

(No Model.)

3 Sheets—Sheet 2.

N. ANDERSON.
HARROW.

No. 485,677.

Patented Nov. 8, 1892.

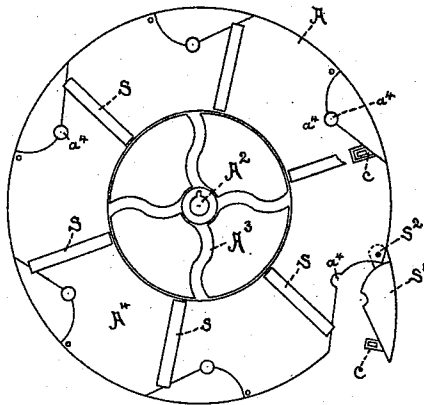


FIG. 3.

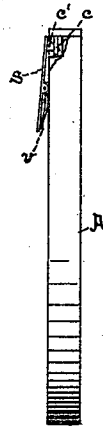


FIG. 4.

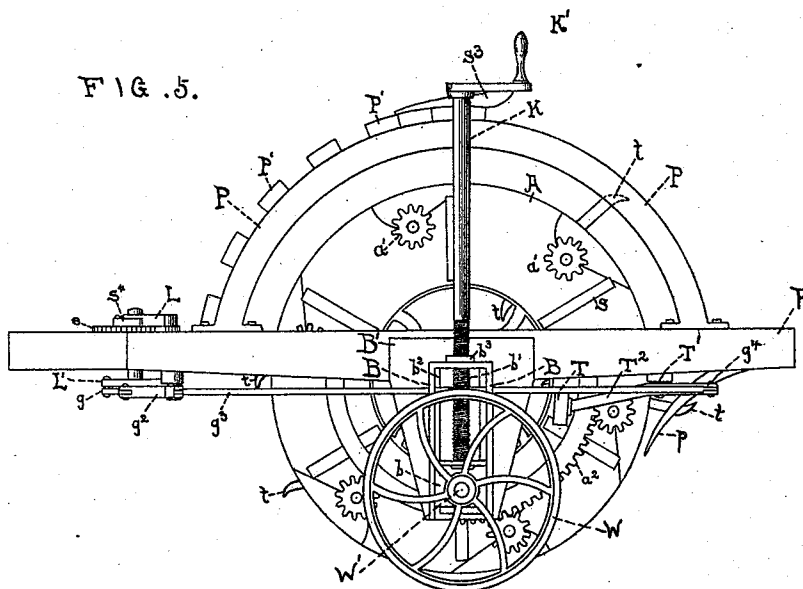


FIG. 5.

Witnesses

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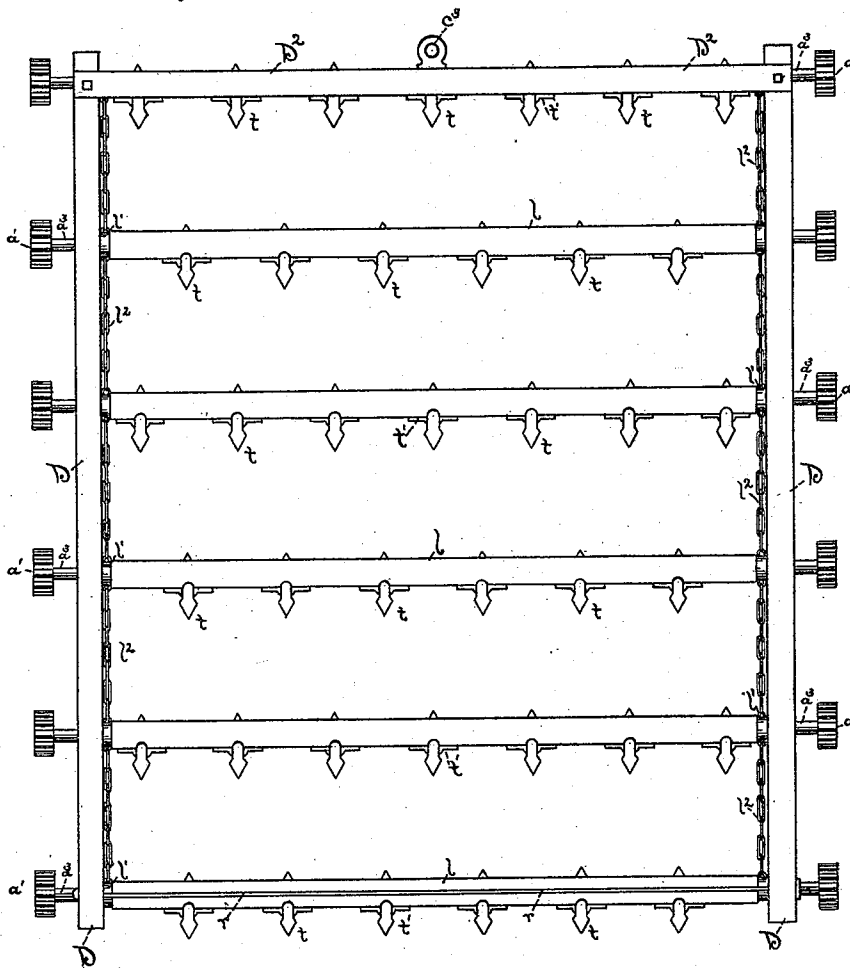


FIG. 6.

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UNITED STATES PATENT OFFICE.

NIELS ANDERSON, OF SIOUX CITY, IOWA.

HARROW.

SPECIFICATION forming part of Letters Patent No. 485,677, dated November 8, 1892.

Application filed July 16, 1892. Serial No. 440,214. (No model.)

To all whom it may concern:

Be it known that I, NIELS ANDERSON, a citizen of Denmark, residing at Sioux City, in the county of Woodbury and State of Iowa, have
5 invented certain new and useful Improvements in Harrows; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to
10 make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My invention has reference to harrows. Its
15 object is to provide a revolving riding-harrow that may readily be converted into an ordinary flat harrow. It is also intended to provide a harrow that will thoroughly pulverize the soil by means of teeth upon revolving
20 shafts and which by the operation of a single lever may be changed from a riding-harrow to a flat harrow. It is furnished with a cleaning device and with carrying-wheels by which it may be conveyed to any desired
25 place while inoperative.

In my description reference is had to the following drawings, in which similar parts are designated by similar letters throughout the several views.

30 Figure 1 is a top view of my invention. Fig. 2 is a detail view of certain parts used in the flat harrow. Fig. 3 is an enlarged detail view of drive-wheel. Fig. 4 is an enlarged detail view of edge of drive-wheel, showing
35 one of the springs on side of same. Fig. 5 is a view of my invention, in side elevation, resting on carrying-wheels. Fig. 6 is a view of parts converted into flat harrow.

Referring now to the illustrations, W W
40 are the carrying-wheels, borne upon shaft W', which may be raised and lowered by crank-rod K, crank K', thread b' on crank-rod, thread b^3 on top of box B, as shown in Fig. 5. Box b works up and down on flange b^2 within
45 box B and is loosely secured to the lower end of crank-rod K. By this construction the entire working parts may be lifted from the ground and the harrow conveyed inoperative.

F is the frame, supporting circular platform
50 P, bearing cross-slats P' P' P', which bear the seat S³ and protect the operator from the re-

volving shafts and teeth. A A are the drive-wheels, capable of being set in motion by contact with the ground, located inside the carrying-wheels borne upon shaft A². These
55 wheels have spokes A³ on the inside, as shown in Fig. 3, with a solid outside surface A⁴.

S' S' are movable caps cut out of the solid portion of wheel, dovetailed and hinged at S² into drive-wheel and having on the under
60 sides catches c c.

S S, together with v, constitute springs, and c' a notch on the under side and end of S S, by means of which S S are held closed on circumference of drive-wheel. The revolving
65 harrow-shafts are designated by l l, carrying teeth t t, held in position by clasps t' t'. Each of the shafts are clasped loosely near the end by bands l' l' and are connected by chains l² l².

a³ a³ are rounded extensions of l l, supplied
70 with cogged wheels a' a'. a³ a³ work through and upon openings a⁴ a⁴ in drive-wheels, as shown in Fig. 5.

a² designates a semicircular bar with half of its surface cogged to receive cogged wheels
75 a' a'. This bar is secured to frame F and to the inside of frame B', which supports box B. When in use as a circular harrow, drive-wheels carrying cogged wheels a' a' and shafts l l rotate from the front backward,
80 cogged wheels a' a' come into conjunction with bar a², and a revolving motion is communicated to shafts l l just at the time when teeth t t are in the ground. In this manner the ground is thoroughly stirred and pulverized.
85

L is a lever with catch o' and spring o, e a notched bearing on frame F to secure lever in place. By means of shaft L², firmly attached to lever L, a rotary motion may be communicated to a wheel L' under frame F,
90 to which on opposite sides are attached lever-arms g and g', extending in opposite directions from side to side, which are hinged to square arms g² g², which in turn are hinged to other lever-arms g³ g³ and g⁴ g⁴, which are
95 loosely jointed with trip-levers T² T², secured by bolts T' T' to frame F, so as to permit a free movement of trip levers.

T T are small wheels on end of trip-levers, with which trip-levers may easily pass springs
100 S S. It will be seen by reference to Figs. 1 and 5 that when lever L is forced toward the

horses trip-levers will force each spring S S away from circumferences of drive-wheel, catches $c' c'$ are in succession released, shafts $l l$ force open caps $S' S'$ and fall to the
 5 ground. The next revolution of the wheels A A closes caps $s' s'$ by their coming in contact with the ground. Lever L having accomplished its purpose, heavy spring s^4 brings said lever and trips $T^2 T^2$ back to their original position. In this manner all the harrow-shafts assume the position shown in Fig. 6,
 10 and may be converted into a flat harrow by the use of the parts now following.

In Figs. 2 and 6, D D indicate long side bars used for the purpose of connecting harrow-shafts $l l$. r is a rod connecting bars D D, passing through openings $r^2 r^2$. D' D' are flanges secured on under side of side bars to clasp square ends of harrow-shafts. $d d$ are
 15 blocks to fill space between side bars and rounded ends of shafts $a^3 a^3$. x is a concave surface on under side of blocks $d d$ to fit curved ends of shafts $a^3 a^3$. $r' r'$ are rods passing through under ends of flanges D' D' to hold bars D D in position on shafts $l l$. D² is a bar uniting front ends of bars D D, to the middle of which an eye c^3 is secured for the attachment of the doubletrees.

A cleaning device consisting of teeth $p p$
 20 is attached to frame F. When shafts $l l$ revolve, teeth $t t$ pass through teeth $p p$ and are cleared of cornstalks and other débris.

I am aware that harrows similar to mine in certain particulars have been constructed.

What I believe to be new, and desire to secure by Letters Patent, is—

1. In a revolving riding-harrow, drive-wheels A A, caps $S' S'$, with catch c on the under side thereof, forming a part of said wheels and secured by hinge on the circumference
 40 thereof, springs S S and v , holding caps in place, lever L, lever-arms $g' g^2 g^3 g^4$ and $g g^2 g^3 g^4$, connecting lever L with trips $T^2 T^2$, by means of which springs, lever, and trips caps $S' S'$ may be opened, harrow-shafts $l l$,
 45 journaled through drive-wheels by means of rounded shafts $a^3 a^3$, cogged wheels $a' a'$ on the ends of said shafts, and semicircular bars a^2 to receive wheels $a' a'$, by which a circular motion may be communicated to shafts
 50 $l l$, substantially as set forth.

2. In a revolving riding-harrow, drive-wheels A A, harrow-shafts $l l$, journaled through said wheels and supported in position by caps $S' S'$, which form a part of drive-wheels and
 55 are secured by hinges on the circumference of same, trips $T^2 T^2$, which act upon springs S S and v , operated by means of lever L, and lever-arms $g' g^2 g^3 g^4$ and $g g^2 g^3 g^4$, releasing caps $S' S'$, together with shafts $l l$, in succession, by which shafts $l l$ may form part of and be converted into a flat harrow, as specified.

In testimony whereof I affix my signature in presence of two witnesses.

NIELS ANDERSON.

Witnesses:

O. MIDDLEKAUFF,

RASMUS HANSON RASMUSON.