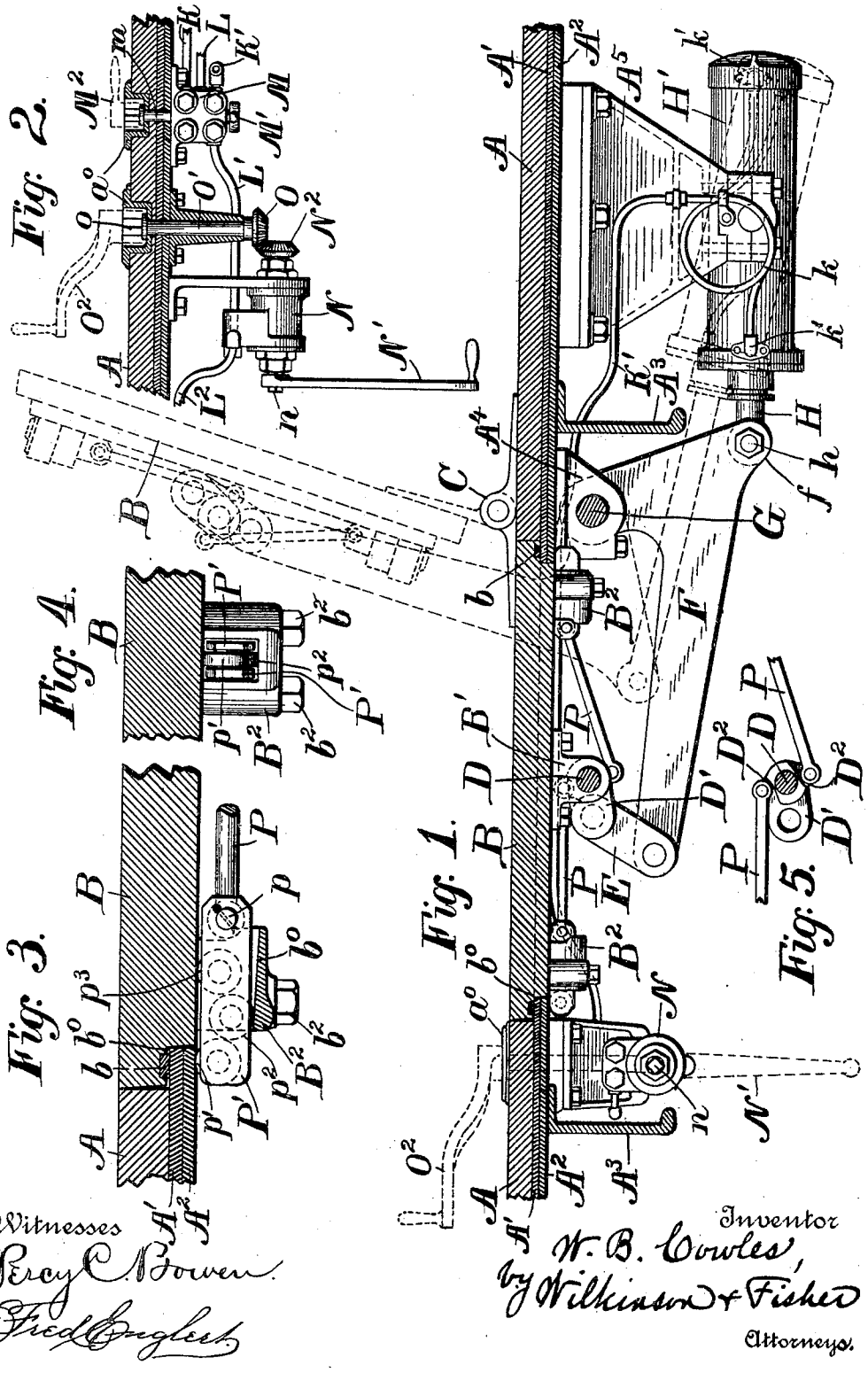
No. 681,624. Patented Aug. 27, 1901.

W. B. COWLES.

MECHANISM FOR MOVING ARMORED HATCHES, &c.

(Application filed May 8, 1901.)

(No Model.) 2 Sheets—Sheet 1.



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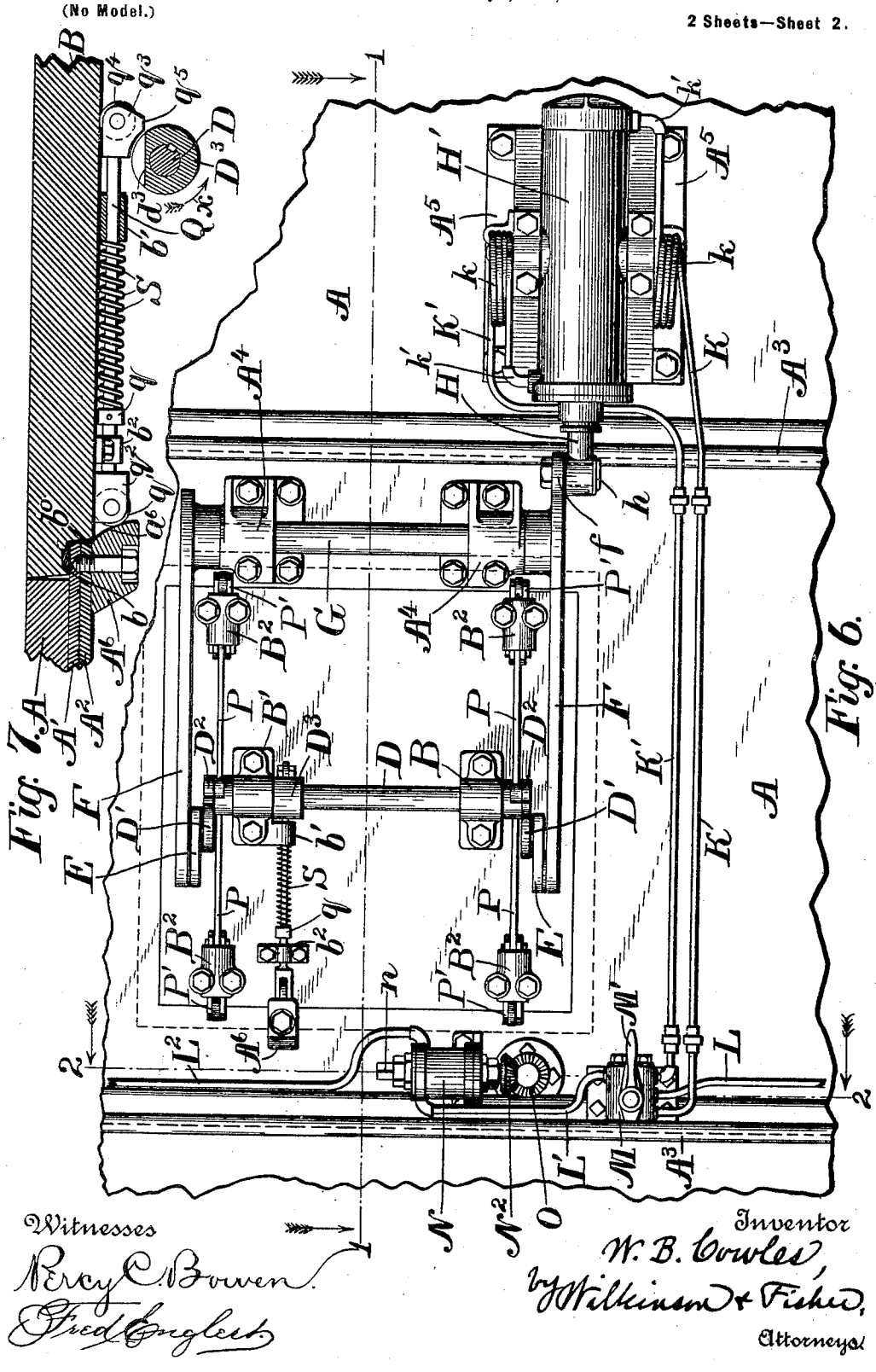


Fig. 7.

Fig. 6.

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UNITED STATES PATENT OFFICE.

WILLIAM BARNUM COWLES, OF CLEVELAND, OHIO, ASSIGNOR TO THE LONG ARM SYSTEM COMPANY, OF SAME PLACE.

MECHANISM FOR MOVING ARMORED HATCHES, &c.

SPECIFICATION forming part of Letters Patent No. 681,624, dated August 27, 1901.

Application filed May 8, 1901. Serial No. 59,272. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM BARNUM COWLES, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Mechanism for Moving Armored Hatches or other Heavy Barriers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My present invention relates to improvements in apparatus for closing swinging doors or hatches, such as heavy armored hatches and other like devices, and while it is especially intended for use on shipboard it may be used advantageously in other places where a heavy hatchway or grating is to be lifted or swung out of the way.

My present invention is intended to embody an adaptation of the general system shown in my United States Patents No. 631,698, granted August 27, 1899, and No. 656,947, granted August 28, 1900, for the opening and closing of heavy hatches either at a distance from one or more central stations or by hand at the hatch itself.

This invention is adapted to use fluid-pressure of any suitable kind; but I preferably employ pneumatic pressure stored up in a main reservoir for operating the mechanism from the central station and liquid-pressure generated in a hand-pump for operating each hatch separately by hand, as described in my Patent No. 656,947 aforesaid.

My invention will be better understood by reference to the accompanying drawings, in which the same parts are indicated by the same letters throughout the several views.

Figure 1 represents a vertical section through an armored hatch and the adjacent parts of the deck, the section being along the line 1 1 of Fig. 6 and looking in the direction of the arrows. Fig. 2 represents the section along the line 2 2 of Fig. 6 looking in the direction of the arrows and shows the means for operating the puppet-valve and hand-pump by hand from either side of the deck. Fig. 3 is a detail sectional view showing the tightening device for binding the hatch down on its seat. Fig. 4 is a view, end on, of the same device. Fig. 5 is a detail view showing the crank-arm and connecting-rods for operating the tighteners. Fig. 6 represents an inverted plan view of a hatch when in a closed position and shows the mechanism for operating the same, and Fig. 7 is a detail sectional view showing the lock for controlling the operating-shaft which moves the tighteners.

A represents the armored or protective deck of a ship, which is placed over the deck-plating A′ and A^2.

A^3 represents a bulk beam or girder, secured to the under side of the deck.

B represents a hatch rabbeted, as shown at b^0, and provided with a suitable packing *b*. This hatch is hinged at one side to the deck, as at C, and is swung up to the open position (indicated in dotted lines in Fig. 1) by the mechanism that will hereinafter be described.

D is a rock-shaft journaled in bearings B′, secured beneath the hatch. Said rock-shaft is provided with cranks D′, having ears D^2, projecting laterally therefrom. Links E are pivotally connected to the cranks D′ and also to the bell-crank levers F, which are pivoted on the shaft G, journaled in bearings A^4, secured to the under side of the deck. The piston-rod H is connected to a lug *f* on one of the bell-crank levers F by means of the pin *h*, and the said piston-rod projects into the cylinder H′, which is trunnioned in bearings provided in the brackets A^5, secured beneath the deck. Fluid-pressure is supplied at one end of the cylinder by means of the pipe K and is carried off from the other end of the cylinder by means of the pipe K′, or vice versa. In order to allow the cylinder H′ to rock through the desired angle and to obviate the necessity for stuffing-boxes in the trunnions, the pipes K and K′ are coiled, as at *k*. Fluid-pressure from the main reservoir (not shown) is admitted through the pipe L to the valve mechanism M, which may be controlled by hand from either side of the deck by means of the handles M′ and M^2, (see Figs. 2 and 6,) and passes from this valve mechanism to the proper end of the cylinder. These two handles M′ and M^2 are or may be mounted on opposite ends of the valve-stem *m*. (See Fig. 2.) The handle M′ is

kept permanently in place; but the handle M^2 is made to slip over the squared end of the valve-stem m, which projects into the cup a^0, let into the upper face of the deck. Fluid under pressure is let into the valve mechanism M from the main reservoir by means of the pipe L and from the hand-pump, hereinafter to be described, by means of the pipe L'.

The construction and mode of operation of the valve mechanism (indicated at M) is fully described in my Patent No. 631,698, hereinbefore referred to, but not being a part of my present invention will not be further described herein.

In order to operate the hatch by hand, I provide a suitable hand-pump N, connected to the auxiliary reservoir (not shown) by means of the pipe L^2, and delivering fluid under pressure through the pipe L' to the valve mechanism M, whence it passes to the proper end of the cylinder H'. Any suitable hand-pump may be adapted for this purpose; but I have shown one such arrangement in Fig. 2.

N represents the cylinder, provided with a rocking piston (not shown) operated by means either of the handle N', sliding over the squared end n of the piston-rod, or by means of the handle O^2, sliding over the squared end o of the shaft O', which carries the bevel-gear O, meshing in the bevel-gear N^2 on the opposite end of the rocking piston-rod. By rocking either the handle N' or the handle O^2 the hand-pump is operated. It would ordinarily be preferable to keep the handles O^2 and N' unshipped and to have the squared end o of the shaft O' project up into the cup a^0, let into the deck.

The arrangement by means of which fluid-pressure from the main reservoir may be used to operate a cylinder and piston by emergency pressure from a central station, and yet permit the same cylinder and piston to be operated by hand-power, is described and claimed in my Patent No. 656,947, above referred to, and the application of the principle is precisely the same, whether applied to operating a hatch or to operating a sliding door, and thus it will be unnecessary to describe the fluid-pressure system further in this application.

It will be seen that if fluid-pressure be admitted to the right end of the cylinder H' (shown in Fig. 1) that the piston-rod will be projected outward to the position indicated in dotted lines in Fig. 1, causing the hatch to swing open, while if fluid-pressure be admitted to the opposite end of the cylinder H' the hatch will be brought down to the closed position. By cushioning in the end of the cylinder in the well-known way, or by placing diaphragms with a small hole to regulate the flow of fluid to and from each end of the cylinder through the fittings k', the violent closing or opening of the hatch may be provided against.

In order to lock the hatch firmly on its seat, I provide the tightening devices, which will now be described.

The cranks D' have ears D^2, to which are connected the rods P, connected by means of pins p to the roller-bars P', in which roller-bars are mounted the three rollers p', p^2, and p^3. The rollers p' and p^3 travel on the under side of the hatch or of the deck, while the roller p^2 rides up the inclined face b^0 (see Fig. 3) in the guide plate or frame B^2, secured to the under side of the hatch, as by means of the bolts b^2. In opening the hatch the first movement of the rock-shaft D draws these roller-bars P' clear of the sides of the hatchway before the hatch begins to swing upward, and then the whole hatch swings about the hinge C. In closing the hatch swings down to the lower position, and the next part of the movement of the rock-shaft D is to force the roller-bar P' back to the position shown in Fig. 3. In this position it will be seen that the rollers p', p^2, and p^3 jam the hatch tight down on the packing b, thus making a water-tight and air-tight joint. To prevent the roller-bars P' from being projected prematurely before the hatch is down on its seat, I provide the locking arrangement shown in detail in Fig. 7, where A^6 represents a cam-lug secured at one side to the hatchway, and Q a rod carrying at its outer end a roller q, mounted in the roller-head q^2. This rod slides longitudinally through guides b' and b^2, secured to the under side of the hatch, and the roller q' is normally pressed toward the cam-face a^6 of the lug A^6 by means of the spring S bearing against the set-collar q on the rod Q. The opposite end of this rod Q carries an antifriction-roller q^4 in a frame q^3, which latter is provided with a toe q^5, which registers with a transverse slot d^3 on the set-collar D^3, mounted on the rock-shaft D. As soon as the hatch is lifted from its seat the spring S forces the toe q^5 into this slot d^3 and locks the rock-shaft D against motion in the direction indicated by the arrow X. This insures that the roller-bars P' shall not project beyond the edge of the hatch until the hatch has swung down to the closed position, when the roller q' will ride down the cam-face a^6, pushing the toe q^5 to the disengaged position, (shown in Fig. 7,) and then releasing the shaft D, which will turn through the small angle required to operate the tighteners. Thus it will be seen that when the hatch is closed the application of fluid-pressure to the cylinder H' will first rock the shaft D far enough to release the tighteners and then the hatch will swing open. As soon as the hatch rises from its seat the locking devices will automatically lock the shaft D until the hatch returns to the closed position, when the final movement of the piston H will cause the shaft D to rock and will operate the tighteners.

While I have shown the invention as applied to the fluid-pressure system described in my patents aforesaid, it will be obvious

that the same may be operated by fluid-pressure from any suitable source or sources. It will also be obvious that various modifications of the herein-described apparatus and in the combination and arrangement of parts may be made which can be used without departing from the spirit of my invention.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. In a hatch-operating mechanism, the combination with a deck or floor and a hatch hinged thereto, of a bell-crank lever pivoted to the deck or floor and connected to the hatch, a cylinder trunnioned to the deck or floor, a piston-rod in said cylinder connected to the bell-crank lever, and means for supplying fluid-pressure to said cylinder, substantially as described.

2. In a hatch-operating mechanism, the combination with a deck or floor and a hatch hinged thereto, of a bell-crank lever pivoted to the deck or floor and connected to the hatch, a cylinder trunnioned to the deck or floor, a piston-rod in said cylinder and connected to the bell-crank lever, and means operated from either side of the deck for supplying fluid-pressure to said cylinder, substantially as described.

3. In a hatch-operating mechanism, the combination with a deck or floor, and a hatch hinged thereto, of a bell-crank lever pivoted to the deck or floor and connected to the hatch, a cylinder trunnioned to the deck or floor, a piston-rod in said cylinder connected to the bell-crank lever, and means operated either from a distance, or by hand-power at the hatch, for admitting fluid-pressure into said cylinder, substantially as described.

4. In a hatch-operating mechanism, the combination with a deck or floor and a hatch hinged thereto, of a bell-crank lever pivoted to the deck or floor and connected to the hatch, a cylinder trunnioned to the deck or floor, a piston-rod in said cylinder connected to the bell-crank lever, valve mechanism operated from either side of said deck or floor, and means controlled by said valve mechanism for admitting fluid-pressure to said cylinder, substantially as described.

5. In a hatch-operating mechanism, the combination with a deck or floor and a hatch hinged thereto, of a bell-crank lever pivoted to the deck or floor and connected to the hatch, a cylinder trunnioned to the deck or floor, a piston-rod in said cylinder connected to the bell-crank lever, tighteners operated by said bell-crank lever during part of the motion of said piston-rod, and means operated from either side of the deck for supplying fluid-pressure to said cylinder, substantially as described.

6. In a hatch-operating mechanism, the combination with a deck or floor and a hatch hinged thereto, of a bell-crank lever pivoted to the deck or floor and connected to the hatch, a cylinder trunnioned to the deck or floor, a piston-rod in said cylinder connected to the bell-crank lever, tighteners operated by said bell-crank lever during part of the motion of said piston-rod, and means operated either from a distance or by hand-power at the hatch for admitting fluid-pressure into said cylinder, substantially as described.

7. In a hatch-operating mechanism, the combination with a deck or floor and a hatch hinged thereto, of a rock-shaft mounted on said hatch, a bell-crank lever pivoted to the deck or floor and connected to a crank or arm on said rock-shaft, a cylinder trunnioned to the deck or floor, a piston-rod in said cylinder connected to the bell-crank lever, roller-tighteners automatically operated by said rock-shaft, and means operated from either side of the deck for supplying fluid-pressure to said cylinder, substantially as described.

8. In a hatch-operating mechanism, the combination with a deck or floor and a hatch hinged thereto, of a rock-shaft mounted on said hatch, a bell-crank lever pivoted to the deck or floor and connected to a crank or arm on said rock-shaft, a cylinder trunnioned to the deck or floor, a piston-rod in said cylinder connected to the bell-crank lever, roller-tighteners automatically operated by said rock-shaft, a lock also automatically operated by said rock-shaft for normally holding said tighteners in the disengaged position, and means operated from either side of the deck for supplying fluid-pressure to said cylinder, substantially as described.

9. In a hatch-operating mechanism, the combination with a deck or floor and a hatch hinged thereto, of mechanism operated by fluid-pressure for swinging the hatch about its hinges, and roller-tighteners automatically operated by said mechanism during the early part of the opening and the last part of the closing motion, substantially as described.

10. In a hatch-operating mechanism, the combination with a deck or floor and a hatch hinged thereto, of mechanism operated by fluid-pressure for swinging the hatch about its hinges, and roller-tighteners automatically operated by said mechanism during the early part of the opening and the last part of the closing motion, with means automatically operated by said mechanism for locking said tighteners out of the way except when the hatch is on its seat, substantially as described.

11. In a hatch-operating mechanism, the combination with a deck or floor and a hatch hinged thereto, of a rock-shaft mounted on said hatch, a bell-crank lever pivoted to the deck or floor and connected to a crank or arm on said rock-shaft, a cylinder trunnioned to the deck or floor, a piston-rod in said cylinder connected to the bell-crank lever, roller-tighteners automatically operated by said rock-shaft, and means for supplying fluid-pressure to said cylinder, substantially as described.

12. In a hatch-operating mechanism, the combination with a deck or floor and a hatch

hinged thereto, of a rock-shaft mounted on said hatch, a bell-crank lever pivoted to the deck or floor and connected to a crank or arm on said rock-shaft, a cylinder trunnioned to the deck or floor, a piston-rod in said cylinder connected to the bell-crank lever, roller-tighteners automatically operated by said rock-shaft, a lock also automatically operated by said rock-shaft for normally holding said tighteners in the disengaged position, and means for supplying fluid-pressure to said cylinder, substantially as described.

13. In a hatch-operating mechanism, the combination with a deck or floor and a hatch hinged thereto, of mechanism for swinging the hatch about its hinges, guide-plates each with a wedge face secured to said hatch, and roller-tighteners engaging said wedge faces, automatically operated by said mechanism during the early part of the opening and the last part of the closing motion, substantially as described.

14. In a hatch-operating mechanism, the combination with a deck or floor and a hatch hinged thereto, of mechanism for swinging the hatch about its hinges, guide-plates each with a wedge face secured to said hatch, operated by said mechanism during the early part of the opening and the last part of the closing motion, with means automatically operated by said mechanism for locking said tighteners out of the way except when the hatch is on its seat, substantially as described.

15. In a hatch-operating mechanism, the combination with a deck or floor and a hatch hinged thereto, guide-plates each with a wedge face secured to said hatch, of a rock-shaft mounted on said hatch, a bell-crank lever pivoted to the deck or floor and connected to a crank or arm on said rock-shaft, a cylinder trunnioned to the deck or floor, a piston-rod in said cylinder connected to the bell-crank lever, roller-tighteners engaging said wedge faces automatically operated by said rock-shaft, and means operated from either side of the deck for supplying fluid-pressure to said cylinder, substantially as described.

16. In a hatch-operating mechanism, the combination with a deck or floor and a hatch hinged thereto, guide-plates each with a wedge face secured to said hatch, of a rock-shaft mounted on said hatch, a bell-crank lever pivoted to the deck or floor and connected to a crank or arm on said rock-shaft, a cylinder trunnioned to the deck or floor, a piston-rod in said cylinder connected to the bell-crank lever, roller-tighteners engaging said wedge faces, automatically operated by said rock-shaft, a lock also automatically operated by said rock-shaft for normally holding said tighteners in the disengaged position, and means operated from either side of the deck for supplying fluid-pressure to said cylinder, substantially as described.

17. In a hatch-operating mechanism, the combination with a deck or floor and a hatch hinged thereto, of a bell-crank lever pivoted to the deck or floor and connected to the hatch, a cylinder trunnioned to the deck or floor, a piston-rod in said cylinder connected to the bell-crank lever, and pipes for supplying fluid-pressure to and for carrying it from said cylinder, coiled and respectively connected to the trunnions thereof, substantially as described.

18. In a hatch-operating mechanism, the combination with a deck or floor and a hatch hinged thereto, of a bell-crank lever pivoted to the deck or floor and connected to the hatch, a cylinder trunnioned to the deck or floor, a piston-rod in said cylinder and connected to the bell-crank lever, fluid-pressure pipes coiled and connected to opposite trunnions of said cylinder, respectively, and operated from either side of the deck, for supplying fluid-pressure to said pipes, substantially as described.

19. In a hatch-operating mechanism, the combination with a deck or floor, and a hatch hinged thereto, of a bell-crank lever pivoted to the deck or floor and connected to the hatch, a cylinder trunnioned to the deck or floor, a piston-rod in said cylinder connected to the bell-crank lever, fluid-pressure pipes coiled and connected to opposite trunnions of said cylinder respectively, and means operated from a distance for admitting fluid-pressure into the closing-pipe, or by hand-power, at the hatch for forcing fluid-pressure into either of said pipes, substantially as described.

20. In a hatch-operating mechanism, the combination with a deck or floor, and a hatch hinged thereto, of a bell-crank lever pivoted to the deck or floor and connected to the hatch, a cylinder trunnioned to the deck or floor, a piston-rod in said cylinder connected to the bell-crank lever, a fluid-pressure main, and a hand-pump with pipe connections, both connected to said cylinder, substantially as and for the purposes described.

21. In a hatch-operating mechanism, the combination with a deck or floor, and a hatch hinged thereto, of a bell-crank lever pivoted to the deck or floor and connected to the hatch, a cylinder trunnioned to the deck or floor, a piston-rod in said cylinder connected to the bell-crank lever, a fluid-pressure main, and a hand-pump with pipe connections, both connected to said cylinder, valve mechanism, means for operating the same from either side of said deck or floor, and means for operating said pump from either side of said deck or floor, substantially as described.

22. In a hatch-operating mechanism, the combination with a deck or floor, a hatch hinged thereto, and a link connected to said hatch, of a bell-crank lever pivoted to the deck or floor and connected to said link, a cylinder trunnioned to the deck or floor, a piston-rod in said cylinder connected to the bell-crank lever, and means for supplying fluid-

pressure to said cylinder, substantially as described.

23. In a hatch-operating mechanism, the combination with a deck or floor, a hatch hinged thereto, and a link connected to said hatch, of a bell-crank lever pivoted to the deck or floor and connected to said link, a cylinder trunnioned to the deck or floor, a piston-rod in said cylinder and connected to the bell-crank lever, and means operated from either side of the deck for supplying fluid-pressure to said cylinder, substantially as described.

24. In a hatch-operating mechanism, the combination with a deck or floor, a hatch hinged thereto, and a link connected to said hatch, of a bell-crank lever pivoted to the deck or floor and connected to said link, a cylinder trunnioned to the deck or floor, a piston-rod in said cylinder connected to the bell-crank lever, valve mechanism operated from either side of said deck or floor, and means controlled by said valve mechanism for admitting fluid-pressure to said cylinder, substantially as described.

25. In a hatch-operating mechanism, the combination with a deck or floor, a hatch hinged thereto, and a link connected to said hatch, of a bell-crank lever pivoted to the deck or floor and connected to said link, a cylinder trunnioned to the deck or floor, a piston-rod in said cylinder connected to the bell-crank lever, tighteners operated by said bell-crank lever through said link during part of the motion of said piston-rod, and means operated from either side of the deck for supplying fluid-pressure to said cylinder, substantially as described.

26. In a hatch-operating mechanism, the combination with a deck or floor, a hatch hinged thereto, and a link connected to said hatch, of a bell-crank lever pivoted to the deck or floor and connected to said link, a cylinder trunnioned to the deck or floor, a piston-rod in said cylinder connected to the bell-crank lever, tighteners operated by said bell-crank lever through said link during part of the motion of said piston-rod, and means operated either from a distance or by hand-power at the hatch for admitting pressure into said cylinder, substantially as described.

27. In a hatch-operating mechanism, the combination with a deck or floor, a hatch hinged thereto, and a link connected to said hatch, of a bell-crank lever pivoted to the deck or floor and connected to said link, a cylinder trunnioned to the deck or floor, a piston-rod in said cylinder connected to the bell-crank lever, a fluid-pressure main, and a hand-pump with pipe connections, both connected to said cylinder, valve mechanism, means for operating the same from either side of said deck or floor, and means for operating said pump from either side of said deck or floor, substantially as described.

28. In a hatch-operating mechanism, the combination with a deck or floor, and a hatch hinged thereto, of a rock-shaft mounted on said hatch, a link connected to a crank or arm on said rock-shaft, a bell-crank lever pivoted to the deck or floor and connected to said link, a cylinder trunnioned to the deck or floor, a piston-rod in said cylinder connected to the bell-crank lever, and roller-tighteners automatically operated by said rock-shaft, substantially as described.

29. In a hatch-operating mechanism, the combination with a deck or floor, and a hatch hinged thereto, of a rock-shaft mounted on said hatch, a link connected to a crank or arm on said rock-shaft, a bell-crank lever pivoted to the deck or floor and connected to said link, a cylinder trunnioned to the deck or floor, a piston-rod in said cylinder connected to the bell-crank lever, roller-tighteners automatically operated by said rock-shaft, and a lock also automatically operated by said rock-shaft for normally holding said tighteners in the disengaged position, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM BARNUM COWLES.

Witnesses:

E. K. HOAK,

EDWARD E. NEWMAN.