

(No Model.)

2 Sheets—Sheet 1.

J. DRADER.
SPADE HARROW.

No. 514,066.

Patented Feb. 6, 1894.

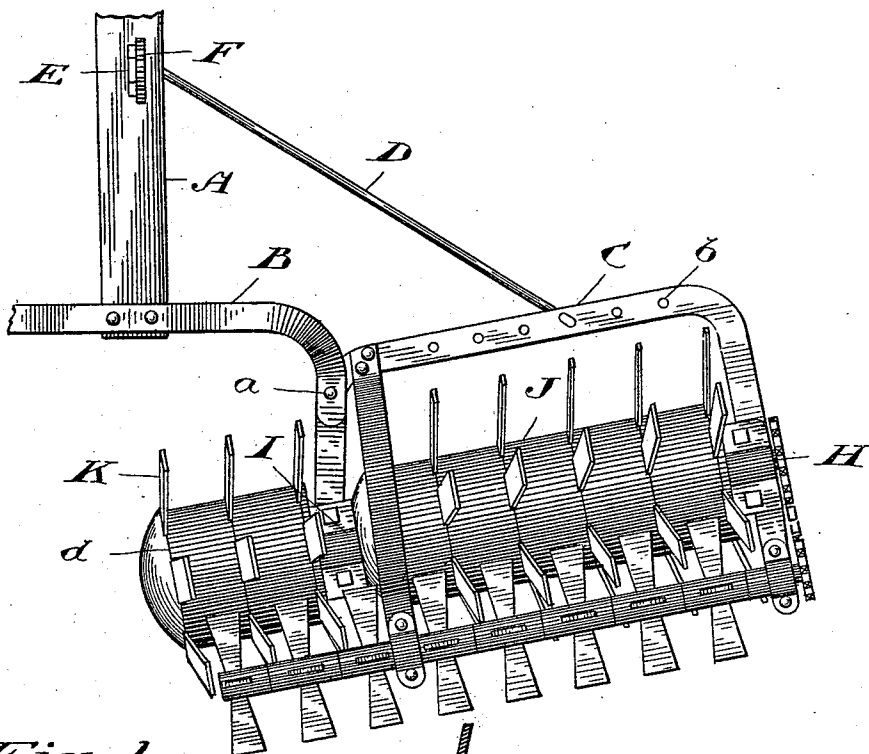


Fig. 1

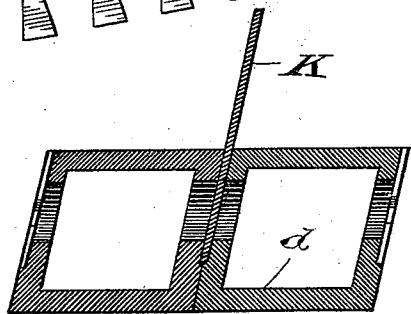


Fig. 3

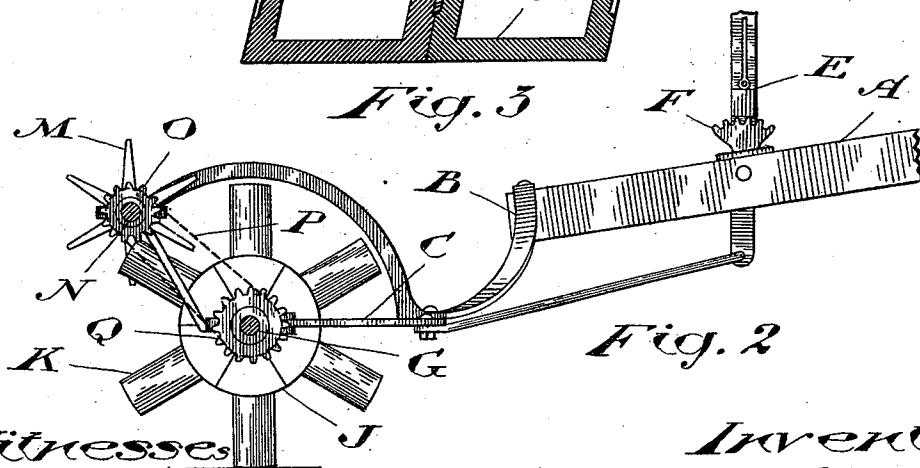


Fig. 2

Witnesses

J. Edw. Mayhew
J. R. Cameron

Inventor

Joseph Drader,
by Donald C. Ridout & Co.
Attys.

(No Model.)

2 Sheets—Sheet 2.

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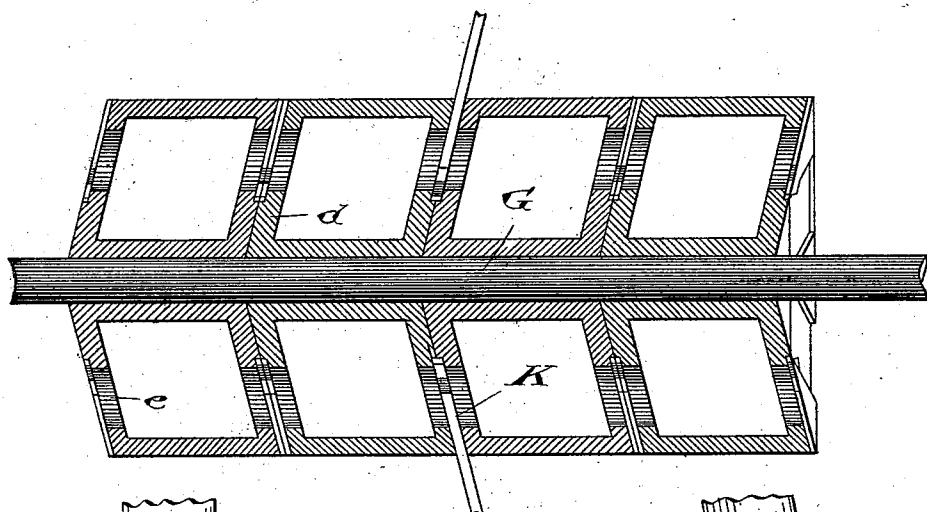


Fig. 4

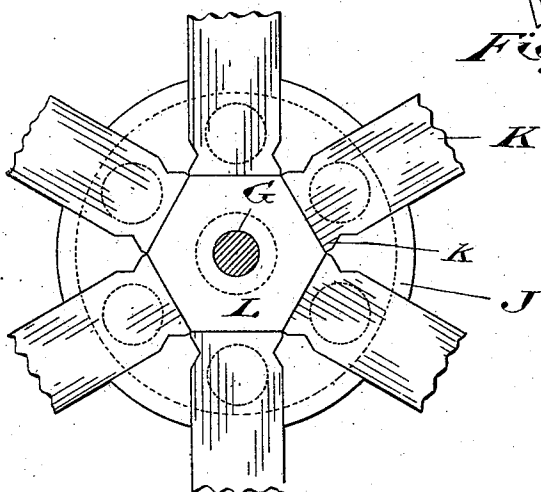


Fig. 5

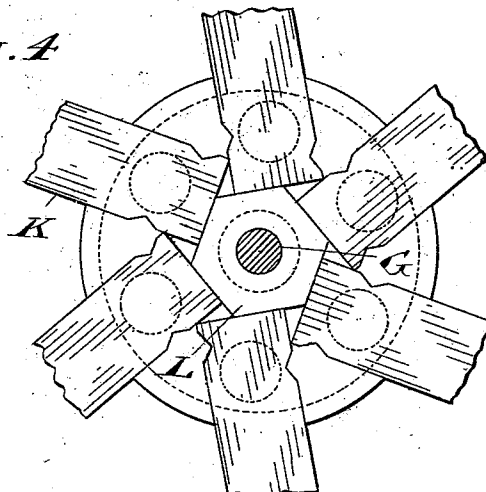


Fig. 6

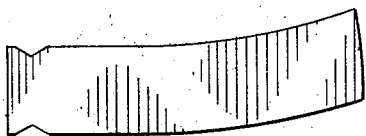


Fig. 8

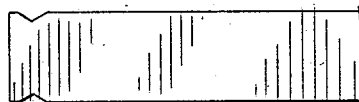


Fig. 7

Witnesses

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UNITED STATES PATENT OFFICE.

JOSEPH DRADER, OF LONDON, CANADA.

SPADE-HARROW.

SPECIFICATION forming part of Letters Patent No. 514,066, dated February 6, 1894.

Application filed December 7, 1892. Serial No. 454,318. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH DRADER, of the city of London, in the county of Middlesex, in the Province of Ontario, Canada, have invented a certain new and Improved Spade-Harrow, of which the following is a specification.

The object of the invention is to make a simply constructed spade harrow which will not penetrate the soil beyond a pre-determined depth and in which all the spades are kept clean, and it consists in the peculiar construction, arrangement and combinations of parts hereinafter more particularly described and then definitely claimed.

In the accompanying drawings—Figure 1, is a plan of one-half of my improved harrow. Fig. 2, is a side elevation of my improved harrow. Fig. 3, is a detail showing the position of a spade. Fig. 4, is a longitudinal section of the cylinder showing two of the spades in position. Fig. 5, is an end view of one of the sections of the cylinder showing the position of the spades radiating from the axle. Fig. 6, is a similar view showing the spade set at a tangent to the periphery of the cylinder. Fig. 7, is a detail of a straight spade. Fig. 8, is a detail of a curved spade.

In the drawings, like letters of reference indicate corresponding parts in each figure.

In the drawings I show only one-half of my improved harrow, the other half being exactly the same, except that it is set at the opposite angle so that the outside corner of each gang points toward the direction in which the harrow travels, the inner ends of the two cylinders butting against each other.

A, is the tongue and B, the center frame preferably made of angle steel and bolted to the said tongue.

C, is an outer frame, also preferably made of angle steel and pivoted at *a*, to the frame B, set substantially at the angle indicated and braced to the tongue by the rod D. One end of the rod D, fits into one of the holes *b*, made in the outer frame C, the other end of the rod being connected to the end of the hand lever E, pivoted to the tongue A, and provided with the ordinary notched quadrant F, so that by the adjustment of the hand lever E, the angle of the frame C, may be altered as desired. A number of holes *b*, are pro-

vided so that before commencing work, the frame C, may be set at its initial angle.

G, is an axle carried at one end in a suitable journal H, and at its other end by a journal I, in the frame C.

The cylinder J, is composed of a series of sections *d*, one end of each section being concave and the opposite end convex, so that when the sections are arranged on the axle G, the convex section of each section shall fit into the concave end of the section next to it. Between each of these sections, the spades K, are arranged, the ends of the sections *d*, being cut away to admit the spades K, one-half of each spade K, fitting into one section and the other half into the section next to it, and the edges of each spade K, have notches *k*, formed in them which engage with projections formed in the sides of the recesses made to receive the spades K. These notches and projections are of course provided only for the purpose of preventing the longitudinal movement of the spades K, and other means might be provided to produce the desired end.

On reference to Figs. 5 and 6, it will be observed that the ends of the spades K, butt against a hub L, formed in the sections *d*, at the end of each recess into which the spades K, fit.

In Fig. 5, the hub L, is shaped so that the spades K, butting against it, radiate from the center of the axle G, whereas in butting against the hub in Fig. 6, the spades K, project at a tangent.

For the sake of lightness, the sections *d*, are made hollow, and holes *e*, are made in the ends of the sections for the same purpose.

Behind the spades K, and between each pair of them I locate a series of blades M, which are fixed to and project from a spindle N, journaled in the frame C, parallel with the axle G. On the ends of this spindle N, I fix a sprocket wheel O, connected by a sprocket chain P, to the sprocket wheel Q, fastened to the end of the axle G.

In the drawings, I show all the sections *d*, the same diameter, but for the practical working of the machine, it will not be necessary to make more than the end sections the required diameter which is to prevent the spades K, entering the ground to a greater depth than is desired.

When the machine is drawn forward, the cylinder J, is caused to revolve by the spades K, acting upon the soil, and as all or some of the sections *d*, are fixed to the axle G, the said axle will also revolve, and being connected by the sprocket chain P, to the spindle N, the said spindle with its blades M, necessarily revolve at the same time as the spades K, and in revolving, act as scrapers to remove any soil which may have adhered to the spades K. I prefer to cut the spades K, of plain sheet steel as shown in Fig. 7, and to arrange them on a hub L, shaped as shown in Fig. 6, so as to throw the spades at a tangent in order that in revolving they shall not be parallel with the blades M, for if parallel, the spades and blades in passing each other are apt to hold the soil between them, whereas if set at a tangent, the end of each spade K, passes the blade M, before the rest of the spade has reached the said blade. By curving each spade K, edgewise, as shown in Fig. 8, the same effect will be produced, even when the spades K, are arranged upon a hub L, shaped as shown in Fig. 5. By holding the spades K, between the concaved sections, the spades are set at an angle pointing forwardly making each spade act upon the ground and dig it up, whereas if it were not for the angle at which the spades were held, each spade would merely act as a cutter without lifting the ground like a spade.

In addition to the sections *d*, forming the cylinder J, acting as gages to regulate the depth that the spades K, enter the ground, the said sections also act as rollers to roll the ground at the same time as the spades are entering it. This has a very beneficial effect upon the soil.

What I claim as my invention is—

1. A spade harrow composed of a series of straight blades, having one of their faces set at an acute angle to the face of the cylinder, and the other face at an obtuse angle to the

same, substantially as and for the purpose specified.

2. In a spade harrow, an axle supported in suitable journals in the adjustable outer frame and having connected to it a cylinder composed of a series of sections, means being provided between each section to rigidly hold a series of spades each blade having one end projecting into the spaces between the sections and all of said blades projecting the same distance from the periphery of the cylinder; substantially as and for the purpose specified.

3. In a spade harrow, an axle supported in suitable journals in the adjustable outer frame and having connected to it a cylinder composed of a series of sections, means being provided between each section to hold a series of spades all projecting the same distance from the periphery of the cylinder, in combination with a series of blades fixed to a spindle suitably journaled in the adjustable frame and caused to revolve by the motion of the spade axle; substantially as and for the purpose specified.

4. In a spade harrow, a series of sections *d*, fixed to the axle G, and forming a cylinder J, a series of spades K, each fitting into a recess formed in and between the sections *d*, a hub L, being formed between each section against which the spades K, abut, substantially as and for the purpose specified.

5. In a spade harrow, a cylinder composed of a series of sections, each having a concave and convex side, recesses in said sides and a series of spades held in said recesses between the concave and convex sides, substantially as described.

London, November 3, 1892.

JOSEPH DRADER.

In presence of—

H. HAWTHORNE,
R. K. COWAN.