Oct. 29, 1940. J. D. WILLIAMS 2,219,461

WINDOW CONSTRUCTION

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Fig. 1.

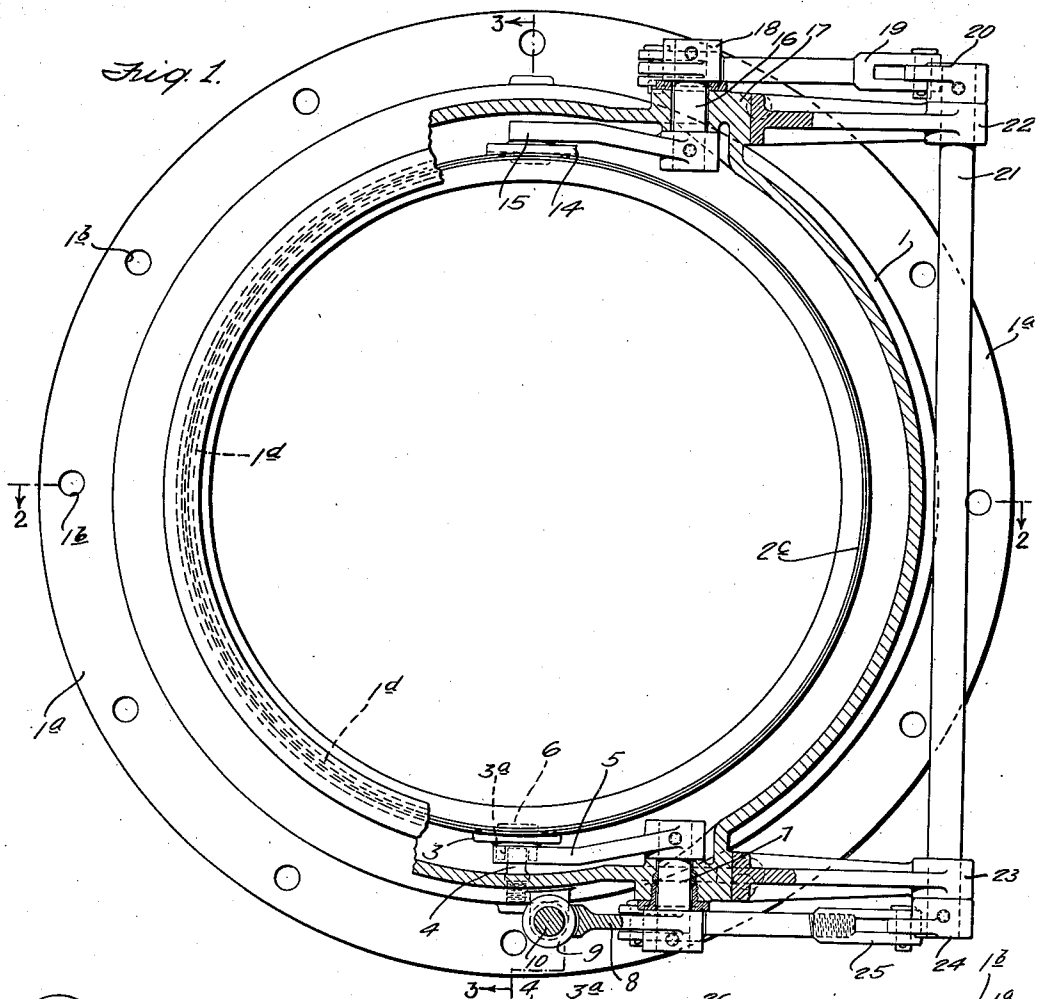


Fig. 2.

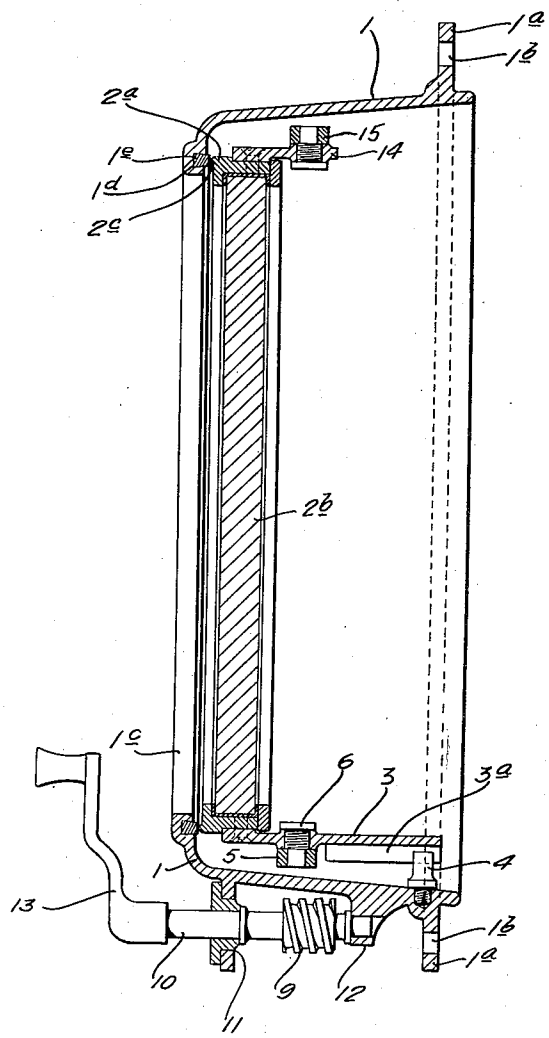
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Fig. 3.



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WINDOW CONSTRUCTION

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4 Claims. (Cl. 114—177)

The invention herein disclosed relates to a window construction and though not limited thereto, it is of especial utility in air-port constructions of the type commonly known as the pivotal air-port, that is, the type in which the closure member pivots about a transverse axis for opening and closing the air-port.

The pivotal type of air-port is more desirable than the swinging type in which the closure member is hinged to one side or the upper or lower edge of the port opening through the frame. In this latter type of air-port, the closure member swings into the stateroom and in consequence that portion of the room below or above the port-hole or adjacent the port-hole on one side or the other must be left clear of any obstructions. In addition it is difficult to provide permanently mounted screens for such port-holes. For this reason the pivotal port is preferred. But, as heretofore constructed, pivotal air-ports have certain serious disadvantages. Among these is the fact that in moving the pivoted closure member to open and close the port-hole, there has not been a positive mechanism for holding the closure member in all positions. In consequence, there have been instances in which the wind acting on the closure member, which is commonly rotated manually, has caused the closure member to spin and in spinning it has injured the hand of the person manipulating it. Similar conditions have caused the closure member to wedge in the open position. Another disadvantage of the common pivotal air-port is the fact that the closure member in the open position is situated in the center of the opening and materially obstructs the opening.

By this invention, there is provided a pivotal window construction in which the closure member is operated through mechanism that is positive in its action, and in which the closure member is held in all positions, and in which the pivoting of the closure member occurs in such a way that in its successive positions the pivoting axis is moved farther and farther away from the center line of the opening, so that in its full open position the obstruction of the opening by the closure member is minimized. The operating mechanism operates on the closure member to effect lateral and pivotal movement of the closure member and it is actuated through rotation of a crank below the window opening.

Such an air-port construction, embodying the invention, is disclosed in the accompanying drawings in which:

Fig. 1 is a front elevation partly in section of an air-port;

Fig. 2 is a horizontal section taken on the line 2—2 of Fig. 1; and

Fig. 3 is a sectional elevation taken on the line 3—3 of Fig. 1.

The air-port illustrated in the drawings comprises a frame 1 of the shape illustrated and which includes a flange 1*a* having a series of holes 1*b* therein for the purpose of securing the frame to the side 1' of a ship. The circular opening 1*c* forming the port-hole has an annular groove 1*d* therein in which there is mounted a gasket 1*e*.

Cooperating with the port-hole 1*c* there is a closure member 2 which consists of a circular metal frame 2*a* of channel shape in cross-section and a circular glass 2*b* carried by the frame. The frame has a bead 2*c* thereon which, in the closed position of the closure member, engages the gasket 1*e* and forms a weather-tight closure.

The closure member is operated to open and close the port-hole by a link mechanism. This link mechanism operates to move the closure member laterally and pivotally with respect to the frame. The mechanism includes a bracket 3 that is secured to the frame of the closure member and that extends perpendicular to the frame of the closure member. The bracket 3 has a slot 3*a* therein extending longitudinally thereof. Within this slot there is received a pivot 4 fixed to the frame 1. One end of a link 5 is pivotally secured to the bracket at 6 between the pivot 4 and the closure member. The other end of the link 5 is secured on a pivot 7 rotatably mounted in the frame 1. The pivot 7 extends through the wall of the frame and has secured on the other end thereof a segmental worm gear 8. The worm gear 8 meshes with a worm 9 mounted on a shaft 10 that is rotatable in brackets 11 and 12 extending from the frame. This link mechanism is in the nature of a Watt straight line link motion. For rotating the shaft 10, there is provided a crank handle 13 that may be rotated manually.

From the foregoing it will be seen that if the crank handle is rotated clockwise as seen in Fig. 1, the segmental gear 8 will be rotated clockwise as seen in Fig. 2 and the link 5 will be rotated with it. The initial movement of the end of the link 5 secured to the bracket 3 will be practically a straight line movement laterally of the plane of the opening through the frame. Thus, the closure member will be moved laterally away from the gasket 1*e* and such lateral movement

will be sufficient so that the closure member will be clear of the frame. Continued movement of the link 5 will carry the pivot 6 in the arc around the pivot 7 and, in consequence, will cause the bracket 3 to pivot on the pivot 4. Since the pivot 4 is fixed to the frame, the closure member will be caused to rotate about the pivot 6 as an axis, the portion of the bracket 3 between the pivot 4 and the pivot 6 and the link 5 being in the nature of a toggle. The closure member will thus have a pivotal movement about the pivot 6 in a counter-clockwise direction as seen in Fig. 2. Such pivotal movement of the closure member 2 will continue until the left-hand side of the closure member as seen in Fig. 2 abuts against the right-hand side of the edge of the opening through the frame. In this position, the closure member will be inclined to the axis of the port-hole.

The air-port is mounted on the ship, so that the left-hand side as seen in Fig. 2 is towards the forward end of the ship. Thus when the closure member is fully open, it acts as a wind scoop. It will be seen that by virtue of the toggle arrangement effected through the bracket 3 acting as a link, and the link 5, that the closure member is positively held by the actuating mechanism in every position it assumes from the full closed to the full open position.

For the purpose of stabilizing the action of the closure member under this link mechanism, the link mechanism, with the exception of the pivot 4 and its relation to the bracket 3 is duplicated at the diametrically opposite side of the closure member. On the upper side of the closure member as seen in Fig. 1, there is provided a bracket 14 that is secured to the frame of the closure member. This bracket is pivotally connected to one end of a link 15, the pivotal connection between the link 15 and the bracket 14 being coaxial with the pivot 6. The other end of the link 15 is secured to one end of a pivot or stub shaft 16 that extends through and that is rotatably mounted in a bracket 17 formed in the frame. The pivot 16 is coaxial with the pivot 7. Secured to the other end of the pivot 16 there is a crank 18 which is pivotally secured to one end of a connecting rod 19. The other end of the connecting rod 19 is pivotally connected to a crank 20 that is secured on one end of a shaft 21. The shaft 21 is rotatably mounted on brackets 22 and 23 that extend from and are secured to the frame 1. At the opposite end of the shaft, there is a crank 24 secured to the shaft and pivotally connected to one end of an adjustable connecting rod 25. The other end of the connecting rod 25 is pivotally secured to a crank 26 formed on the segmental worm gear 8. Thus, as the segmental worm gear 8 is rotated, the crank 26 moves the connecting rod 25 which rotates the shaft 21, and through the crank 20 and connecting rod 19 operates the crank 18. The pivot 16 is thus operated in accordance with the pivot 7 and the link 15 operated in accordance with the link 5. The closure member thus oscillates about the pivotal connections between the bracket 14 and the link 15 and the bracket 3 and the link 5, these pivots being on diametrically opposite sides of the closure member.

From the foregoing description of the air-port construction disclosed in the drawings it will be seen that there is provided by this invention a pivotal air-port construction in which the closure member is at all times positively held by the operating mechanism and in which it is impossible for the wind or other forces to rotate the closure member. It will be noticed in this connection that the mechanism for operating the closure member is not reversible in the sense that a force applied to the closure member cannot effect movement of the closure member by operating the mechanism in a reverse direction and causing rotation of the crank. The worm and worm gear connection prevents any such operation. It will also be noted that there is provided an air-port closure of the pivotal type in which the closure member is operated by a hand crank that is mounted at one side of or below the port-opening. Thus it is unnecessary to touch the closure member directly.

Another fact that will be apparent from the foregoing description of the embodiment of the invention illustrated in the drawings is that the closure member in its pivotal movement, turns about the pivot 6 which is offset from the plane of the closure member and which moves in an arc about the pivot 7. Thus, the pivotal axis is, during the opening movement of the closure member, moved farther and farther away from the vertical center line of the port-opening through the frame 1 so that in its full open position, the closure member is to one side of the vertical center line of the opening leaving a wider unobstructed opening than is attained with the common pivotal air-port construction.

It will be obvious that various changes may be made by those skilled in the art in the shape of the opening or in the details of the embodiment of the invention as disclosed in the drawings and described above within the principle and scope of the invention as expressed in the appended claims.

I claim:

1. In a window construction, the combination comprising a frame having a window-opening therethrough, a closure member for said window-opening mounted in said frame, and means for moving said closure member relative to said frame to open and close the window-opening including a link pivotally mounted on the frame, a bracket having a slot therein secured to the closure member and pivotally connected to said link, a guide for said bracket mounted on the frame and extending into the slot in the bracket, and means for rotating said link to effect lateral and pivotal movement of said closure member.

2. A window construction comprising a unitary structure for mounting on a side wall of a ship including a frame mounted on said side wall having an aperture extending from the exterior to the interior of the ship, a closure member for said aperture mounted on said frame and exteriorly of said aperture, and means for moving said closure member laterally and pivotally with respect to said frame and exteriorly from the aperture including a fixed pivot on the frame, a bracket fixed to said closure member and exteriorly thereof slidably and pivotally engaging said pivot, a link pivotally mounted on the frame and pivotally connected to said bracket, operable means mounted in said frame for rotating said link, and means connected to said operable means interiorly of said frame for effecting operation of said operable means.

3. A window construction adapted for air-ports for ships comprising an outer fixed frame outlining the window opening, a sash member having a window pane and constituting a closure for said opening, diametrically opposed radial pivots on the sash member offset from the plane thereof, two axially alined pivots carried by the frame parallel to the sash pivots, one adjacent each sash

pivot, a link connecting each frame pivot with its respective sash pivot, crank means for swinging the links about the axis of the frame pivots and thereby move the sash bodily about said axis, a bracket extending from the sash in the axial plane of the sash pivots, and a stud carried by the frame having sliding pivotal connection with the outer end of the bracket, whereby the angular position of the sash relative to the frame is constrained as the sash is moved by said links.

4. A window construction adapted for air-ports for ships comprising an outer fixed frame outlining the window opening, a sash member having a window pane and constituting a closure for said opening, a pair of external diametrically opposed radial pivots on the sash in a plane laterally offset from the sash, a pair of axially alined pivots carried by the frame, one adjacent each sash pivot, in a plane outwardly offset from the sash slightly further than the sash pivots, a link connecting each frame pivot with its respective sash pivot, and crank means for swinging the links about the axis of the frame pivots and thereby move the sash pivots in an arc about the said axis and effect substantially a straight line axial bodily movement of the sash in proximity to the frame.

JOHN D. WILLIAMS.