J. W. MILLICAN.

AEROPLANE.

APPLICATION FILED MAY 12, 1917.

1,290,841.

Patented Jan. 7, 1919.

6 SHEETS—SHEET 1.

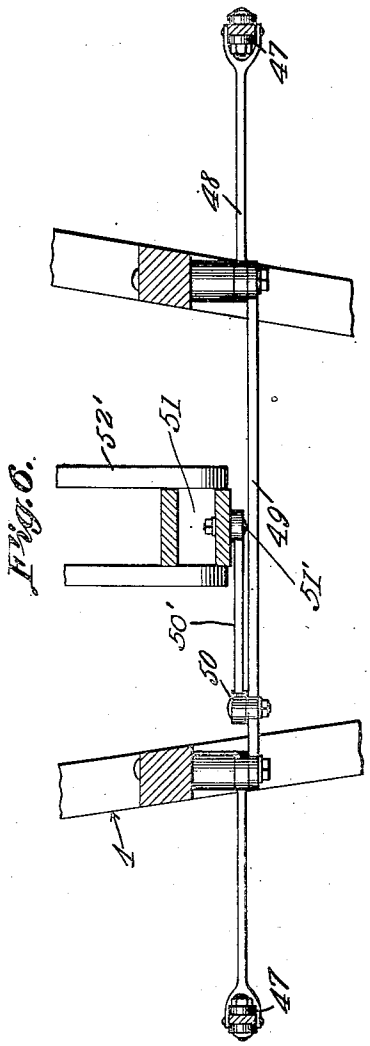


Fig. 6.

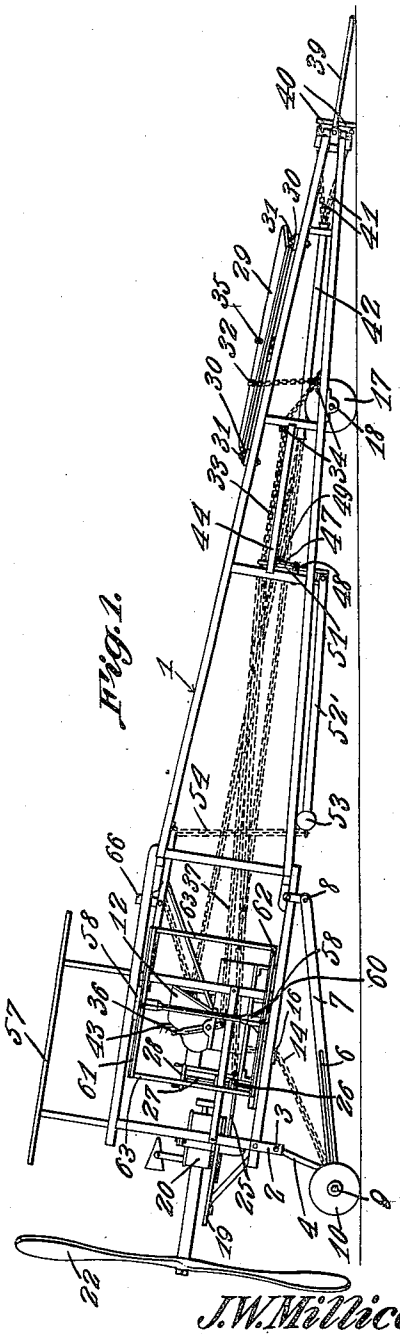


Fig. 1.

Witness

J. C. Fowler

H. A. Mitchell

Inventor

J. W. Millican

By C. A. Snow & Co.

Attorney

J. W. MILLICAN.

AEROPLANE.

APPLICATION FILED MAY 12, 1917.

1,290,841.

Patented Jan. 7, 1919.

6 SHEETS—SHEET 2.

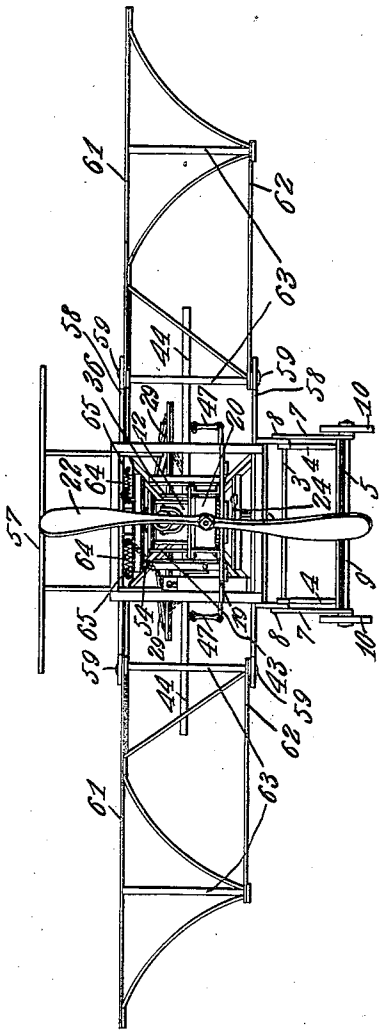


Fig. 2.

J. W. Millican, Inventor.

Witness

J. C. Toner

H. A. Mitchell

By C. A. Snow & Co.

Attorney

J. W. MILLICAN.

AEROPLANE.

APPLICATION FILED MAY 12, 1917.

1,290,841.

Patented Jan. 7, 1919.

6 SHEETS—SHEET 3.

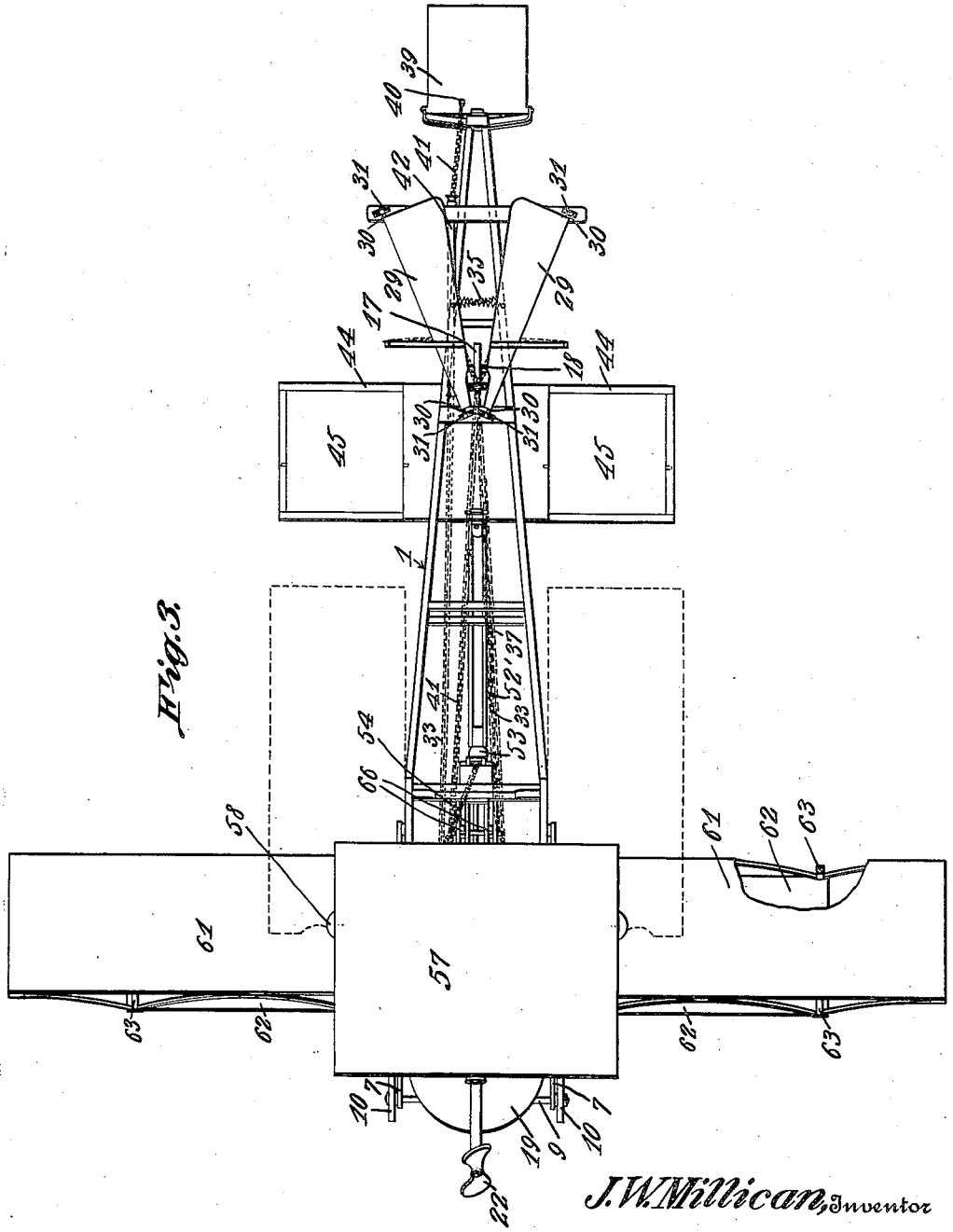


Fig. 3.

Witness

H. A. Mitchell

J. W. Millican, Inventor

By C. A. Snow & Co.

Attorney

J. W. MILLICAN.

AEROPLANE.

APPLICATION FILED MAY 12, 1917.

1,290,841.

Patented Jan. 7, 1919.

6 SHEETS—SHEET 4.

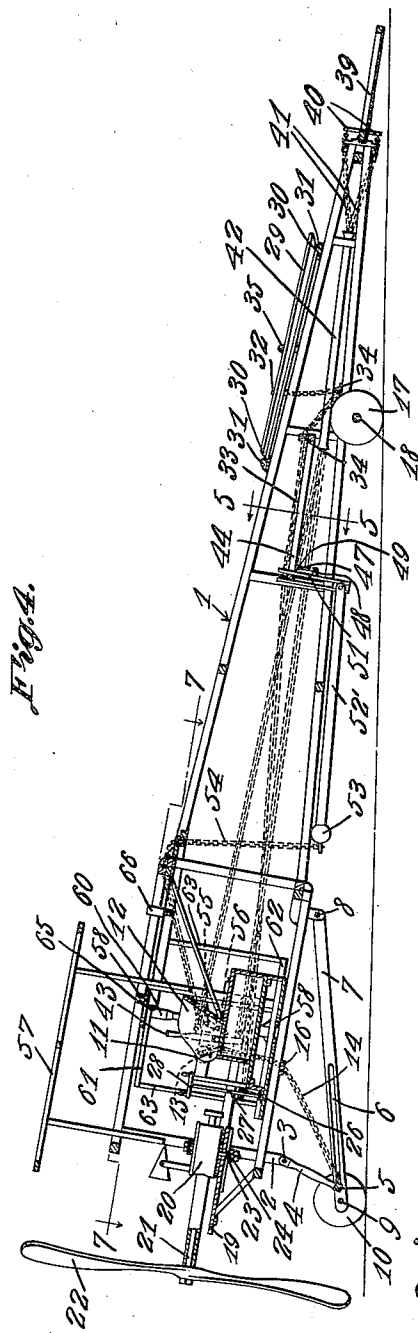


Fig. 4.

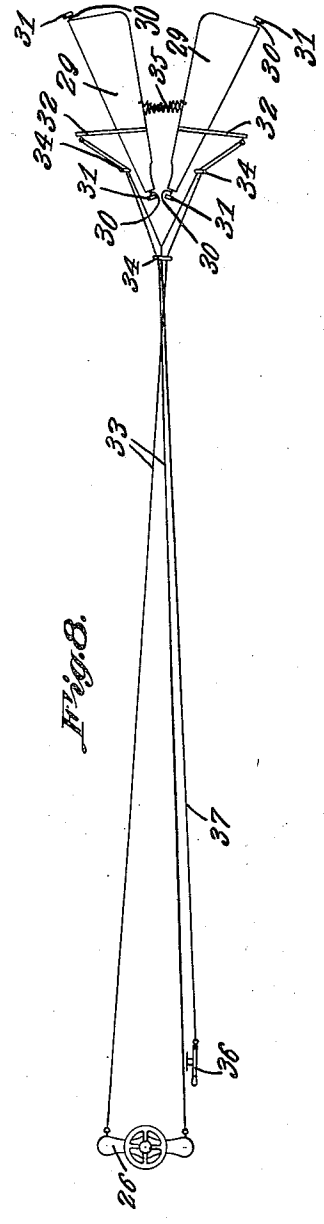


Fig. 8.

Witness

J. R. Somers

H. G. Mitchell

J. W. Millican, Inventor

By C. A. Snow & Co.

Attorney

J. W. MILLICAN.

AEROPLANE.

APPLICATION FILED MAY 12, 1917.

1,290,841.

Patented Jan. 7, 1919.

6 SHEETS—SHEET 5.

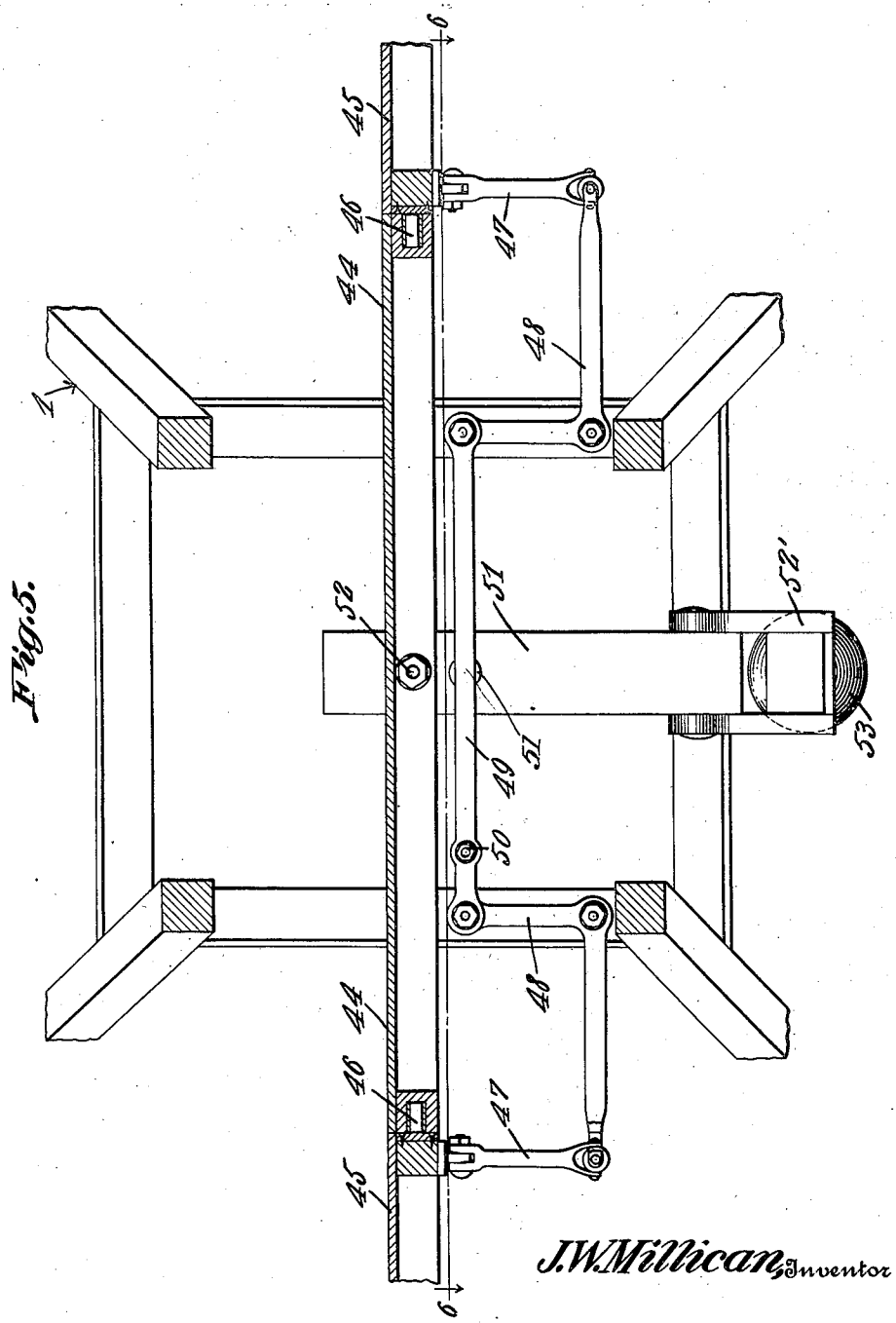


Fig. 5.

J. W. Millican, Inventor

Witness

H. A. Mitchell

By C. A. Snow & Co.

Attorney

J. W. MILLICAN.

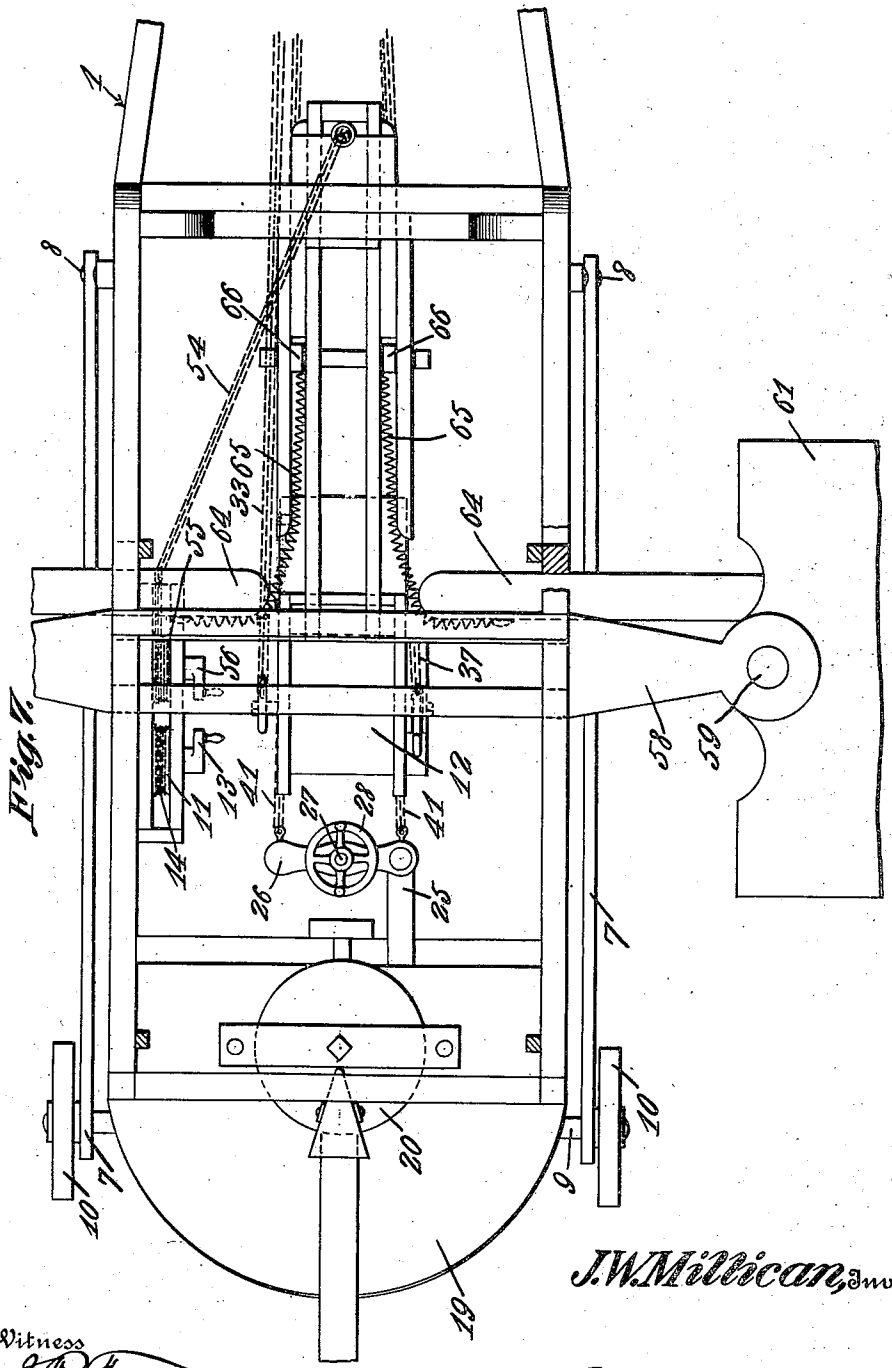
AEROPLANE.

APPLICATION FILED MAY 12, 1917.

1,290,841.

Patented Jan. 7, 1919.

6 SHEETS—SHEET 6.



J. W. Millican, Inventor

Witness

J. R. Gomez

H. A. Mitchell

By C. A. Snow & Co.

Attorney

UNITED STATES PATENT OFFICE.

JOEL WALTER MILLICAN, OF FORT WORTH, TEXAS, ASSIGNOR OF ONE-HALF TO PETER O. KILANDER, OF FORT WORTH, TEXAS.

AEROPLANE.

1,290,841. Specification of Letters Patent. Patented Jan. 7, 1919.

Application filed May 12, 1917. Serial No. 168,220.

To all whom it may concern:

Be it known that I, JOEL W. MILLICAN, a citizen of the United States, residing at Fort Worth, in the county of Tarrant and State of Texas, have invented a new and useful Aeroplane, of which the following is a specification.

This invention relates to aeroplanes, one of its objects being to provide a machine of this character having sustaining planes which, under normal conditions, are extended laterally beyond the fusilage of the machine, but which are designed gradually to swing rearwardly and inwardly in proportion to the increase of speed of the machine so that the frictional resistance caused by the movement of said sustaining planes through the atmosphere is not increased during the increased speed but is, on the contrary reduced, therefore enabling the machine to attain a high speed.

A still further object is to provide sustaining planes which will gradually readjust themselves toward their normal positions as the speed of the machine is reduced.

A still further object is to provide an aeroplane having controlling vanes of novel construction so arranged as to facilitate the steering of the machine and assist in restoring its equilibrium.

A still further object is to provide a motor which, together with the propeller, is designed to swing about an upwardly extending axis, this swinging movement being under the control of the aviator and the turning of the motor resulting in a coincident actuation of the vanes so that said vanes and the propeller will thus coöperate to move the machine in a selected course.

A further object is to provide means constantly under the control of the aviator whereby both of the stabilizing vanes can be actuated simultaneously thus to operate as a means for retarding the flight of the machine and to facilitate a landing.

Another object is to provide ailerons under the control of a stabilizing pendulum, there being means whereby this pendulum can be raised and lowered to inactive and to active position respectively as desired.

A still further object is to provide running gear at the front end of the fusilage which can be raised and lowered as desired, this running gear being lifted up close to the fuselage while the machine is in flight so as to offer the minimum resistance.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed, can be made within the scope of what is claimed, without departing from the spirit of the invention.

In the accompanying drawings the preferred form of the invention has been shown.

Figure 1 is a side elevation of the machine.

Fig. 2 is a front elevation.

Fig. 3 is a plan view, the position of the side sustaining planes when folded against the sides of the fuselage being indicated by dotted lines.

Fig. 4 is a vertical longitudinal section through the machine.

Fig. 5 is a section on line 5—5 of Fig. 4, said section being enlarged.

Fig. 6 is a section on line 6—6 of Fig. 5.

Fig. 7 is an enlarged section on line 7—7 of Fig. 4.

Fig. 8 is a view showing in diagram the vane control.

1 designates the fuselage of the aeroplane, the same being made up of longitudinal spars and connecting struts as ordinarily, the said fuselage tapering rearwardly as shown. Extending downwardly from the sides of the front end of the fuselage are ears 2 connected by a cross rod 3 on which are pivotally mounted hangers. The lower ends of these hangers are connected by a cross strip 5, the ends of which project into longitudinal slots 6 formed within side strips 7 which are pivotally connected as at 8, to the sides of the bottom of the fuselage back from the front end thereof. The front ends of these side strips carry an axle 9 on which are mounted supporting wheels 10. A drum 11 is arranged close to one side of the fuselage within reach of the occupant of a seat 12 and this drum is adapted to be rotated in any suitable manner as by means of crank arm 13 so as to wind on the drum a chain 14 or other flexible element attached to the cross strip 5. This flexible element 14 can be

mounted in suitable guide shafts 16 arranged where desired, and it will be obvious that by winding said element on the drum the ends of the cross strip 5 will be caused to move rearwardly and upwardly in the slots 6, thus to swing the strips 7 upwardly close to the bottom of the fuselage and cause a corresponding upward movement of the wheels 10. These parts are adapted to be held thus supported, while the machine is in flight so as to offer the minimum resistance.

Another supporting wheel 17 may be mounted on axle 18 connected to the rear portion of the fuselage. When the hangers 4 and the cross strip 5 are positioned as shown in Fig. 4 the wheels 10 as well as the wheel 17 will provide efficient supports for the aeroplane so that it can be moved readily over the ground in an inclined position.

Arranged in the front portion of the fuselage and projecting forwardly therebeyond is a table 19 constituting a support for a motor 20 which can be mounted on suitable bearings and can be of any desired type. A shaft 21 is extended forwardly from and is adapted to move with the motor, this shaft being provided at it front end and beyond the table, with the propeller 22. A pivot member 23 is extended downwardly from the motor and through the table and is adapted to rotate with the motor when the same is adjusted angularly. To the lower end of this pivot member is attached a laterally extending arm 24 connected, by a link 25, to one end of a bar 26 which is connected at its center to a steering post 27. This steering post is arranged in front of the seat 12, and is provided at its upper end with a steering wheel 28. This wheel is adapted to be grasped by the aviator and the feet of the aviator are adapted to rest on the bar 26. Thus the shaft 27 can be rotated either by hand or by foot and such rotation will result in the transmission of movement through the link 25 and the arm 24 to the motor which will be adjusted angularly for the purpose of swinging the propeller laterally a desired distance. Thus the machine can be pulled in a desired direction by shifting the motor and the propeller.

Mounted on the fuselage near the rear end thereof are rearwardly diverging obliquely disposed vanes 29 having trunnions 30 extending from their outer corners when mounted in bearings 31. Secured upon each of these vanes and extending laterally therefrom is an arm 32 and attached to the outer ends of these arms are chains or other flexible elements 33 which extend through suitably arranged guides 34 and are attached at their forward ends to the respective ends of the bar 26. Springs 35 are attached to the inner edges of the vanes 29 and to the fuselage and serve to hold these vanes normally at rest upon the top of the fuselage. When the bar 26 is swung in one direction, thus to adjust the motor angularly as herebefore described, motion will also be transmitted from said bar through one of the flexible connections 33 to one of the vanes 29, so as to cause said vane to elevate partly or entirely. At the same time the other flexible connection 33 will be payed out, thereby leaving the vane to which it is attached in a lowered or inactive position. The parts are so assembled that when the propeller is swung to the right the vane at the right side of the machine will be elevated and thus present a resisting surface to the atmosphere so as to facilitate the prompt turning of the machine while in flight. When it is desired to turn the machine to the left the propeller is swung to the left and the vane 29 at the left side of the machine will be elevated.

Located adjacent one side of the seat 12 is a hand lever 36 to which a chain or other flexible element 37 is connected, this element 37 extending rearwardly and having connections 38 attached to the respective arms 32. Thus by shifting lever 36 in one direction the outer ends of both arms 32 can be simultaneously drawn downwardly thus to raise both of the vanes at one time so that they will act as a brake to reduce the speed of the machine, the efficiency of the brake being dependent upon the amount of elevation of the vanes. By partly elevating the vanes they will operate as steadying means for holding the machine in the selected line of flight.

Pivotally connected to the rear end of the fuselage so as to swing about a transverse axis, is a tail plane 39 provided at its front or upper end with upwardly and downwardly extending arms 40. To these arms are secured chains or other flexible connecting arms 41 which are preferably guided within a tube 42 fixedy mounted in the fuselage. From this tube said flexible connections are extended to the upper and lower arms respectively of a hand lever 43 which is located adjacent the seat 12 where it can be reached conveniently by the aviator. By the action of this lever a tail plane can be swung about its transverse axis thus to guide the machine upwardly or downwardly.

Extending laterally from the fuselage and preferably slightly in advance of the vanes 29 are rigid frames 44. In each of these frames is mounted an aileron 45 adapted to swing about a transverse axis 46 and extending downwardly from each aileron is an arm 47. These arms are connected to oppositely disposed bell crank levers 48 mounted upon the fuselage and which levers have upwardly extending arms pivotally connected to a cross strip 49. This cross strip is pivotally attached, as at 50, to a

link 50′ which is pivotally connected at 51′ to a tongue 51 pivotally connected as at 52 to the fuselage. Hingedly attached to the lower end of the tongue so as to swing forwardly and rearwardly relative thereto is a pendulum 52′, the hinge construction being so constructed as to prevent the pendulum from swinging laterally independently of the tongue 51. Attached to the lower portion of the pendulum, which carries a suitable weight 53 is a chain or other flexible element 54 which extends over suitable guides and is attached to a drum 55 adapted to be rotated by a crank arm 56 located where it can be reached conveniently by the occupant of the seat 12. By winding the connection 54 on drum 55 the pendulum 52 can be swung forwardly and upwardly against the bottom of the fuselage as shown particularly in Fig. 4 where it will not interfere with the landing of the machine. After the machine has left the ground the connection 54 can be unwound from its drum, thus to permit the pendulum to swing downwardly by gravity where it will be free to remain vertical during the lateral tilting of the machine thereby to transmit motion through the bell crank levers 48 to the ailerons and cause said ailerons to shift and restore and maintain the lateral balance of the machine. In other words, should the machine tilt downwardly toward the right its movement relative to the pendulum would result in the elevation of the front edge of the aileron at the right side of the machine and the lowering of the front edge at the left side of the machine with the result that the machine would be restored promptly to its balanced position.

In addition to the tail plane and the ailerons used for controlling the flight of the machine, said machine is provided at its front end with a fixed intermediate sustaining plane 57 which is supported above the front end of the fuselage and extends laterally therebeyond for short distances. Upper and lower arms 58 are extended laterally from the fuselage and under the rear portion of this fixed sustaining plane. The outer ends of the arms at each side of the machine are engaged by pivots 59 which extend into or are formed integrally with struts 60 each of which is secured to the inner ends of upper and lower sustaining planes 61 and 62. These upper and lower planes are fixedly connected by suitably arranged struts 63 and under normal conditions the inner ends of said sustaining planes are held close to the sides of the fuselage while the planes are extended laterally substantially at right angles from the fuselage.

Extending from the inner end of each of the upper side sustaining planes is an arm 64 and attached to each of these arms is a spring 65 which extends rearwardly and is attached to a bracket 66 provided therefor on the fuselage. The springs are of sufficient strength to hold the side sustaining planes normally projected laterally as shown in Figs. 2 and 3 but when the wind resistance becomes excessive due to high speed, these side sustaining planes will swing rearwardly and inwardly against the action of their springs until they ultimately arrive at the positions indicated by dotted lines in Fig. 3. Thus frictional resistance will not attain objectionable proportions but will, on the contrary remain practically constant in spite of the variation in speed of the machine so that it becomes possible with a machine such as described to attain a very high speed.

It is to be understood of course that the sustaining planes 57, 61 and 62 can be made of standard shapes and the same is likewise true of the ailerons.

What is claimed is:

1. The combination with an aeroplane structure, of a propeller at the front end thereof and mounted for angular adjustment about an upwardly extending axis, rearwardly diverging vanes mounted on the fuselage of the aeroplane, an operating element, connections between said element and the propeller and between said element and the respective vanes for simultaneously swinging the propeller and one of the vanes to steer the aeroplane laterally, and supplemental means for simultaneously shifting both of the vanes to retard the flight of the aeroplane.

2. The combination with an aeroplane structure of rearwardly diverging vanes mounted upon the fuselage, yielding means for holding the vanes normally flat upon the fuselage and means for shifting either of the vanes out of normal position into a position oblique to the line of flight.

3. The combination with an aeroplane structure of rearwardly diverging vanes mounted on the fuselage of said structure, yielding means for holding the vanes normally in inactive positions, and means for simultaneously shifting the vanes into planes oblique to the line of flight.

4. The combination with an aeroplane structure including a fixed sustaining plane and upper and lower laterally extending arms fixedly connected to the fuselage of the aeroplane and below the sustaining plane, side sustaining planes pivotally connected to the arms and foldable rearwardly against the sides of the fuselage, arms extending inwardly from the sides of the sustaining planes and spring connections between the arms and the fuselage for holding the side sustaining planes normally extended laterally.

5. The combination with an aeroplane structure including ailerons, of a tongue pivotally connected to the fuselage of the structure and mounted to swing laterally relative thereto, a pendulum hingedly connected to the tongue and adapted to swing forwardly relative thereto, lever and rod connections between the ailerons and the tongue for simultaneously shifting the ailerons in opposite directions respectively during the swinging movement of the tongue, and means under the control of the aviator for swinging the pendulum forwardly and backwardly relative to the tongue.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

JOEL WALTER MILLICAN.

Witnesses:
J. F. SENDERTON,
N. D. STARK.