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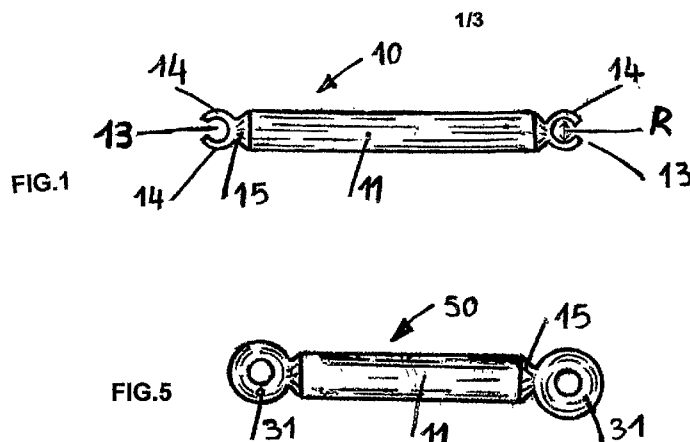
Declarations under Rule 4.17:

- as to the identity of the inventor (Rule 4.17(i))
- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))
- of inventorship (Rule 4.17(iv))

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(54) Title: CONSTRUCTION TOY



(57) Abstract: A construction toy set comprising a plurality of first rod elements having a torus connecting elements at both ends, a plurality of second rod elements having a C-shaped gripping clip at both ends and a plurality of third rod elements having a torus connecting element at one end and a C-shaped gripping clip at the other end. These rod elements are assembled in a combination of different ways to create two and three dimensional structures.

CONSTRUCTION TOY

The present invention relates to a construction toy set for building two and three dimensional structures.

These construction sets are known which are formed of a plurality of rod elements having a C-shaped clip attached at both ends and a plurality of torus

5 connecting elements, which are combined together to form structures.

These existing construction toy sets have shortcomings as they require a large number of parts to build structures.

The device of the present invention, while being known includes advantageous features which greatly enhance its performance and reduce significantly the

10 number of parts used to build basic and complex structures.

The construction toy set of the present invention comprise a plurality of first type of rod elements having a torus element attached at both ends; a plurality of second type of rod elements having a C-shaped gripping clip attached at both

15 attached at one end and a C-shaped gripping clip attached at the other end.

Still according to the present invention, at least one of any said rod element include one or more torus connecting element between its ends.

Still according to the present invention, at least one of any said rod element include one or more U-shaped gripping sockets between its ends so that two or

20 more such rod elements can be connected by snap fit connection to form cruciform or grid composite structures.

Other objects and advantageous features of this present invention will be more apparent on the description carried out in accordance to the drawings included, in which;

25 FIGS.1to 3 show a front view of rod elements having a C-shaped gripping clip at each end.

FIG.4 is a top view, at an enlarged scale, of a part of a rod of FIGS.1to 3.

FIGS.5,7 and 9 illustrates rod elements having a torus element at each end.

FIG.6 shows another rod element having a C-shaped gripping clip at one end

30 and a torus connecting element at the other end.

FIG.8 and 10 show torus segments that may be used in this present invention.

FIG.11 shows another rod element according to the present invention.

FIG.12 shows a body of an elongated rod element, in cross section, having a plurality of torus connecting elements between its ends.

35 FIG.13 shows a body of an elongated rod element, in cross section, having one or more U-shaped gripping sockets between its ends.

FIG.14 shows a cruciform composite structure formed with rods of FIG.13.

FIG.15 shows a grid composite structure formed with rod elements of FIG.13.

FIG.16 and 17 illustrate a body of a rod element, in cross section, formed in

40 two parts.

FIGS.18 and 19 illustrate plate panel elements that may be used in the present invention.

FIGS.20 and 21 show composite structures built with elements of this invention.

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Referring to the drawings; FIG.1 illustrates a rod element 10 formed with a body portion 11. The distal ends of the rod element are formed with a tapered portion 15 in which a C-shaped gripping clip 13 is integrally connected so that to snap and detachably connect into the torus connecting elements 31 of the rod elements of FIGS.5,6,7 and 9.

The C-shaped gripping clip 13 is formed with two symmetrically opposed gripping jaws 14 which extend parallelly to the longitudinal axis of the rod element 10 as shown in FIG.1.

The internal diameter R of the C-shaped gripping clips 13, as shown in FIG.1, is slightly smaller than the cross section of the torus elements 31 of the rod elements so that the jaws 14 can slightly extend to snap and firmly hold the torus elements 31 and its disassembly is made in the reverse order.

FIG.2 shows the embodiment of a second rod element 20, similar to the one of FIG.1. Here the jaws 14 of the C-shaped gripping clip extend perpendicularly to the longitudinal axis of the rod element 20 to allow a lateral snap fit connection between the rod elements, so that the center to center distance of a pair of torus of rod elements does not have to be distorted and enlarged in order to receive a C-shaped clip of another rod element.

FIG.3 illustrates a rod element 30 which is another alternative to the rod elements of FIGS.1 and 2. Here the rod element 30 is formed with one C-shaped gripping clip similar to the one of rod element of FIG.1 and the other similar to the one of rod element of FIG.2. The first end A of the rod element 30 can be assembled from any angular position, then the other end B is swiveled for a radial connection and its disassembly is made in the reverse order.

As shown from FIG.4, at an enlarged scale, each jaw 14 of the rod elements is symmetrically tapered reducing the width W of the jaw towards its distal end to make a generally smaller pointed end 19. The jaws 14 could be formed as not tapered.

FIG.5 shows another rod element 50 according to the present invention which has a torus connecting element 31 attached at both ends.

FIG.6 shows another rod element 60 according to the present invention having a torus connecting element 31 at one end and a C-shaped gripping clip 13 at the other end. The jaws 14 of the C-shaped clip could extend similarly to the ones of the rod element of FIG.1 or be similarly to the ones of FIG.2.

FIG.7 illustrates another rod element 70 similar to the rod element 50 of FIG.5. Here the torus connecting elements 31 are provided with diametrically opposed transverse holes 71. The holes 71 are made to receive and retain torus segments 80 of FIG.8 by friction fit, thereby creating a rod element of FIG.11 having a sphere like connecting element at one or both ends. The torus segment 80 of

FIG.8 has a shape of half a torus formed with a stem 81 at each end to frictionally fit into the holes 71 of the rod elements of FIG.7.

FIG.9 illustrates another rod element 90 similar to the one of FIG.5. Here as well the torus connecting elements 31 of the rod element 90 are provided with one through hole 91 at the tapered end of the rod element to receive and retain the

torus segment 100 of FIG.10 by friction fit, thereby creating the rod element shown in FIG.11.

FIG.11 shows a rod element having each end formed with a sphere-like connecting element. Each sphere-like element is formed with a main torus connecting element 31 into which a torus connecting segment 100 is connected.

The rod element of FIG.11 is used to create complex structures, as it allows more rod elements to be connected therein.

The torus element 31 of the rod element of FIG.6 may be provided with holes 71 or 81 similar to the ones of respectively FIGS.7 and 8 for the same purpose.

The rod elements of the present invention can be formed elongated and having one or more torus connecting elements 31 between their ends, as shown in FIG.12. The torus elements 31 between the ends of rod element of FIG.12 may be formed with holes 71 or 91 similar to the ones of respectively FIGS.7 and 9 for the same purpose.

The rod elements of the present invention may be elongated and having one or more U-shaped gripping sockets 21 between their ends as shown from FIG.13 to receive and retain such rod elements by snap fit connection, thereby creating cruciform or grid composite structures as shown in FIGS. 14 and 15. Each U-shaped socket 21 is formed with gripping lips 22 to receive and retain such U-shaped socket 21. The elongated rod elements of FIGS. 12 and 13 can be formed in rigid, flexible or semi flexible but tough plastic material. The rods of FIG.12 may be formed with both torus elements 31 and U-shaped sockets 21. In FIG.16, a generally cylindrical or polygonal body of the rod elements of the present invention is illustrated having adjustable length. Here the rod element is formed in two sections one having a stem 12 formed with an external screw thread 16, the other being formed with an internal screw thread 18 to accommodate the external screw thread.

In FIG.17, a generally cylindrical or polygonal body of the rod elements of the present invention is illustrated having adjustable length. Here as well the body of the rod element is formed in two sections one having a generally cylindrical or polygonal stem 12, the other being formed with a bore 17 in which the stem 12 is received and removably retained by friction, thereby creating a composite rod element of variable length.

FIG.18 shows a top perspective view of a planar plate panel 180, made from resilient plastic material, having two or more flanges 61 extending on the edges of the panel. The panel is used to fit into the body of the rod elements of built structures by snap fit connection. The panel is shown square but can be made from any polygonal shape.

FIG.19 shows a bottom perspective view of another panel 190 similar to the one of FIG.18 having an opening 62 on its surface 63. The opening 62 can be made from any geometrical or decorative shape. The surface 63 of the panels 180 and 190 may be molded with architectural designs so that built structures are made to resemble to prototypes of buildings, monuments and towers at a reduced scale. The panels can also be made for decorative and aesthetic purposes.

The rod elements having C-shaped clips at both ends may be provided in first rods having first length and second rods having second length.

The first length of second rods is chosen equal to the diagonal 20 of a square formed of four first rods 10 as sides, coupled each other in correspondence

5 of the corners of the square by four torus elements 31 as shown in FIG.20.

Still according to the present invention, the second length of second rods is equal to half of the diagonal of a square formed of four first rod elements 10 as sides, coupled each other in correspondence of the corners of the square by four torus elements 31, minus the external radius of the torus 31 as shown in FIG.21.

10 The cross section of the body 11 of the rod elements of the present invention may be formed approximately equal to the cross section of the torus connecting elements 31 so that a C-shaped gripping clip 13 of one rod element can be connected to the body 11 of a second rod element.

Basic torus connecting elements may be added the construction set of the

15 present invention to enhance its versatility and its performance.

The rod elements of the present invention may be provided with curved shapes so that circular and curved structures can be built.

The rod elements of this present invention are made from a suitable plastic material and may include different lengths and the rod elements can be made

20 in different size scales so that to be suitable for all different ages.

This construction set may also be used in outdoor playground equipment, where the rod elements are made in large sizes which are blow molded for weight purposes.

The construction set of the present invention is provided with elements having a
25 plurality of interconnections which allow a wide range of angular orientations between the rod elements and it may include wheels so that dynamic structure, such as vehicles, can be built.

The different rod elements of the present invention can be combined in different ways to form a combination of different construction toy sets as it is not

30 necessary to use all of the different rod elements, at the same time, in order to create a construction toy set. A simple set of rod elements of FIG.3 and FIG.5 can be combined to form a construction set .

Also, it is contemplated that the present invention can be a platform for other toys which resemble to real life objects such as animals, humans, plants, or
35 robots or action figures where the body 11 of the rod elements are shaped to resemble to arms, legs, wings, bodies, robot parts or other structures.

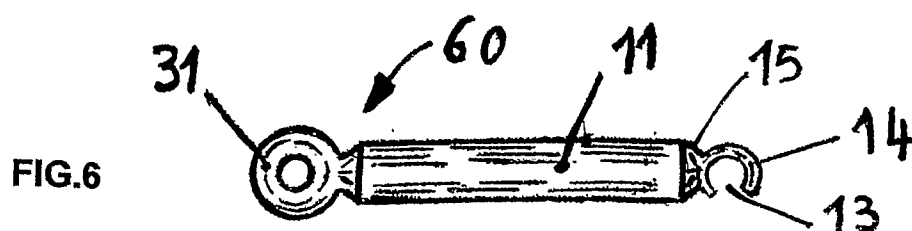
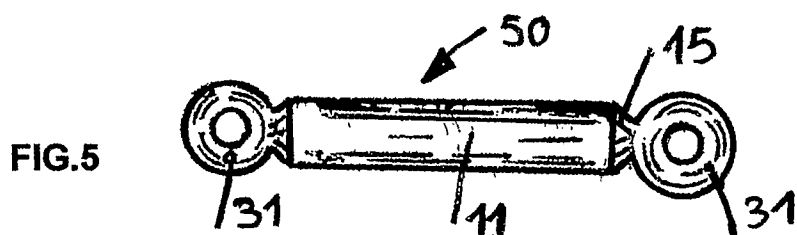
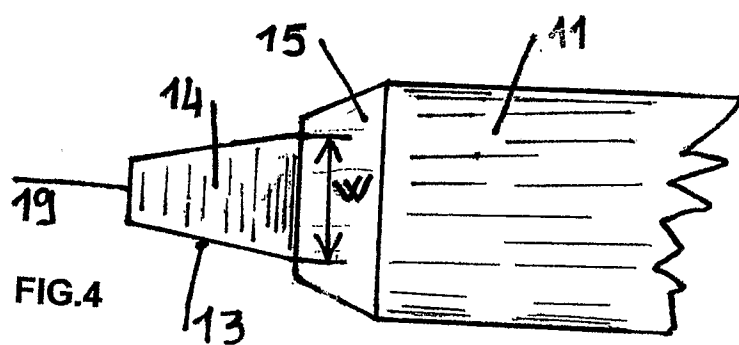
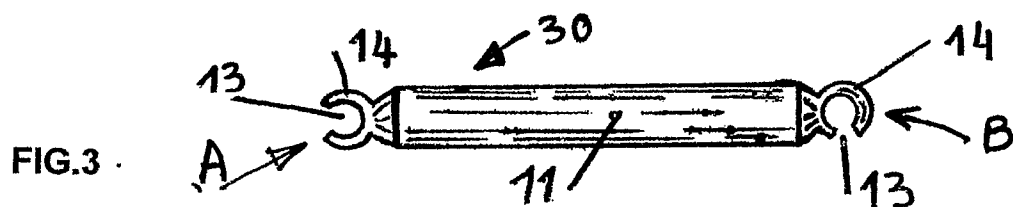
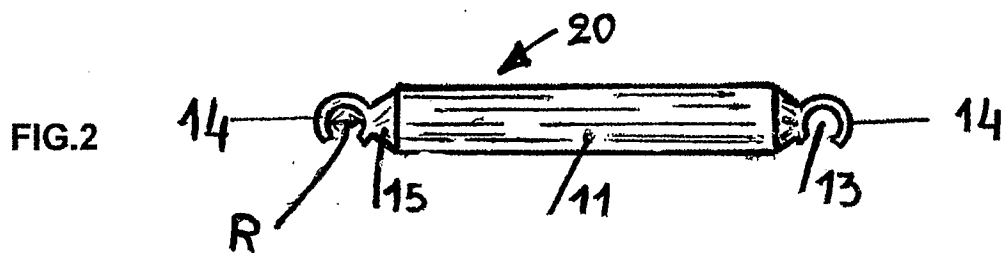
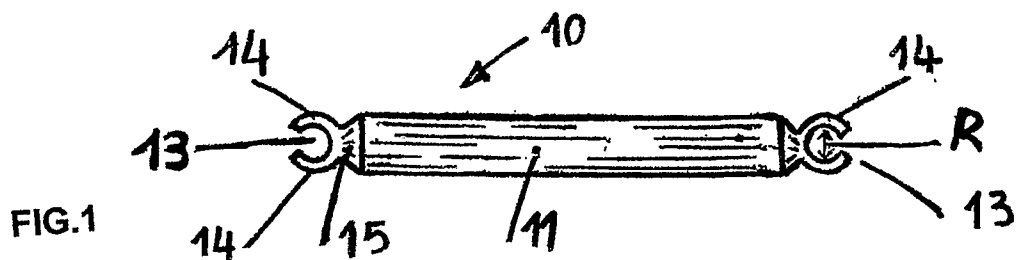
Although this invention is preferably designed for use as a construction toy set but it can be used as an education set for demonstrating and explaining education principles or can be used for architectural or engineering purposes.

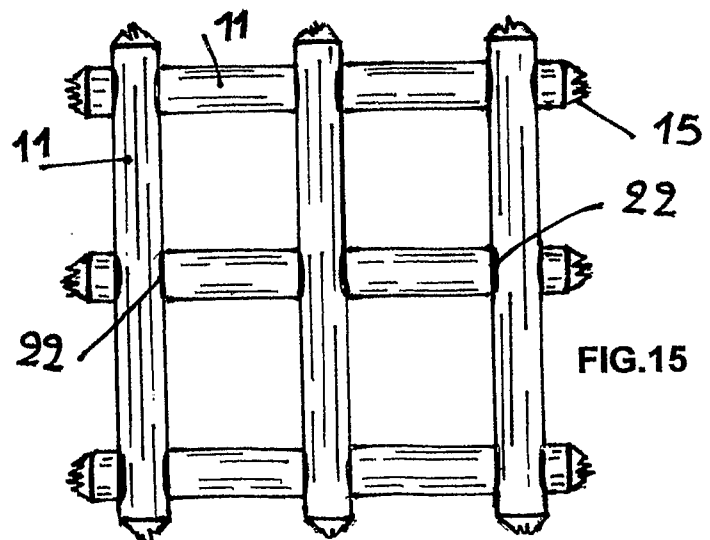
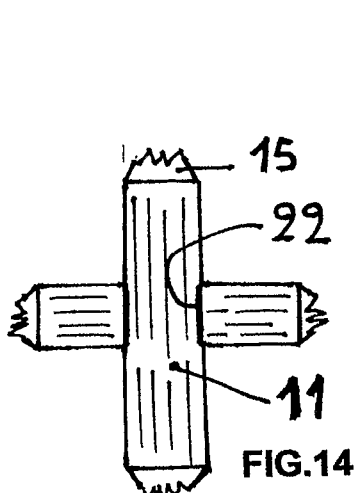
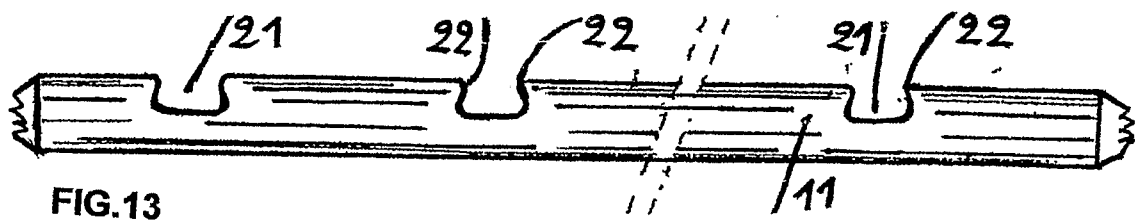
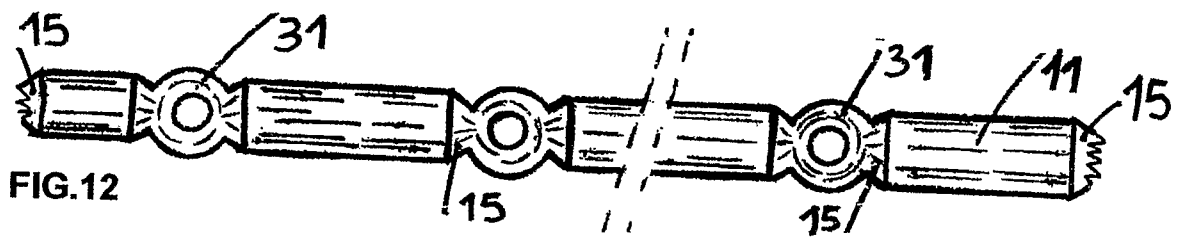
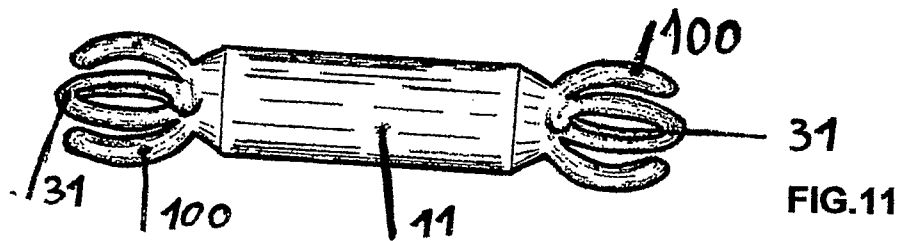
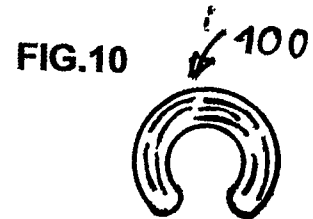
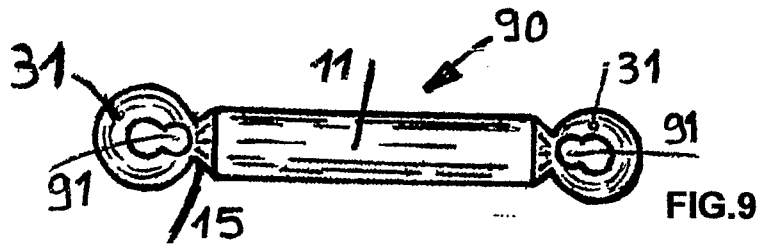
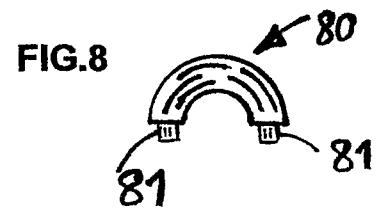
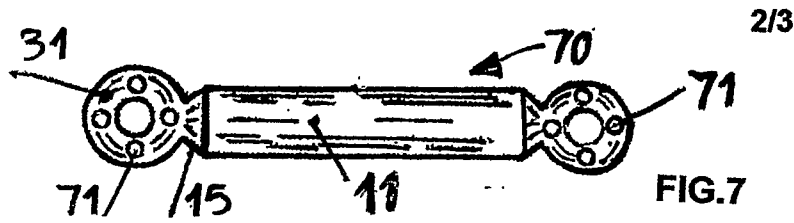
40 The present invention has been disclosed for illustrative but not limitative purposes, it will be obvious that modifications and changes may be introduced.

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claims

1. A construction toy set, comprising: at least one of a first type of rod element and at least one of a second type of rod element, wherein the first type of rod element has a central rod portion with a torus portion at both ends of the rod portion, and the second type of rod element has a central rod portion with a C-shaped gripping clip at both ends of the rod portion, wherein the C-shaped gripping clip is configured to detachably grip a torus portion of a rod element of the first type.
2. A construction toy set according to claim 1, further comprising at least one of a third type of rod element having a central rod portion with a torus portion at one end of the rod portion and a C-shaped gripping clip at the other end of the rod portion, the C-shaped gripping clip being configured to detachably grip a torus portion of a rod element of the first or third type, and wherein the C-shaped gripping clip of the second type of rod element is configured to detachably grip a torus portion of a rod element of the first type and the third type.
3. A construction toy set according to claim 1 and claim 2, wherein at least one of any said rod element include at least one torus element and/or at least one U-shaped gripping socket between its ends.
4. A construction toy set according to claim 1 and claim 2, wherein at least one of any said rod element is formed in two sections one having a stem formed with external screw threads, the other being formed with internal screw threads to accommodate the said external screw threads so that the length of said rod element can be adjusted.
5. A construction toy set according to claim 1 and claim 2, wherein at least one of any said rod element is formed in two sections one having a generally cylindrical stem, the other being formed with a bore in which the said stem is received and removably retained by friction, thereby creating a composite rod element of variable length.
6. A construction toy set according to claim 1 and claim 2, wherein at least one of any said rod element has a body having a cross section approximately equal to the internal diameter of the said C-shaped gripping clip so that a C-shaped gripping clip of one rod element can be connected and be detachably retained by the body of another rod element.
7. A construction toy set according to claim 1, wherein said second type of rod elements are provided in a plurality of first rod elements having first length and a plurality of second rod elements having second length.
8. A construction toy set according to claim 7, wherein said first length is chosen equal to the diagonal of a square formed of four first rod elements as sides, coupled each other in correspondence of the corners of the square by four torus elements.
9. A construction toy set according to claim 7, wherein said second length of second rod elements is equal to half of the diagonal of a square formed of four first rod elements as sides, coupled each other in correspondence of the corners of the square by four torus elements, minus the external radius of the torus element.

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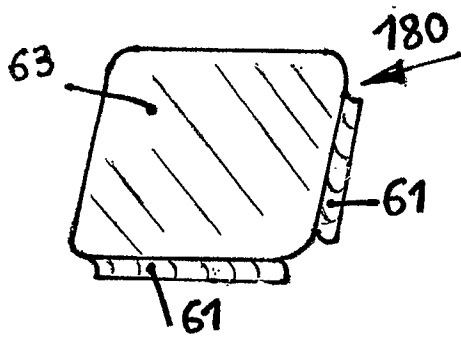
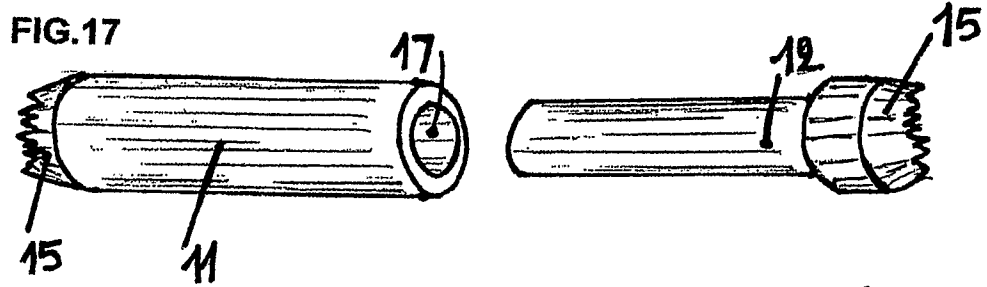
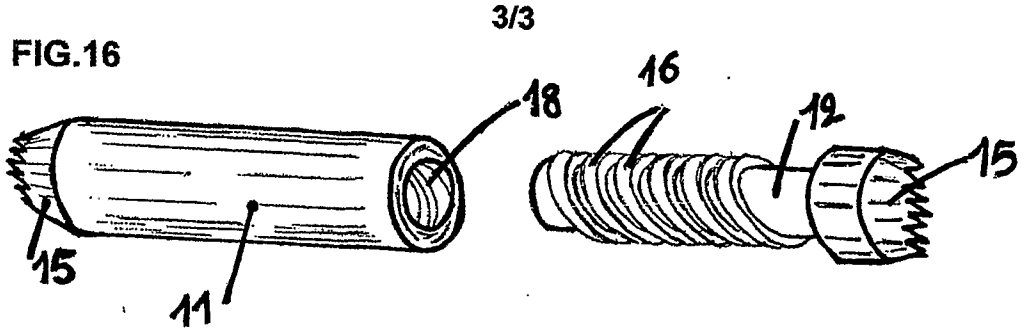


FIG.18

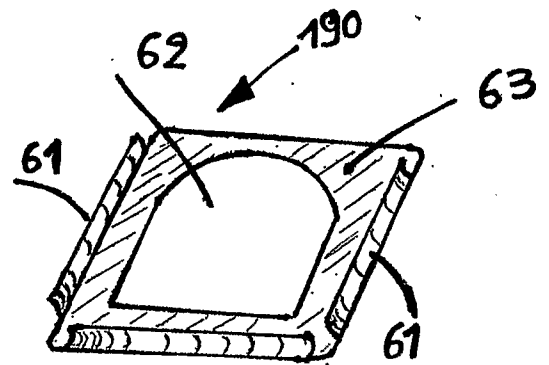


FIG.19

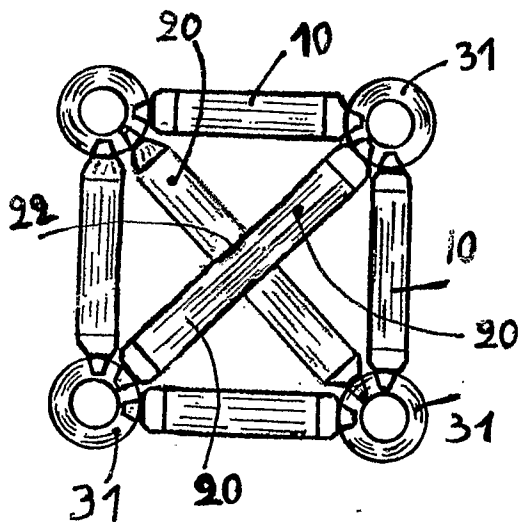


FIG.20

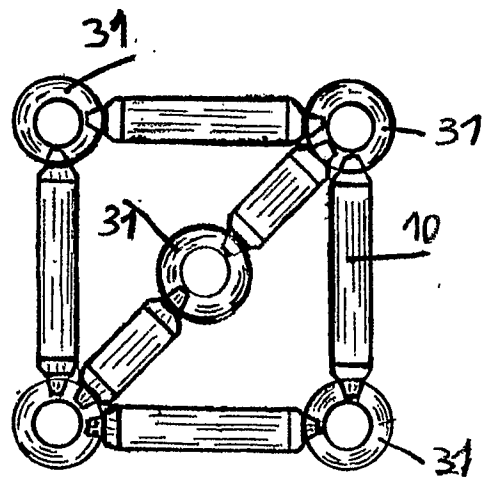


FIG.21

INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2008/001456

A. CLASSIFICATION OF SUBJECT MATTER
INV. A63H33/10 A63H33/06

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A63H

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 3 927 489 A (BERNSTEIN LAWRENCE A) 23 December 1975 (1975-12-23) column 2, line 36 - column 3, line 6; figures	1-9
A	US 2 959 888 A (SID NOBLE) 15 November 1960 (1960-11-15) column 2, line 41 - column 3, line 22; figures	1-9
A	US 3 550 311 A (FOUQUART JOHN J) 29 December 1970 (1970-12-29) column 2, line 20 - column 3, line 44; figures 1-3	1-9
A	US 3 698 123 A (HELDT CARL R) 17 October 1972 (1972-10-17) column 2, line 19 - column 3, line 18; figures	1-9

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:

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Date of the actual completion of the international search

29 July 2008

Date of mailing of the international search report

08/08/2008

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Lucas, Peter

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/GB2008/001456

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 3927489	A	23-12-1975	NONE
US 2959888	A	15-11-1960	NONE
US 3550311	A	29-12-1970	NONE
US 3698123	A	17-10-1972	NONE