Oct. 9, 1956 A. HURTADO 2,765,582

TOY FOLDING WING GLIDER AND LAUNCHER

Filed June 10, 1955 2 Sheets-Sheet 1

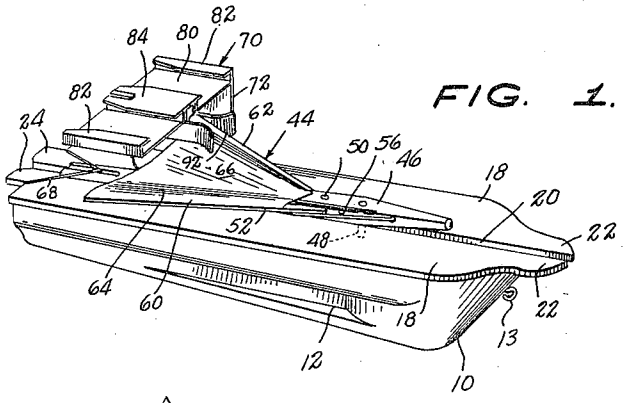



FIG. 1.

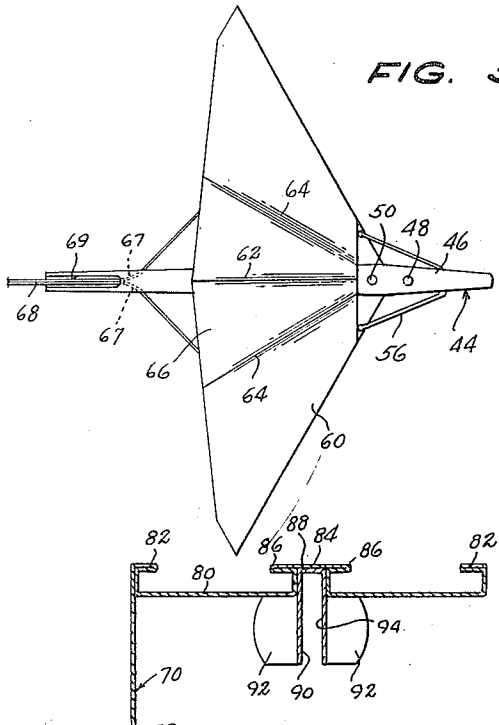



FIG. 5.

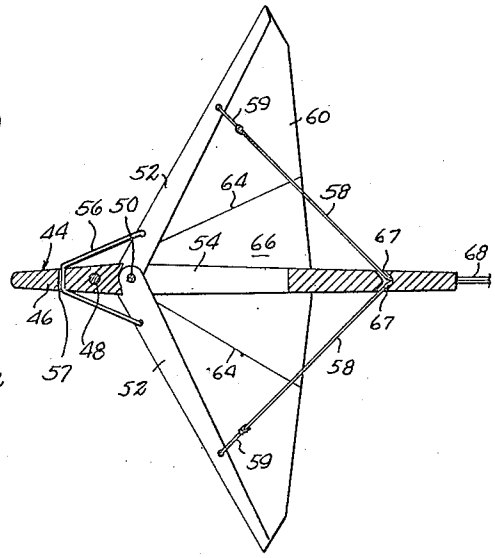



FIG. 6.

FIG. 4.

INVENTOR.
AURELIO HURTADO,
BY
McMorrow, Berman & Davidson
ATTORNEYS

Oct. 9, 1956 A. HURTADO 2,765,582

TOY FOLDING WING GLIDER AND LAUNCHER

Filed June 10, 1955 2 Sheets-Sheet 2

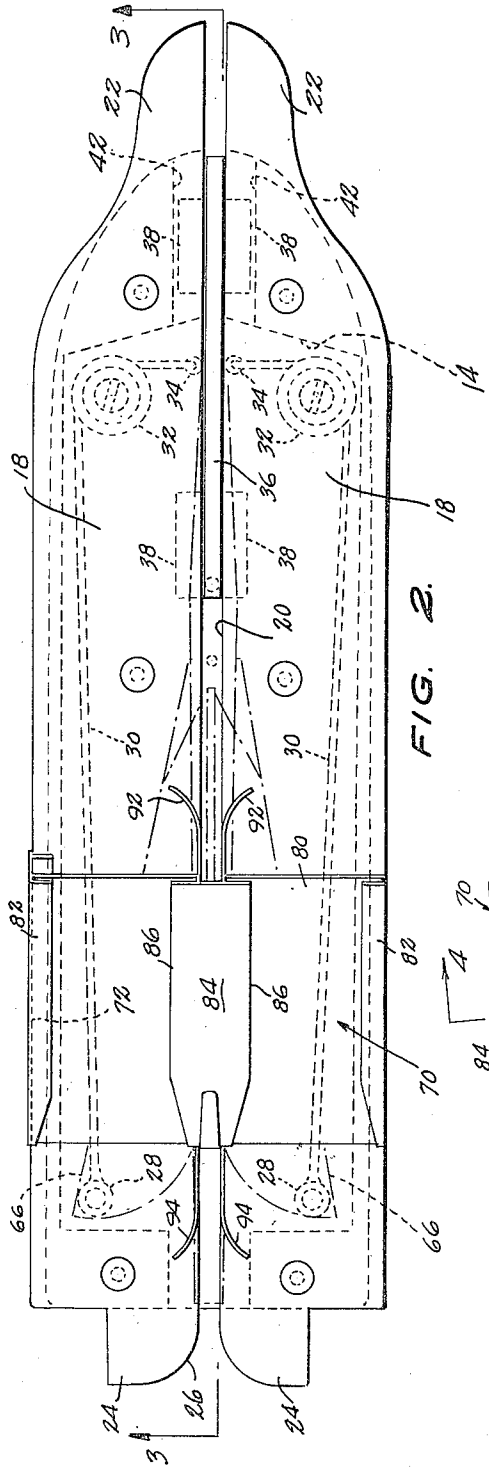


FIG. 2.

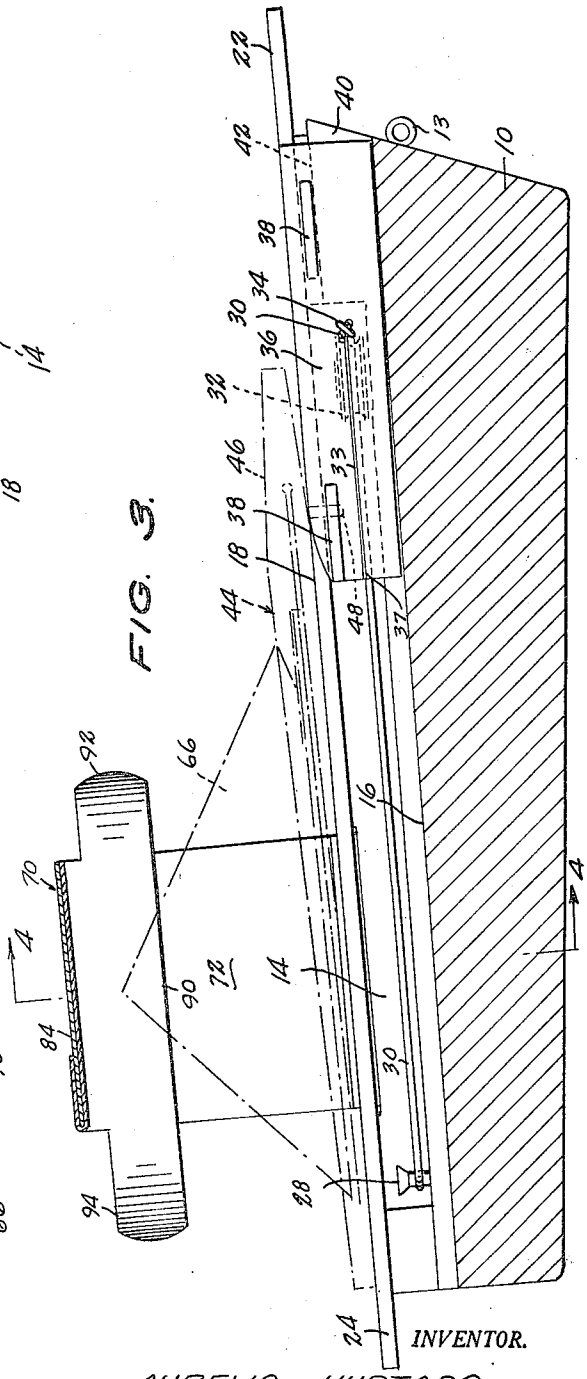


FIG. 3.

INVENTOR.
AURELIO HURTADO,
BY
McMorrow, Berman & Davidson
ATTORNEYS.

United States Patent Office

2,765,582

Patented Oct. 9, 1956



2,765,582

# TOY FOLDING WING GLIDER AND LAUNCHER

Aurelio Hurtado, Taos, N. Mex.

Application June 10, 1955, Serial No. 514,487

3 Claims. (Cl. 46—80)

This invention relates to toys, and more particularly has reference to a toy boat so designed as to simulate a military vessel specifically designed for the launching of guided missiles and similar new weapons of warfare.

The advent of military vessels designed specifically for the launching of guided missiles has been a source of considerable interest to the public, and accordingly, the main object of the present invention is to provide a toy missile boat, which will simulate with considerable faithfulness the full size vessels designed for the launching of missiles of this type.

A further object of importance is to provide a toy vessel as described which can simulate not only a missile launcher, but also, a toy aircraft carrier, the missiles used on the boat being so designed as to be capable of formation in the simulation of aircraft, and being adapted, in fact, when launched, to ascend and then glide to the ground surface.

A further object of importance is to provide novel means for launching the toy missiles or aircraft, which means can be incorporated not only in a watergoing support therefor as described hereinafter, but alternatively, in a toy land vehicle to simulate a movable launching platform for guided missiles or aircraft.

Yet another object is to provide a missile, projectile, or aircraft usable in association with the launching device and the associated watergoing or land vehicle, that will be novelly designed to permit folding of the wings during the time while said missile is awaiting launching, with the wings automatically opening after the missile has been fully launched and is in flight.

Yet another object is to provide a missile boat as described which will be so designed as to include not only a launching platform for a selected missile, but also an elevated support platform for additional missiles, said elevated platform having incorporated therein a guide means for the missile that is being launched.

Still another object is to provide launching means for a toy of the character referred to which will be so formed as to insure that the missile will be projected at a high rate of speed, as the wings thereof open, to provide for prolonged flight of the same after launching.

Other objects will appear from the following description, the claims appended thereto, and from the annexed drawing, in which like reference characters designate like parts throughout the several views, and wherein:

Figure 1 is a perspective view of a missile boat formed according to the present invention;

Figure 2 is an enlarged top plan view, a missile that is to be launched being illustrated in chain dotted lines;

Figure 3 is a longitudinal sectional view in which the missile is again shown in chain dotted outline;

Figure 4 is a transverse sectional view on line 4—4 of Figure 3;

Figure 5 is a top plan view of the missile per se, with wings folded; and

Figure 6 is a view showing the missile from below



with its wings unfolded, the body of the missile being illustrated in section.

The reference numeral **10** designates a supporting body which in the present instance, but not necessarily, is formed as a boat. Alternatively, the body could be mounted on wheels, so as to constitute a rollable vehicle usuable on land to simulate a movable missile launching platform.

In any event, the body **10**, at opposite sides thereof, has longitudinally extending indentations **12**, providing finger grips whereby the body can be held in one hand of the user, when a missile is to be launched. At the front of the body, there is provided an eye **13** to which may be attached a cord, not shown, by means of which the body is drawn through the water.

Formed in the top surface of the body is a relatively shallow recess **14** which in width extends over substantially the full width of the body, and in length terminates adjacent the respective ends of the body, said recess thus occupying the greatest part of the area of the top surface of body **10**.

Formed in the floor of the recess, and extending longitudinally and centrally of the body, is a guide groove **16** of rectangular cross section as shown in Figure 4, said guide groove (see Figure 3) extending fully from end to end of the body, so as to communicate between the respective ends of the body and the opposite ends of recess **14**.

The recess is covered by cover plates **18, 18**, disposed in side by side relation and identically but oppositely formed as shown in Figure 2. The cover plates **18** are secured by screws or equivalent fastening elements to the body **10**, and have straight inter longitudinal edges spaced apart a distance substantially equal to the width of the guide groove **16**, so as to define an upper guide groove **20** between the cover plates. The upper guide groove opens upon the opposite ends of the device as shown in Figure 2, and at their forward ends, the cover plates **18** are formed with longitudinal extensions **22** reduced in width as compared to the width of the main portions of the cover plates so as to provide a faithful simulation of the bow of a missile launching vessel or aircraft carrier and so as, further, to provide the maximum length of the means for guiding the missile when it is being launched, to insure accurate flight of the missile after launching.

At their rear ends, the cover plates **18** are formed with rearwardly projecting extensions **24** of reduced width, having rounded inner edges forming a flared throat **26** communicating with the rear end of the guide groove **20** to facilitate entrance of the missile that is to be launched.

It will be seen from the description which has so far been provided that the supporting body **10** is formed with a cavity over substantially the full area of the top part thereof, and that in communication with said cavity are a lower guide groove **16** and an upper guide groove **18** aligned vertically with the lower guide groove with said guide grooves extending the full length of the body.

Mounted in the recess **14** at the front end thereof (Figures 2 and 4) are pulleys **32** aligned transversely of the recess at opposite sides of the guide grooves, said pulleys rotating in horizontal planes. Trained about the pulleys are elongated elastic elements **30**, such as rubber bands, said elements at one end being connected to upstanding posts **28** (Figures 2 and 3) which can be screws or equivalent elements threaded into the floor of the recess and aligned transversely of the recess at the rear end thereof.

At their forward ends, the elastic elements **30** are connected to inelastic cords **33**, said cords being formed at one end with loops **34** to which the elements **30** are attached. The cords are carried by a propulsion or

catapult plate 36, said plate being of elongated, rectangular outer configuration, and being of flat formation, with the upper and lower longitudinal guide grooves 16, 18 respectively.

The cords 33 are attached to the plate 36 by formation of a small transverse slot 37 formed in the back edge of plate 36, the cords at their rear ends being provided with knots to prevent the same from slipping out of said slot 37. From the slot, the cords 33 extend along opposite sides of plate 36, and at their forward ends, are extended through a transverse opening formed in plate 36 intermediate opposite ends thereof, the portions of the cords extended through said opening formed with loops 34 to which the elastic elements 30 are attached. Thus, the cord 33 extending along one side of plate 36 has a loop 34 at the opposite side of the plate, and the same is true of the cord 33 extending along the other side of plate 36.

By reason of this arrangement, it will be seen that if, against the restraint of the spring action of elastic elements 30, the plate 36 is retracted from the position thereof shown in Figure 3, the elements will be placed under tension. Then, when plate 36 is released, the elements 30, tending to contract, will draw the plate 36 forwardly to the position thereof shown in Figures 2 and 3 at great speed, and as the plate 36 reaches the forward limit of its travel, it will be suddenly brought to a stop with the loops 34 abreast of the forwardmost portions of pulleys 32. The deceleration of the plate 36 will be exceedingly rapid, but there will be no sudden impact of the plate 36 on any portion of the supporting body. Rather, the halting of the plate will be effected with absorption of the shock by the elements 30 since, as the plate 36 tends to move forwardly from its position shown in Figures 2 and 3, the elements 30 will, having now fully contracted, be placed under tension once again to a slight degree, and will pull back on the plate 36 to return to its normal, Figure 2 position.

To further guide the plate 36 in its path of travel from the rear to the forward end of the supporting body 10, there are formed on opposite sides of the plate horizontally, outwardly projecting guide wings 38, there being a pair of said wings at the rear end and a second pair at the forward end of the plate. As the plate reaches the forward end of the vessel, it is guided into a vertically disposed longitudinal slot 40 formed in body 10 as a continuation of the lower longitudinal guide grooves 16, and in communication with slot 40 (Figures 3 and 4) at opposite sides thereof are side guide slots 42 into which the guiding wings 38 move.

The missile, projectile, or aircraft launched by the means hereinafter described has been designated generally at 44, and includes an elongated, tapering body portion 46 having adjacent its nose a depending pin 48. In Figures 2 and 3, the pin 48 has been illustrated in a position adjacent the rear end of the propulsion plate 36. However, in actual use of the device, the pin 48 is placed in front of the propulsion plate, so that the propulsion plate, when propelled forwardly by contraction of the elastic elements 30, will carry with it the missile 44. When the plate 36 reaches the forward limit of its travel, the missile 44 will continue its forward movement at a high rate of speed, since there is nothing disposed forwardly of the pin 48 to retard the launching of the missile.

Spaced rearwardly a short distance from the launching pin 48 is a pivot pin 50, extending through openings formed in the overlapping inner ends of elongated airfoil support arms 52, the pin 50 being disposed in the forward end of an elongated longitudinal slot 54 formed in body portion 46 and opening upon the opposite sides of the body portion to permit folding of arms 52 substantially flat against said opposite sides of the body portion.

Normally urging arms 52 outwardly from the body portion to the positions thereof shown in Figure 6, in which positions the arms 52 are at a wide obtuse angle to one another and are oblique to the longitudinal center line of body portion 46, is a rubber band 56 or equivalent elastic element, the midlength portion of which extends through a transverse slot 57 formed in body portion 46 forwardly of pin 48, and the ends of which are connected to arms 52 a short distance outwardly from the pivot pin 50 thereof.

Rubber band 56, tending to contract, will swiftly urge the arms 52 to their outer positions, to unfold the wings or airfoils of the missile for flight.

An inelastic cord 58 is connected at its opposite ends to links 59 attached to arms 52 intermediate the opposite ends of but closer to the outer extremities of said arms. The cord 58, when pulled to the right in Figure 6, will fold the arms 52 against the opposite sides of body portion 46, against the restraint of the elastic element 56, in a manner to be described hereinafter.

The wings of the missile are formed from a single piece of light, highly flexible material such as a thin plastic or paper, which is glued or otherwise secured to the arms 52 at its leading edge. The airfoil constituted by said wings is formed, in its open condition, substantially in the shape of a low isosceles triangle as shown in Figure 6, and provided in said airfoil medially between opposite ends thereof is a main fold line 62 extending from the leading to the trailing edge of the airfoil as shown in Figure 5 and aligned with the longitudinal center line of body portion 46. Side fold lines 64 are also formed in the airfoil, at opposite sides of the center or main fold line 62, the side fold lines diverging from the leading edge of the airfoil to the trailing edge thereof and being disposed symmetrically with respect to the main fold line.

When the arms 52 are folded against the body portion 46, the airfoil will fold upwardly at its center as shown in Figure 1, to provide a raised center portion 66 therein which in cross section is in the shape of an inverted V.

Formed in body portion 46 adjacent the trailing end thereof are openings 67, which as shown in Figure 6 extend obliquely to the longitudinal center line of body portion 46 and open into the forward end of a bore 69 (Figure 5) formed in body portion 46 and opening upon their rear end thereof. Extending through the opening 67 and bore 69 is the intermediate portion 68 of cord 58, said intermediate portion forming a closed loop adapted to be engaged under the rear extensions 24 of the cover plates in the manner shown in Figure 1.

When the closed loop 68 is pulled to the left in Figure 5, it will pull the arms 52 against the sides of the body portion, to fold the wings of the missile, against the restraint of elastic elements 56, and with the arms folded in this manner the loop 68 can be engaged about the extensions 24 awaiting launching of the missile.

Carried by one of the cover plates 18 is an elevated missile guide assembly generally designated at 70, which can be formed from this sheet metal or the like bent to the cross sectional shape shown in Figure 4. The missile guide assembly includes a side wall 72 disposed in a vertical plane including the outer longitudinal edge of one of the cover plates 18, and extending along the lower edge of side wall 72 are inwardly directed, vertically spaced flanges 74, 76 formed out of the material of the lower edge portion of side wall 72, and defining between them a clamping slot 78 receiving the adjacent outer side edge of cover plate 18, thus to clampably engage the missile guide assembly with the support body and cover plates.

Integral with the side wall 72 at the upper edge thereof is a horizontally disposed platform 80, and to reinforce said platform at opposite sides thereof, folded flanges 82 of inverted L shape in cross section are provided. Intermediate its side edges, the platform 80 is folded to provide an integral raised portion or divider 84 paralleling the side reinforcing flanges 82, the raised portion 84 being formed

to include outwardly, oppositely projecting longitudinal flanges **86** coplanar with the flanges **82**. The provision of the divider **84** defines in the underside of platform **80** a downwardly opening groove **88** extending fully from the leading to the trailing edge of the platform, and engaged in said groove is the bight portion of a missile guide member **90** which in cross section is of inverted U-shape and is removable from the groove whenever desired. The side walls of the missile guide member **90**, at their forward and rear ends, have longitudinal extensions **92**, the extensions diverging in the direction of their free ends to provide flared throats at the opposite ends of the missile guide groove **94** defined by and between the side walls of the guide member **90**.

During the lauching of the missile, the top part of the folded center portion **66** of the airfoil extends within the missile guide groove **94**, to insure that said folded portion will be held against lateral deviation during the launching operation.

The platform **80** forms support surfaces for a pair of additional missiles similar to that shown in Figure 5, said additional missiles not being shown in the drawing. One of these would be disposed at one side of the divider **84** upon the platform, and the other at the opposite side, the missiles being held in place by the cooperating flanges **82, 86** at each side of said divider.

In use of the toy, and assuming that a missile is to be launched, the boat is held in one hand with the fingers of said hand resting in the indentations **12** of body **10**. Then, the missile is placed on the top of the body, with its launching pin **48** in advance of the plate **36**. The plate **36** will at this time be in the position thereof shown in Figures 2 and 3. Then, the user grasps the closed loop **68** of the wing retracting cord **58** and pulls thereon in a direction to the left in Figures 2 and 3.

When the pulling force is exerted, initially, there will be no rearward movement or retraction of the missile and plate **36**. Instead, the initial pulling force will result in folding of the wings against the sides of the body portion **46** of the missile. Then, as said pulling force is continued without interruption, and with the wings fully folded, said force will be transmitted to the body portion **46** and plate **36**, and will cause the same to be retracted, placing elements **30** under tension. When the missile and the plate **36** are fully retracted, the plate **36** will be disposed below the platform **80**.

Then, the user releases the cord **58**, and elements **30**, being now free to contract, forcibly and with great acceleration shift the plate **36** and hence the missile, to the right in Figures 2 and 3. As the missile moves forwardly, and approximately at the time it is just forward of the missile guide assembly **70**, the elastic element **56** will now be free to contract and will swing the arms **52** outwardly to unfold the wings for flight of the missile.

This will result, as the missile disengages from the launching plate **36**, in ascension of the missile into the air, so that the missile is now in full flight and will glide a substantial distance before returning to the ground.

It is believed apparent that the invention is not necessarily confined to the specific use or uses thereof described above, since it may be utilized for any purpose to which it may be suited. Nor is the invention to be necessarily limited to the specific construction illustrated and described, since such construction is only intended to be illustrative of the principles, it being considered that the invention comprehends any minor change in construction that may be permitted within the scope of the appended claims.

What is claimed is:

1. A toy missile launcher comprising a body having a guideway; propulsion means slidable in said guideway and including a plate and a resilient, yielding connection between the plate and body tensioned to shift the plate in one direction within the guideway; a missile including a body portion, foldable wings thereon, resilient, yielding means connected between the wings and body portion tensioned to unfold the wings for flight, a cord connected to the wings for folding the same responsive to pulling of the cord in a direction opposite to said one direction of movement of the plate, and a pin depending from the body portion in the path of movement of the plate in said one direction, thus to in succession fold the wings and then shift the missile and plate in the second named direction, responsive to a pulling force exerted on the cord, said pin being free of connections to the plate to disengage therefrom following release of the cord and movement of the plate and missile in the first named direction under the force exerted thereon by said resilient, yielding connection, to release the missile for flight independently of the plate, said wings being foldable along lines arranged to form a raised portion on the wings aligned with the longitudinal center line of the body portion; and a missile guide assembly mounted on said body in an elevated position above the body, said missile guide assembly having a downwardly opening guide grove receiving the raised portion of the folded wings.



2. A toy missile launcher comprising a body having a guideway; propulsion means slidable in said guideway and including a plate and a resilient, yielding connection between the plate and body tensioned to shift the plate in one direction within the guideway; a missile including a body portion, foldable wings thereon, resilient, yielding means connected between the wings and body portion tensioned to unfold the wings for flight, a cord connected to the wings for folding the same responsive to pulling of the cord in a direction opposite to said one direction of movement of the plate, and a pin depending from the body portion in the path of movement of the plate in said one direction, thus to in succession fold the wings and then shift the missile and plate in the second named direction, responsive to a pulling force exerted on the cord, said pin being free of connections to the plate to disengage therefrom following release of the cord and movement of the plate and missile in the first named direction under the force exerted thereon by said resilient, yielding connection, to release the missile for flight independently of the plate, said wings being foldable along lines arranged to form a raised portion on the wings aligned with the longitudinal center line of the body portion; and a missile guide assembly mounted on said body in an elevated position above the body, said missile guide assembly having a downwardly opening guide groove receiving the raised portion of the folded wings, said missile guide assembly being formed from a single piece of sheet material substantially of inverted L-shape in cross section to define a vertical side wall and a horizontal platform thereon, said side wall being connected at its lower end to one side of the body and said guide groove being formed in the underside of said platform intermediate opposite sides of the platform.

3. A toy missile launcher comprising a body having a guideway; propulsion means slidable in said guideway and including a plate and a resilient, yielding connection between the plate and body tensioned to shift the plate in one direction within the guide-way; a missile including a body portion, foldable wings thereon, resilient, yielding means connected between the wings and body portion tensioned to unfold the wings for flight, a cord connected to the wings for folding the same responsive to pulling of the cord in a direction opposite to said one direction of movement of the plate, and a pin depending from the body portion in the path of movement of the plate in said one direction, thus to in succession fold the wings and then shift the missile and plate in the second named direction, responsive to a pulling force exerted on the cord, said pin being free of connections to the plate to disengage therefrom following release of the cord and movement of the plate and missile in the first named direction under the force exerted thereon by said resilient, yielding connection, to release the missile for flight independently of

the plate, said wings being foldable along lines arranged to form a raised portion on the wings alinged with the longitudinal center line of the body portion; and a missile guide assembly mounted on said body in an elevated position above the body, said missile guide assembly having a downwardly opening guide groove receiving the raised portion of the folded wings, said missile guide assembly being formed from a single piece of sheet material substantially of inverted L-shape in cross section to define a vertical side wall and a horizontal platform thereon, said side wall being connected at its lower end to one side of the body and said guide groove being formed in the underside of said platform intermediate opposite sides of the platform, the platform being formed with a raised divider intermediate said sides thereof, the underside of said divider defining said guide groove, said platform at its opposite sides being formed with raised portions cooperating with the divider in defining spaces between the divider and said raised portion in which spare missiles may be supported on the platform.



**References Cited** in the file of this patent

UNITED STATES PATENTS

| | | |
|---|---|---|
| 1,063,803 | Jones | June 3, 1913 |
| 1,599,280 | Lewis | Sept. 7, 1926 |
| 2,289,702 | Fast | July 14, 1942 |
| 2,306,866 | Crary | Dec. 29, 1942 |
| 2,540,303 | Sylvester | Feb. 6, 1951 |