

DEVICE FOR SELECTING GASES FOR CONTAINER FOR STORING
PERISHABLE PRODUCTS

Technical field

The present invention relates to the technical field of sealed storage containers with modified or controlled atmosphere comprising a space in which perishable products to be preserved are stored.

5

Prior art

The use of such sealed containers is known, in particular for storing perishable products, such as for example fruits and vegetables, mushrooms or flowers, in
10 a modified or controlled atmosphere, in order to increase the storage life of these products. The sealing of this type of container is very important since it makes it possible to maintain in said container the required levels of oxygen and carbon
15 dioxide to guarantee the best possible storage life.

However, in this type of container, it is also very important to control the passage, selectively, of the gases of the external and internal ambient air, in order to provide a modified or controlled atmosphere

inside said container, so as to increase the storage
life of the products contained in it, said passage of
the gases being dependent on the internal volume of
said container and the type of product contained in the
5 vessel.

Disclosure of the invention

The aim of the present invention is to propose a
gas-selection device making it possible to obtain a
10 modified or controlled atmosphere inside a sealed
storage container comprising at least one space
containing perishable products such as for example
fruits and vegetables, or flowers. Said gas-selection
device according to the invention makes it possible to
15 quickly and simply adapt exchanges between the inside
of said container and the gases of the external and
internal ambient air, selectively, according to the
dimensions of the container and/or the products to be
stored.

20 In accordance with the invention, there is
therefore proposed a gas-selection device for a sealed
storage container with modified or controlled
atmosphere for storing perishable products such as for
example fruits and vegetables, or flowers, comprising a
25 hollow body and at least one first orifice, a second
orifice and a first membrane, said first and second
orifices connecting the inside of said body with the
outside thereof, said first membrane being disposed
inside said body between said first and second orifices
30 so that the gases flowing from the first orifice to the
second orifice, or vice versa, necessarily and solely

pass through said first membrane, said body comprising at least one first casing provided with at least said first orifice and a second casing provided with at least said second orifice, said gas-selection device
5 being remarkable in that said second casing comprises, in line with the second orifice, a hollow cylindrical tube projecting towards the outside of the body and being arranged so as to be inserted in an orifice provided on one of the walls of the container
10 connecting the inside of the container to the outside thereof, in order to secure the gas-selection device, sealingly, to said wall of the container, in line with said orifice, so as to allow a flow of gas from its second orifice through said orifice in the wall, or
15 vice versa.

The hollow cylindrical tube extends beyond said wall in which it is arranged so as to be inserted.

Advantageously, the tube is provided at its free end with a fixing member able to cooperate with a
20 complementary fixing member so as to allow the non-permanent securing of the second casing to said wall.

Even more advantageously, the gas-selection device comprises a gasket arranged so as to be compressed between the wall of the container and the second casing,
25 when the gas-selection device is secured to the container.

According to a preferred embodiment, said first and second casings are assembled sealingly together and the first membrane is placed so that its perimeter edge
30 is gripped sealingly between the respective perimeter edges of said first and second casings.

According to a variant embodiment, the second casing comprises an orifice corresponding to the third orifice of the body and connecting the inside of the second casing to the outside thereof, the body
5 comprises, between the first casing and the second casing, two roughly tubular third casings and a fourth casing disposed between said third casings and comprising at least one transverse orifice corresponding to the fourth orifice in the body and
10 connecting the inside of said fourth casing to the outside thereof, and the gas-selection device comprises a second membrane and two third membranes disposed inside said body so that the gases that flow from the first, third and fourth orifices in the body to the
15 second orifice in said body, or vice versa, necessarily and solely pass through respectively the first, second and third membranes.

According to another variant embodiment, the body comprises, between the first casing and the second
20 casing, a roughly tubular third casing and a fourth casing comprising at least one transverse orifice corresponding to the third orifice in the body and connecting the inside of said fourth casing with the outside thereof, and the gas-selection device comprises
25 two second membranes disposed inside said body so that the gases that flow from said first and third orifices in the body to the second orifice in said body, or vice versa, necessarily and solely pass through respectively the first and second membranes.

30 Advantageously, each membrane is pleated.

According to a last variant embodiment, the gas-selection device comprises two second orifices and is associated in series with at least one identical gas-selection device so as to connect together one of their
5 two second orifices by means of at least one sheath, the assembly thus obtained then being firstly sealingly secured to one of the walls of the container, in line with two orifices provided on said wall, and connecting
10 so as to allow a flow of gas from the second free orifices, through said associated orifice in the wall, or vice versa, and secondly connected, at one of its free ends, to blowing means, in order to create forced ventilation inside the two gas-selection devices and
15 the sealed container.

Summary description of the figures

Other advantages and features will emerge better from the following description of an embodiment of a
20 gas-selection device for a sealed storage container with modified or controlled atmosphere for perishable products according to the invention with reference to the accompanying figures, on which:

- figure 1 is a schematic view in cross section of
25 a gas-selection device according to the invention;
- figure 2 is an exploded schematic view in cross section of a gas-selection device of figure 1;
- figure 3 is a partial schematic view in cross section of a first variant of the gas-selection device
30 according to the invention;

- figure 4 is a partial schematic view in cross section of a second variant of the gas-selection device according to the invention;

5 - figure 5 is a partial schematic view in cross section of a third variant of the gas-selection device according to the invention;

- figure 6 is a partial schematic view in cross section of a fourth variant of the gas-selection device according to the invention;

10 - figure 7 is a partial schematic view in cross section of a last variant of the gas-selection device according to the invention;

- figure 8 is a schematic view of two gas-selection devices according to figure 7 put in series.

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Best way of implementing the technical invention

With reference to figures 1 to 2, the invention relates to a gas-selection device 1 for a sealed storage container 100 with modified or controlled
20 atmosphere for storing perishable products such as for example fruit and vegetables, or flowers, not shown in the figures.

The gas-selection device 1 comprises a hollow body 2 and at least one first orifice 3, a second orifice 4
25 and first membrane 5, said first and second orifices 3, 4 connecting the inside of said body 2 to the outside thereof, said first membrane 5 being disposed inside said body 2 between said first and second orifices 3, 4 so that the gases flowing from the first orifice 3 to
30 the second orifice 4, or vice versa, necessarily and solely pass through said first membrane 5.

It will be understood clearly that the gas-selection device 1 may comprises a plurality of first orifices 3 and/or a plurality of second orifices 4 and/or a plurality of first membranes 5, without
5 departing from the scope of the present invention.

Furthermore, the gas-selection device 1 is arranged so as to be secured, sealingly and preferably removably, to one 101 of the walls of the container 100, in line with an orifice 102 provided on said wall 101
10 and connecting the inside of the container 100 with the outside thereof, so as to allow a flow of gas from its second orifice 4 through said orifice 102, or vice versa.

According to a preferred embodiment, the body 2 of
15 the gas-selection device 1 comprises a first casing 6 provided at least with the first orifice 3 and a second casing 7 provided with at least the second orifice 4, said first and second casings 6, 7 being assembled sealingly together.

20 In this configuration, the first membrane 5 is placed so that its perimeter edge 8 is sealingly gripped between said first and second casings 6, 7 and preferably between their respective perimeter edges 9, 10. To ensure a perfect seal at the first membrane 5,
25 the first casing 6 comprises, along its perimeter edge 9, connection means 11 cooperating with complementary connection means 12 disposed along the perimeter edge 10 of the second casing 7. The connection means 11 and the complementary connection means 12 are respectively
30 male and female members or female and male members, the male member preferably being a rim extending

perpendicularly from the associated perimeter edge and the female member preferably being a groove provided in the associated perimeter edge.

5 The first casing 6 preferably comprises, in line with the first orifice 3, a grille 13 in order to provide mechanical protection for the membrane 6 against impacts while allowing the flow of gases.

According to this preferred embodiment, the second casing 7 comprises, in line with the second orifice 4,
10 a hollow cylindrical tube 14 extending so as to project towards the outside of the body 2 of the gas-selection device 1 and being arranged so as to be inserted in the orifice 102 of the wall 101 of the container 100 and to extend beyond said wall 101. This tube 14 is provided
15 at its free end with a fixing member 15 able to cooperate with a complementary fixing member 16 in order to secure the second casing 7 non-permanently to said wall 101, and consequently the gas-selection device 1 to said container 100.

20 Thus, with reference to figure 1, when the tube 14 is inserted in the orifice 102 in the wall 101 of the container 100, its free end is then situated on the other side of said wall 101 and the fixing member 15 and the complementary fixing member 16 cooperate
25 together so as to exert a force on the gas-selection device 1 tending to apply the second casing 7 against the wall 101 and therefore to secure the assembly consisting of device and container 100. To provide the impermeability of this securing, a gasket 17,
30 advantageously an O-ring seal, is disposed around the tube 14 and arranged so as to be compressed between the

second casing 7 and the wall 101, when the gas-selection device 51 is secured to the container.

The fixing member 15 and the complementary fixing member 16 are respectively a thread and a nut. However, 5 the fixing member 15 and the complementary fixing member 16 could be any other suitable equivalent type such as for example quick couplings similar to those used on fire-brigade equipment or clip/groove assemblies, without departing from the scope of the 10 present invention.

It will be understood clearly that the fixing member 15, the complementary fixing member 16 and the gasket 17 make it possible to secure the gas-selection device 1 to the container 100 sealingly and non- 15 permanently.

However, it will also be understood clearly that the gas-selection device 1 may be secured to the container 100 sealingly and permanently by any suitable technique such as for example welding, adhesive bonding 20 or crimping.

It will be understood clearly that the gas-selection device 1 according to the invention makes it possible to quickly and simply adapt the exchanges, with the inside of said container 100, of gas from 25 external ambient air, selectively, according to the dimensions of the container and/or the products to be stored. This is because, once the container 100 is manufactured, it suffices either to produce an orifice 102 in one of the walls 101 of said container 100 and 30 to secure a gas-selection device 1 of suitable dimensions, or to produce a plurality of orifices 102

in only one or a plurality of the walls 101 of said container 100 and to secure, in line with each orifice 102, a gas-selection device 1 of smaller dimensions, the latter configuration allowing a more homogeneous
5 distribution of the gas flows inside said container 100.

A person skilled in the art will have no difficulty in determining and sizing each membrane according to the required atmosphere inside the container and the products contained therein.

10 Finally, because of the configuration of the gas-selection device 1, it will be understood clearly that the latter may indifferently be secured to a wall 101 of the container 100 either inside or outside said container 100.

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Description of other embodiments

According to a first variant embodiment shown in figure 3, in order to increase the gas-selection surface area of the gas-selection device 1 without
20 having to increase the overall dimensions thereof, the first membrane 5 is advantageously pleated.

According to a second variant embodiment shown in figure 4, the gas-selection device 51 comprises a body 52 provided with at least one first orifice 53, a
25 second orifice 54 and a first membrane 55 all similar to those described previously.

Moreover, the body 52 comprises a first casing 56 provided at least with the first orifice 53 and a second casing 57 provided at least with the second
30 orifice 54.

The first casing 56 is identical to the first casing 6 described previously.

The second casing 57 is similar to the first casing 6 described previously and comprises a hollow cylindrical tube 58 disposed in line with the second orifice 54 and extending so as to project towards the outside of the body 52.

However, in this variant embodiment, said tube 58 is also extended inside said second casing 57 over its entire thickness. The second casing 57 also comprises an orifice corresponding to the third orifice 59 in the body 52 and connecting the inside of the second casing 57 of said body 52 to the outside of the latter and preferably comprising a protective grille 60.

The tube 58 is preferably provided at its external free end with a fixing member, not shown in figure 4, able to cooperate with a complementary fixing member, not shown in figure 4, in order to non-permanently secure the second casing 57 to a wall of the container, not shown in figure 4, and consequently to secure the gas-selection device 51 to said container.

Likewise, the gas-selection device 51 advantageously comprises a gasket, not shown in figure 4, arranged so as to be compressed between said wall of the container and the second casing 57, when the gas-selection device 51 is secured to the container.

In addition, this variant embodiment differs from the previous embodiment in that the body 52 also comprises, between the first casing 56 and the second casing 57, two roughly tubular third casings 61 and a fourth casing 62 disposed between said third casings 61.

Said casings 56, 57, 61, 62 of the body 52 are connected together sealingly.

The fourth casing 62 comprises at least one transverse orifice corresponding to the fourth orifice
5 63 of the body 52 and connecting the interior of said fourth casing 62 to the outside thereof, and a transfer tube 64 passing right through the fourth casing 62 in the direction of its thickness, so as to allow a flow of gas through said fourth casing 62.

10 In this second variant embodiment, the first membrane 55 is fitted so that its external perimeter edge 65 is sealingly gripped between the first casing 56 and one of the third casings 61 and preferably between their respective perimeter edges 66, 67.

15 Moreover, the gas-selection device 51 comprises a second membrane 68 and two third membranes 69 similar to the first membrane 55 and roughly annular in shape.

The second membrane 68 is placed so that firstly its external perimeter edge 70 is gripped sealingly
20 between the second casing 57 and one of the third casings 61 and preferably between their respective perimeter edges 71, 67, and secondly so that its internal perimeter edge 72 is fixed sealingly around the free end of the tube 58 situated inside said second
25 casing 57, by any suitable means such as adhesive bonding for example.

Each third membrane 69 is placed firstly so that its external perimeter edge 73 is sealingly gripped between one of the third casings 61 and the fourth
30 casing 62 and preferably between their respective perimeter edges 67, 74, and secondly so that its

internal perimeter edge 75 is fixed sealingly around one of the free ends of the transfer tube 64, by any suitable means such as adhesive bonding for example.

Thus configured, the gas-selection device 51
5 guarantees that the gases that flow from the first, third and fourth orifices 53, 59, 63 of the body 52 to the second orifice 54 of said body 52, or vice versa, necessarily and solely pass through respectively the first, second and third membranes 55, 65, 66.

10 It will be understood clearly that this variant embodiment makes it possible to increase the gas-selection surface area of the gas-selection device 51 without having to considerably increase the overall dimensions thereof. It optionally makes it possible to
15 fit membranes of various designs.

According to a third more minimalist variant shown in figure 5, the gas-selection device 151 comprises a body 152 provided with at least one first orifice 153, a second orifice 154 and a first membrane 155 similar
20 to those described previously.

Moreover, the body 152 comprises a first casing 156 provided with at least the first orifice 153 and a second casing 157 provided with at least the second orifice 154. The first and second casings 156, 157 are
25 identical to the first and second casings 6, 7 previously described.

The body 152 further comprises, between the first casing 156 and the second casing 157, a third roughly tubular casing 158 and a fourth casing 159, the third
30 and fourth casings 158, 159 being identical to the third and fourth casings 61, 62 previously described.

Thus the fourth casing 159 comprises a transfer tube 160 and at least one orifice corresponding to the third orifice 161 in the body 52. Said casings 156, 157, 158, 159 of the body 152 are assembled together sealingly.

5 Likewise, the gas-selection device 151 comprises two second membranes 162 identical to the third membranes 69 previously described.

Each second membrane 162 is placed so that firstly its external perimeter edge 163 is gripped sealingly
10 between the fourth casing 159 and the third casing 158 or the second casing 157, preferably, between their respective perimeter edges, and secondly so that its internal perimeter edge 164 is fixed sealingly around one of the free ends of the transfer tube 160 of the
15 fourth casing 159, by any suitable means such as adhesive bonding for example.

Thus configured, the gas-selection device 151 guarantees that the gases that flow from the first and third orifices 152, 161 of the body 152 to the second
20 orifice 154 of said body 152, or vice versa, necessarily and solely pass respectively through the first and second membranes 155, 162.

Moreover, it can be imagined further increasing the filtering surface of the gas-selection device 51,
25 151 by adding one or more new stages each comprising a third casing, a fourth casing and an additional membrane identical respectively to the third casing 61, 158, fourth casing 62, 159 and membrane 66, 162 previously described.

30 According to a fourth variant shown in figure 6, at least two gas-selection devices 1, as previously

described, disposed in series, are placed on the sealed container 100. Thus each gas-selection device 1 comprises a body 2 provided with at least one first orifice 3, a second orifice 4 and a first membrane 5.

5 Moreover, the body 2 comprises a first casing 6 provided at least with the first orifice 3 and a second casing 7 provided at least with the second orifice 4.

 However, in this variant embodiment, each gas-selection device 1 comprises two second orifices 204.

10 This configuration makes it possible to associate in series the at least two gas-selection devices 1 by means of at least one sheath 200 connecting together one of their two second orifices 4, in accordance with figure 6. The assembly thus obtained is then secured
15 sealingly to one 101 of the walls of the container 100, in line with two orifices 102, provided on said wall 101 and connecting the inside of the container 100 with the outside thereof, so as to allow a flow of gas from the second free orifices 4, that is to say those not
20 connected to a sheath 200, through said associated orifice 102 in the wall 101, or vice versa.

 Once secured to the container 100, the assembly consisting of gas-selection devices 1 and sheath 200 is then advantageously connected, at one of its ends, to
25 blowing means, not shown, such as for example a fan, in order to create forced ventilation inside the two gas-selection devices 1 and the sealed container 100, in accordance with the arrows shown in figure 6 or vice versa, so as to promote the gaseous exchanges through
30 the membrane 5 of each gas-selection device 1.

It will be understood clearly that the assembly consisting of gas-selection devices 1 and sheath 200 previously described may comprise more than two gas-selection devices 1 and therefore more than one sheath 5 200 without departing from the scope of the present invention.

Furthermore, it goes without saying that the gas-selection devices 1 could also be similar to the gas-selection devices 51 or 151 previously described and 10 comprise at least one third casing, a fourth casing and an additional membrane identical respectively to the third casing 61, 158, fourth casing 62, 159 and membrane 66, 162 previously described.

Finally, according to a last variant shown in 15 figure 7 and particularly suited to the arrangement in series of the gas-selection devices according to the invention, the gas-selection device 251 comprises a body 252 and at least one first radial orifice 253, two second axial orifices 254 and a first membrane 255, 20 preferably tubular, disposed between said first and second orifices 253, 254. Said body 252 is in the rough form of a hollow cylindrical tube and comprises a cylindrical peripheral longitudinal wall 256 closed off by two transverse end walls 257, said longitudinal wall 25 256 being provided at least with the first orifice 253 and each transverse wall 257 being provided at least with the second orifice 254. In this configuration of the gas-selection device 251, the first membrane 255 is placed so that its end perimeter edges 258 are gripped, 30 sealingly, between the transverse 257 and longitudinal 256 walls.

Each transverse wall 257 preferably comprises, in line with the second orifice 254, a hollow cylindrical tube 259 extending so as to project towards the outside of the body 252 of the gas-selection device 251 and being arranged so as to be inserted in an orifice in a wall of a container, not shown.

With reference to figure 8, it will be understood clearly that this variant easily allows an arrangement in series by putting at least two cylindrical gas-selection devices 251 end to end and connecting the second free orifices 254 of the assembly obtained to one of the walls of a container, not shown.

Once secured to the container, the gas-selection device assembly 251 is then advantageously connected, at one of its ends, to blowing means, not shown, such as for example a fan, in order to create forced ventilation inside the gas-selection device 251 and the container.

Industrial applicability

The gas-selection device 1 according to the invention applies particularly to the sealed storage container 100 with modified or controlled atmosphere comprising a rigid vessel in which the perishable products to be preserved are stored, such as for example fruits and vegetables, or flowers, and a cowl closing the vessel sealingly, but it may also be used on containers of the flexible cover type for packaging pallets or partially rigid protective covers.

Finally, it goes without saying that the examples of a gas-selection device 1 according to the invention

that has just been described are merely particular illustrations, in no way limitative of the invention.

CLAIMS

1. Gas-selection device (1, 51, 151, 251) for a sealed storage container (100) with modified or controlled atmosphere for storing perishable products such as for example fruits and vegetables, or flowers,
5 comprising a hollow body (2, 52, 152, 252) and at least one first orifice (3, 53, 153, 253), a second orifice (4, 54, 154, 254) and a first membrane (5, 55, 155, 255), said first and second orifices (3, 53, 153, 253; 4, 54, 154, 254) connecting the inside of said body (2,
10 52, 152, 252) with the outside thereof, said first membrane (5, 55, 155, 255) being disposed inside said body (2, 52, 152, 252) between said first and second orifices (3, 53, 153, 253; 4, 54, 154, 254) so that the gases flowing from the first orifice (3, 53, 153, 253)
15 to the second orifice (4, 54, 154, 254), or vice versa, necessarily and solely pass through said first membrane (5, 55, 155, 255), said body (2, 52, 152) comprising at least one first casing (6, 56, 156) provided with at least said first orifice (3, 53, 153) and a second
20 casing (7, 57, 157) provided with at least said second orifice (4, 54, 154), said gas-selection device (1, 51,

151, 251) being characterised in that said second casing (7, 57, 157) comprises, in line with the second orifice (4, 54, 154), a hollow cylindrical tube (14, 58) projecting towards the outside of the body (2, 52, 152) and being arranged so as to be inserted in an orifice (102) provided on one (101) of the walls of the container (100) connecting the inside of the container (100) to the outside thereof, in order to secure the gas-selection device (1, 51, 151, 251), sealingly, to said wall (101) of the container (100), in line with said orifice (102), so as to allow a flow of gas from its second orifice (4, 54, 154, 254) through said orifice (102) in the wall (101), or vice versa.

2. Gas-selection device (1, 51, 151) according to claim 1, characterised in that the hollow cylindrical tube (14, 58) extends beyond the wall (101) in which it is arranged so as to be inserted.

3. Gas-selection device (1, 51, 151) according to claim 2, characterised in that the tube (14, 58) is provided at its free end with a fixing member (15) able to cooperate with a complementary fixing member (16) in order to secure the second casing (7, 57, 157) non-permanently to said wall (101).

4. Gas-selection device (1, 51, 151) according to any of claims 1 to 3, characterised in that it comprises a gasket (17) arranged so as to be compressed between the wall (101) of the container (100) and the second casing (7, 57, 157) when the gas-selection device (1, 51) is secured to the container (100).

5. Gas-selection device (1) according to any of claims 1 to 4, characterised in that said first and

second casings (6, 7) are assembled together sealingly and in that the first membrane (5) is placed so that its perimeter edge (8) is gripped sealingly between the respective perimeter edges (9, 10) of said first and
5 second casings (6, 7).

6. Gas-selection device (51) according to any of claims 1 to 4, characterised in that the second casing (57) comprises an orifice corresponding to the third orifice (59) of the body (52) and connecting the inside
10 of the second casing (57) to the outside thereof, in that the body (52) comprises, between the first casing (56) and the second casing (57), two roughly tubular third casings (61) and a fourth casing (62) disposed between said third casings (61) and comprising at least
15 one transverse orifice corresponding to the fourth orifice (63) in the body (52) and connecting the inside of said fourth casing (62) to the outside thereof, and in that the gas-selection device (51) comprises a second membrane (68) and two third membranes (69)
20 disposed inside said body (52) so that the gases that flow from the first, third and fourth orifices (53; 59; 63) in the body (52) to the second orifice (54) in said body (52), or vice versa, necessarily and solely pass through respectively the first, second and third
25 membranes (55; 65; 66).

7. Gas-selection device (151) according to any of claims 1 to 4, characterised in that the body (152) comprises, between the first casing (156) and the second casing (157), a roughly tubular third casing
30 (158) and a fourth casing (159) comprising at least one transverse orifice corresponding to the third orifice

(161) in the body (152) and connecting the inside of said fourth casing (159) with the outside thereof, and in that the gas-selection device (151) comprises two second membranes (162) disposed inside said body (52) so that the gases that flow from the first and third orifices (153; 161) in the body (152) to the second orifice (154) in said body (152), or vice versa, necessarily and solely pass through respectively the first and second membranes (155; 162).

10 8. Gas-selection device (1, 51, 151) according to any of claims 1 to 7, characterised in that each membrane is pleated.

15 9. Gas-selection device (1, 51, 151) according to any of claims 1 to 8, characterised in that it comprises two second orifices (4, 54, 154) and in that it is associated in series with at least one identical gas-selection device (1, 51, 151) so as to connect together one of their two second orifices (4, 54, 154) by means of at least one sheath (200), the assembly
20 thus obtained then being firstly sealingly secured to one (101) of the walls of the container (100), in line with two orifices (102) provided on said wall (101), and connecting the inside of the container (100) with the outside thereof, so as to allow a flow of gas from
25 the second free orifices (4, 54, 154), through said associated orifice (102) in the wall (101), or vice versa, and secondly connected, at one of its free ends, to blowing means, in order to create forced ventilation inside the two gas-selection devices (1, 51, 151) and
30 the sealed container (100).