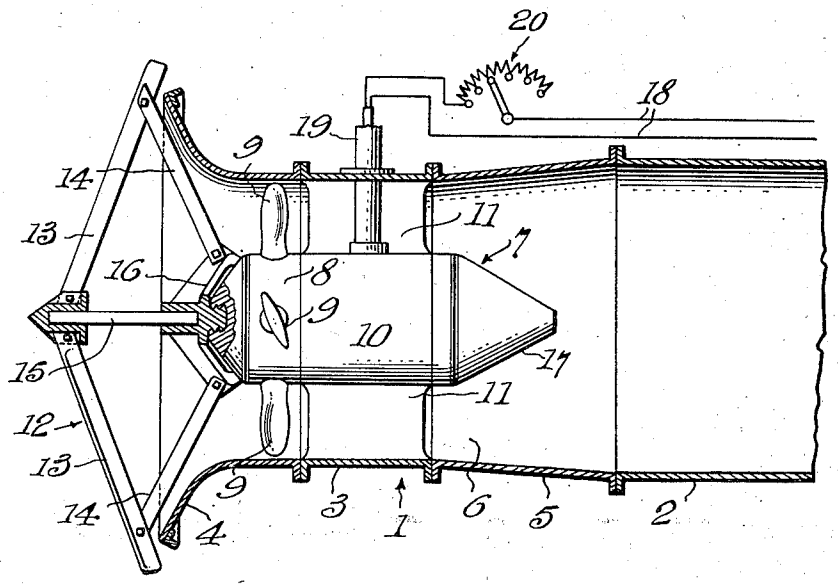
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EXCAVATING DEVICE FOR SUBAQUEOUS MATERIAL

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EXCAVATING DEVICE FOR SUBAQUEOUS MATERIAL

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Original application October 26, 1943, Serial No. 507,663. Divided and this application September 5, 1944, Serial No. 552,787

2 Claims. (Cl. 37—67)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

The invention described herein may be manufactured and used by or for the Government for governmental purposes, without payment to me of any royalty thereon.

This invention relates to the art of dredging and more particularly it is directed to an excavating device of the type disclosed in the copending application Serial No. 507,663, filed October 26, 1943, and entitled Apparatus for excavating subaqueous material, of which this application is a division.

One of the objects of the invention is to provide an excavating device including a combined suction pump and electric motor for driving the same mounted in the suction mouth end of a suction pipe of a hydraulic dredge, together with a cutterhead connected to be directly driven, at the same speed as the pump, whereby subaqueous material is loosened and broken up by the cutterhead, and sucked through the suction pipe by the suction pump for delivery to any place desired.

Another object of the invention is to provide an excavating device for subaqueous material which is compact in construction, efficient in use and not liable to become out of order.

With the above and other objects and advantages in view the invention consists of certain features of construction and operation of parts which will hereinafter be described and shown in the accompanying drawing in which:

The figure is a fragmentary longitudinal sectional view of one end of a suction pipe having a motor driven suction pump mounted therein, with a cutterhead directly connected to be driven by the suction pump.

Referring more specifically to the figure, the free end 1 of a suction pipe 2 for a hydraulic dredge (not shown) is formed with a portion 3 of least cross-section having a bell-shaped suction mouth 4 mounted on an outer end of the portion 3 of the suction pipe 2 and a frusto-conical shaped section 5 mounted on its inner end, whereby a substantially Venturi-shaped passage 6 is provided in which the suction pump 7 is mounted.

The suction pump 7 is preferably of the propeller type including an impeller 8 having blades 9 mounted thereon and operable within the suction mouth 4. The impeller 8 is directly driven by any suitable type of electric motor 10 centrally mounted on ribs 11 within the passage 6.

A cutterhead 12 having blades 13 removably mounted thereon is operable in front of the bell-shaped suction mouth 4 and is directly connected to the motor-driven impeller 8 by arms 14 and a central rod 15 mounted on a bracket 16 secured to the outer end of the impeller, whereby the cutterhead 12 is driven at the same speed and in the same direction as the motor driven impeller. The electric motor 10 has a rearwardly extending streamline portion 17 and is connected by conductors 18 passing through a vertically extending conduit 19, said conductors 18 being connected to a suitable source of electrical supply (not shown). In order to regulate the speed of operation of the electric motor 10, a rheostat 20 may be connected in circuit with the conductors 18.

In operation, assuming that the suction pipe 2 has been lowered until its free end 1 has engaged subaqueous material in a body of water (not shown) and that the electric motor 10 has been connected to a suitable source of electrical supply, upon actuating the rheostat 20 the electric motor 10 may be rotated at any speed desired, thus driving the impeller 8. The cutterhead 12 being directly connected to and driven at the same speed as the impeller loosens and breaks up the subaqueous material, while the blades 13 of the cutterhead and the blades 9 of the impeller break up the subaqueous material into smaller pieces, thereby increasing the carrying capacity of the water in the subaqueous material. The broken subaqueous material is then sucked through the suction mouth 4 by the suction created by the impeller 8, which pumps the subaqueous material through the passage 6 into the suction pipe 2 where it may be delivered to any place desired.

It will thus be seen that there has herein been provided a novel and efficient form of excavating device, which is well adapted for the purpose intended. Even though there has herein been shown certain features of construction and operation of parts, it is nevertheless to be understood that various changes may be made therein, if the changes do not depart from the spirit or scope of the claims.

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

1. In combination with a suction pipe including a portion of least cross-section having a bell-shaped suction mouth at one end and a frusto-conical shaped section on its other end whereby a substantially Venturi-shaped passage is provided in said suction pipe, a motor and impeller unit mounted on said suction pipe portion of least cross-section, said impeller operable within the suction mouth of the suction pipe and driven by

said motor and cutter blades mounted to be driven by said impeller, said cutter blades operable outside of and adjacent to the suction mouth end of the suction pipe.

2. In combination with a suction pipe including a section of least cross-section having a bell-shaped mouth at one end and a frusto-conical shaped section on its other end whereby a substantially Venturi-shaped passage is provided in said suction pipe, ribs mounted on said suction pipe portion of least cross-section, a combined motor, impeller and cutterhead mounted on said ribs, said motor at one end being stream-lined and projecting into said frusto-conical shaped section, said impeller mounted on the other end of said motor and operable within the suction mouth of the suction pipe and said cutterhead mounted on one end of said impeller and operable outside of and adjacent to the suction mouth end of the suction pipe.

JOHN KALIX.