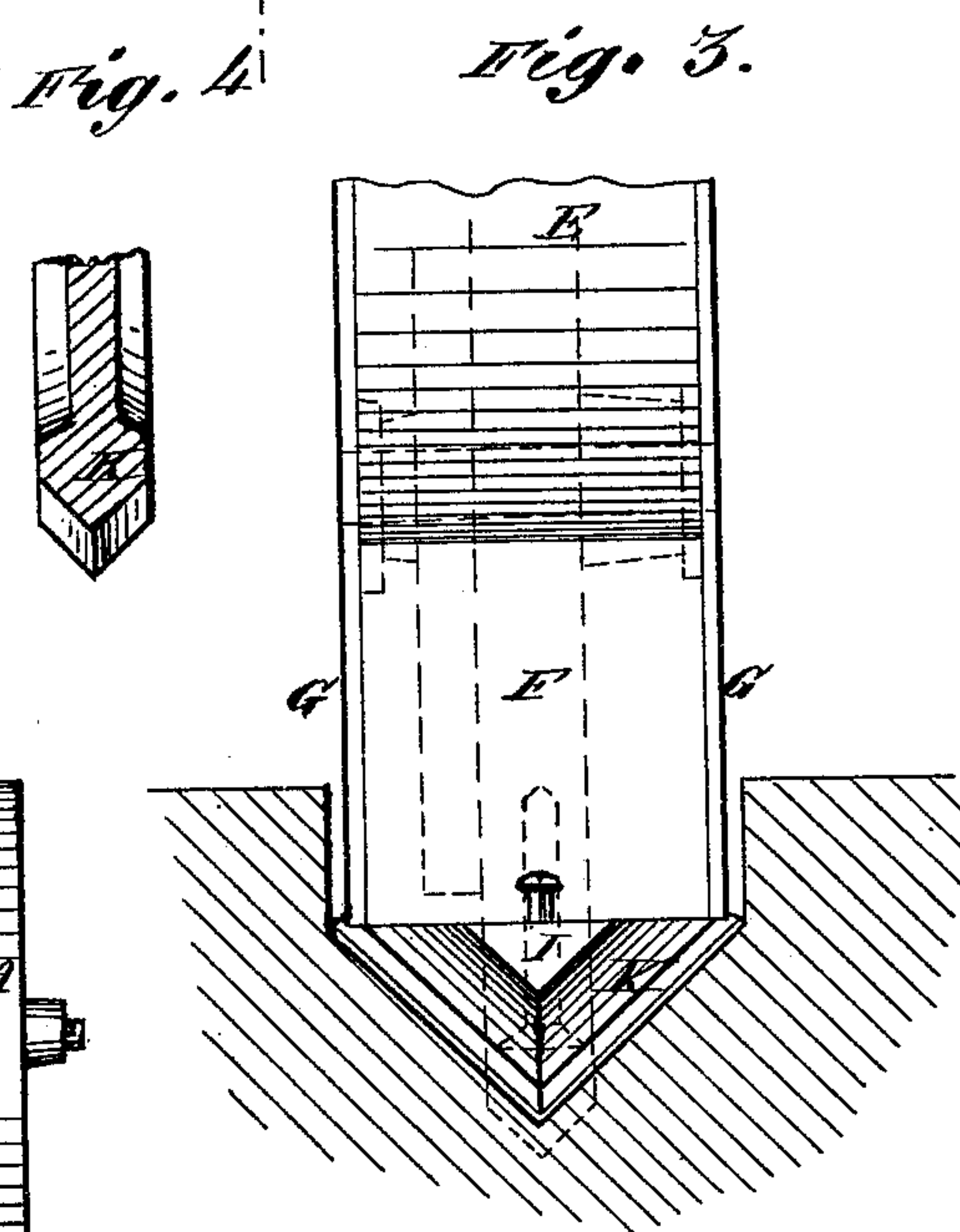
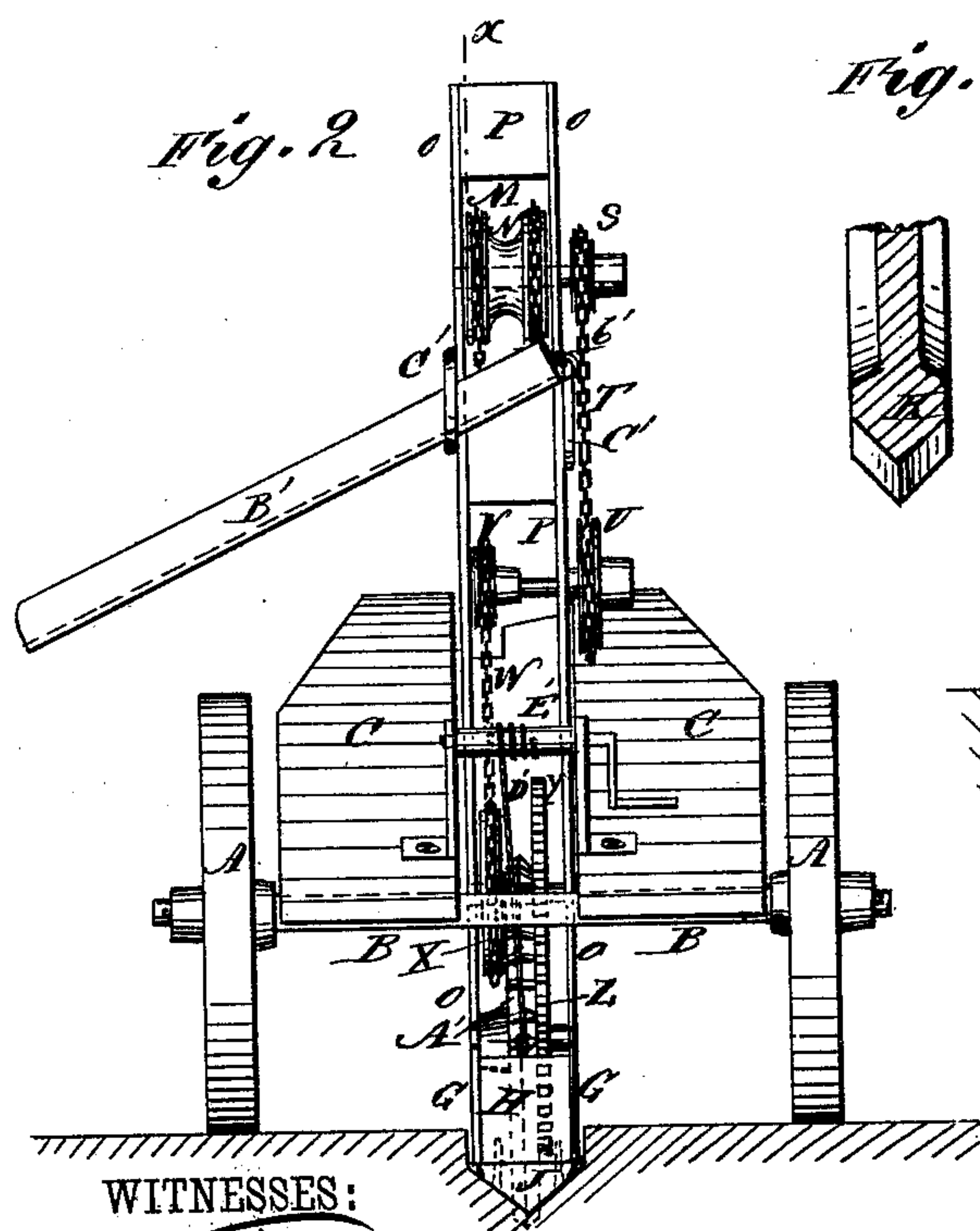
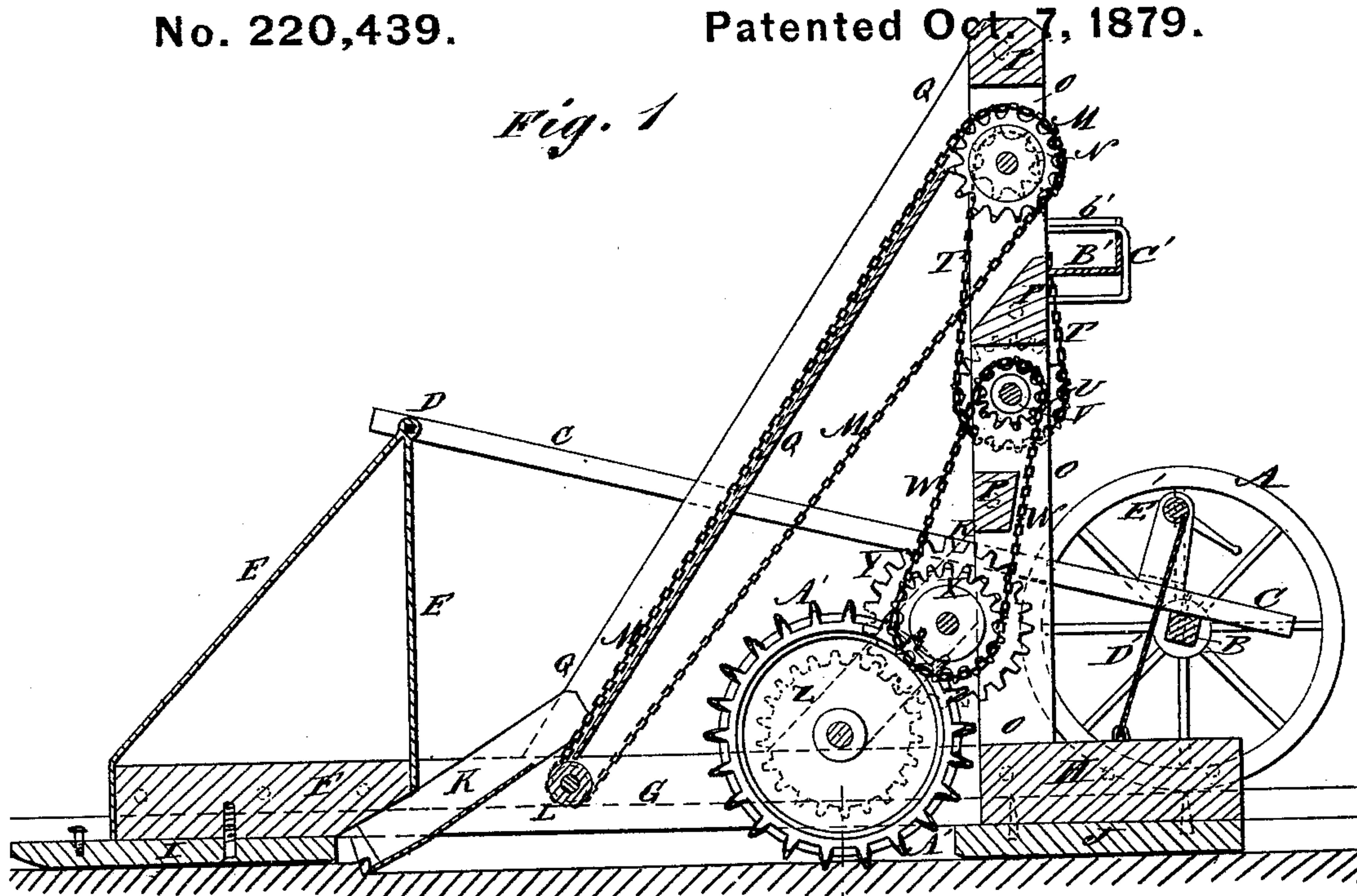


G. SMITH.
Ditching-Machine.

No. 220,439.

Patented Oct. 7, 1879.



WITNESSES:
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UNITED STATES PATENT OFFICE.

GUERNSEY SMITH, OF ROCHESTER, ILLINOIS.

IMPROVEMENT IN DITCHING-MACHINES.

Specification forming part of Letters Patent No. **220,439**, dated October 7, 1879; application filed May 28, 1879.

To all whom it may concern:

Be it known that I, GUERNSEY SMITH, of Rochester, in the county of Sangamon and State of Illinois, have invented a new and useful Improvement in Ditchers, of which the following is a specification.

Figure 1 is a vertical longitudinal section of my improved machine, taken through the line *xx*, Fig. 2. Fig. 2 is a rear view of the same. Fig. 3 is a detail front view of the lower part of the same. Fig. 4 is a detail front view of the plow or scoop.

Similar letters of reference indicate corresponding parts.

The object of this invention is to furnish an improved machine for opening ditches to receive tiles which shall be simple in construction, convenient in use, and reliable in operation, removing the soil and depositing it at the side of the ditch, and leaving the ditch in proper condition to receive the tiles.

The invention consists in the combination of the wheels and axle, the planks, the hinged angle-bar, the base frame or foot, the V-shaped shoes, and the plow or scoop made with a V-shaped forward part with each other; in combining with a spout having a hook two U-shaped bars having arms attached to uprights; and in the combination of the rope or chain and the windlass with the rear part of the base frame or foot and of the planks, as hereinafter fully described.

A are two wheels, which revolve upon the journals of the axle B. To the axle B are attached the rear ends of two parallel planks, C, so as to leave a space or slot between their inner edges.

The forward ends of the planks C are connected by a rod or bolt, D, to the middle part of which, between the said planks C, is hinged the angle of the bar E, the rear arm of which is vertical and its forward arm is inclined forward, as shown in Fig. 1.

The ends of the arms of the angular bar E are attached to the ends of the block F, to the sides of which are attached the forward parts of two parallel metal plates, G. The rear parts of the plates G are attached to the sides of the block H. The two blocks F H and the two plates G form the base or plow frame or the foot of the machine.

To the bottom of the forward block, F, is attached a shoe, I, made V-shaped in its cross-section, and which fits into the cut made by the machine in its previous passage, and supports the forward part of the machine. To the bottom of the rear block, H, is attached a shoe, J, also made V-shaped in its cross-section, and which fits into the cut made by the machine. The shoe J is made as much deeper than the shoe I as the slice of soil raised by the machine is thick, so that the base frame or foot F G H may be kept level.

To the plates G, near the rear end of the forward block, F, is secured the plow, shovel, or scoop K, the forward or cutting part of which is made V-shaped, and projects below the V-shaped shoe I so far as to cut a slice of the desired thickness. To the plates G, below the rear end of the plow or scoop K, is pivoted a chain-wheel, L, around which passes the endless carrier M, to receive the slice of soil and carry it up out of the ditch. The endless carrier M is represented in the drawings by a single chain, as there is nothing new in its construction.

The upper part of the carrier M passes around chain-wheels N, pivoted to and between the upper parts of the upright bars O, the lower ends of which are secured to the plates G and the rear block, H. The bars O are strengthened by the blocks P, placed between and bolted to them by the inclined trough Q, through which the soil is carried by the carrier M and by the inclined bars R.

To one of the journals of the upper chain-wheels, N, of the carrier M is attached a chain-wheel, S, around which passes an endless chain, T. The endless chain T also passes around a chain-wheel, U, pivoted to the upright bars O, and to the journal or shaft of which is attached a second chain-wheel, V. Around the chain-wheel V passes an endless chain, W, which also passes around a chain-wheel, X, pivoted to the inclined bars R.

To the journal or shaft of the chain-wheel X is attached a gear-wheel, Y, the teeth of which mesh into the teeth of the gear-wheel Z, attached to the journal or shaft of the spur-wheel A'. The spur-wheel A' is pivoted to the inclined bars R in such a position that its spurs may take hold of the bottom of the ditch in

the rear of the plow or scoop K, so that the said spur-wheel A' will be revolved by the forward movement of the machine, and may thus drive the elevator M.

As the soil is carried over the chain-wheels N by the elevator M it falls into the inclined spout B', down which it slides and from which it falls to the ground at the side of the ditch.

The upper end of the spout B' is passed through two U-shaped bars or keepers, C', the arms of which are attached to the upright bars O. The spout B' rests upon the lower arm of one of the keepers C', and has a hook, b', formed upon or attached to the projecting upper end of its bottom, to be hooked upon the upper arm of the other keeper C'.

With this construction the spout B' can be changed so as to deposit the soil at either side of the ditch, as may be desired.

To the rear block, H, of the base frame or foot is attached the lower end of a rope or chain, D', the upper end of which is attached to the windlass E', attached to the rear parts of the planks C, and which should be provided with a pawl and ratchet, or other device, for holding it in any desired position. The upright arm of the angular bar E should be six or eight feet long, or of a length a little greater than the required depth of the ditch.

In commencing the ditch the forward end of the planks C are inclined upward, and the base frame or foot F G H rests upon the ground. As the machine is drawn back and forth, and the ditch increases in depth, the forward ends of the planks C move downward until the desired depth be reached.

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

1. The combination of the wheels A and axle B, the planks C, the hinged angle-bar E, the base frame or foot F G H, the V-shaped shoes I J, and the plow or scoop K, made with a V-shaped forward part, with each other, substantially as herein shown and described.

2. The combination, with the spout B', having hook b', of the two U-shaped bars, C', having arms attached to uprights O, as and for the purpose specified.

3. The combination of the rope or chain D' and the windlass E', with the rear part of the base frame or foot F G H and the planks C, substantially as herein shown and described.

GUERNSEY SMITH.

Witnesses:

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JOHN A. TWIST.