D. WATERBURY.

Spring Harrow or Drag.

No. 214,537. Patented April 22, 1879.

Fig. 1.

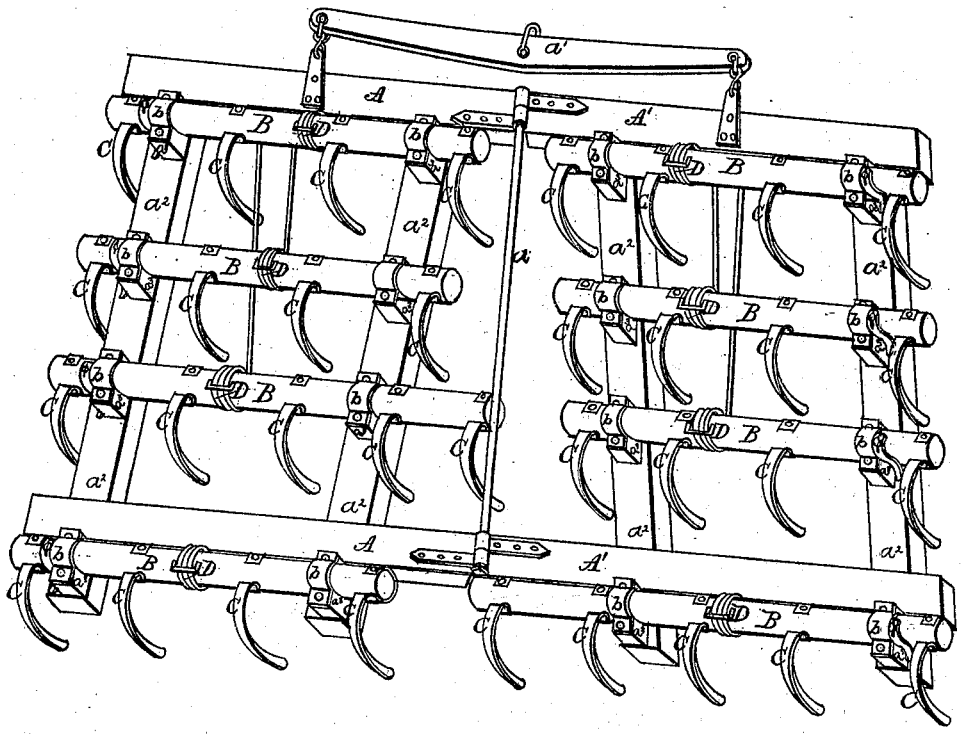


Fig. 2.

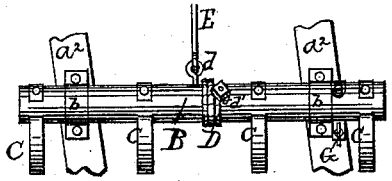
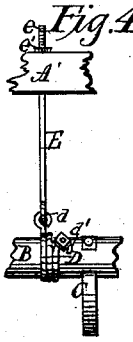


Fig. 3

Fig. 4.



Witnesses:

F. W. Burnham.

D. A. Cowl

Inventor:

Daniel Waterbury

by

W. H. Babcock

Attorney.

UNITED STATES PATENT OFFICE.

DANIEL WATERBURY, OF KALAMAZOO, MICHIGAN.

IMPROVEMENT IN SPRING HARROWS OR DRAGS.

Specification forming part of Letters Patent No. **214,537**, dated April 22, 1879; application filed December 13, 1878.

To all whom it may concern:

Be it known that I, DANIEL WATERBURY, of Kalamazoo, in the county of Kalamazoo and State of Michigan, have invented certain new and useful Improvements in Spring Harrows or Drags; 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, and to letters of reference marked thereon, which form a part of this specification.

This invention relates to that class of harrows in which springs are employed, to allow the teeth to yield on encountering an obstacle, but to press them into position for their work.

The nature of said invention consists in the construction, combination, and arrangement hereinafter particularly set forth and claimed.

In the accompanying drawings, Figure 1 represents a perspective view of my improved harrow or drag. Fig. 2 represents one of the cylindrical tooth-bars detached, and Fig. 3 represents in detail one of the slotted regulating plates and screws. Fig. 4 represents in detail the device for regulating the tension of the springs.

In said drawings, A A′ designate the two corresponding sections of a harrow-frame or drag-frame, hinged on a connecting-bar, *a*, and drawn by whiffletree, a^1. On the oblique longitudinal bars a^2 of these frames are arranged at suitable intervals blocks a^3, which are grooved to serve as bearings for transverse cylindrical tooth-bars B. These bars are held to said blocks by current metal straps *b b*, which complete the bearings, and allow to said cylindrical tooth-bars axial rotary motion.

C designates the teeth carried by these bars, and which may be of any convenient construction. They are, however, attached, by preference, to the front of said bars and bent up behind the same, as shown, so as to leave room for the escape of refuse, stubble, weeds, &c., and prevent clogging. In case any one of said teeth encounters an obstacle sufficient to injure it, the pressure will cause the bar B, to which said tooth is attached, to turn on its axis, relieving said tooth. This rotary motion of said bars is against the resistance of springs D, one of which is applied to each bar B.

Divers forms of said springs may be substituted for that which I use without abandoning or exceeding the spirit of my invention; but I prefer to employ the form shown, having its forward end attached, at *d*, to a rod attached to the frame of the drag, and its rear end, *d′*, coiled around the tooth-bar on which it operates, and finally secured thereto. The said spring resists the turning of the tooth-bar sufficiently to prevent the harrow-teeth from rising on contact with any slight obstacle, but yields when a more serious obstacle is encountered. When the obstacle is past it replaces the tooth-bar in its former position, and throws the teeth again into contact with the soil.

To regulate the degree of resistance of said spring, and also to compensate for the weakening effects of long use, I make the rod E, to which the forward end of said spring is attached, longitudinally adjustable by screw-thread *e* and nut *e′*, or in any convenient manner. Said rod may pass through the harrow-frame or be merely held on top thereof.

I also employ a further device for moving said bars B on their axes to adjust the depth at which the teeth are working, or hold them out of engagement with the soil, if desired. To each bar I attach a curved plate, F, having a flat lower end, through a screw-tapped perforation in which works an adjusting-screw, G, bearing against the frame of said drag. By turning said screw the bar is rocked or turned on its axis, and the teeth raised or lowered, as desired. Said screw does not prevent the rotary motion of said bar, as it merely presses against the drag-frame and is free to rise when the bar turns by reason of the teeth encountering an obstacle. The screw merely establishes a depth below which the teeth cannot go, and that point or depth is varied by the screw alone.

Springs attached to the tooth-bars are less liable to injury than when attached to the individual teeth, and one spring does the work of several. All the bars of the machine, with their teeth and other attachments, are of similar construction.

I do not claim nor use spring-teeth, but rely

solely on the spring attached to the tooth-bar for the yielding action required. The harrow-teeth hereinbefore shown and described are to be understood as rigid teeth.

I do not broadly claim the combination of a rotary harrow tooth head or shaft with a spring attached thereto by one end, such a combination being shown in a patent granted to one Cousins, wherein a harrow forms a part of a horse hay-rake, and the movable rake-head and harrow-head are connected by springs.

Having thus fully described my invention, what I claim as new is—

1. In combination with harrow-frame A, the cylindrical tooth-bars B, having teeth C directly attached thereto, and springs D, attached at one end to said bars and at the other end to a fixed part of the harrow-frame, so as to resist the turning of the same, substantially as and for the purpose set forth.

2. In combination with harrow-frame A, the cylindrical tooth-bars B, teeth C, springs D, and screw-threaded adjusting-rod E, provided with nut e', as and for the purpose set forth.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

DANIEL WATERBURY.

Witnesses:
OSCAR T. TUTHILL,
A. M. DEAN.