C. V. A. ELEY.

SHIP.

APPLICATION FILED APR. 23, 1918.

1,301,238.

Patented Apr. 22, 1919.

2 SHEETS—SHEET 1.

Fig. 1.

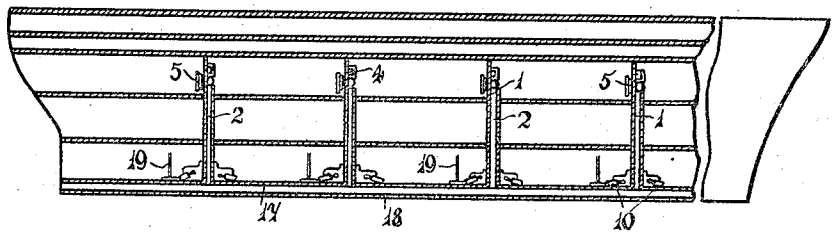


Fig. 2.

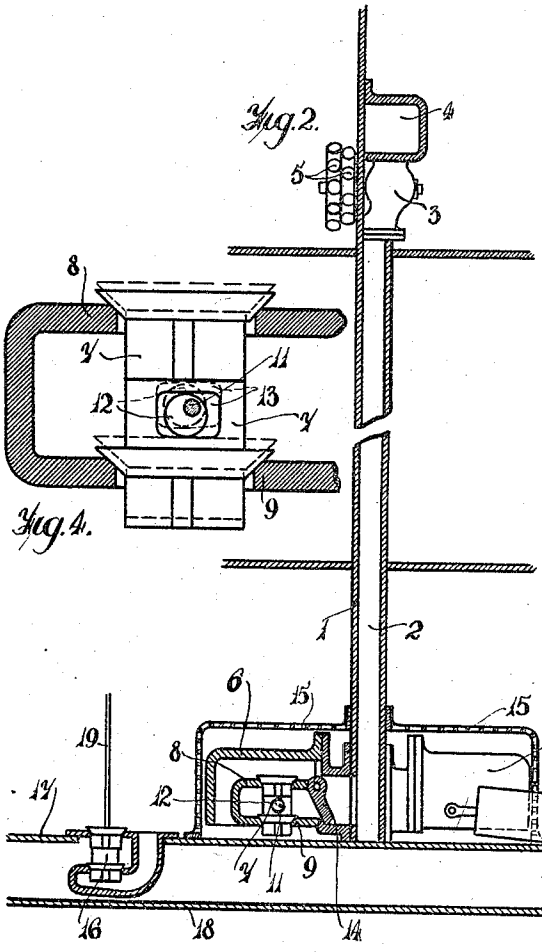


Fig. 3.

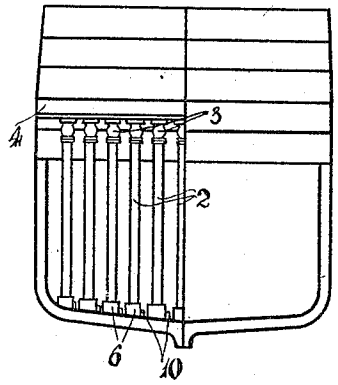
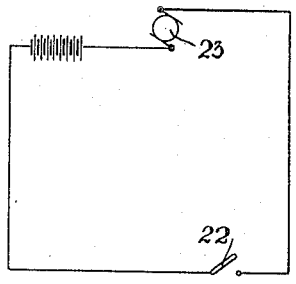


Fig. 4.

Fig. 5.



Inventor:-
Charles V. A. Eley.
By:- B. Singer, Atty.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

C. V. A. ELEY.

SHIP.

APPLICATION FILED APR. 23, 1918.

1,301,238.

Patented Apr. 22, 1919.

2 SHEETS—SHEET 2.

Fig. 4.

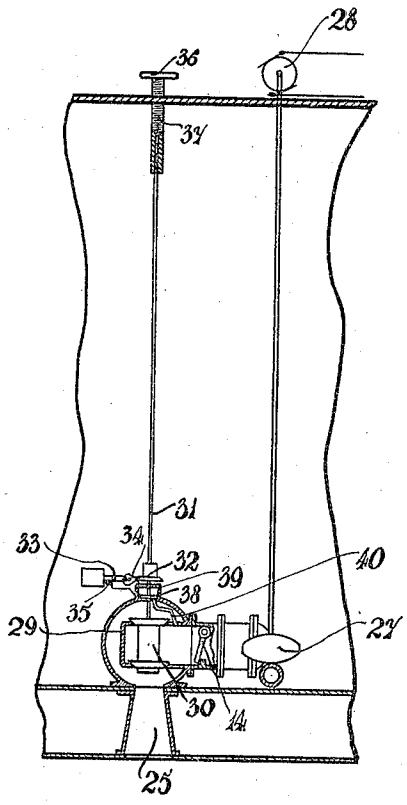
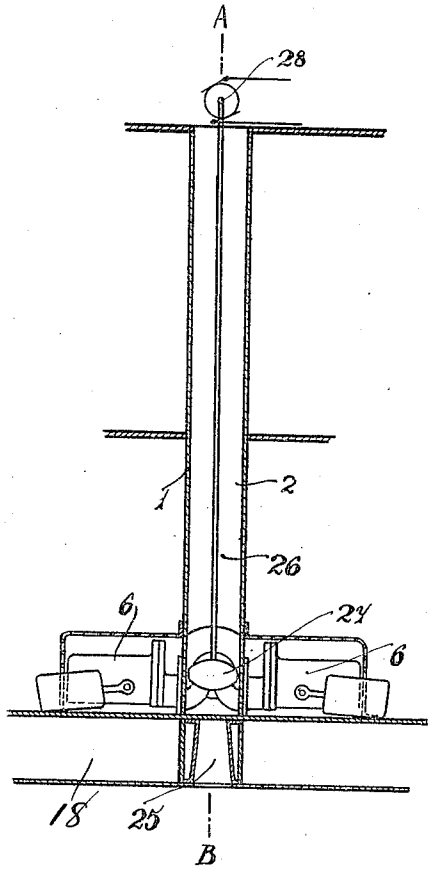


Fig. 6.



Inventor:-
Charles V. A. Eley.
By:- B. Singer.
Atty.

THE NORRIS PETERS CO., PHOTO-LITHO., WASH.

UNITED STATES PATENT OFFICE.

CHARLES V. A. ELEY, OF BIRMINGHAM, ENGLAND.

SHIP.

1,301,238. Specification of Letters Patent. Patented Apr. 22, 1919.

Application filed April 23, 1918. Serial No. 230,292.

To all whom it may concern:

Be it known that I, CHARLES VICTOR ALBERT ELEY, a subject of the King of Great Britain, residing at 10 Cambridge Crescent, Edgbaston, Birmingham, in the county of Warwick, England, have invented new and useful Improvements Relating to Ships; and I do hereby declare the following to be a full, clear, and exact description of the same.

My invention comprises improvements relating to ships and has for its object to provide improved means for the prevention of the sinking of ships even though seriously holed.

In my prior Patent Specification No. 1193528 I have described means of accomplishing this object, such means, however, being dependent upon the supply of power from the engine room, but the present invention accomplishes the object even though the main power is out of action.

According to this invention a ship divided into a series of water-tight compartments is provided with a pump or pumps located on the bulk-heads in each of such compartments and driven by independent engines or motors.

A vertical conduit for conveying the water from the bottom of the ship to the pump located at the top may be conveniently formed by the provision of a cofferdam plate adjacent the bulk-head, or a simple pipe adjacent the bulk-head may be provided.

The conduit or pipe is arranged to communicate with each of the adjacent compartments, float actuated valves being provided which open automatically when the compartment is flooded thereby allowing the water to flow to the pump from either or both of the flooded compartments. These floats may also be adapted to automatically start engines or motors driving the pumps.

The engines employed may be of any suitable form, but are conveniently of the internal combustion type, or electric motors may be used.

By the provision of a conduit beneath each of the water-tight compartments and adapted to communicate with any of them by opening a valve or valves, any one compartment may be put into communication with one or all of the others, thus permitting the water to flow from one to the other either for the purpose of maintaining an even keel or to enable all the pumps to be employed for discharging the water, which may be entering one compartment only.

Referring to the drawings:—

Figure 1. is a diagrammatic sectional elevation of a ship fitted with pumping mechanism according to this invention.

Fig. 2. is an enlarged vertical section.

Fig. 3. is a transverse section through a ship showing pumps according to this invention, and

Fig. 4. illustrates a form of equilibrium valve employed.

Fig. 5. is a diagram illustrating the means whereby the pumps are automatically started when the floats rise.

Fig. 6. is a similar view to Fig. 2 but showing an arrangement wherein the water is ejected through the bottom of the vessel.

Fig. 7. is a section at A—B in Fig. 6.

In carrying this invention into practice as illustrated upon the accompanying drawings, adjacent each of the bulk-heads 1 a cofferdam plate is provided to form a conduit 2, or this conduit may be in the form of a simple pipe extending from the bottom of the water-tight compartments to the top of the vessel where a pump 3, conveniently of the centrifugal type, is located and which is adapted to discharge the water at 4. This pump is driven by an engine 5 which is preferably of the internal combustion type, twenty rotating cylinders being shown.

Communicating with the base of the conduit 2 is a valve chamber 6 which contains an equilibrium valve 7 which is so arranged that pressure of water against the top of the upper seating 8 is tending to close the valve, while pressure of water against the lower seating 9 is tending to open the valve, these two pressures being thus in equilibrium and enabling the valve to be readily opened or closed as desired.

On the outside of the valve chamber a float 10 is arranged which is carried by a shaft 11 which carries an eccentric 12 located in a slot 13 in the valve, so arranged that when the float rises, as by the entry of water into the compartment, the valve is opened and if the engine and pump be started the water will be drawn out of the compartment up the conduit 2 and dis-

charged at 4. Or any other suitable mechanism may be used in place of the eccentric.

If desired the rising of the float might be arranged to automatically start the engine or motor for driving the pump. On rising the float would then close a switch marked 22 in Fig. 5 which would complete a circuit connected to and controlling an "electrical starting motor" 23 for starting up the internal combustion engine in manner well-known in connection with motor road vehicles; or the electric motor might drive the pump.

A non-return valve 14 is provided in such manner as to prevent the return of water from the conduit 2, thus insuring that there will always be a head of water therein so that the pump will commence to operate immediately the engine is started. A strainer 15 is provided covering each of the valve chambers.

There may be one pump adjacent each bulk-head, but, as shown in Fig. 3, a series of pumps are preferably employed parallel to each other and extending across the bulk-head for the width of the ship.

The valves remain closed so long as there is no water in the compartment, but as soon as water enters they are automatically opened and the one pump may draw water from either or both of the adjacent compartments.

For the purpose of maintaining the vessel on a level keel or to enable the pumps remote from the damaged compartment to be employed for drawing off water from the damaged compartment, each compartment is provided with a valve 16 which, as illustrated, is of the equilibrium type previously described, this valve being located in the base of the compartment or tank top 17 and adapted to put the ship in communication with the conduit formed between said tank top and the ship's outer bottom 18, or a separate conduit or pipe may be employed for this purpose. The valve is shown as provided with an operating rod 19 and if it be opened the water will flow from a damaged compartment into the conduit 17, 18 and if a valve or valves be opened in another compartment or compartments the water will flow into those compartments and may then be drawn off by the pumps located therein. Thus, if necessary, the whole of the pumps 3 throughout the ship may be employed for drawing off water entering at one compartment only.

The pumps might be of any of the types shown in my aforementioned prior specification and the present invention might be used supplemental to the system previously patented or independently of same.

In the form of the invention shown by Figs. 6 and 7, instead of discharging the water through the medium of a rising vertical conduit it is discharged through pipes 25 which connect the space 26 between the bulk-head 1 and cofferdam plate 2 with the exterior of the ship's bottom 18. The pump 27 is disposed in space 26, it is driven by a motor 28, and is adapted to communicate with adjacent compartments through the valve chambers 6 having float controlled valves in manner hereinbefore described. Between the pump and the pipe 25 is a valve chamber 29 containing an equilibrium valve 30 connected to a vertical rod 31 carrying a shouldered abutment 32 adapted to pass and engage the pivoted nose 34 of a weighted catch 33. The catch is supported in a horizontal position by an abutment 35, while the nose has only a limited pivotal movement so that it can rise but cannot fall below the horizontal. When the valve opens the weight actuating the catch is sufficient to retain it in its open position irrespective of the continuance of the flow of water from the pump. When the pump is stopped the valve is closed by the hand wheel 36 and screw 37. The rod and screw are adapted to have a free sliding movement between them when the screw is retracted but when the screw is advanced it will depress the rod and close the valve. Thus the valve can open when the screw is retracted.

To enable the valve to open under the pumping pressure the rod is provided with a piston 38 in a chamber 39 communicating with the pump chamber by a by-pass 40 so that when pumping the pressure on this piston is added to the direct pressure tending to open the valve, thus overcoming the pressure tending to close the valve.

A non-return valve 14 is again provided.

What I claim then is:—

1. In a ship the combination of a plurality of bulk-heads dividing the ship into a plurality of water-tight compartments; water pumps mounted adjacent each of said bulk-heads; conduits adjacent the bulk-heads and serving to discharge the water; valves in each of the two compartments adjacent said bulk-heads and serving to connect each of said compartments to said conduit; and floats in said compartments connected to each of said valves and adapted to automatically open them when the float rises for the purpose specified.

2. In a ship the combination of a plurality of bulk-heads dividing the ship into a plurality of water-tight compartments; water pumps mounted adjacent each of said bulk-heads; conduits adjacent the bulk-heads and serving to discharge the water; valves in each compartment adjacent said bulk-heads and serving to connect said compartment to said conduit; floats in said compartments connected to each of said valves and adapted to automatically open them when the float rises; and a non-return

valve intermediate between each of said valves and conduits.

3. In a ship the combination of a plurality of bulk-heads dividing the ship into a plurality of water-tight compartments; water pumps mounted adjacent each of said bulk-heads; means for driving said pumps independently of the main ship propelling power; conduits adjacent the bulk-heads and serving to discharge the water; valves in each compartment adjacent said bulk-heads and serving to connect said compartments to said conduit; a float in each of said compartments connected to each of said valves and adapted to automatically open them when the float rises; and means connecting said floats to said pump driving means whereby the pumps are automatically started when the floats rise.

4. In a ship the combination of a plurality of bulk-heads dividing the ship into a plurality of water-tight compartments; water pumps mounted adjacent each of said bulk-heads; means for driving said pumps independently of the main ship propelling power; conduits adjacent the bulk-heads and serving to discharge the water; valves in each compartment adjacent said bulk-heads and serving to connect said compartment to said conduit; and a conduit and valves connecting said compartments to each other; for the purpose specified.

5. In a ship the combination of a plurality of bulk-heads dividing the ship into a plurality of water-tight compartments; water pumps mounted adjacent each of said bulk-heads; water conduits adjacent the bulk-heads; a valve in each compartment adjacent said bulk-heads and serving to connect each of said compartments to said single conduit; floats in said compartments connected to each of said valves and adapted to automatically open them when the float rises; and a conduit and valves connecting said compartments to each other.

6. In a ship the combination of a plurality of bulk-heads dividing the ship into a plurality of water-tight compartments; water pumps mounted adjacent each of said bulk-heads; means for driving said pumps independently of the main ship propelling power; water conduits adjacent the bulk-heads; valves in each compartment adjacent said bulk-heads and serving to connect said compartment to said conduit; floats in said compartments connected to each of said valves and adapted to automatically open them when the float rises; means connecting said floats to said pump driving means whereby the pumps are automatically started when the floats rise; and a conduit and valves connecting said compartments to each other.

7. In a ship the combination of a ship's bottom; a plurality of bulk-heads dividing the ship into a plurality of water-tight compartments; a cofferdam plate adjacent each of said bulk-heads; a water pump located intermediate between each bulk-head and cofferdam plate; and a water discharge pipe connecting each pump to the exterior of the ship's bottom; for the purpose specified.

8. In a ship the combination of a ship's bottom; a plurality of bulk-heads dividing the ship into a plurality of water-tight compartments; a cofferdam plate adjacent each of said bulk-heads; a water pump located intermediate between each bulk-head and cofferdam plate; a water discharge pipe connecting each pump to the exterior of the ship's bottom; and a valve intermediate between the said pipe and pump; for the purpose specified.

9. In a ship the combination of a ship's bottom; a plurality of bulk-heads dividing the ship into a plurality of water-tight compartments; a cofferdam plate adjacent each of said bulk-heads; a water pump located intermediate between each bulk-head and cofferdam plate; a water discharge pipe connecting each pump to the exterior of the ship's bottom; a valve intermediate between the said pipe and pump and adapted to open under the pressure of the pump; means for locking said valve in its open condition; and means for closing the valve; for the purpose specified.

10. In a ship the combination of a ship's bottom; a plurality of bulk-heads dividing the ship into a plurality of water-tight compartments; a cofferdam plate adjacent each of said bulk-heads; a water pump located intermediate between each bulk-head and cofferdam plate; a water-discharge pipe connecting each pump to the exterior of the ship's bottom; a valve intermediate between each water-tight compartment and the pump; and a float in each compartment adapted to open the valve when said float rises; for the purpose specified.

11. In a ship the combination of a ship's bottom; a plurality of bulk-heads dividing the ship into a plurality of water-tight compartments; a cofferdam plate adjacent each of said bulk-heads; a water pump located intermediate between each bulk-head and cofferdam plate; a water discharge pipe connecting each pump to the exterior of the ship's bottom; a valve intermediate between the said pipe and pump; a valve intermediate between each water-tight compartment and the pump; and a float in each compartment adapted to open the valve when said float rises; for the purpose specified.

12. In a ship the combination of a ship's bottom; a plurality of bulk-heads dividing the ship into a plurality of water-tight compartments; a cofferdam plate adjacent each of said bulk-heads; a water pump located intermediate between each bulk-head and

cofferdam plate; a water discharge pipe connecting each pump to the exterior of the ship's bottom; a valve intermediate between the said pipe and pump and adapted to open under the pressure of the pump; means for locking said valve in its open condition; means for closing the valve; a valve intermediate between each water-tight compartment and the pump; and a float in each compartment adapted to open the valve when said float rises; for the purpose specified.

In testimony whereof I affix my signature.

CHARLES V. A. ELEY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."