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F. G. HAYWOOD, EXECUTRIX OF D. H. HAYWOOD, DEC'D.

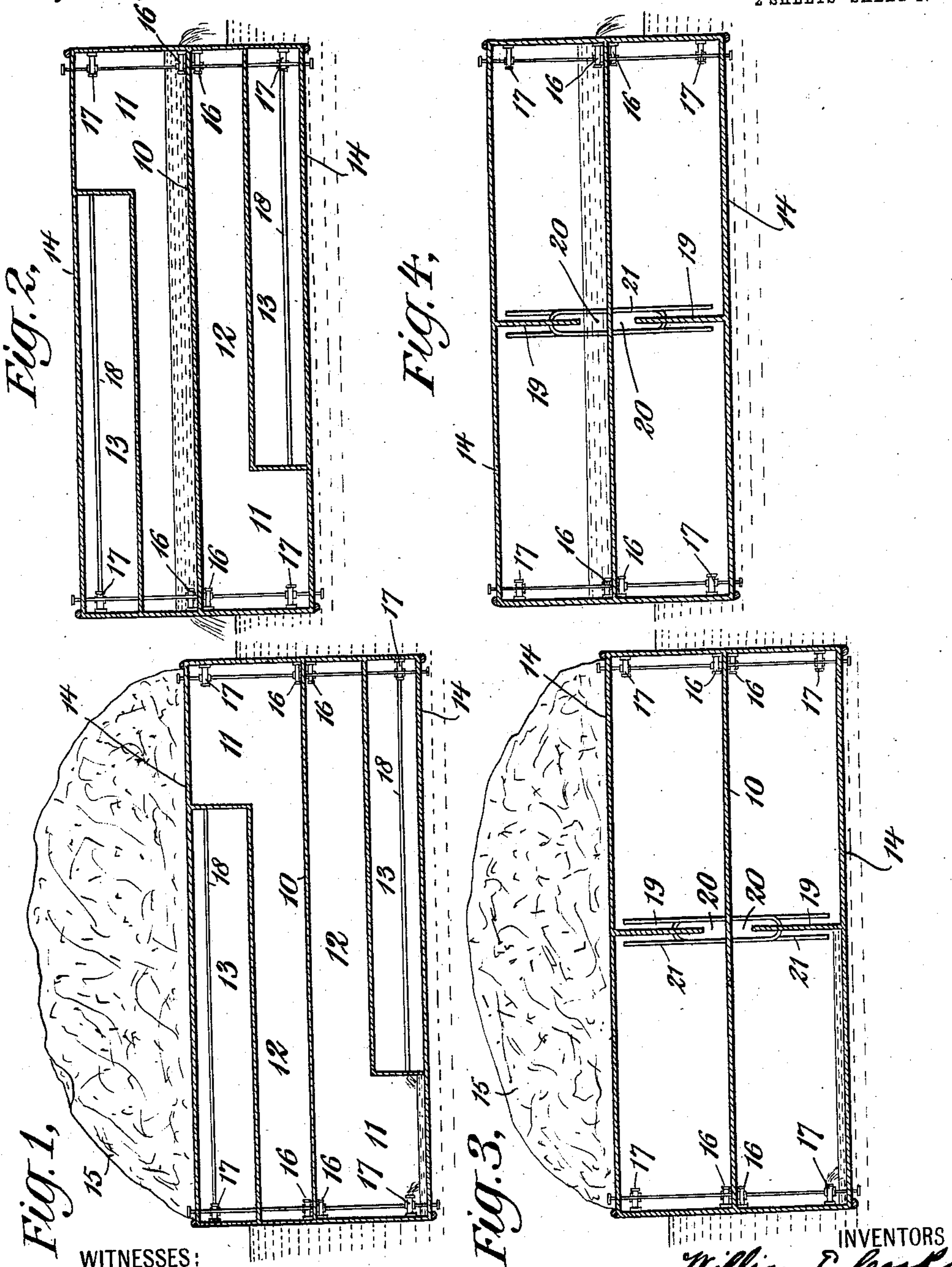
INVERTIBLE SCOW.

APPLICATION FILED MAR. 17, 1911.

1,015,755.

Patented Jan. 23, 1912.

2 SHEETS—SHEET 1.



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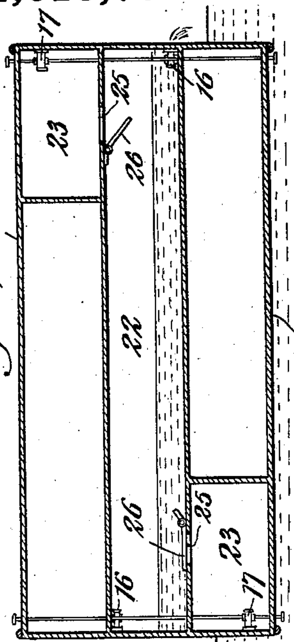

Fig. 6.

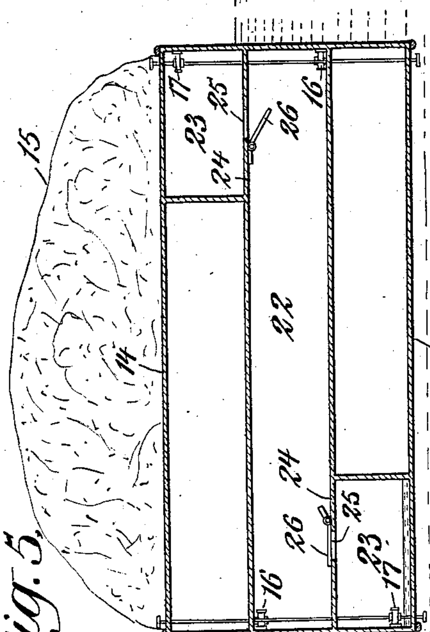

Fig. 5.

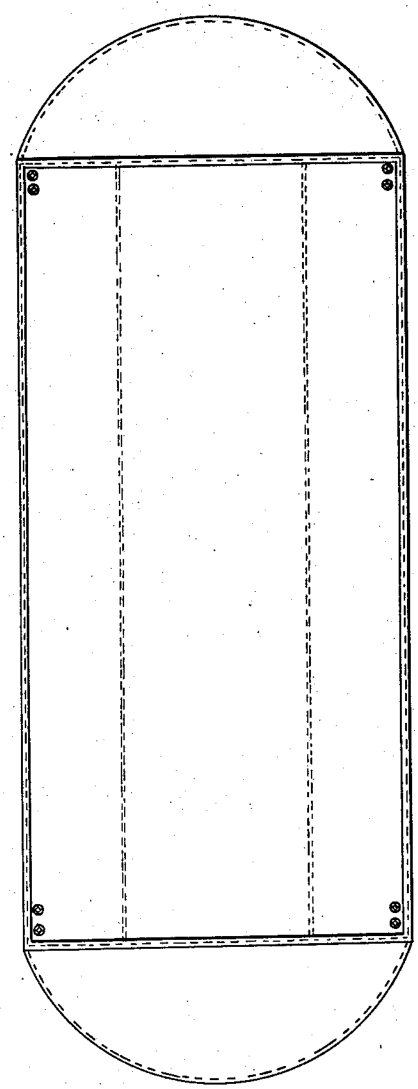

Fig. 7.

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INVERTIBLE SCOW.

1,015,755. Specification of Letters Patent. **Patented Jan. 23, 1912.**

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To all whom it may concern:

Be it known that we, WILLIAM E. COOK, a subject of the Crown of Great Britain, and a resident of St. George, county of Richmond, and State of New York, and DANIEL HOWARD HAYWOOD, a citizen of the United States of America, and a resident of New York, county of New York, and State of New York, have invented certain new and useful Improvements in Invertible Scows, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

Our invention relates to that class of scows which have a movement of rotation bodily to dump their load, being completely inverted at each dumping operation. Such a scow is commonly made exactly alike upon each side of the central horizontal plane thereof, whereby it may be employed indifferently either way up.

A common method of dumping such a scow at the present day, is to admit a large quantity of water ballast thereto, so as to submerge the scow to such an extent as to reduce it to a condition of unstable equilibrium, whereupon the scow in tipping in one direction or the other, as it will under the slightest wave disturbances, causes the water ballast to flow in the direction in which it tips, and the scow promptly turns over, dumping its load and then righting itself in an inverted position. The load having been dumped the unloaded scow will rise in the water to a higher level than that which it occupied when loaded, and theoretically the water ballast should be automatically discharged when the scow reaches its inverted position, the scow being thus self bailing. Under the above system of operation it has, however, been found necessary to admit such a large quantity of water to the interior of the scow for dumping purposes, that when inverted the level of the scow is too low to permit self bailing. Moreover the admission of such a considerable quantity of water takes more time than is desirable to be spent upon a dumping operation, and the uncertainty as to which side the scow is going to dump is often objectionable.

Under another suggested system of operation water is admitted to a chamber contained upon one side or the other of the scow, and in such case the scow is caused to dump in the desired direction, but after dumping the water contained in the chamber gives such a list to the scow as to render self-bailing difficult if not impossible.

It is the object of our present invention to decrease the amount of time consumed in a dumping operation, to insure the self bailing of the scow when the same is inverted in the dumping operation, and to render certain the movement of rotation of the scow in a predetermined direction, whereby the dumping will be effected upon one side or the other as may be selected. These objects are effected by a peculiar arrangement and construction of the water ballast chamber or chambers, by which the water ballast admitted for dumping purposes is distributed unevenly across the scow when the same is in position to dump, and is then redistributed evenly across the scow when the same is inverted. The amount of water ballast thus required for the purpose is reduced, a proportionate saving of time being thereby effected, and the scow when dumped and inverted will be lighter and will float high enough in the water to bring about the discharge of the water ballast by gravity. Moreover the uneven distribution of the water ballast will positively determine upon which side of the scow the load is to be dumped.

In order that our invention may be fully understood we will now describe in detail certain embodiments thereof having reference to the accompanying drawings illustrating the same, and will then point out the novel features in claims.

In the drawings: Figure 1 is a view in transverse vertical section of a scow constructed in accordance with our invention, showing the same as loaded. Fig. 2 is a similar view showing the scow in an inverted position from that in which it is shown in Fig. 1, the scow having dumped its load, and being in the act of self-bailing. Figs. 3 and 4 are views similar to Figs 1 and 2, showing another embodiment of our invention. Figs. 5 and 6 are similar views of still another embodiment of our invention. Fig. 7 is a top view of the scow.

In the example of our invention illustrated in Figs. 1, 2 and 7 the scow is provided with two water chambers, separated by means of a horizontal partition 10. This horizontal partition is arranged in the horizontal medial plane of the scow, the water chambers being arranged above and below it. Each water chamber comprises a portion 11 of relatively greater height or depth upon one side of the scow, and a portion 12 of less height or depth, which extends throughout the remainder of the width of the scow, clear to the other side thereof. Considering the lower chamber 11—12 the portion 11 is of greater depth than the portion 12,—extending from the partition 10 to the bottom of the scow; while the portion 12 extends from the partition 10 only about half way down toward the bottom of the scow. The remaining space 13 constitutes an air chamber from which water is excluded. The portion of the scow above the partition 10 is an exact inversion of the lower portion so that the scow as a whole may be inverted, either part indifferently constituting the upper or the lower portion thereof. The upper and lower walls 14 are alike and the one uppermost at the time constitutes the deck of the scow. In Fig. 1 the upper wall 14 is shown as loaded with material 15 to be dumped.

At the proper time water is admitted to the portion 11 of the water chamber which is at the time below the central partition 10, the mass of water thus admitted upon one side of the vertical central longitudinal plane of the scow tending to quickly destroy the equilibrium thereof, whereby the scow will have a movement of rotation in an anti-clockwise direction as viewed in the drawings, during which movement it will dump its load and become completely inverted. The amount of water ballast necessary to be admitted to the water chamber will vary under different conditions of load and distribution thereof. In some instances it will not be necessary to admit any more water than will be contained in the well portion of the part of the water chamber designated by the reference character 11, while in other cases it may be necessary to admit considerably more water so that the water will be contained not only in the portion 11, but also in the portion 12 of the water chamber, it being understood that as the greater mass of water is admitted so the submergence will be greater, and hence the stability of the vessel decreased.

When the vessel dumps its load and is inverted, the loss of load will lighten the vessel so that it will rise in the water as shown in Fig. 2. The part which received the water ballast when the vessel was in the position shown in Fig. 1 is now above the medial horizontal plane of the vessel, while the part below such plane is entirely free of water. The entire portion therefore below the medial plane of the vessel constitutes an air chamber to assist in the flotation of the vessel, that is to say, not only will the portion 13 which is an air chamber in any event constitute such a flotation chamber but also the part 11 and 12 which is at this time below the central partition or diaphragm 10, and the level of the vessel will be such at this time as to permit the ready discharge of the water ballast from the chamber above the partition 10, by gravity.

When the vessel is inverted the water ballast, which in the previous condition of the scow was unevenly distributed widthwise thereof, becomes distributed evenly because it rests upon the diaphragm or partition 10 which is uniformly disposed across the scow from side to side thereof. Thus, though the water is admitted and retained upon one side of the scow when the scow is in a position to be dumped, in order to dump the same, directly the load is dumped and the scow inverted the water is redistributed so as to cause the scow to float in a proper horizontal position.

The water may be admitted and discharged through any conveniently disposed valved openings, and the mechanism for operating the valves may also be of any desired character. In the drawings herewith we have shown each of the water chambers with valved openings 16—17 at the top and bottom thereof, *i. e.*, considering the top portion as that portion which is uppermost in either water chamber when the scow is in a position wherein the said water chamber is beneath the central diaphragm or partition 10. The lowermost valved openings 17 upon the side of the scow laterally opposite to the portion 11 of the water chamber may communicate with the portion 11 through pipes 18. The valves for the openings in either of the chambers must be accessible to the operator when the vessel is in either position, and as a simple means for bringing about this result we have shown the valves as provided with stems which extend in either direction through the upper and lower walls 14. Hence any of the valves may be operated from that wall 14 which is at the time employed as the deck of the vessel.

When the vessel is in the position shown in Fig. 1 and it is desired to dump, the valved openings 16—17 in the chamber 11—12 beneath the central partition 10, are opened upon both sides of the vessel, the corresponding valved openings 16—17 in the chamber above the central partition or diaphragm being kept closed. The water will flow in through the openings 17 while the air displaced thereby will flow out through the openings 16 into the water in which the vessel is floating, and so upward therethrough to discharge in the atmosphere above the water level. After the vessel has been inverted and occupies the position shown in Fig. 2 the water will be discharged through the valved openings 16, air being admitted through the valved openings 17 to take the place of the water thus discharged. In Fig. 2 the water is shown as being so discharged, such water being discharged by gravity and being received by the water in which the vessel is floating.

In Figs. 3 and 4 we have shown a somewhat modified form of the scow in which the upper and lower portions of the vessel are separated by vertical longitudinal bulkheads 19 which extend from the wall 14, part, but not all the way, toward the central horizontal partition 10. A comparatively narrow space or channel 20 is left between the upper and lower edge of the bulk-heads 19, as the case may be, and the central partition or diaphragm 10, as is clearly shown in Figs. 3 and 4 of the drawings. In this case the valved openings 16 or 17 are opened only upon that side of the vessel toward which it is intended for the vessel to dump, and in Fig. 1 the lower valved opening 17 upon the left-hand side of the vessel is shown as open to admit water, the displaced air being discharged through the upper valved opening 16 which has been simultaneously opened. The water rises in that portion of the lower chamber contained between the central bulk-head 19 and the left-hand wall of the scow as viewed in Fig. 3 until a sufficient quantity of water is received to effect the dumping operation. Ordinarily this will be an amount not sufficient to overflow the top of the bulk-head 19, but under some circumstances a sufficient quantity of water may be admitted so that a part thereof overflows the upper edge of the bulk-head 19, wherein some water will also be received in the right-hand portion of the scow. A greater quantity, however, will be contained in one side than in the other, except and unless an amount of water is admitted sufficient to fill both sides of the lower chamber up to the top of the bulk head 19. In practice the admission of such extraordinary quantity of water will probably never occur.

Directly the vessel is inverted the unevenly distributed water is redistributed evenly across the vessel because the part which is now the lowermost portion of the water chamber when in its position above the central horizontal partition 10, is in free communication through the space or opening 20. We may, if it be found necessary, employ air distributing pipes 21 such as will permit the air to circulate freely through the two sides of the uppermost portion of the upper water chamber, and thereby prevent an air lock occurring such as would prevent the free distribution of the water when the vessel is inverted, the air distributing pipes being made of sufficient length or otherwise properly disposed to obviate any danger of their acting as a siphon to carry the water from one side of the lower chamber to the other when the water is admitted to one portion or the other of the chamber for dumping purposes.

In Figs. 5 and 6 we have shown a further modification in which the central diaphragm or partition 10 is dispensed with. In this case the water chamber comprises three parts,—an intermediate portion 22 vertically disposed midway between the upper and lower walls and extending clear from one side of the vessel to the other, and two portions 23—23 arranged to one side of the vertical longitudinal central plane of the vessel and which extend from the intermediate portion 22 to the upper and lower walls 14 respectively. Diaphragms 24 separate the space 22 from the spaces 23—23 respectively, the said diaphragms being provided with openings 25 therethrough, the said openings having non-return valves 26 for closing them. The valved openings 16 and 17 are opened upon one side of the vessel (such being the left-hand side as viewed in Fig. 5) when it is desired to dump the load. Water enters through the lowermost openings 17 into the lower space 23 until the space is filled; then the water rises through the openings 25 past the check valves 26 and runs into the space 22. When the vessel dumps and becomes inverted the water is distributed equally across the intermediate portion 22 as is shown in Fig. 6, the valves 26 for that chamber 23 which is now in the lower position automatically closing, while the valves 26 for the upper chamber portion 23 automatically open. The water now discharges through the valved openings 16, being those openings through which air was discharged when the vessel was in the position shown in Fig. 5, air being admitted through the valved openings 17 while the water is discharging through the valved openings 16 as is shown in Fig. 6.

The top view shown in Fig. 7 represents either the form of scow shown in Figs. 1 and 2 or the form shown in Figs. 5 and 6. The exact form and shape of the vessel is of course immaterial, and in this connection attention is called to the fact that the drawings herein are largely diagrammatic the representations being conventional only.

No attempt has been made to show the details of construction of the vessel, the illustration being directed to showing the relative disposition of the water chambers and portions thereof, such as constitute the subject matter of our invention.

It will also be understood that the means by which water is admitted and air discharged and vice versa is also illustrated conventionally, as *per se* the same forms no part of the present invention.

It is obvious that given the fundamental disclosure herein those skilled in the present art will readily work out details of construction and combinations of parts such as will be suited for the particular use for which the vessel is to be employed.

It will also be understood that the proportionate size of the water chambers will vary in accordance with the relative load to be carried, and also in accordance with the normal stability required.

What we claim is:

1. An invertible scow having a water ballast chamber of greater water carrying capacity upon one side of the central vertical longitudinal plane of the scow than upon the other, when the scow is one way up, and of equal water carrying capacity upon opposite sides of the said central vertical longitudinal plane when the scow is the other way up, whereby water ballast admitted to the said chamber when the scow is one way up will destroy the equilibrium thereof, which water will be redistributed evenly upon either side of the central vertical longitudinal plane of the scow when the scow is the other way up, to restore the equilibrium thereof.

2. An invertible scow having a water chamber therein, the upper portion of which is equally distributed upon opposite sides of a vertical longitudinal plane passing through the center of gravity of the vessel, the lower portion of which is unevenly disposed with respect to such longitudinal central plane, and means for admitting and discharging water to and from the said chamber.

3. An invertible scow having water carrying pockets arranged upon one side of the central longitudinal plane of the scow when the same is either way up, and means for admitting water thereto to destroy the equilibrium of the scow in either position to invert the same, the said scow having an intermediate water carrying portion evenly disposed upon either side of the said central vertical plane for receiving the water from either of the said pockets when the scow is inverted, whereby upon inversion the water will be redistributed evenly across the scow to restore the equilibrium thereof.

4. An invertible scow having a central horizontal partition and water chambers upon either side thereof, each of the said water chambers including a pocket upon one side of the longitudinal vertical plane of the scow, which pocket projects outward in a direction away from the central partition, and means for admitting water to the said pocket in the lower water chamber to destroy the equilibrium of the scow and bring about its inversion, the said water being evenly distributed upon the said horizontal partition and the equilibrium thus restored when the scow is inverted.

5. An invertible scow having a central horizontal partition, water chambers on either side thereof which include a portion evenly disposed across the scow in proximity to the central partition and a portion unevenly disposed across the scow in proximity to the part thereof away from the partition, whereby that chamber which is at the time beneath the central partition will be adapted to contain more water upon one side of the central vertical longitudinal plane of the scow than upon the other, and means for admitting water to the lower chamber to destroy the equilibrium of the scow to bring about its inversion, and for discharging the water thus admitted from the said chamber when the scow has been inverted and the said chamber is at such time in the portion of the scow which is uppermost.

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