Feb. 28, 1939. R. L. GARRETT 2,149,168

DIVING DEVICE

Filed March 1, 1937 2 Sheets-Sheet 1

Fig. 1.

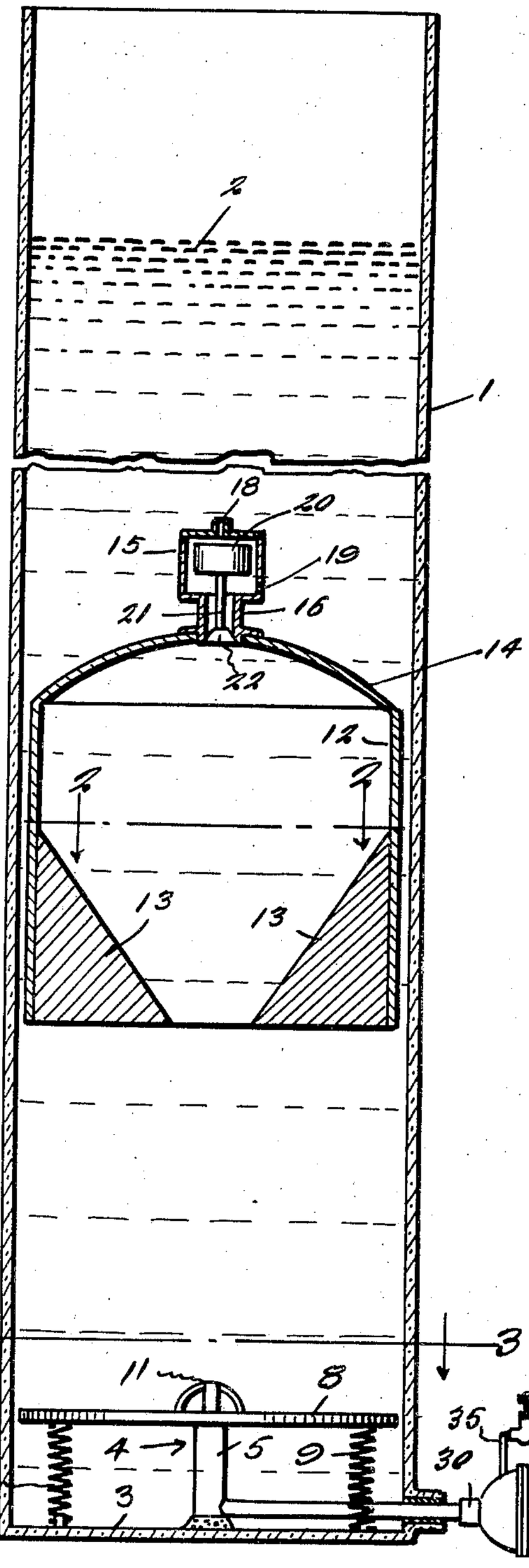


Fig. 2.

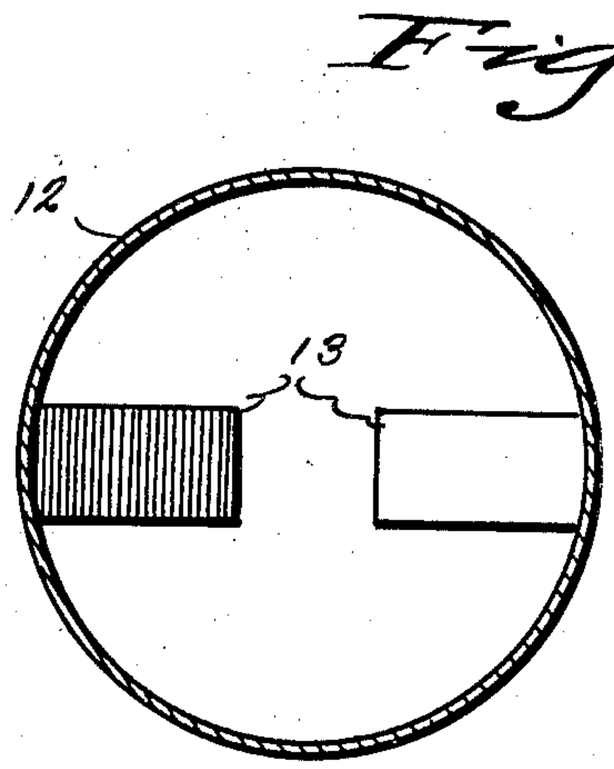
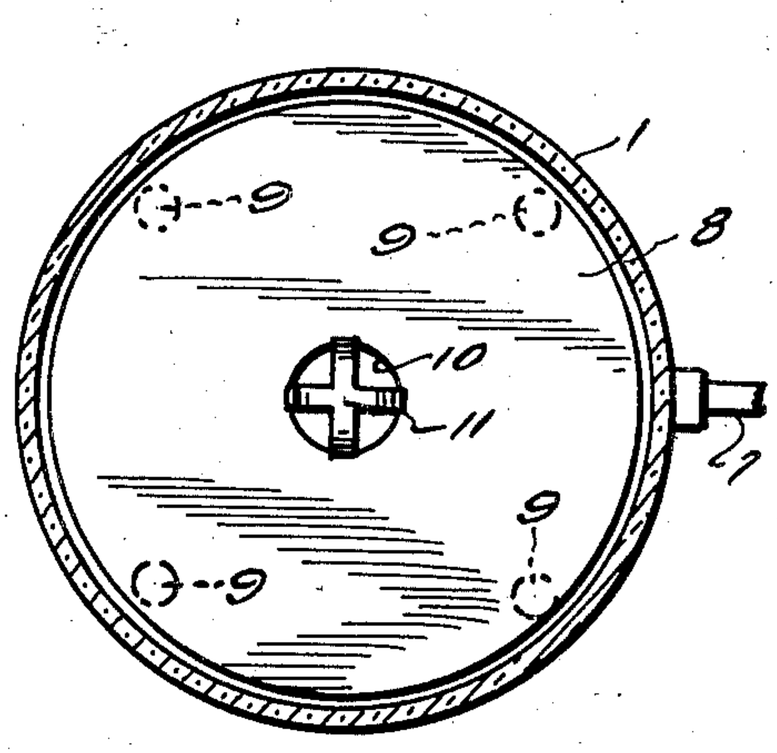


Fig. 3.



Inventor

Richard L. Garrett

By Clarence O'Brien

Hyman Berman

Attorneys

Feb. 28, 1939. R. L. GARRETT 2,149,168

DIVING DEVICE

Filed March 1, 1937 2 Sheets-Sheet 2

Fig. 4.

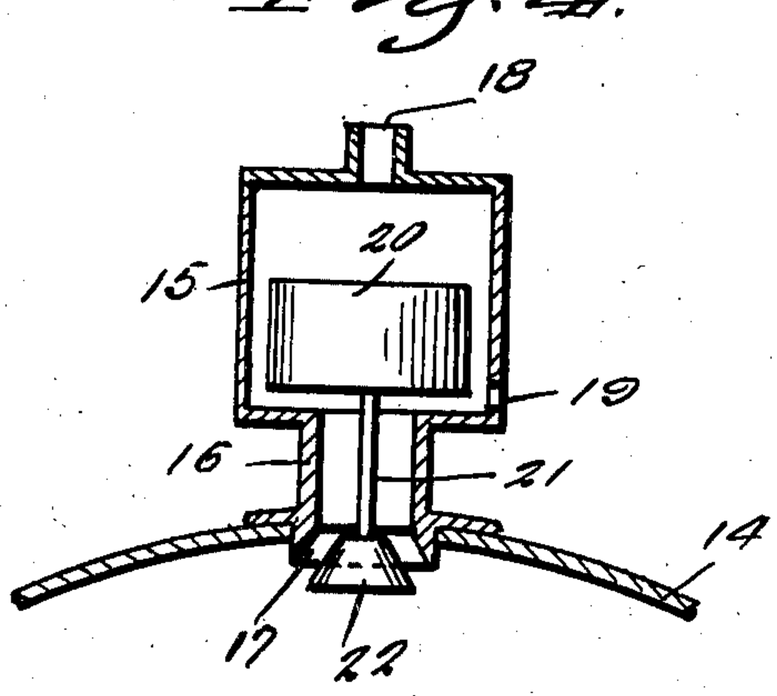


Fig. 7

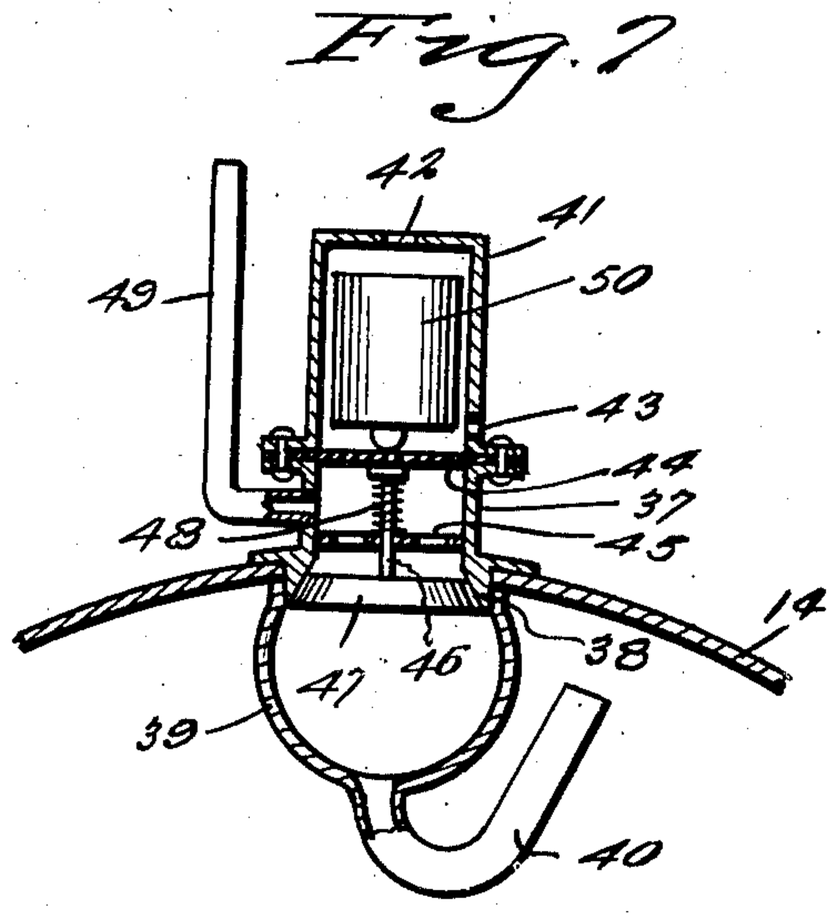


Fig. 6.

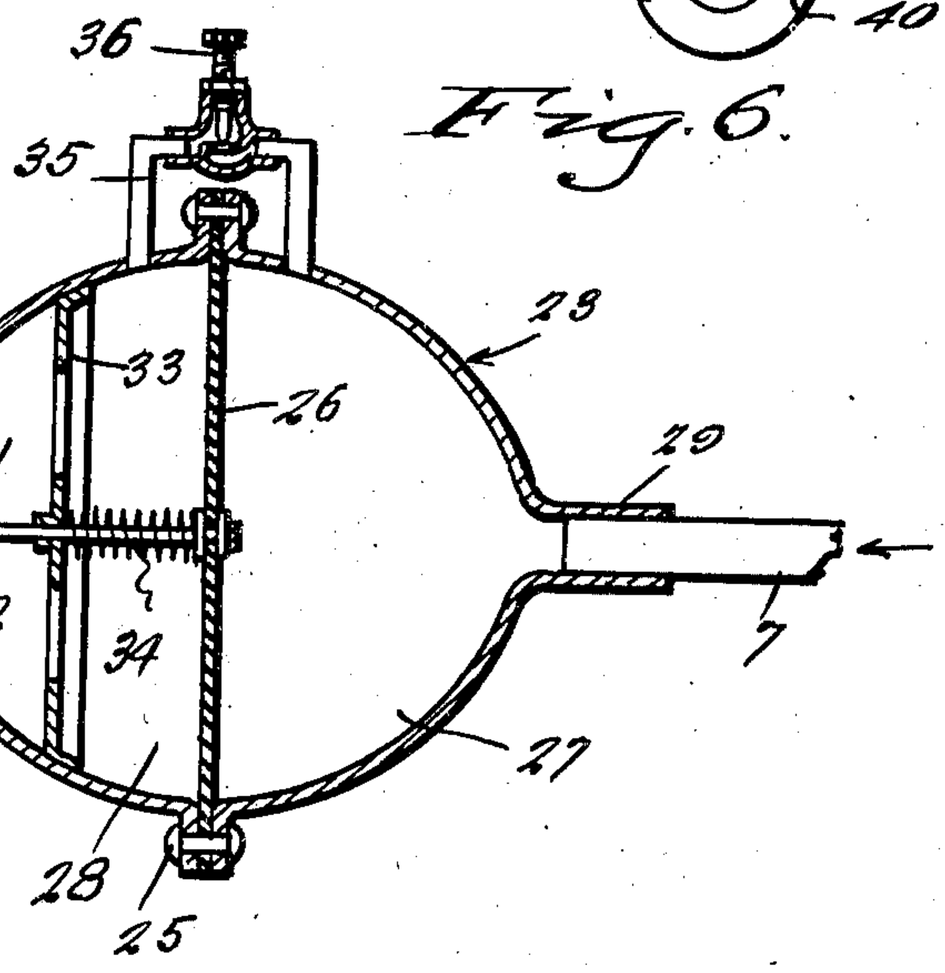
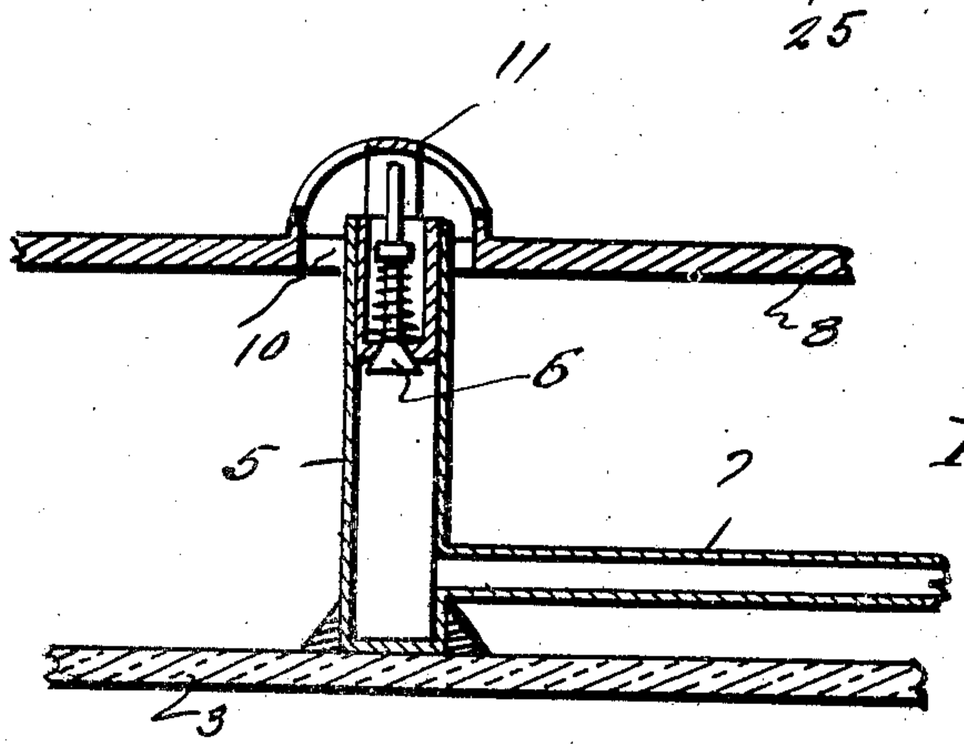


Fig. 5.



Inventor

Richard L. Garrett

By Clarence A. O'Brien

Hyman Berman

Attorneys

Patented Feb. 28, 1939 2,149,168

UNITED STATES PATENT OFFICE

2,149,168

DIVING DEVICE

Richard Leigh Garrett, Norfolk, Va.

Application March 1, 1937, Serial No. 128,471

2 Claims. (Cl. 46—91)

The present invention relates to new and useful improvements in diving devices for use particularly as a toy or as an advertising novelty in show windows, etc., and has for one of its important objects to provide, in a manner as hereinafter set forth, a toy or advertising novelty of this character embodying a member in the form of a bell or the like which is adapted to submerge and rise to the surface, together with novel means for automatically controlling said member.

Another very important object of the invention is to provide a device of the aforementioned character comprising novel means for causing the diving member to remain submerged for a predetermined length of time.

Still another very important object of the invention is to provide a toy or advertising novelty of the character described which is adapted to emit a jet of water when the diving member rises to the surface thus enhancing the attractiveness and novelty of the device.

Other objects of the invention are to provide a diving device of the character set forth which will be comparatively simple in construction, strong, durable, attractive in appearance, highly amusing and which may be manufactured at low cost.

All of the foregoing and still further object and advantages of the invention will become apparent from a study of the following specification, taken in connection with the accompanying drawings wherein like characters of reference designate corresponding parts throughout the several views, and wherein:

Figure 1 is a view in vertical section through an embodiment of the invention.

Figure 2 is a detail view in horizontal section through the diving bell, taken substantially on the line 2—2 of Fig. 1.

Figure 3 is a horizontal sectional view through the device, taken substantially on the line 3—3 of Fig. 1.

Figure 4 is a view in vertical section through the float operated air exhaust valve.

Figure 5 is a view in vertical section through the bell operated air control valve.

Figure 6 is a view in vertical longitudinal section through the automatic pressure controlled valve.

Figure 7 is a view in vertical section through a modification.

Referring now to the drawings in detail, it will be seen that the reference numeral 1 designates an elongated, substantially cylindrical container of glass or other suitable material for the reception of water, as at 2. Mounted vertically on the bottom 3 of the container 1 is an air control valve which is designated generally by the reference numeral 4. As best seen in Fig. 5 of the drawings, the valve 4 includes an upstanding tube 5 having mounted therein and projecting thereabove a spring and pressure seated core 6. An air line 7, from a suitable source of supply, enters the lower portion of the container 1 and is connected to the tube 5.

The reference numeral 8 designates a platform which is yieldingly mounted on the bottom 3 of the container 1 through the medium of coil springs 9. The platform 8 has formed therein a centrally located opening 10 for the reception of the upper portion of the valve 4. Mounted on the platform 8 over the opening 10 is a cage 11 which is engageable with the core 6 of the valve 4 for actuating said core to open position when the platform 8 is depressed.

The reference numeral 12 designates a diving bell which is mounted for vertical movement in the container 1, said diving bell being provided with suitable weights 13. Mounted on the substantially dome shaped top 14 of the bell 12 and communicating with said bell is a float chamber 15. As best seen in Fig. 4 of the drawings, the float chamber 15 includes a depending neck 16 which is fixed in an opening provided therefor in the top 14 of the bell 12 and which has formed in its lower end portion a seat 17. In the top of the float chamber 15 is a port 18. One or more drain openings 19 are provided in the lower portion of the float chamber 15. Mounted for operation in the chamber 15 is a float 20. A stem 21 depends from the float 20 and has fixed on its lower end a valve member 22 which is engageable with the seat 17.

Interposed at any suitable point in the air line 7 is a pressure operated valve which is designated generally by the reference numeral 23. Referring to Fig. 6 of the drawings, it will be seen that the valve 23 includes a housing 24 comprising a pair of complemental half sections secured together as at 25 and between which a diaphragm 26 is secured. It will thus be seen that the diaphragm 26 divides the housing 24 into what may be referred to as intake and discharge chambers 27 and 28, respectively. One end of the housing 24 is an inlet 29 and on the other end of said housing is an outlet 30.

The reference numeral 31 designates a valve in the chamber 28 which is connected to the diaphragm 26 and which is engageable with a seat 32 in the outlet 30. The valve 31 is slid-

able in a guide 33 which is provided therefor in the chamber 28. A coil spring 34 encircles the stem of the valve 31 and has one end engaged with the guide 33 and its other end engaged with the diaphragm 26. A by-pass 35 on the housing 24 establishes communication between the chambers 27 and 28. Interposed in the by-pass 35 for controlling same is a hand operated needle valve 36.

Briefly, the operation of the device is substantially as follows:

When the bell 12 submerges water enters the chamber 15 and causes the float 20 to rise, thus engaging the valve member 22 with the seat 17 for closing the neck 16. When the bell 12 comes to rest on the platform 8 said platform is depressed against the tension of the supporting springs 9 and the valve 4 is opened by the engagement of the cage 11 with the core 6. Air from the line 7 is thus discharged into the bell 12 and displaces the water therein. When the bell 12 has gained sufficient buoyancy in this manner, said bell rises to the surface of the water 2. Of course, when the platform 8 is thus relieved of the weight of the bell 12, said platform is raised to its former position by the springs 9 and the valve 4 closes. When the bell 12 reaches the surface of the water the chamber 15 empties and the float 20 drops thus opening the valve 22 and permitting the air in said bell 12 to escape. After the air escapes therefrom, the bell 12 again submerges and the foregoing operation is repeated. Through the medium of the pressure operated valve 23, the bell 12 is caused to remain submerged for a predetermined length of time. There is normally greater pressure in the chamber 27 than in the chamber 28 with the result that the diaphragm 26 closes the valve 31 against the tension of the coil spring 34. Air under pressure flows slowly around the diaphragm 26 through the valve controlled by-pass 35 from the chamber 27 to the chamber 28. When the pressure in the chamber 28, with the assistance of the spring 34, balances the pressure in the chamber 27, the valve 31 is opened by the diaphragm 26 for permitting the air to flow from said chamber 28 to the valve 4. This operation of the valve 23 may be repeated several times before sufficient air passes into the bell 12 to cause said bell to rise to the surface of the water. Of course, when the pressure in the chamber 28 drops with the discharge of the air therefrom, the diaphragm 26 again closes the valve 31.

In the modification shown in Fig. 7 of the drawings, a neck 37 is fixed in an opening which is provided therefor in the top 14 of the bell 12. Formed in the lower portion of the neck 37 is a seat 38. Depending from the neck 37 into the bell 12 is a bowl 39 having an arcuate intake pipe 40 communicating therewith. Mounted on the neck 37 is a float chamber 41 having a port 42 in its top. The chamber 41 is further provided, in its lower portion, with one or more drain ports 43. Interposed between the chamber 41 and the neck 37 is a diaphragm 44. A guide 45 is mounted in the neck 37 and slidable therein is the stem 46 of a valve 47 which is engageable with the seat 38. The upper end of the stem 46 is engaged with the diaphragm 44. A spring 48 yieldingly urges the valve 47 toward closed position. Mounted on the neck 37 and communicating therewith is an upstanding discharge pipe 49.

In the operation of the modification shown in Fig. 7, when the bell 12 submerges, the bowl 39 and its upwardly curved intake pipe 40 fill with water and a float 50 in the chamber 41 rises as said chamber also fills, thus relieving the diaphragm 44 of the weight of said float and permitting the valve 47 to close. When the bell 12 again rises to the surface, the chamber 41 drains or empties and the float 50 drops and comes to rest on the diaphragm 44, the weight of said float being sufficient to depress said diaphragm and open the valve 47. When the valve 47 is thus opened the water which has been trapped in the bowl 39 and the intake pipe 40 thereof is ejected by the escaping air in the bell 12 through the pipe 49.

It is believed that the many advantages of a diving device constructed in accordance with the present invention will be readily understood and although preferred embodiments of said device are as illustrated and described, it is to be understood that further modifications may be resorted to which will fall within the scope of the invention as claimed.

What is claimed is:

1. A diving device comprising a container for the reception of water, an air line communicating with said container, a diving bell operable in the water in the container and adapted to receive air from the air line to be lifted thereby to the surface of the water, and a pressure controlled valve interposed in the air line for periodically discharging air into the container, said valve including a casing, a diaphragm dividing said casing into inlet and outlet chambers, a valve connected to said diaphragm for controlling the discharge of air from the outlet chamber, and a by-pass connecting the chambers.

2. A diving device comprising a container for the reception of water, a diving bell operable in the water in the container, means for discharging air into the diving bell for displacing the water therein and raising said bell to the surface, and means for discharging the air from the bell when said bell reaches the surface, the last named means including a neck mounted on the bell and communicating therewith, said neck including a seat and further including a bowl depending from said neck into the bell, an upwardly curved intake pipe communicating with the bowl, said bowl and intake pipe for the reception of water, a chamber mounted on the neck and having water intake and drain ports therein, a diaphragm mounted between said chamber and the neck, a valve engageable with the seat for controlling the communication between the neck and the bell, said valve being operable to open position by the diaphragm, a discharge pipe connected to the neck, and a float operable in the chamber and engageable with the diaphragm for opening the valve when the water drains from said chamber.

RICHARD LEIGH GARRETT.