

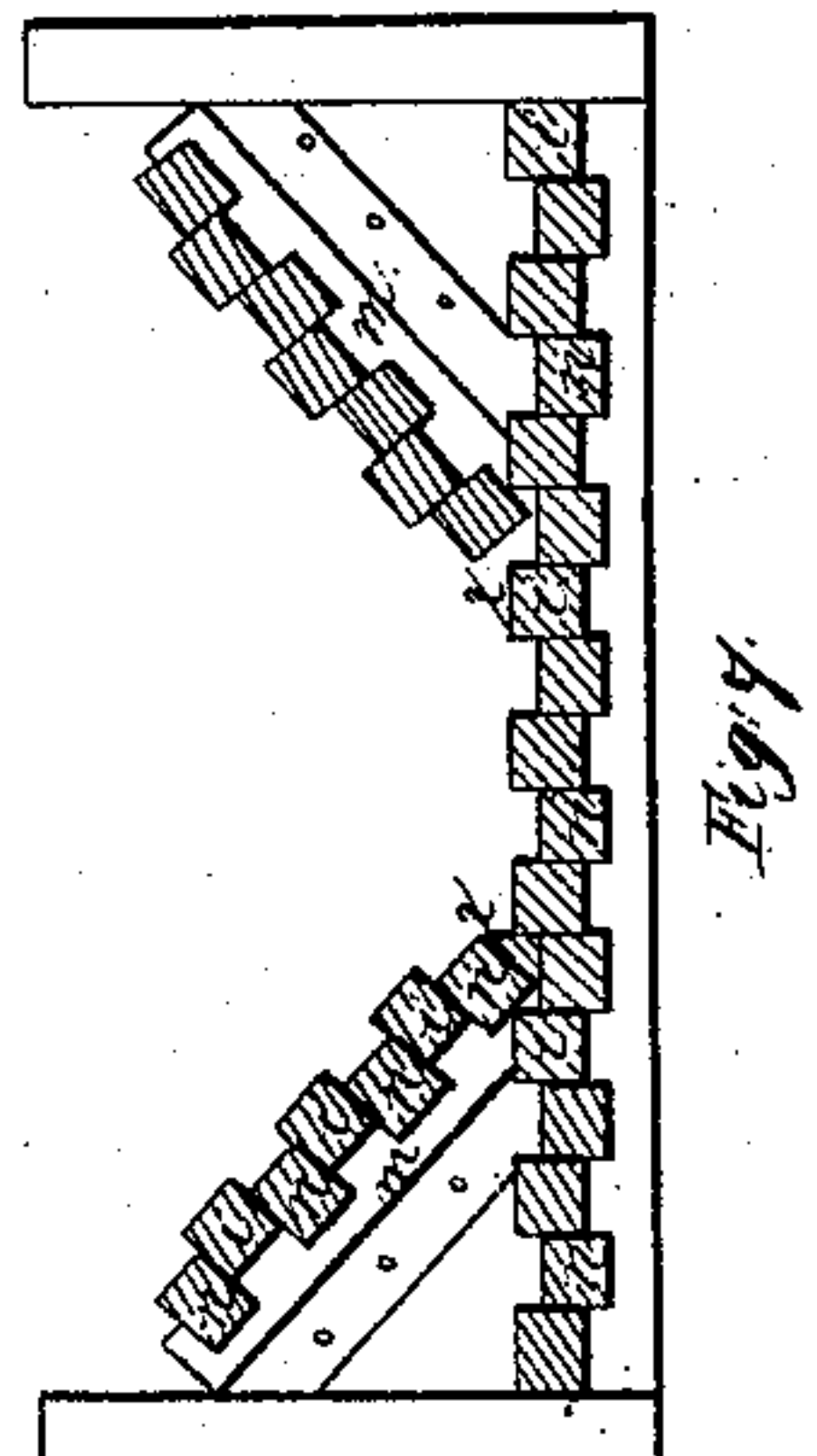
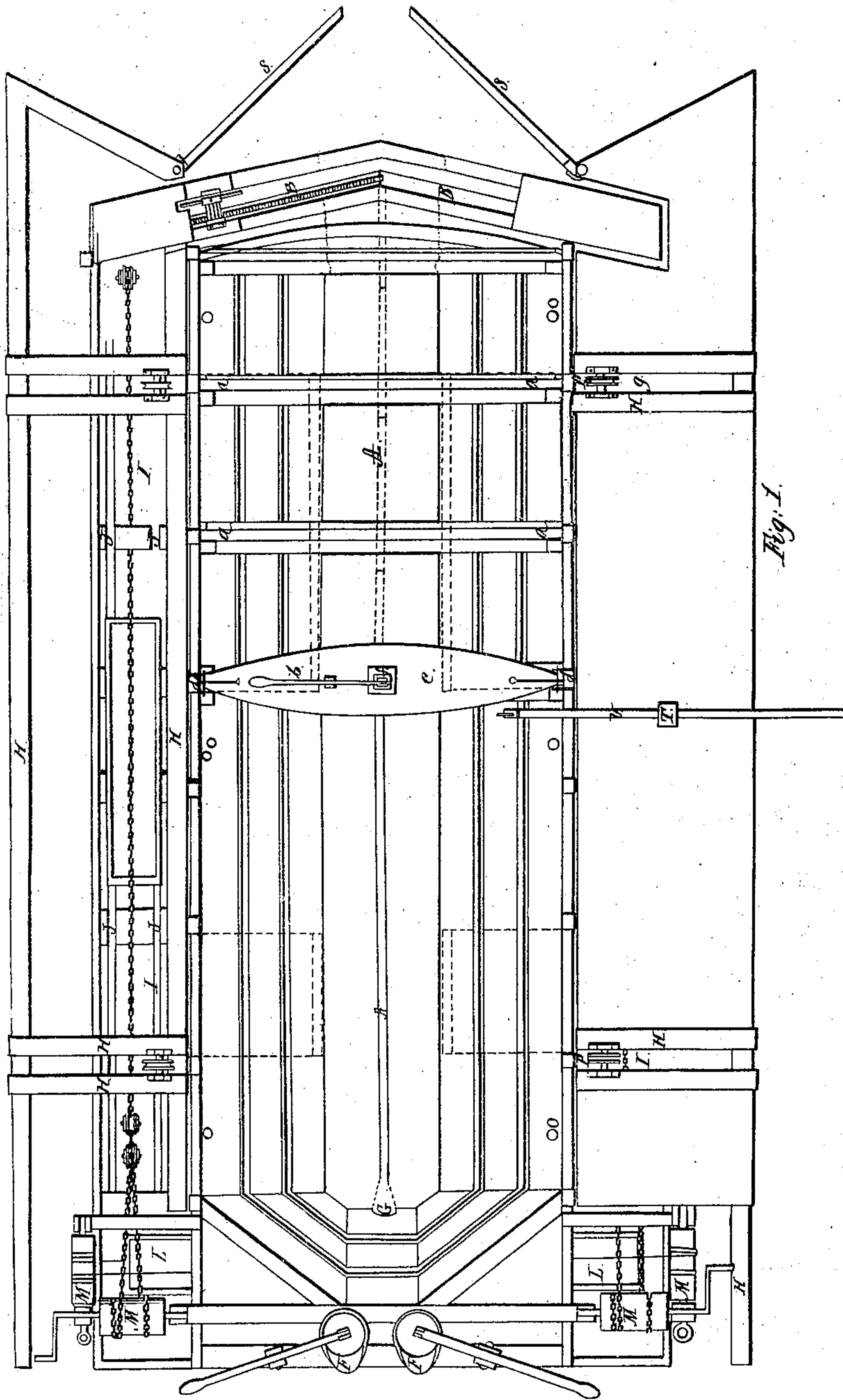
Sheet 1, 2 Sheets.

J. S. Gilbert.

Floating Dry Dock.

N^o 1,524.

Patented Mar. 25, 1840.

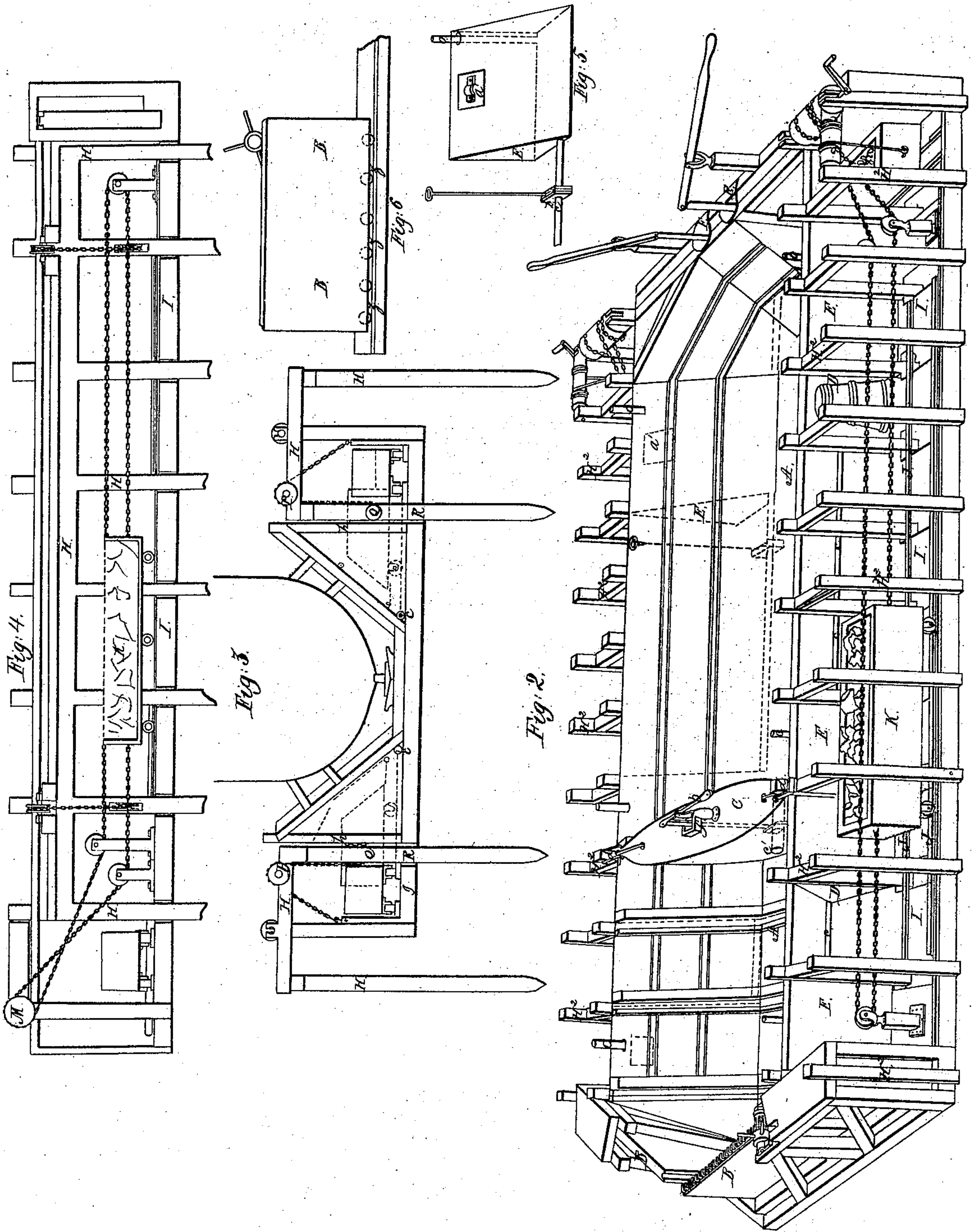


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UNITED STATES PATENT OFFICE.

JOHN S. GILBERT, OF NEW YORK, N. Y.

FLOATING DRY-DOCK.

Specification of Letters Patent No. 1,524, dated March 24, 1840.

To all whom it may concern:

Be it known that I, JOHN S. GILBERT, of the city of New York, in the State of New York, naval architect, have invented a new and useful Mode of Constructing a Floating Dock for the Repairing of Vessels, which dock I denominate the "Floating Balance Dry-Dock;" and I do hereby declare that the following is a full and exact description thereof.

This dock is to be situated in a wharf, or between piers, by which it is to be guided as it rises and falls, and which are to serve in part in giving to it the requisite stability. It is usually built close at one end and at the two sides, there being sliding gates at one end for the admission of the vessel to be repaired. When situated between piers it may be furnished, if preferred, with such gates at each end, admitting, in this way, two vessels, one at each end for repair at the same time. This, however, may be effected when there is a gate at one end only.

Figure 1 in the accompanying drawings is a top view of the floating dock as situated between two piers. A, A, is the interior of the dock.

B, B, are sliding gates at one end, which are moved in and out by a rack and pinion, so geared as to afford the requisite power.

C, is a boat gate, fitting into grooves formed by ledges in different parts of the dock, as shown at *a, a, a, a*. By the aid of this boat gate a vessel may be inclosed in a space adapted to its length, and thus obviate the necessity of discharging more water from the machine than is absolutely necessary for the size of the vessel to be repaired. There is an opening C' through the boat gate, from side to side, near to its lower edge, or keel, which may be opened for the purpose of allowing water to pass through from one side of it to the other. A plug tree, carrying a wicket gate, or valve, at its lower end, passes down the middle of the boat gate through a trunk *f*, and is raised or lowered by means of the lever *b*; it may be raised to such height as will allow the water to pass from side to side only, through the opening for that purpose, but when raised entirely, the

water will then be admitted into the hold of the boat, and allow of its being settled down in the grooves formed for that purpose. When this boat gate is used, it is, after having been settled down in the proper grooves, to be firmly attached to the sides of the dock, in order to keep them from spreading, which might cause a leakage of water past the ends of the boat gate; this may be done by means of screw bolts and nuts; or there may be a bar of iron fastened by a hinge, or staple joint, at each end of the boat, and having a loop or opening at the other end to clasp on the heads of the timbers that project above the grooves, or on iron bolts attached to them, as at *d, d*, Fig. 2.

The dock may be constructed by making a proper platform two hundred feet long, and eighty four broad; upon this the sides are to be raised, starting not less than ten, nor more than twenty-five feet apart, rising at an angle of from thirty to sixty degrees, as may be preferred, to the height of twenty feet, more or less, according to the capacity required. The sides are to be supported by what is termed by shipwrights dead-wood, or timbers bolted close to each other, and extending from the joint where the sides join the platform out to a line perpendicular with the extreme edge of the sides. These dead wood partitions are placed at from twenty to thirty feet apart, and contain strong tanks, or may themselves constitute the ends of such tanks, as by the dead-wood being built into the platform, and having its upper end securely fastened to the sides, they may be made perfectly tight by calking their seams.

In Fig. 2, which is a perspective view of the apparatus the same letters of reference are used as in Fig. 1, where like parts are designated.

D, D are the dead-wood partitions, or supports; and E, E, E, the outsides of tanks, or water tight sections, from which water may be exhausted, or into which it may be admitted, as may be found requisite. On the top of each of these tanks, or sections, there is to be a notch, as shown at *a'* Fig. 5, which may be removed when it is necessary to en-

ter them for the purpose of repairs, or otherwise; *b*, is a valve seat or gate, in the pipe *c*, Fig. 5.

F, *F*, are two pumps to discharge the water from the pump well over which they are situated; although only two pumps are represented, any desired number may be used; into this pump-well all the water contained within the body of the dock, and within the tanks, may be made to pass through proper conductors.

G, Fig. 1, is an opening from the body of the dock, leading into the pump well. There is a conductor also in each of the angles formed by the junction of the sides with the platform running along the whole length of the dock, and leading into the pump well, these may be seen at *c*, *c*, Figs. 2 and 3. There are gates *b*, Fig. 5, to let the water from each of the tanks into these conductors at pleasure; and also gates to let water run inside under the floor, with holes through the cross timbers to afford it an uninterrupted passage into the pump well. A machine of this description, and of the dimensions stated, will possess a buoyancy of about 8,400 tons, including the space on the inside of the dock, and the water tight sections, or tanks, on the outside.

The plan of making the end gates *B*, *B*, to slide, instead of to turn like ordinary gates is, I believe, new in its application to docks, and is esteemed by me an essential improvement in their construction. These gates have friction rollers on their lower edges, which run on iron rails, as at *z*, *z*, *z*, Fig. 6, and are embraced by ledges constituting suitable grooves. In Fig. 6, one of these ledges is removed to exhibit the rollers. The pressure of the water on their outsides will, when a portion is exhausted from within, keep them up against their bearings, so as to render them water tight. I have stated that they are opened and closed by the aid of a rack and pinion, but any other adequate means may be resorted to, as by blocks and chains leading to a windlass, or capstan. To keep them together, polls, or other devices, may be employed.

H, *H*, *H*, Fig. 1, are the piles and timbers constituting a part of the piers within which the dock is situated. The tops of these piers, when in use, are covered over so as to constitute a platform for the workmen, but in the drawings they are in part represented as uncovered, for the purpose of exhibiting parts which would otherwise be hidden by them. The platform, or bottom of the dock, extends out between the timbers constituting the piers, as shown at *T*, *T*, *T*, Figs. 1, 2, 3 and 4, and upon this portion of the platform, so extended, on each side, iron rails *J*, *J*, are placed, upon which the loaded cars *K*, *K*, are capable of being moved back and forth. I also place similar

cars *L*, *L*, to traverse on rails at the closed end of the dock. These cars are to be moved by means of the windlasses *M*, *M*, which are provided with double chains, passing around guide pulleys, and attached to the cars in such a way as that by reversing the motion of the windlasses the cars may be made to move in either direction at pleasure. These cars must contain a sufficient quantity of ballast to overcome the buoyancy of the wood of which the machine is built, and to cause it to sink when water is admitted to fill the body of the tanks and of the dock. As this machine may be built of iron, instead of wood, the load in the cars will be in this case comparatively small, say from fifty to a hundred tons, or such amount as will suffice to balance the dock and its load by the shifting of the cars, so as to establish the center of gravity in the point required. In the perspective view Fig. 2, and the vertical section, Fig. 4, the operation of the chains by which the cars are moved, with the pulleys around which they pass, are distinctly exhibited, so as not to require further description. In the perspective view of the dock, the timbers constituting the piers are omitted; those marked *H*², *H*² in that figure representing a framing on the platform of the dock itself, it being sometimes so constructed.

Fig. 3, shows a cross section of the machine, having a vessel blocked and shored within it. A main object of this section, however, is to show the difference of the arrangement of the buoyant parts of my apparatus from those which have been heretofore constructed. In these a large portion of the buoyant power is situated below the bottom of the vessel, while in mine the larger portion of the space which gives buoyancy is situated above the keel of the vessel under repair. In the section, Fig. 3, the elevation of the vessel is shown as proportionately greater than in the actual machines. By this mode of construction the depth of water required to sink the dock is much diminished, there not being anything more below the keel than the necessary blocking, and the thickness of the platform. A great saving of labor is also effected by my construction, as the quantity of water required to be pumped from my machine to attain the necessary buoyancy, is much less than in any other. By establishing a connection between the pump well and all the parts of my machinery by means of conductors, and other openings leading thereto, governed by valves, gates, stoppers, or similar contrivances which may be opened or closed at pleasure, I am enabled by one or more pumps leading into the pump well to exhaust the water from the whole, or from any particular portion of the apparatus, at pleasure, and also to admit it where

it may be required, and there only. There are, for example, plugs *o, o, o*, which close and open holes, for letting water into the sections, and within this is to be inserted a
 5 cock, fawcet, or other analogous contrivance, with a shaft extending to the upper part, furnished with an iron cross piece for turning it. And the different gates, or openings are in like manner placed under control, by
 10 devices of various kinds, which it is not necessary to describe, as they are such as are familiar to all competent engineers.

When one small vessel has been admitted for repair, and it is desired to take in
 15 a second, the gates at the lower end of the conductor, before described, are to be opened, and the water will be thereby admitted into the pump well. When the bottom is to be repaired and it is desirable to
 20 heel the dock over for this purpose, the sections on one side may be filled with water, and those on the opposite side left empty, by which means the end desired will be accomplished.

25 *P, P*, Fig. 1 are pulleys over which chains are to pass, or rather they should be wheels, or pulleys, with cogs upon them to take into the chains, so that by proper gearing they may be made to haul the chain taut. These
 30 chains answer several useful purposes, among which is their giving stability to the dock under certain circumstances, and by its aid the dock may be hove either up or down to a certain extent. In the section Fig. 3 the
 35 manner in which they are arranged is shown. *P, P*, are the cogged pulleys sustained on the timbers of the pier, and over which, as above stated, the chains pass. The chains are at one end made fast to the outside edge of the
 40 dock, as at *g, g*, and after passing over the cogged pulley *P*, it descends to low water mark, and around a pulley *G*, in the pile *R*, constituting a part of the pier, and is attached to the side of the dock, as at *h*. It
 45 will be seen that under this arrangement the turning of the pulley *P*, in one direction, will haul the dock downward, and that turning it in the opposite direction will haul it upward. If a stop is put on the sheave the
 50 motion in either direction will be arrested. The movable ballast cars furnish the means of using these chains with facility, as when the machine is to be raised at one end, by running them to the other end the raising
 55 of the opposite end will be readily effected.

In certain situations, as where the dock will not be affected by tides, it may be used without the erecting of piers, and, in this case, side decks will have to be built, supported by posts fastened to the platform,
 60 outside of the moving ballast cars. The cranes, and other apparatus required by the shipwrights will be affixed to these side decks. When used in piers, breakwater gates
 65 *S S*, Fig. 1, should be attached to these piers,

to prevent the dashing of waves against the dock; in rough weather these will be found to be of great use. *T* is a stanchion, of which there may be one or more on each pier, and through them a bar or rod *U*,
 70 is made to slide, that it may be made to bear against the side of a vessel as it is guided into the dock; it may be governed by a rack and pinion, by tackle, or otherwise; these and other devices for guid-
 75 ing vessels into the dock, are well known to those conversant with nautical affairs.

In the foregoing description my floating dock has been spoken of as constructed either
 80 of wood, or of iron, in the ordinary mode of joining those materials together; but independently of the novelty in the general construction of my machine, I have devised
 85 a new mode of combining the timbers together, or of uniting them to each other, in building the platform and sides of my dock. In this novel construction I use for the plat-
 form and sides of my dock square timber, as it comes from the mill.

Fig. 7, is a cross section of the platform
 90 and sides so constructed. The ends of the square timbers are shown at *i, i, i, n, n, n*, sustained by similar sized cross timbers *m, m, m*, of which there may be such number as
 95 may be deemed requisite. The scantling *n, n*, is let into the cross timbers *m, m*, by halving, or notching the latter, and between these the pieces *i, i*, fit in, resting upon the original surface of the cross pieces; the side
 100 parts of the timbers *i, n, i, n*, lap over on each other, therefore, throughout their whole length, the pieces *n*, being firmly held by the notches made in the cross pieces *m, m*, to which the whole are firmly bolted. By this
 105 method of framing, all the calk seams are on the inside, and a leak can be seen, and it will not be possible to drive the seams apart in calking them. The overlapping of the
 110 timbers *i, n, i, n*, form rests also for sustaining the shores, and for the stages used in the repairing of a vessel; they also constitute
 115 steps upon which to ascend and descend. I intend sometimes to construct the sides of my dock in this manner, and to allow those
 120 sides to move, like gates, upon hinges along their line of junction with the platform, at
x, x, so that they may be raised against the sides of a vessel, and thus be made to aid in altering the shape of an old and crooked
 vessel.

Having thus fully described the manner in which I construct my floating balance dry dock, and also the mode of using the same, I do hereby declare that what I claim there-
 125 in as of my invention, and desire to secure by Letters Patent, is—

1. The employment of a boat gate, in the manner described, for the purpose of divid-
 130 ing the machine into two compartments, in the manner, and for the purpose described.

2. The manner of employing movable loaded, or ballast cars, which are made to run upon suitable rails, or ways, situated on the platform, extended out for that purpose, in order to regulate the center of gravity of the apparatus, as described.

3. The particular manner of uniting, or putting together the timbers of uniform size, for the construction of the platform and of

the sides of the dock which saves the expenses of building stages, as set forth, and represented in Fig. 7, whether said sides be made stationary, or movable.

JOHN S. GILBERT.

Witnesses:

LYMAN SANFORD,
G. C. WING.