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(54) Hinge

(57) The present invention concerns a hinge arrangement for a self-closing lid in the form of a sealing flap (52), such as a lid, mounted to rotate around bearings and influenced by a closing force, , preferably intended to seal a container (46). The arrangement comprises a first and a second hinge (10). Each hinge is arranged to comprise a rotation brake (36) in the form of a cylinder constituted by a pair of components that can be rotated relative to each other. The rotation brake (36) in the first hinge is arranged to be activated in a first range of angles (A) during the process of closing of the sealing flap, while the rotation brake in the second hinge is arranged to be subsequently activated in a second range of angles (B) during the process of closing of the sealing flap with the aim of achieving a stepwise increase of the braking effect during the process of closing of the sealing flap and in this way of delaying the flap at its open position. The arrangement can be mounted in a removable manner on a plane lid of freely chosen size and design, and it encapsulates the rotation brake in the hinge such that it can be protected from dirt and moisture.

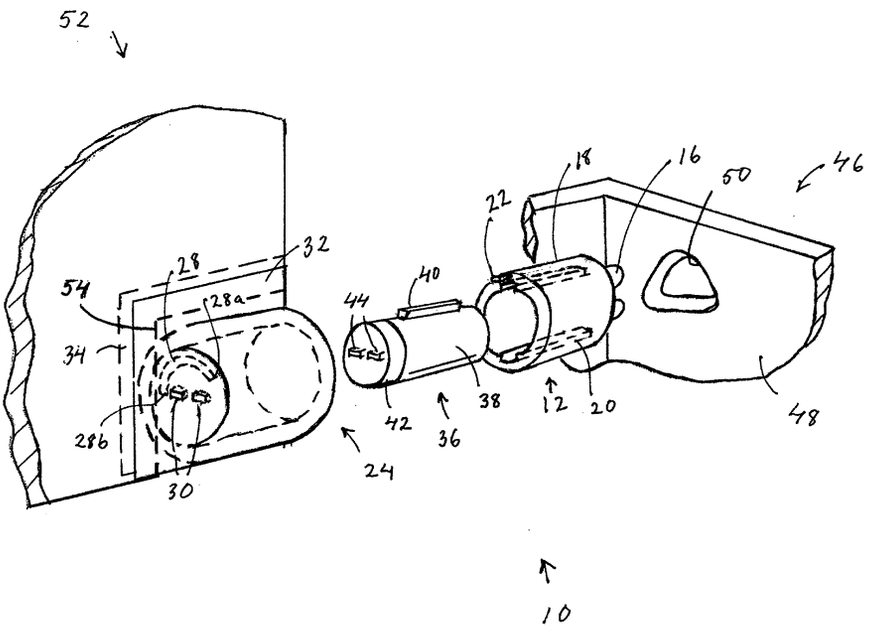

Fig. 1

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Description

TECHNICAL AREA

[0001] The present invention concerns a hinge arrangement for a self-closing lid or sleeve, preferably for a container of the type of dispenser used, for example, for foodstuffs or confectionery.

THE PRIOR ART

[0002] It is today common in, among other places, food shops, small stores, etc., to offer customers the opportunity of picking, for example, confectionery and delicatessen items that are sold by weight from containers of different types. For reasons of hygiene and to ensure that the goods keep well, such containers are usually provided with lids, mounted to rotate on bearings, that the customers themselves open in order to pick the contents from the container. However, problems arise when these lids are left open so that the goods are exposed to dirt and similar, which is why self-closing lids are desirable. Self-closing lids, however, that close immediately by the aid of, for example, the force of a spring are not suitable in this context. Since problems arise when the customer needs to hold the lid open while at the same time using, for example, a scoop and a bag or similar. Thus it is desirable with a lid that after being opened is held in the open position during a period that is sufficient for the customers to supply themselves with goods from the container, and then is automatically closed after a certain period.

[0003] The problem has previously been solved by the lid being arranged to be self-closing with the aid of, for example, the force of a spring while at the same time the hinge is equipped with brakes in the form of rotation dampers that brake the rotatory motion of the lid around the hinge. Since the lids in this type of container are normally mounted horizontally, the force that influences the closing will, however, continuously increase during the process of closing due to the effect of gravity that acts on the lid as it falls towards its closed position, since the distance between the centre of gravity of the lid and the hinge (which determines the torque acting on the lid) increases during the process of closing. Since the resistive force of the rotation dampers is constant, the speed increases continuously during the process of closing such that a closing action that is far too fast is obtained. In order to solve this problem and to brake further the motion of the lid during the latter part of the process of closing, the arrangement of brake springs that oppose the springs that initiate the closing of the lid is known. This prior art, however, displays the disadvantage that the arrangement comprises a number of external parts that not only make the cleaning of the container more difficult, but also are sensitive for moisture and dirt, something that often leads to the lid starting to bind. Furthermore, the braking arrangements according to the prior art requires a lid that has been specially manufactured.

DESCRIPTION OF THE INVENTION

[0004] The present invention aims at solving the problems that are associated with the prior art. Thus, the invention aims at achieving a hinge arrangement for a self-closing lid comprising rotation brakes that delay the lid in its open position. The arrangement can be mounted on a plane lid of freely chosen size and design in such a manner that it can be removed, and it encapsulates the rotation brake in the hinge such that it is protected from dirt and moisture. Cleaning of the container is made easier in that it is easy to dismount the arrangement, since each part can be individually cleaned. Furthermore, the arrangement comprises means for increasing the braking effect in steps during the process of closing. To be more precise, the invention concerns a hinge arrangement for a sealing flap, such as a lid or a sleeve, that is mounted to rotate on bearings and to be influenced by a closing force, preferably intended to seal a container. The arrangement comprises a first and a second hinge that are mounted at one of the edges of the sealing flap. Each hinge is arranged to comprise a cylindrically shaped rotation brake consisting of a pair of components that can rotate relative to each other. The rotation brake in the first hinge is arranged to be activated in a first range of angles during the process of closing of the sealing flap, while the rotation brake in the second hinge is arranged to be activated subsequently in a second range of angles during the process of closing of the sealing flap with the aim of achieving a stepwise increase of the braking effect during the process of closing of the sealing flap, and in this way, delaying the flap in its open position.

[0005] The rotation brakes that are used in the hinges are preferably of a standard type and can also be denoted by "rotation dampers". Such are common in various contexts in which it is desired to brake the motion of a flap that is mounted to rotate on bearings, for example, the sleeve of a music cassette player, ash-trays in cars, etc. The function of the rotation brakes is based on the mounting on bearings of one component that is free to rotate in a casing that contains a highly viscous substance such as silicone, in order to brake the rotation of the rotatable component within the casing.

[0006] Each hinge according to the invention comprises a first sleeve, which surrounds the rotation brake. A connecting means, preferably a radially directed protrusion on the rotation brake, is arranged to interact with a connecting means, preferably a recess, such as a longitudinal track, arranged on the inner surface of the first sleeve. The connection between the rotation brake and the first sleeve in each hinge comprises a play, which makes it possible for the rotation brake in each hinge to rotate within the sleeve within the range of the play without coming into engagement with the recess in the

sleeve. The plays of the connections in the two hinges are different in magnitude, which means that the rotation brakes come into engagement with the sleeves, and are in this way activated, at different times in each hinge during the process of closing of the sealing flap.

[0007] The connection between the first sleeve and the rotation brake in both the first hinge and the second hinge comprises a play, and thus a clear stop position for the flap arises at its fully open position since neither of the rotation brakes is activated at this position. When the flap is initially moved from its fully open position in a direction towards its closed position, it will thus, due to the play between the rotation brake and the first sleeve, move freely without resistance in the direction towards the closed position until the connecting means of the rotation brake enters into engagement with the connecting means of the first sleeve. When the rotation brake enters into engagement with the first sleeve in the first hinge, what has been denoted above as a "first range of angles" during the process of closing of the sealing flap starts. This range of angles corresponds to the difference between the plays in the first and the second hinges, which thus means that the connecting means of the rotation brake has come into engagement with the connecting means of the first sleeve only in the first hinge. The motion of the sealing flap in this first range of angles continues until the rotation brake in the second hinge enters into engagement with the first sleeve, something that happens at a later time than it does in the first hinge, since the play in the connection is greater in the second hinge than it is in the first. When the rotation brake in the second hinge enters into engagement with the first sleeve what is denoted above as the "second range of angles" during the closing process of the sealing flap is entered. Thus, the motion of the sealing flap is braked during this phase of the process of closing by the rotation brakes both the first and in the second hinge.

[0008] The first sleeve in each hinge has at one end an end-wall, which on its outer surface displays means, for example, an axially directed protrusion, for fixing the first sleeve such that it cannot rotate by a construction in connection with the closing arrangement, for example, an end-wall on the container that the sealing flap is intended to seal. At the periphery of its second end, the said first sleeve displays an axially oriented peg. The first sleeve is in addition enclosed by a second sleeve, which is arranged to be attached to the sealing flap. The second sleeve comprises a component in the form of a tube that is closed at one end by an end-wall. The inner surface of this end-wall displays a track, which runs along one section of the periphery of the end-wall. The said track is arranged to interact with the axially directed peg of the first sleeve. Thus, the second sleeve can be rotated around the inner sleeve with the peg running in the track in such a manner that the ends of the track constitute stop limits for the peg in the opening and closing motions of the sealing flap. The mounting of the first sleeve in, for example, the end-wall of the container thus determines the angle of the open stop limit of the sealing flap.

[0009] The force that affects the flap to produce closing is the force of gravity in one preferred embodiment. In order for the lid to perform in a self-closing manner, the open stop limit of the flap is arranged such that the weight of the flap gives rise to a closing torque around the hinge. The peg that limits the motion of the flap is thus arranged such that the centre of gravity of the flap in the fully open position of the flap will be located on the same side as the direction of closing relative to an imaginary plumbline above the hinge. The flap is in this way prevented from reaching an equilibrium position over the hinge, and from tipping over past the equilibrium position to the other side of the plumbline.

[0010] The inner surface of the end-wall of the second sleeve displays additionally connecting means, preferably in the form of recesses, arranged to interact in a manner that does not allow rotation with connecting means, preferably in the form of axially directed protrusions, arranged on the end-wall of the rotation brake. The motion of the sealing flap thus creates a rotational motion of the second sleeve, which in turn transmits the motion to a component of the rotation brake that is able to rotate, whereby the motion of the flap is braked.

[0011] The first sleeve in each hinge is in one preferred embodiment equipped with at least two connecting means, preferably in the form of tracks, each one of which allows play of different magnitude in the connection to the rotation brake in each hinge. This makes it possible for the first sleeve in each hinge to be mounted such that different connecting means of the sleeve are exploited in each hinge, without the need for manufacturing different types of first sleeve for each hinge. Additional connecting means, for example, four, are arranged in the first sleeve, in one preferred embodiment, adapted to be able to interact with connecting means of rotation dampers of different sizes. The same sleeve can in this way be used to receive rotation brakes of different sizes having different magnitudes of braking power. Suitable braking powers can be achieved for sealing flaps of different sizes and having different weights by varying the size of the rotation brakes in the hinge. The duration of the period during which the flap is held in its open position can also be varied as required by the selection and combination of rotation brakes.

[0012] The space that the play in the two hinges gives rise to has the result that a user of the sealing flap feels the stop position of the sealing flap as a noticeable position, since the space means that the stop position is not inelastic. The space also means that there is a noticeable feeling that the flap experiences braking outside of the region of the space, which means that the user is made aware that the flap can be released in its open position without it immediately falling back again.

[0013] The hinge according to the invention is preferably arranged to be mounted in such a manner that it

can be dismounted both from the sealing flap and from the construction onto which the flap is mounted, for example the end-wall of the container that the sealing flap is intended to seal. This means that the hinge can be easily removed without needing to be dismantled, during, for example, cleaning of the container. The sensitive parts of the construction are protected from external influence such as dirt and moisture through the design of the hinge with the rotation brakes arranged surrounded by a first sleeve, which in turn is mounted in bearings in a second sleeve. Since the hinge is constituted by only two components, the first and the second sleeve, it is cheap to produce and simple to mount. The hinge according to the invention can be manufactured in, for example, injection moulded plastic.

DESCRIPTION OF FIGURES

[0014] Applications according to the present invention are described below with reference to the attached drawings without, for that reason, limitation of the protective scope.

[0015] **Fig. 1** shows the constitutive components of the arrangement in a disassembled condition.

[0016] **Fig 2** shows the process of closing of the sealing flap.

[0017] **Fig 3a** shows in cross-sectional view the hinge equipped with a large rotation brake.

[0018] **Fig 3b** shows in cross-sectional view the hinge equipped with a small rotation brake.

DESCRIPTION OF EMBODIMENTS

[0019] With reference to Figure 1, the present invention concerns a hinge arrangement for a sealing flap 52, mounted to rotate on bearings, such as a lid of a container 46. The container displays end-walls 48 on which the lid is mounted with the aid of a first and a second hinge 10. The sealing flap is, in one preferred embodiment, mounted horizontally and it is influenced by a closing force that is constituted by the force of gravity on the flap itself.

[0020] Figure 1 shows, furthermore, the constitutive components in a hinge 10 in one preferred embodiment. The hinge 10 is arranged to surround a cylindrically shaped rotation brake 36. This brake comprises a component 42 that can be rotated, which is mounted in bearings in a casing 38. The casing 38 contains a highly viscous substance such as silicone, which means that the component 42 that can be rotated rotates against a resistance within the casing 38. A first sleeve 12 is arranged to surround the rotation brake 36. The first sleeve 12 comprises one section in the form of a tube that is open at one end and closed by an end-wall at its second end. The outer surface of the end-wall displays means 16 for attaching the sleeve 12 in a manner such that it cannot be rotated to the end-wall (48) of the container. This means can preferably be constituted by a protrusion arranged to be inserted into a recess 50 with an equivalent shape in the end-wall of the container. At the periphery of its open end, the first sleeve 12 displays an axially directed peg 22. The rotation brake 36 is arranged to be surrounded by the first sleeve 12 in such a manner that one end section of the rotation body 42 is located essentially along the line of the edge section of the open end of the first sleeve 12.

[0021] The hinge comprises further a second sleeve 24 comprising a component in the form of a tube that is open at one end and closed by an end-wall at its second end. The second sleeve is arranged to be attached, preferably in such a manner that it can be dismounted, to the sealing flap 52 with the aid of, for example, parallel flanges 32, 34 intended to surround the edge section of the sealing flap. The flanges are integrated with the second sleeve 24 and arranged such that an imaginary diametrical plane of the sleeve 24 will coincide with the plane of the sealing flap (52) when the sleeve is mounted on the flap. A recess 54 is arranged in the flap in order to achieve mounting of the second sleeve 24 on the flap 52 as is shown in Figure 1.

[0022] The second sleeve 24 is arranged to surround the first sleeve 12 and the rotation brake 36 in such a manner that the end section of the rotation body 42 and the edge section of the open end of the first sleeve 12 come into contact with the inner surface of the end-wall of the second sleeve 24. The inner surface of this end-wall displays means 30 intended to enter into engagement in a manner that does not allow rotation with corresponding means 44 arranged at the end section of the rotatable component 42. These means can preferably be constituted by axially directed protrusions 44 arranged on the end section of the rotatable component 42, which protrusions interact with recesses 30 in the end-wall of the second sleeve. It is of course conceivable to arrange in an alternative embodiment, not shown here, protrusions on the end-wall of the sleeve 24 and recesses in the end section of the rotatable component 42.

[0023] The inner surface of the end-wall of the second sleeve displays, furthermore, a track that runs along a part of the periphery of the end-wall. The said track is arranged to interact with the axially directed peg 22 of the first sleeve in such a manner that the peg 22 runs in the track 28 when the second sleeve 24 is rotated around the first sleeve 12. The two ends of the track 28 thus constitute end limits for the peg 22 in the opening motion of the sealing flap in the two hinges. Identical second sleeves can be used in both hinges, whereby one end 28a of the track constitutes a stop limit for one hinge, and the second end 28b of the track constitutes a stop limit for the second hinge. This depends on the fact that the two second sleeves 24 in the two hinges are, when mounted, mirror images of each other. The track 28 is given a length that is at least equivalent to, and preferably exceeds, the desired travel of the flap between open and closed positions.

[0024] The protrusion 16 and the recession 50 are designed such that the protrusion 16 can be inserted with only one determined orientation relative to the recession 50. The shape of the protrusion and that of the recession can, for example, be an isosceles but not an equilateral triangle.

[0025] It is preferable that the track 28 is arranged symmetrically around the flanges 32, 34 that surround the flap 52, such that an equal part of the track is located on one side of the flap 52 as is located on the other side. If, alternatively, the track 28 is arranged asymmetrically around the flanges 32, 34, the recessions 50 in each end-wall must be rotated by an angle that corresponds to the difference between the extensions of the track 28 on the two sides of the flap, in order for the stop limits to be located at the same positions in the two hinges.

[0026] Thus the angle for the open position of the sealing flap is determined by the mounting of the first sleeve 12 in a manner that does not allow rotation in the end-wall of the holder 48. In order to achieve a closing torque due to the force of gravity at the fully open position of the sealing flap 52, the first sleeve 12 is mounted such that the centre of gravity of the flap is prevented from coming into a position of equilibrium vertically above the hinge, and prevented from tipping over past the equilibrium position.

[0027] The inner surface of the first sleeve 12 displays furthermore at least two connecting means in the form of tracks 18, 20 that run in an axial direction. These are intended to interact with connecting means in the form of an axial protrusion 40 on the casing 38 of the rotation brake. The tracks 18, 20 have different mutual tangential extents. The connection between the casing 38 and the first sleeve 12 comprises a play, which means that the rotation brake 36 can rotate within the sleeve 12 within the framework for the play without entering into engagement with the sleeve. The play is achieved in that the tracks 18, 20 are broader than the protrusion 40 in the tangential direction. When the flap is released from its fully open position, it will, due to the play between the rotation brake 36 and the first sleeve, initially fall somewhat forwards in the direction towards the closed position before the protrusion 40 of the casing enters into engagement with the track 18 of the first sleeve. This space corresponds to a range of angles that is denoted by A' in Figure 2. When the space has been passed, the protrusion 40 of the casing will enter into engagement with the track 18 of the first sleeve, whereby the rotation brake 36 is activated in that the rotatable component 42 starts to rotate within the casing 38, and through this the closing motion of the flap is braked. When this occurs in the first hinge, what has been denoted as the first range of angles during the process of closing of the sealing flap, denoted by A in Figure 2, commences. This range of angles corresponds to the difference between the plays in the first and the second hinges, which thus means that the connecting means 40 of the rotation brake has entered into engagement with the connecting means 18 of the first sleeve only in the first hinge. The motion of the sealing flap within this first range of angles continues until the rotation brake 36 in the second hinge enters into engagement with the first sleeve 12, something that occurs at a later time than in the first hinge, since the play in the connection between the rotation brake 36 and the first sleeve 12 is greater in the second hinge than it is in the first hinge. When the rotation brake 36 in the second hinge enters into engagement with the first sleeve 12 what has been denoted as the second range of angles during the process of closing of the sealing flap, denoted by B in Figure 2, commences. Thus the motion of the sealing flap is braked during this second range of angles B by the rotation brakes in both the first and the second hinge.

[0028] The closing torque that arises as a result of gravity increases as the flap falls towards its closed position, since the distance between the centre of gravity of the flap and its centre of rotation, that is, the hinge, increases. The rotation brakes in the two hinges are mounted in tracks of different widths, as described above, with the aim of achieving the stepwise increase of braking effect on the flap. Through the first sleeve 12 being equipped with at least two tracks 18, 20 that have mutually different widths, identical inner sleeves 12 can be used for the two hinges, as long as they are mounted such that different tracks 18, 20 are exploited as connecting means. Thus, only one type of first sleeve 12 needs to be manufactured. The same first sleeve 12 can be used to receive rotation brakes of different sizes with different braking powers through the arrangement in the first sleeve 12 of additional tracks, for example, four, with different lengths that correspond to the axial length of the protrusion 40. Thus, suitable braking powers can be achieved for sealing flaps of different sizes and with different weights by varying the size of the rotation brakes in the hinge. The period that the flap is maintained at its open position can also, in this way, be varied.

[0029] Figure 3a and Figure 3b show cross-sections of the hinge 10. The hinge shown in Figure 3a is equipped with a large rotation brake 36a, while Figure 3b shows the hinge with a smaller rotation brake 36b. As is shown in Figure 3a, the track 18 has a length that is adapted such that it interacts with the axially directed protrusion 40a of the large rotation brake. In an equivalent manner, the protrusion 40b of the smaller rotation brake interacts with the shorter track 20 as is shown in Figure 3b. In order to make it possible to use rotation brakes of different sizes in the hinge, the end-walls of the first and the second sleeve are preferably equipped with axial pegs 240, 120, which interact with an axial through hole in the rotation brake 36a, 36b with the aim of achieving control of the same. However, both the axial pegs 240, 120 and the axial hole in the rotation brake have been excluded in Figure 1 for reasons of clarity, and these are shown only in Figure 3a and Figure 3b.

Claims

1. A hinge arrangement for a sealing flap (52), such as a lid or a sleeve, mounted to rotate in bearings and influenced by a closing force, preferably intended to seal a container (46), where the arrangement comprises a first and a second hinge (10) that are mounted at the sealing flap (52), and where each hinge (10) is arranged to comprise a cylindrically shaped rotation brake (36) consisting of a pair of components that can be rotated relative to each other, **characterised in that** the rotation brake (36) in the first hinge is arranged to be activated within a first range of angles (A) during the process of closing of the sealing flap while the rotation brake in the second hinge is arranged to be subsequently activated within a second range of angles (B) during the process of closing of the sealing flap with the aim of achieving a stepwise increase of the braking effect during the process of closing of the sealing flap (52), and in this way of delaying the flap in its open position.

2. The hinge arrangement according to claim 1, **characterised in that** each hinge comprises a first sleeve (12) that surrounds the rotation brake (36), whereby a connecting means (40, 40a, 40b) of the rotation brake (36) is arranged to interact with a connecting means (18, 20) arranged on the inner surface of the first sleeve (12), where the connection between the rotation brake (36) and the first sleeve (12) in each hinge comprises a play, which means that the rotation brake (36) in each hinge can rotate within the sleeve (12) within the framework for the play without entering into engagement with the sleeve (12), and where the plays of the connections in the two hinges are of different magnitudes, something that means that the rotation brake (36) enters into engagement with the sleeve (12), and is in this way activated, in each hinge (10) at different times during the process of closing of the sealing flap (52).

3. The hinge arrangement according to claim 2, **characterised in that** the connecting means (40, 40a, 40b) of the rotation brake comprises a radially directed protrusion and **in that** the connection means (18, 20) on the inner surface of the first sleeve (12) is constituted by a recess, for example, a track.

4. The hinge arrangement according to claim 2 or 3, **characterised in that** the first sleeve (12) in each hinge has at one of its ends an end-wall that displays means (16) for attaching the sleeve (12) in a manner that does not allow rotation to a construction in association with the closing device, for example an end-wall (48) of a container (46), and at the periphery of the second end displays an axially directed peg (22), and **in that** the first sleeve (12), furthermore, is surrounded by a second sleeve (24) that is arranged to be attached to the sealing flap (52) and that comprises a component in the form of a tube that is closed at one of its ends by an end-wall, and where the inner surface of this end-wall displays a track (28) that runs along part of the periphery of the end-wall, arranged to interact with the peg (22) of the first sleeve (12), whereby the second sleeve (24) can be rotated around the first sleeve (12) with the peg (22) running in the track (28) in such a manner that the ends (28a, 28b) of the track (28) constitute stop limits for the peg (22) for the opening and closing motions of the sealing flap, whereby the mounting of the first sleeve (12) in the end-wall (48) of the container in this way determines the angle of the open stop position of the sealing flap (52).

5. The hinge arrangement according to claim 4, **characterised in that** the inner surface of the end-wall of the second sleeve (24) furthermore displays connecting means (30) arranged to interact in a manner that does not allow rotation with connecting means (44) arranged on the end-wall of the rotation brake (36), whereby the motion of the sealing flap (52) causes a rotational motion of the second sleeve, which in turn transfers the motion to a component (42) of the rotation brake (36) that can be rotated, whereby the motion of the flap is braked.

6. The hinge arrangement according to any one of claims 3-5, **characterised in that** the first sleeve (12) in each hinge (10) is equipped with at least two connecting means (40, 40a, 40b) each one of which allows plays of different magnitude in the connection to the rotation brake (36) in the two hinges, which makes it possible for the first sleeves (12) in each hinge (10) to be mounted in such a manner that different connecting means of the sleeve (12) are exploited in the hinges (10) respectively.

7. The hinge arrangement according to any one of claims 1-6, **characterised in that** the sealing flap (52) is mounted in a essentially horizontal position and that the closing force that acts on the flap (52) is constituted by the force of gravity.

8. The hinge arrangement according to claim 7, **characterised in that** the stop limit of the open position of the sealing flap (52) is arranged such that the centre of gravity at the stop position is located in a position that gives rise to a closing torque on the flap around the hinge (10).

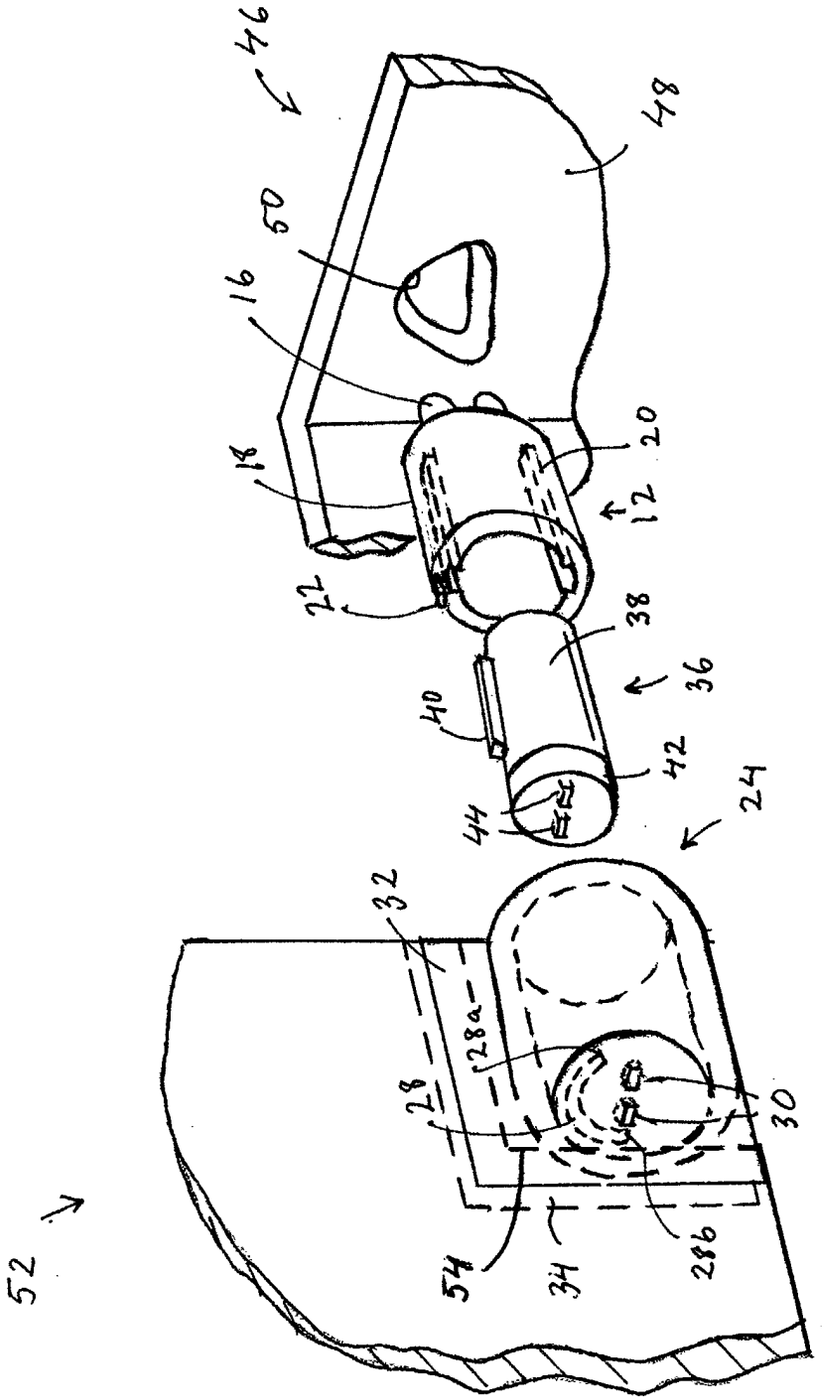

Fig. 1

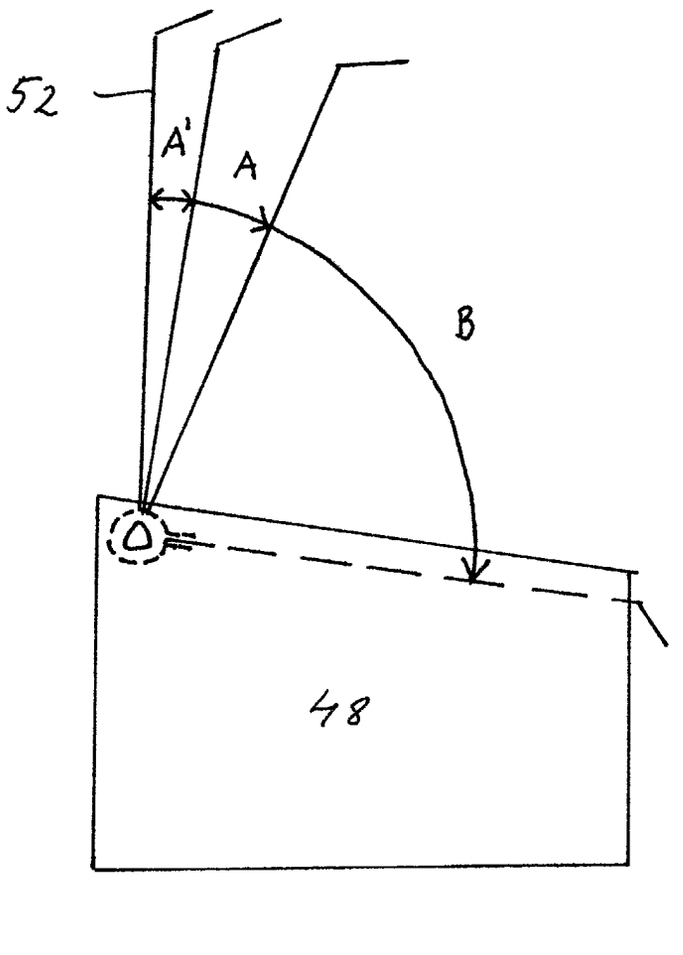

Fig 2

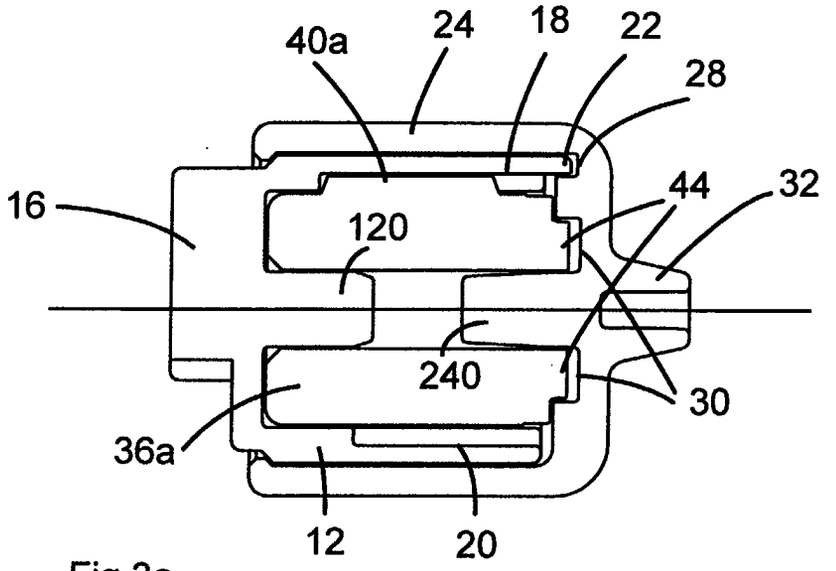
40a
24
18
22
28
16
120
44
32
240
30
36a
12
20

Fig.3a

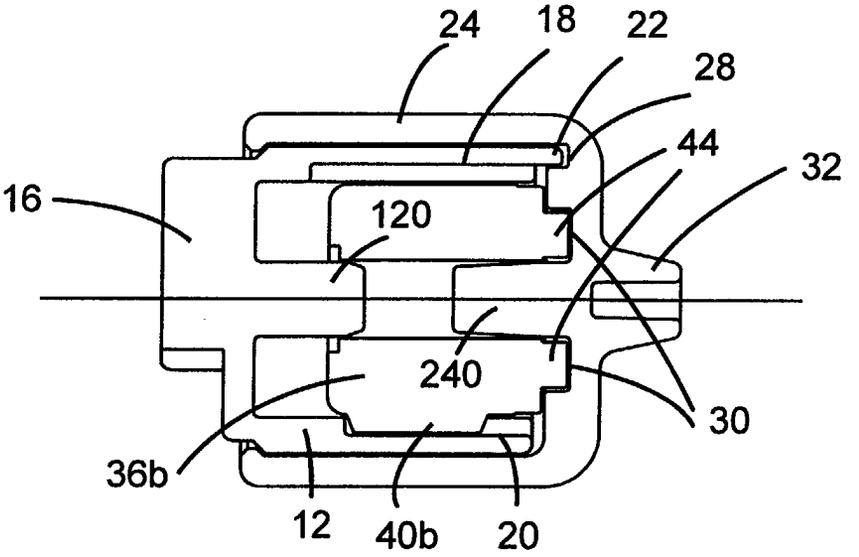
24
18
22
28
16
120
44
32
240
30
36b
12
40b
20

Fig. 3b