June 2, 1953 H. KUMMERMAN 2,640,454

MEANS FOR OPERATING HATCH-COVERS ABOARD SHIP

Filed July 14, 1949

2 Sheets-Sheet 1

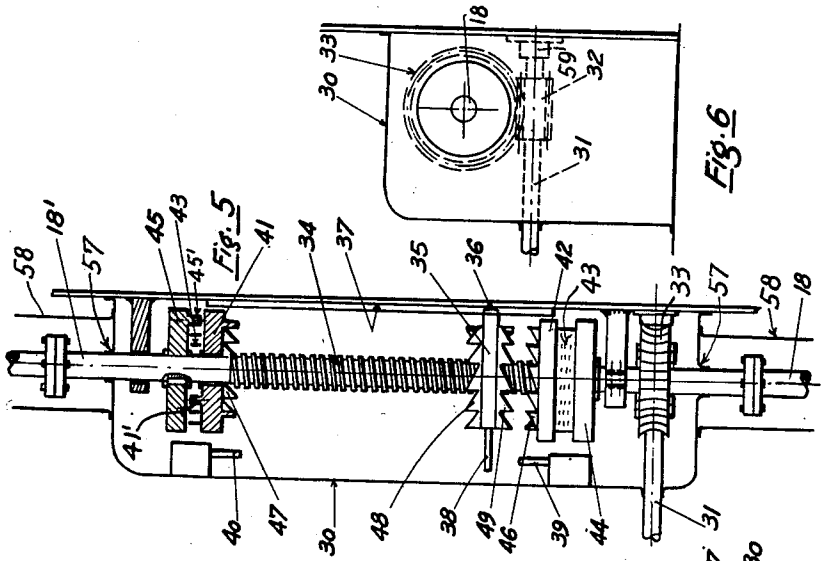


Fig. 6

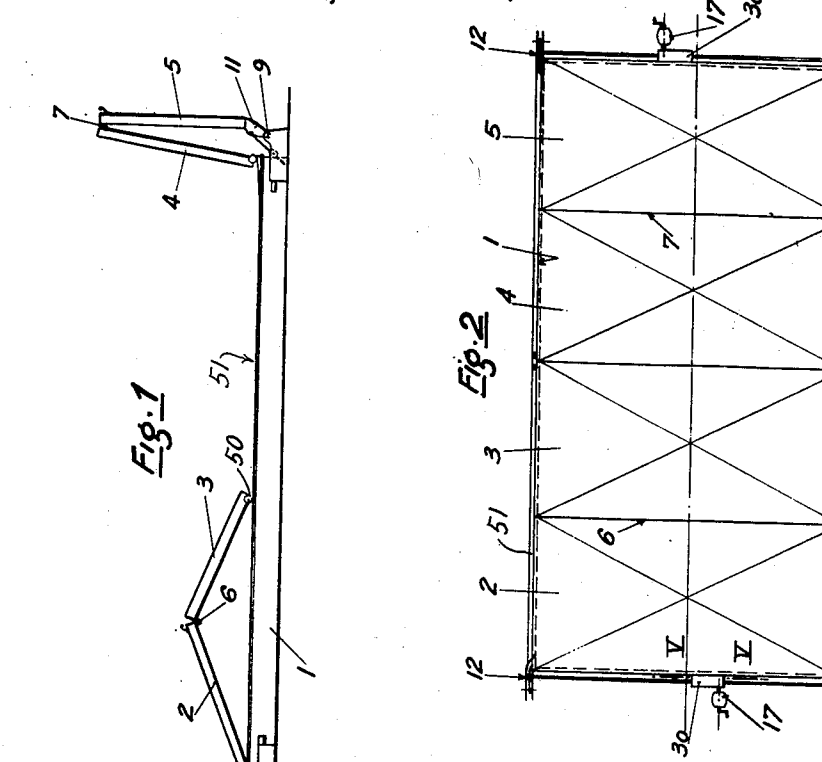


Fig. 5

Fig. 1

Fig. 2

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2 Sheets-Sheet 2

Fig. 7

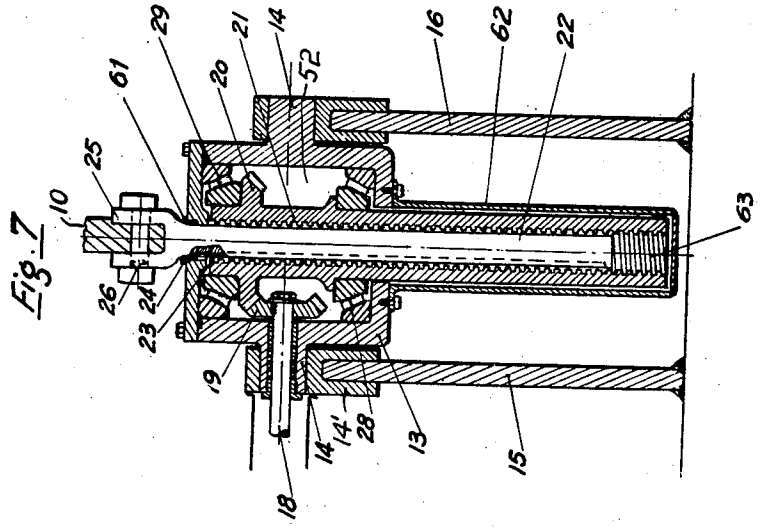


Fig. 3

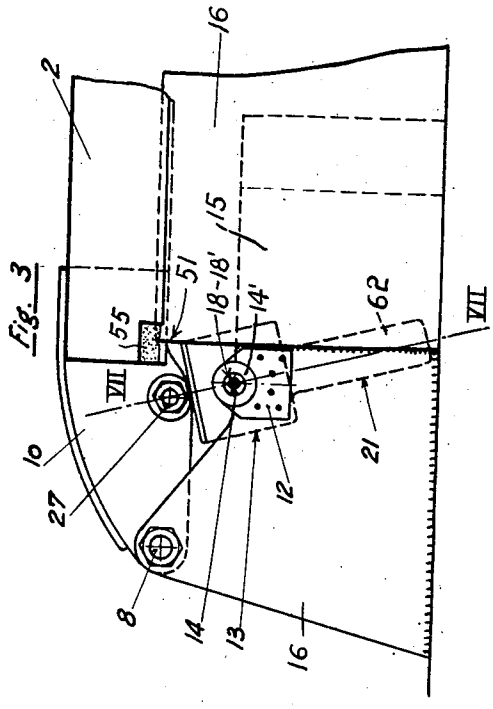
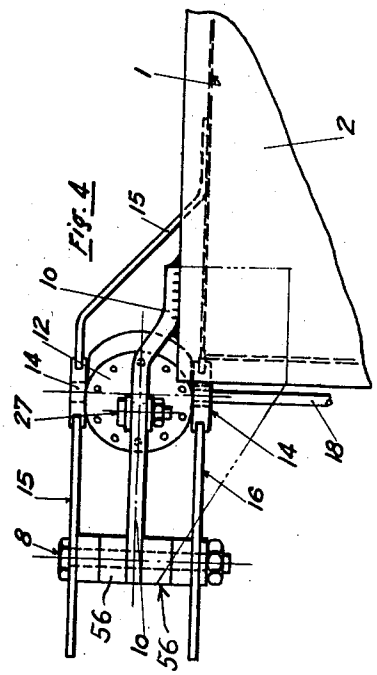


Fig. 4



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Patented June 2, 1953

2,640,454

UNITED STATES PATENT OFFICE

2,640,454

MEANS FOR OPERATING HATCH-COVERS ABOARD SHIP

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Application July 14, 1949, Serial No. 104,748
In France March 26, 1949

8 Claims. (Cl. 114—201)

1

This invention relates to the operation of hatch-covers or hatches on board ships, and more especially hatches of the pivoted type.

My invention contemplates the provision of an arrangement for ship's hatch covers of the type comprising mutually pivoted hatch sections at least one of which is also pivoted to the usual hatch coaming, said arrangement comprising at least one jack means consisting essentially of a body pivotally mounted on the ship's deck and of a movable member slidingly located in said body and pivotally secured to one of said hatch sections, said jack being situated outside the hatch opening, and further control means adapted to actuate the said jack, thereby causing the sliding of said member in said body.

It will readily be understood that the device of the invention greatly increases the rate at which hatches may be operated aboard ship, whether the hatches be mounted for pivotal movement longitudinally or transversely with respect to the main axis of the hatchway and the ship. Moreover all of the working elements involved in the operation of the hatches are secured to the ship structure itself and are in a position to be protected from injury due to impact or the like. Further, in as much as the constituent elements of the said device are located outside the hatchway, they will be easy to dismantle and it will be extremely simple in case of mechanical failure therein to disconnect the hatch-covers from the hoisting means and cause the hatches to be operated manually.

The above and further objects, features and advantages of the invention will appear from the ensuing description and the accompanying exemplary drawings, in which:

Fig. 1 diagrammatically illustrates in elevation, a hatchway provided with hatch-covers of the vertically foldable type operated according to the invention.

Fig. 2 is a corresponding view in plan.

Fig. 3 is a fragmentary view in elevation on an enlarged scale illustrating in detail the pivotal arrangement for a hatch-cover.

Fig. 4 is a corresponding plan view.

Fig. 5 is a section along V—V of Figure 2, on an enlarged scale of a safety movement-transmitting device according to the invention.

Fig. 6 diagrammatically shows the coupling assembly of the device of Fig. 5.

Fig. 7 illustrates in section on line VII—VII of Figure 3 one exemplary embodiment of a screw-jack suitable for use according to the invention.

As shown in Figs. 1 to 4, the hatchway is shown

2

at 1 and the four hatches or hatch-covers or hatch-sections cooperating two by two to close the hatchway are illustrated at 2, 3 and 4, 5. The hatch-covers in each pair are pivoted together at 6 for the hatch-covers 2 and 3 and at 7 for the hatch-covers 4 and 5. The end hatch-covers 2 and 5 are moreover pivoted at 8 and 9 to the adjacent edges of the hatchway 1. Said end hatch-covers are provided with integral attachments 10 and 11 (pivoted about 8 with the help of spacers 56) respectively serving to actuate the related pair of hatch-covers. These sections 2 to 5 are adapted to roll by means of suitable rollers 50 on the hatch coaming 51.

The actuation of the hatch-covers may according to the invention be accomplished with hoisting or elevating apparatus of any suitable type. In the ensuing disclosure for illustrative purposes the hoisting apparatus will be described as comprising mechanically operated jacks actuated from an electric motor. The jack 12 includes a frame 13 (Fig. 7) journalled as at 14 in housing 14' between two flanges 15 and 16 arranged to one side of the hatchway so as not to protrude above the vertical level of the hatchway opening. The jack-frame 13 as shown is rockable about the journals 14. An electric motor 17 or the like is adapted to rotate a shaft 18 on which is fixedly secured a bevel gear 19 meshing with a mating bevel gear 20 integral with an internally screw-threaded bushing 21. The bushing 21 contains a jack-shank 22 movable in it. The shank 22 has a keyway 23 slidably engaging projection 24 to prevent rotation of the jack-shank 22, which is thus constrained to assume longitudinal displacements only. The head 25 of the jack-shank as shown may be in the form of a fork perforated as at 26 and pivoted as at 27 (Fig. 4) to the hatch-cover. The bushing 21 is mounted in bearings such as the conical roller bearings 28 and 29. An oil cavity 52 is provided inside member 13 which is supported by piece 14'.

On Figure 3, I have also shown a packing 55 placed between section 2 and the coaming edge 51.

Between the motor 17 and the jack 12 or equivalent elevating means the invention provides for the interposal of a safety drive device shown in Figs. 5 and 6 and now to be described. Said device comprises a frame 30 having projecting into it a shaft 31 located in bushing 59 actuated from the motor 17 and a further pair of shafts 18, 18' or a single shaft 18—18' adapted to transmit the drive to the jacks or the like. The motor drive shaft carries a helical worm member 32 (Fig. 6) engaging a worm gear 33 splined on the shaft

18—18'. The shaft 18 is extended by a screw-rod 34 having a sliding disc 35 threaded on it, the sliding disc 35 being provided with a projecting heel 36 slidably engaging a slot 37 in the frame to prevent rotation of the sliding disc 35. The disc 35 further has a finger 38 projecting therefrom to actuate limiting contacts 39 and 40 at the opposite ends of its travel. To avert the danger of injury to the device in case of non-operation of the limit contacts, there is provided in conjunction with the above-described assembly a safety device comprising two flanges 41 and 42 loosely mounted on the shaft 18' and each connected through suitably calibrated spring means 43 with further flanges 45, 44 keyed on the said shaft 18'—18. The flanges 41 and 42 are formed with clutch teeth 46 and 47 adapted to mesh with mating teeth 48 and 49 provided on the opposite faces of the sliding disc 35. Shaft 18 is located in flanges 57 pertaining to the extension 58 of housing 30. The above-described device operates as follows:

At the end of a stroke the finger 38 engages the contact element 39 or 40. Should the motor fail to stop, the teeth 48 of the sliding clutch disc will engage say the teeth 47 of flange 41. This flange will rotate and produce by means of fingers 41' and 45' the tensioning of spring 43. The overload created by this supplementary force produces the cutting of the safety fuses of the motor supply circuit.

It will be observed that the jack shank 22 is preferably only formed with a screw thread over a very small vertical extent thereof adjacent its free end 63, while the bushing 21 is internally threaded throughout its whole length. This makes it possible to insure that a perfectly tight seal is provided for the interior of the jack by means of a packing ring gasket 61 or rubber seal ring adapted to be compressed at the end of the stroke of the jack, or both such means simultaneously. There is nothing to prevent the provision of a supply of oil within the said bushing, an outer casing or cover 62 being of course in that case provided.

As shown in Fig. 2 there is a single motor 17 actuating through the medium of the safety-drive device 30 previously described, a shaft 8 actuating the two jacks 12, 12. This shaft has each of its opposite ends operatively projecting into a related one of the coaxial pair of jacks 12. As a result of this arrangement, there is no necessity of providing an angular transmission of any sort to operate said jacks.

It will of course be understood that the invention is in no way limited to the exemplary embodiments illustrated and described, but only as defined by the scope of the ensuing claims.

What I claim is:

1. In a ship having a deck provided with a hatch surrounded by a coaming and with hatch covers, a control arrangement for the ship's hatch covers of the type comprising mutually pivoted hatch sections at least one of which is also pivoted to the latch coaming, said arrangement comprising at least one hollow body pivotally mounted on the ship's deck outside the hatch coaming and laterally thereof, and a movable member slidingly located in said body and pivotally and directly secured to the hatch section which is pivoted to the coaming, this latter pivotal connection being closely adjacent the pivotal connection between the corresponding hatch cover and the coaming, said body and member forming a jack and being adapted to cause the sliding of said member in said body and the lifting of the cover.

2. An arrangement as in claim 1, wherein the hatch covers consist of two pairs of hatch sections, the sections of each pair being pivoted together, said pairs being alined to provide proximal and end sections, two pivots oppositely situated with respect to the hatch opening for the pivotal mounting of one of the end sections of each pair on the coaming, the said jack means being located in the vicinity of each of said ends and actuating the said section which is pivoted to the adjacent part of the hatch coaming.

3. An arrangement as in claim 1, wherein the hatch covers consist of two pairs of hatch sections, the sections of each pair being pivoted together, said pairs being alined to provide proximal and end sections, two pivots oppositely situated with respect to the hatch opening for the pivotal mounting of one of the end sections of each pair on the coaming, the said jack means being located in the vicinity of each of said ends and actuating the said section which is pivoted to the adjacent part of the hatch coaming, and wherein two pairs of jacks are located oppositely with respect to the hatch opening and actuate said adjacent pivotally mounted hatch sections.

4. In a ship having a deck provided with a hatch surrounded by a coaming and with hatch covers, an arrangement for the control of ship's hatch covers of the type comprising pairs of mutually pivoted hatch sections at least one of each pair being pivoted to the hatch coaming, to provide proximal and end sections, said arrangement including one end hatch section, a pivot on one side of the hatch coaming for pivotally supporting said section, additional pivots on said end section only a short distance away from said first pivot and parallel thereto, a pair of jacks situated outside the hatch opening, each of said jacks comprising a main hollow body pivotally mounted on the ship's deck and a movable element slidingly located in said body and pivotally connected to said additional pivots, a drive shaft abutting to said jacks, a motor for the actuation of said shaft, gear means in said jack for transforming the rotation of said drive shaft into the sliding movement of said sliding member inside said hollow body, said drive shaft extending outside said hatch and being parallel to said pivots, and a drive transmission for the control of said jacks, said drive transmission including a bevel and worm gearing between said motor and said shafts.

5. In an arrangement as in claim 4, automatic movement arresting means in said drive transmission including limit switches stopping said motor and actuated upon said jack reaching the end of its pivotal movement in each direction.

6. In means for opening and closing a hatchway having a coaming including side and end walls and a hatch cover adapted to fit on said coaming, frame plates fixed to one corner portion of the coaming and projecting in spaced parallel relation therefrom, an arm fixed to said hatch cover at one edge thereof and terminating centrally between the plates, a pivot bolt passing through said plates and the terminal portion of said arm, alined bearings carried by said plates between said bolt and coaming, a jack-frame provided with journals resting in said bearings, a nut member rotatably mounted in said frame with its longitudinal axis perpendicular to the axis of said journals, a jack screw extending through said nut member and having its

upper end pivoted to said arm, and means to rotate said nut member.

7. In means for opening and closing a hatchway having a coaming including side and end walls and a hatch cover adapted to fit on said coaming, frame plates fixed to one corner portion of the coaming and projecting in spaced parallel relation therefrom, an arm fixed to said hatch cover at one edge thereof and terminating centrally between the plates, a pivot bolt passing through said plates and the terminal portion of said arm alined bearings carried by said plates between said bolt and coaming, a jack-frame provided with journals resting in said bearings, a nut member rotatably mounted in said frame with its longitudinal axis perpendicular to the axis of said journals, a jack screw extending through said nut member and having its upper end pivoted to said arm, a shaft extending laterally through said frame, meshing miter gears carried by said nut member and shaft, and driving means for said shaft.

8. In means for opening and closing a hatchway having a coaming including side and end walls and a hatch cover adapted to fit on said coaming, frame plates fixed to one corner portion of the coaming and projecting in spaced

parallel relation therefrom, an arm fixed to said hatch cover at one edge thereof and terminating centrally between the plates, a pivot bolt passing through said plates and the terminal portion of said arm alined bearings carried by said plates between said bolt and coaming, a jack-frame provided with journals resting in said bearings, a nut member rotatably mounted in said frame with its longitudinal axis perpendicular to the axis of said journals, a jack screw extending through said nut member and having its upper end pivoted to said arm, a shaft extending laterally through said frame, meshing miter gears carried by said nut member and shaft, and driving means for said shaft, and including a motor and a safety circuit device controlling said motor.

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