Dec. 13, 1927. 1,652,519

R. E. DOWD

FLYING TOY

Filed April 25, 1924 2 Sheets-Sheet 1

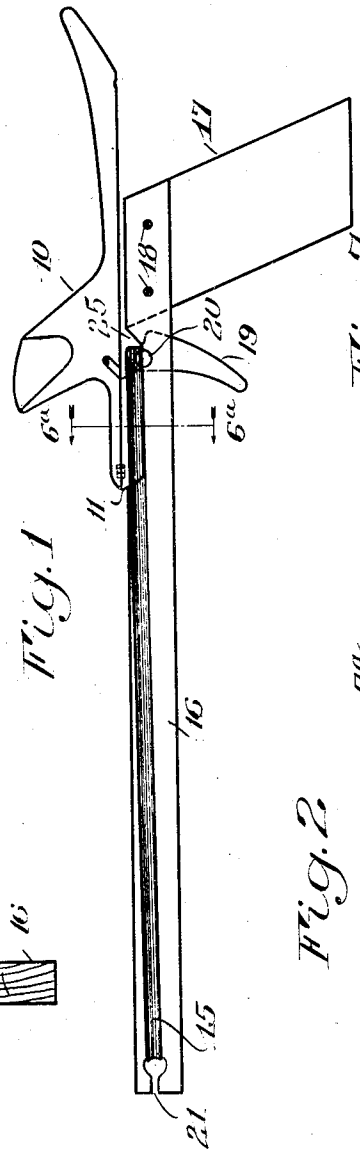


Fig. 1

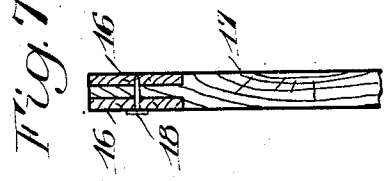


Fig. 7

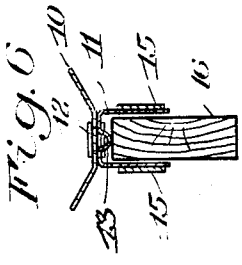


Fig. 6

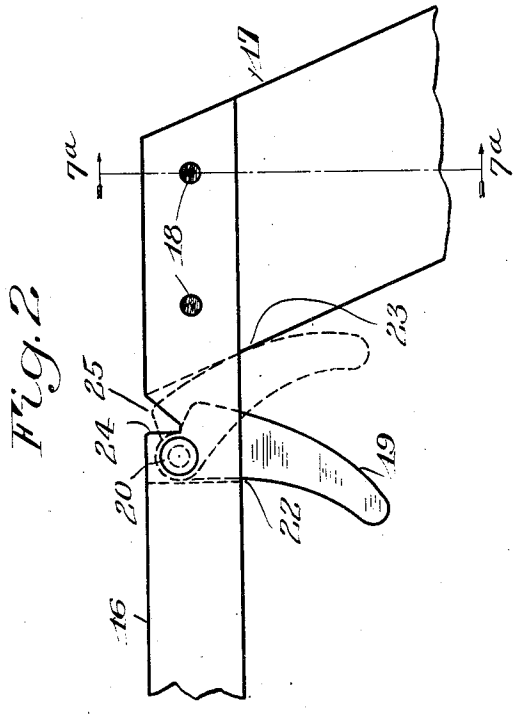


Fig. 2

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Fig. 3

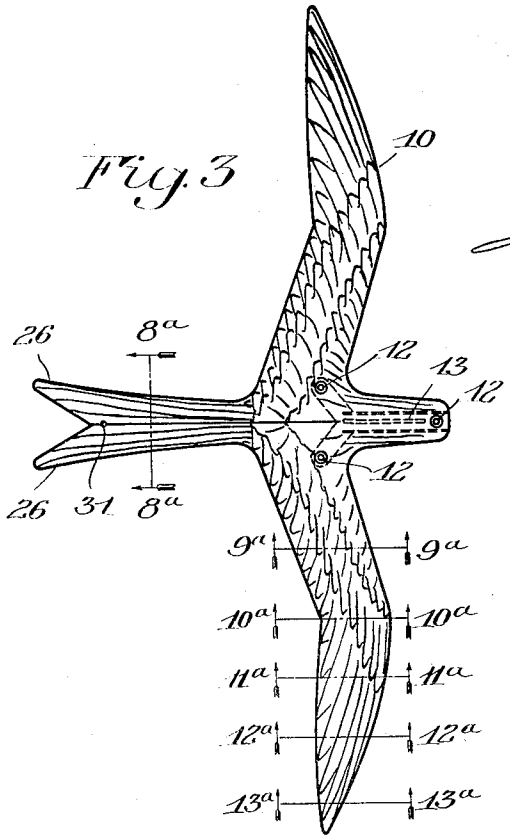


Fig. 1

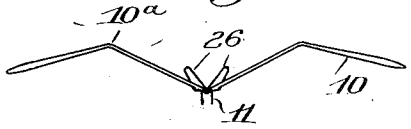


Fig. 8

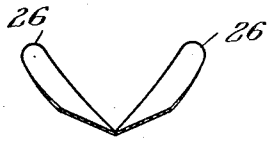


Fig. 9



Fig. 10



Fig. 11



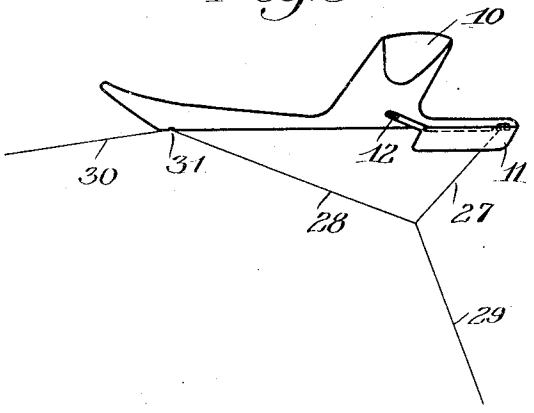
Fig. 12



Fig. 13



Fig. 5



Datum Line

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UNITED STATES PATENT OFFICE.

RAYMOND E. DOWD, OF SPRINGFIELD, MASSACHUSETTS.

FLYING TOY.

Application filed April 25, 1924. Serial No. 709,055.

This invention relates to flying toys, the chief object being to provide therefor a combination toy that may be catapulted into the air by a special form of gun, launched into the air by a swing of the arm, or flown to great heights as a kite. Another object being the provision of a toy that is simple and inexpensive to manufacture, yet of such design and construction as to have a high degree of aerodynamic efficiency as well as sufficient strength and rigidity to maintain its accuracy of form when in use.

Still another object of the present invention is the provision of a flying toy of such a form as to have positive inherent stability allowing its successful operation by an unskilled operator, and under adverse atmospherical conditions. To these and other ends the invention consists of 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 side elevation of a flying object mounted upon a catapult device embodying the present invention.

Figure 2 is an enlarged detail of the releasing trigger of the catapult device.

Figure 3 is a top plan view of the flying object of the toy.

Figure 4 is a front elevation of the same.

Figure 5 is a side elevation of the same, showing the arrangement of the cords when the toy is flown as a kite.

Figure 6 is a sectional view of the front end of the toy, taken on line 6^a—6^a of Figure 1.

Figure 7 is a sectional view of the catapult or gun handle taken on line 7^a—7^a of Figure 2.

Figure 8 is a sectional view of the tail of the toy, taken on line 8^a—8^a of Figure 3.

Figures 9 to 13 inclusive are sectional views taken on lines 9^a—9^a to 13^a—13^a inclusive of Figure 3 showing the wing curves and their respective angles relative to the horizontal datum line.

Similar reference numerals thruout the several views indicate the same parts. The preferred embodiment of the invention comprises an airplane of the glider type made up in bird-like form, constructed of relatively light sheet material having a reinforcing and protective skin of vitreous material as more fully described hereafter. At its forward end a ballasting metal clip is secured which cooperates with a rubber band of the catapult or gun when the object is projected into the air. This forward end also provides a grip for launching from the hand as well as strengthening the wings and head of the object.

I am aware that various types of catapult and sling shot flying toys are well known to the prior art as well as various types of gliders made to roughly simulate a bird with outstretched wings but I known of none in which the various dihedral angles and incidence combinations, combined with an exceedingly simple launching device, are to be found. It is upon these features that the advantageous performance of this toy depends and it will be noted that the aerodynamic principles here applied to the motorless or glider type of airplane are also applicable to the power driven type as well and also to types other than the monoplane.

Referring more particularly to the drawings it will be noted in Figures 1, 3, 4, 5 and 6, that the flying object 10 is made of sheet material, preferably a single sheet of light, stiff, tough, fibrous material which will form readily and which will, when encased in a skin or film of highly elastic vitreous material such as celluloid, possess remarkable resistance to permanent deformations that might result in impacts or rough handling. In order to stiffen the construction further, corrugations or embossings representing the feathers as indicated in Figure 3 may be resorted to, but their presence will be found to have a detrimental effect on the flight of the object due to the increased resistance. As stated before, the object is given a generally birdlike form and the inner parts of the wings are given a pronounced dihedral which is carried through to the tail as shown in Figure 4. This dihedral, however, loses its prominence at the forward end under the clamping action of the eyelet 12, taking a form as shown in Figure 6. This sharp dihedral serves as a backbone for the object as well as introducing through the side area of the tail the proper amount of keel or fin area to bring the directional center or center of lateral area to its correct location relative to the center of gravity so that complete circular return flights are possible when the object is launched with a lateral inclination, as well understood in the art. The tips of the tail

26 are upturned slightly so as to improve the longitudinal stability, a feature understood in the art. The dihedral angle of the wings extends out about half the length of each wing where it changes at 10° to a downward angle as clearly shown in the front elevation. The change in the dihedral is accompanied by a progressive reduction of the angle of the wing section to the flight path known as the angle of incidence. This reduction of the angle of incidence is clearly shown by the sections in Figures 9 to 13 inclusive.

At the forward end of the object is a ballasting means 11 preferably a clip made of sheet metal having at its rear end two short lateral arms which are secured to the wings by the eyelets 12. A third eyelet 12 secured the front end of the clip to the head of the object. On either side of this head clip flanges or extensions are bent down to provide a grooved or channel shaped part for slidably embracing the guideway on the gun, and finger and thumb grips when launching by hand. A stiffening corrugation 13 runs lengthwise of the clip.

The catapult device is preferably made in the form of a gun of wood or other suitable material. The elongated element or rod 16 corresponding to the barrel is rectangular in section and slotted to receive the releasing trigger 19 and the tongue of the grip 17 which is fastened in place by nails 18. A resilient member or rubber band 15 furnished the desired starting impulse. This band is secured to the barrel by means of a recess 21 cut in the end of the element 16 with a restricted opening as shown through which the band is removably engaged and when stretched for use the band is engaged in the notch 24 of the barrel. This construction provides convenient means for using driving elements of different resilient force. Thus a light band may be used indoors interchangeably with a heavier band for out of doors. The trigger 19 is loosely mounted on a flat headed rivet 20 so that it is free to swing down until it is brought to a stop against the end of the slot 22. The lifting surface of the trigger 25 is then entirely clear of the band. When the gun is thus "cocked" the bird is placed upon the barrel so that the downwardly extending flaps of the clip 11 are inside the rubber band. The band when extended along the element or barrel in embracing relation therewith serves to embrace and clamp the device or clip 11 and thus affords a simple means of retaining the bird on the gun until the trigger 19 is pulled which causes the rubber band to be lifted out of the notch by the shoulder 25. The rearward stop of the trigger is the grip at 23.

The use of the gun as a launching means, allows even the novice to achieve remarkable flights from the toy. For example, if the gun is pointed upwards, a "loop the loop" is made; if it is pointed more or less level, but with a lateral inclination, a circular flight will result, the bird "banking" around a circle and returning approximately to its starting point. The ever changing atmospherical conditions cause unexpected maneuvers to take place, greatly enhancing the interest in the toy.

When it is desired to fly the object as a kite, a light cord or thread is attached as shown in Figure 5 in which 27 and 28 are front and rear parts of the bridle secured to the eyelet 12 at the nose and to a hole 31 in the tail. The regular kite line is shown at 29. It is possible to fly this object without a tail of any kind, but since it is a perfectly balanced glider, it has been found to pitch over during a lull in the wind and to glide upwind, slackening the line. A light thread 30 ten or twelve feet in length, fastened to the hole 31 will obviate any such tendency and will greatly stabilize the flight. When high in the air, the tail 30 and the line 29 are invisible and the object floats like a live bird to and fro, on the changing air currents.

From the foregoing description it may be readily understood that the present embodiment represents but a small part of the possibilities of the invention and that the toys may be made in a variety of designs and sizes for countless different purposes and yet remain within the scope of the invention.

I claim as my invention:

1. In a flying toy, a flying object, projecting means therefor having an elongated element, a channel-shaped part on said object for slidably embracing said element and a resilient loop secured to and embracing said element and arranged in extended position to embrace and retain said channel-shaped object part thereon, and trigger means for holding said loop extended and for releasing the same to slide said object part along said element to project the object into the air.

2. In a flying toy, a flying object, projecting means therefor having an elongated element, a channel-shaped part on said object for slidably embracing said element a recessed portion adjacent one end of said element, a resilient rubber loop secured adjacent the opposite end of said element and adapted to be extended therealong and engaged in said recessed portion, said loop being arranged in extended position to embrace said element and said channel-shaped object part and retain the latter on said element, and a device for releasing said loop from said recessed portion to project the object along said element and into the air.

3. In a flying toy, a flying object, projecting means therefor comprising a rod form-

ing a guideway and having a handle adjacent one of its ends and adjacent the other a recess with a restricted opening, a part on said object for slidably embracing said rod, and a plurality of rubber loops of different resilient strength adapted to be interchangeably engaged in said rod recess and extended along said rod for engagement with said object to project the same along said rod guideway and into the air.

4. In a flying toy, a flying object, projecting means therefor comprising an elongated element forming a guideway, a channel shaped clip secured to said object in position to strengthen and ballast the same and having depending flanges for slidably embracing said element, and resilient means secured to said element and extensible therealong for engaging and sliding said object along said element and projecting the same into the air.

5. In a flying toy, a flying object comprising a body portion and sustaining planes, projecting means for said object including an elongated element forming a guideway, a channel shaped metal clip secured to said body portion and having laterally extended portions secured to said planes for ballasting and reinforcing said object, said clip being arranged with its flanges depending to serve as a hand grip and also for slidably embracing said element, and resilient means on said projecting means for projecting said object along said element and into the air.

6. In a flying toy, a flying object of monoplane type comprising a body and wings of sheet material, projecting means for said object including a guideway, a channel shaped metal clip secured to the forward end of said body and having laterally extended portions secured to said wings to ballast and strengthen said object, said clip having its flanges depending for slidably embracing said guideway, and a resilient element secured to said projecting means, and extensible along said guideway for engagement with said object to project the same along said guideway and into the air.

7. In a flying toy, a flying object comprising a single sheet of relatively stiff material cut to form a body and wings, a channel shaped clip on said body, and projecting means comprising a guideway adapted to be slidably embraced by said clip and resilient means for projecting said object along said guideway and into the air.

8. In a flying toy, a flying object constructed of sheet material to provide a body and wings of generally birdlike shape, said wings being arched in the direction of spread and curved at their forward edges to afford an angle of incidence to the flight path, and projecting means for said object having substantially the shape of a gun and comprising a barrel-like rod with resilient means for projecting said object along the latter and into the air.

9. In a flying toy, a flying object comprising sheet material cut into the shape of a body and wings, said wings being arched in the direction of spread and formed at their forward edges to an angle of incidence with the flight path decreasing progressively in magnitude from the body toward the wing tips, and means for projecting said object into the air.

10. In a flying toy, a flying object comprising relatively light and stiff sheet material cut into the shape of a body and wings of generally bird-like outline and bent upwardly longitudinally of the body from head to tail to form a dihedral angle, said wings having the outer ends thereof turned downwardly and their forward edges formed to provide an angle of incidence with the flight path decreasing progressively in magnitude outwardly from the body.

11. In a flying toy, a flying object comprising relatively light and stiff sheet material cut into the shape of a body having a tail portion and laterally extending wing portions and bent upwardly at opposite sides of its longitudinal center to form a dihedral angle, said tail portion being turned upwardly at the rear end thereof and said wing portions having their outer ends turned downwardly and their forward edges formed to provide an angle of incidence to the flight path decreasing progressively in magnitude outwardly from the body.

12. In a flying toy, a flying object constructed of a single sheet of material cut into the shape of a body having head and tail portions and laterally extending wing portions and bent upwardly at opposite sides of its longitudinal center to form a dihedral angle, said wings having their outer ends turned downwardly and their forward edges formed to provide an angle of incidence to the flight path, and a device on said head portion for launching said object and serving also to ballast the same.

13. In a flying toy, a flying object constructed of a single sheet of fibrous material having a vitreous coating cut into the shape of a body provided with head and tail portions and laterally extended wings and bent upwardly at opposite sides of the longitudinal center line to form a dihedral angle, said tail portion being turned upwardly and said wings having their outer ends bent downwardly and their forward edges curved to an angle of incidence with the flight path, and a device on said head portion for launching said object serving also to ballast the same.

RAYMOND E. DOWD.