Oct. 24, 1950 J. I. WHITE ET AL 2,527,284

TOY CANNON

Filed April 12, 1946 2 Sheets-Sheet 1

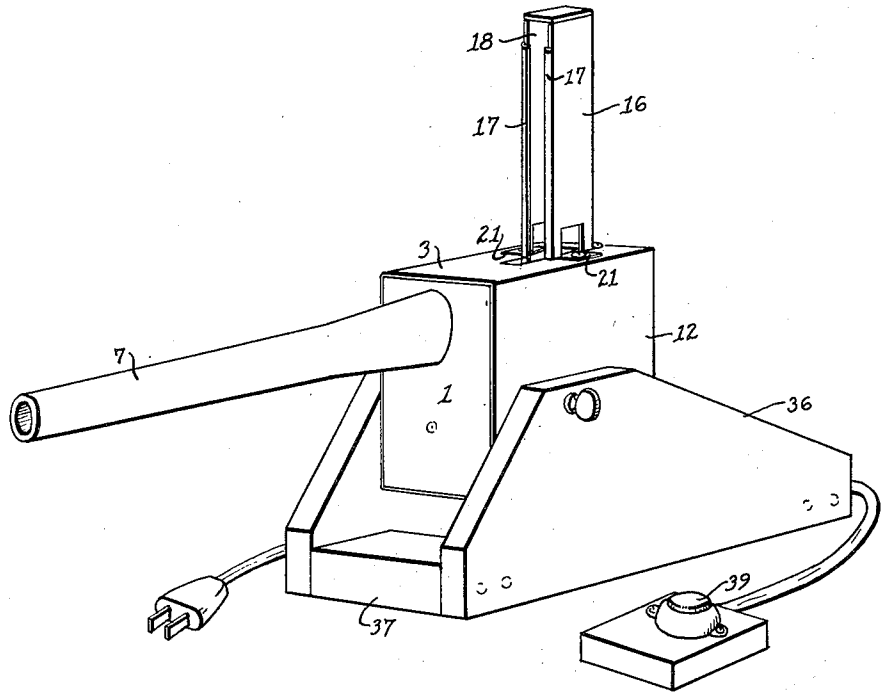


Fig. 1

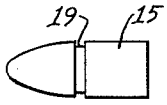


Fig. 3

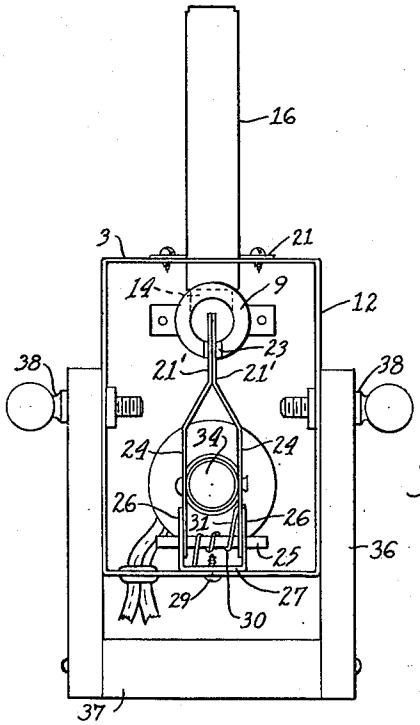


Fig. 2

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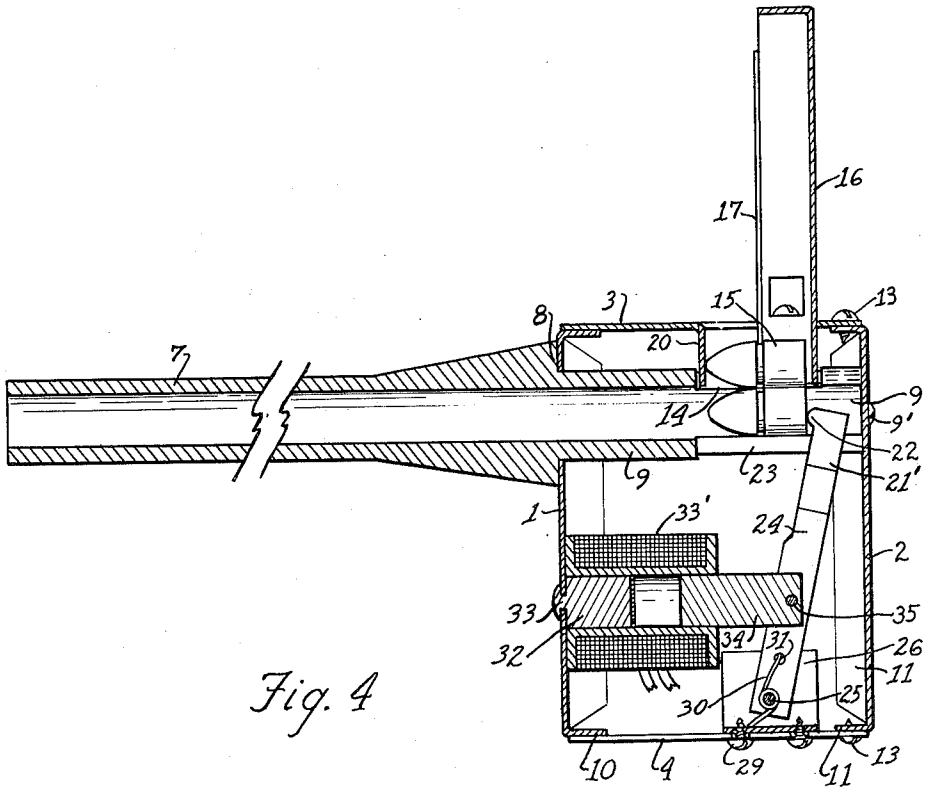


Fig. 4

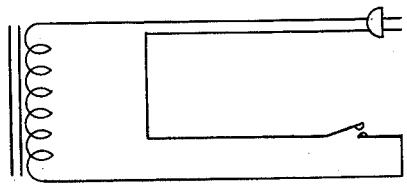


Fig. 5

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2,527,284

TOY CANNON

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3 Claims. (Cl. 124—1)

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The present invention relates to improvements in toys and more particularly to improvements in toy guns, primarily of the "cannon" type.

It is one of the objects of the invention to provide an electromagnetically operated toy cannon which may be connected to any suitable electric lighting circuit and which may be caused to operate by the closing of a hand control switch, the closing of which will cause the projectile to be ejected from the gun.

A further object of the invention is to provide a toy cannon electromagnetically operated of the repeater type, wherein a plurality of projectiles may be loaded in the gun and the projectiles serially ejected from the gun by the repeated operation of a control switch.

For the purpose of disclosing the invention, an embodiment thereof is illustrated in the accompanying drawings, in which:

Fig. 1 is a perspective view of a toy cannon embodying the invention;

Fig. 2 is a rear elevation of the toy cannon embodying our invention, with the rear cover of the casing removed;

Fig. 3 is an elevation of the type of bullet or projectile used;

Fig. 4 is a longitudinal, sectional view of the cannon and operating mechanism therefor; and

Fig. 5 is a schematic view of the circuit arrangement.

In the embodiment of the invention illustrated, there is provided a casing comprising a front panel 1 and a rear panel 2, together with a top panel 3 and a bottom panel 4 and side panels 12. The parts are so arranged as to provide a rectangular casing for the operating mechanism of the cannon.

The barrel 7 of the cannon extends through a front opening in a front panel 1, the barrel being tapered towards the rear and then partially cut off to provide a shoulder 8. The rear portion 9 of the barrel extends through the front panel and abuts against the rear panel 2. The rear abutting end of the barrel is secured to the rear panel 2 by suitable screws 9'. The front panel 1 has inturned top and bottom flanges 10, which telescope the top and bottom panels 3 and 4 and are preferably spot welded to the top and bottom panels 3 and 4. The rear panel 2 likewise has inturned top and bottom flanges 11, which telescope the top and bottom panels. The side panels 12 are in practice made continuous with the top and bottom panels, so that there is provided a rectangular casing closed by the front and rear panels 2. The rear panels 2 are secured in position by suitable screws or bolts 13, which pass through the top and bottom panels and into the flanges 11.

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The rear portion 9 of the barrel 7, at its top, is cut away as at 14, to provide a feed opening sufficiently wide to accommodate the projectile 15, which when dropped through this feed opening will drop into the hollow barrel and substantially fill the same. For feeding projectiles through this opening 14, there is provided a magazine 16 comprising a substantially rectangular casing open at its front and having inturned flanges 17. These flanges stop short of the top of the magazine 16 to provide a full opening 18 to permit the feeding into the magazine of the projectiles. The arrangement is such that the depth of the magazine 16 from front to back accommodates the rear end of the projectile 15 and the projectile is provided with an annular groove 19, into which the flanges 17 fit. These flanges 17 do not extend to the bottom of the magazine, but stop short of the bottom of the magazine sufficiently to substantially clear the top of the bottommost projectile. The projectiles are stacked one on top of the other, the bottommost projectile resting in the cavity of the barrel 7 and the remaining projectiles being supported one on top of the other above this bottommost projectile. As the bottommost projectile is ejected through the barrel, upon its clearance from beneath the next succeeding projectile, the stack above will drop down to insert another projectile in the barrel. To prevent the projectile immediately above the one in the barrel from being pushed forward by its frictional engagement with the bottommost projectile, we provide a stop in the form of a downturned flange 20.

For supporting the magazine in position, ears 21 are struck out from the two sides of the magazine, which ears are secured to the top of the casing by suitable screws. The striking up of the structure 20 from the material of the top leaves a sufficient opening in the top for the forward portion of the projectile to pass downwardly through the top.

The projectile is ejected from the barrel through the medium of an electromagnetically operated ejector. This ejector comprises a pair of parallel strips 21^1, their tops being provided with a lip 22 for engaging the rear end of the projectile, which strips operate in a longitudinal slot 23 in the bottom of the rear portion 9 of the barrel. This slot, while being wide enough to accommodate the ejector, is so narrow that a projectile cannot drop therethrough. At a point be-

low the tops of the strips 21, the strips are separated to form a pair of arms 24, which arms are pivoted on a pivot pin 25. This pivot pin is supported in a substantially U-shaped support having the spaced arms 26 through which the pivot pin 25 passes and the base 27 of the U-shaped support is secured to the bottom panel 4 through the medium of suitable metal screws 29.

The ejector is maintained in its normally retracted position through the medium of a spring 30, one end 31 of which is locked into one of the side arms 24. The spring is wound around the pivot pin 25 and its opposite end bears upon the bottom 27 of the support so that the spring is biased in a direction to move the ejector in its retracted position.

For moving the ejector forward or in an ejection direction, there is provided a solenoid comprising a relatively stationary core 32 having a rivet head 33 which is riveted to the front panel 1. Surrounding this stationary core 32 is a winding 33' and operating within the winding 33' is a plunger 34 pivotally connected at 35 between the two arms 24—24, so that upon the closing of the circuit of the coil 33', the plunger 34 will be drawn into the coil 33', in the usual manner of a solenoid operating electromagnet and with such rapidity that the top of the ejector striking the projectile in the barrel 7 will eject the projectile with considerable force. As soon as the circuit of the electromagnet is opened, the spring 30 will retract the ejector, permitting another projectile to drop into position to be ejected.

The structure above described may be mounted in any suitable manner and as illustrated, the mounting comprises a pair of side members 36 suitably spaced by spacer blocks 37. These side members have removable pivot pins 38 extending therethrough and through the sides 12 of the casing, so that the structure is swingably supported between the side members of the support.

The circuit through the winding 33 is controlled by a suitable push button switch 39 which may be maintained in normal open position by any suitable means, such as a spring or the like, and will be closed upon the pushing of the button.

The arrangement of the structure is such that the repeated ejection of projectiles takes place as rapidly as the operator can manipulate the switch 39 to open and close the solenoid circuit.

We claim as our invention:

1. In a toy cannon, in combination, a hollow elongated barrel having an opening in the top of said barrel adjacent and spaced forwardly of the rear end of said barrel and of sufficient width to receive a projectile, and having beneath said opening, in the lower part of the barrel, an elongated slot of less width than the diameter of a projectile deposited in said barrel through said top opening and extending from the rear of said barrel to a point beneath the forward end of said projectile receiving slot, a magazine disposed above said barrel and adapted to contain projectiles in a vertically stacked relation and the lower end of said magazine communicating with the top opening of said barrel, a projector lever pivotally mounted at its lower end below said barrel, the upper end of said lever projecting into said barrel through said lower slot and normally retracted to a position to the rear of the deposit position of a projectile, and a solenoid supported in front of said projector lever having a movable core pivotally connected with said lever at a point below the center point of said lever, the stroke of the projecting side of said lever being at least equal to the length of the projectile when deposited in said barrel said lever having a rearward extension partially closing when in its projected position at least a portion of the projectile receiving opening whereby when a projectile is ejected by the movement of said lever the next succeeding projectile is prevented from completely dropping into the barrel until the lever has been moved into its retracted position.

2. In a toy cannon, in combination, a hollow elongated barrel adapted to receive a projectile having an opening on its top near its breech through which a projectile may be dropped and having an elongated slot on its under side near its breech, a lever projector having its upper end operating in said elongated slot and having its lower end bifurcated, a pivotal mounting for the lower end of said lever, and a solenoid stationarily mounted in front of said lever having a movable core straddled by the bifurcated ends of said lever arm and pivotally connected thereto, and means for retracting said arm in one direction.

3. In a toy cannon, in combination, a casing including a front and a rear wall, an elongated barrel having spaced apart from its rear end an annular flange, the rear end of said barrel being projected into said casing through an opening in the front wall thereof, means for securing the rear end of said barrel to the rear wall of the casing, the top of said barrel having an opening therein through which a projectile may be passed, a magazine supported on the top of said casing and having a delivery opening coinciding with an opening in the top of said casing, supporting a plurality of projectiles in stacked relation and delivering said stacked projectiles through said magazine opening into the barrel through said barrel top opening, a projector lever pivotally supported in the bottom of said casing and having its upper end projecting through an elongated slot in the bottom of said barrel, a solenoid supported on the inner face of the front wall of said casing and pivotally connected to said projector lever below the center point of said lever and means for retracting said lever in one direction.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,207,669	Troubridge	Dec. 5, 1916
1,343,127	Halliman	June 8, 1920
1,356,664	Stough	Oct. 26, 1920
2,214,297	Ferry	Sept. 10, 1940
2,313,400	Smith et al.	Mar. 9, 1943