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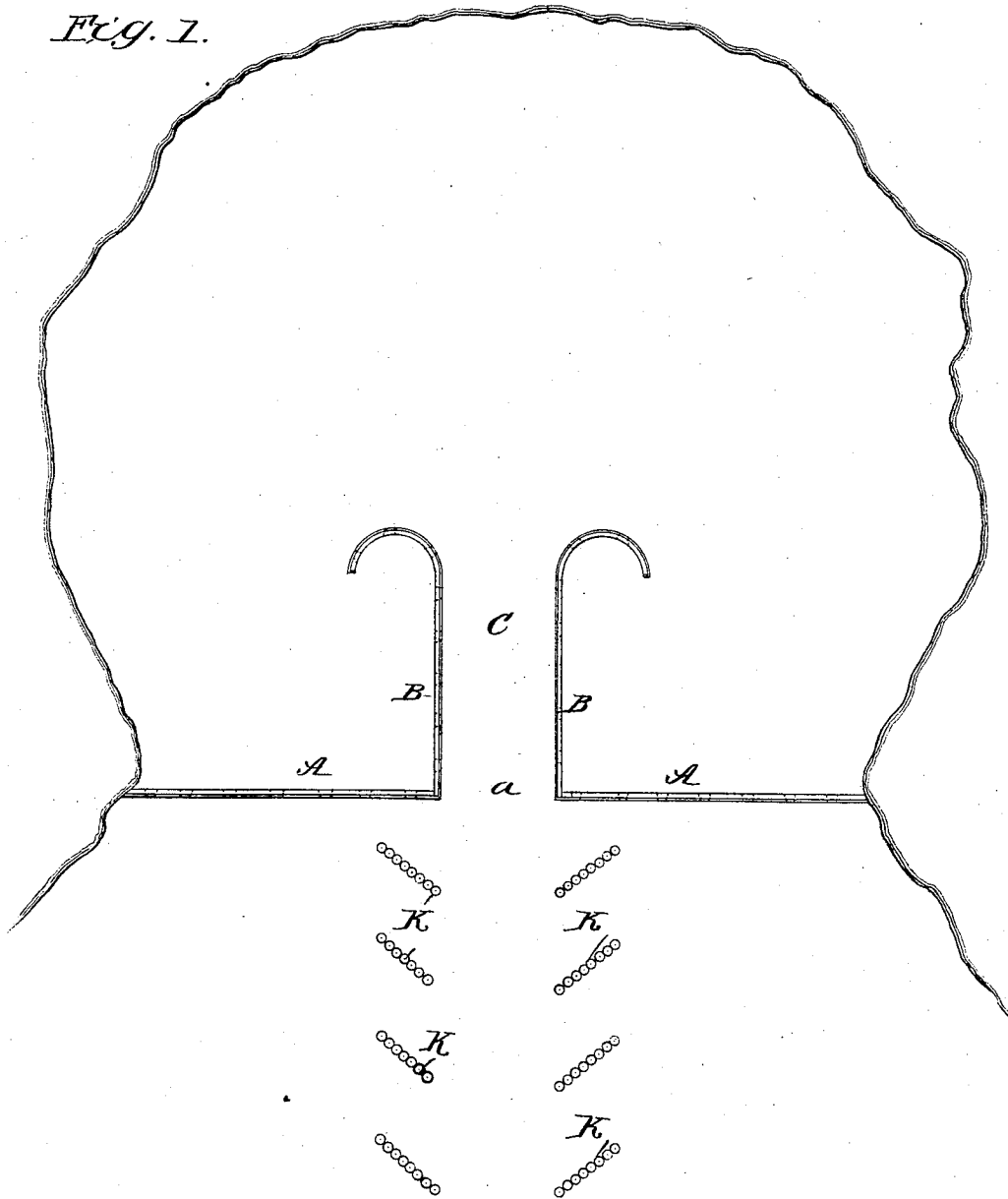
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R. H. F. & N. H. SEWALL.
HARBOR.

No. 479,309.

Patented July 19, 1892.

Fig. 1.



WITNESSES:

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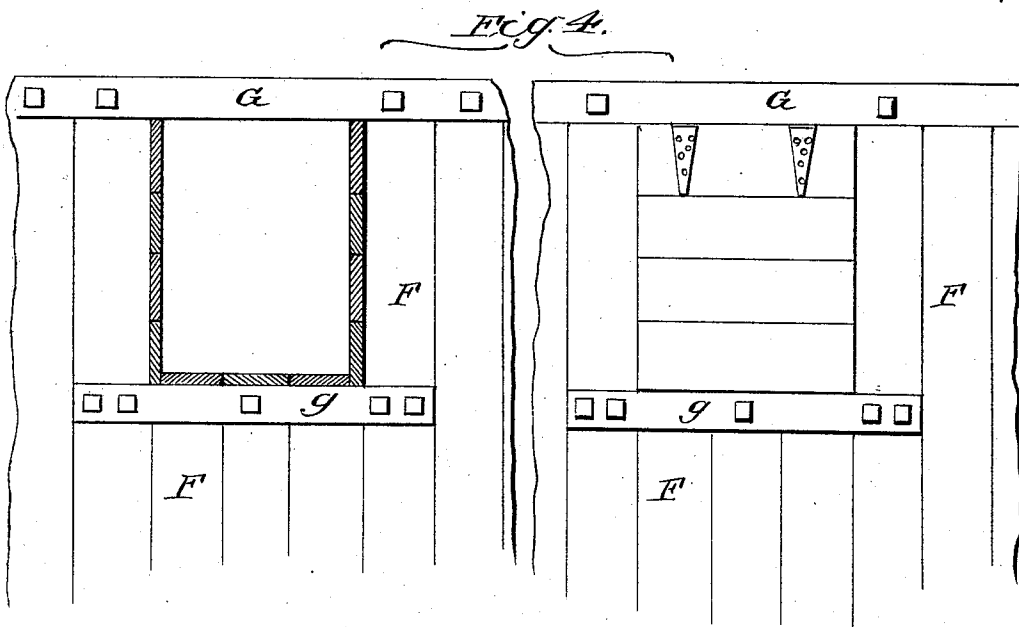
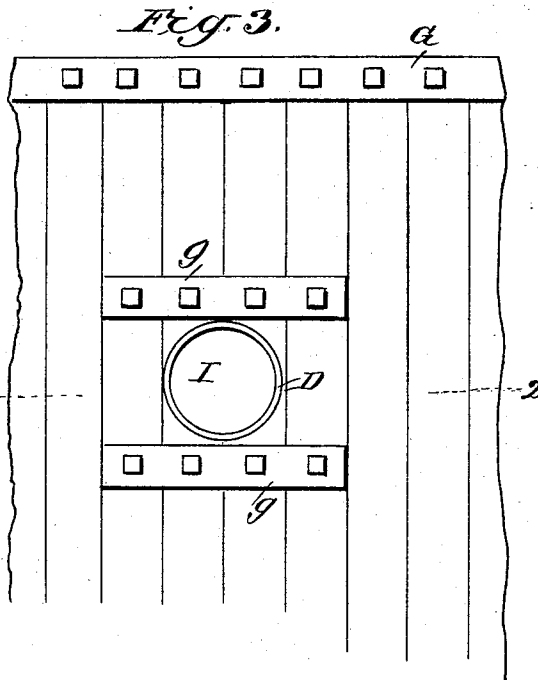
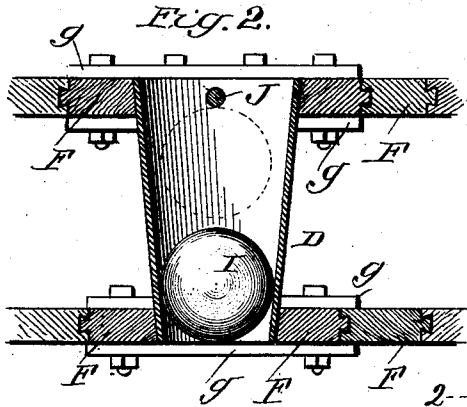
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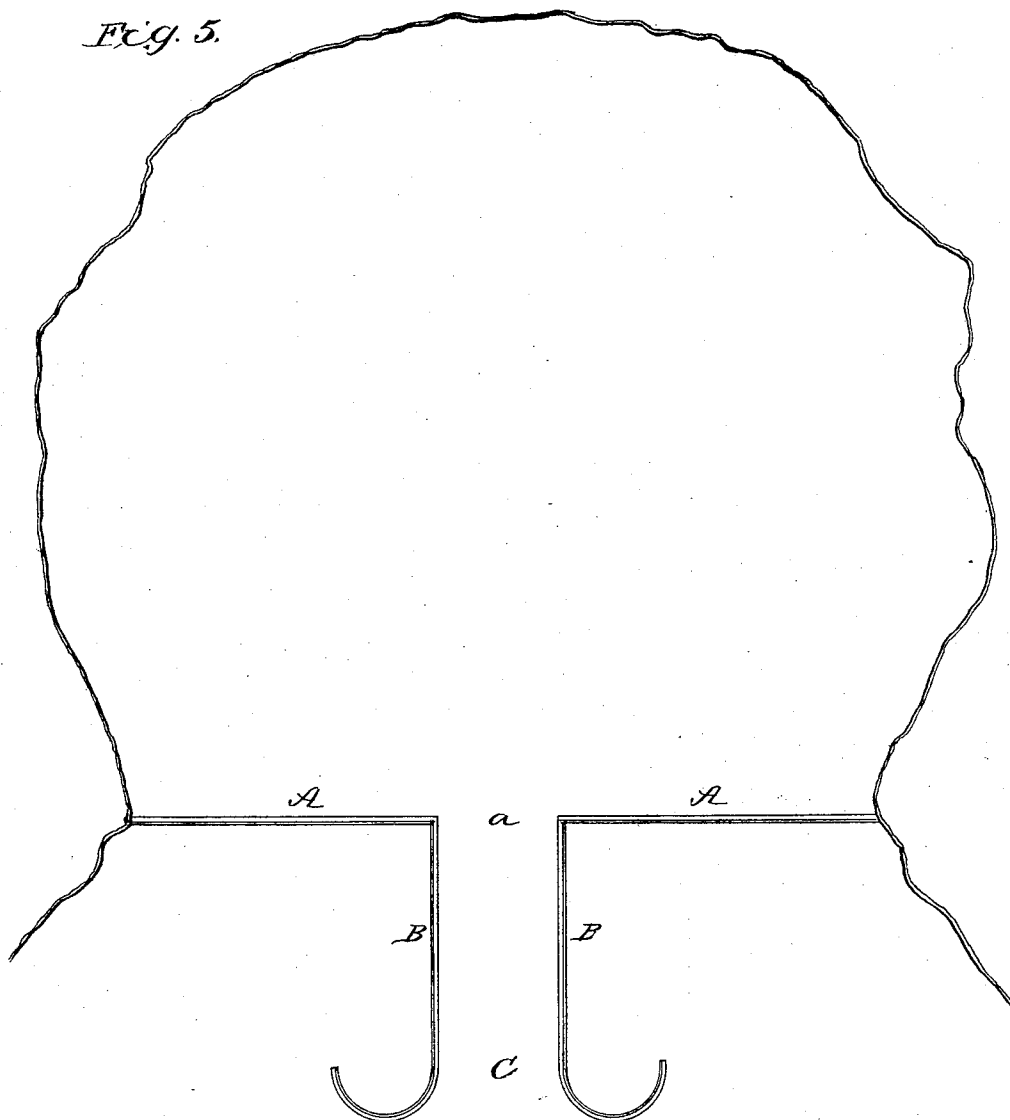
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Fig. 5.



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UNITED STATES PATENT OFFICE.

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HARBOR.

SPECIFICATION forming part of Letters Patent No. 479,309, dated July 19, 1892.

Application filed July 6, 1891. Serial No. 398,491. (No model.)

To all whom it may concern:

Be it known that we, ROBERT H. F. SEWALL and NICHOLAS H. SEWALL, of Bessemer, in the county of Jefferson and State of Alabama, have invented a new and useful Improvement in Harbors, of which the following is a specification.

This invention is an improvement in harbors, and seeks to provide a strong durable construction so arranged as to furnish ample wharf space and facilities, and also so that the ebb and flow of the tide, as well as the force of the waves, are utilized to establish, deepen, and maintain the channel and depth of the harbor or anchorage and the channel thereto.

The invention consists in the novel constructions, combinations, and arrangements of parts as will be hereinafter described, and pointed out in the claims.

In the drawings, Figure 1 is a diagrammatic top plan view of a harbor provided with our improvements. Fig. 2 is a horizontal sectional view taken on line 2 2 of Fig. 3 to show one of the flumes and valves. Fig. 3 is a face view of a part of the harbor-wall. Fig. 4 shows the form of flume and flume-valve employed in constructing the harbor-wall, and Fig. 5 shows a different arrangement of the channel-wings from that shown in Fig. 1.

In arranging the harbor-wall when the bar is comparatively near to land it is preferred to arrange the main portions of the wall and the wings thereof as shown in Fig. 5, while in cases where the bar is far out from the land and the artificial channel of great length the wings of the wall may be turned in toward land, as shown in Fig. 1, instead of running out to sea, as shown in Fig. 5. The main portions A A of the wall preferably lead out from shore in a straight line and are separated at their inner ends by a channel or opening *a* of the desired width. Usually one hundred feet will be sufficient. From the inner ends of the portions A the wings B are extended, forming the channel-way C, the said wings B being extended parallel, or approximately so, as shown. The wall is provided with flumes D and check-valves I, such flumes being arranged just above the low-tide mark, and the valves are arranged to open inward, so that the flow of the tide may pass through the flumes, but the tide will ebb entirely through the channel-way. The result of such operation will be

the scouring and deepening of the channel by the ebbing of the tide, as there will be but the slight normal flow of the tide in through the said channel; but the entire tide accumulation in the harbor will ebb out through the narrow channel with a rapid rush, carrying out all sand, silt, and other accumulations in the said channel. It will also be understood that dredgings from the harbor may be deposited in the said channel and will be carried out to sea by the outflow from the harbor.

In forming the walls we employ piles F, driven close alongside each other and dove-tailed together, as shown. These piles are driven in two or more rows a suitable distance apart to provide a wharf or pier of the desired width, and the piles of each row are braced at their upper ends by stout collar-beams G, firmly bolted on the opposite sides of the upper ends of the piles, as shown. During the construction of the harbor-wall we employ the wooden flumes and gate-valve, as shown in Fig. 4, in which the flume is a wooden tubular water-way and the valve a gate hinged at its upper edge at the inner end of the flume.

The openings for the flumes are provided by driving at intervals several shorter piles and bracing such short piles together and to the adjacent longer piles by means of short collar-beams *g*. These wooden flumes are only used while the piles are being driven. When such operation is completed, the wooden flumes and their valves are removed and metallic funnel-shaped molds or flume-casings, extending from side to side of the wall, are inserted with their large ends toward the harbor. The water is now pumped out and concrete is filled in between the walls and around the mold or casing, and when hardened or set forms a solid wall with the conical or flaring flume-openings. In these flumes are placed ball-valves I, which are preferably turned from marble or other suitable stone, so they will not corrode, the said balls being too small to escape from the small end of the flumes and being prevented from escaping at the larger end thereof by means of cross-bars J, grating, or other suitable means, as desired. This construction, it will be seen, permits the flow of the tide in through such flumes, but prevents the outflow or ebb there-through, and forces the same to pass out

through the channel-way with the result before described. Manifestly the wall may be of such width as to form a wharf, on which drays, &c., may run, and, when desired, a railroad may be built thereon, so that cars can be run out on the wharf and loaded and unloaded thereon, as desired.

When the bar is far out from the land and the artificial channel is required to be of comparatively great length, it may be preferred to run the wings in toward the shore and to curve or deflect the ends, as shown in Fig. 1, and in such arrangement the channel-wings are also provided with the valved flumes, which serve to greatly reduce the rush of the tide in through the channel-way by permitting part of the inflow of the tide to pass through the said flumes, as will be readily understood. In the use of this arrangement of the wings the sand can be readily pumped from the harbor into the channel, whence it will be carried to sea by the force of the ebbing tide. Spur dikes K are arranged in two rows outside the wall, the said rows being on opposite sides of the line of the channel and the dikes being arranged at angles to such line, as shown, so that they will concentrate the current when running out and scatter or dissipate it when running in, so as to deepen the channel in line with the channel-way C and to cause natural banks of sand to form on each side and form a well-defined channel in the course of time.

By our invention a good harbor can be economically made and maintained at any place where the bottom is of sand or silt.

Having thus described our invention, what we claim is—

1. In an improved harbor, a wall provided with openings made circular in cross-sections and the check-valve consisting of a ball movable within said opening, all substantially as and for the purposes set forth.

2. An improved harbor having main wall portions and channel-wings or portions extended from the adjacent ends of said wings, the said main wall portions being provided with flumes and with inwardly-opening check-valves, all substantially as and for the purposes set forth.

3. In a harbor, a wall composed of a plurality of rows of piles, tubular flumes extending through the wall, a filling of concrete between the rows of piles and around the flumes, and inwardly-opening check-valves controlling the said flumes, all substantially as and for the purposes set forth.

4. An improved harbor comprising the main wall portions provided with flumes and with check-valves controlling the same and the wings extended in parallel lines and projected from the adjacent ends of the main portions, all substantially as and for the purposes set forth.

5. An improved harbor comprising the main wall portions having flumes and check-valves, channel-wings extended from the adjacent

ends of the main wall portions, and dikes arranged in rows on opposite sides of the channel-line and inclined with respect to said line, substantially as described, and for the purposes set forth.

6. An improved harbor comprising the main wall portions provided with flumes and check-valves and the channel-wings extended from the adjacent ends of the main portions inwardly toward the land, substantially as set forth.

7. In a harbor, a wall composed of a plurality of rows of piles, the rows being separated by an intervening space, tapering tubular flumes extended between said rows of piles and opening at their opposite ends through the same, ball-valves movable within said tapering flumes, whereby they may operate as check-valves, and retaining devices whereby the said balls are held from escaping from the large ends of the flumes, all substantially as and for the purposes set forth.

8. In an improved harbor, the combination, with the main wall portions, of the channel-wings extended from the adjacent ends of the main portions inwardly toward the land, the said main portions being provided with flumes and with check-valves controlling the same, substantially as set forth.

9. In a harbor, a wall formed of side piles, a metal flume-casing extending from side to side thereof, a ball-valve in said casing, and concrete filled in between the side piles and around the flume-casing, substantially as set forth.

10. In a harbor, substantially as described, the combination, with the main wall portions having side piles, flumes, and concrete filling and provided with inwardly-opening check-valves controlling the said flumes, of the channel-wings extended from the adjacent ends of the main wall portions, all substantially as and for the purposes set forth.

11. In a harbor, the combination, substantially as described, with the main wall portions having openings and inwardly-opening check-valves controlling the same, of the channel-wings extended from the adjacent ends of the main wall portion, said channel-wings being also provided with openings and inwardly-opening check-valves controlling the same, substantially as and for the purposes set forth.

12. In a harbor, substantially as described, the combination of the main wall portion, the channel-wings extended from the adjacent ends of the main wall portions, and the spur dikes arranged outside the main wall and extended in rows on opposite sides of the line of the channel and at an angle to such line, all substantially as and for the purposes set forth.

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Witnesses:

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GEO. O. WARREN.