No. 897,000. PATENTED AUG. 25, 1908.

H. L. MALECOT.

DIRIGIBLE AIR SHIP.

APPLICATION FILED MAY 6, 1904.

3 SHEETS—SHEET 1.

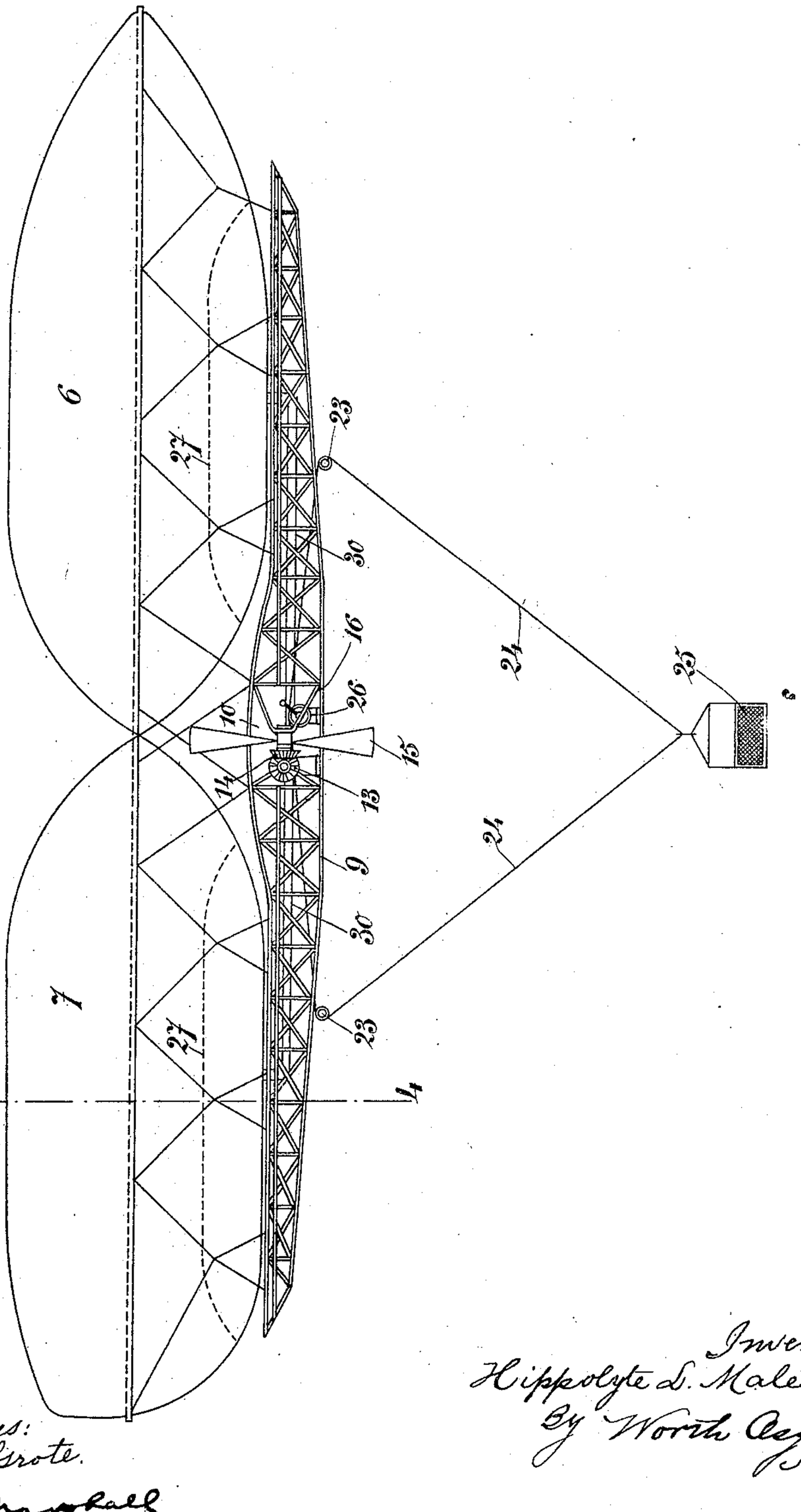

Fig. 1.

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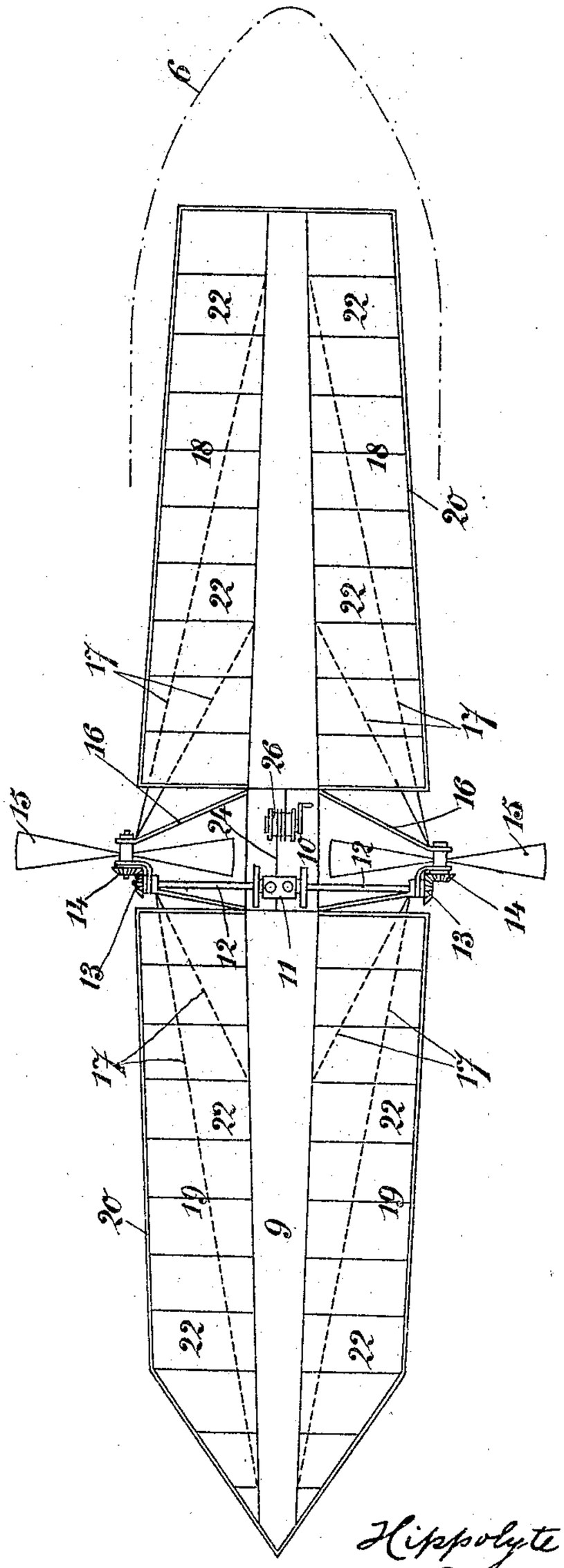
3 SHEETS—SHEET 2.

Fig. 2.



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3 SHEETS—SHEET 3.

Fig. 4.

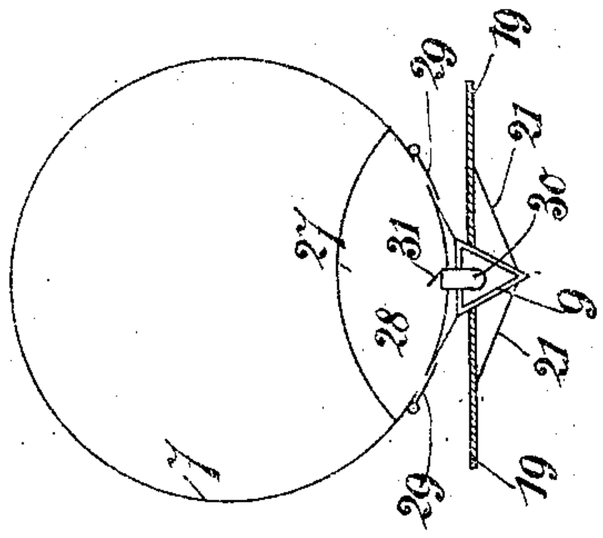


Fig. 5.

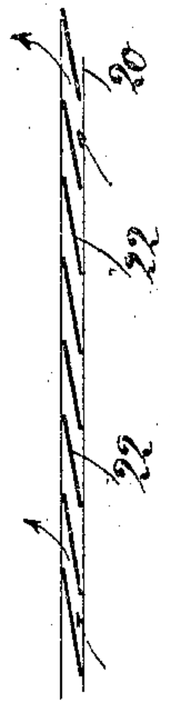
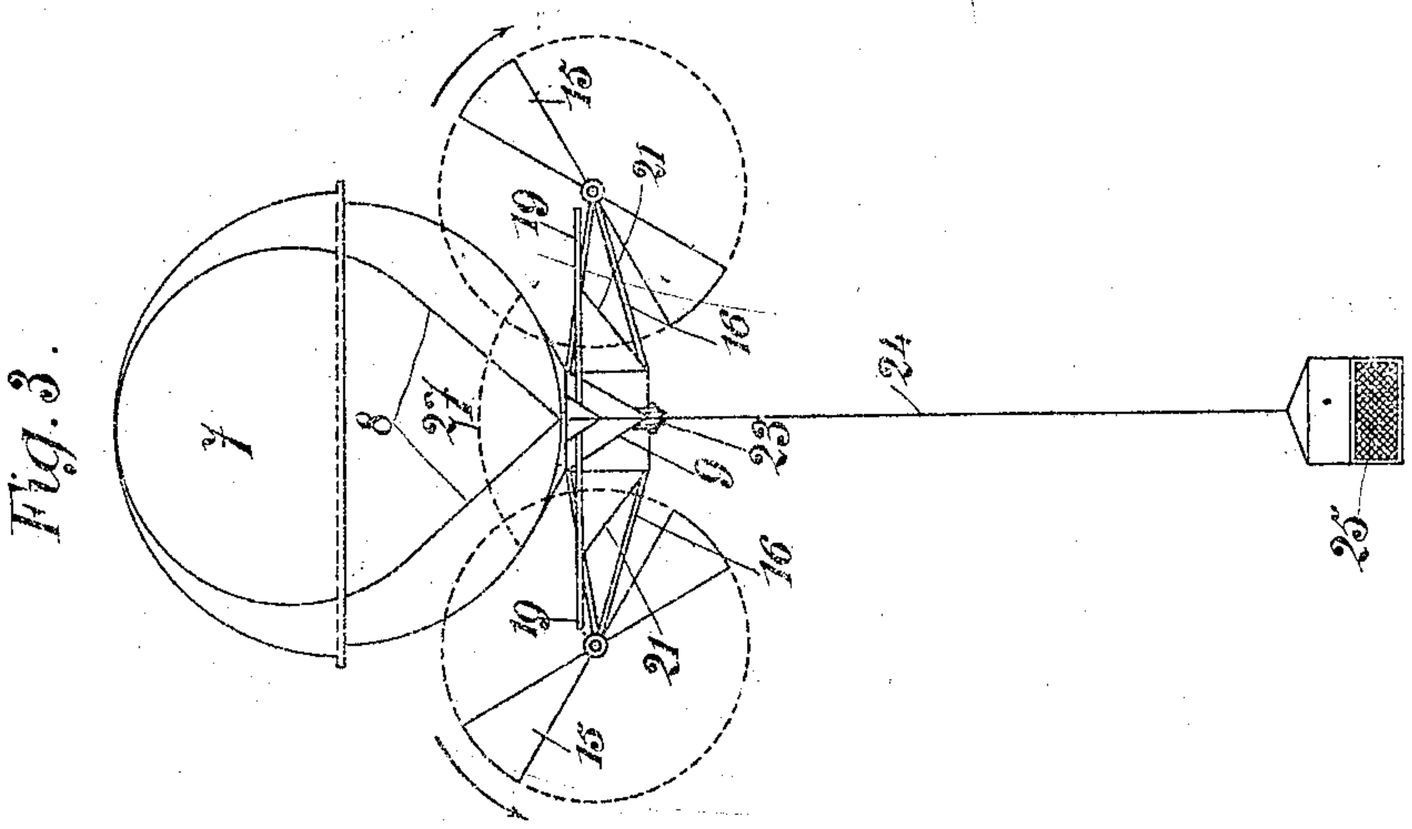


Fig. 3.



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UNITED STATES PATENT OFFICE.

HIPPOLYTE LOUIS MALÉCOT, OF PARIS, FRANCE.

DIRIGIBLE AIR-SHIP.

No. 897,000. Specification of Letters Patent. Patented Aug. 25, 1908.

Application filed May 6, 1904. Serial No. 206,608.

To all whom it may concern:

Be it known that I, HIPPOLYTE LOUIS MALÉCOT, a citizen of the Republic of France, and a resident of Paris, No. 65 Faubourg du Temple, in France, have invented certain new and useful Improvements in Dirigible Air-Ships, of which the following is a specification.

This invention relates to an improved dirigible air-ship built on the principle of the combination of the balloon and aeroplane and combining the principles of apparatus lighter than air with those of apparatus heavier than air.

The apparatus imitates very closely the flight of a bird, while having at the same time a certain analogy with a kite.

The combination of the balloon with the aeroplane approximately equilibrates the weight of the apparatus, so that the motor used for propulsion need not support the air ship in the air; the work done by the said motor is thus exclusively employed for displacing the air-ship.

One form of the invention is illustrated as an example in the annexed drawings in which Figure 1 is an elevation of the air ship; Fig. 2 a plan view thereof with the balloon removed; Fig. 3 a front view, Fig. 4 a cross section on the line 4—4 of Fig. 1 and Fig. 5 a partial longitudinal section of one of the wings.

The apparatus comprises a double balloon, the two parts 6 and 7 of which are placed end to end and have the same longitudinal axis. The rear balloon part F tapers towards its rear end and its lower rear part, which serves as a wind cutter, is shaped in cross-section approximately like the corresponding part or stern of a ship. In the same manner the lower front part tapers like the bow of a ship. The lines 8 in Fig. 3 indicate the shape in both cases. The central parts of both balloons are cylindrical.

From the balloon is suspended a trussed frame or keel 9 by which the rigidity of the air-ship is secured. The central part of the said frame is of rectangular section and contains what may be called a cabin or well 10 for the pilot or aeronaut and the motor man. From the central part to the ends the frame is of triangular section, the apex of the triangle pointing downwards, so that the under part of the frame forms for almost its entire length, a longitudinal edge (Figs. 3 and 4). At the rear, the frame terminates in a point. The triangular parts of the frame are covered with light material in order to be adapted to cut through the air. The well 10, contains a motor 11, preferably of the explosion type which is adapted to drive by means of variable speed gear, two transverse shafts 12 and 12, each of which has at its outer end a bevel gear wheel 13 meshing with a similar wheel 14. The axle of each wheel 14 carries a propeller 15 and is mounted in a light support or bearing 16 fixed to the frame 9 and having its outer end connected to the latter by means of stays 17 adapted to strengthen the structure. The propellers are arranged below that point at which the tapering ends of the balloons 6 and 7 meet, so that the latter do not interfere with the rotation of the propellers.

At the sides of the frame 9 wings 18, 18, and 19, 19 are fixed in such a manner that a space between the two wings 18 and 19 on each side is left for the respective propellers 15. The wings 18 terminate at the rear in a point, like the frame 9 (Fig. 2). The wings consist of light frames 20 fixed to the frame 9 and connected to the latter at intervals by means of stays 21 (Figs. 3 and 4) in order to insure rigidity. Between the frames 20 and the frame 9 bands 22 of light material such as silk are stretched in slightly inclined planes (Fig. 5) in such a manner that they overlap each other but have a certain amount of space between them.

Below the frame 9 and at equal distances from the center thereof are mounted two grooved pulleys 23 23 over which passes a rope 24 supporting a car or the like 25 adapted to contain ballast, baggage or passengers. The rope 24 is connected to a winch-drum 26 arranged in the well 10. Across each balloon 6 and 7 is stretched a gas tight diaphragm 27 so that in the lower part of the balloon there is produced a separate chamber 28, which is adapted to communicate with the outer atmosphere by means of valves 29. Tubes 30 provided with valves 31 lead from the lower parts of the chambers 28 to an air-pump or fan operated by the motor 11.

The lifting power of the balloons 6 and 7 is adapted to lift the aeroplane, comprising the frame 9, the wings 18 and 19, the propellers 15 and accessories such as the motor, winch and the like, but is insufficient to lift the car 25 and its contents, a suitable predetermined margin or over-weight being calculated in advance. When the air ship starts the apparatus lighter than air ascends and

finds its natural point of equilibrium a certain distance above the ground, only the car 25 remaining in contact with the latter. The aeronaut then operates the winch 26 in such a manner as to pay out rope towards the front of the air-ship, whereupon the rear part of the latter is pulled downwards by the weight of the car and the air ship assumes an inclined position. The motor is then caused to revolve the propellers 15 and the reaction of the air driven by the latter against the wings 18 and 19 causes the air-ship to ascend in an inclined direction with the car 25. When the aeronaut desires to discontinue the ascent he pays out rope towards the rear by means of the winch 26 until the air-ship assumes a horizontal position and travels in a horizontal direction. The descent is effected by reversing the conditions which produce the ascent, that is to say by paying out cable to the rear. The car insures the equilibrium, stability and fixity of the center of gravity which are the essential conditions for aerial navigation.

For turning the ship, the propeller mechanism is so operated that one propeller revolves with greater speed than the other, or that only one propeller is revolved or that the propellers revolve in opposite directions if it is desired to turn the ship more rapidly.

When the gas in the balloon expands the air in the chambers 28 is compressed and escapes through the valves 29. When on the other hand the said gas becomes condensed the pressure in the chambers 28 is reduced and the valves 31 open and allow air to be driven into the said chambers by the fan referred to. The shape of the balloons thus remains unchanged and their lifting power constant. Safety-valves are, however, provided in the upper parts of the balloons for use in case of excessive expansion of the gas. It must be mentioned that this arrangement is indispensable to the air-ship since the difference between the lifting power of the balloons and the total weight of the apparatus must remain constant, the power of the motor being limited and serving only for the propulsion of the ship. It is obvious that if this difference were to increase substantially in such a manner as to establish too great a preponderance of weight, the apparatus would not work.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed I declare that what I claim is:

In a flying machine, the combination with a balloon, of a longitudinal beam arranged under said balloon and connected with the same by means of cables, plates arranged longitudinally on each side of said beam and composed of light material to form an aeroplane, two propellers arranged one on each side of the balloon, a winch located under said balloon, a cable wound upon said winch and passing over two pulleys arranged under said beam and at equal distances from the center of its length, a ballast car mounted and movable upon said cable, and means for actuating the said propellers, the whole arranged substantially as described and for the object specified.

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

HIPPOLYTE LOUIS MALÉCOT.

Witnesses:

PAUL BACARD,

PAUL F. PAQUET.