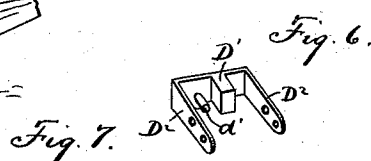
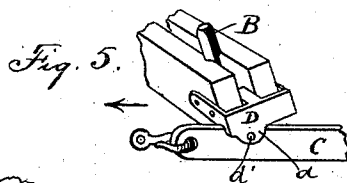
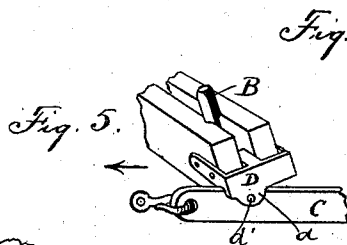
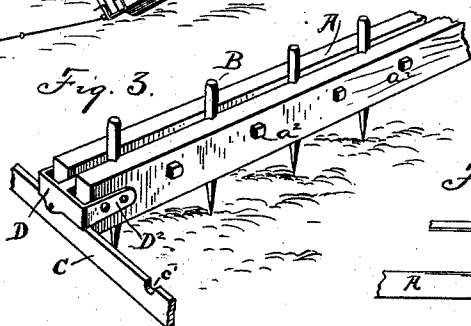
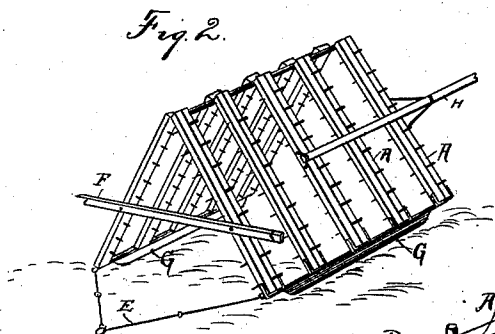
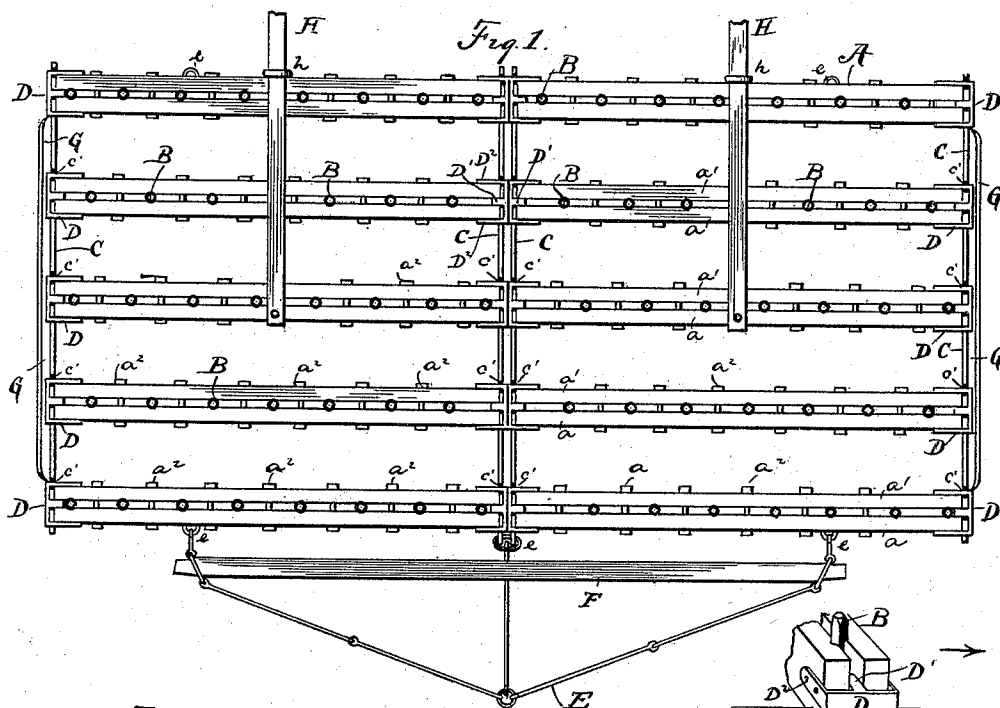


(No Model.)

J. S. RAYL.
HARROW.

No. 474,692.

Patented May 10, 1892.



Witnesses:

E. Ryne Gilchrist
[Signature]

Inventor.

James S. Rayl
[Signature]
By *[Signature]*
attorney

UNITED STATES PATENT OFFICE.

JAMES S. RAYL, OF GREEN CAMP, OHIO.

HARROW.

SPECIFICATION forming part of Letters Patent No. 474,692, dated May 10, 1892.

Application filed February 28, 1891. Serial No. 383,242. (No model.)

To all whom it may concern:

Be it known that I, JAMES S. RAYL, of Green Camp, in the county of Marion and State of Ohio, have invented certain new and useful

5 Improvements in Harrows; and I do hereby 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 pertains to make and use the same.

10 My invention relates to improvements in harrows in which the teeth are clamped between the two members of the respective beams, the latter being of the rocking variety, the arrangement being such that when the

15 harrow is traveling the one end foremost the teeth stand approximately vertical and when traveling with the other end foremost the beams rock or tilt, so that the teeth incline downward and rearward and engage the

20 ground obliquely. My invention also relates to the details of construction hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a plan. Fig. 2 is a view in perspective showing the harrow in position folded for transportation. Figs. 3, 4, 5, and 6 are perspective

25 views in detail. Fig. 7 is a side elevation in detail of a modification.

A A represent the beams, in which the teeth

30 B are set, and C C are the side bars, that connect and hold the different beams in place, the beams and side bars constituting the frame-work and the harrow comprising two such frames arranged side by side, as shown

35 in Fig. 1.

D are metal caps made right and left handed, and with which caps each beam is provided at either end thereof, as shown. Each beam comprises two longitudinal sections or members

40 $a a'$, with securing-bolts a^2 , located between the teeth—that is to say, the two members of a beam being bolted through and through. The beams shown are supposed to be of wood, the latter being preferable on account of its cheapness. If metal beams are

45 preferred, channel-bars may be used to advantage in constructing the same, in which case the ribbed or channeled sides are arranged facing each other and bolted through and through the same, as with a wooden beam.

50 The holes for inserting the teeth are drilled or bored at the union of the two members of a

beam and are made a trifle smaller than the teeth, so that in inserting the teeth the securing-bolts are loosened and the two members

55 of a beam are slightly separated, whereupon by tightening the bolts the teeth are clamped and firmly held in place. When the securing-bolts are loosened, the teeth may readily be removed for sharpening or other purposes, and

60 the teeth may be adjusted lengthwise thereof, as may be desired. The caps D have tongues D' , that fit between members $a a'$ of the beams, and the caps have inwardly-projecting arms D^2 , that fit astride or embrace the beam, these

65 parts being bolted through and through, and thereby rigidly secured the one to the other. The end pieces of the cap have depending flanges d , that extend down some little distance outside of the opposing side bar C, member

70 d having an inwardly-projecting trunnion at d' , such trunnion being adapted to fit in a hole c of bar C. Beams A fit in between bars C. Hence when the parts are assembled the

75 whole structure is securely coupled together into a frame-work. Bars C are cut away or notched on top at c' just to the one side of a hole c . When the harrow is drawn in the direction indicated by the arrow in Fig. 4, the

80 forward ends of the cap bear upon the upper edges of bars C, in which position of parts the teeth are supposed to be in position about vertical. If the harrow be drawn in the opposite

85 direction, (see Fig. 5,) what is then the forward end of the cap tilts downward into the opposing notches c' , whereby the beams are

90 rocked, so that the teeth as they extend downward incline rearward and engage the ground obliquely, in which oblique position the teeth do not enter the ground so deeply as when

95 the teeth stand perpendicular to the surface of the ground.

E is the draft-chain, and $e e e$ are hooks or staples for attaching the chain, these hooks or staples being provided at either end of the

100 harrow, and F is the spreader for holding the chain distended.

G G are runners fastened to the sides of the harrow—that is to say, to the outer bars C—and when it is desired to move the harrow

105 from place to place the spreader is removed and the harrow is folded to the position shown in Fig. 2, in which position the runners engage the ground, and the spreader may be used

to hold the parts in such position, the upper edges of the harrow being supposed to be chained together temporarily during the transportation. The handles H are secured by loops
5 h h, and these handles may be removed and changed to the other end of the harrow in reversing the travel of the harrow.

Sometimes it is desirable to have the harrow in three sections, in which case the central section is provided on either side thereof
10 with upwardly-projecting runners, as shown at G', Fig. 7, and in moving the harrow from place to place the harrow is turned bottom upward and the outside sections are folded
15 on top of the central section, in which case runners G' support the entire structure.

What I claim is—

1. In a harrow, the combination, with beams constructed in sections with provision for
20 clamping the teeth between the sections, of metal caps connected with the ends of the respective beams, each cap having a tongue fitting between the beam-sections and having arms embracing the beams, the caps bearing
25 lateral trunnions for engaging holes in the

side bars that connect the different beams, substantially as set forth.

2. The combination of beams, caps, and side bars, substantially as indicated, the caps having lateral trunnions engaging holes in the
30 side bars, the latter having notches to allow the caps and beams to tilt the limited distance in the one direction, substantially as set forth.

3. In a harrow, the combination of beams, caps, and side bars, a cap having a depending
35 flange fitting next outside the side bars, each flange having a lateral trunnion adapted to engage a hole in the side bars, the beams being adapted to fit between the side bars, the latter being notched or cut away to allow the
40 caps or beams to rock or tilt in the one direction, substantially as set forth.

In testimony whereof I sign this specification, in the presence of two witnesses, this 10th day of January, 1891.

JAMES S. RAYL.

Witnesses:

JOHN A. WOLFORD,
JOHN F. MCNEAL.