A. FRIEDEMANN.

Harrows.

No. 154,792. Patented Sept. 8, 1874.

Fig. 1.

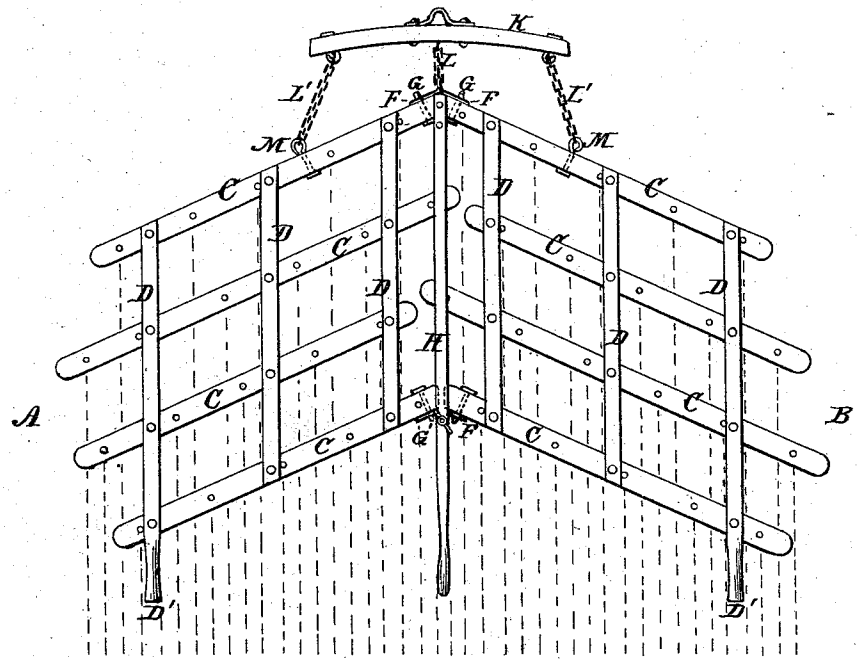


Fig. 2.

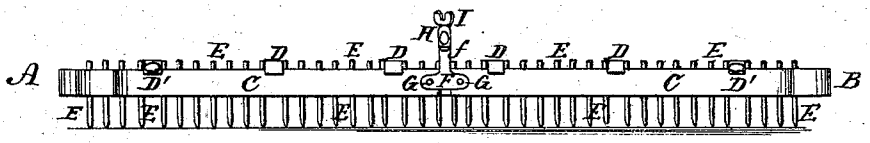
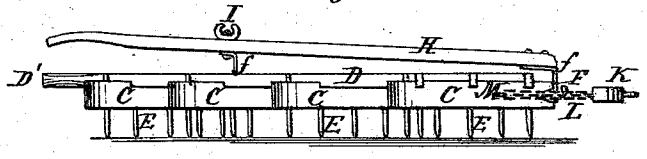


Fig. 3.



Witnesses.

Edmund Masson

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UNITED STATES PATENT OFFICE.

AUGUST FRIEDEMANN, OF WAVERLY, IOWA.

IMPROVEMENT IN HARROWS.

Specification forming part of Letters Patent No. **154,792**, dated September 8, 1874; application filed May 15, 1874.

To all whom it may concern:

Be it known that I, AUGUST FRIEDEMANN, of Waverly, in the county of Bremer and in the State of Iowa, 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 drawing making part of this specification, in which—

Figure 1 is a plan view of my improved harrow. Fig. 2 is a rear elevation of the same, and Fig. 3 is an elevation of one side of said device.

Letters of like name and kind refer to like parts in each of the figures.

My invention is an improvement upon a similar device for which Letters Patent were granted to me upon the 2d day of August, 1870, and the 31st day of January, 1871; and it consists, principally, in the means employed for connecting together the sections of the harrow and for rendering the same capable of independent radial and vertical motion, substantially as and for the purpose hereinafter specified. It consists, further, in the relative arrangement of the bars which form the sections, substantially as and for the purpose hereinafter shown. It consists, further, in the arrangement upon the sections of the handles employed for controlling their vertical, radial, and lateral motions, substantially as and for the purpose hereinafter set forth.

In the annexed drawing, A and B represent the sections of the harrow, each composed of two outer bars, C, and two inner bars, C′, arranged parallel with and equidistant from each other, and connected together by means of three cross-bars, D, placed near the ends and center of said bars C C′, and having an angle of about thirty degrees with relation to the same. As seen in Fig. 1, the bars C C′ of each section have different lengths, and, while the inner ends of the forward and rear bars C of each section extend inward to an equal distance from the inner cross-bar D, the corresponding ends of the center bars C′ extend inward unequally, so as, in a measure, to interlock with the corresponding bars of the opposite section. The outer ends of all of said bars C C′ project unequally, the increase in length from the shortest to the longest of said ends being equal to the width of one, two, or three furrow-marks. Within each bar C C′ are placed teeth E, of usual form, which teeth are equidistant from each other and are relatively arranged so as to mark each fourth furrow, while, as a whole, the teeth of the harrow are so arranged as to equally divide the space between the outer sides of the latter. As the average length of the bars of one section is exactly equal to those of the other section, and said sections contain an equal number of teeth, their draft will be the same, although the order of their long and short bars is different. The sections are connected together at the contiguous ends of their front and rear bars by means of a metal strap, F, which is provided near each end with an opening that receives a stud, G, which extends horizontally outward and then downward from said bars C. Extending upward from the center of each strap F is an arm, *f*, which is fastened to or upon a lever, H, that extends from the front end of the harrow rearward beyond the rear end of the same and terminates in a handle. The front strap is permanently secured to said lever, while the rear strap is connected with the same by means of a bolt and nut, I, which enable said parts to be readily attached to or detached from the sections.

By means of the lever H the central portion and rear end of the harrow can be raised at will, while the straps F afford to each section independent radial and (within certain limits) vertical motion without disturbing the position of the opposite section. The outer side of each section is elevated or depressed by means of a handle, D′, formed by the rearward-extended end of the outer cross-bar D.

The draw-bar K is connected to or with the harrow by means of a central chain, L, which extends between said bar and the front strap F, and two other chains, L′, that extend between the ends of said draw-bar and suitable fastening-hooks M, which are attached to the front bars C in a line with said draw-bar ends, the whole operating as in my said patent of January 31, 1871.

As constructed, the harrow is capable of efficient use upon stony or uneven ground, and,

from the facility with which it can be handled, can be made to operate with one attendant where two would ordinarily be required.

In order to free the harrow from obstructions at or near either side, but one-fourth its weight requires to be lifted, while to free its central portion one-half only of its weight is raised by the operator, by which means the services of a boy are rendered available where ordinarily the strength of a man would be necessary in order to handle the device.

Having thus fully set forth the nature and merits of my invention, what I claim as new is—

1. In combination with the sections A and B, the straps F pivoted to or upon the studs G and attached to the lever H, substantially as and for the purpose specified.

2. The bars C and C′, having unequal lengths and arranged with relation to each other and to the corresponding bars of the opposite section, substantially as and for the purposes set forth.

3. The arrangement upon the sections A and B of the lever H and handles D′, substantially as and for the purpose set forth.

In testimony that I claim the foregoing I have hereunto set my hand.

AUGUST FRIEDEMANN.

Witnesses:

H. S. HOOVER,

H. S. BURR.