Feb. 4, 1969 W. H. HARTSOCK 3,425,157

MAGNETIC TOY OR SIMILAR APPARATUS

Filed April 1, 1966

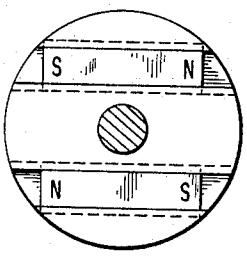
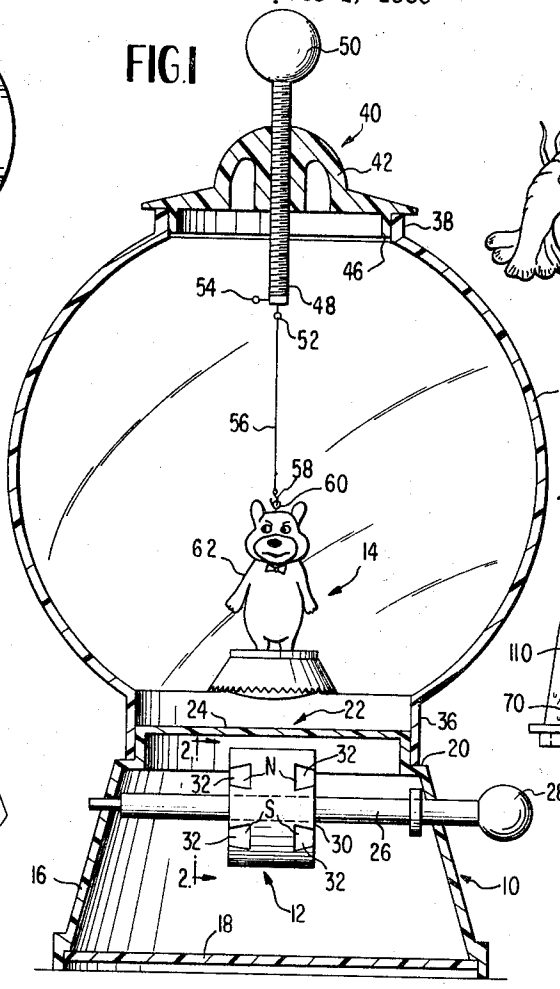


FIG.2

FIG.1



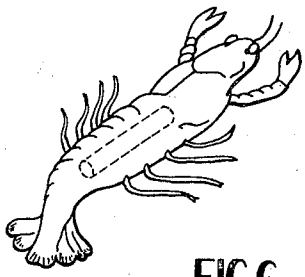
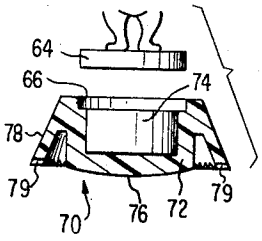


FIG.6

FIG.5



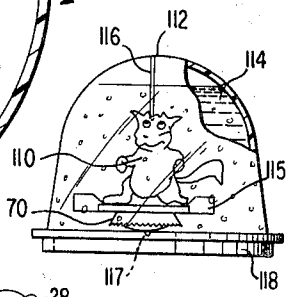


FIG.7

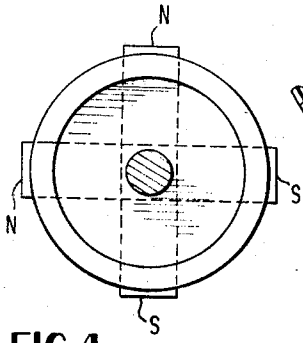


FIG.4

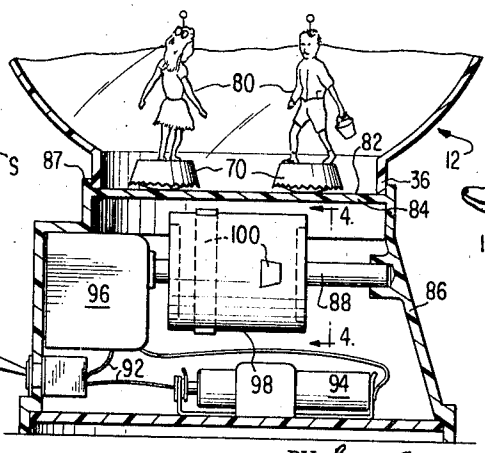
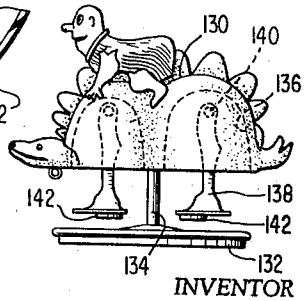


FIG.3

FIG.8



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MAGNETIC TOY OR SIMILAR APPARATUS

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ABSTRACT OF THE DISCLOSURE

A toy figure responsive to magnetic fields is movably positioned adjacent the upper surface of a base assembly containing distinctively arranged movable magnet means, so that movement of the magnet means will cause movements of the toy figure. North and south poles of the magnet means are spaced apart in a vertical plane and the magnet means rotate about a horizontal axis intermediate the poles. Different movement effects are achieved through the use of different toy figure constructions and/or mountings.

This invention relates to magnetic toys or similar apparatus.

Heretofore magnetic toys, or the like, have been known wherein a movable magnetic responsive element is propelled or animated by being acted upon by the magnetic field of a remotely positioned magnet which may be moved to induce movement of the element. Certain of these devices support and motivate the movable element in such a way to cause a movement of the element which is considered entertaining or eye-catching.

It is an object of this invention to provide a magnetically operated device of the type described providing a particularly entertaining and eye-catching erratic movement of the movable element.

More particularly, it is an object of this invention to provide such a magnetically operated device wherein a particularly erratic movement of the movable element is induced by movement of a remotely positioned magnet.

Another object of this invention is to provide such a magnetically operated device wherein the movable element and remotely mounted magnet are oriented so that movement of the magnet varies both the direction and the intensity of the magnetic field acting upon the movable element and thereby induces an erratic movement thereof.

A further object of this invention is to provide such a magnetically operated device wherein the movable element is supported in a manner that, when acted upon by the magnetic field of a remotely mounted magnet, a particularly erratic movement of the movable element is induced.

It is still another object of this invention to provide a magnetically operated device of the type described that is simple, inexpensive and dependable in construction, as well as pleasing in appearance.

In achieving these and other objects as will become apparent hereinafter, the present invention provides a magnetically operated device of the type described including a base with which a movably mounted magnetic means is associated. Movably positioned supra-adjacent the base within the magnetic field generated by the magnetic means is a form means which includes a magnetic responsive means. To induce a particularly erratic movement of the form, means for simultaneously varying the intensity and direction of the magnetic field acting upon the magnetic responsive means of the form means is provided.

To further induce an erratic movement of the movable form means, one form of the present invention provides form means with a novel base portion. The base

portion includes a lowermost portion of diminished dimensions relative to the remainder of the base portion and projecting portions laterally projecting above the lowermost portion whereby movement of the form means may occur with less friction between the form means and the base of the overall device. Further, by this construction, movement of the form means is accompanied by the rocking motion as the form means is tilted thereby bringing both the lowermost portion and the projecting portion into contact with the base. Additionally, the projecting portions may be serrated to cause an erratic movement during contact thereof with the base of the device.

In another form of the present invention, the form means may be suspended above the base of the overall device by a flexible and resilient suspension means, the nature of which is to act as a torsion spring to provoke erratic movement as the energy stored therein is released.

A more complete understanding of this invention may be gained from a study of the following detailed description taken in conjunction with the accompanying drawings forming a part thereof in which:

FIGURE 1 is a front elevational view, partially in cross section, of a magnetically operated device according to the present invention;

FIGURE 2 is a side view, on a slightly enlarged scale, of the magnetic means of the device shown in FIGURE 1;

FIGURE 3 is a fragmentary, front elevational view, partially in cross section, of a second embodiment of a magnetically operated device according to the present invention;

FIGURE 4 is a side view, on a slightly enlarged scale, of the magnetic means of the device shown in FIGURE 3;

FIGURE 5 is a fragmentary elevational view, partially in cross section, of a removable magnetic responsive base portion of the movable elements shown in FIGURES 1 and 3;

FIGURE 6 is a perspective view of an alternate embodiment of a movable element according to the present invention, the orientation of a magnet means therein shown in phantom lines;

FIGURE 7 is a perspective view of another embodiment of a movable element according to the present invention, the element being encased in a closed, liquid-filled container; and

FIGURE 8 is a perspective view of still another embodiment of a movable element according to the present invention.

Referring in more detail to FIGURE 1 of the drawings, the form of the present invention shown therein comprises a generally frusto-conical base **10** having a magnet assembly **12** rotatably supported therein. Supported on the upper end of the base **10** is a transparent, globe-like support **12** from the upper end of which a magnetic responsive, movable element or figure **14** is flexibly suspended. The basic operation of the present invention is such that rotation of the magnet assembly **12** causes an erratic movement of the magnetic responsive movable element **14**. Because of the orientation of the magnetic assembly **10**, rotation thereof causes the magnetic field acting upon the magnetic responsive figure **14** to vary in both direction and intensity.

The frusto-conical base **10** includes annular side walls **16** converging in an upwardly direction. The lower end of the base **10** is sealed by a lower cover member **18**. The upper end of the base includes a horizontally disposed, annular shoulder **20** about the periphery of an upper cover **22** having a smooth, generally horizontally disposed upper surface **24**.

Rotatably mounted in the side walls **16** of the base **10** is a generally horizontally disposed shaft **26** an exposed end of which includes a knob **28** or the like to facilitate manual rotation of the shaft **26**. On an intermediate por-

tion of the shaft **26** a cylindrical magnet drum **30** is positioned. Recessed in each vertically extending side face of the magnet drum **30** are a pair of spaced bar magnets **32** the north-south polar axis of which is disposed in perpendicular relation to the longitudinal axis of the shaft **26**.

The globe-like support assembly **12**, which is constructed of a transparent plastic material, includes a generally spherical portion **34** having an annular neck **36** integral with the lower end thereof. The neck **36** is slidably and removably received about the upper cover **22** of the base. On the upper end of the spherical portion **34** an upper annular neck **38** is provided which slidably and removably receives a suspension assembly **40**.

The suspension assembly **40** comprises a cap **42** having a downwardly extending, annular flange **46** received within the upper neck **38**. Centrally positioned within the cap **40** is a suspension shaft **48** threadably connected to the cap **40**. The exposed upper end of the suspension shaft **48** mounts a knob **50** to facilitate manual vertical adjustment of the shaft. The lower end of the shaft **48** is provided with first and second, laterally spaced eyes **52, 54**. Fixedly connected to the first eye **52** is a flexible nylon suspension thread **56** to the lower end of which a hook **58** is connected. The second eye **54** acts as a stop to prevent accidental removal of the shaft from the cap.

The movable element or figure **14** which, as shown in FIGURE 1, takes the form of a comic bear, includes an eye **60** on the upper end thereof adapted to be removably positioned on the hook **58** at the lower end of the suspension thread **56**. The vertical position of the suspension shaft **48** may be adjusted to support the figure **14** in spaced relation to the upper surface **24** of the base **10**. The rovable figure **14** comprises a figure portion **62** to the lower end of which a cylindrical pedestal **64** of a predetermined diameter is fixed. The pedestal **64** is slidably and removably received in a cylindrical bore **66** of a figure base assembly **70** and is retained therein by friction. The base assembly **70** includes cylindrical portion **72** having a bar magnet of the button type **74** fixedly positioned therein. The north-south axis of polarity of the magnet **74** is oriented in a generally vertical position. The lower end of the cylindrical portion **72** is closed by a generally arcuate lower surface **76** and a generally frustoconical skirt **78** projects about the periphery of the base assembly **70**. It should be noted that the lower end of the skirt **78** terminates above the lower end of the arcuate surface **76**. The lower periphery of the skirt **78** may be serrated, as at **79**, to purposes which will be discussed hereinafter.

In operation, upon manual rotation of the magnet assembly **12** the magnetic field generated by the bar magnets **32** act upon the bar magnet **74** of the figure **14** to erratically move the same. Because the axis of rotation of the magnet assembly **12** lies in a plane that is perpendicular to and intersects the north-south axes of the bar magnets **32**, rotation of the magnet assembly varies both the intensity and direction of the magnetic field acting upon the magnet **74** of the figure. When the north poles of the bar magnets **32** are disposed adjacent the upper surface **24** of the base **10**, the magnetized figure **14** is attracted towards a centrally suspended condition as the south pole of the button magnet **74** is attracted to the north poles of the magnet assembly **12**. Further rotation of the magnet assembly **12** initially reduces the intensity of the field acting on the magnet **74** and subsequently brings the south poles of the bar magnets **32** adjacent the surface **24** whereby the magnetized figure **14** is repulsed and swung away from a central location as permitted by the flexible nylon suspension thread **56**. Manual rotation of the magnet assembly **12** induces an erratic pendulum action of the figure **14** as well as a twist or an oscillation about the longitudinal axis thereof as a torque is exerted on the figure. The twisting movement of the figure is enhanced and made more erratic because the suspension thread **56** is thin and constructed of nylon which acts as a torsion spring. The thread stores torsional energy which, when it overcomes the varying magnetic force being applied at a particular instance, urges the figure in an opposite rotational direction. Variation of both the intensity and direction of the magnetic field acting upon the figure **14**, when coupled with the torsion spring action of the nylon thread **56**, provides a particularly eye-catching and erratic movement of the figure.

A fragmentary view of an alternate embodiment of the present invention is shown in FIGURE 3. In this embodiment, one or more figures **80**, each having a base assembly **70** identical to that shown in FIGURE 5, are supported directly upon an upper surface **82** of an upper cover **84** of a base **86**. The base **86** is generally similar to the base **10** shown in FIGURE 1, but includes an annular rim **87** for confining figure movement within the periphery of the rim when the support assembly **12** is removed. The base **86** houses electric power means for rotating a horizontally disposed, magnet assembly shaft **88** rotatably mounted therein. The electric power means comprises a switch assembly **90** connected by suitable electrical leads **92** to a battery assembly **94** and an electric motor **96**. The electric motor **96** is drivingly connected to one end of the magnet assembly shaft **88**. A magnet assembly drum **98** is mounted on an intermediate portion of the shaft **88** and includes a pair of laterally spaced, perpendicularly related bar magnets **100**, the north-south polar axis of which perpendicularly intersects the longitudinal axis or axis of rotation of the shaft **88**.

Supporting of the figures **80** directly on the upper surface **82** of the base **86** permits free movement of the figures **80** within the bounds defined by the lower annular neck **36** of the globe-like support assembly **12** or the rim **87**. Of particular significance is the fact that the lower surface **76** of the figure base assembly **70** is arcuate in form. By this construction only a reduced portion of the lower surface **76** of the figure base assembly **70** contacts the upper surface **82** of the base **86** upon movement of the figures about the base assembly. In this manner, figure movement is more easily achieved by a reduction in friction generated by movement of the figures on the surface **82**. But still further, such a construction acts to aid in providing an erratic movement of the figures when acted upon the magnetic field generated by the magnet assembly. Because the lower surface **76** is arcuate in construction the figures tend to twist and wobble during movement as the magnetic field varies in intensity and direction. The serrated annular skirt **78** prevents complete overturning of the figures during such wobble by contacting the upper surface **82** of the base assembly and thereby supporting the figure. Because the lower rim of the skirt is serrated, twisting movement of the figure in this tilted position occurs erratically and in an intermittent or pausing twisting movement as the serrations contact the base. By this construction of the base assembly **70**, not only is an eye-catching, erratic, wobble-like motion of the figure possible but toppling over of the figure is circumvented.

Within the scope of the present invention any number of figures taking diverse animal, comic or symbolic forms may be provided, each being supported on a cylindrical pedestal **64** of a like diameter, the pedestals being an integral part of the diverse forms. In this manner although a large variety of figures may be included for possible use with the present device, only a few figure base assemblies **70** need to be included. The figure base assembly **70** may be removed from one figure and utilized with another thereby circumventing unnecessary duplication of parts.

Alternate figure arrangements are shown in FIGURES 6, 7 and 8, each being adapted for positioning directly on the upper surfaces **24, 82** of the bases **10** or **86**.

A lobster or crayfish-like figure assembly constructed of pliable rubber of plastic may be provided, the figure having an elongated, cylindrical bar-type magnet embedded in the interior of the figure and oriented so that the north-south polar axis of the bar magnet is parallel to

the elongated axis of the figure. In this manner, when such a figure is placed directly upon the upper surface of the base and the magnet assembly rotated, a pulsating, alternating upward and downward movement as well as sweeping action is induced.

Shown in FIGURE 7 is an alternate embodiment of a figure arrangement that is adapted to be installed upon the base **10** upon removal of the globe-like support assembly **12**. In this embodiment a rotatable figure **110** is supported on a magnetized figure base assembly **70** for rotation within a closed container **112**. The container **112** may be constructed of transparent material and filled with any suitable liquid **114** having snow-like particles immersed therein and assuming a suspended condition on agitation of the liquid. Laterally extending vanes **115** or projections may be provided on the figure **110** so that rotation thereof stirs the liquid **114** and disturbs and agitates the particles suspended therein. The figure **110** may be free or may be pivotally mounted between an upper pivot pin **116**, fixed in the container **112**, the lower end of which is received in a recess on the upper end of the figure, and a lower pivot pin **117**, fixed to the base **70**, the lower end of which is received in a recess in the container base **118**. Upon positioning of the container **112** on the upper cover **22** of the base **10** and rotation of the magnet assembly **12**, the figure **110** is caused to rotate within the interior of the container **112**, the rotation thereof being particularly erratic as the figure cuts through the fluid within the container **114**.

In the figure arrangement shown in FIGURE 8, a body portion **130** of the figure is fixedly mounted on a support **132** by a vertical shaft **134**. The support **132** may be positioned directly on the upper surface **24** of the base **10**. A plurality of legs **138** may be pivotally connected at their upper ends to the body portion **130**. Button-type magnets **142** may be fixed to the lower end of each of the legs **138**. Rotation of the magnet assembly causes a walking action which is considered entertaining.

Although a limited number of embodiments of the present invention have been illustrated and described in detail, it will be apparent that various other modifications and alterations will suggest themselves to persons skilled in the art. Further, although the instant invention has been disclosed as a toy, it should be appreciated that it has equal application to advertising displays and educational devices. For example, in an educational application the figure elements could advantageously take the form of various types of animals, reptiles, birds, insect species, and so by their attention attracting movement are adapted to teach identification of such species. It is therefore intended that the foregoing be considered exemplary only and that the scope of the invention be ascertained from the following claims.

I claim:

1. A magnetically operated toy or the like including a base having a horizontal upper surface, magnet means having north and south poles spaced apart from each other in a vertical plane, said magnet means being mounted beneath said upper surface of said base for rotation about a horizontal axis intersecting said vertical plane at a location intermediate said poles, form means including a magnetic responsive means movably positioned supra-adjacent said base within the magnetic field generated by said magnet means whereby changes in the direction of said field cause movement of said form means, and means for rotating said magnet means for simultaneously varying the intensity and direction of the magnetic field acting upon said magnetic responsive means.

2. A magnetically operated toy or the like according to claim **1** wherein the form means includes a base portion having a lowermost portion of a diminished dimension relative to the remainder of said base portion and projecting portions laterally projecting above said lowermost portion, said lowermost portion and said projecting portions contacting said upper surface of said base.

3. A magnetically operated toy or the like according to claim **1** including support means projecting above said base, suspension means vertically adjustably connected to the upper end of said support means, said suspension means including resilient thread means rotatably suspending said form means above said upper surface of said base.

4. A magnetically operated toy or the like according to claim **1** wherein said form means is of an elongated shape having an elongated side contacting on said upper surface of said base, said form means including a bar magnet the north-south polar axis of which is parallel to the elongate axis of said form means.

5. A magnetically operated toy or the like according to claim **1** wherein said form means is positioned in a closed transparent container means, said container means contacting said base and containing liquid having snow-like particles immersed therein.

6. A magnetically operated toy or the like according to claim **1** wherein said form means includes a fixed portion and a movable portion pivotally connected thereto, said magnetic responsive means being fixed to said movable portion.

7. A magnetically operated toy or the like according to claim **1** wherein said magnet means includes at least two bar magnets laterally spaced from each other.

8. A magnetically operated toy or the like according to claim **7** wherein said means for rotating said magnet means includes electric motor means.

9. A magnetically operated toy or the like including a base having a horizontal upper surface, a magnetic means movably mounted on said base beneath said upper surface, movable form means including a magnetic responsive means movably positioned on said upper surface of said base, said form means including a removable base portion containing a magnet, said base portion having a lowermost convex surface portion and an annular skirt portion projecting laterally above said lowermost surface portion for contacting said upper surface of said base.

References Cited

UNITED STATES PATENTS

1,947,920	2/1934	Primrose	46—239
2,220,049	10/1940	Dunmore	46—239 X

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U.S. Cl. X.R.

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