L. E. WATERMAN.

ALFALFA HARROW.

APPLICATION FILED APR. 3, 1908.

930,250. Patented Aug. 3, 1909.

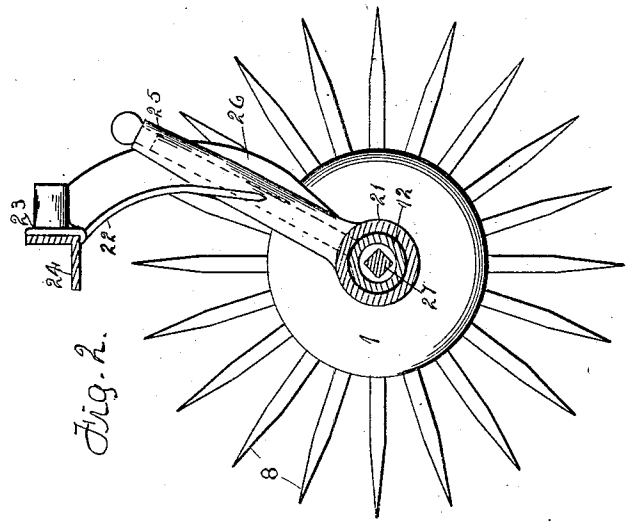

Fig. 2.

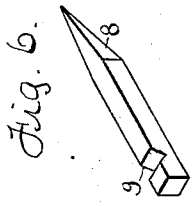

Fig. 6.

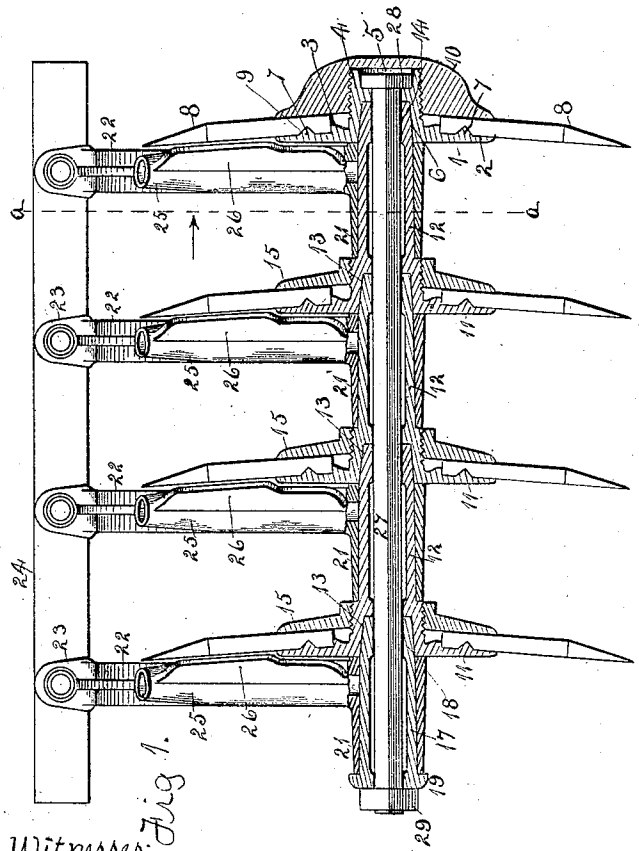

Fig. 1.

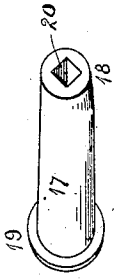

Fig. 5

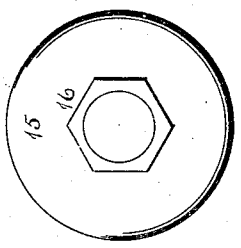

Fig. 4.

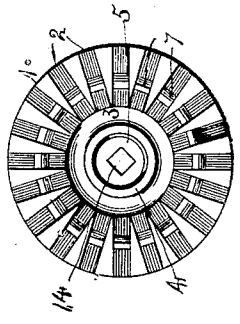

Fig. 3.

Witnesses:
J. B. Clark,
E. Behel.

Inventor.
Lewis E. Waterman.
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Attys.

UNITED STATES PATENT OFFICE.

LEWIS E. WATERMAN, OF ROCKFORD, ILLINOIS, ASSIGNOR TO EMERSON MANUFACTURING COMPANY, OF ROCKFORD, ILLINOIS, A CORPORATION OF ILLINOIS.

ALFALFA-HARROW.

No. 930,250. Specification of Letters Patent. Patented Aug. 3, 1909.

Application filed April 3, 1908. Serial No. 424,909.

To all whom it may concern:

Be it known that I, LEWIS E. WATERMAN, a citizen of the United States, residing at Rockford, in the county of Winnebago and State of Illinois, have invented certain new and useful Improvements in Alfalfa-Harrows, of which the following is a specification.

The object of this invention is to construct an alfalfa harrow in which the teeth of a head are held in place by a screw-threaded cap which will liberate all the teeth of a head when it is desired to replace a tooth.

The further object of this invention is to form as many connections between the main frame and a section as there are heads, and each connection formed with a scraper for the teeth of a head.

The further object of this invention is to form each tooth with a notch which engages a projection formed in one section of the head which holds the tooth against lengthwise movement.

In the accompanying drawings. Figure 1 is a vertical section through the harrow section, the upper portion of the supports and the main frame not sectioned. Fig. 2 is a transverse section on dotted line *a a* Fig. 1. Fig. 3 is an inner face representation of the main section of the inner head. Fig. 4 is an outer face representation of the teeth clamping cap. Fig. 5 is a perspective view of outer bearing for one of the standards. Fig. 6 is a perspective view of one of the teeth.

The inner head comprises the main section 1 in disk form having its inner face provided with radially extending grooves 2 at the inner ends of which is formed a ring 3. From the center of this main portion extends an externally screw-threaded projection 4, having a center cavity 5 in its end. The outer face of the main portion is formed with a cone-shaped recess 6. Within each of the radially extending grooves is formed a transverse V shaped projection 7. Teeth 8 are located in the radial grooves 2 and each is fitted with a V shaped recess 9, which receives the V shaped projections 7. The inner ends of the teeth are seated against the ring 3.

A cap 10 in disk form and of the same diameter as the main portion 1 is internally screw-threaded, and is adapted to be turned on the screw-threaded projection 4, until the cap is brought hard against the teeth 8, thereby clamping the teeth firmly in the radial grooves 2 of the main portion of the head. The cap 10 is formed with an excess of material to form the bumper which contacts with a like bumper of another like section.

The main portion 11 of the other heads are the same as the main portion 1 of the inner head, and the screw-threaded projections 12 are lengthened and have their ends fitted to enter the cone shaped recess 13 of an adjoining head.

The projections 4 and 13 are fitted with square openings 14. The caps 15 of the other heads have a screw-threaded connection with the projections of the heads, but do not have the excess of material carried by the cap for the inner head, each of these caps have a side projection 16 upon which a wrench may be placed to tighten the caps against the teeth. The teeth of all the remaining sections are supported in the same manner as the teeth of the inner head.

The head at the outer end of the section has a projection 17 formed with a cone shaped end 18 which enters the cam-shaped recess 13 in the head. This projection has an enlarged end 19, and the projection has a square opening 20.

On the projection 17 and each of the projections 12 of each of the heads, with the exception of the inner head, is located a tubular section 21 from which extends upwardly a standard 22, the upper end 23 of which is fitted to receive the angle iron frame 24, to which they are adapted to be secured by bolts, each of these standards have an oil tube 25 formed integral therewith. The lower ends of these tubes communicating with the outer surface of the projections which the tubular sections embrace. From each of the standards extend a scraper 26 which conforms approximately with the concave form of a head and teeth. The heads are arranged on the square rod 27, the headed end 28 of which is located in the recesses 5 formed in the end of the projection 4 of the inner head, and a nut 29 is turned on the projecting end of the rod. The cap 10 for the inner head is then turned in connection with the projection 4 which will inclose the head 28 of the rod, and also hold the teeth of that head in position.

The rod 27 being square binds all the heads together so that they revolve in unison.

The caps of any of the heads can be turned

back far enough to liberate the teeth without disturbing the connection of the heads on the rod.

Each standard 22 assists to support the frame 24, oil tube 25 and scraper 26, and as there is a standard for each head, the section and frame will be held in alinement.

I claim as my invention.

A harrow comprising a plurality of heads, each head comprising a main section in disk form, the main section provided with radially extending grooves within each of which is formed a transverse projection, a tooth for each groove and formed with a notch to receive the projection, and a cap for holding the teeth in position.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

LEWIS E. WATERMAN.

Witnesses:
A. O. BEHEL,
E. D. E. N. BEHEL.