H. H. ASHLOCK.

AERODROME.

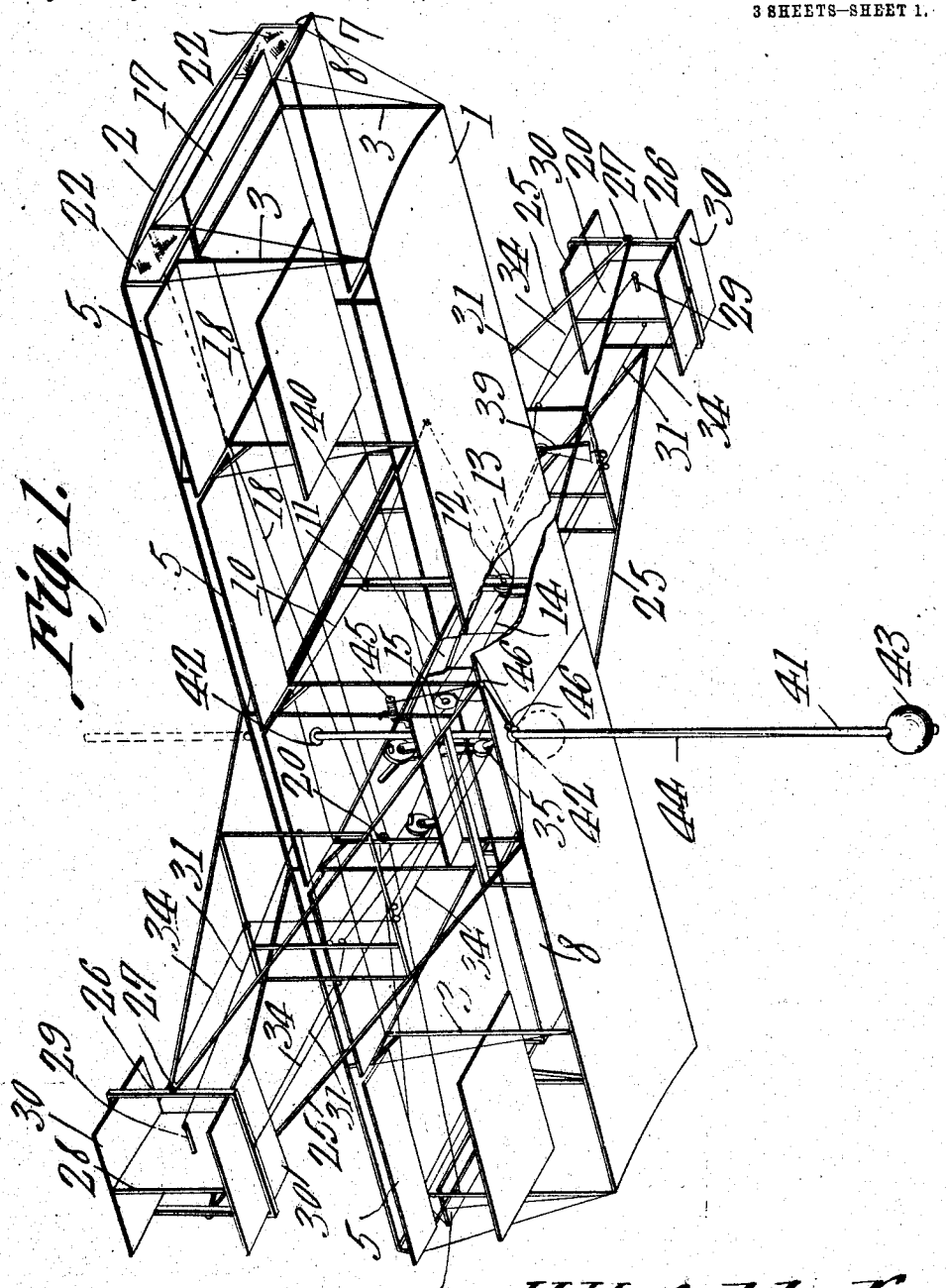
APPLICATION FILED APR. 6, 1911.

1,014,031.

Patented Jan. 9, 1912.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses

J. P. Timein

S. A. Wilson.

Inventor

H. H. Ashlock

by C. A. Snow & Co.

Attorneys

H. H. ASHLOCK.

AERODROME.

APPLICATION FILED APR. 6, 1911.

1,014,031.

Patented Jan. 9, 1912.

3 SHEETS—SHEET 2.

Fig. 3.

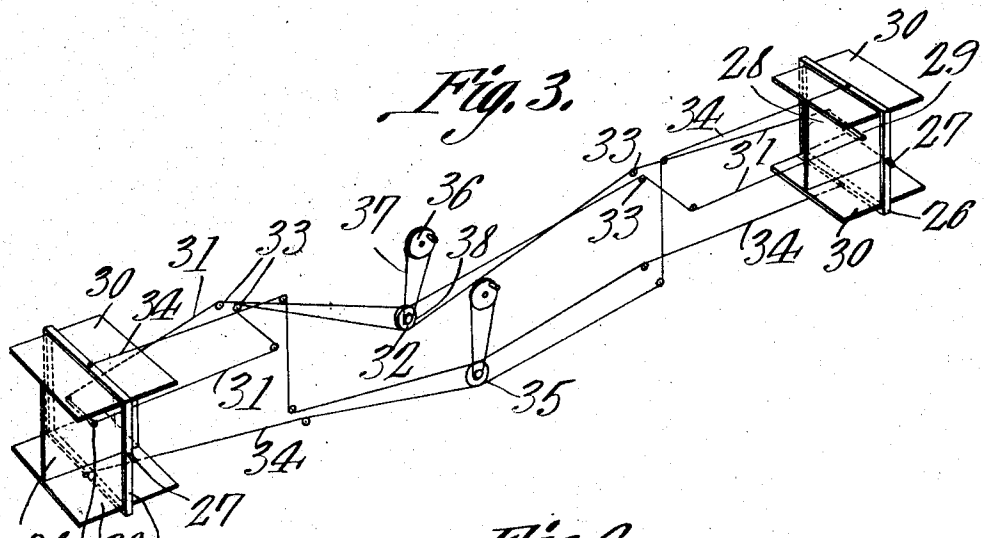
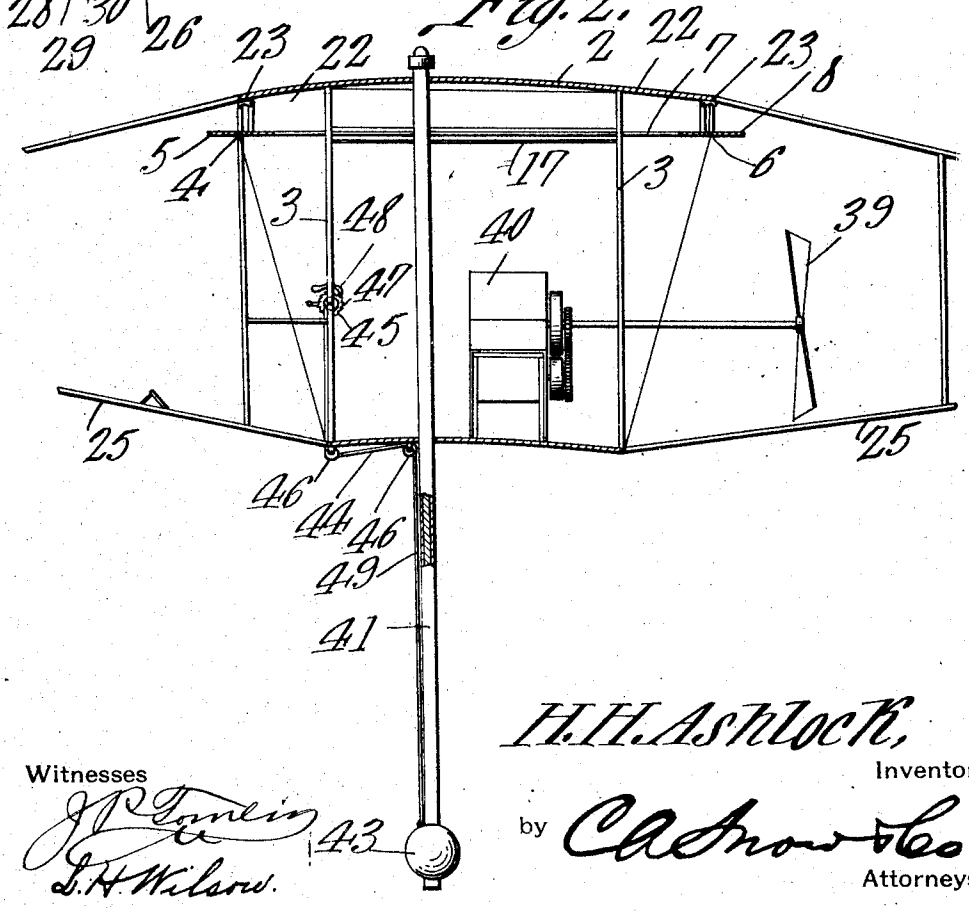


Fig. 2.



Witnesses

J. P. Tomlin

L. H. Wilson.

H. H. ASHLOCK,

Inventor

by C. A. Snow & Co.

Attorneys

H. H. ASHLOCK.

AERODROME.

APPLICATION FILED APR. 6, 1911.

1,014,031. Patented Jan. 9, 1912.

3 SHEETS—SHEET 3.

Fig. 4.

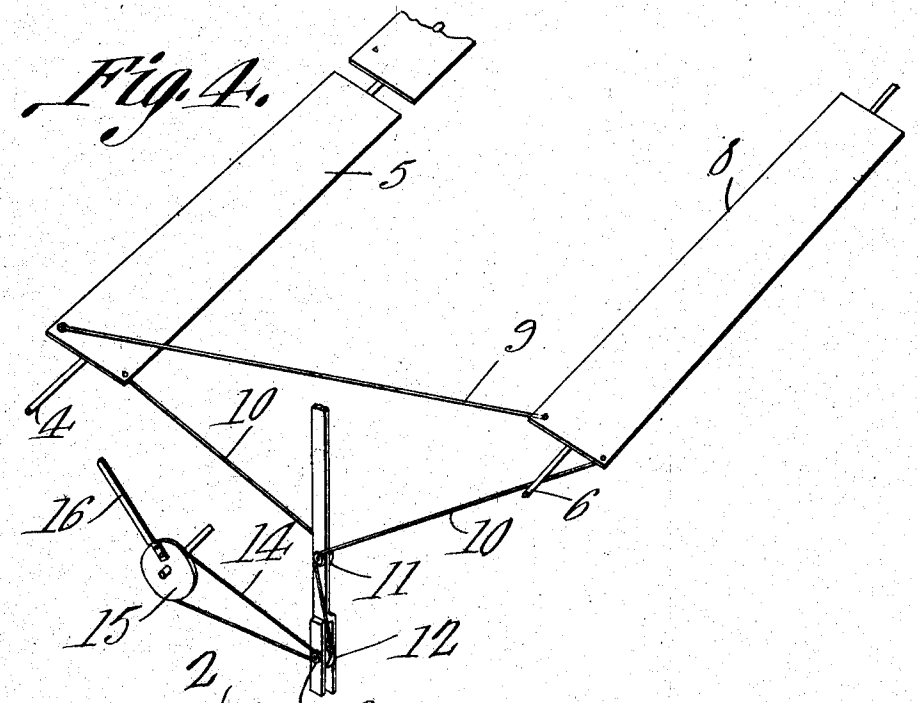


Fig. 5.

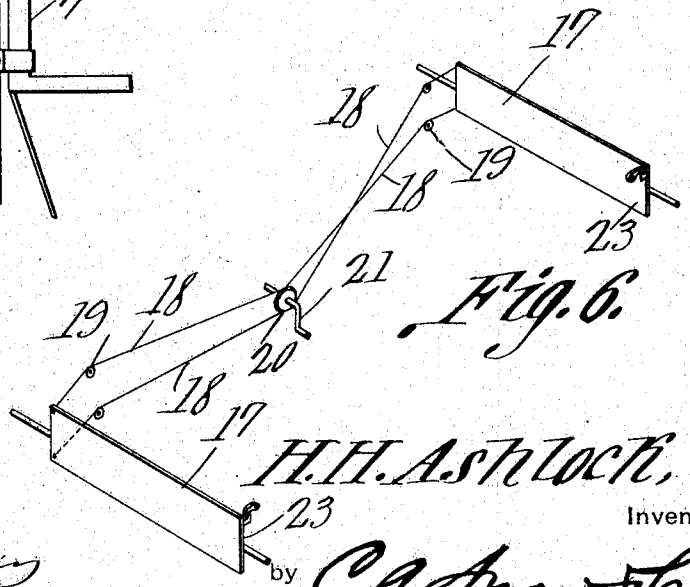


Fig. 6.

Witnesses

J. R. Towers

L. H. Wilson

Inventor

H. H. Ashlock.

by C. A. Snow & Co.

Attorneys

UNITED STATES PATENT OFFICE.

HENRY H. ASHLOCK, OF KANSAS CITY, MISSOURI.

AERODROME.

1,014,031. Specification of Letters Patent. Patented Jan. 9, 1912.

Application filed April 6, 1911. Serial No. 619,408.

To all whom it may concern:

Be it known that I, HENRY H. ASHLOCK, a citizen of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented a new and useful Aerodrome, of which the following is a specification.

This invention relates to aerodromes or flying machines of the heavier than air type, and the principal object of the invention is to provide a novel arrangement of ballast depending from the center of the machine and held against swinging in any direction relative thereto, this ballast serving to restore and maintain the equilibrium of the machine without the necessity of providing balancing planes such as heretofore devised for this purpose.

Another object is to provide ballast which can be raised and lowered relative to the machine, the effectiveness of the ballast increasing in proportion to the distance it is lowered from the machine.

A further object is to provide an aerodrome the upper sustaining plane of which projects beyond the lower sustaining plane, in a bi-plane construction, said upper plane having supplemental planes movably connected thereto and under the control of the aviator, whereby flight in an upward and downward direction may be controlled.

A further object is to provide supplemental planes designed to be shifted relative to the sustaining plane and to coöperate therewith to form a parachute whereby, in the event of the disabling of any of the propelling mechanism of the machine or any other vital portion of the structure, the machine can be caused to descend gradually.

Another object is to provide improved steering mechanism.

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 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 perspective view of a bi-plane having the present improvements applied thereto, the position of the ballast when raised, being indicated by dotted lines. Fig. 2 is a central vertical section through the middle portion of the machine, said section being taken from front to rear. Fig. 3 is a view showing, diagrammatically, one means which may be employed for operating the rudders. Fig. 4 is a perspective view of some of the supplemental planes and of one form of mechanism which can be utilized for shifting them. Fig. 5 is a side elevation of one of the supplemental planes and a portion of the adjacent sustaining plane being shown in section, said supplemental planes being locked in closed position. Fig. 6 is a perspective view of the side supplemental planes and showing one form of operating means which may be used in connection therewith.

Referring to the figures by characters of reference 1 designates the lower sustaining plane of a bi-plane and 2 designates the upper sustaining plane, said upper plane being extended forwardly, rearwardly and laterally beyond the lower plane 1, the two planes being rigidly connected, as ordinarily, by posts 3 or the like.

A shaft 4 is supported below and extends parallel with the front or advancing edge of the upper plane 2 and is mounted for rotation, this shaft having a series of supplemental planes 5, fixedly connected to it and spaced apart at their ends sufficient distances to receive the posts 3 therebetween. The supplemental planes 5 are all disposed in alinement and the said planes are so proportioned that, when brough into position parallel with the posts 3, their upper edge portions will lie close to the front or advancing edge of the plane 2. Another shaft 6 is supported below and parallel with the rear edge of the plane 2, any suitable frame 7 being provided for this purpose. This shaft is also adapted to rotate and has a series of supplemental planes 8 fixedly connected to it and spaced apart at their ends sufficient distances to receive the depending members of the frame 7 therebetween. The upper edge portions of one plane on each shaft are connected by cords or wires 9 (see Fig. 4) while the lower edge portions of said planes have wires or cords 10 extending from them and downwardly over guide sheaves 11 to a drum 12 about which they are wound and fastened.

The shaft of the drum 12 has a small

wheel 13 secured to it and adapted to be operated by a cord or chain 14 engaging a wheel 15 from which an operating lever 16 extends. It will be apparent, therefore, that when the lever 16 is operated in one direction, motion will be transmitted from wheel 15 through the chain or cord 14 to wheel 13 and the drum 12 will therefore be rotated so as to wind one of the cords 10 and to play out the other cord 10. The planes 5 and 8 will therefore be simultaneously tilted, these planes being maintained constantly parallel. When lever 16 is shifted in the opposite direction, the movement of the planes is reversed. It is to be understood that these planes can be moved so as to assume any desired positions relative to the horizontal and, in extreme cases, can be shifted so as to swing against the longitudinal edge portions of the plane 2, as shown by dotted lines in Fig. 2.

Side supplemental planes 17 are mounted between the posts of the machine at the sides of said machine, the said planes being extended from front to rear and their axes of rotation being located in the same plane with the shafts 4 and 6. Each of these supplemental planes 17 has a cord 18 secured to the upper and lower edge portions thereof, said cord being extended over guide sheaves 19 and wrapped about an operating drum 20 to which it is connected. This drum may be operated by any suitable mechanism, such as indicated generally at 21 in Fig. 6, it being apparent that when the drum is rotated in one direction the supplemental planes 17 will be simultaneously tilted so as to bring their upper edges into contact with the projecting side edges of the upper sustaining plane 2. The space between the ends of the side supplemental planes 17 and the front and back supplemental planes 5 and 8 may be closed by strips of fabric or the like such as shown at 22.

Under normal conditions the planes 17 are to be held in the same plane but, when it is desired to produce a parachute for the purpose of retarding the downward movement of the machine when control thereof has been lost, these planes 17 are to be swung against the ends of the upper sustaining plane 2, thus coöperating with the planes 5 and 8 which have been similarly shifted relative to the upper sustaining plane, to restrain and deflect the air after the fashion of the parachute. Under normal conditions, and with the two supplemental planes 17 lying in the same plane, said supplemental planes will not interfere with the movements of the machine. The planes 5 and 8 can, however, be simultaneously tilted so as to elevate the machine during its forward flight. If desired, latches such as have been indicated at 23 may be arranged in the paths of the planes 5, 8 and 17 so that when they are swung to closed positions, these latches will automatically engage keepers 24 on the planes and therefore lock them automatically when closed against the upper sustaining plane.

The aeroplane structure includes, as ordinarily forwardly and rearwardly converging spars 25 provided with any suitable arrangement of braces and a frame 26 extends between the spars at the front and the rear ends thereof, each frame having laterally extending trunnions 27 bearing within the spars. A vertical rudder 28 extends through each frame 26 and is mounted to swing about an axis extending through the centers of the upper and lower portions of the frame, said vertical rudder having laterally extending arms 29 at the center thereof and being provided, at its upper and lower edges with horizontal rudders 30. Cords or wires 31 extend from the arms 29 on one rudder and are wrapped about and secured to a drum 32, said cords being mounted on suitably arranged guide sheaves 33. The cords extending to one of the vertical rudders are crossed so that, when the drum 32 is rotated in one direction, the two vertical rudders will be simultaneously swung in opposite directions within their frames 26. Each of the frames 26 has cords 34 connected to the upper and lower portions thereof and extending to and wrapped about a drum 35, the cords extending from one of the frames being crossed so that, when the drum is rotated in one direction, the two frames 26 will be simultaneously tilted in opposite directions thus changing the angles of incidence of the horizontal rudders.

The drums 32 and 35 can be operated by any suitable mechanism provided for that purpose, the means shown in Fig. 3 consisting of an actuating wheel 36 connected, as by means of a chain 37 or the like, to a smaller wheel 38 revoluble with the drum. It is to be understood, however, that any other desired means may be provided.

The machine is provided with one or more propellers 39 of the usual or any preferred type and it is designed to provide two motors for driving the propellers, one of the motors being operated while the other is at rest. These motors have been indicated at 40.

It will be apparent from the foregoing description that by simultaneously tilting the horizontal rudders the machine can be directed upwardly or downwardly while in flight and the vertical rudders, by being shifted, serve to steer the machine laterally. The front and back supplemental planes 5 and 8 can also be utilized for the purpose of steering the machine upwardly and downwardly. Should any vital portion of the machine become broken or otherwise disabled, a too rapid descent of the machine can be prevented by shifting the supplemental

planes 5 and 8 against the front and rear edges of the upper sustaining plane 2 and by shifting the side supplemental planes 17 against the side edges of the plane 2. The supplemental planes 5, 8 and 17, together with the strips 22, thus coöperate to form a continuous apron depending from the edge portions of the upper sustaining plane and thus forming a parachute which will operate efficiently to retard the downward movement of the structure. The various supplemental planes will of course lock as soon as moved to the positions mentioned and the entire attention of the aviator can then be directed to the manipulation of the machine during its descent.

In order that the equilibrium of the machine may be maintained under all conditions, ballast of novel form is employed. This ballast consists of a stem 41, preferably tubular and which is slidably mounted within the upper and lower sustaining planes 1 and 2 at the center of gravity, this stem being preferably mounted within reinforcing rings 42 secured to the planes and braced by any suitable means provided for that purpose. A weight 43 is secured to the lower end portion of the stem and a lifting cable 44 or the like is connected to the weight and extends upwardly to a windlass 45 arranged close to the aviator's seat, this cable being mounted on guide sheaves 46 arranged in any manner desired. A ratchet wheel 47 rotates with the windlass and a pawl 48 normally engages said wheel so as to hold the cable against unwinding from the windlass. It is to be understood that before a flight, the stem 41 is to be elevated by winding cable 44 on the windlass 45, thus bringing the weight 43 close to the lower sustaining plane 1. After the machine has left the ground, the aviator releases the ratchet wheel 47, thus permitting the cable to unwind from the windlass and allowing the weight 43 to descend until the stem 41 has moved downwardly as far as desired. As the stem cannot swing relative to the sustaining planes, it will be obvious, that the weight when thus lowered, will operate to maintain the equilibrium of the machine under normal conditions and to promptly restore the equilibrium whenever the machine is tilted in any direction from any cause. When the machine descends, the weight can be held off of the ground by winding the cable 44 on the windlass 45. The ballast will not, therefore, prevent the machine from making a perfect landing.

It is to be understood that the aerodrome is to be provided with supporting wheels or skids such as ordinarily employed but, for the sake of clearness, they have not been illustrated in the drawings.

As heretofore stated the stem 41 is preferably tubular. In order, however, to reinforce the stem and prevent it from bowing when tilted, a filling 49 of wood or the like is preferably forced into the stem.

Although the present improvements have been shown and described in connection with a bi-plane, it will be understood that the improvements may be used in connection with a monoplane or any other type of heavier than air machine.

What is claimed is:—

1. An aerodrome including a sustaining plane, supplemental planes, and means for shifting said supplemental planes to coöperate with the sustaining plane to form a parachute, and means for automatically locking said supplemental planes relative to the sustaining plane when used as a parachute.

2. An aerodrome including a sustaining plane, front and back supplemental planes mounted to swing about axes extending transversely of the line of flight, means for simultaneously closing said planes against the front and back edges of the sustaining plane, and means for locking the supplemental planes in closed positions.

3. An aerodrome including a sustaining plane, supplemental planes arranged below the front and back edges of the sustaining plane, means for tilting said supplemental planes simultaneously to steer the machine in an upward or downward direction, said supplemental planes being movable to positions substantially at right angles to path of movement of the sustaining plane, and means for automatically locking the supplemental planes when brought to said positions at right angles to the path of the sustaining plane.

4. An aerodrome including a sustaining plane, supplemental planes below the front and back edges of the sustaining plane, supplemental planes below the side edges of the sustaining plane, and separate means for shifting the front and back and the side supplemental planes to positions substantially perpendicular to the path of movement of the sustaining plane to coöperate with said sustaining plane and form a parachute.

5. An aerodrome including a sustaining plane, supplemental planes below the front and back edges of the sustaining plane, supplemental planes below the side edges of the sustaining plane, and means for shifting the front and back and the side supplemental planes to positions substantially perpendicular to the path of movement of the sustaining plane to coöperate with said sustaining plane and form a parachute.

6. An aerodrome including a sustaining plane, supplemental planes below the front and back edges of the sustaining plane, supplemental planes below the side edges of the sustaining plane, and means for shifting

the front and back and the side supplemental planes to positions substantially perpendicular to the path of movement of the sustaining plane to coöperate with said sustaining plane and form a parachute, and means for automatically locking the supplemental planes when shifted against the sustaining plane.

7. An aerodrome including a sustaining plane, supplemental planes below the front, rear and side edge portions thereof, and separate means for shifting the front and rear, and the side supplemental planes respectively to coöperate with the sustaining plane to form a parachute.

8. An aerodrome including a sustaining plane, supplemental planes below the front, rear and side edge portions thereof, separate means for shifting the front and rear, and the side supplemental planes respectively to coöperate with the sustaining plane to form a parachute, and separate means for automatically locking the respective supplemental planes when shifted.

9. An aerodrome including a sustaining plane, supplemental planes mounted for rotation below the side, front and rear portions of the sustaining plane, means for shifting said supplemental planes to coöperate with the sustaining plane to form a parachute, and means suspended below and held against swinging movement relative to the sustaining plane for maintaining the equilibrium of said sustaining plane.

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

HENRY H. ASHLOCK.

Witnesses:
FRANK B. OCHSENREITER,
LENA WILLSON.