Sept. 25, 1923. 1,468,950

L. A. KRUPP

BACK FILLING MACHINE

Filed Aug. 8, 1921 4 Sheets-Sheet 1

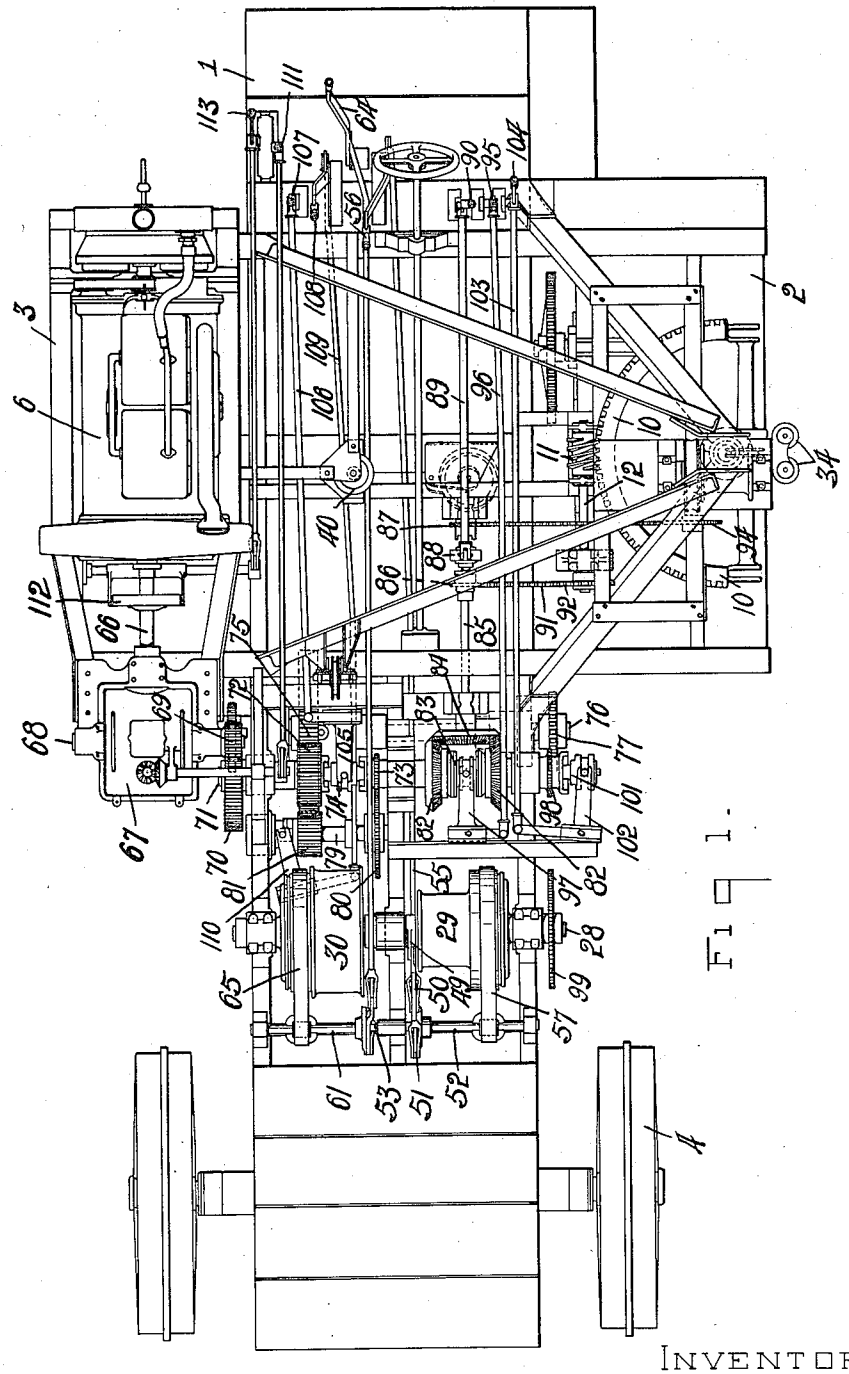


Fig. 1.

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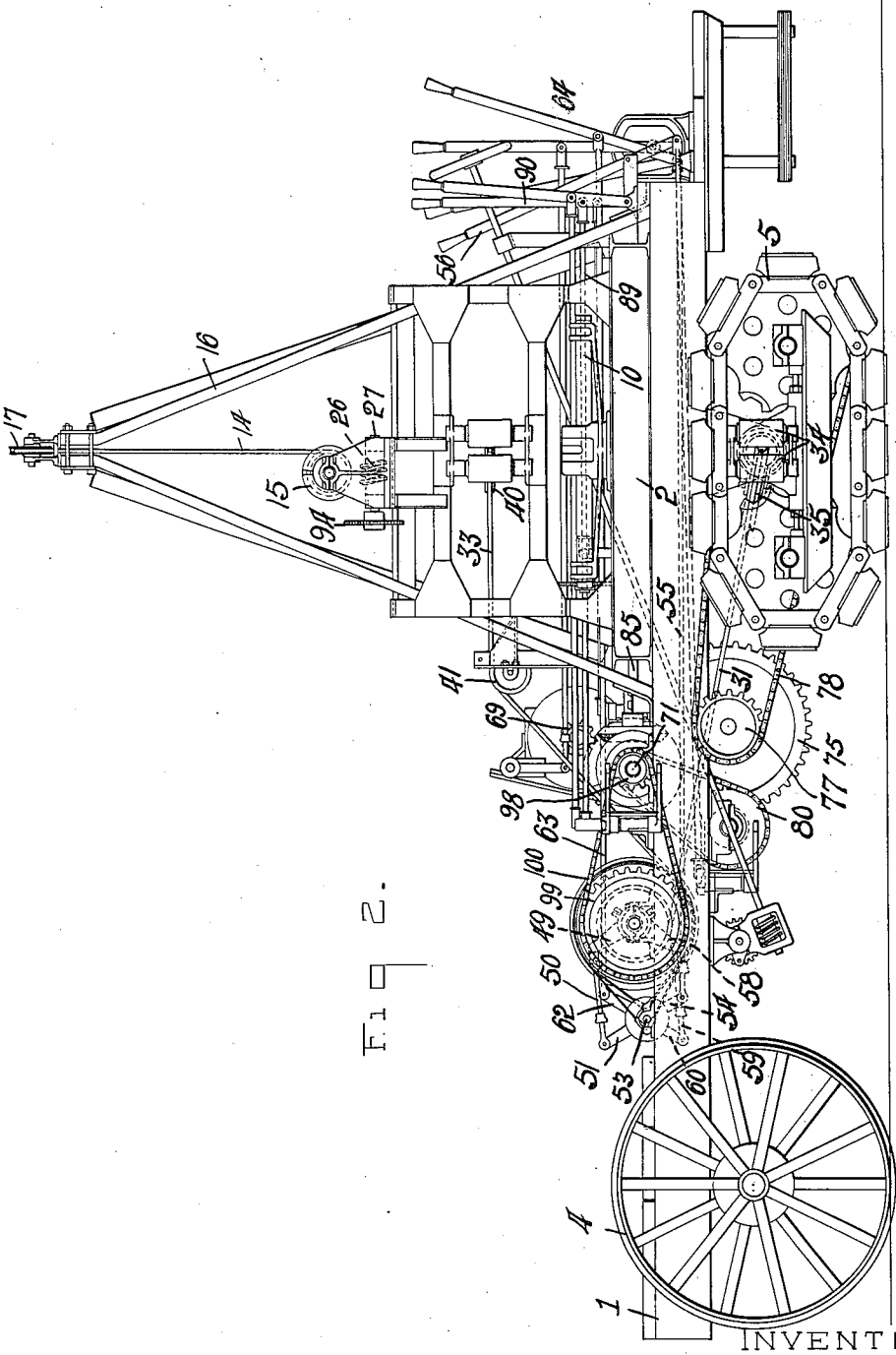


Fig 2.

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BACK FILLING MACHINE

Filed Aug. 8, 1921 4 Sheets-Sheet 3

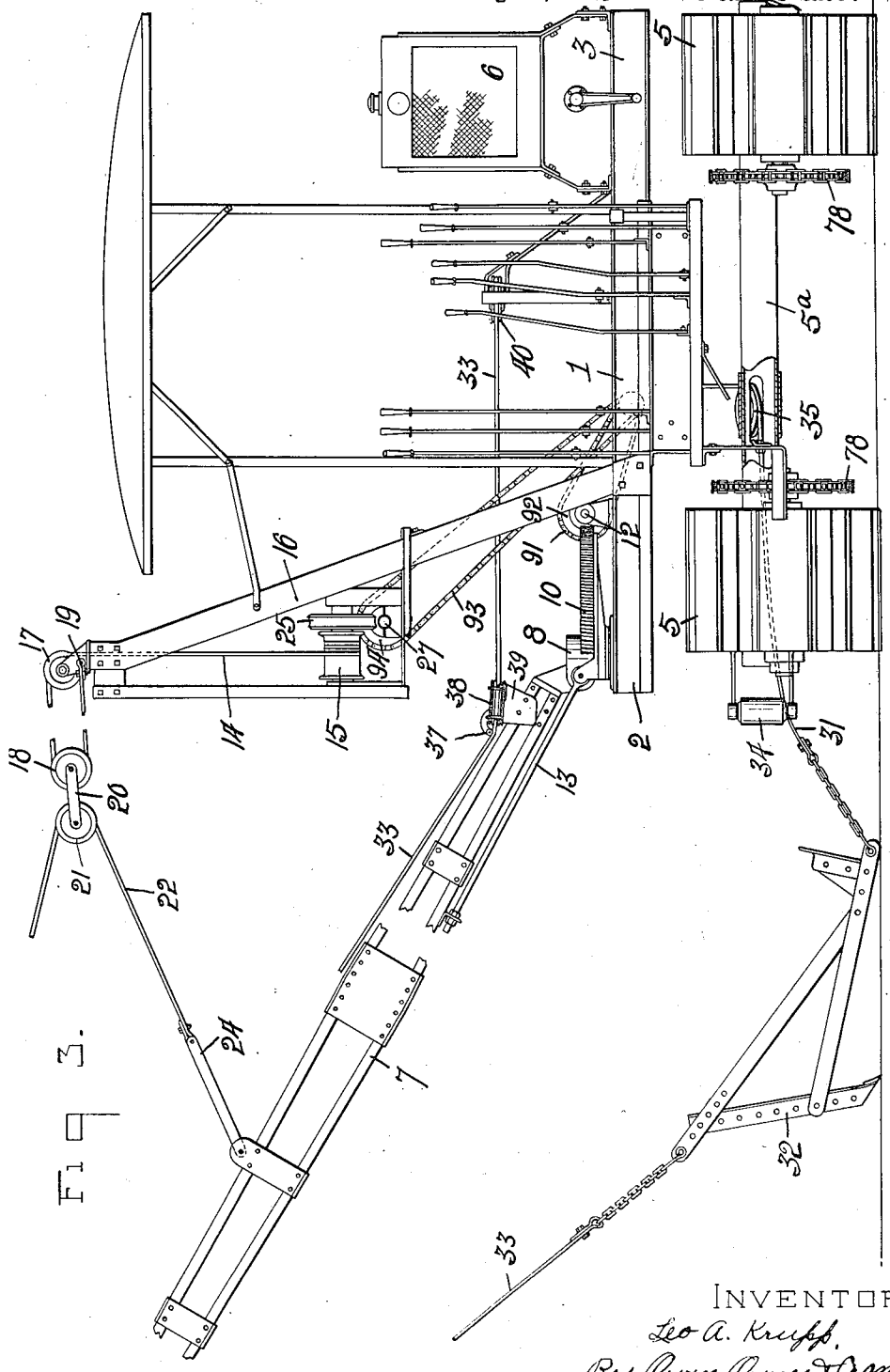


Fig. 3.

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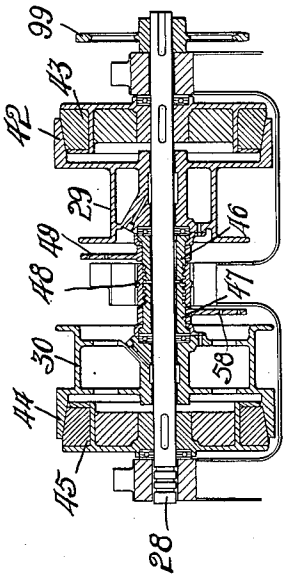


Fig. 5.

Fig. 4.

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UNITED STATES PATENT OFFICE.

LEO A. KRUPP, OF FINDLAY, OHIO, ASSIGNOR TO THE BUCKEYE TRACTION DITCHER COMPANY, OF FINDLAY, OHIO, A CORPORATION OF OHIO.

BACK-FILLING MACHINE.

Application filed August 8, 1921. Serial No. 490,449.

To all whom it may concern:

Be it known that I, LEO A. KRUPP, a citizen of the United States, and a resident of Findlay, in the county of Hancock and State of Ohio, have made an Invention Appertaining to Back-Filling Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this specification.

This invention relates to trenching machinery and more particularly to a machine for back filling trenches, or, in other words, scraping dirt and other material from the bank of a trench from which previously dug, back into the trench.

The object of the invention is the provision of a machine of the class described which is provided with a scraper boom at one side thereof mounted for vertical and horizontal swinging movements, and with simple and efficient means for controlling the swinging movements of the boom and the drawing in and retracting movements of the scraper controlling cables.

Further objects and advantages of the invention will be apparent from the drawings and the following detailed description.

While the invention, in its broader aspect, is capable of embodiment in numerous forms, a preferred embodiment thereof is illustrated in the accompanying drawings, in which,—

Figure 1 is a top plan view of a machine embodying the invention with the boom and other parts removed. Fig. 2 is a side elevation thereof with the boom removed. Fig. 3 is a rear end elevation of the machine with parts broken away. Fig. 4 is a fragmentary top plan view of the frame with the boom and scraper paying out and drawing in control means associated therewith, a part of the boom being broken away, and Fig. 5 is a central longitudinal section through the cable control drums and associated clutch means.

Referring to the drawings, 1 designates the machine frame having lateral extensions or side platforms 2 and 3 at opposite sides of its rear end portion. The frame is supported at its forward end by wheels 4 capable of steering movements and at its rear end, in the present instance, by tractor means 5 of the apron belt type. On one side platform of the frame, 3 in the present instance, is mounted the motor or operating engine 6 of the machine, while the other platform 2, has a boom 7 mounted thereon for vertical and horizontal swinging movements. The boom 7 is pivoted at its inner end for vertical swinging movements to a hub member 8 that is mounted for horizontal swinging movements on a stud 9 carried by and projecting upward from the platform 2. The hub member 8 carries a worm-wheel segment 10 in concentric relation thereto, and this segment is engaged and driven by a worm 11, the shaft 12 of which extends longitudinally of the frame and is journaled in bearings rising from the platform 2 adjacent the inner edge thereof. The worm shaft 12 is driven from the engine by a clutch controlled intermediate driving connection, as hereinafter described. It is evident that a turning of the worm 11 will cause a swinging of the boom 7 in one direction or the other. The boom is laterally braced with respect to the worm wheel segment 10 by rods 13.

The vertical swinging movements of the boom are controlled by a cable 14, which winds on a drum 15 mounted in a frame 16 rising from the main frame 1 and disposed above the horizontal swinging axis of the boom. The cable 14 passes upward from the drum around a sheave 17 carried by the frame 16 at its top and thence extends forward around a sheave 18 and back to the upper end of the frame to which it is attached, as at 19. The sheave 18 is connected by a pair of links 20 to a sheave 21 around which a loop cable 22 passes, one end of the cable being fixed to a bail member 23 that is pivotally attached to the upper side of the boom at its forward end, while the rear end of the loop cable is attached to a bail member 24 pivotally carried by the top of the boom intermediate its ends.

The shaft carrying the drum 15 has a worm-wheel 25 in mesh with a worm 26 on a subjacent shaft 27 journaled in the frame 16 longitudinally of the main frame. The driving and controlling means for the shaft 27 to rotate the drum 15 in one direction or the other is hereinafter described.

The machine frame is provided near its

forward end, in the present instance, with a cross-shaft 28 on which are mounted two clutch controlled drums 29 and 30, the former having a drawing-in cable 31 for the scraper retracting cable 33 attached thereto. The cable 31 is attached to the forward end of the scraper 32, thence passes transversely of the machine between a pair of vertically disposed guide rollers 34 carried by and projected outwardly from the frame of the adjacent tractor member 5, the cable then passing inwardly through the adjacent tractor member 5 and hollow rear axle 5ª and thence through a side opening in the axle around a sheave 35 mounted below the frame 1, the cable then extending forward to and winding on the drum 29. The retracting cable 33 attaches to the rear end of the scraper 32 thence passes outward around a sheave 36 carried by the boom 7 at its outer end and inward therefrom along the boom to near the inner end thereof where it passes under a horizontally disposed guide roller 37 and between a pair of sheaves 38 mounted on the top of the inner end portion of the boom. The sheaves 38 have vertical axes and are spaced transversely of the boom so that the cable will have guiding engagement with one sheave when the boom is in advance of a right angular position with respect to the machine frame, and will have engagement with the other sheave when the boom is at the rear of such right angular position. The cable 33 extends inwardly from the sheaves 38 over the frame 1 around a guide sheave 40 carried thereby and thence extends forward over a sheave 41 and around the drum 30. The sheaves 40 and 41 are carried by suitable bearing brackets secured to and rising from the frame 1.

The shaft 28, which is driven in a manner hereinafter described from the driving mechanism of the machine, has the drums 29 and 30 mounted for loose rotation and axial movements thereon, and the drum 29 has a female friction cone member 42 on the outer end thereof to be engaged by a male clutch member 43 keyed to the shaft, while the drum 30 has a female clutch member 44 at its outer end engaged by a male clutch member 45 keyed to the shaft. The drums have sleeves 46 and 47 respectively projected from their inner ends for rotary movements relative thereto and each sleeve is threaded at its inner end into a bearing sleeve 48 whereby a turning of either worm sleeve will impart inward or outward movements to the respective drum to cause it to engage and release the associated clutch member, as is apparent. The sleeve 46 has an arm 49 projecting therefrom and connected by a link 50 to a rocker arm 51 carried by a sleeve 52 loose on a cross-shaft 53 mounted in the frame 1. The sleeve 52 has an arm 54 (Fig. 2) projecting downward therefrom and connected by a rod 55 to a control lever 56 at the rear of the machine. A brake band 57 is attached at its ends to the sleeve 52 and operable by a rocking thereof to engage and release the clutch flange 42 of the drum 29. The connections of the worm sleeve 46 and brake-band 57 with the operating sleeve 52 are such that when the clutch 43 is engaged the brake-band is released with respect to the drum, and when the clutch is released the brake-band may either stand in neutral released position with respect to the drum or to be moved to engage the drum.

The drum 30 is controlled in a similar manner to the drum 29, and, in the present instance, has the arm 58 of its worm sleeve 48 connected by a link 59 to a rocker arm 60 projecting from a sleeve 61 loose on the shaft 53. This sleeve has a rocker arm 62 projecting upward therefrom and connected by a rod 63 to a control lever 64 at the rear of the machine. 65 designates the brake-band of the drum 30 and is operatively connected to the sleeve 61. Nothing is claimed for the manner of mounting and controlling the drums 29 and 30 as this is old in the art.

The motor 6 has its shaft 66 entering a gear case 67 where it is connected by a suitable shifting gear transmission to a shaft 68 carrying a pinion 69 at its inner end. This pinion is in driving mesh with a gear 70 fixed to a cross-shaft 71, and this shaft has a spur gear 72 and a sprocket wheel 73 mounted loosely thereon at opposite sides of and adapted to be alternately engaged by an interposed clutch sleeve 74 on the shaft whereby rotation may be imparted to either the gear or sprocket-wheel from the shaft. The gear 72 is in direct driving connection with a gear 75 on a countershaft 76 journaled crosswise of the frame and carrying a sprocket-wheel 77 at each end in chain and sprocket wheel connection 78 with the respective tractor wheel 5. This connection between the shaft 71 and tractor wheels is for road traction purposes and when it is desired to effect a slow driving of the machine when it is being operated as the back filler, the clutch 74 is thrown to engage the sprocket-wheel 73 with the shaft, thus driving a countershaft 79 through a sprocket and sprocket-wheel connection 80 and the shaft 79 in turn drives a gear 81 in mesh with the gear 75.

The shaft 71 also carries a pair of loose bevel gears 82 between which a clutch member 83 is shiftable on the shaft to engage either miter gear and cause a driving thereof from the shaft. The miter gears are in mesh with a companion miter gear 84 mounted on a shaft 85, which is journaled in the frame lengthwise thereof. It is thus evident that the shaft 85 may be driven in either direction from the shaft 71. The shaft 85 has

two sprocket-wheels 86 and 87 loose thereon and adapted to be fixedly connected to the shaft by a clutch member 88, which is shiftable between the sprocket-wheels into engagement with either. The clutch 88 is connected by a rod 89 to a control lever 90 at the rear of the machine. The sprocket-wheel 86 is connected by a chain 91 to a sprocket-wheel 92 on the shaft 12, which imparts horizontal swinging movements to the boom 7, and the sprocket-wheel 87 is connected by a sprocket-chain 93 to a sprocket-wheel 94 on the shaft 27, which drives the boom hoisting drum 15. The shifting of the clutch 83 is controlled from a control lever 95, that is connected by a rod 96 and rocker member 97 to the clutch sleeve.

The shaft 71 is in driving connection with the drum shaft 28 through the sprocket-wheels 98 and 99 and connecting chain 100, the sprocket-wheel 98 being loose on the shaft 71 and releasably connected thereto by a clutch member 101, which is shiftable by the movement of a rocker member 102. This member is connected by a rod 103 to a control lever 104.

The control for the clutch 74 is through a rocker member 105, rod 106 and control lever 107. The gear 81 may be shifted into and out of mesh with the gear 75 by the movement of a control lever 108, which is connected to the gear through a rod 109 and shifter lever 110. Transmission gears in the case 67 are controlled from the lever 111, and the motor clutch 112 is controlled from a lever 113.

It is evident in the operation of my machine that to raise and lower the boom 27 the clutch 83 is thrown to engage the proper gear 82 to drive the shaft 85 in the desired direction and the clutch 88 is thrown by an operation of the lever 90 into engagement with the sprocket-wheel 87, which effects a driving of the hoisting drum 15 through the sprocket-chain 93, sprocket-wheel 94, shaft 27 and worm and worm-wheels 25 and 26. The horizontal swinging movements of the boom are also driven from a turning of the shaft 85 in one direction or the other by shifting the clutch 88 into engagement with the sprocket-wheel 86, which effects a driving of the worm 11 in mesh with the segmental gear 10. It is thus evident that a single control is provided for both the raising and lowering of the boom and the horizontal swinging movements thereof. The inward and outward movements of the scraper 32 are controlled respectively by the drums 29 and 30 through the respective cables 31 and 33, the movements of the drum 29 being controlled by movements of the lever 56 and the movements of the drum 30 being controlled by movements of the lever 64. Slow tractive movements are imparted to the machine during an operation of the same by throwing the clutch 74 into engagement with the sprocket wheel 73.

It is evident that I have provided a back filling machine having a boom mounted at one side thereof for both vertical and horizontal swinging movements and that the movements of the boom and the drawing in and retracting movements of the scraper are easy and simple to control. It is also evident that the boom and associated parts are mounted on the opposite side of the machine to the motor so that each has a balancing action on the other.

I wish it understood that my invention is not limited to any specific construction, arrangement or form of the parts, as it is capable of numerous modifications and changes without departing from the spirit of the claims.

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

In a machine of the class described, a frame, a hollow axle below the frame, a tractor wheel carried by the axle, a boom carried by and projecting laterally from the frame, a pair of drums carried by the frame, means for driving and controlling the operation of the drums, a scraper below the boom, a drawing-out cable connecting the scraper and one drum, guide means for said cable carried by the boom and frame, a drawing-in cable connecting the scraper and other drum and extending in through a part of the hollow axle, and means guiding the movements of the drawing-in cable.

In testimony whereof I have hereunto subscribed my name to this specification.

LEO A. KRUPP.