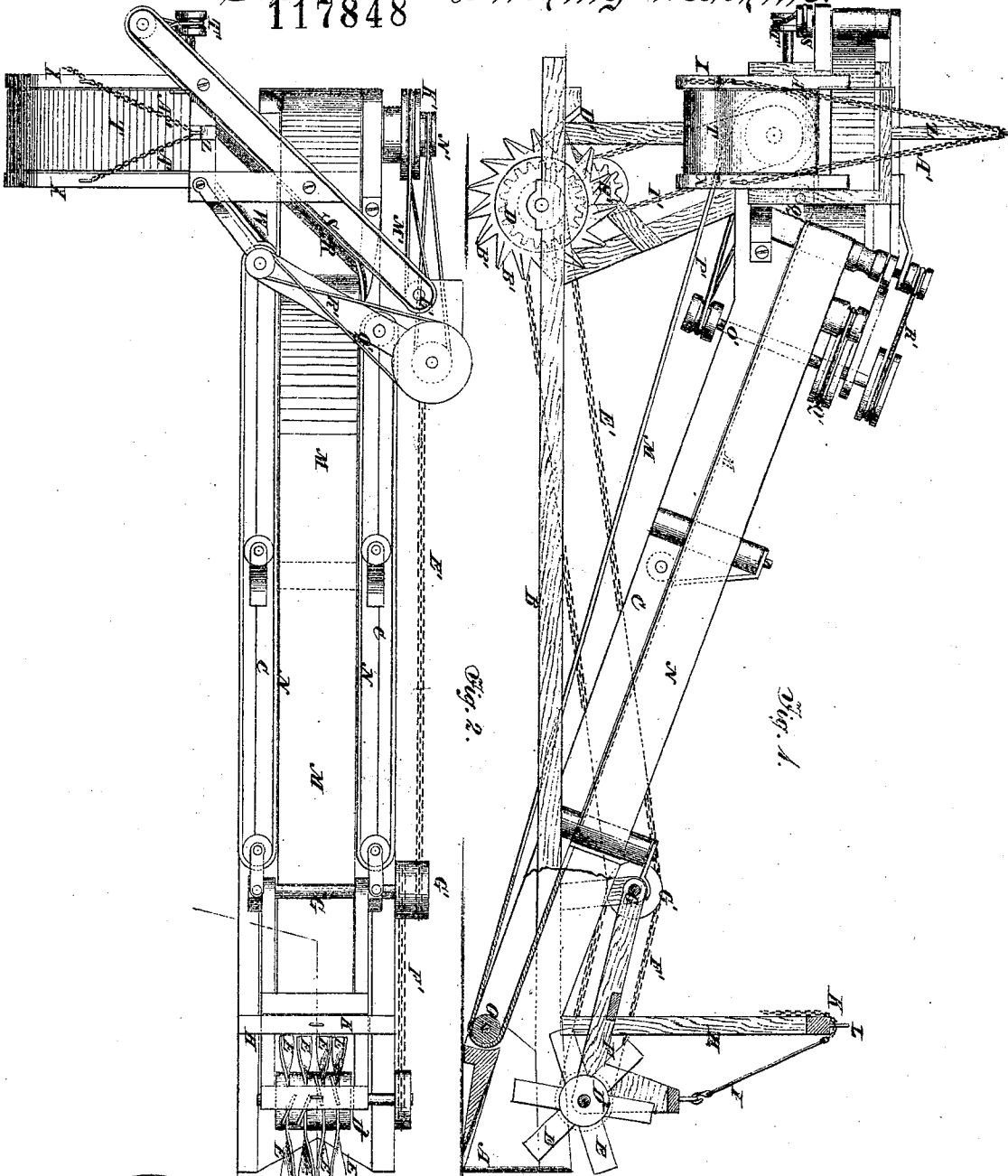


S. S. Wood. Ditching Machine.
 117848 PATENTED AUG 8 1871



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Fig. 3.

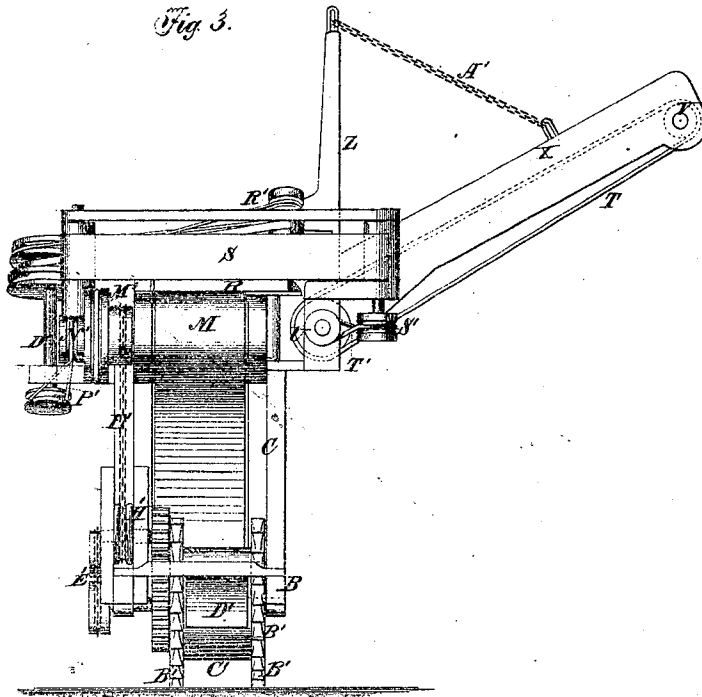


Fig. 4.

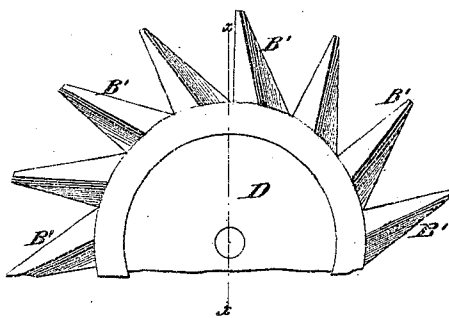
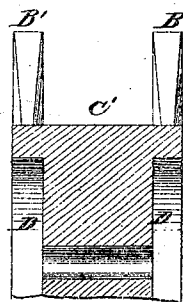


Fig. 5.



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STEPHEN S. WOOD, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN DITCHING-MACHINES.

Specification forming part of Letters Patent No. 117,848, dated August 8, 1871.

To all whom it may concern:

Be it known that I, STEPHEN S. WOOD, of Brooklyn, in the county of Kings and State of New York, have invented a new and Improved Ditching-Machine; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawing forming part of this specification.

This invention relates to improvements in ditching-machines; and it consists in the construction, combinations, and arrangements hereinafter described, of the several operative parts, whereby the earth scooped up by an oblique scraper or plow is discharged onto an inclined elevating apparatus, from the top of which, after being elevated, it is transferred to a lateral conductor to be discharged upon the bank at one side of the ditch.

Figure 1 is partly a side elevation and partly a sectional elevation of my improved ditching-machine. Fig. 2 is a plan view of the same. Fig. 3 is a rear end view. Fig. 4 is a partial elevation of the propelling-wheel, and Fig. 5 is a sectional elevation of Fig. 4 taken on the line *x x*.

Similar letters of reference indicate corresponding parts.

A is a scoop-shaped plow mounted at the front end of a frame, B C, to be drawn along the ground, the rear end of said frame being mounted on a power-wheel, D, for supporting it, and transmitting motion to the operative parts. From this scoop, which ascends toward the rear, the earth gathered by it is to be delivered upon an endless elevator; but, as it is liable to clog, I employ a rotary feeding-wheel or brush for acting upon the earth raised by the scoop to work in conjunction with the scoop, which, moving forward under the earth which is prevented from moving with it by the resistance of the solid earth in advance of that in the scoop, causes the earth to slide up the scoop toward the conductor to some extent. This feeding-wheel consists of a drum or shaft, D², and twisted or plane flat blades E, mounted on it radially so that the outer ends stand spirally to the axis of the drum and act obliquely on the earth, and they are arranged so that the spiral pitch of the blades has a tendency to throw the earth toward the center from each end for keeping it away from the sides of the scoop and conductor

as much as possible. Another object of the spiral arrangement of the blades is to allow them to enter the earth edgewise by a cutting action and carry it toward the conveyer at the same time that they convey it toward the center, also to clear them from the earth at the rear, whereas if they were arranged parallel with the axis they could not enter the earth except at great expense of power, and they would not clear. These blades may be arranged on the drum in rows parallel with the axis or transversely thereto. But I, preferably, set them transversely for two reasons; first, they are not so liable to clog and they admit of the passage of a set broom or scraper for clearing them; and second, they possess a greater measure of strength in the direction they move for a given weight. As a further means of relieving these blades from obstructions I mount the drum in a frame, F, pivoted at G, so that the end supporting the wheel may rise and fall, working at the same time between the vertical guides H, which prevent it from working laterally, and the weight of the wheel and frame is partially suspended by an elastic cord, I, or it may be a spring of any kind from the top of the frame H, to assist the wheel in its tendency to rise when it strikes an obstruction, also to allow it to rise and fall slightly, as the height of the earth being scraped up varies. A chain, K, and stud-pin L are employed, in connection with the frame H, to hold the wheel above the earth when the latter is of such a character that the wheel is not needed to convey it to the belt M. The elevator or conductor consists of an endless belt, M, at the bottom of a trough whose sides are also formed by endless belts N, arranged perpendicular to belt M, and moving on the side next to it in the same direction. The belt M is employed without any lugs, projections, blades, or buckets such as are ordinarily used with endless conveyers for admitting of the discharge of the earth carried up by a scraper, under which the belt passes; and, to insure the carrying of the earth on the belt, it is arranged on a grade sufficiently low for the purpose, and provided with the side belts N, which relieve the earth of the friction that would be caused by fixed sides commonly used, and assist in carrying it. The said belts may be made of metal or other approved substance. The belt M works over a roller, O, at the lower end, and the driving-drum P, shown dotted in Fig. 1, at the

upper end, and at Q it passes over a small guide-roller in its upward movement, from which roller it moves in a level plane to the drum P and under the discharging-scraper, consisting of the fixed bar or plate R crossing the belt obliquely, and the endless belt S running behind the bar and conveying the earth over the apron W onto the lateral carrier T, which is also an endless belt, and stretched from the drum U, arranged under outer end of apron W, to the roller V, mounted in the outer ends of the arms X, which are pivoted to the axle of drum U, so that the outer end of the belt T may be raised or lowered for allowing it to descend from the drum while the ditch is shallow, and it can be carried sufficiently high above the earth-bank to do so, for utilizing the gravity of the earth to assist in the working of the carrier, and as the ditch deepens to allow of raising the carrier to travel clear above the bank. Either the fixed scraper R or the belt S may be used separately for discharging with good results; but I prefer to employ them both. The arms X form the sides of the carrying-trough, and they are suspended from the post Z by a chain, A', in a manner to be held higher or lower, as may be required.

All these endless belts and the feeding-wheel are driven by the power-wheel D, which, to prevent slipping, is provided with two rows of points, B', one at each end of a plane drum, C', to enter the ground and insure rotation. The said points are arranged tangential to a circle about half the diameter of the drum, so as to be inclined in the direction the machine moves for entering the ground and withdrawing again with less friction than they would if pointing radially from the drum.

The rows of points are used in preference to blades or plates extending across the tire, because they obtain all the power of resistance the earth is capable of giving within the distance from row to row of points and the depth they enter, without offering as much resistance to the entering as the blades would; but a more especial advantage is that the space between the rows of points admits of the use of a scraper, D', for scraping off the earth packing in between them, the removal

of which either forces out what may be between the points of a row or loosens it so that it will give way when the points enter the ground again, whereas if continuous blades are used they cannot be cleaned. I may use three or more of these rows of points with a scraper between each, according to the power I wish the wheel to transmit.

The feed-wheel D² is worked by a chain, E', and another, F', the first working on a pulley, G', at the axis G of the frame F, and the other from pulley G' to a pulley on the said feed-wheel shaft. The endless belt M is worked by a shaft, H', geared with the power-wheel and a chain, I', and a pulley, K', works the drum L' of the belt S by a belt, M'. Another pulley, N', drives the shaft O' by a belt, P', and this shaft O' drives the belt N', one by a belt, Q', and the other by a belt, R'. The belt T is driven by the belt S through the medium of the shaft S' and belt T'. Behind the power-wheel the frame will be provided with suitable handles for guiding the machine, and suitable hitching apparatus will be applied at the front.

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

1. The rotary feeding-wheel, consisting of a drum or shaft and the spiral blades, constructed and arranged substantially as specified.

2. The said feeding-wheel, mounted in the vertically-oscillating frame F, and the latter arranged between the guides H, all substantially as specified.

3. A carrier, M, and lateral carrier T, combined with the plate R, endless belt S, and apron W, when arranged intermediately, as and for the purpose specified.

4. The power-wheel, consisting of a drum and two or more rows of points with a plane surface between the said rows of points, substantially as specified.

5. The combination, with the power-wheel, constructed as described, of the scraper D', substantially as specified.

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Witnesses:

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