(No Model.) 3 Sheets—Sheet 1.

C. BROWN & T. BIDDLECOMBE.

FLOATING DRY DOCK.

No. 398,223. Patented Feb. 19, 1889.

Fig. 1

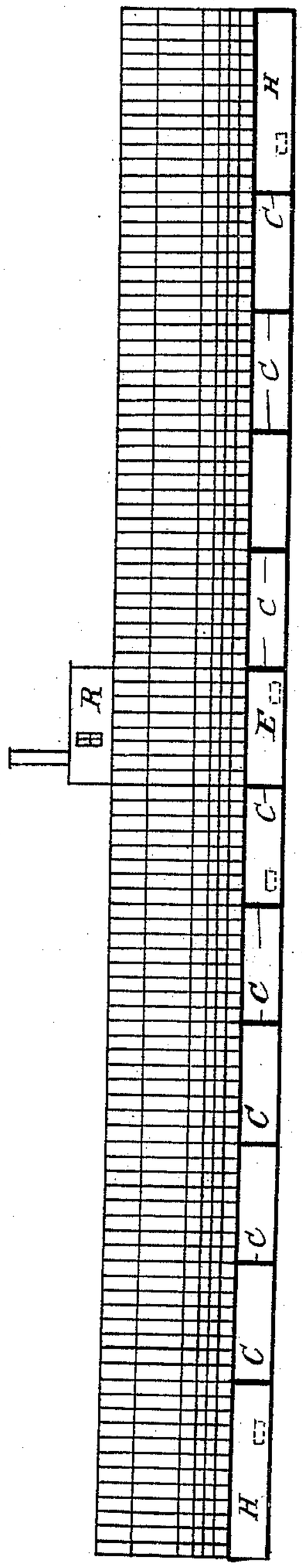
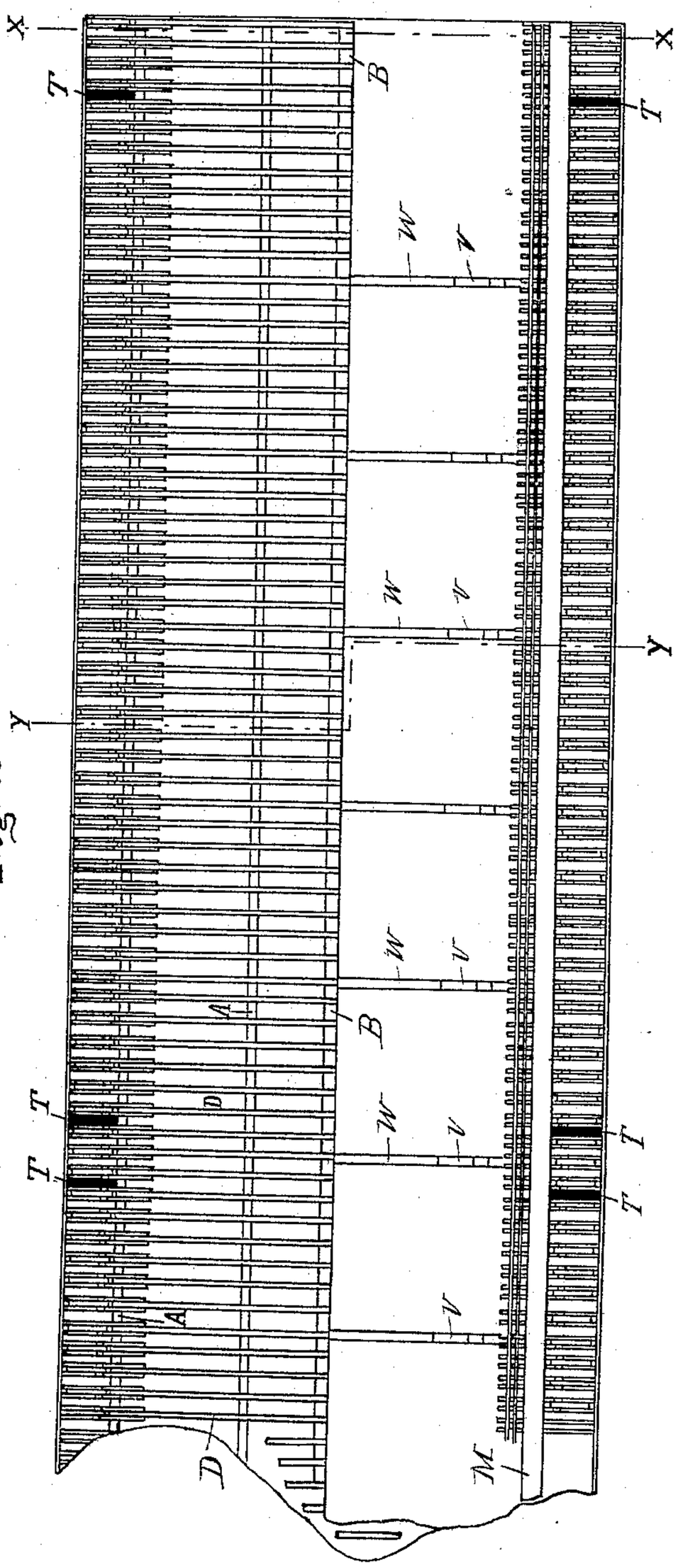


Fig. 2



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(No Model.) 3 Sheets—Sheet 2.

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Fig. 3

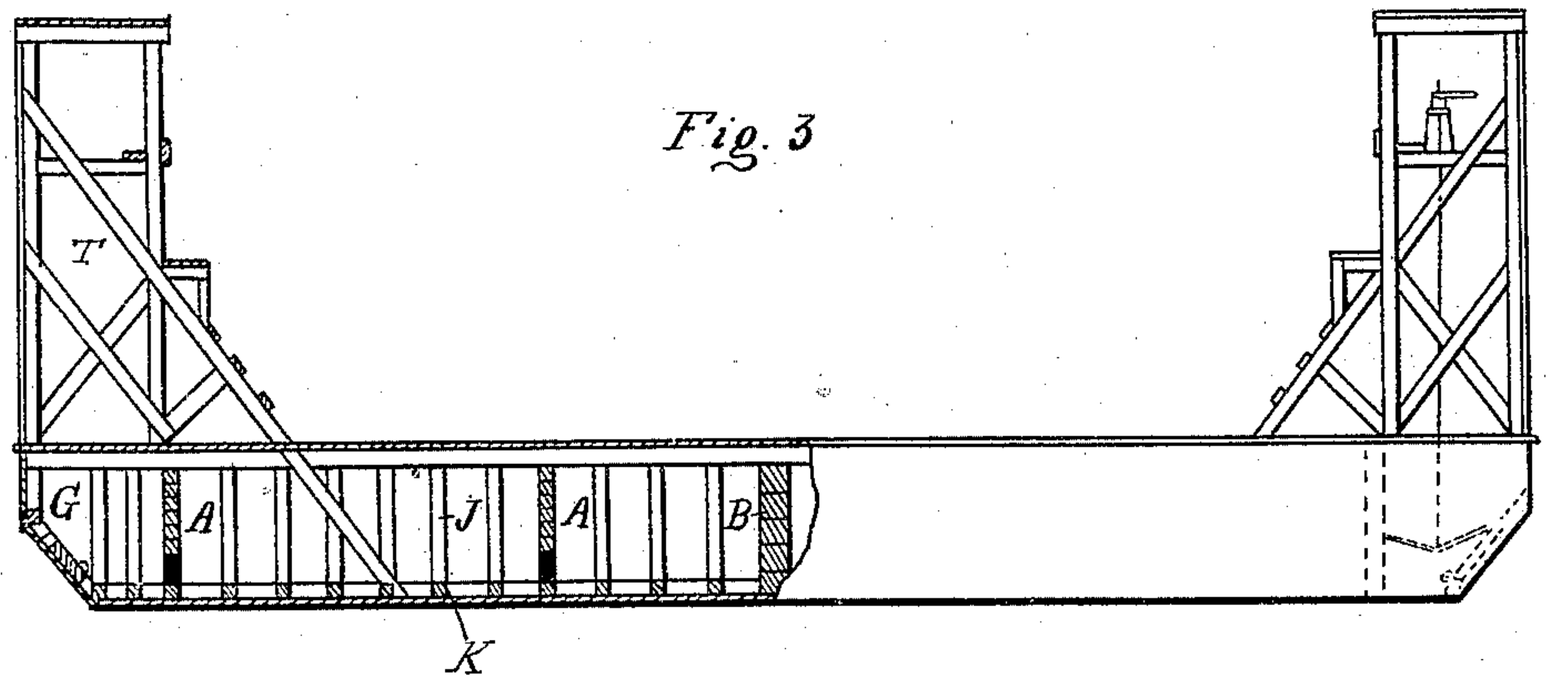
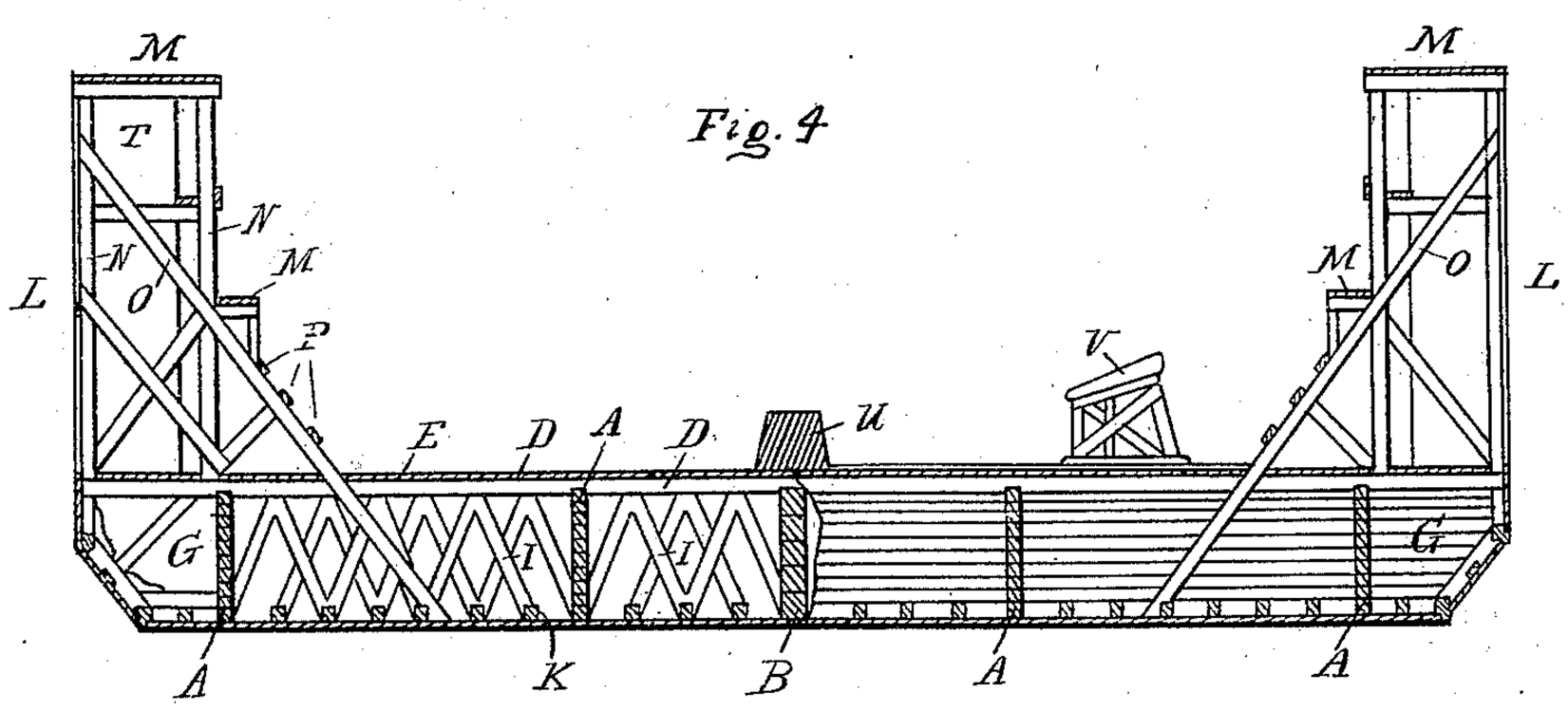


Fig. 4



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C. BROWN & T. BIDDLECOMBE.

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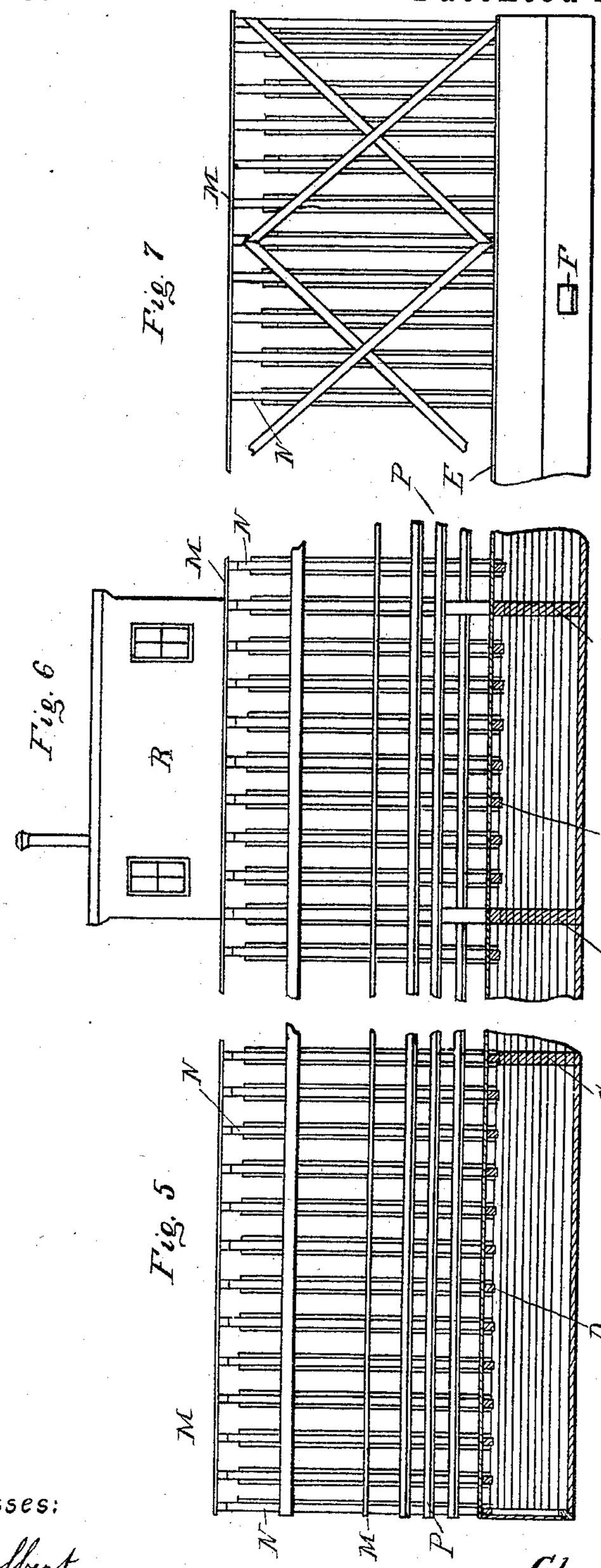

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UNITED STATES PATENT OFFICE.

CHARLES BROWN AND THOMAS BIDDLECOMBE, OF PORT HURON, MICHIGAN.

FLOATING DRY-DOCK.

SPECIFICATION forming part of Letters Patent No. 398,223, dated February 19, 1889.

Application filed December 31, 1887. Serial No. 259,504. (No model.)

To all whom it may concern:

Be it known that we, CHARLES BROWN and THOMAS BIDDLECOMBE, citizens of the United States, residing at Port Huron, in the county of St. Clair and State of Michigan, have invented certain new and useful Improvements in Floating Dry-Docks, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to new and useful improvements in floating docks; and the invention consists in the construction and arrangement of the parts, as more fully hereinafter described, and set forth in the claims.

In the drawings which accompany this specification, Figure 1 is a central longitudinal section, in diagram, to show the relative arrangemant of the parts. Fig. 2 is a plan on a larger scale, showing a section of the structure, with the deck-planking partly omitted. Fig. 3 is an end elevation and partly a cross-section on line *x x* in Fig. 2. Fig. 4 is a cross-section on line *y y* in Fig. 2. Figs. 5 and 6 are longitudinal central sections, the former being taken through a portion of the forward end and the latter through the central portion of the dock. Fig. 7 is a side elevation of the rear end.

The dock consists of a large hollow water-tight caisson of substantially rectangular shape, and of a size to provide ample dockage for vessels on the deck of the caisson, as will appear more fully hereinafter.

The construction of this caisson is as follows: The outside shell is constructed on the same plan as is used in building wooden vessels of the type known as "scows" or "lighters," designed for carrying heavy deck-loads, the size and strength of the timbers being proportionately increased, as is required by the size of the structure. The space within the caisson is divided into compartments by means of longitudinal division-walls A and B and transverse division-walls C, which are built of solid timber and reach from the bottom to the deck-timbers D, which lay crosswise the caisson on top of these walls and which support the flooring E.

The longitudinal division-wall B, running through the center of the caisson, is made extra heavy, as it has to support the most of the load, and the transverse division-walls C are spaced closer together near the center of the caisson than toward the end. All these division-walls are built in the most substantial manner and bolted together to impart the greatest possible strength to the caisson, and the joints between the individual timbers are water-tight, and where the walls cross each other the timbers are halved. These division-walls divide the hold into a series of compartments, which are made to communicate with each other and with the outside by suitable openings, F, formed in the walls near the bottom.

All the outside openings are controlled by valves suitably constructed to be opened and closed from the deck, and the openings which communicate with the compartments G at the sides of the caisson and with the compartments H at the end of the caisson are also controlled by valves for the purpose hereinafter stated. The rigidity of the structure is still further increased by placing intermediate between the cross-walls C open trusses, either, as shown in Fig. 4, by means of inclined braces I, or by vertical braces J, as shown in Fig. 3, the two methods being preferably employed alternately with each other through the length of the caisson, so that every deck-timber is braced underneath. Suitable bottom timbers, K, are employed to support the braces I and J.

The top of the caisson is provided with the superstructure, which consists of the scaffolds L L, along the sides of the caisson, and which support the usual platforms, M M, for the use of the workmen employed in repairing the vessel. We preferably construct this scaffold by erecting a series of like frames at equal distances apart along the edges of the deck, each frame consisting of the uprights N N, suitably connected by cross-braces and provided with the large anchoring-brace O, which runs from near the top of the frame at an angle through the deck to the bottom of the caisson. By means of longitudinal stringers P we provide additional raised supports for the workmen to stand upon. This construction of scaffold adds to the strength of the caisson, and the central portion of this scaffold is utilized to support the pump-house R, in which the pumps and pumping apparatus are sheltered.

T are vertical shafts for the escape of the air when the water is admitted into the hold of the caisson. In the center of the deck and running longitudinally therewith we construct the keel-block U, upon which the keel of the boat is designed to rest, and upon its sides we place the adjustable brace-shores V, which are constructed in the form substantially as shown and which are movably supported upon the lateral track W, secured to the top of the deck.

In practice this dock is designed to operate as follows: When it is desired to dock a vessel, the whole structure is submerged by admitting water through the openings F in the sides of the caisson, the specific gravity of the parts being such that when the hold is full the structure will sink to the bottom. The depth of water in which the structure is used is calculated to leave the top of the scaffolds, with the pump-house, above water. The vessel to be docked is then floated on top of the deck and fastened securely in position thereon. After closing the ports through which the water has been admitted into the caisson the pumps are set to work to pump the water out of the hold, and as the dock rises its balance is maintained by using the water in the end and side compartments for keeping it in trim, the valves which control the access of the water to these compartments being opened and closed as required. The buoyancy of the whole dock when empty is supposed to support the vessel above the water. To undock the vessel after it is repaired, the reverse operation is performed.

The advantage of our construction is that it greatly reduces the cost and does not require such special and extended facilities for building as is required by the present state of the art, which practically forbids an enterprise of this nature to be carried on away from the large centers of ship-building, and which, on account of the great difficulty and expense attending the transport of such a large structure, naturally deprives the maritime interests along a large extent of coast of the great benefits to be derived from the use of a dry-dock in case of urgent necessity.

Our construction can be carried out at a minimum of cost, and is intended to solve the difficulty of building such a structure with the ordinary materials and workmen at command of any place equipped for building ordinary wooden vessels, and, furthermore, its construction is specifically adapted to the conditions of the coast along our great northern lakes.

We are aware that it is not new to divide a caisson or ponton into compartments communicating with each other and controlled by valves, and provided with means for submerging or raising such caisson by the admission or expulsion of water into or from such compartments; nor is it new to trim the caisson by providing it with trimming compartments; but what we claim is the constructive arrangements and combination of the different parts of the whole structure.

What we claim as our invention is—

1. The combination, in a floating dock, of the inclosed buoyant caisson or vessel of substantially rectangular shape, the series of transverse and the series of longitudinal solid timber division-walls dividing the hold into compartments, of outside and inside openings to admit the water into the compartments of the hold, valves controlling the outside openings, valves controlling the inside openings into the side and end or trimming compartments, the scaffolds on the deck of the caisson, the inclined anchoring-brace O, the longitudinal stringers P, secured to said brace, the vent-shafts extending through such scaffolds, and the pump apparatus housed on top of such scaffolds, all arranged substantially as described.

2. The combination, in a floating dock, of the buoyant caisson or vessel of substantially rectangular form, the series of longitudinal and transverse solid timber walls dividing the hold into compartments, the intermediate transverse trusses, the openings at the bottom of the outside and inside walls to admit the water into the different compartments, the valves for controlling such openings, the side and end compartments, the keel-block in the center of the deck, the lateral brace-shoers movably supported upon lateral guides, the scaffolds extending along the sides of the deck and supporting the platforms, the anchoring-braces of the scaffolds, and the air or vent shafts extending through the scaffolds, all substantially as described.

In testimony whereof we affix our signatures, in presence of two witnesses, this 28th day of July 1887.

CHARLES BROWN.
THOMAS BIDDLECOMBE.

Witnesses:
H. S. SPRAGUE,
P. M. HULBERT.