April 7, 1964 R. V. A. SJÖSTRÖM 3,127,925

SHIP'S HATCH COVERS

Filed April 21, 1961 2 Sheets-Sheet 1

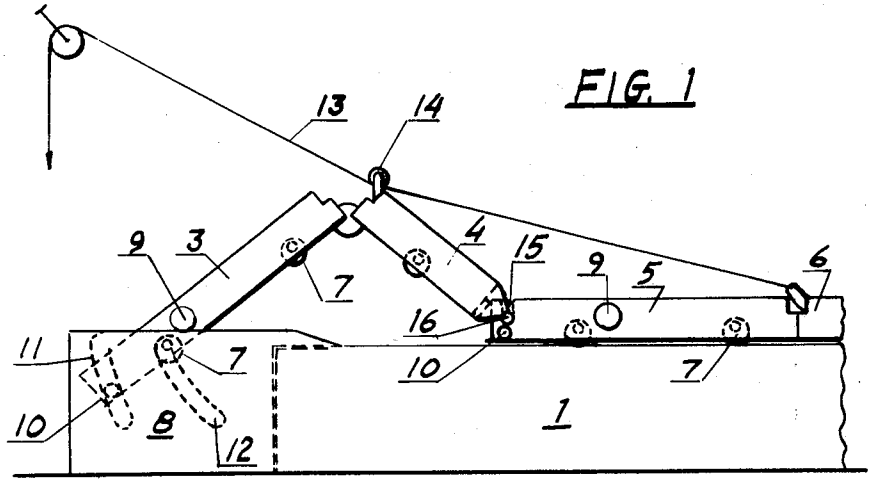


FIG. 1

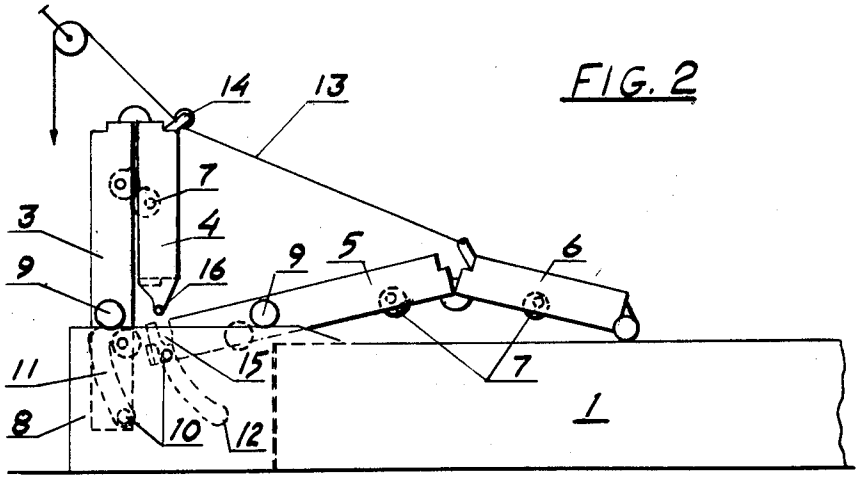


FIG. 2

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FIG. 3

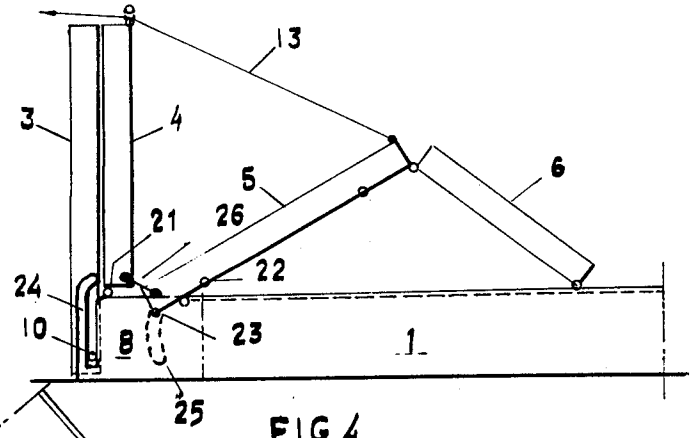


FIG. 4

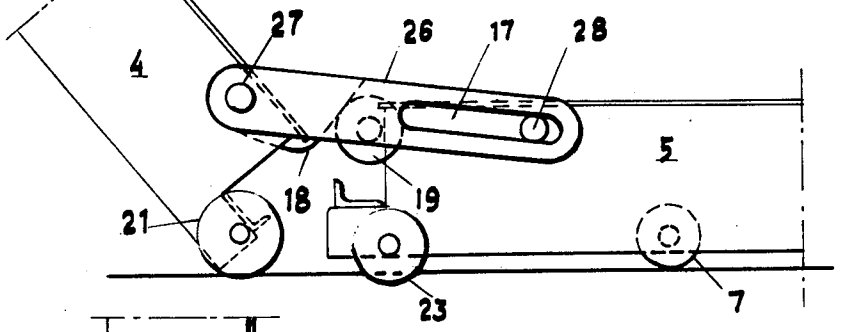
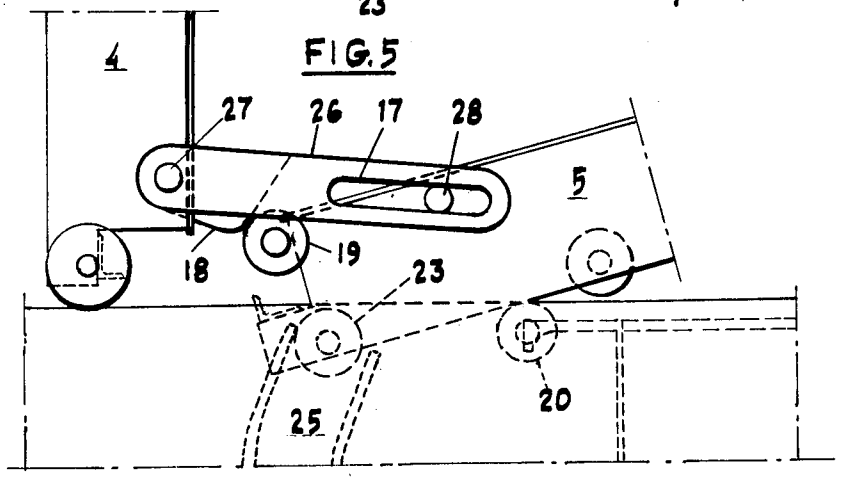


FIG. 5



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SHIP'S HATCH COVERS

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1 Claim. (Cl. 160—193)

The present invention relates to a ship's hatch cover of the type in which the hatchway is covered by a number of pairs of sections foldably connected to each other. Such sections are usually provided with wheels, and when opening the hatch the sections are moved to a stowing space, situated outside the opening and arranged about on the same level as the upper edge of the coaming. An object of the invention is to provide a hatch cover which in open position takes a minimum of space, and therefore the first section of each pair of sections is as much wider than the second section as corresponds to about the height of the coaming. A further object of the invention is to provide locking means between the sections which will permit an automatic disengagement between the pairs when the cover is brought to the stowing space and which also automatically connects the pairs when these are brought from said space to cover the opening. A still further object of the invention is to provide locking means between the different pairs of sections, so that these during opening or closing movements will be moved to their appropriate place having a limited mobility in relation to each other in the folding direction.

In the accompanying drawings two embodiments according to the invention as applied to a hold hatch of a large ship are shown by way of example.

FIGURE 1 shows one of the embodiments in partly open position.

FIGURE 2 shows the same cover in more open position.

FIGURE 3 shows the other embodiment in partly open position.

FIGURE 4 is a detail, showing on an enlarged scale a connecting link between two pairs of sections in a position when the first pair still is being raised, while the second pair of sections is moved horizontally on the coaming.

FIGURE 5 shows a corresponding picture when the first pair of sections is tilted to vertical position and the second pair of sections has started its raising movement.

In FIGURES 1 and 2 numeral 1 denotes the coaming surrounding the hatchway. This is in the present case covered by two pairs of first and second sections 3, 4 and 5, 6, respectively. The sections are supported by wheels 7, which in a manner known per se, run on tracks associated with the sides of the coaming. The wheels are adjustable in the vertical direction in order to effect a sealing between the sections and the coaming. The first sections 3 and 5, respectively, of each pair, i.e. the section of each pair which is located adjacent to the stowing space is about as much wider than the second section, 4 and 6, respectively, of the corresponding pair, as corresponds to the height of the coaming. By this it is possible to stow the sections in a simple manner within a proportionally limited space, as the height of the coaming can be used to receive a part of one of the sections. If also the second sections had been so wide that they had to be stowed lower than the upper edge of the coaming, it had been necessary to perform a complicated guiding arrangement for these sections which had increased the cost of the cover as well as of the maneuvering apparatus. At one end of the hatch opening a stowing ramp 8 is arranged, which, so to say, is an extension of the longitudinal sides of the coaming. It consists of two

side frames, arranged a distance outside the longitudinal sides of the coaming for allowing the section unimpededly to pass between them. The frames are so constructed, that the upper edges form tracks for wheel-shaped supporting members 9, which are arranged on the first section in each pair, 3 and 5, respectively. Said sections are also at their corners adjacent to the stowing space, provided with guiding members in the shape of horizontal, outwardly directed pins 10, which are intended to cooperate with slots in the frame sides of the stowing ramp. The slots, which are mainly vertical are each defined by a guiding ledge 11 and 12, respectively, and are open at the top. The guiding ledges 12 have their upper ends below the level of the guiding pins 10, while the ledges 11 reach up to the pins and engage them, when the cover is moved outwards. If there are more than two pairs of sections, all the guiding ledges have varying height so that the guiding pins pass all the irrelevant slots and stop firstly at the slots, for which they are adapted.

For operating the cover a wire 13 in known manner is provided. The wire may be connected with an arbitrary pulling device, for instance a cargo winch or the like. It is connected with the outermost second section 6 near the folding axis of the pertaining pair, and runs over a pulley 14, which is arranged at a corresponding place at section 4. When the hatch is to be opened and a pulling force is applied to wire 13, the sections are moved in the horizontal plane towards the stowing space. The first supporting wheels 7 will after a time be situated outside their corresponding tracks on the sides of the coaming and the guiding pins will unimpededly pass the guiding slots 12. After further movement these pins will be in engagement with the open ends of slots 11, as these reach above the normal path of the guiding pins. A further pulling of the wire 13 will cause a raising of the pulley 14. By this the sections are folded towards each other and the pins are pressed downwards into the slots. Further pulling turns the section on its supporting member 9, so that it finally will be raised in vertical position. The slots 11 are given such a shape that the section 3 in connection therewith is moved to the remote part of the stowing space.

At the same time the second pair of sections 5 and 6, respectively, is moved in the horizontal plane such a distance, that also their supporting members 9 reach the stowing space and these pins 10 will be situated above the slots 12. A continued pulling on the wire now raises the section 6, and eventually the pins 10 of section 5 are pressed downwards into the slots and the same procedure as with the first pair of sections is repeated. In order to make this operation possible, the connection between the pairs of sections at 15, 16 is so designed that it is automatically disengaged as soon as the first pair of sections is raised into vertical position and the second pair of sections starts its turning movement. The section 5 is accordingly at each of its outer edges provided with an upwardly open slot 15 and the section 4 is provided with pins 16 adapted to fit said slots. From FIGURE 2 it is evident how the engagement between the pairs of sections is disengaged, when the section 5 starts its turning movement and in a corresponding manner an engagement takes place between 15 and 16, when the sections are moved in the opposite direction in order to close the hatch opening. The pins 16 thus guide the following pair of sections 5, 6 towards their intended slots 12. The pins 16 may be eccentrically journalled in their mountings and in this manner it is possible by adjusting the eccentrics to press the transverse edge of sections 4 and 5 towards and from each other in connection with a closing or opening movement, in order to engage or disengage the connection at 15, 16. The pins 16 are de-

tachable and by virtue of this it is possible to close or open only one pair of the pairs of sections, if desired.

The distance between the slots **11** and **12** is so chosen, that the hatch section **5** in open position will be located immediately adjacent to the section **4**. To accomplish this, the distance between the slots is essentially equal to the width of two sections folded together. On certain occasions it may be suitable to arrange the pins alternatingly at the upper edge of one section and at the lower edge of the next section. In this case the distance between the slots ought to be increased or decreased by a corresponding amount.

When closing the hatch a wire is used, which pulls the sections in the opposite direction to that accomplished by the wire **13**.

In the FIGURES 3–5 numeral **1** likewise denotes the coaming surrounding the hatchway. This is covered by two pairs of sections **3**, **4** and **5**, **6**, respectively, which are opened by means of a wire **13** in order to be stowed on the stowing ramp **8** arranged at one end of the hatchway. The different sections are fitted with carrying wheels **21**, **22**, which are intended to run in tracks along the longitudinal sides of the coaming. In connection with the stowing in the stowing space the guiding pins **10** and **23**, respectively, at the first sections in each pair of sections will be brought into and guided by the slots **24** and **25**, respectively, in the sides of the stowing space. The two pairs of sections are mutually connected by means of links **26**, which are arranged one at each longitudinal side of the opening and connected to the corners of the related sections, where the pairs of sections abut against each other. Said links are articulatedly fixed to the second section in the first pair, i.e. number **4**, by means of pins **27**. At the first section **5** in the second pair are other pins **28** fitting into longitudinal slots **17** in the links **26**.

When the opening movement begins, the first pair of sections folds upwards and moves towards the stowing space, and the second pair of sections is simultaneously moved horizontally in the same direction. Before the movement begins a smaller raising of the sections from the coaming will be brought about in the usual manner, so that the closure will not be damaged. As will best appear from FIGURE 4 the first pair of sections moves with its outermost carrying wheels **21** sliding along the tracks, and the second pair of sections will be pulled along by the links in the direction of the stowing space, without being raised. When the first pair of sections has ended its movement and rests in a vertical position, a continued pulling on the wire **13** will move the second pair of sections towards the stowing space, the pins **28** moving in the slots **17**. On each link **26** is a guiding surface **18**, and on section **5** are guiding members **19** shaped in a corresponding manner, which in cooperation with said guiding surfaces force the front edge of section **5** downwards around a fulcrum **20** arranged in the coaming.

In this manner a mechanical operation of the members **23** down the slots **25** is brought about, so that the second pair of sections upon stowing will reach the intended position, and thereafter upon closing the cover will reach such a position, that the closure means at the contact surfaces between the pairs of sections obtain an accurately adjusted position in relation to each other.

The details of the invention may be varied in many ways within the scope of the appended claim. The number of pairs of sections may be varied depending on the size of the opening, and there is no obstacle to

an arrangement in which half the number of pairs is moved towards one side of the opening and the other half of the pairs is moved towards the other side. The movement of the sections can be performed by devices known per se, and possibly a device can be used, which pushes the sections in the horizontal direction, at which it is possible to attain an initial folding movement by means of simple pulley members attached to the sides of the coaming and the movement can then be continued by the horizontally pushing force.

As the links in the embodiment according to the FIGURES 3–5 mainly will be used when the covers are to be pulled towards the closed position, they can be substituted by shorter pieces of wire or chain, while guiding surfaces and guiding members may be designed to engage each other in connection with the opening movement.

What I claim is:

In a ship having a deck with a hatch opening therein, a coaming and a hatch cover adapted to cooperate with said coaming, said cover comprising a number of pairs of first and second cover sections foldably connected to each other;

wheels supporting said cover sections upon and arranged to slide along the coaming;

a stowing ramp situated at one end of the opening and arranged at about the same level as the upper edge of the coaming, the first cover section of each pair of cover sections being about as much wider than the second cover section of the same pair as corresponds to the height of the coaming;

pin-shaped members fitted to the corners of the larger first cover sections closest to the stowing ramp;

mainly vertical guiding slots in side parts of the stowing ramp, the number of the slots in each side part corresponding to the number of pairs of cover sections;

said slots being further shaped and designed in relation to the pin-shaped members so that the two pin-shaped members on any first cover section in a pair during movement of the cover to overlie the ramp will pass such slots as correspond to subsequent pairs, but will engage their own pertaining slots;

locking means including lost-motion links for mutually connecting pairs of cover sections with a limited mobility in the vertical direction for the abutting corners thereof;

cam shaped guiding surfaces at the links adjacent their point of connection to one of said cover sections and juxtaposed, and guiding roller members fitted on the cover sections, for cooperation therewith; and

a fulcrum on the hatch coaming;

the guiding cam surfaces and the guiding roller members cooperating so that a larger first cover section is given a tilting movement when pressed against the fulcrum by the second cover section of a preceding pair upon said preceding pair being brought to a vertical position.

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