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(19)

(54) TOY DISCHARGE MECHANISM

(71) We, BRITAINS LIMITED, a British Company, of Blackhorse Lane, London E17 5QJ, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to a toy discharge mechanism, for example a toy or model gun.

According to the present invention a toy discharge mechanism comprising a barrel, a breech-loading member for positioning a projectile in the breech of the barrel, and a firing member adapted to strike, and eject from the barrel, a projectile located in the breech, is characterised in that the breech-loading member is normally biased into a first position which prevents the firing member from striking a projectile loaded in the barrel through the muzzle end thereof.

In a simple embodiment of the toy discharge mechanism the breech-loading member is biased into said first position by the force of gravity.

Conveniently the breech-loading member is positionable in a second position for inserting a permitted projectile therein, and a third position, intermediate the first and second positions, for locating a permitted projectile in the breech of the barrel in a position aligned with the bore of the barrel and where it can be struck by the firing member.

The breech-loading member and the barrel may be dimensioned to limit the physical size of projectile locatable in the breech of the barrel.

The invention will now be described, by way of example, with reference to the accompanying drawings accompanying the Provisional Specification, in which:

Figure 1 is a plan from above of a barrel structure of a toy discharge mechanism according to the present invention,

Figures 2 to 5 are cross-sectional views taken on line A—A of Figure 1 showing the various positions of a firing pin and a breech-loading member during loading and firing of the toy discharge mechanism, and

Figures 6*a* and 6*b* are end and side views, respectively, of the breech-loading member shown in the barrel structure of Figures 1 to 5.

Figure 1 shows a metallic barrel structure, generally designated by the reference numeral 1, of a toy gun or discharge mechanism. The barrel structure 1 has a bore 2 and is provided with trunnions 3 enabling the barrel structure 1 to be mounted on a wheeled carriage (not shown). The trunnions 3 are adapted to engage in recesses (not shown) in the wheeled carriage. A spring loaded lever (not shown) is mounted on the wheeled carriage and is adapted to engage the teeth of a toothed member 4 provided on the barrel structure 1. By engaging the spring loaded lever with a different tooth of the toothed member 4, the angle of elevation of the barrel structure 1 relative to the carriage may be altered.

In Figures 2 to 5 there is shown a firing member in the form of a substantially U-shaped firing pin 5 (for simplicity no shown in Figure 1) having arms 5*a* and 5*b* of circular cross-section. The arm 5*b* is located along the axis of a channel 6 of circular cross-section provided in the barrel structure and comprising an inner portion 6*a* and an outer portion 6*b* of smaller cross-sectional area. A helical spring 7, coiled about the arm 5*b*, is accommodated in the inner portion 6*a* between one end 6*c* of the portion 6*a* and a head 8 of circular cross-section provided at the end of the arm 5*b*.

The position of the firing pin 5 immediately after discharging a shell is shown in Figure 2. The arm 5*a* is aligned along the axis of the bore 2, a breech-loading member 9 is positioned in an intermediate or third position, and the spring 7 is not compressed or only slightly compressed.

In order to load and fire a toy shell from the position shown in Figure 2, it is first necessary to cock the firing pin 5. This is achieved by pulling the pin 5 in the direction indicated by arrow B in Figure 2 against the

increasing compression force of the spring 7 until the end of the arm 5*a* has been completely withdrawn from a hole 10 aligned with the axis of the bore 2. The arm 5*a* is then turned about the axis of the arm 5*b* and its end is engaged against the bottom of a recess 11 provided in the barrel structure 1 around the hole 10. In withdrawing the firing pin 5 in this manner, the arm 5*a* is completely withdrawn from a keyhole opening 12 (see Figures 6*a* and 6*b*) in the breech-loading member 9 so permitting the latter to drop under the force of gravity into a first position, shown in Figure 3. In this first position of the breech-loading member 9, a shell or any other projectile loaded through the muzzle 13 of the barrel structure is prevented from being properly located in a breech chamber 14 of the barrel, as hereinafter described. Furthermore when the firing pin 5 is uncocked, as hereinafter described, the progress of the arm 5*a* along the axis of the bore 2 towards the muzzle 13 is barred by the breech-loading member 9.

With the firing pin 5 in its cocked position the loading of a shell 15 (see Figure 4) into the breech chamber 14 may now be performed. This is achieved by first lifting the breech-loading member 9 against the force of gravity into an upper or second position shown in Figure 4. Wing members 16 are provided to assist in the handling of the member 9, and the member 9 is retained in the barrel structure 1 by means of lugs 17 slidable along grooves 18 provided in the breech chamber 14. A further groove 19 in the upper surface of the barrel structure 1 enables the shell 15 to be moved from a position shown in full lines in Figure 4, through the circular part of the keyhole opening 12, into the position shown in dashed lines in Figure 4. The length of the breech chamber 14, in the axial direction of the bore 2 and the cross-sectional area of the circular part of the keyhole opening 12, limit the length and diameter, respectively, of shell which is locatable in the breech of the barrel structure 1.

The breech-loading member 9 carrying the shell 15 is then allowed to fall under gravity from its upper or second position. The shell 15 drops into position in the breech chamber 14 with its axis in alignment with that of the bore 2 (see Figure 5). When thus correctly positioned in the breech chamber 14, the shell 15 prevents the breech-loading member 9 from falling into its lower or third position.

In order to prevent a proposed projectile of smaller diameter than a permitted projectile (assuming the projectiles to be of circular cross-section) from being correctly positioned in the breech chamber 14, a recess 22, of generally rectangular cross-section, which opens directly into the lower part of the rear end of the bore 2, is provided in the barrel structure 1. The width of the recess 22, in the direction perpendicular to the plane of the paper of Figure 5, is dimensioned to receive any proposed projectile which has a diameter or width less than a certain minimum dimension. Such a smaller diameter proposed projectile, falls into the recess 22 and is accommodated thereby in a position of non-alignment with the axis of the bore 2. With the proposed projectile located in the recess 22, the breech-loading member 9 falls into its lower or first position and then blocks the progress of the arm 5*a* of the firing pin 5.

With the shell 15 properly located in the breech of the barrel structure 1 it is possible to move the firing pin 5 from the cocked to the uncocked position in order to fire the gun. This is accomplished by turning the arm 5*a* about the axis of the arm 5*b* until the former can pass through the hole 10. The energy stored in the compressed helical spring 7 is then released and the arm 5*a* of the firing pin 5 is urged along the axis of the bore 2. The end of the arm 5*a* strikes the rear end of the shell 15 and propels the shell along the bore 2 and out through the muzzle 13 of the barrel structure 1, the firing pin 5 coming to rest in the position shown in Figure 2. The discharge mechanism of the toy gun is now ready for reloading and refiring.

When the breech-loading member 9 is in its lower or first position (see Figure 3) it is possible to move the firing pin 5 from its cocked position to a semi-cocked position in which the end of the arm 5*a* abuts against one side of the member 9. A shell inserted through the muzzle 13 and abutting against the other side of the member 9 could then only be ejected from the barrel structure 1 by raising the breech-loading member 9 to its intermediate or third position thereby allowing the stored energy in the partly compressed spring 7 to move the arm 5*a* of the firing pin 5 to strike the shell. In order to make this method of firing more difficult to achieve, recesses 20 and 21 are located in the breech-loading member 9 for engaging respectively, the end of the arm 5*a* and the rear end of a shell inserted through the muzzle 13. In order to fire the shell inserted in this manner it is thus necessary to perform the relatively complicated task of disengaging the firing pin 5 and the shell from the recesses 20 and 21, respectively, before the member 9 can be raised. This is beyond the scope of small children.

It should be realised that the present invention is suited to any form of toy discharge mechanism. In the embodiment described above the barrel structure 1 is suitably formed in two halves separable

along a vertical plane to allow insertion of the firing pin 5, the helical spring 7 and the breech-loading member 9.

In another embodiment of the invention a spring may be provided to assist in biasing the breech-loading member 9 into its lower or first position.

WHAT WE CLAIM IS:—

1. A toy discharge mechanism comprising a barrel, a breech-loading member for positioning a projectile in the breech of the barrel, and a firing member adapted to strike, and eject from the barrel, a projectile located in the breech, characterised in that the breech-loading member is normally biased into a first position which prevents the firing member from striking a projectile loaded in the barrel through the muzzle end thereof.

2. A toy discharge mechanism according to claim 1, in which the breech-loading mechanism is biased into said first position by the force of gravity.

3. A toy discharge mechanism according to claim 1 or 2, in which the firing member is spring loaded.

4. A toy discharge mechanism according to any preceding claim, in which the breech-loading member is movable substantially perpendicular to the axis of the barrel in a breech chamber, the latter communicating with the bore of the barrel.

5. A toy discharge mechanism according to claim 4, in which the dimension of the breech chamber, in a direction parallel to the axis of the barrel, permits only a projectile which has a length less than said dimension to be positionable in said breech-loading mechanism for subsequent location in the breech of the barrel.

6. A toy discharge mechanism according to any preceding claim, in which a recess, opening directly in to the lower part of the rear end of the bore, is provided in the barrel, the recess being dimensioned in a transverse direction perpendicular to the axis of the barrel to receive a projectile from the breech-loading member which has a cross-section less than a permitted value, thereby positioning such a projectile in a position of non-alignment with the bore of the barrel where it cannot be struck by the firing member.

7. A toy discharge mechanism according to claim 5 or 6, in which the breech-loading member is positionable in a second position for inserting a permitted projectile therein, and a third position, intermediate the first and second positions, for locating a permitted projectile in the breech of the barrel in a position aligned with the bore of the barrel and where it can be struck by the firing member.

8. A toy discharge mechanism constructed and arranged substantially as herein described with reference to, and as illustrated in, Figures 1 to 5 and Figures 6*a* and 6*b* of the drawings accompanying the provisional specification.

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1494503 PROVISIONAL SPECIFICATION
2 SHEETS *This drawing is a reproduction of the Original on a reduced scale*
Sheet 1

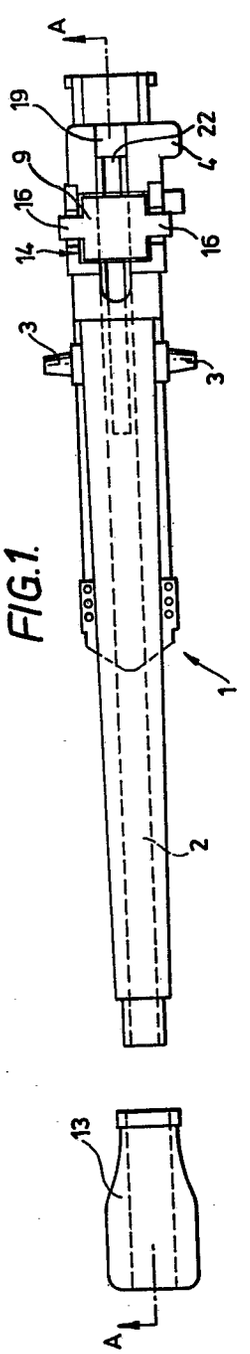

FIG.1.

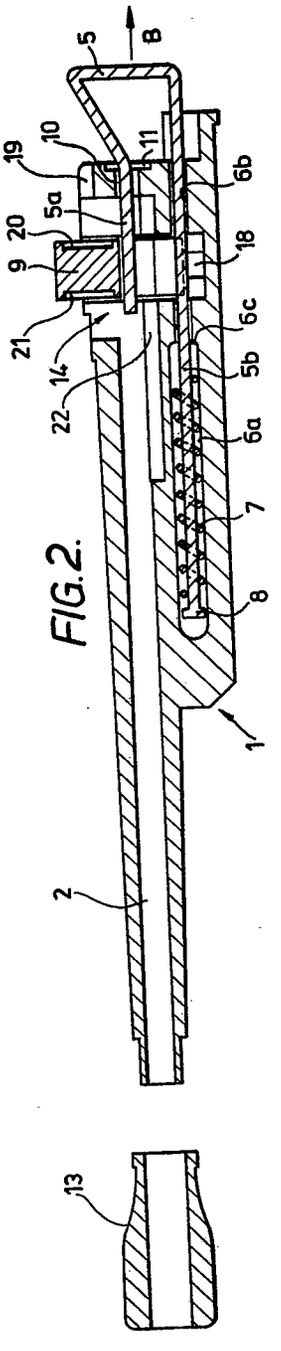

FIG.2.

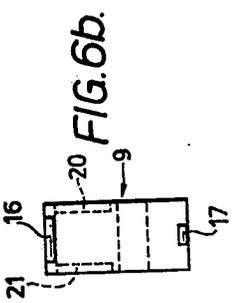

FIG.6b.

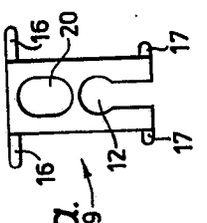

FIG.6a.

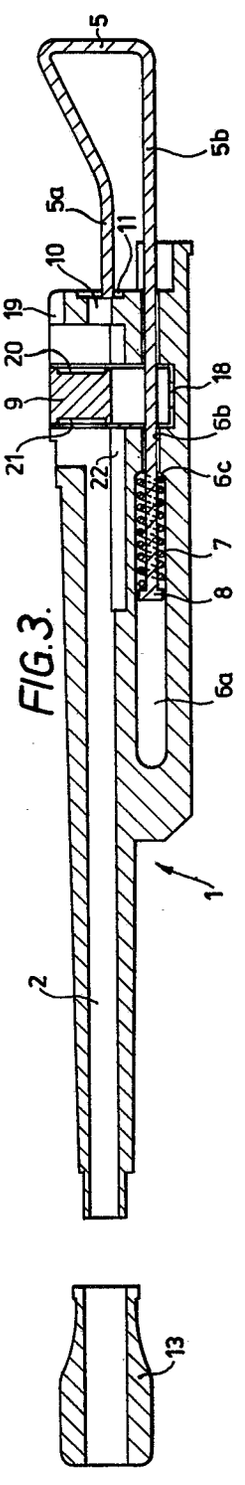

FIG.3.

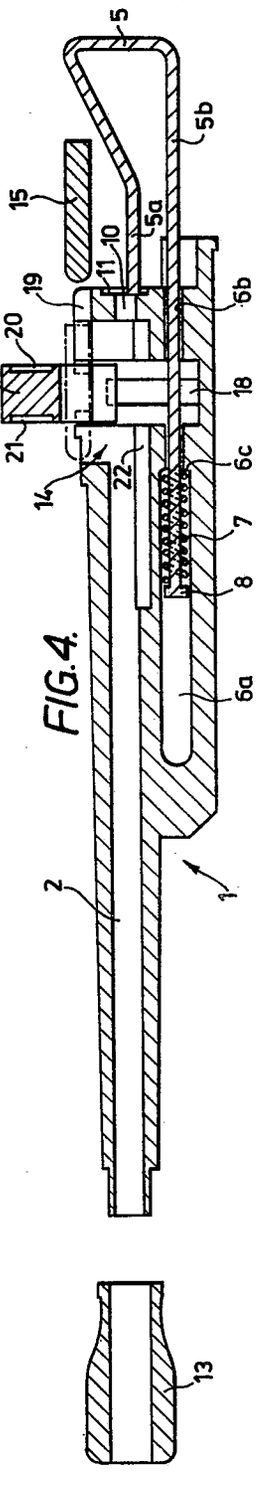

FIG.4.

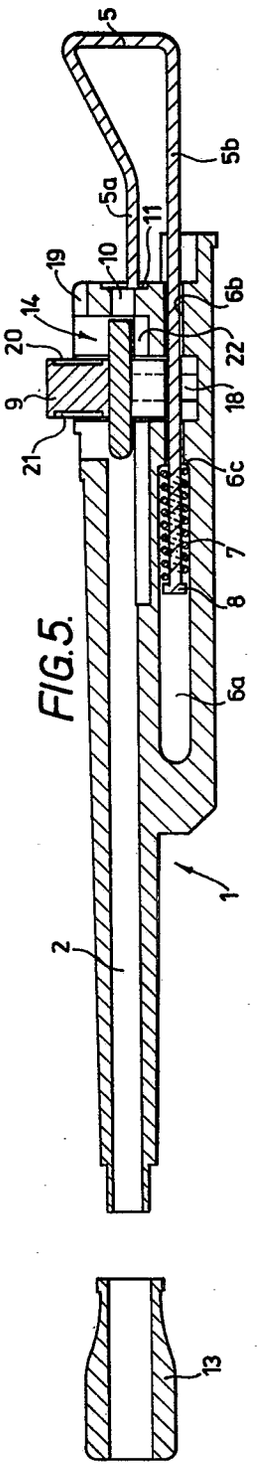

FIG.5.