

Abstract

Cooking Vessel

The invention relates to a cooking vessel with a container having an encircling container margin bent outwardly and with a cover having an encircling cover margin bent outwardly. The container can be closed airtight by the cover with the aid of a closing mechanism acting onto container margin and cover margin. The closing mechanism comprises a closure ring extending over the container circumference with a C-profile cross section open radially inwardly, which, with the aid of an actuating mechanism, can be moved from an open position with greater diameter, in which the cover can be lifted from the container, into a closed position with lesser diameter, in which the container margin and the cover margin are clamped together by interspersing a sealing ring between a lower flank and an upper flank of the closure ring. To improve the safety and the operating ease, it is proposed that either the encircling flanks of the closure ring are provided with radial slots open toward the inner flank margin and distributed over the circumference and/or *[sic: and/ not struck out]* the flanks are formed by C-profile segments, short in the circumferential direction, and disposed on an encircling annular connection element radially at the outside while keeping vacant interspaces distributed over the circumference.

Cooking Vessel

The invention relates to a cooking vessel with a container intended to receive items to be cooked, comprising an outwardly bent, encircling container margin and with a cover placeable onto the container and comprising an outwardly bent, encircling cover margin, in which the container can be closed airtight by the emplaced cover with the aid of a closing mechanism acting onto the container margin and the cover margin, wherein the closing mechanism comprises a closure ring with a C-profile cross section open radially inwardly and having inherent rigidity, extending nearly over the entire container circumference and essentially nondeformable in terms of its height, however elastically deformable in the radial opening direction, which with the aid of an actuating mechanism disposed on the cover, which can be moved from an open position with greater diameter, in which the container margin is released from a lower flank of the closure ring such that the cover can be removed from the container, into a closed position with lesser diameter, in which the container margin and the cover margin are clamped together by interspersing a sealing ring between the lower shorter flank and an upper longer flank of the closure ring.

Such a cooking vessel is disclosed for example in WO-A-96 35621. Herein a cover is provided for a container with an outwardly bent, encircling container margin. The container comprises a closing mechanism acting peripherally onto the margin of the container. For this purpose, at the margin of the cover an open closure ring of metal with elastic properties is accommodated, having spring resiliency, which, upon expansion of the closure ring, increases in diameter. In its resting position the closure ring is clamped between the end region of a portion of the encircling container margin and the end region of a bent-off portion structured annularly at the cover margin. The closing mechanism comprises means to expand the diameter of the closure ring against this spring resiliency. The closure ring is a C-profile with completely continuous wall between its two ends at which the closure mechanism

applies. Of disadvantage herein is that the closure ring in the closed position does not assume a completely round form, for which, however, it should be striven for reasons of greatest possible safety. Of disadvantage is further that the known closure ring must comprise, on the one hand, relatively strong material in order for it to absorb pressure forces, thus under the given operating conditions of a pressure cooker, is substantially nondeformable in terms of height, but, on the other hand, is to have the requisite elasticity and ready adjustability in the radial direction. These requirements can only with difficulty be mutually fulfilled.

It is the objective of the present invention to remedy in particular these disadvantages of prior art and to propose a cooking vessel of the above described type which comprises greater safety and greater operating ease without increased technical expenditures.

This objective is achieved according to a main idea of the invention, for example, thereby that either the encircling flanks of the closure ring are provided with radial slots of given length and width open toward the inner flank margin and distributed over the circumference *[struck out 22 July 99: and/]* or the flanks are formed by C-profile segments, short in the circumferential direction, and disposed on an encircling annular connection element radially at the outside while keeping vacant interspaces distributed over the circumference.

Hereby several advantages are achieved simultaneously: due to the selection of the slots or interspaces according to length and width, the opening forces, taking into consideration optimum operability, can be adjusted without the nondeformability of the closure ring suffering in terms of height. Therefore for the closure ring or the individual C-profile segments a relatively large material thickness can be used in order to increase the safety of the closure. The ready operability is not impaired hereby. With the number of slots or interspaces, the approximation of the closure ring to the circular form increases, which also contributes to increased safety.

If the flanks of the closure ring are of different length, thus, if the lower flank is shorter than the upper one such that during a move of the closure ring toward the outside into the open position the container margin is already released by the lower flank while the upper flank is still being carried on the cover margin, by way of the difference of slot length an equalization of the radial deformability in the upper and lower flank region can be created thereby that the slots in both flanks terminate in each instance at the same spacing in front of the C-profile back.

A further improvement of the functional safety can be attained thereby that the closure ring is guided on a covering ring, for example detachably held with spring elements on the cover and comprising for example a synthetic material, perpendicularly to the cover axis.

In a further embodiment of the invention the closure ring rests in its open position on an outer circumferential shoulder formed, for example by the covering ring and extending parallel to the cover circumference, such that it is centered on the outer circumference. This has the advantage that the inner margin edge of the lower flank of the closure ring in the open position of the closure ring only needs to have a small spacing from the corresponding margin edge of the container margin in order to ensure that the cover can be readily placed and removed.

It is further of advantage according to a further characteristic of the invention if the margin edges of container margin and cover margin, on the one hand, and the two flanks of the closure ring, on the other hand, have bent-offs facing one another whereby not only a stiffening of the particular margins and flanks is ensured but also the reliable guidance of these elements one [to] another.

According to a still further embodiment of the invention the closure ring is prestressed such that in its open position it tends to decrease its diameter, thus to move automatically into the closed position unless it is intentionally prevented from

doing so. This contributes to a further increase of the safety.

A simple operation of the cooking vessel structured according to the invention is attained in particular if the two ends of the closure ring for the force introduction are connected with the actuating mechanism, preferably form-fittingly.

In the actuating mechanism can take place a force transmission and possible force conversion from a movement of an actuating element into a movement of the ends of the closure ring in the circumferential direction.

In order to prevent that the closure ring automatically moves from an open position into the closed position or conversely, the actuating mechanism and thus also the position of the ends of the closure ring and/or the closure ring itself can be arrestable in the open position and/or the closed position.

For reasons of safety, further, the actuating mechanism can be coupled with a neutral-pressure safety mechanism and specifically such that the actuation for widening out of the closure ring from the closed position in the direction toward opening can only be initiated if the container interior is pressure-relieved.

The actuating mechanism is usefully developed such that during its actuation for opening first steam is released until the interior of the vessel is without [over]pressure, thereby the potentially provided neutral-pressure safety mechanism enables the further actuation path, the ends of the closure ring are unlatched from a locking member and the actuation element is enabled for opening the closure latch such that the ends of the closure ring can be moved apart in the circumferential direction.

The actuating mechanism can comprise a slider as the actuating element with the aid of which the neutral-pressure safety mechanism, a rotary button for opening the

closure ring as a further actuating element, and thus the ends of the closure ring, can be latched.

Further goals, characteristics, advantages and application feasibilities of the invention are evident in the following description of embodiment examples in conjunction with the drawing. All described and/or graphically depicted characteristics alone or in any combination form the subject matter of the invention, independently of their compilation in individual claims or their reference back.

In the drawing depict:

- Fig. 1 a cover for a cooking vessel comprising the invention, seen from below,
- Fig. 2 a vertical section through a cooking vessel comprising the invention according to section line A-A of Figure 1, according to one embodiment,
- Fig. 3a and 3b a vertical section corresponding to Figure 2 through a cover according to the invention of a different developing, wherein in Figure 3a the closure ring is in the open position, however, in Figure 3b in the closed position,
- Fig. 4a and 5a view onto partial segments of closure rings of different embodiment,
- Fig. 4b and 5b sections through the closure rings of Figure 4a and 5a corresponding to the section lines A-A depicted therein,
- Fig. 6 a partially broken view from obliquely below onto a cover comprising the invention with the actuation mechanism, and
- Fig. 7

and 8 two further representations of a cooking vessel according to the invention in the region of the actuating mechanism for the closure ring.

The cooking vessel depicted in the Figures comprises a container 1 for receiving items to be cooked and a cover 2 with which the container 1 can be closed pressure-tight. The container 1 has a bent-outward, smoothly encircling container margin 2 and the cover 3 a bent-outward, smoothly encircling cover margin 4. Container margin 2 and cover margin 4 are each provided at their margin edges encircling on the outside with - as shown graphically - bent-offs 14 directed upwardly or downwardly, respectively.

The closing mechanism for the cooking vessel comprises an inherently rigid closure ring 6, extending essentially over the entire container circumference, essentially nondeformable in terms of height, however elastically deformable in the radial direction of opening, with a C-profile cross section open radially inwardly. With the aid of an actuating mechanism 7 disposed on the cover 3 the closure ring 6 can be moved from an open position with greater diameter into a closed position with lesser diameter. In the open position of closure ring 6 the container margin 2 is released from a lower flank 8 of the closure ring 6 such that the cover 3 can be removed upwardly from the container 1. In the closed position of the closure ring 6, in which the latter assumes a lesser diameter than in the open position, the container margin 2 and the cover margin 3 are clamped together by interspersing a sealing ring 5 between the lower shorter flank 8 and the upper longer flank 9 of the closure ring 6 structured as a C-profile.

It is evident in Figures 4a to 5b that the closure ring 6 comprises in its two flanks 8, 9 slots 10 of selectable length and width distributed uniformly over the circumference or the closure ring 6 or the closure ring 6 can be formed by an annularly encircling connection element 11', comprising for example wire, on which are disposed, for example spot-welded, C-profile segments of short length, distributed uniformly over

the circumference with interspaces 10'.

As is evident in Figure 4a, the slots 10 in the shorter lower flank 8 and the longer upper flank 9 are of different length, however, to equalize the different flank length each terminates at the same spacing from the common C-profile back 11.

As is evident in Figure 2 to 3b, the margin edges of flanks 8, 9 encircling at the inside, of the closure ring 6 are provided with bent-offs 14 directed obliquely inwardly in order to attain with container margin 2 and cover margin 4, additional stiffening and a guidance of these elements together.

On the basis of the embodiment depicted in Figure 3a and 3b it is evident that the closure ring 6 during its opening and closing movements is guided on a covering ring 12 of synthetic material perpendicularly to the axis of rotation, which [covering ring] can be detachably disposed with the aid of (not shown) spring elements on the metal body of cover 3. This covering ring 12 is also suitable for the purpose of receiving the actuating mechanism 7 (cf. Figure 6 to 8) for the closure ring 6. The covering ring 12 forms further a circumferential shoulder 13 on which the closure ring 6 in its open position, shown in Figure 3a, rests with its C-profile back 11 and is thereby retained centered.

As is evident from Figure 1 as well as 6 to 8, the actuating mechanism 7 has a radially adjustable locking member 15 which encompasses in the closed position end segments 16 of the closure ring 6 and latches them. The actuating mechanism 7 further comprises a lever gear 17 which converts a movement of a further actuating element (not shown), structured for example as a rotary button, into a movement of the ends of the closure ring 6 in the circumferential direction.

The opening process proceeds essentially as follows: by actuating a slider (18) of the actuating mechanism 7 the interior of the vessel is initially brought to neutral

pressure by releasing steam. The neutral-pressure safety mechanism subsequently enables the further actuation path of slider 18. Thereby the locking member 15 can be moved into its open position. Simultaneously a rotary button is released such that the closure ring 6 can be opened. Rotation of the rotary button moves the ends of the closure ring 6 away from one another in the circumferential direction such that the closure ring 6 becomes widened in its diameter until it is centered and rests on the circumferential shoulder 13 of the covering ring 12. In the open position the rotary button can snap in such that the closure ring 6, against its tendency due to its prestress to become narrowed, is held in its circular centered open position. In this position the cover 3 can be removed simply from the container 1 in the upward direction since the container margin 2 is released from the lower flank 8 of the closure ring 6.

For closure the rotary button is turned in the reverse direction whereby the closure ring 6, by bringing together its ends, is brought into the closed position, in which container margin 2 and cover margin 4 by interspaceing the sealing ring 5 is clamped in by flanks 8, 9 of the closure ring 6. This process is enhanced by the prestress of the closure ring 6 whereby high operating ease is ensured. The latching subsequently takes place in the above described manner by means of the slider 18.

List of Reference Symbols

- 1 Container
- 2 Container margin
- 3 Cover
- 4 Cover margin
- 5 Sealing ring
- 6 Closure ring
- 6' C-profile segments
- 7 Actuating mechanism
- 8 Lower flank
- 9 Upper flank
- 10 Slots
- 10' Interspaces
- 11 C-profile back
- 11' Connection element
- 12 Covering ring
- 13 Circumferential shoulder
- 14 Bent-offs
- 15 Locking member
- 16 End segments
- 17 Planing [sic: Lever] gear
- 18 Slider



Patent Claims

1. Cooking vessel with a container (1) comprising a bent-outward encircling container margin (2) and with a cover (3) which can be placed onto the container (1) comprising a bent-outward encircling cover margin (4), in which the container (1) can be closed airtight by the emplaced cover (3) with the aid of a closing mechanism acting upon container margin (2) and cover margin (4), wherein the closing mechanism comprises an inherently rigid closure ring (6) extending nearly over the entire container circumference, essentially nondeformable in its height however elastically deformable in the radial opening direction, with a C-profile cross section open radially inwardly, which, with the aid of an actuating mechanism (7) disposed on the cover (3), can be moved from an open position with greater diameter, in which the container margin (2) is released from a lower flank (8) of the closure ring (6) such that the cover (3) can be removed from the container (1), into a closed position with lesser diameter, in which the container margin (2) and the cover margin (3) by interspersing a sealing ring (5) are clamped together between the lower, preferably shorter, flank (8) and an upper, preferably longer, flank (9) of the closure ring (6), characterized in that either the encircling flanks (8, 9) of the closure ring (6) are provided with radial slots (10) open toward the inner flank margin and distributed over the circumference, of given length and width [*and/ struck out 22 July 99*] or the flanks (8, 9) are formed by C-profile segments [(16) *struck out, (6') handwritten*], short in the circumferential direction, and disposed on an encircling annular connection element [(15) *struck out, (11') handwritten*] radially at the outside while keeping vacant interspaces (10') distributed over the circumference.



2. Cooking vessel as claimed in claim 1, characterized in that the slots (10) in the lower flank (8) and in the upper flank (9) are of different length but terminate each at the same spacing in front of the C-profile back (11).
3. Cooking vessel as claimed in claim 1 or 2, characterized in that the closure ring (6) is guided on a covering ring (12), held, for example, detachably with spring elements on the cover (3) and comprising for example synthetic material, perpendicularly to the cover axis.
4. Cooking vessel as claimed in one or several of the preceding claims, characterized in that the closure ring (6) in its open position rests on an outer circumferential shoulder (13) formed by example by the covering ring (12) and extending parallel to the cover circumference.
5. Cooking vessel as claimed in one or several of the preceding claims, characterized in that the margin edges of container margin (2) and cover margin (4), on the one hand, and the two flanks (8, 9) of the closure ring (6) on the other hand, comprise bent-offs (14) facing one another.
6. Cooking vessel as claimed in one of the [sic: or] several preceding claims, characterized in that the closure ring (6) is prestressed such that in its open position it tends toward decreasing its diameter.
7. Cooking vessel as claimed in one or several of the preceding claims, characterized in that the two ends of the closure ring (6) for the force introduction are connected with the actuating mechanism (7), preferably form-fittingly.



8. Cooking vessel as claimed in one or several of the preceding claims, characterized in that in the actuating mechanism (7) takes place a force transmission and possible force deflection from a movement of an actuating element into a movement of the ends of the closure ring (6) in the circumferential direction.
9. Cooking vessel as claimed in one or several of the preceding claims, characterized in that the actuating mechanism (7) and/or the closure ring (6) in the open position and/or the closed position (6) is/are arrestable.
10. Cooking vessel as claimed in one or several of the preceding claims, characterized in that with the actuating mechanism (7) a neutral-pressure safety mechanism is coupled.
11. Cooking vessel as claimed in claim 8, characterized in that upon actuating the actuating mechanism (7) for the purpose of opening first steam is released until the interior of the vessel is at neutral pressure thereby that the potentially provided neutral-pressure safety mechanism enables the further actuation path, the ends of the closure ring (6) are unlatched by a locking member (15) and the actuating element is enabled for opening the closure ring (6) such that the ends of the closure ring (6) can be moved apart in the circumferential direction.
12. Cooking vessel as claimed in one of the preceding claims, characterized in that the actuating mechanism comprises a slider (18) as the actuating element, with the aid of which the neutral-pressure safety mechanism, a rotary button for opening the closure ring (6) are latchable.