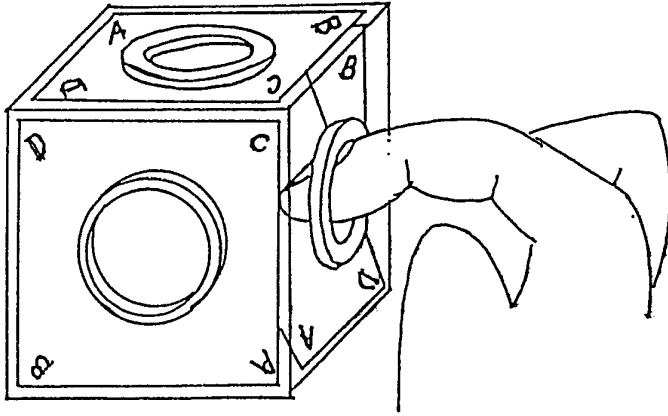




INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<p>(51) International Patent Classification ⁵ : A63F 9/08</p>	<p>A1</p>	<p>(11) International Publication Number: WO 90/10481 (43) International Publication Date: 20 September 1990 (20.09.90)</p>
<p>(21) International Application Number: PCT/HU90/00017 (22) International Filing Date: 9 March 1990 (09.03.90) (30) Priority data: 1190/89 10 March 1989 (10.03.89) HU (71) Applicant (for all designated States except US): RUBIK STUDIO MŰSZAKI FEJLESZTŐ KFT [HU/HU]; Vár- osmajor u. 74, H-1122 Budapest (HU). (72) Inventors; and (75) Inventors/Applicants (for US only) : BOGNÁR, József [HU/ HU]; Fény u. 2.III.4, H-1024 Budapest (HU). RUBIK, Ernő [HU/HU]; Virágárok u. 11, H-1026 Budapest (HU). (74) Agent: S.B.G. & K.; P.O. Box 360, H-1369 Budapest (HU).</p>		<p>(81) Designated States: AT, AT (European patent), AU, BE (European patent), BG, BR, CA, CH, CH (European patent), DE, DE (Utility model), DE (European patent), DK, DK (European patent), ES, ES (European patent), FI, FR (European patent), GB, GB (European patent), IT (European patent), JP, KR, LU, LU (European pa- tent), MC, NL, NL (European patent), NO, RO, SE, SE (European patent), SU, US. Published <i>With international search report.</i></p>
<p>(54) Title: THREE-DIMENSIONAL PUZZLE</p>		
		
<p>(57) Abstract</p> <p>The invention provides a three-dimensional puzzle which consists of a box-like casing (2) and a number of game pieces (1) that are freely movable relative to each other within a closed system defined by said casing (2). The game pieces are, at least partially, marked and thus, distinguishable from each other. The casing (2) is a substantially closed, shape-retentive hollow body of the shape of a geometric solid bound by lateral faces. At least four such lateral faces are both in shape and size identical with each other. The interior of the casing serves as a game space for the enclosed flat plate-like game pieces (1) of the shape that is substantially identical with that of the at least four lateral faces of the casing (2). The game pieces (1) are laid out in size so that they are allowed for free movement within the game space. Each of the at least four lateral faces of the casing (2) and/or the game pieces (1) are/is provided with a retaining means (3) for releasably holding any one of the game pieces (1) to any one of the at least four lateral faces of the casing (2). By performing a sequence of rearranging steps, the game pieces (1) can be moved into every possible position within the game space. The goal of the puzzle lies in rearranging the game pieces (1) so that they show at least one predetermined specific pattern.</p>		

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AT	Austria	ES	Spain	MG	Madagascar
AU	Australia	FI	Finland	ML	Mali
BB	Barbados	FR	France	MR	Mauritania
BE	Belgium	GA	Gabon	MW	Malawi
BF	Burkina Fasso	GB	United Kingdom	NL	Netherlands
BG	Bulgaria	HU	Hungary	NO	Norway
BJ	Benin	IT	Italy	RO	Romania
BR	Brazil	JP	Japan	SD	Sudan
CA	Canada	KP	Democratic People's Republic of Korea	SE	Sweden
CF	Central African Republic	KR	Republic of Korea	SN	Senegal
CG	Congo	LI	Liechtenstein	SU	Soviet Union
CH	Switzerland	LK	Sri Lanka	TD	Chad
CM	Cameroon	LU	Luxembourg	TG	Togo
DE	Germany, Federal Republic of	MC	Monaco	US	United States of America
DK	Denmark				

THREE-DIMENSIONAL PUZZLE

TECHNICAL FIELD

The invention relates to a three-dimensional puzzle comprising a box-like casing and a number of game pieces that are freely movable relative to each other within a closed system defined by said casing. The game pieces are, at least partially, marked and thus, distinguishable from each other.

BACKGROUND ART

Three-dimensional logical toys comprising movable game elements or pieces that are marked or provided with symbols, or differently coloured, and as a result of this, they are at least partially distinguishable from each other have become known in various embodiments. In such known logical toys or puzzles the game elements or pieces are movable, one by one or even groupwise along courses that are defined by a closed system of guide tracks. When playing with such logical toys or puzzles, an initial characteristic pattern of the game pieces is first mixed up by moving the game pieces into various different positions along paths allowed by said system of guide tracks. Following this, the player tries to bring back the game pieces through a sequence of steps into their initial characteristic pattern or into positions in which the game pieces show other, different pre-determined patterns. The efforts of the player are crowned with success if such pre-determined characteristic pattern(s) of the game pieces are realized or arrived at by performing the shortest possible sequences of operational steps. In other words, satisfaction and success are achieved by finding, out of a large number of possible combinations, the simplest and thus, less time-consuming sequence of steps leading to certain

- 2 -

pre-determined solutions of the puzzle. The three-dimensional puzzle according to the present invention belongs to the wide range of spatial logical toys of the kind referred to above.

5 DISCLOSURE OF THE INVENTION

The general aim of the present invention is to develop a puzzle by which the relationships between three-dimensional space and two-dimensional planar structures, the interrelation of inner and outer space characteristics, 10 their specific features and regularities can be illustrated and shown in a clear, expressive and suggestive way. Another aim of the present invention is to provide an article of manufacture by which the above general aim is achieved by the provision of a puzzle consisting of a relatively small number 15 of possibly simplest game pieces. The puzzle according to the invention should further offer a considerably wide range of choices between possible step variations whereby for the player self-entertainment, arrestment of attention and improvement of mechanical aptitude are ensured simultaneously.

20 In contrast to previous known spatial logical toys of the kind referred to further above, the three-dimensional puzzle of the present invention comprises a number of flat plate-like game pieces arranged movably within a game space of the shape of a regular geometric solid. The 25 game pieces are of substantially regular polygonal shape and they are, at least partially, marked by being coloured or carrying identical and/or different symbols. They are enclosed in a framework, preferably a hollow box-like casing whereby the puzzle forms a closed system. The flat plate-like 30 game pieces are releasably held to lateral faces of the casing. The gripping force through which one game piece is held to any one of said lateral faces of the casing can be provided e.g. by magnetic pull or alternatively, by adhering friction induced via attractive forces generated locally by

- 3 -

resilient deformation. Such releasable gripping force between a game piece and a lateral face of the casing is provided by suitable retaining means. Since the game pieces are movably encased in said casing of the puzzle, they can be rearranged, i.e. moved into different positions with respect to each other and the casing within the game space bound by the latter. The possible movements of the game pieces are determined by general rules of space geometry and by the specific geometrical dimensions of any particular design of the casing.

Moving of the game pieces for the purpose of their being brought into different positions within the game space can be performed either by directional shaking the box-like puzzle casing, by handling the game pieces directly by finger-tips through suitable access openings or, by using any additional tool, e.g. a pencil or the like for this purpose. Alternative, more sophisticated embodiments of the puzzle may also comprise actuating means arranged on the lateral faces of the casing for the purpose of indirect handling.

From the viewpoint of practical realization, embodiments of the puzzle having flat plate-like game pieces of substantially quadratic shape enclosed in a substantially cubiform casing have proved to be the simplest and most suitable for easy manufacture at low cost. Observation of the movements of the game pieces is made easy by arranging the game pieces in a substantially transparent casing.

The number of possible game step variations can be substantially increased if casings having lateral faces also provided with (different) symbols are used and/or if in a puzzle of cubiform casing instead of five, altogether six game pieces are movably arranged.

Following from the above, and in accordance with the aims set, the present invention provides as a novel and useful article of manufacture, a three-dimensional puzzle

- 4 -

of the kind indicated in the introductory paragraph of the present specification. The casing of the puzzle is a substantially closed, shape-retentive hollow body of the shape of a regular geometric solid bound by planar lateral
5 -faces. At least four such lateral faces are both in shape and size identical with each other. The interior of the casing serves as a game space for a number of encased flat plate-like game pieces of the shape that is substantially identical with that of the at least four lateral faces of the
10 casing. The game pieces are laid out in size so that they are allowed for free movement within the game space defined by the casing. Each of the at least four lateral faces of the casing and/or the game pieces are/is provided with a retaining means for releasably holding any one of the game pieces to any one
15 of the at least four lateral faces of the casing. In preferred embodiments of the puzzle each retaining means comprises at least one piece of preferably ferromagnetic substance. More particularly, in such preferred embodiments the flat plate-like game pieces may be, at least partially, of ferromagnetic
20 material or they may comprise, fastened to them, at least one area of such ferromagnetic material. The retaining means of each of the at least four lateral faces of the casing may consist of at least one piece of permanent magnet capable of interacting with the (area of) ferromagnetic material of the
25 game pieces.

In certain embodiments of the invention the retaining means may simultaneously serve as symbol, i.e. as means of marking the game pieces e.g. by colouring or otherwise, so that they will become distinguishable over each other. When
30 designed so, the function of retaining is - at least to a certain extent - substantially hidden or even disguised whereby such embodiments of the invention are made even more "puzzling".

In very simple and cheap embodiments of the puzzle the retaining means may simply comprise at least one surface

- 5 -

area of increased mechanical friction or adherence.

In further preferred embodiments of the invention, for handling the puzzle, each of the at least four lateral faces can further be provided with an actuating means for releasing
5 the gripping force by which a game piece is temporarily and
releasably held to a lateral face of the casing. In cheaper
embodiments again, each of the at least four lateral faces
of the casing may be provided as actuating means with an
access opening for direct manual handling of the puzzle. Alter-
10 natively there may be embodiments in which on each of the
at least four lateral faces of the casing a sensor or push
button serving as actuating means is provided for indirect
handling of the game pieces in the puzzle. An advantage
of such embodiments lies in their casings being closed, i.e.
15 sealed hermetically so that the access of dust, dirt etc. to the
game space from outside is excluded. All kinds of such
actuating means for indirect handling perform, independently
from their actual design, the act of pushing away the game
piece from the lateral face it is held to by a certain pre-
20 -determined initial distance whereby the gripping force maintain-
ed by e.g. magnetic pull or friction is ceased, and free
movement of the game piece concerned is allowed.

Quite obviously, embodiments of the three-
dimensional puzzle according to the invention without
25 actuating means, i.e. without access openings or means such
as sensor or push buttons for indirect handling the game
pieces are also possible. In such embodiments the temporary
gripping force between a game piece and any lateral face of
the casing the game piece is held to may be overcome by
30 exercising directional dynamic impacts to said game piece e.g.
by shaking the puzzle with a certain skill that can easily
be learned and experienced. Resulting from such dynamic impacts
of proper size and direction the game piece can be forced
to separation from the respective lateral face of the casing
simply under its weight and inertia.

- 6 -

In order to improve their handling characteristics preferred embodiments of the invention may have a hollow casing of the shape of a substantially regular solid with cut-off or preferably rounded apical areas and/or edges.

5 Such embodiments are, besides their more suitable shape for manual handling, less dangerous to children. Further to this, the cut-off or rounded apical areas, together with correspondingly cut-off or rounded corners of the flat plate-like game pieces improve the freedom of movement of the

10 latter in the game space, since in such embodiments, the game pieces arrive after their movements always centrally in their new positions adjacent to any one of the lateral faces.

As already mentioned further above, in preferred

15 embodiments of the invention the flat plate-like game pieces are substantially quadratic in shape, and they are enclosed in a substantially cubiform hollow casing. At least some of the game pieces and/or at least some of the lateral faces of the casing should be substantially transparent. In still

20 further embodiments of the puzzle, for providing a wider range of possible solutions and/or step variations, at least some of the lateral faces of the casing may also be marked and/or provided with symbols and/or shaped openings or transparent areas.

25 BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be described in details by the aid of the drawings enclosed, wherein

30 Fig.1 is an exploded view of an embodiment of the three-dimensional puzzle according to the invention showing, in perspective, five flat plate-like game pieces and their box-like casing in elevation,

- 7 -

- Fig.2 shows an at least partially transparent puzzle casing in half view-half section without game pieces contained,
- 5 Fig.3 shows in similar view, the puzzle casing as shown in Fig.2 together with encased game pieces,
- Fig.4 is a perspective view of the embodiment of the puzzle shown in Fig.1,
- 10 Fig.5 shows the puzzle in a state of playing, where a game piece that used to be held to the uppermost lateral face of the casing has just been caused to fall downwardly by a finger-tip push against the middle area of such game piece through an access opening of said uppermost lateral face,
- 15 Fig.6 is a simplified diagrammatic picture showing the momentary position of the game piece moving relatively to the casing of the puzzle in the same instant state of play as shown in Fig.5,
- 20 Fig.7 shows the embodiment of the puzzle in an instant state of playing where a game piece that used to be held to the right-hand lateral face of the casing has just been caused to tilting downward movement by a finger-tip touch of the player exercised against such game plate through an access opening of said right-hand lateral face of the casing,
- 25 Fig.8 is again, a simplified diagrammatic picture illustrating the momentary position of the game piece moving relatively to the casing of the puzzle in substantially the same instant state of play as shown in Fig.7,
- 30

- 8 -

Fig.9 shows in a simplified diagrammatic sketch the game piece shown in an instant state of its movement in Fig.5 and 6 after having arrived in its new position within the puzzle casing, and similarly to this,

5
10 Fig.10 illustrates the game piece shown in its instant state of its initiated movement in Fig.7 and 8 after its arrival in the new position within the casing of the three-dimensional puzzle according to the
15 present invention.

DETAILED DESCRIPTION OF AN EMBODIMENT OF THE INVENTION

In a preferred embodiment of the three-dimensional puzzle according to the invention a box-like casing 2 encloses flat plate-like game pieces 1. The casing 2 is
20 a substantially closed, shape-retentive, hollow cubiform body bound by quadratic lateral faces that are both in shape and size identical with each other. The interior of the casing 2 serves as a game space for the movably encased, altogether five flat plate-like quadratic game pieces 1
25 which are of ferromagnetic, preferably of iron sheet material. Thus, the ferromagnetic game pieces 1 form simultaneously component part of a retaining means 3, by which one such game piece 1 is releasably held to any one of the lateral faces of the casing 2. Corresponding component parts of said
30 retaining means 3 are circular ring-shaped magnets 31. One such piece of magnet 31 is fastened to the substantially middle area of each lateral face of the casing 2. The

- 9 -

magnets 31 are arranged very much like circular window frames for access openings serving as actuating means 4 that are worked out in central areas of the lateral faces surrounded by the circular ring-shaped magnets 31. The access openings provide access to a game piece 1 held temporarily and releasably to a lateral face of the casing for the purpose of releasing the gripping force provided by the magnetic pull between the ferromagnetic material of the game plate 1 and the magnet 31 of the lateral face. Such release of the gripping force is best effected by a finger-tip push of the player against the middle are of the game piece 1 through the free access opening in the lateral face, whereby the magnetic gripping force is overcome, and the particular game piece pushed is allowed to free movement within the casing 2. The casing 2 is bound by transparent lateral faces so that symbols A,B,C,D by which corners of the game pieces 1 are marked, can be observed and followed easily.

The above described embodiment of the three-dimensional puzzle can be handled as follows:

Let us assume that the puzzle has only one solution, at which the marked game pieces 1 together with the casing 2 show a specific, pre-determined pattern: Within the casing 2 the game pieces are able to perform two basic kinds of movement. They can shift parallelly or they can tilt around each of their edges.

Consequently, by performing sequences of such shifts and tilts, the game pieces 1 can be moved relative to the casing 2, into every possible position within the game space defined by the lateral faces of the casing 2.

For the purpose of simplicity and easier understanding, the embodiment of the puzzle shown in the attached drawings comprises five game pieces 1 only. Let us assume that these five game pieces 1 form a hollow box having five lateral faces, and this hollow box is, showing a certain

- 10 -

specific initial pattern, arranged in the inside of the transparent casing 2, the inner faces of said hollow box formed by the five game pieces 1 can be seen when viewed through the bottom face of the casing 2 as shown in Fig.1.

5 As already mentioned, the surfaces of the plate-like game pieces 1 may be marked, e.g. provided with symbols, sections or parts of graphic pictures which, when the game pieces 1 are arranged properly, show a specific, pre-determined pattern. One such specific pattern could be seen e.g. in

10 one particular arrangement on the resulting outer surface of the five game pieces, and in another particular arrangement on the resulting inner surface of the game pieces 1. With the embodiment of the puzzle as shown in the attached drawing, instead of sections of a picture pattern, letters

15 A,B,C,D are printed in respective corners of the game pieces 1. The puzzle is deemed to be solved if the game pieces 1 are in positions with their corners marked with the same letter being in one particular apex of the cubiform casing 2. Figs.1 and 4 of the attached drawing show such arrangements

20 of the game pieces 1.

In the course of playing first, the arrangement of the game pieces 1 that constitutes the solution of the puzzle has to be altered for the worth by rearranging, through any sequence of steps, the game pieces within the casing 2.

25 Following this, the goal of the game lies in arriving at the initial regular specific pattern of the game pieces 1, possibly and preferably within the shortest period of time, i.e. by performing, out of a large number of variations, the shortest sequence of steps through which all game pieces 1

30 are moved back into their initial position.

With the particular embodiment of the puzzle as shown in the attached drawing figures, one step of rearrangement is performed by causing any one of the game pieces 1 to move to the previously unoccupied sixth lateral face of the

- 11 -

5 casing 2. For doing this, the casing 2 of the puzzle has to be turned in a position where the unoccupied lateral face goes to the lowermost, bottom position. After having done so, the game piece 1 occupying now the uppermost, top lateral
10 face position can be caused to fall down parallelly and thus, arrive at bottom position by releasing the gripping force by which it is held to the top lateral face of the casing. This can be performed as clearly shown in Fig.5 of the attached drawing, by exerting a slight push by the player's finger-tip
15 against the game piece 1 in question through the free access opening of the top lateral face of the casing 2. By such slight push exerted, an initial distance is opened between the magnet 31 and the game piece 1 concerned. As a result, the magnetic pull of the retaining means 3 will gradually be
20 overcome by the weight of the game piece 1 and the latter will fall downwardly until it arrives in its desired new position adjacent to the previously unoccupied lateral bottom face of the casing 2. Here, it is gripped by the bottom magnet 31 and is securely held in its new position as shown in Fig.9.

25 Alternatively, any of the vertically standing game pieces 1 can be moved to the unoccupied bottom face of the casing 2. An example, for the sole purpose of illustration only, is shown in Fig.7 of the drawing. The only difference lies in that instead of being caused to parallel shifting, such
30 vertical game piece is tilted around its bottom edge in order to arrive at its new, desired position as clearly shown in Fig.8 and Fig.10, the latter indicating the game piece tilted now in its new position. After having performed one such step of rearrangement, the puzzle has to be turned again into a position where its now unoccupied lateral face goes into the bottom face position.

By performing sequences of the above steps of rearrangement, variations of the positions of the game pieces 1 relative to each other and, if also marked properly, relative

- 12 -

to the lateral faces of the casing 2 can be realized. Arriving
at a pre-determined specific pattern of the game pieces 1
will prove to be a hard task despite of the fact that the
handling of the puzzle seems, at least at first instance,
5 to be very easy.

While handling the puzzle with the aim of
solving the problem of how to arrive at a solution, the
player will automatically be confronted with the deep-going
questions of the relationship between a three-dimensional
10 space and planar structures contained and moved therein.

Also the problems of the interrelations of senses of rotation
the reversibility of coordinate systems, the terms of "outside"
and "inside" will gradually become more and more apparent to
regular and enthusiastic users of the puzzle.

15 It is to be understood that the above embodiment
has been shown by way of example only. The embodiment
specifically described herein can be modified in various
ways without departing from the spirit of the invention as
defined in the following claims.

- 13 -

WHAT IS CLAIMED IS:

1. A three-dimensional puzzle comprising a box-like casing (2) and a number of game pieces (1) that are freely movable relative to each other within a closed system defined by said casing (2), said game pieces (1) being, at least partially, marked and thus, distinguishable from each other, wherein said casing (2) is a substantially closed, shape-retentive hollow body of the shape of a geometric solid bound by lateral faces of which at least four such lateral faces are, both in shape and size, identical with each other, the interior of said casing (2) serving as a game space for said number of encased flat plate-like game pieces (1) of the shape that is substantially identical with that of said at least four lateral faces of said casing (2); said game pieces (1) being laid out in size so that they are allowed for free movement within said game space defined by said casing (2), and wherein each of said at least four lateral faces of said casing (2) and/or said game pieces (1) are/is provided with a retaining means (3) for releasably holding any one of said game pieces (1) to any one of said at least four lateral faces of said casing (2).

2. The three-dimensional puzzle as claimed in Claim 1 wherein said retaining means (3) comprises at least one piece of preferably ferromagnetic substance.

3. The three-dimensional puzzle as claimed in Claims 1 and 2 wherein said flat plate-like game pieces (1) are, at least partially, of ferromagnetic material or they comprise, fastened to them, at least one area of such ferromagnetic material, and said retaining means (3) of each of said at least four lateral faces of said casing (2) consists of at least one piece of permanent magnet (31) capable of interacting with said (area of) ferromagnetic material of said game pieces (1).

- 14 -

4. The three-dimensional puzzle as claimed in Claim 1 wherein said retaining means (3) comprises at least one surface area of increased mechanical friction or adherence.

5. The three-dimensional puzzle as claimed in any one of the preceding Claims 1 to 4 wherein, for handling the puzzle, each of said at least four lateral faces is further provided with an actuating means (4) for releasing the gripping force by which a game piece (1) is temporarily and releasably held to a lateral face of said casing (2).

6. The three-dimensional puzzle as claimed in Claim 5 wherein in each of said at least four lateral faces of said casing (2) an access opening is provided as actuating means (4) for direct manual handling of the puzzle.

7. The three-dimensional puzzle as claimed in Claim 5 wherein on each of said at least four lateral faces of said casing (2) a sensor or push button serving as actuating means (4) is provided for indirect handling of the puzzle.

8. The three-dimensional puzzle as claimed in any one of the preceding Claims 1 to 7 wherein said hollow casing (2) has the shape of a substantially regular geometric solid with cut-off or rounded apical inside areas and/or edges.

9. The three-dimensional puzzle as claimed in any one of the preceding Claims 1 to 8 wherein said flat plate-like game pieces (1) are substantially quadratic in shape, and they are enclosed in a substantially cubiform hollow casing (2).

10. The three-dimensional puzzle as claimed in any one of the preceding Claims 1 to 9 wherein at least some of said game pieces (1) and/or at least some of said lateral faces of said casing (2) are substantially transparent.

- 15 -

11. The three-dimensional puzzle as claimed in any one of the preceeding Claims 1 to 10 wherein at least some of said lateral faces of said casing (2) are marked and/or provided with symbols and/or shaped openings or shaped transparent areas.

1/2

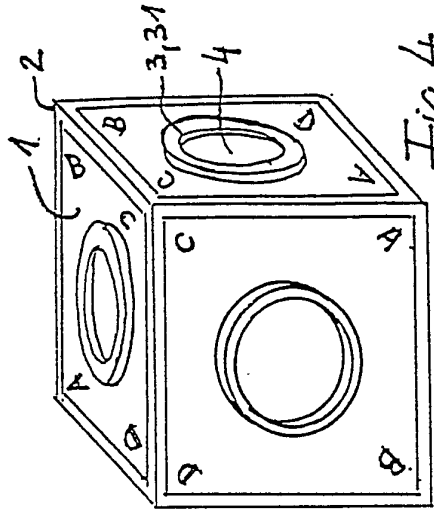


Fig. 4

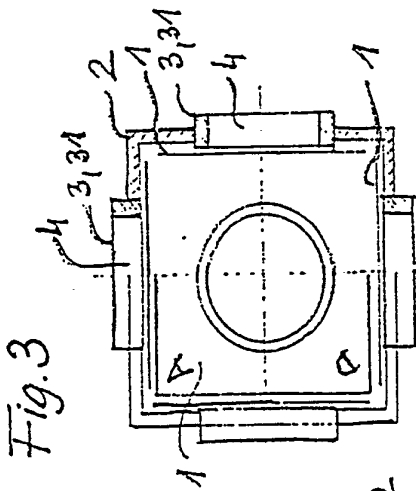


Fig. 3

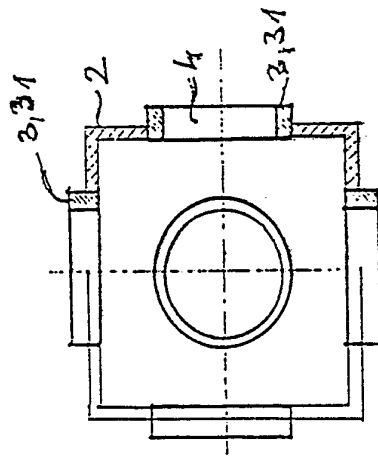


Fig. 2

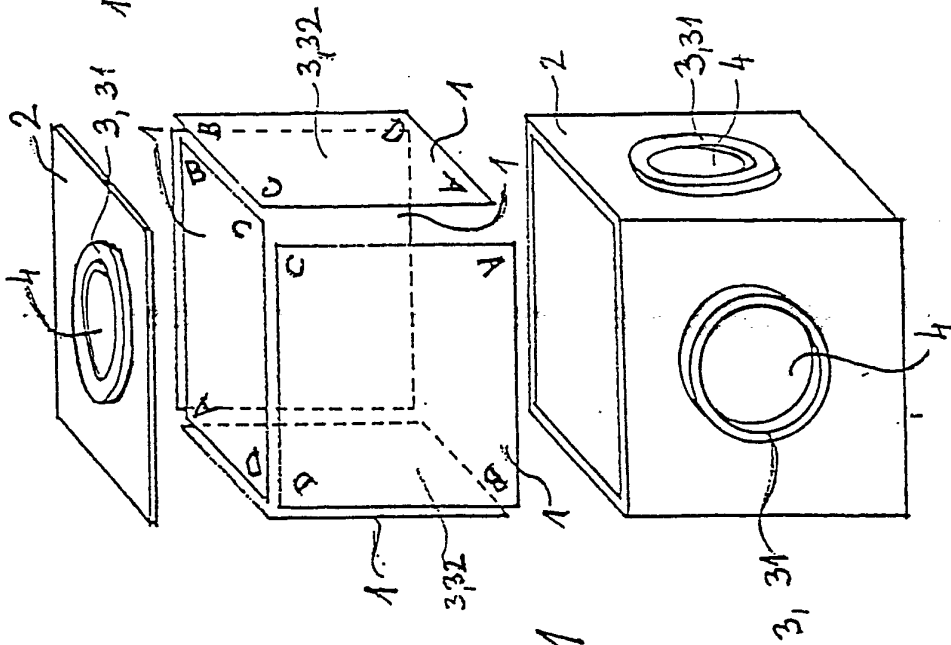
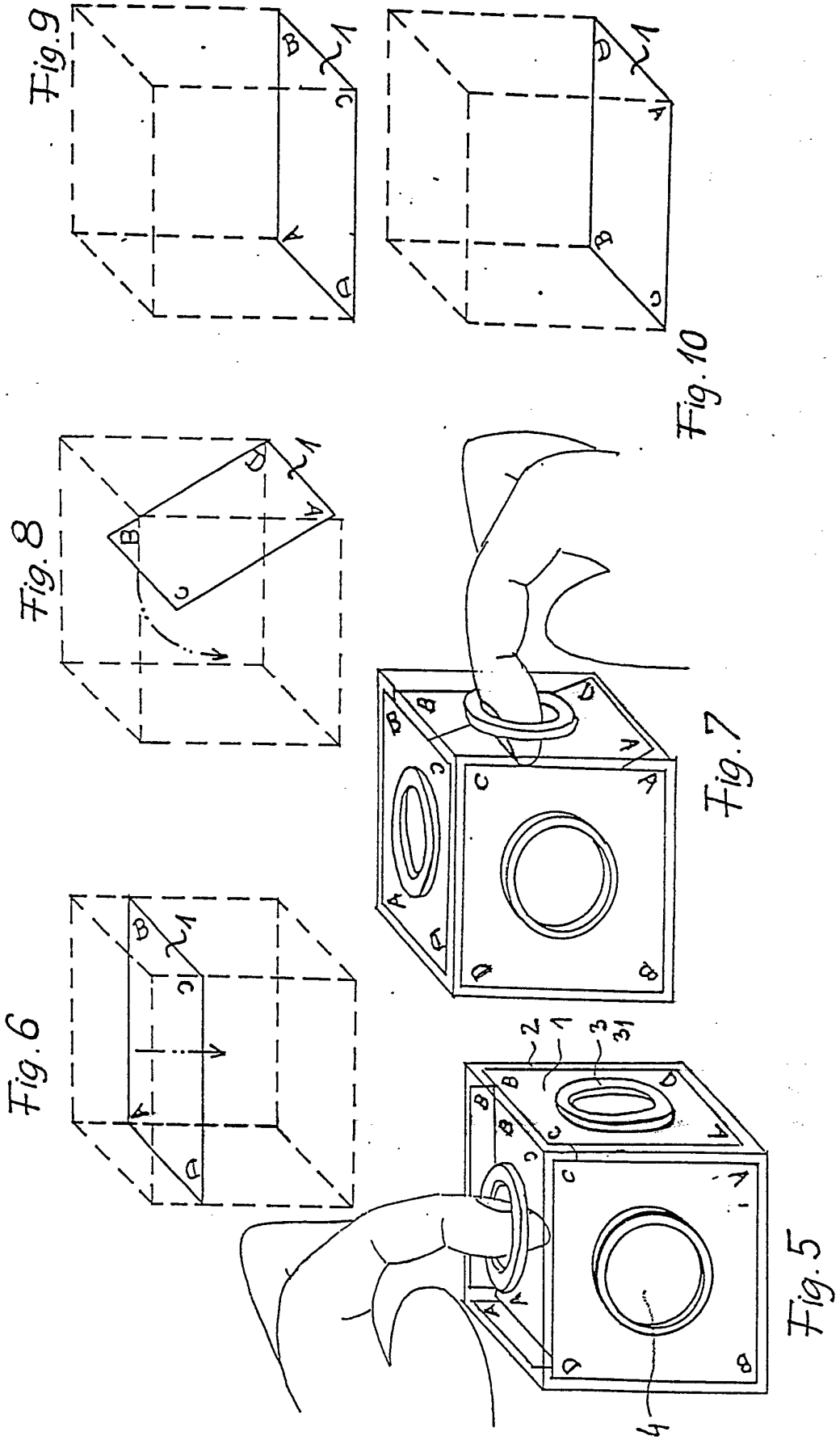


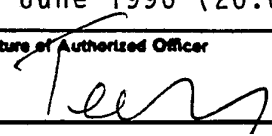
Fig. 1



INTERNATIONAL SEARCH REPORT

International Application No PCT/HU 90/00017

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) ⁶		
According to International Patent Classification (IPC) or to both National Classification and IPC		
IPC ⁵ : A 63 F 9/08		
II. FIELDS SEARCHED		
Minimum Documentation Searched ⁷		
Classification System	Classification Symbols	
Int.Cl. ⁵	A 63 F 9/08, A 63 F 9/00, A 63 F 9/06	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched ⁸		
III. DOCUMENTS CONSIDERED TO BE RELEVANT ⁹		
Category ¹⁰	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³
A	US, A, 416 344 (RICE) 03 December 1989 (03.12.89), see fig. 1-7; page 1, lines 39-52.	(1,5,6,9,11)
A	US, A, 537 168 (ORHSBY) 09 April 1985 (09.04.85), see fig. 1-5.	(1,4,10,11)
A	Soviet Inventions Illustrated, sections P,Q, week 8842, issued 1988, November 30 (Derwent Publications Ltd., London), P 36, see SU-1 388-072-A (NAGI).	(1,9,10,11)
A	US, A, 4 036 503 (LANCE) 19 July 1977 (19.07.77), see fig. 1-8.	(1,10,11)

<p>¹⁰ Special categories of cited documents:</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"Δ" document member of the same patent family</p>		
IV. CERTIFICATION		
Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report	
11 June 1990 (11.06.90)	20 June 1990 (20.06.90)	
International Searching Authority	Signature of Authorized Officer	
AUSTRIAN PATENT OFFICE		

Anhang zum internationalen Recherchenbericht über die internationale Patentanmeldung Nr.

Annex to the International Search Report on International Patent Application No. PCT/HU 90/00017

Annexe au rapport de recherche internationale relatif à la demande de brevet international n°.

In diesem Anhang sind die Mitglieder der Patentfamilien der im obengenannten internationalen Recherchenbericht angeführten Patentedokumente angegeben. Diese Angaben dienen nur zur Unterrichtung und erfolgen ohne Gewähr.

This Annex lists the patent family members relating to the patent documents cited in the above-mentioned International search report. The Austrian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

La présente annexe indique les membres de la famille de brevets relatifs aux documents de brevets cités dans le rapport de recherche internationale visé ci-dessus. Les renseignements fournis sont donnés à titre indicatif et n'engagent pas la responsabilité de l'Office autrichien des brevets.

Im Recherchenbericht angeführtes Patentdokument Patent document cited in search report Document de brevet cité dans le rapport de recherche	Datum der Veröffentlichung Publication date Date de publication	Mitglied(er) der Patentfamilie Patent family member(s) Membre(s) de la famille de brevets	Datum der Veröffentlichung Publication date Date de publication
US-A - 416344		US-A - 3937522 AT-A - 7382/73 AT-B - 329014 BE-A1- 807388 CA-A1- 1014584 CH-A - 562745 DE-A1- 2256877 FR-A5- 2207442 GB-A - 1441596 IT-A - 999390 JP-A2-49082073 NL-A - 7313535 SE-B - 401158 SE-C - 401158	10-02-76 15-07-75 26-04-76 15-03-74 26-07-77 13-06-75 22-05-74 14-06-74 07-07-76 20-02-76 07-08-74 22-05-74 24-04-78 03-08-78
US-A - 537168		CA-A1- 1024067 US-A - 3976139 US-A - 4613110 US-A - 4562990	10-01-78 24-08-76 23-09-86 07-01-86
US-A - 4036503	19-07-77	None	