

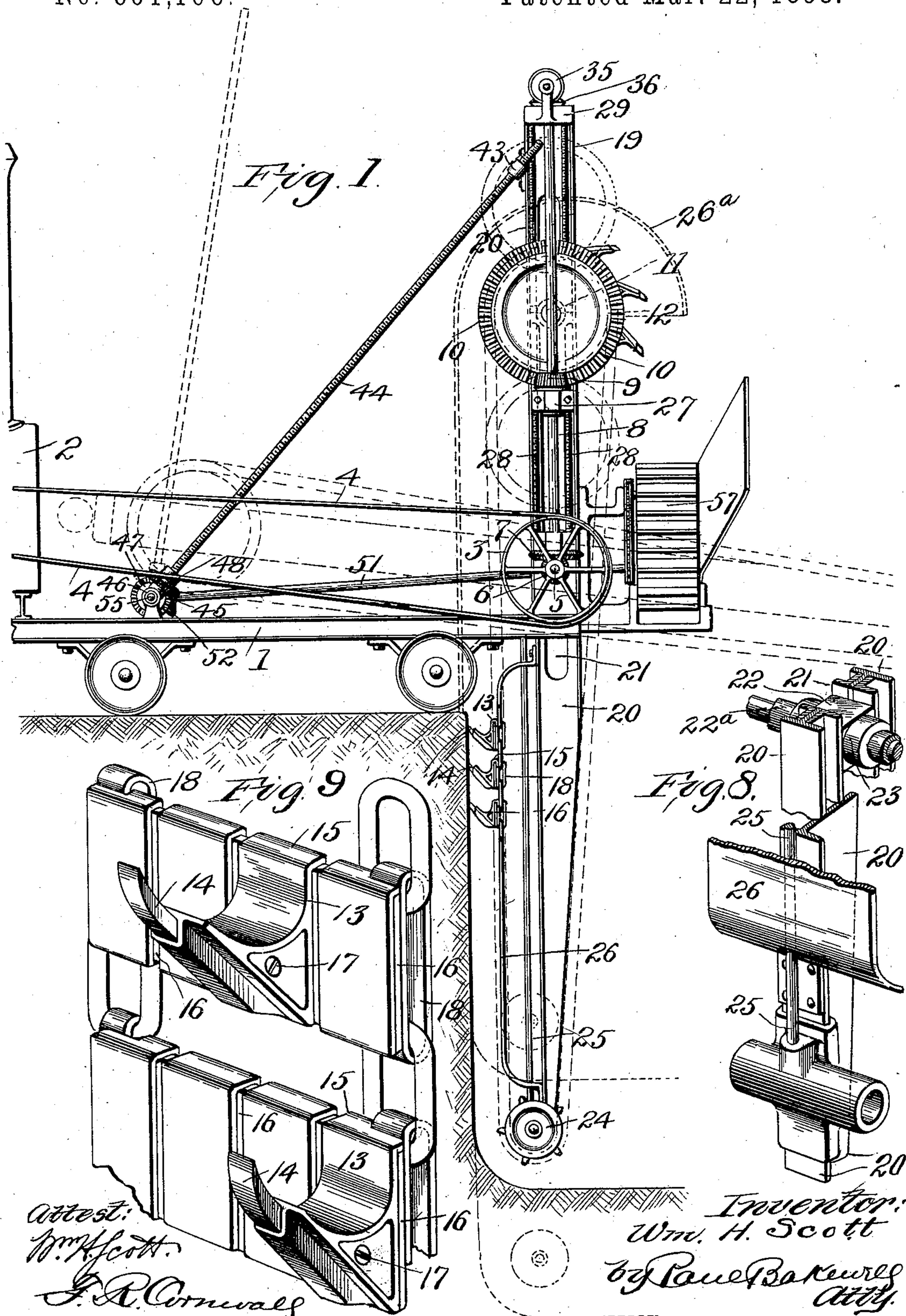
(No Model.)

3 Sheets—Sheet 1.

W. H. SCOTT.
DITCHING MACHINE.

No. 601,106.

Patented Mar. 22, 1898.



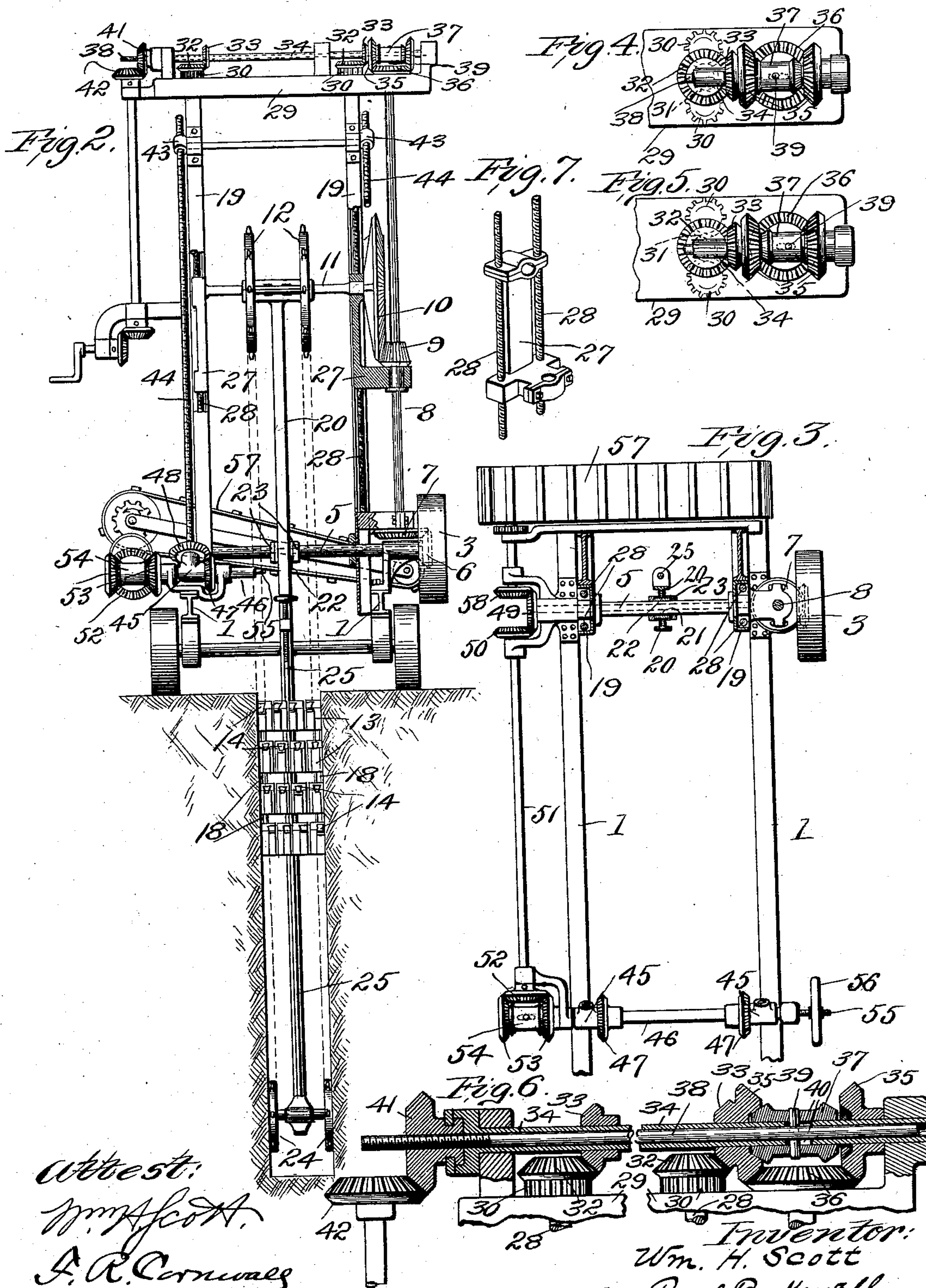
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Witness:
Wm. H. Scott
J. R. Cornwell

Inventor:
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by Paul Bakewell
att'y.

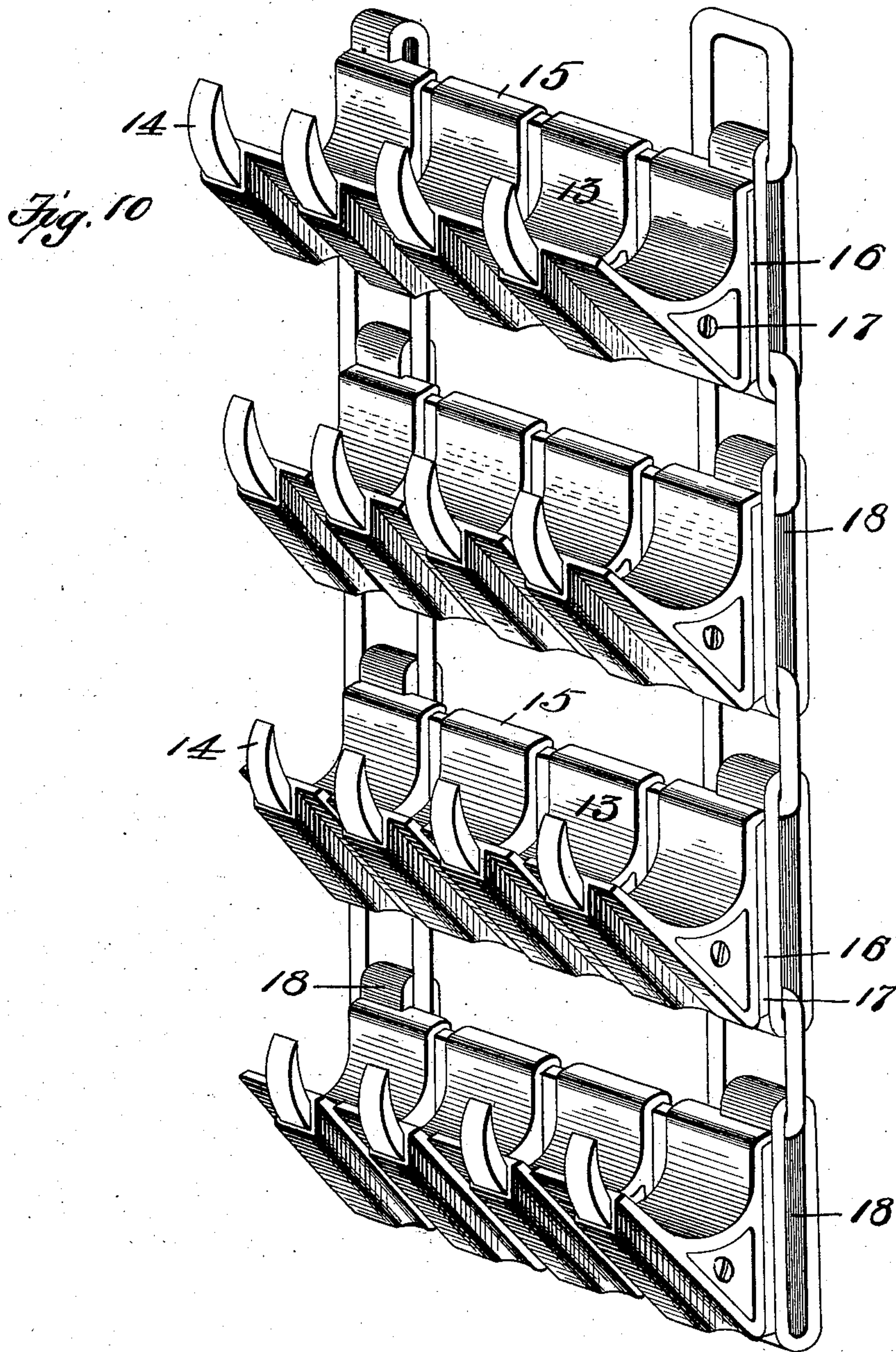
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Attest:
J. H. Scott
J. A. Cornwall

Inventor:
Wm. H. Scott
by *Paul B. Kuyper* Atty.

UNITED STATES PATENT OFFICE.

WILLIAM H. SCOTT, OF ST. LOUIS, MISSOURI, ASSIGNOR OF ONE-HALF TO
GOTTLIEB EYERMANN, OF SAME PLACE.

DITCHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 601,106, dated March 22, 1898.

Application filed July 8, 1897. Serial No. 643,796. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. SCOTT, a citizen of the United States, residing at the city of St. Louis, State of Missouri, have made certain new and useful Improvements in Ditching-Machines, 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 is a side elevational view of my improved machine. Fig. 2 is an end view, partly in section. Fig. 3 is a top plan view, the swinging frame being shown in section. Fig. 4 is a top plan view of the shifting clutches for the ditching-chain raising and lowering mechanism. Fig. 5 is a similar view, the parts being shown in different positions. Fig. 6 is an enlarged sectional view of the same. Fig. 7 is a detail view of the sliding bracket in which the shaft of the upper chain-sprocket is mounted. Fig. 8 is a detail view of the ditching-chain support. Fig. 9 is a detail view of one form of ditching-chain. Fig. 10 is a view of the preferred form of chain.

This invention relates to a new and useful improvement in ditching-machines; and it consists, generally stated, in mechanism for raising and lowering the ditching-shovels, mechanism for tilting said shovels at an angle, the construction of said shovels, the novel arrangement and combination of the driving mechanism for said shovels, and, finally, the invention consists in the construction, arrangement, and combination of the several parts, all as will hereinafter be described and afterward pointed out in the claims.

In the drawings, 1 indicates a suitable frame mounted on ground-wheels, said frame being preferably composed of parallel I-beams suitably braced.

2 indicates the boiler of a stationary engine, which is preferably mounted on the frame 1.

3 indicates a pulley, driven by belt 4 from the engine, for driving the machine. Pulley 3 is mounted on a cross-shaft 5, which shaft has arranged upon it a beveled gear 6, meshing with a beveled gear 7 on the lower end of a shaft 8. Shaft 8 is grooved and carries a pinion 9, meshing with a beveled gear 10, arranged on a cross-shaft 11.

12 indicates a pair of sprockets mounted on

shaft 11 for driving the chain of ditching-shovels. These ditching-shovels preferably consist of separable sections 13, carrying staggered scraping-points 14, which are so arranged that each scraping-point will travel in a different path from those immediately above and below. These shovels 13 are formed with a hooked portion 15 on their upper ends, which engage a plate 16, the lower ends of the shovels being held to said plate by a bolt 17. Plate 16 is bolted to links 18 of two sprocket-chains, which sprocket-chains pass over the sprockets 12, as has been before described. If desired, these plates 16 may be made longer to accommodate a greater number of sectional pockets 13 to increase the width of cut of the ditch; also, the sprocket-wheels 12 and 24 may be placed wider apart in connection with this increased capacity of the chain to accommodate the same.

19 indicates a swinging frame pivotally mounted on the cross-shaft 5, the vertical members of said frame being preferably in the form of channel-beams. Shaft 11, beveled gear 10, and the pinion 9 are mounted in suitable brackets 27, slidingly arranged in the channel-beams 19, which are slotted vertically for this purpose.

20 indicates an I-beam suspended from shaft 11, said I-beam being slotted, as at 21, and passing on each side of the shaft 5, upon which it has a pivotal bearing through the medium of a bearing-block 22, which is arranged on a sleeve 22^a, surrounding shaft 5 between the I-beams 1 of the main frame. This I-beam 20 is preferably provided with angle-irons on each side of the slot 21 to afford a more extended bearing on block 22, as shown in Figs. 3 and 8, and collars 23 are arranged on each side of the bearing-block 22 to guide said beam 20 in its bearing. The lower end of this beam 20 carries a sliding bearing in which are mounted sprocket-wheels 24, over which wheels 24 the lower end of the ditching-chain passes.

In order to place the scrapers and the chain which carries the same under tension, I preferably arrange a rod 25 in connection with the bearing for wheels 24, which rod passes through a threaded nut secured to the beam 20, the upper end of the rod being provided

with a hand-wheel for turning the same, as shown.

26 indicates a pressure-frame secured to the beam 20 for holding the ditching-chain to its work when the scrapers are cutting in the ditch. The shaft being driven by pulley 3 will rotate shaft 8 and pinion 9, and, by reason of the pinion being feathered on shaft 8, said pinion will be driven regardless of its position along the length of said shaft. Pinion 9 drives gear 10, which, being fixed to shaft 11, will drive the sprocket-wheels 12 and cause the ditching-chain to travel, as is obvious. A hood 26^a (shown in dotted lines in Fig. 1) is preferably arranged to confine the dirt to the shovels after the shovels issue from the ditch and before they are dumped.

The means for raising and lowering the ditching-chain will now be described.

27 indicates sliding brackets mounted in the channel-beams 19, and in which brackets is carried the shaft 11, one of said brackets carrying also the pinion 9.

28 indicates threaded rods preferably arranged in the corners of the channel-beams, said rods being stepped or socketed at their lower ends in brackets on the lower ends of the channel-beams and passing through threaded projections on the brackets 27. There are preferably four of these threaded rods 28, their upper ends passing through a cross-piece 29, which connects the upper ends of the channel-beams 19.

30 indicates pinions arranged on the upper ends of rods 28, said pinions meshing with an idle-pinion 31, so that they will be driven in the same direction when motion is imparted to said idle-pinion.

32 indicates miter-gears conjoined to the idle-pinion 31, said miter-gears meshing with miter-gears 33, which are fixed to the sleeve or hollow shaft 34, mounted in suitable bearings on the cross-piece 29.

It is obvious from the above description that when the shaft 34 is rotated in one direction it will drive the threaded rods 28 and cause the brackets 27 to be raised, said brackets carrying with them the ditching-chain and its associate parts, and when said shaft 34 is rotated in the other direction it will cause said ditching-chain and its associate parts to be lowered.

I desire to drive shaft 34 from shaft 8, which necessitates, as said shaft is rotating in one direction at all times, the presence of suitable devices for changing the motion from said shaft 8 or for disengaging the shaft 34 from shaft 8. This construction is more clearly shown in Figs. 4, 5, and 6, wherein are two miter-gears loosely mounted on hollow shaft 34. 36 is a gear on shaft 8, which constantly meshes with gears 35, driving them, respectively, in opposite directions.

37 is a sleeve feathered on hollow shaft 34 and provided with friction-clutches on its ends to engage, respectively, the gears 35 and fix one or the other of said gears 35 relative to shaft 34.

38 is a rod passing through hollow shaft 34 and provided with a pin 39, passing through slots 40 in the hollow shaft 34 and engaging the clutch-sleeve 37. This rod 38 is threaded at one end, on which threaded end is arranged a gear 41, said gear 41 being provided with interlocking means relative to the hollow shaft 34 to prevent independent longitudinal motion of the same, but permitting independent rotary motion.

42 indicates a gear meshing with gear 41, suitable means being provided for the manual rotation of gear 42. When gear 42 is rotated, it will rotate gear 41 and cause the longitudinal movement of rod 38 relative to the shaft 34, in which it is arranged, thereby causing the clutches on the sleeve 37, carried by rod 34, to engage either one or the other of the wheels 35 and fix said wheels, respectively, to the hollow shaft 34 and drive said hollow shaft 34 in either direction it is desired to raise or lower the ditching mechanism. Under this condition the pinion 41 is constantly rotated, and by reason of the pitch of the threads on rod 38, with which it engages, said rotation has a tendency to bind the friction-clutch more firmly into the socket in the pinion 35, which it engages. When the other friction-clutch is in engagement with the other pinion, the reverse movement of the parts takes place, and the threaded rod is such that, due to the rotation of such reverse movement, it will force said other friction-clutch more firmly into its socket in the pinion 35.

It will be understood that while the ditching-chain is being raised or lowered the pinions 41 and 42 are being constantly rotated, but at such slow speed that the manually-operated handle for rotating pinion 42 may be easily caught, so as to reverse the movement of the ditching-chain or cause it to cease its vertical movement entirely by disengaging both clutches from both pinions 35. In addition to this vertical movement of the ditching-chain I also provide means for arranging said chain so that it will act at an angle, and by such combination of movements I am enabled to avoid any boulders or rocks which might be in the path of the ditch to be cut, at the same time taking out as much dirt as possible. To accomplish this throw of the ditching-chain to an angle, which throw is also utilized to cause the ditching-chain to assume almost the horizontal position shown in dotted lines in Fig. 1, which entirely disengages its scraping-blades from the ground, as when it is desired to transport the machine from one point to another without disassembling the machine, I provide pivoted nuts 43 on the sides and near the upper ends of the swinging channel-beams 19, through which pivoted nuts pass threaded rods 44. These rods 44 are mounted in a swinging bearing 45 on their lower ends, which bearing is arranged on a cross-shaft 46, said cross-shaft 46 carrying beveled gears 47, meshing with beveled gears 48, fixed to the threaded rods 44. Shaft 46

is driven from shaft 5 by means of a beveled gear 49 on shaft 5 meshing with a beveled gear 50 on a shaft 51, which shaft 51 carries at its other end a beveled gear 52, meshing with beveled gear 53, loosely mounted on the hollow shaft 46.

54 indicates a clutch-sleeve feathered on the hollow shaft 46 and connected to a rod 55, passing through said hollow shaft, similar to the rod 38, which has been before described.

56 indicates a hand-wheel on the end of rod 55, which is used to move said rod longitudinally the hollow shaft 46 to accomplish a reversal in movement of said hollow shaft 46 or to disengage said shaft 46 from the shaft 51 in like manner to the mechanism heretofore described for raising and lowering the ditching-chain.

From the above it will be noted that at the time the scraping-points are doing their work in the ditch the chain on which said blades are arranged can be either raised or lowered at will or be caused to remain stationary, or the parts may be swung at an angle during the operation of the scraping-points in either direction.

Of course it will be understood that the arrangement of the gearing is such that the vertical movement or the angular movement of the swinging frame which carries the scraping-points is accomplished at a very slow speed, which can be increased or diminished, as desired.

The dirt collected in the pockets 13, being carried up, will be discharged onto a conveyer-belt 57, which belt is preferably mounted on a frame secured to the swinging channel-beams 19, so as to be constantly in mesh with the driving mechanism of the machine to conduct off the loose material at whatever angle said swinging frame may be. I drive this conveyer-belt by means of a gear 58, meshing with the pinion 49, as shown more clearly in Fig. 3.

I am aware that many minor changes in the construction, arrangement, and combination of the several parts of my device can be made and substituted for those herein shown and described without in the least departing from the nature and principle of the invention.

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

1. In a ditching-machine, the combination with an endless chain, of castings secured thereon, forming pockets, scraping-blades detachably secured in the outer edges of said castings, sprocket-wheels over which said chain passes, and means cooperating with the upper sprocket-wheels for lifting and lowering the chain; substantially as described.

2. In a ditching-machine, the combination with an endless chain, of castings secured thereto, forming pockets, scraping-blades detachably secured in the outer edges of said

castings, means for raising and lowering said chain, and means for tilting said chain at an angle; substantially as described.

3. In a ditching-machine, the combination with a swinging frame, of a drive-shaft on which said frame is pivotally mounted, brackets slidingly mounted on said swinging frame, sprocket-wheels journaled in said brackets, mechanism for driving said sprocket-wheels in their positions, from said drive-shaft, a ditching-chain passing over said sprockets, and means for raising and lowering said brackets; substantially as described.

4. The combination with a swinging frame, of a drive-shaft on which said frame is pivotally mounted, brackets carried by said swinging frame, a shaft journaled in said brackets, a ditching-chain supported by said shaft, a grooved shaft 8, which is driven by said drive-shaft, a pinion 9 on said grooved shaft, a gear-wheel 10 on the bracket-shaft meshing with pinion 9, threaded rods which engage the bracket, and means on the upper end of said grooved shaft for imparting motion to said threaded rods to raise and lower said brackets; substantially as described.

5. In a ditching-machine, the combination with sliding brackets, of a shaft 11 mounted therein, sprocket-wheels arranged on said shaft over which a ditching-chain passes, a vertically-disposed grooved shaft 8, a pinion 9 slidingly mounted on said shaft and engaging a pinion 10 mounted on shaft 11, rods 28 having a threaded connection with said sliding brackets, gear-wheels cooperating with the upper ends of the rods, a gear-wheel secured to the upper end of grooved shaft 8, a geared connection between said last-mentioned gear and the gears on the upper ends of the rods 28, and a clutch cooperating with said gears; substantially as described.

6. The combination with brackets, of rods 28 having a threaded connection therewith, pinions 30 on the upper ends of said rods 28, an idle-pinion with which said pinions mesh, a miter-gear conjoined to said idle-pinion, a shaft 8 carrying a pinion 36 at its upper end, with which meshes two pinions loosely mounted on a hollow shaft or sleeve, one of said pinions being geared to a miter-gear which drives the rods 28, and a clutch fixed to a rod passing through said hollow shaft or sleeve, for starting, stopping, or reversing the rotation of rods 28; substantially as described.

7. In a ditching-machine, the combination with a swinging frame, of a drive-shaft on which said frame is pivotally mounted, brackets slidingly mounted on said swinging frame, sprocket-wheels journaled in said brackets, mechanism for driving said sprocket-wheels in their positions, from said drive-shaft, a ditching-chain passing over said sprockets, threaded rods engaging said brackets, a power-driven gear for rotating said threaded rods, and a manually-operated clutch for throwing

said power-driven gear into or out of operative relation to said threaded rods, to start, stop, or reverse the movement of said rods; substantially as described.

5 8. The combination with a swinging frame, pivoted on a drive-shaft, of sliding brackets arranged on said swinging frame, and a beam 20 suspended from said brackets and pivoted on the drive-shaft through the medium of a slot; substantially as described.

10 9. The combination with a swinging frame, of sliding brackets carrying sprocket-wheels, a drive-shaft on which said frame is pivoted, a beam 20 suspended from said sliding brackets and having a slot through which said drive-shaft passes, sprocket-wheels on the lower end of said beam, and means for raising and lowering said lower sprocket-wheels relative to the beam; substantially as described.

15 10. The combination with a drive-shaft, of a beam 20 provided with a slot through which said drive-shaft passes, a block on said drive-shaft for engaging the beam, bearings at the ends of the beam in which are mounted sprocket-wheels, a ditching-chain carried by said sprocket-wheels, means for adjusting the lower sprocket-wheels relative to the beam, and a pressure-frame secured to the beam for holding the ditching-chain to its work; substantially as described.

20 11. In a ditching-machine, the combination with a swinging frame 19, of a drive-shaft on which the same is pivoted, brackets slidingly mounted on said swinging frame, a beam 20 suspended from said brackets and embracing said drive-shaft, sprocket-wheels journaled in the ends of said beam, a ditching-chain which passes around said sprockets, and mechanism cooperating with said brackets to raise and lower the ditching-chain; substantially as described.

25 12. In a ditching-machine, the combination with a swinging frame 19, of a drive-shaft on which the same is pivoted, brackets slidingly mounted on said swinging frame, a beam 20 suspended from said brackets and embracing said drive-shaft, sprocket-wheels journaled in the ends of said beam, a ditching-chain which passes around said sprockets, mechanism cooperating with said brackets to raise and lower the ditching-chain, and means cooperating with the swinging frame for tilting

the ditching-chain at an angle; substantially as described.

13. The combination with a swinging frame 19, of sliding brackets mounted thereon, a drive-shaft on which said swinging frame is pivoted, a beam 20 suspended from said brackets and embracing said drive-shaft, sprocket-wheels at the ends of the beam, a ditching-chain which passes over said sprocket-wheels, means for raising and lowering said brackets, threaded rods 44 engaging the swinging frame to move the same to an angle, and a clutch mechanism for throwing said threaded rods into or out of engagement with the positive driving mechanism of the machine; substantially as described.

14. The combination with a swinging frame 19, of a ditching-chain carried thereby, a positively-driven shaft 51 carrying a gear 52 at its end, rods 44 having a threaded connection with said swinging frame 19, and a manually-operated clutch for throwing said rods into, or out of, engagement with said positively-driven shaft, to start, stop, or reverse the rotation of said threaded rods; substantially as described.

15. In a ditching-machine, the combination with parallel chains, of plates mounted thereon, sectional pockets mounted on the plates, and scraping points or blades secured to the outer edges of each pocket; substantially as described.

16. In a ditching-machine, the combination with parallel chains, of plates 16 secured thereon, sectional pockets 13 secured to said plates, sockets on the outer edges of said sectional pockets, and scraping-points 14 secured in said sockets; substantially as described.

17. In a ditching-machine, the combination with parallel chains, of plates secured thereon, a pocket whose upper end is bent over the plate and whose lower end is secured to said plate by a bolt, and a scraping-blade 14 carried at the outer edge of said pocket; substantially as described.

In testimony whereof I hereunto affix my signature, in the presence of two witnesses, this 22d day of June, 1897.

WILLIAM H. SCOTT.

Attest:

HUGH K. WAGNER,
G. A. PENNINGTON.