No. 757,012. PATENTED APR. 12, 1904.

A. G. BELL.

AERIAL VEHICLE.

APPLICATION FILED JUNE 1, 1903.

NO MODEL.

Fig. 1.

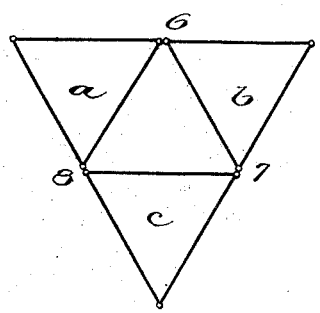


Fig. 2.

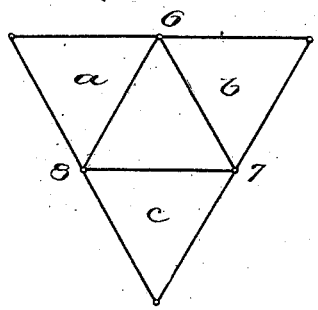


Fig. 3.

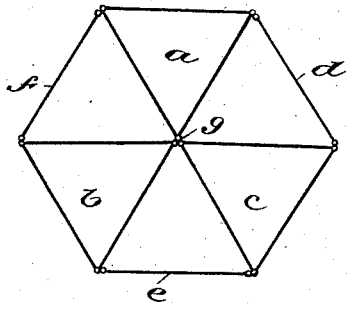


Fig. 4.

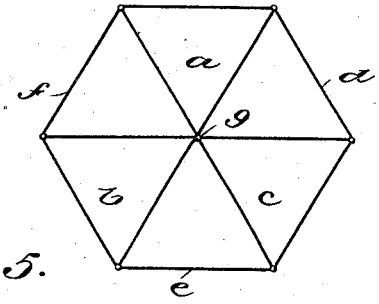
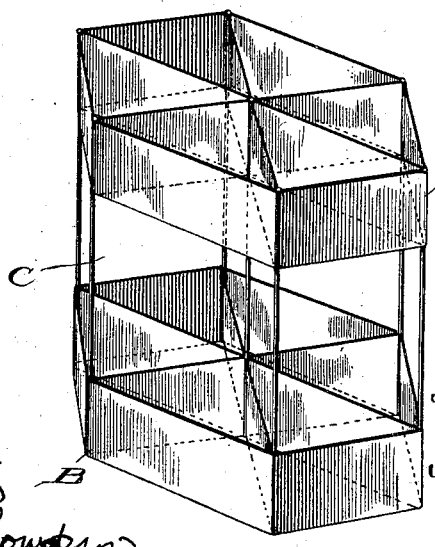


Fig. 5.



Witnesses

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No. 757,012. Patented April 12, 1904.

UNITED STATES PATENT OFFICE.

ALEXANDER GRAHAM BELL, OF WASHINGTON, DISTRICT OF COLUMBIA.

AERIAL VEHICLE.

SPECIFICATION forming part of Letters Patent No. 757,012, dated April 12, 1904.

Application filed June 1, 1903. Serial No. 159,557. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER GRAHAM BELL, of Washington, District of Columbia, have invented a new and useful Improvement in Aerial Vehicles, which invention is fully set forth in the following specification.

This invention has reference more particularly to the construction of aerial vehicles, and is based upon experiments conducted with kite structures.

Prior to this invention and largely through the investigations of Laurence Hargrave the advantages of the cellular box-kite have been made widely known. Although multicellular kites have been constructed upon the Hargrave principle, it has not been observed or pointed out that they possess any substantial advantage over a kite composed of two cells only.

The typical Hargrave kite is composed of two rectangular cells separated by a considerable space and connected together by a light framework, the cells being disposed in the same horizontal plane. A limit to the lifting power of such kites is quickly reached, since mere enlargement of the dimensions of the parts does not proportionately increase the lifting power. On the contrary, such enlargement increases the ratio of weight to surface exposed to the action of the wind, inasmuch as weight increases as the cube of the dimensions, while the surface increases only as the square of the dimensions. Furthermore, the rectangular cell is structurally weak and easily collapsed or distorted, giving rise to the necessity for internal bracing. This bracing adds to the dead load and (owing to the shape of the cell) is necessarily so disposed as to increase the resistance of the wind. These objections have been partly overcome by resorting to a triangular cell—that is to say, a cell of pentahedral form, triangular in cross-section, which is self-braced in the direction of its plane. In such a cell each oblique plane may be regarded as the resultant and equivalent of its horizontal and vertical components—*i. e.*, as presenting a supporting (horizontal) surface and a steadying (vertical) surface. It has heretofore been proposed to construct a kite or aerodrome composed of two such triangular cells separated by an open space, as in the Hargrave box-kite. This form of structure is subject to the law above referred to—namely, that an increase of dimensions increases the ratio of weight to surface. I have found, however, that advantageous results may be obtained by utilizing the triangular cell as a unit or element and building up structures of large size by combining a number of these units or elements. Triangular cells are specially adapted for combination into a compound structure in which the aeroplane-surfaces do not interfere with each other. Where the edges of two or three of the elements coincide, a single bar or stick will suffice, thus dispensing with the weight of one or two bars or sticks.

In the accompanying drawings, which form part of this specification, Figure 1 is a diagram representing an end view of a compound structure composed of triangular cells. Fig. 2 is a similar view illustrating the omission of the duplicate bars or sticks. Figs. 3 and 4 are similar diagrams illustrating a structure of hexagonal outline, and Fig. 5 is a perspective view illustrating the embodiment of the invention in a kite of hexagonal form.

In the forms illustrated by the drawings and in various other structural forms which may be compounded of triangular cells the latter are connected at their corners, so that two or more of the longitudinal rods coincide. Thus in Fig. 1 is illustrated a compound structure composed of three triangular elements *a b c*. It is obvious that where two sticks or bars come together, as at 6, 7, and 8, these may be replaced by a single stick or rod, as at 6, 7, and 8 of Fig. 2.

In Figs. 3 and 4 I have shown the three complete triangular cells connected together in such manner as to form, with the addition of three plane surfaces *d e f*, a hexagonal outline. The three coinciding bars or sticks at the center 9 in Fig. 3 are replaced by a single bar or stick in Fig. 4.

Fig. 5 shows in perspective (the structure standing on end) a kite of hexagonal form composed of elements triangular in cross-section. This compound kite is composed of two hexagonal cells A and B, separated by a space C,

the interspace being an important feature of kites constructed on this principle. Obviously the principle may be extended in building up kites composed of a greater number of compound cells separated by intervening spaces, as shown in the drawings.

Experiment has shown that kites constructed as illustrated in Fig. 5 possess remarkable buoyancy and great steadiness of flight.

In carrying out the invention it will be obvious that the triangular elements can be combined into structures of various outlines, those illustrated and described being given merely by way of example.

Having now fully described my said invention, what I claim is—

1. A compound cellular aerial vehicle composed of pentahedral elements triangular in cross-section so disposed as to have meeting corners and connected at said corners.

2. An aerial vehicle composed of elements triangular in cross-section so disposed as to have meeting corners or edges at which they are connected and having a single bar or stick at the meeting edges of two elements.

3. An aerial vehicle comprising cellular elements triangular in cross-section, combined to form a structure of hexagonal outline, and provided with covered surfaces.

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

ALEXANDER GRAHAM BELL.

Witnesses:

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