Container

The invention relates to a container, in particular a plastic vial produced in the blow-molding method and filled and closed in the mold, comprising a neck part adjoining a container body, onto which a one-part or multi-part cap can be placed, in particular slipped, wherein a fixing part is allocated to the cap, which is connected to the cap by means of at least one predetermined breaking point, which can be detached by a relative rotational motion between the cap and the container body or parts thereof.

From DE 42 32 305 C1 a multi-part cap for containers is known, in particular bottles produced in the blow-molding method and filled and closed in the mold, including in the form of a vial, having a neck part, onto which the cap can be placed, whereby, adjoining to the section receiving the neck part, the cap has an integrally formed part that is formed as a dropper. The above-mentioned patent describes, as further known solutions, bottles of this kind having an externally threaded neck that is closed at its free end by a closure part, integrally formed with the neck part, wherein a cap screwed onto the neck part is provided with a centrally arranged spike on the inside as an opening device with which the closure part can be pierced. When the cap is removed after piercing the closure part, the liquid present in the bottle can be discharged through the opening created in the closure part.

From DE 195 80 104 T1 a container solution is known, having a hermetically sealed container which is provided with a covering cap, wherein a spike incorporated in the cap serves for piercing a membrane on the neck part of the container. The hollow spike forms a kind of attachment that defines a discharge path in a manner that ensures a controlled removal of liquid. To this end, the

spike, acting as an opening device, pierces the membrane, and after removal of a first cap part, the spike is retained in the membrane by the second cap part such as to provide a controlled dispenser or discharge opening for the container. The first cap part can then serve again for closing the dispenser or discharge opening for the container body of the container.

A container is also known from US 5 954 233 A, which, for an opening process of the known container solution, in addition to a ramp guide between ramp parts of a first cap part /and a second cap part that, when actuated, effects a longitudinal insertion of the second cap part into a locked position on the neck part of the container, which is accompanied by a corresponding exertion of force during actuation, is also provided with nose-like projecting engaging parts on the neck part, that engage with associated recesses of the second cap part for its non-rotatable fixing on the neck part, allowing an opening process of the container in both possible directions of rotation of the first cap part during its screw-on or unscrewing process onto the, or from the, container, respectively. Comparable solutions, however with only one cap part or one cap, having at its end facing the container body a piercing spike, which, as an opening device, pierces a sealing membrane or housing cover part facing it, when screwing the cap onto or off a corresponding threaded segment of the neck part of the container body, are known from US 3 454 196 A1 as well as US 4 723 687 A1.

All solutions in the prior art mentioned above have in common that they do not have a so-called tamper-evident closure, which is an important feature for pertinent containers, clearly indicating to the user possible tampering with the opening-closing system, which is undesirable, or even preventing such tampering.

On the other hand, a container with a two-part cap solution is known from DE 10 2005 025 760 A1, the container body of which is provided with such a tamper-evident closure. The known container body can in turn be manufactured in a simple and cost-effective manner by a blow-molding, filling, and closing method, as it has become known under the trademark "bottelpack®" in the

trade, and the cap parts, as well as the tamper-evident closure, can be produced preferably by injection molding. Especially when such containers are provided for containing a sensitive filling material, such as food or, in particular, pharmaceutical or cosmetic substances, the fixing parts that, during first use of the container, need to be separated from the first cap part by releasing associated predetermined breaking points in order to perform the opening process, have a particularly important function as a tamper-evident closure by clearly indicating, or even preventing, tampering with the opening-closing system as outlined above. For this purpose, the fixing part is connected with the edge of its associated first cap part in the form of a retaining ring via predetermined breaking points in the aforementioned known solution.

The fixing part is mounted on the neck part of the container body, rotatable in the screwing-on direction, but fixed against rotation in the unscrewing direction by means of a unidirectional locking mechanism. To break the tamper-evident closure, i.e., release the connection with first cap part, the user must continue turning the initially loose first cap part in the screwing direction (down) until the retaining ring makes contact with the container shoulder, causing an axial compression between the shoulder, retaining ring and cap part and the predetermined breaking points are torn during further rotation by superimposed axial and torsional forces.

When the user starts, on the other hand, with a rotation in screw-off direction for the first opening, a completely different type of release behavior arises compared to the long paths (up to several rotations) required with the former approach (screwing in). Since the rotation of the locking ring in the unscrewing direction is blocked, releasing the predetermined breaking points is carried out without pronounced deformation and over a short path (small angle of rotation). In this case, however, the user must reverse the direction of rotation after releasing the predetermined breaking points in order to perform the piercing process, and thus the opening of the container body, by unscrewing the first cap part and driving the second cap part with the spike cannula located thereon.

Proceeding from this prior art, the object of the invention is to provide a container of the type under consideration that, while maintaining the advantages achieved in the prior art, is characterized by improved ease of operation.

According to the invention, this object is achieved by a container having the features of claim 1 in its entirety.

According to the characterizing part of claim 1, an essential feature of the invention is the fact that the respective predetermined breaking point can be released by a rotational movement in either rotational direction and with approximately the same rotation angle and torque. Due to the fact that the tearing off of the tamper-evident closure is carried out with a small angle of rotation, i.e., over a short path, even if the user begins the opening cycle with a rotational movement in the unscrewing direction, there is no superposition of the torque required for the release of the breaking points with other torques, such as by piercing the spike cannula, as is sometimes the case with known solutions where, during the unscrewing process, the second cap part is driven in order to make contact with or engage with the neck part, and the piercing of the spike cannula occurs before the release process takes place by the fixing ring making contact with the container shoulder. In the invention, in contrast, the processes of piercing by the spike cannula or the engaging of the cap, or of the respective cap part, takes place independently of the breaking the tamper-evident closure, i.e., the release of the predetermined breaking points is carried out with the invention for both directions of rotation, with approximately the same torque and angle of rotation.

In a preferred embodiment of the container according to the invention, it is provided that the respective predetermined breaking point is implemented using a web bridge with a preferably small cross section, extending between the cap and the fixing part. By reducing the respective predetermined breaking point to a punctiform separating point, the respective predetermined breaking point can be released with relatively low actuating forces while nevertheless, in the sense

of an effective tamper-evident closure, the cap or the respective cap part cannot be unintentionally released for an opening process. Accordingly, an effective lock is added against unwanted or unintended actuation.

In another preferred embodiment of the container according to the invention, it is provided that the opening device opens the container body by piercing, cutting, or by tearing or cutting off at least parts of the container body or that an existing opening in the container body is sealed in a removable manner by a closure body, such as a sealing film which can also be formed such that it is penetrable, which is pierced, for example, by an opening device formed as a piercing spike.

If the container is equipped with a one-piece cap or simply with a single cap part, a piercing spike may be present on the inside of the cap or of the cap part, which pierces open the container body during the screwing-on process for a removal process of the container contents. In alternative embodiments, the cap or the respective cap part has a cutting or tearing ring which serves as an opening device for opening the container body.

In a particularly preferred embodiment of the container according to the invention it is provided that the cap has at least a first cap part and a second cap part, which at least partially extends between the first cap part and the neck part and is provided with at an opening device having at least one opening for opening the container body, that the opening is closable by the first cap part, and that, by means of the attachment or unscrewing process of the first cap part, the first cap part drives the second cap part such that the opening device causes the opening of the container body.

Depending on the particular application and depending on customer requirements, two different opening variations can be implemented in this manner with only one container. Thus, on the one hand, there is the option to deliver the preferred formed container with a so-called open cap assembly, i.e., the first cap part is only partially screwed onto the associated thread of the

container body, for example, half a turn, so that the user must first continue rotating the first cap part further down along the thread in order to then open the container body in a regular manner by means of the opening device in the shape of a spike. The second cap part then remains on the neck part and the upper cap, in the form of the first cap part, must be rotated in the direction opposite to the previous screw-on direction to release the opening for removal of the stored medium from the container. On the other hand, the container can be delivered already open, i.e., the first cap part is completely screwed on; the second cap part is set fixed on the neck part and the opening device, for example in the form of a piercing spike, has already pierced through the opening in the container body for releasing the same. The user of the container must now only unscrew or untwist the upper first cap part in order to use the container contents, for example in the form of eye drops contained therein. Accordingly, with only one assembly, two different customer-specific types of removal options can realized, each of them secured by the described tamper-evident closure. It should be stressed at this point that, where screwing or unscrewing processes of the respective cap or the respective cap part are concerned, this process includes re-releasable engaging processes and engagements between said parts of container.

In exemplary embodiments in which the fixing part, serving as a tamper-evident closure, is in the form of a ring surrounding the neck part in the assembled state, a stop device can be formed on the inside of the ring and the outside of the neck part which blocks a relative rotation in both directions of rotation.

In advantageous exemplary embodiments, the stop device has at least one wing part, preferably a plurality of wing parts, radially projecting from the inside of the ring, acting together with blocking elements on the neck part, preventing rotations in both directions of rotation. In order for such a tamper-evident ring to tear off of the cap at the respective predetermined breaking points in both directions of rotation in a similar and essentially brittle manner, materials with low tensile strength and a high elasticity modulus are particularly suitable, such

as styrene acrylonitrile (SAN), polystyrene (PS), polyethylene terephthalate (PET) polyamide (PA), high density polyethylene (HDPE), polypropylene (PP), and the like.

The wing parts can be provided in the form of ledges extending axially on the inside of the ring, which act together with associated radially projecting blocking elements on the neck part. The ledges may have a rectangular cross-section.

Alternatively, the arrangement may also be such that ledges with a T-shaped, Y-shaped or V-shaped cross-section are provided.

The stop device can also be formed in such a way that, on a respective wing part of the ring, a groove is provided for the engagement with an associated blocking element on the neck part.

The number of blocking elements and the wing parts may be between one and twelve, preferably two to four blocking elements and four to eight wing parts being provided.

In especially advantageous embodiments, the ring serving as a tamper-evident closure has the shape of a crown with a rim of perforations, which are open on the edge facing the first cap part. Thanks to the perforations, the crown shape allows the user an additional, simple visual inspection of whether the first cap part is sufficiently screwed in to perform the piercing process by driving the second cap part.

The object of the invention is also achieved according to another aspect of the invention by a container having the features of claim 15 in its entirety.

According to the characterizing part of claim 15, the invention provides that second cap part, remaining on the neck part when the container body is open, is resiliently expandable in its bell part, extending over the end area of the neck part. This allows for the process, of screwing and of opening by driving the

second cap part, to be performed with little need for torque because, thanks to the resilience of its bell part, the second cap part can be placed securely on the end area of the neck part without great need for force.

In order to provide the desired resilience, axial slots may be formed in the bell part, extending from the edge of the opening.

It may further be advantageously provided that, in order to form an engaging connection between the second cap part and the neck part, ribs are provided, extending circumferentially on the inside of the bell part for engaging in an annular groove on the neck part.

In the following, the invention is explained in detail, with reference to exemplary embodiments shown in principle in the drawings. In the figures:

Fig. 1 shows a longitudinal section of a first exemplary embodiment of the container according to the invention with a two-piece cap, wherein the container body is shown schematically in simplified form, showing only its outline;

Fig. 2 is a perspective view of the first embodiment, wherein the central area is shown in the manner of an angle cut;

Fig. 3 shows a partial longitudinal section of only the upper end portion of the neck part of the container body, with attached first and second cap part of the complete cap;

Fig. 4 shows a longitudinal section of only the second cap part, enlarged in relation to Fig. 3;

Fig. 5 shows, in a further enlarged view, a partial longitudinal section of only the upper portion of the first and second cap part;

Fig. 6 shows a side view of the second cap part, shown separately;

Fig. 7 shows an enlarged and partial depiction of a respective partial cross section of a peripheral region of the neck part with a protruding blocking element and the annular fixing part, serving as a tamper-evident closure, with radially inwardly protruding wing part, having a T-shaped cross section;

Figs. 8 and 9 show partial cross-sections with Y-shaped or V-shaped wing part, respectively, corresponding to Fig. 7;

Fig. 10 shows a representation corresponding to Figs. 7-9, with of an axial groove located on the respective wing part of the annular fixing part for the engagement of an associated blocking element on the neck part;

Fig. 11 shows a representation corresponding to Fig. 1 of a further second embodiment with only one cap; and

Fig. 12 shows four different variants of annular fixing parts with differently designed window openings.

Figs. 1 and 2 show a first embodiment of the container according to the invention. As indicated there, the container includes a container body designated with 1, with a two-part cap 2 and an opening device designated with 3 as a whole. The container body 1 is formed in the manner of a vial made of a plastic material, in which a fluid, not shown in further detail, can be stored, for example, a medically effective liquid, such as in the form of eye drops or the like. Other types of media, including, for example, gaseous or paste-like substances, can be introduced into the container body 1, for example by means of the above-mentioned blow molding process, which has become known in the trade under the trademark "bottelpack®." The opening device 3 can also be used for container bodies 1 produced in a different manner.

Adjoining the top of the container body 1 there is a neck part 5, onto which a first cap part 7 of the cap 2 can be screwed. A second cap part 11 of the cap 2 is inserted in the first cap part 7 at its closed upper end 9, for which Figs. 3 to 6 illustrate further details, wherein the second cap part 11 is shown separately in Fig. 4 in a longitudinal section, and in a side view in Fig. 6. The second cap part 11 is provided as an opening element for the container body 1 and, on its side facing the neck part 5, is provided with a bell portion 13, in the center of which a spike cannula 15 is formed, the cannula of which continues to the upper end of the second cap part 11 via a channel 17. When screwing the first cap part 7 onto the thread 19 of the neck part 5, the second cap part 11 is driven by the closed end 9 of the first cap part 7 so that the bell part 13 is pushed onto the cone-like end part 21 of the neck part 5, wherein the spike cannula 15 pierces the wall of the container body 1 in order to form an opening for dispensing of the container contents via the channel 17. During this opening process, the spike cannula 15 is pierced open at its lower end for fluid removal under formation of a channel opening, or it has already had corresponding fluid passages to respective discharge openings into the channel 17 from the outset.

Figs. 1 and 2 show the state before first opening, wherein the first cap part 7 initially is only loosely fitted to the neck part 5, wherein the cap part 7 is snapped onto the neck part 5 during the assembly process without rotational movement by axially sliding it onto the upper end of the thread 19. As shown in Figs. 1 and 2, the thread 19 has a saw-tooth shape, which allows for this engagement, while securing the cap part 7 against axial movement away from the neck part 5. When, for the first opening process, the cap part 7 is screwed on and the spike cannula 15 performs the puncture, the second cap part 11 is placed onto the cone-like end part 21 of the neck part 5 with its bell part 13. In order to rest on the end part 21, the bell part 13 has a plurality of projecting ribs 23 on the inside, extending in circumferential direction, which, see in particular Figs. 3 and 4, engage with an annular groove 25. For an open container body 1 and a screwed on first cap part 7, the channel 17 is closed by a pin 27 forming a stopper, which is formed at the end 9 of the cap part 7.

For the formation of a tamper-evident closure that provides an indication of whether the container is still in its original state or manipulation of the opening device 3 has already occurred, a fixing part in the form of a ring 29 is allocated to the first cap part 7, wherein the ring, in the assembled state or original state, is integrally formed on the opening edge of the first cap part 7 via predetermined breaking points 31. The release of this connection by breaking the predetermined breaking points 31 is performed by rotating the cap part 7 relative to the ring 29. In order to allow for the relative rotation, a stop device is provided between the ring 29 and the neck part 5 of the container body 1, which secures the ring 29 against rotation in both directions of rotation. As shown in Figs. 1 and 2, the ring 29 surrounds the neck part 5 in the area adjoining the container shoulder 33. In the embodiment illustrated in Figs. 1 and 2, the stop device is provided with blocking elements 35 radially projecting on the neck part 5, which, acting together with the wing parts radially projecting from the inside of the ring 29, form locks against rotation. In the embodiment of Figs. 1 and 2, the wing parts are formed by ledges 37 which have a quadrilateral cross-section and extend in the axial direction along the inside of the ring 29. While in Figs. 1 and 2 only a few blocking elements 35 and ledges 37 are visible, it will be appreciated that a plurality of blocking elements 35 and ledges 37 are present to form an effective barrier even at small angles of rotation in both directions of rotation. Preferably two to four blocking elements 35 and four to eight wing parts are provided, for example in the form of ledges 37.

Figs. 7 to 10 illustrate modified embodiments with a modified design of the stop device. The examples of Figs. 7 to 9 differ with respect to the exemplary embodiment of Figs. 1 and 2 in that ledges 37 with a modified cross-sectional shape are provided, namely T-shaped ledges 37 in Fig. 7, Y-shaped ledges 37 in Fig. 8, and V-shaped ledges 37 in Fig. 9. By the cross-sectional shape extending further circumferentially, the respective dead space between successive blocking elements 35 is reduced, so that the blocking is effective even for small angles of rotation in both directions of rotation. The example of Fig. 10 shows wing parts 37 on the ring 29 with an axially extending groove 39

for the engagement with a respective blocking element 35. In this example, the free angle of rotation is limited to virtually zero. Alternatively, the individual blocking elements 35 can be at least partially disposed on the ring 29 and the interacting elements or ledges 37 can be disposed on the container body 1.

Due to the blocking of the relative rotation in both directions of rotation, the user can release the tamper-evident closure by turning the cap part 7 in any direction without having to perform several revolutions. With the tamper-evident closure released, the user is free to perform the piercing and opening process by further screwing on, and then remove the first cap part 7 to dispense contents, wherein the second cap part 11 is pushed onto the end part 21 of the neck part 5 and remains engaged. After dispensing the contents, a closing process may be performed again by means of the pin 27 by screwing the cap part 7 on.

In the embodiment shown in Figs. 1 and 2 the ring 29 forming the tamper-evident closure has the shape of a crown with a rim of perforations 41, which are open on the upper edge facing the first cap part 7. These perforations 41 allow the user a simple visual inspection if the cap parts 7, 11 are screwed on sufficiently for the piercing and opening process.

To make placing the second cap part 11 onto the end part 21 of the neck part 5 and the securing by engaging the bell part 13 simple and secure, several slots 45, beginning at the opening edge 43 and extending axially, are formed in the bell part 13. They provide the bell portion 13 with a certain elastic resilience, so that the bell part 13 can expand radially when pushed onto the end part 21 before the ribs 23 cause the engagement of the second cap part 11 with the neck part 5 by snapping into the groove 25.

The ledges 37 extend in vertical direction in the perspective of Figs. 1 and 2 over the entire inner circumference of the ring 29 from top to bottom for secure anchoring and force-transmission. At the upper transition point, the ledges 37 are then connected with the outer cap 7 only via a small web bridge 47 at its lower end, so that, despite the large number of predetermined breaking points

31 formed via the web bridges 47, which are released collectively, only low actuation forces are necessary for releasing the cap 7 from the ring 29. The web bridges, which are moreover thin-walled, provide the connection between the lower circumferential edge of the respective outer cap 2 to the edge-like longitudinal ridges 37 virtually without spacing. Predetermined breaking points 31 are also provided via the above mentioned web bridges 47 in a number comparable to the number of ledges 37. Predetermined breaking point solutions are here also possible in which, if appropriate, the respective inner side of the ledge 37 is connected to the facing outer side of cap 2 in a releasable manner over a longer distance. In particular, seen in the perspective of the individual figures, the respective web bridge 47 has a horizontal orientation with respect to the vertically arranged ledges 37.

In the further second embodiment according to the illustration of Fig. 11, which is constructed similarly to the solution according to Fig. 1 with respect to the graphic representation, instead of a two-part cap, only a one-part cap 2 is used, which, by means of a piercing spike 42, which in this case is a solid form 42, provides for the opening of the container body 1 at its upper side in the region of the neck part 5, when the cap 2 is moved downward over the thread sections 19 that can be allocated thereto, seen through a screwing-in in the perspective of Fig. 11. In this case as well, the tamper-evident closure must first be released via the predetermined breaking points 31, 47. If the cap 2 is removed from the container body 1 after piercing the container body 1 by the solid spike 42, a removal process can take place for the container contents through the, not shown, opening in the neck part 5. Analogous embodiments to the design of Fig. 11 are obtained by the use of other one-piece caps, which can open the container body not by piercing or cutting in, but by tearing or cutting off. In such relevant cases as well, for the purposes of the invention, only a retaining ring 29 attached via the predetermined breaking points 31 is provided as a tamper-evident closure.

In the embodiments according to Figs. 1 to 11, the retaining ring 29 is provided

with slot-like perforations in the form of a crown at its upper side in perspective of the figures. The representation of Fig. 12, on the other hand, shows other embodiments of perforations 41 for the ring 29. In the perspective of Fig. 2, the ring 29 is provided with slot-like perforations 41 in a horizontal orientation in the top left, the linear extension of which may be chosen differently, allowing for a division into groups of different lengths. In contrast, in the embodiment in the perspective of Fig. 12 in the top right, the horizontally arranged perforations 41, which extend over the entire outer circumference of ring 29, are formed with the same length.

The embodiment according to Fig. 12 shows, at bottom left, an arrangement of perforations 41 in the vertical orientation at an equal distance from each other. The pertinent vertical slits are bounded on their outer circumference by the material of the ring 29. The remaining depiction (Fig. 12, bottom right) now shows perforations in the ring 29 in a circular ring shape; in this case, other configurations of any kind are possible, including in a polygonal shape. Ultimately, the perforations 41 in the manner of window openings are to provide the operator with visual feedback from outside as to what extent the cap 2 is screwed in in the direction of the ring 29 by the lower outer periphery of the cap 2, when being screwed in, overlapping with the respective passage point 41, thus allowing for visual determination of the position detection for the cap 2. Due to the fact that the openings 41 are arranged at several locations along the outer periphery of the ring 29, the desired visual detection can be performed regardless of the location position of the container 1 with respect to the user. Finally it should be noted that, for a better actuation of the respective cap 2, it may be provided with ribbing 49 on is outer peripheral side.

Claims

1. A container, in particular a plastic vial produced in the blow-molding method and filled and closed in the mold, comprising a neck part (5) joining a container body (1), onto which neck part a one-part or multi- part cap (2) can be placed, in particular slipped, a fixing part (29) being associated with the cap (2), which fixing part is connected to the cap (2) by means of at least one predetermined breaking point (31), which can be detached by a relative rotational motion between the cap (2) and the container body (1) or parts of the container body, characterized in that each predetermined breaking point (31) can be detached by rotational motions that occur both in the one rotational direction and in the other rotational direction with approximately the same angle of rotation and approximately the same torque.

2. The container according to Claim 1, characterized in that the respective predetermined breaking point (31) is implemented using a web bridge, (47) with a preferably small cross section, extending between the cap (2) and the fixing part (29).

3. The container according to Claim 1 or 2, characterized in that the opening device (3) opens the container body (1) by piercing, cutting into, or by tearing or cutting off at least parts of the container body (1), or that an existing opening in the container body (1) is sealed in a removable manner by a closure body, such as a sealing film which can also be formed penetrable.

4. The container according to one of the preceding Claims, characterized in that the cap (2), in a one-piece design, includes a piercing spike (42) or a cutting or tear-off ring which opens the container body (1).

5. The container according to one of the preceding Claims, characterized in

that the cap (2) has at least a first cap part (7) and a second cap part (11), which at least partially extends between the first cap part (7) and the neck part (5) and is provided with an opening device (3) having at least one opening (17) for opening the container body (1), that the opening (17) is closable by the first cap part (7), and that, by means of the attachment or unscrewing process of the first cap part (7), the first cap part (7) drives the second cap part (11) such that the opening device (3) causes the opening of the container body (1).

6. The container according to one of the preceding Claims, characterized in that the fixing part serving as a tamper-evident closure is in the form of a ring (29) surrounding the neck part (5) in the assembled state, and that a stop device (35, 37) is formed on the inside of the ring and the outside of the neck part (5), which blocks a relative rotation in both directions of rotation.

7. The container according to one of the preceding Claims, characterized in that the stop device (35, 37) has at least one wing part (37), preferably a plurality of wing parts (37), radially projecting from the inside of the ring (29), acting together with blocking elements (35) on the neck part (5), preventing rotations in both directions of rotation.

8. The container according to one of the preceding claims, characterized in that the wing parts can be provided in the form of ledges (37) extending axially on the inside of the ring (29), which act together with associated radially projecting blocking elements (35) on the neck part (5).

9. The container according to one of the preceding Claims, characterized in that edges (37) have a rectangular cross-section.

10. The container according to one of the preceding Claims, characterized in

that the edges (37) have a T-shaped, Y-shaped, or V-shaped cross-section.

11. The container according to one of the preceding Claims, characterized in that, in order to form the stop device, a groove (39) is provided, extending in the axial direction in the respective wing part (37) of the ring (29) for engaging with an associated blocking element (35) on the neck part (5).

12. The container according to one of the preceding Claims, characterized in that the number of blocking elements (35) and the wing parts (37) may be between one and twelve, preferably two to four blocking elements (35) and four to eight wing parts (37) being provided.

13. The container according to one of the preceding Claims, characterized in that the ring (29) has the shape of a crown with a rim of perforations (41), which are open on the edge facing the first cap part (7).

14. The container according to one of the preceding Claims, characterized in that the ring (29) has one or more window-like perforations (41) which are at least partially formed slot-like, round or polygonal in shape.

15. A container, in particular a plastic vial manufactured in the blow-molding method and filled and closed in the mold with a neck part (5) adjacent to a container body (1) onto which a first cap part (7) is attachable, in particular pluggable, and having a second cap part (11), which at least partially extends between the first cap part (7) and the neck part (5) and which is provided with an at least one opening device (3) with an opening (17) for opening the container body (1), which is closable by means of the first cap part (7), wherein, through the attachment or screwing process of the first cap part (7), the first cap part drives the second cap part (11) such that the opening device (3) causes the opening of the container body (1),

and wherein the second cap part (11) remains on the neck part (5), characterized in that, when the container body (1) is open, the second cap part (11) remaining on the neck part (5) is resiliently extensible in its bell portion (13) extending over the end region (21) of the neck part (5).

16. The container according to Claim 10, characterized in that, in the bell part (13), axial slits (45) are formed extending from the opening edge (43).

17. The container according to Claim 10 or 11, characterized in that, in order to form an engaging connection between the second cap part (11) and the neck part (5), ribs (23) are provided, extending circumferentially on the inside of the bell part (13) for engaging in an annular groove (25) on the neck part (5).

Container

The invention relates to a container, in particular a plastic vial produced in the blow-molding method and filled and closed in the mold, comprising a neck part adjoining a container body, onto which a one-part or multi-part cap can be screwed, wherein a fixing part is allocated to the cap, which is connected to the cap by means of at least one predetermined breaking point, which can be detached by a relative rotational motion between the cap and the container body or parts thereof.

From DE 42 32 305 C1 a multi-part cap for containers is known, in particular bottles produced in the blow-molding method and filled and closed in the mold, including in the form of a vial, having a neck part, onto which the cap can be placed, whereby, adjoining to the section receiving the neck part, the cap has an integrally formed part that is formed as a dropper. The above-mentioned patent describes, as further known solutions, bottles of this kind having an externally threaded neck that is closed at its free end by a closure part, integrally formed with the neck part, wherein a cap screwed onto the neck part is provided with a centrally arranged spike on the inside as an opening device with which the closure part can be pierced. When the cap is removed after piercing the closure part, the liquid present in the bottle can be discharged through the opening created in the closure part.

From DE 195 80 104 T1 a container solution is known, having a hermetically sealed container which is provided with a covering cap, wherein a spike incorporated in the cap serves for piercing a membrane on the neck part of the container. The hollow spike forms a kind of attachment that defines a discharge path in a manner that ensures a controlled removal of liquid. To this end, the

spike, acting as an opening device, pierces the membrane, and after removal of a first cap part, the spike is retained in the membrane by the second cap part such as to provide a controlled dispenser or discharge opening for the container. The first cap part can then serve again for closing the dispenser or discharge opening for the container body of the container.

A container is also known from US 5 954 233 A, which, for an opening process of the known container solution, in addition to a ramp guide between ramp parts of a first cap part /and a second cap part that, when actuated, effects a longitudinal insertion of the second cap part into a locked position on the neck part of the container, which is accompanied by a corresponding exertion of force during actuation, is also provided with nose-like projecting engaging parts on the neck part, that engage with associated recesses of the second cap part for its non-rotatable fixing on the neck part, allowing an opening process of the container in both possible directions of rotation of the first cap part during its screw-on or unscrewing process onto the, or from the, container, respectively. Comparable solutions, however with only one cap part or one cap, having at its end facing the container body a piercing spike, which, as an opening device, pierces a sealing membrane or housing cover part facing it, when screwing the cap onto or off a corresponding threaded segment of the neck part of the container body, are known from US 3 454 196 A1 as well as US 4 723 687 A1.

All solutions in the prior art mentioned above have in common that they do not have a so-called tamper-evident closure, which is an important feature for pertinent containers, clearly indicating to the user possible tampering with the opening-closing system, which is undesirable, or even preventing such tampering.

On the other hand, a container with a two-part cap solution is known from DE 10 2005 025 760 A1, the container body of which is provided with such a tamper-evident closure. The known container body can in turn be manufactured in a simple and cost-effective manner by a blow-molding, filling, and closing method, as it has become known under the trademark "bottelpack®" in the

trade, and the cap parts, as well as the tamper-evident closure, can be produced preferably by injection molding. Especially when such containers are provided for containing a sensitive filling material, such as food or, in particular, pharmaceutical or cosmetic substances, the fixing parts that, during first use of the container, need to be separated from the first cap part by releasing associated predetermined breaking points in order to perform the opening process, have a particularly important function as a tamper-evident closure by clearly indicating, or even preventing, tampering with the opening-closing system as outlined above. For this purpose, the fixing part is connected with the edge of its associated first cap part in the form of a retaining ring via predetermined breaking points in the aforementioned known solution.

The fixing part is mounted on the neck part of the container body, rotatable in the screwing-on direction, but fixed against rotation in the unscrewing direction by means of a unidirectional locking mechanism. To break the tamper-evident closure, i.e., release the connection with first cap part, the user must continue turning the initially loose first cap part in the screwing direction (down) until the retaining ring makes contact with the container shoulder, causing an axial compression between the shoulder, retaining ring and cap part and the predetermined breaking points are torn during further rotation by superimposed axial and torsional forces.

When the user starts, on the other hand, with a rotation in screw-off direction for the first opening, a completely different type of release behavior arises compared to the long paths (up to several rotations) required with the former approach (screwing in). Since the rotation of the locking ring in the unscrewing direction is blocked, releasing the predetermined breaking points is carried out without pronounced deformation and over a short path (small angle of rotation). In this case, however, the user must reverse the direction of rotation after releasing the predetermined breaking points in order to perform the piercing process, and thus the opening of the container body, by unscrewing the first cap part and driving the second cap part with the spike cannula located thereon.

Additional containers were disclosed by US 2004/0200855 A1 and WO 98/55368 A2.

Proceeding from this prior art, the object of the invention is to provide a container of the type under consideration that, while maintaining the advantages achieved in the prior art, is characterized by improved ease of operation.

According to the invention, this object is achieved by a container having the features of claim 1 in its entirety.

According to the characterizing part of claim 1, an essential feature of the invention is the fact that the respective predetermined breaking point can be released by a rotational movement in either rotational direction and with approximately the same rotation angle and torque. Due to the fact that the tearing off of the tamper-evident closure is carried out with a small angle of rotation, i.e., over a short path, even if the user begins the opening cycle with a rotational movement in the unscrewing direction, there is no superposition of the torque required for the release of the breaking points with other torques, such as by piercing the spike cannula, as is sometimes the case with known solutions where, during the unscrewing process, the second cap part is driven in order to make contact with or engage with the neck part, and the piercing of the spike cannula occurs before the release process takes place by the fixing ring making contact with the container shoulder. In the invention, in contrast, the processes of piercing by the spike cannula or the engaging of the cap, or of the respective cap part, takes place independently of the breaking the tamper-evident closure, i.e., the release of the predetermined breaking points is carried out with the invention for both directions of rotation, with approximately the same torque and angle of rotation.

In a preferred embodiment of the container according to the invention, it is provided that the respective predetermined breaking point is implemented using a web bridge with a preferably small cross section, extending between the cap

and the fixing part. By reducing the respective predetermined breaking point to a punctiform separating point, the respective predetermined breaking point can be released with relatively low actuating forces while nevertheless, in the sense of an effective tamper-evident closure, the cap or the respective cap part cannot be unintentionally released for an opening process. Accordingly, an effective lock is added against unwanted or unintended actuation.

In another preferred embodiment of the container according to the invention, it is provided that the opening device opens the container body by piercing, cutting, or by tearing or cutting off at least parts of the container body or that an existing opening in the container body is sealed in a removable manner by a closure body, such as a sealing film which can also be formed such that it is penetrable, which is pierced, for example, by an opening device formed as a piercing spike.

If the container is equipped with a one-piece cap or simply with a single cap part, a piercing spike may be present on the inside of the cap or of the cap part, which pierces open the container body during the screwing-on process for a removal process of the container contents. In alternative embodiments, the cap or the respective cap part has a cutting or tearing ring which serves as an opening device for opening the container body.

In a particularly preferred embodiment of the container according to the invention it is provided that the cap has at least a first cap part and a second cap part, which at least partially extends between the first cap part and the neck part and is provided with at an opening device having at least one opening for opening the container body, that the opening is closable by the first cap part, and that, by means of the attachment or unscrewing process of the first cap part, the first cap part drives the second cap part such that the opening device causes the opening of the container body.

Depending on the particular application and depending on customer requirements, two different opening variations can be implemented in this

manner with only one container. Thus, on the one hand, there is the option to deliver the preferred formed container with a so-called open cap assembly, i.e., the first cap part is only partially screwed onto the associated thread of the container body, for example, half a turn, so that the user must first continue rotating the first cap part further down along the thread in order to then open the container body in a regular manner by means of the opening device in the shape of a spike. The second cap part then remains on the neck part and the upper cap, in the form of the first cap part, must be rotated in the direction opposite to the previous screw-on direction to release the opening for removal of the stored medium from the container. On the other hand, the container can be delivered already open, i.e., the first cap part is completely screwed on; the second cap part is set fixed on the neck part and the opening device, for example in the form of a piercing spike, has already pierced through the opening in the container body for releasing the same. The user of the container must now only unscrew or untwist the upper first cap part in order to use the container contents, for example in the form of eye drops contained therein. Accordingly, with only one assembly, two different customer-specific types of removal options can realized, each of them secured by the described tamper-evident closure. It should be stressed at this point that, where screwing or unscrewing processes of the respective cap or the respective cap part are concerned, this process includes re-releasable engaging processes and engagements between said parts of container.

In exemplary embodiments in which the fixing part, serving as a tamper-evident closure, is in the form of a ring surrounding the neck part in the assembled state, a stop device can be formed on the inside of the ring and the outside of the neck part which blocks a relative rotation in both directions of rotation.

In advantageous exemplary embodiments, the stop device has at least one wing part, preferably a plurality of wing parts, radially projecting from the inside of the ring, acting together with blocking elements on the neck part, preventing rotations in both directions of rotation. In order for such a tamper-evident ring to

tear off of the cap at the respective predetermined breaking points in both directions of rotation in a similar and essentially brittle manner, materials with low tensile strength and a high elasticity modulus are particularly suitable, such as styrene acrylonitrile (SAN), polystyrene (PS), polyethylene terephthalate (PET) polyamide (PA), high density polyethylene (HDPE), polypropylene (PP), and the like.

The wing parts can be provided in the form of ledges extending axially on the inside of the ring, which act together with associated radially projecting blocking elements on the neck part. The ledges may have a rectangular cross-section.

Alternatively, the arrangement may also be such that ledges with a T-shaped, Y-shaped or V-shaped cross-section are provided.

The stop device can also be formed in such a way that, on a respective wing part of the ring, a groove is provided for the engagement with an associated blocking element on the neck part.

The number of blocking elements and the wing parts may be between one and twelve, preferably two to four blocking elements and four to eight wing parts being provided.

In especially advantageous embodiments, the ring serving as a tamper-evident closure has the shape of a crown with a rim of perforations, which are open on the edge facing the first cap part. Thanks to the perforations, the crown shape allows the user an additional, simple visual inspection of whether the first cap part is sufficiently screwed in to perform the piercing process by driving the second cap part.

The object of the invention is also achieved according to another aspect of the invention by a container having the features of claim 15 in its entirety.

According to the characterizing part of claim 15, the invention provides that

second cap part, remaining on the neck part when the container body is open, is resiliently expandable in its bell part, extending over the end area of the neck part. This allows for the process, of screwing and of opening by driving the second cap part, to be performed with little need for torque because, thanks to the resilience of its bell part, the second cap part can be placed securely on the end area of the neck part without great need for force.

In order to provide the desired resilience, axial slots are formed in the bell part, extending from the edge of the opening.

It may further be advantageously provided that, in order to form an engaging connection between the second cap part and the neck part, ribs are provided, extending circumferentially on the inside of the bell part for engaging in an annular groove on the neck part.

In the following, the invention is explained in detail, with reference to exemplary embodiments shown in principle in the drawings. In the figures:

Fig. 1 shows a longitudinal section of a first exemplary embodiment of the container according to the invention with a two-piece cap, wherein the container body is shown schematically in simplified form, showing only its outline;

Fig. 2 is a perspective view of the first embodiment, wherein the central area is shown in the manner of an angle cut;

Fig. 3 shows a partial longitudinal section of only the upper end portion of the neck part of the container body, with attached first and second cap part of the complete cap;

Fig. 4 shows a longitudinal section of only the second cap part, enlarged in relation to Fig. 3;

Fig. 5 shows, in a further enlarged view, a partial longitudinal section of only the upper portion of the first and second cap part;

Fig. 6 shows a side view of the second cap part, shown separately;

Fig. 7 shows an enlarged and partial depiction of a respective partial cross section of a peripheral region of the neck part with a protruding blocking element and the annular fixing part, serving as a tamper-evident closure, with radially inwardly protruding wing part, having a T-shaped cross section;

Figs. 8 and 9 show partial cross-sections with Y-shaped or V-shaped wing part, respectively, corresponding to Fig. 7;

Fig. 10 shows a representation corresponding to Figs. 7-9, with of an axial groove located on the respective wing part of the annular fixing part for the engagement of an associated blocking element on the neck part;

Fig. 11 shows a representation corresponding to Fig. 1 of a further second embodiment with only one cap; and

Fig. 12 shows four different variants of annular fixing parts with differently designed window openings.

Figs. 1 and 2 show a first embodiment of the container according to the invention. As indicated there, the container includes a container body designated with 1, with a two-part cap 2 and an opening device designated with 3 as a whole. The container body 1 is formed in the manner of a vial made of a plastic material, in which a fluid, not shown in further detail, can be stored, for example, a medically effective liquid, such as in the form of eye drops or the like. Other types of media, including, for example, gaseous or paste-like substances, can be introduced into the container body 1, for example by means

of the above-mentioned blow molding process, which has become known in the trade under the trademark "bottelpack®." The opening device 3 can also be used for container bodies 1 produced in a different manner.

Adjoining the top of the container body 1 there is a neck part 5, onto which a first cap part 7 of the cap 2 can be screwed. A second cap part 11 of the cap 2 is inserted in the first cap part 7 at its closed upper end 9, for which Figs. 3 to 6 illustrate further details, wherein the second cap part 11 is shown separately in Fig. 4 in a longitudinal section, and in a side view in Fig. 6. The second cap part 11 is provided as an opening element for the container body 1 and, on its side facing the neck part 5, is provided with a bell portion 13, in the center of which a spike cannula 15 is formed, the cannula of which continues to the upper end of the second cap part 11 via a channel 17. When screwing the first cap part 7 onto the thread 19 of the neck part 5, the second cap part 11 is driven by the closed end 9 of the first cap part 7 so that the bell part 13 is pushed onto the cone-like end part 21 of the neck part 5, wherein the spike cannula 15 pierces the wall of the container body 1 in order to form an opening for dispensing of the container contents via the channel 17. During this opening process, the spike cannula 15 is pierced open at its lower end for fluid removal under formation of a channel opening, or it has already had corresponding fluid passages to respective discharge openings into the channel 17 from the outset.

Figs. 1 and 2 show the state before first opening, wherein the first cap part 7 initially is only loosely fitted to the neck part 5, wherein the cap part 7 is snapped onto the neck part 5 during the assembly process without rotational movement by axially sliding it onto the upper end of the thread 19. As shown in Figs. 1 and 2, the thread 19 has a saw-tooth shape, which allows for this engagement, while securing the cap part 7 against axial movement away from the neck part 5. When, for the first opening process, the cap part 7 is screwed on and the spike cannula 15 performs the puncture, the second cap part 11 is placed onto the cone-like end part 21 of the neck part 5 with its bell part 13. In order to rest on the end part 21, the bell part 13 has a plurality of projecting ribs 23 on the inside,

extending in circumferential direction, which, see in particular Figs. 3 and 4, engage with an annular groove 25. For an open container body 1 and a screwed on first cap part 7, the channel 17 is closed by a pin 27 forming a stopper, which is formed at the end 9 of the cap part 7.

For the formation of a tamper-evident closure that provides an indication of whether the container is still in its original state or manipulation of the opening device 3 has already occurred, a fixing part in the form of a ring 29 is allocated to the first cap part 7, wherein the ring, in the assembled state or original state, is integrally formed on the opening edge of the first cap part 7 via predetermined breaking points 31. The release of this connection by breaking the predetermined breaking points 31 is performed by rotating the cap part 7 relative to the ring 29. In order to allow for the relative rotation, a stop device is provided between the ring 29 and the neck part 5 of the container body 1, which secures the ring 29 against rotation in both directions of rotation. As shown in Figs. 1 and 2, the ring 29 surrounds the neck part 5 in the area adjoining the container shoulder 33. In the embodiment illustrated in Figs. 1 and 2, the stop device is provided with blocking elements 35 radially projecting on the neck part 5, which, acting together with the wing parts radially projecting from the inside of the ring 29, form locks against rotation. In the embodiment of Figs. 1 and 2, the wing parts are formed by ledges 37 which have a quadrilateral cross-section and extend in the axial direction along the inside of the ring 29. While in Figs. 1 and 2 only a few blocking elements 35 and ledges 37 are visible, it will be appreciated that a plurality of blocking elements 35 and ledges 37 are present to form an effective barrier even at small angles of rotation in both directions of rotation. Preferably two to four blocking elements 35 and four to eight wing parts are provided, for example in the form of ledges 37.

Figs. 7 to 10 illustrate modified embodiments with a modified design of the stop device. The examples of Figs. 7 to 9 differ with respect to the exemplary embodiment of Figs. 1 and 2 in that ledges 37 with a modified cross-sectional shape are provided, namely T-shaped ledges 37 in Fig. 7, Y-shaped ledges 37 in Fig. 8, and V-shaped ledges 37 in Fig. 9. By the cross-sectional shape

extending further circumferentially, the respective dead space between successive blocking elements 35 is reduced, so that the blocking is effective even for small angles of rotation in both directions of rotation. The example of Fig. 10 shows wing parts 37 on the ring 29 with an axially extending groove 39 for the engagement with a respective blocking element 35. In this example, the free angle of rotation is limited to virtually zero. Alternatively, the individual blocking elements 35 can be at least partially disposed on the ring 29 and the interacting elements or ledges 37 can be disposed on the container body 1.

Due to the blocking of the relative rotation in both directions of rotation, the user can release the tamper-evident closure by turning the cap part 7 in any direction without having to perform several revolutions. With the tamper-evident closure released, the user is free to perform the piercing and opening process by further screwing on, and then remove the first cap part 7 to dispense contents, wherein the second cap part 11 is pushed onto the end part 21 of the neck part 5 and remains engaged. After dispensing the contents, a closing process may be performed again by means of the pin 27 by screwing the cap part 7 on.

In the embodiment shown in Figs. 1 and 2 the ring 29 forming the tamper-evident closure has the shape of a crown with a rim of perforations 41, which are open on the upper edge facing the first cap part 7. These perforations 41 allow the user a simple visual inspection if the cap parts 7, 11 are screwed on sufficiently for the piercing and opening process.

To make placing the second cap part 11 onto the end part 21 of the neck part 5 and the securing by engaging the bell part 13 simple and secure, several slots 45, beginning at the opening edge 43 and extending axially, are formed in the bell part 13. They provide the bell portion 13 with a certain elastic resilience, so that the bell part 13 can expand radially when pushed onto the end part 21 before the ribs 23 cause the engagement of the second cap part 11 with the neck part 5 by snapping into the groove 25.

The ledges 37 extend in vertical direction in the perspective of Figs. 1 and 2

over the entire inner circumference of the ring 29 from top to bottom for secure anchoring and force-transmission. At the upper transition point, the ledges 37 are then connected with the outer cap 7 only via a small web bridge 47 at its lower end, so that, despite the large number of predetermined breaking points 31 formed via the web bridges 47, which are released collectively, only low actuation forces are necessary for releasing the cap 7 from the ring 29. The web bridges, which are moreover thin-walled, provide the connection between the lower circumferential edge of the respective outer cap 2 to the edge-like longitudinal ridges 37 virtually without spacing. Predetermined breaking points 31 are also provided via the above mentioned web bridges 47 in a number comparable to the number of ledges 37. Predetermined breaking point solutions are here also possible in which, if appropriate, the respective inner side of the ledge 37 is connected to the facing outer side of cap 2 in a releasable manner over a longer distance. In particular, seen in the perspective of the individual figures, the respective web bridge 47 has a horizontal orientation with respect to the vertically arranged ledges 37.

In the further second embodiment according to the illustration of Fig. 11, which is constructed similarly to the solution according to Fig. 1 with respect to the graphic representation, instead of a two-part cap, only a one-part cap 2 is used, which, by means of a piercing spike 42, which in this case is a solid form 42, provides for the opening of the container body 1 at its upper side in the region of the neck part 5, when the cap 2 is moved downward over the thread sections 19 that can be allocated thereto, seen through a screwing-in in the perspective of Fig. 11. In this case as well, the tamper-evident closure must first be released via the predetermined breaking points 31, 47. If the cap 2 is removed from the container body 1 after piercing the container body 1 by the solid spike 42, a removal process can take place for the container contents through the, not shown, opening in the neck part 5. Analogous embodiments to the design of Fig. 11 are obtained by the use of other one-piece caps, which can open the container body not by piercing or cutting in, but by tearing or cutting off. In such relevant cases as well, for the purposes of the invention, only a retaining ring 29

attached via the predetermined breaking points 31 is provided as a tamper-evident closure.

In the embodiments according to Figs. 1 to 11, the retaining ring 29 is provided with slot-like perforations in the form of a crown at its upper side in perspective of the figures. The representation of Fig. 12, on the other hand, shows other embodiments of perforations 41 for the ring 29. In the perspective of Fig. 2, the ring 29 is provided with slot-like perforations 41 in a horizontal orientation in the top left, the linear extension of which may be chosen differently, allowing for a division into groups of different lengths. In contrast, in the embodiment in the perspective of Fig. 12 in the top right, the horizontally arranged perforations 41, which extend over the entire outer circumference of ring 29, are formed with the same length.

The embodiment according to Fig. 12 shows, at bottom left, an arrangement of perforations 41 in the vertical orientation at an equal distance from each other. The pertinent vertical slits are bounded on their outer circumference by the material of the ring 29. The remaining depiction (Fig. 12, bottom right) now shows perforations in the ring 29 in a circular ring shape; in this case, other configurations of any kind are possible, including in a polygonal shape. Ultimately, the perforations 41 in the manner of window openings are to provide the operator with visual feedback from outside as to what extent the cap 2 is screwed in in the direction of the ring 29 by the lower outer periphery of the cap 2, when being screwed in, overlapping with the respective passage point 41, thus allowing for visual determination of the position detection for the cap 2. Due to the fact that the openings 41 are arranged at several locations along the outer periphery of the ring 29, the desired visual detection can be performed regardless of the location position of the container 1 with respect to the user. Finally it should be noted that, for a better actuation of the respective cap 2, it may be provided with ribbing 49 on is outer peripheral side.

Claims

1. A container, in particular a plastic vial produced in the blow-molding method and filled and closed in the mold, comprising a neck part (5) joining a container body (1), onto which neck part a one-part or multi- part cap (2) can be screwed, a fixing part (29) being associated with the cap (2), which fixing part is connected to the cap (2) by means of at least one predetermined breaking point (31), which can be detached by a relative rotational motion between the cap (2) and the container body (1) or parts of the container body, characterized in that each predetermined breaking point (31) can be detached by rotational motions that occur both in the one rotational direction and in the other rotational direction with approximately the same angle of rotation and approximately the same torque.

2. The container according to Claim 1, characterized in that the respective predetermined breaking point (31) is implemented using a web bridge, (47) with a preferably small cross section, extending between the cap (2) and the fixing part (29).

3. The container according to Claim 1 or 2, characterized in that the opening device (3) opens the container body (1) by piercing, cutting into, or by tearing or cutting off at least parts of the container body (1), or that an existing opening in the container body (1) is sealed in a removable manner by a closure body, such as a sealing film which can also be formed penetrable.

4. The container according to one of the preceding Claims, characterized in that the cap (2), in a one-piece design, includes a piercing spike (42) or a cutting or tear-off ring which opens the container body (1).

5. The container according to one of the preceding Claims, characterized in

that the cap (2) has at least a first cap part (7) and a second cap part (11), which at least partially extends between the first cap part (7) and the neck part (5) and is provided with an opening device (3) having at least one opening (17) for opening the container body (1), that the opening (17) is closable by the first cap part (7), and that, by means of the attachment or unscrewing process of the first cap part (7), the first cap part (7) drives the second cap part (11) such that the opening device (3) causes the opening of the container body (1).

6. The container according to one of the preceding Claims, characterized in that the fixing part serving as a tamper-evident closure is in the form of a ring (29) surrounding the neck part (5) in the assembled state, and that a stop device (35, 37) is formed on the inside of the ring and the outside of the neck part (5), which blocks a relative rotation in both directions of rotation.

7. The container according to one of the preceding Claims, characterized in that the stop device (35, 37) has at least one wing part (37), preferably a plurality of wing parts (37), radially projecting from the inside of the ring (29), acting together with blocking elements (35) on the neck part (5), preventing rotations in both directions of rotation.

8. The container according to one of the preceding claims, characterized in that the wing parts can be provided in the form of ledges (37) extending axially on the inside of the ring (29), which act together with associated radially projecting blocking elements (35) on the neck part (5).

9. The container according to one of the preceding Claims, characterized in that edges (37) have a rectangular cross-section.

10. The container according to one of the preceding Claims, characterized in

that the edges (37) have a T-shaped, Y-shaped, or V-shaped cross-section.

11. The container according to one of the preceding Claims, characterized in that, in order to form the stop device, a groove (39) is provided, extending in the axial direction in the respective wing part (37) of the ring (29) for engaging with an associated blocking element (35) on the neck part (5).

12. The container according to one of the preceding Claims, characterized in that the number of blocking elements (35) and the wing parts (37) may be between one and twelve, preferably two to four blocking elements (35) and four to eight wing parts (37) being provided.

13. The container according to one of the preceding Claims, characterized in that the ring (29) has the shape of a crown with a rim of perforations (41), which are open on the edge facing the first cap part (7).

14. The container according to one of the preceding Claims, characterized in that the ring (29) has one or more window-like perforations (41) which are at least partially formed slot-like, round or polygonal in shape.

15. A container, in particular a plastic vial manufactured in the blow-molding method and filled and closed in the mold with a neck part (5) adjacent to a container body (1) onto which a first cap part (7) is attachable, in particular pluggable, and having a second cap part (11), which at least partially extends between the first cap part (7) and the neck part (5) and which is provided with an at least one opening device (3) with an opening (17) for opening the container body (1), which is closable by means of the first cap part (7), wherein, through the attachment or screwing process of the first cap part (7), the first cap part drives the second cap part (11) such that the opening device (3) causes the opening of the container body (1),

and wherein the second cap part (11) remains on the neck part (5), wherein, when the container body (1) is open, the second cap part (11) remaining on the neck part (5) is resiliently extensible in its bell portion (13) extending over the end region (21) of the neck part (5), characterized in that, in the bell part (13), axial slits (45) are formed extending from the opening edge (43).

16. The container according to Claim 10 or 11, characterized in that, in order to form an engaging connection between the second cap part (11) and the neck part (5), ribs (23) are provided, extending circumferentially on the inside of the bell part (13) for engaging in an annular groove (25) on the neck part (5).