

A. VON HOFFMANN.
BALLOON.
APPLICATION FILED SEPT. 11, 1909.

1,056,791.

Patented Mar. 25, 1913.

Fig. 1.

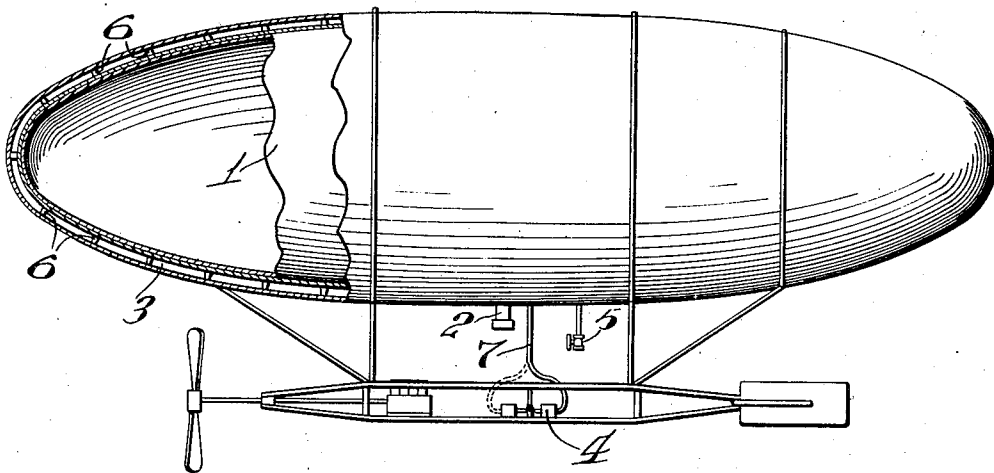
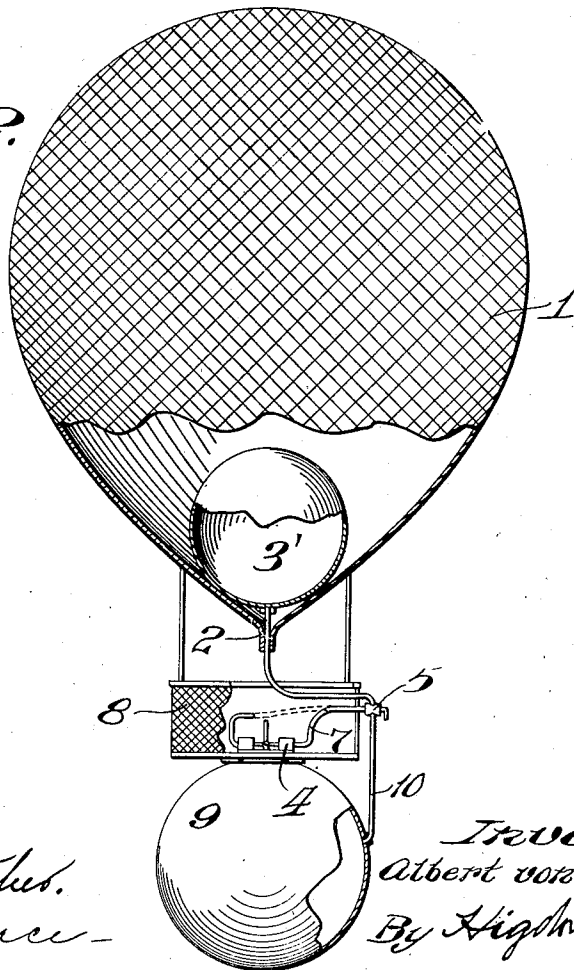


Fig. 2.



attest:
A. G. McKus.
E. R. Wallace-

Inventor:
Albert von Hoffmann
By *Highm & Ingan.*
attys.

UNITED STATES PATENT OFFICE.

ALBERT VON HOFFMANN, OF ST. LOUIS, MISSOURI.

BALLOON.

1,056,791.

Specification of Letters Patent. Patented Mar. 25, 1913.

Application filed September 11, 1909. Serial No. 517,266.

To all whom it may concern:

Be it known that I, ALBERT VON HOFFMANN, a citizen of the United States, and resident of St. Louis, Missouri, have invented certain new and useful Improvements in Balloons, of which the following is a specification containing a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to the construction of balloons, the object of my invention being to provide means whereby balloons, either dirigible or non-dirigible or "pear" or "cigar-shaped", may be ballasted solely by air.

For the above purposes my invention consists in certain novel features of construction and arrangement of parts as will be hereinafter more fully set forth, pointed out in my claim and illustrated in the accompanying drawing, in which.

Figure 1 is an elevation of a dirigible balloon of the cigar-shape having parts broken away to illustrate the arrangement of the ballast chamber; and, Fig. 2 is a similar view of a pear-shaped balloon partly in section illustrating the means whereby the expansion and contraction of the gas within the gas bag is compensated for, and which means also serves to contain air to be employed for a ballast.

Referring by numerals to the accompanying drawing: 1 designates the gas bag which is provided with the usual filling opening 2.

3 designates a chamber carried by the gas bag, 4 designates a pump for compressing air within the chamber 3 and 5 designates a valve arranged to exhaust the compressed air from the chamber.

In the construction shown in Fig. 1 the chamber 3 is preferably provided with non-collapsible walls, there being studs or pins 6 connecting the walls. By this arrangement of a chamber having non-collapsible walls, the chamber may be either filled with compressed air or a vacuum may be formed therein which vacuum serves a double function to increase the buoyancy of the balloon and forming a heat or cold insulation for the gas bag to prevent expansion and contraction of the gas contained within the gas bag.

As shown in each of the figures of the drawing, the connection 7 between the cham-

ber 3 and pump 4 is flexible and of such construction that it may be attached to either end of the pump so that the pump may be employed either to compress air within the chamber, or when the connection 7 is applied to the opposite end of the pump and the pump operated the air may be exhausted from the chamber 3, and, when the chamber is of the non-collapsible variety, as shown in Fig. 1, a further continued operation of the pump may create and form a vacuum within the chamber 3.

In the construction shown in Fig. 2, suspended from the basket 8 is a second collapsible chamber 9 having a connection 10 with the collapsible chamber 3' and with the pump 4. The valve 5 in this arrangement may be operated and the air from the pump 4 supplied to either the chamber 3 or 9 both, or the valve may be operated to open a vent to atmosphere to exhaust air from either or both of the chambers 3 and 9.

In preparing the balloon for ascension constructed as shown in Fig. 1 with the non-collapsible chamber 3, a vacuum is formed in the chamber 3 to be utilized in the insulating of the gas bag to prevent contraction and expansion of the gas within the gas bag and materially assist the lifting of the balloon, and if it be desired at any time the valve 5 may be operated and the vacuum within the chamber 3 destroyed. And if it be desired at any time to add weight to the balloon for ballast the pump 4 may be operated and the chamber filled with compressed air, if then it be desired to make further ascension the valve 5 may be operated to release the compressed air and the connection between the chamber and pump connected with the opposite end, or suction end, of the pump, and a vacuum again formed in the chamber 3 which will increase the buoyancy of the balloon and again utilize as a means for insulating the gas bag against heat and cold to prevent expansion and contraction of the gas contained therein.

In preparing the form of balloon shown in Fig. 2, or one in which there is a collapsible chamber for air, for ascension the chambers 3' and 9 are each filled with compressed air, the gas bag 1 is then inflated. In this construction, by reason of the collapsible air chamber, no provision is possible for a vacuum which is utilized for insulating against heat and cold to prevent contraction and expansion of gas but by reason

of the chamber 3 being placed within the gas bag the chamber 3 may be inflated or deflated to compensate for the expansion and contraction of the gas. In other words, the stretching and shrinking of the fabric forming the gas bag has a tendency toward deterioration and if there is no provision for the maintenance of the bag at a uniform size the bag is constantly changing size and shape; and by the employment of an inflatable bag within the gas bag when the gas contracts and occupies a smaller compass the gas bag may be maintained at the same pressure and of the same size at all times by either inflating or deflating the chamber 3 according to the contraction or expansion of the gas.

The bag 9 which is suspended from the basket is utilized for the storage of air from the chamber 3 when the same is deflated to allow for expansion of the gas; in this manner the air may be again supplied to the chamber 3 from the chamber 9 without the employment of the pump.

If, assuming that the balloon is ascending, it be desired to descend, the pump is actuated and air is supplied to either or both of the chambers 3' and 9 to a weight sufficient for the descension desired, the descension being governed by the amount of air supplied to the air chambers.

When both chambers 3' and 9 are filled with air and it be desired to deflate them more rapidly than could be accomplished by the valve 5 alone, the connection 7 is fixed to the suction end of the pump and the pump operated to exhaust the air from the chambers; in this manner, and in either form of balloon, air may be utilized for the ballast of the balloon without the employment of cumbersome weights as is now in common use.

I claim:

In a balloon of the class described, a gas bag, an inclosure for the gas bag having spaced apart, non-collapsible walls, a car suspended from said inclosure, a combined compressing and exhausting pump, a flexible connection arranged to connect the interior of said inclosure to either the compressing or exhausting end of said pump, a valve controlled communication between the interior of the inclosure and atmosphere, and means extended through the inclosure for filling the gas bag.

In testimony whereof, I have signed my name to this specification, in presence of two subscribing witnesses.

ALBERT VON HOFFMANN.

Witnesses:

E. E. LONGAN,
E. L. WALLACE,