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(54) CONTAINER FOR TIRE REPAIR FLUID

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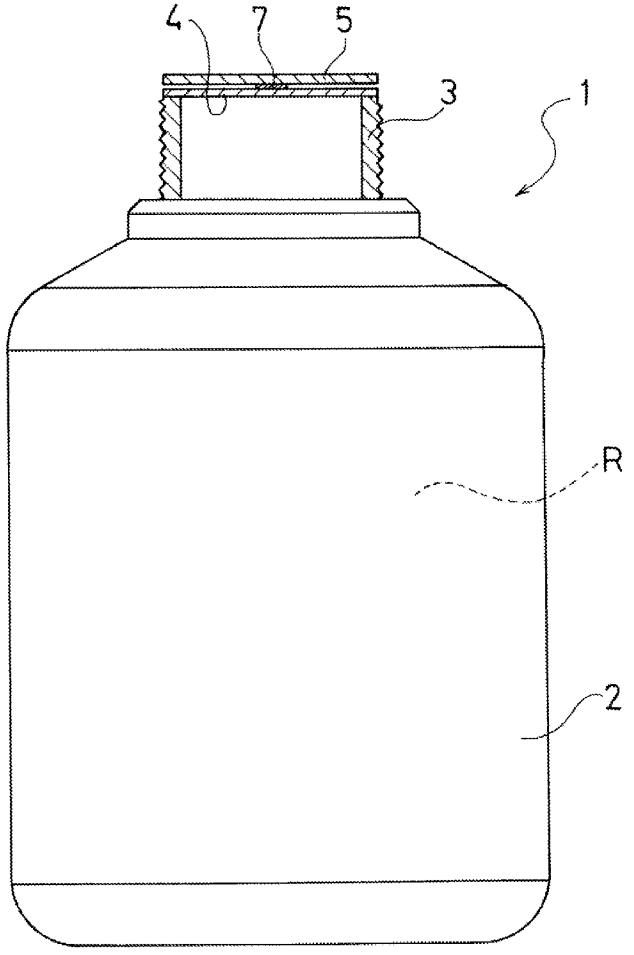
(57) **ABSTRACT**

A container for containing tire repair fluid is provided that does not require a protective cap provided with a perforating member for perforating a sealing film, and is capable of ensuring protection effect of the sealing film during storage as well as allowing perforating of the sealing film during tire repair. In the container for containing tire repair fluid of the present technology includes a liquid containing portion that contains a tire repair fluid, an opening connected to the liquid containing portion, and a sealing film that seals the opening. The container further includes a plate-like protective member larger in size than an internal diameter of the opening and held in a layered state on the sealing film, wherein the protective member, upon being folded, functions as a perforating tool for perforating the sealing film.



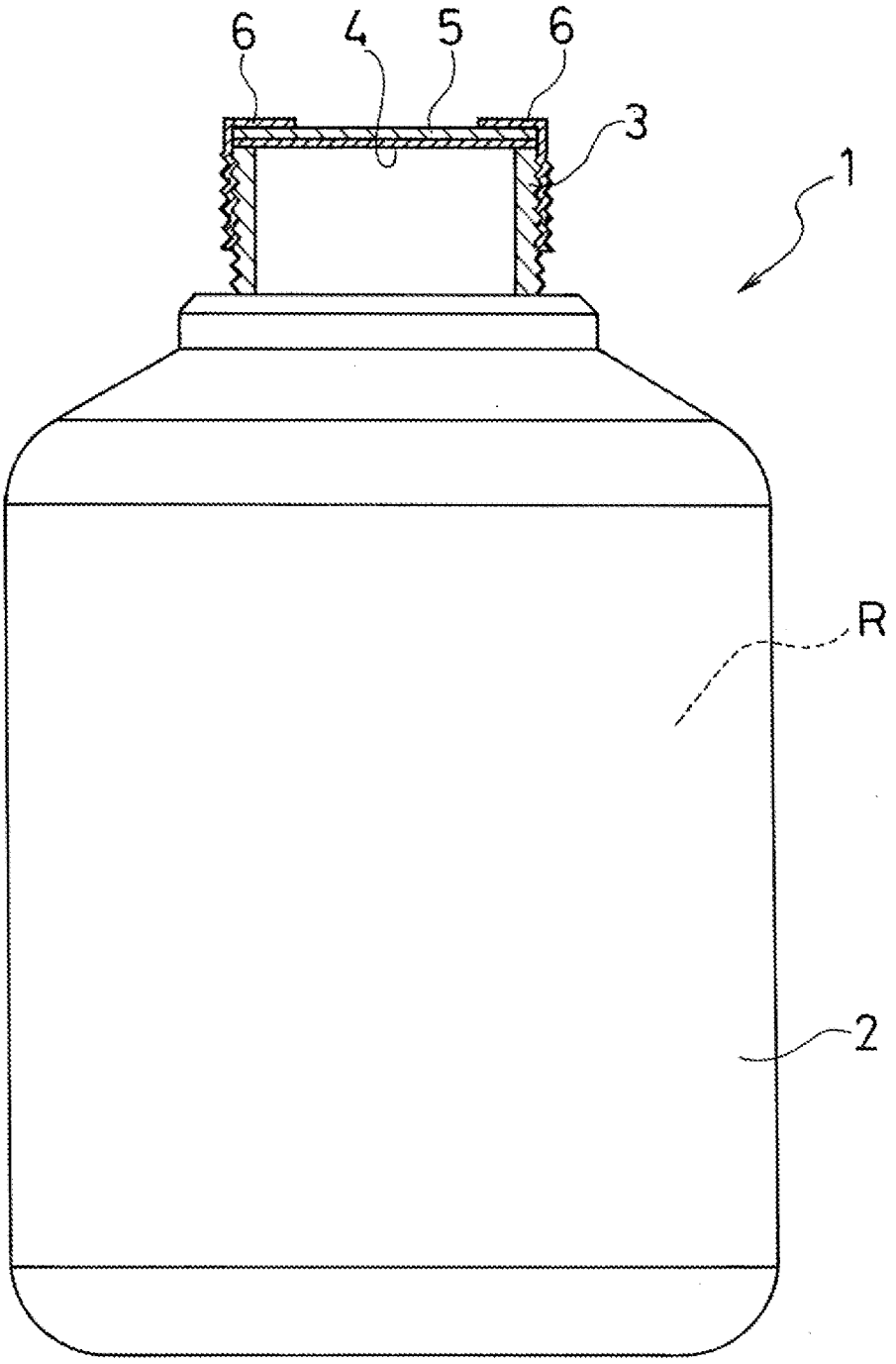


FIG. 1

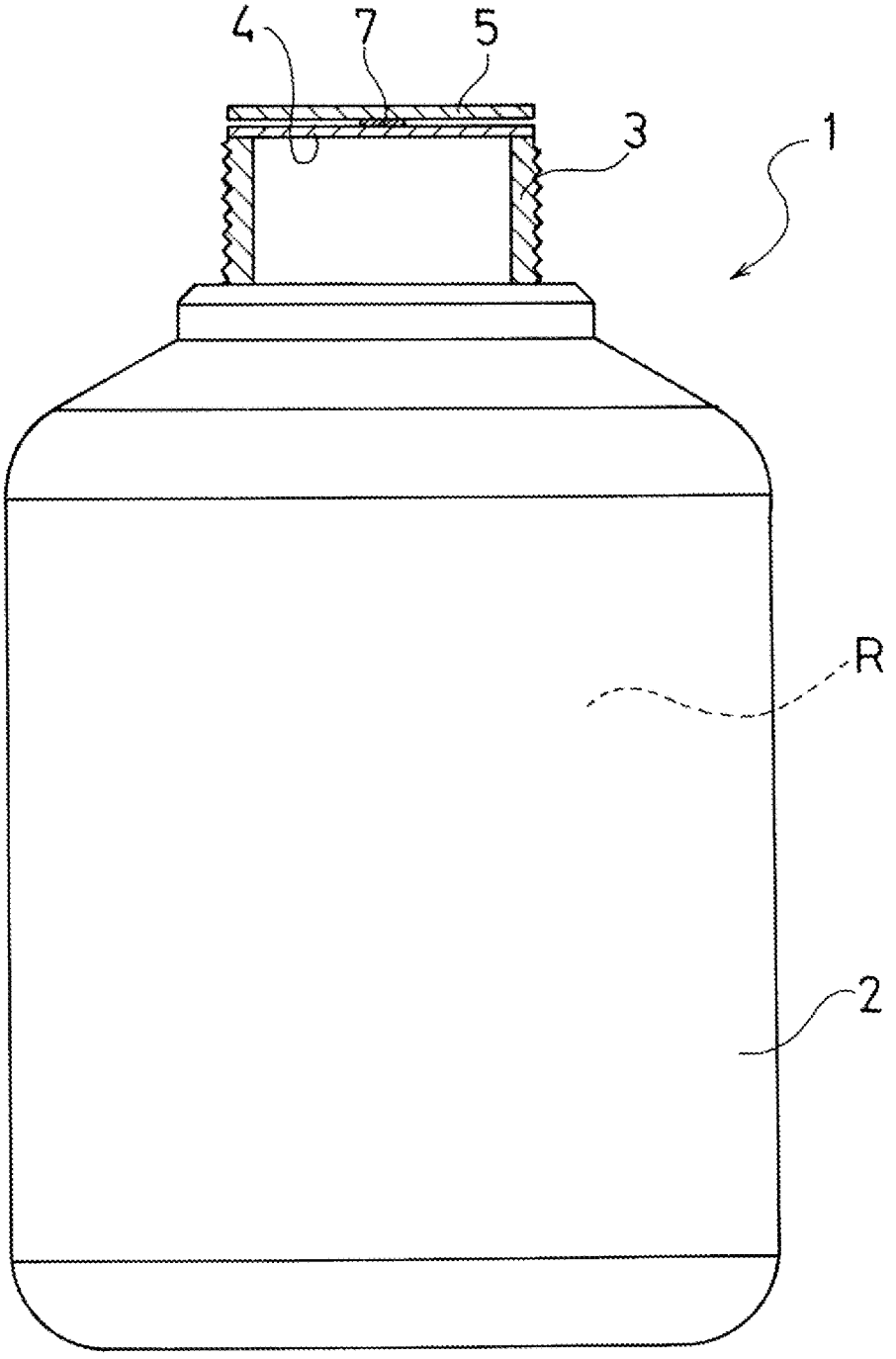


FIG. 2

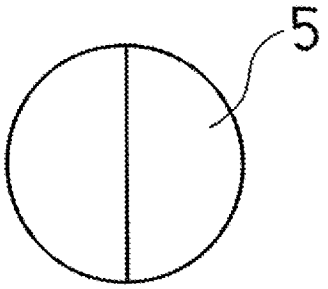


FIG. 3A

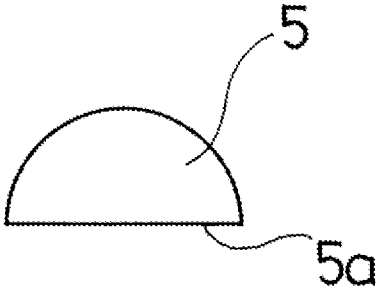


FIG. 3B

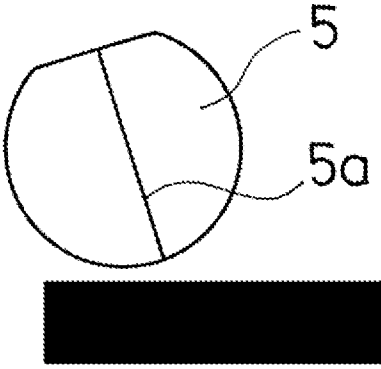


FIG. 4A

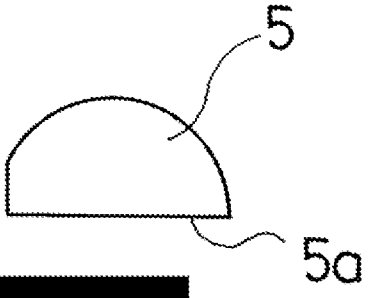


FIG. 4B

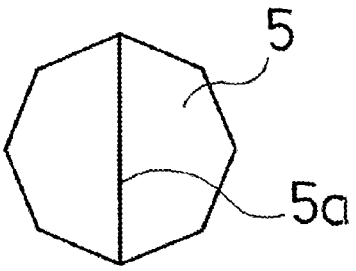


FIG. 5A

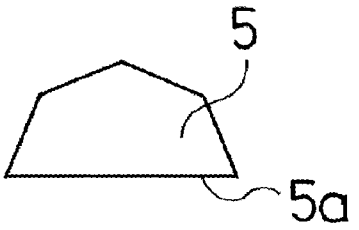


FIG. 5B

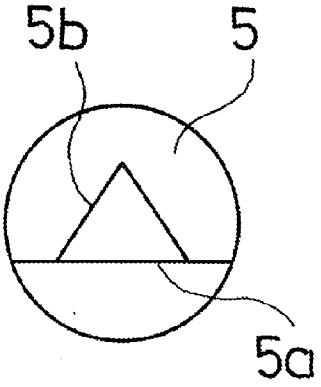


FIG. 6A

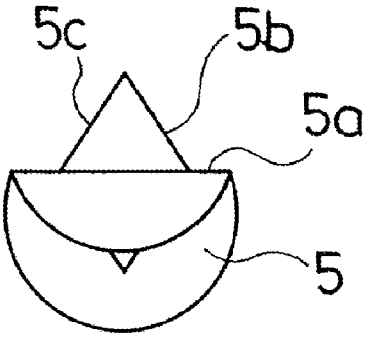


FIG. 6B

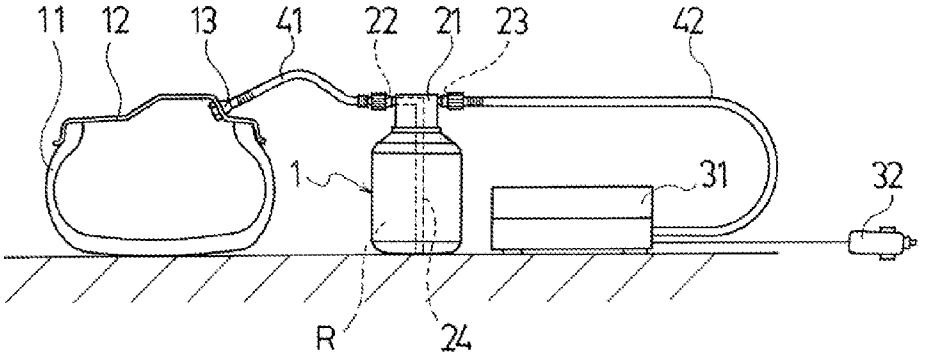


FIG. 7

CONTAINER FOR TIRE REPAIR FLUID

TECHNICAL FIELD

[0001] The present technology relates to a container for containing tire repair fluid, and in particular to a container for containing tire repair fluid that, while not requiring a protective cap provided with a hole perforation member for perforating a sealing film, is capable of ensuring reliable protection effect of the sealing film during storage and allows perforating of the sealing film during tire repair.

BACKGROUND

[0002] In recent years, when a tire mounted on a vehicle has a puncture, a tire repair fluid is injected into the tire via a tire valve to temporarily repair the puncture, and the tire is simultaneously filled with air.

[0003] Tire repair fluid injector devices (for example, see Japanese Unexamined Patent Application Publication Nos. H09-118779, 2000-108215 and 2010-69847) comprise a container for containing tire repair fluid, an air compressor, and hoses for connecting the container and the air compressor to a tire valve.

[0004] Tire repair fluid injector devices of this type are provided in vehicles in preparation for punctures. To prevent deterioration or leakage of the tire repair fluid during extended storage, a sealing film made of a material with a low gas permeability, such as an aluminum film, is adhered to an opening of the container for containing the tire repair fluid, and the container is sealed by the sealing film. Since there is a risk that the sealing film will be broken upon contact with a sharp protrusion, a protective cap is fitted to the opening of the container to protect the sealing film. Further, a perforating member for perforating the sealing film is provided at a top portion of the protective cap, and is used to perform a perforating operation of the sealing film during tire repair.

[0005] However, the protective cap provided with the perforating member has a complex form and is expensive, and reduction of the cost of the protective cap therefore is required. Also, since the protective cap provided with the hole perforating member increases the overall height of the container, reduction of this dimension is required. Note that while the above-described requirements can be met by eliminating the protective cap provided with the perforating member, if this cap is eliminated, it is not possible to ensure that protection effect of the sealing film during storage, and to perforate the sealing film during tire repair.

SUMMARY

[0006] The present technology provides a container for containing tire repair fluid that, without requiring a protective cap with a perforating member for perforating a sealing film, is capable of ensuring protection effect of the sealing film during storage and allows perforating of the sealing film during tire repair.

[0007] The present technology is a container for a tire repair fluid including a liquid containing portion for containing a tire repair fluid, an opening connected to the liquid containing portion, and a sealing film that seals the opening, the container including a plate-like protective member larger in size than an internal diameter of the opening and held in a layered state on the sealing film, wherein the protective member, upon being folded, functions as a perforating tool for perforating the sealing film.

[0008] In the present technology, the container for containing the tire repair fluid includes a plate-like protective member larger in size than an internal diameter of the opening and held in a layered state on the sealing film, wherein the protective member, upon being folded, functions as a perforating tool for perforating the sealing film. Hence, even after eliminating the protective cap provided with the hole perforating member for perforating the sealing film, the plate-like protective member makes it possible to ensure that the protection effect of the sealing film during storage. In addition, during tire repair, the user can fold the protective member and use it as a perforating tool to perforate the sealing film.

[0009] In the present technology, it is preferable that at least one folding groove extending along a surface direction of the protective member is provided in the protective member. With such an arrangement, the user can easily fold the protective member along the folding groove when using the protective member as a perforating tool. In addition, the user can easily tear the sealing film because the folded portion becomes sharp.

[0010] Further, it is preferable that at least one notch connected to the folding groove is provided in the protective member. With such an arrangement, when the protective member is folded along the folding groove, a partitioned sharp corner portion created by the notch is protruded and the sealing film can be easily broken using the corner portion.

[0011] It is preferable that the protective member is fixed to the sealing film by a shrink film that integrally covers the protective member and the opening, or that the protective member is fixed to the sealing film by an adhesive adhered to a portion of the sealing film. In such cases, the protective film can be fixed to the sealing film without adding more than necessary to the height of the container for containing tire repair fluid.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] FIG. **1** is a side view illustrating a container for containing tire repair fluid according to an embodiment of the present technology.

[0013] FIG. **2** is a side view illustrating a container for containing tire repair fluid according to another embodiment of the present technology.

[0014] FIGS. **3**A and **3**B illustrate an example of a protective member used in the present technology, FIG. **3**A being a plan view illustrating a pre-folding state and FIG. **3**B being a plan view illustrating a folded state.

[0015] FIGS. **4**A and **4**B illustrate a modification example of a protective member used in the present technology, FIG. **4**A being a plan view illustrating a pre-folding state and FIG. **4**B being a plan view illustrating a folded state.

[0016] FIGS. **5**A and **5**B illustrate a modification example of a protective member used in the present technology, FIG. **5**A being a plan view illustrating a pre-folding state and FIG. **5**B being a plan view illustrating a folded state.

[0017] FIGS. **6**A and **6**B illustrate a modification example of a protective member used in the present technology, FIG. **6**A being a plan view illustrating a pre-folding state and FIG. **6**B being a plan view illustrating a folded state.

[0018] FIG. **7** is a side view illustrating a tire repair method using the container for containing tire repair fluid of the present technology.

DETAILED DESCRIPTION

[0019] Detailed descriptions will be given below of a configuration of the present technology with reference to the accompanying drawings. FIG. **1** is a side view illustrating a container for containing tire repair fluid according to an embodiment of the present technology. As illustrated in FIG. **1**, the container **1** for containing tire repair fluid of this embodiment includes a liquid containing portion **2** containing a tire repair fluid R, an opening **3** connected to the liquid containing portion **2** and a sealing film **4** that seals the opening **3**. The sealing film **4** is fixedly adhered to an edge surface of the opening **3** using an adhesive or thermal fusing. For the sealing film **4**, it is preferable to use a laminate film of a resin film and an aluminum film with low gas permeability, but it is also possible to use a resin film with low gas permeability.

[0020] The container **1** for containing tire repair fluid includes a plate-like protective member **5** larger in size than an internal diameter of the opening **3** and held in a layered state on the sealing film **4**. More specifically, the protective member **5** is fixed to the sealing film **4** by a shrink film **6** that integrally covers the protective member **5** and the opening **3**. Hence, the protective member **5** is separated from the sealing film **4** by peeling the shrink film **6** from the opening **3**.

[0021] FIG. **2** is a side view illustrating a container for containing tire repair fluid according to another embodiment of the present technology. In FIG. **2**, components that are identical to those in FIG. **1** have been assigned the same symbols, and detailed descriptions of those components have been omitted. As illustrated in FIG. **2**, the protective member **5** is fixed to the sealing film **4** by an adhesive **7** adhered at a central portion of the sealing film **4**. In short, the adhesive **7** is used in place of the shrink film **6** described above as a fixing means for the protective member **5**. In this case, the protective member **5** is separated from the sealing film **4** by peeling the protective member **5** from the adhesive **7**.

[0022] The above-described protective member **5** is preferably constructed from a cardboard or resin sheet and preferably has a thickness of **1** mm to **2** mm to ensure a certain degree of stiffness. If a cardboard is used, the cardboard may have a surface coating to prevent disintegration when it is folded. The protective member **5** may, if necessary, be constructed from a metal plate. A plan view shape of the protective member **5** is not particularly limited and can, for example, be circular or polygonal shape. Since the protective member **5** has a high level of stiffness and forms a corner portion in a folded state, the protective member **5** functions effectively as a perforating tool for perforating a hole in the sealing film **4**.

[0023] The above-described container **1** for containing tire repair fluid includes a plate-like protective member **5** held in a layered state on the sealing film **4**.

[0024] Upon being folded, the protective member **5** functions as a perforating tool for perforating the sealing film **4**. Hence, even when the protective cap provided with a perforating member of the prior art is eliminated, the plate-like protective member **5** makes it possible to ensure the protection effect of the sealing film **4** during storage. In addition, during a tire repair, a user can fold the protective member **5** and use it as a perforating tool to perforate the sealing film **4**.

[0025] Here, it is necessary that the protective member **5** is larger in size than an internal diameter of the opening **3**. If the protective member **5** is smaller than the internal diameter of the opening **3**, there is a risk that the protective member **5** layered on the sealing film **4** will drop into the opening **3** and break the sealing film **4**. Note also that in order to hold the protective member **5** in a layered state on the sealing film **4** using the shrink film **6** or the adhesive **7**, the size of the protective member **5** is preferably smaller than an outer diameter of an edge surface of the opening **3**.

[0026] FIGS. **3** to **6** each illustrate the protective member used in the present technology. In FIG. **3**A, the protective member **5** has a circular form when seen in plan view and includes a single folding groove **5***a* extending along the surface direction thereof. The protective member **5** can be easily folded along the folding groove **5***a* and, upon being folded, takes the form illustrated in FIG. **3**B. In FIG. **4**A, the protective member **5** has a circular form a portion of which is removed when seen in plan view and includes a single folding groove **5***a* that extends along the surface direction thereof. The protective member **5** can be easily folded along the folding groove **5***a* and, upon being folded, takes the form illustrated in FIG. **4**B. In FIG. **5**A, the protective member **5** has an octagonal form when seen in plan view and includes a single folding groove **5***a* that extends along the surface direction thereof. The protective member **5** can be easily folded along the folding groove **5***a* and, upon being folded, takes the form illustrated in FIG. **5**B. A plurality of folding grooves **5***a* may be formed in the protective member **5** or a folding groove **5***a* may be branched part-way along. There is no particular limitation on the cross-sectional profile of the folding groove **5***a*, but it may be, for example, a V-form groove.

[0027] The protective member **5** can be appropriately folded even without including the folding grooves **5***a*. However, the provision of at least one folding groove **5***a* extending along the surface direction of the protective member **5** results in a simpler folding process and a sharp folded portion, thereby allowing the sealing film **4** to be broken easily. In particular, in the case of a cardboard, it is possible to prevent a loss of shape in the paper.

[0028] As illustrated in FIG. **6**A, the protective member **5** is in a circular shape when seen in plan view, and includes a single folding groove **5***a* that extends in the surface direction of the protective member and a notch **5***b* that is connected to the folding groove **5***a* and has a bent form. The protective member **5** can be easily folded along the folding groove **5***a* and, upon being folded, takes the form illustrated in FIG. **6**B. In other words, when the protective member **5** is in the folded state, a sharp corner portion **5***c* divided by the notch **5***b* forms a projection. Hence, the sealing film **4** can be broken easily using the sharp corner portion **5***c*.

[0029] FIG. **7** illustrates a tire repair method using the container for containing tire repair fluid of the present technology. In FIG. **7**, **11** is a pneumatic tire, **12** is a wheel, and **13** is a tire valve attached to the wheel.

[0030] As illustrated in FIG. **7**, the tire repair fluid injector device is provided with the container **1** that contains tire repair fluid R, an injection cap **21** fitted to an opening **3** in the container **1**, an air compressor **31** for supplying compressed air, and hoses **41** and **42** for connecting the container **1** and the air compressor **31** to a tire valve **13**. An outlet **22** for ejecting tire repair fluid R and an inlet **23** into which compressed air is taken are provided in the injection cap **23**, and an inner tube **24** extending to the bottom of the container **21** is connected to the outlet **22**.

[0031] When repairing a tire, a hole is first opened in the sealing film **4** that seals the opening **3** of the container **1** using the protective member **5** and the injection cap **21** is then fitted to the opening **3** in the container **1**. Next, the hose **41** is connected between the outlet **22** of the cap **21** and the tire

valve **13**, while the hose **42** is connected between the inlet **23** of the cap **21** and the air compressor **31**. A plug **32** of the air compressor **31** is then connected to a power source and the air compressor **31** is operated, thereby injecting the tire repair fluid R in the container **1** into a pneumatic tire **11** using the pressure of compressed air, and the interior of the pneumatic tire **11** remains filled with compressed air after injection is complete.

[0032] Note that while the case has been described in which the injection of the tire repair fluid R is performed with the container **1** arranged so that the opening faces upward, the arrangement of the container **1** during the injection operation can be appropriately selected in accordance with the configuration of the injection cap.

1. A container for containing a tire repair fluid, comprising:

a liquid containing portion that contains a tire repair fluid;

an opening connected to the liquid containing portion;

a sealing film that seals the opening; and

the container comprising a plate-like protective member larger in size than an internal diameter of the opening and held in a layered state on the sealing film, the protective member, upon being folded, functioning as a perforating tool for perforating the sealing film.

2. The container for containing the tire repair fluid according claim **1**, wherein at least one folding groove extending along a surface direction of the protective member is provided in the protective member.

3. The container for containing the tire repair fluid according claim **2**, wherein at least one notch connected to the folding groove is provided in the protective member.

4. The container for containing the tire repair fluid according to claim **3**, wherein the protective member is fixed to the sealing film by a shrink film that integrally covers the protective member and the opening.

5. The container for containing the tire repair fluid according to claim **3**, wherein the protective member is fixed to the sealing film by an adhesive adhered to a portion of the sealing film.

6. The container for containing the tire repair fluid according to claim **2**, wherein the protective member is fixed to the sealing film by a shrink film that integrally covers the protective member and the opening.

7. The container for containing the tire repair fluid according to claim **2**, wherein the protective member is fixed to the sealing film by an adhesive adhered to a portion of the sealing film.

8. The container for containing the tire repair fluid according to claim **1**, wherein the protective member is fixed to the sealing film by a shrink film that integrally covers the protective member and the opening.

9. The container for containing the tire repair fluid according to claim **1**, wherein the protective member is fixed to the sealing film by an adhesive adhered to a portion of the sealing film.

10. The container for containing the tire repair fluid according to claim **1**, wherein the sealing film is fixedly adhered to an edge surface of the opening using an adhesive.

11. The container for containing the tire repair fluid according to claim **1**, wherein the sealing film is fixedly adhered to an edge surface of the opening using an thermal fusing.

12. The container for containing the tire repair fluid according to claim **1**, wherein the sealing film comprises a laminate film of a resin film and an aluminum film with low gas permeability.

13. The container for containing the tire repair fluid according to claim **1**, wherein the sealing film comprises a resin film with low gas permeability.

14. The container for containing the tire repair fluid according to claim **1**, wherein the protective member has a thickness of from 1 mm to 2 mm.

15. The container for containing the tire repair fluid according to claim **1**, wherein the protective member is constructed from a cardboard sheet.

16. The container for containing the tire repair fluid according to claim **15**, wherein the cardboard sheet includes a disintegration prevention surface coating.

17. The container for containing the tire repair fluid according to claim **1**, wherein the protective member is constructed from a resin sheet.

18. The container for containing the tire repair fluid according to claim **1**, wherein the protective member is constructed from a metal plate.

19. The container for containing the tire repair fluid according to claim **1**, wherein the size of the protective member is smaller than an outer diameter of an edge surface of the opening.

* * * * *