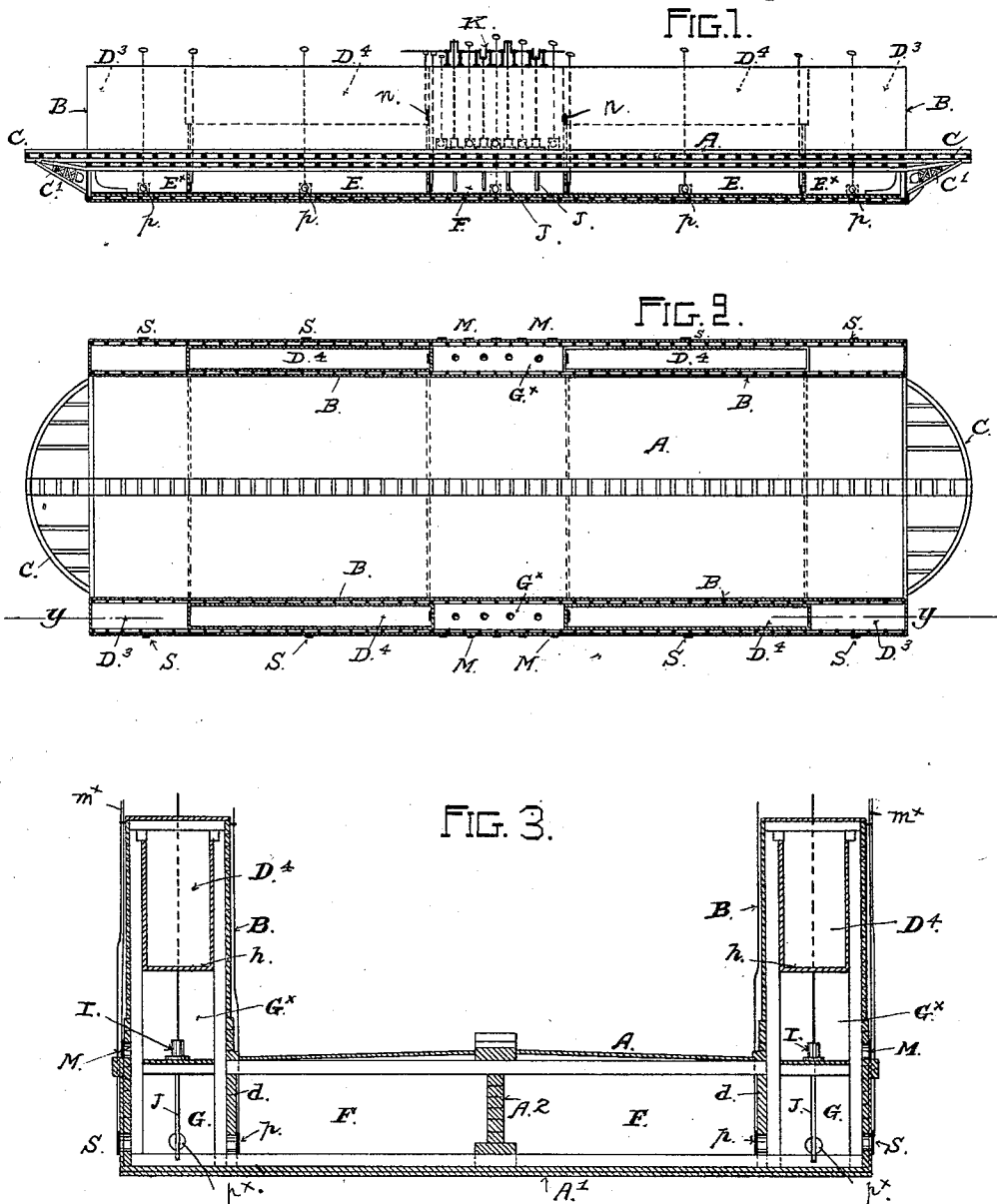


J. J. COUSINS.
BALANCED FLOATING DOCK.

No. 536,683.

Patented Apr. 2, 1895.



WITNESSES

Marcus Leve.

M. Hegner.

INVENTOR

James Joseph Cousins

By S. M. H. H. H.

his Atty.

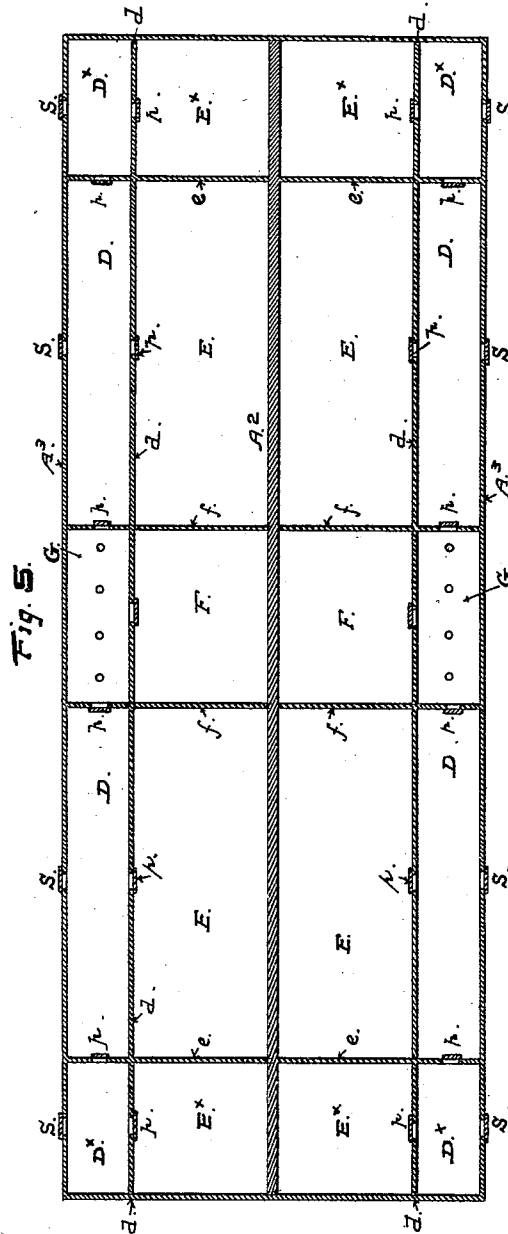
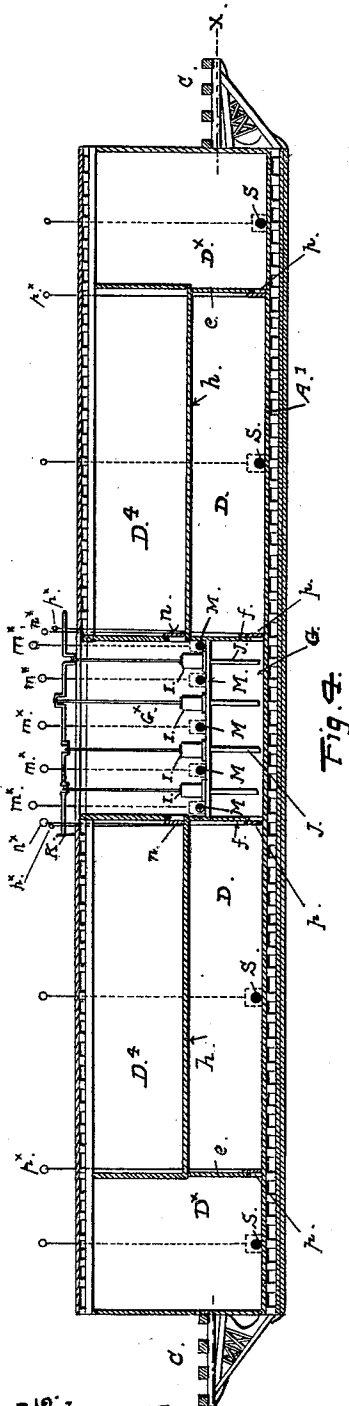
(No Model.)

2 Sheets—Sheet 2.

J. J. COUSINS.
BALANCED FLOATING DOCK.

No. 536,683.

Patented Apr. 2, 1895.



Witnesses:
M. Regner
Marcus Levi.

Inventor:
James Joseph Cousins
By *Smith & Co.*
his Attys

UNITED STATES PATENT OFFICE.

JAMES JOSEPH COUSINS, OF SAN FRANCISCO, CALIFORNIA.

BALANCED FLOATING DOCK.

SPECIFICATION forming part of Letters Patent No. 536,683, dated April 2, 1895.

Application filed April 10, 1894. Serial No. 506,991. (No model.)

To all whom it may concern:

Be it known that I, JAMES JOSEPH COUSINS, a citizen of the United States, residing in the city and county of San Francisco and State of California, have invented certain new and useful Improvements in Balanced Floating Docks, of which the following is a specification.

My invention relates to improvements made in constructing and operating floating dry-docks.

This invention has for its object, first, to reduce the length of a floating-dock without affecting its capacity; whereby a vessel of considerable length can be docked and handled in a dock of much less length than heretofore. In a dock two hundred and fifty feet in length constructed according to my invention a vessel of three hundred feet can be readily and safely docked and carried.

It has for its object, further, to dispense with the great amount of ballast heretofore found necessary in these floating-docks, and thus to secure greater buoyancy and consequent lifting power. In connection with this point, or feature, I discard the rock-ballast and other ballast heretofore used, and substitute therefor a novel arrangement of communicating water-compartments controlled by gates or valves and pumping-mechanism for filling and emptying the compartments.

To such ends and object my invention consists in the described construction of balanced floating-docks and in certain novel construction and arrangement of communicating water-compartments, gates or valves and pump-wells, as hereinafter fully explained and set forth in the following description and claims; reference being had therein to the accompanying drawings forming a part of this specification.

Figure 1 represents a longitudinal section through the center of a balanced-dock constructed according to my invention. Fig. 2 is a plan of the dock, with the sides in longitudinal section. Fig. 3 is a vertical transverse section. Fig. 4 is a longitudinal section on an enlarged scale taken through one of the upright sides of the dock and about on the line $y-y$ Fig. 2. Fig. 5 is a horizontal section taken on the line $x-x$ Fig. 4 longitudi-

nally through the dock and below the line of the deck.

A— indicates the deck and —B—B— the upright hollow sides extending fore and aft. 55

A'— is the bottom and —A²— a solid central bulk-head between the bottom and the deck running from end to end of the body or hull.

C— is an apron, or extension, built out from each end on a level with the deck and constructed principally of bracket-timbers, or beams, bolted into the deck-frame at the end and projecting out over the water. On these supports are laid planks; the whole forming an extension of the deck overhanging the water. Ordinarily, I make these extensions from twenty to forty feet in length in a two-hundred-and-fifty foot dock, so that in a dock of that length or thereabout, the dock will have sufficient capacity to accommodate a vessel of three hundred feet. These dimensions of apron, or extension, are varied as circumstances may require. On either side of the central bulk-head are two sets of water-tight compartments formed by a longitudinal bulk-head — d — running the full length of the hull and transverse bulk-heads — $e-e-f-f$ — which extend across the space between the bottom and the deck from the central bulk-head across the bulk-head — d — and to the outer skin —A³— of the upright sides. These divide the spaces inclosed between the longitudinal bulk-heads and also between the before-mentioned outer skin and the bulk-head — d — into the compartments —D—D—D^x—D^x—G— and the series of compartments —E—E—E^x—E^x—F—F—. In addition to these, bulk-heads — $e-e-f-f$ — are carried up between the perpendicular walls or skin of the hollow sides above the level of the deck to divide the inclosed space into compartments which are extensions of the compartments —D—D^x— perpendicularly upward to the top of the standing sides. By a horizontal partition — h — the upper portion of the compartment —D— is made a tank —D⁴— separated from the end compartment —D^x— and also from the compartment —B— below, but connected with the pump-well by a gate at the end next the pump-well. The central compartment —G^x—G^x— is 100

the pump-well. It has a water-tight deck or bottom on which are set the pumps —I—I—, and the suction-pipes —J— from the pumps are carried down into the space —G— below.

5 This pump-deck is about on the same level with the main-deck —A—.

The engines —K— are located on the upper deck over the pumps and are properly connected with the pumps beneath.

10 In the outer sides of the pump-wells are outlets on a level with the deck, discharging to the outside, and provided with gates —M— which are opened and closed from the deck above by rods or shafts —m^x.

15 In the vertical cross bulk-heads —e— and —f— that separate the compartments —D— D^x— from each other and the compartment —D— from the pump-well are openings provided with gates —p—p— worked from the

20 deck above by rods —p^x—p^x— and in the partition —d— separating the secondary compartments —D—D^x— from the central compartments —E—E^x— are similar openings with controlling gates —p— connecting each

25 central compartment with the corresponding outer compartment independently of the others. The middle compartment —F— communicates with the pump-well through a similar opening and controlling gate. In addition to these openings there is in the outer side or

30 skin on a level with the bottom A' of the hull an outlet controlled by a gate —S— operated from the deck above.

The principal compartments, which it will be understood are those between the main bulk-heads —d—d—, are separately connected with the pump-wells through the secondary compartments —D—D^x—, and these take in water from the outside through the openings

40 —S—S— and are emptied through the pump-well and discharged at the outlets —M—M—; so that each one of the principal compartments is both filled and emptied through the secondary compartments independently of the others.

45 The openings in the ends of the tanks —D⁴— next the pump-well are on a level with the bottom of the tank and are provided with gates —n— to connect the tanks with the pump-well, and through these openings the tanks are filled from the well, or are emptied into it.

All the outlets or openings above described are provided with suitable gates and rods to control the filling and emptying of the compartments from the upper deck of the dock.

55 In this construction the system of communicating compartments and pump-well on one side of the main central bulk-head is the same as that on the other side; and one is separated from the other by that bulk-head.

60 In the case of a very large dock the compartments before described can be subdivided by bulk-heads or partitions with communicating openings for the purpose of securing additional steadiness and equilibrium in the lock.

As thus constructed and arranged this dock

is handled and operated as follows in docking a vessel:—All the outside gates are raised and the compartments are allowed to fill with 70 water, and the discharge gates in the pump-well are shut. When the gates in the tanks —D⁴— are opened the pumps are set in motion to fill the tanks, which is done with the water drawn up from the pump-well below. 75 In this way the dock is submerged to the required depth and the vessel is floated into position between the upright sides. All the outer gates are then closed; and the discharge gates in the pump-wells being opened, 80 the pumps are operated and the compartments and tanks are emptied through the pump-wells and their discharge-gates until the dock is raised. This is the mode of operating the dock when the vessel in it is of the largest 85 size which the dock is capable of floating; and in such case all the compartments are brought into service to lift the vessel. In the case of smaller vessels, however, only the middle or central compartments need be used, 90 and the outer ones at both ends, that is to say, the compartments —D^x—D^x—E^x—E^x— are shut off from the other compartments by closing the connecting gates while their flood gates are left open. In this way I bring into 95 use only that number of compartments which is found necessary to raise the vessel, and leaving the remaining compartments open to the outside water. By this means I am able to sink the dock and raise a vessel with considerable saving in time and labor. In this construction I also secure considerable increase in buoyancy and lifting power, first, by dispensing with the dead weight of solid ballast which is carried at all times by the dock 105 as at the present time constructed, and, secondly, by the greater lightness of the dock-structure itself, obtained by reducing the length of the dock. This reduction in length of the hull or body enables me to use much 110 lighter timber and thus further reduce the dead-weight. With this system of water-compartments two vessels of different sizes or tonnage, when the combined length of the two vessels is not greater than the capacity of the 115 dock, can be docked and safely balanced at the same time, by regulating the water-ballast in the end-compartments accordingly—the difference in weight between one side or end of the dock and the other being counter-balanced by filling one or more of the water-compartments at the lighter end. 120

Having thus fully described my invention, what I claim therein as new, and desire to secure by Letters Patent, is— 125

1. In a balanced floating-dock the combination, substantially as hereinbefore set forth, of the principal water compartments E E^x E^x F arranged in two sets or opposite sides of a central bulk-head below the deck and each 130 separated from the other by the central bulk-head and by cross partitions, the secondary compartments D D^x situated between said principal compartments and the outer skin of

the dock, an opening with a controlling gate p in the longitudinal partition between each principal compartment and the secondary compartment next to it, an opening with a controlling gate S in the outer side of each secondary compartment below the level of the deck, a pump-well G to each set of principal and secondary compartments having a pump-deck and pumps thereon with suction-pipes extending downward into the well beneath, discharge-gates through the sides of the deck on a level with the pump-deck, and openings with controlling gates in the cross-partitions between the pump-well G and the secondary compartments; whereby each principal compartment is filled and emptied through the secondary compartment next to it separately of the remaining principal compartments and is also capable of being isolated and left open to the inflow and outflow of the water outside independently of the remaining compartments.

2. In a balanced floating-dock a hull or body, having the separated water-ballasting and submerging compartments $E E^x F$, pump-wells G , the secondary compartments $D D^x$ connecting the principal compartments with the pump-well, one separately of the other, and gates $p p^x$ through which one of said principal compartments can be filled independently of the other, and the overhang-

ing deck-portions C at the ends extending beyond the hull, combined for operation substantially as hereinbefore set forth.

3. In a balanced floating dock the combination, substantially as hereinbefore set forth, of the principal compartments, the secondary compartments and pump-wells with which said principal compartments are connected through the secondary compartments, one separately of the others, the said secondary compartments having flood-gates for admitting water to the principal compartments and arranged to flood each of said compartments separately or independently of the others.

4. In a balanced floating dock the combination, substantially as hereinbefore set forth, of the principal compartments $E E^x F$, pump-wells G secondary compartments $D D^x$ connecting separately each of said principal compartments independently of the others with the pump-wells and the ballasting tanks above the deck separated from the other compartments and adapted to be filled and emptied only through the pump-well.

In testimony that I claim the foregoing I have hereunto set my hand and seal.

JAMES JOSEPH COUSINS. [L. S.]

Witnesses:

EDWARD E. OSBORN,
M. REGNER.