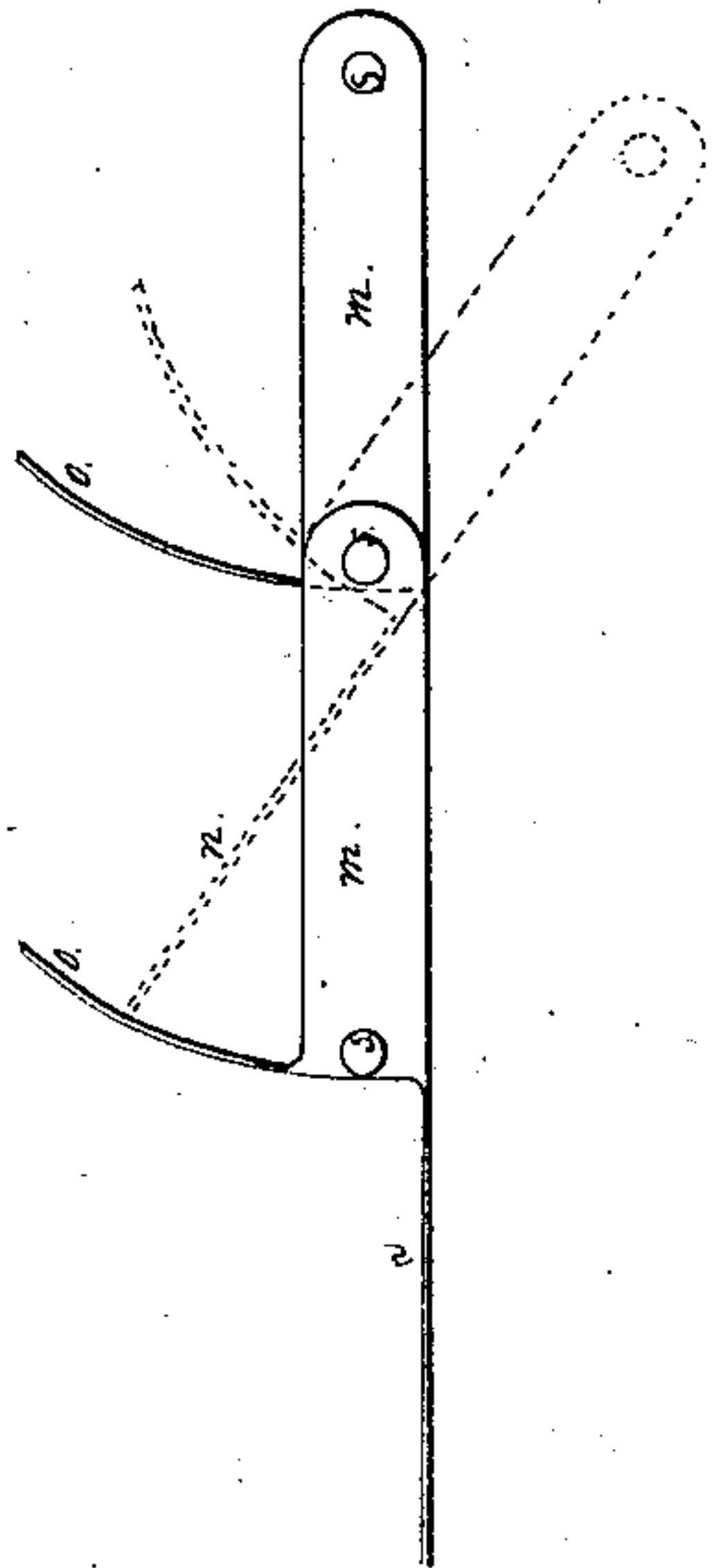
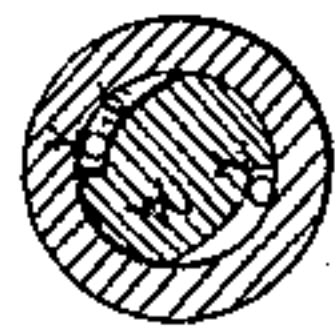
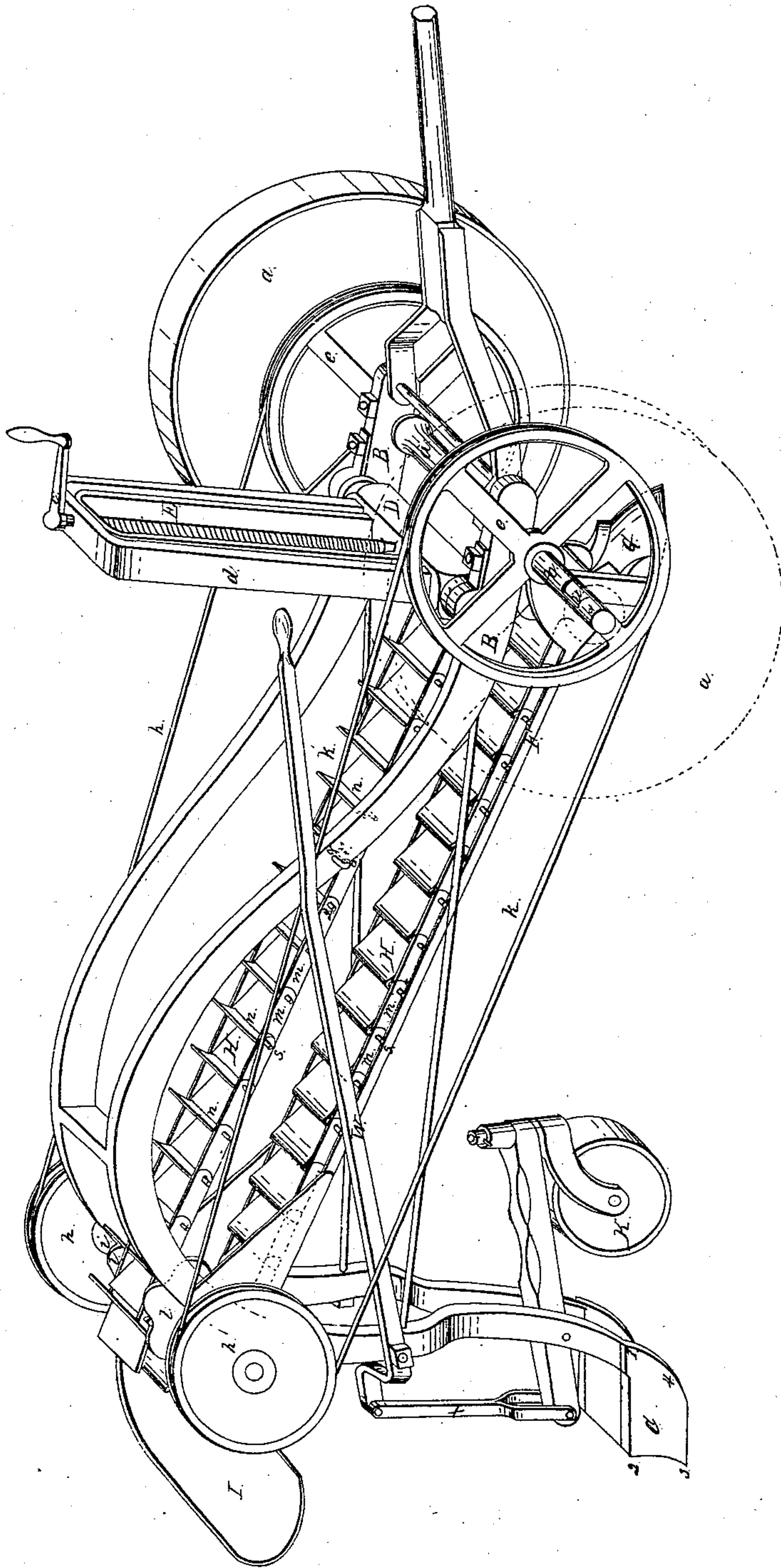


R. Connaroe.

Excavator.

Nº 70,960.

Patented Nov. 19, 1867.



*Witnesses,
G. B. Day,
J. C. Peter.*

*Inventor,
Robert Connaroe, by
Brown & Beadle attys.*

United States Patent Office.

ROBERT CONARROE, OF CAMDEN, OHIO, ASSIGNOR TO HIMSELF AND
HOWARD YOUNG, OF SAME PLACE.

Letters Patent No. 70,960, dated November 19, 1867.

IMPROVEMENTS IN DITCHING MACHINES.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, ROBERT CONARROE, of Camden, in the county of Preble, and State of Ohio, have invented a new and improved Ditching Machine; and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

This invention consists of a frame, having at one end a pair of cutters, at the other end a plough, and between the same an endless elevating-apron, with buckets of peculiar construction. The frame is supported at the rear end by a caster-wheel, and at the front by an axle and pairs of wheels, the connection between the latter and the former being such that during a forward movement the axle rotates with the wheels and imparts motion to the elevator, but during a backward movement the axle does not rotate with the wheels, and the elevator ceases to work.

To enable those skilled in the art to make and use my invention, I will now proceed to describe its construction and operation.

A represents an axle, of any suitable material, and *a a* are the wheels. B B represent bars, the forward ends of which are connected by clips with the axle A, in such manner as not to interfere with its rotation. The bars B curve upward and backward, as shown, sufficiently to afford height and length enough for the reception of the elevating apparatus, when they pass downward perpendicularly, or nearly so, until at their lower ends they project horizontally backward, and form supports for the cutters C. These bars are the framework of the machine. Just in rear of and above the axle A, a cross-bar, D, rests upon the bars B. From this cross-bar rises a frame, *d*, in the top of which is supported the upper end of the screw *b*, which is stepped in the cross-bar D. A clevis, E, within the frame *d*, passes through the cross-bar in orifices large enough to permit it to play freely, through the operation of the screw *b*, which passes through its upper end. The pin which connects the ends of the clevis supports the lower and forward end of the elevating-trough F, which at this end bears the plough G. By turning the crank *c*, and thus rotating the screw *b*, the clevis may be raised or lowered, and with it the plough G. Any other suitable device for accomplishing the same purpose can be used. *e e* represent smaller wheels, rigidly secured to the axle A, just outside the ends of the bars B. The peripheries of these wheels are grooved, for the reception of the chains *k*, which connect them with the similar trucks *h h*, rigidly attached to the shaft *i*. The main frame B supports the shaft *i*, near the point where the former becomes upright, and the latter is furnished with notched disks *l*. In the lower part of the clevis E is a transverse shaft, bearing two similar disks. The elevating apparatus H is sustained by and receives motion immediately from these two pairs of disks. The elevating apparatus consists of an endless chain, H, the links of which consist of parallel plates *m*, through both ends of each of which pass transverse rods or pins *n*, in such manner that every rod passes at each of its own ends through the ends of two of the plates *m*. The projecting ends of the rods form spurs, *s*, which are acted on by the teeth of the before-mentioned disks. Each pair of parallel plates projects from a transverse plate, *o*, parallel with its corresponding rod *n*, and from and at right angles to each plate *o* projects on the opposite sides from the plates *m* a plate, *r*, of the same width with the plate *o*, and long enough to extend nearly to the next plate *o* in rear of it. The function of the plates *o* is to act as shovels in carrying the soil cut by the plough, through the trough F, to the discharging-spout I. They therefore project downward while passing upward, and their edges nearly touch the bottom of the trough. As the teeth of the upper disks engage with the projecting spurs *s*, and the links bend upward, the plates *o* pass successively and gradually from the downward projecting to the upward projecting direction, and as they do so each plate *r* passes down across the face of the next plate *o* in its rear, and cleans it of any soil that may be adhering to it. In passing around the disk, a half revolution is made. During the first half of this movement, the outer edge of the plate *r*, being farthest removed from the centre, and having a greater distance to traverse, must necessarily move with great rapidity. This rapid motion just at the point desired, has the effect to throw the dirt with great force, and effectually clear it from the machine. Spouts or guiding-boards can be so arranged that the dirt can be thrown in any desired direction.

The arrangement of the shovels as above described, by which they are automatically and perfectly cleaned

at the proper time, is one of the principal features of my invention. The great difficulty with ditching machines as constructed heretofore has been, that in taking up the soil, which is usually wet and sticky in its nature, it has adhered to the machine, and, being unprovided with suitable means for getting rid of it, they have proved inoperative. This fatal objection is perfectly overcome by my invention.

At the lower disk, the same movement as at the upper, as above described, causes the shovels to strike the dirt as it comes from the plough with a quick and powerful blow, effectually breaking it if hard, and cutting it through if soft. The trough F is sustained at its lower end by means of the pin which connects the ends of the clevis E, as has been described. At its upper end arms extend, and surround the shaft *i* in such manner that the trough is pivoted, and moves freely, through the action of the screw *b*, at the forward end of the machine. The shaft *i* is also the centre of the upper disks, which actuate the elevating apparatus, therefore the trough and elevating apparatus always maintain the same relative distance to each other.

As before stated, motion is communicated to the endless chain from the axle A, through intermediate mechanism. It is desirable that when the machine is moving forward, the elevating apparatus should work, but should not work when the machine is moving backward. The connection between the axle A and the wheels *a a* is therefore such as to effect the desired result. In each journal *t* are made two notches, *u u*, opposite each other. Each notch has but one side, and a plane bottom, which vanishes on the periphery of the journal, and both are made in the journal in the same direction, that is to say, from front to rear. A cylindrical pin, *v*, is placed lengthwise in each notch, of such dimensions that, when it lies against the side of the notch, the contact between the pin and the internal surface of the box of the wheel *a* is so slight as not to clamp the wheel and axle during a backward revolution of the former, yet sufficient to roll the pin over the plane surface of the bottom of the notch as soon as a forward revolution of the wheel commences, and thus wedge it in between the axle and the wheel tightly enough to clamp the two, and insure rotation of the axle in the right direction to impart the proper motion to the elevating apparatus. To insure rapid action, in cases where it may be deemed necessary, a flat spring can be attached to the side of the notch, to press upon the pin, and force it to clamp the wheel and axle instantly when the direction of the revolution is changed. *w* represents a lever, pivoted to one of the bars B, and curved inward just in rear of said bars sufficiently to bring its end perpendicularly over the lower lever *x*, pivoted between the bars B, and sustaining at its inner end the caster-wheel K. Through the operation of this lever the cutters C may be raised above the surface of the soil, and sustained in that position by the pin *z*, under which the lever *u* is passed, and against which it bears. Other pins can be added, so that the cutters may be held in any desired position. The cutters C are shaped like spherical triangles, the sharp points 1, 2, 3, being above or in rear of the curved side 4, which is the cutting side. The effect of this formation is, that the cutters easily rise over any obstacle they may meet, and thus give warning of the same, without sudden and violent stoppage of the machine, or fracture of any part thereof. During the first passage of the machine across the field, the plough being in advance, the ground is broken without the aid of the cutters, the surface of the soil being light and easily moved, but at the same time the cutters are preparing the sides of the ditch for the next passage of the plough. This result is accomplished by so arranging the cutters that they act two or three inches lower, as may be desired, than the plough. Thus, after the first passage across the field is made, the cutters are essentially in advance of the plough, and the ground is prepared, by the cutting of roots and other obstructions, so that no undue strain comes upon the machine.

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

1. The shovels of the elevating apparatus, the plates *r* of which automatically clean the plates *o*, substantially as set forth.

2. The notches *u* and pins *v*, in combination, when applied to a wheel and axle, substantially as described.

3. The plough G, trough F, elevating apparatus H, *e e*, *h h*, cutters C, and lever *w*, when combined and arranged substantially as described.

ROBERT CONARROE.

Witnesses:

H. W. BEADLE,
F. E. PORTER.