(No Model.)

J. H. HANSON.

HARROW.

No. 428,392. Patented May 20, 1890.

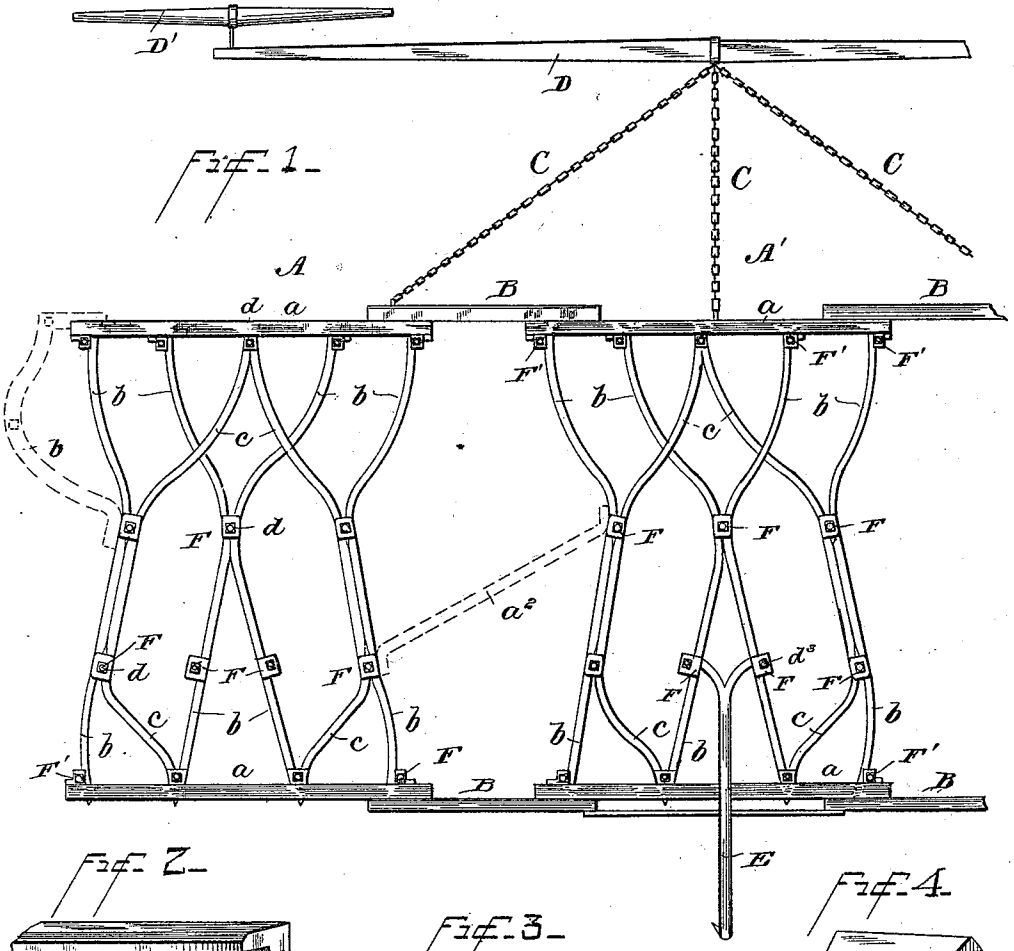

Fig. 1.

Fig. 2.

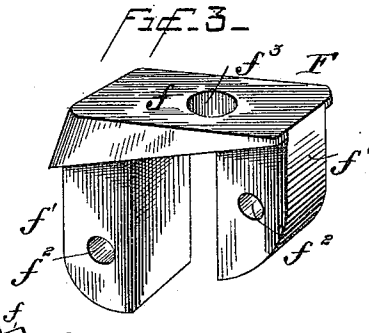

Fig. 3.

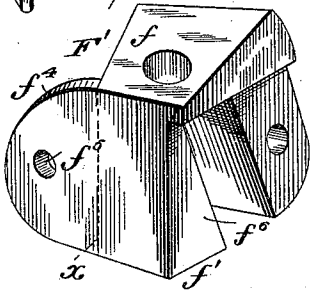

Fig. 4.

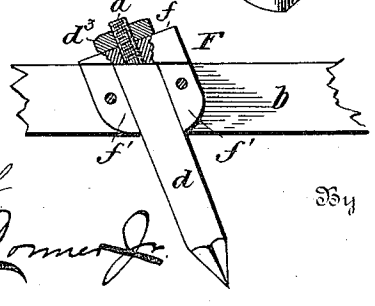

Fig. 5.

Witnesses

Arthur H. Cobb.

L. A. Connor Jr.

Inventor

John H. Hanson

By his Attorney

Geo. C. Whittlesey

UNITED STATES PATENT OFFICE.

JOHN H. HANSON, OF OAKLAND, NEBRASKA.

HARROW.

SPECIFICATION forming part of Letters Patent No. 428,392, dated May 20, 1890.

Application filed September 7, 1889. Serial No. 323,268. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. HANSON, a citizen of the United States, residing at Oakland, in the county of Burt and State of Nebraska, have 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 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 relates to agricultural implements, and especially to harrows or cultivators, such as are used for loosening the earth between rows of corn or other growing plants.

It consists in certain details of construction, as hereinafter set forth, and particularly pointed out in the claim hereunto annexed.

In the drawings, Figure 1 is a top plan view of a portion of my improved harrow. Fig. 2 is a view of one end of one of the cross-bars. Figs. 3 and 4 are views of the sockets for the teeth, and Fig. 5 shows the manner of holding the teeth.

The harrow is preferably composed of three similar sections A A′ A^2, though any number may be used. Each section is composed, preferably, of a front and a rear cross-bar *a*, arranged parallel with each other and united by longitudinal bars or rails *b*.

The teeth *d* consist of straight stout spikes having sharp points set so as to incline downward and backward at an angle of about forty or forty-five degrees from the horizontal. By slanting the teeth backward they allow sticks, stones, and other débris with which the harrow may come in contact to pass beneath them, and so the harrow does not become choked.

The sections A A′ A^2 are united by strips B B′, which are secured to the sections by means of bolts or otherwise, so as to be removable. Several bolt-holes are provided at different distances from the ends of the strips B B′, in order that the space between the sections may be adjusted to suit the space between the rows of plants. The sections thus united constitute a rigid structure which is attached by means of chains C to a suitable doubletree D, as shown. The ends of the doubletree lie in front of the two outer sections A A^2, so that a draft-animal hitched to the singletree D′ will walk between the rows. The harrow is guided by a handle E, rigidly attached to the middle section A′ and projecting rearwardly therefrom, so that the farmer can walk between the rows and easily govern the device, guiding it to right or left or raising it in front or rear, as required. The two outer rails are braced by bars *c*, while the inner rails are bent toward each other and united together at about the middle of their length. At this point, and also at the points where the braces *c* join the outer rails *b*, a metal block F is inserted between the two bars. These blocks are to receive the teeth *d* and are composed of a top plate *f*, from which depend two tongues *f′*. The top plate overhangs the tongues on each side, forming flanges to rest on the upper edges of the rails *b* and braces *c*. The sides of the tongues are flat to afford a good bearing for the rails and braces. In each tongue is a hole f^2 for the passage of the bolts or rivets that fasten the parts together. The inner edges of the tongues that face each other are parallel to fit the square shank of the tooth *d*. In the top plate is the hole f^3, in line with the center of the space between the tongues to receive the screw-threaded neck d^2 of the tooth, the projecting portion of which is furnished with a nut d^3 to fasten it firmly in place in the block F. In order to give the teeth the proper slant, the plane of the under side of the flanges on the block is at an angle with the plane of the top, so that when the block is in place the top slants forward and the space between the tongues *f′* inclines backward.

At the junction of the rails with the cross-bars *a* a modified form of block F′ is used, having a lateral wing or ear f^4, extending from the forward tongue *f′* at right angles with the side of the tongue. The ear has a hole f^5 to enable it to be bolted to the bar *a*. These blocks F′ thus constitute angle-irons for strengthening the frame. They are preferably strengthened by a web f^6, extending across between the tongues *f′* on the outer side. When a tooth is to be attached to a

rail at a point where it does not meet a brace or a cross-bar, a block F^2 is used, which is similar to the block F′, except that the ear f^4 is omitted beyond the dotted line *x*.

To still further stiffen the harrow-sections, the cross-bars *a* are made in the form of channel-irons, as shown in Fig. 2, the flanges facing away from the spacing-strips B and receiving between them the ends of the rails *b* and braces *c*. The spacing-strips B may also be channel-irons, if desired, like the bars *a*. The harrow can be widened, when desired, by bolting to the outer sections arms *b*′, adapted to carry one or more additional teeth. When the entire surface of the ground is to be treated, a bar a^2 can be inserted between the sections, carrying a series of teeth adapted to operate upon the ground between the sections.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

A harrow consisting of the cross-bars *a*, the rails *b*, preferably four in number, the middle ones being bent toward each other and joined at or near their middle, the braces *c*, joined to the outer rails and to the cross-bars, and the socketed blocks inserted between and secured to the rails and the braces and rigidly holding the harrow-teeth, substantially as described.

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

JOHN H. HANSON.

Witnesses:

EDWARD MITCHELL,

WILLIAM EKSTROM.