June 21, 1966 A. P. CLARK 3,256,539

VARIABLE BUOYANCY FLOAT

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Fig. 1

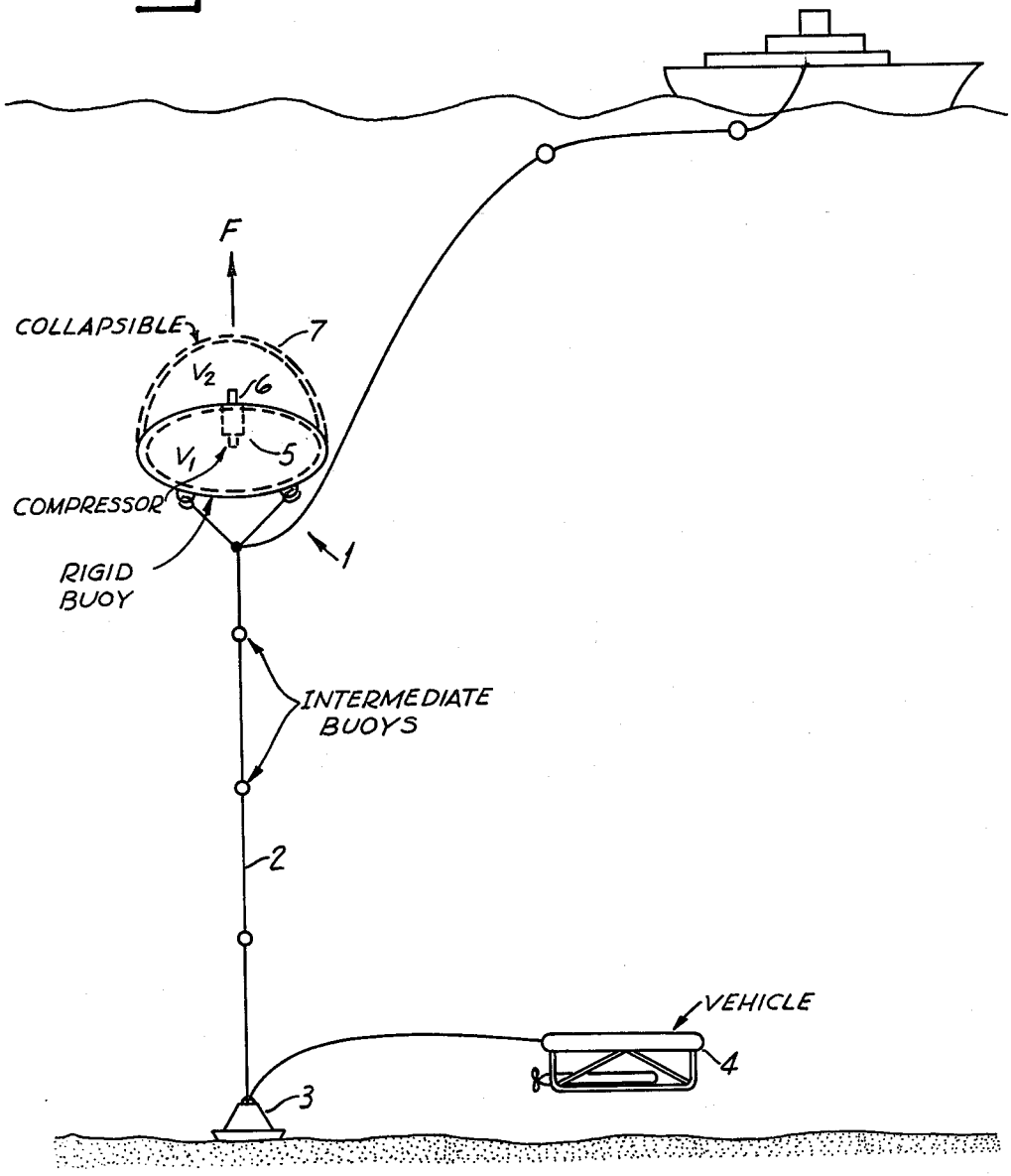

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Fig. 2

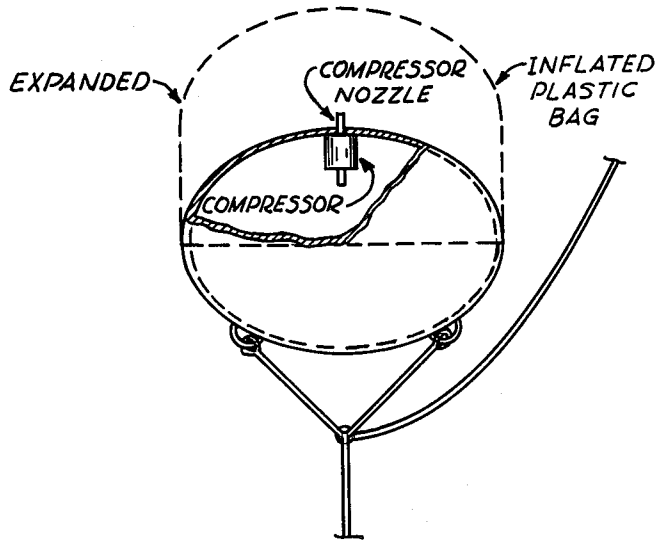
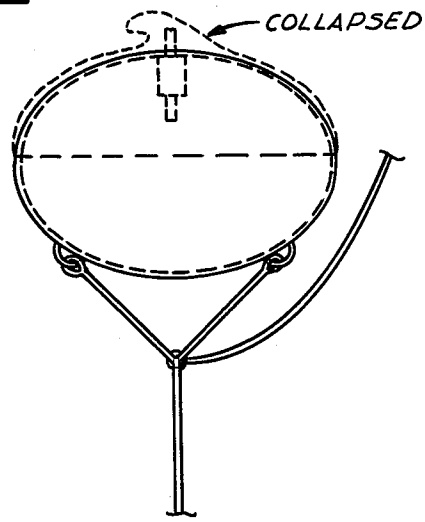


Fig. 3



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VARIABLE BUOYANCY FLOAT

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3 Claims. (Cl. 9—8)

This invention relates to floats in general and is particularly directed to buoyant floats whose buoyancy is variable and controllable.

It is an object of the invention to provide an improved buoyant float.

Another object of the invention is to provide a float whose volume displacement is variable and controllable to effect its buoyancy.

A further object of the invention is to provide a float which prevents drift currents and swells from creating mooring cable drifts and high tensile stresses and strains therein resulting from such drifts and swells.

A still further object of the invention is to provide a variable buoyant float which permits the anchoring weight to be easily lifted and displaced to a new location either by the surface vessel or a vehicle underwater.

Other objects and advantages will become apparent from a reading of the specifications and a study of the accompanying drawings, and wherein;

FIGURE 1 shows a schematic drawing of the variable buoyancy float system according to the invention.

FIGURE 2 shows an enlarged drawing of the variable buoyant float partially sectioned showing the compressor therein and the expanded plastic section.

FIGURE 3 is similar to FIGURE 2 with the plastic section collapsed.

Now describing the invention there is shown in FIGURE 1 a metallized variable buoyancy float 1 having an ellipsoidal configuration and moored beneath the sea surface via a cable 2 to an anchoring station 3. The cable 2 is an armored cable having encased therein the usual power lines and signal lines as they are connected to the surface vessel and the anchoring station 3. The said station is in the form of a distribution box or center, housing all the heavy electrical gear necessary to provide an undersurface television search type vehicle 4, not a part of this invention, with the necessary power and control to sustain underwater operations using the said vehicle.

Enclosed and anchored within the said buoy 1 is a compressor type member 5, having an exit nozzle 6 extending without the buoy shell and extending into an area embraced and enclosed by a collapsible and distensible bag 7 made of plastic, rubber and other like materials having expandable and durable like qualities. Upon proper signal control to the compressor from the surface vessel the function thereof will force air into the area embraced by the collapsible bag 7 to cause the expansion thereof, thus increasing the total volume displaced by the buoy and its corresponding upward buoyant force. The amount of expansion is controlled by the length of time the compressor is permitted to function. The air for the compressor is obtained from the air which resides within the

metallized buoy, there being no effect to the buoy since its buoyancy is a function of the rigid volume it displaces. To collapse the bag, or to reduce its volume, the compressor is reversed in operation so that air is withdrawn from the plastic bag area and urged into the rigid metallized buoy member. Hence, we have a two-way flow of air, controllable in accordance with the degree of buoyancy desired.

Another possible method for providing inflation and deflation consists in supercharging the rigid volume of the metal buoy with air under pressure. Upon signal to a quick opening valve in the metal skin of the buoy near the compressor, air is allowed to pass rapidly into the inflatable member, thereby increasing the total buoyancy of the system in a very short time. To deflate the distensible member or plastic section, a signal is given to close the valve, then the compressor is started and pumps air back into the metal rigid section.

FIGURES 2 and 3 show enlarged fragmentary sectionalized views with the distensible bag inflated and collapsed. Power to operate the compressor mechanism is obtained via the cable 2 previously referred to.

Having described the invention what is claimed is:

1. A variable buoyancy float system comprising,
   (a) a buoy composed of a rigid section of predetermined volume and a distensible inflatable collapsible section fixed to the exterior of the rigid section and coextensive therewith, the said distensible section adhered to and conforming to the rigid section in its non-inflatable collapsible state,
   (b) gaseous means in said buoy and compressor means mounted in the wall of said rigid section and communicating with the interior of both of said sections in said buoy disposed to transmit and receive the gaseous means in the said buoy to and from its rigid and distensible sections to cause the inflation and deflation of the said distensible section thereby effecting a change in the buoyant forces of said buoy.

2. A variable buoyancy float system according to claim 1 and wherein the said gaseous means includes air under compression in the said rigid section.

3. A variable buoyancy float system according to claim 2 and wherein the said compressor means includes rapid action valves to permit the air under compression to egress from the said rigid section to the distensible section to permit the rapid expansion thereof.

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