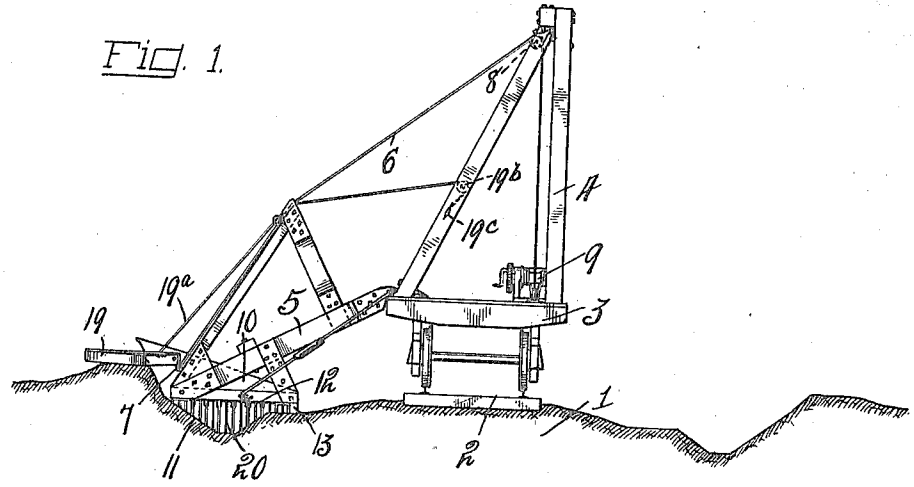
P. JONES & R. C. MILLER.
RAILROAD DITCHING MACHINE.
APPLICATION FILED NOV. 21, 1916.

1,265,088.

Patented May 7, 1918.
3 SHEETS—SHEET 1.

Fig. 1.



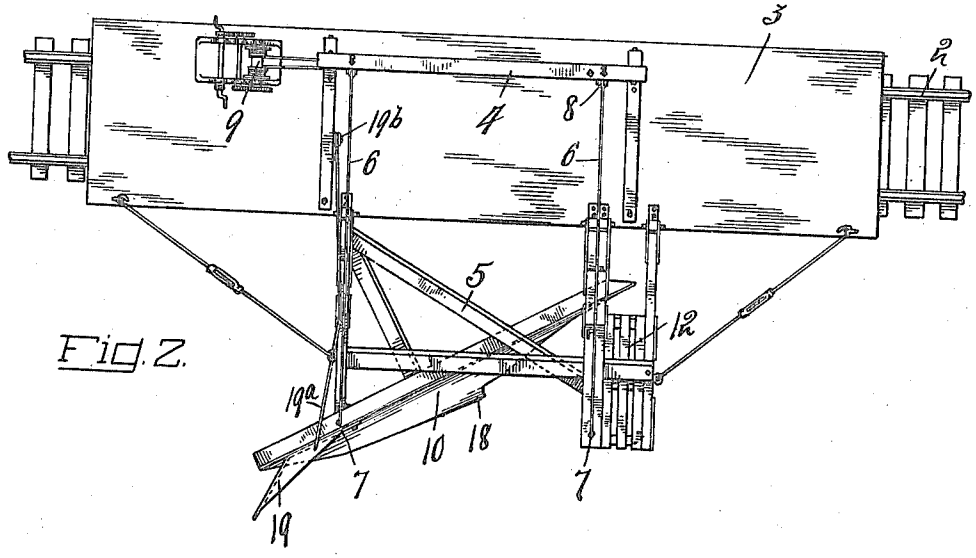
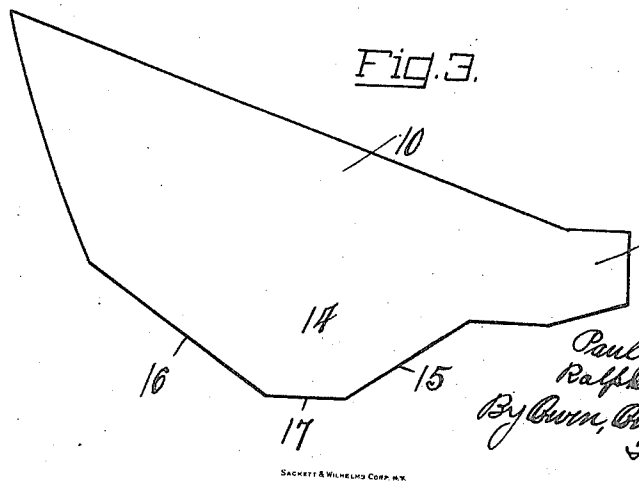


Fig. 2.

Fig. 3.



INVENTOR
Paul Jones
Ralph C. Miller,
By Burns, Burns & Crampton,
Their attys.

SACKETT & WILHELMS CORP. N.Y.

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Fig. 4.

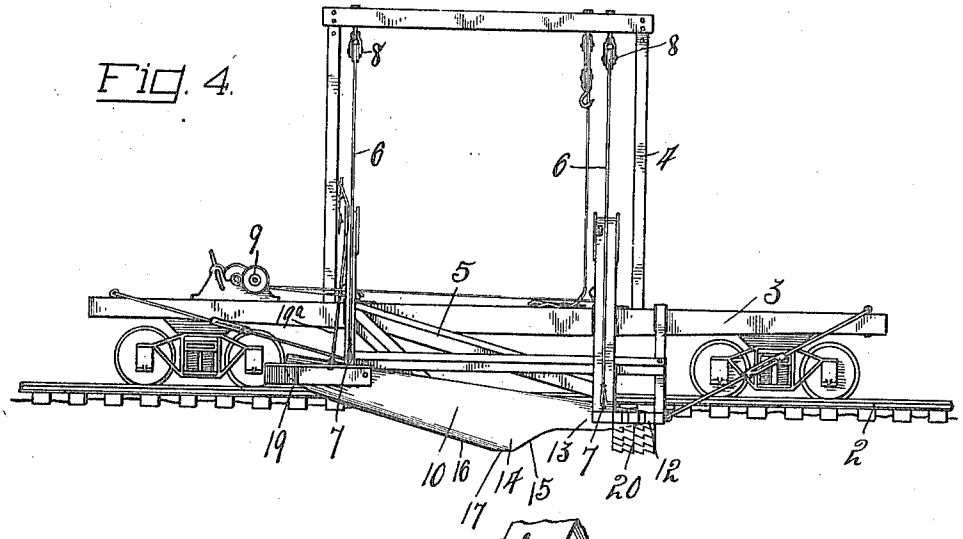
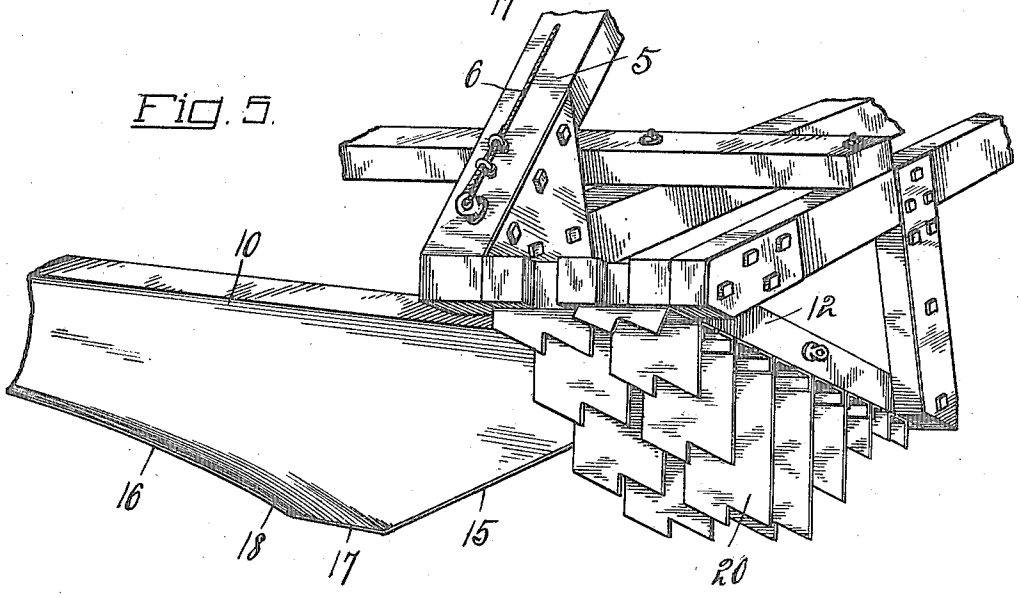


Fig. 5.



INVENTOR
Paul Jones,
Ralph C. Miller,
By Owen, Owen & Crampton,
Their attys.

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3 SHEETS—SHEET 3.

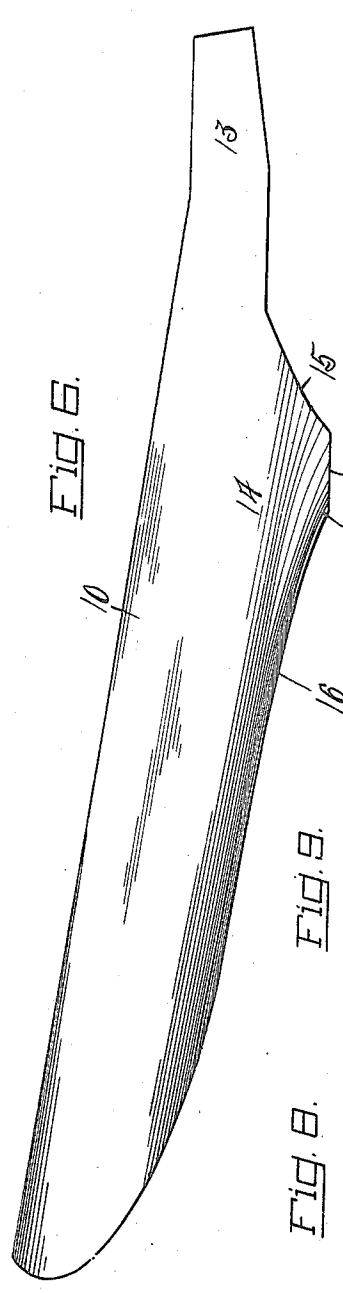


Fig. 6.

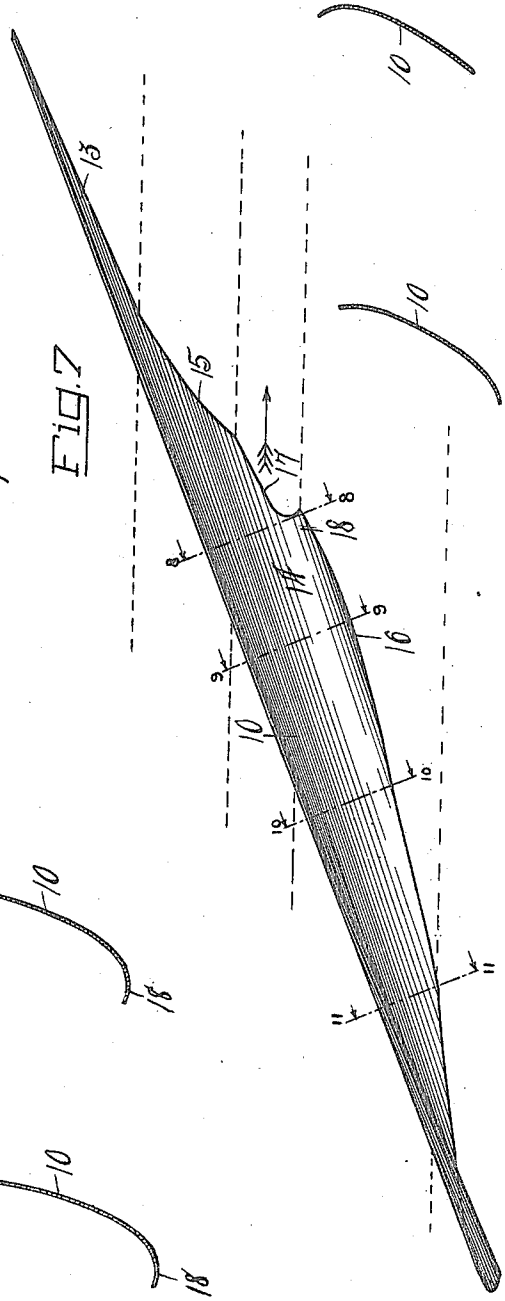


Fig. 7.

Fig. 9.

Fig. 8.

Fig. 11.

Fig. 10.

INVENTOR
Paul Jones,
Ralph C. Miller
By Owen, Owen & Crampton
Their attys.

UNITED STATES PATENT OFFICE.

PAUL JONES AND RALPH C. MILLER, OF TOLEDO, OHIO.

RAILROAD DITCHING-MACHINE.

1,265,088. Specification of Letters Patent. Patented May 7, 1918.

Application filed November 21, 1916. Serial No. 132,552.

To all whom it may concern:

Be it known that we, PAUL JONES and RALPH C. MILLER, citizens of the United States, and residents of Toledo, in the county of Lucas and State of Ohio, have invented a certain new and useful Railroad Ditching-Machine; and we 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 appertains to make and use the same, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this specification.

This invention relates to open ditch making machines, and particularly to those of the type adapted for forming ditches at the sides of railway road beds.

The object of our invention is the provision of an improved apparatus of the character described which is simple and efficient in its construction and operation and capable of easily and quickly loosening the soil and digging a ditch of predetermined contour in cross-section, and at the same time delivering the excavated soil to the outer side of the ditch. Further objects and advantages of the invention will be apparent from the following detailed description thereof.

While the invention, in its broader aspect, is capable of embodiment in numerous forms, a preferred embodiment thereof is illustrated in the accompanying drawings, in which,—

Figure 1 is the cross-section of a railway road bed, with an apparatus embodying the invention in ditch digging position. Fig. 2 is a top plan view thereof. Fig. 3 is a diametrical view of the ditch forming mold board as it appears in front elevation when in use. Fig. 4 is a side elevation of an apparatus embodying the invention. Fig. 5 is an enlarged perspective view of the soil loosening means and a portion of the mold board. Figs. 6 and 7 are side and plan views of the mold board, the latter being set at the angle in which it appears, and the horizontal dotted lines designating the angle lines of the ditch, and Figs. 8, 9, 10 and 11 are sections taken, respectively, on lines 8—8, 9—9, 10—10 and 11—11 in Fig. 7.

Referring to the drawings, 1 designates a railroad bed having a track 2 thereon, and 3 a flat car operating on the track, having a derrick 4 mounted thereon. A frame 5 is pivotally connected at its inner end to a side edge of the car 3 for vertical swinging movements and has its raising and lowering movements controlled by cables 6, each of which, in the present instance, is anchored at its outer end to the frame 5, as at 7, thence extends over a respective sheave 8 at the top of the derrick and down to a windlass 9 on which both cables wind.

The frame 5 carries a plow or mold board 10 at the under side of its outer end portion, which, when the frame is in lowered position and the car 3 is moved forward, is adapted to form a ditch or channel 11 in the road bed at one side of the car. The frame 5 also carries a harrow 12 in advance of the plow 10 to loosen or harrow the soil in advance of the plow, the portion of the soil loosened by the harrow substantially conforming in cross-sectional area to the cross-sectional form of the ditch.

The plow 10 comprises a blade or mold board which is disposed diagonally of its path of movement and is so shaped as to level the land at the inner or track side of the trench, form the trench with inclined sides, and deliver the dislodged soil away from the trench at the outer side thereof, as indicated in Fig. 1. For this purpose a plow blade is provided with a vertically narrowed nose portion 13, which passes over the inner bank or track side of the trench to level such bank, the blade then increasing in depth at the inner end of the nose to form the trench digging body part 14, the lower edge of which is fashioned to form the ditch of predetermined shape in cross-section. In the present instance the lower edge of the trench digging portion 14 of the blade has the oppositely tapered inner and outer sides 15 and 16 and the connecting bottom portion 17. The body portion of the blade has its outer end fashioned to extend on an incline over the outer side of the trench bank to deliver the excavated soil over said bank away from the trench and smooth the inner side of the bank formed by the excavated soil so as to form a continuation of the inclined outer side of the trench. The lower edge of the blade, beginning adjacent to the outer end of the bottom edge portion 17 thereof, is rolled or curved forward as at 18, such rolled portion extending up the inclined outer edge 16, as shown in Figs. 6 to 9, thus causing the blade to have a tendency to dig into the

soil as it is drawn forward. It is thus evident that it is not necessary to weight the plow or outer end portion of the frame 5 in order to cause the plow to work down into the soil, but on the contrary it is necessary to exert an upward restraining force to prevent the plow from digging too deeply into the soil. The depth of digging is regulated by the cable 6, as the more said cable is played out the deeper will be the cut. The digging-in edge 18 gradually narrows in width as it extends rearward and finally loses itself in the blade, as shown by the cross-sections in Figs. 8 to 11.

The outer end of the plow blade preferably has a leveling arm 19 pivotally projecting outward in rearwardly inclined horizontal position therefrom and effects a leveling and outward scraping of the top surface of the bank, as is apparent by reference to Fig. 1. The plane of projection of the arm 19 from the blade 10 is adjusted by a cable 19^a which projects upward from the arm over a sheave 19^b on the derrick 4, and attaches to a cleat 19^c thereon.

The harrow 12 has a plurality of transversely spaced harrow members 20 which, in the present instance, are in the form of stationary knives or teeth, which project downward from the top portion or framework of the harrow and are arranged in two transversely extending sets disposed one at the rear of the other, and in alternating relation thereto. The harrow members 20 vary in depth in accordance with the depth of the portion of the trench to be loosened thereby, so that they combine to loosen the soil in conformance to the cross-sectional form of the trench to be dug, as shown in Fig. 1. In other words, the depth of penetration of the soil by the respective members 20 is gaged by the length thereof to conform to the depth of digging of the portion of the plow blade following the respective members.

It is evident that we have provided an improved plow particularly adapted for the forming of ditches at the sides of road beds, and that the harrow and plow blade cooperate to dig a ditch of predetermined shape and area in cross-section, and that the blade and scraper arm 19 coöperate to deliver the excavated soil at the outer side of the trench and to level and smooth the top and inner side of the bank formed by the excavated soil.

We wish it understood that our invention is not limited to any specific construction or form of the parts, as it is capable of numerous modifications without departing from the spirit of the claims.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is,—

1. In a railway ditching machine, a car, a frame pivotally connected at its inner end to a side of the car, a harrow extending transversely across the frame at the front end thereof and at substantially right angles thereto, a mold board carried by the frame to the rear of the harrow and being inclined so as to have its ends extend beyond the ends of the harrow, a vertically movable leveling arm pivoted at its inner end to the outer end of said mold board and inclining rearwardly therefrom, and means connected to the leveling arm and to the car limiting downward movement of said arm.

2. In a railway ditching machine, a car, a frame carried by the car, a series of vertical cutting blades arranged substantially parallel to the longitudinal axis of the ditch to be cut, said blades depending from the frame and being of varying lengths so as to approximate in general outline the shape of the ditch to be cut, and a mold board extending at an incline to the plane of said cutting blades and across the latter to the rear thereof and having lower edges approximating in shape, the shape of the ditch to be cut.

3. In a railway ditching machine, a car, a frame carried by the car, and a plow blade carried by the frame, said blade having a narrowed nose at its inner end and a central part having upwardly diverged sides with a bottom connecting said diverged sides, the outer of said diverged sides being rolled inwardly to provide a digging edge.

4. In a railway ditching machine, a car, a frame carried by the car, a series of vertical cutting blades depending from the frame and arranged at substantially right angles thereto and each having stepped upwardly inclined lower edges, the blades of one series being staggered in relation to the blades of the other series, and a plow blade carried by the frame and arranged to the rear of the vertical cutting blades, said plow blades extending diagonally of the vertical cutting blades.

5. In a railway ditching machine, a car, a frame carried by the car, a series of vertical cutting blades depending from the frame and arranged at substantially right angles thereto and each having stepped upwardly inclined lower edges, the blades of one series being staggered in relation to the blades of the other series, and a plow blade carried by the frame and arranged to the rear of the vertical cutting blades, said plow blade extending diagonally of the vertical cutting blades and having a cutting edge which extends outwardly beyond the outermost vertical blades and at an angle to the cutting edges thereof.

6. In a railway ditching machine, a car, a frame carried by the car, a harrow carried by the frame and having cutters arranged

with their cutting edges at substantially right angles to the frame and a plow blade carried by the frame and arranged at an angle to the harrow, said plow blade having a bottom part forming the ditch bottom and having a cutting edge which curves inwardly and extends outwardly from the outer end of said bottom part and gradually narrowing and merging into the outer end of the plow blade, said cutting edge extending outwardly beyond the outer end of the harrow, and a narrowed nose formed on the inner end of the plow blade.

7. In a railway ditching machine, a car, a frame carried by the car, and a plow blade carried by the frame and shaped to approximate the shape of the ditch to be cut, said blade having a central bottom part and upwardly diverged sides extending from the respective ends of said bottom part, the outer of said diverged sides being curved inwardly to form a digging edge and a series of vertical cutters carried by the frame in advance of said blade, said digging edge having its inner edge extending to approximately the center of the series of vertical cutters.

In testimony whereof, we have hereunto signed our names to this specification.

PAUL JONES.
RALPH C. MILLER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."