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D. L. SHIKALY

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TOY

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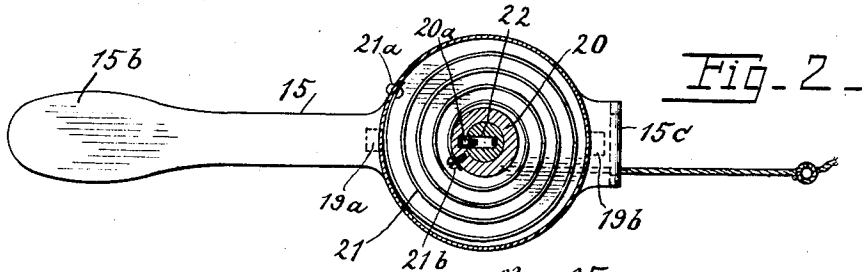


Fig. 2

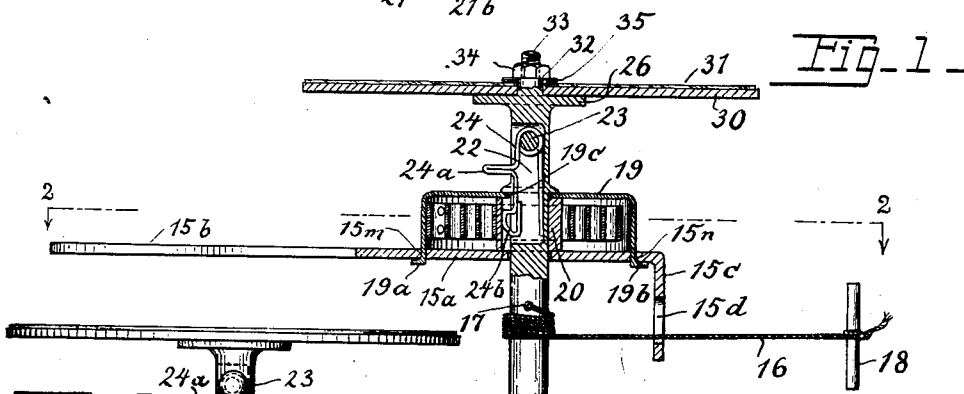


Fig. 1

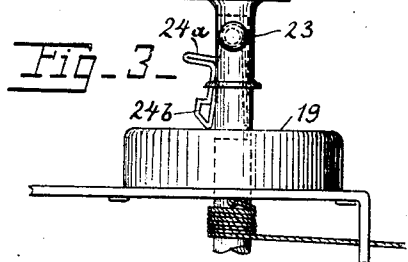


Fig. 3

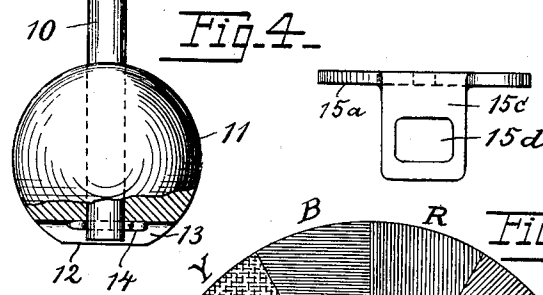


Fig. 4

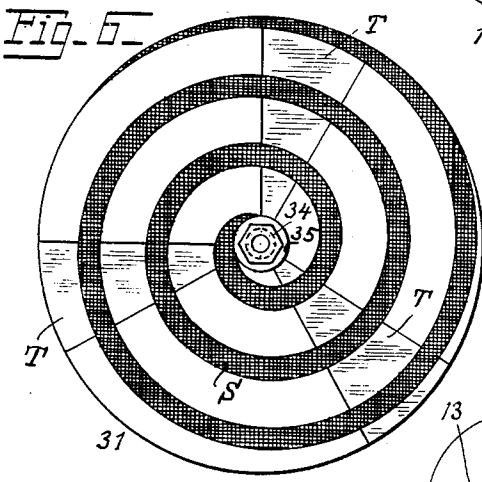


Fig. 5

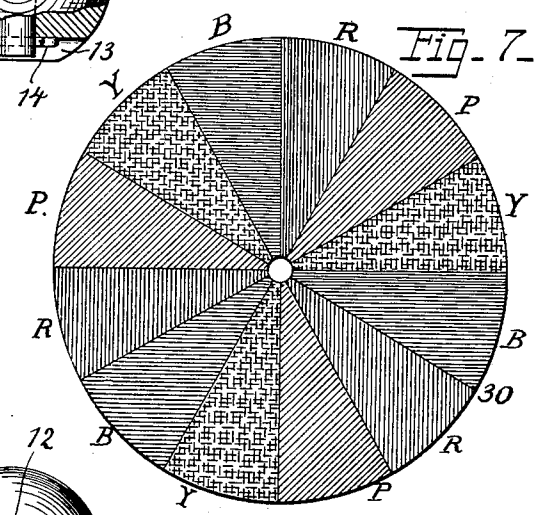


Fig. 7

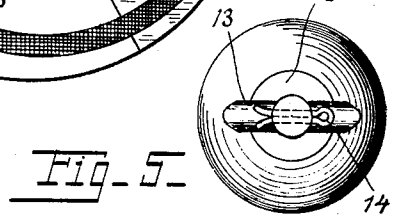


Fig. 5

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2 Claims. (Cl. 46—14)

This invention relates to improvements in toys of the spinning or whirling type and more especially to such adapted to produce an optical display of the character commonly called "optical illusions." A well known example of this type of toys is a spinning top which has some ornamental colored design painted on its upper surface that, when speedily rotated, produces the illusion of a combination of concentric colored rings. The device forming the subject of this invention however, does not consist in a spinning top, inasmuch as a top is supposed to spin in one direction only, that is; in the direction initially given it, but the present device is based upon an old and well known whirling toy which periodically alternates its direction, commonly called a "whirligig." To better understand the underlying principle as well as the improvements proposed and advances made over this old-fashioned "whirligig" it will be appropriate to shortly describe this former device.

In its elementary form it consists of an upright spindle having a shoulder or slightly enlarged portion on the top end and being provided with a heavy more or less spherical body, firmly attached to the bottom end.

The spindle is mounted for rotation in a bearing forming a hollow ball, having a vertical hole through it in which is loosely inserted the stem of the spindle right underneath the shoulder above mentioned, so that, when the ball is held in the hand, the spindle can revolve freely within and upon it. In the side of the ball, at right angles to the vertical hole and the spindle, is provided another hole through which a thin cord is threaded which is firmly secured to and tightly wound upon the spindle within the hollow of the ball.

As since times immemorial children used to make this toy by their own handicraft, they employed a hollowed out hazelnut or peach kernel as bearing for the spindle and an apple or a potato as the spherical weight to give the spindle momentum. The toy is used by holding the hollow ball in the fingers of one hand and quickly pulling the cord with the other. This sets the whirligig into rapid rotation, unwinds the cord, and the momentum of the weight at the bottom of the spindle carries the rotation beyond the attaching point of the cord, rewinding it in the opposite direction, provided that the tension upon said cord is sufficiently relaxed. Then the cord is given another quick pull to unwind and permitted to rewind as described, this operation being repeated as often as desired. The result

is a periodical quick rotation of the whirligig in alternate directions.

As all boys know and an actual trial by an inexperienced person shows however, the manipulation of such a whirligig has its drawbacks and is somewhat tricky: In the first place the cord must be wound up originally rather tight and the rotary motion initiated by a quick and short jerk to give it sufficient momentum. Then again the tension must be released just at the proper moment, while even during the rewinding the cord ought to be kept taut, thus calling for a sensitive and experienced "feel" of the hand. Otherwise the cord will unwind unsteadily and refuse to rewind, not gaining sufficient momentum, consequently children of younger years are usually not strong or skillful enough to manipulate this toy successfully. Moreover the great tension necessary together with the friction caused by the close winding soon wears out the cord, so that frequent retieing or renewal of the cord or string is required. Aside from these obvious shortcomings the pleasure and entertainment derived from this antiquated toy is rather monotonous, as to my best knowledge such a whirligig has not been combined with any additional feature or object besides its alternating whirling motion. The main object of my invention therefore is to provide a whirligig which is free from the drawbacks above mentioned and can therefore be manipulated successfully by inexperienced and unskilled infants.

The second general object is to provide a toy of the whirligig type which has additional attraction of an entertaining or amusing kind for children.

A third object, defining the second more closely, is to provide, in cooperative combination with the whirling toy an optical illusion device.

A fourth object, corollary with the preceding one, is to make this illusion effect instructive and therefore of educative value.

A fifth object is to make the whole device simple in construction and manipulation.

A sixth object is to so design and shape the cooperative members of the device that they can be produced as a cheap wholesale article not requiring much machining or accurate fitting of parts.

Other objects concurrent with the above listed ones, will become obvious from a more detailed description of the device in connection with the accompanying drawing in which

Figure 1 is an elevational view, partly in sec-

tion of a whirligig constructed according to the principles of the invention.

Figure 2 is a horizontal sectional view on the line 2—2 of Fig. 1.

5 Figure 3 is an elevational outside view of the upper portion of the whirligig with the handle and other extremities of the device shown broken off. The illustrated portion is shown in a position where the spindle is disengaged from the capsule containing the rewinding spring.

10 Figure 4 is a detail view of the lip serving as guide for the winding cord.

Figure 5 is a bottom view of the spherical weight member indicating the fastening of the spindle to it.

Figure 6 is a top view of the whirligig showing specifically in detail the upper disk forming part of the optical illusion attachment.

Figure 7 is a top view of the underlying disk, separated from the rest of the device.

Similar reference characters refer to similar parts throughout the different views.

Referring more in detail to the construction, numeral 10 designates the spindle of the toy. At the bottom end, a spherical weight 11 is permanently attached in the following manner. A vertical central hole, fitting around the spindle, is drilled through it, and the zone 12 surrounding the extreme lower end of the diametrically penetrating spindle is flattened, to provide supporting surface on which the toy can be stood up in an upright position when not being used (see Figs. 4 and 5). Furthermore, at right angles to the vertical bore, the lower surface of the spherical body is recessed by a groove 13, and the end of the spindle is secured within this groove by a cotter pin 14 whose protruding ends are imbedded thereon.

By this arrangement a permanent connection between the spindle and the weight is provided which would be rather insecure if for example the spindle were threaded into the weight. Furthermore it allows an easy mounting and dismantling of the device, besides the facility of making the parts of different materials, for instance making the spindle of wood or hollow tin tubing and the weight of soft lead.

The bearing supporting the upper part of the spindle comprises the plate 15, formed as a circular disk 15a, perforated in the center to pass the spindle 10 through it.

Toward one side this disk is elongated to form a handle 15b, on the opposite side it protrudes in the form of a lip 15c, bent downwardly at right angles and provided with an aperture 15d to guide the cord 16. This is shown more clearly in Fig. 4.

The cord 16 is securely attached through a hole 17 or in any other suitable manner to the spindle at some distance beneath the supporting plate 15, wound around the spindle in a counterclockwise manner—that is: in a direction opposite to that in which the spring 21—to be described later—is wound, and at the outer free end is attached to a small handle 18, or a ring or ball or other convenient device for manipulating the cord.

The circular portion 15a supports a cylindrical capsule 19 which is clamped facing downwardly upon the plate 15. The rim of the capsule has two clips 19a and 19b, spaced diametrically apart, protruding through two corresponding slots 15m and 15n in the supporting plate and bent outwardly to insure a tight grip upon the plate 15.

The bottom of the capsule, which in this arrange-

ment therefore is uppermost, has an aperture 19c through which the spindle 10 passes. Within the space between this bottom and the supporting plate the spindle is surrounded by a loose sleeve 20 which is adapted to freely turn within the capsule and around the spindle. The remaining space within said capsule is occupied by a spiral watch spring 21, riveted with one end 21a to the inside of the capsule wall and with the other end 21b to the sleeve, either by welding or by means of a couple of tap screws. The thickness of the spring in the drawing is for the sake of clearness shown greatly exaggerated, in reality an ordinarily thin bladed winder spring of the sort employed in small alarm clocks is sufficiently strong. It is immaterial in which direction the spring is wound up, the cord however should always be wound up in a direction opposite to that of the spring, as previously stated.

The rotatable spindle 10 is detachably connected to the sleeve 20 around which the watch spring is coiled in a manner presently to be described. The neck of the spindle, provided that the latter is solid, is grooved by a longitudinal slot 22 not penetrating all the way through the stem, as shown in Figures 1 and 2. If the spindle should be made of hollow tubing, the side wall is simply slotted. The recess thus formed is used to seat a resilient catch 24 formed of a single wire coiled around a pivotal pin 23, in the upper part of the slot. This pin traverses the slot 22 at right angles and is riveted over on the outside of the spindle. The resilient wire forming the catch is bent and rebent in a peculiar way plainly indicated in the sectional view of Fig. 1. It substantially forms a resilient staple resting with one straight leg against the rear wall of the slot. The front leg is doubled up in the middle part, forming a projecting stud 24a, and the lower end 24b is looped over so as to form a key or nose, adapted to engage a keyway 20a, out into the hub of the sleeve 20, running parallel with the spindle. This leg of the catch spring is obviously under tension which forces the nose 24 out of the groove, and if the spindle is lifted vertically out of the capsule the spring catch assumes a position as shown in Fig. 3. In this position the sleeve 20 and therewith the watch spring 21 is disengaged from the spindle which may then be rotated freely, supported by the catch 24b above the capsule 19 and the cord can then be wound up, if necessary, to any required length. Thereafter the projecting stud 24a is deflected by a finger, the catch 24b is depressed into the slot 22, and the spindle can be lowered into engaging position with the sleeve 20 and the watch spring 21. When the spindle is turned one way or the other, the nose of 24b will spring forward into operative engagement with the keyway 20a.

It is also obvious that by a downward deflection of the stud 24a the catch 24b may be disengaged again and the spindle lifted out of engagement.

The mechanical operation of the device is therefore quite simple.

When the cord is pulled, it unwinds and while doing this, it winds up the watch spring. The more of the cord is pulled out the more of the spring is wound up. When the cord is relaxed, the spring unwinds itself and automatically winds up just as much of the cord as originally was unwound. Thus the rewinding of the cord is no longer depending upon the "vis viva" or the accumulated momentum of the spindle and it does not matter, whether the pulling of the

cord is done slowly or fast. The reaction is always positive and the string or cord is always kept taut.

It remains to describe the attachment, forming the optical illusion device:

This consists of two disks or circular plates, superimposed upon each other, of approximately the same diameter. The lower one 30 is permanently affixed to a circular shoulder or flange 26 which forms part of the upper end of the spindle 10. This should be of rather substantial thickness, but may be made of printed cardboard, wood or a painted and varnished tin plate.

The superimposed plate 27 which should be rather thin can also be made of any suitable material, preferably, for reasons stated afterwards, of transparent thin celluloid, cellophane or similar substances.

The lower plate which is represented in Fig. 7 is subdivided into radial sectors representing a multiple of groups or units. Each unit consists of a series of differently colored smaller sectors, the different colors repeated in exactly the same rotation. Thus the combination shown for example in Fig. 7 consists of three groups, each group comprising 4 sectors R, B, Y, P, showing the colors red, blue, yellow and purple by conventional shading, and repeated twice in the order named. The upper plate which, let us assume, is made of transparent celluloid, has painted on its underside a spiral S, either blank or some neutral dark color, the remainder being covered by a white back ground except for three segments T. T. T. radially arranged, their center lines forming angles of 120° with each other and left transparent. When the upper plate is superimposed upon the lower plate, it is obvious that the three transparent segments, except where they are traversed by the opaque spiral, will always appear colored in the same way, be it that they may just fit over three equally colored segments or that they may take in two portions of adjacent segments. Thus for example they may all three appear blue or red or again each segment may show part yellow and part blue, etc.

Instead of being made of transparent material, covered partly on the under side with an opaque design, as indicated, the upper plate or disk can be made of opaque material, for instance of thin metal, with the spots described as transparent, stamped out.

The upper disk, in either case however, has a loose central fit around the upper shaft and of the spindle. The latter has an offset 32, just a trifle above the upper surface of the top disk 31 when the latter is mounted, and the rest 33 of the spindle is threaded to receive the nut 34. Between the latter and the upper disk one or more thin smooth paper washers 35 are inserted and the nut is screwed down to such a degree that the upper disk when the lower one is in rotation, is taken along with it by friction, yet has still so much free play that when the lower disk is suddenly stopped in its motion, it is carried on for a short interval of time by its own momentum, thus changing its position relative to the underlying colored disk. The optical illusion resulting from this arrangement is as follows:

When the dark colored spiral is quickly rotated it gives the impression of a continuous series of concentric rings expanding centrifugally or contracting centripetally according to the direction in which the disk is rotated. The colors appearing through the transparent spots or the cut-outs—as the case may be—seem to be equally distributed as a colored hue over the whole white area between the runs of the spiral. But whenever the direction of rotation is alternated by a sudden stop, another set of colors or blending of two colors will appear, the upper disk advancing for a varying and accidental angle over the lower one, the accumulated torque being dispersed by friction. Thus not only will the original colors shown on the lower disk appear, forming a tenderly-hued background for the contracting or expanding rings but when for instance a purple and yellow sector simultaneously show under the transparent spots, an orange color will appear, if a yellow and blue sector blend, the resulting color will be green and so forth, varying at every alternation for another hue and shade.

The illusional device shown by Figures 6 and 7 however is to be taken as merely illustrative, for it is obvious and evident that a good many other modifications and variations of design could be substituted and give very interesting effects. It is also possible to employ only one disk, for instance the upper one, showing a spiral or the lower one and still effect an entertaining result. The use of two disks therefore is not to be construed as a restrictive means, and the scope of the invention should be judged according to the claims rather than the exact details shown.

I claim as my invention:

1. A whirling toy adapted to be alternately rotated in opposite directions comprising a balanced spindle, a stationary member serving as a handle and as a bearing for said spindle, manual means to impart rotary motion to the spindle in one direction, said manual means comprising a tension member, adapted to be wound upon said spindle in one direction, a spiral spring, fixedly attached with one end to the stationary member and wound around said spindle in an opposite direction and connecting means to engage said spiral spring operatively with or disengage it from said spindle for the purpose of winding up said tension member on said spindle, independently from said spring, and to operatively engage said spring to the spindle.

2. A whirling toy, adapted to be alternately rotated in opposite directions comprising a balanced spindle, a stationary member serving as a handle and as a bearing for said spindle, manual means to impart rotary motion to the spindle in one direction, an automatically operative helical spring, concentrically attached to the spindle, adapted to be put under tension by the manually imparted rotary motion of the spindle and to impart rotary motion to the spindle in the opposite direction when released, a rotatable collar, seated on the spindle and fixedly attached to said spring means and disengageable locking means, fixedly attached to the spindle and adapted to form an operative connection with said collar.

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