A. S. TERHAAR.

SAFETY APPLIANCE FOR SHIPS.

APPLICATION FILED DEC. 1, 1916.

1,354,069. Patented Sept. 28, 1920.

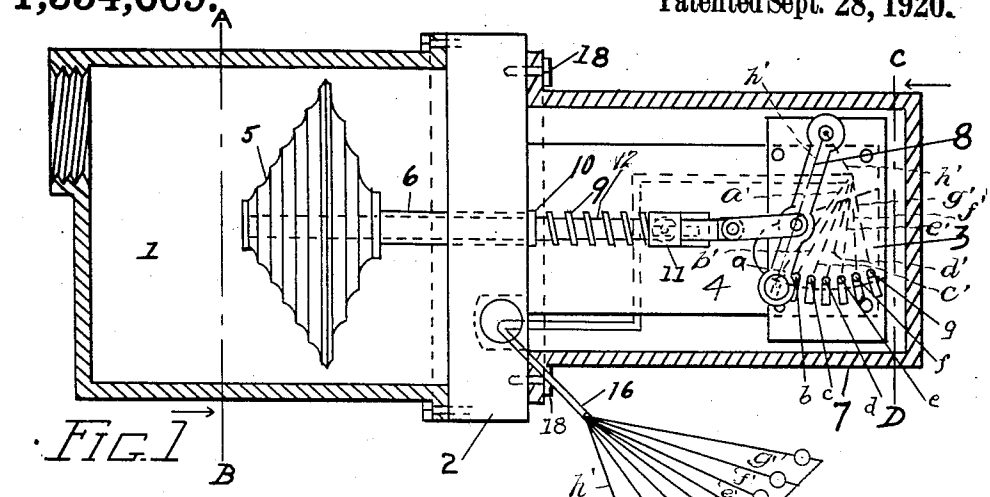



FIG. 1

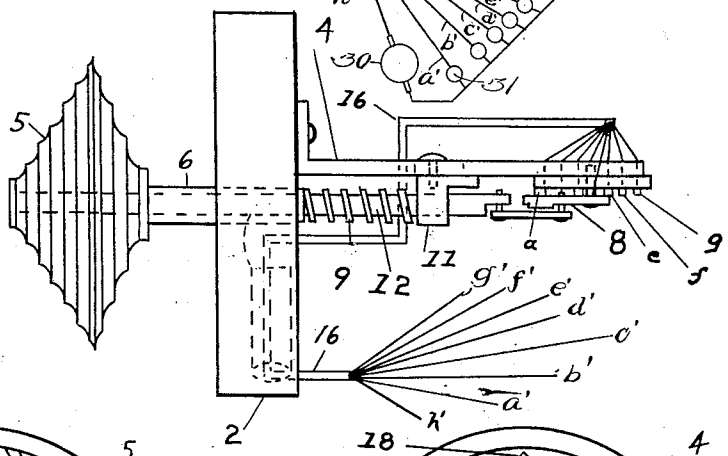



FIG. 2

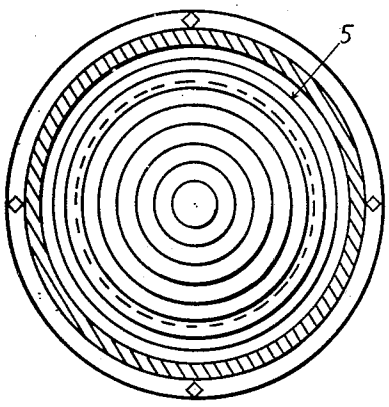



FIG. 3

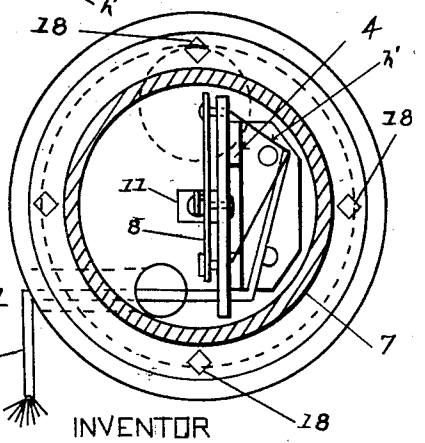



FIG. 4

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## SAFETY APPLIANCE FOR SHIPS.

1,354,069. Specification of Letters Patent. Patented Sept. 28, 1920.

Application filed December 1, 1916. Serial No. 134,520.

*To all whom it may concern:*

Be it known that I, ALOYSIUS S. TERHAAR, a citizen of the United States, and a resident of San Diego, in the county of San Diego and State of California, have invented a new and useful Safety Appliance for Ships, of which the following is a specification.

My invention relates to devices having a water chamber adapted to be mounted in the bow of the keel of a ship or other suitable place below the water line and connected with the outside of the ship so that the water may enter said chamber; wherein a normally expanded wafer is acted upon by the pressure of said water and made to operate a switch to which said wafer is connected, said switch having electrical connections with suitable electrical devices from which the supply of electric current may be automatically cut off or turned on by the action of said wafer.

The objects of my invention are the provision of such a device which can be so regulated that it will turn on the electric current when the pressure of the water in the water chamber shall reach a predetermined degree and to turn it off again when the pressure is released to a predetermined degree and to indicate by a series of electric lamps, the various degrees of pressure above the point at which it is turned on.

With these and other objects in view, I show one embodiment of my invention in the accompanying drawings which are for illustrative purposes but I do not wish to be understood as limiting myself to this particular adaptation as the device may be used anywhere in the ship below the water line or anywhere else that a multiple switch operated by hydrostatic pressure, is desired.

Figure 1 is an elevation of the device, partly in section, showing the switch points connected diagrammatically with a series of electric lamps and the switch arm 8 connected by the wire $h'$ to a generator 30, the wafer 5 being compressed enough to make a connection between the switch arm 8 and the switch point $a$; Fig. 2, a top plan view of the device, the water chamber and the housing being removed; Fig. 3, a vertical cross section of the device on the line A—B of Fig. 1; and Fig. 4, a vertical cross section of the device on the line C—D of Fig. 1.

Similar reference characters refer to like parts throughout the several views.

The invention comprises a water chamber 1 having a head 2; a switch 3 mounted on a bracket 4 which is mounted on the outside of said head; a normally expanded wafer 5 mounted on a tube 6 within said water chamber, said tube being mounted in and extending through said head 2; a shaft 12 slidably mounted in said tube having one end connected with said wafer 5 and the opposite end connected with a switch arm 8 mounted on the switch 3. Wires $a'$, $b'$, $c'$, $d'$, $e'$, $f'$ and $g'$ run from the switch points $a$, $b$, $c$, $d$, $e$, $f$ and $g$ respectively through a cable 16, each wire being connected with an independent lamp; the wire $h'$ runs from the contact point of the switch arm 8 to the top of said switch arm and thence through said cable 16 to a generator 30, as shown diagrammatically in Fig. 1. A housing 7 is mounted on the head 2 by the bolts 18 to protect the members mounted on the bracket 4.

When the pressure in the water chamber 1 becomes great enough to overcome the resistance of the spring 9 which is mounted on the shaft 12 with one end resting against a collar 10 rigidly mounted on said shaft and one end resting against the adjustable guide lug 11 on the bracket 4, the wafer 5 is compressed and forces the shaft 12 through the tube 6 and thereby throws the switch arm 8 on the point $a$ and lights the lamp 31, as shown in Fig. 1; when the pressure is further increased the switch arm 8 is moved to the point $b$, and so on throughout the series. Each point is connected with an independent lamp, each succeeding lamp indicating a greater degree of pressure. When the ship plunges into the water during a storm, the depth of the plunge may be ascertained by translating the pressure units into depths units. As the bow rises in the water the pressure decreases and therefore the wafer 5 will expand and bring the switch arm 8 back over the points which it has traveled and as the bow rises clear of the water the switch arm will resume its normal position and not be in contact with any point.

I claim:

A device of the class described, adapted to be mounted in the keel of a ship, in combination, a disk having a central hole therein; a tube mounted in said hole; a normally expanded collapsible member 5 mounted on said tube; a shaft mounted within said tube, said shaft having one end extending within

said collapsible member and attached to the apex thereof, and the opposite end extending without said disk; a water chamber mounted on said disk and inclosing said collapsible member, said water chamber having a water inlet adapted to communicate with the outside of the ship in which it is mounted; a bracket mounted on said disk outside said water chamber; a guide block for said shaft mounted on said bracket; a collar mounted on said shaft; a spring mounted on said shaft between said guide block and said collar whereby auxiliary resistance is afforded to the pressure of the water on the member 5; a switch having a plurality of points, mounted on said bracket; a connecting pitman for said shaft and said switch; and a housing mounted on said disk without said water chamber to protect the members which are mounted on said bracket; substantially as described and for the purposes set forth.

ALOYSIUS S. TERHAAR.