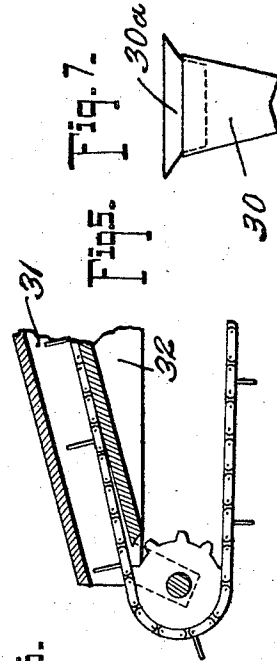
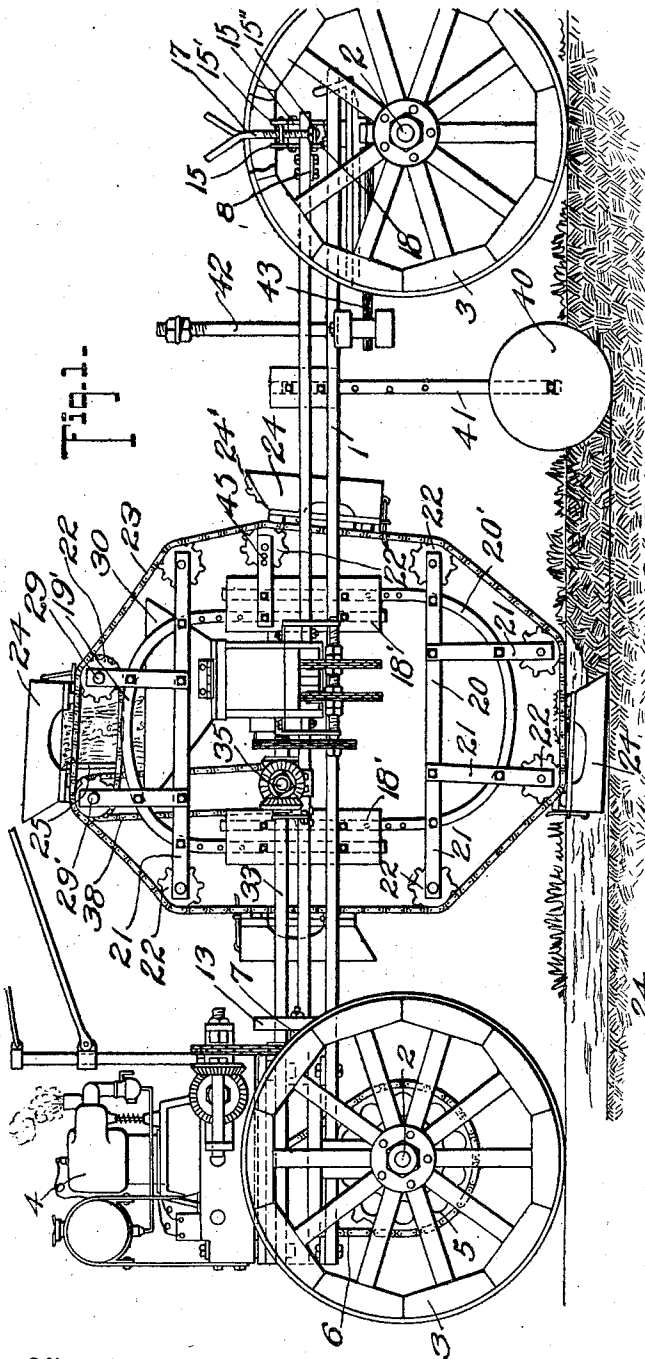


C. N. MORGAN.
DITCHING MACHINE.
APPLICATION FILED OCT. 26, 1911.

1,066,308.

Patented July 1, 1913.

3 SHEETS—SHEET 1.



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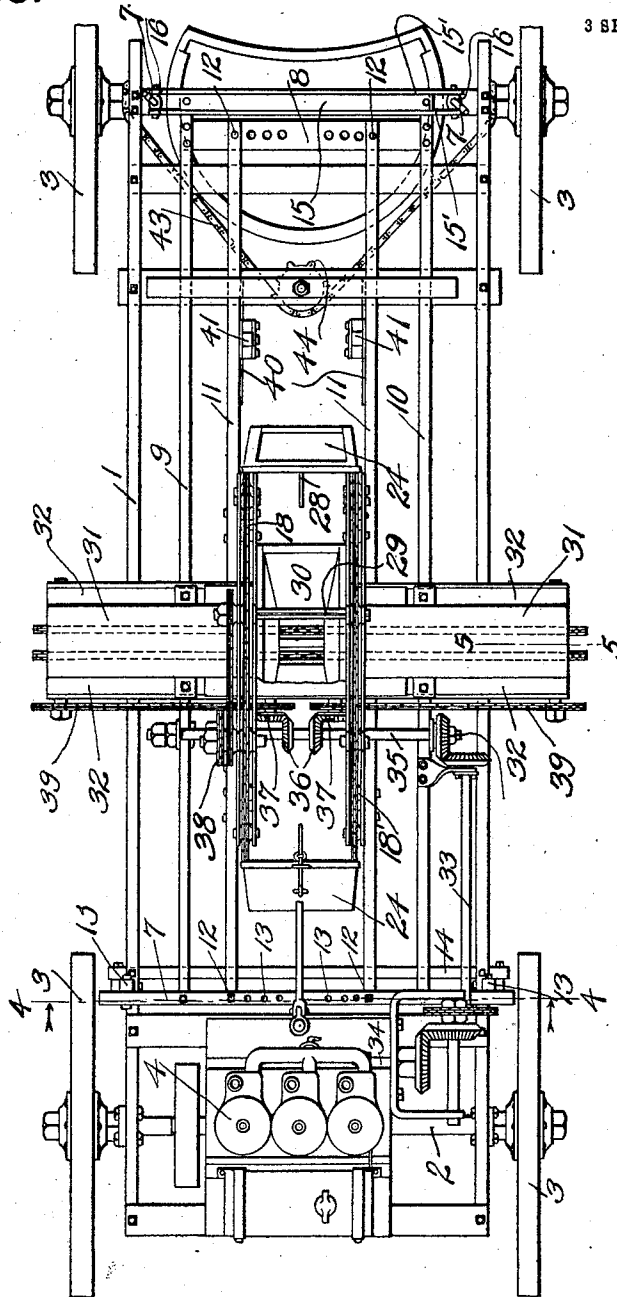
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3 SHEETS—SHEET 2.

Fig. 2.



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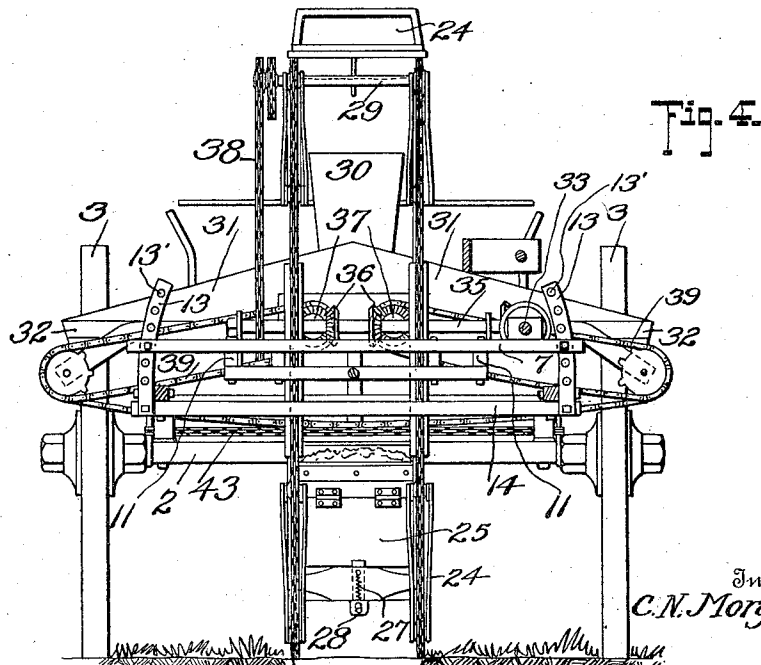
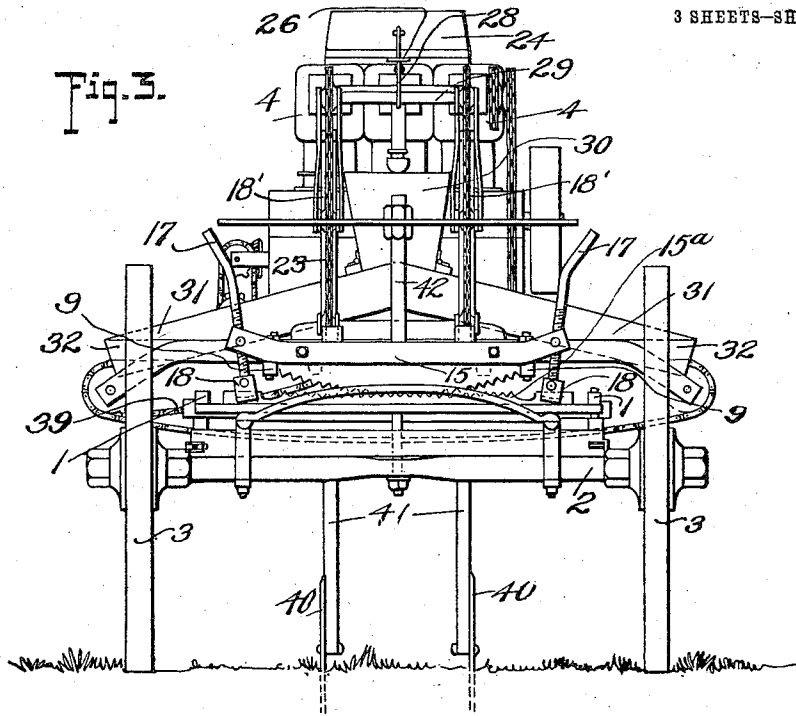
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3 SHEETS-SHEET 3.



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UNITED STATES PATENT OFFICE.

CHARLES N. MORGAN, OF ELIZABETH CITY, NORTH CAROLINA.

DITCHING-MACHINE.

1,066,308.

Specification of Letters Patent.

Patented July 1, 1913.

Application filed October 26, 1911. Serial No. 656,871.

To all whom it may concern:

Be it known that I, CHARLES N. MORGAN, a citizen of the United States, residing at Elizabeth City, in the county of Pasquotank and State of North Carolina, have invented certain new and useful Improvements in Ditching-Machines, of which the following is a specification.

The present invention relates to ditching machines and comprises primarily a vehicle adapted to be propelled by a suitable motor, or any convenient means, and having mounted thereon suitable cutters adapted to operate vertically in the ground to determine the width of the ditch and form straight walls therefor, peculiarly mounted elevating and excavating means being arranged to operate in rear of said cutters to carry the dirt or excavated material upward from the ditch to a suitable hopper from which it is conveyed to any suitable point of deposit or delivery.

The essential feature of the invention resides in the aforesaid excavating and elevating means, whereby a desirable construction is afforded having special adjustment to permit of varying the width of the ditch to a determined extent, and afford an additional degree of adjustment to change the angle at which the excavating means operates in the ground so that a flat bottom ditch may be formed as the machine is propelled along a hillside, or operated under similar conditions of service requiring the last mentioned adjustability of the excavating devices.

The invention resides further in the general arrangement of the parts of the machine, permitting of adjustment to vary the depth of cutting action of the excavating means, and in other detail features of construction, the advantages and operation of which will appear more fully upon reference to the following description and to the accompanying drawings, in which—

Figure 1 is a side elevation of a machine embodying the essential features of the invention. Fig. 2 is a top plan view of the same. Fig. 3 is a front end view. Fig. 4 is a vertical sectional view taken about on the line 4—4 of Fig. 2. Fig. 5 is a fragmentary sectional view on the line 5—5 of

Fig. 2, showing more clearly the construction of the conveyers. Fig. 6 is a sectional view showing more fully the manner in which the excavating buckets are caused to dump their contents into the hopper. Fig. 7 is a detail view of the hopper, showing the detachable end sections.

Throughout the following detail description and on the several figures of the drawings, similar parts are referred to by like reference characters.

In the drawings, 1 denotes the main frame of a wheeled vehicle, said frame being mounted at its opposite ends upon axles 2 having the wheels 3. Supported preferably at the rear end of said frame 1, though it may be arranged at any convenient place on said frame, is a motor 4, which may be an explosive engine or any other type, within the contemplation of the invention. The rear axle 2 is adapted to be driven by the motor through the sprocket wheel 5 connected to a driving element of the motor 4 by a chain or belt 6. Any suitable clutch mechanism may be utilized to connect and disconnect the rear axle 2 from the engine, this being immaterial to the invention.

Mounted on the frame 1 is an auxiliary frame comprising end sills 7 and 8, and main side sills 9 and 10, the latter being permanently attached at their opposite ends to the sills 7 and 8. Spaced from the main side sills 9 and 10 are the adjustable side sills 11 which are connected at their opposite ends also to the end sills 7 and 8, the connections being shown at 12, and comprising bolts or similar fastenings adapted to enter selected ones of different series of openings 13 in the sills 7 and 8. The auxiliary frame just described is supported at its rear end by short vertical standards 13^a which are pivotally mounted at their lower ends on the extremities of a cross piece 14 on the main frame 1. At its front end, the auxiliary frame aforesaid is provided with a cross beam 15 having plates 15' secured to opposite sides thereof and projecting beyond the beam proper so as to support bearings 16 having threaded openings therein through which threaded adjusting shafts 17 pass, the lower extremities of said shafts operating in bearings 15'' supported by

yokes 18 attached to the front end of the main frame 1. It will be understood therefore that the rear end of the auxiliary frame, consisting of the sill 7 is supported by the standards 13^a and the front end of said frame is adjustably supported on the frame 1 by the beam 15 and the adjustable shafts 17. The latter may have wheels or other operating means at their upper ends by which they may be turned so as to raise one side of the auxiliary frame and correspondingly lower the opposite side, this operation at the rear end of the auxiliary frame being permitted by adjusting the fastenings connecting the parts 7 and 13^a in the series of openings 13' with which the standards 13^a are provided. In other words, the transverse tilting of the auxiliary frame just described will change the angle of said frame to a transverse horizontal plane, and since certain excavating mechanism hereinafter described is supported entirely upon the auxiliary frame, it will be observed that the above adjustment permits of varying the angle at which the excavating devices operate with respect to the surface over which they travel. By this adjustment, the excavating devices are adapted to form a ditch, the bottom of which is in a horizontal plane, even though the machine is traveling over an inclined surface such as a hillside or the like.

The excavating means comprises a main frame disposed vertically and composed of combined casings and guides 18', a pair of which is mounted upon each of the sills 11, and these casings 18' have mounted therein, the lower ends of the upper section 19 and the upper ends of a lower section 20 of the frame of the excavating means, said sections 19 and 20 being of somewhat U-form, and comprising sides of similar shape designated 19' and 20' respectively. The frame sections 19 and 20 carry suitable arms 21 which are provided with sprocket or similar wheels 22, about which operate the carrier chains or belts 23. Between the carrier chains 23 are mounted excavating devices in the form of buckets 24, secured to the chains by any suitable fastenings. At one end, each bucket 24 has a scraper 24', and said end is open so as to receive the dirt or material, as shown clearly in Fig. 1. The bottom of each bucket 24, has a closure 25, hinged thereto, and normally held closed by a catch 26 and spring 27, the latter being connected directly to a trip lever 28 pivoted to the closed end of the bucket, and loosely engaging the outer end of the catch 26. Any suitable number and type of buckets 24 may be employed and it will be noted that as each bucket reaches a horizontal position at the upper end of the excavating mechanism, the trip lever 28 will engage the shaft 29 by which a pair of the

wheels 22 are supported at the upper part of the frame sections 19 and 20, this action releasing the closure 25 from the catch 26, permitting said closure to drop into a vertical position, as shown in Fig. 1, to thereby discharge the contents of the bucket 24 into a suitable hopper 30 arranged between the sides of the upper frame sections 19. The wheels 22, aside from those carried by shaft 29, are supported by the frame sections on stub shafts, as clearly apparent in Fig. 2, whereby the intermediate space between the frame sections is left open and the lever 28 is free to pass all of the stub shafts without tripping and unloading. From the hopper 30 the excavated material passes to either one or both of the conveyers 31 which extend from opposite sides of the machine, and are supported by spaced arms 32 attached primarily to the longitudinal sills 9 and 10 of the auxiliary frame. The conveyers 31 are ordinary belt conveyers and operate in opposite directions with respect to the hopper 30, being driven by means of a drive shaft 33, geared to a motor shaft 34 and also geared to a shaft 35. On the shaft 35 are the gears 36 which mesh with similar gears 37 carried by the inner shafts of the conveyers 31. The carrier chains or belts 23 are also driven from the shaft 35 which is connected by a chain or belt 38 to the stub shaft 29' at the upper end of the carrier or excavating frame section 19. It may be noted also at this time that as the buckets 24 move, after dumping of the contents of the same into the hopper 30, the closures 25 remain open until the bucket is inverted as it arrives in its lowermost position, whereupon the closure drops closed by gravity, and is held thus by the catch until again released by the shaft 29. Drive gears 39 connect the shafts at the inner ends of the conveyers 31 to the shafts at the outer ends of said conveyers and it will be apparent that in the operation of the latter the dirt or material is carried outwardly from opposite sides of the machine and delivered to points on opposite sides of the ditch, or to receptacles such as wagons or the like, as may be desired.

The width of the ditch made by this machine may be varied by adjusting the points of connection of the sills 11 with the end sills 7 and 8, each sill 11 carrying a side of the excavator frame composed of sections 19' and 20' so that the distance between said sides will, of course, be varied according to the adjustment of the parts 11 above mentioned. When the width of the ditch is thus changed by the adjustment of the parts just described, the distance between the cutters 40 will also be varied or correspondingly adjusted since said cutters are mounted on standards 41 supported by the sills 11, and

vertically adjustable thereon to accommodate for variation in the depth of their cutting action.

It will, of course, be understood that the depth of the excavating action of the excavators 24 will be regulated by adjustment of the section 20 of the frame of the excavating means, whereby said section is raised or lowered. On adjustment of either of the sections 19 and 20, it is necessary to change the length of the chains or belts 23 and therefore the latter are preferably composed of links which may be detached and attached readily for the purpose desired. When the width between the members 11 is changed so as to obtain different widths of cutting and excavating action, detachable end sections 30^a may be placed in the upper open end of the hopper 30, the said sections 30^a being formed wider than the hopper 30, so that the latter will receive the entire discharged contents of the buckets 24; this construction is shown in Fig. 7. It will, of course, be understood that different sizes of the end sections 30^a will be provided for, so as to correspond to various widths of buckets. The beam 15 at the front end of the tiltable auxiliary frame has a rocker bearing on a stationary beam 15^a located at the front end of the main frame above the front axle, the contacting surfaces of the parts 15 and 15^a being toothed so as to prevent relative shifting, all of which is shown most clearly in Fig. 3 of the drawings. In tilting the excavating means at an angle to the vertical by adjustment of the connections between the sill 7, beam 15, and the parts 13 and 15^a respectively, the beam 15 is adapted to rock on the stationary beam 15^a.

The buckets 24 will be made detachable from the chains 23 in any suitable manner, and it will be understood that different sizes of buckets may be provided so as to correspond to various widths had between the sills 11, when the latter are adjusted.

Any suitable steering means may be used for turning the front axle, that illustrated being conventional and comprising the steering shaft 42 connected by means comprising the chain 43 and wheel 44, or any equivalent means that may be desired. When the sections 19 and 20 of the excavating frame are adjusted together or separately, any slack in the length of the chains 23 is taken up by the adjustable arms 45 carrying sprockets 22.

Having thus described the invention, what I claim as new is:

1. In a ditch excavating machine, the combination of a main frame, an auxiliary frame comprising an end sill and an end rocking beam, standards on the main frame adjustably connected with the end sill, adjusting shafts on the main frame coöperat-

ing with the rocking beam to rock the latter and tilt the auxiliary frame, means on said shafts to hold the auxiliary frame in an adjusted position and excavating means on the auxiliary frame movable therewith.

2. In a ditch excavating machine, the combination of a main frame, an auxiliary frame comprising an end sill and an end rocking beam, adjustable connections between said main frame and the end sill, adjusting shafts on the main frame coöperating with the rocking beam to rock the latter, whereby the auxiliary frame may be tilted to any desired angular inclination with respect to the main frame, means on said shafts to hold the auxiliary frame in an adjusted position, frames extending upwardly and downwardly from said auxiliary frame and adjustable with respect thereto, and excavating means carried by said last-named frames.

3. In a ditch excavating machine, the combination with a frame, end sills carried by the frame, a pair of longitudinally disposed sills carried by the frame and having adjustable connections with said end sills whereby the distance between said longitudinally extending sills may be varied, and excavating means carried by said longitudinally extending sills and adjustable therewith for varying the dimensions of the excavating means.

4. In a ditch excavating machine, the combination with a frame, a pair of guiding casings sustained by said frame, said guiding casings being oppositely disposed to each other, a pair of frames adjustably connected to each pair of guiding casings, one frame in each pair extending vertically above the casing and the other frame of each pair extending below the same, and excavating means carried by said frames.

5. In a ditch excavating machine, the combination with a main supporting frame, an auxiliary frame mounted thereon, a standard connected with each side of the main frame, each of said standards being provided with a plurality of apertures, an end sill member carried by said auxiliary frame and having adjustable connections with said standards, said sill member being provided with a plurality of apertures, adjustable connections between the other end of said auxiliary frame and said main frame whereby the auxiliary frame may be set at various angular inclinations with respect to the main frame, and excavating means carried by said adjustable frames.

6. In a ditch excavating machine, the combination of a main frame, longitudinally extending sill members sustained thereby, a pair of guiding casings connected with each of said longitudinally extending sill members, a pair of frames connected with each

pair of guiding casings, one frame of each
pair extending vertically above the guiding
casings and the other frame of each pair ex-
tending vertically below the same, said
5 frames having adjustable connections with
said guiding casings whereby the distance
between the lower end of the lower frame
and the upper end of the upper frame may

be varied, and excavating means carried by
said frames.

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

CHARLES N. MORGAN.

Witnesses:

W. W. CARVER,

T. E. D. MORGAN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."