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EP-A- 0 367 260 **US-A- 4 759 959**

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Description

[0001] The present invention relates to a method of protecting a part of an article from a surface treatment such as coating or plating, using a masking member.

[0002] In case a part to be protected is a plane or a hole, a masking member having an adhesive layer is attached to the part through the adhesive layer. In case the part is a hole, a masking member having an inserting part is attached to the hole part by inserting the inserting part into the hole. In case the part is a panel, a masking member having a ditch is attached to the part by fitting the ditch to the panel. In case the part is a protrusion, a masking member having a fitting part is attached to the part by fitting the fitting part to the protrusion. And after the surface treatment, such masking members are removed from the parts respectively.

[0003] Hitherto, material consisting of thermoplastic resin mixed with inorganic filler has been provided for such masking members (TOKKAIHEI 2-126996).

[0004] Among the thermoplastic resin materials polyolefin especially has strong solvent resistance and is mechanically reinforced by mixing with inorganic filler, so that the thermal conductivity will increase and the thermal resistance will also increase; therefore, the masking members can be used repeatedly. However, with respect to the above mentioned conventional masking members, thermal resistance of which is 150 °C at the highest even mixed with inorganic filler, and in a process of surface treatment which requires a temperature higher than 150 °C, the masking members are deformed.

[DISCLOSURE OF THE INVENTION]

[0005] As a means to solve the above described problem in the prior art, the present invention provides a masking member which is made of an engineering plastic.

[BRIEF DESCRIPTION OF THE DRAWINGS]

[0006]

Figure 1 to Figure 3 relate to a comparative masking member;

Figure 1 is the perspective view;

Figure 2 is the partial sectional view when the masking member is attached;

Figure 3 is the partial sectional view when the masking member is removed.

Figure 4 to Figure 6 relate a further comparative masking member.

Figure 4 is the perspective view;

Figure 5 is the partial sectional view when the masking member is attached;

Figure 6 is the partial perspective view when the masking members are produced.

Figure 7 is the perspective view of a further comparative masking member.

Figure 8 to Figure 10 relate to a further comparative masking member

Figure 8 is the perspective view;

Figure 9 is the partial sectional view when the masking member is attached;

Figure 10 is another partial sectional view when the masking member is attached.

Figure 11 and Figure 12 relate to a further comparative masking member.

Figure 11 is the perspective view;

Figure 12 is the partial sectional view when the masking member is attached.

Figure 13 and Figure 14 relate to a further comparative masking member.

Figure 13 is the perspective view;

Figure 14 is the partial sectional view when the masking member is attached.

Figure 15 is the perspective view of a further comparative masking member,

Figure 16 is the perspective view of a further comparative masking member.

Figure 17 and Figure 18 relate to a further comparative masking member,

Figure 17 is the perspective view;

Figure 18 is the partial sectional view when the masking member is attached.

Figure 19 and Figure 20 relate to a masking member the present invention.

Figure 19 is the perspective view;

Figure 20 is the partial sectional view when the masking member is attached.

Figure 21 to Figure 26 relate to the practical examples

Figure 21 is the perspective view of a car-body of the practical example.

Figure 22 is the explanatory perspective view of Part A of the practical example.

Figure 23 is the explanatory perspective view of Part B of the practical example.
 Figure 24 is the explanatory perspective view of Part C of the practical example.
 Figure 25 is the explanatory perspective view of Part D of the practical example.
 Figure 26 is the explanatory perspective view of Part E of the practical example.
 Figure 27 and Figure 28 relate to a further comparative masking member.
 Figure 27 is the perspective view
 Figure 28 is the sectional view when the masking member is attached.
 Figure 29 to Figure 31 relate to a further comparative masking member.
 Figure 29 is the perspective view before the masking member is attached.
 Figure 30 is the sectional view taken along line A-A of Figure 29.
 Figure 31 is the sectional view taken along line A-A of Figure 29 when the masking member is attached.
 Figure 32 and Figure 33 relate to a further comparative masking member.
 Figure 32 is the perspective view;
 Figure 33 is the partial sectional view when the masking member is attached.
 Figure 34 to Figure 36 relate to a further comparative masking member.
 Figure 34 is the perspective view,
 Figure 35 is the partial sectional view of an inlet of fuel tank
 Figure 36 is the explanatory sectional view when adhesive layer is applied.
 Figure 37 to Figure 40 relate to a further comparative masking member.
 Figure 37 is the perspective view.
 Figure 38 is the sectional view when the masking member is attached.
 Figure 39 is the front view of a group of masking members.
 Figure 40 is the front view of a masking member separated from the group of masking members.
 Figure 41 and Figure 42 relate to a further comparative making member.
 Figure 41 is the perspective view.
 Figure 42 is the sectional view when the masking member is attached
 Figure 43 to Figure 46 relate to a further comparative masking member.
 Figure 43 is the perspective view.
 Figure 44 is the sectional view when the masking member is provisionally fixed.
 Figure 45 is the sectional view when the masking member is attached.
 Figure 46 is the front view when the masking member is attached.

[0007] In the drawings,

(1)	article
(11)	car-body
(12)	underside of car body
(13)	bumper
(14)	inlet of fuel tank
(15)	pillar
(2)	part being protected
(21)	protrusion
(22)	hole
(23)	extending part
(31) ~ (317)	masking member
(31A) ~ (316A)	body
(4)	coating layer

[DETAILED DESCRIPTION OF THE INVENTION]

[0008] The invention provides a method of protecting a part of an article from surface treatment, using a masking member removably fitted to the part, characterised in that the masking member is moulded from an engineering plastic which is polycarbonate (PC).

[0009] A filler or a reinforcing material such as calcium carbonate, magnesium carbonate, barium sulphate, calcium sulfite, magnesium hydroxide, aluminum hydroxide, magnesium oxide, titan white, iron oxide, zinc oxide, alumina, silica, diatom earth, dolomite, gypsum, talc, clay, asbestos, mica, calcium silicate, bentonite, white carbon, carbon black, iron powder, aluminum powder, stone powder, blast furnace slag, flyash, synthetic fiber, natural fiber, glass fiber, carbon fiber, ceramic fiber or whisker may be mixed in the engineering plastic. An amount of from 10 to 200% by weight of the

filler is commonly mixed with the engineering plastic.

[0010] Further, one or more kind of : thermoplastic resin such as polyolefin such as polyethylene, polypropylene, ethylene-propylene copolymer or ethylene-vinylacetate copolymer, polyvinyl chloride, polystyrene, polymethacrylate, polyvinylidene chloride, styrene-butadiene copolymer or polyamide; plastic foam of the above described thermoplastic resin; or polyurethane foam; may be mixed or laminated with the engineering plastic.

[0011] A surface treatment such as corona discharge treatment or primer coating treatment is preferably effected on the surface of the engineering plastic to increase its affinity with paint or adhesive. Also a releasing treatment may be effected on the surface of the engineering plastic to decrease its affinity with paint or adhesive. A primer used in the primer coating treatment is, for example: synthetic rubber such as modified polyolefin or olefin copolymer such as chlorinated polypropylene or ethylene-vinylacetate copolymer, styrene-butadiene rubber, acrylonitrile-butadiene rubber, chloroprene rubber or polybutadiene; a synthetic resin such as acrylic synthetic resin, vinyl synthetic resin, acrylic synthetic resin including amino group and/or amide, vinyl synthetic resin including amino group and/or amide, amino synthetic resin or epoxy synthetic resin; and a low-molecular weight primer such as aluminium alcoholate or aluminium chelate agent such as aluminium isopropylate or aluminium triacetylacetonate; an alkyl metal such as 2-ethylhexyl lead or hexadecyl lithium; an organotin compound such as dibutyl tin diacetate or di-n-butyl tin dioxide; a silane compound such as methylvinyl dichloro silane; a metal complex salt of 1,3-dicarbonyl compound such as acetylacetone lithium or acetylacetone beryllium; an organotitan compound such as tetrabutyl titanate; a boric acid compound such as tri-n-butyl borate or triphenyl borate; a phosphate such as trioleyl phosphate or tridecyl phosphate; a metal salt of a carboxylic acid such as magnesium stearate or cobalt naphthenic acid; a metal thioalcoholate such as n-potassium dodecylmercapto chloride; a thiodicarboxylate such as 2-ethylhexane dithio acid zinc; a metal salt of a dithiocarbamic acid such as nickel dimethyldithiocarbamate or copper dimethyldithiocarbamate; a metal salt of sulfonic acid such as nickel benzenesulfonate; an organophosphate compound such as dibutylvanadium phosphate. One or more kinds of the above primers may be mixed together.

[0012] The primer has affinity with both the engineering plastic and the synthetic resin other than the engineering plastic which is generally used as a paint vehicle or an adhesive for the engineering plastic. A preferable primer is an acrylic synthetic resin containing quarternary ammonium salt or synthetic resin containing amino group. For the primer coating treatment, a solution of an emulsion of one or more kinds of the primer is coated on the surface of the engineering plastic as the material for the masking member and then dried.

[0013] Prior to the primer coating treatment, an affinity treatment may be effected on the surface of the engineering plastic. Examples of the affinity treatment include flame treatment, sulphuric acid treatment and corona discharge treatment, and the surface of the engineering plastic is slightly carbonised by the treatment to obtain affinity with other synthetic resin.

[0014] Further, the examples of a release agent used for the surface treatment of the engineering plastic include a silicone type release agent, a fluoro type release agent, a fatty acid type release agent, a paraffin type release agent and a wax type release agent.

[0015] For releasing treatment, a solution or an emulsion of one or more kinds of the releasing agent or melted releasing agent is coated on the surface of the engineering plastic and then dried or cooled.

[0016] The engineering plastic may be coloured by a pigment or a dyestuff to discriminate the masking parts, and other agents such as a flame-retardant, an insecticide, an antiseptic, an antioxidant, an ultraviolet absorber, a blowing agent such as a chemical blowing agent or a capsule type blowing agent may be mixed with the engineering plastic. Two or more kinds of these agents may be mixed and then added to the engineering plastic.

[0017] To manufacture the masking member by using the engineering plastic as a material, commonly the vacuum-forming method in which a film or a sheet of engineering plastic is vacuum-formed is most appropriate because it is the most suitable method for mass-production. However, a press moulding method, blow moulding method or injection moulding method may be applied to manufacture the masking member. Both un-stretched film or sheet and stretched film or sheet of the engineering plastic may be used to manufacture the masking member.

[0018] The engineering plastic has a high heat resistance and a masking member made of the engineering plastic has a high mechanical strength and the masking member does not soften or deform even at a temperature higher than 150 °C.

[0019] Accordingly, in the present invention, the masking member can be used repeatedly even in surface treatments having a heating process at a high temperature.

[Masking member Type A]

[0020] Masking member Type A is used to protect an even surface of an article.

[0021] Figure 1 to Figure 3 relate to a comparative masking member (31) which comprises a body (31A) having a vessel form consisting of a rectangular bottom and an adhesive layer (31B) formed on the under surface of the body (31A), with the body (31) manufactured by vacuum forming of a sheet consisting of polyphenylenesulfide in which 50%

by weight of calcium carbonate is mixed. The adhesive layer (31B) is covered with a release sheet (31 C) such as polyethylene film, a polypropylene film or a release paper to prevent sticking to another article, the hands of workers and the like when the masking members are handled, stacked, transported, kept and the like.

[0022] When the masking member (31) is used, the release sheet (31 C) is removed from the adhesive layer (31 B) and the masking member (31) is then attached to an even part (2) of the surface of an article (1) by the adhesive layer (31B), which is necessary to be protected from a surface treatment. After the masking member (31) is attached to part (2), for example, a coating material (4) is coated on the surface of the article (1) by spraying as shown in Figure 2. Part (2) of the surface of article (1) is not subjected to coating since part (2) is covered with the masking member (31). Part (2) may have hole(s) and in this case, the hole(s) is (are) also not subjected to coating.

[0023] After or before the coated article (1) is heated to dry and/or cure if desired, the masking member (31) may be removed by a worker's hand as shown in Figure 3.

[0024] The masking member (31) consisting of the above-mentioned sheet is easily manufactured, for example by vacuum forming and can be reused without deformation.

[0025] Further in a case when a silicone treatment is effected on the surface of masking member (31), affinity of the surface of masking member (31) with the paint reduces and the film of the paint is easily peeled from the surface of masking member (31) so that masking member (31) can be repeatedly used after peeling the film of the paint.

[0026] Figure 4 to Figure 6 relate to a comparative masking member (32) comprises a body (32A) having a vessel form consisting of a rectangular bottom and perpendicular walls which extend upwards from the perimeter of the bottom, and a flange (32B) which is extended from the upper edges of the walls and an adhesive layer (32C) formed on the under surface of body (32A), with body (32A) being manufactured by vacuum forming of a sheet consisting of polyethylene terephthalate in which 30% by weight of talc is mixed. An adhesive layer (32C) is formed on the under surface of body (32A) and adhesive layer (32C) is covered with a release sheet (32D). The masking member (32) is attached to an even part (2) of the surface of an article (1) the same as the masking member of Figure 1 to 3.

[0027] In this embodiment, coating layer (4) is cut by flange (32B) of masking member (32) as shown in Figure 5. As a result, masking member (32) may be smoothly removed from part (2) of the surface of article (1) by a worker's hand without obstruction of coating layer (4). Masking member (32) is easily manufactured by vacuum forming and can be reused in the same way as the masking member of Figures 1 to 3.

[0028] A number of masking members (32) of this embodiment may advantageously be produced by vacuum forming, if desired. Referring to Figure 6, a number of bodies (32A) of masking member (32) are formed arranged in rows and lines, and each body (32A) is connected to the other body (32A) by the flange (32B). Cutting lines (32E) or grooves are formed between flange (32B) and another flange (32B) and when masking member (32) is used, masking member (32) is broken along cutting lines (32E) or grooves may be formed simultaneously with vacuum forming or after vacuum forming.

[0029] Figure 7 relates to a comparative masking member (33) comprising a body (33A) having a vessel form consisting of a rectangular bottom from which a grip (33D) is risen and perpendicular walls which extend upwards from the perimeter of the bottom and an adhesive layer (33B) formed on the under surface of body (33A), with body (33A) manufactured by vacuum forming of a sheet consisting of polyamide in which 40% by weight, of calcium carbonate is mixed. Adhesive layer (33B) is covered with a release sheet (33C) the same as the masking member of Figure 1 to 3. The masking member (33) is easily handled by holding grip (33D) of masking member (33) and is easily manufactured by vacuum forming and can be reused in the same way as the masking member of Figures 1 to 3.

[Masking Member Type B]

[0030] Masking member Type B is used to protect an even surface or a protruding part of an article. Masking member B is manufactured by vacuum forming of two layers of sheets consisting of polyetherester imide in which 30% by weight of glass fiber is mixed and polypropylene sheet in which 15% by weight of calcium carbonate and 5% by weight of styrene-butadiene elastomer is mixed.

[0031] Figure 8 and Figure 9 relate to a comparative masking member (34) which comprises a body (34A) having a vessel form consisting of a rectangular bottom, perpendicular walls which extend upwards from the perimeter of the bottom, a flange (34B) which is extended from the upper edges of the walls, and an adhesive layer (34C) formed on the surface of flange (34B). Adhesive layer (34C) is covered with a release sheet (34D).

[0032] Referring to Figure 9, when masking member (34) is used, release sheet (34D) is removed from adhesive layer (34C) and masking member (34) is then attached to an even part (2) of the surface of an article (1) by adhesive layer (34C) thereof. After masking member (34) is attached to part (2), the surface of article (1) is not subjected to coating since part (2) is covered with masking member (34). After forming a coating layer (4), masking member is removed by a worker's hand. Further, even part (2) may have hole(s). As shown in Figure 10, masking member (34) is also used to protect a protruding part (21) of article (1) by covering protruding part (21) with masking member (34). Masking member (34) is easily manufactured by vacuum forming and can be reused without deformation.

[0033] Figure 11 and Figure 12 relate to a comparative masking member (35) which comprises a body (35A) having

a vessel form consisting of a circular bottom, an inner perpendicular wall which extends upwards from the circumference of the bottom, a flange (35B) which is extended from the upper edge of the wall, and an outer perpendicular wall (35C) which extends downwards from the perimeter of flange (35B), and an adhesive layer (35D) formed on the surface of flange (35B). Adhesive layer (35D) is covered with a release sheet (35E).

[0034] When masking member (35) is used, release sheet (35E) is removed from adhesive layer (35D) and masking member (35) is then attached to an even part (2) of the surface of an article (1) by adhesive layer (35D) thereof, and part 92) has a hole (22). After masking member (35) is attached to part (2), a coating is effected on the surface of article (1) to form a coating layer (4) as shown in Figure 12. Masking member (35) can be removed from part (2) of article (1) by a worker's hand without obstruction of coating layer (4). Masking member (35) is easily manufactured by vacuum forming and can be reused the same as the masking member of Figures 8 and 9. Further, part (2) of article (1) may be an even part without hole (22).

[Masking member Type C]

[0035] Masking member Type C is used to protect hole(s) of an article. Masking member C is manufactured by vacuum forming of a sheet consisting of methylpentene copolymer.

[0036] Figure 13 and Figure 14 relate to a comparative masking member (36) which consists of an inserting part (36A) having a vessel form consisting of a circular bottom and a perpendicular wall which extends upwards from the circumference of the bottom, and a flange (36B) which is extended from the upper edge of the wall.

[0037] When masking member (36) is used, masking member (36) protects the inside of hole (22) of an article (1) by inserting the inserting part (36A) into hole (22) as shown in Figure 14 and the flange (36B) of the masking member (36) covers the surroundings of the hole (22). After which, a coating is effected on the surface of the article (1) to form a coating layer (4) and the inside and surroundings of the hole (22) are not subjected to coating. After coating, the masking member (36) may be removed from the hole (22) by hand. As the masking member (36) has a good heat resistance and does not deform during curing process of the coating layer (4), the masking member can be reused.

[0038] Further in a case where the primer coating treatment using an acrylic synthetic resin including a quaternary ammonium salt is effected on the surface of the masking member (36) the film of the paint may be strongly bonded with the surface of the masking member (36) and after the heating treatment, the film of the paint does not peel from the surface of the masking member (36) so that pieces of the film of the paint peeling from the surface of the masking member (36) are not formed to avoid contamination of the circumference by the pieces of the film of the paint. Accordingly, the masking member (36) may be preferably used repeatedly without peeling the film of the paint.

[0039] Figure 15 relates to a comparative masking member (37) which comprises an inserting part (37A) having a vessel form consisting of a circular bottom from which a grip (37C) is risen, and perpendicular wall which extends upwards from the circumference of the bottom, and a flange (37B) which is extended from the upper edge of the wall. The masking member (37) is used the same as the masking member of Figures 13 and 14 and is easily handled by holding the grip (37C) when the masking member (37) is inserted into the hole of the article or removed from the hole. The masking member (37) is easily manufactured by vacuum forming and can be reused the same as the masking member of Figures 13 and 14.

[0040] Figure 16 relates to a comparative masking member (38) which consists of an inserting part (38A) having vessel form consisting of a cross-shaped bottom and a perpendicular wall which extends upwards from the perimeter of the bottom, a flange (38B) which is extended from the upper edge of the wall, and a perpendicular wall (38C) which extends upwards from the circumference of the flange (38B).

[0041] The masking member (38) is inserted into a hole (22) of the article (1) by inserting part (38A) the same as the masking member of Figures 13 and 14 further the masking member (38) is supported in the inner wall of the hole by only partial contacts at the tips of inserting part (38A) so that attaching and removing of the masking member (38) to (from) the hole may be very easy. Further, the material of the masking member (38) may be less than the masking member having cylindrical form.

[0042] Figure 17 and Figure 18 relate to a comparative masking member (39) which consists of an inserting part (39A) having vessel form consisting of circular bottom from which a grip (39E) is risen and an inner perpendicular wall which extends upwards from the circumference of the bottom, a lower flange (39B) which is extended from the upper part of the wall, an outer perpendicular wall (39C) which extends upwards from the circumference of lower flange (39B), and an upper flange (39D) which is extended from the upper part of wall (39C), and plural radiated grooves (39F) and (39G) are respectively formed in lower flange (39B) and upper flange (39D).

[0043] As shown in Figure 18 masking member (39) is inserted into a hole (22) of an article (1) the same as the masking member of Figures 13 and 14 and since a coating layer (4) may be cut by upper flange (39D) of masking member (39), the removing of masking member (39) from hole (22) may be very smooth without obstruction of coating layer (4) and further grooves (39F) and (39G) respectively reinforce lower and upper flanges (39B) and (39D). Masking member (37) is easily manufactured by vacuum forming and can be reused the same as the masking member of Figures

13 and 14,

[Masking member Type D]

[0044] Masking member Type D is used to protect the extending part of the article and is manufactured by vacuum forming a sheet consisting of polycarbonate in which 50% by weight of calcium carbonate is mixed.

[0045] Figure 19 and Figure 20 relate to a masking member of the present invention, in which a masking member (310) consists of a body (310A) having a cylindrical vessel form, which has a slit (310B) formed from the opening end of body (310A). An extending part (23) of the article (1) to be protected is inserted into slit (310B) of masking member (310) and the coating layer (4) is not formed on extending part (23) since extending part (23) is protected by masking member (310) as shown in Figure 20. After coating, masking member (310) is removed from extending part (23) by a worker's hand. Masking member (310) is easily manufactured by vacuum forming and can be reused.

[0046] Figure 21 to Figure 26 illustrate the application of masking members Type A, B, C and D described above to the under side (12) of the car body (11) for corrosion, sound and vibration-proofing.

[0047] As shown in Figure 21, the masking members are attached to parts A, B, C, D and E of the under side (12) of a car body (11). Namely, as shown in Figure 22, the masking member Type C, such as masking member (36) of the Figures 13 and 14 may be attached to a hole a (22A) of part A into which a spring axis of a forward wheel is inserted and the circumference of the hole (22A) is used as a bed for the spring.

[0048] As shown in Figure 23, the masking member Type B, such as Type B masking member (35) of Figures 11 and 12 is attached to a bolt (21 A) of part B.

[0049] As shown in Figure 24, the Type C masking member (37) of Figure 15 is inserted into a drainage hole (22B), as shown in Figure 25, the masking member (310) of the invention is attached to a bracket (23A) of part D, and as shown in Figure 26, the Type A masking member (31) of Figures 1 to 3 is attached to a screw hole (22C). Thus, hole (22A), bolt (21A), drainage hole (22B), bracket (23A) and screw hole (22C) are protected by masking members of the present invention from coating.

[0050] Figure 27 and Figure 28 relate to a comparative masking member (311) used to protect a bumper (13), and a fitting part (311A) which is fitted in an air-intake (13A) of bumper (13), a flange (311B) having a C-shaped cross section on the lower edge of the fitting part (311A), and horizontal ribs (311C), (311D) and vertical ribs (311E), (311F) for reinforcement are formed in the masking member.

[0051] When the masking member (311) is attached to the bumper (13) by fitting the fitting part (311A) in the air-intake (13A) of the bumper (13), as the fitting part (311 A) of the masking member (311) is reinforced by the flange (311 B) and prevented from obstruction, fitting is easily achieved. In addition, since the surface of the flange (311B) is substantially on the same plane as the lower edge of the air-intake (13A) of bumper (13) in this state, as shown in Figure 28, it can be easily fixed thereover by the adhesive tape (311 G). Material for the comparative masking member (311) is engineering plastic in which polyamide is mixed with PPE.

[0052] Figure 29 and Figure 31 relate to a comparative masking member (312) also used to protect a bumper (13). A pair of air-intakes (13A), (13A) is formed on bumper (13), and vertical ribs (13C), (13C) and horizontal ribs (13D), (13D) are formed in the inside of the air-intakes (13A), (13A), and further grooves (13B), (13B) are formed on the upper edge of the air-intakes (13A), (13A) as shown in Figure 30. Flight parts (13E), (13E) are also formed on the lower edge of the air-intakes (13A), (13A).

[0053] The masking member (312) is to protect the air-intakes (13A), (13A) of the bumper (13) from coating, and the masking member (312) has a pair of fitting parts (312A), (312A) which is fitted in the air-intakes (13A), (13A) of bumper (13). On the upper edge of fitting parts (312A), (312A), a fitting flanges (312B), (312B) are formed. On the lower edge of the fitting parts (312A), (312A) C-shaped bends (312C), (312C) are formed. Also horizontal fitting ribs (312D), (312D) and vertical fitting ribs (312C), (312C) are formed on the fitting parts (312A), (312A) of the masking member (312).

[0054] When the masking member (312) is attached to the bumper (13) by fitting the fitting parts (312A), (312A) in the air-intakes (13A), (13A) and fitting a horizontal ribs (13D), (13D) and vertical ribs (13C) (13C) of the air intakes (13A), (13A) respectively in horizontal fitting ribs (312D), (312D) and vertical fitting ribs (312E), (312E). As shown in Figure 31, fitting flange (312B), (312B) on the upper edge of the fitting parts (312A), (312B) of masking member (312) is fitted in grooves (13B), (13B) without using adhesive tape.

[0055] Since the lower edge of the fitting parts (312A), (312A) is reinforced by the bends (312C), (312C) and is protected from deformation, fitting is easily achieved. Since the surface of the bends (312C), (312C) is substantially on the same plane as the flight parts (13E), (13E) of the air-intakes (13A), (13A) of the bumper (13) in this state, as shown in Figure 31, it can be easily fixed thereover by the adhesive tape (312F). Material for the masking member (312) of the embodiment is the engineering plastic of the masking member of Figures 27 and 28,

[0056] Figure 32 and Figure 33 relate to a comparative masking member (313) which is used to protect plural protrusions (21), (21) of an article from a surface treatment. The masking member (313) comprises a body (313A) and fitting parts (313B), (313B) projected from the body (313A).

[0057] The masking member (313) is attached to the plural protrusions (21), (21) of an article by fitting parts (313B), (313B) to protect parts (21), (21) of the article from the surface treatment as shown in Figure 33.

[0058] The masking member (313) is easily manufactured by vacuum forming of two layers sheet and can be reused the same as the masking member of Figure 8 and 9.

[0059] Figure 34 to Figure 36 relate to a further comparative marking member In the figures, an inlet (14) of the fuel tank of the car consists of a hole part (14A), an inner flange part (14B) surrounding the hole part (14A) and an outer flange part (14C) formed at the outside of the inner flange part (14B) intermediating a packing groove (14D) and the inner flange part (14B) is slightly higher than the outer flange part (14C).

[0060] A comparative masking member (314) consists of a central disk part (314A), an outer ring part (314C) surrounding the central disk part (314A) intermediating a guide groove (314B), a grip (314D) projecting from the central disk part (314A) and an adhesive layer (314E) formed on the backside of the outer ring part (314C) and masking member (314) is manufactured by the vacuum forming of a polymer alloy film consisting of PPE and polyamide containing 30% by weight of calcium carbonate.

[0061] When the masking member (314) is attached to the inlet (14), the position of masking member (314) is adjusted by inserting inner flange part (14B) of the inlet (14) into guide groove (314B) of masking member (314) and then the adhesive layer (314E) of the outer ring part (314C) is pressed to the top of outer flange part (14C) as shown in Figure 35 and the paint is prevented from going into the fuel tank through the inlet (14) by masking member (314).

[0062] As no projecting part rising from the outer ring part (314C) in the backside of masking member (314), the adhesive can be applied on the backside of the outer ring part (314C) to form adhesive layer by a roll coater (5) as shown in Figure 36.

[0063] Figure 37 to Figure 40 relate to a comparative masking member (315) that consists of a body (315A) inside of which an inserting part (315B) for a pillar body (15A) of a pillar member (15) is formed and a pair of flange inserting parts (315D), (315D) formed along the lower end of side walls (315C), (315C) of the body (315A) and in which a pair of flanges (15D), (15D) are respectively inserted and reinforcing ribs (315E) are formed on the circumference of the body. The masking member (315) is manufactured by the same method using the same material as the masking member of Figures 34 to 36,

[0064] The masking member (315) is attached to the pillar member (15) and the pillar member (15) is constituted by an outer panel (15A) and an inner panel (15B) and consists of a pillar body and flanges (15D), (15D) formed along the lower ends of a pair of side walls (15C), (15C).

[0065] The masking member (315) is attached to the pillar member (15) by inserting the pillar body (15A) into the inserting part (315B) of masking member (315) and inserting flanges (15D), (15D) of the pillar body (15A) into flange inserting parts (315D), (315D) of masking member (315) respectively as shown in Figure 38. After masking member (315) is attached to the pillar member (15) as above described, a surface treatment such as a coating, plating or the like is effected and after surface treatment, the masking member (315) is removed from the pillar member (15).

[0066] To manufacture the masking member (315), first a masking member assemblage (315G) consisting of a plural number of masking members (315) connected respectively through connecting parts (315F) is moulded by the vacuum forming, press moulding, and the like using a thermoplastic resin sheet as shown in Figure 39, and then the masking member assemblage (315G) is cut by a cutter (6) at the connecting parts (315F) as shown in Figure 40 and the resulting cut parts are further cut along dotted lines shown in Figure 40 by a cutter, shears or the like to obtain the masking member (315).

[0067] Figure 41 and Figure 42 relate to a comparative masking member (316) that consists of a body (316A) inside of which an inserting part (316B) for a pillar body (15A) of a pillar member (15) is formed, and projections (316F) formed on the insides of a pair of lower side walls (316E), (316E) which are formed respectively along the lower ends of a pair of side walls (316C), (316C) of the pillar body (316A) intermediating flight parts (316H), (316H), and flange inserting parts (316D), (316D) are formed upon the projections (316F) and further reinforcing ribs (316G) are formed on the circumference of the body (316A). The masking member (316) is made of a polymer alloy consisting of PPE and polystyrene containing 30% by weight of calcium carbonate and is manufactured by vacuum forming using polymer alloy sheet.

[0068] The masking member (316) is attached to a pillar member (15) by inserting a pillar body (15A) of the pillar member (15) into the inserting part (316B) of masking member (316) and inserting flanges (15D), (15D) of pillar member (15) into the flange inserting parts (316D), (316D) of the masking member (316) as shown in Figure 42.

[0069] Figure 43 to Figure 46 relate to a comparative masking member (317) shown in Figure 43 consists of a body (317A) inside of which an inserting part (317B) of a pillar body (15A) of a pillar member (15) is formed, flange inserting parts (317D), (317D) into which flanges (15D), (15D) of the pillar member formed along a pair of side walls (317C), (317C) of the body (317A) is inserted, a pair of back sheets (317E), (317E) extending from the flange inserting parts (317D), (317D), and an upper sheet (317F) extending from the upper end of the body (317A), and reinforcing ribs (317G) are formed on the circumference of the body (317A) and the masking member (317) is manufactured by the same method using the same material as the masking member of Figures 41 and 42. The masking member (317) is provisionally

attached to a pillar body (15A) of a pillar member (15) shown in Figure 44 by inserting the pillar body (15A) into the inserting part (317B) of the masking member (317) as shown in Figure 44 and inserting the flanges (15D), (15D) of the pillar members (15) into the flange inserting parts (317D), (317D), respectively as described in the masking member of Figures 34 to 36,

[0070] After masking member (317) is provisionally attached to the pillar member (15), the back sheets (317E), (317E) are respectively turned over to be attached to the back side of the pillar member (15) and the back sheets (317E), (317E) are mutually fixed by such as an adhesive tape (317H), a tackler, or the like as shown in Figure 45.

[0071] As above described, after the masking member (317) is attached to the pillar member (15) as shown in Figure 46, a surface treatment such as a coating, a plating or the like is effected. Since the back side of the pillar member (15) is covered with the back sheets (317E), (317E) of the masking member (317), the surface treatment is not effected on the backside of the pillar member (15). After surface treatment, the masking member (317) is removed from the pillar member (15) by peeling off the adhesive tape (317H) from back sheets (317E), (317E) of the masking member (317).

Claims

1. A method of protecting a part of an article from surface treatment, using a masking member removably fitted to the part, **characterised in that** the masking member is moulded from an engineering plastic which is polycarbonate.
2. A method according to claim 1, wherein the masking member further comprises a filler or a reinforcing material.
3. A method according to claim 2, wherein the filler or reinforcing material is chosen from calcium carbonate, magnesium carbonate, barium sulphate, calcium sulphite, magnesium hydroxide, aluminium hydroxide, magnesium oxide, titan white, iron oxide, zinc oxide, alumina, silica, diatom earth, dolomite, gypsum, talc, clay, asbestos, mica, calcium silicate, bentonite, white carbon, carbon black, iron powder, aluminium powder, stone powder, blast furnace slag, flyash, synthetic fibre, natural fibre, glass fibre, carbon fibre, ceramic fibre and whisker.
4. A method according to claim 3, wherein the filler or reinforcing material is calcium carbonate.
5. A method according to any preceding claim wherein the masking member is moulded by vacuum forming, press moulding, blow moulding or injection moulding.
6. A method according to any preceding claim, wherein the masking member is surface treated to increase the affinity for paint or adhesive.
7. A method according to any preceding claim, wherein the masking member is reusable.

Revendications

1. Procédé de protection d'une partie d'une pièce contre un traitement de surface, dans lequel on utilise un élément masquant ajusté à la partie de manière à pouvoir être ôté, procédé **caractérisé en ce que** l'élément masquant est obtenu par moulage d'une matière plastique industrielle qui est un polycarbonate.
2. Procédé selon la revendication 1, dans lequel l'élément masquant est un élément qui comprend en outre une charge ou un matériau de renforcement.
3. Procédé selon la revendication 2, dans lequel la charge ou le matériau de renforcement est un produit choisi parmi le carbonate de calcium, le carbonate de magnésium, le sulfate de baryum, le sulfite de calcium, l'hydroxyde de magnésium, l'hydroxyde d'aluminium, l'oxyde de magnésium, le blanc de titane, l'oxyde de fer, l'oxyde de zinc, l'alumine, la silice, la terre de diatomées, la dolomite, le gypse, le talc, l'argile, l'amiante, le mica, le silicate de calcium, la bentonite, le « blanc de carbone », le noir de carbone, la poudre de fer, la poudre d'aluminium, la poudre de pierre, les scories de haut fourneau, les cendres volatiles, les fibres synthétiques, les fibres naturelles, les fibres de verre, les fibres de carbone, les fibres de céramique et les trichites.
4. Procédé selon la revendication 3, dans lequel la charge ou le matériau de renforcement est du carbonate de calcium.
5. Procédé selon l'une quelconque des revendications précédentes, dans lequel l'élément masquant est un élément

moulé, obtenu par formage sous vide, moulage par compression, moulage par soufflage ou moulage par injection.

6. Procédé selon l'une quelconque des revendications précédentes, dans lequel l'élément masquant est un élément qui est traité en surface pour augmenter l'affinité pour une peinture ou un adhésif.

7. Procédé selon l'une quelconque des revendications précédentes, dans lequel l'élément masquant est un élément réutilisable.

Patentansprüche

1. Verfahren zum Schützen eines Teils eines Gegenstands vor einer Oberflächenbehandlung, wobei ein Abdeckelement verwendet wird, das entferntbar an dem Teil befestigt wird, **dadurch gekennzeichnet, daß** das Abdeckelement aus einem Kunststoffwerkstoff geformt wird, der aus Polycarbonat besteht.

2. Verfahren nach Anspruch 1, wobei das Abdeckelement ferner ein Füllmittel oder ein Verstärkungsmaterial enthält.

3. Verfahren nach Anspruch 2, wobei das Füllmittel oder Verstärkungsmaterial aus Kalziumkarbonat, Magnesiumkarbonat, Bariumsulfat, Kalziumsulfid, Magnesiumhydroxid, Aluminiumhydroxid, Magnesiumoxid, Titanweiß, Eisenoxid, Zinkoxid, Aluminiumoxid, Silika, Kieselgur, Dolomit, Gips, Talk, Ton, Asbest, Glimmer, Kalziumsilikat, Bentonit, Weißruß, Rußschwarz, Eisenpulver, Aluminiumpulver, mineralischem Füllstoff, Hochofenschlacke, Flugasche, Synthesefaser, Naturfaser, Glasfaser, Kohlenstoff-Faser, Keramikfaser und Whisker ausgewählt wird.

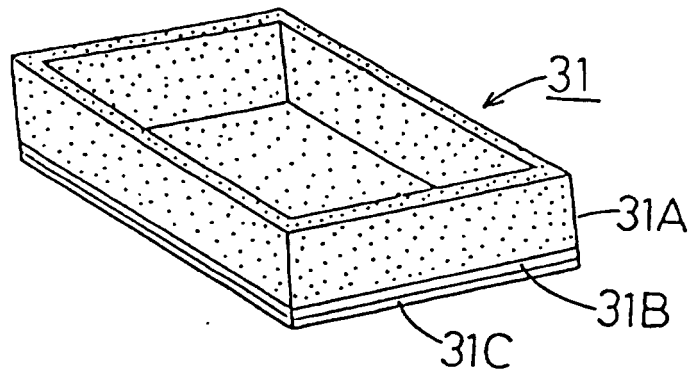
4. Verfahren nach Anspruch 3, wobei das Füllmittel oder Verstärkungsmaterial Kalziumkarbonat ist.

5. Verfahren nach einem der vorhergehenden Ansprüche, wobei das Abdeckelement durch Vakuumformen, Preßformen, Blasformen oder Spritzgießen geformt wird.

6. Verfahren nach einem der vorhergehenden Ansprüche, wobei das Abdeckelement oberflächenbehandelt wird, um die Affinität gegenüber einer Anstrichfarbe oder einem Klebemittel zu erhöhen,

7. Verfahren nach einem der vorhergehenden Ansprüche, wobei das Abdeckelement wiederverwendbar ist.

F i g. 1



F i g. 2

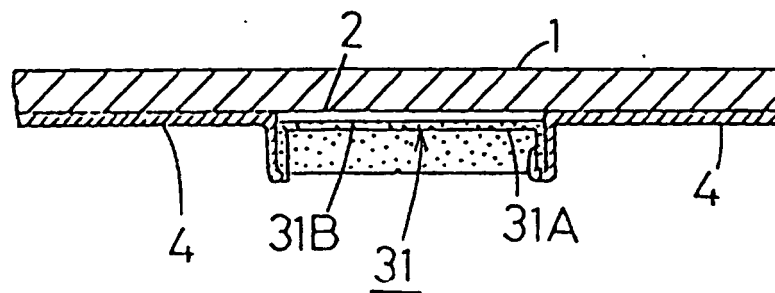


Fig. 3

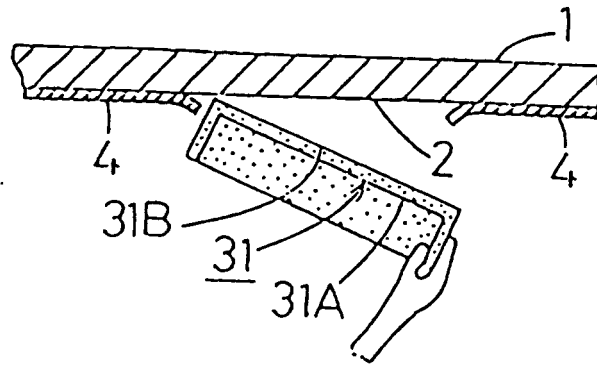


Fig. 4

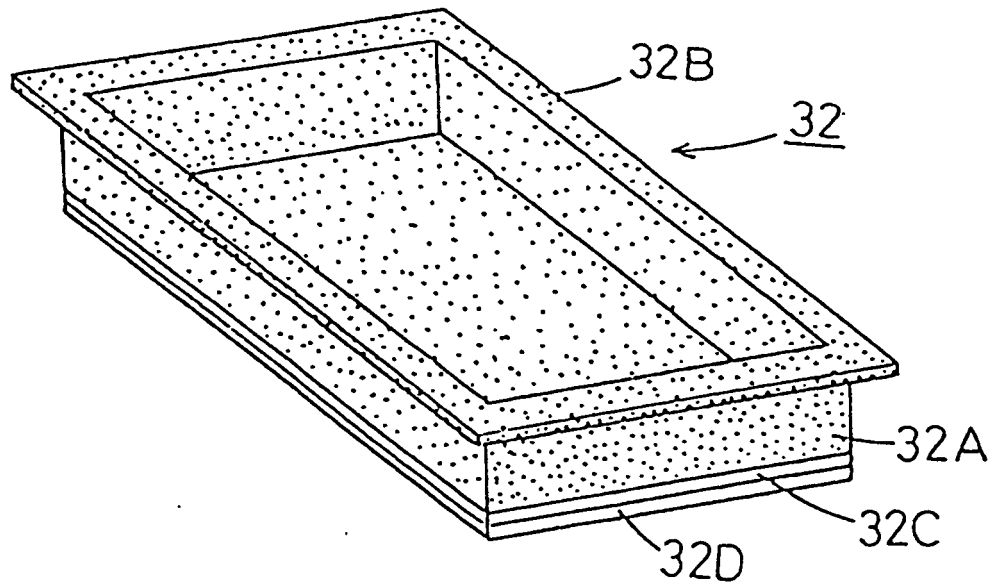


Fig. 5

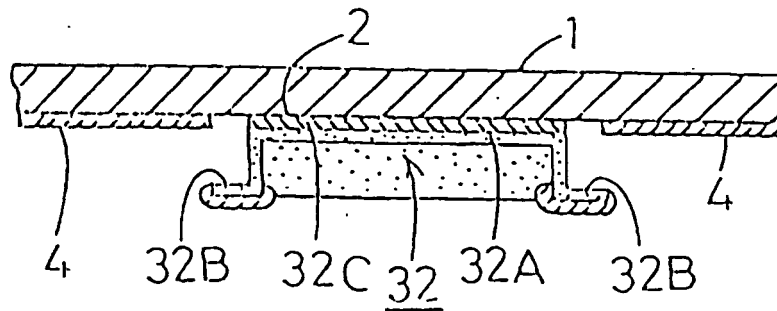


Fig. 6

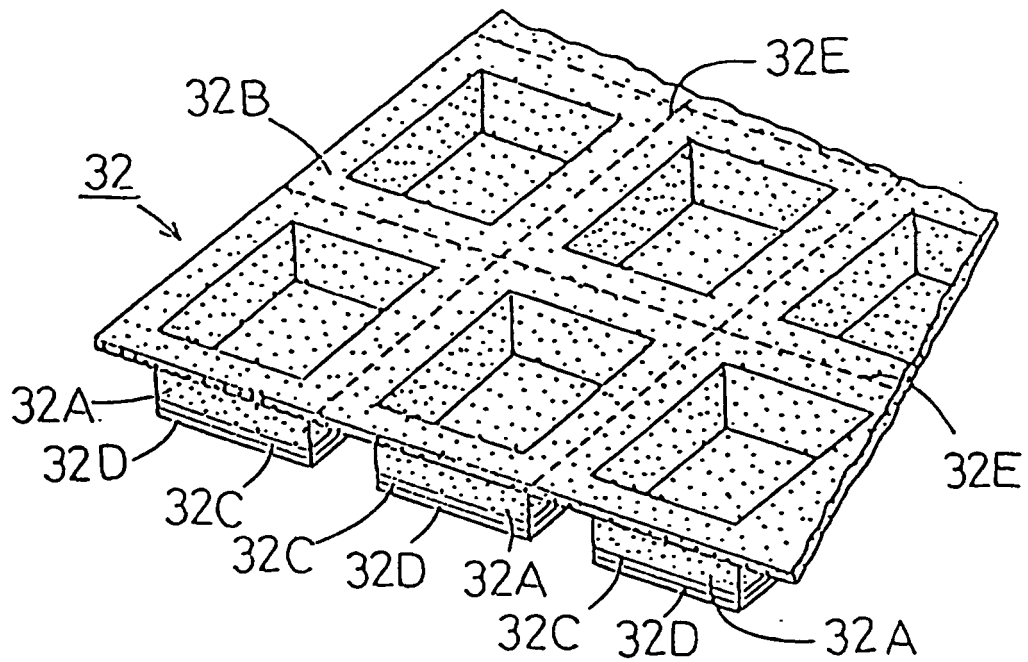


Fig. 7

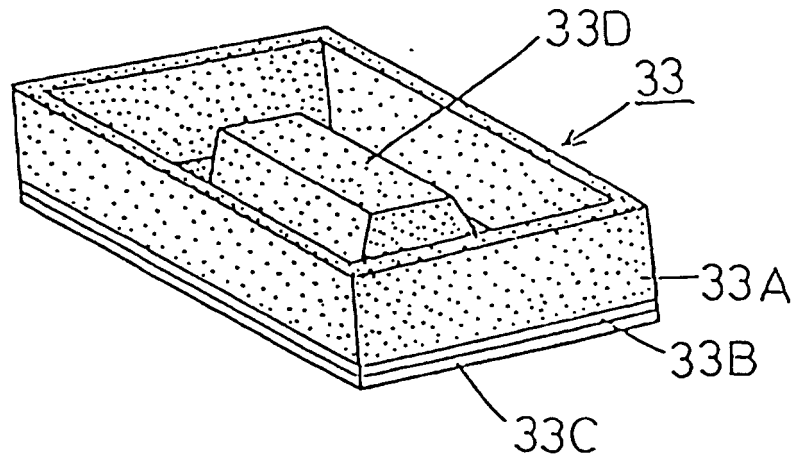
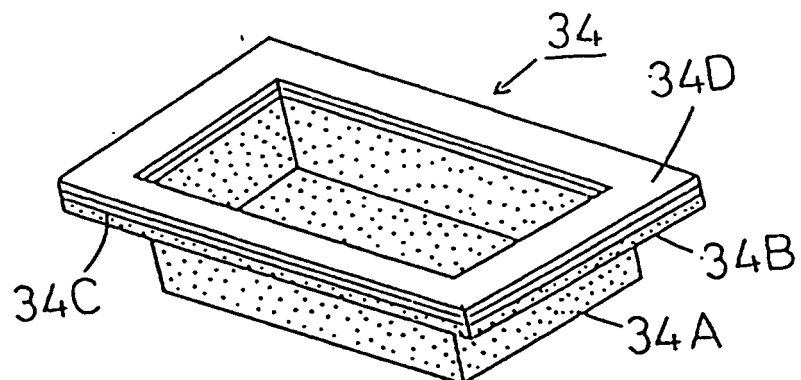
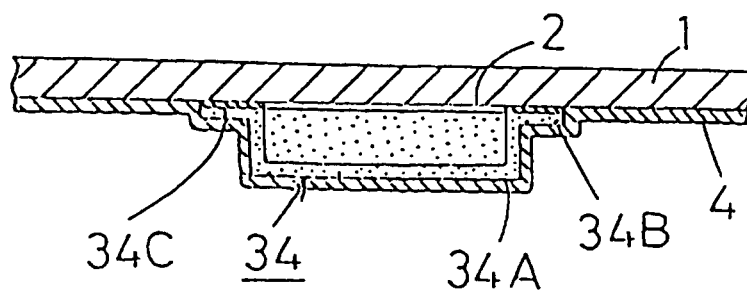


Fig. 8



F i g. 9



F i g. 10

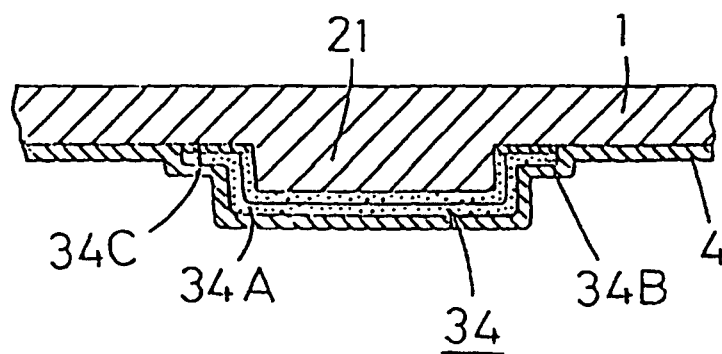


Fig. 11

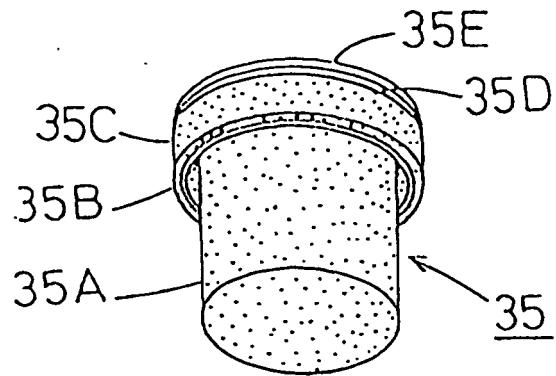
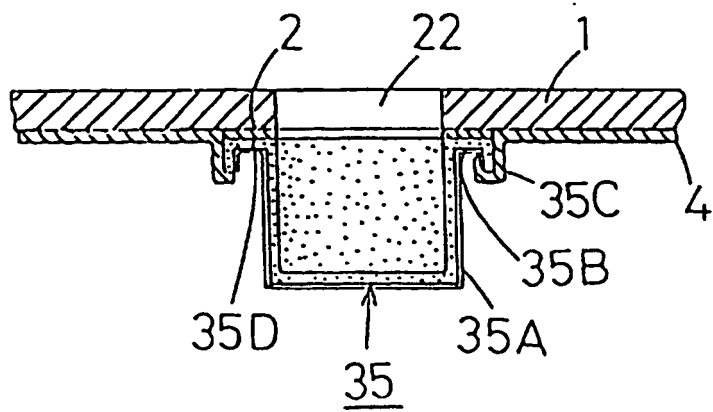
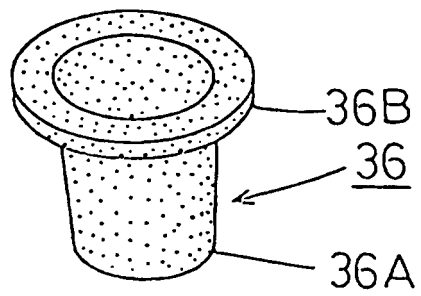


Fig. 12



F i g. 1 3



F i g. 1 4

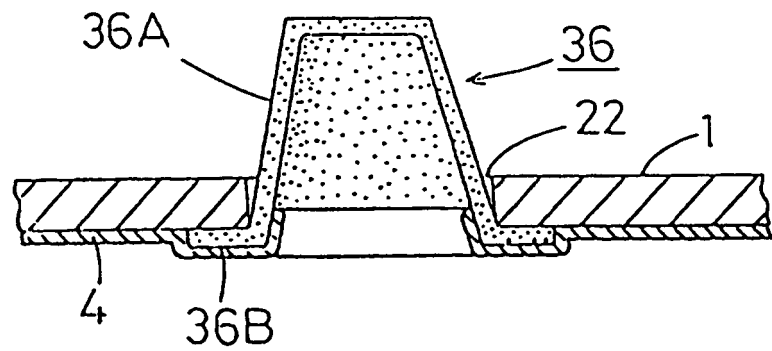


Fig. 15

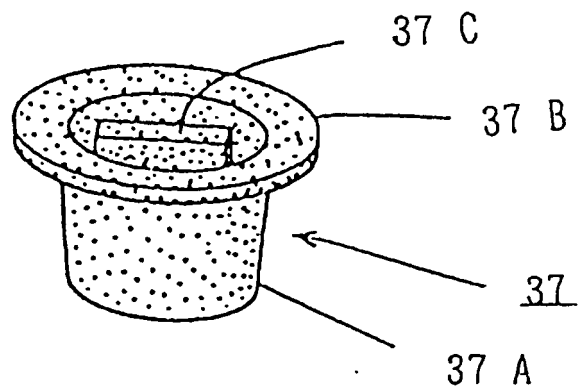


Fig. 16

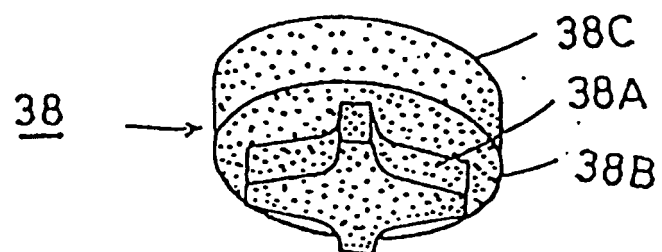


Fig. 17

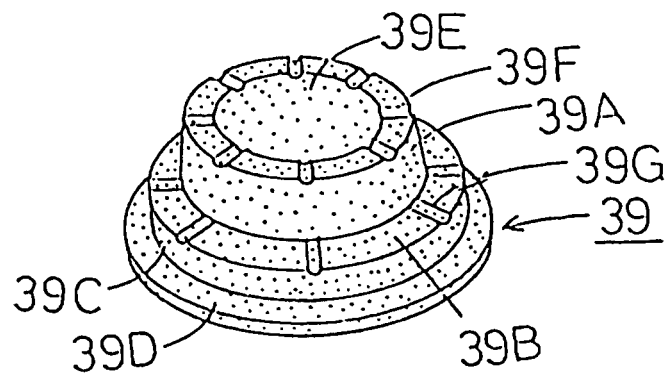


Fig. 18

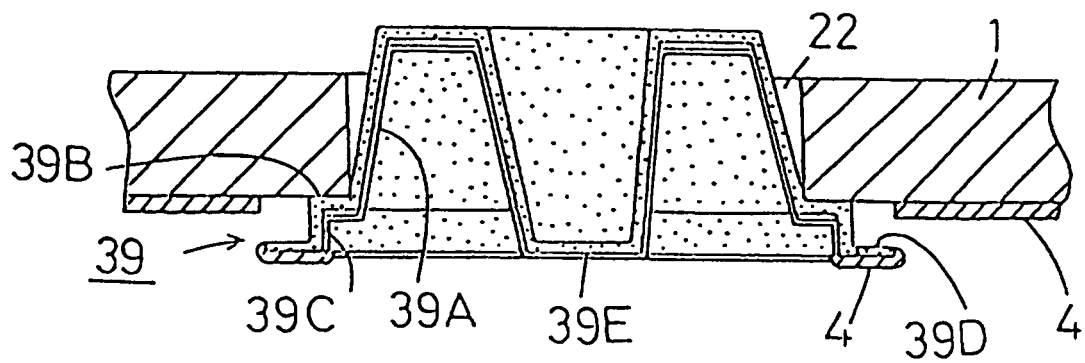


Fig. 19

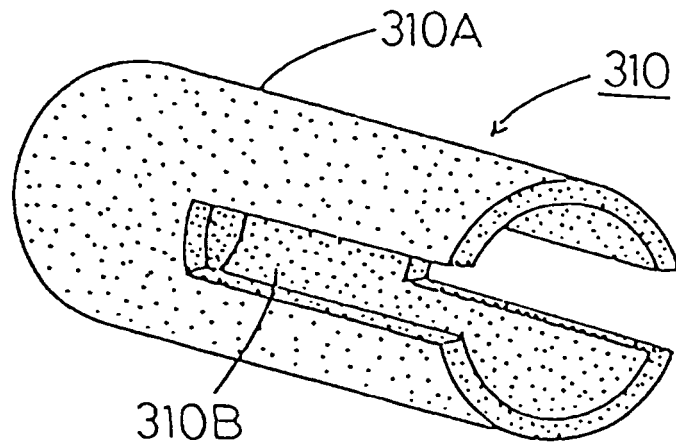


Fig. 20

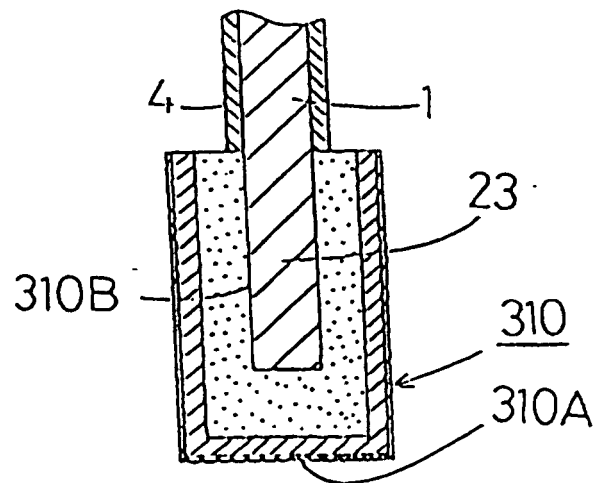


Fig. 21

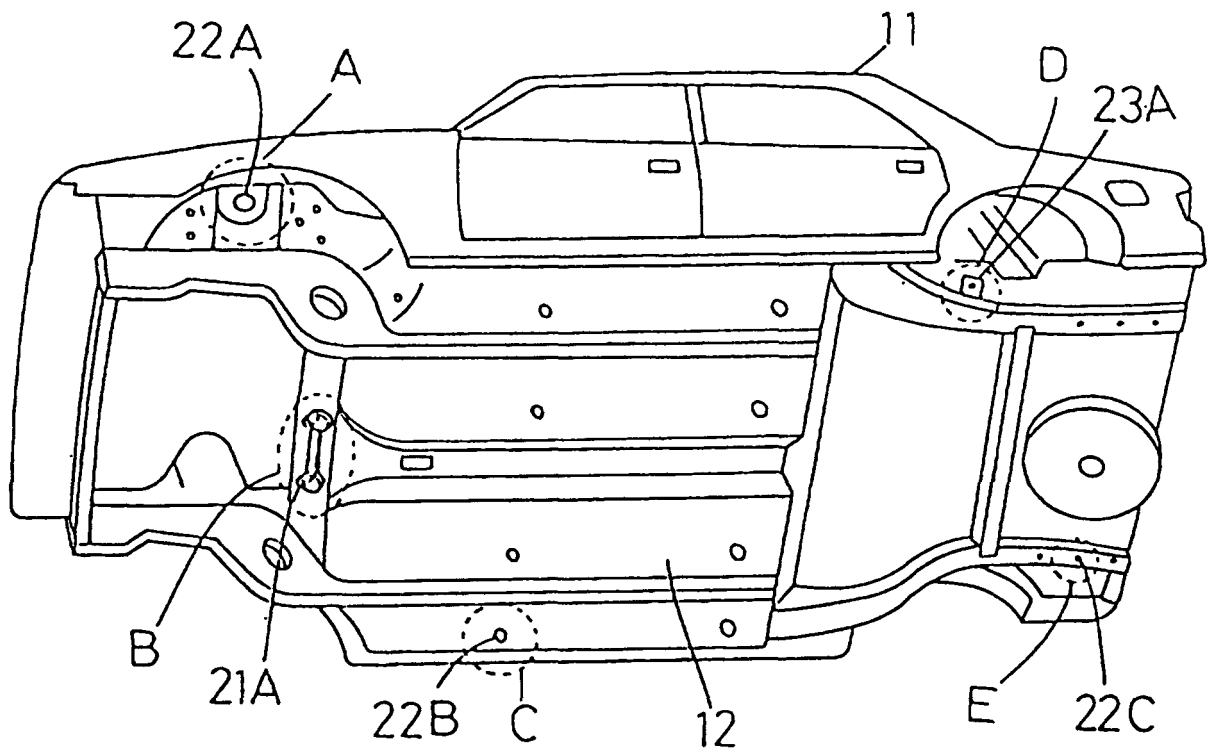
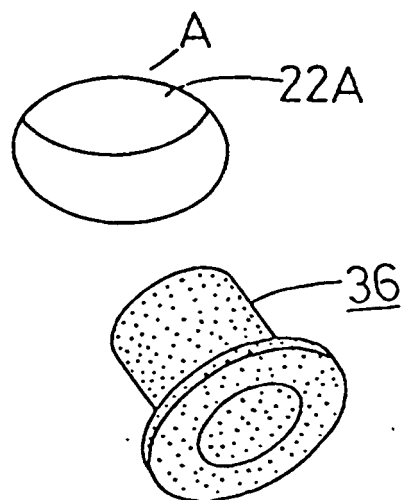
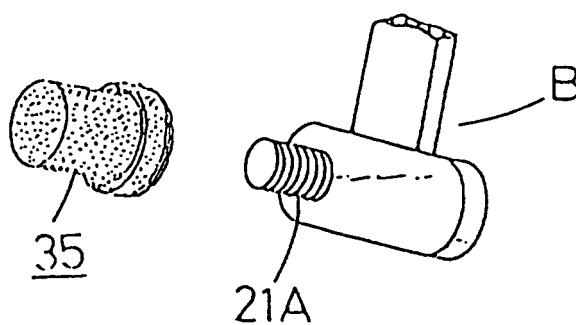


Fig. 22



F i g. 2 3



F i g. 2 4

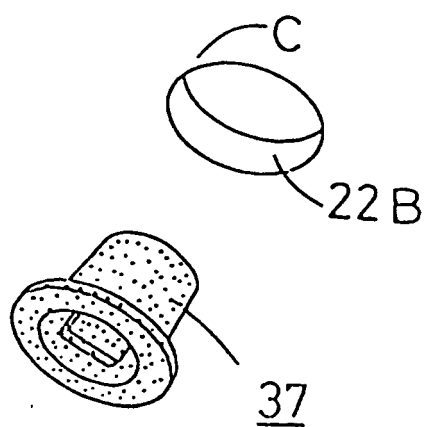


Fig. 25

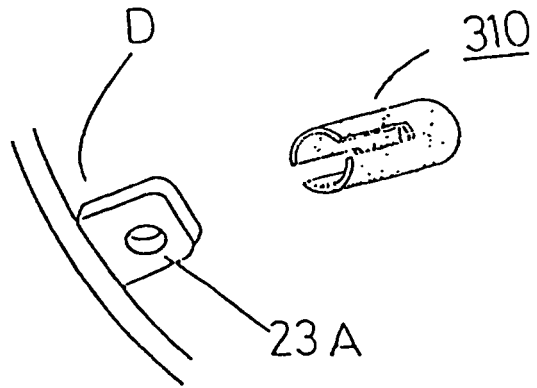


Fig. 26

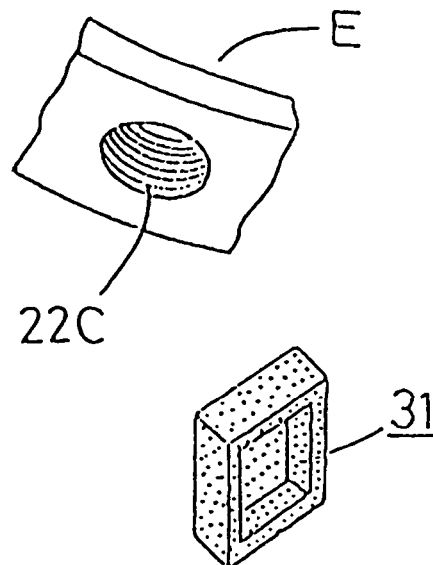


Fig. 27

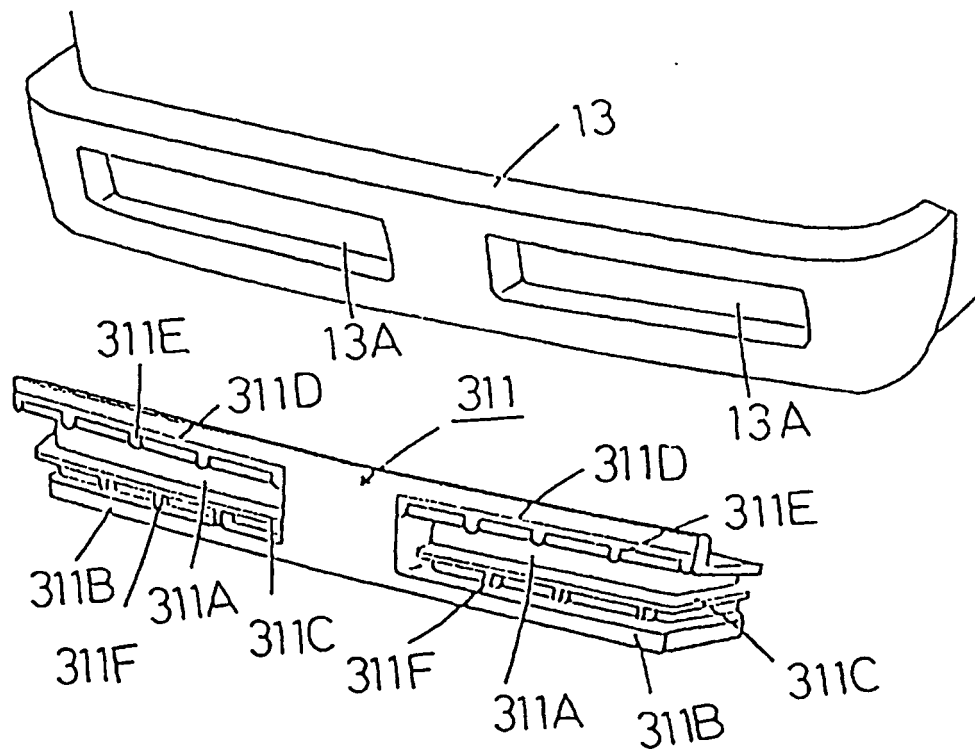


Fig. 28

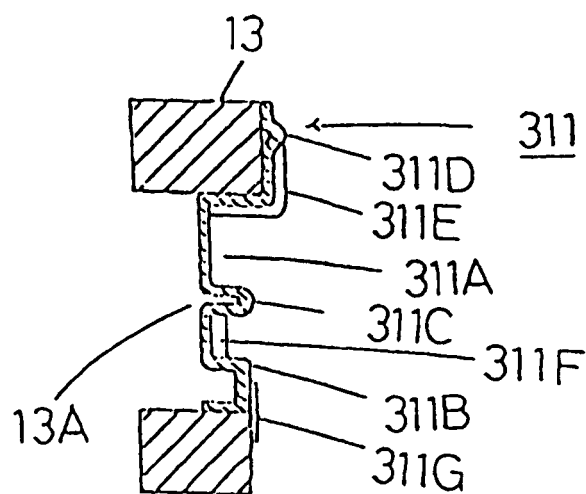


Fig. 29

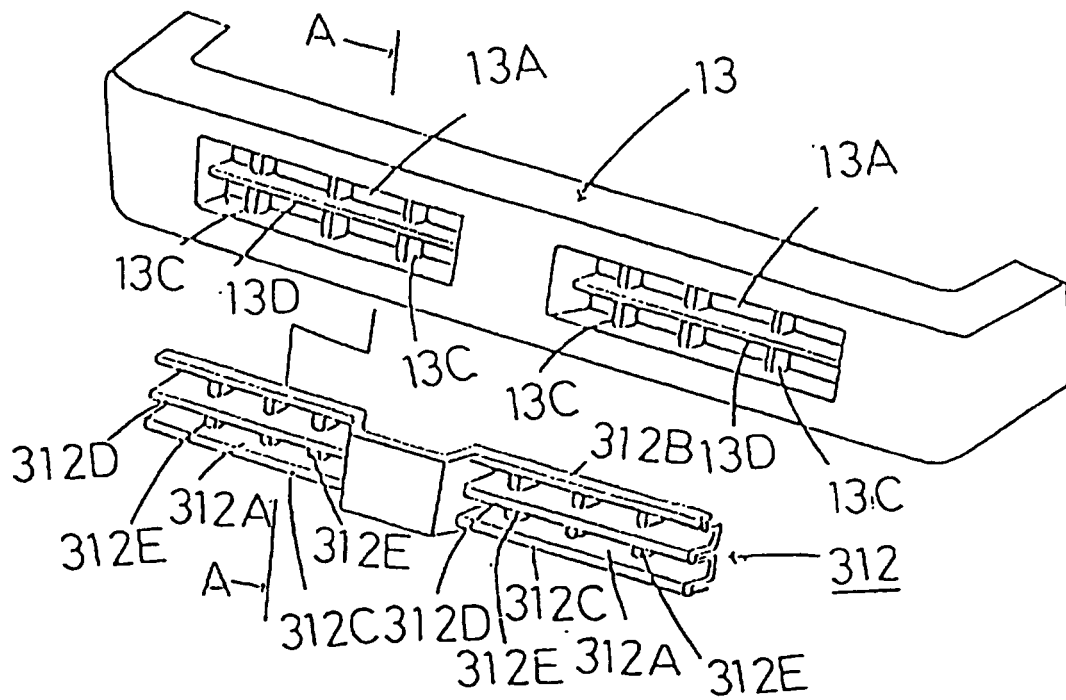


Fig. 30

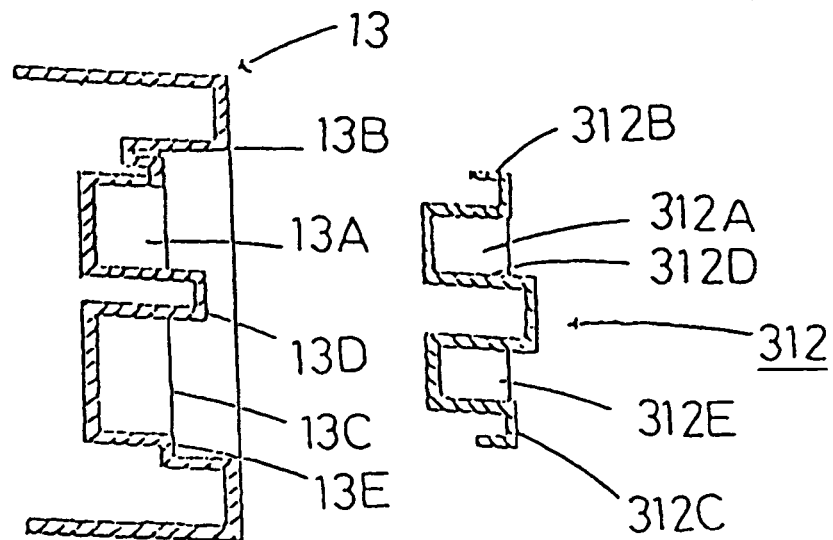


Fig. 31

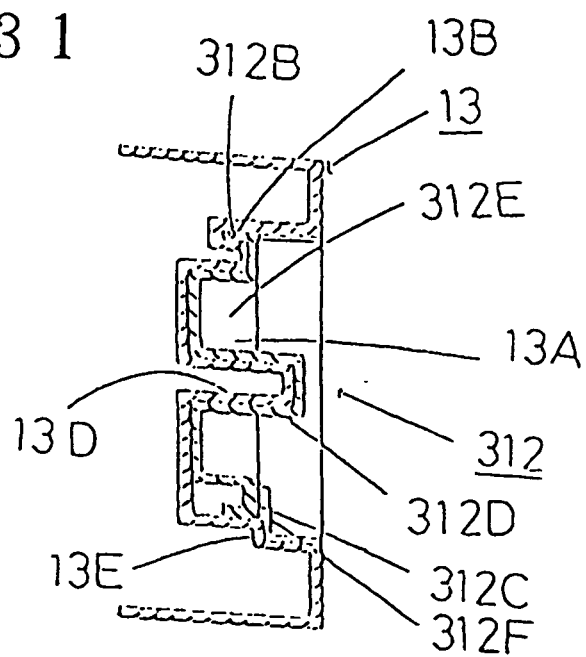
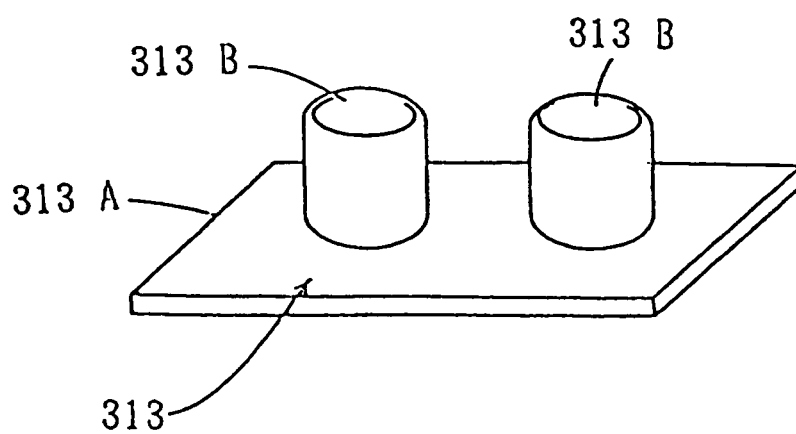
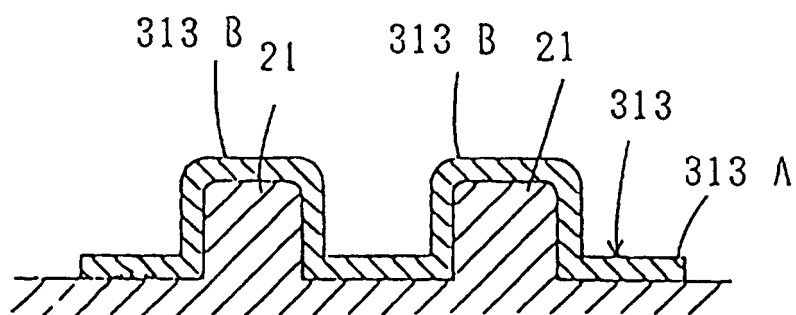


Fig. 32



F i g. 3 3



F i g. 3 4

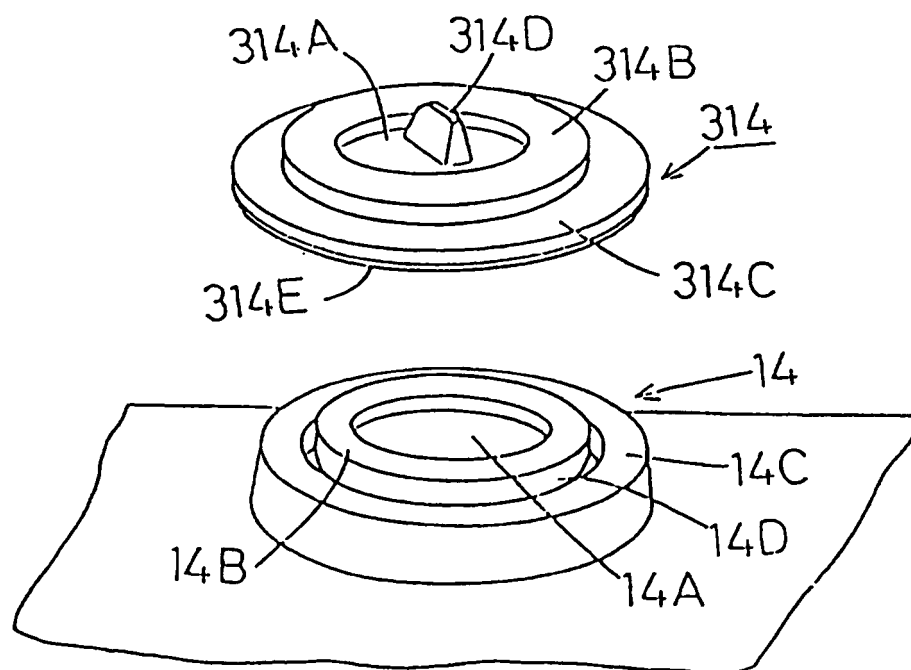
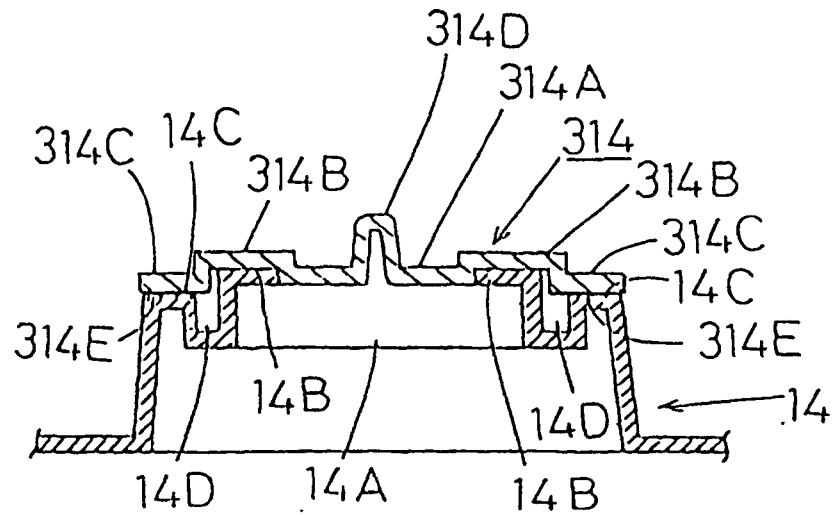


Fig. 35



F i g. 36.

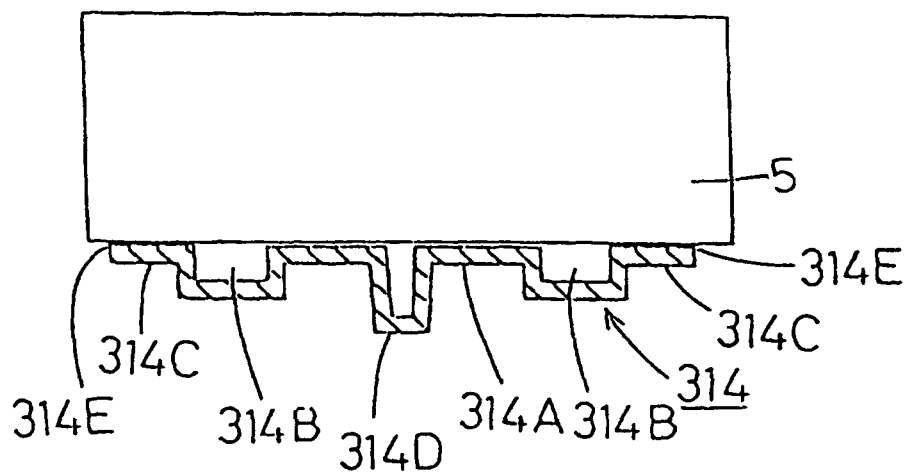


Fig. 37

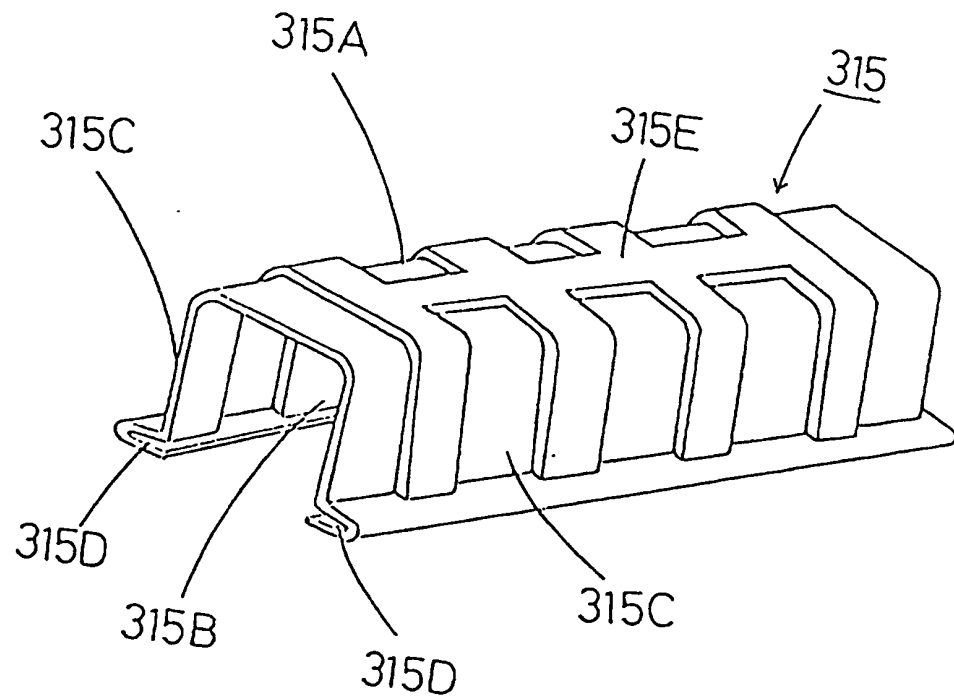


Fig. 38

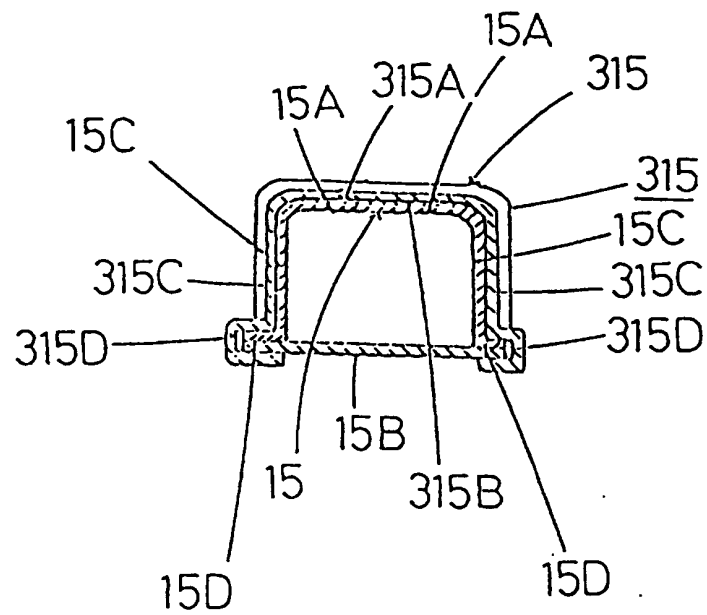


Fig. 39

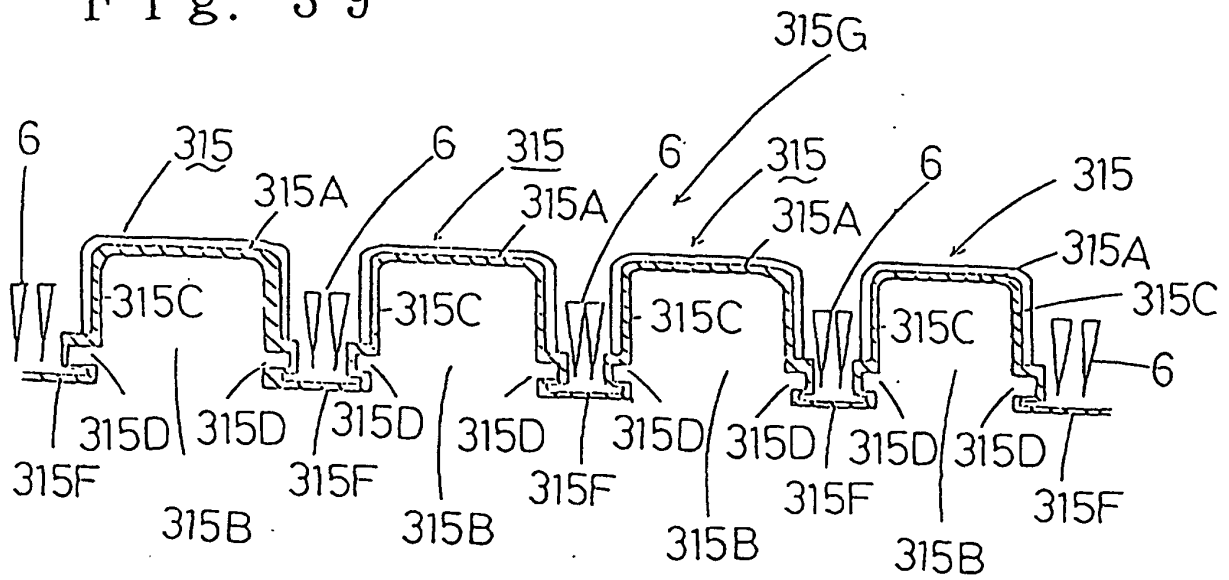
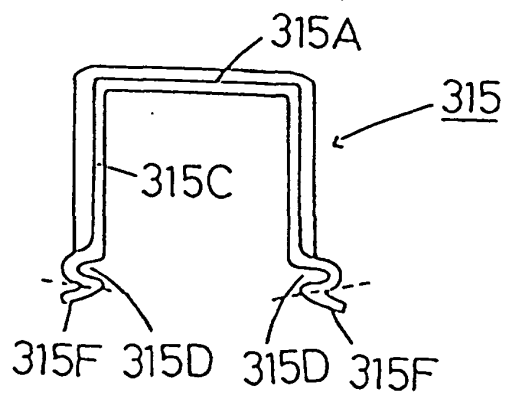
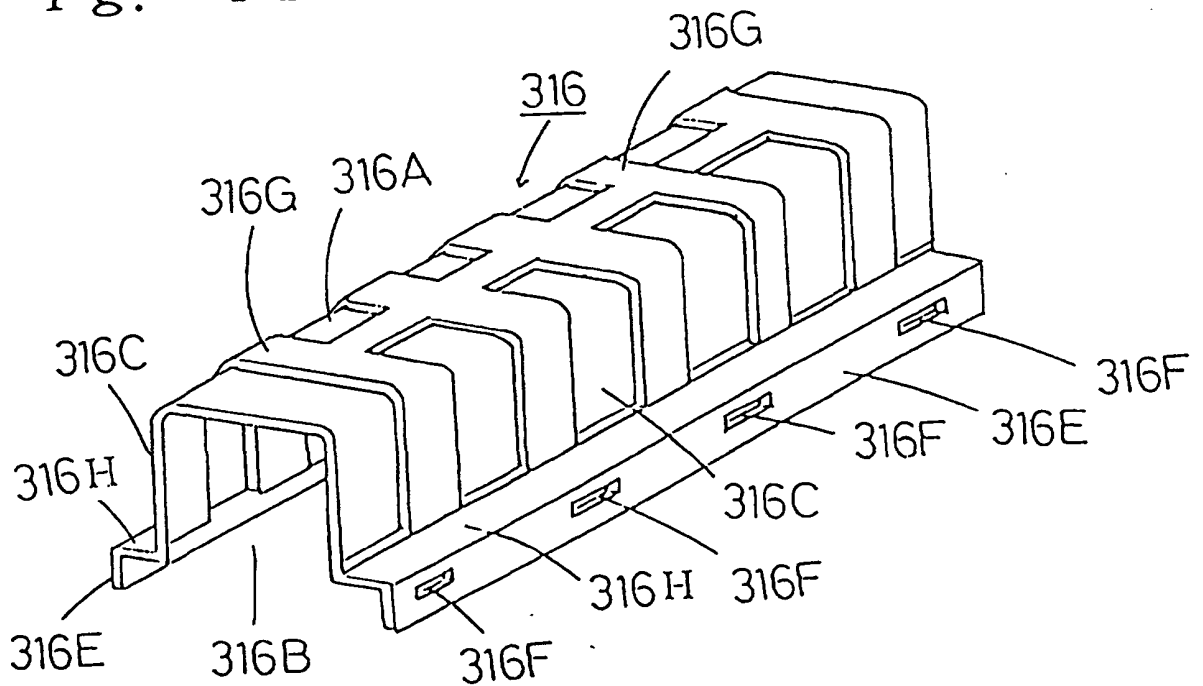


Fig. 40



F i g. 41



F i g. 4 2

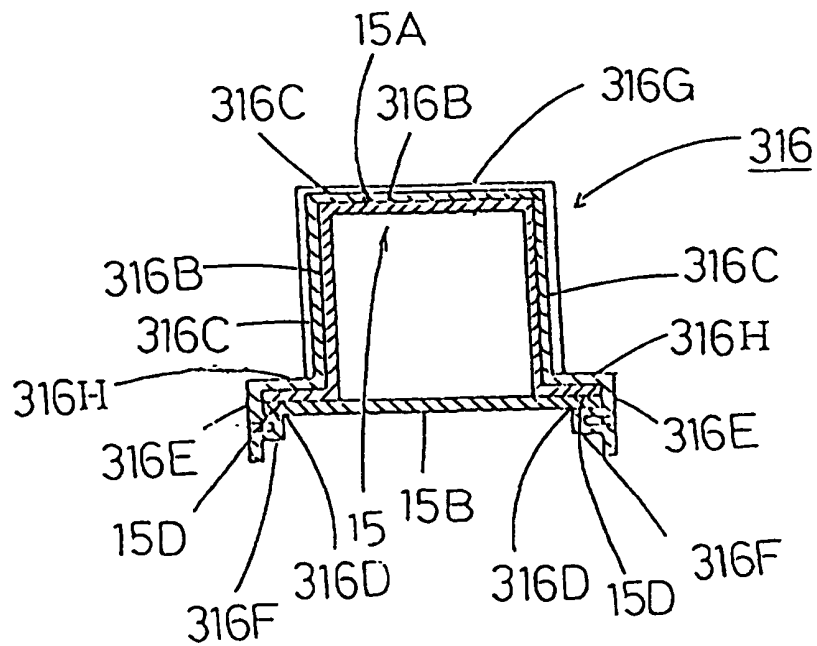


Fig. 43

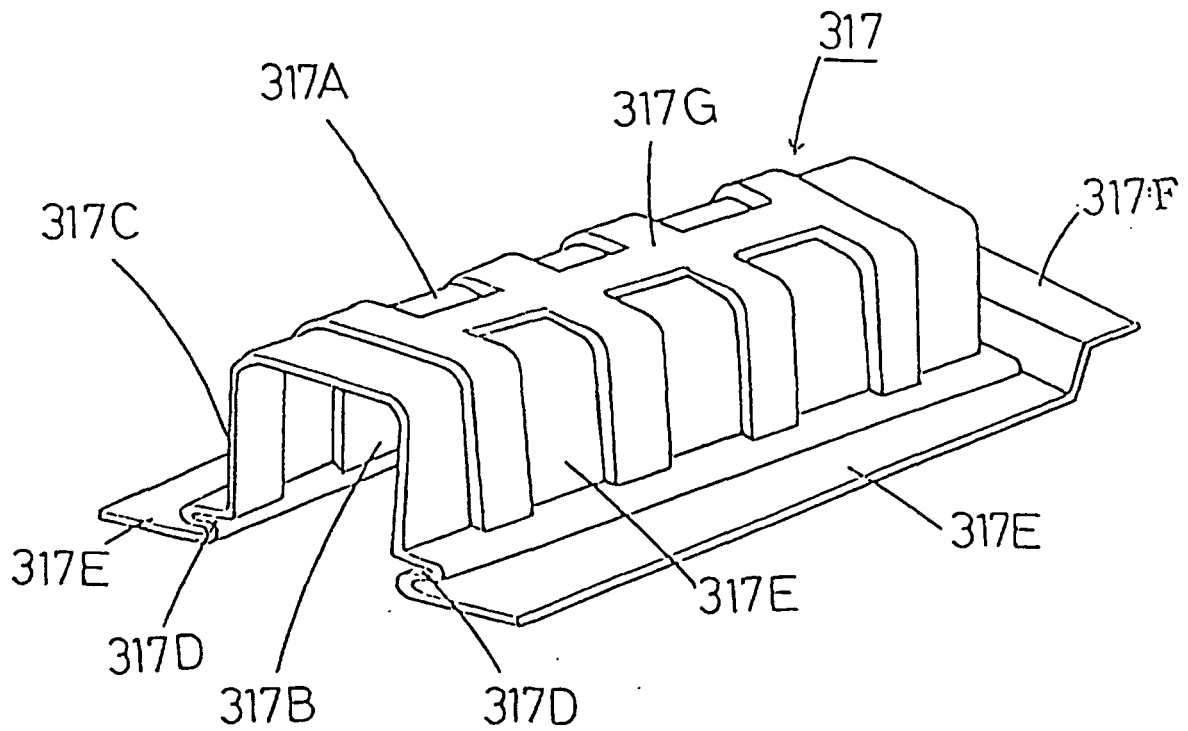


Fig. 44

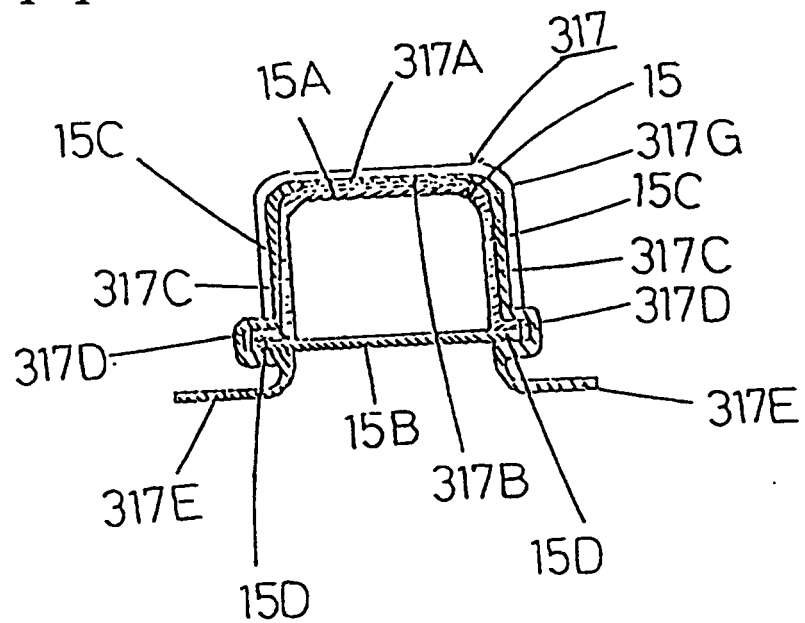


Fig. 45

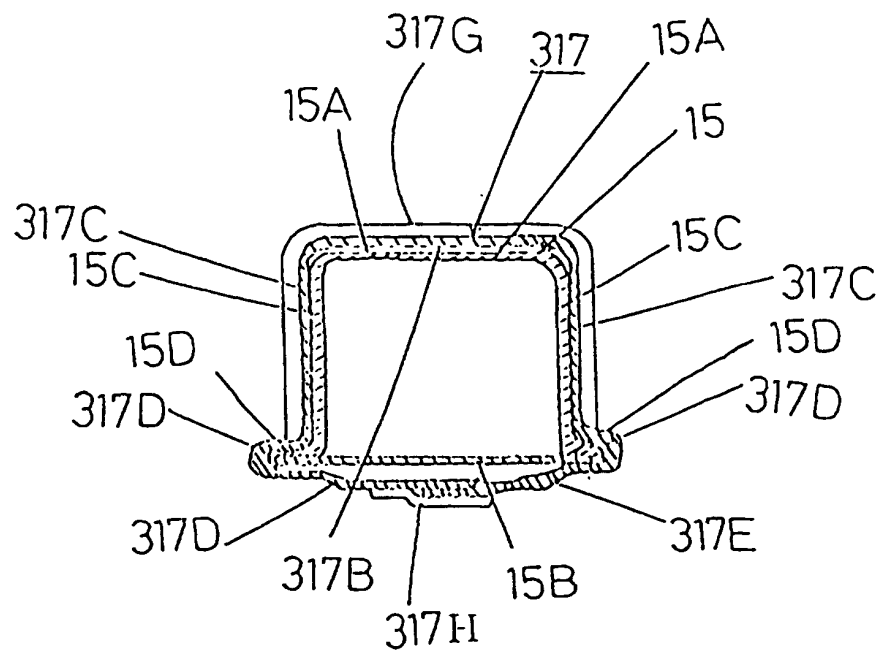


Fig. 46

