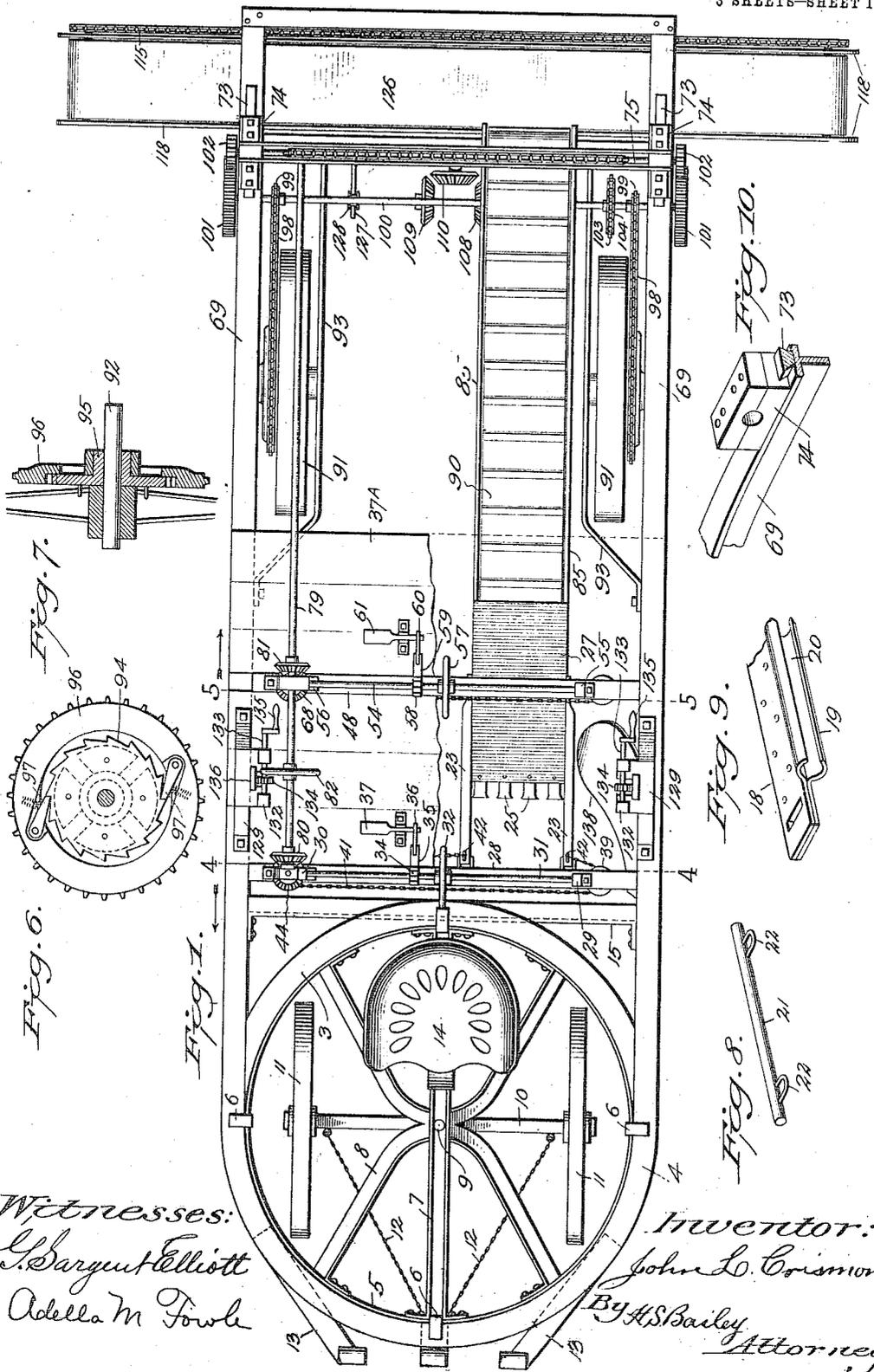


979,442.

J. L. CRISMON.
DITCHING MACHINE.
APPLICATION FILED JULY 12, 1909.

Patented Dec. 27, 1910.

3 SHEETS—SHEET 1.



Witnesses:
L. Sargent Elliott
Adella M Fowle

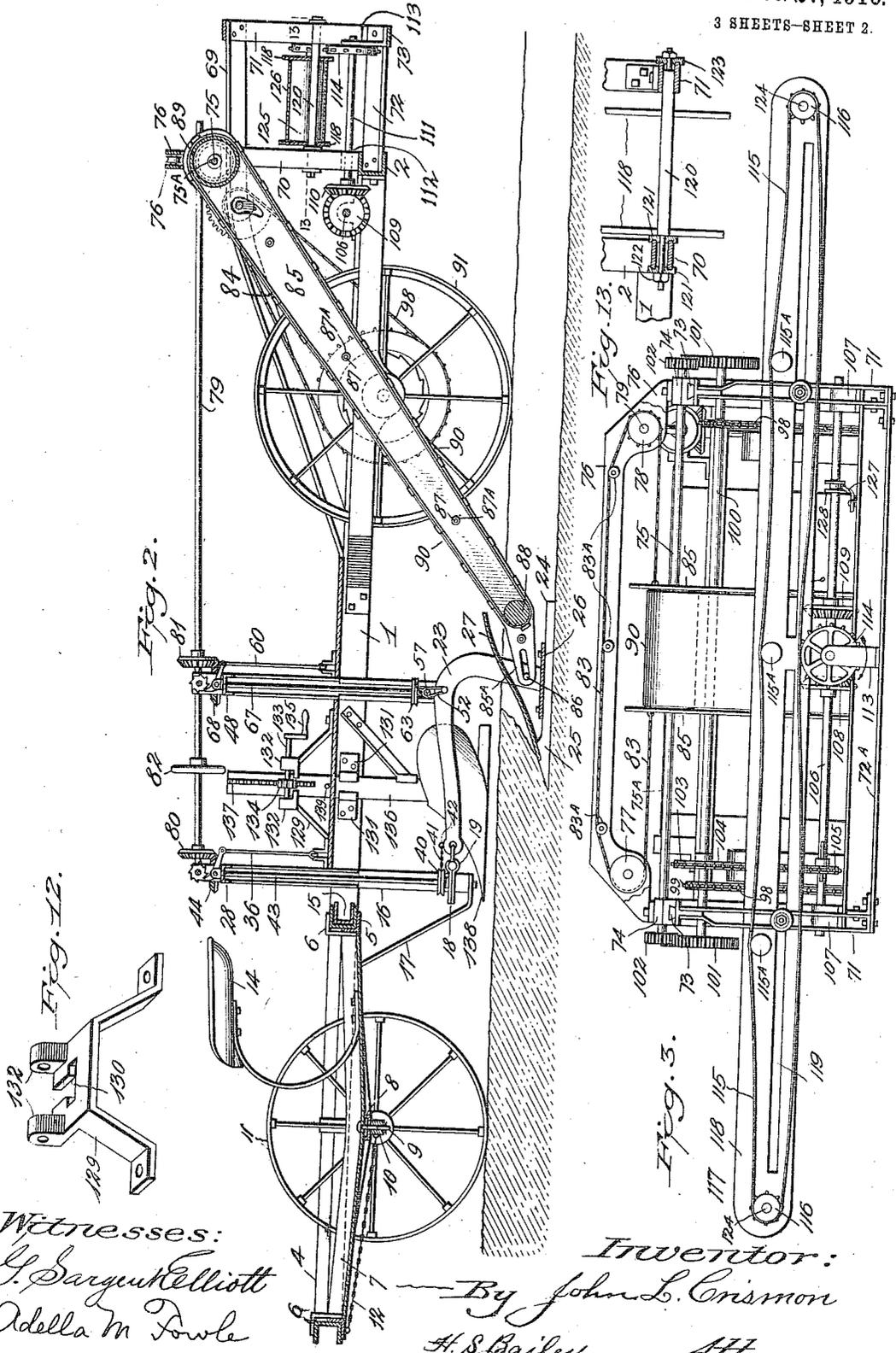
Inventor:
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3 SHEETS-SHEET 2.



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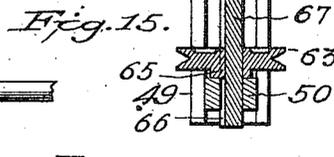
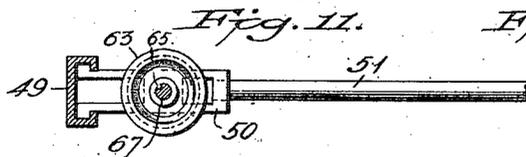
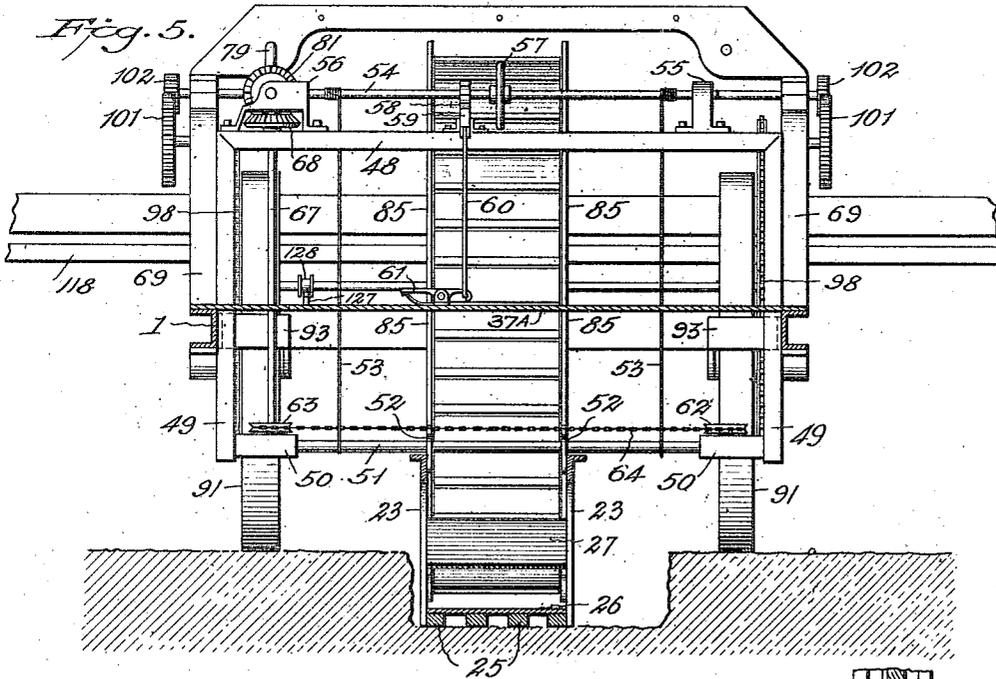
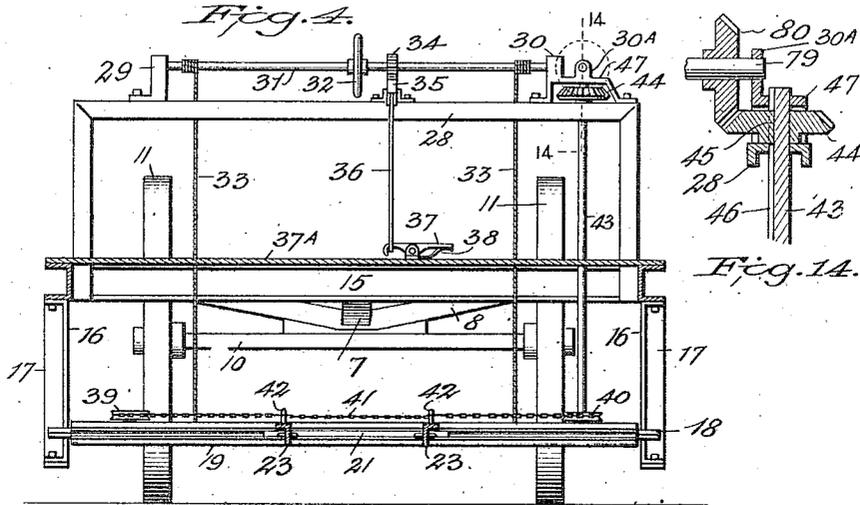
Inventor:
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3 SHEETS—SHEET 3.



Witnesses:
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 Adella M. Fowler

Inventor:
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UNITED STATES PATENT OFFICE.

JOHN LOUIS CRISMON, OF EAGLE, COLORADO.

DITCHING-MACHINE.

979,442.

Specification of Letters Patent. Patented Dec. 27, 1910.

Application filed July 12, 1909. Serial No. 507,218.

To all whom it may concern:

Be it known that I, JOHN LOUIS CRISMON, a citizen of the United States of America, residing at Eagle, county of Eagle, and State of Colorado, have invented a new and useful Ditching-Machine, of which the following is a specification.

This invention relates to improvements in ditching machines.

10 The object of the invention is to provide a machine of this character, comprising a supporting frame mounted upon wheels, and having a plow and an endless inclined conveyer cooperating therewith, means being
15 provided for simultaneously adjusting said plow and conveyer laterally or vertically, whereby a ditch of any practical width and depth may be formed, said conveyer being adapted to discharge the excavated earth
20 upon a horizontally disposed endless apron, which is adjustably mounted upon the frame so as to discharge on either side of the ditch, suitable gearing being provided for changing the direction of travel of said belt.

25 A further object of the invention is to provide a frame mounted upon wheels, and having a laterally and vertically adjustable plow, for forming a ditch of less width than the distance between the rear supporting
30 wheels, and vertically adjustable plows in advance of said rear wheels, which are adapted to excavate the earth in front of the said wheels as the ditch is deepened, conveyers being adjustably connected to the
35 frame for receiving the earth from the plows and depositing it on either side of the ditch, means being provided whereby the conveyers are automatically disconnected from their operating mechanism, when the
40 central plow is elevated above the ground level for the purpose of transporting the machine from place to place, the said machine being light and simple in construction, and requiring far less power in practical
45 operation, than machines in present use.

These objects are accomplished by the mechanism illustrated in the accompanying drawings, in which:

50 Figure 1, is a plan view of the improved ditching machine, a portion of the platform thereon being broken away for clearer illustration. Fig. 2, is a central vertical longitudinal sectional view through the same. Fig. 3, is a rear view thereof. Fig. 4, is a
55 transverse, vertical, sectional view on the

line 4—4 of Fig. 1. Fig. 5, is a similar view on the line 5—5 of Fig. 1. Fig. 6, is a front elevation, showing one of the sprocket wheels which are connected with the main conveyer driving shaft, and the
60 ratchet wheel and pawls for operating the same. Fig. 7, is a vertical, sectional perspective view through the same. Fig. 8, is a perspective view of the slide bar to which the front end of the central plow is attached. Fig. 9, is
65 a perspective view of a portion of the adjustable guide in which the said slide bar is held. Fig. 10, is a perspective view of a slide bearing for the inclined conveyer shaft. Fig. 11, is a plan view of the adjustable
70 supporting bar, upon which the rear end of the central plow is slidably supported, and the guide in which the said bar is adjustably mounted. Fig. 12, is a perspective view of one of the standards for the side
75 plows. Fig. 13, is a sectional view on the line 13—13 of Fig. 2. Fig. 14, is a sectional view on the line 14—14 of Fig. 4. And Fig. 15, is a sectional view on the line 15—15 of Fig. 5.

Similar characters of reference refer to similar parts throughout the several views.

Referring to the accompanying drawings, the numeral 1, indicates a frame which is preferably formed from a channel bar.
85 This frame is U-shaped, as shown, the bar being bent to form a semi-circular forward end, while the extremities of the side members are connected by a cross bar 2. A section of channel bar 3, is bent to form a semi-
90 circular member of the same arc as the forward end of the frame, and this section is secured in the frame to form with the said forward end a circular track or support 4,
95 within which is rotatably mounted a ring or band 5, which is preferably formed from an angle bar. The horizontal flange of this ring bears against the under face of the track, and the ring is held within the track by angle plates 6, the vertical members of
100 which are secured to the ring, while their horizontal members rest upon the top of the track and slide thereon when the ring is turned. A channeled brace bar 7, extends diametrically across the ring, its opposite
105 ends being secured thereto, and a second brace 8, is secured to the ring, and is preferably formed from a section of channel bar, which is split centrally from each end to within a short distance of its center, and the
110

separate portions of the bar are bent in the form shown in Fig. 1, the extremities thereof being riveted or bolted to the said ring. The brace 7, rests upon the brace 8, and at their intersection a king bolt 9, passes through them, and through an axle 10, upon which are mounted the forward supporting wheels 11. The two braces incline slightly upward from their point of intersection to their connection with the ring, and this construction gives greater rigidity and affords greater resistance to the down pressure of the frame. The axle 10, is connected to the ring by chains 12, and to the forward portion of the ring are secured eyed bars 13, to which the usual double-trees—not shown—are hooked. It will thus be seen that the ring 5 acts as a "fifth wheel," and that when it is turned the axle is also turned. A suitable seat 14, is secured to the brace 7, for the accommodation of a driver.

A cross brace 15, connects the sides of the frame, rearwardly of the track section 3, and adjacent to this brace a depending guide bar 16, is secured to each side of the frame, which bars extend down to within a short distance of the ground, and are braced by bars 17, which are secured to their lower ends, and to the under side of the frame. Upon the bars 16, is mounted an adjustable horizontal bar 18, which is preferably formed of two plates, which are riveted together, as shown in Fig. 9, leaving free portions adjacent to one side, which are bent to form longitudinal registering channels, which together form a slideway 19, having a slot 20 throughout its length, which is formed by the edges of the channels. Within the slideway is placed a slide bar 21, having clevises 22, which extend out through the slot 20, and are secured to the forward ends of a pair of plow beams 23, which are secured to a plow 24, comprising a plurality of independent horizontally disposed shares or cutters 25, which are connected by a plate 26, to which the said shares or cutters are rigidly secured, a space being left between each two shares substantially the width of one of the shares. A mold board 27, is secured upon the shares adjacent to their cutting ends, and extends rearward a suitable distance, and at an upward inclination between the plow beams.

A support 28, is secured to the frame in line with the guide bars 16, and this support comprises a channel bar which is bent to form two vertical standards, which are united by a horizontal member, the standards being bolted at their lower ends to the side bars of the frame, as shown in Figs. 2 and 4. Bearings 29 and 30, are secured upon the top of the support 28, adjacent to its ends, and in these bearings is mounted a shaft 31, having a hand wheel 32. Wire

ropes 33, or other suitable flexible connections, are attached at one end to the shaft 31, and at their opposite ends to the bar 18, and by turning the hand wheel 32, the ropes 33 are wound or unwound upon the shaft to raise or lower the bar 18, for a purpose to be hereinafter described. The shaft 31, is also provided with a ratchet wheel 34, and a pawl 35 is pivotally mounted upon the support 28, in position to engage the said ratchet wheel. A rod 36 is pivotally secured to the free end of the pawl, and its lower end is pivotally attached to one end of a foot lever 37, which normally exerts a downward pull upon the rod 36, under the upward pressure of a spring 38 beneath the free end of said lever. The down pull upon the rod 36, holds the pawl in engagement with the ratchet wheel 34, whereby rotation of the shaft 31 to unwind the ropes 33 is prevented, and the bar 18 is therefore held at the elevation to which it has been raised; but by depressing the free end of the foot lever, the pawl is operated to release the said ratchet wheel, as will be understood by reference to Figs. 2 and 4. The foot lever 37, is supported in brackets, which are secured to a platform 37^A, which rests upon the top of the main frame.

Horizontally disposed sheave wheels 39 and 40, are mounted respectively near the opposite ends of the bar 18, and a suitable flexible connection, preferably a chain 41, is passed around them, and the free ends of said chain are connected to eye bolts 42, in the forward ends of the plow beams 23. A shaft 43, is keyed to the sheave wheel 40, and passes up through the support 28, and a bevel gear 44, is mounted upon its upper end so as to rest upon the support 28. This gear is provided with a feather key 45, which enters a groove 46 in the upper portion of the shaft, and when the bar 18 is raised, the shaft slides through the gear, and through a horizontal member 47 of the bearing 30, which extends over the gear and prevents it from being raised with the shaft.

A support 48, similar to the support 28, is secured to the main frame in position to extend above the rear ends of the plow beams, but the vertical standards of this support are longer than those of the support 28, and extend down approximately half way between the sides of the main frame and the ground level, and the portions of the standards which extend below the frame form guideways 49, the edges of the channel bars of which they are constructed being inverted or turned toward each other for that purpose, as clearly shown by Fig. 11. Within the guideways are placed guide blocks 50, which are connected by a bar 51, to which the rear ends of the plow beams are connected by means of links 52. Wire ropes 53, are connected to the bar 51, and extend

up through the support 48, and are attached to a shaft 54, which is mounted in bearings 55 and 56, secured upon the top of the support 48. This shaft is provided with a hand wheel 57, and a ratchet wheel 58, which is engaged by a pawl 59, operated by a rod 60, and foot lever 61, all of which are similar in operation and construction to the corresponding mechanism described in connection with the shaft 31.

Upon the guide blocks 50, are mounted sheave wheels 62 and 63 respectively, around which a chain 64 is passed, the free ends of which are attached to the links 52, which connect the plow beams with the bar 51. The sheave wheel 63 is provided with a feather-key 65, which projects into a groove 66, in the lower portion of a shaft 67, which extends up through the support 48, and has a bevel gear 68, keyed upon its upper end, and which rests upon the support 48. When the bar 51 is raised to elevate the rear end of the plow 24, the sheave wheel 63 slides upon the shaft 67, and the shaft is held against upward movement by the bearing 56, which extends over the gear wheel 68. When the shafts 43 and 67 are rotated, the sheave wheels 40 and 63 operate the chains 41 and 64, respectively, and the plow, together with a conveyer, to be hereinafter described, is moved laterally in either direction, and the rotation of these shafts is accomplished in the following manner:

Upon each side of the rear portion of the main frame is secured a T-bar 69, which bars incline up from the frame, as shown in Fig. 2, and terminate in portions which are approximately in a horizontal plane, and which extend beyond the rear end of the main frame. The ends of the bars 69, which extend beyond the main frame, are each supported by a pair of parallel uprights 70, which connect them with the end bar 2, of the main frame, and by similar uprights 71, which connect them with angle plates 72, secured to the said bar 2, and which are also connected by a bar 72^A. Upon the rear portions of the T-bars 69, are secured slides 73, upon which are mounted movable shaft bearings 74, in which is mounted a shaft 75, and upon the bearings 74 are bolted a pair of supporting beams 76, which extend from one bearing to the other in parallel order, a space of suitable width being left between them. Between these beams at one end, is journaled a sheave wheel 77, and at the opposite end a sprocket wheel 78 is mounted on the end of a shaft 79, which is journaled in the beams 76, and in the bearing 56 on the support 48, and also in a bearing 30^A on the portion 47 of the bearing 30, but it does not extend far enough through this latter bearing to obstruct the upward movement of the shaft 43. Bevel pinions 80 and 81, are secured upon this shaft, which mesh respectively

with the gears 44 and 68, and the shaft is provided with a hand wheel 82, for turning the same.

A sprocket chain 83 is passed around the wheels 77 and 78, and is supported between the wheels upon rollers 83^A. The free ends of this chain are attached to the opposite sides of a conveyer-supporting frame 84, comprising side bars 85, which are provided with slots 85^A, at their forward ends, by which they are connected to a rod 86, which unites the rear ends of the plow beams, while their opposite ends are supported upon the shaft 75, which is journaled in the movable bearings 74. The side bars 85 are connected at intervals by brace rods 87, which pass through spacing sleeves 87^A, and incline from their forward ends at an angle of substantially sixty degrees.

A roller 88, is journaled between the forward ends of the bars 85, in position to lie beneath the mold board 27 of the plow 24, and a roller 89 is secured upon the shaft 75, between the rear or upper ends of the said bars, and a suitable endless conveyer belt is supported upon these rollers, and is adapted to receive the excavated earth, from the said plow. The roller 89 is secured to the shaft 75 by a feather-key 75^A, so as to slide thereon and turn therewith. When the shaft 79 is turned, the bevel pinions 80 and 81, meshing with the bevel gears 44 and 68 respectively, turn the shafts 43 and 67 respectively, with their sheave wheels 40 and 63 respectively, by which the chains 41 and 64 are drawn upon to move the plow 24 with the forward end of the conveyer frame 84 laterally in either direction, while at the same time the sprocket wheel 78, on the rear end of the shaft 79, operates the chain 83, to move the rear end of the conveyer frame. Thus by turning the hand wheel 82 on the shaft 78, the plow and conveyer are shifted simultaneously either to the right or left.

The rear end of the main frame of the ditcher, is mounted upon wheels 91, which revolve upon independent stub axles 92, journaled in bearings upon the main frame, and upon bars 93, which are secured to the said frame, each wheel lying between one of said bars, and the adjacent side of the frame, as clearly shown by Fig. 1.

A ratchet wheel 94, having forwardly-set teeth, is mounted on each stub axle 92, and suitably secured to the adjacent traction wheel 91. The ratchet wheels have outwardly extending hubs 95, upon which are revolubly mounted sprocket wheels 96, which are recessed so as to inclose the ratchet wheels, as shown in Figs. 6 and 7. The sprocket wheels 96 carry spring-actuated pawls 97, which are adapted to be engaged by the teeth of the ratchet wheels 94, when the machine is moved forward, whereby the said sprocket wheels are revolved with the

ratchet wheels, while the ratchet wheels escape the pawls on the reverse movement of the machine. The sprocket wheels 96 are connected by chains 98, with smaller sprocket wheels 99, on a shaft 100, which passes through the T-bars 69 and through openings in the side bars 85 of the conveyer frame. Gear wheels 101 are secured upon the outer ends of this shaft, which mesh with gears 102, on the outer ends of the conveyer-operating shaft 75. The shaft 100 is also provided with a sprocket wheel 103, connected by a chain 104 with a sprocket wheel 105, on a shaft 106, which is slidably mounted in bearings 107 on the main frame. This shaft also carries bevel gear wheels 108 and 109, which are adapted to mesh singly with a bevel gear 110 mounted on a shaft 111, which is supported in bearings 112 and 113 secured respectively upon the beam 2 and the bar 72^A, as shown in Fig. 2. The shaft 111 carries at its rear end a sprocket wheel 114, which engages the under half of a sprocket chain 115, which is mounted upon sprocket wheels 116 at opposite ends of a laterally-movable conveyer supporting frame 117, the chain being supported at intervals upon rollers 115^A. This frame comprises parallel side bars 118, each of which is provided with a slot 119, which extends from near its outer ends to within a short distance of its center. These bars are positioned a suitable distance apart, and are supported upon arms 120, each of which has a reduced forward end which is threaded, and which is passed between a pair of the uprights 70, plates 121 being placed upon the reduced portions of the arms on each side of the uprights, which plates are clamped to the opposite edges of the uprights by nuts 122, so as to hold the arms securely in place. The rear ends of the arms, which are also threaded, pass between pairs of the uprights 71, and receive plates 123, which are clamped upon the rear edges of the said uprights, as will be fully understood by reference to Fig. 13.

The sprocket wheels 116, are mounted on shafts 124, which are journaled in the side bars 118, and upon these shafts are secured rollers 125, which support an endless belt 126, and this belt lies directly below the upper end of the inclined belt 90, so as to receive the earth as it falls from said belt.

The conveyer frame 117 can be shifted to discharge upon either side of the ditch, and when shifted to the left—as one looks forward—the shaft 106 is shifted to the right, by any suitable shifting device, such as a lever 127, which is pivoted to the beam 2, one end of which lever is adapted to engage a grooved collar 128, secured upon said shaft. When the shaft is thus shifted, the bevel gear 108 meshes with the bevel gear 110, and the said gear, its shaft, and

the sprocket wheel 114 on the end of the shaft, are turned in the direction of the arrow shown in Fig. 3, whereby the belt 126 is caused to discharge upon the left side of the ditch. When the shaft 106 is shifted to bring the bevel gear 109 into mesh with the bevel gear 110, the said belt discharges upon the right side of the ditch.

Upon opposite sides of the frame, and between the supports 28 and 48, are secured standards or brackets 129, comprising supporting legs, and horizontal portions, provided with guideway slots 130, which are in vertical alinement with guide plates 131, secured to the inner sides of the frame. The brackets are also provided with bearings 132, in which are mounted short shafts 133, having gear wheels 134, and crank handles 135. Vertical standards 136 are supported in the guide plates 131, and the slots 130, and are provided on their inner sides with gear teeth 137, which mesh with the gear wheels 134, so that by turning the crank handles 135, the said standards may be raised or lowered.

The lower ends of the standards carry plows 138, of ordinary construction, which are set to throw the plowed earth inward, or toward each other. When the plow 24 is in operation, the plows 138, which are in advance of the rear supporting wheels, are held up out of contact with the ground in any suitable manner, as by pins 139, which are passed through holes in the standards 136, and rest upon the top of the main frame; but when the plow 24 has cut to its full depth, all the ground within the limits of its lateral travel, it is elevated above the ground level, by the ropes 33 and 53, and the plows 138 are lowered into operative position, and as these plows are in front of the rear supporting wheels, the earth removed by them, allows the rear wheels to drop to the level cut by the said plows, and these plows throw the earth toward the center of the excavation, where it can be removed by lowering the plow 24, in position to gather it up and discharge it upon the conveyer 90, which delivers it to the conveyer 126, by which it is discharged upon one side of the ditch. If desired, however, the plows 138 may first be operated, and afterward the plow 24, but in either case a ditch is formed which is equal in width to the full width of the machine. When the plow 24 is at the ground level or in any position between that and its lowest position, the gear wheels 102, on the conveyer shaft 75, are in mesh with the driving gears 101 and the conveyer 90 is thereby operated; but when the said plow is elevated far enough above the ground to permit the machine to be transported from place to place, the rod 86, which connects the plow beams, engages the rear ends of the slots 85^A in the side bars 85, and the said bars are pushed rearward, causing the bearing 74 of 130

the shaft 75, to slide upon the slides 73, whereby the gears 102 are thrown out of mesh with the gears 101, and the conveyer 90 is stopped.

5 The machine is adapted to be propelled by horse or other suitable power, and is operated as follows: Assuming that the plows are all out of operative position, and that it is desired to excavate the central part of the ditch first, the foot levers 37 and 61 are depressed to disengage the pawls 35 and 59 from the ratchet wheels 34 and 58 respectively, and the plow 24 drops by gravity to the ground, and by turning the hand wheel 82, the shaft 79 with the bevel gear wheels 80, 81 and sprocket wheels 78, is turned, and the plow 24 and conveyer frame 84 are shifted to one side or the other of the frame; the gears 80 and 81 operating the gears 44 and 68 respectively, which turn the shafts 43 and 67 respectively, carrying the sheave wheels 40 and 63 respectively, which operate the chains 41 and 64, attached to the plow, while simultaneously with the movement of the plow the sprocket wheel 78 turns the chain 83, which moves the rear end of the conveyer frame 84, carrying the conveyer 90. When the central part of the ditch has been excavated, the plow 24 is elevated above the ground by turning the hand wheels 32 and 57, which turn the shafts 31 and 54 respectively, which carry the ropes 33 and 53 respectively, which are attached to the bars 18 and 51 respectively. As the bar 18 rises, it is held and guided by the vertical guide bars 16, and the shaft 43 slides through the bevel gear 44, which is held down by the horizontal portion of the bearing 30; and as the bar 51 rises, the blocks 50 upon its ends are held and guided in the guideways 49, the shaft 67 remaining stationary, while the sheave wheel 63 slides upon it. The pins 138, which hold up the side plows 138, are then removed, and these plows drop by gravity and remove the earth in line with the rear supporting wheels, thus forming a ditch the full width of the machine, and the earth removed by these plows is gathered up by the plow 24, which is again lowered for that purpose, and falls upon the conveyer 90, which deposits it upon the conveyer 126, whence it is deposited upon one or the other side of the ditch according to the position of the conveyer frame 117.

55 This machine is much lighter than machines of this character in general use; is easily operated, and with the arrangement of plows, a ditch of the full or greater width than the machine, and of any practical depth, 60 may be excavated.

Having described the invention, what I claim as new and desire to secure by Letters Patent, is:

1. In a ditching machine, the combination 65 with a frame mounted on front and rear

wheels, of horizontally disposed vertically adjustable bars mounted on said frame; a plow connected at its opposite ends to said bars; an inclined conveyer secured at its lower end to said plow in position to receive 70 earth therefrom; means for adjusting said plow laterally upon said bars, and said inclined conveyer simultaneously therewith; a laterally adjustable horizontally disposed conveyer on said frame adapted to receive 75 the discharge from the inclined conveyer; means for changing the direction of travel of said horizontally disposed conveyer; and vertically adjustable plows on said frame in front of said rear wheels, having their 80 mold boards facing each other.

2. In a ditching machine, the combination with a frame mounted on front and rear wheels, of horizontally disposed vertically adjustable bars mounted on said frame, 85 the forward bar having a longitudinal guideway formed on its rear edge; a slide in said guideway; a plow connected at its forward end to said slide, and means for connecting the rear end of said plow in sliding engagement with the rear bar; means for effecting 90 the lateral adjustment of said plow; means for receiving excavated earth from said plow and for conveying the same beyond either side of the ditch; and vertically adjustable 95 plows on said frame in line with the rear wheels, having their mold boards facing each other.

3. In a ditching machine, the combination with a frame mounted upon front and rear wheels, of vertical front and rear guides upon said frame; bars supported upon said guides and means for raising and lowering said bars, a guideway being formed in the forward bar; a slide in said guideway; a 105 plow connected at its forward end to said slide; links connecting the rear end of said plow in sliding engagement with said rear bar; and means for effecting the lateral adjustment of said plow; conveyers adapted 110 to receive the excavated earth from said plow and convey it beyond either side of the machine; plows on the side of said frame in front of the rear wheels thereof; and means for raising said plows to an inoper- 115 ative position.

4. In a ditching machine, the combination with a wheeled frame, having transverse supports, of shafts mounted upon said supports; flexible connections secured at their 120 upper ends to said shafts; a plow supported at its front and rear ends by said connections; means for turning said shafts to wind said connections thereon; means for preventing backward rotation of said shafts; 125 an inclined conveyer secured to said plow so as to receive the excavated earth therefrom; means for effecting the lateral adjustment of said plow and conveyer simultaneously; a conveyer for receiving the discharge from 130

the inclined conveyer and depositing it on either side of the ditch; means for operating said conveyers; and vertically adjustable plows secured to the sides of the frame adapted to cooperate with said first plow.

5 5. In a ditching machine, the combination with a wheeled frame, having transverse supports, of shafts mounted upon said supports and means for turning them; ratchet
10 wheels on said shafts; pawls for engaging said ratchet wheels; means for operating said pawls; flexible connections attached to said shafts; bars supported by said connections, one of which has a slideway thereon;
15 a slide in said slideway; a plow attached at its forward end to said slide; links connecting the rear end of the plow in sliding engagement with the other bar; vertical guide-
20 ways for said bars; a conveyer in operative engagement with the plow; means for effecting the lateral movement of said plow and conveyer simultaneously; a conveyer adapted
25 to receive the discharge from the first conveyer and deposit it beyond either side of the machine; means for operating said conveyers; and vertically adjustable plows upon the sides of the frame which cooperate with the first plow.

30 6. In a ditching machine, the combination with a frame mounted on forward and rear wheels; of a plow adapted to operate between the sides of said frame; an inclined conveyer in operative engagement at its
35 lower end with said plow; a shaft extending through the rear end of the conveyer and mounted on said frame; a support above the rear end of the conveyer; wheels at opposite ends of the support and a chain which
40 passes over said wheels and is secured at its ends to the opposite sides of said conveyer; depending guides on opposite sides of the frame in line with the front end of the plow; a bar in sliding engagement with
45 said guides, having a longitudinal slideway; a slide in said slideway connected with the front end of the plow, and means for raising and lowering said bar; sheave wheels at opposite ends of said bar; a chain connected
50 at its ends to the forward end of the plow and passing around said sheave wheels; a bar above the rear end of the plow; depending guides on opposite sides of the frame, in which the ends of said bar are mounted,
55 and means for raising and lowering said bar; sheave wheels at opposite ends of the bar; a chain extending around said wheels and connected to the rear end of said plow; links connecting the rear end of the plow in sliding engagement with the said bar;
60 and means for operating the chains connected to the plow and the chain connected to the rear end of the conveyer simultaneously for effecting the lateral movement of said plow and conveyer.

65 7. In a ditching machine, the combination

with a frame mounted on front and rear wheels; a plow laterally and vertically adjustable upon the frame; and an inclined conveyer operatively connected at its lower
70 end to said plow and adapted to move therewith; of horizontal arms supported at the rear end of the frame; parallel side bars having slots through which said arms pass; rollers mounted between the opposite ends
75 of the side bars; and an endless belt supported upon said rollers in position to receive the discharge from the inclined conveyer; and sprocket wheels on the ends of the roller shafts and an endless chain connecting
80 said sprocket wheels.

8. In a ditching machine, the combination with a frame supported upon front and rear wheels; a laterally and vertically adjustable
85 plow supported on said frame; movable bearings on the rear end of the frame; a shaft mounted in said bearings, having gear wheels upon its opposite ends, and a conveyer mounted at its rear end upon the shaft and connected at its forward end to
90 said plow in position to receive earth therefrom; of means for operating said conveyer, comprising driving sprocket wheels connected to the rear frame supporting wheels; a shaft parallel with the conveyer shaft,
95 having sprocket wheels thereon and gears adapted to mesh with the gears on the conveyer shaft; and chains connecting said sprocket wheels with the driving sprocket wheels.

9. In a ditching machine, the combination
100 with a frame mounted upon front and rear supporting wheels; vertical guides depending from said frame; bars supported upon said guides; a plow in sliding engagement with said bars; a conveyer connected
105 at its lower end to said plow and a shaft extending through the upper end of the conveyer and journaled in bearings upon the frame; of means for moving the plow and conveyer laterally and simultaneously, comprising a horizontally disposed shaft mounted
110 at its forward end in bearings, supported above and on one side of the frame in line with the said bars, and at its rear end in parallel supports which extend over the rear
115 end of the conveyer; vertical shafts extending from said bars through the forward bearings of the horizontally disposed shaft; bevel gears on the upper ends of said vertical shafts; bevel gears on said horizontal
120 shaft in mesh with those on the vertical shafts; sheave wheels on the lower ends of said vertical shafts and resting upon said bars; sheave wheels at the opposite ends
125 of said bars; chains which pass around said sheave wheels and connect respectively with the front and rear end of the plow; a sprocket wheel upon the rear end of the horizontal shaft between the said parallel
130 supports; a wheel at the opposite ends of

said supports; and a chain which is passed around said wheels and connected at its ends to the adjacent sides of the conveyer, and a hand wheel on the horizontal shaft.

5 10. In a ditching machine, the combination with a wheeled frame; movable bearings on said frame; and a shaft mounted in said bearings, having gear wheels at its opposite ends; of a laterally and vertically adjustable plow supported in said frame; a
10 conveyer connected at one end to the plow and at its opposite end to said shaft; and a power-driven shaft having gear wheels at its ends adapted to mesh with those on the
15 conveyer shaft, the bearings of said conveyer shaft being moved when the plow is raised, whereby the gears on the end of said shaft are thrown out of mesh with those on the power-driven shaft.

20 11. In a ditching machine, the combination with a wheeled frame having guides thereon, of bearings having a sliding movement on said guides; a shaft mounted in said bearings; a plow supported in said
25 frame and means for raising and lowering said plow; parallel side bars pivotally attached at one end to said plow and mounted at the other upon the said shaft; a roller mounted between the forward ends of said
30 bars; a roller mounted between the rear ends of said bars upon said shaft so as to slide thereon but rotate therewith; an endless belt on said rollers; a power-driven shaft having gears upon its ends in mesh
35 with the gears on the conveyer-supporting shaft, and means for effecting the lateral

movement of said plow and conveyer simultaneously, the raising of the plow with the forward end of the conveyer causing the movable bearings to slide upon their guides, 40 whereby the gears on the conveyer supporting shaft are disengaged from those on the power driven shaft.

12. In a ditching machine, the combination with a frame mounted on wheels, and 45 movable bearings thereon; of a shaft mounted in said bearings having gear wheels upon its ends; a plow; a mold board secured to and extending at an incline above said plow; beams secured to said plow; a rod connect- 50 ing said beams beneath the rear end of said mold board; side bars slotted at their forward ends to connect with said rod, and supported at their rear ends upon said shaft; a roller journaled between the forward ends 55 of the bars beneath the mold board; a roller mounted on the shaft between the upper ends of the bars and adapted to rotate with the shaft; a driving shaft having gears which mesh with the gears on the conveyer 60 supporting shaft, and means connected with the frame wheels for operating said shaft; and means for raising the plow and forward end of the conveyer, whereby the conveyer shaft is thrown out of operation. 65

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

JOHN LOUIS CRISMON.

Witnesses:

G. SARGENT ELLIOTT,
ADELLA M. FOWLE.