

F. E. SUMMERS.  
AEROPLANE.  
APPLICATION FILED JULY 11, 1916.

1,230,620.

Patented June 19, 1917.  
3 SHEETS—SHEET 1.

Fig. 1.

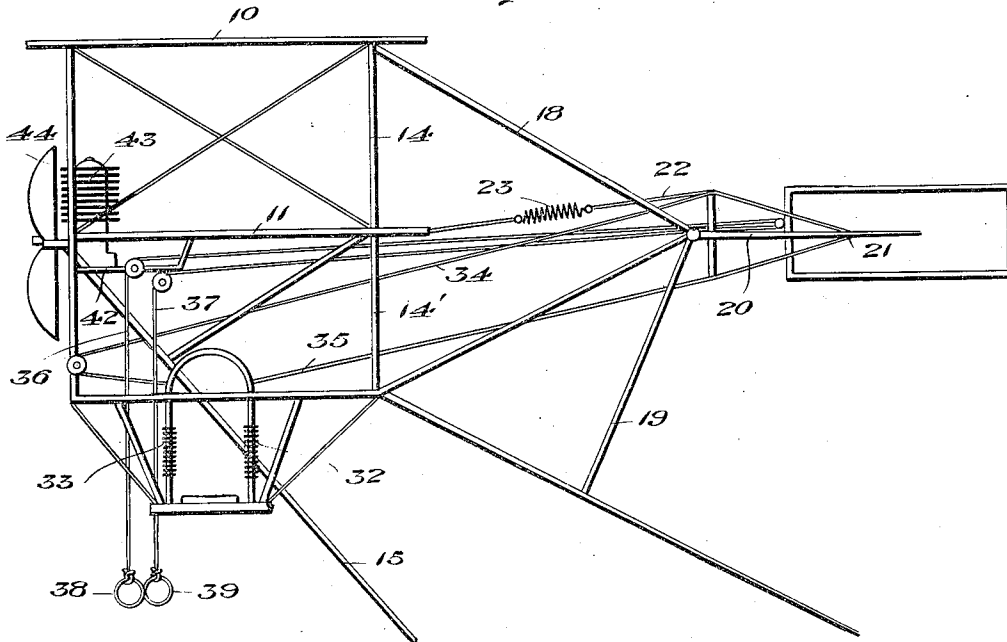
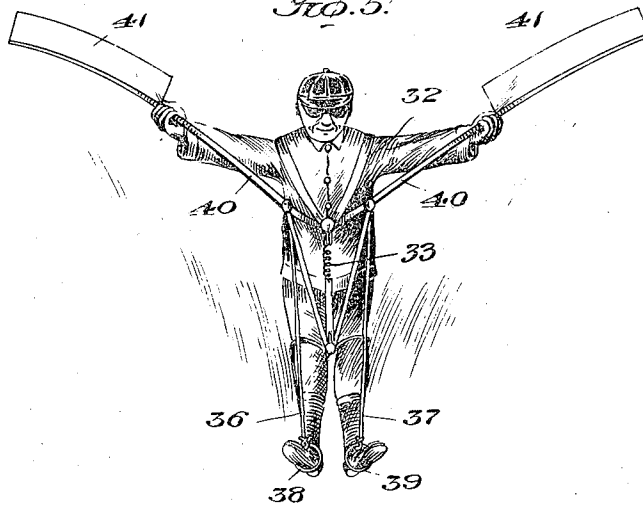


Fig. 5.



Witness

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Attorney

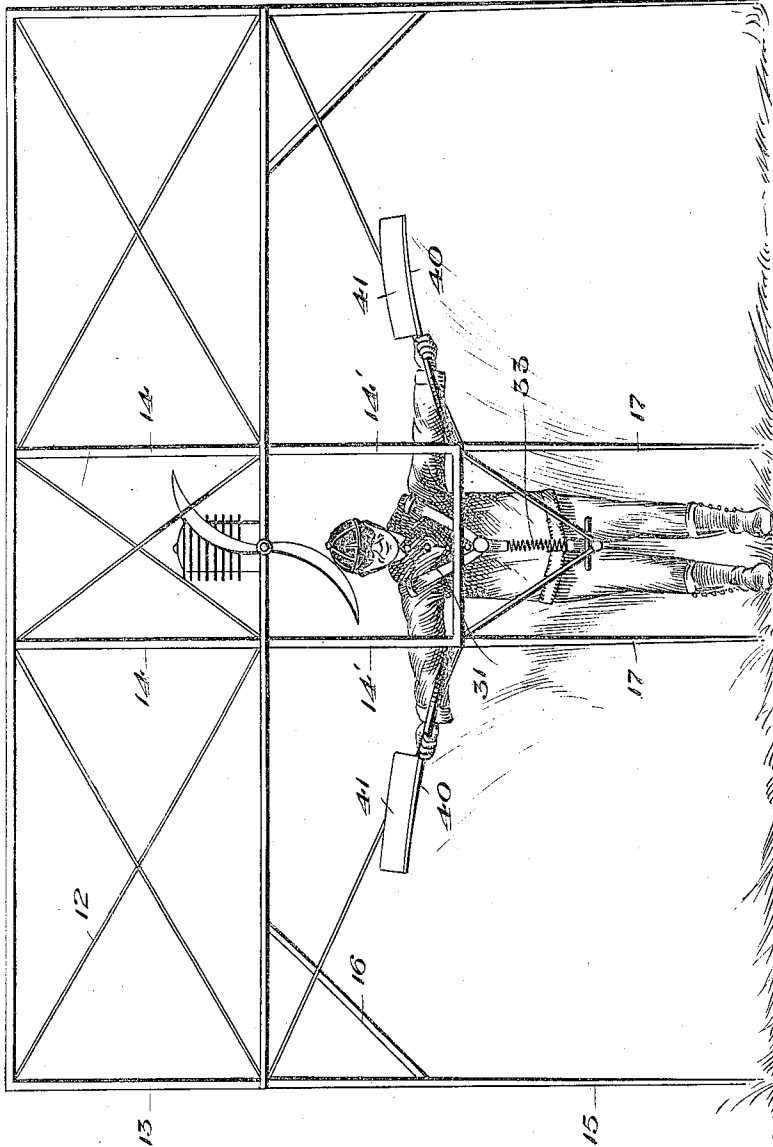
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3 SHEETS—SHEET 2.

Fig. 2.



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3 SHEETS—SHEET 3.

Fig. 3.

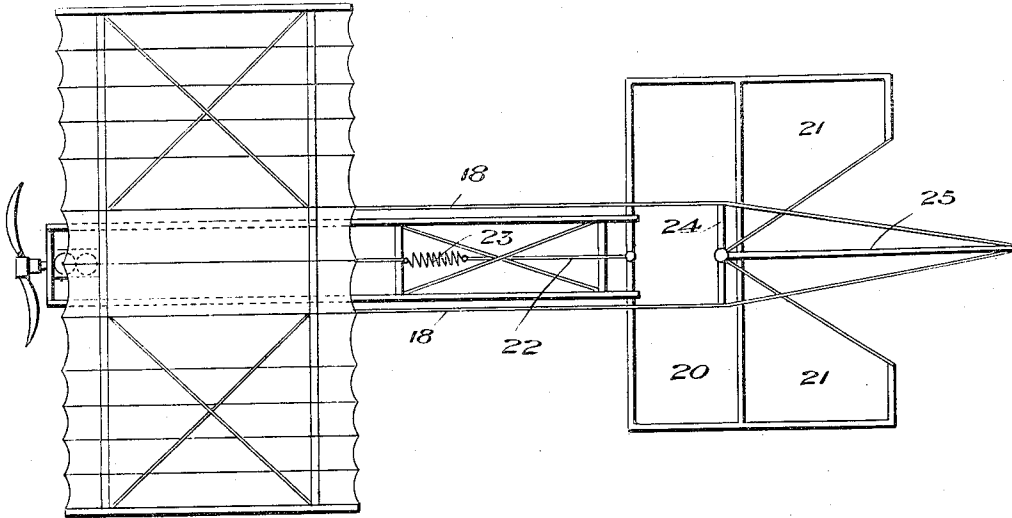
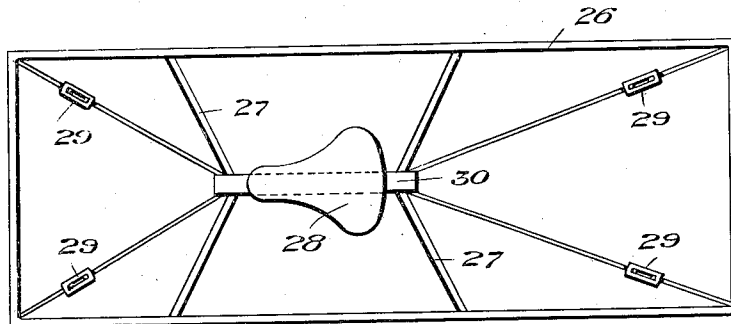


Fig. 4.



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# UNITED STATES PATENT OFFICE.

FRANK E. SUMMERS, OF MEMPHIS, MISSOURI.

## AEROPLANE.

1,230,620.

Specification of Letters Patent. Patented June 19, 1917.

Application filed July 11, 1916. Serial No. 103,702.

*To all whom it may concern:*

Be it known that I, FRANK E. SUMMERS, a citizen of the United States, residing at Memphis, in the county of Scotland and State of Missouri, have invented certain useful Improvements in Aeroplanes, of which the following is a specification, reference being had therein to the accompanying drawing.

10 This invention relates to improvements in aeroplanes, one object of the invention being the provision of a gliding machine provided with a propulsion means to be used in conjunction with the aviator, the propulsion means being operated to propel the aeroplane while the gliding and landing mechanism as well as the mechanism for starting the flight is controlled entirely by the aviator.

20 A further object of this invention is the provision of an aeroplane employing flat, rigid planes which in turn employ an angle of incidence that will assist in the proper gliding of the machine through the atmosphere.

25 A still further object of this invention is the provision of an exceedingly light type of aeroplane which is simple and durable in construction and which is thoroughly efficient and practical in use.

In the accompanying drawings:—

Figure 1 is a side elevation of the complete aeroplane.

Fig. 2 is a front elevation thereof.

35 Fig. 3 is a top plan view thereof.

Fig. 4 is a top plan view of the seat arrangement.

40 Fig. 5 is a detail view showing the method of supporting the machine by the shoulders of the operator and also a simple method of vibrating the wings.

Referring to the drawings, the numeral 10 designates the upper plane and 11 the lower plane which are connected together by suitable braces 12, the rigid end pieces 13, and central bracing members 14. Depending from and extending rearwardly of the forward edge of the lower plane 11 and in alignment with the end braces 13 are the inclined skids 15, while extended from the lower ends 14' of the braces 14 and projecting rearwardly are the inclined sled runners 17, the runners being free at their ends and being made of a resilient material such as bamboo, will hold the present machine in a stable position when landing and will also carry a

portion of the weight of the machine when at a standstill and when such machine is connected to the aviator, as will presently appear.

60 Extending rearwardly of the rear bracing members 14 is the supplemental framework 18, the free end of which is connected by the rods 19 to the sled runners 17, while hingedly mounted in the rear end of such framework is the horizontal rudder 20 having the reduced and spaced ends 21, while connected to the same for, and acting as a counterbalancing means therefor is the cable 22 having the spring 23. Mounted in the 70 extreme end 24 of the frame 18 is the vertical rudder 25.

Supported from the open frame 26 by means of the bars 27 is a saddle or seat 28 for the aviator, the adjustable wire braces 29 also being employed.

Connected to the seat carrying bar 30 is a harness 31 which is provided with shoulder straps 32 and spring connecting members 33. These springs 33 serve as shock absorbers so as to relieve the impact on the landing of the machine from the shoulders of the aviator. Also, the said springs 33 hold the aviator and the steering rudder in a neutral position. It will be obvious that when the harness is applied to the aviator the aeroplane, when starting a flight and the ending thereof, will be partially supported by the aviator with the assistance of the runners 17, which latter may be of any desirable construction.

90 When the aviator is seated upon the support 28 with the straps 32 above his shoulders, the harness being connected to the front and rear of him, he will be in a position to readily sway his body forwardly or rearwardly and thus through the cables 34 and 35 which are connected to the horizontal rudder 20 operate such rudder to cause an elevation or depression of the machine, while in order to operate the vertical rudder 25 the cables 36 and 37 are connected to such rudder, and at their forward ends are provided with the foot receiving rings 38 and 39 which permit of the manipulation of the rudder 25 by the feet of the aviator.

105 From the foregoing description it is evident that the respective rudders 20 and 25 may be manipulated by the body of the aviator and that therefore the aeroplane may be lowered or elevated and steered in any desired direction.

In a machine of this type it is also de-

sirable to provide a means whereby the aviator may propel the same, and therefore hingedly connected to the frame 26 adjacent the upper end of the forward braces 27 are the arms 40 which extend in opposite directions and carry the wings 41 which are adapted to be grasped by the hands of the operator and manipulated similarly to the wings of a bird. These wings are of what is known as the ornithopter type.

It is also desirable in this type of aeroplane to provide a motor propulsion means, and in this instance there is connected to the framework 42 adjacent the forward central edge of the lower plane 11, a motor 43 having the forward propeller 44.

The planes 10 and 11 in this structure are flat rigid ones and have no ailerons.

From the foregoing description taken in connection with the drawings, it is evident that a machine of this type which is exceedingly small and light will readily carry a single operator whose body controls the direction of travel, and in some cases when the motor is not being used, will be manually actuated to propel the same, the present device being a glider structure having propulsion means as before stated, either mechanical or manual.

What I claim as new is:—

1. In an aeroplane, a glider structure having a frame, a support for an aviator rigidly depending from the frame, manually actuated and mechanical propulsion means mounted in said frame, and resilient means connected with the support for partially supporting the frame by the aviator when starting and ending a flight.

2. In an aeroplane, a glider structure having a frame, a support for an aviator rigidly depending from the frame, manually actuated and mechanical propulsion means mounted in said frame, resilient means connected with the support for partially supporting the frame by the aviator when starting and ending a flight, and skids depending from said frame rearwardly for assisting in supporting the frame.

3. In an aeroplane, a glider structure having a frame, manually actuated and mechanical propulsion means mounted in said frame, a lifting rudder swingingly supported on the frame, a steering rudder supported by said frame, manually controlled means for operating the steering rudder, resilient means for partially supporting the frame by an aviator, and connections between the lifting rudder and said resilient means for moving said lifting rudder by the body of the aviator.

4. In an aeroplane of the glider type, a frame-work, a plurality of flat planes thereon, mechanical propulsion means mounted in the frame, manually controlled propulsion means also mounted in the frame, a rigid

support depending from the frame-work for holding the aviator when the aeroplane is in flight, and resilient means connected with the support for partially supporting the frame-work by an aviator when the aeroplane is at a standstill.

5. An aeroplane having a frame, a plane carried thereby, horizontal and vertical rudders, a depending support for the aviator, a resilient harness connected to the support for engaging the body of the aviator, means connected to the harness and to the horizontal rudder whereby the forward and rearward swinging of the body will actuate the horizontal rudder, and foot operated means connected to the vertical rudder.

6. An aeroplane having a frame, a plane carried thereby, horizontal and vertical rudders, a depending support for the aviator, a resilient harness connected to the support for engaging the body of the aviator, means connected to the harness and to the horizontal rudder whereby the forward and rearward swinging of the body will actuate the horizontal rudder, foot operated means connected to the vertical rudder, and a counterbalancing resilient connection between the frame and the horizontal rudder.

7. An aeroplane having a frame, a plane carried thereby, horizontal and vertical rudders, a depending support for the aviator, a resilient harness connected to the support for engaging the body of the aviator, means connected to the harness and to the horizontal rudder whereby the forward and rearward swinging of the body will actuate the horizontal rudder, foot operated means connected to the vertical rudder, and a pair of wings of the ornithopter type disposed in coöperative relation to the support for the aviator and adapted to be grasped by the arms and hands of the aviator.

8. An aeroplane having a frame, a plane carried thereby, horizontal and vertical rudders, a depending support for the aviator, a resilient harness connected to the support for engaging the body of the aviator, means connected to the harness and to the horizontal rudder whereby the forward and rearward swinging of the body will actuate the horizontal rudder, foot operated means connected to the vertical rudder, a counterbalancing resilient connection between the frame and the horizontal rudder, and a motor propulsion means mounted at the forward portion of the frame above the support for the aviator.

9. An aeroplane having a frame, a plane carried thereby, horizontal and vertical rudders, a depending support for the aviator, a resilient harness connected to the support for engaging the body of the aviator, means connected to the harness and to the horizontal rudder whereby the forward and rearward swinging of the body will actuate the

horizontal rudder, foot operated means connected to the vertical rudder, a pair of wings of the ornithopter type disposed in coöperative relation to the support for the aviator and adapted to be grasped by the arms and hands of the aviator, and a motor propulsion means mounted at the forward portion of the frame above the support for the aviator.

10. An aeroplane including a frame having a rearward extension, a plurality of parallel relatively flat planes mounted in the forward portion of the frame, a horizontal rudder swingingly connected to the extension of the frame, a vertical rudder also swingingly connected to the extension of the frame, a seat support for the aviator suspended from the frame so that the feet of the operator will act as a support for the forward portion of the aeroplane, auxiliary supporting means attached to the frame and extending rearwardly therefrom, a resilient harness connected to the support for the aviator for fitting upon the body of the aviator, means connected to the harness and to the horizontal rudder, foot actuated means connected to the vertical rudder, manually operated ornithopter wings mounted adjacent to the harness, and a motor propulsion means mounted in the forward portion of the frame adjacent the lower plane.

11. In an aeroplane, a glider structure having a frame, runners on the frame, rearwardly inclined skids on said frame and forwardly of said runners, a seat depending from the frame-work, a lifting rudder supported by the frame, a resilient harness connected with the seat, and connections between the lifting rudder and said harness and normally held in neutral position thereby.

12. In an aeroplane, a glider structure having a frame, runners on the frame, rearwardly inclined skids on said frame and forwardly of said runners, a seat depending from the frame, a lifting rudder supported by the frame, a resilient harness connected with the seat, connections between the lifting rudder and said harness and normally held in neutral position thereby, a steering rudder supported by the frame, means for moving the steering rudder, and stirrups connected with said means and adapted to be engaged by the feet of the aviator when in the harness.

13. In an aeroplane of the glider type, a frame-work, a plurality of flat planes on said frame-work, mechanical propulsion means mounted in the frame, landing means connected with the frame, a lifting rudder supported on the frame, and a harness carried by the frame for permitting the partial support of the latter by an aviator and having connection with the lifting rudder

for actuating the same on movement of the aviator in predetermined directions.

14. In an aeroplane of the glider type, a frame-work, a plurality of flat planes on said frame-work, mechanical propulsion means mounted in the frame, landing means connected with the frame, a lifting rudder supported on the frame, a harness carried by the frame for permitting the partial support of the latter by an aviator and having connection with the lifting rudder for actuating the same on movement of the aviator in predetermined directions, and manually controlled propulsion means in said frame and independent of the mechanical propulsion means.

15. In an aeroplane, a glider structure having a frame and landing means, a plurality of planes carried by said frame, propulsion means mounted in the frame, a depending support for the aviator, a resilient harness connected to the support for engaging the body and shoulders of the aviator so that his feet will coöperate with the landing means when starting and ending a flight.

16. In an aeroplane of the glider type having a frame, a plane, propulsion means mounted in the frame, a depending seat for the aviator, and resilient harness connected adjacent said seat and extending upwardly for engaging the body and shoulders of the aviator.

17. In an aeroplane, a glider structure having a frame, means for supporting an aviator, resilient harness connected with the means for engaging the body of the aviator for aiding in supporting the frame when starting a flight and ending the same.

18. In an aeroplane, a frame, planes co-operative with the frame, propulsion means mounted in said frame, elevating and steering means supported by the frame, and means adapted to be worn by an aviator and connected with the elevating means for holding the same in normal position.

19. In an aeroplane, a frame, planes co-operative with the frame, propulsion means mounted in said frame, elevating and steering means supported by the frame, and means adapted to be worn by an aviator and connected with the elevating means for holding the same in normal position and also for partially supporting the frame when starting in flight or in the landing of the aeroplane.

20. In an aeroplane, a frame, planes co-operative with the frame, propulsion means mounted in said frame, elevating and steering means supported by the frame, means adapted to be worn by an aviator and connected with the elevating means for holding the same in normal position and also for partially supporting the frame when starting in flight or in the landing of the

aeroplane, and resilient means included in said last named means for absorbing shock incident to the landing of the aeroplane.

21. In an aeroplane, a frame, a plane, 5 propulsion means carried by the frame, alighting means connected to the frame, a depending support connected to the frame for an aviator, a resilient harness connected to the support for engaging the body of an 10 aviator, and elevating rudders on the frame and connected with the resilient harness and adapted to be sustained in normal neutral position under the action of the harness.

22. In an aeroplane, a frame, a plane, 15 propulsion means carried by the frame, alighting means connected to the frame, a depending support connected to the frame for an aviator, a resilient harness connected to the support for engaging the body of 20 an aviator to partially support the frame,

and elevating rudders on the frame and connected with the resilient harness and adapted to be sustained in normal neutral position under the action of the harness, said support being disposed relative to the 25 frame so that the feet of the aviator will coöperate with the alighting means when starting and ending the flight.

23. In an aeroplane, means for embracing the body and shoulders of an aviator to 30 sustain the aeroplane supported when making a landing and in the starting of a flight, lifting and steering rudders controlled by said aviator, means for supporting the aviator when embraced by the first 35 named means, and shock absorbing means included in said first named means.

In testimony whereof I affix my signature.

FRANK E. SUMMERS.