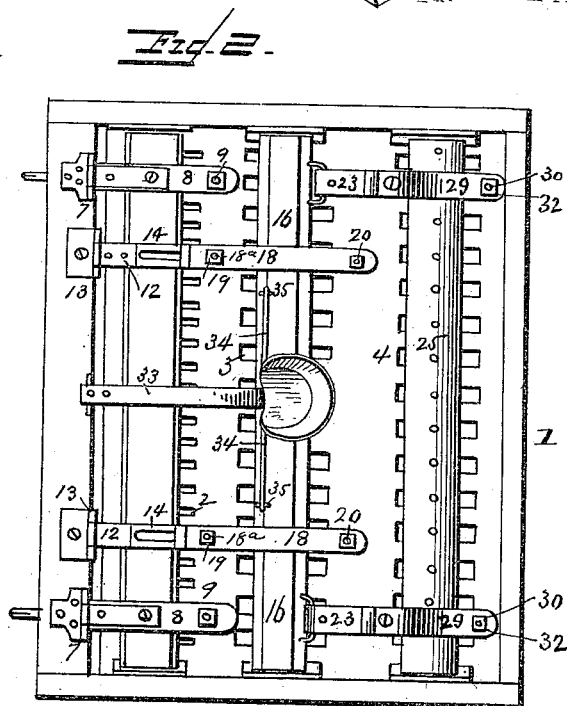
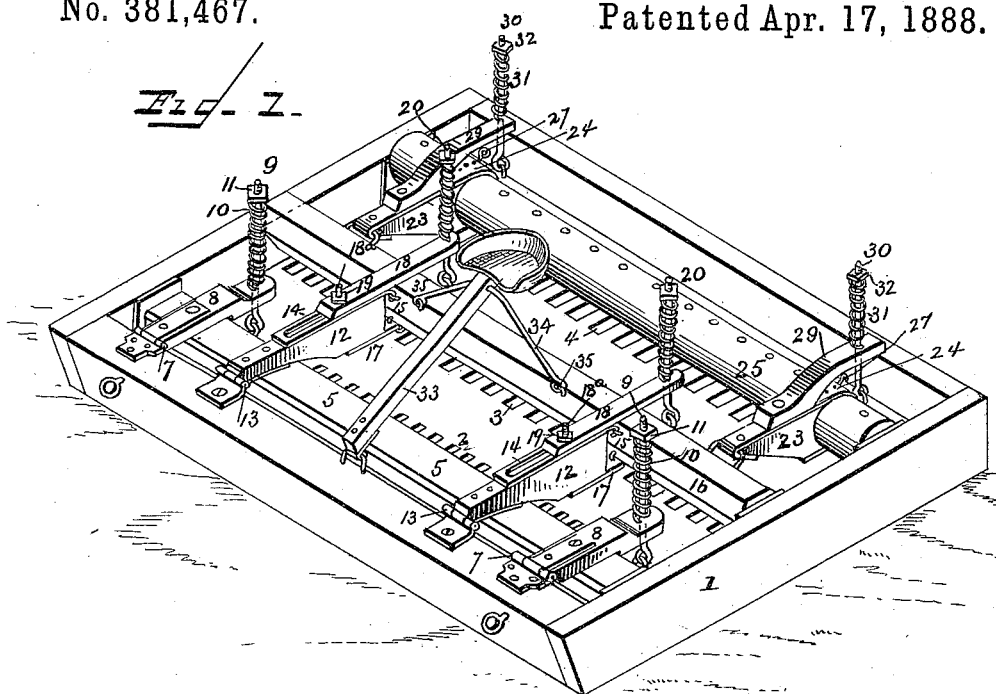
2 Sheets—Sheet 1.

B. ESSIG.

HARROW.

No. 381,467.

Patented Apr. 17, 1888.



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A. L. Mossell.

INVENTOR,  
Benton Essig,  
by Louis C. Egger & Co.  
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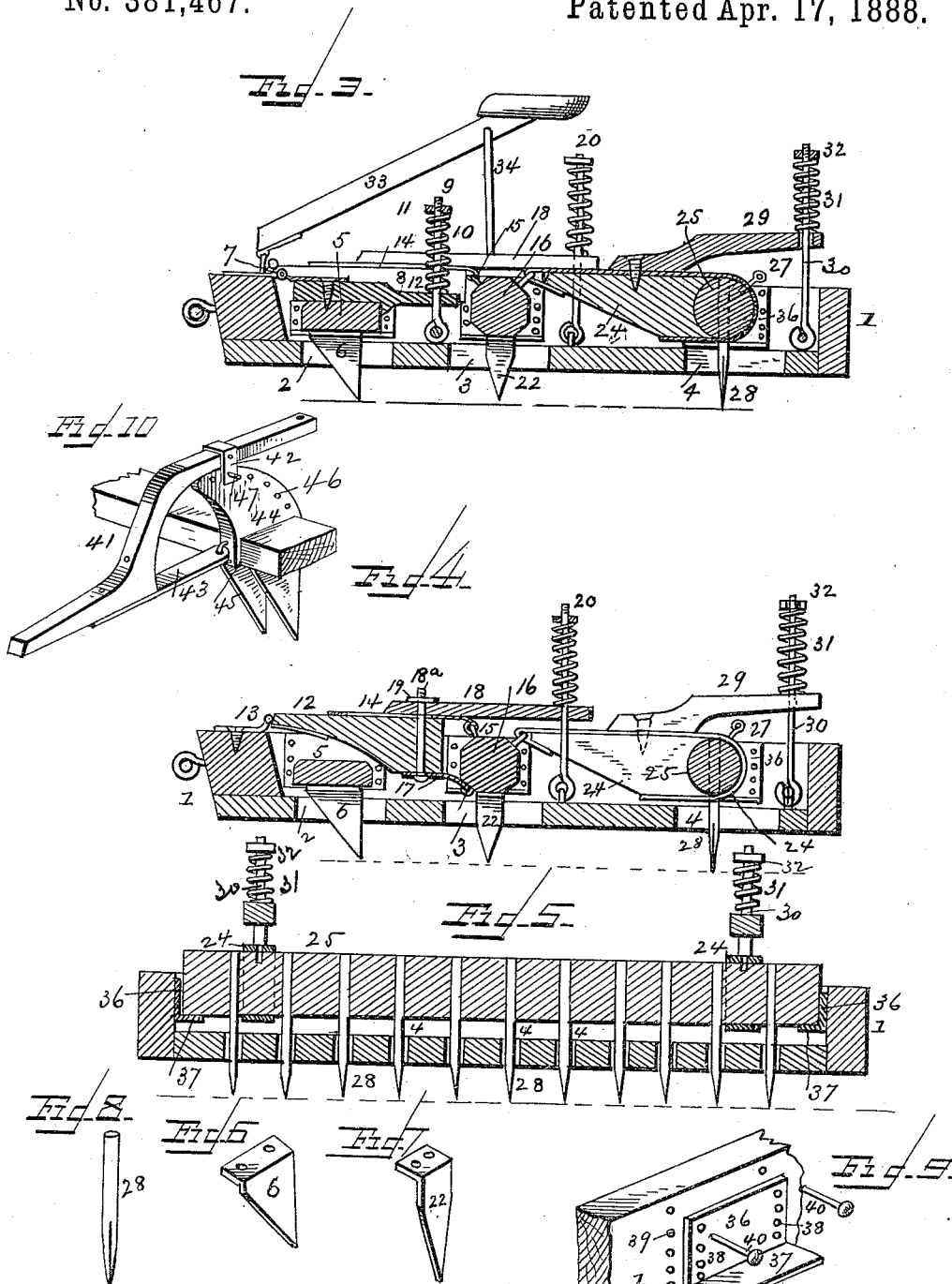
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# UNITED STATES PATENT OFFICE.

BENTON ESSIG, OF DISKO, INDIANA, ASSIGNOR OF ONE-HALF TO SELTON  
ESSIG, OF SAME PLACE.

## HARROW.

SPECIFICATION forming part of Letters Patent No. 381,467, dated April 17, 1888.

Application filed November 5, 1887. Serial No. 254,377. (No model.)

*To all whom it may concern:*

Be it known that I, BENTON ESSIG, a citizen of the United States, and a resident of Disko, in the county of Fulton and State of Indiana, have invented certain new and useful Improvements in Harrows; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification, and in which—

Figure 1 is a perspective view of my improved harrow. Fig. 2 is a top or plan view of the same. Fig. 3 is a vertical sectional view taken through the outer connecting-arms. Fig. 4 is a similar view taken through the inner connecting-arms. Fig. 5 is a transverse vertical section through the cylindrical cutter-bar. Figs. 6, 7, and 8 are detail views of the cutter blades and teeth. Fig. 9 is a detail view of the device for adjusting the height of the cutter-bars, and Fig. 10 is a detail view in perspective of a modified construction of the connecting-arms used upon the central and rear cutter-bars.

Similar numerals of reference refer to the same parts throughout the several views.

My invention relates to improvements in harrows; and it consists in the peculiar combination and arrangement of the various parts, as hereinafter more fully described and set forth.

The object of my invention is to provide a harrow having the body or frame thereof so constructed that the clods of hard earth are retained thereby during the operation of harrowing, affording the knives and teeth an opportunity to effectually pulverize and reduce the soil. This peculiar construction of harrow also constitutes the harrow-frame of itself a leveler or evener without the aid of additional mechanism.

A further object of my invention is to provide a harrow having the cutter-bars thereof made adjustable, so that the blades or teeth of said cutter-bars may be set at any angle, the same being effected by the novel arrangement and combination of parts, as hereinafter more fully described.

A further object is to provide mechanism whereby the tension of the cutter-bars may be regulated and any desired pressure given to the knives and teeth.

A further object is to provide means whereby the height of the cutter-bars may be regulated.

A still further object is to provide means whereby the several cutter-bars are pivotally secured in position, so that when the knives or teeth strike a stone, piece of wood, or clod which they cannot make fine the cutter-bars will be lifted up and pass over the obstructions.

Referring to the different parts by their designating numerals, 1 represents the body or frame of my improved harrow, having its bottom provided with three or more series of longitudinal slots, 2, 3, and 4.

Above the slots 2 in the front of the frame is suitably journaled a cutter-bar, 5, carrying a set of triangular cutters or blades, 6, having their front edges slanting rearward, as clearly shown in Fig. 6 of the drawings.

Secured to the front piece of the frame by hinged joints 7 7 are arms 8 8, said arms being also rigidly secured to the cutter-bar 5, their other ends fitting over threaded upright bars 9 9, secured in the bottom of the frame, said upright bars being encircled by coiled springs 10 10, whereby the tension of the extended portion of these arms is regulated, thumb-nuts 11 11 serving to depress the springs or to allow the same to recoil, as desired. Arms 12 12 are also secured to the front piece of the frame by hinged connections 13 13, while metallic slotted plates 14 14 are superimposed upon the said arms. The ends of these metallic plates 14 14 are pivotally secured to staples 15 15 in a hexagonal or cylinder shaped shaft or cutter-bar, 16. Plates or bars 17 17, rigidly secured to the under side of the arms 12 12, are also secured pivotally to the cutter-bar 16, thereby securely connecting said arms thereto.

Arms 18 18 bear against the upper side of the metallic slotted plates 14 14, and are secured to the under arms, 12 12, by threaded bolts 18<sup>a</sup> 18<sup>a</sup>, passing through perforations in said arms respectively. The screw-threaded upper ends of these bolts are provided with thumb-nuts 19 19, adapted to be screwed down

upon the upper arms and hold the same firmly in place. The other ends of the arms 18 18 are provided with holes or perforations adapted to fit over upright rods 20 20, secured to the bottom of the frame, and by means of springs encircling the upright rods the arms may be depressed, or vice versa, said arms of course acting upon the cutter-bar, the tension of the knives being thus regulated as in the other case.

The cutter-bar 16 carries a set of triangular or arrow-shaped cutter-blades or knives, 22, passing through the longitudinal slots 3 in the bottom of the frame, these cutter-blades being of somewhat different shape than the cutter-blades 6, as will be clearly seen by reference to Fig. 7 of the drawings. Hinged to the rear side of said cutter-bar 16 are arms 23 23, carrying perforated sleeves 24 24, fitting around a cylinder-shaped cutter-bar, 25, said cylinder having on each end thereof a perforation adapted to register with the perforations in the sleeves 24 24, thus permitting the cutter-bar to be turned or adjusted in any position, being held in its adjusted position by pins 27 27, fitting in the said perforations. This cutter-bar 25 carries a series of round or other shaped teeth, 28, passing through the longitudinal slots 4 in the bottom of the frame, the tension of said teeth and cutter-bar being regulated in the same manner as in the other two cases—viz., by means of arms 29 29, secured to the pivoted arms 23 23 and passing over threaded upright rods 30 30, encircled by coiled springs 31 31, together with the thumb-nuts 32 32 for the depression and recoil of the springs.

An inclined seat-standard, 33, is pivotally secured to the front piece of the frame, and at its upper end is affixed or secured thereto in any ordinary seat in any preferable manner. Seat-braces 34 34 are secured to the cutter-bar 16 by staples 35 35; or, if the weight of the driver upon the cutter-bar is not found desirable or necessary, the staples may be removed and set in perforations to the rear of the cutter-bar, transferring the weight of the driver direct to the frame instead of upon the cutter-bar.

This being the construction of my improved harrow, the operation is as follows, viz: It will be seen that the frame of the harrow rests firmly on the ground to be harrowed, so that when the machine passes over the soil clods of hard earth are held fast, permitting the knives to effectually reduce and level the earth. The triangular cutters or blades 6 first engage the soil, their object being to cut up the ground, clods, &c., and will perform much more effective work with the same power than teeth of round, square, or other shape. It will be seen that these cutters are sloped rearward, so that they will pass over stones, clods, or other obstructions which it is impossible for them to make fine, being assisted in this particular by means of the hinged arms 8 8, which permit of limited play of the cutter-bar 5. The blades or cutter-knives 22 next engage the earth or soil, and are so arranged as to make an inde-

pendent furrow therein. When it is desired to change the inclination of these knives, the adjustability of the metallic slotted plates 14 14 permits the knives to be placed at any desired angle, this being accomplished by simply loosening the thumb-nuts 19 19 above arms 18 18, and moving the slotted plates 14 14, connected to the central cutter-bar, either forward or rearward, and then again tightening thumb-nuts 19 19. The teeth 28 upon bar 25 next, and finally, come in contact with the soil undergoing harrowing, the principal object of said teeth being to level and pulverize the earth, and may also be adjusted to any desired position by simply removing the pins 27 27 and turning the cutter-bar within the perforated sleeves 24 24 until the desired angle is reached, when the pins may be replaced and the bar securely retained in its adjusted position. The arms secured to each of the several cutter-bars, being provided with hinged or pivoted connections, will of course allow of limited play, thereby permitting the knives or teeth, when inclined rearwardly, to pass over obstructions, thus obviating the inconvenience of the whole machine being raised, or the stone, clod, or other obstruction being dragged along with the machine. By means of the threaded upright rods passing through the ends of the connecting-arms, the teeth and blades are held firmly to their work and any needed tension given by operating the thumb-nuts on said rods. It is obvious that when it is desired to harrow rough ground it is much preferable to have the teeth and blades inclined rearwardly, in order that they may be raised in passing over stones; and also, when exceedingly hard ground is being harrowed, considerable tension should be given to the springs upon the upright rods, so that the cutter-bars, carrying their respective cutter-blades or knives, may be held firmly in the ground, yielding as little as possible. On the other hand, the knives, as well as the teeth, may be set forward for clean ground, such as sod generally, and but very little tension may be applied to the cutter-bars. In this case it will also be found desirable to transfer the weight of the driver from the cutter-bar 16 to the bottom of the frame.

In practice I prefer to secure the cutter-bar 5 rigidly to its connecting-arms, whereas the cutter-bars 16 and 25 are made adjustable, so that the blades and teeth carried thereby may be inclined at any desired angle. Each set of knives or teeth are so arranged as to make an independent furrow in the soil, and whatever obstruction raises one will not be likely to affect the others.

All the cutters can be made stationary by removing the springs upon the upright rods and screwing the nuts down.

Fig. 9 of the drawings shows the manner of adjusting the height of the cutter-bars. Plates 36 36, having flanged lower portions, 37 37, and provided with perforations 38 upon each side thereof, respectively, are adjustably secured to the side of the frame in such a position that

the ends of the cutter-bars will rest upon the flanged lower portions thereof. The adjustability is regulated by simply raising or lowering the plates to the desired position, or until one of the perforations in the side of said plates registers with the perforations 39 39 on the side of the frame, being retained in this adjusted position by means of pins 40. I have only shown this adjusting device as applied to the rear cutter-bar; but in practice I prefer to use it in connection with all of the several cutter-bars.

Fig. 10 of the drawings shows a modification in the manner of adjusting the inclination of the knives carried by the central and rear cutter-bars. This device consists of a peculiar-shaped arm, 41, (clearly shown in the drawings,) carrying upon its straight upper portion a perforated guide-plate, 42, and having extending from the under side of the lower straight portion a metallic arm, 43, having its extended end pivotally secured to a plate, 44, the peripheral portion of said plate forming an arc of a circle, and conforming in configuration to the under side of the corresponding part of the arm 41. The peripheral portion of plate 44 passes between the downwardly-extending sides of the perforated guide-plate 42, while the extreme lower portion of said plate 44 carries the cutter-bar, which fits in a slot, 45, arranged therein, adapted to be made of a shape similar to the shape of said cutter-bar. When it is desired to change the inclination of the knives, the plate 44 is moved within the guide-plate 42 to the proper position, a series of perforations, 46, near the edge of said plate 44, registering with the perforation on each side of the guide-plate, a transverse pin, 47, acting as a lock therefor.

From the foregoing description, taken in connection with the accompanying drawings, the operation, construction, and advantages of my improved harrow will be readily understood.

Not only does the peculiar construction of this harrow serve to make the frame thereof, *per se*, act as a leveler, but also by having said frame rest firmly on the ground and employing a closed harrow-frame, as described, the machine when passing over the soil will hold clods of earth fast, so as to permit the knives to effectually reduce and level the earth, being a great improvement in this respect over the open-frame harrows now in common use.

Besides the other advantages mentioned by me, my device is simple and exceedingly effective in its work, and can be applied with equal facility to any kind of soil, whether rough or clean ground, the cutter blades or teeth being so adapted as to readily accommodate themselves to the uneven character of the ground and still be held in contact therewith by the gravity of the harrow-frame and the tension-regulating device.

Having thus described my invention, I claim and desire to secure by Letters Patent of the United States—

1. The combination of the frame having a

series of longitudinal slots, the hinged arms, the cutter-bar secured to said arms and provided with a series of harrow-teeth, and the central cutter-bar pivotally secured to the front piece of the harrow-frame and carrying a series of arrow or other shaped teeth or knives.

2. The combination of the frame having a series of longitudinal slots, the hinged arms, the cutter-bar secured to said arms and provided with a series of harrow-teeth, the central cutter-bar and its connecting-arms pivotally secured to the front piece of the frame, and the cylindrical cutter-bar and its connecting-arms pivotally secured to the central cutter-bar.

3. The combination of the frame having a series of longitudinal slots, the hinged arms, the cutter-bar secured to said arms and provided with a series of harrow-teeth passing through the slots in the bottom of the harrow-frame, the upright rods engaging the extended ends of the connecting-arms and having coiled springs encircling the same, said springs being operated by suitable thumb-nuts.

4. The combination of the frame having a series of longitudinal slots, the hinged arms, the cutter-bar secured to said arms and provided with a series of harrow-teeth, the connecting-arms secured by hinged connections to the front piece of the harrow-frame and having threaded uprights provided with suitable thumb-nuts extending therefrom, the cutter-bar suitably journaled in the sides of the frame and carrying a series of arrow or other shaped knives or teeth, said cutter-bar being suitably secured to its connecting-arms by pivoted auxiliary arms rigidly secured to the under sides of said connecting-arms, and the slotted plates pivotally secured to the central cutter-bar.

5. The combination of the frame having a series of longitudinal slots, the hinged arms, the cutter-bar secured to said arms and provided with a series of harrow-teeth, the connecting-arms secured by hinged connections to the front piece of the frame and having threaded uprights provided with suitable thumb-nuts extending therefrom, the cutter-bar suitably journaled in the sides of the frame, carrying a series of arrow or other shaped knives, said cutter-bar being suitably secured to its connecting-arms by pivoted auxiliary arms rigidly secured to the under sides of said connecting-arms, the slotted plates pivotally secured to the central cutter-bar, the tension-regulating arms provided with suitable perforations or holes in the ends thereof, and the upright threaded rods passing through the holes in the ends of the tension-regulating arms and having coiled springs encircling the same, said springs being operated by suitable thumb-nuts.

6. The combination of the frame having a series of longitudinal slots, the hinged arms, the cutter-bar secured to said arms and provided with a series of harrow-teeth, the cen-

tral cutter-bar pivotally secured to the front  
piece of the harrow-frame by suitable connect-  
ing-arms and carrying a series of arrow or  
other shaped teeth or knives, the cylindrical  
5 cutter-bar suitably journaled in the sides of  
the frame and carrying a series of pointed or  
round cutter-teeth, the hinged connected arms  
provided with perforated sleeves encircling  
the cylindrical cutter-bar, the perforations in  
10 said sleeves registering with a perforation in  
each end of the cylindrical cutter-bar, and the  
pins adapted to fit into said perforations and  
retain said cutter-bar in its adjusted position.

7. The combination of the frame having a  
15 series of longitudinal slots, the hinged arms,  
the cutter-bar secured to said arms and pro-

vided with a series of harrow-teeth, the cen-  
tral cutter-bar and its connecting-arms pivot-  
ally secured to the front piece of the frame,  
and the cylindrical cutter-bar and its connect- 20  
ing-arms pivotally secured to the central cut-  
ter-bar, and means, substantially as described,  
for regulating the tension of the connecting-  
arms.

In testimony that I claim the foregoing as my 25  
own I have hereunto affixed my signature in  
presence of two witnesses.

BENTON ESSIG.

Witnesses:

WARREN G. SAYRE,  
JACOB R. BRUNER.