

F. BRACKETT.
AIR CRAFT.

APPLICATION FILED JULY 11, 1910.

1,039,092.

Patented Sept. 24, 1912.

4 SHEETS—SHEET 1.

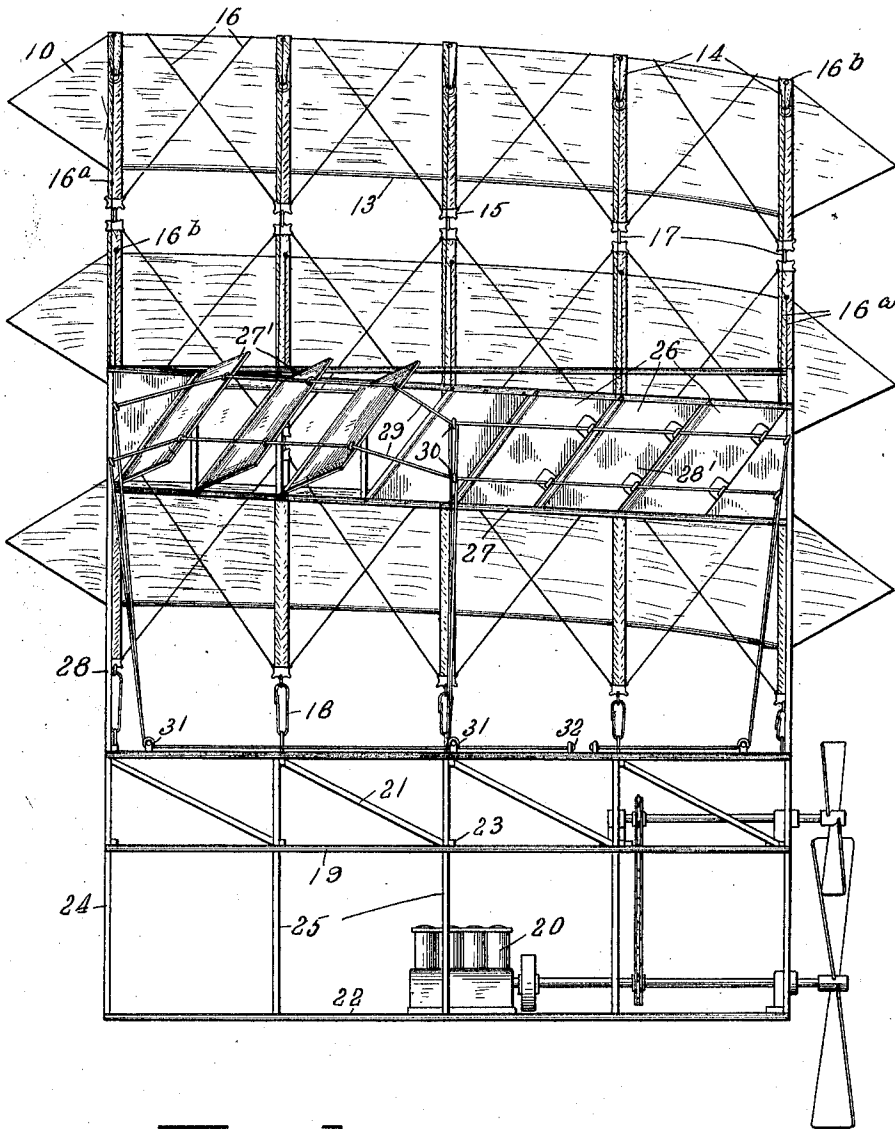


Fig 1

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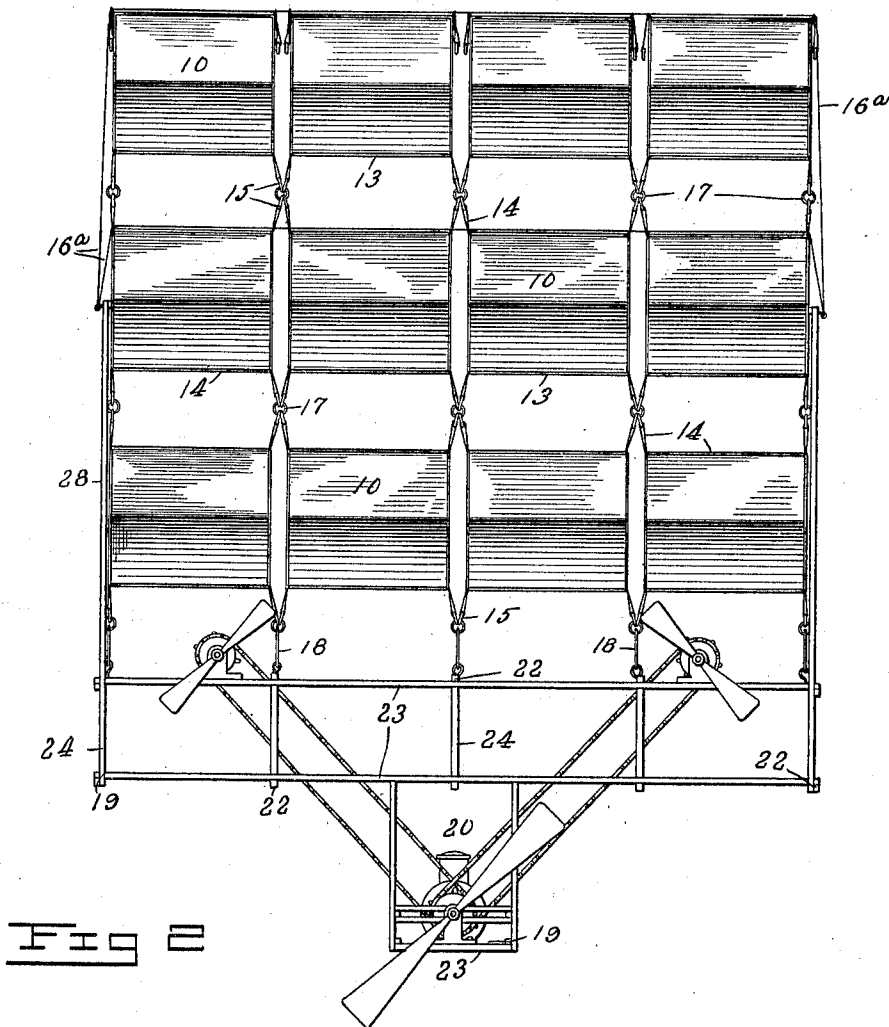
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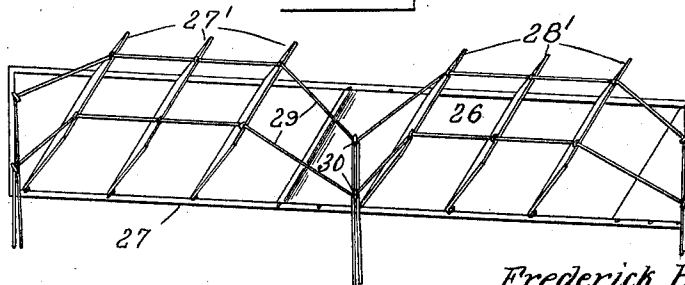
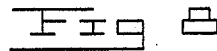
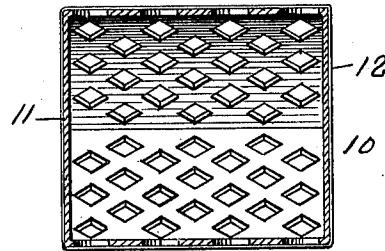
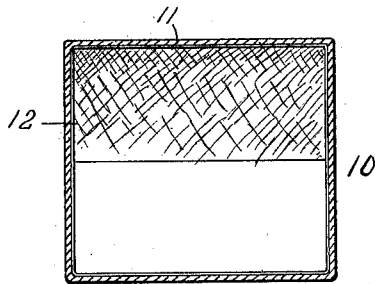
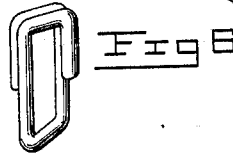
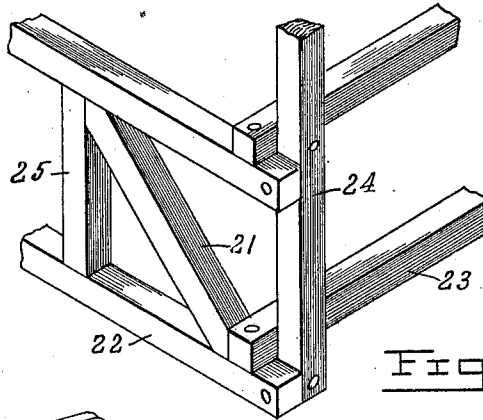
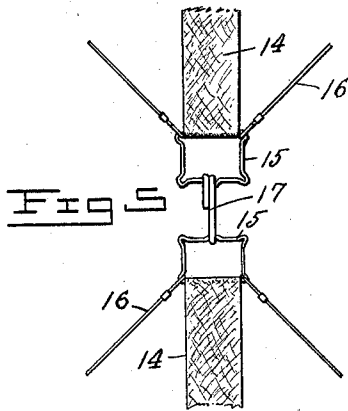
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4 SHEETS—SHEET 3.

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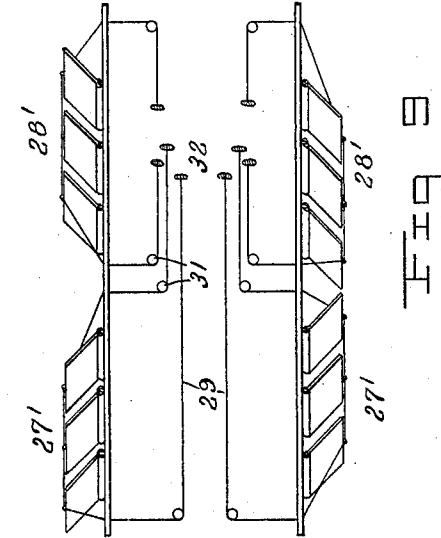
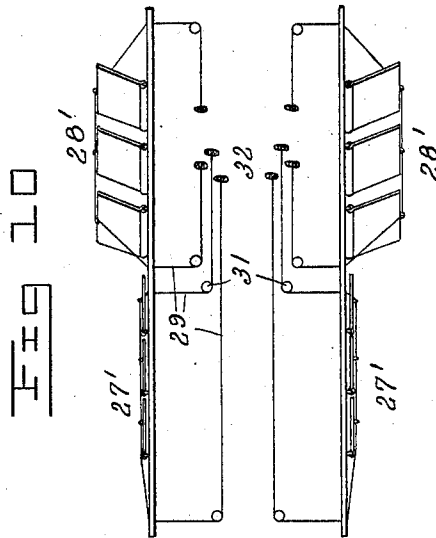
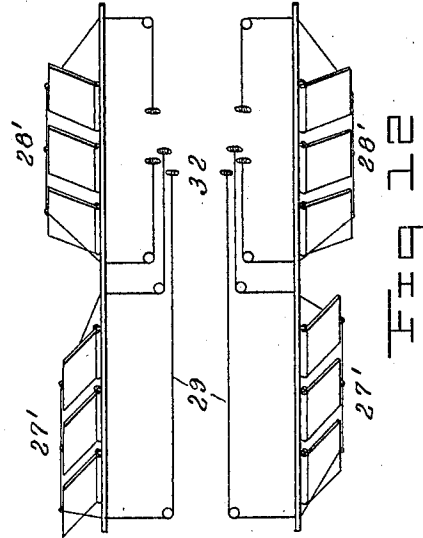
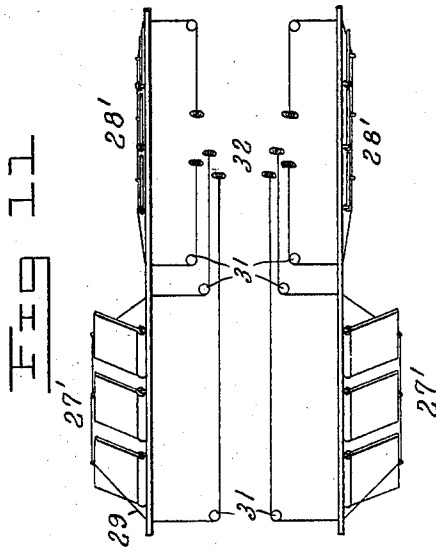
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4 SHEETS—SHEET 4.

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UNITED STATES PATENT OFFICE.

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AIR-CRAFT.

1,039,092.

Specification of Letters Patent.

Patented Sept. 24, 1912.

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To all whom it may concern:

Be it known that I, FREDERICK BRACKETT, a citizen of the United States, residing at Washington, in the District of Columbia, have invented new and useful Improvements in Air-Craft, of which the following is a specification.

My invention relates to a type of air ship made up of an especially advantageous combination of supporting surfaces and gas bags. While of this particular relation however, there are many features of my invention which may be applied, some of them, to heavier than air machines which most commonly are constructed with plane supporting surfaces, while some of them may be applied to lighter than air craft in which use is made of gas bags and in which the gas is principally relied upon to support the structure, and still others of which may be utilized singly or in combination in both types of air craft.

Aeroplanes or heavier than air flying machines possess the disadvantage that they cannot remain in the air for long periods of time after the propelling power is cut off. On the other hand they possess the advantages of a very flexible control, light weight, and freedom from damage or destruction due to escape or firing of gases, since no gas is used to support them. In case of attack in time of war, it will be practically impossible to disable a flying machine of this type by rifle shot or other small arm, unless some vital part of the propelling means or steering means is damaged. On the other hand machines of the lighter than air type in which use is made of containers filled with gas for supporting, are very large and bulky, presenting an easy mark for rifle shots in case of attacks. The gas container may be most readily penetrated by a ball, and further than that set on fire and the ship destroyed either by fire or the resulting explosion. In case fire does not result it is probable that the gas would escape from the opening made by a ball in a very short time, and the craft would either be forced to come to the earth or would fall violently down. Furthermore, air ships of this type are not nearly so quick in their movements as are machines of the heavier than air type, and owing to the great lightness of their supporting means in comparison with the exposed surface of the container, they often become unmanageable in

adverse winds. They possess the advantage that in case of failure of motive power, or in case it is cut off, the ship will still float, and may be sailed as a balloon for days at a time under good conditions.

It is the prime object of my invention to produce an air craft in which are combined the good features of both types of air craft which I have mentioned, by which combination I secure substantially all the advantages and exclude substantially all the disadvantages possessed by each type singly.

According to my invention I make use of a supporting means for an air craft consisting of a gas container, the underside of which is shaped as a supporting plane. This secures for the craft a means whereby the same may remain in the air after the gas may have escaped from the container, and also a means whereby the ship may remain in the air for a long period of time after the motive power has been cut off. Thus it is evident that damage to either a motor or to a gas container may be done without disabling the craft. Preferably I make use of a plurality of gas containers arranged in a plurality of rows, one above the other, and each provided with a plane supporting surface on its underside, the result being that for each row of containers there is an aggregate plane supporting surface of large area. By using a plurality of containers, I adapt the air craft of my invention for portation, and ready assemblage and raising, and lowering and disassemblage.

An improved steering means secures for the air craft of my invention a flexibility of control which is equal to that of the best of the heavier than air craft in use today. The steering means which I employ comprises a plurality of obliquely mounted steering vanes on each side of the craft and means for operating them in groups.

In the accompanying drawings, I show a specific embodiment of my invention.

Referring to the drawings:—Figure 1 is a side elevation of the craft of my invention; Fig. 2 is a rear end elevation of the same; Fig. 3 is a cross section of one of the gas containers; Fig. 4 is a cross-section of a modified form; Fig. 5 is a detail of the means connecting them together; Fig. 6 is a view of a fastener used for connecting the gas bags together; Fig. 7 is a detail of the car of the air craft; Fig. 8 is a side eleva-

tion of a steering apparatus on one side of the craft; and Figs. 9 to 12 inclusive are diagrammatic views of the steering apparatus in its several positions.

10 are the gas containers of which there are in this embodiment twelve arranged in three rows of four each. Each container is rectangular in cross section and has its ends pointed wedge shape, and is formed with a supporting frame or shell 11 of aluminium, or other light metal or fiber, and an inner gas bag of silk or other suitable material 12 (see Fig. 3). The metallic shell or framework may be varied in structural form depending upon circumstances. In Fig. 4 there is shown a modified form, the supporting frame 11 being inside of the gas bag 12 instead of outside, and being formed as lattice work of stamped material. The under or bottom side 13 of each of the containers is curved in the direction of flight of the machine, as clearly shown in Fig. 1, and shaped in accordance with the rules used for shaping the supporting planes of heavier than air machines. It will be noted that for each row there is an aggregate supporting surface of a large area. This surface may be made of such an area that the craft may be supported by it alone without the assistance of gas in the containers, and the capacity of the containers may be made such that they will hold enough gas to support the machine when it is not being propelled. This proportion may be varied at will, and in war crafts it is preferred that they be made as specified. Each container is provided with a plurality of straps 14 extending from each corner of the container. Preferably these straps are formed as shown by a continuous strip of material passed entirely around the container (see Fig. 2) and looped at the corners. Each of these straps is provided with a square link 15 (see Fig. 5) the ends of which are extended outwardly to form offset portions. Between the straps and secured to the sides of the containers are diagonal supporting cords 16 which extend diagonally between the links 15 of each container. I may use stiff light braces instead of cords. The straps and cords are of such length that each is drawn taut when in the extended position shown in Figs. 1 and 2. The containers are connected to each other and in rows by snap rings or links 17 (see Figs. 3 and 6) which connect four adjacent links 15 when the containers are placed side by side. When so connected, the containers are greatly strengthened by the straps and cords, and are united and maintained in the battery formation shown, the cords of each container being then diagonal in continuation of each other. Cords 16^a are passed through eyelets 16^b in each strap on the tops of the containers and around each group

and tied to the frame of the car to hold the units of the groups close together. Other means may be devised for fastening the groups together.

Attached to the links 17 of the lowermost containers by detachable snap hooks 18 similar to the hooks 17, (see Fig. 1) is a car structure on which is mounted the propelling motor 20, and from which the craft is controlled. This car is a frame structure formed of light, strong materials and diagonally braced by struts 21. The longitudinal members 22 of this structure meet the transverse members 23, the vertical members 24 and diagonal members 21, as shown in detail in Fig. 7. It will be noted that the transverse members lap the vertical members on the inside, and that the longitudinal members 22 lap the vertical members on the outside of the corner and underneath the projected ends of the transverse members 23, while the diagonal members are located between the longitudinal members 22, and the end-most of them are braced at the foot against the projected ends of the transverse members 23, and against the intermediate vertical members 25 between the longitudinal members 22. The propellers, three in number in this case, are all journaled on the car, one directly connected to the motor 20 and the other two geared to it as shown. Suitable provision may be made for mounting these propellers in any desired relation to the gas containers or to each other.

Above the car and on each side of the air craft is a series of steering vanes 26 supported in a frame 27 carried by uprights 28 from the car. In this embodiment there are six of these vanes on each side of the craft. They are obliquely journaled in a vertical plane, the inclination of their journal axes being rearwardly (see Fig. 1). They are arranged in two groups of three on each side for independent operation. One group of three 27' on each side is arranged forwardly of the middle of the craft, while the other group of three 28' on each side of the machine is arranged aft of the middle of the craft. The vanes of each group of three are connected by cords 29 secured to them in such manner that they may be moved in unison in the same angular position, the cords being run through eyes 30 and pulleys 31 at each end of the group to operating pulls 32 suitably placed on the car. By pulling upon the cords leading to either end, the vanes of a group may be moved from and to the vertical plane in which they normally lie and may be given any angular position whatsoever. It will be noted that the frames 27 in which the vanes are mounted have an upward inclination at their forward ends. By this provision air is enabled to reach each vane, and each vane is thus made

active. When it is desired to steer the ship to the right the groups of vanes are turned as shown in Fig. 9 diagrammatically. That is, the forward right hand group 27' is turned outwardly and forwardly, while the left hand group 28' is turned outwardly to make same acute angle with the vertical plane as is made by the forwardly turned vanes 27'. The action of the air upon the vanes, as shown by the arrows, thus tends to turn the craft to the right. If desired the aft vanes 28' may be operated to position them oppositely to the forward vanes 27' as shown, and thus assist in the turning of the craft. A very abrupt turning about of the ship may be had in this manner. Of course the ship may be turned to the left in an entirely similar manner. If it is desired to point the ship upwardly the two aft groups of vanes 28' are given the extended position shown in Fig. 10, while the forward groups of vanes 27' are retained in their normal planes. The air acting on the inclined blades will move the stern of the craft downwardly and therefore point the prow upwardly. That this is true will appear when we consider the fact that the groups of vanes are on opposite sides of the middle of the craft and the turning moment therefore will be in a direction dependent upon the position of the particular groups of vanes actuated. On the other hand if it is desired to point the craft downwardly the front groups of vanes 27' are extended as shown in Fig. 11, while the aft groups of vanes 28' are maintained in normal position.

The craft may be steered to right or left at the same time that it is being pointed upwardly or downwardly. In Fig. 12 is shown diagrammatically the position of the vanes for causing the ship to point upwardly and to the right. The aft vanes 28' are extended outwardly as in Fig. 10, while the forward vanes 27' are positioned as in Fig. 9, making the same acute angle in opposite directions on opposite sides of the craft. A little inspection will show that a pointing of the craft downwardly may be brought about by positioning the vanes 27' as the vanes 28' are positioned and by positioning the vanes 28' as the vanes 27' are positioned.

It may be found desirable to drop the craft abruptly from an elevation and the steering means provided makes it possible to accomplish also this result. All of the vanes are moved to the same extended position as shown in Fig. 8. The rapid descent will depend upon the extent which the vanes are moved. If moved to a position at right angles to the normal vertical plane the descent will be very abrupt, while if moved from a vertical plane to an intermediate position the descent may be very gentle.

And thus it should be evident that by the simple provision of groups of vanes obliquely mounted I have provided for a most flexible use and rapid control of the craft of my invention. Of course, the flexibility of the vanes may be varied at will and should be varied according to circumstances. So also, the vanes may be hinged as shown, or may be made of flexible material and rigidly mounted, or mounted to turn in any other well known manner.

By virtue of the detachable connection of the gas containers with each other, the craft of my invention may be readily assembled and disassembled, and by virtue of its sectional or multiple construction is best adapted for portation. In disassembling the craft the car is first detached from the containers by removing the snap hooks 18, and thereafter the containers are detached one by one, the lowermost first by detaching the snap hook 17. In assembling the reverse operation is followed. The first containers filled with gas are raised, and thereafter others are attached in place and filled with gas, the craft being allowed to rise in the air as it is assembled. It is of course obvious that when disassembled the units of the car are such that they may be most readily transported from point to point.

While I have described in detail the one specific embodiment of my invention, which embodiment is the best known to me at the present time, I wish to have it understood that many modifications may be made without departing in any wise from its generic spirit, and I desire to cover in the annexed claims all such modifications.

What I claim is:—

1. In an air craft, a steering mechanism comprising a rectangular frame disposed vertically against each side of the craft and being inclined downwardly at its rear end, independent groups of planes hinged obliquely to the vertical axis of the craft in said frames, and independent operating means for each group of said planes whereby the latter are moved in different directions.

2. In an air craft, a steering mechanism comprising a frame disposed against the side of the craft and inclining downwardly toward one end of the craft, and a plurality of planes mounted in spaced relation in the frame.

3. In an air craft, a steering mechanism comprising a vertical frame for attachment at an angle against the side of the craft, and a plurality of planes mounted in the frame.

4. In an air craft, a steering mechanism comprising an inclined frame for attachment against the side of the craft, and a plurality of planes arranged in the frame and being consecutively spaced downwardly

whereby their lower ends lie in the direct path of the air currents.

5. In an air craft, a steering mechanism comprising a frame carried against the side of the craft and being inclined with respect to the length of the craft, and a plurality of planes hinged obliquely in the frame whereby said planes are disposed in the path of the air currents upon the vertical and the horizontal flight of the craft.

6. In an air craft, a steering mechanism comprising a plurality of longitudinally spaced planes carried at the side of the craft and being consecutively offset with respect to the length of the craft, whereby the planes are each disposed directly in the path of the air currents during the flight of the craft.

7. An air craft having a plurality of planes longitudinally spaced at the side of

the craft and being disposed obliquely and in offset relation, whereby each plane lies in the direct path of the air currents during the horizontal and the vertical flight of the craft.

8. In an air craft, a steering mechanism comprising a plurality of planes hinged obliquely with respect to the longitudinal axis of the craft and being consecutively offset from one another with respect to the length of the craft whereby a portion of each plane lies directly in the path of the air currents.

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

FREDERICK BRACKETT.

Witnesses:

ARTHUR L. BRYANT,
G. M. STUCKER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."