A closure having a frame, a lid and a first closing means as well as at least one second closing means, apart from the first closing means. The closing means each have a lid portion and a frame portion, the first closing means can be opened by the frame portion being manipulated and the second closing means can be opened by the lid portion being manipulated. The lid portion of the second closing means has a pressure-exerting surface and a counter-pressure surface, the lid portion can be fixed by the retaining forces such that a pivoting force acting transversely to the retaining forces can be introduced into the lid portion, via the pressure-exerting surface and counter-pressure surface, in order for the lid to be pivoted out of the closed position.
CLOSURE DEVICE FOR HINGED-LID CONTAINERS

FIELD OF THE INVENTION

[0001] The present invention generally relates to a closure device, comprising a frame defining an opening, a lid, which covers the opening in a closed position, and a first closure means, and at least one second closure means. The closure means serve to hold the lid in the closed position.

BACKGROUND OF THE INVENTION

[0002] It is routine today to use active substances, for example from the group of laundry detergents, dishwashing detergents, pharmaceuticals, personal care products, agricultural tools, building materials, dyes, adhesives or foods, in a flowable or pourable form, or also as pre-measured quantities, which for example are stored as pre-measured units in a container. In the field of storage of commercially available quantities of these active substances, plastic containers are known, which may be transparent, inter alia.

[0003] These containers comprise said closure device, wherein the frame of the closure device is secured to the container or may also be formed integrally therewith. The container can then be closed accordingly by the lid of the closure device.

[0004] The closure means are intended to hold the lid on the frame in the closed position, even if external, unexpected forces are acting on the frame or on the lid. These forces can elastically deform the closure device and in the worst case scenario can open the closure device, which is undesirable. Such forces may occur for example during transport, or within the scope of a mishandling, for example if a child attempts to open the lid in an unintended way. In this respect there is a need on the one hand to design the closed position of the closure device in a secure manner, and on the other hand to unnecessarily complicate the intended opening of the closure device. For this purpose, the closure means must be, inter alia, easy to operate in order to open the lid in an intended way.

[0005] A closure device having a lid and frame is known from WO 2001/48757 A1, wherein the lid is held in a closed position by two closure means, which each comprise a lid portion and a frame portion. The first closure means can be opened by direct action of an opening force on the associated frame portion, whereas the second closure means can be opened by direct action of an opening force on the associated lid portion. The lid in WO 2001/48757 A1 is rectangular. On one of its four sides it is pivotally secured to the frame. On an opposite side, the two closure means are arranged adjacently.

[0006] The object of the invention is to provide a closure device having a lid, frame and at least two closure means, which closure device provides a certain protection against an unintentional opening of the lid, but at the same time can be easily handled and can be easily opened as intended.

[0007] Furthermore, other desirable features and characteristics of the present invention will become apparent from the subsequent detailed description of the invention and the appended claims, taken in conjunction with the accompanying drawings and this background of the invention.

BRIEF SUMMARY OF THE INVENTION

[0008] A closure device (10) comprising a frame (20) defining an opening, a lid (30), which covers the opening and is pivotally coupled to the frame (20) via a pivot axis (6) arranged on a side of the frame, and a first closure means (40), and at least one second closure means (50), which is distanced from the first closure means (40), wherein the closure means (40, 50) serve to hold the lid in a closed position and each have a lid portion (41, 51) and a frame portion (42, 52), wherein the first closure means (40) can be opened by direct action of an opening force on the associated frame portion (42) and the second closure means (50) can be opened by direct action of an opening force on the associated lid portion (51), characterized in that the lid portion (51) of the second closure means (50) has a pressure surface and a counter pressure surface, wherein the pressure surface serves as a contact surface for the opening force or for a first retaining force and the counter pressure surface serves as a contact surface for a second retaining force, which is opposite the first retaining force, wherein the lid portion (51) can be fixed by the retaining forces in such a way that a pivot force acting substantially transversely to the retaining forces can be introduced into the lid portion (51) via the pressure surface and counter pressure surface in order to pivot the lid (30) out from the closed position.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] The present invention will hereinafter be described in conjunction with the following drawing figures, wherein like numerals denote like elements, and

[0010] FIG. 1A shows phase 1 of the opening process with the container closed;

[0011] FIG. 1B shows phase 2 of the opening process with the user’s left thumb on the second closure means;

[0012] FIG. 1C shows phase 3 of the opening process with the closure means in open position;

[0013] FIG. 2 shows a cross section of a first closure means; and

[0014] FIG. 3 shows a cross section of a second closure means.

DETAILED DESCRIPTION OF THE INVENTION

[0015] The following detailed description of the invention is merely exemplary in nature and is not intended to limit the invention or the application and uses of the invention. Furthermore, there is no intention to be bound by any theory presented in the preceding background of the invention or the following detailed description of the invention.

[0016] The closure device according to the invention is characterized in that the lid portion of the second closure means has a pressure surface and a counter pressure surface, wherein the pressure surface serves as a contact surface for the opening force or for a first retaining force. The counter pressure surface serves as a contact surface for a second retaining force, which is opposite the first retaining force. The lid portion can be fixed or clamped by the retaining forces in such a way that a pivoting force directed substantially transversely to the retaining forces for pivoting the lid out from the closed position can be introduced into the lid portion via the pressure surface and the counter pressure surface.
The closure device can only be opened properly when the first closure means is in an open position and the second closure means is also in an open position. In order to bring the second closure means into the open position, the opening force is introduced into the lid portion via the pressure surface. The second closure means is firstly transferred into the open position, wherein the second retaining force may be equal to zero or relatively small. The first and the second retaining force then act on the lid portion via the surface and the counter pressure surface, wherein these retaining forces are of approximately the same magnitude.

The lid portion or a part of the lid portion is clamped or fixed by the retaining forces. It is thus possible to draw the lid portion transversely to the retaining forces in one direction, such that the lid is pivoted from its closed position.

Here, a surface that can be actuated using a finger of a human hand of the user is to be understood as a pressure surface. The pressure surface may comprise humps, hollows or other aids in order to provide improved adhesion properties of the applied finger. In addition, the pressure surfaces may have suitable markings, which makes it easier to find the pressure surface. The same is true analogously for the counter pressure surface.

It may be that at least one of the closure means comprises a tamper-evident closure. It is also preferable for this closure means to comprise a recessed pressure surface, such that the tamper-evident closure is level with an outer wall region of the frame or of the lid, preferably of the lid, i.e. is arranged in the same plane. The tamper-evident closure is configured in such a way that it has to be at least partially broken before the lid is opened for the first time, and preferably has to be fully separated from the closure device.

In one exemplary embodiment the closure means are designed and arranged such that a simultaneous actuation of the two closure means, generally only with both hands of a user, is possible. The closure device in principle may comprise, besides the first and second closure means, also further closure means. Here, the opening forces for the first and second closure means are where applicable for further closure means are in each case independent of one another. It follows that the closure device cannot be easily opened in an unintended way, for example by children.

The first closure means and/or the second closure means can be formed as a detent connection. Accordingly, the lid portion of the second closure means may comprise a detent hook, which in a locking position engages from behind with a detent undercut of the frame portion of the second closure means.

The lid portion of the second closure means may comprise a tab having a front side and a rear side, wherein the front side forms the pressure surface and the rear side forms the counter pressure surface, and wherein the detent hook is formed integrally with the tab. In order to transfer the second closure means into its open position, the opening force acts firstly on the pressure surface of the tab, whereby the detent hook is moved from its locking position. Here, a certain counter force may already act on the counter pressure surface, such that the tab is held by the thumb and index finger of a hand of the user. By pulling the tab using the thumb and index finger, the lid portion and therefore the lid can then be pivoted out from the closed position.

In one exemplary embodiment the tab is connected to the rest of the lid via a flexible connection piece, which defines a pivot axis for the detent hook. The detent hook is preferably arranged between the pivot axis and the detent undercut. The distance between an upper open end of the tab and the detent hook (reference is to the detent surface of the detent hook) may be 1 to 5 cm, preferably 1.5 to 3 cm. If the opening force acts on the upper end, the tab will thus be bent and the detent hook will be slid from its locking position. This opening force may assume values between 5 to 15 N, preferably 8 to 10 N. The pivot force, i.e. the tensile force, is determined in order to pivot the lid portion when the detent hook is unlocked, and therefore in order to pivot the lid from its closed position, may assume values between 1 to 10 N, preferably 1 to 5 N. The opening force for the first closure means may be 1 to 30 N, preferably 3 to 8 N.

The first closure means and the second closure means can be arranged on an arrangement side of the closure device. The arrangement side is preferably arranged opposite the pivot axis. The first closure means and the second closure means can also be arranged on sides of the closure device that border the side having the pivot axis. It is also possible for the first closure means and the second closure means to be provided across a corner, i.e. on two sides forming a corner.

In an exemplary embodiment a distance between the first closure means and the second closure means is smaller than 15 cm. The distance preferably lies in a range between 5 and 8 cm.

The lid and the frame can be formed as a one-part component. Here, the frame and lid can be interconnected via at least one living hinge. The closure device can thus be produced in an injection mold as an economical plastic part. In a multi-part embodiment the lid and frame may also be made of the same or different plastic.

Any suitable plastics material can be used as plastic, and plastics are preferably selected from the group of polyolefins. The following plastics are particularly preferred from the class of polypropylenes, polyethylenes, polypropylene-containing blends, polyethylene-containing blends, polypropylene-containing copolymers and/or random copolymers, polyethylene-containing copolymers.

The lid is preferably colored. If the lid and the frame are formed in one part, it is also preferable for the lid and frame to be produced from the same, colored plastic.

By means of the living hinge, a stable open position of the lid can be defined. When the lid has been opened following successful unlocking of the closure means, the lid should therefore be prevented from easily pivoting back again unintentionally into its closed position. By way of example, the living hinge may be formed with a dead center kinematics, in which case a certain force must be overcome in order to pivot the lid from the stable open position into the closed position.

The closure device is preferably used for a container for washing and cleaning agents. A container containing washing and cleaning agents and having a closure device is thus disclosed, wherein the latter may be formed in accordance with the exemplary embodiments described here. The washing and/or cleaning agents may be proportioned and/or cleaning agents, which in at least one lateral dimension measure equal to or greater than 31.7 mm and preferably do not fit in a cylinder according to ISO standard 8124-1 (second edition, dated Mar. 15, 2009), 5.2 and therefore pass the “small parts test.”
The invention will be explained in greater detail on the basis of the exemplary embodiments presented in the drawing, in which:

FIGS. 1A-1C show a container having a closure device according to the invention, wherein FIGS. 1A-1C shows different phases of the opening process of the closure device;

FIG. 2 shows a cross section of a first closure means; and

FIG. 3 shows a cross section of a second closure means.

With the aid of FIGS. 1A-1C, the fundamental operating principle of a closure device 10 according to the invention will be described. FIGS. 1A-1C show three different phases (phase 1, phase 2 and phase 3) of an opening process of the closure device 10.

The closure device 10 comprises a frame 20 and a lid 30. The frame 20 is secured here to an upwardly open container 5. FIG. 1A shows the lid 30 in a closed position. In this closed position the lid 30 bears against the frame 10 and closes the opening, which is defined by the frame. In the phase 1 shown in FIG. 1A of the opening process, the container 5 therefore is still closed.

The closure device 10 also comprises a first closure means 40 and a second closure means 50. The closure means 40, 50 are arranged on one side of the substantially rectangular closure device 10. This side can be referred to as the arrangement side and is characterized in FIG. 1A by 11. On a pivot side 12 opposite the arrangement side 11, frames 20 and 30 are interconnected via living hinges (not visible in FIGS. 1A-1C). The living hinges define a pivot axis 6, about which the lid 30 can be lifted when the closure means 40, 50 are in an open position (see FIG. 1C).

In phase 1 a user places the thumb of their right hand on the first closure means 40. The other fingers of the right hand engage the pivot side 12 of the closure device 10 from behind. As will be described later in greater detail, the first closure means 40 can be opened by means of an opening force exerted by the thumb.

In phase 2 (see FIG. 1B), the user places the thumb of their left hand on the second closure means 50. The second closure means can be opened by an opening force in the direction of the pivot side 12. In phase 2 the user continues to press the thumb of the right hand onto the first closure means 40, so that this still retains its open position.

In phase 3 (see FIG. 1C), the user grasps a lid portion 51 of the second closure means 50 using the thumb and index finger, wherein the thumb exerts a first retaining force and the index finger exerts a second retaining force. The thumb and index finger thus pinch the lid portion 51, which is connected to the lid 30, so securely that the lid portion 51 can be drawn upwardly with the lid 30. Since the thumb of the right hand continues to hold the first closure means 40 in the open position, the lid 30 can be fully lifted. Here, the lid 30, as illustrated in FIG. 1C, may warp slightly on account of certain frictional forces or clamping forces between the frame 20 and lid 30.

It should be noted that phases 2 and 3 can also be combined to form a joint phase. In this case the lid portion 51 of the second closure means 50 is grasped by the thumb and index finger of the left hand and then moved in the direction of the pivot axis 6. As soon as the closure means 50 has been opened in this way, the lid portion 51 can be lifted up.

As can be deduced from FIGS. 1A-1C, the first closure means 40 are arranged approximately centrally on the arrangement side 11 of the closure device 10. The second closure means 50 is provided beside said first closure means, at a distance of approximately 6 cm.

Features or components that are similar or identical to the features of components in FIGS. 1A-1C are provided with the same reference signs in the following figures.

FIG. 2 shows a possible embodiment for the first closure means 40 in section. FIG. 2 also shows the lid 30 and the frame 20. The lid 30 has a deeper lid base 31, which rests on a support surface 21 of the frame 20. The lid 30 has a substantially peripheral upper edge 32, wherein a slightly inclined connection wall 33 extends between the lid base 31 and upper edge 32.

The first closure means 40 has a lid portion 41 and a frame portion 42. The lid portion 41 comprises a detent hook 43, which in the position illustrated in FIG. 2 engages a detent undercut 44 from behind. The undercut 44 is formed by a web 45, which is formed in one piece with the frame 20. If an opening force (see arrow 47) now acts on a pressure surface designated by 46, the web 45 is thus pushed to the left with the pressure surface 46 in the illustration of FIG. 2. The locking between the detent hook 41 and detent undercut 44 can thus be released. When the closure means 40 are unlocked, the lid 30 can be lifted, provided the second closure means 50 has also been opened. When the opening process of FIGS. 1A-1C is taken as a basis, the opening force 47 is produced by the thumb of the right hand of the user.

FIG. 3 shows an embodiment for the second closure means 50 in section. The closure means 50 has the lid portion 51 already mentioned above, which is formed in one part with the lid 30, and a frame portion 52, which also can be considered as part of the frame 20. The lid portion 51 comprises a detent hook 53 and a tab 54 connected thereto. The tab 54 has an open end 55 and is connected at an opposite end to the detent hook 53. Between the detent hook 53 and the lid base 31, there is provided a flexible connection piece 56, which defines a pivot axis 57 for the detent hook 53. The pivot axis 57 lies here beneath the lid base 31 and is also arranged beneath the detent hook 53. In the position of the detent hook 53 illustrated in FIG. 3, there is a detent connection between detent hook 53 and a detent undercut 58.

The tab 54 has a front side 59 and a rear side 60, wherein the front side 59 is intended to form a pressure surface and the rear side 60 is intended to form a counter pressure surface. Proceeding from the opening process of FIGS. 1A-1C, wherein phase 2 and phase 3 can also be carried out jointly, the thumb of the left hand is thus placed on the front side 59 and the index finger of the left hand is placed accordingly on the rear side 60. An opening force (see arrow 61) can then be applied to the tab 54 by the thumb, whereby the tab 54 and also the detent hook 53 secured thereto are moved to the left in the illustration of FIG. 3. From a certain point the detent hook 53 no longer engages with the detent undercut 58 from behind, and therefore the tab 54 and thus also the lid 30 can be drawn upwardly. Here, the thumb and index finger of the left hand must clamp the tab 54 using a certain force. A first retaining force (again, see arrow 61) acts accordingly on the front side
and a second retaining force (see arrow 62) acts accordingly on the rear side 60 and is directed against the first retaining force.

LIST OF REFERENCE SIGNS

59, and a second retaining force (see arrow 62) acts accordingly on the rear side 60 and is directed against the first retaining force.

1. A container (10) comprising a frame (20) defining an opening, a lid (30), which covers the opening and is pivotably coupled to the frame (20) via a pivot axis (6) arranged on a side of the frame, and a first closure means (40), and at least one second closure means (50), which is distanced from the first closure means (40), wherein the closure means (40, 50) serve to hold the lid in a closed position and each have a lid portion (41, 51) and a frame portion (42, 52), wherein the first closure means (40) can be opened by direct action of an opening force on the associated frame portion (42) and the second closure means (50) can be opened by direct action of an opening force on the associated lid portion (51), characterized in that the lid portion (51) of the second closure means (50) comprises a pressure surface and a counter pressure surface, wherein the pressure surface serves as a contact surface for the opening force or for a first retaining force and the counter pressure surface serves as a contact surface for a second retaining force, which is opposite the first retaining force, wherein the lid portion (51) can be fixed by the retaining forces in such a way that a pivot force acting substantially transversely to the retaining forces can be introduced into the lid portion (51) via the pressure surface and counter pressure surface in order to pivot the lid (30) out from the closed position.

2. The closure device (10) according to claim 1, characterized in that the lid portion (51) of the second closure means (50) comprises a detent hook (53), which in a locking position engages from behind with a detent undercut (58) of the frame portion (52) of the second closure means (50).

3. The closure device (10) according to claim 2, characterized in that the lid portion (51) of the second closure means (50) comprises a tab (54) having a front side (59) and a rear side (60), wherein the front side (59) forms the pressure surface and the rear side (60) forms the counter pressure surface, and wherein the detent hook (53) is formed integrally with the tab (54).

4. The closure device (10) according to claim 3, characterized in that the tab (54) is connected to the lid (30) via a flexible connection piece (56), which defines a pivot axis (57) for the detent hook (53).

5. The closure device (10) according to claim 4, characterized in that the detent hook (53) is arranged between the pivot axis (57) and the detent undercut (58).

6. The closure device (10) according to claim 1, characterized in that the first closure means (40) and the second closure means (50) are arranged on an arrangement side (11) of the closure device (10).

7. The closure device (10) according to claim 6, characterized in that the arrangement side (11) is arranged opposite the pivot axis (6).

8. The closure device (10) according to claim 1, characterized in that a distance between the first closure means (40) and the second closure means (50) is less than 15 cm.

9. The closure device (10) according to claim 1, characterized in that the lid (30) and the frame (20) of the closure device (10) are formed as a one-part component.

10. The closure device (10) according to claim 1, characterized in that the frame (20) and the lid (30) are pivotably interconnected by a living hinge.

11. The closure device (10) according to claim 1, characterized in that a stable open position of the lid (30) is defined by the living hinge.

12. A container having a closure device according to claim 1.

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