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HATCH COVER AND ACTUATING MEANS

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1 Claim. (Cl. 114—202)

This invention relates to covers for the hatch openings of ships and to operating means for moving such covers to open and closed positions.

An object of my invention is to provide improved hatch cover actuating means of a simpler and more direct acting type than has here-tofore been used and which does not require a traveling crane or other cumbersome and expensive apparatus for moving the covers to open and closed positions.

Another object of my invention is to provide improved hatch cover actuating means in which a pair of spaced rails extend longitudinally of the ship at opposite sides of a series of hatch openings and wheels on the individual covers adjacent the corners thereof are operable on such rails for shifting the covers into an out of hatch closing position.

A further object of my invention is to provide a hatch arrangement and cover actuating means, of the type referred to, in which the spacing of the hatch openings of the series and the width of the covers are such that when the covers are moved into the spaces between the pairs of openings they leave the openings substantially unobstructed.

Still another object of my invention is to provide an arrangement, of the type referred to, in which the cover actuating means includes power means at one end of the series of openings for moving the covers to open position and power means at the other end of the series for moving the covers to closed position.

Yet another object of my invention is to provide a novel construction for a wheeled hatch cover.

My invention may be further briefly summarized as consisting in certain novel combinations and arrangement of parts hereinafter described, and particularly set out in the appended claim.

In the accompanying sheets of drawings:

Fig. 1 is a top plan view of a ship provided with the hatch arrangement and cover actuating means of my invention;

Fig. 2 is a partial top plan view showing one of the hatch covers on a larger scale;

Fig. 3 is a partial vertical sectional view taken through the deck of the ship and showing the hatch cover and coaming in end elevation;

Fig. 4 is another partial vertical sectional view taken through the deck of the ship and showing a portion of the hatch cover and coaming in elevation;

Fig. 5 is a vertical sectional view taken through the hatch cover and coaming as indicated by line 5—5 of Fig. 2;

Fig. 6 is a partial vertical sectional view taken as indicated by line 6—6 of Fig. 4 and showing one of the hatch cover clamps;

Fig. 7 is a partial vertical sectional view taken through one of the wheel bearings as indicated by line 7—7 of Fig. 2; and

Fig. 8 is a partial sectional plan view taken on line 8—8 of Fig. 4 and showing the construction of one of the wheel mounting brackets at the corners of the hatch covers.

Further reference will now be made to the accompanying drawings for the purpose of describing my improved hatch construction and cover actuating means more in detail but before proceeding with the detailed description it should be understood that the drawings are to be regarded as illustrative and that the invention may be embodied in various other constructions and arrangements.

In Fig. 1 of the drawings I show a ship 10 having a longitudinally extending series of hatch openings 11 in its spar deck 12 affording access to the hold of the ship for loading and unloading cargo. Each of the hatch openings is provided with a cover 13 although as a matter of convenience I have shown covers only for the end hatches of the series. The spacing of the hatch openings and the width of the covers 13 are such that the covers can be moved into the spaces between the pairs of adjacent openings to thus leave the hatch openings substantially unobstructed.

As will be explained more in detail hereinafter, I arrange a pair of spaced continuous rails 14 to extend longitudinally of the ship at opposite ends of the hatch openings and provide the covers with wheels 15 at their corners which are operable on the rails for moving the covers to open and closed positions. To facilitate the opening and closing of the hatches I provide a winch 16, or other power means, at one end of the series of hatch openings, for example the forward end, for moving all of the hatch covers toward closed position and provide another winch 17 at the other end of the series for moving all of the hatch covers to open position. A cable 18 leading from each winch may have a bridle 19 at its outer end for detachable connection with the covers for actuating the same.

In opening the covers the bridle 19 of the winch 17 is applied to the covers in succession, beginning with the cover of the foremost hatch, and during the closing of the hatches the bridle of
the winch 16 is applied to the covers in succession, beginning with the rearmost cover. As shown in Figs. 4 and 5, each of the hatch openings 14 is surrounded by a plate-like structure 20 which extends above the deck 12 and is commonly known as a fairing. This fairing may be provided around its upper edge with a lateral flange 21 which forms a seat for a sealing gasket 22 when the hatch cover 13 is applied to the fairing. The hatch openings 11 preferably extend athwartship, that is, transversely of the ship and in substantially parallel relation with each other and may be substantially rectangular in outline. The fairing 20 corresponds in shape with the hatch opening, that is, is rectangular and the cover 13 is likewise of rectangular shape.

The hatch covers 13 are of relatively rigid construction so that when a lifting force is applied at the corners thereof, they will not sag and drag on the hatch fairing. To this end I construct the covers in the form of hollow box-like structures having vertical side and end plates 24 which define the shape of the cover and also impart stiffness thereto. The covers are closed at their tops by means of plates 24 and may be further reinforced by stiffening plates or structural members 25 extending between the side-walls 23. The outer edge of the cover may be provided with a lateral flange 26 which corresponds with the flange 21 of the fairing and cooperates with the sealing gasket 22.

As mentioned above, I provide the cover 13 with wheels 15 at its four corners which operate on the rails 14. For mounting these wheels on the cover I provide the latter with a wheel mounting bracket 23 at each of its four corners. As shown in Figs. 4 and 8 this wheel mounting bracket may be constructed as a more or less integral part of the cover by extending the end of the vertical side plate 23 and reinforcing and stiffening the same with one or more gusset plates 29 and a pair of vertical angle bars 30 at its outer edge.

The wheels may be mounted on the brackets 23 in various ways, but I prefer to use a structural member 32 for this purpose which is preferably of channel-shape and arranged to extend between a pair of the brackets in substantially parallel relation to the rails 14. The channel member 32 may be riveted or otherwise connected to the angle members 30 of the brackets with its recess opening outwardly away from the fairing. The rails 14 are laid on, and secured to, the deck 15 although spacers may be provided under the rails, if desired, to facilitate drainage and cleaning.

For mounting the wheels 15 on the channel member 32 I provide a bearing block 33 for each wheel which is preferably shaped to fit into the recess of the channel member where it may be welded or otherwise secured in place. Axle shafts 34 are mounted in the bearing blocks 33 by means of bushings 35 provided therein and project in opposite directions from the bearing block. The axle shaft extension 36 which projects inwardly toward the hatch fairing is offset or eccentric to the remainder of the shaft and forms a journal upon which the wheel 15 is rotatably mounted. The eccentric shaft-extension 36 is carried on the bearing block and the hatch fairing may be of non-circular form to provide an actuating part whereby the axle shaft may be rotated in the bearing block to cause relative raising or lowering of the wheel 15.

The eccentric mountings thus provided for the wheels 15 afford a means for lifting and lowering the cover 13 with respect to the hatch fairing 20. When the hatch cover is to be moved off of the cover to uncover the hatch opening, a wrench or the like is applied to the shaft projection 40 at each corner of the hatch opening 14. Rotation of the axle shafts through 180° the wheels are caused to press against the rails 14 and to lift the cover relative to the hatch fairing. This lifting of the cover releases the sealing gasket 22 and provides a space between the flanges of the cover and cooperates so that the cover can be moved laterally without dragging or scraping on the fairing.

When the hatch cover 13 has been thus lifted to clear the fairing, the bridge 19 of the opening which 17 is applied to the spaced ring 41 of the cover and a winding-in of the cable 18 causes the cover 13 to travel on the rails 14 toward the stern of the ship to thereby uncover the hatch opening 11. When the hatch is to be closed the cover 13 is moved back into hatch closing position by the closing projection 16, whereupon the axle shafts are again rotated through 180° to thereby lower the cover relative to the fairing and cause the flange 26 to engage the sealing gasket 22. After the cover has been lowered onto the hatch fairing it may be clamped and held against accidental shifting by means of suitable clamps or dogs 42 spaced around the outer edge of the fairing.

When the axle shafts 34 are rotated to either of their 180° positions above referred to, they may be locked against accidental turning by means of pins 43 which are adapted to be inserted through aligned openings of the bearing block and shaft.

To facilitate the locating of the hatch cover 13 with respect to the hatch fairing 20 when the cover is moved to the hatch closing position I may provide stops 45 on the hatch fairing along the forward edge of the hatch opening. As shown in Fig. 5 these stops project above the flange 21 of the fairing so as to be engaged by the cover flange 22 when the cover is in proper position on the fairing.

From the foregoing description and accompanying drawings it will now be readily seen that I have provided an improved hatch arrangement and cover actuating means whereby hatch covers can be moved to open or closed position in a more direct manner and with much less work and equipment than has heretofore been required. It will be seen further that in my arrangement all of the covers operate on the same pair of rails and it is only necessary to move each cover a relatively short distance into the space between the stops 45 and then to leave the opening entirely unobstructed. The provision of opening and closing winches at opposite ends of the series of hatch openings also facilitates the manipulation of the hatch covers. The reinforced hatch cover construction and wheel mounting to which I have provided contribute to the practicability of this arrangement and further eliminate the need for lifting cranes and other expensive apparatus which has heretofore been provided, either on the ships themselves, or on the loading and unloading docks.

While I have illustrated and described my im-
proved hatch arrangement and cover actuating means in a somewhat detailed manner, it will be understood, of course, that I do not wish to be limited to the precise arrangement of parts and details of construction herein disclosed, but regard my invention as including such changes and modifications as do not constitute a departure from the spirit of the invention and the scope of the appended claim.

Having thus described my invention I claim:

In a ship having a deck and a series of longitudinally spaced hatch openings of elongated quadrangular form and extending transversely of the ship, coamings around said openings, a track comprising rails on said deck extending longitudinally of the ship past the ends of the hatch openings, elongated quadrangular covers adapted to seat on said coamings for closing the hatch openings and each comprising a reinforced unitary metallic plate structure having brackets projecting laterally at the corners thereof and overhanging said rails, a channel-shaped bar extending along each end of the cover and connected with the corresponding pair of brackets, a pair of spaced bearings mounted in the recess of each channel-shaped bar, axle shafts journalled in said bearings and having portions projecting oppositely therefrom, the shaft portions projecting from one end of the bearings being eccentric and the shaft portions projecting from the opposite end being non-circular to provide for rotation of the shafts in said bearings, and wheels journalled on the eccentric shaft portions and operable on said rails.

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