

May 4, 1948.

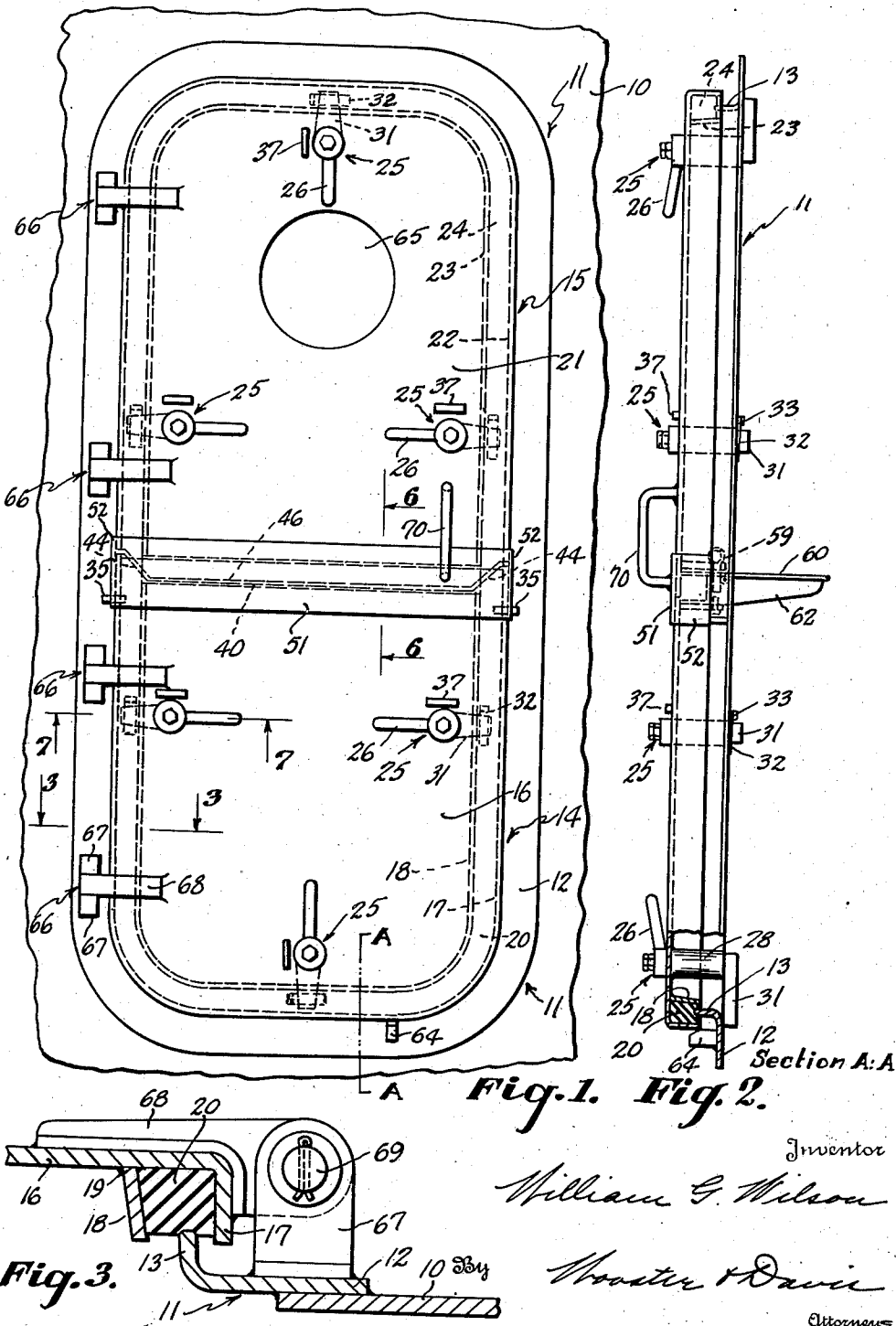
W. G. WILSON

2,440,764

WATERTIGHT DOOR

Filed April 6, 1944

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

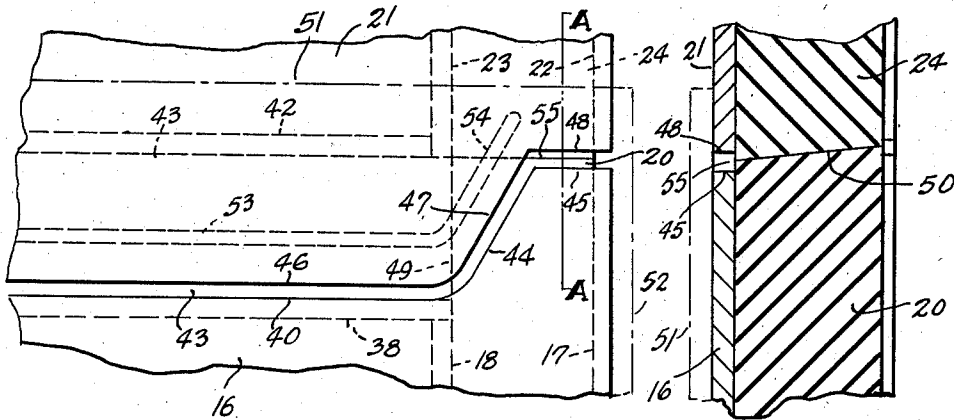


Fig. 4.

Section A-A
Fig. 5.

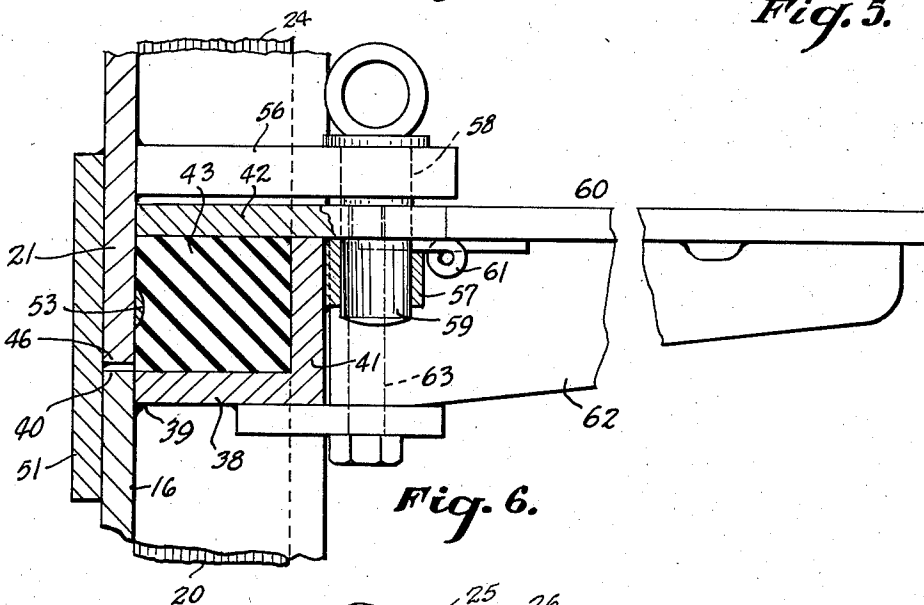


Fig. 6.

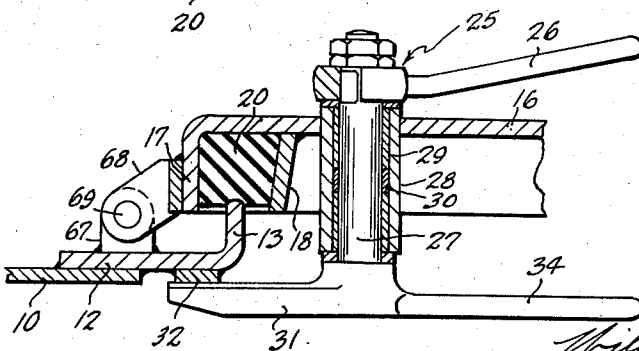


Fig. 7.

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UNITED STATES PATENT OFFICE

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WATERTIGHT DOOR

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7 Claims. (Cl. 189—46)

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This invention relates to water-tight doors, particularly bulkhead doors of the so-called "Dutch" type which are made in two sections, and it is a particular object of the invention to provide an improved simple construction whereby the door is absolutely water-tight entirely around the outer periphery and at the joint through the center of the door between the two sections.

With the foregoing and other objects in view I have devised the construction illustrated in the accompanying drawings forming a part of this specification. It is, however, to be understood the invention is not limited to the specific construction and arrangement shown but may embody various changes and modifications within the scope of the invention.

In these drawings:

Fig. 1 is a front elevation of the door mounted on a bulkhead and in closed position;

Fig. 2 is a side elevation thereof looking from the right of Fig. 1 but with the bulkhead wall omitted the section at the lower part being substantially on the line A—A of Fig. 1;

Fig. 3 is a section substantially on line 3—3 of Fig. 1 on an enlarged scale.

Fig. 4 is a detail of one side of the joint between the two sections of the door looking from the front and on a larger scale than Fig. 1 and with the extension on the lower edge of the upper door section omitted but outlined in broken lines;

Fig. 5 is a section substantially on line A—A of Fig. 4;

Fig. 6 is a vertical section on an enlarged scale through the joint between the two door sections, substantially on line 6—6 of Fig. 1, and

Fig. 7 is a detail section on an enlarged scale through one of the locking means taken on substantially line 7—7 of Fig. 1.

A portion of the bulkhead wall is shown at 10 having the door opening therethrough, which is surrounded by a flanged plate frame 11 including a flange 12 resting against and welded to the face of the wall 10 and provided with an outwardly extending flange 13 forming the periphery of the door opening in the frame. The door comprises two sections, the lower or panel section 14 and the upper section 15. It is desirable in this type of door to be able to open the upper section while

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the lower or panel section is kept closed and locked, as for example where the door is used as a door to the galley through which food may be served from the galley. The lower section or panel 14 comprises a front wall 16 with its outer peripheral edge bent backwardly to form a rearwardly extending flange 17, and a flat bar 18 is welded at its edge 19 to the inner face of the wall 16 and spaced a suitable distance from the flange 17 to form a groove to receive and hold a continuous square strip gasket 20, preferably of rubber or similar material. The bar 18 is preferably inclined somewhat toward the flange 17 so that the resulting groove will be somewhat narrower at its outer or open side to retain the gasket 20 in the groove.

The upper door section 15 is of similar construction comprising a front wall 21 with a backwardly extending peripheral flange 22 the same as the flange 17, and on the inner side of the wall 21 is welded a bar 23 the same as the bar 18 spaced from the flange 22 to form a groove for a continuous gasket strip 24 around the vertical sides and top edge of the upper door section. When the door sections are closed the edge of the outwardly extending flange 13 of the door frame engages the surface of the strip gaskets 20 and 24 making a water-tight joint, and they are preferably so arranged that when the door is secured the edge of this flange 13 will be forced somewhat into the gasket to compress it sufficiently to insure a water-tight joint. The door sections are drawn closed and this tight contact between the flange and the gaskets is secured by locking dogs 25, there being preferably three of these on each door section. Each of these locking dogs comprises a handle 26 on the outside of the door secured to a pin 27 mounted in a bearing 28 in the door with a bushing 29 having a packing 30 to prevent leakage. Carried on the inner end of the pin 27 is a locking dog 31 adapted to ride up on a tapered wedge 32 welded to the inner wall of the frame 14, and the wedge is provided with a stop 33 to limit turning movements of the dog so that it would be impossible to turn the dog too far, so as to pass off the wedge. In view of this tapered wedge, turning the dog onto this wedge to locking position will draw the door tightly closed and press the gasket tightly against the edge of the flange 13 to insure a water-tight joint.

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The dog 31 has a second handle 34 so that the door may be locked or unlocked from the inside. Welded on the frame 14 are stop lugs 35 to be engaged by the edge flange 17 of the lower panel section to prevent the flange 13 being forced too deeply into the gasket. A guide 64 is welded to the frame below the lower half of the door to bring this door section into alignment when closed. The guide is tapered or inclined on the top side to guide the door to proper position. When the dogs are unlocked or swung to the unlocked position to carry the dogs away from the tapered wedge, the handle 26 rides up onto a small tapered wedge 37 welded to the outside of the door so as to hold the handles and dogs in the released position to prevent their swinging into position to interfere with the closing of the door.

As the door is made in two sections it is necessary to provide a water-tight joint across the center of the door between these two sections. To secure this result there is in effect a continuous gasket in the lower panel or section throughout the entire periphery thereof. The gasket 20 extends along the two opposite vertical edges and the lower edge, but to continue this gasket across the upper edge a sort of box is welded to the upper edge of this lower section on the inner side thereof. This as shown in Fig. 6 comprises an angle shaped member 38 welded to the inner side of the door wall 16, as shown at 39, the top surface of the lower flange 39 being substantially on a line with the top edge 40 of the lower door section. At the top edge of the vertical flange 41 is welded a plate 42 forming with the angle member 38 a transverse groove across the upper edge of the lower door section facing outwardly and exposed or open at the outer side in which is mounted the continuous gasket 43. However, the opposed lower edge of the upper section and top edge of the lower sections of the door are not formed straight across the full length of the door but adjacent the opposite edges are inclined upwardly and outwardly. The top edge 40 is so inclined as indicated at 44, Fig. 4, and then extends outwardly in a horizontal direction as indicated at 45. The lower edge 46 of the upper door section is similarly shaped at 47 and 48. The two edges are preferably spaced a short distance to insure that they will not interfere with the closing of the upper door section. The rubber gasket 20 is continued upwardly above the top edge 40 of the lower door section, as indicated in Fig. 4, and the opposite ends of the horizontal gasket 43 abut against the side of this upper end portion of the gasket 20 to form a joint 49, and this joint may be sealed with a suitable rubber cement. The same kind of a joint is formed on the opposite side of the door section at the other end of the horizontal gasket 43. The rubber strip or gasket 43 is inserted from the front face side of the lower door or panel and joined with the gasket strips 20 at the sides of this panel. This makes a continuous gasket throughout the entire periphery of the lower door section. The top ends of the gasket 20 are inclined upwardly and rearwardly, as indicated at 50 in Fig. 5, and the lower end of the gasket 24 in the upper door section is similarly inclined, so that when the upper door section is swung to the closed position the lower inclined end of the gasket 24 will engage the upper inclined end of the lower gasket 20 with a sort of wedging action, making a water-tight joint.

Welded to the lower edge portion of the upper

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door section is an extension 51. This is a plate with its ends 52 bent backwardly to lie over the outer sides of the flanges 17 and 22 of the two door sections. This plate 51 is welded to the upper door section on the outer surface thereof and extends downwardly below the lower edge 46 of the section so as to overlap the upper portion of the lower door section 14, as shown in Figs. 1 and 6. Therefore when the upper door section is closed it covers up the joint between the edges 40 and 46 of the two door sections.

On the inner side of the front wall 21 of the upper door section 15 is welded a small bead or rib 53 extending entirely across the door in alignment with the transverse gasket 43 so that when the upper door section is closed it will engage the exposed outer side of the gasket 43 and will be compressed somewhat into it as the upper door section is locked to make a water-tight joint, and to further insure the joint between the door sections is absolutely water-tight this bead is inclined upwardly and outwardly, as shown at 54 in Fig. 4, so as to cross over the joint 49 between the gaskets 43 and 20 and also over the joint 55 between the upper end of the gasket 20 and the lower end of the gasket 24. This insures absolute sealing of the joint between the two door sections, so that there is no chance of leakage of water through the joint.

It is necessary at times to open the door as a unit, that is to open the two sections as a unit. For this purpose a pad 56 is welded to the inside of the wall 21 of the top section of the door and a socket 57 is welded to the inside of the lower door section. The pad 56 is provided with an opening 58 in alignment with this socket to receive a pin 59 so as to lock the two door sections together so that the door can be opened as a unit. When the top half of the door only is to be opened this pin may be removed and the top half opened by releasing the dogs 25 carried by this section. A drop shelf 60 may be hinged to the plate 42 at 61 and held in the upper or horizontal position by a hinging bracket 62 on a hinge pin 63 secured to the lower door section. A glass covered port 65 may be provided in the upper door section. The two door sections are mounted to swing on hinges 66 comprising spaced lugs 67 welded to the frame 11 and a center lug 68 welded to the door section with a hinge pin 69 connecting them. There may also be a handle 70 welded to the upper section.

It will be seen from the above that although the door is made in two sections it may be opened and closed as a unit. Also that if desired, the upper door section may be opened independently of the lower section while the lower section is kept closed and locked. However, with this construction a water-tight seal or joint is provided entirely around the periphery of the door and also at the horizontal joint or separation between the two door sections, effectively preventing any leakage of water through the door.

Having thus set forth the nature of my invention, I claim:

1. A door of the character described comprising two sections each comprising a plate with a rearwardly extending flange at its side and end edges, a flat bar welded to the plate inwardly of the flange and providing therewith a groove open toward the rear, a strip gasket of yieldable material in said groove, an open frame provided with an outwardly extending flange in alignment with said groove with its edge adapted to press against the gasket to make a tight joint, means for

hinging the sections to the frame, means for securing the sections in closed position with the gaskets pressed against the frame flange, a box structure at the edge of one section at the division between the sections forming a transverse groove opening outwardly, a yieldable gasket in said groove extending the full width of the door and engaging the first gasket at its opposite ends to form a tight joint with it, and a transverse bead on the inner side of the other section adapted to press against said latter gasket to make a tight joint between the sections when the door is closed.

2. A door of the character described comprising an open frame provided with an outwardly extending flange around the periphery of the opening therein, upper and lower door sections pivoted to the frame each comprising a plate provided with spaced rearwardly extending flanges at its side and end edges forming a rearwardly facing groove in alignment with the frame flange, a sealing gasket in the groove adapted to press against the frame flange to form a tight joint, said lower door section being provided with spaced transverse members forming a forwardly facing groove transversely of the section at the top edge thereof, a sealing gasket in said latter groove extending the full width of the door and engaging the first gasket at its opposite ends to form a tight joint with it, a transverse bead adjacent the lower edge of the upper section in alignment with said latter gasket and adapted to press against it to form a tight joint, and means for securing the sections in closed position with the first gaskets pressed against the frame flange.

3. A door of the character described comprising an open frame provided with an outwardly extending flange around the periphery of the opening therein, a door comprising upper and lower sections hinged to the frame and each comprising a plate provided with a rearwardly facing groove along its side and end edge in alignment with said flange, a sealing gasket in each of said grooves adapted to seat against the flange to make a tight joint and with the ends of the upright side gaskets in the two sections in contact to make in effect a continuous gasket about the periphery of the door, said lower section being provided with an outwardly facing groove at the top edge thereof extending transversely of the door and communicating with the grooves at the sides of this section, a sealing gasket in the transverse groove contacting the gaskets in the side grooves at its opposite ends to form a continuation thereof, a transverse bead adjacent the lower edge of the upper section adapted to engage the transverse gasket to form a seal therewith and extending over the joints between the transverse and side gaskets, and means for securing the sections in closed position with the first gaskets against the frame flange.

4. A door of the character described comprising an open frame provided with an outwardly extending flange around the periphery of the opening therein, a door comprising upper and lower sections hinged to the frame and each comprising a plate provided with a rearwardly facing groove along its side and end edge in alignment with said flange, a sealing gasket in each of said grooves adapted to seat against the flange to make a tight joint, the ends of the gaskets at the dividing line between the two sections being exposed and in contact when the sections are closed to form a continuous gasket

about the periphery of the door, a transverse gasket at the top edge of the lower section in contact at its opposite ends with the first gasket in that section to form a continuation thereof, means at the lower edge of the upper section forming a tight joint with the transverse gasket, and means for securing the sections in closed position with the first gaskets against the frame flange.

5. A door of the character described comprising an open frame provided with an outwardly extending flange around the periphery of the opening therein, a door comprising upper and lower sections independently hinged to the frame, said sections provided with means at their outer periphery mounting a sealing gasket around the periphery of the door and with the ends of the side gaskets at the division between the sections in contact to form a continuous gasket, said gasket being in alignment with the flange and adapted to seat against it to form a seal, a transverse gasket across the door on one section adjacent the division line between the sections and in contact at its ends with the gaskets at the opposite edges of that section to form in effect a continuous gasket therewith, means on the other section seating against the transverse gasket to form a tight joint between the sections, and means for securing the sections in closed position with the first gasket against the frame flange.

6. A door of the character described comprising an open frame provided with an outwardly extending flange around the periphery of the opening therein, a door comprising upper and lower sections independently hinged to the frame, said lower section being provided with a continuous groove at its upright side and bottom edges facing rearwardly and a transverse groove across its upper edge facing forwardly, and communicating at its opposite end with the first groove, gasket material filling said grooves throughout their entire length, the upper section being provided with a rearwardly facing groove along its upright side and top edges, a continuous gasket in said latter groove arranged with its free lower ends adapted to engage the upper ends of the side gaskets in the lower section to form a continuous gasket about the periphery of the door when the sections are closed, transversely extending means adjacent the lower edge of the upper section adapted to engage the transverse gasket to form a tight joint between the sections, and means for securing the sections in closed position with the gaskets about the periphery of the door against the frame flange.

7. A door of the character described comprising an open frame provided with an outwardly extending flange around the periphery of the opening therein, a door comprising upper and lower sections independently hinged to the frame, said sections provided with means at their outer periphery mounting a sealing gasket around the periphery of the door and with the ends of the side gaskets at the division between the sections in contact to form in effect a continuous gasket, said gasket being in alignment with the flange and adapted to seat against it to form a seal, a transverse gasket across the top edge of the lower section facing outwardly and in engagement at its opposite ends with the side edge gaskets of this section, a bead adjacent the lower edge of the upper section adapted to engage the transverse gasket and extend onto the side gaskets to form a seal between the two sections when the sections are closed, means locking the two sec-

tions together to swing as a unit and adapted to be released to permit the upper section to be swung to the open position while the lower section remains closed, and means for securing the sections in closed position with the gaskets about the periphery of the door against the frame flange.

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