Sept. 26, 1933. J. WEISINGER 1,928,519

AIRPLANE MANEUVERING APPARATUS

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Fig. 3.

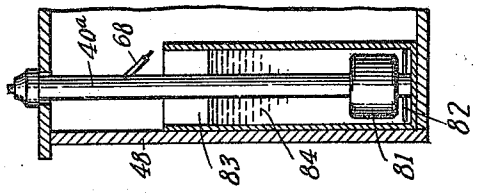


Fig. 1.

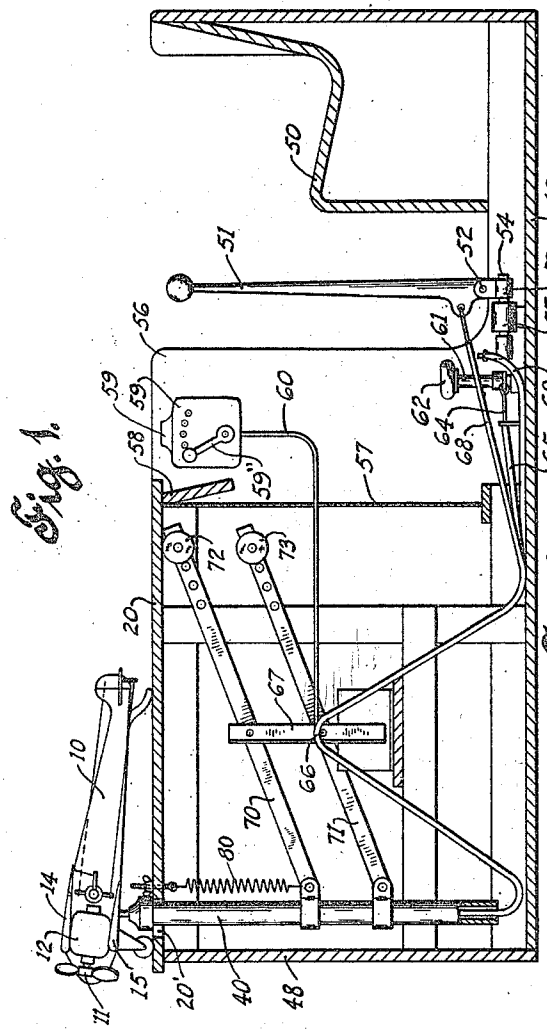
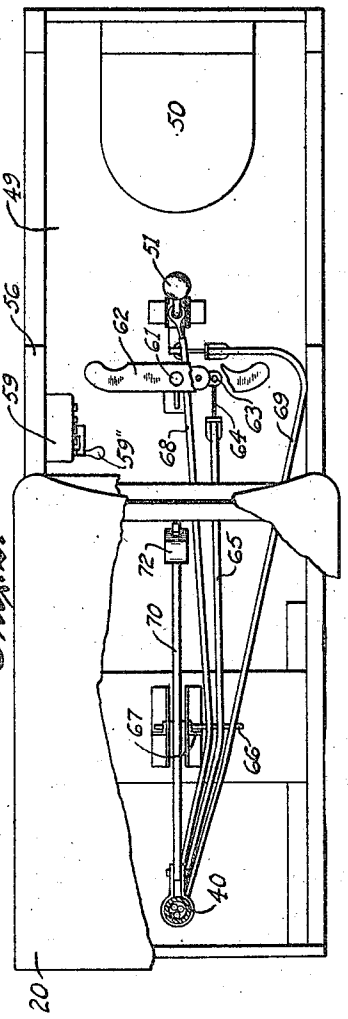


Fig. 2.



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Fig. 3.

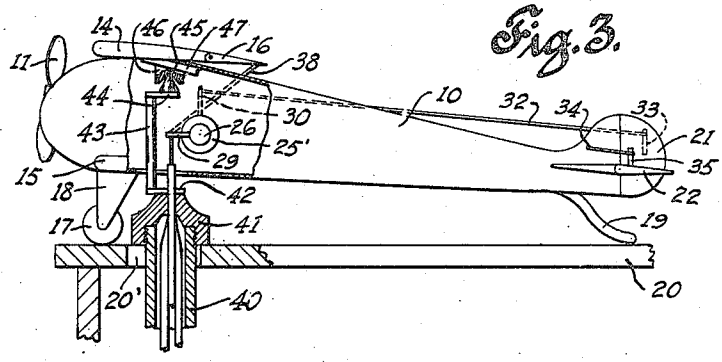


Fig. 4.

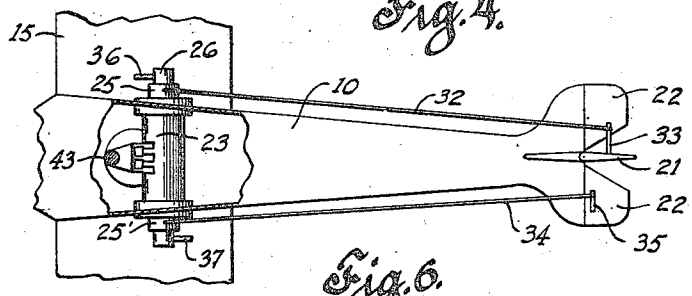


Fig. 6.

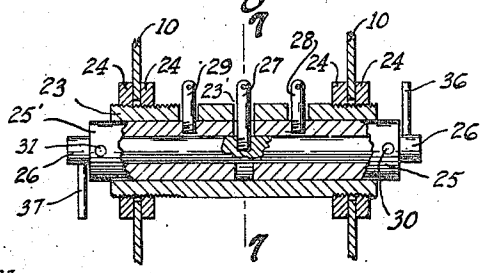


Fig. 5.

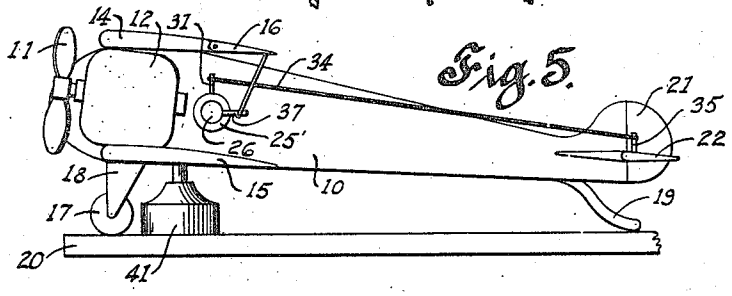
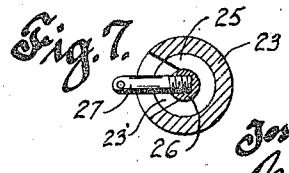


Fig. 7.



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UNITED STATES PATENT OFFICE

1,928,519

AIRPLANE MANEUVERING APPARATUS

Joseph Weisinger, Newark, N. J.

Application June 23, 1930. Serial No. 462,984

20 Claims. (Cl. 35—12)

This invention relates to devices for inculcating a knowledge of flying machine operation and control.

One of the objects of the invention is to provide an apparatus, on which is mounted a model or reduced copy of an actual flying machine, made in accordance with standard practice of conventional types, the airplane being so mounted as to permit maneuvering of its several principal elements whereby a very complete knowledge of the action of the airplane under all circumstances can be obtained.

A further feature of the invention is in the provision of means for a beginner or prospective operator to raise and lower the airplane, and operate the ailerons, rudder and elevators in the same manner that an actual full size machine would be operated, the controls being from a point remote from the airplane.

Another aim is to produce a model airplane actuating apparatus, so that a person may learn from actuating a model, the demonstrative effects produced by movements of the motor, ailerons, elevators and rudder in a fairly comprehensive manner.

These and other important objects are accomplished by the design, construction and arrangement of parts hereinafter described, forming a part of this disclosure, and shown in the accompanying drawings, and in which:—

Figure 1 is a longitudinal sectional view taken through an embodiment of the invention, showing the airplane as resting on top of the structure.

Figure 2 is a plan view of the same, parts being broken away in order to disclose the construction.

Figure 3 is an enlarged side elevational view of the model airplane, parts being broken away to disclose the manner of its mounting and actuating devices associated therewith.

Figure 4 is a top plan view of the same.

Figure 5 is a side elevational view thereof.

Figure 6 is a partial side elevational, partial sectional view, showing the control means of the apparatus.

Figure 7 is a transverse sectional view, taken on line 7—7 of Figure 6.

Figure 8 is a sectional view showing a modified form of counter-balancing means.

Referring to the drawings in greater detail, a conventional type of airplane structure is disclosed, in which the numeral 10 designates in general a hollow body or fuselage of the usual conical or cigar shape, having at its front propellers 11 driven by motors 12, disposed at the front of the apparatus, between its upper and lower wings, respectively 14 and 15, the latter of which extends out in opposed pairs at the lower front portion of the fuselage, while the upper wings 15 extend similarly outward from the upper front end and are provided with ailerons 16.

Pairs of landing wheels 17 are carried by brackets 18 at the front, and at the rear is a tail skid 19 attached to the under side of the body, these elements resting normally on the surface of a platform 20.

Hingedly engaged at the extreme rear of the body, is a vertical rudder 21, adapted to direct the nose of the plane in whatever direction it may be desired, and extending outwardly from the sides of the airplane tail are horizontal rudders or elevators 22.

Mounted transversely in the body of the airplane at a point well toward the front, is a sleeve 23, its extending ends being threaded to receive nuts 24 at each of its ends, whereby the sleeve may be adjusted longitudinally and clamped within the body.

Rotatably mounted, within the sleeve, are tubular members or sleeves 25 and 25' in which, in turn, is mounted a spindle 26, and set rigid centrally of the spindle is a post 27 extending through an opening 23' in the sleeve 23.

Fixed in the sleeves 25, 25' at spaced distances from the post 27, are other posts, respectively 28 and 29, all these several posts being substantially of a uniform length.

Fixed in the other end of the sleeves 25, 25' are pins 30—31, respectively, the former of which has connected to its upwardly extending end a wire 32 extending rearwardly and attached at its end to a pin 33, set in the rudder 21 and by which the rudder may be actuated.

Attachment to the other post 31 is a similar wire 34, engaging a pin 35 fixed in the side of the elevators 22.

Set in the extending ends of the spindle 26 are pins, respectively 36 and 37, connected by wires 38 with the ailerons 16, one on each side, whereby they may be operated in opposite directions in accordance with the turning movement of the spindle.

The platform 20 has an opening 20' through which extends a tube 40, having threaded on its upper end a generally conical cap 41 resting on the platform 20, and secured at its upper end is a plate 42 carrying a post 43 provided with an offset element 44 on which is mounted a

sharp pointed cone 45, the same being axial with respect to the tube 40.

The point of this cone acts as a support for a cap 46 carried by a plate 47, attached centrally to the upper portion of the airplane body 10, the arrangement being such that the cap and cone act in a manner similar to a knife edge permitting the fuselage to rotate and tilt in any direction thereon, being limited only by the angle of the cap with respect to the angle of the cone, and it will be understood that the cone is positioned so that the machine will balance very exactly on its point.

The platform 20 rests on a cabinet 48 having a level flooring 49, and arranged at the extreme opposite end of the cabinet is an operator's seat 50.

Directly in front of the seat is a joy stick 51, pivoted at 52 on a bracket 53, adjustable on a support 54 mounted in a rigid bracket 55 secured to the flooring 49.

The sides 46 of the cabinet have set between them, at a point within the plane of the platform 20, an upright partition 57, and at the top an instrument board 58, one of the sides 56 carrying a rheostat 59, from which current is delivered through a conductor 60 which extends upward within the tube 40 to the motors 12 of the airplane, thus the motors can be operated at different speeds according to the position of the rheostat control lever. A coin operating mechanism indicated at 59', is provided so that by the insertion of a coin in a slot provided therefor, the lever arm 59'' will be released.

In front of the fixed bracket 55 is a post 61, on which is pivotedly mounted a foot lever or rudder bar 62, having an extending offset element 63, connected to a wire 64, running through a "Bowden" casing 65, which is raised upwardly and supported on a pin 66 carried in an upright bracket 67 and then depressed to enter the lower end of the tube 40, the end of the "Bowden" wire being attached to the post whereby the airplane body may be swung. Sleeve 25 may be rotated and the rudder 21 thereby swung in either direction.

Another "Bowden" wire 68 is attached at one end to a projection on the joy stick 51 and passes over the pin 66, thence upwardly through the tube 40 to be attached to the post 29, whereby the elevators 22 may be raised or depressed as required by the operator.

In a similar manner, still another "Bowden" wire 69, connected to the joystick and actuated by the operator, passes into the cabinet, then eventually up through the tube 40 to the post 27 whereby the ailerons may be moved in either direction.

The tube 40 has connected with it a pair of levers 70—71, respectively upper and lower, these levers being pivoted on the element 67 centrally the cabinet, and provided at the opposite ends with adjustable counterbalances 72 and 73. An adjustable spring 80 normally under tension is attached to lever 70. The weight of the airplane is slightly greater than the counterbalancing weight plus the force extended by the spring under tension so that its normal position is resting on the platform 20.

Figure 8 shows a modified form of counterbalancing means. Instead of the levers 70—71, counterbalancing weights 72—73 and spring 80, the tube 40a is provided with a suitable float which is confined within a float chamber 83 containing a suitable liquid. Guide pins 82 are provided on the tube 40a to guide the latter within the float chamber 83. In this modified form the "Bowden" wires enter the tube 40a above the float chamber. The weight of the model airplane, tube 40a and float 81 is slightly greater than the weight or buoyant force of the displaced liquid so that normally the float is submerged within the float chamber. When the motor propellers 11 are cause to function, the airplane's "apparent" weight diminishes and it slowly rises carrying with it the tube 40a and attached float 81. This form of counterbalancing means affords very fine adjustments of differences between the normal weight of the airplane and its "apparent" weight when the propellers are functioning.

Upon causing the motor to actuate the propellers the air current produced strikes the wings 14 and 15 producing an upward movement of the airplane, so that it is free of all supports, except the conical point on which it is accurately balanced, and when in this flying position, it will be obvious that an operator, by controlling the speed of the motors, the use of the rudder bar or joystick may actuate the rudders, elevators and ailerons, so that the model of the machine may to all intents and purposes represent the actions of a full sized flying machine.

Instead of the mechanical means hereinabove described for controlling the movements of the elevators, ailerons and rudder, other means, as for example electromagnetic means may be employed, in which case the airplane would be provided with solenoids the current in which would be controlled by the movements of the joystick and rudder bar.

While I have shown and described certain embodiments of this invention I am well aware that other modifications may be made and I therefore desire a broad interpretation of the invention within the scope and spirit of the disclosure herein and the claims appended hereto.

By the use of the name "Bowden" casing or "Bowden" wire wherever it may appear in the specification and appended claims, it is understood that I do not restrict myself to that particular make as any wire free to slide within a casing is contemplated and intended.

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

1. In an apparatus for demonstrating model airplanes, a cabinet having a top platform on which the airplane normally rests, said airplane having a motor driven propeller, elevators, ailerons and rudder, a conical support for said airplane at its center of equilibrium, said support being partially counterbalanced, means to actuate said propeller motor whereby the airplane is caused to rise, means to control the ailerons and elevators, and means for actuating the rudder, in conformity with desired movements of the airplane.

2. In an apparatus for demonstrating an airplane, said airplane having motor driven propeller, wings, ailerons, elevators, and rudder, a support for the airplane on which it is pivotally mounted to dip in all directions, a counterbalance for said support, independent means mechanically associated with the ailerons and elevators for actuating the ailerons and elevators, and the rudder of the airplane whereby it is caused to tilt and rotate upon its central support.

3. In an apparatus for demonstrating model airplanes, a cabinet having a platform on which the airplane normally rests, said airplane having a

motor driven propeller, wings, ailerons, rudder and elevators; a conical pivotal support on which said airplane may turn and tilt; counterbalancing means for said support, a rheostat controlling the speed of said motor, a hand control for actuating said ailerons and elevators, and a foot control for actuating said rudder, said hand and foot controls being remote from the airplane.

4. In combination, a model airplane having a motor driven propeller, a rudder, ailerons and elevators, a pivotal support on which said airplane may turn and tilt, a counterbalance for said support, means to actuate said propeller motor whereby the airplane is caused to rise, a joystick, and a rudder bar remote from said airplane, means connecting said joystick with the elevators and ailerons independently, and means connecting said rudder bar with the rudder.

5. In an airplane maneuvering apparatus, a cabinet on which a model airplane may be mounted, a pivotal support at the center of equilibrium, said support being partially balanced with respect to the weight of the airplane, a series of freely encased control wires connecting respectively with the rudder, elevators and ailerons of the airplane, means for actuating each of said wires, independently, means for actuating the propeller of the airplane, all of said means being remote from the airplane and accessible to an operator.

6. In combination, a model airplane having a rudder, ailerons and elevators, a pivotal support on which said airplane may rotate and tilt, a joystick, and a rudder bar remote from said airplane, means connecting said joystick with the elevators and ailerons, independently, and means connecting said rudder bar with the rudder.

7. In combination, a model airplane having a motor driven propeller, a rudder, ailerons and elevators, a pivotal support on which said airplane may turn and tilt, a counterbalance for said support, said counterbalance comprising a float chamber, a liquid in the float chamber and a float attached to said support and normally submerged in said liquid, means to actuate said propeller motor whereby the airplane is caused to rise, a joystick and a rudder bar remote from said airplane, means connecting said joystick with the elevators and ailerons, independently, and means connecting said rudder bar with the rudder.

8. In combination, a model airplane having a rudder, ailerons and elevators, a support on which said airplane is mounted for universal movement, a counterbalance for said support, said counterbalance comprising a float chamber, and a float attached to said support and normally submerged in the float chamber, means to cause the airplane to rise, and controllable means for actuating the rudder, ailerons and elevators of the airplane from a position remote from the latter.

9. In combination, a model airplane having a rudder, ailerons and elevators, a support on which said airplane is mounted for universal movement, a counterbalance for said support, means to cause the airplane to rise, a joystick and a rudder bar remote from the airplane, means secured to the airplane operatively connected with the rudder, ailerons and elevators, independently, and means connecting said last mentioned means with the rudder bar and with the joystick for independent operation of the rudder, ailerons and elevators.

10. In combination, a model airplane having a rudder, ailerons and elevators, a floating support on which said airplane is mounted for universal movement, a counterbalance for said support, means to cause the airplane to rise, a joystick and a rudder bar remote from the airplane, means in the airplane operatively connected with the rudder, ailerons and elevators, independently, and "Bowden" wires connecting said last mentioned means with the rudder bar and with the joystick for independent operation of the rudder, ailerons and elevators.

11. In combination, a model airplane having a rudder, ailerons and elevators, a pivotal support on which said airplane may turn and tilt, means in the airplane operatively connecting with the elevators, ailerons and rudder, for independent movement of each thereof, a joystick and a rudder bar remote from the airplane and "Bowden" wires connecting the rudder bar and the joystick separately with said means whereby the rudder, ailerons and elevators may be independently actuated.

12. In combination a model airplane having a rudder, ailerons and elevators, a support on which said airplane is mounted for universal movement, a counterbalance for said support, said counterbalance comprising a float chamber and a float attached to said support and normally submerged in the float chamber, means to cause the airplane to rise, thereby permitting the support to ascend, means in the airplane operatively connecting with the elevators, ailerons and rudder, for independent movement of each thereof, a joystick and a rudder bar remote from the airplane, and "Bowden" wires connecting the rudder bar and the joystick, separately with said means whereby the rudder, ailerons and elevators may be independently actuated.

13. In combination, a model airplane having a rudder, ailerons and elevators, a pivotal support on which said airplane may turn and tilt, a sleeve fixed in the airplane, said sleeve being provided with independently rotatable elements, connected respectively with the rudder, ailerons and elevators, a joystick and a rudder bar remote from the airplane, and "Bowden" wires connecting the rudder bar with the rotatable element connected with the rudder, the joystick with the rotatable element connected with the ailerons and the rotatable element connected with the elevators, independently.

14. In combination, a pivotally supported miniature airplane, mechanism for actuating the ailerons, elevators and rudder, independently, in conformity with desired movements of the airplane, said mechanism being directly operable from a point remote from the airplane.

15. In combination, a pivotally supported miniature airplane, and mechanism for actuating the rudder, ailerons and elevators of the airplane from a point remote therefrom, said mechanism being independently connected to the rudder, ailerons and elevators.

16. In combination, a miniature airplane pivotally supported by which said airplane may turn and tilt, and controllable means for actuating the rudder, ailerons and elevators of the airplane from a point remote therefrom, said means being mechanically associated with the rudder, ailerons and elevators.

17. In combination, a model airplane having a propeller, a rudder, ailerons and elevators, a pivotal support on which said airplane may turn and tilt, a counterbalance for said support, means to actuate said propeller whereby the airplane is caused to rise, mechanism for actuating the ailerons, elevators and rudder, independently, in con-

formity with desired movements of the airplane, said mechanism being directly operable from a point remote from the airplane.

18. In combination, a pivotally supported miniature airplane, and control mechanism located at a point remote from the airplane, the rudder, ailerons and elevators of the airplane being connected to said controllable mechanism.

19. In an apparatus for demonstrating a model airplane, a platform on which the airplane normally rests, said airplane having propellers, wings, ailerons, rudder and elevators; a conical pivotal support on which said airplane may turn and tilt; counterbalancing means in said support, an electrical motor on the airplane for each of the propellers to drive it, a hand control for actuating said ailerons and elevators, and foot control for actuating said rudder, said hand and foot controls being remote from the airplane.

20. In combination, a model airplane having an electrically motor driven propeller, a rudder, ailerons and elevators, a pivotal support on which said airplane may turn and tilt, a counterbalance for said support, means to actuate said propeller motor whereby the airplane is caused to rise, means to facilitate the support being raised when the propellers are in motion, and means mechanically associated with the rudder, ailerons and elevators to actuate each thereof.

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