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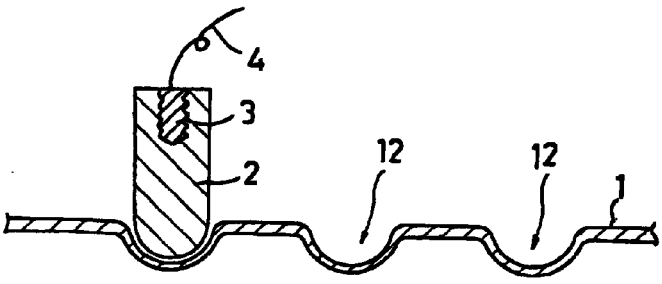
(54) PROJECTING INDICATOR AND METHOD OF MANUFACTURING THE SAME

(57) A projecting indicator which comprises a plurality of projections fixed to an object surface, such as a road surface or a wall surface, and which is used mainly as a guide sign for visually handicapped persons; and a method of manufacturing the same. The indicator is characterized by comprising projections (8) formed separately from an object surface (7), such as a road surface or a wall surface, and being fixed to the object surface (7) by solidifying a solidifiable substance (5).

Fig 1



EP 1 004 706 A1

Description

Technical Field

[0001] The present invention relates to a projecting indicator and a method of manufacturing the same, and more particularly to a projecting indicator, which includes a plurality of projections fixed on an object surface such as a road surface or a wall surface to be used mainly as a sign for guiding the visually impaired, and a method of manufacturing the same.

Background Art

[0002] There has been used the projecting indicator of the type including the sign for guiding the visually impaired, which is made, for example, by implanting rivets in a concrete block, integrally forming projections with a plate to be laid on a sidewalk, or molding a plate by rubber chips, those of which are placed on a road surface, or embedded in the road surface.

[0003] However, the guiding sign made in the above manners may pose a problem of lowering the work efficiency, since it involves works including forming blocks, etc., with preformed projections thereon, transporting those blocks to an actual site and placing or embedding the same.

[0004] In addition, the use of the guiding sign for a prolonged period of time may invite the wearing, or detachment of the rivets for braille and cause the visually impaired to stumble over immediately detaching rivets. In any cases, the guiding sign poses problems in view of durability and safety.

[0005] Since the guiding sign for the impaired person is manufactured upon the layout of blocks, etc., the shape of the projections of the guiding sign is limited to a spherical convex, band-like shape with a convex surface, etc., and therefore the pattern of the guiding sign is limited to a simpler one.

[0006] The visually impaired can only know the location of a crosswalk, dangerous areas on a train platform, etc., and therefore can not acknowledge a proper direction in order to walk to his or her destination. Consequently, he or she can solely walk to the sites where he or she often come and go, but hardly go to the destination by himself or herself where he or she has never been.

Disclosure of Invention

[0007] The present invention has been made to solve those problems. It is an object of the present invention to provide a projecting indicator such as a sign for guiding the visually impaired, which allows the site installation in easy manner on a road surface, a wall surface, etc., at various sites, and which also enables the visually impaired not only to know the location of a crosswalk, dangerous areas on a train platform, but also to be guided to his or her destination in a relatively easy manner where he or she has never been.

[0008] Specifically, the present invention has been conceived as the projecting indicator and the method of manufacturing the same to achieve the above objects. The projecting indicator is characterized by including protrusions 8 separately made from an object surface 7 such as a road surface or a wall surface, and the said projections 8 being bonded to the object surface 7 by solidifying a solidifiable substance 5.

[0009] The method of manufacturing the projecting indicator is characterized by forming concave portions 12 in a sheet member 1, placing a solidifiable substance 5 into the said concave portions 12, applying a bonding agent 6 on a surface of the said solidifiable substance 5, after the solidifiable substance has been solidified, turning the sheet member 1 upside down, and bonding the solidifiable substance 5 to an object surface 7 such as a road surface or a wall surface via the said bonding agent 6.

[0010] There has been further proposed a method of manufacturing a projecting indicator with projections 8 arranged on an object surface 7 such as a road surface or a wall surface, which is characterized by forming concave portions 12 in a sheet member 1, placing a solidifiable substance 5 into the said concave portions 12, applying a bonding agent 6 on a surface of the said solidifiable substance 5, after the solidifiable substance has been solidified, turning the sheet member 1 upside down, bonding the solidifiable substance 5 to the object surface 7 via the said bonding agent, and removing the said sheet member 1.

[0011] There has been further proposed a method of manufacturing a projecting indicator with projections 8 arranged on an object surface 7 such as a road surface or a wall surface, which is characterized by pouring a solidifiable substance 9 onto the object surface 7, forming through holes 10 in the said solidifiable substance, after the solidifiable substance has been solidified, pouring a hot melt resin 11 into the said through holes, and removing the said solidifiable substance 9, after the said hot melt resin 11 has been solidified.

[0012] The solidifiable substance may be without limitation cement, gypsum, polyester resin, epoxy resin, polyurethane resin, stone dust, rubber, glass or other solidifiable substances. However, a methacrylate resin which is solidified in 10 to 20 minutes even at -30°C is preferable. Particularly for the application where the projecting indicator is installed, for example, on a room floor, and therefore a person steps on the projecting indicator with his or her bare foot, it is preferable to use the methacrylate resin because it has a rubber-like elastic force after solidified.

[0013] It is possible to use, for example, a film made of a synthetic resin for the sheet member 1.

[0014] The method of forming the concave portions 12 includes eroding the portions corresponding to the concave portions 12, or solidifying the portions other

than the portions corresponding to the concave portions 12 by using an ultraviolet ray curing resin and eroding the portions other than the cured portions to form the concave portions. Both methods are hardly performed at an actual site, and may increase costs. Therefore, it is preferable to form the concave portions by pressing a heated metal bar against the film surface.

[0015] The synthetic resin film may be without limitation of materials polyethylene terephthalate film, polyethylene film, cellophane, etc., provided that the concave portions can be formed therein. However, it is preferable to use a polyvinyl chloride film, which can form therein concave portions having a depth of about 1 cm and a diameter of several mm to about 3 cm in several seconds at 20 to 80°C

[0016] However, the polyvinyl chloride film is weak against heat, and hence lose the shape thereof due to the heat, resulting in disposition of the film after a single use.

[0017] In this regard, the polyethylene terephthalate film, etc., is advantageous in the fact it is strong to heat, and therefor can be repeatedly used, although it takes a longer period of time to form a concave therein. Accordingly, for manufacturing a large number of the same raised letters, the use of heat resistant films such as the polyethylene terephthalate film are preferable to lower the costs involved.

Brief Description of Drawings

[0018]

FIG. 1 is an enlarged cross section of an essential portion illustrating a step of forming a die in a method of manufacturing a sign for guiding the visually impaired in accordance with one embodiment of the present invention.

FIG. 2 is an enlarged cross section of an essential portion illustrating a pouring step of a solidifiable substance.

FIG. 3 is an enlarged cross section of an essential portion illustrating a bonding-agent-applying step.

FIG. 4 is an enlarged cross section of an essential portion illustrating a bonding step.

FIG. 5 is an enlarged cross section of an essential portion illustrating a film-removing step.

FIG. 6 an enlarged cross section of an essential portion illustrating a solidifiable-substance-pouring step.

FIG. 7 is an enlarged cross section of an essential portion illustrating a through-hole-forming step.

FIG. 8 is an enlarged cross section of an essential portion illustrating a step of solidifying a hot melt resin poured into the through-holes.

FIG. 9 is an enlarged cross section of an essential portion illustrating a solidifiable-substance-removing step.

Best Mode for Carrying out the Invention

[0019] The description will be made hereinafter for respective embodiments of a method of manufacturing a sign for guiding the visually impaired as one example of a projecting indicator of the present invention, and the sign for guiding the visually impaired obtained by this method.

(First Embodiment)

[0020] The manufacturing steps of a first embodiment of the present invention will be described herein in conjunction with FIGS. 1 to 5.

[0021] A sheet member 1 made of a polyvinyl chloride film having a thickness of 10 to 30 μm is brought into a tensioned state by pulling both ends of the sheet member 1, and respective points forming a desired raised letter on the sheet member 1 are determined.

[0022] A metal bar 2 with a rounded end having a diameter of 1 cm is then heated to 70°C and pressed against each point from above to form concave portions 12 having a depth of 7 mm in the sheet member 1.

[0023] The thickness of the sheet member 1, the size of the metal bar 2, the heating temperature and the depth of each concave portion 12 are not limited to the above values, but it is possible to set the values according to the size of a projection manufactured, the type of the sheet member 1 to be used, etc.

[0024] For example, it is possible to manufacture a projection which can be used as a guiding line, when the concave portions 12 each having a depth of 1 cm, a lateral length of 2 cm and a longitudinal length of 10 cm are formed by using a metal bar having a size of 2 cm x 2 cm x 10 cm.

[0025] It is possible to use zinc, brass, lead, etc., for the metal bar, and also possible to modify the thickness, and the shape and the temperature of the end of the metal bar according to the quality of the sheet member 1 and the size of a raised letter.

[0026] The vertical motion of the metal bar can be accomplished through any types including a fixed type, mobile type and arm type. The thrusting operation of the metal bar is made via a direct-acting vale, air cylinder, oil cylinder, water cylinder, etc.

[0027] To enable the replacement of the metal bar by a new one having a different size, shape, etc., a screw 3 is attached to an end of a heating coil 4, and the said screw 3 is screwed into a threaded hole formed in an upper portion of the metal bar 2, thereby supporting the heating coil 4 on the metal bar 2 in a detachable manner.

[0028] After cooling the sheet member 1, the blend of a methacrylate resin liquid (Acrysirup manufactured by Mitsubishi Rayon Co., Ltd.), aggregate and a curing agent, which blend will be hereinafter referred to "blended resin liquid," is poured into the concave portions 12.

[0029] Sands, ceramic, glass powders, or other materials are used for aggregate, and benzoyl peroxide, etc., are used for the curing agent.

[0030] There are methacrylate resin liquids of different types, which are respectively used for face coating, intermediate coating, and ground coating. To manufacture the braille according to the present invention, the blended resin liquid, which is further blended with a resin liquid for face coating for hardening the surface of a raised letter, is poured into a die. This resin liquid will be hereinafter referred to "first blended resin liquid". The blended resin liquid, which is further blended with a resin liquid for ground coating, is poured into the die in 5 to 10 minutes. This resin liquid will be hereinafter referred to "second blended resin liquid."

[0031] When the blend ratio of the first blended resin liquid is higher, breaking, cracking may occur after the solidification. Therefore, it is preferable to blend the first blended resin liquid with the second blended resin in a ratio of 1:4 by volume.

[0032] The second blended resin liquid possesses flexibility, and therefore follows the movement of a substrate, which substrate is repeatedly expanded and shrunk due to the temperature change effected by the season variation such as summer and winter. Therefore, it is unlikely to cause shrinkage, cracking, falling-off, so that the braille can be made solely by the second blended resin liquid depending on the environment of an installation site.

[0033] It is not necessary to limit the material to be poured into the die, provided that it is solidified after pouring. It is possible to use cement, gypsum, polyester resin, epoxy resin, stone dust, rubber, glass, etc. However, a methacrylate resin is the most preferable material, since it is capable of curing in a short period of time, and curing at a low temperature, as well as has a wear resistance, chemical resistance, etc.

[0034] After the blended resin liquid 5 has been poured and solidified, a bonding agent is applied on the surface of the said blended resin liquid 5 by a brush, etc., as illustrated in FIG. 3.

[0035] After the bonding agent 6 has been dried, the sheet member 1 is turned upside down and bonded to an object surface 7 such as a road surface or wall surface of concrete, asphalt, tiles, bricks, plastic tiles, mortar, glass, metal, marble, etc., as illustrated in FIG. 4.

[0036] A methacrylic primer, instantaneous adhesive, etc., are used for the bonding agent.

[0037] The sheet member 1 is removed in 20 minutes after it is bonded to the object surface 7, as illustrated in FIG. 5. Thereby, the sign for guiding the visually impaired, which has a plurality of the projections 8 for forming the braille, made of a methacrylate resin and bonded on the object surface 7 such as the road surface or wall surface, is formed.

[0038] It is possible to embed a sensor in the above blended resin liquid, enabling the sensor to sense signals transmitted from a transmitter mounted in a cane held by the visually impaired with a solar battery as a power source, and to make a sound. With this arrangement, it is possible to guide the visually impaired to an area where the braille is installed, by the sensor arrangement which senses the signals at a remote area such as 100 m away from the braille, and make a sound which becomes louder as he or she walks closer to the braille.

[0039] The blended resin liquid can be mixed with a coloring agent such as pigment. For example, when it is mixed with reflecting beads and titanium, the beads reflect and glitter even at night by receiving lights. When mica is mixed, it is possible to form the braille that is capable of glittering even at daytime, thereby leading to a traffic safety even for the visually impaired.

[0040] The respective projections manufactured in the above manner cannot be used only for constituting the braille, but also for preventing unauthorized wall banners from being affixed on a utility pole, fence, etc. It is more effective to make the projections particularly by a metal bar with the end pointed to such a degree as not to break the film.

[0041] Alternatively, when a pattern is made through shaping of each projection into a star, or changing a color of each projection, the projections can be used as an ornament of the object surface such as the road surface and wall surface.

[0042] When the blended resin liquid is mixed with silver powders or copper powders, allowing the manufactured projections to possess conductivity, it can be applied to an IC board, etc.

(Second Embodiment)

[0043] Next, a manufacturing process in accordance with another embodiment of the present invention will be described in conjunction with FIGS. 6 to 9.

[0044] First, the solidifiable substance 9 such as gypsum is poured onto the object surface 7 such as the road surface until it is reached to a height of 5 mm to 1 cm, and solidified, as illustrated in FIG. 6.

[0045] Through-holes 10 are then formed in portions corresponding to the positions where the raised letters are to be formed, as illustrated in FIG. 7.

[0046] The hot melt resin 11 is, then, poured into the through-holes 10 made in this manner, and solidified, as illustrated in FIG. 8.

[0047] The solidifiable substance 9 is then removed, thereby forming the sign for guiding the visually impaired, which sign has the projections 8 of the hot melt resin fixed to the object surface 7 forming a plurality of raised letters, as illustrated in FIG. 9.

[0048] It is not necessary to limit the solidifiable substance to gypsum, but it is possible to use cement, synthetic resin film, etc., provided that they can have a thickness forming the height of the projections.

[0049] The thickness of the solidifiable substance laid on the object surface, and the size of the through-

holes formed in the solidifiable substance can be determined according to the size of the projections.

[0050] The hot melt resin is made of a resin such as a methacrylate resin as a base resin, a tackifier which possesses compatibility with the said base resin, waxes, antioxidant, etc., and is capable of possessing plasticity at a temperature of 70 to 200°C, and then being solidified by cooling and being simultaneously bonded to the road surface of asphalt, etc., by the effect of the tackifier. The type of the base resin, the tackifier, etc., is determined according to a working condition.

(Another Embodiment)

[0051] In the first embodiment, the sheet member 1 is turned upside down, and bonded to the object surface 7 such as the road surface or the wall surface via the bonding agent 6. The sheet member 1 is then removed from the solidifiable substance 5. However, such a removal of the sheet member is not essential in the present invention. It is possible to leave the sheet member on the solidifiable substance 5.

[0052] In this case, when the transparent sheet member 1 is made, the solidified protrusions 8 is visible via the transparent sheet member 1. By forming the solidifiable substance 5 of the protrusions 8 in desirable colors or patterns, various decorative effects can be obtained.

[0053] The projecting indicator of the present invention is principally used as the sign for guiding the visually impaired. However, the present invention is not limited to such a use.

[0054] For example, when the transparent sheet member 1 is not removed from the projections 8, but left thereon and installed on the object surface such as the road surface, as mentioned above, it is possible to obtain an effect which enables a person with no impaired vision to see through the color and pattern as mentioned above.

[0055] In either case, it is not necessary to have limited uses of the projecting indicator. It is essential to use the projecting indicator, which includes the projections separately made from the object surface such as the road surface or wall surface, and bonded to the object surface.

Testing Example

[0056] The testing has been conducted to confirm if the visually impaired can read the guiding sign of the present invention.

[0057] The testing has been conducted by the cooperation of ten congenitally visually impaired persons and ten acquired visually impaired persons, who walked on raised numbers of the guiding sign, which sign has been installed on the road surface, with shoes respectively having thick and thin soles.

[0058] In accordance with the test result, all of the ten congenitally visually impaired persons could exactly read the numbers with the shoes having the thick soles, and also could read only by touching the numbers with a cane. Among the ten acquired visually impaired persons, four of five persons who impaired their visions in their childhood could exactly read the numbers with the shoes having the thick soles, and the remaining one person could read the numbers with the shoes having the thin soles.

[0059] Two persons of five persons who impaired their visions at age ten or more could read 50% of the raised numbers with the shoes having the thick soles, and could read all the numbers with the shoes having the thin soles. The remaining three persons could read nearly 20% of the numbers with the shoes having the thick soles, and could read 50% of the numbers with the shoes having the thin soles.

[0060] In accordance with the above result, it has been found that the guiding sign of the present invention can be remarkably easy to read for the visually impaired.

[0061] The present invention of the above arrangement produces the following effects.

[0062] It is possible to manufacture the guiding sign for the visually impaired, which sign represents descriptions, etc., with raised letters, in cheap and easy manners, by manufacturing the guiding sign as one example of the projecting indicator of the present invention, in accordance with the above-mentioned method. That is, it is possible to install the sign in a short period of time on the object surface such as the road surface or the wall surface at various sites, thereby lowering the costs involved.

[0063] Accordingly, it is possible to place the sign, for example, at an intersection, which sign carries descriptions, such as "Turn to right for AAA school," or "Turn to left for BBB station." This enables the visually impaired to go to an unknown destination for him or her.

[0064] It is also possible to manufacture the guiding line extending over a longer distance in a cheap manner, which guiding line can safely guide the visually impaired to his or her destination.

[0065] Further, by representing languages used in many countries with the braille, the projecting indicator can be used in those countries, thereby facilitating the visually impaired to travel abroad by himself or herself.

[0066] On the other hand, the sign for guiding the visually impaired obtained in the above-mentioned manufacturing method is remarkably easy to read for the visually impaired, and further exhibits excellent safety and wear resistance, etc.

[0067] The projecting indicator of the present invention can be manufactured in a varying shape and color, resulting in the safety for a person with no impaired vision, too. In addition, it can be used for decorating the road surface, wall surface, etc., and preventing unauthorized wall banners from being affixed on a utility pole, etc.

Claims

1. A projecting indicator comprising protrusions (8) separately made from an object surface (7) such as a road surface or a wall surface, said projections (8) being bonded to the object surface (7) by solidifying a solidifiable substance (5).

2. A projecting indicator according to claim 1, wherein said projections (8) together form a braille pattern.

3. A projecting indicator according to any one of claims 1 and 2, wherein said solidifiable substance (5) is a methacrylate resin.

4. A projecting indicator according to any one of claims 1 to 3, wherein a sensor is embedded in said projections (8).

5. A method of manufacturing a projecting indicator comprising forming concave portions (12) in a sheet member (1), placing a solidifiable substance (5) into said concave portions (12), applying a bonding agent (6) on a surface of said solidifiable substance (5) after the solidifiable substance has been solidified, turning the sheet member (1) upside down, and bonding the solidifiable substance (5) to an object surface (7) such as a road surface or a wall surface via said bonding agent (6).

6. A method of manufacturing a projecting indicator with a plurality of projections (8) arranged on an object surface (7) such as a road surface or a wall surface comprising forming concave portions (12) in a sheet member (1), placing a solidifiable substance (5) into said concave portions (12), applying a bonding agent (6) on a surface of said solidifiable substance (5) after the solidifiable substance has been solidified, turning the sheet member (1) upside down, bonding the solidifiable substance (5) to the object surface (7) via said bonding agent, and removing said sheet member (1).

7. A method of manufacturing a projecting indicator according to any one of claims 5 and 6, wherein said concave portions (12) formed in the sheet member (1) are formed in a braille pattern.

8. A method of manufacturing a projecting indicator according to any one of claims 5 to 7, wherein said sheet member (1) is a synthetic resin film.

9. A method of manufacturing a projecting indicator according to claim 8, wherein said sheet member (1) is a polyvinyl chloride film.

10. A method of manufacturing a projecting indicator according to any one of claims 5 to 9, wherein said solidifiable substance (5) is a methacrylate resin.

11. A method of manufacturing a projecting indicator according to any one of claims 5 to 10, wherein a sensor is embedded in the projection (8).

12. A method of manufacturing a projecting indicator according to any one of claims 5 to 11, wherein said projections (12) are formed in the sheet member (1) by pressing a heated metal bar (2) against the sheet member (1).

13. A method of manufacturing a projecting indicator with projections (8) arranged on an object surface (7) such as a road surface or a wall surface comprising pouring a solidifiable substance (9) onto the object surface (7), forming through holes (10) in said solidifiable substance after the solidifiable substance has been solidified, pouring a hot melt resin (11) into said through holes, and removing said solidifiable substance (9) after said hot melt resin (11) has been solidified.

14. A method of manufacturing a projecting indicator according to claim 13, wherein said through holes (10) formed in the solidifiable substance (9) are formed in a braille pattern.

Fig 1

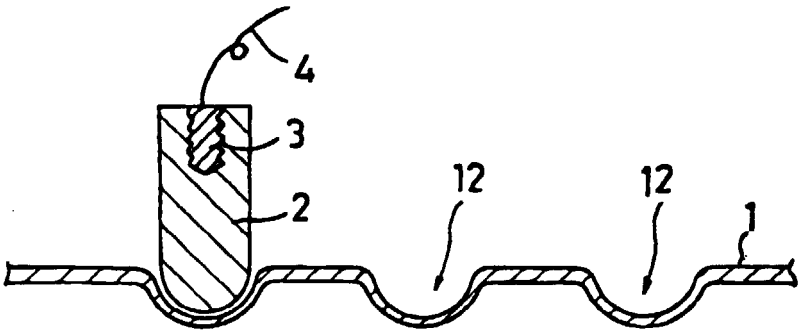


Fig 2

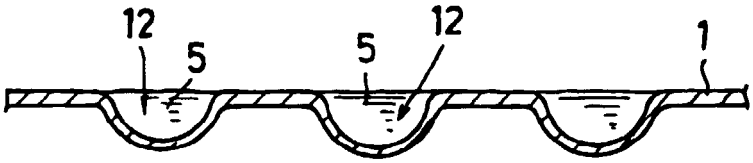


Fig 3

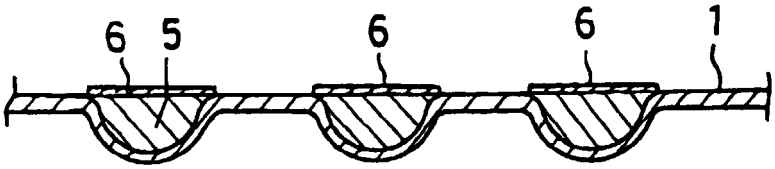


Fig 4

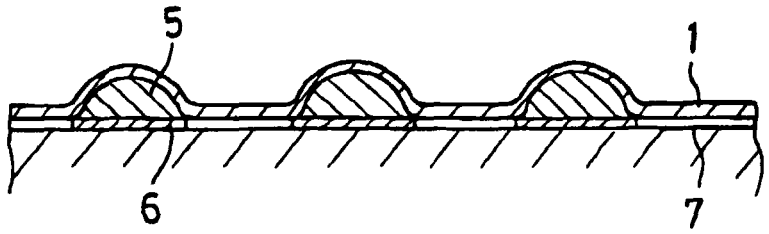


Fig 5

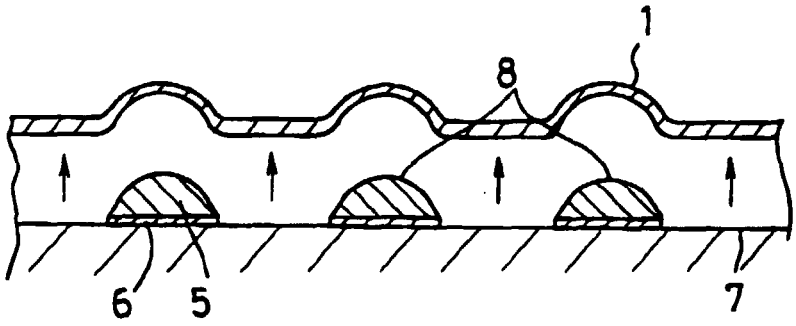


Fig 6

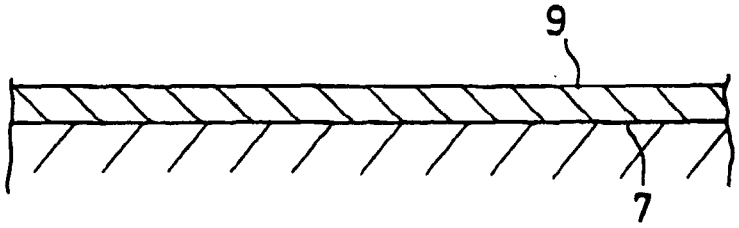


Fig 7

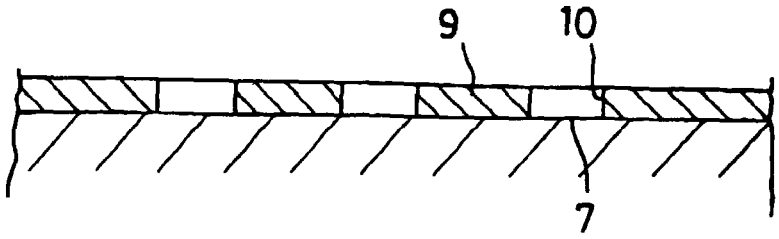


Fig 8

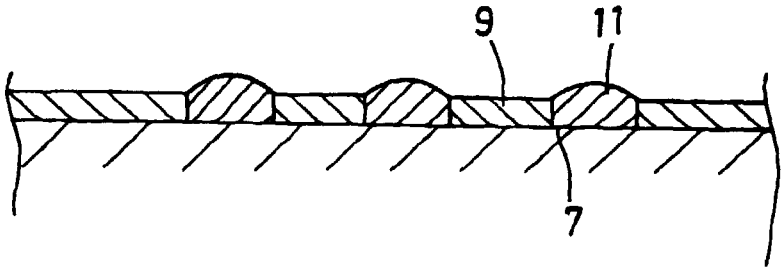
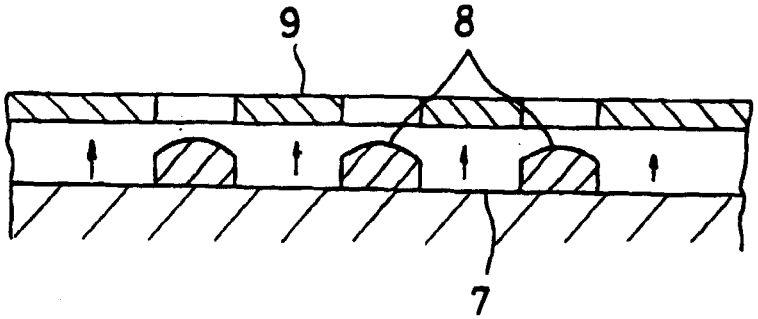


Fig 9



INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP98/03398

A. CLASSIFICATION OF SUBJECT MATTER
Int.Cl[6] E01F9/04

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
Int.Cl[6] E01F9/04

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Jitsuyo Shinan Koho 1951-1996 Toroku Jitsuyo Shinan Koho 1994-1998
Kokai Jitsuyo Shinan Koho 1971-1998 Jitsuyo Shinan Toroku Koho 1996-1998

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CD-ROM of Japanese Utility Model Application No. 16894/1993 (Laid-open No. 68820/1994) (K.K. JSB), 27 September, 1994 (27. 09. 94), Full text ; Figs. 1 to 8 (Family: none)	1-3
Y	Full text ; Figs. 1 to 8 (Family: none)	13-14
A	Full text ; Figs. 1 to 8 (Family: none)	5-12
Y	CD-Rom of Japanese Utility Model Application No. 16894/1993 (Laid-open No. 68820/1994) (K.K. JSB), 27 September, 1994 (27. 09. 94), Full text ; Figs. 1 to 8 (Family: none) Full text ; Figs. 1 to 8 JP, 8-209643, A (Utsumi Denki K.K.), 13 August, 1996 (13. 08. 96), Full text ; Figs. 1, 2 (Family: none)	4
A	Full text ; Figs. 1, 2 (Family: none)	11

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
4 November, 1998 (04. 11. 98)	17 November, 1998 (17. 11. 98)
Name and mailing address of the ISA/ Japanese Patent Office Facsimile No.	Authorized officer Telephone No.

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