

## SPECIFICATION

## COVER BODY LOCKING STRUCTURE FOR SEALED VESSEL

## Technical Field

5           The present invention relates to a lid body locking structure of a container formed of a container main body and a lid body screwed over it and to a lid body locking structure of an airtight container in which a heap notch portion at a neck base portion of a container main body is brought into contact with a notch portion formed at an outer periphery of a cap portion in  
10 a direction perpendicular to a screw thread to thereby allow an area of the lid body integrally molded with the cap portion to always correspond to a predetermined area of the container main body and airtightness is enhanced by an annular skirt portion provided at a center of a bottom portion of the cap and subjected to inclining processing.

## Background Art

Conventionally, many containers of a type in which a container neck portion is screwed into a cap have such a structure in which an external thread and an internal thread are merely fitted with each other. Moreover,  
20 for a purpose of manufacturing and processing at low cost and because of ease of handling, the external thread and the internal thread are molded of synthetic resin on the container and the cap. In the above container, however, excessive tightening and insufficient tightening of the cap depend on a sense of a user and a complete screwed state is not always obtained.  
25 Furthermore, because repeated use causes wear of screw threads, trouble occurs in screwing and such an event becomes further conspicuous with time. For the above reason, the same side face or the same area of the cap does not always correspond to the container main body. In spite of a wish to provide a design in which the container main body and the cap are  
30 regarded as an integral body, for example, the container main body and the cap are likely to be displaced from each other. Therefore, designs are separately provided to the container main body and the cap or the design is not provided to the cap. Therefore, with the above problems in view, it is an object of the present invention to provide a lid body locking structure of  
35 an airtight container in which airtightness of the cap is enhanced, the cap and the container main body always correspond to each other through predetermined areas, a complete screwed state can always be obtained

without depending on the sense of the user, and displacement of the cap due to a degree of tightening of the cap and displacement and trouble due to wear with time do not occur.

## 5 Disclosure of the Invention

The gist of a lid body locking structure of an airtight container of the invention is that means for stopping progress of screwing is provided at portions where the lid body and the container are engaged with each other. In a lid body locking structure of an airtight container of the invention, the  
10 lid body is formed of a grip portion having a concave sectional shape and a cap portion provided to an inside of a center of the grip portion and has a notch portion formed in a direction perpendicular to a screw thread in an end face of a peripheral wall of the cap portion, a neck base portion of a container main body is formed with a heap portion having the same  
15 diameter as an outer periphery of the cap portion, the heap portion is formed with a notch portion in a direction perpendicular to a screw thread, and the notch portion in the heap portion and the notch portion in the end face of the peripheral wall of the cap portion come in contact with each other and an area of the grip portion always corresponds to a predetermined area  
20 of the container main body when screwing of the cap portion over the neck portion of the container main body is completed. In a lid body locking structure of an airtight container of the invention, the lid body is formed of a grip portion having a concave sectional shape and a cap portion provided to an inside of a center of the grip portion, a tip end on an opening portion side  
25 of an external thread formed at a neck portion of the container is molded such that a face of the tip end stands in a direction perpendicular to a screw thread, molding of a tip end groove on an upper bottom portion side of an internal thread formed at the cap portion ends such that a face of the tip end groove stands in a direction perpendicular to a screw thread, the tip end  
30 face of the external thread and the end face of the internal thread come in contact with each other and an area of the grip portion always corresponds to a predetermined area of the container main body when the screwing of the cap portion over the neck portion of the container main body is completed. In a lid body locking structure of an airtight container of the  
35 invention, in addition to the structures according to claims 1 to 3, the structure is formed of a container main body and a lid body made of synthetic resin and the lid body is harder than the container main body. In

a lid body locking structure of an airtight container of the invention, in addition to the structures according to claims 1 to 3, an annular skirt portion having a tapered inclination and extending toward the opening portion of the container is provided to an upper bottom inside the cap portion, an outer periphery of the annular skirt portion is engaged with an inner periphery of the opening portion of the container main body, and a peripheral wall of the neck portion of the container main body is bent and deformed radially outward along the inclination of the annular skirt portion to be engaged with the skirt portion in a sealed manner when the screwing of the cap portion over the neck portion of the container main body is completed. A lid body locking structure of an airtight container of the invention is formed of a container main body, a transparent cap screwed over a neck portion of the container main body, and a lid body of a grip portion having a concave sectional shape, wherein the lid body has a fitting hole to be fitted over the transparent cap and either locking means by which the lid body and the container main body are locked to each other or locking means by which the lid body and the transparent cap are locked to each other is provided.

## Brief Description of the Drawings

FIG. 1 is a general reference view of a container having a lid body locking structure of an airtight container of the present invention; FIG. 2 is an enlarged perspective view of a structure of a lid body; FIG. 3 is an end view of the lid body and a neck portion of the container after completion of screwing; FIG. 4 is a perspective view of the neck portion of the container main body with a portion omitted; FIG. 5 is a perspective view of a lid body locking structure and showing a second embodiment; FIG. 6 is an explanatory schematic diagram of a lid body locking structure and showing a third embodiment; FIG. 7 is an explanatory schematic diagram of a lid body locking structure and showing a fourth embodiment; and FIG. 8 is an explanatory schematic diagram of a lid body locking structure and showing a fifth embodiment.

## Best Mode for Carrying out the Invention

An airtight container having a lid body locking structure of the airtight container of the invention is an airtight container formed of a lid body formed by integrally molding a grip portion having a concave sectional

shape with a cap portion formed on an inside of a center of the grip portion and a container main body having an opening portion at a neck portion.

Materials forming the container are thermoplastic resins such as polystyrene, polyethylene, polypropylene and polyvinyl chloride,

5 thermosetting resins such as phenolic plastic, and other synthetic plastics.

The lid body is molded to be harder than the container main body. It is also possible, on the contrary, that the container main body is molded to be

harder than the lid body. These are molded by injection molding, hollow molding, vacuum molding, compression molding, or other known molding

10 methods. According to a type of contents, the container is not necessarily made of the above materials but may be made of other materials as long as such materials do not impair characteristics of the present application.

Moreover, the container main body or the lid body may be transparent if necessary.

15 As shown in FIGS. 1 and 3, the lid body (2) of the airtight container having the lid body locking structure of the airtight container of the invention has a structure formed by integrally molding the grip portion (3) having the concave sectional shape and the cap portion (4) provided to an inside of a center of the grip portion and having an internal thread (11) on

20 an inner periphery. As shown in FIG. 2, an inner wall of the grip portion and the cap portion may be supported by support chips (7) for reinforcement. At an end face of a peripheral wall of the cap portion, a notch portion (6) provided in a direction perpendicular to a screw thread is formed. A neck

25 portion (9) of the container main body is provided with an external thread (10) to be screwed into the internal screw of the cap portion. A neck base portion of the container main body is formed with a heap portion (12) having the same outside diameter as an outer periphery of the cap portion. The heap portion is formed with a notch portion (13) provided in the direction perpendicular to the screw thread. By bringing the notch portion (13) and

30 the notch portion (6) in contact with each other, screwing of the cap portion over the neck portion of the container main body is stopped at the position.

Providing the notch portions in the direction perpendicular to the screw threads means that the notch portions are formed along a plane including an axis (P) passing through a center of an opening portion of the

35 container as shown in FIG. 4. As a method of stopping progress of screwing of the lid body over the neck portion of the container, bringing the external thread and the internal thread in contact with each other through faces is

conceivable besides the above method. In other words, the external thread is molded such that a face of a tip end of the external thread on a side of the opening portion stands in the direction perpendicular to the screw thread, the internal thread groove ends such that a face of a tip end groove on a side of an upper bottom portion of the internal thread provided to the cap portion stands in the direction perpendicular to the screw thread, and the tip end face of the external thread and the end face of the internal thread come in contact with each other when screwing of the cap portion over the neck portion of the container main body is completed. Providing in the direction perpendicular to the screw thread means notching along the plane including the axis (P) passing through the center of the opening portion of the container as shown in FIG. 4. At the upper bottom inside the cap portion, an annular skirt portion (8) having a tapered inclination (14) extending toward the opening portion of the container is provided. An inner periphery of a tip end of the neck portion of the container main body is engaged with the inclination. When the screwing of the cap portion over the neck portion of the container main body is completed, a radially outward force is applied to a peripheral wall of the neck portion of the container main body to engage the cap portion and the neck portion with each other in a sealed manner. At this time, because the container main body is molded of a softer material than the lid body, a tip end portion of the peripheral wall of the neck portion is deformed slightly and radially outward as shown in FIG. 3. A shape of the container main body is not limited to a shape in the following embodiments but may be other three-dimensional shapes as long as such shapes have the characteristics of the present application. As shown in FIGS. 7 and 8, it is also possible that the concave portion (3) and the cap portion (4) are formed as separate bodies, i.e., a lid body (2a) and a transparent cap (4a), that a fitting hole (18) to be fitted over the cap (4a) is provided to the lid body (2a), and that a locking means according to either of a combination of locking means (19), (20), (21) and (22) for locking the lid body (2a) and the container main body (1) to each other and a combination of locking means (23) and (24) for locking the lid body (2a) and the cap (4a) to each other is provided.

### Embodiment 1

A first embodiment of a lid body locking structure of an airtight container of the present invention will be described below by reference to

FIGS. 1 to 5. FIG. 1 is a general reference view of a container having the lid body locking structure of the airtight container of the invention. FIG. 2 is an enlarged perspective view of a structure of the lid body. FIG. 3 is an end view of the lid body and a neck portion of the container after screwing is completed. FIG. 4 is a perspective view of the neck portion of the container main body with a portion omitted. In FIG. 2, an internal thread is omitted. In FIG. 4, an external thread, an internal thread and a grip portion are omitted. A reference numeral (1) designates the container, (2) designates the lid body, (3) designates the grip portion, (4) designates a cap portion, (5) designates the container main body, (6) designates a notch portion provided to a peripheral wall of the cap portion, (7) designates a support chip, (8) designates an annular skirt portion, (9) designates the neck portion of the container main body, (10) designates the external thread, (11) designates the internal thread, (12) designates a heap portion, 13 designates a notch portion provided to the heap portion, and (14) designates an outside inclination of the annular skirt portion. The airtight container (1) of the present embodiment is formed of the container main body (5) in a shape of a rectangular parallelepiped and having the neck portion (9) and the lid body (2) adapted the shape and an outside diameter of the container main body as shown in FIG. 1. As shown in FIGS. 1 and 3, the lid body (2) of the airtight container having the lid body locking structure of the airtight container of the invention is formed of the grip portion (3) having the concave sectional shape and the cap portion (4) provided to an inside of a center of the grip portion. The internal thread (11) is formed at an inner periphery of the cap and the notch portion (6) is formed in an end face of a peripheral wall of the cap portion in a direction perpendicular to a screw thread. Furthermore, as shown in FIG. 2, an inner wall of the grip portion and the cap portion are supported by the support chips (7) for reinforcement. On the other hand, the neck portion (9) of the container main body (5) is formed with the external thread (10). A neck base portion of the container main body is formed with the heap portion (12) having the same outside diameter as an outer periphery of the cap portion. The heap portion is formed with the notch portion (13) provided in the direction perpendicular to the screw thread.

The airtight container (1) of the embodiment has a length of each side of 55 mm, a total length of 140 mm, and a height of the lid body of 30 mm. With regard to materials, the container main body (5) is molded of

polyethylene, the lid body (2) is molded of polystyrene, and the lid body (2) is harder than the container main body (5). The container may be made of other synthetic resins and the like as long as such materials do not impair characteristics of the present application. By using the grip portion (3) as a  
5 hold for a hand, the external thread (10) of the neck portion (9) of the container main body is fitted with and screwed further into the internal thread formed at the inner periphery of the cap portion (4). As shown in FIGS.5(a) to 5(b), when the notch portion (6) in the end face of the peripheral wall of the cap portion comes in contact with the notch portion  
10 (13) provided to the heap portion (12) of the neck base portion of the container main body in the direction perpendicular to the screw thread, the screwing is completed. Because the container main body is molded of a softer material than the lid body, an inner wall of a tip end of the neck portion of the container main body is fitted with the annular skirt portion  
15 (8) and deformed slightly and radially outward along the outside inclination (14) of the annular skirt portion (8) to be engaged in a sealed manner as the screwing proceeds as shown in FIG. 3 to thereby further enhance airtightness. Consequently, by utilizing the present invention, besides enhancement of airtightness of the container, a closing operation of the lid is  
20 easy and reliable without depending on a sense of a user because the screwing is completed when the notch portion (6) in the end face of the peripheral wall of the cap portion and the notch portion (13) in the heap portion (12) of the neck base portion of the container main body come in contact with each other. Even if the container is made of the synthetic  
25 resin material, trouble in the screwing caused by wear of screw thread due to use for a long time does not occur. Because a side face of the lid body always corresponds to a side face of the container main body to be flush with the side face without being displaced from the side face when the screwing is completed, it is possible to provide a design in which the lid body and the  
30 container main body are regarded as an integral body. Moreover, if positions of the notch portion (6) provided to the cap portion and the notch portion (13) provided to the heap portion of the neck base portion of the container main body are set in a vicinity of the a central portion of a side face which is to be determined as a front face of the container main body,  
35 front faces can be respectively discriminated at a glance from the other side faces even if the container main body (5) and the lid body (2) are separated from each other and such a container is convenient to handle.

## Embodiment 2

A second embodiment of the invention will be described by reference to FIG. 5. FIG. 5 is a perspective view of the lid body locking structure and showing the second embodiment. In FIG. 5, the external thread and the internal thread are omitted. A reference numeral (15) designates a fitting groove and the other reference numerals in the drawing correspond to the similar parts in the first embodiment. The container main body (5) in the present embodiment is in a circular cylindrical shape. While being adapted to the shape and an outside diameter of the container main body (5), the grip portion (3) integrally molded with the cap portion (4) is formed. The circular fitting groove (15) is formed at a periphery of the neck portion (9) in a top portion of the container main body while being aligned with a peripheral wall of the cap (4), a helical bottom portion is molded in the fitting groove, and the notch portion (13) having an acute angle is provided to an end of the bottom portion as shown in the drawing. The notch portion (6) having an acute angle is molded while being adapted to a shape of the notch portion (13) at an end portion of the peripheral wall of the cap portion (4) and the end portion is molded while being adapted to a shape of the bottom portion of the helical groove in the fitting groove (15). Although the annular skirt portion, the external thread, the internal thread and the like are not shown in the drawing, their structures and constructions are similar to those of the first embodiment. In the construction shown in the embodiment, effects that the closing operation of the lid can be reliably carried out and that an area of the grip portion and an area of the container main body always correspond to each other can be obtained similarly to the first embodiment. Although faces are standing perpendicularly in both the notch portions in the above-described first embodiment, the notch portions are molded to make acute angles in the present embodiment to thereby further reliably complete screwing. Because the notch portions are housed in the fitting groove (15) when screwing of the lid body over the container main body is completed in the embodiment, a simple design can be achieved when the grip portion (3) is transparent.

## Embodiment 3

A third embodiment of the invention will be described by reference to FIG. 6. FIG. 6 is an explanatory schematic diagram of the lid body

locking structure and showing the third embodiment. A reference numeral (16) designates a tip end face of the external thread on a side of the opening portion of the container, (17) designates a groove face of a tip end of the internal thread on a side of an upper bottom portion, and the other  
5 reference numerals in the drawing correspond to the similar parts in the first embodiment. Because FIG. 6 is the schematic diagram showing structures and shapes of (16) and (17), parts of the external thread and internal thread are omitted. The tip end (16) of the external thread on the side of the opening portion is molded such that a face of the tip end stands  
10 in the direction perpendicular to the screw thread and the internal thread groove ends such that the face of the tip end groove on the side of the upper bottom portion of the internal thread provided to the cap portion stands in the direction perpendicular to the screw thread. With such a structure, the tip end of the external thread (10) at the neck portion (9) of the container  
15 main body is fitted in the internal thread groove in the cap portion (4), screwing proceeds, and the screwing is completed when the end face (16) of the external thread on the side of the opening portion of the container finally comes in contact with the groove face (17) of the tip end of the internal thread on the side of the upper bottom portion. If positions where  
20 the tip end face (16) of the external thread and the groove face (17) of the tip end of the internal thread correspond to predetermined side faces in advance, it is possible that an area of the grip portion can always correspond to a predetermined area of the container main body when the screwing is completed. By providing the annular skirt portion of the cap portion in  
25 addition to the structures of the present embodiment, it is possible to enhance airtightness.

#### Embodiment 4

A fourth embodiment of the invention will be described by reference  
30 to FIG. 7. FIG. 7 is an explanatory schematic diagram of the lid body locking structure and showing the fourth embodiment. Because the lowermost diagram in FIG. 7 is a schematic diagram showing a locked state of the lid body (2a) and the container main body (1), the container neck portion, the external thread and the internal thread are omitted. A  
35 reference numeral (2a) designates a lid body, (4a) designates a transparent cap, (18) designates a fitting hole, (19) designates a locking convex portion provided to the lid body (2a), (20) designates a locking concave portion

provided to the lid body (2a), (21) designates a locking convex portion provided to the container (1), (22) designates a locking concave portion provided to the container (1), and the other reference numerals in the drawing correspond to the similar parts in the first embodiment. In the present embodiment, the lid body (2a) and the transparent cap (4a) are formed as separate bodies, the lid body (2a) is provided with the fitting hole (18) to be fitted over the transparent cap (4a), and locking means to fit the lid body (2a) and the container main body (1) with each other is provided. The transparent cap (4a) is screwed over the neck portion of the container and then, the lid body (2a) and the container main body (1), the locking convex portion (19) provided to the lid body (2a) and the locking concave portion (22) provided to the container main body (1), and the locking concave portion (20) provided to the lid body (2a) and the locking convex portion (21) provided to the container main body (1) are respectively locked to each other. The lowermost diagram in FIG. 7 is the sectional schematic diagram of the fitted state of the container main body (1), the transparent cap (4a) and the lid body (2a) and the transparent cap (4a) and the lid body (2a) are formed to be flush with each other as shown in this view. Besides the locking means (21), (22) provided to parts of the container as shown in the middle diagram in FIG. 7, the locking means provided to a periphery of the container is also possible. According to a structure of the embodiment, the transparent cap is less likely to loosen because the cap is covered with the lid body. Because the cap is transparent, a mixed state of ingredients can be checked easily without opening the cap. Moreover, the lid body and the container main body can be engaged with each other reliably by the locking means.

#### Embodiment 5

A fifth embodiment of the invention will be described by reference to FIG. 8. FIG. 8 is an explanatory schematic diagram of the lid body locking structure and showing the fifth embodiment. Because the lowermost diagram in FIG. 8 is a schematic diagram of a locked state of a lid body (2a) and a transparent cap (4a), a neck portion of a container, an external thread, and an internal thread are omitted. A reference numeral (23) designates a locking convex portion provided to the lid body (2a), (24) designates a locking concave portion provided to the transparent cap (4a), and the other reference numerals in the drawing correspond to the similar parts in the

preceding embodiments. The present embodiment relates to an invention of a variation of the fourth embodiment and is formed, as shown in the uppermost diagram in FIG. 8, by increasing a width of the fitting hole (18), providing locking convex portions (23) at four positions of a side wall of the fitting hole (18), and providing the locking concave portions (24) to the transparent cap (4a) such that the locking concave portions (24) correspond to the locking convex portions (23), as shown in the middle diagram in FIG. 8. As shown in the lowermost diagram in FIG. 8, the transparent cap (4a) and the lid body (2a) are formed to be flush with each other in the embodiment.

With a structure of the embodiment, a mixed state of ingredients can be checked easily without opening the cap. Moreover, because the lid body and the transparent cap are engaged with each other, the container main body (1) does not need to be subjected to special processing.

#### Industrial Applicability

As described above, according to the invention, while enhancing airtightness, completion of the closing operation of the lid can be accurately and easily recognized because both the notch portions formed in the container main body and the cap portion come in contact with each other.

Even if the container is made of synthetic resin, trouble in the screwing caused by wear of the screw threads due to use for a long time does not occur. Because a side face or an area of the lid body always corresponds to a side face or an area of the container main body to be flush with the side face or the area without being displaced from the side face or the area when the screwing is completed, it is possible to provide a design in which the lid body and the container main body are regarded as an integral body. Moreover, because the lid body and the container main body or the lid body and the cap are swiftly and reliably engaged with each other by the engaging means, the container is easy to handle.

## CLAIMS

1. A lid body locking structure of an airtight container having a lid body screwed over a neck portion of the container, wherein means to stop progress of screwing is provided at portions where the lid body and the container are engaged with each other.

2. A lid body locking structure of an airtight container having a lid body screwed over a neck portion of the container, wherein the lid body is formed of a grip portion having a concave sectional shape and a cap portion provided to an inside of a center of the grip portion and has a notch portion formed in a direction perpendicular to a screw thread in an end face of a peripheral wall of the cap portion, a neck base portion of a container main body is formed with a heap portion having the same diameter as an outer periphery of the cap portion, the heap portion is formed with a notch portion in a direction perpendicular to a screw thread, and the notch portion in the heap portion and the notch portion in the end face of the peripheral wall of the cap portion come in contact with each other and an area of the grip portion always corresponds to a predetermined area of the container main body when screwing of the cap portion over the neck portion of the container main body is completed.

3. A lid body locking structure of an airtight container having a lid body screwed over a neck portion of the container, wherein the lid body is formed of a grip portion having a concave sectional shape and a cap portion provided to an inside of a center of the grip portion, a tip end on an opening portion side of an external thread formed at a neck portion of the container is molded such that a face of the tip end stands in a direction perpendicular to a screw thread, molding of a tip end groove on an upper bottom portion side of an internal thread formed at the cap portion ends such that a face of the tip end groove stands in a direction perpendicular to a screw thread, the tip end face of the external thread and the end face of the internal thread come in contact with each other and an area of the grip portion always corresponds to a predetermined area of the container main body when the screwing of the cap portion over the neck portion of the container main body is completed.

4. A lid body locking structure of an airtight container according to

claims 1 to 3, wherein the structure is formed of a container main body and a lid body made of synthetic resin and the lid body is harder than the container main body.

5           5. A lid body locking structure of an airtight container according to claims 1 to 3, wherein an annular skirt portion having a tapered inclination and extending toward the opening portion of the container is provided to an upper bottom inside the cap portion, an outer periphery of the annular skirt portion is engaged with an inner periphery of the opening portion of the  
10 container main body, and a peripheral wall of the neck portion of the container main body is bent and deformed radially outward along the inclination of the annular skirt portion to be engaged with the skirt portion in a sealed manner when the screwing of the cap portion over the neck portion of the container main body is completed.

15           6. A lid body locking structure of an airtight container formed of a container main body, a transparent cap screwed over a neck portion of the container main body, and a lid body of a grip portion having a concave sectional shape, wherein the lid body has a fitting hole to be fitted over the  
20 transparent cap and either locking means by which the lid body and the container main body are locked to each other or locking means by which the lid body and the transparent cap are locked to each other is provided.