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O. A. FENN.
FLYING MACHINE.
APPLICATION FILED MAY 16, 1910.

Patented July 4, 1911.

3 SHEETS—SHEET 1.

Fig. 1.

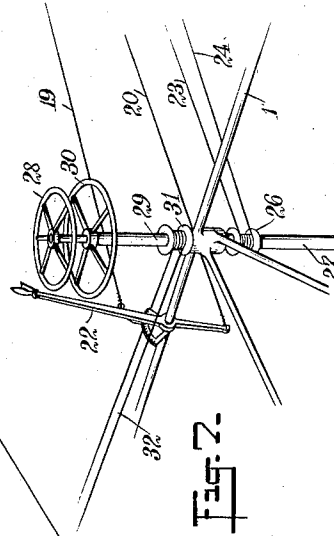
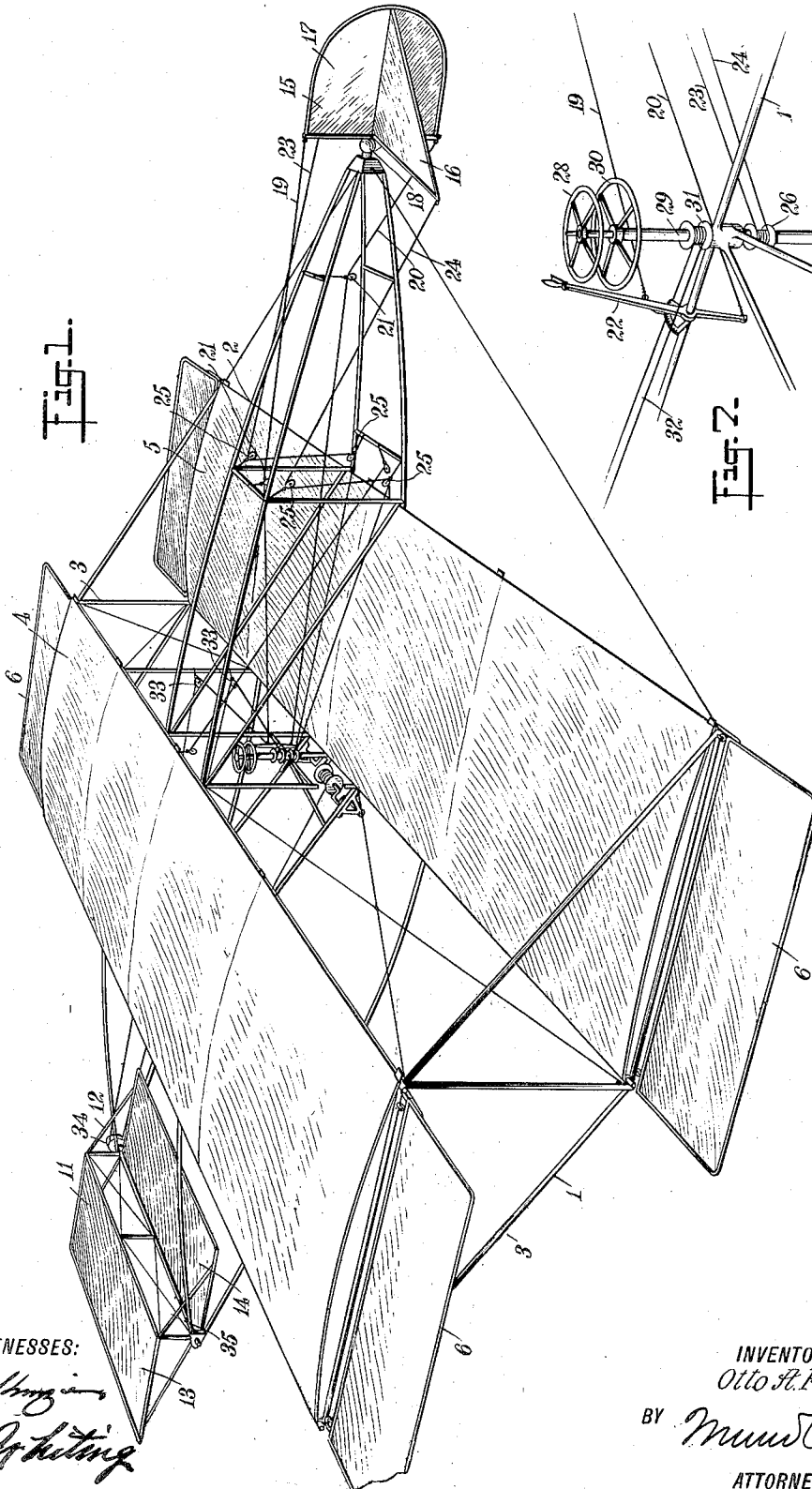


Fig. 2.

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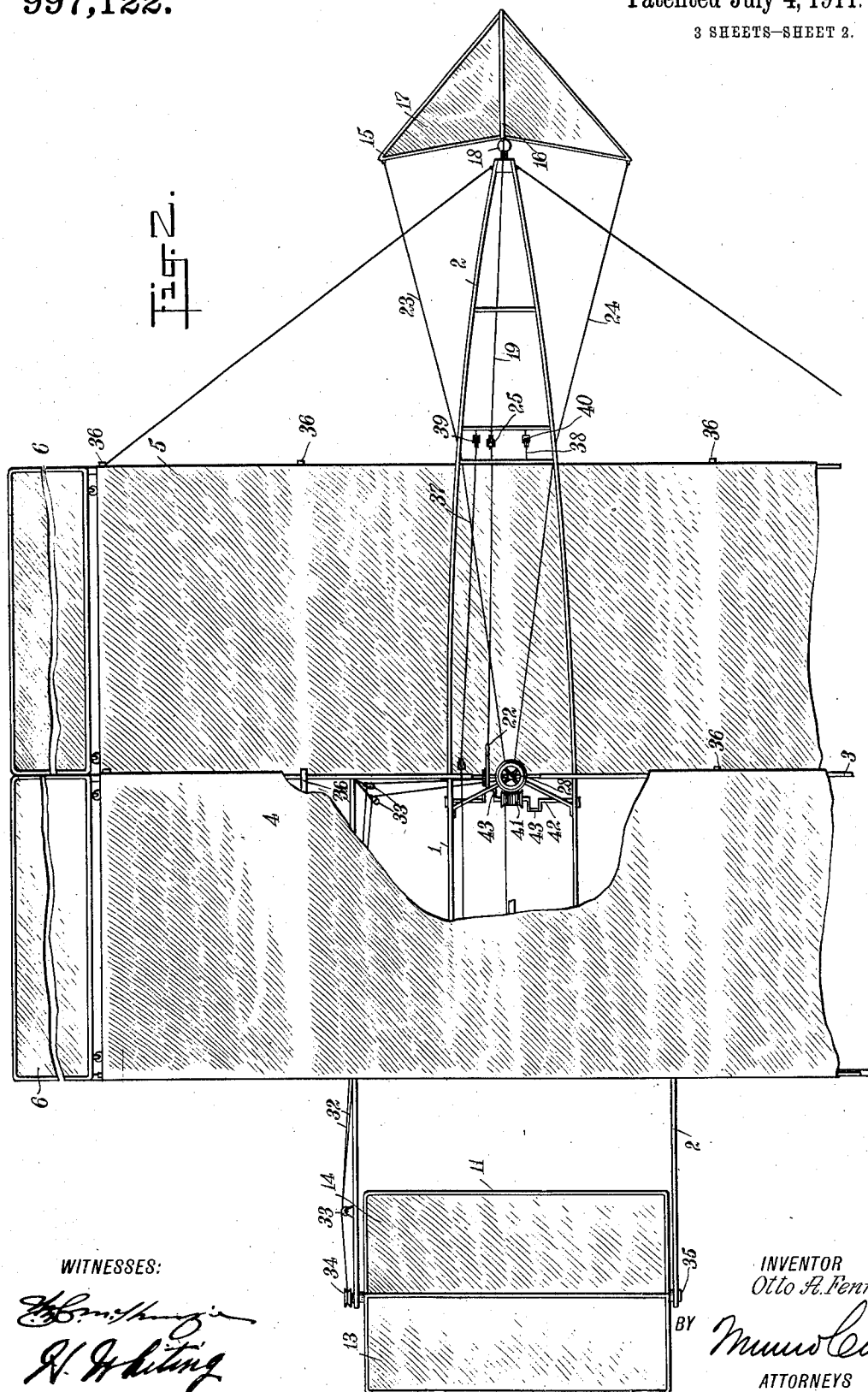
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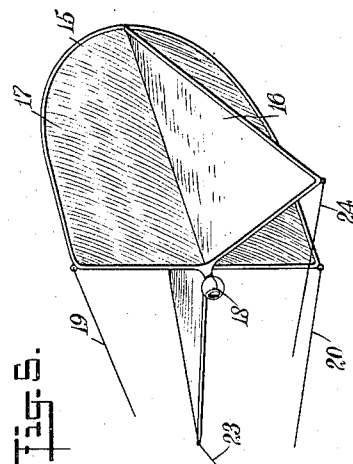
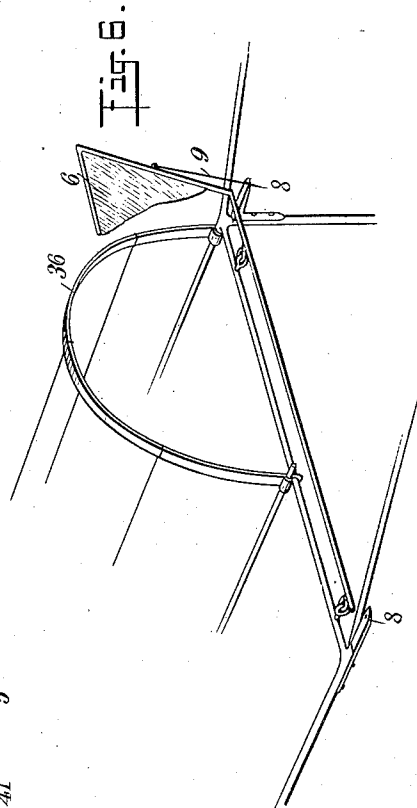
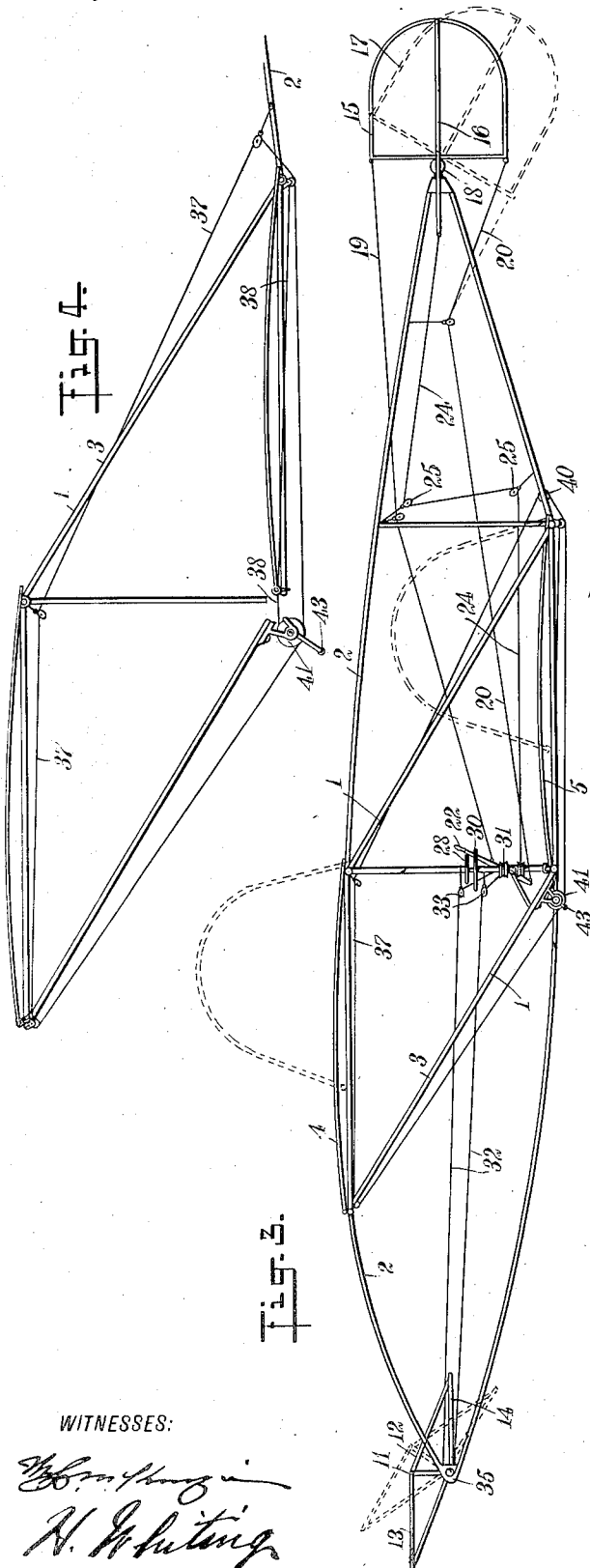
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FLYING-MACHINE.

997,122.

Specification of Letters Patent.

Patented July 4, 1911.

Application filed May 16, 1910. Serial No. 561,521.

To all whom it may concern:

Be it known that I, OTTO A. FENN, a citizen of the United States, and a resident of the city of New York, borough of the Bronx, in the county and State of New York, have invented a new and Improved Flying-Machine, of which the following is a full, clear, and exact description.

This invention relates to a new and improved flying machine of the heavier-than-air, or aeroplane, type.

An object of this invention is to provide a device which will be simple in construction, light in weight, inexpensive to manufacture, strong, durable, and reliable and positive in its operation.

Another object of this invention is to provide a flying machine with a plurality of supporting planes, offset from each other out of vertical alinement.

A further object of this invention is to provide a flying machine with means for directing the vertical travel of the machine, and with a universal rudder for further controlling the direction of travel of the machine.

A still further object of this invention is to provide a flying machine with supporting planes capable of being distorted into parachute form, so as to effect a safe landing in case of accident to the motor or other parts of the machine.

These and further objects, together with the construction and combination of parts, will be more fully described hereinafter and particularly set forth in the claims.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views, and in which—

Figure 1 is a perspective view; Fig. 2 is a top plan view, partly broken away to show the underlying structure; Fig. 3 is a side view in elevation, showing the various positions of the members in full and dotted lines; Fig. 4 is an enlarged detached side view in elevation, showing the connection of the mechanism for distorting the supporting planes; Fig. 5 is a perspective view of the rudder; Fig. 6 is an enlarged fragmentary view showing a distorted supporting plane, and also showing one of the side equilibrium planes; and Fig. 7 is an enlarged perspective view illustrating the controlling mechanism.

Referring more particularly to the sep-

arate parts of the device, 1 indicates a frame, which may be of any suitable light material, and preferably consists of a longitudinal portion 2 extending from front to rear of the machine, and a transverse portion 3 extending sidewise of the machine and formed diagonally so as to provide convenient supports for a plurality of supporting planes 4 and 5. It is to be noted that these planes are offset or staggered one from the other, so that, instead of the plane 4 being superposed above the plane 5, it extends forwardly of the plane 5, and does not project over the surface of the plane 5. This gives increased stability to the machine, and adds to the active supporting surface.

For the purpose of maintaining the transverse equilibrium of the machine, each of the planes 4 and 5 are provided on each side with equilibrium planes 6, which are pivotally connected to the frame in any well known manner, and are limited in their downward movement by means of brackets 8. These planes are also limited in their upward movement, as will be seen more particularly by reference to Fig. 6, by flexible connections 9, which are secured at one end to the plane 6 and at their opposite ends to the brackets 8.

For the purpose of guiding the machine in a vertical direction, there is provided on the front end of the auxiliary frame 2, a rudder or directing member 11, which is pivoted to the frame so as to rotate about a horizontal axis substantially parallel to the transverse direction of the planes 4 and 5. This directing member preferably consists of a diamond frame 12, and planes 13 and 14 arranged at different levels but offset from each other so as not to be in superposed relation; that is to say, the plane 13 is disposed forwardly of the plane 14, so as not to project over the latter. The purpose of this is to increase the active surface of the directing member and render its action more positive and yet steady.

In order to aid in the directing of the machine, there is provided at the rear end of the frame 2 a rudder 15, which consists of a horizontal plane 16 and a vertical plane 17, secured together in any well known manner. This rudder 15 is connected to the frame 2 by means of a universal joint 18, so that the rudder can move in any direction.

For the purpose of manipulating this rudder so as to swing it vertically and bring

the plane 16 into action, there are provided flexible connections 19 and 20, which extend over suitable guide pulleys 21 to opposite sides of the pivot point of a pivoted lever 22, as will be seen more clearly by reference to Fig. 7. It will be seen that by moving this lever back and forth, the rudder can be swung in a vertical direction to aid in the up-and-down movement of the flying machine.

For the purpose of manipulating the rudder in a transverse manner so as to bring the plane 17 into action, in order to steer the machine to the right or to the left, there are secured to the rudder, on opposite sides thereof, flexible connections 23 and 24, which extend over suitable guide pulleys 25, supported in any well known manner on the frame, to opposite sides of a drum 26 secured to a shaft 27, which is rotatably supported in the frame in any well known manner, and is provided with suitable operating means, shown in the form of a hand wheel 28.

On the shaft 27, there is provided a sleeve 29, which is adapted to be operated by a hand wheel 30, and is provided with a drum 31, over which is wound a flexible connection 32, the opposite ends of which extend, over suitable guide pulleys 33, to the opposite sides of a drum or pulley 34 on a shaft 35, which forms the pivot of the directing member 11. It will thus be seen that the directing member 11 is manipulated from the hand wheel 30, which is arranged in close juxtaposition to the hand wheel 28, so that the two can be operated simultaneously, if desired, by the operator.

In case of an accident to the motive or steering mechanism, it is highly desirable that the aeroplane should come slowly and steadily to an easy landing. For this purpose, the planes 4 and 5 are pivotally connected to the frame at one end, preferably at their rear end, and are slidingly connected to the frame at the other end, so as to permit them to be distorted from a substantially horizontal position to the parachute form illustrated in the dotted lines in Fig. 6.

For the purpose of normally maintaining the planes in their normal position, these planes are provided with spring ribs 36. For the purpose of transferring the planes from their normal to their abnormal, distorted, parachute position, there are provided flexible connections 37 and 38, which are continuous and extend over suitable guide pulleys 39 and 40, and are connected to the forward ends of the planes 4 and 5, respectively, in any well known manner. These flexible connections also extend over a drum 41 in such a manner that when the drum is rotated in one direction, the planes 4 and 5 will be warped to the position illus-

trated in the dotted lines in Fig. 3, and when the drum is rotated in the opposite direction, the planes will be returned to their normal position.

For the purpose of manipulating the drum 41, it is provided with a shaft 42, which is rotatably supported in the frame in any well known manner, and is provided with cranks 43, arranged in staggered relation and adapted to be operated by the feet in the manner of pedals.

The operation of the device will be readily understood when taken in connection with the above description. The flying machine is driven by any suitable motive force, and by any suitable type of propeller mechanisms. While in the air, it is guided in a vertical direction with the aid of the forward directing member 11 and the rear rudder 15. Travel in a horizontal direction is accomplished by swinging the rudder 15 to the right or left according to the direction in which it is desired to fly. If a side current or any other cause should swing the plane transversely, the equilibrium planes 6 will come in play, limiting the swing and bringing the flying machine back to a normal horizontal position. In case of accident to the propelling mechanism or to the steering mechanism, the operator can transform his flying machine into a parachute, by working the pedals 43, so as to distort the planes 4 and 5 into the curved form indicated by the dotted lines in Fig. 3 and the full lines in Fig. 6, in which case, the flying machine will catch considerable air as it descends, lessening the shock of alighting.

While I have shown one embodiment of my invention, I do not wish to be limited to the specific details thereof, but desire to be protected in various changes, modifications and alterations which I may make within the scope of the appended claims.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:—

1. The combination with a frame, of one or more planes connected to said frame normally assuming a comparatively flat form, and mechanism for distorting said planes into a parachute form.

2. The combination with a frame, of one or more planes connected to said frame normally assuming a comparatively flat form, mechanism for distorting said planes into a parachute form, and means for maintaining said planes in their normal position.

3. The combination with a frame, of one or more planes connected to said frame, mechanism for distorting said planes into a parachute form, and springs for maintaining said planes in their normal position.

4. The combination with a frame, of one or more supporting planes on said frame, said planes being pivotally connected to

said frame at one end and slidingly connected at their opposite ends, means for maintaining said planes in their normal position, and mechanism for distorting said planes into an abnormal distended position.

5 5. The combination with a frame, of one or more supporting planes on said frame, said planes being pivotally connected to said frame at one end and slidingly connected
10 at their opposite ends, means for maintaining said planes in their normal position, and mechanism for distorting said planes into an abnormal distended position, said mechanism comprising a drum, cranks for
15 operating said drum, and flexible connections for transmitting the motion of said drum to said planes.

6. The combination with a frame, of one or more supporting planes on said frame,
20 said planes extending normally substantially horizontal and adapted to assume a concave form by bulging a portion intermediate the edges above the plane of the edges.

7. The combination with a frame, of one or more supporting planes on said frame,
25 said planes extending normally substantially horizontal and adapted to assume a concave form by bulging a portion intermediate the
30 edges above the plane of the edges, and means for manipulating said planes from a horizontal position to a concave position.

8. The combination with a frame, of one or more supporting planes on said frame,
35 said planes extending normally substantially horizontal and adapted to assume a concave form by bulging a portion intermediate the edges above the plane of the edges, means
40 for manipulating said planes from a horizontal position to a concave position, and means for returning said planes to their normal position.

9. The combination with a frame, of a plurality of supporting planes on said
45 frame, arranged at different levels, the front edge of a lower plane being in vertical alinement with the rear edge of the next higher plane, and a rudder pivotally mounted on
50 said frame, said rudder comprising a plurality of planes disposed at different levels, the front end of the lower of which being in vertical alinement with the rear end of the next higher plane.

10. The combination with a diamond-
55 shaped frame having the rear end of the upper portion thereof in vertical alinement with the front end of the lower portion thereof, and having said ends interconnected by a vertical brace, and a supporting plane

on both the upper and lower portions of
said frame, said supporting planes being off-
set one from the other.

11. The combination with a frame, of one or more supporting planes on said frame,
65 equilibrium planes pivotally connected to said frame, flexible connections for limiting the movement of said equilibrium planes in one direction, and brackets for limiting the movement of said equilibrium planes in another direction.

12. The combination with a frame, of a plurality of supporting planes on said frame,
70 said supporting planes being vertically spaced and horizontally spaced relative to each other, a pair of equilibrium planes extending in alinement with each of said supporting planes, means for manipulating said equilibrium planes, a rudder located at the front of said frame and comprising a plu-
75 rality of vertically-spaced planes horizontally offset relative to each other, means for manipulating said rudder, a rudder having a universal connection with said frame, at the rear thereof, said last-mentioned rudder having a vertical plane and a horizontal
80 plane, and means for manipulating said last-mentioned rudder in any direction.

13. The combination with a frame, of a plurality of supporting planes on said frame,
85 said supporting planes being vertically spaced and horizontally spaced relative to each other, a pair of equilibrium planes extending in alinement with each of said supporting planes, means for manipulating said equilibrium planes, a rudder located at the
90 front of said frame and comprising a plurality of vertically-spaced planes horizontally offset relative to each other, means for manipulating said rudder, a rudder having a universal connection with said frame, at
95 the rear thereof, said last-mentioned rudder having a vertical plane and a horizontal plane, means for manipulating said last-mentioned rudder in any direction, said supporting planes normally occupying a com-
100 paratively flat form and being capable of being distorted into an inverted U-shaped form, so as to form a parachute, and means for manipulating said supporting planes from one form into the other form.

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

OTTO A. FENN.

Witnesses:

HORATIO WHITING,
PHILIP D. ROLLHAUS.