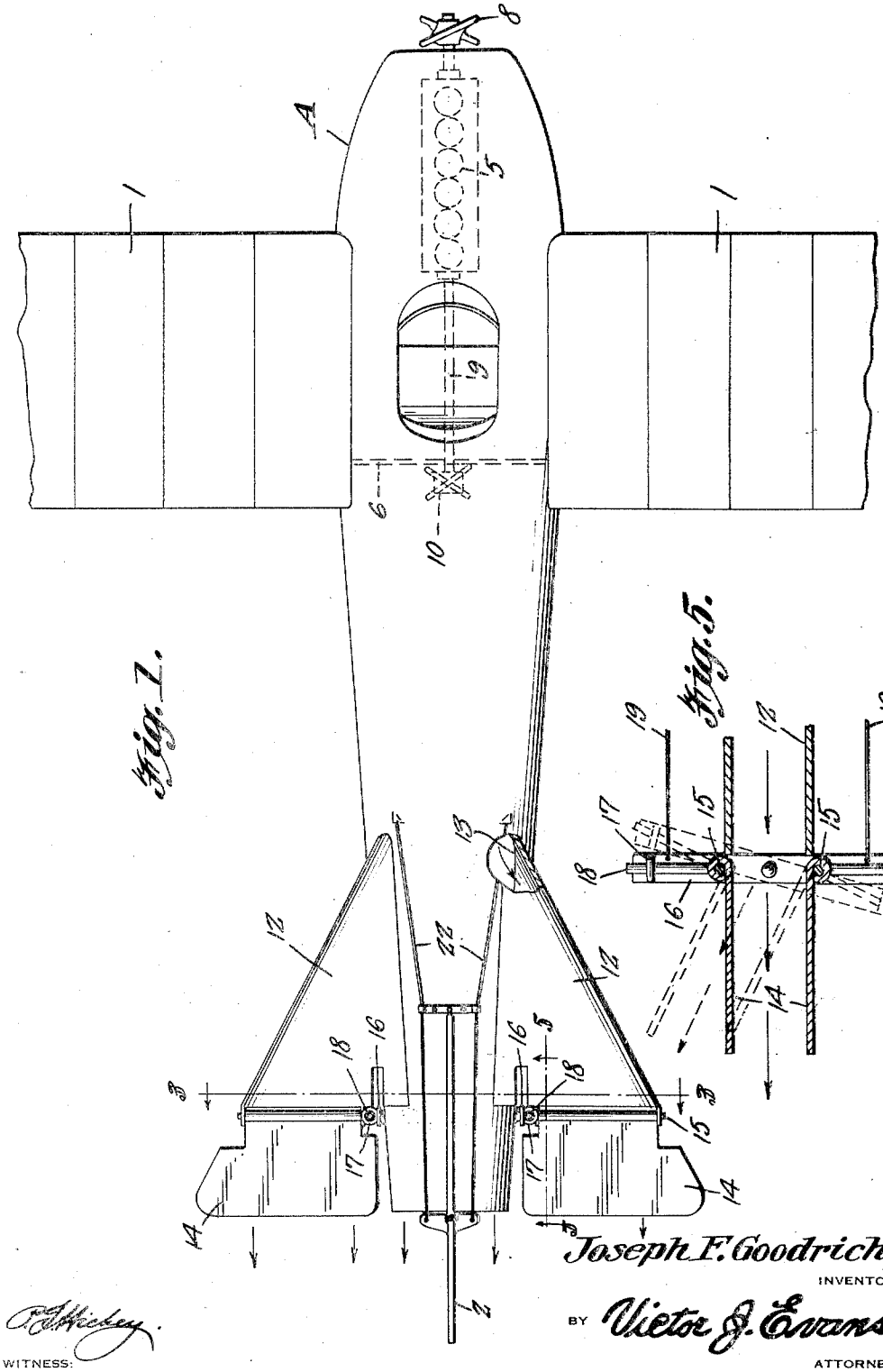
Aug. 6, 1929. J. F. GOODRICH 1,723,479

AEROPLANE

Filed June 2, 1928 2 Sheets-Sheet 1



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WITNESS:

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AEROPLANE

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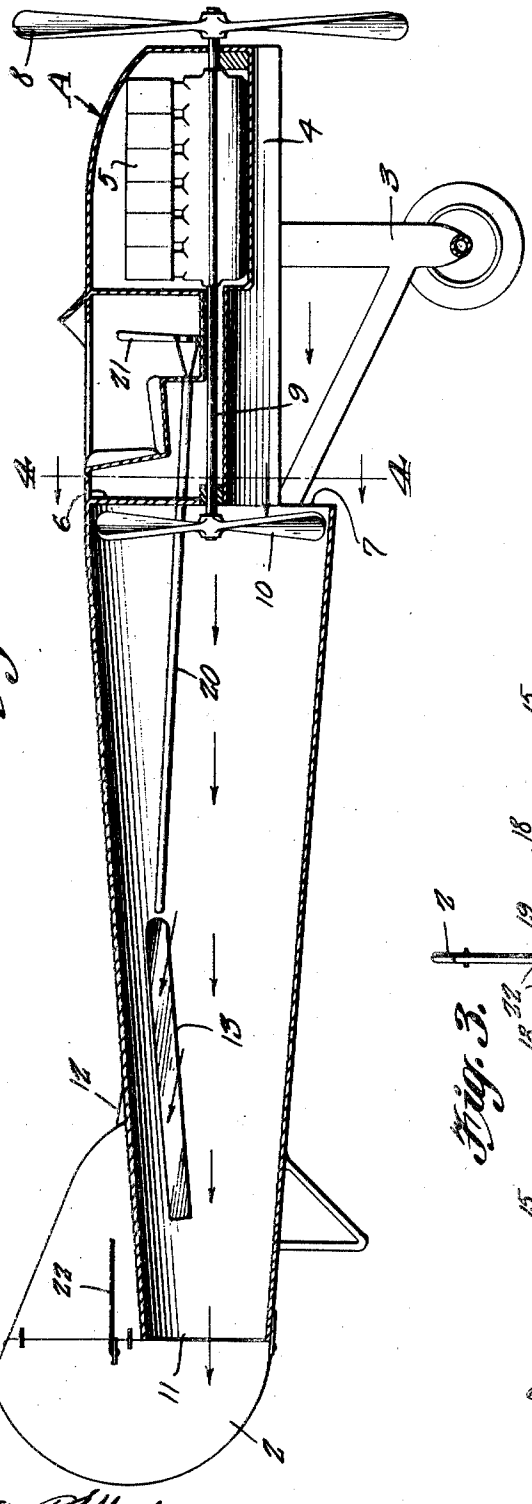


Fig. 2.

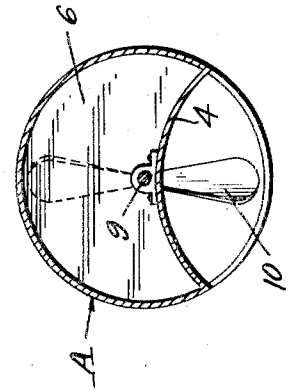


Fig. 4.

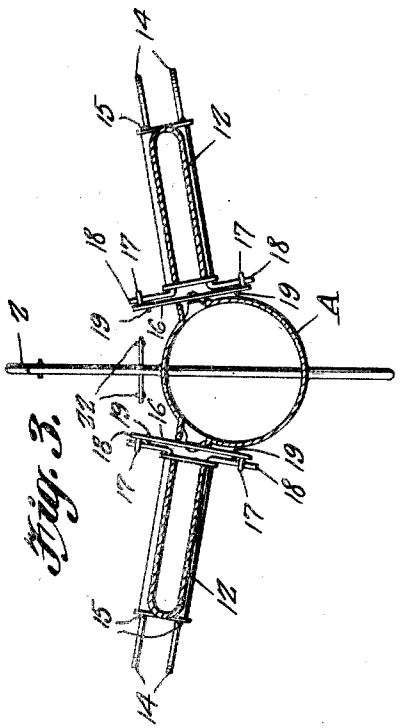


Fig. 3.

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UNITED STATES PATENT OFFICE.

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AEROPLANE.

Application filed June 2, 1928. Serial No. 282,374.

This invention relates to improvements in aeroplanes, the general object of the invention being to so construct the plane that it will have the maximum speed with the minimum amount of power and maximum stability and can take off and land in a small area.

Another object of the invention is to provide means whereby the plane can be easily controlled and the danger of tail spins and nose dives is practically eliminated.

This invention also consists in certain other features of construction and in the combination and arrangement of the several parts, to be hereinafter fully described, illustrated in the accompanying drawings and specifically pointed out in the appended claims.

In describing my invention in detail, reference will be had to the accompanying drawings wherein like characters denote like or corresponding parts throughout the several views, and in which:—

Figure 1 is a plan view of the improved aeroplane.

Figure 2 is a longitudinal sectional view.

Figure 3 is a section on line 3—3 of Figure 1.

Figure 4 is a section on line 4—4 of Figure 2.

Figure 5 is a section on line 5—5 of Figure 1.

In these views, A indicates the fuselage of the aeroplane which is provided with the usual wings 1 and the vertical rudder 2 and the landing gear 3. The fuselage is of the usual tubular formation and tapers from its nose to its tail, with the lower part of the forward portion of the fuselage cut away and the upper portion of the forward part having an arched bottom, as shown at 4. This upper forward portion is divided into chambers in one of which is placed the motor 5 and the rear one of which forms a compartment for the pilot and other occupants of the plane. This compartment is separated from the rear part of the fuselage by a partition 6. By cutting away the lower portion of the forward part of the fuselage, an opening 7 is formed at the front of the rear part of the fuselage through which air can enter.

The usual propeller 8 is connected with the motor shaft which extends through the nose of the fuselage and said shaft is provided with a rear extension 9 which projects through the partition 6 and a second propeller 10 is fastened to this projecting part and is arranged in the front part of the rear portion of the fuselage so that it will be contacted by the air entering the opening 7. This propeller has its blades of greater pitch than the blades of the propeller 8. The tail of the fuselage is formed with an opening 11 for the escape of the air passing into the rear part through the opening 7 and the rudder 2 intersects this opening.

The stabilizers 12 are of hollow construction and extend upwardly and outwardly from the rear part of the fuselage with their rear ends located an appreciable distance from the rear end of the fuselage. As shown, these stabilizers are connected with the fuselage adjacent the top thereof and their outer edges extend at an angle outwardly toward the tail of the fuselage. The stabilizers are in communication with the interior of the rear part of the fuselage through means of the slots 13 and the rear ends of the stabilizers are open so that some of the air entering the fuselage through the opening 7 will pass out of these slots or openings into the stabilizers and will pass from the stabilizers through their open rear ends. The opening 11 and the passages through the stabilizers should be of practically the same area as the opening 7 so as to prevent back pressure in the rear part of the fuselage.

A pair of elevators 14 is hinged to the rear part of each stabilizer, as shown at 15, and when these elevators are in horizontal position, they will form extensions of the upper and lower walls of the stabilizers, as clearly shown in Figure 5. A vertically arranged lever 16 is pivoted to each side of the fuselage adjacent the rear end of each stabilizer and an eye member 17 is connected with each end of each lever. An arm 18 is connected with each hinge pin of each elevator, the arm of each upper elevator extending upwardly and the arm of each lower elevator extending downwardly, the arms passing through the eye members so that as the levers are rocked, the elevators of each pair will be moved in unison, as shown in dotted lines in Figure 5. During this movement, the arms will slide through the eye members. The control wires 19 which are connected with the levers pass through holes in the fuselage and through tubes 20 within the fuselage to the pilot's compartment, where

they are connected with the usual control stick 21. The control wires 22 of the rudder 2 are also guided by the tubes placed within the fuselage.

From the foregoing it will be seen that the air passing rearwardly from the front propeller will pass under the arch 4 into the opening 7 where it is engaged by the propeller 10 and then the air will pass through the tunnel formed by the rear part of the fuselage, some of this air escaping through the opening 11 and some through the openings 13 and through the stabilizers. This air, acting on the rudder and elevators, will make the craft respond readily when the rudder and elevators are shifted, as the rudders and elevators will not only be acted on by the air escaping from the interior part of the fuselage, but they will also be acted on by the air flowing rearwardly from the front propeller 8 so that the craft can be very easily controlled. The air passing under the arch 4 will also give the craft great stability and facilitate the landing and take-off of the craft so that the craft can take off and land in a small area and this arched part also works in conjunction with the rudder and elevators to make the craft easily controllable as the air passing thereunder will have a lifting force and this force, together with the stabilizers, will act to keep the craft on an even keel and practically eliminate tail spins and nose dives.

The second propeller 10, having a greater pitch than the front propeller and being enclosed in the tunnel-like part of the fuselage, will greatly accelerate the speed of the craft without increased power, and the air escaping from the rear of the fuselage will dissipate the vacuum usually formed at the rear of an aircraft and thus the retarding action of such vacuum will be eliminated. The arched front portion of the fuselage also acts to prevent back pressure against the front propeller. The arched part of the fuselage permits the air to enter the rear part thereof and the air passing under the arch has a lifting power that will make the plane more stable and this lifting power will make it possible for the plane to take the air in about one-half the distance necessary for planes as now constructed. If the engine should stall, the air will rush under the arch and through the rear tunnel-like part, thus causing a pressure on the elevators that will make a nose dive practically impossible. The craft can be landed with the motor cut off and the craft elevated in front as the force of the air on the arch will enable the craft to land after a short run. The double elevators will greatly increase the force of control and the air passing through the tunnel-shaped part will act on the lower part of the rudder so that the craft will respond quickly to said rudder. As will be seen, the stabilizers serve two purposes as they act to stabilize the craft and to convey the air to the elevators and rudder.

It is thought from the foregoing description that the advantages and novel features of my invention will be readily apparent.

It is to be understood that I may make changes in the construction and in the combination and arrangement of the several parts, provided that such changes fall within the scope of the appended claims.

What I claim is:—

1. An aeroplane having a fuselage formed with a front portion provided with an arch-shaped bottom and a rear portion of circular shape with its lower front part open to receive air passing under the arched part, a propeller at the front end of the fuselage, a propeller in the front end of the circular part, means for driving the propellers, the rear propeller acting on the air entering the circular part, the rear end of the fuselage being open for the escape of the air and horizontal and vertical rudders connected with the rear part of the fuselage, the vertical rudder intersecting the open rear end of the fuselage.

2. An aeroplane having a fuselage formed with a front portion provided with an arch-shaped bottom and a rear portion of circular shape with its lower front part open to receive air passing under the arched part, a propeller at the front end of the fuselage, a propeller in the front end of the circular part, means for driving the propellers, the rear propeller acting on the air entering the circular part, the rear end of the fuselage being open for the escape of the air, horizontal and vertical rudders connected with the rear part of the fuselage, the vertical rudder intersecting the open rear end of the fuselage and stabilizers of hollow construction extending upwardly and outwardly from the rear part of the fuselage with their interiors in communication with the interior of the fuselage whereby some of the air passing through the fuselage will pass through the stabilizers and act on the vertical and horizontal rudders.

3. An aeroplane having a fuselage formed with a front portion provided with an arch-shaped bottom and a rear portion of circular shape with its lower front part open to receive air passing under the arched part, a propeller at the front end of the fuselage, a propeller at the front end of the circular part, means for driving the propellers, the rear propeller acting on the air entering the circular part, the rear end of the fuselage being open for the escape of the air, horizontal and vertical rudders connected with the rear part of the fuselage, the vertical rudder intersecting the open rear end of the fuselage and stabilizers of hollows construction extending upwardly and outwardly

from the rear part of the fuselage with their interiors in communication with the interior of the fuselage whereby some of the air passing through the fuselage will pass through the stabilizers and act on the vertical and horizontal rudders, the horizontal rudders or elevators being arranged in pairs adjacent the open rear ends of the stabilizers, each pair of elevators forming continuations of the upper and lower walls of each stabilizer when the elevators are in horizontal position.

4. An aeroplane having a fuselage formed with a front portion provided with an arch-shaped bottom and a rear portion of circular shape with its lower front part open to receive air passing under the arched part, a propeller at the front end of the fuselage, a propeller at the front end of the circular part, means for driving the propellers, the rear propeller acting on the air entering the circular part, the rear end of the fuselage being open for the escape of the air, horizontal and vertical rudders connected with the rear part of the fuselage, the vertical rudder intersecting the open rear end of the fuselage and stabilizers of hollow construction extending upwardly and outwardly from the rear part of the fuselage with their interiors in communication with the interior of the fuselage whereby some of the air passing through the fuselage will pass through the stabilizers and act on the vertical and horizontal rudders, the horizontal rudders or elevators being arranged in pairs adjacent the open rear ends of the stabilizers, each pair of elevators forming continuations of the upper and lower walls of each stabilizer when the elevators are in horizontal position and means for actuating the elevators of each pair in unison.

5. An aeroplane having a fuselage formed with a front portion provided with an arch-shaped bottom and a rear portion of circular shape with its lower front part open to receive air passing under the arched part, a propeller at the front end of the fuselage, a propeller at the front end of the circular part, means for driving the propellers, the rear propeller acting on the air entering the circular part, the rear end of the fuselage being open for the escape of the air, horizontal and vertical rudders connected with the rear part of the fuselage, the vertical rudder intersecting the open rear end of the fuselage and stabilizers of hollow construction extending upwardly and outwardly from the rear part of the fuselage with their interiors in communication with the interior of the fuselage whereby some of the air passing through the fuselage will pass through the stabilizers and act on the vertical and horizontal rudders, the horizontal rudders or elevators being arranged in pairs adjacent the open rear ends of the stabilizers, each pair of elevators forming continuations of the upper and lower walls of each stabilizer when the elevators are in horizontal position, means for actuating the elevators of each pair in unison, such means comprising a lever pivoted intermediate its ends to a part of the craft, arms connected with the pivotal means of the elevators and extending parallel with each lever and means for slidably connecting the arms with the levers.

6. An aeroplane having a fuselage formed with a front portion provided with an arch-shaped bottom and a rear portion of circular shape with its lower front part open to receive air passing under the arched part, a propeller at the front end of the fuselage, a propeller at the front end of the circular part, means for driving the propellers, the rear propeller acting on the air entering the circular part, the rear end of the fuselage being open for the escape of the air, horizontal and vertical rudders connected with the rear part of the fuselage, the vertical rudder intersecting the open rear end of the fuselage and stabilizers of hollow construction extending upwardly and outwardly from the rear part of the fuselage with their interiors in communication with the interior of the fuselage whereby some of the air passing through the fuselage will pass through the stabilizers and act on the vertical and horizontal rudders, the horizontal rudders or elevators being arranged in pairs adjacent the open rear ends of the stabilizers, each pair of elevators forming continuations of the upper and lower walls of each stabilizer when the elevators are in horizontal position, means for actuating the elevators of each pair in unison, such means comprising a lever pivoted intermediate its ends to a part of the craft, arms connected with the pivotal means of the elevators and extending parallel with each lever, means for slidably connecting the arms with the levers, control wires connected with the levers and with the vertical rudder and guiding tubes within the fuselage through which the wires pass.

In testimony whereof I affix my signature.

JOSEPH F. GOODRICH.