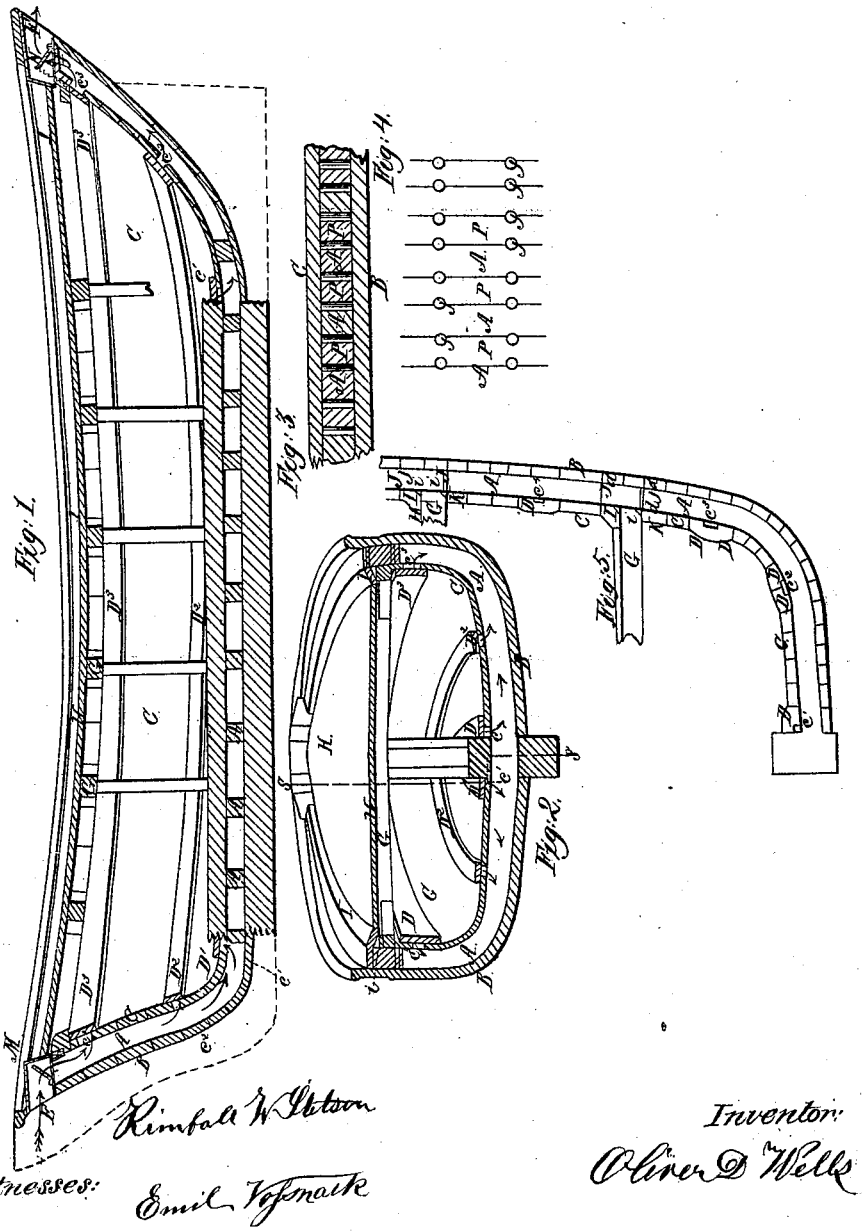
O. D. Wells,

Ventilating Ships,

No. 51,504. Patented Dec. 12, 1865.



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OLIVER D. WELLS, OF WESTERLY, RHODE ISLAND.

IMPROVED APPARATUS FOR THE VENTILATION OF SHIPS.

Specification forming part of Letters Patent No. **51,504**, dated December 12, 1865.

To all whom it may concern:

Be it known that I, OLIVER D. WELLS, of Westerly, in the county of Washington and State of Rhode Island, have invented certain new and useful Improvements in Means for Ventilating and Preserving the Material of Ships and other Vessels; and I do hereby declare that the following is a full and exact description thereof.

The accompanying drawings form a part of this specification.

Figure 1 is a longitudinal vertical section on the line S S in Fig. 2. Fig. 2 is a transverse section. Fig. 3 is a horizontal section of a portion of one of the sides on a larger scale. It is taken on the line of one of the water-tight horizontal partitions, which I designate by the letter J. Fig. 4 represents a corresponding vertical section through the timbers, showing the method of forming the partition J. Fig. 5 is a vertical section of one of the sides between the timbers, showing the best method known to me of forming the passages *c* and *i*. It also shows the position of the partitions J relatively to the deck-beams.

Similar letters of reference indicate like parts in all the figures.

Tints are employed to aid in distinguishing parts, and do not imply a difference of material. The entire wood-work may be oak or any other suitable wood.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation by the aid of the drawings and of the letters of reference marked thereon.

A represents the timber frame-work of a vessel; B, the outside skin or planking, made tight by the ordinary means, and C D an inner skin, made equally tight by corresponding means. The entire frame-work and skin of the vessel is represented as greatly increased in thickness above that required in practice, in order the more plainly to indicate the parts, Figs. 1 and 2. The inner skin, C D, is not in a continuous layer, like the outer skin, B. There are, on the contrary, lines or openings at different levels, each extending the entire length of the ship, and each tightly and strongly covered by a plank fitted on so as to lap over upon the adjacent planks and form a tight and strong connection therewith. The openings or breaks in the inner skin are represented respectively by c' c^2 c^3, &c., and the planks which cover them are represented respectively by D′ D² D³. The openings c' c^2 c^3, thus provided within the inner line of the timber-framing A, afford a free circulation for air through the spaces between the timbers of the entire hull.

E and F are boxes or cases, of cast-iron or other suitable material, fixed in the hull at or near the level of the deck, with their open mouths presented horizontally outward, as represented. In the bottom of each is a hole, which allows the air to pass freely down between the timbers. The hole *e* in the box E is guarded by an ample valve, M, which is, under ordinary circumstances, held up by a coiled spring, *m*. The hole *f* in the bottom of the box F is guarded by a valve, N, which is held up, under ordinary circumstances, by the coiled spring *n*. The tension of each spring *m* and *n* is sufficient to sustain the weight of the valve, and also to resist the force of the wind; but when, under any circumstances, the box becomes filled with water, as by the plunging of the vessel or the rise of the waves in a heavy sea, the weight of the water pressing on the valve compels the spring to yield, and the valve closes and prevents the water from flowing down from the box into the frame-work of the vessel. This valve may be closed by hand, if desired, and secured after the manner of the glass dead-lights ordinarily used on shipboard.

In all the figures, G G are the deck-beams, and H the deck. I is a water-way, extending around the deck in the ordinary manner, but cut away on its under side, so as to leave a capacious channel, *i*, beneath it. K is the clamp upon which the deck-beams G rest, and above this is a corresponding channel, *i'*. These channels *i i'* extend the entire length of the vessel, and communicate at the bow and stern with the boxes E and F, or with analogous boxes provided for the purpose and similarly guarded against the entrance of water. I provide the passages *i* both above and below each deck, arranged as represented in Fig. 5, and also provide one or more passages, *c*, between each deck. The provision for the passages c' c'', &c., shown in Fig. 5 is worthy of notice. In this figure two planks, D D, are made thicker than the rest in the inner planking, and a rabbet of square section is cut from the inside corner of each, where they abut to-

gether. The seam is tightly calked. This leaves a hollow groove or channel, *c*, beneath, extending the entire length of the ship. This construction I generally prefer to the form shown in Fig. 1.

A portion of the advantage of my invention may be realized by dispensing with the boxes E F and connecting the several passages, *i i' c' c²*, &c., with the open air at the bow and stern by means of simple pipes opening inside the bulwarks above the main or upper deck. In case such method is adopted provision must be made for closing the pipes connecting with the passages *i i'*, because these do not open into the water-tight compartments, but connect over the lodge-knees and covering-knees with the interior of the vessel. Care should be taken to see that they are always shut when in danger of receiving water. The passages *c' c² c³*, &c., may be left open all the time with safety, if desired.

The air, entering by the force of the wind or by the motion of the vessel, or by both causes, into the box E, passes down through the opening *e* and circulates through the longitudinal spaces *c' c² c³*. In case water stands in the bottom of the vessel, so as to obstruct the passage *c'*, the spaces above are freely ventilated by the remaining channels, *c² c³*, &c. The air entering at either of these points may circulate freely downward between the timbers to the surface of the water and upward between the timbers and between the chocks P to the partition J at the top of the clamp K. The circulation of air thus induced or provided for tends very effectually to preserve the timbers under all ordinary circumstances.

The water-tight partitions above and below each deck are provided in the following manner: Chocks or balks of timber P, Fig. 3, are introduced between the timbers of the vessel, after which large holes are bored through between them and the timbers in such position as to cut partly into both timber and balk, as is shown in Figs. 3 and 4. These holes are bored in a line with the top of the clamp K, on which the deck-beams rest, and also in a line with the top of the water-way I above. Cylinders of wood, *j*, are then driven tightly through these holes and sawed off even with the edge of the timbers, both at the outer and inner side. After the clamp has been attached the joint *d* between it and the timbers A and balks P is tightly calked, and also the corresponding joint between the timbers and the planking outside. After the deck-beams G are secured and the water-way I bolted on, the joint *d* between it and the timbers and balks is tightly calked, and the same operation again repeated on the outside between the timbers and the planking B. These water-stops *j* and lines of calking or equivalent water-tight packing *d* form tight partitions, which I designate collectively as J, in the sides extending along the whole length of the vessel, so that the portion of the sides above and below these partitions may be filled with water without disturbing or in any way interfering with the interior of the vessel or any other portion of the sides thereof.

I propose to employ two sets of pumps to rid my vessel of water, one to communicate with and pump out the hold of the vessel within the inner skin, C D, and the other to pump the space between the two skins.

Some of the advantages due to certain features of my invention may be separately enumerated as follows:

First, by reason of the fact that the inner skin, C D, is tightly fitted and calked, my vessel is able to endure the destruction of a considerable portion of the planking or ordinary outer skin, B, without endangering its safety; and by filling between these skins with water I prevent the outer works above the water-line from drying up and becoming shrunken when exposed to a hot sun for a long time. It also affords me great facility for saturating the planks and timbers with brine or other preserving-fluid by filling the spaces between them with such fluid. I also prevent the choking of the pumps by dirt working through from the inside or hold of the vessel, and insure that the cargo shall not be injured by having the water blown over it from the seams in the ceiling in rough and stormy weather. The calking of the inner skin also considerably braces and stiffens the vessel.

Second, by reason of the fact that the water-tight partitions J divide the walls of the ship into tight compartments, I am able to fill one particular portion of the walls of the ship with brine or other liquid without its passing to other parts of the vessel. The partitions J, formed by driving the treenails or coags *j* between the timbers A J, as described, prevent brine or other liquid from passing down within the sides from between the decks, so as to reach the spaces *i*, from where it could pass over the lodge-knees and covering-knees to the interior of the vessel. It also provides against disaster by injury to any one part by preventing any flow of water from one part to the other.

Third, by reason of the fact that the inner skin, C D, does not fit tightly to the timbers A over their whole inner surface, but leaves considerable spaces *c* formed in the planking, extending the entire length of the vessel and connected with the open air at each end, I am able to insure an ample passage for air, and to avail myself of the lateral motion or swash of the water between the two skins induced by the rolling of the vessel, to promote a circulation of the air by alternately forcing it out and drawing it in, without detracting from the strength of the timbers or tightness of the work.

Fourth, by reason of the fact that the passages *i i'* extend longitudinally both above and below the deck, as represented, I am able to insure a passage for the air in contact with the ends of the deck-beams and knees and timbers connected therewith, thereby tending to preserve them from decay.

Fifth, by reason of the fact that my airways

E F open horizontally outward and are guarded by valves M N, arranged as represented, I am able to render available the force of the wind to impel currents of air through and along the framing of the vessel, both when at anchor and in motion, and to exclude the water in case waves rise sufficiently high to strike the same.

Having now fully described my invention, what I claim as new therein, and desire to secure by Letters Patent, is as follows:

1. The interior tight skin, C D, arranged relatively to the timber framing A and to the tight planking or outer skin, B, substantially in the manner and for the purpose herein set forth.

2. The tight partitions J, formed in the sides of a vessel, substantially in the manner and for the purpose herein set forth.

3. The airways *c* between the parts D and A, arranged relatively to each other and to suitable means of receiving and discharging the atmospheric air, substantially in the manner and for the purpose herein set forth.

4. The passages *i*, formed longitudinally above and below the deck of a vessel, substantially in the manner and for the purpose herein set forth.

5. The airways E F and valves M N, mounted in a vessel, and arranged relatively to each other and to suitable passages for the movement of air through the frame-work of the vessel, substantially in the manner and for the purposes herein set forth.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

OLIVER D. WELLS.

Witnesses:

KIMBALL W. STETSON,

EMIL VOSSNACK.