April 21, 1942. J. A. DORST 2,280,066

DRAGHEAD FOR DREDGING APPARATUS

Filed Dec. 3, 1940

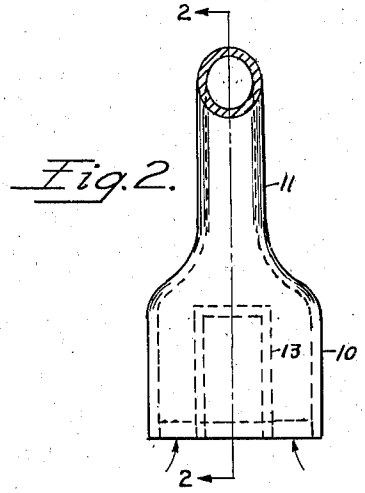


Fig. 2.

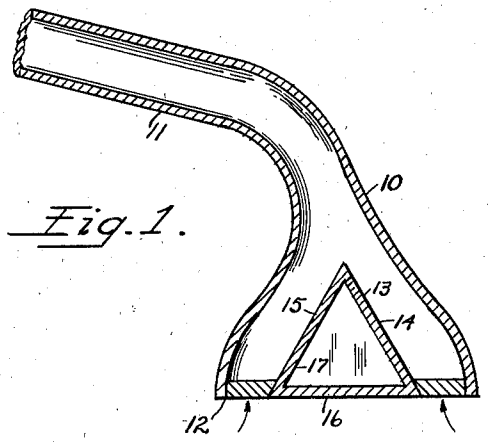


Fig. 1.

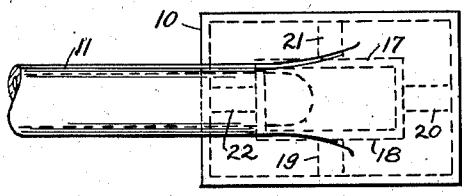


Fig. 3.

Fig. 4.

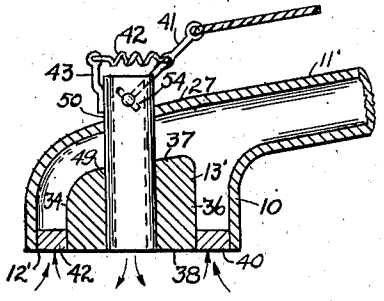
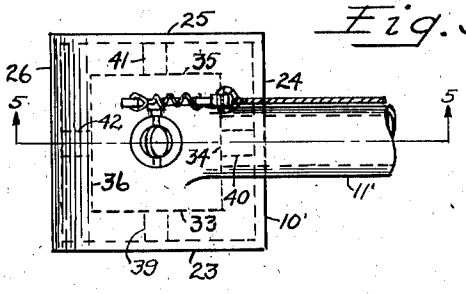


Fig. 5.



Inventor
James A. Dorst,
By Francis P. Vandenwerker
Attorney.

Patented Apr. 21, 1942 2,280,066

UNITED STATES PATENT OFFICE

2,280,066

DRAGHEAD FOR DREDGING APPARATUS

James A. Dorst, United States Army,
Columbus, Ohio

Application December 3, 1940, Serial No. 368,346
6 Claims. (Cl. 37—58)

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

This 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 generally to hydraulic excavating apparatus, but more particularly to the dragheads used therewith.

One object of the invention is to provide a draghead which, due to an increased velocity of the suction stream therethrough is capable of exerting a greater scouring action for a given degree of suction.

Another object of the invention is to provide a draghead in which turbulence in the flow of the suction stream is eliminated, and which is lighter in construction than those of the type now in use having the same suction capacity.

Still another object of the invention is to provide a draghead which offers a minimum interference to the intake flow, and one in which the downward pressure on the bottom of the channel, due to the vacuum exerted, is not increased by excessive weight.

With these and other objects in view this invention consists in certain novel details of construction, combination and arrangement of parts to be more fully hereinafter described and claimed.

Referring to the drawing in which corresponding parts are indicated by similar reference characters:

Fig. 1 is a sectionized view of one form of the improved draghead taken on the line 2—2 of Fig. 2;

Fig. 2 is a rear elevation of the draghead;

Fig. 3 is an upper plan view of the draghead;

Fig. 4 is a partially sectionized view of a modified form of the improved draghead, the section being taken on the line 5—5 of Fig. 5; and

Fig. 5 is a top plan view of the modified form of the improved draghead.

The improved draghead which forms the subject matter of this invention comprises a shell 10 provided with a tubular stem 11, adapted to be connected to the suction tube of a dredging apparatus (not shown) and a mouth 12 adapted to contact the surface of a channel for dredging purposes. The walls of the shell diverge from the diameter of the tubular stem 11 to the mouth 12, and within the interior of the shell is located a bearing block 13. The lower surface 16 of this block lies approximately in the plane of the edge of the shell which defines the mouth. The block may function both as a bearing surface to contact the bottom of the stream over which the draghead is pulled, and as a means for restricting the flow through the shell 10 to the tubular stem 11, to thus increase its velocity.

The mouth 12 is preferably rectangular in form extending around the lower surface of the block 13 which may be either of solid or hollow construction, the latter form being used to lighten the draghead. The block 13 as shown in Figs. 1, 2 and 3 is hollow and of triangular cross-section having upper sloping walls 14 and 15, a bottom 16 and vertical side walls 17 and 18. The block 13 is retained within the shell in spaced relation to the walls thereof by four radially extending members 19, 20, 21 and 22, thus forming a restricted passage from the mouth 12 to the tubular stem 11.

In the modified form of the device, the shell 10' is formed with rectangular side walls 23, 24, 25, 26 and a top 27, and the block 13' which may be of solid construction, as shown in Figs. 4 and 5, is provided with corresponding external surfaces 33, 34, 35, 36 and 37 and also a bottom 38. The forward portion of the top 27 of the shell 10' and the upper surface 37 of the block 13' are curved downward to their line of union with the end wall 26 and the surface 34 respectively. The block 13' is retained within the shell in spaced relation to the walls thereof by four radially extending members 39, 40, 41 and 42, thus forming a restricted passage from the mouth 12' to the tubular stem 11' as in the design previously described. The central block 13' in this modified form is provided with a central opening 49 within which is rigidly fastened a tube 50. The tube 50 projects above the upper wall 27 of the shell 10' and is provided with any suitable type of valve 54. The valve 54 shown in Figs. 4 and 5 is of the swivel type, pivotally mounted within the tube, and provided with a crank arm 41, and a spring 42 attached to a bracket 43, the latter being adapted to hold the valve in closed position.

In the operation of the form of draghead shown in Figs. 1, 2 and 3, the base or bottom 16 of the centrally located block 13 may function as a supporting surface. The suction stream passes through the mouth and restricted channel between the block and the shell of the draghead to the tubular stem. In the modified form of the invention, as illustrated in Figs. 4 and 5, the base or bottom 38 of the block 13' may also function as a supporting surface, but the suction stream which passes through the mouth and restricted channel to the tubular stem may be supplemented by a stream which passes down-

wardly through the centrally located tube 50 and across the lower surface of the block 13' to the mouth, to relieve the pressure of the draghead on the surface of river channel and thus effect a scouring action on its under surface.

Partially closing off the bottom of the head with the centrally spaced block restricts the intake area and increases the velocity of flow past the lower edges of the shell defining the perimeter of the mouth, and thus increases the scouring action of the bulkhead.

Consideration of turbulence in the design of the improved bulkhead led to the adoption of the blocks illustrated in the figures instead of a flat plate to restrict the area of the mouth. The flow or draft block shown in each of the designs streamlines the intake passage to prevent turbulence and thus further increases the velocity of the suction stream.

In order to reduce turbulence to a minimum it is necessary that the inlet water interfere as little as possible with the filament flow within both the draghead and the suction pipe. In the designs depicted the inlet water is introduced at the bottom of the draghead, around the periphery of the mouth thereof and encounters a minimum of interference in its passage to the tubular outlet.

In the modified form of the device, the draghead is provided with a central passage to allow water to pass to the lower surface of the block and sweep across the bottom thereof to the intake passage at the perimeter of the mouth. The control valve is placed in the central passage to limit the sweeping action caused by the intake water.

The construction shown provides a draghead to be used where additional scouring action is desired, especially where fine sand is encountered, since the increased velocity of the inlet stream scours the channel bottom more effectively than the ordinary type of draghead.

It is obvious that many changes may be made in the construction herein set forth without in any way departing from the material principles of the invention. It is not, therefore, desired to confine the invention to the exact form shown and described but it is desired to include all forms which come within the scope of the appended claims.

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

1. A draghead comprising a shell of inverted V-form cross-section and provided with a tubular stem for attachment to the intake pipe of a dredging apparatus, an internally arranged hollow block of triangular cross-section extending longitudinally within said shell and spaced from the internal surfaces thereof to form a passage to said tubular stem.

2. A draghead for hydraulic dredging apparatus comprising a wedge-shaped shell, having a lower rectangular opening and converging upward to a tubular stem adapted for attachment to the suction of a dredging apparatus, an internally arranged hollow block of triangular cross-section extending longitudinally within said shell and spaced from the internal surfaces thereof to form a restricted passage to said tubular stem.

3. A draghead for hydraulic dredging apparatus comprising a wedge-shaped shell, having a lower rectangular opening and converging upward to a tubular stem adapted for attachment to the suction pipe of a dredging apparatus, an internally arranged hollow block of triangular cross-section extending longitudinally within said shell, radial spacing members extending from the block to said shell to retain the block in spaced relation thereto and thereby form a restricted passage to said tubular stem.

4. A draghead for dredging apparatus, comprising a shell having rectangular walls and a sloping top which converge to a tubular stem adapted for attachment to the suction pipe of a dredging apparatus, an internal block positioned within said shell in spaced relation to said walls and top to form a restricted passage to said tubular stem, a tube extending through said block to the exterior of said top to form an intake passage, and a valve located within said tube to regulate the passage of water therethrough.

5. A draghead comprising a shell having rectangularly arranged sloping walls converging to a tubular stem adapted for attachment to the suction pipe of a dredging apparatus, said walls terminating in a rectangular mouth opening, a hollow spacing block of triangular cross-section provided with a lower bearing surface, and radially extending spacing members adapted to retain said block within said shell in spaced relation thereto and with the lower bearing surface of said block approximately in the plane of the mouth opening.

6. A draghead comprising a shell having rectangularly arranged walls converging to a tubular stem adapted for attachment to the suction pipe of a dredging apparatus, said walls terminating in a rectangular mouth opening, a spacing block provided with a lower bearing surface, and radially extending spacing members adapted to retain said block within said shell in spaced relation thereto, and with the lower bearing surface of said block approximately in the plane of said mouth opening, to form a restricted passage to said tubular stem, and a tube extending through said block to the exterior of said shell to form an intake passage to the bearing surface of said block.

JAMES A. DORST.