

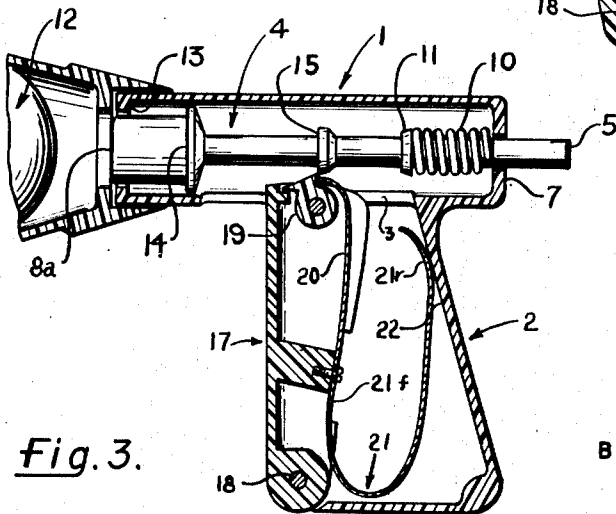
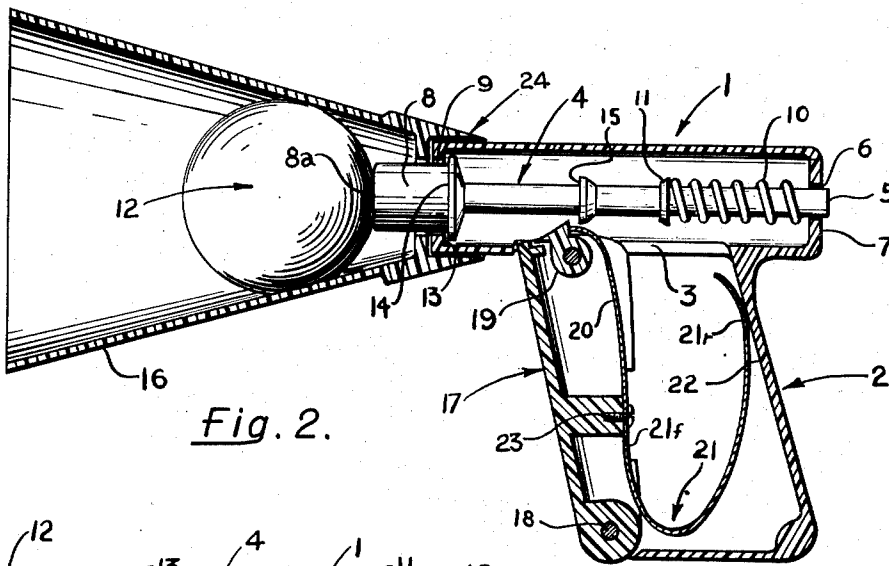
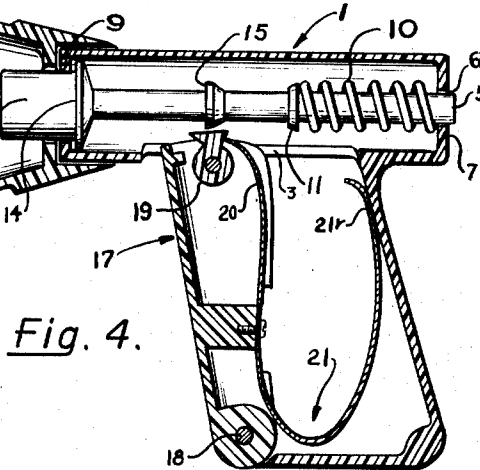
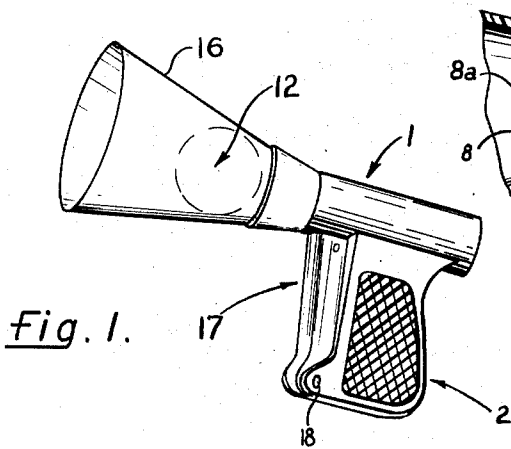
April 28, 1953

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2,636,738

TOY PROJECTOR AND CATCHER

Filed March 7, 1950



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UNITED STATES PATENT OFFICE

2,636,738

TOY PROJECTOR AND CATCHER

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Application March 7, 1950, Serial No. 148,021

1 Claim. (Cl. 273—96)

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The present invention relates generally to toy guns, and more particularly to an improved toy gun of exceedingly simple, cheap, fool-proof construction, which is adapted to shoot a projectile, such as a Ping-pong ball, for example, with considerable force and accuracy. In a preferred form, it is also provided with projectile catching means (which may or may not be removable) for catching a suitable projectile, such as a Ping-pong ball, for example, and guiding same into firing position with respect to the gun. This makes it possible for two or more persons, each provided with a gun of the present invention, to play a game wherein one person fires a suitable projectile, such as a Ping-pong ball, from his gun toward a second person, who attempts to catch the ball in the projectile catching means carried by his gun, which will automatically guide the Ping-pong ball into firing position where he can reproject it back toward the first person (or towards any other person) taking part in the game, who will attempt to catch the ball in his projectile catching means carried by the forward end of his gun. This can be continued as long as desired, and makes it possible to play various types of games. For example, miniature volley ball, Ping-pong or various other games can be played with the opposing players being provided with guns of the present invention. It is also possible for a single person to shoot the Ping-pong ball into the air and attempt to catch it during descent for reprojection into the air again and again, or a single individual can project the Ping-pong ball against a suitable surface which will cause the ball to bounce backwardly in a manner whereby the player can, if skillful enough, catch the ball in the projectile catching means positioned on the forward end of his gun. In one preferred form of the present invention, the projectile catching means is of generally conical form (though not limited to such shape), and is removably carried by the barrel of the toy gun. This has certain advantages in a toy gun intended primarily for children, since the conical member can be removed from the gun and employed as a megaphone.

A considerable number of prior art toy guns of the same general type of the present invention have been developed. However, all such guns known to me, have been relatively complex and/or costly devices, and usually so constructed as to become inoperative after a very short operating period of time. Furthermore, such prior art guns were not provided with projectile catching means of the type employed in the present

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invention, adapted to act as a projectile catching, guiding and holding means for catching a projectile, such as a Ping-pong ball, for example, and/or guiding and positioning the projectile in firing position. The removable conical form of the projectile catching means of the present invention adapted for removal to act as a megaphone when desired, has certainly not been anticipated by prior art toy guns. In prior art toy guns, trigger operated means adapted to cock the gun into firing position usually consisted of some sort of lip, shoulder catch or pawl means, temporarily cooperating with similar means and usually arranged for sliding engagement and disengagement with respect thereto. Usually the contact area of such cooperative means was relatively small and wear rapidly rendered the gun inoperable by making proper engagement of said cooperative means impossible. Another disadvantage of such prior art toy guns was that they were difficult (and therefore usually costly) to assemble.

Generally speaking, the present invention comprises a toy gun adapted to forcibly catapult, project or shoot a suitable projectile therefrom. It includes a hollow longitudinal barrel provided with longitudinally movable means positioned within said barrel for longitudinal movement with respect thereto. It also includes resilient means (usually, though not necessarily, coil compression spring means) normally biasing the longitudinally movable means into a forward projectile engaging or striking position. Projectile carrying means is positioned adjacent the front end of the barrel and is adapted to temporarily support or position a suitable projectile (such as a Ping-pong ball, for example, though not so limited), in firing position with respect to the forward end of the gun barrel where it will be in engagement with the forward end of the longitudinally movable means when said longitudinally movable means is in its forward position. Lip means is operably connected to the longitudinally movable means. A hollow handle is provided which depends from the barrel with the hollow interior thereof connected to the hollow interior of the barrel to form a chamber. Trigger means is mounted for pivotal movement with respect to the handle. Lip engaging means is operatively connected to the trigger means and is arranged within the chamber for selective cooperation with the lip means for rearwardly moving the longitudinally movable means against the resilient biasing means in response to rearward manual actuation of the trigger means. The lip

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engaging means is arranged to become disengaged from the lip means in response to rearward movement of the lip engaging means beyond a predetermined point whereby the longitudinally movable means will be released and forcibly impelled forwardly by the resilient biasing means and will strike a projectile (such as a Ping-pong ball, for example) carried adjacent the forward end of the barrel by the projectile carrying means and will forcibly catapult said projectile therefrom. It should be noted that in a preferred form of the present invention, the projectile carrying means also acts as a projectile catching and guiding means, and in certain cases, may be removably positioned with respect to the front end of the gun barrel.

From the above general description, it will readily be understood that the present invention has none of the hereinbefore-mentioned disadvantages of prior art toy guns. It is of exceedingly simple, cheap construction, and will operate for a long period of time without getting out of order.

In a preferred form of the present invention, the lip means operably connected to the longitudinally movable means, takes the form of an annular lip. This makes it possible to rotate the longitudinally movable means with respect to the barrel to place a new portion of the lip means in position for engagement with the lip engaging means operatively connected to the trigger means. This can be done at the first sign of wear or improper engagement of the lip engaging means and the lip means. This greatly extends the operating life of the gun.

In one form of the present invention, the projectile carrying means also acts as a projectile catching means and can be removed from its engagement with the end of the gun barrel for use as a megaphone, thus functioning in a dual capacity. In a preferred form of the present invention, the trigger means is pivotally mounted adjacent the bottom of the handle means by a single pivot pin, thus facilitating the assembly and disassembly of the gun, and making it much simpler than any prior art toy guns. Also in a preferred form of the present invention, a single cantilever type spring is employed for biasing the trigger means in a forward direction and for biasing into a projecting position a pawl connected to the trigger means which comprises the lip engaging means adapted for selective engagement with the lip carried by the longitudinally movable means slidably mounted in the gun barrel in response to manual rearward arcuate actuation of the trigger means. This is a much simpler and more fool-proof construction than employed in any of the prior art toy guns known to me.

With the above points in mind, it is an object of the present invention to provide a new and improved toy gun adapted to catapult a suitable projectile (such as a Ping-pong ball, for example) which is of exceedingly simple, cheap, fool-proof construction.

It is a further object of the present invention to provide an improved toy gun adapted to catapult a suitable projectile (such as a Ping-pong ball, for example), which is provided with projectile catching means mounted adjacent the forward end of the gun barrel, which is adapted to catch a projectile (such as a Ping-pong ball, for example) and position it in firing position for reprojection therefrom.

It is a further object of the present invention,

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to provide a new and improved spring operated toy gun adapted to catapult a suitable projectile (such as a Ping-pong ball, or the like) therefrom, which is provided with removable conically shaped means, removably mounted on the forward end of the gun barrel and adapted to catch a suitable projectile (such as a Ping-pong ball, or the like) and/or position same in firing position with respect to the gun barrel for reprojection therefrom. The removable conical means is adapted for use as a megaphone when removed from engagement with respect to the gun barrel.

Other and allied objectives will be apparent to those skilled in the art after a careful perusal, examination and study of the illustrations, specification and appended claim.

To facilitate understanding, reference will be made to the hereinbelow described drawings, in which:

Fig. 1 is a perspective view of one illustrative embodiment of the present invention.

Fig. 2 is a vertical section of Fig. 1. In this view a Ping-pong ball is shown in firing position and the trigger means and longitudinally movable means are shown before manual actuation of the trigger means.

Fig. 3 is a vertical section, similar in aspect to Fig. 2, but with the trigger means and the longitudinally movable means shown as they would appear during rearward manual actuation of the trigger means just prior to disengagement of the lip engaging means and the lip means, and the subsequent forward striking movement of the longitudinally movable means against the Ping-pong ball which will catapult it from its position with considerable force.

Fig. 4 is a fragmentary, vertical section, similar in aspect to similar portions of Figs. 2 and 3, and shows the lip engaging means operatively connected to the trigger means during the return thereof to normal position for a second manual actuation of the trigger means.

Generally speaking, a hollow longitudinal barrel, indicated generally at 1, is provided with depending hollow handle means indicated generally at 2. The hollow interiors of the barrel 1 and the handle 2 are in communication through an opening 3 in the underside of the barrel 1, and the upper end of the handle 2, to form a chamber. Longitudinally movable means is positioned within the barrel 1 for longitudinal movement with respect thereto. In the specific example described and illustrated herein, the longitudinally movable means comprises a longitudinal plunger indicated generally at 4 provided with guiding portions thereof in sliding engagement with longitudinally concentrically aligned guiding apertures at opposite ends of the barrel which position and guide the position of movements of the plunger. In the example illustrated, the guiding portions comprise a rear end 5 slidably positioned in an aperture 6 in the rear end 7 of the barrel 1, and the enlarged guiding portion 8 at the forward end of the plunger 4 slidably mounted in a large aperture 9 in the forward end of the gun barrel 1, which is concentrically positioned with respect to the rear aperture 6 and the hollow interior of the gun barrel 1. It should be noted that the forward surface 8a of the front guiding portion 8 also acts as the projectile striking surface. Resilient biasing means is also provided for normally biasing the longitudinally movable means (in the specific example illustrated, the plunger 4) into a forward projectile striking position.

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In the specific example described and illustrated, said resilient means comprises a coil compression spring 10 axially carried around the rear portion of the plunger 4 between a shoulder 11 carried by the plunger 4 and the inside surface of the rear end 7 of the gun barrel 1. As can be seen from an examination of Figs. 2 and 3, the spring 10 normally urges the plunger 4 into the position shown in Fig. 2 in contact with the rear surface of a suitable projectile, such as a Ping-pong ball, or the like, indicated generally at 12, when said ball is in firing position. Stop means may be provided for limiting the forward travel of the longitudinally movable means (in the specific example illustrated, plunger 4) with respect to the barrel 1, to a position such that the plunger 4 is still spring biased in a forward direction. In other words, the spring 10 is still under some compression. In the example described and illustrated, such stop means takes the form of an inwardly directed annular lip or flange 13 carried by the front end of the gun barrel 1, which is adapted to make contact with an outwardly directed annular lip or flange 14 carried by the guiding portion 8 at the forward end of the plunger 4. The plunger 4 is also provided with lip means. In the specific example illustrated, this takes the form of an annular lip 15, the purpose of which will be more fully described hereinafter.

Means is also provided for carrying or positioning a projectile, such as the ball 12, for example, in firing position with respect to the front end of the gun barrel 1 and the front projectile striking surface 8a at the forward end of the plunger 4. In the specific example described and illustrated, this comprises a conical member 16 which also acts as a projectile or ball catching means adapted to catch a ball and guide it into firing position.

Trigger means is also provided and is mounted for pivotal movement with respect to the gun. In the specific example illustrated, the trigger means is indicated generally at 17 and is pivotally mounted by a pivot pin 18 at the front bottom corner of the handle 2 (although not so limited). Lip engaging means is operatively connected to the trigger means 17 and is arranged within the chamber to cooperate with the lip means 15 for rearwardly moving the plunger 4 against the biasing spring 10 in response to rearward, arcuate, pivotal, manual actuation of the trigger 17 from the position shown in Fig. 2 to the position shown in Fig. 3. In the example illustrated, said lip engaging means comprises a pawl 19 normally spring biased by cantilever spring means 20 into a projecting position as shown in Figs. 2 and 3, where it is capable of engagement with the lip 15. It should be noted, that the arcuate or pivotal movement of the trigger 17 around the pivot pin 18 is such that the pawl 19 becomes disengaged from the lip 15 if the trigger 17 is rearwardly moved beyond the predetermined point illustrated in Fig. 3, which will thus allow the plunger 4 to be driven forward forcibly by the biasing spring 10 into the position shown in Fig. 2 where the striking surface 8a will strike the rear surface of the ball 12 and forcibly catapult it from its position within the member 16. Trigger biasing resilient means is also provided to normally maintain the trigger means 17 in a forward extreme position as shown in Figs. 1 and 2. In the specific example described and illustrated, the trigger biasing resilient means comprises a longitudinal bent

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spring 21 positioned in the chamber in the interior of the hollow handle 2 with the rear portion 21r of the spring abutting the rear wall 22 of the handle 2 and with the forward portion 21f of the spring abutting the rear side of the trigger means 17 to which it may be attached by suitable fastening means, if desired, such as indicated at 23. In the example described and illustrated, the pawl biasing spring 20 and the trigger biasing spring 21 are integral (although not so limited).

The operation of the gun is exceedingly simple. A suitable projectile, such as the Ping-pong ball 12 for example, is either manually placed in the position shown in Figs. 1 and 2, or is dropped or caught in the open outer end of the conical member 16 and is allowed to position itself by gravity (the gun of course being positioned below the conical member 16 during this operation). It should be noted at this point, that the ball 12 may be loosely positioned in the firing position above in Figs. 1 and 2 or it may be frictionally retained in said firing position by means of frictional contact with the interior wall of the conical member 16. After positioning the ball in firing position, the trigger is then manually grasped and squeezed which forces the plunger 4 backwardly and compresses the biasing spring 10. This continues until the lip engaging pawl 19 releases the lip 15 and allows spring 10 to forcibly drive the plunger 4 forward, causing the front end 8a of the plunger 4 to forcibly strike the rear surface of the ball 12 and forcibly catapult same out of the conical member 16.

If the engagement of the pawl 19 and the lip 15 becomes unsatisfactory as a result of wear from long operation of the gun, the plunger 4 may be rotated with respect to the barrel 1, thus placing a new or fresh portion of the lip 15 in position for engagement with the pawl 19.

It should be noted that in the specific examples illustrated, the ball carrying and/or catching member 16 is removably frictionally mounted as indicated generally at 24 (although it can be removably mounted in any desired manner) on the end of the barrel 1 and can be removed at will for use as a megaphone.

Numerous modifications and variations of the present invention will occur to those skilled in the art after a careful study thereof. All such properly within the scope and teachings hereof are intended to be included and comprehended herein as fully as if they were specifically described, illustrated and claimed herein. For example, the exact construction, configuration and relationship of the component parts of the present invention may be modified substantially without departing from the teachings hereof. And while in its preferred form I contemplate making the barrel, handle, trigger means, lip engaging means and lip means and ball carrying and/or catching means primarily of plastic or other similar material, and while I contemplate making the spring means of suitable metals, I do not limit myself to such materials. Any suitable materials may be employed. While I have described and illustrated the ball carrying and/or ball catching means as a conical member, I do not limit myself to such construction. Any member having an open, outer end of greater area than the inner end adjacent the forward end of the gun barrel, may be employed, whether of circular, elliptical, triangular, rectangular or any other cross-sectional shape, and irrespective

of variations in convergence or divergence of the walls thereof. It is also to be understood that while in the preferred form described and illustrated herein I show a removable ball carrying and/or catching means adapted for use as a megaphone when removed, I do not limit myself to such a construction. It may be integral with the gun, if desired. The biasing springs may be modified substantially. The stop means may be modified or dispensed with entirely, if desired.

The examples described and illustrated herein are exemplary only and are not intended to limit the scope of the present invention, which is to be interpreted in the light of the prior art and the appended claim only, with due consideration for the doctrine of equivalents.

I claim:

An improved toy gun adapted to forcibly catapult a projectile therefrom, comprising: a hollow longitudinal barrel; a longitudinally movable plunger within the barrel for longitudinal movement with respect thereto, said plunger being provided with guiding portions in sliding engagement with longitudinally concentrically aligned apertures at opposite ends of the barrel which position and guide the direction of movement of the plunger, said plunger being provided with a shoulder, resilient biasing coil compression spring means axially carried by the rear portion of the plunger between said shoulder and the rear end of the barrel and adapted to normally bias the plunger into a forward projectile striking position; said barrel and said plunger being provided with cooperable stop means for limiting the forward travel of the plunger with respect to the barrel to a position such that said plunger is still spring biased in a forward direction; projectile receiving means removably mounted on the front end of the barrel with the larger end thereof open and outwardly directed, said projectile receiving means being adapted for use in catching a projectile and guiding same into firing position and temporarily supporting same in firing position in engagement with the front end of the plunger when said plunger is in its forward position; rotatably adjustable annular lip means carried by the plunger; a hollow handle depending from the barrel with the hollow interior thereof connected to the hollow interior of the barrel to form a chamber; trigger means mounted for pivotal movement with respect to the handle; lip engaging means pivotally carried by the trigger means and arranged within the chamber to cooperate with the annular lip for rearwardly moving the plunger against the coil compression spring in response to a rearward manual actuation of the trigger means, said lip engaging means being arranged to cooperate

with the annular lip during arcuate movement of the lip engaging means such as to become disengaged from the annular lip in response to rearward movement of the lip engaging means beyond a predetermined point, whereby the plunger will be released and forcibly impelled forwardly by the compression spring and will strike a projectile carried adjacent the forward end of the barrel by the projectile receiving means and will forcibly catapult the projectile therefrom, said lip engaging means being arranged for pivotal movement with respect to the trigger means during forward pivotal movement of said trigger means so as to be capable of moving past the annular lip means into firing position; said trigger means being pivotally mounted adjacent the bottom of the handle for pivotal movement into and out of the chamber; said lip engaging means comprising a pawl pivotally carried by the upper free pivotally movable end of the trigger means within the chamber in a position such that rearward arcuate movement thereof will cause said pawl to engage the lip carried by the plunger and to forcibly rearwardly move the plunger against the action of the coil compression spring into a cocked position and to then become disengaged from the lip allowing the coil compression spring to forcibly return the plunger into its normal forward position; and trigger biasing resilient means comprising a longitudinal bent spring member positioned in the chamber with the rear portion thereof abutting the rear of the chamber and with the forward portion thereof abutting the rear side of the pivotally mounted trigger means whereby to normally maintain said trigger means in a forward extremum position; and cantilever spring means integral with the forward portion of the bent spring member normally biasing the pawl means into a projecting position capable of engaging the annular lip when rearwardly arcuately moved into the proper position for engaging said lip.

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