

I. W. FORBES.
Aerial-Cars.

No. 129,401.

Patented July 16, 1872.

Fig. 1.

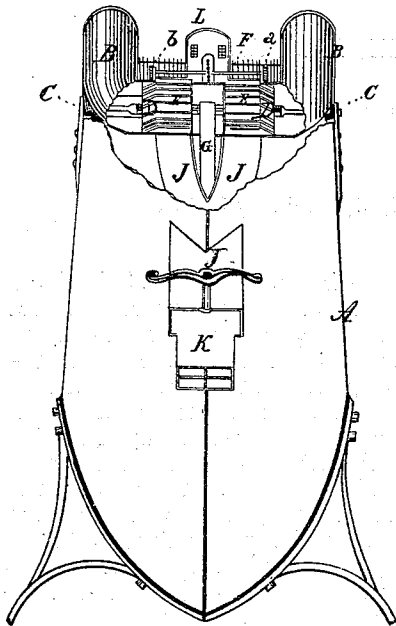


Fig. 2 ^{Pc}

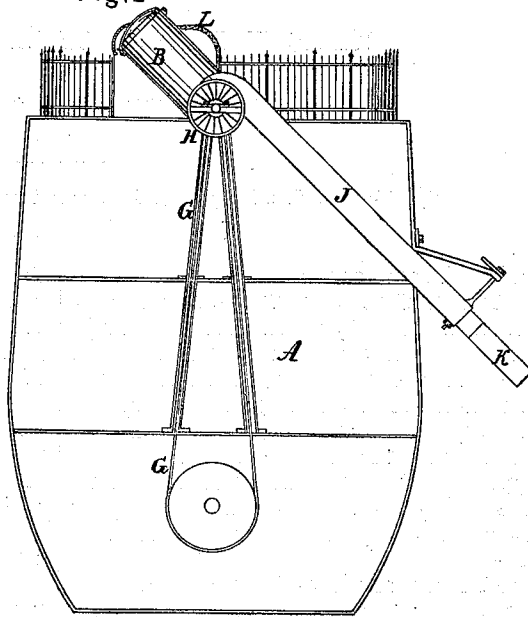


Fig. 4.

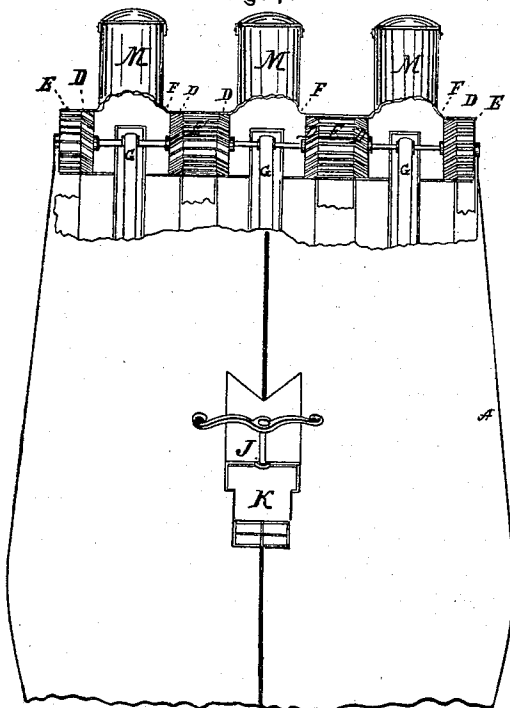
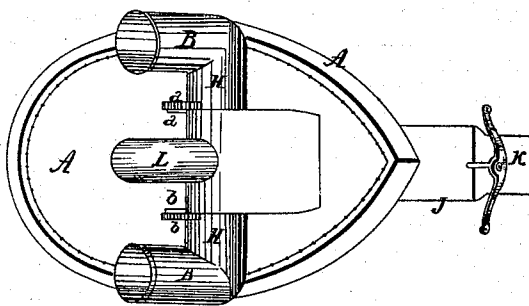


Fig. 3.



Witnesses:

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UNITED STATES PATENT OFFICE.

ISAAC W. FORBES, OF LA PORTE, INDIANA.

IMPROVEMENT IN AERIAL CARS.

Specification forming part of Letters Patent No. 129,401, dated July 16, 1872.

To all whom it may concern:

Be it known that I, ISAAC W. FORBES, of La Porte, in the county of La Porte and State of Indiana, have invented a new and useful Improvement in Aerial Cars; and I do hereby declare that the following is a full, clear, and exact description thereof, sufficient to enable others skilled in the art to which my invention appertains to make and use the same, reference being had to the accompanying drawing making a part of this specification, in which—

Figure 1 is a rear view of the device illustrating my invention. Fig. 2 is a longitudinal section thereof. Fig. 3 is a top or plan view of the same. Fig. 4 is a modification.

Similar letters of reference indicate like parts of the invention in all figures.

This invention relates to a device for aerial navigation, and consists of helical fans, adjustable induction-tubes, a discharge-tube, and rudder. The helices and fans are secured upon a horizontal shaft, the former being at the outer ends thereof. The blades of the helices extend back upon an incline of about forty-five degrees, then taking a slight curve until they run straight with the shaft toward the center, which forms blades for the fans. The helices have a rim around their outer surface through which the air passes from the tubes into the fans, and by them is driven through the tube below. This last-mentioned tube stands at an angle of forty-five degrees, more or less, with a rudder at the lower end, by means of which the car is guided in its direction. The tube in which the helices work is horizontal, and at each end has an elbow-pipe, which is movable, the design of which is to give any desired direction to the car from the vertical to the horizontal. The fans are separated in the center, leaving space between them in the middle of the shaft for pulley, belt, and bearings for the same. The tubes of these fans form a junction with each other a little way down their extent to the rear of the car. Through this tube, in common, the air passes as it is driven by the fans.

By putting the helices and fans in motion, whose surfaces travel many thousand feet per minute, a vacuum, or a partial vacuum, is produced in the elbows of the tubes at the outer surfaces of the helices, thence through

the tube below in the fans. The helical wheel gathers the air which by the fan is projected through the tube, the velocity being very great, and as near as is possible to the speed of air flowing into a vacuum; hence a complete or a partial vacuum is produced. The force of atmospheric pressure upon the lower portion of the elbow opposite to their open ends will be in proportion to the vacuum, or proportional vacuum, which will be produced by the speed of helix and fans which produce the propelling force of the car, that force being in proportion to the area and extent of vacuum and pressure of atmosphere upon the same. The elbow-tubes are moved in the arc of a circle, as may be required, by means of gearing attached to that portion of the elbow which connects with the horizontal tube and pinions meshing into the same, which are secured together by the means of a shaft. They being made fast to each end with proper bearings for the same, with a wheel or windlass for operating purposes. By these means the tubes are controlled at will. However, there may be various means and ways for moving them, but they should be both moved simultaneously to prevent a circular motion being imparted to the car. They may be governed from a pilot-house at the top of the car, as may also be the rudder, and they may be controlled by the pilot or engineer. The elbow-tubes have bearings in the center of the elbows at the outer surface firmly secured to the same. To these bearings the car is attached for lifting purposes, and at the same time to prevent an inward pressure and overcome friction otherwise produced. Their bearings may extend through the center of the tube to the bearings of the helix and fan shaft, to which the inner end of the tube may be attached for the purpose of destroying friction upon the outer surface of the inner end of the tube when moved to give the car a direction. It may not be necessary to have rims to the helices, but they should fit, either with or without rims, as closely as possible to the tubes in which they work, and they should be driven with as great rapidity as the adhesive property of the steel, of which they should be composed, would warrant, in order to create as near a vacuum as possible, and hence produce the greatest amount of lifting power.

The car should be constructed with legs, so that it can stand upright when resting upon the ground, and should also be made water-tight, of proper height, in order to float in the water with safety. The ballast should be put in the bottom of the car, and the latter may be divided into two or three stories properly lighted and ventilated, the lower story being appropriated for the machinery and ballast and the upper one for passengers and light baggage. A subsidiary car or platform may be attached by means of proper supports, and the car may be used for transporting substances or articles from place to place. The helices and fans are exactly of the same area upon each end of the shaft, so that one may neutralize the force of the other and the pressure endwise upon the shaft. The driving-belt should be large and of the best possible materials. The car may be made of thin sheets of steel or copper or other suitable material, and, in order to guard against the attraction of lightning, it should be coated with a proper protecting composition.

In Fig. 4 the shaft extends through the horizontal tube across the top of the car driven by three belts from the power below with six helices and four fans. The four helices in the center or between the pipes are connected at each end of the two inner fans. The two helices outside of the pipes are connected to the inner ends of the fans, which extend outside of the helices. The blades of the same may be formed similar to those in Fig. 1, and the helices and fans between the pipes. The fan-blades and helices are of the same pieces. The fan-blades run straight with the shaft; then curve until they form proper shape for the blades, the outer helices being the same as the inner ones, except that the fan requires but half of the length of the blade and but one helix on the inner end.

In this car there are but three upright receive-tubes, in which the air passes through the helices in the fan and through the passage below. The pipes are over the belts, the latter being protected from the air by means of coverings, which are made air-tight, and thence from a spout, through which the belt passes through the first and second stories above. In this case each pipe has two helices and two fans for the purpose of producing a more perfect vacuum in place of one, as in Fig. 1. The two passages for the air below from the double fan unite and form one passage, the same as that shown in Fig. 1, which stands at a proper angle, and to which these tubes may be moved the same as those in Fig. 1, and the same results are produced. This method I prefer, as twice the area of wheel may be had; hence, twice the vacuum produced as that in Fig. 1, in proportion to the pipe in which they work and the receive-pipes, there being no lateral pressure upon the pipe by the vacuum, as in Fig. 1. There may be a strainer upon the tops of the pipes to prevent obstacles passing in by the current of air.

In the drawing, A represents the body of the car, B the elbow-tubes, and C the shaft on which are secured the helices D, fans E, and the pulley F, over which passes the belt G. H represents the horizontal tube which receives the helices and fans, and J the discharge-tube. K is the rudder and I the pilot-house. In Fig. 4, M represents vertical receive-pipes. The gearing for moving the elbow-pipes is represented by *a a b b*. To comprehend my invention more fully I would call the attention once more to the pipe and tube in Fig. 2, that portion below the helices being stationary, (still it may be movable if required,) while the pipes B B, above the helices and fans, connected with the horizontal tube, is movable, as the lifting-pressure produced by the vacuum or partial vacuum is upon the opposite part from the opened end, and the atmospheric pressure toward that end is just in proportion to its area and vacuum. Now, in order to produce a direct vertical pressure it would be necessary to move the top back to near a right angle with its present position, or with the discharge-tube, as the air in that tube being pressed out it would necessarily produce an upward pressure upon a line of forty-five degrees with the horizon, hence a counter-acting force upon a line of forty-five degrees in the opposite direction by the atmospheric pressure upon the lower end of the receive-tube or pipe B, moved at right angles from its present position, must necessarily neutralize the force produced by the pressure in the discharge-tube J below and give vertical motion to the car, and by moving the tubes B B forward from the last-described position to any degree between that and their present position, must necessarily produce a forward motion. Now, to make this method more fully and easily comprehended, we will suppose that tubes B B shall extend above the top of the atmosphere, that the helices and fans have driven the air entirely out of them and through the tube below the fans; hence a vacuum produced in the tubes B B, which pressure is equal to two thousand one hundred and sixteen pounds per square foot of surface of buoyancy or atmospheric pressure opposite to their open ends, and the same pressure being upon the fans and helices by the pressure through the discharge-tube J, which pressure must be sustained by the power applied to drive the fans and helices to produce the vacuum in pipes B B to force the air through the discharge-tube J. The combined helices and fans and pipes J, with receive-pipes, may be very useful in producing a blast fan. Instead of making the receive-tubes B B movable, if necessary or desirable, they may be stationary, with chutes or flies above the same for giving direction to the current of air passing therein, and hence direction of buoyancy. A picket may surround the top of the car in order to afford protection to the pilot. Steam or other motive power may be employed to drive the machinery.

The rudder should be made hollow or tubular, and may have divisions to form as it were a continuation of discharge-tube J, so that the escaping blast of air will pass through said rudder and guide the car. If steam is used and a blast required, a pipe may lead from the discharge-tube and supply the furnace with the required blast of fresh air to the passengers.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

In an aerial car, the helical fans and adjustable induction-tubes, in combination with the discharge-tube J and rudder K, when constructed and operating, substantially as herein described.

To the above I have signed my name this 27th day of August, 1869.

I. W. FORBES.

Witnesses:

PHIL. F. LARNER,
ADOLPHE ROCK.