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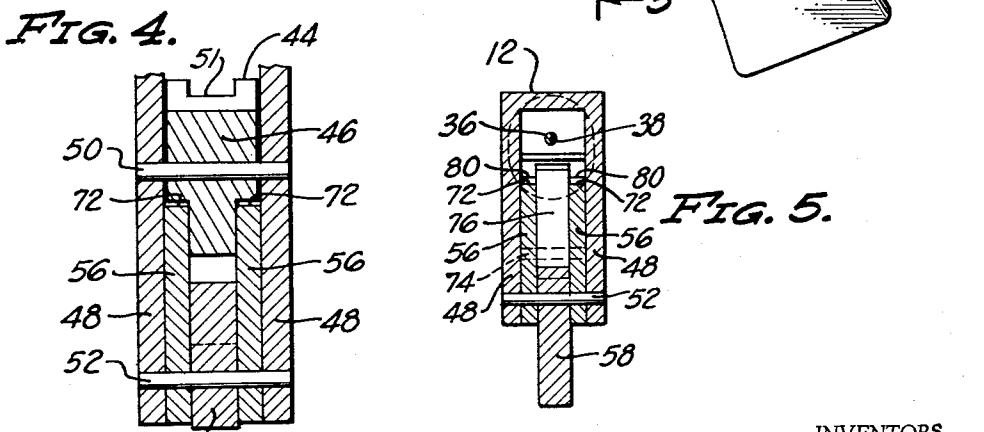
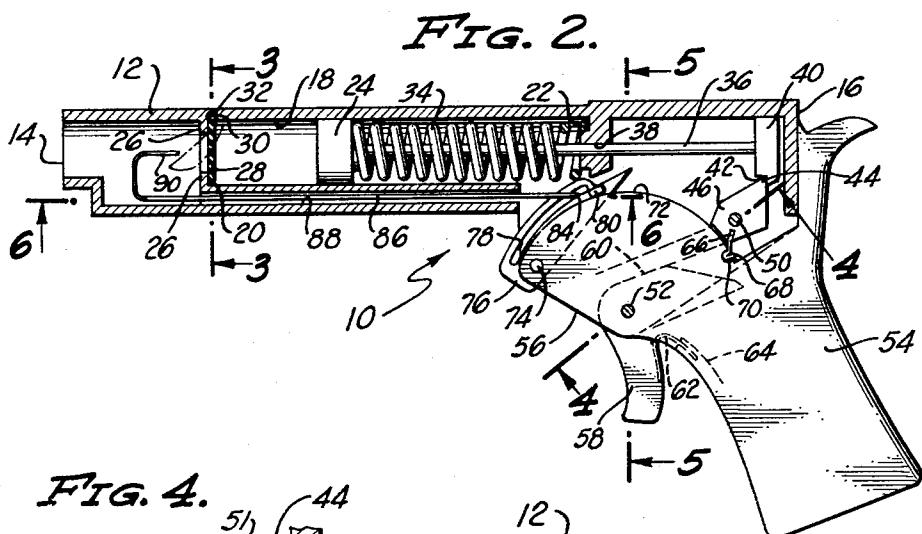
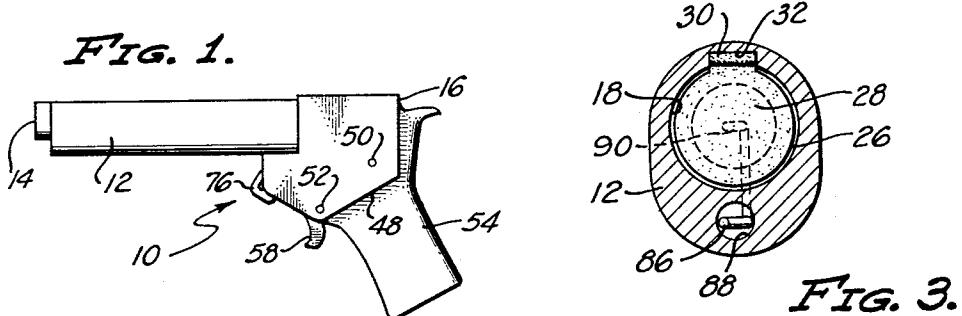
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3,003,281

POP GUNS

Filed Aug. 24, 1959

2 Sheets-Sheet 1



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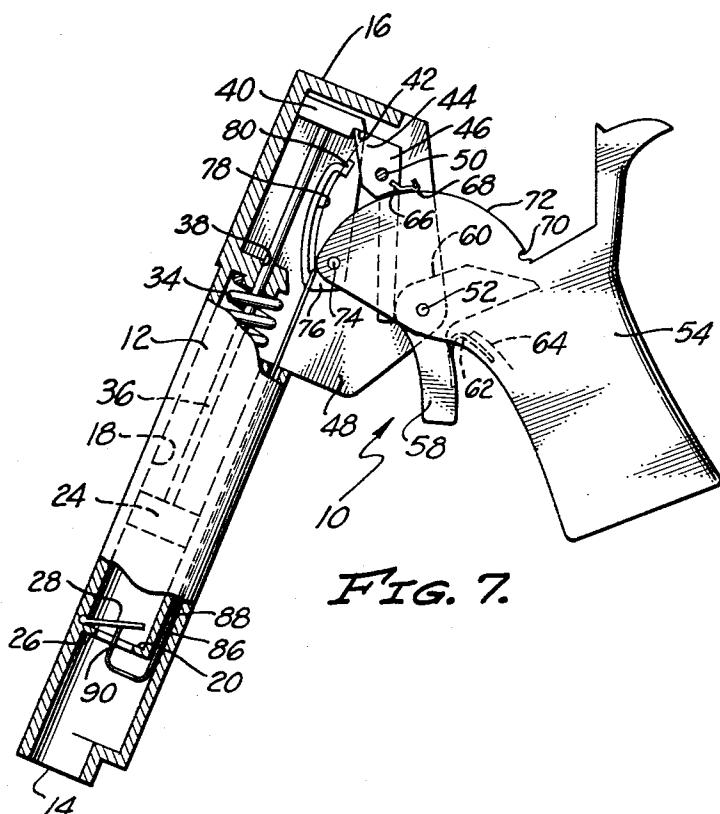
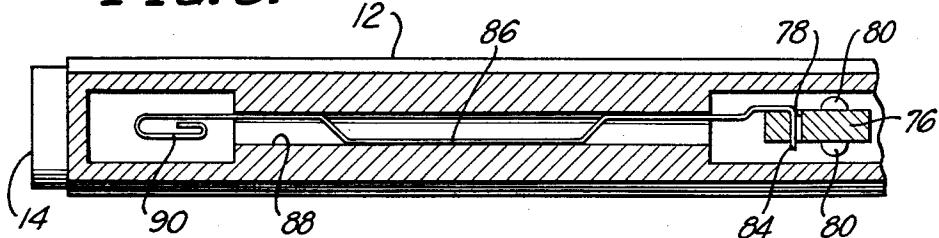
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FIG. 6.



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3,003,281
POP GUNS

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This invention pertains to new and improved pop guns. Various types of pop guns have, of course, been known for an extremely long period. All of such guns are designed so as to produce a comparatively large sound when they are appropriately actuated. Conventional pop guns may be of any one of a wide variety of different constructions. Many of the most successful prior pop guns have been designed so that air pressure is built up within them and then is suddenly released through some sort of appropriate mechanism or structure.

Many of the prior pop guns have been designed so that when they are actuated air under pressure bursts a paper or similar diaphragm. Other of these guns have been designed so that air under pressure causes a cork or the like to suddenly pop away from an appropriate seat. Those of the guns based on the use of a diaphragm which bursts are considered disadvantageous for play purposes since the average child cannot afford rolls of paper or the like and since such paper, when perforated, has to be thrown away. With prior guns based upon the use of a cork or the like the replacement of such corks is in many cases troublesome and disadvantageous as far as play purposes are concerned.

A broad object of the present invention is to provide new and improved pop guns. A related object of the present invention is to provide pop guns which, when appropriately actuated, produce a comparatively very large sound. Another object of this invention is to provide pop guns which may be easily and conveniently manufactured at a comparatively nominal cost, and which may be used without difficulty by virtually any child.

These and other objects of this invention as well as many advantages of it will be fully apparent to those skilled in the art to which this invention pertains from a detailed consideration of the remainder of this description, including the appended claims and the accompanying drawings in which:

FIG. 1 is a side elevational view of a pop gun of the present invention;

FIG. 2 is a similar side view showing the barrel portion of this gun in section;

FIG. 3 is a cross-sectional view taken at line 3—3 of FIG. 2;

FIG. 4 is a cross-sectional view taken at line 4—4 of FIG. 2;

FIG. 5 is a cross-sectional view taken at line 5—5 of FIG. 2;

FIG. 6 is a cross-sectional view taken at line 6—6 of FIG. 2; and

FIG. 7 is a view similar to FIG. 2 showing how this pop gun is reset or cocked for use after it has been discharged.

The accompanying drawings are primarily intended so as to clearly illustrate a presently preferred embodiment or form of this invention. Those skilled in the art to which this invention pertains will realize, however, that a large number of differently appearing pop guns utilizing the essential features or principles of this invention as explained in this specification may be designed through the use of routine engineering skill from a consideration of the particular pop gun illustrated in the drawings and explained herein.

As an aid to understanding this invention it can be stated in essentially summary form that it pertains to pop

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guns, each of which includes a passage having an end containing an internal flange against which there rests a deformable diaphragm normally serving to seal this end. Means for compressing air against the diaphragm are provided within this passage. Further, the diaphragm itself is of such a nature that once the air pressure against it reaches a predetermined value it deforms and snaps through this end so as to cause a loud sound.

The actual nature of this invention is best more fully explained by referring directly to the accompanying drawings in which there is shown a pop gun 10 of the present invention including an elongated barrel 12 having front and rear ends 14 and 16, respectively. This barrel 12 is formed so as to include intermediate the ends 14 and 16 an elongated cylinder 18 having front and rear ends 20 and 22, respectively. If desired, the cylinder 18 may be considered a passage which serves to hold a piston 24 in such a manner that this piston may be reciprocated generally between the ends 20 and 22.

With this construction the front end 20 is provided with an internal ring-like flange 26 against which there normally rests a circular disc 28 formed out of rubber or various other equivalent elastomeric materials. Preferably the disc 28 includes a peripheral tab 30 which is secured by an adhesive or other equivalent means (not shown) within a correspondingly shaped opening 32 leading from the interior of the cylinder 18 adjacent to the end 20. This disc 28 may be referred to as a diaphragm since it is adapted to pop through the flange 26 when the piston 24 is moved toward the end 20 so as to compress air within the cylinder 18.

Such movement of the piston 24 is caused by a coil spring 34 mounted so as to resiliently bear against the end 22 of the cylinder 18 and the piston 24. A piston rod 36 extends from the piston 24 through the spring 34 and through an opening 38 in the rear end 22; this rod 36 terminates in a head 40. This head 40 preferably includes a notch 42 which is adapted to receive an end 44 of a catch 46. The catch 46 is pivotally mounted upon parallel extensions 48 leading from the bottom of the rear end 16 of the barrel 12 by means of a pin 50. The catch 46 includes a notch 51 located in the end 44 adjacent to the head 40.

These extensions 48 also pivotally carry by means of a pin 52 a handle 54 having parallel carriers 56 located parallel to, and within, the extensions 48. The pin 52 also carries a trigger 58 which extends from the handle 54. This trigger is of a shape corresponding to the shape of a common bell crank lever and includes an extremity 60 which normally engages the catch 46 so as to ride against it when the gun 10 is ready for use as indicated in FIG. 2. If desired, a small leaf spring 62 may be located between the trigger 58 and a wall 64 within the handle 54 so as to hold the trigger 58 against accidental movement in the position shown in FIG. 2 of the drawings.

The catch 46 preferably carries a small leaf spring 66 having an end 68 shaped so as to conform to the internal shape of notches 70 within circular edges 72 of the carriers 56. The centers of these edges 72 coincide with the axis of the pin 52. These carriers 56 carry a pin 74 which in turn rotatably supports a pick-up 76 having an internal channel 78 formed therein. This pick up 76 is aligned with the notch 51. This pick up 76 also includes projections 80 which hold the pick-up 76 against movement between the carriers 56.

The channel 78 carries a bent end 84 of a reset wire or link 86. This wire 86 is located largely within an elongated passage 88 extending through the barrel 12 at one side of the cylinder 18. The wire 86 terminates in a generally U-shaped end 90 which is aligned with the axis of the cylinder 18 and which is pointed toward

the axis of this cylinder so as to be in close proximity to the disc or diaphragm 28 when the gun 10 is ready for use.

When this gun is ready for use as shown in FIG. 2, the trigger 58 may be pulled. This causes the trigger 58 to bear against the catch 46, rotating this catch out of contact with the notch 42 and the head 40. This in turn releases the spring 34 so that this spring serves to drive the piston 24 toward the front end 20 of the cylinder 18. As the piston 24 moves in this manner considerable air pressure is built up within the cylinder 18 which air pressure in due course causes the disc or diaphragm 28 to deform and pop through the flange 26. During this latter motion air under pressure is suddenly released, causing a comparatively loud report or noise.

After the gun 10 has been operated in this manner it may be reset or re-cocked for use by applying pressure to the barrel 12 and the handle 54 so as to rotate these two parts apart to the positions indicated in FIG. 7 of the drawings. During such rotation the pick-up 76 will engage the head 40 so as to cause a pull against the spring 34 and so as to cause withdrawal of the piston 24 toward the rear end 22 of the cylinder 18. As this movement is continued the tip end of the pick-up 76 slides within the end 44 of the catch 46 causing the catch 46 to lock within the notch 42. Also, as the pick-up 76 is moved in this manner the end 84 of the reset link 86 is pulled by it so as to move the end 90 against the disc 28, forcing this disc back through the flange 26 where it assumes its initial or normal position as indicated in FIG. 2.

After these operations are complete the handle 54 may be rotated back to its initial position as indicated in FIG. 2 of the drawings so that the end 68 on the spring 66 engages the notch 70, holding the handle 54 with respect to the barrel 12.

From the foregoing description it will be realized that the gun 10 is formed so that the disc 28 is in effect a deformable, re-usable diaphragm which is adapted to be popped through a restricted opening defined by the flange 26 as a result of air pressure built up by means for compressing air. Such means are, in the gun 10, constituted by means of the piston 24 which is operated by the spring 34 within the cylinder 18. The remainder of the structures employed in the gun 10 are employed primarily for use in resetting the air compressor means employed and for use in resetting the diaphragm 28 in its initial position. Because of the nature of the structures involved in the gun 10 for these purposes, these structures which are actuated by rotation of the handle 54 as indicated in FIG. 7 can be considered resetting or cocking means.

Because of the fact that a number of different structures can be employed for the purpose of resetting or recocking guns of the general type shown in the drawings, and because of the fact that a number of different structures may be employed so as to achieve the type of pop-through action embodied in the gun 10, this invention is to be considered as being limited only by the appended claims forming a part of this disclosure.

We claim:

1. A device for creating a noise which includes: a member having a restricted opening formed therein; a deformable, imperforate diaphragm located within said member so as to cover said opening said diaphragm having a tab formed thereon, said tab being secured to said member, said diaphragm being capable of being moved through said opening; means for applying air pressure within said member against said diaphragm so as to cause said diaphragm to pop through said opening in said member, causing sound.

2. A pop gun which includes: an elongated cylinder having ends, one of said ends being formed so as to include a flange extending towards the interior of said

cylinder so as to define a restricted opening into said one of said ends; an elastomeric, deformable, imperforate diaphragm located within said cylinder against said flange so as to close said one of said ends of said cylinder said diaphragm having a periphery which is free to move with respect to said cylinder and said opening upon deformation of said diaphragm, and which periphery is capable of deforming so as to enable said diaphragm to move through said opening; a piston located within said cylinder, said piston being capable of being moved toward said one of said ends of said cylinder, so as to build up air pressure within said cylinder, said air pressure causing said diaphragm to deform and move past said flange in order to cause sound; and means for moving said piston toward said one of said ends of said cylinder.

3. A pop gun which includes: a barrel; a handle attached to an end of said barrel; means defining an elongated cylinder within said barrel, one of the ends of said cylinder being provided with an inwardly extending flange defining a restricted opening into said cylinder; a deformable, imperforate elastomeric diaphragm located within said cylinder against said flange so as to normally seal said end of said cylinder said diaphragm having a periphery which is free to move with respect to said cylinder and said opening upon deformation of said diaphragm, and which periphery is capable of deforming so as to enable said diaphragm to move through said opening; piston means movably mounted within said cylinder so as to be capable of movement toward said end of said cylinder in order to compress air within said cylinder; spring means for moving said piston means toward said end of said cylinder; and trigger means for releasing said spring means so as to cause said piston means to move toward said end of said cylinder.

4. A pop gun as defined in claim 3 including: means for forcing said diaphragm through said opening part of said flange into the interior of said cylinder after said diaphragm has been moved out of said cylinder through said opening; and means for moving said piston means away from said end of said cylinder.

5. A pop gun which includes: a barrel having first and second ends; a handle pivotally mounted on said barrel; a cylinder having first and second ends formed within said barrel; a flange extending inwardly from said first end of said cylinder so as to define a restricted opening leading from said cylinder; a deformable, imperforate, elastomeric diaphragm means capable of being deformed upon the application of pressure to said diaphragm, said diaphragm having a periphery located within said cylinder so as to normally rest against said flange, said diaphragm including tab means formed thereon secured to the interior of said cylinder, said tab means being flexible, said diaphragm being capable of being deformed by air pressure so as to pop through said restricted opening; a piston movably mounted within said cylinder; spring means held under compression between said second end of said cylinder and said piston, said spring means being capable of moving said piston within said cylinder so as to compress air against said diaphragm; a piston rod attached to said piston so as to extend therefrom past said second end of said cylinder; catch means for holding said piston away from said first end of said cylinder, said catch means releasably engaging said piston rod; trigger means for moving said catch means so as to release said piston rod so that said spring means propels said piston toward said first end of said cylinder; means for engaging said piston rod and moving said piston away from said first end of said cylinder and causing said piston rod to be engaged by said catch means in order to hold said piston away from said first end of said cylinder; and means for pushing said diaphragm from the outside of said first end of said cylinder through

said flange and into the interior of said first end of said cylinder adjacent to said flange and said restricted opening.

6. A pop gun as defined in claim 5 wherein said handle is pivotally mounted upon said barrel and wherein rotation of said handle with respect to said barrel causes ac-

tuation of said means for engaging said piston rod and said means for pushing said diaphragm.

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