MODEL AIRPLANE GLIDER

FIG. 1

FIG. 2

FIG. 3

FIG. 4

FIG. 5

FIG. 6

FIG. 7

FIG. 8

FIG. 9

FIG. 10

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This invention relates to the class of model airplanes which are practicable in the sense that they will fly or glide when thrown horizontally in the air. Its object is to provide model airplanes of this type, which can be made in various sizes and can be used for instruction in the principles of airplane flight and design, as well as for the amusement and entertainment of possessors. A further object is to enable such practicable glider planes to be constructed of a minimum number of parts, which can be packed in disassembled condition for shipment and preservation to purchasers, and can be assembled in condition for flying with the utmost ease and almost complete elimination of any liability to wrong assembling.

Another object is to make the assembled plane firm in the relationship of its several parts to one another, and yet with enough flexibility to eliminate substantially all danger of breakage of parts on striking an obstacle when in flight or in falling to the ground.

In the accomplishment of these objects, airplanes embodying the principles of this invention are made of a minimum number of parts, separately connected together, with provision for relative adjustments of wings and body, and with elastic tie members or binders as means for securing the body and wings together.

In the drawings which accompany this specification I have shown certain airplane gliders which embody the principles of the invention, but without attempting to show all of the forms and constructions in which such principles may be contained.

In the drawings:

Fig. 1 is a plan view of one such model airplane;

Fig. 2 is a perspective exploded view of all of the parts, except the elastic tie members, separated from one another but in the vicinity of the positions which they respectively take when assembled;

Fig. 3 is a perspective view and Fig. 4 an elevation or edge view of the wings and struts of the airplane model in knocked-down condition for packaging;

Fig. 5 is a perspective view and Fig. 6 an elevation of the wings and struts in their erected position and in the course of being assembled with the body of the airplane;

Fig. 7 is a perspective view of a form of strut alternative to those illustrated in the preceding figures;

Fig. 8 is a perspective view of the wing tips of a model triplane in assembled relation with two struts such as that shown in Fig. 7;

Fig. 9 is a fragmentary sectional view of the wing tips and struts shown in Fig. 8;

Fig. 10 is a fragmentary view similar to Fig. 9 showing a further alternative form of strut;

Fig. 11 is an exploded perspective view of another embodiment of the invention illustrating a further modification in form and assembly of wings and struts;

Fig. 12 is a plan view of the contiguous parts of the body and wings, and the strut, shown in Fig. 11, in their assembled relationship;

Fig. 13 is a side elevation of the last mentioned airplane partly in section on line 13—13 of Fig. 12;

Fig. 14 is a sectional elevation taken on line 14—14 of Fig. 13;

Fig. 15 is a perspective view of a body such as shown in the preceding figures with a variation of the tail end structure.

Like reference characters designate the same parts wherever they occur in all the figures.

In Figs. 1—6 a model biplane glider is shown composed of a body a, upper and lower wings b and c H-shaped, wing struts or separators d and e, a tail stabilizer vane f and a rudder vane g. The body a is a bar or beam of suitable length having a longitudinal slot k extending through it from side to side in a location between its ends, and having also a notch j and a groove k in its tail end. The notch j extends inward from the tail end on a forward and downward inclination and extends laterally from side to side of the body. The groove k is in the upper side of the body, extends longitudinally thereof, and its depth is less than the height dimension or thickness of the body. A nose weight l is applied to the forward end of the body. It is conveniently, and preferably, made of a strip of thin sheet steel bent in the middle into U form so that it may embrace and frictionally grip the body.

When assembled, the lower wing c is placed in the slot k so that it extends transversely of the body and to equal distances therefrom, the struts d and e are mounted on the upper surface of the wing c, in parallel, extending fore and aft, and the upper wing is placed on the struts. These latter are formed with projections or extremities d', d', d', d' and d'; e', e', e' and e', respectively at opposite ends and adjacent to their lower and upper edges, which are longer than the wings so that they extend beyond the leading and trailing edges of the wings when
assembled. They are tied to the means by means of elastic endless rubber bands, of which three are shown in these drawings and are designated \( n \), o, and p. The bands n and o extend over the upper side of the wing and their end loops pass under the projections \( d' \) and \( d' \) of strut \( d \) and projections \( e' \) and \( c' \) of strut \( c \). The band \( p \) passes under the wing \( c \) and its end loops are brought over the projections \( d' \) and \( d' \) of strut \( d \). A fourth band, similar to the band \( p \), is passed under the wing \( c \) and looped over the strut projections \( e' \) and \( c' \) when the plane is fully assembled.

The stabilizer vane \( f \) is assembled with the body by being placed in the notch \( j \), and the rudder vane is connected by being inserted at one of its ends in the groove \( k \).

Preferably all of the parts of the model airplane, except the nose weight and the elastic tie bands, are made of wood for adequate strength and stiffness combined with light weight. In the case of small models, leather is used. This, however, is not an essentially limiting factor of the invention, since I may use any other material or selection of different materials, which combine adequate strength, resilience, and balance of stiffness and flexibility with sufficiently light weight.

The wings and vanes are thin slabs of the material, while the body and struts are substantially thicker and stiffer.

The widths of the slots \( h \) and \( j \) and groove \( k \) are made slightly less than the thickness of the wing and vanes which they are designed to receive, but not so much less as to prevent entrance of these members or to make entrance difficult. In other words, the bounding sides of the slots and groove are slightly spread apart by the entering wing and vanes, and exert pressure on the latter to hold them firmly enough to prevent their displacement when the plane is launched in flight.

An important factor is that the slot \( h \) is longer than the wing \( c \) in the fore and aft dimension of the plane, the relationship being substantially like that of the body, slot and lower wing represented in Figs. 11 and 13. This permits the wing and body to be relatively adjusted lengthwise and affords scope for the observation and study of the influence on flight of different conditions of balance and relationship between the parts. It was previously stated that one of the objects of the invention is to facilitate assembly by the purchaser who receives the article in disassembled condition. The struts and elastic tie members here described accomplish that object. Both struts are connected to the upper wing, and one of them to the lower wing, by three elastic bands, and the struts are laid down flatwise on the lower wing, as shown in Figs. 3 and 4. They are packed in that condition with the disassembled body, stabilizer vane and tail vane in a compact package. When removed from the package, the struts are erected without disconnection from the wings, as shown by Figs. 5 and 6; one end of the lower wing is passed through the slot \( h \) in the body, and the body is slipped over it past the strut \( c \), the elasticity of the binder tie \( p \) allowing the wing to be separated from the strut. Then an elastic band is interengaged with the wing and the strut \( c \) in the same way that the band \( p \) is assembled. Finally the vanes \( f \) and \( g \) are placed in their respective grooves. A sufficient thickness is given to the struts, at least at the edges which bear on the wings, to afford stability when erected.

A variant form of strut is shown at \( q \) in Fig. 7. This strut is designed to be placed between two wings and tied by an elastic band encircling it and the adjacent wings. The strut is longer than the wings and is furnished with grooves \( q' \) and \( c' \) and bounding flanges in its forward and rear edges to contain the elastic band so that the flanges embrace the band and hold it in place. One such strut can be thus secured between the wings of two central struts or more struts in a column between three or more wings of a multiplane construction. Figs. 8 and 9 show a triplane where the strut \( q \) is located between the bottom wing \( c \) and an intermediate wing \( b' \), while a similar strut \( r \) is located between the intermediate wing and a top wing \( b'' \). An elastic tie band \( n' \) encircles the entire assemblage of wings and struts.

The struts previously described are rectangular. This is not an essential condition however, and I have shown in Fig. 10 a strut \( b \) of rhomboidal form. Such rhomboidal struts can hold the wings of a biplane or multiplane structure in rearwardly or forwardly stepped relation. Struts provided with projections for engagement with the loops of rubber bands, like those shown in Fig. 1, can also be of rhomboidal form.

A further variation is shown in Figs. 11-14, wherein a single strut \( t \), located at the axis of the airplane, is substituted for the struts previously described, which are located at opposite sides of the axis. The single central strut is a solid block wider than the body member and is provided with a central groove in one of its edges which is adapted to receive the upper edge of the body and is bounded by flanges \( u \) which are spaced apart suitably to exert a light gripping pressure on the opposite sides of the body. These flanges both centralize the strut and prevent it from tipping over when engaged with the body. The two opposite edges, or all four edges (as shown in this illustration), may be provided with such grooves, whereby the struts may be mounted with either long edge upward.

The wings, vanes and body of the airplane here shown are of one piece, as first described, except in details of dimensions and proportions, and are designated by the same reference letters modified by an exponent. The wings and body are tied together by an endless elastic band \( w \) which passes over the upper wing \( b' \) and the loops of which pass around the body. The grooves in the upper and forward and rear edges of the strut receive the band, where it passes over the edges of the wing \( b' \), and centralize it. Downward force exerted by the band on the strut causes the edges of its flanges \( n \) to press on the upper side of the lower wing and thereby exert frictional pressure of the wing against the lower edge of the slot \( h' \). To permit this action, the groove between such flanges is made deeper than the height of the body above the upper boundary of the groove. Thus the band augments the gripping effect of the body on the lower wing, and may be relied on for holding the wing in position. If, in any specific article, the slot \( h' \) should be too wide to cause gripping of the wing by the body material itself.

Figs. 11 and 13 show plainly that the slot \( h' \) in the body is substantially longer than the lower wing \( c' \). This is the same condition as that mentioned at an earlier point in this specification with reference to the model shown in Figs. 1-4, carried to a further degree. It enables the wings
to be adjusted fore and aft through a considerable extent.

The rudder vanes of any airplane model embodying this invention may be integral with the body instead of being made as a separate piece detachably mounted, and Fig. 15 shows a body having such an integral rudder vane $g$.

By virtue of the construction described, the airplane is not only easily assembled and adjustable for elementary instruction in airplane design, but it is also safeguarded against destruction by striking obstacles when in rapid flight or falling swiftly to the ground. If a wing tip or either of the guide vanes should strike hard against an unyielding obstacle, it can give way and be displaced without being broken. Yet at the same time the frictional grip afforded by the walls of the slots and the elastic tie bands holds the wings and vanes in such firm connection with the body that they are not deranged by air resistance when suddenly thrown into the air, or even by light contact with rigid objects. The body and struts, however, are made sufficiently thick and strong to stand heavy shocks without being broken.

What I claim is:

1. A model airplane consisting of a body and a wing assembly, said body having a transverse slot extending from side to side in its mid length portion, said wing assembly consisting of upper and lower wings and at least one connecting strut for maintaining said wings in spaced relation, said lower wing being frictionally engaged in said slot and projecting from both sides of said body, said slot being longer than the width of the lower wing, whereby said wing assembly as a unit can be adjustably displaced lengthwise of said body.

2. A model airplane as in claim 1, said strut having free bearing engagement with the lower surface of the upper wing and the upper surface of the lower wing.

3. A model airplane as in claim 1, said wing assembly including two H-shaped struts having their side edges in free bearing engagement with the wings, and elastic bands engaging said wings and struts to hold them in assembled relation.

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REFERENCES CITED

The following references are of record in the file of this patent:

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<th>United States Patents</th>
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<tr>
<td>Number</td>
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<tr>
<td>1,315,849</td>
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<td>1,381,080</td>
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