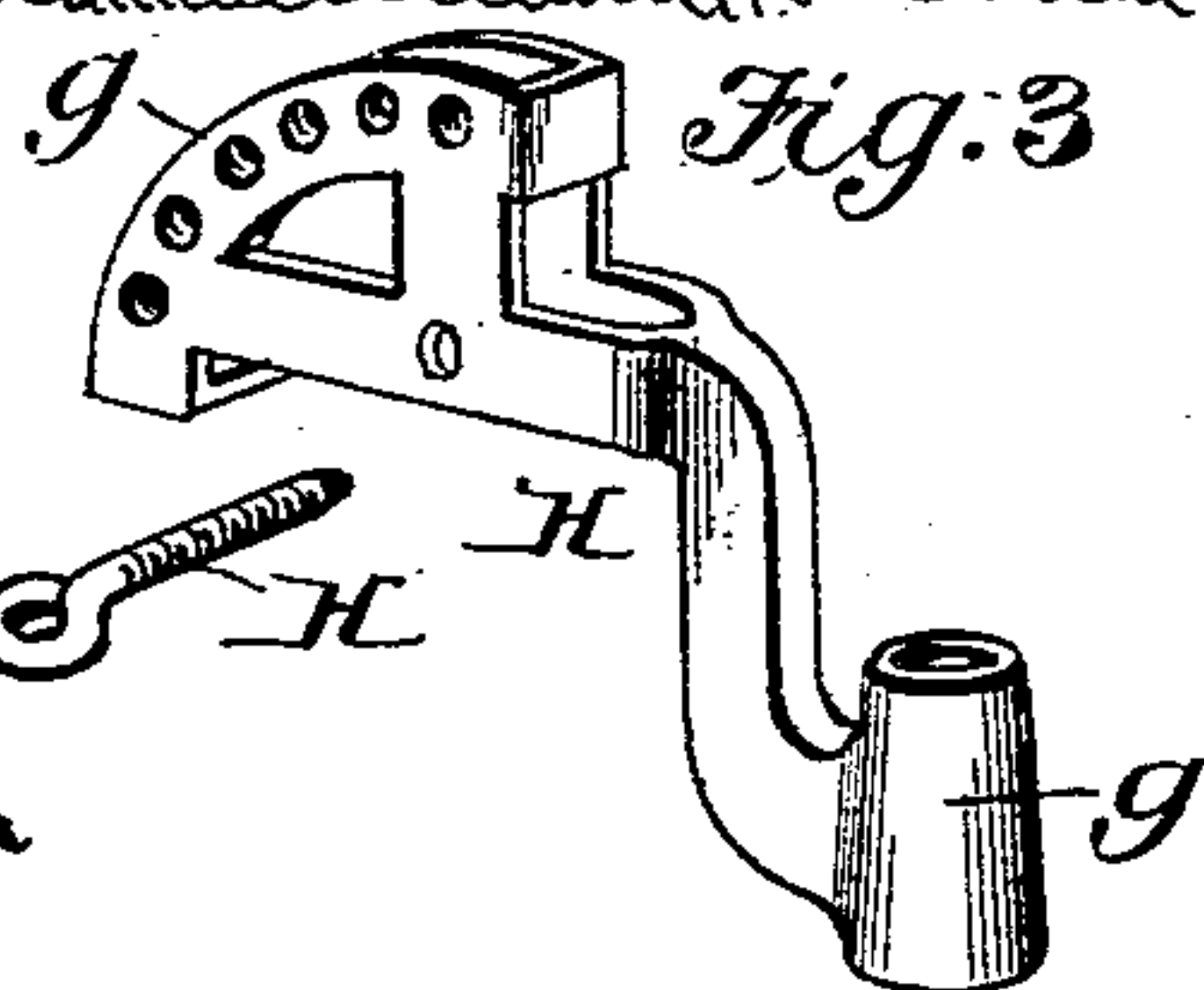
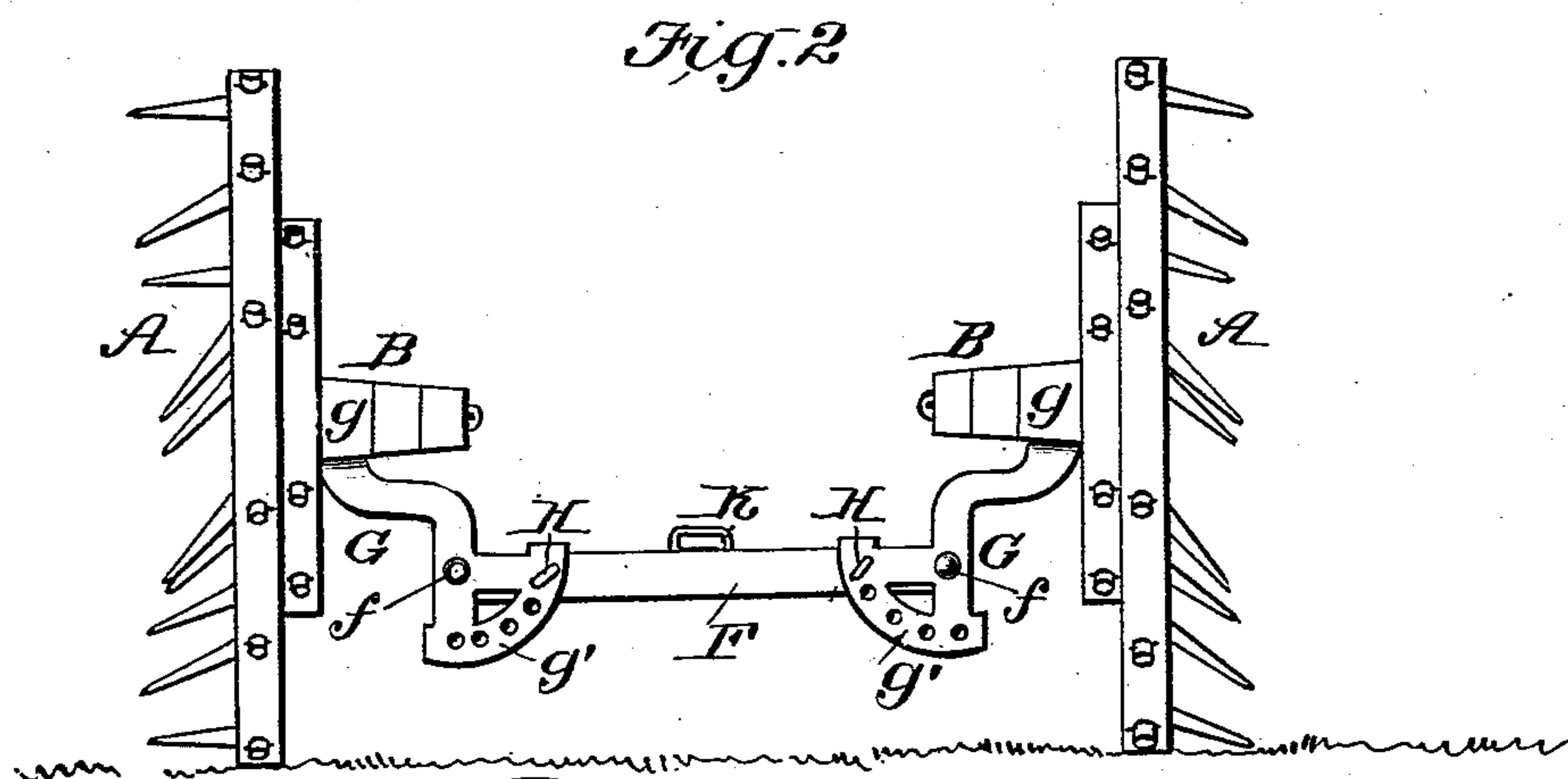
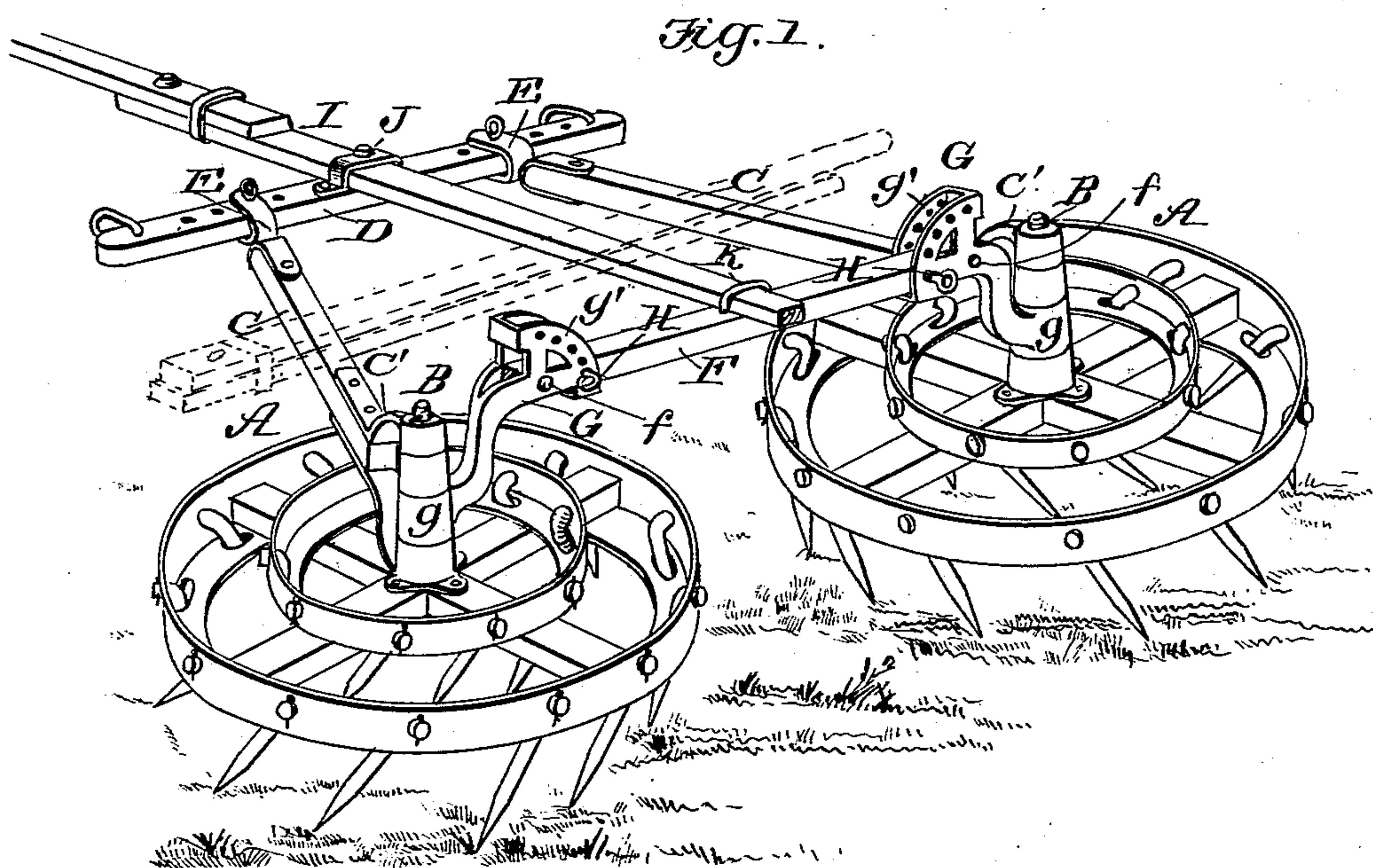


(No Model.)

J. G. FERRILL.
ROTARY HARROW.

No. 563,150.

Patented June 30, 1896.



WITNESSES:

Jos. A. Ryan.
Amos W. Hark

INVENTOR

James G. Ferrill

BY Munst Co.

ATTORNEYS.

UNITED STATES PATENT OFFICE.

JAMES G. FERRILL, OF BATESVILLE, ARKANSAS.

ROTARY HARROW.

SPECIFICATION forming part of Letters Patent No. 563,150, dated June 30, 1896.

Application filed August 3, 1895. Serial No. 558,145. (No model.)

To all whom it may concern:

Be it known that I, JAMES G. FERRILL, residing at Batesville, in the county of Independence and State of Arkansas, have invented a new and Improved Rotary Harrow, of which the following is a specification.

My invention is an improvement upon the harrow for which I have obtained Letters Patent No. 542,587, dated July 9, 1895, which consists, essentially, of two rotary harrows connected by a rigid coupling.

The improvement consists in the construction of the devices for coupling the harrows, and the construction and attachment of the tongue or pole, as hereinafter described.

In the accompanying drawings, Figure 1 is a perspective view of my improved harrow. Fig. 2 is rear view showing the harrow-sections set vertical, as required for transportation from one point to another. Fig. 3 is a detail perspective of one of the coupling-irons.

The circular harrows or harrow-sections A are provided centrally with vertical spindles or journals B. The wooden or metal draft-beams C are connected with the latter by iron arms C', and are attached to the draft-bar D by means of swivel-couplings E. The above parts are substantially the same as employed in my former invention.

The harrow-sections A are connected by a wooden or metal cross-bar F and iron couplings or coupling members G. The latter have an elongated eye *g*, that fits somewhat loosely on the harrow-spindles B, and their inner ends resemble quadrants, being constructed with parallel, perforated arcs *g'* of more than ninety degrees. The ends of the coupling-bars F are fitted between the plates or sides *g'* of the quadrants, and permanently pivoted thereto at *f*, that is to say, at the inner angles of the quadrants. The arcs *g* of the latter are concentric with this pivotal point, and a screw-threaded pin H is adapted to be inserted through one of the holes in such arc-plates and through the coincident hole in the coupling-bar. It will be seen that by this construction and combination of parts, when the pins H are inserted through holes in the inner ends of the quadrants *g*, as shown in Fig. 1, the two harrows A may be held rigidly parallel in the same plane, and that when the pins H are inserted through holes in the up-

per extremity of the arcs *g'* the harrow-sections A may be locked in parallel vertical position, as shown in Fig. 2, so that the harrow may be drawn or hauled to and from the field, the sections A, in that case, rotating vertically and serving as transporting-wheels. It is further apparent that the harrow-sections A may be adjusted and locked at various angles to each other, as may be desired, to adapt them to work along both sides of a row of cotton or other plants, or alongside of a water-furrow, or that one section A may be held in a horizontal plane and the other at any other angle; also, that if the pins H be withdrawn altogether the harrow-sections will then be flexibly connected and work independently, shifting their respective angles or inclinations according to the inequalities or angles of the surface over which they pass. The special feature of improvement in the quadrants is, however, the closed ends of the same, whereby stops are provided that limit the adjustment or angle of adjustment of the harrows. That is to say, the parallel arc-bars *g'* composing the quadrants proper are connected at their ends by webs or cross-pieces, which, when the harrows are thrown from horizontal to vertical, or the reverse, come in contact with the bar F and stop or limit the adjustment at the desired angle. No care or labor is therefore required to arrest the harrows when making the change from horizontal to vertical, or reversely, since the stops thus provided determine the exact position the quadrants must assume relative to the bar F.

The light pole or tongue I is pivoted in a keeper J on the draft-bar D, and its rear end enters a keeper K on the coupling-bar F, whereby it is somewhat loosely or flexibly connected with the harrow proper. The tongue is made in two parts, which are lapped and pivoted together, and a slidable ring or keeper is provided to hold the two parts duly aligned when the tongue is in use, as shown by full lines, Fig. 1. The tongue is necessary in hauling the harrow on downgrade, to prevent the harrow running up on the heels of the team, and is also useful for guiding it in narrow ways. It is not however required when working a field, and is then detached, to which end it is only necessary to remove the pivot-pin that constitutes the sole means for holding

the tongue in the two keepers J K. The tongue is then withdrawn from said keepers and the two pivoted parts turned on each other, so that the tongue is reduced one-half in length. The detached tongue may be laid across the harrow, in front of the coupling-bar F, and tied to the latter or to the arms of the draft-beams C, and thus carried with the harrow until again required for use, as shown by dotted lines, Fig. 1.

Having thus described my invention, what I claim is—

1. In the class of harrows hereinbefore specified, the combination, with the harrow-sections, provided with spindles as specified, and the transverse coupling-bar, F, of the couplings proper, composed of arms journaled on said spindles, and having quadrants formed

of parallel arc-plates provided with webs, or cross-pieces, at their ends, to serve as stops by contact with said bar, F, when the harrow is adjusted from horizontal to vertical and the reverse, and means for securing the quadrants in such limits of adjustment, as specified.

2. In the class of harrows hereinbefore specified, the combination, with the harrow-sections, and the frame provided with the front and rear keepers J, K, of the two-part, foldable and detachable tongue, held free and slidably in one keeper, and pivoted in the other, as shown and described.

JAMES G. FERRILL.

Witnesses:

J. M. C. SOUTHARD,
ELISHA BAXTER.