July 2, 1929. V. EHMIG 1,719,048

FLYING MACHINE

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Fig. 1

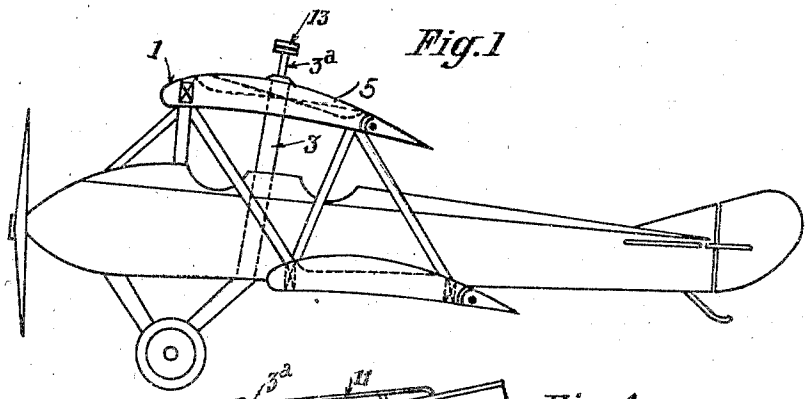


Fig 4

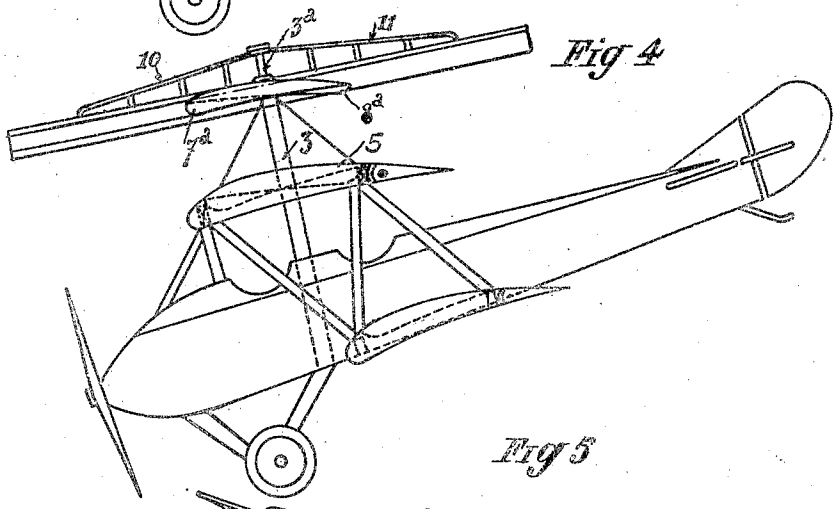
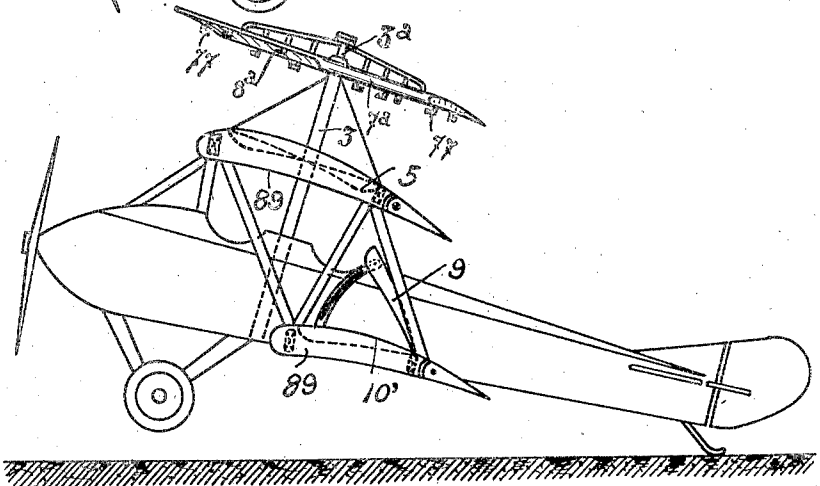


Fig 5



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Fig. 2

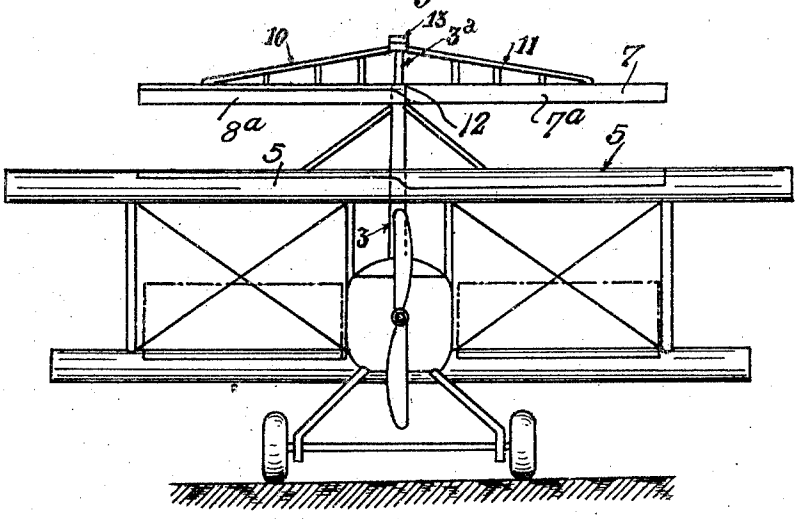
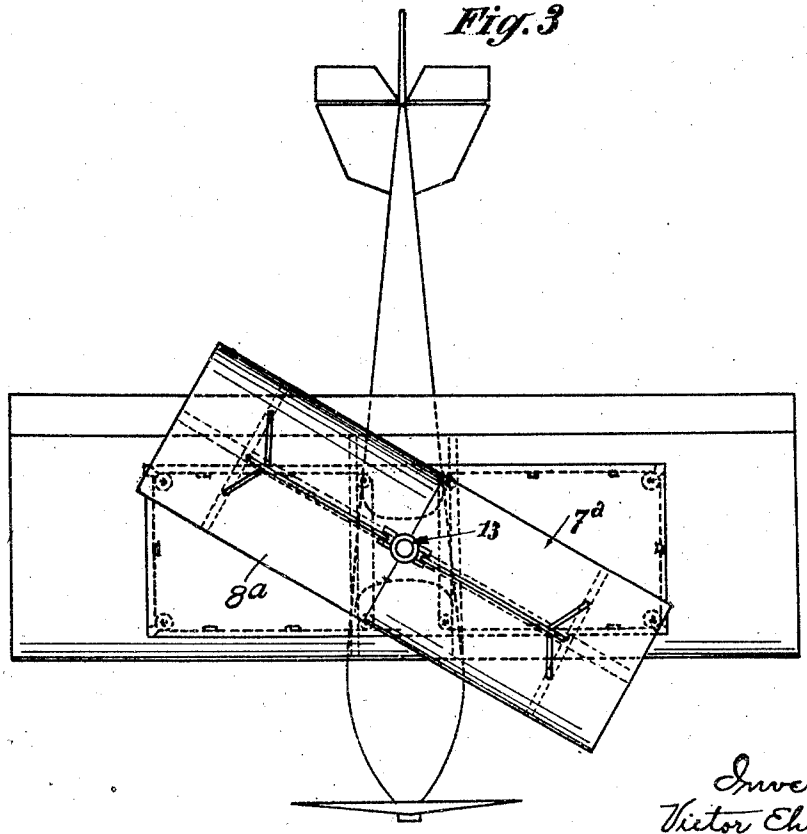


Fig. 3



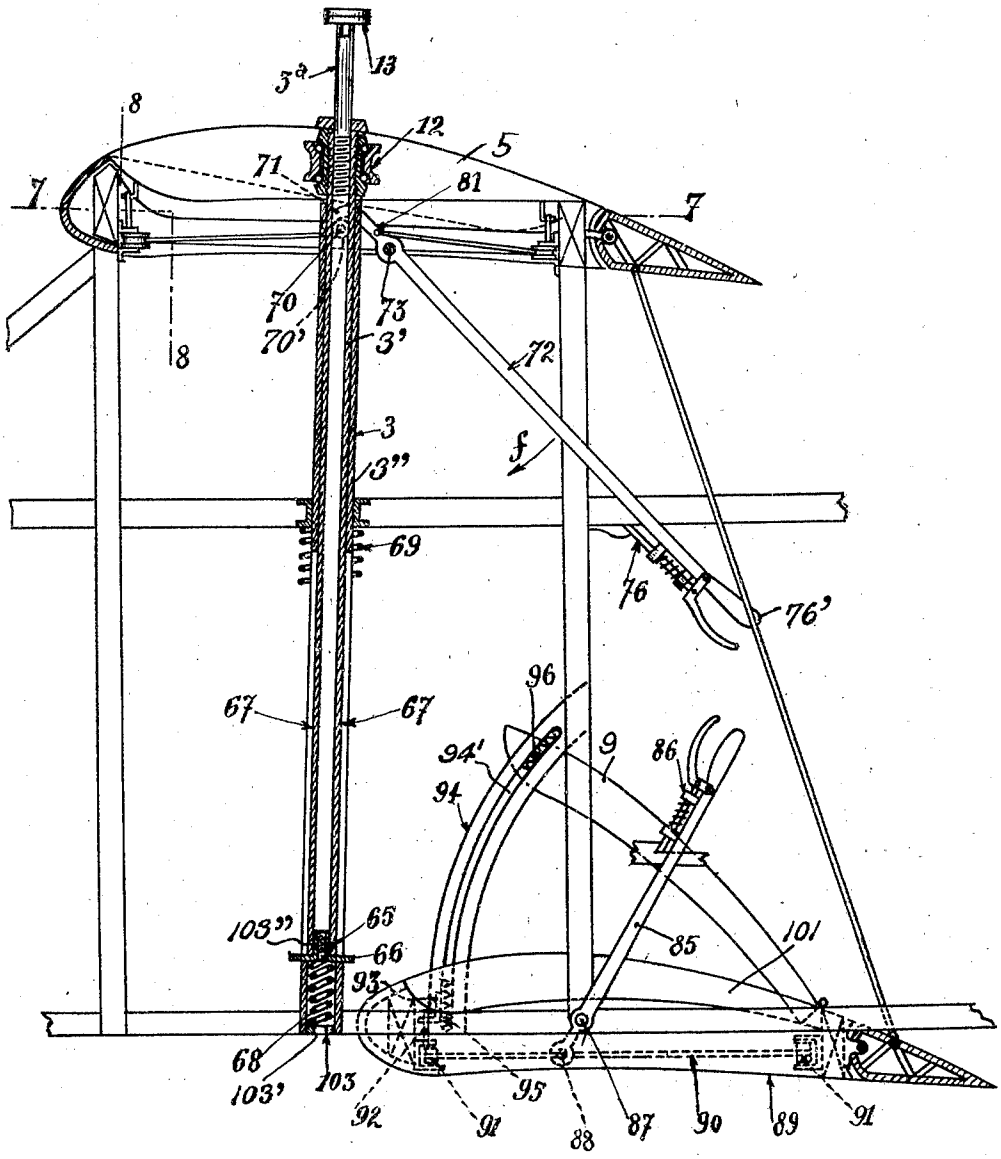
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FLYING MACHINE

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Fig. 6



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Fig. 7

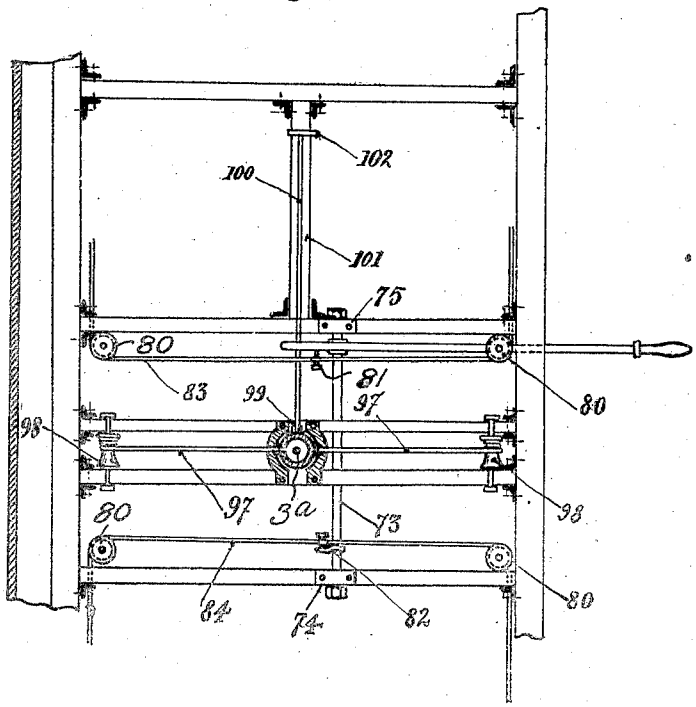


Fig. 8

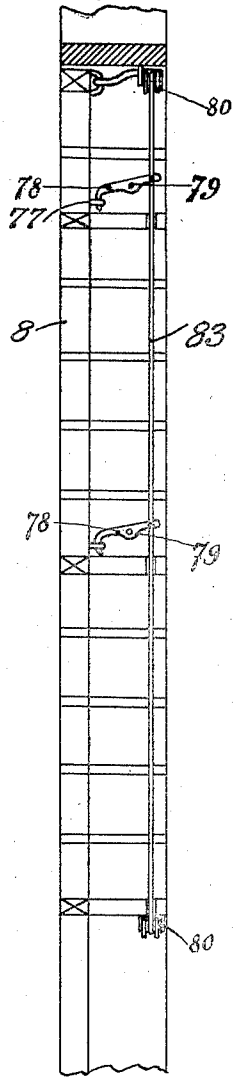
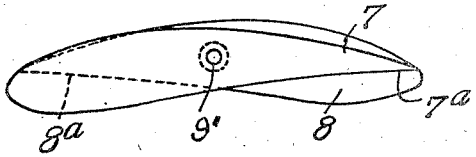


Fig. 9



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FLYING MACHINE

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Fig. 10

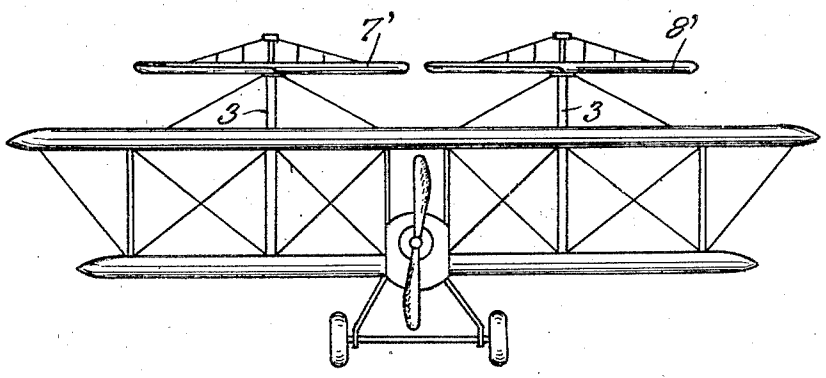
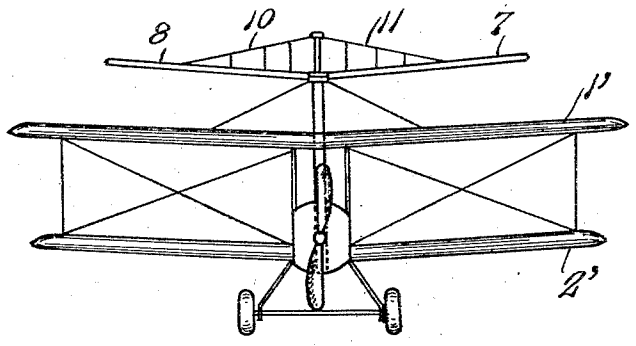


Fig. 11



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By Lemmon & Lemmon
Att'y

Patented July 2, 1929. 1,719,048

UNITED STATES PATENT OFFICE.

VICTOR EHMIG, OF PARIS, FRANCE.

FLYING MACHINE.

Application filed June 20, 1927, Serial No. 200,139, and in France July 1, 1926.

My invention relates to improvements in aerial apparatus of the type having rotatable planes by means of which the sustaining surface of the apparatus is increased at will in order to descend more slowly and to facilitate landing upon rough ground, or to avoid a fall when the engine fails or the control apparatus becomes inoperative and analogous reasons.

According to my invention the said rotatable planes are superposed upon stationary planes, into which they are adapted to be fitted when not in use. By acting upon the control levers disposed within reach of the pilot, the said rotatable planes automatically assume the position upon their guiding shaft which they are to occupy for the descent, and immediately become operative thereafter.

The rotatable planes are placed in line and sufficiently close as to not interrupt their continuity. Their incidence, which is small, is inverse and is so chosen that the resistance of the air will cause the planes to rotate as soon as they issue from their recess. The said planes may even be mounted so as to pivot along their longitudinal axes, under the pilot's control, so as to change their incidence and hence change their rate of rotation.

The supporting shaft upon which the said planes rotate consists of a telescoping mast which extends but slightly above the planes in order to reduce the resistance to the air, and is so disposed to give maximum visibility to the pilot.

For airplanes having a large span, I may duplicate the retarding device by placing a mast at each side of the fuselage of the airplane in the middle of the planes, each mast serving as a pivot for a pair of blades or rotatable planes.

My invention will be readily understood by those skilled in the art in the following description when taken in connection with the accompanying drawing, forming part of this specification, and in which—

Fig. 1 is a side view of my device with planes in inoperative position;

Fig. 2 is a front view with planes in operative position;

Fig. 3 is a plan view of Fig. 2;

Fig. 4 is a side view of the device in flight corresponding to Fig. 2;

Fig. 5 is a view similar to Fig. 4 of the device in landing position;

Fig. 6 is a partial section of the airplane, on a larger scale, showing the control mechanism of the rotatable planes;

Fig. 7 is a section on the line 7—7 of Fig. 6;

Fig. 8 is a section on the line 8—8 of Fig. 6;

Fig. 9 is a diagrammatic view showing the relative pivoting effect of the movable planes;

Fig. 10 shows a front view of a modification in which the retarding device is duplicated.

Fig. 11 is another modification showing the use of the retarding device upon an airplane with oblique wings.

Referring to the drawing, in an upper stationary wing 1 of the apparatus are formed one or more recesses 5 in which is concealed a movable plane consisting of two wings 7 and 8 connected together. For small or medium-sized airplanes, as shown in Figs. 1 to 5, the wings 7 and 8 are joined at the ends so as to form a single plane pivotally mounted at the middle. For airplanes of large span, a double pair of movable planes 7′ and 8′ are employed, as shown in Fig. 10, which are disposed symmetrically in the middle of the main planes with respect to the fuselage.

The coupled movable planes or wings have their leading edges 7^a and 8^a disposed in opposite positions and hence their rear edges are also oppositely disposed as clearly shown in the drawings.

Instead of mounting the pair of planes in rigid connection at their ends, they may be pivoted on their longitudinal axis and provided with a device controlled by the pilot, so that he may increase the incidence of each wing as desired, as shown in Fig. 9. In all cases, the movable wings 7—8 are provided with reinforcing elements 10—11 which are preferably connected to ball bearings 12—13 mounted respectively on a shaft 3^a which is secured to an inner tube 3′ and on said inner tube forming part of a telescoping mast 3 disposed upon the airplane body, with a slight rearward inclination.

As shown in Fig. 6 the inner tube 3′ of the mast 3 has at the lower end a screw plug 65 carrying two diametrically disposed lugs 66 which serve to guide and to limit the motion of the said tube by coacting with slots 67 formed in the outer tube 3″ of the

mast. Shock-absorbing springs 68 and 69 are provided at each end of said slots for taking up shocks.

To hold the said movable wings in their recess, the inner tube carries at its upper end a pin 70, preferably provided with a roller 70′, coacting with a hook 71 of a lever 72 keyed to a shaft 73 mounted in a pair of bearings 74—75 (Fig. 7), secured to the cross-bracing in the interior of the main stationary plane. The lever 72 is provided with a latching device 76, and terminates in a handle 76′, disposed within reach of the pilot.

To prevent the wings from warping and rising slightly, due to the vacuum produced above them by reason of the fact that they are situated exactly at the center of thrust at which the lifting effect is strongest, the movable wings are adapted to be held by rings 77 which are provided in suitable number and are each disposed at a point near the edge, said hooks cooperating with a series of pawls 78 (Fig. 8). Said pawls consist of small levers with a hook at one end, pivoted at 79, and placed on the interior of the wings. The other end of each lever is attached to endless cables 83—84 which follow the periphery of each wing, passing over the pulleys 80 mounted on the bracing structure of the main aeroplane wing. One of the said cables 83 is attached at 81 to the hook of the lever 72, while the other cable is attached to a small lever 82 keyed to the shaft 73.

By moving the lever 72 in the direction of the arrow *f*, the pilot releases the pin holding the inner tube of the mast 3 and the movement of the cables 83—84 releases all of the pawls 78 holding the movable wings.

The spring 68 thus becomes released and in turn releases the movable wings in such manner that they may issue from their recess. The air resistance will act at once to raise the wings, as shown in Figs. 2, 4 and 5. Due to the incidence of their planes, the wings are at once set in motion, thus retarding the descent of the airplane by forming an additional lifting surface, and assuring its stability by their rotation and by lowering the center of gravity of the airplane.

I may provide a spiral spring or like which is secured at one end to the mast and at the other to a ratchet device mounted on the wings, so that the wings will be given an initial gyratory movement when brought out of their recess.

The two wings or planes may be mounted on a longitudinal shaft 9′ (Fig. 9) and are placed under the control of the pilot who can pivot the wings upon the said shaft in order to vary their inclination, thus obtaining a more or less rapid rotation and descent.

The lower main stationary planes 89 of the machine are also provided with the movable planes or wings 9, which are hinged in the recesses of the main planes, and the said movable wings 9 are raised in order to form a brake when the machine lands, as shown in Fig. 5.

The apparatus is controlled by a lever 85 provided with a fastening device 86 within reach of the pilot. Said lever is keyed to a shaft 87 and transmits by its angular motion by means of small levers 88, which are also keyed to the shaft 87 placed in the wings 89, in order to effect linear displacement of a cable 90 which is mounted on the pulleys 91 and controls, as in the rotating planes, catches 92 retaining the wings 9 by means of pawls 93 (Fig. 6). The said wings 9 are guided at the ends by sector plates 94 having recesses 94′ which contain two springs 95—96 associated with said wings. The spring 95 acts at the bottom to facilitate removal of the wing 9 from its recess, while the spring 96 serves for shock absorbing purposes.

To properly hold the inner mast tube in its upper position, I provide two cables 97 of which one end is secured to said tube beneath the bearing 12 and the other end is wound on spring drums 98 disposed upon the lateral struts of the machine.

In the lengthwise direction I may provide two bracing rods 100 which are pivoted at their upper end at a point beneath the bearing 12 at 99 whereas the other ends each carries a shoe or spindle 102 which is slidably mounted on a track 101 provided in the movable wings. The length of the cables and stretching rods is so adjusted that the mast will be firmly held against oscillation when in the upper position.

When the machine has landed on the ground and has come to a stop, the movable wings are lowered. In certain cases I may provide a suitable latch for maintaining said wings in the upper position.

To facilitate the compression of the spring 68 and release of the rotatable wings or planes into flying position, I insert a screw into a central hole 103 formed in a lower closing plate 103′ of the mast 3, which screw is screwed into a tapped hole 103″ of screw plug 65. Said screw is then withdrawn after the wings have been released.

While I have described what I deem to be the preferred form of my device I do not wish to be limited thereto as changes might be made in the disposition of the parts and details of construction thereof without departing from the spirit of the invention as comprehended within the scope of the appended claims.

In particular the lifting planes of the machine, in certain cases, may be given a V shape representing two intersecting oblique planes which increases the stability during

descent, such an arrangement being shown in Fig. 11.

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

1. In an aeroplane of the type described having a main sustaining plane, a mast disposed at the center of said plane, a pair of auxiliary sustaining planes loosely mounted on said mast, a recess formed in said main plane adapted to receive said auxiliary planes, manually releasable means for locking said auxiliary planes in said recess and means for automatically ejecting said auxiliary planes from said main plane upon release of said locking means.

2. In an aeroplane of the type described having a main sustaining plane, a mast disposed at the center of said plane, a pair of auxiliary sustaining planes loosely mounted on said mast, a recess formed in said main plane adapted to receive said auxiliary planes, a plurality of pawls on said main plane, a plurality of cooperating eyes on said auxiliary plane, a manually controlled cable for operating said pawls and means for automatically ejecting said auxiliary planes from said main plane upon release of said locking means.

3. In an aeroplane of the type described having a main sustaining plane, a mast disposed at the center of said plane consisting of a pair of telescoping tubes, a pair of auxiliary sustaining planes loosely mounted on said mast, a recess formed in said main plane adapted to receive said auxiliary planes, manually releasable means for locking said auxiliary planes in said recess and a spring opposing the movement of the movable tube of said mast for ejecting said auxiliary planes from said main plane upon release of said locking means.

4. In an aeroplane of the type described having a main sustaining plane, a mast disposed at the center of said plane consisting of a pair of telescoping tubes, a pair of auxiliary planes loosely mounted on said mast, a recess formed in said main plane adapted to receive said auxiliary planes, a plurality of cooperating eyes on said auxiliary plane, a manually controlled cable for operating said pawls and a spring opposing the movement of the movable tube of said mast for ejecting said auxiliary planes from said main plane upon release of said locking means.

5. In an aeroplane of the type described having a main sustaining plane, a mast disposed at the center of said plane, a pair of auxiliary sustaining planes loosely mounted on said mast, a recess formed in said main plane adapted to receive said auxiliary planes, a plurality of pawls on said main plane, a plurality of eyes cooperating with said pawls on said auxiliary plane, a manually controlled cable for operating said pawls, and a spring opposing movement of said auxiliary planes into said recess for ejecting said auxiliary planes from said main plane upon release of said locking means.

6. In an aeroplane of the type described having a main sustaining plane, a mast disposed at the center of said plane consisting of a pair of telescoping tubes, a pair of auxiliary sustaining planes loosely mounted on said mast, a recess formed in said main plane adapted to receive said auxiliary planes, a plurality of pawls on said main plane, a plurality of cooperating eyes on said auxiliary plane, a manually controlled cable for operating said pawls and a spring opposing the movement of the movable tube of said mast for ejecting said auxiliary planes from said main plane upon release of said locking means.

7. In an aeroplane of the type described having a main sustaining plane, a mast disposed at the center of said plane, a pair of auxiliary sustaining planes loosely mounted on said mast, a recess formed in said main plane adapted to receive said auxiliary planes, manually releasable means for locking said auxiliary planes in said recess, means for automatically ejecting said auxiliary planes from said main plane upon release of said locking means, a pair of ball-bearings carried by said mast and reenforcing rods interconnecting said ball bearings and said auxiliary planes.

8. In an aeroplane of the type described having a main sustaining plane, a mast disposed at the center of said plane, a pair of auxiliary sustaining planes loosely mounted on said mast, a recess formed in said main plane adapted to receive said auxiliary planes, a plurality of pawls on said main plane, a plurality of cooperating eyes on said auxiliary plane, a manually controlled cable for operating said pawls, means for automatically ejecting said auxiliary planes from said main plane upon release of said locking means, a pair of ball-bearings carried by said mast and reenforcing rods interconnecting said ball-bearings and said auxiliary planes.

9. In an aeroplane of the type described having a main sustaining plane, a mast disposed at the center of said plane consisting of a pair of telescoping tubes, a pair of auxiliary sustaining planes loosely mounted on said mast, a recess formed in said main plane adapted to receive said auxiliary planes, manually releasable means for locking said auxiliary planes in said recess, a spring opposing the movement of the movable tube of said mast for ejecting said auxiliary planes from said main plane upon release of said locking means, a pair of ball-bear-

ings carried by said mast and reenforcing rods interconnecting said ball-bearings and said auxiliary planes.

10. In an aeroplane of the type described having a main sustaining plane, a mast disposed at the center of said plane consisting of a pair of telescoping tubes, a pair of auxiliary planes loosely mounted on said mast, a recess formed in said main plane adapted to receive said auxiliary planes, a plurality of cooperating eyes on said auxiliary plane, a manually controlled cable for operating said pawls, a spring opposing the movement of the movable tube of said mast for ejecting said auxiliary planes from said main plane upon release of said locking means, a pair of ball-bearings carried by said mast and reenforcing rods interconnecting said ball-bearings and said auxiliary planes.

11. In an aeroplane of the type described having a main sustaining plane, a mast disposed at the center of said plane, a pair of auxiliary sustaining planes loosely mounted on said mast, a recess formed in said main plane adapted to receive said auxiliary planes, a plurality of pawls on said main plane, a plurality of eyes cooperating with said pawls on said auxiliary plane, a manually controlled cable for operating said pawls, a spring opposing movement of said auxiliary planes into said recess for ejecting said auxiliary planes from said main plane upon release of said locking means.

12. In an aeroplane of the type described having a main sustaining plane, a mast disposed at the center of said plane consisting of a pair of telescoping tubes, a pair of auxiliary sustaining planes loosely mounted on said mast, a recess formed in said main plane adapted to receive said auxiliary planes, manually releasable means for locking said auxiliary planes in said recess, a spring opposing the movement of the movable tube of said mast for ejecting said auxiliary planes from said main plane upon release of said locking means and means for stabilizing said mast when said auxiliary planes are ejected.

13. In an aeroplane of the type described having a main sustaining plane, a mast disposed at the center of said plane consisting of a pair of telescoping tubes, a pair of auxiliary sustaining planes loosely mounted on said mast, a recess formed in said main plane adapted to receive said auxiliary planes, manually releasable means for locking said auxiliary planes in said recess, a spring opposing the movement of the movable tube of said mast for ejecting said auxiliary planes from said main plane upon release of said locking means, a plurality of cables attached to said mast and a spring drum for each of said cables carried by said main plane for stabilizing said mast when said auxiliary planes are ejected.

14. In an aeroplane of the type described having a main sustaining plane, a tube disposed at the center of said plane, a second tube slidably mounted in said first tube, a plurality of elongated guide slots formed in said first tube, a lug for each of said guide slots on said second tube, a pair of auxiliary sustaining planes rotatably mounted on said second tube, a recess formed in said main plane adapted to receive said auxiliary planes, manually releasable means for locking said auxiliary planes in said recess, a spring disposed in said first tube adapted to abut said second tube and manually releasable means for depressing and locking said second tube.

15. In an aeroplane of the type described having a main sustaining plane, a mast disposed at the center of gravity of said plane and rearwardly inclined with reference to the curvature of the upper surface of the main sustaining plane and to the longitudinal axis of the aeroplane; a pair of auxiliary sustaining planes loosely mounted on said mast, and adapted for rotating under the influence of the relative wind, a recess formed in the said sustaining plane adapted to receive said auxiliary planes, manually controlled means for locking the said auxiliary planes in said recess, and means for automatically ejecting said auxiliary planes from said main plane.

16. In an aeroplane of the type described having a main sustaining plane and a mast disposed at the center of said plane; a pair of auxiliary sustaining planes having an outline analogous to that of the said main plane and loosely mounted on said mast in such manner that the leading and the trailing edges of said auxiliary planes will be inversely disposed and that the upper surfaces will be in line with one another and adapted for rotating under the influence of the relative wind, a recess formed in said main plane adapted to receive said auxiliary planes, manually controlled means for locking said auxiliary planes in said recess, and means for automatically ejecting said auxiliary planes from the main plane.

17. In an aeroplane of the type described having a main sustaining plane and a mast disposed at the center of said plane; a pair of auxiliary sustaining planes loosely mounted on said mast and adapted for rotating under the influence of the relative wind, a horizontal shaft traversing said auxiliary planes and secured to said mast, means for rotating said auxiliary planes about said shaft and thus varying their incidence, a recess formed in said main plane adapted to receive said auxiliary planes, manually controlled means for locking said auxiliary planes in said recess, and means for automatically ejecting said auxiliary planes from the main plane.

18. In an aeroplane of the type described having a main sustaining plane; a mast disposed at the center of gravity of said plane and rearwardly inclined with reference to the curvature of the upper surface of the main sustaining plane and to the longitudinal axis of the aeroplane, a pair of auxiliary sustaining surfaces mounted on said mast and adapted for rotating under the influence of relative wind, a recess formed in said main sustaining plane adapted to receive said auxiliary surfaces, manually controlled means for locking the said auxiliary surfaces in said recess, and means for automatically ejecting said auxiliary surfaces from said main sustaining plane.

19. In an aeroplane of the type described having a main sustaining plane; a mast disposed at the center of said plane, a pair of auxiliary surfaces having an outline analogous to that of the said main plane and loosely mounted on said mast, the said auxiliary surfaces being adapted for rotating under the influence of the relative wind, the loading and trailing edges of said auxiliary surfaces being inversely disposed and the upper part of the said auxiliary surfaces being in line with one another, a recess formed in said main plane adapted to receive said auxiliary surfaces, manually controlled means for locking said auxiliary surfaces in said recess, and means for automatically ejecting said auxiliary surfaces from the main plane.

20. In an aeroplane of the type described having a main sustaining plane; a mast disposed at the center of the plane, a pair of auxiliary sustaining surfaces loosely mounted on said mast and adapted for rotating under the influence of the relative wind, a horizontal shaft traversing said auxiliary surfaces and secured to said mast, means for tilting each of said auxiliary surfaces about said shaft and whereby the incidence of the same is varied in opposite directions, a recess formed in said main plane to receive said auxiliary surfaces, manually controlled means for locking said auxiliary surfaces in said recess and means for automatically ejecting said auxiliary surfaces from the main plane.

21. In an aeroplane of the type described having a main sustaining plane; a mast disposed at the center of gravity of said plane, a pair of auxiliary sustaining surfaces loosely mounted on said mast and adapted for rotating under the influence of the relative wind, a recess formed in said main sustaining plane adapted to receive said auxiliary surfaces, manually controlled means for locking said auxiliary surfaces in said recess, and means for automatically ejecting said auxiliary surfaces from said main sustaining plane.

In testimony that I claim the foregoing as my invention, I have signed my name hereto.

VICTOR EHMIG.