

J. B. Eads,

Caissons,

N^o 78,793.

Patented June 9, 1868.

Fig. 1.

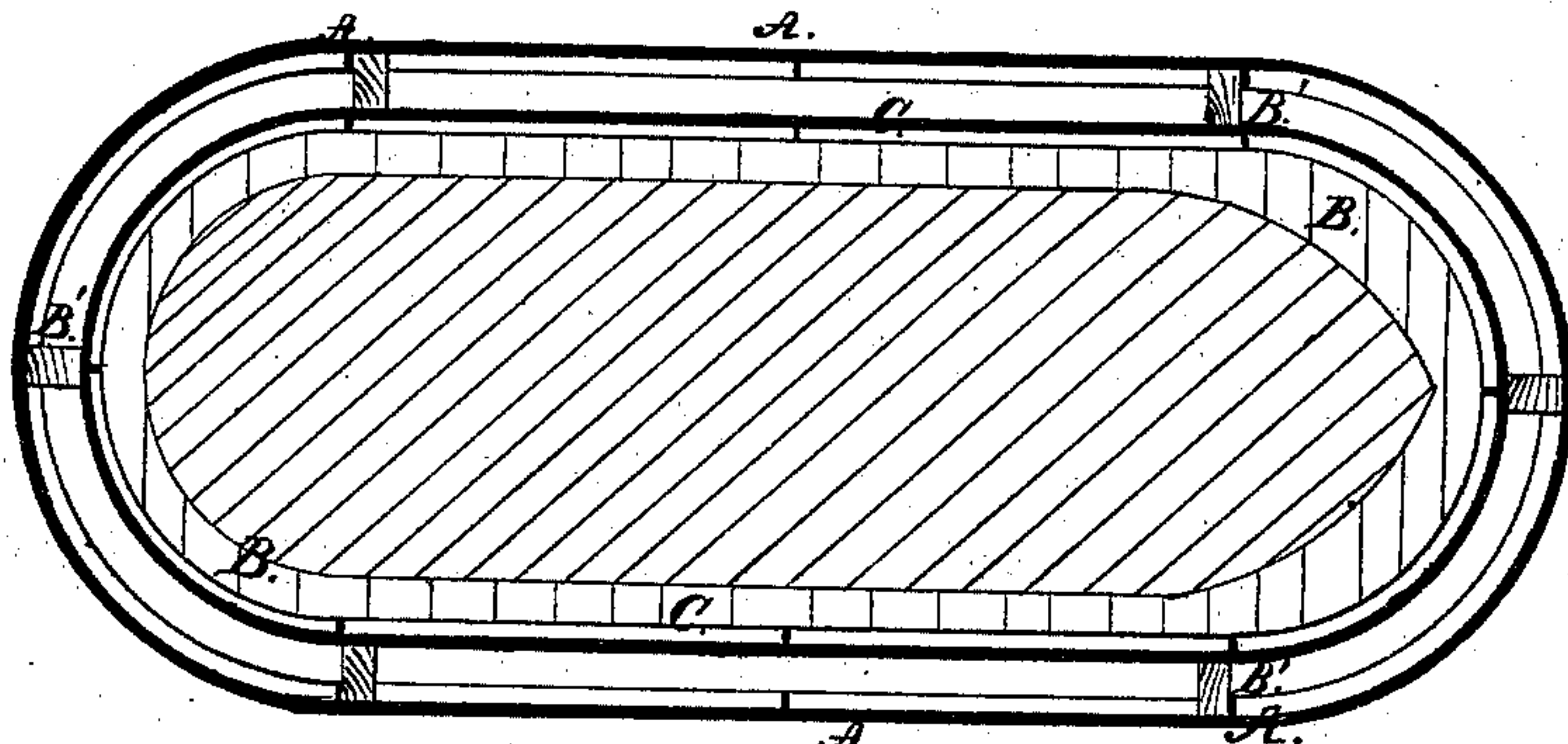
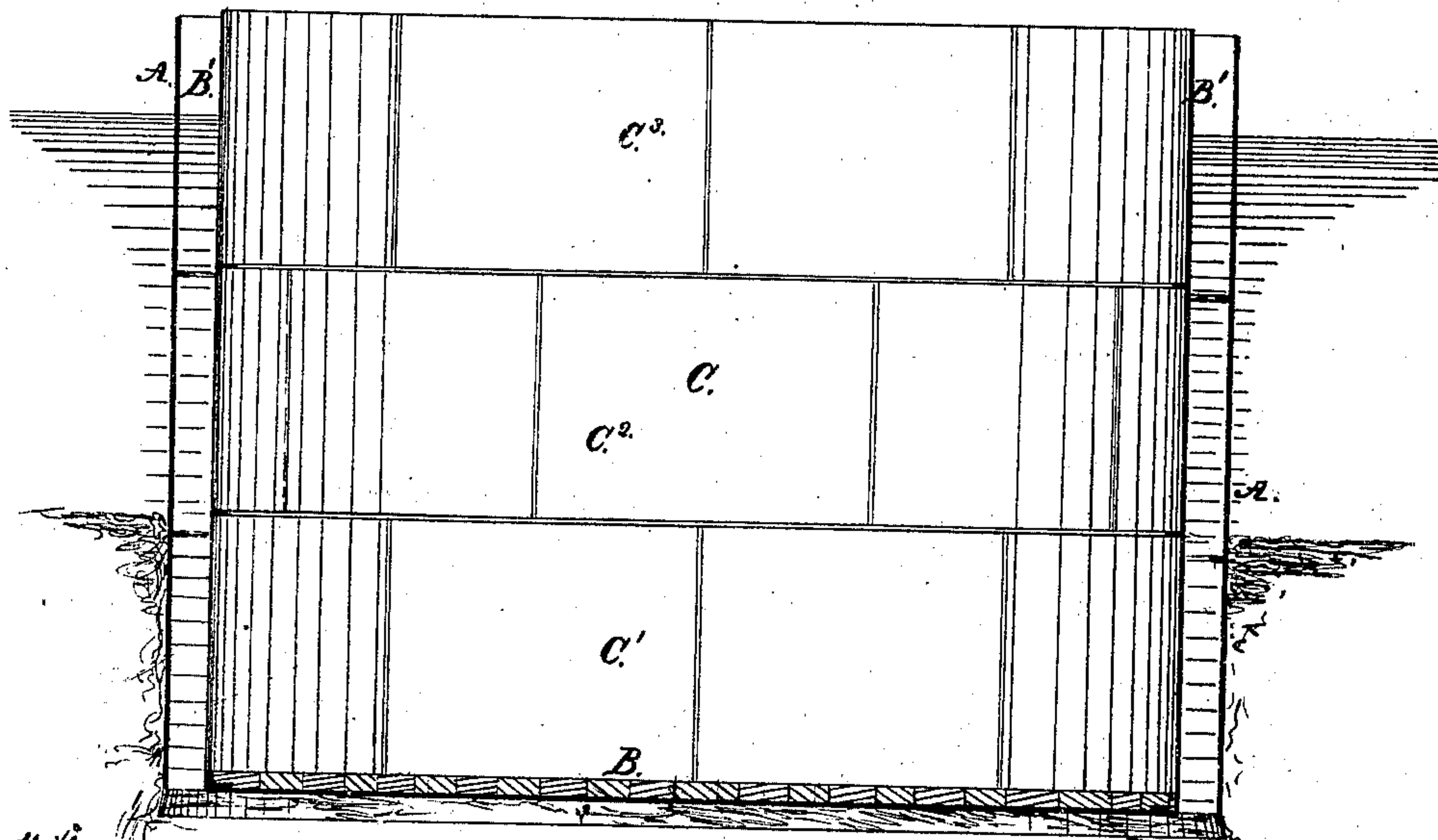


Fig. 2.



Witnesses:

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JAMES B. EADS, OF ST. LOUIS, MISSOURI.

Letters Patent No. 78,793, dated June 9, 1868.

IMPROVED SUBAQUEOUS FOUNDATION.

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, JAMES B. EADS, of the city of St. Louis, in the county of St. Louis, and State of Missouri, have made certain new and useful Improvements in Constructing Subaqueous Foundations; and I do hereby declare that the following is a full and clear description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

It is well known that in the construction of bridge-piers, dams, breakwaters, and similar structures, the foundations are made upon the firm subaqueous strata of rock or hard soil. To construct said structures firmly upon the proper substrata, various general methods have been devised. In the method used by Brunel at the Saltash bridge, and by Keller at the Kehl-Rhine bridge, a strong box was employed; the said box being open at the bottom, and sustaining the masonry on its top, when supported by chains. The masonry was laid above water, the foundation-box being lowered as the masonry was raised. When the box reached the water-bed, it became necessary to excavate the sand or other subsoil to permit the box to descend and reach the firm substratum intended to support the structure. To enable workmen to perform the work of excavation under said box, compressed air was forced into the same, thus forcing out the water therein, and supplying a medium for respiration for the laborers. It will be seen that in said method the supply of compressed air, and its retention, necessitate various and complex devices, which, at the same time, are modified by the necessities for passage of workmen and material from the platform above to the work-site below. And it is further apparent that the progress of said work must be slow, because of the limited space afforded to apply the powers of laborers, and the circumstantial operations which must be performed to achieve limited results. The advantage possessed by said general method is in the possibility of laying all masonry above water, but the disadvantage in said method is in the delay and expense caused by the manner of excavating the subaqueous passage for the descent of the foundation-box or crib. To retain the general advantage of said method, and to evade its said defects, the nature of my improved method of constructing subaqueous foundations is in the prior formation of the passage in which the pier or other structure descends as it is constructed, and for said purpose the nature of my invention is in the application of an open-ended tube or caisson, which shall first be sunk surrounding the pier-site, and from within which the sand or light subsoil shall have been excavated, thereby forming within said caisson a clear site containing no other obstruction but water to the descent of the inner structure. Thereupon the masonry is constructed in a suitable caisson, sectional or otherwise in its detail construction, or said masonry may be built upon a simple platform, and the said caisson or platform and superincumbent masonry being sustained either by the water-displacement or by screws and chains, and being guided properly in its descent as the masonry is built up.

To enable those skilled herein to use my said improvement, I will now describe the same in its general detail constructions and operations, referring herein to the accompanying

Figure 1 as a horizontal sectional plan, and to

Figure 2 as a vertical sectional elevation.

In said figures similar letters of reference are used to indicate similar parts.

I construct the enclosing caisson A of wood or iron, and sink the same to reach the firm substratum, as indicated in fig. 2. To facilitate the descent of said caisson, the lower edge *a* is curved outwardly, and may be sharpened or shod. In lowering the caisson A, the weight thereof, with any added ballast that may be needed, will be aided by the excavation of the sand, gravel, or light subsoil within the caisson; said sand, gravel, or subsoil being excavated by dredges or sand-pumps, or similar devices. By said processes the space within the caisson A will be cleared of all obstructions except water, and, as the water-levels within and without the same are or may be properly adjusted, the compression upon the caisson itself will be so slight that a light and inexpensive construction thereof is admissible.

I construct, furthermore, a platform, B, to sustain the masonry, and guide said platform B by the guide-posts B' arranged on the inner surface of the caisson A. In case the weight of the masonry built on B cannot

be properly balanced by the upward pressure of the water in A, suitable valves may be arranged to add a ballast on water on B, as required. Around the platform B, I arrange the caisson C enclosing the masonry. In the construction of C, it is advisable to arrange the same in sections C¹ C² C³, the said sections being added successively as the building of the masonry within progresses, and the platform B and caisson C descend.

It will be seen that, by the caisson C, the water may be excluded from the masonry until the same is "set," and that the sides of said caisson may be braced by proper braces acting against the masonry within the same, and thus the caisson be relieved to a great extent of the pressure of the surrounding water, thereby permitting a light and inexpensive construction of said caisson.

When the platform B has been lowered to the subsoil prepared by blasting, or by layers of beton to receive the same properly, it will be easy to remove the enclosing sectional caisson C by disconnecting the same or its separate sections from each other and from the platform B. The outer caisson A may then be removed, and the removal hereof will be facilitated by a construction thereof in sections similarly to the caisson C.

Having thus fully described my invention, what I claim is—

The combination and arrangement of the outer caisson, its ribs or posts B B', with the internal caisson, C, in the manner and for the purpose substantially as herein set forth.

JAS. B. EADS.

Witnesses:

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