

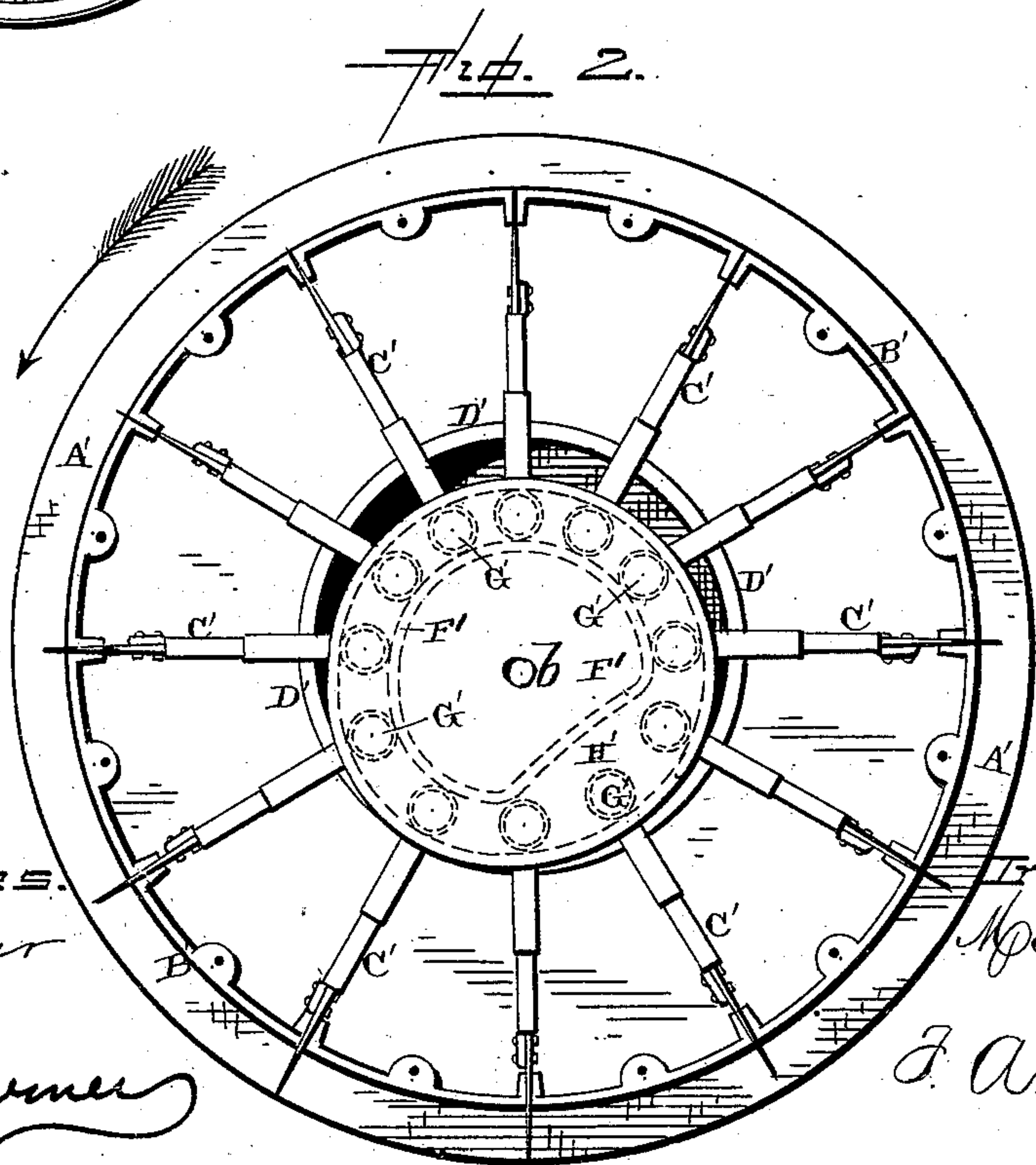
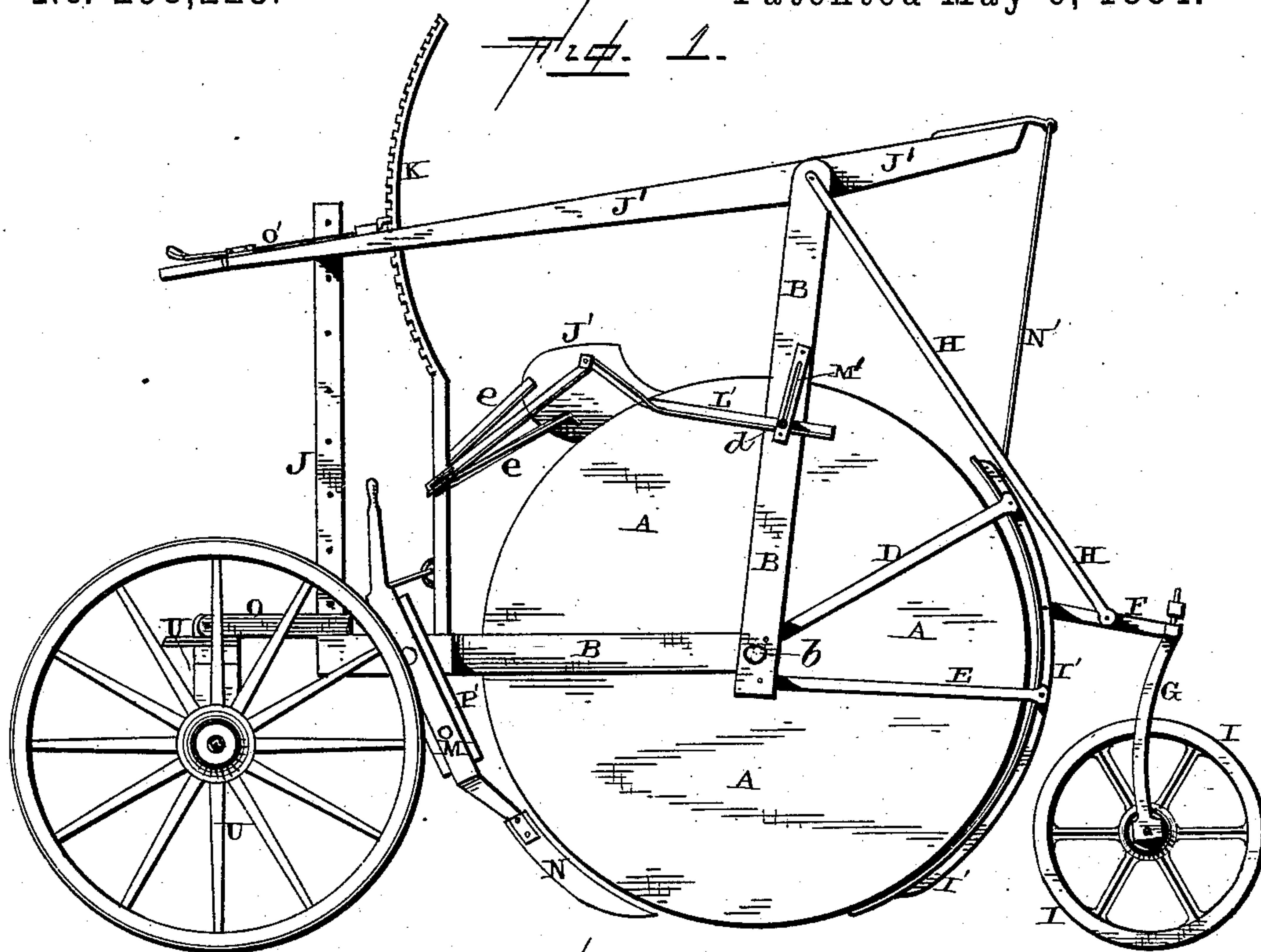
(No Model.)

2 Sheets—Sheet 1.

M. MILNER.
DITCHING MACHINE.

No. 298,223.

Patented May 6, 1884.



Witnesses:

L. F. Gardner

J. W. Garner

Inventor.

Moses Milner
per

J. A. Lehmann,
Atty.

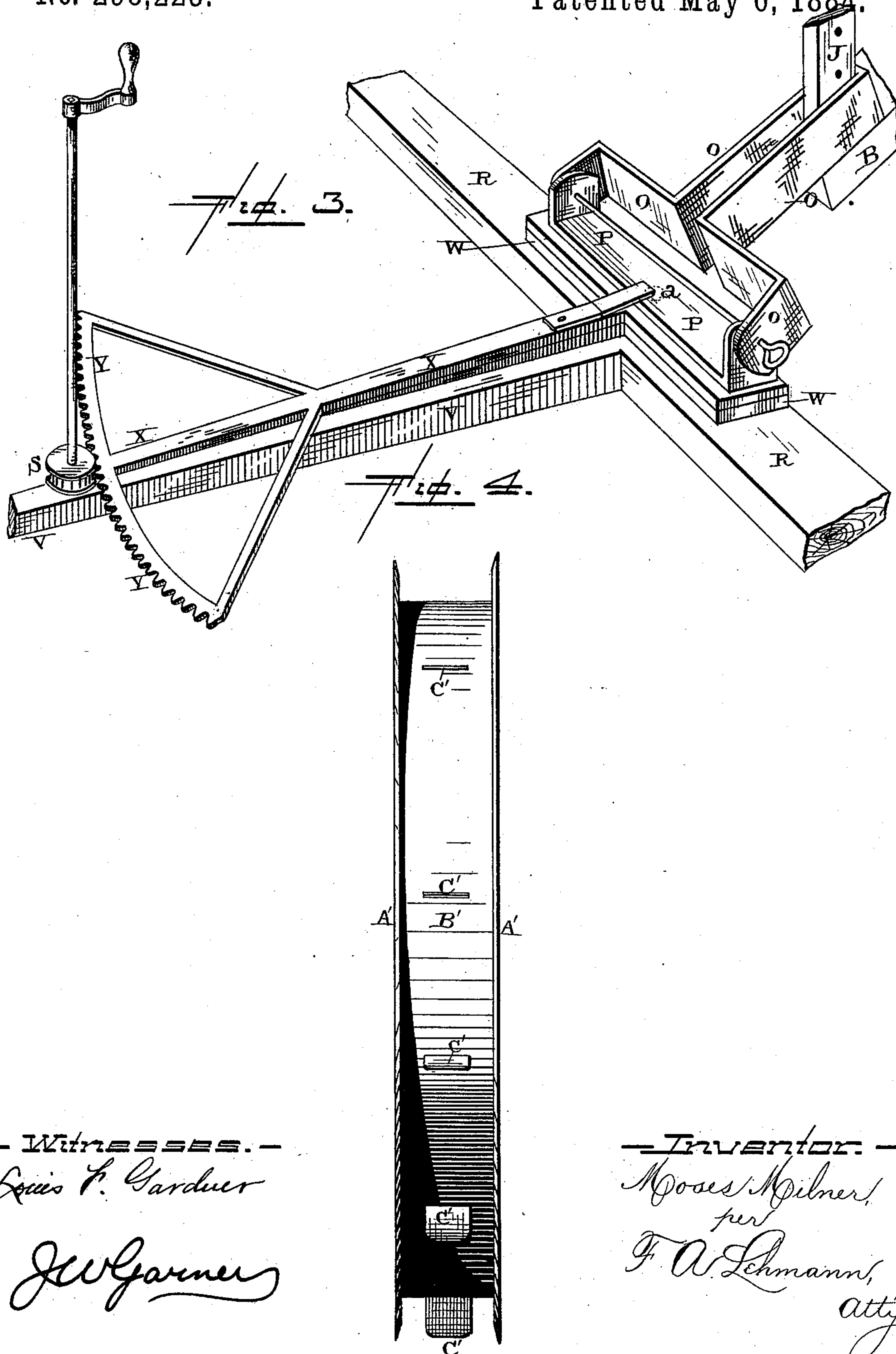
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Louis P. Gardner

J. W. Garner

— Inventor. —

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per

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att'y

UNITED STATES PATENT OFFICE.

MOSES MILNER, OF LEESBURG, OHIO.

DITCHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 298,223, dated May 6, 1884.

Application filed December 10, 1883. (No model.)

To all whom it may concern:

Be it known that I, MOSES MILNER, of Leesburg, in the county of Highland and State of Ohio, have invented certain new and useful
5 Improvements in Ditching-Machines; and I do hereby 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 pertains to make and use it, reference being
10 had to the accompanying drawings, which form part of this specification.

My invention relates to an improvement in ditching-machines; and it consists, first, in the combination of the ditching-wheel, the
15 frame in which it is journaled, a suitable plow which is pivoted in the rear of the wheel and to which is pivoted a caster-wheel, and a lever by means of which caster-wheel and plow are both moved at the same time for the pur-
20 pose of throwing the wheel in and out of action; second, in the combination of the ditching-wheel, cam having an angular side, the spades, and the friction-rollers, the angular side of the cam being arranged in such rela-
25 tion to the spades that they can give inward when they strike an obstruction; third, in the arrangement and combination of parts, which will be more fully described hereinafter.

The object of my invention is to provide a
30 ditching-machine by means of which ditches of different widths can be dug by simply driving the machine back and forth across the field, and which can be made to cut a shallow or deep furrow, as may be required, so as to give
35 the ditch the necessary inclination to freely carry off the water.

Figure 1 is a side elevation of a machine embodying my invention complete. Fig. 2 is a vertical section of the ditching-wheel. Fig. 3
40 is a perspective showing the guiding mechanism, and Fig. 4 is an edge view of the ditching-wheel.

B represents the frame-work, in which the ditching-wheel A is journaled. This frame-
45 work may be made of iron, wood, or any suitable material that may be preferred, and is supported at its front end by means of the truck U. This truck consists of the axle, to which the two driving-wheels are secured, up-
50 on the top of which axle is placed the cross-bar R. (Shown in Fig. 3.) This cross-bar is rigidly secured upon the top of the axle, and

has the tongue V projecting outward from it. Upon the top of this cross-bar R is secured a
metallic plate, W, which serves as a base up- 55
on which the other parts move. Upon the top of this bearing-plate W, at the point *a*, is pivoted the lever X, which has the segment Y, formed upon its front end, for the purpose of
60 engaging with the pinion S. Connected with this pinion S is a suitable operating-lever or hand-wheel, by means of which the lever X may be turned upon its pivot either toward the right or left, according to the direction in
65 which it is desired to turn the wheel. Upon the rear end of the lever is secured the plate P, which is provided with suitable ears, and upon which ears is provided the clevis O. This clevis O projects backward, and has the
70 standard J, upon the front end of the frame B, passed up through its rear end. The object of this guiding mechanism is to enable the driver to control the direction of the ditching-wheel A, and thus move it in whatever direc-
75 tion he may see proper. Where ditches have to be made with curves in them, a guiding mechanism for controlling the movement of the ditching-wheel is very necessary, for otherwise the horse upon one side would be made
80 to travel so close to the ditch that there would be danger of the horse falling into it. Where the wheel can be guided, as here shown, the horses can travel in a straight line, while the wheel can be thrown into curves at different
85 points without in any manner interfering with the forward movement of the horses.

The ditching-wheel A consists of two heads, A', preferably made of steel, and which have cutting-edges upon them, as shown in Fig. 4. These heads will be arranged any suitable dis- 90
tance apart, according to the width of the ditch which is to be dug. In between these two heads A' is placed the perforated drum B' which has suitable openings at regular intervals apart for the ends of the spades C' to project through. 95
Inside of this large outer drum, B', is placed a smaller guiding-drum, D', which encircles the cam F'. (Shown in Fig. 2.) Each one of the spades C' has a roller, G', journaled upon its inner end, and these rollers G' move around 100
as the ditching-wheel A moves forward inside of the flanges of the cam F'. This cam is secured rigidly to the stationary shaft *b*, upon which the ditching-wheel revolves, and this

cam remains stationary while the ditching-wheel revolves around it. The shape of the cam F' is such that its cut-away portion is turned toward the bottom and rear edge of the wheel, so that should any of the spades encounter a stone or other hard substance just as the weight of the wheel is being brought to bear upon it, the spade can give inward and upward, and thus prevent the spade from being injured or broken. As the ditching-wheel A revolves, the spades are forced outward upon the front edge of the wheel, and are forced outward to their greatest extent just as the spades are being brought into use. After the spades have sunk into the earth to their full extent, they remain outward until the wheel has carried them along up past the center of the cam and beyond the wide space H', which is formed between the two flanges of the cam. The space H' between the two flanges of the cam F' allows the spades to be forced inward at any time should they strike a stone or other hard substance which would be liable to injure them. As long as nothing hard is encountered, the spades remain outward to their full extent, and serve to carry upward, along the rear side of the wheel, and in between the cutting-flanges, that dirt which has been loosened.

Pivoted to the frame B by means of the two rods D E is the plow I', which is curved as shown, and which has its lower end to extend down below or slightly above the lowest cutting-point of the cutting-edges of the wheel A. The rod D, which is attached to the upper end of this plow, is pivoted above the center of the wheel A, while the rod E is pivoted to the frame below the center of the wheel. The rod D serves to control the movement of the plow, while the lower rod, E, simply serves to brace it in position. The plow I', being eccentrically connected to the frame B, when the plow is forced downward its lower end moves farther away from the cutting-edges of the wheel and cuts a deeper furrow than the cutting-edges of the wheel. This plow I' is made of the curved form here shown, and extends along up the rear edge of the wheel to any desired point, for the purpose of holding the dirt which has been loosened in between the flanges of the wheel until the wheel has moved the dirt sufficiently high to have it remain in position and be carried along over the top of the wheel toward the device J', which catches the dirt and throws it out upon the ground. This device J' is like an ordinary mold-board of a plow, its inner end being made to come either in contact with or as near as desired to the drum B', and it is supported by means of the braces e, which are attached at their front ends to the upright K. The front ends of the braces e are slotted, so that they can be raised and lowered upon the clamping or pivotal bolts, by means of which they are fastened to the upright K. For regulating the distance, the lower end of this guide shall approach the drum, the lever L' is connected

to the guide, and this lever has a set-screw, d, which passes through the slotted plate M', connected to lever L'. By moving the end of this lever L' to any desired point, and then fastening it by means of the set-screw, the guide will be held in any desired relation to the drum B'. This may be given any desired shape, so as to throw the dirt from the wheel, either near or far from the side of the ditch that is being dug.

Pivoted upon the top of the frame B is the operating-lever J', which has connected to its rear end the rod N', which rod is connected to the plow-frame I' at its lower end. This lever J' is provided with a suitable locking device, O', which engages with the toothed segment K, for the purpose of locking the lever J' in any desired position. When the upper end of the lever J' is raised upward, the plow-frame I' is depressed, so as to have it extend below or slightly above the cutting-edges of the ditching-wheel A, at the will of the driver. When the front end of the lever J' is depressed, the plow-frame I' can be raised upward, so that it will not cut below the cutting-edges of the wheel, but will then serve simply to raise the earth upward which has been loosened by the spades.

Pivoted to the plow-frame at any suitable point is the rod F, to the rear end of which is connected the standard G of the caster-wheel I. This rod F has connected to it the brace-rod H, for the purpose of always holding the rod F in position. At the same time that the plow-frame I' is forced downward, the wheel I is lifted upward out of contact with the earth, so that the wheel A can run deeper, and when the plow-frame I' is raised upward the caster-wheel I is forced downward, so as to raise the ditching-wheel A upward, and thus form a support, by means of which the wheel can be moved along the ground without coming in contact with it. This wheel I travels in the ditch behind the ditching-wheel A, and is only brought into use when it is desired to throw the ditching-wheel A out of operation. When the ditching-machine is to be moved to and from the field or place where it is to be used, this wheel I forms the rear support for the machine, and the ditching-wheel A is then carried along, raised above the ground, between the wheel I and the truck U.

As the operator can raise and lower the plow-frame I' at will, and as the lower the plow-frame is forced the deeper will it dig the ditch, the operator, by gradually forcing the plow-frame I' downward, can give the ditch a suitable incline, so as to carry away all of the water which may run into the ditch. It will be seen that by the use of a single lever, J', the plow-frame and the wheel I are both controlled, either for the purpose of digging the ditch deeper, or for the purpose of raising the ditching-wheel up above the ground and preventing any cutting whatever from taking place. When it is desired to dig a deeper ditch, the perforated standard J, which is secured to the

front end of the frame B, is allowed to slip down through the clevis O, and thus allow the frame B to sink deeper into the earth without in any manner interfering with any other part of the machine. This standard J is perforated, as shown, so that a pin may be passed through it just above the top of the clevis, and thus prevent the front end of the frame from sinking downward beyond a regulated distance.

Pivoted to suitable hangers or blocks, P', which are secured to opposite sides of the front end of the frame B, are the levers M, which have the cutters N attached to their lower ends. These cutters shave the dirt from the sides of the ditch, for the purpose of widening it to any extent beyond the width of the ditching-wheel A. The dirt which is cut from the sides of the ditch by these cutters N falls in front of the wheel, and this dirt is taken up by the wheel as it moves along. These cutters, being pivoted by means of the lever M upon the blocks P', can be moved back out of the way or brought into operation at will. When it is desired to cut a wider ditch than the width of the wheel A, these cutters N are widened out either by means of blocks or any other suitable attachments, and will thus cut a greater or less slice from the side of the ditch, as may be preferred. By this construction a single machine may be made to cut ditches of different widths.

The cutters N and the plow upon the lower end of the plow-frame I' are made removable, so that they can be sharpened when they become dull, or repaired in case they become injured at any time by striking against stones or other obstructions.

When the wheel is to be conveyed to any considerable distance, the truck is detached from the frame, and then the truck is backed

around against the center of the wheel A, when the wheel A and its attachments may be tilted over upon the truck, and thus carted about with perfect ease.

Having thus described my invention, I claim—

1. In a ditching-machine, the combination of the wheel A, frame B, plow-frame I', rods D E, pivoted on opposite sides of the center of wheel A, and the wheel I, for supporting the plow-frame, substantially as shown.

2. The combination of the ditching-wheel, the plow-frame I', rods D E, and wheel I, with the rods H N', frame B, and lever J', substantially as described.

3. The combination of the truck, the ditching-wheel, the plow-frame, the caster-wheel, which is loosely attached to the plow-frame, an operating-lever, J', and a supporting-rod for the caster-wheel, whereby the plow-frame and the caster-wheel can be adjusted at the same time, substantially as specified.

4. The combination of the ditching-wheel, the cam F', having the angular side H', the spades C', and the friction-rollers G', the angular side of the cam being arranged in such relation to the spades that they can give inward when they strike an obstruction, substantially as specified.

5. The combination of the truck and tongue with the pivoted lever X and a means for moving it, the clevis O, and the standard J, substantially as set forth.

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

MOSES MILNER.

Witnesses:

B. LEWIS BLACKFORD,
F. A. LEHMANN.