(No Model.)

C. SHELMIDINE.

DITCHING MACHINE.

No. 306,870. Patented Oct. 21, 1884.

Fig. 1.

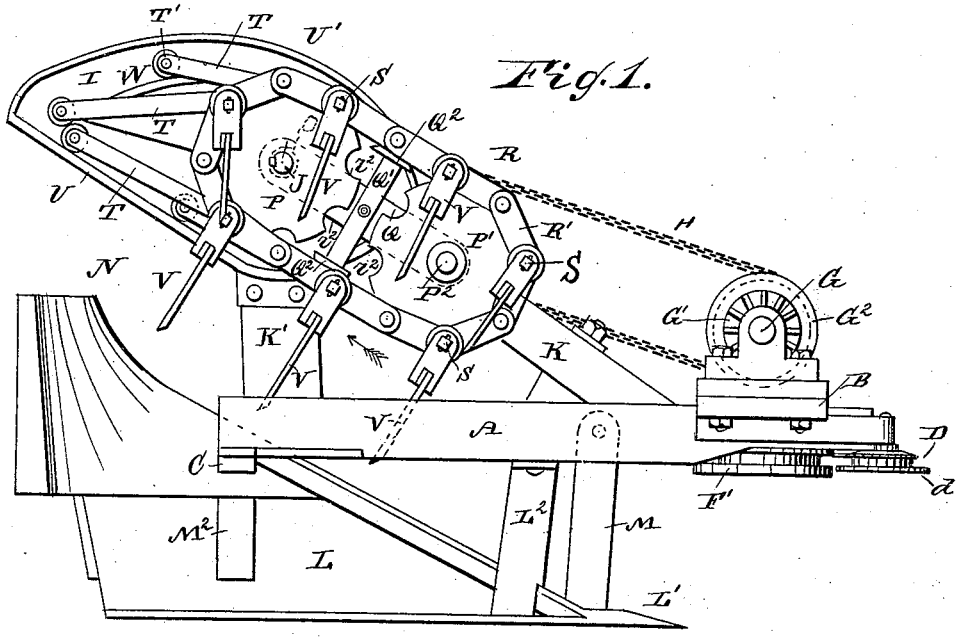


Fig. 2.

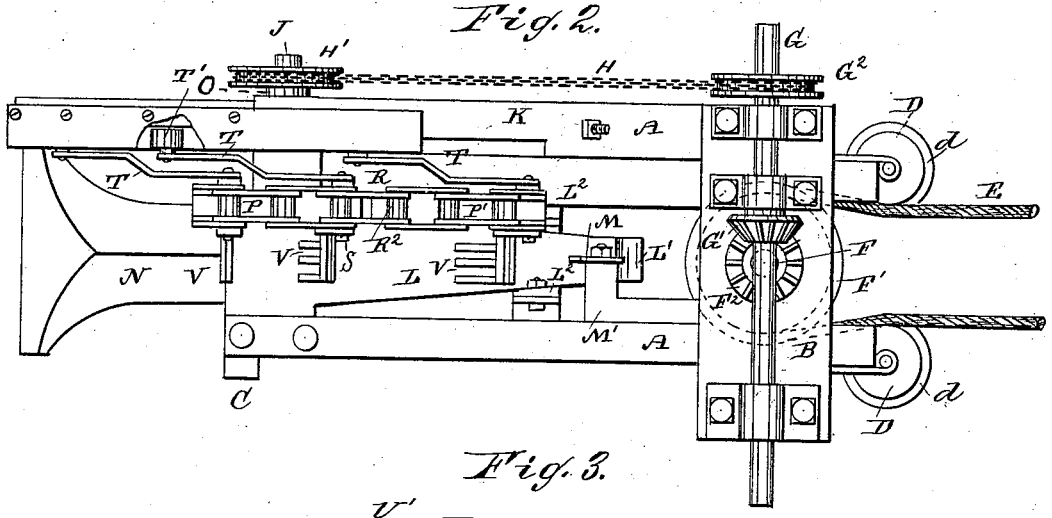
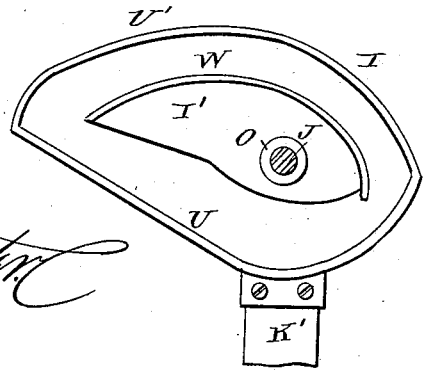


Fig. 3.



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UNITED STATES PATENT OFFICE.

CHARLES SHELMIDINE, OF BOONE, IOWA.

DITCHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 306,870, dated October 21, 1884.

Application filed April 2, 1884. (No model.)

To all whom it may concern:

Be it known that I, CHARLES SHELMIDINE, of Boone, in the county of Boone and State of Iowa, have invented a new and Improved Ditching-Machine, of which the following is a full, clear, and exact description.

The object of my invention is to provide a new and improved ditching-machine which is so constructed that it automatically raises the earth out of the ditch that the machine cuts and deposits it on the surface of the ground at the sides of the ditch.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a side view of my improved ditching-machine. Fig. 2 is a plan view of the same, parts being broken out. Fig. 3 is a side view of the cam-track for governing the forks for raising the earth.

Two horizontal beams, A, are united at their front ends by a cross-bar, B, and at their rear ends by a metal cross-bar, C.

On the front end of each beam A a roller, D, is journaled to revolve in a horizontal plane, the upper surfaces of the said rollers being below the bottom surface of the beams.

The rollers are grooved and the bottom flanges, *d*, of the rollers project farther than the top flanges, so that the cable E running on the rollers cannot drop.

In the cross-bar B a short vertical shaft, F, is journaled, on the lower end of which is mounted a grooved pulley, F′, or in place of the same a sprocket-wheel can be used, around which pulley the chain or cable E passes.

On the upper end of the shaft F a bevel-pinion, F^2, is mounted which engages with the bevel-pinion G′, mounted on a horizontal shaft, G, journaled in suitable bearings on the ends of the cross-bar B, which shaft G is parallel with the longitudinal axis of the said cross-bar. The shaft G projects some distance beyond the ends of the cross-bar B, and a short distance from one end of the said shaft G a sprocket-wheel or grooved pulley, G^2, is mounted, over which a driving chain or cable, H, passes, which also passes over a grooved pulley or sprocket-wheel, H′, mounted on one end of a horizontal transverse shaft, J, journaled in the upper end of an upwardly-inclined beam, K, secured to one of the side bars, A, which inclined beam is supported and braced by an upright beam, K′, secured to the inner end of the corresponding side bar, A.

Between and below the side bars, A, a runner, L, is held, the bottom edge of which is horizontal, and is provided with a steel or other runner-strip provided at its front with a tapered shoe or point, L′. The top face of the said runner L is inclined upward from the front end of the runner to the rear ends of the side bars, A, and the said top of the runner increases in width from the lower front end to the rear ends of the side bars, A. The inclined top of the runner is provided with a covering-plate of steel or iron. The front end of the runner is supported from the side bars, A, by hangers L^2, secured to the sides of the runner and to the inner surfaces of the side bars. The said hangers have sharp front edges and serve as cutters. The vertical cutting-blade M has its lower end secured on the front of the runner directly behind the beveled shoe L′, and the upper end of the blade M is secured to an arm, M′, projecting from one of the side bars, A. The rear end of the runner is braced and supported from the rear ends of the side bars, A, by L-shaped bars M^2. On the rear part of the runner—that is, on the part behind the upper end of the inclined front edge—a double mold-board, N, is secured, which mold-board gradually increases in width from the front toward the rear end, the front edge of the said double mold-board forming a continuation of the said top edge of the runner L.

In the upper end of the inclined arm K a transverse tubular shaft, O, is held, through which the shaft J passes, the tubular shaft O being held rigidly in the upper end of the beam K. A notched wheel, P, is mounted on the inner end of the shaft J, and a like notched wheel, P′, is mounted on a shaft, P^2, projecting from an arm, Q, secured to the inner end of the tubular shaft O, and projecting down from the same about parallel with the inclined beam K.

Between the wheels P and P′ an arm, Q′, is

secured on the arm or bar Q at right angles to the arm or bar Q, and on each end of the arm Q′ a plate, Q^2, is secured.

Around the wheels P and P′ an endless chain, R, passes, which is formed of links R′, having their ends pivoted on short tubes R^2, the said tubes R^2 being placed such a distance apart, and the links R′ being of such length, that the said pivots or tubes R^2 can pass into the notches r^2 of the said wheels P and P′. Between the wheels the strands of the chain are held separated by the bar Q′ and its end plates, Q^2. In every other tubular pivot R^2 a shaft, S, is journaled, to the inner end of each of which shafts an arm, T, is secured rigidly, and to the outer end of each shaft S a fork, V, is secured rigidly, the arms T being at right angles to the forks V.

To the free end of each arm T a roller, T′, is pivoted, which rollers are adapted to run on a segmental track, W, and on an inclined and curved track, U. The track U is secured to and projects laterally from the bottom edge of a plate, I, fastened on the upper end of the inclined beam K and the standard K′, which plate I is provided on its upper segmental edge with a flange, U′, projecting in the same direction as the track U. The segmental track W is secured to the curved edge of a block, I′, fastened on the plate I, whereby a track-groove will be formed around the block I′.

The operation is as follows: The machine can be propelled forward in different ways, either by means of cables or by means of horses, which pull the machine directly. One end of the cable E is secured to a stump or other strong fixed object, and the other end is secured to a windlass-drum, the rope is wound on the windlass-drum, the machine is driven forward, and at the same time the pulley F′ is revolved, and by means of the bevel-gearing F^2 G′ the shaft G is revolved, and revolves the other parts in a manner that will be described hereinafter; or driving-wheels can be keyed on the ends of the shaft G, the said driving-wheels resting on the ground at the sides of the ditch, and horses can be hitched to the machine for pulling the same. In both cases the shaft G will be revolved. If the machine is pulled forward, the shoe L′ of the runner L digs down into the earth until the under side of the mold-board N rests on the earth. The shoe L′ loosens the earth as the plow moves forward, the loosened earth slides up the inclined front edge of the runner L, the shaft G revolves the shaft J by means of the chain H, and thereby the endless chain R will be moved in the direction indicated by the arrow in Fig. 1. The chain moves the bottom forks, V, upward and the top forks downward. As the forks move upward they carry the earth up the inclined top edge of the runner L to the double mold-board N, and then the earth slides down the two sides of the mold-board to the ground at the sides of the ditch. The rollers T′ of the arms T run over the track W when the forks move downward, and run up the track U when the forks move upward. When the forks pass from the lower wheel, P′, down to the inclined edge of the runner, they are about at right angles to the inclined edge of the runner, and remain in this position until they arrive at the upper end of the mold-board. During this time the rollers run up the track U. When the forks arrive at the upper end of the mold-board, the rollers T′ run up the segmental track W, and thus change their inclination, thereby also changing the inclination of the forks, which are then in a vertical position, so that all the earth, &c., can drop from the same. As the rollers T′ pass over the inclined track U, they swing the forks V in such a position that they will be about at right angles to the inclined top edge of the runner, in which position the forks remain until they again arrive at the upper end of the mold-board.

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

1. The combination, in a ditching-machine, of a series of carrier-forks the shafts of which are pivotally secured to an endless chain, arms firmly secured to the ends of the shafts of the forks, and cam-tracks within which the free ends of the arms are held at all times for firmly holding and governing the inclination of the forks, with the ditch-cutting device below said chain and forks, substantially as set forth.

2. A ditching-machine constructed with a runner having an inclined front face, and with an endless chain provided with forks for carrying the loosened earth up the inclined runner, which forks are connected with arms running on cam-tracks for governing their inclination, substantially as herein shown and described.

3. In a ditching-machine, the combination, with a frame carrying the digging or ditching apparatus, of a transverse shaft journaled in the front of the machine, a series of forks secured on an endless chain, means for operating the forks from the front transverse shaft, a pulley held on the frame of the machine, around which pulley a cable or chain is to be passed, and of means for operating the transverse shaft from the said pulley, substantially as herein shown and described.

4. In a ditching-machine, the combination, with a frame carrying the digging or ditching apparatus, of a series of forks secured on an endless chain, the transverse shaft G, means for operating the endless forks carrying chain from the said shaft, the bevel cog-wheel G′ on the shaft G, the shaft F, and the cross-bar B in the front of the frame, the bevel-pinion F^2 on the said shaft F, the grooved pulley F′ on the said shaft, and of rollers D, pivoted to revolve in a horizontal plane on the front ends of the frame, substantially as herein shown and described.

5. The combination, with a ditching-machine, of a horizontal pulley, F′, pivoted on the free end of the same, the pulleys D, piv-

oted on the front end of the machine, and adapted to support a cable passed around the pulley F′, a digging or ditching apparatus, and means for raising the earth, which means are operated by suitable intermediate gearing and shafting from the pulley F′, substantially as herein shown and described.

6. The combination, with a ditching-machine, of a digging or ditching apparatus, the sprocket-wheels P and P′, the endless chain R, passed around the said wheels, forks secured on the chain, and the cross-piece Q′, arranged between the two wheels, substantially as herein shown and described.

7. In a ditching-machine, the combination, with a ditching device, of notched wheels P and P′, the chain R, passing around the same, the shafts S, passing through the pivots of the chain, forks V, secured on the shafts S at one end, arms T, secured to the shafts at the opposite ends, which arms T are preferably at right angles to the forks, and of cam-tracks for governing the position of the forks, substantially as herein shown and described.

8. In a digging-machine, the combination, with a digging or ditching device, of the notched wheels P and P′, the endless chain R, passed over them, the shafts S, the forks V, and the arms T on the ends of the shafts S, the rollers T′ on the arms T, and the cam-tracks U and W, on which the rollers T′ run, substantially as herein shown and described.

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Witnesses:

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