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2 SHEETS—SHEET 2.



Fig. 5.

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## UNITED STATES PATENT OFFICE.

CHARLES R. CULVER, OF SPRINGFIELD, MASSACHUSETTS.

## FLYING-MACHINE.

No. 922,264.

Specification of Letters Patent.

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*To all whom it may concern:*

Be it known that I, CHARLES R. CULVER, a citizen of the United States of America, and resident of Springfield, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Flying-Machines, of which the following is a full, clear, and exact description.

10 This invention relates to an apparatus primarily designed for aerial navigation, the same being also available for decreasing the tractional resistance in running upon the land.

15 The invention comprises a suitable frame or open work body provided with traction wheels, an air propeller, a motor for driving the same, one or more aeroplanes suitably and movably mounted above the base of the frame, and means for moving the same to any desired angle or inclination and for holding the same thereat together with one or more steering vanes or rudders, and all as hereinafter particularly described and set forth in the claim.

20 In the drawings,—Figure 1 is a plan view of the apparatus; Fig. 2 is a side elevation of the same; Fig. 3 is a perspective view of one of the aeroplanes; Fig. 4 is a side elevation of the apparatus having a balloon equipment. Fig. 5 is a sectional view in detail of a part of the steering connections.

Similar characters of reference indicate corresponding parts in all of the views.

35 In the drawings,—A represents the frame, which may be of elongated rectangular form and comprising a skeleton base *a* having bearings for a single front wheel *b* and double rear wheels *d d*, the base supporting a seat *c* and having at a suitable location thereon a motor B,—which may be a gasoline or other motor,—having an elongated rearwardly extending shaft C at the central line of the frame and carrying at the rear end thereof a bladed propeller D.

45 E E and E<sup>2</sup>, E<sup>2</sup>, represent aeroplanes in the form of flat rectangular blades or boards, the same having opposite edgewise extended horizontal trunnions *e e* having pivotal supporting engagements in eyes *f* in the opposite upper and lower pairs of horizontal and longitudinally extending frame rods or bars *f'* and *g*. Each of these aeroplanes has a depending triangular shaped lever *h*

55 extended from its middle portion and in the median longitudinal plane of the series, connecting with which are links *i* and *j*; and the rear trunnions of the upper and lower series of aeroplanes are provided with short levers *k*, *k*<sup>2</sup>, which are connected by a link *m*, and some one of the aeroplanes, in the present instance the middle one of the lower series, has a lever *n* affixed on the trunnion *e* thereof at one side, the same being provided with a detent or catch *n*<sup>2</sup> which coacts with a notched arc shaped plate *o* attached on the longitudinal frame member *g*. By releasing the detent *n*<sup>2</sup> and swinging the lever *n*, all of the articulated aeroplanes may be simultaneously swung to forward and upward inclinations in varying degrees within the control of the operator.

The front and rear vanes or steering blades G and G<sup>2</sup> are affixed on vertical sleeve shafts *u* fitted about upright bearings *t*, and each of said sleeve shafts has on the lower end thereof a pinion *p* in mesh with both of which pinions are the racks *q q* formed on, or provided to, a long longitudinally slidable bar J which intermediately is also provided with a rack *q*<sup>2</sup>,—coöperating with which latter is a pinion *r* affixed on an operating shaft *s* provided with a hand wheel *s*<sup>2</sup>.

The apparatus may have a balloon equipment, L, as represented in Fig. 4.

In operation, the motor will be set running and under the forward movement of the vehicle imparted by the propeller, the impingement of the upwardly and forwardly inclined boards or aeroplanes will exert a tendency to elevate the machine, which elevation will be gradual or abrupt, proportionate to the inclination of the aeroplanes; and a descent and a modification of the course of the vehicle may be acquired by reversing and otherwise manipulating the series of aeroplanes through the single operating handle lever *n*.

A deflection laterally in the course of the vehicle may be acquired by the deflection of both the front and rear rudders or vanes G, G<sup>2</sup>, which may be simultaneously accomplished by rotation through the hand-wheels of the shaft *s*.

As represented by the section lined portion at *w*, Fig. 4, a horizontal board or partition may be provided for the whole width



and length of the frame between the upper and lower series of pivotally mounted and variably movable boards E and E<sup>2</sup>.

I claim:—

5 In an apparatus of the character described, in combination, a frame and a central horizontal longitudinally ranging shaft at the lower portion of the frame carrying a  
10 bladed propeller at its rear end, and a motor mounted on the frame having a driving connection with said shaft, two series of aeroplanes, one of each set having its location  
15 next behind another, one series being located above the other, all of the aeroplanes being pivotally mounted, on transverse horizontal  
axes on said frame, for fore and aft variable inclinations as described, and all of said pivoted aeroplanes having depending triangular  
20 trusses which also constitute levers therefor, crank levers connected at the pivotal portions of the end aeroplanes of both series and having a vertically arranged link  
connecting them, longitudinally ranging links connecting the truss levers of the upper  
25 and lower series of aeroplanes respectively,

a lever connected to, downwardly extending from, and for manually swinging, an intermediate aeroplane of the lower series, an operator's seat or support on the frame  
below the last named lever, a rotative shaft 30 having an operating appliance adjacent both the operator's support and the manually operable depending lever, having a pinion thereon, a longitudinally ranging and end-  
wise slidable bar provided with racks at its 35 ends facing in opposite directions, and a rack at its middle portion with which the pinion of said lever meshes, front and rear steering vanes and vertical sleeve shafts on  
40 which they are affixed having pinions at their lower ends in mesh with the end racks of the aforementioned longitudinally sliding bar.

Signed by me at Springfield, Mass., in presence of two subscribing witnesses.

CHARLES R. CULVER.

Witnesses:

WM. S. BELLOWS,  
G. R. DRISCOLL.