(No Model.)

J. S. ROWELL.

HARROW.

No. 332,562. Patented Dec. 15, 1885.

Fig. 1.

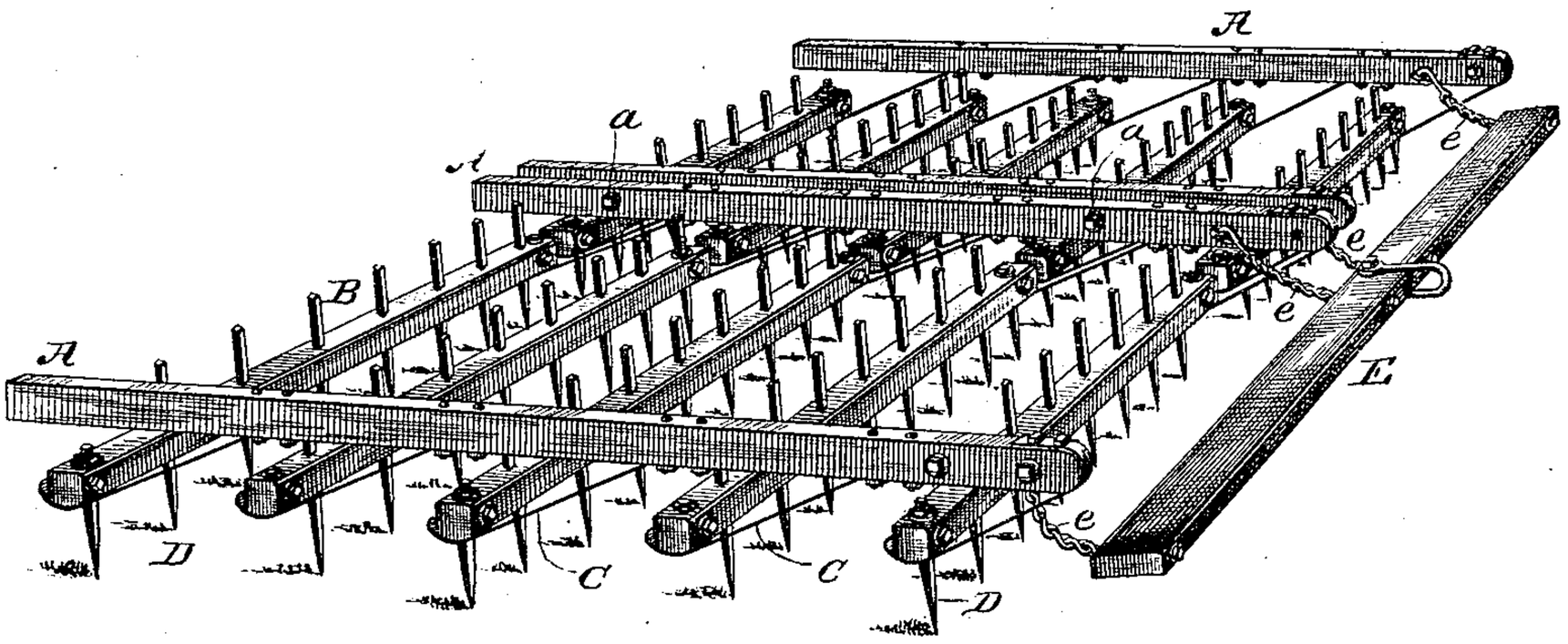


Fig. 2.

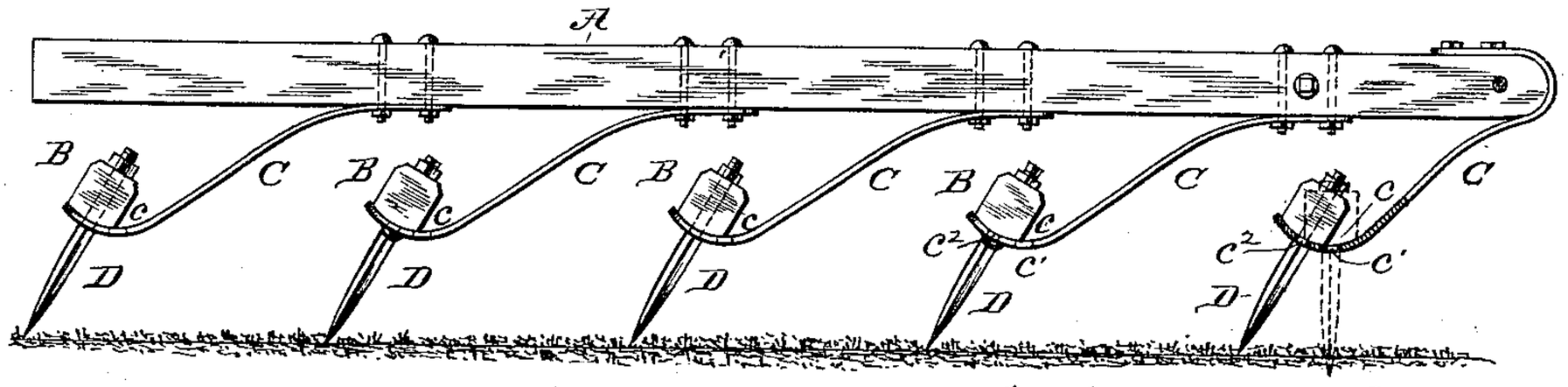


Fig. 3.

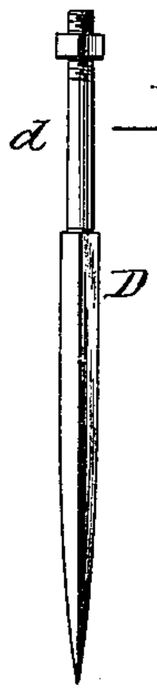
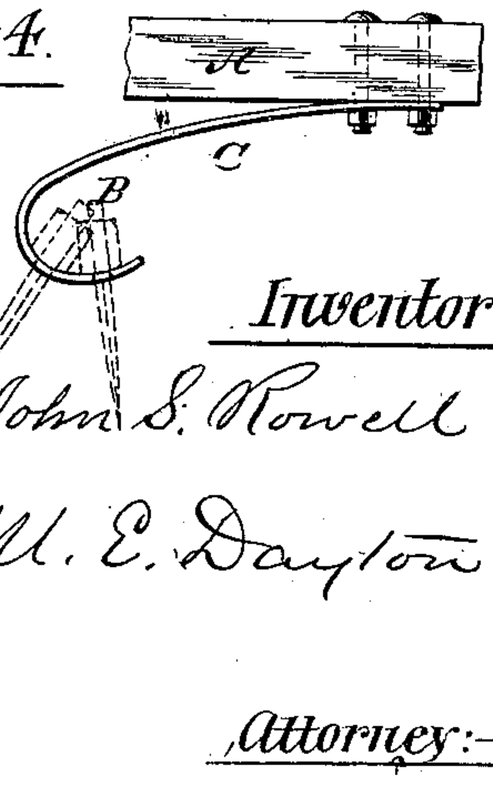


Fig. 4.



Witnesses:-

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HARROW.

SPECIFICATION forming part of Letters Patent No. 332,562, dated December 15, 1885.

Application filed June 29, 1885. Serial No. 170,122. (No model.)

To all whom it may concern:

Be it known that I, JOHN S. ROWELL, of Beaver Dam, in the county of Dodge and State of Wisconsin, have invented certain new and useful Improvements in Harrows; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to harrows having a spring action on the part of the teeth or teeth-supports, to those having adjustable teeth, and also to harrows having flexible frames.

The objects and nature of the invention will fully appear from the following description and claims.

In the accompanying drawings, Figure 1 is a perspective view of a double-frame harrow containing all my improvements. Fig. 2 is a side elevation, and Fig. 3 is an elevation of a tooth constructed to hold the tooth-beam to the spring-metal strap by which it is connected with the main frame-beams. Fig. 4 is a modification of the form of the spring-strap.

Describing the exact construction illustrated, A A are beams which run from front to rear of the machine. B B are transverse tooth-beams, or beams to which the teeth are directly attached. C C are spring-metal straps secured at their front ends to the main frame-beams A A, and running downwardly and rearwardly from the attachment at their rear ends of the tooth-beams B. D D are the teeth. E is a draft-beam connected with each of the frame-beams A by connections *e*, and provided with a central hook or clevis for the attachment of the horse or team.

For the purpose of flexibility in each section of the harrow, the main or upper longitudinal beams A A thereof have no connection with each other except through the tooth-beams B and the springs C C; but when two sections are employed to make the double harrow shown the inner beams A A of the two sections are hinged together by eyebolts of the usual form for this purpose, as indicated sufficiently at *a*. The tooth-beams are rigid, but are flexibly joined with the beams A by means of the spring-metal straps C C, which incline downwardly and rearwardly, as shown, and are stiff enough to hold the teeth movably to their work, and to sustain the frame-beams clear of the tooth-beams. The said straps are therefore capable of such torsion as will give each section of the harrow a desired degree of flexibility, or as will, for example, allow one corner of the section to rise over an obstacle without lifting the three other corners from the ground, or as will allow the section to adjust itself to ordinary inequalities in the ground-surface. The front straps, C, are extended over the rounded ends of the beams A, as shown, both to bring the front tooth-beam farther forward, and to furnish a shoe for the protection of the wood when the harrow is being drawn "bottom up" over the ground in moving it from or to the field. All the said straps are fastened to the beams A by two bolts to hold the straps in place beneath the beams. The rear or free ends of the straps C are curved upward, so as to present a concaved upper surface, *c*, beneath the tooth-beam, and each strap is provided with two holes—one, *c'*, at the lowest or a little in front of the lowest point of the concave, and the other, c^2, behind the former—said holes to be used alternatively for the attachment of the beam. The beam is held at each end to a strap, C, by means of a bolt passing through one or the other of these holes, and to be better held the under surface of the beams is shown curved or convex where it bears on the strap. The mere application of the holding-bolt thus gives the desired direction to the teeth. For example, when the bolt occupies the front hole, *c'*, the teeth are held vertical, or substantially so, and when it occupies the rear hole the teeth are held inclined rearwardly. In the first position of the teeth their action is more rank, while in the second position they are less so, as desired sometimes for smoothing or other special work.

To avoid the use of tooth-beams of unnecessary length, the extreme teeth on some of the beams may be made to serve as bolts for attaching the beams to the straps by making these teeth with shanks *d* and nuts *d'*, as shown in Fig. 3.

The draft-beam E is connected with the beams A by means of short connections or

chains *e*, which by their flexibility permit the several beams A to rise and fall in accordance with the character of the ground-surface.

When the harrow is to be drawn to or from the field, it may be turned over upon the beams A, and the spring-straps uphold the heads of the teeth clear of the ground, so that it may be drawn as upon "runners." The harrow provided with straps sustaining the tooth-beams in this manner has the same advantages, in point of portability, as have those which are provided with wide or deep runners, especially adapted to sustain them when reversed, while at the same time being much lighter and more simple in construction by reason of the absence of such runners.

While the above-described details of construction are believed to be desirable in the embodiment of my invention in its best form, I am not restricted thereto—as, for example, it is not essential to the general purposes of the springs C that they be so inclined as to bring the heads of the teeth below the upper surface of the beams A for the purpose of clearing the ground when the harrow is turned bottom up, and generally the appended claims, except where they specify particular purposes, are intended to embrace the construction substantially as therein described, when in form to secure either of the functions, purposes, or advantages belonging to said construction, though so varied that it will not secure all of them.

I claim as my invention—

1. The combination, with the transverse tooth-beams B, of separate beams A A, running from front to rear, and downwardly and rearwardly directed metal springs C C, connecting the beams A and B, said beams B and springs C C affording the only connection between the beams A A, substantially as described.

2. The combination, with longitudinal beams A and transverse tooth-beams B, of downwardly and rearwardly directed metal springs C, fastened at their front ends to the beams A, and curved at their rear and free ends, said tooth-beams being adjustably attached upon the curved portions of the springs, whereby the inclination of the teeth may be varied, substantially as described.

3. The combination, with the transverse tooth-beams B, of separate beams A A, running from front to rear, and springs C C, connecting the beams A and B and sustaining the teeth-heads clear of the ground when the harrow is overturned, said beams B and springs C C affording the only connection between the beams A A, substantially as described.

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

JOHN S. ROWELL.

Witnesses:
H. W. KEYES,
L. W. BARBER.