

Oct. 16, 1962

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3,058,261

ACTION TOY

Filed Aug. 19, 1960

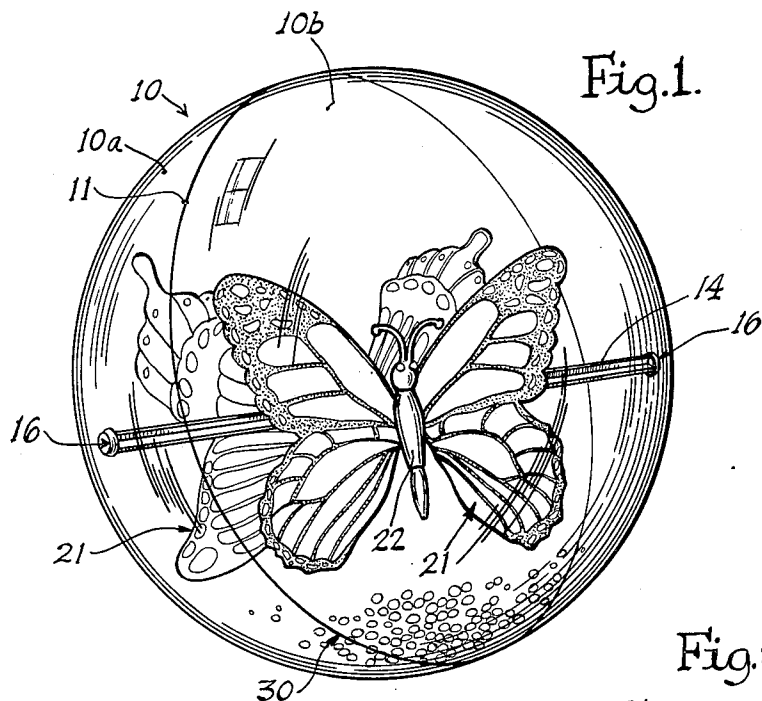


Fig. 2.

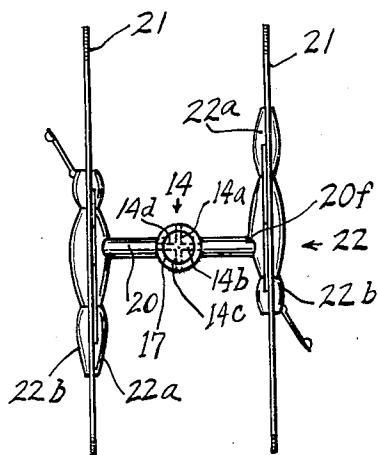
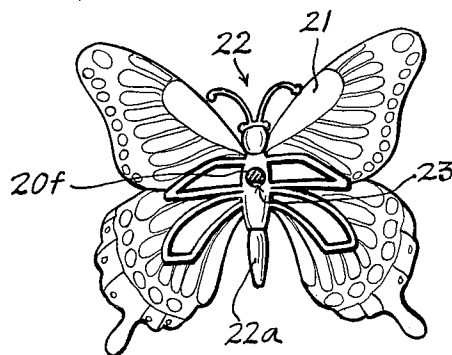
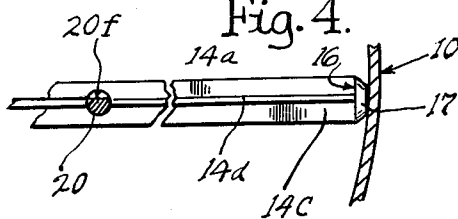


Fig. 4.



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ACTION TOY

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Filed Aug. 19, 1960, Ser. No. 50,620
8 Claims. (Cl. 46-99)

This invention has as its principal object the provision of a novelty device and action toy in the form of a transparent sphere containing a rotatable action element mounted on a spindle floating free therein and adapted to be set into rocking, spinning or tumbling motion responsive to rolling of the sphere.

More specific aspects of novelty and utility relate to details of construction and operation of the illustrative embodiment described and claimed hereafter in view of the annexed drawings in which:

FIG. 1 is a perspective view of the device;

FIG. 2 is a side elevation of the spindle and action elements carried thereby;

FIG. 3 is a plan view of one form of action element with parts shown in section;

FIG. 4 is a fragmentary elevation of the floating spindle with portions shown in section.

As viewed in FIG. 1, the novelty device consists of a hollow sphere 10 formed of two hemispherical shells 10a, 10b accurately molded from a transparent synthetic plastic material such as cellulose acetate, the two halves, after insertion of the action elements, being cemented along the equatorial seam line 11.

Disposed in detached condition interiorly of the sphere or ball 10 is a free or floating spindle 14, also molded from a cellulose acetate material and having the section or configuration of a Greek cross, as seen in FIG. 2, whereby the mass is kept low while achieving substantial rigidity, owing to the resulting configuration of four integrally-intersecting planar sections comprising the vanes 14a, 14b, 14c, 14d (FIGS. 2, 4).

At its opposite ends the spindle is provided with bearing means 16 in the form depicted in FIG. 4 and comprising an annular button of plastic which may be formed in the molding process as an integral part of the spindle, the periphery 17 of each bearing being chamfered at an angle of approximately 45° to provide the actual bearing contact engaging the inner wall surfaces of the sphere, it being noted in FIG. 4 that the chamfer produces a secondary periphery 17 of lesser diameter than the bearing button, and this periphery affords a rolling edge somewhat analogous to a knife-edge type of contact, and while such an edge bearing contact is not essential to successful reactive turning of the spindle, it is found that especially good results are produced by employing such a bearing construction which has the additional advantages of not becoming wedged in crosswise positions while affording sufficient frictional driving coupling between the ball and spindle to impart a very vigorous spin to the latter, especially in the horizontal roll-away attitudes of the spindle.

Formed integrally with the spindle at its mid-region are oppositely-projecting radial fingers 20 (FIG. 2) of equal length and each having formed at its outer end a keying flat 20F seen in FIG. 4.

The action or novelty element in the illustrative embodiment comprises a pair of figures such as the simulated butterflies 21 each secured as by cementing at the end of one of the radial projections 20, each butterfly figure having a separately molded plastic body portion 22 (FIG. 2) comprising two mating half-sections 22a, 22b, fitted and cemented together with the appertaining wing section clamped therebetween, said wing sections being stamped from a thin sheet of plastic which has been imprinted by silk screening or like processes with a coloring

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and configuration according to the character or species of the simulated butterfly or other simulated object.

The inner sections 22a of the body elements have molded therein a bore with one flatted side portion 23 interfitting closely with the like keying formation 21F on the ends of the radial supporting projections, whereby in assembly the bodies are always properly oriented in their respective locations for purposes of balance.

To ensure satisfactory rotative motion of the action element responsive to rolling of the ball as a result of a driving couple between the ends of the spindle and walls of the sphere, the floating spindle and the figure members carried radially on opposite sides thereof should preferably be in good dynamic balance with respect to turning moments about the long axis of the spindle, which can be achieved commercially with the construction shown by employing molding, stamping, and mounting procedures such as described, there being only small amounts of cement carefully applied in securing the body parts of the action figure together and on their keyed seats at the ends of the radial fingers 20.

An adhesive or cement may also be sparingly applied to the body portions engaged with the wing sections.

In order that the included action element comprising, in the illustrative embodiment, the spindle and radially supported pair of balanced figures, may be wholly free to assume any of the multitude of angular attitudes possible as a result of turning over of the ball or sphere in any direction, the total length of the spindle, bearings included, must be less than the internal diameter of the ball or sphere.

For example, one set of parameters yielding satisfactory action provides for a sphere having an internal diameter of 6.904 inches, and a total length for the corresponding spindle of 6.750 inches or a difference of 0.154 inch less than the diameter of the sphere.

Cellulose acetate is found to be a suitable material for the sphere by reason of its transparency and capability to hold its shape and the required sphericity, and its further high impact strength, the device affording an especially attractive infant's and child's toy and as such being required to withstand the shocks of dropping and abuse, in which respects the cellulose acetate type of synthetic plastic has been found successful.

When the spindle and sphere are dimensioned relatively, as aforesaid, and the spindle is caused to assume a nearly true horizontal position across the sphere parallel to a horizontal diameter thereacross, the shorter spindle length will cause the centers of the spindle to lie at a level approximately one-half inch below the equator of the sphere. Stated otherwise, if the cemented seam line 11 of the sphere is turned to lie in a horizontal plane, and if the spindle is caused to assume a transverse position parallel to said plane, then the aforesaid shorter length of the spindle will cause it to lie below such plane by approximately one-half inch measured to the centers at the ends of the spindle.

This illustrates one particularly successful chordal spanning relationship between the spindle and the opposite walls of the sphere capable of affording good rotative action and also permitting the spindle to tumble about within the sphere into any of a multitude of angular crosswise attitudes relative to a horizontal, equatorial reference plane, for example.

When the ball is rolled along with the spindle lying in an approximately horizontal crosswise position, an optimum-spinning reaction will be achieved. If the sphere rolls in a direction away from the observer, the spindle and figures will spin in that same direction and with a vigor roughly proportional to the rolling energy imparted to the ball.

Or, if it be assumed, for example, that the spindle is

lying at an angle of about 60° to the horizontal rolling plane with the butterfly figures, or other simulated figures, lying about as they appear in FIG. 1 and if the ball is then rolled directly away from the observer, the spindle will at first be catapulted end over end and shortly the spindle will begin to rock back and forth about its long axis and may thereafter assume a spin in one direction, particularly if it tumbles into a more nearly horizontal attitude.

Some substantial rocking or turning of the action element will almost always result from rolling of the ball no matter what the angular attitude of the spindle may be initially, in consequence of which almost any of a multitude of positions of the spindle in the ball will produce a responsive movement of the action element which will afford amusement and fascination to children of all ages, and some measure of interest and entertainment as a novelty item to adults.

The cemented seam 11 of the sphere is preferably made water-tight so that the ball will float and afford an engaging water toy.

The foregoing particulars of dimension and material are not intended to be exclusive or limiting, but are given by way of example of relationships found to produce very satisfactory reaction effects, particularly as respects the relative length of the spindle and internal diameter of the sphere and shaping of the bearing elements. The butterfly figures may be replaced by a great variety of other colorful or interesting or significant configurations, as will occur to those skilled in the art.

In the embodiments particularly intended as infants' toys, it is preferred to include a quantity of diversely colored polyethylene tumbling shot 30 to provide sound and added action effects.

I claim:

1. A novelty device of the class described comprising a rigid transparent hollow sphere having freely disposed therein a spindle of slightly lesser length than the inside diameter of the sphere and adapted to rest at its axial ends upon inner surface portions of the sphere and having surface portions at its said ends adapted to roll and rock upon said inner surface portions in turning movement of the spindle, and figure means carried by said spindle in dynamic balance with respect to turning moments about the spindle axis at a position about midway between its ends.

2. In a rolling hollow ball toy, a substantially rigid ball formed of transparent material and having enclosed therein a freely movable spindle wholly detached from the wall thereof and of an overall length several thousandths of an inch less than the internal diameter of said ball so as to be able to tumble about therein and to lodge in a crosswise position at a level perceptibly below and parallel to a plane containing an equator of the ball, the opposite ends of the spindle comprising bearing means adapted to roll on the inner wall portions of the ball; and figure means carried by said spindle at the mid region thereof for turning motion therewith.

3. A construction according to claim 2 in which said bearing means is in the form of an annular body portion having a chamfered periphery providing a narrow annular contact zone extending about the axial center of the spindle at the ends thereof for bearing engagement with the inner wall portions of the ball as aforesaid.

4. A construction according to claim 2 in which said figure means comprises two members respectively mounted

at radially-situated positions on opposite sides of the spindle in dynamically balanced relation.

5. An action novelty comprising a transparent hollow sphere having captured therein a free, rigid cross shaft devoid of attachment thereto and of an overall length less than the inside diameter thereof but substantially greater than the radius of curvature of the inner wall surfaces, said shaft having portions at its opposite ends providing bearing means for a driving coupling with said inner wall surfaces; together with display means carried by the shaft near the middle thereof and exerting no gravitational turning moment on the shaft in a horizontal position of the latter, at least, and having an extent in directions radial to the shaft substantially less than said radius of curvature so as to be rotatable with the shaft without collision with the inner wall surfaces of the sphere.

6. An action toy comprising a hollow transparent ball having an unattached axle rod enclosed therein and of a length end to end slightly less than the inside diameter of the ball, such that the rod is free to assume any of a multitude of crosswise rotative positions by tumbling when the ball is rotated or rolled in any of a multitude of directions relative to the initial crosswise attitude of the rod, including directions tending to turn the rod substantially end over end; a figure means carried by said rod at a point between its ends and having portions disposed in radially-opposite directions from the axis of the rod and substantially balanced to provide a substantially neutral turning moment relative to said axis, said figure means being of a size measured in radially opposite directions from the rod axis, sufficiently less than the inside diameter of the ball to be able to rotate within the latter concentrically of the rod axis, said rod ends having bearing portions located symmetrically of the rod axis to permit the rod to rotate about said axis in engagement with opposite inside wall portions of the ball responsive to rolling of the ball in any of a plurality of directions.

7. In a rolling toy, a transparent, hollow, spheroid having freely disposed therein a straight axle rod with enlarged end portions constituting a bearing means such that the over-all axial length of the rod is slightly less than the diametric distance across the interior of the spheroid whereby the rod has total freedom to tumble within the spheroid and seek a substantially diametric attitude at approximately right angles to the direction of rolling movement of the spheroid regardless of the direction of rolling movement in which the spheroid may be initially launched, said rod carrying at its mid-region a figure means with portions extending in a radial sense away therefrom a distance substantially less than the internal diameter of the spheroid and the semi-length of the rod so as to be freely rotatable about the axis of the rod within the spheroid and not collide with the walls thereof in any position of the rod whatever.

8. The construction defined in claim 7 further characterized in that said figure means is in a state of approximately dynamic balance about the long axis of the rod.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,058,261

October 16, 1962

Willis M. Lakin

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 1, line 61, for "20F" read -- 20f --; column 2, line 5, for "21F" read -- 20f --.

Signed and sealed this 28th day of May 1963.

(SEAL)

Attest:

ERNEST W. SWIDER
Attesting Officer

DAVID L. LADD
Commissioner of Patents