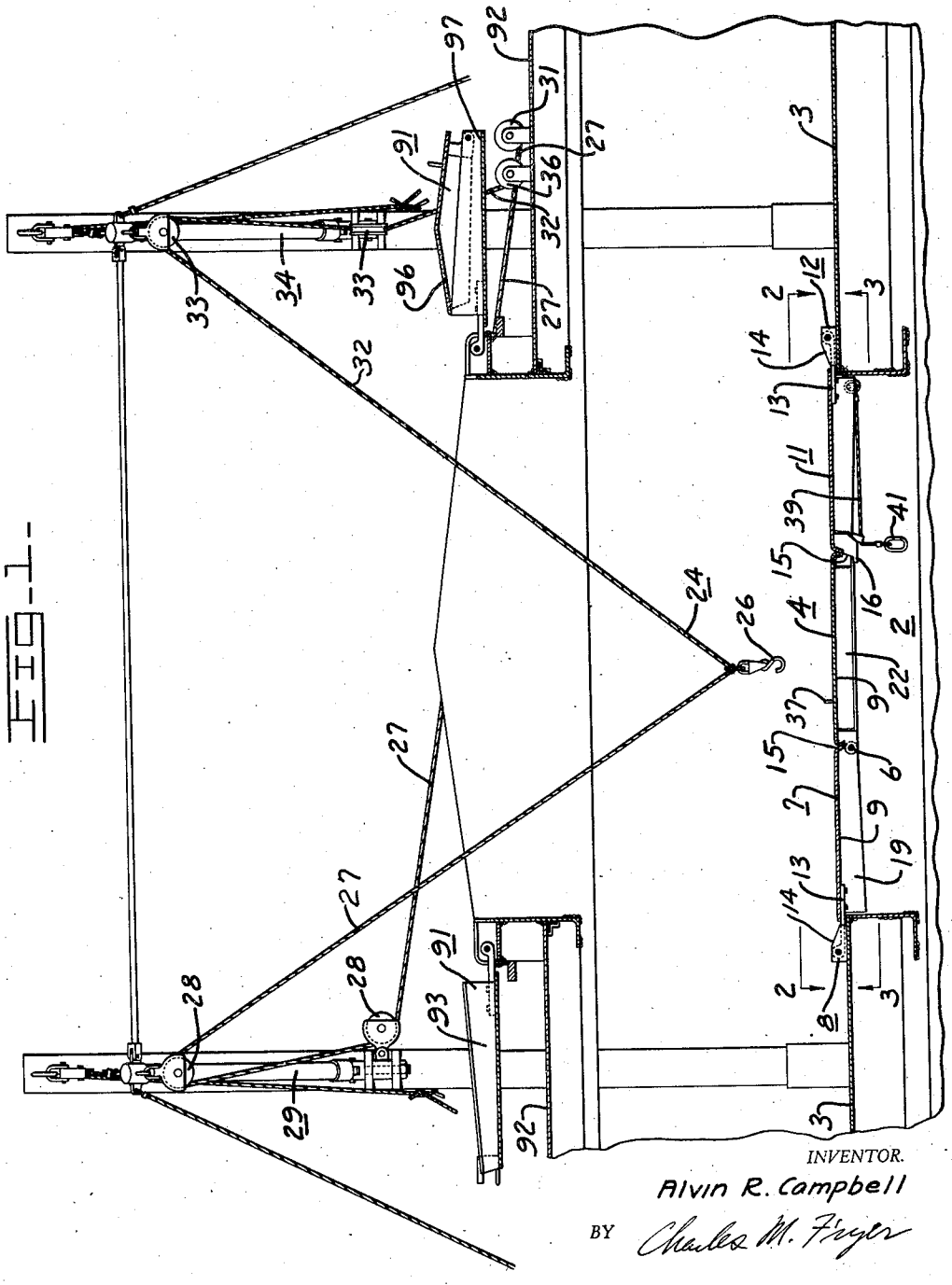
July 3, 1945. A. R. CAMPBELL 2,379,623

HATCH COVER CONSTRUCTION

Filed June 29, 1942 4 Sheets-Sheet 1



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HATCH COVER CONSTRUCTION

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Fig-2-

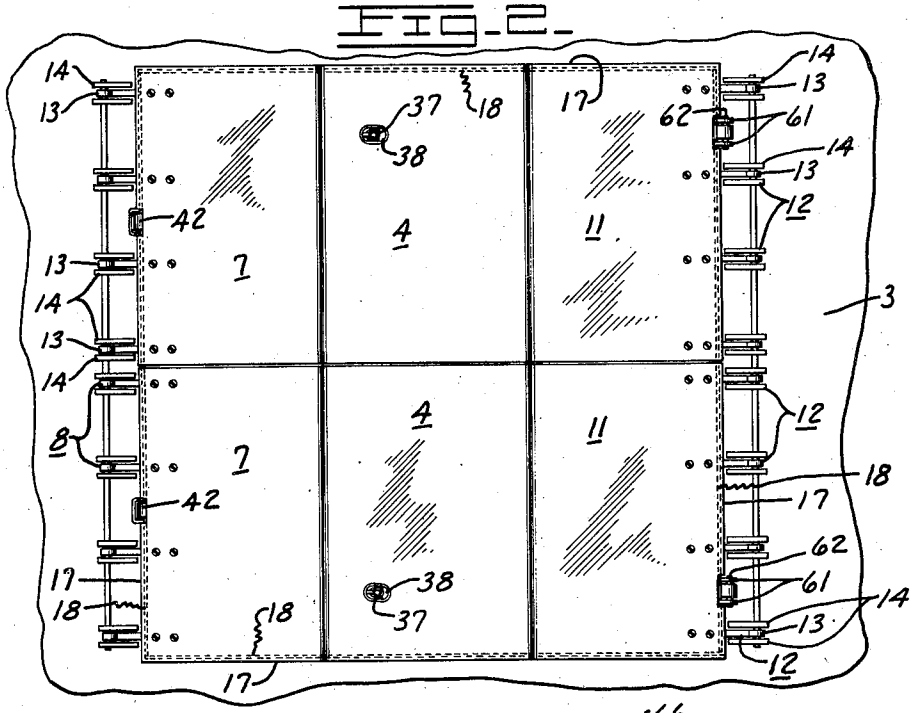
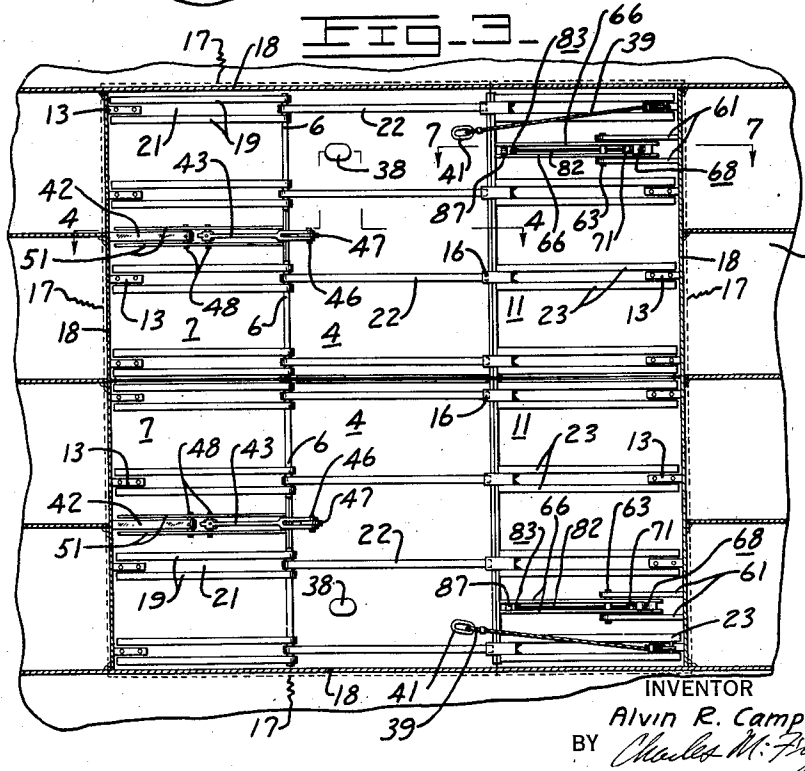


Fig-3-



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FIG. 4.

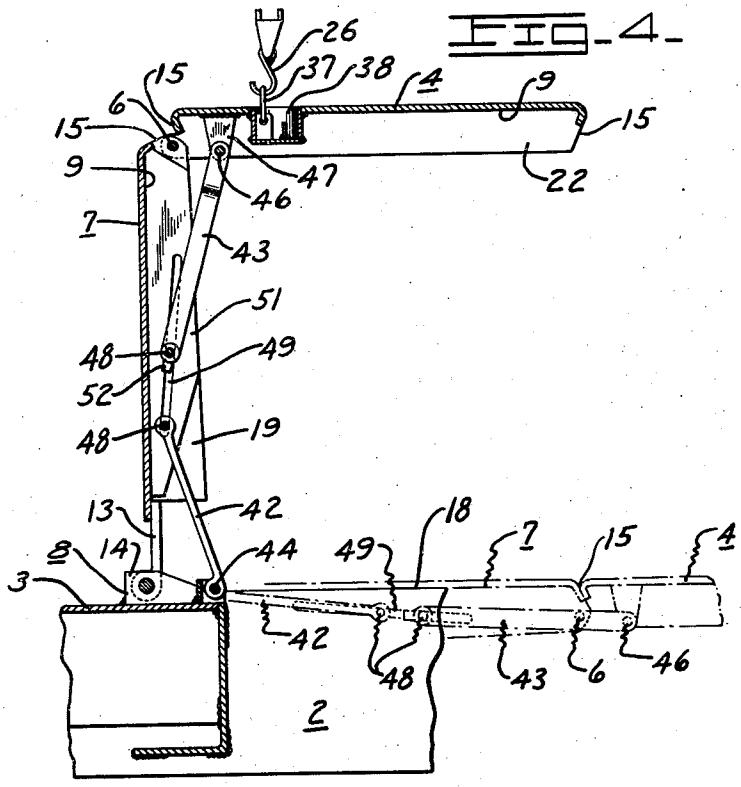


FIG. 5.

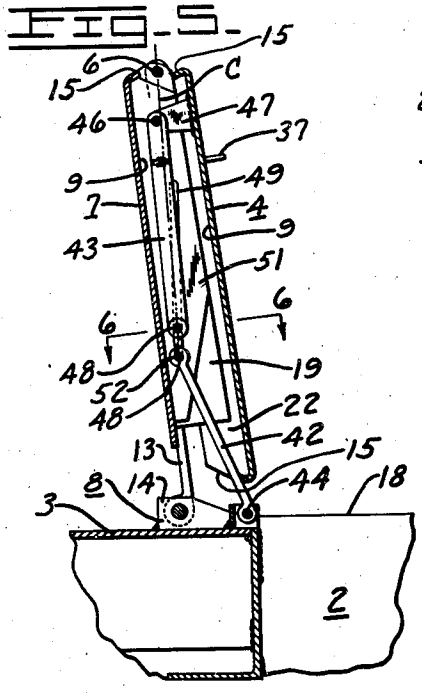
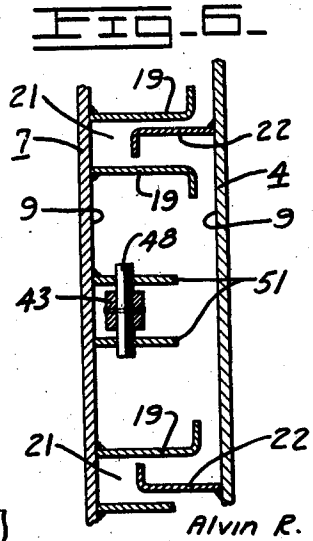


FIG. 6.



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FIG. 7.

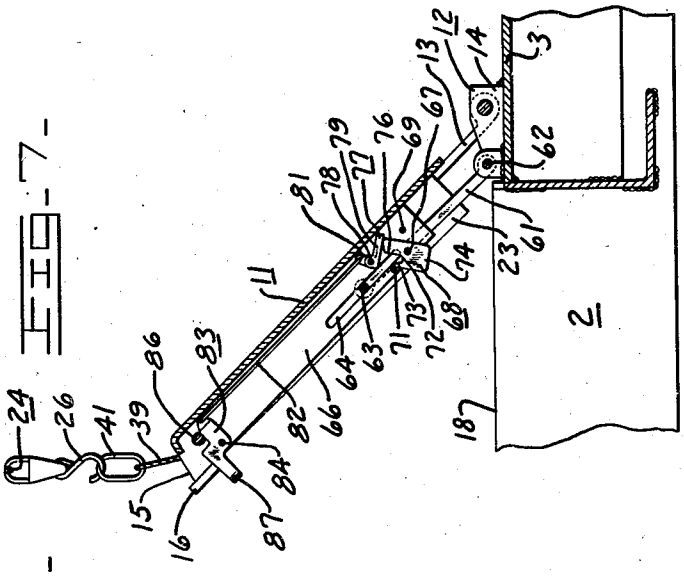


FIG. 8.

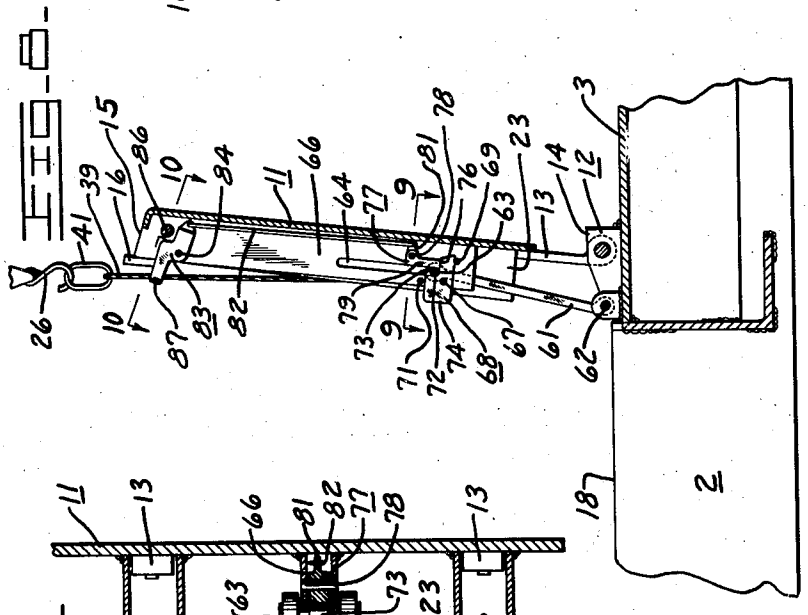


FIG. 9.

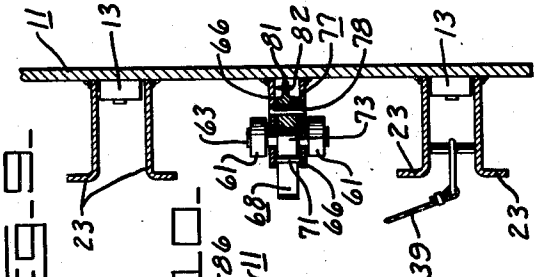
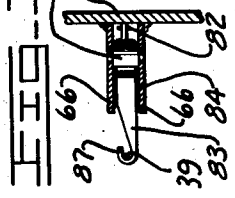


FIG. 10.



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UNITED STATES PATENT OFFICE

2,379,623

HATCH COVER CONSTRUCTION

Alvin R. Campbell, San Mateo, Calif.

Application June 29, 1942, Serial No. 448,981

5 Claims. (Cl. 114—203)

My invention relates to a hatch cover construction particularly adapted for the closing of hatch openings on ships.

Cargo carrying ships generally have a top deck known as the "weather" deck, and a pluarality of spaced cargo carrying decks below the weather deck, generally designated as "tween" decks. In order to provide for unloading or loading of the ship, the decks are formed with vertically alined hatch openings through which the cargo is raised or lowered by means of a power operated cable on the ship. After a deck has been properly loaded, it has heretofore been the general custom to close the hatch opening by means of beams placed across the opening and covered with planks or any other suitable cover members. Closing of a hatch in this manner, and also opening of a hatch thus closed, necessitates considerable time and labor and is, consequently, undesirable.

My invention is designed to overcome the objections to the old form of hatch covering, and has as its objects among others, the provision of an improved hatch cover which: may be quickly opened or closed by power; is adapted to support a load in the closed position thereof; will not, when open, interfere with loading or unloading of cargo through the hatch opening, and will be out of the way of cargo on the deck adjacent the hatch opening; is automatically latched when opened so that there will be no danger to seamen which might otherwise occur if the cover could fall; may be readily automatically unlatched when a force is applied by the proper means for closing such cover; and is of simple and economical construction. Other objects of my invention will become apparent from a perusal of the following description thereof.

Referring to the drawings:

Fig. 1 is a fragmentary transverse vertical sectional view through alined hatch openings in a weather deck and a tween deck of a ship, illustrating the cover construction of my invention; a more or less conventional form of winch-operated cable being shown on the weather deck by which the cover construction may be manipulated.

Fig. 2 is a top plan view taken in a plane indicated by line 2—2 in Fig. 1.

Fig. 3 is a bottom plan view taken in the plane indicated by line 3—3 in Fig. 1.

Fig. 4 is a fragmentary vertical sectional view taken in planes indicated by line 4—4 in Fig. 3, of the left-hand hatch cover construction appearing in Fig. 1; the cover members being illustrated partially open and the closed position of such cover members being indicated by phantom lines.

Fig. 5 is a view similar to Fig. 4, illustrating the cover members in open and automatically latched position.

Fig. 6 is a horiontal section taken in a plane indicated by line 6—6 in Fig. 5.

Fig. 7 is a fragmentary vertical sectional view of the right-hand cover member appearing in Fig. 1, illustrating such cover member in partially open position; the plane of the section being indicated by line 7—7 in Fig. 3.

Fig. 8 is a view similar to Fig. 7, illustrating the cover member in open and automatically latched position.

Fig. 9 is a horiontal section taken in a plane indicated by line 9—9 in Fig. 8.

Fig. 10 is a horiontal section taken in a plane indicated by line 10—10 in Fig. 8.

Most hatch openings 2 in a tween deck 3 are generally so wide that if only two cover members or sections were employed, each one hingedly connected adjacent a side edge of a hatch opening, they could not be fully opened without striking the next upper deck because of the customary close spacing between such decks. Therefore, the preferred hatch cover construction of my invention comprises three hatch cover members or sections. An intermediate cover member 4 is hingedly or pivotally connected by suitable hinge connections 6 to one edge of a side cover member 7, the opposite edge of which is hingedly or pivotally connected by hinge connections 8 to deck 3 adjacent hatch opening 2, at the left edge of such opening with reference to Fig. 1. The hinge connections 6 are such that cover members 4 and 7 can fold toward each other with their under sides 9 adjacent each other. The third cover member 11 is hingedly or pivotally connected by suitable hinge connections 12 to deck 3 adjacent the opposite edge of hatch opening 2.

Hinge connections 8 and 12 are preferably such as to support side cover members 7 and 11 in self-supporting cantilever fashion when they are closed. For this purpose, a plurality of spaced link members 13 is rigidly secured to and projected from the outside edges of cover members 7 and 11, so as to extend over the edges of deck 3 adjacent the side edges of hatch opening 2; and such link members 13 are pivotally connected in brackets 14 spaced along the top of deck 3 adjacent the side edges of opening 2. Thus, when

cover member 7 and 11 are closed, they will be held in a self-supporting horizontal position by virtue of link members 13. In this connection, it is to be noted that the adjacent edges 15 of cover members 4 and 11, and 4 and 7, which are adapted to meet when the cover members are closed, are inclined in planes converging downwardly toward each other, so that in the closed position of the cover members, intermediate cover member 4 is supported in keystone fashion thus forming a self-supporting arch-type structure for the entire cover assembly. As a safety support for intermediate cover member 4 in closed position, in case vibration of the ship should jar the cover members, a plurality of spaced outwardly projecting brackets or lugs 16 is preferably rigidly secured to the inner edge of the right-hand cover member 11 appearing in Fig. 1; the inner edge of intermediate cover member 4 being adapted to rest on such lugs.

It will be noted from Figs. 2 and 3 that the alined outer transverse edges 17 of the cover members are adapted to overlie a transverse edge portion 18 of the deck adjacent the hatch opening, for the purpose of sealing such opening. As is indicated in Figs. 2 and 3, I preferably provide a plurality of units of the described hatch cover construction, spaced longitudinally along the hatch opening, instead of covering the entire hatch opening by one of such described units, as this lessens the weight of the individual cover members thus facilitating opening or closing thereof.

Means is provided for reenforcing the cover members. As can be observed more clearly from Figs. 1 and 3, a plurality of spaced beams 19 is rigidly secured to the under side of cover member 7. Such beams are arranged in pairs to provide spaces 21 between each pair so as to receive spaced reenforcing beams 22 secured to the under side of intermediate cover member 4. Thus, the arrangement of beams 19 and 22 is such that when cover members 4 and 7 are folded against each other in the manner indicated by Fig. 5, interference to the folding is avoided. Spaced reenforcing beams 23 are also rigidly secured to the under side of cover member 11.

The customary winch-operated cable usually on the weather deck of a ship may be conveniently utilized for opening and closing the cover members of my hatch cover construction. Such cable 24 has a hook 26 secured to an intermediate portion thereof. One end portion 27 of the cable at one side of hook 26 passes around suitable pulleys 28 supported on boom 29, to power operated winch drum 31. The opposite end portion 32 of the cable at the opposite side of hook 26 passes around similar pulleys 33 supported on boom 34, to another power operated winch drum 36. Winch drums 31 and 36 may be independently manipulated or manipulated together, in the same or opposite directions. As a result, the cable hook 26 may be readily moved by the winch man laterally in either direction, vertically upwardly or downwardly, or with a combined upward or downward and lateral movement in either direction.

Such movements that may be imparted to cable hook 26 enable facile opening or closing of the cover members. For this purpose, intermediate cover member 4 is provided on its upper side with pivotally mounted eye 37 which is located between the longitudinal center line of such cover member and hinge connections 6, or in other words between the center of gravity of cover member 4 and hinge connections 6. As a result, when cable hook 26 is engaged in eye 37 and moved with a combined upward and lateral movement to the left, with reference to Fig. 1, both cover members 4 and 7 will be lifted together at first; and as such combined movement is continued, intermediate cover member 4 will fold toward the under side of side cover member 7 until both of such cover members assume the upright position illustrated by Fig. 5. When fully open, cover members 4 and 7 may be unfolded away from each other and closed by a reverse movement imparted to hook 26. In this connection, eye 37 is supported in a suitable recess 38 in the top side of cover member 4, so as to be out of the way when not engaged by hook 26.

In opening the hatch covers, the hingedly connected cover members 4 and 7 should be opened first because of the support of cover member 4 on cover member 11; and after opening of cover members 4 and 7, cover member 11 may be opened by swinging it about its hinge connection. For this purpose, a cable 39 is connected at its outer end to the under side of cover member 11. An eye 41 is attached to the inner end of such cable, and is adapted to be engaged by hook 26. When hook 26 is moved upwardly, as well as laterally to the right with reference to Fig. 1, cable 39 will engage the under side of cover member 11, which results in such cover member being lifted about its hinge connections 12.

With reference to Figs. 2 and 3, it is to be noted that eyes 37 and 41 are located closely adjacent the transverse edge 18 of the deck adjacent hatch opening 2, to enable seamen to engage hook 26 in such eyes without having to reach far over the hatch opening. This avoids the possibility of seamen falling through the hatch opening.

Automatically operable latching means is provided for holding cover members 4 and 7 in an upright position when they are opened. Such automatic latching is to preclude accidental falling of the cover members which, if occurring, might result in injury to seamen. Holding of the covers in an upright position conserves deck space for loading of cargo thereon, which would not obtain if the covers, when opened, were to rest on the deck. The automatic latching means includes means to enable it to be automatically releasable when a force is applied to close the cover members over the hatch opening. With particular reference to Figs. 4, 5 and 6, the latching means comprises a plurality of cooperating links 42 and 43. One end of link 42 is pivotally connected at 44 to deck 3 adjacent opening 2; while an end of link 43 is pivotally connected by a pin 46 in a bracket 47 secured to the under side of cover member 4. The adjacent ends of such links 42 and 43 are slidably connected to the under side of cover member 7 by means of pins 48 slidably mounted in elongated slots 49 formed in a pair of spaced brackets 51 secured to the under side of cover member 7.

The limit of lifting of the cover member 7 is determined by engagement of pin 48 in link 42, against the lower edge of slot means 49; the arrangement being such that cover member 7 and cover member 4, when lying against cover member 7, will be inclined slightly beyond the left-hand edge of hatch opening 2. Such inclination precludes obstruction of the hatch opening to enable a cargo to be swung freely through it. When the cover members 4 and 7 are fully opened, the pivotal connection 46 between link 43 and bracket 47 is beyond dead center with reference

to center line "C" between the pivot axis of hinge connection 6 and pin 48 in link 43, as is illustrated by Fig. 5.

In such position, the adjacent ends of links 42 and 43 are in substantially abutting relationship; a lug 52 being formed on the outer end of link 43 to abut the adjacent end of link 42. As a result, a lateral force applied to the upper side of cover member 7 will only cause links 42 and 43 to engage each other without effecting movement of pivot 46. Hence, cover members 4 and 7 will be latched together in the position shown in Fig. 5. Unlatching can only occur when cover member 4 is lifted about hinge connection 6, which is the normal action which will obtain when hook 26 is engaged in eye 37 to unfold cover members 4 and 7 for effecting closing thereof. This is so because as soon as cover member 4 is swung about hinge connection 6, link 43 will be raised to allow movement of link 42; so that cover member 7 may swing downwardly.

Automatically operable latching means is also provided for holding cover member 11 in an upright position with a slight inclination beyond the edge of hatch opening 2 when it is opened, as is indicated by Fig. 8; and such latching means also includes means rendering it automatically releasable when a force is applied to close cover member 11 over the hatch opening. With reference to Figs. 7, 8, 9 and 10, such latching means comprises a pair of cooperating spaced links 61 pivotally connected at 62 adjacent one end thereof, to deck 3 adjacent hatch opening 2. The opposite ends of links 61 are connected by a cross pin 63 slidably engaged in elongated slots 64 formed in spaced brackets 66 secured to the under side of cover member 11; each link 61 being at an outer side of an associated bracket 66. The limit of opening of cover member 11 is determined by engagement of pin 63 against the lower edges of slots 64. Pivotally connected at 67 and located in the space between brackets 66 is a latching member 68 adapted to swing about pivot 67, between an outer stop pin 69 and an inner stop pin 71 spaced from stop pin 69. Latching member 68 is formed with a recess 72 in which pin 63 is adapted to engage, and with a lip 73 over the recess for a purpose to be subsequently explained.

The weight distribution of latching member 68 on pivot 67 is such as to cause its end 74 opposite recess 72, to swing downwardly when cover member 11 is closed or in partially open position. However, when such cover member is raised, pin 63 will move down slot means 64, and recess 72 in latching member 68 will be in the path of pin 63 to receive it. As cover member 11 approaches its maximum position of lift, as is indicated by Fig. 8, pin 63 will enter recess 72 and tilt latching member 68 upwardly about pivot 67; stop 69 serving to limit upward tilting movement of the latching member at the maximum position of lift of cover member 11. In this position, lip 73 will engage over pin 63; and releasable dogging mechanism is provided for automatically engaging a portion 76 of latching member 68, below recess 72, and thus hold cover member 11 positively latched.

Such dogging mechanism comprises a bell crank member 77 pivoted to and between brackets 66, at 78. One leg 79 of bell crank 77 is adapted to engage portion 76 of latching member 68 while the other leg 81 of the bell crank is pivotally connected to a link rod 82 at one end, which in turn is pivotally connected at its opposite end to a Z-shaped lever 83 pivoted to and between brackets 66, at 84; a stop pin 86 being provided to limit tilting movement of lever member 83 toward the inner edge of cover member 11. At its free end, lever member 83 is formed with a hook 87 in which cable 39 is adapted to be held.

The described arrangement of the dogging mechanism is such that leg 79 is always urged by the weight distribution of the dogging mechanism on pivots 78 and 84, toward latching member 68. Consequently, as cover member 11 is raised from a closed position latch portion 76 of latching member 68, will ride by leg 79, but when it passes the end of leg 79, leg 79 will fall into recess 72, and engage such latch portion 76. Such action in cooperation with engagement of pin 63 under lip 73 will maintain cover member 11 positively latched in the position shown by Fig. 8. This is so because any lateral thrust against the outside of cover member 11 will cause bell crank 77 and latch member 68 to become more tightly engaged. When leg 79 of the bell crank enters recess 72, Z-shaped lever member 83 will pivot in a clockwise direction about pivot 84, and assume the position shown in Fig. 8.

To close cover member 11 after it is opened, a seaman need only engage cable 39 in hook 87 on lever member 83, and connect hook 26 in eye 41 connected to the end of cable 39. Upon initial lateral movement of hook 26 to the left with reference to Fig. 8, lever member 83 will be caused to move in a counter-clockwise direction about pivot 84, and thus effect release of the latching mechanism; and upon continued lateral movement combined with lowering of hook 26, the cover will fall, but will be supported on cable 39 as it is being lowered. Thus, the described latching mechanism for cover member 11 is such that a proper force applied for closing it, automatically releases the latch. In the closed position of cover member 11, hook 87 serves as a support for cable 39 so as to render its eye 41 readily acessible to a seaman when it is desired to open the cover member. In this connection, should cable 39 move out of the line of hook 87 during lifting of cover member 11, this will make no difference because the seaman can very readily insert it in hook 87 when it is desired to close the cover member.

I prefer to employ the automatically latchable and releasable latching mechanism for the cover members on the tween deck hatch because of the desirability of maintaining such cover members in the described upright position. However, the described cover construction may be employed without such latching mechanism if so desired. This is preferred with respect to the cover construction 91 on weather deck 92, because in unloading a ship, the cargo must be swung laterally beyond the hatch opening; and if the cover members were held in an upright position, such cargo might strike them.

In the weather deck cover construction, cover member 93 is of substantially the same construction as the described cover member 11; while cover members 96 and 97 are of substantially the same construction as the described cover members 4 and 7, respectively. Should one desire to support the cover members by removable beams placed across the hatch opening, the cantilever hinge construction and the reenforcing beams may be omitted; and ordinary hinge means may be employed for connecting the cover members.

Should the space between decks be such as to accommodate one or two cover members over the hatch, when swung to an upright position,

then the cover construction comprising hingedly connected cover members 4 and 7 need not be employed; and the hatch opening may be covered by one cover member, or two cover members hingedly connected adjacent the sides of the hatch opening, as the circumstances may require. Each of such cover members may be provided with the described latching mechanism employed for holding cover member 11 in an upright position.

I claim:

1. A hatch cover construction comprising a cover member for overlying a hatch opening in a deck structure, hinge connecting means between an edge of such member and the deck structure, another cover member hingedly connected to the first mentioned cover member adjacent an opposite edge thereof so as to fold against the first mentioned member, and automatically operable latching mechanism including means movably connected between such members and the deck structure for holding the members in an upright position when they are moved on their hinge connections and folded against each other to uncover the hatch opening, the latching mechanism including means enabling it to be automatically releasable when a force is applied to the second mentioned cover member to move it on its hinge connection with the first mentioned cover member for closing the hatch opening.

2. A hatch cover construction comprising a cover member for overlying a hatch opening in a deck structure; hinge connecting means between an edge of such member and the deck structure; another cover member; means hingedly connecting the latter member to the first mentioned member adjacent an opposite edge thereof so as to fold against the first mentioned member with its under side adjacent the under side of such first mentioned member; and automatically operable latching mechanism for holding the members in an upright position when they are moved on their hinge connections and folded against each other to uncover the hatch opening including a plurality of links having adjacent ends slidably connected to the first mentioned member at the under side thereof, one of such links being movably connected to the deck structure and another of such links being movably connected to the other cover member at the under side thereof.

3. A hatch cover construction comprising a cover member for overlying a hatch opening in a deck structure; means hingedly connecting such member to the deck structure; and latching mechanism connected to the cover member at the under side thereof for automatically holding it in an upright position when it is lifted including a link movably connected to the deck structure adjacent one end thereof and slidably connected adjacent its opposite end to the cover member at the under side thereof, and dog and latch means connected to the cover member at the under side thereof for automatically holding the link in said upright position of the cover member, such dog and latch means having means enabling it to be automatically releasable by a force applied thereto for lowering of the cover member from its upright position.

4. A hatch cover construction comprising a cover member for overlying a hatch opening in a deck structure, means hingedly connecting such member to the deck structure adjacent an edge of the hatch opening and providing a cantilever support therefor, another cover member for overlying the hatch opening, means hingedly connecting the latter cover member to the deck structure adjacent an opposite edge of the hatch opening and providing a cantilever support therefor, an additional cover member hingedly connected adjacent an edge thereof to the free edge of one of the first mentioned cover members so as to fold against such one member with its under side adjacent the under side of such one member, the edges of such cover members which are adapted to meet when the cover members are closed being inclined to provide a keystone support for the additional cover member and to cooperate with the other cantilever supported cover members to provide a self-supporting arch-type structure for the entire cover assembly, and means on the upper side of the additional cover member adapted for connection to lifting means and which is located between the center of gravity of such cover member and its hinge connection so as to enable it and the cover member to which it is hingedly connected to fold toward each other during lifting of such members and to unfold away from each other during lowering of such members.

5. A hatch cover construction comprising a cover member for overlying a hatch opening in a deck structure, means hingedly connecting such member to the deck structure adjacent an edge of the hatch opening and providing a cantilever support therefor, another cover member for overlying the hatch opening, means hingedly connecting the latter cover member to the deck structure adjacent an opposite edge of the hatch opening and providing a cantilever support therefor, an additional cover member hingedly connected adjacent an edge thereof to the free edge of one of the first mentioned cover members so as to fold against such one member with its under side adjacent the under side of such one member, the edges of such cover members which are adapted to meet when the cover members are closed being inclined to provide a keystone support for the additional cover member and to cooperate with the other cantilever supported cover members to provide a self-supporting arch-type structure for the entire cover assembly, automatically operable latching means for holding the hingedly connected cover members in upright position when they are moved on their hinge connections to uncover the hatch opening, automatically operable latching means for holding the remaining cover member in upright position when it is moved on its hinge connection to uncover the hatch opening. and means on the upper side of the additional cover member adapted for connection to lifting means and which is located between the center of gravity of such cover member and its hinge connection so as to enable it and the cover member to which it is hingedly connected to fold toward each other during lifting of such members and to unfold away from each other during lowering of such members.

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