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(54) **Packages.**

(57) A package 10 comprises a plurality of three or more containers 12 and a retainer 16a,16b. The containers 12 are arranged linearly along an elongate flexible strip 14, and are preferably formed integrally with the strip of a plastics material so that each of the containers presents an opening 18 lying in the plane of the strip. The openings can be closed by a common tear-off foil 34 which is sealingly secured to the strip around all of the openings to permit fluids to be retained in the containers. The retainer 16a,16b is adapted to hold the strip in a ring-like structure in which each one of the containers is in abutment with the two containers adjacent to that container. The retainer could be of various forms, such as a sleeve, a box, an adhesive tape or a mechanical catch.

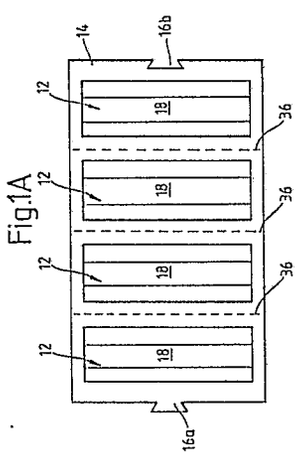
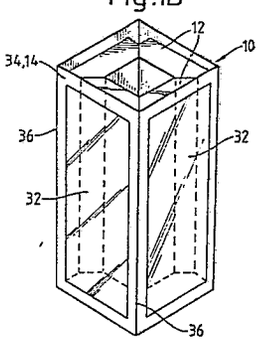


Fig.1A

Fig.1D



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Description

PACKAGES

The present invention relates generally to packages and is more particularly concerned with packages which themselves each include a plurality of containers.

There is no restriction on what products are to be held by the containers. There could be a soap powder to be supplied in pre-measured units to facilitate use in loading the soap powder into a washing machine by avoiding the need for a measuring cup. Another example of a pre-measured product would be a medicine where supply of a series of doses of the medicine would avoid the need for a measuring spoon. Alternatively, there could be a sauce, or a range of different condiments, to be supplied in individual portions, or indeed any other product commonly packaged in individual portions, such as cream or marmalade. The product need not, however, be pourable or of a paste-like consistency. There could be, for example, a collection of ornaments or toys such as a set of model cars.

Hitherto, where a plurality of containers have been handled together in a single package, the containers have usually been of cuboid shape as in the packaging of butter. This shape has allowed the containers to be reasonably closely packed against one another in a box to reduce wastage of space within the box. It is also known from US-A-3 000 496 that a plurality of containers of tetrahedral shape, as in the packaging of milk, can be close packed in a generally cooperative self-supporting arrangement which is held together by a sleeve. However, when one of the containers is removed from the sleeve, to gain access to the product contained therein, the remaining containers may be disturbed and may even collapse.

An aim of the present invention has been to provide a package including a plurality of containers which is potentially both more attractive and more convenient.

According to the present invention, a package comprises a plurality of at least three containers and a retainer, said containers being arranged linearly along an elongate flexible strip, and said retainer being adapted to hold said strip in a ring-like structure in which each of said containers is in abutment with the two containers adjacent thereto.

The retainer could be in the form of a box or a sleeve, as known per se in the packaging of loose containers, but could alternatively be in the form of an adhesive tape or a mechanical catch securing the ends of the strip together.

More particularly, a box could be formed of cardboard. Re-openable flaps could close or partially close either or both ends of the box to provide protection and/or support laterally of the length of the strip. One or more holes could extend through the periphery of the box to allow, for example, inspection of the product or products held in the containers. The hole or holes could be covered by windows of a transparent material.

If there was a sleeve, it could be of a shrink-wrapped plastics material, particularly if the circumstances were such that re-insertion of the strip into the sleeve was unlikely to be necessary.

Alternatively, a sleeve could be formed of cardboard, preferably with the periphery of the sleeve having inspection holes which may or may not be covered by transparent windows, and preferably with both free edge portions of the sleeve being folded inwardly of the package to resist inadvertent escape of the strip from within the sleeve.

An adhesive tape for connecting the ends of the strip, to maintain the strip in the ring-like structure, may carry information and thus act as a label. A mechanical catch could include a dove-tailed tab at one end of the strip for releasable fastening interengagement with a dove-tailed slot or other opening at the other end of the strip. The adhesive tape may be the more convenient if the package is not to be repeatedly unfolded, whereas the mechanical catch may be the more convenient if the package is to be repeatedly unfolded.

Especially if the containers are not to be surrounded by a box or a sleeve, it would be desirable but not necessarily essential for outwardly facing portions of the containers to be closed, to prevent the product held by each of the containers from falling out.

Naturally, if the product was a fluid the container would need to be sealed independently of any sealing effect provided by the retainer. However, if the product was a self-supporting solid it could be glued or otherwise fixed within an open container. A base of the open container may have a stud or the like to which the product could be releasably secured, or the product may initially have been introduced into the open container in a molten state and then allowed to set.

It is nonetheless envisaged that the containers will usually be provided with their own closures, which will usually be non-resealable by virtue of being formed as a heat sealed, ultrasonically welded or otherwise secured foil. Each of the containers could be closed by a respective tear-off foil, but it is more likely that all of the containers would be closed by a single foil. Access to each chosen one of the containers would be achieved by appropriate peeling or puncturing of the common foil. The foil or foils are preferably formed of a transparent plastics material but could be formed of a non-transparent metallic material.

The strip is preferably formed of a resiliently deformable plastics material, but could be formed of any other flexible material. In particular, the material of the strip could be more flexible than the material of the containers, although the containers are preferably formed of the same resiliently deformable plastics material as the strip, and indeed may be integrally formed with the strip. Either as part of a moulding operation or subsequently the strip may be provided with perforations or other lines of weaken-

ing between the containers to facilitate folding the strip into the ring-like structure. Lines of weakening produced after the containers had been closed by a common foil could cut the common foil into separate portions each associated with a respective one of the containers.

There is no restriction on what shapes are possible for the containers provided that, in the ring-like structure, each one of the containers is in abutment with the two containers adjacent thereto.

An outwardly facing portion of each of the containers may define an opening, of for example rectangular outline, extending through a flat or predominantly flat sheet constituting the strip. A foil acting as a closure for the opening can then be easily secured to the sheet by for example the above-mentioned techniques of heat sealing or ultrasonic welding.

An inwardly facing portion of each of the containers may be of sheet material and be elongate, laterally of the length of the strip, with each of the containers being of uniform cross-section along its length. The cross-section may be of polygonal outline, rather than being curved, and the polygonal outline may include five faces. The two faces closest to the strip may extend perpendicularly to the plane of the strip to facilitate folding of the strip between the containers. The central face furthest from the strip may extend parallel to the plane of the strip to provide a flat bottom for the container and thereby facilitate removal of a product from the container. The remaining two faces may be inclined to the strip in opposite directions to form truncations at what would have been the junctions of the other three faces to facilitate the abutment of the containers with one another.

Preferably, each of the containers is of similar shape to each of the other containers.

The truncations of each of the containers should then lie in planes extending radially from the centre of the ring-like structure to the mid-points along the strip between each adjacent pair of the containers. If the face furthest from the strip was omitted, the inclined faces should meet one another at the centre of the ring-like structure. If the faces closest to the strip were omitted, the inclined faces should meet the strip to leave no gap between adjacent containers along the length of the strip. In the situation where there are just three of the containers, the strip is folded to give a ring-like structure of substantially triangular peripheral outline. Four containers give a substantially square outline, five containers give a substantially pentagonal outline, etc. Although the total number of the containers is in theory unlimited, it may be that in practice having more than six of the containers might be unwieldy.

Three packages according to the present invention, of the above-mentioned substantially triangular, square and pentagonal outlines, will now be described, by way of example only, with reference to the accompanying drawings, in which:-

Figures 1A, 1B, 1C and 1D are respectively front when unfolded, end when unfolded, end when folded views of a strip and a perspective view of a package according to the present invention including four containers;

Figures 2A, 2B, 2C and 2D correspond to Figures 1A, 1B, 1C and 1D but show a package according to the present invention including three containers; and

Figures 3A, 3B, 3C and 3D correspond to Figures 1A, 1B, 1C and 1D but show a package according to the present invention including five containers.

Referring initially to the package according to the present invention shown in Figures 1A, 1B, 1C and 1D it will be seen that the package 10 includes at least three, and in fact four, containers 12 arranged linearly along an elongate flexible strip 14 and that a retainer 16 is provided for holding the strip 14 in a ring-like structure in which each of the containers 12 is in abutment with the two containers 12 adjacent thereto.

The containers 12 are integrally formed with the strip 14 of a transparent plastics material for example vacuum forming or injection moulding. Each of the containers 12 is formed to the same shape and defines a rectangular opening 18 extending laterally to the length of but co-planar with the surface of the strip 14. The strip 14 is formed as a flat sheet of rectangular outline. As is particularly clear from Figure 1A, however, the rectangular outline of the sheet is interrupted by a dove-tailed tab 16a at one side edge of the strip 14 which can interlock with a dove-tailed slot 16b formed at the other side edge of the strip 14.

Each of the containers 12 is of uniform polygonal cross-section along its length, that is to say the length of the openings 18, and includes two end faces 20 and five side faces 22, 24, 26, 28 and 30. The faces 22 and 30 extend perpendicularly to the strip 14, whereas the face 26 extends parallel to the strip 14. The remaining faces 24 and 28 are inclined to the strip 14 at angles such that, when the strip 14 is folded to form the ring-structure, the adjacent containers 12 abut one another over the full extent of the faces 24 and 28, as is particularly clear from Figure 1C.

Before folding the strip 14, but after formation of the strip 14, the containers 12 are filled through the openings 18 with the desired product or products, indicated schematically at 32. A foil 34, formed of for example a transparent plastics material, is then heat sealed to the strip 14 to close the openings 18 of the containers 12. After this, lines of weakening 36 are formed in the strip 14 between the containers 12. The purpose of the lines of weakening 36 is to facilitate folding of the strip 14 and facilitate subsequent separation of the foil 34 into different portions. Finally, the strip 14 is folded so that the openings 18 of the containers 12 face outwardly, and the dove-tailed tab 16a is secured to the dove-tailed slot 16b to form the completed package 10.

A similar package is shown in Figures 2A, 2B, 2C and 2D and the same references will be used to indicate the same components. The only difference apart from the number of the containers 12 is that, instead of providing a retainer in the form of a catch, the retainer is in the form of a cardboard sleeve 16c. The two open ends of the sleeve 16c are each

provided with three inwardly directed corner folds 38. Each of the six folds 38 is made by forming a slit 40 in the sleeve 16c to span a corner, and then pressing inwardly that portion of the sleeve 16c at the corner between its end and the slit 40. The purpose of the folds 38 is to resist inadvertent escape of the strip 14 from within the sleeve 16c.

Another similar package is shown in Figures 3A, 3B, 3C and 3D and the same references will again be used to indicate the same components. The only difference apart from the number of the containers 12 is that, instead of a retainer in the form of a catch or a sleeve, the retainer is in the form of a cardboard box 16d. The ends of the box 16d are closed by interlocking flaps 42 and each side face of the box 16d is formed with a window 44. As an alternative to the box 16d, the retainer could be in the form of an adhesive tape indicated schematically in dashed outline at 16e.

Claims

1. A package (10) comprising a plurality of at least three containers (12) and a retainer (16a,16b;16c;16d;16e), characterised in that said containers are arranged linearly along an elongate flexible strip (14), and said retainer (16a,16b;16c;16d;16e) is adapted to hold said strip (14) in a ring-like structure in which each of said containers (12) is in abutment with the two containers (12) adjacent thereto.

2. A package according to claim 1, characterised in that each of said containers (12) is formed integrally with said strip (14) of a plastics material.

3. A package according to claim 1 or claim 2, characterised in that each of said containers (12) is formed initially with an opening (18) which is subsequently closed by a closure (34).

4. A package according to claim 3, characterised in that each of said containers (12) is closed by a common closure (34) which is sealingly secured to said strip (14) around all of said openings (18).

5. A package according to any preceding claim, characterised in that each of said containers (12) is separated by a line of weakness (36) in said strip (14) from at least one of the two containers adjacent thereto in said ring-like structure.

6. A package according to any preceding claim, characterised in that each of said containers (12) is formed of sheet material, is elongate in a direction laterally of said strip (14), and is of a uniform cross-section of polygonal outline.

7. A package according to claim 6, characterised in that each of said containers (12) is constructed such that said polygonal outline has five faces arranged linearly of said strip (14), the end two faces (22,30) being closest to said strip and extending perpendicularly from said strip, the central face (26) being furthest from said strip and extending parallel to said strip, and the remaining two faces (24,28) being inclined to said strip in opposite directions to form truncations, said truncations lying in respective planes extending radially from the centre of said ring-like structure to mid-points along said strip (14) between each adjacent pair of said containers (12).

8. A package according to any one of claims 1 to 7, characterised in that said retainer is in the form of a sleeve (16c;16d).

9. A package according to claim 8, characterised in that said sleeve (16c) is formed of cardboard and is adapted at its ends (38) to retain said ring-like structure therein.

10. A package according to any one of claims 1 to 7, characterised in that said retainer is in the form of a mechanical catch (16a,16b).

Fig.1A

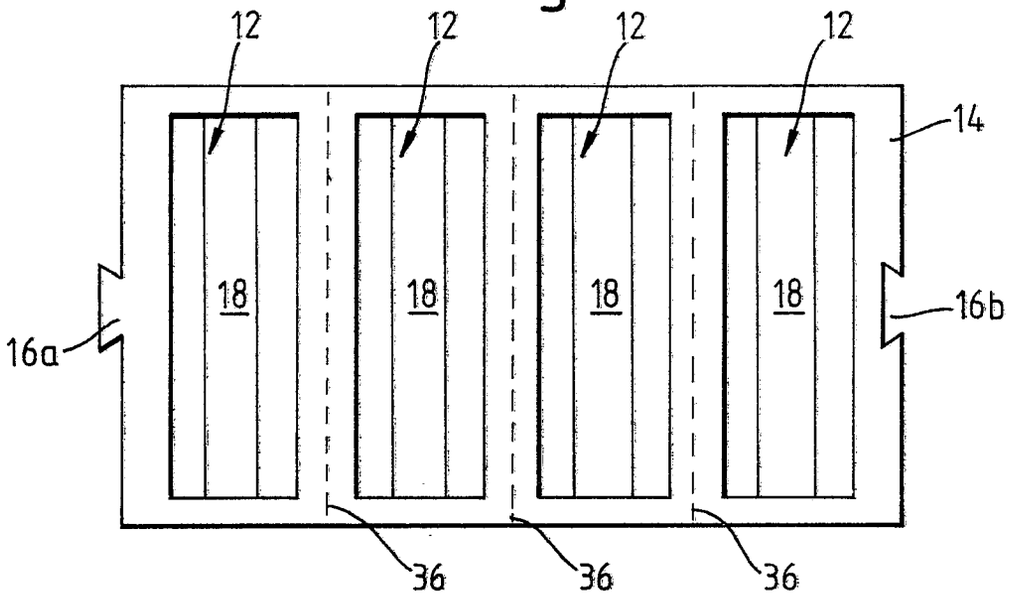


Fig.1B

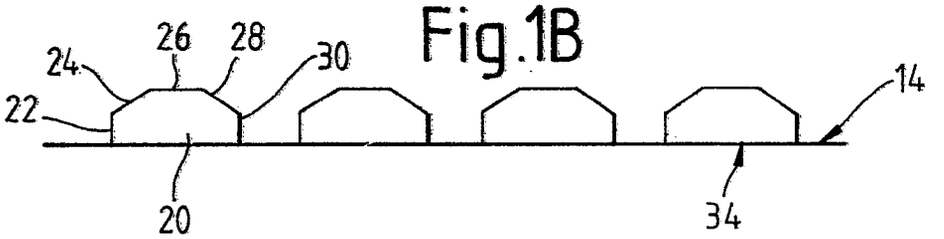


Fig.1C

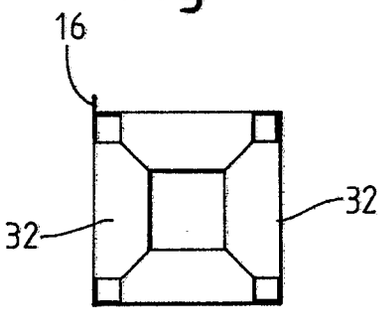


Fig.1D

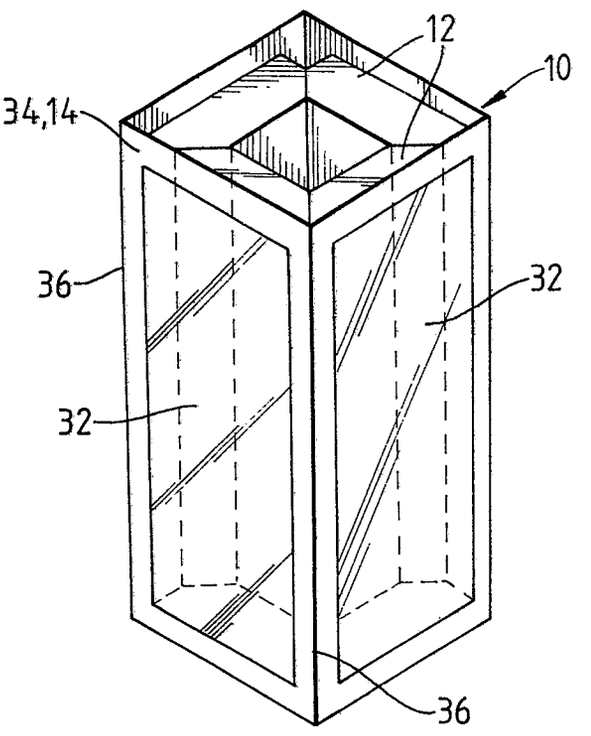


Fig.2A

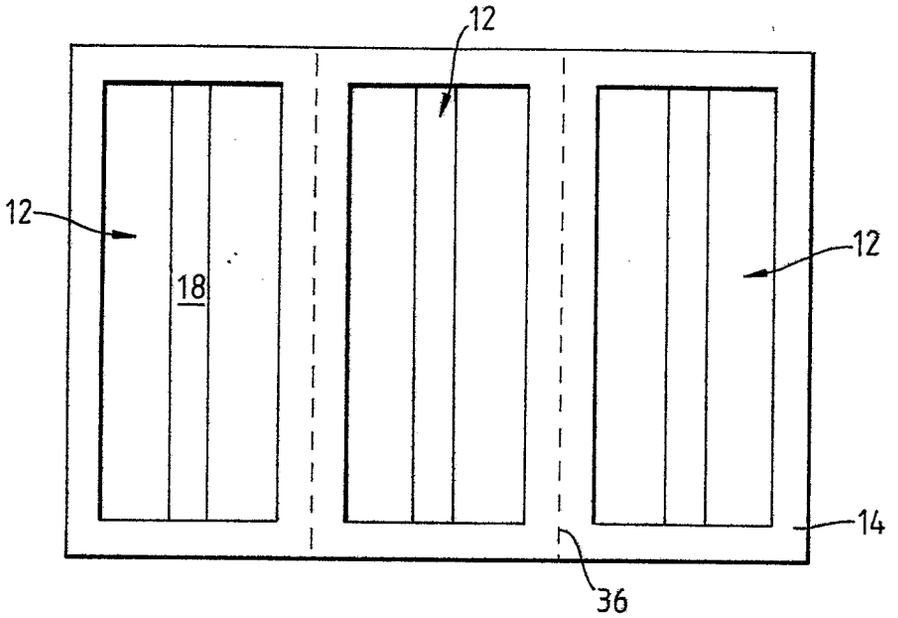


Fig.2B

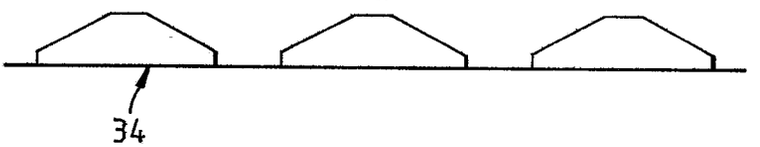
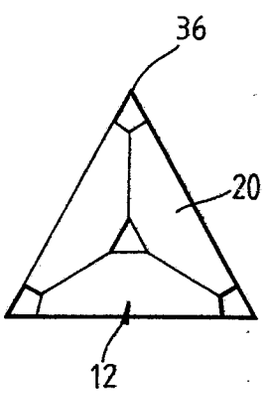


Fig.2C



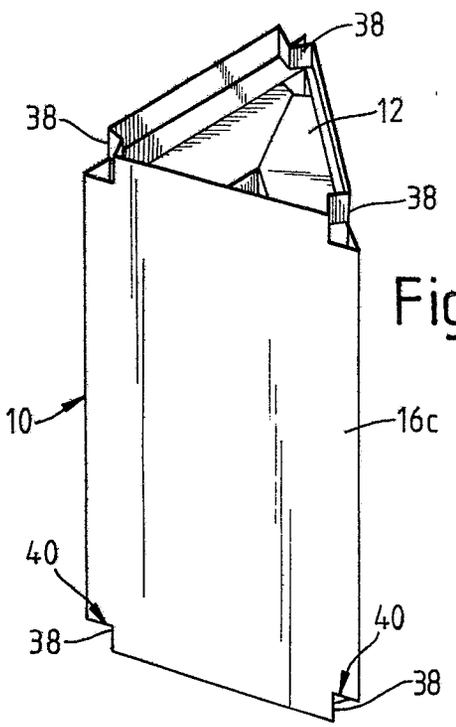


Fig.2D

Fig.3A

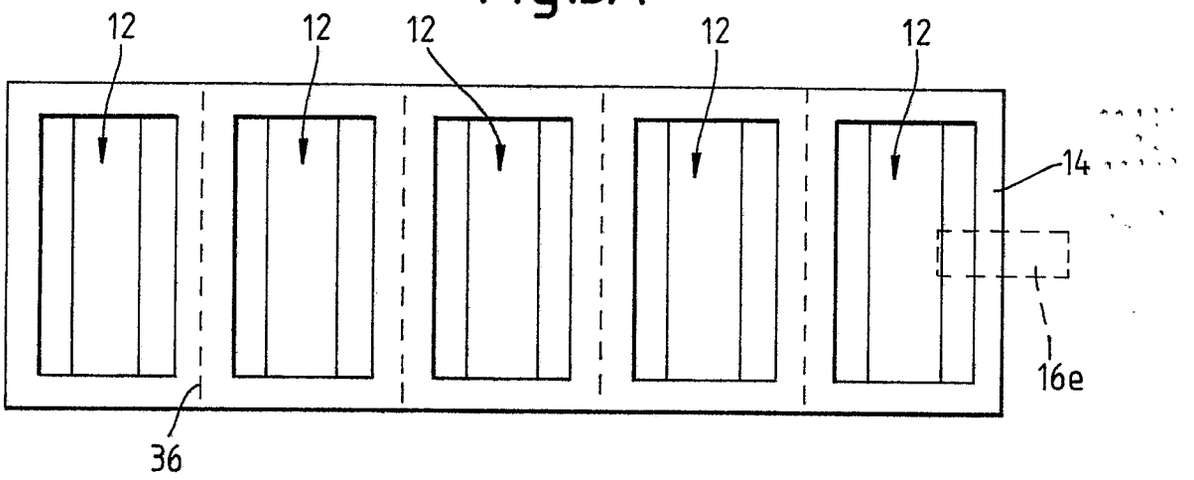


Fig.3B

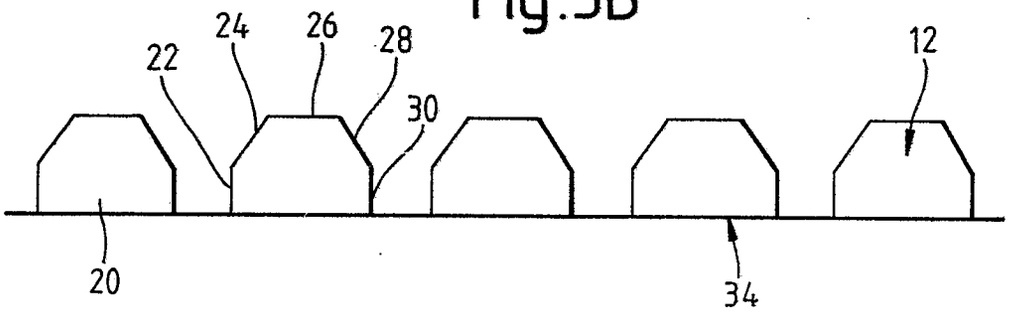


Fig.3C

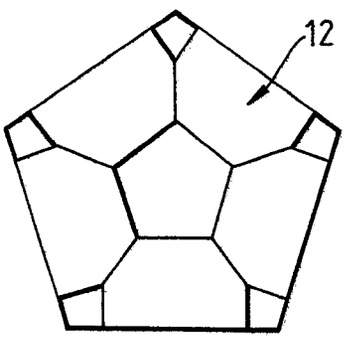


Fig.3D