

Feb. 20, 1962

R. E. MOORE

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SELF-PROPELLED TOY PROJECTILE

Filed July 25, 1960

2 Sheets-Sheet 1

Fig. 1.

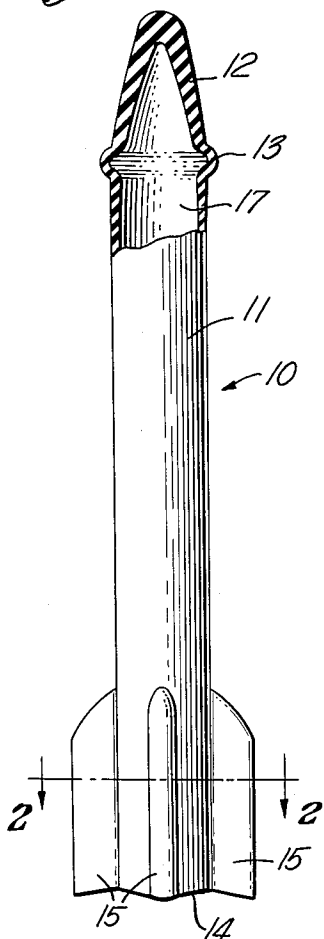


Fig. 2.

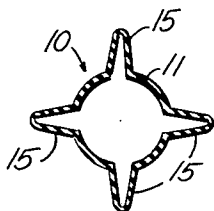


Fig. 3.

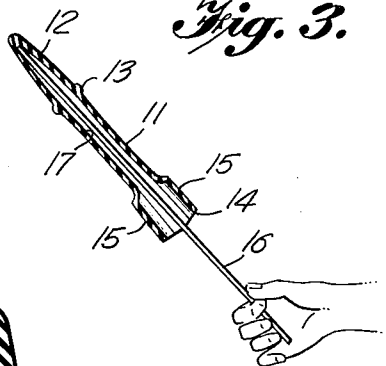
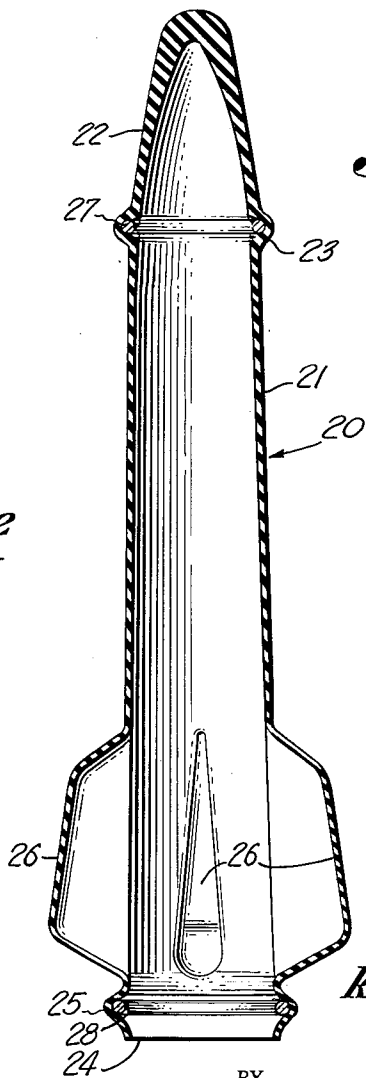


Fig. 4.



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2 Sheets-Sheet 2

Fig. 5.

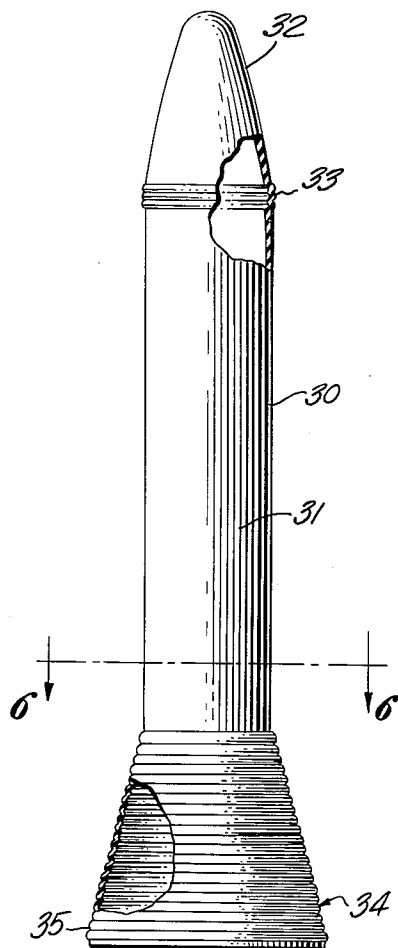
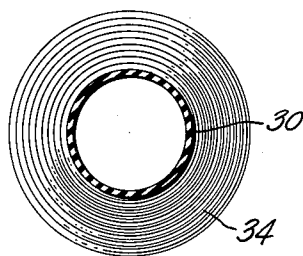


Fig. 6.



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1

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SELF-PROPELLED TOY PROJECTILE
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The present invention relates in general to rocket-shaped toys, and more particularly to rocket-shaped toy missiles formed of rubber or similar elastic material.

Toy missiles heretofore known and in use have customarily required an additional and complete propelling device similar to a bow, a slingshot or a catapult for shooting or propelling the toy into the air. In such cases, the toy missile does not provide a complete toy in itself which can be economically manufactured and marketed. In some instances, catapult toys have been devised which incorporate energy storage devices therein as a separate part from the body of the toy, such for example as spring and surrounding tubular housing assemblies, adapted to be employed with a relatively simple elongated rod or like propelling device. However, such separate mechanical energy storage devices increase the cost of manufacture of the toy because they represent further and separate manufacturing operations and materials beyond what is required for the body of the toy, and represent parts which can readily become damaged and destroy the operativeness of the toy.

An object of the present invention, therefore, is the provision of a novel elastic rocket-shaped toy missile which is of simple and inexpensive construction and which permits a very high thrust-to-weight ratio to be obtained providing a toy missile of high performance.

Another object of the present invention is the provision of an improved rocket-shaped toy missile wherein the body of the missile is a unitary tubular body of readily stretchable elastic material capable of being stretched over an elongated guide member to store energy throughout the extent of the missile body for propelling the missile through the air upon release thereof.

Another object of the present invention is the provision of a novel rubber rocket-shaped toy missile of unitary one-part construction which has advantageous characteristics of durability, collapsibility upon impact with an object, high energy storage potential by utilizing the energy storage properties of the entire body of the missile, and simplicity of manufacture in that the toy can be made by simply dipping forms of the shape of the missile into a rubber latex solution.

Other objects, advantages and capabilities of the present invention will become apparent from the following detailed description taken in conjunction with the accompanying drawings illustrating several preferred embodiments of the invention.

In the drawings:

FIGURE 1 is a side elevation of a rocket-shaped toy missile constructed in accordance with one embodiment of the present invention, with parts broken away to reveal the inner configuration of the missile body;

FIGURE 2 is a transverse section view taken along the line 2-2 of FIGURE 1;

FIGURE 3 is a view of the toy missile of FIGURE 1 stretched over a launching rod illustrating the relationship of the components just prior to release of the missile for flight, the missile being shown in section;

FIGURE 4 is a longitudinal section view of a modified form of rocket-shaped toy missile embodying the present invention;

FIGURE 5 is a side elevation of another modified form of a toy missile embodying the present invention, with parts broken away to reveal the internal configuration thereof; and

2

FIGURE 6 is a transverse section view taken along the line 6-6 of FIGURE 5.

The present invention in general is concerned with a toy missile having the general configuration of a rocket which is made entirely or substantially of stretchable rubber or other highly elastic material shaped to form a generally tubular body having a closed front or leading end in the general shape of a nose cone and an open rear or trailing end, together, with integral tail fins or a flared tail. The missile body has an increased thickness of rubber in the leading end or nose cone portion, serving both to increase the weight of the nose cone region to provide balanced flight without tumbling and to permit a more uniform stretching of the entire missile by a launching rod during preparation for flight. The toy missile may be conveniently and inexpensively produced by merely dipping a form of the required shape into a rubber latex solution, and provides a unitary integral missile shaped body when stripped from the dipping form. If desired, a rigid base ring of wire or other material may be provided in the rear or trailing end region of the missile body and a weight ring of similar material may be provided just aft of the nose cone portion to facilitate achievement of proper dynamic balance in the missile and to rigidify the rear or trailing end portion to facilitate launching. To propel the toy missile, open rear or trailing end of the missile body is merely drawn over an end of an elongated launching rod which is of substantially greater length than the missile body, and the missile is pulled back over the launching rod while the latter is held stationary to stretch the entire missile body, thereby storing potential energy throughout the entire body structure. Upon release of the missile while the launching rod is held stationary, the sudden release of the stored potential energy in the missile body causes the missile to fly off in the direction in which the rod is aimed.

Referring particularly to the drawings, there is illustrated in FIGURES 1, 2 and 3 a convenient preferred form which the invention may take, wherein the toy missile body 10 in the general configuration of a rocket is formed entirely and exclusively of rubber or comparable highly stretchable elastic material, for example by dipping a suitably shaped form into a rubber latex solution. The missile body 10 includes an elongated hollow tubular portion indicated by the reference character 11 which is of substantially uniform cylindrical configuration closed at its forward end by a nose cone portion 12 of considerably greater thickness than the central region 11 and joining the central region 11 by an ornamental annular bulge 13. The rearmost end of the tubular body portion 11 terminates in an open rear or trailing end 14, and four equally spaced tail fins 15 of hollow form may be located along the rearmost region of the tubular portion 11 adjacent the rear end 14 thereof. An exemplary practical form of this embodiment may be about 7 inches long and have a tubular body portion 11 approximately $\frac{3}{4}$ inch in diameter, with the wall thickness of the tubular body portion 11 from the bulge 13 to the rearmost end 14 being about $\frac{1}{64}$ inch to $\frac{1}{32}$ inch and the wall thickness of the nose cone portion 12 being approximately twice this thickness.

To launch this toy missile 10, an elongated launching rod 16 having a length approximating at least twice the length of the toy missile should be used, one end of the launching rod 16 being inserted into the hollow bore 17 of the missile until the end of the rod 16 contacts the inner surface of the wall portion forming the nose cone 12. The missile 10 should then be stretched rearwardly over the launching rod 16 to assume a position approximating that illustrated in FIGURE 3 by grasping the fins 15 or the rearmost portion of the tubular body 11

3

and drawing the same rearwardly along the rod 16. It will be appreciated that such stretching of the missile 10 relative to the forwardmost end portion of the nose cone 12 will cause potential energy to be stored substantially through the entire missile structure, to effect propulsion of the missile along a line of flight initially governed by the direction of the launching rod 16 when the rearmost portion of the missile is released. By utilizing the energy storage potential of the entire missile structure, an extremely high thrust-to-weight ratio is obtained, and due to the flexible elastic nature of the entire missile body, the missile is readily collapsible to minimize the possibility of injury to any objects struck during flight.

Another convenient practical form which the toy missile may take is illustrated in FIGURE 4, wherein the missile 20 is provided with a hollow tubular elongated body portion 21 of approximately cylindrical configuration closed at its forward end by a nose cone portion 22 joined to the tubular body portion 21 by an annular weight ring bulge 23 and terminating in an open rear end 24 bounded by an annular base ring bulge 25. The tubular body portion 21 may be provided with four hollow tail fins 26 similar to the tail fins 15 of the form shown in FIGURE 1. In a practical example of this embodiment, the toy missile may be about 8 inches long, the tubular body portion 21 may taper uniformly rearwardly from a diameter of about 1 inch at the bulge 23 to a diameter of about $1\frac{1}{8}$ inches at the rear opening 24, the nose cone may be about $1\frac{1}{2}$ inches long from the apex thereof to its juncture with the weight ring bulge 23, the bulge 23 may have a maximum diameter of about $1\frac{1}{4}$ inches, and the base ring bulge 25 may have a maximum diameter of $1\frac{1}{2}$ inches. The missile 20 may be made entirely of stretchable rubber having a uniform wall thickness throughout of approximately $\frac{3}{64}$ inch. To aid in achieving proper dynamic balance of the toy missile 20 during flight, a weight ring 27 made of thick metal wire or rod and having an outer diameter and configuration conforming substantially to the internal configuration of the bulge 23 may be inserted inside the weight ring bulge 23. Additionally, to stiffen the rearmost end portion of the tubular body 21 adjacent the rear or trailing end opening 24 thereof, a base ring 28 of thin stiff wire having an outer diameter conforming substantially to the maximum diameter of the bulge 25 may be inserted inside the base ring bulge 25. It will be apparent that the toy missile 20 is launched in precisely the same manner as the toy missile 10 with the use of an elongated launching rod 16 illustrated in FIGURE 3.

Still another practical form of a toy missile embodying the present invention is illustrated in FIGURES 5 and 6 wherein the missile 30 has an intermediate tubular body portion 31 of cylindrical configuration having a substantially uniform diameter throughout its length, which is closed at its forward end by a nose cone portion 32 joined to the portion 31 by a group of ornamental annular grooves 33. An outwardly and rearwardly flaring tail portion 34 extends from the rearmost end of the cylindrical tubular body portion 31 and may also be provided with a group of annular ornamental grooves 35 extending over its entire length. In this form, the entire toy missile 30 may be made of one hollow rubber part, the tubular body portion 31 and the flared tail portion 34 having walls of approximately $\frac{1}{32}$ inch thickness, and the nose cone portion 32 having a sufficiently greater wall thickness to provide the necessary weight at the forward end to achieve nose-first flight. The particular form illustrated in FIGURES 5 and 6 has some advantage over those illustrated in the preceding figures in that the missile 30 may be turned inside out when stripped from the dipping form without distortion of its shape, insuring that designs on the dipping form will be reproduced exactly on the outer surface of the missile.

4

It will be apparent that by making the entire toy missile body of one rubber part as illustrated in FIGURES 1 and 5, or by making it of one rubber part reinforced by a few simple annular metallic rings as in the form of FIGURE 4, the same functional operation with fewer parts can be obtained than occurs in previously known propulsion toy bodies of the catapult type where springs and tubular mounting assemblies are secured inside the body of the toy. Consequently, an easier and far less expensive method of manufacture may be employed. Further, there is a reduction in overall weight from that of a catapult propulsion toy which requires separate parts for propulsion. This is achieved by utilizing the energy storage potential of the entire missile body structure instead of requiring a separate energy storage mechanism encased within the body of the toy. Also, a toy of great durability is produced by this combination. The unbreakable nature of rubber and the unitary one part construction of the toy missile render distinct advantage and durability over propulsion toys made of several mechanical parts which may become disengaged during hard use. Or, where any of the parts are made of breakable material, may break on accidental hard impact against solid objects.

While but several preferred examples of the present invention have been particularly shown and described, it is apparent that various modifications may be made therein within the spirit and scope of the invention, and it is desired, therefore, that only such limitations be placed on the invention as are imposed by the prior art and set forth in the appended claims.

What is claimed is:

1. A self-propelled toy projectile comprising a rocket-shaped body of elongated, thin walled, tubular construction having front and rear ends and an elongated axial bore extending substantially through the entire length of the projectile body and opening through the rear end thereof, said body comprising a substantially cylindrical tubular central and rearmost portion and a nose cone portion integral with said cylindrical central and rearmost body portion at the front end thereof forming a complete closure for the forward end of said axial bore, said integral body and nose cone portion being formed throughout of highly stretchable elastic rubber-like material to permit potential energy to be stored throughout the length of the projectile body upon stretching thereof, said projectile being adapted to be launched by inserting an elongated launching rod into said axial bore into engagement with said nose cone portion, manually grasping the rearmost end portion of the projectile body, drawing the rearmost end portion of the projectile body rearwardly along the launching rod to extend the projectile body to a stretched state wherein all parts thereof are stretched substantially to the elastic limit of the body whereby potential energy is stored throughout the entire structure of the body, and releasing the projectile body whereby the stored energy is suddenly released to return the body to its unextended state and thereby imparting a force projecting the projectile away from the launching rod, said nose cone portion having thickened walls relative to the walls of said central and rearmost portion, to increase the weight of the nose cone portion so as to impart desired balance to the projectile.

2. A self-propelled toy projectile comprising a rocket-shaped body of elongated, thin walled, tubular construction having front and rear ends and an elongated axial bore extending substantially through the entire length of the projectile body and opening through the rear end thereof, said body including an integral nose cone portion at the front end thereof forming a complete closure for the forward end of said axial bore, said integral body and nose cone portion being formed throughout of highly stretchable elastic rubber-like material to permit potential energy to be stored throughout the

5

length of the projectile body upon stretching thereof, said projectile being adapted to be launched by inserting an elongated launching rod into said axial bore into engagement with said nose cone portion, manually grasping the rearmost end portion of the projectile body, drawing the rearmost end portion of the projectile body rearwardly along the launching rod to extend the projectile body to a stretched state wherein all parts thereof are stretched substantially to the elastic limit of the body whereby potential energy is stored throughout the entire structure of the body, and releasing the projectile body whereby the stored energy is suddenly released to return the body to its unextended state and thereby imparting a force projecting the projectile away from the launching rod, an outwardly convex bead formed integrally with said body at the juncture of said nose cone portion with the remaining portion of said body and an outwardly convex bead formed in said body at the rearmost end thereof, each of said beads providing a con-

6

cave annular groove facing inwardly of said axial bore, a rigid annular weight ring seated in the annular concave groove formed by the bead adjacent said nose cone portion to impart balance to the projectile and a rigid reinforcing annular ring seated in the concave groove defined by the rearmost bead for reinforcing the rearmost end of the projectile to facilitate grasping thereof during launching of the projectile.

References Cited in the file of this patent

UNITED STATES PATENTS

2,478,224	Armstrong	Aug. 9, 1949
2,751,711	Greenwood	June 26, 1956
2,810,379	Solomon	Oct. 22, 1957

FOREIGN PATENTS

552,598	Italy	Dec. 6, 1956
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