

Sept. 18, 1951

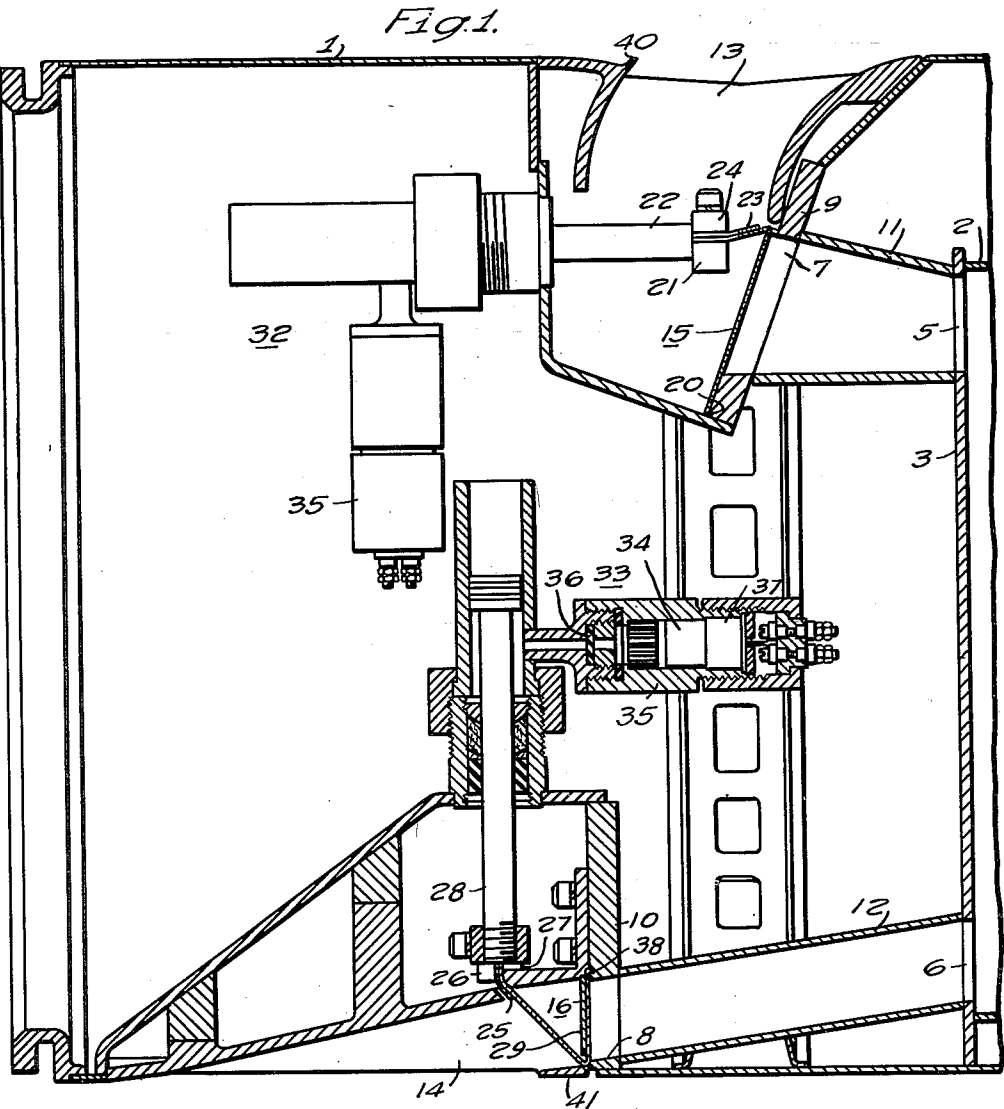
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2,568,340

REMOVABLE CLOSURE FOR DEFERRED ACTION BATTERIES

Filed March 8, 1946

3 Sheets-Sheet 1



WITNESSES:
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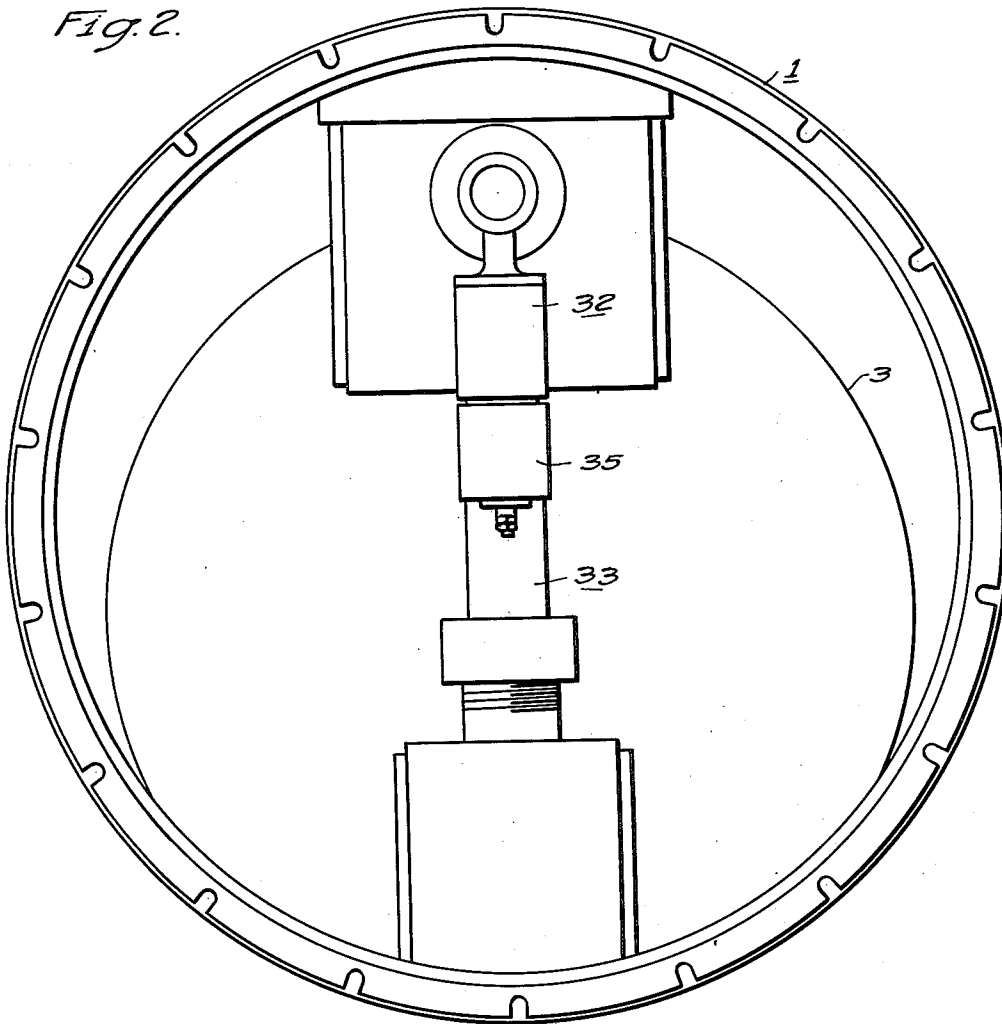
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3 Sheets-Sheet 2

Fig. 2.



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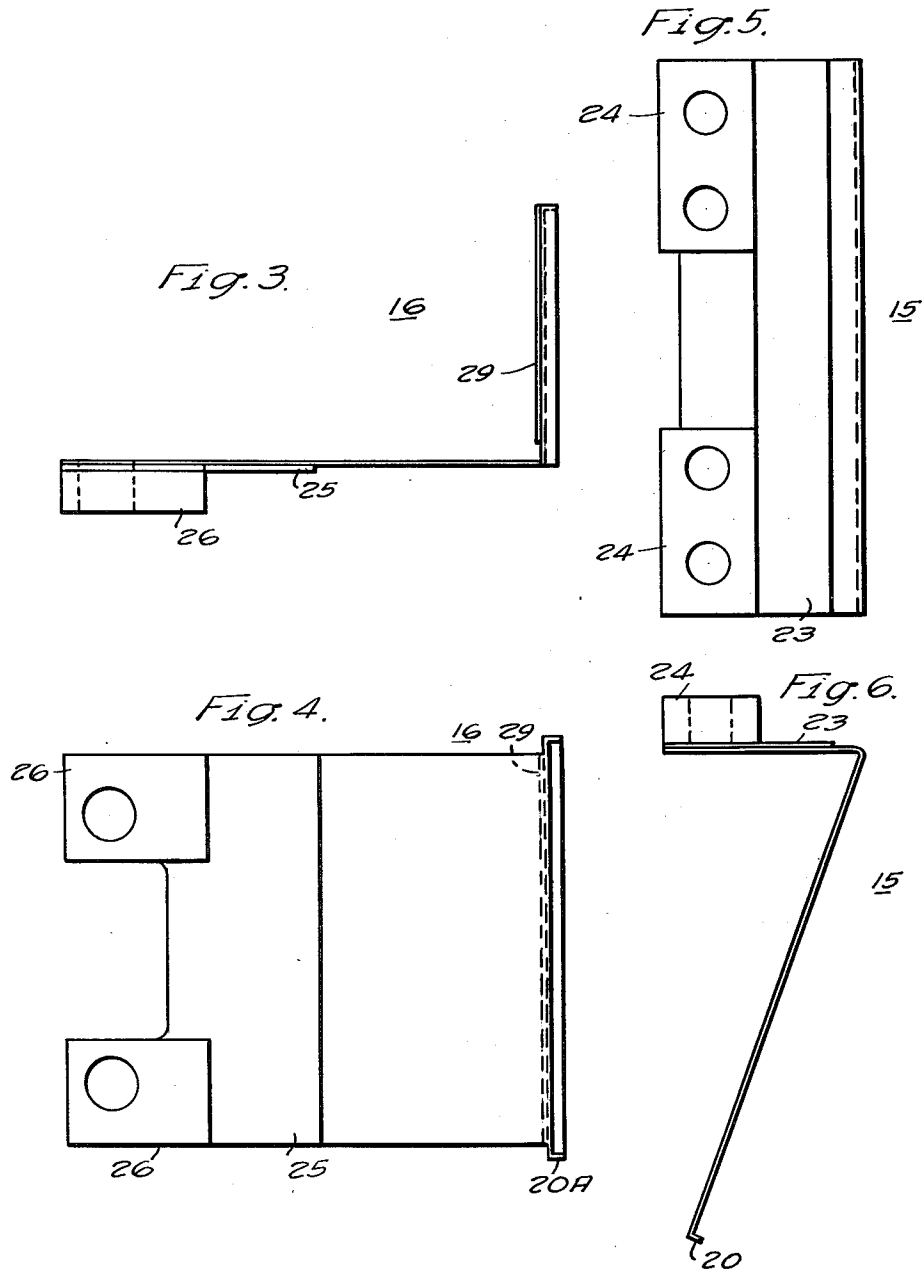
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REMOVABLE CLOSURE FOR DEFERRED ACTION BATTERIES.

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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

2,568,340

REMOVABLE CLOSURE FOR DEFERRED
ACTION BATTERIES

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to the United States of America as represented
by the Secretary of the Navy

Application March 8, 1946; Serial No. 653,191

5 Claims. (Cl. 114—20)

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This invention relates generally to control apparatus and more particularly to control apparatus for flooding the battery compartment or casket of a torpedo utilizing a primary battery requiring seawater as the electrolyte.

One object of this invention is to provide an apparatus for opening the ports to a torpedo battery compartment which is simple in construction and effective in operation.

Another object of this invention is to provide a control apparatus for flooding a torpedo battery compartment in which the motion of the torpedo through the water is utilized to induce a circulating flow of water through the battery casket.

Another object of this invention is to provide a control apparatus for flooding a torpedo battery compartment which requires a minimum of electrical power for operation.

Yet another object of this invention is to provide a control apparatus for pulling the sealed covers from the battery casket of a torpedo in which the covers, when pulled, form a part of the passageway extending from the ports through the torpedo hull.

The foregoing statements are merely illustrative of the various aims and objects of this invention. Other objects and advantages will become apparent upon a study of the following specification when considered in conjunction with the accompanying drawings, in which:

Figure 1 is a longitudinal sectional view through a portion of a torpedo illustrating the apparatus of this invention.

Fig. 2 is an end view of the assembly of Fig. 1. Figs. 3 and 4 are respectively enlarged side and plan views of one of the battery casket port or opening covers, and

Figs. 5 and 6 are respectively enlarged end and side views of the other battery casket opening cover.

Recent developments in electrically operated torpedoes have brought into use primary batteries of the type utilizing seawater on the electrolyte. These batteries must be kept dry until they are to be used and are, hence, sealed in a battery casket within the torpedo hull. When the torpedo is to be launched it is inserted into the torpedo or launching tube after which air pressure is applied and the torpedo ejected therefrom into the water. Usually about one-half second is required for the torpedo to move from the tube, during which time the torpedo is accelerated to substantially full speed and all control functions such as ripping off the battery casket covers must be accomplished, that

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the torpedo upon entering the water will be under full control.

In Fig. 1 the torpedo hull is denoted by numeral 1 and the battery casket fragmentarily shown, by numeral 2. A plate 3 having openings 5 and 6 therein covers the end of the battery casket. Openings 5 and 6 communicate with openings 7 and 8 respectively in plates 9 and 10 through the medium of tubes 11 and 12, respectively. Openings 7 and 8 communicate with passages 13 and 14 extending through the hull of the torpedo. The lower system of passageways and openings is directed forwardly of the torpedo while the upper system is directed aft. The arrangement is such that upon movement of the torpedo through the water, the torpedo tending to ride with the nose thereof slightly elevated to counteract the negative buoyancy, a pressure differential is created between the passageways, in part due to the pumping action of lip 40 on casting 13 and the scooping action of projection 41 on casting 14 with the result the lower passageway is of higher pressure than the upper. As a consequence upon pulling of the covers 15 and 16, sealing the openings 7 and 8, respectively, water is circulated through the battery casket, entering through the bottom openings and leaving through the top. This continually supplies fresh electrolyte to the primary battery.

Covers 15 and 16 are of special construction and are torn free of their respective openings from one end only, the other end remaining secured to the plates adjacent the respective openings. The cover 15 (see Figs. 2 and 3) is formed of sheet metal such as copper and is formed approximately to the configuration shown, being provided with a lip 20 which fits into a recess in the plate 9. The end of this cover which is attached to a bar 21 secured to the end of piston rod 22 is provided with a reinforcing lamination 23 to which pads 24 connecting with bar 21, are secured. In a similar way cover 16 is provided with reinforcing lamination 25 and pads 26 which connect with the bar 27 of piston rod 28. Cover 16 is provided with lips 20a on three sides thereof which fit into cooperating grooves in the plate 10 and the portion thereof which seals opening 8 is provided with a stiffening plate 29 which prevents bending thereof when being ripped from the opening. The cover is preferably secured along the edges of plate 29 so that a clean tear results. Both covers are tinned and sweated to the respective openings.

The mechanism for pulling the covers 15 and

16 from the openings, comprises the piston-cylinder assemblies 32 and 33, the assembly 33 being detailed in section, and the pistons of which are actuated by the cartridge devices 35, the cartridge chambers of which are connected with the respective cylinder at a point beneath the piston thereof. Each cartridge chamber is sealed from the associated cylinder by a washer 36 to prevent moisture from damaging the cartridges 37. The cartridges are fired by a small electrical impulse produced by a suitable mechanism (not shown) which is actuated by an obstruction in the launching tube.

Upon firing of the cartridges the products of combustion burst the washer 36 sealing each chamber and high pressure gas enters the cylinders causing the pistons to stroke to the end of the cylinders. In the case of the cover 15 the stripping action begins at the top as viewed and continues downwardly to lip 20, completely uncovering opening 7 and in effect forming a side wall of passage 13 completely removed from a position obstructing opening 7. In the case of the lower cover the tearing action begins at the bottom thereof and the cover is guided over the curved extremity of guide member 33 recessed slightly with respect to the surface of passageway 14. As a consequence of the support afforded by reinforcing lamination 29 and the support provided by guide 38, cover 16 remains substantially flat and fits neatly into the recess provided by the positioning of guide 38 to present a surface fairly continuous with that of passage 14. The seawater thus has an unobstructed passageway into the battery casket through passageway 14 and out through the passageway 13 rendering the primary battery active.

The foregoing disclosure and the showings made in the drawings are merely illustrative of the principles of this invention and are not to be interpreted in a limiting sense. The only limitations are to be determined from the scope of the appended claims.

We claim as our invention:

1. In a torpedo adapted for operation from electric power supplied by a primary battery in which water is utilized as the electrolyte, the combination of, a casket arranged internally of said torpedo for housing said primary battery, means forming entrance and exit passages communicating with said casket through the hull of said torpedo, closure means in said passages including plates arranged transversely thereof and having openings therethrough substantially the size of passages, covers of sheet metal soldered to said plates to seal the opening in each there-

of, each cover having one extremity secured to the associated plate to prevent pulling loose thereof, a pair of pistons, the end opposite the end of each of said covers which is secured to prevent pulling loose thereof being connected to one of said pistons, a cylinder for each of said pistons, means for applying fluid under pressure to each of said cylinders to move said pistons and strip said covers from said opening, said covers stripping from said opening beginning with the end thereof connected to said piston and folding back about the extremity of each thereof firmly secured to the associated end of said plates.

2. Apparatus as recited in claim 1 and in addition, one of said covers having a stiffening plate soldered thereto and being scored along the edges of said plate so that tearing will occur therealong upon motion of said piston.

3. Apparatus as recited in claim 1 in which said means for applying fluid under pressure to said cylinders comprises a cartridge chamber communicating with each of said cylinders, and means for detonating a cartridge in each cartridge chamber.

4. Apparatus as recited in claim 1 in which said means for applying fluid under pressure to said cylinders comprises a cartridge chamber for each of said cylinders, means providing a passage between the associated cartridge chambers and cylinders, a moisture proof diaphragm sealing each of said passages, means for detonating a cartridge in each of said cartridge chambers, the products of combustion of said cartridges bursting said diaphragms whereby gas under pressure flows to said cylinders.

5. Apparatus as recited in claim 1 in which one of said passages is provided with a recessed section terminating in a slot spaced from the securely held end of the associated cover a distance equal to the length of said cover sealing said opening, tightly secured to the end of said cover being adjacent said recessed section of the passage, the opposite end of said cover being provided with an extension passing through said slot and connecting with said piston, movement of said piston pulling the extension of said cover through said slot and stripping said cover from said opening, said cover folding back about said tightly secured end into said recessed section to provide a substantially flush passage surface.

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No references cited.