L. B. GOLDMAN.

AERIAL MACHINE.

APPLICATION FILED APR. 12, 1910.

1,009,736.

Patented Nov. 28, 1911.

4 SHEETS—SHEET 1.

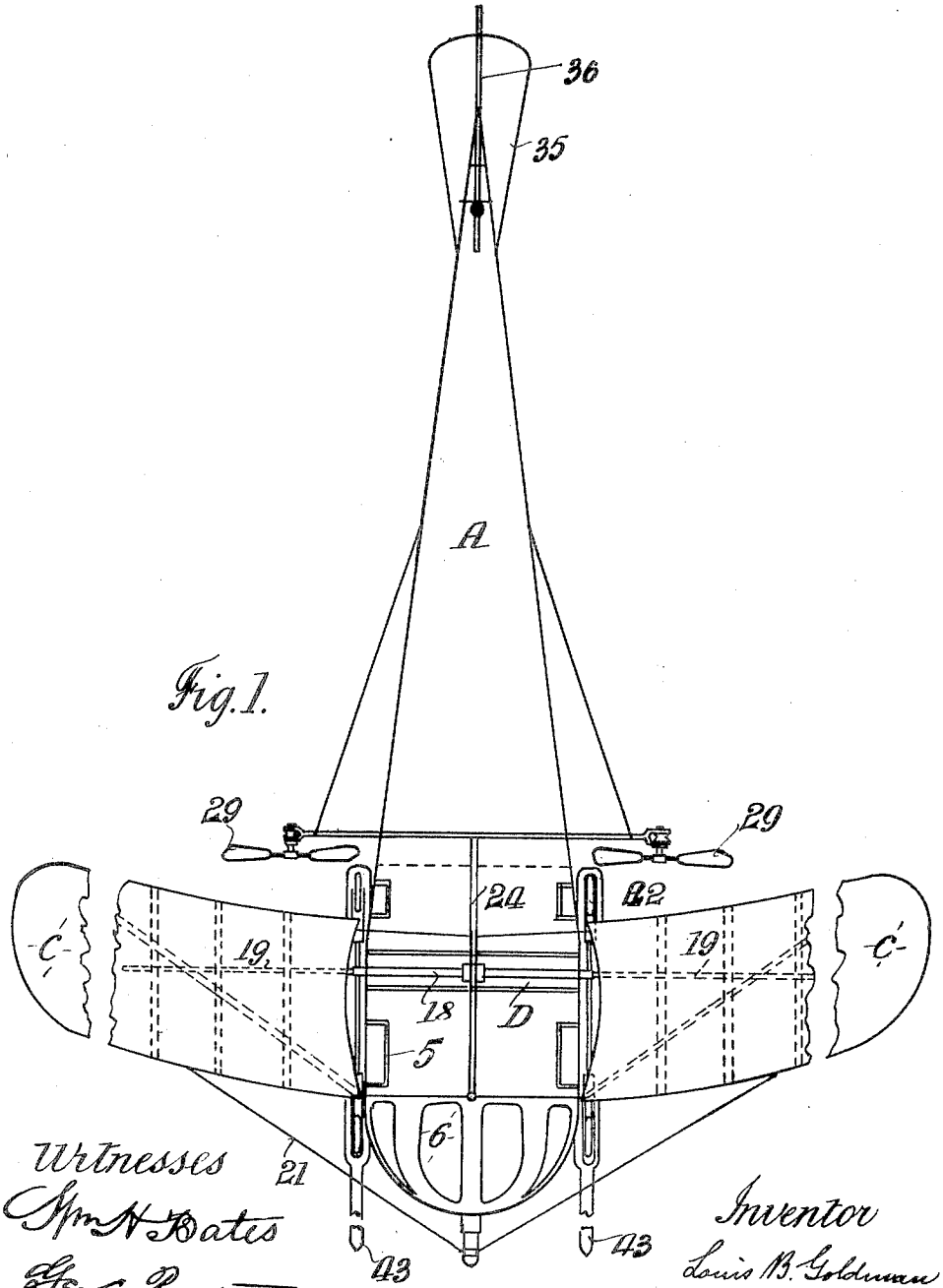


Fig. 1.

Witnesses
Wm. N. Bates
Geo. C. Poulton

Inventor
Louis B. Goldman
per Hubert W. Jenner
Attorney

L. B. GOLDMAN.

AERIAL MACHINE.

APPLICATION FILED APR. 12, 1910.

1,009,736.

Patented Nov. 28, 1911.

4 SHEETS—SHEET 2.

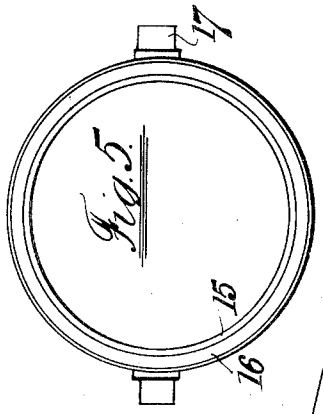


Fig. 5.

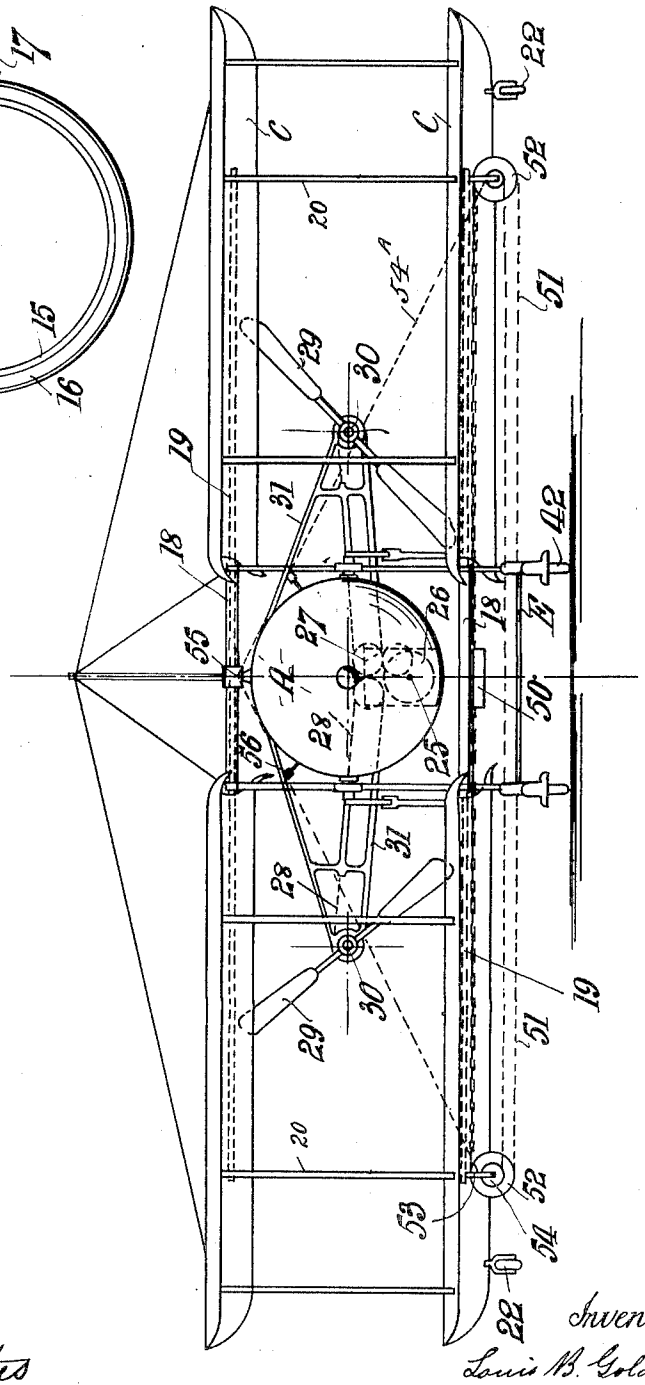


Fig. 2.

Witnesses

Wm. N. Bates

Geo. C. Breton

Inventor

Louis B. Goldman

per Herbert W. Jenner.

Attorney

L. B. GOLDMAN.

AERIAL MACHINE.

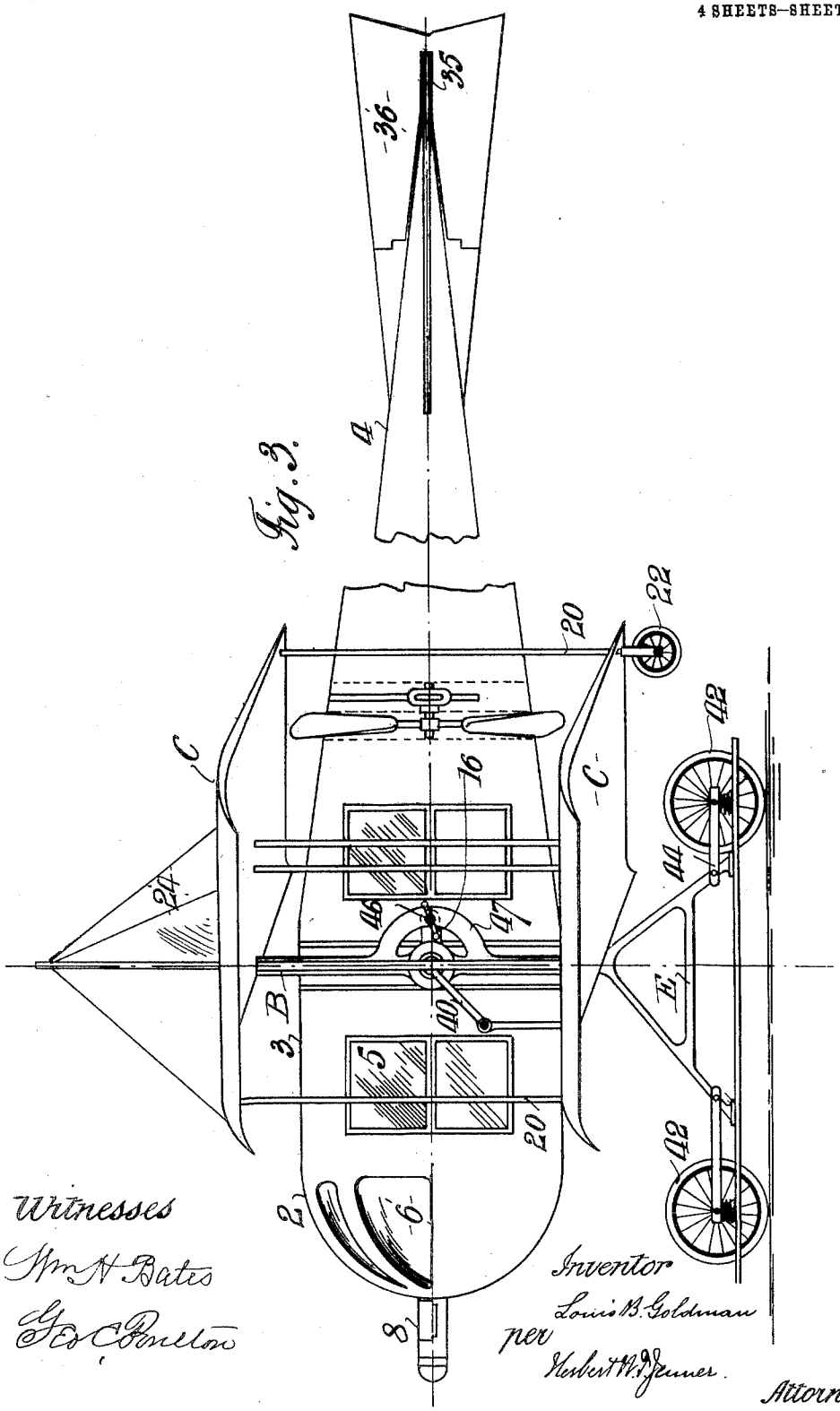
APPLICATION FILED APR. 12, 1910.

1,009,736.

Patented Nov. 28, 1911.

4 SHEETS—SHEET 3.

Fig. 3.



Witnesses

Wm. N. Bates

Geo. C. Bonelon

Inventor

Louis B. Goldman

per

Herbert W. Jenner.

Attorney

L. B. GOLDMAN.

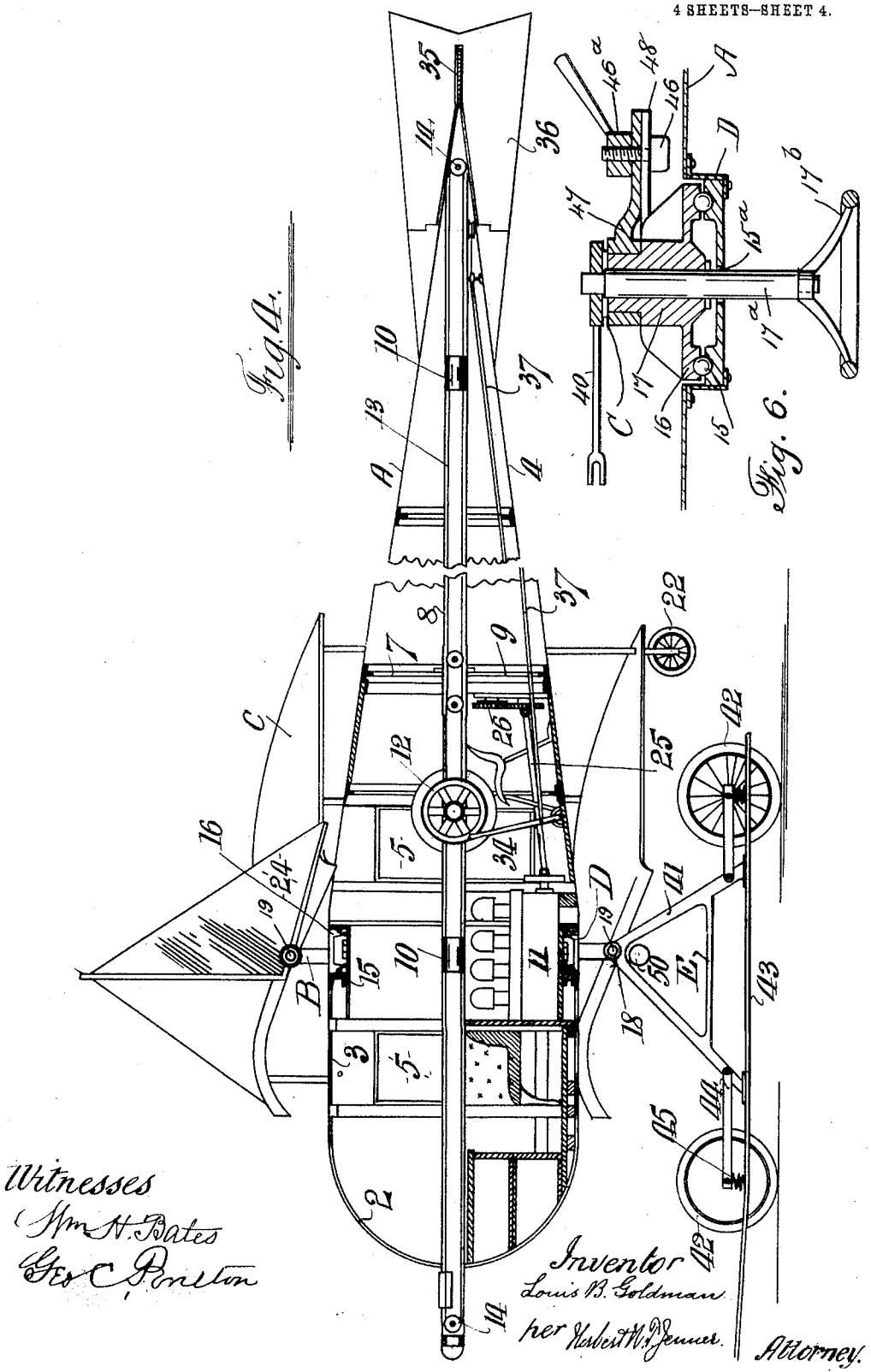
AERIAL MACHINE.

APPLICATION FILED APR. 12, 1910.

1,009,736.

Patented Nov. 28, 1911.

4 SHEETS—SHEET 4.



Witnesses

Wm. N. Bates

Geo. C. Boulton

Inventor

Louis B. Goldman

per Herbert W. Jenner.

Attorney.

UNITED STATES PATENT OFFICE.

LOUIS BEAUCLERC GOLDMAN, OF DOWNSLEIGH, HAYWARDS HEATH, ENGLAND.

AERIAL MACHINE.

1,009,736. Specification of Letters Patent. Patented Nov. 28, 1911.

Application filed April 12, 1910. Serial No. 555,052.

To all whom it may concern:

Be it known that I, LOUIS BEAUCLERC GOLDMAN, residing at Lucastes avenue, Downsleigh, Haywards Heath, Sussex, England, have invented certain new and useful Improvements in Aerial Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to an improved aeroplane or heavier than air machine for mechanical flight, and has for its principal object means for obtaining lateral balance during flight, but further comprises, *inter alia*, the construction of a body or chassis with but little air friction, that is rotatively free of the planes or decks and consequently tends to maintain a stable angle of inclination when turning and having automatic means external to such chassis for restoring such balance to the planes after or during a turning movement as well as means for the production of longitudinal balance.

It is carried out as follows, reference being made to the accompanying drawings, in which:

Figure 1 is a plane of a biplane constructed according to this invention. Fig. 2 is a front elevation of Fig. 1. Fig. 3 is an external side view. Fig. 4 is a section. Fig. 5 is a view of the ball race. Fig. 6 is a detail view of the elevation gear.

It will be understood that although the drawings show the invention as applied to a biplane construction, it is in no way limited to that form, as the invention can equally well be embodied in monoplanes or polyplanes.

Referring to the drawings, A is the body or chassis containing the engine and other weighty parts, B is a frame carrying the planes or decks C, and D is a ball race surrounding the chassis at the center of gravity, enabling the chassis to be rotatively free of the planes.

The chassis A consists of a hollow body formed of the combination of a hemisphere 2, a cylinder 3, and a hollow tapering cone 4. The hemisphere 2 with its convexity forward and outward is joined to one end of the cylinder 3 the other end of which is connected to the base of the cone 4. Thus, as shown, the chassis A is totally inclosed and forms a hollow shell. Doors 5 and windows 6 are provided on the chassis (see Fig. 3) and the shell is strengthened at convenient intervals with angle rings 7 upon which are secured the thin metal plates or other material forming the skin. Within the chassis is a tube 8 extending from the head 2 to the end of the cone or tail 4. The tube is suspended by means of spokes 9 to the rings 7 (see detached drawing of Fig. 4). Within the tube 8 are disposed weights 10 one on either side of the engine 11 which represents the approximate center of gravity. These weights are adjustable in a longitudinal direction by means of the hand wheels 12, cords 13, and pulleys 14. The body A as before mentioned is provided with a ball race D. The inner part 15 of the said ball race is attached to the chassis as shown, the outer part 16 is free to rotate around part 15 and is provided with trunnion arms 17 (see Fig. 4), upon which the deck frame B is pivoted. It will thus be observed that the body A is supported by the trunnion arms 17 on the frame B and balanced longitudinally thereon. Balls to take thrust and friction are provided between the inner and outer parts of the ball race D. The frame B is preferably of rectangular shape and constructed from tubes. The upper and lower tubes 18 of the frame support the deck spars 19 to which the decks or frames C are secured. Through the frame B the planes are secured to the outer part 16 of the ball race D and are therefore free to rotate around the body A, such movement however is regulated as hereinafter described.

The decks may be of the usual pattern and camber but preferably of the type shown, and disposed in pairs one above the other, two on either side of the chassis A, the head of said chassis projecting beyond them. The decks are linked together through struts 20 and strengthened with tie rods 21. The rods 21 extend from the front end of the guide tube 8 to the decks or air planes, and are shown in Fig. 1. At the outer end of each lower deck a small alighting wheel 22 is provided. A vertical plane 24 is secured to the frame B at right angles to the deck planes and in a central position, this plane is of triangular form and presents a vertical edge to the front.

The engine 11 is cardan coupled to the driving gear which consists of a spur wheel train (see Figs. 2 and 4). The shaft 25 drives the spur wheel 26, which through an

intermediate wheel drives the countershaft wheels 27 intermeshing in opposite directions. The shafts on which the wheels 27 are mounted carry pitch chain sprocket wheels, which through a chain 28 drive the propellers 29 journaled in bearings 30 on brackets 31 attached to the chassis A. The usual stern rudder 36 is employed and operated from a lever 34 through the rod 37. The body A terminates in a fixed tail 35 mounted in a horizontal position across which the rudder 36 swings.

Vertical elevation is given to the machine by either hinging the horizontal tail (herein described as fixed) under hand control in the well known manner or by varying the elevation of the planes or decks C. For the latter purpose a rod 17[a] (see Fig. 6) passes from the interior of the chassis through the ball race D and through one of the trunnion arms 17 extending to the outside of the machine. This rod has a hand wheel 17[b] mounted thereon inside the chassis, and carries on the outside a cranked extension 40 attached to one of the deck members. By turning the hand wheel the decks are turned slightly on their axis 19 journaled in the tubes 18, thereby giving the desired vertical elevation to the machine. The interdeck struts 20 are hinged to allow such movement. The inner part 15 of the ball race is slotted in its length as shown at 15[a] (Fig. 6) so as to allow the rod 17[a] to pass through without impeding the lateral tilting of the planes.

The carriage E consists of preferably tubular members 41, attached to the lower part of the frame B and has alighting wheels 42 hinged to such members at back and front. The carriage also has runners 43 between which and the wheel forks 44 are springs 45 adapted to absorb shock.

In operation after filling the engine tanks the aviator takes his seat and adjusts the longitudinal balance of the machine by moving the weights 10 backward and forward thereby tilting the body A in the plane supporting frame B until he has obtained a desired level as compared with the planes. He can now lock himself in this balanced position by means of the quadrant 47 attached to the frame B and the locking plate 48 attached to the outer ball ring 16. The quadrant 47 is disposed adjacent to the trunnion 17 and has a slot concentric therewith in which slot a bolt 46, fixed in the locking plate, is adapted to move. A nut 46[a] on the bolt 46 locks the quadrant against the locking plate. He now starts the engine and adjusts the angle of the planes by means of the hand wheel 17[b] as hereinbefore described. Assuming the craft to be in flight the weight of the carriage and other parts tends to keep the planes substantially parallel with the horizontal axis of the chassis. In effecting a turning movement however or by a sudden gust of wind the planes C mounted upon the ball race D would tend to rotate around the chassis A. A sudden movement of this sort is checked by the vertical plane 24, but a further automatic means is provided to gradually restore the lateral balance, consisting of a wing weight 50 (see Figs. 2 and 4) disposed on an endless chain 51. This chain passes over sprocket wheels 52 mounted on ball bearings on shafts in forks 53, attached, one on each side of the machine, to the end of the plane spars or rods 19. On the said sprocket wheel shafts are also mounted smaller sprocket wheels 54, the ratio between sprockets 52 and 54 being as 3 to 1. A second chain 54[a] passes over the wheels 54 and friction rollers 56 and is fixed to the chassis A at the point 55. Therefore if any lateral movement is given to the planes and to the frame to which they are attached the sprocket wheels 54 are automatically rotated against the chain 54[a] which engages them, as said chain is fixed to the body A, which on account of its own weight remains stationary in a vertical sense relative to the planes attached by means of the frame to the outer part of the ball race D. The consequent revolution of the sprockets 52 fast with sprockets 54 gives motion to the endless chain 51 and moves the wing weight 50 attached to it, upward and outward toward the rising plane tips until the counter action caused by the weight 50 and the weight of the carriage E overcomes the tilting tendency and enforces the rapid return movement which restores the planes to their respective normal positions.

As regards the body A, it may be made water-tight and as an entirely closed vessel, when it is provided with necessary port holes, windows, and doors. On the other hand part of it may be open or of skeleton formation; the point desired is that a hemispherical head should precede a diminishing elongated sectionally circular tail, it being common knowledge that a vessel of such a shape offers the minimum of resistance when wholly immersed in a supporting fluid such as air or water.

I claim:—

1. The combination, with a frame, and air planes secured thereto; of a bearing ring provided with trunnions at its sides which are mounted in the said frame, a tubular body portion having a ring secured around its middle part, said ring being revoluble in the said bearing ring, brackets projecting on opposite sides of the said body portion, propellers journaled in the said brackets, a motor arranged inside the said body portion, and driving devices connecting the motor with the said propellers.

2. The combination, with a frame, and air planes secured thereto; of a bearing ring

provided with trunnions at its sides which are mounted in the said frame, a tubular body portion having a ring secured around its middle part, said ring being revoluble in the said bearing ring, an endless conveyer provided with guide sheaves and supported by the said frame and arranged under the trunnions of the body portion and crosswise of the body portion, a balance weight attached to the said conveyer, and connecting devices between the said conveyer and body portion whereby the weight is moved crosswise of the body portion when the air planes are tilted.

In testimony whereof I affix my signature, in presence of two witnesses.

LOUIS BEAUCLERC GOLDMAN.

Witnesses:

ISABELLA DEAN,

GEORGE ERIC STEVENS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."