2 Sheets—Sheet 1.

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EVANS & PARSONS.

Suspension Dock.

Patented May 13, 1831.

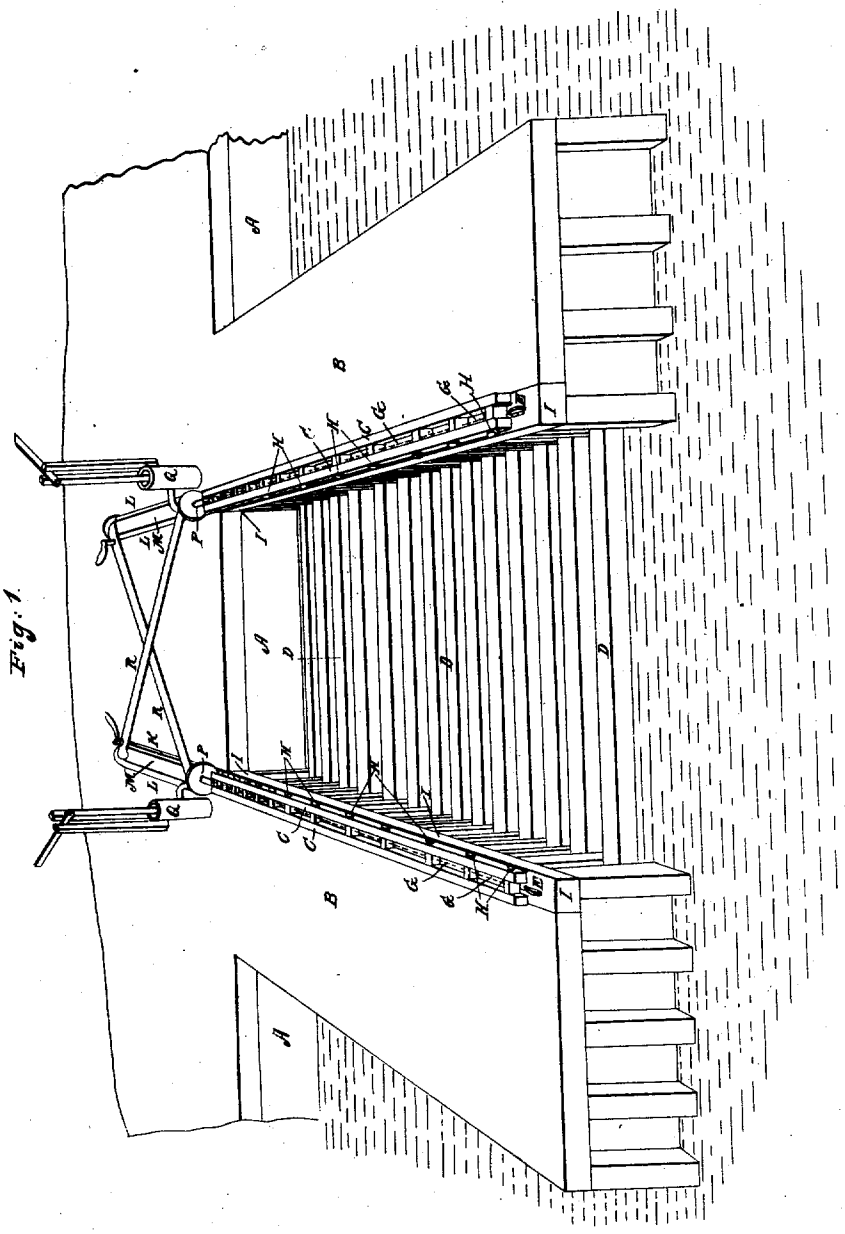


Fig. 1.

N. PETERS. Photo-Lithographer. Washington, D. C.

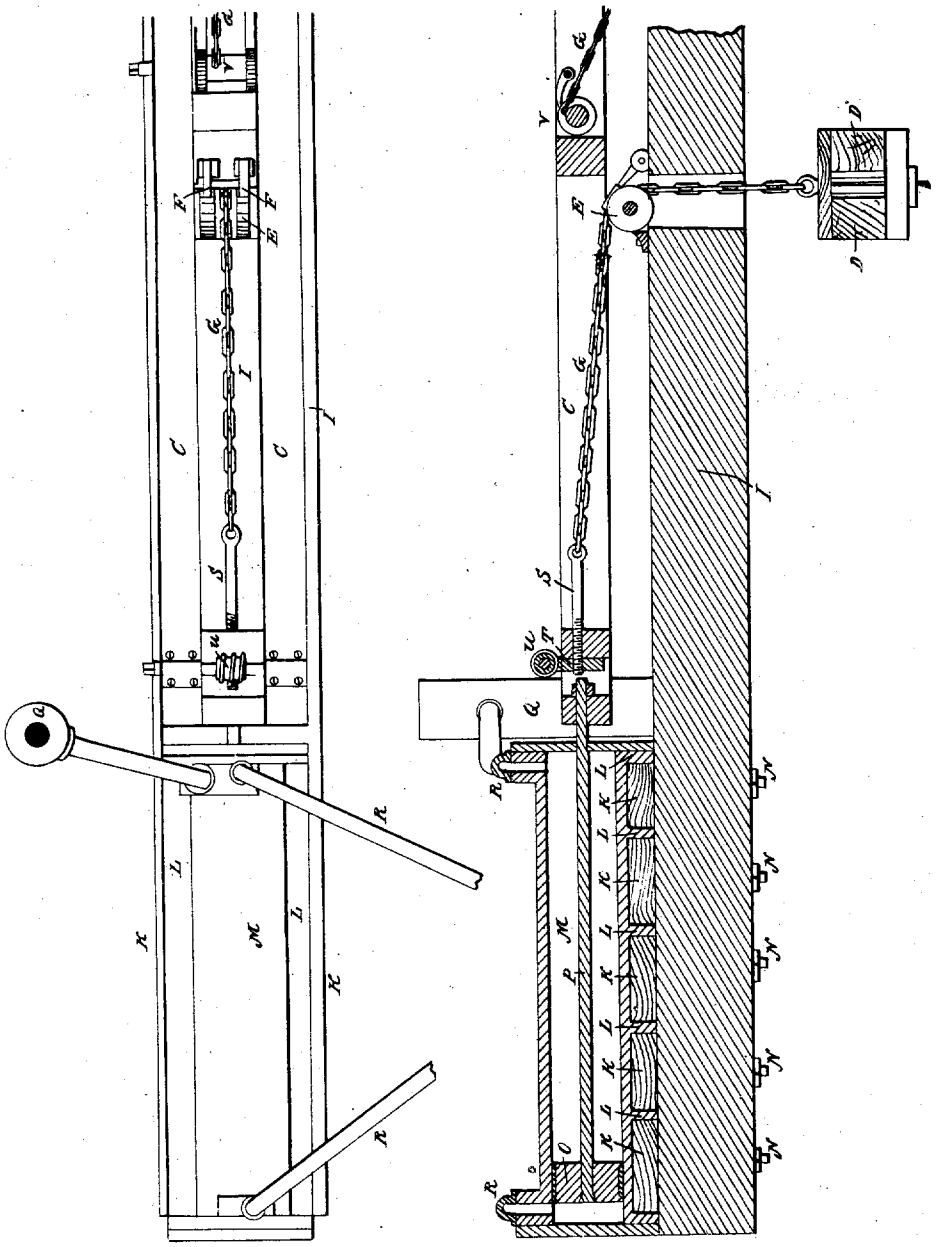
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2 Sheets—Sheet 2.

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N. PETERS. Photo-Lithographer. Washington, D. C.

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Thomas Evans and John Parsons of New York City

Letters Patent

The Schedule referred to in these Letters Patent and making part of the same containing a description in the words of the said Thomas Evans and John Parsons themselves of their improvement in the application for lifting Ships and other vessels called the Hydrostatic suspension Dock.

To all whom these presents shall come. Be it known that we Thomas Evans (machinist) and John Parsons (ship carpenter) of the City and State of New York have invented made and applied to use a new and useful improvement in the art of lifting ships and other vessels, for inspection and repairs called Evans' and Parsons Hydrostatic suspension Dock, and that the following is a full and exact description thereof, to wit. Two piers, wharfs, or other suitable structures are formed at right angles to the shore or current of the River, by driving piles in the bed thereof, in precisely the same manner as such piers have been constructed before, for screw docks and other contrivances when the ships are lifted vertically out of the water. If we suppose this dock to be capable of raising a ship of six hundred tons, it should be one hundred and twenty feet in length and thirty six in width between the piers having a clear depth of fourteen feet, this being a convenient size for vessels of that class, but it is evident that the dimensions of the docks must vary to suit the craft raised thereon. The piles forming the inner rows in each side of the piers or dock being driven with great care and at as equal distances asunder as possible are secured together at the level of the piers by two large and solid pieces of oak timber called plates, running the whole length of the dock including the head thereof at the land end. The use of this extension will be shown hereafter. In the dock we have employed three rows of piles, would be eight feet apart in the clear dimension of the dock into the before named plates which rest on and are firmly secured to the piles last mentioned. — Gudgeons are made to receive large cast iron Dock wheels, cylindrical having angle pendicular to

C. M. Lanning

support them (the wheels) that they may be freely on their bearings. These wheels may be about two feet six inches diameter and are to be arranged that the groove shall be exactly in the centre between each pair of piles the rotation being lengthwise of the dock. The edge or rim of the roach wheels may in some cases be simply a shallow groove like a sheave of a block excepting it is made to receive a logle chain instead of a rope. In case the wheels are made in this manner, the pulls that are intended to prevent accidents would be made to fall into the chain when the ship is in the act of raising out of the water. On the other hand if it should be deemed advisable to pull the wheels instead of the chains, then the wheels should be made with teeth of such a form as will insure their passing in and out freely from the openings of the logle chains, without catching. A portion of the edge of the wheels being notched to receive two pulls on each side, the teeth of the wheels prevent the chains from slipping when the machine is at rest. Cradle beams are provided similar to those used for lifting ships in a variety of ways, the construction of which are so well understood that they need not be described. The length of these beams are governed by the size of the dock. Two of these beams form a section, they are kept about two feet apart and are planked from one to the other on the inner side, the space being filled with ballast to make the cradle sink. Strong chains pass down over the aforesaid Roach wheel and are strongly fastened to the beams forming the cradle, one chain on each side sustaining a section. The other ends of the chains are fastened to two pieces of iron to be placed directly over the plates and parallel thereto with reaching from the River end of the dock to the wharf. These pieces are called the drawing frame. There are two drawing frames one on each piece over their respective plates. These pieces are firmly bolted at a sufficient distance apart to allow the roach wheels and chains room them to come between without touching. These frames have a horizontal section of wheel work at their upper end to raise the ship. The drawing frames are guided in their passage backwards & forwards by friction wheels having flanges to them, on which they take in and

the chains aforesaid coming up from the beams through the plates, and passing over the reach wheels as passing their centre, are fastened to the drawing frames in a particular manner, of which more hereafter. At the land end of the dock and wholly in a line with the drawing frames are placed two cylinders one over each plate on either side of the dock. The extension of which spoken of in the beginning is for the purpose of bolting the cylinders in their places, which is accomplished by bolting pieces of timber called fixing timbers to the plate. The thickness of these pieces being such that the top faces are in a line with the centre of the cylinders which having projections cast on each side called fins of sufficient breadth and thickness likewise having these fins running at right angles to the body of the cylinders on the underside of the first mentioned fins, these last are let into the fixing timbers their whole width, say three inches. Bolts being now passed through the longitudinal fins of fixing timbers, and plates are firmly thereby secured to the dock. These cylinders are intended to act as hydrostatic presses, the pistons being drawn inwards in the operation of lifting, or pulled. They consequently must have a piston similar to a steam Engine with a rod playing through a stuffing box. This rod must be of sufficient size to bear upon one half the united weights of the ship and cradle. The space between the heads of the cylinders and the ends of the drawing frames when the cradle is sunk to its greatest depth must always be seven feet greater than the distance the ship is to be elevated. A steam engine is to be placed in as convenient a situation as possible to which will be attached two pumps for forcing water into the cylinders. There must always be two pumps, one to each cylinder, and there must never be any communication between these pumps or the pipes leading from them to the cylinders, for reasons given hereafter. We will now suppose a vessel to be floated in between the piers and moved in a proper position to be raised. The pistons being drawn out their whole length, they are each fixed by a hooker to the aforesaid drawing frames. The pumps being put in operation the pistons of the hydrostatics are drawn in to their respective cylinders the chains to which the cradle is suspended being fastened to the drawing frames, the vertical motion of the ship and cradle is connected with a horizontal one by the chains passing over the aforesaid reach wheels it is evident of the pistons continue to

recede the Ship will be drawn up as long as that pressure continues. The vessel being now completely lifted out of the water. The pumps being stopped the weight of the Ship is sustained by the aforesaid falls, on the rack wheels they likewise form a perfect security against accidents while the Ship is lifting the hydrostatics with their respective pumps, must be as near equal as possible or the Ship will be far the more drawn on one side than the other there being no communication between the cylinders. If the pumps are equal in their bores and length of stroke both sides of the Cradle must come up level no matter how unequal the load may be.

The operation of lowering the Ship is quite a different work. The friction of the machinery and weight of the cradle being so unequal, that in attempting to let down a Ship by opening two orifices of equal diameters in each Hydrostatic the side which moved easiest first gaining rapidly on the other by the weight of the Ship being thrown on that side until utter destruction ensues. To correct this evil and which the Patentees consider a most important feature in their invention, is what we term a self regulating apparatus. This consists in the insertion of a pipe into the head of each cylinder. each of those pipes passing in a diagonal manner to the back end of the other cylinder. each of these pipes have a stop cock in them for shutting off the communication when the Ship is lifting there are likewise two discharging cocks, the use of which is to let the water out of the cylinder when necessary. Now let us suppose a Ship ready to be let down. the pistons are forced back sufficient to relieve the falls on the rack wheels, the stop cocks first mentioned in the diagonal pipes are opened, the water in either cylinder being all pressed of the piston is acted on by the weight of the Ship causes it to escape with great force. but it is shown that the water does not escape into the atmosphere, but is conveyed from before one piston to the rear of the other this produces a most perfect equilibrium in the descent of the Ship, for if one piston be drawn by fifty tons more than the other, it cannot move an inch, till the other moves also. because if the second piston remains at rest the first has no place to discharge its water. therefore whatever power the first piston has over the second it imparts just as much to it they therefore move together. This was confirmed by actual

experiment, when the ships afloat the cylinders are as full of water as ever it being merely conveyed from one cylinder to the other, when the next operation takes place, the discharging cocks aforesaid, one opened to let the water escape. In repairing a ships bottom it is often necessary to lower a section without disturbing the rest. one method to do this is to attach screws to the end of each chain, the female being made to stand in such a position between the drawing frames as to be nearly horizontal. the female screws would have a sufficient support to revolve against, having spiral teeth on their peripheries, an endless screw being made to work into these teeth, a power is gained for lowering and hoisting the sections. Another method is, to place Iron Rollers on the drawing frames in proper places, and simply winding a portion of each chain round the roller wheels and endless screws may be attached to the rollers thereby they may be wound, or unwound conveniently. Another great use of these Spiral powers on the sections are to adapt the cradle to the shape of the Hogged keel of the ships. this is one of the greatest advantages the sectional lift docks, have in common over all species of inclined planes, it is intended as all the machinery attached to the chains, whether screws or rollers are fixed in exactly the same position between the drawing frames, we propose that to have expence instead of having sufficient gearing attached to each chain to work it, that we just have each chain with a roller or screw, wherever it is used, furnished so far as the first motion, then if we have a frame with wheels attached to it, these wheels to have flanges and run on the top of the drawing frames similar to a Rail Road carriage, this frame containing the respective powers for working a section may be run along from one chain to the other, and will answer for the whole. What we claim as new and our invention, to avoid confusion we will state under distinct heads,

First, We claim the invention or application of placing the Hydrostatic or cylinders in a horizontal position whereby we are enabled to make the cylinders shorter, and likewise have the advantages of applying the moving power at one point. Second. We claim the invention of the self regulating apparatus as described above taken in connection with the hydrostatics for the purpose of lowering the ships. Third. We claim the drawing frames with their appendages viz. the chains and dock wheels as we have applied them

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a vertical lift dock for repairing ships and other vessels. Cylinders have been placed in a horizontal position before for a variety of purposes. Rack wheels and chains for hauling up ships on inclined planes, even in cases of sunken vessels chains have been used to lift them vertically. This being the case we thought best to specify that we claim the above mentioned machinery only as we have combined them together in a floating platform machine called a vertical lift Dock and all its relative functions and combined operations of the parts that form the essentially of our claims.

Witnesses
Wm. P. McKinney
H. De Blanc

J. Evans
John F. Pandorg.

(2,750 words)

(Granted May 13. 1831)