No. 728,014. PATENTED MAY 12, 1903.

L. L. RINALDI.

SUBMARINE CONSTRUCTION.

APPLICATION FILED JULY 10, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

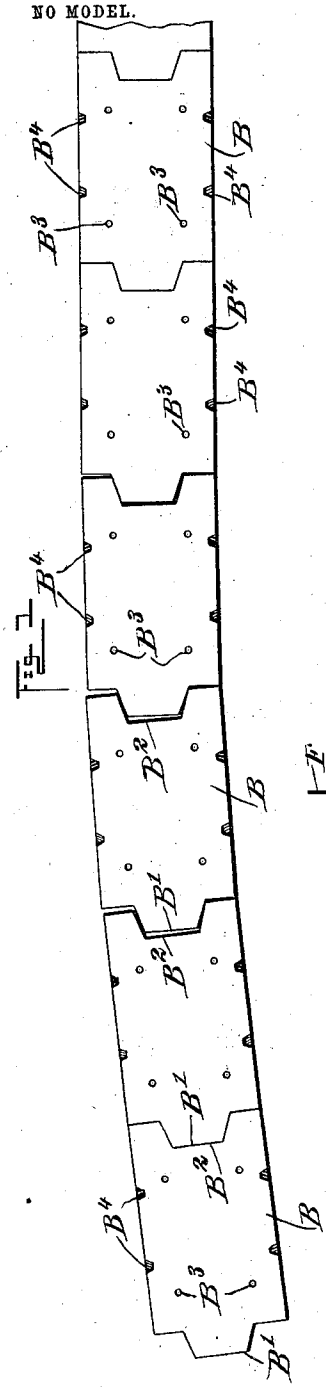


Fig. 1.

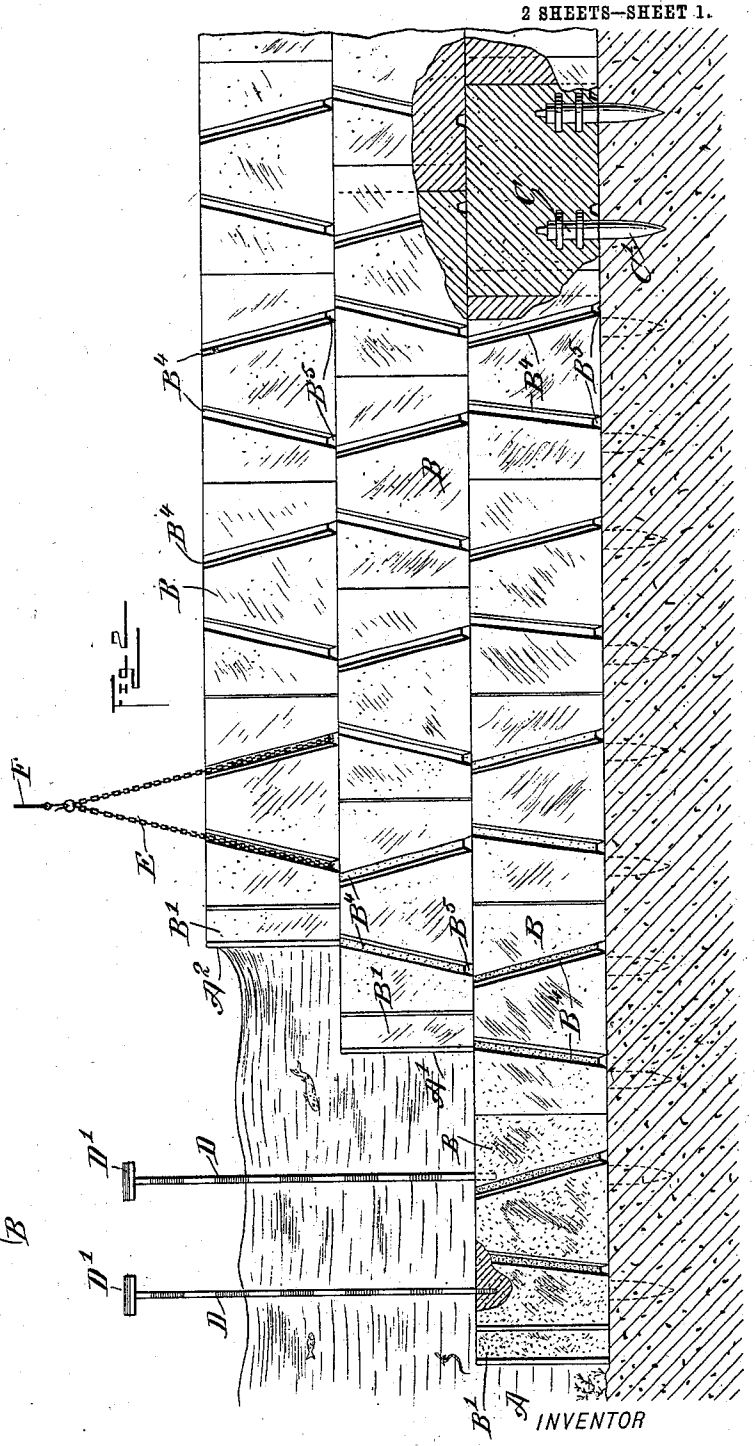


Fig. 2.

WITNESSES:

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NO MODEL. 2 SHEETS—SHEET 2.

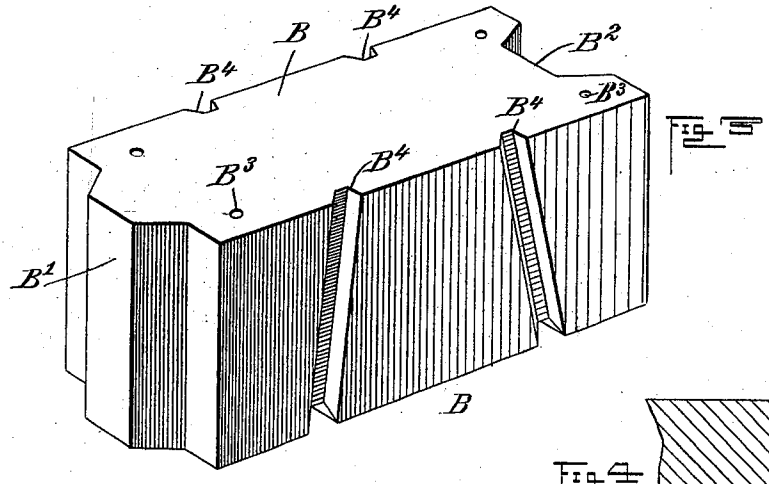


Fig. 3

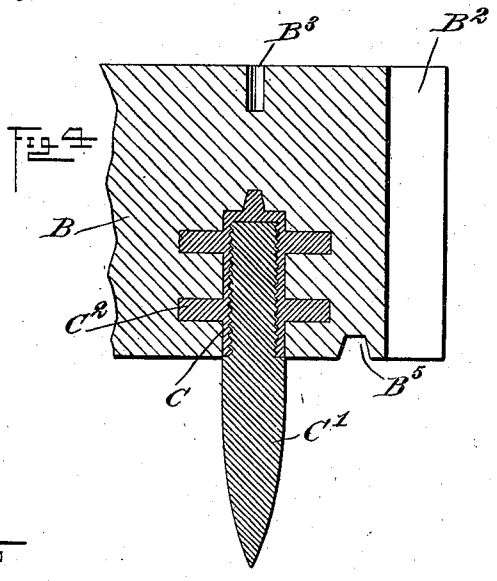


Fig. 4

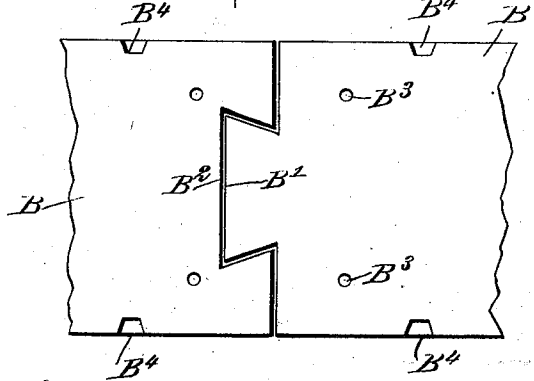


Fig. 5

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No. 728,014. Patented May 12, 1903.

UNITED STATES PATENT OFFICE.

LEONIDA LORENZO RINALDI, OF SOMERVILLE, MASSACHUSETTS.

SUBMARINE CONSTRUCTION.

SPECIFICATION forming part of Letters Patent No. 728,014, dated May 12, 1903.

Application filed July 10, 1902. Serial No. 115,051. (No model.)

To all whom it may concern:

Be it known that I, LEONIDA LORENZO RINALDI, a citizen of the United States, and a resident of Somerville, Boston, in the county of Middlesex and State of Massachusetts, have invented a new and Improved Submarine Construction, of which the following is a full, clear, and exact description.

The invention relates to the construction of piers, sea-walls, lighthouses, and the like; and its object is to provide a new and improved submarine construction arranged to permit of placing the building-blocks in proper position below the water-level to securely fasten the lowermost layer of blocks in place on the bed of the waterway and form a secure, durable, and accurate submarine foundation in quiet waters as well as in strong currents.

The invention consists of novel features and parts and combinations of the same, as will be more fully described hereinafter and then pointed out in the claims.

A practical embodiment of the invention is represented in the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a plan view of the improvement arranged as a curved wall. Fig. 2 is a side elevation of the same, parts being in section. Fig. 3 is an enlarged perspective view of one of the building-blocks. Fig. 4 is a sectional side elevation of a building-block of the lowermost or foundation layer, and Fig. 5 is a plan view of two interlocking blocks of modified form.

The submarine construction consists, essentially, of superimposed layers A, A′, and A^2, each formed of building-blocks B, made of concrete, such as a mixture of Portland cement and crushed stone, formed in molds under pressure into the desired shape. Each of the blocks B is provided at its ends with interlocking members B′ B^2, preferably in the shape of tongues and grooves, so that the tongue B′ of one block fits into the groove B^2 of the adjacent block to interlock adjacent blocks in each layer, as plainly indicated in Fig. 1. The tongues and grooves may be of various shapes, as shown in Figs. 1 and 5, and the tongues are preferably so arranged relative to the grooves that adjacent blocks may be slightly set at angles one to the other, as indicated in the middle portion of Fig. 1, to allow of forming curved walls or curved portions in a straight wall. As the blocks are all of the same size, it is evident that they can be readily joined in each layer, and the blocks in the next layer are preferably arranged to break joints with the blocks of the preceding layer. (See Fig. 2.)

In very strong currents it is desirable to anchor the blocks of the lowermost layer A to the bed of the waterway, and for this purpose each block B is provided at its under side with one or a plurality of piles, each consisting of a socket C, embedded in the block material and formed with an internal screw-thread, into which screws the pile-point C′, as plainly indicated in Fig. 4, the socket C being provided with retaining-flanges C^2 to hold the socket against displacement in the block B.

In order to indicate that the blocks are set level in the lowermost layer as well as in the succeeding layers, each block is provided on top, near the ends thereof, with apertures B^3 for removable engagement by the lower ends of leveling-rods D of such length as to extend with their upper ends above the level of the water in which the wall is built. (See Fig. 2.) The outer upper ends of the leveling-rods D are provided with cross-pieces D′, standing in alinement, and as the leveling-rods are of the same length it is evident that when a block B is not placed perfectly level then the cross-pieces D′ indicate such position, and consequently permit the builder to rectify the position of the block until the latter is level. This position is readily indicated by the cross-pieces D′ of the rods D, which can then be removed from the block and used on following blocks.

In order to conveniently lower the blocks from a boat, raft, or other support into position below the level of the water, I provide the front and rear faces of each block with obliquely-extending grooves B^4, of which the corresponding grooves on front and rear faces are connected with each other at the bottom by a transverse groove B^5, and the said grooves B^4 B^5 are adapted to receive a sling E, attached to the lowering chain, cable, or

rope F, connected with a windlass or other device for lowering the block to its position. When this has been done, the sling E can be readily disconnected from the chain, cable, or rope F and then disengaged from the block, to be reused on another block to be lowered.

From the foregoing it will be seen that a pier, sea-wall, and like submarine construction can be readily carried out at comparatively low cost and at the same time produce a very secure, durable, and accurate submarine foundation in both quiet waters and strong currents.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. A submarine construction comprising building-blocks of concrete and arranged in superimposed layers, the ends of adjacent blocks in a layer having interlocking tongues and grooves extending from top to bottom of the blocks, and piles secured in and projecting downward from the bottom of the blocks forming the lowermost foundation-layer, as set forth.

2. A submarine construction comprising building-blocks of concrete arranged in superimposed layers, the ends of the blocks having interlocking tongues and grooves, threaded pile-sockets embedded in the bottoms of the blocks forming the lowermost foundation-layer, and pile-points screwing into the said sockets and projecting downwardly from the blocks into the material of the bed of the waterway, as set forth.

3. A submarine construction provided with a building-block of concrete, piles projecting from the bottom of the building-block and consisting of an internally-threaded socket embedded in the concrete material, and a pile-point screwing in the said socket and projecting downwardly from the bottom of the block, as set forth.

4. A submarine block of concrete formed at its ends with interlocking members, and in its front and rear faces with oblique grooves, connected with each other at the bottom by transverse grooves, as set forth.

5. A submarine block of concrete having a vertical groove at one end and vertical tongue at its other end, and provided in its front and rear faces with grooves inclined upwardly and inwardly toward each other and on its bottom with transverse grooves connecting the inclined grooves, as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

LEONIDA LORENZO RINALDI.

Witnesses:

WILLIAM E. LUDDEN,

CHARLES M. LUDDEN.