W. H. MARTIN.

FLYING MACHINE.

APPLICATION FILED JAN. 3, 1908.

935,384. Patented Sept. 28, 1909.

2 SHEETS—SHEET 1.

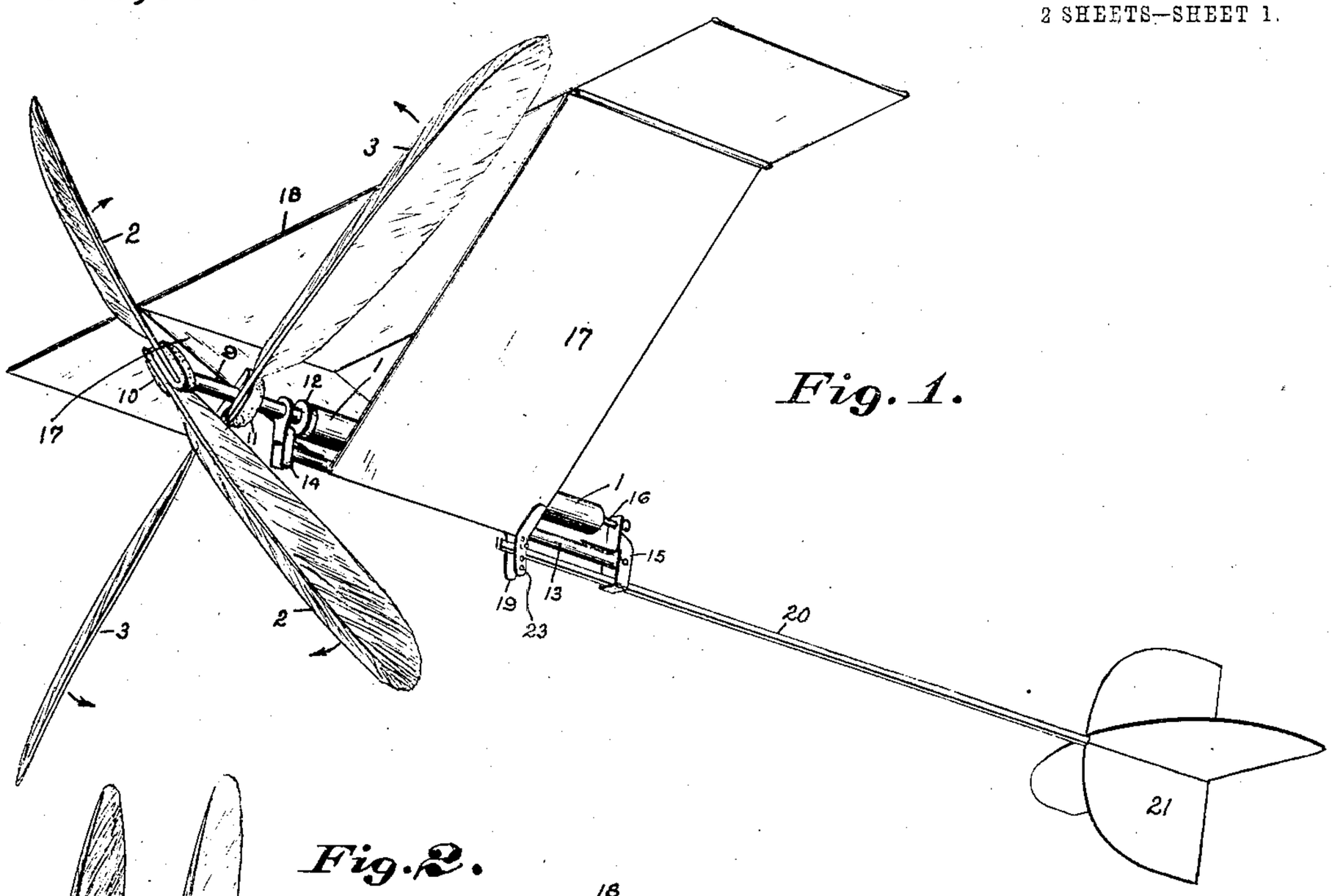


Fig. 1.

Fig. 2.

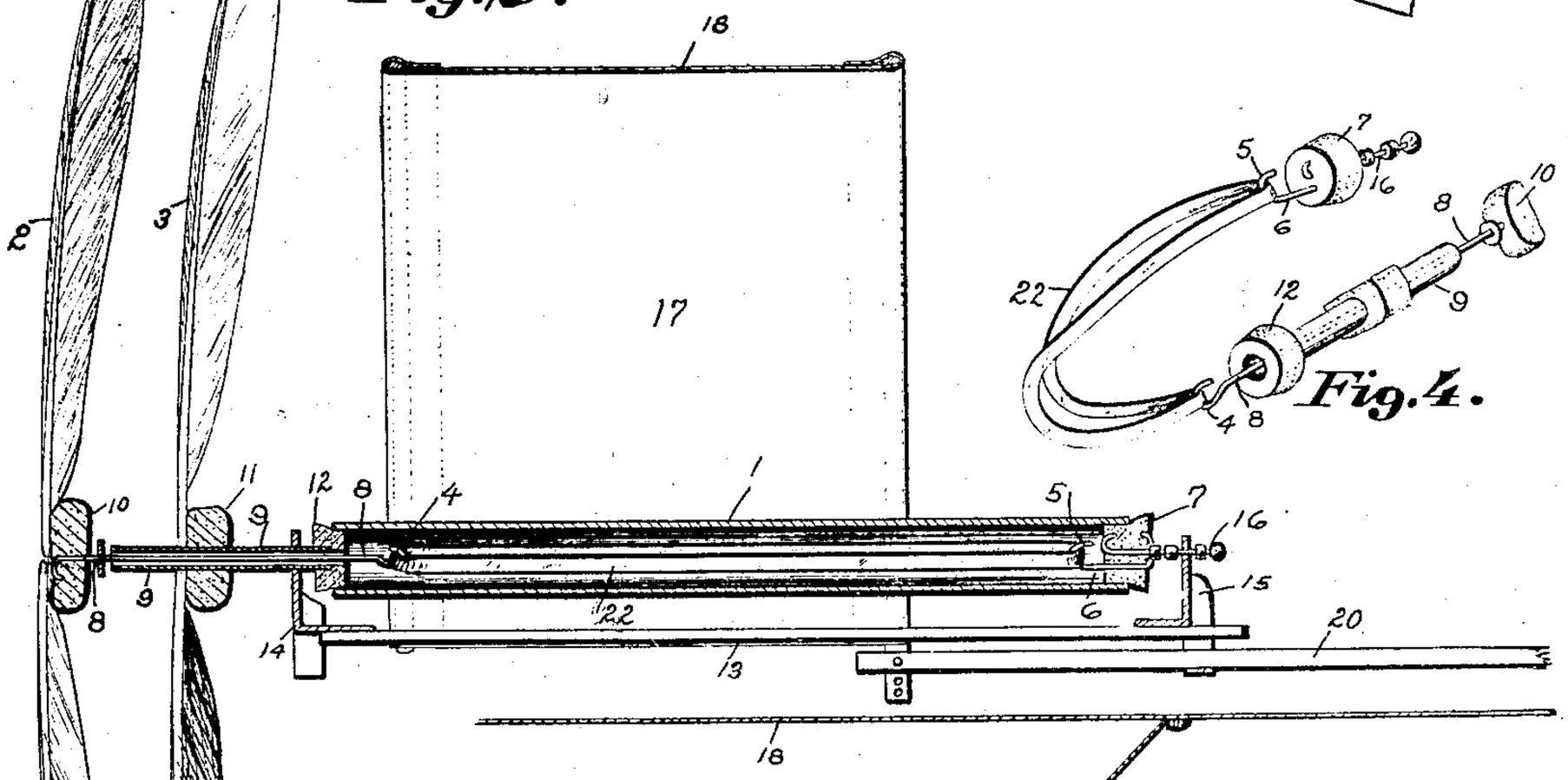
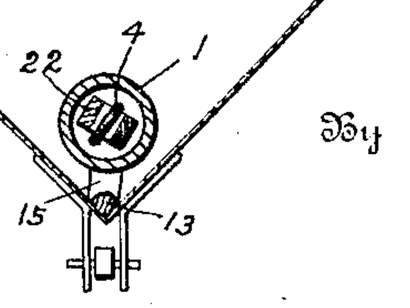


Fig. 4.

Fig. 3.



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2 SHEETS—SHEET 2.

Fig. 5.

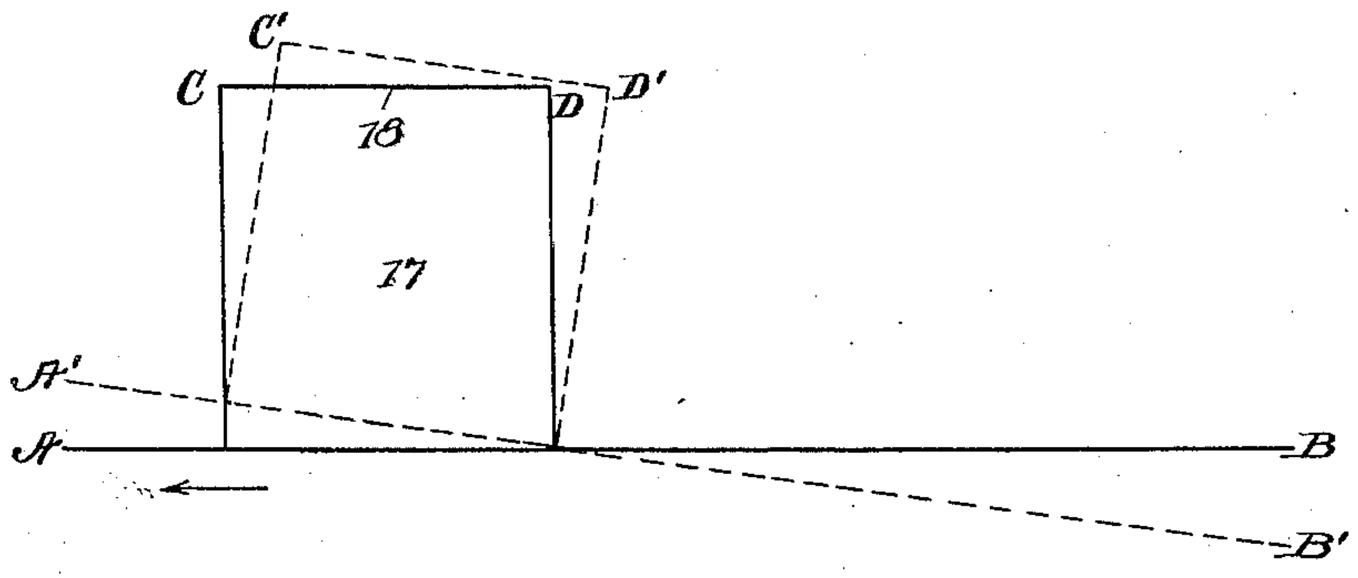

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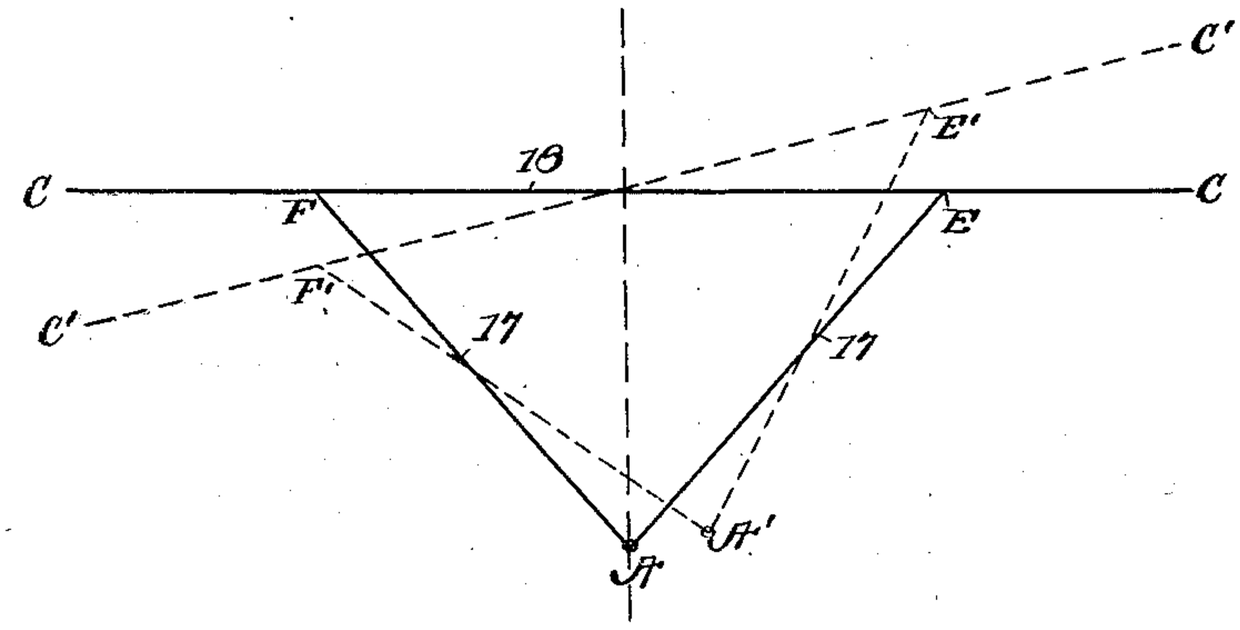
Fig. 6.



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FLYING-MACHINE.

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To all whom it may concern:

Be it known that I, WILLIAM H. MARTIN, a citizen of the United States, residing at Canton, in the county of Stark and State of Ohio, have invented certain new and useful Improvements in Flying-Machines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawing, making a part of this specification, in which,—

Figure 1 is a perspective view of the entire device in the position of flight. Fig. 2 is a vertical longitudinal section. Fig. 3 is a partial transverse section taken through the aeroplane. Fig. 4 is a detail view showing the torsional power spring and its attachments, detached from its inclosing frame, and Figs. 5 and 6 are diagrammatic views illustrating the principle upon which my flying machine is constructed.

The present invention has relation to flying machines more particularly designed as toys, but I do not desire to be confined to toys, owing to the fact that by an enlargement of the machine proper and providing suitable power, rudders, &c., the device may be applied to flying machines other than toys.

Similar characters of reference indicate corresponding parts in all the figures of the drawing.

In order that the principle of my flying machine may be better understood, I have shown in Figs. 5 and 6 diagrams giving an analysis of principles. My invention belongs to that class of devices in which an aeroplane is propelled through the air by two rotating propellers revolving in opposite directions about an axis arranged in the general line of flight.

In Fig. 5 A, B represents the axial line of the propellers, which latter tend to advance the machine in the direction of the arrow. C, D is the cross section of the aeroplane 18, the plane of which is parallel to the axial line A, B and a considerable distance above the same. From a point at or near the axis A, B, see Fig. 6, two sheets 17, 17, extend upwardly at equal diverging angles to the vertical and at their upper and outer ends are joined on to the aeroplane 18 at the points E and F near the outer ends of said aeroplanes.

Now my invention comprehends two general principles, one serving to effect the automatic adjustment of the aeroplane to such an angle to the horizontal as to cause it to have a buoyant tendency from the resultant upward pressure against its lower sides. This is shown in Fig. 5. The other principle, illustrated by Fig. 6, is to provide for the automatic balancing, or self-righting quality of the aeroplane as against the tendency to dip sidewise about its axial line of flight.

Referring to Fig. 5, it will be seen that if the propellers be located at A and a rudder at B and the propelling power be exerted in the line A, B, the frictional resistance of the aeroplane C, D will be so far above the line A, B that it will turn the aeroplane backwardly, causing the axial line A, B to be tilted to A′, B′ and the aeroplane C, D to be canted backwardly to the plane C′, D′ as shown in dotted lines, which gives the proper angle for the resultant upward pressure of the air to buoy up the aeroplane.

Referring now to Fig. 6, if from the wind or other extraneous disturbing forces, the aeroplane is tilted sidewise to the dotted line position, it will be seen that the angle which the sheet A, 17, E makes to the vertical is less than formerly and the angle which the other sheet A, 17, F makes to the vertical will be greater, consequently the more nearly horizontal surface A′, F′ will be in a position to be pressed upwardly with a greater power than the more nearly vertical surface A′, E′ and consequently the machine will at once right itself, producing an automatic balancing effect. These sheets 17, 17 I term balancing planes. I will now proceed to the description of my machine as constructed under these principles.

In Figs. 1 to 3 of the drawing 17, 17 are the balancing planes and 18 the aeroplane seen in Figs. 5 and 6. 1 represents a frame, preferably cylindrical, within which is located a spring to impart rotary motion to the propelling blades 2 and 3 and consequently includes the axial line of the propellers. In the drawing I have shown the spring to consist of a torsional rubber band, which is connected to hooks 4 and 5, the hook 5 being formed upon the short bar 6 which is attached to the head 7. The hook 4 is formed upon the inner end of the shaft 8, and said shaft extends through the hollow shaft 9, in which it has its bearings, and a short distance beyond said hollow shaft to the outer end of shaft 8 is attached the head

10, to which the propeller blades 2 are attached in any substantial manner. The hollow shaft 9 has its bearings in the bracket 14 and against the head 10 and is attached to the head 12 which in turn is attached to the cylindrical frame 1 with which it rotates. On the hollow shaft 9 is fixed the head or hub 11 to which the propelling blades 3 are attached. Below the cylindrical frame 1 is located any suitable frame bar 13, to which is fixed the upwardly projecting brackets 14 and 15. The bracket 14 provides a bearing for the hollow shaft 9 and the bracket 15 on its upper end provides a bearing for the short shaft 16, which has a head upon its rear end to prevent it from being drawn forward and out of its bearing. The shaft 16 is fixed to the center of head 7, which is fixed to the cylindrical frame 1 and rotates with it. To the bar 13, or its equivalent, are fixed the balancing planes 17, to which the aeroplane 18 is attached. The aeroplane 18 and the balancing planes 17 consist of suitable frames of wood or other material upon which light material such as paper or other suitable material is attached. The balancing planes 17 are located at an angle to each other and extend downward and toward each other from the aeroplane, to which they are attached at equal angles presenting a V-shaped form, and are so arranged for the purpose of atmospherically maintaining the aeroplane 18 in a horizontal position laterally while in flight as heretofore described.

It will be understood that when the aeroplane 18 is in a true horizontal position laterally as in full lines in Fig. 6 and tilted at an angle upward to the line of flight as in dotted lines in Fig. 5, while in flight, the resistance and sustaining power will be equal on the two balancing planes 17, but when the aeroplane 18 is thrown out of a true horizontal position laterally as in dotted lines in Fig. 6, (but remains at an angle tilted upward to the line of flight in the direction of flight, as in dotted lines Fig. 5) then the plane 17 approaching the nearest to the vertical will have less resistance and sustaining power as it approaches the vertical, (at which the sustaining power will be zero), and the opposing sheet will increase in resistance and sustaining power as it approaches the horizontal, (at which it will have its maximum resistance and sustaining power), or in other words if the machine leans to either side of the greater weight or load (which in the toy is the cylinder or frame with its attachments), the supporting surface and power on the side to which it leans will be increased, while on the other side they will be diminished, which will cause the aeroplane to right itself and be sustained in a true horizontal position laterally and the machine will be held in proper position and will not have a tendency to roll laterally while in flight.

To the bar 13, or its equivalent, is attached the bracket 19, which is for the purpose of connecting the rudder bar 20, below the aeroplane, and the rudder bar 20 is so connected that it can be adjusted and held in fixed adjustment and at any desired angle to the bar 13 and the axis of the propeller. This is brought about by means of the rudder bar 20 resting in a loop of bracket 15, in connection with a series of holes in bracket 19 and a pin connecting the same to the rudder bar. The rudder bar 20 is provided on its rear end with a combined vertical and horizontal rudder 21, of the usual construction.

The rubber band 22 is connected to the hooks 4 and 5, and when power is desired to be stored, the cylinder or frame 1 is held against rotation by clasping it with the thumb and forefinger of one hand and the shaft 8 together with the propelling blades 2 are rotated by placing the forefinger of the other hand against one of the propelling blades 2, and rotating it until the desired amount of energy is stored, after which the cylindrical frame 1 and the aforesaid blade are quickly and simultaneously released and rotary motion is imparted to the cylindrical frame 1 and the shaft 8 in opposite directions, thereby imparting opposite rotary motion to the propelling blades 2 and 3, which are so arranged that the toy or flying machine will be drawn or propelled forward through the air. In the drawing I have illustrated a rubber band such as 22, but it will be understood that any other motor or source of power may be used.

For the purpose of utilizing the properties of the balancing planes 17 and at the same time to support the machine and maintain it at the proper angle to the line of flight and maintain it in a horizontal position laterally, the machine is caused to tilt backward as heretofore described by placing the propeller shaft far enough below the aeroplane 18 so that when the propeller blades 2 and 3 are rotated they will draw the machine forward and the aeroplane will tilt backward on account of the air resistance which the aeroplane 18 and the balancing planes 17 meet with, causing the entire machine to assume an angle upward to the line of flight in the direction of flight. The rudder bar 20 being adjustable, the rudder 21 can be raised or lowered to any desired position, in relation to the line of flight. When so adjusted the horizontal rudder will be forced upward by striking the air while in flight until the upward pressure on the rudder equals the tilting influence caused by the location of the propeller axis below the aeroplane and the whole machine is thus held poised at the desired angle to the line of flight. It will be understood that if the

rudder is set so that the line of flight of the machine is a horizontal line, then increasing the speed of the machine through the air, will cause it to rise and decreasing the speed will cause it to fall. For this reason it will be understood that the angle of the aeroplane to the line of flight is not permanent, but must be changed to suit prevailing conditions and requirements.

The object and purpose of rotating the blades 2 and 3 in opposite directions is to cause their torsional effect on the aeroplane to neutralize each other.

I claim—

1. A flying machine, comprising an aeroplane, a motor, reversely rotating and concentric propellers with axes located at a distance below the aeroplane and two balancing planes arranged on opposite sides of the propeller axis and extending in V-shape relation from the propeller axis to the aeroplane at equal angles and connecting with the aeroplane at points between the outer ends of the same and the middle.

2. A flying machine, comprising a rotatable frame, heads secured to said frame, a motor located in said frame, a rotatable shaft provided with propelling blades, a hollow shaft located around the aforesaid shaft and fixed to one of the heads of the rotatable frame, propelling blades connected to said hollow shaft, an aeroplane located above the frame, balancing planes located in V-shaped relationship with reference to each other and below the aeroplane, a rudder bar provided with a rudder, and bearings for the frame and hollow shaft.

3. A flying machine, comprising a rotatable frame, heads fixed to said frame, a motor located in said frame, a hollow shaft secured to one of the heads fixed to the rotatable frame, said hollow shaft being provided with propelling blades, a shaft located within the hollow shaft and carried by said hollow shaft, propelling blades fixed to the shaft carried by the hollow shaft, an aeroplane located above the rotatable frame and balancing planes located in V-shaped relationship with reference to each other, and below the aeroplane, a bar with bearings adapted to carry the ends of the rotatable frame, and a rudder.

4. In a flying machine, upwardly divergent balancing planes, an aeroplane supported upon the top of said balancing planes and extending beyond the point of connection of the balancing planes, shafts rotatable in opposite directions located at the lower angle of the upwardly divergent balancing planes, said shafts being provided with propelling blades, means for imparting rotary motion to said shafts in opposite directions and a rudder bar provided with a rudder.

5. In a flying machine, an aeroplane, balancing planes located below the aeroplane and arranged in V-shaped relation to each other and at equal angles to the aeroplane, and connecting with the aeroplane at points inside the outer ends of the latter, a motor located below said aeroplane, shafts located at the lower angle of the balancing planes and adapted to rotate in opposite directions and provided with propelling blades, a rudder bar with rudder and means for adjusting the rudder bar and rudder at an angle to the aeroplane.

6. In a flying machine, an aeroplane, balancing planes connected to said aeroplane at points inside the outer ends of the same and extended downward from said aeroplane at equal angles and in V-shaped relation with reference to each other, a motor located below said aeroplane, shafts located at the lower angle of the balancing planes and adapted to rotate in opposite directions, propelling blades secured to said shafts and an adjustable rudder bar and rudder.

7. In a flying machine, an aeroplane, balancing planes located below said aeroplane and connecting with the latter at equal angles at points inside the outer ends thereof and converging toward each other downwardly, a motor located below said aeroplane, rotating blades actuated by the motor, a shaft carrying the blades and located at the lower ends of the balancing planes, and a rudder bar provided with a rudder, said rudder being located below the aeroplane and arranged to oppose the tilting of the aeroplane and hold it at an angle to the line of flight.

8. In a flying machine, an aeroplane, balancing planes located below said aeroplane and connecting with the same at equal angles at points inside the outer ends of the same, a motor located below said aeroplane, rotating blades actuated by the motor and having their axial line below the aeroplane, a frame supporting the motor and propeller blades, and an adjustable rudder bar provided with a rudder, said adjustable rudder bar being connected to the motor frame in fixed relation and having a horizontal blade whereby the aeroplane is caused to adjust itself at an angle to the line of flight by the location of the axial line of the propellers below the aeroplane.

9. In a flying machine, upwardly divergent balancing planes, an aeroplane supported upon the top of said balancing planes and extending beyond the points of connection with the same, shafts rotatable in opposite directions, said shafts being located at the lower angle of the balancing planes and provided with propelling blades, means for imparting rotary motion to said shafts in opposite directions and a rudder.

10. In a flying machine, an aeroplane, balancing planes located below said aeroplane and extending downward and toward each

other from the aeroplane; a motor located below said aeroplane; rotating blades actuated by said motor, and having their axial line below the aeroplane and below the greater resistance to the device while being propelled through the air, and a rudder having a horizontal blade arranged to oppose the tilting of the device caused by locating the axial line of the propellers below the aeroplane and below the greater resistance to the device while being propelled through the air, and having a vertical blade to direct and control its course.

In testimony that I claim the above, I have hereunto subscribed my name in the presence of two witnesses.

WILLIAM H. MARTIN.

Witnesses:

J. A. JEFFERS,

F. W. BOND.