

April 11, 1939.

J. DAVIS

2,153,957

JUMPING TOY

Filed Feb. 23, 1938

Fig. 1.

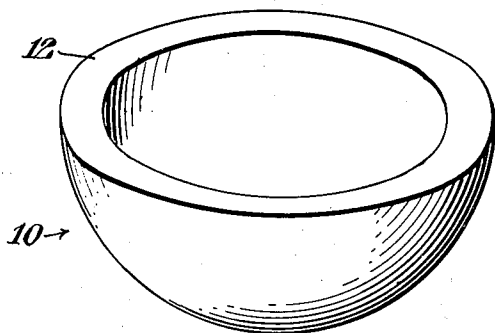


Fig. 2.

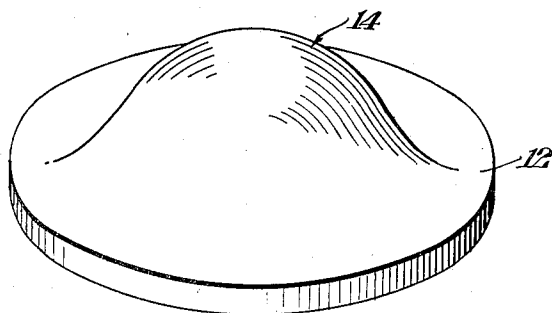


Fig. 3.

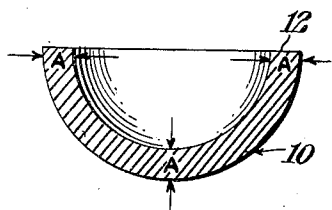
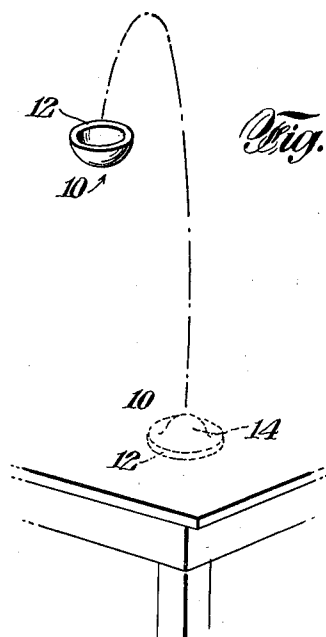
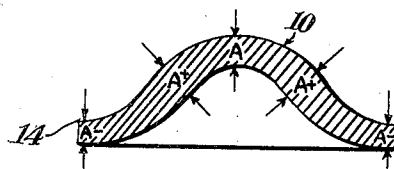


Fig. 4.

Fig. 5.



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2,153,957

JUMPING TOY

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Application February 23, 1938, Serial No. 192,016

3 Claims. (Cl. 46—1)

My invention relates to a very simple toy of the type that jumps upwardly into the air.

Structurally, the working part of my toy is a more or less hemispherical body consisting of a wall of fairly stiff and hard rubber.

To operate the toy one simply turns it inside out and places it rim down on a flat surface. The toy will shortly start to return, at first slowly and then with increasing rapidity, to its undeformed shape. At a critical midway point the toy suddenly and completely snaps back into shape. The impact on the underlying flat surface of the deformed portion of the wall as it snaps back into shape sends the toy upwardly into the air.

The general effect of the operation of my toy is quite surprising. Because of the interval between the time the toy is placed inside out on the flat surface and the time it jumps into the air, the top appears to jump of its own accord. The toy also jumps surprisingly high. For example, a toy of average size (that is, a diameter of approximately 2 inches) will jump six or seven feet into the air. The construction of the toy is quite simple; and, being made of rubber, it is particularly suitable for children to use for it is not likely to cause damage. Obviously, the toy can be produced and sold at small cost.

My device can also serve as a basic working element in combination with various other elements. For example, conventional animal figures may be used in conjunction with the device. I have found that children particularly like a device which has some kind of animal figure attached to it. In that case, the animal figure is preferably attached to the rim portion of the toy. Again, a paper parachute may be attached to my device so that after the device is sent up into the air it will float down.

A generally hemispherical contour is essential to the operation of my device; but within limits the wall may be slightly greater or less than hemispherical.

Likewise, the quality of the rubber forming the wall of the toy is critical to its operation. Broadly speaking the rubber should be fairly stiff and hard. If it is too stiff or too hard the wall is so rigid that it will not function properly. In that case, if the wall is substantially greater than hemispherical it will not return to its molded equilibrium; and if the wall is substantially less than hemispherical it will return to its molded equilibrium immediately the pressure on the wall is released after deformation so that it cannot be placed inside out and rim down on a flat

surface to await a delayed return. On the other hand, if the rubber is soft and spongy the wall resumes its molded equilibrium after deformation too slowly to cause a portion of the wall suddenly to snap completely back into shape.

In addition to the quality of the rubber and the contour of the wall the thickness of the wall is a factor. The factor of thickness is dependent particularly on the diameter of the hemisphere and preferably the ratio of thickness to the over-all diameter should be between 1:5 and 1:8. Generally, the thickness of the wall is uniform throughout; but in some forms of my device I provide a tapered wall which diminishes in thickness as it approaches the rim portion.

While my toy will generally be made of rubber I can of course use rubber-like material with substantially the same results. Consequently, when I use the term "rubber" I mean to include rubber-like materials.

In the drawing I show a specific form of a device embodying my invention.

Fig. 1 is a perspective view of the device in molded equilibrium;

Fig. 2 is a perspective view of the device turned inside out and placed rim down on a flat surface;

Fig. 3 is a perspective view showing my device in operation;

Fig. 4 is a cross section through the center of my device showing the wall of the device; and

Fig. 5 is a cross section of the wall shown in Fig. 4 after it has been turned inside out and placed rim down on a flat surface.

The numeral 10 indicates the substantially hemispherical body which constitutes the working part of my device and 12 is the rubber wall of that body. In Fig. 1 the device is in molded equilibrium. When the device is turned inside out as shown in Fig. 2 it is under tension and will tend to return to its molded equilibrium. Where the wall 12 is hemispherical and consists of fairly stiff and hard rubber, the deformed portion 14 of that wall will start to return to molded equilibrium at first very slowly and then with increasing rapidity as the diameter of the deformed portion decreases. When the diameter of the deformed portion is substantially decreased, there is no resistance to the tendency of the device to resume its molded equilibrium and the remaining deformed portion suddenly snaps completely back into shape.

When the device is inverted and placed rim down on a flat surface the distorted portion which suddenly snaps back into molded equilibrium

hits the flat surface with considerable force and sends the toy upwardly into the air as shown in Fig. 3.

5 Figs. 4 and 5 illustrate the changes in thickness and diameter which follow deformation of the toy by turning it inside out. It is apparent that when the toy is turned inside out the diameter of the rim portion is increased. The uniform thickness of the wall 10 in molded equilibrium is shown in Fig. 4 and is indicated by the letter A. The thickness of the wall becomes variable when the device is turned inside out and placed rim down as shown in Fig. 5. The portion of the wall near the rim is shown diminished in thickness as indicated by the letter A-, and the portion of the wall immediately adjacent the rim portion is increased in thickness as shown by the letter A+. The top part of the deformed portion remains substantially unchanged in thickness, as shown by the letter A.

20 The successful operation of my device depends upon the rather delicate relationship between the quality of the rubber and the thickness and contour of the wall of the device. In the drawing I show a preferred form of my device; but it is

understood that modifications may be made without departing from the spirit of my invention.

I claim:

1. A toy device consisting of an approximately hemispherical rubber body having a wall which 5 will return to its molded equilibrium when turned inside out and placed rim down on a flat surface, said return to molded equilibrium taking place at first slowly and then at an increasing rate until the diameter of the deformed portion is so reduced that the remaining deformed portion suddenly snaps completely into molded equilibrium. 10

2. A structure as claimed in claim 1 having a tapered wall which increases in thickness toward the base portion and decreases in thickness toward the rim portion. 15

3. A toy device consisting of an approximately hemispherical body having a wall of rubber which is quite stiff and hard, the thickness of said wall and the diameter of said hemisphere being in the 20 ratio between 1:5 and 1:8, said wall returning to molded equilibrium when the hemispherical body is turned inside out and placed rim down on a flat surface.

JEROME DAVIS. 25