Oct. 25, 1966 W. HAMILTON 3,280,892

HATCH COVER LINKAGE

Filed Feb. 20, 1964 3 Sheets-Sheet 1

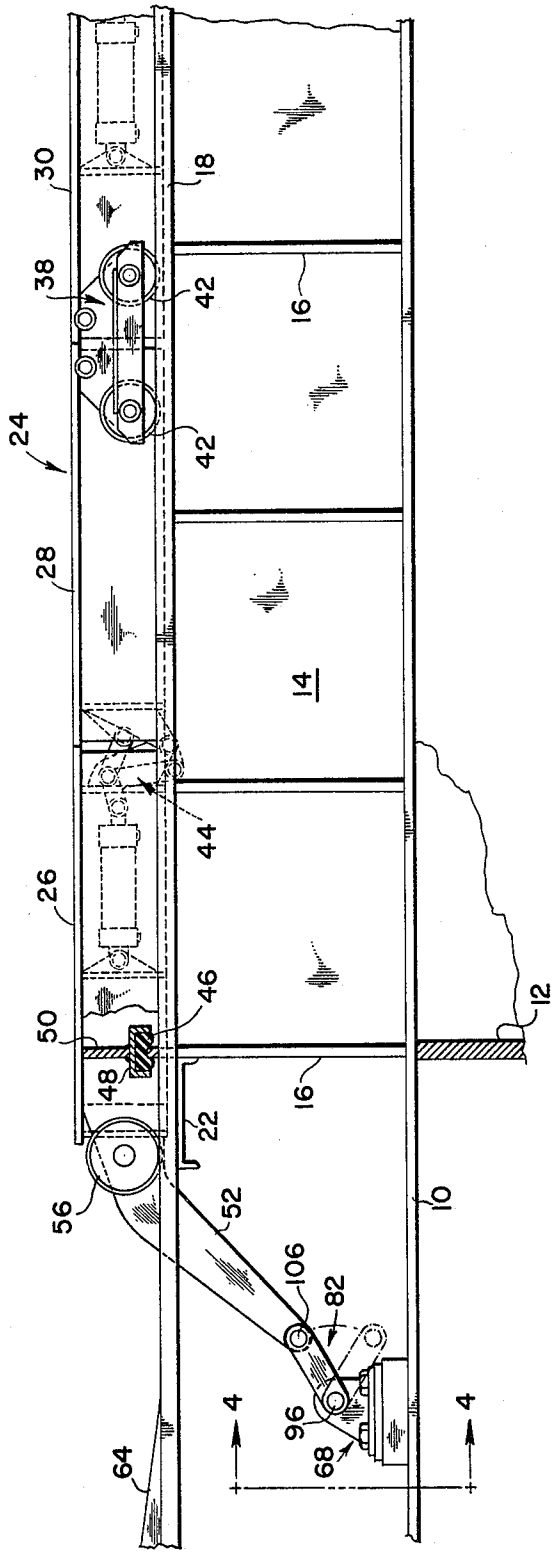


FIG. 1

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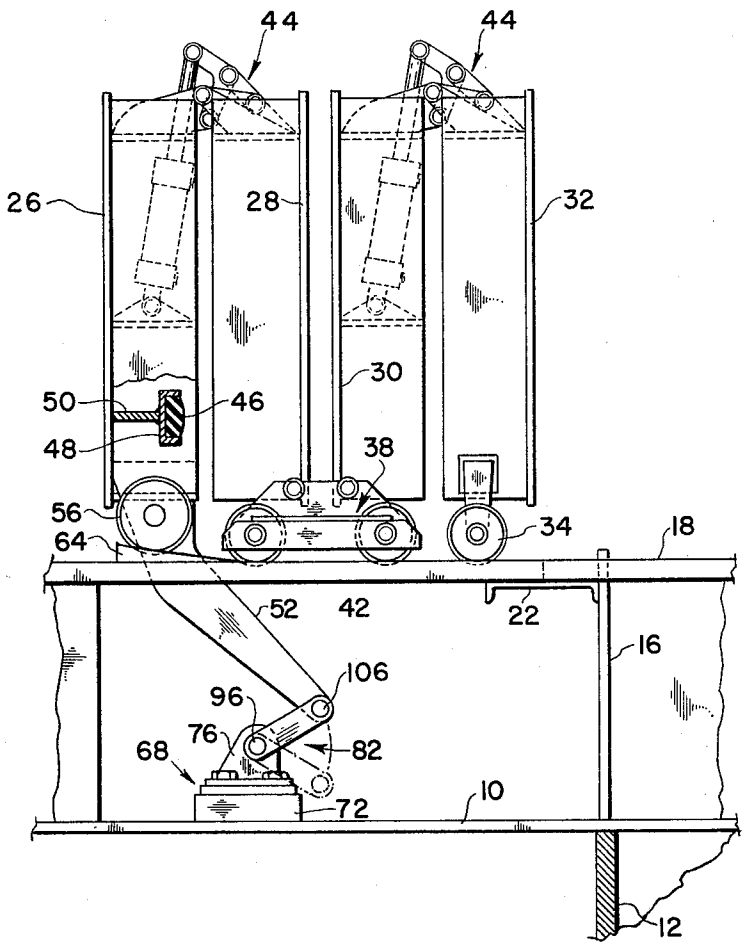


FIG. 2

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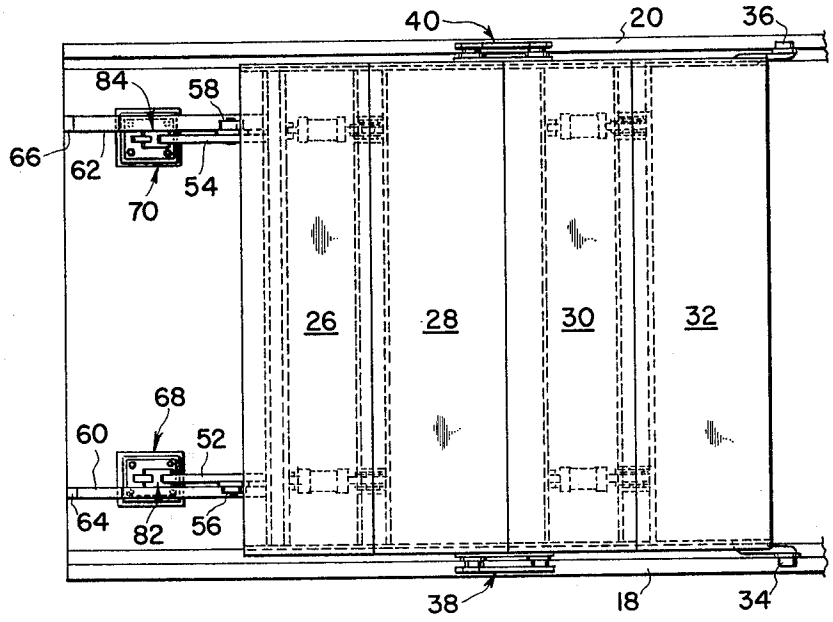


FIG. 3

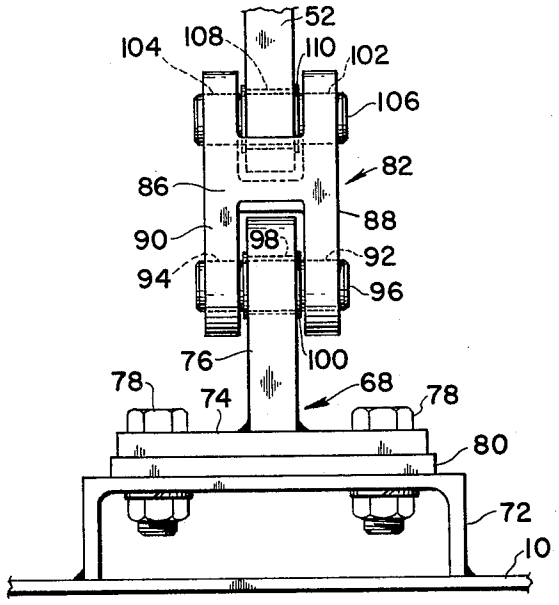


FIG. 4

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3,280,892

HATCH COVER LINKAGE

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7 Claims. (Cl. 160—206)

The present invention relates, as indicated, to a hatch cover linkage, and more particularly to an improved linkage interconnecting an articulated hatch cover panel assembly to the ship deck which permits the use of uniform sized panels movable from an aligned position covering the hatchway to an open or stowed position completely uncovering such hatchway.

In present commercially available articulated hatch cover panel assemblies, the end or outboard panel, generally through arms fixed thereto at the end and toward each side thereof, is normally directly pivotally connected to hinges fixed to the deck or coaming for permitting rotation of the outboard panel thereabout. Such fixed arm and hinge arrangements affect the stowed or open position of the panels relative to the hatchway in either of two ways. If the fixed arms are relatively short, the lateral outward movement of the outboard panel relative to the fixed hinges is correspondingly limited with the undesirable consequence of such limited movement being that the inboard panels of the articulated panel assembly overhang the hatchway thereby partially covering covering the same. In order completely to uncover the hatchway, it has been found necessary to provide relatively long arms fixed to the outer end of the outboard panel of the articulated assembly, the arms similarly being pivotally mounted to the fixed hinges. This latter arrangement has necessitated reducing the width of the outboard panel to compensate for the relatively long fixed arms in order to accommodate lateral movement of the articulated assembly to the stowed position uncovering the hatchway. The making of the outboard panel of a lesser width compared to the other panels is obviously undesirable from a fabrication standpoint and is further objectionable due to the fact that generally the actuating mechanism disposed within the outboard panel has unalterable space requirements.

With the above in mind, it is a primary object of the present invention to provide an articulated hatch cover assembly comprising individual panels of uniform size and wherein such assembly is laterally movable to a stowed position completely uncovering the hatchway.

A more specific object of the present invention is to provide a novel linkage interconnecting the outboard panel and fixed deck hinges for permitting such complete uncovering of the hatchway.

A further object of the present invention is to provide such a linkage which is characterized by its simple and economical construction and the relatively slight frictional forces attending pivotal movement thereof.

A further object of the present invention is to provide a novel linkage permitting initial panel folding with substantially reduced scrubbing of the seals operatively disposed between the hatch cover and the coaming for sealing the hatch cover when closed.

These and other objects and advantages of the present invention will become apparent as the following description proceeds.

To the accomplishment of the foregoing and related ends, the invention, then, comprises the features hereinafter fully described and particularly pointed out in the claims, the following description and the annexed drawings setting forth in detail certain illustrative embodiments of the invention, these being indicative, however, of but a few of the various ways in which the principle of the invention may be employed.

In said annexed drawings:

FIG. 1 is a side elevational view of a hatch cover panel assembly embodying the present invention, with the assembly being shown in a closed position covering the hatchway;

FIG. 2 is a side elevational view similar to FIG. 1 showing, however, the panel assembly in its stowed or open position completely uncovering the hatchway;

FIG. 3 is a top plan view of the hatch cover panel assembly of the present invention; and

FIG. 4 is an enlarged sectional view taken on lines 4—4 of FIG. 1.

Referring now in more detail to the drawings, wherein like parts have been designated by like reference characters, and initially to FIGS. 1 and 2, the ship deck **10** is provided with the usual hatchway **12** which provides in the usual manner an opening in the ship deck through which cargo can be lowered and removed. Coaming structure generally indicated at **14** is provided around the hatchway and projects upwardly from the deck **10**, the coaming comprising a plurality of transverse coaming stiffeners commonly designated at **16** which support coaming tracks **18** and **20** disposed at opposite sides of the hatchway. It will be understood that the transverse coaming stiffeners **16** do not extend into the hatchway so as to impair cargo movement therethrough. A transversely extending channel beam **22** is rigidly secured to the adjacently disposed coaming stiffeners **16** and the coaming tracks **18** and **20** and extends between the latter for reinforcing the coaming structure.

A hatch cover panel assembly generally indicated at **24** is supported by the coaming tracks **18** and **20**, the panel assembly being constructed and arranged for rolling movement along the tracks by roller means as will be hereinafter related. In the form shown, the hatch cover panel assembly **24** comprises a plurality of individual, hinged panels **26**, **28**, **30** and **32**, with the panels being shown in their horizontally aligned, closed position in FIG. 1, and in their open or stowed position in FIG. 2. It should be understood that the panel assembly in the form shown is merely exemplary of the type of panel assembly with which the novel linkage of the present invention can be advantageously employed, with the number of individual panels being obviously variable to include fewer or more than the number illustrated.

To permit folding of the panels between their closed and open positions, the panels are hinged adjacent either their top or bottom edges relative to the adjacently disposed panels, in the manner clearly illustrated in FIG. 2. To facilitate movement of the panels along the tracks **18** and **20**, the inboard panel **32** is provided at the sides thereof with rollers **34** and **36**, FIG. 3, engageable with the coaming tracks **18** and **20**, respectively. Truck assemblies generally designated at **38** and **40** are pivotally connected to the adjacently disposed ends of panels **28** and **30** at opposite sides thereof, and each of the truck assemblies, referring to truck assembly **38**, is provided with a pair of rollers commonly designated at **42** which engage the coaming tracks for controlled rolling movement of the hatch cover assembly therealong.

In the form shown, hydraulic actuating mechanisms generally indicated at **44** are disposed within the panels and are suitably connected to a source of fluid supply for actuating the panels. It will be apparent, however, that any suitable means can be employed for such panel actuation. The truck assemblies **38** and **40** and the actuating mechanisms **44** clearly form no part of the instant invention and have been described only in sufficient detail to afford a clear understanding of the present invention.

A plurality of coaming seals are provided disposed between the hatch cover panels and the coaming for sealing the hatch when the panels are in their closed position.

One such seal **46** has been illustrated in the drawings, being carried by a seal flange **48** connected to the panel **26** through web **50**. It will be understood that similar seals are provided with the hatch cover for engagement with the coaming along both sides and at the opposite end thereof.

Referring now to the novel linkage means for controlling the lateral movement of the panel assembly away from the hatch opening during panel folding, the outer end of the outboard panel **26** has rigidly secured thereto relatively adjacent the sides thereof a pair of hinge arms **52** and **54**. As readily seen in FIGS. 1 and 2, the opposite ends of the arms **52** and **54** are inclined downwardly and rearwardly and extend substantially below the coaming tracks **18** and **20**. A pair of rollers **56** and **58** are journalled one on each of the arms **52** and **54**, and are supported by track sections **60** and **62** which may comprise continuous extensions of the coaming tracks **18** and **20**, but which, in the form shown, comprise separate track sections inwardly spaced from the main coaming tracks **18** and **20**, as clearly shown in FIG. 3. The rollers **56** and **58** thus serve to support the outboard end of the panel **26** during all positions of lateral and pivotal movement thereof. A pair of inclined ramp-like members **64** and **66** are secured respectively to each of the coaming track sections **60** and **62** adjacent the outer ends thereof for aiding in the initial closing movement of the panels.

A pair of fixed hinge blocks generally indicated at **68** and **70** are rigidly secured to the deck **10**. Both of the hinge blocks **68** and **70** are identically constructed and, referring primarily to FIG. 4, the hinge block **68** comprises an inverted U-shaped channel member **72** mounted on the deck **10**. A generally T-shaped member **74** having an upwardly extending tongue portion **76** is bolted to the base of the channel **72** through nut and bolt connections commonly designated at **78**. In the form shown a spacing plate **80** is disposed between the hinge member **74** and the base of the channel **72**.

A pair of generally H-shaped connecting links generally indicated at **82** and **84** are provided each disposed respectively between the fixed hinge blocks **68** and **70** and the lower end portions of the arms **52** and **54**. The connecting links **82** and **84** are identically constructed, and connecting link **82**, for example, referring to FIG. 4, comprises a central web section **86** interconnecting side plates **88** and **90**. The side plates **88** and **90** adjacent the lower portions thereof are formed with aligned openings **92** and **94**, respectively, for receiving pivot pin **96**. The tongue **76** of the hinge member **74** extends into the opening defined by the side plates **88** and **90** and the tongue **76** is similarly formed with an opening **98** for receiving the pivot pin **96**, a self-lubricating bearing **100** being disposed around pin **96** within the opening **98**.

The upper portion of the connecting link **82** is similarly arranged, a pair of aligned openings **102** and **104** being formed in the upper portions of the side plates **88** and **90** to receive therethrough pivot pin **106**. The lower portion of the arm **52** is formed with an opening **108** for receiving the pin **106**, a self-lubricating bearing **110** being disposed in the opening **108** around the pin **106**. It will be understood that the lower portion of the arm **54** at the opposite side of the outboard panel is interconnected with the hinge block **70** in precisely the same manner.

Referring now to the operation of the described structure, the position of the connecting links **82** and **84** when the panel assembly is in a closed position covering the hatchway is shown in FIG. 1. Upon actuation of the actuating mechanisms **44**, the panels **26**, **28**, **30** and **32** will be folded in the usual manner and such actuation will simultaneously produce lateral rolling movement of the panel assembly along the coaming tracks in a direction away from the hatchway or to the left, as viewed in FIG. 1. Such lateral movement is guided by the rollers **34**, **36**, **56** and **58** mounted at the side of the hatch cover, and the outboard panel **26** is supported and guided at the

outer end thereof by the rollers **56** and **58**. As the outboard panel **26** moves during folding from its horizontal, FIG. 1 position, toward its vertical, FIG. 2 position, the arms **52** and **54** will likewise be reoriented relative to their FIG. 1 position, moving in a counterclockwise direction about their pivotal connections with the links **82** and **84**. As the outboard panel **26** is folded and moves simultaneously laterally outwardly, the lower portions of the arms **52** and **54** will move downwardly relative to the fixed hinge blocks **68** and **70** thereby effecting clockwise movement of the connecting links **82** and **84** about their pivotal connections with the hinge blocks **68** and **70**. The arc through which the connecting links **82** and **84** move about their pivotal connections with the hinge blocks **68** and **70** is indicated both in FIGS. 1 and 2 by means of dashed lines.

As will be apparent, the lower rotative position of the connecting links **82** and **84** about their pivotal axes will be effected when the rollers **56** and **58** are substantially vertically above the pivotal connections between the arms **52** and **54** and the connecting links, at which position the arms effect maximum vertical displacement. As the panel assembly continues to travel outwardly away from the hatchway and the rollers **56** and **58** travel beyond the noted pivotal connections, the connecting links **82** and **84** will pivot counterclockwise or upwardly, as viewed in FIGS. 1 and 2, about their pivotal connections with the hinge blocks **68** and **70** and will eventually assume the position indicated in FIG. 2 when the panel assembly is in a completely folded position. In the latter such position it will be seen that the inboard panel **32** is disposed completely outwardly of the hatchway **12** thereby completely to expose the same for unimpaired movement of cargo therethrough. The panel assembly can be maintained in its folded position by any suitable means.

During the return movement of the panel assembly from its folded, FIG. 2 position to its closed, FIG. 1 position, the movement of the arms **52** and **54** and the connecting links **82** and **84** relative to the fixed hinge blocks is substantially the reverse of that previously described during the folding movement of the panel assembly. The connecting links **82** and **84** will thus move through the rotative arc indicated and will, when the panel assembly reaches its closed position, reassume their FIG. 1 orientation relative to the arms **52** and **54**. The initial closing movement of the panel assembly, as above noted, is aided by the inclined members **64** and **66** down which the rollers **56** and **58** move during initial panel movement.

It will be noted that the described linkage arrangement permits unconfined, substantially vertical movement of the lower ends of the arms **52** and **54** during the initial stages of panel folding and simultaneous lateral movement whereby the folding of the panels is attended by a minimum of scrubbing of the coaming seals.

It will thus be seen that the present invention provides a novel linkage arrangement by means of which each panel of the panel assembly can be of uniform size thereby eliminating fabrication of varying size panels, and wherein the panel assembly comprised of such uniform sized panels can be moved during the folding operation to a position completely exposing the hatchway thereby not to impair movement of cargo therethrough. The linkage is, moreover, extremely simple and is provided with self-lubricating bearings at the pivotal connections thereof with the fixed hinge blocks and the arms of the outboard panel thereby to eliminate the need for constant lubrication and maintenance.

Other modes of applying the principle of the invention may be employed, change being made as regards the details described, provided the features stated in any of the following claims or the equivalent of such be employed.

I therefore particularly point out and distinctly claim as my invention:

1. A hatch cover panel assembly for a hatchway formed in the deck of a ship, comprising a plurality of articulated panels supported by and movable on coaming track means above said deck, said panel assembly being movable between a closed position covering said hatchway and a folded, open position completely uncovering said hatchway, means for folding said panels, arm means mounted on the outboard panel of said panel assembly at the outer end thereof, the opposite end of said arm means extending downwardly approximately midway between said coaming track means and said deck when said outboard panel is in a horizontal, closed position, hinge means mounted on said deck laterally outwardly of said outboard panel and said arm means when said panel is in said horizontal, closed position, and link means pivotally connected at one end to said hinge means and at its other end to said opposite end of said arm means, the arrangement being such as to permit the lateral movement of said panel assembly during folding thereof partially laterally outwardly relative to a vertical plane through said pivotal connection of said link means to said hinge means to completely uncover said hatchway.

2. The combination of claim 1 wherein the pivotal connection between said arm means and said link means is spaced slightly above and laterally inward from the pivotal connection between said link means and said hinge means when said outboard panel is in a horizontal, closed position, the movement of said opposite end of said arm means being generally vertically downward during initial folding of said panel assembly thereby to minimize scrubbing of the coaming seal carried by said outboard panel.

3. The combination of claim 1 wherein said link means during panel folding moves first clockwise about its pivotal connection with said hinge means and during the latter stages of panel folding moves counterclockwise about such connection, with said link means being approximately in the same position when said panels are in either a folded or unfolded position.

4. A hatch cover panel assembly for a hatchway formed in the deck of a ship, comprising a plurality of articulated panels supported by and movable on coaming track means above said deck, said panel assembly being movable between a closed position covering said hatchway and a folded, open position completely uncovering said hatchway, means for folding said panels, arm means mounted on the outboard panel of said panel assembly at the outer end thereof, roller means carried by said arm means and engaging said coaming track means for controlling movement of said panel assembly therealong, the opposite end of said arm means extending downwardly approximately midway between said coaming track means and said deck when said outboard panel is in a horizontal, closed position, hinge means mounted on said deck laterally outwardly of said outboard panel and said arm means when said panel is in said horizontal, closed position, and link means pivotally connected at one end to said hinge means and at its other end to said opposite end of said arm means, said pivotal connection between said arm means and said link means being spaced slightly above and laterally inward from the pivotal connection between said link means and said hinge means when said outboard panel is in a horizontal, closed position, the arrangement being such as to permit the lateral movement of said panel assembly during folding thereof partially laterally outwardly relative to a vertical plane through said pivotal connection of said link means to said hinge means to completely uncover said hatchway.

5. The combination of claim 4 wherein said link means during panel folding moves first clockwise about its pivotal connection with said hinge means and during the latter stages of panel folding moves counterclockwise about such connection, with said link means being approximately in the same position when said panels are in either a folded or unfolded position.

6. A hatch cover panel assembly for a hatchway formed in the deck of a ship, comprising a linkage for interconnecting the outboard panel of said panel assembly to a plurality of fixed hinge blocks mounted on said deck substantially below and laterally outwardly of said outboard panel, comprising a plurality of hinge arms secured to the outer end of said outboard panel, the opposite end of each of said hinge arms terminating relatively adjacent a respective hinge block, and a plurality of connecting links each of which is pivotally connected at one end to said respective hinge block and at its other end to the adjacent end of the associated hinge arm, the pivotal connections between said hinge arms and said links being spaced slightly above and laterally inward from the pivotal connections between said links and said hinge blocks, said links during initial panel folding movement pivoting clockwise about said pivotal connections with said hinge blocks and during the latter stages of panel folding pivoting counterclockwise about said pivotal connections, the arrangement being such as to permit the lateral movement of said panel assembly during folding thereof partially laterally outwardly relative to a vertical plane through said pivotal connection of said links to said hinge blocks to completely uncover said hatchway.

7. A hatch cover panel assembly for a hatchway formed in the deck of a ship, comprising a plurality of articulated panels supported by and movable on track means positioned substantially above said deck and extending along both sides of said hatchway, said panel assembly being movable along said track means between an unfolded position covering said hatchway and a laterally outward, folded position completely uncovering said hatchway, means for folding said panels, fixed hinge means mounted on said deck laterally between the respective unfolded and folded positions of the outboard panel of said panel assembly, a pair of relatively long hinge arms mounted on the outer end of the outboard panel of said panel assembly at the respective sides thereof, the opposite end of each of said hinge arms when said outboard panel is in a horizontal, closed position terminating relatively adjacent said fixed hinge means, and a pair of relatively short links interconnecting said hinge arms to said fixed hinge means, each of said links being pivotally connected at one end to the adjacent end of a respective hinge arm and at its other end to said fixed hinge means at a point substantially below said track means, the arrangement being such as to permit the lateral movement of said panel assembly during folding thereof partially laterally outwardly relative to a vertical plane through said pivotal connections of said links to said hinge means to completely uncover said hatchway.

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