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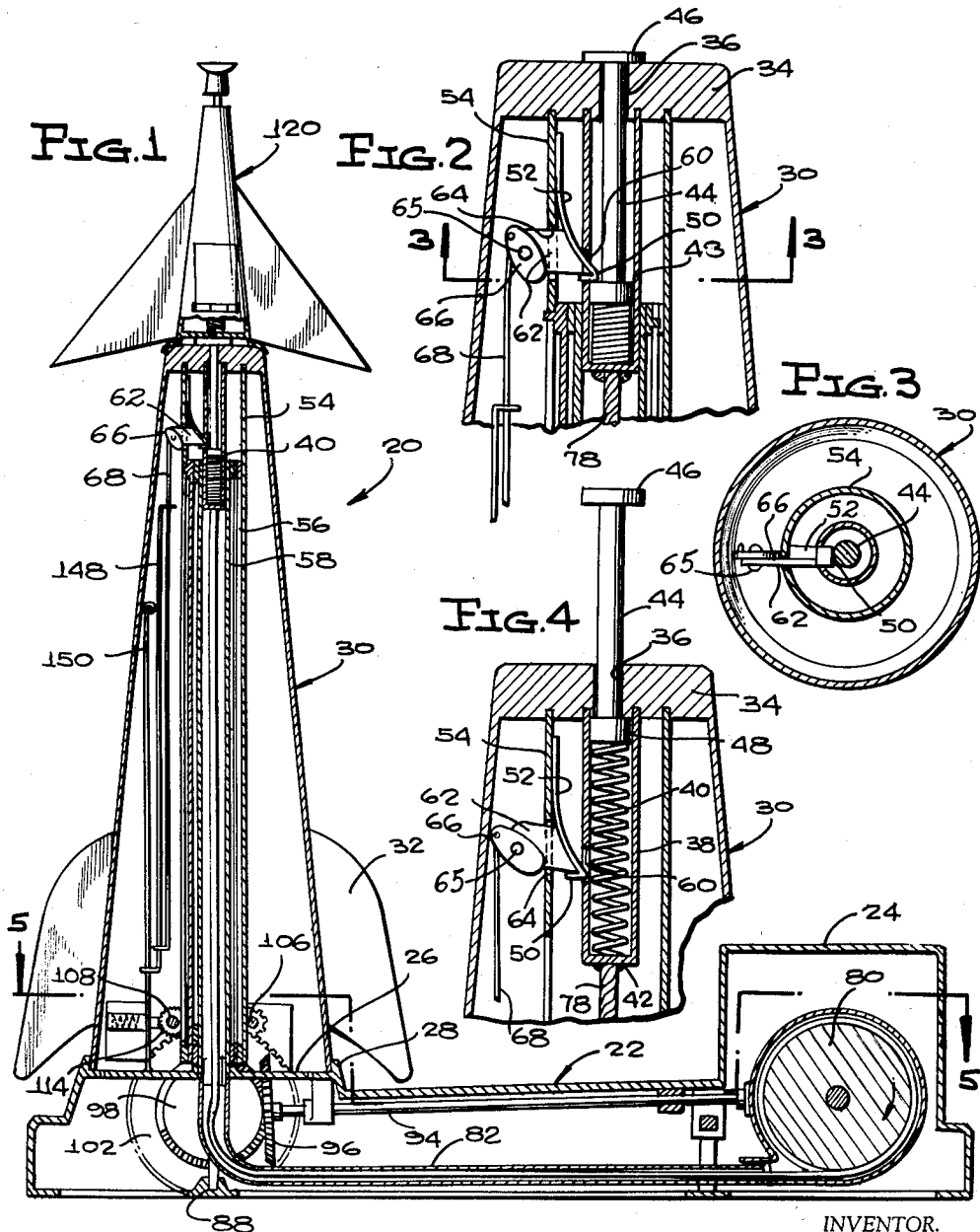
C. H. TRAYLOR, JR

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ROCKET AND SATELLITE TOY APPARATUS

Filed May 29, 1958

3 Sheets-Sheet 1



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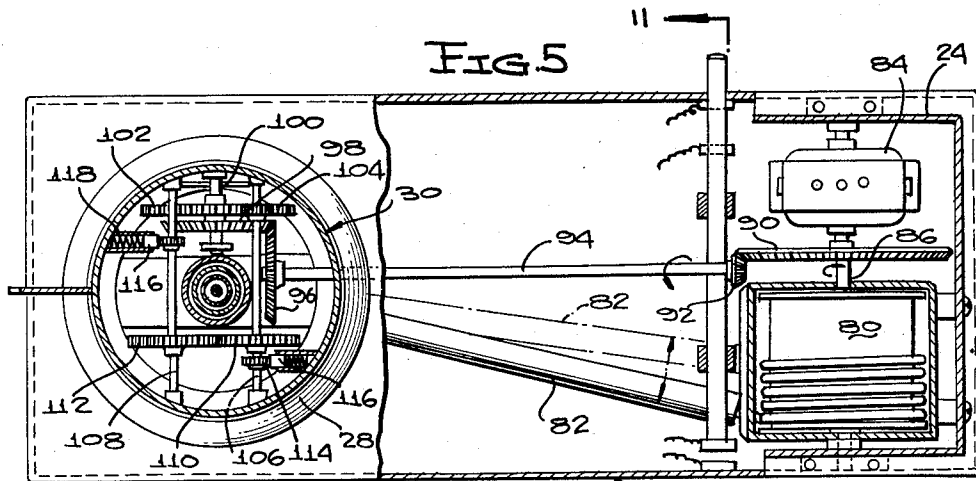
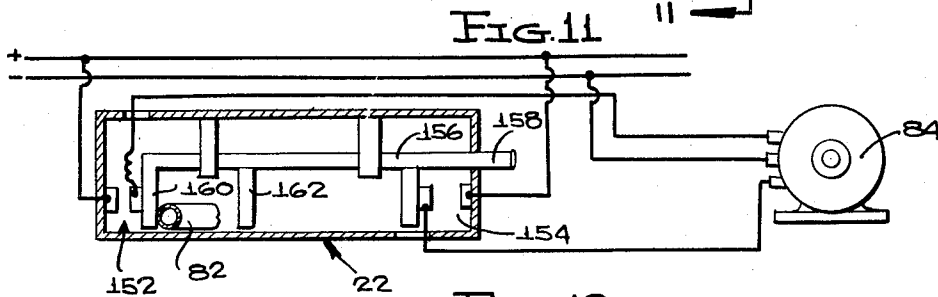
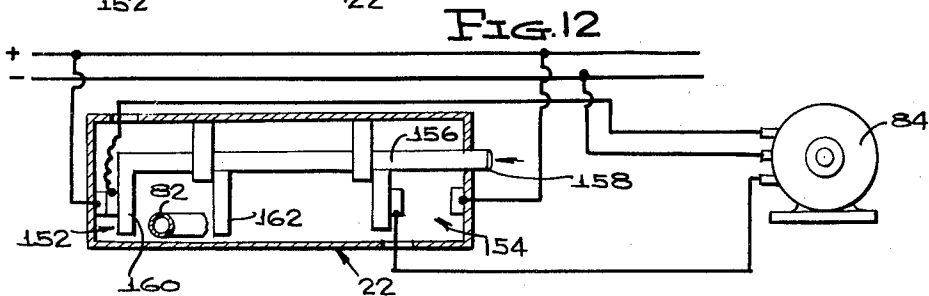
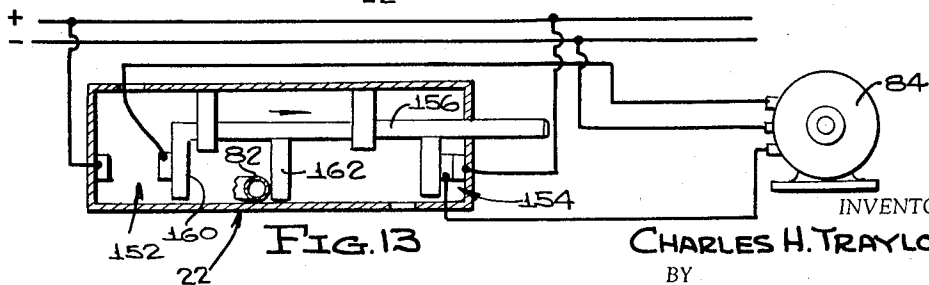
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ROCKET AND SATELLITE TOY APPARATUS

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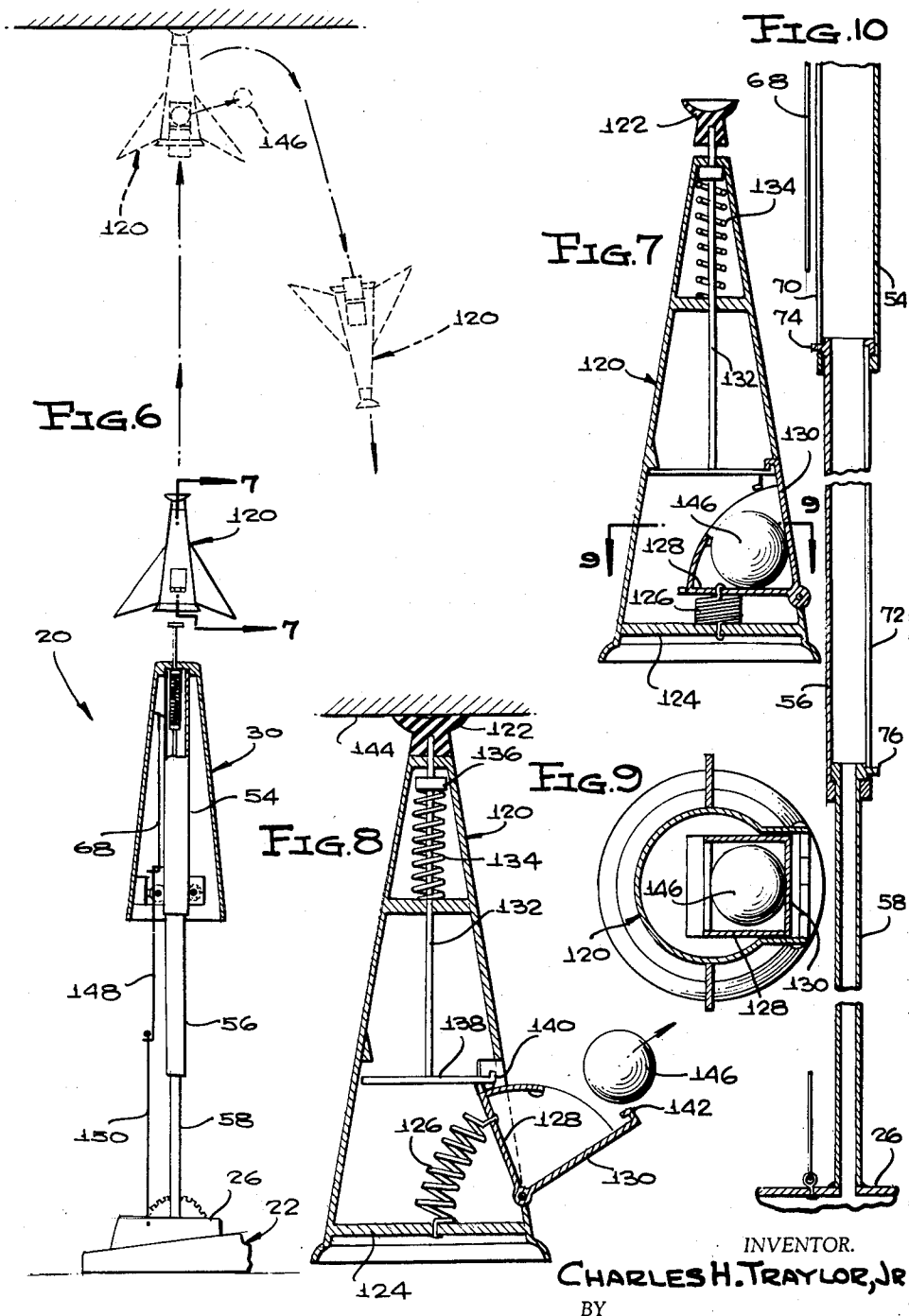
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ROCKET AND SATELLITE TOY APPARATUS

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2,946,151

ROCKET AND SATELLITE TOY APPARATUS

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4 Claims. (Cl. 46—74)

The present invention relates to toys generally and in particular to a rocket and satellite toy apparatus.

An object of the present invention is to provide a toy apparatus in the form of a rocket launcher, a rocket, and a satellite carried by the rocket, such apparatus lending itself to amusing and instructive play for children, one which is automatic in operation, and one highly effective in action.

Another object of the present invention is to provide a rocket and satellite toy apparatus which is sturdy in construction, one foolproof in operation, one economical to manufacture and assemble, and one which is commercially practical.

These and other objects and advantages of the present invention will be fully apparent from the following description when taken in conjunction with the annexed drawings, in which:

Figure 1 is an elevational view, partially in section, showing the rocket and satellite toy apparatus according to the present invention with the rocket in position on the upper end of the launching member of the apparatus;

Figure 2 is a sectional view of the upper end of the launching member showing the rocket-driving plunger and spring in cocked position;

Figure 3 is a view taken on the line 3—3 of Figure 2;

Figure 4 is a view similar to Figure 2, showing the plunger and spring in extended or fired condition;

Figure 5 is a view taken on the line 5—5 of Figure 1;

Figure 6 is an elevational view partially in section, on a reduced scale showing the rocket being launched from the launching member, and showing in dotted lines the action of the rocket when striking an overhead object and ejecting the satellite of the present invention;

Figure 7 is a sectional view of the rocket showing the satellite in position for ejection;

Figure 8 is a view similar to Figure 7, showing the satellite being ejected;

Figure 9 is a view taken on the line 9—9 of Figure 7;

Figure 10 is a partial sectional view of the elevating means for the rocket member removed from the rocket member;

Figure 11 is a view partially schematic and as seen on line 11—11 of Figure 5, showing the motor reversing switch in a neutral position;

Figure 12 is a view similar to Figure 11, showing the switch in a position for elevating the rocket launching member; and

Figure 13 is a view similar to Figures 11 and 12, showing the switch in the rocket launching member lowering position.

Referring in greater detail to the drawings in which like numerals indicate like parts throughout the several views, the rocket and satellite toy apparatus of the present invention is designated generally by the reference numeral 20 and comprises a base 22 having a flat bottom surface for support upon a floor or table. At one end of the base 22 is a motor or control housing 24 and at the other

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end is a platform or support 26 representing a launching pad. A lower wall 28 extends around the perimeter of the support 26 and serves as a guide for the lower end of an upstanding launching member 30 when the latter is positioned upon the support 26. The upper end of the launching member 30 is spaced above and in vertical alignment with respect to the support 26 when it has its lower end resting upon the support 26.

The lower end portion of the launching member 30 carries at least one pair of fins 32 arranged in opposed spaced relation and the upper end of the launching member 30 carries a cap 34 having a vertically disposed aperture extending therethrough, the aperture being designated in Figures 2 and 4 by the reference numeral 36.

A hollow cylinder 38 having a closed lower end and an open upper end is secured by its upper end in the cap 34 in concentric relation with respect to the aperture 36. A coil spring 40 is positioned within the cylinder 38 and has its lower end resting upon the closed end 42 of the cylinder 38. A plunger 44 having a head 46 on its upper end and a base 48 on its lower end is positioned within the aperture 36 with its head 46 normally resting upon the upper surface of the cap 34. The base 48 of the plunger 44 bears against the upper end of the spring 40 and is engaged by the free end 50 of a spring leaf lever 52, constituting a latch means, which is positioned beneath the cap 34. The lever 52 is mounted upon the outermost tube 54. Telescoping within the tube 54 is an intermediate tube 56, and into the tube 56 is telescopically received an innermost tube 58. In Figure 1, the respective tubes 54, 56 and 58 are shown in nested positions and in Figure 10, said tubes are shown in extended positions.

The upper end of the tube 54 is anchored in the cap 34 and carries the lever 52 with the free end 50 remote from the cap 34.

As shown in Figure 2, the free end 50 of the lever 52 projects through a slot 60 provided in the cylinder 38 and engages the base 48 of the plunger 44 on the upper face thereof when the spring 40 is compressed by a manually applied force to the plunger head 46. The lever 52 carries a projection 62 extending through a slot 64 provided in the outermost tube 54 adjacent the upper end thereof. The slot 64 is in registry with the slot 60 as clearly shown in Figure 2. A latch release lever 66 is disposed in the space between the launching member 30 and the outermost tube 54, Figures 2 and 4, and is pivotally mounted on the projection 62 for limited rotation about a horizontal axis or pin 65. As shown in Figures 2 and 4, the one end of the lever 66 bears against the outer face of the tube 54 and an actuating rod 68 is connected to the other end of the lever 66. Application of a pulling force, as will be explained later, to the rod 68 effects the movement of the lever 66 from the position shown in Figure 2 to the position shown in Figure 4, effecting the withdrawal of the free end 50 of the lever 52 out of engagement with the plunger base 48, thereby releasing the plunger 44 and permitting its ejection upwardly through the aperture 36 under the action of the spring 40.

As seen in Figure 10, the tubes 54 and 56 are provided with slots 70 and 72, receiving pins 74 and 76, respectively, the pin 74 being fixed to the upper end of the intermediate tube 56 and the pin 76 being fixed to the upper end of the innermost tube 58. The arrangement of the pins 74 and 76 in the slots 70 and 72 prevent the total disconnection of the tubes 54, 56, and 58 from each other when they are projected to the extended position relative to each other. The slots 70 and 72 extend nearly to the ends of the tubes 54 and 56 and the tubes 54, 56, and 58 telescope from the position shown in Figure 1 to the position shown in Figure 6 and Figure 10 under the action of a push-type cable 78 having its free end fixedly secured, as in Figure 2

to the exterior face of the closed end 42 of the cylinder 38. An intermediate portion of the cable 78 extends through a hole in the support 26 and the other end of the cable 78 is secured to a reel 80 in the motor or control housing 24, the reel being shown most clearly in Figure 5. A guide tube 82 extends from the housing 24 to the support 26 and has the portion within the support part of the base 22 turned upwardly and in communication with the lower end of the support 26.

A motor 84, of the reversible type, is mounted within the housing 24 and has its shaft 86 directly connected to the reel 80. The guide tube 82 is pivotally supported in a pivot point 88 (Figure 1) so that as the cable 78 is unwound from the reel 80 the guide tube 82 swings from the full line position shown in Figure 5 to the dotted line position.

Mounted upon the motor shaft 86 is a first bevel gear 90 in meshing engagement with a second bevel gear 92 carried on a shaft 94 which extends from the housing 24 to the part of the base 22 beneath the support 26. Another bevel gear 96 is carried on the end portion of the shaft 94 beneath the support 26 and is in driving engagement with the bevel gear 98 carried upon a jack shaft 100. The ends of the jack shaft 100 are mounted in suitable bearings provided in the base 22 and a main drive gear 102 is carried upon the shaft 100 adjacent and spaced from the bevel gear 98. The drive gear 102 is in mesh with a pinion 104 carried on a first driven shaft 106. A second driven shaft 108 is positioned in parallel spaced relation with respect to the shaft 106 and, as shown in Figure 5, like the driven shaft 106, has its ends mounted within the elongated portions of the support wall 28, as shown in Figure 1. A pinion gear 110 on the shaft 106 is in driving relationship with a pinion gear 112 carried by the shaft 108. A tooth sparking wheel 114 is carried upon each of the shafts 106 and 108 and is in rubbing engagement with a conventional flint 116 mounted in the wall 28 and biased outwardly by conventional spring means as at 118 in Figure 5.

Preferably, either the bevel gear 90 or the pinion gear 102 may be connected by conventional clutch means to their associated shafts 86 or 100, respectively, so that upon actuation of the motor 84 and rotation of the shaft 86 in one direction the sparking wheels 114 are caused to rub against the flints 116 and to thereby produce sparks outwardly of the bottom of the launching member 30. Such clutch means is not necessary, however, and is not here illustrated as not a part of the invention and for reasons of simplification.

Referring to Figures 6 to 9, a rocket toy is designated generally by the reference numeral 120 and consists in an upwardly tapering body having a suction cup 122 facing upwardly and resiliently connected to its upper end. The toy 120 is closed at its lower larger end by a floor 124 against which bears one end of a coil spring 126. The other end of the spring 126 bears against the bottom of the compartment 128 having a door 130 pivotally mounted in the body of the toy 120 and normally flush with the exterior wall of the toy 120. A rod 132 is mounted within the toy 120 for upward and downward movement and is biased to the upward position by means of a spring 134 bearing against a collar 136 carried by the rod 132 inwardly of and adjacent the upper end of the toy 120. A transversely arranged bar 138 is fixedly secured to the lower end of the rod 132 and carries a hook 140 on one end engageable with a cooperating lip or hook 142 on the free edge of the door 130.

As shown in Figure 7, the spring 134 normally biases the rod 132 to the position in which the suction cup 122 is above and spaced from the small end of the toy 120. Upon impact of the suction cup 122 with an overhead surface, such as the ceiling of a room as designated by the reference numeral 144 in Figure 8, the rod 132 is pushed downwardly to the position in which the catch or hook 140 is out of engagement with the door hook 142.

This permits the opening of the compartment 128 and the ejection therefrom of a toy satellite 146 which is normally carried within the compartment 128. Preferably, the satellite 146 is fabricated of lightweight material or it may be filled with a lighter than air gas if found to be practical.

The means for actuating the releasable latch means embodying the lever 52 to permit the ejection of the plunger 44 consists in two other rods 148 and 150 telescopically arranged with respect to the rod 68, as shown in Figure 1. The lower end of the rod 150 is fixedly secured to the support 26 and upon upward movement of the launching member 30 in response to actuation of the motor 84 in one direction the tubes 54 and 56 extend above the tube 58 and the rods 68, 148, and 150 telescope to their greatest length and trip the lever 66 to effect the release of the plunger 44.

Referring to Figures 11 to 13, means are shown for effecting the automatic reversal of the motor 84. This means consists in a first switch 152 mounted in one end of a transverse portion of the base 22 adjacent the housing 24 and a second switch 154 mounted in the other end of such base portion. One contact of each switch 152 and 154 is carried by an actuating rod 156 which is slidably mounted in the base portion and has a portion 158 adjacent one end exteriorly of such base portion. In Figure 11 the switches 152 and 154 are shown in their open positions. Legs 160 and 162 depend from the actuating rod 156 on each side of the adjacent portion of the guide tube 82 and are engaged thereby as the guide tube 82 moves transversely of the base 22.

In operation, with the switch 152 and the switch 154 open as in Figure 11, finger pressure is applied to the projecting end portion 158 of the rod 156 to close the switch 152 as in Figure 12. This will energize the motor 84 to drive the shaft 86 in one direction effecting the rotation of the reel 80 to unreel the cable 78 therefrom and to project the same upwardly through the innermost tube 58 and thereby effect the extension of the tubes 54 and 56 above the tube 58 to the position shown in Figure 6. As the tube 54 reaches or nearly reaches the uppermost limit of its movement, the rod 68 and its associated rods 148 and 150 are projected to the extended positions, as shown in Figure 6, and a pulling force is transmitted to the rod 68 relative to the extended tubes 54, 56 and 58, causing the lever 66 to tilt about its axis or pin 65 in a counterclockwise direction and apply a force to the tube 54 adjacent the slot 64 through the intermediacy of the one end of the lever 52 to shift the projection 62 outwardly of the slot 64, thereby effecting the withdrawal of the free end 50 of the lever 52 out of engagement with the plunger 48 and the plunger to be ejected upwardly through the aperture 36 under the action of the spring 40. This effects the casting vertically upwardly of the toy 120 and launches the toy 120 into space. Upon striking of the overhead surface or ceiling of a room, the suction cup 122 on the upper end of the toy 120 will cause the toy 120 to cling to the ceiling momentarily and the striking of the suction cup 122 results in the opening of the compartment 128 and ejection of the satellite 146 from the toy 120, as shown in dotted lines in Figure 6.

When the cable 78 has been unwound from the reel 80 the guide tube 82 will be in the position shown in Figure 13 and bearing against the one leg 162 to effect the actuation of the rod 156 to the right, closing the switch 154 and reversing the motor 84 so that the cable 78 is rewound upon the reel 80 and the tubes 54, 56, and 58 are telescoped to their original position nested together as in Figure 1.

An important feature of the present invention consists in the sparking wheels 114 and their driving connection to the motor 84. The flints 116 are so arranged with reference to their associated sparking wheels 114 that as the motor 84 is initially energized, sparks are thrown outwardly and downwardly from the base of the launching

member 30 in a realistic manner representing the flaming of the rocket fuel of a conventional rocket.

The cable 78 is preferably fabricated of plastic, woven metal, or the like, sufficiently rigid as to resist bending in the narrow confine of the tube 58 or the guide tube 82. A certain amount of slack should be allowed in the cable 78 so that the sparking wheels 114 reach their maximum speed of rotation prior to moving of the launching member 30 upwardly. Additionally, the gears 110 and 112 should be weighted to thereby provide momentum for the sparking wheels 114 when driven by the motor 84 and the associated shafts and gears.

After the launching member 30 has been projected upwardly by the thrust imparting cable 78 and motor 84, the rocket toy 120 launched into space by the unloading of the spring 40, and the miniature satellite 146 ejected from the compartment 128 by the propelling spring 126, the toy 120 may be retrieved and replaced on the upper end of the launching member 30 so that it rests upon the cap 34 and upon the head 46 of the plunger 44. Manually applied pressure to the toy 120 will depress the plunger 44, permitting the free end 50 of the lever 52 to again engage with the base 48 of the plunger 44 with the tripping element or lever 66 in its upwardly sloping position to which it has been returned by the spring action of the lever 52. The miniature satellite 146 may again be placed within the compartment 128 and the compartment door 130 closed and latched for repeated launching and casting of the satellite into space.

What is claimed is:

1. A rocket and satellite toy apparatus comprising a base adapted to rest upon a supporting surface, a support carried by said base, an upstanding launching member positioned upon said base so that the lower end rests upon said support with the upper end spaced above and in vertical spaced alignment with said support, a vertically disposed spring-loaded plunger positioned within said launching member adjacent to and below the upper end of said launching member and having the upper end normally resting upon the upper end of said launching member, releasable latch means for holding said plunger in the normal position, a rocket toy normally bridging the upper end of said plunger and supported upon said launching member, an openable and closable door on said rocket toy, a miniature satellite in said rocket toy, propelling means within said rocket toy for ejecting said satellite out of said door when the latter has been moved to the open position, thrust imparting means carried by said base and operatively connected to said launching member for projecting said launching member from the position of rest upon said support vertically upwardly from said base, and a tripping element carried by said thrust imparting means and operable upon execution of the upward movement of said launching member to shift said latch means to the released position and permit the unloading of said plunger and the upper end of said plunger to be forcibly ejected against the rocket toy and launch the rocket toy into space, the door of said rocket toy being shiftable to open position upon contact by the launched rocket toy of an overhead object and permit actuation of the propelling means to eject the satellite into space.

2. A rocket and satellite toy apparatus comprising a base adapted to rest upon a supporting surface, a support carried by said base, an upstanding launching member positioned upon said base so that the lower end rests upon said support with the upper end spaced above and in vertical spaced alignment with said support, a cap on the upper end of said launching member, there being an aperture extending vertically through said cap, a vertically disposed spring-loaded plunger positioned within said launching member adjacent to and below said cap and having the upper end normally bridging said aperture and resting upon said cap, releasable latch means for holding said plunger in the normal position, a rocket toy normally bridging the upper end of said plunger and supported

upon said cap, an openable and closable door on said rocket toy, a miniature satellite in said rocket toy, propelling means within said rocket toy for ejecting said satellite out of said door when the latter has been moved to the open position, thrust imparting means carried by said base and operatively connected to said launching member for projecting said launching member from the position of rest upon said support vertically upwardly from said base, and a tripping element carried by said thrust imparting means and operable upon execution of the upwardly projecting movement of said launching member to shift said latch means to the released position and permit the unloading of said plunger and the upper end of said plunger to be forcibly ejected against the rocket toy and launch the rocket toy into space, the door of said rocket toy being shiftable to open position upon contact by the launched rocket toy of an overhead object and permit actuation of the propelling means to eject the satellite into space.

3. A rocket and satellite toy apparatus comprising a base adapted to rest upon a supporting surface, a support carried by said base, an upstanding launching member positioned upon said base so that the lower end rests upon said support with the upper end spaced above and in vertical spaced alignment with said support, a cap on the upper end of said launching member, there being an aperture extending vertically through said cap, a vertically disposed spring-loaded plunger positioned within said launching member adjacent to and below said cap and having the upper end normally bridging said aperture and resting upon said cap, releasable latch means for holding said plunger in the normal position, a rocket toy normally bridging the upper end of said plunger and supported upon said cap, an openable and closable door on said rocket toy, a miniature satellite in said rocket toy, propelling means within said rocket toy for ejecting said satellite out of said door when the latter has been moved to the open position, thrust imparting means including a reel supported on said base for rotary movement about a horizontal axis and a cable wound upon said reel and having the free end operatively connected to said launching member for projecting said launching member from the position of rest upon said support vertically upwardly from said base, and a tripping element carried by said thrust imparting means and operable upon execution of the upwardly projecting movement of said launching member to shift said latch means to the released position and permit the unloading of said plunger and the upper end of said plunger to be forcibly ejected against the rocket toy and launch the rocket toy into space, the door of said rocket toy being shiftable to open position upon contact by the launched rocket toy of an overhead object and permit actuation of the propelling means to eject the satellite into space.

4. A rocket and satellite toy apparatus comprising a base adapted to rest upon a supporting surface, a support carried by said base, an upstanding launching member positioned upon said base so that the lower end rests upon said support with the upper end spaced above and in vertical spaced alignment with said support, a cap on the upper end of said launching member, there being an aperture extending vertically through said cap, a vertically disposed spring-loaded plunger positioned within said launching member adjacent to and below said cap and having the upper end normally bridging said aperture and resting upon said cap, releasable latch means for holding said plunger in the normal position, a rocket toy normally bridging the upper end of said plunger and supported upon said cap, an openable and closable door on said rocket toy, a miniature satellite in said rocket toy, propelling means within said rocket toy for ejecting said satellite out of said door when the latter has been moved to the open position, thrust imparting means including a reel supported on said base for rotary movement about a horizontal axis, a plurality of upstanding tubes arranged

in telescopic nested position positioned within said launching member and having the upper end of one of said tubes fixedly attached to said cap, and a cable wound upon said reel and having the free end operatively connected to the portion of said one tube adjacent to and below said cap for projecting said launching member from the position of rest upon said support vertically upwardly from said base, and a tripping element carried by said thrust imparting means and operable upon execution of the upwardly projecting movement of said launching member to shift said latch means to the released position and permit the unloading of said plunger and the upper end of

said plunger to be forcibly ejected against the rocket toy into space, the door of said rocket toy being shiftable to open position upon contact by the launched rocket toy of an overhead object and permit actuation of the propelling means to eject the satellite into space.

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