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(12) # EUROPEAN PATENT APPLICATION

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(54) **Puzzle.**

(57) The invention relates to a puzzle of the type in which a plurality of pieces are moved along rows or columns to obtain a definite combination in which the pieces (3) are slideably assembled in contact with each other within grooves made on the surface of a sphere (1) along maximum circle circumferences perpendicular to each other. The improvement consists in a structure substantially made up of a central element (5), of a plurality od sphere sectors (2) and of a locking element or slider (10).

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The present invention relates to a puzzle.

More particularly, the present invention relates to a puzzle made up of dowels or pieces that can be moved on a surface of a sphere along maximum circle circumferences arranged perpendicularly to each other.

The same Applicant has disclosed for the first time a puzzle of the mentioned type in the Italian Patent No. 1.219.472.

Moreover, in the same Italian Patent a system for assembling the game and the specific structure relevant thereto were disclosed and claimed.

Particularly, the disclosed game is characterized by pieces slideably assembled in contact with each other in grooves made on the outer surface of a sphere.

The game which is realized is a classic puzzle, to be located, to better explain, in the category the most famous example of which certainly is "Rubik's cube", wherein every piece can move on an arc of 360° without having any stop.

In the mentioned Italian Patent, a structure was disclosed for constructing and assembling the puzzle at hand which, though turning out to be practical and functional enough, couldn't constitute an ideal solution from the standpoint of the industrialization of the product, and from both the standpoints of its cheapness and of the certainty that its mechanisms operate correctly.

Moreover, the game as disclosed in the preceding patent, didn't have any system for ensuring the correct positioning of the pieces in correspondence with the positions of crossover among the various tracks whereon they slide.

The Applicant has now studied a new structure for the realization and the assembling of a puzzle of the disclosed type, which solves all the mentioned problems turning out to be extremely simple and cheap as regards its construction, and reliable in the operation of the game.

Moreover, according to the present invention a structure for a puzzle is suggested endowed with a system for locking the position of the pieces in their position.

It is therefore the specific subject of the present invention a puzzle of the type wherein a plurality of pieces are moved along rows or columns to obtain a defined combination, wherein the pieces are slideably assembled in contact with each other within grooves made on the surface of a sphere along maximum circle circumferences perpendicular to each other, characterized in that the structure of the sphere is made up of four upper sphere sectors and of four lower sphere sectors, so coupled to each other through a central element as to realize three grooves on maximum diametre circles arranged at 90° to each other, a plurality of pieces for the realization of the puzzle being slideably arranged in said grooves; said four upper sphere sectors and said four lower sphere sectors being dimensionally equal to each other.

In a first preferred embodiment of the puzzle according to the invention, said central element is made up of a central disk bearing a plurality of, particularly eight, holes to couple corresponding coupling pins inferiorly realized on said sphere sectors and a plurality of joint elements, preferably flexible flaps, that couple with corresponding check elements provided below said sphere sectors, the positioning of the sphere sectors on the central element and the sizes of the same and of the central element being such as to make up three grooves on maximum circle arcs of the resulting sphere arranged at 90° to each other.

The joint elements of the corresponding upper and lower sphere sectors can be so shaped as to couple to each other when the relevant sphere sectors are coupled to said central element.

In an embodiment of the puzzle according to the present invention, an element is provided for locking the position of the pieces in correspondence with each one of the three grooves at 90°, said element being so structured as to allow the free movement of the pieces along the grooves and to fix their position when they are no longer moved.

Preferably, said locking element can be made up of a central cylindrical element arranged on said central element in correspondence with the crossover between the two grooves at 90°, perpendicular to the central element so as to be able to move, compressed towards the lower part by the pieces that are moved along said two grooves and pushed towards the upper part by lower elastic means, preferably elastic flaps, realized centrally on said central element, and by a shaped element substantially parallel to said central element, elastically coupled to said cylindrical element, so as to push towards the lower part the pieces that slide along the groove parallel to said central element and to be pushed towards the upper part by the pieces themselves.

Said cylindrical element preferably will be coupled to the central element (disk) by means of at least two vertical guides.

Otherwise, said locking element can be made up of a cylindrical element, as disclosed,, but not coupled with elastic means arranged on said central element, and with at least two shaped elements elastically coupled with said cylindrical element so as to give it the necessary push towards the upper part.

Again according to the present invention, each one of the pieces slideable in said grooves is made up of a pin, inside the sphere, upon which a dowel is mounted, outerly of the sphere itself, preferably

by hot calking.

On the outer face of the piece the representation is provided of the figure that is desired, glued on it, or removeably applied by means of a support card than jointwise couples with said dowel.

In a further embodiment of the puzzle according to the invention, said central element is made up of two specular parts that couple with each other through joint means arranged on a first face of theirs and each one endowed, on the other face, with means for fixing the four upper (lower) sphere sectors.

The present invention now will be disclosed according to preferred embodiments thereof with particular reference to the figures of the accompanying drawings, wherein:

figure 1 shows a puzzle according to the invention with a first arrangement of pieces;

figure 2 shows a second arrangement of pieces of the puzzle according to the invention opened on the plane;

figure 3 is an exploded view of a first embodiment of the puzzle according to the invention;

figure 4 shows a detail of the assembled game of figure 3;

figure 5 is an assembled view of the game of figure 3 partially in vertical section;

figures 6a and 6b are two views of two further embodiments of the locking element, or slider, of the game according to the invention;

figure 7 is a section view of a piece of the game according to the invention;

figures 8a and 8b show a second embodiment of the central element of the game according to the invention;

figure 9 shows a third embodiment of the puzzle according to the invention, and

figures 10a and 10b show a second embodiment of the pieces of the game according to the invention.

With reference first of all to figures 1 and 2, one can observe the puzzle 1 according to the invention, which has the shape of a sphere made up of eight sphere sectors 2 which realize among them three grooves for the movement of n pieces 3.

Pieces 3 bear on their outer face a digital indication, but they can also be white or bear more complex indications, such as for instance is the case of figure 2, whereby one can have various kinds and levels of game.

Each one of sphere sectors 2 is provided with a grip recess 4.

Pieces 3 slide along the mentioned grooves, realized at 90° to each other, on maximum diametre circles according to arrows A, B and C of figure 1.

With reference to figures 3, 4, 5 and 7, one can observe a preferred embodiment of the puzzle according to the invention.

It provides a central element 5 or disk upon which eight holes 6 are realized whereinto pins 7 inferiorly borne by each one of sphere sectors 6 go to insert themselves.

Moreover, each sphere sector 2 inferiorly has an unsymmetrical flap 8 that goes to jointwise couple with tongues 9 provided on disk 5 so as to realize an integral coupling.

Moreover, a locking element 10, or slider, is provided made up of a cylindrical element 11 with a rounded head, and of a projecting shaped element 12.

The cylindrical element 11 has vertical guides 13 laterally and shaped flaps inferiorly that couple with an elastic structure 14 realized centrally on disk 5.

As can be seen in detail in figure 4, the cylindrical element acts as a lock of the position of pieces 3 that slide on the two grooves perpendicular to disk 5.

Piece 5 which passes, pushes the slider 10 towards the lower part, compressing elastic element 14 which, in turn, when piece 5 has positioned itself, pushes the slider towards the upper part locking the position of the piece.

Projecting element 12, on the contrary, acts upon the pieces 3 that slide along the groove parallel to disk 5.

It is elastically coupled with cylindrical element 11 so as to push towards the lower part (see figure 5) pieces 3 that slide in said groove and so as to be pushed towards the upper part by the same when they move.

From figures 1 and 7 it is possible to observe a preferred structure of piece 3.

Each one of the pieces is made up of a pin 15 having the head turned towards the lower part, inside sphere 1, and the stem turned towards the outside, and of a dowel 16 coupled with the stem of pin 15, outerly with respect to sphere 1, through hot calking.

As can be observed in figure 7, the shape of the two facing parts of pin 15 and of dowel 16 is such as to be able to slide along a circumferential groove.

Outside the dowel 16 one (or more) dowel 17 is coupled upon which the indication is borne, by jointing pins 18 in holes 19, endowed with four pawls (not shown) for locking pins 18.

As already mentioned, the indication on the dowel 16 can also be realized by pressing, glueing or in any other suitable manner.

In figure 6a a second embodiment of slider 10 is shown.

It provides a second shaped projecting element 12' equal to the first element 12, arranged in a position diametrically opposed to the latter.

Two figures 12 and 12' make up the elastic element, substituting 14 of figure 3, for the push towards the high of the cylindrical element 11.

Moreover, cylindrical element 11 can be substituted by two elements 11' and 11'' that don't find themselves axially central with respect to piece 3 (see figure 6b).

Finally, in figures 8a and 8b a second embodiment is shown of the central element 5 made up of two specular elements 5' and 5'' that couple, by a side, jointwise betwwen them and that have, by the other side, holes 6' for the insertion of pins borne by said sphere sectors 2.

In figure 9 a further embodiment of the game according to the present invention is shown, similar to that of figure 3, whereby corresponding parts will be indicated with the same numerals.

In this case, the central element 5 has four groups of holes 6 corresponding, respectively, to pins 7 of upper sphere sectors 2 in the drawing, or to holes 7' of lower sphere sectors 2 in the drawing, and that allow the passage of the screw 20 which inserts itself into the central through hole 21 realized on the sphere sectors themselves.

As is seen, unlike the preceding case, there are some sphere sectors 2 only endowed with pins 7 and some sphere sectors only endowed with holes 7'.

Through the insertion of screws 20, a solid and compact structure is realized.

With reference now to figures 10a and 10b, one can see a second embodiment of pieces 3 of the game according to the present invention, wherein card 17' is so shaped that the colour of the pieces themselves can be seen on the four side edges of piece 3, facilitating the task of the player.

The present invention has been disclosed with reference to some preferred embodiments thereof, but it is to be understood that variations and/ot modifications can be made by those skilled in the art without so departing from the relevant protection scope.

Claims

1. A puzzle of the type in which a plurality of pieces are moved along rows or columns to obtain a definite combination, in which the pieces are slideably assembled in contact which each other within grooves made on the surface of a sphere along maximum circle circumferences perpendicular to each other, characterized in that the structure of the sphere is made up of four upper sphere sectors and of four lower sphere sectors, coupled with each other by means of a central element so as to realize three grooves on maximum sphere diametre circles arranged at 90° to each other, a plurality of pieces for the realization of the puzzle being arranged slideably in said grooves; said four upper sphere sectors and said four lower sectors being dimensionally equal to each other.

2. The puzzle according to claim 1, characterized in that said central element is made up of a central disk upon which a plurality of holes are provided, to couple corresponding coupling pins inferiorly realized on said sphere sectors, and a plurality of joint elements, that couple with corresponding check elements inferiorly provided on said sphere sectors; the positioning of the sphere sectors on the central element and the sizes of the same and of the central element being such as to form three grooves on arcs of maximum circle of the resulting sphere, arranged at 90° to each other.

3. The puzzle according to claim 2, characterized in that eight holes are provided on said central disk.

4. The puzzle according to claim 2 or 3, characterized in that said joint elements are made up of flexible flaps.

5. The puzzle according to one of claims 2 to 4, characterized in that the joint elements of the corresponding upper and lower sphere sectors are so shaped as to couple to each other when the relevant sphere sectors are coupled with said central element.

6. The puzzle according to any one of the preceding claims, characterized in that an element, or slider, is provided for locking the position of the pieces in correspondence with each one of the three grooves at 90°, said element being so structured as to allow the free movement of the pieces along grooves and to fix their position when they are no longer moved.

7. The puzzle according to claim 6, characterized in that said locking element is made up of a central cylindrical element arranged on said central element, in correspondence with the crossover between the two grooves at 90° perpendicular with respect to the central element, so as to be able to move vertically, compressed towards the lower part by the pices that are moved along said two grooves

and pushed towards the upper part by lower elastic means, realized centrally on said central element, and of a projecting shaped element substantially parallel to said central element, elastically coupled with said cylindrical element, so as to push towards the lower part the pieces that slide along the groove parallel to said central element and to be pushed towards the upper part by the action of the pieces themselves.

8. The puzzle according to claim 7, characterized in that said elastic means are made up of elastic flaps made on said central element.

9. The puzzle according to claim 7 or 8, characterized in that said cylindrical element is coupled with the central element by means of at least two vertical guides.

10. The puzzle according to one of claims 1 to 6, characterized in that said locking element is made up of a central cylindrical element arranged on said central element in correspondence with the crossover between the two grooves at 90° perpendicular with respect to the central element, so as to be able to move in vertical direction, compressed towards the lower part by the pieces that are moved along said two grooves and pushed towards the upper part by elastic means, and of at least two projecting shaped elements elastically coupled with said cylindrical element so as to make up the elastic means for pushing towards the upper part, and so as to push towards the lower part the pieces that slide along the groove parallel to said central element and to be pushed towards the upper part by the pieces themselves.

11. The puzzle according to one of the preceding claims, characterized in that on the outer face of the pieces a figure is provided directly realized by pressing, or glued onto the pieces themselves or applied removeably jointwise.

12. The puzzle according to one of claims 1 and 6 to 11, characterized in that said central element is made up of two specular parts that couple with each other through joint means arranged on a first face of theirs and each one provided, on the other face, with means for fixing the four upper (lower) sphere sectors.

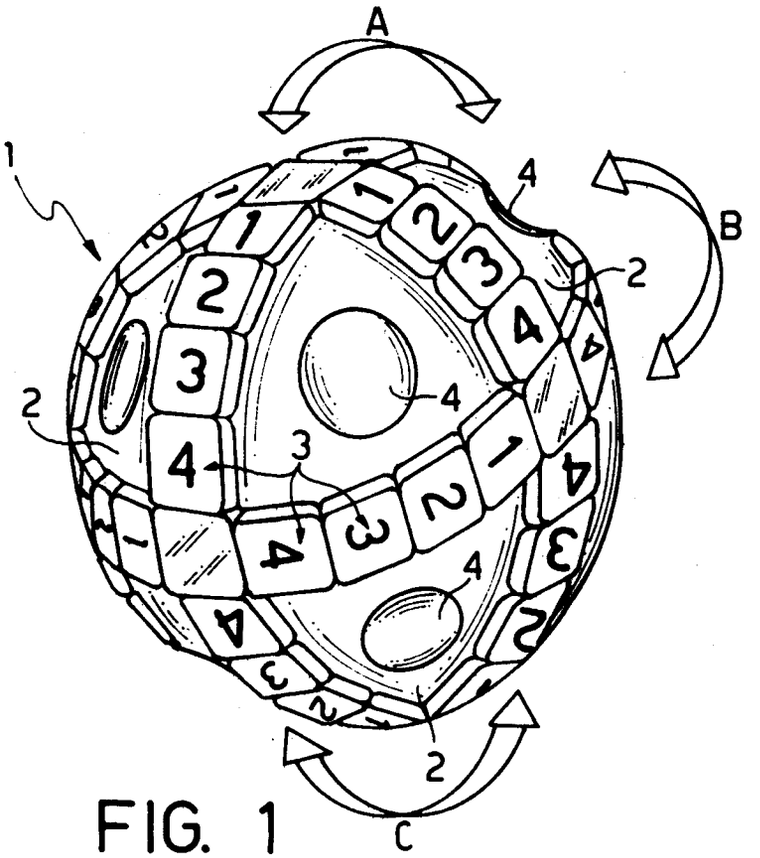


FIG. 1

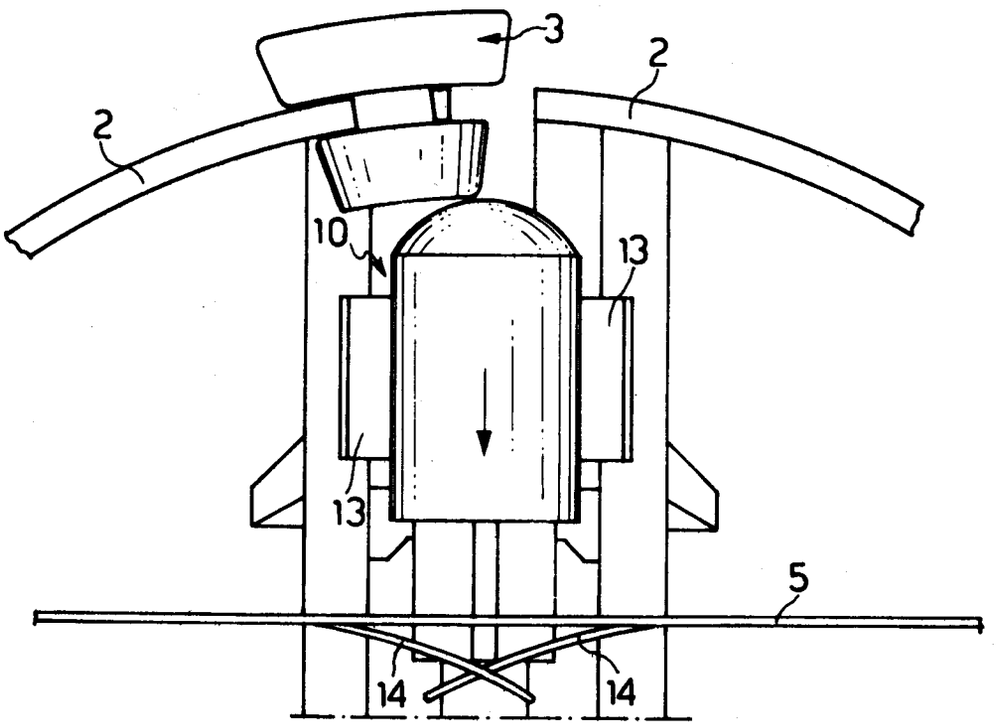


FIG. 4

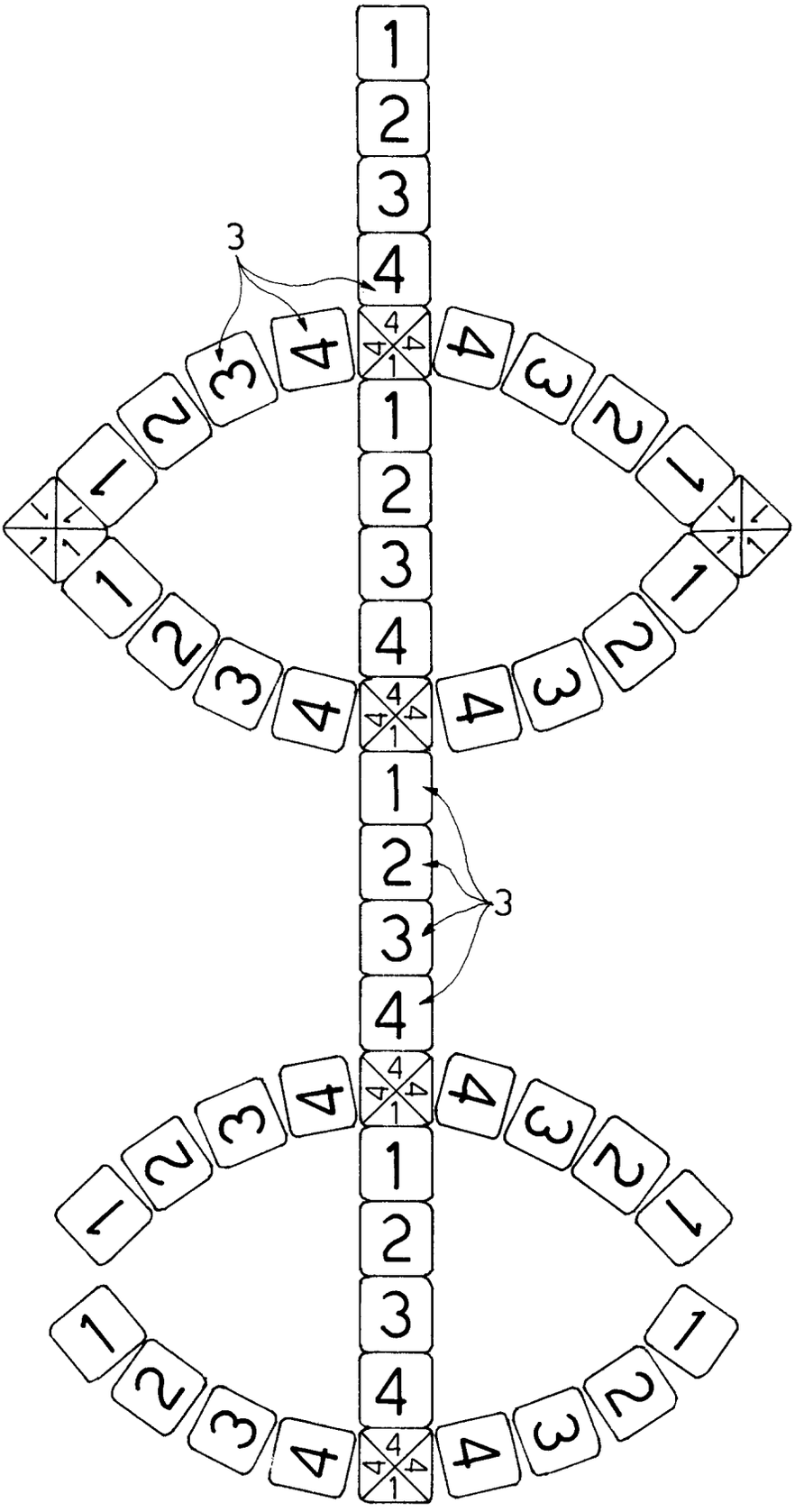


FIG. 2

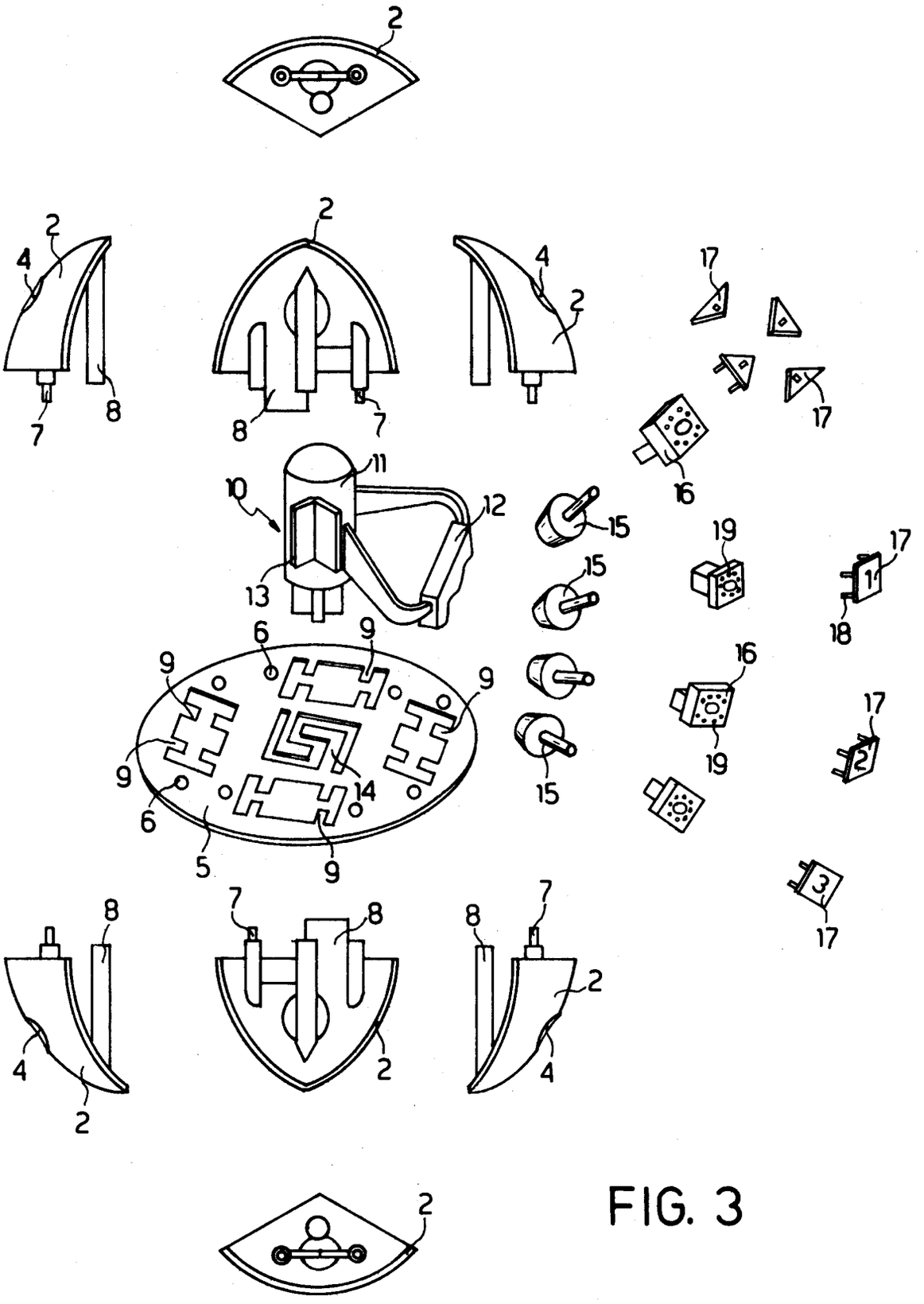


FIG. 3

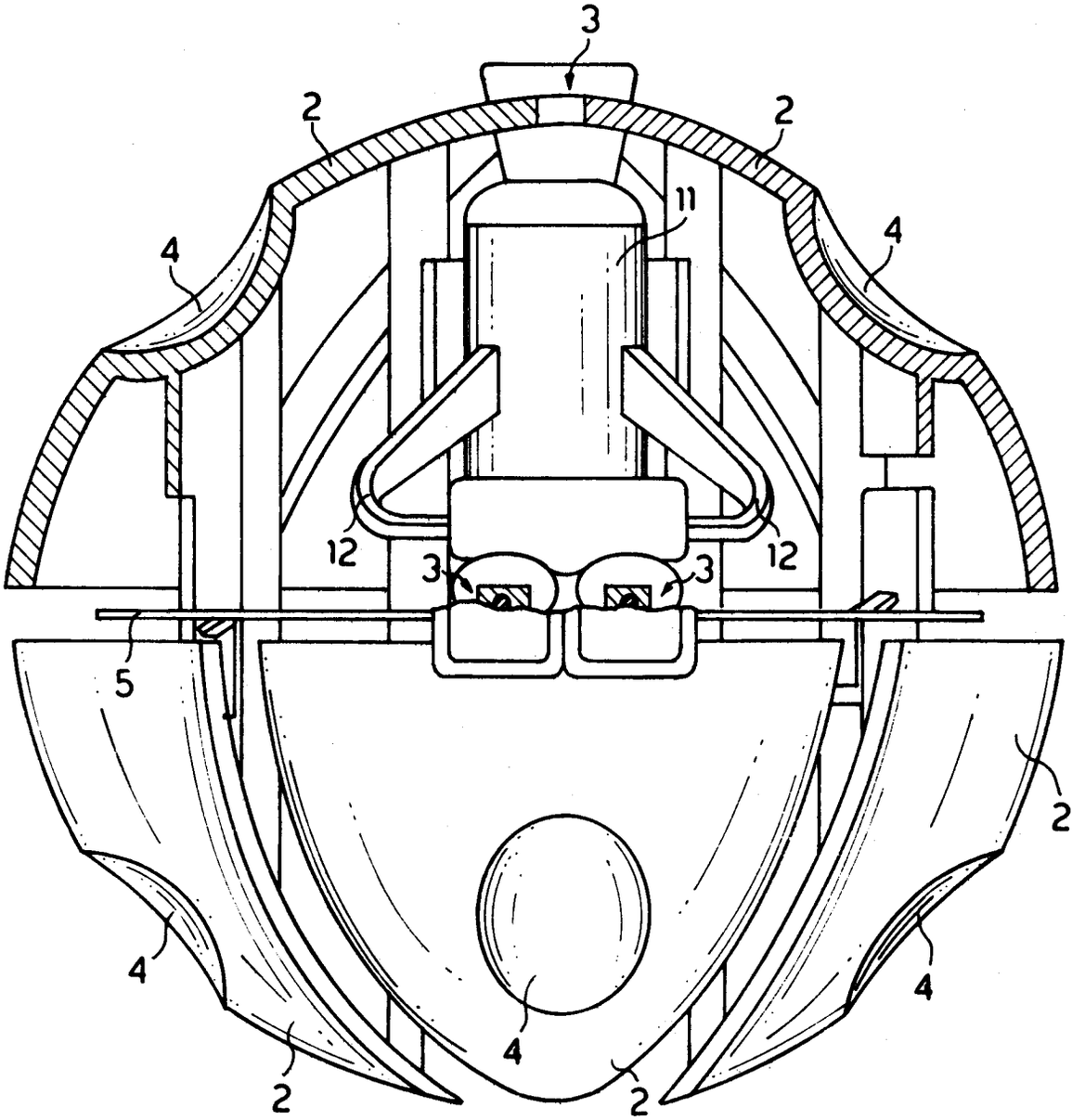


FIG. 5

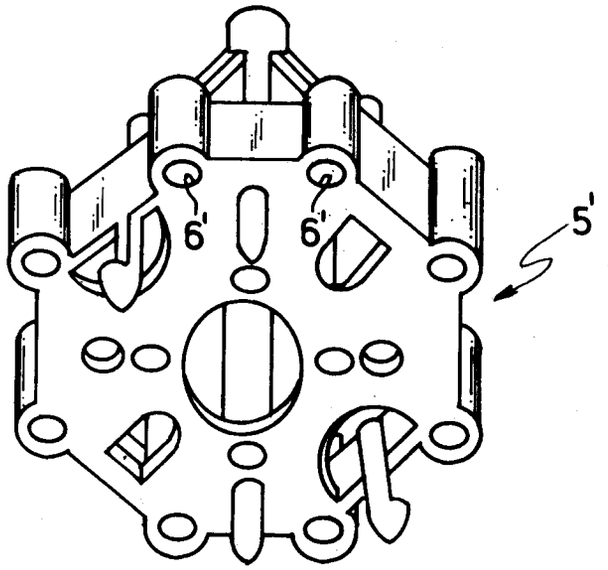


FIG. 8a

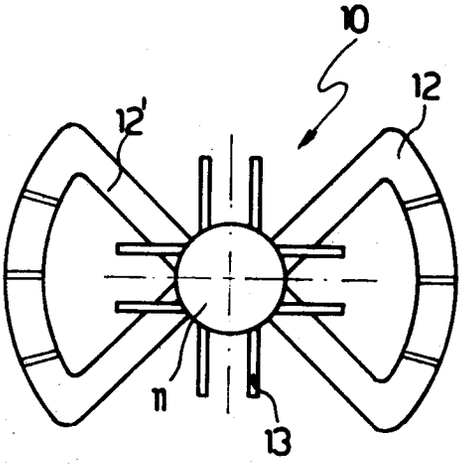


FIG. 6a

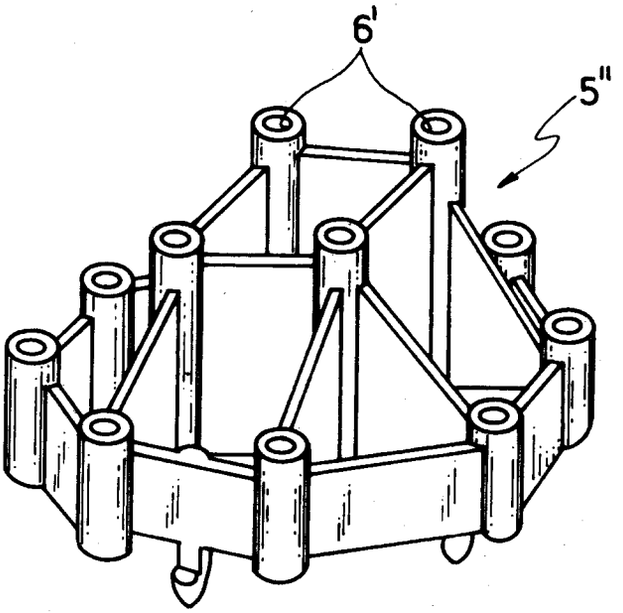


FIG. 8b

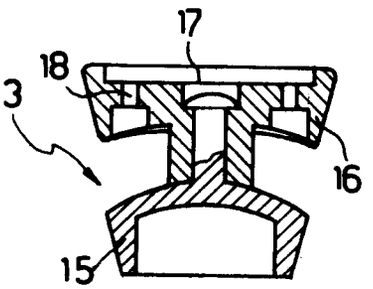


FIG. 7

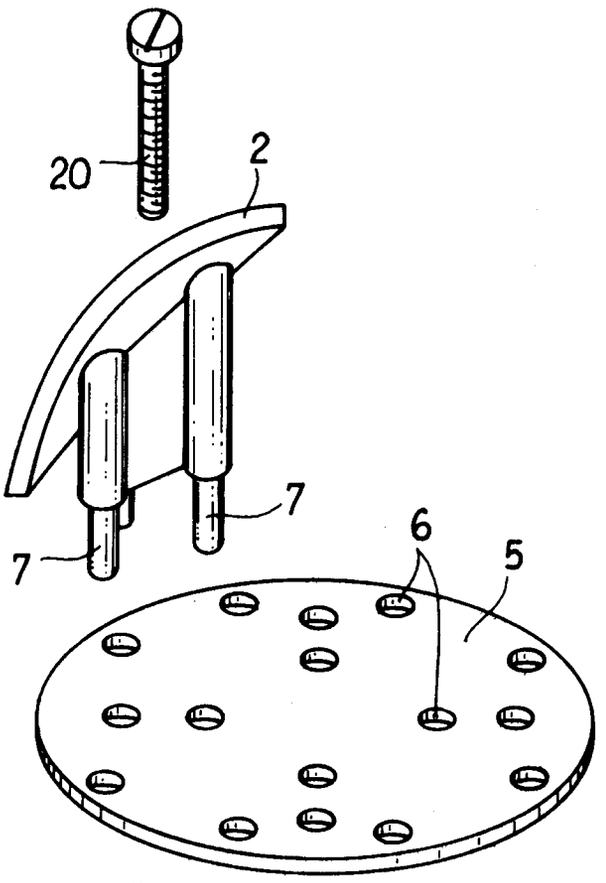


FIG. 9

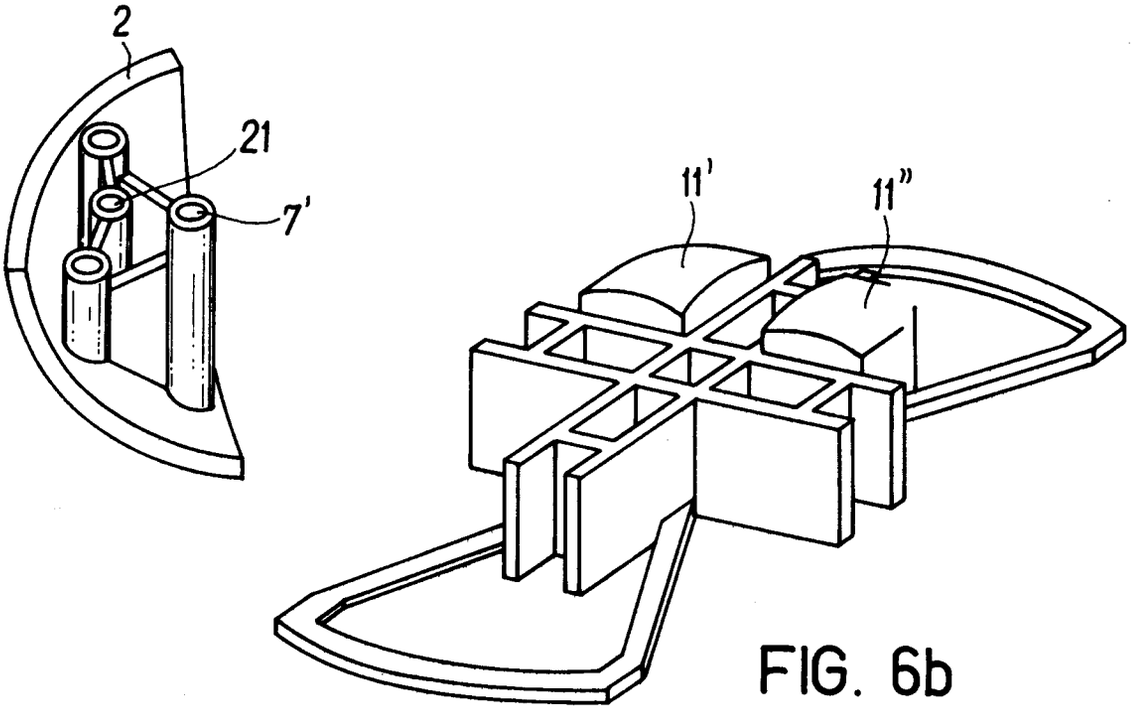


FIG. 6b

FIG. 10a

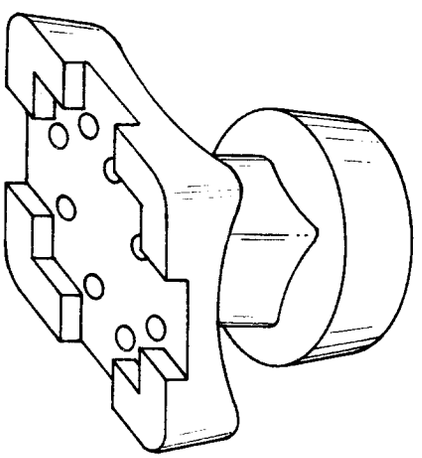
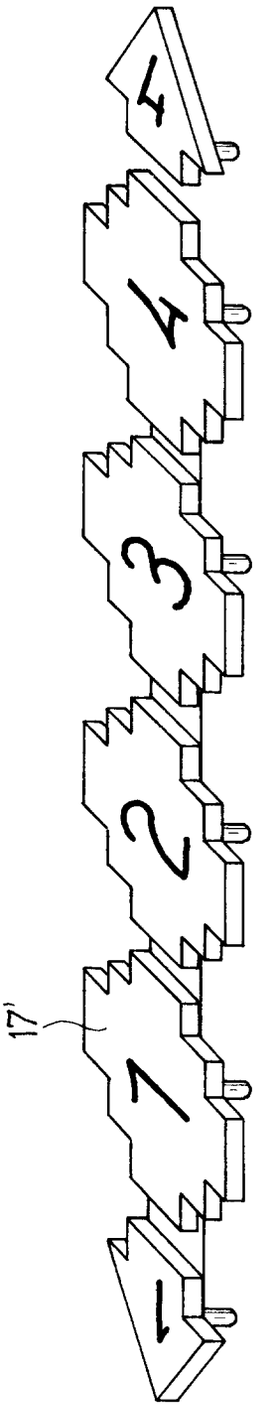


FIG. 10b



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EUROPEAN SEARCH REPORT

Application Number
EP 93 83 0292

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.5)
Y	CH-A-632 418 (GMÜNDER) * page 3, left column, line 9 - line 20 *	1-12	A63F9/08
Y	US-A-5 114 148 (LIU) * column 1, line 62 - line 64; figure 2 *	1-12	
A	DE-U-8 524 945 (HIRTH) * claim 1 *	1	
A	US-A-4 452 454 (GREENE) * column 3, line 48 - line 54 *	1,7	
A	GB-A-2 088 728 (MUVEK) * claims 1-3 *	1	
A	DE-U-8 905 359 (SZÖKE) * claim 1; figure 1 *	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			A63F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	07 OCTOBER 1993	GLAS

CATEGORY OF CITED DOCUMENTS

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