(No Model.)

E. DE JONGH.

AERONAUTIC APPARATUS AND REGULATOR.

No. 246,872. Patented Sept. 13, 1881.

Fig. 1.

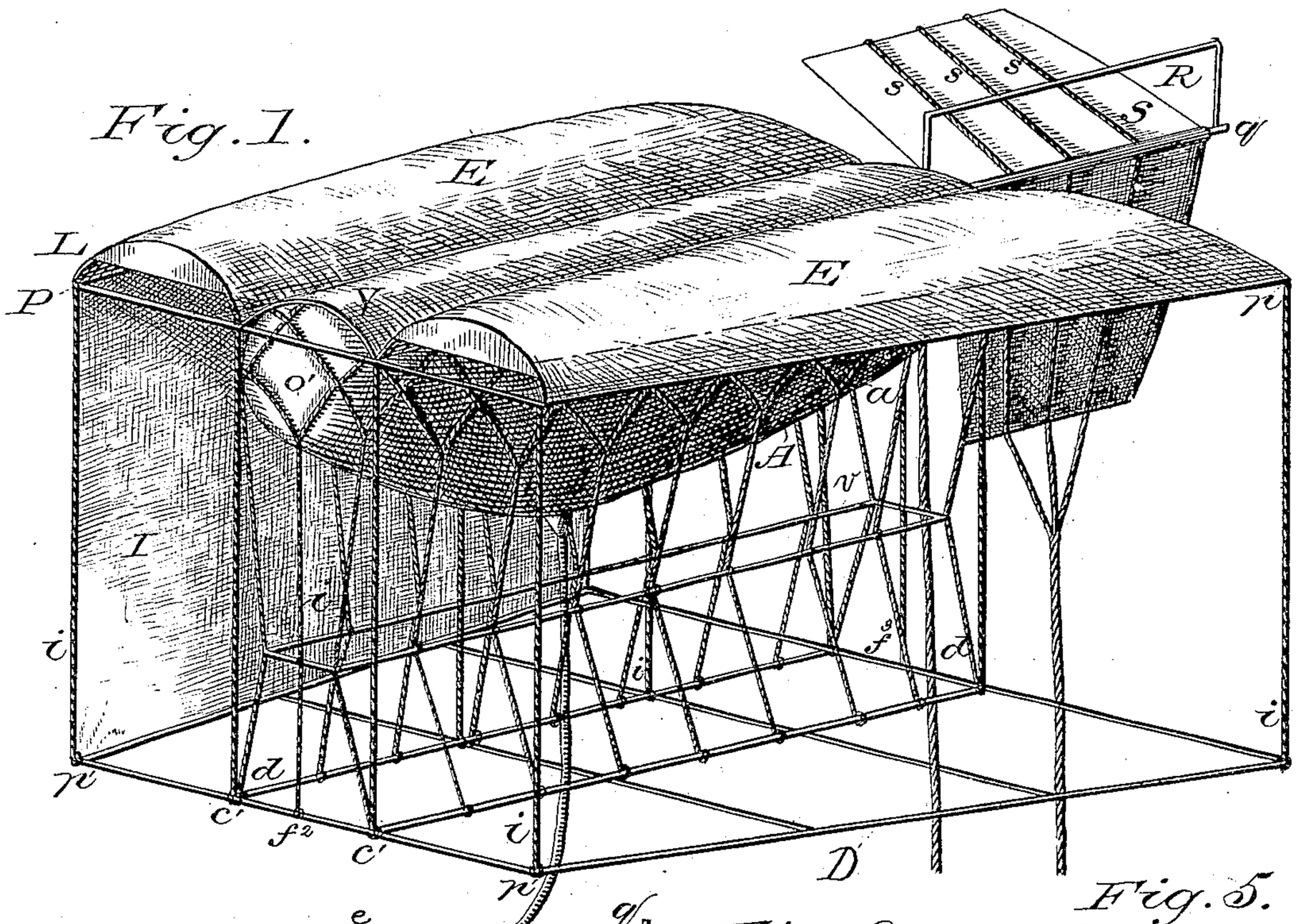


Fig. 2.

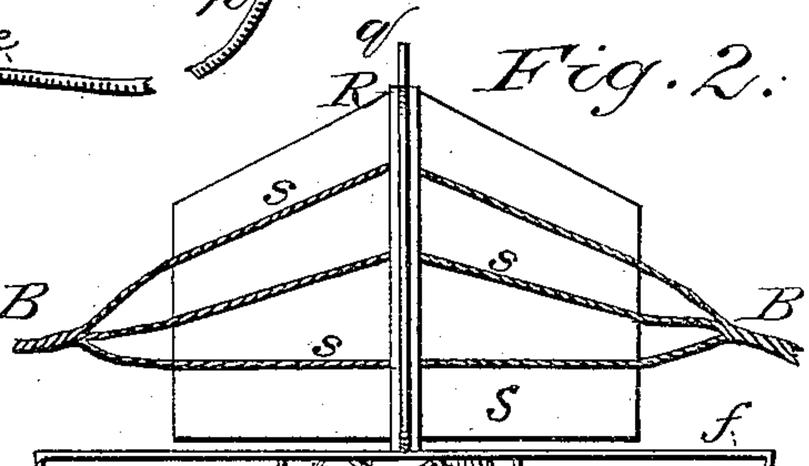


Fig. 3.

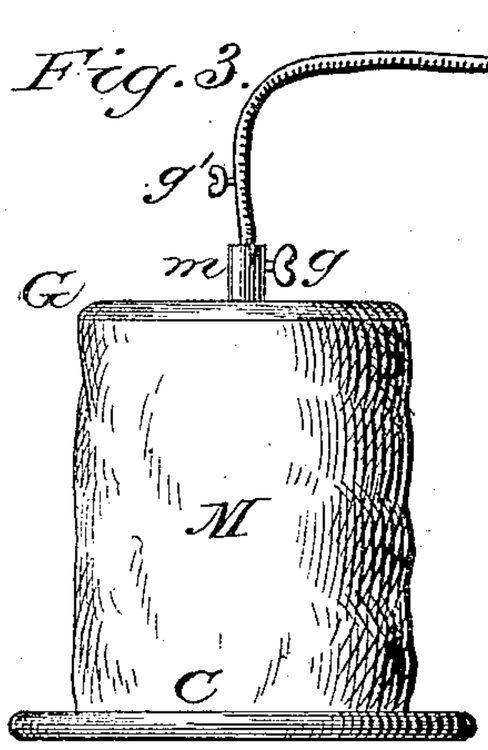


Fig. 4.

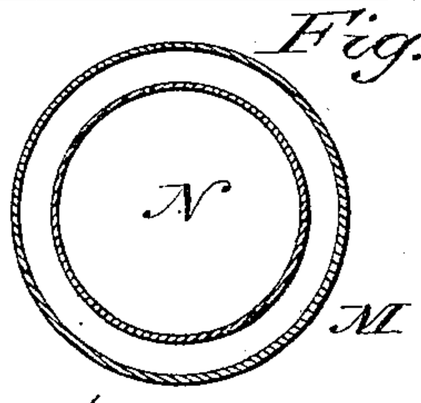


Fig. 5.

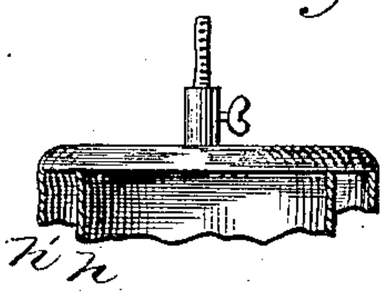
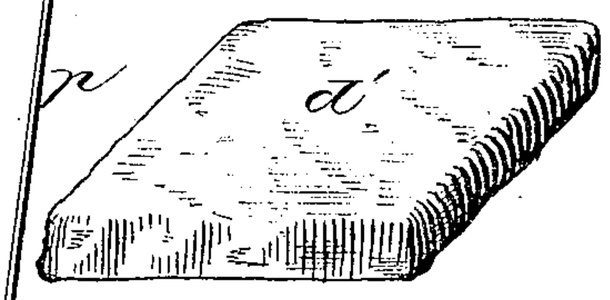


Fig. 6.



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EDWARD DE JONGH, OF SALEM, OREGON.

AERONAUTIC APPARATUS AND REGULATOR.

SPECIFICATION forming part of Letters Patent No. 246,872, dated September 13, 1881.

Application filed October 27, 1880. (No model.)

To all whom it may concern:

Be it known that I, EDWARD DE JONGH, a citizen of the United States, residing at Salem, in the county of Marion and the State of Oregon, have invented a new and useful Aeronautic Apparatus and Regulator, of which the following is a specification.

My invention relates to improvements in mechanisms for navigating the air; and the objects of my improvements are, first, to provide means to enable a boat or any similar device driven by either sail, steam, or any other propulsive motors to navigate the air with the same safety and facility as on land or water; second, to afford facilities for the gradual ascent and descent of the apparatus, including the attached boat or device, by varying the amount of gas within the balloon and wings forming part thereof without sacrificing it; and, third, to increase the capacity of the lifting-power and prevent the balloon from rotating and bring its load gently to the ground. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a perspective view of the apparatus; Fig. 2, a view from above the apparatus, showing the construction of the upper frame-work, including the head and tail; Fig. 3, a vertical view of the mechanism for regulating the ascent and descent of the apparatus; Figs. 4 and 5, detail views of the same, and Fig. 6 view of a mattress-shaped balloon for attaching to the platform.

Similar letters refer to similar parts throughout the several views.

My invention consists of an apparatus constructed to resemble a bird floating in the air, and in which the balloon-body is surrounded by a rectangular frame-work, and is connected thereto by means of a covering and netting, which are so arranged as to give to the balloon the requisite elongated form and maintain it in such shape, thus obviating the necessity of employing struts or a frame-work within the balloon to enable it to retain its form. A head to enable the balloon to cut the air, and a tail for steering the apparatus and its accompanying boat or device, are respectively secured to the rods or bars of the said frame-work in the front and rear of the balloon, the said rectangular frame merging into two wedge-shaped frames, one on each side of it, and to which are attached wings, provided with gas-receptacles for the purpose of inflating them; and it further consists of a tunnel attached to the bird-like structure for the purposes of enabling the apparatus to cut the air with greater facility, protect the balloon from lateral air-currents, to increase the carrying capacity by confining the air to a certain extent within the apparatus, and increasing the speed of the apparatus; and my invention furthermore consists of a mechanism combined with the balloon and wings of the apparatus for the purpose of regulating the ascent and descent of the apparatus, and also of other details which will be hereinafter fully explained and described.

The frame-work of the apparatus, consisting of the upper frame, P, including the head O and steering-tail S, Fig. 2, and the platform D, Fig. 1, may be firmly constructed of bamboo, iron, steel, or any other suitable strong material securely joined and braced.

The upper frame, P, Fig. 2, is composed of two parallel bars, *c c*, securely joined at right angles to the bars *f'* and *f*, the bar *f'* to be shorter than *f*, so that when the slanting bars *p p* are attached thereto each side of the frame shall form a wedge-like opening, leaving the center of the frame rectangular. The frame thus constructed will be of a wedge-like shape, as shown.

To the center of the rear portion of the frame P a suspended pivot-bearing, *q*, is attached, on which pivots the tail S, which is pentagonal in form. It is essential that the tail should be of this form, so that it may be easily worked and also offer no obstruction to the progress of the apparatus. A support, R, of any suitable form and having its two ends threaded, is let into holes in the front and rear portion of the bearing *q*, and is firmly secured thereto by nuts above and below, the said support R serving to strengthen the bearing and acts as a support for the part of the rudder that is uppermost when it stands in a vertical position. The frame-work of the tail S is to be covered with canvas or similar suitable material on the upper and under sides, securely sewed together,

its covering being further strengthened by ropes *s s s*, attached on both sides and terminating in two coils of ropes, as at B B, Fig. 2, which are secured to a compass-wheel having a grooved tire or similar device attached to the boat used, for the purpose of working the tail. The tail or rudder pivots on the bearing *q*, which passes through a longitudinal opening in the central portion of the rudder's frame-work, and it steers the apparatus and its accompanying boat by having alternately either side elevated or depressed at any angle from the horizontal to the vertical, according to the course of the apparatus and the direction of the wind, by means of the ropes B B attached to each side of the rudder, and manipulated from the boat below. It thus controls the air-currents in the same manner that a bird in flight inclines its whole body at different angles, which angles vary also from the horizontal to the vertical, according to the course of its flight and the direction of the air-currents. The support R, by its lower ends being inserted in the front and rear portion of the bearing *q*, retains the rudder between them securely on the bearing, and the longitudinal upper part of the support R prevents the tail from pivoting around too far when powerful air-currents strike against it when standing in a vertical position, and thereby giving the steersman less trouble to maintain it in that position. The tail is represented in a horizontal position in Fig. 2 and in a vertical position in Fig. 1, except that the upper part is drawn down to clearly illustrate the position of the shoulder R on the bearing.

The head O, which serves to cut the air, is securely joined to the forward portion of the frame P, in the center of the bar *f'*, so that when the balloon is attached to the frame it fits over the neck *o'*, Fig. 1. In form it should resemble an arrow-head, and its frame-work be covered with canvas or similar material.

With the exception of two additional cross-bars, the platform D, Fig. 1, should be exactly similar in construction, size, and form, minus the head and tail, to the upper frame, P, Fig. 2, and should be covered with canvas or other strong suitable material.

The balloon A, Fig. 1, is constructed of silk, bunting, or any suitable material rendered air and gas tight, and should be the shape of a bird's body. The top portion of its netting *a* is securely fastened in its whole length to the inner surface of a covering, Y, made of canvas or other strong material stretched over the entire top of the balloon, and which is securely attached on each side to the parallel bars *c c* of the frame P in such a manner as to form the segment of a circle when the inflated balloon rises up against it, as shown in Fig. 1, the balloon to occupy the rectangular opening in the frame P, Fig. 2, between the broken lines, leaving sufficient space on each side, as at *y y*, for expansion when ascending to a high altitude, the front and rear portions of the balloon to be firmly fastened by its netting and additional cords to the bars *f'* and *f* of the frame P. The attachment-cords leading from the netting are attached to the rectangular frame V, and from there fastened to the parallel bars *c' c'* and f^2 f^3 of the platform D. Additional cords or chains, *d d d d*, secured to the parallel bars of the frame P above, are also fastened to similar bars of the suspended platform below.

The wings E E, Fig. 1, cover the wedge-like openings of the frame P on each side of the balloon, and are constructed of the canvas Y, covering the balloon, which is continuous and has already been joined to the parallel bars *c c*. The continuous portions of the canvas are so arranged that when securely fastened to the outer slanting bars, *p p*, of the frame P each wing shall assume the form of a larger segment of a circle than the central piece, Y, covering the balloon. The inner surface of the canvas wings E E is lined to the point shown by the broken line in Fig. 1 with a longitudinal piece of silk or similar material, and vertical pieces are fastened to the front and rear of the wings, as shown at L; and a longitudinal plane piece to form the bottom is attached to the lower ends of the top, front, and rear pieces, leaving an aperture in the bottom piece to be covered by a rubber pipe, thus constituting in all a receptacle, in the shape of the upper part of the wing, for the reception of gas, so that the wings may be inflated, the canvas of the wings and also the receptacles to be made air, gas, and water tight by compounds used for that purpose.

The continuous canvas covering Y, after forming the wings E E, forms other continuations from their outer edges, constituting walls of canvas I I, which are fastened below to the slanting bars *p' p'* of the platform D, thus helping to sustain each side of the platform. The walls I I are still further strengthened by ropes *i i i i*, sewed to the inner and outer surfaces of each wall, and also attached above to the slanting bars *p p* of the frame P and below to similar bars, *p' p'*, of the platform D. In Fig. 1 only one of the walls is shown, the other wall and part of the additional ropes being left out to render the inside construction of the apparatus clear and distinct to the view.

With the head O in place, the apparatus represents a bird in full flight carrying a wedge-shaped tunnel from the tips of its wings.

The mechanism, Fig. 3, I call an "aeronautic regulator," and its use is to withdraw gas from the balloon and wings, either simultaneously or separately, according to necessity, when wishing to descend, and supplying the same gas to both or either when wishing to ascend. At starting, an ascertained quantity of gas is supplied to the balloon and gas-receptacles of the wings, which, in combination with a certain amount of gas supplied to them by the regulator, will enable the apparatus to attain a predetermined elevation in the atmosphere.

If in case of danger, such as the advent of a storm or meeting with heavy clouds, or through other causes, such as a more favorable superior current of air, it should be found necessary to ascend higher, an increase of gas to accomplish that purpose can be supplied to the balloon and wings by the regulator, which could again withdraw the same quantity to enable the apparatus to descend to its former elevation. On account of the pliancy of the bags M and N of the regulator, the exact amount of gas necessary can be supplied to or withdrawn from the balloon and wings, and in this manner the elevation of the apparatus can be regulated at the pleasure of the aeronaut, who can thus take advantage of the most favorable air-currents and avoid any atmospheric dangers. When the apparatus is at an elevation where the air is attenuated, and when the internal pressure of the gas within the balloon and wings overbalances the outside pressure of the air, the stop-cocks connected with the regulator can be opened either partially or entirely, and when the pressure of gas from the balloon and wings is sufficient to overcome the weight of the metal cover G of the regulator the gas will flow into the regulator until the pressure is relieved, and the balloon and gas-receptacles will be relieved, as it were, automatically, from the danger of explosion.

In large apparatus several regulators can be combined by pipes leading from them to the main pipe *e*, connected with the balloon and gas-receptacles.

The regulator is composed of two cylindrical-shaped bags made of rubber, canvas, or other pliant material. The circumference of one of the bags is smaller than that of the other, so that one may be placed within the other and leave a margin of a few inches all around between the two, as shown in Fig. 4, in which N is the smaller or inner bag and M the outer bag. The inner bag, N, receives the gas, and is lined with silk or similar material, made air and gas tight. The bags have their upper circumferences fastened to annular rings of wood, *h h'*, joined to a circular cover, G, and their lower circumferences are attached to similar annular rings joined to a wooden platform, C, which has a margin extending beyond the bags, so as to enable the mechanism to be screwed down firmly to the floor of the boat or other device attached to the apparatus, the cover G to be made of iron, steel, or other metal heavy enough to counteract the lifting-power of the gas within the inner bag. The object of the outer bag is to keep the air from surrounding the gas-receptacle, thus rendering the gas contained therein a dead weight. The short metal pipe *m* is joined to the cover over an aperture in the cover G, leading into the gas-receptacle.

In the sectional view of the regulator a section of the wooden rings *h h'* and bags M and N shows the position of the rings and bags and their relation to each other. The rings *h h'*, secured to the metal cover and the platform of the regulator, are merely for the purpose of fastening thereto the cylindrical bags M and N. In place of the rings, annular grooves can be made in the metal cover and platform of the regulator, or any other suitable means may be employed for attaching the bags to them.

A stop-cock, *g*, is adjusted to the short metal pipe *m* to cut off the gas from the regulator or the balloon and wings, and the upper portion of the pipe is threaded for the reception of a rubber pipe, *e*, also having a stop-cock, *g'*, and leading to and fastened over an aperture in the balloon or wings, similar methods to be employed when attaching the regulator to the gas-receptacles in the wings E E. After strongly joining to the platform D masts of iron or wood attached to a boat or other device provided with sails or other propelling motors, and having partially inflated the balloon and wings, but not sufficiently to ascend, through the means of the rubber pipe *e* and similar pipes connected with the wings, which can be disconnected for that purpose from the regulator, the stop-cock *g'* on the pipe *e* shuts off the gas from escaping from the balloon, and similar stop-cocks joined to similar pipes connected with the wings are made to act likewise. Sufficient gas is then allowed to flow into the regulator, and which, by addition to the gas already in the balloon and wings, would enable the apparatus to ascend. The pipe *e* is again connected with the pipe *m*, fastened over the aperture in the cover G. and when wishing the apparatus to ascend both stop-cocks *g'* and *g* are simultaneously opened, thereby establishing the connection between the regulator and balloon or the regulator and wings, and by merely pressing the metal cover G downward the gas is transferred from the regulator by degrees to the balloon or wings, and the apparatus gradually rises. When all the gas has been forced into the balloon or wings the stop-cocks *g* and *g'* are immediately closed, thereby preventing its return.

When the aeronaut wishes to descend the stop cocks are opened and the gas flows back again into the regulator of its own accord, its descent being accomplished by the pressure brought to bear on it of the air below and the pressure above the balloon and gas-receptacles of the wings of the several divisions of the canvas covering the balloon and constituting the wings, as these divisions sustain a great portion of the weight of the apparatus and attached boat or device. In this manner the gas contained in the balloon and wings can be alternately withdrawn or supplied an indefinite number of times for the purpose of ascending or descending.

If found convenient, the gas can be pressed from the regulator into the balloon and gas-receptacles of the wings by the means of a rack joined to the top of the metal cover G, running in suitable guides attached to a support in the boat, with a cog-wheel gearing into the rack

and journaled to the same support and operated by a crank.

The device attached to the platform D should preferably be a boat or similarly-shaped device, for, in case of accident to the balloon and the apparatus should fall into a body of water, a boat can be easily navigated. Even in case of the total destruction of the balloon the inflated wings and central cover would convey the apparatus to the ground or water without the least injury to apparatus or passengers. The wings also answer the purpose of preventing the balloon from rotating, and also enabling the apparatus to sustain heavier loads.

In large apparatuses that have to sustain a great weight, additional lifting-power can be derived from the use of the mattress-shaped gas-receptacle *d'*, Fig. 6, which can be attached in any suitable manner to the platform D.

The walls I I, formed from a continuation of the canvas shaping the wings, and joined above to the outside bars of the frame P and below to similar bars of the platform D, give to the interior of the apparatus the form of a wedge-shaped tunnel, which, in combination with the wedge-shaped wings, enables the front portion of the apparatus to cut the air with facility, whereas the rear portion of the tunnel and wings being much broader than the front part, a favorable wind would increase the speed of the apparatus by the wind entering faster than it could get out. The wedge-shaped tunnel has also the advantage of concentrating the wind under the wings and balloon, and therefore aids in sustaining the apparatus, so that by means of the wings considerable weight may be gently brought to the ground.

Although the devices are herein shown in one form, I do not limit myself to this form alone, as they may be somewhat varied without departing from the spirit of my invention.

It is obvious that my invention may be carried out by employing other forms of frame P and platform D, and having somewhat different openings, and consequently carrying wings and a tunnel and also a head and tail of a different shape from those shown, but which would attain the same objects as herein specified.

The central canvas cover, Y, netting, and balloon can also be somewhat varied in their relations to the frame P and platform D without departing from the spirit of my invention.

The canvas forming the cover of the balloon, wings, and walls can be covered with a compound rendering them water-tight.

Two or more aeronautic apparatuses can be attached together by their platforms for the purpose of carrying passengers, freight, baggage, &c.

Having fully described my invention, what I desire to claim, and secure by Letters Patent, is—

1. In an aeronautic apparatus, a balloon body and wings provided with gas-receptacles attached to one general frame-work, and said frame-work having secured to it in front a head, so as to cover the front or neck of the balloon, and a tail secured to said frame-work in the rear of the balloon, all substantially as shown, and for the purpose described.

2. In an aeronautic apparatus, the wedge-shaped frame P, having wedge-like openings on each side and a rectangular center, the arrow-shaped head O, and pentagonal-shaped steering-tail S, in combination with the covering Y, balloon A, netting *a*, wedge-shaped wings E E and gas-receptacles contained therein, walls of canvas I I, depending from the wings, rectangular frame V, ropes *d d d d* on each side, and wedge-shaped platform D, for the purpose of enabling an attached boat or other device driven by sails or other propelling motors to navigate the air, the parts being arranged and operating substantially as herein shown and described.

3. In an aeronautic apparatus, an elongated balloon, in combination with the rectangular portion of frame P, cover Y, netting *a*, and concentrating frame V, all combined with said frame P so as to retain the balloon in its elongated form without the use of struts or braces within the balloon, all substantially as set forth.

4. In an aeronautic apparatus, the frame P, consisting of a frame-work divided into three openings, the central portion or opening being rectangular and the opening on each side of the central opening wedge-shaped, substantially as and for the purpose specified.

5. In an aeronautic apparatus, the walls I I, with attached ropes *i i i i*, in combination with the wedge-shaped platform D, the wedge-shaped frame P, the wedge-shaped wings E E, ropes *d d d d* on each side, cover Y, and balloon A, arranged to form a wedge-shaped tunnel, for the purpose of cutting the air and also increasing the speed of the apparatus when the wind is in favor, all substantially as set forth.

6. The frame P, in combination with the head O, secured thereto in front, and tail S, pivoted on suspended pivot-bearing *q*, provided with shoulder R, secured to said frame in the rear, all substantially as and for the purpose described.

7. The pentagonal-shaped tail S, in combination with the frame P, ropes *s s s*, forming one coil on each side of the tail, the suspended pivot-bearing *q* on which it pivots, and shoulder R, let into the bearing to sustain and retain the tail, for the purpose of steering aeronautic apparatus, all substantially as shown.

8. An aeronautic regulator, combined with aeronautic apparatus consisting of the bag N within the bag M, attached to annular rings to a wooden platform, C, below, and above to similar rings joined to the metal cover G, having an aperture over which is fastened the short metal pipe *m* and connected stop-cock *g*, the rubber pipe *e* and connected stop-cock *g'*, for the purpose of varying the amount of gas in balloons and wings connected with aero-

nautic apparatus, so as to enable them to ascend or descend at will, all arranged and operating substantially as described.

9. The wings E E, provided with gas-receptacles L L, in combination with the wedge-like portions of the frame P, substantially as and for the purpose set forth.

10. The wedge-shaped wings E E, constructed substantially as described, and having their interiors concave or shaped as a segment of a circle, substantially as set forth.

11. In an aeronautic apparatus, the gas-receptacles L L, consisting of receptacles constructed substantially as described, and attached to the interior of the wings and conforming in shape thereto, substantially as set forth.

12. The wedge-shaped platform D, in combination with the mattress-shaped gas-receptacle, substantially as set forth.

In testimony whereof I have hereunto set my hand this 27th day of July, 1880.

EDWARD DE JONGH.

Witnesses:

JOHN S. HAWKINS,

L. A. MALLORY.