W. H. REED.

DREDGING APPARATUS.

APPLICATION FILED NOV. 17, 1913.

1,268,387.

Patented June 4, 1918.

Fig. I

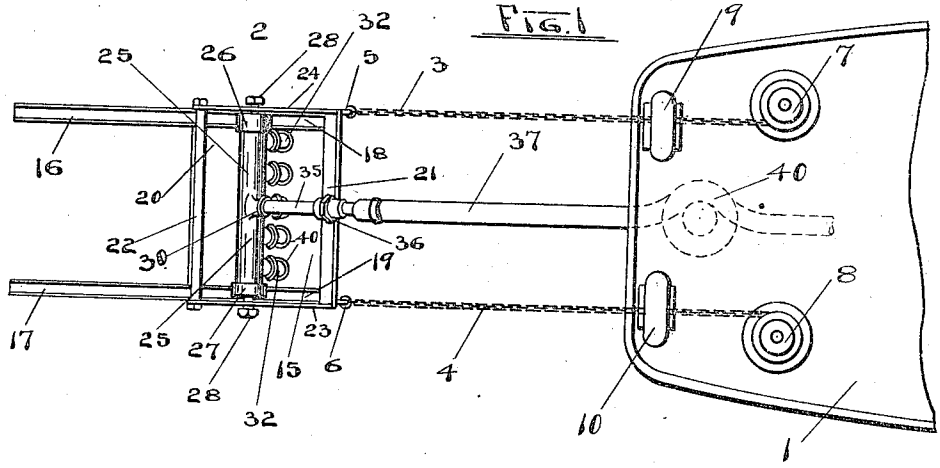


Fig. II

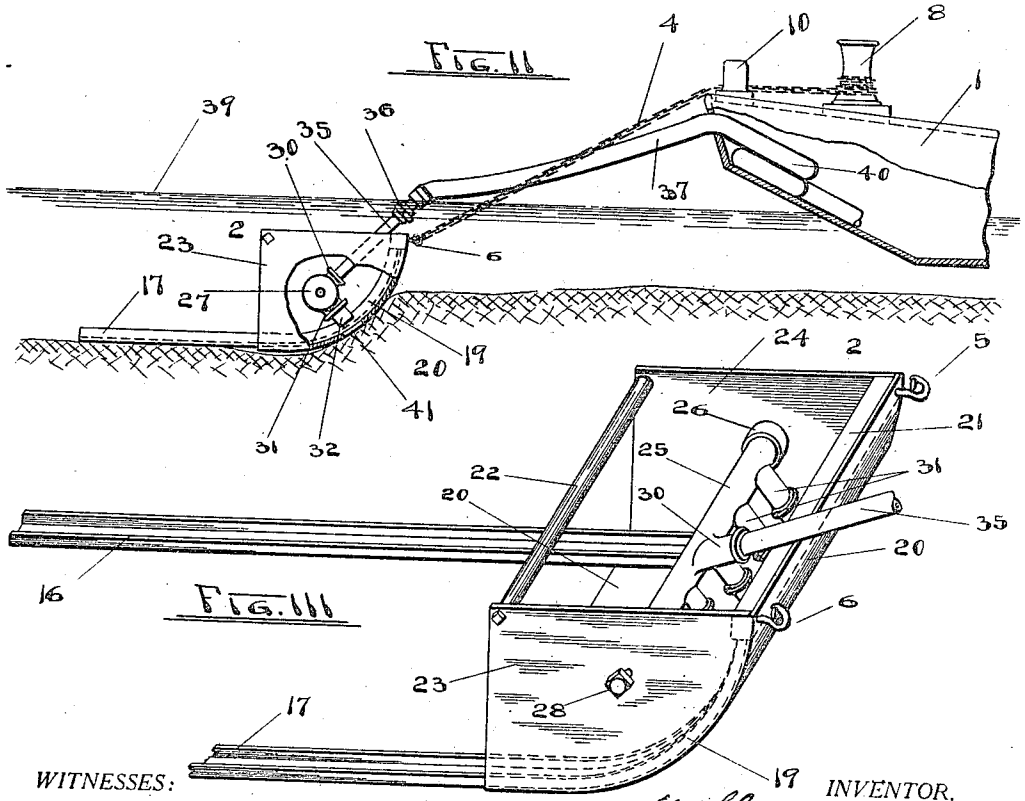


Fig. III

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DREDGING APPARATUS.

1,268,387. Specification of Letters Patent. Patented June 4, 1918.

Application filed November 17, 1913. Serial No. 801,494.

To all whom it may concern:

Be it known that I, WILLIAM H. REED, a citizen of the United States of America, residing at 1031 East 20th street North, Portland, in the county of Multnomah, in the State of Oregon, have invented certain new and useful Improvements in Dredging Apparatus, of which the following is a specification, reference being had to the accompanying drawing.

My invention relates to improved apparatus for loosening up sand, gravel, mud and like substances in the bottoms of harbors and rivers or other water courses whereby a desired depth, as for a channel therein, may be maintained through the driving operation upon the substances so loosened of natural tides or currents.

In carrying my invention into practice, I employ as a means of agitation of the substance to be loosened up in the manner above described a fluid under pressure, the same preferably being adapted to develop hydraulic energy.

Heretofore in devices of this character an objection has been found to them that they lack proper means for directing their operation, for keeping them to their work, and for operating them to advantage under varying conditions of tide level. Moreover, in respect to the method of directing or applying the agitating or loosening blast, as of compressed air, or jet of water, a difficulty has been experienced by reason of the fact that such blast or jet has tended rather to burrow into the ground than to loosen it widely.

By my invention means are provided for overcoming the various difficulties above enumerated, and more particularly for introducing the fluid discharge with explosive effect into the material of the bed undergoing operation.

What constitutes my invention will be hereinafter described in full and succinctly set forth in the appended claims.

In the accompanying drawing, Figure I is a top plan view of a preferred form of my invention as operatively applied to the end of a boat or barge. Fig. II is a side elevation, partially in section, of the subject matter of Fig. I, showing my apparatus located as in operation. Fig. III is a perspective view of the discharging member of my apparatus, or that portion of it which, in practice, works submerged upon and discharges against the bed of the stream.

Referring to the numerals on the drawing, 1 indicates the hull of a boat or barge, to which the dredge frame 2 is operatively secured, preferably by chains 3 and 4, fastened, as indicated at 5 and 6, respectively, to the opposite fore-corners of the frame and to capstans 7 and 8 upon the deck of the boat 1. Guide blocks 9 and 10 upon the boat serve to maintain a fixed relationship between the chains 3 and 4 and the boat without interfering with the play of the chains to and from the capstans 7 and 8 respectively.

It may be observed that the illustration afforded in the drawing is in part, and particularly with respect to the chains 3 and 4 and their connections 5 and 6, diagrammatic only. The fastenings 5 and 6 are intended to indicate a feature of my invention whereby means is provided for casting loose either chain at will from its fastening to the dredge frame 2 whereby the frame may be, in case of need, slued around and free of any immovable obstruction that may be found in operation in the path of its ordinary forward movement.

The dredge frame may be of any preferred shape and weight and dimensions, provided only that therein it be adapted to the attainment of an object, and preferably of all the objects of my invention.

One of the objects last referred to is that of keeping the frame constantly in a position most favorable to its proper operation. To that end it consists of a forward hood 15 and a rearward counterbalance, comprising, as illustrated, a pair of runners 16 and 17. The runners 16 and 17 are the rearward extensions of frame pieces which are curved as indicated at 18 and 19 respectively after the manner of sled runners. They are united preferably by a breast plate 20 which is shaped to conform to and cover the curved

ends of the runners to which they are securely attached by any usual or preferred means in such manner as to combine the runners and the breast plate into a solid rigid frame.

The better to fit the frame to its office, I prefer to reinforce it by a cross piece 21 and a cross bar 22 extending between and secured to cheek plates 23 and 24 of the hood 15.

The cheek plates 23 and 24 and the breast plate 20 being made of heavy sheet metal, the weight of the hood is considerable. To counterbalance this weight as well as the additional weight which it carries, the runners 16 and 17 must be made of heavy metal and extended a considerable distance in order to afford that counterbalancing effect which constitutes a part of their office. For that reason, as well as for structural consideration I prefer to make the runners of channel iron, although other shapes such, for example, as T iron, may be, if preferred, employed.

Secured between the cheek plates 23 and 24, and well housed by the hood of which they constitute a part, I provide a hollow cross-head 25, whose opposite ends are closed, as by caps 26 and 27, secured as by screw bolts 28 to the cheek plates. The cross-head is preferably made of cast metal, and provided with an inlet port 30 and a series of outlets 31, each of the latter being provided with a discharge nozzle 32.

With the inlet 31, as through a pipe 35 and coupling 36 thereon, a hose 37 connects. The end of the hose opposite the coupling 36 connects with a source of energy, as, for example, an hydraulic pump or compressed air tank unnecessary to illustrate, inasmuch as such devices for the purpose possess no other significance in the present connection than such as is wholly understood in the art. The length of the hose between the coupling 36 and its point of connection with its source of energy-supply is proportionate to the length of the chains 3 and 4, and such as to accommodate it to its function under maximum variations of the water level indicated in Fig. II by the numeral 39, and due, for example, to the rise and fall of tides or to the increase in depth as the dredging process accomplished by my apparatus proceeds.

40 indicates a coil of the hose 37, and illustrates a method of taking up any slack of the hose that may occur in practice. Each nozzle 32 is designed to discharge the fluid derived from the hose 37 through the cross-head 25 into the bed of the harbor or stream operated upon, and substantially at an angle of forty-five degrees, to maintain which angle, substantially, is the object of the frame construction in respect to its hood and counterbalance previously specified.

An important feature of my invention is found in the employment of the breast plate 20 in connection with the several nozzles 32 and in their relative arrangement, respectively, toward each other. My invention comprehends a relative arrangement of the respective nozzles and the breast plate whereby those nozzles are made to discharge through an aperture in the breast plate. Each nozzle may be and preferably is provided with its individual aperture 41 in the breast plate as illustrated. If the preferred individual aperture construction be employed, I prefer to make the diameter of each aperture somewhat greater than the outside diameter of its nozzle (see Fig. II) and to provide space between the end of the nozzle and the inner face of the breast plate. It is one of the offices of the breast plate to provide a smooth working face upon its outside which may slip freely and unobstructedly upon the channel bed against which it works in operation. For that reason, the nozzles should not project beyond the outer face of the breast plate, but by constructing them to terminate short of contact with the breast plate I provide a clear space about the end of each nozzle whereby the end of the nozzle may be kept clear and free from obstruction upon the part of any material which may be dislodged by it in action.

Hitherto, nozzles adapted to perform, by their discharge of fluid, an agitating function have not only been exposed and liable to be caught by snags or other obstructions in the channel bed, and also unprovided with means for directing them positively to the accomplishment of the purpose for which they have been designed, but have also had no other effect than to discharge a jet directly into the material of the channel bed. Consequently the tendency of each nozzle in practice has been to bore into the ground and thereby to make a pocket which in certain earths would tend to catch the nozzle and to interfere with, if it did not interrupt its operation. This objection is by my invention removed, by reason of the fact that for each nozzle the breast plate constitutes a cap or cover to the area of the ground into which the nozzle discharges with the result that a continuous explosive effect or rending force in all directions is imparted to the discharge of each nozzle. Consequently the formation of pockets is prevented, all the material into which a jet is discharged from one of my nozzles being violently driven away from the face of the breast plate and forced into a state of suspension in the water of the channel, whence it may be readily taken up and carried off by the force of natural currents present therein.

From the language of the foregoing specification it will be apparent that it is not my intention to limit myself to details of construction, and I desire, moreover, to reserve

expressly the right to modify and vary the same at will, within the scope of the principle of my invention.

What I claim is:

1. The combination with a dredge frame provided with a hood, and a counterbalance, of a discharge member within the hood.

2. The combination with a dredge frame provided with a hood, and a counterbalance, of a discharge member within the hood, said hood being provided with a curved breast plate.

3. The combination with a pair of runner irons curved at one end, united by a breast plate, and provided with cheek plates to form a hood, of a cross head discharge member secured within the hood between said cheek plates and adapted to make operative discharge through the breast plate.

In testimony whereof, I have hereunto set my hand in the presence of two subscribing witnesses.

WILLIAM H. REED.

Witnesses:

EUGENE H. DOWLING,

K. D. FENN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."