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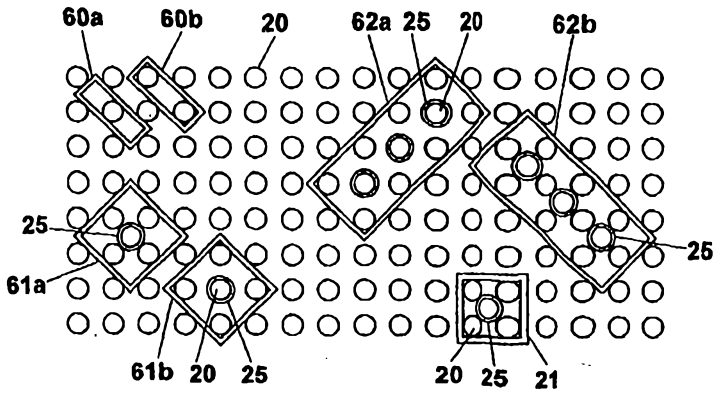
(54) Title: A TOY BUILDING SET



(57) Abstract

A toy building set comprises building elements (11, 21, 22) of a first type with coupling studs (10, 20) arranged in a two-dimensional periodical pattern with the coupling studs (10, 20) disposed in rows in two main directions perpendicular to each other in such a manner that the coupling studs (10, 20) also form diagonal rows in diagonal directions relative to the main directions, whereby neighboring diagonal rows are separated by a space having a width (d) wider than zero, and building elements (11, 21, 22) of a second type for interconnecting with building elements (11, 21, 22) of the first type, said building elements (11, 21, 22) of the second type having pairs of parallel coupling walls (12, 23, 24) which define cavities with coupling means for receiving coupling studs (10, 20) on building elements of the first type in a releasable engagement in such a manner that the coupling walls (12, 23, 24) are arranged in main directions between rows of coupling studs, wherein the building set further comprises building elements (40, 50, 60a, 60b, 61a, 61b, 62a, 62b) of a third type for interconnecting with building elements of the first type, said building elements (11, 21, 22) of the first type having pairs of parallel coupling walls (42, 52) that define cavities with coupling means for receiving coupling studs (10, 20) on other building elements in releasable engagement whereby the coupling walls (42, 52) are arranged in diagonal directions in spaces between diagonal rows of coupling studs.

A toy building set

The present invention relates to a toy building set or building system with interconnectable building elements, and more specifically such building elements which are provided on the one side with coupling studs and on another with pairs of parallel coupling walls which define cavities with coupling means for receiving coupling studs on another building element in a releasable engagement.

Such toy building systems are known i.a. from US patent No. 3 005 282, and they feature coupling studs arranged in rows in main directions perpendicular to each other whereby the studs form a square pattern. Building elements with pairs of parallel coupling walls are arranged with the coupling walls, which are most frequently the outer delimiting walls of the building elements, disposed in spaces between rows of coupling studs. In such a square pattern, the coupling studs will also form diagonal directions between the main directions, and in building sets marketed under the trade marks LEGO® or DUPLO®, a space is provided between diagonal rows with a width wider than zero.

DE 2,414,246 teaches a building element with studs substantially perpendicular to each other. In each main row, large and small studs alternate in such a pattern that they also form diagonal rows. The diameters of the large studs and the diameters of the small studs as well as the relative distances of the studs are so adapted that a building block with walls that define a cavity in the underside of the building block may optionally be so arranged that two parallel walls on the building block either spans large studs in main rows or small studs in diagonal rows.

US 3,162,973 illustrates toy building blocks with outer walls that are perpendicular to each other and define a cavity in the underside of the building block. In this cavity there are diagonally extending walls. However, the building blocks can only be interconnected with their outer walls in the main directions of the studs.

Accordingly, the present invention provides a toy building set having:

building elements of a first type with uniform coupling studs arranged in a two-dimensional periodical pattern with the coupling stud arranged in rows in two main directions perpendicular to each other in such a manner that the coupling studs also form diagonal rows in diagonal directions relative to the main directions, whereby a space having a width greater than zero is provided between neighbouring diagonal rows,

building elements of a second type for interconnecting with building elements of the first type, the building elements of the second type having pairs of parallel coupling walls, which define cavities for receiving coupling studs on building elements of the first type in a releasable frictional engagement in such a manner that the coupling walls are arranged in main directions between rows of coupling studs, and

building elements of a third type for interconnecting with building elements of the first type, the building elements of the third type having a first pair of parallel coupling walls receivable in spaces between diagonal rows of coupling studs, and a second pair of parallel coupling walls, perpendicular to the first pair of coupling walls, receivable in spaces between diagonal rows of coupling studs, the first and second pairs of coupling walls defining a cavity for receiving coupling studs on building a element of the first type in a releasable engagement, whereby the coupling walls of the first and second pairs each have a thickness which corresponds to said width of

the space between neighbouring diagonal rows, the coupling walls of the first and second pairs being the sole coupling walls on the building elements of the third type receivable between rows of coupling studs

Preferably the building elements of the third type have outer delimiting walls, which extend beyond the coupling walls of elements.

Preferably outer delimiting walls are situated in the main directions upon combination with building elements of the first type.

In order that the present invention may be more clearly ascertained, preferred embodiments will now be described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a schematic, sectional view of a prior art toy building element with coupling studs arranged in directions perpendicular to each other,

Figure 2 is a schematic view of assembled building elements from a known toy building set,

Figure 3 is a schematic view of a toy building set according to a preferred embodiment of the present invention,

Figures 4 and 5 are perspective views of a known toy building element seen from the top and from below, respectively,

Figure 6 is a perspective top view of a further known toy building element,

Figure 7 is a partial, perspective view of a novel toy building element seen from below for use in a toy building set according to a preferred embodiment of the present invention,

Figure 8 is a direct bottom view of the toy building element illustrated in Figure 7,

Figures 9 and 10 illustrate an alternative novel

toy building element for use in toy building sets according to a preferred embodiment of the invention, seen from the top and bottom, respectively.

Figure 11 is a schematic view of the building element illustrated in Figures 7 and 8, in connection with a toy building element with coupling studs of the same type as illustrated in Figure 1,

Figure 12 is a schematic view of a building set according to a preferred embodiment of the invention with the building elements shown in Figures 4, 5, 7 and 8 in combination with other known building elements, and

Figure 13 is a schematic view of the building set illustrated in Figure 10 with two building elements like those of Figures 7 and 8.

Figure 1 shows a known arrangement of cylindrical coupling studs 10 arranged in four by five rows in main directions perpendicular to each other on an outer surface of a not shown building element, such as a building plate. The building set shown in Figure 1 is DUPLO® building set. Identical spaces are provided between coupling studs in the two main directions whereby the studs form a square pattern. A DUPLO® toy building element 11 has coupling walls 12 arranged in spaces between rows of coupling studs in main directions, and the insides of the coupling walls are in contact with two rows of coupling studs 10. In the cavity defined by the coupling walls 12, the building element 11 is provided with coupling means in the form of coupling tubes 13 which are in contact with four coupling studs 10 and thereby couple thereon.

The coupling studs in the square pattern shown in Figure 1 moreover form rows in diagonal directions which form angles of 45° relative to the main directions. Between diagonal rows there is a space with a width d.

Figure 2 illustrates another known arrangement of

cylindrical coupling studs 20 which are here arranged in four by eight rows which also have main directions perpendicular to each other on an outer surface of a not shown building element, such as a building plate. The building set illustrated in Figure 2 is a LEGO SYSTEM® building set. Also in this building set, equal spaces between the coupling studs in the two main directions are provided whereby the studs form a square pattern. Like in Figure 1, two building elements 21 and 22 are affixed on the coupling studs 20 in Figure 2. The building elements 21 and 22 are arranged with their coupling walls 23 and 24 in spaces between coupling studs in the main directions and in contact with coupling studs 20. In the cavities defined by the respective coupling walls of the building elements 21 and 22, the tubular coupling means or coupling tubes 25 described in US patent No. 3 005 282 are provided. The coupling tubes 25 are in contact with four coupling studs 20 and their internal diameter corresponds to the outer diameter of a coupling stud 20.

Figure 4 and 5 illustrate a known toy building element 30 which constitutes a part of the toy building system described in WO 96/09869 and marketed under the trade mark PRIMO®. The building element 30 has a box-shaped base part with a substantially square horizontal cross section and rounded edges. The building element 30 has four outer

delimiting walls 31 and on the upper surface of the element, a coupling stud 32 is provided. At the bottom, the coupling stud 32 is provided with a short cylindrical portion, and at the top a semisphere with the same diameter as the cylindrical portion. The outer delimiting walls 31 of the building element define or delimit a cavity in the bottom of the element, and in this cavity a coupling means 33 is provided in the form of a cylindrical coupling tube with an internal diameter corresponding to the diameter of the coupling stud 32 whereby the coupling stud 32 may be received in the coupling tube 33. The diameters of the coupling stud 32 and the coupling tube 33 may be adapted to each other to allow them to be interconnected without significant friction which renders such building elements suitable as stacking blocks for quite small children, or with a friction which produces a certain holding force. The lowermost portion of the coupling tube 33 extends a certain distance below the outer delimiting walls 31 of the element.

Figure 6 illustrates another toy building element 35 which is a part of the toy building system disclosed in WO 96/09869 like the element 30 in Figures 4 and 5. The element 35 is provided with four coupling studs 32 which are each identical with the coupling stud 32 on the element 30 and on the element 35 these four coupling studs are arranged in a square. In a manner corresponding to that of the element 30, the underside of the element 35 is provided with a tubular coupling skirt below each of the four coupling studs (not shown).

Figures 7 and 8 illustrate a novel toy building element 40. From the bottom of the coupling skirt 40 an outer coupling skirt 41 and an inner coupling skirt 42 protrude downwards. By means of the coupling skirts 41 and 42 the building element 40 may be combined with toy building

elements in the building system in the disclosures of WO 96/09869, such as the element 30 in Figures 4 and 5 or the element 35 in Figure 6. The single coupling stud 32 on the element 30 may with or without friction be received in each of the four shown positions 32a in the space between the outer coupling skirt 41 and the inner coupling skirt 42 and moreover in the shown one position 32b in the inner coupling skirt 42. Moreover the four coupling studs 32 on the element 35 may be received with or without friction in the four positions 32a.

Figure 11 illustrates how the toy building element 40 may also be combined with a DUPLO® building element, in this case a building plate with DUPLO® coupling studs 10. The outer coupling skirt 41 spans or encloses five by five coupling studs 10 in a square and its inside is in contact with the four coupling studs 10a which are located at the corners of the square, and four studs 10b centrally on the sides of the square, and thus the outer coupling skirt 41 constitutes a wall which is arranged in spaces between rows of coupling studs in the main directions. The inner coupling skirt 42 spans or encloses five coupling studs 10 situated in two intersecting rows in the main directions, and the inner coupling skirt constitutes walls which are arranged in spaces between rows of coupling studs in the diagonal directions.

Figures 9 and 10 illustrate a novel toy building element 50 which, like the building element 30 in Figures 4 and 5, has a box-shaped base part with a substantially square cross section and rounded edges, four outer delimiting walls 51 and a coupling stud. The building element 50 differs from the building element 30 in Figures 4 and 5 substantially only by the cavity defined by the outer delimiting walls 51 being provided with a coupling skirt 52 with the same dimensions as the inner coupling skirt 42

on the building element of Figures 7, 8 and 11. The building element 50 may hereby be interconnected with other building elements which have DUPLO® coupling studs 10 with its coupling skirt 52 arranged in spaces between diagonal rows of coupling studs 10.

Figure 12 illustrates two DUPLO® building elements 11 and a PRIMO® building element 30 affixed on a building plate with DUPLO® coupling studs 10. The PRIMO® building element 30 is shown in a known position where its coupling skirt 33 encloses four coupling studs 10, where the element is capable of rotating about said four studs as taught in WO 96/09869 provided there are no neighboring elements to restrict its freedom to do so. The PRIMO® building element 30 cannot be stacked in completely close abutment on the DUPLO® building elements and its outer delimiting walls 31 cannot be caused to align with the outer delimiting walls of the DUPLO® elements. This is due to the fact that the distance between the outer delimiting walls of the PRIMO® element and the DUPLO® elements is exactly half of the distance between two neighboring coupling studs 10, and this distance constitutes the smallest possible interval which the DUPLO® as well as the PRIMO® elements may be moved on the coupling studs 10.

Figure 12 also illustrates a novel building element 50 arranged in substantially close abutment on the PRIMO® building element 30. Here the coupling skirt 52 on the building element 50 encloses four coupling studs 10 and upright portions or walls of the coupling skirt 52 are arranged in spaces between diagonal rows of coupling studs 10. The novel building element 50 is thus arranged in a position on the coupling studs 10 which corresponds exactly to the position of the PRIMO® element. However, the novel building element 50 will be prevented from ro-

tating in a position where it is stacked on DUPLO® coupling studs 10.

Like the coupling skirt 42 on the building element 40, the coupling skirt 52 is also capable of being stacked on a PRIMO® coupling stud 32 of other building elements. Except from being prevented from rotating the novel building element 50 thus has the exact same building options available as the known PRIMO® building element 30. Its rotatability is prevented by the very fact that the upright coupling walls of the coupling skirts are arranged in spaces between diagonal rows of coupling studs.

Figure 13 illustrates two novel building elements 50 and two DUPLO® building elements 11 affixed on a building plate with DUPLO® coupling studs 10. Here the building elements 50 are arranged in such a manner that their coupling skirts 52 enclose five coupling studs 10 in the same manner as the coupling skirt 42 in Figure 11. The building elements 50 are arranged with the outer delimiting walls 51 disposed in the main directions and substantially in close abutment on the DUPLO® building elements 11. Moreover, it will appear that a DUPLO® building element 11 and a novel building element 50 have outer delimiting walls which are aligned with each other or are in substantially the same plane perpendicular to the building plate.

Thus, the building elements with the novel coupling skirt 42 or 52 with walls intended for arrangement in spaces between diagonal rows of coupling studs have exactly the same coupling positions as the known PRIMO® elements, and in addition new coupling positions which are diagonally displaced half the distance between the neighboring coupling studs in diagonal direction. Hereby the number of coupling positions is doubled.

Figure 3 illustrates an alternative embodiment of the toy building system according to the invention. Here a known LEGO SYSTEM® building plate is used with coupling studs 20 arranged in rows in main directions perpendicular to each other. Like in Figure 1, here a (not shown) space is provided between diagonal rows of coupling studs 20. A known building element 21 is shown that encloses four coupling studs 20 and has a coupling tube 25 which touches the four coupling studs 20.

Moreover Figure 3 illustrates toy building elements 60a, 60b, 61a, 61b, 62a and 62b which all have coupling walls arranged in spaces between diagonal rows of coupling studs 20. The building elements 60a and 60b are identical and shown in the two different coupling positions where they enclose one and two coupling studs 20, respectively. Moreover, the elements 61a and 61b are identical and shown in their two coupling positions where they enclose four and five coupling studs 20, respectively. Finally, the elements 62a and 62b are also identical and enclose eleven and twelve coupling studs 20, respectively.

Like the building elements 21 and 22, the building elements 61a, 61b, 62a and 62b have cylindrical coupling tubes 25 in the cavities defined by their coupling walls. These coupling walls 25 have a coupling position in both the shown coupling positions, since the coupling tubes couple either with their outsides on four coupling studs 20, like in Figure 2, or with their insides about one single coupling stud 20.

Like the building element 50, the building elements 60a, 60b, 61a, 61b, 62a and 62b may be provided with outer delimiting walls in the main directions or with outer delimiting walls in diagonal directions, thereby allowing

these delimiting walls to be stacked in substantially close proximity to each other.

The building elements 50, 60a, 60b, 61a, 61b, 62a and 62b will always be able to have either an even or an uneven number of coupling studs 20 between their coupling walls where the difference between the even and the uneven number is always 1.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A toy building set having:

building elements of a first type with uniform coupling studs arranged in a two-dimensional periodical pattern with the coupling stud arranged in rows in two main directions perpendicular to each other in such a manner that the coupling studs also form diagonal rows in diagonal directions relative to the main directions, whereby a space having a width greater than zero is provided between neighbouring diagonal rows,

building elements of a second type for interconnecting with building elements of the first type, the building elements of the second type having pairs of parallel coupling walls, which define cavities for receiving coupling studs on building elements of the first type in a releasable frictional engagement in such a manner that the coupling walls are arranged in main directions between rows of coupling studs, and

building elements of a third type for interconnecting with building elements of the first type, the building elements of the third type having a first pair of parallel coupling walls receivable in spaces between diagonal rows of coupling studs, and a second pair of parallel coupling walls, perpendicular to the first pair of coupling walls, receivable in spaces between diagonal rows of coupling studs, the first and second pairs of coupling walls defining a cavity for receiving coupling studs on building a element of the first type in a releasable engagement, whereby the coupling walls of the first and second pairs each have a thickness which corresponds to said width of the space between neighbouring diagonal rows, the coupling walls of the first and second pairs being the sole coupling walls on the building elements of the third type receivable between rows of coupling studs.

2. A toy building set as claimed in claim 1, wherein

the building elements of the third type have outer delimiting walls, which extend beyond the coupling walls of elements.

3. A toy building set as claimed in claim 2, wherein the outer delimiting walls are situated in the main directions upon combination with building elements of the first type.

4. A toy building set substantially as herein before described with reference to Figure 3 or to Figures 7, 8, 11 and 13 or to Figures 9 and 10 or to Figure 12 of the accompanying drawings.

Dated this 29th day of February 2000

INTERLEGO A.G.

By their Patent Attorneys

GRIFFITH HACK

Fellows Institute of Patent and

Trade Mark Attorneys of Australia

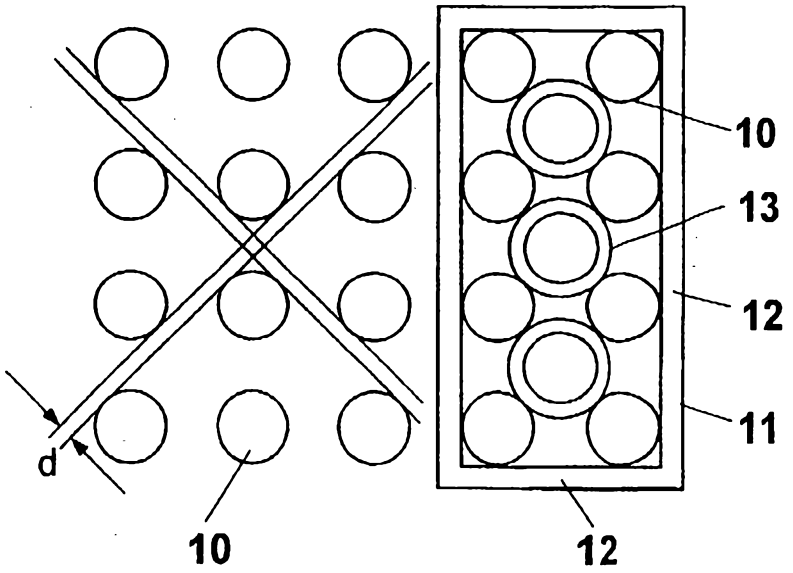


Fig. 1

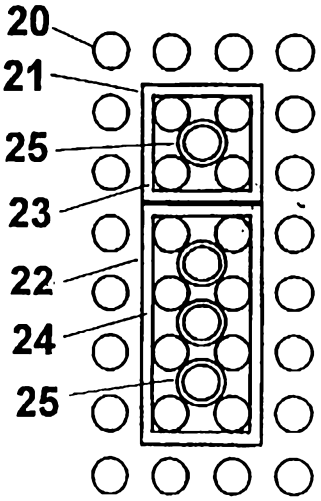


Fig. 2

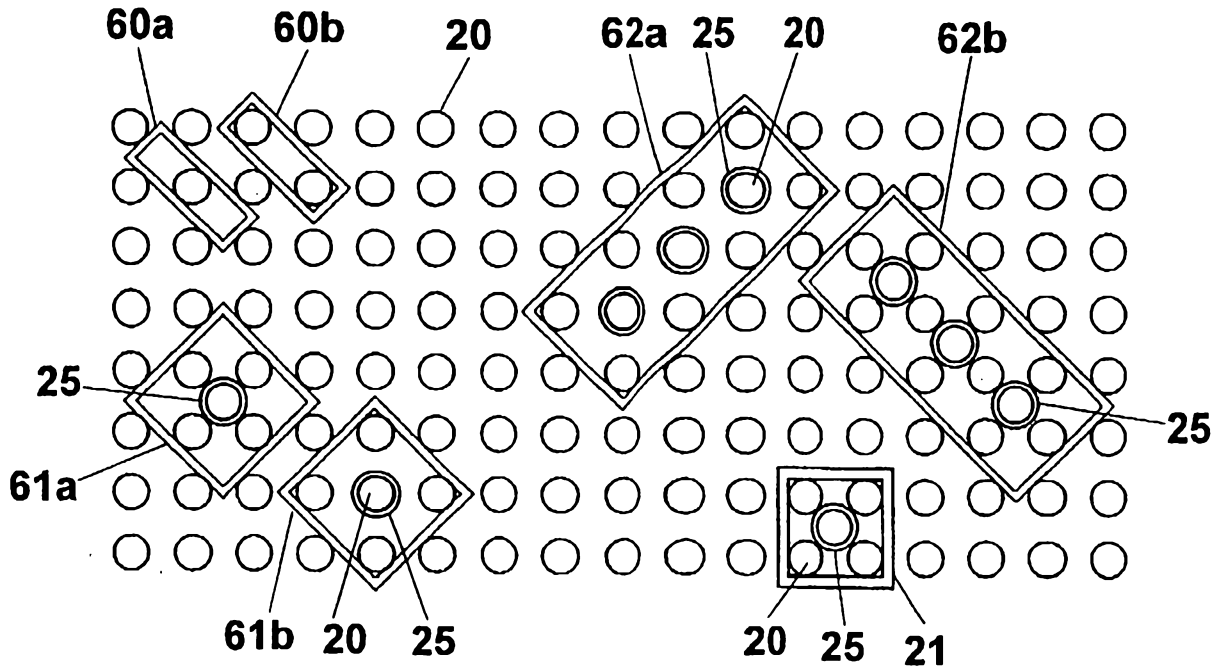


Fig. 3

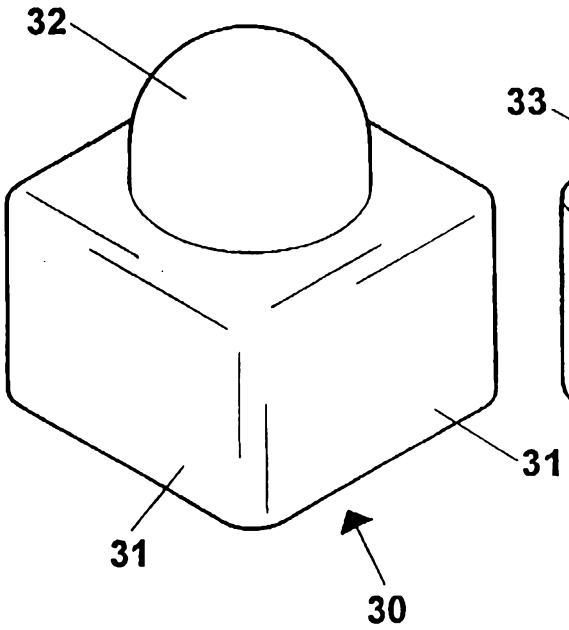


FIG. 4

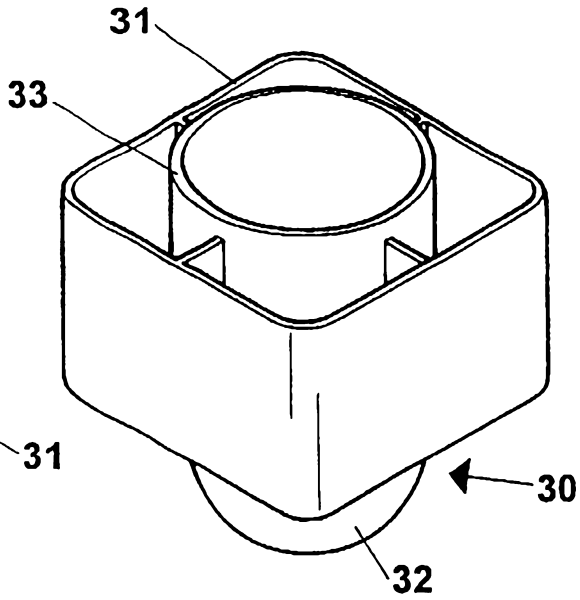


FIG. 5

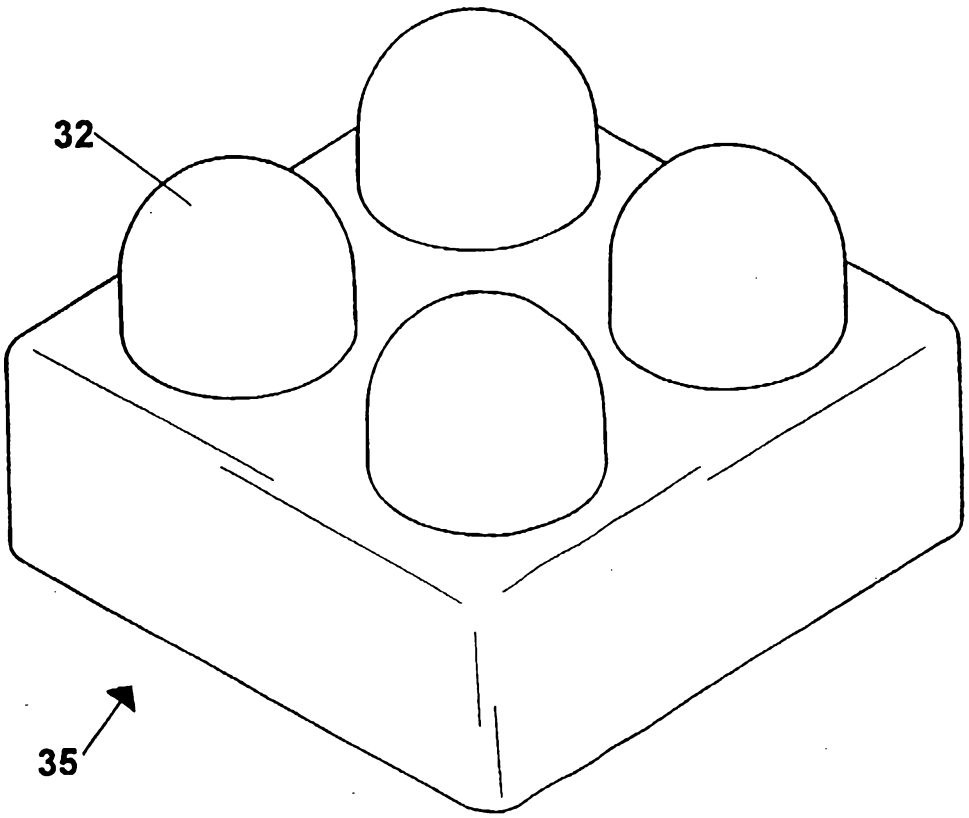


FIG. 6

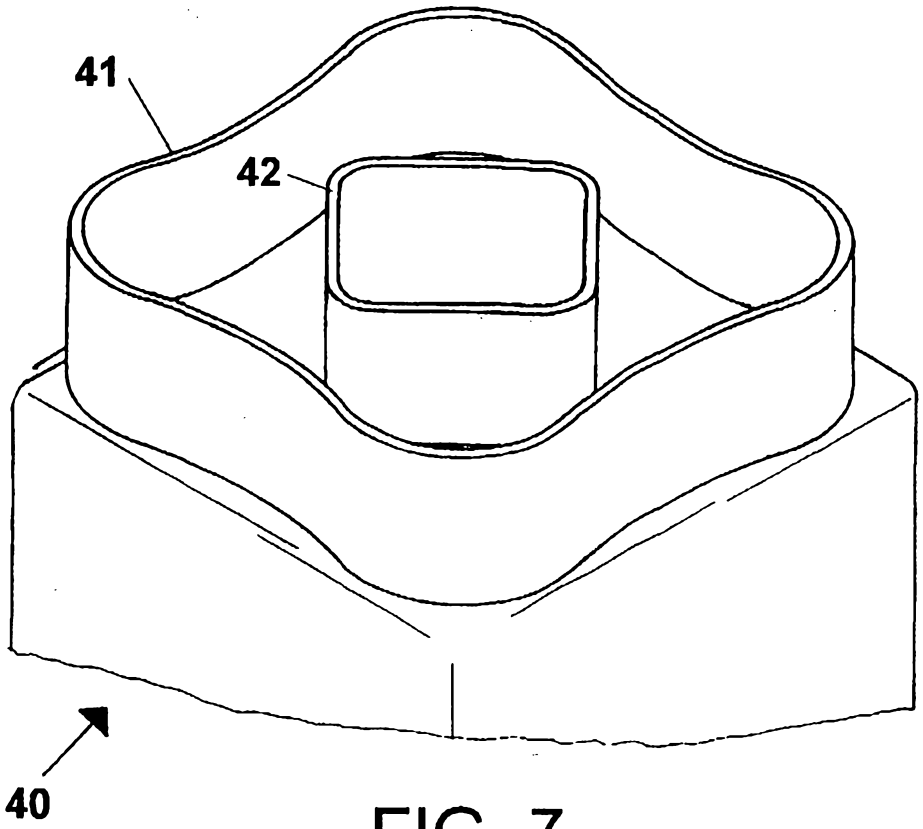


FIG. 7

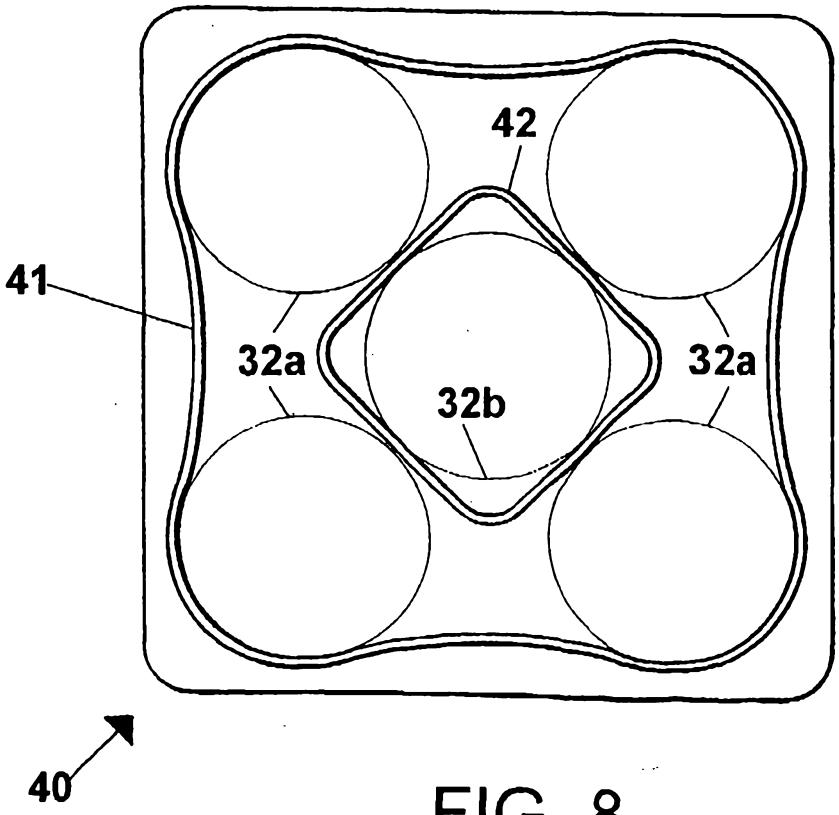


FIG. 8

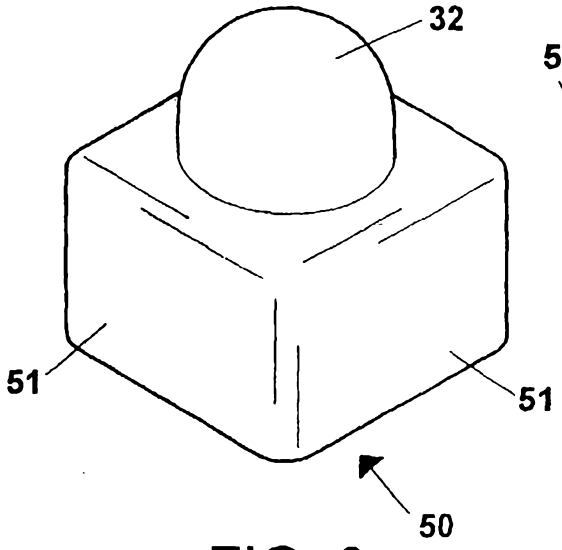


FIG. 9

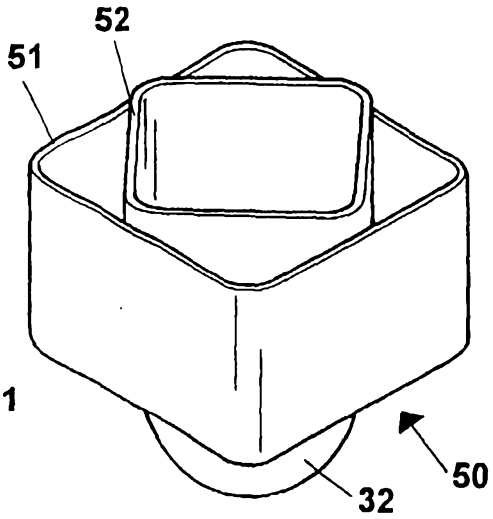


FIG. 10

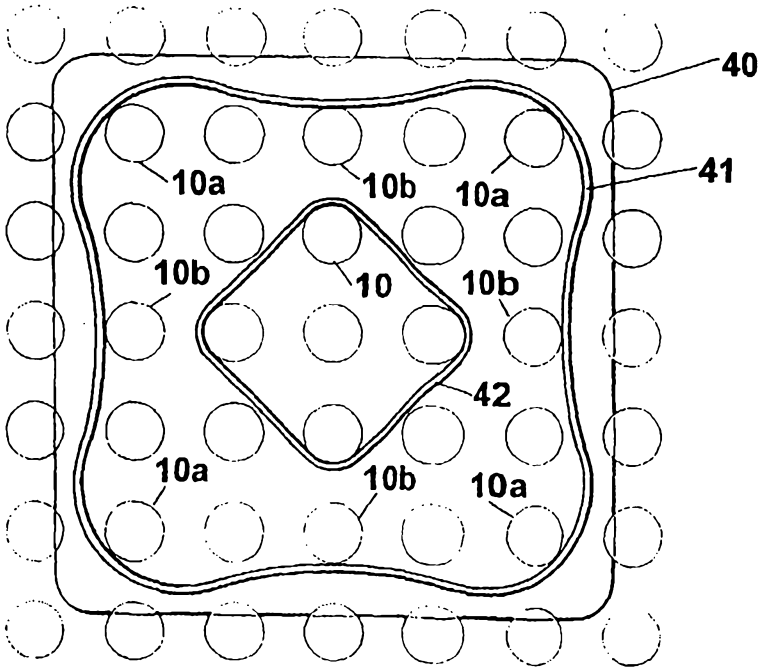


FIG. 11

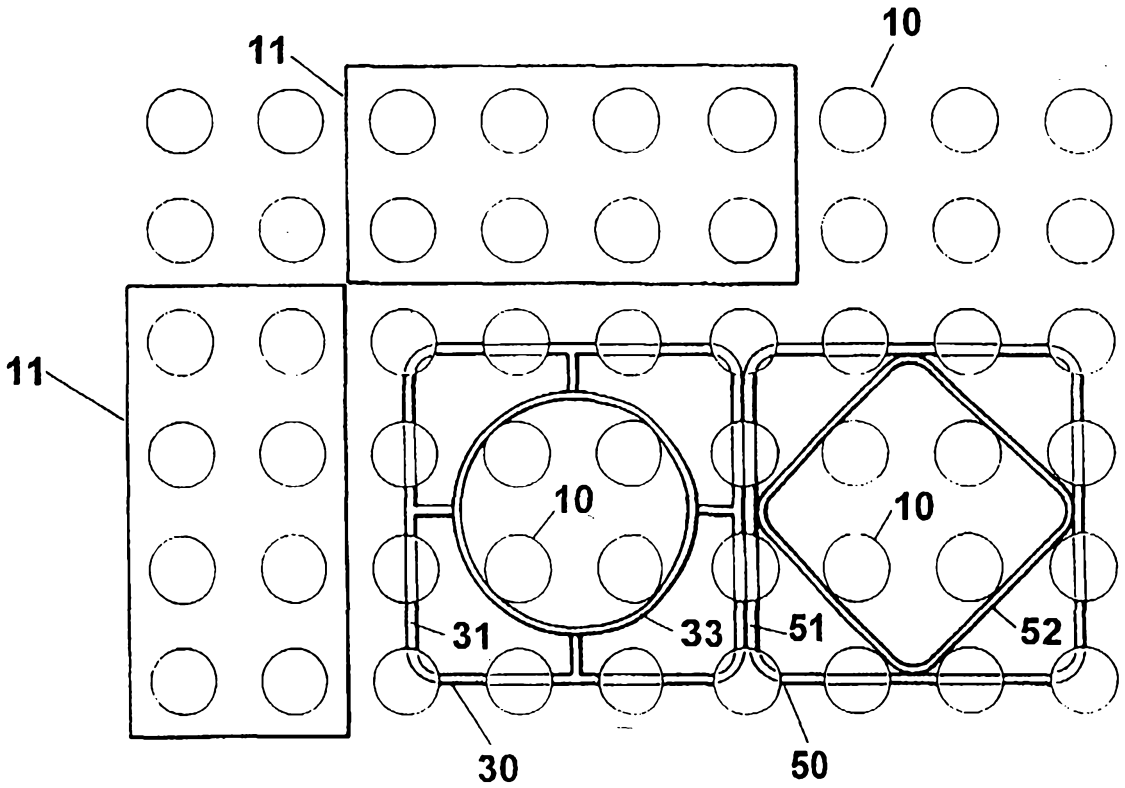

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FIG. 12

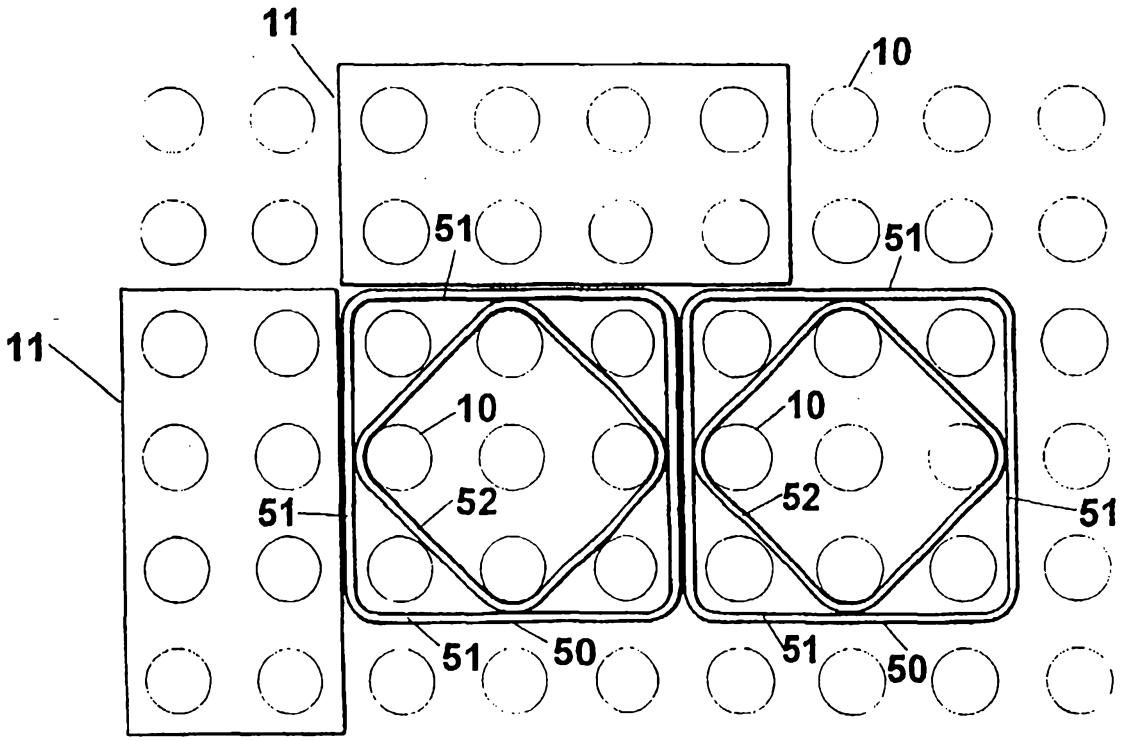
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FIG. 13