

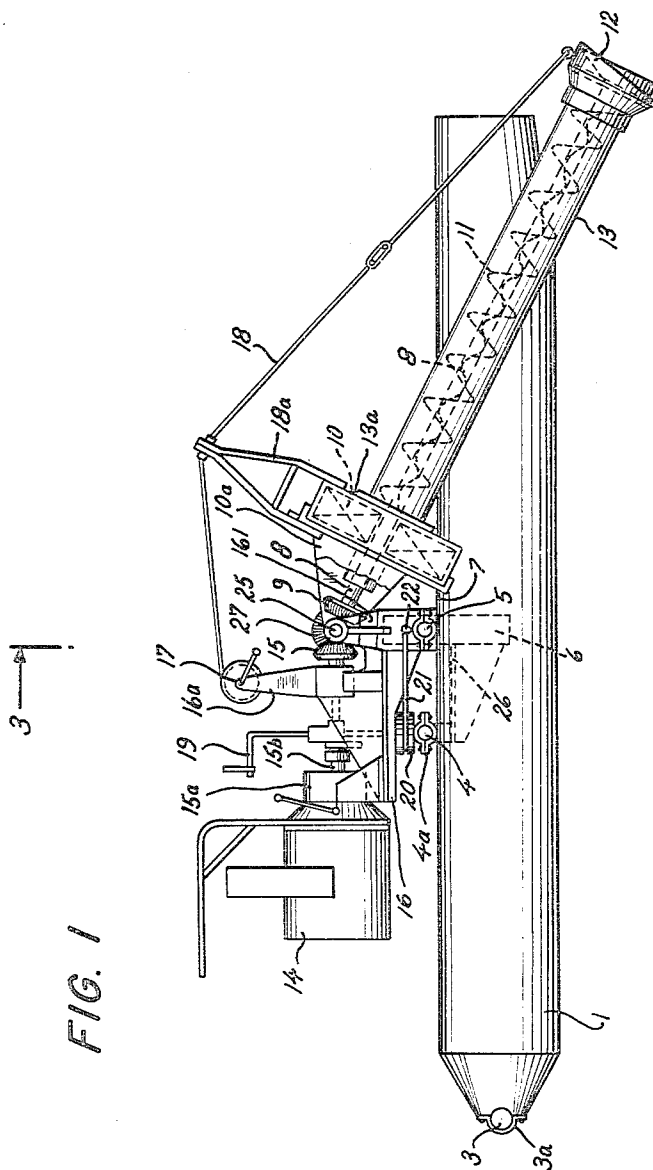
Aug. 30, 1960

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DITCH CLEANING MACHINE

2,950,548

Filed Nov. 5, 1954

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

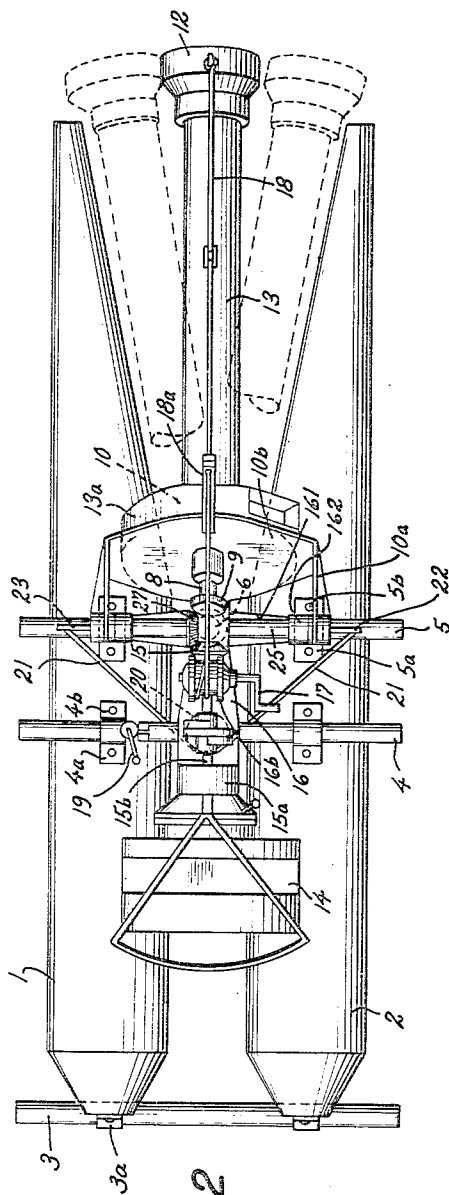


FIG. 2

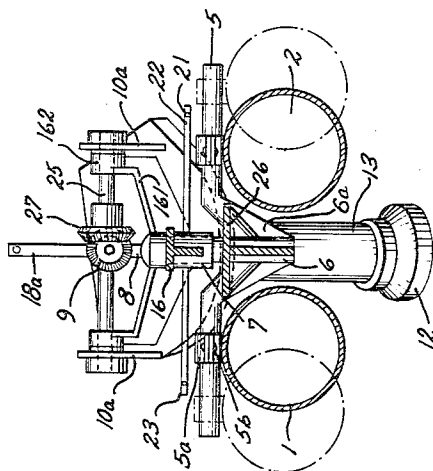


FIG. 3

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2,950,548

DITCH CLEANING MACHINE

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Filed Nov. 5, 1954, Ser. No. 467,031

Claims priority, application Germany Nov. 11, 1953

7 Claims. (Cl. 37—67)

The present invention relates to a ditch cleaning machine arranged on a floating means.

A suction dredger-like ditch clearing machine provided with an embankment cutter has already been proposed and arranged so as to be pivotable on all sides on a pontoon-like water craft, the lengthened shaft of same serving at the same time for the driving of the propeller-like embankment cutter.

Such an arrangement has the disadvantage that it can only be used on ditches in which the water craft can float, and furthermore it can only clear out ditches which are wider than the width of the floating pontoon. The centrifugal pump used with same can only act if the whole suction means, in particular, the rather long suction pipe is filled with water. If shallow ditches are to be cleared out, it frequently happens that the cutting device works partly above the surface of the water so that a large quantity of air is sucked in so that, carrying away of the material is not possible. With the known arrangement there is also the danger that only a part of the cut material of the ditch is sucked in.

By means of the arrangement according to the invention a universally applicable ditch clearing apparatus is provided in which the above-mentioned disadvantages of the known arrangements do not occur.

With the invention, features known in ditch cleaning machines are used, for example, a cutter, a conveying screw and also a mud centrifuge. The particularly favourable manner of operation of the arrangement according to the invention is obtained by a new combination of known individual constructional features and the result of this arrangement exceeds what could be expected from the operation of the single features.

According to the characteristic feature of the present invention the ditch cleaning unit consisting of a cutting head, encased conveying screw and mud centrifugal is arranged on floating means which are adjustable in width. The unit is pivotable in vertical and lateral directions.

According to a further feature of the present invention the floating means may be so constructed that at the same time it can be used as a sliding support if in consequence of the spatial proportions of a ditch, floating of the arrangement on the water is not possible because of too low a water level in the ditch.

The floating means may, for example, consist of two or more floating members, of cylindrical shape connected to each other at an adjustable distance by means of one or several cross bars and may serve as sliding supports when the machine slides on mud.

The entire clearing means arrangement including a motor may be suitably balanced and held in equilibrium on a kingpin support.

According to a further feature of the present invention the mud centrifuge, conveying screw and cutting head are arranged on a common shaft.

Furthermore the arrangement may be such that the

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clearing unit can be pivoted out of the middle longitudinal axis of the floating means so that it clears more vigorously on one side of the machine than the other.

The height and side adjustment may be effected by means of small hand windlasses.

The conveyor screw turning in the suction pipe produces a suction effect at the front end of the pipe and thus sucks the cleared material cut up by the cutting head whereupon the centrifuge arranged on the other end of the screw seizes the material of the ditch pressed into it and discharges it onto the embankment.

The floating means may be adapted to the ditch width to be cleared so that the means according to the invention can be used for narrow as well as wide ditches.

The forward movement of the whole ditch cleaning machine may be suitably effected by means of a rope.

The invention is illustrated by way of example in the accompanying drawings.

Fig. 1 is a side view, mostly in section, of an embodiment of the present invention;

Fig. 2 is a plan view; and

Fig. 3 is a cross section on line 3—3 of Fig. 1.

Two floating members 1 and 2 of generally cylindrical shape and tapered at the rear end thereof are traversed by cross bars 3, 4 and 5 passing through shackles 3a, 4a and 5a. Shackles 4a and 5a are secured by threaded bolts 4b and 5b to floating members 1 and 2. Normally, the bolts are tightened, but when they are loosened, the width of the floating means 1, 2 can be adjusted and consequently the members 3—5, 3a—5a, 4b and 5b constitute means for adjusting the width of floating means 1, 2.

A support, shown to be a king pin 6 is fixedly secured to cross bar 5 by a bracket 6a and supports a socket 7 for turning movement about a vertical axis. A support 16 is fixedly secured to socket 7 and turns with the same on king pin 6. A yoke 161 is also secured to socket 7 and carries bearings 162 supporting a horizontal shaft 25. Elements 7, 16 and 161 constitute a supporting member.

A pair of arms 22 and 23 project from socket 7 below the yoke 161, as best seen in Fig. 3. A bracket 26 is secured to king pin 6 and carries a windlass drum 20 on which is wound a rope 21 whose ends are secured to the ends of arms 22 and 23. A turntable crank 19 is connected to windlass drum 20 for turning the same so that turning of crank handle 19 effects turning of the supporting member 7, 16 and 161.

A clearing unit is provided which includes a shaft 8, a bevel gear 9 fixedly connected to shaft 8, a conveyor screw means 11, a cutting head 12, and a mud centrifuge 10 all mounted on shaft 8. The clearing unit further includes a casing 13 for the conveyor screw which is fixedly connected to the housing 13a of the mud centrifuge 10. A bracket including lateral parts 10a and a connecting part 10b is secured to the housing of the mud centrifuge 10 and has bearing means through which shaft 25 passes, so that this bracket with its parts 10a and 10b is turnable with respect to the shaft 25. Consequently, the entire clearing unit is pivotable about a horizontal axis. Elements 7, 161 and 10a, 10b constitute mounting means for mounting the clearing unit on the support 6 for pivotal movement about horizontal and vertical axes.

For raising and lowering the clearing unit, a rope means 18 is secured to the lower end of casing 13 and passes through an intermediate support 18a and over a rope drum 17 which is turnably mounted on a bracket 16a which is part of support 16.

Elements 19, 20, 21, 22, 23 constitute first operating means connected to supporting member 7, 161 for turning the same and thereby the clearing unit about a ver-

tical axis defined by the king pin support 6. Drum 17 and rope 18 constitute second operating means for raising and lowering the clearing unit by pivotal movement about a horizontal axis defined by shaft 25.

A motor 14 is mounted on support 16 and drives a gear box 15a, a shaft 15b, and a bevel gear 15 in mesh with a bevel gear 27 which is turnably mounted on shaft 25. Bevel gear 27 meshes with bevel gear 9 which is fixed on shaft 8 of the clearing unit. Consequently, shaft 8 is driven by motor 14 for turning the cutting head, the conveyor screw and the mud centrifuge, but the clearing unit can be raised with bevel gear 9 rolling on bevel gear 27.

From the above description of the structure of the present invention it will become apparent that the operating means 19, 20, 21, 22, 23 and 17, 18 are connected to the mounting means 7, 161, 25, 10a, 10b and to the casing 13 of the clearing unit for turning the unit about the axis of king pin support 6, and the axis of shaft 25.

When the clearing unit swings about the king pin support 6, it may be moved to the extreme positions illustrated in dash and dot lines in Fig. 2. Regardless of the angular position of the clearing unit, its lower end can be raised and lowered by the operating means 17, 18, and of course the unit can be driven from motor 14 in any adjusted position.

I claim:

1. Ditch clearing apparatus comprising, in combination, floating means; means for adjusting the width of said floating means; a support mounted on said floating means; a clearing unit including a cutting head, conveyor screw means, and a mud centrifuge; mounting means for mounting said clearing unit on said support pivotable about horizontal and vertical axes; and operating means connected to said unit and to said mounting means for turning said unit about said axes.

2. Ditch clearing apparatus comprising, in combination, floating means having surface portions adapted to slide on the surface of a ditch; means for adjusting the width of said floating means; a support mounted on said floating means; a clearing unit including a cutting head, conveyor screw means, and a mud centrifuge; mounting means for mounting said clearing unit on said support pivotable about horizontal and vertical axes; and operating means connected to said unit and to said mounting means for turning said unit about said axes.

3. Ditch clearing apparatus comprising, in combination, floating means including two floating bodies; means connecting said floating bodies for movement toward and away from each other for adjusting the width of said floating means; a support mounted on said floating means; a clearing unit including a cutting head, conveyor screw means, and a mud centrifuge; mounting means for mounting said clearing unit on said support pivotable about

horizontal and vertical axes; and operating means connected to said unit and to said mounting means for turning said unit about said axes.

4. Ditch clearing apparatus comprising, in combination, floating means; means for adjusting the width of said floating means; a vertical king pin means mounted on said floating means; a supporting member mounted on said king pin means turnable about the axis of the same; a clearing unit mounted on said supporting member pivotable about a horizontal axis, said clearing unit including a cutting head, conveyor screw means and a mud centrifuge; first operating means connected to said supporting member for turning the same; and second operating means connected to said clearing unit for turning the same about said horizontal axis.

5. A ditch clearing apparatus as set forth in claim 4 wherein said clearing unit includes a shaft supporting said cutting head, conveyor screw means and mud centrifuge for simultaneous turning movement.

6. Ditch clearing apparatus comprising, in combination, floating means including two floating bodies; cross bar means connecting said floating bodies for movement toward and away from each other; a vertical king pin means mounted on said cross bar means so that the distance between said king pin means and each of said floating bodies is adjustable; a supporting member mounted on said king pin means turnable about the axis of the same; a clearing unit mounted on said supporting member pivotable about a horizontal axis, said clearing unit including a cutting head, conveyor screw means and a mud centrifuge; first operating means connected to said supporting member for turning the same; and second operating means connected to said clearing unit for turning the same about said horizontal axis.

7. A ditch clearing apparatus as set forth in claim 6 wherein said clearing unit includes a casing; and wherein said first operating means includes a rope drum supported on said king pin means, a pair of transverse arms projecting from said supporting member, and rope means connected to said transverse arms and passing over said rope drum; and wherein said second operating means include a rope connected to said casing of said clearing unit, and windlass means mounted on said supporting member and being connected to said rope for turning said clearing unit about said horizontal axis.

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