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AIRSHIP.

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1,033,186.

Patented July 23, 1912.

3 SHEETS—SHEET 1.

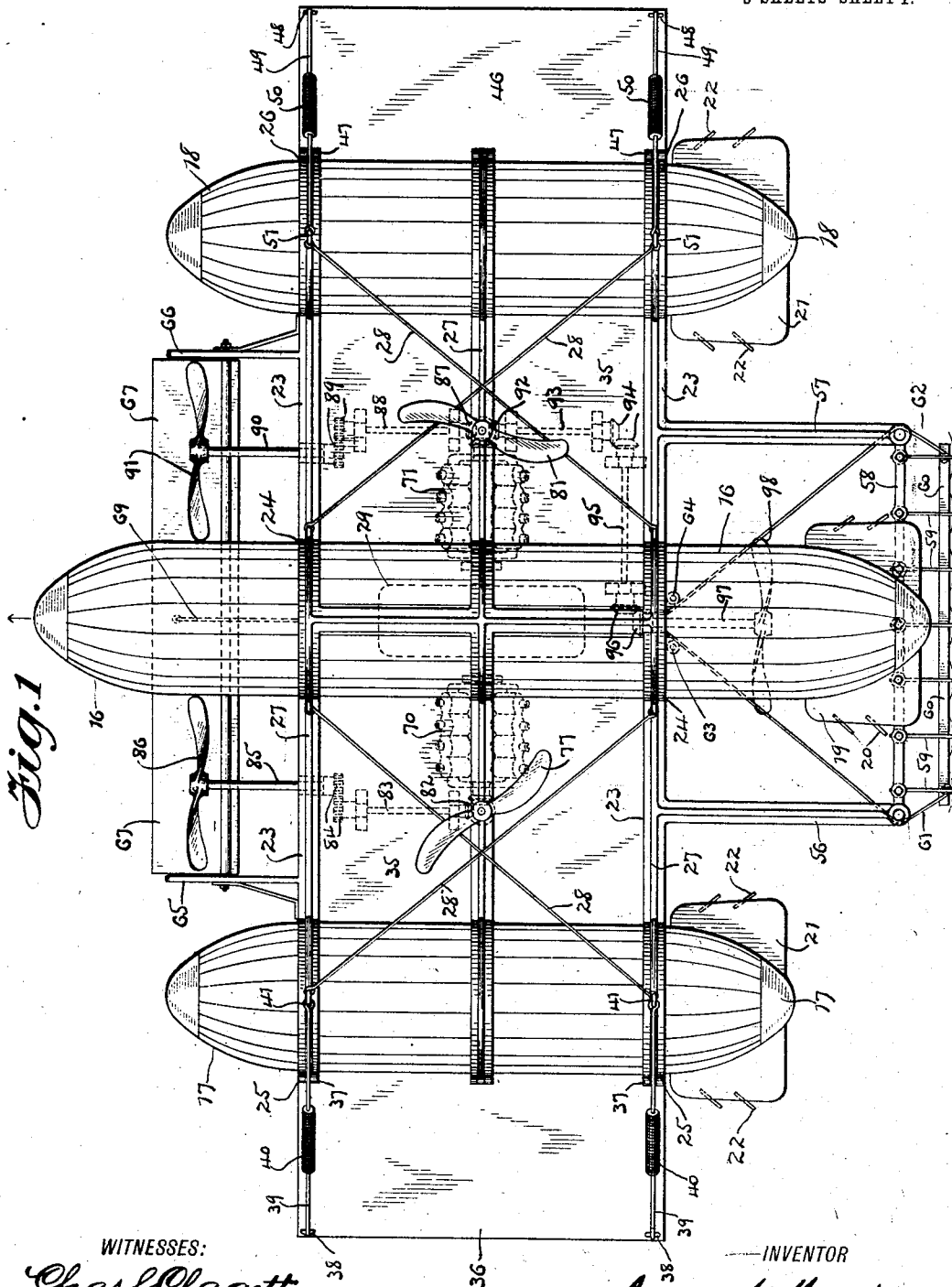


Fig. 1

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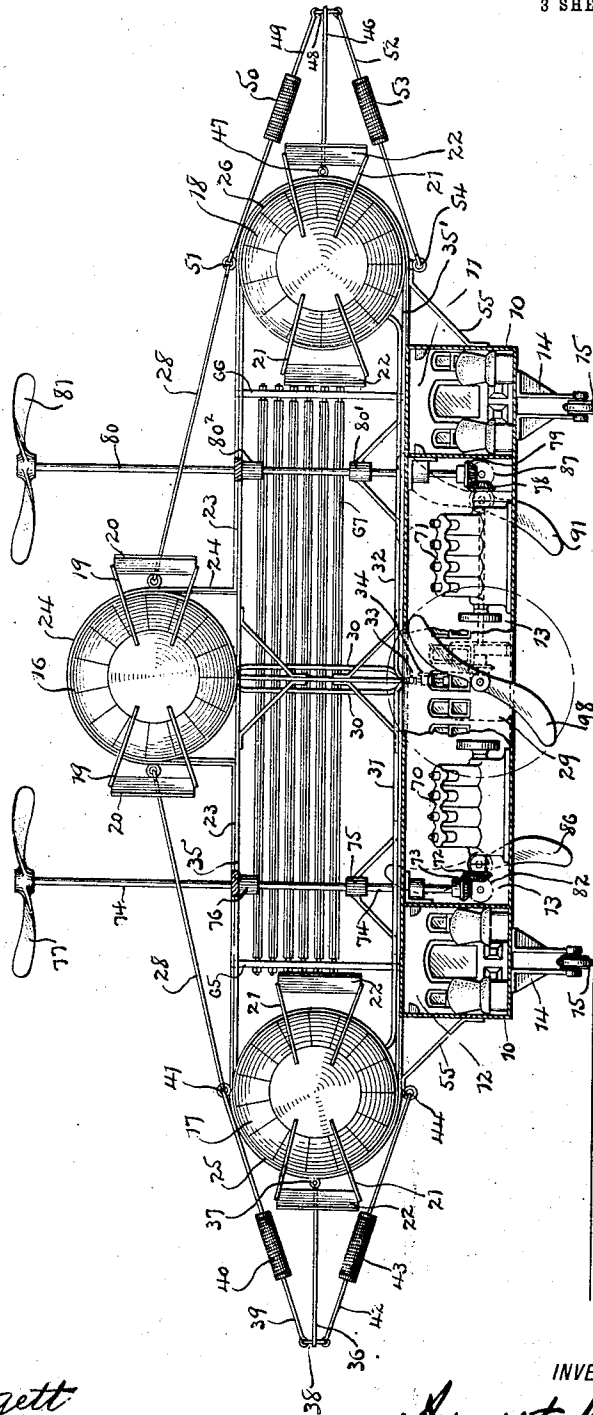
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3 SHEETS—SHEET 2.

Fig. 2



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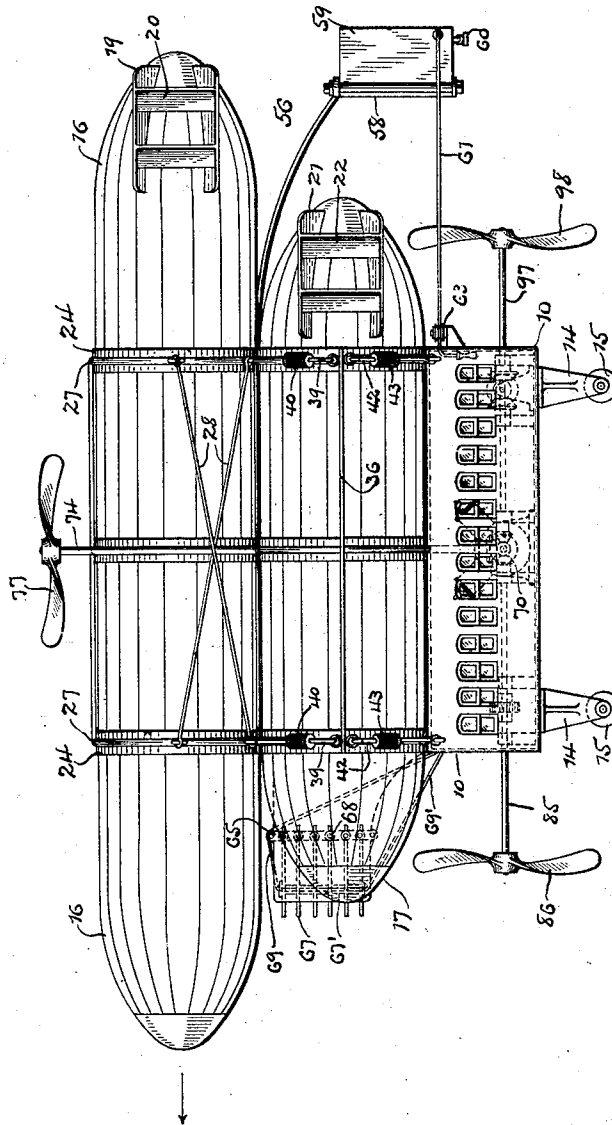
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3 SHEETS-SHEET 3.

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Fig. 3



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# UNITED STATES PATENT OFFICE.

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## AIRSHIP.

1,033,186.

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*To all whom it may concern:*

Be it known that I, AUGUST MERCKENS, a citizen of the United States, residing in the borough of Brooklyn, county of Kings, city and State of New York, have invented an Improvement in Airships, of which the following is a specification.

My invention relates to airships and particularly to that class of airships in which are employed a combination of heavier than air and lighter than air structures.

In carrying out my invention I employ a car, a plurality of balloons or gas containers, a framework, a plurality of planes, some of which are fixed relatively to the frame and some of which are movable therein, the said framework securing together the car, the balloons or gas containers and the said planes, and I also provide means for lifting and propelling the airship in flight.

The car of the airship made in accordance with my invention is preferably arranged to carry both passengers and freight, and to contain an engine-room, and the car is also mounted upon trucks upon which the entire airship structure rests when upon the ground.

The balloons or gas containers which I prefer to employ in my improved airship are of the Zeppelin type and each is made with a plurality of separate compartments, all of which can be independently supplied with gas from the source of supply in the engine-room in the car, from which place also the supply of gas to these separate compartments is also controlled.

I may also employ one or more main planes which preferably extend between the balloons or gas containers, or some of them; steering planes both vertical and horizontal, the former of course for guiding the airship in its course from one side to the other, and the latter for guiding the airship upwardly or downwardly; and I also employ side planes which are pivotally connected to the framework and yieldingly held in position so as to permit of a swinging movement in the event of encountering sudden and unexpected gusts of wind and like emergencies, to assist in maintaining the horizontal level of the airship.

I also employ one or more hydrocarbon engines, preferably the modern, eight cylinder engine, and a series of propellers driven by the said engine or engines, some of which propellers are lifting propellers

and others employed for driving the airship horizontally in its flight, all of which will be hereinafter more particularly described.

In the drawing, Figure 1 is a plan view of my improved airship. Fig. 2 is a rear elevation and front partial cross section of the same, the cross section being taken through a part of the car; and Fig. 3 is a side elevation of the airship.

Referring to the drawing, my improved airship comprises a car 10, which is made of any suitable material and preferably divided into several compartments, the compartments 11 and 12 running along the sides of the car and being fitted up as passenger compartments, while the central compartment 13 contains the engine-room and rooms for freight or merchandise to be transferred from one point to another. The car 10 is provided with trucks 14 in which wheels 15 are fixed and upon which latter the car and all the superstructure of the airship rest and may be moved when on the ground. I also employ a plurality of balloons or gas containers, and in the drawing I have illustrated three of these, the one indicated at 16 being relatively larger than the balloons indicated at 17 and 18. Each of these balloons is made up of a plurality of independent gas-bags or containers, placed within a common envelop, as is old in the art. The central portion of each of the balloons is preferably cylindrical and each balloon is pointed or tapering at both its ends. At the rear end of the balloon 16, the same is provided with a series of laterally projecting fins 19 and planes 20, extending between and connected with the said fins 19 to assist in lending stability of position to the said balloon. Similarly both balloons 17 and 18 at their rear ends are provided with laterally projecting fins 21 and intermediate planes 22.

23 designates a frame which may be of pressed steel or any other suitable material provided with bands 24 passing around the balloon 16, and bands 25, 26, passing relatively around the balloons 17 and 18, this framework being preferably formed with a central rib indicated at 27 to strengthen the same, the form of the frame being such that when the balloons 16, 17 and 18 are in position therein, the balloon 16 which is considerably larger than the balloons 17 and 18, is centrally disposed and placed above the balloons 17 and 18, so that while all the

balloons through their buoyancy produce a lifting effect, the greater portion of the work is done by the balloon 16, the balloons 17 and 18 acting also to steady the airship to maintain the car in as nearly a horizontal position as possible. The frame 23 is also preferably strengthened by the use of the guy rods 28.

In a suitable position in the engine-room or compartment 13, I employ a tank or receptacle 29 as a reservoir for gas under pressure. Extending from this tank 29 are pipes 30, each one of which leads to one of the separate compartments in the balloon 16. Also leading from the tank 29 are pipes 31, 32, each of which relatively leads to the separate compartments in the balloons 17 and 18. In each of the pipes 30, 31, and 32, is a cock 33 and connected to each pipe 30, 31, and 32, is a gage 34. By means of the gage 34, the pressure in each and every compartment of the balloons may be ascertained and by the cocks 33 the gas pressure in these compartments of the balloons may be regulated and controlled.

Connected to the frame 23 in any suitable manner, and extending between the balloons 17 and 18, I employ main planes 35 and 35'. These planes are respectively of the same area and in width as hereinbefore stated, extend between the balloons 17 and 18, and in length are approximately equal to the length of the cylindrical portion of the balloons 17 and 18. The upper main plane 35 is at or about a level with the top of the balloons 17 and 18 and the lower main plane 35' is at or about a level with the lower portion of the balloons 17 and 18, the upper main plane 35 extending beneath the balloon 16 and the lower main plane 35' extending over the top or roof of the car 10. It will be understood, however, that the relationship between the planes 35 and 35' and the balloons 16, 17 and 18, as hereinbefore described, may be varied to suit necessary requirements without departing from the nature and spirit of my invention.

36 represents an auxiliary plane, one end of which is pivotally connected, as indicated at 37, to the bands 25 which form a part of the frame 23 which passes around the balloon 17. The outer end of this auxiliary plane 36 at suitable points adjacent to its corners, is provided with eye-pieces 38, which extend both above and below the plane. Rods 39 in which there are springs 40, are connected at one end to those parts of the eye-pieces 38 above the plane 36, and at the opposite end to the eyes 41 which are secured in the bands 25. Rods 42 in which there are springs 43, are connected at one end to those parts of the eye-pieces 38 below the plane 36 and at the opposite end to the eyes 44 which are also secured to

the bands 25 below the balloons 17. Similarly on the opposite side of the airship, there is a plane 46 which is also rectangular and pivotally connected at one longitudinal edge, as indicated at 47, to the bands 26, forming part of the frame 23, which extend around the balloons 18. This auxiliary plane 46 is also provided adjacent to its outer corners with eye-pieces 48. Rods 49 in which there are springs 50 are connected at one end to those parts of the eye-pieces 48 above the plane 46 and at the opposite ends, in eyes 51 which are secured in the bands 26 above the balloon 18. There are also rods 52 in which are springs 53, the rods 52 being connected at one end to those parts of the eye-pieces 48 below the plane 46 and at the opposite ends in eyes 54 which are secured in the bands 26 below the balloon 18, it being understood that by this construction, the auxiliary planes 36 and 46 may swing on their pivotal points by the yielding of the springs 40, 43, or 50 and 53, and this movement of these planes is called into play when sudden gusts of wind are encountered or a rapid change in the course of flight is necessary, and assists in maintaining the car, and for that matter the entire ship, in a horizontal position, these planes 36 and 46 being yieldingly held in a normal position which is horizontal, by means of the springs 40, 43, 50, and 53. As will also be understood, the car 10 is suitably connected to the frame 23, and brackets 55 may be employed at the points of connection to strengthen the structure.

At the rear of the airship, extending from the frame 23, on both sides, of the balloon 16, are frame members 56 and 57. These are preferably inclined downwardly and at their outer ends are connected to a steering gear frame 58.

59 represents a series of vertical steering planes, each of which at corresponding sides, is pivotally connected in the steering plane frame 58. Adjacent to their outer edges and preferably along the bottom edge, each of these steering planes 59 is pivotally connected to a rod or bar 60, so that by moving one plane or the bar 60, all of the other planes will be caused to move and further to always assume a parallel relationship to one another. The outer plane 59 on the left hand side of the ship, is connected to one end of a cord or chain 61, and the outer plane 59 on the right hand side of the ship, is connected to one end of a cord or chain 62. These cords or chains 61, 62, pass over the exterior and vertical portion of the frame 58, or through grooves or pulleys in the same and also respectively over the pulleys 63, 64, and lead to a suitable steering wheel or other device not shown, by means of which the position of the planes 59 may

be determined to cause the airship to move directly ahead or to turn either to the right or to the left.

In the front of the airship and also connected to and extending from the frame 23, there are frame members 65 and 66, extending between and pivotally mounted in which is a series of horizontal steering planes 67, each plane 67 being provided adjacent to its long edge with a rod 68 which passes through and is pivotally mounted in the frame members 65 and 66. These horizontal steering planes are connected at their outer edges with a rod 67' in a manner which is similar to that in which the rod 60 connects the vertical steering planes 59, and the upper and lower horizontal steering planes 67 are each connected to the ends of the cords 69 and 69' which pass over suitable pulley wheels to a steering wheel, which is not shown, but by which the position of the horizontal steering planes may be determined. The use of the horizontal steering plane 67, as will be understood, is to cause the airship to ascend or descend in flight.

In the engine room of the car, as illustrated, there are two eight cylinder hydrocarbon engines, indicated at 70 and 71. The shaft of the engine 70 is connected through the gears 72 and 73, through the shaft 74 which passes through the roof of the car, through the lower main plane 35', through bearings 75 and 76, through the upper main plane 35, and carries at its upper extremity a propeller 77. Similarly the shaft of the engine 71 is connected through the gears 78, 79, to the shaft 80, which like the shaft 74, passes through the roof of the car, the lower plane, bearings 80', 80'', through the upper plane and at its upper end carries a propeller 81. The shafts 74 and 80 are preferably of such a length that the propellers 77 and 81 are appreciably above the top of the balloon 16. The shaft of the engine 70 through the gear 72 and gear 82, is connected with a counter-shaft 83, which through the gears 84 is connected with a propeller shaft 85 extending from the front of the airship and having fixed at its outer end a propeller 86, and the shaft of the engine 71 is connected by the gears 78 and 87 to a counter shaft 88, and the counter-shaft 88 through the gears 89 is connected to a propeller shaft 90 which also extends outwardly from the front of the airship and at its extremity carries a propeller 91, similar to the propeller 86.

The engine 71 may drive a propeller 98 at the rear of the airship, the shaft of the engine 71 being connected to the counter-shaft 93 by the gears 78 and 92, and the counter-shaft 93 connected to a second counter-shaft 95 from the gears 94, the counter-shaft 95 being connected to a pro-

peller shaft 97 by the gears 96, the propeller 98 being secured to the end of the shaft 97.

It will be understood that the balloons 16 and 17, and 18, are so designed that the buoyancy thereof practically counterbalances the other parts of the airship together with any passengers, freight or cargo which it may be designed to carry, so that the lifting and propelling machinery has only to perform these functions, the propellers 77, and 81, being employed to raise the airship and the propellers 86, 91, and 98 being employed to move it in flight, it being understood that any suitable means which forms no part of my invention, may be employed to connect and disconnect the several propellers to their relative engines, so that any one or more of the propellers may be actuated at the same time.

I claim as my invention:

1. An airship comprising a car, a plurality of gas containers, a plurality of outwardly diverging longitudinally extending fins on each side of the rear end of each of said gas containers, a plurality of angularly disposed vertical fixed rudder planes intermediate the outer edges of the said fins, a frame in which said gas containers are secured and to which the car is fixed, a plurality of planes fixed to the said frame, auxiliary side planes each pivotally connected to turn on its side next adjacent to the said frame, and means for yieldingly holding the said auxiliary side planes in their normal positions.

2. An airship comprising a car, a frame work to which the car is secured, a relatively large gas container fixed to the said frame above the car, relatively smaller gas containers fixed in the said frame at both sides of the said relatively large gas container, a pair of outwardly diverging longitudinally extending fins on each side of the rear end of each of said gas containers, a plurality of angularly disposed vertical fixed rudder planes intermediate the outer edges of each pair of fins, the gas containers being arranged parallel to one another, a plurality of planes fixed in the said frame, auxiliary planes pivoted along the sides of the said frame, and means for yieldingly holding the said side planes in their normal positions.

3. An airship comprising a car, a frame-work to which the said car is secured, a relatively large gas container fixed in said frame above the car, relatively smaller gas containers fixed in said frame on both sides of said relatively large gas container, the said gas containers being arranged parallel to one another, a pair of outwardly diverging longitudinally extending fins on each side of the rear end of each of said gas containers, a plurality of angularly disposed vertical fixed rudder planes intermediate the

outer edges of each pair of fins, a plurality of planes fixed in said frame, auxiliary planes pivoted along the sides of the said frame, means for yieldingly holding the said side planes in their normal positions, and means for propelling the airship.

4. An airship comprising a car, a framework to which the said car is secured, a plurality of gas containers, each comprising a multiplicity of gas compartments, means for separately supplying gas to each one of the several gas compartments of the gas containers, a pair of outwardly diverging longitudinally extending fins on each side of the rear end of each of said gas containers, a plurality of angularly disposed vertical fixed rudder planes intermediate the outer edges of each pair of fins, a plurality of fixed planes secured to the said frame, yielding planes pivotally connected along the sides of the frame so as to turn about a pivotal line parallel with the direction of flight, and means for propelling the airship.

5. An airship comprising a car, a framework to which the said car is secured, a relatively large gas container fixed in said frame above the car, relatively smaller gas containers fixed in said frame on both sides of said relatively large gas container, the said gas containers being arranged parallel to one another, a pair of outwardly diverging longitudinally extending fins on each side of the rear end of each of said gas containers, a plurality of angularly disposed vertical fixed rudder planes intermediate the outer edges of each pair of fins, a plurality of planes fixed in said frame, yielding planes pivotally connected along the sides of the frame so as to turn about a pivotal line parallel with the direction of flight, and means for propelling the airship.

6. An airship comprising a car, a framework to which the said car is secured, a relatively large gas container fixed in said frame above the car, relatively smaller gas containers fixed in said frame on both sides of said

relatively large gas container, a pair of outwardly diverging longitudinally extending fins on each side of the rear end of each of said gas containers, a plurality of angularly disposed vertical fixed rudder planes intermediate the outer edges of each pair of fins, the said gas containers being arranged parallel to one another, a plurality of planes fixed in said frame, auxiliary planes pivotally connected along the sides of the frame so as to turn on a pivotal line parallel to the direction of flight, means both above and below each of the said auxiliary planes for yieldingly holding the same in their normal positions, a plurality of propellers, an engine in the said car, devices connecting the said engine with said propellers for driving the same.

7. An airship comprising a car, a framework to which the said car is secured, a relatively large gas container fixed in the said frame above the car, relatively smaller gas containers fixed in said frame on both sides of said relatively large gas container, the said gas containers being arranged parallel to one another, a pair of outwardly diverging longitudinally extending fins on each side of the rear end of each of said gas containers, a plurality of angularly disposed vertical fixed rudder planes intermediate the outer edges of each pair of fins, a plurality of planes fixed in said frame, auxiliary planes pivotally connected along the sides of the frame so as to turn on a pivotal line parallel to the direction of flight, means both above and below each of the said auxiliary planes for yieldingly holding the same in their normal positions, a lifting propeller, a driving propeller, an engine and connections between the said engine and propellers for driving the latter.

Signed by me this 20th day of Sept. 1911.  
AUGUST MERCKENS.

Witnesses:

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