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TOY GUN

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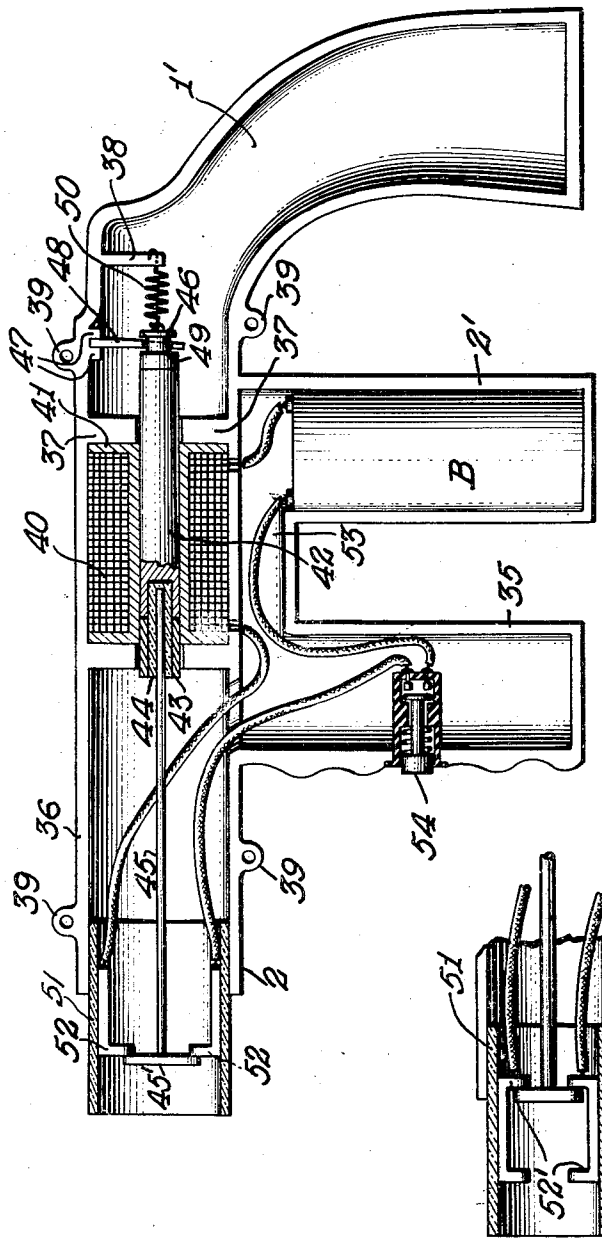


Fig. 1.

Fig. 2.

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TOY GUN

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6 Claims. (Cl. 46—1)

The invention relates to improvements in toy guns in which new forms of firing and shooting simulations are used.

The objects of the invention are to provide firing and shooting effects exciting to the juvenile mind, yet harmless to the juvenile; also to provide such a toy which is inexpensive in relation to cost of manufacture and operation. It is seen that effects are produced by electrical and mechanical phenomena only, which produce the most satisfactory effects at the lowest cost, since all parts are repeatedly usable for long periods of time before it is necessary to discard. The battery in the direct current embodiment, and the bulb in the alternating current embodiment, while it is possible to use them out, will generally last as long as the toy itself.

Figure 1 is a vertical cross-section of the direct current embodiment; Figure 2 is a sectional cross-section of the double contacts in the direct current embodiment.

The direct current embodiment shown in Figure 1 comprises a gun form having a stock 1', a simulated bullet-drum 2', in which is placed the battery B, which may, for example, comprise two "A" cells in series, or one 4½ volt dry battery. The gun form also comprises the hand and trigger support 35, the barrel 36, the magnet core 37, the spring support 38 and the rings 39, through which both halves of the gun form are joined by means of rivets or screws and nuts. The winding 40, wound on a spool 41, is placed snugly into the core hollow, the other half of the gun form fitting snugly over it. The plunger 42 has attached to it a non-magnetic ring or tube 43; within this non-magnetic ring and extending into a hollow portion of the plunger is an insulator cup 44, into which is glued a T-bar 45. To the other end of the plunger is attached a non-magnetic element 49. Between two supports 47, which are part of the iron gun form, is suitably attached a flexible element 48 the lower portion of which is perforated and slipped movably over the narrow end of the non-magnetic element 46, as shown. Attached to the narrow end of the non-magnetic element 46 is a guard 46 to keep the flexible element 48 in place. Suitably attached to the narrow end of the non-magnetic element 46 is one end of the spring 50 the other end of which spring is attached to the spring support 38. A glass tube 51 is secured, as by cement, into the end of the barrel 36. This glass tube should be thick enough to withstand some jarring. Attached within the glass tube by glue or cement are two L-shaped contacts or terminals 52. The cross-bar 45' of the T-bar 45 bridges the gap between these two L-shaped contacts or terminals. The wires from the battery B are connected as follows: One wire passes through a hollow section 53 to one terminal of the trigger-button 54, thence from the other side of the trigger button to one of the L-shaped terminals or contacts 52. Thence from the other L-shaped contact or terminal a wire continues to one lead of the winding 40. From the other lead of the winding a wire passes through the hollow section 53 to the second terminal of the battery. These connection wires are preferably rubber covered and are glued or cemented to the walls of the gun-form through which they pass, so as not to interfere with the movement, especially of the plunger and the T-bar. After connection, all terminals are covered with suitable insulation, at the points where the wires are connected to the terminals.

The action of the gun is as follows: When the trigger button is pressed the circuit is closed, the cross-bar 45' of the T-bar being normally held in position bridging the gap of the L-shaped terminals. The circuit being closed, the plunger, which is in the open air-gap position is attracted to the closed or lesser air-gap position. The T-bar, being connected to the plunger, moves with it. Thus the cross-bar 45' breaks the circuit, producing a spark, due to self-inductance. This spark serves as a simulation of the "firing" of the gun. At the same time the flexible member 48 is flexed. The said flexible member is attached in position to form a slight curve so that when flexed at this point it emits a crackling sound, adding to the "firing" effect, the explosion of the bullet in sound. At this point, the circuit having been broken, there is no attraction on the plunger, but force has been stored in the spring, which pulls the plunger back to its original position, causing the T-bar to move with the plunger and the cross-bar again closes the circuit. This action continues while the trigger-button is pressed. Thus a machine-gun effect is produced.

The interior surface of the glass tube may be covered with a thin coating of reflecting substance, as silvering, and it may be formed into, for example, an octagon shape. Thus when the sparking takes place part of the light passes through the silver and part is reflected from one surface to the other, increasing the sparking effect. Instead of single contacts or terminals 52 a double set of contacts or terminals 52' may be used. In this way the plunger is attracted from one open air-gap position, due to momentum, to the next and being re-attracted each time its T-bar at-

tachment closes the circuit, the spring being milder and being used only to keep the plunger in one starting open air-gap position, the lengths of the non-magnetic ring 43 and the non-magnetic element 49 being changed if necessary. The direct current type may also be used without the sparking, simply producing a crackling intermittent sound when the plunger moves to flex the flexible element 48. Also, the direct current type may operate only with the sparking effects and without the flexible element 48.

It is to be understood that the embodiments shown and disclosed herein are illustrative only, variations of the same may be made within the spirit and scope of the invention as claimed herein. The combinations disclosed herein may conceivably be used in devices other than that of a toy gun.

I claim:

1. A device of the class described, comprising a hollow form including a barrel, a flexible sounding member suitably attached in and to said form, and reciprocating electro-magnet means suitably placed within said form for flexing said sounding member to produce sound and for producing light flashing, thus simulating the firing of a gun, said electro-magnet means comprising a coil of insulated wire on a suitable support, a plunger of high magnetic permeability movable within the hollow of said coil, a T-form attached to one end of and being electrically insulated from said movable member, aforesaid flexible member suitably engaging the opposite end of said plunger, a hollow non-conducting element penetrable by light attached to the end of said barrel, a pair of separated contacts attached within said element, aforesaid T-form extending out from said movable member, the cross-bar of said T-form providing a path for electric current across the air-gap between said contacts when said plunger is in its open air-gap position, a spring suitably attached to said hollow form and to said plunger to hold said plunger in its proper open air-gap position when said plunger is not attracted, said contacts and said coil being connected in series in the circuit, excitation means for said circuit and means for opening and closing said circuit at will, the operation being that when said circuit is closed the plunger is attracted to its lesser air-gap position, storing force in said spring, causing said cross-bar to break the circuit at said contacts, thus causing a spark, at the same time flexing the flexible sounding member causing it to make a sound at which time the force stored in said spring causes the plunger to return to its open air-gap position, completing a cycle of operation.

2. A device of the class described, comprising a hollow form including a barrel, a flexible sounding member suitably attached in and to said form and reciprocating electro-magnet means suitably placed within said form for flexing said sounding member to produce sound and for producing light flashing, thus simulating the firing of a gun, said electro-magnet means comprising a coil of insulated wire on a suitable support, a plunger of high magnetic permeability movable within the hollow of said coil, a T-form attached to one end of and being electrically insulated from said plunger, aforesaid flexible member suitably engaging the opposite end of said plunger, a hollow non-conducting element penetrable by light attached to the end of said barrel, a pair of separated double contacts attached within said element, aforesaid T-form extending out from said movable member, the cross-bar of said T-form providing a path for electric current across each of the air-gaps between said double contacts when said plunger is in one of its corresponding open air-gap positions, a spring suitably attached to said hollow form and to said plunger to hold said plunger in its proper open air-gap position when said plunger is not attracted at start, said contacts and said coil being connected in series in the circuit, excitation means for said circuit and means for opening and closing said circuit at will, the operation being that when said circuit is closed the plunger is attracted to the lesser air-gap position, causing said cross-bar to break the circuit at the corresponding portion of said double contacts, thus causing a spark, at the same time the flexible sounding member is flexed causing it to make a sound and due to the fact that the circuit is broken and to momentum said plunger continues to the opposite open air-gap position said cross-bar again closing the circuit at the corresponding portion of said double contacts, causing the plunger to be reattracted to its starting open air-gap position, producing the same effects as the first attraction of the plunger, which thus completes a cycle of operation.

3. A device of the class described, comprising a hollow form including a barrel, and electro-magnet means for creating light-flashing, thus simulating the firing of a gun, said electro-magnet means comprising a coil of insulated wire on a suitable support, a plunger of high magnetic permeability movable within the hollow of said coil, a pair of separated contacts electrically insulated from said form and placed in position in said barrel so that the sparking hereinafter described may be visible from outside said form, an element attached on one end of and being electrically insulated from said plunger extending out from said plunger, one portion of said element forming a conductive bridge for electric current across the air-gap between said contacts when said plunger is in its open air-gap position, a spring attached to said form and to the other end of said plunger to bring said plunger to its open air-gap position when it is no longer attracted, said coil and said contacts being connected in series in the circuit, means for exciting said circuit and means for opening and closing said circuit at will, the operation being that when said circuit is closed the plunger is attracted to its lesser air-gap position, storing force in said spring, at the same time causing said portion of said element which bridges said air-gap to move away from said contacts, breaking the circuit, thus causing sparking, and due to the fact that the circuit is broken and the plunger no longer attracted, the force stored in said spring causes said plunger to return to its open air-gap position, completing a cycle of operation.

4. A device of the class described comprising a hollow form including a barrel, and electro-magnet means for creating light flashing, thus simulating the firing of a gun, said electro-magnet means comprising a coil of insulated wire on a suitable support, a plunger of high magnetic permeability movable within the hollow of said coil, separated contacts electrically insulated from said form and placed in position in said barrel so that the sparking hereinafter described may be visible from outside said form, means attached to and being electrically insulated from said plunger, extending out from said plunger to form a conductive bridge for electric current from

one of said contacts to the other when said plunger is in an open air-gap position, means for causing said plunger to move to an open air-gap position when it is no longer attracted, said coil and said contacts being connected in series in the circuit, means for exciting said circuit and means for opening and closing said circuit at will, the operation being that when said circuit is closed said plunger is attracted to a lesser air-gap position, said means attached to said plunger being moved away from said contacts causing the circuit to be broken at said contacts and producing sparking, at which time said plunger is no longer attracted, thus being moved to an open air-gap position, said plunger being reciprocated until the circuit is permanently opened by the means for opening and closing said circuit at will.

5. A device of the class described, comprising a hollow form including a barrel and means for creating light-flashing, thus simulating the firing of a gun, said means comprising make and break contact means placed in position in said barrel so that the sparking hereinafter described may be visible from outside said form and electro-magnetic means suitably connected mechanically and in series circuit relation with said make and break contact means, the operation being that the action of said electro-magnetic means, due to its mechanical connection with said contact means, causes making and breaking of the circuit at said contact means, the action of said electro-magnetic means, due to its electrical series circuit connection with said contact means, causing sparking at the time of breaking of the circuit.

6. A device of the class described according to claim 5, and sound-creating means comprising at least one sounding member, said sound-creating means being situated in said hollow form and being mechanically engageable with said electro-magnetic means in a manner so as to emit sound, thus aiding said sparking effects in simulating the firing of a gun, when said electro-magnetic means mechanically engages said sound-creating means when said electro-magnetic means is in action.

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