J. J. Sherman,

Balloon,

No. 33,165. Patented Aug. 27, 1861.

Fig 1.

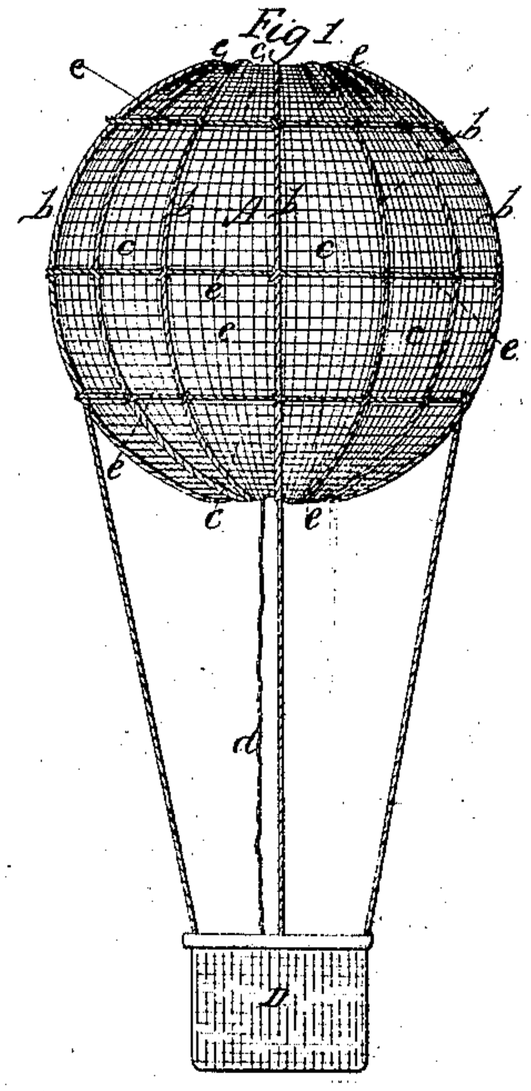
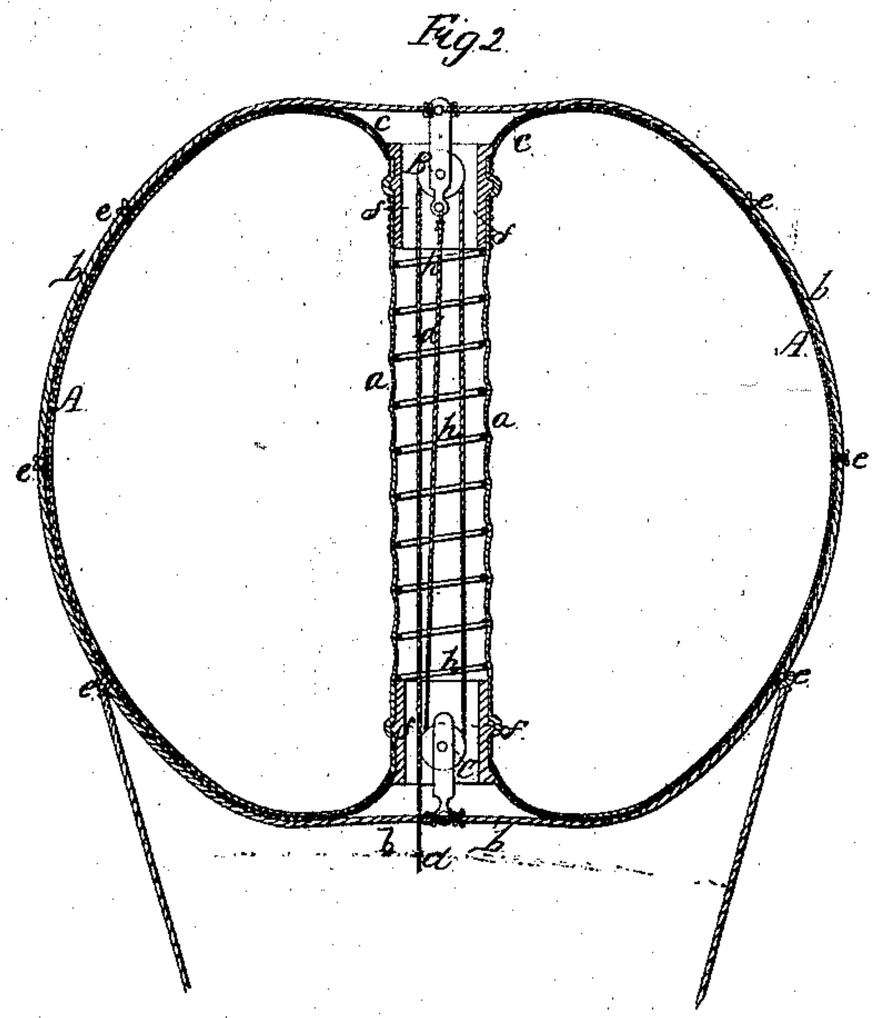


Fig 2.



Witnesses.
J. W. Coombs
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UNITED STATES PATENT OFFICE.

JOSIAH J. SHERMAN, OF ALBANY, NEW YORK.

IMPROVEMENT IN BALLOONS.

Specification forming part of Letters Patent No. **33,165**, dated August 27, 1861.

To all whom it may concern:

Be it known that I, JOSIAH J. SHERMAN, of the city of Albany, in the county of Albany and State of New York, have invented a new and useful Improvement in Balloons; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which

Figure 1 is a side view of a balloon and car, and Fig. 2 is a central vertical section of the balloon without the car on a larger scale than Fig. 1.

Similar letters of reference indicate corresponding parts in the two figures.

The object of my invention is to give to the aeronaut in the car beneath a mechanical control over the volume of the gas contained in the balloon, whereby he can increase or diminish its density at pleasure, and thus be enabled to ascend or descend in the air without the expenditure of gas or ballast.

For the above-stated purpose I make the balloon A of a spherical or nearly spherical form, and pass vertically through its center a flexible tube *a*, which is air-tight with respect to the interior of the balloon, and which is capable of corrugation in such manner as to contract lengthwise, and is secured to the balloon at the top and bottom by air-tight and gas-tight connections. Within this tube I arrange a system of pulleys and tackle, one block B of which is attached to the top and the other C is attached to the bottom of the balloon, or to the ropes *b b* or netting *c c* surrounding it, and the fall *d* of which passes down to the car D, where it is operated by hand, or by a windlass, or in any of the modes adapted on shipboard.

If the material of which the balloon is constructed is sufficiently strong, I dispense with the usual netting *c c* and use only the cords or ropes *b b*, which surround it longitudinally and are gathered to a point or knot at each end of the tube, where the blocks of the pulleys are attached to them, as shown in Fig. 2. These cords or ropes are further secured in place by fastening them to two or more bands *e e*, surrounding the balloon horizontally; but as the balloon may be made of much lighter material if a netting is used, I prefer to use it, and would recommend that the balloon be entirely surrounded with one, still using the cords or ropes *b b* and bands *e e* outside of it.

To prevent the collapse of the tube *a* from the pressure of the gas surrounding it in the balloon, I employ to keep it distended either an internal spiral wire *h* (see Fig. 2) passing through its length and secured at its top and bottom and such other points as may be necessary to keep it in place, or rings secured to the said tube at proper distances.

To prevent injury to the balloon or to the tube *a* by abrasion from the blocks B C, I surround each of the said blocks with a thimble *f* of metal, wood, or other suitable material secured to the tube, and this thimble may be made to serve as a medium of connection between the tube and the balloon, as represented in Fig. 2.

The injection and ejection cocks for filling the balloon with and discharging it of the gas may be arranged within the tube *a* or elsewhere, as may be deemed most convenient.

To illustrate the operation of my invention, let it be supposed that the top and bottom of the balloon have been brought toward each other by drawing upon the fall *d* until its internal capacity is diminished to three-fourths, and that when inflated to this extent it will rise with the load in the car one thousand feet, and there rest in equilibrium in the air. Now it is obvious that any further compression of the balloon, however slight, which shall be caused by drawing upon the fall *d*, will increase the density of the contained gas, and thus lower its elevation of equilibrium, and it will descend immediately to that elevation, and that by a continued drawing upon the cord a continued descent will ensue. On the other hand, it is also obvious that if instead of drawing upon the fall *d* the latter is let out, the compression of the balloon being diminished, it will expand, and its contained gas becoming more rarefied by expansion, its elevation of equilibrio will be higher, and it will at once rise to it and will continue to rise if the aeronaut so wills, until the highest elevation of equilibrium, due to the full ascensive power of the balloon, is reached.

The number of pulleys employed in the

tube may be one or many according to the size of the balloon and the power it may be desirable to exert upon the fall.

What I claim as my invention, and desire to secure by Letters Patent, is—

The combination, with a balloon, of a pulley or system of pulleys applied to operate substantially as and for the purpose herein specified.

JOSIAH J. SHERMAN.

Witnesses:
PAUL I. COOPER,
WILLIAM LANSING.