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(54) **A TOY CONSTRUCTION SET AND A METHOD OF ASSEMBLING SUCH A TOY CONSTRUCTION SET**

**SPIELZEUGBAUSATZ UND VERFAHREN ZU DESSEN ZUSAMMENBAU**

**ENSEMBLE DE JEU DE CONSTRUCTION ET PROCÉDÉ D'ASSEMBLAGE D'UN TEL ENSEMBLE DE JEU DE CONSTRUCTION**

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(56) References cited:

**CA-A1- 2 185 619 US-A- 2 885 822**  
**US-A- 4 581 793 US-A1- 2017 106 309**

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## Description

### The prior art:

[0001] The present invention relates to a toy construction set comprising a number of toy building blocks forming a construction having multiple coupling sockets arranged in a spatial or planar pattern, and where the toy building set further comprises a number of coupling pins and a flexible sheet having at least one hole, and where each of the coupling pins extends in a longitudinal direction between a first end being shaped for releasable attachment of the pin to one of the coupling sockets, and a second end extending away from the coupling socket in the attached position of the pin in the socket, and where the second end of the pin comprises a head arranged distally on a neck on the second end of the pin, and where the neck has a cross section allowing it to pass freely through the hole.

[0002] Toy construction sets are known in various different embodiments, and as an example US patent application no. 20170106309 discloses such a toy construction system, where the head of the coupling pins are spherical, and it is possible to pass through the hole in the flexible sheet by elastic deformation of the flexible sheet.

[0003] US patent no. 2885822 furthermore discloses a toy construction set having coupling pins with a head having a size preventing that the head can be shifted through the hole in the flexible sheet.

[0004] The toy construction sets provides many different options for attaching sheet elements to a rigid structure constructed with the building blocks.

### The object of the invention:

[0005] On this background it is the purpose of the present invention to provide a construction set as mentioned in the introduction, and providing the user with further options for easily building more different constructions with new and intriguing functionality.

[0006] This is obtained by the toy construction set according to claim 1 by having the size and shape of the hole and the size and shape of the head are adapted such that it is impossible to pass the head through the hole without tearing or providing a plastic deformation on the flexible sheet, and by having the neck extending between the head and a flange surrounding the pin and the size and shape of the flange being such that passing the flange through the hole requires plastic deformation of the flexible sheet.

[0007] Thereby the flexible sheet is easy to attach to the coupling pin, but at the same time it is impossible to detach from an assembled construction as long as the coupling pin is mounted in a coupling socket.

[0008] In a preferred embodiment of the invention the head of the coupling pin is shaped like a panhead having a flat surface on the side of the head where the neck of

the coupling pin is arranged, and a convex surface on the opposite side. Thereby the risk of tearing the flexible sheet is reduced if a force is applied to the sheet trying to pull the sheet over the head.

[0009] In a preferred embodiment of the invention the largest cross section of the head is in a direction perpendicular to the longitudinal direction larger than the largest cross section of the hole in the flexible sheet.

[0010] In a further preferred embodiment the hole in the flexible sheet, and the largest cross section of the head in a direction perpendicular to the longitudinal direction are both circular.

[0011] Preferably the construction set comprises one or more of said building blocks, each having multiple coupling sockets arranged equidistantly at least along one straight line.

[0012] The construction set according to the invention may advantageously comprise two or more of said building blocks, and at least one connector pin having a first end adapted for being attached to a coupling socket on one of said building blocks, and an opposite end adapted for being attached to a coupling socket on the other one of said building blocks.

[0013] In an especially advantageous embodiment of the invention the flexible sheet is made from an elastically bendable material. Thereby the bending elasticity of the flexible sheet, along with the secure attachment of the sheet to the coupling pin provides various new functionalities without the risk that the flexible sheet disengages from the coupling pin.

[0014] In this relation the couplings sockets are preferably formed by a substantially cylindrical through hole extending through the building block.

[0015] The invention also provides a computer-readable model comprising computer-readable instructions configured to cause, when processed by an apparatus for performing an additive manufacturing process, said apparatus to manufacture the toy building elements as defined above.

[0016] Furthermore the invention provides a method of assembling at toy construction set according to one or more of the preceding claims, wherein the coupling pin is first attached to the flexible sheet by passing the first end of the coupling pin through the hole in the flexible sheet, and thereafter the first end of the coupling pin is attached to the coupling socket of one of the toy building blocks.

### The drawing:

[0017] In the following one or more embodiments of the invention will be described in more detail and with reference to the drawing, where:

Fig. 1: Is a perspective view showing one embodiment of a toy construction set according to the present invention before assembly.

Fig. 2: Is a perspective view of the toy construction set shown in fig. 1 after assembly.

Fig. 3: Is a detailed side view of one as shown in fig. 1 and 2.

Fig. 4: Is a side view of a connector pin to be used with the toy construction set shown in fig. 1 and 2.

Fig. 5: Is a side view of an alternative embodiment of the coupling pin according to the invention.

#### **Description of exemplary embodiments:**

**[0018]** Fig. 1 shows a very simple embodiment of a toy construction set according to the invention, having only a single building block 1, a flexible sheet 2, and a coupling pin 3 adapted for interconnecting the building block 1 with the flexible sheet 2 to form a combined construction.

**[0019]** The building block 1 has two legs forming a V, and each of the legs has a row of coupling sockets 4 arranged equidistantly along a straight line, and being formed as cylindrical through holes with a recess 5 arranged at each end of the through hole.

**[0020]** In the end of each of the legs on the building block 1 a second type of coupling socket 4a are arranged being formed as a splined through hole.

**[0021]** Building blocks of this type, are well known in the prior art having many different shapes and sizes allowing the user to construct various different structures e.g. by interconnecting two or more such building blocks using a connector pin 17 as shown in figure 4 formed as a cylindrical pin having oppositely arranged ends that extend away from a mid-flange 18, and due to the cutouts 20, and the distally arranged end flanges 19 each may be snap fitted into one coupling socket 4 on two different building blocks, so that the mid-flange 18 and the end flanges 19 fits into the recesses 5 on each end of the coupling sockets 4.

**[0022]** In this way it is possible to construct both simple and complex and rigid or articulating structures such as toy sailing ships, toy tents, toy flag poles and the like, and by providing the opportunity of mounting a sheet 2 on such structures, then it is possible to construct such toy structures that more realistically resembles real such sailing ships, tents, flag poles and the like, where the sheet 2 respectively resembles the sails, the tent canvas or the flag.

**[0023]** It is therefore apparent to the skilled person that the present invention is applicable to any such constructions, and toy construction sets.

**[0024]** According to this embodiment of the invention the sheet 2 has a hole 10 and is possible to attach to the building block/building element 1 by using a substantially cylindrical coupling pin 3 as shown in figure 1 and 3 by inserting the first end 11 of the substantially cylindrical coupling pin 3 through the hole 10 in the sheet 2, and into a snap engagement with one of the coupling sockets

4 formed by cylindrical through holes in the building block 1. According to this embodiment of the invention the head 7 of the coupling pin 3 has a cross section in a plane being perpendicular to the longitudinal symmetry axis 12 of the coupling pin 3 that is much larger than the width of the diameter of the circular hole 10 in the sheet, so that it is securely attached to the building block 1 due to the fact that it is impossible to pass the head 7 through the hole 10 without tearing or providing a plastic deformation of the sheet 2.

**[0025]** It will be apparent to the skilled person that it is possible, according to the invention, to design various different shapes and sizes of the hole 10 in the sheet 2 and corresponding shapes and sizes of the head 7 of the coupling pin 3, and to select a sheet material of the sheet 2 having an elasticity so that it is not possible to pass the head 7 through the hole 10 without tearing the material of the sheet 2 or at least forming a permanent/plastic deformation of the sheet material around the hole 10.

**[0026]** As an example the sheet 2 shown in figure 1 and 2 also has a second hole 10a, being triangular with a side length so that it allows the intermediate flange 9 mentioned below to pass the hole 10a.

**[0027]** In the embodiment shown in figure 1 and 3 the head 7 is formed as a panhead having a flat surface on the side facing the sheet 2 and a convex surface 16 facing away from the sheet 2 when it is attached to the coupling pin as shown on figure 3. In this embodiment the coupling pin 3 also has a neck 8 extending between the panhead 10 and an intermediate flange 9, and the diameter of the flange is in this embodiment smaller than the diameter of the hole 10, whereas the diameter of the flange 9 is a little larger than the diameter of the hole 10, so that it is possible to pass the flange 9 through the hole 10 by elastic deformation of the sheet. Thereby it is possible to attach the coupling pin 3 to the sheet 2 without the risk of losing the coupling pin 3 when handling the sheet 2 before it is attached to the building block 2 as shown on figure 2.

**[0028]** In some embodiments the holes have a triangular shape. This allows the flange to pass through the hole by elastic deformation of the hole while reducing the risk of damaging the sheet.

**[0029]** In the same way as the connector pin 17 is possible to snap into one of the coupling sockets 4 on the building element, then the coupling pin 3 shown in figure 3 is possible to snap into any one of the cylindrically shaped coupling sockets 4 on the building block 1, where the intermediate flange 9 fits into the recess 5 on one side of the coupling socket 4. In this way the same coupling socket 4 may be used for either interconnecting building blocks 1 or for attaching coupling pins 3.

**[0030]** In this relation this embodiment of the invention also comprises a second type of coupling sockets 4a that are shaped as splined through holes where a second type of coupling pin 24 as shown in figure 5 having a splined axle end are to be inserted into and held in place by friction.

**Claims**

1. A toy construction set comprising a number of toy building blocks (1) forming a construction having a number of coupling sockets (4) arranged in a spatial or planar pattern, and where the toy building set further comprises a number of coupling pins (3) and a flexible sheet (2) having at least one hole (10, 10a), and where each of the coupling pins (3) extends in a longitudinal direction between a first end (11) being shaped for releasable attachment of the pin to one of the coupling sockets (4), and a second end extending away from the coupling socket (4) in the attached position of the pin (3) in the socket (4), and where the second end of the pin (3) comprises a head (7) arranged distally on a neck (8) on the second end of the pin (3), and where the neck (8) has a cross section allowing it to pass freely through the hole (10, 10a), and where the size and shape of the hole (10, 10a) and the size and shape of the head (7) are adapted such that it is impossible to pass the head (7) through the hole (10, 10a) without tearing or providing a plastic deformation on the flexible sheet (2), wherein the neck (8) extends between the head (7) and a flange (9) surrounding the pin (3), and the size and shape of the flange (9) is such that passing the flange (9) through the hole (10, 10a) requires plastic deformation of the flexible sheet (2).
2. A toy construction set according to claim 1, wherein the head (7) is shaped like a panhead, or having a flat surface at the side of the head (15) facing the neck (8).
3. A toy construction set according to claim 1 or 2, wherein the hole (10a) is triangular.
4. A toy construction set according to claim 3, wherein the cross section of the neck (8) is circular having a diameter being smaller than the corresponding diameter of the circle circumscribing the triangular hole (10a).
5. A toy construction set according to claim 3 or 4, wherein the cross section of the flange (9) is circular having a diameter being larger than the corresponding diameter of the circle inscribing the triangular hole (10a).
6. A toy construction set according to one or more of the preceding claims, wherein the largest cross section of the head (7) is in a direction perpendicular to the longitudinal direction is larger than the largest cross section of the hole (10) in the flexible sheet (2).
7. A toy construction set according to claim 6, wherein the hole (10, 10a) in the flexible sheet (2), and the largest cross section of the head (7) in a direction

perpendicular to the longitudinal direction are both circular.

8. A toy construction set according to one or more of the preceding claims, wherein the construction set comprises one or more of said building blocks (1), each having multiple coupling sockets (4) arranged equidistantly at least along one straight line.
9. A toy construction set according to one or more of the preceding claims, wherein the construction set comprises two or more of said building blocks (1), and at least one connector pin (17) having a first end adapted for being attached to a coupling socket (4) on one of said building blocks, and an opposite end adapted for being attached to a coupling socket (4) on the other one of said building blocks (1).
10. A toy construction set according to one or more of the preceding claims, wherein the flexible sheet (2) is made from an elastically bendable material.
11. A toy construction set according to one or more of the preceding claims, wherein each of the couplings sockets (4) are formed by a substantially cylindrical through hole extending through the building block (1).
12. A computer-readable model comprising computer-readable instructions configured to cause, when processed by an apparatus for performing an additive manufacturing process, said apparatus to manufacture the toy building elements as defined in one or more of claims 1 through 10.
13. A method of assembling a toy construction set according to claims 1 to 11, wherein the coupling pin (3) is first attached to the flexible sheet (2) by passing the first end (11) of the coupling pin through the hole (10, 10a) in the flexible sheet (2), and thereafter the first end (11) of the coupling pin (3) is attached to the coupling socket (4) of one of the toy building blocks (1).

**Patentansprüche**

1. Spielzeug-Konstruktionsset, umfassend eine Reihe von Spielzeug-Bausteinen (1), die eine Konstruktion mit einer Reihe von Steckhülsen (4) bilden, die in einem räumlichen oder ebenen Muster angeordnet sind und wobei das Spielzeug-Bausteinset weiter eine Reihe von Steckzapfen (3) und eine flexible Steckplatte (2) umfasst, das mindestens ein Loch (10, 10a) aufweist, und wobei sich jeder der Steckzapfen (3) in einer Längsrichtung zwischen einem ersten Ende (11), das zum lösbaren Befestigen des Zapfen an einer der Steckhülsen (4) geformt ist, und

- einem zweiten Ende, das sich von dem Steckzapfen (4) weg in der befestigten Position des Zapfens (3) in der Hülse (4) erstreckt, und wobei das zweite Ende des Zapfens (3) einen Kopf (7) umfasst, der distal an einem Hals (8) an dem zweiten Ende des Zapfens (3) angeordnet ist, und wobei der Hals (8) einen Querschnitt aufweist, der es ermöglicht, sich frei durch das Loch (10, 10a) hindurchzuführen, und wobei die Größe und Form des Lochs (10, 10a) und die Größe und Form des Kopfes (7) derart angepasst sind, sodass es unmöglich ist, den Kopf (7) durch das Loch (10, 10a) ohne Reißen oder Bereitstellen einer plastischen Verformung an der flexiblen Steckplatte (2) hindurchzuführen, wobei sich der Hals (8) zwischen dem Kopf (7) und einem Flansch (9), der den Zapfen (3) umgibt, erstreckt und die Größe und Form des Flanges (9) derart bemessen sind, sodass ein Hindurchführen des Flansches (9) durch das Loch (10, 10a) eine plastische Verformung der flexiblen Steckplatte (2) erfordert.
2. Spielzeug-Konstruktionsset nach Anspruch 1, wobei der Kopf (7) wie ein Flachkopf geformt ist oder eine flache Fläche an der Seite des Kopfes (15) gegenüber dem Hals (8) aufweist.
  3. Spielzeug-Konstruktionsset nach Anspruch 1 oder 2, wobei das Loch (10a) dreieckig ist.
  4. Spielzeug-Konstruktionsset nach Anspruch 3, wobei der Querschnitt des Halses (8) kreisförmig ist, mit einem Durchmesser, der kleiner als der entsprechende Durchmesser des Kreises ist, der das dreieckige Loch (10a) umschreibt.
  5. Spielzeug-Konstruktionsset nach Anspruch 3 oder 4, wobei der Querschnitt des Flansches (9) kreisförmig ist, mit einem Durchmesser, der größer als der entsprechende Durchmesser des Kreises ist, der das dreieckige Loch (10a) umschreibt.
  6. Spielzeug-Konstruktionsset nach einem der vorstehenden Ansprüche, wobei der größte Querschnitt des Kopfes (7), der in einer senkrechten Richtung zur Längsrichtung verläuft, größer als der größte Querschnitt des Lochs (10) in der flexiblen Steckplatte (2) ist.
  7. Spielzeug-Konstruktionsset nach Anspruch 6, wobei das Loch (10, 10a) in der flexiblen Steckplatte (2) und der größte Querschnitt des Kopfes (7) in einer senkrechten Richtung zur Längsrichtung beide kreisförmig sind.
  8. Spielzeug-Konstruktionsset nach einem der vorstehenden Ansprüche, wobei das Konstruktionsset einen oder mehrere der Bausteine (1) umfasst, wobei jeder davon mehrfache Steckhülsen (4) aufweist, die mindestens entlang einer geraden Linie in gleichen Abständen angeordnet sind.
  9. Spielzeug-Konstruktionsset nach einem der vorstehenden Ansprüche, wobei das Konstruktionsset zwei oder mehr der Bausteine (1) und mindestens einen Steckerstift (17) umfasst, der ein erstes Ende aufweist, das angepasst ist, um an einer Steckhülse (4) an einem der Bausteine befestigt zu werden, und ein zweites Ende, das angepasst ist, um an einer Steckhülse (4) an dem anderen der Bausteine (1) befestigt zu werden.
  10. Spielzeug-Konstruktionsset nach einem der vorstehenden Ansprüche, wobei die flexible Steckplatte (2) aus einem elastisch biegbaren Material hergestellt ist.
  11. Spielzeug-Konstruktionsset nach einem der vorstehenden Ansprüche, wobei jede der Steckhülsen (4) durch eine im Wesentlichen zylindrische Durchgangsbohrung, die sich durch den Baustein (1) hindurch erstreckt, geformt ist.
  12. Computer-lesbares Modell, umfassend computerlesbare Anweisungen, das konfiguriert ist, um zu veranlassen, dass wenn durch eine Einrichtung zum Durchführen eines zusätzlichen Herstellungsprozesses verarbeitet, die Einrichtung Spielzeug-Bau-elemente, wie in einem der Ansprüche 1 bis 10 definiert, herstellt.
  13. Verfahren zum Zusammensetzen eines Spielzeug-Konstruktionssets nach Anspruch 1 bis 11, wobei der Steckzapfen (3) zuerst an der flexiblen Steckplatte (2) befestigt wird, indem das erste Ende (11) des Steckzapfens durch das Loch (10, 10a) in der flexiblen Steckplatte (2) hindurchgeführt wird und danach das erste Ende (11) des Steckzapfens (3) an der Steckhülse (4) eines der Spielzeug-Bausteine (1) befestigt wird.

## Revendications

1. Jeu de construction comprenant un certain nombre de blocs de jeu de construction (1) créant une construction qui présente un certain nombre de douilles d'accouplement (4) agencées en une configuration spatiale ou plane, et où le jeu de construction comprend en outre un certain nombre de tiges d'accouplement (3) et une feuille flexible (2) présentant au moins un trou (10, 10a), et où chacune des tiges d'accouplement (3) s'étend dans une direction longitudinale entre une première extrémité (11) qui est formée pour une attache libérable de la tige à une des douilles d'accouplement (4), et une seconde extrémité s'étendant à distance de la douille d'accou-

- plement (4) dans la position attachée de la tige (3) dans la douille (4), et où la seconde extrémité de la tige (3) comprend une tête (7) agencée de manière distale sur un collet (8) sur la seconde extrémité de la tige (3), et où le collet (8) présente une coupe transversale lui permettant de passer aisément à travers le trou (10, 10a), et où la taille et la forme du trou (10, 10a) et la taille et la forme de la tête (7) sont adaptées de telle sorte qu'il soit impossible de passer la tête (7) à travers le trou (10, 10a) sans déchirer ni produire une déformation plastique sur la feuille flexible (2), dans lequel le collet (8) s'étend entre la tête (7) et une bride (9) entourant la tige (3), et la taille et la forme de la bride (9) sont telles qu'un passage de la bride (9) à travers le trou (10, 10a) exige une déformation plastique de la feuille flexible (2).
2. Jeu de construction selon la revendication 1, dans lequel la tête (7) est formée comme une tête cylindrique large, ou présentant une surface plane au niveau du côté de la tête (15) faisant face au collet (8).
  3. Jeu de construction selon la revendication 1 ou 2, dans lequel le trou (10a) est triangulaire.
  4. Jeu de construction selon la revendication 3, dans lequel la coupe transversale du collet (8) est circulaire présentant un diamètre qui est plus petit que le diamètre correspondant du cercle circonscrivant le trou (10a) triangulaire.
  5. Jeu de construction selon la revendication 3 ou 4, dans lequel la coupe transversale de la bride (9) est circulaire présentant un diamètre qui est plus grand que le diamètre correspondant du cercle inscrit dans le trou (10a) triangulaire.
  6. Jeu de construction selon une ou plusieurs des revendications précédentes, dans lequel la coupe transversale la plus grande de la tête (7) est dans une direction perpendiculaire à la direction longitudinale est plus grande que la coupe transversale la plus grande du trou (10) dans la feuille flexible (2).
  7. Jeu de construction selon la revendication 6, dans lequel le trou (10, 10a) dans la feuille flexible (2), et la coupe transversale la plus grande de la tête (7) dans une direction perpendiculaire à la direction longitudinale sont tous les deux circulaires.
  8. Jeu de construction selon une ou plusieurs des revendications précédentes, dans lequel le jeu de construction comprend un ou plusieurs desdits blocs de construction (1), chacun présentant de multiples douilles d'accouplement (4) agencées à égale distance au moins le long d'une ligne droite.
  9. Jeu de construction selon une ou plusieurs des revendications précédentes, dans lequel le jeu de construction comprend deux ou plus desdits blocs de construction (1), et au moins une tige de liaison (17) présentant une première extrémité adaptée pour être attachée à une douille d'accouplement (4) sur un desdits blocs de construction, et une extrémité opposée adaptée pour être attachée à une douille d'accouplement (4) sur l'autre desdits blocs de construction (1).
  10. Jeu de construction selon une ou plusieurs des revendications précédentes, dans lequel la feuille flexible (2) est faite d'un matériau pliable élastiquement.
  11. Jeu de construction selon une ou plusieurs des revendications précédentes, dans lequel chacune des douilles d'accouplement (4) est créée par un trou traversant sensiblement cylindrique qui s'étend à travers le bloc de construction (1).
  12. Modèle lisible par ordinateur comprenant des instructions lisibles par ordinateur configurées pour amener, lorsqu'elles sont traitées par un appareil permettant de réaliser un processus de fabrication additive, ledit appareil à fabriquer les éléments de jeu de construction tels que définis dans une ou plusieurs des revendications 1 à 10.
  13. Procédé d'assemblage d'un jeu de construction selon les revendications 1 à 11, dans lequel la tige d'accouplement (3) est tout d'abord attachée à la feuille flexible (2) en passant la première extrémité (11) de la tige d'accouplement à travers le trou (10, 10a) dans la feuille flexible (2), et par la suite la première extrémité (11) de la tige d'accouplement (3) est attachée à la douille d'accouplement (4) d'un des blocs de jeu de construction (1).

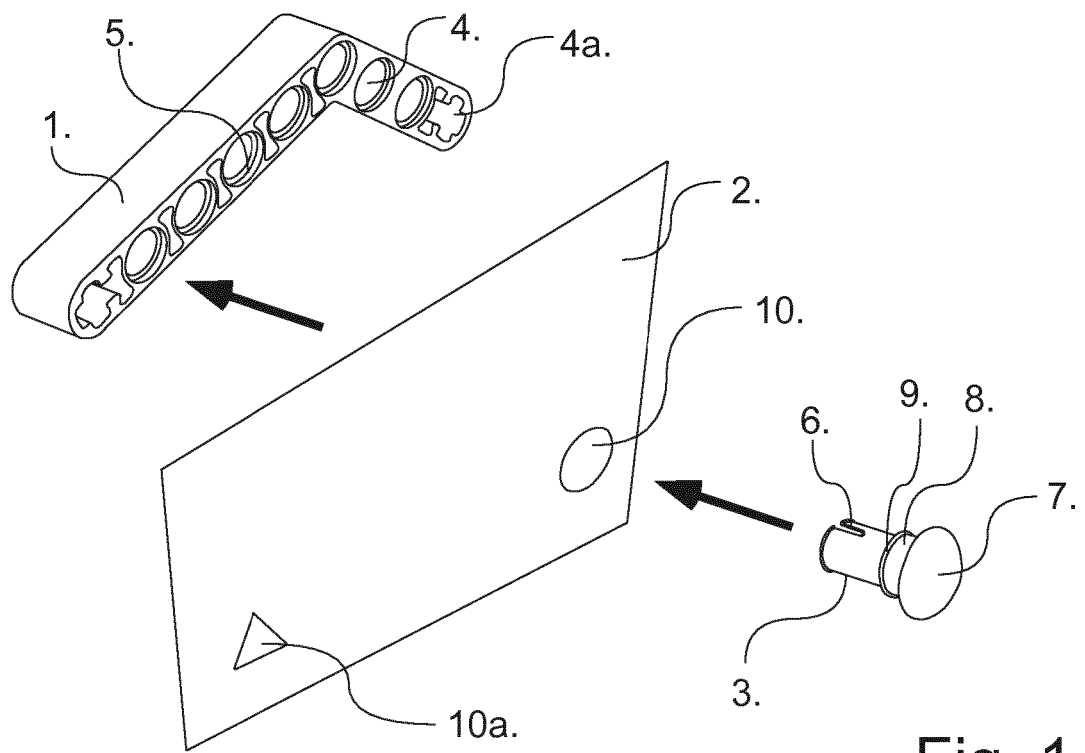


Fig. 1

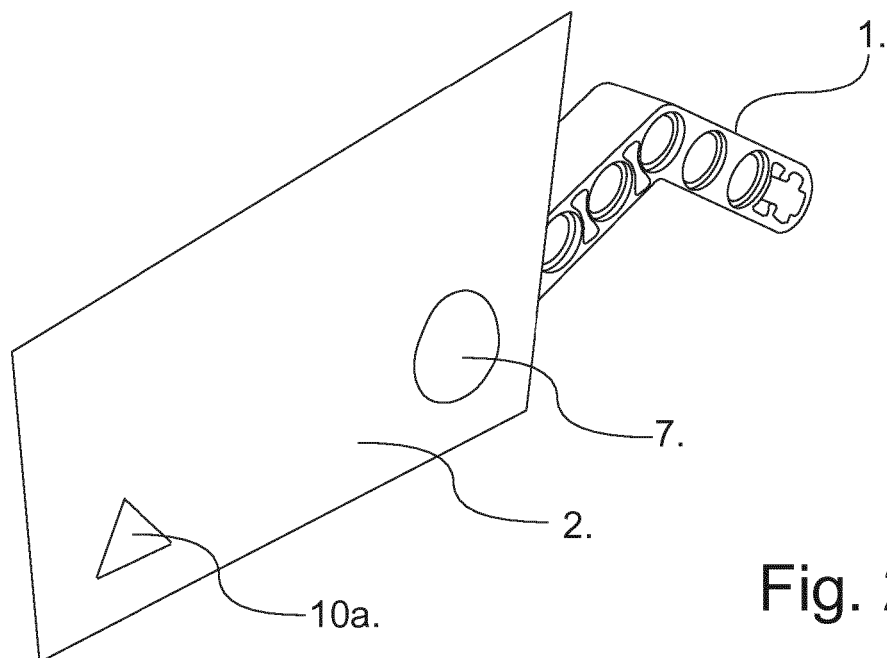


Fig. 2

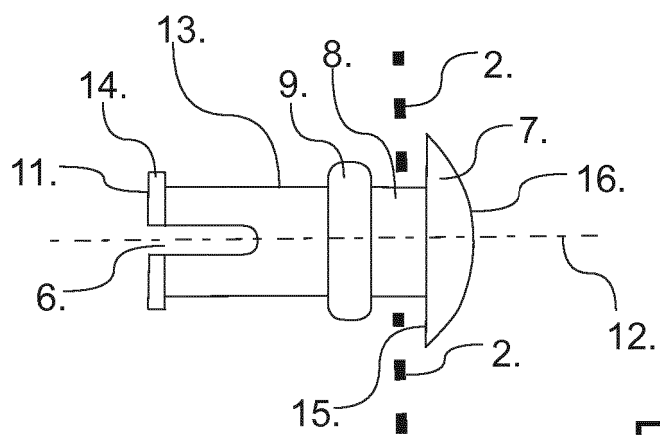


Fig. 3

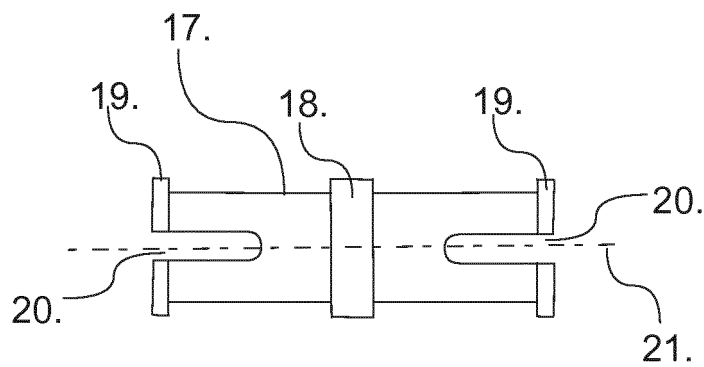


Fig. 4

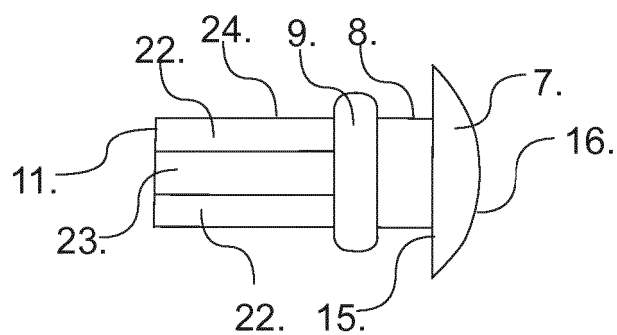


Fig. 5



**REFERENCES CITED IN THE DESCRIPTION**

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**Patent documents cited in the description**

- US 20170106309 A [0002]
- US 2885822 A [0003]