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(54) **Puzzle system**

(57) A puzzle system comprises a first and second polyhedral object (1,2;52,53). The first polyhedral object (1;52) comprises at least a first picture-bearing face (5; 11-16;57) and the second polyhedral object (2;53) comprises at least two picture-bearing faces (7;17-22;59), each picture on an associated picture-bearing face (5,7; 11-22;57,59) being displayed correctly at one intended angle ( $\alpha,\beta$ ) about an axis (6,8) perpendicular to the associated picture-bearing face (5,7). The puzzle system comprises co-operating detection and sound-emitting

systems, arranged to emit a first sound only upon detecting that the first and second polyhedral object (1,2; 52,53) have been juxtaposed with a face of the first polyhedral object (1;52) facing a face (54) of the second polyhedral object (2;53) and with a picture on the first picture-bearing face (57) of the first polyhedral object (52) at its intended angle being observable adjacent to a picture on a first picture-bearing face (59) of the second polyhedral object (53) at its intended angle when looked at in a direction substantially parallel to the facing faces.

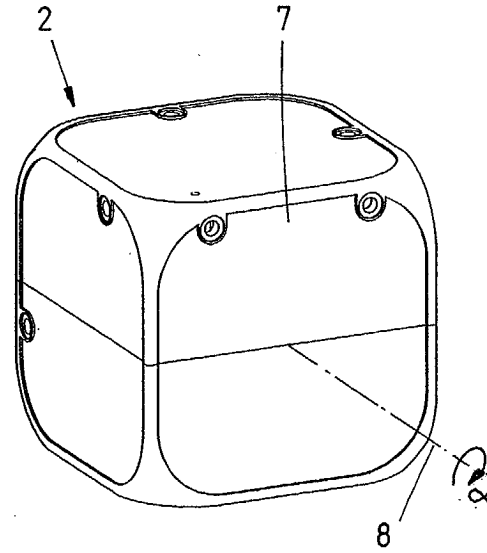
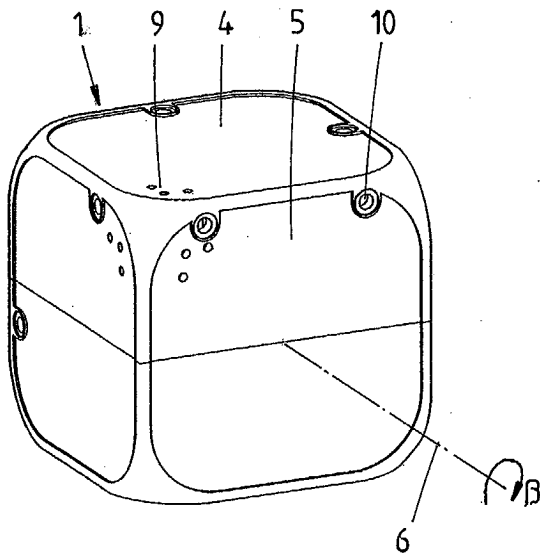


Fig.1

**Description**

5 [0001] The invention relates to a puzzle system comprising a first and second polyhedral object, wherein the first polyhedral object comprises at least a first picture-bearing face and the second polyhedral object comprises at least two picture-bearing faces, each picture on an associated picture-bearing face being displayed correctly at one intended angle about an axis perpendicular to the associated picture-bearing face, wherein the puzzle system comprises co-operating detection and sound-emitting systems, arranged to emit a first sound only upon detecting that the first and second polyhedral object have been juxtaposed with a face of the first polyhedral object facing a face of the second polyhedral object and with a picture on the first picture-bearing face of the first polyhedral object at its intended angle being observable adjacent to a picture on a first picture-bearing face of the second polyhedral object at its intended angle when looked at in a direction substantially parallel to the facing faces.

10 [0002] An example of such a puzzle system is known and currently marketed by the applicant under the trade name "Sound Cubes". The known system comprises two identically shaped plastic cubes. A set of six pictures has been distributed over the faces of the first cube and the same six pictures have been distributed over the faces of the second cube. Each picture occupies substantially the whole area of an associated picture-bearing face and is thus substantially square in shape. Each picture has a definite orientation in the sense that of the four sides of the square, it is possible to distinguish between an upper, a lower, a left and a right side, regardless of the actual contents of the picture. Thus, it is possible to define an upright position as an orientation about a viewing axis perpendicular to the picture-bearing face in which the upper side is at the top. Two electric contacts are arranged on each surface of both cubes. One of the cubes contains a sound-emitting system. A detection system comprises an electric circuit, which is closed when two contacts on the surface of one cube make contact with two contacts on the surface of the other cube. A sound-emitting system is responsive to the detection system for emitting one of six sounds, each associated with one of the pictures. The player must arrange the cubes side-by-side and in contact with each other. When a picture on one cube is placed adjacent the same picture on the other cube, with both pictures the right way up, this is detected and the associated sound is emitted.

20 [0003] The known system thus tests merely the player's ability to find appropriate combinations of two pictures. Thus, it can only be used to implement a very limited test of the player's cognitive abilities and is thus suited primarily for very young children.

25 [0004] It is an object of the invention to provide an improved system of the kind mentioned above, that implements a more advanced test of the player's cognitive abilities.

30 [0005] This object is achieved by the puzzle system according to the invention, which is characterised in that the detection and sound-emitting systems are arranged to emit a second sound only upon detecting that the first and second polyhedral object have been juxtaposed with a further face of the first polyhedral object facing a further face of the second polyhedral object and with the picture on the first picture-bearing face of the first polyhedral object at its intended angle being observable adjacent to a picture on a second picture-bearing face of the second polyhedral object when looked at in a direction substantially parallel to the further facing faces.

35 [0006] Thus, the puzzle system is suitable for implementing a test of the ability of a player to order the pictures on the picture-bearing faces into a sequence. Because the first sound is only emitted when the picture on the first picture-bearing face of the first polyhedral object is combined with the first picture-bearing face of the second polyhedral object and a different second sound is only emitted when it is combined with that on the second picture-bearing face of the second polyhedral object, the player must mentally order the combinations. The first sound is a reward for finding the first combination, the second sound is a reward for finding the second combination.

40 [0007] Preferably, the system is arranged to emit the first sound only when the second polyhedral object has been placed at a first position relative to the first polyhedral object and the second sound only when the second polyhedral object has been placed at a different position relative to the first polyhedral object.

45 [0008] Thus, the order of the sounds gives a further indication of whether the polyhedral objects have been juxtaposed in the intended order of relative positions. The reward for combining the objects in the correct relative orientations in the correct order is a correct order of different sounds, each sound being unique for a unique juxtaposition of the polyhedral objects.

50 [0009] In a preferred embodiment, the first and second position are on opposite sides of the first picture-bearing face of the first polyhedral object.

[0010] Thus, a story can unfold, with each picture on a picture-bearing face forming a frame in a sequence depicting the story. This arrangement is rather like that of a comic strip and thus comes naturally to the user of the puzzle system.

55 [0011] In a preferred embodiment, the first polyhedral object comprises at least one further picture-bearing face, each picture on the further picture-bearing face being displayed correctly at one intended angle about an orientation axis perpendicular to the associated picture-bearing face, wherein the detection and sound-emitting systems are arranged to emit a third sound, only upon detecting that the first and second polyhedral objects have been juxtaposed with a face of the first polyhedral object facing a face of the second polyhedral object and with a picture on the further

picture-bearing face of the first polyhedral object at its intended angle being observable adjacent to a picture on the second picture-bearing face of the second polyhedral object at its intended angle when looked at in a direction substantially parallel to the facing faces.

[0012] Thus, sequences of more than three pictures are possible, making the game more interesting.

[0013] In a preferred embodiment, the sound-emitting system comprises an arrangement for reproducing a voice recording, wherein preferably, each sound comprises a voice recording comprising a different spoken message.

[0014] Thus, a sequence of pictures can represent a sequence of episodes in a story, which is told as the polyhedral objects are juxtaposed in the correct orientation relative to each other in a plane. The reward for finding the correct next combination is the recital of a further episode, preferably building on the previous episode.

[0015] The invention will now be explained in further detail with reference to the accompanying drawings, of which:

Fig. 1 is a perspective view of a puzzle system comprising two cubes;

Fig. 2 is a perspective view from one side of the cube containing the sound-emitting system;

Figs. 3A and 3B are schematic views of the faces of the two cubes with their contact arrangement; and

Fig. 4 is a very schematic diagram of another variant of the puzzle system, comprising two prisms.

[0016] The embodiment of the puzzle system described herein by way of non-limiting example comprises a first cube 1 and a second cube 2, both examples of a polyhedral object. Other embodiments of the puzzle system may comprise two prisms, as shown in Fig. 4 or two cuboctahedrons, for example. Other polyhedrons will easily occur to the mathematically inclined. The invention is not limited to any particular class, nor is it absolutely necessary that the two polyhedral objects be of the same shape.

[0017] The first and second cubes 1,2 are made of two halves, for instance from plastic. At least the first cube 1 is hollow, as it houses some electronics (not shown) and a battery compartment 3, shown in Fig. 2. On the faces of the first and second cubes 1,2 are recessed surfaces 4 (Fig. 1), on which a picture (not shown) can be applied, for example by means of a transfer. The pictures each represent a scene in a sequence, for instance forming a story. The object of the puzzle is to position the two cubes 1,2 next to each other, with the second cube 2 alternately to the right and to the left of the first cube 1. This is to be done in such a way that two consecutive scenes are projected on a plane facing the player, the scene to the right following the scene to the left in the story.

[0018] To aid in understanding, Fig. 1 shows a first picture-bearing face 5 of the first cube, and an axis 6 perpendicular to the first picture-bearing face 5. Fig. 1 also shows a second picture-bearing face 7 of the second cube 2, and a corresponding axis 8, which is perpendicular to the second picture-bearing face 7. The picture on the first picture-bearing face 5 is the right way up when placed in a plane at one intended angle  $\alpha$ , just as the picture on the second picture-bearing face 7 is the right way up when oriented at an angle  $\beta$  around the axis 8 perpendicular to it. The first and second cube 1,2 are to be juxtaposed, for example by placing them on a shelf or table, in which position the two axes are in parallel and the angles  $\alpha, \beta$  are at their intended values for viewing the pictures the right way up.

[0019] Each time two picture-bearing faces have been correctly placed side-by-side in the plane, an appropriate sound is emitted by a sound emitting system in the first cube 1 through holes 9 in the first cube 1. In this example, the sound emitting system comprises an arrangement for reproducing a voice recording and a different spoken message is reproduced for each combination of pictures. Each spoken message is only reproduced for a specific combination of pictures. Thus, a story is told, for example providing dialogue to characters shown on the pictures on the picture-bearing faces.

[0020] Subsequently, the cube placed to the right is to be left in place, with its picture-bearing face remaining in position. The cube on the left must be picked up and rotated, before being placed to the right of the cube that remained in position, i.e. in a position on the opposite side of the other cube from that occupied previously. The trick is to do this in such a way that the picture following the picture on the picture-bearing face that remains in position is placed next to the picture-bearing face remaining in position, with both pictures the right way up.

[0021] The puzzle system comprises a detection system, distributed over the first and second cubes 1,2. The detection system detects whether, and if so, which two consecutive pictures have been correctly placed side by side in a plane, and co-operates with the sound-emitting system to reproduce the appropriate voice recording.

[0022] In the present example, the detection system comprises electric contacts 10, provided on the picture-bearing faces of the first and second cubes 1,2. Faces on the first cube 1 comprise three contacts, those on the second cube 2 comprise two. The two contacts on the face of a second cube 2 are electrically connected inside the second cube 2. When placed in contact with two of the three contacts on the face of the first cube 1, a circuit is closed, providing a signal for the co-operating detection and sound-emitting systems.

[0023] Fig. 3 shows an example of the lay-out of the first cube (Fig. 3A) and second cube 43 (Fig. 3B). It is assumed that there are eleven different sound recordings, thus eleven different combination of pictures. Faces 11-16 of the first cube 1 are each shown with an arrow to aid in applying the pictures on their surface. Faces 17-22 of the second cube 2 are similarly adorned. In addition, contacts 23-39 provided on the faces of the first cube 1 and contacts 40-51 provided

on the faces of the second cube 2 are labelled for reference when consulting Table 1, provided below.

TABLE 1

Left Picture		Right picture		First contact combination	Second contact combination
Number	Orientation	Number	Orientation		
13	→	19	←	46-33	29-42
19	←	14	←	28-44	45-31
14	←	18	←	39-47	43-37
18	←	12	→	51-34	50-35
12	→	20	↓	41-24	40-23
20	↓	16	↓	49-25	48-24
16	↓	21	↑	34-43	47-36
21	↑	15	↑	51-38	37-50
15	↑	17	→	28-46	32-42
17	→	11	→	45-33	44-30
11	→	22	↓	41-27	40-26

**[0024]** In Table 1, the arrows depicted show the inclination of the corresponding angle shown in Figs. 3A and 3B when the pictures applied to that face is at its intended angle, i.e the right way up. Thus, the first picture in the sequence of pictures is borne by the face of the first cube 1 labelled 13 in Fig. 3A. The second picture, which follows the first picture logically in the sequence, is on face number 19 of the second cube 2. When placed at their intended angle, with the first cube in contact with the second cube, the contacts 29 and 33 on the face 14 of the first cube 1 contact the contacts 42 and 46 on a face 18 of the second cube 2. This closes a circuit which triggers the reproduction of a first voice recording. The first cube 1 is then placed to the right of the second cube 2, with a different picture-bearing face 14 adjacent the face 19 that was previously the face bearing the picture on the right-hand side. Now, the contacts 28 and 31 provided on a face 13 of the first cube 1 are in contact with contacts 44 and 45 on a face 20 of the second cube 2. This closes a different circuit, triggering the reproduction of a different voice recording, the second part of the story.

**[0025]** Fig. 4 shows a variant of the puzzle system comprising a first prism 52 and a second prism 53. A first face 54 of the second prism 53 faces a corresponding face (not visible) of the first prism 52. In Fig. 4, the first and second prisms 52,53 are shown spaced slightly apart for illustrative purposes. To ensure that a sound is emitted in the actual physical embodiment, the first face 54 must be in close proximity and thus parallel to the corresponding face of the first prism 53. The outlines of a first orientation plane 55, parallel to the first face 54 are shown for reference purposes. Perpendicular to the first orientation plane 55 is a second orientation plane 56 also indicated by means of its outlines. The direction of viewing is normal to the second orientation plane 56, and thus parallel to the first orientation plane 55. When the first and second prism 52,53 have been so juxtaposed, a first picture-bearing face 57 of the first prism 52 projects an image 58 on the second orientation plane 56. A first picture-bearing face 59 of the second prism projects an image 60 on the second orientation plane 56 too. Note that the picture-bearing faces 57,59 are not parallel to the second orientation plane 56 and that the orientation planes 55,56 are imaginary constructs, defined here to aid in the definition of the invention. The images 58,60 are adjacent, in the sense that no picture-bearing face of the first and second prisms 52,53 projects an image in between the two images 58,60.

**[0026]** Assuming that both the first picture-bearing faces 57,59 are both at their intended angle about an orientation axis perpendicular to these faces, the two images 58,60 are both the right way up, and depict two consecutive scenes in a story. A first sound is then emitted. If the second prism 53 is subsequently placed on the other side of the first prism 52, with a particular predetermined further face (not shown) correctly facing a further face 61 of the first prism 52, a second sound is emitted. In that case, a second picture-bearing face of the second prism 53 will project an image adjacent and to the left of the image 58 projected by the picture on the first picture-bearing face of the first prism 52.

**[0027]** The invention is not restricted to the embodiments described above, which may be varied in a number of ways within the scope of the appended claims. For example, instead of using electric contacts, there may be provided an optical detection system, comprising light-emitting diodes on one cube and light sensors on the other cube, for example. In this respect, it is to be noted that the term juxtaposed does not necessarily imply that the polyhedral objects in the puzzle system are positioned in contact with each other. Rather, their proximity is determined by the sensitivity and

type of detection system employed. It is further noted, that it is not a necessary requirement that there be only two polyhedral objects in the puzzle system. An implementation is possible, in which three or four cubes are to be placed in a line, with the leftmost cube being transferred to the right each time a sound has been emitted.

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## Claims

1. Puzzle system comprising a first and second polyhedral object (1,2;52,53), wherein the first polyhedral object (1;52) comprises at least a first picture-bearing face (5;11-16;57) and the second polyhedral object (2;53) comprises at least two picture-bearing faces (7;17-22;59), each picture on an associated picture-bearing face (5,7;11-22;57,59) being displayed correctly at one intended angle ( $\alpha,\beta$ ) about an axis (6,8) perpendicular to the associated picture-bearing face (5,7), wherein the puzzle system comprises co-operating detection and sound-emitting systems, arranged to emit a first sound only upon detecting that the first and second polyhedral object (1,2;52,53) have been juxtaposed with a face of the first polyhedral object (1;52) facing a face (54) of the second polyhedral object (2;53) and with a picture on the first picture-bearing face (57) of the first polyhedral object (52) at its intended angle being observable adjacent to a picture on a first picture-bearing face (59) of the second polyhedral object (53) at its intended angle when looked at in a direction substantially parallel to the facing faces, **characterised in that** the detection and sound-emitting systems are arranged to emit a second sound only upon detecting that the first and second polyhedral object (1,2;52,53) have been juxtaposed with a further face of the first polyhedral object facing a further face of the second polyhedral object and with the picture on the first picture-bearing face (57) of the first polyhedral object (1;52) at its intended angle being observable adjacent to a picture on a second picture-bearing face of the second polyhedral object (2;53) when looked at in a direction substantially parallel to the further facing faces.
2. Puzzle system according to claim 1, arranged to emit the first sound only when the second polyhedral object (2;53) has been placed at a first position relative to the first polyhedral object (1;53) and the second sound only when the second polyhedral object (2;53) has been placed at a different position relative to the first polyhedral object (1;52).
3. Puzzle system according to claim 2, wherein the first and second position are on opposite sides of the first picture-bearing face (5;57) of the first polyhedral object (1;52).
4. Puzzle system according to any one of the preceding claims, wherein the first polyhedral object (1;52) comprises at least one further picture-bearing face (11-16), each picture on the further picture-bearing face (11-16) being displayed correctly at one intended angle about an orientation axis perpendicular to the associated picture-bearing face, wherein the detection and sound-emitting systems are arranged to emit a third sound, only upon detecting that the first and second polyhedral objects (1,2;52,53) have been juxtaposed with a face (61) of the first polyhedral object (1;52) facing a face of the second polyhedral object (2;53) and with a picture on the further picture-bearing face of the first polyhedral object (1;52) at its intended angle being observable adjacent to a picture on the second picture-bearing face of the second polyhedral object (2;53) at its intended angle when looked at in a direction substantially parallel to the facing faces.
5. Puzzle system according to any one of the preceding claims, wherein the detection and sound-emitting systems are comprised in the polyhedral objects (1,2;52,53).
6. Puzzle system according to claim 5, wherein the sound-emitting system is comprised in only one of the polyhedral objects (1).
7. Puzzle system according to any one of the preceding claims, wherein the detection system comprises a plurality of electric contacts (10;23-51), provided on a plurality of contact-bearing faces (5,7;11-22) of each polyhedral object (1,2).
8. Puzzle system according to claim 7, wherein at least one of the contact-bearing faces (5,7;11-22) of a polyhedral object (1,2) is also a picture-bearing face.
9. Puzzle system according to any one of the preceding claims, wherein the sound-emitting system comprises an arrangement for reproducing a voice recording.

10. Puzzle system according to claim 9, wherein each sound comprises a voice recording comprising a different spoken message.

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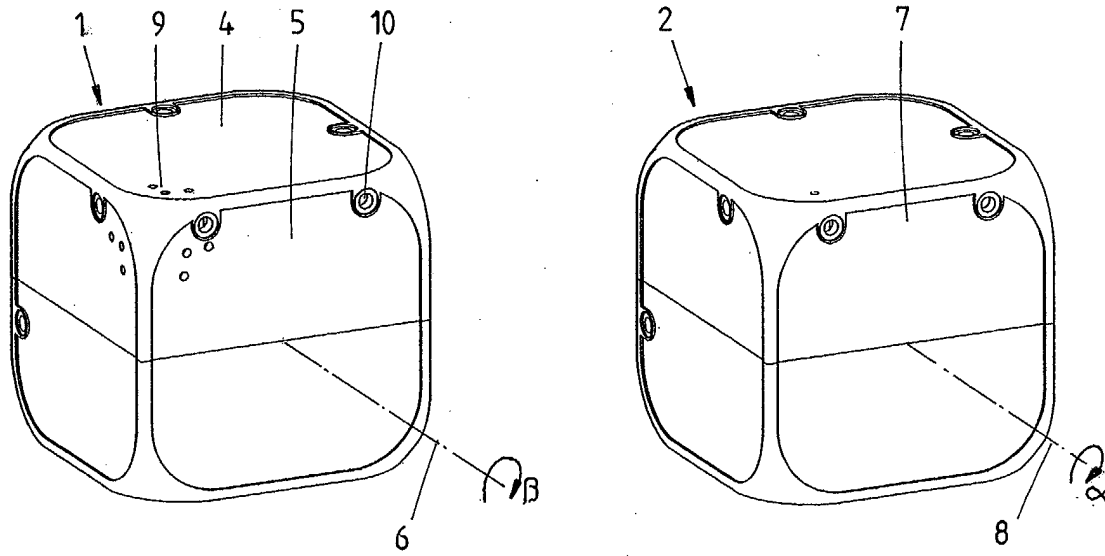


Fig.1

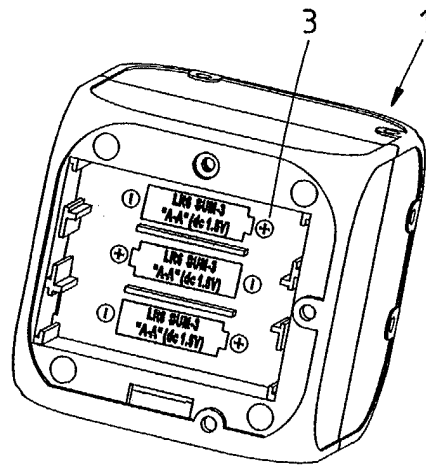


Fig.2



European Patent Office

EUROPEAN SEARCH REPORT

Application Number  
EP 03 10 1737

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	EP 0 931 573 A (DIAZ ESCANO JESUS M) 28 July 1999 (1999-07-28) * paragraphs [0001],[0012],[0013],[0025],[0085]; figures * ---	1-10	A63F9/12 A63H33/04
A	WO 00 61248 A (JAEMSAE SAULI SAKARI) 19 October 2000 (2000-10-19) * column 1, line 3-5; claim 9; figures * ---	1-10	
A	EP 0 914 853 A (SYSTEM WATT CO LTD) 12 May 1999 (1999-05-12) * paragraphs [0001],[0006]; claim 12; figures * -----	1	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.7)  A63F A63H
Place of search <b>MUNICH</b>		Date of completion of the search <b>29 September 2003</b>	Examiner <b>Lucas, P</b>
<b>CATEGORY OF CITED DOCUMENTS</b> X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ----- & : member of the same patent family, corresponding document	

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**ANNEX TO THE EUROPEAN SEARCH REPORT  
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