

G. F. WARREN.
SUSTAINING AND STABILIZING ATTACHMENT FOR AEROPLANES.
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1,180,347.

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2 SHEETS—SHEET 1.

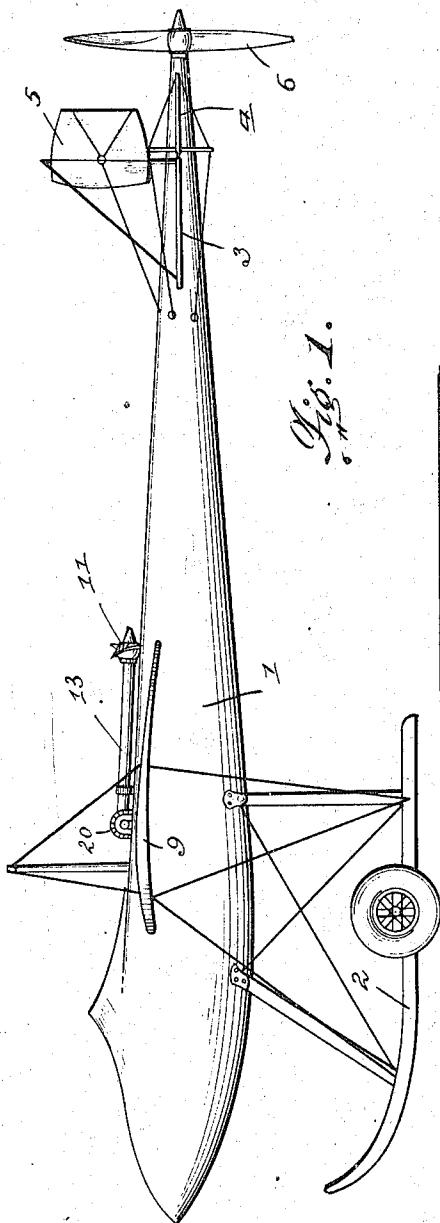


Fig. 1.

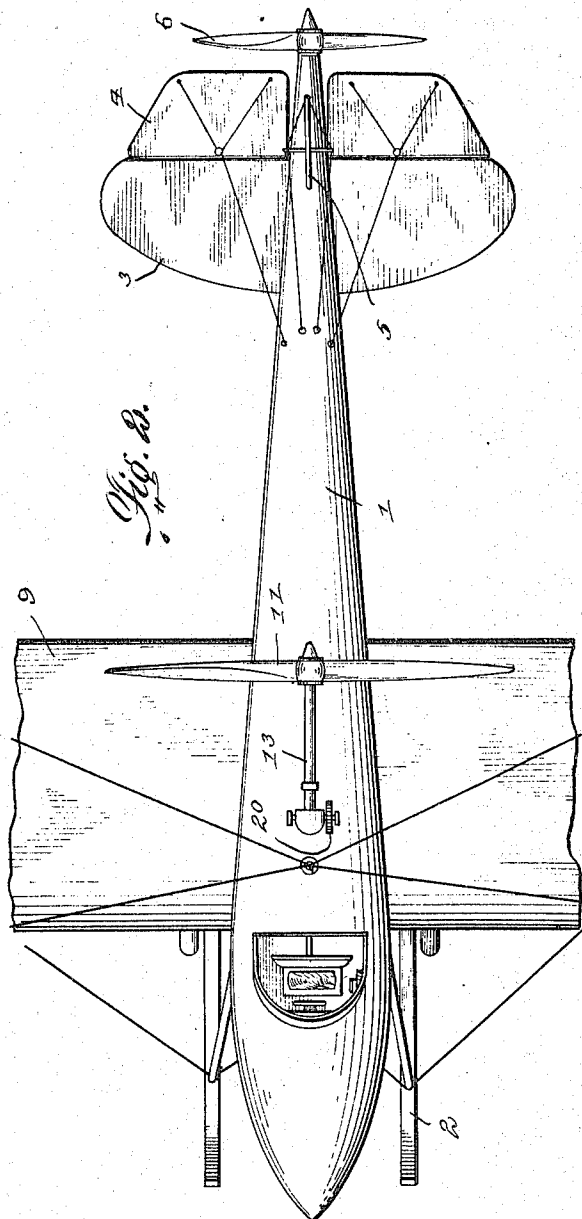


Fig. 2.

Witnesses

Frederick L. Lee.

C. C. Hines.

Inventor

G. F. Warren.

By *C. Randolph*
Attorney

1,180,347.

Fig. 7.

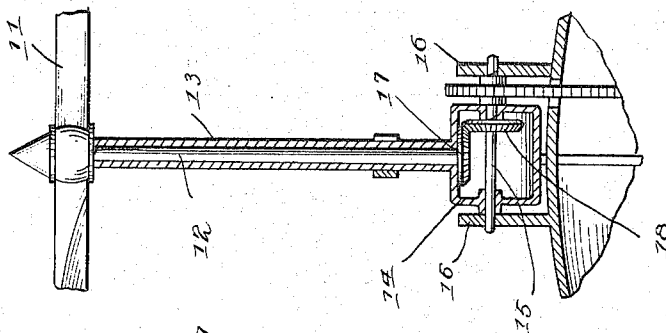
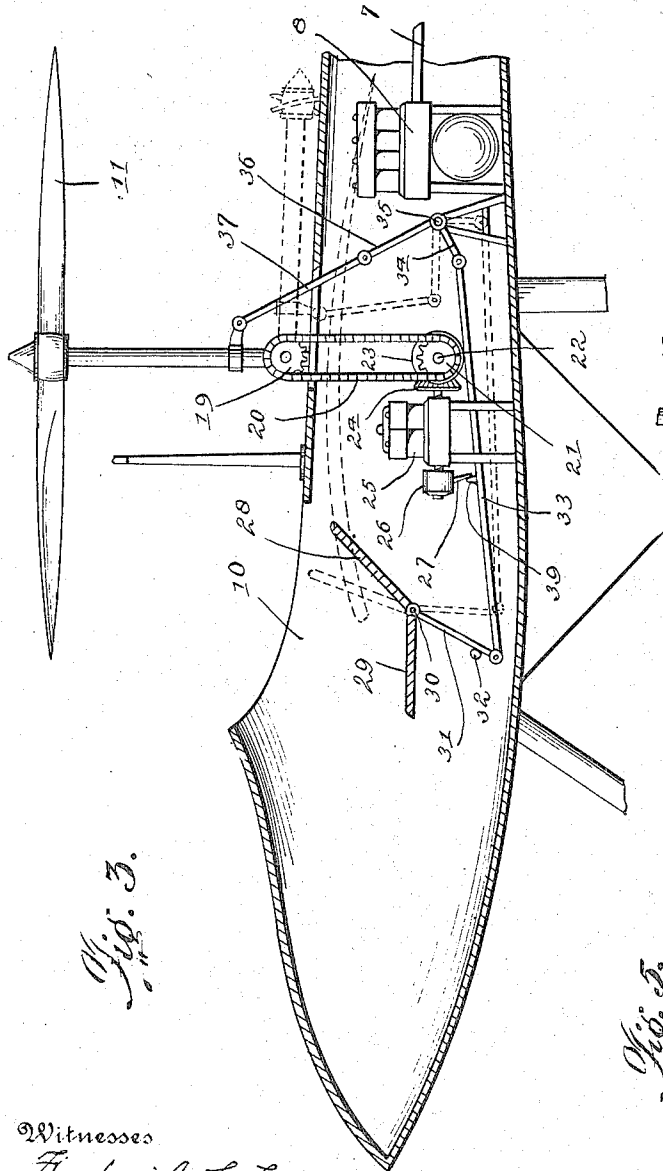


Fig. 3.

Frederick L. Fox.

W. E. Hill

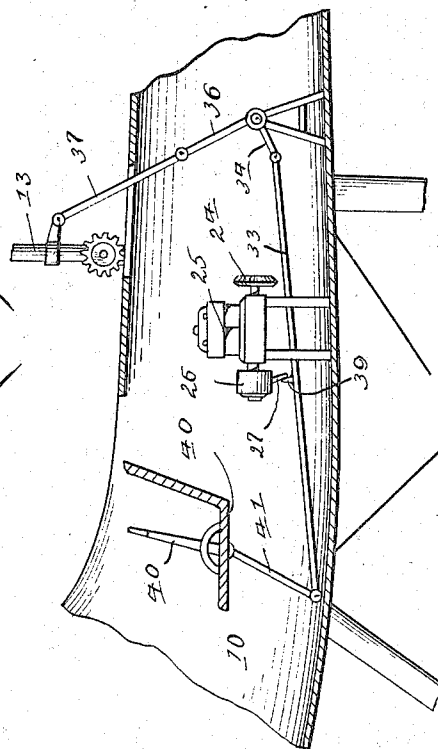


Fig. 5.

Inventor

G. F. Warren.

Wm. Randolph Jr., Attorney

UNITED STATES PATENT OFFICE.

GEORGE F. WARREN, OF DOUBLE BAYOU, TEXAS, ASSIGNOR OF ONE-HALF TO ELTON L. MITCHELL, OF DOUBLE BAYOU, TEXAS.

SUSTAINING AND STABILIZING ATTACHMENT FOR AEROPLANES.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, GEORGE F. WARREN, a citizen of the United States, residing at Double Bayou, in the county of Chambers and State of Texas, have invented certain new and useful Improvements in Sustaining and Stabilizing Attachments for Aeroplanes; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to a sustaining and stabilizing attachment for aeroplanes, contemplating particularly the provision of an auxiliary propeller designed to be driven from an auxiliary motor and to be thrown into action either upon the failure of the propelling mechanism employed or the plunging of the machine in a downward and forward direction, to sustain the machine in the air and at the same time correct any instability so that a safe landing may be made.

One object of the invention is to provide an attachment of the character specified embodying a lifting and stabilizing propeller, a normally inactive motor for driving the same, and means for throwing the said motor into action when occasion requires.

A further object of the invention is to provide a safety appliance of the designated character in which the propeller, when inactive, is disposed horizontally upon the body of the machine so as to offer minimum head resistance, and in which means are provided for simultaneously adjusting said propeller to an operative position and throwing its motor into action.

A still further object of the invention is to provide a novel construction and arrangement of means for adjusting the propeller and controlling the auxiliary motor, whereby the propeller may be instantly thrown into action whenever danger exists in order that the aviator may maintain or regain complete control over the machine.

With these and other objects in view, which will appear as the nature of the invention is better disclosed, the invention consists of the features of construction, combination and arrangement of parts, hereinafter fully described and claimed, reference being had to the accompanying drawings, in which:

Figure 1 is a side elevation of a flying machine of the monoplane type embodying my invention, and showing the auxiliary propeller in normal position; Fig. 2 is a top plan view of the same; Fig. 3 is a vertical longitudinal section through the body of the machine, showing in full and dotted lines the auxiliary propeller and its controlling means in normal and projected positions; Fig. 4 is a vertical transverse section showing the mode of constructing and mounting the auxiliary propeller; and Fig. 5 is a view similar to Fig. 3, illustrating a modification in the controlling mechanism.

Referring to the drawings, 1 designates the stream-line body or nacelle of an aeroplane of the monoplane type, which body is mounted upon a suitable launching and alighting base 2 and is equipped with the usual stability fins or tail-piece 3, a horizontal rudder 4, and a vertical rudder 5, which rudders may be operated through any suitable style of controlling gear. As shown in the present instance, the machine is provided at the rear with a driving propeller 6 mounted on a shaft 7 extending longitudinally through the tail portion of the body, which shaft receives motion from a driving motor 8 arranged within the body. The body 1 carries a supporting surface consisting of wings or planes 9 of any ordinary type, and is provided with the usual cockpit 10.

While I have described a type of monoplane to which the invention is shown applied for purpose of exemplification, it will, of course, be understood that the invention may also be applied to biplanes or other multiplane machines.

In carrying my invention into practice, I provide an auxiliary sustaining and stabilizing propeller 11, which is preferably of somewhat greater size or sweep than the driving propeller 6. This propeller 11 is mounted upon a shaft 12 journaled in a sleeve 13, which sleeve is provided at one end with a gear casing or yoke 14 mounted to swing longitudinally on a horizontal transverse shaft 15. The shaft 15 is journaled in suitable bearings 16 upon the top of the body 1, at a point adjacent to and immediately in rear of the cockpit 10, and is so arranged as to permit the propeller to be normally swung downwardly and rearwardly to a substantially horizontal position upon the top of

the body, as indicated in dotted lines in Fig. 3, so that when out of use it will lie out of the course of the air stream and consequently will oppose but a minimum amount of added resistance to the progress of flight of the machine.

The shaft 12 carries at its end within the gear casing a beveled gear 17 meshing with a similar gear 18 on the shaft 15, and on said shaft 15 is arranged a sprocket gear 19 connected by a chain 20 with a sprocket gear 21 on a horizontal transverse shaft 22 locked within the body, which shaft 22 also carries a beveled gear 23 meshing with a beveled driving gear 24 on the shaft of an auxiliary motor 25. It will be evident that this construction of driving gearing permits the propeller to be swung from a normal horizontal position upwardly and forwardly to a vertical working position, as illustrated in Fig. 3, in which working position the blades of the propeller revolve in a horizontal path and act to give a lifting impulse to sustain the machine in the air.

Preferably, the lifting propeller is so arranged that when adjusted to working position its sustaining action will be about in line with the centers of gravity and pressure, or a little in advance thereof, so that in the event of the derangement of the normal driving or propelling mechanism of the machine the propeller 11 may be thrown into action and driven from the motor 25, said propeller operating when in action to sustain the whole or a greater proportion of the weight of the machine as well as to maintain longitudinal stability. The motor 25 may be a comparatively light motor of less power than the motor 8, but of sufficient power to drive a sustaining propeller of the character described. As shown, the motor 25 is provided with an automatic starting device 26 having a trip projection 27 whereby it may be thrown into operation.

The mechanism for adjusting the propeller 11 and throwing the motor 25 into action may be of such a type as to be automatically or manually operated, and, if desired, to be operated automatically by an instinctive movement of the operator such as occurs when the machine begins to fall head first. In the present instance I have shown a primary operating device consisting of the back 28 of the aviator's seat 29, which back 28 is pivoted to swing in a fore and aft direction on an axis 30 and has connected therewith a crank arm 31 limited in its forward movement by a stop 32 and coupled by means of a connecting rod 33 with a crank arm 34 on a shaft 35, which shaft is provided with another crank arm 36, connected by a link 37 with the propeller sleeve 13, the construction being such that a backward movement of the seat 28 will throw the arm 31 forward and in so doing transmit motion to the bell

crank formed by the arms 34 and 36 and the link 37 to swing the propeller 11 to an upright position for operation, the link 37 being in such position self-locking to hold the propeller in its working position. By manually swinging the seat 28 forwardly or swinging the propeller backwardly after breaking the lock joint between the lever 37 and arm 36, the propeller may be returned to normal position after having performed its intended sustaining and stabilizing function. The connecting rod 33 is provided with a projection 39 adapted on its forward movement to engage the trip member 27, so that when the propeller is adjusted to working position the motor 25 will also be set into action to drive the gearing whereby the propeller is operated.

It will thus be understood that if the ordinary propelling mechanism of the machine should stop or become inoperative from any cause, the aviator may throw the propeller 11 into action, so that the machine will be sustained and its stability maintained, allowing a safe descent to be made. If, for any cause, the machine should lose its fore and aft balance and tilt downwardly and forwardly, an instinctive backward movement of the aviator will throw the propeller 11 and motor 25 into action, the propeller serving to resist further loss of stability and to sustain the machine and lift the forward end thereof until the longitudinal stability is regained. The invention thus provides a safety attachment which may be applied to any ordinary flying machine for the purpose of sustaining the machine in the event of the derangement of its propelling mechanism, as well as preventing the machine from turning over, as when an air hole is encountered or the machine plunges downwardly and forwardly from any other cause.

It will, of course, be understood that modifications in the construction and arrangement of the parts of the attachment may be made, and that if desired any suitable non-automatic, manually operable controlling means may be employed. In Fig. 5 I have shown such a means, comprising a lever 40 pivotally mounted upon or adjacent to the aviator's seat 41, and which is movable independently of said seat, said lever being provided or connected with a crank arm 41 coupled to the connecting rod 33, the construction of the attachment being otherwise the same as that previously described.

Having thus described my invention, I claim:

1. A flying machine including a body, a lifting and sustaining propeller normally arranged in a horizontal position and adapted for adjustment to a vertical position for action, a normally inactive motor for driving said propeller, and means for simultaneously adjusting the propeller to opera-

tive position and throwing the motor into action.

2. A flying machine including a body, a normally inactive lifting and sustaining propeller thereon, a normally inactive motor for driving said propeller, and means automatically actuated by a body motion of the aviator when the machine tilts in a prescribed direction to throw said motor into action.

3. A flying machine including a body, a normally inactive lifting and sustaining propeller arranged in a horizontal position upon the body, said propeller being adjustable upwardly to an operative vertical position, a normally inactive motor in gear with the propeller, and means operative by the aviator for simultaneously shifting the propeller to working position and starting the motor.

4. A flying machine including a body, a lifting and sustaining propeller movable from a normally inoperative to an operative position, a normally inactive motor, and a

means for simultaneously shifting the propeller to working position and starting the motor.

5. In a flying machine, a body, propelling mechanism, an auxiliary lifting and sustaining propeller pivotally mounted for movement from a normally inactive to a working position, an auxiliary motor in gear with said propeller, a starting device associated with said motor, a movable element provided with means for throwing said starting device into action, and a connection between said element and the propeller for adjusting the propeller to working position simultaneously with the actuation of said starting device.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE F. WARREN.

Witnesses:

EUGENE BEESON,
Mrs. E. BEESON.