May 8, 1923 1,454,283

M. HOLLANDER

AERIAL NAVIGATING APPARATUS

Filed April 12, 1920 2 Sheets-Sheet 1

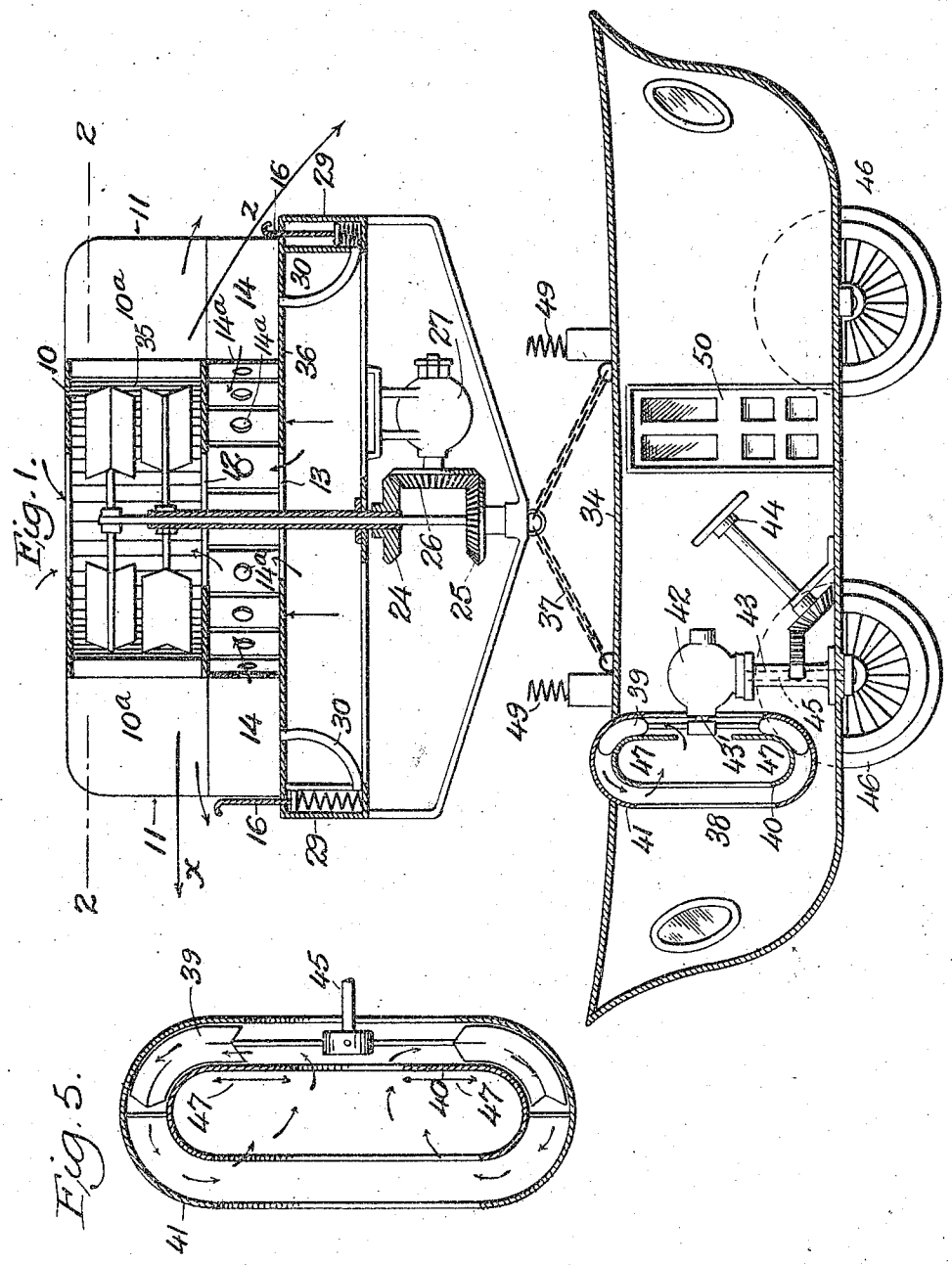


Fig. 1.

Fig. 5.

INVENTOR,
Marcus Hollander,
BY
James P. Duhamel,
ATTORNEY

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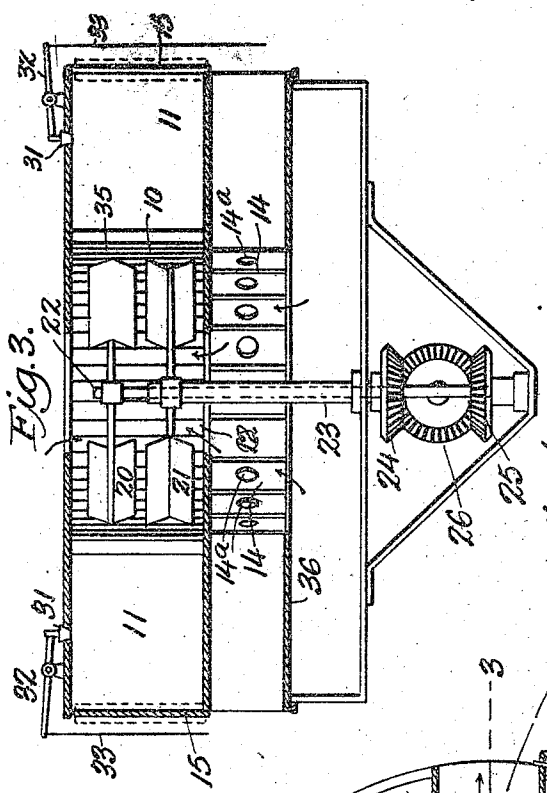


Fig. 3.

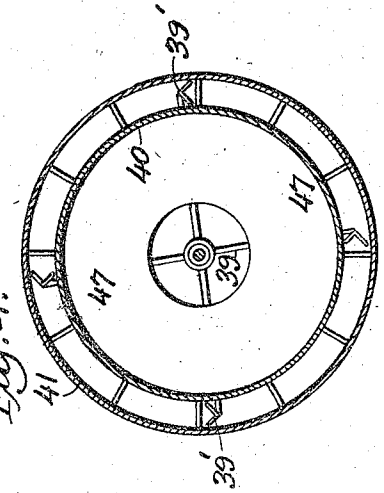


Fig. 4.

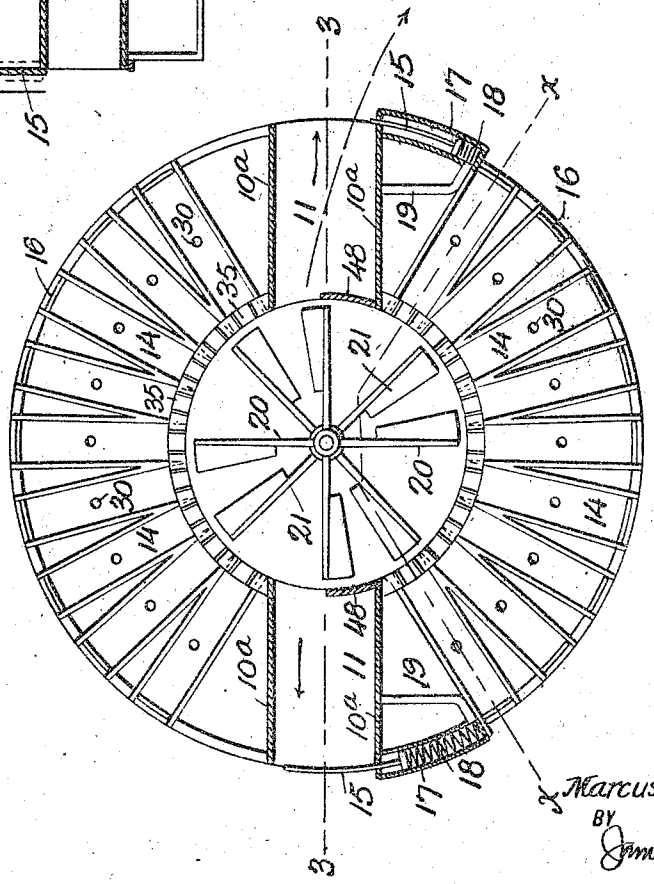


Fig. 2.

INVENTOR.
Marcus Hollander,
BY
James P. Duhamel
ATTORNEY.

Patented May 8, 1923. 1,454,283

UNITED STATES PATENT OFFICE.

MARCUS HOLLANDER, OF BROOKLYN, NEW YORK.

AERIAL NAVIGATING APPARATUS.

Application filed April 12, 1920. Serial No. 373,168.

To all whom it may concern:

Be it known that I, MARCUS HOLLANDER, a citizen of the United States, residing at Brooklyn, Kings County, New York State, have invented certain new and useful Improvements in Aerial Navigating Apparatus, of which the following is a specification.

This invention relates to apparatus for aerial navigation and more especially to the class of helicopters which are adapted to rise vertically from the ground and be held in suspension and directed in a horizontal course while afloat in the air, and it is also adapted for travel on land or navigation in the water.

The object of the invention is to reduce the atmospheric pressure from one side of the device, preferably the upper side, while the reverse side continues under normal atmospheric action, so that the apparatus with its car is buoyed or floated by pressure from beneath. Means are also provided to prevent the apparatus from being overturned by placing the lifting apparatus above the car and both are thereby balanced by gravity and the device is readily adaptable at all times as an air ship, or boat or a vehicle.

These and other objects and details of the invention are more fully described in the following specification, set forth in the appended claims and illustrated in the accompanying drawings, wherein:

Fig. 1 is a vertical sectional view of the apparatus and the car, the latter being partly in elevation on the line x—x of Fig. 2.

Fig. 2 is a horizontal sectional view through the fans and on the line 2—2 of Fig. 1.

Fig. 3 is a vertical sectional view on the line 3—3 of Fig. 2.

Fig. 4 is a vertical sectional view through the steering fans.

Fig. 5 is a vertical sectional view of the steering means.

The elevating part of the apparatus consists of a shell having at its top the fan chamber 10, open at its sides and having lateral passages 11, at two sides and an opening 12, at its bottom which communicates with a lower chamber 13, that is divided into a plurality of radial compartments 14, shown in Figs. 1 and 2. Both the passages 11 and the compartments 14, are normally closed at their outer ends by the spring actuated doors 15 and 16, respectively, the former operating circumferentially and in a housing 17, as will be seen in Fig. 2 and closed by the spring 18, and retracted when the air is rarified in the passages 11, and drawn from the housings through the pipes 19, the inner ends or the doors 15, fitting closely in the housing and following the vacuum created therein.

The rarification of the air in the passages 11, is produced by the fans 20 and 21, revolving in reverse directions and one being mounted on the shaft 22, while the fan 21, is carried at the upper end of the sleeve 23, and the latter and the shaft 22, are rotated in a reverse direction by the bevelled gear wheels 24 and 25, which are actuated by the wheel 26, on the shaft of the motor 27.

The doors 16 at the outer ends of the radial compartments 14 move vertically when performing their function and are also normally in a closed position and as the air circulates outward from the fan, chamber 10, and over the doors 16 and is drawn inward through the opening 12, the outer ends of the compartments 14, are denuded of air and a vacuum or partial vacuum is created therein.

The doors 16 are also adapted to recede into housings 29, when rarification draws the air from the bottom of the housing through the pipes 30.

There are openings 14^a at the inner end of each of the compartments 14, in order to communicate with the chamber 13, and allow the air to escape from the compartments and through the opening 12, when the fans 20 and 21, are set in motion and partitions 10^a form side walls for the lateral compartments 11. The air is also driven out of the openings 35, the supply for the fans being provided both above and below but is driven over the various compartments 14, on curved lines but collected therein and directed radially towards the openings 14^a, thus creating a rapidly moving current that rarifies the air in the bottom of each compartment as long as the door 16, is elevated.

The car 34, is hung from the elevating means by the chain 37, and may be of any preferred construction, but carries the steering device 38, at one end and which consists of two concentric shells secured to each other by radial braces 39^1, to enclose the fan 39, and change the course of the tangential air currents to radial.

The two shells 40 and 41, are open at each side, a motor 42, and the fan shaft 43, being

located in one of these openings and as the fan operates, it circulates a current of air through the space between the shells and in the direction of the arrows through the openings and drawing the air from the inner edges of the shell.

This device is mounted on a stand 43, and has the steering wheel 44, for shifting it on a shaft 45, connected with the axle of the rear wheels 46, so that these two motive parts move in unison to direct the car while resting on the earth or in the air while afloat. When vacuums are produced in the spaces 47 of the steering shell 40, atmospheric pressure is exerted on the right hand side of the shell and the whole apparatus impelled towards the left.

The car 34, may be constructed to act as a boat in case the device should descend into the water and has the wheels 46, to enable it to travel on land and a door 50, that is made water tight when necessary.

By creating the vacuums in the compartments 14, the atmospheric pressure is exerted from below and tends to elevate the wall 36, and raise the whole device and it is then directed by the wheel 44, as desired.

At one side of the entrances to the passageways 11, are walls 48, which in conjunction with the doors 15, form a pocket in that half of the said passageway and as the air current from the fans pass through the same, the air is rarified or vacuum produced therein. When sufficient force is created by this vacuum, the air is drawn out of the door casing 17, and the latter opened as shown at the right hand passageway in Fig. 2.

The action of the device is as follows:

When the fans 20, 21 in chamber 10, are rotating by the action of motor 27, a current of air will be drawn through the openings 35, and pass between the extended side walls 10^a in the direction of arrow x. Normally the springs will keep the doors 16, closed so that the current of air passing over the open surface of compartment 14, will slightly touch the curved edges of doors 16. Simultaneously the air from within the compartments 14 and from housing 29, will be sucked out through pipes 30, openings 14^a, and central opening 12, by the action of the fans forming a partial vacuum in the compartments 14 and under the heads of doors 16, in the housing 29. It is to be understood that when the air in the compartments 14, is rarified, the pressure of the atmosphere from above will deflect the current from the fans and will cause to move in a parabolic line as indicated by arrow z, pressing thereby on the curved edges of doors 16, which will slide down due to the rarification of the air below. The current of air will serve as a cover to prevent the surrounding air from penetrating into the evacuated compartment and will also act as a supporting arc to sustain the pressure of the atmosphere so that the bottom of the interior of the compartment will be practically devoid of atmospheric pressure while the opposite sides of same will remain under the ordinary atmospheric pressure from below, so that the apparatus will be lifted by the higher pressure.

Chambers 11, are of the same construction as compartments 14 but open at the ends, while the latter are open at the top. As above described, the current of air by its momentum will reduce the pressure of the atmosphere from the bottom in the interior of the compartments 14, so that the atmosphere on the opposite side will tend to raise the apparatus vertically, while in chamber 11, the air is reduced at the side opening, and the action of the atmosphere on the opposite side is exerted horizontally to steer the device from right to left. Air is permitted into the left chamber by opening the valve 31, breaking thereby the vacuum therein, so the right chamber will turn the apparatus to the left, while by breaking the vacuum in the right chamber, the apparatus will turn to the right by the action of the left chamber. It is understood that by breaking the vacuum in both chambers, the horizontal motion will cease and the compartments acting in a vertical direction will sustain the apparatus motionless in the air.

To increase the efficiency of the horizontal motion of the apparatus and also to propel the car on land or water, propelling device 38, with a separate motor 42, are provided and serves also as a lifting device in an emergency case.

Sliding doors 15—16 are in constant touch with the deflected current moving up and down in accordance with the change of the deflection, so the compartments are kept closed from all sides and the vacuum inside is maintained during the operation.

In order to reduce the resistance of the fans, which is due to the vacuum formed behind when at a high speed of rotation, they are shaped in a form of a V, this will increase the efficiency of the current of air generated by said fans. It is understood that instead of fans, the current of air can be supplied by other means as an air compressor operated by the motor, etc. It is also understood that the same principle can be applied to propel ships in water where in place of a current of air, water will serve the same purpose.

It is obvious that the parts may be otherwise arranged and modified without departing from the essential features above described or from the scope of the appended claims.

What I claim as new is:—

1. In an aerial apparatus, the combination of a casing, divided into outer compartments

and having central openings and fans between the openings and adapted to deliver currents of air through and over the compartments.

2. In an aerial apparatus, the combination of a frame having central openings, substantially radial partitions, automatically operating doors, and fans rotating in reverse directions and producing vacuums between the partitions and adapted to prevent rotation.

3. In an aerial apparatus, the combination of a frame, substantially radial partitions to form compartments around the outer edges of the frame, fans within the frame and adapted to draw air currents through a portion of the compartments to produce vacuums therein, automatically operated doors to the compartments, and a car hung from the frame.

4. In an aerial apparatus, the combination of a frame, substantially radial partitions to form outer compartments, fans adapted to receive air at their axes and create a current through the compartments to form vacuums therein to elevate the frame, and means operated by a vacuum, and adapted to steer the apparatus.

5. In an aerial apparatus, the combination of a frame divided about its outer edge into compartments, fans at the inner ends of the compartments and adapted to drive currents of air through the same, a shaft carrying one of the fans, a sleeve carrying the other fan, a motor, and gear wheels connecting the fans with the motor.

6. In an aerial apparatus, the combination of a frame having central openings, substantially radial compartments, with automatically operated doors at their outer ends and communicating with the central openings, fans, and a motor with means for rotating the fans in opposite directions.

7. In an apparatus of the character described, the combination of a plurality of compartments open at one side, walls forming passageways over the compartments, and means for creating a continuous stream of air through the passageways and over the compartments and adapted to protect the partial vacuum in the compartments from the air pressure above.

8. In an aerial navigating apparatus, the combination of a chamber with openings at its sides, top and bottom, a plurality of compartments radially located around said chamber, and a passageway over said compartments, and means for creating a continuous current of air directed through said passageway and adapted to serve as a cover on the open side of said compartments, to prevent the air above from penetrating the evacuated compartments.

9. In an aerial navigating apparatus, comprising a chamber open at its top and bottom and having side openings, fans with V-shaped blades, located in said chambers and adapted to rotate in opposite directions, a plurality of compartments open at one side and located radially around said chamber, means for creating a continuous stream of air directed over the open side of said compartments, and means for draining the air from said compartments.

10. In an aerial navigating apparatus, comprising a chamber with openings at its top and bottom and having side openings, V-shaped fans adapted to rotate in opposite directions within the chamber, a plurality of compartments around the chamber with side and top openings, means for creating a current of air and directing the same over the open sides of said chambers, and means for changing the course of the air current from a tangential to a radial direction.

11. In an aerial apparatus, the combination therewith of a steering device comprising an inner and outer shell with front and rear openings and a space between them, means in the space for circulating air through the space, and means for creating a vacuum in the inner shell.

12. In an aerial apparatus, the combination therewith of a steering device comprising concentric shells with a space between them and open at their centre and a fan with blades playing in the space and adapted to circulate air through the said space and openings and extract the air from about the walls of the inner shell.

13. In combination with a steering device of the character described, a shell, an auxiliary shell within the same, channels between the shells and open at the top and bottom; the outlets of said channels being inwardly directed, means to direct a current of air over the open surface of said first shell to concentrate the same at the centre, and means to create a vacuum in the auxiliary shell.

14. In an apparatus of the class described having a chamber with an opening, means for directing a stream of fluid across said opening for relieving atmospheric pressure at said opening, a movable wall to said chamber, and means for governing the movement of said wall by the atmospheric density of said chamber.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses, this 7th day of April, 1920.

MARCUS HOLLANDER.

Witnesses:
A. M. Baker,
James F. Duhamel.