

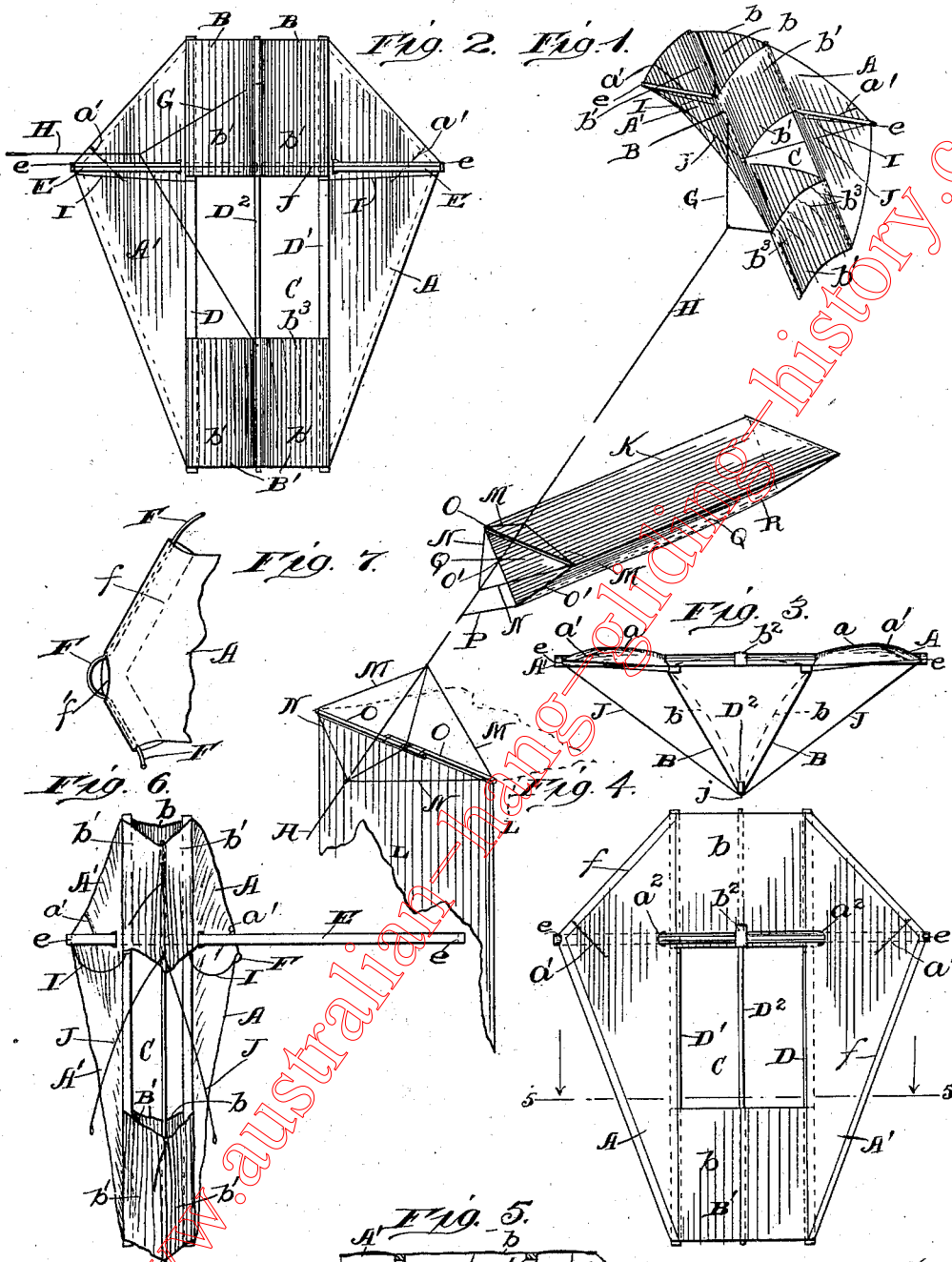
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S. J. CONYNE.  
AEROPLANE.

(Application filed July 15, 1901.)

(No Model.)



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# UNITED STATES PATENT OFFICE.

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## AEROPLANE.

SPECIFICATION forming part of Letters Patent No. 698,634, dated April 29, 1902.

Application filed July 15, 1901. Serial No. 88,408. (No model.)

*To all whom it may concern:*

Be it known that I, SILAS J. CONYNE, a citizen of the United States, residing at Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Aeroplanes, of which the following, when taken in connection with the drawings accompanying and forming a part hereof, is a full and complete specification, sufficient to enable those skilled in the art to which it pertains to understand, make, and use the same.

This invention relates particularly to an aeroplane designed to be held captive and to be used with aerial advertising apparatus, although such aeroplane may be used for amusement only, if desired; and the object of the invention is to obtain a collapsible aeroplane of great durability constructed of few parts and but one thereof (a cross stick or rod) loose or removable from the remainder of the aeroplane and such loose or removable rod or stick attached in place to the remainder of the aeroplane in a manner easily accomplished by persons not familiar with the art.

A further object of the invention is to obtain a collapsible aeroplane not liable to get out of order, the strain upon the several parts being distributed over the entire surface of the construction, with stay lines and trusses entering into such construction in a manner tending to preserve the shape and form of the aeroplane.

A further object of the invention is to obtain an aeroplane having lifting power, the aeroplane itself being light—that is, not of great weight—so that a large advertising apparatus may be raised and supported thereby.

A further object of the invention is to obtain an aeroplane having but little wind resistance when the same is raised, so as to render it unnecessary to employ a heavy cord or twine to hold it captive when in use to support an advertising apparatus.

A further object of the invention is to obtain a slightly aeroplane and one presenting a pleasing appearance when in the air.

In the drawings accompanying and forming a part of this specification, and wherein a reference-letter applied to designate a given part is used to indicate such part throughout the several figures of the drawings wherever the same appear, Figure 1 is an aeroplane

viewed in perspective as supported in the air by the atmosphere and held captive by a string or cord, on which string or cord advertising apparatus are attached and by which such advertising apparatus is suspended or supported. Fig. 2 is a front plan view of the aeroplane of the apparatus with the string or cord by which it is held captive attached thereto and drawn to one side to show the manner of such attachment. Fig. 3 is a front elevation of the aeroplane forming part of this apparatus. Fig. 4 is a rear plan view of such aeroplane. Fig. 5 is a sectional view on line 5 5 of Fig. 4, viewed in the direction indicated by the arrows. Fig. 6 is a front plan view of the aeroplane with the loose stick or rod thereof partially withdrawn therefrom and such aeroplane partially collapsed; and Fig. 7 is an elevation, on an enlarged scale, of a portion of one of the wings of the aeroplane at the point thereof where one end of the removable stick or rod of the aeroplane engages with one of the corners of such aeroplane.

A A are the right and left hand wings of the aeroplane.

B B' are triangular trusses separated from each other by open space C and held in proper relative position to each other and to the wings A A' by sticks D D' D<sup>2</sup>.

E is the cross-stick of the aeroplane, engaging at its ends with the cord F and removable from the aeroplane by detaching it from such cord. Cord F extends from one end of the sticks D D', respectively, over the ends of cross-stick E and to the other end of such sticks D D', passing through slots e e at the end of stick E.

G is the bridle-line of the aeroplane, and H is the string or cord by which the aeroplane is held captive and on which are supported advertising-banners, as K and L, of the apparatus.

The wings A A' at the widest part thereof—that is, where the stick E extends across such wings to maintain them extended—should be about one-fourth of the length of the aeroplane.

The relative length of the several parts of the aeroplane, in my opinion, varies the effectiveness of such aeroplane as a lifting apparatus, and as I propose to use this aeroplane principally for the purpose of lifting banners

containing advertising matter I consider the lifting capacity of the aeroplane essential, and I will therefore give the comparative lengths which I have found most effective therefor.

Assuming the length of the aeroplane to be ten, the length of the triangular trusses  $B B'$  on the several sticks  $D D' D^2$  should be substantially three, and the length of the open space  $C$  between such triangular trusses  $B B'$  should be substantially four. The width of the aeroplane at stick  $E$  should be substantially eight, and the width of the wings  $A A'$ , respectively, on stick  $E$  should be substantially 2.5, leaving the width of the open space  $C$ , as three, such open space being rectangular and substantially four in length to three in width.

One end of the bridle  $G$  should be attached to stick  $D^2$  at about one-third of the distance from the upper of the truss  $B$  to the lower end of such truss—that is, at about one-tenth the distance from the upper end of stick  $D^2$ —and the other end of such bridle should be attached to stick  $D^2$  at about seven-tenths of the distance from the upper end thereof toward the bottom. I have further found in practice that I obtain greater lifting power by constructing such wings so as to obtain an upward bellying of the fabric thereof, as is indicated by reference-letter  $a a$  in Fig. 3, and this upward bellying may be obtained by making the goring or seaming indicated at  $a'$  in Figs. 1, 2, 3, 4, and 6. In practice I find that where the wings  $A A'$  are constructed to obtain the bellying last above referred to the cross-stick  $E$  may and properly should be placed on the under side of such wings. To obtain the greatest lifting power to the plane  $b$  of the truss  $B$ , such cross-stick  $E$  should be placed back of such plane  $b$ , leaving the under and forward surface thereof smooth. The trusses  $B B'$  are respectively constructed to obtain the three duplicate planes  $b b' b'$ , each of which is substantially square. Plane  $b$  extends between sticks  $D D'$  in substantially the same plane as wings  $A A'$  extend.

In large aeroplanes I place the loop or pocket  $b^2$  on the upper side of the plane  $b$ , through which loop the stick  $E$  passes to maintain such plane closely to such stick.  $a^2 a^2$  are apertures through wings  $A A'$ , through which apertures the stick  $E$  is placed to obtain the construction last above recited. I have further found in practice that by constructing the aeroplane  $B'$  with the forward edges of the several planes  $b b' b'$  slightly longer than the rear edges of such planes a fluttering action will be obtained, which, in my opinion, increases the lifting power of the aeroplane, and I therefore prefer to construct the truss  $B'$  with the forward edges of the several planes thereof slightly longer than the rear edges—as, say, one one-hundredth longer. A wavy motion is thus obtained to the several planes of the truss  $B'$ , particularly to the forward ends thereof, as is indicated in

Figs. 1 and 2 of the drawings by the lines marked  $b^2 b^3$  and as is also shown in Fig. 5 of the drawings.

I are trusses extending, respectively, from the ends of the stick  $E$  to the adjacent one of the parallel sticks  $D D'$ , and  $J J$  are trusses extending from the ends of the stick  $E$  to stick  $D^2$ . Trusses  $J J$  may consist of a single cord passing through a loop or eye, Fig. 3, on stick  $D^2$  and attached at its ends to the ends  $f$  of the stick  $E$ .

The cords  $F F$  are respectively secured to the edges of the wings  $A A'$  by turning or hemming such wings over thereonto, as is illustrated in Fig. 7 of the drawings, the broken line  $f$  being the boundary of such hem. The hemming of the wings  $A A'$  is cut away at the corners (see Fig. 7) to permit stick  $E$  to pass therethrough and engage with the cord  $F$ , as at  $f'$ .

Bridle  $G$  comprises parts  $g g'$ , and the relative length of such parts is such as to obtain a right angle thereto at the junction of the line  $H$  to such bridle.

The banners  $K L$  may be attached to the string or cord  $H$  by means of a cradle consisting of string or cord  $M M$  and  $N N$  and stick  $O$ , such string or cord extending, respectively, from cord  $H$  to the ends of stick  $O$ .

The banner  $K$ , which is triangular in cross-section, has additional sticks  $O' O'$  at the end thereof adjacent to cord or string  $H$ . Sticks  $O O' O'$  are connected together at their ends, and the additional cord  $P$  is extended from cord  $H$  to the lower angle of the triangle formed by such sticks.

To take the aeroplane of the apparatus down and roll it up for shipment or other purpose, it is simply necessary to disengage one end of the stick  $E$  from one of the cords  $F$  and withdraw such stick (see Fig. 6) from the remaining parts of such aeroplane and then to roll such remaining parts around the sticks  $D D' D^2$ , as the wings and trusses are made of flexible material, preferably cloth. The stick  $E$  may also be rolled up with the remaining parts of the aeroplane by placing it parallel with sticks  $D D' D^2$ .

The manner of operation of the apparatus embodying this invention is as follows: The aeroplane, attached to string or cord  $H$  by means of bridle  $G$ , as hereinbefore described, is made to float or fly by holding it in such position that the wind (there must be wind to fly the aeroplane) will blow toward and against the under side thereof. Cord or string  $H$  may be gradually paid out until the aeroplane is sufficiently high to avoid surface and conflicting winds—as, say, a few hundred feet. Either of the banners  $K L$  may be attached to cord  $H$  in the manner heretofore described, and more of such cord then paid out until the banner is at the desired height. When the relative size of the aeroplane and the banners  $K L$  permit, in view of the velocity of the wind which is blowing at the time, banners  $K L$  may be attached, successively, to the string

or cord H in the manner illustrated in Fig. 1 of the drawings. When the aeroplane is flying, as above described, the several planes  $b'$  of trusses B B' are forced inward to near the curve indicated by broken lines in Fig. 3 of the drawings. Air striking planes  $b'$  of trusses B B' is directed underneath the wings A A', and such air, together with the air coming directly against the under side of such wings, tends to force the wings upward, and, because of the construction of such wings, as hereinbefore described, the same are bellied into substantially the position illustrated in Fig. 3 of the drawings, such wings being thereby lifted off of cross-stick E, and such cross-stick does not, therefore, become a material obstruction to the flying of the aeroplane. The air on the under side of the bellying wings A A' and traveling longitudinally along such wings materially assists in giving great stability and lifting power to the aeroplane. In case of uneven shrinkage of the fabric of the wings A A' the trusses I I maintain stick E, so that the widths of the wings are substantially even, and the aeroplane therefore flies evenly or on an even keel, the planes  $b'$  of the trusses B B' constituting what may be termed the "body" part of the aeroplane and stick D<sup>2</sup> the "keel" thereof. Air entering the forward end of the trusses B B', respectively, comes against the under or forward side of the planes  $b$  of such trusses and tends to lift the same in addition to the lifting effect of the air striking the under side of the wings A A' and planes  $b$ . The constant fluttering of the planes  $b'$  of the truss B', in my opinion, also adds to the lifting power of the aeroplane, and in making an aeroplane where the lifting power is not desired—as, for amusement—such planes are constructed rectangular in shape, so as to be drawn taut in flying the aeroplane in the same manner as are the planes of truss B.

The sticks D, D', D<sup>2</sup>, and E may be made of wood or of metal tubes, preferably aluminium, and of any desired shape in cross-section, although I prefer to have them square, with the upper side of stick E rounded.

I prefer to attach the wings A A' and trusses B B' to sticks D D' D<sup>2</sup>, respectively, by tacks or rivets.

Having thus described my invention and the construction of an apparatus embodying the same, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, in an aeroplane, of a plurality of longitudinally-extending parallel sticks, triangular trusses, consisting of a forward and a rear truss separated by an open space, uniting such sticks, longitudinally-extending wings on the sides of the trusses and constituting an extension of one of the planes of the trusses, a removable stick at right angles to the remaining sticks, such removable stick when in operative position maintaining the wings and the upper plane of the trian-

gular trusses in operative position, and a bridle attached to the remaining one of the parallel sticks and holding the remaining planes of the trusses in operative position when a cord holding the aeroplane captive in the air is attached thereto; substantially as described.

2. The combination, in an aeroplane, of a plurality of parallel sticks, triangular trusses uniting such sticks, such trusses positioned to obtain an open space between them, wings attached to two of the parallel sticks, means to obtain an upward bellying to the wings, respectively, when such wings are in an operative position, a removable stick at right angles to the parallel sticks and in contact with the ones thereof in the plane of the wings, such removable stick, when in operative position maintaining the wings and the plane of the truss between such wings in operative position, a bridle consisting of a cord attached to the one of the parallel sticks not adjacent to the wings, and a cord to hold the aeroplane captive attached to the bridle, such bridle proportioned to obtain a substantial right angle at the point of attachment thereof of the cord holding the aeroplane captive; substantially as described.

3. The combination, in an aeroplane, of a plurality of parallel sticks, triangular trusses uniting such sticks, such trusses positioned to obtain an open space between them, wings attached to two of the parallel sticks, means to obtain an upward bellying to the wings, respectively, when such wings are in an operative position, cords attached, respectively to the ends of the two of the parallel sticks to which the wings are attached and extending around the outer edges of the wings, a removable stick at right angles to the parallel sticks and in contact with the ones thereof in the plane of the wings, such removable stick, when in operative position, maintaining the wings and the plane of the trusses between such wings in operative position, cords attached to the ends of the removable stick, when the same is in operative position, and to the sticks to which the wings are attached, respectively, and an additional cord attached to the ends of the removable stick and extending to the one of the parallel sticks not attached to the wings, a bridle attached to the last-named one of the parallel sticks, and a cord to hold the aeroplane captive attached to the bridle; substantially as described.

4. The combination in an aeroplane, of a plurality of parallel sticks, triangular trusses uniting such sticks, such trusses positioned to obtain an open space between them, wings attached to two of the parallel sticks and a bridle attached to the remaining one of such parallel sticks, means to hold the wings and the plane of the trusses between the wings in an operative position and a cord attached to the bridle to hold the aeroplane, obtained by the combination of trusses and wings, captive; substantially as described.

5. The combination, in an aeroplane of a

plurality of parallel sticks, triangular trusses uniting such sticks, such trusses positioned to obtain an open space between them, wings attached to two of the parallel sticks, means  
5 to obtain an upward bellying to the wings, respectively, when such wings are in an operative position, a stick at right angles to the parallel sticks and in contact with the ones thereof in the plane of the wings, such last-  
10 named stick, when in operative position maintaining the wings and the planes of the trusses between the wings in operative position, means to obtain a fullness to the forward part

of the rear truss, whereby a fluttering movement in the several planes of the truss is ob- 15  
tained when the aeroplane is in the air, a bridle attached to the one of the parallel sticks which is not adjacent to the wings, and a cord to hold the aeroplane captive attached to such  
20 bridle; substantially as described.

Signed this 11th day of July at Chicago,  
county of Cook, and State of Illinois.

SILAS J. CONYNE.

In presence of—

CHARLES TURNER BROWN,  
CORA A. ADAMS.

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