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2,078,729

STRUCTURAL GYROSCOPIC PHENOMENA

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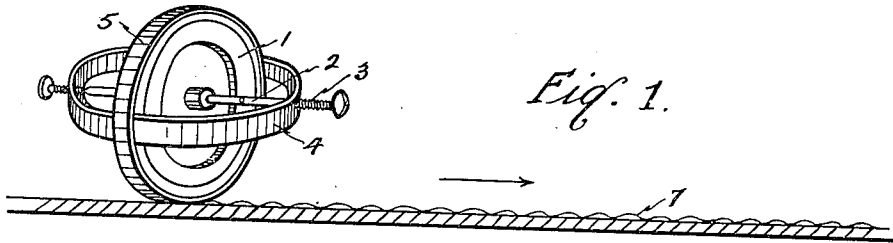


Fig. 1.

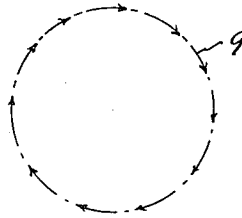
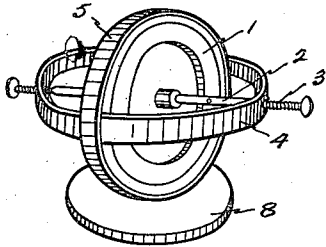


Fig. 2.

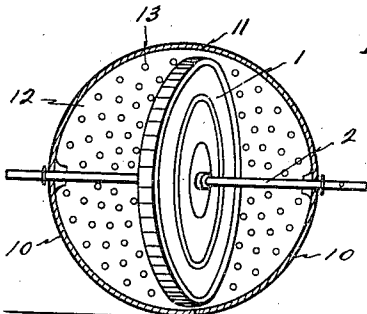


Fig. 3.

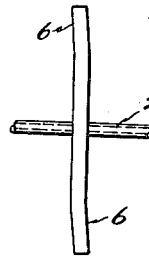


Fig. 4.

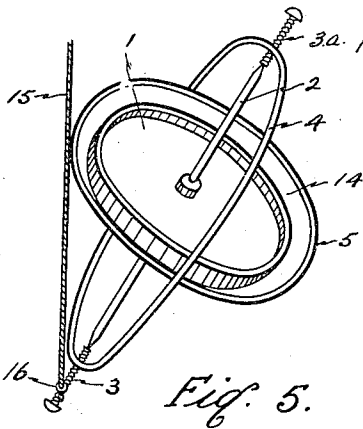


Fig. 5.

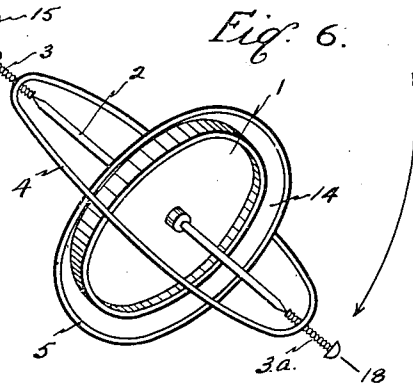


Fig. 6.

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STRUCTURAL GYROSCOPIC PHENOMENA

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3 Claims. (Cl. 46—50)

This invention relates to structural gyroscopic phenomena permitting of the demonstration of new and novel movements of predetermined character not heretofore associated with the operation of a device of this kind.

In a previous United States patent numbered 1,495,911 granted to me May 27th, 1924, I therein explained the construction of a gyroscope that permitted the demonstration of what was then believed to be novel and peculiar characteristics of such an instrument, and in the present application I wish to extend and describe further phenomena I have discovered through structural alterations in the gyroscope itself.

While an ordinary constructed gyroscope is in operation it has certain well defined characteristics of stability, while in rotation, due to the resistance it offers to movement from its plane of rotation, which characteristics can be demonstrated while the axle of the wheel or rotor is rotatably supported in the usual surrounding ring mounting, but there are other characteristics of movement which cannot be demonstrated unless certain structural alterations are effected and included in the construction of the gyroscope itself, and it is to these features that this application is directed.

The provision by which I am enabled to display and demonstrate these new and novel movements of predetermined character is more fully described in the following specification and illustrated in the accompanying drawing forming part of this application, and in which:

Figure 1 is a perspective view of a simple gyroscope in which slight modifications have been made in the wheel of the gyroscope to cause portions of the periphery to be out of perpendicular with its axle to set up one defined character of motion when in operation.

Figure 2 is a view of another type of gyroscope somewhat similar to that of Figure 1 but provided with a round flat base portion to demonstrate another character of motion dissimilar to that set up by Figure 1.

Figure 3 illustrates a gyroscopic wheel mounted in two hollow hemispherical members that are perforated to lessen air disturbance within the shell when the wheel is rotating. This model is capable of demonstrating straight line slow motion of traverse when operating.

Figure 4 is a cross section of a gyroscopic wheel having a deflection formed therein to cause the wheel to wobble. Deflection exaggerated.

Figure 5 illustrates a truly balanced gyroscope that when suspended from the end of a string

and set in motion will assume a position like that indicated in the drawing and will set up an increasing spiral of motion during rotation.

Figure 6 illustrates the gyroscope shown in Figure 5 after the same has partaken of a falling movement from the position shown in Figure 5 during the giving off of speed of the wheel of the gyroscope to cause the same to fall.

In the drawing like numerals indicate like parts throughout all the figures, and the numeral 1 indicates a wheel having an axle 2 mounted between end centers 3 within a surrounding ring 4 which is stationarily secured at right angles within another guard ring 5 which is positioned directly over the wheel 1 which is mounted after the usual manner to have the minimum of frictional resistance to rotation.

The wheel 1 has formed therein a slight "offset" at 6 of its periphery as illustrated diagrammatically in exaggerated form in Figure 4 so as to cause the wheel when rotating to "wobble" which has the effect of setting up a slight pulsating vibration within its surrounding frame mounting through the axle 2 of the wheel.

This vibration has the effect of causing the gyroscope when set in motion and the surrounding guard ring 5 placed upon a smooth flat surface to move and traverse in a direction approximately at right angles to its plane of rotation (see Figure 1) but not in a smooth manner of motion but rather in a jumpy fashion somewhat after the manner diagrammatically illustrated in Figure 1 at 7.

This motion of traverse is directly contrary to the action of a truly balanced gyroscope which when released will remain in a practically stationary position as long as there is sufficient rotative speed within its wheel to preserve its equilibrium.

In Figure 2 is illustrated another form of gyroscope having all of the characteristics of that of Figure 1 but having a round base portion 8 secured to the guard ring 5 at that point immediately below the longitudinal center line of the axle 2.

When this model is set in motion the effect of the vibration of the wheel 1 through its "wobble" is to set up a vibration through its axial mounting upon the supporting framework and round base 8 such as to cause said base to traverse a circular path of motion so long as the rotative speed of the wheel 1 is sufficient to set up a degree of vibration great enough to allow the round base 8 to vibrate and move over the floor or surface it is placed upon.

The circular path of motion set up by the gyroscope shown in Figure 2 is diagrammatically illustrated at 9 by the dot and dash circle, and during its period of traverse the gyroscope will turn upon its base 8 until its forward motion is approximately at right angles to its plane of rotation.

In Figure 3 is illustrated a gyroscopic wheel 1 having a "wobble" mounted within a pair of hollow hemispherical members 10 that when secured together along their center line 11 forms a complete hollow sphere 12 whose walls are perforated by a large number of perforations 13 to allow of air displacement within the sphere when the wheel 1 is in motion.

The chief characteristic of this model after being set in motion is that the sphere 12 will move in slow motion in a path of traverse approximately at right angles to its plane of rotation.

I have also discovered that when a truly balanced gyroscope 14 is suspended from the end of a piece of string 15 by one of its axial end center mountings and set in motion that the gyroscope will assume an angular position above its point of suspension at 16 as illustrated in Figure 5, and will set up an increasing spiral path of movement at the end of the string during the giving off of speed of the wheel of the gyroscope and that this spiral motion is attributable to a gradual falling movement of the gyroscopic body from its first assumed angular position above its point of suspension 16 to a position in which the axial center line of the wheel mounting assumes an angular position below its point of suspension (see Figure 6) when the maximum of spiral motion will have been reached, after which the spiral motion of the gyroscope will become smaller and practically nil as the axial center line of the gyroscope falls from the point 18 in line with its line of suspension at 19. In Figures 5 and 6 is shown a gyroscope suspended at 16 to the end of a piece of string 15 and assuming the angular position of the axial center line of the gyroscope as at 60 degrees to the vertical string 15 above its point of support 16, then while the gyroscope is falling from the position indicated in Figure 5 to the position indicated in Figure 6 which is assumed to be 60 degrees from its vertical line of support 15, but below its point of suspension 16 then it will

have reached the maximum of spiral traverse, and during the period that the center pivot 3A falls from the point 18 to a point 19 where it will be practically in line with its line of suspension 15 the spiral motion of the suspended gyroscope will become smaller and practically nil as the gyroscope becomes still and motionless.

Having now described the phenomena that I have discovered through structural alterations in gyroscopes, what I claim and desire to be protected in by Letters Patent, is:

1. A gyroscope having a wheel in which the perpendicular center plane thereof is slightly deflected laterally at one or more points to cause said wheel to wobble and set up vibrations within the supporting framework of said wheel when the latter is rotated whereby said vibrations will cause said gyroscope to set up motion and traverse at right angles to the plane of rotation of said wheel when said gyroscope is free to move during rotation of said wheel.

2. A gyroscope having a wheel in which the perpendicular center plane thereof is slightly deflected laterally at one or more points to cause said wheel to wobble and set up vibrations in the supporting framework of said wheel when the latter is rotated, a flat round base portion secured to said framework directly below and along the longitudinal center line of the axle of said wheel whereby said base is adapted to receive the vibrations set up in the framework of said gyroscope and cause said base to have motion and traverse a circular line of motion during the rotation of said wheel at high speed.

3. A gyroscopic wheel having an offset in the periphery thereof mounted within a hollow sphere, said offset causing said wheel to wobble and set up vibrations within said sphere, said sphere having its walls punctured with a series of small apertures to allow of air circulation within said sphere when the wheel therein is rotating, said vibrations causing said sphere to set up a line of slow motion traverse at right angles to the plane of rotation of said wheel when said wheel is rotated at high speed and said sphere is free to move.

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