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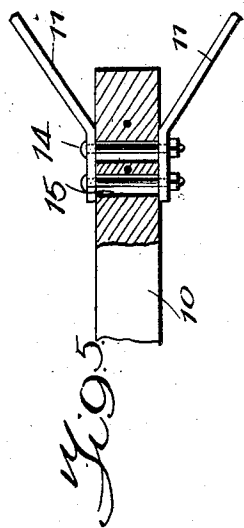
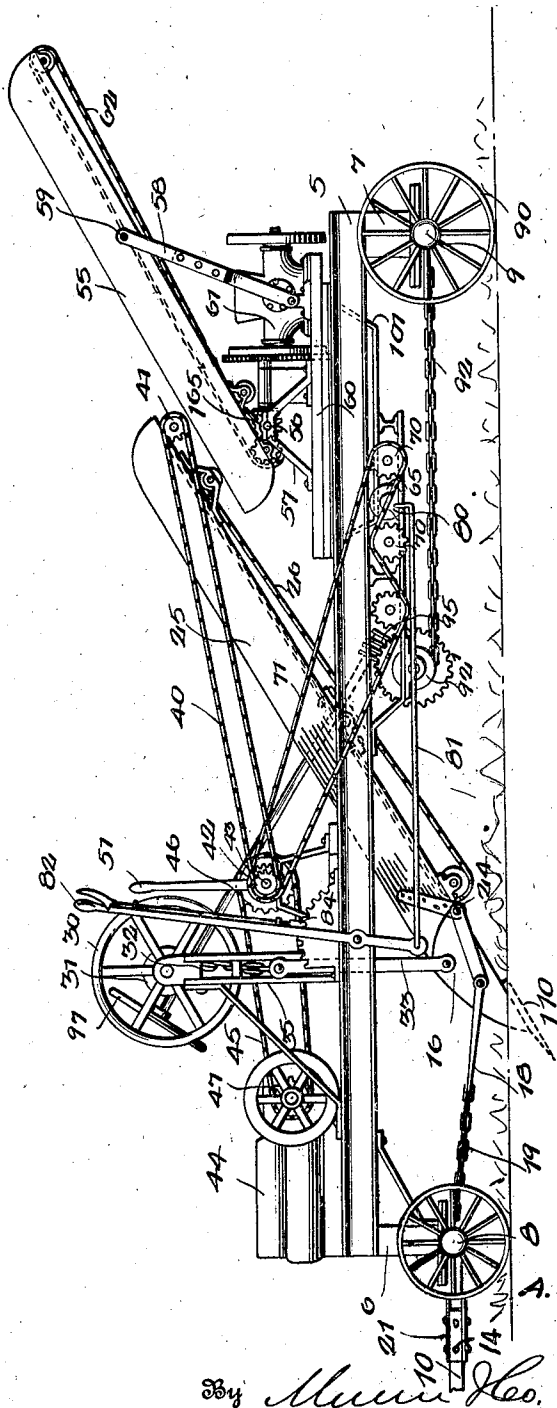
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A. NAYLOR

DITCH DIGGER

Filed June 12, 1922

2 Sheets-Sheet 1



WITNESSES

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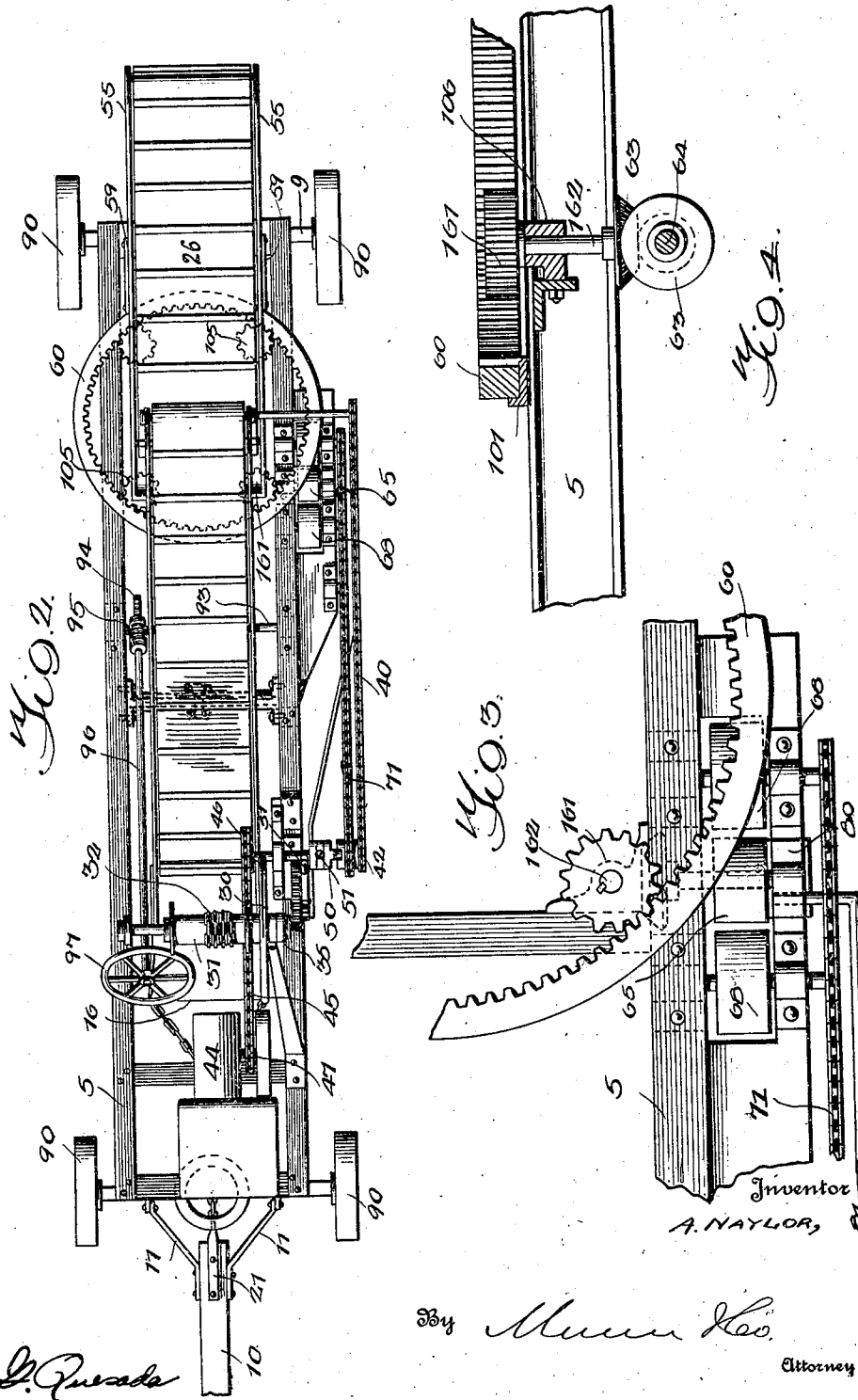
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UNITED STATES PATENT OFFICE.

ADOLPHUS NAYLOR, OF MEDFORD, OREGON.

DITCH DIGGER.

Application filed June 12, 1922. Serial No. 567,705.

To all whom it may concern:

Be it known that I, ADOLPHUS NAYLOR, a citizen of the United States, and a resident of Medford, in the county of Jackson and State of Oregon, have invented certain new and useful Improvements in Ditch Diggers, of which the following is a specification.

This invention relates to ditch digging machines especially adapted for use in irrigation, though not necessarily restricted to such use.

Briefly stated an important object of this invention is to provide a ditch digging machine having novel means whereby the pull thereon is transmitted directly to the scraper or digger blade so as to relieve the other parts of the machine of the strain incident to the engagement of the blade with the ground.

Further the invention forming the subject matter of this application is characterized by the provision of reliable means whereby the depth of the blade may be varied.

Also the invention aims to provide a ditch digging machine having simple means whereby the dirt which is loosened is picked up and conveyed the desired distance to either side of the ditch.

A further object is to provide a ditch digging machine of the class described which is of highly simplified construction, simple to operate and cheap to manufacture.

Other objects and advantages of the invention will be apparent during the course of the following description.

In the accompanying drawings forming a part of this application and in which like numerals are employed to designate like parts throughout the same,

Figure 1 is a side elevation of the improved ditch digging machine,

Figure 2 is a plan view thereof,

Figure 3 is a fragmentary plan view illustrating the means for operating the turntable and consequently the discharge conveyor carried thereby,

Figure 4 is a detail sectional view illustrating the operating means for the turntable,

Figure 5 is a detail sectional view illustrating the connection between the tongue and the pick-up shovel.

In the drawing wherein for the purpose of illustration is shown a preferred embodiment

of the invention, the numeral 5 generally designates a frame which may be constructed of channel iron or any other material found suitable for the purpose. The improved frame is as illustrated in Figure 1 provided with front and rear cross beams 6 and 7 respectively, the said cross beams having connection with the front and rear axles 8 and 9 respectively.

In carrying out the invention a tongue 10 has connection with the front of the frame through the medium of a pair of attaching links or rods 11 having their forward portions arranged on opposite sides of the frame and connected thereto through the medium of pins or bolts 14, the said bolts being extended through slots or transverse openings 15 in the tongue. It will be observed that the transverse slots 15 are considerably wider than the diameter of the pins so that the pins are capable of movement in the slots. Therefore, when the tongue advances the pins 14 will be engaged with the rear walls of the transverse slots 15 and the machine will then begin to advance.

The limited sliding connection between the tongue and the machine is provided so that the pull will be transmitted directly to a blade or shovel 16. The blade or shovel 16 has its side walls connected to a coupling member 18 having a flexible element 19 joined with the tongue 10 through the medium of an attaching strip or bar 21. It might be stated that the chain 19 and the coupling member 18 constitute a Y-shaped connecting device by means of which the shovel is directly connected to the tongue. When this construction is employed the pull of the tongue is transmitted directly to the shovel and consequently heavy braces or rods are not necessary for the shovel. However, this connection between the tongue and the shovel does not in any way interfere with the forward movement of the machine when operated either by draft animals or a tractor.

Figure 1 illustrates that the rear portion of the shovel is hinged as indicated at 24 to the forward end of a main longitudinal extending conveyor frame 25. The conveyor frame 25 is arranged in an inclined position and is provided with a conveyor or pick up device 26 of any desired or well known type. It will be seen as the material

is loosened and picked up by the shovel it will enter the conveyor frame 25 and move upwardly on the endless conveyor 26.

The inclination or cutting depth of the shovel may be varied by the operation of a large hand wheel 30 keyed or otherwise secured to a reel 31 to which a chain 32 is connected. In carrying out the invention the chain is connected at its lower end to a vertical rod or link 33 which is in turn connected to the shovel. The link 33 has connection with and is guided by a pair of guide rods 35 extended upwardly from the frame. It will be seen that when the hand wheel 30 is rotated the chain 32 and the link 33 will be operated for either raising or lowering the shovel. This adjustment of the shovel may be brought about without interfering with the pull on the shovel through the medium of the members 18 and 19.

The conveyor 26 is operated by an endless chain 40 trained about a sprocket wheel 41 of the conveyor and a second sprocket wheel 42 on a counter shaft 43. The counter shaft 43 is connected with a power unit 44 through the medium of a chain 45 and sprocket wheels 46 and 47. It will be observed that when the power unit 44 is in operation it will operate the conveyor 26 for elevating the dirt loosened by the shovel. Figure 2 illustrates that a clutch 50 is connected to the counter shaft 43 and is provided with a lever 51 by means of which the driving connection between the power unit 44 and the conveyor may be broken.

The dirt upon being discharged from the main conveyor 25 is received in a conveyor frame 55 which discharges the dirt at the desired place at one side of the ditch. The lower portion of the discharging conveyor frame 55 is horizontally pivoted as indicated at 56 to a pair of brackets 57. The intermediate portion of the conveyor frame 55 is supported by means of rods 58 pivoted to the frame as indicated at 59. Each rod 58 consists of a pair of adjustably connected overlapped sections and by the adjustment of the sections with relation to each other the inclination of the conveyor frame 55 may be varied.

Figure 1 illustrates that the turntable 60 is rotatably mounted upon the base member supported at the rear end of the frame by means of a plurality of bracing devices 101 secured in any suitable manner to the frame.

The brackets 57 and consequently the conveyor 55 are mounted on the deck of a turntable 60 and an engine 61 is also mounted on the deck and forms a means whereby to operate the endless dirt conveyor member 62. Figure 1 illustrates that the engine 61 is connected to the member 62 through the medium of co-acting gears 165, one of which

is connected to the endless conveyor while the other one is connected to a shaft operated by the engine. In this manner when the machine is in operation the endless conveyor 62 operates for conveying the dirt to the desired point at one side of the ditch.

An important feature of this invention is the fact that the turntable 60 may be rotated for causing the dirt to be discharged from the conveyor 55 at a point laterally of the ditch. Figure 3 illustrates that the turntable is provided with an internal gear having connection with an operating gear 161 keyed or otherwise secured to a vertical shaft 162. The vertical shaft 162 is connected through the medium of gears 63 to a shaft 64. The shaft 64 also has connection with a friction wheel 65 to which power is applied for rotating internal gears in the desired direction.

Attention is directed to Figure 3 which illustrates that the friction wheel 65 is arranged between driving friction wheels 68 having connection with the power unit 44. With reference to Figure 1 it will be observed that the friction wheels 68 are provided with sprocket wheels 70 to which a chain 71 is connected. The chain 71 has connection with the counter shaft 43 and is operated thereby. It will be observed that the chain 71 is trained about the upper side of one of the sprocket wheels 70 and about the lower side of the other wheel 70 whereby to cause the wheels 70 to rotate in opposite directions. When the friction wheel 65 is engaged with one of the driving wheels 68 it will be rotated in one direction and when it is engaged with the other wheel 68 it will be rotated in the other direction for causing the movement of the turntable to be reversed. However, when the friction wheel 65 is in the vertical position illustrated in Figure 3 the turntable will be more or less fixed, and it is obvious that the turntable is rotated only when it is desired to adjust or change the position of the conveyor 62.

The position of the friction wheel 65 may be varied by shifting the carriage 80 which operates the same. The carriage 80 is slidably supported and has connection with a longitudinally movable link 81. The link 81 has connection with a lever 82 by means of which the carriage 80 and consequently the wheel 65 may be shifted. A suitable locking device in the nature of a dog 84 and a segment 85 is provided for securing the lever in a set position.

The rear wheels 90 are mounted on an axle 9 the position of which may be shifted by means of chains 92. The chains 92 are employed for steering the machine and are trained about the spools 92' mounted on a shaft 93. The shaft 93 is provided with a worm gear 94 and a worm gear 95 is engaged with the gear 94. A steering column or

post 96 operates the worm gear 95 and is provided at its upper end with a hand wheel 97 by means of which the machine forming the subject matter of this application may be steered.

In carrying out the invention the internal ring gear is not only engaged by a driving pinion 61 but also by a plurality of idler gears 105. It might be stated that the shaft 162 is rotatably supported by a combined corner brace and bearing 106 which is secured to the sides of the frame and to one of the cross members of the same. The shaft and the idler gears 105 may also be carried by combined corner braces and bearings.

In practise the shovel is provided with a renewable blade 110 which may be made adjustable so that the cutting depth of the shovel may be varied.

In the operation of this machine the same is connected to a suitable source of power and the pull thus exerted on the tongue is transmitted directly to the shovel for picking up the dirt. The dirt thus picked up is elevated by the endless conveyor 26 and is discharged on to the endless discharge conveyor 62 which may be adjusted to discharge the dirt laterally of the ditch.

As previously stated the position of the digging conveyor may be readily varied by engaging the friction wheel 65 with either one of the driving wheels 68. When the discharge conveyor has been positioned as desired the lever 82 is supported for breaking the driving connection between the turntable and the source of power 44.

A machine constructed in accordance with this invention is especially adapted for use in land characterized by the absence of stone and in arid lands of the West and South which are inadequately supplied with water. The machine starts to the surface on one end of the line and at the other end it will be reversed to run in the opposite direction for taking up more dirt.

In this manner the operation is continued until the ditch reaches the proper depth. Of course, the machine will leave a small portion of dirt at each end which may be readily dug out by laborers.

When a pull is exerted on the tongue, a direct pull will be transmitted to the horizontally pivoted shovel so that the same will be engaged with the earth for the purpose of loosening and picking up the same. As the tongue 10 continues to move forwardly the pin 14 will be engaged with the rear walls of the slots 15 so that the links 11 and consequently the frame will begin to travel. The connection between the tongue 10 and the links 11 is clearly illustrated in Figure 5. By reason of this construction the strain on the shovel is not transmitted through the frame and then to

the tongue, but is borne solely by the tongue. By thus establishing a direct connection between the shovel and the tongue the possibility of breaking of the various parts of the organization is reduced to a minimum.

In operation suitable means such as an idler may be provided to take up any slack which may occur in the chain 40 due to the various positions which the conveyor may assume.

Figures 1 and 2 illustrate that the conveyor is horizontally pivoted intermediate its ends to the frame.

In operation the bail or connecting member 18 will exert a pull on the shovel 16 slightly in advance of the pivot point or attaching point of the rod or link 33 so that there will be no tendency of the apparatus to buckle. In this connection, it is desired to point out that a machine constructed in accordance with this invention is especially adapted for use in land characterized by the absence of stones and which is more or less sandy so that the resistance will not be excessive. However, it will be seen that the cutting depth of the apparatus is very limited and in fact the cutting depth is regulated so that there will be no more strain on the machine than it can stand. Furthermore, due to the weight of the conveyor and the fact that the chain 19 and associated elements exert a practically straight pull on the shovel, buckling is positively prevented.

Having thus described the invention what is claimed is:—

1. A ditch digging machine comprising a frame, a conveyor carried thereby, a shovel pivoted to the lower end of said conveyor, a tongue having a limited sliding connection with the frame, and means whereby to establish a direct driving connection between the tongue and the shovel.

2. A ditch digging machine comprising a frame, a conveyor carried thereby, a shovel pivoted to the lower end of said conveyor, a tongue having a limited sliding connection with the frame, means whereby to establish a direct driving connection between the tongue, and means whereby the shovel may be adjusted about a horizontal axis.

3. A ditch digging machine comprising a frame, a conveyor carried thereby, a shovel pivoted to the lower end of said conveyor, a tongue having a limited sliding connection with the frame, means whereby to establish a direct driving connection between the tongue, and a source of power connected to said conveyor.

4. A ditch digger comprising a frame, a tongue having limited sliding connection therewith, a horizontally pivoted shovel having means whereby a direct driving con-

nection is established between the shovel and the tongue, and means whereby the cutting depth of the shovel may be regulated.

5 5. A ditch digger comprising a frame, a tongue having limited sliding connection therewith, and a horizontally pivoted shovel having means whereby a direct driving connection is established between the shovel
10 and the tongue.

6. A ditch digging apparatus comprising a frame, an inclined conveyor carried thereby, a scraper horizontally hinged to the lower end of said conveyor, a rod pivoted
15 to said scraper, a flexible element connected to said rod, a tongue slidably connected to said frame, and flexible means directly connecting said tongue directly to said scraper.

7. A ditch digging machine comprising
20 a frame, a pair of forwardly directed links carried thereby, a tongue having a limited sliding connection with said links, a blade arranged rearwardly of said tongue, a
25 Y-shaped connecting member joining said tongue to said blade whereby the pull of the tongue is transmitted through the connecting member to the blade, and a conveyor member supporting said blade for movement about a horizontal axis.

30 8. A ditch digging machine comprising a frame, a pair of forwardly directed links carried thereby, a tongue having a limited sliding connection with said links, a blade arranged rearwardly of said tongue, a
35 Y-shaped connecting member joining said

tongue to said blade whereby the pull of the tongue is transmitted through the connecting member to the blade, a rod connected to said blade, a guiding device on said rod, a chain connected to said rod, and
40 means whereby to elevate said chain.

9. A ditch digging machine comprising a frame, a pair of forwardly directed links carried thereby, a tongue having a limited sliding connection with said links, a blade
45 arranged rearwardly of said tongue, a Y-shaped connecting member joining said tongue to said blade whereby the pull of the connecting member to the blade, a rod connected to said blade, a guiding device on
50 said rod, a chain connected to said rod, and a second conveyor to receive the material from the first named conveyor.

10. A ditch digging machine comprising
55 a frame, a pair of forwardly directed links carried thereby, a tongue having a limited sliding connection with said links, a blade arranged rearwardly of said tongue, a connecting member joining said tongue
60 to said blade whereby the pull of the tongue is transmitted through the connecting member to the blade, a rod connected to said blade, a guiding device on said rod, a chain connected to said rod, and
65 a power unit for operating said first named conveyor and for adjusting said second named conveyor about a vertical axis.

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