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N700 N706 N707 N746 N747
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U1S S1205

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(58) Field of search
UK CL (Edition J) **A6S, H1N**
INT CL[4] **A63H, H01H**

(54) **Electrical switch**

(57) An electrical switch including a contact member which comprises a coil spring (22), said coil spring (22) being resiliently deformable between a non-contacting or OFF position and a contacting or ON position with respect to opposed limbs (25) of a metal bracket.

The invention also provides a toy such as a Yo-Yo or Frisbee (Registered Trade Marks) incorporating one or more electrical switches to light a lamp or lamps and/or produce a musical phrase in response to spinning speed.

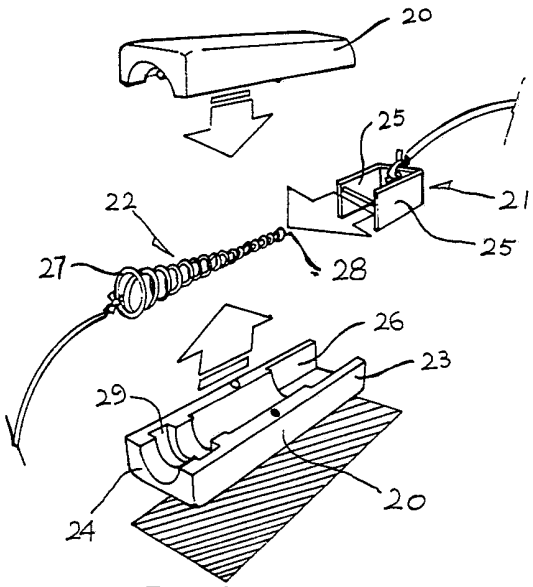

FIG.3

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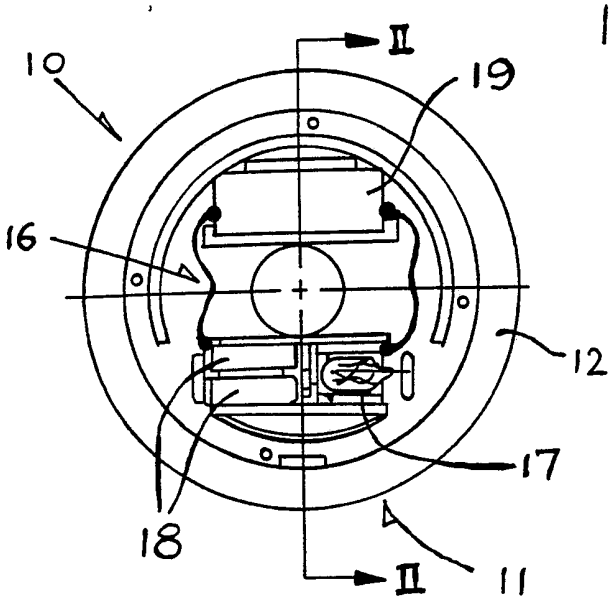

FIG. 1

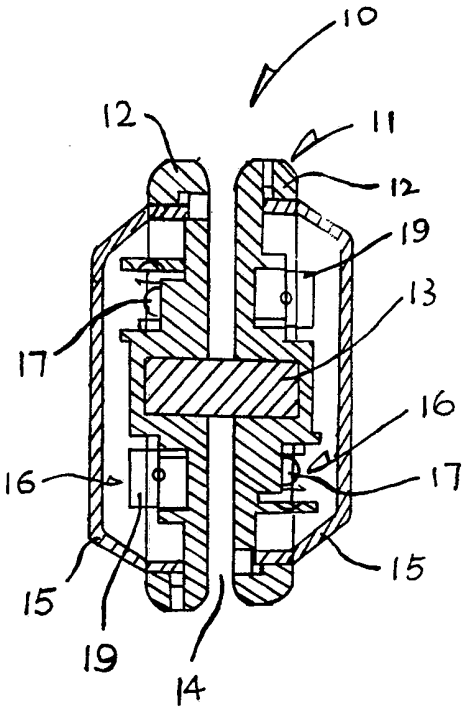

FIG. 2

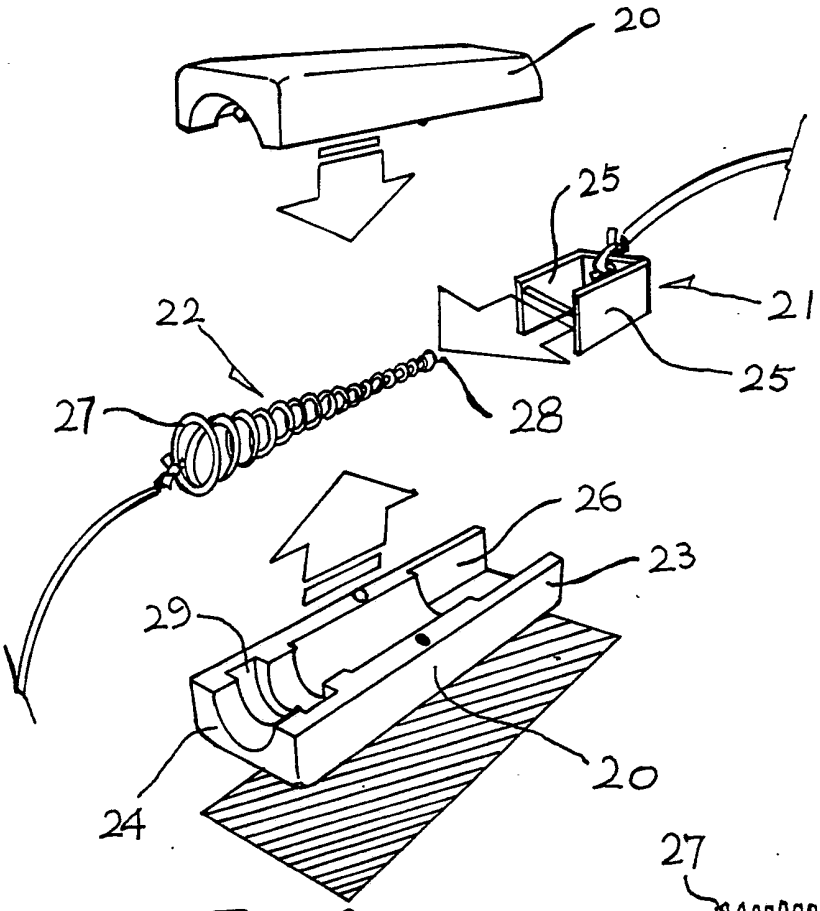

FIG. 3

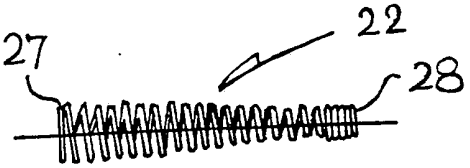

FIG. 3A

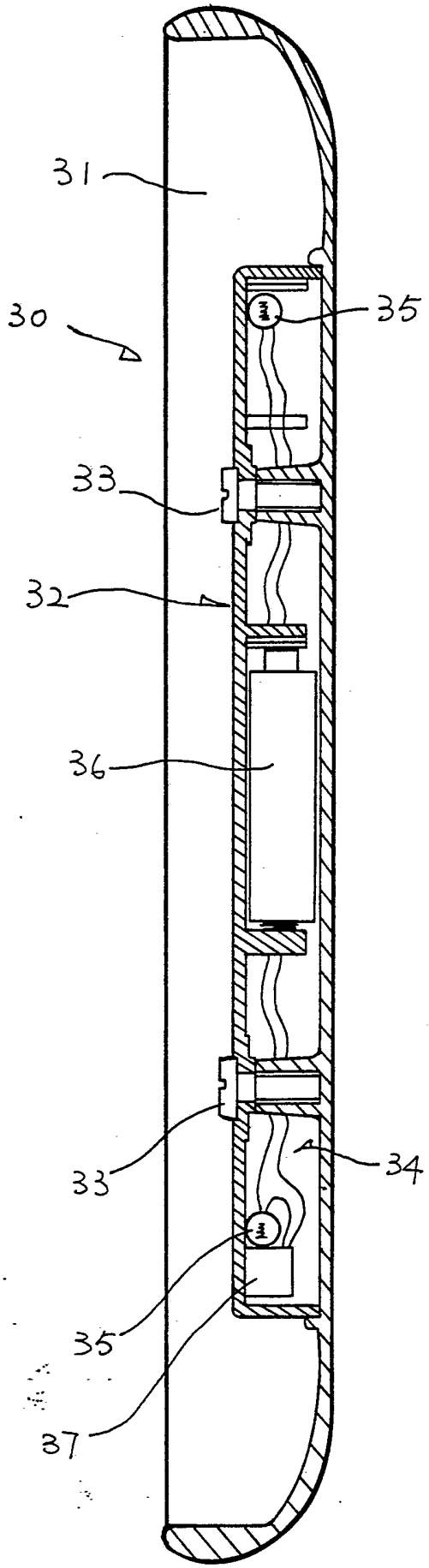

FIG.4

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ELECTRICAL SWITCH

The present invention relates to an electrical switch, and to a toy incorporating such an electrical switch.

According to the invention there is provided an electrical switch including a contact member which comprises a coil spring, said coil spring being resiliently deformable between a non-contacting or OFF position and a contacting or ON position.

Preferably, the coil spring forms the contact.

The electrical switch preferably includes a fixed contact which is co-operable with the first-mentioned contact.

Preferably, the coil spring includes a free end which is located adjacent to, but without touching, the fixed contact.

The invention further provides a toy comprising an electrical circuit which incorporates an electrical switch as hereinbefore defined, said switch being arranged to switch on the circuit to produce a signal.

Other, preferred features of the invention will be apparent from the following description and the accompanying claims 5 to 8 and claims 11 to 14.

The invention will now be more particularly described, by way of example, with reference to the drawings, in which:

Figure 1 is a front view of a first embodiment of a toy in accordance with the invention;

Figure 2 is a sectional side view, taken along line II-II, of the toy of Figure 1;

Figure 3 is an exploded perspective view of a switch used in the toy of Figure 1 or 2;

Figure 3A is a side view of a spring of the switch of Figure 3; and

Figure 4 is a sectional side view of a second embodiment of a toy in accordance with the invention.

Referring to Figures 1 and 2 of the drawings, a first embodiment of a toy in accordance with the invention shown therein is in the form of a yo-yo (RTM) 10. The yo-yo 10 comprises a body 11 which is formed by two dish members 12. The two members 12 are connected back-to-back together by a concentric axle 13, forming a gap 14 therebetween for a string (not shown), and are closed by respective covers 15. The yo-yo 10 further comprises two electrical circuits 16 which are located in the

respective dish members 12, and each circuit 16 includes a light bulb 17 connected electrically in series with two batteries 18 and a switch 19. Each dish member 12 has appropriate formations so as to fix the components of the corresponding electrical circuit 16 in position.

Figures 3 and 3A show the construction of the switches 19. Each switch 19 includes an elongate two-part housing 20, and first and second switch contacts 21 and 22 located at respective ends 23 and 24 of the housing 20. The first contact 21 is provided by a copper bracket having two opposed parallel limbs 25, and is located in a recess 26 in the housing end 23. The second contact 22 is provided by a copper coil spring which, as best shown in Figure 3A, converges from a relatively larger end 27 to a relatively smaller end 28. The larger end 27 is fixed in an annular groove 29 in the other end 24 of the housing 20, and the spring 22 is arranged into a non-contacting or OFF position in which the smaller end 28 is located between, but without touching, the two limbs 25 of the first contact 21.

The switch 19 normally remains open, but will be closed when it is subject to a sufficiently large acceleration or impulse. In order to increase the sensitivity of the switch 19, a few turns at the free end 28 of the coil spring 22 are formed closer together than are the rest of

the turns so as to provide additional weight at the free end 28. Each switch 19 is eccentrically located in the corresponding dish member 12, and in a position in which the two limbs 25 of the first contact 21 lie parallel to the axial direction of the axle 13.

When the yo-yo 10 is set into motion by a user, the housing 11 rotates with respect to the axis of the axle 13. Under the action of sufficient centrifugal force, the free end 28 of the coil spring 22 will bend towards and come into a contacting or ON position in which it contacts the outer limb 25 of the first contact 21, thereby closing the switch 19. The light bulb 17 is then energised as long as the yo-yo 10 is rotating sufficiently fast.

Figure 4 shows a second embodiment of a toy according to the invention and which is in the form of a flying disc 30. The disc 30 comprises a dish-like body 31 which in itself is a conventional flying disc or "frisbee" (RTM), an elongate rectangular housing 32 which is secured by two screws 33 to and at the centre of the inner side of the body 31, and an electrical circuit 34 located in the housing 32 for producing light. The electrical circuit 34 includes two light bulbs 35, two batteries 36 and a switch 37, all connected electrically in series. Each light bulb 35 is located at a respective end of the

housing 32, and the two batteries 36 are located in the middle part of the housing 32 so as to maintain the flying disc 30 in balance.

The switch 37 is identical with and operates in the same manner as the switches 19 used in the yo-yo 10. It is located at one end of the housing 32, and is therefore eccentric with respect to the body 31. This results in the switch 37 being closed to energise the light bulbs 35 when the flying disc 30 is thrown in the conventional way.

Instead of producing a light signal, the circuits 16 and 34 can be modified into electronic circuits for producing an audible signal, such as a musical phrase, for example by means of an integrated circuit and a piezo-electric buzzer, or can be modified to produce both light and audible signals.

It is conceived that the present invention may also be applied to other toys, or any parts thereof, which are set into rotating, swinging or pivoting action in normal operation. Examples of these are spinning tops, spinning wheels, swinging tambourines, swinging spiky balls, flying disc-like bullets launched by toy guns, and wheels of toy vehicles or the like, etc.

The invention is described by way of example only, and various modifications and/or alterations will be apparent to persons skilled in the art without departing from the scope of the invention.

CLAIMS

1. An electrical switch including a contact member which comprises a coil spring, said coil spring being resiliently deformable between a non-contacting or OFF position and a contacting or ON position.

2. An electrical switch as claimed in claim 1, wherein the coil spring forms the contact.

3. An electrical switch as claimed in claim 1 or claim 2, further includes a fixed contact which is co-operable with the first-mentioned contact.

4. An electrical switch as claimed in claim 3, wherein the coil spring includes a free end which is located adjacent to, but without touching, the fixed contact.

5. An electrical switch as claimed in claim 4, wherein the coil spring is deflectable between the non-contacting or ON position and the contacting or OFF position.

6. An electrical switch as claimed in claim 4 or claim 5, wherein the free end of the coil spring is weighted.

7. An electrical switch as claimed in claim 6, wherein the number of turns per unit length of the coil spring at

the free end is greater than that of the rest of the spring.

8. An electrical switch as claimed in any one of claims 3 to 7, wherein the fixed contact is in the form of a bracket which includes two opposed portions between which the free end of the coil spring is located.

9. An electrical switch substantially as hereinbefore described with reference to the accompanying drawings.

10. A toy comprising an electrical circuit which incorporates an electrical switch as claimed in any one of the preceding claims, said switch being arranged to switch on the circuit to produce a signal.

11. A toy as claimed in claim 10, wherein the electrical circuit is adapted to produce a light signal.

12. A toy as claimed in claim 10, wherein the electrical circuit is adapted to produce an audible signal.

13. A toy as claimed in claim 11 or claim 12, which is a yo-yo.

14. A toy as claimed in claim 11 or claim 12, which is a flying disc.

15. A toy substantially as hereinbefore described with reference to the accompanying drawings.

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