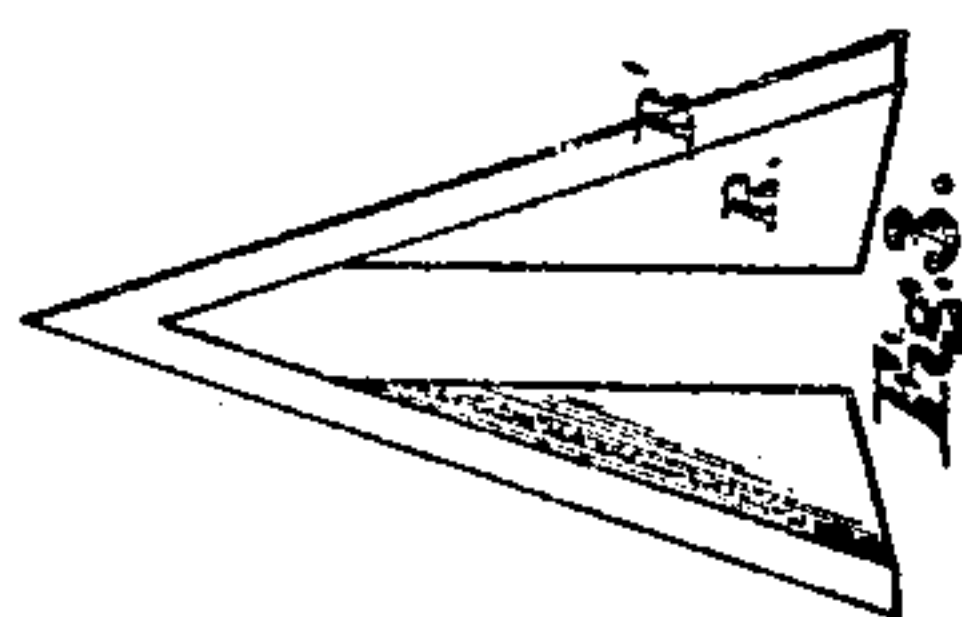
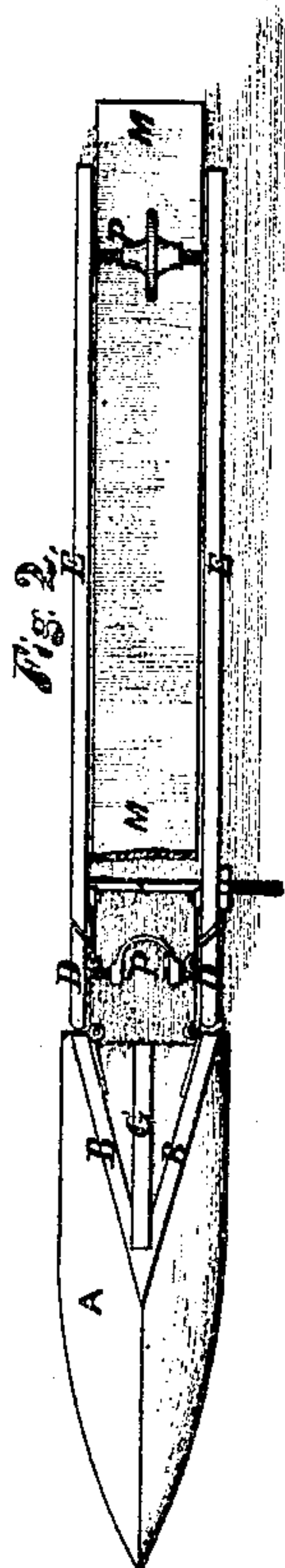
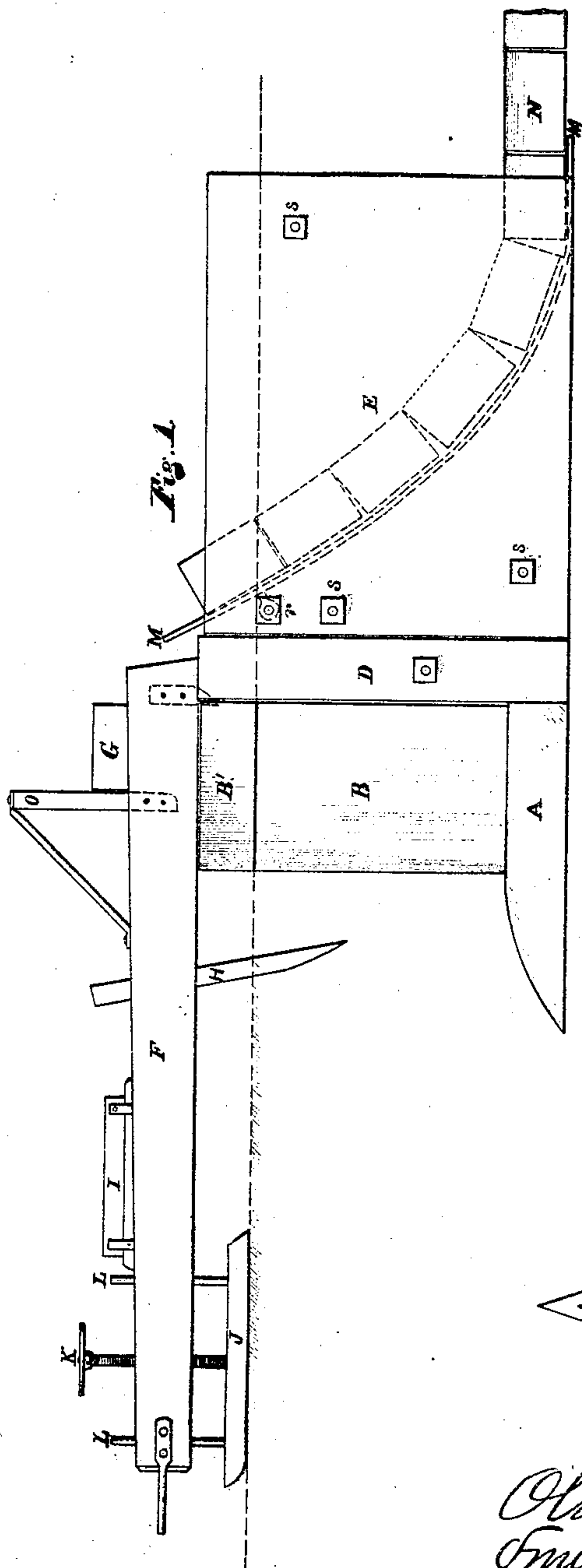


*Voorhis, Mapes & Voorhis,*

*Ditcher.*

*No. 103801.*

*Patented May 31, 1870.*



WITNESSES

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# UNITED STATES PATENT OFFICE.

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## IMPROVEMENT IN COMBINED DITCHING AND TILE-LAYING MACHINE.

Specification forming part of Letters Patent No. **103,801**, dated May 31, 1870.

*To all whom it may concern:*

Be it known that we, OLIVER W. VOORHIS, SMITH H. MAPES, and WILLIAM M. VOORHIS, of Lawrence, in the county of Marion and State of Indiana, have invented certain Improvements in Combined Ditching and Tile-Laying Machine, of which the following is a specification.

The first part of our invention consists in the construction of the ditcher in such a manner as to open the ditch from the bottom to the top by raising and pressing the earth open sufficiently to receive tile of the required size.

The second part of our invention relates to the arrangement for laying tile in connection with and as the ditch is opened by the ditching-machine; and it consists in attaching side plates to the rear of the ditcher to hold the earth open, and the arrangement of a curved inclined plane between said plates in such a manner that the tiles laid thereon will slide down it as the machine progresses and be properly laid along the bottom of the ditch, while the earth falls in and covers the tiles in the rear of the machine, the whole machine being designed to open the ditch, lay the tile, and cover the same at one operation.

In the accompanying drawings, Figure 1 is a side elevation of the ditching-machine embodying our invention. Fig. 2 is a top view of the ditcher and tile-laying machine with the draft-beam removed to show more clearly the construction of the device for opening the ditch. Fig. 3 is a detached view of pieces formed like the cutter and of the same material, which are to be added to the latter when opening a deeper ditch.

The ditcher is composed of the cutter, consisting of the center upright stock, G, and the side pieces B, both made of steel, shoe A, and hinged expansible wings D, the detachable pieces B', formed like the cutter, and the draw-beam F, the latter being constructed in most respects like the beam of an ordinary mole-plow, with the exception of the adjustable guide J and the colter H, the whole to be constructed of suitable material and of sufficient strength to withstand the strain and wear, the former being very great.

The shoe A is of cast-iron, of the form shown,

designed to raise the soil somewhat as it is drawn forward, so that it will be more easily pressed outward by the flaring cutter B. The wings D are hinged to the rear of the side pieces B', and are made adjustable by means of right and left screws fixed to each wing D and a nut, P, as shown, so as to make a wide or narrow ditch.

The device for laying the tile is composed of the side plates, E, of boiler-iron, and the curved inclined self-adjusting slide-plate M. The side plates, E, are made adjustable to adapt them to hold the earth out to the full size opened by the cutter and to lay large or small tile. This is done by means of right and left screws fixed in the plates E, and suitable nuts, P, Fig. 2. The position of the screws and nuts P is at s, Fig. 1. The inclined slide M is hung on a rod at r, and is thus left free to adapt itself to any required depth of ditch.

The draft-beam F is of wood, having a mortise at the rear end to receive the upright G, and in which the latter fits neatly. A braced standard, O, serves to aid in holding the cutter upright.

H is a colter for cutting sod and breaking the hard top soil.

J is an adjustable guide to regulate the grade of the ditch, and can be set by means of the screw K.

L are rods running through the beam to keep it in place.

I is a spirit level, pivoted at the rear end and made adjustable at the forward end, by which to determine the grade and know how to regulate guide J.

The movable pieces B' are of the same material and form as the cutter, and arranged so as to be added to the top of the cutter when it is desired to cut the ditch deeper. The tile-laying device is attached to the ditcher by means of hooks and staples, so that it may be readily attached or detached.

The machine is drawn forward by means of an ordinary capstan, a rope from which is attached to the forward end of the beam F, and as it progresses the tiles are placed on the inclined curved plate M, as indicated by the dotted lines, and at N, the weight of those above serving to press the lower ones out and keep



them in close contact. The soil falls in behind the plates E and covers the tiles, seldom leaving any filling to be done by hand.

We claim as our invention—

1. The cutter B B', shoe A, upright G, and adjustable wings D, all constructed and arranged substantially as and for the purpose set forth.

2. The tile-laying device composed of the ad-

justable plates E and inclined slide M, attached in the rear of the ditcher, substantially as and for the purpose set forth.

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