

(No Model.)

4 Sheets—Sheet 1.

W. HUBERTZ.
TILE DITCHING MACHINE.

No. 536,727.

Patented Apr. 2, 1895.

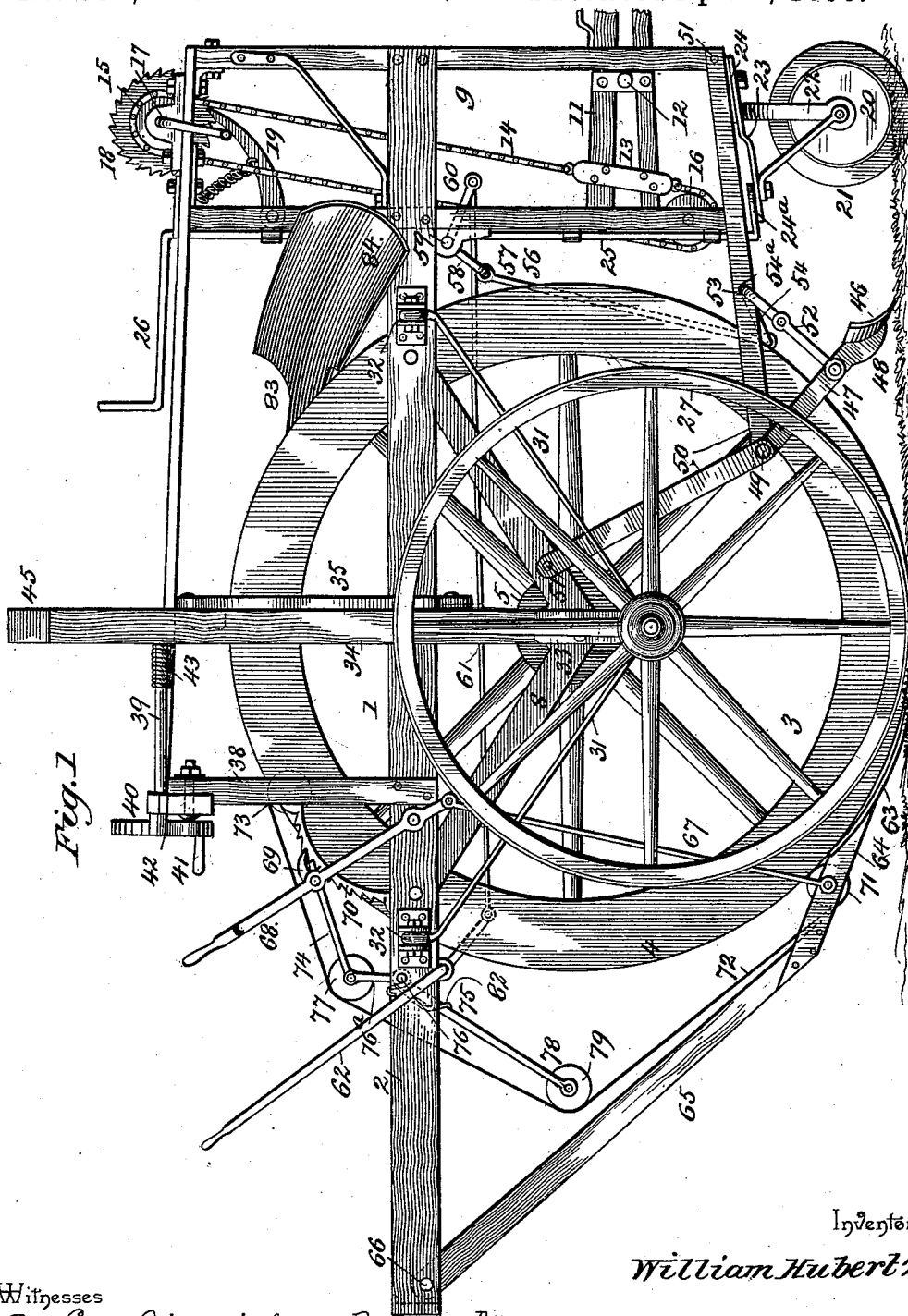


Fig. 1

Inventor

William Hubertz

Witnesses

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By his Attorneys,

Cash & Co.

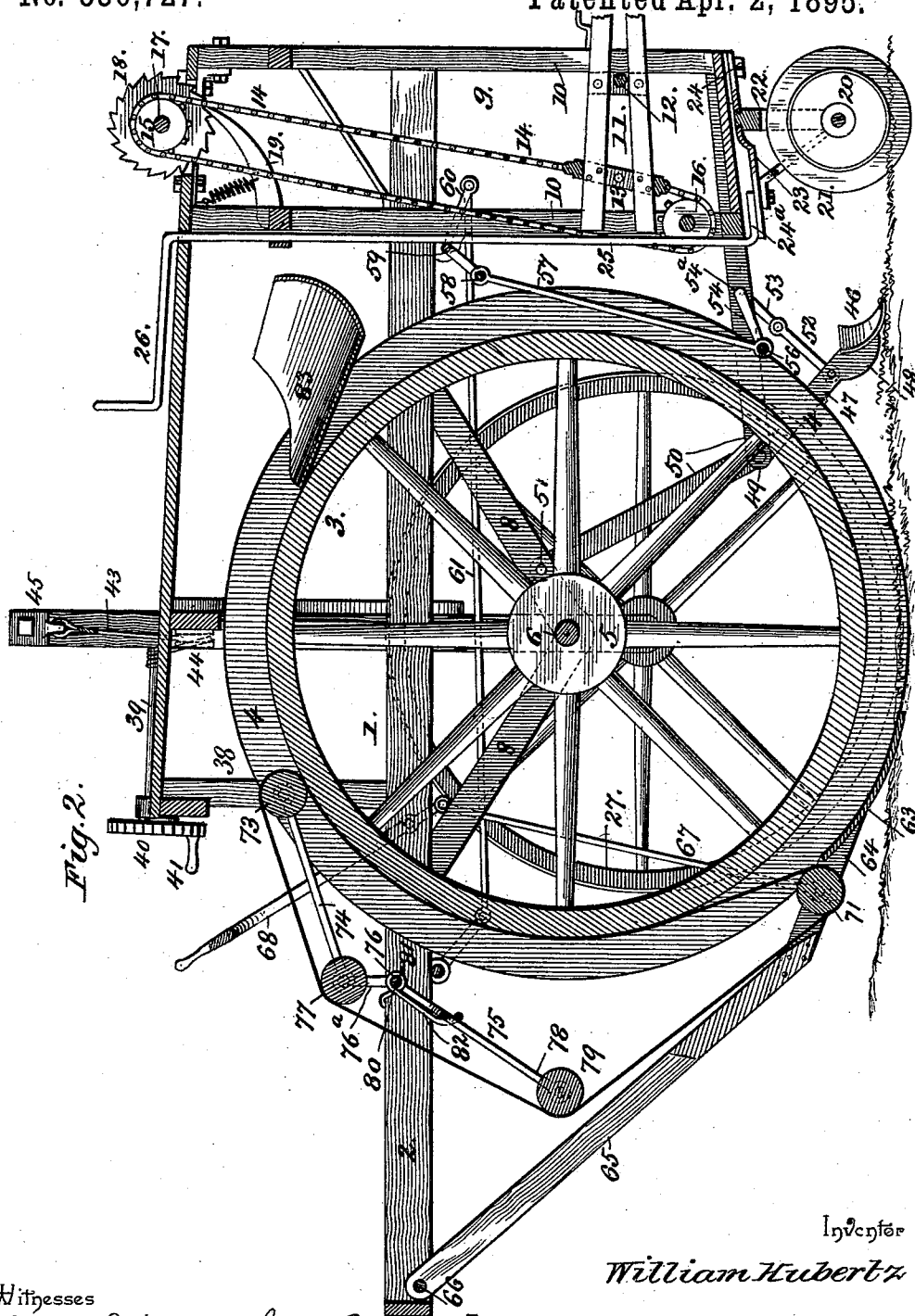
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4 Sheets—Sheet 2.

W. HUBERTZ.
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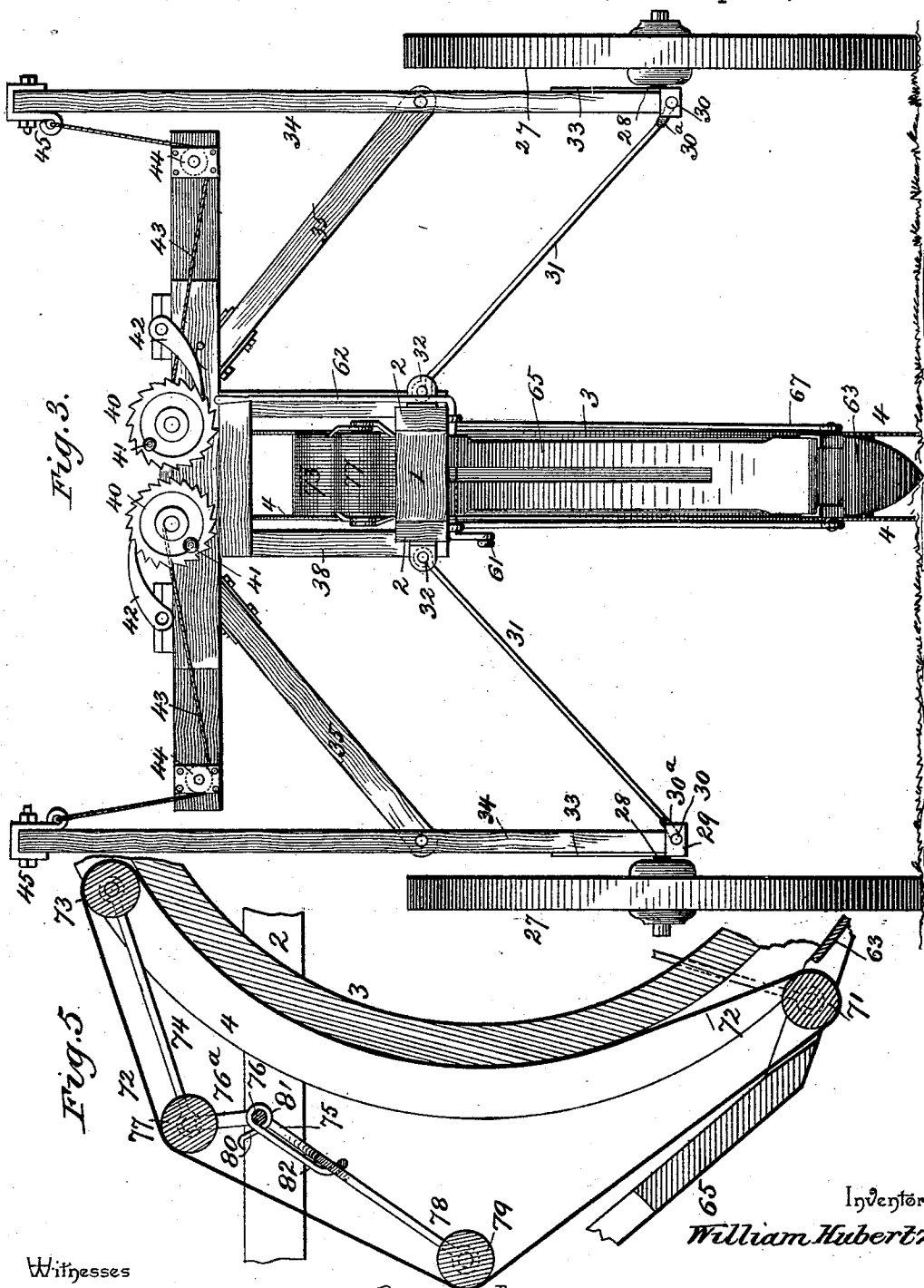
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4 Sheets—Sheet 3.

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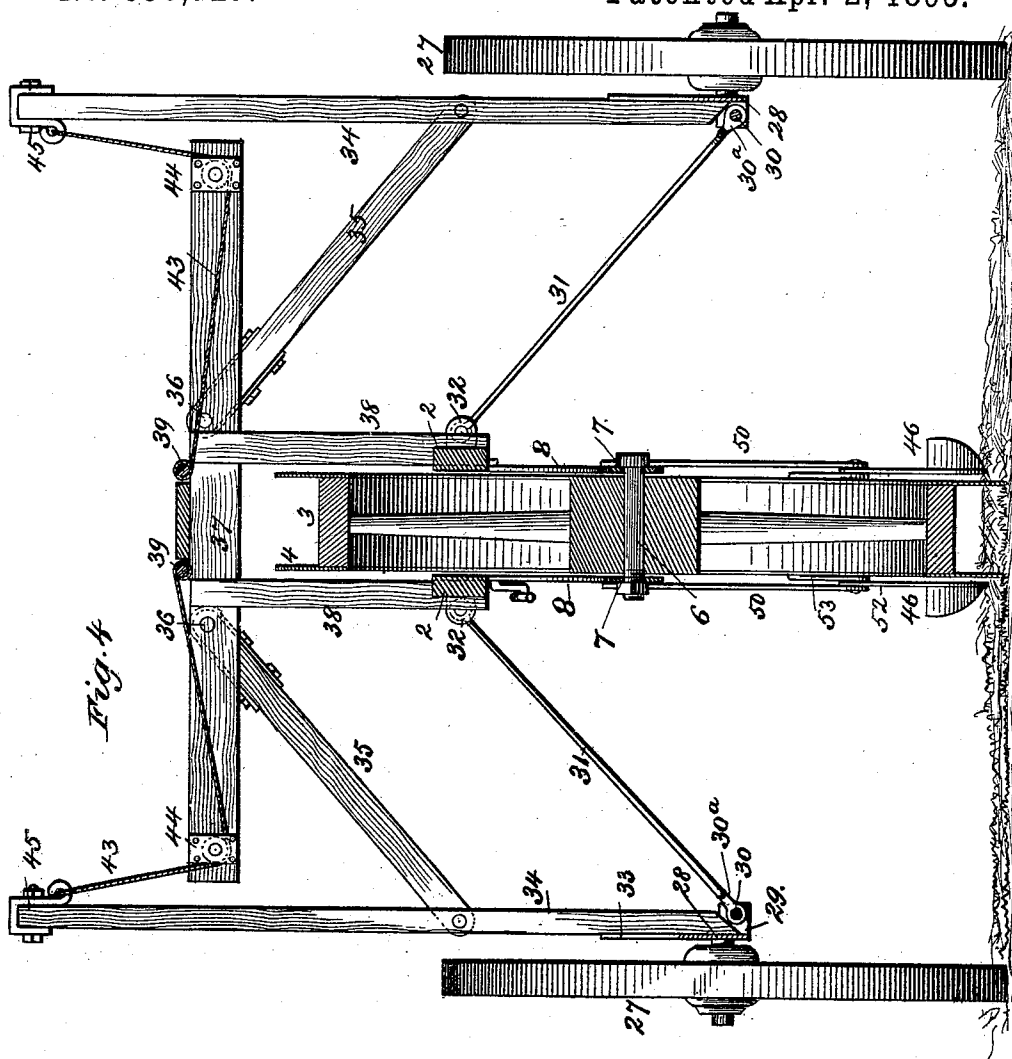


Fig. 4

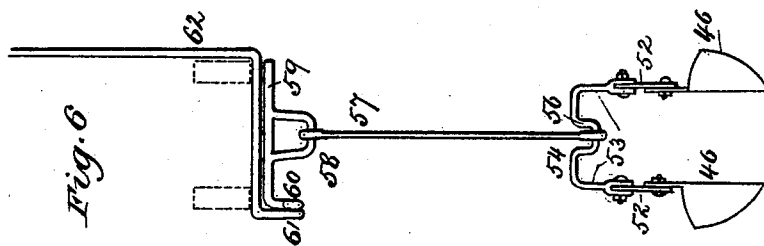


Fig. 6

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UNITED STATES PATENT OFFICE.

WILLIAM HUBERTZ, OF LAFAYETTE, INDIANA.

TILE-DITCHING MACHINE.

SPECIFICATION forming part of Letters Patent No. 536,727, dated April 2, 1895.

Application filed August 14, 1894. Serial No. 520,279. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM HUBERTZ, a citizen of the United States, residing at Lafayette, in the county of Tippecanoe and State of Indiana, have invented a new and useful Tile-Ditching Machine, of which the following is a specification.

This invention relates to tile ditching machines; and it has for its object to effect certain improvements in machines of this character whereby simple and efficient means shall be provided for cutting or excavating a line of ditching adapted for the reception of the ordinary drain tiles.

To this end the main and primary object of the present invention is to provide a new and useful tile ditching machine constructed with special reference to durability and efficiency.

With these and other objects in view, which will readily appear as the nature of the invention is better understood, the same consists in the novel construction, combination, and arrangement of parts hereinafter more fully described, illustrated, and claimed.

In the accompanying drawings:—Figure 1 is a side elevation of a ditching machine constructed in accordance with this invention. Fig. 2 is a central vertical longitudinal sectional view thereof. Fig. 3 is an end view of the machine. Fig. 4 is a central vertical transverse sectional view thereof. Fig. 5 is an enlarged detail sectional view of the rear portion of the ditching wheel and the rear scoop shovel and endless elevator belt employed in connection therewith. Fig. 6 is a diagrammatic elevation showing more clearly the arrangement of the adjusting devices for the advance knife or cutter shovels arranged in advance of the ditching wheel at both sides thereof.

Referring to the accompanying drawings, 1 designates an elongated wheel frame essentially comprising the parallel connected side bars 2, and said wheel frame 1, is adapted to carry for rotation therein between its opposite side bars the large ditching wheel 3. The large ditching wheel 3, is provided with the peripheral side flanges 4, which project beyond the periphery thereof to form a grooved rim for the wheel, which spans the block of earth that is cut out of the ditch and serves to carry up the same from the bottom of the

ditch in the manner to be hereinafter described, it of course being understood that said peripheral side flanges also act in the capacity of knives to cut and line up the opposite sides of the ditch being excavated. The ditching wheel 3, is provided with a central hub 5, mounted on the short wheel axle 6, the opposite ends of which are journaled in the bearing openings 7, formed in the depending V-shaped side bearing arms 8, secured to the side bars 2, of the frame at both sides of the ditching wheel and depending therefrom to properly position the said wheel for its work.

Attached to the front end of the elongated wheel frame 1 in advance of the ditching wheel 3, is an upright guide frame 9, projecting above and below the frame 1, and provided in its front and rear sides with the vertical guide slots 10, that receive the inner end of an ordinary draft tongue 11, and accommodate the vertical adjustment thereof. The inner end of said draft tongue 11, is held securely locked within the frame 9 and prevented from withdrawal therefrom by means of the tongue pin 12, passed through the tongue and engaging behind the front side of said vertical guide frame. The said inner end of the draft tongue working in the guide slots of said guide frame is suitably connected to the chain clamp 13, carried by an endless adjusting chain 14, arranged to pass over the upper and lower chain or sprocket wheels 15 and 16 respectively, the lower of said wheels (16) being suitably journaled at the lower end and rear side of the frame 9, and the upper of said wheels (15) being mounted on a crank shaft 17, journaled in suitable bearings on top of the frame and also carrying a ratchet check wheel 18. The ratchet check wheel 18, is normally engaged by the spring actuated check dog or pawl 19, pivotally mounted on the frame 9, below said ratchet wheel and providing means for checking and holding the shafts 17, stationary in order to hold the tongue 11, stationary in any adjusted position. It will be obvious that by turning the crank shaft 17, in either direction, the dog 19, being easily disengaged from the ratchet wheel if necessary in this adjustment, will raise or lower the tongue 11, to the proper position whereby the center of draft may be properly maintained according to the adjust-

ment of the ditching wheel which will be presently referred to.

The lower end of the upright guide frame 9, is supported on the advance guide or caster wheel 20. The advance wheel 20, is provided with a central peripheral cutting flange 21, that takes a purchase in the ground and serves to guide the machine in a line with the ditch to be excavated, and said wheel 20, is journaled in the bearing yoke 22, secured at its upper end to the adjusting arm 23. The adjusting arm 23, is pivoted at its front end as at 24, to the under side of the upright guide frame 9, and has the other free end thereof loosely connected to the crank arm 24, formed on the lower end of the vertical adjusting shaft 25. The vertical adjusting shaft 25, is journaled in suitable bearings at the rear side of the frame 9, and is provided at its upper end above the said frame 9, with a crank handle 26, which is grasped by the driver or operator for the purpose of adjusting the position of the wheel 20, and thereby guiding the machine.

The frame 1 and the ditching wheel 3, carried thereby are supported for vertical adjustment and travel over the ground on the opposite side ground wheels 27. The side ground wheels 27, are mounted on the short wheel spindles 28, projected from the outer sides of the U shaped spindle brackets 29, the opposite sides of which receive the pivot pins or bolts 30, to which are pivotally connected the U-shaped connecting yokes 30^a, formed at the outer ends of the opposite adjustable V-shaped brace frames 31. The V-shaped brace frames 31, are pivotally connected at their inner ends as at 32, to the opposite sides of the frame 1, so that the same may be freely adjusted up and down to accommodate themselves to the adjustment of the wheels 27. The U-shaped spindle brackets 29, have projected from their upper sides the attaching straps 33, to which are secured the lower ends of the upright adjusting arms 34, to an intermediate point of which arms are pivotally connected the outer ends of the pivoted brace arms 35, the inner ends of which brace arms are pivoted at 36, to one side of a transverse pulley beam 37, supported at one side of an upright extension frame 38, extended from the frame 1 above the upper part of the ditching wheel. Journaled in suitable bearings on top of the extension frame 38, are the winding shafts or drums 39, carrying at one end the ratchet check wheels 40 having operating cranks 41, and engaged by the check dogs or pawls 42, and said winding shafts or drums have attached thereto one end of the adjusting ropes or chains 43, which are guided around guide pulleys 44, at the ends of the pulley beam 37, and have their other ends connected to the cap plates 45 bolted on the upper ends of the upright adjusting arms 34. It will be obvious that by turning the winding shafts or drums 39, the ropes or chains 43, will be caused to wind or unwind thereon

and through the medium of the connections described will adjust the wheels 27, either up or down, which adjustment, when the machine is in operation, will serve to elevate or depress the ditching wheel to cause the same to travel in the ground at the proper depth whereby the proper depth of ditch may be excavated.

The revolving ditching wheel 3, is directly preceded by the advance knife or cutter shovels 46, that are arranged closely adjacent to the peripheral flanges of the wheel at both sides thereof and directly in advance of the front lower portion of the wheel that first passes into the ditch being cut. The advance knife or cutter shovels 46, are concavo-convex in shape and diverge or flare outwardly from the side flanges of the ditching wheel, so as to loosen up or cut the earth at both sides of the ditch to make a clear path for the side flanges of the ditching wheel, and to direct the earth cut thereby into the channel or groove between the said side flanges of the wheel. The said shovels 46, are suitably secured to the front ends of the swinging shovel arms 47, which front ends below the shovels are rounded as at 48 to form runners for the shovels, and the other rear ends of said swinging shovel arms are pivoted at 49, to the angles of the L-shaped or angle hangers 50, that are arranged at both sides of the ditching wheel and are attached at their extremities as at 51, to the side bearing arms 8, and the opposite sides and lower end of the upright guide frame 9. The opposite swinging shovel arms 46, which are thus suspended from the angles of the hangers 50, have pivotally connected thereto at an intermediate point the lower ends of the adjusting links 52, the upper ends of which are pivotally connected to the crank arms 53, at both ends of the lower crank shaft 54 which is journaled transversely in bearing openings 54^a, formed in the lower sides of the hangers 50, directly in front of the wheel 3. The lower crank shaft 54, is provided with a central crank 56, to which is connected the lower end of the connecting rod 57, the upper end of which is pivotally connected to the central crank 58, of the upper crank shaft 59, that is journaled in suitable bearings on the frame 1 near the front end thereof. The upper crank shaft 59, is provided at one end with a crank arm 60, to which is connected one end of the adjusting rod or bar 61, extended toward the rear end of the machine and also connected to a suitable adjusting lever 62, which through the medium of the connections described provides means for adjusting the shovels 46, up and down according to the depth at which it is desired that such shovels should travel.

As the machine travels forward the excavated earth that is carried rearwardly between the side flanges of the ditching wheel is caught by the V-shaped rear scoop shovel 63. The V-shaped rear scoop shovel 63, is of a width adapting the same to fit snugly within

the peripheral groove or channel of the wheel formed between the side flanges thereof, and said shovel is adapted to be adjusted to work at the rear lower portion of the wheel so as to receive all the earth carried rearwardly by the wheel as the rear portion thereof leaves the ditch in which the wheel travels. The rear scoop shovel 63, has extended from the rear side thereof the parallel shovel arms 64, between the outer ends of which is fitted the lower end of the swinging standard 65, the upper end of which is pivoted as at 66, to the rear extremity of the frame 1, and said standard 65, not only braces and supports the shovel in position, but also accommodates itself to any adjustment thereof.

The parallel shovel arms 64, have attached thereto the lower ends of the opposite adjusting bars or rods 67, the upper ends of which are pivotally connected to the depending crank arms of the yoke lever 68, pivotally mounted on the frame 1 and carrying a pawl 69, adapted to engage a toothed segment 70, secured on top of the frame 1 and providing means for holding the shovel 63, fixed in any adjusted position.

The parallel shovel arms 64 of the rear scoop shovel 63, support for rotation therebetween the lower belt roller 71, over which passes the lower end of the endless elevator belt 72. The endless elevator belt 72, is arranged to have the inner portion thereof work between the side flanges of the wheel and against the rim or periphery thereof, so as to provide means for elevating therebetween and the wheel the earth caught up by the shovel 63, and the upper end of said belt which is held to work in a position near the top of the wheel is guided over the upper belt roller 73, which is journaled in the free end of the pivoted bearing support 74, the other end of which is pivotally connected to the upper end of the tension bearing bracket 75. The tension bearing bracket 75, is pivotally mounted at a point near its upper end on the transverse pivot rod 76, arranged on the frame 1 in rear of the wheel 3, and above its point of pivot the said bracket is provided with a short upwardly disposed yoke 76^a, in which is journaled an upper tension roller 77, over which passes the outer portion of the belt 72, and to which yoke is connected one end of the roller support 74. Below its point of pivot the tension bracket 75, is extended into a longer depending bearing yoke 78, in the lower end of which is journaled a lower tension roller 79, over which also passes the outer portion of the belt 72. An adjusting spring 80, is coiled at one end as at 81, on the pivot rod 76, and is provided with a U-shaped arm 82, embracing and engaging under the bearing yoke 78, so as to normally press upwardly thereon. It will be obvious that by reason of the upwardly exerted tension of the spring arm 82, the lower tension roller 79, will be normally held pressed against the outer portion of the belt 72, while at the same time the disposition of the yoke 76^a, will

cause such yoke to exert a leverage on the support 74, which moves the same forwardly and thereby holds the upper belt roller 73, in a position that keeps the upper end or portion of the belt 72, tightly stretched thereover. This arrangement and construction of tension device for the belt 72, not only provides for keeping the same stretched to the proper tension, but at the same time permits the same to readily yield and accommodate itself to the quantity of earth elevated thereby up to the top portion of the ditching wheel.

The earth that is elevated to the top portion of the ditching wheel by the elevating belt is carried by the wheel up to the stationary discharge scraper 83. The scraper 83, is secured on top of the frame 1 in front of the ditching wheel and works inside of the peripheral groove or channel of the wheel against the rim thereof, and said scraper is disposed upwardly at an angle so as to scrape the earth off of the ditching wheel and direct the same onto the curved discharge spout or apron 84. The spout or apron 84, is projected laterally from the scraper at an angle so as to extend to one side of the frame 1 to provide means for delivering the excavated earth at one side of the ditch being excavated.

From the above it is thought that the construction, operation and many advantages of the herein described ditching machine will be readily apparent to those skilled in the art without further description, and it will be understood that changes in the form, proportion and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention.

Having thus described the invention, what is claimed, and desired to be secured by Letters Patent, is—

1. In a ditching machine, the combination with the wheel supported frame; of an upright guide frame mounted on the front end of said wheel supported frame and provided with vertical guide slots, a draft tongue arranged to have its inner end work in said guide slots, a tongue pin detachably fitted to the tongue in rear of the front side of said guide frame, a clamp connected to the inner end of the draft tongue, and an adjusting device connected with said clamp, substantially as set forth.

2. In a ditching machine, the combination with the wheel supported frame; of an upright guide frame mounted on the front end of said wheel supported frame and provided with vertical guide slots, a draft tongue arranged to have its inner end work in said guide slots, upper and lower chain or sprocket wheels mounted on said guide frame, a pawl and ratchet adjusting device connected with the upper ratchet or chain wheel, and an endless adjusting chain passing over said sprocket or chain wheels and provided with a clamp connected to the inner end of said draft tongue, substantially as set forth.

3. In a ditching machine, the combination

with the wheel supported frame; of an upright guide frame arranged at the front end of said wheel supported frame, the draft tongue connected to said guide frame, an advance guide
5 or caster wheel adjustably supported below said guide frame and provided with a central peripheral cutting flange, and means for adjusting said wheel, substantially as set forth.

4. In a ditching machine, the combination
10 with the wheel supported frame; of an adjusting arm pivotally attached at one end to the front end of said frame and having a bearing yoke depending therefrom, an advance guide or caster wheel journaled in said
15 yoke and provided with a central peripheral cutting flange, and a vertical adjusting shaft journaled at the front end of said frame and provided at its lower end with a crank arm loosely connected with the free end of said
20 pivoted adjusting arm, substantially as set forth.

5. In a ditching machine, the combination of the wheel frame, a revolving ditching wheel mounted within said wheel frame, opposite swinging V-shaped brace frames pivotally connected at their inner ends to opposite sides of the wheel frame, spindle brackets pivotally connected to the outer ends of said swinging brace frames and having wheel
30 spindles, the side ground wheels journaled on said wheel spindles, upright adjusting arms attached fast at their lower ends to said spindle brackets, and separate adjusting devices connected respectively with the opposite upright adjusting arms, substantially as
35 set forth.

6. In a ditching machine, the combination of the elongated wheel frame having an upright extension and a transverse pulley beam supported at one side of said extension, opposite V-shaped brace frames pivotally connected at their inner ends to opposite sides of the wheel frame, and provided at their apices or outer ends with U-shaped connecting yokes, spindle brackets
45 pivotally connected to said yokes and having wheel spindles, the side ground wheels journaled on said wheel spindles, upright adjusting arms attached at their lower ends to said spindle brackets, brace arms pivoted at one end to an intermediate point of said adjusting arms and at their other end to said pulley beam, separate winding shafts or drums journaled on top of the frame extension and provided
50 at one end with a pawl and ratchet check device, guide pulleys mounted on opposite ends of said pulley beams, adjusting ropes or chains winding and unwinding on one end on said shafts or drums, guided around said
60 guide pulleys, and connected at their other ends to the upper ends of said upright adjusting arms, and the revolving ditching wheel journaled in said wheel frame, substantially as set forth.

7. In a ditching machine, the combination of the wheel frame, a revolving peripherally grooved ditching wheel journaled in the

frame, the elevating device arranged in the rear of the wheel, opposite L-shaped hangers arranged at both sides of the ditching
70 wheel in front of the axle thereof, swinging shovel arms pivoted at one end to the angles of said hangers and provided with outer rounded ends forming runners, advance knife or cutter shovels fitted to the runner ends of
75 the shovel arms, and an adjusting device connected with said shovel arms to simultaneously adjust the same, substantially as set forth.

8. In a ditching machine, the combination
80 of the wheel frame, the revolving peripherally grooved ditching wheel journaled in said frame, the elevating device arranged in rear of the wheel, shovel arms adjustably supported on both sides of the ditching wheel at
85 the front lower portion thereof and provided with outer rounded ends forming runners, and concavo-convex advance knife or cutter shovels fitted to the runner ends of said shovel arms and divergently disposed from the sides
90 of the wheel, substantially as set forth.

9. In a ditching machine, the combination of the frame, the revolving peripherally grooved ditching wheel journaled in the frame, the rear dirt elevating device for the
95 wheel, opposite angle or L-shaped hangers arranged at both sides of the ditching wheel in front of the axle thereof, swinging shovel arms pivoted at one end to the angles of said hangers and carrying at their other free ends
100 advance knife or cutter shovels arranged at both sides and directly in advance of the front lower portion of the wheel, suitably arranged upper and lower crank shafts journaled in front of the ditching wheel, link
105 connections between the lower crank shaft and said shovel arms, a connecting rod connecting the two crank shafts, and an adjusting lever connected with the upper of said crank shafts, substantially as set forth.
110

10. In a ditching machine, the combination of the frame, the peripherally grooved revolving ditching wheel journaled in said frame, the adjustably supported advance shovels, an adjustable shovel standard carrying a
115 rear scoop shovel arranged to work within the rear lower portion of the wheel, an adjusting device for said rear scoop shovel, a self adjusting endless carrier belt working against the rim of the wheel above the rear
120 scoop shovel, and a stationary discharge scraper secured to the frame and working in the front upper portion of the ditching wheel, substantially as set forth.

11. In a ditching machine, the combination
125 of the wheel frame, a revolving peripherally grooved ditching wheel journaled in said frame, a swinging shovel standard pivotally connected at its upper end to the rear end of said wheel frame, a rear scoop shovel having
130 rear parallel arms attached to the lower end of said standards, a lower belt roller journaled between said shovel arms, a suitably supported upper belt roller, a self adjusting

endless elevator belt arranged over said belt rollers, and a lever adjusting device connected with the lower end of said shovel standards to adjust the shovel carried thereby, substantially as set forth.

12. In a ditching machine the combination of the wheel frame, a revolving ditching wheel journaled in said frame, the rear adjustable shovel standard carrying a lower belt roller, a tension bearing bracket pivotally mounted on the wheel frame in rear of the wheel and provided with upper and lower different length bearing yokes, tension rollers journaled in said bearing yokes, an adjusting spring arranged to engage under the lower of said

bearing yokes, a bearing support pivoted at one end to the upper bearing yoke of said tension bearing bracket and carrying at its other end an upper belt roller, and an endless elevator belt arranged to pass over said upper and lower belt rollers and around said tension rollers, substantially as set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

WM. HUBERTZ.

Witnesses:

JOSEPH SPITZNAGLE,
ISAAC W. CHAMBERLIN.