Jan. 12, 1932. F. C. SCHEFFAUER 1,840,606

SELF ADJUSTING DRAGHEAD

Filed Feb. 27, 1929

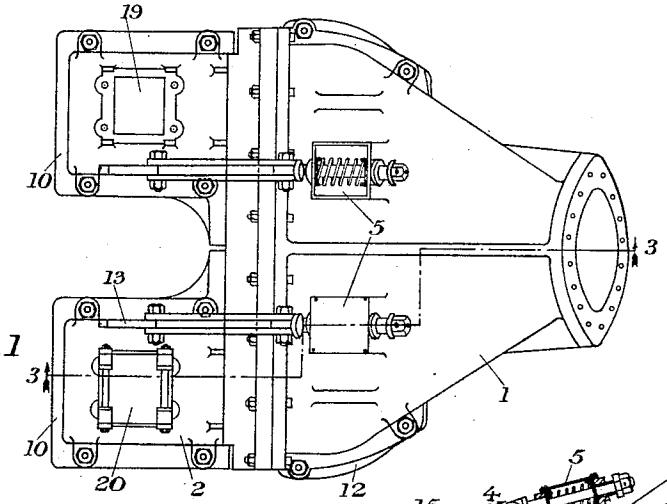


Fig.1

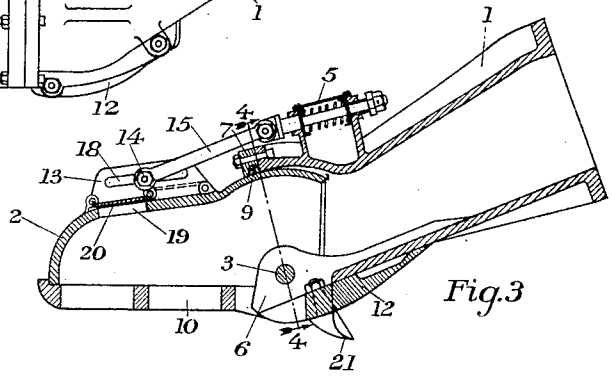


Fig.3

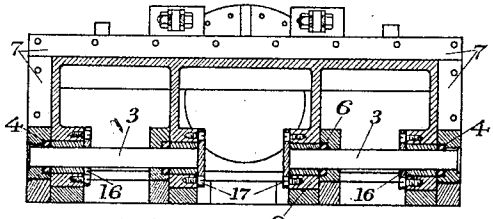


Fig. 4

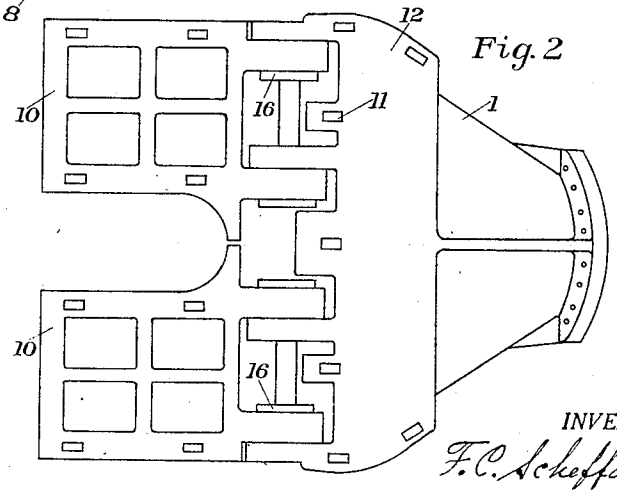


Fig. 2

WITNESSES

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UNITED STATES PATENT OFFICE

FREDERICK CARL SCHEFFAUER, OF MILL VALLEY, CALIFORNIA

SELF-ADJUSTING DRAGHEAD

Application filed February 27, 1929. Serial No. 343,828.

(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.

My invention relates to improvements in the dragheads used on the sea-going hopper type of dredges in conjunction with suction drag pipes and large centrifugal pumps, to dredge material from the bottoms of navigable waters, such as harbors, rivers, and canals, and to deposit the material into hoppers or bins provided on the dredge.

The main object of this invention is to provide a draghead of a self-adjusting type which will automatically adapt itself to the best dredging, or suction contact position, on the channel bottom, under the varying heights of the dredge hull as referenced to the channel bottom; said varying heights being caused by the different depth of immersion of the dredge in its light condition as compared with its loaded condition; the vertical range between low and high tide; the rise and fall of the dredge when working in ocean swells, and the different bottom depths existing in the channel being dredged. As the upper end of the suction drag pipes are fixed to the hull of the dredge, this variation in height is transmitted direct to the drag pipes. The above factors caused a total variation of about twenty-five (25) feet of the upper end of the suction pipe of dredges working in the San Francisco Bar. This variation in height causes variations in the inclination angle of the rigid drag pipes with the channel bottom, and therefore prevents the fixed type of dragheads in common use on dredges of the sea-going hopper type, from making the best suction contact with the bottom at all times particularly when the bottom material consists of hard packed sand, into which the dragheads are unable to depress themselves.

My self-adjusting type of draghead, owing to its providing more constant and better suction contact with the channel bottom being dredged, results in more material being excavated by it than can be obtained by a fixed type of draghead operating under the same conditions. This has been proven by tests made with a full size draghead of my invention and with a draghead of the standard fixed type in common use on sea-going hopper dredges in this country today.

My invention consists further of providing a removable heel piece casting for cutter teeth. This heel piece enables the teeth to be fastened and placed in such manner that they can loosen or scarify hard material in the channel bottoms in a more efficient manner than similar devices on a fixed type of draghead. This is due to the lesser degree of fluctuation in height of the teeth owing to their close proximity to the hinge center of the draghead and the elimination of any lifting of the teeth off the bottom by toe contact of the draghead grate, which becomes the case when a fixed type of draghead is used, under varying height conditions.

My invention further consists of a U shape design in plan view, whereas older types are either full circular, square or rectangular in plan view. The opening between the two legs of the U of my invention provide in my draghead about 30% more perimeter for equal area than in the other dragheads in common use, and it eliminates the possibility of a dead area existing in the center of a large square or rectangular draghead grate. As the material is to a large extent carried into the draghead by the inrushing water around the perimeter of the draghead, the above feature aids my draghead in obtaining an increased quantity of dredged material.

The foregoing and other advantages of the invention are attained by the mechanism hereinafter fully described and claimed, and illustrated in the accompanying drawings forming a part of this specification, in which like characters of reference indicate corresponding parts in the figures, and in which:

Figure 1 is a top plan view of the draghead. Figure 2 is a bottom plan of the same, Figure 3 is a sectional elevation of the same, and Figure 4 is a sectional elevation through the hinges of the draghead.

Referring particularly to the drawings, there is shown at 1, the upper section of the draghead body, which has a flange at the upper end for connection to the suction drag-

pipe of the dredge. It is flared out at its lower end into a female telescopic section, which has on its bottom side hinge lugs 6 for supporting the hinge pins 3 that connect casing 1 and drag 2 together and permit drag 2 to hinge on 1. Casing 1 also carries a wearing pad or heel piece 12 which is bolted to casing 1 and easily removable when worn out. The heel piece 12 is provided with socket holes 11 for scarifier teeth 21 which are used for plowing up or loosening compacted or cemented materials into such condition that they may be drawn into the draghead and elevated by the pump suction. On top of casing 1 are constructed two double acting spring shock absorber arrangements 5 provided for reducing the shocks which occur when the draghead is operated in a seaway, causing body drag member 2 to move rapidly and violently through its full hinge range limits. The spring arrangement 5 provides for both tension and compression shocks.

Drag 2 is hinge connected by hinge pins 3 and hinge lugs 6 and 8 to casing 1 and closure between casing 1 and drag 2 is obtained by the male telescope section on drag 2 telescoping into the female telescope section of casing 1. Watertightness between the telescoping parts of casing 1 and drag 2 is obtained by a rubber packing strip 9 which is held in the packing keeper strips 7 bolted across the end face of casing 1. To the lower faces of U shaped drag 2 are bolted grated castings 10 for taking the abrasive wear between draghead and the bottom material and to prevent objects larger than the existing pump clearances from passing into the draghead and the suction drag pipe. On top of drag 2 are two lugs 13 in the slots 18 of which the lower pins 14 of links 15 slide. The slots 18 in lugs 13 together with the link 15 and shock absorber spring arrangement 5 control the movement of drag 2 in casing 1. Each leg of the U of drag 2 has a port 19 fitted with cover plates 20 for water supply to the draghead when needed under certain operating conditions. The hinge pin bearings are protected from entrance of abrasive material by the rubber gaskets 4 and the cover plates 16 and 17.

The above described self-adjusting draghead has been tested in practical service and has been found very effective. Under test with a fixed draghead of the type in general use in the United States today, it obtained between 20 and 50 per cent more material than the fixed type.

I wish it to be understood that I will not be limited to the exact construction illustrated reserving the right to vary therefrom within the scope of the claims hereinafter set forth.

Having thus described my invention, what I claim is new and desire to secure by the Letters Patent is:—

1. A draghead comprising in combination a casing, a drag and means effecting a hinged connection between the forward portion of the drag and the rear portion of the casing, said drag including a hollow member grated at its bottom and formed into parallelly extending laterally spaced legs, intercommunicating adjacent the hinged portion of the drag whereby the perimeter effect for equal area of drag is increased.

2. A draghead comprising in combination a casing, a drag having its forward portion telescopically positioned in the rear portion of the casing and means effecting a hinged connection between the telescopically engaged portion of the drag and said rear portion of the casing, said drag including a hollow member grated at its bottom and formed into parallelly extending laterally spaced legs intercommunicating adjacent the hinged portion of said drag whereby the perimeter effect for equal area of drag is increased.

3. A draghead comprising in combination a casing having forward and rear portions, means at the forward portion for engagement with a suction pipe, a drag having its forward portion telescopically positioned in the rear portion of the casing, means effecting a hinged connection between the telescopically engaged portion of the drag and the rear portion of the casing, said drag including a hollow member grated at its bottom and formed into parallelly extending laterally spaced legs intercommunicating adjacent the hinged portion of said drag whereby the perimeter effect for equal area of drag is increased.

4. A draghead comprising in combination a casing including a forward portion and a flared rear portion and means in connection with the forward portion for engagement with a suction pipe, a drag having its forward portion telescopically positioned in said flared portion, means effecting a hinged connection between the telescopically engaged portion of the drag and the flared portion of the casing, said drag including a hollow member grated at its bottom and formed into parallelly extending laterally spaced legs intercommunicating adjacent the hinged portion of the drag whereby the perimeter effect for equal area of drag is increased.

5. A draghead comprising in combination a casing, a drag and means for effecting a hinged connection between the forward portion of the drag and rear portion of the casing, said drag including a hollow member grated at its bottom and formed into parallelly extending and laterally spaced legs intercommunicating adjacent the hinged portion of the drag whereby the perimeter effect for equal area of drag is increased, and a shock absorbing device arranged between the drag and casing to limit their relative movement.

6. A draghead comprising in combination a casing including a forward portion and a flared rear portion and means in connection with the forward portion for engagement with a suction pipe, a drag having it forward portion telescopically positioned in the rear portion of the casing and means effecting a hinged connection between the telescopically engaged portion of the drag and the rear portion of the casing, said drag including a hollow member grated at its bottom and formed into parallelly extending laterally spaced legs intercommunicating adjacent the hinged portion of the drag, whereby the perimeter effect for equal area of drag is increased, and a shock absorbing device arranged between the drag and casing to limit relative movement therebetween.

7. A draghead comprising in combination a casing including a rear flared portion and a forward flanged portion, the latter being adapted to be connected to a suction pipe, a drag having its rear portion conforming in shape to that of the flared portion and telescopically engaging the flared portion of the casing, means effecting a hinged connection between the telescopically engaged portion of the drag and the rear portion of the casing, and a shock absorbing device arranged between the drag and casing to limit relative movement therebetween.

8. A draghead comprising in combination a casing including a rear flared portion and a forward flanged portion, the flanged portion being adapted to be connected to a suction pipe, a drag having its rear portion conforming in shape to and telescopically engaging the flared portion of the casing, means effecting a hinged connection between the telescopically engaged portion of the drag and the rear portion of the casing, and shock absorbing means arranged between the drag and casing to limit their relative movement, said means including a member slidably connected at one end to the drag, a normally retracted yieldable plunger supported by the casing and a connection between the plunger and the free end of said member.

9. A draghead comprising in combination a casing including a flanged forward portion and a flared rear portion, the flanged portion being adapted to be connected to a suction pipe, a drag having its forward portion telescopically positioned in the flared portion of the casing, means effecting a hinged connection between the telescopically engaged portion of the drag and the rear portion of the casing, said drag including a hollow member grated at its bottom and formed into parallelly extending laterally spaced legs intercommunicating adjacent the hinged portion of the drag whereby the perimeter effect for equal area of drag is increased and means in connection with the drag and casing for limiting their relative movement, said means including a member slidably connected at one end to the drag, a normally retracted yieldable plunger mounted on the casing and a connection between the free end of said member and the plunger.

10. A draghead comprising in combination a casing, a drag and means effecting a hinged connection between the forward portion of the drag and the rear portion of the casing, said drag including a hollow member grated at its bottom and formed into separated legs, the latter intercommunicating adjacent the hinged portion of the drag whereby the perimeter effect for equal area of drag is increased.

11. A draghead comprising in combination a casing, a drag, and means for effecting a hinged connection between the forward portion of the drag and the rear portion of the casing, said drag including a hollow member grated at its bottom and formed into separated legs, the latter intercommunicating adjacent the hinged portion of the drag whereby the perimeter effect for equal area of drag is increased, and a shock absorbing device arranged between the drag and casing to limit their relative movement.

In testimony whereof I have signed my name to this specification.

FREDERICK CARL SCHEFFAUER.