Aug. 27, 1957 R. L. GRAY ET AL 2,804,039

HATCH COVER FOR ORE CARRIER AND TANKER

Original Filed July 19, 1954 3 Sheets-Sheet 1

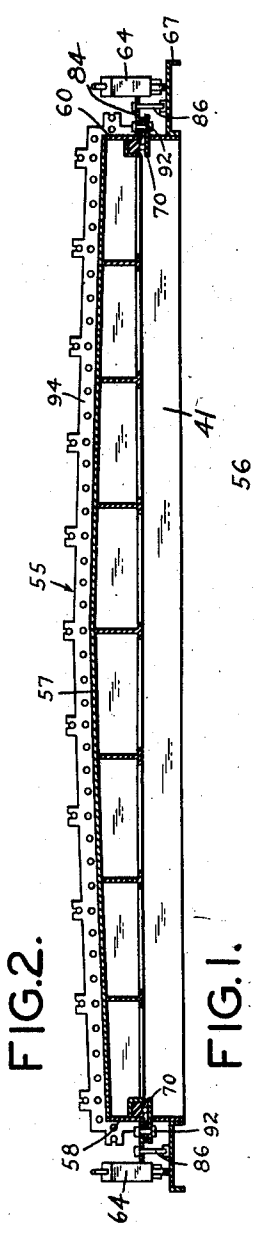


FIG. 2.

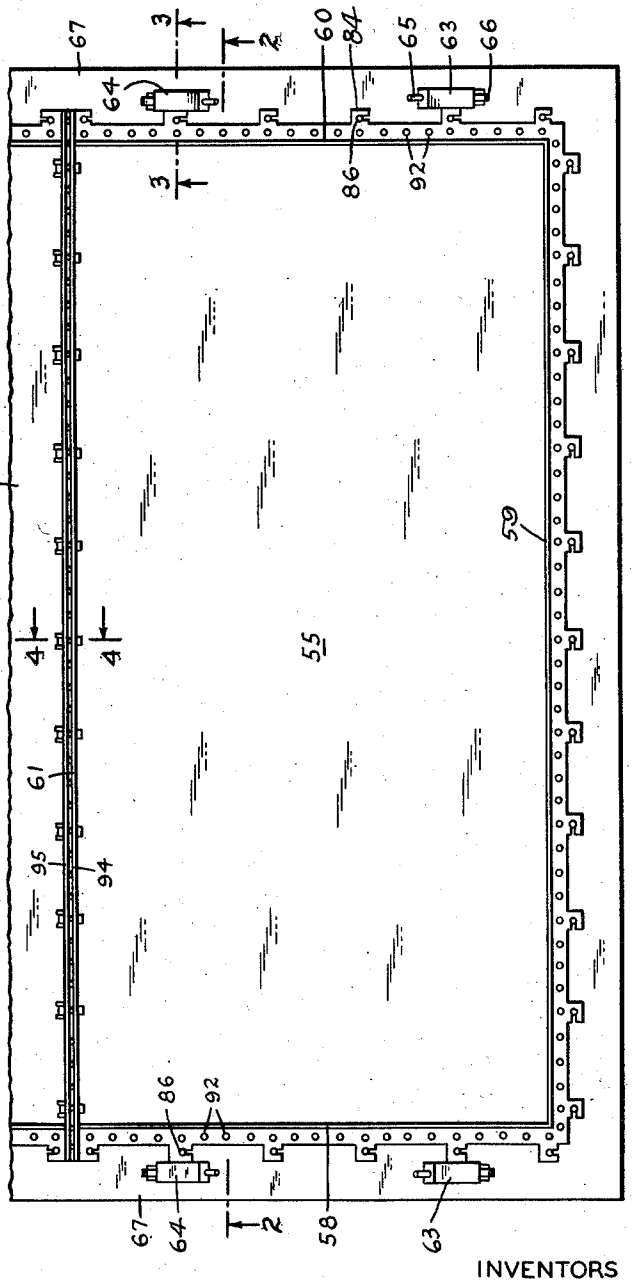


FIG. 1.

INVENTORS
ROBERT L. GRAY
JAMES J. HENRY

BY
Campbell, Brumbaugh, Free & Graves

THEIR ATTORNEYS

Aug. 27, 1957 R. L. GRAY ET AL 2,804,039

HATCH COVER FOR ORE CARRIER AND TANKER

Original Filed July 19, 1954 3 Sheets-Sheet 2

FIG. 3.

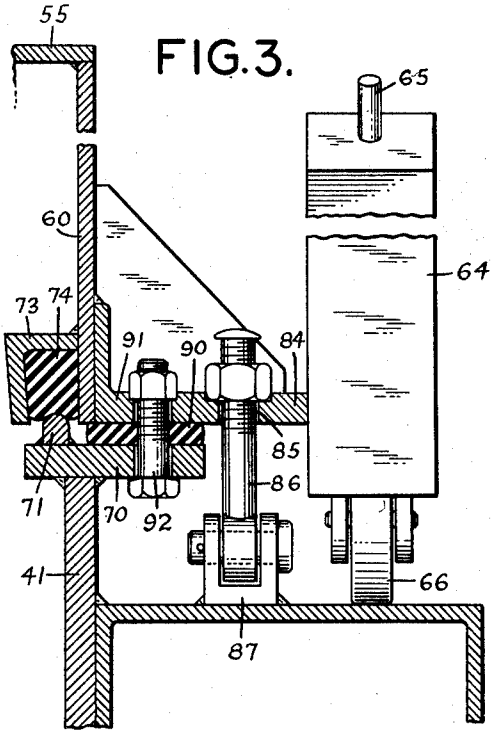


FIG. 4.

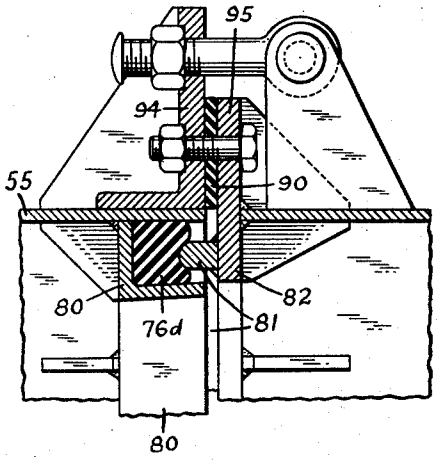
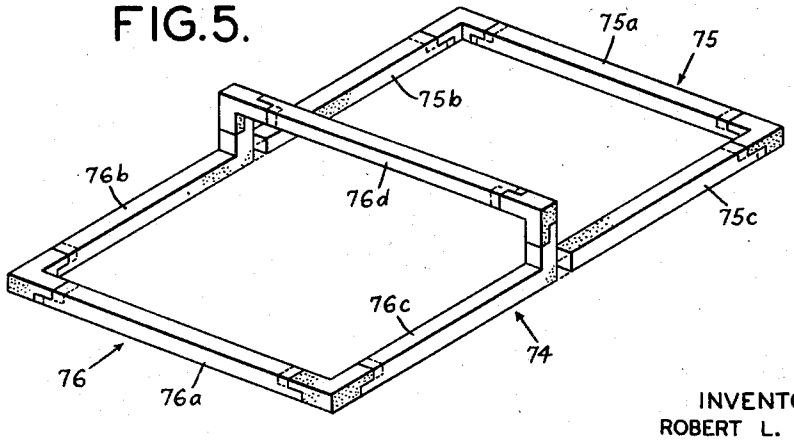


FIG. 5.



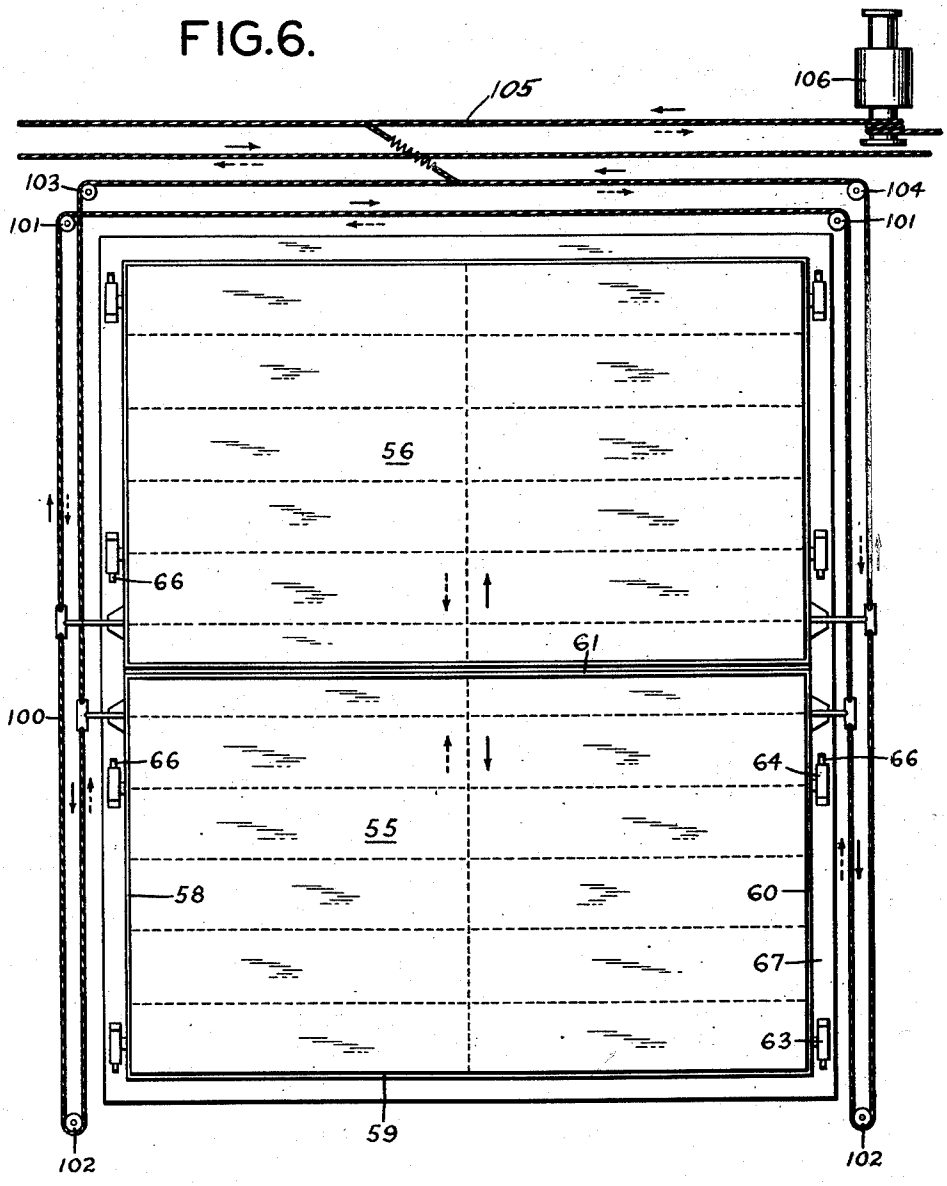
INVENTORS
ROBERT L. GRAY
JAMES J. HENRY
BY
Campbell, Brumbaugh, Free & Graves
THEIR ATTORNEYS

Aug. 27, 1957 R. L. GRAY ET AL 2,804,039

HATCH COVER FOR ORE CARRIER AND TANKER

Original Filed July 19, 1954 3 Sheets-Sheet 3

FIG.6.



INVENTORS
ROBERT L. GRAY
JAMES J. HENRY
BY
Campbell, Brumbaugh, Free & Graves
THEIR ATTORNEYS

United States Patent Office 2,804,039 Patented Aug. 27, 1957

2,804,039

HATCH COVER FOR ORE CARRIER AND TANKER

Robert L. Gray, Brooklyn, N. Y., and James J. Henry, Cranford, N. J., assignors to American-Hawaiian Steamship Company (Del.), a corporation of Delaware, Ore Transport, Inc., New York, N. Y., a corporation of Delaware, and J. J. Henry, Inc., New York, N. Y., a corporation of New York

Original application July 19, 1954, Serial No. 444,172. Divided and this application December 13, 1954, Serial No. 474,736

3 Claims. (Cl. 114—203)

This invention relates to improvements in hatches and hatch covers for cargo carrying ships and it relates particularly to an improved form of hatch cover for ocean-going ships for carrying liquid and dry bulk cargoes selectively or simultaneously.

This is a division of our U. S. application Serial No. 444,172, filed July 19, 1954.

Due to inherently different properties of dry bulk cargoes, such as iron ore, bauxite, phosphates, coal, sugar and wheat, and liquid cargoes, such as gasoline, or bunker C oil, it is usual to provide entirely different types of ships for transporting them. In other words, tankers for transporting gasoline or other petroleum products are not designed or readily modified in any way to handle dry bulk cargoes. The tanks of such tankers require different kinds of hatches, they must be provided with bulkheads or the like to prevent sloshing of the liquid contents, they require piping for connection with pumps and the like which are totally unusable for dry bulk cargoes and they, of course, must be provided with expansion trunks and the like to accommodate the change in volume of the liquid under different temperature conditions. Most particularly, their design is such that they cannot be cleaned to permit the shipment interchangeably of the dry bulk cargoes, oil, gasoline and the like.

In a like manner, ships designed for the transportation of dry bulk cargo, such as iron ore, have certain characteristics which render them unsuitable for transporting liquid cargoes. Due to the greater specific gravity or weight per cubic foot of iron ore as compared with petroleum products and the like, the arrangement of the cargo holds must be such as to position the center of gravity so that proper stability of the ship is attained. Usually, the iron ore holds are mounted relatively high in the hull of the ship and near its center so as to give the ship a high center of gravity and thereby avoid stiffness and excessive stability of the ship.

Some attempts have been made in the past to provide ships with facilities for transporting both dry bulk cargoes and liquid cargoes. However, these prior attempts have not met with any success because of failure to depart from the prior practice with respect to the position and shape of holds for the different types of cargoes. Thus, in combining dry bulk and liquid cargo carriers, the dry bulk or ore holds have been mounted high in the ship and centrally to avoid excessive stability. Moreover, no one heretofore appears to have designed a type of hold structure and hatch therefor that can be used with equal facility for transporting and protecting dry bulk cargo or liquid cargo. Heretofore, the hatchways for liquid cargo carrying ships, such as tankers, have been small and relatively easily sealed. Such small hatches are not satisfactory for loading and discharging dry bulk cargoes and, of course, they present difficulties from the standpoint of cleaning and maintenance of the hold, when the type of cargo is to be changed. The large hatches used for loading and discharging dry bulk cargo cannot be used to seal the holds and enable them to be used for liquid cargo.

The present invention involves a novel type hold structure and hatch structure which enables dry bulk cargo or liquid cargo to be carried in the same hold, selectively, and which is of such nature as to facilitate the cleaning and maintenance of the holds.

Cargo carrying ships of the type disclosed herein are capable of handling a full payload at the rated capacity of the vessel either in dry bulk cargo or liquid cargo, or a combination of both, without altering the desired stability of the vessel to a degree rendering it unsatisfactory, in the least. In this way, maximum use can be made of the cargo carrying facilities of the ship and maximum economy in the transportation of cargo is thereby obtained.

For a better understanding of the present invention, reference may be had to the accompanying drawings in which:

Fig. 1 is a plan view of our new hatch cover for a hold of the ship;

Fig. 2 is a view in section taken on line 2—2 of Fig. 1;

Fig. 3 is a view in section taken on line 3—3 of Fig. 1;

Fig. 4 is a view in section taken on line 4—4 of Fig. 1;

Fig. 5 is an isometric view of a sealing gasket used for rendering the hatchway weathertight; and

Fig. 6 is a schematic plan view of a system for opening and closing the hatches individually or simultaneously.

When using holds alternately or selectively for liquid or dry bulk cargoes, it is necessary to provide large hatch openings and, at the same time, be able to seal these hatch openings to protect the materials or cargo being transported. When handling dry bulk cargo, such as ore and other materials that are unaffected or little affected by the presence of small amounts of water, a watertight seal is all that is required for the hatch cover. On the other hand, when liquid cargoes are being carried, it has been found that an oiltight seal is essential because otherwise the liquid cargo would leak out of the tanks onto the deck, creating, in the case of petroleum products, a serious fire hazard. Moisture can leak into such cargo as wheat and other grains or raw sugar and seriously damage such cargoes.

The problem of providing an oiltight seal capable of withstanding a hydrostatic pressure of about 10 feet on a hatch cover that weighs several tons and which has an expanse of approximately 20 feet is a difficult one. It has been found that such a hatch cover must be provided with a double seal to render it essentially watertight and oiltight.

Referring now to Figs. 1 and 2, the hatch cover is shown as consisting of two sections 55 and 56 which are substantially identical, except for minor features, as pointed out hereinafter. Each hatch section, for example the section 55, is generally rectangular in plan view and has a slightly domed upper surface 57, as shown in Fig. 2. The dome top 57 has on three sides downwardly extending flanges 58, 59 and 60, forming the sides of the hatch cover. The other inner side 61 is open and confronts a similar open side of the hatch cover section 56.

Mounted on the opposite sides 58 and 60 are pairs of jacks 63, 64 which may be hydraulically operated, or as shown, operated by screw shafts 65, to extend a wheel 66 into engagement with the deck of the ship or a track 67 on each side of the hatchway to thereby lift up each hatch section 55, 56 and enable it to be rolled aside to uncover the mouth or opening of the hatch.

The hatch sections 55 and 56 cooperate with the hatch coaming 41 to affect a seal. Referring to Fig. 3, the

hatch coaming 41 is provided with a transverse plate 70 which extends completely around the coaming and carries a rib or bar 71 having a rounded upper edge extending upwardly toward the hatch covers 55 and 56. Mounted inside the walls or flanges 58, 59 and 60 is an angle iron forming a downwardly opening channel 73 that receives a gasket 74 formed of "neoprene" or the like. The relation of the bar 71 and the gasket 74 is such that when the hatch sections are lowered into contact with the plate 70 on the coaming, the bar 71 indents the gasket 74 and thereby provides a watertight seal. It will be understood that the gasket 74 is in part carried by the hatch section 55 and in part carried by the hatch section 56.

As shown in Fig. 5, the gasket 74 is made up of a U-shaped section 75 carried by hatch section 56, having a base 75*a* and two side arms 75*b* and 75*c*. The other section of the gasket 74 is carried by hatch section 55 and is made up of a part 76 having a base 76*a*, two arms 76*b* and 76*c* and a bridge section 76*d* which, as shown in Fig. 4 is carried in a channel 80 extending around inside the open end 61 of the hatch section 55. The portion 76*d* of the gasket cooperates with a rib or bar 81 which is carried on a flange 82 extending inwardly around the open end of the hatch section 56. In this way, the two sections 75 and 76 of the gasket 74 are in abutting engagement when the hatch sections are closed but separate when the hatch sections 55 and 56 are pulled apart.

In order to hold the hatch sections in position, they may be provided with laterally extending flanges 84 extending around them and having notches 85 therein to receive the hinged quick-acting locking bolts or dogs 86 that are pivotally mounted in U-shaped brackets 87 fixed to the deck or to an extension of the coaming. The dogs 86 are relatively widely spaced around the periphery of the hatch cover. The structure thus far described is entirely satisfactory for rendering the hatch covers watertight when transporting dry cargo or cargo which is not damaged by small amounts of moisture. When, however, the hatch is to be sealed when used for transporting liquids, a second sealing gasket 90 is provided.

As shown in Figs. 3 and 4, the gasket 90 is interposed between flange 70 and an overlying portion 91 of the flange 84. These flanges are continuous, except for holes therein to receive clamping bolts 92. In shape, the gasket 90 is very similar to the gasket 75, with the exception that it is flat and relatively thin in cross section in order to fit between the flanges 70 and 91 and between the opposed flanges 94 and 95 which extend around the open, opposing ends of the hatch sections 55 and 56. A series of the bolts 92 which are spaced apart at intervals of only 6 to 10 inches around all of the edges of the hatch sections 55 and 56 clamp the hatch cover sections to the coaming with the gasket 90 therebetween. When all of the bolts 92 are drawn up tight, the gasket 90 is compressed tightly between the flanges on the hatch covers and the coaming and the flanges on the confronting ends of the hatch section to provide an absolutely liquidtight seal. In this way, the hatches can be rendered oiltight and satisfactory for transporting gasoline, bunker C and many other liquid products or cargoes.

Due to the fact that the hatch covers are extremely heavy, provision has been made for mechanical movement of the hatches individually or collectively to open and closed position. As shown in Fig. 6, a cable 100 is looped over pulleys 101, 102 at each side of the hatches with the inner flight of the cable connected to hatch section 55 and the outer flight of the cable connected to hatch section 56. The intermediate portions of the cable are passed over suitable pulleys 103, 104, etc. and may be wound around a winch drum. As the winch is operated, the hatch covers are moved in opposite directions, to move them apart or bring them together, after they have been raised onto their supporting wheels 66. If desired, all of the hatch covers can be connected into a main operating cable 105 and to a common winch 106 so that all of the hatch covers can be opened or closed simultaneously, as may be desired.

It will be understood, of course, that manually operated means may be provided also for moving the hatch covers or that individual electric motors or the like may be provided for operating the individual hatch covers.

From the preceding description, it will be apparent that we have provided a hatch construction which is capable of sealing the holds of a ship to enable it to handle bulk or liquid cargoes simultaneously or selectively, thus greatly facilitating the use of a single cargo carrying ship for handling almost any desired type of cargo that may be encountered in the various ports that the ship may enter. Adequate facilities are provided for stowing the cargo in such a manner as to maintain the ship properly stable whether fully loaded or only partly loaded and whether loaded with dry or liquid cargo, or both.

It will be understood that the principles of hatch construction involved may be adapted to large or small ships depending upon the requirements and the use to which the ship is to be put. Therefore, the form of the invention described herein is to be considered as illustrative and not as limiting the scope of the following claims.

We claim:

1. A hatch coaming and cover for rendering a hatch opening water-tight comprising a hatch coaming extending around a hatch opening, a substantially horizontal flange around the top of said coaming, a rib member extending upwardly from said flange and around said coaming, a hatch cover comprising two sections, each adapted to cover about one-half of said opening, a gasket carried by and extending peripherally around each cover section for engagement with said rib member, said cover sections having open confronting sides, a gasket portion extending around the open side of one of said sections, a rib member at the open side of the other cover section engageable with said gasket portion, flanges extending around the faces of said cover sections and adapted to overlie said coaming flange in substantially parallel relation thereto, other flanges extending around the open sides of said cover sections, a sealing gasket interposed between said flanges, means for releasably clamping said cover sections and coaming together with said rib members engaging said gaskets and gasket portion and with said flanges in liquid-tight relation to said sealing gasket.

2. The hatch coaming and cover set forth in claim 1 comprising jacks at opposite sides of each cover section of said hatch cover to lift said cover sections and wheels movable to support said cover sections to enable them to be rolled aside to uncover said hatch opening, cables having separate flights connected to different cover sections, and winch means for moving said cables to roll said cover sections in opposite directions into positions covering and uncovering said hatch opening.

3. A hatch coaming and cover for rendering a hatch opening water-tight comprising a hatch coaming extending completely around a hatch opening, a rib member extending upwardly from said coaming, and extending completely around said opening, a hatch cover comprising two hatch cover sections each adapted to cover about one-half of said hatch opening, said cover sections having tops and downwardly extending side walls around three sides thereof, each cover section having an open side confronting the other cover section, a gasket mounted on the lower edge of the side walls of one of said cover sections, a gasket mounted at the lower edge of the side walls of the other cover section, said gaskets being engageable with each other and the rib when the cover sections are brought together to cover said opening, one of said gaskets having a section extending around the edges of the open side of one of the cover sections, and a rib member extending around the edges of the open side of the other cover section to engage the gasket section, first releasable means for clamping said cover sections to said coaming and said cover sections to each other to hold said rib and

rib member in engagement with said gaskets and gasket section, flanges extending laterally from the lower edges of the side walls and the open sides of said cover sections, complemental flanges extending laterally from the upper edges of said coaming, another gasket interposed between the flanges on said cover sections and the flanges in said coaming, and second, more closely spaced means for detachably clamping the flanges against said another gasket to form an oil-tight seal.

References Cited in the file of this patent

UNITED STATES PATENTS

1,835,856 Fliegel ---------- Dec. 8, 1931
2,192,135 King ---------- Feb. 27, 1940
2,194,012 Dawson et al. ---------- Mar. 19, 1940
2,564,966 Farrell ---------- Aug. 21, 1951
2,707,928 Farrell ---------- May 10, 1955
2,753,827 Sabin ---------- July 10, 1956

FOREIGN PATENTS

460,753 Great Britain ---------- Feb. 3, 1937