E. P. FARUM.

AERIAL MACHINE.

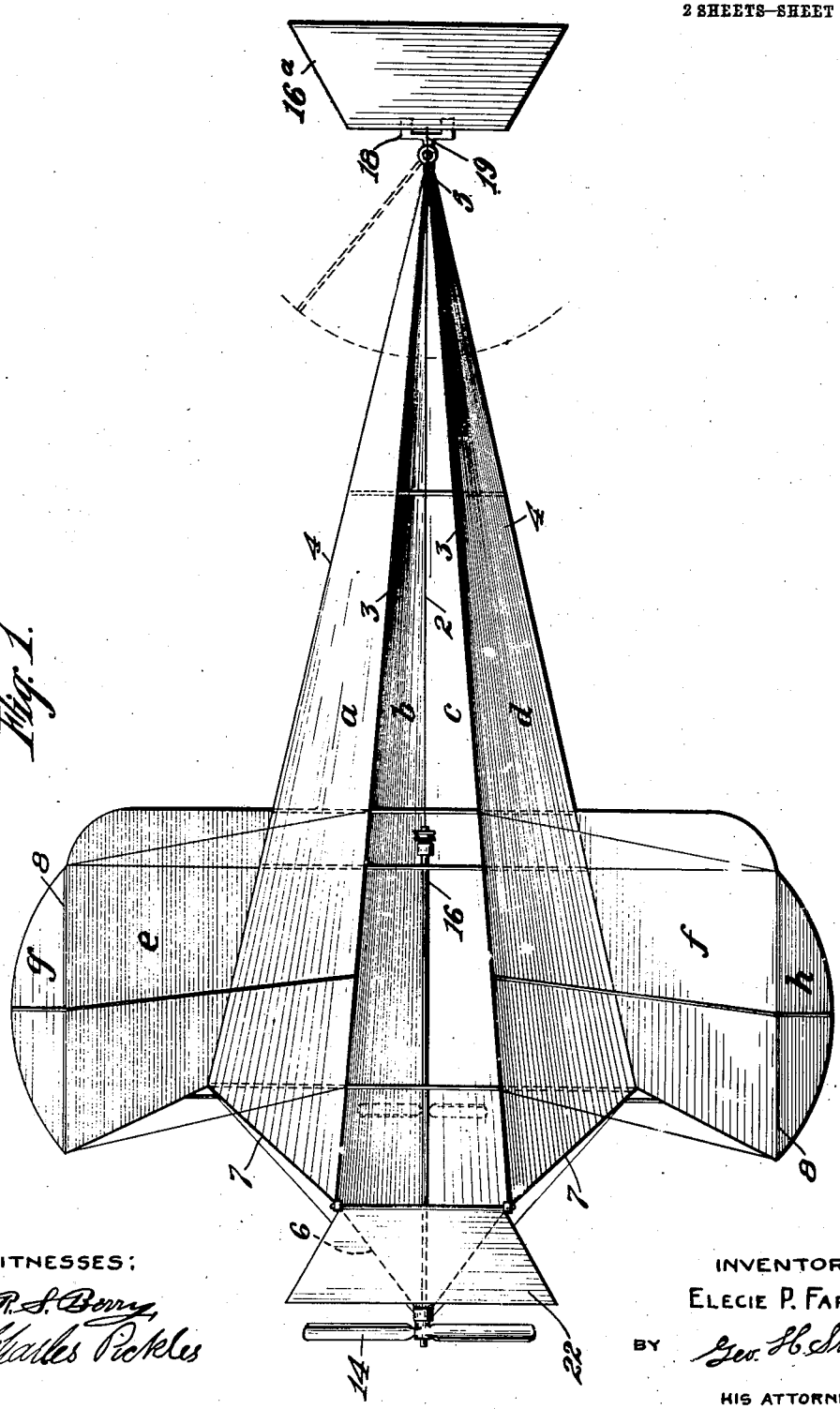
APPLICATION FILED NOV. 15, 1910.

1,011,767.

Patented Dec. 12, 1911.

2 SHEETS—SHEET 1.

Fig. 1.



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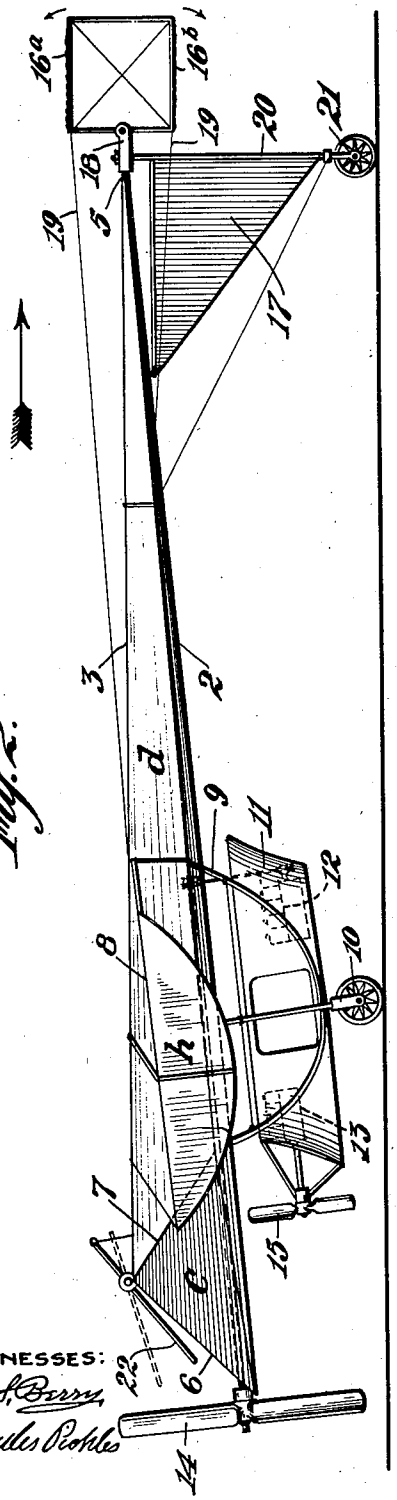

Fig. 2.

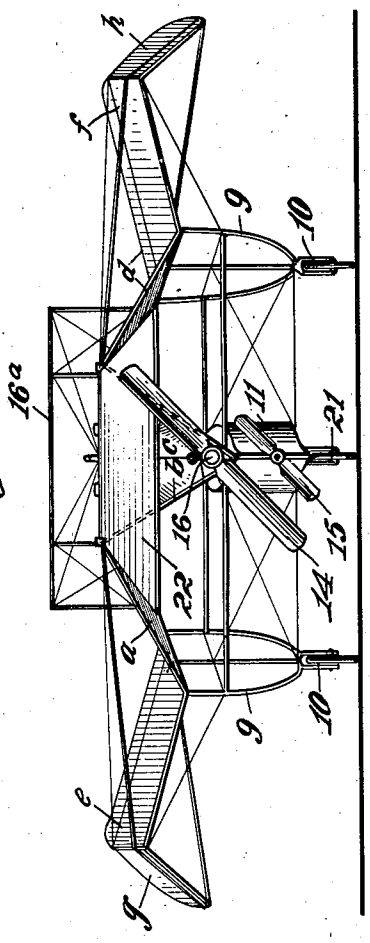

Fig. 3.

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ELECIE P. FARUM, OF SANTA CRUZ, CALIFORNIA.

AERIAL MACHINE.

1,011,767. Specification of Letters Patent. Patented Dec. 12, 1911.

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To all whom it may concern:

Be it known that I, ELECIE P. FARUM, citizen of the United States, residing at Santa Cruz, in the county of Santa Cruz and State of California, have invented new and useful Improvements in Aerial Machines, of which the following is a specification.

This invention relates to a machine for navigating the air and particularly pertains to the formation of the aeroplane structure.

It is the object of this invention to provide a flying machine which is so constructed as to operate upon the principle of the wedge or inclined plane to raise the machine into the air when propelled in a forward direction, and which is adapted to travel at either a high speed or a slow speed in flight.

A further object is to provide an aeroplane structure which can be readily steered in any direction, and which is so designed as to be little effected by air currents and continually maintain a state of balance or equilibrium, thus producing a machine which is not liable to "turn turtle."

The invention consists of the parts and construction and combination of parts hereinafter more fully described and claimed, having reference to the accompanying drawings, in which—

Figure 1 is plan view of the invention. Fig. 2 is a side elevation. Fig. 3 is a rear-end elevation.

In the drawing the main body of the aeroplane is shown as composed of four peculiarly arranged plane surfaces, *a—b c* and *d*, all of which are angularly disposed transversely relative to each other and form in the aggregate, a single corrugated or fluted plane which is cuneiform or wedge-shaped in plan, the fluted configurations of the plane beginning at a common point at the forward end of the machine and gradually flaring or diverging outward to their termination at the rear end of the machine, that is to say, each section *a—b—c* and *d* is tapered in for and attached to each other on their adjacent edges in the order named, to form a series of ridges or grooves. The sections *b* and *c* forming the central portion of the plane are disposed at an acute angle in relation to each other to form a longitudinally extending tapered groove, and the sections *a—d* are arranged at approximately a right angle, or greater, to their adjacent sections *b—c*. The central rib 2, at the junction of the surfaces *b—c*, normally stands at an incline to the horizontal, as shown in Fig. 2, while the ribs 3 at the ridge formed by the junction of the surfaces *a—b* and *d—c* normally extend in substantially a horizontal direction. The surfaces *a—d* slope outward and downward from the ridges 3 with their outer edges 4 disposed a short distance above the plane of the center rib 2, the ribs 2—3—4 converging toward and terminating at one end at the apex or forward end of the plane, as at 5.

The plane surfaces *b—c* extend beyond the plane surfaces *a—d* at the rear end and are cut away on an angle to form an inwardly sloping edge on the ends thereof, as at 6, and the plane surfaces *a—d* are likewise cut away at an angle at their rear end, as at 7, so as to expose an expanse of the plane surfaces *b—c* to laterally directed air currents, the underside of the plane surfaces *b—c* directing these currents of air downward at this point while the upper side of the plane surfaces *a—d* deflect lateral currents upward, thus splitting the air current as it were, at this point and tending to lateral horizontal stability at the rear or broad end of the plane.

Oppositely disposed, upwardly inclined plane surfaces, *e—f* extend laterally from and are secured to the outer edges or ribs 4 of the plane surfaces *a—d* at a point beginning with the rear ends of the ribs 4 and extending approximately one-third the length thereof. These planes *e—f* following the plane of the ribs 4 thus slope upwardly in two directions, toward the forward end of the machine, and away from the center. The outer edges 8 of these planes extend parallel with the center rib 2 and as a consequence are wider at their forward edge than at their rear.

Downwardly sloping segmental planes *g—h* are mounted on the ribs 8 at the outer edges of the planes *e—f*, and are disposed at an obtuse angle in relation thereto; these planes being designed to offer a resistance to the natural tendency of a current of air striking the underside of the planes *e—f* to "slide" outwardly, and to deflect these currents of air rearwardly and downwardly; the planes *e—f* and *g—h* thus forming, in a manner, a restricted avenue for the passage of air, the action of which

is to cushion or momentarily compress air beneath the planes *e—f* tending to both lift the rear end of the machine upward and to maintain it on an even keel during a straight ahead flight.

The fluted or corrugated coneiform plane, composed of the members or surfaces *a—b—c—d—e—f—g—h*, may be made of any suitable material and mounted on a frame of any desired formation, the several plane members being rigidly braced in any appropriate manner to retain them in their proper fixed relation to one another.

The rear end of the plane is supported clear of the ground on a frame-work 9 which is mounted on running gear 10. Suspended beneath the plane on the frame 9 is an inclosed passenger car 11, in which are mounted the motors or engines 12—13, of any suitable type or construction, by means of which power is supplied to rotate propellers 14—15 to drive the machine in a forward direction. The main propeller 14 is located at the rearmost point of the plane and is mounted on a shaft 16 which extends along the rib 2 and is connected in any desired manner to the engine 12. The auxiliary propeller 15 is located beneath the planes *b—c*, rearward of the car 11 and is adapted to be revolved by the engine 13. The object of providing separate engines and propellers is to insure propulsive force in event either one of the engines or propellers becomes disabled, and to furnish means by which two different speeds may be obtained; the propeller 14 and engine 12 being so designed and proportioned as to drive at a high speed and the propeller 15 and engine 13 to drive at a slow speed.

The steering of the machine is accomplished by means of pivoted double horizontal planes 16^a—16^b, and a vertical rudder 17, disposed at the forward end of the machine. The planes 16^a—16^b are so mounted as to be rocked up or down in unison, on a bearing 18 by means of cables 19 which extend backward to the car 11 and are operated in any suitable manner.

The plane 16^a is disposed above the forward end of the fluted cuneiform plane while the plane 16^b is disposed below, and they are adapted to direct the machine in either an upward or downward direction.

The vertical rudder 17 is mounted on a rotatable shaft 20, depending from the apex 5 or the forward end of the plane, and is adapted to be swung from side to side by any suitable connection from the car 11, to direct the nose of the machine either to the right or left, or maintain it in a straight course. The lower end of the shaft 20 carries a wheel 21 which is designed to rest upon the ground when the machine is not in flight, thus supporting the forward end of the plane and also providing a steering wheel for navigating the machine over the ground; the wheel being turnable from side to side with the shaft 20.

A tail plane 22 is mounted on the rear end of the machine in bearings supported on the ends of the ribs 3, and extends in normally an approximately horizontal position. This tail plane is intended to be actuated in unison with the forward steering planes 16^a—16^b, only in opposite directions. That is to say, as the planes 16^a—16^b are tilted upward the tail plane 22 is tilted downward, and vice versa; the tail plane thus acting in conjunction with the forward planes to steer the machine up and down.

The operation of the invention is apparent from the foregoing description, it being readily seen that as the machine is driven in a forward direction it will have a tendency to leave the ground and mount into the air, a tendency due to the inclined form of the plane surfaces. The corrugated or fluted contour of the plane insures stability, and the wedge-shaped construction lessens the friction in cutting the air, thus requiring little power to obtain sufficient speed to sustain the machine in the air.

In experimenting with a model machine built on the lines and proportions here shown, it was found that regardless of contrary winds or air currents, the machine would travel only in a forward direction, and on a comparatively even keel, cross winds or deflected air currents having no appreciable effect in destroying the equilibrium of the machine.

Having thus described my invention, what I claim and desire to secure by Letters Patent is—

1. An aerial machine composed of central and outer planes of cuneiform or wedge-shape angularly disposed in transverse section to form a horizontal fluted plane declining transversely and longitudinally from front to rear, the central planes being contiguous having their rear ends cut away to form inwardly sloping edges and the outer planes having oppositely cut divergent edges to expose the corresponding portions of the central planes to lateral air currents.

2. An aerial machine composed of cuneiform or wedge-shaped planes angularly disposed in transverse section to form a horizontal fluted plane declining transversely and longitudinally from front to rear, said planes beginning at a common point at the forward end of the machine and diverging rearwardly, horizontally and vertically to their termination at the rear end of the machine, upwardly inclined planes extending transversely from the rear portion of the outer longitudinal planes and having their outer edges substantially parallel.

3. An aerial machine composed of cuneiform or wedge-shaped planes angularly dis-

posed in transverse section to form a horizontal fluted plane declining transversely and longitudinally from front to rear, said planes beginning at a common point at the forward end of the machine and diverging rearwardly, horizontally and vertically to their termination at the rear end of the machine, upwardly inclined planes extending transversely from the rear portion of the outer longitudinal planes and having their outer edges substantially parallel, and downwardly extending ailerons projecting from the outer edges of the said outer planes.

4. An aerial machine composed of cuneiform or wedge-shaped planes and extensions, divergent from front to rear and forming horizontal fluted surfaces, a car and motor disposed beneath said planes, a propeller adapted to act directly upon the planes, a second independently actuated propeller upon the car, superposed separated planes hinged respectively above and below the apex of the wedge-shaped planes, means actuated from the car to tilt the hinged planes up or down, a vertical turnable shaft dependent from the front of the machine with a bearing wheel journaled in its lower end, a steering rudder fixed to the shaft to turn in unison with the wheel, and actuating connections between the shaft and the car.

5. An aerial machine composed of cuneiform or wedge-shaped planes and extensions, divergent from front to rear and forming horizontal fluted surfaces, a car and motor disposed beneath said planes, a propeller adapted to act directly upon the planes, a second independently actuated propeller upon the car, superposed separated planes hinged respectively above and below the apex of the wedge-shaped planes, means actuated from the car to tilt the hinged planes up or down, a vertically hinged rudder located behind the tiltable planes, and a horizontal tiltable plane carried at the upper rear part of the machine.

6. The combination in an aerial machine, of a mechanism which is automatically stable in conflicting currents, said mechanism including a surface formed of horizontal, rearwardly divergent fluted planes attached to each other at their meeting edges to form a series of ridges and grooves, which increase in width and depth rearwardly, said planes having transverse angularly disposed extensions near the rear end, downwardly sloping segmental planes mounted at the outer edges of the said extensions, and propelling and steering mechanisms.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

ELECIE P. FARUM.

Witnesses:
FRANK M. COVELL,
ARCHER M. COVELL.