May 1, 1962 N. M. GELFAND 3,031,797

TOY PROJECTILE LAUNCHING DEVICE

Filed Nov. 21, 1958

3 Sheets-Sheet 1

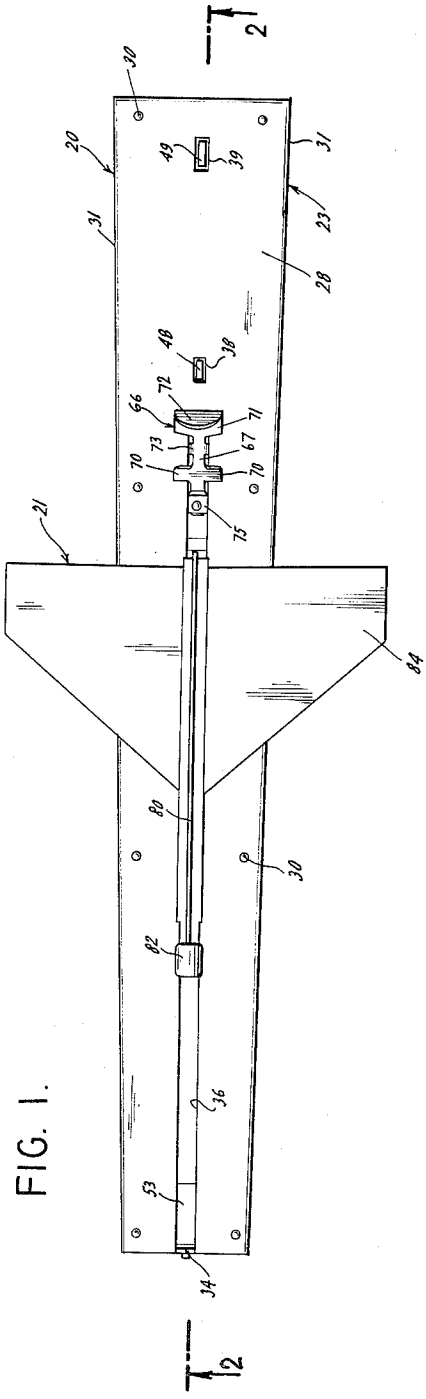


FIG. 1.

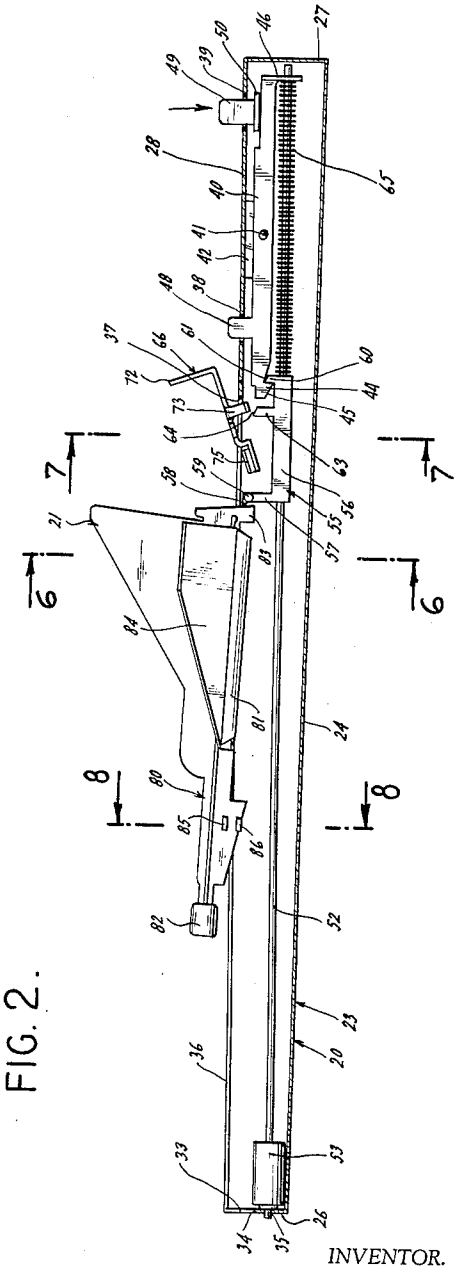


FIG. 2.

INVENTOR.
NATHAN M. GELFAND
BY Mock & Blum
ATTORNEYS

May 1, 1962 N. M. GELFAND 3,031,797

TOY PROJECTILE LAUNCHING DEVICE

Filed Nov. 21, 1958 3 Sheets-Sheet 2

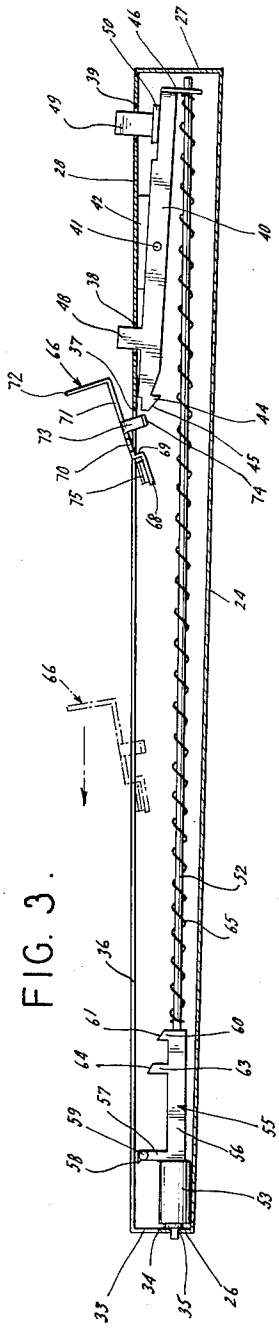


FIG. 3.

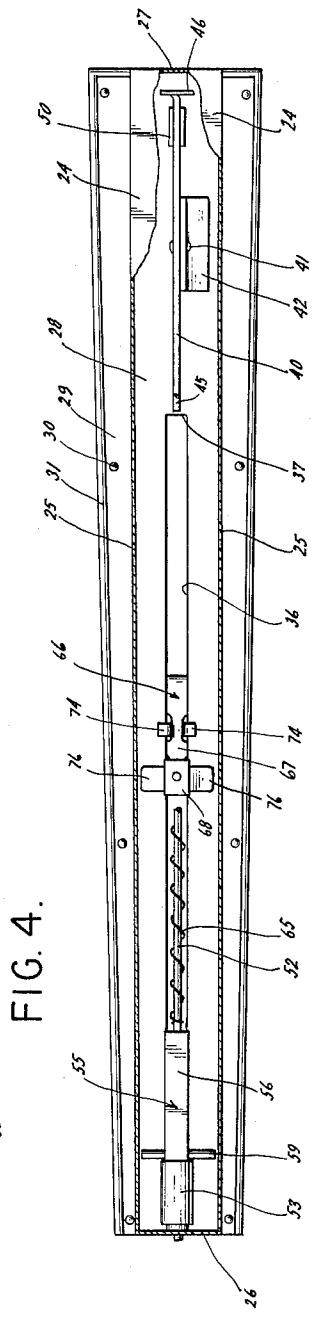


FIG. 4.

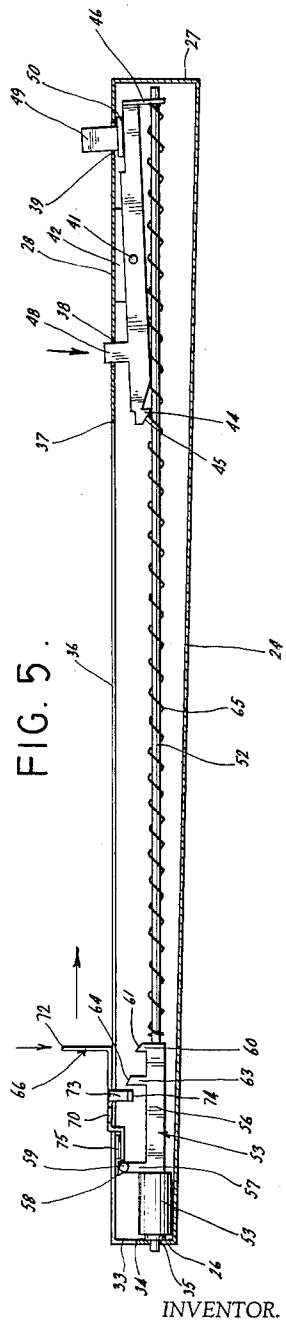


FIG. 5.

INVENTOR.
NATHAN M. GELFAND
BY
Mack & Blum
ATTORNEYS

May 1, 1962 N. M. GELFAND 3,031,797

TOY PROJECTILE LAUNCHING DEVICE

Filed Nov. 21, 1958 3 Sheets-Sheet 3

FIG. 6.

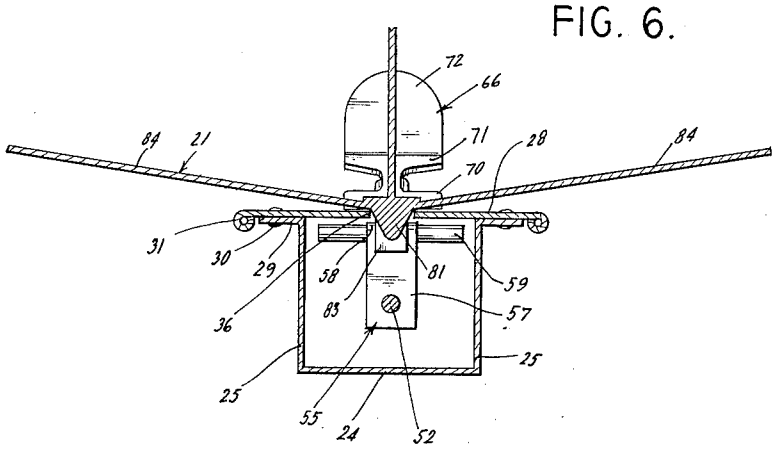


FIG. 7.

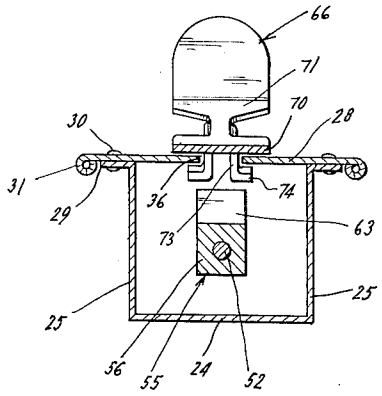
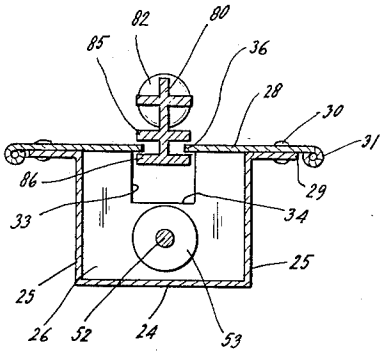


FIG. 8.



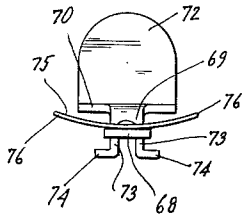


FIG. 10.

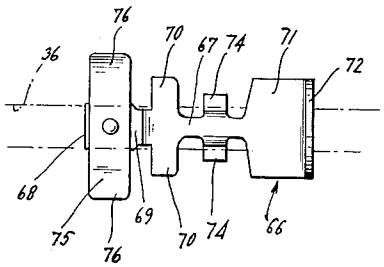


FIG. 9.

INVENTOR.
NATHAN M. GELFAND
BY Hock & Blum
ATTORNEYS

United States Patent Office 3,031,797 Patented May 1, 1962

3,031,797

TOY PROJECTILE LAUNCHING DEVICE

Nathan M. Gelfand, North Valley Stream, N.Y., assignor to Ideal Toy Corporation, New York, N.Y., a corporation of New York

Filed Nov. 21, 1958, Ser. No. 775,452
6 Claims. (Cl. 46—81)

This invention relates generally to a novel toy construction and is particularly concerned with a toy construction of the launching type.

It is one object of the present invention to provide a projectile launching toy which is extremely easy to operate, regarding both the necessary manipulation and effort required, and which is entirely fool proof, safe and reliable in operation, being capable of use by relatively small children with little or no instruction.

It is a more particular object of the invention to provide a launching device wherein the retracting or cocking element is adapted to remain retracted during launching to eliminate all possibility of injury to the person of a user.

It is another object of the present invention to provide a toy launching device and missile or projectile to be launched thereby having the advantageous characteristics mentioned in the preceding paragraph which is simple in construction, durable in use, and capable of economic mass production for sale at a reasonable price.

Other objects of the present invention will become apparent upon reading the following specification and referring to the accompanying drawings, which form a material part of this disclosure.

The invention accordingly consists in the features of construction, combinations of elements, and arrangements of parts, which will be exemplified in the construction hereinafter described, and of which the scope will be indicated by the appended claims.

In the drawings:

FIG. 1 is a top plan view showing a launching device of the instant invention in operative association with a projectile in launching position;

FIG. 2 is a longitudinal sectional elevational view taken substantially along the line 2—2 of FIG. 1;

FIG. 3 is a view similar to FIG. 2, but illustrating the launching device subsequent to the launching operation, and showing a retractor element in dot-and-dash outline at a position of movement through its cycle of operation;

FIG. 4 is a bottom plan view of the launching device of FIG. 3, with parts broken away to facilitate understanding, and showing the retractor element in the phantom position of FIG. 3;

FIG. 5 is an additional view similar to FIG. 3, but showing a slightly later stage in operation of the launching device;

FIG. 6 is a transverse sectional view taken substantially along the line 6—6 of FIG. 2;

FIG. 7 is a transverse sectional view taken substantially along the line 7—7 of FIG. 2;

FIG. 8 is a transverse sectional view taken substantially along the line 8—8 of FIG. 2;

FIG. 9 is a top plan view showing the retractor element apart from the launching device, but illustrating in dot-and-dash outline the location of the slot in which the retractor rides; and

FIG. 10 is an end elevational view of the retractor device of FIG. 9 taken from the left hand side thereof.

Referring now more particularly to the drawings, and specifically to FIGS. 1 and 2 thereof, a launching device is there generally designated 20, and carries a projectile or device to be launched or projected, generally designated 21.

The launching device includes an elongate housing 23 having a bottom wall 24, and longitudinally extending upstanding, generally parallel spaced side walls 25, along the longitudinal edges of the bottom wall, see FIGS. 6–8. The housing 23 further consists of upstanding front and rear end walls 26 and 27 at opposite ends of the bottom wall and extending laterally between adjacent end regions of the side walls, and an elongate top wall 28 longitudinally coextensive with the bottom wall and extending between the upper regions of the side and end walls. As best seen in FIGS. 6–8, the bottom wall 24 and side walls 25 combine to define an upwardly facing channel, the side walls being provided along their upper edges, respectively, with longitudinally extending laterally outstanding flanges 29. The top wall 28 may be substantially flat and extends laterally outward beyond the side walls 25 seating on the upper surfaces of the flanges 29 to which it is fixedly secured by fasteners 30. Along the longitudinal or side edges of the top wall 28, outward of the flanges 29, there may be provided inturned portions or beads 31, if desired. As seen in the vertical sectional views of FIGS. 2, 3, and 5, and also in the transverse sectional views of FIGS. 6–8, the depth of the side walls 25, and consequently the depth of the channel 24, 25 increases gradually from the front end wall 26 to the rear end wall 27.

Formed in the housing end wall 26 is an upwardly opening, generally vertically disposed cutout or slot 33 opening through the upper edge of the end wall and terminating at its lower end 34 medially between the upper and lower end-wall edges. In vertical alignment with the slot 33, spaced medially between the slot end wall 34 and the lower end of the wall 26, there is formed in the latter wall a through opening or aperture 35.

The top wall 28 is formed with longitudinally disposed through slot 36 extending from the upper end of end-wall slot 33 toward the housing end wall 27 and terminating short of the latter at 37. Thus, the elongate longitudinally extending slot 36 opens at its forward end into the upper end of vertical slot 33 and extends throughout a substantial portion of the length of the top wall, terminating adjacent to but spaced from the rear end wall 27. However, the slot 36 is narrower than the slot 33, see FIG. 8. Located in spaced relation between the terminal end 37 of the slot 36 and the rear end wall 27, and in substantial alignment with the slot 36, the top wall 28 is formed with a pair of spaced, through apertures or openings 38 and 39, the former being forward of the latter.

Interiorly of the housing 23, located beneath the top wall region between slot end 37 and rear housing end wall 27, and in substantial longitudinal end-to-end alignment with the slot 36, is an elongate member or lever 40. The lever 40 is located beneath the top-wall openings 38 and 39, having its forward end proximate to the terminal slot end 37, and its rear end proximate to the rear housing end wall 27; and, the lever is mounted medially for rotation about the axis of a generally horizontal, laterally extending pivot 41 carried by a bracket 42 fixed to and depending from the top wall 28. Provided on the forward end of the lever 40 is a downwardly facing retaining hook or catch member 44 having an oblique, downwardly and forwardly facing edge 45. Depending from the rear end of the lever 40, adjacent to the rear housing end wall 27, and disposed generally normal to the lever in facing relation with the rear-housing end wall, is a hanger plate or connector 46. As the lever 40 is pivoted medially about the laterally extending axis of pin 41, opposite ends of the lever, and consequently the catch 44 and connector 46 are relatively movable up and down upon lever rotation. An upstanding lug or button 48 projects from the lever 40, at a region forward of the

pivot 41, freely upward through the top-wall opening 38 beyond the top wall. A rearward button or manually actuable element 49 projects vertically upward, freely through the housing opening 39, and is provided on its lower end beneath the housing top wall 28 with an enlarged base portion foot or head 50 seated on the upper surface of the lever 40 adjacent to the rearward end thereof.

Arranged longitudinally within the housing, substantially directly below the slot 36, is an elongate guide rod or rail 52 which has its forward end projecting loosely through and received in the opening 35 of the front-housing end wall 26. The guide rod or rail 52 extends rearward, having its rearward end portion loosely received in and carried by the depending hanger or connector 46 and terminating proximate to the rear-housing end wall 27. A resilient cushion member or shock absorber 53 is fixed to the forward end region of the rail 52 in abutting engagement with the front end wall 26 of the housing, and limits forward sliding movement of the guide rail. Thus, withdrawal of the rearward portion of the guide rail 52 from the connector 46 is prevented by engagement of the shock-absorbing member 53 with the front-housing end wall; and further, rearward withdrawal of the forward end portion of the guide rail from the front-housing end wall is prevented by engagement of the rear rail end with the rear-housing end wall 27. As the rearward end of the lever 40 is movable vertically, and carries the rearward end of the rail 52, it is understood that the rail is swingable vertically about an axis extending generally laterally through the forward end region of the rail. This vertical swinging movement of the rail 52 is accommodated by the rearwardly increasing depth of the housing.

The rail 52 supports a projector element, generally designated 55, for reciprocating movement longitudinally within the housing 23 beneath the slot 36. The projector 55 includes an elongate body 56 longitudinally slidably receiving the rail 52 for endwise movement along the latter. Extending upward from the forward end of the projector body 56 is a projectile-engaging element or lug 57 which terminates at its upper end just below the slot 36, and may have its upper end forwardly pointed, as at 58. The upper end region of the lug 57 may be provided with a laterally extending crosspiece 59 having its opposite ends respectively engageable with the housing side walls 25 to limit rotation of the projector body 56 about the axis of rod 52 and maintain the lug 57 substantially upright. On the rear end of the projector body 56 is an upstanding pawl formation 60 having its upper end or terminal surface 61 facing obliquely upward and rearward, and at a height engageable with the catch surface 45 to ride beneath the latter for interengagement with the catch 44, the condition seen in FIG. 2. Intermediate the ends of the projector body 56, there is provided an upstanding retractor-engaging lug 63 having its upper surface facing obliquely upward and rearward, as at 64.

Loosely circumposed about the guide rod or rail 52, between the projector 55 and connector 46 is a resilient member or coil compression spring 65. The spring 65 is of such undistended length as to be axially compressed between the projector 55 and connector 46, having its forward and rearward ends respectively engageable therewith, upon rearward movement of the projector to its position of FIG. 2, as will appear more fully hereinafter.

Carried by the housing top wall 28 for movement along the slot 36 is a retractor, generally designated 66. That is, the retractor 66 is slidable along the slot 36 longitudinally of the housing 23, the slot defining a track for the retractor in the housing top wall. As best seen in FIGS. 9 and 10, the retractor includes an elongate body member disposed longitudinally of and over the track or slot 36. The forward end portion 68 of the body member 67 is offset downward, as by a depending portion 69, to locate the forward end portion beneath the top wall 28. Medially of the body member 67 are provided a pair of laterally oppositely outstanding wings 70 resting on the upper surface of the housing top wall 28 each adjacent to and slidable along a respective longitudinal edge of the slot or track 36. The rearward end region of the retractor body member 67 is laterally enlarged, as at 71, the enlarged portion 71 also being above the housing top wall and slidable thereon along opposite longitudinal bounding portions of the track 36. An upstanding manually actuable member or tab 72 is provided on the enlarged rearward body member end portion 71.

Depending from opposite sides of the retractor body member 67, spaced intermediate the wings 70 and rearward enlarged region 71, are a pair of legs 73 passing downward through the slot 36, each having at its lower end a laterally outstanding foot 74 extending laterally beyond the slot beneath the adjacent portion of the housing top wall. The legs 73 depend sufficiently beneath the top wall 28, when the body member 67 is substantially horizontal, to engage with the upstanding lug 63 of the projector 55; and, the feet 74 are spaced sufficiently below the top wall 28 to permit a limited upward swinging movement of the rearward end region of the retractor 66, the condition shown in FIG. 2.

Secured on the downwardly offset forward end region 68 of the retractor body member 67 is a laterally extending resiliently deflectable member or leaf spring 75. As seen in FIG. 10, the leaf spring 75 extends laterally considerably beyond the body member 67 and is upwardly concave in its unstressed condition, its opposite ends defining normally upwardly and outwardly extending wings 76. As may be seen in FIG. 3, in the solid-line position of the retractor 66, the resiliently deflectable wings 76 are engageable with the undersurface of the housing top wall 28 to yieldably swing the forward end of the retractor downward and the rearward end of the retractor upward. However, the retractor is manually swingable into substantial horizontal relation against the force of the resilient wings 76 by resilient deflection thereof into substantial coplanarity, the condition of FIG. 5. Further, the retractor is slidable along the track 36 of top wall 28 either in its generally horizontal disposition of FIG. 5, or in its canted, solid-line position of FIG. 3.

The projectile 21 may be of any suitable configuration, that illustrated including an elongate body 80 having a longitudinal rib 81 on its underside slidably received in the slot 36. A soft resilient bumper 82 may be provided on the forward end of the projectile body 80, while a lug 83 may depend from the rearward body end through the slot 36 for engagement with the projector lug 57. Suitable airfoils or guiding fins 84 may be carried by the body 80 to guide its free flight, as desired. In addition, a pair of vertically spaced laterally outstanding lugs 85 and 86 may be provided on each side of the body 80, on the forward region thereof, for receiving the adjacent housing top-wall portion bounding the slot 36.

In operation, say from the condition of FIG. 3, the spring 65 is loosely carried on the rail 52, not being in compression, so that the lever 40 gravitationally swings to its limiting position of clockwise movement about the pivotal axis 41, the rail and projector 55 drawing the connector 46 and rearward end of the lever downward. The retractor 66 is loosely received in the slot 36, being canted rearward and upward by the resiliently deflectable leaf spring 75, and in this condition is freely slidable forward toward the front-housing end wall 26. The depending legs and feet 74, 73 will ride over the inclined upper surface 64 of the projector lug 63, and forward movement of the retractor will be limited by abutting engagement of the forward end portion 68 with the forward lug 57 of the projector. The retractor is then moved downward to its position of FIG. 5, resiliently deflecting the leaf spring 75, in the direction of arrow 89, so that the legs and feet 73, 74 depend below the upper end of the projector lug 63. The retractor is then slid rearward along the

track 36, the legs and feet 73, 74 engaging the projector lug 63 and drawing the projector rearward against the force of spring 65. During this rearward withdrawal of the projector 55, opposite ends of the spring 65 engage respectively with the rearward end of the projector and the connector 46 to compress the spring and exert a force against the connector to swing the lever 40 counterclockwise. This raises the rearward end of the rail 52 and lowers the forward end or catch 44 of the lever 40, whereupon the catch snap-engages over the projector lug 60, the catch and lug surfaces 45 and 61 riding over each other to effect the interengagement between catch 44 and pawl 60 illustrated in FIG. 2. The retractor 66 then releases to assume its canted position, and the projector 55 is retained rearward by its pawl 60 engaged with the catch 44.

The projectile 21 may then be slid rearward through the front end wall slot 33 into the top wall slot 36 with the marginal edge portions of the top wall slot received between the laterally projecting lugs 85 and 86 until the depending rear lug 83 of the projectile engages with the upstanding forward lug 57 of the projector. The launching device 20 and the projectile 21 are now in condition for the launching operation.

It is only necessary to depress the rear button 49 to catapult the projectile 21 from the launching device 20. Depression of the rear button 49 swings the lever 40 clockwise, to lower the connector 46 and raise the catch 44. By this action, the projector 55 and its rear retaining pawl 60 are lowered with the rail 52 and connector 46, and the catch 44 is simultaneously raised to release the pawl from interengagement with the catch. The compressed spring 65 is then free to expand and drive the projector forward along the rail 52, the projector serving to drive the projectile 61 along and beyond the open end of the track 36. It will be noted that the retractor 66 in its normal canted position, see FIG. 2, is free of the projector 55 and therefore remains in its rearward position during the launching. To prevent excessive shock, the projector 55 is retarded and stopped at the forward end of its travel by engagement with the resiliently yieldable shock absorber 53. The launching device is now in the condition discussed hereinbefore in connection with FIG. 3, and the operating cycle may be completed as described above.

From the foregoing, it is seen that the present invention provides a toy of the projectile-launching type which fully accomplishes its intended objects and is well adapted to meet practical conditions of manufacture and use.

Although the present invention has been described in some detail by way of illustration and example for purposes of clarity of understanding, it is understood that certain changes and modifications may be made within the spirit of the invention and scope of the appended claims.

What is claimed is:

1. A launching device comprising a housing having top, bottom, side and end walls, said housing being formed with a through slot extending inward through one end wall and along said top wall toward and terminating short of the other end wall, a lever arranged in said housing in end to end relation with the terminal end of said slot and pivotally connected to said housing for relative up and down movement of its opposite ends, a catch element on the lever end adjacent to said slot, a connector element depending from the lever end remote from said slot, a rail arranged within said housing longitudinally of and below said slot having one end connected to said housing adjacent to said one end wall and having its other end connected to said connector element for up and down movement therewith, a projector mounted on said rail for sliding movement therealong beneath said slot, a spring interposed between said projector and connector and compressible therebetween upon movement of said projector toward said terminal slot end, said spring

resiliently urging said connector toward its upward position of movement upon compression of said spring, a formation on said projector engageable with said catch element to retain said projector at its position of movement toward said terminal slot end when said connector is moved upward and said catch member moved downward, upward swinging movement of said catch member effecting disengagement with said projector formation and releasing said projector for movement toward said one end wall under the force of said spring, and a retractor mounted for back and forth movement on said top wall along said track and releasably engageable with said projector for drawing the latter toward said terminal track end against the force of said spring.

2. A launching device according to claim 1, in combination with a projectile adapted to rest on said top wall and having a longitudinally extending depending portion engageable downward through said slot with said projector for projection by the latter along and beyond said slot upon release of said catch element.

3. A launching device according to claim 1, said retractor comprising an elongate slide member arranged longitudinally of and over said slot and slidable on said top wall, an engaging member depending from said slide member through said slot for retracting engagement with said projector upon sliding movement of said slide member along said slot, and a resiliently deflectable member adjacent to one end of said slide member beneath said top wall and resiliently engageable with the latter to urge the other end of said slide member upward for elevation of said engaging member out of retracting engagement with said projector, said retractor thus being movable downward against the force of said resiliently deflectable member and slidable along said slot in its downward position for retracting said projector and being releasable from its downward position for disengaging from said projector.

4. A launching device according to claim 3, said resiliently deflectable member being carried on the end of said slide member remote from the terminal end of said slot and comprising a pair of laterally outwardly and upwardly extending wing elements engageable with the underside of said top wall to resiliently urge the engaging member upward and being resiliently deflectable into substantial coplanarity upon downward movement of said engaging member.

5. A projectile launching device comprising a housing formed in an upper wall with a slot having one end open and one end closed, said slot defining a track for guiding and receiving a portion of a projectile during launching, a projector mounted in said housing for back and forth movement longitudinally of said track, resilient means operatively connected to said projector for urging the latter toward the open end of said track, a catch mounted in said housing adjacent to the closed end of said track for swinging movement between releasing and engaging positions with respect to said projector when the latter is drawn toward the closed end of said track, and a retractor mounted for back and forth movement along said track and releasably engageable with said projector for drawing the latter toward the closed track end against the force of said resilient means, said retractor comprising an elongate slide member arranged longitudinally of and over said slot and mounted for sliding movement on the top wall of said housing and pivotally movable about a transverse axis intermediate the ends of said slide member, one end of said slide member extending downward through and beneath said slot for up and down swinging therebelow upon pivotal movement of said slide member, an engaging member depending from a region of said slide member spaced from said transverse axis on the opposite side thereof as said one slide member end, said engaging member passing downward through said slot for retracting engagement with said projector upon sliding movement of said slide member along said slot, and

a resiliently deflectable member carried by said one end of said slide member beneath said housing top wall and resiliently engageable with the latter to urge said one slide member end downward for elevating said engaging member out of retracting engagement with said retractor, said retractor thus being movable to a position with its other end downward against the force of said resiliently deflectable member and slidable along said slot in said position for retracting said projector and being releasable from said position for disengagement from said projector, whereby said retractor is adapted to remain retracted upon projecting movement of said projector.

6. A projectile launching device comprising a housing having a track for guiding a projectile during launching, a projector mounted in said housing for back and forth movement longitudinally of said track, resilient means operatively connected to said projector for urging the latter toward one end of said track, a retractor mounted for back and forth movement along said track and releasably engageable with said projector for drawing the latter toward the other track end against the force of said resilient means, a catch mounted in said housing adjacent to said other track end for movement between releasing and engaging positions with respect to said projector when the latter is drawn toward said other track end, and a rail in said housing extending longitudinally of said track and mounting said projector for said back and forth

movement, said rail having one end connected to said housing adjacent to said one track end and having its other end connected to said catch for up and down movement respectively upon engagement and release of said catch with respect to said projector, said resilient means comprising a compression spring operatively connected between said projector and catch for urging the latter to its engaging position upon movement of said projector toward said other track end, said catch comprising a lever arranged in longitudinal end to end relation with said track and pivoted to said housing for relative swinging movement of its opposite ends, a hook on the lever end adjacent to said track, a connector on the lever end remote from said track connected to said other rail end for raising and lowering the latter, and manually actuable means connected to said lever for effecting selective swinging movement thereof.

References Cited in the file of this patent

UNITED STATES PATENTS

440,190	Pederson	Nov. 11, 1890
1,381,639	Hess	June 14, 1921
2,099,957	Graham	Nov. 23, 1937
2,426,437	Cole et al.	Aug. 26, 1947
2,521,083	Nasello	Sept. 5, 1950