(No Model.)

2 Sheets—Sheet 1.

# P. AHNLUND.

## DITCHING MACHINE.

No. 322,771. Patented July 21, 1885.

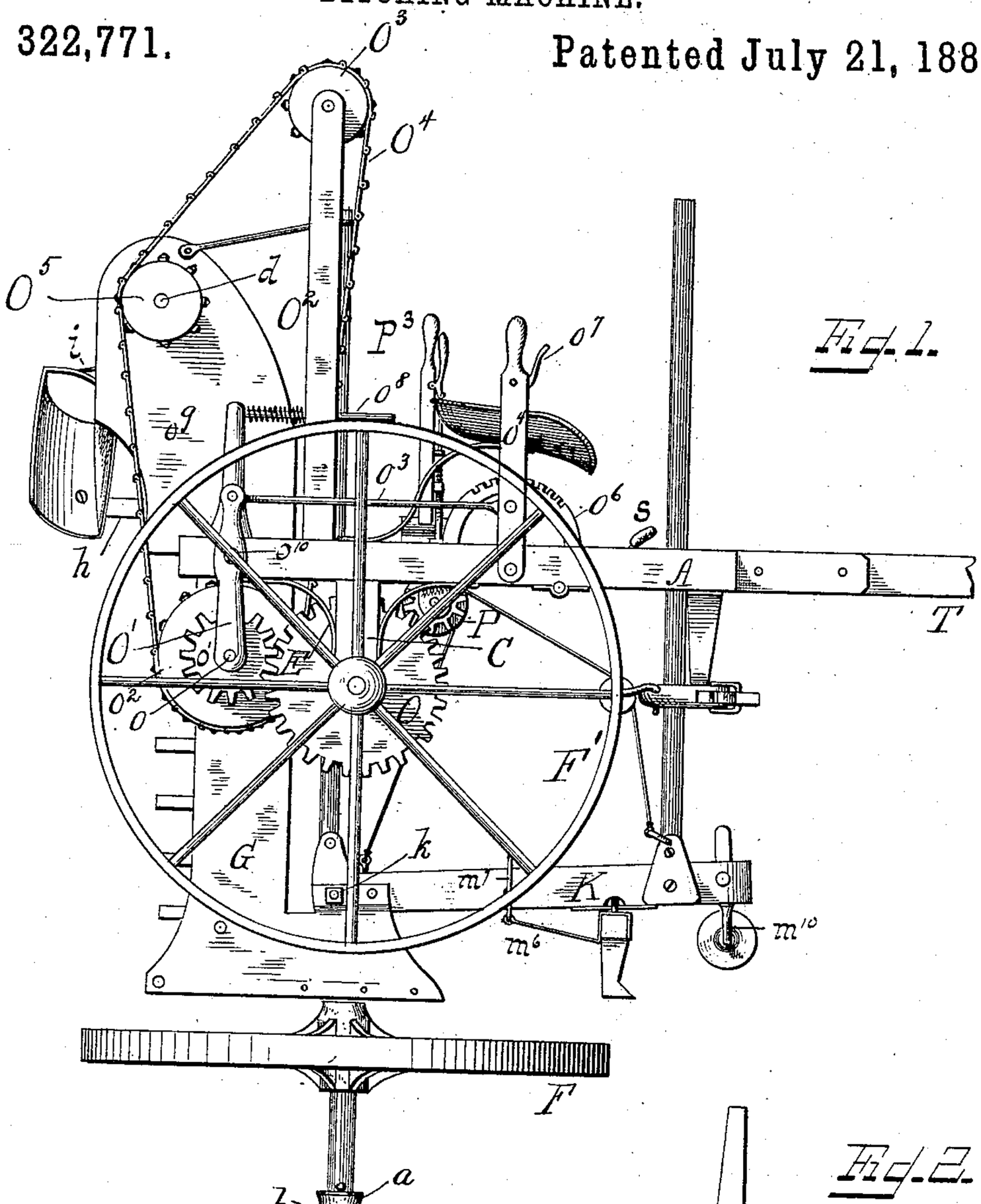

Fig. 1.

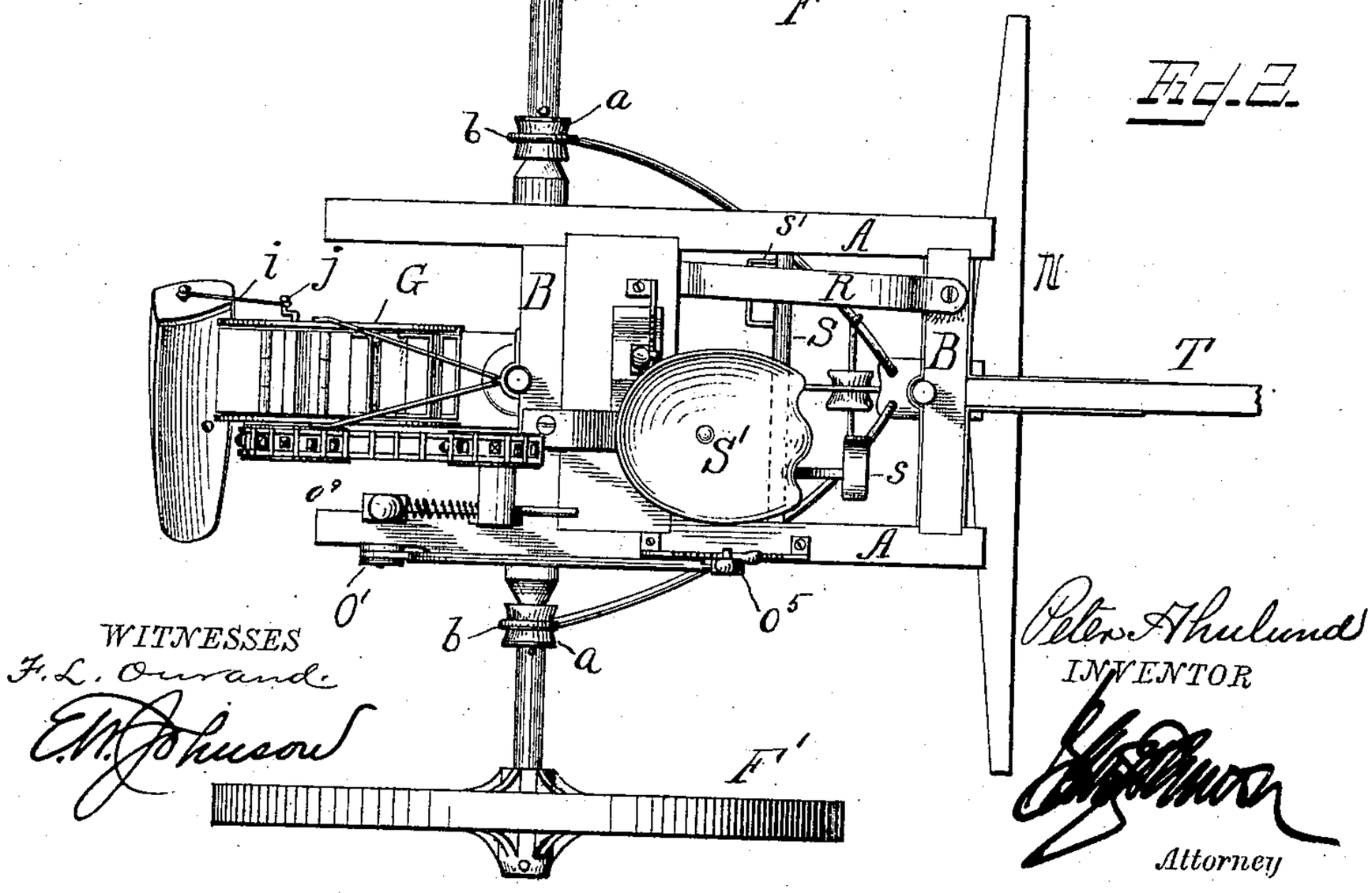

Fig. 2.

WITNESSES
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2 Sheets—Sheet 2.

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## DITCHING MACHINE.

No. 322,771. Patented July 21, 1885.

Fig. 3.

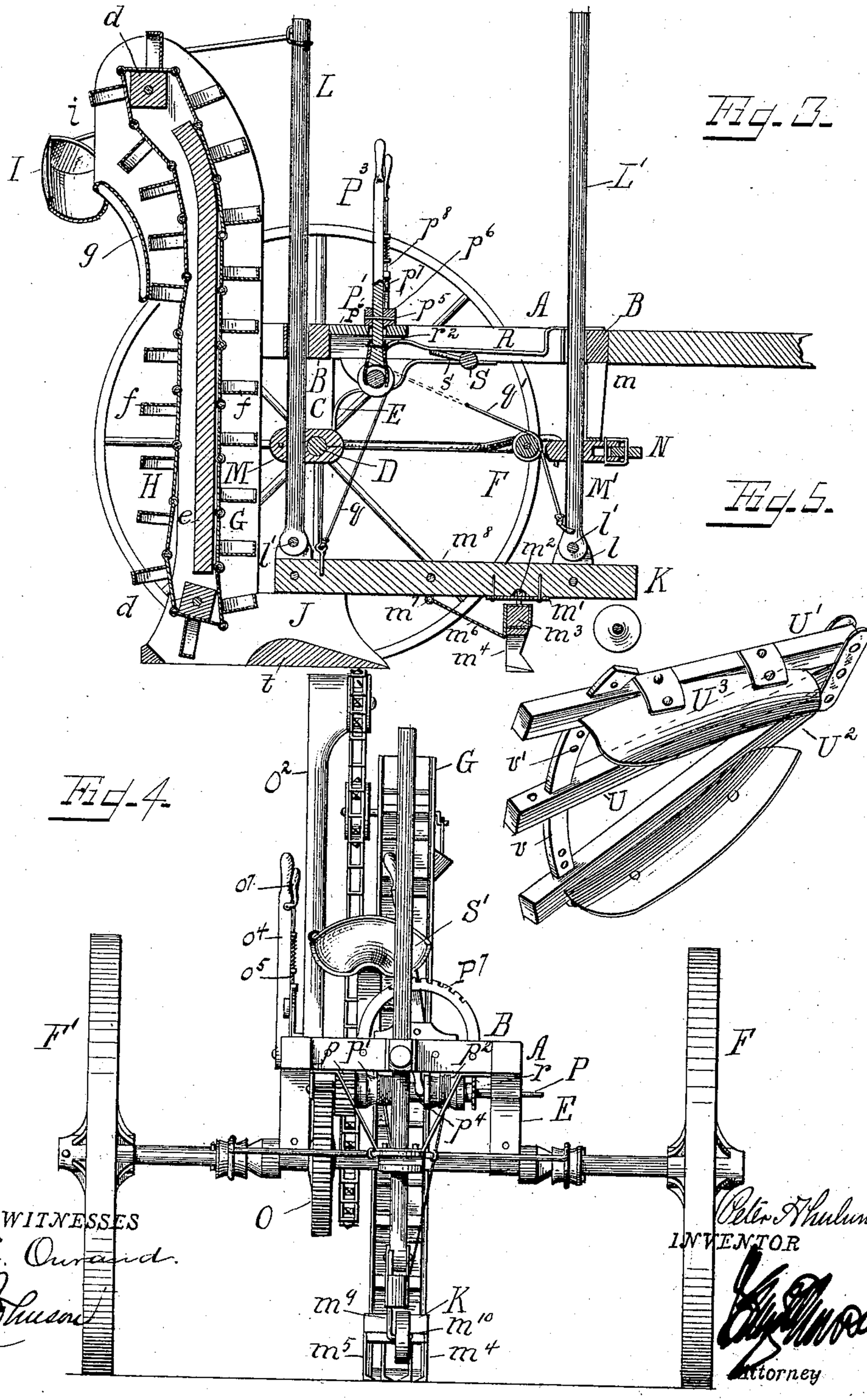


Fig. 4.

# UNITED STATES PATENT OFFICE.

PETER AHNLUND, OF WEST UNITY, OHIO.

## DITCHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 322,771, dated July 21, 1885.

Application filed April 7, 1884. (No model.)

*To all whom it may concern:*

Be it known that I, PETER AHNLUND, a citizen of the United States of America, residing at West Unity, in the county of Williams and State of Ohio, have invented certain new and useful Improvements in Ditching-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as 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 letters or figures of reference marked thereon, which form a part of this specification.

My invention relates to ditching-machines; and it consists in the improved construction and combination of parts hereinafter fully described and set forth.

In the accompanying drawings, forming part of this specification, Figure 1 is a side elevation of a ditching-machine constructed in accordance with my invention. Fig. 2 is a plan view of Fig. 1. Fig. 3 is a longitudinal section. Fig. 4 is a front elevation, and Fig. 5 is a detailed perspective view of an attachment.

The supporting-frame of the machine consists of side bars, A, connected together by means of bars B. Arms C depend from the said supporting-frame, and are supported upon and secured to the axle D by means of metallic straps E, which embrace said axle D, as shown in Figs. 3 and 4, and are secured to the front and rear sides of said arms C.

Carrying-wheels F F′ are mounted upon the ends of the axle D, the wheel F turning loosely thereon, while the wheel F′ is keyed so as to turn therewith.

At the rear of the supporting-frame is located an excavator consisting of the side sections, G, which are curved at their upper portion, as shown in Figs. 1 and 3. Said sections G are connected together by shafts *d* and a vertical partition, *e*. A link-belt, H, passes around said shafts *d*, and is provided with a series of excavator-buckets, *f*. A guard or shield, *g*, is provided at the rear of the curved portion of the excavator, and in proximity thereto is an inclined delivery-spout, I, which is centrally supported by an arm, *h*, while a connecting-rod, *i*, connects the rear of the delivery-spout with the crank end *j* of the upper shaft, *d*.

The lower extremities of the sides G of the excavator terminate in a shoe or scoop, J. The said shoe J is connected by bolts *k* to the rear end of a longitudinal beam, K, arranged centrally, as seen in Figs. 3 and 4. The said beam K is pivotally secured to the lower ends of vertical rods L L′ by means of ears *l* and pivot-bolts *l′*, the lower end of said vertical rods L L′ being enlarged and flattened to adapt them for such attachment.

The rod L plays vertically through a perforation therefor formed in a collar, M, coupled on the shaft D, the rod L′ playing through a perforated block, M′, supported by straps *m* depending from the front bar, B.

A whiffletree, N, is pivotally secured to the front portion of the block M′.

The beam K has attached on its under side, near its forward end, a plate, *m′*, which engages a bail, $m^2$, on the upper side of a stub-bar, $m^3$, carrying a series of depending cutters or blades, $m^4$ $m^5$. The lower portions of the blades $m^4$ $m^5$ are turned inward, as shown most clearly in Fig. 4.

A strap, $m^6$, secured to the rear portion of the stub-bar $m^3$, is secured to a yoke, $m^7$, which embraces the beam K, and is held thereto by a pivotal connection, $m^8$.

A bar, $m^9$, depending from the front portion of the beam K, carries a guide-roller, $m^{10}$, at its lower end.

A gear-wheel, O, is keyed on the shaft D at one side of the center thereof.

An arm, O′, is centrally pivoted at the rear end of one of the side beams A and carries a stub-shaft, *o*, at its lower end, upon which is mounted a pinion, *o′*, and a sprocket-wheel $o^2$. A connecting-rod, $o^3$, connects the upper portion of the arm O′ with a lever, $o^4$, pivoted at its lower end to the outer side of the beam A, and carrying a spring-pawl, $o^5$, to engage with a segmental rack secured on the upper side of said beam A. The said spring-pawl $o^5$ is manipulated by a thumb-plate, $o^7$, secured to the lever $o^4$ and operating in the usual manner to disengage the pawl.

A standard, $O^2$, is secured at its lower end to the inner rear portion of the said beam A, and is perforated at or about the center for

the passage of a rod, $o^8$, secured at its rear end to a bar, $o^9$, connected at its lower end to the pivoted lever O′ by a pivot-bolt, $o^{10}$, which rigidly connects said bar and lever together and turns in its bearings in the beam A. An expanding spring embraces said rod $o^8$, and bears at its respective ends against the bar $o^9$ and the standard $O^2$. The said standard $O^2$ has journaled at its upper extremity a sprocket-wheel, $O^3$, around which passes a drive-chain, $O^4$, which also engages the teeth of a sprocket-wheel, $O^5$, keyed on the end of the upper conveyer-shaft, $d$, and around the sprocket-wheel $o^2$.

A shaft, P, is journaled centrally on the under side of the bars A, so as to play transversely in bearings, and said shaft P has keyed thereon a pinion, $p$, and two drums, $p'$ $p^2$, separated by a reduced portion, $p^4$.

A platform, P′, arranged in proximity to the rear bar, B, has a slot through which extends the lower portion of a lever, $P^3$, centrally pivoted by a pin, $p^5$, passing through said lever and through bearing-blocks $p^6$ secured on said platform. The lower end of said lever $P^3$ is bifurcated to embrace the reduced portions $p^4$ of the shaft P. A segmental rack, $p^7$, secured on the upper side of the platform is adapted to engage a spring-pawl, $p^8$, arranged on the lever $p^3$, so as to lock said lever at any point of its pivotal movement.

Chains or cables $q$ $q'$ are connected, respectively, to the rear end of the beam K and drum $p'$ and to the lower portion of the vertical rod L′ and drum $p^2$. A ratchet-wheel, $r$, is also mounted on the shaft P, and is adapted to have its teeth engage the bent end $r^2$ of a spring-plate, R, secured at its forward end to the front bar, B.

A rock-shaft, S, parallel with the shaft P, is journaled in bearings on the under side of the bars A, and has extending therefrom an inclined pedal, $s$, which is located immediately beneath the operator's seat S′. A projection or bail, $s'$, on said shaft S is adapted when said shaft S is rocked in its bearings to come in contact with the spring-plate R and lift the bent end out of engagement with the ratchet-wheel $r$.

The shoe J has arranged in its forward portion a section, $t$, which inclines toward the front of the shoe, as shown in Fig. 3, and terminates a short distance in advance of the sweep of the buckets $f$ as they pass around the lower shaft, $d$.

A tongue, T, extends centrally from the front bar, B.

As the machine moves forward the cutters $m^4$ $m^5$ cut the earth to the extent of their depth, which earth is thrown inward and rearward by the bent lower portions of the said lower cutters. The shoe J, moving forward in line with the said cutting devices, the loose earth moves up the incline of the section $t$ and drops into the space in which the sweep of the buckets $f$ occurs. The said buckets $f$ take up the earth, and passing up the front side of the conveyer, carry it over the upper shaft, $d$, after which they dump it into the inclined chute I, from which it is thrown out at one side of the machine by reason of said chute being agitated by its connection with the crank $j$ by the rod $i$.

The cutters $m^4$ $m^5$, by being suspended and supported as described, may be inclined to enter the earth at any desired angle.

By disengaging the pawl $o^5$ of the lever $o^4$ from the rack $o^6$, and moving said lever forward, the lower end of the arm O′ can be moved rearward so as to effect the disengagement of the pinion $o^2$ from the gear-wheel O, and consequently arrest the operation of the excavating-belt H. By moving the lever $P^3$ upon its pivot so as to transversely shift the shaft P in its bearings and cause the pinion $p$ to engage with the gear-wheel O the drums $p'$ $p^2$ will be rapidly revolved, so that the cables $q$ $q'$ will be wound on their respective drums, and exerting a traction upon the parts to which they are connected will slide the rods L L′ in their bearings and elevate the beam K, cutting devices, excavator, and shoe out of the ditch.

Fig. 5 illustrates a device designed to be connected at its respective ends to the lower extremities of the rods L L′, in lieu of the beam K and appurtenances. The said device consists of a central bar, U, to the front end of which are pivotally connected bars U′ $U^2$. A curved plate, $u$, is centrally connected to the bar U, so that the ends of said plate play through slots therefor in the bars U′ $U^2$. A series of perforations, $u'$, in said plate permit a bolt to pass through the bars U′ $U^2$ and engage the plate to lock the said bars in position thereon.

Each bar U′ $U^2$ carries at its outer side a depending curved wing, $U^3$. The ends of the wings may be caused to approach each other by moving the bars U′ $U^2$ on the plate $u$.

In operation the portion at which the bars U′ $U^2$ are pivoted will constitute the rear of the device, and the wings $U^3$ will operate to take the earth from either side of the ditch and move it into the same for the purpose of filling the ditch, the extent to which the earth is removed being dependent upon the adjustment of the bars U′ $U^2$ on the plate $u$.

From the foregoing it will be apparent that a machine embodying my improvements is effective in operation and capable of performing the various operations incident to this class of machines, and is at all times under the complete control of the operator.

I claim—

1. The combination, in a ditching-machine, of a supporting-frame, a shaft, D, having rigidly mounted on its projecting ends the main carrying-wheels of the machine, a collar, M, secured on said shaft and vertically perforated, a longitudinal beam, K, located beneath said machine, a vertical rod, L, pivotally connected to the rear end of the said beam and playing

through the perforation in the collar M and through the supporting-frame, a block, M′, suspended from the front of the frame and vertically perforated, a second rod, L′, playing through said block and through the frame and pivotally connected at its lower end to the front of the beam K, cords or cables $q$ $q'$, connected, respectively, at or near the front and rear ends of the beam K and winding upon windlasses $p'$ $p^2$, mounted on a shaft, P, and clutch devices driven from the main axle and adapted to be thrown into and out of engagement with the said windlasses to wind the cords $q$ $q'$ thereon, and thus elevate the beam K and rods L L′ in their guide, a vertical excavating-frame connected at its lower end to the rear of the beam and at its upper end to the top of the rod L, and an endless carrier carried thereby having a series of scoops or buckets, and connections, substantially as described, for driving said endless carrier from the main axle, as and for the purpose specified.

2. The combination, in a ditching-machine, of a supporting-frame and axle journaled therein, and having at its ends the carrying-wheels, an excavating-frame adapted to play and be guided vertically and be held against lateral play with respect to said supporting-frame by the means described, an endless belt or carrier mounted upon shafts located in said excavating-frame and provided with scoops or buckets, a sprocket-wheel, $O^5$, mounted on the end of one of said shafts, a drive-chain meshing with said sprocket-wheel, a gear-wheel, O, mounted on said shaft, a sprocket-wheel, $o^2$, journaled on the lower end of a centrally-pivoted lever, O′, a gear-pinion, $o'$, also carried by said lever, the said drive-chain also meshing with said sprocket-wheel $o^2$, and an operating-lever and connections for moving the lever O′ to throw the said pinion $o'$ into and out of engagement with the pinion O, substantially as set forth.

3. The combination, in a ditching-machine, of a supporting-frame and axle journaled therein, carrying-wheels mounted on the ends of the same, a beam, K, located below said carrying-frame, rods L L′, pivotally connected to the front and rear of said beam and playing through guides, as described, a vertical excavator-frame connected to the rear of said beam and having an endless belt or carrier provided with scoops or buckets, devices, substantially as set forth, for driving said belt or carrier from the axle, windlasses $p'$ $p^2$, mounted on a shaft, B, clutching devices adapted to be thrown into and out of engagement with the main axle K and to said windlasses, and a cutting device pivoted on the end of said beam and consisting of the depending blades $m^4$ $m^5$, turned inward at their lower ends, substantially as set forth.

4. The combination, in a ditching-machine, of excavating devices, mechanism for rigidly supporting the same against lateral strain or play, mechanism, substantially as described, for elevating and driving the same, and means, as specified, adapted to be thrown into engagement with said driving mechanism for elevating the excavating devices, a beam, K, connected to the excavating devices and vertically guided, and a cutting device pivoted on the under side of said beam, and consisting of the bar $M^3$ and depending blades $m^4$ $m^5$, turned toward each other at their lower extremities, substantially as set forth.

5. The combination, in a ditching-machine, of a supporting-frame, a shaft journaled therein and having rigidly mounted on its ends the carrying-wheels, a beam, K, located beneath said supporting-frame, rods L L′, pivotally connected to said beam and vertically playing through guides, as described, a shaft, P, driven from the axle, windlasses $p'$ $p^2$, mounted on said shaft and carrying cords or cables connected to said beam K, a vertical excavator-frame connected to the end of the beam K and to the upper portion of the rod L, horizontal shaft journaled in said excavator-frame, an endless carrier passing around said shafts and provided with scoops or buckets, a sprocket-wheel located on one of said horizontal shafts and driven from the main axle by means of the sprocket-chain and sprocket and gear wheels, a chute connected to the upper end of the excavator-frame, and a rod, $i$, connecting the rear end of said chute with the crank $j$ on one of said horizontal shafts, to vibrate said chute, substantially as set forth.

6. The combination, in a ditching-machine, of a supporting-frame, a shaft journaled therein and having rigidly mounted on its ends the carrying-wheels of the machine, a beam, K, located beneath said frame, rods L L′, pivotally connected to the beam and adapted to play vertically in guides, as described, a vertical excavating-frame, an excavating device located therein, connected to the rear end of the beam and to the upper end of the rod L, and driven from the said axle, a shaft, P, provided with the drums carrying cables attached to the beam K, a pinion, $p$, mounted on said drum-shaft, a gear-wheel located on the axle, and means for throwing said pinion into and out of engagement with said gear-wheel, substantially as set forth.

7. The combination, in a ditching-machine, of a device for moving the dirt into a ditch, the same being provided with wings $U^3$ secured to bars U′ $U^2$, adjustable upon a plate, $u'$, substantially as and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

PETER AHNLUND.

Witnesses:

PETER BOOLIN,

WILLIAM REAL.