

Nov. 30, 1965

PER-ERIK JONSSON.
HINGE MEANS FOR MOVABLE CLOSURE PANELS
AND PANELS PROVIDED THEREWITH

3,220,468

Filed March 5, 1963

3 Sheets-Sheet 1

Fig. 1.

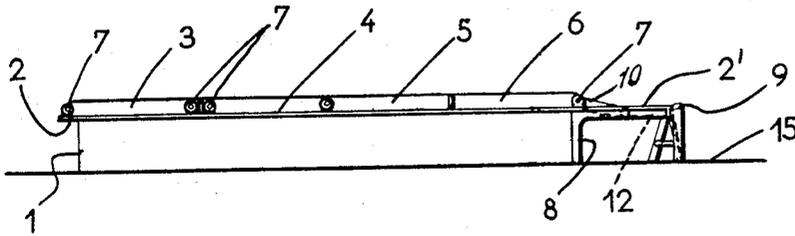


Fig. 2.

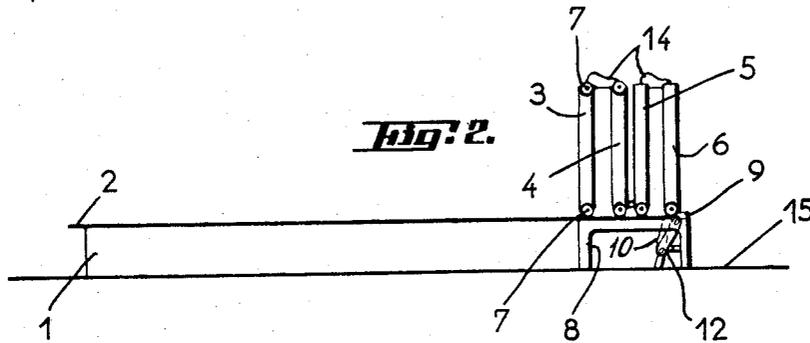
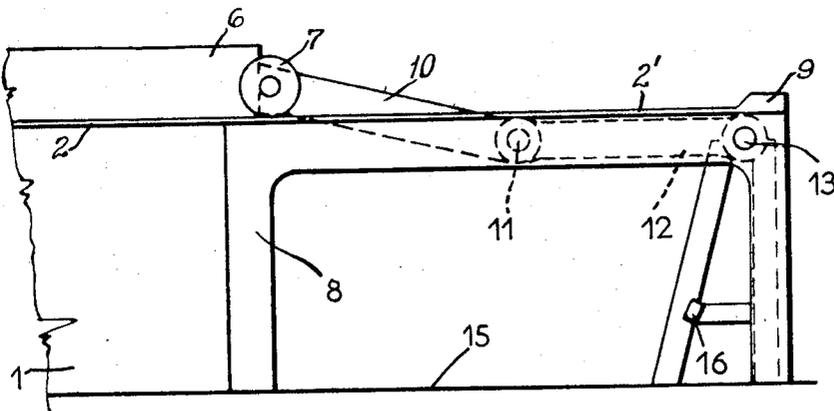


Fig. 3.



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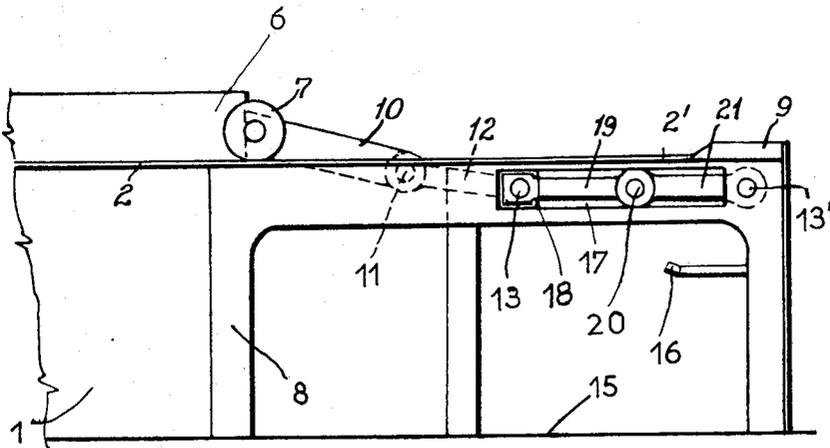
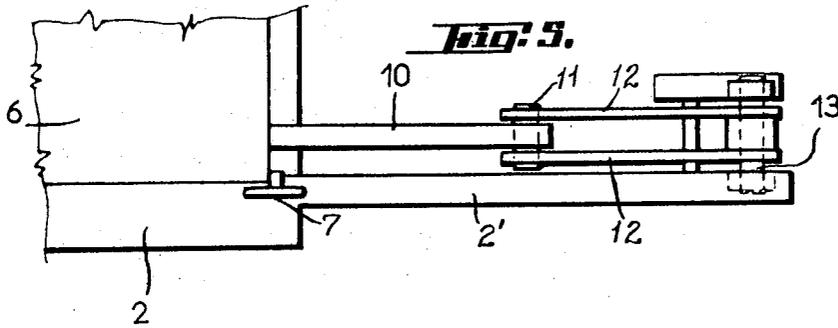
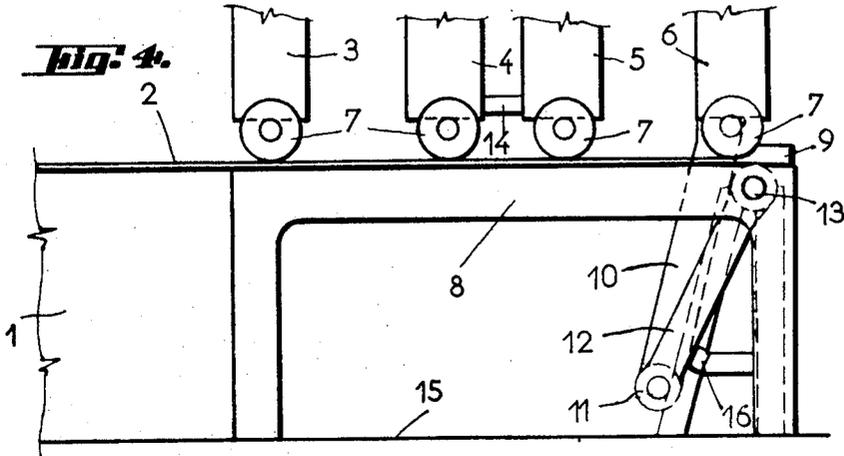
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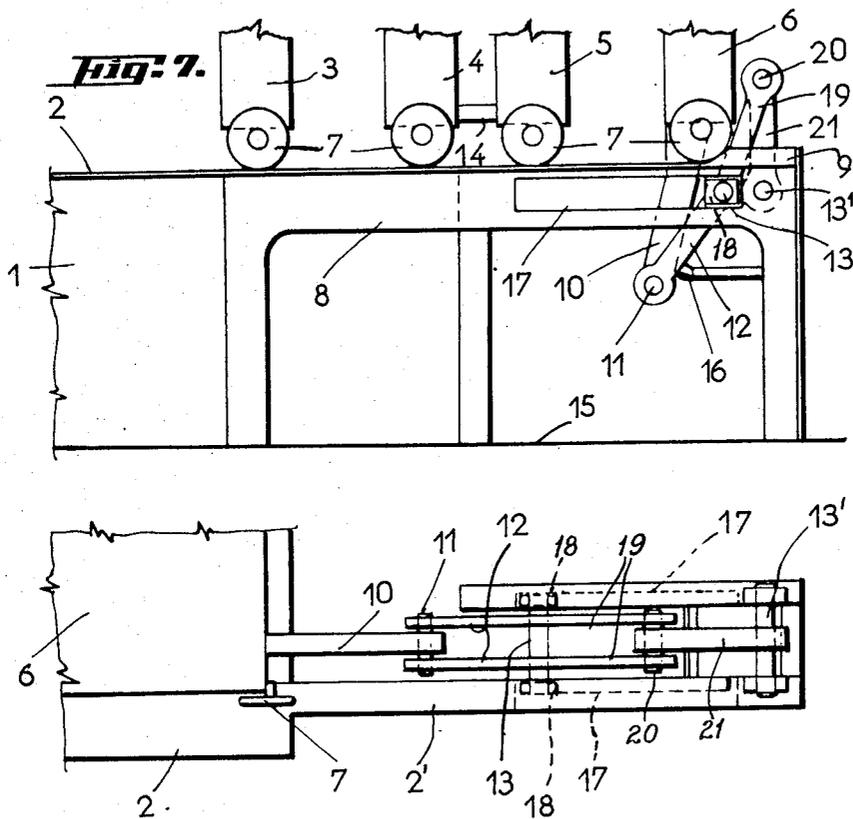


Fig. 8.

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HINGE MEANS FOR MOVABLE CLOSURE PANELS AND PANELS PROVIDED THEREWITH

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891,260

9 Claims. (Cl. 160-206)

This invention relates essentially to hinge means for pivotally connecting a plurality of elements constituting a movable panel for closing the hatchway of a ship's hold or like aperture to the edge of said aperture, or for a panel consisting of two or more panel elements or sections pivotally interconnected, said panel being adapted to be mounted on its small or narrow side on a support disposed laterally with respect to said aperture so as to occupy a substantially vertical position. It has already been proposed to connect the panel or the panel section nearest to said support on each one of the two opposite edges of the hatchway by means of a simple one-piece arm projecting with respect to the panel or panel section and pivoted at a fixed point on said support. This hinge device suffers from certain inconveniences due to the fact that the vertical space occupied by the corresponding links or arms, in the upright or stowed position of the panel is too considerable. These inconveniences are more pronounced when the panel or panel sections are to be operated through hydraulic mechanisms incorporated in said panels or panel sections. In other known hatch cover constructions, the panel or cover section at one end is provided near its outer end edge with a pair of side rollers or wheels running on tracks extending outside of the hatchway from runways on the hatch coaming and also with a pair of endwise projecting spaced arms fitted with follower trunnion pins, the pins engaging guiding slots arranged in upstanding support members outside of the hatch in such a manner that said cover section may swing on its wheels to a vertical position for stowage on said tracks. As the hatch cover is relatively heavy, a drawback of such a design is that the friction incident to the sliding engagement of the pins with the slots tends to resist the powered motion of the cover, resulting in a requirement for increased motive power. Moreover, the pressure of the tilting moment caused by the cover weight and transmitted by the lever arm results in substantial wear of the co-operating pins and slots. In addition, in practice it is difficult to cut out the slots in their proper locations and proper shapes. A further drawback of this arrangement is that, as the number of foldable cover sections exceeds two, the length of the outside tracks must be increased in order to clear the hatchway and accommodate the aggregate thickness of the cover sections in their vertical stowed position, and the length of the aforesaid arms must be increased in order to allow the end cover section to move toward and away from its hatch closing position to its stowed position. The vertical space needed by the lengthened arms in the upright stowed position is thereby increased to such an extent that the deck would generally have to be recessed.

It is the essential object of the present invention to avoid the drawbacks set forth hereinabove by providing improved hinge means for hatchway and like panels and panel sections, which may be provided in any desirable number and which are remarkable notably in that the panel or panel section nearest to the aforesaid support is connected on each one of the two opposite edges to an arm pivoted on one end of a link having its opposed end pivoted on said support, whereby, after the panel has

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been positioned on the support, the arm and link extend downwardly respectively from the panel and from the pivot pin between said link and said support. With this disposal, in the stowed position of the panel, said arm and link are so positioned that they do not interfere with the vertical sides of the panel. Preferably, said arm and link are so disposed relative to each other that in the hatchway closing position of said panel or panel sections they form together an obtuse angle having its vertex directed downwardly.

This invention is also concerned with hatchway panels or like structures equipped with a hinge device of the type set forth hereinabove.

In order to afford a clearer understanding of the present invention and of the manner in which the same may be carried out in practice, reference will now be made to the accompanying drawings illustrating diagrammatically by way of example two typical forms of embodiments of the invention, it being understood that changes in the precise embodiments shown and described herein may be made within the scope of the invention as defined by the appended claims. Other objects and advantages will become apparent from the following description taken in conjunction with the accompanying drawings, in which:

FIGURE 1 illustrates diagrammatically in side elevational view a hatchway panel divided into four sections shown in their hatchway closing position and comprising an end section connected to a hinge device constructed according to this invention;

FIGURE 2 is a diagrammatic side elevational view showing the same hatchway panel structure with the panel sections stowed at one end of the hatchway;

FIGURE 3 is a diagrammatic side elevational view showing on a larger scale the right-hand portion of FIGURE 1;

FIGURE 4 is another side elevational view showing on a larger scale the right-hand portion of FIGURE 2;

FIGURE 5 illustrates diagrammatically on a larger scale a plan view of the device of FIGURE 3; and FIGURES 6 to 8 inclusive are other diagrammatic views corresponding to FIGURES 3 to 5 but showing another form of embodiment of the device of this invention.

In the drawings, the reference numeral 1 designates the frame or coaming surrounding the hatchway aperture and carrying a flange 2 supporting the panel sections 3, 4, 5 and 6 (which are four in number in the drawings), although this number can be varied to suit requirements shown in the hatchway closing position. The adjacent edges of these panel sections are interconnected through links 14 so that the panel sections may be moved from said closing position in which they are substantially coplanar to a vertical position by moving these sections through a suitable device, not shown, so that they are pushed together from the left, as seen in FIGURE 1, by pivoting simultaneously about their horizontal pivot or hinge pins. In this stowed position they occupy little space in the horizontal direction. To facilitate the movements of said sections to their vertical or stowed position they carry on their opposite sides rollers or wheels 7 adapted to roll on the coaming flange 2 having an extension 2' on the right-hand side of the frame 1 over a frame or support 8 constituting a track or base for the panel sections. The end of flange or track 2' which is remote from the hatchway frame 1 is provided with a stop member 9. The edge of panel section 6 nearest to the support 8 in the open hatchway position is carried by a pair of wheels 7 and rigidly connected, inside each track extension 2', with an arm 10 extending obliquely downwardly toward the remote end of support 8 so as

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to form a relatively small angle with the horizontal. The outer end of this arm 10 is connected through a horizontal pivot pin 11 to one end of a link 12 having its opposed end pivoted by means of a horizontal pin 13 to the remote end of support 8. In the hatchway closing position of the panel sections the arm 10 and link 12 form together an obtuse angle with the vertex directed downwardly.

When the panel sections are moved to their stowed position on the support 8, the ends of arm 10 and link 12 which are connected through the pivot pin 11 move downwardly toward the ship's deck 15 to a position in which they are substantially below the level of the coaming flange or track 2'. In the stowed position of the panel sections the link 12 will abut against the stop block 16 to limit the pivotal movement when the wheels 7 of panel section 6 engage the stop members 9 at the end of track 2'.

The alternate form of embodiment of the invention shown in FIGURES 6 to 8 differs from the form of embodiment of FIGURES 1 to 5 described hereinabove in that the pivot pin 13 is adapted to slide in a substantially horizontal plane and in a direction at right angles to its axis, said pivot pin being connected to another arm and link system pivoted in turn on said support 8 through a pivot pin held against lateral sliding movement.

As shown in the drawings, the support or like structure 8 is provided on both sides with a horizontal slide-way 17 extending at right angles to the pin 13 and guiding a slide block 18 or a pair of slide blocks 18, said pin 13 being journaled in said slide block or blocks. The link 12 connected to the pivot pin 13 has an extension in the form of an arm 19 (or is rigidly connected thereto) pivoted in turn by means of a pin 20 on one end of a link 21 having its other end pivoted through a pin 13' on the support 8. This last-named pivot pin 13' is therefore held against lateral movement. The arms of the two-armed lever 12, 19 form together, in the hatchway opening position, an obtuse angle having its angle directed downwardly.

During the movement of the panel or panel sections to their stowed positions, the slide blocks 18 carrying the pivot pins 13 will move from a limit position shown in FIGURE 6 to another position shown in FIGURE 7. In this last-named position the arm 10 and link 12, as in the preceding form of embodiment, are pivoted downwardly until they engage a stop member 16. The arm 19 and link 21 will pivot upwardly, behind the panel or panel section 6 remote from the hatchway aperture. With this construction relatively short, arm 19 and link 21 can be used, and these members will not interfere whatsoever during the hatchway panel movements.

Of course, the pivot pin 13' may also be mounted in a slide block like the pivot pin 13 and connected to a complementary arm and link system pivoted in turn on the support by means of a pivot pin held against lateral motion, and it is assumed that this complementary arm and link system (or a multiple system) constitutes an integral part of this invention.

Although the present invention has been described in conjunction with two preferred embodiments, it is to be understood that modifications and variations may be resorted to without departing from the scope of the invention, as those skilled in the art will readily understand. Thus, the arm 10 may be pivoted on the hatchway panel or section 6. The wheels 7 may be replaced by skids or like sliding members. Such and other modifications and variations are considered to be within the purview and scope of the invention and appended claims.

What I claim is:

1. In a ship having at least one deck with at least one hatch therein, a coaming surrounding the hatch and having at least two opposite sides, a pair of substantially parallel runways provided on and along said opposite

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sides respectively, a frame outside of the hatch and adjacent to one end of said coaming, a pair of tracks supported on said frame substantially in flush relationship with and in registering extension of said runways respectively, a pair of upwardly projecting stop members provided at the ends of each of said tracks farthest from the hatch, at least one hatch cover panel carrying at least one pair of wheels adjacent the end of said hatch cover which is next to said frame for rolling on and being supported by said runways and tracks, said cover panel being adapted to swing on said wheels for being stowed in an upright hatch opening position on said tracks with its wheels engaging said stop members, at least one bracket arm integral with said cover panel at the end thereof which is next to said frame and projecting endwise and sloping downwards from said cover panel in its horizontal position, said bracket arm extending in a substantially vertical plane parallel to said tracks so as to reach below the level of and between said tracks, linkage means movable in said vertical plane and pivotally connected at one end to one end of said bracket arm and at the opposite end to a fixed pivot point at that end of said frame which is farthest from the hatch, at least one longitudinal portion of said linkage means adjacent said pivot point extending substantially horizontally below said tracks in the horizontal hatch closing position of said cover panel so as to form with said arm an obtuse angle the vertex of which is directed downwards, and lower stop means carried by said frame and located substantially in said vertical plane and engageable by said linkage means in the upright hatch opening position of said cover panel, in which position said bracket arm and said linkage means extend downwardly.

2. A device according to claim 1 wherein said linkage means comprises a substantially straight rod and said fixed pivot point is substantially on a level with the pivotal connection of said rod with said bracket arm.

3. A device according to claim 2 wherein said cover panel forms the end cover section of an even number of pivotally interconnected cover sections, each cover section carrying at least one pair of side wheels and said cover sections being foldable in close order in an upstanding stowed position on said tracks in which stowed position said cover sections are arranged in pairs, and the adjacent cover sections of two successive pairs being pivotally connected through at least one drag link.

4. A device according to claim 2, wherein said rod comprises a pair of substantially parallel connecting links formed with apertured ends, which connecting links are pivoted at one end through a trunnion pin to said bracket arm and arranged in symmetrical relationship on either side thereof, and pivoted at the opposite end through a pivot pin to said frame.

5. A device according to claim 1 wherein said linkage means comprises at least one two-toggle system having a double-armed lever rotatably fulcrumed intermediate its ends to said frame through a trunnion pin reciprocally movable along a substantially straight path in constraining guide means formed on said frame and extending substantially parallel to said tracks, one lever arm of the double-armed lever being pivoted to said bracket arm, and a link pivotally connected at one end to the other lever arm of the double-armed lever and at its opposite end to said fixed pivot point.

6. A device according to claim 5 wherein said trunnion pin of said double-armed lever is carried by at least one sliding block, said sliding block engaging a substantially straight guide slot extending substantially parallel to said tracks, and wherein said fixed pivot point is substantially on a level with the center line of said guide slot, said double-armed lever being bent so that the two lever arms thereof form an obtuse angle the vertex of which is pointing downwards, the lengths of said guide slot and of said link being such that, in the hatch closing position of said cover panel, said other lever arm and

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said link are substantially aligned in extension of each other parallel to said tracks.

7. A device according to claim 6 wherein said cover panel forms the end cover section of an even number of pivotally interconnected cover sections, each cover section carrying at least one pair of side wheels and said cover sections being foldable in close order in an upstanding stowed position on said tracks in which stowed position said cover sections are arranged in separate pairs, and the adjacent cover sections of two successive pairs being pivotally connected through at least one drag link.

8. A device according to claim 6 wherein said double-armed lever comprises a pair of substantially parallel connecting rods formed with apertured ends and pivoted endwise through pins to said bracket arm and link respectively in symmetrical relationship on either side thereof, said trunnion pin being supported endwise by two sliding blocks respectively engaging two confronting guide slots arranged in said frame in registering relation.

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9. A device according to claim 6 having a second two-toggle system similar to the first named two-toggle system, and having a second double-armed lever, pivoted on a constrainedly slidable fulcrum, and a second link hingedly connected to said second double-armed lever, said second two-toggle system being interposed and pivotally connected in series between said first named link and said fixed pivot point.

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HARRISON R. MOSELEY, *Primary Examiner.*

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,220,468

November 30, 1965

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It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

In the heading to the printed specification, line 8, for "Mar. 12, 1962" read -- Mar. 15, 1962 --.

Signed and sealed this 17th day of January 1967.

(SEAL)

Attest:

ERNEST W. SWIDER
Attesting Officer

EDWARD J. BRENNER
Commissioner of Patents