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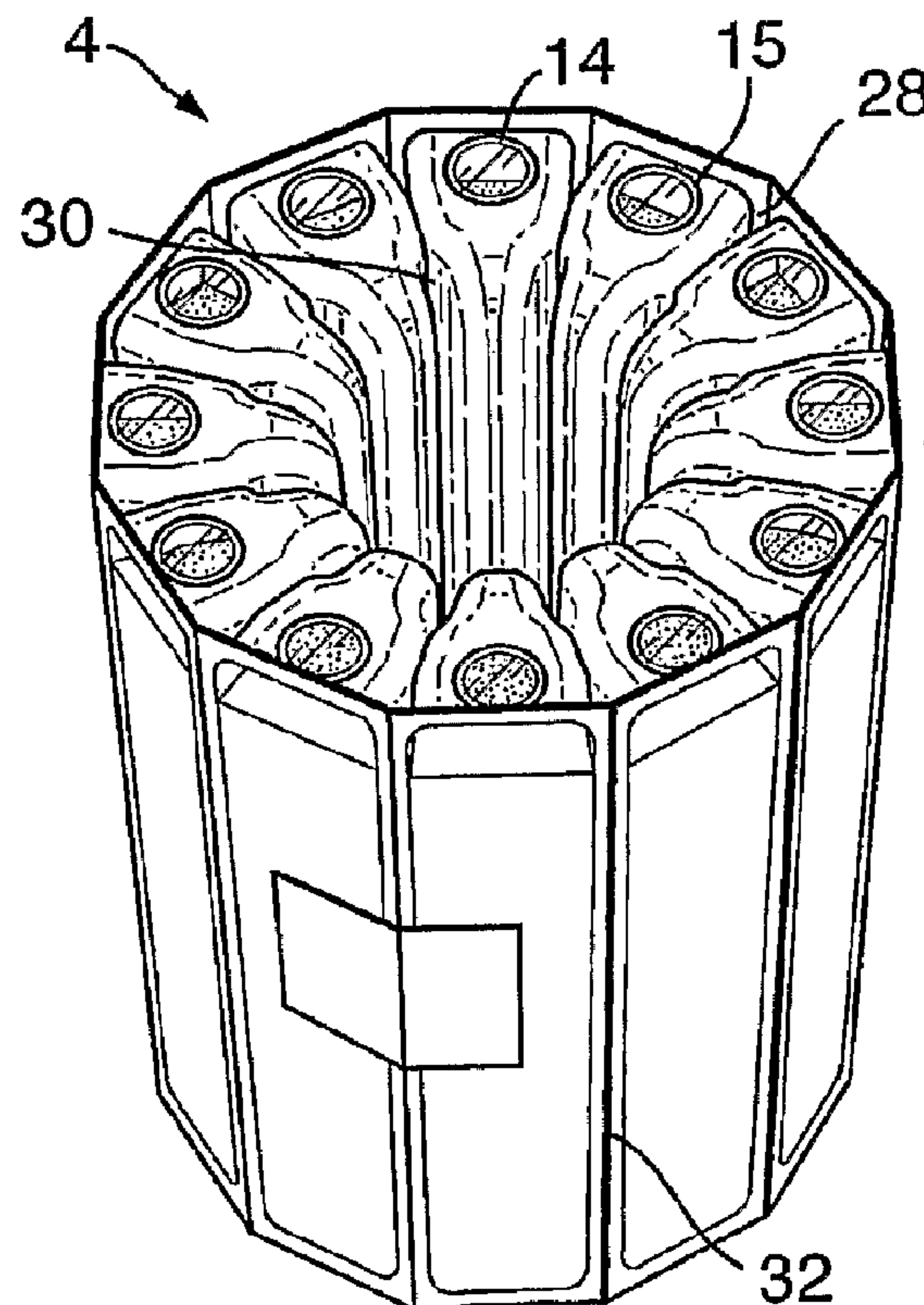
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(54) Title: ARTICLE

Fig.2C.



(57) **Abrégé/Abstract:**

This invention relates to container containing a dose of a liquid cleaning composition for use in a ware washing machine, wherein said container is adapted to be disposed in a ware washing machine in a predetermined orientation and wherein said container comprises a low-level opening for permitting egress of the cleaning composition from the container (when disposed in said predetermined orientation), and wherein the container is of a water-insoluble plastics material and wherein the low-level opening is closed by water-soluble plastics closure member. The dosage element and chamber are particularly useful in the context of forming part of a multi-dosing cleaning composition delivery device and/or a refill for such a device.

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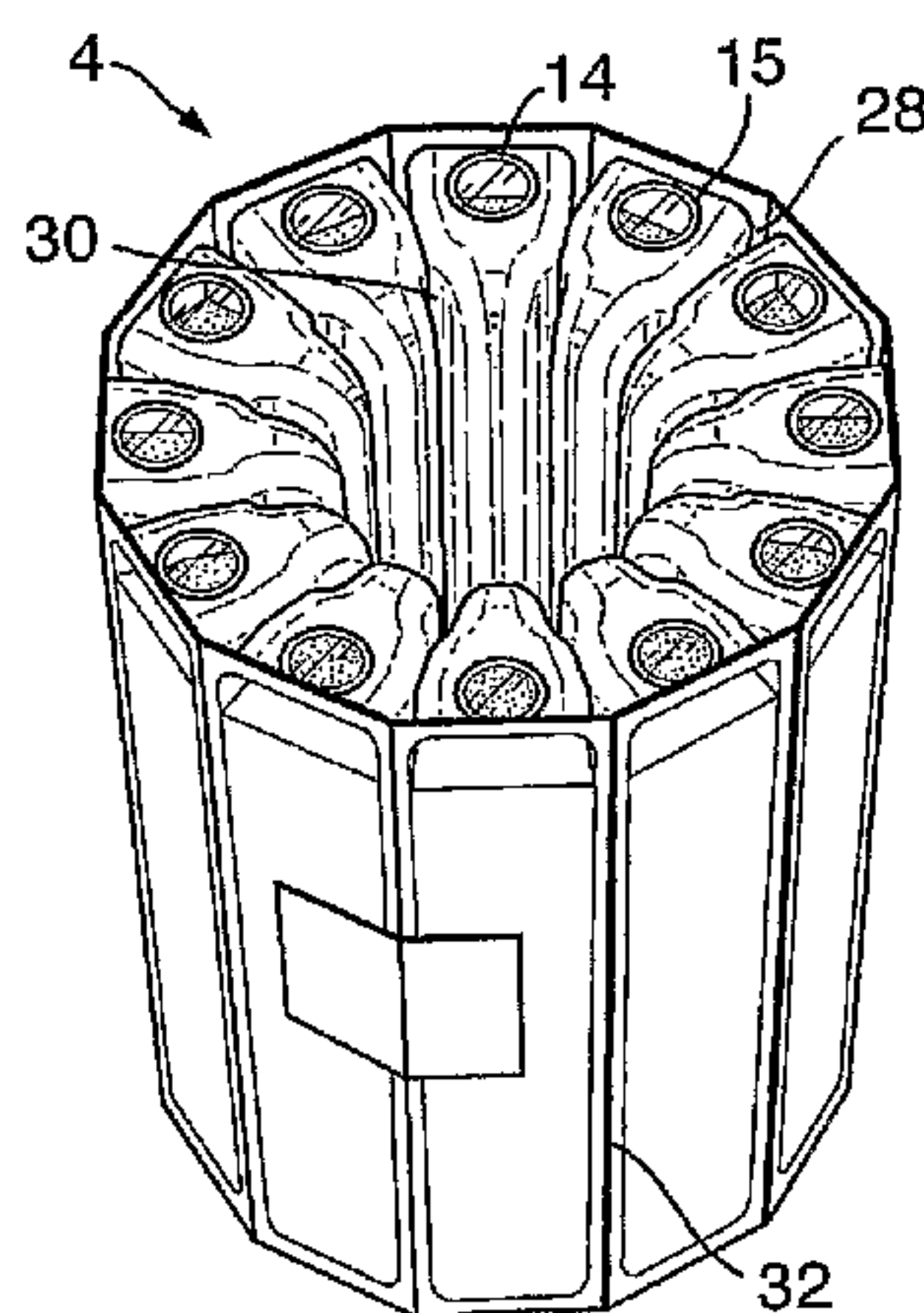
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Fig.2C.



(57) Abstract: This invention relates to container containing a dose of a liquid cleaning composition for use in a ware washing machine, wherein said container is adapted to be disposed in a ware washing machine in a predetermined orientation and wherein said container comprises a low-level opening for permitting egress of the cleaning composition from the container (when disposed in said predetermined orientation), and wherein the container is of a water-insoluble plastics material and wherein the low-level opening is closed by water-soluble plastics closure member. The dosage element and chamber are particularly useful in the context of forming part of a multi-dosing cleaning composition delivery device and/or a refill for such a device.

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ARTICLE

This invention relates to the delivery of cleaning composition into a ware washing machine, for example a dishwashing machine or a laundry washing machine. The invention is particularly useful in the context of forming part of a multi-dosing device for delivering a cleaning composition and/or a refill for such a device.

10 In PCT/GB2007/000175 there is described a container for use in an automatic dishwasher, the container containing a plurality of separate doses of cleaning composition, to be utilized sequentially. The plurality of doses are introduced into the container in a disposable
15 blister-type body. The plurality of doses are in the form of sticks or rods or other solid forms of cleaning composition. Inflow and outflow holes are provided in compartments of the blister-type body.

20 In accordance with a first aspect of the present invention there is provided a container containing a dose of a liquid cleaning composition for use in a ware washing machine, wherein said container is adapted to be disposed in a ware washing machine in a predetermined orientation
25 and wherein said container comprises a low-level opening for permitting egress of the cleaning composition from the container (when disposed in said predetermined orientation), and wherein the container is of a water-insoluble plastics material and wherein the low-level
30 opening is closed by a water-soluble plastics closure member.

Suitably the viscosity of a liquid cleaning composition suitable for use in the invention is up to 1,500 cP, preferably up to 1,000 cP, more preferably up to 600 cP.

5

For the purpose of the viscosity definitions given in this specification, viscosity is measured on a Brookfield RVT viscometer, 20°C, No. 5 spindle, 50 rpm.

10

In layman's terms the liquid cleaning composition may be described as a free-running or free-flowing liquid at 20°C, in the manner of water or of conventional laundry washing liquids.

15

Suitably the low-level opening is opened in use by dissolution of the water-soluble plastics closure member.

Preferably the container has a bottom end face, and the low-level opening is provided in the bottom end face.

20

The container may comprise a high-level opening for permitting ingress of water into the container (in said orientation), and also closed by a water-soluble plastics closure member. In this embodiment water may enter the container through the high-level opening and wash through it, leaving via the low-level opening.

25

Preferably the container has an upper end face, and the high-level opening is provided in the upper end face.

30

In this embodiment there may be a middle opening intermediate said upper and lower openings, and also closed by a water-soluble plastics closure member.

Said low-level opening, and preferably said high-level and middle openings where provided, is preferably of area in a range of from 1mm^2 to 30mm^2 , suitably in the
5 range of from 2 to 20mm^2 , preferably in the range of from 3 to 8mm^2 .

Any water-soluble plastics closure member herein may be in the form of a patch which is adhered in face-to-face
10 relationship with the water-insoluble plastics material, about the respective opening. Adhesion may be achieved by application of heat, for example delivered as such or induced in situ by electro-magnetic radiation (induction heating). Adhesion may be achieved by application of an
15 adhesive. In many cases water is a suitable adhesive.

Any water-soluble plastics closure member herein may be in the form of a plug which plugs the respective opening.

20

Suitable materials for use in this invention to serve as any water-soluble plastics closure member(s) are such that discs of such material of $100\text{ }\mu\text{m}$ thickness and 30mm diameter dissolve in 5 litres of water maintained at 50°C ,
25 under gentle stirring, in less than 30 minutes, preferably in less than 10 minutes.

A material for any water-soluble plastics closure member(s) for use herein may suitably be selected from the
30 group comprising polyvinyl alcohols, polyvinyl alcohol copolymers, partially hydrolyzed polyvinyl acetates, cellulose derivatives (such as alkylcelluloses, hydroxyalkylcelluloses, salts, ethers and esters of

alkylcelluloses and hydroxyalkylcelluloses, for example, hydroxypropylcellulose, hydroxypropylmethyl-cellulose and sodium carboxymethylcellulose); polyglycolides, polyglycolic acids, polylactides, polylactic acids; 5 polyvinyl pyrrolidines, polyacrylic acids or salts or esters thereof, polymaleic acids or salts or esters thereof, dextrans, maltodextrins, polyacrylamides, acrylic acid/maleic anhydride copolymers, including copolymers (which includes terpolymers), and blends. Optionally 10 fillers, plasticisers and process aids may also be comprised in the formulation of any water-soluble plastics closure member(s) for use herein.

Preferred material for any water-soluble plastics 15 closure member(s) for use in this invention are selected from the group comprising polyvinyl alcohols, polyvinyl alcohol copolymers, and partially hydrolyzed polyvinyl acetates. A preferred material for any water-soluble plastics closure member(s) for use in this invention is a 20 poly(vinyl alcohol) (PVOH) or a soluble polymer blend containing at least 50% wt/wt PVOH.

Suitable water-insoluble plastics materials for use herein include polyesters, and polyalkylenes such as 25 polyethylene and polypropylene.

The following definitions apply to a container of the first aspect, when completely filled with cleaning composition, and thus "bulked out".

30

Preferably the container is of elongate form, preferably arranged in an upright orientation, in use. It may be of rod-like or stick-like shape.

Preferably the weight of the cleaning composition in the container is at least 8g, preferably at least 12g, preferably at least 15g. Preferably said weight is up to
5 32g, preferably up to 26g, preferably up to 24g.

Preferably its length (that is, the minimum length - see above) is at least 4cm, preferably at least 5cm, preferably at least 6cm. Preferably its length is up to
10 14cm, preferably up to 12cm, preferably up to 10cm.

Preferably its thickness (that is, the maximum thickness - see above) is at least 0.8cm, preferably at least 1.4cm, preferably at least 1.8cm. Preferably its
15 thickness is up to 5cm, more preferably up to 3.5cm, more preferably up to 2.5cm.

Preferably its cross-sectional area (that is, the maximum cross-sectional area - see above) is at least 0.6
20 cm², preferably at least 1cm², preferably at least 1.5cm². Preferably its cross-sectional area is up to 5cm², preferably up to 3.5cm², more preferably up to 2.5cm².

Preferably its volume is at least 6ml, preferably at least 9ml, preferably at least 12ml. Preferably its
25 volume is up to 25ml, preferably up to 20ml, preferably up to 16ml.

Preferably its aspect ratio (that is, the ratio of
30 minimum length to maximum thickness - see above) is at least 2:1, preferably at least 2.5:1, preferably at least 3:1. Preferably its aspect ratio is up to 12:1, preferably up to 8:1, preferably up to 6:1.

Preferably the ratio of length to cross-sectional area is at least 2:1, preferably at least 2.5:1, preferably at least 3:1 (units of length^{-1}). Preferably the ratio of length to cross-sectional area is up to 12:1, preferably up to 8:1, preferably up to 6:1 (units of length^{-1}).

As noted above the preceding definitions apply when the definitions apply to a container of the first aspect, when completely filled with cleaning composition, and thus "bulked out". This assumption is made so that the definitions given are meaningful and reliable. In some embodiments of the invention the container may be completely filled with cleaning composition, but in other embodiments there may be advantage in only partially filling the container. This is so that water may enter the container and dilute the cleaning composition, to the point where the diluted cleaning composition dissolves the water-soluble plastics closure member(s), whereas the undiluted cleaning composition does not.

20

Preferably the ratio of the volume of liquid cleaning composition in the container to the volume of the container is at least 30%. It may be at least 40%, or at least 50%.

25

Preferably the ratio of the volume of liquid cleaning composition in the container to the volume of the container is up to 100%. It may be up to 90%, or up to 80%.

30

According to a second aspect of the invention, there is provided an article comprising a plurality of conjoined containers each in accordance with the first aspect,

provided as chambers containing individual doses of liquid cleaning composition.

The article may be in the form of a parallel array of
5 elongate chambers each containing a said dose.

The article can be made in flat or otherwise extended form, and formed into a nested form, and inserted into a holder which is located in use in a ware washing machine.
10 The nested form may be made by forming the article into a roll.

Preferably the nested form is generally cylindrical.

15 Preferably, in the nested form, the backing material is on the outside and so the chambers project inwards. However embodiments in which, in the nested form, the backing material is on the inside, so that the chambers project outwards, are not excluded.

20

Preferably the article has at least 6 chambers, more preferably at least 8, and most preferably at least 10.

Preferably the article has at least 6 chambers, more
25 preferably up to 18, and most preferably up to 16.

Preferably the backing material is a sheet or is made up of a series of elements, for example panels, articulated together such that the nested form may be
30 achieved. When the backing material is a sheet the article may be formed into a nested form by rolling it, preferably until one end touches or even overlaps the other end.

Preferably the nested form is maintained by securing one part of the backing material to another part; preferably one end to the other end. The securement means may conveniently be adhesive tape located so as to prevent
5 unrolling or unfolding of the article, as the case may be.

Preferably there is a small gap between chambers in the non-nested position so that they can be formed into their nested position without hindrance.

10

Preferably the container is formed in one main piece i.e. apart from the water-soluble plastics closure member(s). That one main piece may be in the form of a moulded or thermoformed tray having said chambers, in
15 which the doses are provided. The backing material may be secured over the tray to close the chambers, and entrap the doses. In such an embodiment the tray and backing material in effect together form the multiple chambers.

20 Preferably the chambers, containing said doses, are of substantially the same cross-section along their length; in particular, they preferably do not taper.

Preferably the article is such that, in its nested
25 form, adjacent chambers containing doses of cleaning composition are separated by a spacing. A separate holder into which the nested article is placed, in use, preferably has an array of walls radiating from a hub, wherein spacings must be mated with divider walls when the
30 article is located in the holder. There could be one-to-one correspondence between spacings and divider walls, but preferably there are more spacings than divider walls. Three or four divider walls will generally suffice to

cause the article to be located correctly in the holder. In general we may say there is preferably 3-8 divider walls, preferably 4-6.

5 The holder is generally a plastics body, rigid and substantial, but the article, once the dosage elements have gone, is light and may even be rather flimsy. It suitably comprises just the backing material and the sleeves (which may be light thermoformed sheet, or film).
10 The article is intended as a refill, the holder retained. The wastage of material when the article is exhausted is very small. The invention may thus be seen as a desirably ergonomic solution.

15 In the context of the second embodiment the patch may be a patch which occludes one opening only or it may be a patch, such as a band, which occludes more than one opening.

20 In accordance with a third aspect of the invention there is provided a multiple dosing ware washing product comprising an article of the second aspect, in nested form, retained within a holder as described above. Preferably the holder is adapted for location in use in a
25 ware washing machine and the article is adapted for location in the holder. Preferably the holder is designed as a non-disposable or long-life body. Preferably the article is intended as a refill or disposable body. In practice successive refills are fitted into the one
30 holder.

Thus, preferably, the holder has means for retaining it releasably within a ware washing machine. For example

it may have a hook to enable it to be hung from a rack of a dishwasher; or a clamp to enable it to be clamped to a rack of a dishwasher; or be designed to be fitted into a compartment of a rack of a dishwasher; or may have means
5 allowing it to be releasably fitted to the wall of a dishwasher or laundry washing machine, or to the window of a laundry washing machine.

Preferably when the container is located in the
10 product of the third aspect it is disposed with its low-level opening lowermost so that when the low-level opening is breached the liquid cleaning composition flows out under gravity.

15 Preferably the holder has a lid adapted to deliver water to a selected dosage element. Preferably the holder has means to deliver water to the dosage elements in sequence, one in each wash. Such means may operate automatically or be operated by the user, before a wash is
20 commenced.

In accordance with a fourth aspect of the invention there is provided a method of making an article in accordance with the second aspect, comprising forming a
25 parallel array (e.g. a rack) of empty chambers, delivering doses of cleaning composition into the chambers using the open low-level openings as fill openings, or using the high-level openings (when provided) as fill openings, closing the fill openings with water soluble plastics
30 closure member(s), and forming the article into said nested form.

In accordance with a fifth aspect of the invention there is provided a method of carrying out washing in a ware washing machine, the method comprising:

(1) mounting a product of the third aspect in the
5 ware washing machine, the article (of the second aspect) within the holder containing a plurality X of dosage elements (where X is an integer and is 3 or more, preferably 6 or more);

(2) operating the ware washing machine for one cycle
10 such that the water soluble plastics closure member(s) of one chamber is/are dissolved and one dose of cleaning composition is released into the ware washing machine;

(3) operating the ware washing machine for X-1 (X
15 minus 1) further cycles such that the water soluble plastics closure member(s) of further chambers are dissolved and X-1 further doses of cleaning composition are released into the ware washing machine chamber by chamber in successive washes, until the article is spent;

(4) removing the spent product from the holder;

(5) introducing a new article of the second aspect
20 into the holder; and

(6) repeating steps (2) to (5) with successive new articles loaded into the same holder.

25 In accordance with a sixth aspect of the invention there is provided the use of a container in accordance with the first aspect or of an article in accordance with the second aspect or of a multiple dosing ware washing product in accordance with the third aspect, in carrying
30 out washing in a ware washing machine.

Preferred features of any aspect of the invention herein described are preferred features of any other aspect.

5 The invention will now be further described, by way of example, with reference to the accompanying drawings, in which:

Fig. 1 shows a fully assembled multi-dose dishwashing
10 device;

Figs. 2A, 2B and 2C show the device of Fig. 1, disassembled;

15 Figs. 3A, 3B and 3C show respectively top plan view, side plan view and bottom plan views of the article in flat form.

The device shown in Fig. 1 is made up of a holder 2
20 (Fig. 2A), a refill 4 (Fig. 2C) for location within the holder, and a lid or cap 6 (Fig. 2B).

The refill is a container in the form of a cylindrical roll, formed from a flat thermoformed water-
25 insoluble plastics tray 8 of elongate parallel blister recesses 10 and a backing film or sheet 11. The tray and backing sheet are secured together by heat or adhesive. The open face of each blister recess 10 is formed all around its perimeter with an endless flange 12. Cleaning
30 composition doses 6 comprising a low-water, free-running, liquid cleaning composition (intended in this embodiment to be used for cleaning in an automatic dishwasher machine) are introduced into the blister recesses.

Each blister recess has opposed end walls, one of which, the upper end wall in use, has an opening 14. In this embodiment each upper opening 14 is circular, and 6mm
5 in diameter. Each such opening 12 is covered by a PVOH disc 15. A smaller opening 16 is formed in the lower end wall of each blister recess. In this embodiment each such opening is circular, and 2.5mm in diameter. Each such opening 16 is covered by a PVOH disc 17.

10

At a position mid-way between the upper and lower end walls the side wall of each blister recess has a third opening 18, which is circular and 3mm in diameter. Each such opening is covered by a PVOH disc 19.

15

A backing sheet is 11 secured, for example by heat sealing or adhesive, over the open blister recesses, to form the article with its discrete chambers.

20

Securement of the discs 15, 17, 19 is in face-to-face manner, onto the outer surface of the water-insoluble plastics tray, about the respective opening. Securement may be by means of a suitable adhesive, which may conveniently be water. However the discs 17, 19 are
25 secured first, then the chambers are filled with low-water cleaning composition by injection via the upper openings 14 (which have not been sealed over). The upper openings are then sealed over by discs 15.

30

Next, the flat article, initially in the form of a rack or parallel linear array, of elongate dosage elements 6, may be curled into its nested form shown in Fig. 2C, with the backing sheet 11 outermost. In this embodiment

the nested form is a generally cylindrical array. It may be retained in its nested form by a piece of adhesive tape 16.

5 The backing may be printed on its outwards-directed side - the free face of backing sheet 11 - with information, for example a trade mark and/on, with product get-up, and/or with contents information, and/or with instructions for use.

10 It will be noted that the dosage elements are provided with a separation 28 between them, on the backing sheet 11.

15 It may further be noted that the dosage elements taper in the inwards direction, and so have a separation 30 between them, at their distal end region, when in their nested form.

20 The tray 8 has, as a result of the mould into which it is thermoformed during manufacture, preferential fold lines 32. These fold lines 32 are aligned with the spacings 28 between the dosage elements.

25 The end result of these features is as follows, and can be clearly seen in Fig. 2C: when the article is formed into its nested form the article is displaced about its fold lines 22, in a segmented or articulated manner. This is permitted by the spacings 28 and 30; if the dosage elements simply abutted against each other the operation
30 would not be permitted, due to physical obstruction.

As can be seen in Fig. 2C the spacings 30 in the inboard regions of the dosage elements remain, even in the nested form (though obviously narrowed when nested).

5 In use, the article of the invention is provided as a refill, supplied in its nested form shown in Fig. 2C. In that nested form it is inserted by the customer into the holder 2, shown in Fig. 2A. The holder is a cylindrical tub having a hub-like axial projection 40 extending
10 upwards from its base substantially the whole axial length of the tub. Projecting outwardly from the projection 40 are four fins 42, set at 90° intervals. The fins extend approximately four-tenths of the radial distance of the holder.

15

The holder has a hanging handle 44.

The bottom wall of the holder has a large opening (not shown).

20

The holder has a lid 6 shown in Fig. 2B. The lid has a central indexing device 46 surrounded by a sieve 48, to allow particulate-free water to enter the holder. The central indexing device has a push button 50 and, around
25 it, a dial 54 carrying numbers, equalling the number of chambers. Each time the dishwasher is to be used, the user presses the button to advance the control dial by one number, bringing the next chamber into use. This is done by rotating an apertured disc within the lid by one
30 position so that water entering the holder must pass through the aperture thereof, now in alignment with the next chamber. Water enters the appropriate chamber through the opening 12 which is aligned with the opening within

the lid, the PVOH disc 15 having very quickly been dissolved away. Water enters the chamber and dilutes the low-water liquid cleaning composition, leading to dissolution of the other PVOH discs 15, 19, as the
5 cleaning composition becomes more dilute, and allowing the cleaning composition dose to leave the chamber through the lower and central openings 16, 18. To facilitate this process, in this embodiment the chamber is only 75% filled with the cleaning composition,

10

When the refill 4 is located within the holder 2 the fins 42 are located within spacings 30 of the nested article. The tolerance of the fins in the spacings 30 is not large and in this way it is assured, that the cleaning
15 composition doses, and the upper openings 12, are in the correct orientation, to align with the opening within the lid.

If is helpful for filling purposes and to assure that
20 water flows into the respective container that the upper opening is somewhat large. The lower and central openings do not need to be as large.

The arrangement is very space-efficient, in not
25 taking up very much of the "footprint" available within the dishwashing machine.

Further advantages of providing water-soluble closure members include the fact that they allow suitable liquid
30 cleaning compositions to be used.

Other embodiments, for example, in which upper and lower openings are of the same area; or in which the upper

opening is of smaller area than the lower opening; or in which there is no intermediate opening) are within the broad scope of the present invention.

CLAIMS

1. A container containing a dose of a liquid cleaning composition for use in a ware washing machine, wherein
5 said container is adapted to be disposed in a ware washing machine in a predetermined orientation and wherein said container comprises a low-level opening for permitting egress of the cleaning composition from the container (when disposed in said predetermined orientation), and
10 wherein the container is of a water-insoluble plastics material and wherein the low-level opening is closed by a water-soluble plastics closure member.

2. A container as claimed in claim 1 wherein the
15 container has a bottom end face, and the low-level opening is provided in the bottom end face.

3. A container as claimed in claim 1 or 2 wherein the container comprises a high-level opening for permitting
20 ingress of water into the container (in said orientation), and also closed by a water-soluble plastics closure member.

4. A container as claimed in claim 3 wherein the
25 container has an upper end face, and the high-level opening is provided in the upper end face.

5. A container as claimed in any preceding claim wherein the (or each) water-soluble plastics closure member is in
30 the form of a patch which is adhered in face-to-face relationship with the water-insoluble plastics material about the opening, or is in the form of a plug which plugs the opening.

6. A container as claimed in any preceding claim wherein the container is only partially filled with the cleaning composition, wherein in use water enters the container and dilutes the cleaning composition, to the point where the diluted cleaning composition dissolves the water-soluble plastics closure member, whereas the undiluted cleaning composition does not.

7. An article comprising a plurality of conjoined containers each as claimed in any preceding claim, provided as chambers containing individual doses of liquid cleaning composition.

8. An article according to claim 7 and formable into a nested form.

9. A multiple dosing ware washing product comprising an article as claimed in claim 7 or 8, in nested form, retained within a holder which is adapted for mounting within a ware washing machine.

10. A method of making an article as claimed in claim 8, comprising forming a parallel array of empty chambers, delivering doses of cleaning composition into the chambers using the open low-level openings as fill openings, or using the high-level openings (when provided) as fill openings, closing the fill openings with water soluble plastics closure member(s), and forming the article into said nested form.

30

11. A method of carrying out washing in a ware washing machine, the method comprising:

20

(1) mounting a product as claimed in claim 9 in the ware washing machine, the article within the holder thereof containing a plurality X of individual doses of cleaning composition (where X is an integer and is 3 or
5 more, preferably 6 or more);

(2) operating the ware washing machine for one cycle such that the water soluble plastics closure member(s) of one chamber is/are dissolved and one dose of cleaning composition is released into the ware washing machine;

10 (3) operating the ware washing machine for X-1 (X minus 1) further cycles such that the water soluble plastics closure member(s) of further chambers are dissolved and X-1 further doses of cleaning composition are released into the ware washing machine chamber by
15 chamber in successive washes, until the article is spent;

(4) removing the spent article from the holder;

(5) introducing a new article into the holder; and

(6) repeating steps (2) to (5) with successive new articles loaded into the same holder.

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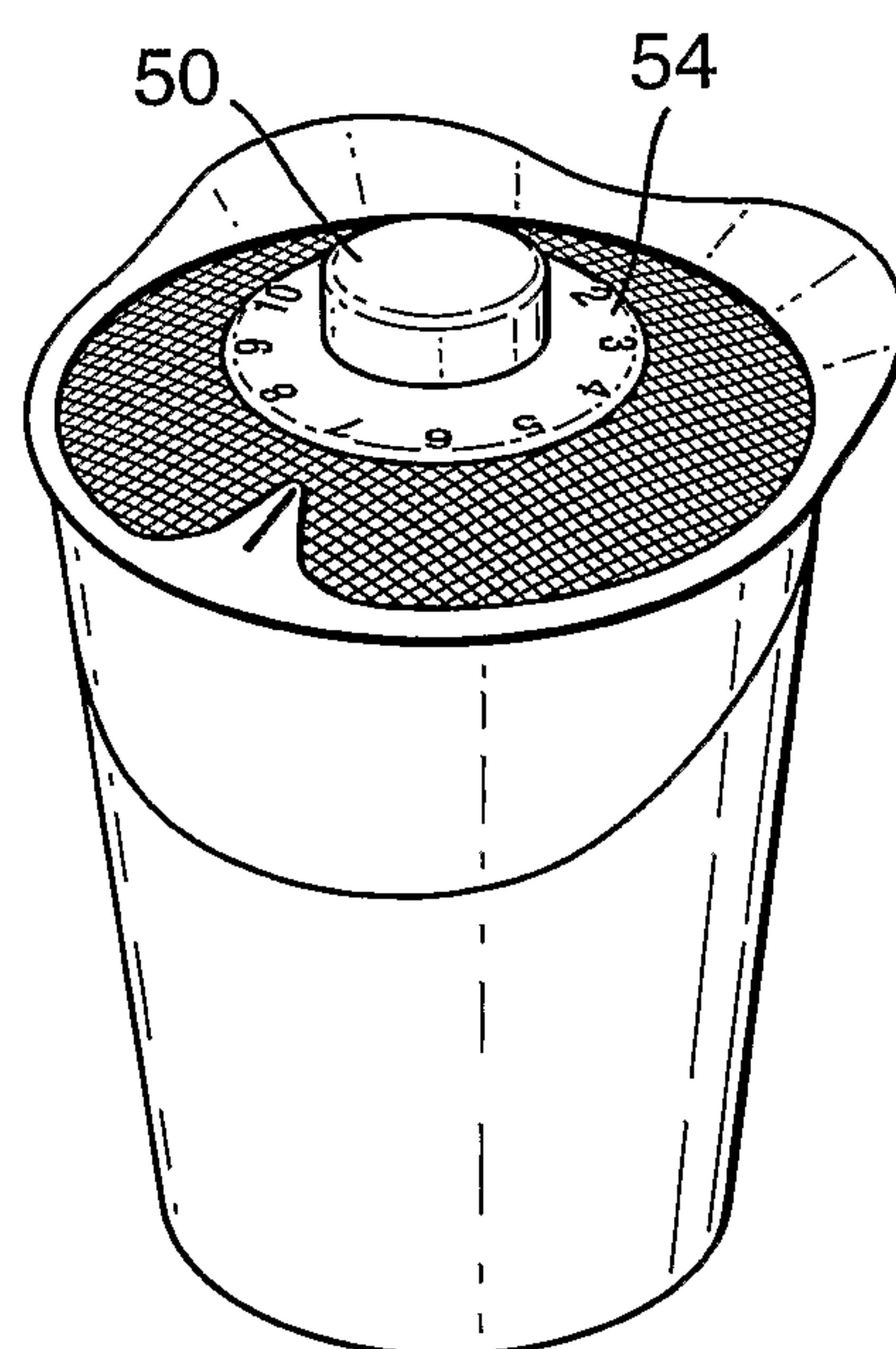
12. Use of a container claimed in any of claims 1 to 6 or of an article claimed in claim 7 or 8 or of a multiple dosing ware washing product claimed in claim 9, in carrying out washing in a ware washing machine.

25

30

1/3

Fig.1.



2/3

Fig.2A.

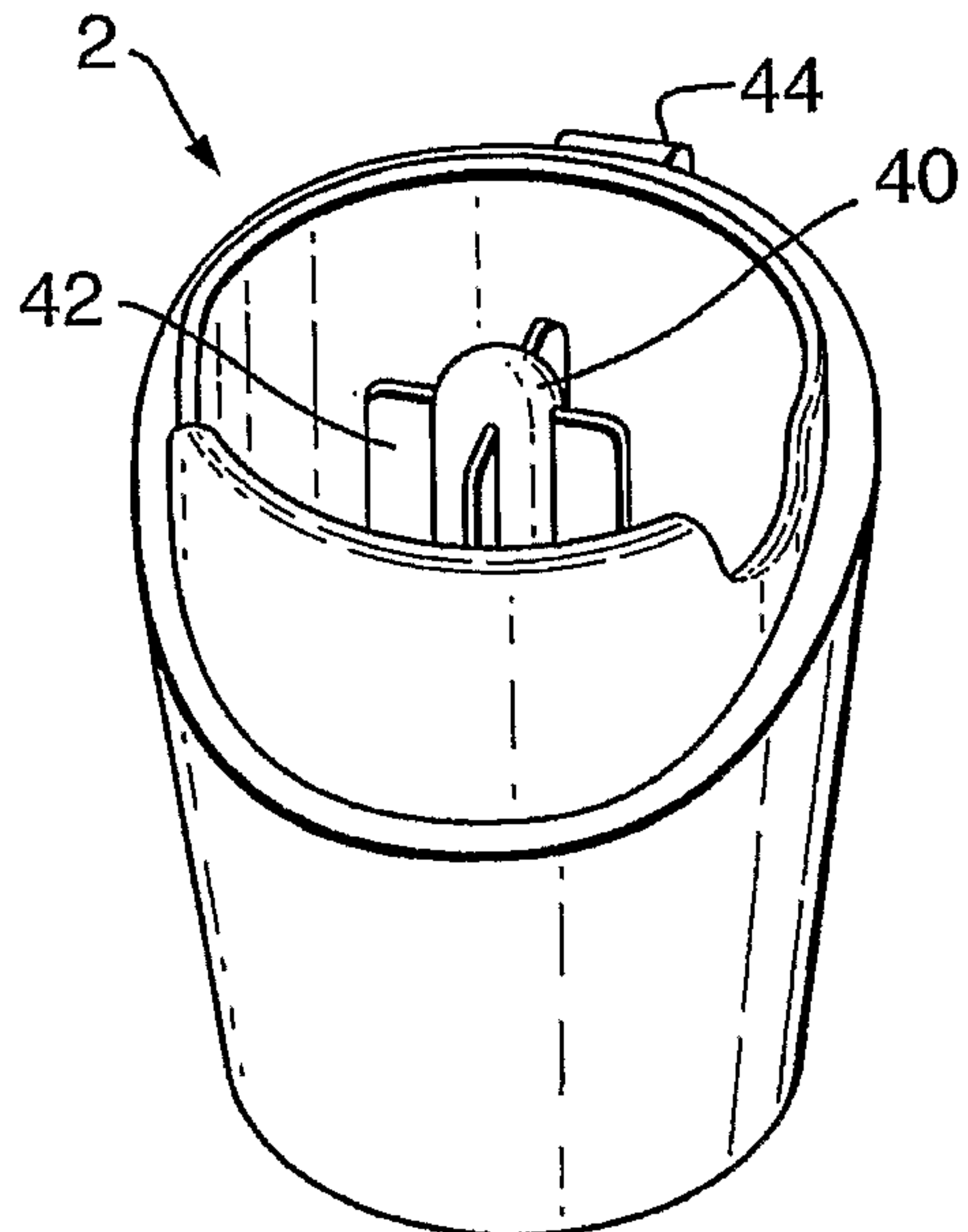


Fig.2B.

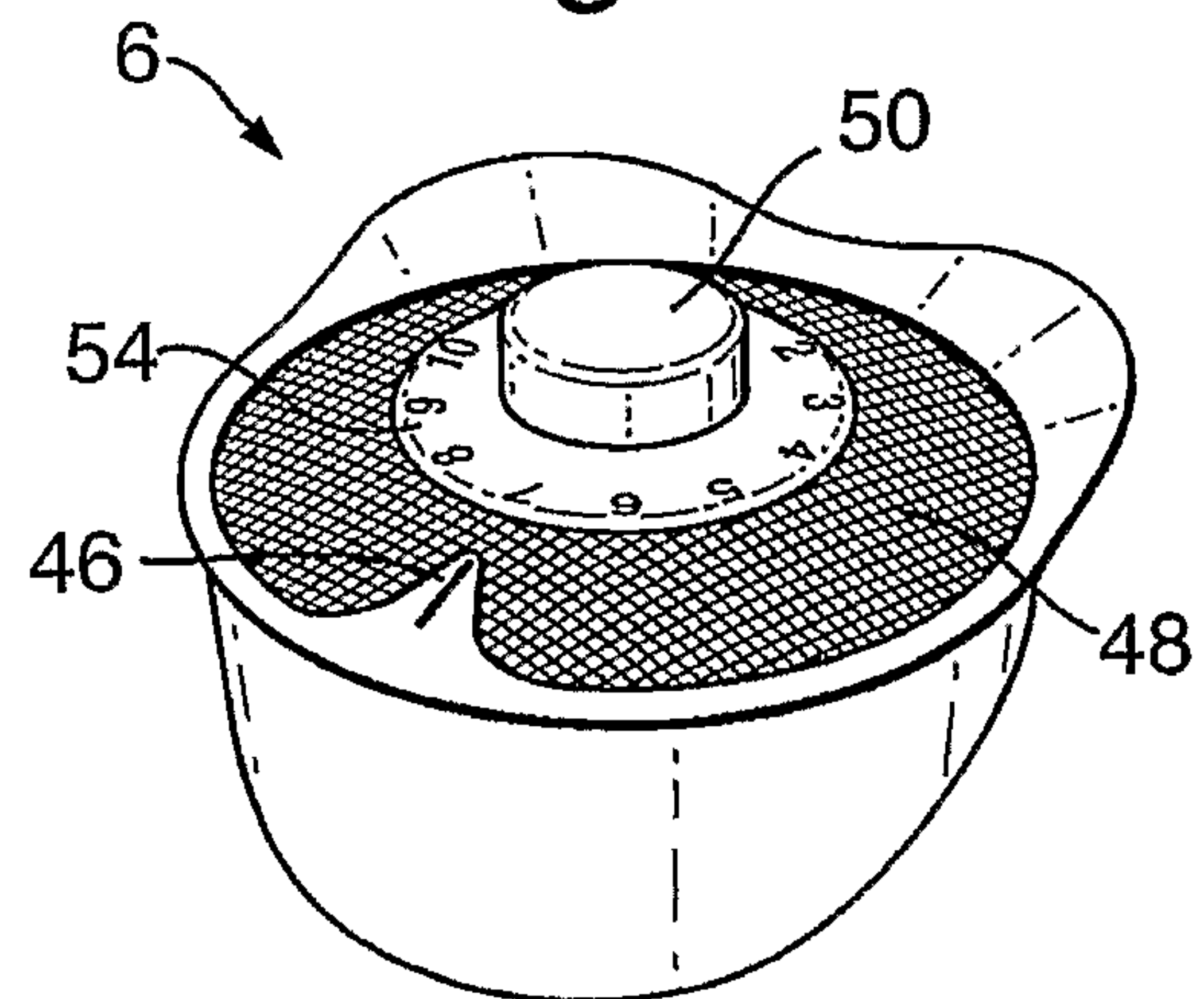
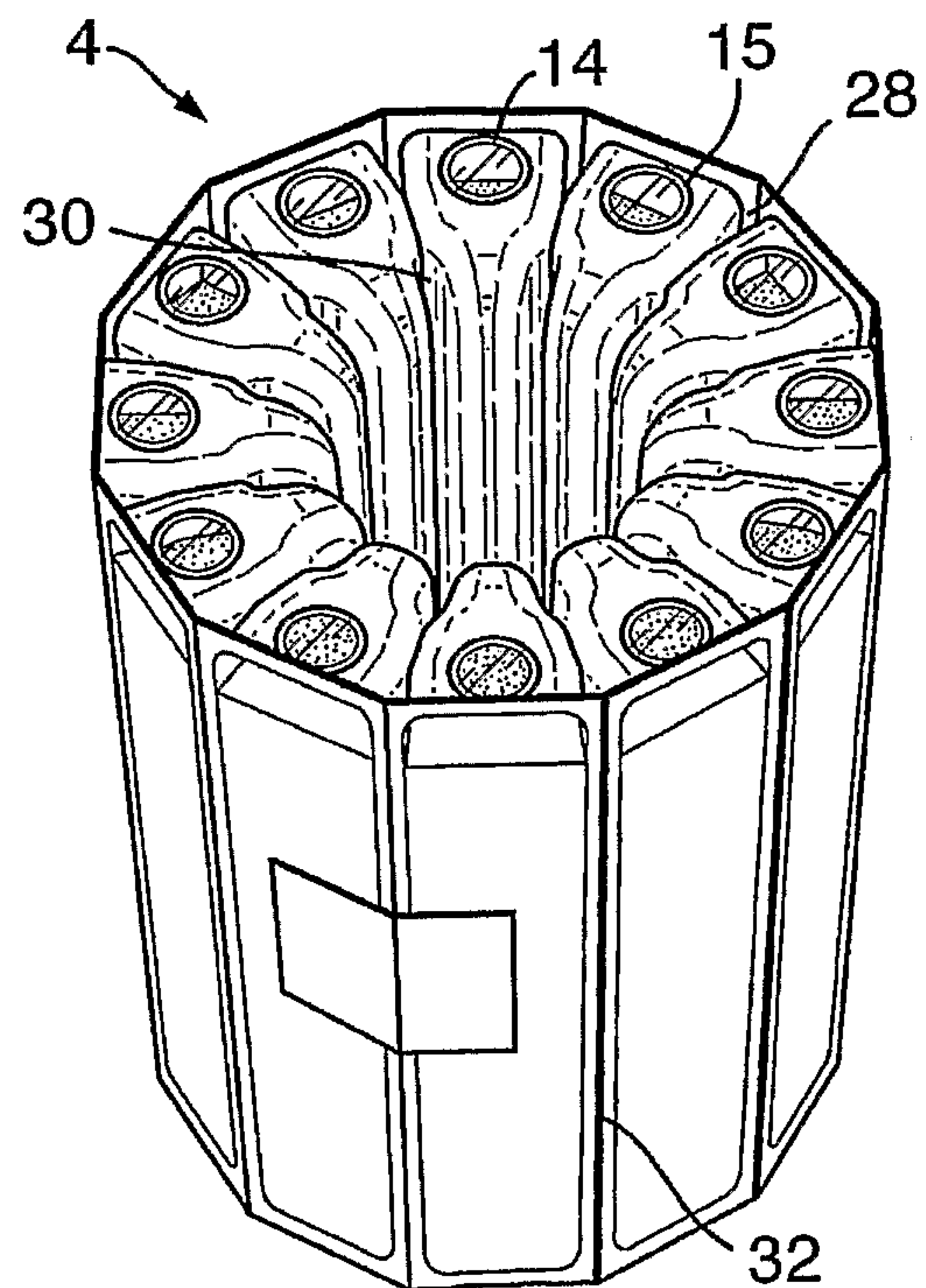


Fig.2C.



3/3

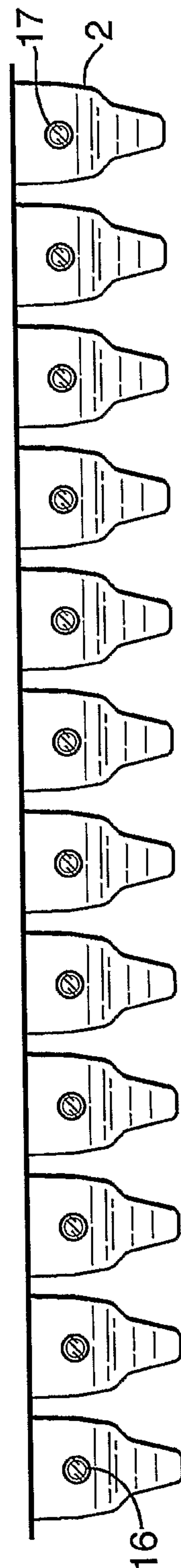
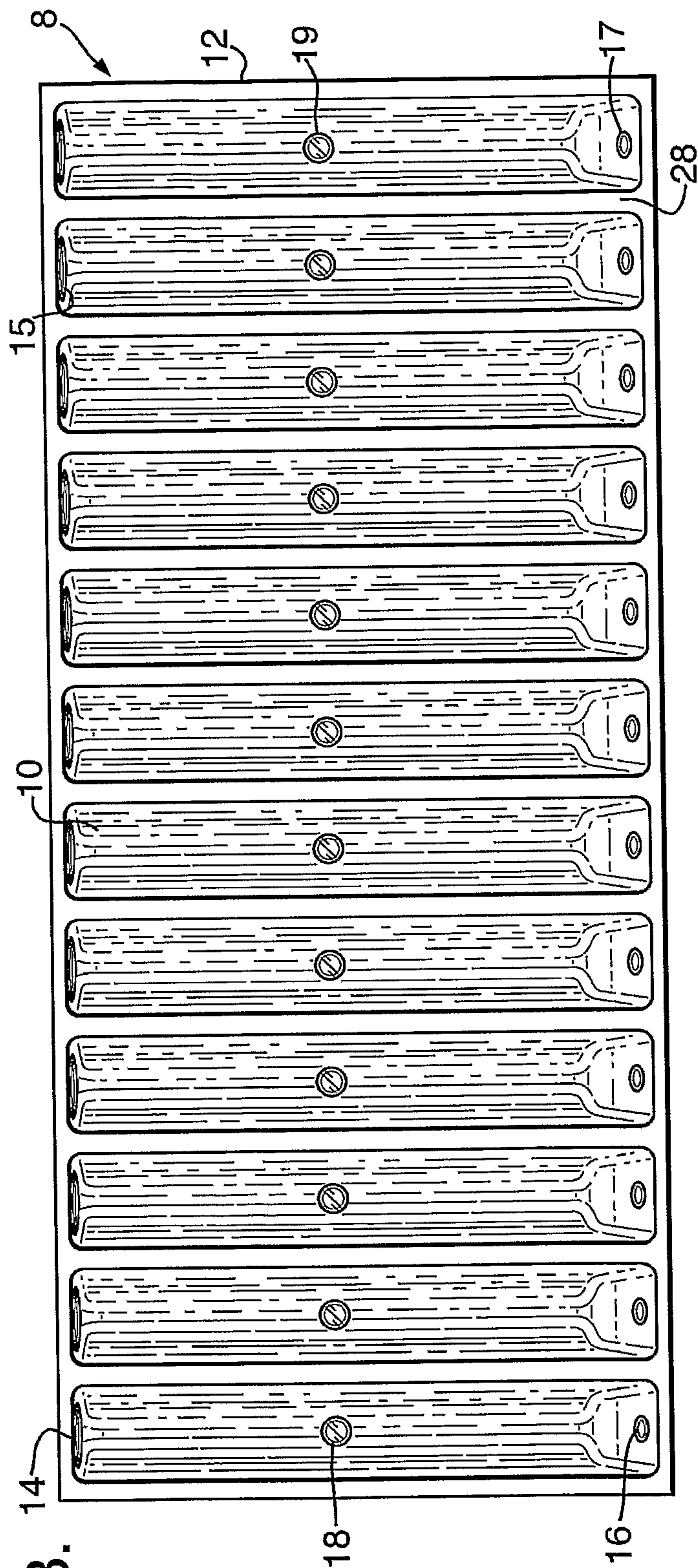
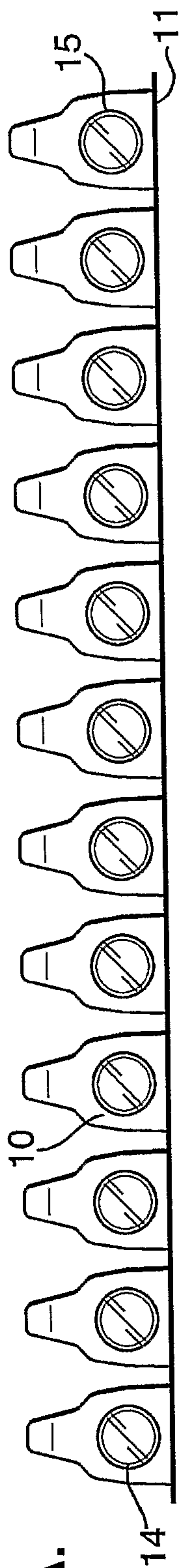


Fig.2C.

