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(71) Applicant: **N.V. VEREENIGDE GLASFABRIEKEN (UNITED GLASSWORKS)**
114-116 Buitenhavenweg P.O. Box 46
NL-3113 BE Schiedam(NL)

(71) Applicant: **VEGLAPLAST B.V.**
Oude Kerkstraat 6 P.O. Box 95
NL-4878 AA Etten Leur(NL)

(72) Inventor: **Evers, Laurentius Adriaan Maria**
294 Baronielaan
NL-4837 BH Breda(NL)

(74) Representative: **Keijser, Johannes Maurits L. F.**
EXTERPATENT 3 & 4, Willem Witsenplein
NL-2596 BK The Hague(NL)

(54) **Method, device and apparatus for joining packaging containers, joining member and multiple pack.**

(57) A method, device and apparatus for joining packaging containers (8, 9), having a circumferential flange (10, 11) along the top edge of the wall, particularly plastics cup-type containers. The connection is made by separate joining members (6) which may be strips which are welded, glued or otherwise connected to the flanges of the containers to be joined. Both method and means can be kept quite simple and offer an extreme flexibility in many respects.

Invention also comprises the joining strips and the multiple packs obtained by applying method and apparatus.

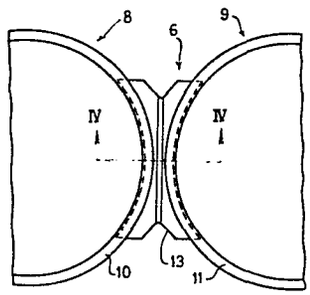

Fig. 5.

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Method,-device and apparatus for joining packaging containers, joining member and multiple pack.

The invention relates to a method of joining packaging containers, more particularly of the so-called cup-type, having an outwardly directed circumferential flange along the top edge of the upstanding wall delimiting the container opening, said circumferential flange being apt to be used, after filling the container, to bear a closing means for the opening.

Several methods are known, more particularly because cup-type containers, particularly those made in plastics material but also in other materials, are widely in use for food products, particularly dairy products, and also for soft drinks, jams and many other things.

There is a desire with the users and consumers, and therefore a need with the industry, for bundles, groups or otherwise multiple individual filled containers. The number of containers in such a multiple packing unit - which hereinafter will be called "multipack" - may be 2, 3, 4, 6, 8, or even more 12. In some cases the whole multiple pack is intended to be taken by the buyer in a shop, in other cases it is permitted for the buyer

to tear off a smaller number, from a multiple pack which contains a great number of individual cups.

One particular problem is with printing the outside of the containers. This is usually done with a multi-colour all-around decoration printing technique. This technique, however, requires free accessibility of the full cup circumference. This implies that the cups must be manufactured and printed individually, and that they can not be joined into multiple packs until after the printing. Joining a plurality of individual cups into a multi-pack is then usually done after filling the cups with the matter which they are intended to contain, and it is done, for example, by attaching a common sheet or foil which closes all top apertures of the individual, filled cups in the bundle.

In the alternative, the multiple container can be manufactured, for example drawn, when plastics containers are concerned, in its ready, multiple state, in which a number of containers is interconnected. One of the limitations of this method is, therefore, that printing can hardly or not be done on the outside of the containers and must therefore be limited to the covering sheet of foil.

The present invention is therefore concerned with the former method, i.e. the one in which the containers are manufactured

individually and therefore apt to be printed individually, they being united into multiple packs afterwards. The considerations underlying this preference can be elaborated in some more detail.

This disadvantage of manufacturing, such as by a drawing process out of sheet material, individual containers rather than multiple containers, is by far outweighed by the limitations in the handling of these multiple containers in the further processing, not only including printing, but also including filling. Individual containers can be handled in much more efficient, high speed machines in all stages of processing. Also they can be handled by a variety of types of filling machines. The structural features of filling machines will depend on many factors such as, in the first place, the article to be contained, but also the degree of mechanization and automation, related to the skill of operators of the industry in which the containers are used.

In this line the invention has a twofold aim. In the first place it wants to provide a method of joining individual cups which is much more efficient (one may also say: cheap) than any of the other methods which are on the market. In the second place it wants to introduce a planning flexibility as regards the nature of the articles or products to be packed, that is, a

planning flexibility in many respects as has not yet existed so far. Such planning flexibility comprises not only the choice or combination of processing steps and the capacity thereof, but more particularly also flexibility in the number of units in each multipack, the shape of the bundle, the volume of the separate units and even in a possible combination of articles or products of different nature into one multiple pack.

The method according to the invention is characterized by the following steps:

- supplying a separate, substantially strip-shaped joining member for each joint to be made,
- connecting, by any appropriate method or technique, said joining member to the circumferential flanges of any pair of containers which are destined to be neighbouring containers in the desired multiple pack.

The joining member used according to the invention can be an extremely simple part of plastics material, and when this is used one obtains a full freedom to combine and connect any number of containers into a multiple pack, by any method or apparatus, and containing any type of contents. The joining members, because of their extreme simplicity, are very cheap in manufacture.

A preferred embodiment of the method is characterized by:

- supporting a plurality of containers to be joined in mutual positions substantially corresponding to their mutual positions in the desired multiple pack,
- supporting the supplied joining members in mutual positions substantially corresponding to the positions which they are supposed to assume in the desired mutiple pack,
- moving the containers thus supported relative to the joining members thus supported, until they contact,
- and making the connections.

Also this form of realization of the method is of a rather universal character and it allows for any degree of mechanization and automation between simple hand operated arrangements and fully automated high speed handling.

The abovementioned steps of the method may be performed after filling the containers with the substance they are destined to contain, and before closing the container openings. This means that the method according to the invention is incorporated as part of a processing or handling line.

An advantangeous embodiment of the method is characterized by

- supplying and supporting, according to a matrix pattern, containers to be joined in a number which is a multiple of the number in the desired multiple pack, and
- supplying, supporting and connecting the joining members only

in those positions substantially corresponding to their mutual position in a plurality of the desired multiple packs.

In this way joining members are only supplied where they are needed according to the desired structure of the multipacks made. Flexibility is retained because for every different pattern of individual containers to be united into multipacks one need only change the way of supplying the joining members and, naturally, the place where connecting means such as welding means are being made operative.

Alternatively, however, there is a method which is characterized by

- supplying and supporting, according to a matrix pattern, containers to be joined in a number which is a multiple of the number in the desired multiple pack, and
- supplying and supporting, according to a matrix pattern, joining members on all places, corresponding to the mutual positions of the supported containers, between neighbouring containers, and
- connecting the joining members to the containers only in those positions substantially corresponding to their mutual position in a plurality of the desired multiple packs,
- discharging the joining members not connected.

In this way a simplification is obtained in the step of

supplying the joining members, because they are put everywhere, irrespective of the pattern where connections are made. The only change, when choosing a different pattern of interconnections, would be related with the connecting or welding means.

According to the invention there is also provided a device for joining packaging containers, more particularly of the so-called cup-type, having an outwardly directed circumferential flange along the top edge of the upstanding wall delimiting the container opening, said circumferential flange being apt to be used, after filling the container, to bear a closing means for the opening.

Such device, basically, is characterized by
- a support for at least two containers,
- means in said support for also supporting a substantially strip-shaped joining member in a position relative to said at least two containers such that it is properly placed for effective operation of the connecting means mentioned below,
- connecting means, of an appropriate type, for connecting said joining members to the circumferential flanges of any pair of containers which are destined to be neighbouring containers in the desired multiple pack.

Preferably
- the support comprises at least two apertures having supporting edges for the container upon which the circumferential flange of the container can rest in substantially stable position,
- the means for also supporting the joing member comprising depended places relative to the level of support for the container flanges.

This defines a device of a rather universal character again. Preferably, as will be clear, the device is incorporated as part of an apparatus. Such apparatus is characterized in that it comprises:
- means for supplying the containers to be joined,

- a device for supporting the containers and the connecting members and the connecting means as defined above, and
- means for discharging the containers joined into multiple packs.

Again these structural principles allow for a great variety of particular forms of implementation of the apparatus, depending on factors like those mentioned above.

Preferably the apparatus is adapted to be included in a processing line between a filling station and a closing station.

The invention also comprised joining members apt to be used for joining packaging containers, because such joining members, as used in connection with the method or the apparatus of this invention, have not been used earlier for this purpose.

Thus a joining member according to the invention is characterized in that

- the joining member is substantially strip-shaped.

This definition illustrates the extreme simplicity of this essential part of the idea of the invention.

The joining member may be plastics material, particularly when the cups to be united are made in the same material,

The most simple strip-shape is an elongate rectangular piece. In this simple form it can be used in connection with the invention, provided that the containers to be joined have circumferential flanges of relatively great radial dimensions. When working with circumferential flanges of smaller radial dimension it is preferable to adapt the shape of the joining strip or joining member. In view of this, an advantageous embodiment is characterized in that the joining member, in two opposite edges is formed so as to substantially conform to the outer circumference of the containers to be joined at the location where the containers are to be joined.

Finally the joining member may be provided, substantially along a central axis, with a weakening line. Such a weakening line does not in any way hamper the handling or connecting of the strips, but it helps when the consumer wants to break the multiple pack up into the individual containers.

The invention, finally, also comprises a multiple pack of containers of the type referred to, such pack now being characterized in that

- neighbouring containers are joined by means of substantially strip-shaped joining members, connected to the circumferential flanges of the container.

Implementing one feature of the flexibility obtained by the

invention, a preferred embodiment of the multiple pack is characterized in that different containers in the multiple pack are filled with different substances.

The invention will be further clarified with reference to the accompanying drawings. In the drawings:

Fig. 1 shows an elevation of a cup-type container which is commonly in use;

Fig. 2 is a top view of an individual joining member;

Fig. 3 is a diagrammatic top view of two of the containers interconnected according to the invention by means of a joining member;

Fig. 4 is a detail on an enlarged scale, as a cross-sectional view according to the arrows IV-IV in fig. 3;

Fig. 5 schematically illustrates a device for supporting containers and a joining member in order to facilitate the connecting operation;

Fig. 6 schematically illustrates an apparatus for interconnecting containers into multipacks;

Fig. 7a-d illustrate various possible embodiments of the multi-packs made according to the invention.

As an illustration of the containers to which the invention is applicable, fig. 1 shows a plastics cup 1 of a type which is

generally known. It comprises a circular bottom 2, an upstanding wall 3 which is slightly conical except for the uppermost circumferential area 4 which is cylindrical through a transition 4' which thus acts as an abutment in piling the cups in empty condition. The uppermost wall portion 4 is contiguous with a circumferential flange 5 which is directed outwardly and has a flat top surface 5'. Not illustrated in figure 1 is a top closure, which commonly takes the form of an aluminum foil which is carried by, and possibly in a well known manner affixed to, the top surface 5' of the flange.

Figure 2 shows one embodiment of a joining member 6 which is generally strip-shaped and which will therefore also simply be referred to as the joining or connecting strip. In the embodiment illustrated each of the opposite edges 7, 7' having the longest dimension has a part-circular shape, the radius of curvature being substantially equal to the radius of curvature of the outside of the cylindrical wall portion 4 of the cup, so that it will conform to the outer circumference of the container.

When two cups of the type illustrated in figure 1 are arranged next to one another, as is schematically illustrated in figure 3, which is thought of as a top view of two such cups indicated by 8 and 9, respectively, the connecting strip 6 may be put

between them, that is, in the manner which is illustrated in more detail in figure 4, right below the cup flanges 10 and 11, respectively. In this condition a connection may be made between the strip 6 and the portions of the flanges 10 and 11 where these parts contact, more precisely speaking between the top surface of the strip 6 and the bottom surfaces of each of the flanges 10 and 11. This interconnection may be made by any appropriate technique, such as by ultrasonic welding.

Referring again to figure 2 a weakening line 12, along the center line of the strip 6, is visible. Such weakening line is again visible in figure 3 in form of a V-shaped notch. It may, however, have any other form which will facilitate separation of the interconnected cups by the user. The commencement of tearing can be facilitated by some cut out 13 in the shorter edges of the strip, although removing such material would also serve the purpose of economy in the use of plastics material.

One way of implementing a device which would facilitate the method of interconnecting the cups is schematically illustrated by figure 5. Two cups, which may now be indicated by the same reference numerals 8 and 9 as was done in figure 3, are supported by two rings 14 and 15, respectively. These rings, therefore, have apertures such as 16 in which the cups 8 and 9 fit with an appropriate play. The top surface 17 of each of the rings

constitutes a supporting plane for the cup flange 10 or 11.

Each of the rings 14, 15 is provided with a hollowed out or deepened place 18. The vertical dimension or height of this cavity is substantially equal to the thickness of the connection strips 6 to be used. In top view the deepened places such as 18 have a shape corresponding with a part of the strip 6. More particularly the shape of the cavity corresponds to the overlapping portions of cup flanges 10, 11 and connecting strip 6 as seen in figure 3.

At least by the time the interconnection between strip and cup flanges is made, the supporting rings 14, 16 are interconnected, but such interconnection may also be a permanent one, as is, again schematically, illustrated by 19 in figure 5. Thus, when first putting a strip 6 into cavity 18, and thereupon supplying cups 8, 9 and make them rest with their flanges 10, 11 upon the rings, the strip 6 and the cup flanges 10, 11 are in proper position one with respect to the others so that they can be interconnected. This could be done by ultrasonic welding, not illustrated in figure 5. Other welding techniques are also envisaged.

In order to further illustrate the invention, figure 6 represents, in a very schematical way, an apparatus for making the multipacks,

thought of as a top view of the pack forming section which is arranged between other stations in a processing line. Thus the numeral 20 indicated a filling station for the cups, having four synchroneously operating filling heads. In the filling station 20 the cups are still individual cups, and they are being treated, and more particularly transported, in any manner which is usually in such filling stations. At the output end of the filling station 20 there appears a series of filled cups 21 which, in a known manner and by means of a known transfer plate 22 are shifted out of the filling machine and are guided, by a system 23 of guiding plates of strips, or conveyer belts, and are arranged at the mutual distance desired for further processing. In this embodiment the reference numeral 24 indicates a set of 4 x 6 cups collected in this way, the set 24, thus, consisting of 24 cups. The invention does not, as such, introduce any new proposals for arranging a number of cups into such a set. Neither does it, as far as the transfer of the set 24 to the preparation station 25 is concerned; such transfer is schematically indicated by a pivot axis 26 and a part circular line 26', meaning that the whole set 24 is pivoted 90°. This transfer may be done by pivoting appropriate supporting means which carry the set 24, or by clamping them individually, by suction or by any other appropriate means.

The preparation station 25 contains means for supporting the cups and the connecting strips in appropriate manner, for example in

the manner illustrated basically in figure 5. There will be no reason to go into further details about the adaptation of the disclosure of figure 5 to a concrete situation for example of a 4 x 6 unit.

Numeral 27 refers to means for handling the supply of connecting strips and distributing them over the supporting means in the preparation station 25. Techniques for sorting and distributing a mass of individual parts and arranging them in regular places are known in a variety of embodiments so that they need not be further illustrated for the concrete situation of the connecting strips according to this invention.

The preparation station 25 is followed by a connecting station or welding station 28. The welding station may weld, for example, one line of 6 cups at a time, so that the whole set is being welded to the extent that it is being transported through the machine. Thereupon the containers may be closed in a closing station 29.

After closing, the multipacks formed may be further treated, such as packed, at station 30 for example by means of a mechanism arranged as at 31. Thereupon the articles may be transferred to a conveyor 32.

Figures 7a-7d illustrate one aspect of the versatility of the method of forming multipacks according to the invention. They illustrate five possible ways of forming multipacks within the system, illustrated by the machine of figure 6, which operates with sets of 4 x 6, so 24 cups. In figure 7a the cups in the set 24 have been interconnected pairwise. The other figures of the series which, for simplification, show only part of the set of 24 cups, show a multipack consisting of 3 cups in line (figure 7b), a set of 4 cups in a square (figure 7c, sets of 6 cups arranged 2 x 3 (figure 7d). It will be clear that also multipacks containing more than 6 units are well feasible.

For a proper understanding of the invention, and more particularly of the scope of the claims, the following is pointed out.

A plastic cup has been represented and described. The containers may, however, also be made in other materials. The invention applicable when the containers have radially extending top flanges.

The joining members used may still be more simple strips than the embodiment described and shown in the drawing; this has been explained in the preamble to the specification.

The cupes or containers need not necessarily be circular in horizontal cross section. They may also have other forms, such as

with a square cross section having rounded edges. Any shape other than a circular one does have certain disadvantages, for example with the printing, but they may yet be interconnected in the way proposed by the invention.

Interconnecting the containers and the joining members may be done with any appropriate apparatus or method. Ultrasonic welding is one technique which is applicable for plastics material and which, in the opinion of the inventor, deserves preference, but the invention also envisages vibration welding, simple supply of heat (melting together), hot sealing by means of special coatings and application of heat, simple glueing etc.

Similarly the supplying and supporting steps of the method may indeed be performed by any appropriate mechanical means. Many such means are familier to the man skilled in the art, like supporting plates, racks, perforated plates, suction heads etc.

The term "means for supplying" must be taken in its widest sense, including such usual steps as sorting, arranging articles (containers and strips) into proper position, aligning, etc. In the embodiment of the apparatus described concisely with reference to figure 6, there was a supply along 4 lines of a filling machine, and formation of a set of 4 x 6. In this

respect there is no limitation whatsoever on the idea of the invention, other than practical limitations related to the size of machines, their speed of operation etc. More particularly, it deserves attention that a joining or connecting station according to the invention may be arranged at the end of a plurality of filling stations or separate filling machines, more particularly when such machines would fill the containers with different products. One example would be to make a combination of puddings or soft drinks of different tastes in one multipack. Also it is stressed again that the invention can be applied with any desired degree of mechanization and automation, varying between the use of quite simple mechanical auxiliary means and a considerable amount of manual labour, up to a fully automated production line including facilities for changing the type of multipacks made.

The invention puts no restrictions to the nature of the articles or products to be packed in the containers. A plurality of examples of fields in which the invention can be applied are:

- the dairy industry (milk, cream, yoghurt, curds, cheese spread, pudding),
- meat products (pâté, corned beef),
- fish (sardines, anchovy, haddock liver),
- fruit products (candied fruit, jam, fruit jelly, fruit on juice),

- soft drinks (fruit juices, yoghurt drinks),
- sandwich spread (peanut butter, sugar syrup, butter, margarine, chocolate paste),
- hardware (bolts and nuts, assorted nails and screws),
- assortments of paint and colour,
- powdered soups,
- dough products.

- C l a i m s -

CLAIMS

1. Method of joining packaging containers (1; 8,9), more particularly of the so-called cup-type, having an outwardly directed circumferential flange (5; 10,11) along the top edge (4) of the upstanding wall (3) delimiting the container opening, said circumferential flange being apt to be used, after filling the container, to bear a closing means for the opening, characterized by the following steps:

- supplying a separate, substantially strip-shaped joining member (6), for each joint to be made,
- connecting, by any appropriate method or technique, said joining member to the circumferential flanges (5; 10,11) of any pair of containers (8,9) which are destined to be neighbouring containers in the desired multiple pack.

2. Method according to claim 1, characterized by:

- supporting a plurality (24) of containers (8,9) to be joined in mutual positions substantially corresponding to their mutual positions in the desired multiple pack,
- supporting the supplied joining members (6) in mutual positions substantially corresponding to the positions which they are supposed to assume in the desired multiple pack,
- moving the containers (24) thus supported relative to the joining members (6) thus supported, until they contact,
- and making the connections.

3. Method for joining packaging containers, characterized in that the steps according to claims 1 or 2 are performed after filling the containers with the substance they are destined to contain, and before closing the container openings.

4. Method according to any of claims 1 to 3, characterized by

- supplying and supporting, according to a matrix pattern, containers to be joined in a number which is a multiple of the number in the desired multiple pack, and
- supplying, supporting and connecting the joining members only in those positions substantially corresponding to their mutual position in a plurality of the desired multiple packs.

5. Method according to any of claims 1 to 3, characterized by

- supplying and supporting, according to a matrix pattern, containers to be joined in a number which is a multiple of the number in the desired multiple pack, and
- supplying and supporting, according to a matrix pattern, joining members on all places, corresponding to the mutual positions of the supported containers, between neighbouring containers, and
- connecting the joining members to the containers only in those positions substantially corresponding to their mutual position in a plurality of the desired multiple packs,

- discharging the joining members not connected.

6. Device for joining packaging containers (1; 8,9), more particularly of the so-called cup-type, having an outwardly directed circumferential flange (5; 10,11) along the top edge (4) of the upstanding wall (3) delimiting the container opening, said circumferential flange being apt to be used, after filling the container, to bear a closing means for the opening, characterized by

- a support (14, 15) for at least two containers (8,9),
- means (18) in said support for also supporting a substantially strip-shaped joining member (6) in a position relative to said at least two containers such that it is properly placed for effective operation of the connecting means mentioned below,
- connecting means, of an appropriate type, for connecting said joining members to the circumferential flanges of any pair of containers which are destined to be neighbouring containers in the desired multiple pack.

7. Device according to claim 6, characterized in that

- the support (14,15) comprises at least two apertures (16) having supporting edges (17) for the container upon which the circumferential flange (10,11) of the container can rest in substantially stable position,
- the means for also supporting the joining member comprising deepened places (18) relative to the level of support (17) for the container flanges.

8. Apparatus for joining packaging containers (1; 8,9), more particularly of the so-called cup-type, having an outwardly directed circumferential flange (5; 10,11) along the top edge (4) of the upstanding wall (3) delimiting the container opening, said circumferential flange being apt to be used, after filling the container, to bear a closing means for the opening, characterized in that the apparatus comprises:
- means (23,26) for supplying the containers to be joined,
- a device (14,15;25) for supporting the containers and the connecting members and the connecting means according to claim 6 or 7,
- means for discharging the containers joined into multiple packs.

9. Apparatus according to claim 8, characterized in that it is adapted to be included in a processing line between a filling station and a closing station.

10. Joining member apt to be used for joining packaging containers, characterized in that
- the joining member (6) is substantially strip-shaped.

11. Joining member according to claim 10, particularly adapted for use with plastics containers, characterized in that the member (6) consists of plastics material.

12. Joining member according to claim 10 or 11, characterized in that the joining member, in two opposite edges (7,7'), is formed so as to substantially conform to the outer circumference (4) of the containers (1; 8,9) to be joined at the location where the containers are to be joined.

13. Joining member according to claim 10, 11 or 12, characterized in that it is provided, substantially along a central axis, with a weakening line (12).

14. Multiple pack of packaging containers (1; 8,9) more particularly of the so-called cup-type, having an outwardly directed circumferential flange (5; 10,11) along the top edge (14) of the upstanding wall (3) delimiting the container opening, said circumferential flange being apt to be used, after filling the container, to bear a closing means for the opening, characterized in that

- neighbouring containers (8,9) are joined by means of substantially strip-shaped joining members (6), connected to the circumferential flanges (10,11) of the container.

15. Multiple pack according to claim 14, characterized in that different containers in the multiple pack are filled with different substances.

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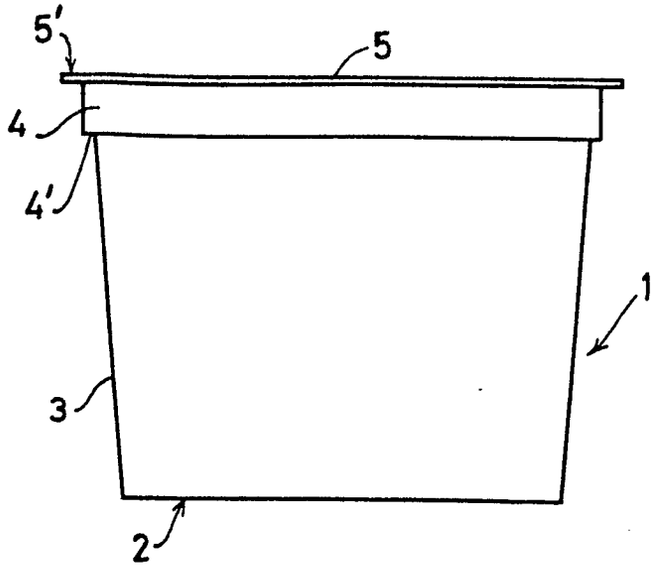

Fig:1.

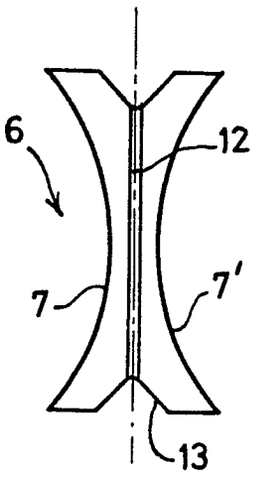

Fig:2.

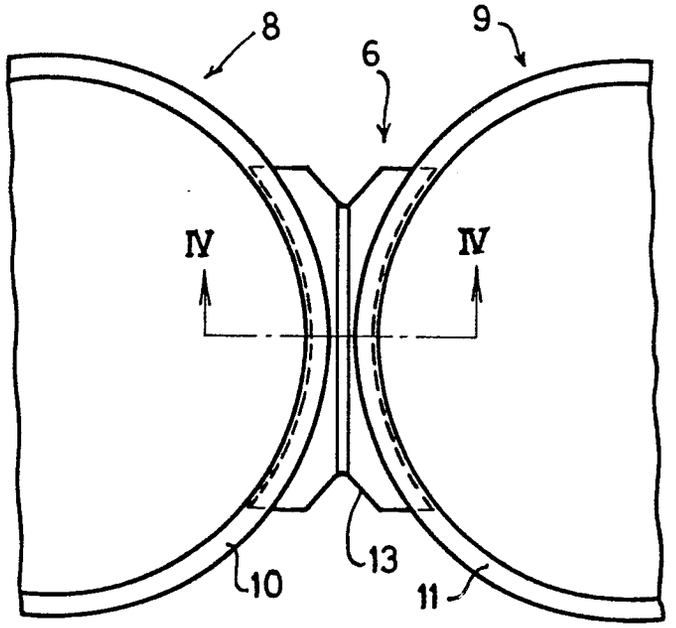

Fig:3.

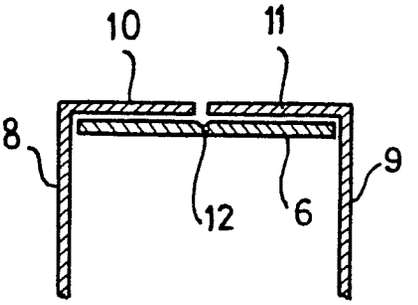

Fig:4.

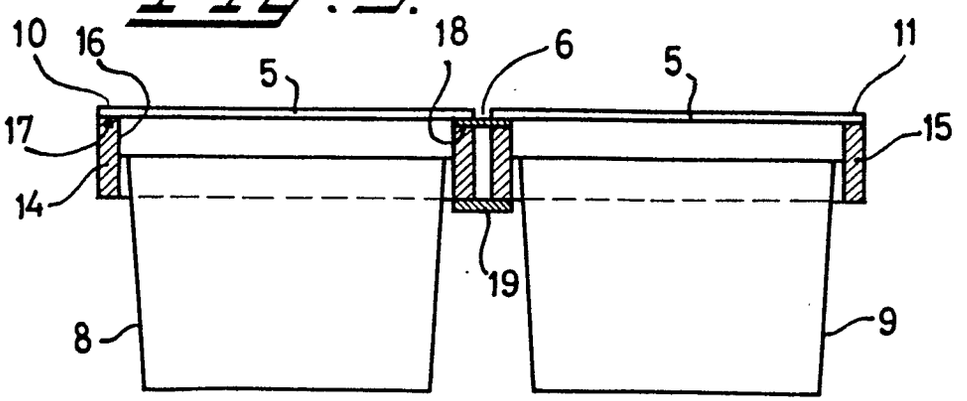

Fig:5.

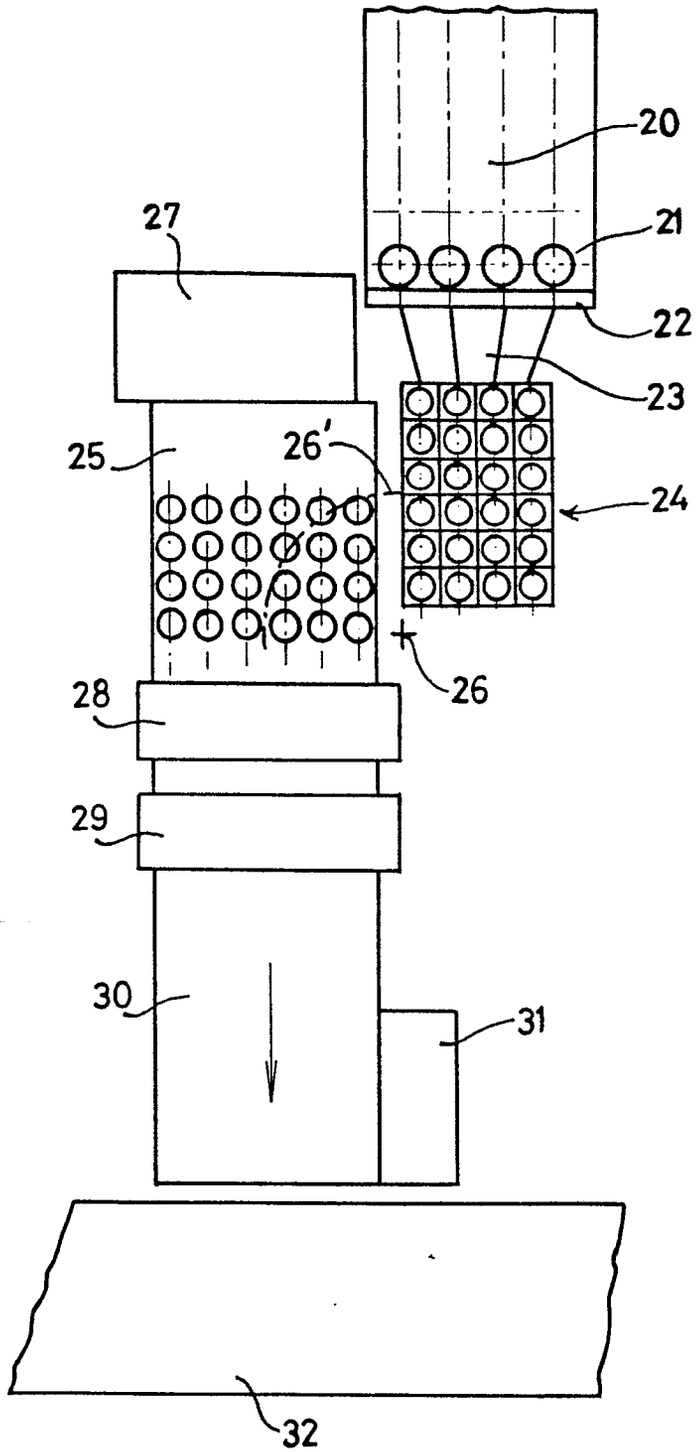

Fig: 6.

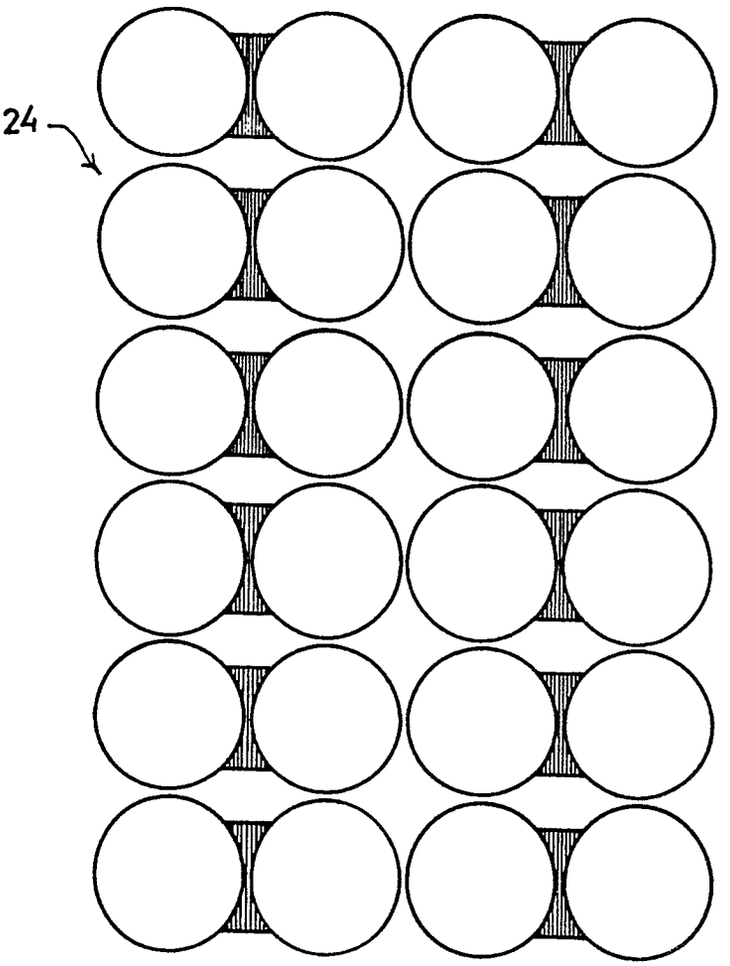

Fig: 7a.

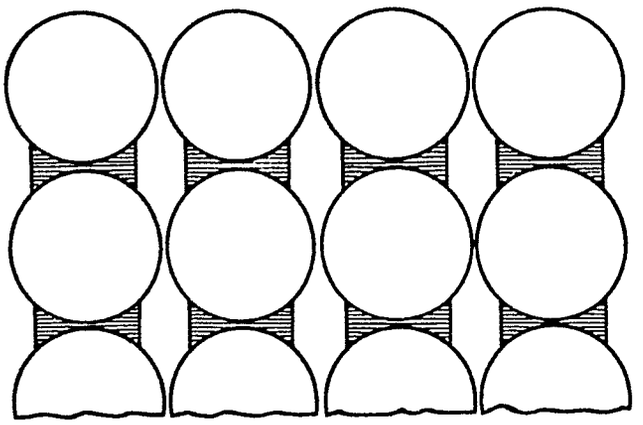

Fig.7b.

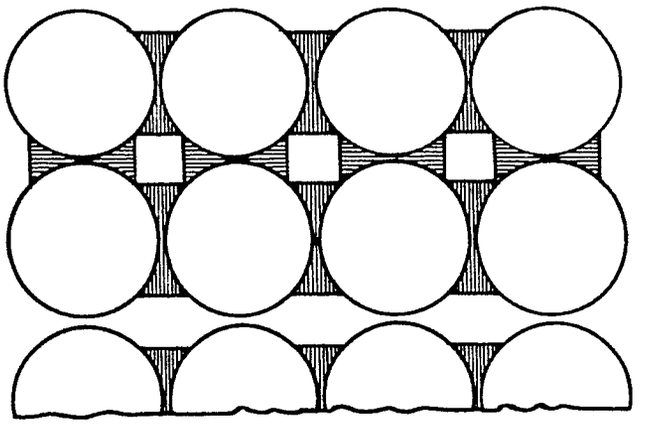

Fig.7c.

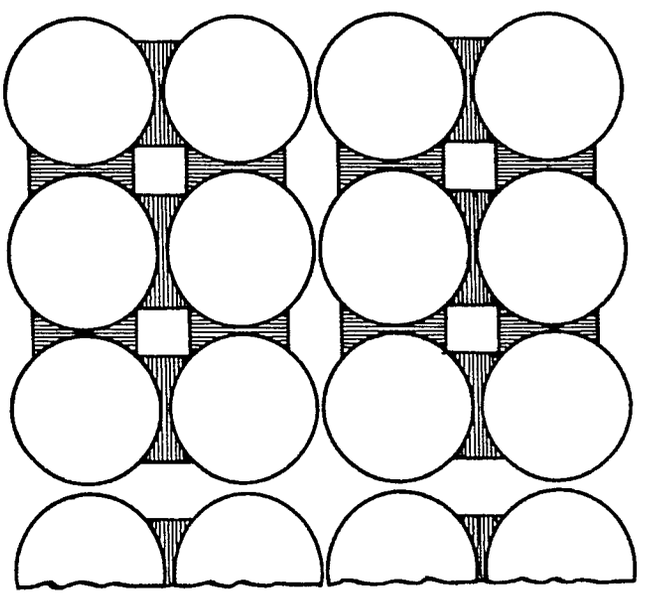

Fig.7d.

European Patent Office

EUROPEAN SEARCH REPORT

0082220
Application number

EP 81 20 1384

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. ³)
Y	FR-A-2 291 111 (E.P.REMY) *Page 4, line 9 - page 7, line 31; figures*	1,2,4, 14	B 65 B 17/02 B 65 D 71/00
A		11,12, 13	
Y	FR-A-2 432 975 (MONOPLAST) *Page 2, line 4 - page 3, line 7; figures*	1,2,4, 14	
A	US-A-3 688 899 (R.WALTER) *Column 1, line 44 - column 2, line 27; figures*	10,11, 12	

TECHNICAL FIELDS SEARCHED (Int. Cl. ³)

B 65 B
B 65 D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	29-07-1982	JAGUSIAK A.H.G.

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