March 3, 1942. G. M. TAYLOR 2,275,094

TOY BIPLANE

Filed April 30, 1940

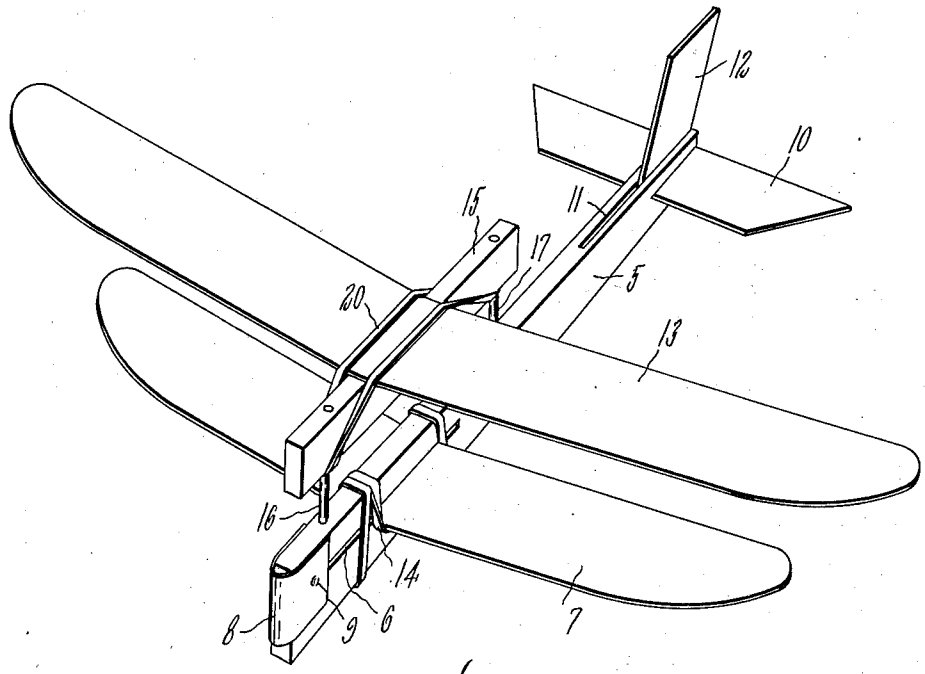


Fig. 1.

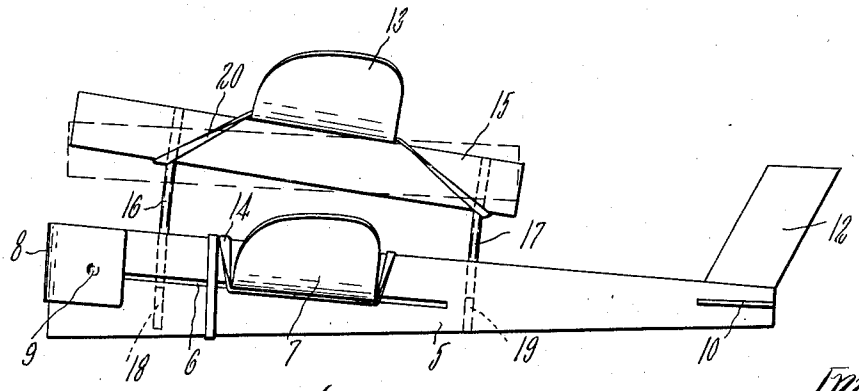


Fig. 2.

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Patented Mar. 3, 1942 2,275,094

UNITED STATES PATENT OFFICE

2,275,094

TOY BIPLANE

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Application April 30, 1940, Serial No. 332,519

9 Claims. (Cl. 46—79)

The invention relates to toy airplanes of the knock-down type; i. e., those which are sold to users in disassembled condition. My object is to furnish a biplane toy of this character having the smallest practicable number of separate parts, and those parts of such character that they can be correctly assembled even by young children. A part of the object is to make possible a wide adjustability of the wings or planes, lengthwise of the assemblage, and for changing the distance between them and regulating the angle of incidence of the upper plane. The preferred embodiment of the invention is described in detail with reference to the drawing, in which

Fig. 1 is a perspective view of the toy as seen from above, and Fig. 2 a side elevation indicating by broken lines the manner in which the upper plane may be adjusted to change its angle of incidence.

Like reference characters designate the same parts in both figures. The body **5** is a single elongated piece of balsa wood of sufficient thickness to permit being grooved and drilled in the manner presently described, and of tapered width or height, having its greatest height at the nose end and its least height at the tail end. It is slotted inwardly from the nose end for approximately, or slightly more than, half its length to form an opening **6** in which the lower plane **7** may be placed. The nose end of the body is protected and weighted, and the open end of the slot **6** covered, by a nose piece **8** made from a piece of sheet steel bent in U shape to embrace the end of the body closely. This piece is indented at isolated spots in its opposite sides, one of which is indicated at **9** to form inwardly projecting anchorage spurs. In the tail end of the body there is an open horizontal slot of a length equal to the width of a stabilizer vane **10** and a width enough less than the thickness of such vane to cause the vane to be firmly gripped by the embracing parts of the body. A longitudinal groove **11** is cut in the upper edge of the body extending forwardly from the tail end to receive a guiding vane **12**. The width of this groove likewise is such as to cause the embracing material to grip the lower edge of the rudder vane firmly.

The upper and lower planes or wings **13** and **7** of the biplane wing equipment are each made of a single piece of balsa wood, preferably bent at the middle fore and aft line to form a stabilizing dihedral angle. The lower wing is assembled with the body by being passed through the slot **6**, as previously described. It is anchored and made fast by means such as an endless rubber band **14** passed over the top of the body and under the plane **7** at both sides thereof, which may be given an additional wrap around the body to increase its tension. This binding member may be so applied before the upper wing support (presently described) is connected to the body.

The upper plane or wing **13** is mounted on a support which consists of a bar **15** of balsa wood connected to the body detachably by means of two posts **16** and **17**. These posts are made of pieces of flexible and resilient tough reed. They are made fast in sockets formed in the bar **15** near the opposite ends of the latter and project at approximately right angles from the lower side thereof. They are entered into vertical holes or passageways **18** and **19** in the body, which holes are enough smaller than the posts to grip the latter with sufficient firmness to prevent accidental withdrawal, but not so tightly as to prevent inward or outward movement of the posts by the application of sufficient force. The upper plane is laid across the bar **15** and bound thereto by means of an elastic band **20**, which is passed over the upper side of the plane and the end loops of which are placed under the bar. Either or both of such end loops may be placed outside of the nearer post, as here shown, or between the posts, and may be additionally wrapped around the bar, the way the band **14** is wrapped about the body, if desired to create a greater tension.

It will be noted that the length of the bar **15**, the distance between and location of the posts **16** and **17**, and the length and location of the slot **6** are such as to permit a considerable latitude of adjustment of both planes in the fore and aft direction. In fact these parts are so disposed that the planes may be located at, or ahead or in rear of, the center of gravity of the assemblage; and either may be set more or less ahead or in rear of the other, or one squarely over the other, in different ones of such locations. Also the length of the posts and the depth of the sockets receiving them in the body (such sockets extending nearly or wholly through the height of the body as indicated by dotted lines in Fig. 2) are such that the bar **15** may be adjusted toward and away from the body. Thereby the distance or height between the wings may be varied. Each post is independently movable in its socket, whereby the bar may be tilted at different angles to the body and the angle of incidence of the upper plane correspondingly varied. One of the possible angular adjustments is illustrated by broken lines in Fig. 2.

The construction thus described is of a simplicity such that children possessing only slight manual skill can correctly assemble the disconnected parts. And the capacity for adjustment above described enables the flight of the toy to be altered, thus affording instruction as well as amusement and interest to the possessor. By changing the position of the wings forward or back with respect to the center of gravity, the distance between them, and the angle of incidence of the upper wings, useful studies in the behavior of airplanes may be carried on. Further variations may be made by mounting the upper plane on the under side of the bar 15 or the lower plane on the top or bottom surface of the body, or by thus remounting both planes at the same time. It is not essential that the under surface of the body be inclined at the angle shown. It may be parallel, or inclined at a less angle, to the top surface to permit relocation of the lower plane as described without too greatly changing the angle between this plane and the elevator vane 10.

Another possible adjustment is to reverse the bar 15 end for end. This may be done either by removing the posts 16 and 17 from the passageways 18 and 19, along with the bar, and inserting the post 17 into socket 18 and post 16 into socket 19, or by disconnecting the bar from the posts and reconnecting it in reversed position. As the socket which contains post 16 in the bar is farther from the forward end of the bar than the socket which contains post 17 is from the rear end, such a reversal has the effect of shifting the center of gravity of the bar, and consequently of the whole airplane, rearwardly.

The embodiment of the invention here illustrated is a glider toy to be launched by a throwing movement of the user's arm or with the aid of a catapult. But the fundamental principles embodied therein may be applied to self propelled planes also, wherefore I do not limit the protection which I claim to a glider toy exclusively.

Balsa wood is the preferred material for making the body structure, planes and vanes, because of its well known properties of lightness and resilient flexibility combined with adequate strength when properly used. And reeds have suitable toughness and resilience to serve as the posts, while also being light in weight. But I am not necessarily limited to these details.

What I claim and desire to secure by Letters Patent is:

1. An airplane toy comprising a body, a lower plane secured to said body, a bar adjustably connected to the body with provision for changing the angle between its longitudinal dimension and that of the body, and an upper plane secured to said bar.

2. A toy airplane comprising a body member, a bar, separated posts between said body and bar supporting the latter above the body and having a sliding connection whereby the distance and angle between the body member and bar may be varied, a lower plane detachably and adjustably secured to the body, and an upper plane detachably and adjustably secured to said bar.

3. A toy airplane comprising a body having a longitudinal slot between its upper and lower edges, a lower plane movably contained in said slot, an elastic band binding said plane to the body, a bar, posts entering the bar and body connecting them and having a sliding engagement whereby the position of the bar with respect to the body may be varied, an upper plane crossing said bar, and an elastic band binding the upper plane to the bar.

4. A toy airplane as set forth in claim 3, in which the length of the bar and the distance between the posts is greater than the fore and aft dimension of the upper plane, whereby said plane may be secured on either the upper or lower edge of the bar and at different positions along the length thereof.

5. A toy airplane comprising a body, a lower plane secured to said body with provisions for adjustment lengthwise of the body, an upper plane support connected to the body above said lower plane, and an upper plane secured to said support with provisions for adjustment lengthwise of the body independently of the lower plane; said support being adjustably mounted with provisions for changing its angular relation to the body in a manner to alter the angle of incidence of said upper plane.

6. An airplane toy consisting of a body, an upper plane support connected to the body above the same and in longitudinal, substantially parallel, arrangement therewith, and having provisions for adjustment whereby to alter its longitudinal inclination with respect to the body, a lower plane engaged with the body, an upper plane engaged with said support, and means securing said planes to the body and support respectively with provisions for adjustment of each independently lengthwise of the body, whereby to place either plane more or less ahead of the other in different locations forward or aft and with differences in the angle of incidence of the upper plane.

7. A toy airplane comprising a body, posts rising from the body and connected thereto in a longitudinally movable manner, a bar supported by said posts with a longer overhang at one end than at the other from the nearer post, and upper and lower planes connected detachably with the body and bar respectively; the bar being reversible end for end with respect to the body whereby to shift its center of gravity in the fore and aft direction.

8. A toy airplane comprising a body, a plane secured to said body, a support for a second plane connected to the body in generally parallel relation thereto and spaced apart therefrom in a plane which is substantially vertical when the airplane is in upright position for normal forward flight, and a plane secured to said support; the said support being adjustably mounted with provisions for changing its angular relation to the body in a manner to alter the angle of incidence of the plane which is secured thereto.

9. A toy airplane comprising a body, a lower plane secured to the body, an upper plane support connected to the body above said lower plane, and an upper plane secured to said support; the support being adjustably mounted with provisions for changing its angular relation to the body in a manner to alter the angle of incidence of said upper plane.

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