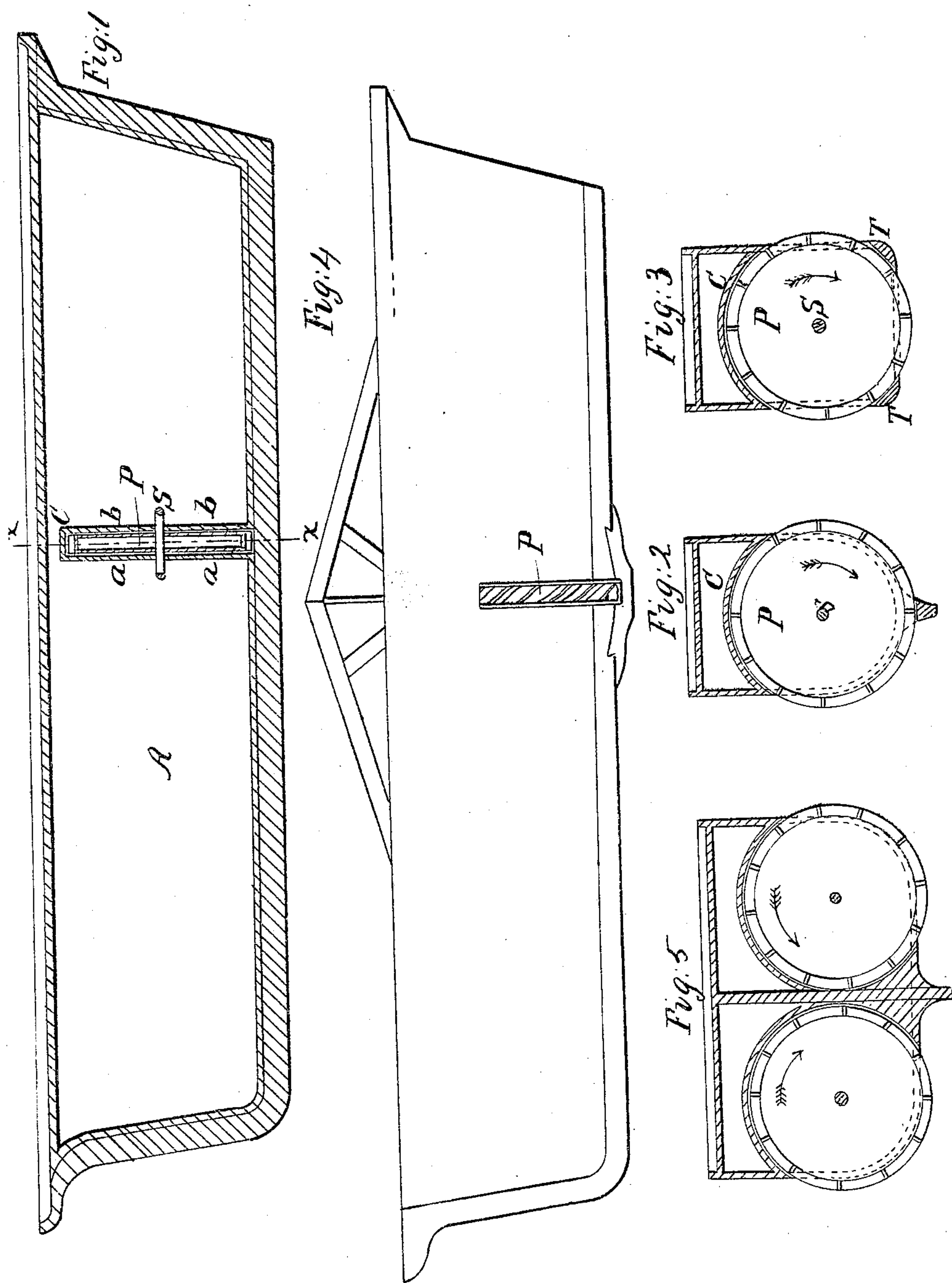


*R & T. Winans.*

*Screw Propeller.*

*No. 21,919.*

*Patented Oct. 26, 1858.*





# UNITED STATES PATENT OFFICE.

ROSS WINANS AND THOMAS WINANS, OF BALTIMORE, MARYLAND.

## IMPROVEMENT IN CONSTRUCTION OF OCEAN STEAMERS.

Specification forming part of Letters Patent No. 21,919, dated October 26, 1858.

*To all whom it may concern:*

Be it known that we, ROSS WINANS and THOMAS WINANS, of the city of Baltimore, in the State of Maryland, have invented a new and useful Improvement in Ocean Steamers; and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, which form part of this specification, and in which—

Figure 1 represents a vertical longitudinal section through a vessel embracing our improvement. Fig. 2 represents a vertical transverse section of the same through the line  $xx$  of Fig. 1. Fig. 3 represents a similar section through a vessel of a form different from that shown in Fig. 2, but also embracing our improvement; and Fig. 4 represents a side view of a vessel embracing our improvement and is intended to show how its hull may be strengthened; Fig. 5, a modification to be referred to hereinafter.

Our invention relates to the improvement of ocean steamers not essentially different in form from those hitherto in general use.

In an application for another patent made simultaneously with the application for this we have described an arrangement which we deem the most advantageous for giving a nearly uniform speed to vessels having spindle-shaped hulls, and our present invention is intended to give the same advantages, as far as possible, to vessels having hulls of the usual form. This end we accomplish by fitting the vessel with a water-tight trunk for the accommodation of a vertical transverse propelling-wheel of larger size than could advantageously be used under any plan heretofore devised.

The hull  $A$  of the vessel has a transverse opening through its lower part of sufficient size to accommodate the wheel presently to be described. This opening is most advantageously placed at that part of the length of the vessel at which side paddle-wheels are placed, which is generally nearer the stern than the bow. This space is inclosed before and behind by water-tight partitions  $a\ b$  and covered by a water-tight roof  $C'$ , forming a trunk open below. A propeller  $P$  is arranged in this trunk in such manner that its blades will project out of the trunk beyond the surface of the vessel at the bottom and in both sides. The shaft  $S$  of the propeller passes

through suitable stuffing-boxes in the partitions  $a\ b$  and derives motion from a steam-engine, with which it may be connected by a crank at either end.

The body of the propeller-wheel may be made in any way in which strength and lightness are combined. We propose, however, to fasten the screw-blades upon the periphery of a drum fastened to the shaft. In this way nearly the whole cavity of the trunk will be occupied by the drum of the wheel, which should be water-tight to give it buoyancy. In the form of vessel shown in Figs. 1 and 2, in which the blades of the propeller project at the sides and bottom, but not beyond the line of the keel, the keel itself and the timbers or frame-work adjoining it may be strengthened to give the requisite stiffness and strength to the bottom of the hull, thus compensating the want of continuity in the sides in the part occupied by the trunk. That portion of the hull which is above the trunk may also be strengthened by a truss or other framing in a manner similar to that in which long river-boats are stiffened, as shown in Fig. 4.

In some cases it might be deemed advisable to allow the propeller to project below the straight line of the keel and to bend or curve the keel, or to place timbers or frame-work below to strengthen the hull, and thus retain the advantages of a continuous keel.

In vessels with flatter bottoms (such as the one shown in section in Fig. 3) the blades of the propeller may project at the bottom below the line of the keel as well as beyond the sides, and in such a case the desired strength might best be given not by strengthening the keel, but by beams  $T$  on either side of the bottom. This improved arrangement of the propeller may be applied to vessels already built; but it is evident that it will be most advantageous to adapt the structure of the vessel originally for the reception of the trunk, strengthening-framing, and other new parts. If the vessel should be constructed with reference to the employment of a trunk and propeller of this kind, the section of the hull below the water-line in the parts adjacent to the trunk should be made concentric with the propeller at as many points as possible, in order that the greatest area of propelling-surface may be projected.

When a vessel constructed as above de-



scribed rolls or keels over to one side from the force of the wind, if a portion of the propeller be lifted out of the water on one side a corresponding portion is immersed on the other side, and the same is true when the vessel on an even keel is passed by waves, causing an elevation of the surface of the water on one side and a depression on the other. In either case nearly the same proportion of the propeller will remain immersed, thereby giving a more uniform rate of progression to the vessel when it rolls or is in a heavy sea than could be obtained with side wheels. A trunk arranged in this way also permits the use of a propeller of greater diameter than could otherwise be used in vessels of similar form; but the advantages which result from the use of a screw-propeller of large diameter are more particularly described in the before-mentioned application for another patent, and need not therefore be described here.

Our improved mode of construction will permit the use of a short shaft, for the propeller is brought near to the engine or engines, the most advantageous position for which when large and powerful, as in ocean-steamers, is adjacent to the best position for the trunk and propeller. An engine may be placed either before or behind the trunk, or two may be used—one before and the other behind it. In either case we attain a far greater compactness of arrangement in the machinery than is possible with the ordinary stern or quarter propeller. The advantages of our arrangement of the engines are more fully set forth in an application for another patent made simultaneously with the application for this.

The position of the wheel within the hull dispenses with the frame-work required to support the shaft and blades of a stern-propeller, and this is advantageous, as all such frames add resistances to the motion of the vessel. In our improvement the hull itself affords the support, and no other resistance is superadded. The pitching of the vessel cannot under our improved arrangement lift the wheel out of the water and immerse it alternately, as may happen when it is at the stern, and thereby cause shocks in the machinery similar to those caused by rolling when side wheels are used.

The trunk has been described as placed not far from the middle of the vessel, this position being considered by us as the most advantageous; but if it should for any reason be deemed advisable it may be placed in other parts of the length of the hull, the general advantages being retained so long as it is kept within the hull.

We have described above a single transverse propelling-wheel as the most suitable for carrying out our invention when the relative depth and width of the vessel are such as to admit a propelling-wheel of such size that its blades will project from both sides of the hull; but in certain forms of vessels, the

breadth being much greater than the depth, it would be more convenient to use two transverse propelling-wheels arranged side by side in the trunk, and for the purpose of strengthening the vessel a central partition might pass through the middle of the trunk to any distance fore and aft of it, and it might extend from the keel upward to any required height. This modification enables us readily to apply many features of our improvement to wide and comparatively flat-bottomed vessels and with great advantage, although not with the full effect which results from its application to vessels of forms better adapted to its use.

Various arrangements have been made for the accommodation of wholly or partially immersed propellers; but none of these attain all of the advantages which we propose to gain. Thus two submerged propellers have been placed low in the hull of the vessel, one on each side. In this case the diameter of the wheels cannot be as great as in our plan, and a more rapid motion of the engine is required. Again, a vertical longitudinal trunk has been used in the hull to inclose a paddle-wheel projecting through the bottom; but such an arrangement of the paddle-wheel has never been made with practical success, nor would our propelling-wheel so arranged be practically successful. A vertical transverse propeller has also been placed in the "dead-wood" at the stern; but this position limits its size, and it cannot be made, as ours is, of a diameter limited only by the width or depth of the hull; and the parts which require to be added for the support and protection of the wheel present resistance to motion through the water in addition to that of the hull itself, which additional resistance we avoid by placing the trunk and the supports for the wheel within the hull.

We are aware that it has been proposed to use an annular propeller revolving around a vessel; but such a form, from the great amount of friction produced and its liability to distortion, owing to its want of strength, could not be employed with success. Besides, our invention is easily distinguished from such a contrivance, as this refers only to a propelling-wheel which has a continuous radial support from the axis of rotation. All such arrangements are therefore essentially different from ours; and

We claim under this patent as our invention—

The combination of a vertical transverse trunk within the hull of a vessel with a screw-propeller of large diameter whose blades shall project beyond the outline of the hull, substantially as herein set forth.

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Witnesses:

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