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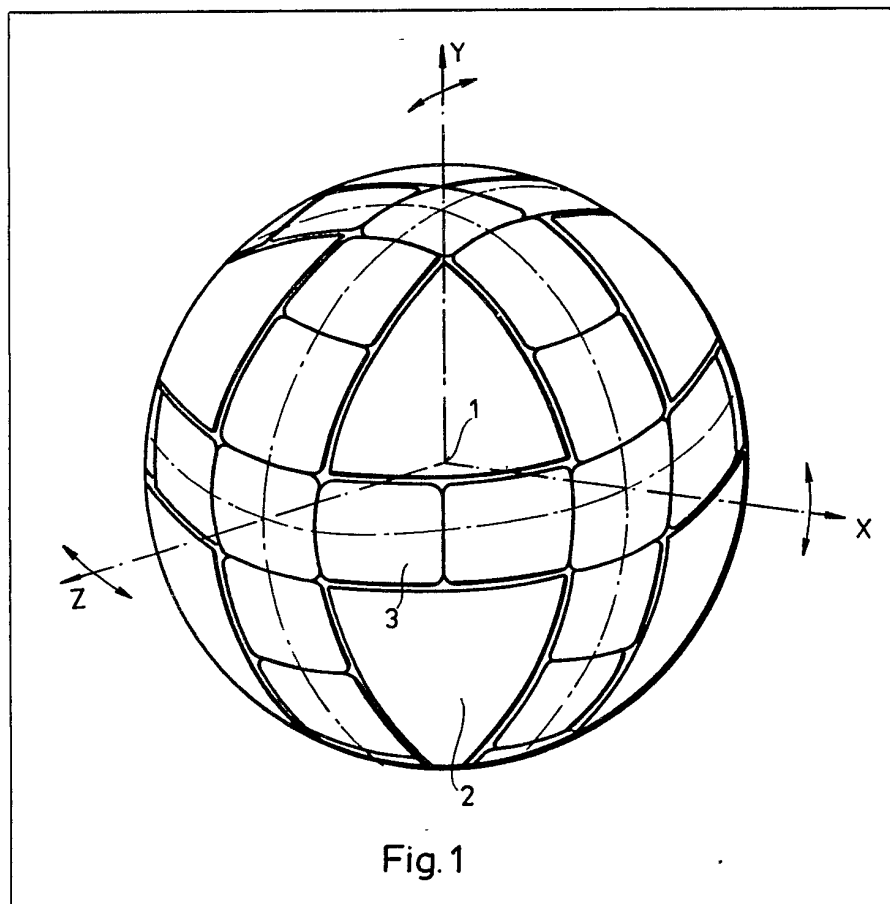
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(54) **Ball puzzle with sliding elements**

(57) The surface of the ball is formed of fixed immovable guide elements (2) and sliding elements (3) displaceable along grooves between the guide elements (2). Preferably a central portion of the ball is formed from eight spherical segments, each of which bears a guide element (2), and thirty sliding elements are provided in the grooves.



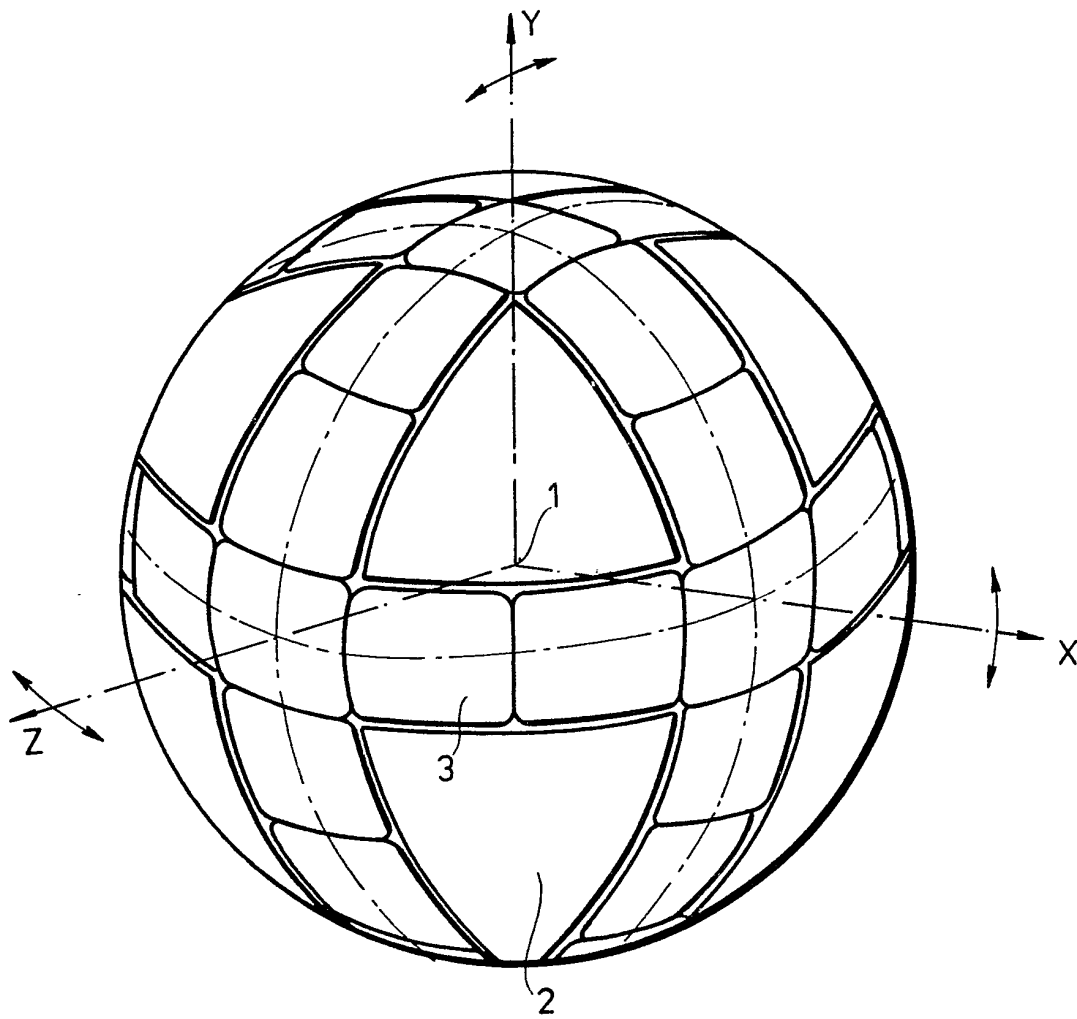


Fig.1

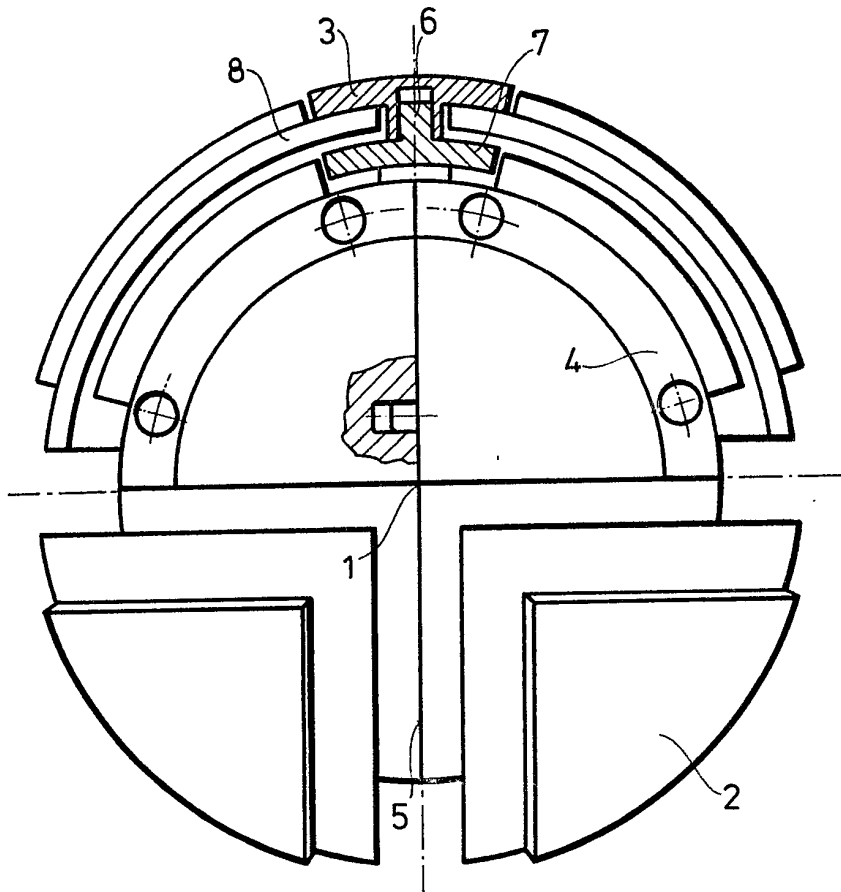


Fig. 2

SPECIFICATION

Improvements in or relating to logic toys

5 The invention relates to a logic toy in the form of a "magic ball", which forms, in respect to its appearance, a closed unit. Such a toy may be used for solving different tasks requiring a way of thinking directed to spatiality, in a most amusing and playful manner.

10 Logical toys with a wide variety of systems, appearances and modes of operation are known. A common characteristic is that the constructional elements thereof form independent units. One such toy widely known as the "magic cube" has the aim of promoting the development of logical ability and a way of thinking directed to spatially. In the case of the magic cube, from the appearance of the cube it may be seen that three types of element are required according to the function of the cube. The cube contains a total of twenty seven ($26 + 1$) elements, of which six, twelve and eight are absolutely identical and can be turned-off in groups of nine. A further characteristic is that the corner elements eight pieces) may be turned exclusively to a corner (the number of orientations amounts to three), the edgecubes (of which there are twelve) may be turned only to edges (the number of orientations amounts to two), while the elements arranged in the middles of the faces cannot be exchanged at all.

15 According to the invention, there is provided a logic toy comprising a ball whose surface comprises fixed immovable guide elements and sliding elements displaceable between the guide elements.

20 It is thus possible to provide a new, interesting toy, which when compared to other known toys, requires logical thinking to a higher degree.

25 Such a toy comprises a "magic ball" having a surface comprising fixed, immovable guide elements, serving as orienting or guiding surfaces only, and sliding elements to be displaced between the guide elements. The common surface of the guide elements and the sliding elements forms the outer surface of the magic ball.

30 The relative arrangement of the guide elements and the sliding elements on the surface of a preferred magic ball can be described in the most simple manner, if the centre of the magic ball is notionally placed at the centre of an imaginary spatial co-ordinate system XYZ. In this case, the planes XY, SZ and YZ intersect three circles at the surface of the magic ball. Along the circles, at least along two of them, the sliding elements are arranged in a slideable manner. Between the sliding elements the fixed, immovable guide elements are arranged. The sliding elements having been arranged along one circle may be turned-off along the circle in either one or the

35 other direction. The sliding elements at the points of intersection of two circles, may be turned-off either with the sliding elements lying on one of the circles or with those lying along the other circle. Accordingly the possibility of displacement in four directions is provided.

40 The sliding elements lying at the points of intersection may be displaced from one circular arc to the other, so that a sliding element could be displaced to the place of any other sliding element. In such a manner the relative positions of the single sliding elements can be varied within a wide range.

45 The surface of the magic ball can be provided with one or more figures, numbers, colours etc. In such a manner, in its original position, the surface of the magic ball shows a complete figure (or more figures) or uniformly arranged colours etc. By turning-off the sliding elements from their original position, the homogenous picture or colour-arrangement falls to pieces. The essence of the logic lies in that the original picture or colour-arrangement is to be restored by the rotation of the sliding elements.

50 The invention will be further described, by way of example, with reference to the accompanying drawings, wherein:

55 *Figure 1* shows a magic ball in a spatial co-ordinate system XYZ; and

60 *Figure 2* is a part sectional view of the magic ball of Fig. 1.

65 A magic ball 1 constituting a preferred embodiment of the invention comprises eight guide elements 2 and thirty sliding elements 3. The common surface of these elements forms the surface of the magic ball 1.

70 The guide elements 2 are identical and the surface of each has the shape of a spherical triangle. The sliding elements are also identical, each having the shape of a spherical rectangle (Fig. 1).

75 The eight guide elements 2 are fixed and cannot be moved, whereas between them the sliding elements 3 may be displaced and turned-off, respectively.

80 The guide elements 2 and the sliding elements 3 are arranged on the surface of the magic ball 1 in the following manner:

85 When the centre of the magic ball 1 is placed at the middle of a spatial co-ordinate system XYZ, the co-ordinate planes divide the magic ball 1 into eight spherical segments.

90 On the surface of each of the spherical segments 4, respective guide element 2 is arranged or formed in such a manner that the edges thereof are parallel to the co-ordinate planes and lie at equal distance therefrom (Fig. 1). The co-ordinate planes XY, SZ, YZ intersect three circles at the surface of the magic ball 1. The sliding elements 3 are arranged along these circles, between the guide elements 2. Along each circle twelve sliding elements 3 are arranged, however, as

the sliding elements lying in the points of intersection of the circles are common, a total of thirty gliding elements 3 is required.

5 The embodiment shown in the drawings has a construction that the hollow body of the magic ball 1 consists of eight spherical segments 4, which are either joined by rabbets or glued to each other. The surfaces thereof form the guide elements 2, and the segments 10 define grooves 5 whose profiles correspond to the width and depth of the sliding elements 3 so as to retain the sliding elements 3.

15 The sliding elements 3 are arranged in the profiled grooves 5 in a manner such that the protruding parts 8 of the profiled groove 5 enter between flanges 7 on rabbets 6 for the sliding elements and the sliding elements themselves, so that the sliding elements 3 can slide only on one circular arc of the spherical 20 surface.

In another preferred embodiment (not illustrated here), the guide element 2 and the profiled groove 5, or half thereof, form a separate element and are fixed to the inner 25 ball or onto the shell of the ball.

As already mentioned, twelve sliding elements 3 are arranged on one circle. These can be turned-off simultaneously along the circle, in one direction or in the other. As a consequence, the relative positions of the sliding elements 3 lying on the same circle are not 30 changed by one or more turns. However, as any two circles contain two common sliding elements 3, when turning the sliding elements 3 lying on one of the circles, new sliding elements 3 are moved into the other two circles, and accordingly their relative position on that place will change. Any sliding element 3 can be displaced to any point of the magic 35 ball 1 having been previously occupied by any other sliding element 3. At the same time, the position of any sliding element 3 in relation to the other sliding element 3 cannot be optional.

45 Any sliding element 3 can be turned-off with the sliding element 3 lying diagonally opposite to it only in a synchronized manner, that is to say, the sliding elements 3 lying diagonally opposite to each other keep their 50 relative positions in pairs. Although, in such a manner the number of the possible positions, which could be obtained by displacing a sliding element 3 to the place of an adjacent sliding element 3, will be reduced, the number of diverse positions will still be extremely 55 high, and this constitutes an advantage in comparison with the magic cube.

A further embodiment may be obtained by changing the number of the guide elements 2 60 (for instance to 4 pieces) or by changing the number of the sliding elements 3 in the case of the previously described embodiment. However, the embodiment described is considered to be far better realization than any 65 other solution.

The material of which the magic ball 2 is made may be a readily workable material. Alternatively, the ball may be made of any solid material such as metal, wood etc. The 70 size should be such that it can be held easily in the hand.

CLAIMS

1. A logic toy comprising a ball whose 75 surface comprises fixed immovable guide elements and sliding elements displaceable between the guide elements.
2. A toy as claimed in claim 1, in which 80 the sliding elements are disposed along two or three circles defined by the intersections of co-ordinate planes of a rectangular spatial co-ordinate system whose origin is at the centre of the ball, the guide elements forming the remaining part of the ball.
- 85 3. A toy as claimed in claim 1 or 2, in which the surface of the ball is formed by eight guide elements, each having the shape of a spherical triangle, and thirty sliding elements, each having the shape of a spherical 90 rectangle.
4. A toy as claimed in any one of the preceding claims, in which the body of the ball is formed by eight spherical segments, the outer surfaces of which form the guide 95 elements and which define therebetween profiled grooves whose width and depth correspond to the sliding elements for receiving the sliding elements.
5. A ball as claimed in claim 4, in which 100 protruding parts of the spherical segments extend between inner and outer flanges of the sliding elements.
6. A logic toy substantially as hereinbefore 105 described with reference to and as illustrated in the accompanying drawings.