

March 1, 1960

C. E. ELLICOTT, JR
DREDGE DISCHARGE PIPE

2,926,437

Filed Dec. 3, 1956

3 Sheets-Sheet 1

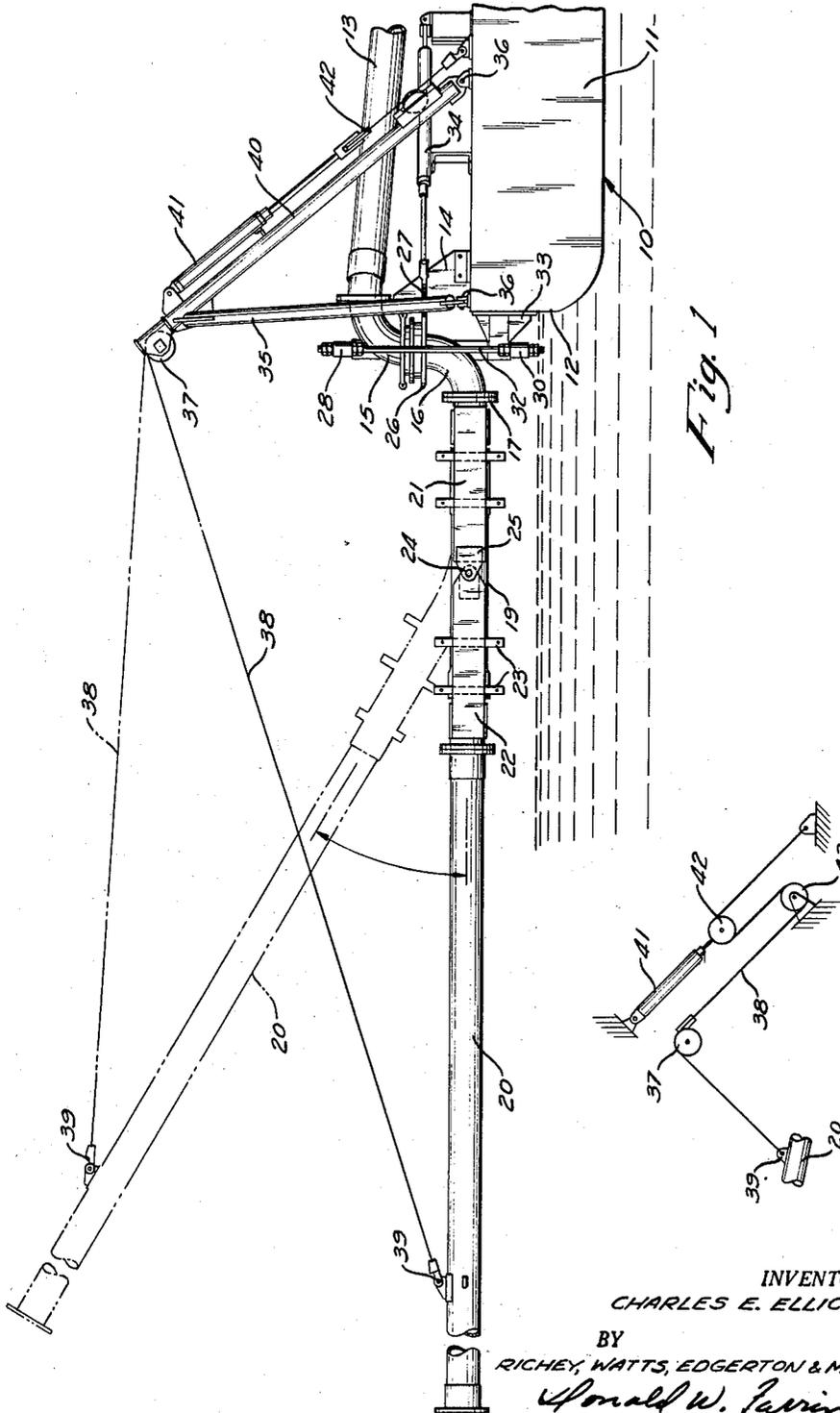


Fig. 1

Fig. 3

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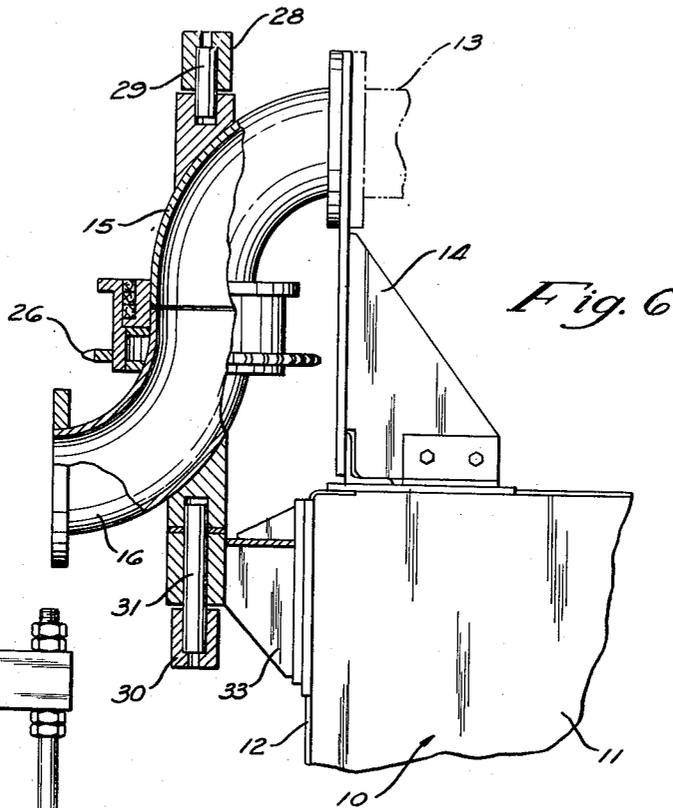


Fig. 6

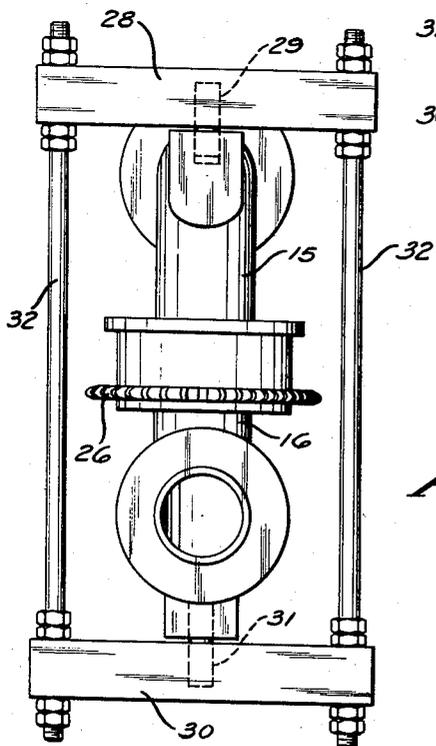


Fig. 7

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DREDGE DISCHARGE PIPE

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Application December 3, 1956, Serial No. 625,932

2 Claims. (Cl. 37--72)

This invention relates to improvements in hydraulic dredges, and more particularly, to an adjustable discharge pipe construction permitting it to be readily moved laterally and vertically.

The use of dredges on canals, rivers, and other bodies of water for removing silt and dirt and either depositing it along the banks or into an accompanying barge, is well recognized in the art. Frequently it is necessary that the discharge pipe of such dredge be moved either vertically or laterally to permit the dredge to pass under a bridge or to discharge from one bank or the other or to be lifted over roads and other obstructions.

I have discovered that a self-contained one-man operation method for selectively discharging the silt directly into the banks or barges, usually without the use of floating pontoons or similar equipment, is provided by means of a discharge-pipe swivel elbow operated by means of a sprocket chain and two hydraulic cylinders for laterally swinging the discharge pipe, while raising and lowering of the pipe is accomplished by wire rope and blocks, the aforesaid operations may be accomplished by hydraulic cylinders operated by a source of hydraulic power located on the dredge.

The disposition and arrangement of the discharge pipe as herein described is advantageous on dredges working in narrow canals or streams where there may be no disposal area available due to buildings, roads, or the like and the discharge may be into a barge directly astern of the dredge. During the course of this operation the discharge pipe is brought to the center line and then swung slightly to one side or the other, in order to equalize the distribution of the silt in the barge. In those instances when the material is being discharged onto either bank of the stream, it may be necessary to raise the discharge pipe occasionally in order to avoid a tree or obstruction and to swing it forward or backward in order to avoid discharging onto a road or some structure.

Therefore, objects of this invention are to provide self-contained flexible means for readily swinging the discharge pipe laterally and vertically, such means being operated by a source of hydraulic power installed on the dredge and quickly and easily operated by an individual operator.

Another object of this invention is to provide relatively simple and inexpensive means for moving the discharge pipe as above described.

Another object is to provide discharge pipe control means requiring relatively few parts the same being adapted to be disposed at the stern where the parts are readily accessible for repair and adjustment.

Other objects are to provide a sturdy swinging mechanism which is easily operated and is reliable and efficient in operation.

These and other objects will appear during the course of the following specifications.

In the drawings forming a part of this specification:

Fig. 1 is a side elevation view of an illustrative embodiment of my invention showing the stern of a dredge,

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the discharge pipe in both lowered and raised positions, and the mechanism for operating it;

Fig. 2 is a top plan view of the device illustrated in Fig. 1;

Fig. 3 is a schematic view of the hoisting cylinder and means for vertically moving the discharge pipe;

Fig. 4 is a broken sectional view of a discharge pipe mounted on the stern of the dredge and discharging onto the bank of a stream;

Fig. 5 is a schematic view illustrating the hydraulic system and controls;

Fig. 6 is a view illustrating the detail of the swivel construction of the discharge pipe, with parts broken away, while

Fig. 7 is a rear view of Fig. 6.

The type of dredge referred to in this specification comprises a suitable hull, usually having a movable ladder mounted at the bow thereof and a cutter device disposed at the outer end of the ladder, while a suction pipe having an opening near said cutter device extends upwardly along the ladder onto the deck, where a suction pump draws in the silt and forces it out a discharge pipe usually located at the stern. This type of dredge may be powered by a single prime mover, such as a diesel motor, driving an hydraulic pump coupled to the various operating mechanisms on the dredge through a control mechanism enabling the operator to selectively operate the various mechanisms. Frequently such dredges are provided with hydraulically controlled spuds adapted to swing or move the dredge in the water within limited areas.

The disclosure herein is limited to the stern of the dredge and the mechanism for operating the discharge pipe. The details of the dredge construction, including the power unit, the ladder and associated features are disclosed in my co-pending patent application Serial No. 625,933, filed December 3, 1956, while spud construction details are illustrated in my co-pending application Serial No. 625,911, filed December 3, 1956.

In the drawings, disclosing an illustrative embodiment of this invention, the numeral 10 refers generally to a dredge including a hull 11 and a stern 12. A discharge pipe 13, leading from the discharge pipe of a suction pump not shown herein and supported at the stern by a frame 14 suitably secured to the deck is provided with a downwardly curved section 15, while a cooperating swivel elbow 16 is joined thereto in such manner that it permits rotation of the swivel elbow 16 on a vertical axis, providing for the lateral movement of the discharge pipe on such axis.

The swivel elbow 16 is curved so that its outer end is horizontally disposed as indicated at 17 in Fig. 1. A horizontally disposed pipe section 18 continues outwardly from the swivel elbow 16, while an intermediate rubber tube or pipe section 19 is press-fitted around the end of the pipe 18 and extends outwardly a few feet where it is similarly mounted on the outer end section 20 of the discharge pipe. Channel members 21 and 22 are disposed along the sides of discharge sections 18 and 20 respectively, while clamps are provided to secure the ends of intermediate pipe section 19 to pipes 18 and 20. The rubber pipe section 19 is mounted on a horizontal pivot through the cooperation of pins 24 disposed in brackets 25 in cooperating channel members 21 and 22 in order that the discharge pipe 20 may be raised and lowered due to the flexibility of the rubber pipe section 19.

As shown in Figs. 1 and 2, swivel elbow 16 is provided with a sprocket 26 around which is mounted a roller chain 27. The two sections of the swivel elbow 16 are retained together by an upper bar 28 mounted on pin 29 and lower bar 30 mounted on pin 31 the

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same being held together by two tie rods 32 suitably mounted on the stern in a bracket 33 extending rearwardly therefrom.

Two horizontally disposed swivel elbow cylinders 34, operatively connected to roller chain 27 are adapted to swing swivel elbow 16 on its vertical axis in an obvious manner. The swivel elbow cylinders 34 are hydraulically connected to a source of hydraulic power in such manner that they operate in opposite directions for causing the swivel elbow 16 to rotate on a vertical axis as hereinafter described.

A tripod 35 substantially vertically disposed at the rear edge of the stern 12 and suitably secured to the deck as by means of bolts 36 supports means for raising and lowering the outer end 20 of the discharge pipe, such means including a sheave 37 mounted on a horizontal axis at the top of the tripod 35 in which operates a wire cable 38 secured to discharge pipe 20 near its outer end in a dead end fitting 39. A slanting arm 40 of the tripod 35 supports a discharge pipe hoist cylinder 41 suitably connected to a source of hydraulic power, which is adapted to raise and lower sheave 42 and cooperates with a fixedly mounted sheave 43 in such manner that the wire cable 38 lifts the discharge end section 20 when the hoist cylinder 41 moves sheave 42 upwardly and lowers such pipe section when said cylinder moves sheave 42 downwardly.

As illustrated in Fig. 5 the hydraulic fluid connections to the swivel elbow cylinders 34 are connected so that when the forward end of one swivel cylinder is connected to pressure, the forward end of the other is connected through the valve to the tank, in order that they may move in unison for selectively rotating the sprocket 26 on a vertical axis in either direction and thus swing the discharge pipe 20 from side to side. The controls for such cylinders are indicated by the letters S.V., while the cylinders are indicated by the letters S.C. The hydraulic connections for the discharge pipe hoist cylinder 41 indicated by the letters L.C. are operated by controls indicated by the letters L.V. while the source of hydraulic fluid under pressure is indicated by the letter P.

Fig. 4 illustrates a manner of operating the dredge 10 to discharge the silt along the banks of the stream. When discharging the material along the banks of the stream, it has been found advantageous to build dirt banks 45 along the bank edge to retain the dredged material 46 and prevent it from returning to the stream.

In operating the dredge 10, a source of hydraulic pressure may be obtained by providing a prime mover or diesel motor which provides hydraulic power through a pump indicated by the letter "P" on Fig. 5. The pipes and connections for supplying such hydraulic pressure are well known in the art and are omitted from this specification in the interest of brevity. It should be noted that the apparatus for raising, lowering, and laterally swinging the discharge pipe is mounted on the stern of the dredge and provides means whereby such movement of the discharge pipe may be readily accomplished by the operator at the control stand near the bow.

The controls illustrated in Fig. 5 may be operated by an individual operator in the following manner: To raise the end 20 of the discharge pipe, the three-way control valve indicated by the letters L.V. is moved to one operating position, forcing oil to enter the top of a single acting hoist or lift cylinder 41, also designated by the letters L.C. and having an air vent V, thereby forcing downwardly the piston and raising the sheave 42 and drawing in the wire cable 38 to cause the end of the discharge pipe to be raised to the position indicated by the dotted lines in Fig. 1. To lower the end 20 of the discharge pipe, the control valve L.V. is shifted to its opposite operating position, whereupon the weight of the pipe evacuates the oil from the top of the cylinder 41 permitting the oil to return through the conduit 41a

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and the control valve L.V. to the oil supply tank thus lowering the pipe.

The swinging of the discharge pipe to the right or left from the position indicated in Fig. 2 is accomplished by operating the four-way control valve indicated by the letters S.V. Thus, when the valve S.V. is moved to one operating position, oil is forced into the top of the right cylinder 34 through the conduit 34b, and forces the piston inwardly of the cylinder causing the chain 27 to rotate the sprocket 26 in one direction and swing the pipe in one direction. At the same time oil is evacuated from the top of the left cylinder 34 and returns through conduit 34a and the valve S.V. into the oil tank. When the control valve S.V. is moved to its opposite operating position, oil is forced into the top of the left cylinder 34 and is evacuated from the right cylinder 34, thereby swinging the discharge pipe in the opposite direction in an obvious manner. The two swing cylinders 34 are provided with air vents indicated by the letter V.

Having completed a detailed description of a preferred embodiment of the present invention so that others skilled in this art may be able to understand and practice the same, I state that what I desire to secure by Letters Patent is not limited by said preferred embodiment but rather is defined in what is claimed.

I claim:

1. A dredge comprising a hull having a deck and a stern, discharge means for the dredge comprising a vertically disposed bracket mounted on the deck near the stern, a horizontally disposed bracket secured to and projecting from the stern, a pair of complementary upper and lower swivel elbows, said upper elbow having a horizontally disposed portion mounted on said deck bracket, said lower elbow having a vertically disposed pivotal mounting on said stern bracket, said lower elbow having a coupling ring to receive a depending portion of the upper elbow, said ring having a chain sprocket mounted exteriorly thereof above the deck, a multi-section discharge pipe comprising a first rigid metal pipe section secured to said lower elbow, a flexible pipe section secured to said first metal pipe section and a second rigid metal pipe section secured to said flexible pipe section in the sequence named, a pair of rigid metal members fixed to said first metal pipe section and extending horizontally therefrom to embrace a portion of the flexible pipe section, a pair of rigid metal members fixed to said second metal pipe section, said pairs of metal members being pivoted to each other intermediate the ends of said flexible pipe section, a pair of hydraulic cylinders having piston rods mounted on said deck, chain means having one end thereof secured to one piston rod and arranged around said sprocket on said ring and having the other end thereof secured to the other piston rod, a hydraulic pump, conduit and valve means connected to said cylinders whereby said lower elbow and said discharge pipe is moved in response to the introduction of hydraulic fluid under pressure to one or the other of said cylinders.

2. A dredge comprising a hull having a deck and a stern, discharge means for the dredge comprising a vertically disposed bracket mounted on the deck near the stern, a horizontally disposed bracket secured to and projecting from the stern, a pair of complementary upper and lower elbows, said upper elbow having a horizontally disposed portion mounted on said deck bracket, said lower elbow having a pivotal mounting on said stern bracket, said lower elbow having a coupling ring to receive the lower end portion of the upper elbow, said ring having a sprocket mounted exteriorly thereof above said deck, a multi-section discharge pipe comprising a first rigid metal pipe section secured to said lower elbow, a flexible pipe section secured to said first metal pipe section and a second rigid metal pipe section secured to said flexible pipe section in the sequence named, a pair of rigid metal members fixed to said first metal pipe sec-

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tion and extending horizontally therefrom to embrace a portion of the flexible pipe section, a pair of rigid metal members fixed to said second metal pipe section and projecting therefrom to embrace a portion of the flexible pipe section, said pairs of metal members being pivoted to each other on a horizontal pivot intermediate the ends of said flexible pipe section, a pair of hydraulic cylinders having piston rods mounted on the deck, chain means having one end thereof secured to one piston rod, the intermediate portion of said chain in engagement with said sprocket on said ring and the other end of said chain means being secured to the other piston rod, a hydraulic pump, conduit and valve means connected to said cylinders whereby said discharge pipe is moved about the axis of said coupling ring in response to the introduction of hydraulic fluid under pressure to one or the other of said cylinders, a tripod mounted on the deck near the stern thereof, two legs of said tripod being secured to the deck at opposite sides of the discharge pipe, a third leg of said tripod being secured to the deck substantially along the center line of the hull, a hydraulic hoist cylinder

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inder having a piston rod mounted on said third leg, flexible means having one end thereof secured to the outer end of the discharge pipe, a pulley at the top of said tripod, said flexible means being arranged over said pulley and having the other end thereof secured to the piston rod of said hoist cylinder, hydraulic valve and conduit means connecting said pump and hoist cylinder to raise the discharge pipe in response to the introduction of hydraulic fluid under pressure to said hoist cylinder.

References Cited in the file of this patent

UNITED STATES PATENTS

326,072	Von Schmidt -----	Sept. 8, 1885
341,539	Angell -----	May 11, 1886
358,686	Milliken -----	Mar. 1, 1887
657,567	Robinson -----	Sept. 11, 1900
707,293	Bates -----	Aug. 19, 1902
746,995	Robinson -----	Dec. 15, 1903
1,808,066	Plummer -----	June 2, 1931
2,801,013	Pilch -----	July 30, 1957