Feb. 21, 1939. K. P. HOGAN 2,148,374

TOY

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FIG. I.

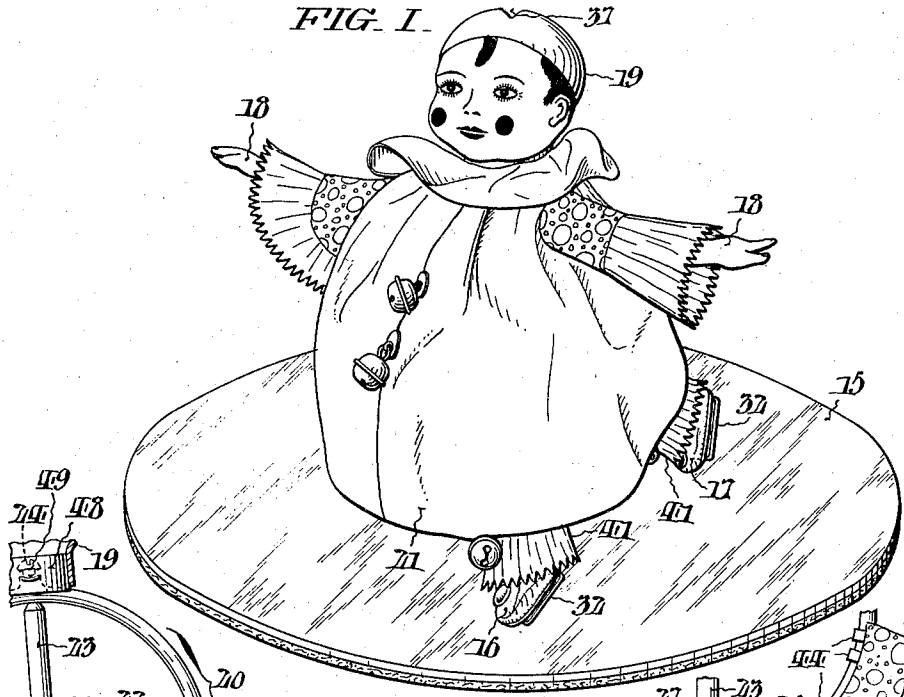

FIG. II.

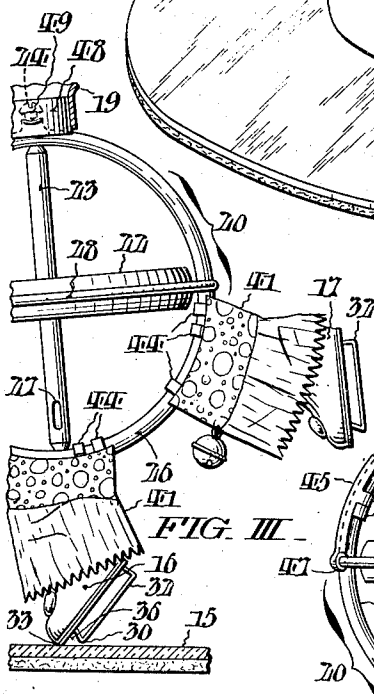

FIG. III.

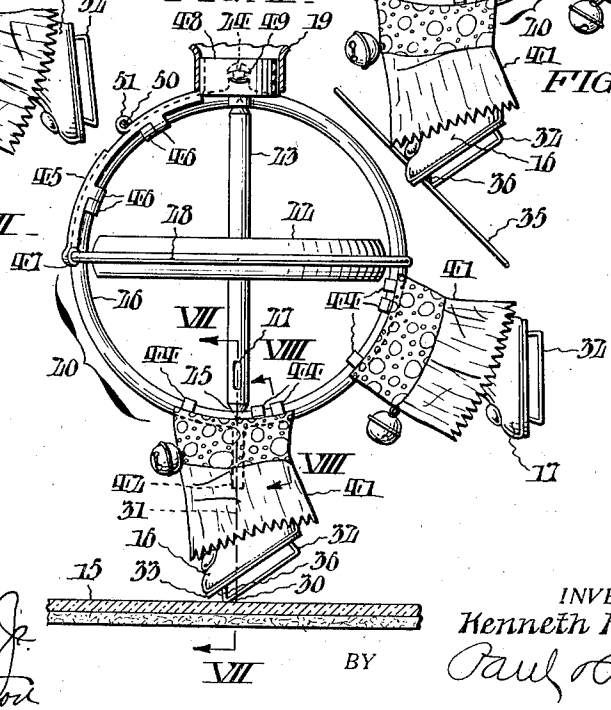

FIG. V.

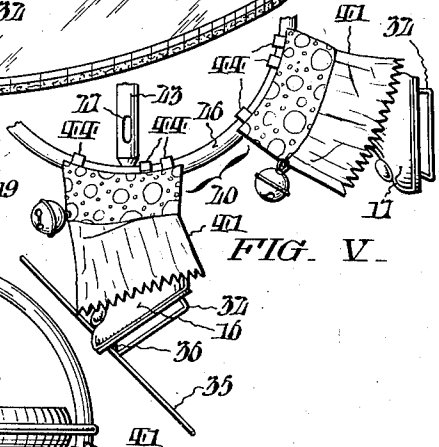

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FIG. VI.

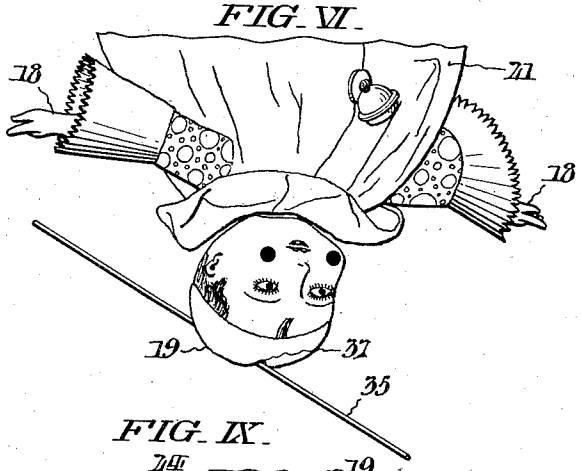


FIG. IX.

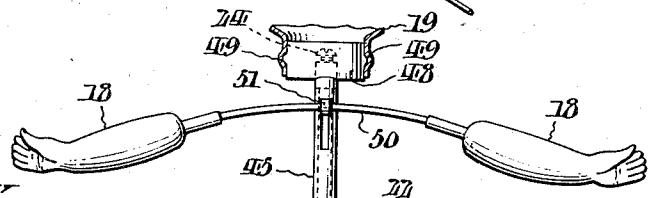


FIG. X.

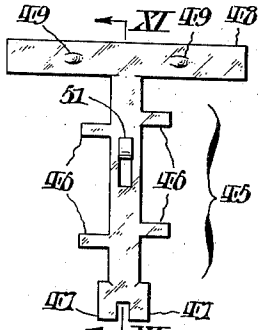


FIG. XI.

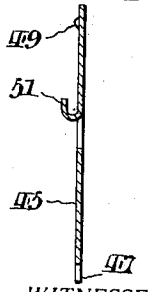


FIG. IV.

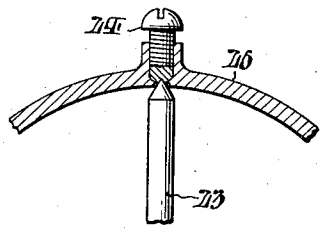


FIG. VIII.

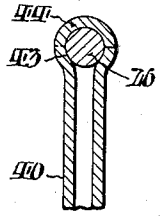
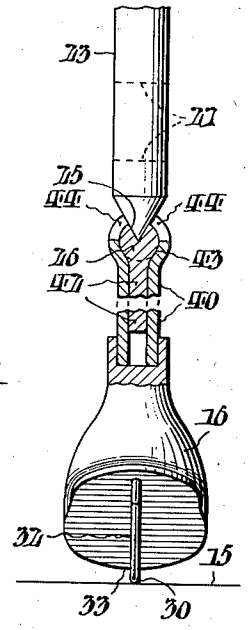


FIG. VII.



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UNITED STATES PATENT OFFICE

2,148,374

TOY

Kenneth P. Hogan, Philadelphia, Pa., assignor to Hogan Inventions, Inc., Philadelphia, Pa., a corporation of Pennsylvania

Application February 28, 1938, Serial No. 192,928

11 Claims. (Cl. 46—50)

My invention relates to performing toys, and more particularly to a gyroscopic type of toy. I have here illustrated and explained it as embodied in a clown-like doll, called "Topper", adapted to perform both head-up and head-down, on either a plain surface, corresponding to a dance floor or a skating rink, or on a string, corresponding to a tight-rope. However, it will be apparent that in its broader aspects my invention is concerned with the motions given to the gyroscopic device embodying it, and is not limited to a doll or any other particular form of toy. Various features and advantages of the invention will appear from the following description of a species or form of embodiment, and from the drawings. All the features and combinations shown or described are, indeed, of my invention, so far as novel.

In the drawings, Fig. I is a perspective view of a "Topper" doll pirouetting on a flat surface such as a piece of glass.

Fig. II is a side elevation of the gyroscopic device and certain associated parts of the doll, illustrating one principle of its performance, as well as various details of construction.

Fig. III is a fragmentary view similar to Fig. II, illustrating another feature or principle of performance of the doll.

Fig. IV is a fragmentary sectional view illustrating an adjustable bearing for the gyroscope rotor.

Figs. V and VI are fragmentary views illustrating the performance of the doll on a string, one head-up and the other head-down.

Fig. VII is a fragmentary view, partly in section as indicated by the line and arrows VII—VII in Fig. II, illustrating the attachment of a foot; and Fig. VIII shows a fragmentary sectional view taken as indicated by the line and arrows VIII—VIII in Fig. II.

Fig. IX is a view similar to Fig. II, but at right angles thereto, also showing the arms and hands of the doll.

Fig. X is a side view of a sheet metal clip for securing certain body parts; and Fig. XI shows a section therethrough, taken as indicated by the line XI—XI in Fig. X.

In Fig. I, a doll embodying my invention is shown performing upright on a flat, smooth, level, surface consisting of a circular piece of glass 15, which may if desired be a mirror, and may have a felt pad on its lower side. Erect as if pirouetting on the toe of one foot 16, the doll is shown with the other foot 17 off the ground, and with both arms 18 extended horizontally. This posture (as well as that of the head 19) corresponds well to certain movements which the doll is adapted to execute, but may be departed from or changed as desired.

As illustrated in Figs. II and III, the doll embodies a gyroscopic device or gyroscope 20 which keeps it upright and causes it to execute motions such as hereinafter described, and is included in the doll body, but is normally concealed under the dress 21 shown in Fig. I. The gyroscopic device 20,—which may be of any suitable or preferred form and construction,—comprises a relatively heavy fly-wheel rotor 22 whose (conical-ended) spindle axis 23 revolves in upper and lower bearings 24, 25 at opposite sides of a ring-like (wire) frame 26, which normally lies in a (vertical) plane through the axis 23. As shown in Figs. II and IV, the upper bearing 24 is formed in an adjusting screw threaded through the frame ring 26. The spindle 23 is shown with an axially extending slot 27 for use with a string (not shown) to set it spinning. In the present instance, the gyroscope frame 26 also serves as a structural frame or "skeleton" for the doll, and is supplemented with a guard ring 28 (of smaller gauge wire) attached to the ring 26 at diametrally opposite points, and lying in the (horizontal) plane of the rotor 22. Preferably, the plane of the guard ring 28 is a "meridian" plane substantially perpendicular to the axis of rotation at 23, and, in fact, an "equatorial" plane substantially midway between the upper and lower sides of the frame ring 26, where the bearings 24, 25 are located. This guard ring 28 serves to keep the skirt of the dress 21 from becoming entangled with the rotor 22 or its spindle 23.

As shown in Fig. II, the constant point of engagement 30 between the foot-support 16 and the supporting device or surface 15 is under the lower bearing 25 of the rotor axis 23, almost in the (extended) axial line 31 of the rotor 22 and its spindle 23, but slightly eccentric thereto, preferably in front of the line 31. In this instance, the doll has "ice-skates" 32 on its feet 16, 17, each skate being formed of pieces of wire suitably bent and having their ends fixed in the foot. The constant point of engagement 30 consists of the sharp front point or bend of this wire skate. This affords a sharp, nearly frictionless pivotal point at 30 for the pirouetting of the doll. Adjacent the pivotal point 30 and eccentric to the axial line 31, the foot support 16 has also a contact point 33 for occasionally or periodically engaging the supporting surface 15, preferably further from the line 31 than the point 30 and

in front of the latter. This contact point 33 is slightly higher than the pivotal point 30, so as to be generally out of contact with the surface 15, yet to touch the latter when the doll tips slightly in the right direction, as shown in Fig. III, which happens from time to time in the precessional movement of the gyroscope.

As shown in Fig. V, the doll is adapted to perform on a supporting device such as a taut string 35, like a tight-rope dancer. For this purpose, the supporting point for engagement with the string 35 lies at the bottom angle of a notch 36 between the front end of the skate 32 and the bottom of the foot 16, closer to the line 31 than the point 30, though slightly in front of said line 31. As shown in Fig. VI, the doll is also adapted to perform head-down on a string, having for this purpose a notch or furrow 37 across the top of its head, likewise, of course, affording a point of support slightly eccentric to the axial line 31 (prolonged), as in the case of the notch 36, though approximately in said line 31. In this case, of course, the bearings 24 and 25 are interchanged in position and function, since the head 19 becomes the support of the doll, instead of the foot 16.

Further details of the particular construction here illustrated are shown in Figs. II and VII.

As shown in Fig. VII, the feet 16, 17 have ankle and leg portions 40 of sheet metal, which are ordinarily concealed by the pantalettes 41 shown in Figs. I–III. Between the walls of each portion 40 is formed a socket into which fits a downward projecting pin or stud 42 on the frame-ring 26, directly in line with the axis at 23, thus aligning the pivot point 30 with reference to said axis. At the upper end of the portion 40, its walls spread out to form a curved seat 43 for the lower side of the frame-ring 26. On the walls of the seat 43 are ears 44, which are bent over the ring 26 as shown in Figs. II and VIII to clamp and secure it in the seat, thus connecting each foot 16, 17 to the ring.

As shown in Figs. II and IX–XI, a sheet metal clip 45 is used to attach the arms 18 and head 19 to the frame-ring 26. Made of a T-shaped piece of sheet metal, this clip 45 is bent to fit on the outside of the upper quadrant of the ring 26, and is clamped thereto by ears 46 bent around the ring as shown in Fig. II. Ears 47 at the lower end of the clip 45 are bent around the ring 28 at either side of the ring 26, thus further clamping the clip to the gyroscope frame. The upper portions of the T shown in Fig. X are bent into a springy collar 48 above the ring 26, around the adjustable bearing screw 24; and they have struck-up projections 49 which engage in corresponding recesses in the wall of the neck portion of head 19, to hold the head securely in place. However, the head 19 is easily slipped off and on to permit adjustment of the bearing screw 24. The hands and forearms 18, 18 are mounted on the ends of a wire 50 which may be secured to the clip 45 by a tongue portion 51 struck out and bent up around the wire. This construction makes it easy to adjust the arms to balance the doll properly, or to change its balance and performance when desired. The parts 16, 17, 18, 19 may preferably be of hollow celluloid, or other light construction.

When it is desired to make the doll perform, its dress 21 is lifted sufficiently to allow of setting the gyroscope 20 spinning as already mentioned, and is turned down again. The doll may then be placed on the smooth, level surface 15 as shown in Figs. I and II. Owing to the slight eccentricity of the pivotal point 30 relative to the axis of the rotor 22, the gyroscope causes the doll to spin around on the point 30 rather slowly,—or, in other words, to pirouette,—the center of gravity of the whole device remaining vertically over the point 30, or substantially so. As the gyroscope precesses, its axis 23 has a slow tipping or wobbling movement, somewhat like that of a top when started, so that from time to time the contact point 33 touches the surface 15. This temporarily checks or slows the pirouetting movement, so that the doll appears to hesitate in a manner not unlike the pirouetting of an actual performer.

The distance from the rotor 22 to the pivotal point 30—the "leg length", in other words—is to be proportioned according to the size (and speed) of the gyroscope, and the eccentricity of the point 30 relative to the line 31 should be proportioned to the leg length. The clown's performance can also be controlled and varied by shifting the arm wire 50 in its clamp 51. The action also depends on the speed of the rotor 22 and on how the clown is placed on the surface 15: e. g., if placed there with a forward tilt to start with, he will first spin a couple of times one way, and then spin the other way.

When the clown is placed on a string as in Fig. IV or V, he does not spin, but has a motion of trying to keep his balance, owing to the smaller eccentricity of the notch relative to the line 31 than of the point 33 relative to said line.

Having thus described my invention, I claim:

1. A gyroscopic toy device comprising a gyratory rotor having an axis of rotation, and a support provided with bearings for said rotor and having a supporting point which is the only constant point of engagement with a supporting device and is eccentric to the axial line of said rotor.

2. A gyroscopic toy device comprising a gyratory rotor and a support provided with bearings for said rotor and having a supporting point for engagement with a supporting device, and also having an additional point of engagement offset relative to the said supporting point, for engaging the supporting device to make the toy hesitate or pirouette in its movement.

3. A gyroscopic toy device comprising a gyratory rotor having an axis of rotation, and a support provided with upper and lower bearings for said rotor and having a supporting point for engagement with a supporting device which is eccentric to the axial line of said rotor, and also having an additional point of engagement offset relative to the said axis of rotation and the first mentioned supporting point, for engaging the supporting device to make the toy hesitate or pirouette in its movement.

4. A gyroscopic toy device comprising a gyratory rotor and a support provided with bearings for said rotor and having a supporting point which is the only constant point of engagement with the supporting device, and also having a point of engagement offset relative to the aforesaid supporting point and sufficiently above said supporting point to engage the supporting device only occasionally, when the gyroscopic device tips slightly, to make the toy hesitate or pirouette in its movement.

5. A gyroscopic toy device comprising a gyratory rotor having its axis substantially vertical, and a support provided with upper and lower bearings for said rotor and having a supporting

point under the lower bearing which is the only constant point of engagement with a supporting device and is slightly eccentric to the axial line of said rotor, and also having an additional point of engagement eccentric to the axial line and to the aforesaid supporting point, and sufficiently above the said supporting point to engage the supporting device only occasionally, when the gyroscopic device tips slightly.

6. A performing doll comprising a doll body including a gyroscopic device with a rotor having its axis substantially vertical, and provided with a frame having upper and lower bearings for said rotor, a support under the lower bearing having a pivotal point which is the only constant point of engagement with a supporting surface, and is eccentric to the axial line of the gyratory rotor, and interconnected arms attached to said frame but shiftable relative thereto to vary the performance of the doll.

7. A performing doll comprising a gyratory device including a rotor with its axis substantially vertical, and a frame with upper and lower bearings for the ends of said axis; a doll body connected to the upper portion of said frame, including a head and arms and a garment extending down around the gyratory device; feet connected to the lower portion of said frame, one in an off-the-ground position, and the other under the lower rotor bearing, the latter foot having a supporting point which is the only constant point of engagement with a supporting device, and is eccentric to the axial line of the gyratory rotor.

8. A performing doll comprising a gyratory device including a rotor with its axis substantially vertical, and a frame with upper and lower bearings for the ends of said axis; a doll body connected to the upper portion of said frame, including a head and arms and a garment extending down around the gyratory device; feet connected to the lower portion of said frame, one in an off-the-ground position, and the other under the lower rotor bearing, the latter foot having a pivotal supporting point which is the only constant point of engagement with a supporting surface, and is eccentric to the axial line of the gyratory rotor, and also a contact point adjacent said pivotal point but slightly higher, so as to touch the supporting surface from time to time as the gyroscopic device precesses.

9. A performing doll comprising a gyratory device including a rotor with its axis substantially vertical, and a frame ring with upper and lower bearings for the ends of said axis; a doll body including a clip clamped around said frame ring and carrying a neck collar, a head fixed around said collar, and arms attached to said clip; and a foot-support under the lower bearing having a clip clamped around said frame ring, and also having a pivotal point which is the only constant point of engagement with a supporting surface, and is eccentric to the axial line of the gyratory rotor.

10. A performing doll comprising a doll body including a gyroscopic device with a rotor having its axis substantially vertical, and provided with upper and lower bearings for said rotor, and a foot-support under the lower bearing having a notch therein eccentric to the axial line of the gyratory rotor.

11. A performing doll comprising a doll body including a gyroscopic device with a rotor having its axis substantially vertical, and provided with upper and lower bearings for said rotor, and also including a head with a notch or furrow therein eccentric to the axial line of the gyratory rotor, for engaging a stretched string.

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