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(54) **FASTENING STRUCTURE AND SEAL BOX WITH THE FASTENING STRUCTURE**

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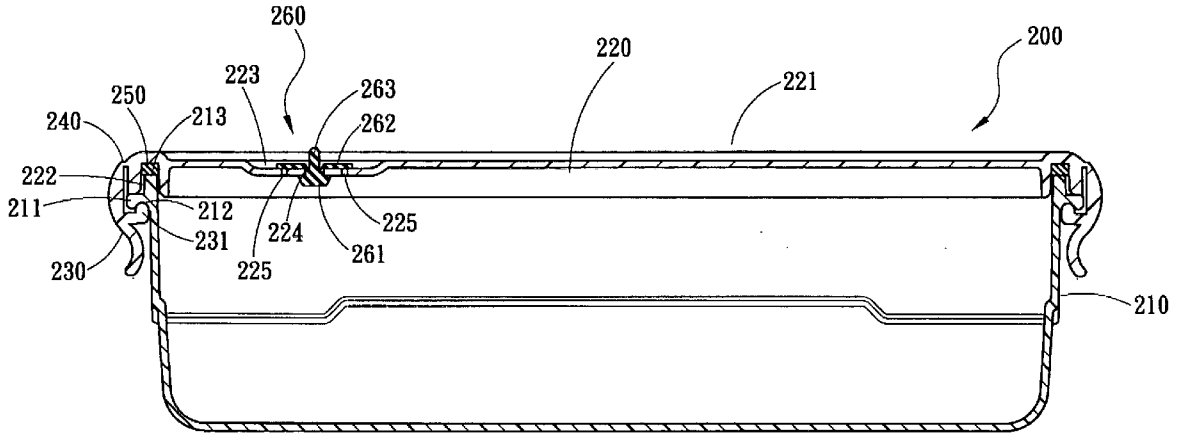
(57) **ABSTRACT**

The present invention discloses a fastening structure having a fastening flange extended outward from the periphery of a cover, and the fastening flange has a latch portion under the fastening flange for latching and fixing the cover; and a hinge portion for connecting the fastening flange at the periphery of the cover, and the hinge portion has a plurality of sections of crevices for reducing a hinge area that connects the fastening flange to the cover. The invention also discloses a sealed box that includes the fastening structure, and a container having a latch structure disposed at a top edge of the container and used together with the latch portion for latching and fixing the cover. Without changing the thickness of the hinge portion, the invention can save efforts for the operation of the sealed box while maintaining the stress of the hinge portion.



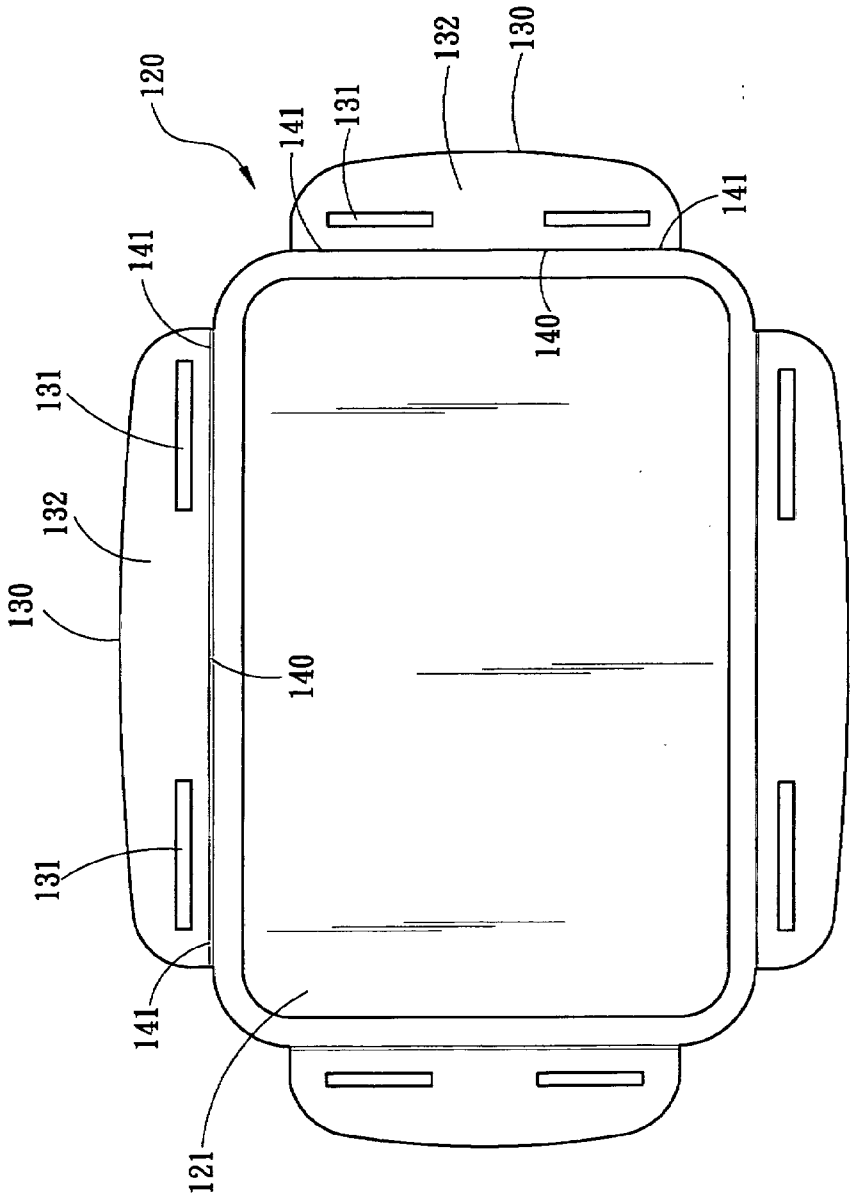


Fig. 1
PRIOR ART

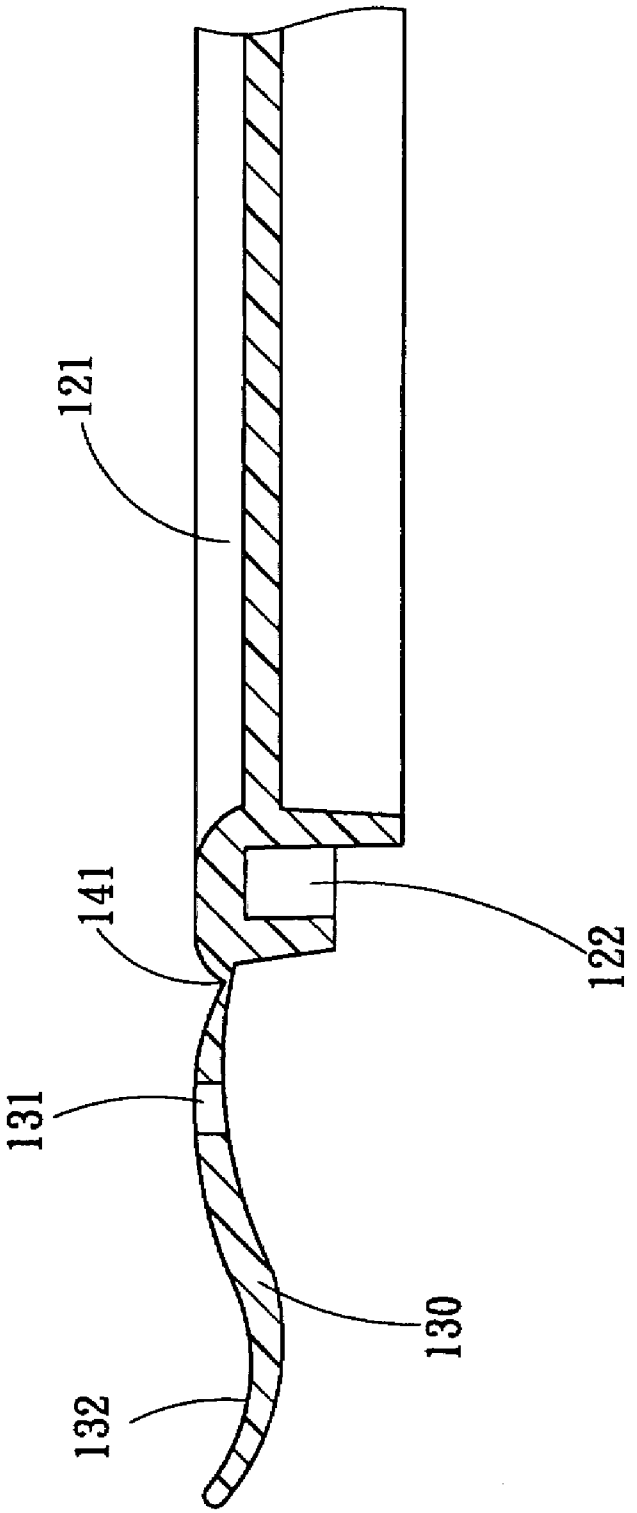


Fig. 2
PRIOR ART

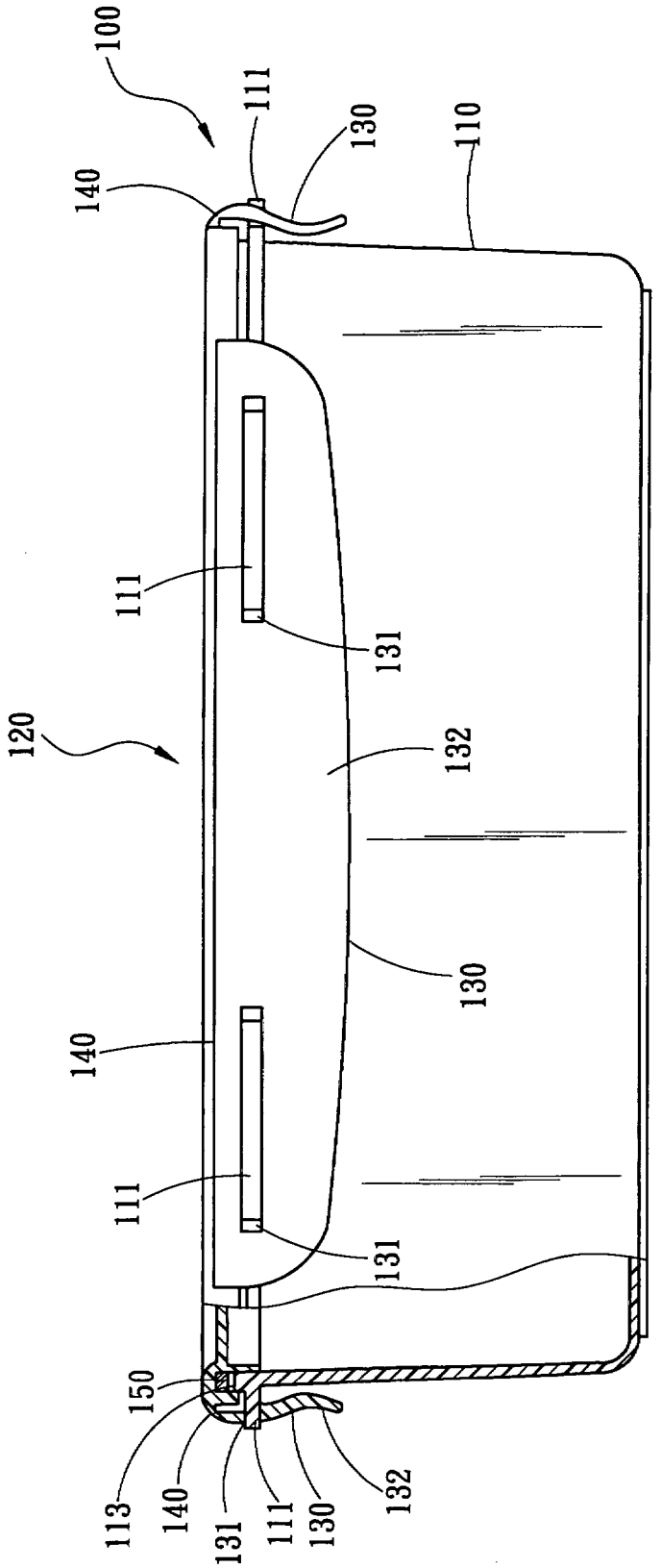


Fig. 3
PRIOR ART

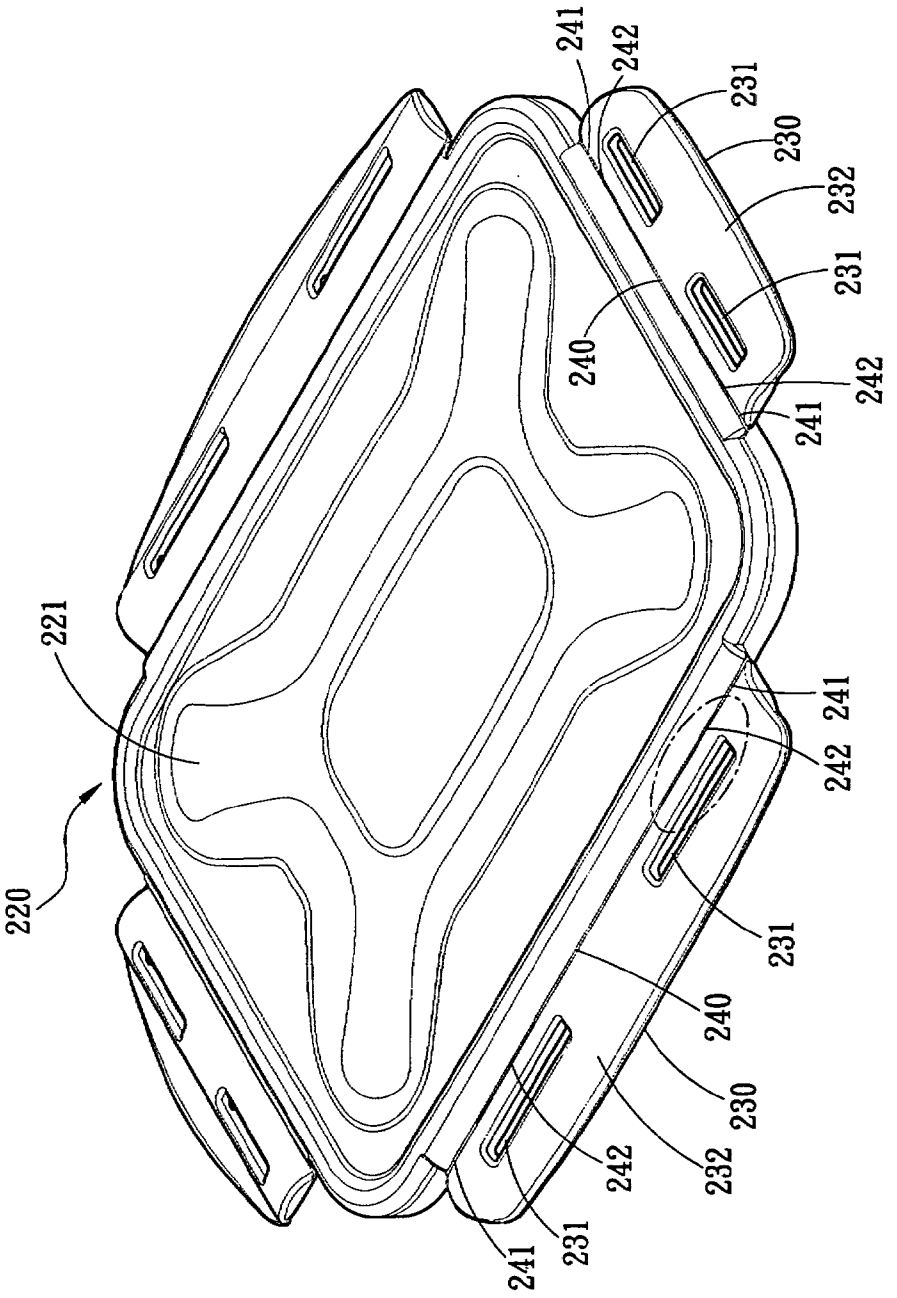

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Fig. 4A

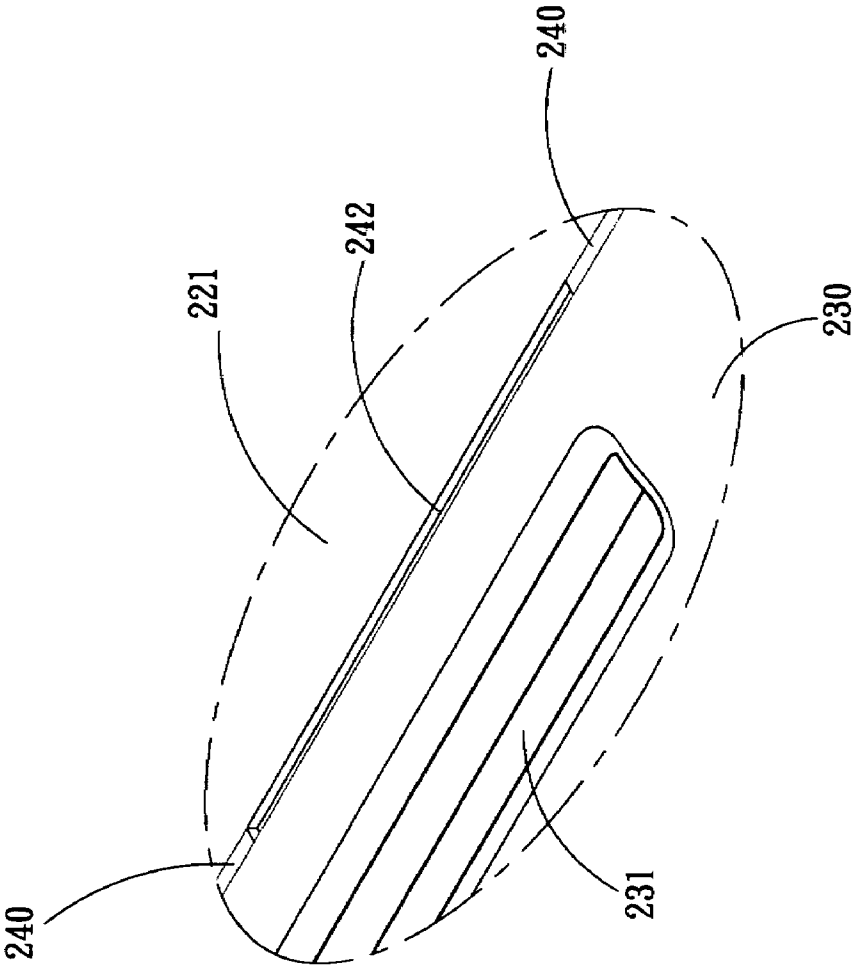

Fig. 4B

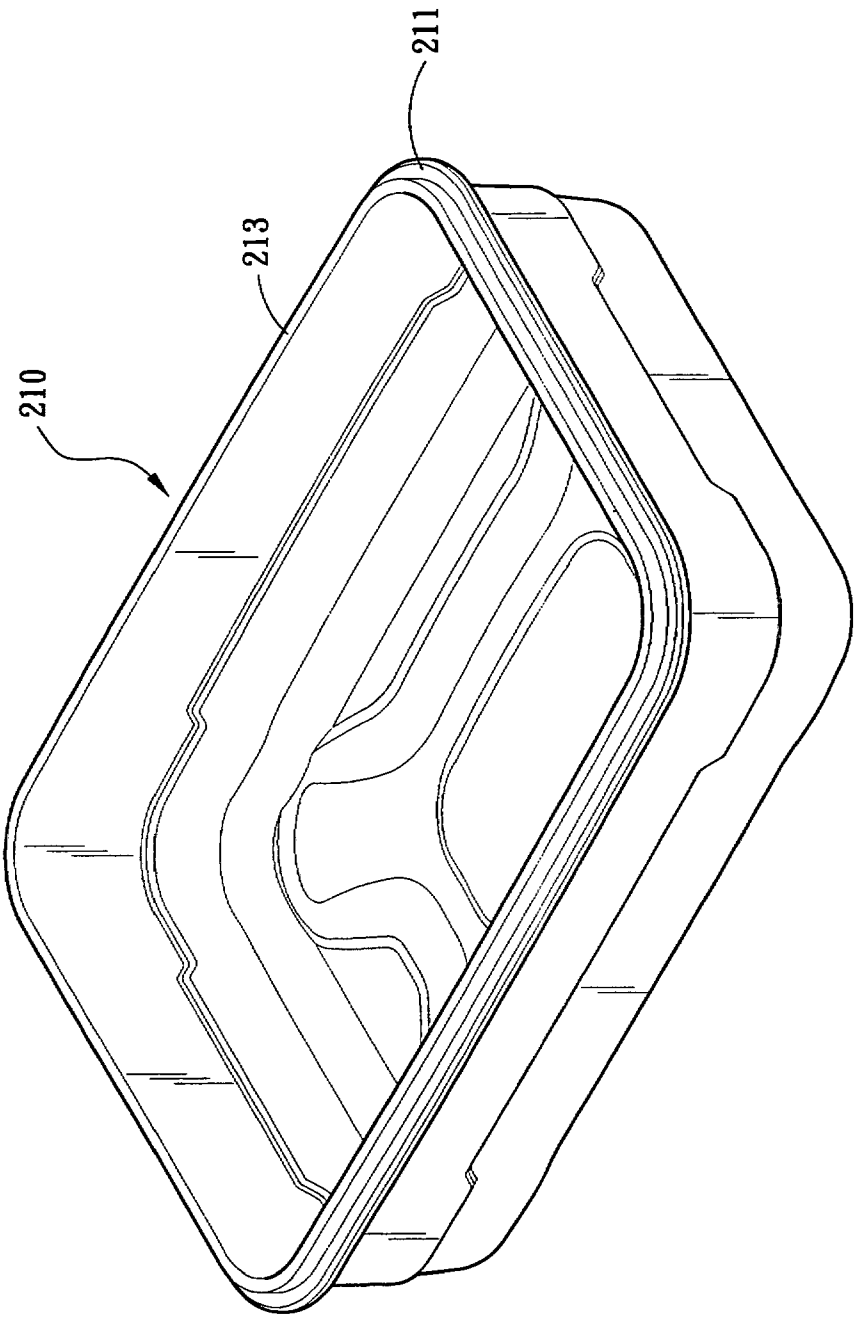

Fig. 5

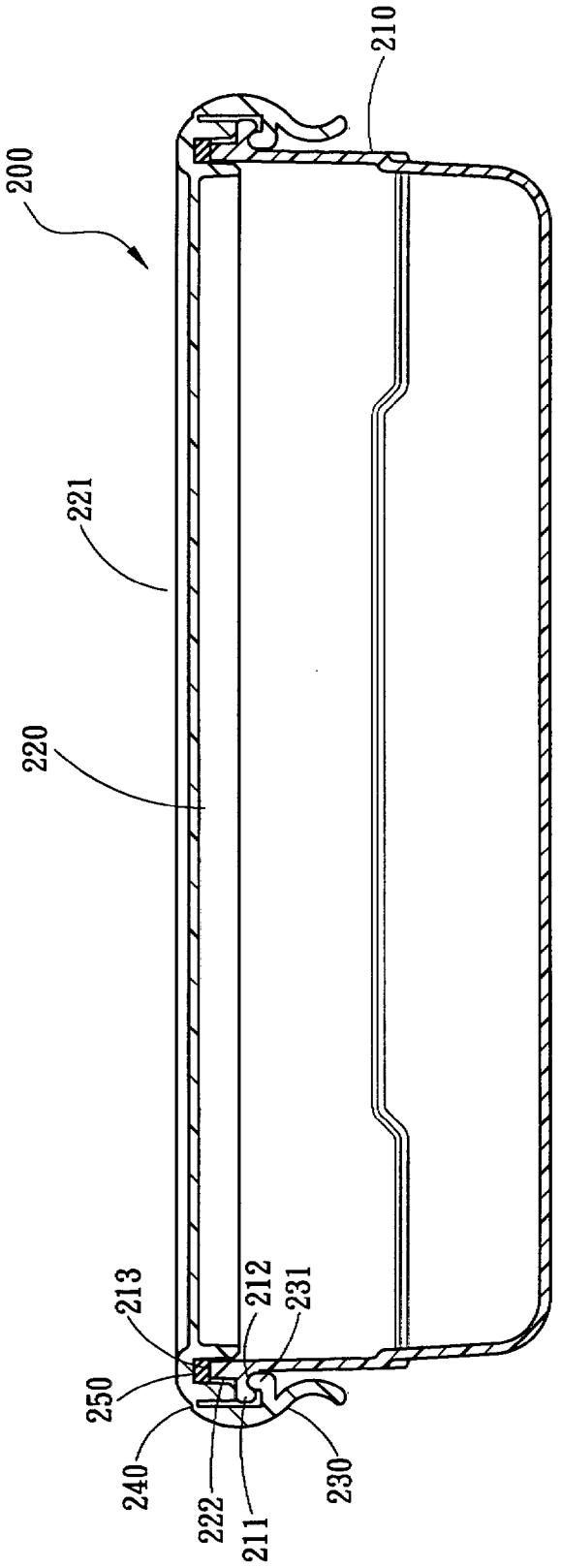

Fig. 6

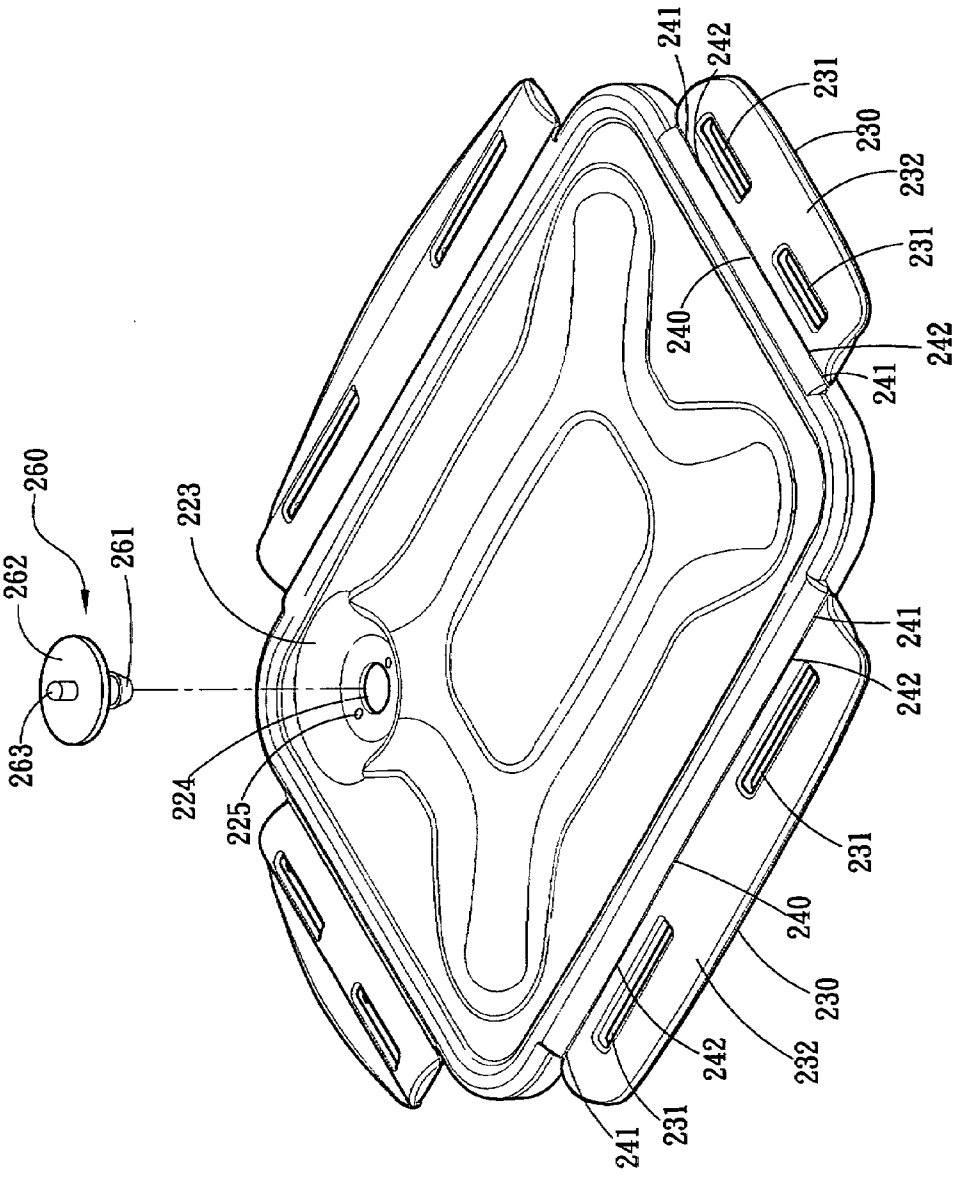
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Fig. 7

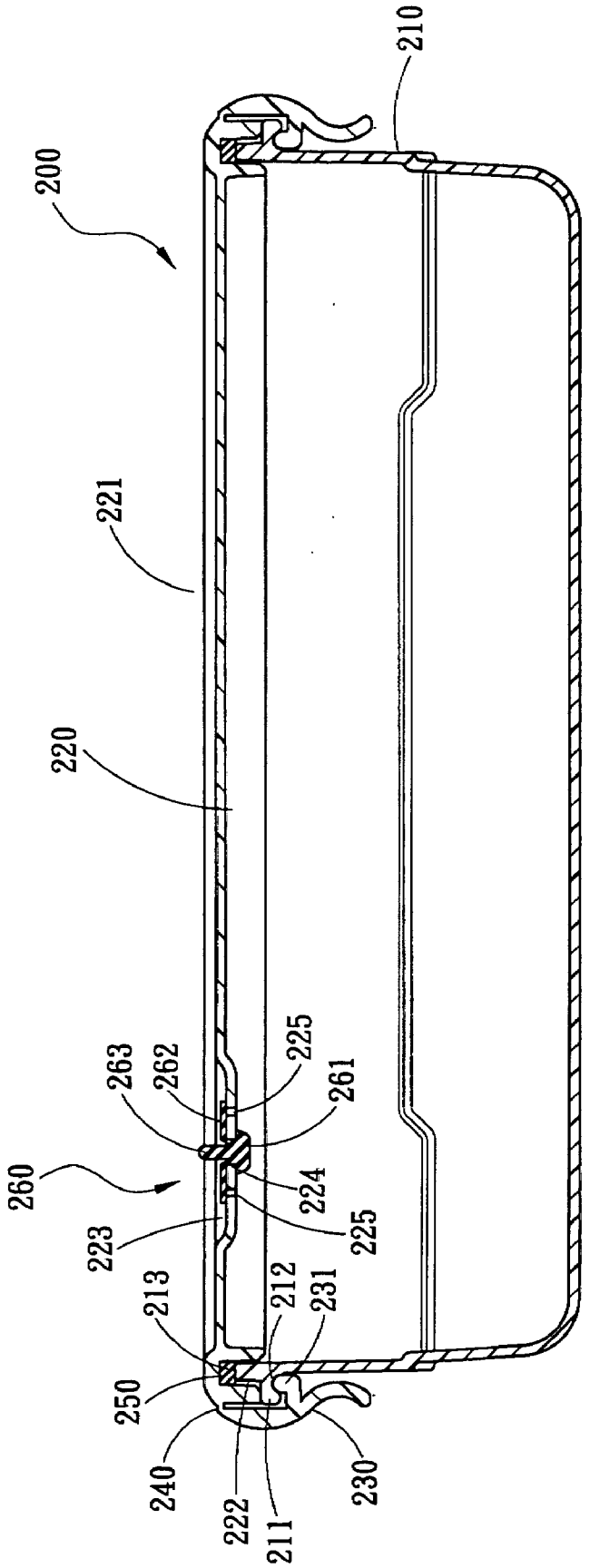
210
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Fig. 8

FASTENING STRUCTURE AND SEAL BOX WITH THE FASTENING STRUCTURE

FIELD OF THE INVENTION

[0001] The present invention relates to a plastic box, and more particularly to a fastening device of a box body and a plastic container with the fastening device.

BACKGROUND OF THE INVENTION

[0002] Referring to FIGS. **1** to **3** for a traditional structure of a sealed box having a container for containing objects or storing food, the plastic sealed box **100** includes a sealed box **100** having a container **110** and a cover **120**. The container **110** includes a plurality of fixing protrusions **111** disposed at the top of the container **110** and a plurality of fastening flanges **130** disposed at the periphery of the cover **120**, and the fastening flanges **130** are connected to the periphery of the cover **120** by a hinge portion **140** and turned through the hinge portion **140**. The fastening flange **130** includes a locking slot **131** corresponding to the fixing protrusion **111** for latching and fixing the protrusion **111**, such that the fastening flange **130** can latch the cover **120** to the container **110**.

[0003] The cover surface **121** of the cover **120** forms a recession **122** disposed at the periphery of the cover surface **121** and coupled to a top edge **113** of the container **110**, wherein the pad **150** can be inserted into the recession **122**.

[0004] If the cover **120** is put onto the container **110** and a force applying portion **132** is pressed onto the fastening flange **130** by a user's fingers and the fastening flange **130** is pressed towards the fixing protrusion **111** of the container **110**, the fixing protrusion **111** will be passed through and latched into the locking slot **131**. Since the top edge **113** presses the pad **150** at the recession **122**, the interior of the container **110** will be isolated from the outside to form a sealed condition.

[0005] As shown in the figures, the sealed box **100** is a rectangular box with a length greater than 10 cm, and each side has two locking slots **131** of the fastening flange **130** and two fixing protrusions **111** of the container **110** to assure a sufficient latching pressure and a consistent sealing pressure. However, the hinge portion **140** has a thickness smaller than that of the fastening flange **130** for connecting the fastening flange **130** with the cover **120**. Since the hinge portion **140** has to cope with the bending of the fastening flange **130** with respect to the cover **120**, therefore the thickness cannot be too thin for its manufacture, or else the bending stress of the hinge portion **140** will become too weak due to repeated operations.

[0006] Particularly, a rear hinge portion **141** of the hinge portion **140** will be torn or cracked easily by the repeated operation of folding and opening the fastening flange **130**. Once if the rear hinge portion **141** is torn or cracked even a little, the torn or cracked portion will be spread and expanded, and the life expectancy of the sealed box **100** will be shortened. If the length is greater than 10 cm and the thickness of the hinge portion **140** is too thick, then it will take lots of efforts to fold and open the fastening flange **130**, and users cannot operate the fastening flange **130** by one hand easily.

[0007] Further, the design of the fixing protrusion **111** no longer can keep the integrity of the periphery of the top of the container **110**. If the container **110** is one with a circular opening, the locking slot **131** of the fastening flange **130** of the cover **120** must be aligned precisely with the fixing protrusion **111** of the container **110**, so that the locking slot **131** can latch and fix the fixing protrusion **111**, and the fastening flange **130** can latch the cover **120** with the container **110**.

SUMMARY OF THE INVENTION

[0008] The primary objective of the present invention is to overcome the foregoing shortcomings and avoid the existing deficiencies by providing a fastening structure that can maintain the stress of a hinge portion for saving efforts for the operations of folding and opening the fastening flange than the prior art without changing the thickness of the hinge portion between a cover and a fastening flange.

[0009] Another objective of the present invention is to provide a sealed box having a container without the fixing protrusions to maintain the integrity of the periphery at the top of the container, such that if the sealed box is one with a circular opening, then the fastening flange no longer need any locking slot to be aligned precisely at the fixing protrusion, and the fastening flange can latch with the cover to facilitate the operations of the container.

[0010] The fastening structure of the invention is a fastening structure disposed at the periphery of a cover, comprising: at least one fastening flange extended outward from the periphery of the cover, a latch portion disposed under the fastening flange for latching and fixing the cover; and a hinge portion for connecting the fastening flange at the periphery of the cover, wherein the hinge portion has a plurality of sections of crevices for reducing a hinge area where the fastening flange is connected to the cover.

[0011] The thickness of the hinge portion is smaller than that of the fastening flange, so that the fastening flange can be folded and stacked onto the cover by the hinge portion.

[0012] A sealed box of a preferred embodiment of the invention comprises: a cover, a plurality of fastening flanges disposed at the periphery of the cover, and each fastening flange having at least one latch portion disposed under the fastening flange; and a hinge portion for connecting the fastening flange to the periphery of the cover. The thickness of the hinge portion is smaller than that of the fastening flange, such that the fastening flange can be folded and stacked onto the cover by the hinge portion. The hinge portion has a plurality of sections of crevices for reducing a hinge area that connects the fastening flange with the cover and a container having a latch structure disposed proximate to the top edge, and the latch structure works together with the latch portions for latching and fixing the cover.

[0013] The latch structure includes a sunken latch portion for pressing and hooking the latch portion, such that the fastening flange can latch the cover to the container, and thus the latch structure can be installed along the periphery of the top of the container for maintaining the integrity of the opening at the top of the container. If the container is one having a circular opening, the fastening flange of the cover can be pressed conveniently.

[0014] With a certain specific thickness of the hinge portion, the present invention provides sufficient thickness and bending stress for the hinge portion to deal with the operations of turning the hinge portion up and down as well as opening the sealed box. The hinge portion comes with a plurality of crevices for reducing a hinge area that connects the fastening flange with the cover, and thus the hardness for

turning the fastening flange up and down and opening the sealed container will not be increased due to the issues of the thickness of the hinge portion and the length of the fastening flange. As a result, users can fold and stack the fastening flange or open the sealed box as easy as shortening the fastening flange, and the invention also allows users to operate the latch structure easily by one hand.

[0015] The invention further comprises a sheathe hole at the bottom of a cover surface of the cover and a plurality of air holes disposed around the external periphery of the sheathe hole; and an umbrella valve for extracting air and maintaining the interior of the sealed box in a vacuum state, so as to extend the expiration date of objects stored in the sealed box, enhance the sealing function by using an umbrella valve, and add a vacuum function.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] FIG. **1** shows a traditional plastic sealed box cover;

[0017] FIG. **2** is cross-sectional view of a cover depicted in FIG. **1**;

[0018] FIG. **3** shows a traditional rectangular sealed box including a cover and a container;

[0019] FIG. **4**A shows a plastic sealed box cover of a preferred embodiment of the present invention;

[0020] FIG. **4**B is a partial enlarged view of FIG. **4**A;

[0021] FIG. **5** shows a container of a plastic sealed box a preferred embodiment of the present invention;

[0022] FIG. **6** is a cross-sectional view of an assembly of a sealed box of a preferred embodiment of the present invention;

[0023] FIG. **7** shows a cover of a plastic sealed box of another preferred embodiment of the present invention; and

[0024] FIG. **8** is a schematic view of an assembly of a sealed box adopting the cover as depicted in FIG. **7**.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0025] The present invention will now be described in more detail hereinafter with reference to the accompanying drawings as follows:

[0026] Referring to FIG. **4**A to **6**, a plastic sealed box **200** in accordance with a preferred embodiment of the present invention. The sealed box **200** is made of a plastic material and comprises a container **210** and a cover **220**. The container **210** has a latch structure **211** protruded from a position proximate to the periphery of the top edge **213** of the container **210** and a latch portion **212** under the latch structure **211**. The periphery of the cover **220** has a plurality of fastening flanges **230** (each is a rectangular sealed box **200** with four sides), and each fastening flange **230** is connected to the periphery of the cover **220** through a hinge portion **240** for bending and turning the fastening flange **230** with respect to the periphery of the cover **220** through the hinge portion **240**. The hinge portion **240** forms a plurality of sections of crevices **242**, such as 0.2 mm crevices **242** disposed at a middle section of a rear hinge portion **241** for reducing a hinge area that connects the fastening flange **230** with the periphery of the cover **220**.

[0027] The fastening flange **230** has a plurality of latch portions **231** corresponding to the latch portion **212** for latching the latch portion **212** of the latch structure **211**, such that the fastening flange **230** latches the cover **220** to the container **210**.

[0028] The cover **220** forms a recession **222** disposed at the periphery of the cover surface **221** and coupled to a top edge **213** of the container **210**, and a pad **250** is inserted into the recession **222**. When the cover **220** is put on the container **210**, a force applying portion **232** of the fastening flange **230** can be pressed by a user's fingers to press the fastening flange **230** towards the latch portion **212** of the latch structure **211** of the container **210**. The latch portion **231** of the fastening flange **230** presses the lower edge of the latch structure **211** and latches with the latch portion **212**. Since the top edge **213** presses the pad **250** at the recession **222**, the interior space of the container **210** is isolated from the outside to form a sealed condition.

[0029] If the sealed box **200** is a rectangular box and one of the sides is greater than 10 cm, there will be at least two latch portions **231** of the fastening flange **230** on each side to assure a sufficient latching pressure and a consistent sealing pressure.

[0030] Since the hinge portion **240** has to deal with the operations of turning the fastening flange **230** up and down and opening the sealed box, therefore the length of the hinge portion **240** must have a specific thickness to provide a sufficient bending stress for the hinge portion **240** to deal with the operations of turning the fastening flange **230** up and down and opening the sealed box, if the length of the fastening flange **230** is greater than 10 cm. The hinge portion **240** forms a plurality of crevices **242** for reducing a hinge area that connects the fastening flange **230** with the periphery of the cover **220**, so that the hardness of turning the fastening flange **230** up and down and opening the container will not be increased due to the issues of the thickness of the hinge portion **240** and the length of the fastening flange **230**, and users can save efforts of folding and stacking the fastening flange **230** and opening the sealed box similar to shortening the fastening flange **230**, and users can operate the latch structure of the sealed box by one hand. With the formation of the crevices **242**, the thickness of the rear hinge portion **241** can be increased, so that the rear hinge portion **241** will not be torn, cracked or damaged easily.

[0031] Further, the design of the latch structure **211** and its latch portion **212** can maintain the integrity of the periphery at the top of the container **210**. If the container **210** is one with a circular opening, the fastening flange **230** of the cover **220** can be pressed conveniently, and thus the latch portions **231** can be latched to the latch portion **212** of the latch structure **211**, and the fastening flange **230** can latch the cover **220** to the container **210**.

[0032] Referring to FIGS. **7** and **8** for another preferred embodiment of the present invention, the cover **220** has an indent **223** under the cover surface **221**, and the center of the indent **223** has a sheathe hole **224** penetrating to the outside, and the external periphery of the sheathe hole **224** of the indent **223** has a plurality of air holes **225**.

[0033] An umbrella valve **260** includes a diaphragm **262**, a press button **263** disposed above the diaphragm **262**, and a blocking latch portion **261** disposed under the diaphragm **262**. The umbrella valve **260** is inserted into the sheathe hole **224** from the blocking latch portion **261**, and the width of the diaphragm **262** can cover the air hole **225** of the indent **223**.

[0034] When the container is assembled, the umbrella valve **260** can be forced into the sheathe hole **224** of the cover **220**, the blocking latch portion **261** of the umbrella valve **260** is latched to the bottom of the cover **220** for its positioning, such that an air-extracting cylinder (not shown

in the figure) can be used for extracting air at the indent **223**, or a user can press the cover surface **221** by a hand to drive the diaphragm **262** to draw the extracted air upward, and the air in the sealed box **200** can be discharged from the air holes **225** of the indent **223**. When the interior of the sealed box **200** is in a vacuum state, the air-extracting cylinder is removed or the pressing of the cover surface **221** is stopped. The diaphragm **262** of the umbrella valve **260** is attached onto each air hole **225** by pressure to maintain the vacuum state of the sealed box **200** and extend the expiration date of objects stored in the sealed box **200**.

[0035] If a user wants to open the cover **220** and access the objects stored in the sealed box **200**, the user just needs to press the press button **263** of the umbrella valve **260**, and the press button **263** is pressed to deform the diaphragm **262** and separate each air hole **225** at the surface of the indent **223**, so that air can enter into the sealed box **200** successfully, and the cover **220** can be opened more conveniently. With the application of the umbrella valve **260**, the present invention can increase the using surface of the sealed box **200** and add a vacuum function in addition to the sealing function of the sealed box **200**.

[0036] While the invention has been described by means of specific embodiments, numerous modifications and variations could be made thereto by those skilled in the art without departing from the scope and spirit of the invention set forth in the claims.

What is claimed is:

1. A fastening structure, disposed at a periphery of a cover and comprising:

at least one fastening flange extended outward from the periphery of said cover, and having a latch portion disposed under said fastening flange; and

a hinge portion, for connecting said fastening flange with the periphery of said cover, and having a plurality of sections of crevices, for reducing a hinge area that connects said fastening flange and said cover.

2. The fastening structure of claim **1**, wherein said hinge portion has a thickness smaller than that of said fastening flange, such that said fastening flange can be folded from said hinge portion and stacked onto said cover.

3. A sealed box, comprising:

a cover, having a plurality of fastening flanges disposed at the periphery of said cover and a latch portion disposed under said fastening flange;

a hinge portion, coupled to the periphery of said cover at said fastening flange, and having a plurality of sections of crevices, for reducing a hinge area that connects said fastening flange to said cover; and

a container, having a latch structure disposed proximate to a top edge of said container and used together with said latch portions for fastening and fixing said cover with said container.

4. The sealed box of claim **3**, wherein said hinge portion has a thickness smaller than that of said fastening flange, such that said fastening flange can be folded and stacked onto said cover by said hinge portion.

5. The sealed box of claim **3**, wherein said latch structure comprises a sunken latch portion, for pressing and latching said latch portions into said latch portion.

6. The sealed box of claim **3**, wherein said cover has a recession coupled to the top of said container, and said recession includes a pad for sealing said container.

7. The sealed box of claim **3**, wherein said has a sheathe hole disposed at a cover surface of said cover, and said sheathe hole has at least one air hole disposed adjacent to the periphery of said sheathe hole; and an umbrella valve, including a diaphragm with a sufficient width to cover said air hole, a press button disposed above said diaphragm, and a blocking latch portion disposed under said diaphragm and provided for inserting into said sheathe hole.

8. The sealed box of claim **7**, wherein said cover has an indent sunken into said cover surface, and said sheathe hole is disposed at said indent.

* * * * *