May 25, 1954 A. C. GRAHAM 2,679,242

TOY CANNON

Filed Oct. 18, 1952

Fig. 1.

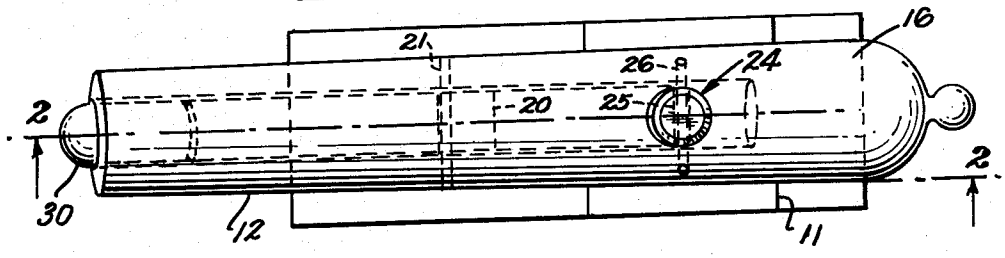


Fig. 2.

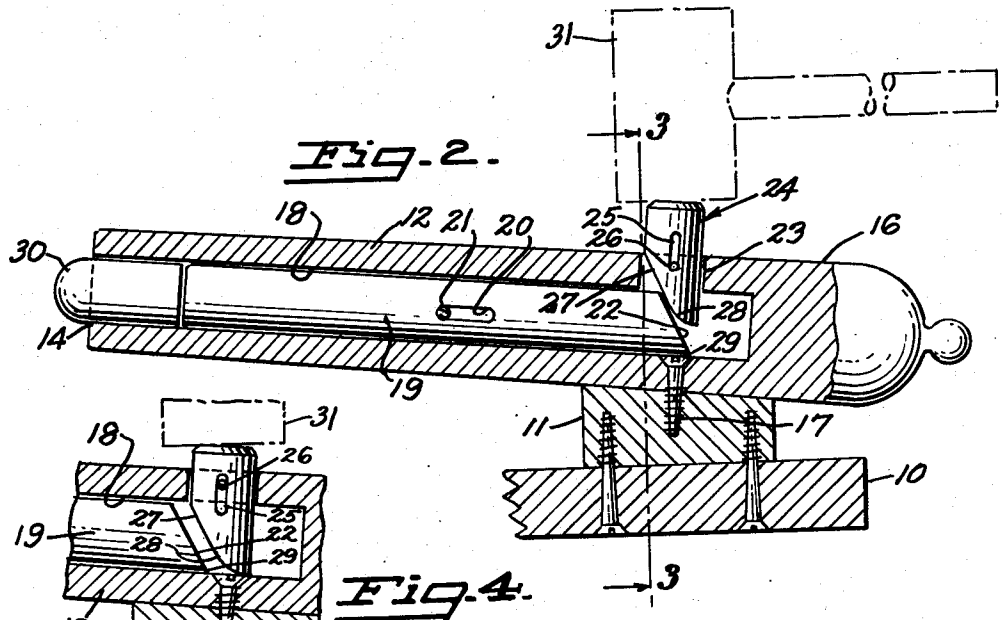


Fig. 4.

Fig. 3.

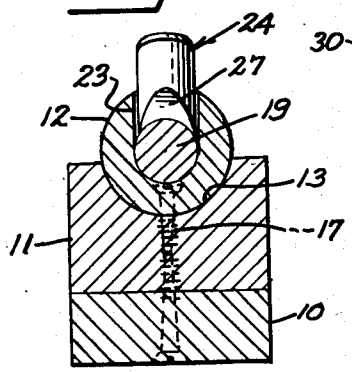
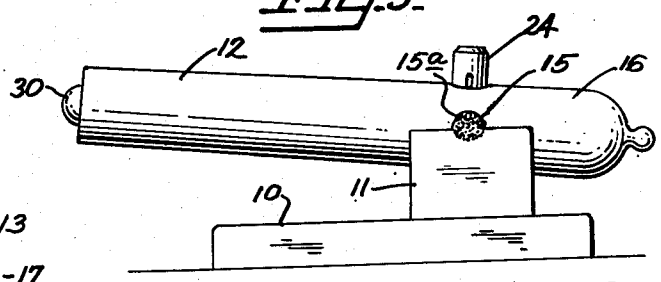


Fig. 5.



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TOY CANNON

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6 Claims. (Cl. 124—1)

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This invention relates to the broad class of toys and more particularly relates to a toy cannon.

Toy cannons, though well known in the toy art, have heretofore usually been designed to discharge a missile by spring compression, which is dangerous and usually projects the missile for a considerable distance from the muzzle so that a child must go some distance to recover the missile to repeat the operation of firing the cannon. Obviously it is to be understood in this invention that the term firing is not employed literally but rather figuratively to indicate the discharge of a missile by any force applied in the muzzle of the cannon.

Briefly the invention comprises a base and an upstanding support upon which is mounted the cannon body comprising an axially bored muzzle open at its mouth and closed at its breech and having therein a slidable ram of sufficiently lesser length than the bore of the muzzle to permit a missile to be inserted in the mouth of the bore, the longitudinal movement of the ram being limited within the bore of the cannon. Adjacent the breech end the body of the cannon has an opening perpendicular to the bore, and in which is slidably mounted a plug in simulation of a fuse or firing pin. The plug extends above the exterior of the cannon body and is pinned therethrough for limited reciprocation in the opening, the ram and plug being adapted for relative contact adjacent to the breech end of the muzzle bore at an angle whereby force exerted upon one propels the movement of the other.

The purpose and object of the invention is to provide a toy cannon simple, economical and rugged in construction, and in which the missile is projected from the cannon by manually applied force applied to the relatively angularly contacting ram and plunger plug without the employment of a compression spring, and wherein the placing of the missile in the mouth of the muzzle bore rearranges the ram and plunger plug whereby the cannon is primed or made ready for another operation.

One form in which the invention may be embodied is described herein and illustrated by the accompanying drawing in which:

Fig. 1 is a plan view of the invention.

Fig. 2 is a side elevation partly broken away in longitudinal vertical section on line 2—2 of Fig. 1, and including in dotted line a suitable mallet for manually striking a plug member.

Fig. 3 is a transverse vertical section on line 3—3 of Fig. 2.

Fig. 4 is a fragmentary longitudinal section of the structure shown in Fig. 2 with a plug member at the depressed position.

Fig. 5 is a side elevation showing a modification of the supporting pedestal.

Referring to the drawing in which like reference characters indicate corresponding parts in

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the several views, 10 is a base of sufficient length and width to provide a firm foundation in contemplation of the rather forceful blow to which it may be subjected in operation of the toy. Upstanding from the base is a supporting pedestal 11 in simulation of an artillery carriage mount which supports an elongated cannon body 12. This pedestal may assume the shape of a cradle 13 to support the cannon body at an incline in simulation of the elevational incline of a real cannon, the upper edge wall of the cradle arms having semi-circular lugs in simulation of trunnions as indicated at 15 (as shown in the modification of Fig. 5), the down half of the trunnion being completed by paint on the side wall of the cradle as indicated by stippling 15a. The cannon body is supported upon the pedestal or cradle in adjacently spaced relation to its breech end 16, the cannon body being secured to the pedestal by any suitable means, such as screw 17, which may be supplemented by gluing of the parts if desired. The cannon body is provided with a longitudinal cylindrical muzzle bore 18 extending from the closed breech end 16 to the mouth 14 of the muzzle. Within the bore 18 is slidably mounted a cylindrical ram 19, the reciprocal slidability of which is limited by a transverse elongated slot 20 therethrough substantially centrally of the length of the ram, the slot slidably engaging a cross-pin 21 to limit its longitudinal movement and also to stay the ram against rotation in the bore.

At its outer end the ram terminates in spaced relation to the mouth of the muzzle to provide space for insertion of a missile, whereas at its opposite inner end adjacent the breech the ram terminates in an angular wall face 22 which will be further described.

Adjacently spaced from the breech end the cannon body is provided with a cylindrical opening 23 which mounts therein a vertical movable cylindrical plunger plug 24 which has a loose slidable fit in the opening 23, the plug being guided in movement by the walls of said opening. The axis of the plunger plug is substantially perpendicular to the axis of the ram, and it is delimited in axial movement and stayed against rotation by an elongated slot 25 through which passes a pin 26 fixed in the cannon body athwart the opening 23. The outer end of the plug extends beyond the circumference of the cannon body as best shown in Fig. 2, and its inner end is provided with a longitudinal parabolic chamfer 27 providing a wall face extending from substantially the diametral center of the inner end of the plug to the outer cylindrical wall at a point substantially centrally of the length of the plug, the base of the chamfer at the inner end wall of the plug being preferably rounded as at 28 though it may be cut at an angle on a chord of such a curve.

The inclines of angular face wall 22 at the inner end of the ram and plug face chamfer 27 are relatively confrontingly opposed and are adapted for superficial relative slidable contact when the plug and ram are moved with relation to each other. The relative angular relationship of the respective opposed angular faces 22 and 27 are such that pressure upon either one of said members will move the other.

Since the axes of the ram and plunger plug are perpendicular, the sum of the angles would be 90 degrees, and the respective faces 22 and 27 are inclined accordingly. However, it is to be noted that the angles are not equal at 45 degrees each, since the contact of the two inclined faces must be adapted to force the ram forward when the plunger is struck, and, conversely, to force the plunger upward when the ram is retracted. From experiment it has been determined that the angle of ram face 22 must be greater and the angle of plug face 27 must be less than 45 degrees, the angles being measured with relation to the respective longitudinal axes of those members. Just exactly the relative angularity may depend on the degree of thrust desired to be imparted to the ram and plunger plug. An angularity of the order of substantially 55 to 65 degrees to the face 22 of the ram and 25 to 35 degrees to the face 27 of the plunger have been found efficient, the preferred angles being substantially 60 degrees and 30 degrees. It is to be further observed, however, that the curve 28 of the plunger plug or the chord of such a curve, is at an angle of substantially 60-degrees, since this variation of angle, though not effective in propelling the ram forward, provides for an initial lift to the plunger when the ram is retracted and the apex 29 of the angle 22 initially engages under such curved or chord face.

A missile 30 is provided for free slidable insertion in the mouth of the muzzle in the space forwardly of the ram, the missile preferably being of a length to extend beyond the mouth of the muzzle when the ram is at retracted position to facilitate the manual manipulation for so-called loading.

In Fig. 2, there is shown in dotted lines a mallet 31 by which the plunger plug may be struck a relatively sharp blow, manifestly by manually exerted force.

With this foregoing description, the operation of the cannon may be described briefly. Assuming that the cannon has been operated and it is desired that the operation be repeated, the ram is then forward in the muzzle, limited by slot and pin 20, 21, and the plunger plug is at a downward or inward position. The missile 30 is inserted in the muzzle mouth, pushing the ram rearwardly in the muzzle bore, whereupon the apex 29 of the ram engages under the curve or chord 26 and starts an initial lift of the plunger plug 24. The two opposed angular faces 22 and 27 thereupon come into contact, the relative angularity of the faces being such that the further retractive pressure on the ram raises plunger pin 24 to the limit of slot and pin 25, 26, whereupon the cannon is ready for a so-called firing. The firing is accomplished by striking the plunger pin 24 a relatively sharp blow with the mallet 31 thus sharply and violently depressing the plunger pin and causing impact of the chamfer 27 on the angled face 22 of the ram, the relative angles being such that the ram is propelled forward to contact and discharge the missile, the forward movement of the ram being limited by the slot and pin 20, 21 so that the ram is retained in the muzzle bore. The impact of the plug on the ram may drive the ram forward out of contact with the plug as shown in Fig. 4.

Manifestly, the plunger plug may be raised and also the ram may be retracted by manual finger operation if it is desired to do so, but the toy is designed for operation to simulate loading a cannon by inserting a missile in the cannon bore.

Having described the invention what is claimed as new and patentable is:

1. A toy cannon including an elongated cannon body having a longitudinal bore providing a mouth open at one end and having adjacent the opposite end a relatively perpendicular opening through its body from the bore to the exterior of the body, a ram freely slidable in the bore, a plunger plug mounted slidably in said opening, said ram and plug having their respective axes substantially perpendicular relatively and having respective inclined adjacent end faces relatively opposed and adapted for contact relatively within the cannon bore whereby one may move the other perpendicularly responsive to pressure contact of the inclined faces, the sum of the angles of said inclined faces being substantially 90 degrees, the angle of incline of the end face of the ram being the greater.

2. A toy cannon device of the character described having the elements of claim 1 and in which there are means for delimiting the slidable movement of the ram and plug respectively.

3. A toy cannon device of the character described, having the elements of claim 1 and in which the ram terminates at one end in spaced relation to the cannon mouth and having its opposite end face inclined between 55 and 65 degrees relative to its axis, and the said plunger plug has its inclined face at its inner end longitudinally chamfered at an incline of between 25 and 35 degrees relative to its axis.

4. A toy cannon device comprising a suitably supported elongated cannon body having a longitudinal bore providing an open mouth at one end and a closed breech at the opposite end and having adjacent the breech end an opening through its body wall from the bore to the exterior of the body, a ram slidable in the bore, a plunger plug mounted slidably in said opening, the ram terminating at one end in spaced relation to the cannon mouth and having its opposite end face inclined at substantially 60 degrees relative to its axis, and the said plunger plug having adjacent its inner end a longitudinal face chamfered at an incline of substantially 30 degrees relative to its axis, said faces being confrontingly opposed and adapted for sliding contact relatively.

5. A toy cannon device of the character described having the elements of claim 4 and in which there are means for delimiting the slidable movements of the ram and plug, respectively.

6. A toy cannon device having the elements of claim 4 and in which there are slot and pin means for delimiting the slidable movements of the ram and plug, respectively.

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