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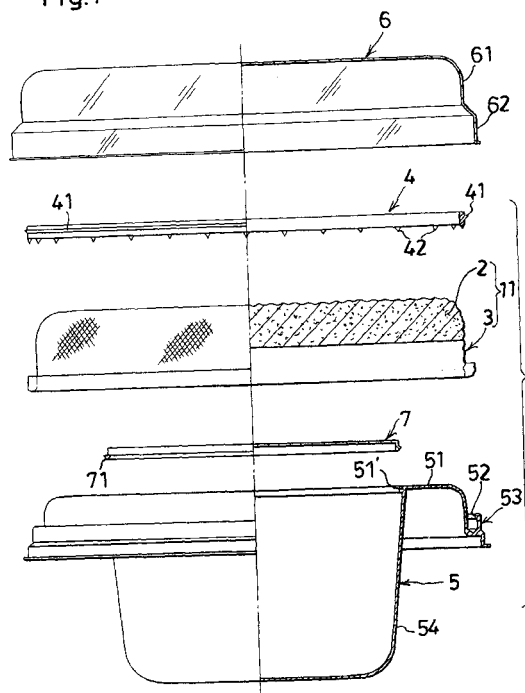
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(54) **SURFACE PROCESSING DEVICE**

(57) A surface treating device is used for lustering car bodies, furniture, etc. This surface treating device includes a material that constitutes a treating portion (11) of a continuously foamed body (2) coated with a fibrous film (3), an annular engaging member (4), and a holder (5) that has a base (51) for supporting the treating portion thereon and an annular groove (53) provided in an inside peripheral surface thereof with an engaging structure. The surface treating device can be assembled with ease by causing a distal end of the annular engaging member to forcibly fit an end of the treating portion into the annular groove to engage it integrally with the engaging structure.

Fig.1



Description

Field of Art:

[0001] The present invention relates to a surface treating device formed by assembling a small number of members having simple configuration, that can be used as a lustering-agent applicator used for lustering car bodies or tires, furniture, etc. as well as a cleaner, an eraser for a blackboard or other such device.

Background Art:

[0002] A great number of brushes or applicators having a grip to be held by a user have heretofore been proposed.

[0003] Typical of the proposed brushes are represented by toothbrushes, clothesbrushes, etc. having a treating portion constituted of numerous bristle members. Generally, the treating portion has a relatively small area or is rod-shaped. The major structural feature of the treating portion is that the proximal ends of the bristle members are totally adhered and fixed to a base by means of an adhesive agent.

[0004] The proposed applicators have a treating portion constituted of various kinds of materials. Materials capable of retaining a liquid composition therein include a continuously foamed body, such as sponge, and a continuously foamed body coated with cloth, felt or the like. The treating portion generally has a relatively large area. The major structural feature of the treating portion constituted of sponge, for example, is that the back surface of the sponge is adhered and fixed to a base by means of an adhesive agent. When the treating portion is constituted of sponge coated with cloth, for example, the side edges of the cloth are fixed to the peripheral edge of a base by means of an adhesive agent or metal fittings. So-configured applicators are disclosed in JU-A 54-177764, JU-A 54-177766, JU-B 57-46939, JU-B 59-9742, JP-B 60-2046 and JD-B 559923.

[0005] However, since the conventional brushes or applicators are fabricated using an adhesive agent, they cannot be used until the adhesive agent sets. In addition, the adhesive agent contains an organic solvent. For these reasons, the productivity thereof is not good. To be specific, the material of the treating portion easily falls out before the adhesive agent sets. Therefore, a step of setting the adhesive agent is required. In addition, the adhesive agent contains an organic solvent that is flammable and harmful to the human body. Therefore, it is necessary to install an exhausting unit and pay strict attention to fire prevention.

[0006] Some structures using no adhesive agent, such as an eraser for a blackboard, also have heretofore been proposed. In this case, a strap of metal has to be attached and fixed to the peripheral edge of a base by striking metal fittings such as rivets. Since the assembling work requires special treatments, as described

above, the productivity of the devices is not good and the production cost is high.

[0007] On the other hand, the work of lustering car bodies is to coat a thin film of a water-repellent treating agent, such as liquid or semisolid wax onto the car body surface. A car owner has to assemble a set of materials including an applicator such as a spongy member, a water-repellent treating agent, a container for the treating agent, a cloth member for thinly applying and wiping off the treating agent and disposable gloves for carrying out this work. This set is bulky and takes up a large space. If always kept in a car trunk, it is likely to be a nuisance, especially if not frequently used.

[0008] In view of the above, the present invention has been accomplished and one object thereof is to provide a surface treating device that can be easily fabricated with high productivity without requiring the use of an adhesive agent or the work of welding or other such attaching treatment.

[0009] Another object of the present invention is to provide a surface treating device advantageously usable for the work of lustering car bodies without requiring the use of an applicator, wax, a cloth member, etc.

Disclosure of the Invention:

[0010] To attain the above objects, the present invention provides a surface treating device comprising a material that constitutes a treating portion of a continuously foamed body coated with a fibrous film, a holder that has a base for supporting the treating portion thereon and an annular groove provided in an inside peripheral surface thereof with an engaging structure, and an annular engaging member that has a distal end forcibly fitting an end of the treating portion into the annular groove of the holder to support the treating portion on and fix it integrally to the base.

[0011] The continuously foamed body may be impregnated with wax, detergent or like agent.

[0012] The holder may be provided with a hollow cylindrical grip portion having in an open end face thereof a ring groove and with a base member having on a peripheral edge thereof a downwardly overhanging portion that constitutes an engaging structure fitted on the open end face of the grip portion.

[0013] The surface treating device may be provided further with a cover member having a bulged portion for covering the treating portion.

[0014] As described above, the surface treating device according to the present invention comprises a material constituting a treating portion, a holder and an annular engaging member. These component members can be assembled with ease into a surface treating device, without use of adhesive agent or other such agent, by a simple operation of forcing the treating portion into an annular groove of the holder and fitting the annular engaging member in the annular groove. Thus, the present invention can provide a surface treating device

that can be produced with high efficiency and used with high safety.

[0015] The surface treating device of the present invention having a treating portion impregnated with wax can be used directly for the work of lustering car bodies without requiring separate preparation of an applicator, wax and a cloth member. Thus, the present invention can provide a surface treating device that can be put to very advantageous and practical use.

Brief Description of the Drawings:

[0016]

Figure 1 is an exploded front view showing a first embodiment of the surface treating device according to the present invention, with the right half thereof sectioned.

Figure 2 is a partially cutaway plan view showing the surface treating device of Figure 1.

Figure 3 is a side view showing the surface treating device of Figure 1, with the right half thereof sectioned.

Figure 4 is an exploded front view showing a second embodiment of the surface treating device according to the present invention, with the right half thereof sectioned.

Figure 5 is a plan view showing the surface treating device of Figure 4, with a base member fitted on the open end of a grip portion.

Figure 6 is a partially cutaway plan view showing the surface treating device of Figure 4.

Figure 7 is a side view showing the surface treating device of Figure 4, with the right half thereof sectioned.

Best Mode for Embodying the Invention:

[0017] Figures 1 to 3 illustrate a first embodiment of the surface treating device according to the present invention. The device is a wet-type one usable advantageously as an applicator for applying a lustering agent to car bodies and comprises a material constituting a treating portion 11 of a continuously foamed soft body 2 of urethane etc. that is so-called sponge and a fibrous film 3 coated on the surface of the body. The continuously foamed body 2 occludes therein a lustering agent such as semisolid wax or like agent. (A surface treating device having a treating portion impregnated with wax, detergent or the like agent is called a wet-type one, and one having a treating portion impregnated with no such agent is called a dry-type one throughout the description.)

[0018] The surface treating device (lustering-agent applicator) 1 fundamentally comprises the material (2 and 3), an annular engaging member 4 and a holder 5. Since the continuously foamed body 2 occludes a lustering agent therein, as described above, the material is

provided with a cover member 6 for covering the material to prevent accidental adherence of wax before the use of the device and volatilization of the lustering agent, such as wax, detergent, etc., occluded in the material.

[0019] Each of the component members will be described hereinafter.

[0020] The material constituting the treating portion 11 coming in contact with a surface to be treated (a car body surface in this case) when using the surface treating device, comprises the continuously foamed body 2 and the fibrous film 3 coated on the surface of the body. The continuously foamed body 2 is impregnated with nothing when applied to a dry-type surface treating device, but is impregnated with (occludes therein) a lustering agent, detergent or other such agent when applied to a wet-type surface treating device.

[0021] In the embodiment shown in the drawings, the continuously foamed body 2 is sponge as described above, i.e., a molded soft body having continuous pores therein. The continuous pores form spaces for occluding a lustering agent, etc. when the body is applied to a wet-type surface treating device. The lustering agent, detergent or other such agent to be occluded includes wax, a polisher and a cleaner in the state of liquid, solid or emulsion. A solid agent is first melted into liquid and the liquid is occluded in the body. In this embodiment, semisolid wax at normal room temperature is melted at 70°C, and the melt is impregnated in the body so that it is occluded therein.

[0022] Cloth, nonwoven fabric or other such fibrous member that permits permeation of the lustering agent etc. occluded in the continuously foamed body 2 can be used as the fibrous film 3. However, the fibrous film preferably has high resistance particularly to friction and tensile strength. In the present embodiment, cheesecloth (extremely thin, coarse cotton or hemp cloth) is used as the fibrous film. Various kinds of cheesecloth, such as of acryl/polyester, acryl/rayon, etc., having various characteristics, are available on the market. A suitable one can be selected from among the various kinds.

[0023] The annular engaging member 4 is a member for forcing the end of the material (2, 3) into an annular groove 53 of the holder 5, that will be described later, and fixing it integrally to the holder. The part to be forced into the annular groove 53 may be the end of the fibrous film 3 only. The annular engaging member 4 has a shape formed by molding plural strips of thin plates annularly, although the shape is actually determined by the shape and size of the annular groove 53, that will be described later. To be specific, the annular engaging member is formed to have a shape and a size that can prevent the material (fibrous film 3) from coming out of the annular groove 53. Further, the material of which the annular engaging member is made is not limited, but is plastic in this embodiment.

[0024] The annular engaging member 4 in the embodiment shown in the drawings has an elliptical shape and is provided on the outside circumferential surface there-

of with an engaging portion 41 projecting outward and on the bottom surface thereof with a plurality of engaging projections 42 that are formed in the shape of a conical or pyramidal sharp splinter and substantially equidistantly arranged. The engaging projections 42 bite into the fibrous film 3 to prevent the fibrous film from coming out of the annular groove 53 and may therefore be formed in a sawtoothed shape. Since the annular engaging member 4 is molded to have a shape and a size that can prevent the material (fibrous film 3) from coming out of the annular groove 53, as described above, it does not always require provision of such engaging projections 42. However, the annular engaging member 4, if provided with the engaging projections 42, can prevent the fibrous film 3 from coming out of the annular groove 53 even when it is made thinner. For these reasons, it is preferable for the annular engaging member to have the aforementioned shape and size and the engaging projections so as to make the fibrous film 3 more difficult to come out of the annular groove 53.

[0025] The holder 5 has a base 51 for supporting the material (treating portion 11) thereon, the annular groove 53 provided in the inside peripheral surface thereof with an engaging structure, and a portion (grip portion 54) to be gripped by a user conducting a lustering work. While it is an integral molding of plastic in this embodiment, the material is not limited to plastic.

[0026] In the first embodiment shown in the drawings, the base 51 of the holder 5 is formed to be flat by fitting a lid member 7 for the base in an open end of the hollow cylindrical grip portion 54, and the annular groove 53 is formed by bending an outer peripheral edge 59 of the base 51 inward. The engaging structure formed in the inside peripheral surface of the annular groove 53 is a convex portion 52 formed on the upper end of the annular groove 53 so as to project inward as is shown in an inset of Figure 3 that shows the corresponding part of the figure in an enlarged fashion. The annular engaging member 4 is attached to the holder by engagement between the convex portion 52 and the engaging portion 41 formed on the outer circumference of the annular engaging member 4 so as to project outward.

[0027] Similarly, the lid member 7 for the base is attached to the holder by engagement between a convex part 51' formed on the open end of the grip portion 54 so as to project inward and an engaging part 71 formed on the outer circumference of the lid member 7 for the base so as to project outward.

[0028] The cover member 6 comprises a bulged portion 61 and a fitting portion 62 and is an integral molding of transparent plastic. The bulged portion 61 covers the treating portion 11 containing a lustering agent to prevent accidental adherence of wax before the use of the device and volatilization of the lustering agent. The fitting portion 62 has an inside diameter slightly smaller than the outside diameter of the outer peripheral edge 59 of the holder 5 surrounding the annular groove 53. The cover member is retained on the holder 5 by pres-

sure-inserting and fitting the fitting portion onto the outer peripheral edge.

[0029] The surface treating device 1 in this embodiment is fabricated by assembling together the material (2, 3), annular engaging portion 4, holder 5 and cover member 6, each having a simple structure. This assembly is conducted very easily.

[0030] To be specific, the treating portion 11 can be supported on the base 51 and fixed integrally to the holder 5 by causing the distal end of the annular engaging member 4 to force the end of at least the fibrous film 3 of the material into the annular groove 53 of the holder 5 and fitting the annular engaging member 4 in the annular groove 53. The end (folded-back part) of the material (at least the fibrous film 3) forced into the annular groove 53 is in a small gap in a state clamped between the side wall surface surrounding the annular groove 53 and the annular engaging member 4. In addition, the distal ends (engaging projections 42) of the annular engaging member 4 bite into the material (at least the fibrous film 3). Thus, the material is prevented from coming out of the annular groove 53.

[0031] The fitting portion 62 of the cover member 6 is then fitted on the outer peripheral edge 59 of the base 51 surrounding the annular groove 53 of the holder 5. Since the inside diameter of the fitting portion 62 is 0.1 to 0.4 mm smaller than the outside diameter of the outer peripheral edge 59, pressure insertion of the fitting portion onto the outer peripheral edge 59 of the holder 5 elastically deforms the cover member and the holder, and the two are closely fitted to each other by the spread and restoration of the material of the cover member 6 that compress the outer peripheral edge of the holder.

[0032] This close fitting produces surface pressure on the contact surfaces to suppress volatilization loss of the volatile component in a lustering agent etc. and ensure a long service life of the device.

[0033] When the surface treating device 1 thus assembled is not in use, accidental adherence of wax occluded in the treating portion 11 can be prevented by the cover member 6. In operation, by removing the cover member 6, grasping the grip portion 54 of the holder 5 and bringing the treating portion 11 against an automobile body, the treating portion 11 is sandwiched between the car body and the base 51. The lustering agent occluded in the treating portion 11 consequently oozes out and is applied thinly onto the car body surface.

[0034] A layer of natural or synthetic macromolecular particles having a thickness of approximately 0.5 to 2 mm, though not shown, can be interposed between the continuously foamed body 2 and the fibrous film 3 when fabricating the treating portion 11. This layer of particles is required to have flexibility and elasticity to such an extent as not to mar the surface to be treated, and is also required not to react with the lustering agent, not to manifest a viscous property relative to the surface, and to exhibit a some degree of motion freedom between the particles and between the fibrous film and the

particles. Examples of usable particles include micelles of protein, such as leather, synthetic leather and β -starch; and powders of less viscous rubber, polytetrafluoroethylene, soft synthetic resin, etc., having a particle diameter approximately in the range of 5 to 500 μm .

[0035] In this embodiment, since wax semisolid at normal room temperature is used as the lustering agent, as described above, it does not flow out. However, since wax contains a volatile component, it is necessary to prevent volatilization of the volatile component. If a liquid lustering agent is used, it is necessary to prevent the outflow thereof. However, since the fitting portion 62 of the cover member 6 is brought into intimate contact with and airtightly fitted on the outer peripheral edge 59 of the holder 5 surrounding the annular groove 53, the aforementioned volatilization and liquid outflow can be prevented.

[0036] Figures 4 to 7 illustrate a second embodiment of the surface treating device according to the present invention. The elements identical with or similar to those in the first embodiment are given the same reference numerals and omitted from the description.

[0037] While the surface treating device in the first embodiment has the base 51 fitted integrally to the open end of the grip portion 54, the surface treating device in the second embodiment has a base member that is a separate molding from the grip portion and is fitted to the open end of the grip portion to form a base for supporting the treating portion thereon.

[0038] Returning to the figures, the base member 8 is provided on the flat surface thereof with a multiplicity of small protuberances 81 that are arranged substantially equidistantly and bite into the continuously foamed body 2 when supporting the treating portion 11 thereon, thereby preventing the foamed body from being displaced. The base member 8 is provided on the peripheral edge thereof with an overhanging portion 82 projecting outward and downward, inward of the overhanging portion 82 with a ring wall portion 83 while leaving a ring groove 84 between the overhanging portion and the ring wall portion, and on the inside surface thereof with a plurality of small cylindrical pole portions 85 that are arranged at predetermined intervals. The base member 8 is made of plastic similarly to the holder 5.

[0039] The holder 5 is provided on the open end face of the hollow cylindrical grip portion 54 thereof with a plurality of protuberances 58 at positions corresponding to the positions of the small cylindrical pole portions 85 of the base member 8. Each protuberance has a center hole for admitting the corresponding small cylindrical pole portion 85 and positioning the base member. As is shown in an inset in Figure 7 that shows the corresponding part of the figure in an enlarged fashion, the holder 5 is further provided on the open peripheral edge thereof with a pair of parallel ring walls 55 and 56 between which another ring groove 57 is interposed for fitting the annular engaging member 4 therein.

[0040] The cover member 6 is provided on opposite side surfaces thereof with a pair of engagement portions 63 and on one side surface thereof with a projecting portion 64.

[0041] Assemblage of these component members into the surface treating device 1 of the present embodiment will be described hereinafter.

[0042] The base member 8 is disposed to face the open end face of the holder 5. The inside ring wall 55 of the holder 5 is fitted in the ring groove 84 of the base member 8 and at the same time the small cylindrical pole portions 85 of the base member 8 are inserted into the corresponding holes formed in the protuberances 58 of the holder 5. As a result, the base member 8 is positioned on the open end face of the holder 5 and fixed thereto so as to cover the holder. The overhanging portion 82 projecting downward at a position above the ring groove 57 in which the annular engaging member 4 is fitted, constitutes an engagement structure for the annular engaging member 4.

[0043] The treating portion 11 is fixed to the holder 5 in the same manner as in the first embodiment. To be specific, the treating portion 11 can be supported on the base member 8 and fixed integrally to the holder 5 by causing the distal end of the annular engaging member 4 to force the end of at least the fibrous film 3 of the treating portion into the ring groove 57 and fitting the annular engaging member 4 in the ring groove 57. The annular engaging member 4 momentarily enlarges in diameter owing to the presence of a plurality of cuts 43 formed therein as it passes over the downward projecting overhanging portion 82 of the base member 8 and, upon having passed over the downward projecting overhanging portion 82 and being fitted in the ring groove 57, restores to its original diameter.

[0044] As shown in the enlarged inset in Figure 7, since the end of the fibrous film 3 forced into the ring groove 57 is clamped between the side wall of the ring groove 57 and the annular engaging member 4 and since a swollen portion 44 at the upper outer periphery of the annular engaging member 4 abuts against the inner surface of the outside ring wall 56 and is bent inward to cause the bent end to abut on the downward projecting overhanging portion 82, the fibrous film is prevented from coming out of the ring groove 57.

[0045] Thus, in the surface treating device according to the present embodiment the engagement structure can be easily formed by the annular engaging member 4 at a position above the ring groove 57 by fitting the separate base member on the open end face of the holder 5.

[0046] The cover member 6 can be airtightly attached to the holder 5 in the same manner as in the first embodiment by pressure-inserting and fitting the fitting portion 62 of the cover member 6 onto the outer periphery of the outside ring wall 56 surrounding the ring groove 57 of the holder 5.

[0047] Further, when the airtight attachment of the

cover member 6 to the holder 5 is retained for a long period of time, there is a possibility of the cover member being spontaneously detached from the holder due to an increase in internal pressure (air pressure and vapor pressure) caused by changes in the surrounding temperature and atmospheric pressure etc.

[0048] To avoid this spontaneous detachment, the cover member 6 of the present embodiment is provided on opposite side surfaces with the engagement portions 63. When the cover member 6 is pressure-inserted and fitted onto the holder 5, a concave portion on the inner peripheral surface of the fitting portion 62 is fitted on the outside ring wall 56 as shown in the enlarged inset in Figure 7. In this state, by rotating the engagement portions 63 to cause the distal end thereof to engage with the holder 5, the cover member 6 can be firmly fixed to the holder 5. When the internal pressure in the holder rises, the cover member 6 is expansion-deformed in the outer peripheral direction by the pressure to leave a gap between itself and the outside surface of the holder 5, from which the inside air and the volatile component of wax etc. are discharged. However, this can be prevented because the cover member is retained in the firmly fixed state as described above.

[0049] The firmly fixed cover member 6 can be easily detached from the holder 5 when using the device by disengaging the pair of engagement portions 63 of the cover member 6 from the holder and rotating the grip portion 54 while grasping the grip portion 54 of the holder 5 using one hand and holding the projecting portion 64 of the cover member 6 using the other hand.

[0050] Although the present invention has been described with reference to the two embodiments, it is not limited thereto and can be worked in any way insofar as no alteration is given to the constitution set forth in the appended claims. Although the lustering agent applicator has been illustrated as a wet-type surface treating device by way of example in the embodiment, other wet-type surface treating devices such as a water-drop adherence preventing device for automobile windshields, a cleaning (cleansing) device, an eraser for blackboards, a broad marker pen (for signboards), etc. can be realized by changing the kind of the material of the treating portion and changing the kind of liquid occluded in the material. As a dry-type surface treating device, an eraser for blackboards can be cited.

Industrial Applicability:

[0051] As has been described in the foregoing, the surface treating device according to the present invention comprises a material constituting a treating portion, an annular engaging member and a holder equipped with a base portion, the structures of which are very simple, resulting in high productivity. In assembling these component members, adhesive agent, welding operation and other such means or operation that have heretofore been adopted are not required. Therefore, no

special apparatus or equipment is required, resulting in safety for operators and high practical utility.

[0052] Furthermore, the wet-type surface treating devices having a lustering agent, detergent or other such agent occluded in their treating portion can be advantageously used as disposable ones.

[0053] The surface treating device according to the present invention can be used as a lustering-agent applicator for car bodies and tires, furniture, etc., a cleaner (cleanser), an eraser for blackboards (a blackboard eraser), etc. Thus it has a variety of applications.

Claims

1. A surface treating device comprising a material that constitutes a treating portion (11) of a continuously foamed body (2) coated with a fibrous film (3); a holder (5) that has a base (51) for supporting the treating portion thereon and an annular groove (53) provided in an inside peripheral surface thereof with an engaging structure; and an annular engaging member (4) that has a distal end forcibly fitting an end of the treating portion into the annular groove to support the treating portion on and fix it integrally to the base.
2. The surface treating device according to claim 1, wherein said continuously foamed body (2) constituting the treating portion (11) is impregnated with a lustering agent or detergent.
3. The surface treating device according to claim 1, wherein said holder (5) comprises a hollow cylindrical grip portion (54) provided at an open end face thereof with said annular groove (53), and a base member (8) provided at a peripheral edge thereof that is fitted on said open end face of said grip portion with an overhanging portion (82) projecting downward.
4. The surface treating device according to claim 1, further comprising a cover member (6) having a bulged portion for covering said treating portion (11).
5. The surface treating device according to claim 4, wherein said cover member (6) is provided on opposite side surfaces thereof with a pair of engagement portions (63) and on one side surface thereof with a projecting portion (64).

Fig.1

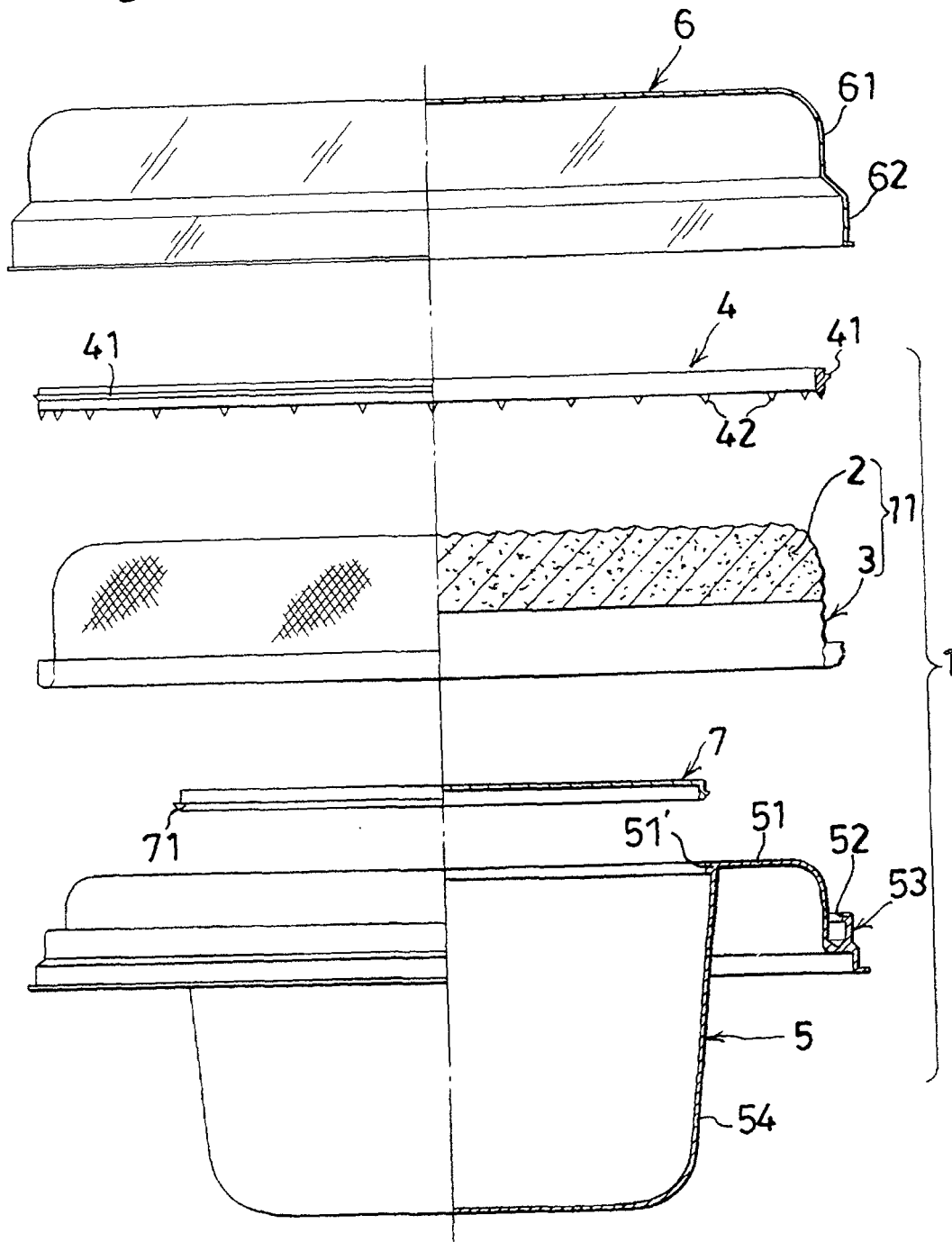


Fig. 2

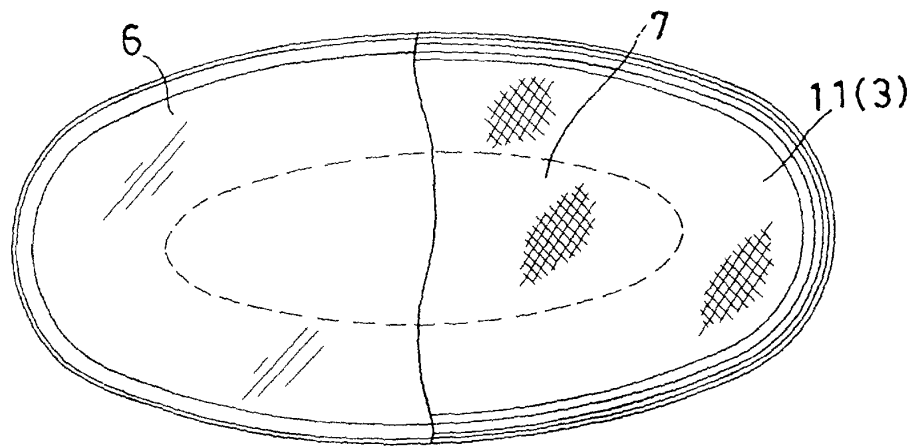


Fig. 3

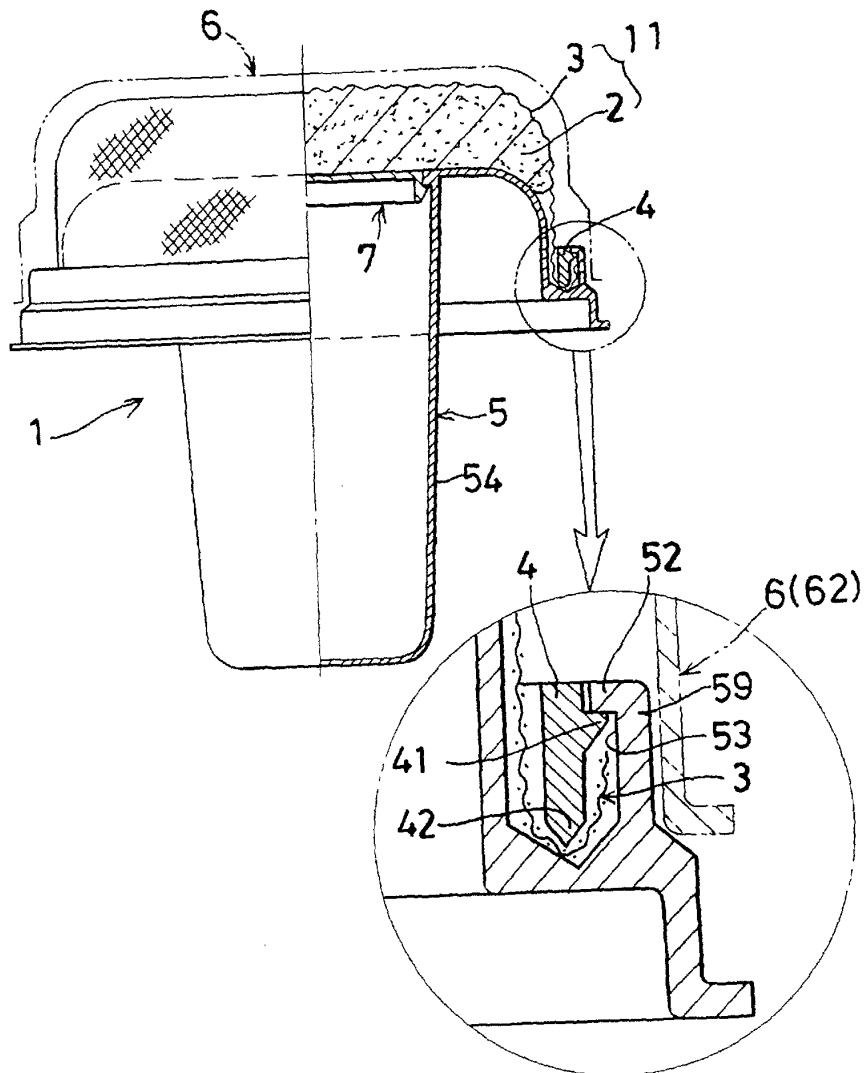


Fig. 4

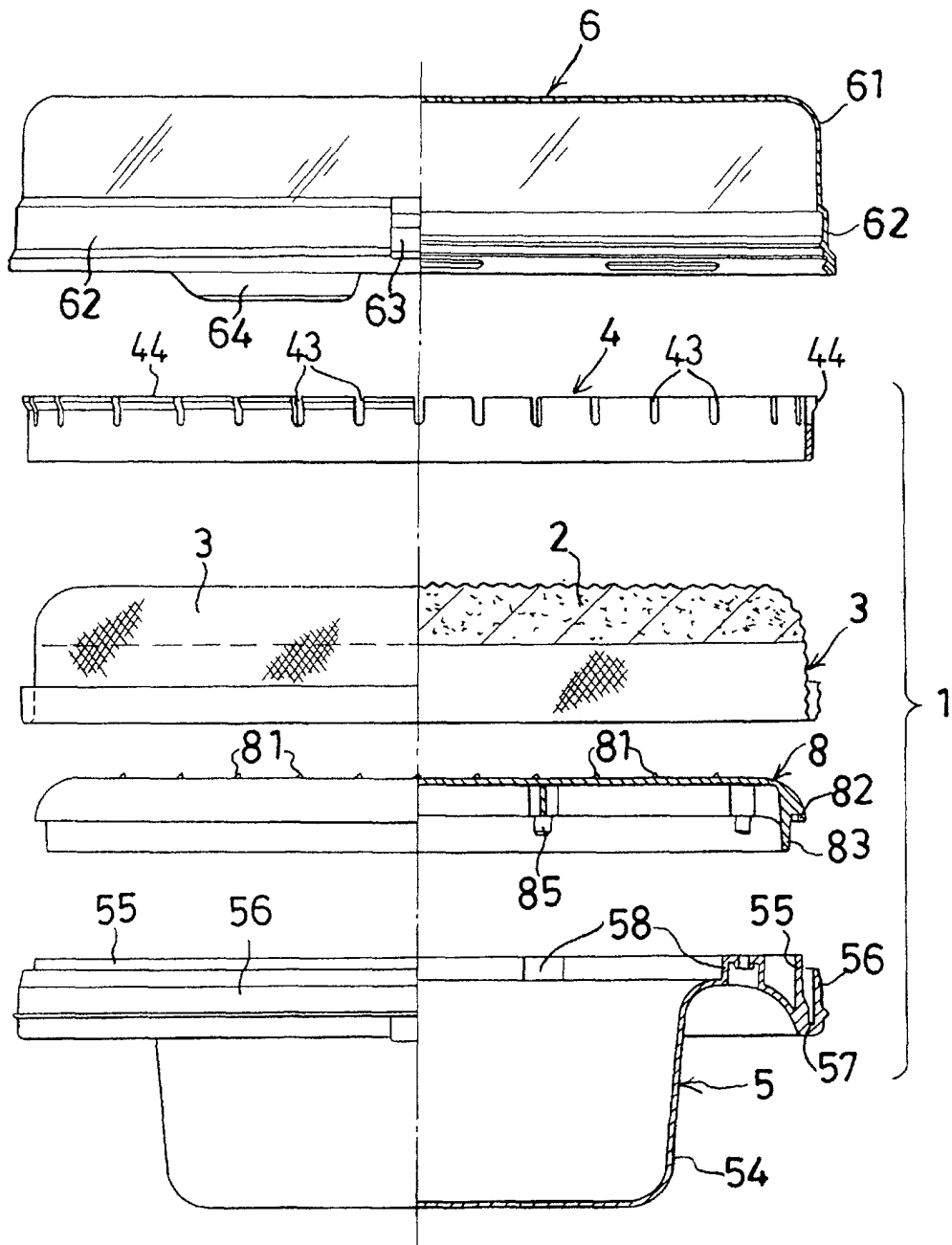


Fig. 5

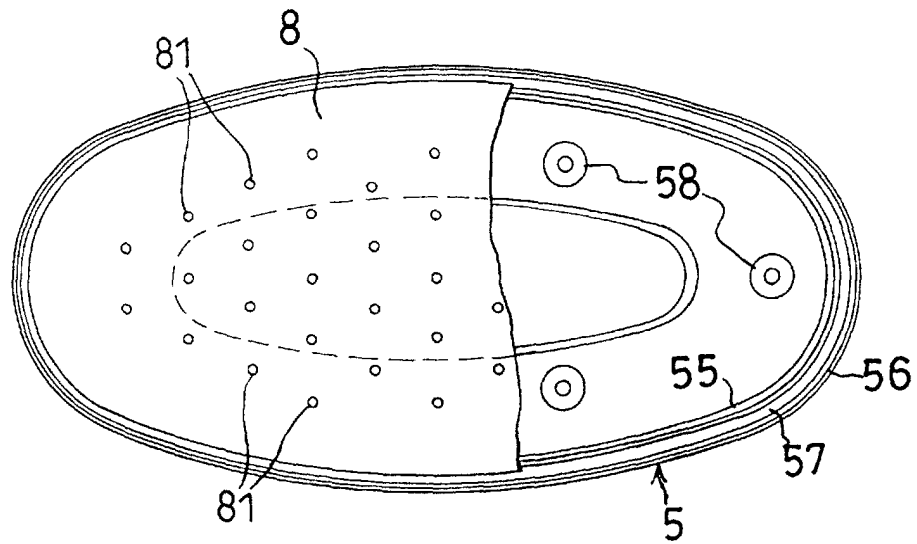


Fig. 6

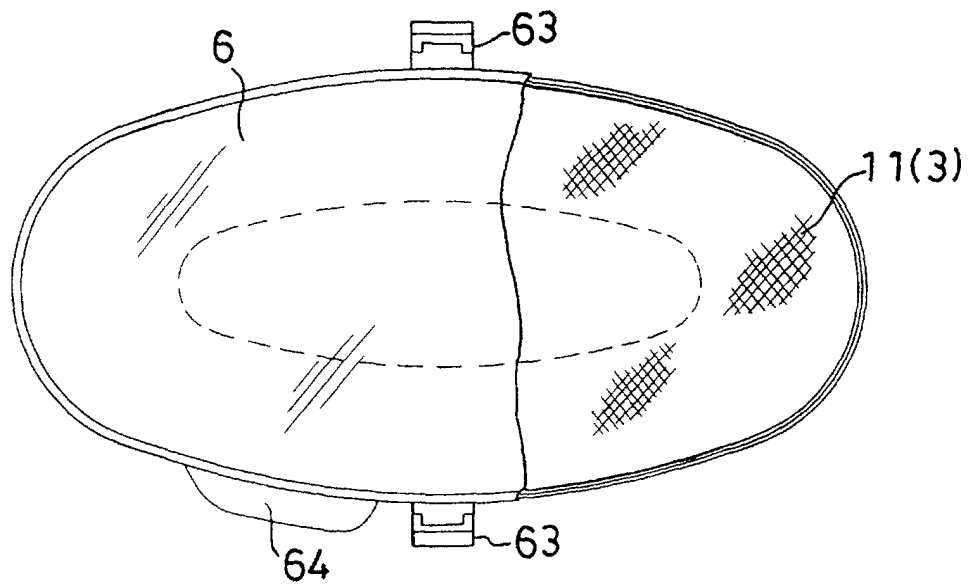
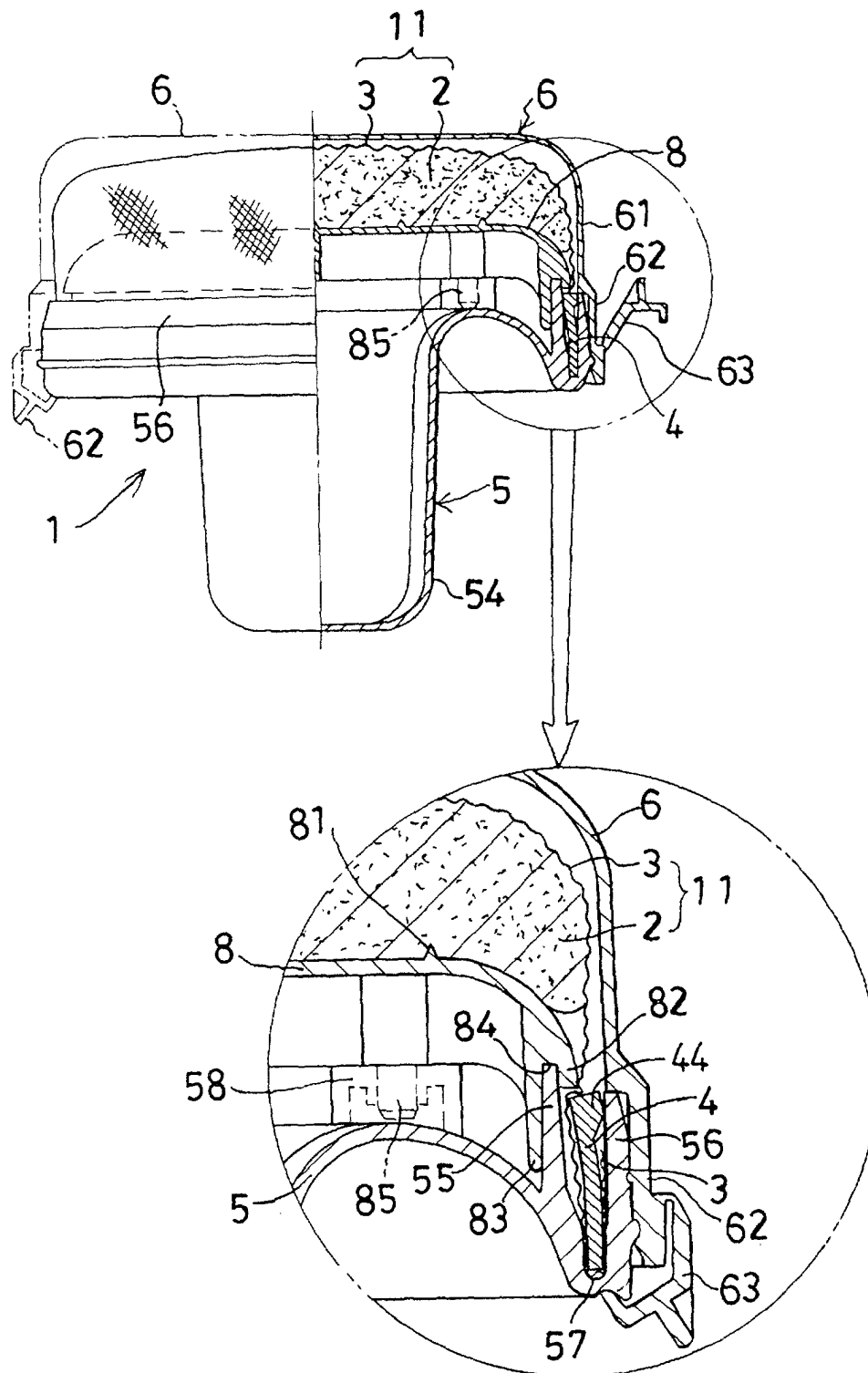


Fig. 7



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP01/00480

A. CLASSIFICATION OF SUBJECT MATTER IPC Cl ⁷ B05C 17/00, A47L 13/16, 13/31, According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) IPC Cl ⁷ B05C 17/00 - 17/015, A47L 13/16, 13/17, A47L 13/28 - 13/31 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Jitsuyo Shinan Koho 1926-1996 Toroku Jitsuyo Shinan Koho 1994-2001 Kokai Jitsuyo Shinan Koho 1971-2001 Jitsuyo Shinan Toroku Koho 1996-2001 Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP, 3054944, U (Yoshiyuki GOTO), 07 October, 1998 (07.10.98), Full text (Family: none)	1-5
Y	US, 2261411, A (William Rees), 04 November, 2041 (04.11.41), Figs. 3, 10 (Family: none)	1-5
Y	JP, 61-3496, Y2 (JAPAN CROWN CORK CO., LTD.), 03 February, 1986 (03.02.86), Full text (Family: none)	4, 5
Y	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 170658/1985 (Laid-open No.78858/1987), (Yoshimitsu Otani), 20 May, 1987 (20.05.87), Full text (Family: none)	1-5
A	JP, 63-23030, Y (Kokushin Sangyo K.K.), 23 June, 1988 (23.06.88), Full text (Family: none)	1-5
☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.		
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search 20 April, 2001 (20.04.01)		Date of mailing of the international search report 01 May, 2001 (01.05.01)
Name and mailing address of the ISA/ Japanese Patent Office		Authorized officer
Facsimile No.		Telephone No.

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP01/00480

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP, 9-299864, A (Shogo Fujita), 25 November, 1997 (25.11.97), Full text (Family: none)	1-5

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