July 10, 1934. C. C. STETSON 1,965,863

TOY

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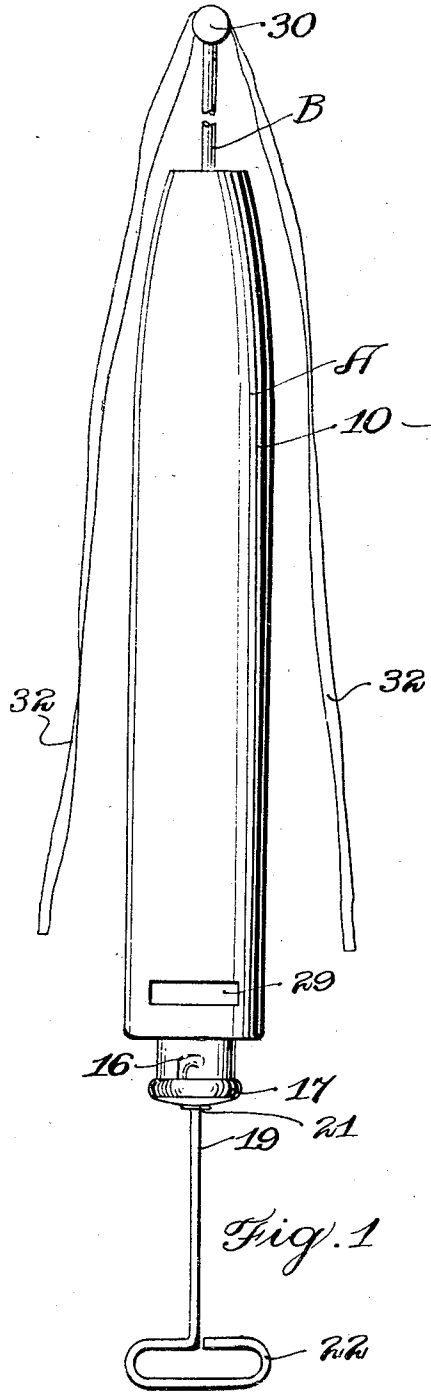


Fig. 1

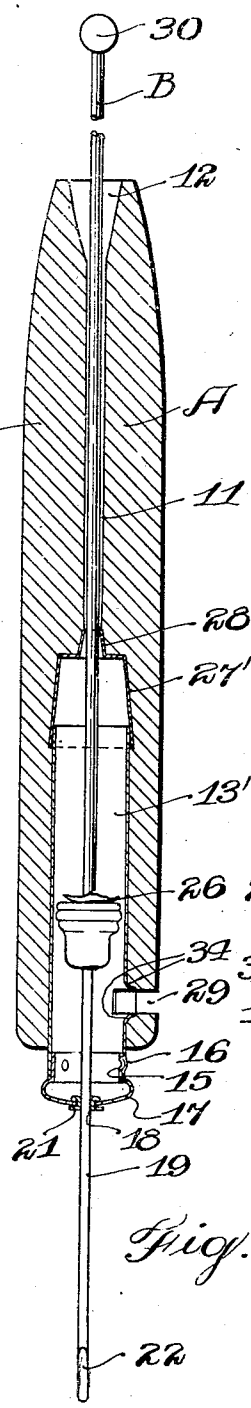


Fig. 4

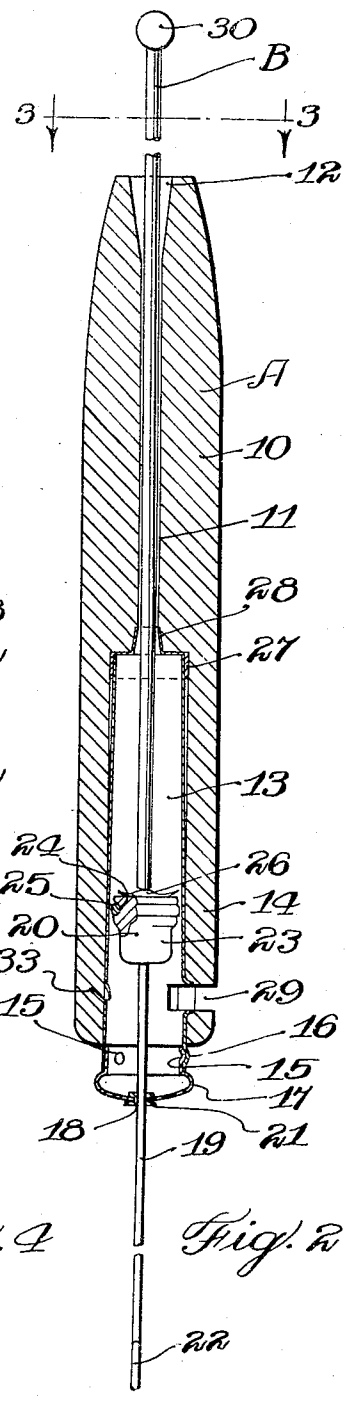


Fig. 2

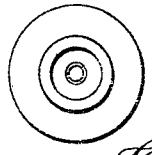


Fig. 3

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TOY

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Application November 9, 1931, Serial No. 573,846

11 Claims. (Cl. 42—54)

My invention relates to an improvement in toys of a type adapted to force a projectile high in the air to provide a novel and entertaining spectacle.

It is the object of my invention to provide a barrel which may be held in one hand of the operator, like a Roman candle, and within which is positioned a firing plunger or piston. An arrow or other projectile is placed in this barrel and shot into the air by forcing the plunger or piston upwardly with a quick forceful movement. The projectile ascends high in the air and drops to the ground where it may be retrieved and shot again.

It is my object to accommodate a plunger or piston suitable for carrying a small percussion cap. This percussion cap is placed between the rear end of the arrow or projectile and the piston or plunger. When the piston or plunger reaches the upward limit of its stroke, the percussion cap strikes against the shoulder which acts to explode the cap and force the projectile from the barrel at a greatly accelerated rate of speed. Accordingly, the upward flight of the projectile is not affected merely by the upward movement of the piston within the firing cylinder, but also by the explosion of the percussion cap which adds greatly to the impetus of the projectile.

The simple and efficient construction of my device is one of the features of my invention. The barrel is made of wood or papier mâché or other suitable material. One end of this barrel contains the bore of the barrel, which acts to guide the projectile and cause the exploding gases to force the same from the barrel. The firing cylinder is formed preferably of a metal tube within which the piston may slide. A cap is formed in one end of the cylinder removable for the purpose of removing the piston when desired, and a peculiarly shaped metal ferrule is positioned at the other end to reinforce the end of the metal cylinder and to form a flat strong shoulder against which the percussion cap may explode to drive the projectile upwardly. Each of the parts of my device may be simply and readily manufactured and replacement of any of the parts may be quickly and easily effected.

It is a feature of my invention that my toy combines the noise of an exploding cap, which is especially delightful to children, with the interesting and educational spectacle provided by the flight of the projectile in the air. Accordingly, my toy is very desirable and an inexpensive toy for the entertainment of children.

It is an important feature of my device that there is very little chance of injury, either to the operator or to companions of the operator. It is obvious that the explosion of the percussion cap takes place at a point remote from the loading slot through which the percussion cap may be placed on the piston. Danger of sparks or fire being ejected from this loading opening is accordingly quite impossible. It may also be seen that the barrel must be held in substantially a vertical position or must at least be well pointed up into the air or else the percussion cap will not rest properly upon the head of the piston. If a child operating the toy attempts to shoot the projectile by pointing the toy practically horizontally, the percussion cap will fall off the head of the piston and will not explode properly, if at all. Therefore, I have found my toy safe for children to use and operate.

These and other objects, together with additional novel features of my invention will be more clearly and fully set forth in the following specification and claims.

In the drawing forming a part of this specification:

Figure 1 is a side elevation view of my toy ready for operation.

Figure 2 is a cross sectional view longitudinally through the center of the toy.

Figure 3 is a cross sectional plan view taken on the lines 3—3 of Figure 2.

Figure 4 is a cross sectional view longitudinally through a modification of my invention.

The barrel 10 of my toy encloses a large portion of the same and the operating mechanism is virtually the only portion of the toy outside of the barrel which is exposed. The barrel 10 is provided with a central bore 11 which flares somewhat at the extreme end of the same, illustrated at 12 in the drawing, to permit easy insertion of the projectile B. The lower portion of the barrel 10 is hollowed out to accommodate the firing cylinder 13. The barrel 10 is formed of wood, papier mâché or any other suitable insulating material and the hollow lower portion of the same is in reality merely a skirt covering and insulating the firing cylinder 13 to prevent the firing cylinder 13, hot from successive percussion cap explosions, from becoming uncomfortable for the hands of the operator.

The firing cylinder 13 is tapered slightly toward the upper or inner end thereof, as illustrated in Figure 2 of the drawing. This cylinder 13 is formed of a tubular metal member. The outer end of the firing cylinder 13 extends slightly from the end of the skirt portion 14 of the barrel 10 and is provided with an outwardly extending teat or projection 15. This teat or projection 15 fits in an L-shaped groove or recess 16 in the cap 17 forming a closure for the end of the firing cylinder. This arrangement forms a means of locking the cap 17 in the end of the firing cylinder 13 in a manner which is well known and widely used.

A hole 18 is provided in the center of the cap 17 through which the piston rod or operating lever 19 may extend. The cap 17 forms a bearing for the rod 19 and helps to keep the plunger

piston 20 in proper alignment in the firing nder 13 at all times. A bearing member 21 brass or similar material may be positioned the hole 18, if desired. An enlarged head or ped end 22 is provided on the end of the pis- rod 19 to provide a bearing for the hand of operator in forcing upwardly the rod 19 and piston 20 attached thereto.

The piston 20 is somewhat restricted in diam- r at the lower end 23 of the same to fit down o the cap 17 on the end of the firing cylin- r 13. The entire piston 20 is of somewhat less ameter than the smallest diameter of the firing linder 13 which is at the upper or inner end the same. A groove 24 is formed in the pis- n head 20 and in this groove 24 is formed a ng of soft bearing metal 25 or other suitable aring material. The outer diameter of this ng 25 of bearing material is substantially that the inner diameter of the upper extremity of e firing cylinder 13. Accordingly, when the ston 20 is at the upper limit of its stroke, e piston is held tightly against the walls of ie firing cylinder 13, preventing any leakage the gases formed by the explosion of the per- ission cap 26.

A ferrule 27 is provided at the upper or in- er end of the firing cylinder 13 and acts to einforce the end of the firing cylinder against ie bursting pressure of the exploding percus- on cap in this portion of the cylinder, and also cts to hold the cylinder perfectly round at all mes. The ferrule 27 extends partially over the nd of the firing cylinder 13 and provides a mooth hard surface against which the percus- ion cap 26 may strike to explode the cap be- ween this ferrule and the end of the piston 20. A tapered projecting flange 28 forms a part of he ferrule 27 and acts to guide the exploded ases into the bore 11 and against the base of he projectile B. Accordingly, by means of the errule 27, the entire portion of the barrel 10 djacent the fire and heat of the explosion is rotected against burning or charring.

In the operation of my toy, the piston rod 19 s drawn outwardly until the piston 20 rests upon he cap 17 at the lower end of the firing cylin- der 13. When the piston 20 is in this position, the percussion cap 26 may be inserted through the slot 29 in the skirt portion 14 of the barrel 10 and through the firing cylinder 13. When the cap 26 is resting properly on the top of the pis- ton 20, the projectile B is inserted in the bore 11 of the barrel 10 into the position illustrated in the drawing with one end resting against the per- cussion cap 26. The flaring end 12 of the bore 11 permits the projectile B to be easily inserted. The outside of the barrel 10 is tapered toward the end in order to make a more pleasing ap- pearance.

To operate the toy the barrel 10 is then grasped in one hand of the operator and a sharp up- ward force is directed against the enlarged end 22 of the piston rod 19. The piston 20 is forced upwardly in the firing cylinder 13, sliding freely because of the slippery metal walls of the cylin- der 13 and bearing ring 25. As the piston 20 does not fit tightly in the cylinder 13 in the low- er portion of this cylinder, air from above the piston is permitted to exhaust about the edges of the piston; and because the lower end of the firing cylinder is larger than the diameter of the piston 23 and ring 25, it is easy for a child to insert it. The projectile B continues to rest upon the percussion cap 26, which is positioned on top of the piston 20, and the piston, cap and pro- jectile are forced upwardly as a unit. As the cap 26 strikes the metal ferrule 27 at the upper end of the barrel 13, however, the cap 26 is ex- ploded. The gases are directed through the flange 28 against the end of the projectile B, greatly accelerating the speed of the projectile and forc- ing the same high into the air. A weighted head 30 insures the proper flight of the pro- jectile B, and that it will not injure anything when it descends, and if it is desired, one or more ribbons 32 may be attached to the head 30 to add color to the flight of the projectile.

It thus may be seen that the toy may be easily operated and is sufficiently simple to be used by even a small child without danger, either to him- self or to his companions. When a cap 26 has been placed on the plunger or piston 20, it is necessary to hold the barrel 10 vertical or nearly so in order to prevent the cap 26 from slipping off the head of the piston. It is therefore ob- vious that the projectile may not be fired with any force horizontally, and accordingly, the chil- dren may not shoot the projectile at one an- other at close range. As the slot 29 is at quite a distance from the inner end of the firing cyl- inder, it may be seen that flying sparks or bits of the cap will not be expelled through this por- tion of the toy.

The piston 20 may be easily removed with the cap 17 in order to clean out the paper caps which have been exploded and which accumulate on the ferrule 27 and on the end of the piston 20. The locking means 15, however, hold this cap or- dinarily securely in position. The tapering of the firing cylinder 13 permits a free sliding of the piston 20 in the cylinder through the greater portion of the length thereof but insures a tight joint between the piston and the cylinder at the point of explosion of the percussion cap 26. In this manner I provide a piston arrangement which may be readily operated and in which all of the gases from the explosion are expended against the end of the projectile being forced from the barrel.

In the modification illustrated in Figure 4 of the drawing, the firing cylinder 13′ is not tapered, but is a true cylinder, of tubular formation. When a firing chamber of this type is used, an elongated ferrule 27′ is attached which is ta- pered, and forms an elongation of the firing cyl- inder. It may be seen that at the upper extrem- ity of the stroke of the piston, the taper of the ferrule 27′ causes the piston to fit snugly against the tapered walls, forming a gas tight joint at the point of explosion. In this modification, the formation of the cylinder is simplified, and the taper may be provided in the ferrule.

Any convenient and suitable means may be used to hold the firing cylinder in place. If the guiding barrel is made of wood or similar mate- rial, a suitable cement or adhesive may be em- ployed to hold these two parts together. If the handle is made of papier mâché, however, several spurs 33 may be cut from the body of the cylin- der and extended at right angles into the body of the skirt 14 of the barrel 10. These V-shaped spurs act to lock the barrel securely to the fir- ing cylinder in a simple and effective manner, holding both from sliding and loosening. The spurs 33 should preferably be in the lower two- thirds of the firing cylinder, leaving the upper third perfectly smooth where the piston 20 will fit closer to prevent uneven wear of the piston adjacent these openings.

I also flare outwardly the metal of the firing cylinder where it is cut through to form the feeding slot near the lower end. This flaring 34 holds and reinforces the material of the guiding barrel which surrounds it and makes the feeding or charging slot through which the percussion cap is fed less liable to injury and at the same time serves as an additional lock to prevent loosening and sliding out of the firing cylinder from the guiding barrel.

The weight of my piston is sufficiently great to assist in starting the upward flight of the arrow. Forcing the piston upwardly provides a momentum to explode the cap and set the projectile in motion.

In accordance with the patent statutes, I have described the principles of operation of my toy and while I have endeavored to set forth the best embodiment thereof, I desire to have it understood that this is only a means of carrying out my invention and that obvious changes may be made within the scope of the following claims without departing from the spirit of the invention.

I claim:

1. A projectile toy including, a barrel, a firing cylinder extending into said barrel, a metal ferrule on one end of said firing cylinder, a cap closing the other end of said firing cylinder, a piston within said cylinder, a slot for the insertion of a percussion cap onto said piston, and means for forcing said piston and cap against said ferrule, and a projectile adapted to be forced from said barrel by the force of the explosion.

2. A projectile toy including, a barrel, a firing cylinder secured to said barrel, a piston within said firing cylinder, a cap on the end of said firing cylinder, a piston rod secured to said piston extending through said cap, means for inserting a percussion cap on said piston, a projectile adapted to be inserted into said barrel to rest upon said percussion cap, and a metal ferrule forming the other end of said firing cylinder against which said percussion cap may be forced to explode the same and to force the projectile, the movement of which has been started by the upward movement of the piston out of the barrel at a greatly accelerated rate of speed.

3. A projectile toy including, a barrel, an inwardly tapered firing cylinder secured to said barrel, a piston within said firing cylinder, a percussion cap adapted to be placed on said piston, and means for forcing said piston into the smaller diameter portion of the cylinder, means at this restricted end of the cylinder for exploding said percussion cap, whereby virtually all of the gases from the exploding cap act to expel the projectile from the barrel.

4. A projectile toy including, a projectile, a barrel adapted to accommodate said projectile, an inwardly tapered firing cylinder secured to said barrel, a piston in said firing cylinder, a percussion cap adapted to be placed on said piston, shoulder means adjacent to the smaller diameter end of said firing cylinder to explode said percussion cap, and means for forcing said piston against said shoulder at a point where the piston fits closely against the cylinder walls to force said projectile from said barrel.

5. A projectile toy including, a projectile, a barrel for accommodating said projectile, a firing cylinder secured to said barrel, a reinforcing ferrule secured at the end of the cylinder adjacent, said barrel, an inwardly tapered flange on said ferrule, a piston in said cylinder, a percussion cap adapted to be placed on said piston, and means for forcing said piston against said ferrule to explode the cap, said tapered flange directing the gases from the explosion toward said barrel to force said projectile therefrom at a greatly accelerated rate of speed.

6. A projectile toy including, a projectile, a barrel for accommodation of said projectile, a firing cylinder, a firing piston therein, and a separate ferrule for engaging about and reinforcing one end of said cylinder against which said piston may strike.

7. A toy adapted to shoot a projectile including, a body, a guide passageway for receiving the projectile formed in said body, a driving piston, an operating cylinder member in said body for said piston, and an opening in said cylinder and body to permit an explosive cap to be laid upon said piston in a manner so that the end of said projectile will rest against the explosive cap and be caused to shoot out of said body by the explosion of the explosive cap when the piston is operated.

8. A shooting toy including, a member adapted to be shot into the air to provide a display, and a guide and shooting means for said display member including a driving member upon which an explosive cap is freely laid with the end of said display member resting on the explosive cap, and a tapered operating chamber for said driving member adapted to cause the same to drive said display upwardly into the air and to simultaneously explode the cap to add driving energy to the display member forcing it high in the air.

9. A flying toy including, a projectable member adapted to be shot high in the air, a guiding and shooting member for said projectile member including a strong body portion adapted to protect the operator of said toy and to guide the projectile in the operation of said toy, a long cylinder member enclosed by said body and having a driving piston therein against which said projectable member rests with an explosive cap interposed therebetween, whereby the driving force of said piston starts said projectile member upwardly out of said guiding member and completes the driving force against the end of said projectile by exploding the cap at the end of the driving stroke of said piston.

10. A flying toy including, a projectile display arrow, a support and shooting means for said projectile including a restricted elongated guide opening for receiving the shank of the projectile, with an elongated piston chamber at one end thereof into which the end of the projectile is adapted to extend, said chamber having a restricted end, and a driving piston operable in said cylinder to drive said projectile out of said support by the force of the piston and by an explosion of a cap carried by said piston.

11. A projectile toy including, a projectile, a barrel adapted to accommodate said projectile, a firing cylinder of larger diameter than said barrel, a piston therein, a shoulder between said cylinder and said barrel, and means for inwardly tapering the cylinder adjacent said shoulder and the point of explosion to provide a gas tight joint at this point.

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