Nov. 19, 1929. A. J. STYLES 1,736,230

AIRCRAFT CONTROL MECHANISM

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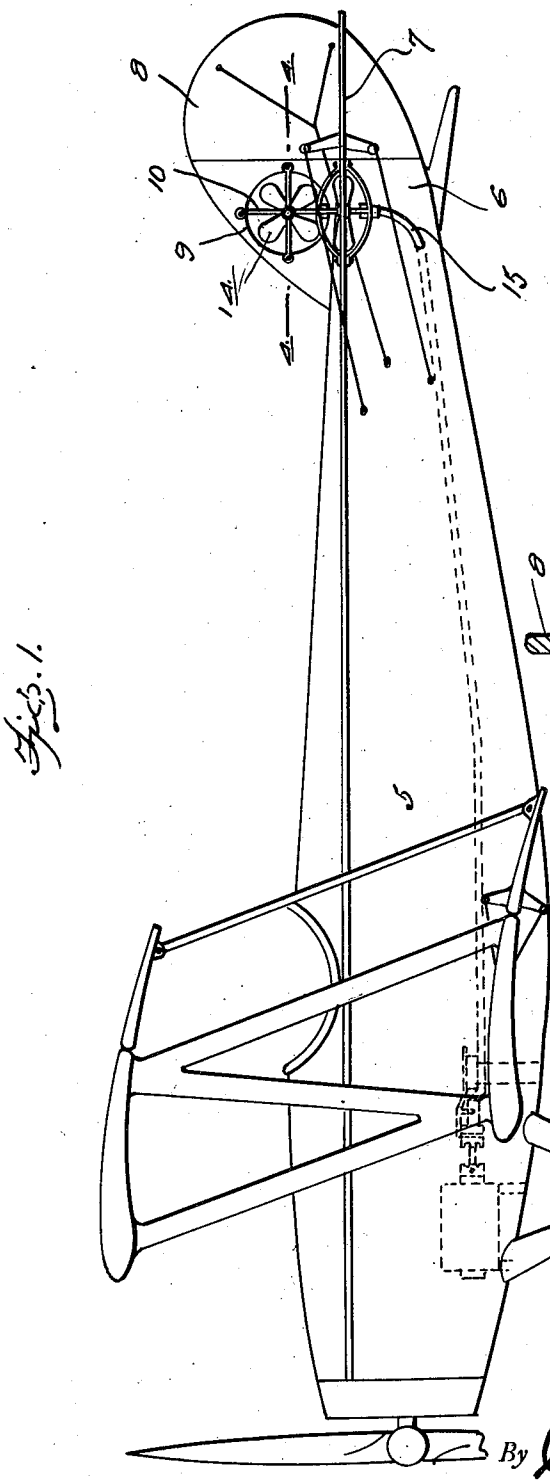


Fig. 1.

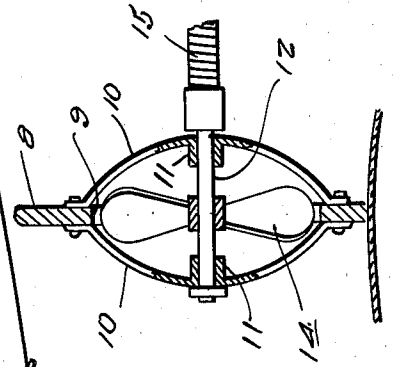


Fig. 4.

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Fig. 2.

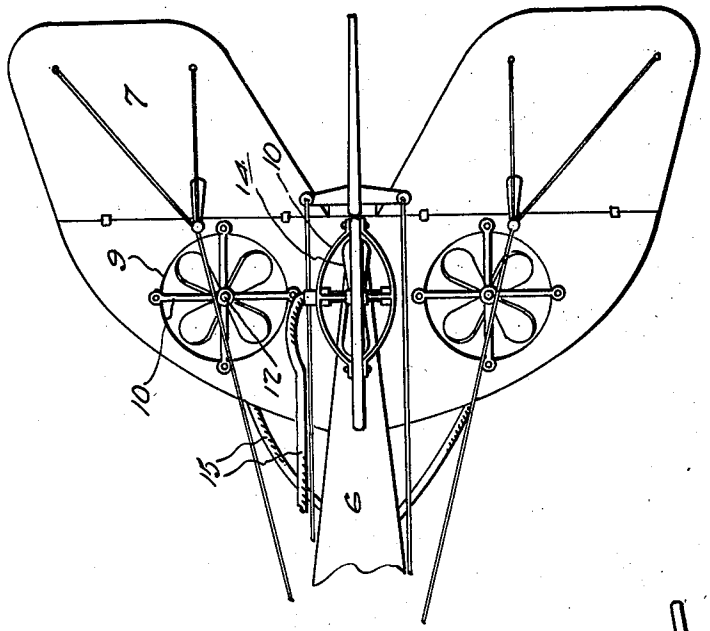


Fig. 3.

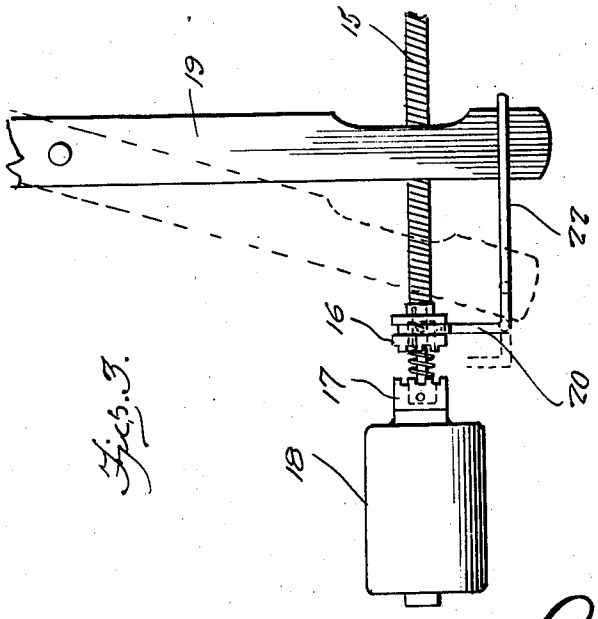
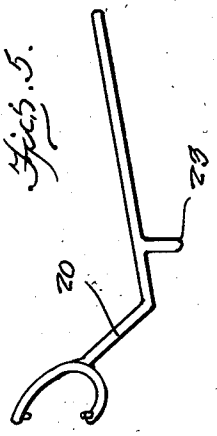


Fig. 5.



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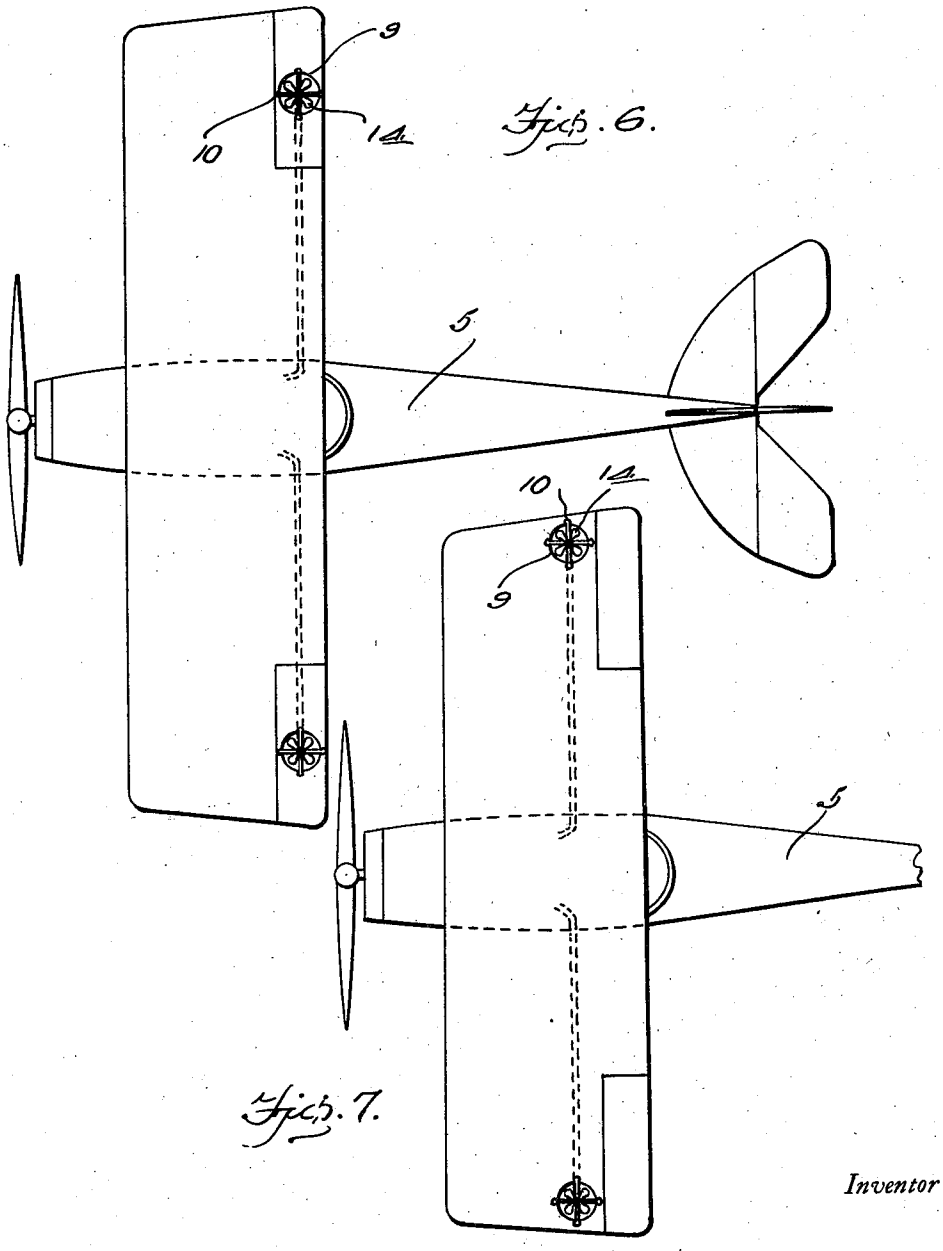


Fig. 6.

Fig. 7.

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UNITED STATES PATENT OFFICE

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AIRCRAFT CONTROL MECHANISM

Application filed January 12, 1928. Serial No. 246,265.

The present invention relates to the art of aeronautics and has for its prime object to provide improved means for controlling, stabilizing or steering heavier than air-craft in the air, or steering or maneuvering same on the ground.

Another very important object of the invention resides in the provision of a propeller for creating currents of air for the purpose of guiding the aeroplane either vertically, horizontally or laterally.

Another very important object of the invention resides in the provision of a mechanism of this nature which may be used either as a substitute or as an auxiliary to the control means now in common use such as rudders, elevators, ailerons, and the like.

A still further very important object of the invention resides in the provision of a mechanism of this nature which when used as an auxiliary control means may be brought into operation after the main means has been actuated.

A further object of the invention resides in the provision of a mechanism of this nature which is simple in its constructions, and thoroughly efficient and reliable in its operation, and can operate independently of the rate of speed of the craft through the air.

With the above and numerous other objects in view as will appear as the description proceeds, the invention resides in certain novel features of construction, and in the combination and arrangement of parts as will be hereinafter more fully described and claimed.

In the drawing:

Figure 1 is a side elevation of an aeroplane showing my improved mechanism incorporated therein,

Figure 2 is a top plan view of the tail portion of the aeroplane,

Figure 3 is a detail view of a foot operable element for actuating one of the usual controls on the aeroplane in conjunction with means to bring into operation my improved mechanism.

Figure 4 is a sectional view taken substantially on the line 4—4 of Figure 1,

Figure 5 is a perspective view of one of the clutch operating forks,

Figures 6 and 7 are top plan views showing my improved mechanism incorporated in the ailerons and planes respectively.

Referring to the drawing in detail it will be seen that in the present example of the invention I have illustrated the well known type of aeroplane including a fuselage 5 having a tail portion 6 which includes elevators 7 and a rudder 8. The elevator 7 and rudder 8 are provided in their stationary portions with openings 9. Spiders 10 are mounted to span the openings 9 one to each side thereof and have central bearings 11 for receiving shafts 12 on which are a plurality of fan blades or propellers 14. The pressure of air fan is reversible, of course, by reversing the direction of its rotation, its blades being fixed, and that construction I prefer and illustrate herein. But it may be reversed also by reversing the set or angle of moveable blades, or by other suitable means. The shafts 12 are connected with flexible shafting 15 operable by slidable clutch elements 16 for engaging clutch elements 17 operated by prime movers 18. The numeral 19 denotes a manually actuated controlling member in the form of a stick, foot pedal or the like which actuates one of the controlling elements on the tail. A fork 20 is provided for actuating the clutch segment 16 and has an extension 22 formed with a laterally extending lug 23 that will be engaged by the stick as it nears the end of its movement for pushing the fork so as to actuate the clutch element 16 into engagement with the clutch element 17 so that the propeller structure of that control element actuated by the stick 19 will be brought into operation to set up a current of air to assist in guiding the aeroplane. As the rudder bar is still further advanced to the limit of its movement, it opens the throttle and accelerates the speed of the motor and fan propeller.

I have described somewhat in detail an example of the utility of the mechanism. It is quite apparent, however, that this mechanism may be used in various other ways and on various other control elements than those illustrated, and, other examples are shown in Figures 6 and 7. It is also practical to use the

mechanism as the sole means for guiding the aeroplane thus eliminating the ailerons and the usual wing like rudder and elevator or at least the movable portions thereof.

It is preferred to operate the controlling and steering propellers by a separate motor, so as to be independent of the main motor of the air-craft, in case the latter should stop or the air-craft's speed should be reduced to the starting point; also for turning the craft when resting on or rolling over the ground.

The gist of the matter is that fans are intended as a new way to control stabilizing and steering in all three possible ways, longitudinally, laterally and directionally (all of "the three stabilities") as they are called being within the scope of the invention. The old way for all three directions was by inclined surfaces depending for effectiveness on the craft having substantial speed through the air. The new way, by fans, is independent of sped through the air.

It is thought that the construction, operation and advantages of the invention will now be quite apparent to those skilled in this art without a more detailed description thereof.

The present embodiment of the invention has been disclosed merely by way of example since in actual practice it attains the features of advantages enumerated as desirable in the statement of the invention and the above description. It will be apparent that numerous changes in the details of construction, and in the combination and arrangement of parts may be resorted to without departing from the spirit or scope of the invention as hereinafter claimed or sacrificing any of its advantages.

Having thus described my invention, what I claim as new is:

1. In combination with a guiding surface element of air-craft and means for operating the same, of means for creating an air current transversely thereto and means controlling the first mentioned means through the second mentioned means.

2. In an aircraft, a surface having an opening therein, a spider mounted on the surface spanning the opening, a bearing supported by the spider structure, a shaft journaled in said bearing, propeller blades radiating from said shaft between the spider structure and in the opening, means for causing rotation of the shaft, means for controlling the surface and a mechanism actuatable by the second means for causing the first mentioned means to operate.

In testimony whereof I affix my signature.

ASA J. STYLES.