Feb. 13, 1940. F. SCHIMPFLE 2,189,763

AERIAL TOY

Filed Sept. 21, 1939

FIG. 1.

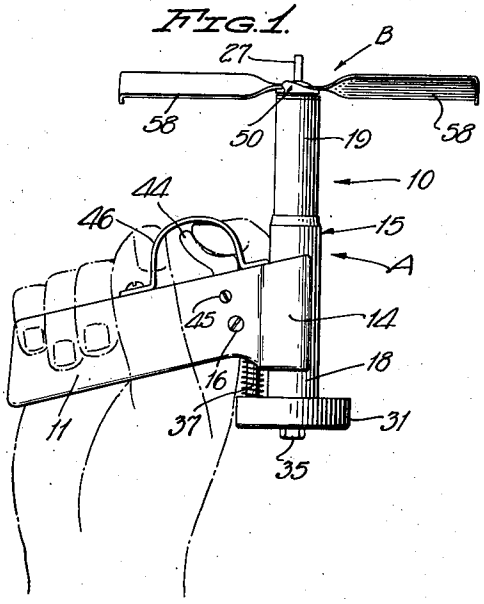


FIG. 2.

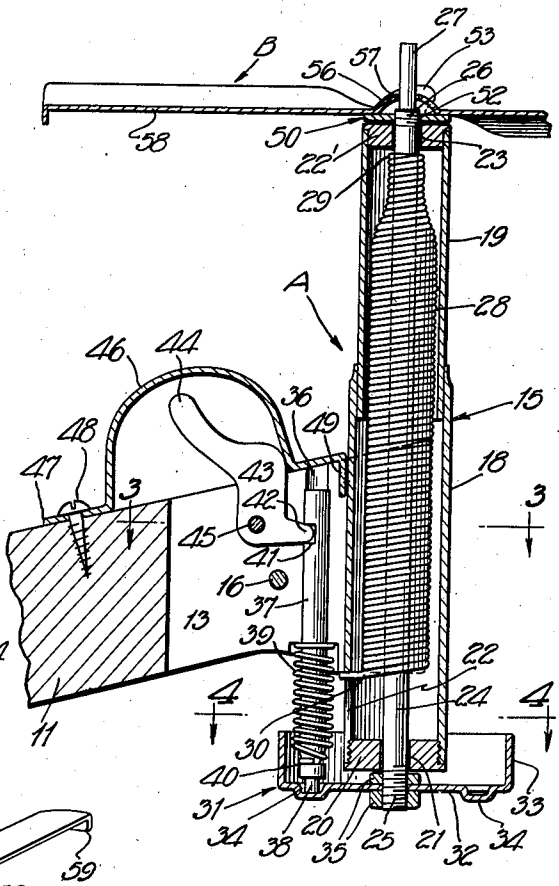


FIG. 3.

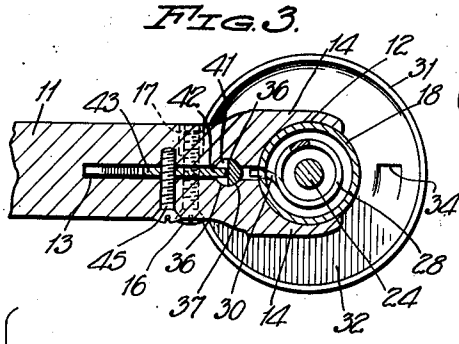


FIG. 5.

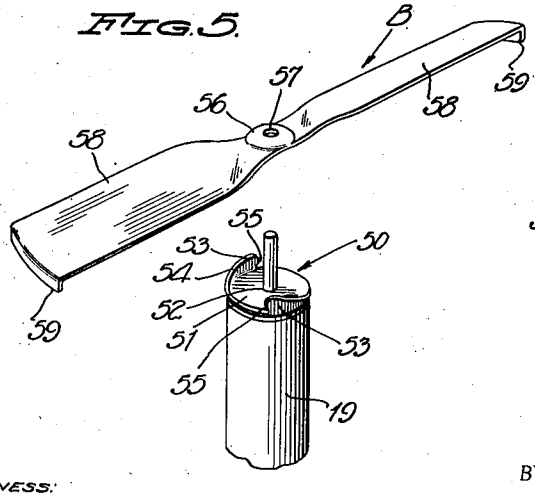
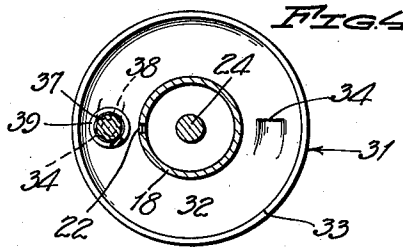


FIG. 4.



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AERIAL TOY

Frank Schimpfle, Garwood, N. J.

Application September 21, 1939, Serial No. 295,871

5 Claims. (Cl. 46—84)

This invention relates to improvements in aerial toys of the type in which a propeller element is projected into the air for a limited sustained flight.

One of the several features of the invention resides in an aerial toy in which the propeller projecting device consists of a spring wound gun which resembles a revolver in appearance, but which is extremely safe, in that it must be pointed upwardly to actuate when it is desired to impart an impelling force to the propeller, thus preventing the propeller from being aimed at bystanders.

Another feature of the invention is to provide an aerial toy in which the projecting device is capable of projecting a whirling propeller relatively high into the air, and which will remain aloft until the whirling energy of the propeller is spent, after which it gently falls to the ground in the fashion of a leaf so that no personal or property injury is likely to occur.

A further feature of the invention is the provision of a spring wound aerial toy which is easy to wind, and which is securely held in a "cocked" position until a definite pull is exerted upon the releasing trigger to prevent the aerial toy from being accidentally operated.

A still further object of the invention is to provide an aerial toy embodying the above mentioned features which is simple and inexpensive of construction, and amusing and entertaining to adults as well as children.

Other features of the invention will appear as the following specification is read in conjunction with the drawing, in which,

Figure 1 is a side elevational view of my aerial toy in a position to be actuated, the hand of an operator being illustrated in dot and dash lines.

Figure 2 is an enlarged fragmentary vertical longitudinal sectional view.

Figure 3 is a horizontal sectional view on the line 3—3 of Figure 2.

Figure 4 is a horizontal sectional view on the line 4—4 of Figure 2.

Figure 5 is a detail perspective view of the outer propelling end of the gun and an aerial propeller member illustrated in separated relation.

Referring to the drawing by reference characters, the numeral 10 designates my improved aerial toy in its entirety which broadly includes a projector device A, and a propeller element B. The projector device A resembles a gun or a revolver, and includes a hand grip member or stock 11 which may be made of wood, or of any molded composition. The hand grip member 11 has one of its ends provided with a substantially semi-circular shaped recess 12, and the hand grip member is provided with a slot 13 which extends inwardly from the recess 12, and the recess and the slot define a pair of resilient furcations or jaws 14—14. Seated in the recess 12 is the enlarged end of a tubular casing or barrel 15, and the said casing or barrel is held or gripped by the jaws 14—14 which are brought together by a screw 16 which passes transversely through the hand grip at the slotted portion thereof, the screw entering one side of the hand grip and being threadedly connected to an internally screw threaded sleeve 17 countersunk in the other side of the hand grip. By tightening the screw 16, the furcations or jaws 14—14 will be brought into tight clamping engagement with the barrel 15.

The barrel 15 includes an enlarged inner tubular section 18 and a reduced outer tubular section 19, the sections 18 and 19 telescoping each other and being fixedly connected together by a tight friction fit, or by any other suitable means. Threaded into the outer end of the casing section 18 is a plug cap 20 having a central opening 21 therein. The outer end of the casing section 18 is provided with a slot 22, the said slot extending inwardly from the outer open end of the section 18. The outer end of the section 19 is provided with a plug cap 22', the same being rigidly fitted into the casing section 19 so as to be fixed therein. The plug cap 22' is provided with a central opening 23 disposed in axial alinement with respect to the opening 21. Extending through the openings 21 and 23 is a shaft 24, the inner end of the shaft extending beyond the plug cap 20 and being screw threaded as at 25. The outer end of the shaft 24 projects beyond the plug cap 22' and is provided with a screw threaded portion 26. The shaft 24 beyond the screw threaded portion 26 is reduced in diameter to provide a reduced extension 27. Disposed within the casing 15 and surrounding the shaft 24 is a coil spring 28, the outer end of which is fixedly connected to the shaft 24 as at 29, while the opposite end of the coil spring terminates in a straight extension piece 30 which passes through the slot 22 in the casing section 18. It will thus be understood that one end of the spring 28 is fixed to the shaft 24 while the opposite end is connected for sliding movement relative to the casing section 18 by reason of the extension piece 30 passing through the slot 22. The extension piece 30 abuts the inner end of the slot 22 when the spring 28 is fully unwound, and slides outwardly as the spring is wound, the outward sliding movement being caused by the

lengthening of the spring when placed under tension.

Carried by the threaded end 25 of the shaft 24 is a winding ratchet wheel 31 which includes an annular disk or end wall 32 having an annular flange 33 integral therewith and extending forwardly thereof. Struck outwardly from the end wall 32 are a pair of diametrically opposed ratchet teeth 34. Jamb nuts 35 are threadedly connected to the threaded portion 25 at opposite sides of the end wall 32 for securely fastening the ratchet wheel 31 to the shaft 24 so that the wheel and the shaft turn as a unit.

The opposed side walls of the slot 13 are provided with oppositely disposed semi-circular shaped recesses 36, which recesses parallel the recess 12, and provide bearing seats for a slidable ratchet pin 37. The pin 37 extends beyond one side of the hand grip in alinement with the circumferential plane of the ratchet teeth 34 so that the reduced outer end of the pin 37 which is designated 38, rides against the inner side of the disk wall 32 and operatively engages the ratchet teeth 34 as the wheel 31 is rotated. A compression coil spring 39 has one of its ends seated against the hand grip member 11 and the other end against a shoulder 40 formed on the ratchet pin inwardly of the reduced end 38, the said spring encircling a portion of the ratchet pin 37 for the purpose of normally urging the reduced end 38 of the ratchet pin against the inner side of the disk wall 32. The inner end of the ratchet pin 37 is provided with a notch 41, and seated in the notch 41 is the nose 42 of a trigger 43, the said trigger having a finger piece portion 44 extending beyond the hand grip member 11. The trigger 43 is disposed in the slot 13 and is pivotally mounted therein by a pivot pin 45. A trigger guard 46 protects the finger piece 44 and consists of a strap of metal bent into substantially U-shape, one end terminating in an ear 47 which fits against the hand grip 11 and is secured by a screw 48. The opposite end of the trigger guard terminates in an inwardly extending ear 49 which fits between the barrel 15 and the wall of the recess formed in the wall of the recess 12. In view of the fact that the wheel 31 is turned in a clockwise direction to effect winding of the spring 38, the screw threaded portion 26 is formed by left hand threads, and threadedly receives a projector member 50. The projector member 50 includes a flat disk base 51 having a threaded central aperture 52 which threadedly engages the threads 26 and extending outwardly at right angle to the flat base 51 are cam lugs 53—53, the same being disposed in a diametric relation. Each cam lug 53 includes a gradually rising cam surface 54 and a shoulder 55 at the high end thereof. The projector element 50 turns with the shaft 24 and in view of the fact that the shaft rotates in a counter-clockwise direction during unwinding of the spring and that left hand threads are provided for securing the element 50 to the shaft, there is no likelihood of the projector element becoming unscrewed from the shaft during a projecting operation.

The propeller element B is constructed of a single length of metal and includes a dome shaped hub 56 having a central aperture 57 therein, of a size to fit the reduced extension 27 of the shaft 24. Extending from the hub portion 56 are opposed blades 58—58, the blades being of the same pitch but canted in reverse directions. The tip ends of the blade terminate in downwardly extending flanges 59 to eliminate the danger of sharp edges which might be injurious, should the ends of the blades come in contact with the hands of the user.

In practice, assume that it is desired to propel one of the propeller elements B into the air. The operator imparts a clock-wise turning movement to the ratchet wheel 31, which causes the shaft 24 to turn and accordingly winds the coil spring 28, thus placing the coil spring under tension. The wheel is turned until such time as the spring becomes tightly wound, and unwinding of the spring is prevented by reason of the reduced end 34 of the ratchet pin 37 engaging one of the ratchet teeth 34. Assuming now that the spring has been sufficiently wound, the operator may now grasp the projector device A in the manner shown in Figure 1, and proceeds to place the propeller element B on the projector element 50 by inserting the outer reduced end 27 of the shaft 24 through the opening 57. The concave side of the dome shaped hub 56 acts to guide the portion 27 of the shaft to the opening 57, to expedite the positioning of the propeller element B upon the projector element 50. The blades 58 of the propeller element B extend at right angle to the opposed relation of the cam lugs 53, and the propeller element is locked against rotation in a clock-wise direction by reason of the engagement of opposite sides of the propeller element with the stop shoulders 55. With the aerial device in the position shown in Figure 1, the operator may now place his finger on the trigger piece 44 and depress it, causing the trigger 43 to be actuated whereby the nose 42 moves the ratchet pin 37 inwardly against the action of the spring 39 and accordingly disengages the reduced end 34 of the ratchet pin from the path of the ratchet teeth 34. With the ratchet wheel released, the wound spring 28 imparts rapid rotation to the shaft 24 and the propeller element B is cammed off the propeller element 50 by the rotating cam surfaces 54. It is the initial force or impulse which is imparted to the propeller element B by the cam surfaces 54 that projects and propels the element B upwardly into the air. As the propeller element B slides off the extension 27 of the shaft 24, it proceeds to climb and continues to rotate until the force is spent. When the force imparted to the propeller element B becomes spent, the same drops to the ground in the manner of a leaf and may be retrieved by the operator and reused. It will be understood that the altitude reached by the propeller element B is dependent upon the energy stored up by the spring, and the lightness and pitch of the propeller element B. In order to obtain the maximum altitude, the projector device A should be held with the outer end of the barrel facing up as illustrated in Figure 1, although the propeller member might be projected at an angle of approximately 45°, but it is impossible to project the same horizontally for any appreciable distance which might cause injury to a bystander, for the reason that the cam surfaces 54 are insufficient to impart any great amount of projecting force to the propeller element when the projector is so held.

While I have shown and described what I consider to be the most practical embodiment of my invention, I wish it to be understood that such changes in construction and design as come within the scope of the appended claims may be resorted to if desired.

Having thus described the invention, what I claim as new and desire to secure by Letter Patent of the United States, is:

1. An aerial toy comprising in combination, a tubular casing, a shaft journaled at opposite ends of said casing and extending therebeyond, a coil spring having one of its ends fixed to said shaft and its other end freely connected to said casing, a hand operated ratchet wheel fixed to the inner end of said shaft having ratchet teeth on the inner side thereof, a slidable spring actuated ratchet pin having one of its ends normally engaging a tooth of said ratchet wheel to prevent rotation of said shaft when placed under tension of said spring by the manual turning of said ratchet wheel in one direction, trigger means operable for disengaging said ratchet pin from engagement with the tooth of said ratchet wheel, a projector element fixedly attached to the outer end of said shaft including a pair of outwardly extending diametrically opposed cam surfaces, and a propeller element normally seated upon said projector element intermediate the opposed cam surfaces thereof.

2. An aerial toy comprising in combination, a hand grip member, a tubular casing fixedly mounted at one end of said hand grip member and disposed transversely thereof, a rotatable shaft journaled at the ends of said casing and extending therebeyond, a coil spring encircling said shaft and disposed within said casing, one end of said coil spring being fixedly secured to said shaft and its other end slidably connected to said casing, a hand operated ratchet wheel fixed to the inner end of said shaft having ratchet teeth on the inner side thereof, a ratchet pin slidably mounted in said hand grip member and disposed parallel to the axis of said shaft, spring means acting to normally hold the outer end of said ratchet pin in operative engagement with a tooth of said ratchet wheel to prevent rotation of said shaft when placed under tension by said spring upon rotation of said ratchet wheel in one direction, a notch provided adjacent the inner end of said ratchet pin, a trigger member pivotally mounted on said hand grip member having a finger piece extending forwardly beyond said hand grip member and a nose portion extending into said notch, a projector cam element fixed to the outer end of said shaft, and a propeller element normally seated on said projector element and adapted to be cammed off said projector element upon the placing of said spring under tension by the manual turning of said ratchet wheel in one direction and by releasing the spring tension by manual actuation of said trigger member to effect disengagement of the ratchet pin from the tooth of said ratchet wheel.

3. An aerial toy including a cylindrical casing, a rotatable shaft journaled in the ends of said casing and extending therebeyond, releasable ratchet means connected to the inner end of said shaft, a coil spring surrounding said shaft and enclosed within said casing, said coil spring having one of its ends fixed to said shaft and its other end slidably connected to said casing, said shaft adapted to be placed under the tension of said spring upon rotation of said shaft in one direction, a projector element fixed to the outer end of said shaft, said projector element including a pair of diametrically opposed outwardly extending cam surfaces, a propeller member having a dome shaped hub portion provided with a central aperture, said propeller member being seated on said projector element between said cam surfaces with the end of the shaft passing through the aperture in the hub portion thereof, whereby the release of the releasable ratchet means when said spring is under tension will cause said shaft to rotate and said cam surfaces to impart rotation to said propeller member and cam the same free of the end of the shaft and project the propeller member into aerial flight.

4. A gun type projector device for rotatably projecting a propeller into aerial flight comprising a solid hand grip having a recess extending across one end thereof and a slot extending inwardly from said recess and defining a pair of yieldable furcations, a cylindrical casing having an intermediate portion thereof seated in said recess, screw means passing through the furcations for causing the furcations to clampingly engage said cylindrical casing, a shaft journaled for rotation in the ends of said casing and projecting therebeyond, a hand wheel fixedly mounted at the inner end of said shaft, a windable coil spring surrounding said shaft within said casing having one of its ends fixed to said shaft and its other end connected to said casing, ratchet teeth provided on the inner side of said hand wheel, a ratchet pin slidably mounted in said hand grip and disposed parallel to said cylindrical casing, spring means acting to hold one end of said ratchet pin in the path of turning movement of the ratchet teeth, trigger means mounted in said hand grip and manually operable for moving said ratchet pin out of the path of said ratchet teeth, and propeller projector means fixedly mounted on the outer end of said shaft.

5. A gun type projector device for rotatably projecting a propeller into aerial flight comprising a solid hand grip having a recess extending across one end thereof and a slot extending inwardly from said recess and defining a pair of yieldable furcations, a cylindrical casing having an intermediate portion thereof seated in said recess, screw means passing through the furcations for causing the furcations to clampingly engage said cylindrical casing, a shaft journaled for rotation in the ends of said casing and projecting therebeyond, a hand wheel fixedly mounted at the inner end of said shaft, a windable coil spring surrounding said shaft within said casing having one of its ends fixed to said shaft and its other end connected to said casing, ratchet teeth provided on the inner side of said hand wheel, a ratchet pin slidably mounted in said hand grip, and disposed parallel to said cylindrical casing, spring means acting to hold one end of said ratchet pin in the path of turning movement of the ratchet teeth, a pivot pin bridging said slot and mounted in said furcations, a trigger member pivotally mounted on said pivot pin having a finger piece extending forwardly beyond the hand grip member and a nose portion extending into a notch provided in said ratchet pin, whereby manual actuation of said trigger member will cause said ratchet pin to move out of the path of the ratchet teeth on said hand wheel.

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