G. E. STEWART.
Ditching Machine.

No. 202,200. Patented April 9, 1878.

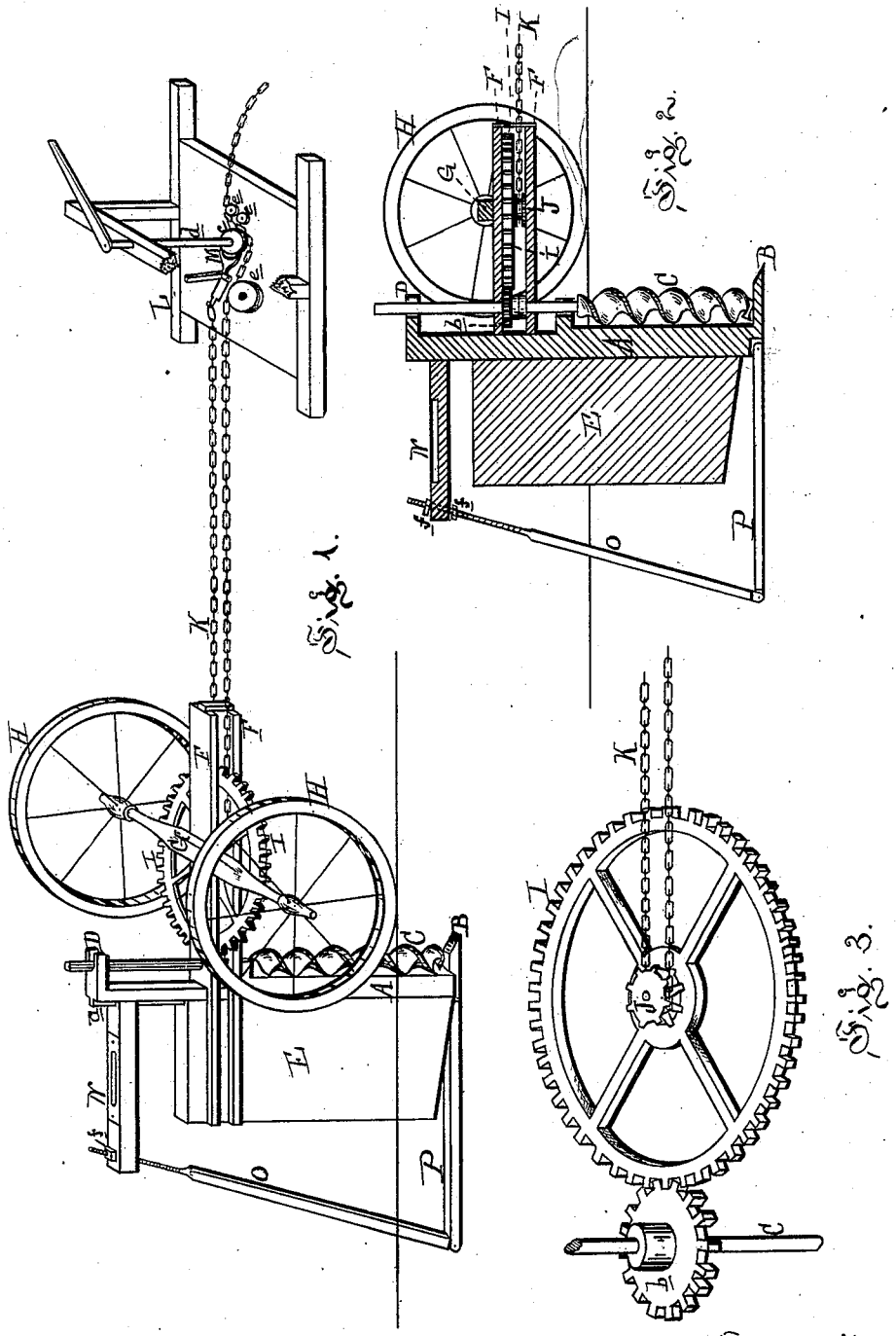

Fig. 1.

Fig. 2.

Fig. 3.

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UNITED STATES PATENT OFFICE.

GEORGE E. STEWART, OF COUNTY LINE, MICHIGAN.

IMPROVEMENT IN DITCHING-MACHINES.

Specification forming part of Letters Patent No. **202,200**, dated April 9, 1878; application filed October 23, 1877.

To all whom it may concern:

Be it known that I, GEORGE E. STEWART, of County Line, in the county of Genesee and State of Michigan, have invented a new and useful Improvement in Ditching-Machines; and I do declare that the following is a true and accurate description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, and being a part of this specification.

The nature of this invention relates to improvements in the construction of ditching-machines, so constructed that the power applied to advance the machine compels it to open the ditch by means of an earth-auger and deposit the earth withdrawn at the surface. The machine is also provided with devices by means of which, after a proper survey and staking out have been had, the grade of the bottom of the ditch is determined in conformity with said survey.

The invention consists in the construction and combination of the various devices necessary to produce these results, as more fully hereinafter set forth.

Figure 1 is a perspective view of my device in operation, the horizontal lines extending beyond the device and immediately under the traction-wheels, representing the surface of the earth. Fig. 2 is a vertical section through the longitudinal center. Fig. 3 is a perspective of the reverse side of the main driving-wheel, showing the spur-wheel which is actuated by the chain, by means of which and the windlass the machine is advanced and operated.

In the drawing, A represents a vertical standard, concave on the lower portion of its front side, and terminating in a foot, B, sharpened upon its free end, and into which is stepped the lower end of the auger C, while the upper end of said standard is provided with projecting bearings D, within which rotates the shank of the auger, the working part of which is partially inclosed by the concave surface hereinbefore mentioned.

The reverse side of this standard is provided with a flange, *a*, upon which the sliding frame E has a vertical motion. Two bars, F, are secured to the slide E. These bars embrace and project in front of the standard, and in the space between them is located the driving mechanism by means of which motion is communicated to the auger. In front of the standard, and to one of these bars, is suitably secured the axle G, upon the outer ends of which are placed the bearing-wheels H.

The mechanism by means of which power is applied to the auger consists of a pinion, *b*, sleeved on the shank of the auger, and suitably secured thereto by the usual device of a feather and slot, by means of which the pinion not only gives motion to the auger, but also of the necessary vertical play of the frame between the projecting bars of which the pinion is placed.

A main driving-wheel, I, suitably journaled between said bars, engages with and gives motion to said pinion. To the under side of this driving-wheel I there is secured a sprocket-wheel, J, such as is usually employed where chain-gearing is used.

A chain, K, one end of which is removably secured to the capstan L, passes around said sprocket-wheel J, while its free end is led forward, and engages with a similar wheel, *c*, upon the shaft *d* of the capstan, and suitable guide and bearing pulleys *e* compel such engagement. The capstan being staked at a suitable distance from the boring-machine and on the line of the proposed excavation, a forward motion of the capstan sweep and shaft, by means of the chain and its connections, as described, causes the machine to be advanced, and at the same time gives motion to the auger.

A suitable clutch, M, properly sleeved upon the capstan-shaft in case of obstruction to the auger, may be used, if desired, to stop the motion of the chain and its connections.

Near the top of the standard A, and projecting in the rear thereof, is secured a spirit or water level, N, through the rear end of which passes the adjusting-rod O, the upper end of which is suitably threaded and provided with adjusting-nuts *f*. The lower end of this rod is pivoted to the outer end of the adjustable extension-foot P, the opposite end of which is pivoted to the bottom of the standard A.

The vertical adjustability of the frame upon the standard is for the purpose of allowing the bearing-wheels to pass over inequalities of

surface without raising or lowering the machine itself, thereby allowing the machine to make the bottom of the trench of a uniform grade.

What I claim as my invention is—

1. In a ditching-machine, the combination, with the frame, of a long auger, C, of uniform size throughout its length, and adapted to excavate the earth and raise the same to the surface, substantially as described.

2. In a ditching-machine, the combination, with the frame, of the cutting-foot B and the long auger C, substantially as described and shown.

3. In a ditching-machine, and in combination with the standard A, the spirit-level N, adjusting-rod O, and adjustable extension-foot P, arranged to operate substantially as and for the purposes set forth.

4. In a ditching-machine, and in combination with the standard A, the frame consisting of the slide E and bars F, provided with suitable bearing-surfaces, and carrying the driving-wheel I, when arranged to operate substantially as and for the purposes herein set forth.

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