

No. 764,784.

PATENTED JULY 12, 1904.

A. VAN DEN HASPEL.
APPARATUS FOR LOADING SUCTION DREDGES, &c.

APPLICATION FILED DEC. 8, 1903.

NO MODEL.

2 SHEETS—SHEET 1.

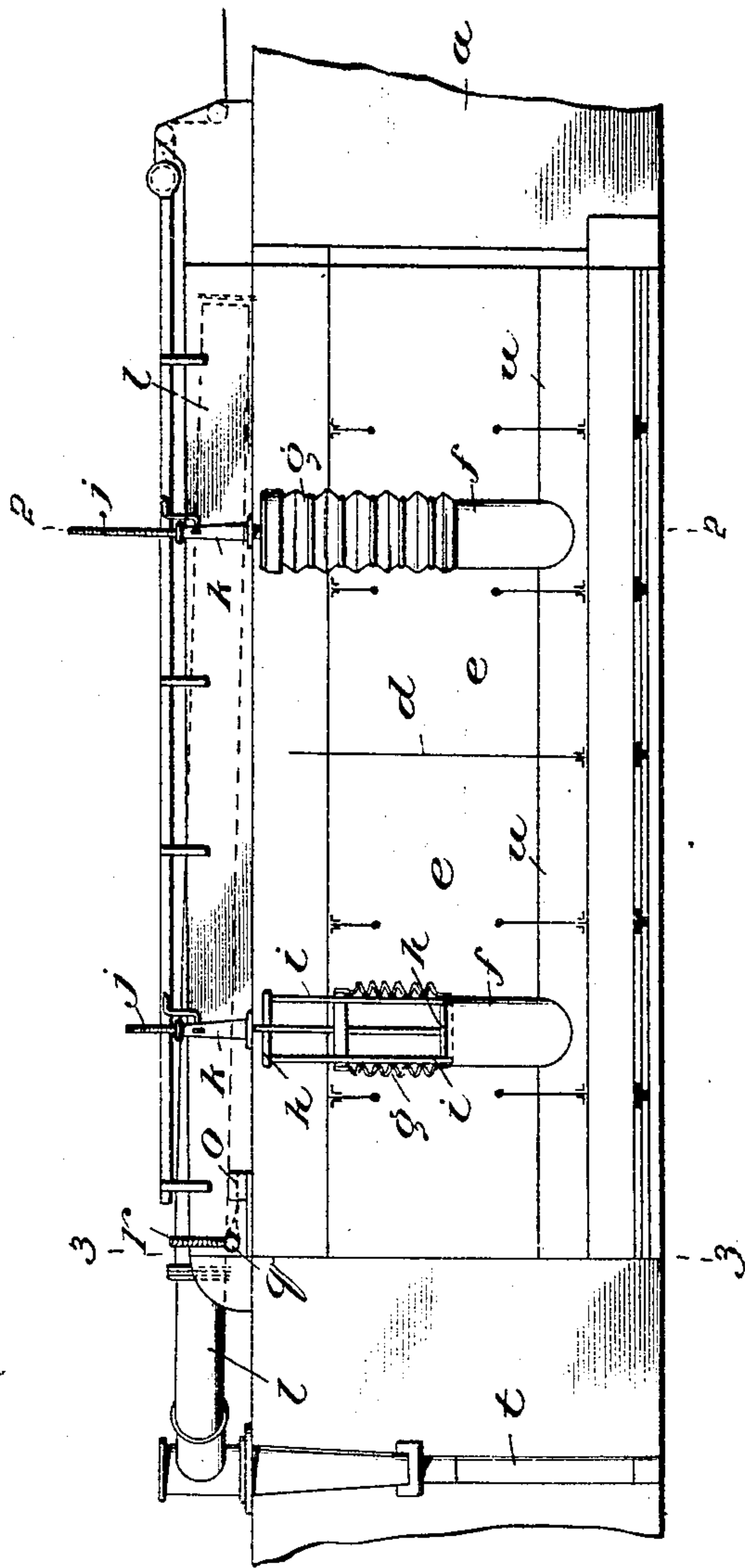


FIG. 1.

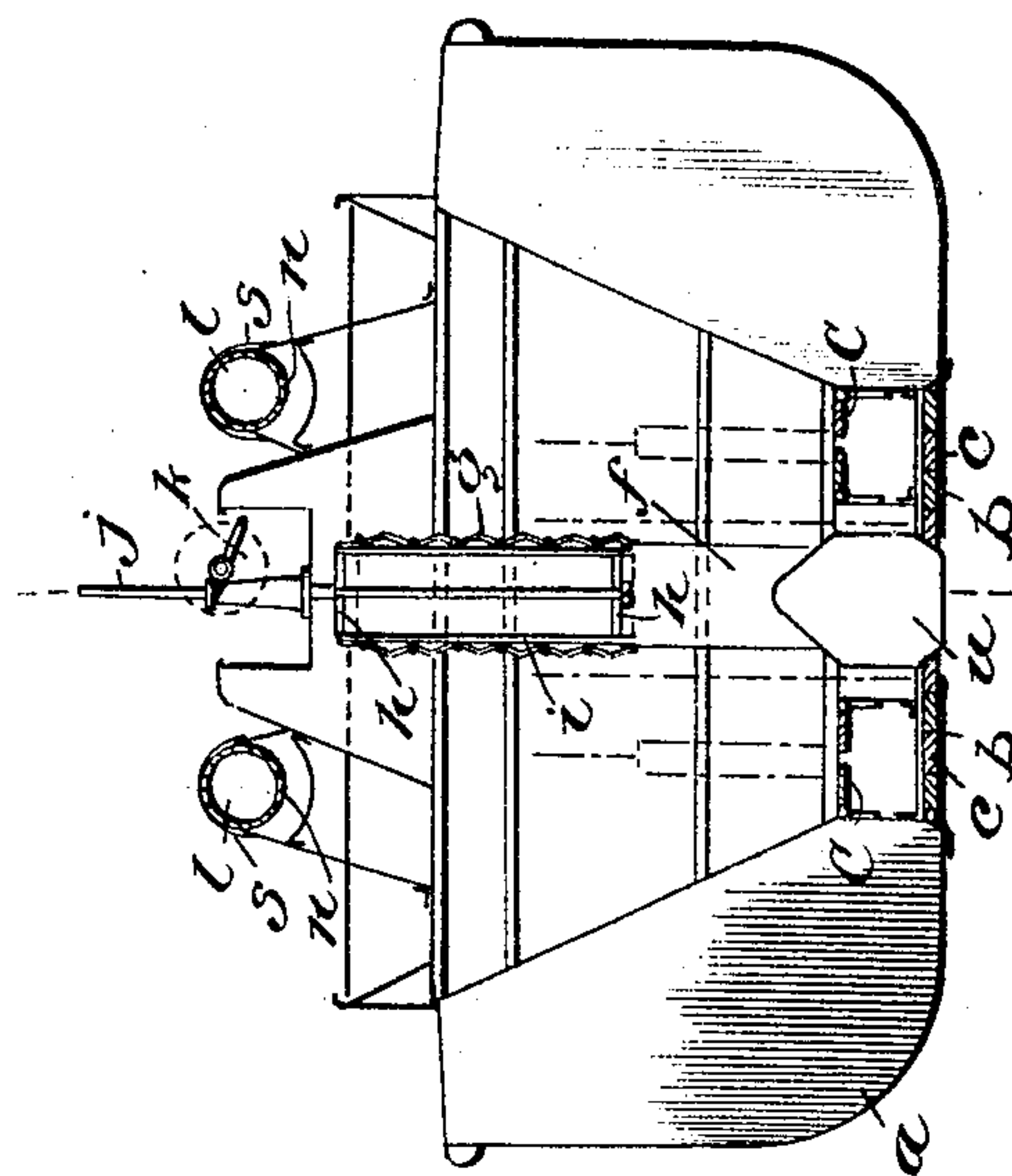


FIG. 2.

Witnesses

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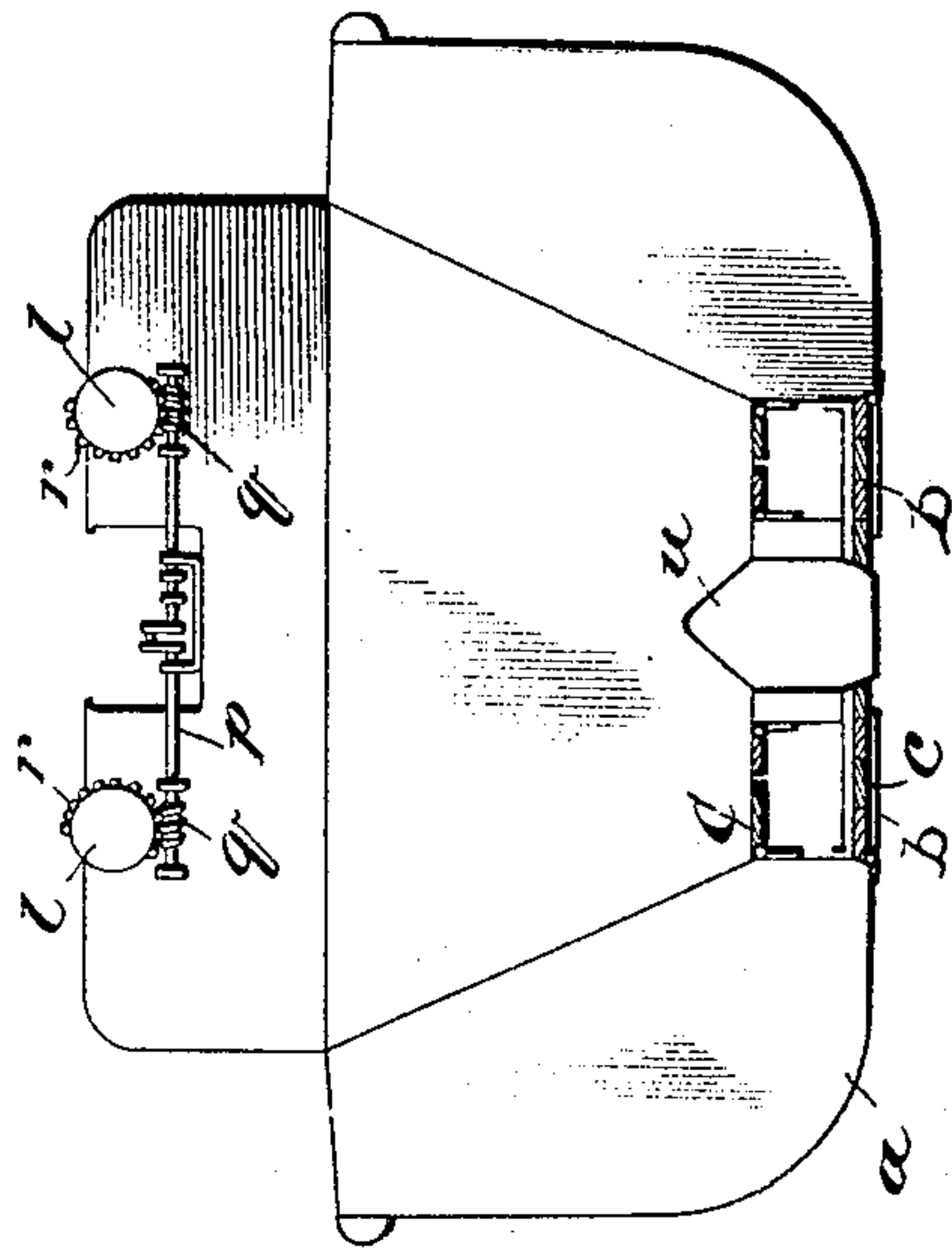
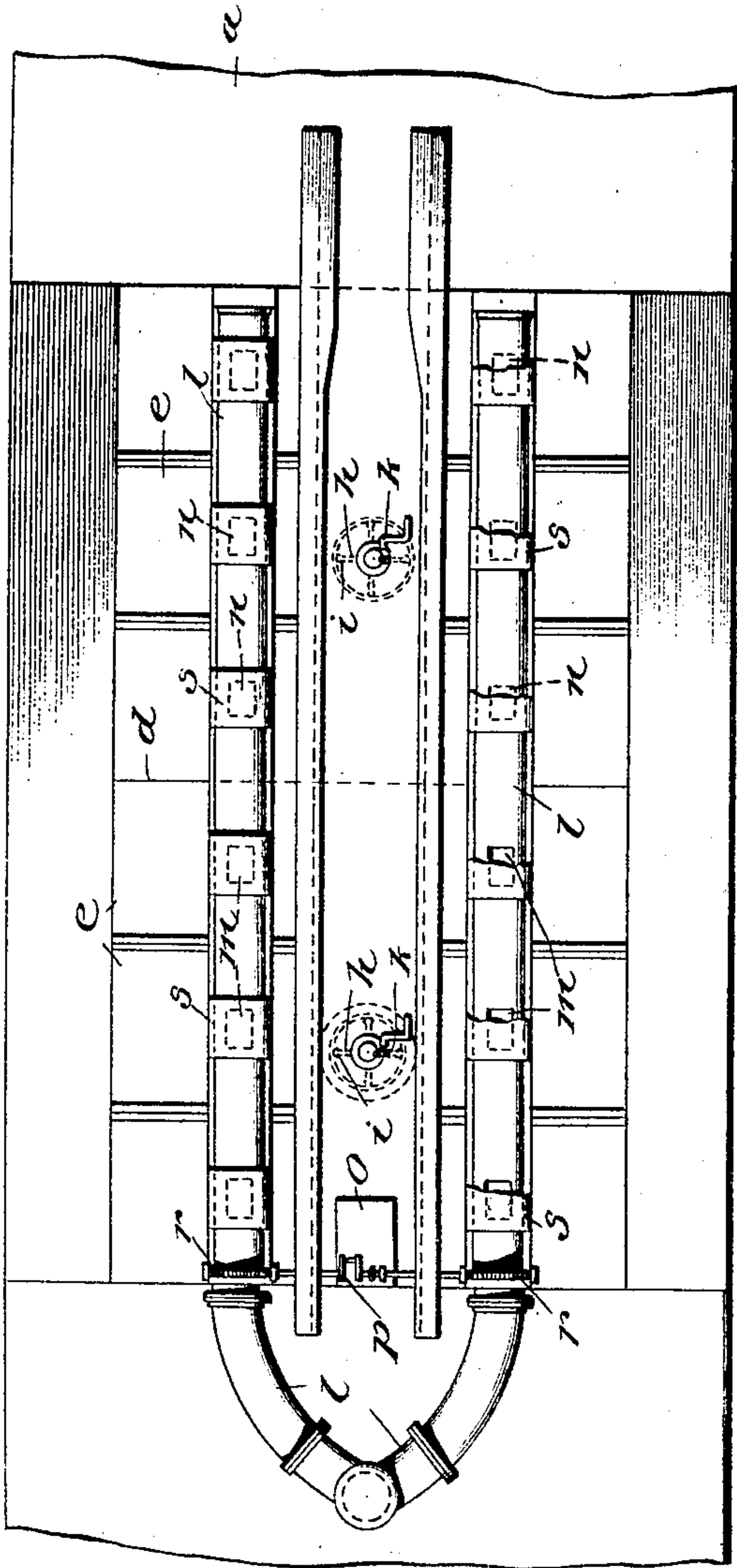


FIG. 3.

Witnesses

For Inve
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FIG. 4.

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UNITED STATES PATENT OFFICE.

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APPARATUS FOR LOADING SUCTION-DREDGES, &c.

SPECIFICATION forming part of Letters Patent No. 764,784, dated July 12, 1904.

Application filed December 8, 1903. Serial No. 184,250. (No model.)

To all whom it may concern:

Be it known that I, ALBERT VAN DEN HASPEL, a subject of the Queen of the Netherlands, residing at Nieuw-Lekkerland, Province of Zuid-Holland, Netherlands, have invented Apparatus for Loading Suction-Dredges, &c., of which the following is a specification.

This invention relates to improvements in the process and apparatus for loading suction-dredgers, barges, and the like vessels with the watery spoil—such as sand mixed with a considerable proportion of water delivered by a suction-dredger.

This invention is applicable to self-loading suction-dredgers and also to barges which are loaded directly or indirectly from a suction-dredger.

In loading the holds of suction-dredgers from their own spoil-pipes and also in loading the holds of barges and the like vessels from the spoil-pipes of a separate suction-dredger in cases where the dredgings or spoil, as is especially the cases when fine sand is being sucked up, contains much water the sand has no time to settle. In consequence of the continuous loading of watery spoil into the hold the spoil is maintained in constant agitation, with the result that the solid portions of the spoil remain suspended in the water. When the hold is full, the operation of loading must, however, be continued in order to get as much sand as possible into the hold. In this operation the water in excess flows continuously away over the side of the dredger and carries a considerable amount of sand with it overboard. If the loading were to be discontinued until the sand had settled, too much time would be lost. Therefore it is preferred to put up with the waste of sand and labor. The more watery the spoil the longer will the solid particles thereof take to settle and the greater will be the quantity of sand which is carried overboard again. Now the improvements in the apparatus which form the subject of the present application for a patent allows of continuing the loading of watery spoil into the hold without interruption, while

giving time to the spoil to settle without being in part washed overboard again. For this purpose the hold of the suction-dredger, barge, or the like is according to this invention divided by means of transverse bulkheads into two or more compartments. While one compartment is being charged with spoil, the spoil in the remaining compartment or compartments has time to come to rest and to settle. Then the water is gradually drawn off from the surface of said compartment or compartments until sand alone remains therein, whereupon the said compartment or compartments is or are charged again, and this operation is repeated alternately until all the compartments have been filled with sand alone.

For the purpose of drawing off the water from the surface of the compartments there is provided a preferably vertical pipe of which the lower portion is fixed and the upper portion can be moved up and down.

For the purpose of charging the various compartments of the hold the spoil-pipes of the sand-pump are so arranged that only one compartment is filled at one time.

The accompanying drawings illustrate apparatus for carrying out this invention applied by way of example to a suction-dredger.

In the drawings, Figure 1 is a part-longitudinal section of a suction-dredger. Figs. 2 and 3 are cross-sections, respectively, on the lines 2 2 and 3 3 of Fig. 1, and Fig. 4 is a plan of Fig. 1.

a is a suction-dredger fitted in the manner set forth in the German Patent No. 87,709, with bottom ducts formed by a double bottom *b c* for the purpose of emptying itself by suction.

d represents transverse bulkheads dividing the hold into a plurality of compartments *e*. (Two compartments are shown.)

f g represent a vertical pipe provided in each compartment *e*. Its lower portion *f* is fixed, while its upper portion *g* is made in the manner of a collapsible bellows of leather or other suitable material well stiffened on the inside by means of rings and is adapted to move along guides *i*, which are connected to-

gether by means of cross pieces or rings *h*. The portion *g* is open at its upper end, where it is connected to a long rack *j*. By means of hoisting mechanism *k* the rack *j*, and with it the bellows *g*, can be drawn up or let down.

l represents the spoil-pipes which are supplied from the sand suction-pump *t*. They extend in the usual manner over the entire length of the hold. In these pipes *l* are provided sets of apertures *m* and *n* for the outflow of the watery spoil, the apertures *m* being arranged over the first compartment *e* and the apertures *n* over the second compartment. In cases where only two compartments *e* are provided, as shown, the sets of apertures *m* and *n* may be arranged diametrically opposite to each other, looking at the pipes end-on. Where there are several compartments, the relative position of these apertures is such that the angle inclosed between one set of apertures and the next set of apertures is one hundred and twenty degrees in the case of three compartments, ninety degrees in the case of four compartments, and so on, so that there will always be only one set of apertures—namely, the apertures over one compartment—directed downward. The spoil-pipes *l*, or at least those portions thereof containing the aforesaid apertures, are mounted so as to be capable of rotation. A motor *o* is provided for the purpose of rotating the same, and on its driving-shaft *p* are worms *q*, which engage in worm-wheel segments *r*, fixed to the rotatable portions of the pipes *l*.

s represents shaped metal plates fitted around the upper part of the charging-pipes *l* in such a manner that in all positions of the pipes *l* all the apertures will be closed with the exception of those apertures which happen to be directed downward at the time. Thus it will be seen that by rotating the pipes *l* the material will be discharged into the compartments successively. The fixed pipes *f* discharge into the box-keelson *u*, arranged in the keel of the ship between the bottom ducts.

The box-keelson is in direct communication through suitable means with the water outside. The transverse bulkhead *d* is made somewhat lower than the sides of the vessel, so that when a compartment *e* is full of watery spoil and the pipes *l* be not immediately shifted the spoil will not flow overboard to waste, but will overflow into the next compartment *e*.

The mode of operation is as follows: In loading the hold of the suction-dredger *a* (or of a dredger-barge fitted with this apparatus) first one compartment *e* is filled with watery spoil. For this purpose the charging-pipes *l* are rotated until the apertures *n* are directed downward, while the apertures *m* are directed upward and are covered by the plates *s*, Fig. 4. When this compartment is full, the pipes *l* are rotated, by means of the motor *o*, until

the apertures *n* are directed upward and the apertures *m* are directed downward. The adjacent compartment *e*—that is to say, the compartment which is situated nearest to the sand suction-pump—is then filled. During this time the watery spoil comes to rest in the full compartment, and the sand or spoil proper gradually settles, leaving a layer of water practically free from sand at the surface. Now the bellows-pipe *g*, which had been completely drawn up by means of the windlass *k*, Fig. 2, is now let down to such a depth as to allow this water to flow away over its edge through this pipe and then through the box-keelson *u*, whence it is discharged overboard. As the water-level falls the bellows-pipe *g* is gradually lowered with it until practically only the settled spoil or sand is left in the compartment, care being taken to draw off only the top layer of water, which contains least sand. When all the water standing above the sand has been drawn off, the bellows-pipe *g* is again raised and the compartment is again filled up with watery spoil. Meanwhile a similar proceeding is taking place in the adjacent compartment *e*, and so on alternately until all the compartments are full of solid sand containing a minimum proportion of water.

The advantage of this invention is that the hold can be charged without interruption, and therefore without loss of time, with spoil containing a considerable proportion of liquid without the disadvantage of a part of the dredged material being carried to waste by the water discharged overboard, as is now the case with ordinary methods and apparatus.

In a modification instead of the partly-movable pipes *f g* wholly-fixed discharging-pipes may be employed to draw off the water at different levels in the hold, such pipes being arranged at different points of the hold. These discharging-pipes closed at the commencement would be opened in succession.

What I claim is—

1. In a dredge, the combination with a hold provided with partitions forming a series of separate compartments, a pipe and means whereby the pipe can deliver into any one of the compartments, the pipe delivering the watery spoil to the compartments successively whereby each compartment will be filled with watery spoil in succession.

2. In suction-dredgers, barges and the like vessels, in combination, a vertically-compartmented hold; a rotary spoil-pipe extending over a plurality of the compartments of the hold and formed with peripheral apertures for charging the said compartments with watery spoil, arranged in sets spaced equally around the periphery of the pipe whereby only one set of apertures can be situated in its lowest position to discharge into its respective compartment at one time; and covers located over the spoil-pipe adapted to close their re-

spective apertures in the spoil-pipe when said apertures are moved out of their lowest position, whereby in the rotation of the spoil-pipe, only the apertures which are situated in the under side of the spoil-pipe will be opened to discharge watery spoil into the compartment situated underneath; the remaining apertures situated over the other compartments being automatically closed by their coincidence with their covers.

3. In suction-dredgers, barges, and the like vessels, in combination, a vertically-compartmented hold; pipes in each compartment for drawing off water from the surface at various levels of the said compartment; a common duct located at the bottom of the hold and communicating with the lower ends of said pipes for receiving water discharged by them; and means for drawing off water from the said duct and discharging said water overboard.

4. In suction-dredgers, barges and the like

vessels, in combination, a vertically-compartmented hold; a draw-off pipe in each compartment, composed of a vertically-collapsible upper inlet portion adapted when in its highest position to extend to the top of said compartment, and of a lower exit portion fixed to the bottom of the compartment; means for raising and lowering the collapsible portion of said draw-off pipe to draw off the water from its surface at varying levels in the compartment; a duct located at the bottom of the hold and communicating with the lower exit portion of the draw-off pipe; and means for drawing off water from said duct and discharging same overboard.

Signed at Rotterdam, the Netherlands, this 10th day of October, 1903.

ALBERT VAN DEN HASPEL.

Witnesses:

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