April 2, 1940. H. B. DANIEL 2,195,695

MODEL AIRPLANE

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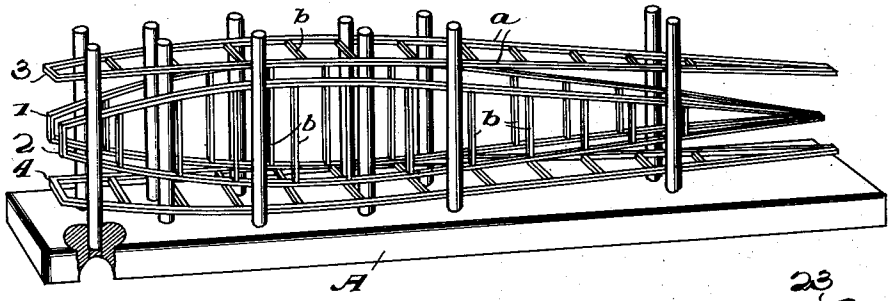


Fig. 1.

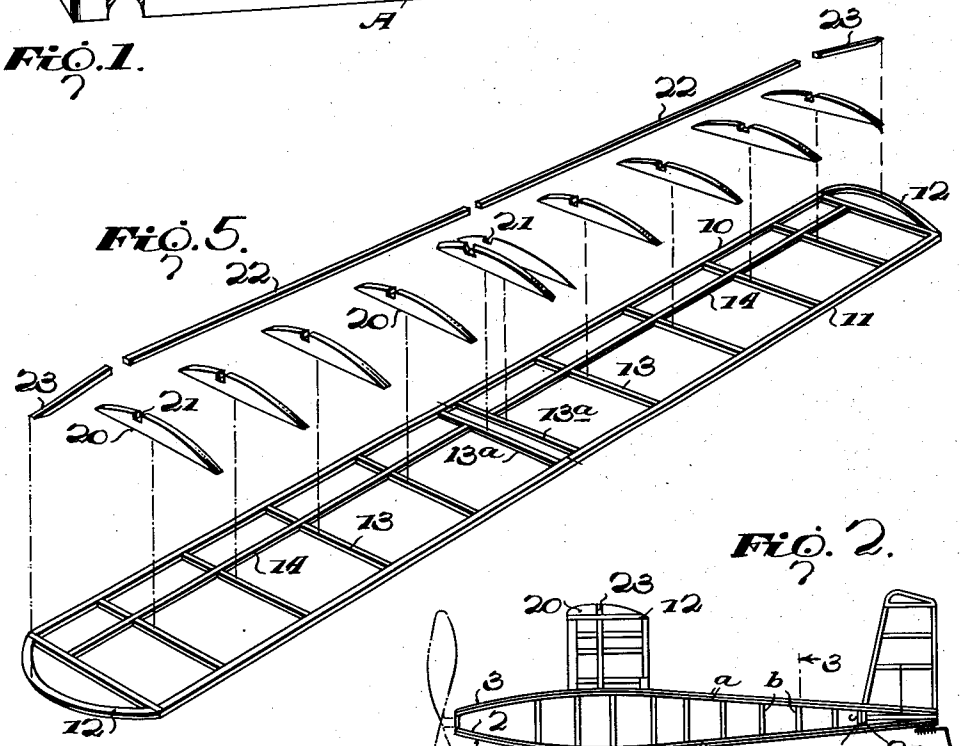


Fig. 5.

Fig. 2.

Fig. 3.

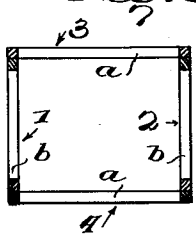


Fig. 4.

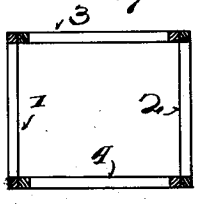


Fig. 7.

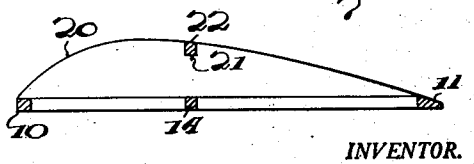
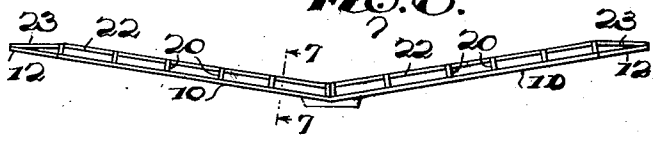


Fig. 6.



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MODEL AIRPLANE

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13 Claims. (Cl. 46—76)

This invention relates to model airplanes and is particularly intended to provide such a device having a new and improved structure and arrangement of parts whereby a strong and rigid structure, which may be manufactured and assembled in a new, improved and more simple manner, is provided.

It is an object of the invention to provide a model airplane structure which is formed of prefabricated assemblages of parts, whereby the model airplane may be assembled into final form with greater ease and speed than has formerly been possible.

Another object of the invention is to provide a new and improved wing structure for model airplane in which the wing is built up by combining a pre-fabricated assemblage of parts, which provides the base for the entire wing, with other associated parts to provide a complete structure.

A further object is to provide an improved fuselage structure which is formed by combining a plurality of elongated, pre-fabricated, unitary assemblages of parts, these assemblages being so constructed and connected together that an improved fuselage is provided which has great advantages in strength and ease of assemblage over structures heretofore provided.

Other objects and features of novelty will be made apparent by the following description and the annexed drawing, it being understood, however, that such description and drawing are only illustrative of the invention, which is not limited thereby, or otherwise than by the appended claims.

Referring to the drawing, in which similar reference numerals refer to like parts,

Fig. 1 is a perspective view showing the method of forming the fuselage of a toy airplane according to the invention;

Fig. 2 is a side view of a toy airplane formed according to the invention;

Fig. 3 is a sectional view taken on the line 3—3 of Fig. 2;

Fig. 4 is a view, similar to Fig. 3, and showing a modified fuselage structure;

Fig. 5 is a perspective view illustrating the method according to the invention of forming a wing structure;

Fig. 6 is a front view of the wing structure after assembly, and

Fig. 7 is a sectional view taken on the line 7—7 of Fig. 6.

One of the principal features of this invention is the new and improved construction of the fuselage of a model airplane and the method of forming and assembling the parts which, together, constitute this new structure. According to the invention, the fuselage is formed by uniting together a plurality of elongated, pre-fabricated, unitary side members, each of which constitutes a complete fuselage element, and which, when attached together form a strong and rigid structure. As illustrated in Fig. 1 of the drawing, if a four-sided fuselage is to be provided, two side members 1, 2, an upper member 3 and a bottom member 4 will be provided. Each of these is a complete, unitary structure comprising longerons *a* and strut members *b*, these parts being formed separately and united in any desired manner, as by gluing, or the entire side member being formed by a stamping operation.

These fuselage members are brought together in a loosely assembled relation, as illustrated in Fig. 1, and a form or frame A may be used to support the parts in this condition while the assembling and attaching procedure is being carried on. The parts are now united in any desired manner, it being preferred to connect them by gluing the longerons together at the four corners of the assembly. The completed fuselage structure will have the desired configuration and may be covered with paper, fabric or other desired covering material.

It will be apparent that by reason of the building up of the fuselage by four separate and complete side members the fuselage will have greater rigidity and strength than is provided by structures formed in accordance with present practices. This is due primarily to the fact that at each of the corners of the fuselage there will be two longerons instead of one. Further, and as illustrated in Figs. 3 and 4, the wood materials of abutting attached longerons are so chosen and arranged that the grain, or wood formation, of one longeron will not co-incide with that of the longeron which abuts it, thereby providing increased strength and rigidity. Each side and top and bottom member of the fuselage, being a complete structural member in itself, will be able to resist greater forces than structures heretofore provided.

While a four-sided fuselage is illustrated in the drawing and described herein, it will be seen that the invention is applicable to the construction of a fuselage having any number of sides, and that in any such case the advantages of strength and rigidity inherent in the disclosed structure will be provided.

The rear end of the fuselage is reinforced by

a cross-shaped block 25 which is positioned in the interior thereof and the four cut-out corners of which are adapted to receive the four longeron assemblies of the fuselage. An additional brace member 26 is positioned between this block and the rearmost end of the fuselage and adds additional strength to the assembly.

The invention also provides a new and improved wing structure which is formed in a novel manner and which permits simplified assembling to provide a complete wing structure. The various parts of this new and improved wing structure, and the manner of assembling the same, are illustrated in Figs. 5 and 6. Referring to these figures it will be seen that the wing structure comprises a unitary, flat base structure comprising outer longitudinal members which are the leading edge strip 10 and the trailing edge strip 11, the curved end members 12 and the transverse bracing members 13. The transverse braces extend between the leading and trailing edge strips and are spaced along the length of the wing base member and adjacent the midpoint of the base member two closely adjacent transverse members 13a are provided, one on each side of the midpoint, for a purpose which will appear hereinafter. Additional bracing of the frame is provided by spars 14 which extend longitudinally from the struts 13a parallel to the edge members 10 and 11 and terminate at the outermost brace members 13, these spar members 14 being preferably positioned closer to the leading edge member 10 than to the members 11. It will be seen that the intermediate longitudinal spars 14 divide the transverse braces 13 and are attached thereto, although these may be connected by interfitting joints if desired. All of the described members are connected together to provide a unitary member as illustrated in Fig. 5.

In order to provide a wing having the proper airfoil cross-section, I provide a plurality of ribs 20, these having flat base portions, which are equal in length to the brace members 13, and curved upper surfaces, the curvature of such upper surfaces being made of such shape that when the ribs are placed on the braces 13, the cross-section of the wing is of proper airfoil shape. These ribs are adapted to be connected, as by gluing, to the upper surfaces of the transverse brace members 13 and, when so attached, extend upwardly therefrom at right angles to the plane of the wing base member, one strut member being provided for each brace 13, and these being of equal size and having corresponding curvature of the upper faces. For each of the two central brace members 13a I provide rib members of generally similar configuration but the lower edges of which are so formed that when these lower edges are attached to the braces 13a the ribs will be inclined toward the nearest end of the wing base, as illustrated in Fig. 5 and for a purpose which will appear hereinafter.

Formed in the upper, curved surface of the spaced rib members are recesses 21 which are similarly shaped and positioned in each strut and which, when the struts are attached to the braces in the manner described, are adapted to receive longitudinally-extending spar members 22, the same being of such length that each extends from one inclined rib outwardly along the longitudinal length of the corresponding half of the wing, terminating in the aperture in the last rib member which, as illustrated in Fig. 5 is attached to the next to last transverse brace 13. The apertures 21 and the longitudinal spars 22 are formed of corresponding section and size whereby, when the spars 22 are positioned within the aligned apertures the upper surfaces thereof will be flush with the upper surfaces of the rib members. The apertures 21 are preferably so positioned in the rib members that, when such members are attached to the wing base in the manner described the apertures will be positioned just above the intermediate longitudinal spar 14, whereby the two longitudinal members 14 and 22 co-operate to provide additional strength and rigidity to the wing.

Additional bracing means are provided for each end of the wing and these comprise short strips 23 which extend in inclined position from the outermost strut members 20 to the curved, end members 12. The inner ends of the braces 23 are adapted to be positioned in the apertures 21 of the outermost rib members, while the lower faces of the outer ends thereof are beveled in order to provide a proper fit with the upper surfaces of the curved wing end members 12.

The wing parts are assembled by attaching the rib members 20 to the upper surfaces of the braces 13, those attached to the braces 13a being disposed in inclined position as described. The longitudinal spars 22 are positioned in the apertures 21 and the braces 23 are arranged in inclined position between the outermost ribs 20 and the curved wing end members 12. These parts may all be connected in the described manner by gluing.

After assembly in the manner described the wing structure is cut along the center line which is equidistant between the two ends of the wing and the two halves are folded upwardly toward each other, as illustrated in Fig. 6 until the adjacent side wall faces of the inclined ribs 13a abut, the parts being attached, as by gluing, in this position, a wing of angular configuration being thus formed. This wing structure is attached to the upper surface of the fuselage by any suitable means, rubber bands being used in the assemblage illustrated in the drawing.

Other parts of the toy airplane may be attached to the wing and fuselage structure, these being the rudder, tail surface, propeller, landing gear and other elements, all as illustrated in Fig. 2 of the drawing. I propose to form all of these parts as unitary, assembled members, thereby facilitating the simple assembly of these parts. Certain of such parts, as may be desired, may be covered with paper, fabric or other suitable material.

While I have illustrated and described one form which my invention may take it will be apparent to those skilled in the art that modifications, improvements and changes may be made therein without departing in any way from the spirit or scope of the invention, for the limits of which reference must be had to the appended claims.

I claim:

1. A fuselage structure for a model airplane comprising an elongated body of polygonal cross-section, certain of the oppositely-disposed sides of said body being formed of separate, unitary frame members comprising elongated edge members and transversely extending struts connecting said edge members, said oppositely-disposed sides being spaced and connected by separate, unitary frame members.

2. A fuselage structure according to claim 1, in which the frame members which space and

connect the oppositely-disposed sides are positioned interiorly of the longitudinal edges of said sides.

3. A fuselage structure according to claim 1, in which the frame members which space and connect the oppositely-disposed sides are positioned exteriorly of the longitudinal edges of said sides.

4. A fuselage structure for a model airplane, comprising an elongated body of polygonal cross-section, each of the sides of said fuselage structure being a unitary frame member comprising elongated edge members extending substantially throughout the length of the fuselage and transversely extending strut members connecting said longitudinal edge members.

5. A fuselage for a model airplane, comprising an elongated body of polygonal cross-section, each of the sides of said body being a separate unitary structure comprising edge members extending longitudinally of the body and bracing members extending between said edge members and connected thereto.

6. A wing for a model airplane comprising a flat frame structure having spaced leading and trailing edge members extending longitudinally thereof, a spar member extending parallel to and between said edge members, a plurality of spaced brace members connecting the leading and trailing edge members and intersecting the intermediate spar member, and separate rib members attached to the upper surfaces of the brace members and extending above said flat frame structure and being so shaped that when so attached the cross-section of the wing is substantially of airfoil shape.

7. A wing for a model airplane according to claim 6, in which each of said rib members has an aperture formed in the upper surface thereof, which apertures are aligned longitudinally of the associated frame structure, and a spar member received in said aligned apertures.

8. A wing for a model airplane according to claim 6, in which apertures are formed in the upper surfaces of the rib members approximately above the intermediate spar member of the flat frame structure, whereby a second spar member positioned in said apertures is disposed substantially above said intermediate spar member.

9. A wing for a model airplane comprising two flat frame structures which are arranged in end to end relation and which form a dihedral angle at their meeting ends, each of said frame structures comprising spaced leading and trailing edge members extending longitudinally thereof, braces connecting said edge members, and spaced rib members attached to the upper surface of said braces and extending above the flat frame structure to which the are attached and defining with the frame structure a cross section of substantially air foil form, the rib members at the meeting ends of the frame structures being disposed in face-to-face engagement.

10. A wing for a model airplane according to claim 9, in which the rib member at the end of each frame structure adjacent the end of the other frame structure is inclined with respect to the attached frame structure.

11. A wing for a model airplane according to claim 9, in which each of said frame structures comprises in addition a spar disposed between said edge members and extending parallel thereto and intersecting and being connected to said braces.

12. A wing for a model airplane comprising a flat frame structure having spaced leading and trailing edge members extending longitudinally thereof, a plurality of spaced brace members connecting said edge members, curved end members connecting said edge members at each end of said frame structure and being disposed outwardly from the last of said brace members, rib members attached respectively to the upper surfaces of said brace members and extending above the plane of said structure and being so shaped that when so attached the wing has a substantially airfoil cross-section, an elongated spar member arranged parallel to said edge members and connected directly to the upper portions of said rib members and extending along the wing toward the outer end thereof to the last of said rib members, and inclined reinforcing spars each of which is connected at its one end to the upper portion of the last of said rib members at one end of said wing and at its other end to the upper surface of the adjacent one of said curved members.

13. A wing for a model airplane comprising a flat frame structure having spaced leading and trailing edge members extending longitudinally thereof, a plurality of spaced brace members connecting the leading and trailing edge members, and rib members attached to the upper surfaces of said brace members and extending above the flat frame structure and being so shaped as to cause the cross-section of the wing to be substantially airfoil in shape.

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