No. 727,059. PATENTED MAY 5, 1903.

G. E. BALCH.

APPARATUS FOR RELIEVING GROUNDED VESSELS.

APPLICATION FILED NOV. 3, 1902.

NO MODEL. 3 SHEETS—SHEET 1.

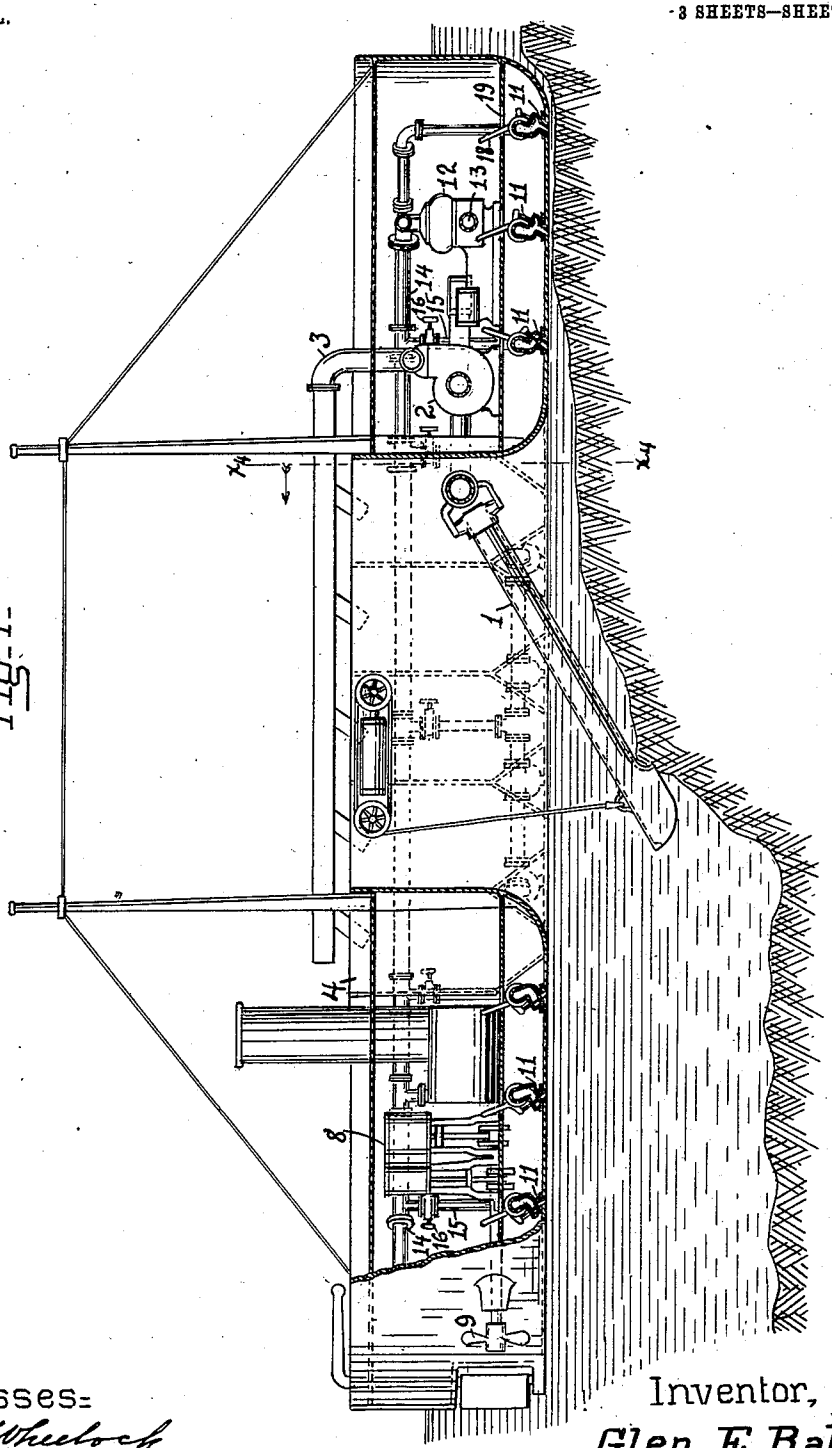


Fig. 1.

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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NO MODEL. 3 SHEETS—SHEET 2.

Fig. 2.

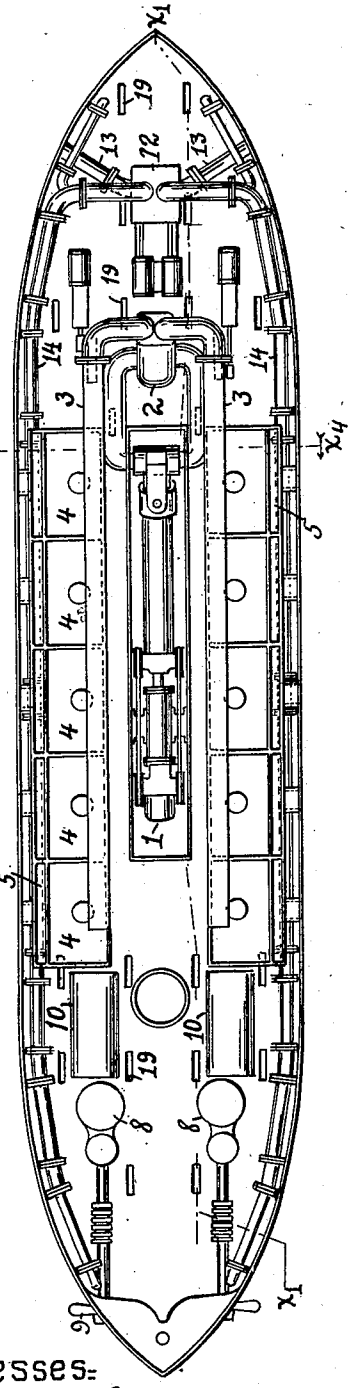
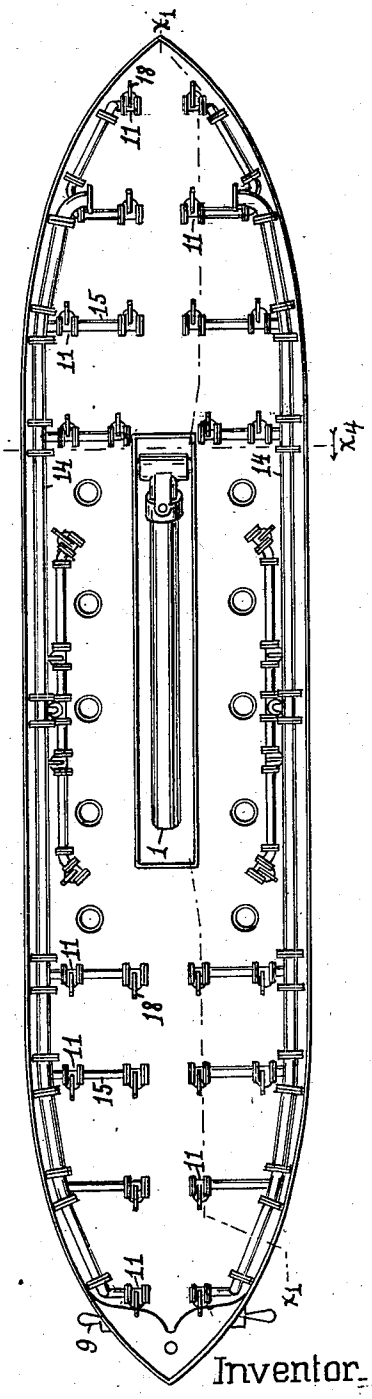


Fig. 3.



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NO MODEL. 3 SHEETS—SHEET 3.

Fig. 4.

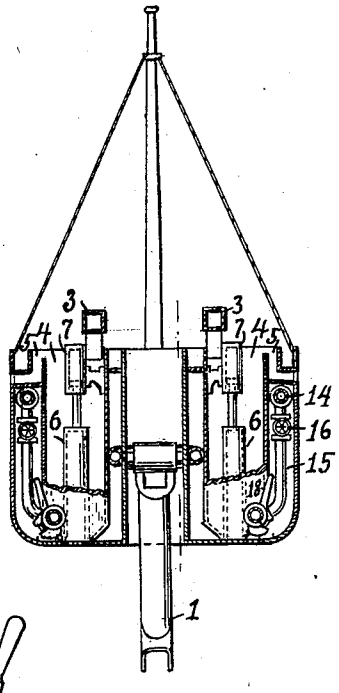


Fig. 5.

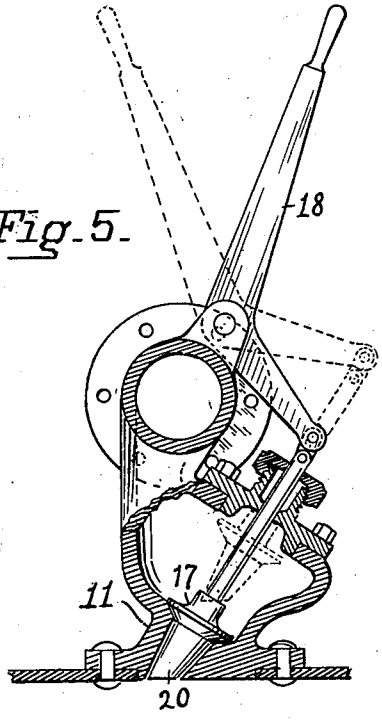
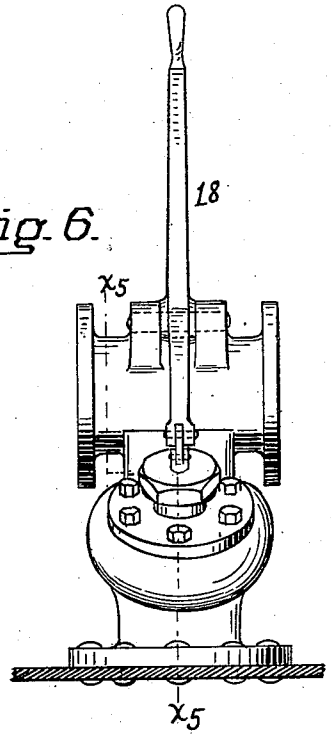


Fig. 6.



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No. 727,059. Patented May 5, 1903.

UNITED STATES PATENT OFFICE.

GLEN E. BALCH, OF NEW YORK, N. Y.

APPARATUS FOR RELIEVING GROUNDED VESSELS.

SPECIFICATION forming part of Letters Patent No. 727,059, dated May 5, 1903.

Application filed November 3, 1902. Serial No. 129,825. (No model.)

To all whom it may concern:

Be it known that I, GLEN E. BALCH, a citizen of the United States of America, and a resident of New York city, borough of Richmond, in the county of Richmond and State of New York, have invented certain new and useful Improvements in Apparatus for Relieving Grounded Vessels, of which the following is a specification.

The object of my invention is to provide vessels, and particularly steam vessels and dredges which carry motive power either for propulsion or for dredging, with a jet apparatus consisting of a system of nozzles downwardly opening along the bottom of the vessel, by which a shoal below the vessel can be scoured away when the vessel is in danger of grounding or has become grounded.

One detail of the invention relates to the installation of the system of nozzles at fixed points along the bottom of the vessels.

Another detail of the invention relates to the installation of the nozzles so that they project downwardly through the bottom of the vessel. The nozzles are supplied through a branched system of pipes inside the hull, and valves are provided at suitable points in the system for regulating the number and location of the nozzles which it may be desirable to use at any one time. The apparatus is thus made a permanent part of the outfit of the vessel and is always in position for immediate use, so that any shoal over which it may be necessary to anchor while dredging can be scoured away as the dredging progresses and the vessel becomes loaded with dredged material and sinks lower in the water.

Another detail of the invention, which is in connection with its use on a dredge, relates to the installation of each nozzle with an inclined relation to the bottom of the vessel where it is located, the inclination being in the direction of the dredging apparatus, so that the dredging apparatus will assist the nozzle by removing the material which is scoured by the nozzle and the nozzle will assist the dredging apparatus by supplying material to the dredging apparatus.

Another detail of the invention, which is more particularly in connection with a passenger or freight vessel, relates to the combination of a valve with each nozzle, the valve having an extension that is flush with the mouth of the nozzle when the valve is closed. The mouth of the nozzle is also flush with the outside of the hull, thereby presenting a smooth surface to the water, so that the nozzle will not impair the speed of the vessel.

In further explanation of the invention reference will be made to the accompanying three sheets of drawings, which form a part of this application, and in which—

Figure 1 shows a longitudinal section through a suction-dredge provided with my invention, the section being taken on the line x' x' of Figs. 2, 3, and 4. Fig. 2 is a plan of the dredge, showing the engine-floors, together with engines, boilers, piping for the dredging apparatus, and pump and mains for supplying the nozzles. Fig. 3 is a horizontal plan of the dredge with the engines and engine-floors removed, showing the nozzles and pipe system by which the nozzles are supplied. Fig. 4 is a vertical cross-section through the dredge on the line x^4 x^4 of Figs. 1, 2, and 3 looking in the direction of the arrows adjoining the section lines. Fig. 5 shows a combined valve and nozzle broken away on the line x^5 x^5 of Figs. 6. Fig. 6 shows a front elevation of a valve and nozzle.

The drawings illustrate my invention in connection with a dredge of the center-suction type. The dredge is provided with a suction-pipe 1, which is hinged in a well through the middle of the vessel and has an open lower end forming the suction-head. The suction-pipe is lowered against the bank of material to be excavated. A powerful pump 2 draws in the water with such rapidity that the material in front of the suction-head will be drawn through the pump and discharged through pipes 3 into pockets 4, carried by the dredge. As the pockets are being filled the surplus water overflows into spillways 5 and is discharged at the side of the hull. The solid material settles in the pockets and is discharged through openings through the bottom of the hull. These openings are closed by valves 6, which are controlled from pressure-cylinders 7, and are opened when the dredge is in deep water, where it is desired

to discharge its load. The dredge is provided with engines 8, which operate the propellers 9 for its propulsion, and with steam-boilers 10, from which steam is supplied to the engines and pumps. It is desirable at times to excavate at the edge of a bank over which there is not sufficient depth to float the dredge when fully loaded. With this style of dredge in order to bring the suction-head into position against the bank to be excavated part of the hull must overlie the bank and will rest on the bottom before the pockets are filled. This necessitates a premature discharge of part or all of the load in order to relieve the dredge. To prevent such grounding of the dredge, nozzles 11 are fixed at intervals inside the hull to all portions of the bottom of the dredge at all remote from the suction-head. These open downwardly through the bottom of the hull. They are supplied from a pump 12, which draws in water through suction-pipes 13 and delivers it through a system of piping consisting of mains 14 with branches 15 to the nozzle, several nozzles being connected to each branch. Gate-valves 16 are provided in each branch pipe, by which the supply to all the nozzles in the branch can be simultaneously regulated. For further convenience plunger-valves 17, by which the nozzles can be controlled singly, are seated opposite the mouth of each nozzle. The plunger-valves are operated through levers 18, which project through slots 19 in the floors of the engine-rooms. The mouth of each nozzle is flush with the outside of the hull, and the valve is provided with an extension 20, which projects into the nozzle when the valve is closed and is flush with the mouth, thereby leaving the hull free from any irregularity that would impede the progress through the water. This feature is particularly applicable to vessels in which speed is important. The nozzles are preferably set at a slight inclination with respect to the walls of the hull through which they pass, and this inclination is made in case of a dredge in the direction of the dredging apparatus. Hence in the center-suction dredge illustrated in the drawings the nozzles forward of the suction-head have their mouths inclined aft, those nozzles aft of the suction-head are forwardly inclined, and those at either side of the suction-head are inclined amidships, so that such material as may be dislodged by the jet from any nozzle will be driven in the direction of the suction-head. In connection with dredging the nozzles are used to prevent the grounding of the dredge as it becomes loaded by scouring the material from under the portion of the hull which is in danger of grounding. As the dredge fills up and settles into close proximity to the bottom jets are started in as many nozzles as the pump can supply in that portion of the hull which is in danger of grounding, and the nozzles are started in turn until the bank is sufficiently scoured away under the dredge, so that the dredge can be floated into deep water when it is loaded. The downstream-nozzles are opened first in order to obtain as much assistance as possible from the tide or currents in washing away the scoured material. In connection with passenger or freight vessels the nozzles are used to relieve them when they have grounded on sand, gravel, or mud bottoms. The jets are started in turn whenever the vessel is found to be grounded, and the material under the vessel is scoured away in the same manner as in preventing grounds.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. The combination with a vessel, of a dredging apparatus, means for operating the dredging apparatus, pockets carried by the vessel for receiving the dredged material, a system of downwardly-opening jet-nozzles at fixed points along the bottom of the vessel, and means for supplying the nozzles, substantially as described.

2. The combination with a vessel, of a dredging apparatus, means for operating the dredging apparatus, pockets carried by the vessel for receiving the dredged material, a system of downwardly-opening jet-nozzles at fixed points along the bottom of the vessel, and a pump for supplying the nozzles, substantially as described.

3. The combination with a vessel, of a dredging apparatus, means for operating the dredging apparatus, pockets carried by the vessel for receiving the dredged material, a system of downwardly-opening jet-nozzles within the vessel and connected to openings through the bottom of the vessel, and means for supplying the nozzles, substantially as described.

4. The combination with a vessel, of a suction dredging apparatus, means for operating the dredging apparatus, pockets carried by the vessel for receiving the dredged material, a system of downwardly-opening jet-nozzles within the vessel and connected with openings through the bottom of the vessel, and a pump for supplying the nozzles, substantially as described.

5. The combination with a dredge, of a dredge-hull, a suction-head supported from the dredge-hull, a pump connected to the suction-head, pockets carried by the dredge-hull for receiving the dredged material, a system of downwardly-opening jet-nozzles opening through the dredge-hull and supported thereby independently of the suction-head, a system of branched pipes within the hull and connected to the nozzles, valves in the branches, and means for supplying the system, substantially as described.

6. The combination with a dredge, of a dredge-hull, a suction-head supported from the dredge-hull, a pump connected to the suction-head, pockets carried by the dredge-hull for receiving the dredged material, a system of downwardly-opening jet-nozzles opening through the dredge-hull and supported there-

by independently of the suction-head, a system of branched pipes within the hull and connected to the nozzles, valves in the branches, and a pump for supplying the system, substantially as described.

7. The combination with a dredge, of a dredge-hull, a dredging apparatus supported from the dredge-hull, means for operating the dredging apparatus, a system of downwardly-opening jet-nozzles within the dredge-hull and supported thereby independently of the dredging apparatus and inclined in the direction of the dredging apparatus, and means for supplying the nozzles, substantially as described.

8. The combination with a dredge, of a dredge-hull, a suction-head supported from the dredge-hull, means for operating the suction-head, a system of downwardly-opening jet-nozzles opening through the dredge-hull and supported thereby independently of the suction-head and inclined in the direction of the suction-head, and means for supplying the nozzles, substantially as described.

9. The combination with a dredge, of a dredging apparatus, means for operating the dredging apparatus, a system of downwardly-opening jet-nozzles supported from the dredge independently of the dredging apparatus and inclined in the direction of the dredging apparatus, and a pump for supplying the nozzles, substantially as described.

10. The combination with a dredge, of a suction-head, means for operating the suction-head, a system of downwardly-opening jet-nozzles supported from the dredge independently of the suction-head and inclined in the direction of the suction-head, and a pump for supplying the nozzles, substantially as described.

11. The combination with a jet-nozzle, of a valve-seat opposite the nozzle, and a valve with an extension into the nozzle and flush with the mouth thereof when the valve is seated, substantially as described.

12. The combination with a vessel, of a jet-nozzle through the hull of the vessel having its mouth flush with the outside surface of the hull, a valve-seat opposite the nozzle, and a valve with an extension into the nozzle and flush with the mouth thereof when the valve is seated, substantially as described.

Signed by me in the city of New York, Manhattan, New York, this 30th day of October, 1902.

GLEN E. BALCH.

Witnesses:
SAMUEL W. BALCH,
GEO. L. WHEELOCK.