No. 816,970. PATENTED APR. 3, 1906.

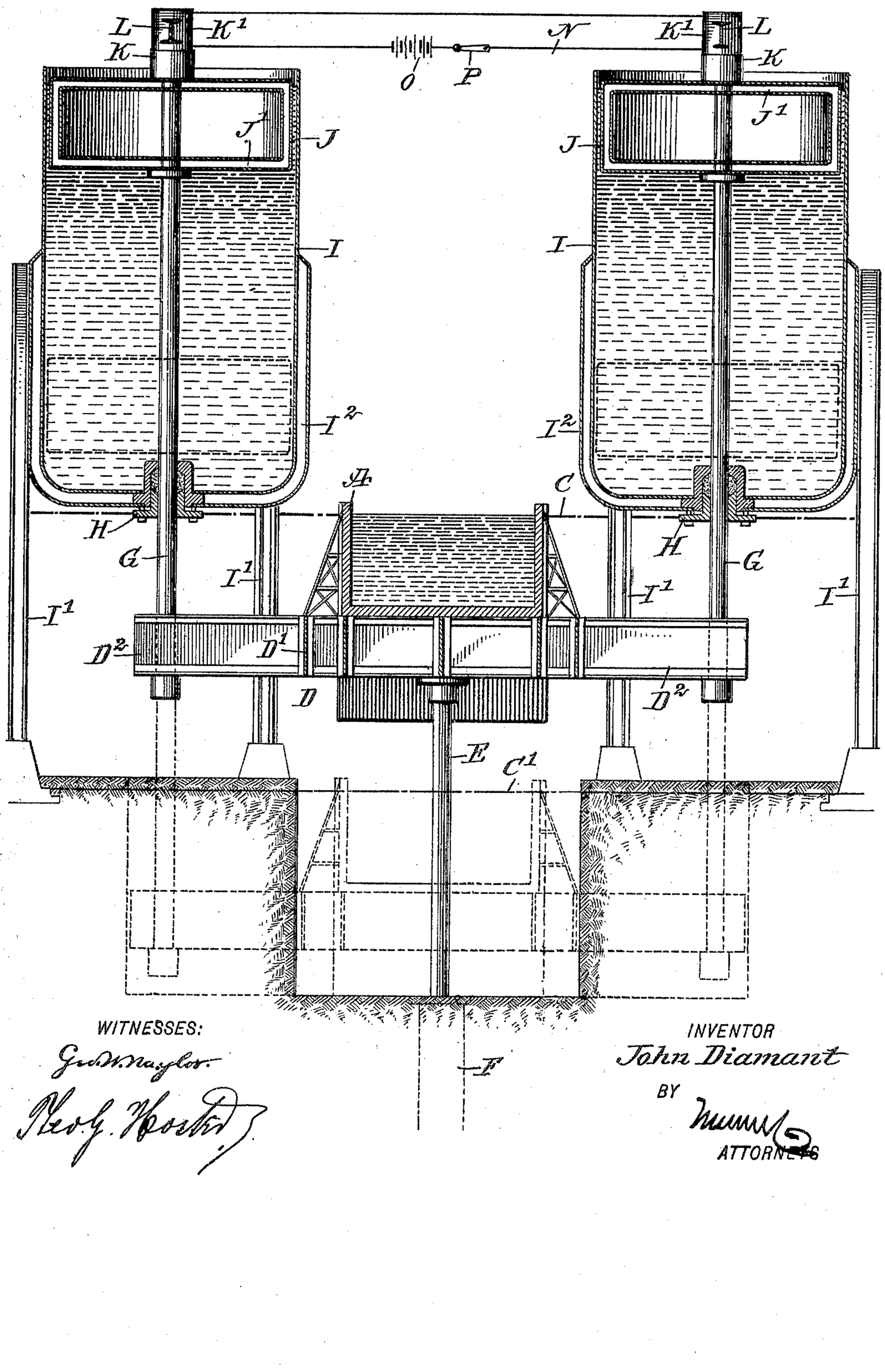
J. DIAMANT.

MARINE LOCK.

APPLICATION FILED OCT. 24, 1905.

2 SHEETS—SHEET 1.

Fig. 1.



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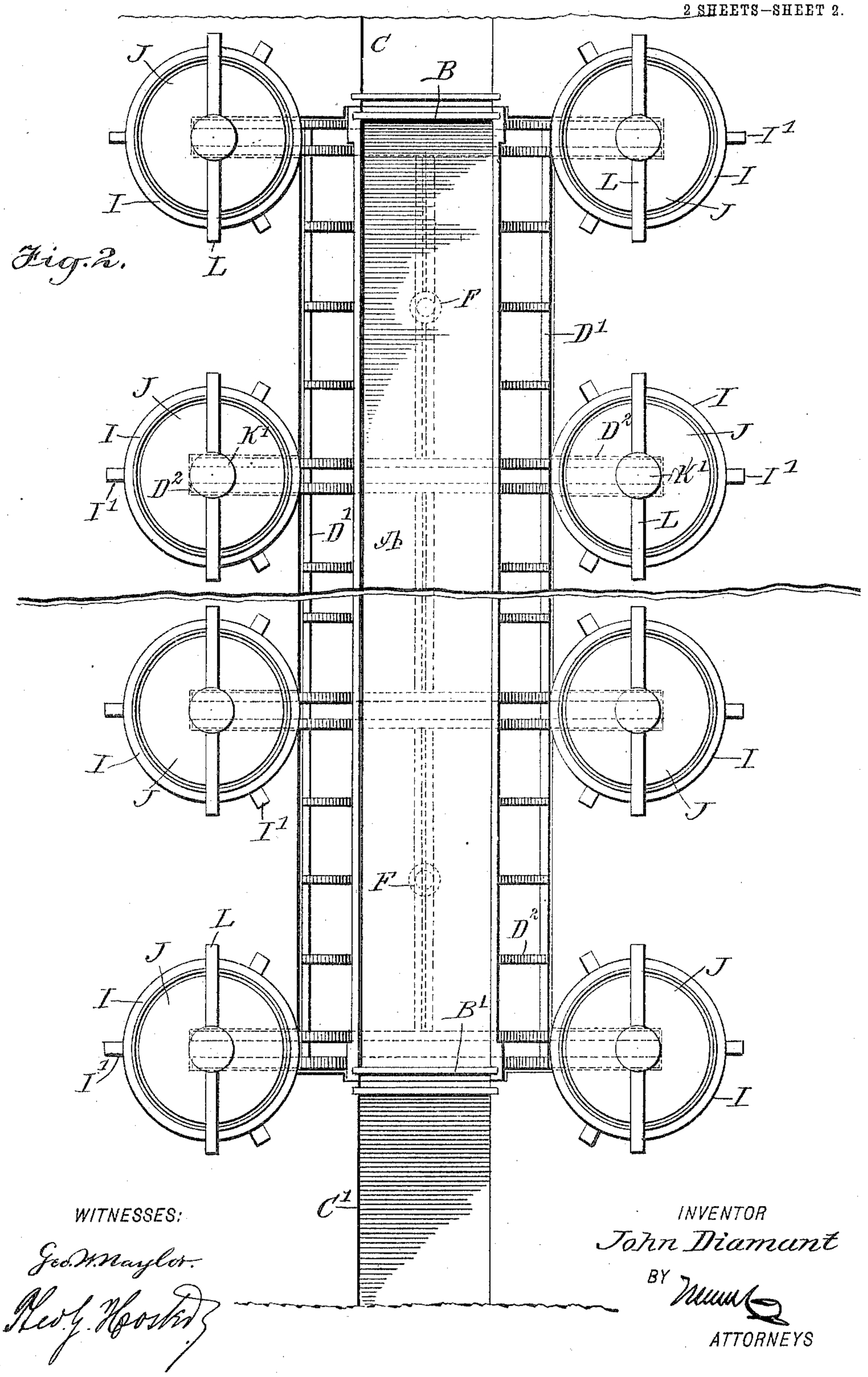
2 SHEETS—SHEET 2.

Fig. 2.



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JOHN DIAMANT, OF NEW YORK, N. Y.

MARINE LOCK.

No. 816,970. Specification of Letters Patent. Patented April 3, 1906.

Application filed October 24, 1905. Serial No. 284,141.

To all whom it may concern:

Be it known that I, JOHN DIAMANT, a subject of the Emperor of Austria-Hungary, and a resident of the city of New York, borough of Manhattan, in the county and State of New York, have invented a new and Improved Marine Lock, of which the following is a full, clear, and exact description.

The invention relates to hydraulic engineering; and its object is to provide a new and improved lock for canals and other waterways and arranged to permit of raising or lowering marine vessels from one water-level to another without loss of water and with the expenditure of comparatively little power.

The invention consists of novel features and parts and combinations of the same, which will be more fully described hereinafter and then pointed out in the claims.

A practical embodiment of the invention is represented in the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in both views.

Figure 1 is a cross-section of the improvement, and Fig. 2 is a plan view of the same.

The cradle A for the reception of the marine vessel to be raised or lowered is preferably in the form of a tank filled with water and provided at its ends with suitable gates B and B′, either of which may be opened for admitting a vessel from a high-water level C or a low-water level C′, as the case may be. The cradle A is mounted on a platform D, preferably formed of longitudinal beams D′ and transverse girders D^2, and the said platform is connected with one, two, or more piston-rods E of hydraulic rams F of any approved construction. Each of the transverse girders D^2 of the platform D projects beyond the sides of the cradle A, and the outer end of each transverse girder D^2 is rigidly connected with rods G, extending upwardly and passing through stuffing-boxes H, formed in the bottoms of reservoirs I, filled with water or other liquid and containing floats or swimmers J, rigidly connected with the rods G. When the cradle A is in a high-water-level position, as illustrated in full lines in Fig. 1, then the floats J are in the upper ends of the reservoirs I, and when the cradle A is in a lowermost position, as shown in dotted lines in Fig. 1, then the floats J are in a lowermost position near the bottoms of the reservoirs I. The lifting capacity of the floats J when completely submerged is somewhat less than the weight of the cradle A and its load, so that the cradle A is normally held in a lowermost position for a vessel to pass from the low level C′ into the cradle A, or vice versa. After a vessel has passed from the low-water level C′ into the cradle A then only a comparatively little amount of power is required at the hydraulic rams F to lift the cradle A and its load on account of the lifting force of the floats J then submerged in the liquid contained in the reservoirs I. When a vessel passes from the high-water level C into the cradle A, then the load and the cradle A overbalances the lifting force of the floats J, so that the cradle A, with its load, sinks to its lowermost position to bring the cradle A in position for the vessel to pass from the cradle to the lower water-level C′. During the downward movement of the cradle A the hydraulic rams F serve only as guides for the cradle. In either case—that is, in transferring a vessel from a high-water level to a low-water level, or vice versa—no water whatever is lost, as the water-level in the cradle A when the latter is in an uppermost or in a lowermost position corresponds to the high-water level C or the low-water level C′. It is understood that for this purpose the cradle A has a range of movement to bring the water-level in the cradle A even with the high-water level C at the time the cradle A is in an uppermost position, and the water-level of the cradle A will be in line with the low-water level C′ at the time the cradle A is in its lowermost position.

The reservoirs I are preferably mounted on suitable supports I′ to hold the bottoms of the reservoirs above the high-water level C, as plainly indicated in Fig. 1; but this construction is not absolutely necesssary, as the reservoirs may be in the form of wells filled with water and arranged in the ground on opposite sides of the cradle A. Topographical conditions may cause considerable variation in the arrangement, location, and form of the reservoirs, and hence I do not limit myself to any particular arrangement.

In order to counterbalance the pressure exerted against the exterior surface of a float J at the time the latter is submerged, an interior pressure-chamber J′ is provided, filled with air or other fluid under pressure, and consequently exerting an outward pressure against the shell of the float to counteract the

pressure against the outside of the float-shell. In a like manner each reservoir I may be provided in its lower portion with an exterior pressure-chamber I^2 to counteract the pressure exerted against the inside of the reservoir by the water contained therein.

In order to hold the cradle A and the floats J, connected therewith, in an uppermost position, a suitable locking device is provided, preferably in the form of a soft-iron core K, attached to each float J, at the top thereof, and adapted to move in contact with an electromagnet K′, held on a beam L, extending across the top of the reservoir I. The electromagnet K′ has its curcuit N connected with a suitable source of electrical energy O, and in the circuit is arranged a switch P to throw the electric current on or off whenever it is desired to lock or unlock the cores K, and consequently the floats J and cradle A.

The marine lock shown and described is very simple and durable in construction, is not liable to get easily out of order, and permits of operating the lock without loss of water and with the expenditure of comparatively little power.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. A marine lock, comprising a cradle for the marine vessel to be raised or lowered, means for raising the cradle, and floats connected with the said cradle and moving up and down in water with the rise and fall of the cradle.

2. A marine lock, comprising a cradle for the marine vessel to be raised and lowered, means for raising the cradle, and floats connected with the said cradle and moving up and down in water with the rise and fall of the cradle, the lifting force of the said floats being less than the weight of the cradle and its load.

3. A marine lock, comprising a cradle for the reception of the marine vessel to be raised or lowered, and floats on which the cradle is hung, the lifting force of the floats being less than the weight of the cradle and its load, to allow the cradle and load to sink to a low level by gravity.

4. A marine lock, comprising a cradle for the reception of the marine vessel to be raised or lowered, floats on which the cradle is hung, the lifting force of the floats being less than the weight of the cradle and its load to allow the cradle and load to sink to a low level by gravity and reservoirs filled with a liquid and containing the said floats.

5. A marine lock, comprising a cradle for the reception of the marine vessel to be raised or lowered, the cradle being in the form of a tank having gates at the ends, means for raising the said cradle, a platform having transverse girders supporting the cradle, reservoirs filled with a liquid, floats in the said reservoirs, and rigid connections between the floats and the said girders.

6. A marine lock, comprising a cradle for the reception of the marine vessel to be raised or lowered, and floats on which the cradle is hung, each float having an interior pressure-chamber to exert pressure against the shell in an outward direction, to counterbalance the pressure of the liquid against the outside of the float on submerging the latter.

7. A marine lock, comprising a cradle for the reception of the marine vessel to be raised or lowered, floats on which the cradle is hung, and means for locking the floats when in an uppermost position.

8. A marine lock, comprising a cradle for the reception of the marine vessel to be raised or lowered, floats connected with the said cradle, and a magnetic locking device for locking the floats when in an uppermost position.

9. A marine lock, comprising a cradle for the reception of the marine vessel to be raised or lowered, floats on which the cradle is hung, and reservoirs filled with a liquid and containing the said floats, the said reservoirs being arranged above the high-water level.

10. A marine lock comprising a cradle for the reception of the marine vessel to be raised or lowered, the cradle being in the form of a tank having gates at the ends, means for raising the said cradle, a platform having transverse girders supporting the cradle, reservoirs filled with a liquid, floats in the said reservoirs, rods rigidly connecting the said floats with the said girders, and stuffing-boxes in the bottom of the said receptacles for the passage of the said rods.

11. A marine lock, comprising a cradle for the reception of the marine vessel to be raised or lowered, the cradle being in the form of a tank having gates at the ends, means for raising the said vessel, a platform having transverse girders supporting the cradle, reservoirs filled with a liquid and arranged in pairs on opposite sides of the said cradle, floats in the said reservoirs, and rods rigidly connecting the floats in a pair of reservoirs with the ends of a girder.

12. A marine lock comprising a tank filled with a liquid for the reception of the vessel to be raised or lowered, gates at the ends of the said tank, transverse girders supporting the tank, and a plurality of float suspensions connected with the ends of the said girders and arranged in pairs, the float suspension of each pair being located on opposite sides of the tank.

13. A marine lock comprising a cradle for the vessel to be raised or lowered, a float suspension for the said cradle and having floats rigidly connected with the cradle, and reservoirs filled with a liquid and containing the said floats.

14. A marine lock comprising a cradle for the vessel to be raised or lowered, a float sus-

pension for the said cradle and having floats rigidly connected with the cradle, and reservoirs filled with a liquid and containing the said floats, the reservoirs having an exterior pressure-chamber to counteract the pressure exerted against the inside of the reservoir by the liquid contained therein.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN DIAMANT.

Witnesses:

THEO. G. HOSTER,

EVERARD B. MARSHALL.