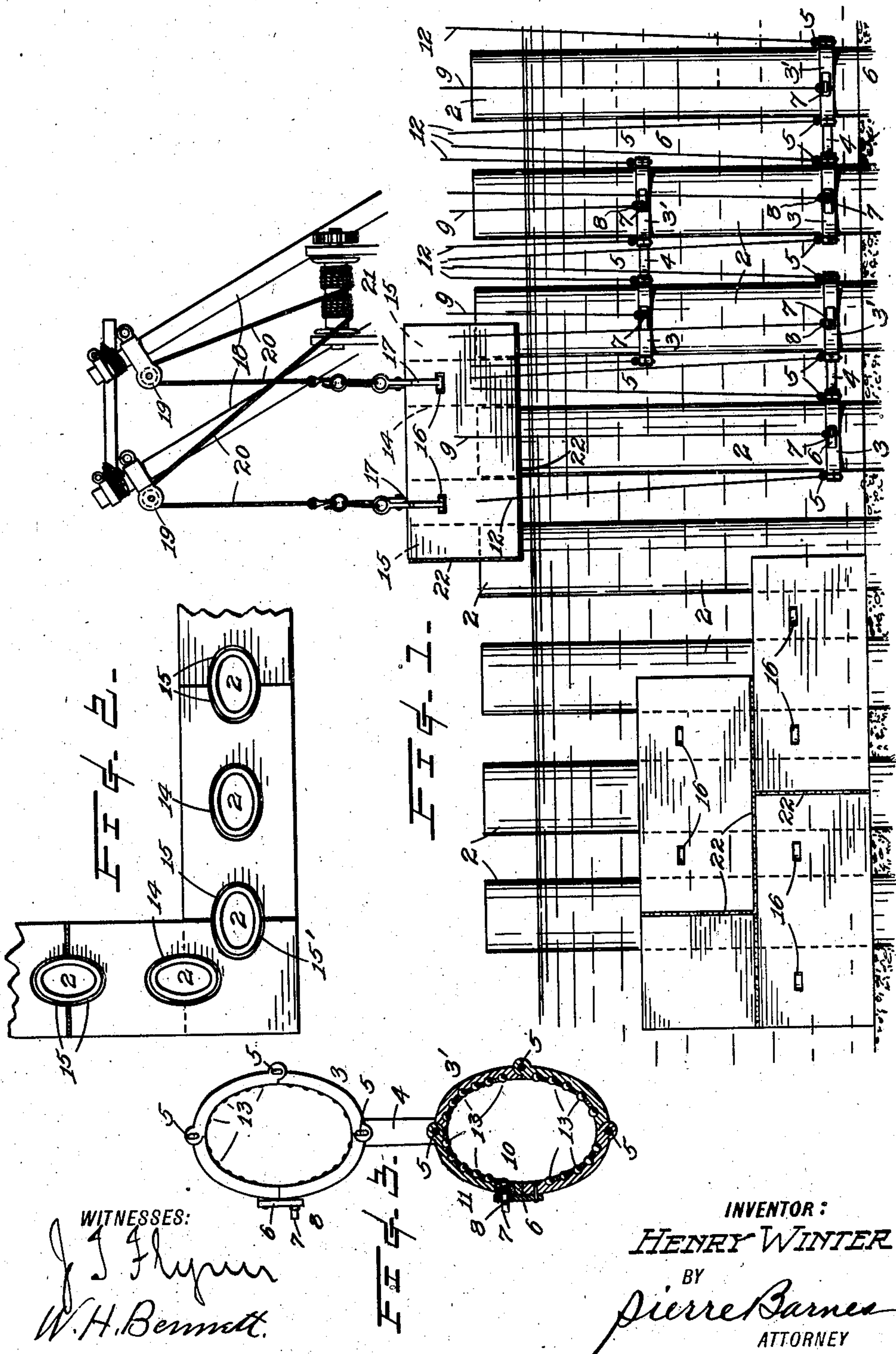


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PATENTED JULY 31, 1906.

H. WINTER.
SEA WALL.

APPLICATION FILED SEPT. 25, 1905.



WITNESSES:

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HENRY WINTER, OF SEATTLE, WASHINGTON.

SEA-WALL.

No. 827,279.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, HENRY WINTER, a citizen of the United States, residing at Seattle, in the county of King and State of Washington, have invented certain new and useful Improvements in Sea-Walls, of which the following is a specification, reference being had therein to the accompanying drawings, in which—

Figure 1 is a front elevation of a sea-wall embodying my invention and shown in course of construction. Fig. 2 is a fragmentary plan view of the same; and Fig. 3 is an enlarged plan view, partly in section, of one of the pile-positioning yokes shown in Fig. 1.

This invention relates particularly to sea-walls or piers which are either partly or entirely submerged; and its object is the improvement in the construction of such walls.

The invention consists in the novel construction of the wall-blocks and the combinations thereof with the guide-columns, whereby they may be accurately predeterminedly laid in position, as hereinafter described, and pointed out in the claims.

In the drawings the reference-numeral 2 designates columns or piles, which may be of any suitable shape or material and where it can be conveniently done are driven or otherwise sunk into the bottom or ground. When, however, this cannot be readily accomplished, as in a rocky bottom, the piles may be maintained in upright and proper positions by the employment of yoke devices, which I will presently describe, and guy-lines leading from anchors or the like. Under the last-mentioned condition concrete in sacks can be deposited about the lower ends of the piles and likewise filled into them when low to increase their weight.

The piles are disposed in a row equidistantly apart and in parallelism by the use of said yoke devices or their equivalent. These yokes are severally comprised of a pair of collars 3 3', having internal openings of similar shape, but somewhat larger than the cross-sectional shape and size of the piles, and each such pair of collars is fixedly connected together by a distance or tie bar 4.

The collars are severally made openable by forming each of a plurality of pieces connected by hinge-joints, as at 5, and by a hasp 6 of one section engaging over a slotted pin or eyebolt 7, provided on the adjacent section.

The collars are locked in their closed condition by forelocks or keys 8, passing through the

respective said pins and which may be most conveniently withdrawn therefrom by lanyards 9, connected to the keys and leading to a scow or elsewhere above the water and within convenient reach of the operator. To insure the quick opening of the collars when the locking-keys are thus withdrawn, a spring 10 (see Fig. 3) may advantageously be interposed in each between its hasp and the bottom of a cavity 11, provided in the adjacent collar part. As above mentioned, the purpose of the yokes is to retain the piles in proper position, and the yokes can be held in predetermined positions thereon by suspending-lines 12, extending from above the water and attached to the yokes in any convenient and suitable manner, as by eyes formed in the hinge-pins 5.

Bronze or other hard-metal balls 13 are provided within the inner peripheries of the yoke-collars to present antifriction-bearings for the piles, whereby the vertical movement or adjustment of the yokes is accomplished and the piles held in suitable position to receive the wall-blocks. These blocks in horizontally straight walls or where rectangular bends occur therein, as illustrated in the drawings, are preferably parallelepipeds of equal depth, at least for each wall-course, and of equal length, desirably, and corresponding to the distance between the axes of the alternate driven piles.

Apertures 14 15 15' of greater dimensions than the piles are provided in the several blocks and are disposed so that the first-named ones, 14, will be centrally of the respective blocks and the others, 15 or 15', as the case may be, in the ends or to one side in proximity of the ends, according to whether the blocks are intended for use in a straight portion or the corner of a wall.

For reliably connecting the tackle by which the blocks are hoisted and deposited in position the latter are each desirably provided in their sides with oppositely-arranged depressions or pockets 16 for the reception of the hook-points of the slings 17. Any suitable and available apparatus may be employed for handling the blocks to place them in their permanent positions—such, for example, as is indicated in Fig. 1, wherein a pair of shears or derrick-booms 18 are represented carrying blocks or pulleys 19, through which are led hoisting-lines 20 from winding mechanism 21 to the aforesaid slings or block-grappling devices.

Where the blocks are exceptionally large or heavy, additional grappling devices may be utilized and can engage with a block beneath its lower side edges; but where such supplemental grapples are used they must obviously be removed prior to the landing of a block in place, as through the medium of a trigger controlled from the scow or place where the operations are controlled.

Under certain conditions, as in the construction of the walls of a dry-dock, it is important that the wall should be put together in such manner as to prevent the passage of water therethrough. This can be attained by the closing of the seams or interstices of the wall with cement, which is desirably spread, while newly mixed, over the juxtaposed faces of blocks immediately before lowering them upon or against the previously-laid blocks. A very convenient and satisfactory way of thus applying the cement is to fill a coarse-mesh fabric, such as quilted burlap, with the same and secure it to the block-faces, as at 22, by wire or strong yarn.

Where the bottom upon which a wall is to be erected is out of horizontal or hummocky, it can be brought to such a level condition by depositing thereupon sacked concrete. The first tier of blocks can then be laid upon the sacked cement or directly upon the ground if even, with the vertical seams closed by cement, as above described, and be followed with the superimposed courses with cement layers intervening until the wall is complete. When the wall has been raised to the required height, the space in the apertures about and above the piles, if they do not extend to the top thereof, are filled with concrete to make the wall to all practical purposes a solid one. The piles, as before mentioned, can be of any suitable material or configuration, either solid or hollow, and constructed of single pieces or of a plurality of plates or staves. As the piles are inclosed by the blocks, they are safeguarded from the corrosive action of the water and also in the case of wooden ones from the destructive attacks of teredoes. Furthermore, the surfaces of the block-apertures may, if desired, be covered with cement-charged quilted fabric to offer additional means to make the wall water-tight, as well as further protecting the piles.

It may be mentioned that where the tide is not considerable dry-docks can be constructed with walls erected in accordance with this invention by simply placing them in the required depth of water and then pumping out the inclosed space, to afterward complete the bottom and interior facings.

It is evident that with this invention no temporary dikes, bulkheads, caissons, or other like contrivances are requisite, as the work can progress directly in the water and

be so controlled as to require not even the assistance of a diver.

The advantages, among others, of the invention are the low cost of construction, availability of the material for constructing any desired shape or size of wall, convenience in manufacturing the integral parts, which may be performed at a considerable distance from the point of erection, and the rapidity with which an extensive sea-wall or dock can be constructed. This last-mentioned point is oftentimes a desideratum of importance, as in situations where from the violence of the waves or other inclement conditions, as prevail during certain seasons of the year, notably in Alaska, the periods where work can be done along the sea-coast are very brief.

I do not wish to be understood as confining myself in carrying out my invention to the specific devices hereinbefore described, for in work of the character contemplated they would be varied to accommodate themselves to each special undertaking and according to the environments and the apparatus available.

What I do claim as my invention, and desire to protect by Letters Patent, is—

1. A wall of the character described, comprising in combination blocks each having an aperture in its center and an aperture at each end and piles passing through the apertures in the centers of the block and through the apertures at the abutting ends of adjacent blocks.

2. A wall of the character described, consisting of blocks arranged in courses, said blocks having apertures at each end and piles passing through the apertures in the adjacent ends of abutting blocks.

3. A wall of the character described, consisting of parallelepiped concrete blocks arranged in courses, the blocks being arranged in the several courses to overlap those in the adjacent courses, piles passing through the various said courses and so disposed as to be at each joint of the contiguous blocks of a course.

4. A wall of the character described, consisting of parallelepiped concrete blocks arranged in courses with intervening cement filling therebetween and between the blocks of each course, the blocks being arranged in the several courses to overlap those in the adjacent courses, piles passing through the various said courses and so disposed as to be at each joint of the contiguous blocks of a course.

5. A wall of the character described, consisting of parallelepiped concrete blocks arranged in courses, the blocks being arranged in the several courses to overlap those in the adjacent courses, piles passing through the various said courses and so disposed as to be at each joint of the contiguous blocks of a course and also intermediate thereof.

6. A wall of the character described, consisting of parallelepiped concrete blocks arranged in courses with intervening cement filling therebetween and between the blocks
5 of each course, the blocks being arranged in the several courses to overlap those in the adjacent courses, piles passing through the various said courses and so disposed as to be at

each joint of the contiguous blocks of a course and also intermediate thereof. 10

In testimony whereof I affix my signature in presence of two witnesses.

HENRY WINTER.

Witnesses:

PIERRE BARNES.

J. T. FLYNN.