Jan. 28, 1947. A. D. BROWN 2,414,797

SELF-CLEANING SUCTION HEAD

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Fig. 1.

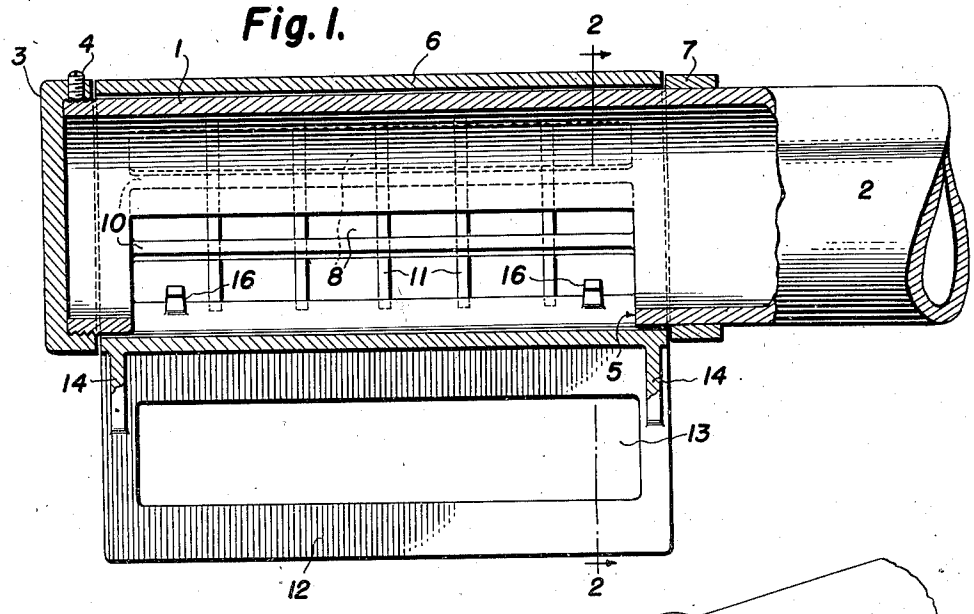


Fig. 3.

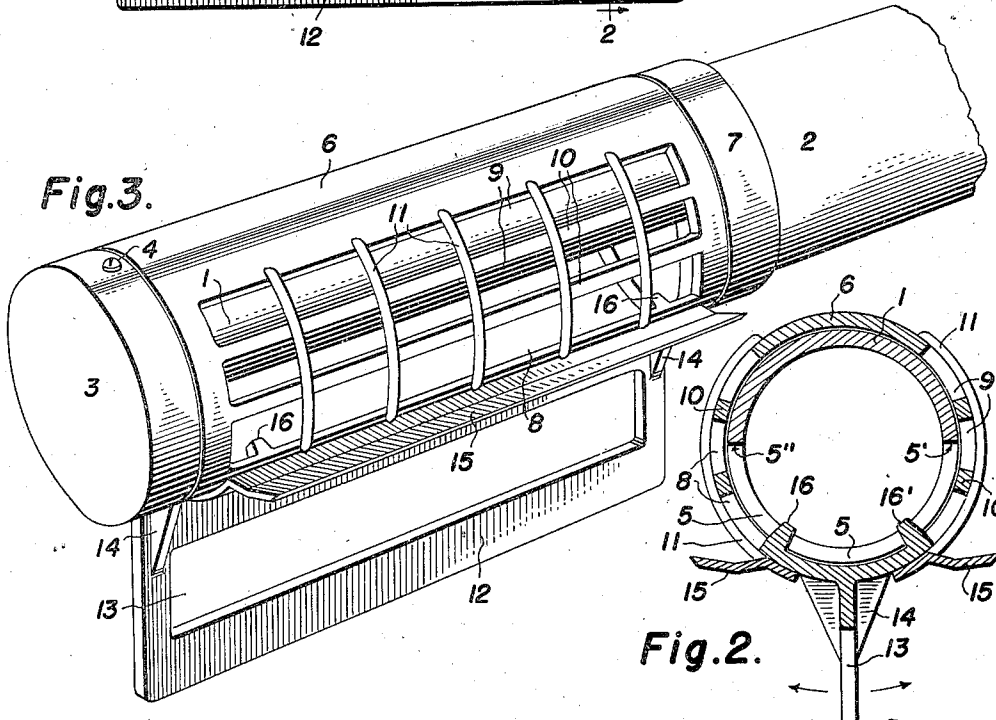


Fig. 2.

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SELF-CLEANING SUCTION HEAD

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2 Claims. (Cl. 37—58)

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

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

This invention relates to the art of hydraulic dredging for excavating sand, gravel, and other subaqueous material from the bottom of lakes, rivers and the like. More particularly it is directed to an improved self-cleaning suction head for use on the intake end of a suction pipe for hydraulic dredges.

One of the objects of the invention is to provide an improved self-cleaning suction head for use on the intake end of a hydraulic dredge suction pipe to prevent any clogging by debris thereon.

Another object of the invention is to provide a self-cleaning suction head for use on suction pipes of small hydraulic dredges that does not require mechanical operation and which is practical and efficient in use as compared to the common grid or open type suction mouth ends of suction pipes whether or not a predominance of debris exists in the material to be dredged.

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:

Figure 1 is a fragmentary longitudinal sectional view of the intake end portion of a suction pipe having the improved self-cleaning suction head applied thereto;

Figure 2 is a cross-sectional view taken on line 2—2 of Fig. 1; and

Figure 3 is a fragmentary perspective view of the suction head.

In the illustrated embodiment characterizing the invention, 1 designates the intake end of a suction pipe 2 used on a hydraulic dredge (not shown) of the type in which subaqueous material on the bottom of bodies of water is drawn into the suction pipe by a suction pump and forced by the suction pump through discharge pipe-lines for distributing the material. The intake end 1 of the suction pipe 2 is closed by a cap 3 held in place by a set screw 4 and has a longitudinally extending slotted suction mouth opening 5 formed therein. A cylinder or sleeve 6 is rotatably mounted on the suction pipe intake end 1. The sleeve 6 is held in a rotatable or movable position on the suction pipe end 1 by means of a thrust collar 7 and is provided with gridded apertures or ports 8 and 9 on two diametrically opposite circumferential portions thereof, which gridded apertures 8 and 9 extend longitudinally

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substantially the entire length of the cylinder. A plurality of spaced longitudinally extending cutting bars 10 and vertically arranged arcuate shaped grid bars 11 are mounted on the sleeve 6 and across the apertures 8 and 9. A lever 12 in the form of a bar or arm containing a longitudinally extending cut-out portion 13 is secured at its upper edge to the lower surface of the sleeve 6 intermediate the gridded openings 8 and 9; said lever 12 extending vertically downward from the sleeve 6 and being held in position by means of braces 14 arranged on opposite sides of the lever.

A pair of longitudinally extending cutter blades 15 made of any suitable material such as hardened steel are mounted on the sleeve 6, said blades extending outwardly from the sleeve 6 and below the gridded openings 8 and 9. In order to prevent the sleeve 6 from moving beyond certain limits in carrying out the dredging operation, the sleeve is provided with a pair of suitably spaced stop members 16 and 16' which project inwardly through the opening 5 in the suction pipe intake end 1.

The intake end 1 of the suction pipe 2, thrust collar 7, cap 3 and set screw 4 constitute the stationary part of the improved self-cleaning suction head; and the rotatable sleeve 6, apertures 8 and 9, cutter bars 10, opening grid bars 11, cutting blades 15, lever 12, members stop 16 and 16' and the braces 14 constitute the movable parts of the suction head.

All parts of the suction head are welded or otherwise secured in place except the cap 3 which is threaded to the intake end 1 of the suction pipe 2 and held in place by cap screw 4.

In operation, when the self-cleaning suction head on the intake end 1 of the suction pipe 2 of a dredge has been lowered to the bottom of a river and the like for excavating sand and other subaqueous material, the lever 12 coming into contact with the river bottom is caused to swing either to the right or left, or in other words in a counter-clockwise or clockwise direction as indicated by the arrows in Fig. 3. Should the lever 12 swing in a counter-clockwise direction, or to the right, the cylinder 6 is also caused to turn in the same direction until the stop 16' engaged the edge 5' on the intake end 1 of the suction pipe 2 whereby the gridded opening 9 on one side of the cylinder is moved completely out of communication with the opening 5 in the intake end 1 and the gridded opening 8 in the other side of the cylinder 6 is moved into complete communication with the slotted opening 5, thus cutting off the suction and preventing any dredging of sub-

aqueous material on one side of the cylinder but permitting the subaqueous material to be dredged from the other side thereof. Upon the lever 12 swinging in a clockwise direction and moving the cylinder 6 in the same direction until the stop 16 engages the edge 5'' on the intake end of the suction pipe 2 the gridded opening 8 is moved out of communication with the opening 5 and the gridded opening 9 is moved into communication with the opening 5 thereby closing one side of the cylinder 6 from a dredging position and opening up the other side to a dredging position.

When the lever 12 changes the direction of its swing it moves the cylinder 6 through an arc of approximately 90° and during the change from one direction to another direction, the cutter bars 10 cut off any debris and the like adhering to the device and any debris held by suction on the portions of the opening 5 in the intake end 1 of the suction pipe 2 which have been closed is released.

It will thus be seen that there has been provided herein a novel and efficient form of self-cleaning suction head for use on the suction pipe of hydraulic dredges which is well adapted for the purpose intended. Even though the suction head has been shown herein as comprising 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. A suction head for hydraulic dredges comprising an intake conduit closed at one end and having a suction mouth opening in the side thereof adjacent said end, a sleeve rotatably mounted on said conduit, gridded apertures provided in said sleeve and arranged to communicate with said opening, cutting bars positioned across said apertures, a lever secured to said sleeve and positioned between said apertures to rotate the sleeve upon contact with subaqueous terrain, and stop members positioned on said sleeve arranged to abut the sides of said suction mouth opening to position one gridded aperture in communication with the suction mouth opening and position the other gridded aperture over the conduit.

2. A suction head for hydraulic dredges comprising a circular conduit closed at one end, a suction mouth opening provided in the side of said conduit adjacent said closed end, a sleeve rotatably mounted on said conduit, a pair of diametrically opposed gridded apertures in said sleeve, cutting bars positioned across said apertures, a lever positioned between said apertures to rotate said sleeve, and stop members on said sleeve arranged to limit the sleeve rotation in any direction to a position at which one gridded aperture is in communication with the suction opening and the other gridded aperture is closed by the conduit.

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