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GUIDE DEVICE FOR BALLS IN LOADED TOY GUNS

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Fig. 1

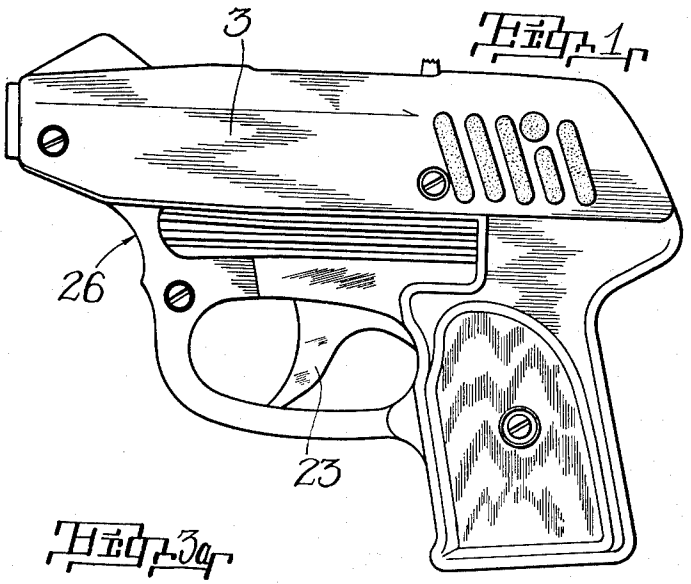



Fig. 3a

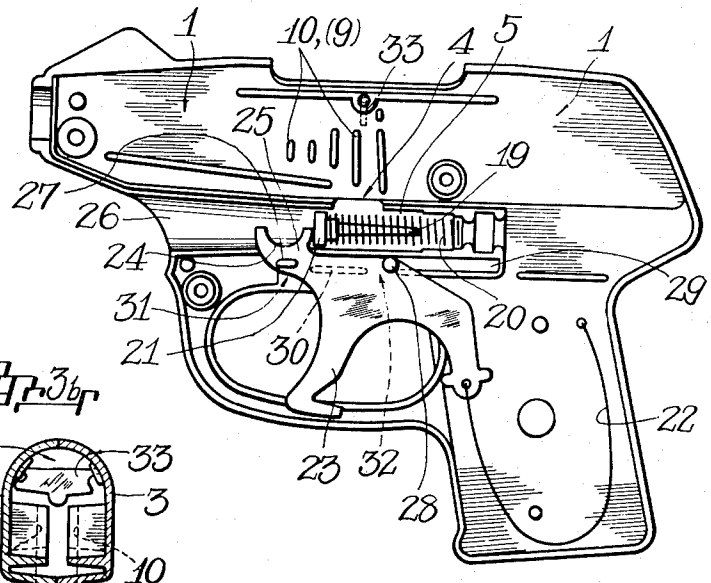
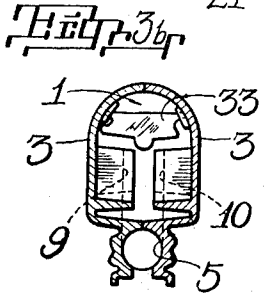



Fig. 3b



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Fig. 2

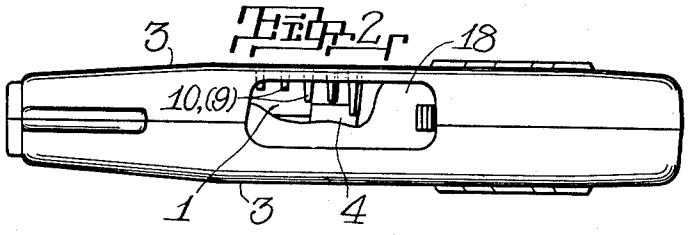



Fig. 4 Fig. 6 Fig. 8 Fig. 10

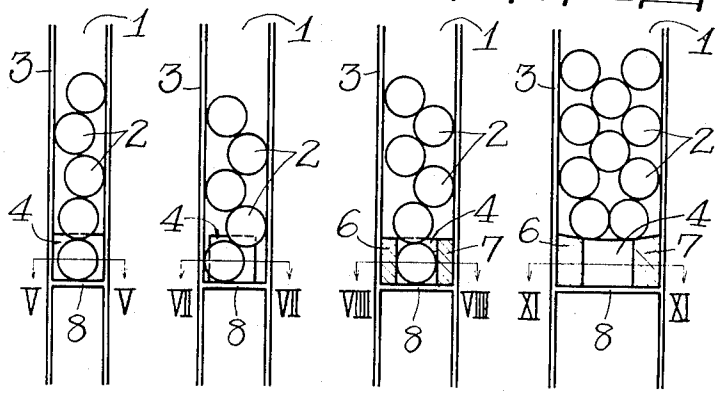
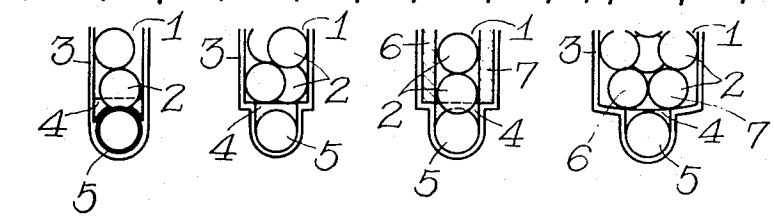


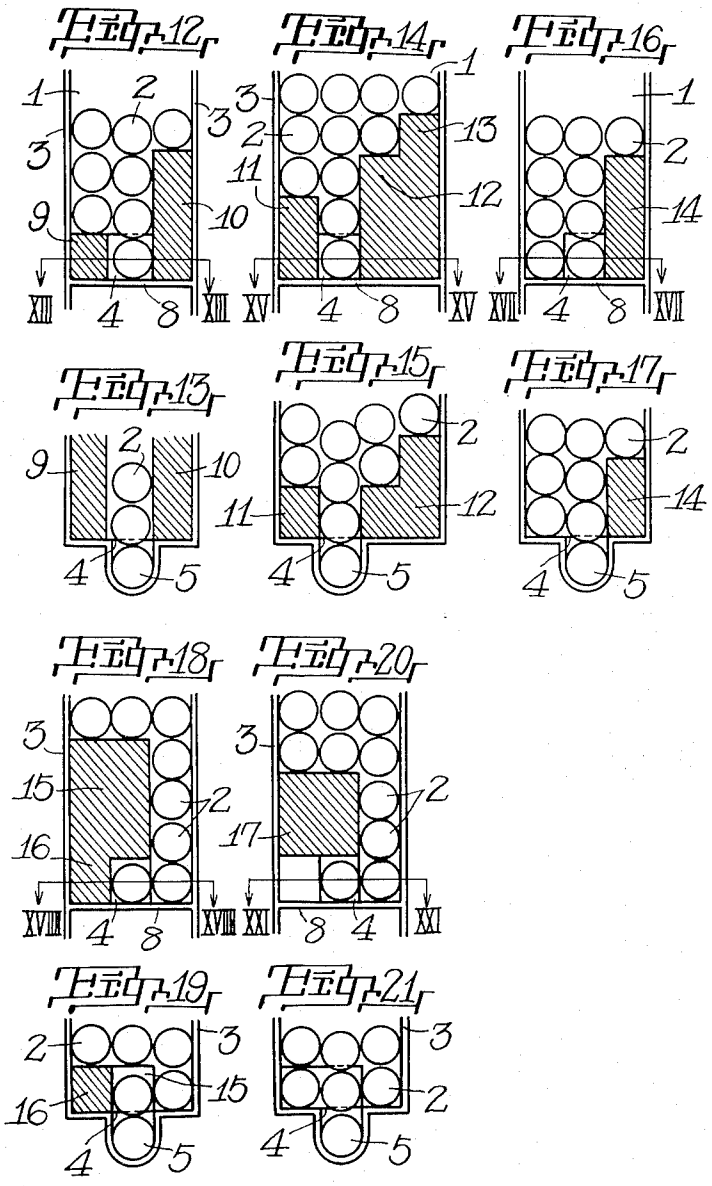

Fig. 5 Fig. 7 Fig. 9 Fig. 11



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3,204,627

# GUIDE DEVICE FOR BALLS IN LOADED TOY GUNS

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1 Claim. (Cl. 124—49)

The present invention relates to toy guns and relates more particularly to a guide device for balls in loaded toy guns.

The principal object of the invention is to provide a novel, simplified and troubleless guide device for balls in loaded toy guns, that is capable of accurately and uninterruptedly guiding balls of a colossal number, for example, 50 or 100 or more, from the magazine chamber into the discharge chamber in the gun body.

Another object of the invention is to provide a novel toy gun capable of an outstanding performance of continuous discharge that has never been seen in any conventional toy gun.

The invention will be set forth in the following description of an illustrative embodiment thereof made in conjunction with the appended drawing, in which:

FIGURE 1 is a front view of a toy gun provided with a form of the device in accordance with the invention;

FIGURE 2 is a partly cutaway plan view of the toy gun illustrated in FIGURE 1;

FIGURES 3*a* and 3*b* are respectively a central cross sectional view of the toy gun and a longitudinal sectional view of the principal section thereof;

FIGURE 4 is a cross sectional plan view of a conventional magazine chamber of the toy gun, the magazine serving also as a guide means for balls;

FIGURE 5 is a sectional view taken along V—V line of FIGURE 4;

FIGURE 6 is a cross sectional plan view of another conventional magazine chamber relatively increased in width size;

FIGURE 7 is a sectional view taken along VII—VII line of FIGURE 6;

FIGURE 8 is a cross sectional plan view of a magazine chamber as a basic form of the device in accordance with the invention;

FIGURE 9 is a sectional view taken along VIIII—VIIII line of FIGURE 8;

FIGURE 10 is a cross sectional plan view of the magazine chamber relatively increased in width size;

FIGURE 11 is a sectional view taken along XI—XI line of FIGURE 10;

FIGURE 12 is a cross sectional plan view of another magazine chamber as an improved form of embodiment of the invention;

FIGURE 13 is a sectional view taken along XIII—XIII line of FIGURE 12;

FIGURE 14 is a cross sectional plan view of another magazine chamber as another improved form of embodiment of the invention;

FIGURE 15 is a sectional view taken along XV—XV line of FIGURE 14;

FIGURE 16 is a cross sectional plan view of another magazine chamber as another form of embodiment of the invention;

FIGURE 17 is a sectional view taken along XVII—XVII line of FIGURE 16;

FIGURE 18 is a cross sectional plan view of another magazine chamber as still another form of embodiment of the invention;



FIGURE 19 is a sectional view taken along XVIIII—XVIIII line of FIGURE 18;

FIGURE 20 is a cross sectional plan view of a magazine chamber as a variation of the form illustrated in FIGURE 18; and

FIGURE 21 is a sectional view taken along A—A line of FIGURE 20.

Prior to describing the structure of the device in accordance with the invention, a reference will be made to the guide device for balls in the conventional toy guns. In conventional toy guns, as illustrated in FIGURES 4 and 5, in order to guide balls stored in the magazine chamber to the feed aperture opening into the discharge chamber, magazine chamber **1** is designed to be substantially equal in width with balls **2** in diameter, as to cause these to successively move along over side walls **3** as guide surface to feed aperture **4**. This design is based on the consideration of balls **2** lying horizontally and in substantially a single line in magazine chamber **4**, and reduces the capacity for balls **2**, i.e. the capacity of magazine chamber **1**, to an extreme degree that it becomes impossible to provide such a large capacity as for example for 50 or 100 balls. An improved form of the magazine chamber of this type considered to remove the defect has, as illustrated in FIGURES 6 and 7, an increased width relative to the diameter of balls **2** with the result of the capacity for balls being increased, but it has proved that the mere increase in width of the magazine chamber, as appears from the illustrative figures, gives rise to another defect that balls **2**, being mutually interlocked in their movement in the magazine, are able to move only with difficulty to feed aperture **4** one after another in order and are liable to suffer stoppage due to jamming leading to feed interruption.

The present invention resides with the provision of a contracted region in magazine chamber **1** having a feed aperture **4** for balls **2**, the aperture opening into discharge chamber **5** to guide balls into feed aperture **4** and the contracted region having a reduced width relative to the remaining region of the magazine chamber and being stepped in configuration. The invention will be set forth in detail in conjunction with a number of principal forms of embodiment thereof with references being made to the appended drawing. The form illustrated in FIGURES 8 and 9 represents the most basic one of the contracted region referred to above. In order to have a reduced region for guiding balls to feed aperture **4** relative to the remaining one of magazine chamber **1**, contracting projections **6** and **7** are, as illustrated, introduced by turning to account side walls **3**, the region that confronts, communicates with or surrounds, feed aperture **4** either partially or entirely is thereby reduced in width relative to the remaining one of the magazine chamber. In FIGURES 8 and 9 those portions of side walls of magazine chamber **1** that stand in the back of feed aperture **4** designated at **8** are the rest of those utilized for introducing a reduced region. Different from the form illustrated in FIGURES 8 and 9, the introduction of the stepped contracted region permits a good variety of forms of embodiment of the invention and the most basic one of which is illustrated in FIGURES 12 and 13, where side walls **3** of magazine chamber **1** are turned to account as to have the region stepwise reduced in width, that guides balls to feed aperture **4**, relative to the remaining region of the magazine chamber, and there are introduced horizontal mutually differently long contracting projections **9** and **10**, and is provided thereby another continuous region which is broader than that provided by projections **9** and **10**, but less broad than that which should be provided, if projection **10** should fail. The form illustrated in FIGURES 14 and 15 has in the contracted

region contracting projections **11** and **12** introduced by turning to account the side walls **3**, wherein projection **12**, contrary to projection **11**, being furnished with two steps by portion **13**, so that the contracted region has more subregions in number of distinct widths than the form of FIGURE 12. As obviously seen from FIGURE 15, these projections may be vertically differentiated in length from one another as much freely as horizontally. Contrary to forms of embodiment of the invention as far described where a pair of sidewalls **3** are turned to account in introducing projections to provide the contracted region, in those illustrated in FIGURES 16 and the rest, is turned to account one of either side walls **3** to provide such region, and indeed the form illustrated in FIGURES 16 and 17, has contracting projection **14** partly contiguous to feed aperture **4**, that illustrated in FIGURES 18 and 19 contracting projection **15** with portion **16** partly contiguous to two sides of feeding aperture **4** and that illustrated in FIGURES 20 and 21 contracting projection **17** which is projection **15** deprived of portion **16**. Of course, these forms of embodiment of the invention are based on the principles thereof. FIGURES 1 to 3 illustrate a toy gun as a form of embodiment of the invention, wherein parallel arranged contracting projections **9** and **10**, that cooperatively provide a contracted region, work to provide projected surfaces. As to be noted, a projection is effective in attaining the object in view, irrespective of its being offered as a thick wall or a parallel collection of several projections. Like numerals or signs designate like parts or portions. Further, **18** designates a hinged cover for the feed inlet, the inlet finding itself on the top of magazine chamber **1**, **19** a striker ram for balls which is driven by tension spring **20** in discharge chamber **5**, **21** a catch and head of striker ram **19**; head **21** is engaged with trigger **23** at head **25**, which forms a receiver **24** for balls, the engagement being made with the help of spring **22** and two pins **27** and **28** in guide groove **29** with recesses **31** and **32** in the front and the back of bottom wall **30**. **26** designates the discharge bore which communicates with discharge chamber **5** and has a continuously increasing diameter in the muzzle direction. In the middle region of magazine chamber **1** is provided valve **33** which is supported at both ends of an extreme edge and hinged exclusively in the forward direction of the gun as to keep the ball feed from back-sliding, the magazine chamber being thereby divided into two, one front and one back, divisions, with the result that balls in the back division may not be fed into the front one but for the forward opening of valve **33** by, for example, a light swing of the gun body. Of course, the visual design of the gun as a whole may be freely selected distinct from the illustrated one. The device in accordance with the invention may expediently be used in any variety of toy guns.

Now a brief description will be made of the just mentioned device in accordance with the invention. In the form illustrated in FIGURES 8 and 9 which has no stepped contracted region in the magazine chamber, balls **2** stored in magazine chamber **1** are fed in a single number, on any slight move of the gun body i.e. magazine chamber **1**, or an external force applied by shock or gravity or weak spring, through the small pass of the contracted region of the chamber into feed aperture **4** and thereby is prepared a new space for a fair shift of balls in the magazine chamber enabling another uninterrupted move of the next ball feed in a single number to feed aperture **4**. It is to be noted, therefore, that there is removed any conventional trouble in action for feed of balls arising from these jamming in their way. Further it is to be noted that mere increase in width of magazine chamber **1** does not remove the jamming of balls, as illustrated in FIGURES 10 and 11, and that the sliding of balls **2** to feed aperture **4** might still remain difficult or under some circumstances become impossible, since balls **2** would be jammed up like a solid wall and this condition could hardly be solved by a regular strong swing, shock, etc. Thus there appears a necessity to determine the relationship prevailing between magazine chamber **1** in width and ball **2** in diameter and the relative value of feed aperture **4** in area, and the necessity may make out a defect as it restricts the size of increased capacity for balls. In order to preclude such defect, forms of embodiment of the invention illustrated in FIGURES 12 and the rest may be called suitable, where the contracted region is made stepped, namely by introducing projections **9**, **10** and so on for the purpose; the balls of the first line facing feed aperture **4** are passed one after another into the feed aperture and the foremost ones of the lines adjacent to the first line prevented from move by projections **9** and **10**, or **11**, **12** and **13**; the preventing force with its components may be turned against the line and made not to develop a rectangular force that the prevented lines from move may not laterally apply force to that line facing the feed aperture. Thus action of a slight shock, gravity, weak spring, etc., may solve the jamming condition of balls if any, and assures the uninterrupted move of balls to feed aperture **4**. Referring to the form illustrated in FIGURE 12, balls **2** stored in three lines in the contracted region are shifted into two lines in the contracted region by projection **10** alone and subsequently into one line in the more reduced contracted region by projections **9** and **10**, to be fed in a single number in succession into feed aperture **4** without exception. It is obvious that in the form illustrated in FIGURE 14, feed of balls takes place in the similar good order, i.e. in successive line number 4–3–2–1. The form of FIGURE 16 has a single contracting projection **14** provided on walls **3** in one side; the projection, although offers a single step, works so that balls in three lines are shifted into two in the contracted region to be securely fed into feed aperture **4** as illustrated. In the form of FIGURE 18, projection **15**, corresponding to projection **14**, has portion **16** as to have one line of balls **2** in the contracted region provided by projection **15** and two in that contracted region done by portion **16**; feed of balls takes place in the same fashion as mentioned. In the form of FIGURE 20, projection **17** is a variation, and the contracted region is stepped and as effectively works as in the preceding forms. In any of these forms of embodiment of the invention described, it is possible to most effectively neutralize the action of the lateral force that would prevent balls **2** from their linearly move to feed aperture **4** and secure a large capacity for balls at the same time not excepting the sure and uninterrupted feed of balls, by providing such a stepped contracted region either in original or varied or combined form in magazine chamber **1** larger in width than balls **2** in diameter.

The device in accordance with the invention herein described on basis of its principal forms together with their obvious variations, is an outstanding one for feeding balls for toy guns with many advantages as could hardly be attributed to any similar conventional device. It is built up of the most simplified parts designed and produced on every scientific consideration and offers no particular difficulty in assembly and easily completed. The invention enables to produce such toy guns as may be loaded with balls in no such limited number as 6 or 8, but in a colossal number such as, for example, a total 50 or 100 or even more, and the loading made at random in the magazine chamber, to be automatically and uninterruptedly fed into discharge chamber **5** accurately and one after another through feed aperture **4**, simply by a mere shock or so as may be experienced in discharge of the gun at the aim, or the action of gravity or weak spring and so on. It makes it feasible with ease therefore for toy guns, that may be loaded, to exercise spells of continued discharges and may have to be highly evaluated as one that has introduced a complete change and

improvement in the guide mechanism for balls, the most important mechanism for any loaded toy gun.

What I claim is:

In toy guns having a magazine chamber capable of storing a large number of balls in said chamber, said chamber having an aperture for passing a single ball, said aperture being located on the bottom of said chamber, said aperture leading to a chamber from which balls are discharged from said gun, the improvement which comprises: guide means permitting an enlargement of said chamber without jamming of said balls, said guide means comprising a plurality of spaced vertically disposed projections extending inwardly from at least one of the sidewalls of said chamber, and positioned adjacent to said aperture, said projections increasing progressively in length from a shortest front projection to a longest rear projection, said projections preventing jamming by reducing the width of portions of said magazine chamber relative to the remaining portions of said magazine chamber.



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