Nov. 17, 1931. C. L. STARK 1,832,330

SPRING BALL GUN

Filed June 17, 1929 2 Sheets-Sheet 1

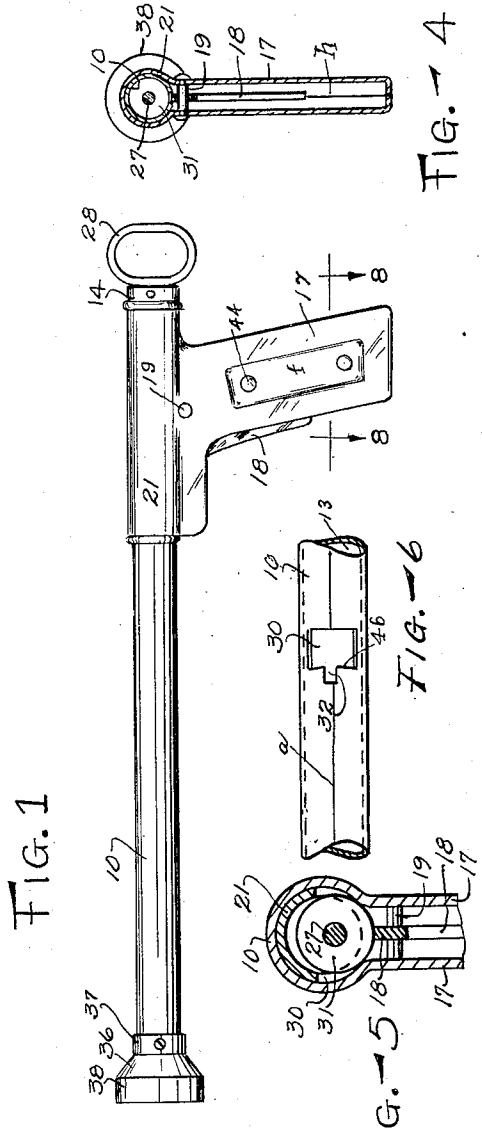


FIG. 1

FIG. 4

FIG. 5

FIG. 6

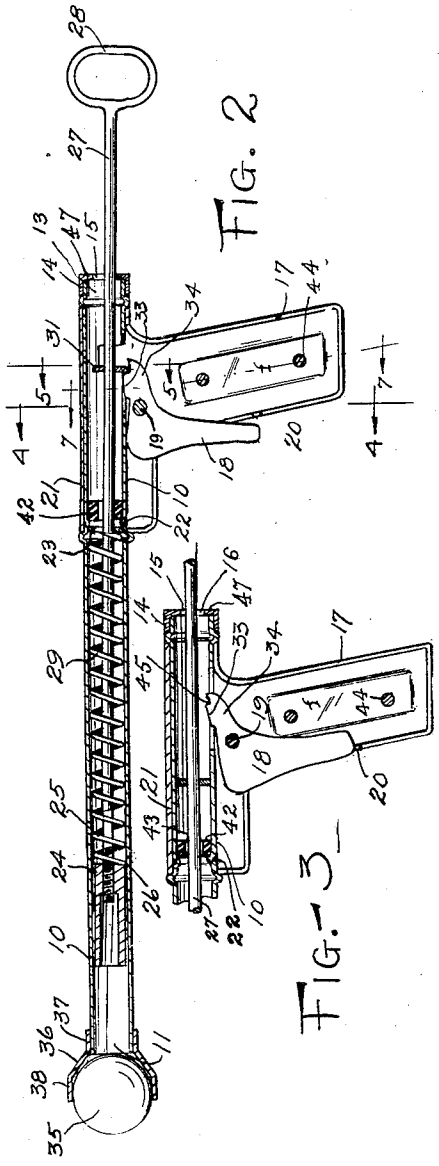


FIG. 2

FIG. 3



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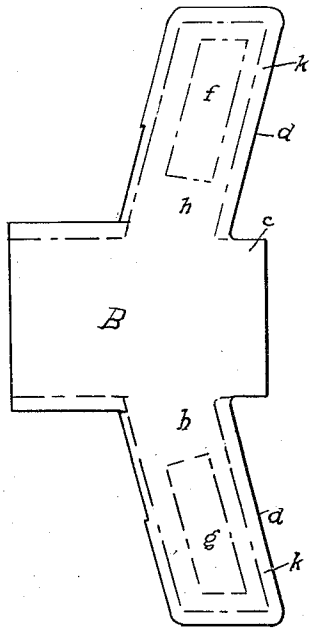


FIG.- 9

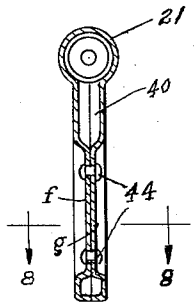


FIG.- 7

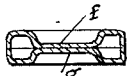


FIG.- 8

FIG.- 10

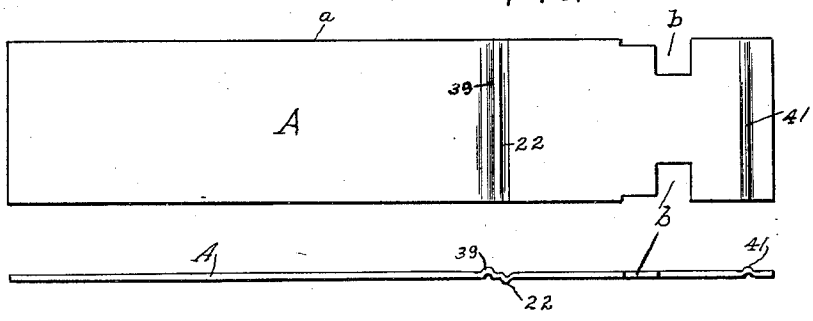


FIG.- 11

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UNITED STATES PATENT OFFICE

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SPRING BALL GUN

Application filed June 17, 1929. Serial No. 371,370.

This invention relates to spring ball guns, and especially to those having tubular metal barrels enclosing a compression spring one end of which is held stationary in the barrel by an annular washer, the opposite end of the spring being operated by means of a slidable tubular member movable telescopically within the barrel by a plunger rod extending rearwardly beyond the end of the barrel, so that the spring may be compressed by manual operation of the rod outside the barrel.

It is an object of my invention to provide an enlarged end or cap for the forward end of the barrel adapted to receive a ball which may be hollow and somewhat of the character of the usual billiard ball, or even a small sized rubber ball used for various forms of games and for shooting from toy guns. It is my purpose to provide such a cap to normally hold the ball therein until struck by a sudden charge of a plunger from within the barrel.

It is a further object of my invention to provide the rear end of the barrel of my toy gun with a radial slot extending downwardly from the center of the barrel end, to permit lowering the plunger rod therein.

A special construction is provided wholly within the barrel of my improved gun to operate the plunger from the trigger within a hollow handle, and I have designed a particular form of blank readily stamped from sheet metal, easily folded upon itself to provide a handle to receive the trigger by such folding operation, and at the same time enclose an end of the barrel to permit cooperation between the trigger and the plunger rod in the barrel.

With these and other objects of my invention in view, my invention resides in the combination and arrangement of parts as hereinafter set forth, recited in the appended claims and illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of my toy gun and the ball just discharged;

Figure 2 is a view showing the tubular parts in central, longitudinal section, and the ball prior to discharge;

Figure 3 is a detail view showing the barrel in longitudinal sections;

Figure 4 is a transverse section of the breech parts on the plane indicated by the line 4—4 of Fig. 2;

Figure 5 is a detail transverse section taken on the plane indicated by the line 5—5 of Fig. 2;

Figure 6 is an inverted plan view of a portion of the gun barrel showing the latch notch;

Figure 7 is a section on the line 7—7 of Fig. 2;

Figure 8 is a section on the line 8—8 of Figs. 1 and 7;

Figure 9 is a plan view of the blank prepared for the folding operation for the handle, and

Figures 10 and 11 are plan and edge views, respectively, of the metal blank for production of the gun barrel.

Like characters indicate like parts throughout the several views.

Referring more particularly to the drawings, the numeral 10 designates a gun barrel which I form from an elongated blank A shown in Figs. 10 and 11 prior to shaping in tubular form. The blank A having first been stamped as shown in these views, it is rolled into the tubular form indicated in Figs. 1, 2 and 6, and the edges secured together, as by soldering or welding along the line (*a*). The notches (*b*) unite to form a common transverse notch 12 slightly spaced from the rear end of the completed barrel. The latter has a forward open end 11 and an open rear end 13 which in the completed device, is partially closed by a cap having an integral peripheral flange 14 encompassing the barrel end 13 and is centrally apertured at 15 and has a vertical and radial slot 16 extending downward from the aperture, for a purpose later to be explained.

A handle 17 is also shaped from the blank B shown in Fig. 9, such blank including the rectangular portion (*c*) from which extend the integral wings (*d*) slightly oblique to the main portion. Before the folding operation of this blank, the elongated central areas (*f*) and (*g*) of the wings (*d*) are de-

pressed from the material, so that such depressions will positively contact, in the manner shown in Fig. 7, but leaving the inner portions (*h*) spaced to form the hollow portion 40 to receive therein the trigger 18 and to serve the additional purpose of forming a suitable handle to be readily grasped by the hand.

In such folding operation, the intermediate blank portion (*c*) will form a loop or partially closed tube 21 which will encompass the rear end of the barrel 10, while the hollow space 40 communicates with the slot 30 of the barrel. The edge borders (*k*) of the wings (*d*) will contact in the completed handle, as shown in Figs. 7 and 8.

The trigger 18 is L-shaped in outline with the upper arm of the L directed rearwardly. This upper arm 34 is apertured for pivoting in the said handle 17 upon the cross pin 19 whose ends are secured to the walls of the handle. The lower arm of the L projects slightly forward from the handle 17 through the usual slot 20. The blank A is provided with three transverse beads 22, 39 and 41 which provide when the tubular barrel is formed, peripheral locking rings, the beads 39 and 41 being widely spaced and shaped outwardly to form shoulders between which the loop 21 of the handle 17 will be accurately positioned. The bead 22 is pressed inwardly and thereby provides means to prevent rearward movement of an annular washer 23 positioned in the barrel 10 just forward of the bead 22.

Within the forward end of the barrel 10 is movably mounted and longitudinally thereof, a cylindrical stop member 24 having one open end and a centrally apertured closure 25 at its rear end, the aperture being threaded for receiving a threaded end 26 of a plunger rod 27, for detachable engagement whereby the rearward end of the rod, which may have a ring 28 for manual actuation rearward of the barrel, may operate stop 24 which latter will be adjacent the forward end of the barrel when the gun has been discharged. A coil spring 29 encircling rod 27 normally forces the stop 24 forwardly, when the rear end of the spring is in engagement with the washer 23, which latter part is always stationary.

Intermediate the transverse beads 39 and 41 of the barrel wall 10 the latter has a transverse notch 30 cut in its lower wall and extending through an arc of approximately 100° of the barrel wall, and of sufficient width measured in the direction of the length of said barrel, to receive therein a washer 31 carried by the plunger rod 27 when the latter is moved downwardly a short distance and also permits slight longitudinal movement of the washer in said notch.

The forward edge of the notch 30 has a cut out portion 32 which extends lengthwise of said barrel but is not wide enough to permit further forward movement of the washer or disc 31, but will permit rising of the lengthwise projection 33 of the upper arm 34 into such cutout portion 32, for a purpose shown especially in Fig. 2 of the drawings. The disc 31, when discharged by the trigger, is raised out of the notch 30 and it together with the rod 27 on which it is carried, and the cylindrical stop 24 travels forwardly to the bead 22. As the stop 24 reaches the forward end of the barrel 10, it strikes the ball 35 with a sharp and sudden force shooting the ball very effectively. For the purpose of supporting the ball 35 prior to being struck by the stop, I have provided a cup-shaped member 36 having a reduced rear end 37 telescopically secured upon the barrel end 11.

At the outer end of the member 36, is an annular flange portion 38 for receiving the ball and holding it frictionally until struck by the member 24. The position of the parts 18, 24, 27, 29, 31, 33 and 35 is that shown in Fig. 2 when the gun is ready for firing, and the shouldered projection 33 is retaining the disc 31 with its rod 27, in its rear position. The spring 29 is now under strong compression between the stop 24 and the washer 23. Manual pressure upon the lower arm of the trigger 18 will lift the arm 34, and force the projection 33 into the notch 32 and thereby crowd the disc 31 out of the notch 30 until the disc is no longer retained by the edges of the notch, and the spring 29 is released from its compression and is thrust forward as before explained.

Rearwardly of the bead 22 I provide an annular washer 42 which may be made of some yieldable composition as of caoutchouc having an enlarged central aperture 43 for receiving the rod 27 therethrough and permit downward swinging of the rod in said aperture. This washer 42 is properly positioned in the barrel so that the disc 31 will strike the washer when the cylinder 24 discharges the ball 35, but not before.

When the extended wings of the handle blank B have been folded toward each other until the depressed portions (*f*) and (*g*) contact and the edges (*k*) contact to form the hollow portion (*h*), bolts or rivets 44 are inserted in the said wing depressions *f* and *g* and thereby secure the sections of the handle 17 in locked position with the loop portion 21 of the handle piece B tightly binding the barrel 10 relative to the handle and trigger. The projection 33 on the upper edge of the arm 34 of the trigger 18, is slightly spaced from the extreme end of the arm 34 and thereby forms a shoulder 45 against which the disc 31 on the rod 27 may engage, when the disc is drawn back by actuating the rod 27, as the disc 31 then drops slightly into the notch 30, although the projection 33

may rise for the purpose in the forward extension 32 of the notch 30. This falling of the disc 31 in the notch 30 as the rod 27 falls slightly in the slot 16, causes the disc 31 to engage both the forward edge of the notch 30 in the barrel, and also the shoulder 45 upon the projection 33. This positively loads the toy gun ready for subsequent discharge of the ball 35 by actuating the trigger 18.

It will be evident that pressing the trigger 18 into the handle 17 will swing the trigger on the pivot 19 in a counter-clockwise direction, and raise the arm 34 and thereby lift the disc 31 out of contact with the forward edge 46 of the notch 30, and thus permit the force of the spring 29 to thrust the rod 27 forward carrying with it the stop member 24 which will strike the ball 35 and discharge it. It is a matter of considerable importance that my provision of the bumper washer 42 will enable it to be struck by the disc 31 just before the ring 28 strikes the metal cap 47 having the flange 14. This avoids pinching of the fingers seriously between the ring 28 and the cap 47. The threaded end 26 of the rod 27 may be adjusted in the member 24 to determine the relative longitudinal position of the parts 24 and 31 on the rod.

The cup member 36 may be used for supporting the ball upon the barrel and discharge mechanism, or the latter mechanism may be used for discharging any object that may be received within the barrel, the particular form of support not being a matter upon which the effective operation of the discharge mechanism depends. I do however, regard the relative arrangement of the barrel, handle, rod and parts mounted thereon, as very important, permitting very effective operation of the toy and making possible a very economical and practicable manufacture of the same in large quantities.

Having thus described my invention, what I claim as new and desire to secure by United States Letters Patents is:

1. In a spring gun, a barrel having open ends and an intermediate transverse notch, a plunger rod movable in said barrel, a discharge member having threaded connection with the forward end of said rod for relative longitudinal adjustment thereon, a stationary washer secured in said barrel between its forward end and said notch, a compression spring within said barrel and having its rear end positioned against the said washer and the forward end opposing the said discharge member, a disc secured to said rod within the barrel for longitudinal movement therein over said notch, and trigger means movable vertically for lifting the disc out of the notch and releasing the rod and discharge member.

2. In a spring gun, a barrel having open ends and an intermediate transverse notch, a plunger rod movable in said barrel, a discharge member having threaded connection with the forward end of said rod for relative longitudinal adjustment thereon, a stationary washer secured in said barrel between its forward end and said notch, a cylindrical compression spring within said barrel and having one end positioned against the said washer and the other end opposing the said discharge member, a disc secured to said rod within the barrel for longitudinal movement thereof and vertical movement into said notch, a hollow handle supporting the said barrel and having a trigger pivotally mounted therein, and means on the said trigger for lifting the disc out of the notch and releasing the rod spring and discharge member.

3. In a spring gun, a barrel having open ends and an intermediate transverse notch, a plunger rod movable in said barrel, a flanged cap engaging the rear end of said barrel and having a vertical slot to permit longitudinal and vertical movement of the rod therein, a discharge member having threaded connection with the forward end of said rod for relative longitudinal adjustment thereon, a stationary washer secured in said barrel between its forward end and said notch, a compression coil spring within said barrel and about said rod and having its rear end positioned against the said washer and the forward end opposing the said discharge member, a disc secured to said rod within the barrel for movement lengthwise therein over said notch, and trigger means movable vertically for forcing the disc out of the notch and releasing the rod and discharge member.

4. In a spring gun, a barrel having open ends and an intermediate transverse notch, a plunger rod movable longitudinally in said barrel and extending rearwardly therefrom, a flanged cap engaging the rear end of said barrel and having a vertical slot to permit longitudinal and vertical movement of the rod therein, a discharge member having threaded connection with the forward end of said rod for relative longitudinal adjustment thereon, means on the forward end of said barrel for releasably supporting a ball therein, a stationary washer secured in said barrel between its forward end and said notch, a compression spring within said barrel and having one end positioned against the said washer and the other end opposing the said discharge member, a disc secured to said rod within the barrel for longitudinal movement therein and for vertical movement into said notch against the normal force of said spring, a handle supporting member for said barrel comprising a tubular transverse portion encompassing the barrel and enclosing the said notch, and a trigger pivotally mounted within said handle and beneath

said notch and in line with said disc, for lifting the latter out of the notch and releasing the rod and discharge member under the force of said spring.

5. In a spring gun, a barrel having open ends and an intermediate transverse notch, a plunger rod movable longitudinally in said barrel and extending rearwardly therefrom, a cylindrical discharge member having threaded connection with the forward end of said rod for relative longitudinal adjustment thereon, a stationary washer secured in said barrel between its forward end and said notch, a compression spring within said barrel and having one end positioned against the said washer and the other end opposing the said discharge member, a disc secured to said rod within the barrel for longitudinal movement therein over said notch, a handle member comprising a central tubular portion encompassing the rear end of the barrel and wing extensions integral with said portion in contiguous engagement beneath the said barrel notch and a trigger pivotally mounted in the said wing extension for lifting the disc out of the notch and thereby releasing the rod and discharge member.

6. In a spring gun, a barrel having open ends and an intermediate transverse notch, a plunger rod longitudinally movable in said barrel, a peripherally flanged cap detachably engaging the rear end of said barrel and having a vertical slot to permit longitudinal and vertical movement of the rod therein, a cylindrical discharge member movable in said barrel having threaded connection with the forward end of said rod for relative longitudinal adjustment thereon, means on the forward end of said barrel for releasably supporting a ball therein, a stationary washer secured in said barrel between its forward end and said notch, a compression spring within said barrel and having one end positioned against the said washer and the other end opposing the said discharge member, a disc secured to said rod within the barrel for longitudinal movement therein and into said notch against the force of said spring, a handle member comprising a central loop portion encompassing the rear end of the barrel and wing extensions integral with said portion in contiguous engagement beneath the said barrel notch, and a trigger pivotally mounted in the said wing extension, the said trigger having a projection on its upper edge directly beneath said notch and forming a shoulder for engaging the said disc while the latter is in the notch, there being a forward extension slot from said notch for receiving the said projection, the raising of the said projection into the slot serving to lift the disc and release the rod and spring to discharge the ball.

7. In a spring gun, a barrel having open ends and an intermediate transverse notch, a plunger rod movable in said barrel, a discharge member having threaded connection with the forward end of said rod for relative longitudinal adjustment thereon, a stationary washer secured in said barrel between its forward end and said notch, an elongated compression spring within said barrel and having its rear end positioned against the said washer and the forward end opposing the said discharge member, a hollow handle supporting the said barrel and having a trigger pivotally mounted therein and directly beneath the said notch, and means on said trigger for releasing the said plunger rod and discharge member.

8. In a spring gun, a barrel having open ends and an intermediate transverse notch, a plunger rod movable longitudinally in said barrel and extending rearwardly therefrom, a discharge member having threaded connection with the forward end of said rod for relative longitudinal adjustment thereon, an elongated compression spring within said barrel and having its forward end opposing the said discharge member and its rear end fixed against movement within said barrel, means on the forward end of said barrel for releasably supporting a ball therein, a handle member comprising a central loop portion encompassing the rear end of the barrel and wing extensions integral with said loop portion and contacting to form a hollow handle beneath the said barrel notch, and a trigger pivotally mounted in said hollow handle and having a projection adapted to cooperate with means on said rod for releasing the latter and said discharge member when the trigger is actuated manually to discharge the ball.

In witness whereof, I have hereunto set my hand this seventh day of May, A. D. 1929. A. D. 1929.

CHARLES L. STARK.