

F. L. DELFER.
Ditching-Machines.

No. 155,184.

Patented Sept. 22, 1874.

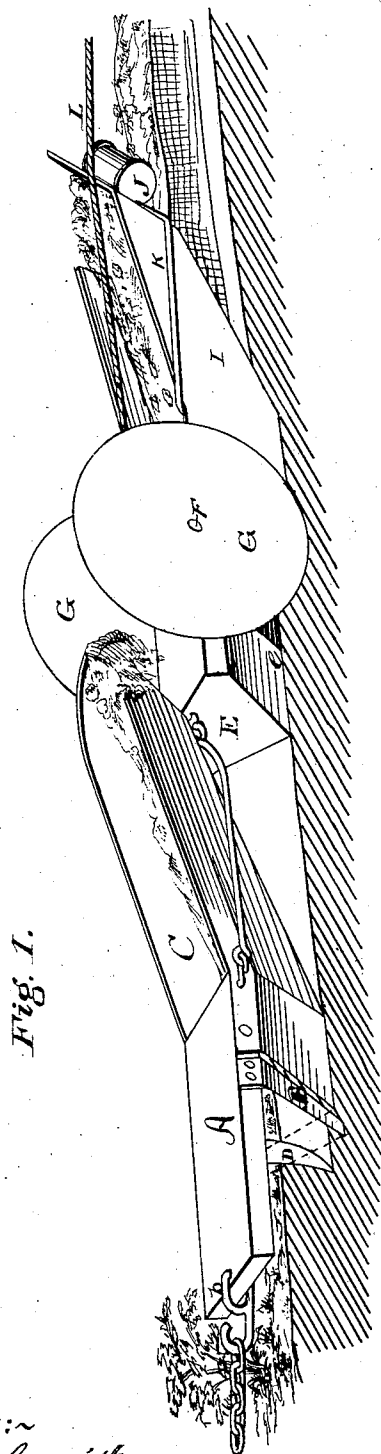


Fig. 1.



Fig. 4.

Fig. 2.

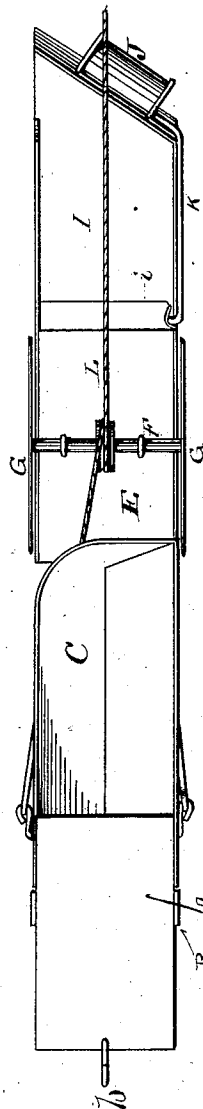
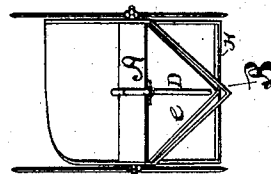


Fig. 3.



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FRANK L. DELFER, OF BURLINGTON, IOWA.

IMPROVEMENT IN DITCHING-MACHINES.

Specification forming part of Letters Patent No. **155,184**, dated September 22, 1874; application filed August 24, 1874.

To all whom it may concern :

Be it known that I, FRANK LEO DELFER, of Burlington, in the county of Des Moines and State of Iowa, have invented a new and useful Improvement in Ditching-Machines; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, in which—

Figure 1 is a perspective view of my machine in operation. Fig. 2 is a plan view of the same. Fig. 3 is a front elevation of the same. Fig. 4 is a longitudinal section, showing the trough for lubrication.

The object of this invention is to diminish the resistance against the cutters of a ditching-machine by dividing the work which each performs into successive portions; and it consists, first, in device for removing a section of earth with a triangular or gouge-shaped cutter in advance of the said cutters or colters and the squaring-cutter; second, in the method of rotating the revolving cutter; third, in the method of reducing friction by lubricating the slides with water.

Heretofore the larger portion of the power employed to advance a ditching-machine has been absorbed in compressing the earth to permit the passage of the colters or cutters, the actual displacement and removal of the earth after separation being comparatively a light matter. This great resistance is due to the fact that to make a passage for the colter it is necessary to displace the earth in lateral directions, and this can only take place by actual compression or crowding together. I propose to obviate the greater part of this resistance by the previous removal of a portion of earth, so that the passage of the colter will merely cause a slight lateral displacement instead of compression of the earth.

It also requires less power to propel a rolling than a sliding body, and a rolling cutter will penetrate with ease where a simply sliding cutter would refuse to enter. I therefore employ rolling colters, and secure their rotation as the machine advances by the action of a proper chain or rope unwinding from a drum or pulley upon the axle upon which said

cutters are mounted, one end of said rope or chain being secured to some stationary object in advance of the machine.

The surface-friction of the sliding rod, or each as it is raised and passes along the conveyer to be discharged, is considerable, and frequently the earth is so adhesive that it will stick to the sides of the chute; and I propose to render such discharge with less resistance by the use of water as a lubricant, the same being contained in a proper receptacle mounted upon the machine, and delivered through a pipe leading to the proper point of discharge, with a regulating-cock, if required. This water may also be used to wet the rotary cutters to keep the dirt from sticking to them—in fact, to keep them sleek and clean. (Some ditchers always dip their spade into water before they put it into some kinds of ground.)

That others may fully understand my invention, I will particularly describe it.

A is the preliminary or advance cutter-frame. It consists of a suitable frame with cutter B secured to its under side; said cutter forming two sides of a triangle or sharply-rounded gouge, the apex extending to a distance equal to the depth of the section to be taken out. The frame A slides upon or near to the surface of the ground, and the draft power may be attached, as at *b*, to its front. The cutter B will separate a triangular or curved slice of earth without much resistance, because the earth affected may be displaced and move upward to permit the passage of the cutter. The slice so liberated will immediately pass into the trough or chute C, which has a similar cross-section, and as the machine advances said slice of earth will be pushed along said trough, and, by the configuration of its closed end, it will be discharged at one side thereof and clear a ditch.

A stationary central colter or cutter, D, may be fixed in advance of the cutter B, if it is desired to have half of the dirt on each side.

For surface-drains, or for purposes of irrigation, the apparatus above described may serve a useful purpose without other parts.

To complete the ditch with vertical sides and flat bottom, I attach to the advance cut-

ter A a follower, E, composed of a suitable frame, having below it a runner, *e*, shaped to fit the furrow made by the cutter B. This runner mainly serves as a guide to keep the follower properly in place. A shaft, F is laid in boxes upon the frame E, and on each end of said shaft a circular sharp-edged disk, G, of sufficient diameter to penetrate the earth to depth equal to the depth of the furrow formed by B. As the machine advances, the cutters G make vertical cuts, which form the sides of the ditch, and the earth so separated is severed along the bottom or floor of the ditch by a horizontal cutter, H, and is pushed up a trough or slide, I, and is discharged from the upper end thereof at one or both sides. The discharge of the slide I may be made at a greater or less distance from the edge of the cut or ditch, as may be desired. The friction of the earth moving along the slide I and the friction of the rotary colters may be reduced by lubrication with water; and for this purpose I place, at some convenient place upon the machine, a tank or vessel containing water, and conduct the same to one or more little troughs, *i*, along which it flows and wets the bottom of the moving mass of earth. The trough *i* is covered by a ledge or flap, which extends from its front edge over its top, leaving it open only along its rear edge, so that the earth cannot get into and obstruct it.

The number of these water-troughs may be such as experience finds to be necessary, and will vary according to the nature of the soil being excavated or the length of the chute I.

The same method of lubrication may be applied to the chute C, and to the upper half of the rotary colter D.

A regulating or stop cock may be placed in the feed-pipe.

In the drawing the water-tank is shown, at

J, attached to the rear end of the chute I, and the water is conducted forward to the points of lubrication by the pipe K. A rope or chain, L, is secured at one end to some stationary object, and the other end is wound around the shaft or axle F of the cutters, and the cutters will thereby be caused to rotate as the machine advances, and said rotation be faster than said advance in proportion to the difference in their diameters.

Having described my invention, what I claim as new is—

1. In combination with the side and bottom cutters of a ditching-machine, an advance or preliminary furrow-cutter, A, provided with an angular or gouge-shaped cutter, B, substantially for the purpose set forth.

2. The advance or preliminary furrow-cutter A, provided with an angular or gouge-shaped cutter, B, and its own side-discharge slide C, as set forth.

3. In combination with the angular cutter B, the central colter D, as set forth.

4. In combination with the cutter H of a ditching-machine and the advance furrow-cutter A, substantially as set forth, the guide-slide *e*, as described.

5. In combination with the side cutters G, fixed upon the axle F, a chain or cord, L, wound upon said axle, and one end of said chain or cord attached to some stationary object, to cause said cutters to rotate as the machine advances.

6. In combination with the discharge-slide of a ditching-machine, a water-tank and pipe, to discharge water into said slide for a lubricant, as set forth.

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Witnesses:

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