Nov. 5, 1968 G. H. ANDERSON 3,408,767

TOY AIRPLANE WITH FOLDING WINGS HAVING TABS

Filed Dec. 21, 1965 2 Sheets-Sheet 1

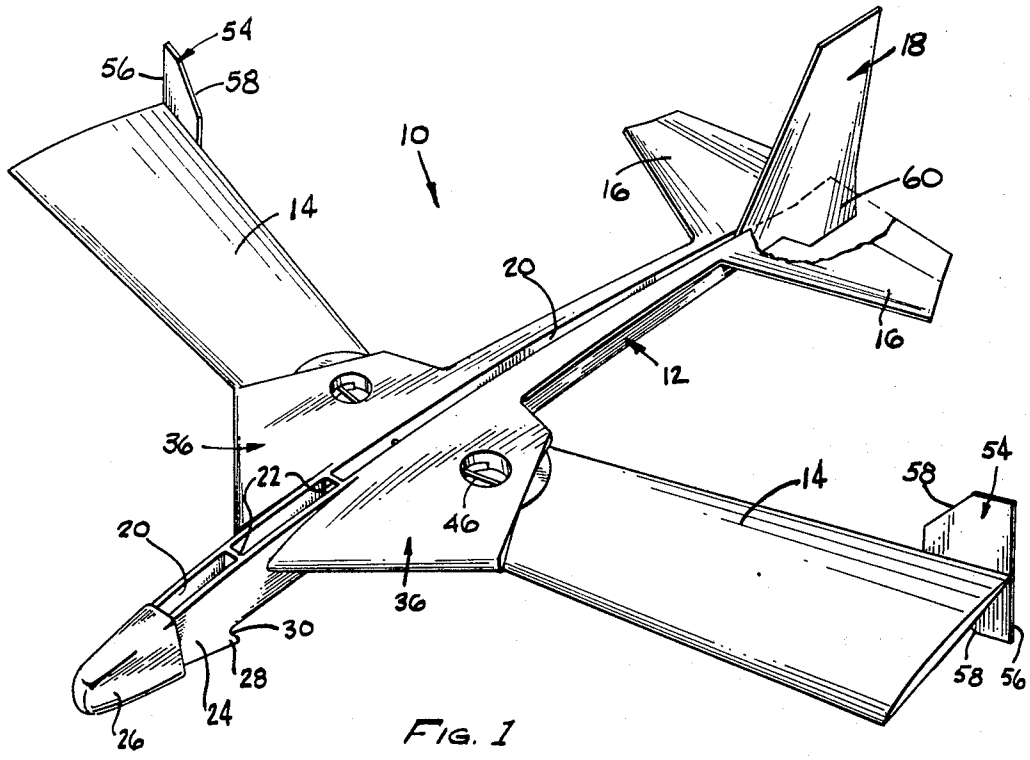


FIG. 1

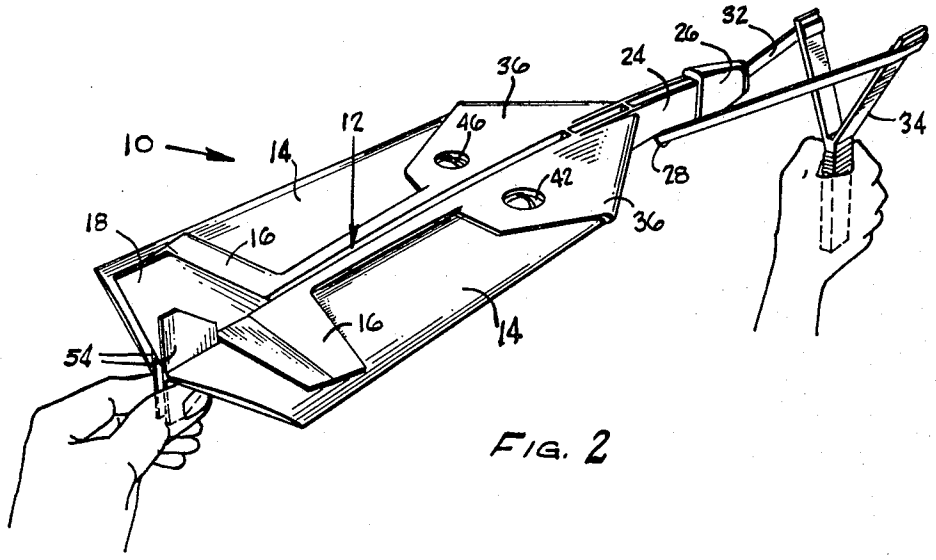


FIG. 2

INVENTOR.
GORDON H. ANDERSON
BY Herzig, Walsh & Blackham
ATTORNEYS

Nov. 5, 1968 G. H. ANDERSON 3,408,767

TOY AIRPLANE WITH FOLDING WINGS HAVING TABS

Filed Dec. 21, 1965 2 Sheets-Sheet 2

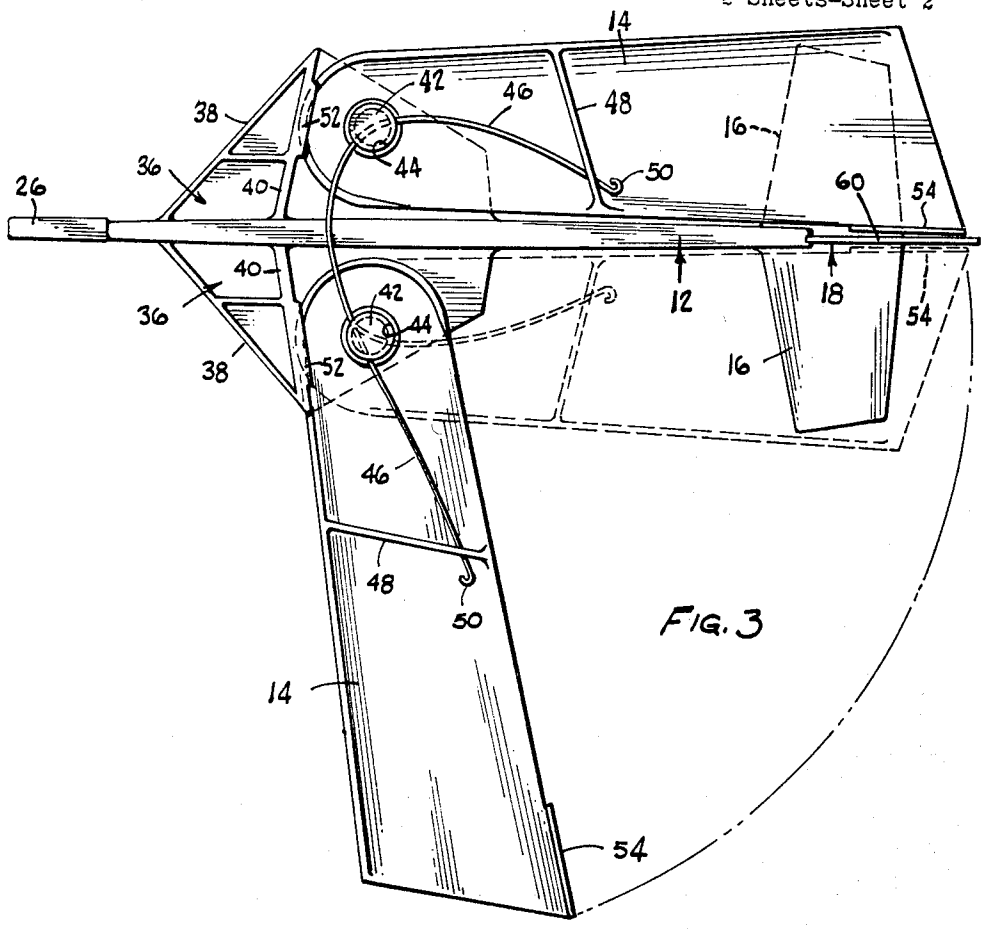


FIG. 3

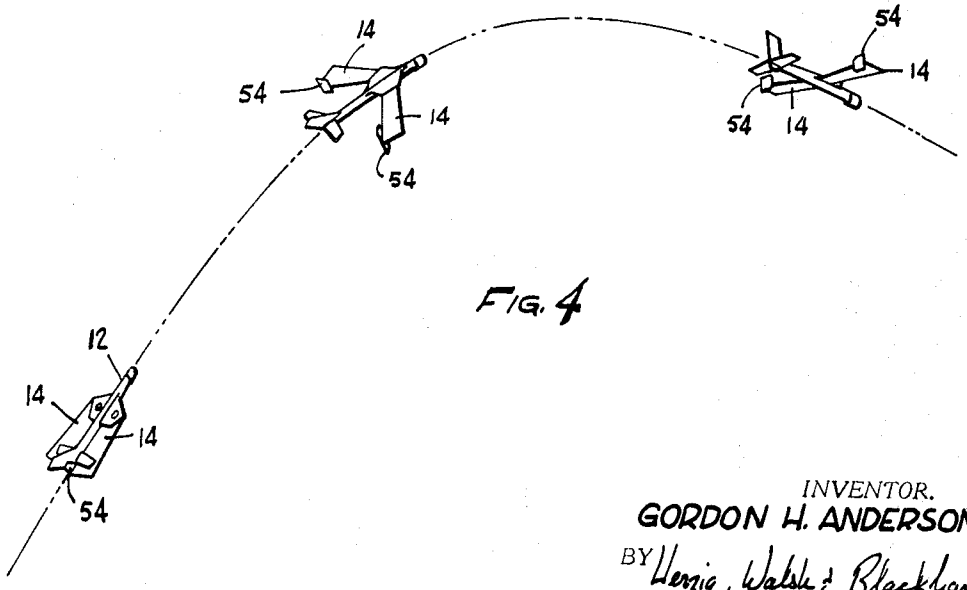


FIG. 4

INVENTOR.
GORDON H. ANDERSON
BY Herzig, Walsh & Blackham
ATTORNEYS

United States Patent Office 3,408,767
Patented Nov. 5, 1968

3,408,767

TOY AIRPLANE WITH FOLDING WINGS HAVING TABS

Gordon H. Anderson, Palos Verdes Estates, Calif., assignor to Lakeside Industries, Inc., a corporation of Delaware

Filed Dec. 21, 1965, Ser. No. 515,350
10 Claims. (Cl. 46—80)

ABSTRACT OF THE DISCLOSURE

The device is a toy airplane made of light weight materials having folding wings that can fold rearwardly and which are urged into extended position by resilient means. The wings fold rearwardly for launching into a position underneath the tail assembly. The airplane is launched by rubber band means preferably in the form of a slingshot. When launched tabs mounted on each wing provide for air resistance to allow the airplane to accelerate to velocity before the wings become fully extended. When the wings are fully extended the tabs provide air resistance to reduce speed during gliding of the airplane.

The present invention relates to a toy airplane and more particularly to a toy airplane having rearwardly folding wings which enable the plane to be launched like a rocket with the wings folded rearwardly, and thereafter flown and landed like a glider after the wings have opened in flight at a predetermined time after launching.

While many toy airplane constructions have been utilized, which have incorporated foldable wings for the purpose of enabling the plane to be launched with the wings in a retracted position, many of these have not been entirely satisfactory for various reasons. Some of the more common disadvantages of previous constructions have included:

(1) Difficulty in maintaining the wings in a retracted position prior to and during launching, and during initial flight of the arplane;

(2) A fragile construction which resulted in damage to the airplane during folding of the wings, launching or landing;

(3) The provision of a complicated locking mechanism for maintaining the wings in a retracted position during launching which was unreliable in operation and costly and difficult to assemble or replace;

(4) A wing construction which necessitated that the wings first be rotated before they could be folded back against the tail end of the airplane, with a consequent difficulty in the retracting of the wings prior to launching; and

(5) An airplane construction that was complicated and comprised a large number of parts, thereby being difficult and expensive to manufacture and assemble, and frequently impossible to repair.

The general purpose of the present invention is to provide a toy airplane having foldable wings which embraces substantially all of the advantages of prior and similarly employed toy airplanes, and which possesses none of the above-mentioned disadvantages.

It is an object of the present invention, therefore, to provide a toy airplane which is so constructed that it can be launched like a rocket with a minimum of air resistance, and then flown and landed like a glider without requiring further control by the operator.

An additional object of the present invention is the provision of a toy airplane having wings which may be folded rearwardly toward the tail end of the body or fuselage and which may be maintained in a retracted

position during launching and initial flight of the airplane.

Another object of the present invention is to provide a toy airplane having foldable wings which are normally biased to an open position and which may be easily manually retracted and maintained in a retracted position during launching and initial flight of the airplane.

A further object is to provide a toy airplane having rearwardly foldable wings which are so constructed as to be maintainable in a retracted position during launching and the initial flight of the airplane, after which the wings will open to sustain flight of the airplane in a glider-like manner.

Still another object is to provide a toy airplane having rearwardly foldable wings with tab means thereon, the tab means being so constructed and positioned as to be easily gripped by the operator to maintain the wings in a retracted position during launching of the airplane, to maintain the wings in said retracted position during the initial flight of the airplane, and to serve as air brakes to reduce the glide velocity of the airplane when its wings are open and it is descending.

A still further object is the provision of a toy airplane of the foldable wing type which is durable, simple in construction, inexpensive to manufacture and assemble, easily repairable, and reliable in operation.

An additional object is to provide such a toy airplane which is so constructed that the components thereof may be easily formed or molded from a suitable plastic material so as to provide a durable, light-weight and economical construction.

According to the present invention, the toy airplane comprises a pair of wings which are pivotally mounted on the body so as to be foldable rearwardly into an abutting relation with the tail end of the body. Each of the wings is normally retained in an open position by suitable resilient means secured to the body and to the wings. A small upright tab is provided on the outer trailing edge of each of the wings and is so constructed as to serve a three-fold purpose: (1) It can be easily gripped by the operator to hold its respective wing in a retracted position against the tail end of the body during launching of the airplane; (2) It prevents its respective wing from unfolding to an open position during the faster initial flight of the airplane; and (3) It serves as an air brake when the wing is open to reduce the glide velocity of the plane when it is descending to thereby prevent a hard landing and damage resulting therefrom. In operation, increased air pressure against the surface of each of the tabs during the initial flight of the airplane prevents the wings from unfolding to an open position until the maximum height of the airplane is attained. Thereafter, owing to reduce air pressure against the tabs, the resilient means secured to the wings and the body causes the wings to unfold to a fully open position to thus sustain the flight of the airplane in a glider-type manner and enable it to be smoothly landed.

The present invention, both as to its organization and manner of operation, together with further objects and advantages thereof, may best be understood by reference to the following description, taken in connection with the accompanying drawings in which like reference characters refer to like elements in the several views.

In the drawings:

FIGURE 1 is a perspective view of a toy airplane constructed in accordance with the principles of the instant invention, showing the wings in a fully opened position;

FIGURE 2 is a perspective view of the airplane shown in FIGURE 1 as it is about to be launched, showing the wings held back in a retracted position against the tail end of the airplane by one hand of the operator, with the nose of the airplane being engaged by the flexible

member of a slingshot held in the other hand of the operator;

FIGURE 3 is a bottom plan view of the toy airplane shown in FIGURES 1 and 2, showing one wing in an open position and the other wing in a retracted position; and

FIGURE 4 is a diagrammatic view in perspective showing the intended flight path of the instant toy airplane after launching.

As an exemplary embodiment of the instant invention, FIGURES 1 through 3 illustrate a toy airplane **10** comprising an elongated body or fuselage **12**, a pair of wings **14** movably mounted on the body **12**, a pair of stabilizers **16** formed integral with the body **12**, and a tail fin **18** removably secured to the rear portion of the body. Each of these components of the toy airplane **10** preferably is formed or molded from a suitable flexible resilient plastic material, such as polyethylene or polypropylene. It is to be understood, however, that the airplane may be formed of any other suitable material, without departing from the principles or scope of the instant invention.

The elongated body **12** is generally U-shaped in cross-section to define a longitudinally extending, upwardly facing groove **20** therein (see FIGURE 1). In order to impart a desired amount of rigidity to the body **12**, one or more cross members **22** are provided in the groove **20**, preferably near the front or nose portion **24** of the body. A bumper or shock absorbing member **26** is removably mounted in any suitable manner on the nose portion **24** of the body **12**, and is formed of any suitable flexible and resilient material, such as rubber or a synthetic equivalent thereof. Rearwardly of the bumper **26**, the body **12** is provided with a depending projection **28** on the underside thereof, which defines a notch **30** that is adapted to receive the flexible member **32** of a slingshot **34** for launching (see FIGURES 1 and 2).

The airplane body **12** further comprises a pair of generally laterally extending, wing-supporting extensions or projections **36** formed integral therewith and disposed on opposite sides thereof. As illustrated in FIGURE 3, each of the wing-supporting projections **36** is provided with a depending flange **38** at its leading edge, a depending and generally laterally extending rib **40** which intersects at its outer end with the rear portion of the flange **38**, and a depending pivot member **42** which is generally circular in cross-section and disposed rearwardly of the rib **40**. The wings **14** have circular openings **44** near the inner ends thereof through which the pivot members **42** extend to thus pivotally support the wings on the lateral projections **36** of the airplane body **12**. An elongated spring member **46**, formed of any suitable flexible and resilient material, extends through aligned apertures in the pivot members **42**, the body **12** and transverse ribs **48** formed on the undersurface of the wings **14**. The spring member **46** serves to bias each of the wings **14** into an open position, wherein the inner leading edge of each wing engages the adjacent rib **40** on the undersurface of one of the body projections **36** (see FIGURE 3), the ribs **40** serving as means for limiting the opening movement of the wings. Each end of the spring member **46** is provided with a curl or enlargement **50** to prevent the spring member from sliding out of the openings in the transverse wing ribs **48**. It will be apparent, therefore, that the spring member **46** and rearwardly extending beads **52** formed on the ribs **40** of the wing-supporting projections **37**, serve to retain the wings **14** on the pivot members **42**.

A tab **54** is provided on the outer trailing edge of each of the wings **14** and, preferably, is formed integral therewith. Each of the tabs **54** extends both upwardly and downwardly in substantially equal distances from its respective wing **14** at substantially right angles to the upper and lower wing surfaces, and is provided with a straight outer wall **56** and laterally inwardly tapered, upper and lower, inner wall portions **58**, as shown in FIGURES 1 and 2. The wings **14** are so pivotally mounted on the supporting body projections **36** as to be foldable rearwardly into a position wherein their trailing edges abut or are disposed closely adjacent to the body **12** of the airplane (see FIGURES 2 and 3). In this retracted position, the wings **14** are disposed beneath the stabilizers **16**, and the tabs **54** are disposed in abutting relation or closely adjacent to the tail fin **18**. As shown in FIGURE 1, the tail fin **18** is provided with a lower portion **60** which extends beneath the body **12**, so that both the upper and lower portion of the wing tabs **54** are disposed closely adjacent to a portion of the tail fin when the wings **14** are in a retracted position.

In the operation of the instant toy airplane, it is launched preferably in a vertical or near vertical direction, by engaging the flexible member **32** of the slingshot **34** in the notch **30** provided on the undersurface of the forward body portion **24** as shown in FIGURE 2. The wings **14** are pivoted rearwardly against the force of the spring member **46** to their retracted positions wherein the tabs **54** are disposed closely adjacent to the tail fin **18**. Both the upper and lower portions of the tabs are of sufficient size so that the operator may grasp either of them between his fingers and hold them against the tail fin **18** to maintain the wings **14** in a retracted position during launching of the airplane with the slingshot **34**, as illustrated in FIGURE 2. With the wings in this retracted position, and because of the rearwardly tapered leading edge of the wing-supporting projections **36**, the airplane presents a streamlined shape which offers minimum resistance to the passage of air during launching and initial flight.

After the tabs **54** and tail fin **18** are released from the grip of the operator, during substantially vertical launching of the airplane under the force of the slingshot member **32**, the tabs **54** serve to maintain the wings **14** in retracted position against the force of the spring **46**, owing to increased air pressure acting on the outer tab surfaces during the initial flight of the airplane. It is to be understood that the tabs **54** are of a predetermined size, which is relative to the strength of the spring member **46**, so that the air pressure on the frontal or outer area of the tabs during initial flight of the airplane will overcome the resilient force of the spring member, thus preventing the wings from unfolding until substantially the maximum height of projected flight is attained, whereupon the air pressure is substantially reduced to allow the wings to unfold.

Referring to FIGURE 4, as the airplane nears or reaches its maximum height and is decelerating, the air pressure against the surfaces of the tabs **54** decreases to a point where the force of the spring member **46** is sufficient to overcome the diminishing air resistance against the tabs and to open the wings **14**. Thereafter, with the wings in an open position, the flight of the airplane is sustained in a glider-like manner, and it is adapted to land in a gradual and smooth flight path, owing to the air braking effect of the tabs as the plane is descending. The forward portion **24** of the body **12** is curved slightly downwardly, as shown in FIGURE 1, so that the flexible bumper **26** will initially strike the ground during landing to absorb the shock and prevent damage to other parts of the airplane. In addition, because the instant airplane preferably is formed substantially entirely of a flexible plastic material, it is resistant to damage from normal or even abnormal use.

From the foregoing description, it will be readily understood that the instant toy airplane is so constructed that it can be launched like a rocket to provide a minimum of frontal area which in turn reduces air resistance, and then flown and landed like a glider, without requiring further control by the operator or a complicated timing mechanism. The wing tabs of the instant airplane serve the three-fold purpose of enabling the wings to be conveniently manually retained in a retracted position during launching, preventing the wings from opening during the launching and initial flight of the airplane, and reducing the glide velocity as the plane is descending. As an addi-

tional advantage, the simple construction and small number of parts of the instant airplane, and the simple manner of removably securing them, enables the airplane to be easily and cheaply assembled, and the parts thereof to be easily removed for repair or replacement.

It is obvious that many modifications could be made to the instant toy airplane construction without departing from the principles of this invention. For example, the wings could be so pivotally mounted on the body that, in a retracted position, they would be disposed over, rather than under the stabilizers of the airplane; the tabs **54** could be of any suitable shape and relative size other than those specifically disclosed herein, and the tabs need not necessarily extend in equal distances both upwardly and downwardly from the wings **14**; moreover, the wings **14** could be pivotally mounted on the body **12** in any suitable or conventional manner other than the pivotal mounting specifically disclosed herein, and various types of resilient means other than the spring member **46** could be utilized to bias the wings to an open position.

It will be understood that the foregoing description and examples are only illustrative of the present invention, and it is not intended that the invention be limited thereto. All substitutions, alterations and modifications of the present invention which come within the scope of the following claims or to which the present invention is readily susceptible, without departing from the spirit and scope of this disclosure, are considered part of the present invention.

What is claimed is:

1. A toy airplane comprising:

a body having a front end and a tail end,

a pair of wings movably mounted on said body for movement between an open position wherein said wings extend laterally outwardly from said body and a closed position wherein said wings extend substantially parallel to and are disposed closely adjacent to said body, and

resilient means for urging said wings to said open position,

each of said wings having a vertical tab on the outer trailing edge thereof, said tabs being disposed closely adjacent the tail end of said body and adjacent each other when said wings are in said closed position whereby to be easily manually gripped to retain said wings in said closed position against the force of said resilient means during launching of said airplane.

2. The toy airplane of claim **1** wherein said tabs are of a size sufficient to resist opening of said wings after launching and during initial flight of said airplane, owing to increased air pressure acting on said tabs during the initial flight of said airplane.

3. The toy airplane of claim **1** wherein said tabs are rigidly secured to the trailing edges of said wings and extend both upwardly and downwardly therefrom substantially at right angles to the upper and lower wing surfaces.

4. The toy airplane of claim **1** wherein a tail fin is secured to the tail end of said body and extends both rearwardly and downardly therefrom, and wherein said tabs are disposed closely adjacent both sides of said tail fin when said wings are in said closed position.

5. The toy airplane of claim **1** wherein said body comprises lateral extensions on both sides thereof, said extensions having pivot members on which said wings are pivotally mounted.

6. The toy airplane of claim **5** wherein said resilient means comprises an elongated spring member secured to said pivot members and said wings, and wherein said lateral extensions are provided with means for limiting the opening movement of said wings.

7. The toy airplane of claim **6** wherein said front end of said airplane is adapted to receive the flexible member of a slingshot for launching of said airplane, and wherein a flexible bumper member is removably mounted on the front end of said body.

8. A toy glider-type airplane comprising:

an elongated body having a front end and a tail end,

a pair of wings pivotally mounted near the front end of said body for movement between an open position wherein the wings extend laterally outwardly from said body and a closed position wherein said wings extend substantially parallel to and the trailing edges thereof are disposed closely adjacent to said body, and

resilient means secured to said wings and said body for urging said wings to said open position,

each of said wings having a vertical tab formed integral therewith and disposed on the outer trailing edge thereof, said tabs being disposed closely adjacent the tail end of said body and adjacent each other when said wings are in said closed position whereby to be easily manually gripped to maintain said wings in said closed position against the force of said resilient means during launching of said airplane.

9. The toy airplane of claim **8** wherein a tail fin is provided on the tail end of said body and extends rearwardly and downwardly therefrom, and wherein said tabs extend both upwardly and downwardly from the trailing edges of said wings and are adapted to be positioned closely adjacent both the rear and bottom portion of said tail fin when said wings are in said closed position.

10. The toy airplane of claim **8** wherein said body comprises lateral extensions on both sides thereof which are formed integral therewith, said lateral extensions having depending pivot members on which said wings are pivotally mounted for movement in a substantially common plane, and wherein said resilient means comprises an elongated spring member extending through said depending pivot members and said body and being secured to said wings.

References Cited

UNITED STATES PATENTS

2,158,377	5/1939	O'Hare	46—80
2,417,267	3/1947	Porter	46—80
2,746,207	5/1956	Starkey	46—75
3,222,817	12/1965	Brandstetter	46—80

LOUIS G. MANCENE, *Primary Examiner.*

R. F. CUTTING, *Assistant Examiner.*