2 Sheets—Sheet 1.

C. B. STOUGH.

Ditcher.

No. 205,439. **Patented June 25, 1878.**

Fig. 1.

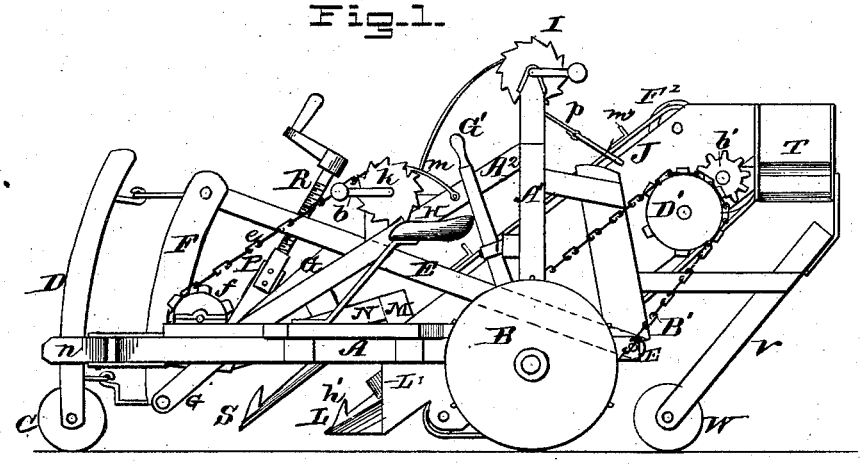
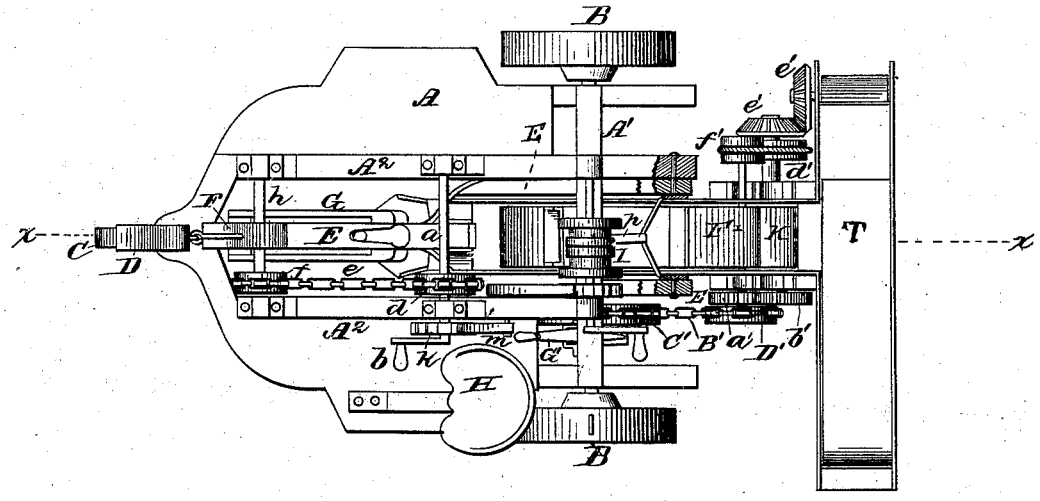


Fig. 2.



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2 Sheets—Sheet 2.

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Fig. 3.

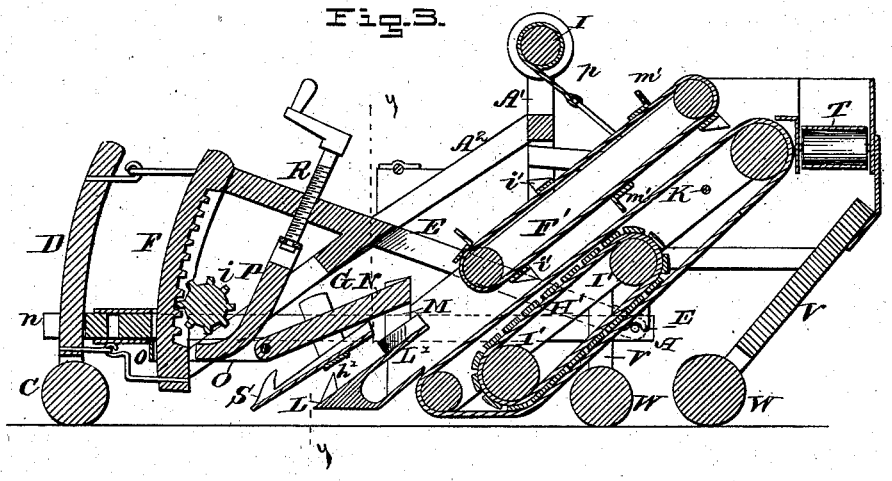
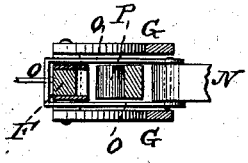


Fig. 4.

Fig. 5.



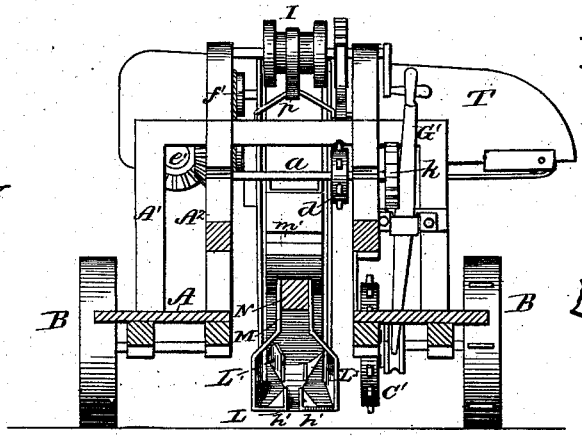


Fig. 6.

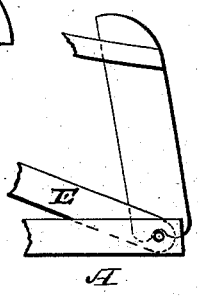
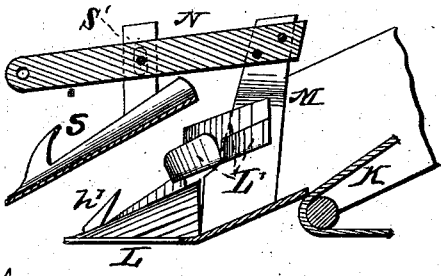


Fig. 7.



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UNITED STATES PATENT OFFICE.

CHARLES B. STOUGH, OF MONTICELLO, ASSIGNOR OF ONE-HALF HIS RIGHT TO HENRY L. TIMMONS, OF PIATT COUNTY, ILLINOIS.

IMPROVEMENT IN DITCHERS.

Specification forming part of Letters Patent No. **205,439**, dated June 25, 1878; application filed May 13, 1878.

To all whom it may concern:

Be it known that I, CHARLES B. STOUGH, of Monticello, in the county of Piatt and State of Illinois, have invented certain new and useful Improvements in Ditchers; and I do hereby declare that the following is a full, clear, and exact description of my invention, which 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 letters of reference marked thereon, which form a part of this specification.

The nature of my invention consists in the construction and arrangement of a combined grading and ditching machine, as will be hereinafter more fully set forth.

In the annexed drawing, which fully illustrates my invention, Figure 1 is a side elevation of my machine. Fig. 2 is a plan view of the same. Fig. 3 is a longitudinal vertical section on the line *x x*, Fig. 2. Fig. 4 is a transverse vertical section on the line *y y*, Fig. 3. Figs. 5, 6, and 7 are detailed views of parts of the machine.

A represents a horizontal frame-work of any suitable construction, supported upon a wheel, B, at each side, at the rear, and a wheel or roller, C, at the front, this latter wheel being mounted in the lower end of a vertical bar, D, hinged to the front of the frame A.

On the rear portion of the main frame A is a vertical frame-work, A^1, which is firmly braced by means of forwardly-inclined braces A^2 A^2.

In the frame A, at the rear end, is pivoted a forked beam, E, to the front end of which is secured a segmental rack-bar, F, projecting downward, and having its cogs on the rear side, the lower end of said rack-bar being connected to the beam E by braces G, as shown.

In suitable bearings on the braces A^2 is placed a shaft, *a*, provided with a crank, *b*, close to the driver's seat H. On the shaft *a* is secured a sprocket-wheel, *d*, connected by a chain, *e*, with a similar wheel, *f*, on a shaft, *h*, and this shaft is provided with a pinion, *i*, which meshes with the rack-bar F, to raise and lower the beam E, said beam being held at any point desired by means of a ratchet-wheel, *k*, on the shaft *a*, and a pawl, *m*, taking therein.

The raising and lowering of the beam E raises and lowers the bar D with the wheel C, said bar sliding through a clevis, *n*, hinged to the front of the main frame A, and the bar connected to the top and bottom of the rack-bar F by means of eyebolts and hooks, substantially as shown, or in any other suitable manner that will allow the bar D to swing to either side.

In the top of the frame A^1 is a windlass, I, provided with crank, ratchet-wheel, and pawl, in the usual manner; and this windlass connects by a belt, *p*, with an elevator-frame, J, containing an endless elevator, K.

The elevator-frame J carries at its lower front end a plow, L, and is, by straps M M, connected with a beam, N, which extends forward between the two braces G G, and is hinged in a stirrup, O, passing around the rack-bar F. In the stirrup O is also attached a bar, P, which extends upward, and is adjusted by a screw-shaft, R, passing through the beam E.

The beam N is provided with a plow, S, which runs above and in front of the plow L.

The upper rear end of the elevator has an endless apron, T, arranged to carry the dirt to one side.

Below the elevator-frame are arms V V, with wheels or rollers W W at their lower ends for supporting the same.

The two elevators are run by a chain, B′, from a wheel, C′, upon the axle of one of the driving-wheels B. This chain passes around a wheel, D′, which is provided with a pinion, *a′*, that takes into a pinion, *b′*, on a shaft, *d′*. This shaft is, by bevel-gears E′ E′, connected with the upper roller on the side apron T. From the shaft *d′* a crossed band, *f′*, runs a second endless apron, F′, arranged in the frame J above the main elevator K.

This machine may be used for grading roads, making small ditches for tiling purposes, and also for making large open ditches to any depth or width desired, different-sized plows and carriers being used to suit the kind of work to be done.

To operate the machine, it is drawn forward

by horses or other suitable means for that purpose. As the machine moves forward the plows are made to cut and gather up the earth and force the same up and onto the carrier. The carrier then conveys the earth placed on it by the plows to the rear end of the machine. Here the earth is taken by the carrier T and conveyed by it out from the machine onto the grade, or dropped at the side of the ditch, as may be desired. The carrier T may be made of any length suitable for the purpose intended.

The plows are so constructed that in cutting the earth they contract the same in width and increase it in height, and by this means the earth is put in proper shape to pass up and out through the carriers without clogging and choking up the same. In making ditches, the three wheels C and W W are to be used. By this means the ditch can be kept level with more ease and accuracy than otherwise. If the wheels W under the carriers are both touching the bottom of the ditch, and the plows are in line with the wheels on the bottom, which is the intention of construction, then, of course, the plows must be runnir g 'evel. In grading, the small wheel next to the plows may be removed.

The wheels B B of the main frame of the machine simply support the machine on top of the ground, while the plows are independently supported in the ditch by the wheels C and W.

The wheel C in front of the plows answers for two purposes: First, by means of it the plows can be set to cut to a depth proportionate to what the team or other means of moving the machine forward is able to draw, and it will hold the plows just at that depth; and when the machine is being moved from place to place this lower wheel answers as a guide-wheel, for supporting and guiding the machine.

In turning the machine around, the rear end of the carrier is raised clear off the ground by means of the windlass I and belt *p*, and held by the windlass, pawl, and ratchet.

The plows are regulated by means of the screw-shaft R. Thus the plow can in uneven ground be kept running level.

The plow S on the beam N is intended to be used in the bottom of tile-ditches. This plow S is made concave, and increases in width and depth from the front to the rear end, and is secured in an inclined position in the beam N by means of side straps or bars S′, which extend upward from the rear portion of the plow through mortises at the sides of said beam, and fastened by a pin or bolt, as shown in Fig. 7. In this figure I have also shown the construction of the plow L. When the ditch is made down to within four or five inches of completion, this small plow S is brought down and the ditch is finished with it, thus leaving a trench in which to lay the tile. By this means the tiles are prevented from rolling out of position while the ditch is being filled up.

The plow L is provided with a side cutter, L′, which is intended to be used in making large ditches. In making a large ditch it can be made as wide as desired at the top by making as many furrows in width as will make the ditch as wide as wanted. Then, if it is desired to make the ditch narrower at the bottom than at the top, which is the usual way of making open ditches, the sides of the ditch can be gradually drawn in to the desired width; and in drawing in the ditch in this way the banks or sides will, of course, be uneven. The intention of the side cutter L′ is to keep these banks or sides trimmed down smooth. Two of these knives may be used, one on each side.

The plow L is provided with small plows *h′*, set on its point, for the purpose of cutting out the center of the furrow, by which means the small plows cut through the earth first, thereby making room for the side cutters L′ to cut down the banks of the ditch and turn the earth so cut into the center from both sides, packing the same close up together at the back edges of the cutters. The earth cut by the center plow passes up and back on the same, being turned onto its side as it passes back to the rear, and here drops upon the earth already cut and closed together by the large plow. The earth from both plows, after coming together, is immediately pushed onto the belt or carrier, and passes up out of the ditch, as before described.

The wheel C′, from which the motion is given to the carrier, is connected to its shaft by an ordinary clutch, which is thrown in and out of gear by a lever, G′.

The elevator K is, in a full-sized machine, to be composed of a rubber belt with netting on it, so that it may be kept clean by scrapers provided for the purpose.

The single belt can be run down close under the plow on a very small pulley, and by this means will relieve the plow of the earth almost as soon as it has cut it. For the purpose of obviating the difficulty of this single belt swaying too much when loaded with dirt, I have placed an endless board belt, H′, underneath it to support the load, said board belt being supported by rollers I′, as shown.

The endless belt F′ above the carrier is provided with small knives *i′*, to keep the sides of the carrier clean in case the dirt should stick to it. The belt is also provided with shovels *m′*, to assist the dirt in passing up the carrier, in case the dirt should be dry and crumbly and inclined to roll back to the plow.

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

1. The combination, with the main frame A, of the beam E, rack-bar F, and braces G, with the devices for adjusting and holding the same upon the forward part of the frame, for the purposes herein set forth.

2. The combination of the beam N, stirrup O, adjustable rack-bar F, bar P, and screw R,

substantially as and for the purposes herein set forth.

3. The wheel C and bar D, connected to the adjustable bar F, said bar D sliding through the hinged clevis *n*, substantially as and for the purposes herein set forth.

4. The board belt H′, arranged within the carrier K, substantially as and for the purposes herein set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

CHARLES B. STOUGH.

Witnesses:
FREDERIC F. CORNELL,
DAVID M. WILLIAMS.