No. 684,139. Patented Oct. 8, 1901.

C. VIVIAN & H. R. WHEELER.

APPARATUS FOR HYDRAULICALLY TRANSPORTING SUBAQUEOUS SOLIDS.

(Application filed Mar. 14, 1901.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1

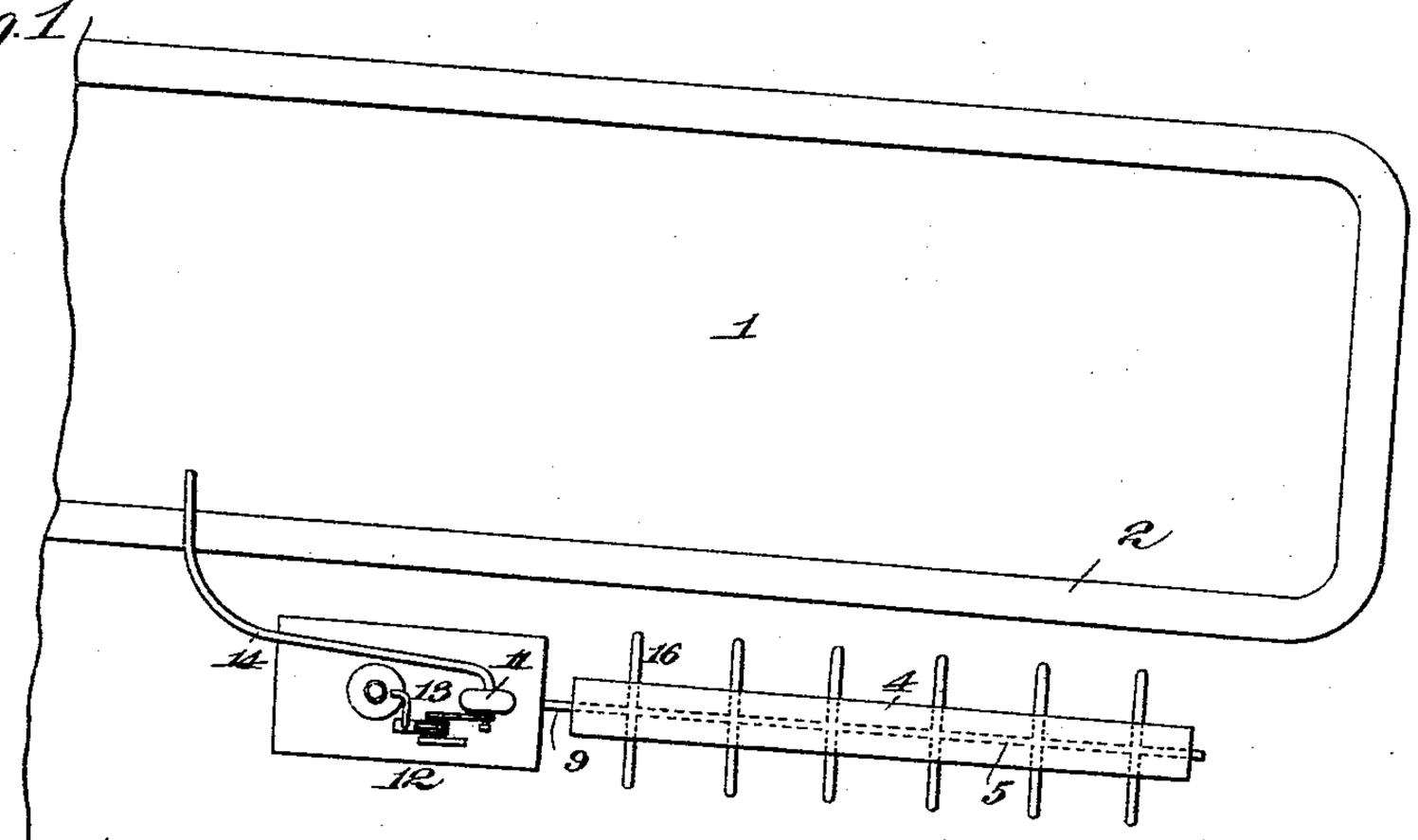
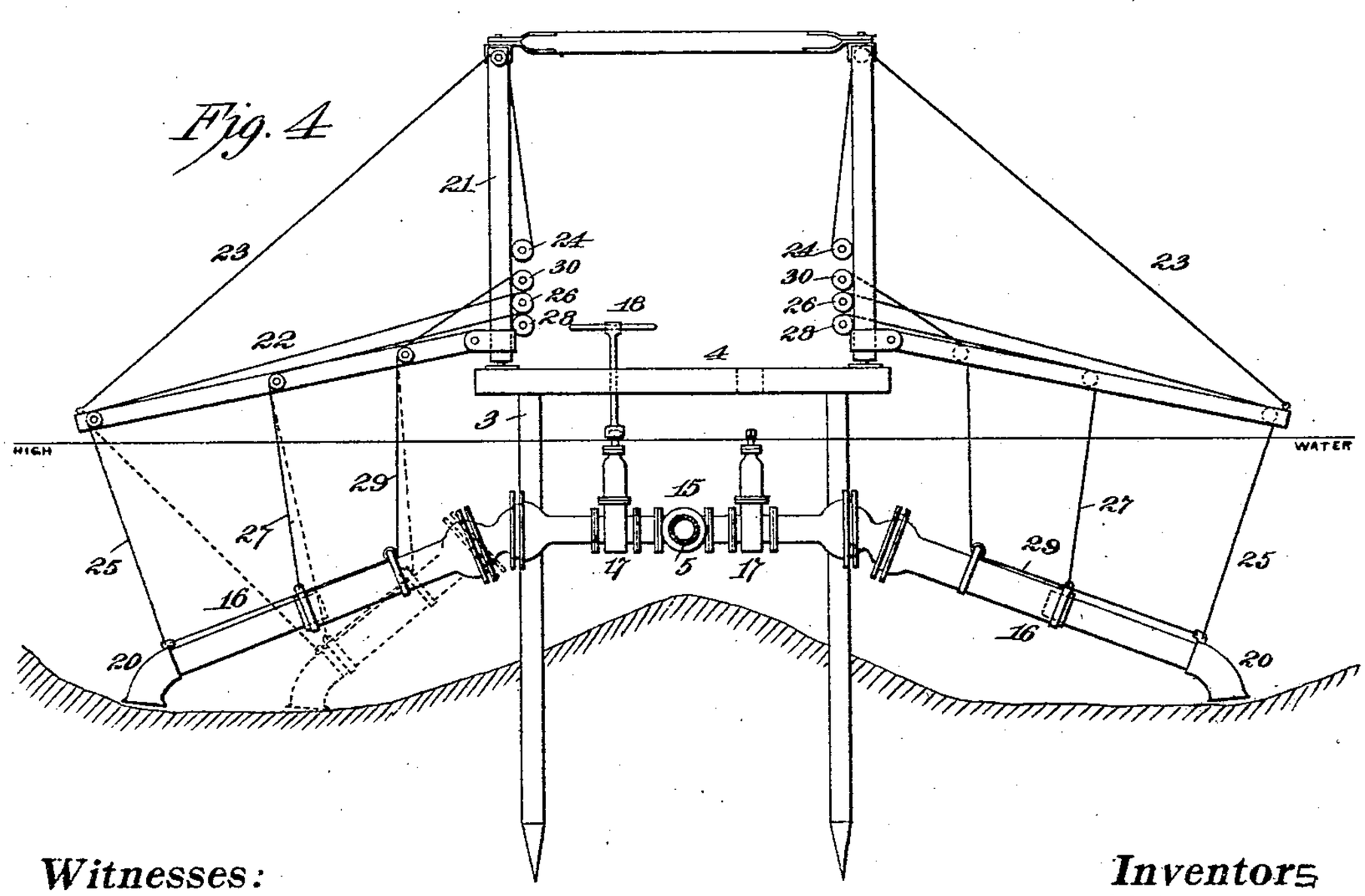


Fig. 4



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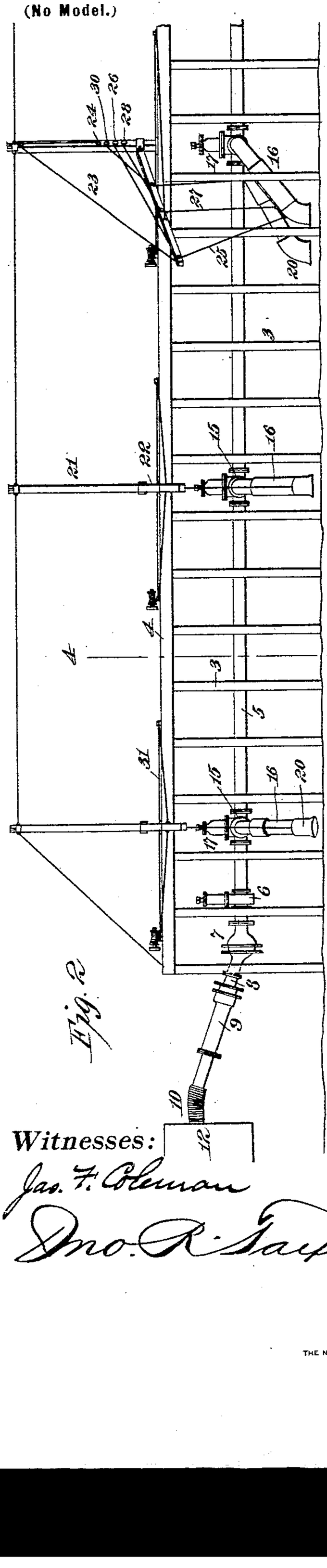

Fig. 2.

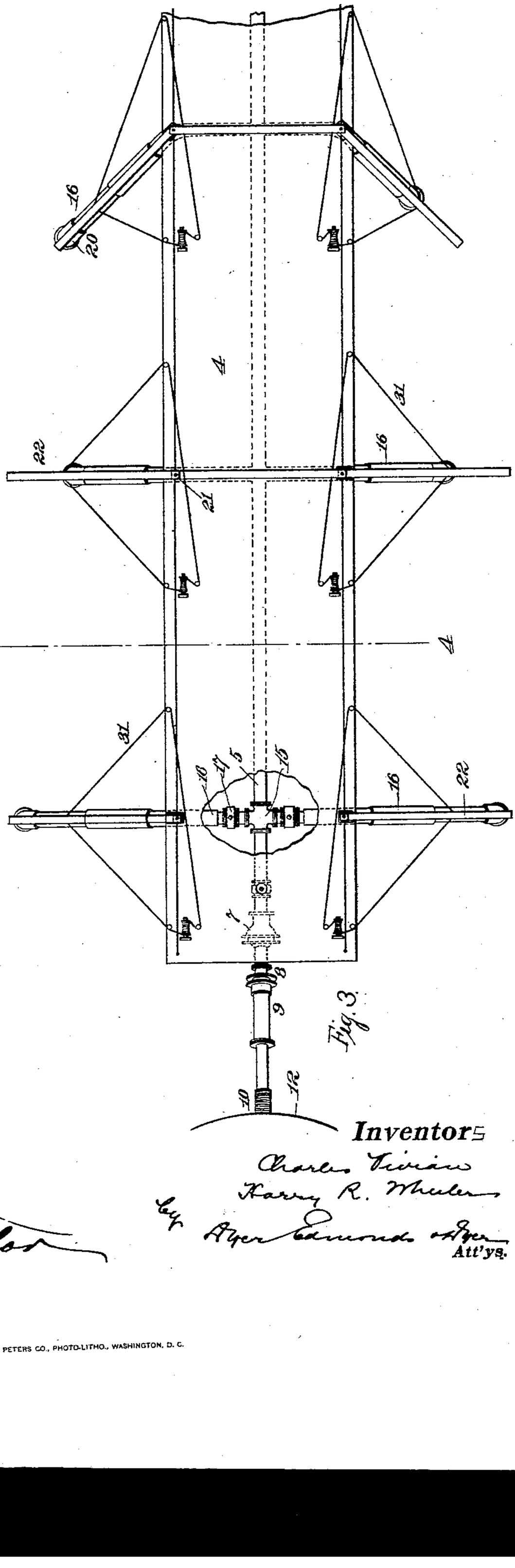

Fig. 3.

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UNITED STATES PATENT OFFICE.

CHARLES VIVIAN, OF ISLIP, AND HARRY ROBERTS WHEELER, OF BROOKLYN, NEW YORK.

APPARATUS FOR HYDRAULICALLY TRANSPORTING SUBAQUEOUS SOLIDS.

SPECIFICATION forming part of Letters Patent No. 684,139, dated October 8, 1901.

Application filed March 14, 1901. Serial No. 51,139. (No model.)

To all whom it may concern:

Be it known that we, CHARLES VIVIAN, residing at Islip, in the county of Suffolk, and HARRY ROBERTS WHEELER, residing in the borough of Brooklyn, city of New York, State of New York, citizens of the United States, have invented a certain new and useful Improvement in Apparatus for Hydraulically Transporting Subaqueous Solids, of which the following is a description.

Our invention relates to improvements in apparatus for automatically, efficiently, and economically removing solid material which may exist in loose or unpacked condition at the bottom of rivers, lakes, and harbors or which may be so deposited in such localities and for discharging the removed material to any desired place of deposit—as, for example, into a basin which requires to be filled. With our improved apparatus the material is removed from the water-bottom, conveyed to the place of discharge, and deposited thereat hydraulically by means of a moving stream or current of water impelled by one or more powerful pumps of any suitable character.

In carrying out our invention, for example, in connection with the filling in of a basin which has been defined by a sea-wall, bulkhead, levee, or dike of the desired size we erect a relatively light staging adjacent to the sea-wall and in sufficiently shallow water, so as to be protected by the sea-wall from the effect of tides and currents as much as may be practicable. The staging is preferably sufficiently removed from the sea-wall to permit the passage between the two of a dumping-scow carrying material which eventually is to be deposited in the basin inclosed by the sea-wall. We carry upon or under the staging a suction-pipe of the desired capacity, from which lead a plurality of branches extending, preferably, on either side of the staging and which are provided at their lower ends with open mouths, which engage with the water-bottom, which mouths are preferably telescopic in order that the capacity of the device may be increased. Each branch pipe is provided with a valve, by which it may be put into communication with the main suction-pipe. Suitable means are provided for moving the open mouths of the branch pipes back and forth and from side to side, so as to engage the entire surface of the bottom within the radius of each branch. Means are provided for causing a powerful suction of water up through any one or more of the branch pipes into the suction-pipe and along the latter—as, for example, a powerful pump placed upon a scow and connected with said suction-pipe. The discharge from the pump leads to the place of deposit, in the assumed case into the space inclosed by the sea-wall. By now opening the valve into one or more of the branch pipes and by engaging the open mouths of the latter with the bottom (the suction-pump being started) water will be drawn by suction up through the branch pipe or pipes and will pass through the suction-pipe and be discharged to the place of deposit, carrying with it the solid matter removed by suction from the water-bottom. This solid matter is preferably supplied to the bottom adjacent to the branch pipes by suitable dumping-scows, which may be loaded in any suitable way—as, for instance, by hydraulic dredges—or which may contain the refuse from the dumps of cities, as street-sweepings. By employing a plurality of branch pipes, any one of which can be put into communication with the main suction-pipe, we obtain a device of great capacity, since a practically continuous flow of material through the suction-pipe can be maintained, while the barges or scows may arrive intermittently alongside of the staging and deposit their contents into the water.

In order that the invention may be better understood, attention is directed to the accompanying drawings, forming part of this specification, and in which—

Figure 1 is a diagram showing the apparatus at work in the filling of a basin, the pump being shown carried on a scow; Fig. 2, a side elevation of the staging and parts carried thereby; Fig. 3, a plan, and Fig. 4 a section on the line 4 4 of Fig. 3.

In all of the above views corresponding parts are represented by the same numerals of reference.

Referring first to Fig. 1, we illustrate a basin 1 as being defined by a sufficiently-heavy sea-wall 2, which extends out from the shore,

as shown. The object to be accomplished with the invention is to fill in the basin 1 in a quick, economical, and efficient manner. At the side of the basin in sufficiently-shallow water is a staging formed of piles 3 and a platform 4. Carried by the staging, either above or below the same or on the water-bottom itself, is a metal suction-pipe 5, having a main valve 6 near each end and by means of which flow of water can be cut off. 7 is a universal joint, which may be bolted in place to either end of the suction-pipe, as shown, and which is illustrated as an ordinary ball-and-socket joint. The discharge member of the universal joint 8 telescopes within a pipe 9, which connects by a flexible joint 10 with the suction-pipe of a powerful pump 11. We illustrate this pump as a large centrifugal pump carried on a scow 12 and operated by a boiler and engine 13. The discharge 14 from the pump leads over above the sea-wall into the basin and may be an ordinary section of flexible hose of large diameter. When the pump 11 is carried on a scow, as shown, the scow will be moored adjacent to the end of the staging, as shown, and the flexible connection between it and the suction-pipe 5 as well as the telescopic joint 8 9 will permit the scow to rise and fall with changes of tide and to partake of movements under the effect of waves.

The suction-pipe 5 is provided with a plurality of four-way couplings 15, with which connect the branch pipes 16, each having a valve 17 therein, by which flow of water through the same may be cut off. These valves may be operated by a removable handle 18 from the platform 4. The branch pipes 16 connect with the couplings 15 by flexible joints 19, and each branch pipe is provided with an open-mouthed lower end 20, telescoping into the branch pipe, as shown, whereby the open mouth of the branch pipe may be moved from the position shown in full lines, Fig. 4, inwardly to the position shown in dotted lines in said figure by moving the telescopic section inwardly. Mounted on the platform 4 above each of the branch pipes is a properly-supported derrick 21, the arm 22 of which can be raised or lowered by a cable 23, passing around the drum 24 of a suitable winch. The outer end of the telescopic section 20 of each branch pipe is raised or lowered by a cable 25, passing around the drum 26 of another winch. The outer end of each branch pipe 16 is raised or lowered by a corresponding cable 27, passing to a winch 28, while the section 20 is moved inward to telescope by a cable 29, passing around a winch 30, the telescopic section moving outwardly by its weight. Each branch pipe 16 is swung from side to side by cables 31, operated by suitable windlasses, as shown.

The operation of the apparatus will be as follows: Suitable dumping-scows will be loaded with material for filling purposes—as, for example, by hydraulic dredges, which may be used for dredging channels in adjacent waterways, or with street-sweepings or other refuse of cities—and will be towed adjacent to the staging and dumped of their contents, which will settle to the bottom adjacent to the open mouths of the branch pipes 16. One or more of the valves 17 are now opened and the pump 11 operated. This creates a powerful suction up through the lower end of the branch pipe and draws up the light unpacked material, which passes with the stream through the suction-pipe 5 and is deposited into the basin or elsewhere. During this operation the branch pipe will be moved from side to side or back and forth, so that all the material within its radius will be removed. While one of the branch pipes is being thus operated fresh material is being deposited around the mouths of others, which operate successively. As soon as all the material has been removed from the immediate location of one of the branch pipes the valve 17 therefor is closed and the corresponding valve of another branch pipe opened, so that at all times there will be a constant flow of water and material through the suction-pipe 5 and out through the pump.

Having now described our invention, what we claim as new, and desire to secure by Letters Patent, is as follows:

1. In an apparatus for removing subaqueous deposits, the combination of a staging, a suction-pipe adjacent thereto, a branch pipe connected to the suction-pipe and capable of universal movement, means carried by the staging for universally operating the branch pipe, a suction-pump connected to the suction-pipe, and a discharge therefrom, substantially as set forth.

2. In an apparatus for removing subaqueous deposits, the combination of a staging, a suction-pipe adjacent thereto, a plurality of branch pipes connected to the suction-pipe and capable of universal movement with respect to the same, means carried by the staging for universally moving said branch pipes, a suction-pump connected to the suction-pipe, and a discharge therefrom, substantially as set forth.

3. In an apparatus for removing subaqueous deposits, the combination of a suction-pipe, a main valve in the suction-pipe, a plurality of branch pipes connected to the suction-pipe and capable of universal movement with respect thereto, a suction-pump connected to one end of the suction-pipe, and a discharge from said pump, substantially as set forth.

4. In an apparatus for removing subaqueous deposits, the combination of a staging, a suction-pipe adjacent thereto, a main valve in the suction-pipe, a plurality of branch pipes connected to the suction-pipe and capable of universal movement with respect thereto, a suction-pump connected to one end of the suction-pipe, and a discharge from said pump, substantially as set forth.

5. In an apparatus for removing subaqueous deposits, the combination of a suction-pipe, a main valve in the suction-pipe, a plurality of branch pipes connected to the suction-pipe and having universal movement with respect to the same, and a suction-pump adapted to be connected with either end of the suction-pipe, substantially as set forth.

6. In an apparatus for removing subaqueous deposits, the combination of a staging, a suction-pipe adjacent thereto, a main valve in the suction-pipe, a plurality of branch pipes connected to the suction-pipe and having universal movement with respect to the same, and a suction-pump adapted to be connected with either end of the suction-pipe, substantially as set forth.

7. In an apparatus for removing subaqueous deposits, the combination of a staging, a suction-pipe adjacent thereto, a plurality of branch pipes connected to the suction-pipe and capable of universal movement with respect to the same, a scow adjacent to the staging, a pump on the scow, and connections between said pump and the suction-pipe, substantially as set forth.

8. In an apparatus for removing subaqueous deposits, the combination of a staging, a suction-pipe adjacent thereto, a plurality of branch pipes connected to the suction-pipe and capable of universal movement with respect to the same, a scow adjacent to the staging, a pump on the scow, and telescopic connections between said pump and the suction-pipe, substantially as set forth.

9. In an apparatus for removing subaqueous deposits, the combination of a staging, a suction-pipe adjacent thereto, a plurality of branch pipes connected to the suction-pipe and capable of universal movement with respect to the same, a scow adjacent to the staging, a pump on the scow, and universal connections between said pump and the suction-pipe, substantially as set forth.

10. In an apparatus for removing subaqueous deposits, the combination of a staging, a suction-pipe adjacent thereto, a plurality of branch pipes connected to the suction-pipe and capable of universal movement with respect to the same, a scow adjacent to the staging, a pump on the scow, and universal and telescopic connections between said pump and the suction-pipe, substantially as set forth.

This specification signed and witnessed this 5th day of March, 1901.

CHARLES VIVIAN.
HARRY ROBERTS WHEELER.

Witnesses:
FRANK L. DYER,
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