

June 17, 1924.

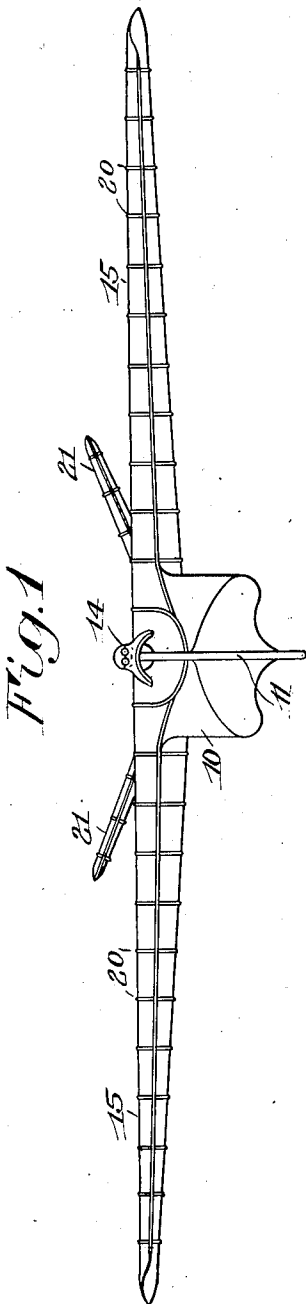
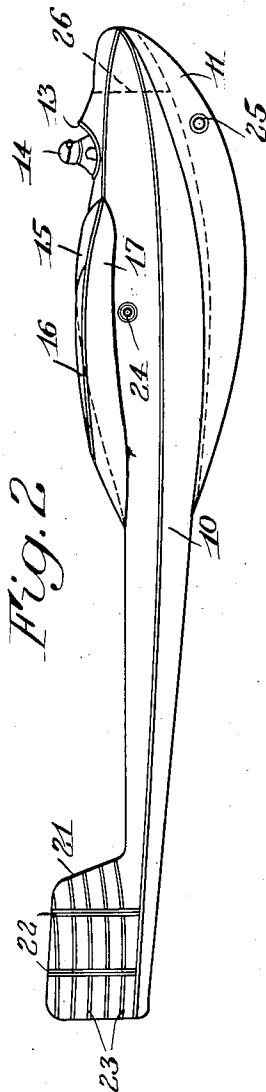
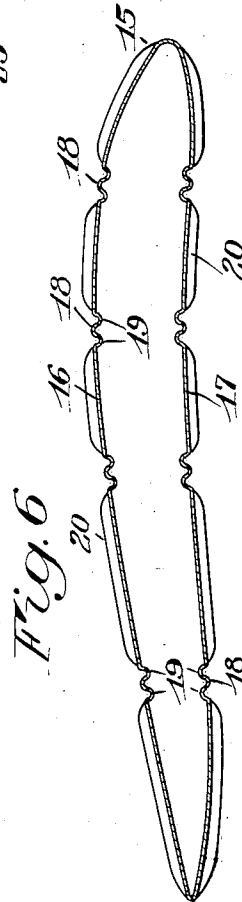
1,497,774

R. E. DOWD

TOY AIRPLANE

Filed Nov. 2, 1922

2 Sheets-Sheet 1



INVENTOR.
Raymond E. Dowd
BY *Frederick W. Church*
his ATTORNEY

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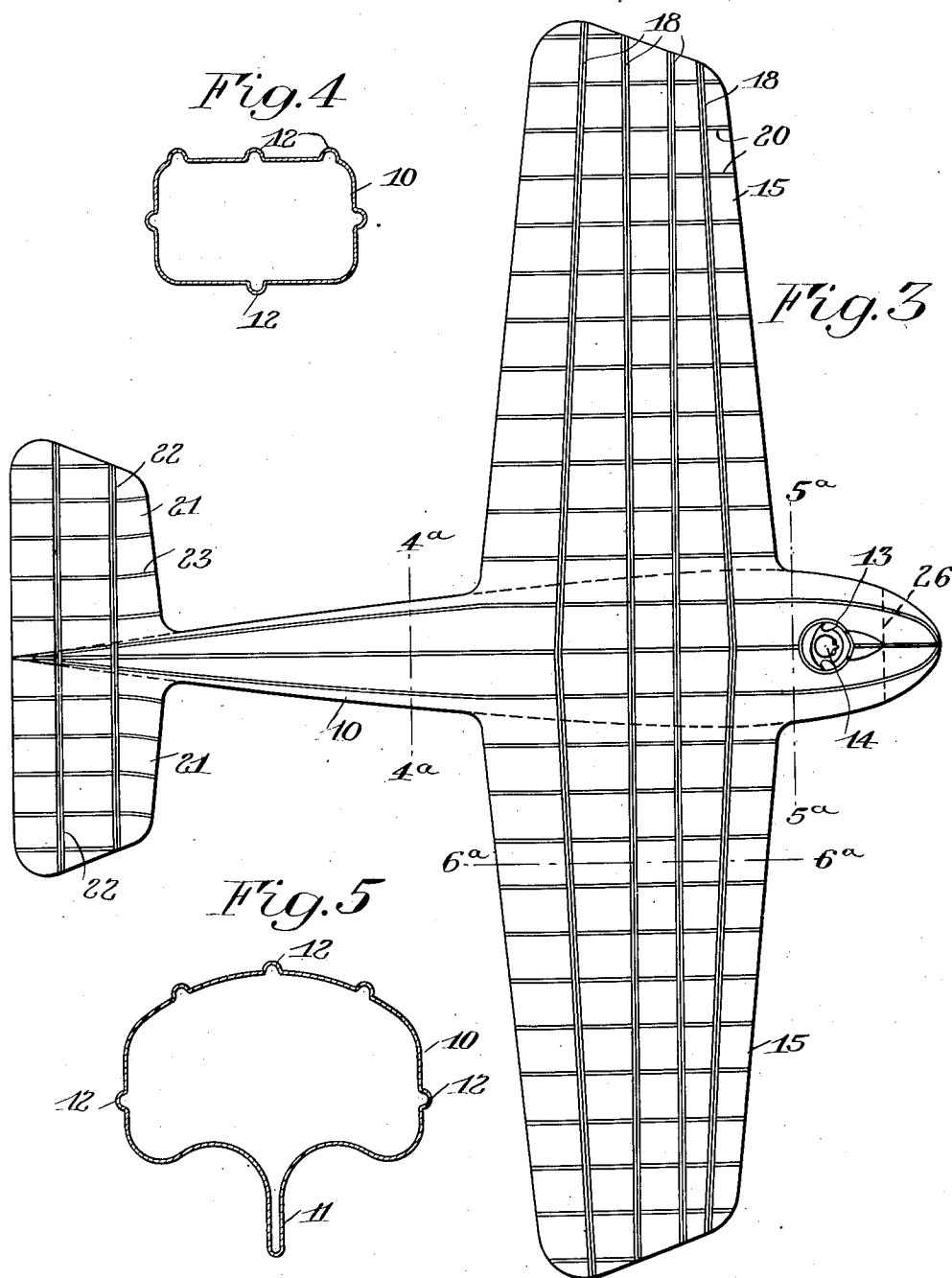
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UNITED STATES PATENT OFFICE.

RAYMOND E. DOWD, OF ITHACA, NEW YORK, ASSIGNOR OF ONE-FOURTH TO WILLIAM T. THOMAS, OF ITHACA, NEW YORK.

TOY AIRPLANE.

Application filed November 2, 1922. Serial No. 598,466.

To all whom it may concern:

Be it known that I, RAYMOND E. DOWD, of Ithaca, in the county of Tompkins and State of New York, have invented certain new and useful Improvements in Toy Airplanes; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the reference numerals marked thereon.

This invention relates to toy airplanes, the chief object being to provide therefor a practical and economical type of construction capable of being accurately produced in accordance with established principles affording a high degree of aerodynamic efficiency and having sufficient strength and rigidity to maintain its accuracy of form and insure durability in use. To these and other ends the invention consists in certain improvements and combinations of parts all as will hereinafter be more fully described, the novel features being pointed out in the claims at the end of the specification.

In the drawings:

Figure 1 is a front elevation of a toy airplane embodying the present invention;

Figure 2 is a side elevation of the same;

Figure 3 is a top plan view thereof;

Figure 4 is a sectional view of the fuselage on the line 4^a—4^a of Figure 3;

Figure 5 is a similar view in line 5^a—5^a of Figure 3;

Figure 6 is a sectional view on the line 6^a—6^a of Figure 3 showing the construction of the sustaining plane or wing.

Similar reference numerals throughout the several views indicate the same parts.

The preferred embodiment of the invention comprises an airplane constructed integrally of relatively thin, light material in the form of a hollow, shell-like structure. The material at present preferred is celluloid as this has been found to lend itself admirably to this purpose both because of its physical qualities and the economy with which articles may be made therefrom. The airplane is preferably formed in two or more molded parts put together with their edges

cemented, fused or otherwise integrally united to produce the completed article. This method of manufacture is not only inexpensive but may be used with great accuracy and uniformity in the product.

The preferred embodiment is of the monoplane type having a fuselage or body portion, a main sustaining plane in the form of laterally extending wings and a stabilizing portion comprising in the present instance a pair of rearwardly disposed planes extending laterally and upwardly from their line of intersection at an angle with the horizontal to form what may be termed a dihedral tail. This embodiment is also in the form of a motorless or glider airplane, but the principles employed are applicable as well to motor driven planes and to those of other than the monoplane type.

Referring more particularly to the drawings the fuselage is shown at 10 as of a shape affording high aerodynamic efficiency, it being noted that the body is provided forwardly with a keel portion 11 adapted to serve also as a grip for launching the airplane by hand or otherwise and also as a landing skid. As shown more particularly in Figures 4 and 5 the body is hollow and integrally constructed with thin walls producing a light, shell-like structure which is however quite rigid by reason of its double-walled form. The walls are formed with stiffening corrugations 12 extending longitudinally of the body from end to end to increase its rigidity and render it capable of maintaining its original shape in use. At 13 is a cock-pit in which the figure of a pilot is represented at 14.

The sustaining surface is formed by a main plane comprising wings 15 extending laterally from the body and formed integrally therewith. As best shown in Figure 6, this plane is designed in accordance with aerodynamic principles affording the best flying qualities and is hollow in construction having upper and lower walls 16 and 17, respectively. This hollow construction affords in itself considerable rigidity but this quality is increased by the provision of spaced lines of corrugations indicated gen-

erally at 18 extending transversely of the direction of flight. Each line of corrugation comprises preferably a pair of adjacent linear depressions 19 projecting inwardly of the structure and below its outward surface, which form reduces to a minimum the frictional air resistance resulting from surface irregularities, as well understood in the art. As a matter of fact corrugations thus formed have been found to have a negligible effect on the flying qualities of the plane. To further stiffen the main plane or wings the latter are formed with spaced corrugations parallel with the direction of flight, as indicated at 20, which of course have no unfavorable effect on the flying qualities. These lines of corrugation extending in both directions, combined with the integral shell-like form of the wings, produce an exceedingly rigid construction capable of maintaining the accuracy of the design in the wear and tear of usage.

The stabilizing surfaces of the airplane comprise a tail portion formed by a pair of planes 21 which as shown extend from their line of intersection at the body outwardly and upwardly at substantially equal angles to the horizontal to provide what may be termed a dihedral tail having various advantages hereafter described. These tail planes preferably have the hollow shell-like construction described in connection with the main plane and like the latter are formed integrally with the body. Their walls are also provided with corrugations 22 extending transversely of the line of flight and similar in form to those of the main plane. Crossing these are other corrugations 23 parallel with the direction of flight so that the tail planes also are rigid in construction and capable of maintaining their accuracy of shape.

The dihedral tail construction which in the present instance replaces the usual horizontal and vertical planes or fins has the advantage that when the air plane is launched with sufficient force to cause it to prescribe a loop, its aerodynamic qualities tend to make the loop one of relatively small diameter as is of course desirable in a toy. This tail construction is furthermore adapted to correct what is known as a "yawing," and also brings the center of lateral area back of the center of gravity, indicated at 24, Figure 2, as well understood in the art.

The keel portion 11 is preferably perforated and provided with a metal eyelet 25, Figure 2, as a means for attaching a draw line for launching the airplane or a sling shot device for the same purpose.

In the type of airplane in which the stabilizing surface or tail is disposed rearwardly of the sustaining surface or wings, as distinguished from the type having the

tail in advance of the wings, it is preferred to employ weighting means or ballast carried forwardly of the wings to bring the center of gravity of the airplane to its proper location substantially over the center of lift of the wings. This is accomplished in the present instance by a small body 26 of relatively heavy material secured in the nose of the fuselage, as shown, although of course, the ballast may have other suitable forms and be secured externally of the fuselage if so desired.

An airplane constructed as above described may be made exceedingly light in weight and the molded rigid form of construction provides for giving it an accurate and permanent design affording a high degree of aerodynamic efficiency which is unimpaired by impacts or rough handling in use. This provides for successful operation of the toy by an unskilled person without adjustment of the sustaining or stabilizing surfaces to suit the players' style of operation or to correct for deformations resulting from impacts or improper handling. The airplane is therefore adapted for operation with uniformly successful and pleasing results enhanced by the life-like appearance which may be given to it, as indicated by the drawings. The use of celluloid as a material renders the article water proof and also affords opportunity for giving it a variety of attractive colors.

I claim as my invention:

1. A toy airplane comprising sustaining and stabilizing planes and a body constructed integrally of moulded material to produce a hollow, shell-like structure having lines of corrugations formed in the material thereof to stiffen the same and afford rigidity of form.

2. A toy airplane comprising sustaining and stabilizing planes and a body constructed integrally of moulded material to produce a hollow, shell-like structure having lines of corrugations extending transversely of the direction of flight to stiffen the structure and formed in said material inwardly of the structure to reduce air resistance.

3. A toy airplane comprising a body, a main sustaining plane, and a pair of stabilizing planes arranged to form a dihedral tail, said parts being integrally constructed of celluloid to form a hollow, shell-like structure with lines of corrugations formed in said planes transversely of the line of flight to stiffen the same and afford a rigid structure.

4. A toy airplane comprising a body, a main sustaining plane and a pair of stabilizing planes, said parts being moulded integrally of light rigid material to form a hollow shell-like structure, and lines of corrugations extending transversely of the line

of flight and extending inwardly from the surface of the material to reduce air resistance, and spaced corrugations parallel with the line of flight, said corrugations 5 serving to stiffen the material.

5. A toy airplane comprising a body, a main sustaining plane and a pair of stabiliz- ing planes, said parts being moulded integrally of light rigid material to form a hollow shell-like structure and lines of cor- 10 rugations extending both parallel with and transversely of the line of flight to stiffen and strengthen the material.

RAYMOND E. DOWD.