H. L. E. JOHNSON.

FLYING MACHINE.

APPLICATION FILED NOV. 7, 1912.

Patented Aug. 5, 1913.

1,069,138.

2 SHEETS—SHEET 1.

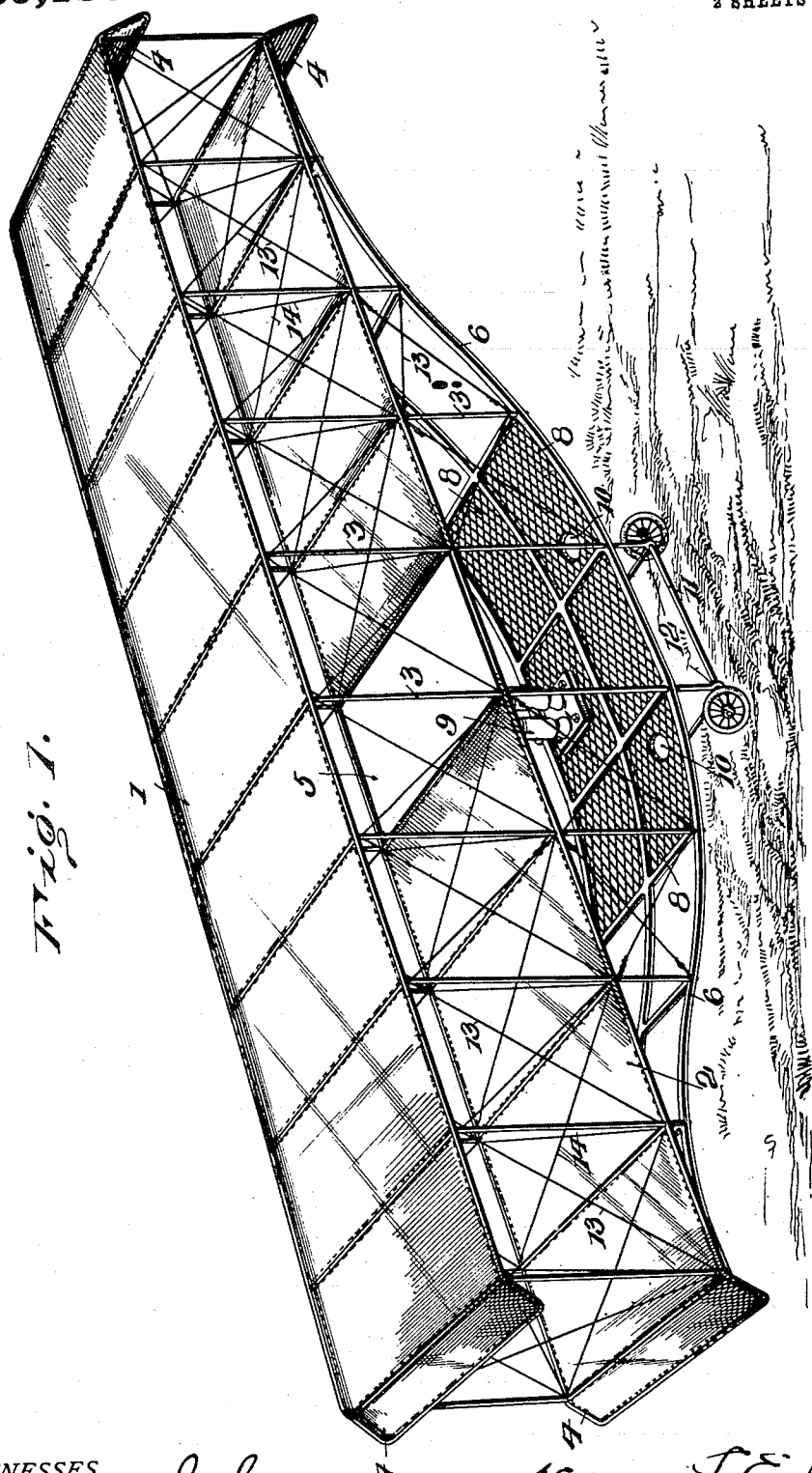

Fig. 1.

WITNESSES

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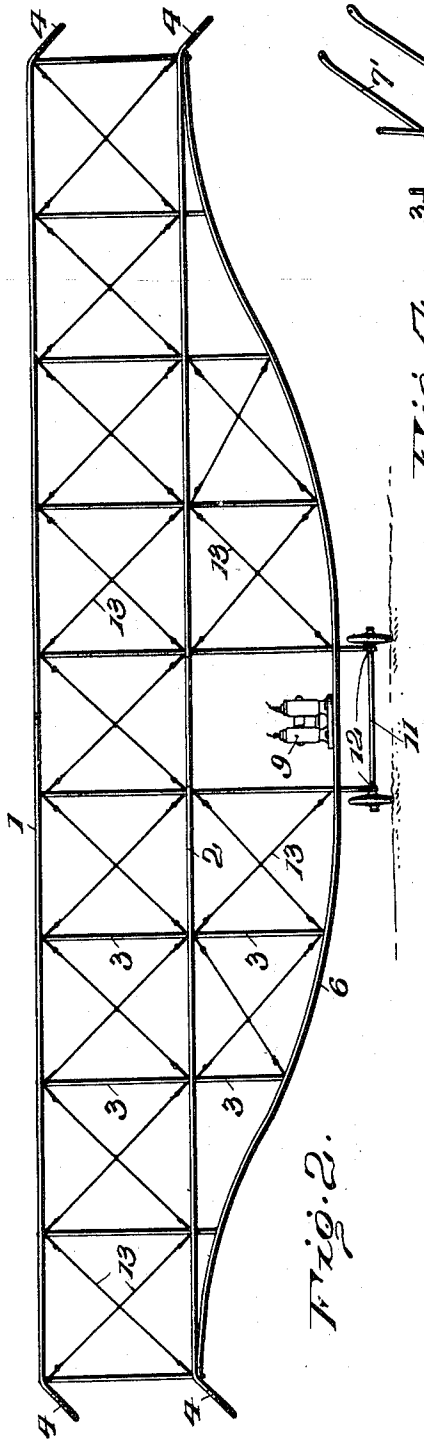

Fig. 2.

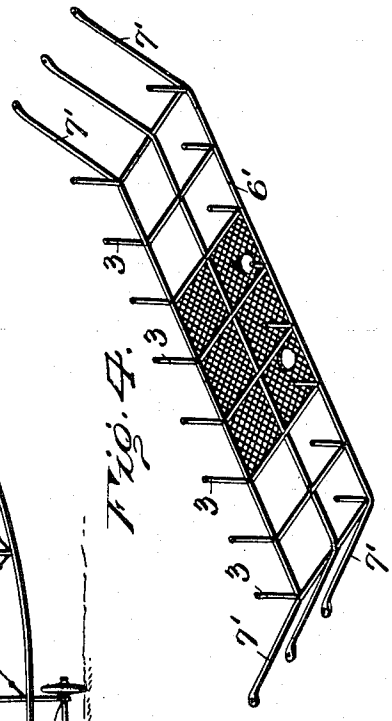

Fig. 4.

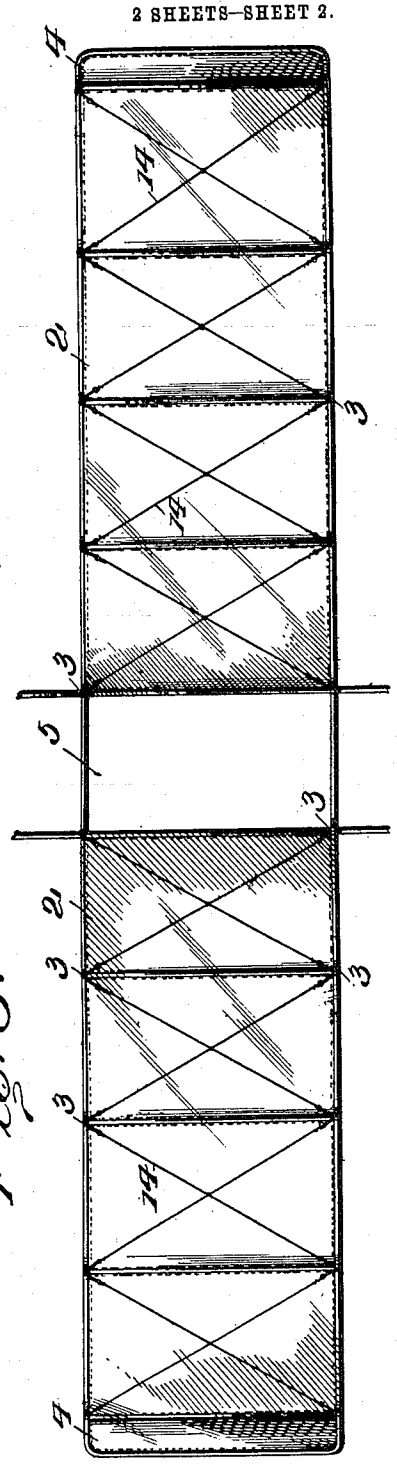

Fig. 3.

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UNITED STATES PATENT OFFICE.

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FLYING-MACHINE.

1,069,138. Specification of Letters Patent. Patented Aug. 5, 1913.

Application filed November 7, 1912. Serial No. 730,085.

To all whom it may concern:

Be it known that I, HENRY L. E. JOHNSON, of Washington, District of Columbia, have invented a new and useful Improvement in Flying-Machines, which invention is fully set forth in the following specification.

This invention relates to flying machines or aerodromes, and has for its object to provide a structure of this character which shall be safe, light, and at the same time of maximum strength, shall have a low center of gravity, and which shall, when in the air, and particularly when descending with the power of the engine cut off, possess great stability and parachute efficiency.

A further object of the invention is to improve such machines in certain other details of construction.

One prominent point of weakness in flying machines as heretofore constructed (in which the supporting surfaces extend for considerable distances on each side of the medial fore and aft line of the machine, and have a limited dimension from front to rear), resides in the fact that the lateral or "wing" portions of the machine are liable to be broken off from the central portion of the structure. This is due to the extended length of the wings laterally, and the consequent leverage.

One object of the invention is to locate the load below the aero-supporting surface, stiffen the structure as a whole, and support the lateral portions or "wings" of the machine, and this I accomplish by providing an inverted arch under the machine, which arch is rigidly secured at its ends to the outer portions of the wings, and is also tied at intervals along its length to the structure, preferably by means of vertical stanchions. Where a plurality of supporting surfaces are employed, the inverted arch is preferably tied to the structure by prolonging the vertical stanchions separating the aerial supporting surfaces from each other, until such stanchions reach and are united to the frame-work of the arch. This arch is preferably a frame-work so constructed that it in no way interferes with the supply of air to the under side of the lower supporting surface of the structure, though such frame-work may be, and preferably is, provided with a reticulated or net-work covering, which affords means for carrying the motor, the aviator, passengers and other freight, well below the aero-supporting surface, to the end that the center of gravity of the whole may be located as low as possible.

In machines as heretofore constructed, when the motor gets out of order, or is thrown out of operation, and the machine, losing its headway, begins to descend through the action of gravity, the lower supporting surface (where a plurality of supporting surfaces are employed) is the one to which the air offers the main resistance which prevents the machine from falling too rapidly, the other supporting surfaces of the machine being largely robbed of the supply of air whose resistance would otherwise enable them to perform this supporting function to the highest degree. This results in two objectionable features. In the first place, it provides the greatest support (resistance to the falling action) for the machine at a point very little, if any, above its center of gravity, and therefore materially lessens or diminishes or interferes with the stability of the machine as a whole. This results in a tendency of the machine to pitch forward, or rearward, or to either side, lose equilibrium and control, and fall to the earth. The second deleterious result of this action is found in the fact that only one of the supporting surfaces (the lower one) offers material resistance to the downward movement of the machine, the supporting surface or surfaces above the lower surface being rendered inefficient or less effective than they should be for this purpose.

By the present invention, I provide a central opening through the lower supporting surface, so as to permit a free upward movement of the air caught under the lower supporting surface during the descent of the machine, which air thus passes to the under part of the upper supporting surface. The result of this is coöperation of the two aero-supporting surfaces, and that the main and most efficient resistance to the downward movement of the machine is that offered by the upper supporting surface. This places the main supporting surface well above the center of gravity of the machine, and particularly is this the case when such machine is provided with the inverted arch carrying the engine, aviator and other weight below the lower supporting surface, with the consequent low center of gravity. In order to

still further increase the stability of the machine, to lessen or prevent air slip over the lateral ends; and to direct lateral currents of air inward and under the supporting surfaces thereof, I deflect the outer ends of the supporting surfaces downward at a suitable angle, the downwardly deflected portions, however, being rigid with the main supporting surface.

The inventive idea involved is capable of receiving a variety of mechanical expressions, and for the purpose of illustrating the invention, one of these is shown in the accompanying drawings, but it is to be expressly understood that the invention is not limited to the particular embodiment thereof shown in the drawings, reference being had to the claims and the specification for the purpose of defining the limits of the invention.

In said drawings—Figure 1 is a perspective view of one form which my invention may assume; Fig. 2 is a front elevation of Fig. 1; Fig. 3 is a plan view of the lower supporting surface; and Fig. 4 is a perspective view of a different form of supporting arch from that shown in Fig. 1.

Referring to these drawings, in which like reference numerals indicate like parts throughout the several views, 1 is an upper supporting surface, and 2 a lower supporting surface, which surfaces are composed of a suitable frame-work covered by any preferred or suitable material impervious to air. The surfaces 1 and 2 are connected at suitable intervals at the front and the rear of the machine by means of stanchions 3, and at the extreme ends of each of the surfaces 1 and 2, there are provided downwardly inclined parts 4. The frame of the upper surface 1 is covered throughout its extent with air-impervious fabric, while the lower surface 2 is so covered throughout the greater portion of its extent, but there is provided means whereby air may pass from the under side of this surface upward into the space between the two surfaces 1 and 2. In the particular form of the invention herein shown, such means are in the form of a central space or opening 5 in the frame-work of the lower surface, which is not covered with air-impervious fabric, but is left entirely open and unobstructed, to the end that air may freely pass therethrough upward to the under part of the surface 1.

Beneath the lower supporting surface 2, I provide a structure for stiffening and supporting the "wings" of the machine, which structure is here shown as in the form of an inverted arch 6. Preferably, this arch is struck on the lines of a compound curve, as shown in Figs. 1 and 2, in which only the middle portion of the arch is approximately parallel with the supporting surfaces above it, but if desired, this arch may receive the form shown in Fig. 4, in which the larger portion 6′ of the arch is approximately parallel with the supporting surfaces of the machine, and the lateral portions 7′, 7′, are inclined more sharply upward, and joined at their extremities to the outer portions of the wings of the lower supporting surface. Whichever form of arch is employed, the ends thereof are firmly secured to the outer portions of the frame-work of the wings or supporting surfaces, and also at intervals along the arch the same is securely trussed to the frame-work of the supporting surfaces, this preferably being accomplished by extending the stanchions 3 downward and securing them firmly to the arch, as clearly illustrated in Figs. 1 and 2. This arch 6 in some instances may be covered with an air-impervious fabric, but in the present instance it is shown as an open frame-work, and does not interfere with the free access of the air from beneath the same to the under side of the lowermost supporting surface 2. As a means, however, of enabling the engine, the aviator, passengers or freight to be carried on such arch, there may be, and preferably is, provided an open net-work 8, composed of heavy woven wire or other suitable material, which would afford a support for the engine, aviator, etc., without interfering with the free upward passage of the air therethrough to the under side of the lower supporting surface. This capability of the net-work is indicated in the drawings, by showing the engine 9 in position on such net-work. I also provide openings, as 10, 10, through the net-work, conveniently located for dropping bombs therethrough, this affording a more convenient and efficient means of dropping a bomb from the machine than for the operator to reach out over the forward or rearward edge of the machine.

The machine may be mounted upon any suitable chassis or other corresponding means for supporting it on the ground. As here shown, this takes the form of a chassis 11, and the stanchions 3, 3, on either side of the medial portion of the machine are preferably extended downward past the arch 6, and secured to the chassis 11, as at 12. This, however, is not essential, as any other suitable means for properly securing the chassis or other ground-support to the inverted arch may be employed. Of course, it will be understood that the frame-work of the machine as a whole and the inverted arch and the lower supporting surface are suitably trussed and stiffened by the usual or any preferred form of truss-wires, such as 13, 14, thereby serving to still further stiffen the structure.

It will be seen that the inverted arch affords an efficient means for bracing or strengthening the wing portions of the structure, and preventing the same from

breaking off, thus rendering possible all increased lateral extension of said portions; that it affords means for carrying the main weight imposed upon the machine at the very lowest point, thereby materially lowering the center of gravity of the machine as a whole; and in short, that it increases the safety of the machine by lowering the center of gravity to the maximum, strengthens the structure, permits increased wing-surface, affords large space for passengers, freight, etc., with great parachute efficiency, while at the same time it leaves an unobstructed view and with greater freedom of personal movement. Furthermore, it will be seen that, by reason of the opening 5 through the lower supporting surface, the efficiency of the upper supporting surface during the downward movement of the machine is maintained at the maximum, thus placing the main point of support at the highest possible point above the center of gravity of the structure as a whole, and to a high degree enhancing or adding to the stability of such structure. It will also be seen that the action of the rigid, downwardly inclined portions 4 of the supporting surfaces is to direct currents of air inward under the respective supporting surfaces, and thus still further add to the stability of the entire structure.

While, for the purpose of clearness in explaining the invention, the same has been herein described with considerable detail, it is to be expressly understood that the invention is not limited to the several details so specifically described, but that it is capable of variation and modification in form and proportions within the terms of the claims hereto appended.

Any suitable steering, elevating and depressing rudders, properly supported, may be employed, but as these do not form any part of the present invention, they are not shown herein.

What is claimed is:—

1. In a flying machine a plurality of superposed supporting surfaces, a supporting inverted arch structure under the lowermost supporting surface, means for securing the ends of the arch to the ends of the lowermost supporting surface, and means for rigidly securing said arch and supporting surfaces together.

2. In a flying machine a plurality of superposed supporting surfaces, a supporting inverted arch structure under the lowermost supporting surface, means for securing the ends of the arch to the ends of the lowermost supporting surface, and stanchions rigidly securing said arch and supporting surfaces together.

3. In a flying machine, a plurality of superposed supporting surfaces, a supporting structure under the lowermost supporting surface, said structure being in the form of an open inverted arch on which the operating mechanism and the aviator are carried, means securing the ends of said arch to the ends of the lowermost supporting surface, and means intermediate the ends of said arch rigidly securing said arch and supporting surfaces together.

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

HENRY L. E. JOHNSON.

Witnesses:
S. T. CAMERON,
W. E. KERKAM.