L. P. McKEONE.

AEROCRAFT.

APPLICATION FILED SEPT. 27, 1910.

1,041,136.

Patented Oct. 15, 1912.

3 SHEETS—SHEET 1.

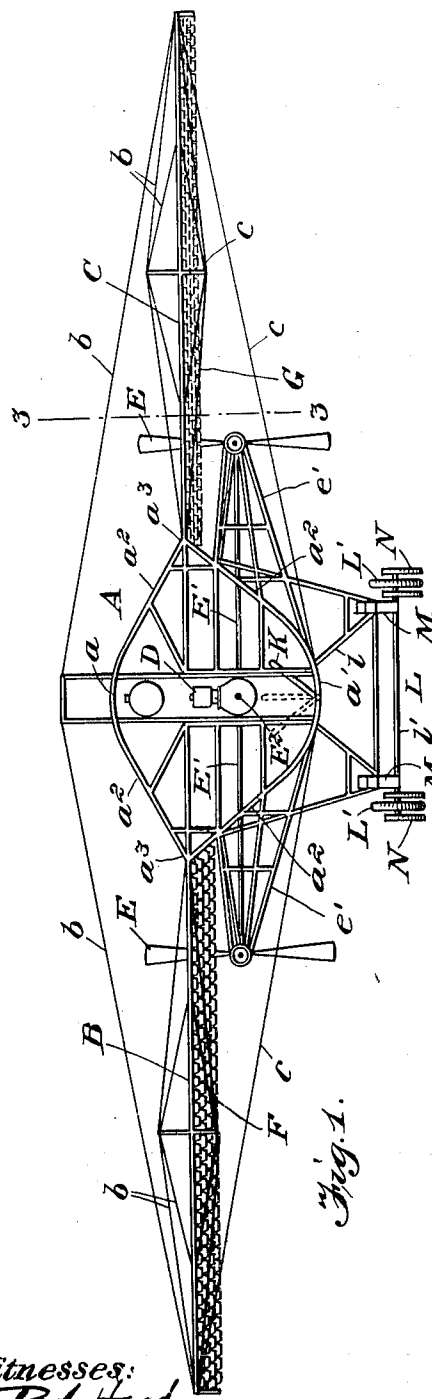

Fig. 1.

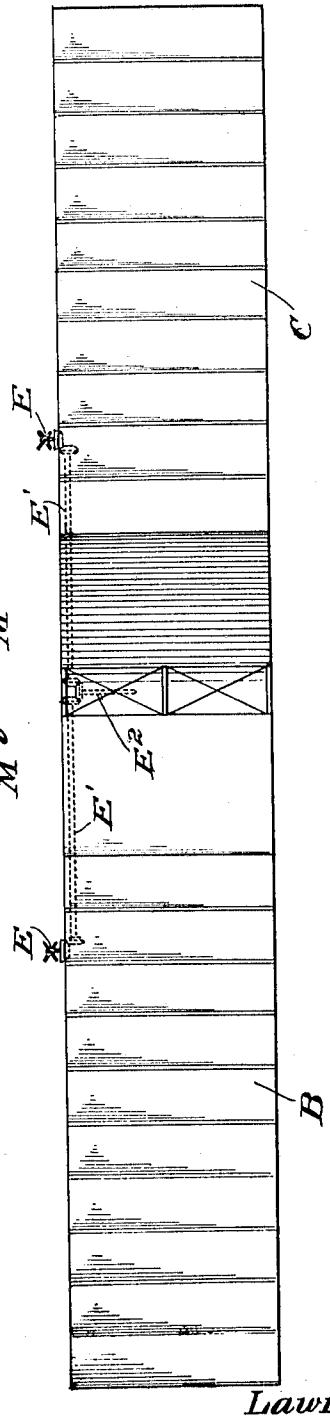

Fig. 2.

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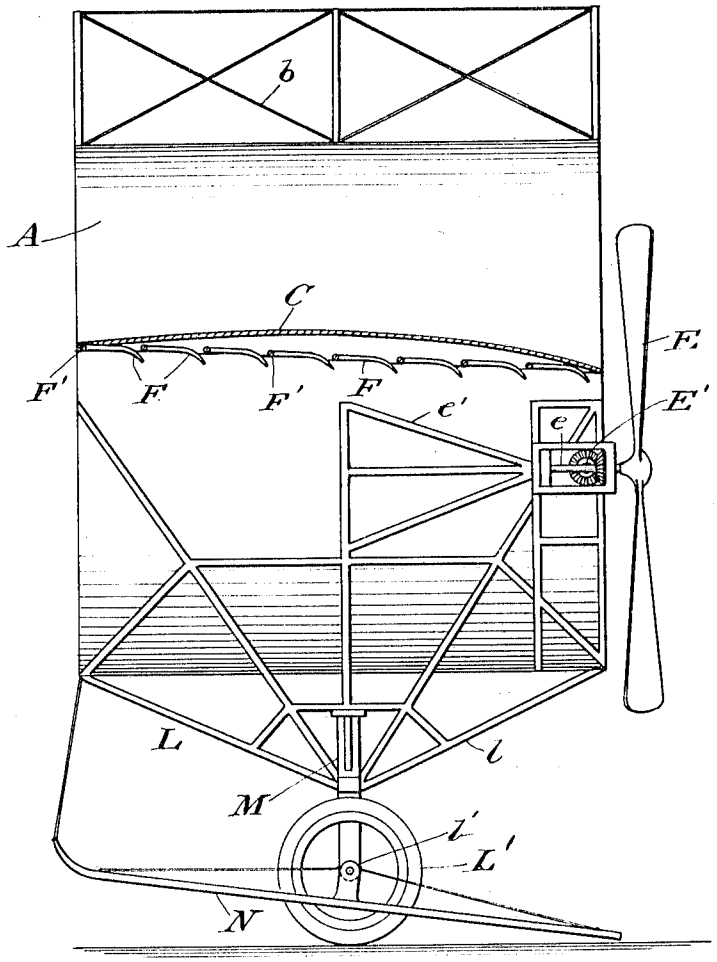

Fig. 3.

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3 SHEETS—SHEET 3.

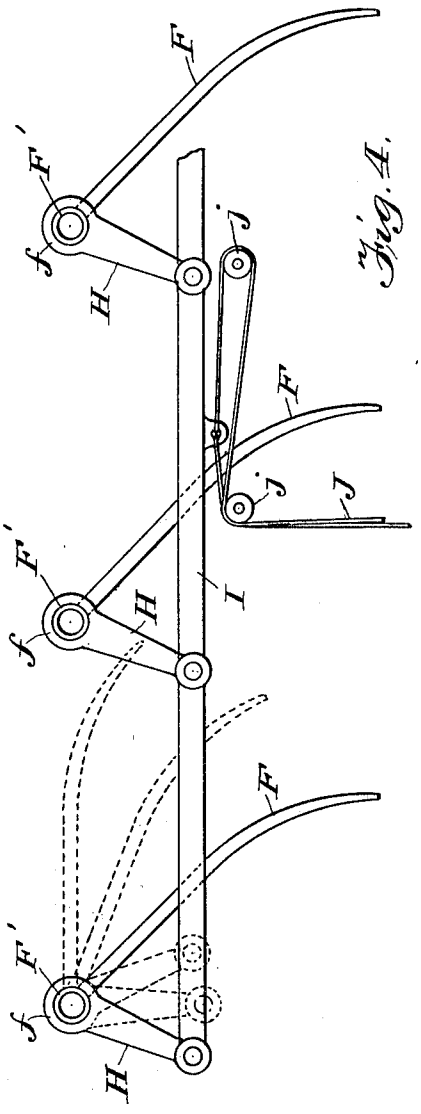

Fig. 4.

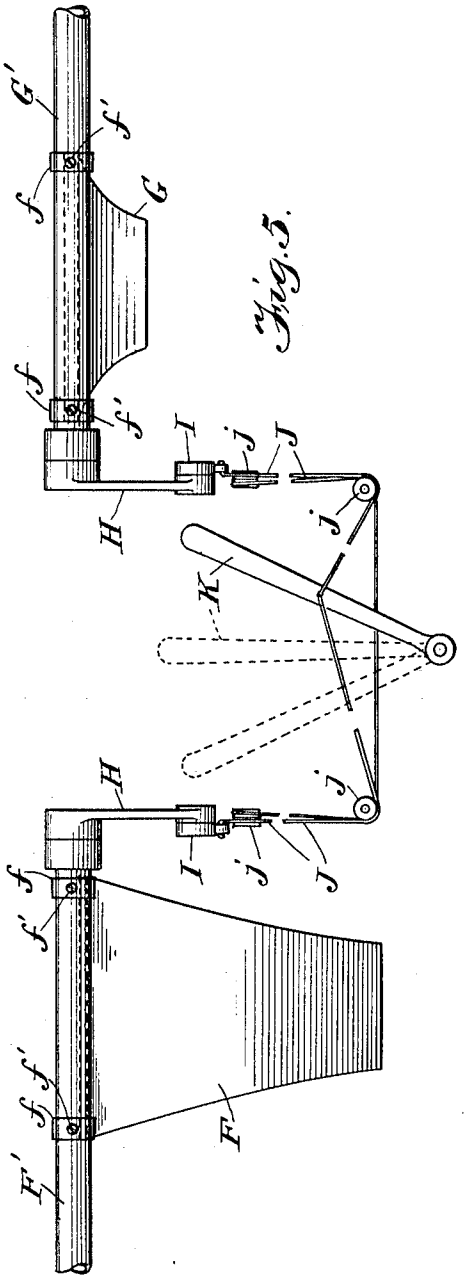

Fig. 5.

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UNITED STATES PATENT OFFICE.

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AEROCRAFT.

1,041,136. Specification of Letters Patent. Patented Oct. 15, 1912.

Application filed September 27, 1910. Serial No. 584,016.

To all whom it may concern:

Be it known that I, LAWRENCE P. McKEONE, a citizen of the United States, residing in the city of New York, borough of Manhattan, county and State of New York, have invented a certain new and useful Aerocraft, of which the following is a specification.

This invention is an aerocraft, but for the purposes of illustration I have shown the invention as embodied in an aeroplane.

The main feature of the invention consists in providing a substantially imperforate weight carrying plane, on its under side, with depending vanes. These vanes are arranged in series, and, preferably, a plurality of series is employed on either side of the chassis. For convenience in operation, the vanes are pivotally supported beneath the plane, and the several series are simultaneously moved by the operator of the machine.

The vanes on one side of the chassis operate in an opposite direction from those on the other side; *i. e.*, when those on the right of the chassis are in an open or depending position, those on the left are closed, and vice versa, although both series may be opened or closed.

By virtue of the construction described, the vanes, when in open position, form a series of air pockets or resistances beneath their particular side of the weight carrying plane. In other words, that portion of the plane beneath which the vanes are open, is subjected to greater air pressure than the other portion of the plane beneath which the vanes are closed. As a result, the stability of the machine is increased, and the operator provided with means whereby he can readily and efficiently control the same.

Another feature of the invention consists in constructing the outer surface of the chassis in a substantially oval form in transverse cross section, whereby lateral air currents are so deflected that they have little or no tendency to capsize the craft.

Other features of the invention not hereinbefore specifically referred to will be apparent from the following detailed description taken in conjunction with the drawings.

In the accompanying drawings I have illustrated one practical embodiment of the invention, but the construction shown therein is to be understood as illustrative, only, and not as defining the limits of the invention.

Figure 1 is a view of my aerocraft in front elevation. Fig. 2 is a plan view. Fig. 3 is a vertical section on the line 3—3 of Fig. 1. Fig. 4 is a detail view, on an enlarged scale, illustrating a plurality of rock shafts, the vanes thereon, and one form of means for simultaneously adjusting said shafts and vanes. Fig. 5 is a detail view in front elevation of the vanes.

A designates a frame, herein designated the "chassis", which supports the power plant for propelling the craft. As shown, the chassis extends centrally and lengthwise of the craft, the top, sides and bottom surfaces of said chassis being imperforate, while the ends thereof are open for air to flow therethrough. The top and bottom of said chassis are curved, at a a', but the sides are inclined, at a^2, the angular walls of each side meeting each other, at a^3, whereby air currents at the sides of the craft are deflected toward the top or bottom, so as to minimize the effect of side wind pressure upon the craft. The chassis is braced or stayed internally by any suitable means.

B, C are weight supporting planes extending from the respective sides of the chassis. Each plane is equal in width to the length of the chassis, see Figs. 2 and 3, but the length of each plane greatly exceeds the length of said chassis, the two planes being of equal area. Each plane, B, C, is constructed in any way preferred by those skilled in the art, but a practical construction embodies a skeleton frame covered by suitable fabric. In cross section, each plane is arched or curved, as shown in Fig. 3. The frames of the planes are joined to the chassis, preferably at the corners, a^3, and said planes are strengthened by appropriate stays, b, c, at the top and under sides.

D is a motor or engine of any suitable kind. It is carried within chassis, A, so that the weight is substantially at the bottom of the craft, in order to secure a balancing effect from the weight of said engine, but it is evident that the engine may be supported or mounted in any desired manner.

E, E are propellers, herein shown as positioned at the rear of the craft and at the respective sides of the chassis and the engine. Each propeller is carried on a shaft, e, and to these shafts are connected suitable

means operated by the engine for driving the propellers simultaneously. As shown, cross shafts, E′, are geared to propeller shafts, *e*, and these cross shafts are geared to another shaft, E^2, which shaft, E^2, is operated by motor, D; but it will be understood that the invention is not restricted to the particular means for operating the propellers, for the reason that any form of power transmission may be employed. The propeller shafts are supported exteriorly to the chassis by suitable means, and said supporting devices are braced by stays, *e*′.

The salient features of the invention are the vanes, F, G, positioned on the under sides of the weight carrying planes for the purpose of producing, when opened, a number of air pockets below the planes, whereby the resistance is increased and stability of the craft is obtained. In a practical construction, two series of shafts, F′, G′, are employed for supporting and operating the two series of vanes, F, G, and the shafts, F′, with the vanes, F, are positioned on one side of chassis, A, whereas shafts, G′, and vanes, G, are on the other side of the chassis. A number of shafts, F or G, are employed at each side of the chassis, the series of said shafts at each side being parallel to each other, and each shaft being at a right angle to the length of the chassis. Thus, a series of horizontal parallel shafts is provided below each weight carrying plane, each shaft being parallel to the length of the plane, and the shafts of each series being properly spaced apart across the width of the plane. The shafts are mounted in bearings provided on the machine frame, the inner ends of said shafts extending into the chamber or inclosure of the chassis.

Vanes, F, comprising one group are fixedly attached to the rock shafts, F′, a series of vanes, F, being secured to each shaft. Similarly, a series of vanes, G, are secured to each rock shaft, G′. As shown, each vane is provided with sleeves, *f*, which are slipped over the shaft and are attached rigidly thereto, as by set screws, *f*′, the vanes being secured by suitable means, to the sleeves; but it is obvious that this mechanical detail may be modified by a skilled constructor. The rock shafts, F′, G′, may be solid or tubular; the vanes may be composed of metal, fabric, or other material, and various mechanical expedients may be resorted to in the detailed constructions of the parts.

The rock shafts and vanes are operated simultaneously from a suitable device positioned within the chassis, A, and within convenient reach of the aviator. One means for operating said vanes is as follows: The inner ends of each series of rock shafts which extend within the chassis are provided with crank arms, H, and a connecting rod or bar, I, is pivoted to all the crank arms of each series of rock shafts. From the connecting rods, I, of the two series of crank arms and rock shafts extend operating cords, cables or other connections, J; in case flexible connections are used, they are guided by suitable pulleys or sheaves, *j*, as shown. The cables are attached to an operating device, K, preferably in the form of a lever. In the example shown, the lever, K, operates to raise one group of vanes and to lower the other group of vanes when the lever is shifted to one position, as indicated in dotted lines; a movement of the lever to an oppositely inclined position, reverses the positions of the vanes by lowering the previously raised vanes and elevating the previously lowered vanes, respectively, but when the lever occupies the middle position, all the vanes are partially lowered. Obviously, however, the lever may be arranged or connected to operate in a different manner from that described, hence it is not desired to restrict the operation to a particular way, it being new with me to provide the two groups of resistance vanes and means for simultaneously operating them.

It is preferred to employ a vane, the side edges of which are inclined toward each other so that the vane is somewhat wider at the top than at the bottom. Furthermore, the lower part of the vane is curved lengthwise and toward the front of the craft, in order to increase the resistance of the vane when the craft is flying in a forward direction.

It will be noted that the vanes are positioned in close relation to the under side of each weight carrying plane. When the rock shafts are operated to raise the vanes, the entire plurality of series of vanes beneath each plane are adapted to fold upwardly and into compact relation to the plane, thus disposing the vanes when folded so that they will still lie in exposed positions below the planes, whereby said vanes will offer some considerable resistance to cross currents of air and at the same time produce pockets below the planes which will increase the stabilizing effect of the planes upon the craft. But when the vanes are unfolded, or are lowered to their operating positions, they offer substantial resistance to the air because of the relatively large area exposed to air pressure, said vanes depending from the lower surface of the weight carrying planes.

The operation will be understood from the foregoing description taken in connection with the drawings.

By moving the lever toward the left, the two series of rock shafts will be turned for the purpose of lifting the vanes below the right hand plane, C, and lowering the vanes below the left hand plane, thus increasing the resistance below the left hand plane and establishing a higher pressure below it, re-

sulting in an elevation of the left hand plane and a corresponding depression of the right hand plane. A movement of the lever in the opposite direction reverses these conditions.

By my invention the stability of the craft when flying against the wind is substantially increased by the vanes affording increased resistance or friction to the air. Furthermore, the vanes and form of chassis tend to break up and deflect cross currents of air and obviate in a large measure the rocking or swaying effect inherent in prior machines of the heavier than air type.

My invention, briefly stated, secures stability to the craft by the vanes increasing the air friction or resistance, resulting in higher pressure upon the under surfaces of the weight carrying planes.

Although I have shown and described the resistance vanes in connection with a particular form of chassis and a certain kind of propelling mechanism, it is to be understood that the invention is not limited to this particular form of craft, for the reason that the vanes and their controlling mechanism may be used generally in all kinds of aerial crafts, and more particularly aeroplanes, for the purpose of increasing the stability thereof.

Associated with the form of the craft is a running gear, L, comprising a depending frame, *l*, an axle, *l'*, having carrying wheels, L', and shock absorbers, M, of any suitable construction, said shock absorbers being positioned intermediate the frame and the wheeled axle for the purpose of reducing the shock upon the machine when it strikes the ground. As shown in Fig. 1, two shock absorbers are employed, one near each end of the axle. Skids, N, are provided to act as brakes or drags when the craft alights, said skids being suspended from the axle.

Having thus fully described the invention, what I claim as new, and desire to secure by Letters Patent is:

1. In an aerocraft, a weight-carrying plane and a plurality of stability vanes pivoted beneath and extending over the major part of said weight-carrying plane, said stability vanes being foldable into inoperative positions in close relation to the under surface of the weight-carrying plane.

2. In an aerocraft, an imperforate weight-carrying plane, and a plurality of movable stability vanes depending beneath the same and the combined area of which exceeds one-half the area of the weight-carrying plane, said stability vanes being foldable into inoperative positions in close relation to the under surface of the weight-carrying plane.

3. In an aerocraft, a chassis, a weight-carrying plane on either side thereof, a plurality of series of stability vanes beneath each of said planes and having a pivotal movement with relation thereto, the combined area of the vanes beneath each weight-carrying plane being equal substantially to the area of said plane, and means for simultaneously operating each series of vanes, said stability vanes being foldable into close relation to the under surface of said weight-carrying plane and adapted to assume depending operative positions relative thereto.

4. In an aerocraft, a chassis, a weight carrying plane on either side thereof, a plurality of shafts beneath each plane, a series of vanes mounted on each of said shafts, and means for operating the shafts, whereby the vanes may be opened into operative positions depending from the weight-carrying plane and moved into inoperative positions in close relation to the under surface of said weight-carrying plane.

5. In an aerocraft, a weight-carrying plane, and stability vanes positioned below said weight-carrying plane, each stability vane being pivoted at one end and the aggregate area of said vanes exceeding one-half the area of said weight-carrying plane, said vanes being movable into operative positions depending from the weight-carrying plane and being foldable into inoperative positions close to the under surface of said weight-carrying plane.

6. In an aerocraft, a weight-carrying plane, and stability vanes positioned below said weight-carrying plane, said stability vanes being arranged in series substantially from end to end and from edge to edge with respect to the weight-carrying plane, said vanes being movable into operative positions depending from the weight-carrying plane and being foldable into inoperative positions close to the under surface of said weight-carrying plane.

7. An aerocraft embodying a chassis the outer surface of which is substantially oval in cross section, weight-carrying planes positioned at the respective sides of the chassis and extending outwardly therefrom, the inner end portions of said weight-carrying planes terminating at the chassis, and a plurality of series of stability planes pivotally supported in close relation to the under surfaces of said weight-carrying planes, said stability planes being foldable to inoperative positions with respect to said weight-carrying planes and movable into depending operative positions relative to said planes.

8. In an aerocraft, a weight-carrying plane and resistance vanes depending from the under surface of said weight-carrying plane, said resistance vanes being arranged in series substantially from end to end and from edge to edge of the weight-carrying plane, the aggregate area of said resistance vanes being equal substantially to the area of the weight-carrying plane, said stability vanes being foldable into close relation to

the under surface of said weight-carrying plane and adapted to assume depending operative positions relative thereto.

9. In an aerocraft, a weight-carrying plane, resistance vanes mounted for pivotal movement relatively to said plane, the aggregate area of said vanes being equal substantially to the area of the weight-carrying plane, and means for adjusting said vanes whereby they may be folded into inoperative positions compactly against the under surface of the weight-carrying plane or adjusted to assume operative positions by extending downwardly therefrom.

10. In an aerocraft, a chassis, weight carrying planes at the respective sides thereof, groups of resistance vanes below each of said planes, respectively, and means for simultaneously adjusting said groups of vanes, said vanes being movable into operative positions depending from the weight-carrying planes and being foldable into inoperative positions close to the under surface of said weight-carrying planes.

11. In an aerocraft, a chassis, weight carrying planes at the respective sides thereof, resistance vanes mounted for pivotal movement relatively to the under surfaces of said planes, said resistance vanes when folded upwardly covering the major part of the under surfaces of the weight-carrying planes, an operating device, and connections intermediate the operating device and said vanes for simultaneously operating the latter, said vanes being movable into operative positions depending from the weight-carrying planes and being foldable into inoperative positions close to the under surface of said weight-carrying planes.

12. In an aeroplane, the combination of a plurality of weight-carrying planes, a plurality of series of resistance vanes positioned below the under surface of each weight-carrying plane, said resistance vanes being movable into depending operative positions relative to the weight-carrying planes and foldable into inoperative positions and in close relation to the under surfaces of said planes, and operating means connected to raise the resistance vanes below one weight-carrying plane simultaneously with the operation of lowering the resistance vanes below the other weight-carrying plane.

13. In an aerocraft, a chassis, weight carrying planes at the respective sides thereof, two series of rock shafts positioned at the sides of the chassis and below said planes, each rock shaft extending at an angle to the length of the chassis, resistance vanes carried by said rock shafts, each vane being positioned to face toward the direction of flight, and means for operating said rock shafts to adjust the vanes, said vanes being movable into operative positions depending from the weight-carrying planes and being foldable into inoperative positions close to the under surface of said weight-carrying planes.

14. In an aeroplane, the combination of a plurality of weight-carrying planes, a plurality of rock shafts supported below, and in close relation to the under surface of each weight-carrying plane, resistance vanes carried by said rock shafts, said resistance vanes having pivotal movement relative to the under surfaces of said weight-carrying planes whereby the resistance vanes are movable into depending operative positions relative to the under surfaces of the planes and are foldable into inoperative positions and in close relation thereto, and operating means connected to said rock shafts for simultaneously adjusting said resistance vanes.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

LAWRENCE P. McKEONE.

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