(No Model.)

H. SULLIVANT.

TILE DITCHING MACHINE.

No. 338,678. Patented Mar. 23, 1886.

Fig. 1.

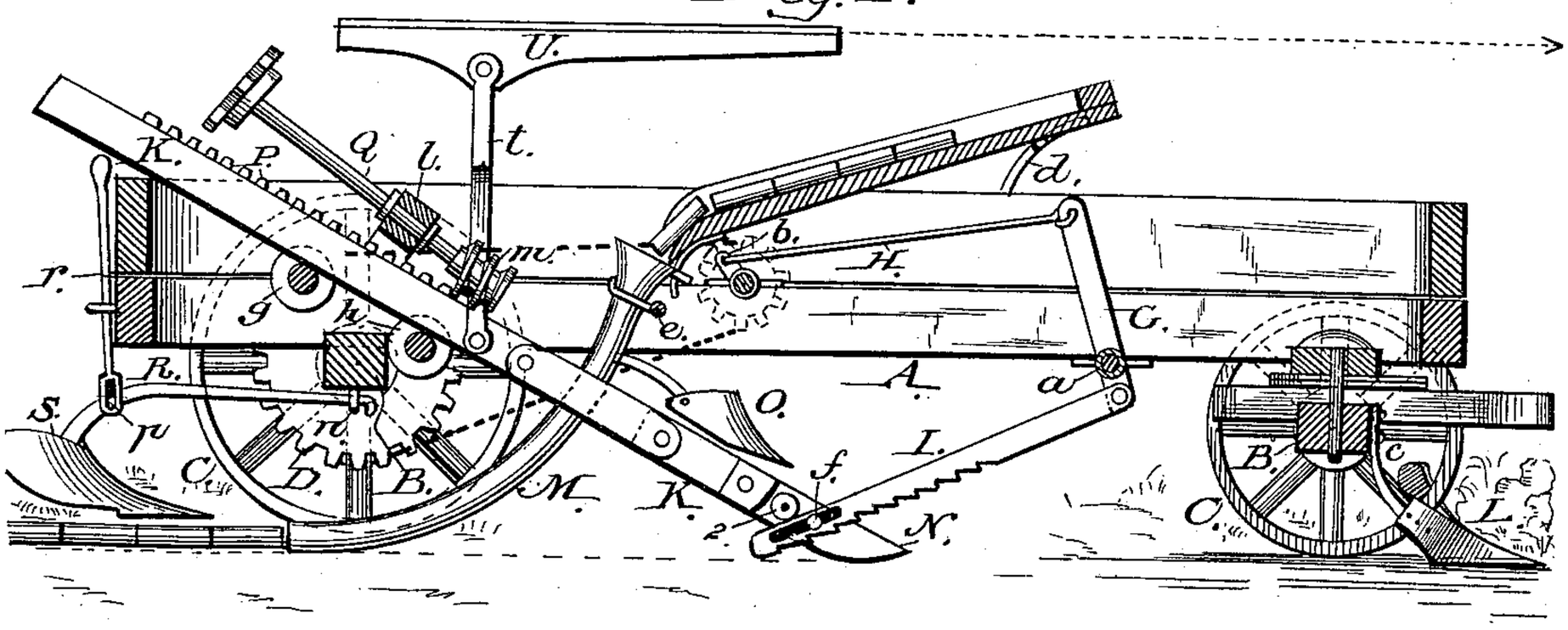
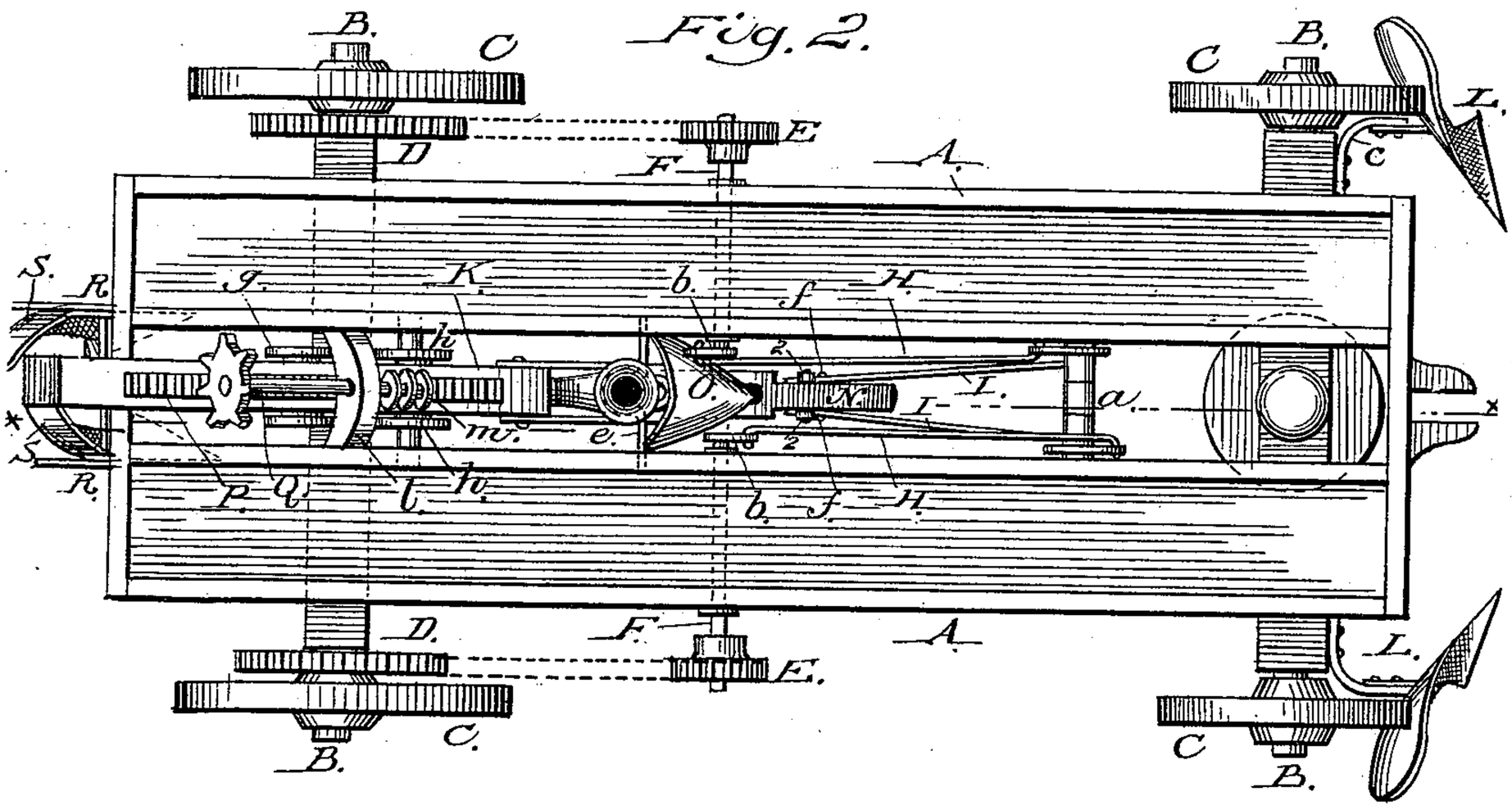


Fig. 2.



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UNITED STATES PATENT OFFICE.

HARRY SULLIVANT, OF ARCHIE, ILLINOIS.

TILE-DITCHING MACHINE.

SPECIFICATION forming part of Letters Patent No. 338,678, dated March 23, 1886.

Application filed September 21, 1885. Serial No. 177,651. (No model.)

To all whom it may concern:

Be it known that I, HARRY SULLIVANT, a citizen of the United States, residing at Archie, in the county of Vermilion and State of Illinois, have invented an Improved Tile-Ditching Machine, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 represents a longitudinal sectional view of a tile-ditching machine embodying my improvements. Fig. 2 represents a plan view with the feeding-table removed.

My invention relates to ditching-machines for laying tile and telegraph-wires; and it consists in a mechanism for cutting the ditch and removing the dirt; in means for automatically feeding the tile or wire to the ditch; in mechanism for covering or leaving uncovered the tile in the ditch; in mechanism attached to the machine for accurately grading the ground in the path of the machine, and in the combination of devices hereinafter described and claimed.

To enable others skilled in the art to make and use my invention, I will now describe the manner in which I have carried it out.

In the said drawings, A represents a suitable frame, mounted upon axles B, which carry the supporting-wheels C. Upon the rear wheels are secured the driving gear-wheels D, which communicate their motion through a drive-chain to pinions E, mounted upon independent shafts F, passing through and projecting from each side of the frame or body of the machine.

Near the front end of the frame, and passing transversely across the same, is a shaft, *a*, upon which are mounted the levers G, the long arms of said levers being attached to cranks *b* upon the inner ends of the independent shafts F by means of connecting-rods H, as shown in Fig. 1. The short arms of the levers G are attached to the upper ends of inclined saw-blades I, the lower ends of said blades being slotted to engage the lower end of an oppositely-inclined and adjustable bar, K, as I shall hereinafter describe.

It will be noticed the saw-blades I (see Fig. 2) approach each other at their lower ends and bear against small anti-friction rollers 2, and the object of these saws is to cut both walls of the ditch with as little friction as possible, the dirt to be removed being forced up the inclined bar K, before referred to. The cranks *b*, before described, are placed at different angles to each other, and by the movement of the driving mechanism impart a reciprocating and alternating movement to these saws.

Upon each end of the front axle is securely bolted a standard, *c*, which carries a plow, L, adapted to remove any obstruction and to level the ground in advance of the saw-blades, and by partially encircling the flange or tread of the front supporting-wheels cause the obstruction or removed dirt to be deposited outside of the path of the machine.

Securely attached to the upper surface of the frame A is a support, *d*, for the inclined grooved feeding-table, the lower end of which is in direct communication with the discharge-chute which conveys the tiles to the ditch. This chute M is mounted upon a rock-shaft, *e*, journaled between the inner sides of the frame, and is provided with a loop or pivot connection for the lower end of the feed-table, the latter having a hook or suitable equivalent device for engaging or disengaging the loop, as shown in Fig. 1.

The inclined bar K has at its lower end a facing plate or cutter, N, and the saw-blades are attached to this plate by bolts *f*, which work in the slots in said blades. The cutter N removes the dirt from the ditch, and a plow, O, secured to the frame A, and having a double mold-board, discharges the dirt upon each side of the ditch.

Passing transversely across and suitably journaled in the machine are flanged rollers *g h*, which furnish bearings for the inclined bar K, the upper end of the inclined bar being provided with a rack, P. A shaft, Q, journaled in a bearing-block, *l*, carries a worm, *m*, which engages the rack and causes the point of the bar K to be adjusted to different depths, the said shaft Q being operated by a hand-wheel secured to its top. The bar K is cut away near its center, and through the slot thus formed passes the chute which discharges the tile.

The rear axle is provided with eyebolts or loops *n*, to which are loosely connected suitable plow-beams, R, having a cross bar, *p*, and carrying the covering-plows S, one working

slightly in advance of the other, and which fill the ditch and cover the tiles with the dirt that has been removed by the plow O. If it should be desired to leave the drain exposed after the tiles are laid, this may be accomplished by a lever, *r*, pivoted to the rear of the frame, and engaging the cross-bar *p*, so as to lift the plows S off the ground.

In the practical operation of my machine, I place at a suitable point in the field an adjustable stake, (not shown,) and pivotally secure to standards *t*, attached to the bar K, a globe or other sight, U, by means of which the operator readily governs the grade and ascertains the condition of the ground in which the drain is to be laid.

The machine, as herein described, may be drawn by any suitable power; but I prefer capstan-power, and may be used in laying telegraph or other wires as well as drain-pipe.

I am aware a tile-ditching machine having a feeding-table, a discharge-chute, and suitable plows for opening and covering the ditch has been used, and such I therefore do not broadly claim as my invention; but

What I do claim, and desire to secure by Letters Patent, is—

1. In a tile-ditching machine, the frame A, independent shafts F, and suitable driving mechanism, in combination with reciprocating saw-blades, the independent levers G, to the short arms of which the blades are secured, and a connection between the shafts F and levers G, whereby the saw-blades move in opposite directions, substantially as described.

2. In a tile-ditching machine, the frame A, gears D, the drive-chain, and the pinions E, in combination with the independent shafts, the connecting-rods H, levers for operating the saw-blades, and an adjustable bar, K, to which the lower ends of the saws are attached, substantially as described.

3. In a tile-ditching machine, the frame, the driving mechanism, and the independent shafts having cranks set at different angles, in combination with the connecting-rod H, the transverse shaft F, and levers fulcrumed upon the shaft and operated by the driving mechanism to cause the saw-blades to move in different directions, substantially as herein described.

4. In a tile-ditching machine, the frame having a support, *d*, in combination with an inclined feeding-table, a discharge-chute connected thereto, and a rock-shaft, *e*, upon which the discharge-chute is mounted, substantially as herein described.

5. In a tile-ditching machine, the frame, the saw-blades, and mechanism for operating the same, in combination with an adjustable bar, K, having a cutter or plate, N, at its lower end, the said cutter being secured to and between the saw-blades and adapted to remove the dirt after the walls of the ditch have been cut by the blades, substantially as herein described.

6. In a tile-ditching machine, the frame, the saw-blades, and mechanism for operating the same, in combination with an inclined bar, K, a plow, O, secured to the frame and adapted to discharge the earth upon each side of the ditch, a rack, P, upon said bar, suitable supporting-rollers, *g h*, a shaft, Q, a worm, *m*, and a hand-wheel for operating the worm to raise or lower the lower point of the bar, substantially as herein described.

7. In a tile-ditching machine, the frame and the rear axle having eyebolts or loops, in combination with the plow-beams R, the oppositely-placed plows S, located one in advance of the other, and a lever, *r*, whereby the plows may be lifted from the ground, substantially as herein described.

8. A tile-ditching machine comprising a frame, a feed-table, a discharge-chute, suitable saw-blades for opening the ditch, an adjustable bar and mechanism for operating the same, grading-plows upon the front of the machine, and covering-plows at the rear, substantially as herein described.

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Witnesses:
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