L. A. BECHT.

AEROPLANE AIR SHIP.

APPLICATION FILED MAY 8, 1905.

914,782.

Patented Mar. 9, 1909.

2 SHEETS—SHEET 1.

Fig. 1.

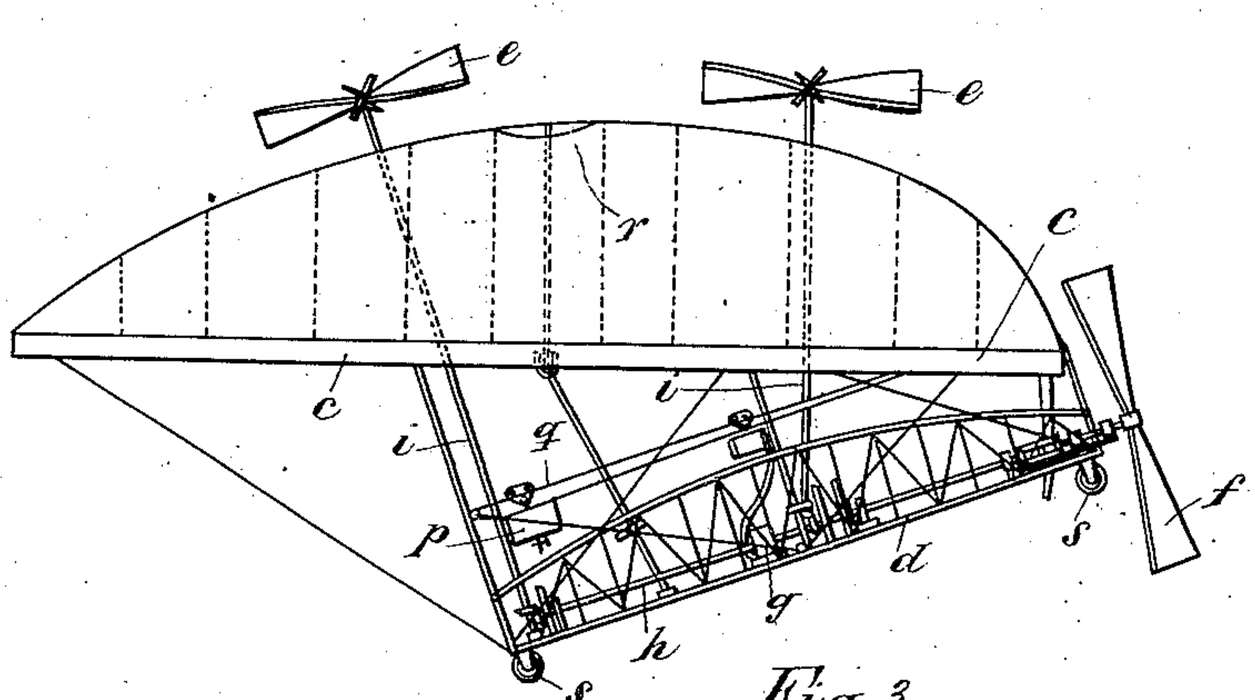


Fig. 3.

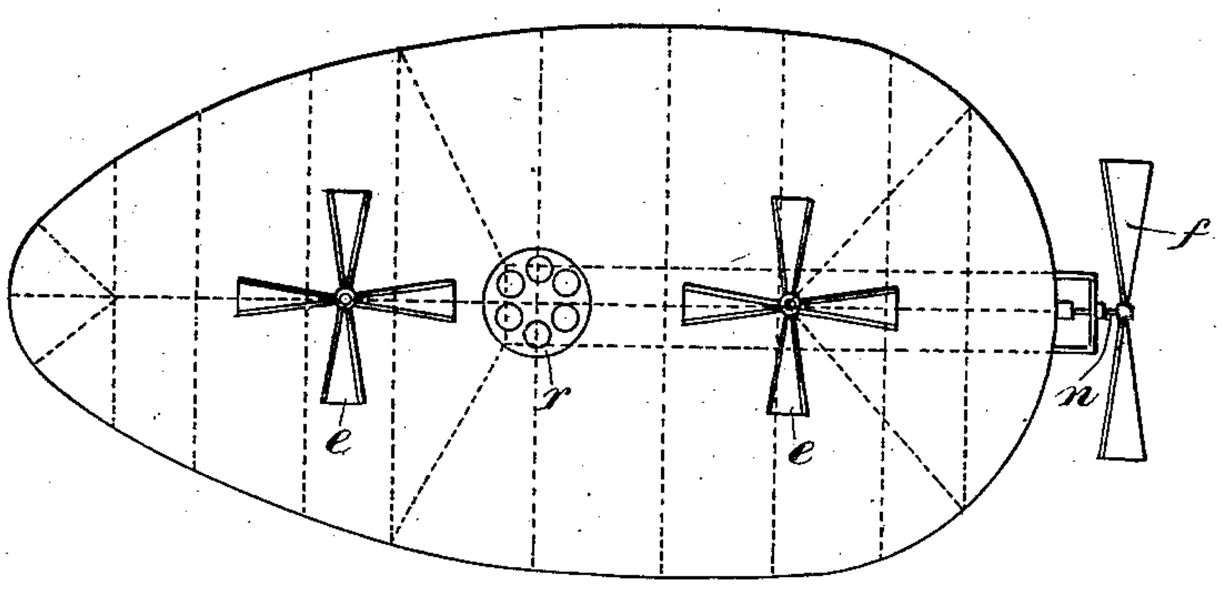


Fig. 7.

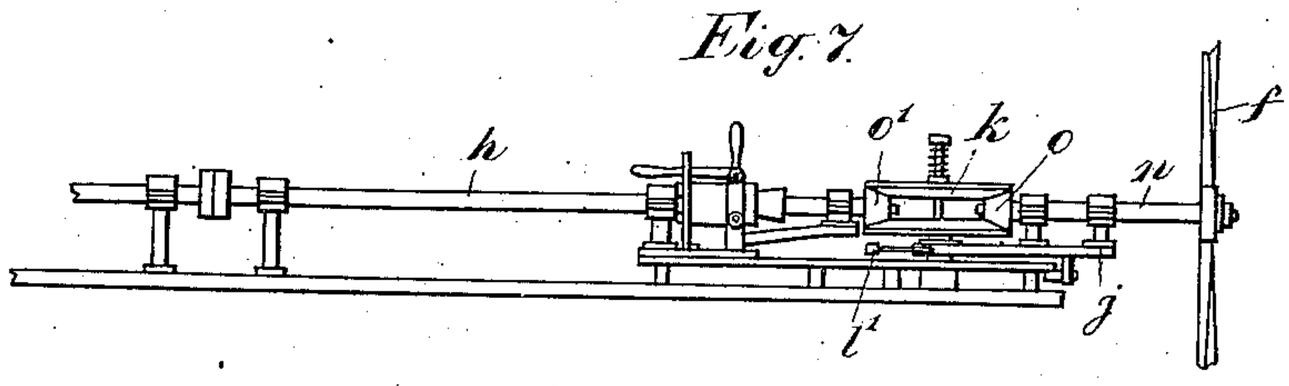
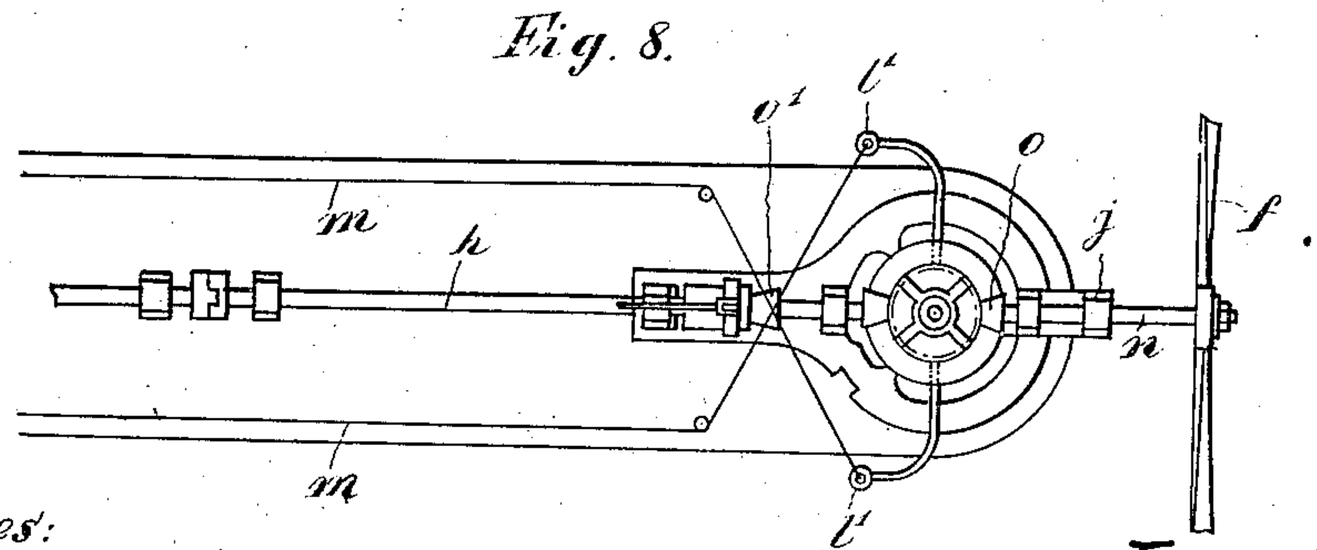


Fig. 8.



Witnesses:

F. W. Wiman

William J. Leith

Inventor:

Louis Auguste Bechl

by Henry Bennett

Attorney

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2 SHEETS—SHEET 2.

Fig. 4

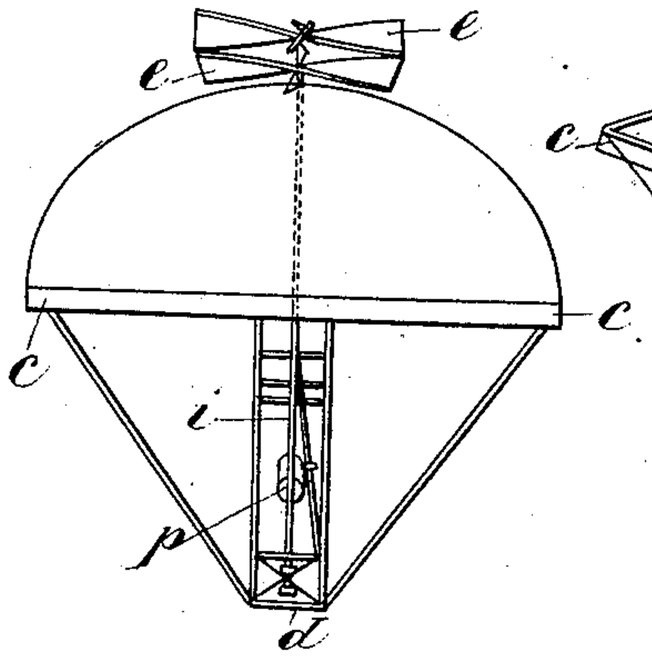


Fig. 6.

Fig. 2.

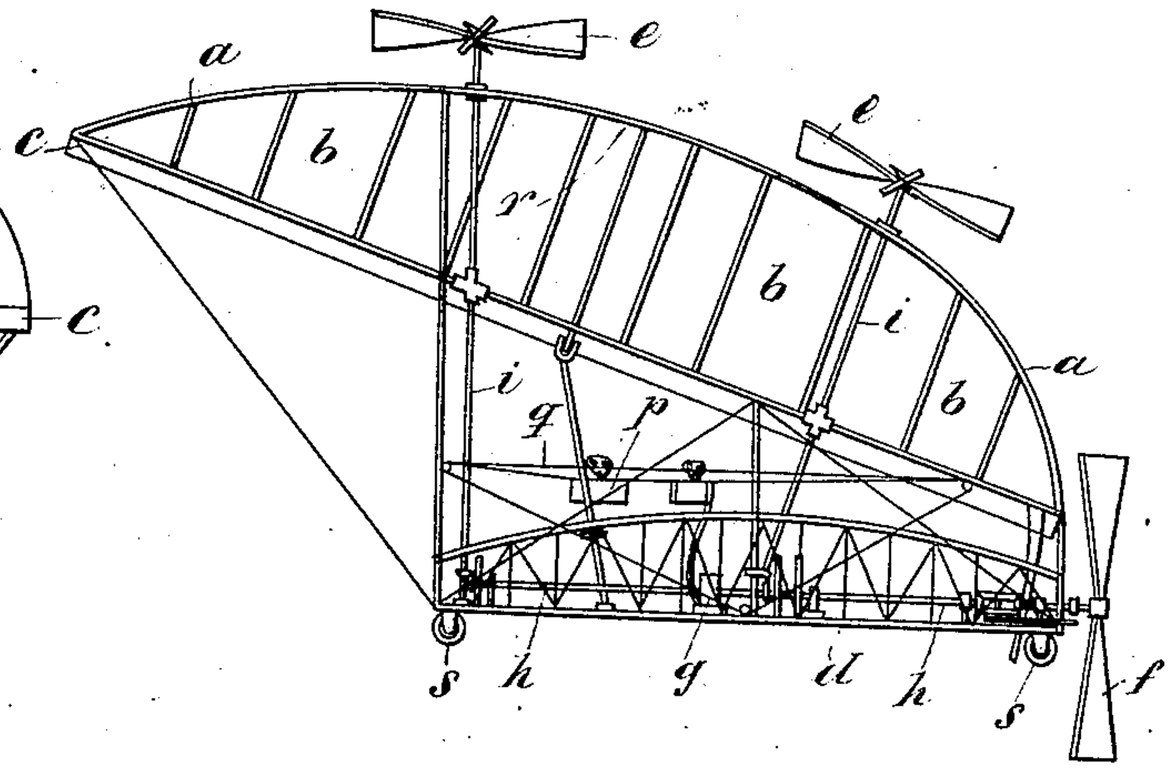
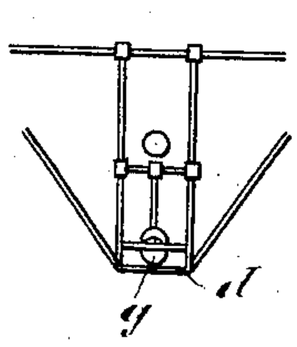


Fig. 5.



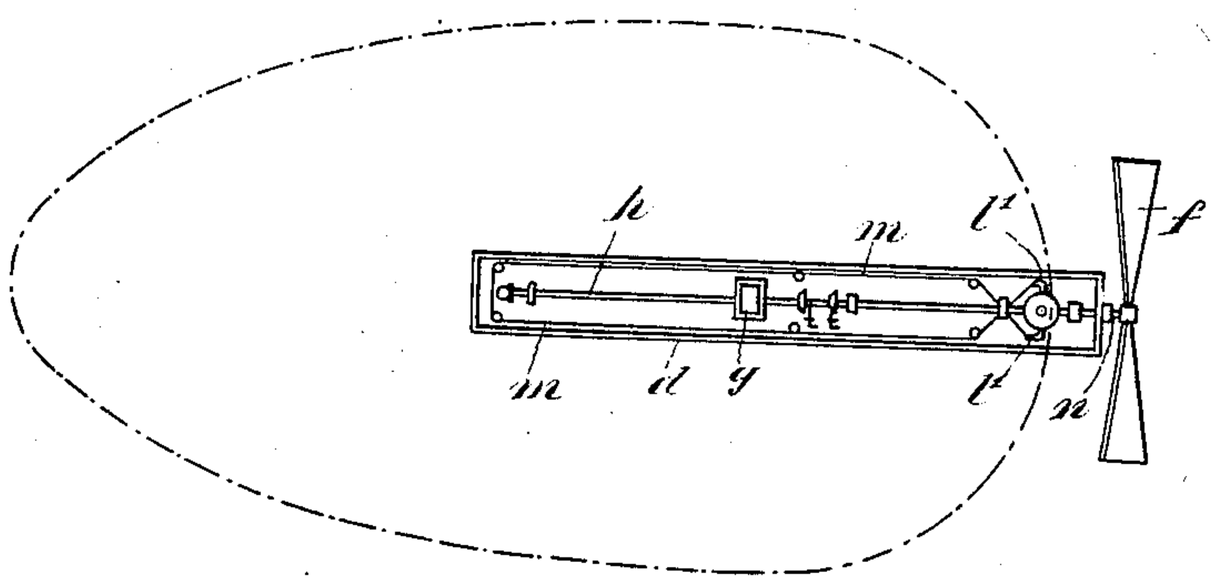


Fig. 9.

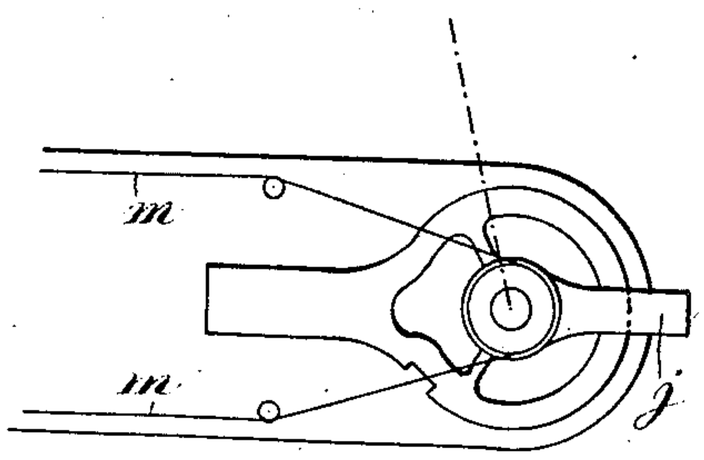
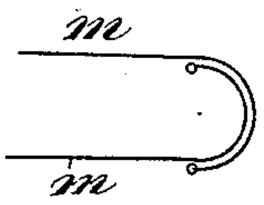


Fig. 10.



Witnesses:

F. H. Kiman

William J. Stitt

Inventor:

Louis Auguste Becht

by Henry Connett

Attorney

UNITED STATES PATENT OFFICE.

LOUIS AUGUSTE BECHT, OF PARIS, FRANCE.

AEROPLANE AIR-SHIP.

No. 914,782. Specification of Letters Patent. Patented March 9, 1909.

Application filed May 8, 1905. Serial No. 259,484.

To all whom it may concern:

Be it known that I, LOUIS AUGUSTE BECHT, a citizen of France, residing at Paris, Department of the Seine, France, have invented a new and useful Aeroplane Air-Ship, of which the following is a specification.

My invention relates to an improved aeroplane air-ship of variable equilibrium, which is slightly heavier than the air and which combines the features of a parachute with those of a kite.

My objects are to provide a rigid frame carrying small gas bags within separate compartments and an immovable car beneath so as to minimize the danger of a collapse and also to prevent the car from interfering with the stability of the air-ship. I attain these objects by the construction and mechanism illustrated in the accompanying drawing, in which:

Figure 1 is a side-elevation of the air-ship as seen when descending; Fig. 2, a longitudinal section of the same but disposed for ascending; Fig. 3, a plan and Fig. 4, an end-view thereof; Fig. 5, is a plan and Fig. 6, a cross-section of the car; Figs. 7 and 8, show constructional details of the propeller-mechanism and steering-gear; Figs. 9 and 10, show slightly modified gear to that of the previous two figures. The principal figures—1, 2, 3 and 4—are somewhat diagrammatic.

Similar letters refer to similar parts throughout the several views.

The superstructure or aeroplane-parachute feature comprises a frame *a* of semi-ellipsoidal form, although any oblong form having a convex upper surface and lower plane surface may be employed. The interior of the frame is divided into compartments to contain gas-bags *b* (Fig. 2) of suitable forms and capacities to fit the respective compartments in the frame. Each bag *b* may have an inlet and outlet nozzle for the gas; and these, as well as the bags, may be of a known kind and will not require specific illustration. To make the frame tight and inclose the gas-bags, the upper convex surface and the under flat surface of the frame *a* are covered with sail-cloth or canvas. This feature will not require specific illustration. About the lower edge is a pendent border *c* of suitable width, to facilitate ingress of the air beneath the parachute. Above the engines the aeroplane is fitted with metal plates.

The car or bridge *d* is rigidly secured beneath the aeroplane by stays and posts connected with the main frame *a* so as to participate in every movement of the latter. Its form is that of a girder whose uprights are made sufficiently strong to support the parts above when the air-ship is resting on the ground.

Generally three propellers are employed, viz: two upright propellers *e e* and a horizontal propeller *f*, the latter serving to impart horizontal motion and to steer. These propellers may be driven by one and the same motor *g* and in such case the main shaft *h* extends along the entire length of the car *d*, while two upright shafts *i i* are driven from it by means of bevel wheels or friction cones and they are fitted with universal joints. However, the said shafts *i* may also be driven by independent motors, and their upper ends project through the main frame. The rear propeller *f*, forming also steering means, is controlled by a special movement which permits of the horizontal displacement of the propeller through an angle of greater amplitude than an ordinary universal joint. Thus, the propeller is always in a proper working position and does not give rise to torsional stresses as would be the case when a Cardan or universal joint is employed. The supporting bracket *j*, of the propeller *f*, is mounted on a fixed central pivot *k* and is caused to turn around such pivot through the intervention of a tiller or handle-bar l^1 to which is attached a rope, chain or like controlling means. The propeller shaft *n* may be fitted with a bevel pinion in gear with an intermediary bevel wheel mounted loose on the central pivot *k* and said bevel wheel is driven by a pinion fast on the main shaft *h*. Thus, the supporting bracket of the propeller is capable of moving in any horizontal direction without disengaging from the gear wheels or the said central pivot and without giving rise to torsional stresses.

If the pinion *o* be a friction wheel it is preferred to provide two central bevel wheels loose on the pivot *k* and pressed by springs against the said pinion as shown at Fig. 7. Further, the main shaft carries a beveled friction pinion o^1 in engagement with the said central bevel wheels under the pressure of their springs and so imparts motion to the propeller.

The propeller *f*, operating in the aforesaid manner, serves as steering gear and replaces the rudder. However, if desired, several propellers may be provided in suitable posi-

tions to impart forward movement, while others are used for the ascensional movement, and each propeller may be fitted with separate starting gear or be driven by a separate motor so as to operate either together or independently of each other.

The ballast is carried in a tank *p* and may be either of a liquid or a solid nature providing it can be made to run out easily. The tank is suspended from a cable *q* above the car in such a manner as to be capable of traveling from one end to the other thereof.

The displacement of the ballast together with the change of position of the conductor, effect a change in the center of gravity, and in this manner it will be easy to cause the air-ship to assume a more or less inclined position for the purpose of utilizing a head wind to carry the same. Under these conditions the ascensional propellers can be left idle, and the full motive force can be transmitted to the propeller *f*.

The tank *p* is fitted with a cock to control the discharge so as to compensate for the condensation or loss of gas, and to render the air-ship heavier than the air and vary its equilibrium, while, when necessary, it can also be rendered lighter.

Extending up through the aeroplane between the gas-bags is a flue-like passage controlled at its upper end by a register *r*. This register, when opened, or partly opened, permits air to pass up through the passage when the device descends, thus enabling the rapidity of the descent of the apparatus to be controlled. Obviously the interior walls of the passage may be, if desired, provided with some form of steps to enable a person to climb up to the register *r*. In case of the air-ship falling into the water it will float by reason of the buoyancy of the superstructure which contains the gas-bags, and the conductor or aeronaut may climp up through the air-passage and register *r* to the top.

The plane portion at the underside of the superstructure forms an aeroplane above the car. By shifting the ballast tank in accordance with the wind, perfect buoyancy in the air is insured and all the propellers may be stopped when traveling with the air current, while the speed can also be regulated by the degree of inclination given to the aeroplane.

By reason of the air ship being but little heavier than the air, it will be easy for the propellers to raise the ship, while the large surface of the latter obviates a dangerous fall in case of a sudden stoppage of the ascensional propellers or the motor. Moreover, the weight is completely distributed over the parachute. As an example and for the sake of further information, it is here supposed to have a frame capable of holding 300 cubic meters of gas and carrying 30 kilg. ballast so that each propeller has to lift 15 kilg. In this case the complete apparatus including the motor and mechanism as well as the conductor, weighs about 300 kilg. The surface serving as a parachute is about 100 square meters, therefore, taking all gas bags as being torn, the weight on the column of air will be only 3 kilg. per square meter under the most perverse circumstances of a fall. If the gas bags be intact, the surface of 100 square meters of the parachute will have only to support a weight of about 30 kilg. on the column of air or about 300 grams per square meter.

The operations are as follows: First the vertical propellers *e e* are started to lift the air-ship a few meters. Then the ballast is shifted so as to change the center of gravity thereby obtaining any desired inclination, and by starting the rear propeller *f*, forward motion is imparted while at the same time rising further. If the ascensional travel be too fast, a slower up-motion may be insured by regulating the inclination of the ship. For traveling with the air current two methods may be employed. The first way consists in presenting a proper inclination of the aeroplane to the wind which then carries the air-ship along without any assistance from the ascensional propellers. The second way consists in working the ascensional propellers and use the force of the wind as the driving means, and when greater speed is required, assist the latter by operating the propeller *f*. For traveling against the wind an inclination is given to the air-ship to render it buoyant. The ascensional propellers are then stopped and the full motive power is utilized to drive the rear propeller. The aeroplane should in this case be inclined after the manner of a flat kite whereby the string of the latter is represented by the rear propeller which forces it againt the wind and with a proper inclination keeps it at the same elevation. By adopting a greater inclination, the air-ship travels forward and upward. The rear propeller *f* serves also for steering by being moved in a lateral plane and this without impairing its onward drive and without producing any tangible resistance which resistance is an objection in ordinary rudders. In this manner the motive power is entirely utilized for the onward travel while the opposing air current provides for the buoyancy of the ship, thus saving the motive power required for driving the ascensional propellers. The car or bridge rigidly secured to the main frame, serves as a keel and the machinery and other parts serve as ship's ballast to insure its stability. For descending, the ascensional propellers are stopped and, if necessary, the shutters of the funnel are opened. Upon touching the ground, small wheels *s* allow the air-ship to be run along, but where the condition of the ground is unfavorable, it requires only the ejection of a little ballast to cause the air ship to rise suf-

ficiently to permit of its being taken along by means of a guide rope like a balloon. Again, if the aeroplane becomes lighter than the air it will be easy to revert to the normal conditions by re-arranging the ballast.

The various operations can be carried out without any necessity of liberating the gas.

In order to increase the ascensional force of the air-ship I may superpose several frames, with gas bags, all well connected together and I may also attach air-balloons thereto, if desired.

As the main frame and the car are firmly connected together and forms a rigid structure, it will not be affected by any deformation of deflation of the gas-bags by the condensation of the gas. This is a distinguishing feature and a great advantage over ordinary balloons with suspended cars in which accidents often occur by reason of the deflation of the balloon and the swaying against it of the suspended car.

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

1. In an air-ship, an aeroplane-superstructure having a frame and provided with gas-bags, a bridge connected rigidly with said superstructure, a driving and steering propeller, ascensional propellers having shafts which extend up through the superstructure, and a motor and intermediate mechanism for operating said propellers, said superstructure having its flat under surface in a plane inclined to that of the bridge.

2. In an air-ship, an aeroplane-superstructure provided with gas-bags and having a strong, light frame, a bridge fixed rigidly to said frame, and the under surface of the superstructure and said bridge being in planes inclined to each other, propellers for driving and steering the ship, a motor and intermediate mechanism for operating the propellers, and a shiftable weight for varying the equilibrium of the ship.

3. In an air-ship, an aeroplane-superstructure containing gas-bags and having extending up through it a flue-like passage provided with a register r at its upper end, a bridge connected rigidly with the frame of said superstructure, and mechanism for propelling and navigating said ship.

In witness whereof I have hereunto signed my name this 25th day of April, 1905, in the presence of two subscribing witnesses.

LOUIS AUGUSTE BECHT.

Witnesses:
JULES ARMENGAUD, Jeune,
HANSON C. COXE.