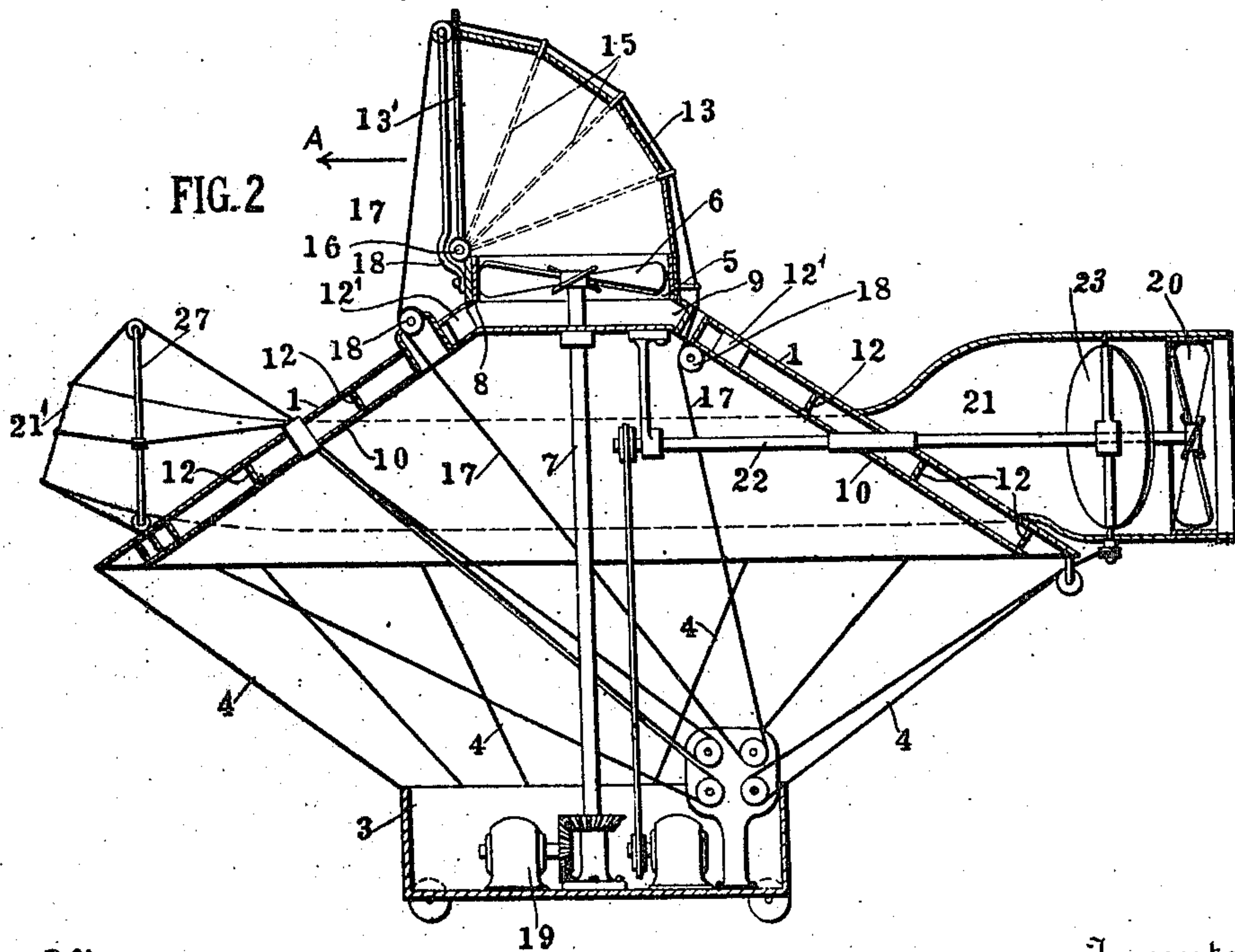
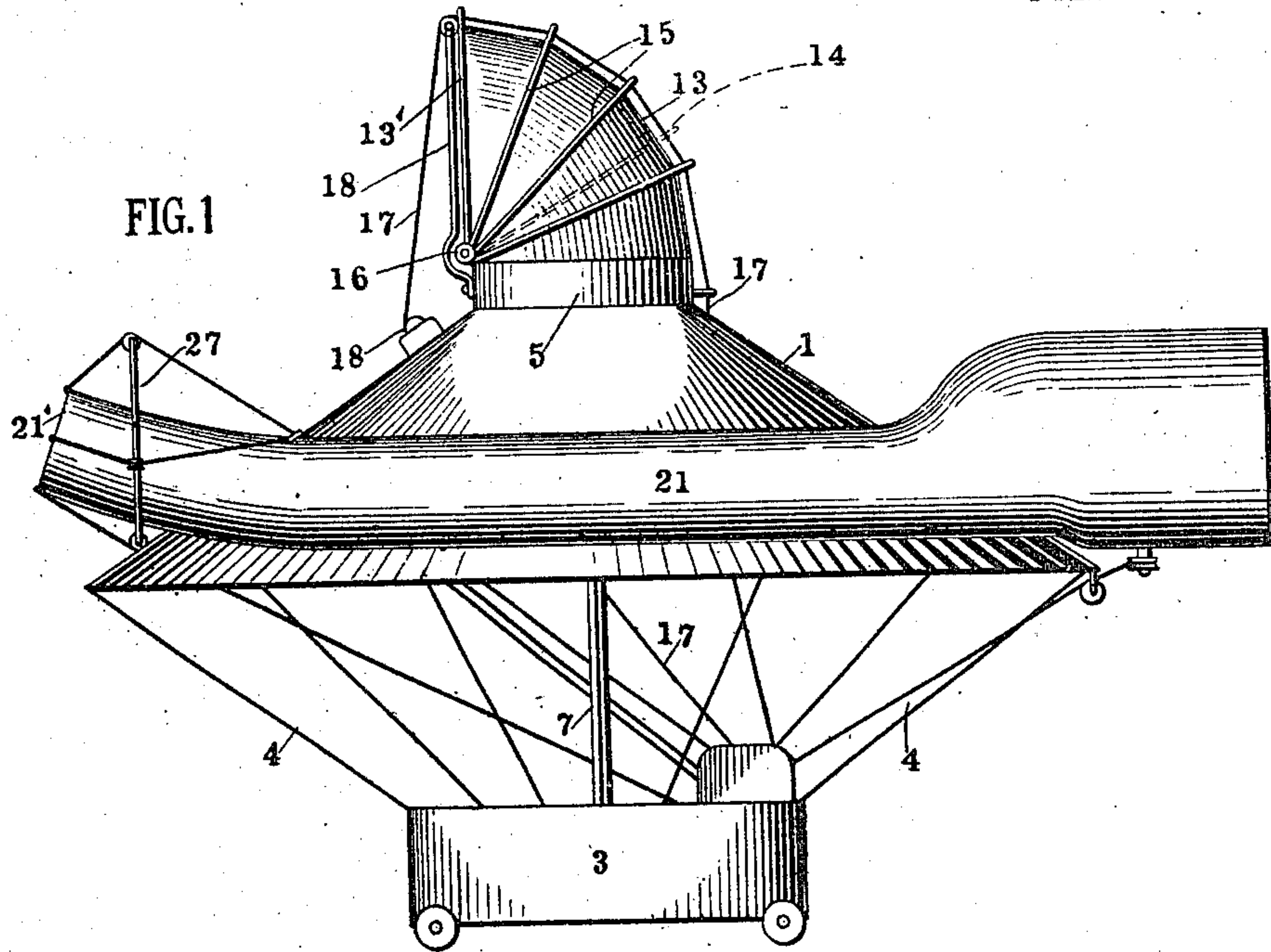


989,834.



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FIG. 3

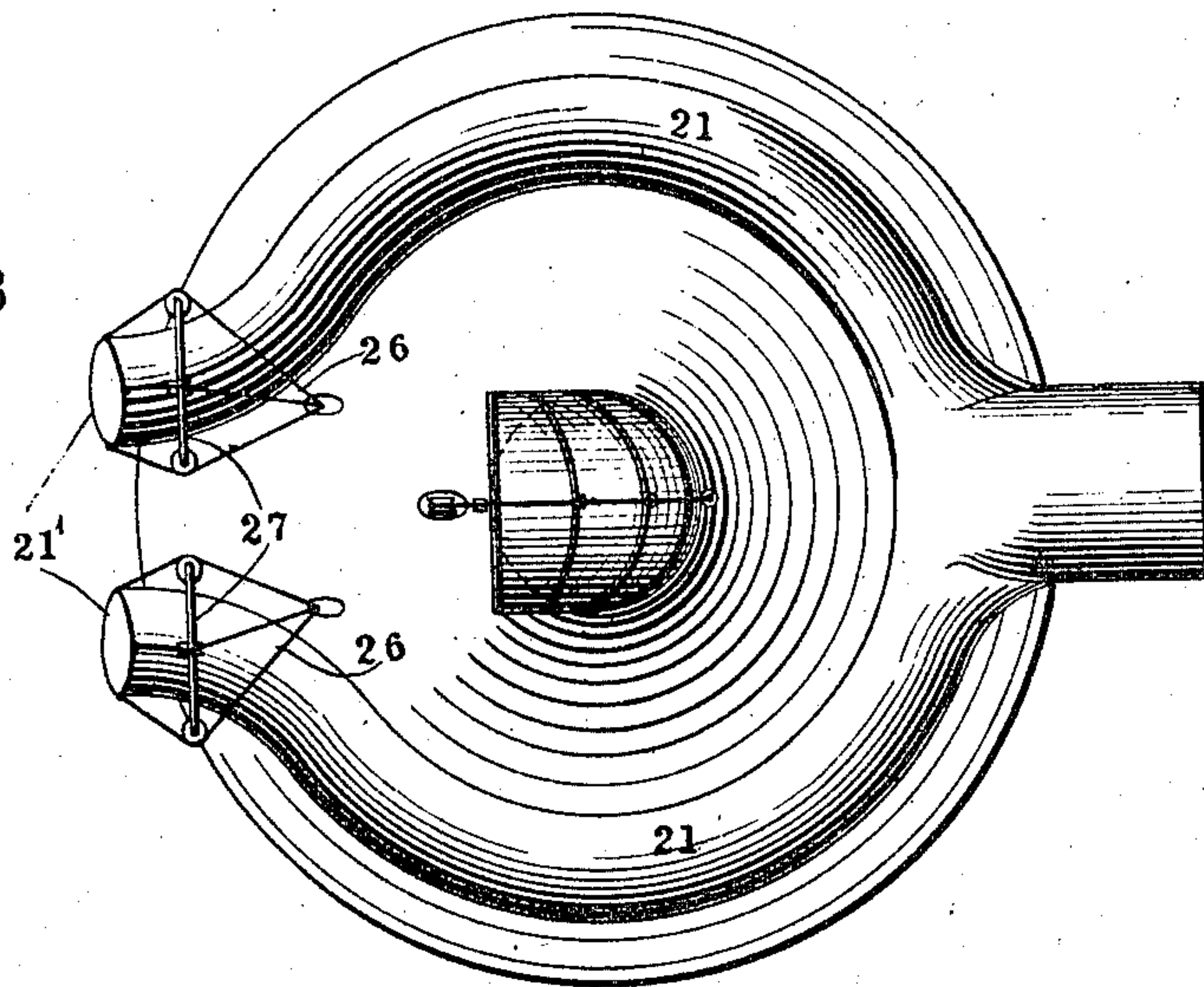
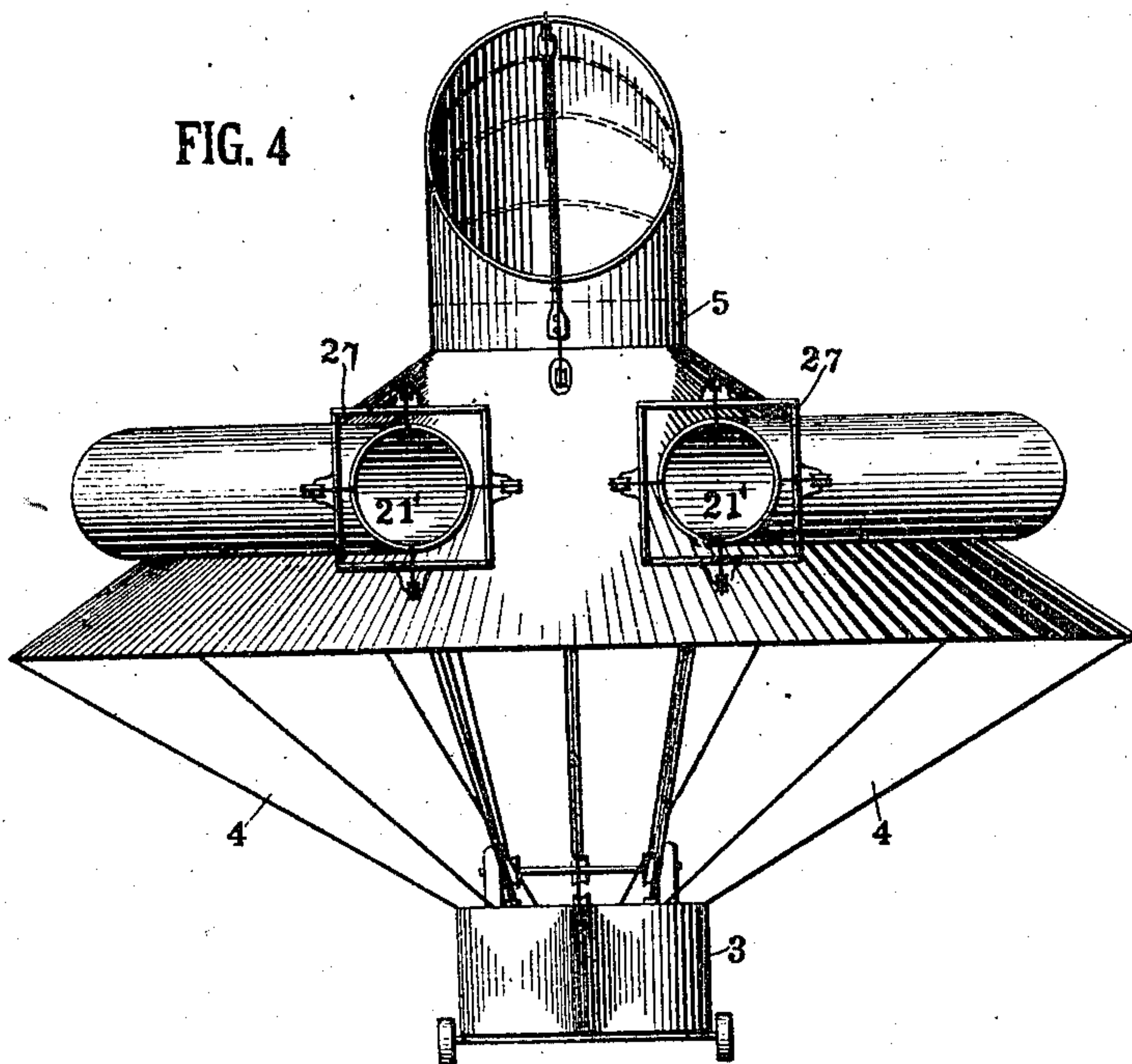


FIG. 4



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# UNITED STATES PATENT OFFICE.

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AIRSHIP.

989,834.

Specification of Letters Patent.

Patented Apr. 18, 1911.

Application filed Janu. y 17, 1907. Serial No. 352,751.

To all whom it may concern:

Be it known that I, JOSEPH I. C. CLARKE, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, with post-office address 159 West Ninety-fifth street, have invented certain new and useful Improvements in Airships, of which the following is a specification.

10 My invention relates to air ships of a class in which the elevating and sustaining effects are obtained by the use of a motor on the machine instead of by the employment of gas bags.

15 The principal object of my invention is to secure the elevation or suspension of the machine in the atmosphere in a simple and effective manner; and so as, also, to insure equilibrium or stability against tipping or diving of the machine.

20 My invention relates to a novel construction of apparatus for utilizing an ascensional or elevating action produced by a blower which has a vertical intake and delivers its blast to the under side of an aeroplane.

The object of my invention is to secure stability by directing the current of air from the edges of the aeroplane in a downwardly and outwardly direction and also to produce a structure which shall be of simple construction and effective in operation.

30 To these ends my invention consists of the novel constructions hereinafter more particularly described and then specified in the claims.

The said aeroplane may be of any shape: that is to say, it may, in general, be flat or more or less convex or conical so as to approach or resemble a parachute in action. The boundaries or edge of the aeroplane may describe a round, square, oblong, triangular, oval, polygonal or other geometrical figure.

40 In constructing the apparatus, any desired material having the requisite lightness and strength may be employed, and those parts which act upon the air may be of thin or flexible material stretched upon a suitable framework.

50 The details of mechanical construction, or the manner of building up the structure may obviously follow the practice at present adopted in machines of the same general character and will not be, therefore, set forth in detail.

My invention consists further in determining the horizontal or vertical movement of the machine by means of a hood for the lifting blower, which hood is placed 60 over the intake and is so constructed that its mouth may be presented in different directions in a vertical plane to vary the direction of the intaken current of air.

The invention consists further in the special constructions and combinations of apparatus as hereinafter more particularly described and then specified in the claims.

In the accompanying drawings, Figure 1 is a side elevation of an apparatus embodying my invention. Fig. 2 is a vertical central section through same. Fig. 3 is a plan view of the machine. Fig. 4 is a rear elevation.

1 indicates the aeroplane proper constructed or built up in any desired manner so as to have the requisite stiffness. The aeroplane as shown is preferably of a general concave or conical form. From said aeroplane or its framework, the car or 80 basket 3 for the operator is sustained by the guy ropes or cords 4 in any suitable manner and in such position as to bring the center of gravity of the sustained parts near the center of the horizontal area of the aeroplane.

Located as near as may be to the center of the aeroplane is a blower which has a vertical intake, or, in other words, draws air in from above, and which blower delivers its 90 blast to the underside of the aeroplane 1 for escape all around the edges thereof. Rising from the edges of an opening at the apex of the conical aeroplane is a casing 5 in which the blower works.

95 The blower or vertical propeller may be of any desired construction, for example a fan, blower, the wings or vanes 6 of which are secured to and rotated by the vertical shaft 7, and by rotating at high speed in said casing 6, draw in air from above and force such air out from below, the air-blast being delivered to the underside of the aeroplane, owing to the fact that the blower is 105 cased in beneath by the case or horizontal floor 8 fixed to or forming a part of the framework and forming in effect a continuation of the casing 5 beneath the blower, openings at 9 being provided for egress of the air to the underside of the aeroplane 110 near its apex. The blast thus received on the underside of the aeroplane is preferably



directed to the edges thereof by means of an under aeroplane 10 between which and the upper aeroplane 1, the air currents pass to the edge where they are directed in a downward direction and outwardly in any suitable way as by constructing the double aeroplane, so that the edge of the upper portion 1 shall overhang the edge of the lower portion 10. By this general construction, the lifting power available from the turning of the blower, and the expulsion of its intaken air current to the underside of the aeroplane produces a sustaining or elevating effect which is supplemented by the reaction of the current of expelled air around the rim of the aeroplane upon the body of air in which the machine lies. Moreover this blast of air expelled in a ring of large diameter and far removed from the center of gravity of the whole apparatus conduces materially to the maintenance of the machine in a stable position or a position of equilibrium, and avoids largely any tendency to dipping or swaying. Between the two aeroplanes may be located any number of stay pieces 12 which maintain a space between them for the circulation of the air. At 12' these stay pieces may be multiplied or may be extended on radial lines so that the air expelled from beneath the blower shall be prevented from taking a spiral path and shall be caused to circulate on direct radial lines to the edges of the aeroplane.

The intaken current of air is preferably received through a hood 13, the mouth of which 13' may be directed in a straight horizontal direction so that the intaken current shall operate in part to propel the machine in the direction of the arrow *a*. Said hood, however, is so constructed that by partially collapsing it, mouth 13' may be thrown back more or less so that the intaken current may pass into the blower in a direction approaching the vertical as would be the case if the mouth 13' were thrown back to the position indicated by the dotted line 14. By thus changing the angle of intake in a vertical plane, the lifting or elevating as compared with the propulsive effect in a horizontal direction will be obviously increased, thereby making it possible to cause the machine to rise in a direct vertical line, or to take a direction more or less inclined to the vertical. The construction of the hood which will permit the variation of the angle of intake may be such as indicated in the drawings or may be anything desired. In the form shown, the intake is a folding structure made of ribs 15, pivoted at 16 and covered with flexible material, the construction being such that the hood may fold up more or less like a fan or like a carriage top when operated by means of cords 17 which extend over suitable guides 18 and are connected to the ribs of the structure as shown.

These cords 18 are extended to the car or basket 3 and are there suitably arranged so as to be capable of manipulation by the operator. The vertical shaft 7 for the elevating blower may be run by a motor 19 of any suitable construction on the car, said shaft having proper bearings in the frame of the machine.

To secure propulsion in a horizontal direction, I prefer to employ a second blower or air propeller 20 which may be of the fan type or of any other suitable form, and which acts by drawing in air at the forward end of the machine, and expelling it through a horizontal tube or tubes 21, the exit or egress ends of which are indicated at 21'. The blower 20 has an operating shaft 22 also mounted in the framework and operated by a motor located on the car and suitably belted or geared to said blower.

When two tubes 21 are employed, I may use a valve 23 for directing the blast of air taken in by blower 20 into one or the other of the two horizontal egress tubes 21. Inasmuch as the two mouths of said tubes are located respectively at opposite sides of the horizontal axis of the structure, it is obvious that by directing the current into one or the other of said tubes, the reaction of the escaping air may be made effective upon one or the other of the sides of the machine thus causing it to turn in a horizontal plane and thus changing its direction of movement. The valve may be turned by the operator through suitable cords or connections carried to the car as indicated. In addition to the means described for directing the movement of the car both vertically and horizontally, I may employ as a steering device a horizontal air egress tube having a flexible air egress end or mouth 21' which may be turned in any direction horizontally or vertically to change the direction in which the reactive effect of the blast upon the circumjacent air shall be expended. To permit this action the end portion or section of the tube or tubes 21 may be made of flexible material and may be set or turned in any direction by any preferred form of mechanism controllable or operable from the car 3. As typical of such devices, I have shown cords 26 connected to the flexible tube ends and extending over suitable guides on a frame 27 to the car where they are attached or connected preferably to suitable operating appliances, permitting the cord connected to one side of the tube to be slacked as tension is applied to the cord at the opposite side in changing the position of the mouth of the tube. By these various devices, the machine may be steered effectively and certainly.

What I claim as my invention is:

1. The combination substantially as described, of a conical aeroplane, a case rising



from the edges of an opening at the apex thereof, a blower located in said case, a floor forming a closure beneath said blower and openings for conducting the air blast to the under side of the aeroplane around the opening at its apex, as and for the purpose described.

2. In an airship, the combination of a vertical air propeller having an overhead intake and means for changing the angle of intake in a vertical plane to vary the ascensional or horizontal motive effect of said blower.

3. The combination of an aeroplane, a blower having a vertical intake and delivering air to the underside of the aeroplane and a hood for the blower collapsible to vary the vertical angle of intake as and for the purpose described.

Signed at New York in the county of New York and State of New York this 11th day of January A. D. 1907.

JOSEPH I. C. CLARKE.

Witnesses:

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LILLIAN BLOND.