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# (54) Cover provided with valve for closing vacuum food containers

Mit einem Ventil zum Schließen von Lebensmittelvakuumbehältern ausgerüsteter Deckel

Couvercle doté d'une vanne pour la fermeture sous vide de récipients alimentaires

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EP 1 867 582 B1

## Description

**[0001]** The present invention refers to a cover for closing vacuum food containers, of the type provided with an improved valve, which is easy to manufacture and user-friendly, to be connected to a suction device capable of creating a vacuum inside the container.

**[0002]** More particularly, the cover according to the present invention consists of a seating, provided on the bottom with a hole, for air passage, wherein a disc is fitted, in which an elastic tongue is cut out supporting a shutter suitable to close and open said hole. A body, fitted into said seating, which can only rotate, is provided with cam means, which engage said tongue and which, as a result of the rotation of said body, move from a position for locking the tongue with the shutter, to a position in which they enable the free oscillation, to a position in which they raise the tongue and the shutter in order to enable the free air passage.

**[0003]** The cover according to the present invention can be made by plastic moulding, is composed of a few parts and, accordingly, can be manufactured at extremely reasonable cost.

**[0004]** Containers, used in particular to preserve foodstuff, closed by a sealed cover provided with elements to be connected to a suction device capable of creating a vacuum inside the container, with a view to guarantee the preservation of foods, are known.

**[0005]** Said containers, whose diffusion noticeably increased in the last years, often consist of a closed basin or canister, where a seal is fitted in between, a cover provided with a valve element, which is in turn fitted with a joint which enable it to connect to the suction device.

**[0006]** In the simplest systems, said valve consists of a simple diaphragm valve having flexible sheets, which close a hole in the valve wall.

**[0007]** When suctioning, most of the pressure inside the container raises the valve thus leaving the air to leak out; at the end of the suction phase, the higher atmospheric pressure presses the sheet against the hole, which, accordingly, remains closed.

**[0008]** A system of this kind is described in patent EP 0 644 128 which shows a food container provided with a cover with a valve able to house the means for the aspiration of the air present inside of the container, the said valve being shaped to be elastically warped when the said aspiration means are positioned in correspondence to the valve, in order to suck out the air in the container, and to acquire the original shape again when the said aspiration means have been removed in order to prevent the external air from entering the container. This solution leaved unresolved the problems solved by the Applicants invention.

**[0009]** This is an extremely simple system but not as much effective, and is not recommended in case of need to preserve the food for more than a few hours.

**[0010]** The Italian utility model N° 236,641 of the same inventor, teaches a seal valve for vacuum containers, wherein a shutter is solidly connected with a pin solidly fitted on a supporting body, which is inserted into a seating, fitted in the cover, provided with an opening on the bottom.

**[0011]** The short sliding movements allowed to the pin, enable the shutter to move from a raised position, with the hole open, to a lowered position, with the hole closed.

**[0012]** The supporting body is provided, on the outside, with a screw-thread, which enable the body to rotate and move to a raised position, in which it keeps the pin and the shutter far from the hole, which hole remains always open, to an intermediate position in which the shutter can move from a closing or an opening position of the hole, to a completely lowered position in which it presses the shutter against the lower wall, thus keeping the hole always closed.

**[0013]** The present solution turned out to be effective but rather complicated, in view of the fact that it consists of several pieces having also complex shapes; this circumstance increases the production cost and the time required to assemble the device.

**[0014]** The present invention falls into this sector, by proposing a cover for closing vacuum food containers, provided with an improved valve, composed of very few parts, which can be manufactured at reasonable cost, easy to assemble and to use.

**[0015]** This and other aims can be achieved by a cover provided with a valve according to the characterizing part of the claims annexed hereto.

**[0016]** This invention will be now described in detail, by way of example and without any limitation thereto, with reference to the figures annexed thereto, in which:

- figure 1 shows, as exploded view, a food container with a cover provided with a valve according to the invention;
- figure 2 shows a magnified particular of figure 1;
- figures 3 shows, in section along line C-C of figure 4, a cover according to the invention, applied to a container;
- figures 3A and 3B show magnified particulars of figure 3, which show in section a valve in closing and opening position, respectively;
- figure 4 is a top view of the cover according to the invention;
- figures 5 and 6 are sections of the cover with the valve along lines A-A and B-B, respectively, of figure 4.

**[0017]** With reference to figure 1, reference number 1 indicates a container for food, which is closed by a cover 2 which leans against an edge with a seal 3 in between shown in figure 3.

**[0018]** The central area of the cover is provided with a seating 4, which lodges a valve indicated as a whole with reference number 5 and which is provided with a seating 6 to fit a push rod into, connected to a known suction device.

**[0019]** The structure of the valve element is better visible in figure 3.

**[0020]** The seating 4 is provided with a side wall having a substantially cylindrical shape indicated with reference number 7 and a lower wall 8 having a hole 9 to leave the air pass from the container to the outside and vice versa.

**[0021]** In the seating 4 a disc 18 is inserted, leaning against the lower wall and provided with a raised tooth 19.

**[0022]** In the disc 18, made for example of plastic, a sheet 10 is cut into, which sheet is fixed to a shutter 11 suitable to close the hole 9 on the lower wall of the seating 4.

**[0023]** A tooth, not shown in the figure, which fits into a corresponding groove in the wall of the seating 4, enables to guarantee a correct position of the disc 8, in order that the shutter 11 is positioned just close the hole 9, and to avoid any rotation of the disc inside the seating 18.

**[0024]** The valve is completed with a cylindrical body 12 (fig. 2), closed on its upper part by a wall which is provided with the joint 6 for the push rod of the suction device and which is fitted, on the external vertical wall, with one or more cavities 13, which give access to an annular groove 14, where projecting teeth 15 are fitted into, provided on the internal wall of the seating 4.

**[0025]** The engagement among these teeth and the groove thereof 14 enables the cylindrical body 12 to rotate but not to travel inside the seating.

**[0026]** Inside, on the wall 15 of the annular body 12 a cam element indicated with 16 is placed.

**[0027]** The cam-shaped element 16 has three consecutive portions: in a first portion it engages the end of the sheet 10 from the bottom, keeping it raised and, accordingly, keeping the shutter in the opening position of the hole 9.

**[0028]** In the intermediate hole, the cam-shaped element does not engage the sheet 10, which is therefore free to oscillate, thus enabling the shutter 11 to raise or come down, depending on whether the air is sucked from the inside of the shutter or the external pressure maintains it closed.

**[0029]** In the third position, shown by figure 3A, the cam-shaped element engages from above the sheet 10, keeping it pressed against the bottom and locking the shutter 11 in the closing position of the hole 9.

**[0030]** The width of rotation of the body 12 depends on setting elements, which can consist, for example, of teeth on the lower edge or of an extension for a certain portion of the same wall of the body 12, which engages the setting tooth 19 on the disc 8.

**[0031]** The assembling and the use of the device are extremely simple.

**[0032]** As regards the assembling, once the shutter 11 has been fitted to the sheet 10, it is only required to fit the disc 18 into the seating 4, with the projecting teeth of the disc, which fit into the corresponding grooves on the wall 7, in order to guarantee the correct position of the disc and the shutter 11.

**[0033]** The body 12 is then mounted, by fitting it into the seating 4 with the teeth 15 passing through the cavities 13 in the side wall.

**[0034]** Once the body is pressed on the bottom, the body 12 is rotated with the teeth 15 which, by acting together with the annular groove 14, prevent the body 12 from travelling, thus enabling only the free rotation thereof.

**[0035]** At this point, the device is ready for use.

**[0036]** The cover is leaned against the edge of the cover with a proper soft seal fitted in between and the body 12 is rotated until the tongue 10, which engages the cam-shaped element 16, is moved just close the intermediate position of said element, in which position the tongue is free to oscillate.

**[0037]** It is now only required to connect the push rod of the suction device to the seating 6 of the valve and actuate the device.

**[0038]** The air, from the inside of the container 1, will pass through the hole 9 and will be sucked from the device connected to the joint 6.

**[0039]** Once the suction is terminated, the internal atmospheric pressure, which is higher than the one inside the container, will press the sheet 10 down, thus making the shutter 11 to close the hole 9.

**[0040]** At this time, it is only required to complete the rotation of the body 12 to make the upper part of the cam-shaped element 16 to engage the tongue 10 and to lock it in the closing position of the shutter 11, with the confidence that the vacuum inside the container will be kept also for a long time.

**[0041]** In order to restore the pressure conditions inside the container and enable the removal of the cover, it is only required to make a complete rotation of the body 12 in the opposite direction, until the lower cam-shaped element 16 engages from the bottom the sheet 10 and raises it, keeping the shutter in the opening position.

**[0042]** As it can be clearly understood by the description above, the cover with valve according to the present invention offers several advantages as compared to the known covers:

- it consists of an extremely reduced number of elements;
- it is extremely easy to assemble, since it is only required, firstly, to fit the disc 18 and then the body 12 into the respective seating, while rotating the body to position the teeth 15 to the annular groove 14;
- it is extremely easy to use, since it is only required to rotate it in the three positions as showed in figure 4, to move the valve from the opening position to the suction position to the closing position and vice versa.

**[0043]** Of course, the size, as well as the materials used, may be changed according to the user's requirements.

## Claims

1. Cover with valve for closing vacuum food containers, of the type provided with an opening for sucking the air inside the container, closed by a valve, which can be coupled to a suction device, comprising a seating (4), in said cover (2), with an opening (9) on the bottom (8) for leaving the air pass through **characterised in that** it provides a shutter (11) suitable to close and open said opening (9), fitted on an elastic support (10) suitable to enable the opening and closing movements, being provided means (16) suitable to engage said support, which can be moved from a first position in which they lock said shutter (11) in a closing position, to an intermediate position in which they disengage said shutter (11) enabling the free movements of said shutter (11) and to a third position in which they engage said shutter (11) to keep it in an opening position.

2. Cover according to claim 1, **characterised in that** it provides for the following:

   • a substantially cylindrical seating (4) in said cover (2) which is provided on the bottom (8) with a hole (9) to leave the air pass through;
   • a disc (18) fitted in the said seating (4) and locked in rotation, in which an elastic tongue (10) is cut out;
   • a shutter (11), fitted to said tongue (10), suitable to open and close said hole (9);
   • a cylindrical body (12), fitted in said seating (4) which can only rotate, in which a cam-shaped element (16) is fitted, which engages the free end of said tongue (10), said cam-shaped element (16), after the rotation of said cylindrical body (12), moving from a position in which it engages on the upper part said tongue (10) locking it in a closing position of the hole (9), to an intermediate position in which it disengages said tongue, thus enabling free movements of the shutter (11), to a third position in which it engages on the bottom said tongue (10), locking it in an opening position of the hole (9).

3. Cover according to claim 2, wherein said disc (18) is provided with projecting elements (19) made in such a way as to fit into corresponding cavities in the wall of said seating to lock the disc rotating, and in which said cylindrical body (12) is provided with an annular groove (14) in which projecting teeth (15) fit into, provided on the internal wall of said seating (4), thus preventing them from shifting.

4. Cover according to any one of the preceding claims, wherein limit relief elements (19) are provided, in order to limit the width of rotation of said cylindrical body (12) between the two extreme engagement positions between said cam-shaped (16) element and said tongue (10).

## Patentansprüche

1. Deckel mit Ventil zum Schließen von Unterdruck-Nahrungsmittelbehältern, von der Art, die mit einer Öffnung zum Ansaugen der Luft im Inneren des Behälters versehen sind, welche durch ein Ventil geschlossen ist, das mit einer Saugvorrichtung verbunden werden kann, umfassend einen Sitz (4) in dem Deckel (2), mit einer Öffnung (9) auf dem Boden (8), um die Luft hindurch treten zu lassen, **dadurch gekennzeichnet, dass** er einen Verschluss (11) vorsieht, der geeignet ist, um die Öffnung (9) zu schließen und zu öffnen, wobei er auf einer elastischen Halterung (10) angebracht ist, die geeignet ist, um die Öffnungs- und Schließbewegungen zu ermöglichen, wobei Mittel (16) vorgesehen sind, die geeignet sind, um mit der Halterung in Eingriff zu treten, welche aus einer ersten Stellung, in der sie den Verschluss (11) in einer Schließstellung verriegeln, in eine Zwischenstellung, in der sie aus dem Eingriff mit dem Verschluss (11) treten, was die freien Bewegungen des Verschlusses (11) ermöglicht, und in eine dritte Stellung bewegt werden können, in der sie mit dem Verschluss in Eingriff treten, um ihn in einer Öffnungsstellung zu halten.

2. Deckel nach Anspruch 1, **dadurch gekennzeichnet, dass** er das Folgende vorsieht:

   • einen im Wesentlichen zylindrischen Sitz (4) in dem Deckel (2), der auf dem Boden (8) mit einem Loch (9) versehen ist, um die Luft hindurch treten zu lassen;
   • eine in den Sitz (4) eingesetzte und drehfest verriegelte Scheibe (18), in der eine elastische Zunge (10) ausgeschnitten ist;
   • einen an der Zunge angebrachten Verschluss (11), der geeignet ist, um das Loch (9) zu öffnen und zu schließen;
   • einen in dem Sitz (4) angebrachten zylindrischen Körper (12), der sich nur drehen kann, in dem ein kulissenförmiges Element (16) angebracht ist, das mit dem freien Ende der Zunge (10) in Eingriff tritt, wobei sich das kulissenförmige Element (16) nach der Drehung des zylindrischen Körpers (12) aus einer Stellung, in der es auf dem oberen Teil der Zunge (10) in Eingriff tritt, wobei es sie in einer Schließstellung des Lochs (9) verriegelt, in eine Zwischenstellung, in der es aus dem Eingriff mit der Zunge tritt, womit freie Bewegungen des Verschlusses (11) ermöglicht werden, in eine dritte Stellung bewegt, in der es auf dem Boden der Zunge (10) in Eingriff tritt, wobei es sie in einer Öffnungs-

stellung des Lochs (9) verriegelt.

3. Deckel nach Anspruch 2, wobei die Scheibe (18) mit überstehenden Elementen (19) versehen ist, die in einer solchen Weise hergestellt sind, dass sie in entsprechende Ausnehmungen in der Wand des Sitzes passen, um die Scheibe drehfest zu verriegeln, und wobei der zylindrische Körper (12) mit einer ringförmigen Nut (14) versehen ist, in die überstehende Zähne (15) passen, die auf der Innenwand des Sitzes (4) vorgesehen sind, womit sie an einer Verschiebung gehindert werden.

4. Deckel nach einem der vorangehenden Ansprüche, bei dem Grenzenetlastungselemente (19) vorgesehen sind, um die Drehweite des zylindrischen Körpers (12) zwischen den zwei äußersten Eingriffsstellungen zwischen dem kulissenförmigen Element (16) und der Zunge (10) zu begrenzen.

**Revendications**

1. Couvercle ayant une soupape pour la fermeture sous vide de récipients de denrées alimentaires, du type muni d'une ouverture pour aspirer l'air à l'intérieur du récipient fermé par une soupape, qui peut être couplée à un dispositif d'aspiration, comprenant un siège (4), dans le couvercle (2), ayant une ouverture (9) sur le fond pour y laisser passer de l'air, **caractérisé en ce qu'**il prévoit un obturateur (11) propre à ouvrir et à fermer l'ouverture (9), adapté sur un support (10) élastique propre à permettre les mouvements d'ouverture et de fermeture, étant prévus des moyens (16) propres à coopérer avec le support, qui peuvent passer d'une première position, dans laquelle ils verrouillent l'obturateur (11) en une position de fermeture, à une position intermédiaire, dans laquelle ils cessent de coopérer avec l'obturateur (11) en permettant à l'obturateur (11) de se déplacer librement, et à une troisième position, dans laquelle ils coopèrent avec l'obturateur (11) pour le maintenir en une position d'ouverture.

2. Couvercle suivant la revendication 1, **caractérisé en ce qu'**il prévoit ce qui suit :

   • Un siège (4) sensiblement cylindrique dans le couvercle (2), qui est muni sur le fond (8) d'un trou (9) pour y laisser passer de l'air,
   • Un disque (18) adapté dans le siège (4) et verrouillé en rotation, dans lequel est découpé une languette (10) élastique,
   • Un obturateur (11), adapté à la languette (10), propre à ouvrir et à fermer le trou (9),
   • Un corps (12) cylindrique, adapté dans le siège (4), qui peut seulement tourner, dans lequel un élément (16) en forme de came est adapté, qui coopère avec l'extrémité libre de la languette (10), l'élément (16) en forme de came passant, après la rotation du corps (12) cylindrique, d'une position, dans laquelle il coopère avec la partie supérieure de la languette (10) en la verrouillant en une position de fermeture du trou, à une position intermédiaire, dans laquelle il cesse de coopérer avec la languette en permettant ainsi à l'obturateur (11) de se déplacer librement, à une troisième position, dans laquelle il coopère avec le fond de la languette (10) en la verrouillant dans une position d'ouverture du trou (9).

3. Couvercle suivant la revendication 2, dans lequel le disque (18) est muni d'éléments (19) en saillie fait de façon à s'adapter dans des cavités correspondantes de la paroi du siège pour verrouiller le disque tournant, et dans lequel le corps (12) cylindrique est muni d'une rainure (14) annulaire dans laquelle s'adapte des dents (15) en saillie, ménagées sur la paroi intérieure du siège (4), en les empêchant ainsi de se décaler.

4. Couvercle suivant l'une quelconque des revendications précédentes, dans lequel il est prévu des éléments (19) en relief de limitation, afin de limiter la largeur de rotation du corps (12) cylindrique entre les deux positions extrêmes de coopération entre l'élément (16) en forme de came et la languette (10).

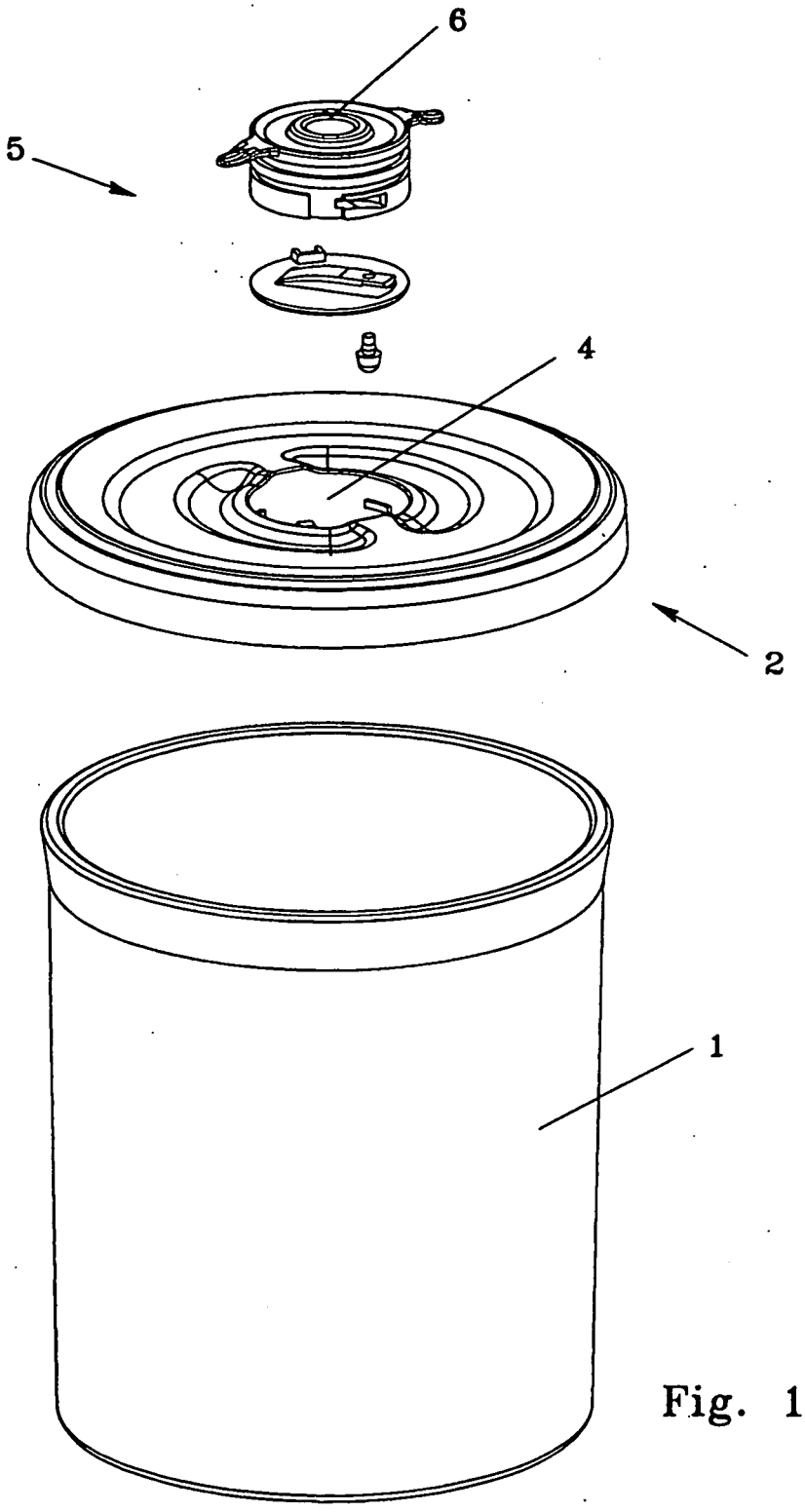



Fig. 1

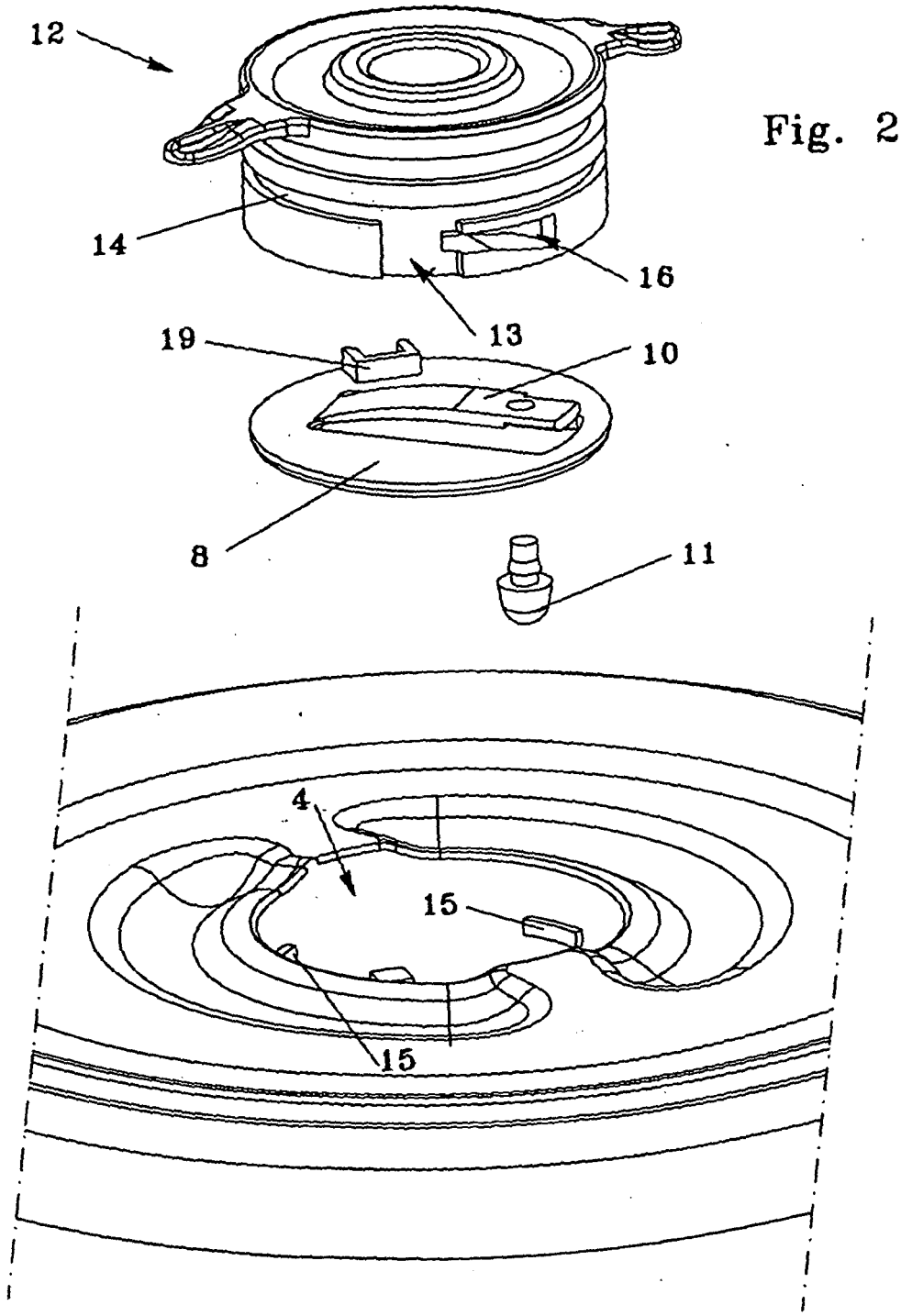
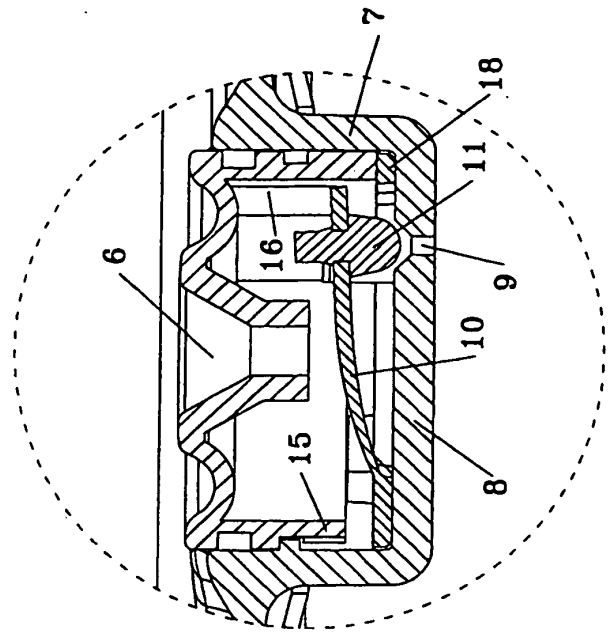
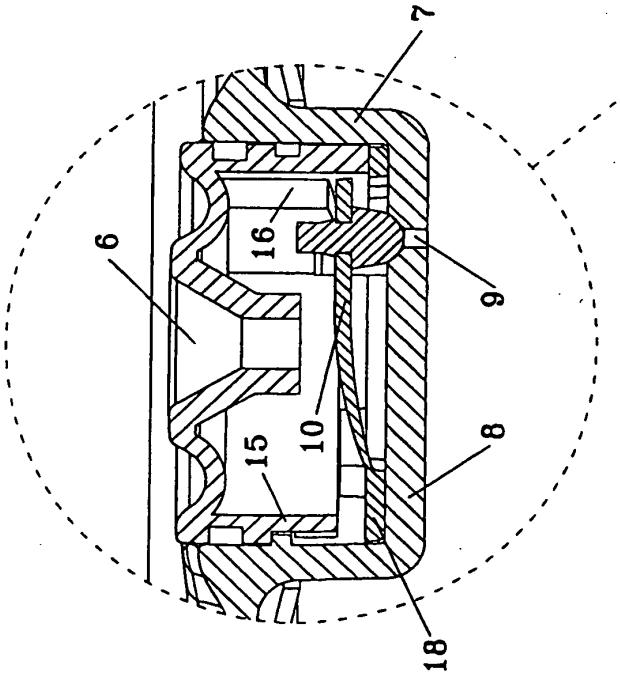



Fig. 2




OPEN VALVE Fig. 3b




CLOSED VALVE Fig. 3a

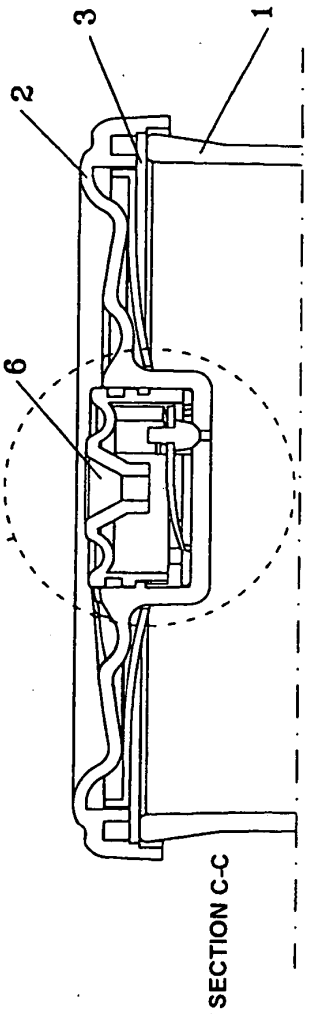



Fig. 3

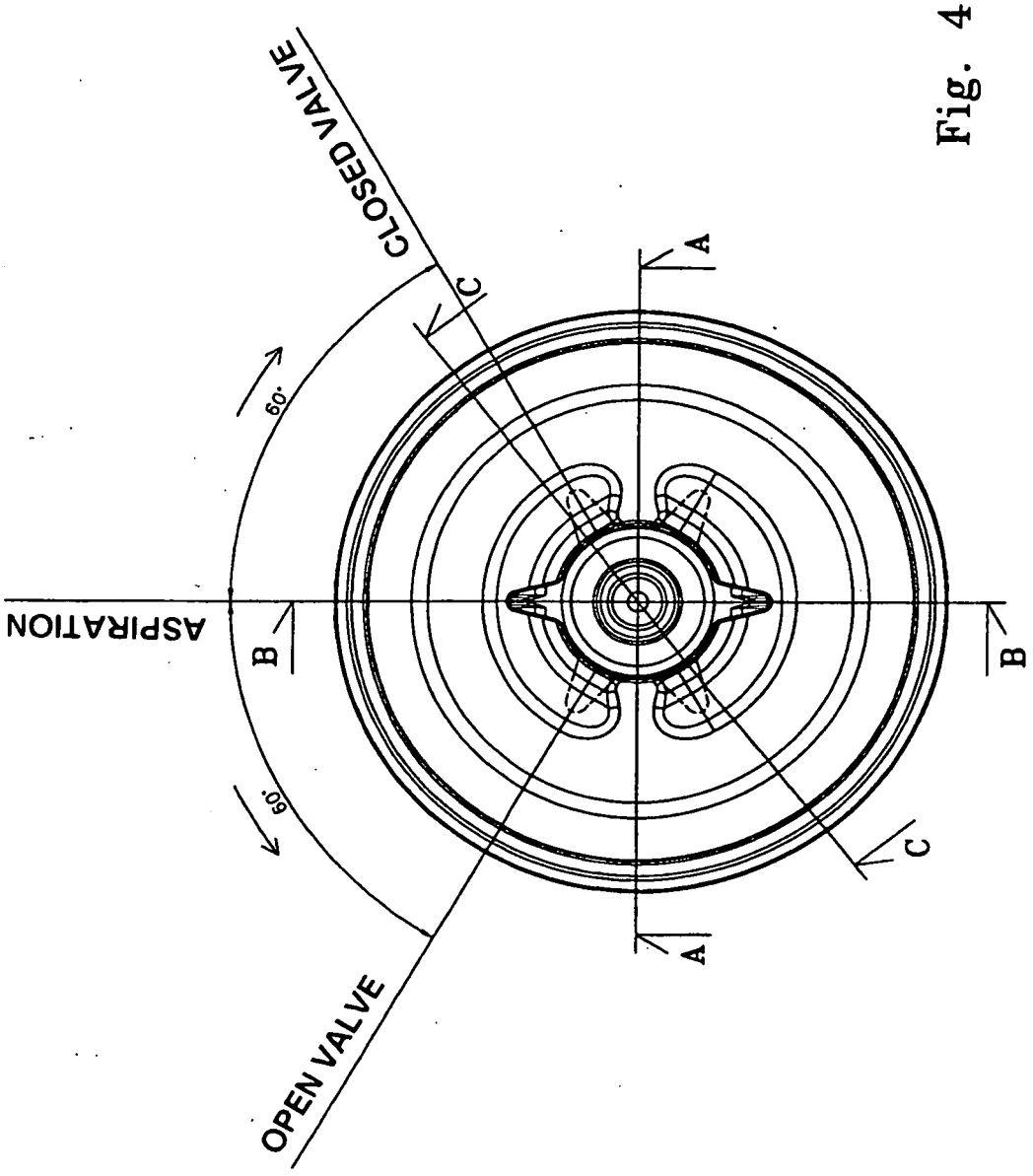



Fig. 4

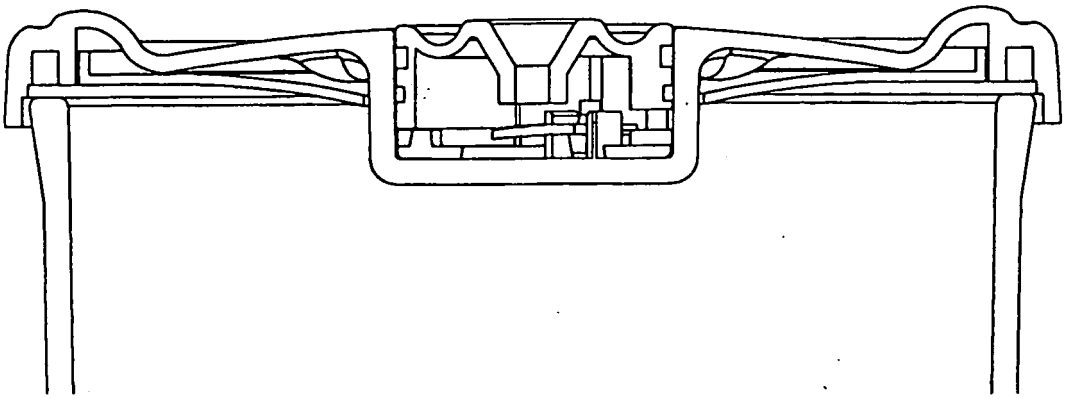


Fig. 5

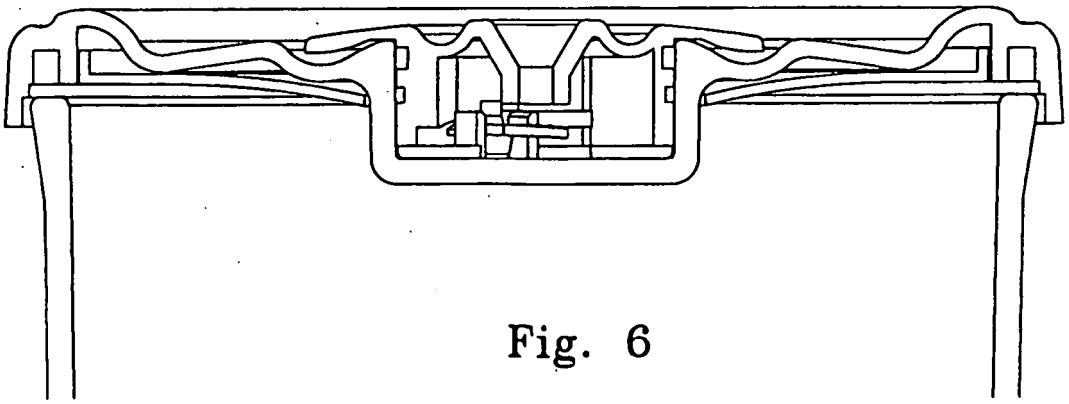


Fig. 6

## REFERENCES CITED IN THE DESCRIPTION

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