

E. EBBINGHAUS.
AEROPLANE.

APPLICATION FILED FEB. 28, 1911.

Patented Aug. 15, 1911.

4 SHEETS—SHEET 1.

1,000,592.

Fig. 1.

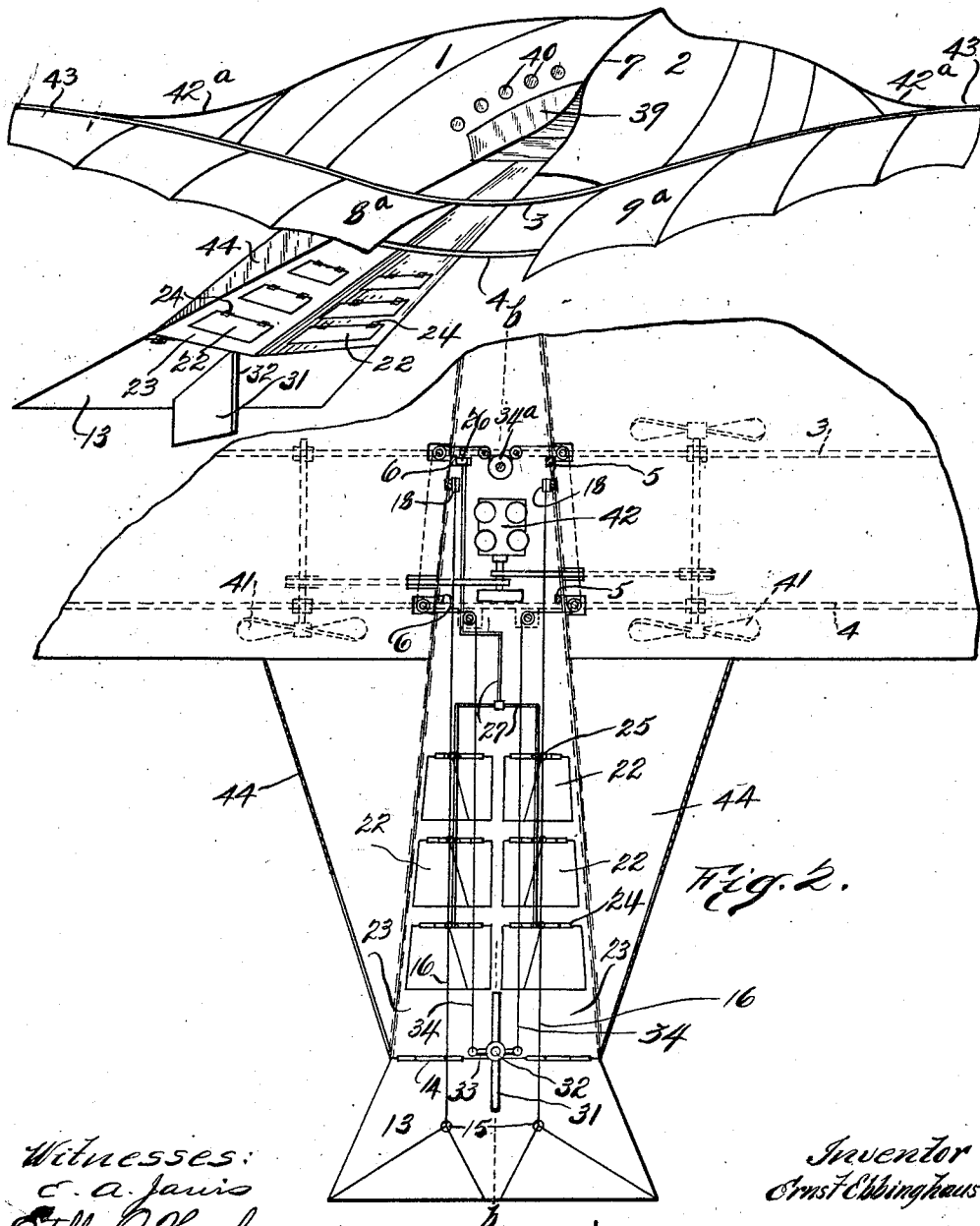


Fig. 2.

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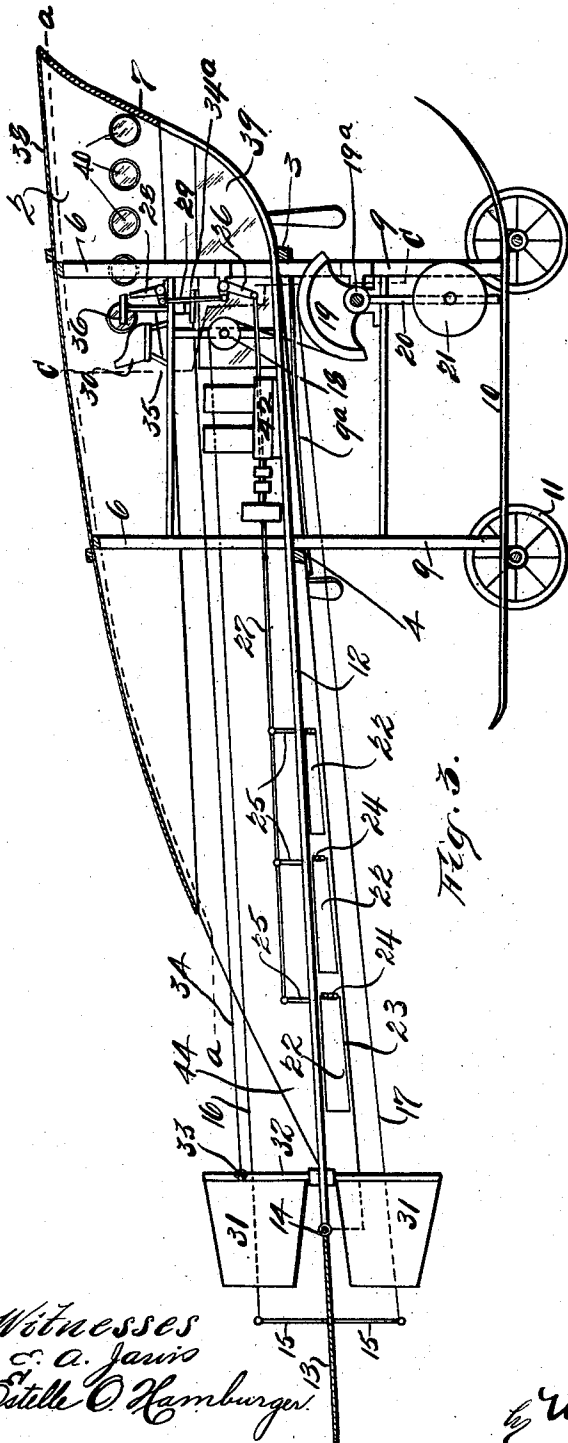
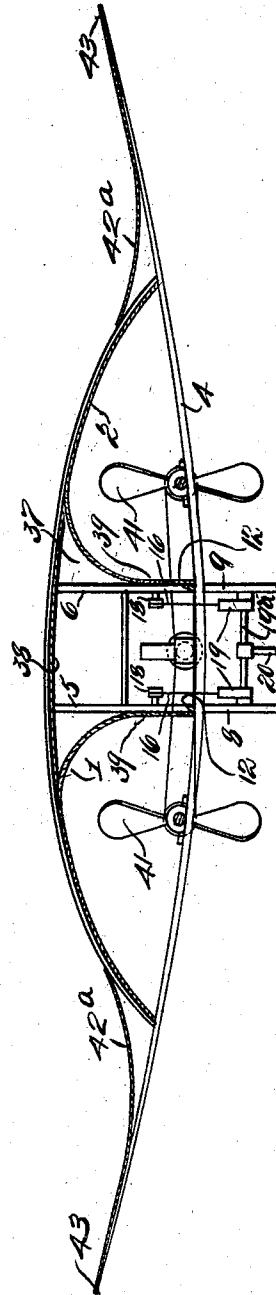


Fig. 3.

Fig. 4.



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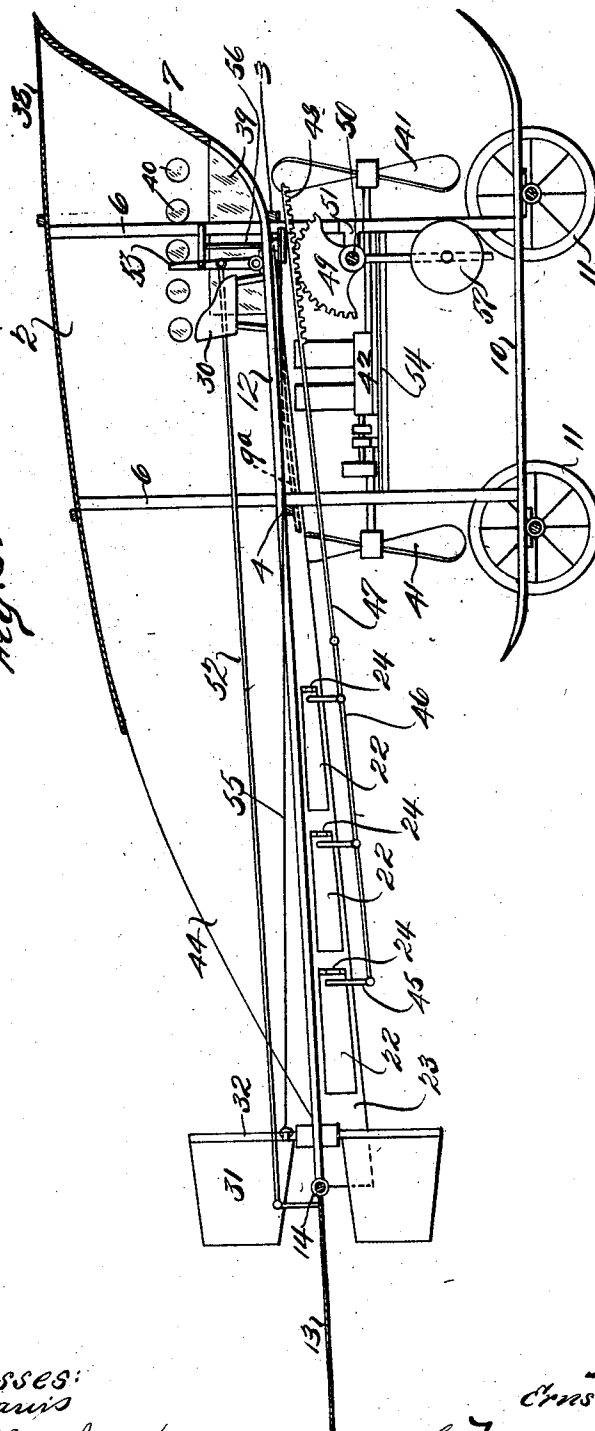
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4 SHEETS—SHEET 3.

1,000,592.

Fig. 5.



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4 SHEETS—SHEET 4.

Fig. 6.

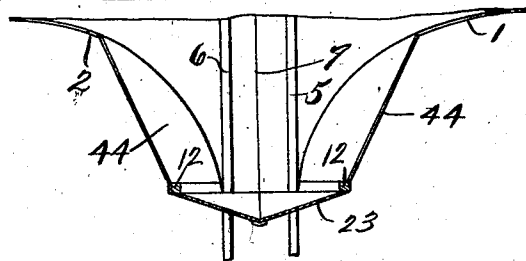


Fig. 7.

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UNITED STATES PATENT OFFICE.

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AEROPLANE.

1,000,592.

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Application filed February 28, 1911. Serial No. 611,433.

To all whom it may concern:

Be it known that I, ERNST EBBINGHAUS, a subject of the Emperor of Germany, residing at Manhattan borough, city, county, and State of New York, have invented certain new and useful Improvements in Aeroplanes, of which the following is a full, clear, and exact description.

This invention relates to an improvement in aeroplanes, the object being to provide a device of this character the planes, or wings, of which are so disposed relative to each other as to provide a protection for the aviator.

A further feature of my improved device is an automatically operated tail, or stern-plane, by which means the device is automatically prevented from diving to a dangerous extent.

Further features of improvement will be hereinafter set forth.

I will now proceed to describe my invention in detail, the novel features of which I will finally claim, reference being had to the accompanying drawings, forming part hereof, wherein:

Figure 1 is a diagrammatic perspective view of my improved aeroplane, the wings and planes only being shown; Fig. 2 is an enlarged sectional plan view, the section being taken on a line *a-a* in Fig. 3; Fig. 3 is a vertical longitudinal sectional view, the section being taken on a line *b-b* in Fig. 2; Fig. 4 is a vertical sectional front view, the section being taken on a line *c-c* in Fig. 3, the truck of the device being omitted; Fig. 5 is a longitudinal, vertical, sectional view of another embodiment of my invention. Fig. 6 is a diagrammatic plan view illustrating the frame and the various wings and planes carried thereby; and Fig. 7 is a vertical sectional view thereof, the section being taken on a line 7-7 in Fig. 6.

Referring to the drawings, my improved aeroplane comprises the convexed wings 1 and 2, one end of each of which is secured to the concaved frame members 3 and 4 (see Figs. 4 and 6). The other ends of the said wings are secured to uprights 5, 5 and 6, 6. As can be seen in Fig. 1, the wings 1 and 2 terminate in a bow 7 (Fig. 1) which acts to cut the wind. To the underside of the frame members 3 and 4, I secure auxiliary wings 8^a and 9^a. The uprights 5, 5 and 6, 6 are extensions of the posts 8, 8 and 9, 9 respectively. To the lower ends of the

posts 8, 8 and 9, 9, I secure a truck comprising frame members 10, one only being shown in Fig. 3, to which are suitably secured wheels 11 by which means the device can travel upon the ground.

The bow 7 of the device is caused to keep its shape by means of the frame members 12, which meet at the said bow portion of the device.

As can be seen in Figs. 1 and 2, the frame members 12 diverge from the bow toward the stern, and to the stern end of the said frame members I pivotally secure a tail 13, as at 14, the said tail being provided with posts 15, to which one end of each of the cables 16 and 17 is secured. As can be seen in Fig. 3, the cables 16 pass forwardly over idlers 18, then to pivotally mounted segments 19, while the cables 17 pass forwardly directly to the said segments 19, the cables 17 being secured to said segments 19 at the end opposite to the end to which the cables 16 are secured. The segments 19 are carried by a pivotal rod 19^a, which in turn carries a rod 20, to which an adjustable weight 21 is secured. The weight 21 acts as a pendulum and tends to keep the rod 20 in a vertical position regardless of the angular disposition of the aeroplane. The function of the weight 21, segments 19 and tail 13 is to prevent the aeroplane from diving or traveling upwardly to an extent which would be dangerous.

To control the horizontal flight of the aeroplane, I provide a plurality of auxiliary pivotal planes 22, which are mounted in the manner of trap-doors in the planes 23, which in turn are angularly disposed relative to the tail 13, as can be seen in Figs. 1 and 7. The auxiliary planes 22 are hinged or pivotally secured to the planes 23, as at 24.

Each plane 23 carries a post 25, said posts being connected one to the other and to a bell-crank lever 26 by rods 27 (see Fig. 3). The bell-crank lever 26 is in turn connected to a manipulating lever 28 by a link 29. The lever 28 is located near the aviator's seat 30.

To control the course of the aeroplane, I provide vertical rudders 31, which are pivotally secured to the frame-members 12 adjacent to the tail 13, as shown in Fig. 3. The rudders are carried by a pivotal post 32, provided with arms 33, to which are secured one end of two cables 34 (Fig. 2), which in turn pass forward and around a

drum 34^a on a steering post 35, provided with a wheel 36, near the aviator's seat 30.

To protect the aviator from the elements, I cover the space 37 (see Fig. 4) with a canopy 38 and extend the said canopy well toward the stern, as shown in Fig. 3. To enable the aviator to see, I provide windows 39, one in each wing or plane 1 and 2, the said windows being located beneath the aviator's seat. The windows 39 enable the aviator to see beneath the aeroplane. To enable the aviator to see ahead and on the sides of the aeroplane, I provide portholes 40, the said portholes 40 being located substantially on a line with the eyes of the aviator.

To direct the flight of the device upwardly or downwardly the aviator has but to manipulate the lever 28 to throw the auxiliary planes 22 upwardly or downwardly.

To alter the course of the aeroplane in a horizontal plane, it is but necessary to manipulate the steering wheel 36 to throw the rudders to the right or to the left.

While the auxiliary planes 22 control the upward or downward course of the device, they do not perform such function entirely unresisted, as the tail 13 will be thrown, by means of the pivotal segment 19, oppositely to the position of the said planes 22. By this means a too sudden inclination of the device is prevented. It will, of course, be obvious that the direction upwardly or downwardly of the device will be altered by the planes 22 before the tail 13 can act, but the action of the tail retards further upward or downward movement of the device, after its position has been altered by the weighted pivotal segments 19. Should the device suddenly dive or suddenly tend to rise, the weight 21 will rotate the segments 19 and cause the angle of the tail 13 to increase and thus retard a too sudden change of inclination.

To propel the device, I utilize propellers 41 which are driven by a suitable motor 42. To prevent a pocketing of the wind, I utilize small concaved wings 42^a (Fig. 4), which extend from the main wings 1 and 2 to the tips 43 of the frame members 3 and 4. To assist in holding the device in its course, I provide upwardly directed inclined planes 44 (Figs. 1 and 2), the lower edges of which are secured to the frame members 12, the front edges being secured to the wings 1 and 2. The planes 44 act as a center or lee-board.

In the form of device as illustrated in Fig. 5, the auxiliary planes 22 are provided with depending posts 45 which are connected one to the other by a rod 46, the said rod 46 being connected by a rod 47, having a rack 48, to toothed segments 49, one only being shown. The segments 49 are carried by a pivotal rod 50, similar to the rod 19^a in Fig. 4, the said rod 50 being carried by brackets

51 on the posts 5 and 6; one bracket only being shown in Fig. 5. In this form of device, I connect the tail 13 by a rod 52 to a lever 53 adjacent the aviator's seat 30, which is located upon the frame 12 instead of above the same, as shown in Fig. 3. The motor 42 is located upon a frame 54, which is located beneath the frame 12, whereby the said motor is kept cool by the passage of air. The rudders 31 are connected by cables 55, one only being shown, to a steering post 56. In the above described form of device, the auxiliary planes 22 are automatically operated by the segments 49, which in turn are operated by a weight 57, the tail 13 being manually controlled.

It will be apparent by an inspection of Fig. 6 that the frame members 3 and 4 have secured thereto in any suitable manner the outer end of each wing 1 and 2; the inner end of each of said wings being secured to the upright posts 5 and 6. It will be also seen that the frame-members 12 are secured to the frame-members 3 and 4 and terminate in a point at the front end of the aeroplane, at which point the wings 1 and 2 also terminate. Fig. 7 illustrates the angular disposition of the planes 23, which are secured to the frame members 12. As the said figures illustrate a frame and a plurality of wings carried by the frame, it is not essential to describe more in detail the manner of connecting the same, as this may be done in various ways, which forms no part of my invention.

It will, of course, be understood that the precise details of construction illustrated in the drawings may be varied in various particulars without departing from the spirit and scope of my invention.

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

1. An aeroplane comprising a frame, a plurality of wings carried by said frame at the forward end thereof, inclined planes carried by said frame on the underside thereof, a plurality of auxiliary planes pivotally mounted in said inclined planes, means adapted to move said auxiliary planes on their pivots, a tail pivotally mounted on said frame to the rear of said auxiliary planes, means adapted to automatically operate said tail when the aeroplane changes its upward or downward course, a rudder, and means adapted to actuate said rudder.
2. An aeroplane comprising a frame, a plurality of separated convex wings carried by said frame at the forward end thereof, a cover for the space between said wings, inclined planes carried by said frame on the underside thereof, a plurality of auxiliary planes pivotally mounted in said inclined planes, means adapted to move said auxiliary planes on their pivots, a tail, pivotally

mounted on said frame to the rear of said auxiliary planes, means adapted to automatically operate said tail when the aeroplane changes its upward or downward course, a
5 rudder, and means adapted to actuate said rudder.

3. An aeroplane, comprising a frame, a plurality of wings carried by said frame at the forward end thereof, inclined planes carried by said frame on the underside thereof,
10 a plurality of auxiliary planes pivotally mounted in said inclined planes, means adapted to move said auxiliary planes on their pivots, a tail pivotally mounted on said
15 frame to the rear of said auxiliary planes, a pivoted weight adapted to automatically operate said tail when said aeroplane

changes the direction of its flight upwardly or downwardly, a rudder, and means adapted to actuate said rudder. 20

4. In an aeroplane, the combination of a frame, a pivoted horizontally disposed tail, wings carried by the frame, a vertically disposed rudder, a plurality of angularly disposed planes, auxiliary planes mounted
25 thereon, and means adapted to actuate said auxiliary planes, tail and rudder independently of each other.

Signed at New York city, N. Y., this 24th day of February 1911.

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