No. 782,557. PATENTED FEB. 14, 1905.

S. HADLOCK & F. E. BROWN.

FLOATABLE CONCRETE PIER.

APPLICATION FILED MAY 26, 1904.

Fig. 1.

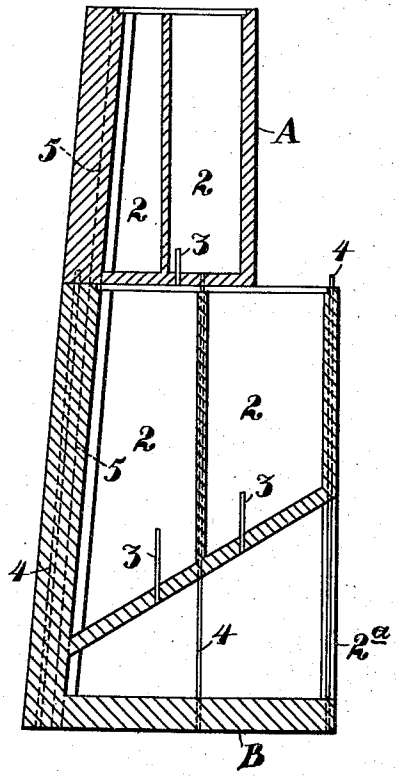


Fig. 2.

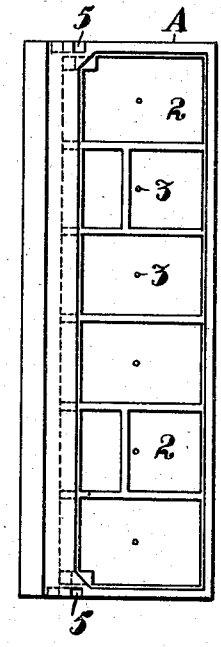
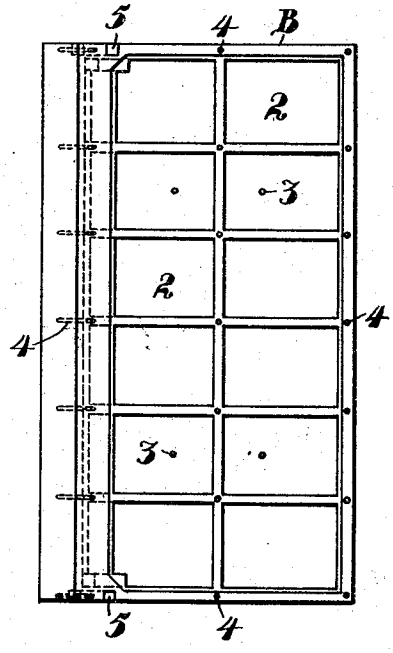


Fig. 3.



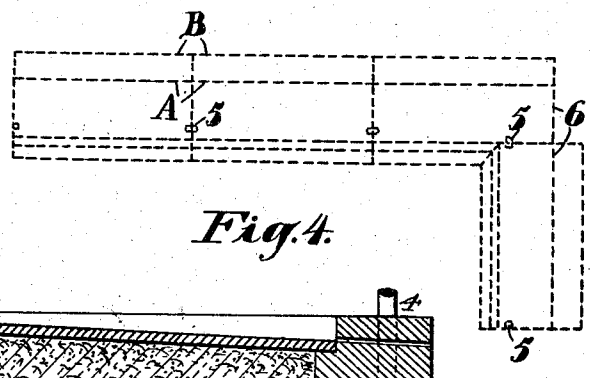


Fig. 4.

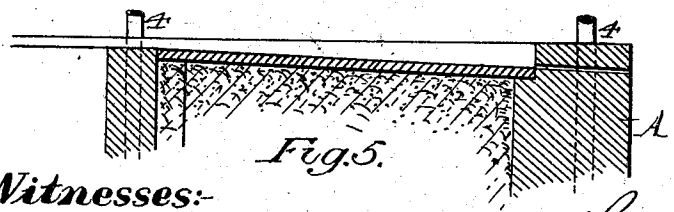


Fig. 5.

Witnesses:-

F. C. Fliedner

J. H. Sause

Inventors

Samuel Hadlock

Francis E. Brown

By Geo. H. Strong. atty

No. 782,557. Patented February 14, 1905.

UNITED STATES PATENT OFFICE.

SAMUEL HADLOCK, OF PORT HADLOCK, AND FRANCIS E. BROWN, OF PORT TOWNSEND, WASHINGTON.

FLOATABLE CONCRETE PIER.

SPECIFICATION forming part of Letters Patent No. 782,557, dated February 14, 1905.

Application filed May 26, 1904. Serial No. 209,828.

To all whom it may concern:

Be it known that we, SAMUEL HADLOCK, of Port Hadlock, and FRANCIS E. BROWN, of Port Townsend, in the county of Jefferson and State of Washington, citizens of the United States, have invented new and useful Improvements in Floatable Concrete Piers, of which the following is a specification.

Our invention relates to what we term a "floating" or "floatable" concrete pier.

It consists in the formation of a hollow structure of concrete which is adapted to be floated to position and in the combination of any number of such structures, which may be permanently fixed to form a wharf, pier, caisson, or other desired permanent structure.

The invention also comprises details of construction which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a transverse section through the upper and lower structures. Fig. 2 is a plan view of the upper one. Fig. 3 is a plan view of the lower one. Fig. 4 shows corner connection. Fig. 5 is a sectional view showing the curb around a wharf with scupper-holes for drain-water.

The object of our invention is to provide a hollow structure of concrete with suitable chambers, which structure may be built on ways and after being built can be launched and floated to any point where it is to be used. If used for a wharf or equivalent structure, it may be sunk upon or into the material forming the bottom of the water, and any number of these independent structures may be alined to form any desired wharf or structure, said caissons or boxes being afterward filled so as to become permanent.

The structures may be made in one or two superposed sections, and such structures may also be completed, anchored, and kept afloat to serve as boat-landings and for similar purposes. It will also be understood that they may be made in the form of caissons and adapted for closing the entrances of dry-docks in place of wooden and iron caissons, such as are now used.

As shown in the accompanying drawings, A is an upper and B a lower structure. These structures are built of concrete and may be built of any suitable or desired shape or size to suit the purposes for which they are to be employed, such as previously mentioned.

The bottom of the structure may be a flat floor. It may be inclined or otherwise shaped to suit the conformation of the surface upon which it is to rest if said surface be hard. If it is to rest upon a soft surface, the surface itself can be excavated or prepared to receive the pier when it reaches the point for use.

The sections B either have the chambers extending entirely to the bottom, or there may be a flat floor and the inclosed chambers may extend to the bottom at the front, and the bottoms of said chambers may be inclined upwardly toward the rear and supported upon piers or pillars, as at 2^a, from the floor below. The chambers are subdivided into compartments 2, so that by loading these compartments the sections may be made to float in a substantially upright position and can thus be towed to the point where they are to be deposited, and when this position is reached the sections may be sunk to the bed. A series of pipes, as 3, connect with the interior of the chambers, and water may be admitted to fill the chambers and allow the sections to sink when placed. We have also shown pipes, as at 4, extending through the sections at suitable points, and these pipes are adapted to receive any fluid under pressure, which being forcibly impelled against the bottom when the latter is soft will serve to excavate the bottom and if it is irregular to level it sufficiently for the proper support of the sections when sunk into place. The partitions which divide the sections serve to give it strength, and steel girders may be placed across the top to carry the weight of the floor or superstructure or any weight which may be placed thereon. These sections will be made of such length, width, and depth as will suit the conditions under which they are to be used. Thus if a considerable depth of water in front of the wharf is desirable at low tide these sections B will be deep enough to appear above the water at low tide when they are set in position, and

the sections A can then be floated into position above the sections B at high tide, and when placed the seam between the two can be made tight with concrete, so as to prevent the sand from washing out after the wharf is completed. The method of constructing the wharf with these sections will then be as follows: One of the piers or sections is floated to the point where it is to be placed, then sunk into position and properly leveled. The next section is then brought into line with the first section and so placed as to make a straight front. Between the ends of these sections are vertical slots or channels 5 of sufficient size and number, and these are alined, so that they form a channel, half of which is in each section. This opening is filled with concrete after the sections are sunk into position, thus uniting the two sections into a single structure and at the same time forming a tight joint, which will prevent any filling placed interior to the pier from washing out. This process of adding sections will be continued until the desired length or frontage of the wharf is attained. At the ends and if the wharf is to run at right angles with the front section corner-sections 6 are employed. These differ from the sections used for the front in having the slots or channels 5 upon the side adjacent to the sections already laid and a slot upon the inner side at right angles with said front section, so that sections may be added in line at right angles with the front section and continue to the shore, or if the wharf is to be constructed entirely away from the shore the sections will be united to form a suitable rectangle by completing it as here described. The cavities or chambers in the sections and also the space inclosed within the entire structure may then be filled with sand, gravel, or other material by means of a pumping-dredge or other appliance until the filling is substantially level with the top of the sections.

If the rise and fall of the tide does not exceed six or eight feet and not more than twenty-six feet of water is required at the front of the wharf, the latter may be made in single sections, the top section A not being necessary; but where the water is deeper and the rise and fall of the tide is considerable it will be necessary to place the top section A upon the bottom section B. The top of the wharf may then have a floor laid upon it of any suitable material. In order to complete the wharf in accordance with our invention, it is preferable to lay the floor of concrete sufficiently heavy and with the central portion slightly raised, so that water falling upon the wharf would drain outwardly.

Around the edge of the wharf a curb may be formed, rising to any suitable or desired height above the wharf-surface and having scupper-holes made through it at intervals to allow any rain-water deposited upon the wharf to run off.

It will be manifest that hollow structures formed of concrete in this manner may be employed as caissons or gates for dry graving-docks or for floating boat-landings and the like, such structures being provided with the usual pumping apparatus and means for filling and emptying them as required, and the tops or floors may be made of wood or other suitable material, if preferred.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

1. A floatable pier made of concrete, with a closed bottom and open top, adapted to be floated upon the water and having interior chambers substantially as described.

2. A pier composed of a plurality of hollow water-tight concrete sections having open tops and closed bottoms, and having separated interior chambers, said chambers being so disposed as to be loaded to balance said structures while floating.

3. A pier composed of concrete having hollow water-tight interior chambers, with open tops and closed bottoms, passages opening into said chambers whereby water may be admitted to balance or sink the structure, and pipes extending through the bottom to conduct fluid under pressure.

4. A pier comprising a hollow floatable structure of concrete having interior water-tight chambers, with closed bottoms, pipes or passages extending from the top through the bottom and adapted to convey a fluid under pressure whereby the surface below the pier may be excavated and leveled.

5. A pier comprising a series of hollow chambered water-tight concrete floatable sections, fluid-conducting pipes for sinking and leveling said sections in position, and means for uniting successive sections to form a continuous structure.

6. A pier comprising hollow chambered concrete floatable sections, fluid-conducting pipes carried by the sections for excavating and leveling the surface upon which the pier is to rest, a means for uniting the sections of which the pier is composed to form a continuous structure, said means consisting of channels formed in the abutting ends of the sections coincident with each other and a body of concrete filling said channels.

7. A pier composed of hollow floatable chambered concrete sections with means for sinking, leveling and placing said sections and uniting them successively to form a continuous structure, a deck or surface formed of concrete and a curb or stringer of concrete extending above the floor-surface and having water-outlets made therethrough.

8. A pier or wharf consisting of hollow chambered floatable sections of concrete, fluid-conducting pipes for sinking, placing and leveling said sections upon the bottom, means for uniting a plurality of said sections to form a continuous structure extending to approximately the surface of the water at low tide and

supplemental floatable concrete sections adapted to be placed upon the substructure at high tide.

9. A pier or wharf comprising hollow chambered floatable concrete sections, with means for sinking and uniting a plurality of said sections to form a continuous structure and supplemental floatable sections adapted to fit upon the top of the substructure and form tight joints therewith, a deck or covering for the upper surface of said superstructure and a filling of solid material for the chambers of the structure and the space inclosed thereby.

In testimony whereof we have hereunto set our hands in presence of two subscribing witnesses.

SAMUEL HADLOCK.
FRANCIS E. BROWN.

Witnesses:
A. H. ADAMS,
C. A. WATROUS.