March 17, 1964 J. P. TAUBMAN 3,124,899

MULTISTAGE PROJECTILE WITH ARTICLE RELEASING CAPSULE

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FIG. 3

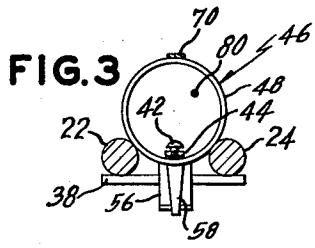


FIG. 4

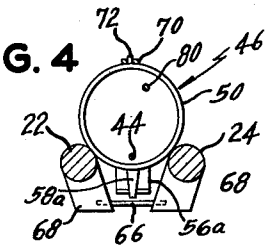


FIG. 5

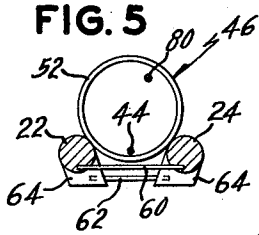


FIG. 1

FIG. 2

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FIG. 6

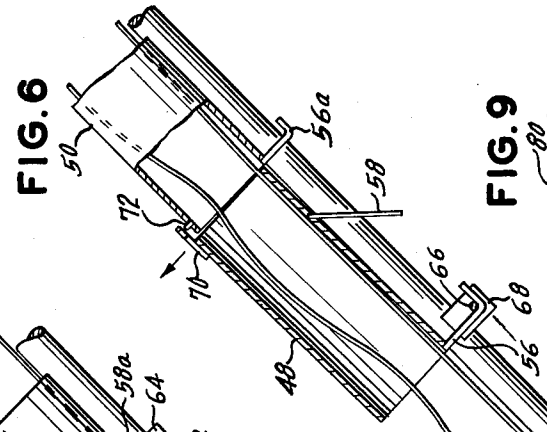


FIG. 9

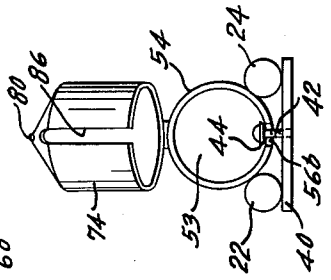


FIG. 7

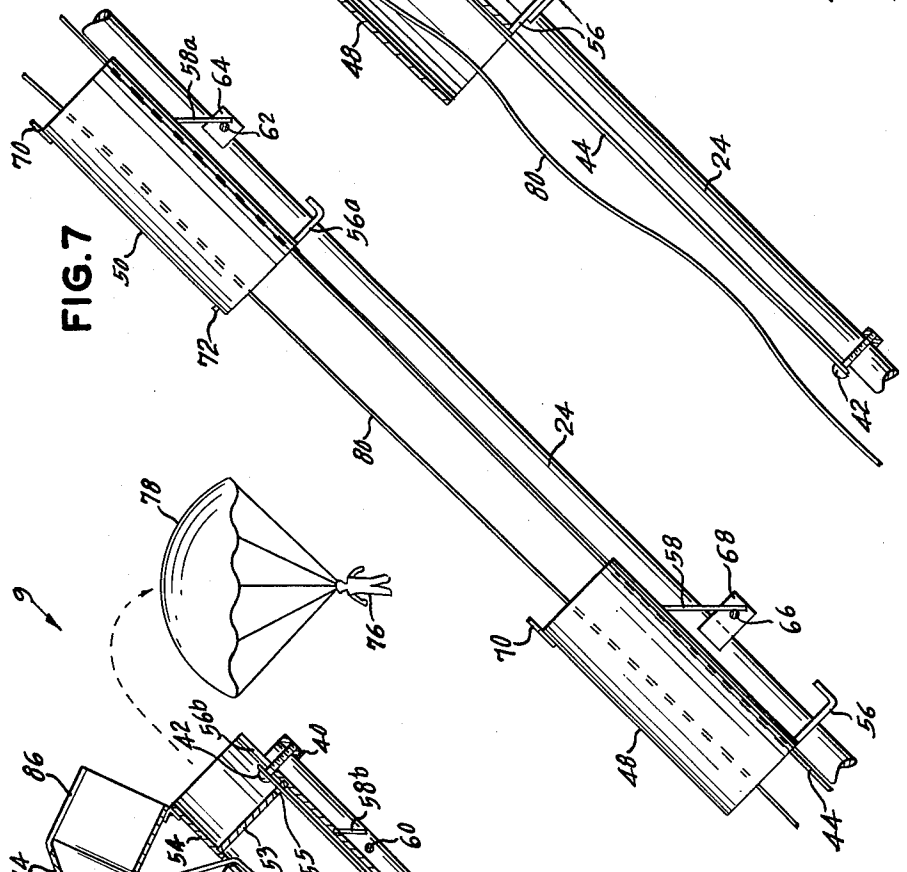


FIG. 8

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MULTISTAGE PROJECTILE WITH ARTICLE RELEASING CAPSULE

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10 Claims. (Cl. 46—86)

This invention relates to a toy, and more particularly to a toy in which there is included a projectile, as a rocket having a plurality of stages, each of which is separable during flight.

An object of the present invention is to provide a toy that will approximate and simulate, as closely as possible, the flight characteristics and patterns of a manned projectile, as that of a rocket.

It is an object of the invention to provide a toy apparatus that is completely safe and harmless to young children and adults to operate, that permits freedom of manipulation upon the part of the user of the toy so that the projectile or rocket may be controlled in direction of movement and in such manner that it may be utilized as an instructive teaching toy for young children.

A further object of the invention is to excite the interest of the user in such manner that he may take an actual part in the releasing or manipulation of the capsule so that an article contained in the same will be released therefrom at any desired time or period of flight of the rocket or projectile, thereby attempting to simulate the possible flight and movement of a manned capsule.

Other and further objects of this invention reside in the the structures and arrangements hereinafter more fully described with reference to the accompanying drawings in which:

FIG. 1 is a perspective view of the toy constructed according to the teaching of the invention.

FIG. 2 is a partial side view of FIG. 1 taken along lines 2—2,

FIG. 3 is an enlarged cross section of FIG. 1 taken along lines 3—3,

FIG. 4 is an enlarged cross section of FIG. 1 taken along lines 4—4,

FIG. 5 is an enlarged cross section of FIG. 1 taken along lines 5—5,

FIG. 6 is an enlarged partial cross section of two of the stages of the rocket or projectile,

FIG. 7 is an enlarged partial view illustrating the separate retention of the projectile at pre-selected points along the length of its flight.

FIG. 8 is a partial view of the track along which the projectile moves and illustrating, in cross section, the details of the last stage of the projectile and its capsule, and

FIG. 9 is a view of FIG. 8 looking in the direction of line 9.

Referring now to the drawings, the toy is generally identified by the numeral 10. It comprises a base having a pair of cross legs 12 and 14, each of which is adapted to rest on any convenient surface and each of which combines with the other to form the base that terminates in a top plate 16. Mounted on the top plate 16 is a bearing block 18.

A turntable 20 has secured in the top thereof a gantry that is defined by a pair of laterally spaced but relatively connected tracks 22 and 24. The gantry, including the tracks 22 and 24, is mounted in the top of the turntable 20 at an angle between the vertical and horizontal planes thereof. Although the present invention illustrates the gantry tracks 22 and 24 to be fixed in the turntable 20, it is within the contemplation of the invention that the same may be movable from any angle between the horizontal and vertical planes by the addition of a crank structure of the type to be subsequently described in connection with the rotation of the turntable 20 in the bearing block 18.

The turntable 20 has a round pin or shaft 26 fixed to its undersurface and that extends downward through a similar bearing hole provided in the block 18 therebeneath and guided for movement in an aligned opening (not numbered) at the apex of the crossed legs 12 and 14. Thus, the turntable 20 may be rotated on its shaft 26. This rotation is accomplished by the provision of a crank mechanism that includes a crank shaft 28 bearingly mounted for rotation at its one end in the block 18 and intermediate its ends in a lug-shaped boss 30. A crank handle 32 and manually gripped knob 34 are fixed to the crank shaft 28 so the same may be rotated at a point extending radially beyond the periphery of the top plate 16.

Circumferentially spaced about the crank shaft 28 are a plurality of pins or driving elements 36 each of which are additionally spaced from the other in spiral form. The pins or driving elements 36 are adapted to engage seriatim the underside of the turntable 20 as the crank shaft 28 is rotated. Thus, as each driving element 36 is rotated into engagement with turntable 20, it causes the same to rotate at its shaft 26, thereby causing the track 22, 24 of the gantry to rotate in like manner. It will be recognized that by rotating the turntable 20, the track 22, 24 can be positioned at any point within an arc of 360°.

Connecting the tracks 22 and 24 together at their lower ends is a cross bar 38. A similar cross bar 40 is connected to the upper ends of the tracks to secure the same in parallel relationship. Each cross bar 38 and 40 is provided with a tension securing means in the form of a screw or pin 42 about which a tensioned guide wire or string 44 forms an integral part of the gantry structure and functions in the manner to be described, to retain the projectile on the upper surfaces of the tracks 22 and 24 during the movement of the same along the tracks.

Included in the toy 10 is a projectile or rocket generally identified by the numeral 46. The projectile or rocket 46 can comprise any number of stages. For simplicity of explanation and ease of understanding, only three stages 48, 50 and 52 are shown in the drawings and are deemed to be adequate to describe the manner of operation of the invention. The cross section of FIG. 1 taken along lines 3—3 and as shown in FIG. 3 is a view of the lowermost stage 48. In FIG. 3, it will be noted that the stage 48 is positioned against surfaces of the tracks 22 and 24 and retained in place by the tensioned guide wire or string 44.

Stages 48 and 50 are hollow and tubular. Stage 52 is similarly hollow and tubular, but terminates at its top in a wall 53 (FIG. 8). Positioned at the top of the stage 52 on the opposite side of the wall 53 is an article containing capsule 54, the details of which will be explained as the description proceeds. The guide wire or string 44 extends completely through the length of the projectile through an opening 55 in the wall 53, and thus serves to retain all the stages of the projectile 46 on the surfaces of the tracks 22 and 24.

It is noted that the underside of the stage 48 of the projectile 46 is provided with a depending engageable arm 56 that is more clearly shown in cross section in FIGS. 6 and 7. The engaging arm 56 is substantially L-shaped and depends downward from the stage through and between the lateral space between the tracks 22 and 24. The engaging arm 56 is positioned at the rearmost portion of the stage 48 whereas a retainer arm 58 is longitudinally spaced from the arm 56 and in like manner depends downward and rearward through the lateral space of the tracks 22 and 24. The engaging arm 56 is substantially unyielding whereas the retainer arm 58 is resilient and flexible, yielding in response to the slightest

force that might be applied to the same. The second stage 50 has a similarly shaped engaging arm 56*a* and a retainer arm 58*a*, whereas the third stage 52 is provided with a retainer arm 58*b* and a V-shaped engaging opening 56*b* at its upper end as shown more clearly in FIGS. 8 and 9.

Mounted on the underside of the gantry tracks 22 and 24 are a plurality of stop means, each of which is predeterminately positioned at a pre-selected portion of the length of the tracks and is adapted to be engaged by a respective one of the engaging arms 56 and 56*a* and the retaining arms 58, 58*a* and 58*b*. The stop means are shown in FIGS. 1, 4, 5 and 6 to 8 as pins that extend across the lateral space defined between the tracks 22 and 24. The uppermost one of the stop means 60 is mounted directly across the tracks 22 and 24 and is closest to the track surface along which the projectile 46 moves, than any other of the remaining stop means to be described.

The next lowermost stop means 62 (more clearly shown in FIGS. 1 and 7), is suspended slightly below the underside of the tracks 22 and 24 in blocks 64 whereas the third stop means 66 shown in FIGS. 4 and 7, is positioned an even greater distance below the projectile riding surface of the tracks 22 and 24 than is the previous mentioned stop means 62. This is accomplished by securing blocks 68 to the underside of the tracks as shown in FIG. 4.

It will be recognized by those skilled in the art that because the engaging means 56 and retaining arm 58 of the lowermost stage 48 are longer in length than are the similar arms 56*a* and 58*a* of the stage 50 or the retaining arm 58*b* of the stage 52, when the projectile 46 is moved along the length of the gantry tracks 22 and 24, the shorter retaining arms 58*b* and 58*a* will pass over the lowermost stop means 66. However, when the projectile 46 continues to move along the length of the tracks, the engaging arm 56, being sufficiently long, will engage and hook over the stop means 66 and thus prevent the continued movement of its stage 48 with the remaining stages 50 and 52 of the projectile. When this occurs, the stage 48 is stopped from its continued movement with the remaining stages, and in turn it would stop the other stages from movement along the tracks unless it is disconnected from them.

To accomplish the connection and disconnection of the three stages 48, 50 and 52 from each other, each such stage is provided with cooperable connecting means in the form of a simple pin and eye construction. At the top portion of each stage is an eye element 70 while at the bottom of the stages 50 and 52 is cooperable pin element 72. In actual practice, these details are extremely small in size. However, they are shown slightly enlarged in the drawings.

As the projectile or rocket 46 moves upwardly along the surfaces of the tracks 22 and 24 and retained thereagainst by the tensioned guide wire 44, the lowermost stage 48 approaches its stop 66 after the previous stages have passed beyond it. The retainer arm 58, being longer than the like retainer arms on the upper stages 50 and 52, is deflected inward toward the body of its stage 48 as it passes over the stop 66. However, the engaging L-shaped arm 56 of the stage 48, being somewhat rigid, hooks under the stop 66 as shown in FIG. 6 and stops the stage 48 from continued movement with the remaining stages of the projectile.

Immediately upon being engaged with the stop 66, the stage 48 lifts slightly at its forward portion to lift its cooperative connecting element 70 from engagement with the lowermost connecting element 72 of the next adjacent stage 50 thereby causing the same to disconnect one from the other. This permits the upper stages 50 and 52 to continue their movement along the tracks while the stage 48 is now released from further movement. Accordingly, stage 48 falls backward and slides down along the surfaces of the tracks 22 and 24 until the now straightened retainer arm 58 hooks over the top of stop 66 as shown in FIG. 7 to hold the stage 48 thereat along the length of the tracks 22, 24.

This similar operation is accomplished once again by the stage 50 whose retainer arm 58*a* is first deflected as it passes over the stop 62 and then stopped in its continued upward movement by its engaging arm 56*a*. When so stopped, its engaging element 70 at its upper end disconnects from cooperation with the engaging element 72 at the lower end of the next adjacent upper stage 52. Thereafter, the stage 50 falls backward. The deflected retainer arm 58*a* has now had time to straighten and reassumes its normal position as shown in FIG. 7. As the stage 50 falls backward, the retainer arm 58*a* hooks over the top of its respective stop means 62 and thus retains the stage 50 thereat.

The last stage 52, however, continues its upward flight and is guided along the tracks by the guide wire 44 until the forward V-shaped opening 56*b* approaches, encompasses and then abuts against the tension securing means 42 at the upper end of the tracks. Then the engaging means 56*b* abuts the tension securing means 42, the stage 52 is stopped in its upper flight. In the meanwhile, however, its retainer arm 58*b* will have been deflected as the same moved over its respective stop 60 and, thereafter, straightened to its normal position as shown in FIG. 8. At that time, the stage 52 drops backward again and tends to ride down the tracks 22, 24 until the retainer arm 58*b* hooks over and engages its stop means 60 to prevent this backward movement of the stage 52.

Thus, it will be recognized that each stage of the projectile is provided with engaging and retaining arms that are adapted to cooperate with selected respective stop means provided at predetermined portions along the length of the track 22, 24. Because of the relative spacing of the stop means below the surface of the track 22, 24 and the similar elongation of the engaging arms of the respective stages, each stage will be stopped only when its respective engaging arm and retaining arm engages with a selected perspective one of the stop means.

The capsule 54 provided at the top portion of the upper stage 52 includes a hinged door 74 that is adapted to be opened, but that is normally closed to contain therein an article such as an animated figure 76 connected to a parachute 78. The door 74 is normally closed in position over the end of the stage 52 to provide a pointed projectile. Connected to the door 74 is an operating element in the form of a string 80. The string 80 extends downward through an opening 82 in the top of the upper stage 52 and then downward along the length of the hollow stages 50 and 48. Its end may be connected to a pin 84 at the lower end of the track. The operating element 80 may be manually controlled to permit the user of the toy to control the point of release of the animated figure 76 contained in the capsule 54.

In operation, the turntable 20 may be rotated to any desired position. A map may be utilized beneath the cross legs 12 and 14 so that the upper end of the gantry tracks 22 and 24 may be positioned to permit the ejection of the animated figure 76 at any point on the map below. When in flight, as each stage of the projectile 46 reaches its respective stop means and is stopped and retained thereat, the last stage 52 continues its flight directly to the end of the tracks until it engages the stop 42. At that point, its retaining arm 58*b* prevents the same from falling backward by engaging with the stop 60. The flying momentum of the projectile 46 is sufficient to cause the ejection of the animated figure 76 and its parachute 78 from the capsule 54 if the operator operates the string 80 to open the door 74 of the capsule. The slot 86 (FIG. 8) provided along the length of the underside of the hinged door 74 provides a proper entranceway for the engaging opening 56*b* of the stage 52.

Although there is not shown in the drawing any means for causing the projectile to move or fly along the length of the gantry tracks 22, 24, any suitable means may be provided for this purpose. Tension springs have been employed and are well recognized in the art and, therefore, such devices may be similarly employed here. In

practice, however, applicant has found it more convenient and safer and of novel concept to position the exhaust end of a vacuum cleaner hose at the lower open portion of the lowermost stage **48**. The exhaust pressure of the hose is thus directed into the hollow of the stage **48**, passing through and up the stage **50** and **52** until it abuts the wall **53** thereof. This blast of air from the vacuum cleaner is sufficient to speed the projectile **46** along the surfaces of the track **22, 24**.

While there have been shown and described and pointed out the fundamental novel features of the invention as applied to a preferred embodiment thereof, it will be understood that various omissions and substitutions and changes in the form and details of the device illustrated and in its operation may be made by those skilled in the art, without departing from the spirit of the invention. It is the invention, therefore, to be limited only as indicated by the scope of the claims appended hereto.

I claim:

1. In a toy, a base, a turntable rotatably mounted on said base, means on said base to rotate said turntable, an elongated gantry connected with said turntable for rotation therewith, a plurality of stops each relatively spaced from the other along the length of said gantry, a projectile movable along said gantry and including a plurality of stages, means on certain of said stages engageable with respective selected ones of said plurality of stops, means on each of said plurality of stages engagingly cooperating to connect the same together for movement with each other along said gantry and releasable to permit separation of one of said stages when the engaging means of said one of said stages engages a respective selected one of said stops, a capsule on an end of one of said plurality of stages, a door on said capsule, means operatively connected with said door to open the same, and means connected with said gantry and cooperable with said projectile to guide the same during its movement along said gantry.

2. In a toy, a rotatable turntable, a gantry fixed on said turntable for rotation therewith, means engaging said turntable to rotate the same, said gantry including elongated spaced tracks, a projectile movable along said elongated tracks and including a plurality of separable stages, means on said gantry cooperable with said projectile to guide the same for movement along said tracks, a plurality of stop means spaced along the length of said tracks, means on at least certain ones of said stages engageable with respective selected ones of said stop means, and means on each of said stages cooperable to connect the same together for movement along said tracks and releasable when the engaging means of their respective stages engages a respective selected one of said stop means.

3. In a toy, a projectile having a plurality of separable stages, an upwardly directed track along which said projectile moves, said track having a terminating end and a plurality of stops relatively spaced from each other along, certain of said plurality of stages each having stop engaging means selectively engageable with certain respective ones of said stops, and means on each of said plurality of stages connecting the same together for movement along said track and operable to disconnect certain ones of said stages from the others as the engaging means of said certain ones of said stages selectively engages with its certain respective ones of said stops.

4. In a toy, an elongated upwardly directed track surface having a terminating end, a plurality of stop means relatively spaced along the length of said track surface, each one of said stop means being spaced progressively further from said track surface than the others, a projectile movable along said track surface and including a plurality of separable stages, certain ones of said stages having engaging means extending below said track surface for engagement with selected respective ones of said stop means to retain their respective stages at said selected respective stop means while the remainder of said stages moves along said track, and means connecting said stages together for movement along said track and operable to disconnect certain of said stages from the other as the engaging means of certain ones of said stages engages with their selected respective ones of said stop means.

5. In a toy, a movable projectile having a plurality of separable stages, a track having an upwardly directed terminating end along with said projectile is movable, means on said track and projectile cooperable to stop the movement of certain pre-selected ones of said stages of said projectile at predetermined positions along the length of said track and to retain the same thereat, and means connecting said plurality of stages for movement along said track and operable to disconnect said certain pre-selected ones of said stages from the others during the movement of said projectile along said track.

6. In a toy, a projectile having a plurality of separable stages, an elongated upwardly directed track having a terminating end surface along which said projectile is to move, means to retain said proectile on said track, means on said track and projectile cooperable to stop the movement of certain of said stages each at pre-selected points along said track and to retain the same thereat, and means releasably connecting said stages together for movement along said track and operable to disconnect said certain stages from movement with the others as said certain stages are stopped and retained at their respective pre-selected points along said track.

7. In a toy as in claim 6, a tensioned guide means extending for the length of said track separate therefrom and connected with said projectile to retain the same on said track.

8. In a toy apparatus as in claim 7, a turntable on which said track is mounted, said track being tilted at an angle to the vertical and horizontal planes of said turntable.

9. In a toy, a base, a turntable rotatable on said base, crank means mounted on said base and engaging said turntable to rotate the same, track means mounted on said turntable for rotation therewith, said track means being elongated and having spaced track surfaces, a projectile on said track means for movement therealong and along the surfaces thereof, tensioned guide means on said track means and connected with said projectile to retain the same on said track surfaces during the movement of said projectile therealong, said projectile including a plurality of separable stages, a plurality of stop means relatively positioned along the length of said track means, means on certain of said stages each selectively engageable with a respective one of said stop means during the movement of said projectile to retain said certain stages at its respective selected ones of said stop means, and means on said projectile connecting said stages together for conjoint movement and operable to disconnect said stages each from the other at their pre-selected respective stop means.

10. In a toy as in claim 9, an operable capsule on one of said stages for containing a releasable article, and means on said projectile connected with said capsule to operate the same to release an article contained thereby.

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