Container for liquid or pasty substances at differentiated doses and container sets thereof

A container for liquid or pasty substances or powders, suspensions or liposomal preparations, for pharmaceuticals, diagnostics, cosmetics or similar, enclosed in a plate 6 of plastic material, comprising two semi-containers 2 with bodies 4 and necks 3, close together and parallel. Pre-cut lines 9-10; 109-110 are provided and at least some of these concern the topi of the said necks 3, in such a way as making a separation along these pre-cut lines causes the selective opening of a said semi-container 2, or of both of them, and therefore the dispensing of a half dose or of the entire dose of the product in the container 1.

A set 20 of containers 1 is also described, comprising a plurality of containers 1 joined between themselves along lines of breakable joints 21 and that allow their separation at the moment of use.
Description

[0001] The object of this invention is a differentiated dosage container, particularly for liquid or pasty substances but also usable for powdered substances, suspensions, liposomal preparations for pharmaceuticals, diagnostics, cosmetics and the like. The invention also concerns sets of these containers.

[0002] Single dose containers in plastic material, which are hereinafter called "phialoids" and which allow the administration of small volumes of product, are known in the art.

[0003] For example US patent 3221939 dated 1962 describes such a container for small volumes and illustrates an attempt to make a set or strip of these containers. It also illustrates the possibility of providing the containers with closures able to dispense the contents in several doses.

[0004] Patent US-4512475 dated 1983 describes a set of containers pressed in one piece with a closure plug, which, once removed from the container can be used to close it again. The plug has a cylindrical cap, which inserts into the neck of the container and a tubular shell, which fits around the neck.

[0005] EP-0326529 dated 1989 describes a series of details and improvements aimed at facilitating the separation of the containers from the sets and to improve the rigidity and the machinability of the sets.

[0006] WO 98/01348 describes a set of containers provided with plugs for re-closing, so as to allow a fractionated consumption of the product. The various containers of the set are joined between themselves by means of easily separated elements, opportune inclined, so as to increase the rigidity of the set and thus reduce problems on the production line.

[0007] In containers for small volumes according to known technique, the problem of being able to use the contents of a single container in more than one part has been resolved by means of a plug which is removed at the moment of opening the container and can then be used to close it again and conserve any second dose of product.

[0008] As pharmacopoeias prescribe that multi-dose liquid formulations must guarantee the microbiological quality during the entire period of use of the product, to be able to adopt the above described solution with a re-closing plug, it is common practice to include bactericidal substances in the composition that are capable of lowering the microbial charge induced by the inevitable contamination brought by the user or more simply from the fact that the product comes into contact with the surroundings.

[0009] As the substances usually used as preservatives, either with antimicrobial activity (e.g. benzyl alcohol, paraben, sodium benzoate, benzalkonium chloride) or with anti-oxidant activity (e.g. butyl-hydroxytoluene, butyl-hydroxyanisole, propyl gallate, sulphites) present a well documented series of allergic and sensitization-like side effects, it appears evident that the solution used up until now to fractionate the administration of the product, by means of re-closing the container, is no satisfactory.

[0010] In the area of containers for small volumes of product, sometimes joined into sets, there therefore exists a problem of allowing differentiated doses of product, without resorting to the use of preservatives and thus eliminating the negative effects associated with these.

[0011] The object of the invention is that of resolving the above mentioned problem, by providing a single dose container that is able to dispense even fractions of its content guaranteeing the microbiological quality of the product.

[0012] This object is achieved, according to the invention, by the features of the enclosed independent claim 1.

[0013] Advantageous embodiments of the invention are reported in the dependent claims.

[0014] Substantially, the container according to the invention has two separate half doses disposed in two respective semi-containers, with the necks close together and parallel.

[0015] According to a first embodiment, the top of the container presents two different pre-cut lines, one horizontal involving the necks of both semi-containers and one oblique involving the neck of a sole semi-container. In this way, making the opening along the horizontal pre-cut the entire dose is dispensed, that is the contents of the two semi-containers, whereas in making the opening along the oblique pre-cut, the contents of a sole semi-container can be dispensed.

[0016] In the case of using a sole semi-container, the remaining half dose does not come into contact with the operator or with the surroundings, remaining sealed in its respective housing and in consequence maintaining the integrity and microbiological quality of the product, even in the absence of preservatives.

[0017] In a second embodiment of the invention, the container still presents two separate half doses disposed in semi-containers, with the necks close together and parallel. A vertical pre-cut is made between the two semi-containers, which allows their separation, but also their "book-like" folding without separation.

[0018] There is a horizontal pre-cut at the top of the container that allows:

- the dispensing of the entire dose in opening the container after having made a "book-like" fold,
- the dispensing of half dose in opening the single semi-container after having separated it from the other half using the vertical pre-cut.

[0019] Also in this second embodiment, clearly, the remaining half dose does not come into contact with the operator or with the surroundings and in consequence it maintains the integrity and microbiological quality of
the product, even in the absence of preservatives.

[0020] This second method as distinct from the first, allows the reduction, at the moment of use, of the encumbrance of the top part (neck), both in the case of complete opening and in the case of a half dose, this facilitates the transfer of the "phialoid" contents in restricted spaces, as in the case of ampoules for aerosol therapy.

[0021] The containers according to the invention can be made in sets with thermoforming techniques, injection moulding, extrusion and blow moulding, from which sets and single containers or semi-containers are detached from time to time.

[0022] More precisely, the containers of the invention are prepared by a process comprising the following steps:

- thermoforming of the cavity, leaving a channel open for filling;
- filling of the cavity with the desired quantity of product;
- welding and closing of the filling channel;
- cutting and removal of the flash according to the design of the container;
- cutting loose of individual containers or cutting off strips of the number of containers required;
- (optional) insertion in plastic or aluminium/plastic envelopes.

[0023] The containers or sets of containers can be suitably packed in aluminium or aluminium/plastic envelopes to protect them from external contamination and to prevent the possible evaporation of solvents.

[0024] Further features of the invention will appear clearer from the detailed description which follows, referred to purely exemplifying aspects of the inventions and therefore not limiting, shown in the attached sketches, in which:

Figure 1 is a plan view of a container according to a first embodiment of the invention;
Figure 2 is a lateral profile view of the container in Figure 1;
Figure 3 is a plan view of the set of containers in Figure 1;
Figure 4 is a plan view of a container according to a second embodiment of the invention;
Figure 5 is a lateral profile view, taken from the right-hand side of Figure 4;
Figure 6 is a plan view showing the two semi-containers of Figure 4 with a "book-like" fold, the plan view of a sole semi-container being substantially the same;
Figure 7 is a lateral profile view of two semi-containers with "book-like" fold, taken from the right-hand side of Figure 6;
Figure 8 is a plan view of a set of containers according to figure 4.

[0025] With reference for now to Figures 1 to 3, the first embodiment of the invention will now be described.

[0026] A container or single dose "phialoid" has been indicated in its whole by reference number 1 and consists of two semi-containers or "semi-phialoids" each containing a half dose and with their necks 3, close together and parallel. The bodies 4 of the semi-containers 2 have a conveniently rounded form with respect to a media plan, as can be seen from Figure 2.

[0027] It is evident that other forms are possible for the semi-containers 2, that are contained in a sheet of plastic material, such as polyethylene, polypropylene, polystyrene, PVC, PVDC or similar, from which they are obtained by thermoforming or other known moulding and pressing techniques.

[0028] The sheet 6 is in practice a substantially rectangular plate that contains the bodies 4 of the semi-containers 2, presenting a narrowing 7 in the upper part, in correspondence with the necks 3 of the semi-containers, and an upper fin 8 that contains the tops of the said necks 3.

[0029] According to this first embodiment, at the top of the container 1, there are two different pre-cut lines, one horizontal 9, disposed immediately beneath the said upper fin 8 of the plate 6, which concerns the necks 3 of both semi-containers 2, and one oblique 10 disposed on the said fin 8 and concerning the top of the neck 3 of a sole semi-container 2.

[0030] In this way, making a separation along the pre-cut horizontal line 9, in separating the fin 8 from the plate 6, both of the semi-containers 2 are opened and the entire dose can be dispensed from the container. Alternatively, making the separation along the oblique pre-cut line 10, a half of the fin 8 is removed causing the opening of the neck 3 of a sole semi-container 2 and then a sole half dose from container 1 can be used.

[0031] It is evident that in this case, the remaining half dose stays perfectly sealed inside the other semi-container 2 and does not therefore come into contact with the operator or with its surroundings and consequently maintains the integrity and microbiological quality of the product without having recourse to preservatives.

[0032] The containers 1 can be produced in sets 20, as shown in Figure 3, comprising a plurality of these containers 1, joined together by their breakable joints 21 which only allow separation at the moment of use.

[0033] Indicatively, the volume of each container 1 can vary from 1 ml to 30 ml, for which the volume of each semi-container 2 will vary from 0.5 ml to 15 ml.

[0034] Referring now to Figures 4 to 8, the second embodiment of the invention will now be described, using the same reference numbers as for the first embodiment, sometimes increased by 100, to distinguish parts that are equal or corresponding.

[0035] Substantially, according to this embodiment, a vertical pre-cut line 110 is provided between the two semi-containers 2 in the plate 6; this allows the separation of the two semi-containers or alternatively to adopt
the "book-like" folding of these semi-containers without separation (see Figure 7 in particular).

[0036] To allow or facilitate this "book-like" folding, conveniently the body 4 of each semi-container 2 has a rounded form which is developed on one side only of the plate 6, while the other side of the plate remains substantially flat (see Figure 5 in particular), so that there are no obstacles to the above mentioned "book-like" folding.

[0037] For the rest, the form of the semi-containers 2 does not differ from that of the first embodiment, and a horizontal pre-cut line 109, is provided, which concerns the top of the necks 3 of the semi-containers 2, which in the attached Figure, has been drawn in a slightly higher position than the corresponding pre-cut line 9 of the first embodiment but it is evident that the pre-cut line 109 can be positioned at the same height as the corresponding pre-cut line 9.

[0038] In this case, one separates the pre-cut line 109 for dispensing the product held in the container 1.

[0039] In this way, if the container 1 has been folded "book-like" (Figure 7), the entire dose can be dispensed by making the separation along the pre-cut line 109, whereas if a semi-container has already been separated along the vertical pre-cut line 110, the half dose of the container is dispensed by making the separation along the pre-cut line 109.

[0040] It is evident that with this second embodiment, all the advantages of the first embodiment are obtained, with the further advantage of reducing the encumbrance of the upper part, that is the neck, at the moment of use, which facilitates the transfer of the contents of container 1 in a restricted space, as in the case of ampoules for aerosol therapy.

[0041] Figure 8 shows a set 20 of containers according to the Figures from 4 to 7.

[0042] Of course, other embodiments are possible while still remaining within the scope of the invention, defined by the following claims.

Claims

1. Container for liquid and pasty substances, powders, suspensions or liposomal preparations for pharmaceutical use, diagnostics, cosmetics and the like, enclosed in a plate 6 of plastic material, characterized in that said container 1 comprises two semi-containers 2 with their bodies 4 and necks 3, in correspondence with which at least one pre-cut line 9-10; 109, is provided, to allow the selective opening of one or both the said semi-containers 2, and therefore the administration of the entire dose or of a half dose of the product.

2. Container according to claim 1, characterized in that said semi-containers 2 have their respective necks 3 brought close together and parallel.

3. Container according to claim 1 or 2, characterized in that said pre-cut line 9 is a horizontal pre-cut line which concerns the necks 3 of both the semi-containers 2, in such a way that its opening allows the administration of the entire dose of the container 1, whereas the said pre-cut line 10 is an oblique pre-cut line which concerns the top of the neck 3 of only one of the said semi-containers 2, in such a way that its opening allows the administration of a half dose of the product of the container 1.

4. Container according to any of the preceding claims, characterized in that the said bodies 4 of the semi-containers 2 have a double rounded form, from both sides of the said plate 6.

5. Container according to claims 1 or 2, characterized in that a vertical pre-cut line 110 is provided, between the said semi-containers 2, that allows the separation of the two semi-containers or their "book-like" folding without separation.

6. Container according to claim 5, characterized in that said pre-cut line 109 is a horizontal pre-cut line concerning the tops of the necks 3 of the said semi-containers 2, in such a way that a separation along its length allows the dispensing of the entire dose of product if the container 1 is folded "book-like", or the dispensing of a half dose if a semi-container 2 has already been separated along the said vertical pre-cut 110.

7. Container according to any of the claims 1, 2, 3, 5 and 6, characterized in that said bodies 4 of the semi-containers 2 have a rounded form only from one side of the said plate 6, in such a way that the other side of the plate 6 is substantially flat.

8. Container according to any one of the preceding claims, characterized in that it is joined by a breakable union line 21 to other equal containers to form a set 20 of containers.

9. Set 20 of containers 1 for liquid, powder, or pasty substances according to any of the claims from 1 to 7, comprising a plurality of the said containers 1, joined between themselves by a breakable junction line 21, which allows them to be detached at the moment of use.

10. Set 20 of containers 1 according to claim 9, in which the said containers 1 are of identical or different conformations and variously disposed inside the set.

11. Package containing a container of claims 1 to 8 or one or more sets of the claims 9 or 10, enclosed in an envelope of aluminium or plastic material or a
combination of the two.
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