April 1, 1952 J. MacGREGOR 2,590,985

SHIP'S HATCH COVER

Filed Feb. 18, 1948 2 SHEETS—SHEET 1

Fig.1.

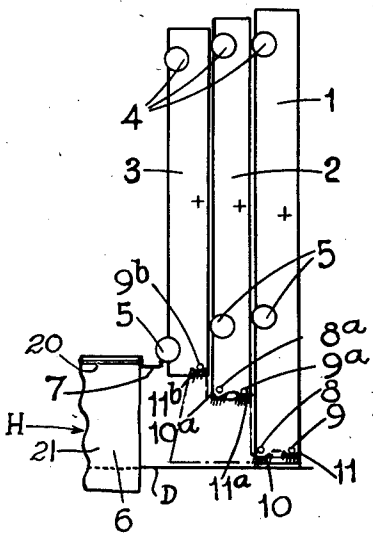


Fig.2.

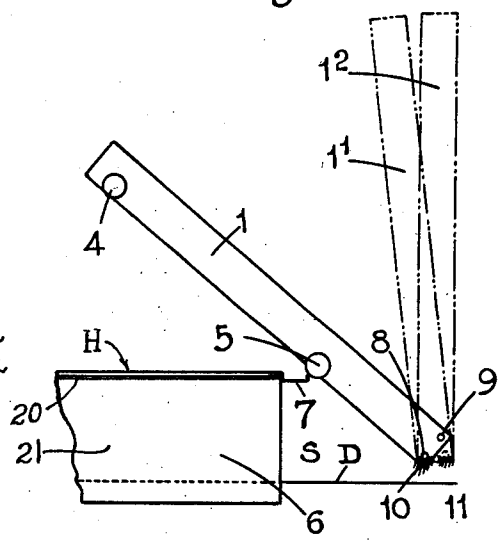


Fig.3.

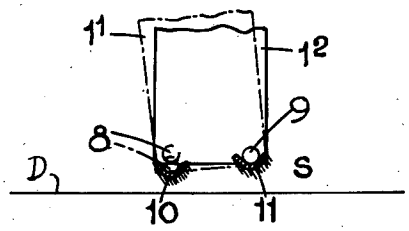


Fig.4.

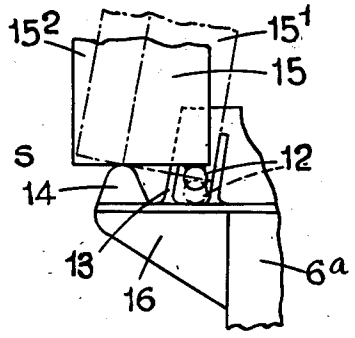
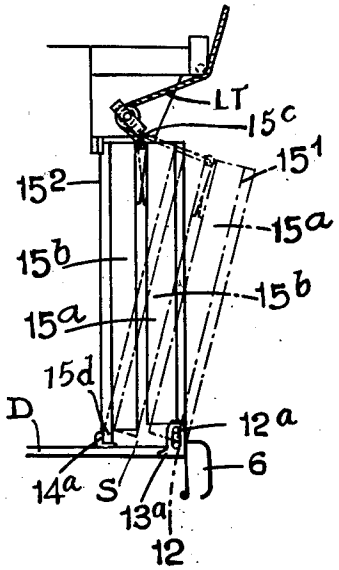


Fig.5.



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SHIP'S HATCH COVER

Filed Feb. 18, 1948 2 SHEETS—SHEET 2

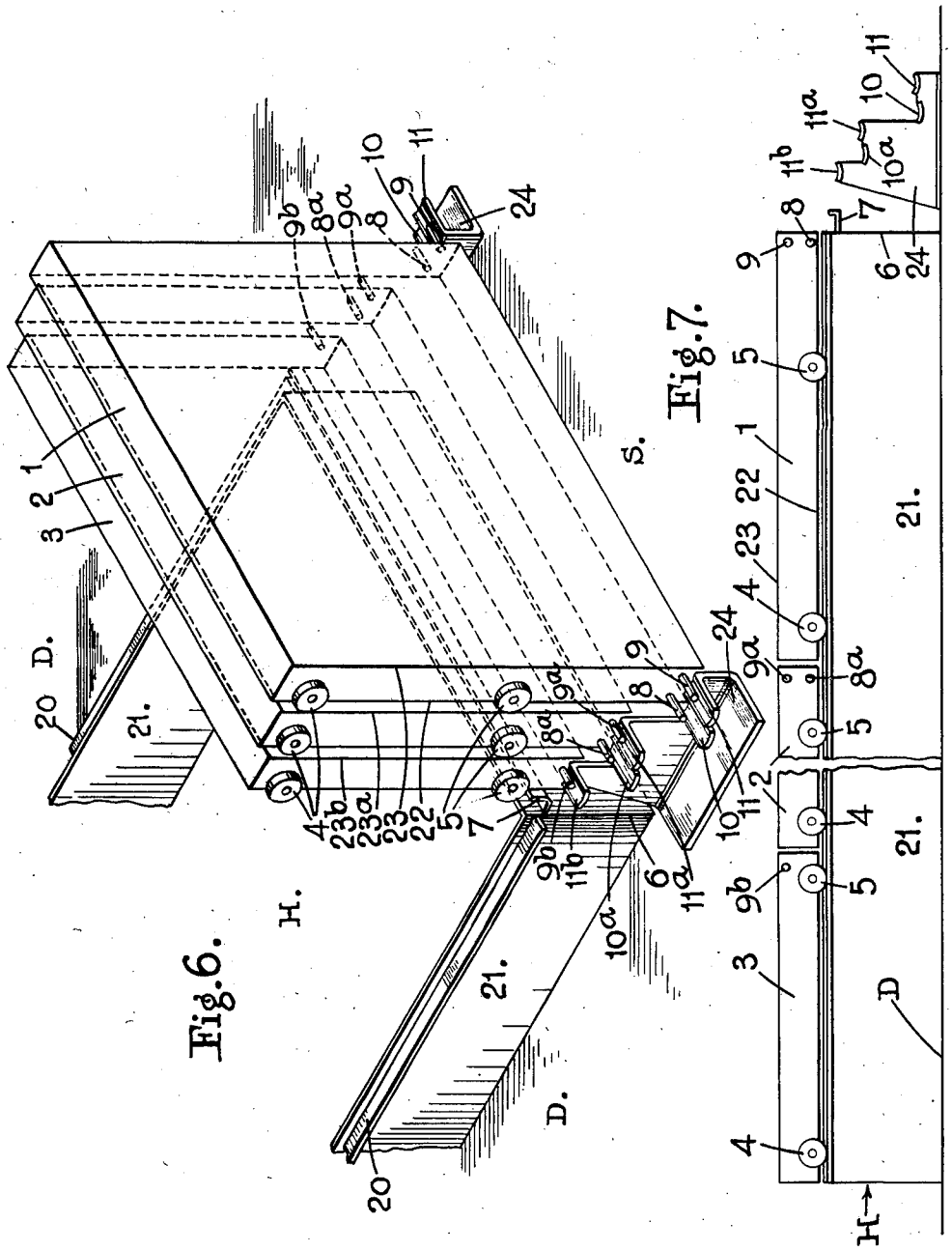


Fig. 6.

Fig. 7.

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SHIP'S HATCH COVER

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Section 1, Public Law 690, August 8, 1946
Patent expires October 7, 1960

6 Claims. (Cl. 114—202)

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This invention has reference to ships' hatch covers of steel (lined or unlined with heat-insulating material) primarily of the kind constructed to roll along the coaming on runners to one end or side and there to be tipped up into substantially a vertical position in a stowage space outside the hatch confines. Covers of this character are frequently made of a plurality of separate sections and in this case each section has been rolled and tipped in the above manner so as to be stowed away in superimposed fashion. The present invention concerns either single-piece covers or sectional covers, and the words "section" or "each section" are used herein to be read as including a single cover when the context admits.

Although this invention is more particularly concerned with a steel hatch cover of the above kind it is also applicable, as will be made clear hereinafter, to a hinged cover, i. e., a cover in which two sections are hinged together at their abutting edges so that they are folded together when raised. Also the invention is applicable to a cover having a section which is hinged at one edge to the end of the hatch.

Up to the present it is necessary with sections which are stowed perfectly vertically to haul or lever each section over its center of gravity when it is lowered from a vertical position. It has been proposed also, for example in British patent specification No. 477,373 (Williamson and MacGregor), to show the sections in an almost vertical position so that they lower automatically when freed, but in this position, they occupy more fore and aft space than if stowed vertically. In this prior construction the sections are transferred from the runways on the hatches to the stacked positions by a rocking movement of the sections about two different pivotal axes in succession.

The object of this invention is to provide an arrangement by which it is possible to stow the sections vertically and at the same time provide that they can lower automatically that is to say purely by gravity, when freed.

According to the invention, there is provided a method of tipping and stowing hatch covers or sections into a vertical position in a stowage space outside the hatch confines which consists in lifting each section pivotally successively about a plurality of pivotal points at or near its end so as to rest finally in a vertical position on a pivotal axis so disposed with relation to the centre of gravity of the section that the section tends to fall back towards the hatch, and holding the section in this position by lifting tackle or the like.

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According to one constructional form of the invention a ship's hatch cover constructed and mounted to tip according to the method set out above is characterized by the provision of an identically disposed pair of pivots on each side of the cover section near one end thereof, one of each pair being so disposed that when the section is standing vertical, these two pivots lie away from a vertical plane passing through the centre of gravity of the section in the direction of the normal upper surface of the section.

To enable the invention to be clearly understood three embodiments of the invention will now be described by way of example with reference to the accompanying diagrammatic drawings whereon:

Figure 1 illustrates the invention as applied to a cover comprising three rolled hatch sections, the latter being shown in the positions they occupy when located in the stowage space outside the hatch confines.

Figure 2 is a view illustrating how one of the sections shown in Figure 1 is supported during its displacement from a horizontal position to a vertical position and vice versa.

Figure 3 is a view of a detail drawn to a larger scale.

Figure 4 illustrates a modified form of the invention as applied to a hinged hatch-cover, and

Figure 5 is a view of the embodiment illustrated by Figure 4 but applied to a cover having sections which fold together.

Figure 6 is a pictorial view of Figure 1 and Figure 7 is a longitudinal elevation of the hatch installation of Figures 1 and 6, and shows the hatch cover closed. In Figures 1, 2 and 3, the supporting brackets, referred to later herein, for the front and back fixed pivot sockets are omitted.

Referring firstly to Figures 1 to 3 and Figures 6 and 7, there is shown the deck D having the hatch H which is adapted to be closed by a superposed cover as shown in Figure 7, the cover comprising three sections 1, 2, 3. Each section 1, 2 and 3 is supported on four wheels 4 and 5 (two at each side and carried by the section in any convenient manner) upon which the section is rolled on tracks 20 on the hatch side coamings 21 towards the stowage S at the hatch end 6. The section 1 which when closed down on the coaming is adjacent to the stowage end of the hatch is longer than either of the other two sections 2 and 3 and the middle section 2 is longer than the remaining section 3 which in the closed position is remote from the stowage S.

Dealing first with the section 1 which is nearest the hatch end 6 when the sections are in a

horizontal position closing the hatch opening as shown in Figure 7 the two wheels 5, 5 abreast nearest this end of the hatch are used as means by which the section is initially pivoted upwardly. Any suitable fixed pivot means such as a stop or a bearing 7, provided at each side of the hatch, may be employed as the means about which the section can pivot about said wheels 5. The bearing 7 is conveniently a bracket secured to the hatch end 6. The ends of the two sides of the section 1 nearest the stowage S are each provided with two identically disposed pivot pins 8 and 9 which, when the section is viewed in a horizontal position are located vertically, one above the other and which therefore are located substantially horizontally alongside each other when the section is raised to a vertical position. In this vertical open position of the hatch cover, the pivot pins 8 and 9 are disposed one on each side of the centre of gravity of the section 1 and are identified herein as the front and back pivots of the section. In the horizontal position of the cover where it closes the hatch as shown in Figure 7, the front pivot 8 of the cover section 1 is disposed adjacent the then bottom face 22 of the section, while the back pivot 9 is adjacent to the top face 23 of the section.

Although in the description to follow the action at the one side of each section only will be described, it will of course be appreciated that as the pins 8, 8 and 9, 9 are co-axial the same action occurs at both sides of the section. After the section 1 has been initially pivoted on its rolling wheels 5 so that it assumes an angle to the horizontal, (see particularly Figure 2) the pivot pin 8 at each side of the section engages in a fixed pivot socket 10 placed as near the level of the deck D as practicable and being identified as the front fixed pivot. The wheel 5 then leaves its aforesaid stop or bearing 7 and the section 1 is then swung upwardly about the pivot pin 8 until the section assumes an almost vertical position indicated at 1' at which stage the pivot pin 9 engages in a further fixed pivot socket 11 (the back pivot) supported by the deck on a bracket 24 mounted thereon. The fixed pivot socket 11 is located at a slightly higher level than the socket 10 for the pivot pin 8. The section 1 is then swung about the pivot pin 9 at each side of the section until it assumes a vertical position indicated at 1^2. In this position the pivot pin 8 is moved a short distance out its socket 10 (see particularly Figure 3) and as the centre of gravity lies in a vertical plane passing between the pivot pins 8 and 9 the section tends to fall automatically back towards the coaming but is restrained from so doing by the lifting tackle or lashing (not shown). The distance between the end 6 of the hatch and the socket 10 for the pivot pin 8 is such that sufficient space is left to accommodate the remaining two sections 2 and 3 when they are swung to the vertical open position.

The second or middle hatch section 2 is adapted to be swung upwardly similarly to first section 1 and is provided at each side with two front and back pivot pins 8*a* and 9*a* at different levels in the vertical position which enter fixed pivot sockets 10*a* and 11*a* placed at a higher level above the deck D and nearer to the hatch end 6 than the sockets 10 and 11 which receive the pivot pins 8 and 9 of the first section 1. As the distance between the second mentioned sockets 10*a* and 11*a* and the hatch end 6 is less than the distance between the first mentioned sockets 10 and 11 and the hatch end 6, so the distance between the wheels 5 of the second section 2 and its pivot pins 8*a* is correspondingly shorter.

The third and shortest section 3 is constructed similarly to the first two sections with the exception that it is fitted with one pivot pin only as shown at 9*b*. This is because this third section needs only to be displaced a short distance from the end 6 of the hatch and as the wheels 5, 5 are positioned near to the end of this particular section they can therefore be conveniently used as pivots about which the section 3 is swung until it reaches the almost upright position. Thus a pair of wheels 5, 5 replace the pair of pivots 8, 8 (or 8*a*, 8*a*) of the other sections, and the bearings 7 replace the lowermost sockets 10, 10 (or 10*a*, 10*a*). When the section 3 is nearly upright, the pivot 9*b* then enters a socket 11*b* which is higher than either of the aforementioned sockets 11 or 11*a* and nearest to the hatch end 6. When the pivot 9*b* engages its sockets 11*b* the wheel 5 leaves the stop or bearing 7.

From the foregoing it will be appreciated that each section during lifting pivots successively about a plurality of pivotal points and that as it is partially balanced in its vertical position, tending to fall back towards the coaming, it will lower automatically when it is permitted to do so by the lifting tackle or release of the lashing, and no effort on the sections is necessary to create initial movement. This is because in the case of each section the back pivots (9, 11) (9*a*, 11*a*) (9*b*, 11*b*) supporting the section when it is in a vertical position lie away from a vertical plane passing through the centre of gravity of the section and in the direction of what is normally the upper surface 23, 23*a*, 23*b* of the section, i. e. the top surface when the cover is on the hatch. The fixed sockets at each side of the stowage S are preferably mounted on a bracket 24 affixed to the deck or if desired to the end of the hatch. Alternatively, if so desired, the sockets may be supported by independent fittings secured to the deck.

Referring to Figure 4, which illustrates a cover comprising a section adapted to be swung to an open position about hinges provided at its edge adjacent to the hatch end, the arrangement is as follows.

The hinges are constituted by pins 12 which project one from each side of the section 15 adjacent to its lower edge and each pin engages within a slotted guide 13 fitted on to the hatch end 6*a*. As the section is raised by lifting tackle (not shown) it swings about said pins 12 which remain at the bottom of the slots in the guides 13. After the section 15 has been raised to an almost vertical position as indicated in dot and dash outline at 15^1 the bottom outer edge of the section engages a stop 14 provided behind each hinge and which has its upper part at a level higher than that occupied by the pins at the bottom of the guides. Continued raising movement of the lifting tackle will cause the section 15 to pivot about the stops 14 to a vertical position as indicated in full outline at 15^2 and the pins 12 will move to the highest parts of the slots 13. The stops preferably comprise any round top supports. In this position the centre of gravity acts in a vertical plane passing between the stops 14 and the pins 12. When the section 15 is released by the slackening of the lifting tackle or lashing as the case may be the pivot pins 12 automatically move to the bottom of the slots in the guides 13 and the lower edge of the sec-

tion moves away from said stops and the section lowers automatically by gravity to a closing position. In this embodiment the stops are equivalent to the pivot pins 9, 9a and 9b of the first embodiment described with reference to Figures 1 to 3.

The second embodiment just described is applicable to hinged covers as shown in Figure 5 wherein the cover comprises two sections 15a and 15b which are hinged at 15c so that they can, in the open position, be folded one upon the other as shown by Figure 5, and in this case it is the projection 15d on the lower edge of the section 15b which is folded on top of the other section 15a which engages the stops 14a. The operation of this embodiment is similar to that of Figure 4, the pins 12a corresponding to pins 12, but being attached to the cover section 15a, and the guides 13a being equivalent to the guides 13. The lifting tackle is shown at LT.

The stops 14 as shown by Figure 4 may be fixed to or form part of a bracket 16 fastened to the end of the hatch 6a or as shown by Figure 5 the stops 14 may be fitted directly to the deck D.

From the foregoing it will be appreciated that the object of the invention is achieved as it is possible to stow the sections vertically and at the same time provide that they can lower automatically, that is to say purely by gravity, when freed.

What I claim is:

1. A hatch installation for a ship comprising parallel runways flanking a hatch opening; at least one cover member having in the horizontal closed position top and bottom faces, said cover member having means to facilitate transport along said runways to an upending position beyond an end of the hatch opening; identically disposed pairs of pivots on opposite sides and adjacent one end of said cover member, one of the two pivots of each pair thereof being disposed adjacent the top face of said cover member and the other adjacent the bottom face of said cover member and situated fore and aft of a plane containing the centre of gravity of said cover member when it is vertically upended; means for securing said cover member in the upended position; aligned pairs of spaced bearings adjacent said hatch opening providing front and back supporting surfaces for receiving said pairs of pivots, and to enable said cover when it is being raised to an open vertical position to rock from the front bearing supports to the back supports, the said cover in the vertical position being balanced only on the back bearing supports so that it tends to close automatically by gravity.

2. A hatch installation according to claim 1, wherein the said pairs of pivots are vertically aligned when said cover member is in the horizontal hatch-closing position and means including the said front and back bearings are arranged at different levels forming a back high level bearing and a front low level bearing, whereby unless the upended cover member is secured in the vertical position when resting on the back high level bearing it will tilt toward the hatch opening until it is supported by the front low level bearing.

3. A hatch installation for a ship, comprising a hatch, a cover for said hatch, means at one end of said hatch for supporting said cover on one end in vertical open position, front and back pivots on the support end of said cover spaced one on either side of the centre of gravity of said cover in the vertical position, and corresponding fixed bearings in said support means, said bearings and cover pivots being positioned relatively at a high level adjacent said hatch and at a low level remote from said hatch and co-operating as the cover is opened such that the front pivots nearest the hatch end cause the cover to rock on to the back pivots and into a vertical position wherever the said cover is balanced only on the back fixed pivots and clear of the front fixed pivots whereby it will close by gravity.

4. A hatch installation according to claim 3, wherein said fixed bearings are positioned one above the other, the front bearings being at a lower level than the back bearings.

5. A hatch installation for a ship, comprising a hatch, a cover for said hatch, means at one end of said hatch for supporting said cover on one end in vertical open position, front and back pivotal surfaces on the support end of said cover, spaced one on either side of the centre of gravity of said cover in vertical position, front and back fixed bearings in said support means spaced to correspond with said cover pivots and disposed with the back bearings at a higher level than the front bearings, and means for opening the cover to cause the bearings and cover pivots to co-operate whereby the cover rocks from the front fixed bearings on to the higher level back fixed bearings and is balanced only on the latter when it comes into the vertical position so that when released the cover will close by gravity.

6. A hatch installation for a ship, comprising a hatch, a cover for said hatch in a plurality of separate sections, means at one end of said hatch for supporting said cover sections on one end in vertical open position, the sections lying side by side in the vertical position, front and back pivotal surfaces on the support end of each cover section and spaced one on either side of the centre of gravity of said cover in vertical position, a plurality of sets of front and back fixed bearings in said support means the number of sets corresponding to the number of cover sections, and each set having the front and back bearings spaced to correspond with the appropriate cover section pivots, means to cause co-operation of the cover pivots and fixed bearings including the front pivots at a lower level than the back pivots whereby as the cover is opened the respective sections successively engage the appropriate fixed bearings, rocking from the front bearings to the back bearings and being balanced only on the latter so that when released the cover sections will rock downwardly under gravitational action.

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