

3 SHEETS--SHEET 1.



COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

C. L. HUDLER.

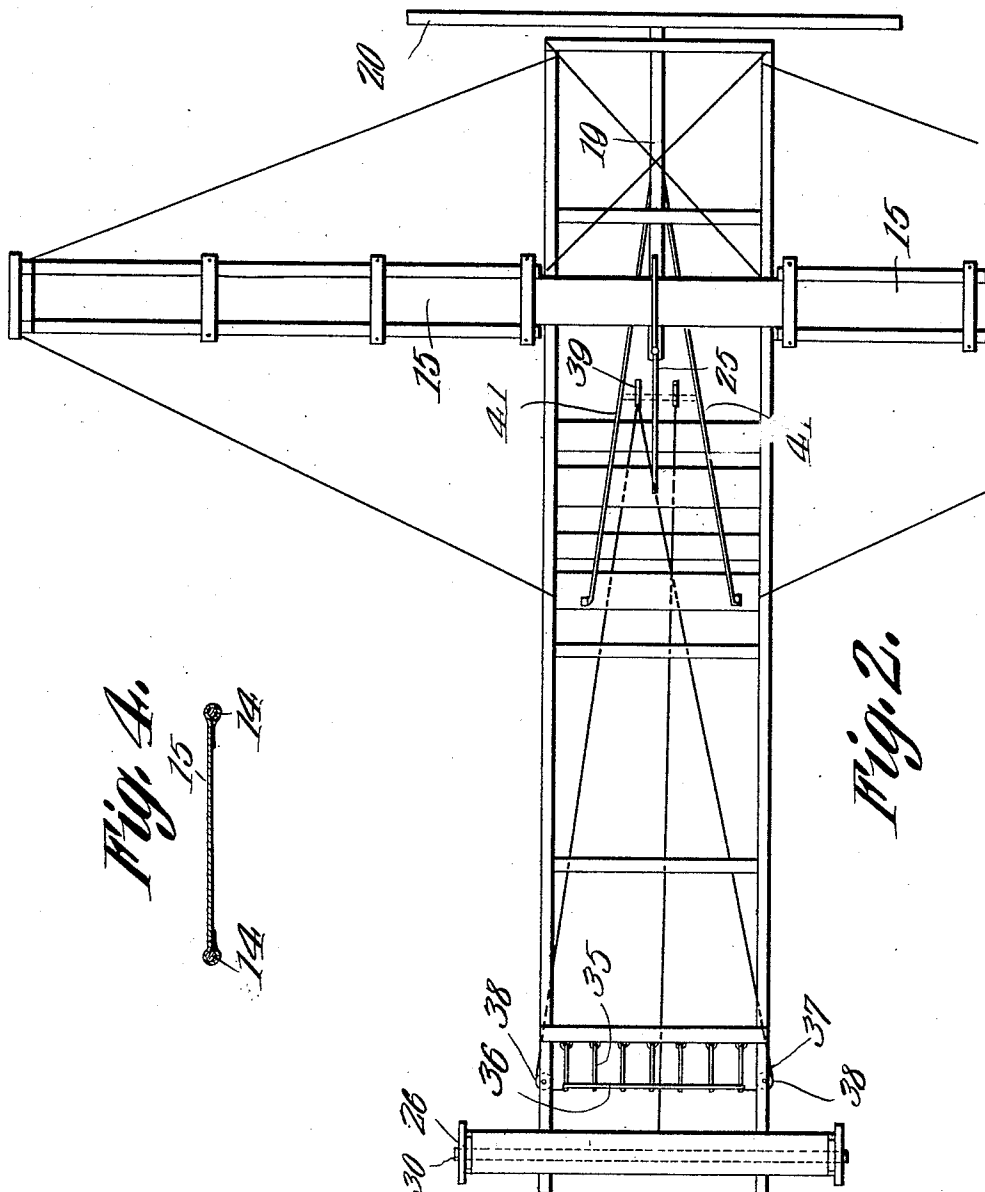
AEROPLANE.

APPLICATION FILED SEPT. 8, 1911.

1,050,462.

Patented Jan. 14, 1913.

3 SHEETS-SHEET 2.



Witnesses
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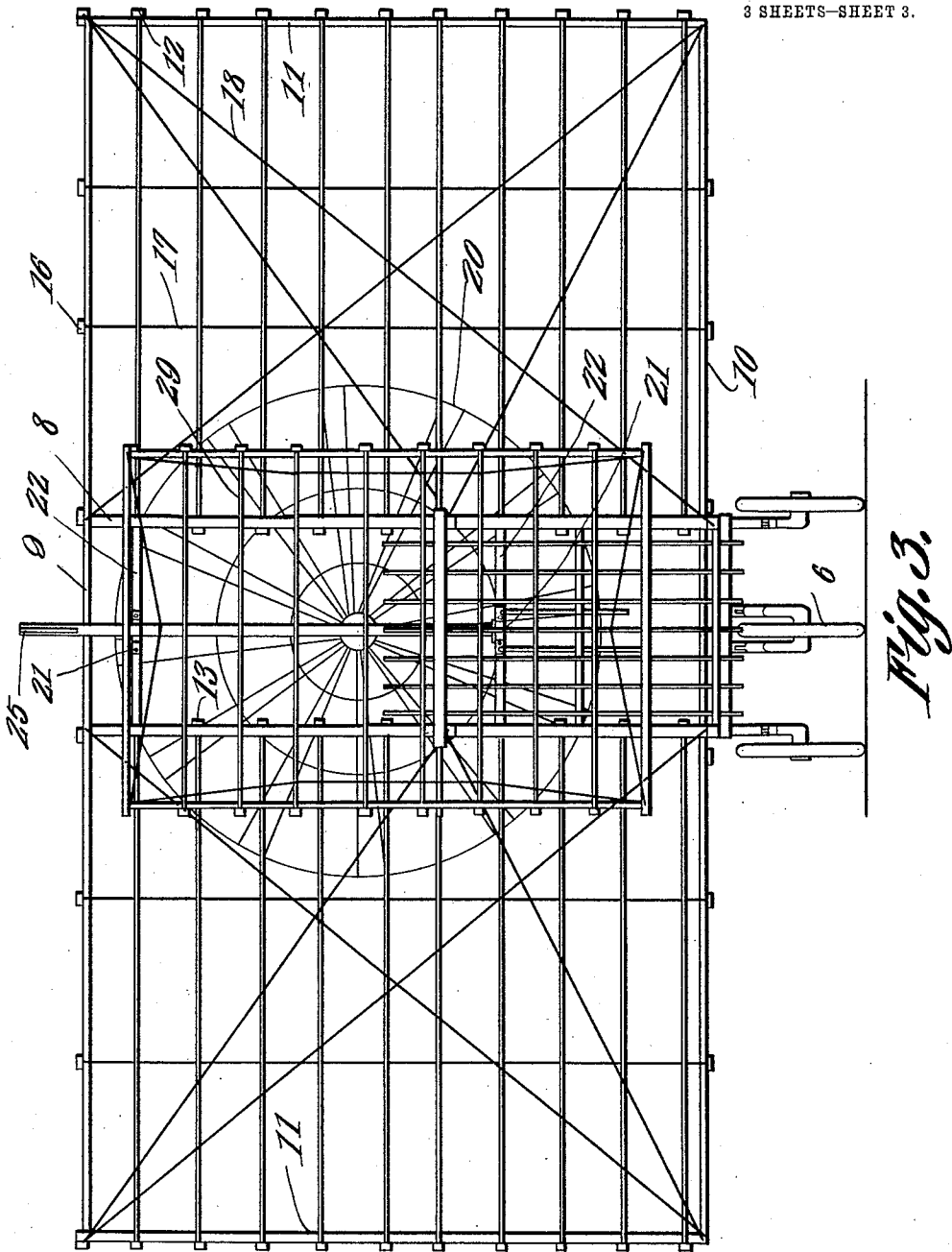
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UNITED STATES PATENT OFFICE.

CHARLES LEMUEL HUDLER, OF ST. LOUIS, MISSOURI.

AEROPLANE.

1,050,462.

Specification of Letters Patent.

Patented Jan. 14, 1913.

Application filed September 8, 1911. Serial No. 648,265.

To all whom it may concern:

Be it known that I, CHARLES L. HUDLER, a citizen of the United States, residing at St. Louis, in the State of Missouri, have invented a new and useful Aeroplane, of which the following is a specification.

This invention relates to aeroplanes of the multiplane type, one of its objects being to provide series of superposed planes, the distance between the inner and outer ends of each plane being much greater than the distance between the front and rear edges thereof whereby the planes are rendered more efficient in flight by being rendered less susceptible to the action of varying air currents.

A further object is to provide a machine of this character having a novel form of rudder combined therewith and which coöperates with the sustaining planes for maintaining the longitudinal equilibrium of the machine.

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.

In said drawings:—Figure 1 is a side elevation of the machine, the wind shield being removed. Fig. 2 is a plan view of a portion of the machine. Fig. 3 is a rear elevation. Fig. 4 is an enlarged transverse section through one of the sustaining planes.

Referring to the figures by characters of reference, 1 designates the lower longitudinal beams of the car and 2 designates the upper longitudinal beams, the upper and lower beams being connected by posts 3 and all of the parts being suitably reinforced, as by means of crossed wires 4. The car formed of the parts 1, 2 and 3 is supported, while the machine is on the ground, by pivoted strips 5 connected to and extending downwardly from the frame, these strips adjacent the front end of the frame being extended downwardly and forwardly while those located adjacent the rear end of the car are extended downwardly and rearwardly. These strips are preferably dis-

posed in pairs, the strips of each pair being supported by wheels 6. A spring 7 is interposed between each strip and the car and serves to cushion the structure and take up objectionable jolts produced during the movement of the structure over the ground or any other uneven surface.

Standards 8 are secured to the sides of the car at points adjacent the front end thereof and are connected, at their upper ends, by a cross bar or frame member 9 which extends a considerable distance beyond the sides of the car and corresponds with and is directly over another or lower frame member 10 secured to the bottom portion of the car. The two frame members 9 and 10 are connected at their ends by uprights 11 to each of which is secured a series of superposed cross strips 12 the ends of which project beyond the longitudinal edges of the uprights. Similar cross strips 13 are connected to the standards 8 and are disposed directly opposite the strips 12, the projecting end portions of the strips 12 and 13 being connected by strong wires 14 the wires being arranged in pairs and the wires of each pair extend through the front and rear edge portions of a sustaining plane 15 made up of a suitable fabric or of any other desired material.

By referring to Figs. 1 and 3, it will be apparent that two series of sustaining planes are provided within the frame made up of the members 9, 10 and 11, these series being located beyond opposite sides of the car and the planes of each series being of the same size and proportions, each plane being directly over the next adjoining plane thereunder. The distance between the front and back edges of each plane is preferably about equal to one-sixth or one-seventh of the distance from the inner to the outer ends of the planes. Thus it will be seen that the plane employed is long and narrow. In Fig. 3 the planes have been shown parallel with the bottom of the car but it is to be understood that if desired, these planes can be arranged in any other desired relation relative to the car. Cross strips 16 are preferably secured upon the members 9 and 10 and the projecting ends of these strips may be connected by means of reinforcing wires 17. Additional reinforcing wires 18 may be stretched across the front and rear faces of the frame and may connect the outer or side ends of said frame with the car structure as

shown particularly in Fig. 3. A propeller shaft 19 is journaled above the front portion of the car and may be driven by any suitable motor not shown, the front end of this shaft being provided with a propeller 20 preferably made up of a plurality of substantially triangular blades suitably connected, each blade being preferably formed of a fabric stretched upon a suitable skeleton frame. It has not been deemed necessary to illustrate this propeller in detail. Bearing members 21 extend rearwardly from cross strips 22 which connect the standards 8 and a shaft 23 is journaled within these bearing members and is provided at its lower end with an operating arm 24 while a controlling plane 25 extends rearwardly from the upper portion of the shaft. This plane is rigid and is fixed relative to the shaft, the said plane lying parallel with the axis of the shaft and being preferably located above the top member 9 of the frame carrying the sustaining planes.

The direction of flight of the machine is controlled by means of a horizontal rudder and of a vertical rudder, both rudders being of peculiar construction and the horizontal constituting sustaining means adapted to maintain the longitudinal equilibrium of the machine. This horizontal rudder consists of a frame 26 having cross strips 27 secured to the sides thereof, the projecting ends of these strips being connected by parallel wires 28 on which are arranged the edge portions of planes 29 corresponding with the planes 15 hereinbefore described. Only one series of these planes 29 is provided and said planes are arranged directly back of the car and extend some distance thereabove, the center of the frame 26 being equidistant from the ends of the members 9 and 10 of the front frame, as will be apparent by referring to Fig. 3. Frame 26 has trunnions 30 extending from the sides thereof and journaled in suitable bearings 31 arranged upon the top of the car at the rear end thereof. Operating wires 32 are connected to the upper and lower portions of the frame 26 and extend to a lever 33 located within the car whereby, by manipulating the lever, frame 26 can be swung about its trunnions so as to vary the angle of incidence of the planes 29.

Upper and lower cross strips 34 are secured within the rear end portion of the car and hingedly connected to these strips are parallel vertical rudder sections or planes 35 extending above and below the car and at right angles to the axis of rotation of the frame 26. The rear ends of these planes 35 are pivotally connected to a coupling bar 36 and the ends of said bar have operating wires 37 connected to them and extending partly around guide sheaves 38 carried by the car. These wires extend forwardly and

are attached to a lever 39 whereby, when desired, the planes 35 constituting the vertical rudder can be simultaneously swung toward either side of the car. One or more seats, 40, are located in the car close to the levers 33 and 39 and the arm 24 so that the machine can be readily controlled, while in flight, by the occupant of one of the seats.

It will be apparent that when the machine is being propelled forward the planes 15 and 29 will cooperate to sustain it off of the ground and the ascent and descent of the machine can be controlled by shifting frame 26 so as to change the angle of incidence of the planes 29. The machine can be guided toward either side by manipulating lever 39 and thus simultaneously swinging the vertical rudder planes 35 to the right or to the left as desired. Should the machine tilt laterally, its equilibrium can be restored by rotating shaft 23 so as to swing plane 25 toward either side thus presenting either side of said plane to the air current and causing the machine to be righted. As the inertia of the atmosphere gives the planes their lifting power, and as the narrow planes utilized in this machine liberate the air the instant this power has been utilized, it will be seen that it will be unnecessary to employ the enormous power heretofore used to drive the useless air forwardly with the broad planes.

Instead of forming the planes of fabric, the same can be made of aluminum or any other desired material in which event it becomes unnecessary to reinforce the edges of the planes by means of wires or the like.

As the machine will travel through the atmosphere at a high speed, it is desirable to protect the aviator from the force of the air current. For this purpose rearwardly diverging wind shields 41 are preferably arranged in front of the seats 40 and extend to the sides thereof, these shields being made of fabric, aluminum, or any other desirable material and operating to cut through the atmosphere and to deflect laterally that portion of the current directly in front of the aviator.

What is claimed is:—

1. An aeroplane including a car structure, laterally spaced upstanding frames fixed relative to the car structure, the front end portion of said structure being extended between the two frames, a series of superposed sustaining planes within each of said frames, the planes of each series being fixed relative to each other, a frame connected to the rear portion of the car structure and adapted to swing about an axis extending transversely of the line of flight and at a point between the upper and lower ends of the frame, a series of superposed sustaining planes fixed relative to each other and carried by said swinging frame, and means for

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adjusting said frame angularly relative to the car structure and to the front frames.

2. An aeroplane including laterally spaced frames, a car structure having its front end
5 extended between the frames and fixedly connected thereto, said frames being disposed at the sides of and above the car structure, a series of superposed cross strips secured to the outer faces of the sides of
10 each frame and projecting forwardly and rearwardly beyond said sides, connections between the projecting end portions of opposed cross strips, sustaining planes mounted at their front and rear edges upon said
15 connections and disposed in superposed relation within each frame, a rear frame connected between its upper and lower ends to the car structure and mounted for angular adjustment at said point of said connection and about a transverse axis, superposed
20 sustaining planes mounted within said frame, and means for adjusting the frame laterally relative to the car structure and to the front frames.

3. An aeroplane including a car structure, 25 laterally spaced front frames fixedly connected to the structure and extending beyond the sides and top thereof, a series of superposed sustaining planes fixed relative to each other and within each frame, a rear 30 frame supported between its upper and lower ends upon the car structure and mounted for angular adjustment about an axis extending transversely of the line of flight, a series of superposed sustaining 35 planes within said rear frame and fixed relative to each other and to the frame, means for adjusting said rear frame angularly, and a vertical rudder connected to the car and interposed between said car struc- 40 ture and the rear frame.

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

CHARLES LEMUEL HUDLER.

Witnesses:

ALBERT H. THIELE,
CHAS. J. RODE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."