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(54) **NON-SLIP FINISHED GLOVE AND METHOD FOR MANUFACTURING THE SAME**

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(75) Inventor: **Nobuaki Takahashi**, Hyogo (JP)

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(73) Assignee: **SHOWA GLOVE CO, HYOGO (JP)**

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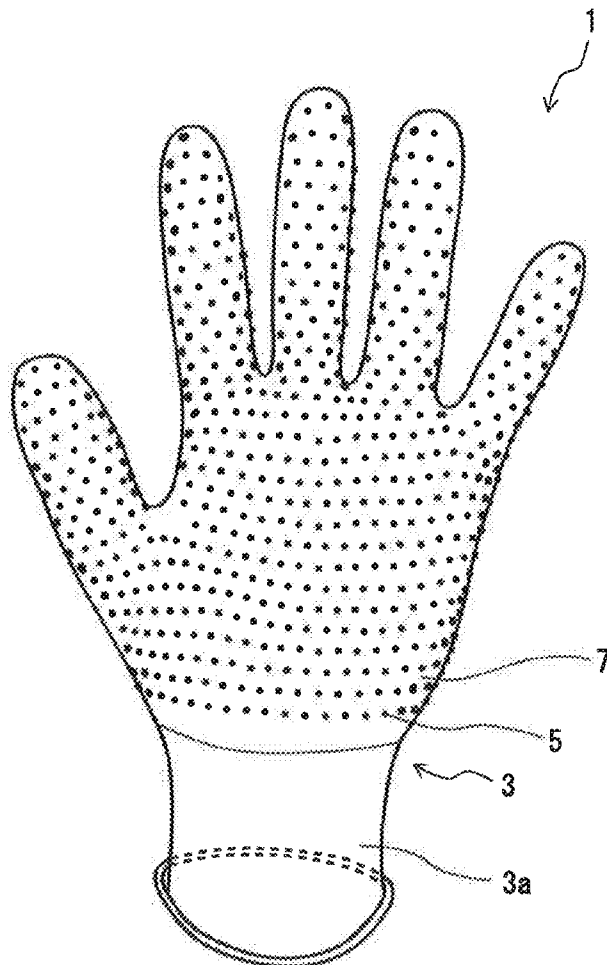
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(57) **ABSTRACT**

A non-slip finished glove includes: a glove main body made of fibers for covering a wearer's hand; a plurality of protrusions made of resin or rubber, the protrusions being fixed at least to a palm region of an outer face of the glove main body; and an air permeable coating layer that is laminated at least on a region other than the protrusions in the palm region of the outer face of the glove main body, in which the protrusions protrude from an outer face of the coating layer. The plurality of protrusions allows grip of an object and, since the coating layer is provided in regions other than the protrusions not to expose fibers of the glove main body, a sufficient gripping force can be exerted to firmly grip the object.

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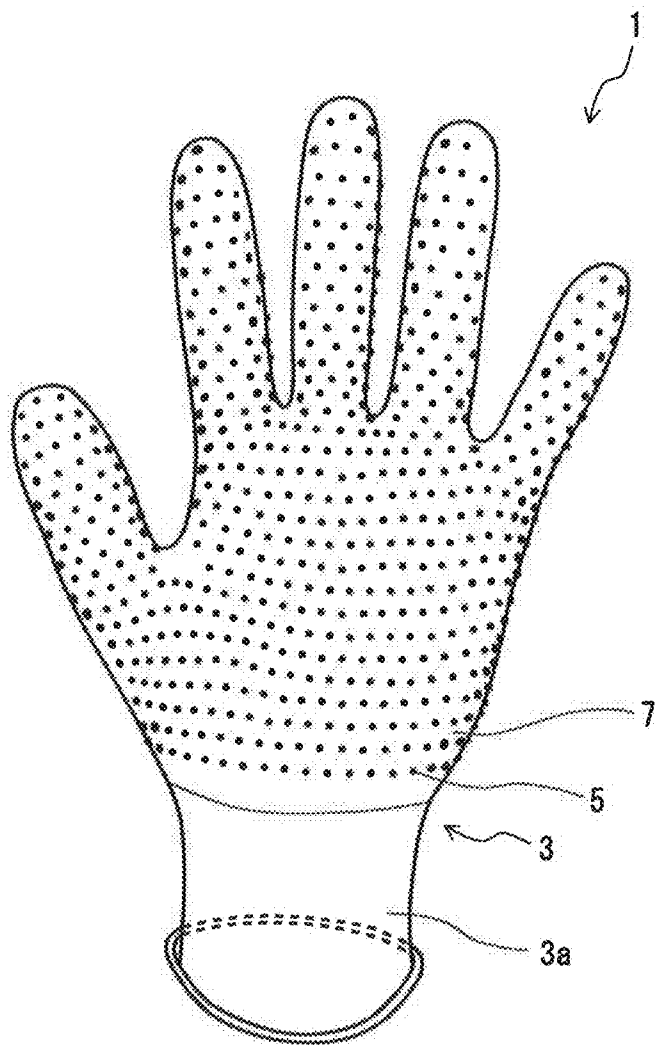


Fig. 1

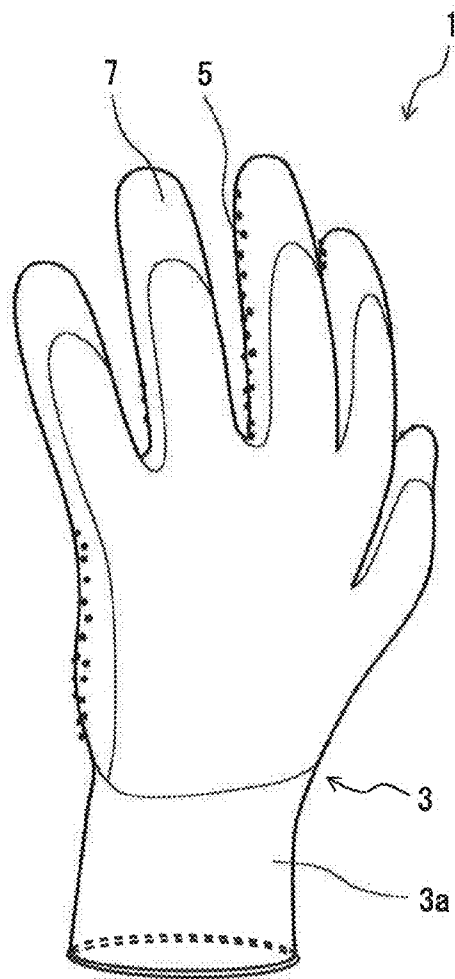


Fig. 2

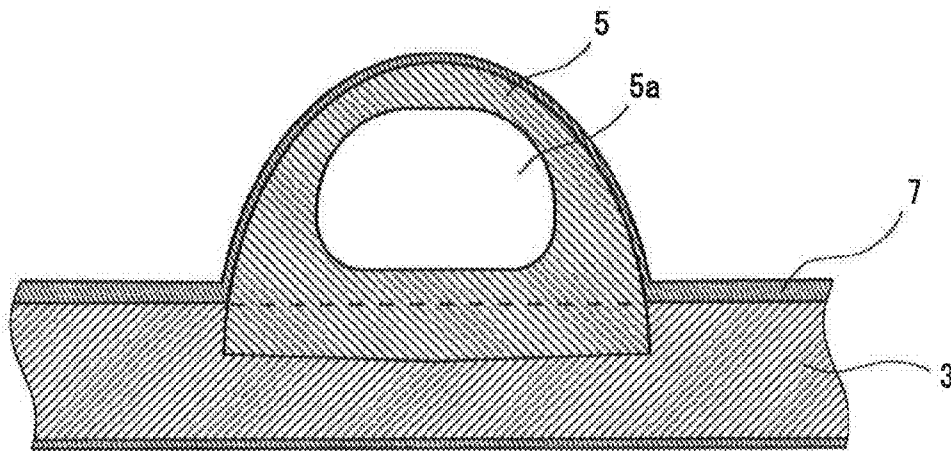


Fig. 3

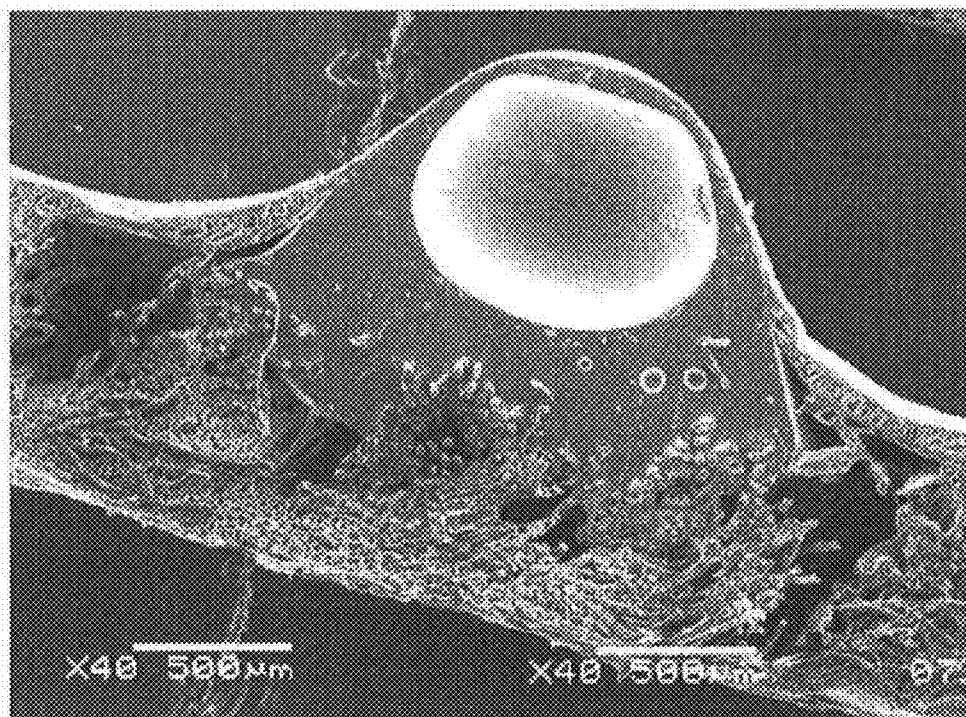


Fig. 4

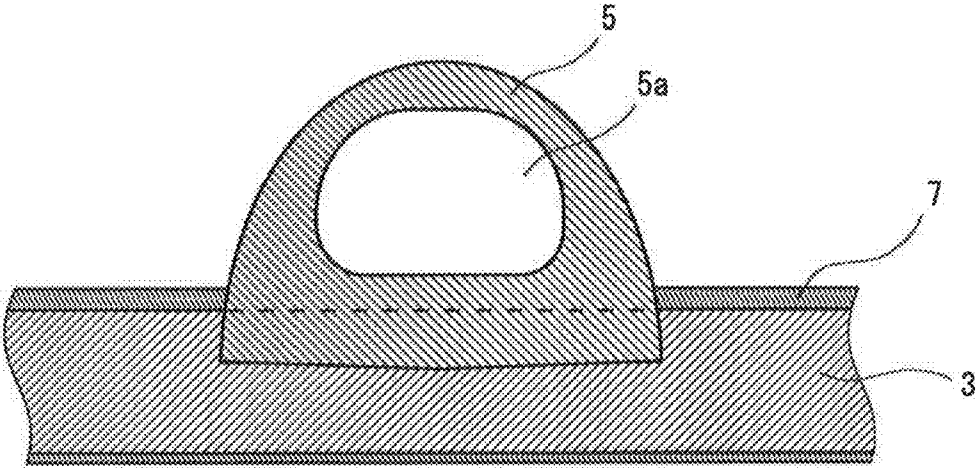


Fig. 5

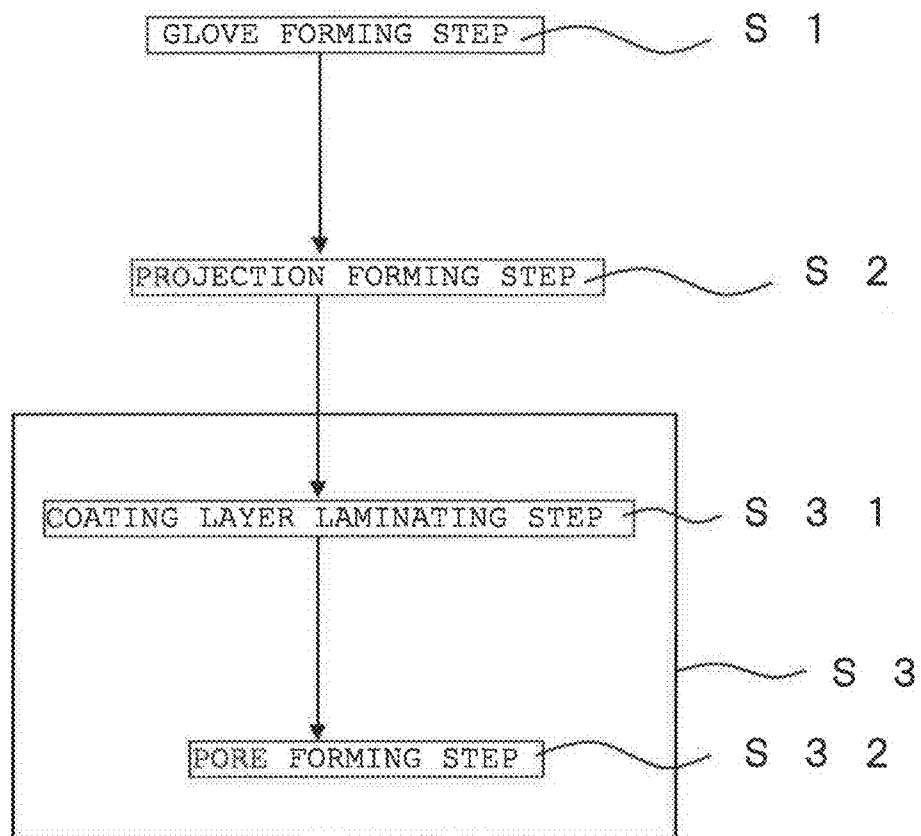
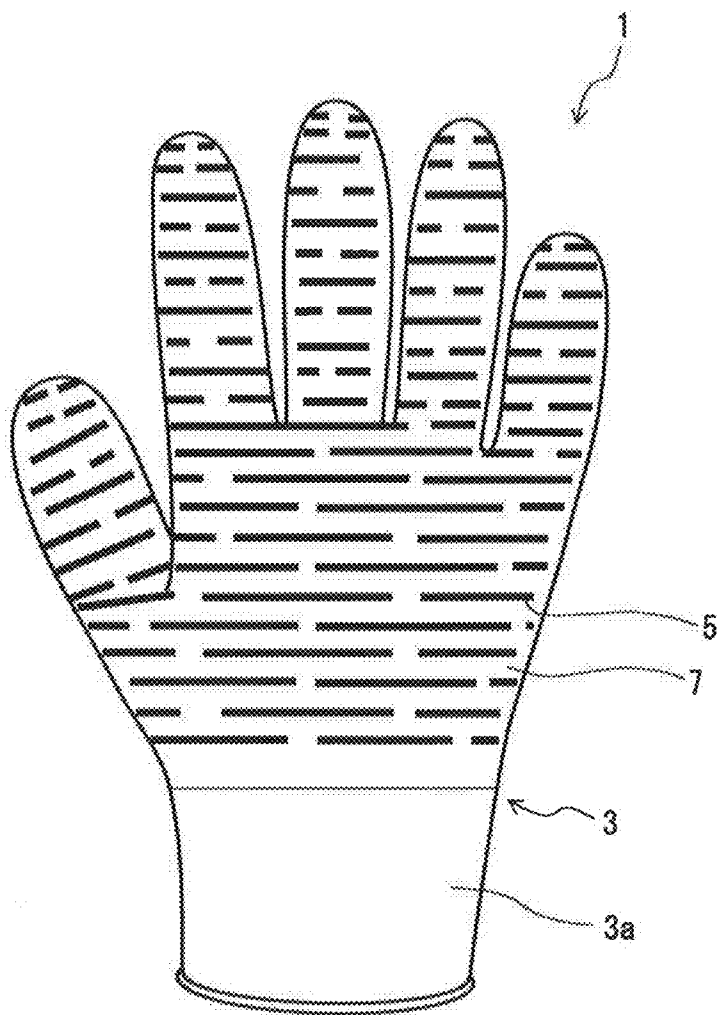


Fig. 6



F i g . 7

	Example 1	Comparative Example 1	Comparative Example 2	Comparative Example 3	Comparative Example 4	Comparative Example 5	Comparative Example 6	Comparative Example 7
Moisture permeability	5020	13372	7935	7544	9782	9595	61	132
Mass abrasion loss (mg)	7.3	2.0	23.4	10.7	3.2	7.2	15.1	8.3
50 times	18.2	4.9	34.2	19.2	9.9	14.3	28.1	18.9
100 times	23.6	6.4	38.4	25.9	22.5	22.0	41.5	25.6
150 times	2.5	1.3	2.6	1.0	1.5	1.5	1.0	1.2
Kinetic coefficient of friction	1.5	1.2	1.9	1.3	1.6	1.3	1.9	1.9
Stainless surface (Glove outer face)	1.6	1.6	1.6	0.2	0.3	0.2	0.3	0.3
Stainless surface (Glove inner face)	A	B	A	B	C	B	A	A
Sensory test 1 (Glove outer face)	A	B	A	B	C	B	A	A
Sensory test 2 (Glove inner face)	A	C	A	B	D	B	A	A
Sensory test 3 (Overall grip properties)	A	A	A	C	D	C	C	C
Cardboard box (paper)	A	A	A	C	D	D	C	C
Stainless product	A	B	A	C	D	C	B	B
Cardboard box (paper)	A	C	A	C	D	D	C	C
Pure bending test	0.39	0.25	0.50	0.82	0.15	0.15	1.06	0.71
28g value (gf·cm/cm)	0.19	0.12	0.18	0.85	0.19	0.20	0.57	0.41
50 times	0/44 projections	~	2/50 projections	~	~	~	~	~
100 times	0/44 projections	~	29/50 projections	~	~	~	~	~

Fig. 8

	Example 1	Example 2	Comparative Example 8	Comparative Example 9
Thickness of fabric of glove main body	0.60	0.61	0.60	0.58
Thickness of masking plate	0.50	0.30	none	0.18
Thickness to coating layer outer face in region without projections	0.85	0.83	0.84	0.83
Thickness to projection outer face	1.05	0.88	none	0.71
Height of protrusion of projections from coating layer	0.20	0.05	none	immersed
Thickness to outer face of coating layer on projections	1.06	0.91	none	0.85
Kinetic coefficient of friction: Cardboard surface	1.5	1.7	1.3	1.0
Kinetic coefficient of friction: Stainless steel surface	2.5	2.9	1.2	1.2
Sensory evaluation: Cardboard surface	A	A	C	C
Sensory evaluation: Stainless steel surface	A	A	C	C

Fig. 9

NON-SLIP FINISHED GLOVE AND METHOD FOR MANUFACTURING THE SAME

FIELD OF INVENTION

[0001] The present invention relates to a non-slip finished glove and a method for manufacturing the same.

DISCUSSION OF THE BACKGROUND

[0002] A non-slip finished glove is used, such that workers wear it at factories; that workers wear at transportation works; and that drivers wear during driving.

[0003] For example, (1) a fiber glove with a plurality of protrusions made of rubber and the like fixed in a form of dispersed dots on an outer face of a palm region of a glove main body covering a wearer's hand has been known as such a non-slip finished glove.

[0004] In addition, (2) a fiber glove with a coating layer of rubber or resin provided on a palm region of a glove main body has also been known wherein the coating layer is air permeable.

[0005] Furthermore, (3) a knitted glove with protrusions in a form of dispersed dots fixed onto a palm region of an outer face thereof, the palm region being applied with a coating layer, has been known (refer to Japanese Unexamined Patent Application Publication No. 2000-328328 and Japanese Registered Utility Model No. 3004374). Japanese Unexamined Patent Application Publication No. S60-236737 also discloses, fixing hard resin protrusions on a surface of a glove in a sprinkling manner, and then forming a flexible resin film laminated on the surface of the glove.

[0006] Moreover, (4) providing a coating layer on a glove main body and forming protrusions on an outer face of the coating layer is also well-known (refer to Japanese Registered Utility Model No. 3164008).

[0007] However, with regard to the non-slip finished glove (1) with the protrusions simply fixed to the palm region, when a wearer grips an object with the glove on, while the protrusions can exert a sufficient friction force, regions between the protrusions where fibers of the glove main body are exposed cannot exert a sufficient friction force, and therefore the glove has a problem that it is difficult to grip the object.

[0008] In addition, with regard to the non-slip finished glove (2) with the coating layer in the palm region, although a friction force thereof is greater than that of a fiber glove with no non-slip finish, the friction force is not sufficient upon grip of an object such as a cardboard box, and therefore the glove has a problem that it is difficult to grip the object.

[0009] Furthermore, with regard to the non-slip finished glove (3) disclosed in Japanese Unexamined Patent Application Publication No. 2000-328328, Japanese Registered Utility Model No. 3004374 and Unexamined Patent Application Publication No. S60-236737 the protrusions provided are buried in the coating layer. In other words, in non-slip finished glove disclosed in Japanese Unexamined Patent Application Publication No. S60-236737, for example, the hard resin protrusions and the flexible resin film are both composed of vinyl chloride-based resins and the hard resin protrusions do not protrude from, and are buried in, the flexible resin film. As a result, the non-slip finished glove cannot exert a sufficient friction force due to the protrusions (protrusions) buried in the resin. This hinders commercialization of such a glove. Meanwhile, the non-slip finished glove disclosed in Japanese Unexamined Patent Application Publication No. 2000-

328328 and Japanese Registered Utility Model No. 3004374 has another problem of sweaty hands after long-time wearing thereof due to the coating layer which is air impermeable. In the non-slip finished glove disclosed in Japanese Unexamined Patent Application Publication No. S60-236737, the flexible film is foamed to provide air permeability; however, the foamed portion may be torn and drop off during use. In addition, there is a problem of requirement of an additional step for foaming.

[0010] Moreover, in the non-slip finished glove (4) disclosed in Japanese Registered Utility Model No. 3164008, since the protrusions are provided on an outer face of the coating layer, the protrusions may easily drop off during use. Due to drop off of the protrusions after long-term use, a gripping force of the glove may be reduced.

PRIOR ART DOCUMENTS

Patent Documents Literature

- [0011] Patent Document 1: Japanese Unexamined Patent Application Publication No. 2000-328328
- [0012] Patent Document 2: Japanese Registered Utility Model No. 3004374
- [0013] Patent Document 3: Japanese Unexamined Patent Application Publication No. S60-236737
- [0014] Patent Document 4: Japanese Registered Utility Model No. 3164008

SUMMARY OF THE INVENTION

Problems to be Solved by the Invention

[0015] The present invention has been made in view of the abovementioned inconveniences and is aimed at providing a non-slip finished glove that can prevent sweaty hands even after long-time wearing and can exert a sufficient friction force to firmly grip an object, in which the protrusions are fixed to a glove main body and do not easily drop thereby preventing a gripping force from being easily reduced even after long-term use, and a method for manufacturing thereof.

Means for Solving the Problems

[0016] The invention made in order to solve the abovementioned problems is a non-slip finished glove includes: a glove main body made of fibers for covering a wearer's hand;

[0017] a plurality of protrusions made of resin or rubber, the protrusions being fixed at least to a palm region of an outer face of the glove main body; and an air permeable coating layer that is laminated at least on a region other than the protrusions in the palm region of the outer face of the glove main body, wherein the protrusions protrude from an outer face of the coating layer.

[0018] In the non-slip finished glove, the protrusions protrude from the outer face of the coating layer and portions of a plurality of protrusions can therefore grip an object. And the coating layer is provided in regions other than the protrusions, such as areas between the protrusions, so that the fibers of the glove main body are not exposed, and the glove can therefore exert a sufficient gripping force to firmly grip the object. In addition, since the coating layer is air permeable, sweaty hands can be prevented even after long-time wearing, the glove can be worn comfortably.

[0019] It should be noted that, in the non-slip finished glove, “the protrusions project from an outer face of the coating layer” includes: a state in which the protrusions stick out through the outer face of the coating layer to be exposed; and a state in which the coating layer forming material covers the outer faces of the protrusions while the protrusions protrude from an average interface of the outer face of the coating layer. In addition, the “palm region” indicates a region on a face directed inward upon grip of an object, next to a wrist and extending fingertips (including fingers).

[0020] In the non-slip finished glove, it is preferable that a base part of the protrusion impregnate at least in a superficial layer of the glove main body. This firmly fixes the protrusions onto the glove main body and can appropriately prevent the protrusions from dropping from the glove main body during use.

[0021] In the non-slip finished glove, it is preferable that a configuration is employed in which the glove main body is impregnated with a material composing the coating layer, and the coating layer appears on an inner face of the glove main body. This provides a sufficient friction force between the inner face of the non-slip finished glove and the wearer’s palm and can appropriately prevent the non-slip finished glove from sliding on a hand during grip of an object. In other words, in a case in which the coating layer is not formed on the inner face of the glove main body and the fibers are exposed on the inner face of the glove main body, the fibers on the inner face of the glove main body are in contact with the wearer’s palm, exerting only an insufficient friction force therebetween, and, during grip of an object, sliding of the glove main body on the hand, in a direction of slipping off from the hand, is likely. On the other hand, in a configuration in which the coating layer appears on the inner face of the glove main body, the wearer’s palm is brought into contact with the coating layer, exerting a sufficient friction force therebetween. This can appropriately prevent the non-slip finished glove from sliding on a hand during grip of an object, so as to allow a firm grip of the object.

[0022] In the non-slip finished glove, it is preferable that a configuration is employed in which the material composing the coating layer is non-penetrable with respect to the protrusions. This can, in manufacture of the non-slip finished glove, for example upon applying a material composing the coating layer to a range in the palm region including the protrusions fixed in advance to the glove main body, prevent the coating layer from being formed on an outer face of the protrusions. In other words, for example in a case of forming the protrusions and the coating layer with the same material, or materials that are easily adhered to each other (materials penetrable to each other), manufacture by the above described methods may lead to the coating layer being thickly formed on the outer face of the protrusions. On the other hand, if the material composing the coating layer is non-penetrable with respect to the protrusions, no coating layer or only a relatively thin coating layer is formed on the outer face of the protrusions, and therefore it is possible to firmly grip an object by the plurality of protrusions.

[0023] It should be noted that the above described “non-penetrable” material is required not to penetrate to the protrusions within a time period required for the above described manufacture. A material that penetrates to the protrusions after a period longer than the time period required for the manufacture is also within a technical scope of being “non-penetrable”.

[0024] As the abovementioned configuration, a configuration in which the material composing the protrusions contains a vinyl chloride resin or a vinyl chloride-vinyl acetate copolymer resin as a main component and the material composing the coating layer contains polyurethane as a main component can be employed. In this configuration, the material composing the coating layer is non-penetrable with respect to the protrusions. Although the material composing the protrusions can also contain a plasticizer, a stabilizer and the like, in such a case, the above described “main component” indicates a material that is greatest in amount among resin materials except for these additives. In a similar way, the “main component” in the material composing the coating layer indicates a material that is greatest in amount among rubber materials.

[0025] In non-slip finished glove, it is preferable that a configuration is employed in which the protrusions are formed in hollow shapes. This makes the protrusions easily deform upon grip of an object. Such deformation increases a contact area between the protrusions and the object, so as to provide a greater friction force.

[0026] The present invention is also characterized by the following aspects.

[0027] A method for manufacturing a non-slip finished glove comprises:

[0028] a protrusion forming step to apply a protrusion forming material that contains a resin or rubber as a main component to a plurality of sites at least in a palm region of an outer face of a glove main body made of fibers for covering a wearer’s hand; and a coating layer forming step to form a coating layer at least in a region other than the protrusions in the palm region of the outer face of the glove main body, in such a way that an outer face of the coating layer is positioned lower than the protrusions, in which the coating layer forming step includes:

[0029] a coating layer material laminating step to laminate onto the glove main body, a coating layer forming material that contains a resin or rubber as a main component and a solvent; and a pore forming step to extract the solvent in the coating layer forming material laminated.

[0030] The non-slip finished glove manufactured by the manufacturing method can prevent sweaty hands even after long-time wearing due to the coating layer that is air permeable, and can exert a sufficient gripping force to firmly grip an object by the protrusions and the coating layer as described above.

Effects of the Invention

[0031] As discussed above, the non-slip finished glove can prevent sweaty hands even after long-time wearing and can exert a sufficient gripping force to firmly grip an object. In addition, since the protrusions are fixed to a glove main body and do not easily drop, reduction in the gripping force after long-term use can be alleviated.

BRIEF DESCRIPTION OF THE DRAWING

[0032] FIG. 1 is an explanatory diagram illustrating a worn state of a non-slip finished glove viewed from a front face side (palm side) according to an embodiment of the present invention;

[0033] FIG. 2 is an explanatory diagram illustrating the worn state of the non-slip finished glove of FIG. 1 viewed from a back face side (back-of-hand side);

[0034] FIG. 3 is an explanatory diagram schematically illustrating an enlarged cross-section of a main part (protrusions) of the non-slip finished glove of FIG. 1;

[0035] FIG. 4 is an electron micrograph corresponding to FIG. 3;

[0036] FIG. 5 is an explanatory diagram schematically illustrating a modification of FIG. 3;

[0037] FIG. 6 is a flow chart showing a method for manufacturing the non-slip finished glove of FIG. 1;

[0038] FIG. 7 is a schematic front view illustrating the non-slip finished glove according to another embodiment of the present invention;

[0039] FIG. 8 is a table showing results of tests of moisture permeability and the like in Example 1; and

[0040] FIG. 9 is a table showing results of tests of kinetic coefficients of friction and the like in Examples 1 and 2.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0041] Preferred embodiments of the present invention are described in detail hereinafter, with reference to the drawings as necessary.

[0042] A non-slip finished glove 1 of FIG. 1 includes: a glove main body 3 made of fibers for covering a wearer's hand; a plurality of protrusions 5 that is fixed in a form of dispersed dots to a palm region of an outer face of the glove main body 3; and a coating layer 7 that is laminated on the palm region of the outer face of the glove main body 3.

[0043] The glove main body 3 is formed in a glove shape by knitting fibers composed of woolly nylon and the like and is air permeable. A fabric of the glove main body 3 can be appropriately 0.6 mm in thickness, and preferably at least 0.2 mm and no greater than 1.0 mm, and more preferably at least 0.4 mm and no greater than 0.8 mm, in a center part of palm.

[0044] The thickness smaller than the abovementioned lower limit reduces strength of the glove main body 3, and the thickness greater than the abovementioned upper limit reduces workability during use. The thickness can be, for example, an average of results of measurements in five sites by using a dial thickness gauge DS-1211 (trade name) (manufactured by Niigata Seiki Co., Ltd.).

[0045] The fiber composing the glove main body 3 is not limited to woolly nylon and various fibers can be employed. For example, the glove main body 3 can also be made of organic fibers such as: polyester; cotton; rayon; acrylic; aramid; high strength polyethylene; polyurethane; and the like, as well as stainless fiber and glass fiber. For a use in which a dust generation is undesirable, the fiber composing the glove main body 3 is preferably a long fiber of nylon and polyester. For a use that requires resistance to cutting, the fiber composing the glove main body 3 is preferably: para-aramid (paraphenylene terephthalamide, for example Kevlar (trade name) (manufactured by DuPont)); high strength polyethylene (for example Dyneema (trade name) (manufactured by Toyobo Co., Ltd.)); a composite fiber including metallic thin wire or glass fiber; and the like. As the fiber composing the glove main body 3, the above listed fibers can be used singly or in combination. In addition, as a method for forming a glove shape, for instance, a seamless knitting method that knits a glove without a seam can be employed, and alternatively, for instance, a method of sewing a fabric composing a back-of-hand part and a fabric composing a palm part to obtain a glove shape can be employed.

[0046] A cuff portion 3a of the glove main body 3 is stretchable in a peripheral direction and thus configured to be extendable and shrinkable in a radial direction. A portion on a fingertip side of the cuff portion 3a of the glove main body 3 is also stretchable in the peripheral direction and thus configured to be extendable and shrinkable in the radial direction. Here, the cuff portion 3a preferably has greater stretchability than that of other portions (portions next to the cuff portion 3a on the fingertip side) and is configured to be smaller in diameter in a shrunk state than an expected wearer's wrist, thereby providing superior close-fitting properties during wearing.

[0047] The plurality of protrusions 5 is formed on an entire area of the palm region of the glove main body 3. In the present invention, the protrusions 5 can be formed only in a limited area of the palm region, for example only in a finger area of the palm region or in an area (flat part) other than the finger area of the palm region. In addition, the plurality of protrusions 5 which are provided in a form of dispersed dots is provided in a manner substantially evenly spread in a formation region of the protrusions 5 (entire area of the palm region).

[0048] In addition, each of the protrusions 5 is configured in a substantially circular granular shape in a front view (the palm region is viewed from a vertical direction). In the present embodiment, the protrusion 5 is configured to be approximately 2 mm in diameter. The diameter of the substantially circular protrusion 5 is preferably at least 1.0 mm and no greater than 8.0 mm, and more preferably at least 1.5 mm and no greater than 5.0 mm. The diameter smaller than the above specified lower limit makes the gripping force of the protrusion 5 insufficient and the diameter greater than the above specified upper limit reduces the air permeability in the vicinity of the protrusion 5 and makes the wearer's hand sweaty. In addition, a proportion of a total area of the plurality of protrusions 5 to an area of the formation region of the protrusions 5 (entire area of the palm region) is preferably at least 1% and no greater than 80%, and more preferably at least 5% and no greater than 50%. The proportion smaller than the above specified lower limit makes the gripping force of the protrusions 5 insufficient and the proportion greater than the above specified upper limit reduces the air permeability of the palm region and makes the wearer's hand sweaty.

[0049] Furthermore, each of the protrusions 5 is configured in a substantially semielliptical shape having a cross-section (a face obtained by vertically cutting the palm region) narrowing from the base part to a tip end (outer face side). The base part of the protrusion 5 is impregnated in a superficial layer of the glove main body 3. This allows firm fixation of the protrusions 5 to the glove main body 3 and can appropriately prevent the protrusions 5 from separating from the glove main body 3. It should be noted that, although FIG. 3 only illustrates the protrusion 5 and not the glove main body 3 in the base part of the protrusion 5, the protrusion 5 and the fibers of the glove main body 3 are both present in the base part. In other words, the base part of the protrusion 5 impregnates into gaps between the fibers of the glove main body 3. In addition, the base part of the protrusions 5 is preferably impregnated in the superficial layer of the glove main body 3 by at least 50 μm , and more preferably by 100 μm . A degree of the impregnation smaller than the above specified lower limit cannot make the fixation of the protrusions 5 to the glove main body 3 firm. An upper limit of the degree of the impregnation is the thickness of the glove main body 3. There may be a case in which some of the plurality of protrusions 5 has the base parts

not impregnated in the superficial layer of the glove main body 3. However, it is preferable that at least a half of the protrusions 5 provided in areas corresponding to phalanges (areas corresponding to fingers and an area in the flat part corresponding to bases of fingers), among the plurality of protrusions 5, are impregnated in the superficial layer of the glove main body 3 as described above.

[0050] Moreover, the protrusion 5 is formed in a hollow shape. More specifically, the protrusion 5 preferably has a hollow part 5a formed thereinside. It should be noted that such a hollow part 5a may be provided in each of the plurality of protrusions 5 or may be provided in only some of the plurality of protrusions 5. However, it is preferable that at least a half of the protrusions 5 provided in areas corresponding to phalanges, among the plurality of protrusions 5, are formed in hollow shapes.

[0051] The protrusions 5 are provided to protrude from the outer face of the coating layer 7. It should be noted that, in the present invention, although the protrusions 5 can be provided to protrude the outer face of the coating layer 7 to thereby become exposed, in the present embodiment, a thin film of the coating layer 7 covers an outer face of the protrusions 5 while the protrusions 5 protrude from an average interface of the outer face of the coating layer 7, as shown in FIG. 3. Here, a height of protrusion of the protrusions 5 with respect to the outer face of the coating layer 7 is preferable at least 0.02 mm and no greater than 0.50 mm, and more preferably at least 0.04 mm and no greater than 0.40 mm. The height smaller than the above specified lower limit makes the gripping force of the protrusions 5 insufficient and the height greater than the above specified upper limit makes the protrusions 5 damageable upon grip of an object. Even a case in which a part of the plurality of protrusions 5 do not protrude from the outer face of the coating layer 7 is within an intended scope of the present invention. However, it is preferable that at least a half of the protrusions 5 provided in the areas corresponding to phalanges, among the plurality of protrusions 5, are provided to protrude from the coating layer 7.

[0052] In addition, the protrusions 5 are made of a resin or rubber and formed to be elastically deformable. Here, the protrusions 5 are formed by attaching a liquid protrusion forming material in a form of dispersed dots to an outer face of the glove main body 3 and then curing the material.

[0053] The resin or rubber as a material for the protrusions 5 can be appropriately selected from conventionally known materials, for example: natural rubber; nitrile butadiene rubber; silicone elastomer; acrylic rubber; acrylic elastomer; polyurethane rubber; polyurethane elastomer; and the like. However, a synthetic resin such as a vinyl chloride resin is preferable. By employing a synthetic resin such as a vinyl chloride resin, which produces less volume change between before and after the curing in a forming process compared to latex rubber and the like, adjustment of size (for example, the height of protrusion) of the protrusion 5 becomes easy and certain, making manufacture of the glove easy and certain.

[0054] The vinyl chloride resin employed as a resin composing the protrusions 5 may be: a soft vinyl chloride resin; a vinyl chloride resin; or a vinyl chloride-vinyl acetate copolymer resin. As such resins, PSM-30 (trade name, manufactured by Kaneka Corporation), PSH-31 (trade name, manufactured by Kaneka Corporation), PCH-843 (trade name, manufactured by Kaneka Corporation) and the like can be exemplified.

[0055] The material for the protrusions 5 can also contain known plasticizer, stabilizer, thickening agent, coloring agent and the like. Here, as the plasticizer: a phthalate ester plasticizer; an adipate ester plasticizer; a citrate ester plasticizer; a benzoate ester plasticizer; a polyester plasticizer; an acrylic copolymer plasticizer; and the like can be exemplified.

[0056] An amount of the plasticizer to be added is preferably at least 90 parts by mass and no greater than 180 parts by mass, more preferably at least 120 parts by mass and no greater than 160 parts by mass, relative to 100 parts by mass of the resin. The amount smaller than the above specified lower limit makes the protrusions 5 rigid and makes the gripping force of the protrusions 5 insufficient; and the amount greater than the above specified upper limit makes the protrusions 5 excessively soft and makes the protrusions 5 damageable upon grip of an object.

[0057] The thickening agent is added for viscosity adjustment. The viscosity (V2 viscosity) of a material composing the protrusions 5 measured by a BH type viscometer is preferably at least 100,000 mPa·s and no greater than 1,500,000 mPa·s, and more preferably at least 200,000 mPa·s and no greater than 1,000,000 mPa·s. The viscosity lower than the above specified lower limit makes fluidity of the material excessively high and may make the protrusions 5 flat. On the other hand, the viscosity higher than the above specified upper limit may cause air bubbles to form in the material and unintentionally form concavities and the like on the outer face of the protrusions 5. In addition, in a case of using a masking plate with punched holes at positions corresponding to the protrusions 5 in order to arrange the material for the protrusions 5 in a form of dispersed dots onto the glove main body 3, the viscosity higher than the above specified upper limit makes the material for the protrusions 5 difficult to flow into the punched holes on the masking plate and may make it difficult to form the protrusions 5 as desired.

[0058] The coating layer 7 is laminated at least on a region other than the protrusions 5 in the palm region of the outer face of the glove main body 3. In the present embodiment, the coating layer 7 is formed in such a way that a liquid coating layer forming material composing the coating layer 7 is laminated onto an entire area of the palm region including the protrusions 5 and then the material is cured. In the illustrated examples, the coating layer 7 is provided in a so-called non coated back manner, in which the coating layer 7 is formed not only in the palm region of the glove main body 3 but also in the periphery of a back-of-hand region (a region next to a wrist and extending to fingertips on a face directed outward upon grip of an object) which is on an opposite side of the palm region as shown in FIG. 2, but not in a central part of the back-of-hand region. It should be noted that, although it is preferable that the coating layer 7 is not formed in the cuff portion 3a, the coating layer 7 being formed in the cuff portion 3a for the sake of manufacturing process is also within the intended scope of the present invention. Alternatively, the coating layer may be provided in an area from fingertips to the bases of fingers in the back-of-hand region, for protection of a hand.

[0059] The coating layer 7 is configured to be porous and air permeable. Here, as the material composing the coating layer 7, latex or vinyl chloride sol that are machine foamed, latex or vinyl chloride sol that include a chemical foaming agent, and the like may be used. However, a machine foamed material is high in viscosity and may make the coating layer 7 high in thickness and the protrusions 5 buried in the coating

layer 7. On the other hand, with a material including a chemical foaming agent, thickness control of a foamed layer is difficult and the protrusions 5 may also be buried in the coating layer 7. Given this, it is preferable to employ a polyurethane solution for wet processing as the coating layer forming material. By a polyurethane solution dipping process, a desired coating layer 7 can easily and infallibly be formed. In other words, the polyurethane solution for wet processing that is low in viscosity can make the coating layer 7 a relatively thin layer and can facilitate protrusion of the protrusions 5 from the outer face of the coating layer 7. In addition, in a case of employing the polyurethane solution as the coating layer forming material, for example a polyurethane resin for wet processing dissolved in DMF (N,N-dimethylformamide) can be used. As the polyurethane resin for wet processing, for example CRISVON 8006 HVLD (trade name, manufactured by DIC Corporation) can be employed.

[0060] The coating layer 7 is provided such that, in a region in which the protrusions 5 are not formed (regions between the plurality of protrusions 5), an interface (outer surface) thereof is positioned more on an outer face side than an outer surface (surface of the superficial layer) of the glove main body 3. More specifically, a superficial layer of the coating layer 7 that is positioned more on an outer face side than the outer face of the glove main body 3 is provided, for example, in a thickness of 0.23 mm (a distance between the outer face of the glove main body 3 to the outer face of the coating layer 7). It should be noted that the thickness of the superficial layer of the coating layer 7 is preferably at least 0.05 mm and no greater than 0.80 mm and more preferably at least 0.10 mm and no greater than 0.40 mm. The thickness smaller than the above specified lower limit makes formation of the superficial layer of the coating layer 7 difficult and the thickness greater than the above specified upper limit may give a rough sensation to a wearer.

[0061] In addition, by forming the coating layer 7 by impregnating the glove main body 3 with the coating layer forming material, the coating layer 7 is provided to appear on an inner face of the glove main body 3. In other words, the coating layer 7 is provided on a face in contact with the wearer's palm. Furthermore, an inner face side of a region in which the protrusion 5 is formed of the glove main body 3 (region immediately below the base part of the protrusion 5) is also impregnated with the material composing the coating layer 7.

[0062] Furthermore, the coating layer 7 is provided in close contact with an outer periphery of an buried part of the protrusion 5. Here, the buried part of the protrusion 5 is a part of the protrusion 5 that is positioned more on an inner face side than the superficial layer of the coating layer 7 (a non-protruding part of the protrusion 5).

[0063] It should be noted that, by employing a vinyl chloride resin or a vinyl chloride-vinyl acetate copolymer resin as a main component of a resin material composing the protrusions 5 and by employing polyurethane as a main component of a rubber material composing the coating layer 7, a main component of a rubber material composing the coating layer 7 is non-penetrable with respect to the protrusions 5. As a result, the coating layer 7 is not easily formed on the outer surface of the protrusion 5, or the coating layer 7 formed on the outer surface of the protrusion 5 can be made a relatively thin film.

[0064] Moreover, in the non-slip finished glove 1, moisture permeability between the outer face and the inner face on a

palm side is preferably at least 1000 g/m²·24 h and no greater than 15000 g/m²·24 h, and more preferably at least 4000 g/m²·24 h and no greater than 12000 g/m²·24 h. Because the moisture permeability lower than the above specified lower limit causes a problem of sweaty hands after long-time, wearing and the moisture permeability higher than the above specified upper limit makes the coating layer 7 insufficient so that a sufficient gripping force thereof can not be achieved. It should be noted that the above discussed moisture permeability is a numerical value measured according to JIS-L-1099A (moisture permeability testing method for fiber products).

[0065] In the non-slip finished glove 1 according to the present embodiment configured as described above, since the protrusions 5 protrude from the outer face of the coating layer 7, a gripping force acts more appropriately on the plurality of protrusions 5 upon grip of an object. Especially, since the protrusions 5 are provided to be elastically deformable, the protrusions 5 deform appropriately upon grip and such deformation increases a contact area between the protrusions 5 and the object, thereby obtaining a sufficient gripping force. Furthermore, since the protrusions 5 are formed in hollow shapes, the above described deformation can be caused more easily and more sufficient gripping force can be obtained.

[0066] In addition, since the material composing the coating layer 7 is non-penetrable with respect to the protrusions 5, the coating layer 7 is not easily formed on the outer face of the protrusion 5. Since no coating layer 7, or only a relatively thin coating layer 7, is formed on the outer surface of the protrusion 5, the protrusions 5 can deform appropriately upon grip of an object to exert a sufficient gripping force. In a case in which no coating layer 7 is formed on the outer face of the protrusions 5, the protrusions 5 are brought into direct contact with the object and a friction force (gripping force) can be obtained between the material (resin) composing the protrusions 5 and the object. Furthermore, even if the thin coating layer 7 is formed on the outer face of the protrusions 5, the coating layer 7 formed thereon is thin and may remove from and expose the protrusions 5 during use or the like. The friction force can thus be obtained between the material composing the protrusions 5 and the object as described above. As a result, a friction force can be obtained in contact with the material of the protrusions 5 that is different from that of the coating layer 7 and can exert an appropriate gripping force for various objects.

[0067] For the coating layer 7, employing the same material as that of the protrusions 5 or employing a material with high adhesiveness with respect to the protrusions 5 may generally be conceived for preventing the protrusions 5 from dropping off. However, in a case of employing the same material for the coating layer 7 and the protrusions 5, the coating layer may be formed thickly on the outer face of the protrusions 5 and the protrusions 5 may easily be buried in the coating layer 7. Especially in a case of configuring the coating layer 7 porous, the coating layer forming material is high in viscosity and the protrusions 5 may easily be buried in the coating layer 7 as described above. Given this, a configuration of the present non-slip finished glove in which the protrusions 5 protrude from the coating layer 7 is remarkable, and the configuration provides an effect of exerting an appropriate gripping force.

[0068] In addition, since the base part of the protrusion 5 is impregnated into the superficial layer of the glove main body 3, the protrusions 5 firmly adhere to the glove main body 3 and dropping off of the protrusions 5 from the glove main body 3 during use can be appropriately prevented. Especially

since the coating layer 7 is provided in close contact with the outer periphery of the buried part of the protrusion 5, dropping off of the protrusions 5 can be prevented even more effectively. As described above, the protrusions firmly adhere to the glove main body and do not easily drop off from the non-slip finished glove. This can prevent the reduction in gripping force after long-term use.

[0069] Moreover, since the coating layer 7 is thus provided to surround the outer periphery of the buried part of the protrusions 5, upon grip of an object, the protrusions 5 lift a first end side of the fabric of the glove main body 3 toward an outer face side, with restricting the movement of the base part away from the wearer's palm. In other words, if the protrusions 5 are simply provided on the glove main body 3 without the coating layer 7, when a force in a planar direction of the palm (for example in a direction toward fingertips) is applied to the protrusions 5 upon grip of an object, the protrusions 5 pull the first end side (cuff side) of the glove main body 3 toward the outer face side and move the base parts of the protrusions 5 away from the palm. This may hinder an appropriate gripping force from acting. On the other hand, in the present non-slip finished glove 1, the coating layer 7 is provided in close contact with the outer periphery of the buried part of the protrusions 5. The glove main body 3 with the coating layer 7 is greater in rigidity than a simple glove main body 3. This can prevent the first end side of the glove main body 3 and the coating layer 7 from being lifted toward the outer face side, allowing an appropriate gripping force to exert. Especially, since the coating layer 7 is provided also on the inner face of a region in which the protrusion 5 is formed of the glove main body 3 (region immediately below the base part), the coating layer 7 supports the protrusions 5 not only from the periphery but also from the inner face (lower face). This can prevent the above described movement of the protrusions 5 away from the palm even more efficiently, allowing an appropriate gripping force to exert.

[0070] On the outer face of the glove main body 3, the coating layer 7 is provided in regions other than the protrusions 5 and the fibers of the glove main body 3 are not exposed. This allows the coating layer 7 to exert a sufficient gripping force to firmly grip an object.

[0071] In addition, the coating layer 7 appears on the inner face of the glove main body 3. This provides a sufficient friction force between the inner face of the non-slip finished glove 1 and the wearer's palm, and can appropriately prevent the non-slip finished glove 1 from sliding on a hand during grip of an object.

[0072] Furthermore, the coating layer 7 is air permeable and therefore prevents the wearer's hand from being sweaty. Specifically, the coating layer 7 is provided in non coated back manner and therefore prevents the wearer's hand from being sweaty.

[0073] A manufacturing method of the non-slip finished glove 1 of the present embodiment configured as described above is outlined hereinafter; however, the manufacturing method according to the present invention is not limited thereto. In addition, in the following explanation of the manufacturing method, descriptions overlapping with those of the above discussed non-slip finished glove may be omitted.

[0074] The manufacturing method according to the present embodiment includes: a glove forming step S1 of forming the glove main body 3 made of fibers for covering a wearer's hand; a protrusion forming step S2 of applying the protrusion forming material that contains a resin as a main component in

a form of dispersed dots in the palm region of the glove main body 3 thus formed; and a coating layer forming step S3 of forming the coating layer 7 in the palm region of the glove main body 3 with the protrusions 5 thus formed, in such a way that an outer face (average interface) thereof is positioned lower than the protrusions 5.

[0075] The glove forming step S1 is a step of forming the glove main body 3 by knitting fibers made of woolly nylon and the like into a glove shape.

[0076] The protrusion forming step S2 is a step of obtaining the glove main body 3 with the protrusions 5 adhering thereto by: placing a masking plate onto the palm region of the glove main body 3 formed by the glove forming step S1; filling punched holes provided on the masking plate with the material composing the protrusions 5 to thereby apply the material onto the glove main body 3; removing the masking plate from the palm region of the glove main body 3; and heating the glove main body 3 with the material of the protrusions 5 applied thereto. Upon lifting the masking plate away from the palm region of the glove main body 3 as described above, an outer peripheral part of the protrusion 5 in contact with an inner face of the punched hole, among the material of the protrusion 5 that fills the punched hole of the masking plate, is first lifted along with the masking plate. In accordance with further elevation of the masking plate, the outer peripheral part of the protrusion 5 separates from the masking plate, inclines toward the center, and drops under its own weight. This combines a plurality of outer peripheral parts to form the hollow part 5a inside the protrusion 5.

[0077] The coating layer forming step S3 further includes: a coating layer material laminating step S31 of laminating the coating layer forming material that contains a resin or rubber as a main component and a solvent onto the glove main body 3; and a pore forming step S32 of extracting the solvent in the coating layer forming material laminated onto the glove main body 3.

[0078] The coating layer material laminating step S31 is a step of putting the glove main body 3 onto a hand mold and immersing the palm region of the glove main body 3 in the coating layer forming material.

[0079] The pore forming step S32 is a step of making the coating layer 7 porous by placing the glove main body 3 in a hot water bath longer than a certain time in order to replace the solvent in the coating layer forming material having impregnated into the glove main body 3 with water, and then drying.

[0080] According to the above described method, the non-slip finished glove 1 with the abovementioned advantages can be manufactured.

[0081] It should be noted that the present invention is not limited to the above described mode, and can be embodied in modes with various modifications and improvements.

[0082] In other words, in the above described embodiment, dot-like protrusions 5 have been described; however, the protrusion 5 is not particularly limited in shape and various shapes can be selected for the protrusions 5. For example, providing a plurality of protrusions 5 in elongated rectangular shapes as shown in FIG. 7 is also within an intended scope of the invention of the present application.

[0083] Furthermore, the material composing the protrusions and the material composing the coating layer are preferably selected such that the material composing the coating layer is non-penetrable with respect to the protrusions, as is already described. More specifically, in a case of employing vinyl chloride resin as the material composing the protrusion

sions, it is preferable to employ polyurethane rubber or polyurethane elastomer as the material composing the coating layer. In a case of employing silicone elastomer as the material composing the protrusions, it is preferable to employ polyurethane rubber, polyurethane elastomer, natural rubber, or nitrile butadiene rubber as the material composing the coating layer. In addition, in a case of employing natural rubber as the material composing the protrusions, it is preferable to employ polyurethane rubber, polyurethane elastomer, or nitrile butadiene rubber as the material composing the coating layer.

EXAMPLES

[0084] The present invention is described more specifically with Examples hereinafter; however, the present invention is not limited thereto.

Example 1

[0085] A protrusion forming material composed of 100 mass parts of vinyl chloride-vinyl acetate resin (trade name: PCH-843 (manufactured by Kaneka Corporation)), 150 mass parts of a plasticizer (trade name: Mesamoll ASEP (manufactured by Lanxess K.K.)), 3 mass parts of stabilizer (trade name: SC-72 (manufactured by Adeka Corporation)), and 7.5 mass parts of a thickening agent (trade name: REOLOSIL QS-102 (manufactured by Tokuyama Corporation)) was prepared. The viscosity of the protrusion forming material measured by using a BH type viscometer (manufactured by TOKIMEC INC. (currently TOKI SANGYO Co., Ltd)) was 700,000 mPa·s.

[0086] A polyurethane resin for wet processing (trade name: CRISVON 8006 HVLD (manufactured by DIC Corporation)) was dissolved in DMF to prepare the coating layer forming material. The solid content concentration was adjusted to be 10% by mass of the coating layer forming material.

[0087] Woolly nylon of 280 denier was knitted into a glove main body by using a 13 gauges glove knitting machine (trade name: N-SFG (manufactured by Shima Seiki Mfg., Ltd)).

[0088] The glove main body was placed on a flat board and a masking plate was placed on the glove main body. The masking plate used herein was 0.50 mm in thickness and provided with a plurality of punched holes of which inner diameter was 2 mm. The above described protrusion forming material was then supplied from an upper face of the masking plate to fill the punched holes on the masking plate with the protrusion forming material. More specifically, the protrusion forming material was placed on the upper face of the masking plate and the protrusion forming material was scraped into the punched holes with a spatula. The masking plate was then lifted away from an upper face of the glove main body. Thereafter, the flat board was heated at 180° C. for 10 minutes to thereby cure the protrusion forming material attached in a form of dispersed dots to the glove main body and form the protrusions.

[0089] The glove main body with the protrusions formed thereon was removed from the flat board, put onto a hand mold, and immersed in the coating layer forming material. This immersion process was performed in such a way that a palm region of the glove main body is immersed in the coating layer forming material while avoiding a back-of-hand region, which is a reverse face of the palm region, from being immersed as much as possible. The glove main body in which

the palm region was thus impregnated with the coating layer forming material was then immersed in a water bath of 50° C. for 40 minutes. The glove was dried at 120° C. for 30 minutes, followed by removing the glove from the hand mold, thereby obtaining the non-slip finished glove of Example 1. A micrograph of FIG. 4 shows the protrusion of the non-slip finished glove of Example 1.

Comparative Example 1

[0090] In Comparative Example 1, only a coating layer, without protrusions, was formed on a glove main body. Palm Pit B0500 (trade name) (manufactured by Showa Glove Co.) was used as Comparative Example 1.

Comparative Example 2

[0091] In Comparative Example 2, a coating layer was first formed on a glove main body and protrusions were formed on the coating layer. It should be noted that the same glove main body, the same coating layer forming material, and the same protrusion forming material as those of Example 1 were used.

Comparative Examples 3 to 5

[0092] In Comparative Examples 3 to 5, only protrusions, without a coating layer, were formed on a glove main body. Atsude Sagyo-yo Suberidome Tebukuro [heavyweight non-slip working glove] No. W301 (trade name) (manufactured by Kachiboshi Sangyou Co.) was used as Comparative Example 3; Shirikon Fitto [silicone fit]U3 No. SY-356 (trade name) (manufactured by Suzuyo Kogyo Kabushiki Kaisha) was used as Comparative Example 4; and DOT LINER No. 290 (trade name) (manufactured by Kachiboshi Sangyou Co.) was used as Comparative Example 5.

Comparative Examples 6 and 7

[0093] In Comparative Examples 6 and 7, only a coating layer made of natural rubber, without protrusions, was formed on a glove main body. 340 Fitto Gurippu [fit grip] (trade name) (manufactured by Showa Glove Co.) was used as Comparative Example 6; and 310 Grip (trade name) (manufactured by Showa Glove Co.) was used as Comparative Example 7.

(Moisture Permeability Test)

[0094] Moisture permeability of a palm region side of the glove was measured in Example 1 and Comparative Examples 1 to 7, respectively. The moisture permeability was measured by a method according to JIS-L-1099A-1, under conditions of 40° C. in temperature and 90% in humidity.

[0095] As a result of the moisture permeability test, it was confirmed that gloves other than Comparative Examples 6 and 7 have high moisture permeability and can prevent sweaty hand even after long-time wearing, as shown in FIG. 8.

(Abrasion Test)

[0096] An abrasion test was conducted for Example 1 and Comparative Examples 1 to 7, respectively, using a Gakushin-Type Rubbing Tester (a rubbing tester for color fastness RT-200 (manufactured by DAIEI KAGAKU SEIKI MFG. Co., Ltd.)) by reciprocating a sample of 20×40 mm adhered to a rubbing head (rubbed face: 20×20 mm) for 150 times on abrasive paper (WATER PROOF ABRASIVE

PAPER #1500 DCC CC-Cw (manufactured by SANKYO-RIKAGAKU Co., Ltd.)) with 500 g load on the rubbing head, and then measuring abrasion loss.

[0097] As a result of the abrasion test, it was confirmed that gloves other than Comparative Examples 2, 3 and 6 had only small abrasion loss as shown in FIG. 8. These gloves can prevent deterioration due to abrasion after long-term use, and can exert an appropriate gripping force for an extended period of time.

(Measurement of Kinetic Coefficient of Friction)

[0098] A kinetic coefficient of friction was measured in Example 1 and Comparative Examples 1 to 7, respectively, according to ASTM D1894-01 Standard in such a way that: a sample was adhered to a sled of 200 g in weight and 63.5×63.5 mm in rubbed face to entirely cover the rubbed face; and then a kinetic coefficient of friction was measured under 150 mm/min pulling speed on a horizontal test plate. Measured were: a kinetic coefficient of friction between an outer face (side of protrusion of the protrusions) of the non-slip finished glove and a stainless surface; a kinetic coefficient of friction between the outer face of the non-slip finished glove and a cardboard box surface; and a kinetic coefficient of friction between an inner face (side of contact with wearer's palm) of the non-slip finished glove and a stainless surface.

[0099] As a result of the measurement, it was confirmed that the outer faces of the non-slip finished gloves of Example 1 and Comparative Example 2 showed high kinetic coefficients of friction with respect to both of the stainless surface and the cardboard, as shown in FIG. 8, and therefore it is possible to exert a high gripping force regardless of the material of the object to be gripped.

[0100] In addition, the inner faces of the non-slip finished gloves of Example 1 and Comparative Examples 1 and 2 showed extremely high kinetic coefficients of friction, allowing exertion of a sufficient friction force between the inner face of the non-slip finished glove and the palm during wearing to thereby appropriately prevent the non-slip finished gloves from sliding on a hand during grip of an object.

(Sensory Test)

[0101] Example 1 and Comparative Examples 1 to 7 were evaluated by testers actually wearing the non-slip finished gloves and lifting a box of 3.0 kg (a stainless steel box or a cardboard box) by pressing opposite side faces of the box between the tester's palms and lifting the box. An outer face, an inner face, and overall grip properties of the non-slip finished gloves were rated as: A (very good); B (good); C (moderate); D (poor). FIG. 8 shows averages of evaluations made by 5 testers.

[0102] As a result of the test, the outer faces of the non-slip finished gloves of Example 1 and Comparative Examples 2, 6 and 7 were highly evaluated with respect to both of the stainless steel box and the cardboard box, as shown in a row "Sensory test 1" in FIG. 8. In addition, as shown in a row "Sensory test 2" in FIG. 8, the inner faces of the non-slip finished gloves of Example 1 and Comparative Example 2 were extremely highly evaluated. Furthermore, Example 1 and Comparative Example 2 were extremely highly evaluated for the overall grip properties.

(Pure Bending Test)

[0103] A pure bending test was conducted for Example 1 and Comparative Examples 1 to 7, by: obtaining a sample of 6 cm in width from the palm region of the non-slip finished glove; and, using a pure bending tester KES-FB2 (manufactured by KATO TECH CO., LTD.), making measurements for 5 times by bending the sample in a direction of clenching under conditions of SENS50 and bending of 2 cm⁻¹ and obtaining an average thereof. A smaller B value (softness) and a smaller 2H₈ value (return force) both indicate softer texture.

[0104] As a result of the pure bending test, it was confirmed that the samples of Example 1 and Comparative Examples 1, 4 and 5 were soft and not likely to give a rough sensation to a wearer upon wearing.

(Fixation Strength Test)

[0105] A test of fixation strength of protrusions was conducted for Example 1 and Comparative Example 2, according to EN ISO12947-1, using Nu-Martindale AA-K01 (manufactured by James H. Heal & co. Ltd.) as a test apparatus, by counting the number of dropped protrusions after rubbing for 50 times and 100 times (44 protrusions and 50 protrusions were fixed to a sample of Example 1 and a sample of Comparative Example 2 respectively). Abrasive paper used here was NORTON Oakey 117 Cabinet Quality Glasspaper grit 100 GRADE F2 (manufactured by Saint-Gobain Abrasives, Inc.).

[0106] As a result of the test, it was confirmed that the fixation strength of the protrusions was greater in Example 1 than in Comparative Example 2, as shown in FIG. 8, and therefore it is possible to prevent dropping of the protrusions even after long-term use and to exert an appropriate gripping force for an extended period of time.

Example 2

[0107] Example 2 was configured substantially similarly to Example 1, except for the height of protrusion of the protrusions. More specifically, the height of protrusion of the protrusion was made to be 0.05 mm by using a masking plate of 0.30 mm in thickness. In Example 1, the height of protrusion of the protrusions was 0.20 mm. It should be noted that the values of thickness and the like of Examples 1 and 2 shown in FIG. 9 (except for kinetic coefficients of friction) are in units of mm, and are averages of results of measurement at 5 sites using a dial thickness gauge DS-1211 (trade name) (manufactured by Niigata Seiki Co., Ltd.). The same applies to Comparative Examples 8 and 9 described later.

Comparative Example 8

[0108] In Comparative Example 8, the coating layer was formed by the same method as in Examples 1 and 2 described above, but the protrusions were not formed thereon.

[0109] In Comparative Example 9, the protrusions and the coating layer were formed by the same method as in Examples 1 and 2 described above, but the protrusions were buried in the coating layer as a result of using a masking plate of 0.18 mm in thickness.

(Measurement of Kinetic Coefficients of Friction)

[0110] A kinetic coefficient of friction between the outer face of the non-slip finished glove and a stainless steel surface; and a kinetic coefficient of friction between the outer

face of the non-slip finished glove and a cardboard surface were measured in Examples 1 and 2 as well as Comparative Examples 8 and 9, according to ASTM D1894-01 Standard.

(Sensory Test)

[0111] Examples 1 and 2, and Comparative Examples 8 and 9 were evaluated by testers actually wearing the non-slip finished gloves and lifting a box of 10 kg (a stainless steel box or a cardboard box) by pressing opposite side faces of the box between the tester's palms and lifting the box. An outer face of the non-slip finished gloves was rated as: A (very good); B (good); C (moderate); D (poor).

(Evaluation of Kinetic Coefficients of Friction and Sensory Test)

[0112] As a result of these tests, Examples 1 and 2 were highly evaluated for showing higher kinetic coefficient of friction with respect to both of the stainless surface and the cardboard than Comparative Examples 8 and 9, as shown in FIG. 9, allowing exertion of a high gripping force.

Example 3

[0113] Example 2 was configured substantially similarly to Example 1, except for the glove main body being formed by knitting aramid spun yarn (paraphenylene terephthalamide) of yarn count equivalent to 4 (Ne), using a 10 gauges glove knitting machine (trade name: N-SFG (manufactured by Shima Seiki Mfg., Ltd)).

[0114] The glove of Example 3 was flexible, while showing non-slip properties on the inner face and the outer face thereof, as well as high resistance to cutting of level 3 measured by a testing method of EN388:2003 Protective gloves against mechanical risks, 6.1 Abrasion resistance.

INDUSTRIAL APPLICABILITY

[0115] As described above, the non-slip finished glove of the present invention is suitable for various uses, for example: wear by workers at factories; wear by workers involved in transportation; wear by drivers during driving, and wear by sport players during game.

EXPLANATION OF REFERENCE NUMERALS

- [0116] 1 Non-slip finished glove
- [0117] 3 Glove main body
- [0118] 3a Cuff portion
- [0119] 5 Protrusion
- [0120] 5a Hollow part
- [0121] 7 Coating layer

1. A non-slip finished glove comprising:
 - a glove main body made of fibers for covering a wearer's hand;
 - a plurality of protrusions made of resin or rubber, the protrusions being fixed at least to a palm region of an outer face of the glove main body; and
 - an air permeable coating layer that is laminated at least on a region other than the protrusions in the palm region of the outer face of the glove main body, wherein the protrusions protrude from an outer face of the coating layer.
2. The non-slip finished glove according to claim 1, wherein a base part of the protrusion is impregnated at least in a superficial layer of the glove main body.
3. The non-slip finished glove according to claim 1, wherein the glove main body is impregnated with a material composing the coating layer; and the coating layer is exposed on an inner face of the glove main body.
4. The non-slip finished glove according to claim 1, wherein the material composing the coating layer is non-penetrable with respect to the protrusions.
5. The non-slip finished glove according to claim 4, wherein:
 - the material composing the protrusions contains a vinyl chloride resin or a vinyl chloride-vinyl acetate copolymer resin as a main component; and
 - the material composing the coating layer contains polyurethane as a main component.
6. The non-slip finished glove according to claim 1, wherein the protrusions are formed in hollow shapes.
7. The non-slip finished glove according to claim 1, wherein the glove main body made of fibers includes at least one of: paraphenylene terephthalamide fiber; high strength polyethylene fiber; and a composite fiber including metallic thin wire or glass fiber.
8. A method for manufacturing a non-slip finished glove, comprising steps of:
 - applying a protrusion forming material that contains a resin or rubber as a main component to a plurality of sites at least in a palm region of an outer face of a glove main body made of fibers for covering a wearer's hand; and
 - forming a coating layer at least in a region other than the protrusions in the palm region of the outer face of the glove main body, in such a way that an outer face of the coating layer is positioned lower than the protrusions, wherein
 - the step of forming the coating layer comprises steps of: laminating onto the glove main body, a coating layer forming material that contains a resin or rubber as a main component, and a solvent; and
 - extracting the solvent in the coating layer forming material laminated onto the glove main body.

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