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(54) Masking member

(57) An object of the present invention is to repeatedly use a masking member which is applied in a surface treatment having a heating process at a high temperature. To attain the object, the masking member of the present invention uses an engineering plastic having a high mechanical strength and a high heat resistance as a material.

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Description

[FIELD OF THE INVENTION]

[0001] The present invention relates to a masking member which is used to protect a part of an article from a surface treatment such as coating or plating.

[DESCRIPTION OF THE PRIOR ART]

[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 a thermal conductivity of which will increase and a thermal resistance of which 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 the first embodiment of the present invention.
Figure 1 is the perspective view of the first embodiment.
Figure 2 is the partial sectional view of the first embodiment when the masking member is attached.
Figure 3 is the partial sectional view of the first embodiment when the masking member is removed.
Figure 4 to Figure 6 relate to the second embodiment of the present invention.
Figure 4 is the perspective view of the second embodiment.
Figure 5 is the partial sectional view of the second embodiment when the masking member is attached.
Figure 6 is the partial perspective view of the second embodiment when the masking members are produced.
Figure 7 is the perspective view of the third embodiment of the present invention.
Figure 8 to Figure 10 relate to the fourth embodiment of the present invention.
Figure 8 is the perspective view of the fourth embodiment.
Figure 9 is the partial sectional view of the fourth embodiment when the masking member is attached.
Figure 10 is another partial sectional view of the fourth embodiment when the masking member is attached.
Figure 11 and Figure 12 relate to the fifth embodiment of the present invention.
Figure 11 is the perspective view of the fifth embodiment.
Figure 12 is the partial sectional view of the fifth embodiment when the masking member is attached.
Figure 13 and Figure 14 relate to the sixth embodiment of the present invention.
Figure 13 is the perspective view of the sixth embodiment.
Figure 14 is the partial sectional view of the sixth embodiment when the masking member is attached.
Figure 15 is the perspective view of the seventh embodiment of the present invention.
Figure 16 is the perspective view of the eighth embodiment of the present invention.
Figure 17 and Figure 18 relate to the ninth embodiment of the present invention.
Figure 17 is the perspective view of the ninth embodiment.
Figure 18 is the partial sectional view of the ninth embodiment when the masking member is attached.
Figure 19 and Figure 20 relate to the tenth embodiment of the present invention.
Figure 19 is the perspective view of the tenth embodiment.
Figure 20 is the partial sectional view of the tenth embodiment when the masking member is attached.
Figure 21 to Figure 26 relate to the practical examples of the present invention.
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 the eleventh embodiment of the present invention.

Figure 27 is the perspective view of the eleventh embodiment.

Figure 28 is the sectional view of the eleventh embodiment when the masking member is attached.

Figure 29 to Figure 31 relate to the twelfth embodiment of the present invention.

Figure 29 is the perspective view of the twelfth embodiment 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 the thirteenth embodiment of the present invention.

Figure 32 is the perspective view of the thirteenth embodiment.

Figure 33 is the partial sectional view of the thirteenth embodiment when the masking member is attached.

Figure 34 to Figure 36 relate to the fourteenth embodiment of the present invention.

Figure 34 is the perspective view of the fourteenth embodiment.

Figure 35 is the partial sectional view of an inlet of fuel tank of the fourteenth embodiment.

Figure 36 is the explanatory sectional view of the fourteenth embodiment when adhesive layer is applied.

Figure 37 to Figure 40 relate to the fifteenth embodiment of the present invention.

Figure 37 is the perspective view of the fifteenth embodiment.

Figure 38 is the sectional view of the fifteenth embodiment when the masking member is attached.

Figure 39 is the front view of a group of masking members of the fifteenth embodiment.

Figure 40 is the front view of a masking member separated from the group of masking members of the fifteenth embodiment.

Figure 41 and Figure 42 relate to the sixteenth embodiment of the present invention.

Figure 41 is the perspective view of the sixteenth embodiment.

Figure 42 is the sectional view of the sixteenth embodiment when the masking member is attached.

Figure 43 to Figure 46 relate to the seventeenth embodiment of the present invention.

Figure 43 is the perspective view of the seventeenth embodiment.

Figure 44 is the sectional view of the seventeenth embodiment when the masking member is provisionally fixed.

Figure 45 is the sectional view of the seventeenth embodiment when the masking member is attached.

Figure 46 is the front view of the seventeenth embodiment 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] An engineering plastic used in the present invention is such as: thermoplastic-type engineering plastic chosen from methylpentene copolymer (TPX), polyethylene terephthalate (PET), polyamide (PA), polycarbonate (PC), cellulose acetate (CA), polysulphone (PSF), polyethersulphone (PES), polyphenylene sulphide (PPS), polyphenylene ether (PPE), polyamideimide (PAI), polyetherimide (PEI), polyether-etherketone (PEEK), polyimide (PI), polyester (PE), polyamide such as nylon 6 and nylon 66, polybutylene terephthalate (PET), polyallylester (PAE), polyethylene naphthalate (PEN), polyallylate (PAR), polyvinylidene fluoride (PVF_2) and the like; liquid crystal-type engineering plastic such as polyallylether and the like; compression moulding-type engineering plastic such as fluororesin and the like; amorphous polymer; aminobimaleimide; and bimaleimidoazine thermosetting aromatic polyamide. The above described engineering plastic may be foamed plastic and two or more kinds of the engineering plastics may be mixed or laminated together.

[0009] A filler or a reinforcing material such as cal-

cium 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, fly-ash, 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. A desirable engineering plastic is a polymer alloy such as PPE and polyamide, high-impact polystyrene, polystyrene and the like.

[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 chlelate 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 unstretched 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 tem-

perature.

[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 the first embodiment of the present invention. Referring now to Figure 1 to Figure 3, a masking member (31) 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 (31C) 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 (31C) is removed from the adhesive layer (31B) 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 the second embodiment of the present invention. Referring now to Figure 4 to Figure 6, a 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 first embodiment of the present invention.

[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 the same as the first embodiment.

[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 the third embodiment of the present invention. In this embodiment, a 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 first embodiment. The masking member (33) of this embodiment is easily handled by holding grip (33D) of masking member (33) and is easily manufactured by vacuum forming and can be reused the same as the first embodiment.

[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 fourth embodiment of the present invention. Referring now to Figure 8 and Figure 9, a masking member (34) 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 the fifth embodiment of the present invention. In this embodiment, a masking member (35) 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 fourth embodiment. 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 the sixth embodiment of the present invention. In this embodiment, a masking member (36) 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 the seventh embodiment of the present invention. In this embodiment, a masking member (37) 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) of this embodiment is used the same as the sixth embodiment 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 sixth embodiment.

[0040] Figure 16 relates to the eighth embodiment of the present invention. In this embodiment, a masking member (38) 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 sixth embodiment and 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 the ninth embodiment of the present invention. In this embodiment, a masking member (39) 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 sixth embodiment 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 sixth embodiment.

[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 the tenth embodiment of the present invention. In this embodiment, 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 sixth embodiment 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 the fifth embodiment is attached to a bolt (21A) of part B.

[0049] As shown in Figure 24, the Type C masking member (37) of the seventh embodiment is inserted into a drainage hole (22B), as shown in Figure 25, the masking member (310) of the tent embodiment is attached to a bracket (23A) of part D, and as shown in Figure 26, the Type A masking member (31) of the first embodiment 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 relates to the eleventh embodiment of the present invention. A masking member (311) is 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 (311A) of the masking member (311) is reinforced by the flange (311B) 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 (311G). Material for the masking member (311) of the above described embodiment is engineering plastic in which polyamide is mixed with PPE.

[0052] Figure 29 and Figure 31 relate to the twelfth embodiment of the present invention. A masking member (312) of this embodiment is 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, fining 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 pans (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 eleventh embodiment.

[0056] Figure 32 and Figure 33 relate to the thirteenth embodiment of the present invention. In this embodiment, a masking member (313) 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 fourth embodiment.

[0059] Figure 34 to Figure 36 relate to the fourteen embodiment of the present invention. 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 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 the fifteenth embodiment of the present invention. In the figures, a masking member (315) 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 fourteenth embodiment.

[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 the sixteenth embodiment of the present invention. A masking member (316) in this embodiment 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 the seventeenth embodiment of the present invention. A 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 sixteenth embodiment. 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 fourteenth embodiment.

[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 tacker, 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 masking member made of an engineering plastic.

Fig. 1

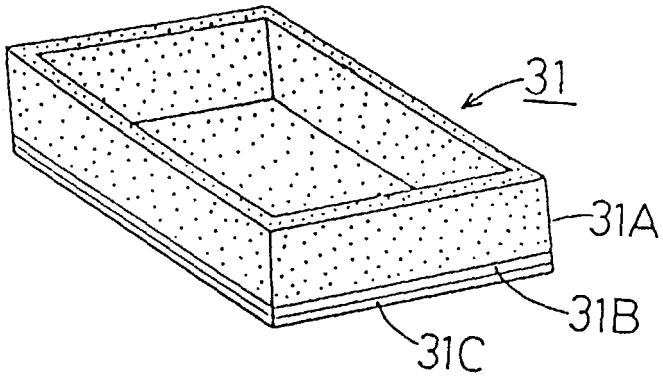


Fig. 2

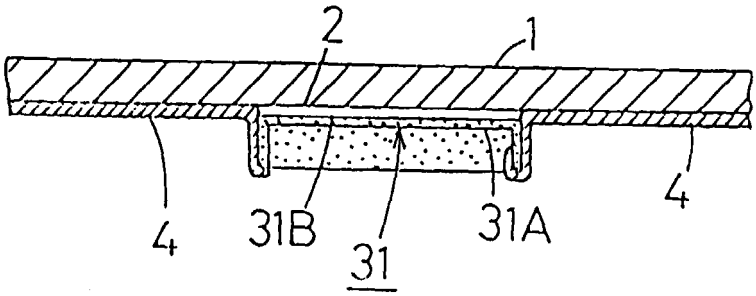


Fig. 3

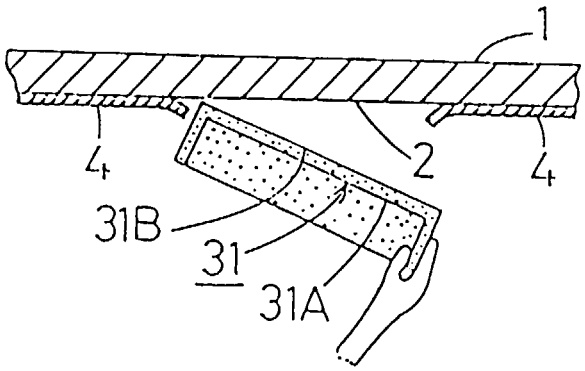


Fig. 4

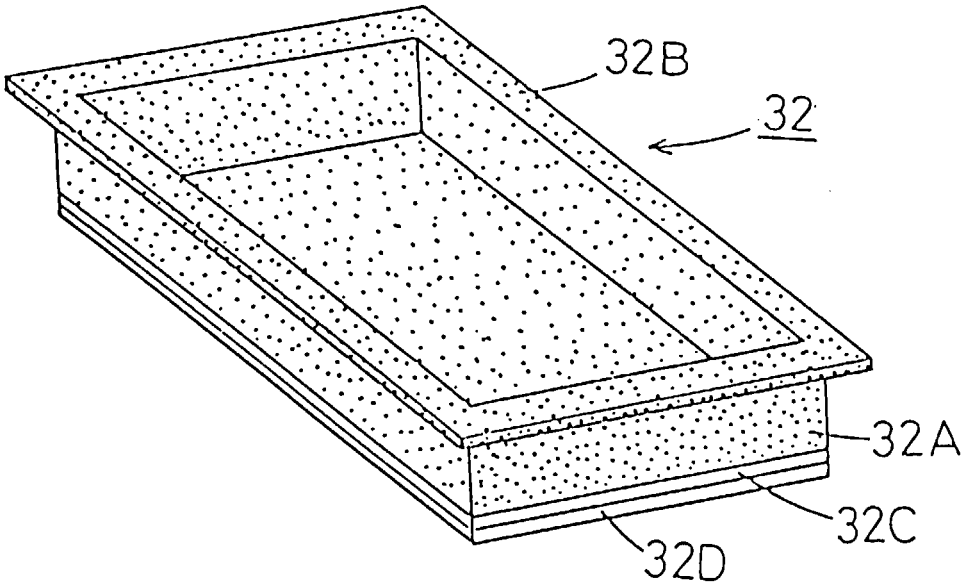


Fig. 5

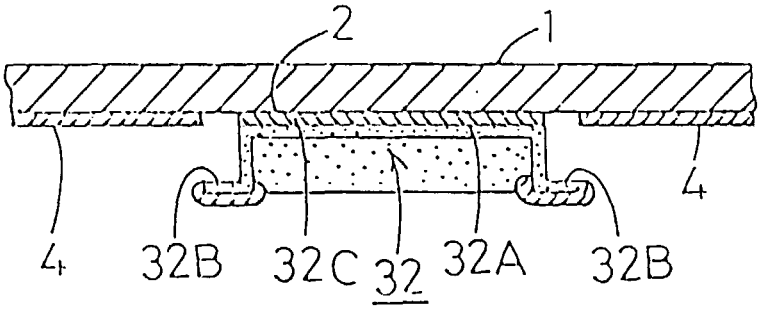

2
1
4
4
32B
32C
32
32A
32B

Fig. 6

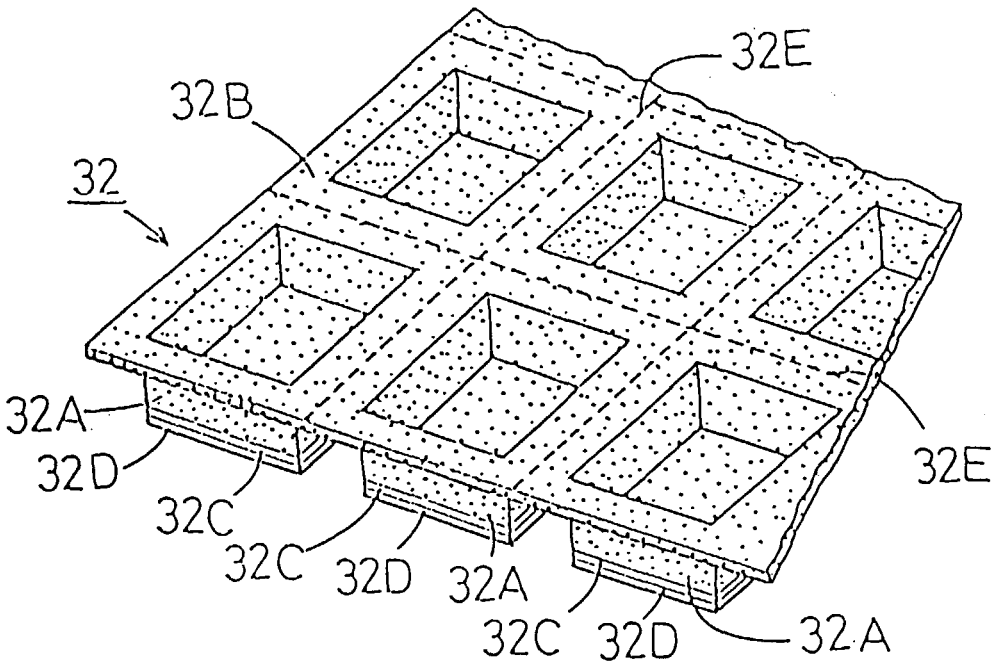

32E
32B
32
32A
32D
32C
32C
32D
32A
32C
32D
32A
32E

Fig. 7

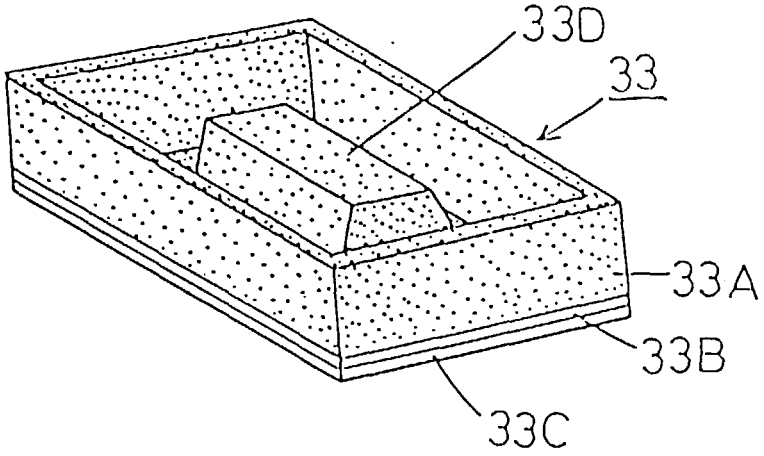


Fig. 8

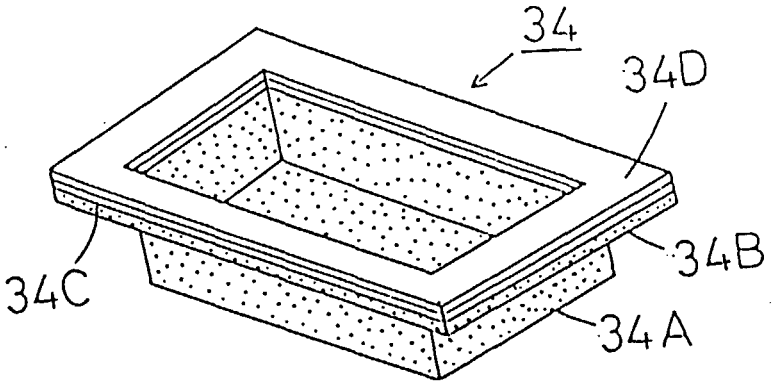


Fig. 9

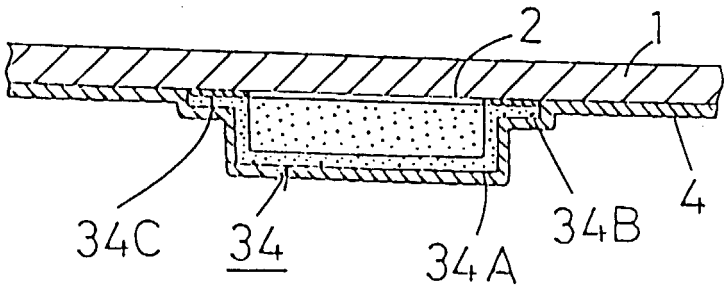


Fig. 10

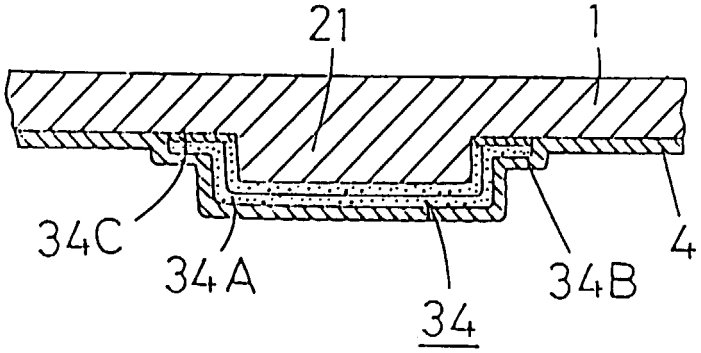


Fig. 11

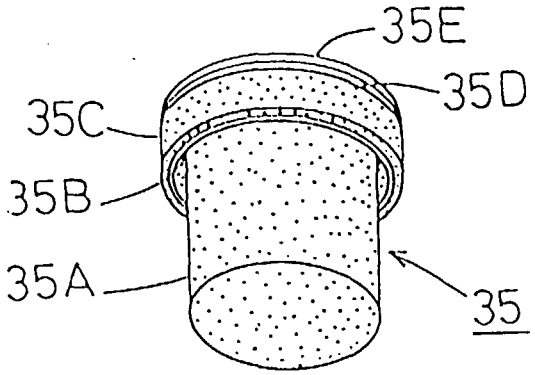


Fig. 12

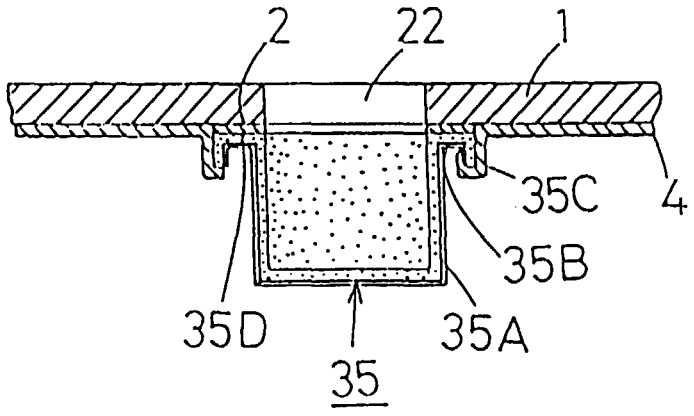


Fig. 13

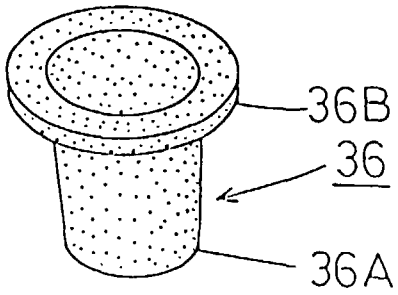


Fig. 14

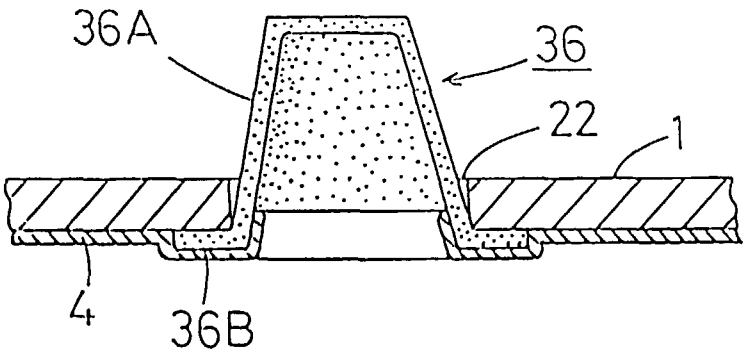


Fig. 15

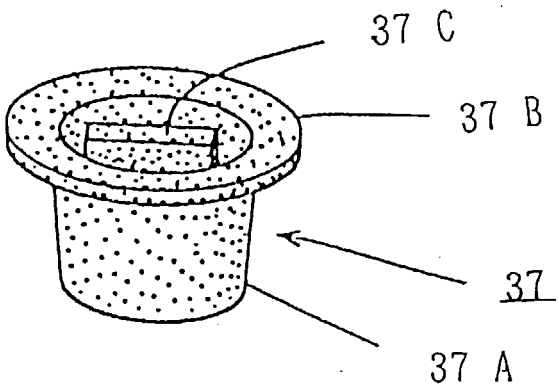


Fig. 16

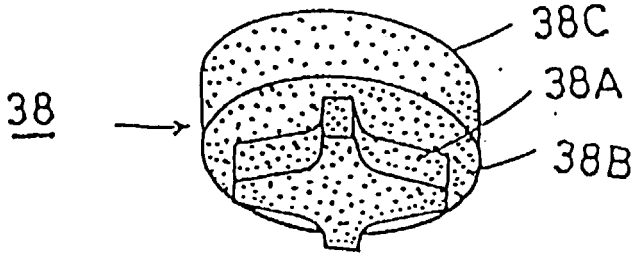


Fig. 17

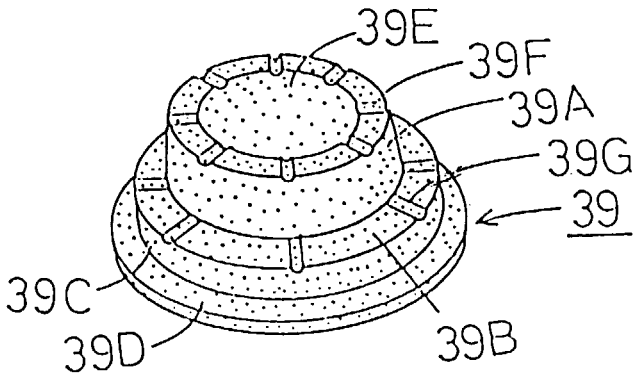


Fig. 18

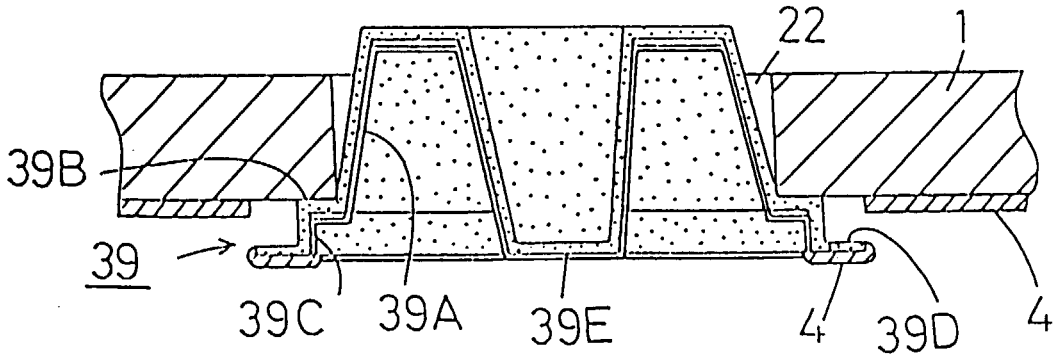


Fig. 19

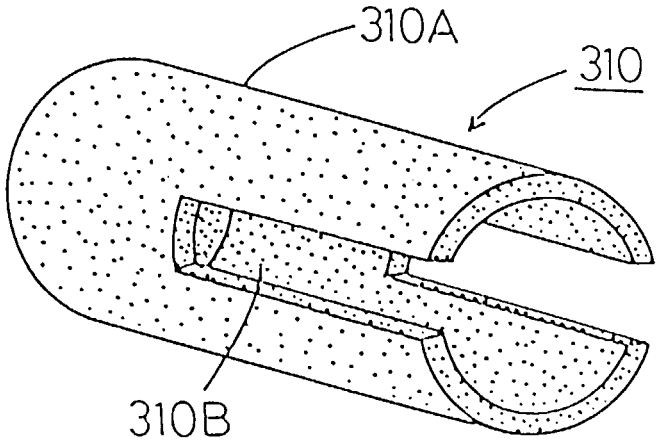


Fig. 20

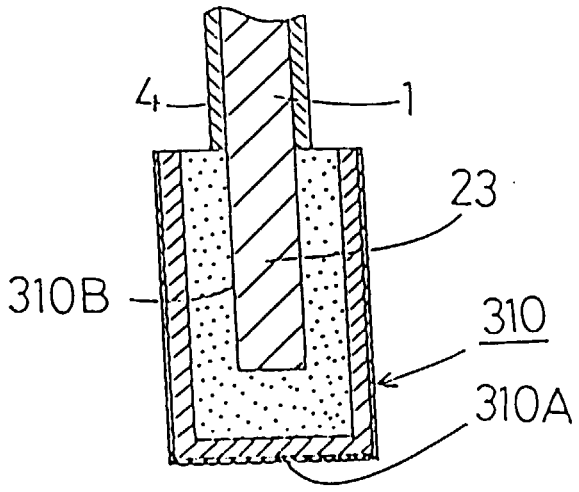


Fig. 21

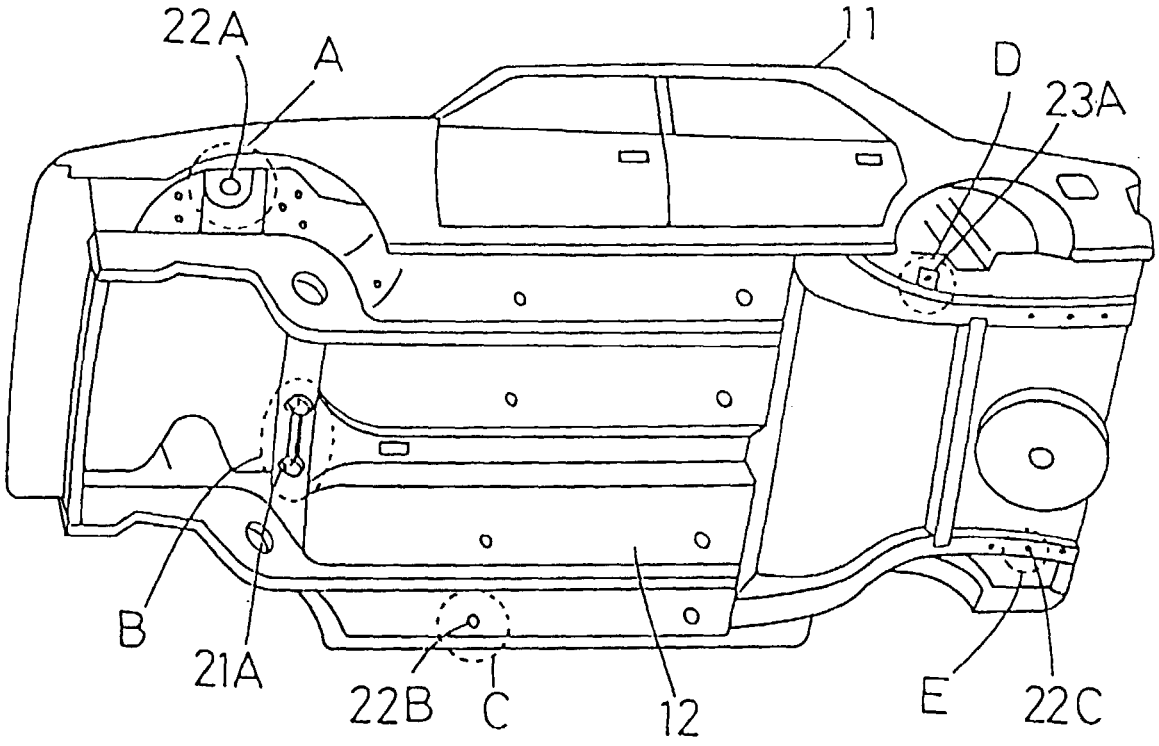


Fig. 22

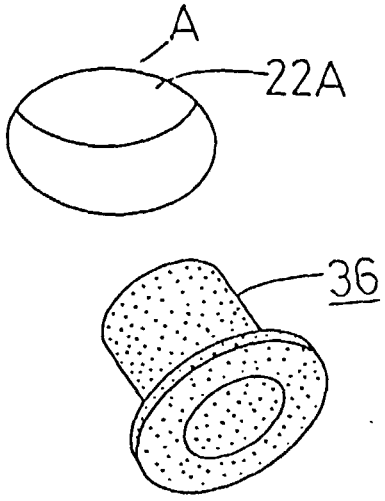


Fig. 23

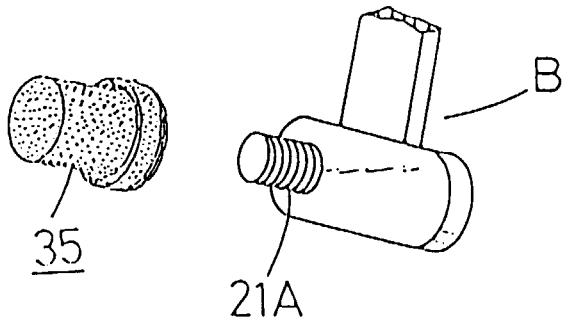


Fig. 24

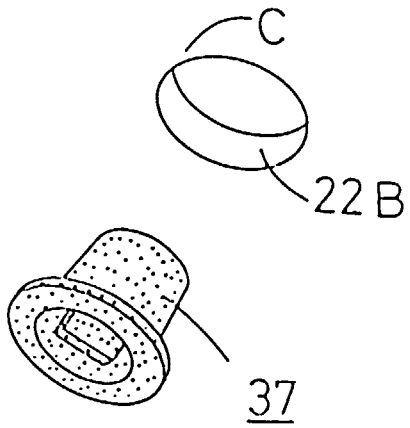


Fig. 25

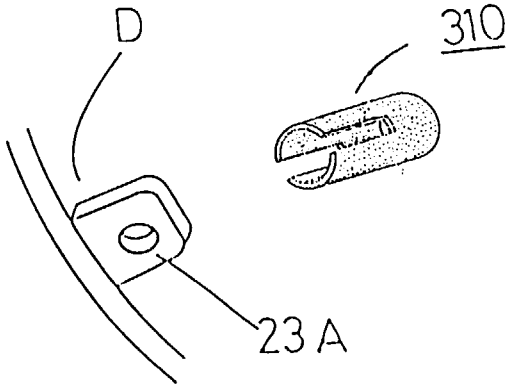


Fig. 26

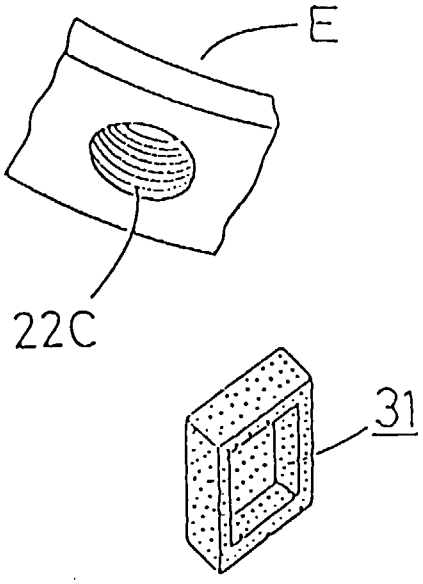


Fig. 27

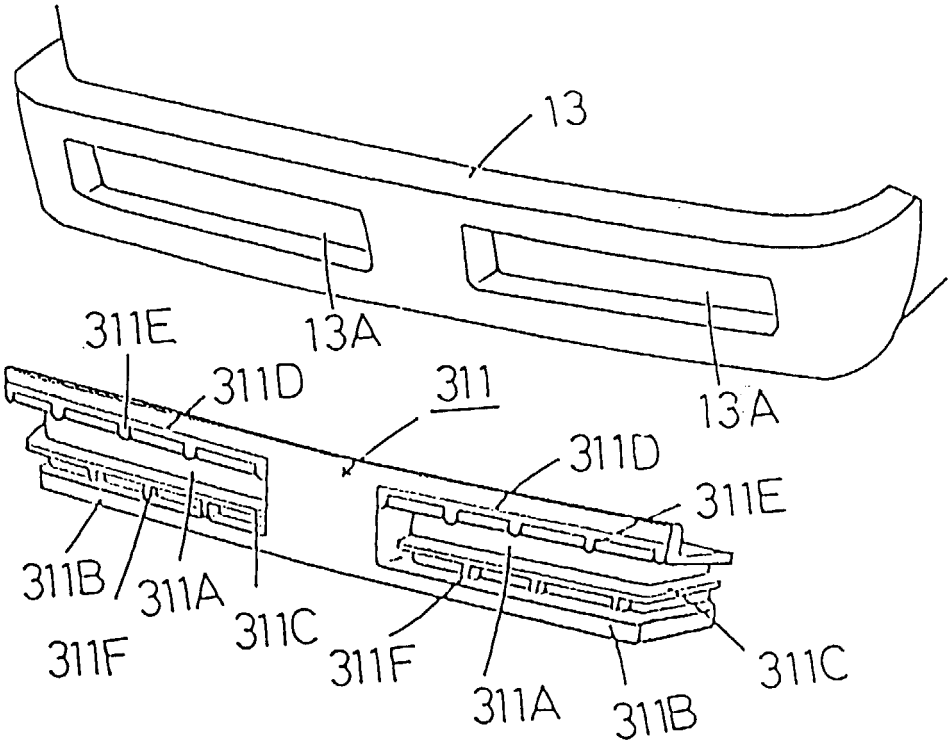

13
311E
13A
311D
311
13A
311D
311E
311B
311A
311C
311F
311F
311A
311B
311C

Fig. 28

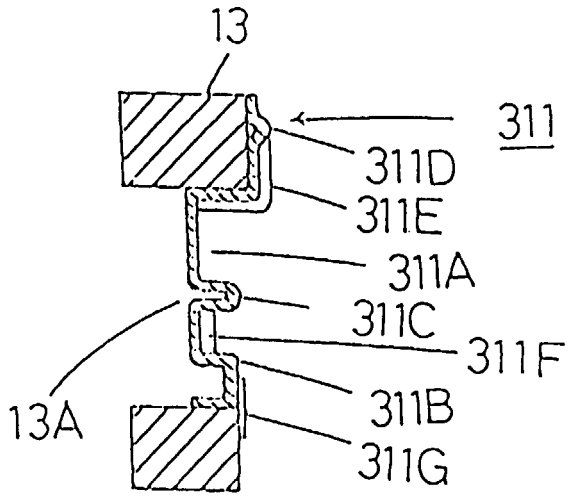
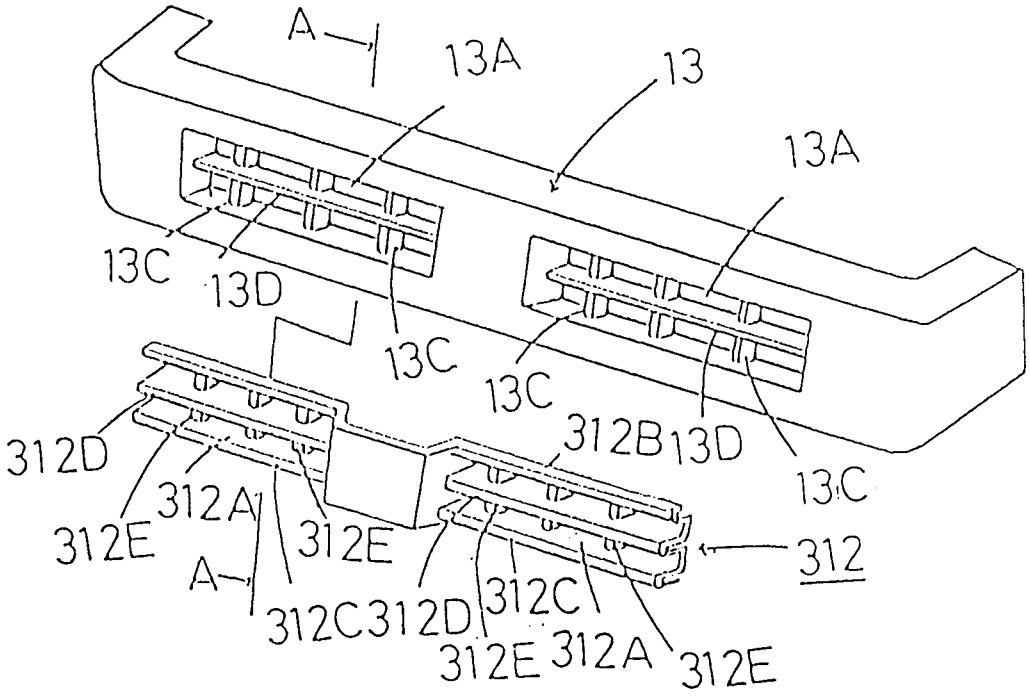

13
311
311D
311E
311A
311C
311F
13A
311B
311G

Fig. 29


A
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13A
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13D
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13C
312B
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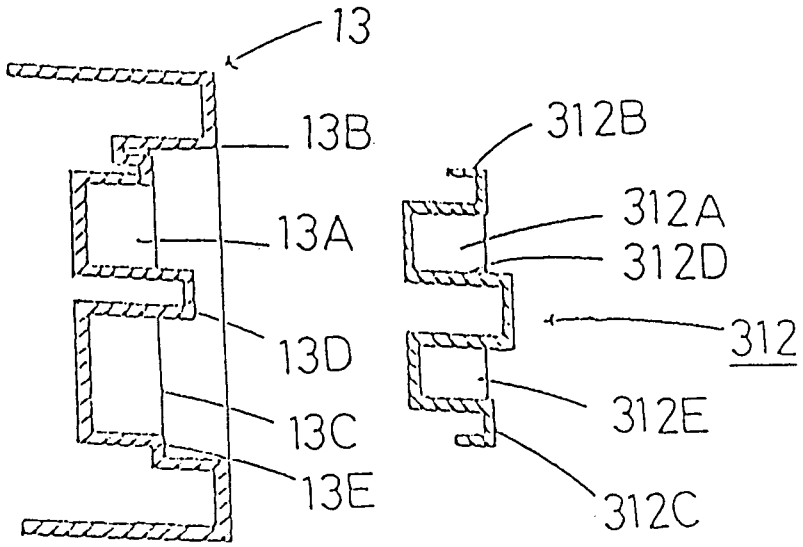
A
312C
312D
312C
312E
312A
312E

Fig. 30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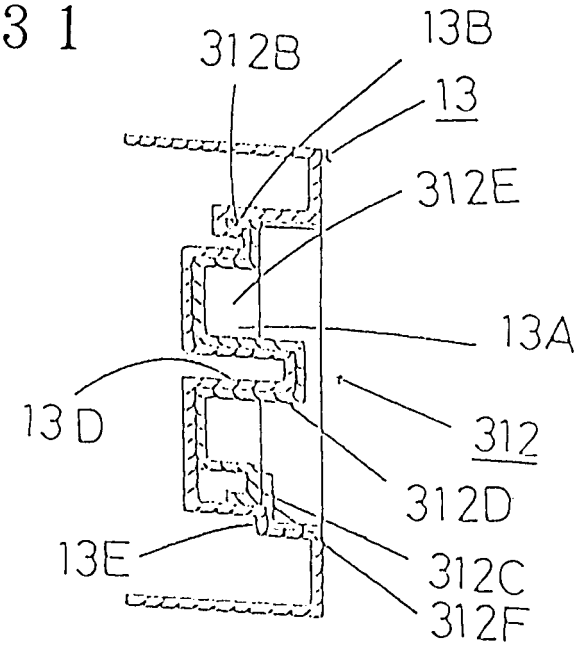
312D
312
312E
312C

Fig. 31


312B
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312E
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13D
312
312D
13E
312C
312F

Fig. 32

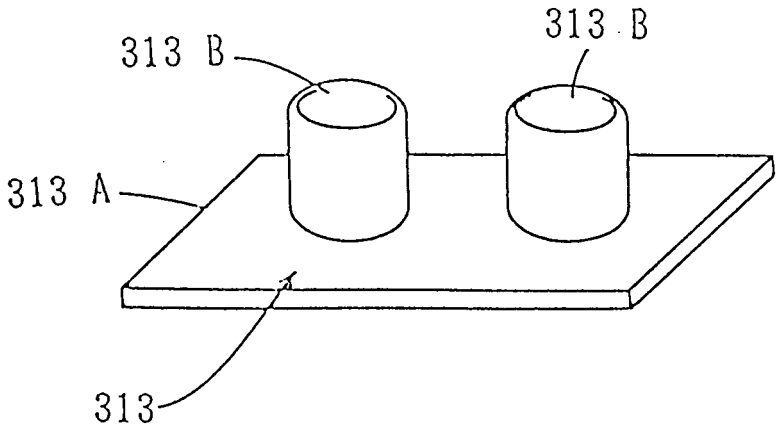

313 B
313 B
313 A
313

Fig. 33

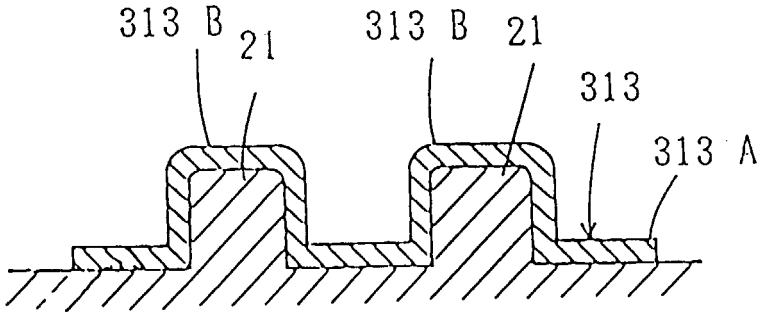

313 B
21
313 B
21
313
313 A

Fig. 34

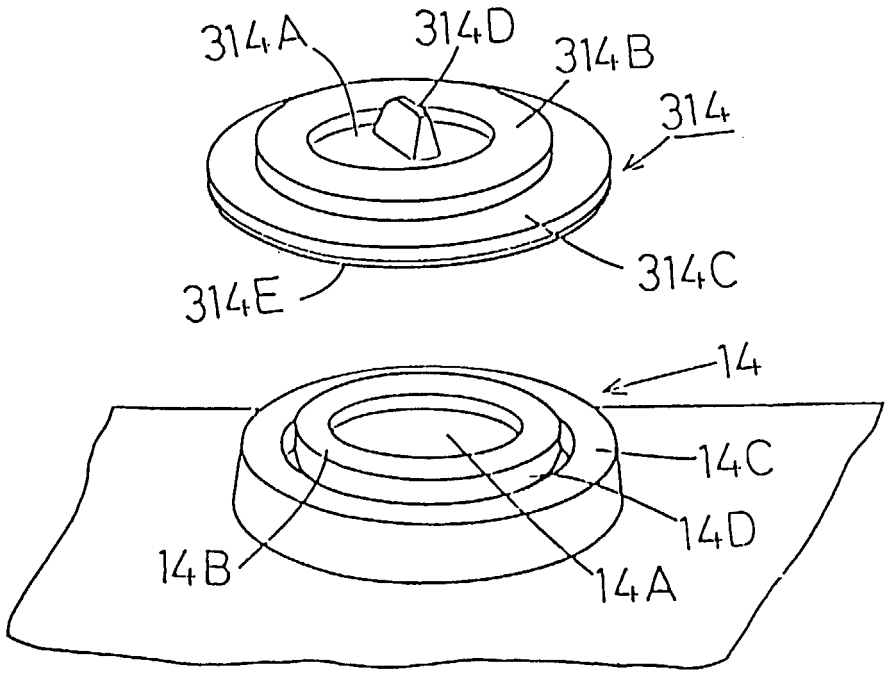
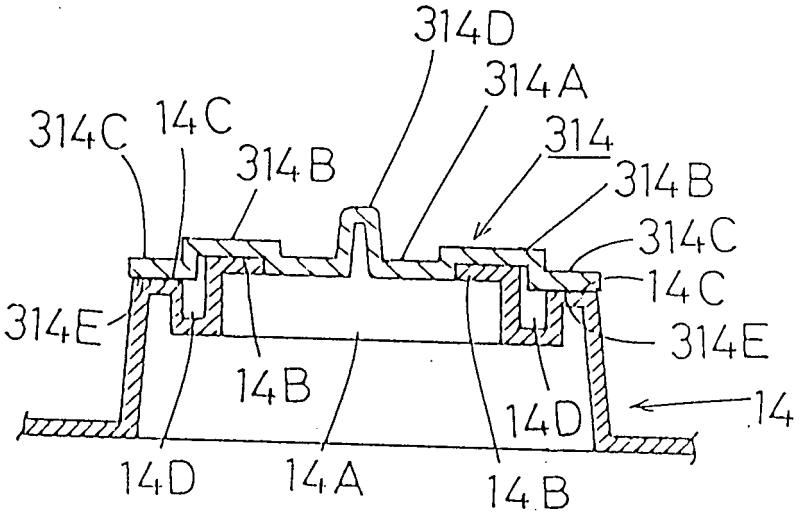

314A
314D
314B
314
314C
314E
14
14C
14D
14B
14A

Fig. 35


314D
314A
314C
14C
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314B
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314C
14C
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14B
14D
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14D
14A
14B

Fig. 36

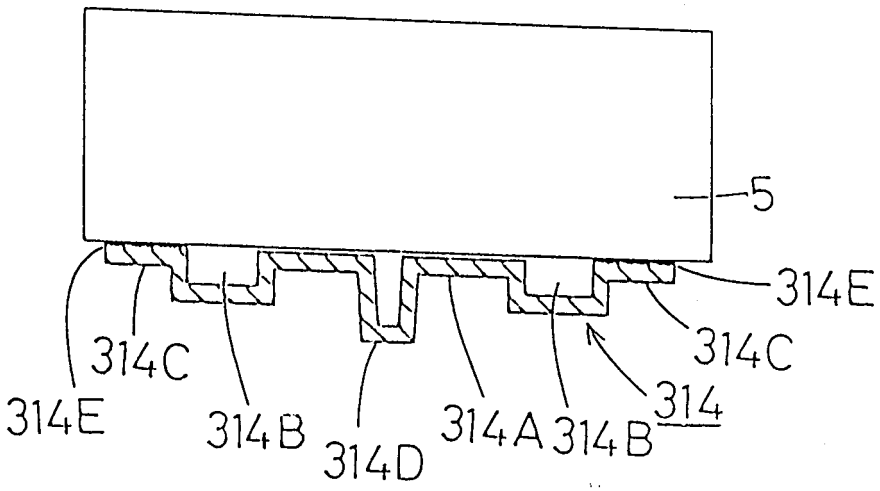

5
314E
314C
314C
314E
314B
314D
314A
314B
314

Fig. 37

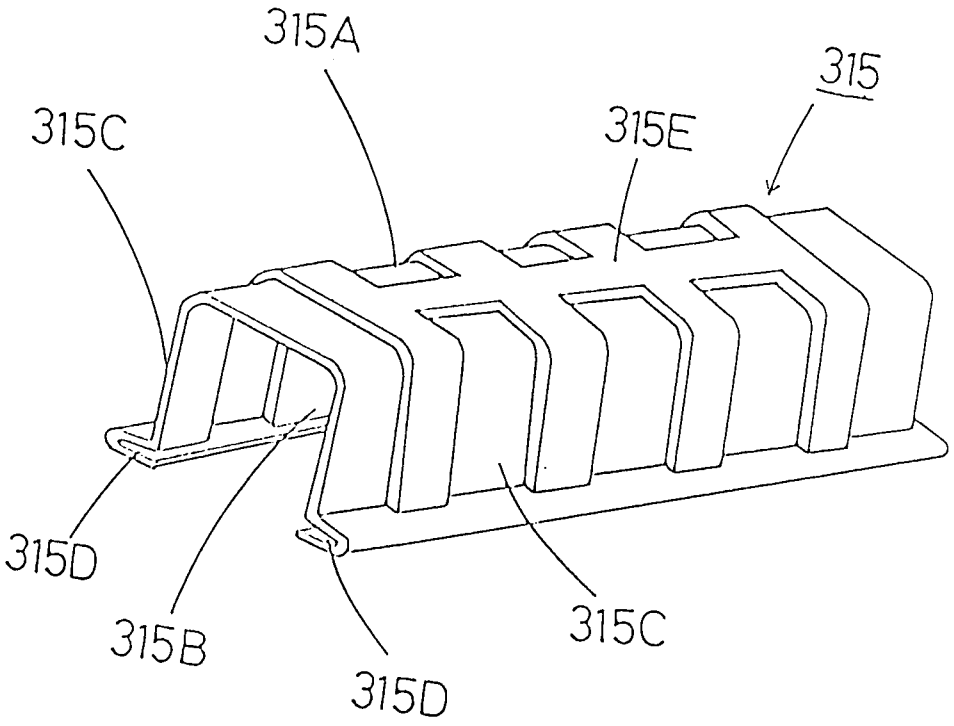

315A
315
315C
315E
315D
315B
315C
315D

Fig. 38

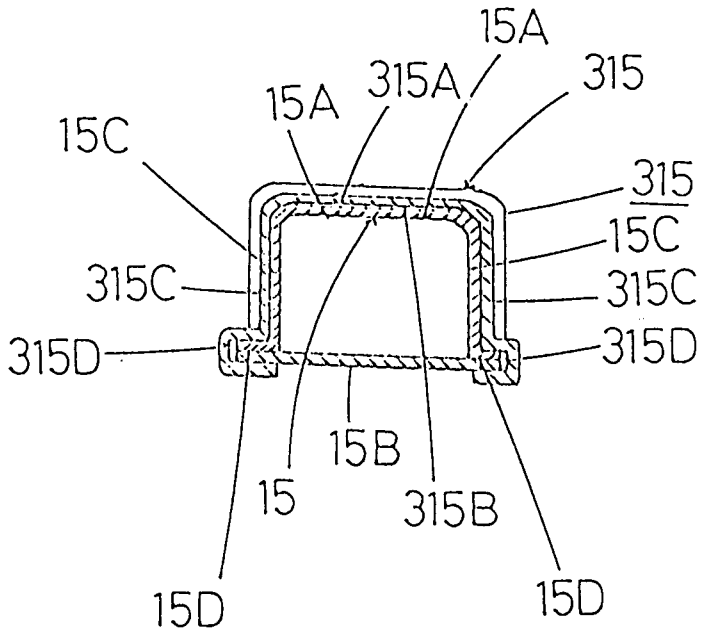

15A
315A
315
15A
15C
315
15C
315C
315C
315D
315D
15B
15
315B
15D
15D

Fig. 39

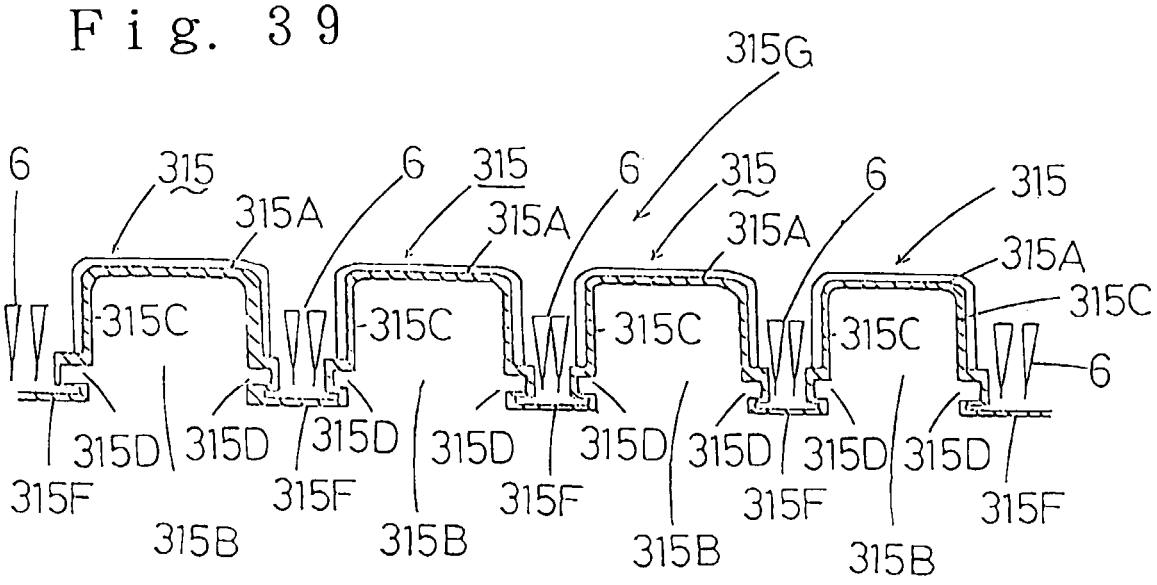

315G
6
315
315A
315C
315D
315F
315B

Fig. 40

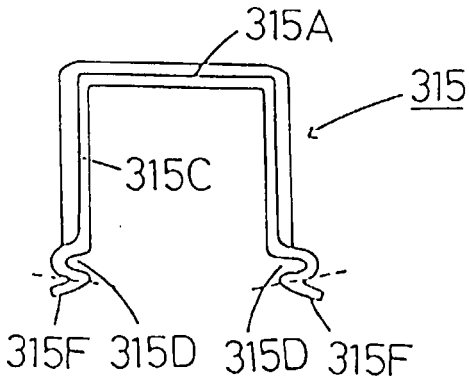

315A
315
315C
315F
315D
315D
315F

Fig. 41

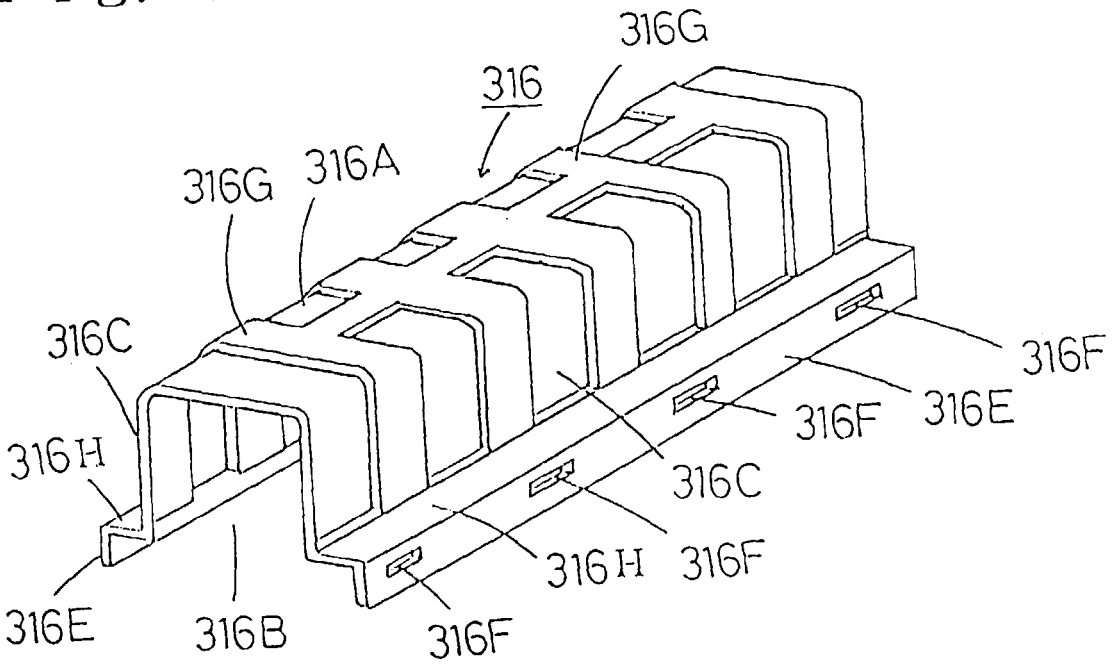

316G
316
316G
316A
316C
316H
316E
316B
316F
316F
316E
316C
316H
316F
316F

Fig. 42

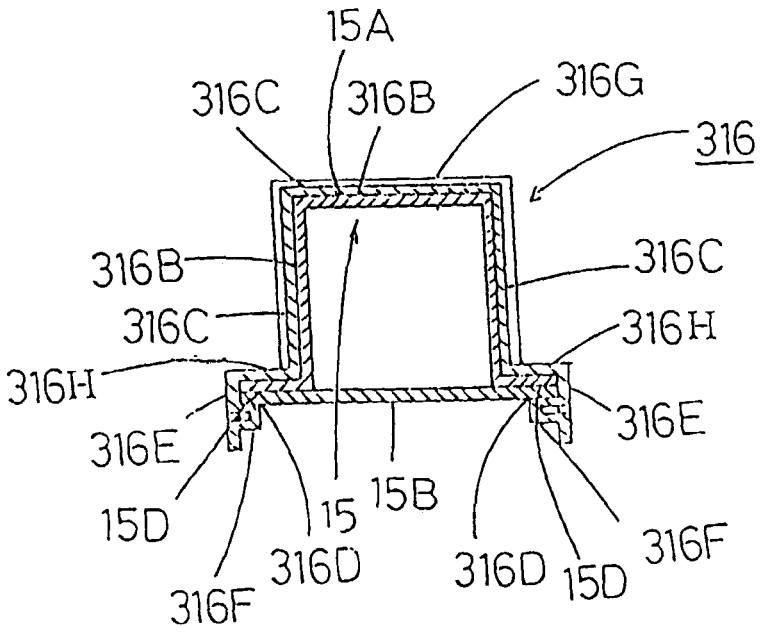

15A
316C
316B
316G
316
316B
316C
316C
316H
316H
316E
316E
15D
15
15B
316D
316D
316F
316F
15D

Fig. 43

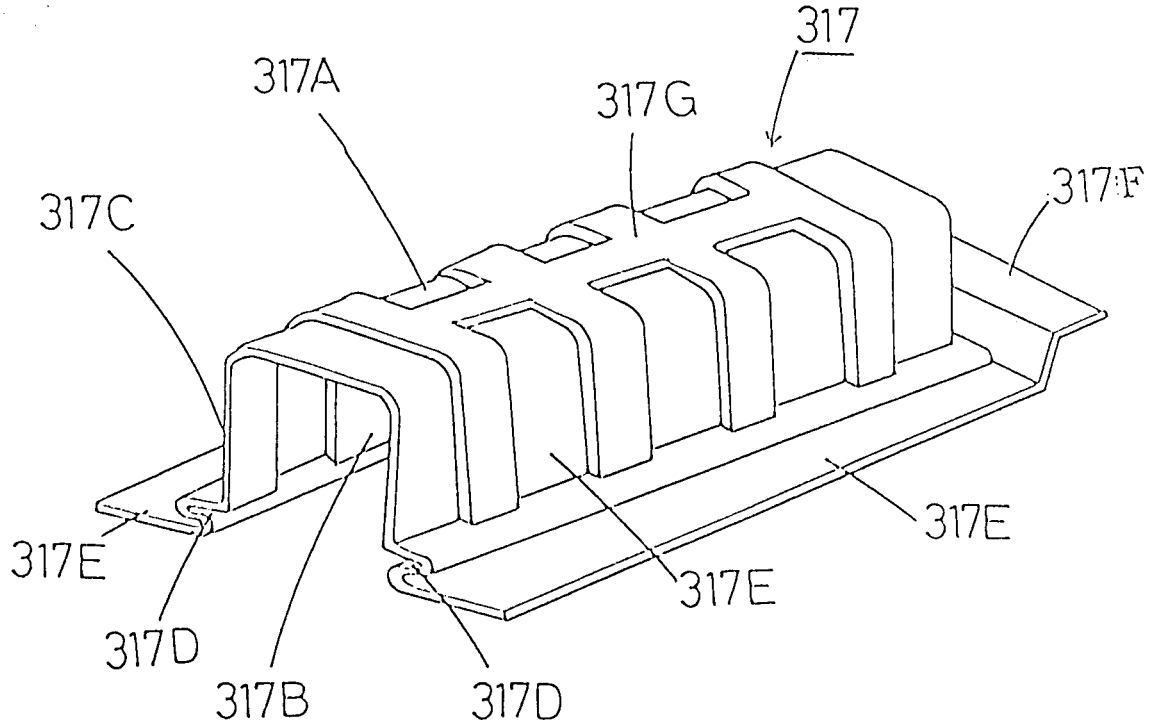

317
317A
317G
317F
317C
317E
317E
317E
317D
317B
317D

Fig. 44

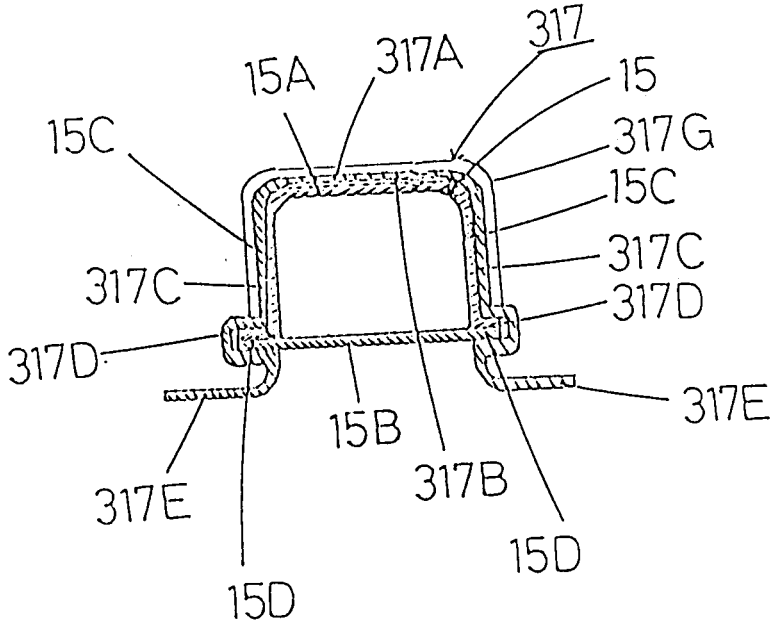

317
15A
317A
15
15C
317G
15C
317C
317C
317D
317D
317E
15B
317E
317B
15D
15D

Fig. 45

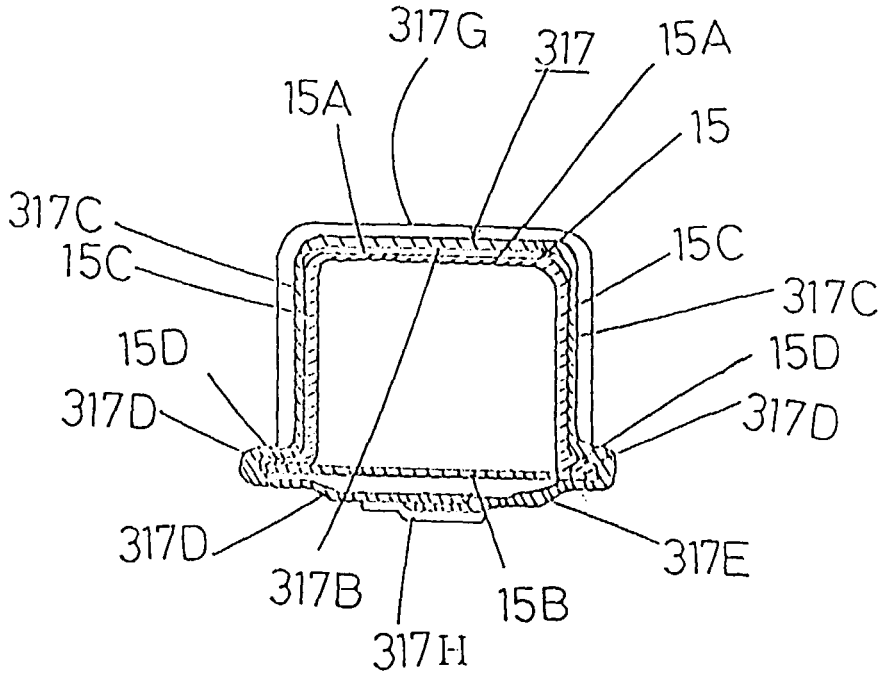
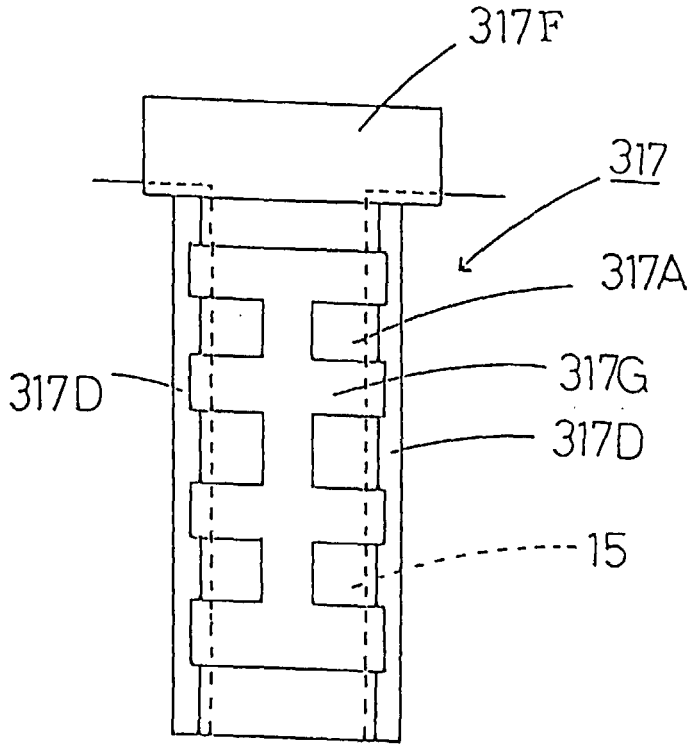

317G
317
15A
15A
15
317C
15C
15C
317C
15D
15D
317D
317D
317D
317E
317B
15B
317H

Fig. 46


317F
317
317A
317G
317D
317D
15