

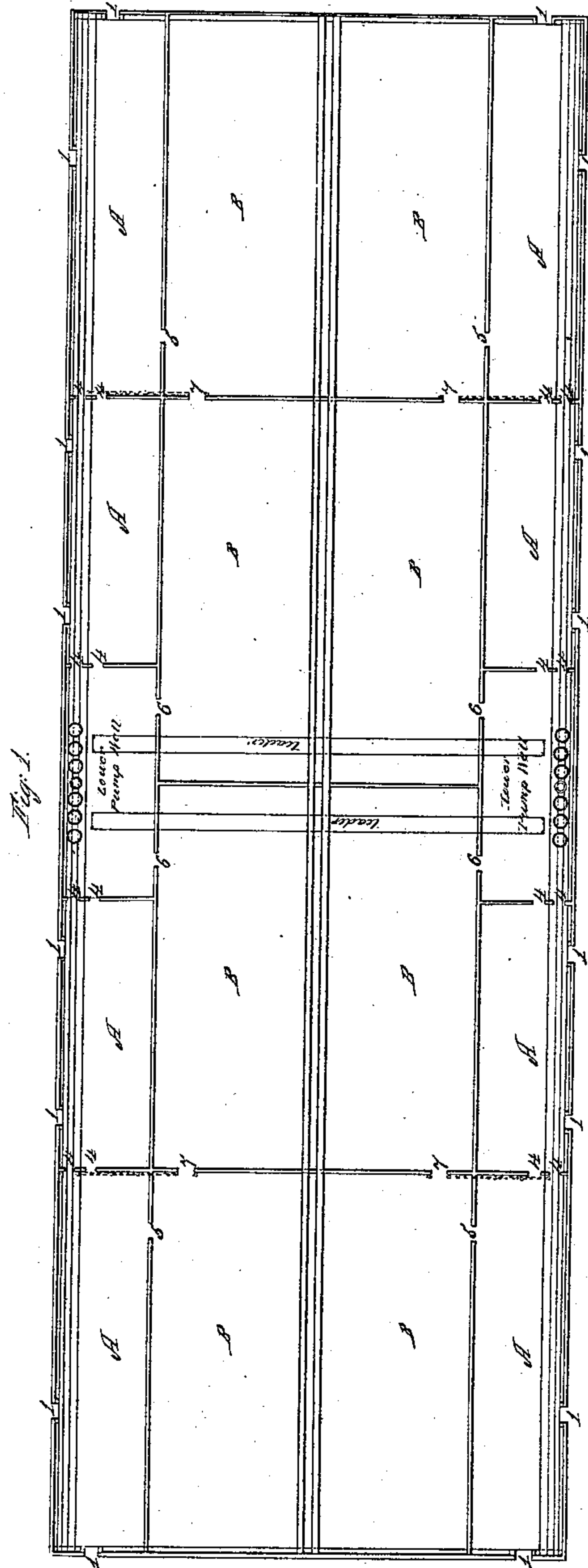
Sheet 1, 3 Sheets.

W. Jones.

Dry Dock.

N<sup>o</sup> 102,554.

Patented May 3, 1870.



Witnesses:

Henry M. Clark.  
Hence Barnard.

Inventor:

William Jones

Sheet 2, 3 Sheets.

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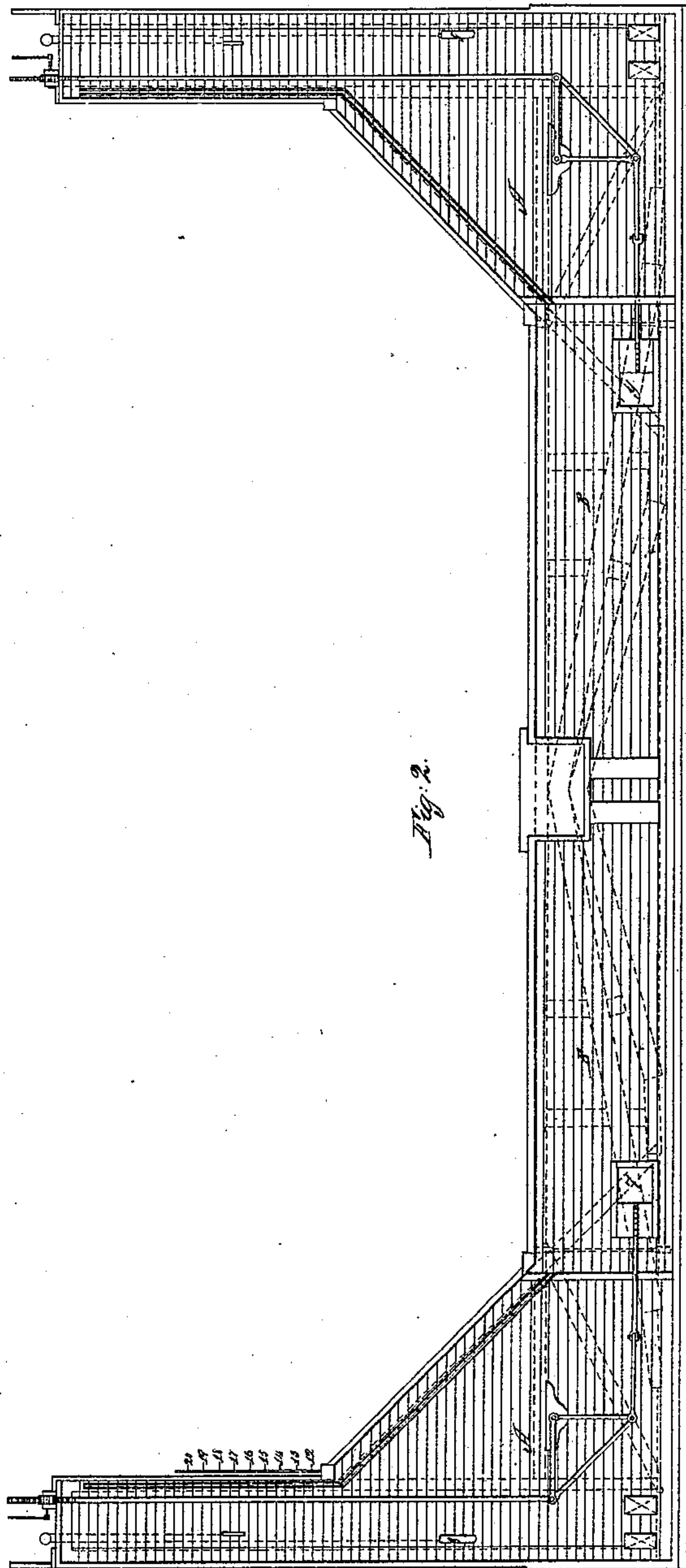


Fig. 2.

Witnesses:

Henry M. Cook  
Hunt Barnard

Inventor:

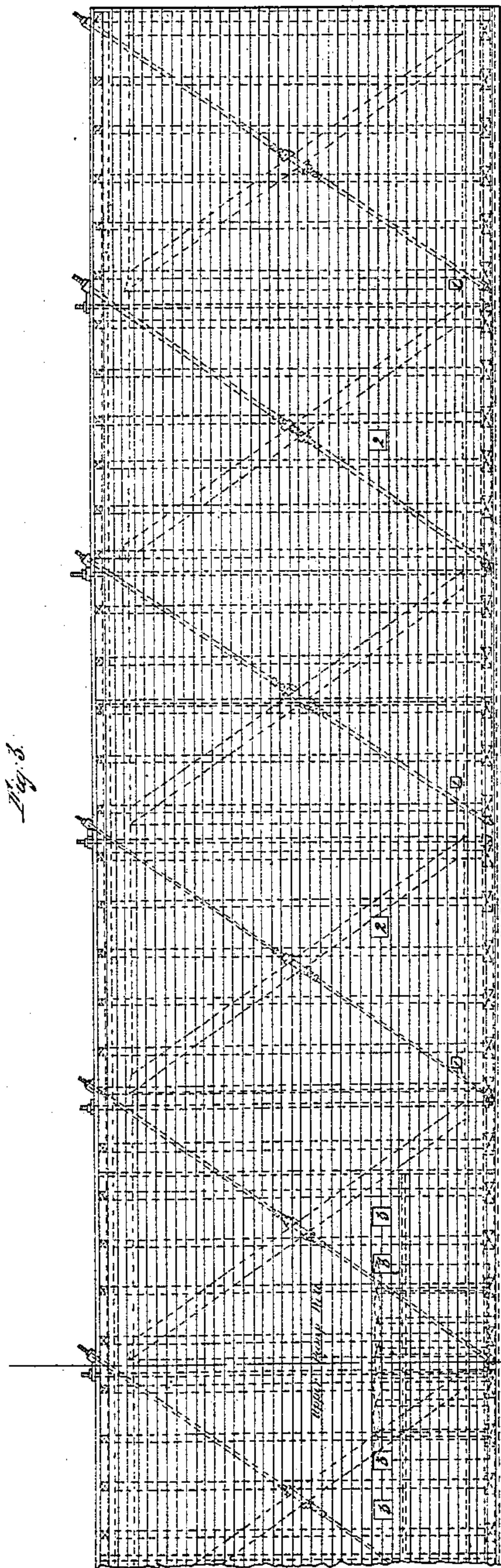
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# United States Patent Office.

WILLIAM JONES, OF NEW YORK, N. Y.

*Letters Patent No. 102,554, dated May 3, 1870.*

## IMPROVEMENT IN DRY-DOCKS.

The Schedule referred to in these Letters Patent and making part of the same.

*To all whom it may concern:*

Be it known that I, WILLIAM JONES, of the city, county, and State of New York, have invented certain new and useful Improvements in Balance Dry-Docks; and I do hereby declare the following to be a full, clear, and exact description thereof, sufficient to enable those skilled in the art to which my invention appertains to fully understand and to make and use the same, reference being had to the accompanying drawings forming part of this specification, and in which—

Figure 1, sheet 1, is a ground plan of a balance dry-dock, showing the gates, bulk-heads, and tanks;

Figure 2, sheet 2, represents a transverse section of the dock; and

Figure 3, sheet 3, is a side elevation of one-half of the dock.

Under the old system of raising a balance dry-dock, with or without a vessel thereon, the sinking-gates must be and are kept closed, and the whole of the water that all the tanks contain must be pumped out of tanks as the dock rises; and when the dock rolls or lists over to one side, (which is a frequent occurrence, especially in raising ships of very heavy tonnage,) there is no way to restore the equilibrium but by opening the aforesaid sinking-gates to readmit water, and stopping the machinery on the lighter side, which sometimes causes a delay of several days before a ship can be raised. The cause of this difficulty is the system heretofore practised of pumping out the water from the upper part of the side tanks, where there is a very small space of lifting power, and the whole body of water in the lower part of the dock inclines to roll to the heavier side.

Another difficulty heretofore experienced in raising docks of this class is the bending of the upper portion or sides of the dock inward, which is very injurious, not only to the dock itself, but also to the ship that is on it, by causing the upper shores, which support the ship on either side on even keel, to press with tremendous force against the vessel. This difficulty arises from the water being taken out of the side tanks first, leaving the whole weight of the water contained in the central compartments, together with the weight of the ship, resting entirely on the center of the dock, thus straining the latter to such an extent as to make the bottom bend upward at the sides, which necessarily tends to draw the upper portions of the side tanks inward toward each other.

To obviate these difficulties, and thus make vast and new improvements in the construction of balance dry-docks, is the object of my invention; and

It consists in the arrangement of the central tanks, located wholly beneath the load, and the side tanks, with valves or gates connecting the two sets, said

side tanks being provided with the ordinary sinking-gates, and also with improved self-delivery gates, as will be hereinafter described.

The invention also consists in the arrangement in a dry-dock having chambers or tanks located as above described, and provided with valves and connections, of the pump-well and discharge-orifices, as hereinafter set forth.

I will now proceed to describe the invention more fully in detail, referring to the accompanying drawings, wherein similar letters and figures of reference indicate like parts in the several figures.

In the drawings—

A A represent the outside tanks, which are very high and have the top inclined, as shown in fig. 2. These tanks are of such aggregate capacity as to contain over one-half of all the water in the dock when it is sunk, preparatory to raising a ship.

B B are the different compartments or tanks in the central part of the dock. The structure of these tanks, with their relative depth as regards the side tanks, is shown on sheet 2.

1 1 1, sheet 1, are the ordinary sinking-gates, which, under the old system, are kept closed while the dock is being raised.

3 3, on sheet 3, represent the discharge-gates or orifices from the pumps.

4 4, sheet 1, represent gates employed to conduct water from the side tanks to the pumps.

5 5, on sheet 1, represent the ordinary gates connecting the central end tanks B with the side tanks A. These gates do not come into use until the water in the side tanks is pumped out down to the level of the under side of the main deck, and it is impossible for the water in the central tanks to run into the side tanks until the water in the latter reaches the aforesaid level. This will be understood from an examination of fig. 2.

6 6 are gates by which a portion of the central tanks B communicate with the pumps. These gates are shown in fig. 1.

An indicator, 8, fig. 2, is employed to show when the full lifting power is taken out of the central tanks, and to tell the proper time for closing the gates 6 and the outside delivery-gate, and open the gates 4 when a ship of extra heavy weight is being raised. This indicator consists of a float attached to a small chain running over a pulley on the upper deck, with a small weight in the other end to balance the chain. A small perpendicular rod serves as a guide for the float.

The line of figures marked from 12 to 20 on the side of the drawing No. 2 shows the depth of water from the top of the keel-blocks.

In addition to the several series of gates above described, which are common in balance dry-docks, I



provide gates marked 7 7 on sheets 1 and 2, in the cross bulkheads between the central tanks B, so arranged as to connect all the said tanks together when desired. These gates are operated from the upper deck by means of a toothed wheel working in a rack on a perpendicular rod, secured at the bottom to a triangular "bob," which is connected by means of a horizontal rod with the gate. This arrangement is shown in fig. 2.

I have also provided a new series of outside delivery-gates, marked 2 on sheet 3. There will most likely be one of these gates leading from each side tank A. These gates will be operated from the upper deck by means of a perpendicular rod. The object of these gates, when the dock is rising, is to allow the water in the side tanks A to deliver itself freely through them, and all the sinking-gates 1 1 will be used partially for the same purpose.

Each of the gates 2 2 is so constructed as to deliver as much water as several, say five, of the ordinary sinking-gates 1 1. This is necessary in order to keep the water down in the outside tanks as nearly as possible level with the water in which the dock is floating, so that there will be no weight of water in the outside tanks to be lifted with the force of the central tanks.

The dock is sunk by opening all the gates 1 1 and 2 2, to admit water to the outside tanks A, whence it flows into the central tanks, the gates 5 being open. The gates 4 4, 6 6, and 7 7 are all closed while the dock is sinking.

When about to raise the dock the gates 7 are all opened, so that the central tanks are connected together, the gates 6 are opened so as to permit the flow of water from the central tanks into the pump-wells, and the gates 5 are closed to shut off the communication of the side tanks with the central compartments. The sinking-gates 1, self-delivery gates 2, and discharge-gates 3, from the pumps, all remain open while raising.

The pumps being now set in motion, water is drawn from the central tanks and discharged by way of the gates 3 3. Water from the side tanks also flows out at these gates 3 by its own gravity. As the dock continues to rise, the gates 2 2 gradually appear above the surface of the surrounding water, and immediately begin to discharge large volumes of water flowing from the side tanks by its own gravity. The dock now rises

very rapidly, the pumps still continuing to work, and the gates 3 3, as well as the gates 2, at the same time discharging by gravity. Under these combined influences the sinking-gates 1, which are below the gates 2 2, are soon uncovered, and materially assist the gates 2 2 by discharging water from the lower part of the dock.

By my improvements the whole of the lifting power is transferred from the outside tanks to the central compartments, upon which the weight of a ship on the dock immediately rests, and consequently there will be an extended area of lifting space directly under the ship, which gives the dock the full lifting power at once, whereby the dock is raised very rapidly, the water at the same time forcing itself out from all the outside tanks through the new self-delivery gates, and partially through the sinking-gates and the discharge-orifices 3, as above described.

This self-discharging feature is very important, in view of the fact that hitherto all the water had to be raised and thrown out by pumps, which is a much slower, and consequently more expensive mode of raising a dry-dock.

It will also be seen that, by the provision of the gates 2 2, which are always open, the water in the side tanks being nearly on a level with the water on the outside of the dock, it will be utterly impossible for the dock to roll.

Having thus described my invention,

What I claim as new, and desire to secure by Letters Patent, is—

1. A balance dry-dock, constructed with central tanks B B, separated by bulkheads, in which are gates 7 7, side tanks A A, connected with the central tanks by gates 5 5, the self-delivery gates 2 2, pump discharge-orifices 3 3, and sinking and self-delivery gates 1 1, said gates 1 2 3 being in series, arranged at different elevations, all arranged and operating substantially as described.

2. In a dry-dock having chambers thus located and provided with valves and connections, the arrangement of the pump-well and discharge-orifices 3 3, as set forth.

WILLIAM JONES.

Witnesses:

HENRY W. CLARK,  
HORACE BARNARD.