Sept. 27, 1949. F. M. LAMBERT 2,482,983

ADJUSTABLE HINGE STRUCTURE

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Fig. 2.

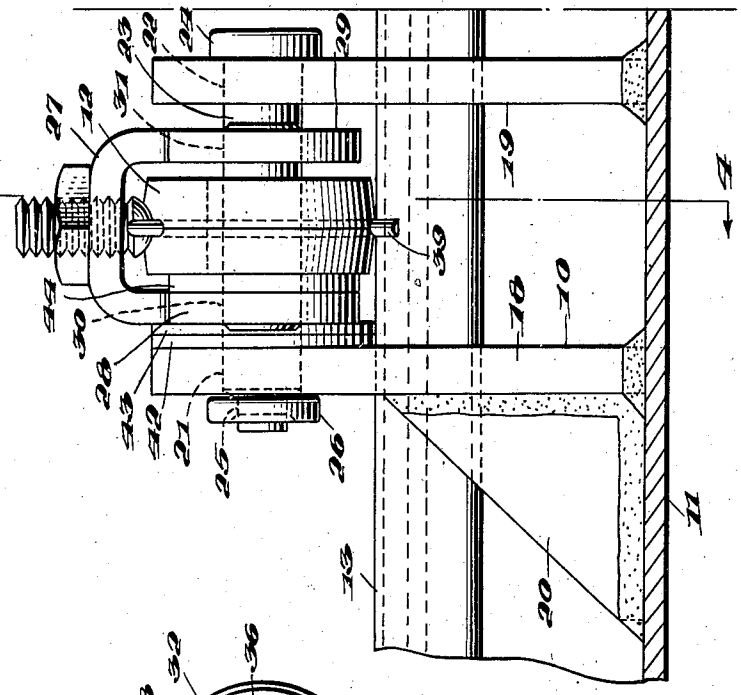
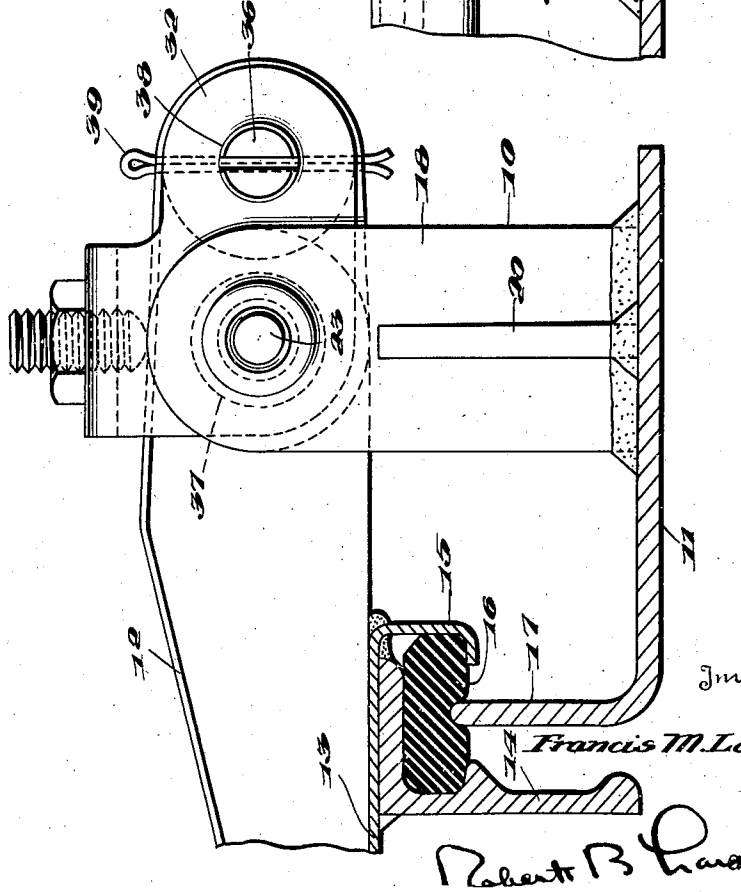


Fig. 1.



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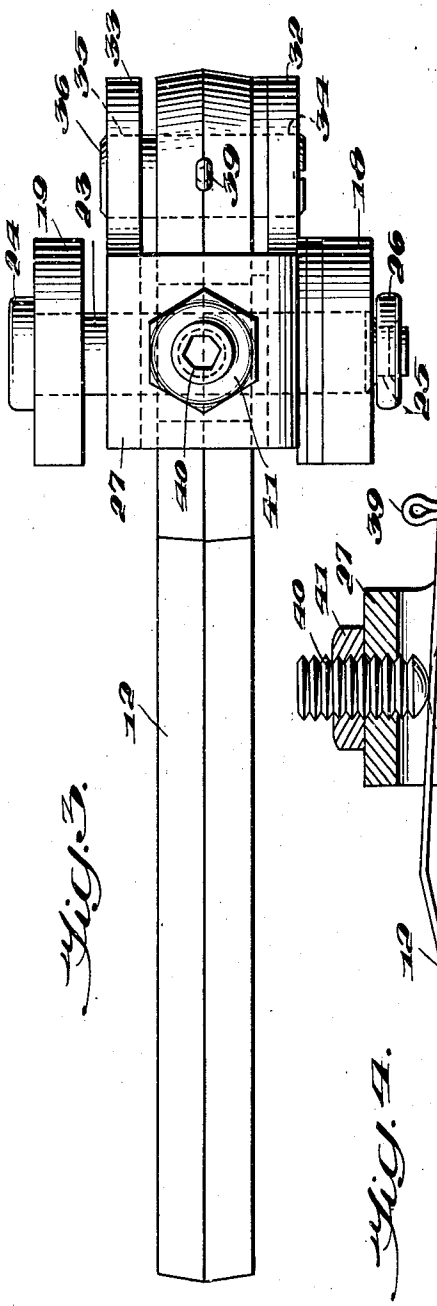


Fig. 3.

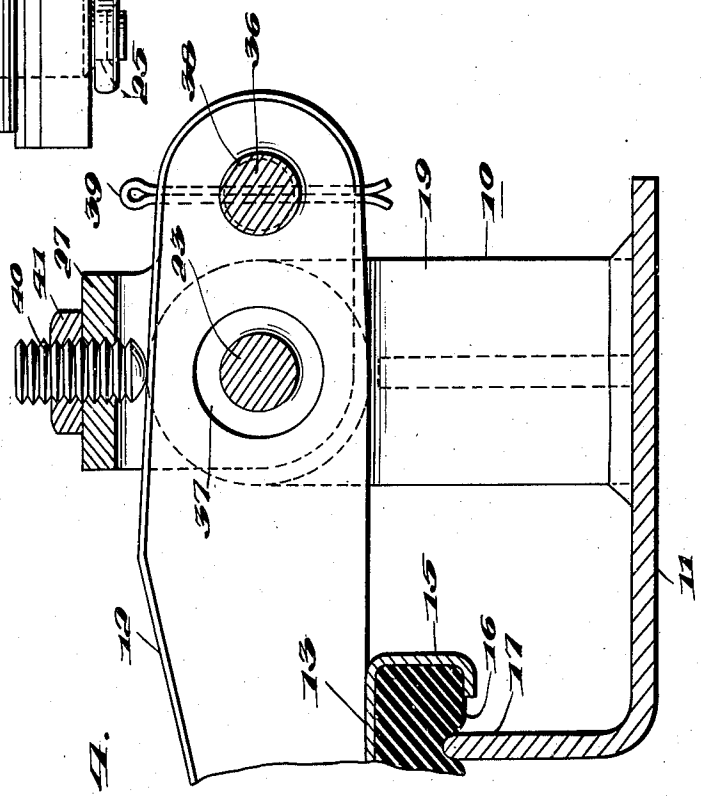


Fig. 4.

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ADJUSTABLE HINGE STRUCTURE

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Application September 7, 1945, Serial No. 614,841

12 Claims. (Cl. 114—117)

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This invention relates to door hinges and more particularly to an improved type of hinge for ships' doors for bulkhead openings.

While the improved type hinges of the present invention may be used to advantage with many types of doors they are especially efficacious when used with water-tight, air-tight doors employed in battleships and the like. Such doors must be constructed to meet exacting requirements. They are usually constructed of sheet metal stretched over a reinforcing frame, the rear edge portion of the door being provided with a gasket or the like adapted to be engaged, when the door is closed, by an upstanding edge on the bulkhead surrounding the door opening. Such doors are usually hinged by providing each with a plurality of hinge blades along the hinge side, which blades are pivotally secured to hinge pads secured to the bulkhead. When the door has been closed it may be locked in position and the pressure on the gasket may be equalized by a plurality of locking dogs acting against wedge surfaces to press the door tightly in closed position. The present invention has for a principal object the provision of an improved type of hinge structure for such doors.

In doors of the type to which reference has been made, it is sometimes desired to provide "pinch type" hinges. These are so constructed that before the door is completely in closed position the gasket on the hinge side of the door is engaged by the edge of the bulkhead opening, and when the door is completely closed the pressure on the remaining portions of the gasket is applied by dogs or the like. It is another object of the present invention to provide a door hinge, which by simple adjustment may immediately be transformed to a hinge of the "pinch type."

In accordance with present practice, doors are usually manufactured by concerns which then ship them to the shipyards for installation. Bulkhead openings of a predetermined size often vary slightly in their dimensions and not infrequently the workman installing a door will find that the hinge pads on the bulkhead are not spaced so as to permit the door to be hung with an even tight fit. Sometimes the workman attempts to remedy the difficulty by striking the hinge pads to bend them to another position. This may cause injury to the hinge pads and also may bend the supporting part of the bulkhead out of shape. The practice is time consuming and, as will be apparent, should be condemned. This difficulty is overcome in accordance with the invention, another object of which is to provide a

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hinge structure rendering such a practice unnecessary.

These and other objects of the invention will become more apparent from the following description and claims when read in conjunction with the accompanying drawings in which:

Fig. 1 is a top plan view of a hinge constructed in accordance with the invention, the door and bulkhead portions being shown in section;

Fig. 2 is an end view;

Fig. 3 is a front elevation; and

Fig. 4 is a section taken on the line 4—4 of Fig. 2.

Referring now to the drawings, the reference numeral 10 indicates a hinge pad which is secured, as by welding, to the bulkhead frame 11. The hinge pad 10 and associated parts are of special construction, as will be described, but they provide a hinge connection for the hinge blade 12 which is secured to the outer surface of the door 13 near the edge thereof. In the specification and claims, the term "outer surface" refers to the surface of the door which faces away from the door frame or bulkhead frame.

As is now customary, the door 13 is provided on its inner surface (the surface facing the bulkhead frame) with a marginal angle support 14 which together with the inwardly bent edge 15 of the door skin provides a channel for receiving and retaining a gasket 16 of rubber or the like. When the door is in closed position (as illustrated) the gasket 16 engages the edge of the flange 17 on the bulkhead frame 11, thus forming a watertight closure.

The hinge pad 10 is comprised of two spaced parallel members 18 and 19 which may be welded or otherwise secured to the bulkhead frame 11. The hinge pad, if desired, may be buttressed by one or more reinforcing angle pieces such as that indicated by the reference numeral 20. Such an angle piece may, as shown, be welded to the hinge pad and to the bulkhead frame.

The upper portions of the members 18 and 19 comprising the hinge pad 10 are provided with aligned circular holes 21, 22 respectively, for reception of a pintle 23. The pintle 23 has a head 24 on one end and a reduced shank portion 25 at the other end. Upon completion of the assembly, as will be described, a collar 26 is slipped on the reduced shank portion 25 and the end of the shank portion is swaged to retain the collar in place.

Supported on the pintle 23 between the members 18 and 19 forming the hinge pad 10 is a yoke member 27 which is in the form of an inverted U,

the legs 28, 29 of which are provided with aligned holes 30, 31, through which the pintle 23 passes. The holes 30, 31 in the legs of the yoke member 27, and the holes 21, 22 in the members 18 and 19 of the hinge pad, are slightly greater but substantially the same diameter as the pintle 23, so that the yoke member 27 is capable of limited pivoting movement about the pintle.

The legs 28, 29 of the yoke member 27 are provided with rearward extensions 32, 33 respectively, and these extensions are provided with aligned holes 34, 35 through which passes a pivot pin 36. By the word "rearward" in the specification and claims is meant the direction away from the door opening. By the same token, the word "forward" means toward the door opening.

The hinge blade 12 is disposed between the legs 28, 29 of the yoke member 27 and is provided with two holes, one for the passage of the pintle 23 and the other for the pivot pin 36. The first of these holes 37 (see Figs. 1 and 4) is of a diameter somewhat larger than the diameter of the pintle 23. The other hole 38 in the hinge blade is of a diameter just sufficient to receive the pivot pin 36. The pin 36 is secured to the hinge blade by means of a cotter pin 39, or the like, which passes through both. The pin 36, thus in effect, comprises a trunnion which is journalled for pivoting movement in the holes 34, 35.

The yoke member 27 is provided with a threaded hole adapted to receive an adjusting screw 40, the inner end of which may be caused to bear against the upper surface of the hinge blade 12 directly above the pintle 23. A lock nut 41 is employed for securing the adjusting screw 40 in adjusted position.

Finally, washers such as those indicated by the reference numerals 42, 43 and 44 may be employed for properly spacing the yoke member 27 with respect to the legs of the hinge pad 10 and with respect to the hinge blade 12 (see Fig. 2).

As previously indicated, the installation of ship's doors has heretofore been accompanied by difficulties because the dimensions of the doors are not always accurately proportioned for the particular opening for which the door is to be used. Where the hinge pad is not positioned to readily receive the hinge blade, the workman assembling the door in place will frequently strike the hinge pad a blow with a hammer to bend it to the proper position. Such a blow or blows will, however, cause a bending of the bulkhead or damage the hinge pad and this practice is thus highly unsatisfactory.

In accordance with the present invention this difficulty has been obviated. In practice the door will be furnished with several sets of yoke members for each hinge. These yoke members will differ principally in the distance between the centers of the two sets of holes 21, 22 and 34, 35. Thus, the workman hanging the door will employ the set of yoke members which will cause the door to fit properly, and it will be wholly unnecessary for him to attempt to bend the hinge pad with probable consequent damage to the bulkhead.

Adjustment of the hinge blade in an upward direction is accomplished merely by employing a suitable number of washers such as 42, 43, and the positioning of the hinge blade with respect to the yoke member 27 is similarly accomplished by the use of one or more of the washers 44.

Where it is desired to employ the hinges as pinch type hinges, it is merely necessary to adjust the adjusting screws 40 inwardly against the hinge blade. In accordance with the amount of the adjustment made, the engagement of the gasket 16 by the edge of the flange 17 on the hinge side of the door will be effected more or less quickly and with a corresponding degree of compression.

It is believed that the structure and operation of the invention will now be clear. It should also now be obvious that changes in the structure and arrangement of the parts may be made without departing from the invention which is only to be limited in accordance with the following claims.

I claim:

1. A hinge structure for ship's doors and the like, comprising, a hinge pad, a hinge blade, a member pivotally mounted on said hinge pad, said member having at least one portion extending from the hinge pad in a direction away from the door opening, means for pivoting one end of the hinge blade on said portion, the other end of the hinge blade being secured to the door, and means carried by the hinge pad for limiting the amount of movement of the hinge blade with respect to said member.

2. A hinge structure for ship's doors and the like, comprising, a hinge pad, a hinge blade, a member pivotally mounted on said hinge pad, said member having at least one portion extending from the hinge pad in a direction away from the door opening, means for pivoting one end of the hinge blade on said portion, the other end of the hinge blade being secured to the door, and means carried by the hinge pad for limiting the amount of movement of the hinge blade with respect to said member, and adjustable means carried by said member for further limiting the amount of movement of the hinge blade with respect to said member.

3. A hinge structure for ship's doors and the like, comprising, a pair of spaced parallel elements on the structure surrounding the door opening and comprising a hinge pad, a yoke member disposed between said elements, the arms of said yoke member having portions extending rearwardly of said elements, a hinge blade secured to the door at one end, the other end of said hinge blade extending between the arms of said yoke, means pivotally mounting said other end of the hinge blade to the rearwardly extending portions of the yoke arms, a pintle extending through said elements and through the arms of the yoke member, said hinge blade having a hole for the passage of the pintle, said hole having a diameter greater than the diameter of the pintle, whereby said hinge blade may enjoy a limited movement with respect to said yoke member.

4. A hinge structure for ships doors and the like, comprising, a pair of spaced parallel elements on the structure surrounding the door opening and comprising a hinge pad, a yoke member disposed between said uprights, a pintle carried by said elements, said yoke member being mounted for pivoting movement about the axis of said pintle, the arms of said yoke member having portions extending rearwardly of said elements, a hinge blade secured to the door at one end, the other end of said hinge blade extending between the arms of said yoke member, means carried by the rearwardly extending portions of the arms of said yoke member for mounting said other end of said hinge blade for pivoting movement of the hinge blade about an axis parallel to the plane of the door opening, said hinge blade having a hole for the passage of said pintle, said hole having a diameter

greater than the diameter of said pintle, whereby said hinge blade may enjoy a limited movement with respect to said yoke member.

5. A hinge structure for ships doors and the like, comprising, a pair of spaced parallel elements on the structure surrounding the door opening and comprising a hinge pad, a yoke member disposed between said uprights, a pintle carried by said elements, said yoke member being mounted for pivoting movement about the axis of said pintle, the arms of said yoke member having portions extending rearwardly of said elements, a hinge blade secured to the door at one end, the other end of said hinge blade extending between the arms of said yoke member, means carried by the rearwardly extending portions of the arms of said yoke member for mounting said other end of said hinge blade for pivoting movement of the hinge blade about an axis parallel to the plane of the door opening, said hinge blade having a hole for the passage of said pintle, said hole having a diameter greater than the diameter of said pintle, whereby said hinge blade may enjoy a limited movement with respect to said yoke member, and an adjusting screw mounted in said yoke member for further limiting the movement of the hinge blade with respect to the yoke member.

6. A hinge structure for ships doors and the like, comprising, a pair of spaced parallel elements on the structure surrounding the door opening and comprising a hinge pad, a yoke member disposed between said uprights, a pintle carried by said elements, said yoke member being mounted for pivoting movement about the axis of said pintle, the arms of said yoke member having portions extending rearwardly of said elements, a hinge blade secured to the door at one end, the other end of said hinge blade extending between the arms of said yoke, a pivot pin mounted in aligned holes in the rearwardly extending portions of the arms of the yoke, said other end of said hinge blade being mounted on said pivot pin for turning movement about the axis of the pin, said hinge blade having a hole for the passage of said pintle, said hole having a diameter greater than the diameter of the pintle, whereby said hinge blade may enjoy a limited movement with respect to the yoke member.

7. A hinge structure for ships doors and the like, comprising, a pair of spaced parallel elements on the structure surrounding the door opening and comprising a hinge pad, a yoke member disposed between said uprights, a pintle carried by said elements, said yoke member being mounted for pivoting movement about the axis of said pintle, the arms of said yoke member having portions extending rearwardly of said elements, a hinge blade secured to the door at one end, the other end of said hinge blade extending between the arms of said yoke, a pivot pin mounted in aligned holes in the rearwardly extending portions of the arms of the yoke, said other end of said hinge blade being mounted on said pivot pin for turning movement about the axis of the pin, said hinge blade having a hole for the passage of said pintle, said hole having a diameter greater than the diameter of the pintle, whereby said hinge blade may enjoy a limited movement with respect to the yoke member, and an adjusting screw mounted in said yoke for further limiting the movement of the hinge blade with respect to the yoke member.

8. A hinge structure for doors for openings in ships bulkheads and the like having a flanged portion surrounding the opening, the flange being engaged by a gasket adjacent the door edge when the door is in closed position; said hinge structure comprising a hinge pad on said bulkhead and comprised of spaced parallel elements with aligned openings therein, a hinge blade the forward end of which is secured to the outer surface of the door and the rearward end of which is adapted to extend between and beyond the elements comprising the hinge pad, a U-shaped yoke member adapted to be positioned between the hinge pad elements with the legs of the yoke member straddling the hinge blade, and a pintle adapted to pass through the aligned openings in said spaced elements, through the yoke member and through the hinge blade, the hole in the hinge blade for the passage of the pintle being of a diameter greater than the diameter of the pintle, said yoke member having rearwardly extending portions, and means for pivotally mounting said rearward end of the hinge blade to said rearwardly extending portions.

9. A hinge structure for doors for openings in ships bulkheads and the like having a flanged portion surrounding the opening, the flange being engaged by a gasket adjacent the door edge when the door is in closed position; said hinge structure comprising a hinge pad on said bulkhead and comprised of spaced parallel elements with aligned openings therein, a hinge blade the forward end of which is secured to the outer surface of the door and the rearward end of which is adapted to extend between and beyond the elements comprising the hinge pad, a U-shaped yoke member adapted to be positioned between the hinge pad elements with the legs of the yoke member straddling the hinge blade, and a pintle adapted to pass through the aligned openings in said spaced elements, through the yoke member and through the hinge blade, the hole in the hinge blade for the passage of the pintle being of a diameter greater than the diameter of the pintle, said yoke member having rearwardly extending portions, and means for pivotally mounting said rearward end of the hinge blade to said rearwardly extending portions, and adjustable screw means carried by the yoke member and adapted for movement toward and from said hinge blade for adjusting the amount of movement between the hinge blade and the yoke.

10. A door hinge structure comprising a hinge pad mounted adjacent a door opening, a hinge blade one end of which is secured to the door and the other end of which is dimensioned to extend past the hinge pad, a yoke member, a pintle for pivotally mounting the yoke member on the hinge pad, said yoke having at least one portion extending past the hinge pad when the structure is assembled, and means for pivoting the free end of the hinge blade to said extending portion of the yoke member, said hinge blade having an enlarged hole for the passage of said pintle therethrough, said yoke member being dimensioned to straddle the hinge blade when the structure is assembled.

11. A door hinge structure comprising a hinge pad mounted adjacent a door opening, a hinge blade one end of which is secured to the door and the other end of which is dimensioned to extend past the hinge pad, a yoke member, a pintle for pivotally mounting the yoke member on the hinge pad, said yoke having at least one portion extending past the hinge pad when the structure is assembled, and means for pivoting the free end of the hinge blade to said extending portion of the

yoke member, said hinge blade having an enlarged hole for the passage of said pintle therethrough, said yoke member being dimensioned to straddle the hinge blade when the structure is assembled, and adjustable means carried by said yoke member and movable toward and away from said hinge blade for limiting the movement between the hinge blade and the yoke member.

12. A hinge structure comprising a hinge pad, a member pivotally mounted on said pad, a hinge blade pivoted to said member at a point spaced from the point of pivotal mounting of said member on said pad, and means carried by the hinge pad for limiting the amount of movement of the hinge blade with respect to said member.

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No references cited.