No. 799,256. PATENTED SEPT. 12, 1905.

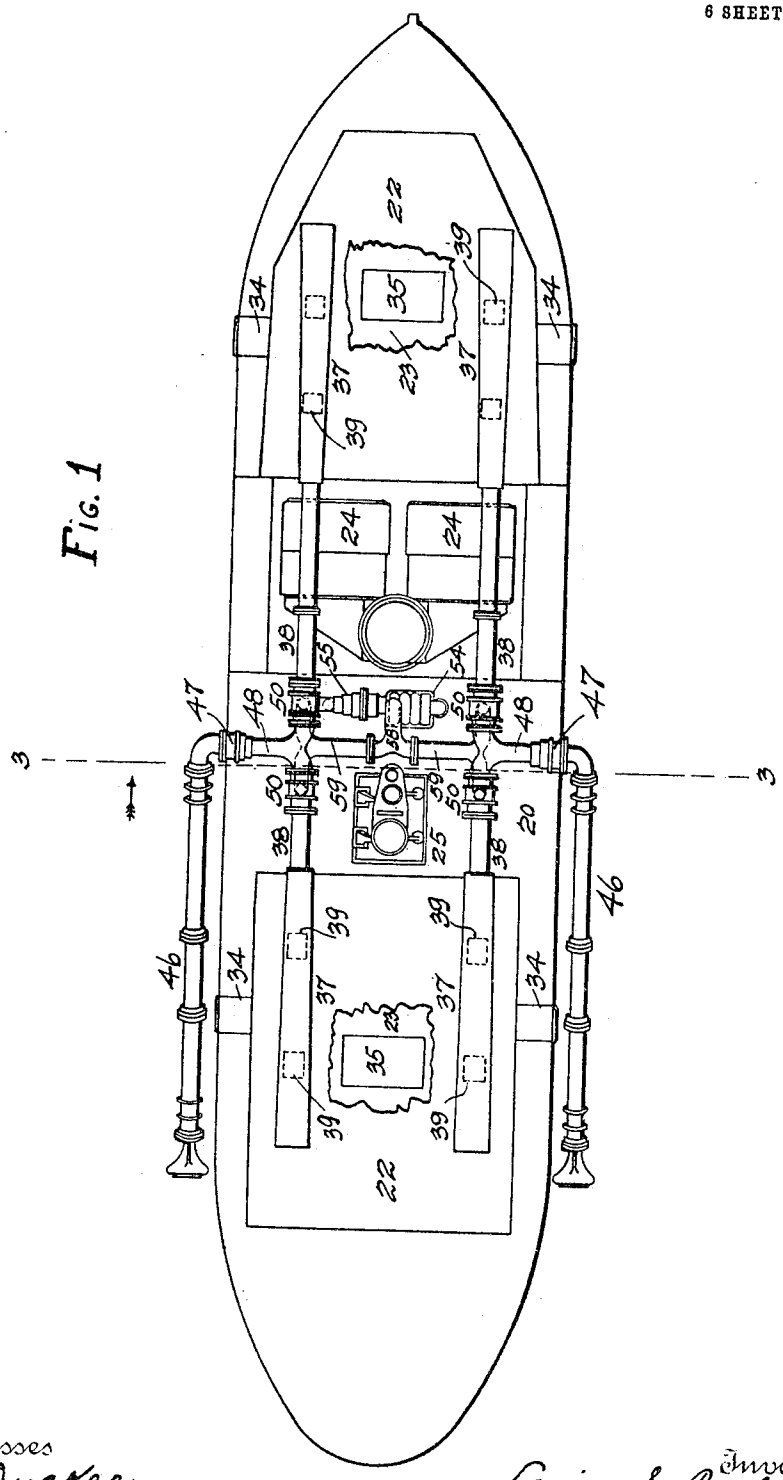
L. S. PARKER.

SUCTION DREDGE.

APPLICATION FILED MAY 1, 1905.

6 SHEETS—SHEET 1.

Fig. 1



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No. 799,256. PATENTED SEPT. 12, 1905.

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6 SHEETS—SHEET 2.

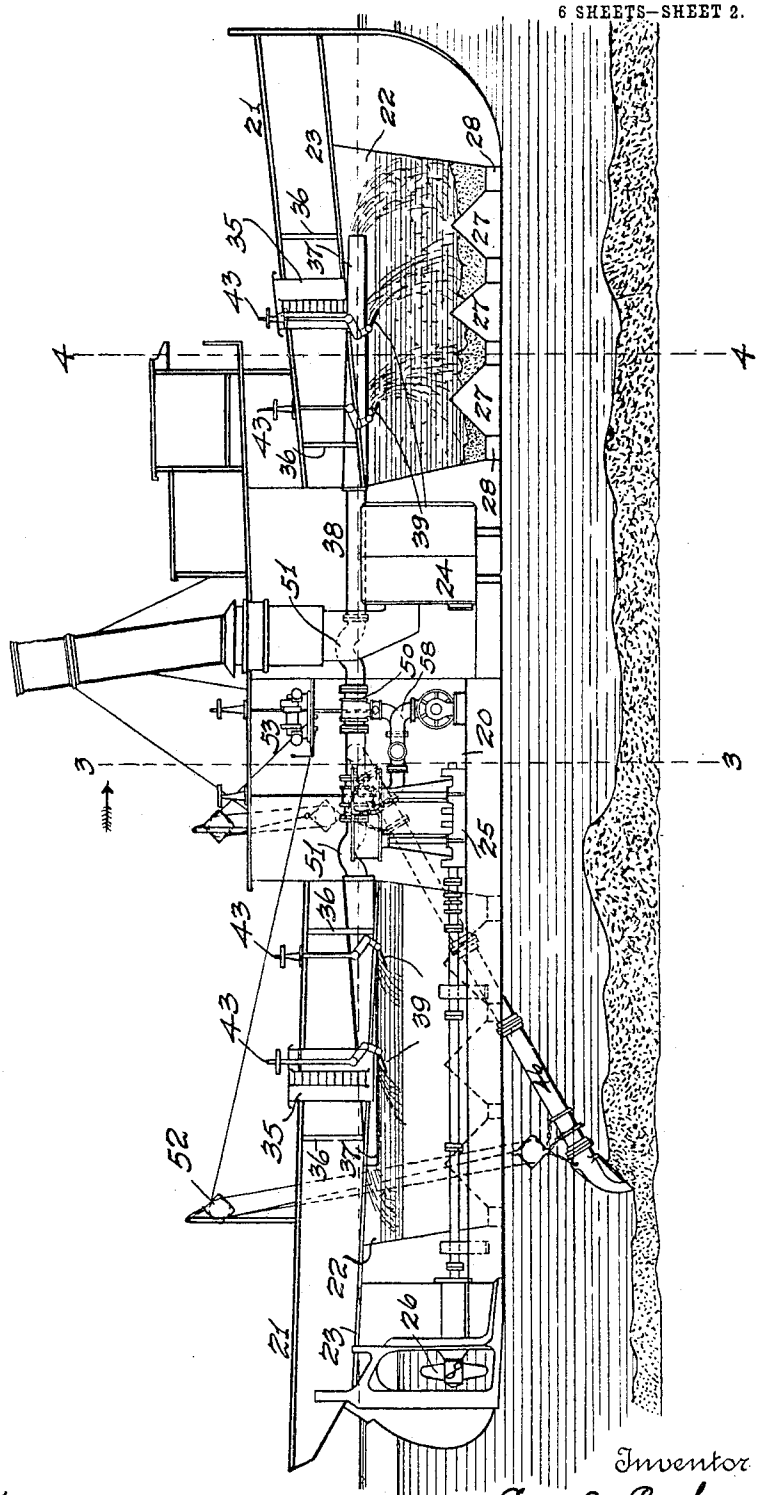


FIG. 2

Witnesses
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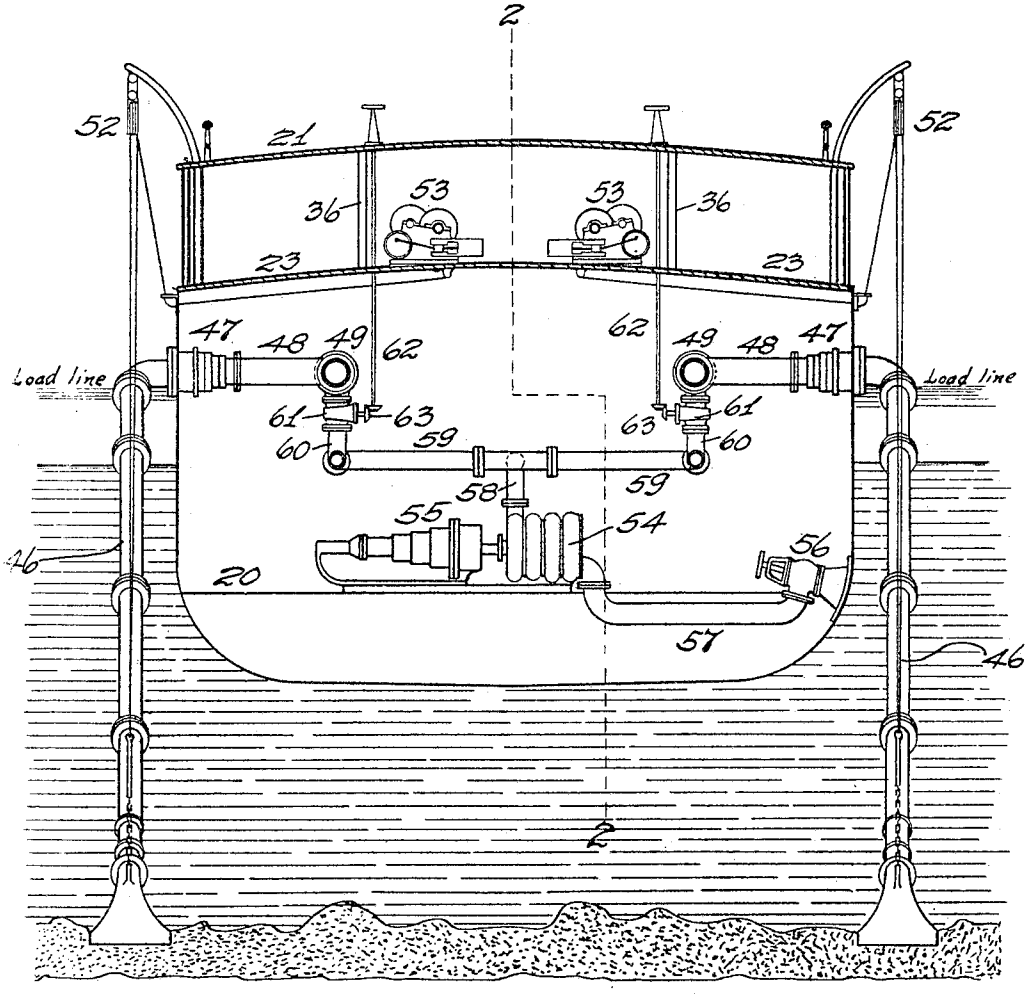
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6 SHEETS—SHEET 3.

FIG. 3



Witnesses
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No. 799,256. PATENTED SEPT. 12, 1905.

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APPLICATION FILED MAY 1, 1905.

6 SHEETS—SHEET 4.

FIG. 5

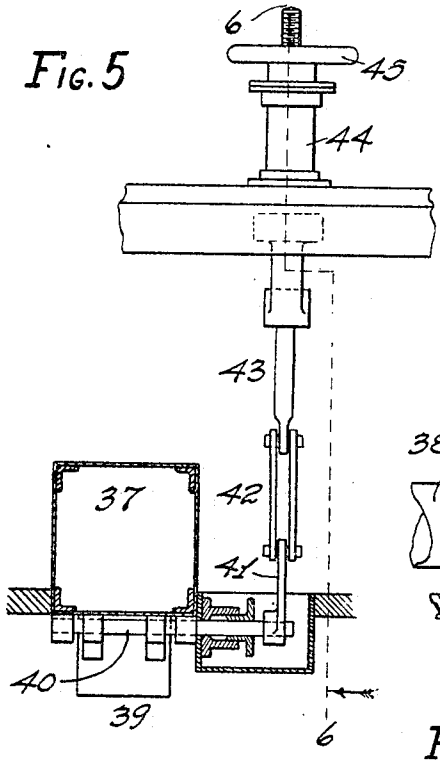


FIG. 6

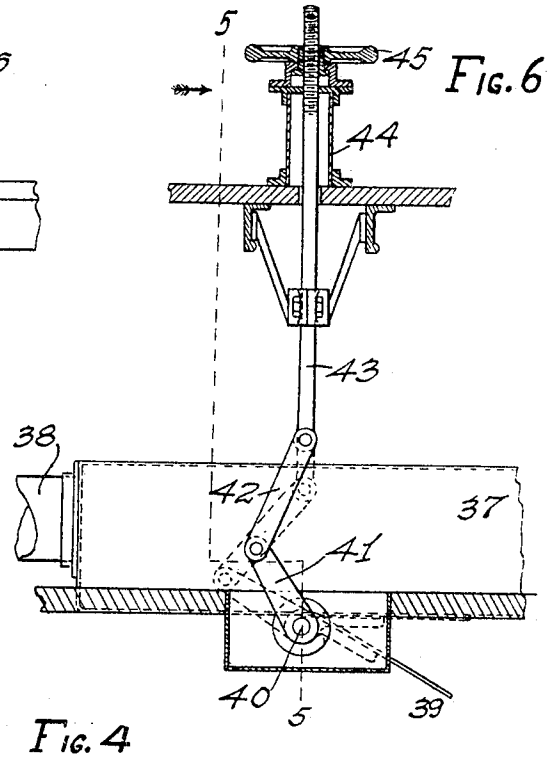
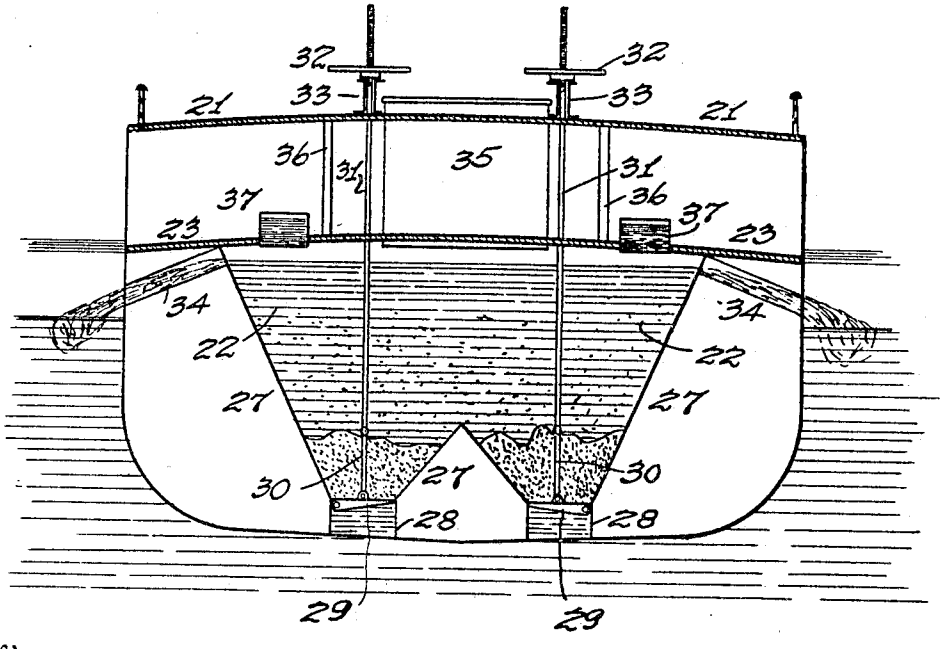


FIG. 4



Witnesses
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SUCTION DREDGE.

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6 SHEETS—SHEET 5.

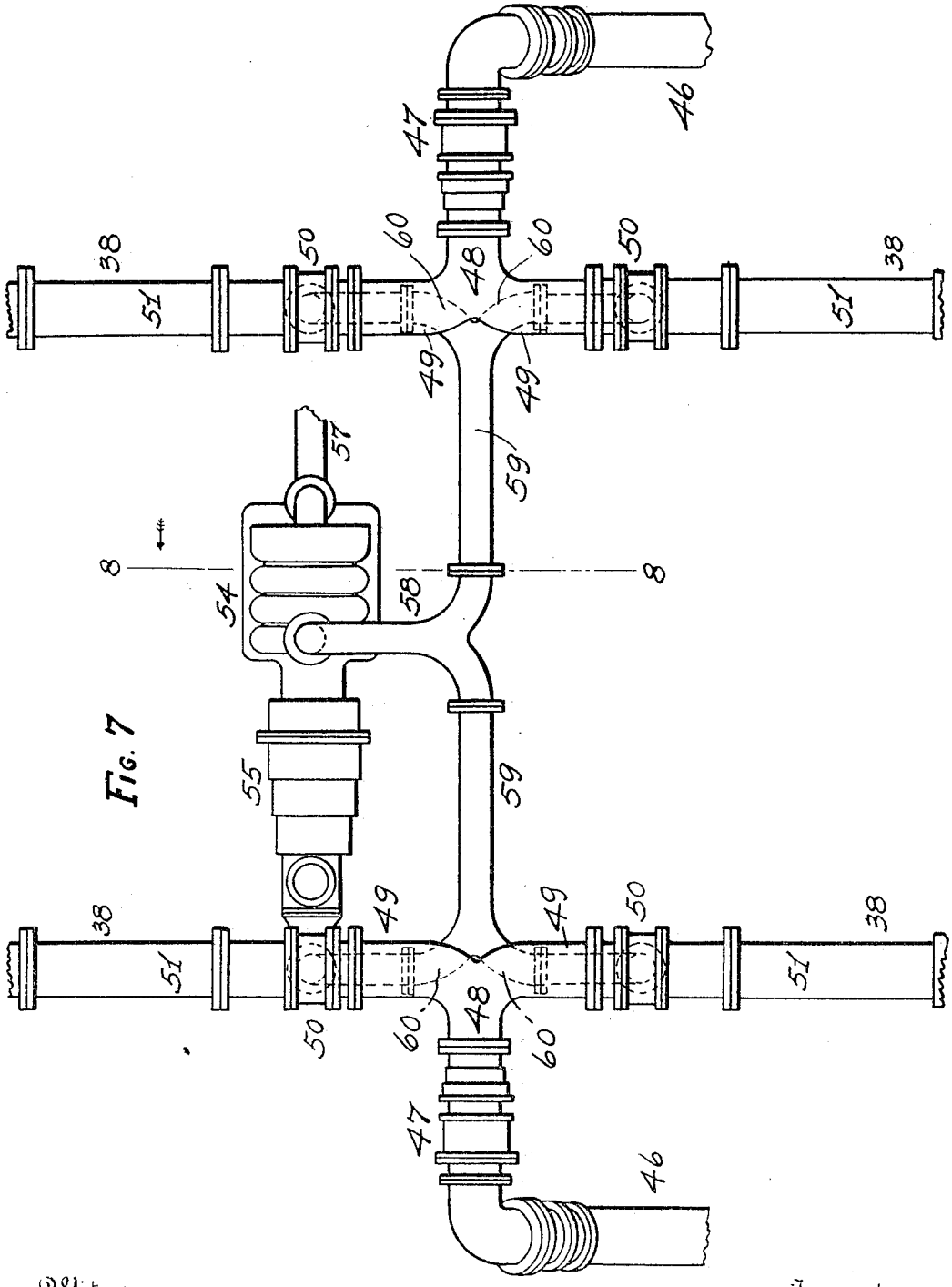


FIG. 7

Witnesses
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APPLICATION FILED MAY 1, 1905.

6 SHEETS—SHEET 6.

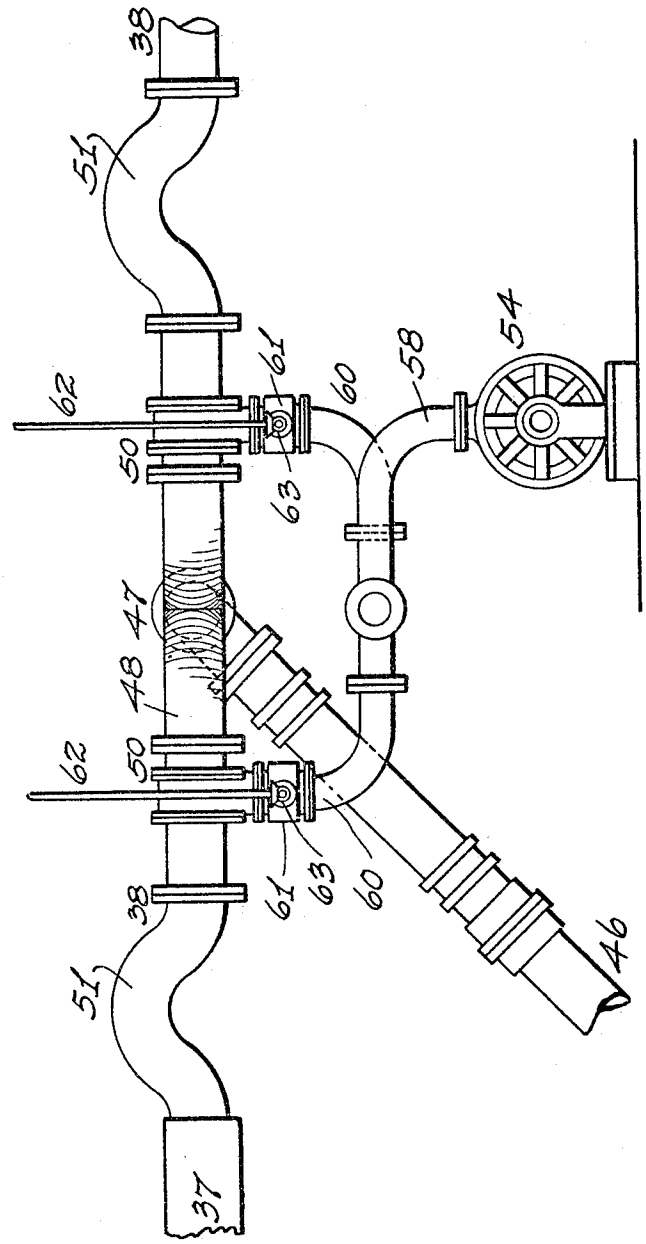


FIG. 8

Witnesses
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UNITED STATES PATENT OFFICE.

LEVIN S. PARKER, OF NEW YORK, N. Y.

SUCTION-DREDGE.

No. 799,256. Specification of Letters Patent. Patented Sept. 12, 1905.

Application filed May 1, 1905. Serial No. 258,217.

To all whom it may concern:

Be it known that I, LEVIN S. PARKER, a citizen of the United States, and a resident of New York city, in the county of New York and State of New York, have invented certain new and useful Improvements in Suction-Dredges, of which the following is a specification.

The invention relates to improvements in suction-dredges; and it consists in the novel features, arrangements, and combinations of parts hereinafter described, and particularly pointed out in the claims.

I present my invention herein as embodied in a seagoing suction-dredge comprising specially-arranged bins for the dredged material and specially constructed and arranged pumping machinery and suction and discharge pipes leading to said bins, which preferably will be located forward and aft of the machinery-space of the dredge.

One object of the invention is to provide highly-efficient pumping and suction apparatus or machinery in the use of which the dredged material will not pass into contact with the pump mechanism, but will be induced to flow through the connected suction and discharge pipes by means of an auxiliary stream of water delivered by the pump into the said discharge-pipe, said pump taking its supply of water through a separate pipe leading through the side or bottom of the dredge.

A further object of the invention is to so construct and arrange the suction and discharge pipes and bins that the dredge may be kept properly trimmed and that pumping the material against any material head may be avoided, said bins being decked over in a substantial manner and at such height from the keel of the ship that when the bins are filled with sand their tops are even with the load water-line.

The nature and objects of the invention will be fully understood from the detailed description hereinafter presented, reference being had to the accompanying drawings, in which—

Figure 1 is a top view of a dredge constructed in accordance with and embodying the invention, a part of the superstructure being omitted. Fig. 2 is a longitudinal section of same. Fig. 3 is a transverse section of same on the dotted line 3 3 of Fig. 1. Fig. 4 is a transverse section of same on the dotted line 4 4 of Fig. 2. Fig. 5 is an enlarged vertical transverse section through one of the discharge-trunks located over the bins and is presented to illustrate more clearly the means for operating the discharge-gates at the lower side of said trunk, the gate-operating mechanism and trunk being sectioned in part on the dotted line 5 5 of Fig. 6. Fig. 6 is a vertical longitudinal section of same on the dotted line 6 6 of Fig. 5. Fig. 7 is an enlarged detached top view, partly broken away, of the water, suction, and discharge pipes with the motor and pump; and Fig. 8 is a side elevation of one portion of same, the piping being divided on the dotted line 8 8 of Fig. 7.

In the drawings I illustrate my invention as embodied in a seagoing dredge of modern exterior outline, and therein 20 designates the machinery-space of the dredge; 21, the upper or main deck; 22, the bins for the dredged material; 23, the decks over these bins; 24, the boilers, and 25 the engine for driving the propeller 26. The bins 22 are located forward and aft of the machinery-space 20 and are centrally disposed within the dredge, as shown in Fig. 4, and the sides of the several sections of said bins have downwardly-converging walls 27, leading to discharge-openings 28, which are adapted to be closed by hinged gates 29, pivotally connected with the lower ends of links 30, Fig. 4, which are pivotally connected at their upper ends with vertical rods 31, extending upwardly through the decks 23 21 and provided with hand-wheels 32, by means of which the said rods 31 may be moved vertically and the gates 29 opened or closed at will. The hand-wheels 32 are mounted upon suitable channels or other convenient supports 33, so that they may be effective in holding the gates 29 in their closed position. From the upper side edges of the bins 22 lead scuppers or overflow-pipes 34, Fig. 4, through which the water which enters the bins 22 with the dredged material may flow through the sides of the dredge back to the sea without forming a pressure on the bins and allowing the solid material to settle within the latter. The bins 22 are decked over in a substantial manner at such height from the keel of the ship as to make their tops come just even with the level of the sea when filled, and this is an important feature of the construction of the bins and dredge in that thereby the necessity of pumping the dredged material against a head is avoided, the purpose being to keep the dredged material and the water in the suction and discharge pipes and bins immersed in the liquid in which the vessel floats.

Above the bins 22 and extending through the decks 21 23 are provided trunks 35 for

the purpose of allowing the air to escape freely upward from the bins and light and air to pass downwardly to the bins and also to permit a man to enter the bins from the upper deck 21 whenever occasion may require. The bins 22 are also equipped with sounding-tubes 36, which extend through the decks 21 23 and are for the purpose of enabling the attendant to determine how much solid matter the bins contain, this being ascertained by the insertion of a rod downwardly through the tubes 36 until it strikes the upper surface of the solid material and being desirable so that the ship may be kept properly trimmed.

Directly over the bins 22 and at each side of the longitudinal center thereof I provide longitudinally-arranged substantially horizontal trunks 37, which are preferably of rectangular shape and flattened out toward their discharge or outer ends, and into the inner ends of these trunks I lead the discharge-pipes 38 for the dredged material, the said pipes 38 discharging into the trunks 37 and the latter discharging into the bins 22. The trunks 37 are open at their discharge ends, as indicated in Fig. 2, and at their lower sides are provided with gates 39, Figs. 2, 5, and 6, adapted to openings in the lower side of said trunks above the several hopper-like divisions or sections of the bins 22. In Fig. 5 I illustrate one of the gates 39 in its open position, and in Fig. 6 the same gate is denoted by dotted lines in its closed position, while in Fig. 2 all of the gates 39 are shown in their open position. Each gate 39 is simply a plate of metal secured upon a rock-shaft 40, to whose outer end is secured a crank 41, extending upwardly and pivotally connected with links 42, whose upper ends are pivotally secured to the lower end of a vertically-movable rod 43, which extends upwardly through a suitable support 44 and is provided with an adjusting hand-wheel 45, which has a bearing upon said support 44 and is utilized to draw the rod 43 upwardly for opening the gates 39 or permitting the descent of said rod for closing said gates. The hand-wheel 45 and upper end of the rod 43 are threaded in a customary manner. The gates 39 may be opened more or less, as occasion may require, and when the attendant ascertains that some of the subdivisions of the bins 22 are becoming filled more rapidly than other subdivisions thereof he will regulate this condition by adjusting the positions of the gates 39 as required or closing some of said gates. The provision of the gates 39 and sounding-tubes 36 enable the proper trimming of the ship at all times.

By preference I duplicate the suction and discharge pipes and trunks 37 at opposite sides of the vessel, and in the drawings 46 denotes the suction-pipes, with their drags, of ordinary construction and up through which the dredged material is drawn for final delivery through discharge-pipes 38 to the trunks 37 and thence to the bins 22. The pipes 38 are continuations or parts of the suction-pipes. The pipes 46 extend upwardly and forwardly along each side of the vessel to a point about on a level with the top of the bins 22, where the said pipes 46 are connected by the customary form of swivel-joint 47 with Y-pipes 48, extending transversely inwardly and having their branches 49 projected forward and aft and secured by usual flanges with the inducers 50, which lead to and are connected with the discharge-pipes 38, extending forward and aft to the inner ends of the trunks 37. The dredged material is drawn upwardly through the pipes 46 and then passes through the Y-pipes 48 and thence into and through the inducers 50, discharge-pipes 38, and trunks 37, whence said material descends into the bins 22.

I do not limit my invention to the employment of the two sets of pipes 46 47 38, but deem it advantageous to employ the same.

Just beyond the inducers 50 I provide the pipes 38 with a section 51, shown on an enlarged scale in Fig. 8, which bends or curves upwardly at its middle portion and performs the duty of breaking or consolidating the several streams passing from the inducers into the discharge-pipes 38. I designate the pipe-sections 51 having the bends as "breakers," because by reason of the lift created by said sections the streams flowing forward and aft from the inducers become at each breaker consolidated into a solid body and insure the proper suction upwardly through the pipes 46. The breakers or pipe-sections 51 are of special importance in the starting of the dredge into operation, since by reason of their presence the suction action responds quickly and efficiently, whereas after the suction apparatus is in operation performing its work the breakers or bent-pipe sections 51 are of less importance, since the suction action having once started may be readily continued.

The suction-pipes 46 are by reason of the swivel-joints 47 capable of being raised and lowered at their outer ends at will, and the means provided for raising and lowering the said suction-pipes 46 are the blocks and tackle 52, which may be operated by steam hoisting-engines 53, located upon a deck or bridge, as shown, these engines 53 being in the line of the machinery-space 20.

The pump for creating the suction is indicated by the numeral 54 and is preferably a multi-stage high-pressure centrifugal pump of commercial construction, and this pump is direct connected with and operated from a high-speed steam-turbine or other motor 55. The pump 54 and motor 55 should be placed well down in the ship in order to have the pump primed at all times and ready for instant use. The pump 54 is, as will be observed, separated from the suction-pipes and takes its pure water from the sea through a

valve 56 and pipe 57, Fig. 3, said valve being secured to the side or bottom of the ship and being provided for the sole purpose of admitting pure water to the pump 54. The pipe 57 is the supply-pipe to the pump, and the outlet-pipe from the pump is numbered 58 and at its upper portion is of Y shape, Fig. 7, having its branches secured to transversely-extending pipes 59, whose outer portions are branched or of Y shape and turn upwardly and enter the inducers 50, one branch of each pipe 59 entering a forward inducer 50 and the other branch of each pipe 59 entering an aft inducer 50. The one pump 54 will draw its water through the side or bottom of the ship and discharge the same under high pressure into the transversely-extending pipes 59, which by means of their branches, which I number 60, will discharge into all of the inducers 50, thereby effecting the suction through both of the pipes 46 and the discharge of the dredged material into both the forward and aft bins 22. In order that I may regulate the flow of the water through the branches 60 of the pipes 59 or cut off the flow entirely through some or all of said branches, I provide said branches, as more clearly shown in Figs. 3 and 8, with valves 61 of usual character and operable by any convenient means, one of which I illustrate as being by means of vertical axially-rotatable rods 62, connected by beveled gear-wheels 63 with the stems of the valves 61. The upper ends of the branches 60 of the pipes 59 discharge into the inducers 50, and it is the passage of the water under high pressure through these inducers that creates and maintains the suction through the pipes 46.

I do not limit my present invention to any special form or construction of inducer 50.

The operation or method of using the dredge will be largely understood from the description hereinbefore presented. The drawings illustrate the dredge as having started in operation, the suction-pipes 46 having been lowered upon the bottom, and the material and water flowing through the system of pipes to the bins, where the sand or dredged material is collecting and the water flowing overboard through the scuppers 34. The upper water-line, marked "load-line," indicates how far the dredge will be immersed in the water when the bins become filled with sand. The suction-pipes 46 having been lowered, the propelling-engine 55 will be kept going ahead very slowly, and the pump 54 will be run at full speed, drawing its supply of water from the sea through the valve 56 and pipe 57, whence the water flows through the pipe 58 and its branches into the inducers 50, whence the water will flow into the discharge-pipes 38, trunks 37, and bins 22, carrying with it the dredged material sucked up through the pipes 46 and entering the inducers through the branches of the pipes 48. I prefer that the sea-water enter the inducers under a pressure of approximately two hundred pounds per square inch, but do not limit myself to this pressure. The water entering the inducers at high pressure will escape into the main channel of the inducers at a very high velocity, thereby forming a partial vacuum in the suction-pipes and causing the water and dredged material to ascend through said pipes and pass along the pipes 48 into the inducers, where it will go into contact with the streams therein and be forced along the discharge-pipes 38 at a velocity of about twelve or fifteen feet per second, and finally be discharged into the bins 22, in which the sand settles and from which the water flows overboard through the scuppers. After the bins 32 have become filled with the sand or other material the ship will be moved to the location where it may be desired to dump the bins, and then the gates 29 will be opened and the sand allowed to discharge.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. A dredge having a bin decked over, an upper deck, and a discharge-gate for the bin, combined with a vertical trunk leading from the upper deck to the top of the bin, a substantially horizontal trunk for conveying the water and dredged material to the bin, and suction apparatus carried by the dredge for delivering the dredged material and water to said horizontal trunk; substantially as set forth.

2. A dredge having a bin decked over, an upper deck, and a discharge-gate for the bin, combined with a vertical trunk leading from the upper deck to the top of the bin, a sounding-tube leading from the upper deck to the top of the bin, a substantially horizontal trunk for conveying water and dredged material to the bin, and suction apparatus carried by the dredge for delivering the dredged material and water to said horizontal trunk; substantially as set forth.

3. A dredge having a bin decked over, an upper deck, and a discharge-gate for the bin, combined with a vertical trunk leading from the upper deck to the top of the bin, a substantially horizontal trunk for conveying the water and dredged material to the bin, and suction apparatus carried by the dredge for delivering the dredged material and water to said horizontal trunk, the said bin being so disposed within the dredge that when full its top is about on a level with the sea; substantially as set forth.

4. A dredge having a bin divided into sections, discharge-gates for said sections, and a trunk for conveying the water and dredged material to the several sections of the bin and having gates for controlling the delivery of said material to said sections, combined with suction apparatus carried by the dredge for

delivering the dredged material and water to said trunk; substantially as set forth.

5. A dredge having a middle machinery-space and bins forward and aft for the dredged material and being decked over, and trunks leading forward and aft for conveying the dredged material to the bins and having discharge-gates, and suction apparatus carried by the dredge for delivering the dredged material and water to said trunks; substantially as set forth.

6. A dredge having a middle machinery-space, bins forward and aft and decked over for receiving the dredged material and having discharge-gates, and trunks leading forward and aft at each side of the center of the vessel for conveying the dredged material and water to the bins, combined with suction apparatus carried by the dredge for delivering the dredged material and water to said trunks, said apparatus having valves for controlling the passage of the dredged material to said trunks; substantially as set forth.

7. A dredge having a bin to receive the dredged material and water, a suction-pipe leading to said bin, a pump connected to take its water from the sea and deliver the same into said suction-pipe, means in said pipe and coöperating with said pump for inducing the flow of the water and dredged material to the bin, and a breaker in said suction-pipe beyond said inducing means for facilitating the suction action; substantially as set forth.

8. A dredge having a bin to receive the dredged material and water, a suction-pipe leading to said bin, a pump connected to take its water from the sea and deliver the same into said suction-pipe, and means in said pipe and coöperating with said pump for inducing the flow of the water and dredged material to the bin, said pipe having an upward bend beyond said inducing means for facilitating the suction action; substantially as set forth.

9. A dredge having a bin to receive the dredged material and water, a suction-pipe leading to said bin, a high-pressure multistage centrifugal pump connected to take its water from the sea and deliver the same into said suction-pipe, and means in said pipe and coöperating with said pump for inducing the flow of the water and dredged material to the bin; substantially as set forth.

10. A dredge having a bin to receive the dredged material and water, a suction-pipe leading to said bin, a high-pressure multistage centrifugal pump connected to take its water from the sea and deliver the same into said suction-pipe, and means in said pipe and coöperating with said pump for inducing the flow of the water and dredged material to the bin, said pipe having a bend beyond said inducing means for facilitating the suction action; substantially as set forth.

11. A dredge having bins to receive the dredged material and water, trunks leading forward and aft to said bins, a suction-pipe leading to said trunks, a pump connected to take its water from the sea and deliver the same into said suction-pipe, and means in said pipe and coöperating with said pump for inducing the flow of the water and dredged material to said trunks; substantially as set forth.

12. A dredge having bins to receive the dredged material and water, trunks leading forward and aft to said bins, a suction-pipe leading to said trunks, a pump connected to take its water from the sea and deliver the same into said suction-pipe, and means in said pipe and coöperating with said pump for inducing the flow of the water and dredged material to said trunks, said pipe having breakers beyond said inducing means for facilitating the suction action; substantially as set forth.

13. A dredge having bins to receive the dredged material and water, suction-pipes at opposite sides of the dredge leading to said bins, a high-pressure multistage centrifugal pump connected to take its water from the sea and deliver the same into said suction-pipes, and means for regulating the action of the pump on the material in the respective pipes; substantially as set forth.

14. A dredge having bins to receive the dredged material and water, suction-pipes at opposite sides of the vessel and leading forward and aft to said bins, a pump connected to take its water from the sea and deliver the same into said suction-pipes, and means in said pipes and coöperating with said pump for inducing the flow of the water and dredged material to the bins; substantially as set forth.

15. A dredge having bins to receive the dredged material and water, suction-pipes at opposite sides of the vessel and leading forward and aft to said bins, a pump connected to take its water from the sea and deliver the same into said suction-pipes, and means in said pipes and coöperating with said pump for inducing the flow of the water and dredged material to the bins, said pipes having breakers beyond said inducing means for facilitating the suction action; substantially as set forth.

16. A dredge having a bin, a suction-pipe leading thereto and that part of same on the vessel extending horizontally about on a line with the top of the bin, and a pump placed well below the water-line and taking its water from the sea and delivering the same into said suction-pipe for creating a flow of the material through the latter; substantially as set forth.

Signed at New York city, in the county of New York and State of New York, this 28th day of April, A. D. 1905.

LEVIN S. PARKER.

Witnesses:
CHARLES C. GILL,
ARTHUR MARION.