Jan. 9, 1940. R. DUCROUX 2,186,450

AIRPORT CONSTRUCTION

Filed Oct. 12, 1938 2 Sheets-Sheet 1

Fig. 1.

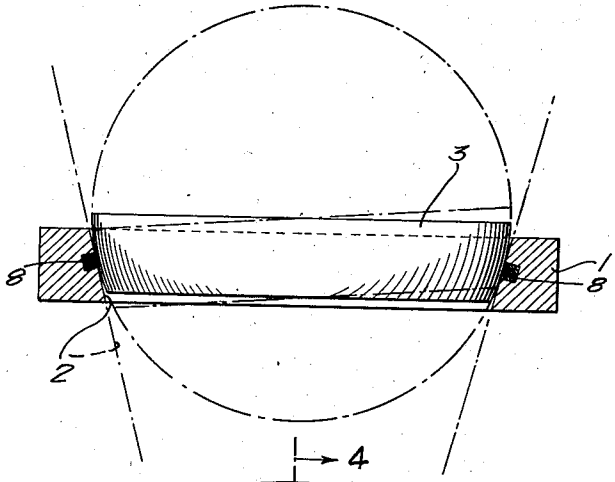


Fig. 2.

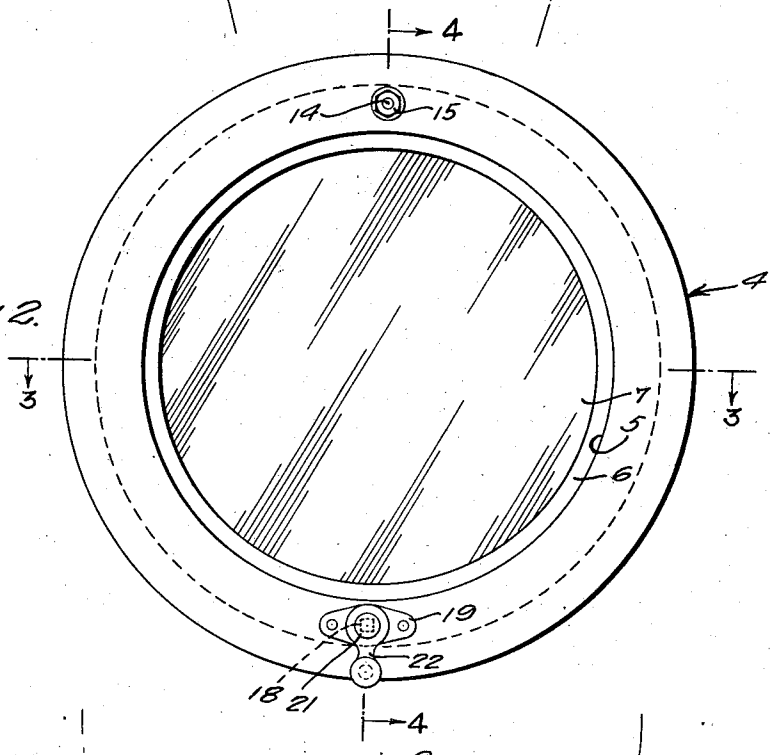
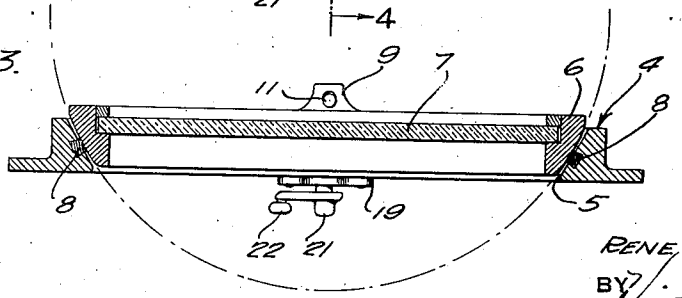


Fig. 3.



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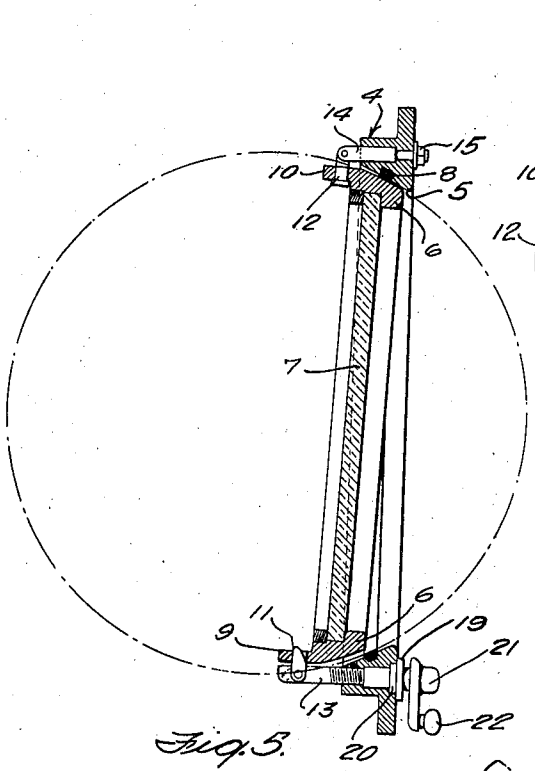


Fig. 5.

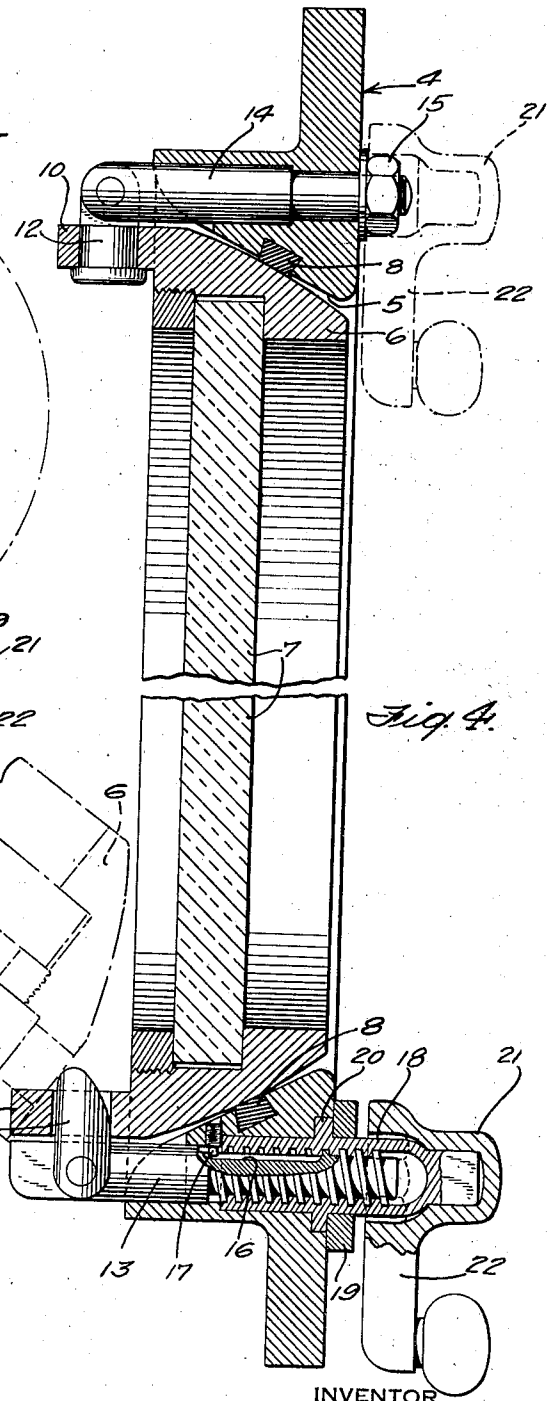


Fig. 4.

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AIRPORT CONSTRUCTION

René Ducroux, Marseilles, France

Application October 12, 1938, Serial No. 234,600
In France November 25, 1937

3 Claims. (Cl. 114—177)

The invention relates to closures for port openings in ships, commonly known as airport constructions. More particularly this invention has to do with airports of the pivoted type, that is, those which turn upon a transverse pivotal axis as distinguished from those that swing upon a hinge.

With relatively large openings these closures become rather massive, and since safety and convenience demand that the airport closure be easily and at the same time quickly operated, resort is often had to complicated constructions to effect the operation.

It is a purpose of this invention to make a construction which will be simple and easy to operate and will have the maximum efficiency as a closure. Another purpose is to provide a pivoted type of construction which in case of emergency may be completely and easily removed from the opening to allow of ready egress. Other objects and advantages of the invention will appear from the following description.

A characteristic of the invention is the fact that the sash ring which holds the glass and forms the closure partakes of both a swinging and a pivotal movement, the former being just sufficient to cause the ring to clear the frame and thus permit it to be turned on its transverse pivotal axis to a plane at right angles to the opening. The swinging movement is outwardly so that the operating handles are on the interior of the cabin.

The pivotal movement of the ring is possible with only a slight swinging movement because the ring and frame are designed to have peripheral contact. To effectively seal the opening two taper surfaces are employed, the outer preferably being frustoconical, and the inner, that is, the periphery of the ring, is a surface of revolution, for example, a sphere the center of which is on the axis of the cone. The contact between the two surfaces will therefore be a circular line at which may well be located a gasket. The pivotal axis of the closure ring is disposed laterally exteriorly of the ring.

I shall now describe the illustrated embodiment of the invention and shall thereafter point out my invention in claims.

Fig. 1 is a schematic representation of the principle of the invention so far as the coaction of the geometric surfaces is concerned.

Fig. 2 is an interior elevation of a closure embodying my invention.

Fig. 3 is a horizontal section of the same on line 3—3 of Figure 2.

Fig. 4 is a vertical central section on line 4—4 of Figure 2 on an enlarged scale.

Fig. 5 is a section similar to Figure 4 on the original scale and showing the closure swung to a position ready for pivoting.

By reference to the diagram of Figure 1 the advantage of a spherical surface on the closure ring in cooperation with a frusto-conical surface on the frame will appear. The frame member 1 has an outwardly flaring conical surface 2 and the ring 3 has a spherical surface the center of which is on the axis of the cone. The cone will always make a tangential contact with the sphere, and as shown by the broken lines, it is not essential that the segment 3 of the sphere be parallel with the frame member 1. Thus the need for great accuracy is avoided. The radius of the sphere must of course be such that the segmental periphery fits into the frusto-conical opening, and the angle of the cone will be a factor in determining the segmental portion of the spherical surface for the closure. Care should be taken to avoid a wedging effect. Since the segment is a portion of a hemisphere, its movement into the cone is limited but it is apparent that a slight angular movement of the segment will cause it to clear the cone so as to be free to turn on a transverse axis which intersects the axis of the cone.

The construction shown in Figs. 2 to 5 inclusive embodies the principle illustrated in Fig. 1. The frame member 4 is an annular flanged member the inner surface 5 of which is frusto-conical. The closure ring 6 constitutes the sash carrying the glass 7. The outer periphery of the ring 6 is a segment of a sphere and is proportioned to fit into the frusto-conical surface of the frame member 4. An annular gasket 8 seals the joint where the ring and frame member contact. Two lugs or arms 9 and 10 at the bottom and top of the ring extend laterally from its external face and these lugs have aligned perforations which receive pivots 11 and 12 respectively. These pivots are in turn pivoted upon transverse axes to bolt members which extend inwardly through the frame member. Pivot 11 is pivoted upon bolt member 13 and pivot 12 is pivoted upon bolt member 14.

Bolt member 14 is reduced intermediate its ends and bears against a complementary shoulder in the opening through the frame member 4, and the inner end of the bolt member which projects beyond the inner face of the frame member is screw threaded and provided with a nut 15.

The inner end of the bolt member 13 is screw threaded throughout a portion of its length where it extends through the frame member 4 and is provided along the screw portion with a spline groove 16 into which projects the end of a pin 17 that is screwed into the frame member 4. The bolt member 13 is thus held against rotation.

Surrounding the screw threaded inner end of the bolt member 13 is a nut 18 the outer end of which is squared and which bears at its inner end in the frame member 4. A plate 19 is secured to the inner face of the frame member in contact with a flange 20 on the nut 18 and thus holds the nut against longitudinal movement. A socket member 21 for operating the nut is shaped to fit over the square end of the nut and has a handle 22 for manual operation.

To open the port the operator places the socket member 21 on the end of the nut 18, as shown in full lines in Fig. 4. The turning of the nut will feed the bolt member 13 outwardly until it assumes the position shown in Fig. 5. By reason of the engagement of the pivot 11 in the stud 9 this longitudinal movement of the bolt 13 carries with it the lower end of the ring closure 6. In this position the ring is cleared from the frame member sufficiently to permit the operator to turn it 90° upon the pivots 11 and 12 by merely pressing against one side of the closure.

It is apparent that once the glass holding ring is swung out to the position shown in Fig. 5, it may be opened to any position up to the fully open position indicated in the broken circular line in Fig. 5. When it is turned to the desired position it is only necessary to retract bolt member 13 and thus cause the ring 6 to bind in the conical opening. To close the port of course the reverse operation is followed and as the ring approaches the conical surface of the opening it will automatically seat itself, forming a watertight joint with the gasket 8.

It will be observed that the upper pivot 12 is headed so that the ring stud 10 can not escape from it. The lower pivot 11, however, is not headed but instead is beveled off on its upper inside edge and the pivot opening in the stud 9 is cylindrical so that the ring may be easily slipped off from this pivot 11 if the upper end of the ring be released.

To accomplish this the operator places the socket member 21 upon the nut 15 on the inner end of the bolt member 14, as shown in broken lines in Fig. 4. By this means the nut is easily removed and the bolt member 14 is thus released. A push on the upper part of the closure will extract bolt member 14 from the frame member 4 and allow the closure to fall over in the position indicated in broken lines in Fig. 4, thus escaping from the pivot 11 and being entirely removed from the opening. In this way in case of emergency the closure may be removed so as to afford means for egress through the opening.

It is obvious that various modifications may be made in the construction shown in the drawings and above particularly described within the principle and scope of the invention.

I claim:

1. An airport construction for ships and the like comprising a frame member having a substantially conical opening, two diametrically opposed bolt members extending through the frame member parallel to the axis thereof, a sash member having a substantially spherical periphery proportioned to seat in the conical opening, two diametrically opposed lateral arms on the sash member having pivot holes therein, two pivots hinged on the corresponding protruding ends of the bolt members and bearing in the said pivot holes, and means operative from the opposite end of one of the bolt members to adjust it longitudinally in the frame member and thereby swing the sash member on the pivot hinge of the other bolt.

2. An airport construction for ships and the like comprising a frame member having a substantially conical opening, two diametrically opposed bolt members extending through the frame member parallel to the axis thereof, a sash member having a substantially spherical periphery proportioned to seat in the conical opening, two diametrically opposed lateral arms on the sash member having pivot holes therein, two pivots hinged on the corresponding protruding ends of the bolt members and bearing in the said pivot holes, one of said bolts being screw threaded and splined in the frame member, a rotative nut engaging the threaded part of said bolt and protruding from the face of the frame opposite the pivot, and manual means for rotating the nut and thereby adjusting the bolt longitudinally and swinging the sash on the pivot hinge of the other bolt.

3. An airport construction for ships and the like comprising a frame member having a substantially conical opening, two diametrically opposed bolt members extending through the frame member parallel to the axis thereof, a sash member having a substantially spherical periphery proportioned to seat in the conical opening, two diametrically opposed lateral arms on the sash member having pivot holes therein, two pivots hinged on the corresponding protruding ends of the bolt members and bearing in the said pivot holes, one of the pivots having its free end beveled sufficienty to permit its escape from the arm by relative lateral rotative movement, the bolt bearing said pivot being screw threaded and splined in the frame member, a rotative nut engaging the threaded part of said bolt and protruding from the face of the frame opposite the pivot, manual means for rotating the nut and thereby longitudinally adjusting the nut, and manually releasable means on the same face of the frame locking the other bolt in the frame.

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