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A. M. ZALKIND
INFANT'S MARBLE TOY OR RATTLE
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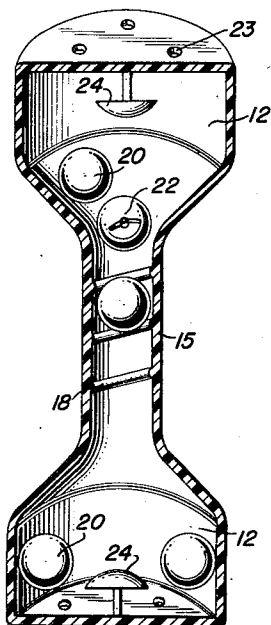


Fig. 1.

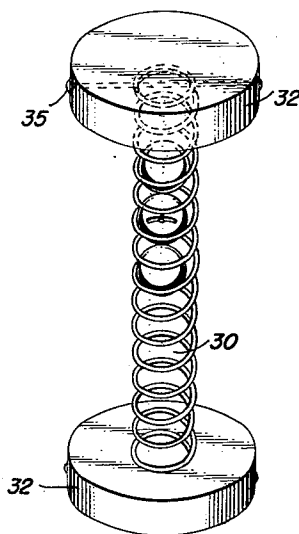


Fig. 2.

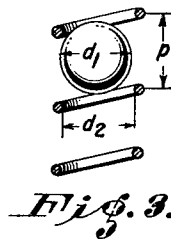


Fig. 3.

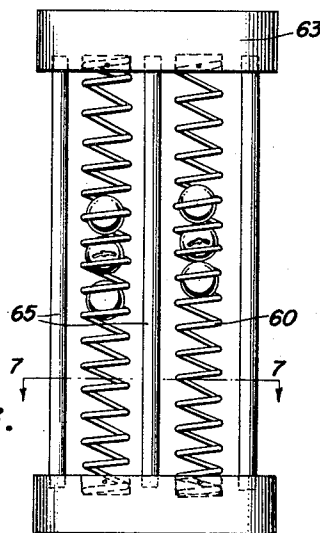


Fig. 6.

Fig. 4.

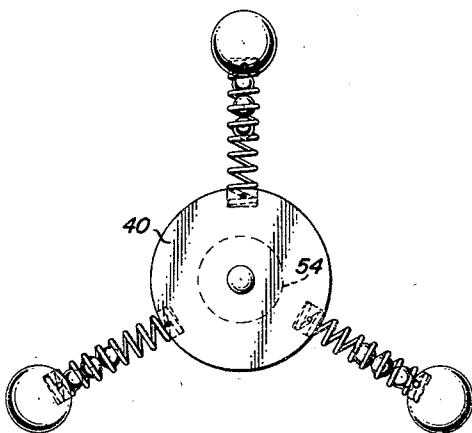


Fig. 5.

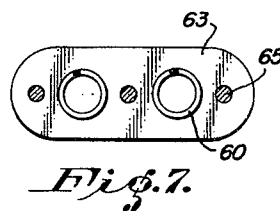
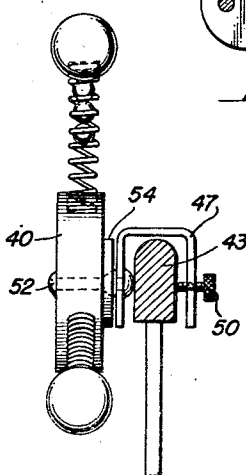


Fig. 7.

INVENTOR

Albert M. Zalkind

UNITED STATES PATENT OFFICE

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INFANT'S MARBLE TOY OR RATTLE

Albert M. Zalkind, Arlington, Va.

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10 Claims. (Cl. 46—43)

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This invention relates to infants' toys and more particularly to toys of the rattle type.

It is an object of my invention to provide an infant's rattle which combines both sound and spectacle to produce an unusually interesting effect.

It is a further object of my invention to provide an infant's toy which will be rugged, economical, and easily cleaned.

In general, my invention comprises constructing a rattle in the form of a helical conduit, so that a plurality of spheres, such as marbles or bells may be caused to fall by gravity therethrough, but preferably following a spiral path during descent; i. e., the spheres revolve about the axis of the conduit producing a unique wobbling effect.

While I am aware that, basically, spiral runways in certain games are not new, the particular structure and combination of my invention is novel as will hereinafter be pointed out in the description which now follows, taken in conjunction with the appended drawing in which:

Figure 1 is an elevation in section of one form of my invention;

Figure 2 is a perspective of another form thereof; and

Figure 3 is a fragmentary detail of the form shown in Figure 2.

Figure 4 is an elevation of a further embodiment of my invention.

Figure 5 is a side view thereof.

Figure 6 is an elevation of a still further embodiment of my invention.

Figure 7 is a section thru 7—7 of Figure 6.

With reference to Figure 1, my device comprises a hollow body of transparent plastic having closed chambers 12 connected by a conduit 15 in which is molded internally a helical rib 18. A mixture of marbles 20 and spherical bells 22 are trapped within the body. Perforations 23 may be provided to permit sound to pass more readily thru the casing, and a bell cup 24 may be disposed in the ends to be struck by the spherical objects as they drop.

I have found that if the diameter of spherical objects in a helical conduit approximates the internal diameter of the helix the spheres will follow a spiral path as they descend.

A certain amount of variation between the sphere diameter and the internal diameter of the helix is permissible; in other words, the relationship therebetween is not particularly critical just so long as the diameter of the sphere approximates the internal diameter of the helix.

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In practice I have used, and prefer, a sphere having a diameter slightly less than the internal diameter of the helix. The approximate relationship is as shown on Figure 3. However, I have found that the sphere diameter could be made equal to or even slightly larger than the inside diameter of the helix, except in cases where materials were used having too high a coefficient of friction. In this connection it should be noted that spheres or helices having a fuzzy or fibrous coating, or with protuberances formed thereon, could be utilized to slow up the rate of rolling so as to increase the time interval.

As will be apparent from consideration of Figure 1, the toy may be turned end for end in the manner of an hour glass, and the spheres provide a pleasing spectacle falling downward in a spiral path, and if the sphere be a little less in diameter than the internal diameter of the helix, an interesting wobbling effect is produced which is very fascinating, especially to babies and small children. The shape of the passage between chambers 12 and conduit 15 is designed to facilitate feeding of the spheres thereto. The toy may be rattled and shaken to further facilitate the action.

The form shown in Figure 2 comprises an open coil spiral spring 30 having its ends blocked by members 32 and in which coil a series of marbles, bells, or both, are placed. It will readily be appreciated that turning of the object end for end will cause these spheres to descend in a spiral path. I have found that this modification provides a very fascinating toy for infants, and one which is easily and cheaply mass produced since all the components are items manufactured by specialized machines capable of enormous output at low prices.

The blocks 32 may be bored and the spring ends threaded thereto with a brad 35 hammered therein so as to engage between coils to insure nonremovability.

I have found the general relationship between the spheres and the spring as shown in Figure 3 to be satisfactory wherein it is noted that the diameter of the sphere is slightly less than the inside diameter of the spring, although it is believed that it could as well be equal to or slightly greater, all as heretofore mentioned.

In general, the smaller the sphere diameter with respect to the spring pitch the greater the degree of wobble; however, it is obvious that the diameter should be large enough to prevent escape thru the spring sides even when the spring is bent double. Further the diameter of the spheres

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should not be so small that they tend to fall straight thru without striking the sides of the spring under normal conditions of handling.

The particular reason for the wobble effect produced is not clearly understood. In the course of many experiments I have determined that under normal handling of the device a ball somewhat smaller than the inside diameter, or somewhat larger, or the same nominal size, will when the spring is oriented to a vertical position initially strike an upper coil. It would then be ordinarily expected that the ball would rebound and strike another coil lower down and thus by a series of ricochets follow a random but substantially zigzag path downward. Such, however, I have discovered is not the case; the ball instead follows the spiraling contour of the spring. This may be a centrifugal force phenomenon, or some other reason may exist.

The pitch of the spring is an important factor; I have further discovered that the pitch should be at least half the ball diameter and preferably as large as possible consistent with secure entrapment of the balls. In other words, the pitch for any particular gauge of spring wire should be such that a child cannot normally pry a ball out of the spring.

While it would ordinarily be expected that the smaller the pitch the more revolutions a ball will make in coursing downward, I have determined that this is not the case at all except where the pitch is relatively large. For example, a pitch of two-fifths the ball diameter, or less produces no discernible wobbling effect, the ball falling straight through the spring. Where, however, the pitch is increased to three-fifths or larger, a marked wobble is achieved. These figures are approximate and appear to indicate that the dividing line is somewhere at one-half the ball diameter. The difference between the ball diameter and the spring diameter is a factor and it is possible that the coefficient of friction between the ball and the spring is also a factor having a bearing on this phenomenon, but no absolute explanation can be offered herein.

As a specific example of my toy structure, I have utilized a spring 13" long, $\frac{3}{4}$ " inside diameter, .102 spring steel, having a $\frac{1}{8}$ " pitch. Glass marbles with diameters approximating $\frac{3}{4}$ " were operable therein, and in fact a $\frac{5}{8}$ " diameter ball was found operable, although there was a tendency for the ball to occasionally fall straight through or follow a recocheting path.

The pitch-diameter relationship shown in Figure 3 is somewhat greater than recommended for safety if the ball is not to be pried out by mischievous fingers. A safe pitch and one which I prefer is about two-thirds the ball diameter.

As indicated in the above discussion, no exact relationship can be given in view of the fact that approximate relationships are operable within the general limits set forth.

An important consideration in connection herewith is that the pitch material of the spring must be such that an infant would not be capable of opening up a space between coils sufficient to force a sphere therethrough. Thus a suitably heavy wire is required for the spring and the safety factor may be further increased by decreasing the pitch thereof so that even when the spring is bent over 180° or more the coils at the bend will not separate sufficiently to permit a sphere to emerge.

In the form of the invention shown in Figure 4, a rotary disc 40 is provided which carries

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spring and sphere assemblies similar to that shown in Figure 2 and which mounting is adapted to be secured to the rail 43 of a crib or play pen in any suitable manner such as by the bracket 47 and thumb screw 50. To permit swiveling, the disc 40 is loosely mounted on a rivet 52 secured in an end of bracket 47 as shown in Figure 5, a spacer washer 54 being preferably utilized to decrease friction and lend support. Thus, in this form of the invention a child may rotate the device and provide continuous movement of the spheres, as will be readily apparent. Another continuously operable device could be provided by forming the spring in the shape of a toroid; i. e., as an endless path; the swivel mounting plate 40 being utilized therewith.

Figures 6 and 7 show an embodiment utilizing two parallel springs 60 spaced between end elements 63. Dowel rods 65 are utilized to brace the structure and it will be appreciated that light-gauge wire may be used for the springs in this embodiment since the dowels prevent bending of the springs. Preferably different color marbles would be used in the springs so as to provide a pleasing contrast therebetween.

I am aware that my invention may be varied and modified without departing from the spirit thereof and accordingly I do not seek to be limited by the specific disclosures herein described except as set forth in the appended claims. For example, while the wobble effect taught herein is an important feature, I believe my invention includes devices, such as rattles, constructed in accordance with my general structure wherein the helix pitch is such as to preclude wobbling of the spheres, the combination of marbles and/or bells engaged in springs being novel per se.

I claim:

1. An infant's toy comprising a plurality of helical conduits each having a substantially cylindrical central opening therethrough and having respective spheres movably engaged in respective openings, including means closing the ends of said conduits, and means for selectively supporting said conduits in a plurality of positions whereat at least one of said conduits is in a vertical position.

2. An infant's toy as set forth in claim 1 wherein said conduits are arranged on a rotary hub in angularly spaced relation.

3. An infant's toy comprising a straight helical conduit of uniform diameter and a sphere encaged therein, and engageable with the inwardly facing surfaces of said conduit, said sphere having a diameter approximating the internal diameter of said conduit, the pitch of said conduit being at least one-half the diameter of said sphere whereby when said conduit is held substantially vertically said sphere will follow a spiral path therethrough motivated by gravity.

4. An infant's toy, as set forth in claim 3, wherein said sphere has a diameter approximately two-thirds the pitch of said conduit.

5. An infant's toy, as set forth in claim 3, wherein said sphere comprises a jingle bell.

6. An infant's toy, as set forth in claim 1, wherein said spheres are of a diameter approximating the internal diameters of the respective conduits, and the pitch of the respective conduits is at least one-half the diameter of the respective spheres.

7. An infant's toy as set forth in claim 3, wherein the helical conduit comprises a transparent tube having a spiral path therein.

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8. An infant's toy, comprising a plurality of helical conduits having respective spheres movably encaged therein, including means closing the ends of said conduits, and means for selectively supporting said conduits in a plurality of positions whereat at least one of said conduits is in a vertical position, wherein said conduits are arranged on a rotary hub in angularly spaced relation, wherein said spheres have diameters approximating the internal diameters of respective conduits, the pitch of said conduits being at least one-half the diameter of respective spheres.

9. An infant's toy, as set forth in claim 8, wherein the pitch of said conduits is approximately two-thirds the diameters of respective spheres.

10. An infant's toy comprising a straight helical self-supporting elongated conduit of uniform diameter and a sphere encaged therein and engageable with the inwardly facing surfaces of said conduit, said sphere having a diameter approximating the internal diameter of said conduit, the pitch of said conduit being at least

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one-half the diameter of said sphere whereby when said conduit is held substantially vertically said sphere will follow a spiral path there-through motivated by gravity.

ALBERT M. ZALKIND.

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