Aug. 11, 1970 P. L. BROWN 3,523,386

SPINABLE STRINGLESS TOP

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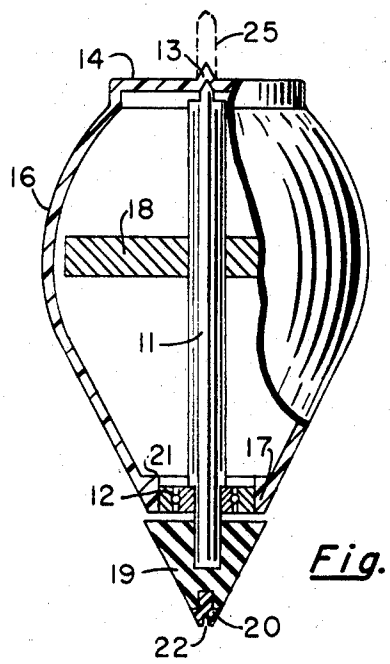


Fig. 1

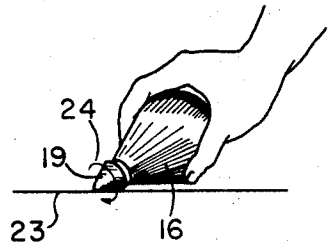


Fig. 2

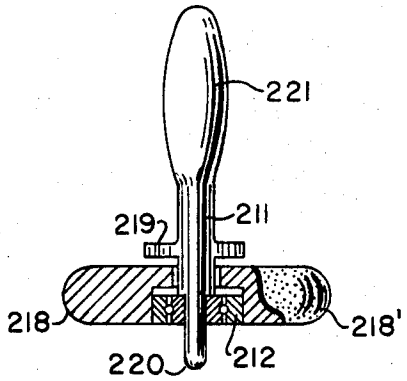
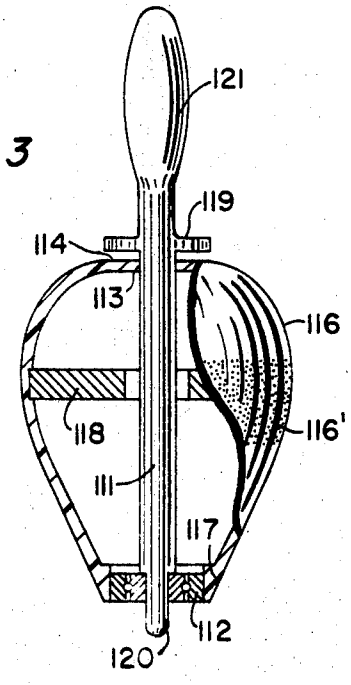


Fig. 4

Fig. 3



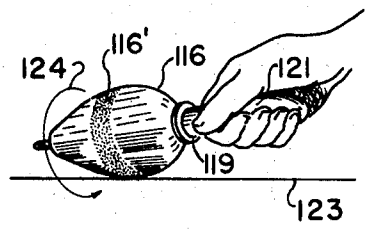


Fig. 5

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SPINABLE STRINGLESS TOP

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ABSTRACT OF THE DISCLOSURE

The invention relates to a gyroscope type top and comprises a rotatable shaft, a flywheel or rotor secured on said shaft, a bearing on said shaft; said bearing including an outer race, a casing supporting said shaft for rotation and engaging said outer race of said bearing for rotation therewith and in unison with said shaft and said rotor, and a friction roller on a portion of said shaft extending outside of said casing; said roller serving by successive rolling engagement with a surface to accelerate said shaft with consequent increased spinning of said rotor to keep the top spinning for an appreciably increased period of time. One modified embodiment of said invention comprises a handle section on an extended portion of said rotatable shaft exteriorly of the casing with the elimination of said friction roller; said handle serving to bring the outer surface of said casing into successive engagements with a surface of any area thereby to accelerate the spinning of said rotor at an increasing rate whereby the top is kept spinning for appreciable times. Another modified embodiment of the invention dispenses not only with the friction roller but also the casing and comprises an integral unit consisting of a rotatable shaft journaled in a bearing which is confined within a rotor mounted on the rotatable shaft, a friction-resistant coating on the outer surface off said rotor, and a handle on the shaft serving to stroke the rotor successively over a surface to effect acceleration of said rotor about said shaft.

Heretofore in the art there have been devised numerous toy tops of which the majority are required to be activated by means of a cord or string tightly wound about the top which is quickly released by tossing the top toward a surface and holding tightly the free end of the cord or string, thus accelerating the tip end of the top and effecting a spinning of the top. There are many inherent disadvantages in the string-activated tops. Some of these are the inability of such string-activated tops to obtain high and sustained rates of rotation when not strongly tosed to the surface on which they can rotate, the necessity of more frequent placement and winding of the string about the top, and the inability of some of the operators to apply a dexterity that will cause the top to spin. For examples of prior art tops of this general type, reference is made to United States Letters Patent, No. 814,962, issued Mar. 13, 1906, to Irving; No. 1,109,562, issued Sept. 1, 1914, to Wingert; No. 1,363,718, issued Dec. 28, 1920, to Cayo; and No. 2,456,341, issued Dec. 14, 1948, to Thoresen, as well as British patent, No. 16,572, issued Aug. 31, 1891, to Barnes; British patent, No. 963, issued, Mar. 19, 1903, to Newman, and German patent, No. 1,213,323, issued Feb. 22, 1922 to Balleis. Recently, there have been developed a stringless type top, sometimes called a gyroscope top, of which one is disclosed and claimed in United States Letters Patent, No. 2,762,162, issued Sept. 11, 1956, to Doljan. Many of these gyroscope tops are unsafe to be used by children because of their construction with exposed parts that can readily fracture or disintegrate and fly from the spinning top in all directions to injure children and other

persons in the vicinity. The present invention is directed to an improved stringless or gyroscope top which is so constructed as to obviate danger of injury to persons in the toy playing area and which has a longer spinning period.

A primary object of the present invention is to provide an improved spinable stringless top of the gyroscope type which is inherently safe for anyone to play with and to enjoy for recurrent long periods.

Another important object of my invention is to provide an improved spinable stringless top of the indicated nature which is additionally characterized by its capability of being used and enjoyed by the unskilled in that it requires no special manual dexterity to set the top in motion.

A still further object of my present invention is to provide an improved spinable stringless top of the aforementioned character which can be activated by successive friction contact thereof with any surface area.

Another object is to provide a top of the indicated nature which can be constructed for spinning on either end thereof.

Other objects of the invention, together with some of the advantageous features thereof, will appear from the following descriptions of a preferred embodiment as well as certain modified embodiments of the invention which are illustrated in the accompanying drawings. It is to be understood, however, that I am not to be limited to the prescise embodiments illustrated, nor to the precise arrangements of the component parts thereof, as my invention, as defined in the appended claims can be embodied in a plurality and variety of forms.

Referring to the drawings:

FIG. 1 is a front elevational view, partly in section of a preferred embodiment of the invention.

FIG. 2 is a side elevational view of a preferred embodiment of the friction roller compartment of the preferred embodiment of the invention shown in FIG. 1, this view illustrating the manner of holding the top for successive friction engagement of a surface of any area to activate the top for rotation.

FIG. 3 is a front elevational view, partly in section of a modified embodiment of my present invention.

FIG. 4 is a front elevational view, partly in section and partly broken away to illustrate the construction, of another modified embodiment of the present invention.

FIG. 5 is a reduced side elevational view of the modified embodiment of the invention illustrated in FIG. 3 in engagement with a surface; this view illustrating the manner of stroking the casing of the top successively over the surface to accelerate the rotor of the top, which manner of stroking also can be employed equally effectively in respect to the modified embodiment shown in FIG. 4 for successively engaging the rotor with a surface.

In its preferred form, the spinable stringless top of my present invention preferably comprises an axial rotatable shaft; a casing encompassing a major portion of th length of said shaft and supporting the same for rotation, a rotor on said shaft, a bearing on said shaft; said bearing including an outer race engaging said casing, together with a friction roller on a portion of said shaft extending outside of said casing and serving to activate said shaft and thereby said rotor by successive stroking of said roller over a surface of any area.

A modified embodiment of the present invention comprises an axial rotatable shaft, a casing surrounding said shaft and supporting the same for rotation, a rotor on said shaft having its periphery engaging said casing, a bearing on said shaft; said bearing having an outer race engaging said casing whereby said rotor and said casing rotate in unison, and a handle on a portion of said shaft

extending exteriorly of said casing; said handle serving to bring the outer surface of said casing into successive rolling engagement with another surface of any area to effect acceleration of said shaft and increased rates of rotation of said rotor and said casing.

Another modified embodiment of the invention comprises an integral structure consisting of an axial shaft, a tapering tip on one end of said shaft, a rotor on said shaft, a bearing on said shaft confined within said rotor for supporting said shaft for rotation, a resilient film on the exterior surface of said rotor, and a handle on an extension of said axial shaft for bringing said resilient film of said rotor into successive rolling engagement with a surface of any area to accelerate rotation of said rotor to cause spinning of the top on the said tip of said axial shaft.

It is to be appreciated that in each of the embodiments of my invention there is provided either a narrowing or tapering of one end of the axial rotatable shaft to afford a spinning tip. Or, as illustrated in the preferred embodiment of the invention illustrated in FIG. 1 the narrowed or tapered spinning top can be separate from the axial shaft and secured in the friction roller component.

In accordance with my present invention, I provide a rotatable shaft **11** which preferably is fabricated from a metal, such as steel or a steel alloy but which can be made of hard wood or an inflexible plastic material as desired. The shaft **11** conveniently is reduced at its opposite ends, as shown in FIG. 1 and is rotatably supported in a vertical position by means of a suitable ball bearing **12** into which the reduced lower end of the shaft is press-fitted and beyond which such lower end of the shaft extends. The upper reduced end of shaft **11** conveniently is fitted into a pintle **13** formed centrally of and integral with an otherwise flat rimmed top **14** of an outer casing **16** which is formed with a truncated lower end or bottom **17** frictionally engaging circumferentially the outer race of the ball bearing **12**. This mounting of the shaft **11** affords an axial mounting in reference to the outer casing **16**, the latter preferably being fabricated of or molded from a suitable opaque or transparent, if desired, plastic material, such as polystyrene or the like which is highly resistant to deformation from impacting extrinsic objects. It is to be understood that the shape of casing **16** is not critical in that it can be fabricated or molded to any selected one of a variety of different shapes such as a sphere, a cone, a truncated cone, an oval or a general egg-shape, as desired.

As particularly shown in FIG. 1 of the annexed drawings, I secured a flywheel or rotor **18** on axial shaft **11** by any suitable means such as keying the same thereto, and I provide a cone-shaped friction roller **19** into which the reduced lower end of the shaft **11** is press-fitted, or to which the lower end of shaft **11** is otherwise firmly secured so as to rotate with the rotation of such friction roller **19**. Seated in the apex or nose of the friction roller **19** which, as shown, is mounted outside or exteriorly of the casing **16** as a separate unit, is a metal or plastic spinner tip **20** on which the top is rotated or spun for appreciable recurrent periods of time. The friction roller **19** is preferably made of semi-soft rubber but can be made of any other suitable resilient material having the capacity to withstand repeated rolling engagement with a relatively hard surface. Or, the friction roller **19** can be made from harder relatively inflexible materials such as hard wood, a metal or a plastic but with the outer surface thereof covered with a layer of soft rubber or like resilient material in order to prevent marring of the surface over which the friction roller is moved to effect the rotation of the shaft **11** and the increased acceleration of the flywheel **18** and of the casing **16**.

It may be observed here that while I have stated that a ball bearing **12** is employed in the preferred embodiment of the invention the top will function as effectively with a nylon bearing in lieu of the ball bearing **12** to fit the centrally located bore **21** in the truncated bottom **17** of casing **16**. It may also be noted here that, if desired, the spinner tip **20** can be formed with a slit **22** therein so that the top can spin with varied spinning and leaning characteristics.

In operation of the preferred embodiment of the invention, the casing **16**, which is illustrated in reduced showing in FIG. 2, is grasped with the hand so as to place the cone-shaped friction roller **19** in engagement with a surface **23** of any area. Then, by successive or repeated rolling movement of the friction roller **19** over the surface **23** always in the same direction of movement, as indicated by the curved arrow **24** in FIG. 2, the shaft **11** and the rotor **18** and the friction roller **19** will be rotated as a single unit while the casing **16** will be rotated by virtue of its contact or engagement with the outer race of ball bearing **12**. This rotatable movement of the shaft **11** as activated by the roller **19** will cause rotor **18** to turn and accelerate to such a high speed that its momentum, or stored kinetic energy, will produce a spinning motion to the top for an extended or increased time interval when the top is released from the hand and placed on its spinner tip **20** at the lower end of the roller **19**. The shaft **11** can be extended at the top thereof so as to project above and beyond the casing **16**, as indicated by the dotted line showing and the reference numeral **25** in FIG. 1 so that upon releasing the top from the hand after activation of the shaft **11** by the movement of the roller over the surface **23**, the top can be inverted and placed so as to seat on the shaft extension **25** so as to spin thereon rather than on the spinner tip **20**.

In FIG. 3 of the annexed drawings, I have illustrated a modified embodiment of my improved stringless gyro type top. In this modification, I provide a vertically arranged rotatable shaft **111** which is reduced at its lower end and press-fitted into a ball bearing **112**. The shaft **111** is extended at its upper end through a centrally located hole **113** in which the shaft moves freely; said hole being formed in the flat top **114** of an outer casing **116** which conveniently is coated or covered on its exterior surface from approximately the center of its height to the lower end with a resilient substance **116'** of sufficient softness as to not mar a surface over which the casing might be rolled. The casing **116** may be molded into any desired shape in the same manner as indicated above in respect to the casing **16**, such as into the shape illustrated in FIG. 3 to provide a substantially flat bottom **117** thereon which frictionally engages circumferentially the outer race of the bearing **112**. Interiorly of the casing **116** is a rotor or flywheel **118** which is cored at its center to permit free movement of the shaft **111** and which is firmly secured at its periphery to the inner peripheral wall of the casing. Thus, the casing **116** and the flywheel **118** rotate as a single unit, and the shaft **111** rotates by frictional engagement or contact with the inner race of ball bearing **112**.

In accordance with my invention, the modification of FIG. 3 is so constructed as to provide a flange **119** on a portion of shaft **111** which projects beyond the top **114** of casing **116**, and I provide a handle **121** on the shaft **111** which could be a separate element attached to the shaft extension or could be formed integral therewith; such handle **121** being enlarged and rounded so as to fit the palm of the hand with facility and for convenient grasping. In operation and as illustrated in FIG. 5 of the annexed drawings, the portion of the outer surface of outer casing **116** which is coated or covered with resilient material **116'** is brought into successive engagement with a relatively hard surface **123** with the handle **121** grasped at its rounded portion in the palm of the hand and with the thumb of the hand braced against the lateral flange **119**. By repeated rolling of the casing surface against the hard surface **123** in the same direction

of rolling, the rotor **118** is activated at increased rates of speed to maintain the top spinning for appreciable periods of time upon releasing the handle **121** and placing the top on its spinner tip **120**.

A still further modification of the present invention is illustrated in FIG. 4 wherein a rotatable shaft **211** is provided and press-fitted into a ball bearing **212** which is confined within a flywheel or rotor **218** to which the bearing is firmly secured. The rotor is coated or covered with a resilient material **218'** so that when the rotor itself is rolled successively over a relatively hard surface it will not scratch or otherwise mar such surface. The shaft **211** is provided with a laterally extending flange **219** and is extended there beyond to provide a handle **221** which is enlarged and conveniently rounded to fit the palm of the hand. If desired, the handle **221** can be a separate element and be attached to the shaft **211** rather than being formed integral therewith as shown. The lower end of the shaft **211** is reduced and tapered to provide a spinner tip **220**. While the flywheel **218** may be fashioned to any desired shape or configuration, the modified embodiment illustrated in FIG. 4 shows such rotor in the form of a semi-flattened circular body. In use, the enlarged rounded handle **221** is grasped in the palm of the hand with the thumb of the hand firmly pressed against the lateral flange **219**. With the modification so grasped, the outer surface of the rotor **218** is briskly rolled against a surface of any size or area, always in the same direction of rolling, so as to activate and rotate the shaft **211** as well as the bearing **212** and the rotor **218** all in unison. Upon release of the handle **221** and the placement of the spinner tip **220** on a surface, the buildup of kinetic energy in the rotor will cause the same to rotate at increasing speeds and to maintain the top spinning for appreciably long periods of time.

It is to be observed that all three embodiments of my improved spinable stringless top can be picked up while spinning and moved to a different surface or area, and still have sufficient energy to continue spinning without the necessity of re-activating the rotatable shaft thereof. When the momentum of the rotor of any one of the illustrated embodiments is reduced to a point on its spinning surface to have ineffective gyratory speed, reacceleration can readily be accomplished by simply grasping the casing, or the handle as the case may be, and repeating the strokes of the friction roller, or the casing, or the rotor, as shown in FIGS. 1, 3 and 4, respectively, and thereafter set the re-accelerated top on its spinner tip. It is to be noted that in the preferred embodiment of the invention illustrated in FIG. 1, the base of the inverted cone constituting the friction roller is made wider than the truncated bottom **17** of the outer casing **16** to enable the roller **19** to readily contact the underlying surface on which it is rolled or stroked without any interference from the casing **16**.

It is further to be observed that the embodiments illustrated are capable of being pierced variably throughout the casing or rotor with a series of holes in order to create various sound effects during the spinning of the tops.

I claim:

1. A toy stringless top comprising a manually grippable portion, an elongated shaft freely rotatively and vertically supported within said portion; said shaft having at least one end section projecting exteriorly of said portion, a rotor secured to and rotatable with said shaft within said portion having a moment of inertia capable of sustaining the angular momentum of said shaft for substantial periods of time, and a friction roller secured to said exteriorly projecting end section of said shaft, said friction roller being substantially smaller in diameter than said rotor whereupon a brisk rolling of said friction roller on a rigid surface, the rotor will revolve at a substantially greater peripheral speed than said friction roller.

2. A toy stringless top as set forth in claim **1**, wherein said portion is of a resilient material.

3. A toy stringless top as set forth in claim **1**, wherein said friction roller constitutes a cone-shaped body of soft rubber and wherein the base of said roller is wider than the bottom of said portion so as to extend beyond the same.

4. The toy stringless top as set forth in claim **2** wherein said resilient material is a high impact synthetic polymer.

5. The toy stringless top as set forth in claim **1** wherein said friction roller is of a soft resilient material.

6. The toy stringless top as set forth in claim **5** further including a rigid spinning tip at the furthermost extremity of said friction roller.

7. The toy stringless top as set forth in claim **6** wherein said spinning tip is metal.

8. A toy stringless top as set forth in claim **6** wherein said spinning tip is a synthetic polymer material.

9. The toy stringless top as set forth in claim **1** wherein said shaft is journaled in at least two spaced apart low friction bearings, said bearings being fixedly mounted to opposite ends of said portion.

10. The toy stringless top as set forth in claim **1** further comprising means extending exteriorly of said portion in axial alignment with said elongated shaft whereby said top can be operatively supported on the end of said portion opposite said end thereof having said end section of said shaft projecting exteriorly therefrom.

11. The toy stringless top as set forth in claim **10** wherein said means comprise an extension of said shaft.

12. The toy stringless top as set forth in claim **10** wherein said means comprises a protuberance on the top of said portion.

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