(12) STANDARD PATENT (11) Application No. **AU 2013260271 B2**
(19) AUSTRALIAN PATENT OFFICE

(54) Title
Modular integrated system for seed germination, cultivation, planting, fertilizing and maintenance of plants

(51) International Patent Classification(s)
A01G 27/00 (2006.01)

(21) Application No: **2013260271** (22) Date of Filing: **2013.04.03**

(87) WIPO No: **WO13/169129**

(30) Priority Data

(31) Number	(32) Date	(33) Country
106236	**2012.04.03**	**PT**

(43) Publication Date: **2013.11.14**
(44) Accepted Journal Date: **2017.06.01**

(71) Applicant(s)
Quizcamp-Fabrico e Comercio de Produtos Alimentares, S.A.

(72) Inventor(s)
Rodrigues, Manuel Maria

(74) Agent / Attorney
AJ PARK, GPO Box 2600, Sydney, NSW, 2001, AU

(56) Related Art
FR 2683121 A1
US 4653529 A
WO 2011044857 A1
WO 9510934 A1

(12) PEDIDO INTERNACIONAL PUBLICADO SOB O TRATADO DE COOPERAÇÃO EM MATÉRIA DE PATENTES (PCT)

(19) Organização Mundial da Propriedade Intelectual
Secretaria Internacional

(43) Data de Publicação Internacional
14 de Novembro de 2013 (14.11.2013)

WIPO | PCT

(10) Número de Publicação Internacional
WO 2013/169129 A1

(51) Classificação Internacional de Patentes : *A01G 27/00* (2006.01)

(21) Número do Pedido Internacional : PCT/PT2013/000020

(22) Data do Depósito Internacional : 3 de Abril de 2013 (03.04.2013)

(25) Língua de Depósito Internacional : Português

(26) Língua de Publicação : Português

(30) Dados Relativos à Prioridade :
106236 3 de Abril de 2012 (03.04.2012) PT

(71) Requerente : **QUIZCAMP-FABRICO E COMÉRCIO DE PRODUTOS ALIMENTARES, S.A.** [PT/PT]; Rua Mem Rodrigues, N°4-A, P-1400-249 Lisboa (PT).

(72) Inventor : **RODRIGUES, Manuel Maria**; Rua da Searas n°°29, P-2790-151 Carnaxide (PT).

(74) Mandatário : **PEREIRA DA CRUZ, João**; J.Pereira da Cruz, S.A., Rua Vitor Cordon, 14, P-1249-103 Lisboa (PT).

(81) Estados Designados *(sem indicação contrária, para todos os tipos de proteção nacional existentes)* : AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Estados Designados *(sem indicação contrária, para todos os tipos de proteção regional existentes)* : ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasiático (AM, AZ, BY, KG, KZ, RU, TJ, TM), Europeu (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(Continua na página seguinte)

(54) Title : MODULAR INTEGRATED SYSTEM FOR SEED GERMINATION, CULTIVATION, PLANTING, FERTILIZING AND MAINTENANCE OF PLANTS

(54) Título : SISTEMA INTEGRADO MODULAR PARA GERMINAR SEMENTES, CULTIVAR, PLANTAR, FERTILIZAR E MANUTENÇÃO DE PLANTA

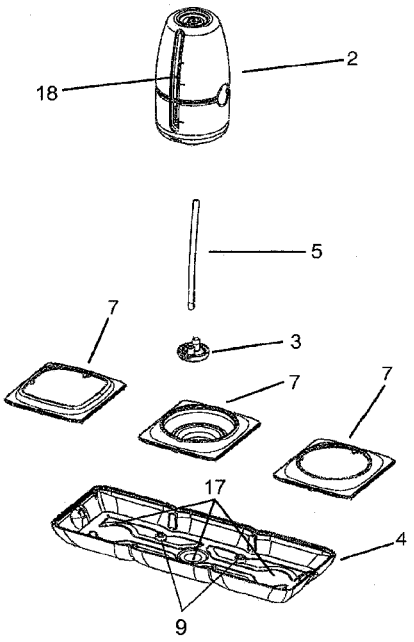


Fig 1

(57) Abstract : This invention relates to a modular integrated system aimed at germinating seeds, cultivating, planting, fertilizing and maintaining plants. It is basically characterized in that it comprises: - a liquid receiver (2) which includes a dosing element (3) comprising two holes, respectively, one for the passage of the air feeding tube (5) to the receiver (2) and another one (6) for the discharge of liquid from the receiver (2) under the action of gravity; - a watertight platform (4) for containing liquid and which is supplied by the said liquid receiver; wherein the regulation of the water flow from the receiver (2) is dictated by the difference of height between the air feeding tube (5) to the receiver and the tube (6) for the discharge of liquid under the action of gravity, i.e. the water will be discharged from the receiver (2) only and if the water level in the platform (4) is lower than the length of the tube (5); - at least one component (7) for fitting the liquid receiver (2) and/or for fitting at least one plant container; - an absorbing cloth at the bottom of the component (4); - drainage means (9) for removing the excess water from the platform (4); and - aerating means (10) for the platform (4) comprised of holes positioned above the water line.

(57) Resumo :

(Continua na página seguinte)

WO 2013/169129 A1

WO 2013/169129 A1

Declarações sob a Regra 4.17 :

— *relativa à autoria da invenção (Regra 4.17(iv))*

Publicado:

— *com relatório de pesquisa internacional (Art. 21(3))*

O presente invento diz respeito a um sistema integrado modular para germinar sementes, cultivai, plantar, fertilizar e manutenção de plantas. É essencialmente caracterizado por compreender.-- um depósito para líquido (2) que inclui um elemento doseador (3) que compreende dois orifícios para respectivamente, passagem de um tubo (5) para alimentação de ar ao depósito (2) e outro (6) para saída por gravidade do líquido do depósito (2); - uma plataforma estanque (4) para conter líquido alimentada pelo referido depósito de líquido; sendo que a regulação do fluxo de água que sai do depósito (2) é comandada pela diferença de altura entre o tubo (5) para alimentação de ar ao depósito e o tubo (6) para saída por gravidade do líquido, i.e. a água só sai do depósito (2) se e só se o nível de água na plataforma (4) for inferior ao comprimento do tubo (5); - pelo menos uma peça (7) para encaixe do depósito para líquido (2) e/ou para encaixe de pelo menos um contentor para plantas; - uma tela de material absorvente colocada no fundo da peça (4); - meios (9) de drenagem de água em excesso da plataforma (4); e - meios de arejamento (10) da plataforma (4) constituídos por orifícios colocados acima da linha de água.

2013260271 11 May 2017

DESCRIPTION

"MODULAR INTEGRATED SYSTEM FOR SEED GERMINATION, CULTIVATION, PLANTING, FERTILIZING AND MAINTENANCE OF PLANTS"

Scope of the invention

This invention relates to a modular integrated system aimed at cultivating, planting, fertilizing and promoting the maintenance of plants.

More particularly, this invention relates to the so-called and currently well-known urban farms, enabling their users to practice gardening and agriculture with several plant species in urban spaces.

The modular integrated system disclosed in this invention is also designed to be used in a more intensive way, namely as plant nurseries and/or for the breeding of other plant varieties.

Background

Several devices are already known in the art which allow gardening and agriculture of different plant species to be practiced in urban spaces.

These devices include the one disclosed in the international patent application PCT WO2007084020. In effect, it relates to a modular container system which is appropriate for growing plant varieties but which, per se, does not

2013260271 11 May 2017

provide an irrigation system, the latter being essential to the good progress of any process aimed at cultivating and maintaining plants.

Other modules for growing and maintenance such as plant stands, different types of flower pots and similar products are commonly used for the above mentioned purposes. However, these also lack an integrated irrigation system.

The existing systems can be provided with an independent irrigation system. However, those systems show some complexity, in addition to being expensive and subject to failure.

An embodiment of the present invention seeks to at least provide the public with a useful choice.

In this specification where reference has been made to patent specifications, other external documents, or other sources of information, this is generally for the purpose of providing a context for discussing the features of the invention. Unless specifically stated otherwise, reference to such external documents is not to be construed as an admission that such documents, or such sources of information, in any jurisdiction, are prior art, or form part of the common general knowledge in the art.

Summary of the invention

The present invention provides a modular integrated system for seeds germination, cultivation, planting, fertilizing and maintenance of plants, the integrated system comprising: a liquid receiver which includes a dosing element

2013260271 11 May 2017

comprising two holes, respectively, one for the passage of the air feeding tube to the receiver and another one for the discharge of liquid from the receiver under the action of gravity; a watertight platform for containing liquid and which is supplied by the said liquid receiver; wherein the regulation of the water flow from the receiver is dictated by the difference in height between the air feeding tube to the receiver and the tube for the discharge of liquid under the action of gravity, i.e. the water will be discharged from the receiver only and if the water level in the platform is lower than the length of the air feeding tube; at least one component for fitting the liquid receiver and/or for fitting at least one plant container; drainage means for removing the excess water from the platform; an absorbing cloth at the bottom of the platform; and aerating means for the platform being comprised of holes positioned above the water line; wherein the tube for the discharge of liquid under the action of gravity has its lower end bevelled.

The term 'comprising' as used in this specification and claims means 'consisting at least in part of'. When interpreting statements in this specification and claims which include the term 'comprising', other features besides the features prefaced by this term in each statement can also be present. Related terms such as 'comprise' and 'comprised' are to be interpreted in similar manner.

In an embodiment, the air feeding and tube and the tube for the discharge of liquid under the action of gravity are an integral part of the dosing element.

In an embodiment, the liquid receiver is removable.

2013260271 11 May 2017

In an embodiment, the dosing element acts as a cover of the removable liquid receiver.

In an embodiment, the liquid receiver is an integral part of the plant container being formed in a double wall of the said container.

In an embodiment, the drainage means for removing the excess water from the platform comprise at least a tubular bounce, which opens outwards, projecting upwards from the bottom of the platform, and whose height determines the maximum level of water in the above mentioned platform.

In an embodiment, the watertight platform is provided with a side groove for the passage of a tube with an absorbing cloth which is connected to another platform in order to promote the transfer of liquid.

In an embodiment, the removable liquid receiver is provided with a vertical window so that the liquid level inside it can be read.

In an embodiment, the removable liquid receiver includes a cover, this being also provided with a vertical window, which is overlapped with the vertical window so that the liquid level inside the receiver can be read.

In an embodiment, the liquid receiver, the components and the watertight platform are manufactured in a moldable material.

In an embodiment, the removable receiver is undifferentiatedly fitted into one of the three parts.

2013260271 11 May 2017

In an embodiment, the parts are put together in order to form a single unit.

In an embodiment, the single unit includes funnelled elements developing downwards, with a hole in the lower end or the platform, the said elements carrying an absorbing cloth.

In an embodiment, the platform and the parts have a configuration whose shape is always suitable for assembling the latter into the platform.

In an embodiment, the component has a conic shape with a hole at its lower end.

In an embodiment, the component includes cavities for germination.

In an embodiment, reducers are fitted into the relevant holes of the components so that containers of different sizes can be used.

In an embodiment, the component comprises: four elements for supporting rods or stakes which are positioned next to each vertex of the inner wall in the upper part of the said component; a fitting element, with a pyramidal shape, aimed at fixing a supporting tube and guide bar.

Further benefits, characteristics and particulars of embodiments of the invention will become clearer from the following description as regards the preferred embodiments, as well as by reference to the drawings, which are provided only for explanatory purposes and should not be restrictively construed.

2013260271 11 May 2017

In the description in this specification reference may be made to subject matter which is not within the scope of the appended claims. That subject matter should be readily identifiable by a person skilled in the art and may assist in putting into practice the invention as defined in the presently appended claims.

Brief description of the drawings

The following description is made with reference to the enclosed figures, which are given for illustrative purposes only and without any limiting character, wherein:
- Figure 1 is a perspective view of the preferred embodiment of the modular system with the three main parts disassembled;
- Figure 2 is a perspective view of the embodiment shown in Figure 1 but with all the parts duly assembled;
- Figures 3 a, b and c are raised and perspective views, respectively, from the top and underneath the dosing element of the system which is the object of the invention;
- Figures 4 a, b, c and d are, respectively, perspective view, plan view, cross-sectional view taken along the line BB, and exploded view, of another embodiment of the invention;
Figures 5 to 15 are views which illustrate the embodiments of the invention.

Detailed description of the invention

As shown in the drawings, the modular integrated system (1) for seeds germination, cultivation, planting, fertilizing and maintenance of plants, is comprised of:

- a liquid receiver (2) which includes a dosing element (3) comprising two holes, respectively, one for the

passage of the air feeding tube (5) to the receiver (2) and another one (6) for the discharge of liquid from the receiver (2) under the action of gravity,

- a watertight platform (4) for containing liquid and which is supplied by the said liquid receiver;

wherein the regulation of the water flow from the receiver (2) is dictated by the difference in height between the air feeding tube (5) to the receiver and the tube (6) for the discharge of liquid under the action of gravity, i.e. the water will be discharged from the receiver (2) only and if the water level in the platform (4) is lower than the length of the tube (5);

- at least one component (7) for fitting the liquid receiver (2) and/or for fitting at least one plant container;

- an absorbing cloth at the bottom of the component (4);

- drainage means (9) for removing the excess water from the platform (4); and

- aerating means (10) for the platform (4) being comprised of holes positioned above the water line.

The simplest embodiment of the system which the object of the invention is depicted in Figures 1 and 2. Some of the aforementioned components are shown therein. It can also be noted that the bottom of the platform (4) is provided with channels and areas (17) that collect the water coming from the receiver and over which is placed an absorbing cloth (non-illustrated in the drawings).

As shown in Figure 3, the tubes (5) and (6) are an integral part of the dosing element (3). In the said element (3), the tube (5) has a greater length than the tube (6). The tube (6) for discharge of the liquid under the action of gravity has its lower end bevelled in order to create a higher surface tension and consequently causing its operation to be easier. The different length of the tubes (5, 6), both above and under the base of the dosing element (3), will ensure the regulation and control of the liquid flow from the receiver (2). This flow is controlled by the difference in height between the air feeding tube (5) to the receiver and the tube (6) for the discharge of liquid under the action of gravity, i.e., the water will be discharged from the receiver (2) only and if the water level in the platform (4) is lower than the length of the tube (5);

As shown in Figure 1, the liquid receiver (2) can be removable. In this specific case, the cover of the removable receiver (2), which obviously works in the inverted position so as to fulfil its role, is comprised of the dosing element (3). As can be observed on the enclosed drawings, the removable receiver (2) may be undifferentiatedly fitted to any of the three parts (7).

Each one of the components (3) can be provided with an upper part (22), forming a whole with it and allowing a more specific use as regards the cultivation of plants. Also, the said components (3), with or without the upper part (22), can be put together thus forming a single unit (21).

The said removable receiver (2), as illustrated in the figures, can be provided with a vertical window (18) in order to allow its liquid level to be read. The receiver can also be provided with a cover (non-illustrated) having a vertical window as well, which is overlapped with the vertical window (18) so that the liquid level inside the receiver (2) can be read.

According to another embodiment of this invention, the liquid receiver is not removable, being instead an integral part of the plants container which is generally represented with reference (11). As can be observed in the figures 4, the aforementioned container (11) comprises an inner wall (13) and an outer wall (14), with the liquid receiver (2) being positioned in the space between those two walls. In this embodiment, the receiver (2) is provided with a filling nozzle (12) and, just like in the remaining embodiments, also with a tube (5) for air circulation and a tube (6) for liquid discharge. This embodiment of the invention, in which the liquid receiver is an integral part of the container (11), has also coupled an electronic box (15) which comprises all the devices allowing to regulate the liquid flow from the receiver (2) (i.e. the tubes (5, 6)) and warning means indicating when the liquid volume has reached its minimum level (for instance with light- or sound-emitting devices). The said box is also provided with level sensors and micro valves and eventually other devices such as, for example, mini solar panel, battery, telephone

SIM card, etc. Other components of this embodiment will be mentioned hereinafter.

As can be observed in the figures, the system includes drainage means (9) for removing the excess water from the platform (4). The said means are comprised of, at least, a tubular bounce which opens outwards, projecting upwards from the bottom of the platform (4), and whose height determines the maximum level of water in the above mentioned platform (4).

In the said platform (4) there is a side groove (19) for the passage of a tube (20) with an absorbing cloth which is connected to another platform (4) in order to promote the transfer of liquid. Therefore, a liquid receiver (2) is able to supply more than one platform (4), thus ensuring the liquid supply to several containers with plants.

The platform (4) and the components (7), with or without the upper part, have a configuration whose shape is always suitable for assembling the latter into the platform. Each one of the components (7) has preferably a conic shape with a hole at its lower end.

The part (22) of the component (7) is provided with funnelled elements (23) developing downwards and a hole in the lower end for the platform (4), the said elements carrying an absorbing cloth (24) which is I-shaped, having

upper flaps in the component (3) and lower flaps in the platform (4).

The component (21 or 22) can include cavities for germination (28).

In order to allow containers of different sizes to be fitted, diameter reducers were envisaged for the component (7), which in their turn will fit into the relevant holes (non-illustrated).

The components of the system which is the object of this invention are manufactured in moldable material.

As evident to the skilled person, there are several possible applications as regards the disclosed system. As an example, the component (7) may include support elements for rods or stakes (26), which are positioned next to each vertex of the inner wall in the upper part of the said component and designed to support a greenhouse element; a fitting element (27), with a pyramidal shape, aimed at fixing the supporting tube and guide bar (28). Examples of this are the embodiments depicted in the Figures 11, 13 and 14.

In the previous description a liquid receiver is referred to. Obviously, the term liquid shall be understood mainly as water, but also as water with products which are commonly used for plant cultivation, such as fertilizers, herbicides, pesticides, etc.

Caption

- Modular integrated system (1);
- Removable liquid receiver (2);
- Dosing element (3);
- Watertight platform for containing liquid (4);
- Air feeding tube (5);
- Water tube (6);
- Component (7);
- Drainage means (9);
- Aerating means (10);
- Plants container (11);
- Receiver's filling nozzle (12);
- Receiver's walls (13, 14);
- Electronic box (15);
- Bounce of the drainage means (16);
- Irrigation channels (17);
- Vertical window (18);
- Groove (19);
- Groove's tube (20);
- Component (3 linked parts) (21);
- Upper part of the component (7) (22);
- Funnelled element (23);
- I-shaped cloth (24);
- Support element for rods or stakes (26);
- Fitting element (27);
- Supporting tube and guide bar (28).

2013260271 11 May 2017

Claims

1. A modular integrated system for seeds germination, cultivation, planting, fertilizing and maintenance of plants, the integrated system comprising:

- a liquid receiver which includes a dosing element comprising two holes, respectively, one for the passage of the air feeding tube to the receiver and another one for the discharge of liquid from the receiver under the action of gravity;

- a watertight platform for containing liquid and which is supplied by the said liquid receiver;

wherein the regulation of the water flow from the receiver is dictated by the difference in height between the air feeding tube to the receiver and the tube for the discharge of liquid under the action of gravity, i.e. the water will be discharged from the receiver only and if the water level in the platform is lower than the length of the air feeding tube;

- at least one component for fitting the liquid receiver and/or for fitting at least one plant container;

- drainage means for removing the excess water from the platform;

- an absorbing cloth at the bottom of the platform; and

- aerating means for the platform being comprised of holes positioned above the water line;

wherein the tube for the discharge of liquid under the action of gravity has its lower end bevelled.

2. An integrated system, according to claim 1, wherein the air feeding and tube and the tube for the discharge of liquid under the action of gravity are an integral part of the dosing element.

3. An integrated system, according to claim 1, wherein the liquid receiver is removable.

4. An integrated system, according to claim 3, wherein the dosing element acts as a cover of the removable liquid receiver.

2013260271 11 May 2017

5. An integrated system, according to claim 1, wherein the liquid receiver is an integral part of the plant container being formed in a double wall of the said container.

6. An integrated system, according to claim 1, wherein the drainage means for removing the excess water from the platform comprise at least a tubular bounce, which opens outwards, projecting upwards from the bottom of the platform, and whose height determines the maximum level of water in the above mentioned platform.

7. An integrated system, according to claim 1, wherein the watertight platform is provided with a side groove for the passage of a tube with an absorbing cloth which is connected to another platform in order to promote the transfer of liquid.

8. An integrated system, according to claim 1, wherein the removable liquid receiver is provided with a vertical window so that the liquid level inside it can be read.

9. An integrated system, according to claim 1, wherein the removable liquid receiver includes a cover, this being also provided with a vertical window, which is overlapped with the vertical window so that the liquid level inside the receiver can be read.

10. An integrated system, according to claim 1, wherein the liquid receiver, the components and the watertight platform are manufactured in a moldable material.

11. An integrated system, according to claim 1, wherein the removable receiver is undifferentiatedly fitted into one of the three parts.

12. An integrated system, according to claim 1, wherein the parts are put together in order to form a single unit.

13. An integrated system, according to claim 12, wherein the single unit includes funnelled elements developing downwards, with a hole in the lower end for the platform, the said elements carrying an absorbing cloth.

14. An integrated system, according to claim 1, wherein the platform and the parts have a configuration whose shape is always suitable for assembling the latter into the platform.

2013260271 11 May 2017

15. An integrated system, according to claim 1, wherein the component has a conic shape with a hole at its lower end.

16. An integrated system, according to claim 15, wherein the component includes cavities for germination.

17. An integrated system, according to claim 1, wherein reducers are fitted into the relevant holes of the components so that containers of different sizes can be used.

18. An integrated system, according to claim 1, wherein the component comprises:

- four elements for supporting rods or stakes which are positioned next to each vertex of the inner wall in the upper part of the said component;

- a fitting element, with a pyramidal shape, aimed at fixing a supporting tube and guide bar.

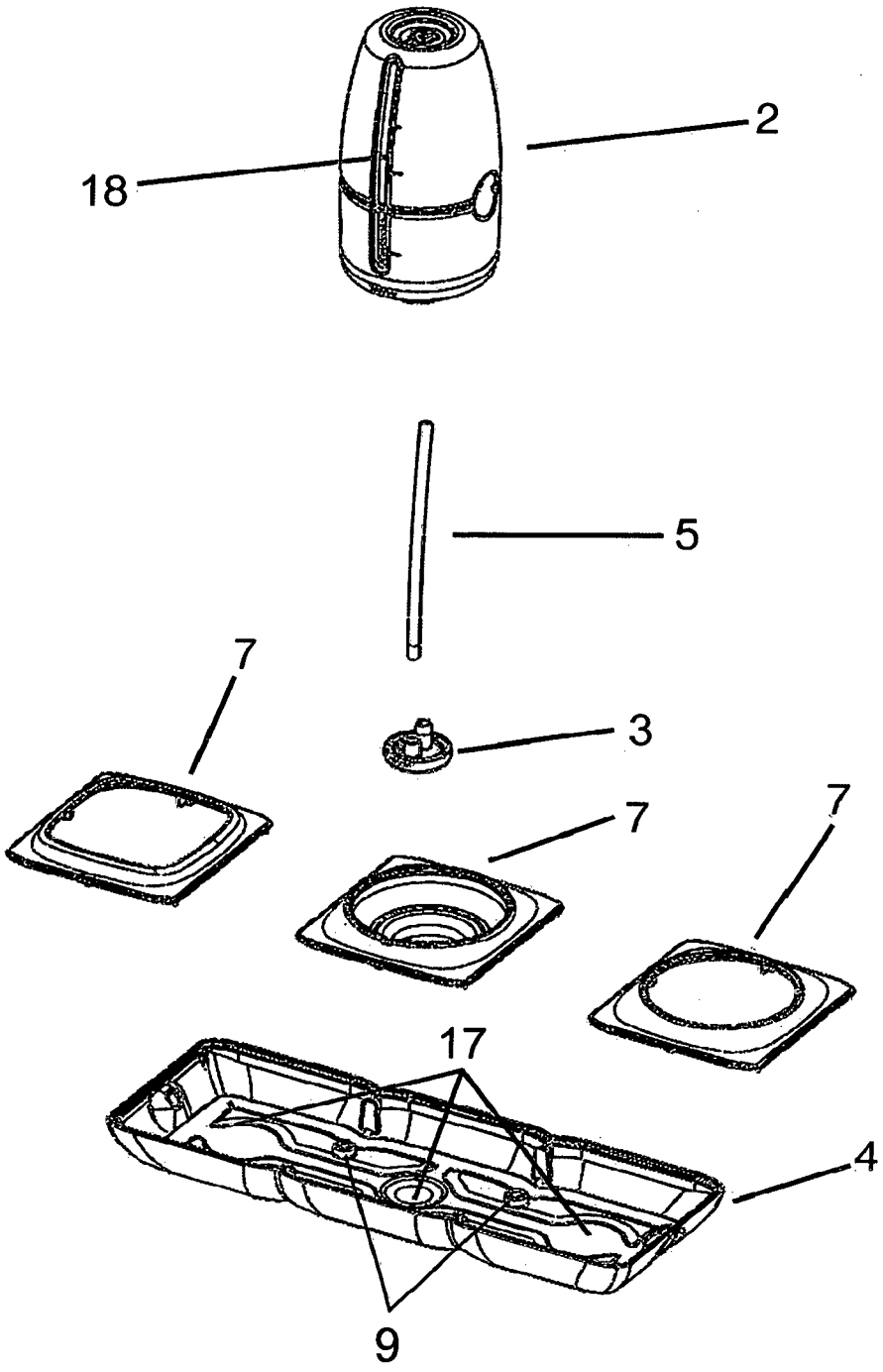


Fig 1

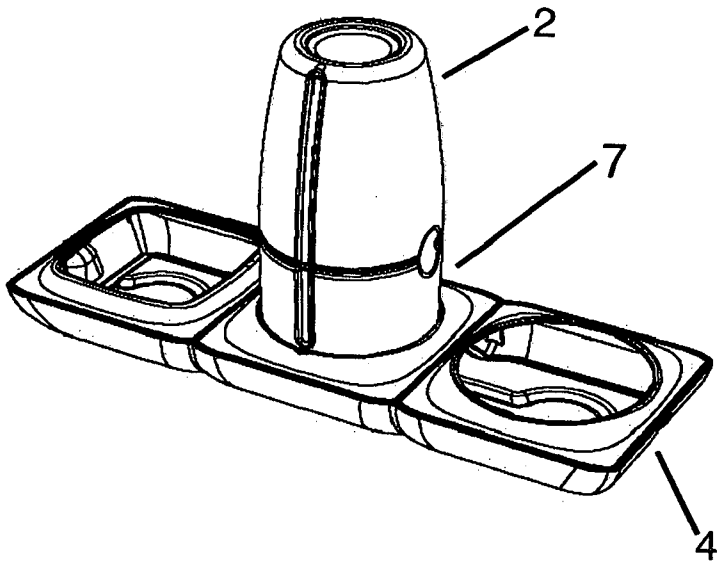
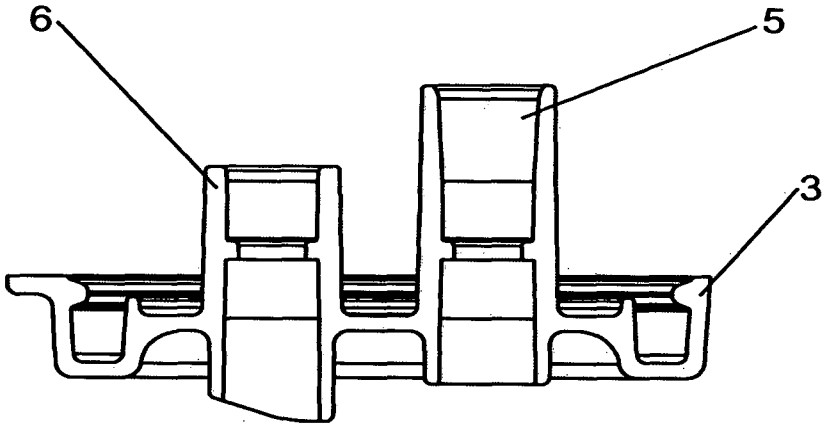
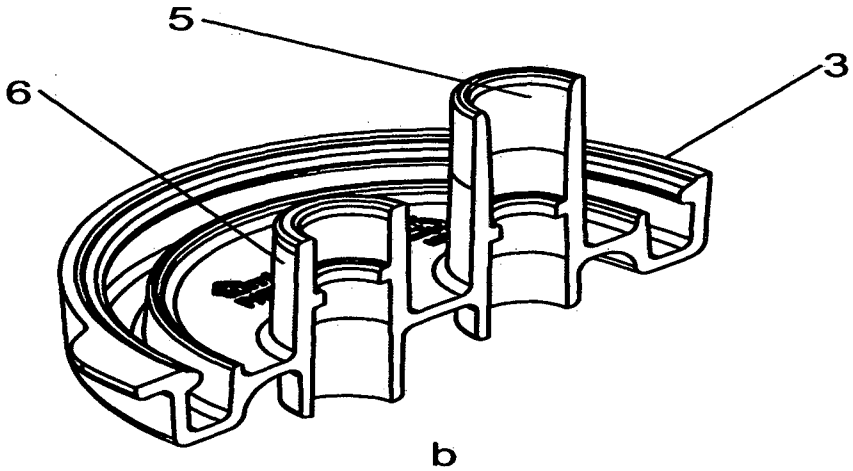


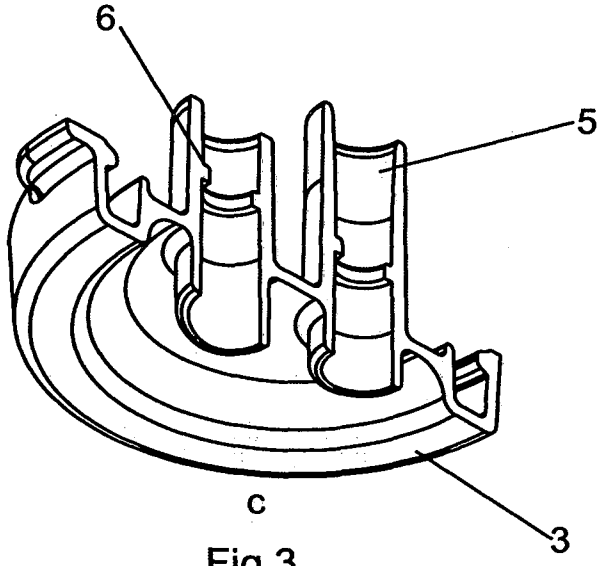
Fig 2



a



b



c

Fig 3

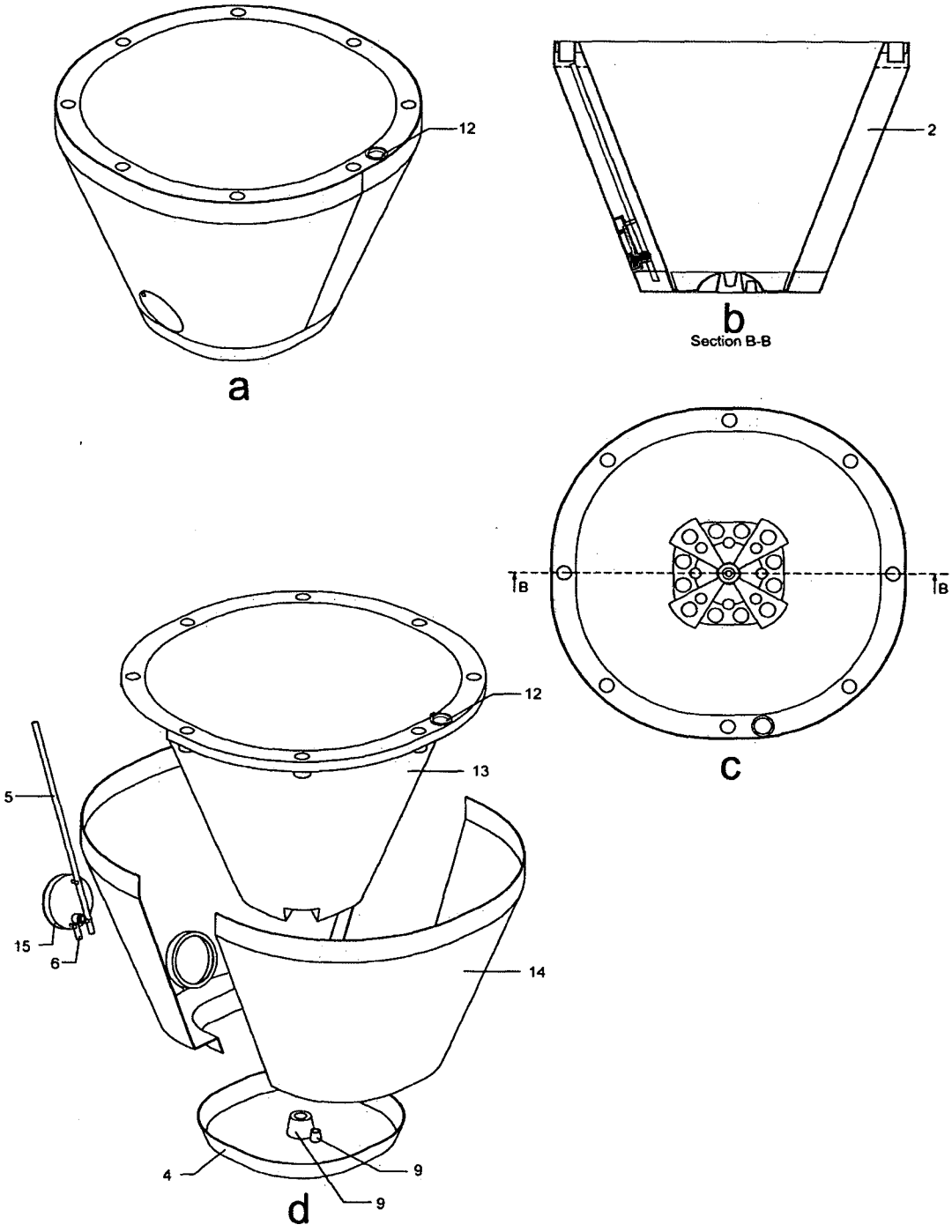


Fig 4

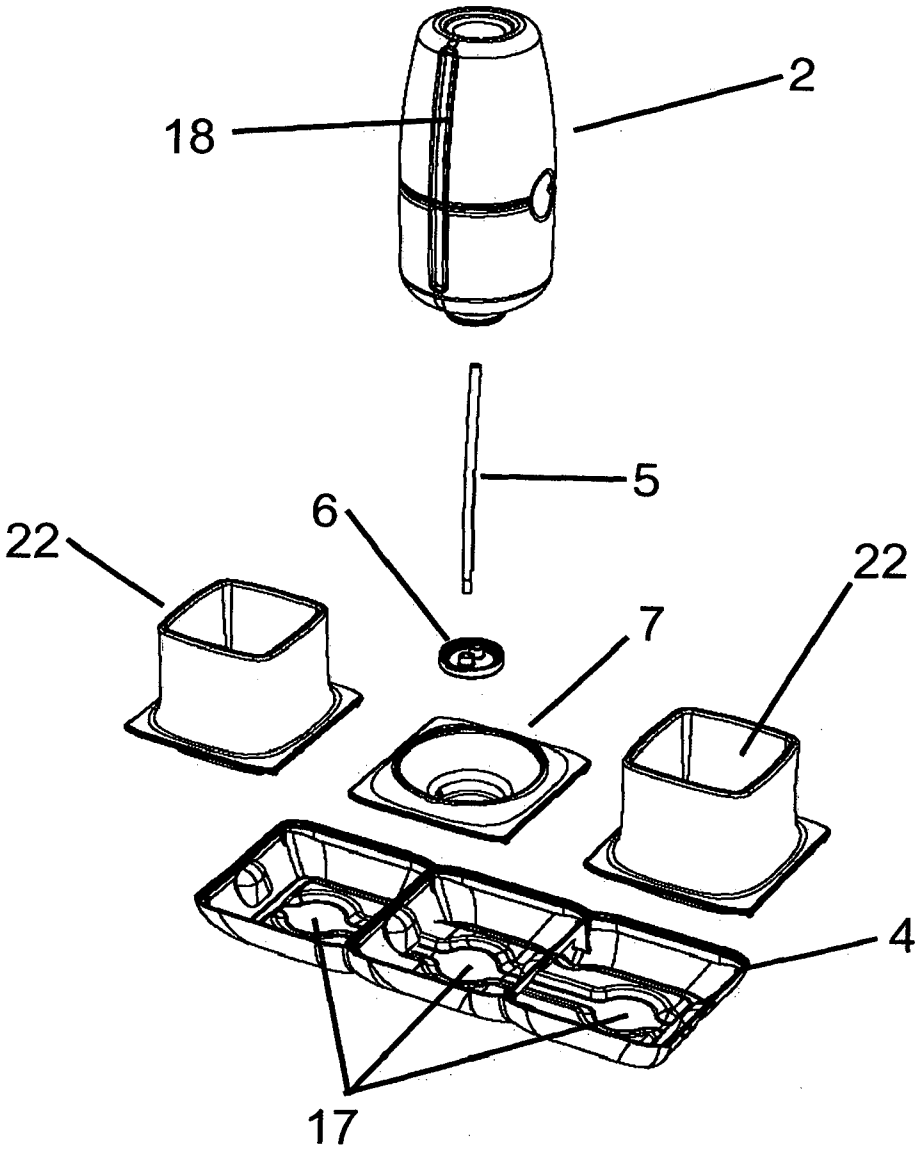


Fig 5

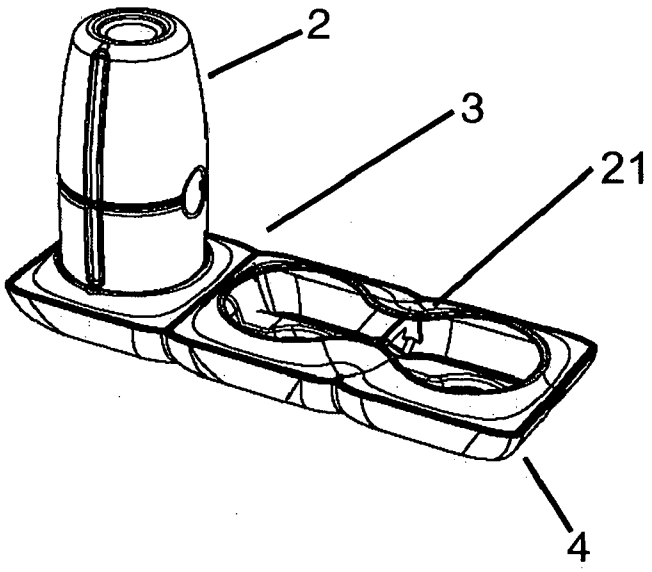


Fig 6

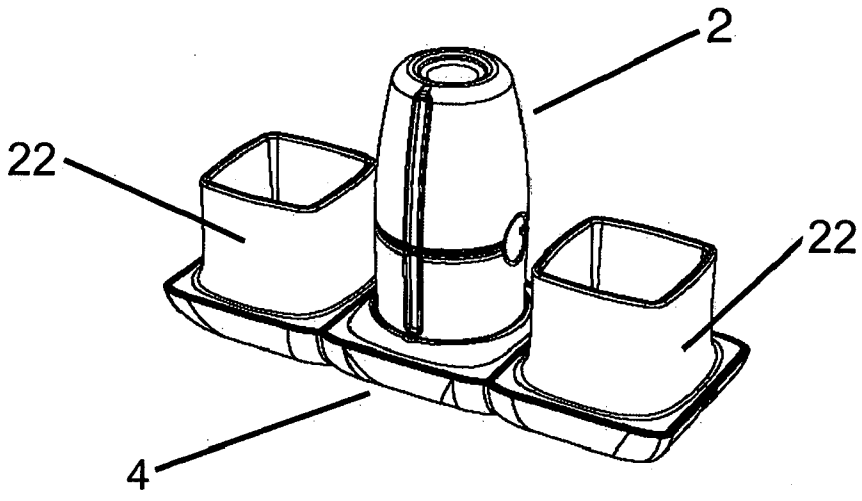


Fig 7

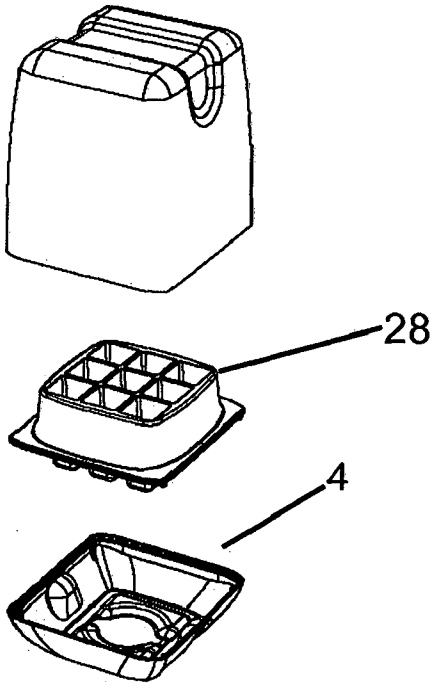


Fig 8

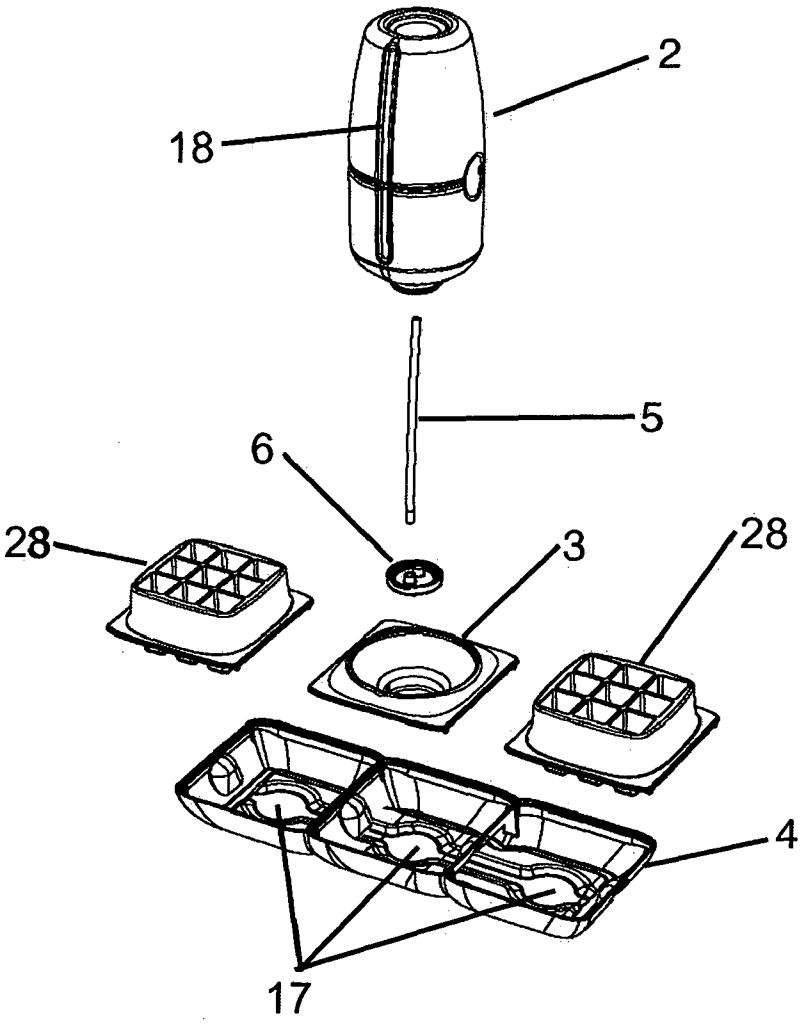


Fig 9

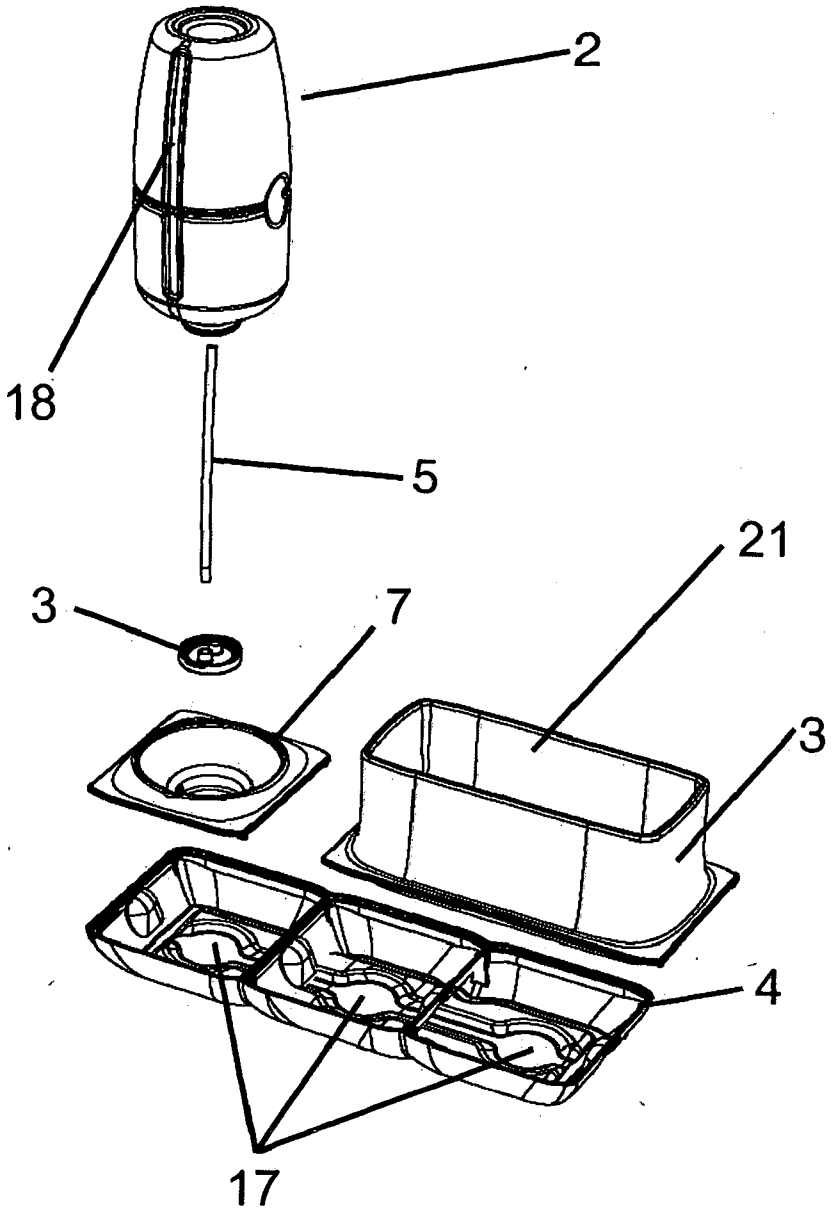


Fig 10

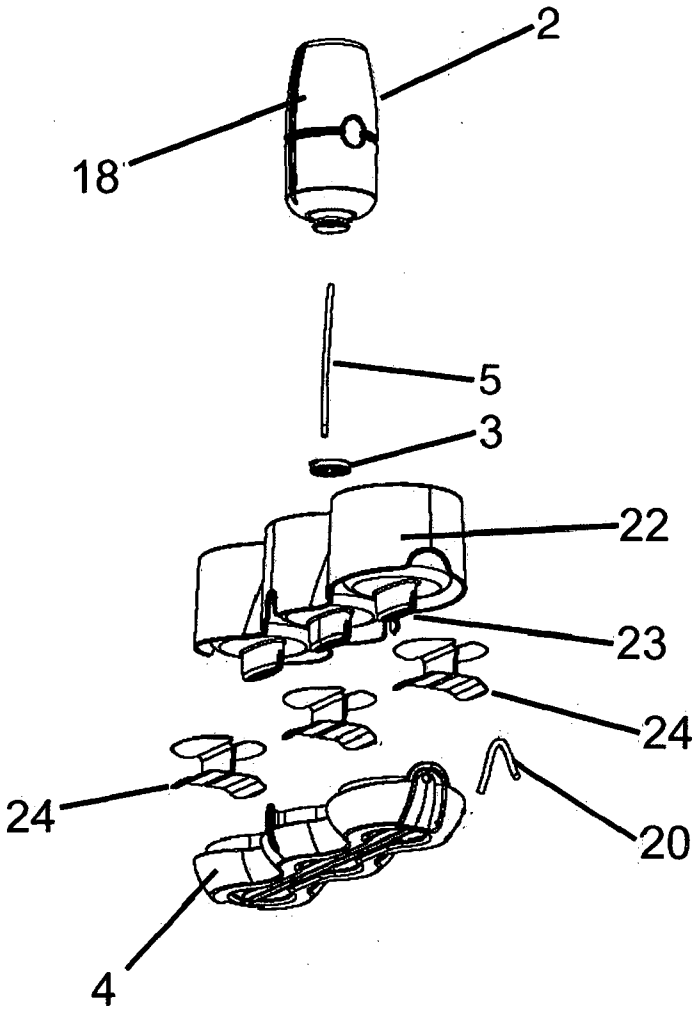


Fig 11

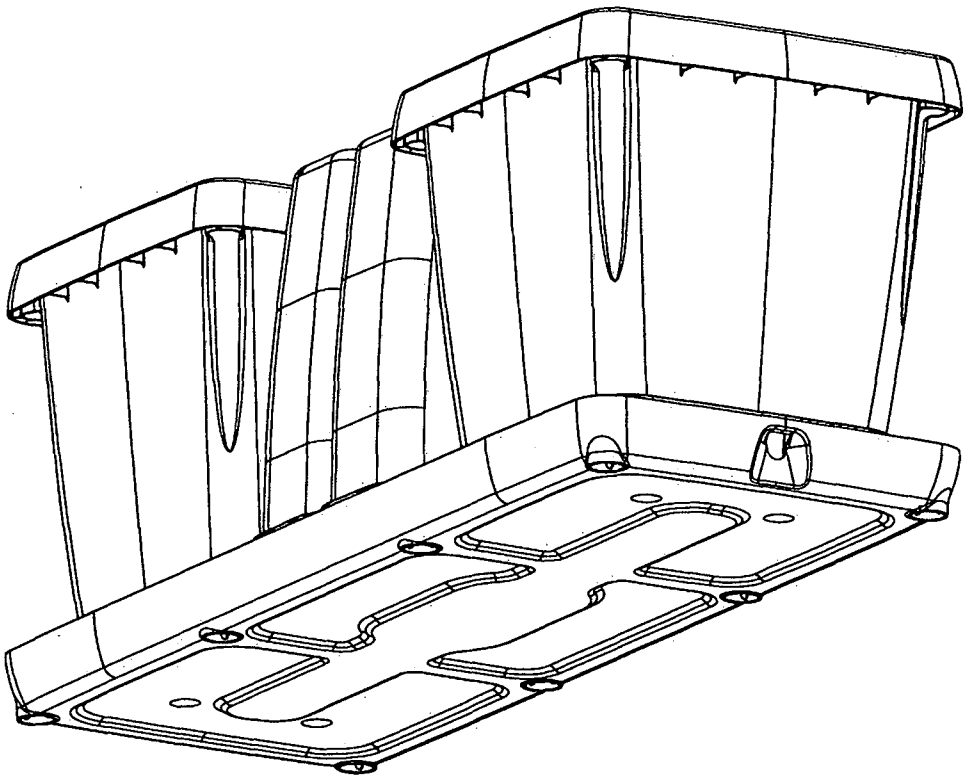


Fig 12

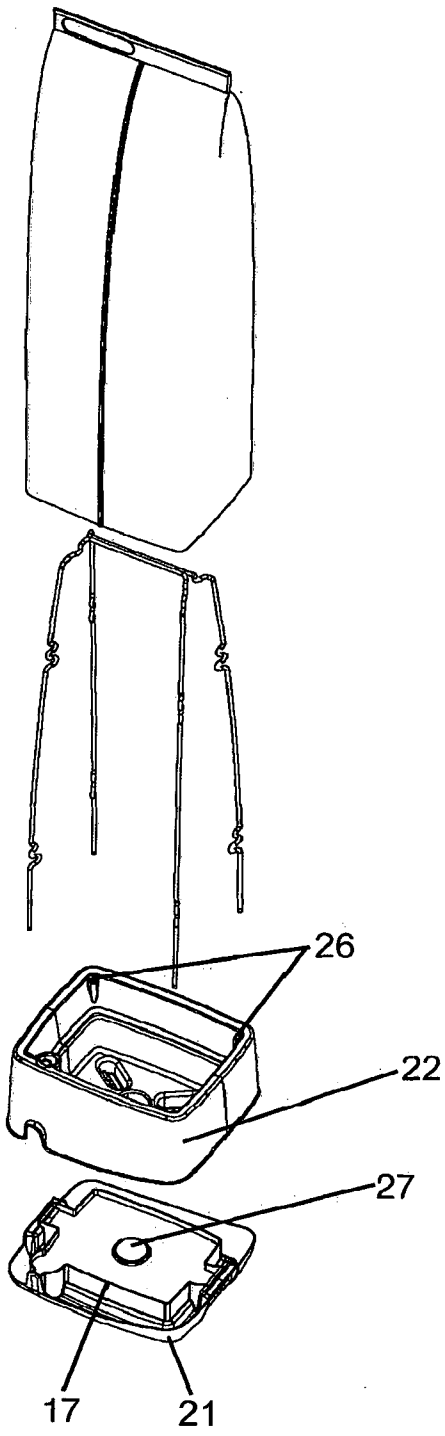


Fig 13

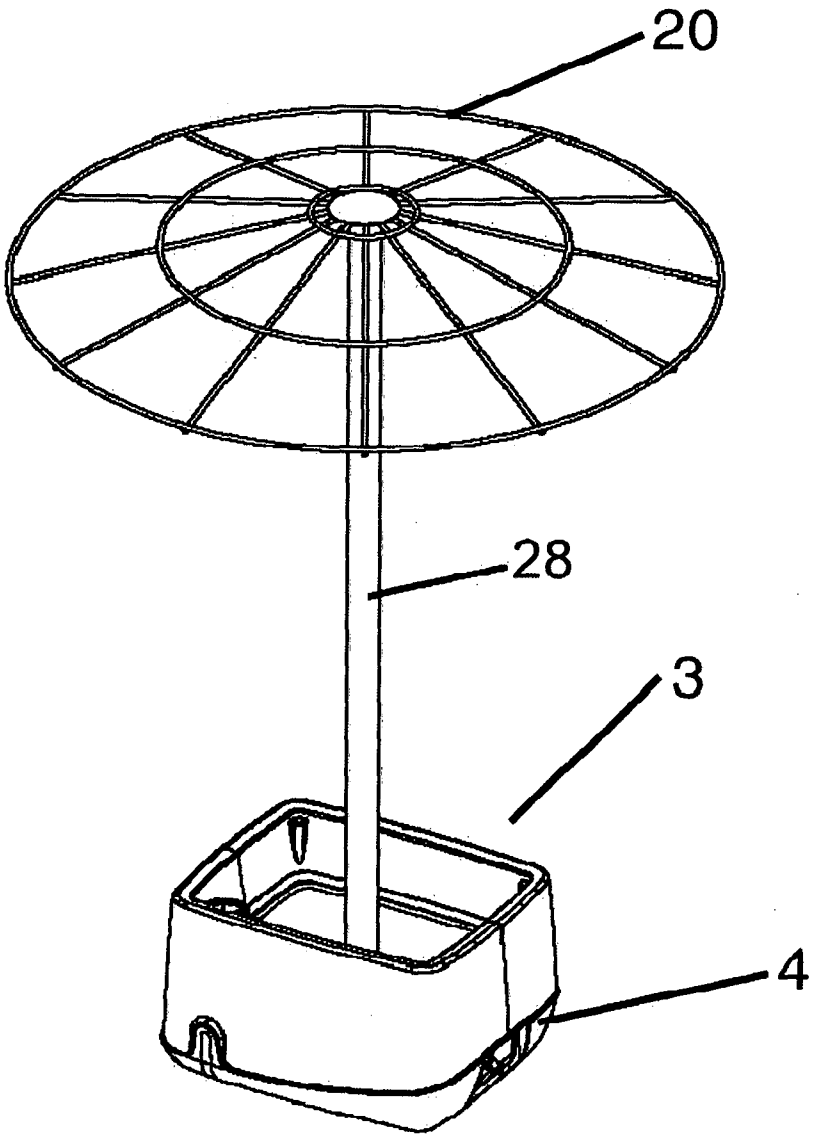


Fig 14

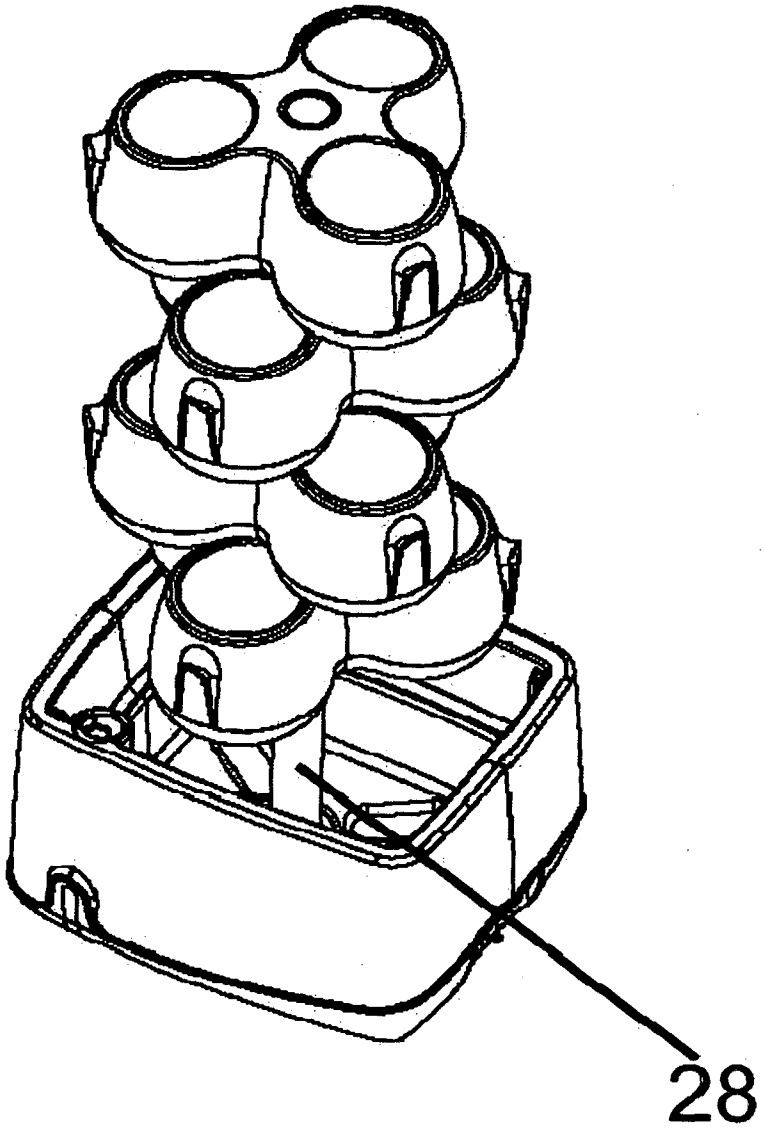


Fig 15