Description

Title of Invention: STORAGE CONTAINER

Technical Field

[1] The invention relates to a storage container comprising a ceramic receiving body for receiving goods, in particular food products such as solid and/or liquid food products.

Background Art

[2] Storage containers, in particular food storage containers are widely recognized for their utility in preserving various items, typically comprising a main body (receiving body) and a (cover) lid. The main body is often constructed from polymer materials and/or glass, and similarly, the lid is made from either polymer materials and/or glass. The connection between the lid and the main body can be either a push-fit (pushing type connection) or a locking mechanism (locking type connection). The locking mechanism generally includes a snap fit feature that secures the lid to the main body until the user disengages it, for example, by turning a flap and/or lever. The push-fit connection involves pressing the lid onto the top edge of the main body to achieve a somewhat loose, press-fit seal within a groove on the lid. A notable drawback of the push-fit design is its tendency to loosen easily, potentially allowing contents, especially liquids, to leak.

[3] Ceramic has also been used for the main body of push-fit type containers, offering benefits like a smooth, hygienic surface and an aesthetically pleasing, high-quality appearance that many users prefer.

Disclosure of Invention

Solution to Problem

[4] It is an object of this disclosure to develop a manufacturing method for a storage container that not only appeals to users but also ensures the safe containment of its contents.

[5] The object is solved, in particular, by the subject-matter of claim 1.

[6] In particular, according to a first aspect of the invention the object is solved by a method for manufacturing a storage container comprising a ceramic receiving body for receiving goods, in particular food products, preferably liquid food products, wherein manufacturing of the receiving body comprises forming a precursor body of the receiving body by isostatic pressing of a raw material and firing the precursor body in order to obtain the ceramic receiving body, wherein manufacturing of the receiving body further comprises providing at least one groove for establishing a snap fit connection with at least one lid element.

[7] According to a second aspect of the invention, the object is in particular solved by a method (preferably according to the first aspect) for manufacturing a storage container comprising a ceramic receiving body for receiving goods, in particular food products, and at least one lid element for closing an upper portion of the receiving body, wherein the receiving body and the lid element are configured to be fixedly connected by a snap-in mechanism comprising a rotatable locking part being part of the lid element, wherein manufacturing of the receiving body comprises forming a precursor body of the receiving body by isostatic pressing of a raw material and firing the precursor body in order to obtain the ceramic receiving body.

[8] This invention introduces a new approach to creating a storage container by combining a ceramic receiving body, formed through isostatic pressing of a raw material, with a locking type lid. This combination has proven not only appealing to users but also feasible to manufacture, a discovery that counters previous assumptions. Likely, the challenge lay in the belief that the necessary groove structure for a snap fit connection could not be successfully molded into a ceramic body formed by isostatic pressing. It is assumed that this was due to concerns that the groove would alter its shape during the firing process, potentially compromising the fit.

[9] However, the inventor realized that in particular by shaping the groove with a certain curve before firing, it can transform into the correct, e.g. straight shape after firing, suitable for a secure snap fit connection. The groove formed post-pressing but pre-firing may follow a curved line that naturally straightens during the firing process. This method simplifies the manufacturing process while ensuring the shape of the groove in the final product is suitable for a reliable locking connection.

[10] At least one groove can be provided during the pressing. Then, an additional step of providing the groove can be omitted.

[11] In an embodiment, the groove is provided by a driller (in particular before the firing).

[12] Preferably, the receiving body comprises an (upper) edge portion defining at least substantially a polygon, in particular a tetragon.

[13] The receiving body may comprise an (upper) edge portion having at least one straight portion, wherein the straight portion comprises the groove and/or is configured to establish the snap-in connection with the lid element.

[14] The groove is (preferably) facing away from a main portion (plate portion) of the lid element and/or facing downwards (when the storage container is put on a plane surface).

[15] The rotatable locking part of the lid member may comprise at least one tongue portion for engaging with the corresponding groove. The tongue portion may be provided on a flap portion which may be rotatable about an axis provided at the lid member (in particular an edge portion of the lid member).

[16] The above object is, in particular, solved by a storage container comprising a ceramic receiving body for receiving goods, in particular food products, preferably manufactured according to the above method, wherein the receiving body is formed by isostatic pressing of a raw material to a precursor body and firing the precursor body, wherein the receiving body comprises at least one groove for establishing a snap fit connection with at least one lid element.

[17] The above object is, in particular, solved, by a storage container, in particular according to the preceding paragraph, preferably manufactured according to the above method, comprising a ceramic receiving body for receiving goods, in particular food products, and at least one lid element for closing an upper portion of the receiving body, wherein the receiving body and the lid element are configured to be (fixedly) connected by a snap-in mechanism comprising a rotatable locking part being part of the lid element, wherein the receiving body is formed by isostatic pressing of a raw material to a precursor body and firing the precursor body.

[18] Preferably, the groove is an at least substantially straight groove (after firing).

[19] Preferably, the receiving body comprises an edge portion defining at least substantially a polygon, in particular a tetragon.

[20] The receiving body may comprise an edge portion having at least one straight portion, wherein the straight portion comprises the groove and/or is configured to establish the snap-in connection with the lid element.

[21] Preferably, the groove is facing away from a main body of the lid element.

[22] Preferably, the rotatable locking part of the lid element comprises at least one tongue portion for engaging with the corresponding groove.

[23] The lid element may be - at least in part - made of a transparent material, in particular glass, and/or a (optionally opaque) material, in particular polymer. Preferably, a base plate of the lid element is made of a transparent material such as glass and at least one frame member and/or locking part is made from Polymer. The (respective) polymer may comprise a polyolefin such as polypropylene and/or polyethylene.

[24] In an embodiment, the transparent part may comprise a transparent base. The lid element may comprise a transparent baseplate (glass plate) encircled by an non-transparent frame member (made of polymer).

[25] Between lid element and receiving body (in an assembled state of the storage container), a sealing member, e.g. based on an elastomer such as rubber, may be arranged. The sealing member may be arranged in a groove at an inner side of the lid element, in particular the frame member.

[26] The rotatable locking part may be rotatable around an axis provided in and/or at the lid element, in particular the frame member. The rotatable locking part may have one or several tongue member(s). If there are several tongue members, they may

be arranged in the same corresponding groove in the receiving body or in different grooves.

[27] The receiving body may comprise several grooves, in particular at least two or at least four grooves, preferably one groove for each side of a tetragon configuration. Alternatively or in addition, the lid element may comprise several, e.g. at least two, preferably at least four rotatable locking parts. In an embodiment, on each side of a tetragonal lid element, one locking part is arranged.

[28] The receiving body may comprise at an upper edge a flange portion, whereas the one or more groove(s) are arranged preferably on an underside of the flange portion.

[29] An inner volume of the receiving body and/or the storage container may be at least 10 cm^3, preferably at least 50 cm^3 and/or less than 5,000 cm^3, preferably less than 2,000 cm^3, optionally less than 1,000 cm^3.

[30] A height of the receiving body may be at least 2 cm, preferably at least 4 cm and/or less than 20 cm, optionally less than 12 cm.

[31] A length of the receiving body may be at least 5 cm, preferably at least 15 cm and/or less than 50 cm, optionally less than 25 cm.

[32] A width of the receiving body may be at least 3 cm, preferably at least 6 cm and/or less than 20 cm, preferably less than 14 cm.

[33] Providing the at least one groove, may comprise: providing a (sub-) station comprising a driller. Such (sub-) station may be part of a fettle station (cleaning station). When forming the groove, the groove may be curved, in particular following the outline of the respective receiving body edge (flange). In an embodiment, the curve of the groove is (perfectly) parallel to the curvature of the edge of the receiving body where the groove is located. In general, the groove is formed such that it is (after firing) compatible with the lid element.

[34] For the drilling step, a robot can be used.

[35] It has been found through a trial and error method that certain difficulties, such as reverse calculation of the groove geometry, the influence of firing properties, the problem of a potential non-circular shape of the storage container, can be overcome. It has been found that it is necessary to correspondingly control the firing temperature and/or the granulate composition.

[36] Preferably, within a firing device, a homogeneous temperature is established. Then, the accuracy of the geometry of the (final) groove is improved. In this regard, it has to be pointed out that for a simple push type lid, the lid element usually has a silicon edge so that certain tolerances can be absorbed. For the locking type system as described here, there is much less room for tolerance.

[37] A specific benefit of the isostatic pressing process is that the granulate is already dry in the raw material stage. Hence, there are less shrinkage problems compared to a conventional casting method.

[38] The forming of the groove (e.g. by drilling) could be also done after firing. However, this might be more difficult because the material could break. In general, such drilling after firing seems to be more difficult and expensive.

[39] Providing the groove during the forming procedure (in the isostatic press) implies difficulties to provide the necessary (relatively deep) groove without damaging the structure during deforming.

[40] Further embodiments will be apparent from the dependent claims.

[41] In the following, the invention will be described with reference to exemplary embodiments which will be explained in more detail with reference to the figures.

Brief Description of Drawings

[42] Fig. 1 a schematic showing an embodiment of the method for manufacturing the storage container;

[43] Fig. 2 a view of a receiving body precursor after isostatically pressing;

[44] Fig. 3 the receiving of Fig. 2 after firing;

[45] Fig. 4 a portion of a receiving body of an embodiment of a storage container.

Mode for the Invention

[46] In the following description, the same reference numerals are used for identical and like-acting parts.

[47] Fig. 1 schematically shows an isostatic pressing device 10. In this pressing device 10, a precursor receiving body with at least one groove is formed. The precursor receiving body is then moved to a drilling station 11, where at least one groove is provided in the receiving body. Thereafter, the precursor receiving body with the groove is fired in a firing station 12.

[48] Fig. 2 shows the receiving body 13, viewed from below and before firing, comprising four (in this case, which is not mandatory) grooves 14 at and underside of a flange portion 15. Precisely, in Fig. 2 an underside 20 of a bottom 21 of the receiving body 13 can be seen.

[49] Fig. 3 shows the structure of Fig. 2 after firing. One can see that the grooves 14 have been straightened.

[50] Fig. 4 shows an embodiment of a storage container 16 comprising a receiving body 13 and a lid element 17. The lid element 17 comprises a rotatable flap portion 18 which can be rotated so that a tongue element 19 engages with the groove 14.

[51] At this point, it should be noted that all the parts described above are claimed to be essential to the invention when viewed individually and in any combination, in

particular the details shown in the drawings. Modifications thereof are familiar to the skilled person.

[52] Furthermore, it is pointed out that the broadest possible scope of protection is sought. In this respect, the disclosure contained in the claims can also be specified by features that are described with further features (even without these further features necessarily being included). It is explicitly pointed out that round brackets and the term "in particular" are intended to emphasize the optionality of features in the respective context (which does not mean, conversely, that a feature is to be regarded as mandatory in the corresponding context without such identification). The term "element/element" is preferably intended to characterize a respective coherent structure, which in turn can be connected to at least one other structure (to form a possibly one-piece and/or inherently non-movable overall structure) or can be delimited from all other structures.

[53] Reference signs

[54] 10 Isostatic pressing device

[55] 11 Drilling station

[56] 12 Firing station

[57] 13 Receiving body

[58] 14 Groove

[59] 15 Flange portion

[60] 16 Storage container

[61] 17 Lid element

[62] 18 Flap portion

[63] 19 Tongue element

[64] 20 Underside

[65] 21 Bottom

Claims

[Claim 1] A method for manufacturing a storage container (16) comprising a ceramic receiving body (13) for receiving goods, in particular food products, wherein manufacturing of the receiving body (13) comprises forming a precursor body of the receiving body (13) by isostatic pressing of a raw material and firing the precursor body in order to obtain the ceramic receiving body (13), wherein manufacturing of the receiving body (13) further comprises providing at least one groove (14) for establishing a snap fit connection with at least one lid element (17).

[Claim 2] A method, in particular according to claim 1, for manufacturing a storage container (16) comprising a ceramic receiving body (13) for receiving goods, in particular food products, and at least one lid element (17) for closing an upper portion of the receiving body (13), wherein the receiving body (13) and the lid element (17) are configured to be fixedly connected by a snap-in mechanism comprising a rotatable locking part being part of the lid element (17), wherein manufacturing of the receiving body (13) comprises forming a precursor body of the receiving body (13) by isostatic pressing of a raw material and firing the precursor body in order to obtain the ceramic receiving body (13).

[Claim 3] The method according to one of the preceding claims, wherein the groove (14) is provided after the pressing and before the firing, preferably in a curved line which straightens during firing.

[Claim 4] The method according to one of the preceding claims, wherein the groove (14) is provided during the pressing.

[Claim 5] The method according to one of the preceding claims, wherein the groove (14) is provided by a driller.

[Claim 6] The method according to one of the preceding claims, wherein the receiving body (13) comprises an edge portion defining at least substantially a polygon, in particular a tetragon.

[Claim 7] The method according to one of the preceding claims, wherein the receiving body (13) comprises an edge portion having at least one straight portion, wherein the straight portion comprises the groove (14) and/or is configured to establish the snap-in connection with the lid element (17).

[Claim 8] The method according to one of the preceding claims, wherein the groove (14) is facing away from a main body of the lid element (17).

[Claim 9] The method according to one of the preceding claims, wherein the rotatable locking part of the lid element (17) comprises at least one tongue portion for engaging with the corresponding groove (14).

[Claim 10] A storage container (16) comprising a ceramic receiving body (13) for receiving goods, in particular food products, in particular manufactured according to one of the preceding claims, wherein the receiving body (13) is formed by isostatic pressing of a raw material to a precursor body and firing the precursor body, wherein the receiving body (13) comprises at least one groove (14) for establishing a snap fit connection with at least one lid element (17).

[Claim 11] A storage container (16), in particular according to the immediately preceding claim, preferably manufactured according to one of the preceding claims, comprising a ceramic receiving body (13) for receiving goods, in particular food products, and at least one lid element (17) for closing an upper portion of the receiving body (13), wherein the receiving body (13) and the lid element (17) are configured to be fixedly connected by a snap-in mechanism comprising a rotatable locking part being part of the lid element (17), wherein the receiving body (13) is formed by isostatic pressing of a raw material to a precursor body and firing the precursor body.

[Claim 12] The storage container (16) according to one of the preceding claims, wherein the groove (14) is an at least substantially straight groove (14).

[Claim 13] The storage container (16) according to one of the preceding claims, wherein the receiving body (13) comprises an edge portion defining at least substantially a polygon, in particular a tetragon.

[Claim 14] The storage container (16) according to one of the preceding claims, wherein the receiving body (13) comprises an edge portion having at least one straight portion, wherein the straight portion comprises the groove (14) and/or is configured to establish the snap-in connection with the lid element (17).

[Claim 15] The storage container (16) according to one of the preceding claims, wherein the groove (14) is facing away from a main body of the lid element (17).

[Claim 16] The storage container (16) according to one of the preceding claims, wherein the rotatable locking part of the lid element (17) comprises at least one tongue portion for engaging with the corresponding groove (14).