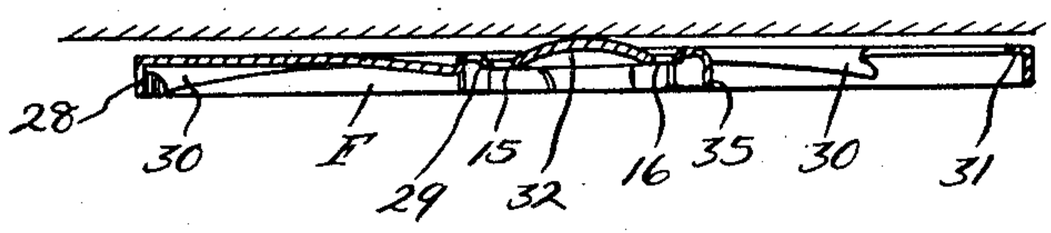
May 9, 1933. H. J. ABRAMS 1,907,697

AERIAL TOY

Filed March 14, 1932 2 Sheets-Sheet 1



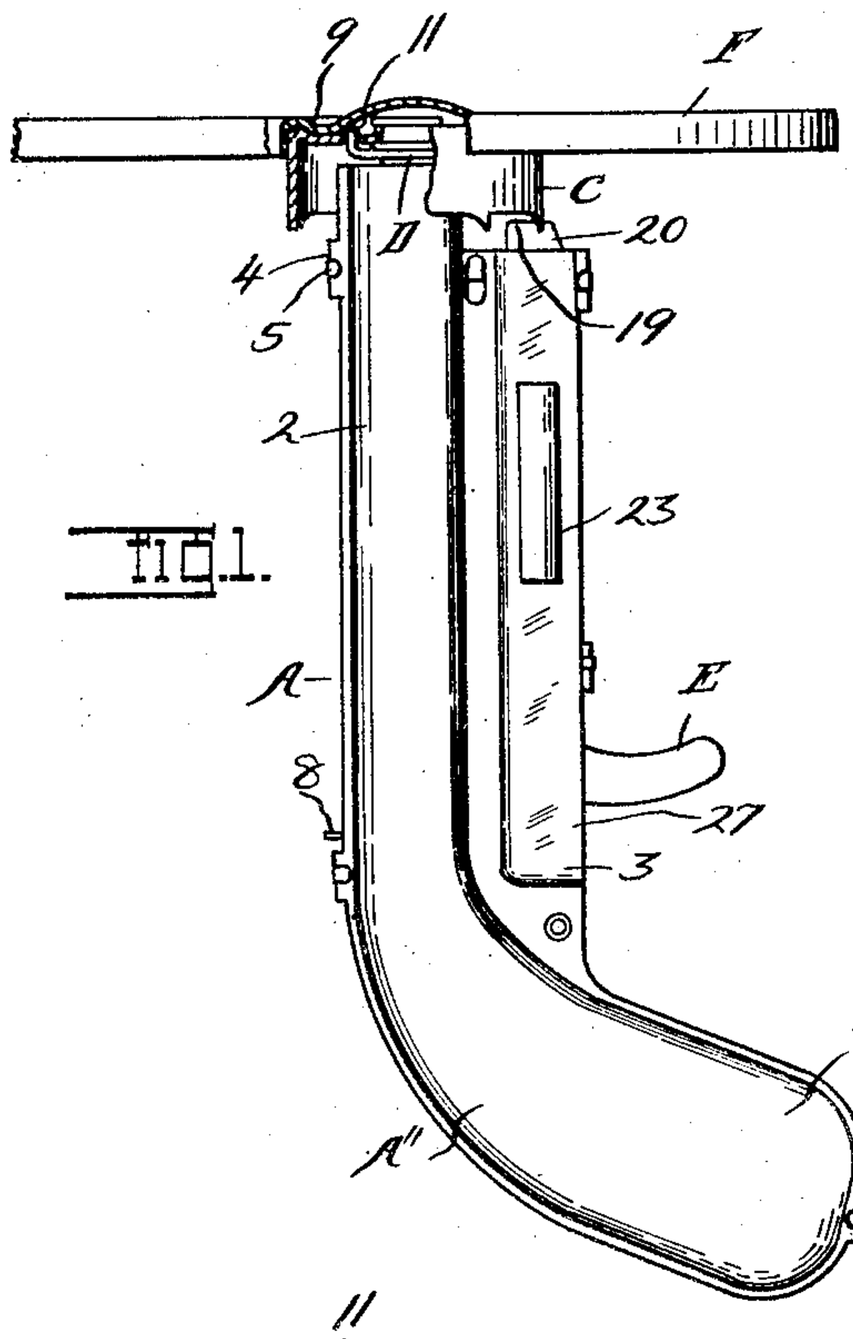


FIG. 1.

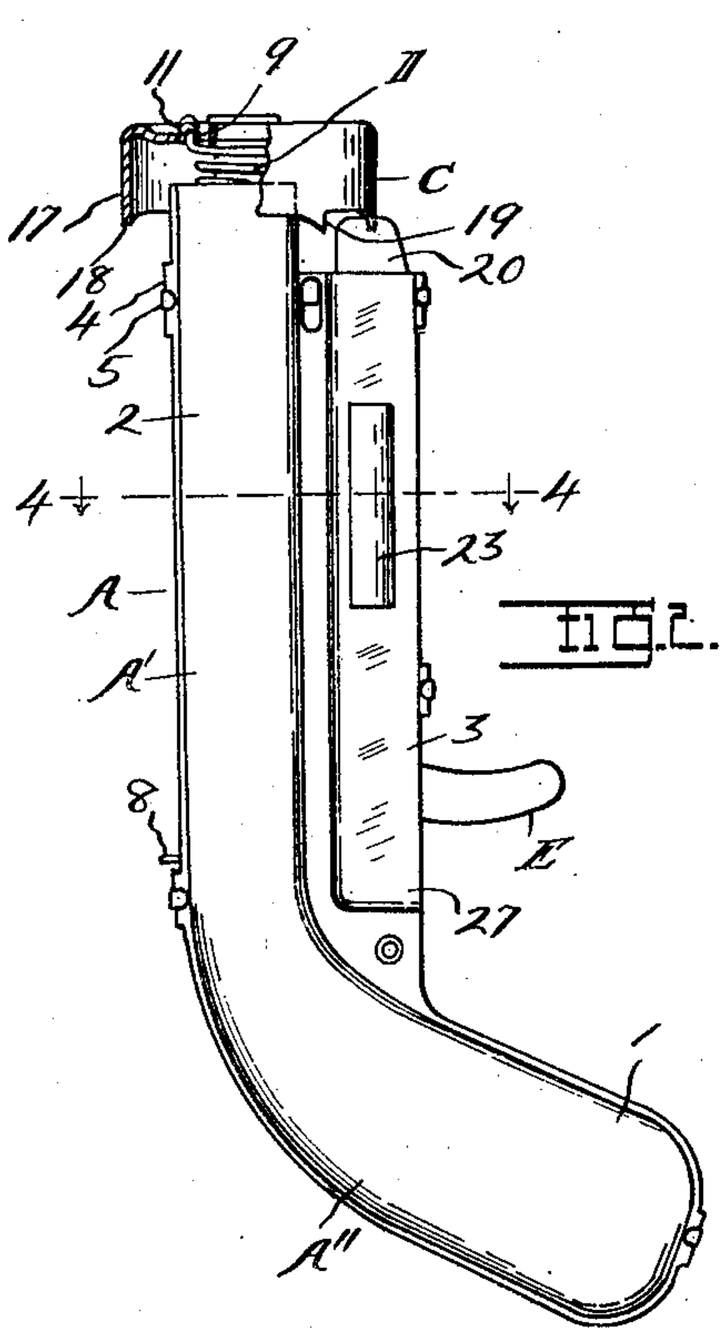


FIG. 2.

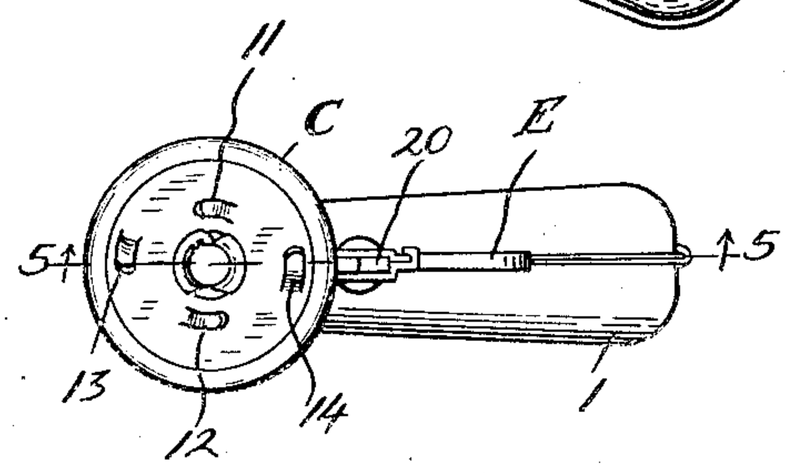


FIG. 3.

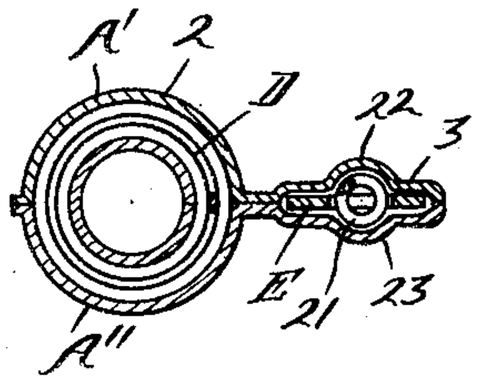


FIG. 4.

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AERIAL TOY

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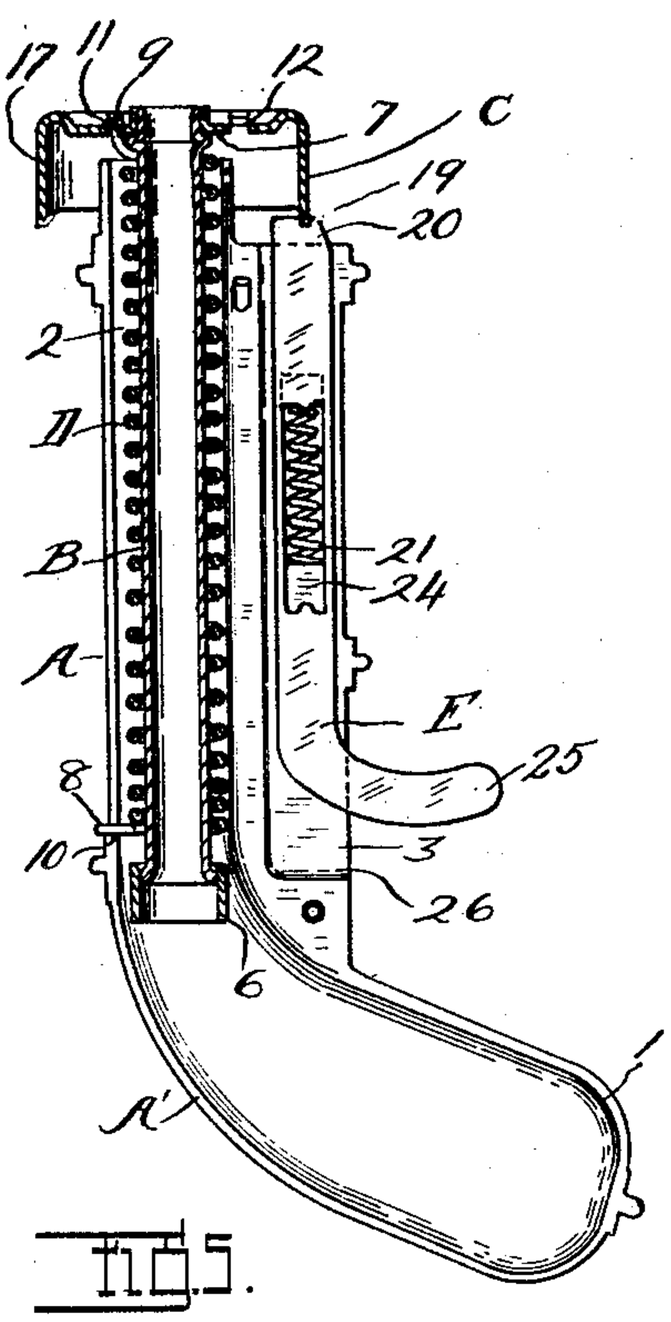

FIG. 5.

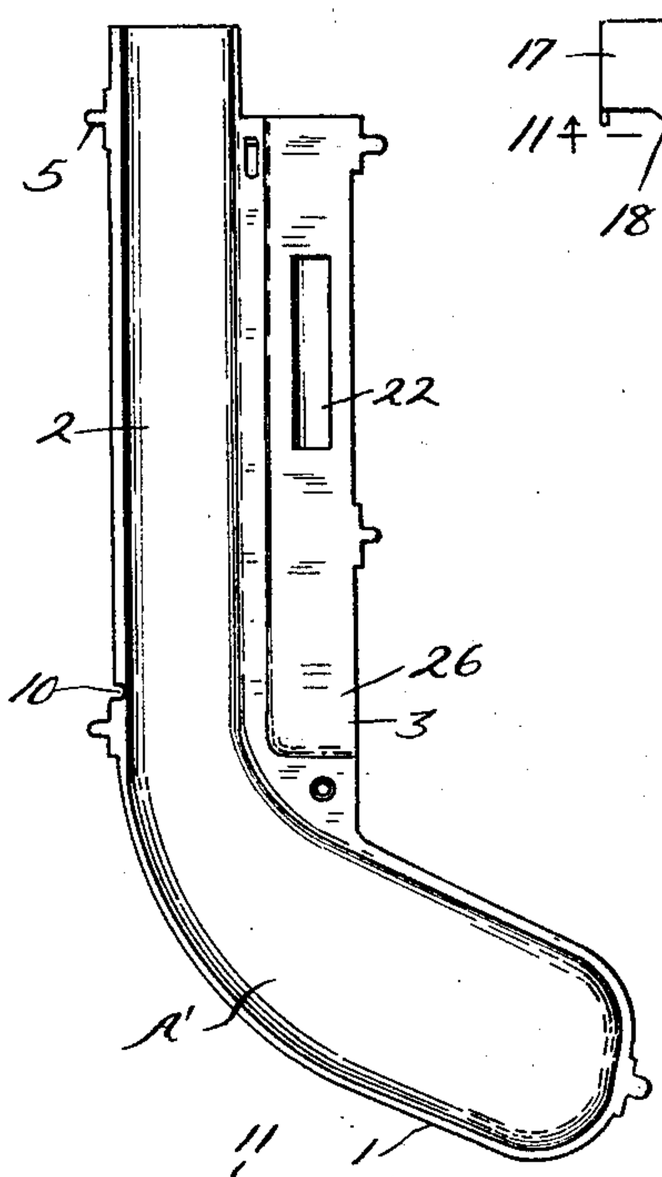

FIG. 7.

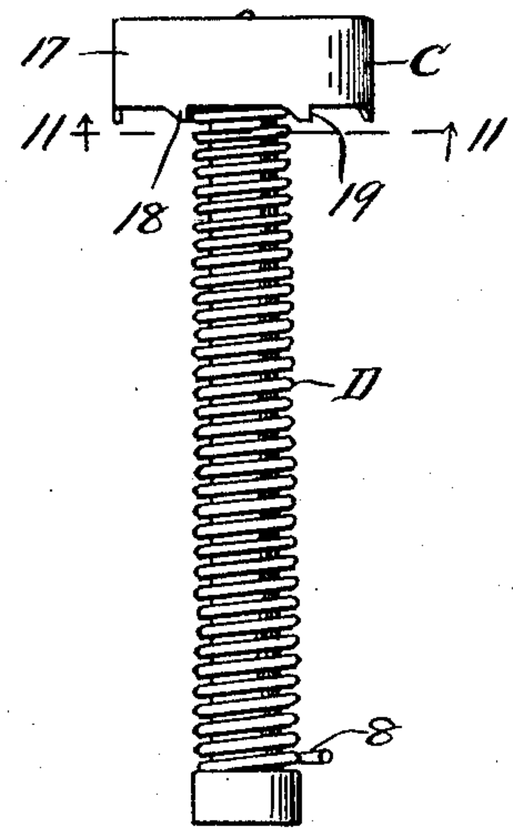

FIG. 8.

FIG. 9.

FIG. 10.

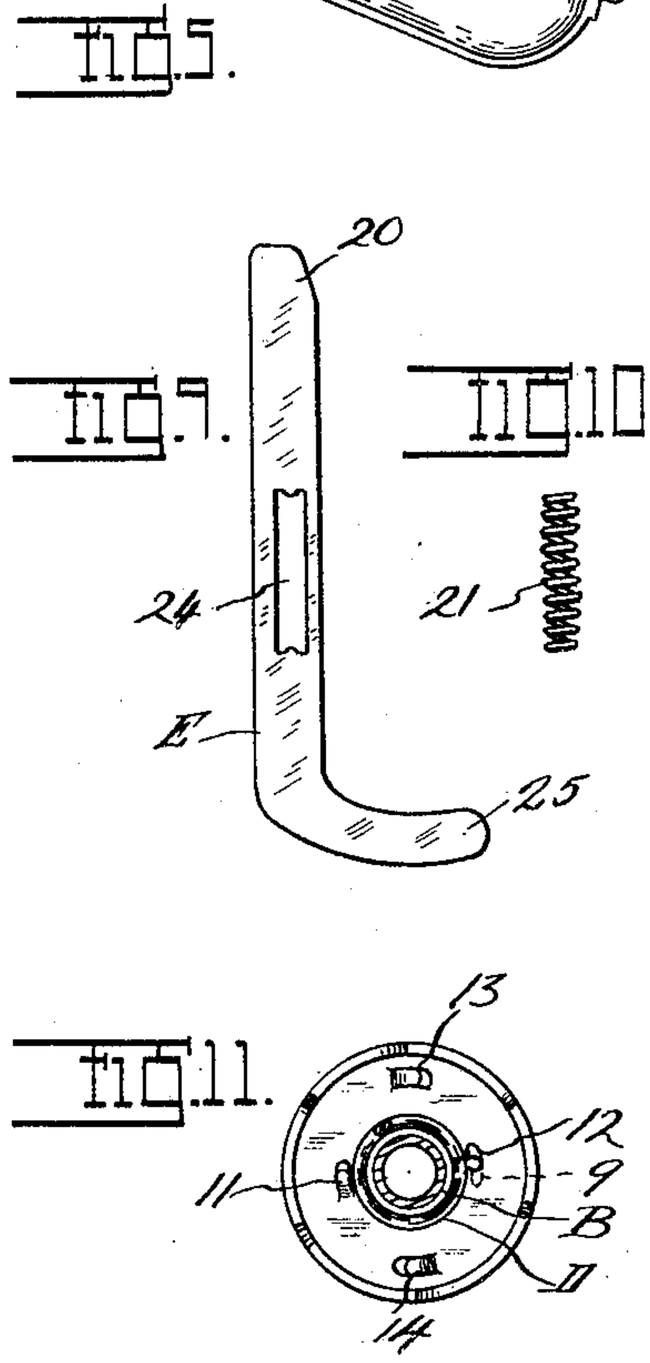

FIG. 6.

FIG. 11.

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UNITED STATES PATENT OFFICE

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AERIAL TOY

Application filed March 14, 1932. Serial No. 598,860.

This invention relates generaly to toys and refers more particularly to aerial toys.

One of the essential objects of the invention is to provide a toy of this type wherein a casing simulating a pistol having a grip portion, barrel and depending trigger chamber comprises two complementary stampings of light gage sheet metal suitably secured together.

Another object is to provide a toy in which the projector for the aerial piece is cup-shape in configuration and is rigid with a shaft rotatably mounted in the barrel.

Another object is to provide a toy in which the projector adapted to impart rotation to the aerial piece is actuable by a coil spring sleeved upon the shaft between a ferrule at one end thereof and the base of the cup-shaped projector.

Another object is to provide a toy wherein one end of the spring aforesaid is engaged with an opening in the barrel while the other end is detachably engageable with either of two openings at diametrically opposite points of the projector base.

Another object is to provide a toy wherein the projector base having the openings aforesaid therein is also provided at diametrically opposite points with struck-out lugs for engagement with suitable openings in the aerial piece and is depressed or offset inwardly so that the lugs projecting therefrom will not extend too far beyond the rim of the base.

Another object is to provide a toy wherein one end of the trigger extends downwardly from the trigger chamber and constitutes a finger piece, while the other end projects forwardly from the trigger chamber and is normally held by a spring in the chamber in engagement with notches in the periphery of the cup-shaped projector, whereby the latter may be held against rotation after being rotated by hand to wind up the spring.

Another object is to provide a toy wherein play is provided between the base of the projector and the forward end of the barrel to permit movement of the projector toward the barrel when the projector is rotated by hand to wind up the spring.

Another object is to provide a toy wherein the spring will be automatically received in one of the openings in the base of the projector when the latter is turned by hand as just described and will be automatically removed therefrom when the spring reaches the end of its throw after being unwound, whereby the projector may continue momentarily to rotate until the inertia thereof is spent.

Another object is to provide an aerial toy that is simple in construction and that can be manufactured at a comparatively low cost.

Other objects, advantages and novel details of construction of this invention will be made more apparent as this description proceeds, especially when considered in connection with the accompanying drawings, wherein:

Figure 1 is a side elevation of a toy embodying my invention with parts broken away and showing the toy in position to be operated;

Figure 2 is a view similar to Figure 1 and showing the parts after they have been operated;

Figure 3 is a top plan view of the toy with the aerial piece removed;

Figure 4 is a sectional view taken on the line 4—4 of Figure 2;

Figure 5 is a sectional view taken on the line 5—5 of Figure 3 and showing the parts in charged position;

Figure 6 is a view similar to Figure 5 but showing the parts after they have been operated;

Figure 7 is a detail view of one of the casing sections;

Figure 8 is a detail view of the shaft projector spring assembly;

Figure 9 is a detail view of the trigger with the spring removed;

Figure 10 is a detail view of the trigger spring;

Figure 11 is a sectional view taken on the line 11—11 of Figure 8.

Referring now to the drawings, A is the casing; B is the shaft; C is the projector; D is the coil spring; E is the trigger; and F is the aerial piece of a toy embodying my invention.

As shown, the casing A simulates a pistol in appearance and has a grip portion 1, barrel 2 and depending trigger chamber 3. Preferably the casing A is formed of two complementary stampings A′ and A″ of light gage sheet metal having interlocking tongues 4 and 5 respectively at spaced points of their edges. The shaft B is preferably tubular in form and extends longitudinally of the barrel 2. A ferrule 6 is secured to the inner end of the shaft while the base 7 of the cup-shaped projector C is secured to the outer end thereof. The coil spring D is sleeved upon the shaft B between the ferrule 6 and the base 7 of the projector and has hook-shaped offset end portions 8 and 9 respectively. One end portion 8 of the spring projects laterally and engages an opening 10 in the barrel 2, while the other end portion 9 projects forwardly and is detachably engageable with either of two openings 11 and 12 respectively at diametrically opposite points of the base 7 of the projector. In addition the base 7 has two struck-out lugs or tongues 13 and 14 respectively at diametrically opposite points thereof for engagement with suitable openings 15 and 16 respectively in the aerial piece F, and is preferably depressed inwardly as shown so that the lugs 13 and 14 will not project too far beyond the rim 17 of the projector. The periphery of the projector has a series of notches 18 formed therein providing shoulders 19. The trigger E is preferably formed from relatively heavy gage sheet metal and is slidably mounted in the chamber 3. As shown, the forward end 20 of the trigger is engageable with the notches 18 and shoulders 19 and is normally held in engagement with one of them by means of a coil spring 21 housed within longitudinally extending embossed portions 22 and 23 respectively of the barrel and extending longitudinally of an opening 24 in the trigger. The rear end portion 25 of the trigger extends downwardly between embossed portions 26 and 27 respectively of the sections A′ and A″ and constitutes a suitable finger piece.

The aerial piece F is formed from a single sheet of light gage metal and comprises a ring 28, a hub 29, and intermediate radially extending blades or vanes 30. Preferably the ring 28 is relatively narrow and is provided at one edge with a lateral flange 31. The hub 29 is circular and is provided at the center thereof with an outwardly projecting concavo-convex portion 32. A number of flanges 35 project at substantially right angles from the hub 29 between the blades 30 and collectively define a ring for the reception of the cup-shaped portion of the projector C.

In use the projector C may be rotated to the left by hand to cause the spring D to be wound up or tensioned about the shaft B. Upon rotating the projector to the left the hook-shaped end portion 9 of the spring will automatically enter either the opening 11 or 12 depending upon the position of the projector to the spring, and continued rotation of said projector to the left will cause the spring D to be tensioned as aforesaid. Likewise the tensioning of the spring causes it to contract and thereby pull the projector C inwardly until the base 7 thereof substantially abuts the forward end of the barrel. The forward end 20 of the trigger travels in the notches 18 in the periphery of the projector when the latter is rotated, hence is in position when rotation of said projector is stopped to engage one of the shoulders 19 and hold the projector against rotating to the right. The aerial piece F may then be applied to the projector by engaging the lugs 13 and 14 with the openings 15 and 16 respectively whereupon the barrel 2 may be pointed upwardly and the trigger E may be pulled. As a result the projector C, aerial piece F and shaft B will be rotated rapidly to the right by the spring D. The inclined vanes 30 will cause the aerial piece F to rise and soar through the air. If the toy is used indoors the central convex portion 32 will abut the ceiling and will spin thereon. After the momentum decreases the aerial piece will drop to the floor.

When the spring D reaches the end of its throw, i. e., becomes unwound after being released by the trigger, there is a tendency for the projector C to continue rotating for a brief moment until the inertia thereof is spent. If the spring end 9 were rigid with said projector such continued rotation would tend to unwind the convolutions of the spring and would result in the crystallization thereof. Moreover if such end 9 were fixed to the projector such continued rotation would cause the convolutions at this end of the spring to enlarge and swell with the result that certain of the convolutions would move out of the barrel and others would bind against the barrel. Such distortion of the spring would therefore destroy its efficiency. Moreover such distortion would preclude the hook-shaped end portion 9 from properly aligning with and entering either the openings 11 or 12 in the projector when it is again desired to wind up the spring. However, in the present instance, all of the objections just referred to have been overcome and entirely obviated by the provision of the detachable connection between the spring and projector permitting the projector to continue rotating after the spring has reached the end of its throw. In my construction the projector will be automatically disengaged from the hook-shaped end portion 9 of the spring when the latter reaches the end of its throw and may continue to rotate free of the spring for a brief moment until the inertia thereof is

spent. Consequently the spring will not crystallize or become distorted or cause binding of any of the parts. Moreover the hook-shaped end 9 will always be in proper alignment for entry into either the opening 11 or the opening 12 when the projector is again rotated to the left to wind up the spring.

What I claim as my invention is:

1. In an aerial toy, an aerial piece projector having a depressed portion provided at diametrically opposite points with struck-out lugs for engagement with openings in an aerial piece and provided between said lugs with openings for detachably receiving an actuating element for the projector, the part of the projector having the lugs struck therefrom being depressed so that the free ends of the lugs will be substantially in line with the rim of the projector.

2. In an aerial toy, a casing having a tubular portion, a shaft rotatable in the tubular portion, an aerial piece projector carried by the shaft beyond an end of the tubular portion, and actuating means for the projector including a coil spring sleeved upon the shaft, having one end fixed to the casing and having its other end free and having a constant ratchet engagement with the projector whereby the spring is adapted to be interlocked with and tensioned by the projector when it is rotated in one direction and adapted during rotation in the opposite direction to become freed from the projector whereby the latter may continue to rotate independently of the spring until its inertia is spent.

3. In an aerial toy, a casing, a yieldable element connected to said casing, and means for imparting rotation to an aerial piece including a rotary member having a constant ratchet engagement with said element whereby said member will be automatically coupled to and uncoupled from said yieldable element by the rotation alone of said member.

4. In an aerial toy, a casing, a spring having one end fixed to the casing and having a free end adjacent the casing, and means for imparting rotation to an aerial piece including a rotary member having a constant ratchet engagement with the free end of the spring whereby said member will be automatically coupled to and uncoupled from said free end by the rotation alone of said member.

5. In an aerial toy, a casing having a barrel portion, a shaft mounted for rotary movement in the barrel portion, a coil spring sleeved on the shaft and having offset end portions, one of said end portions being secured to said barrel portion, and an aerial piece projector associated with the shaft and having a constant ratchet engagement with the other end of said spring whereby said projector will be automatically coupled to and uncoupled from said end by the rotation alone of said projector.

6. In an aerial toy, a casing having a barrel portion, a shaft mounted for rotary movement in the barrel portion, a spring sleeved upon the shaft, having one end fixed to the casing and having a free end, and means for imparting rotary movement to an aerial piece including a member fixed to the shaft and having a constant ratchet engagement with the free end of said spring.

7. In an aerial toy, a casing having a tubular portion, a rotary shaft in the tubular portion, an aerial piece projector carried by the shaft and having an opening therein, and actuating means for the projector including a spring anchored to the casing and having a free end constantly engaging the projector and adapted upon rotation thereof to be received in or withdrawn from said opening depending upon the direction of rotation of the projector.

8. In an aerial toy, a yieldable driving element having a fixed end and a free end, and an aerial piece projector constantly engaging and having a plurality of openings in the path of the free end of said element, whereby said openings upon rotation of the projector will automatically receive or be moved away from said free end.

9. In an aerial toy, a yieldable element and an aerial piece projector mounted for rotary movement and having a constant ratchet engagement with said element whereby the projector may actuate the yieldable element, may in turn be actuated by the yieldable element, and may become freed from and continue to rotate relative to said element, all during rotation alone of said projector.

10. In an aerial toy, a casing having a barrel portion, a shaft mounted for rotary movement in said barrel portion, and means for imparting rotary movement to an aerial piece, including a member fixed to the shaft and having an opening therein, and a spring sleeved on the shaft, secured to the casing and having a free end constantly engaging the member and adapted upon rotation of said member to be received in or withdrawn from said opening depending upon the direction of rotation of said member.

11. In an aerial toy, a casing, an aerial piece projector mounted for rotary movement relative to the casing and having an opening therein, and means adapted to be tensioned by and rotate the projector including a yieldable element fixed at one end to said casing and having a free end constantly engaging the projector but adapted upon rotation thereof to be received in or withdrawn from said opening depending upon the direction of rotation of the projector.

12. In an aerial toy, a spring, and a rotary aerial piece projector constantly engaging an end of the spring and having an opening in the path of and adapted to receive

or be moved away from said end depending upon the direction of rotation of the projector.

13. In an aerial toy, a casing having a tubular portion, a shaft rotatably mounted in and having an end projecting from one end of said tubular portion, and means for imparting rotary movement to an aerial piece, including an aerial piece projector rigid with the projecting end of the shaft and having an opening therein, and a coil spring sleeved upon the shaft within the tubular portion, having one end fixed to said casing and having its other end free and constantly engaging the projector, the construction and arrangement of said free end and projector being such that said free end will be automatically received in said opening when the projector is rotated in one direction and will be automatically withdrawn from said opening during rotation of the projector in the opposite direction.

In testimony whereof I affix my signature.

HENRY J. ABRAMS.