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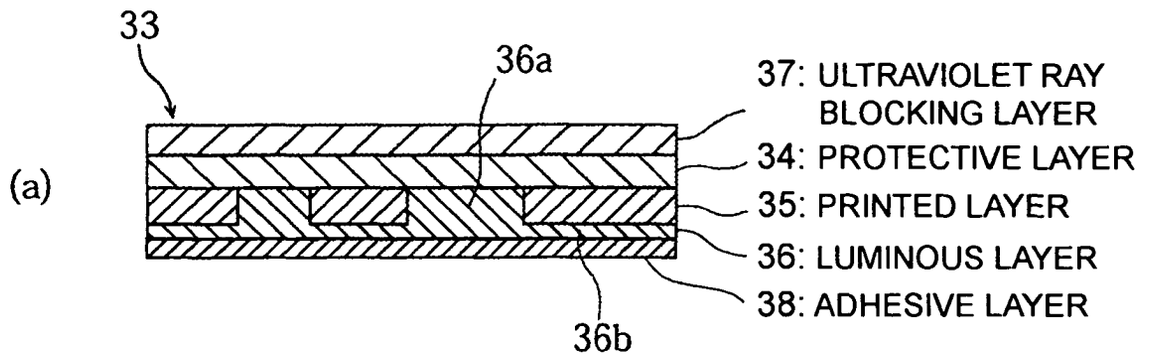
(54) Key cylinder and vehicle with a key cylinder

(57) The invention relates to a key cylinder having a key insertion hole (27a) and to a vehicle (1) with a key cylinder. The invention aims to provide a key cylinder into which a key can be inserted more easily at night-time. The invention proposes that a luminous sheet (33) is provided which at least partially surrounds the key insertion hole (27a) and that the vehicle (1) is adapted to comprise such a key cylinder.

Fig. 1



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Description

[0001] The invention relates to a key cylinder having a key insertion hole. Further, the invention relates to a vehicle, in particular a motorcycle, preferably of the scooter type, having a switch unit comprising a key cylinder.

[0002] In a vehicle, for example, in a motorcycle, there is a problem in that, in the case in which a key is to be inserted in a key cylinder at night or the like, it is hard to see a key insertion hole.

[0003] The present invention has been devised in view of the above-mentioned circumstances in the past. It is an object of the present invention to provide a key cylinder into which a key can be inserted more easily at nighttime.

[0004] It is further an object of the invention to improve a vehicle of the above kind in that it can be actuated more easily at nighttime.

[0005] For a key cylinder of the above kind, this object is solved in an inventive manner in that a luminous sheet is provided which at least partially surrounds the key insertion hole.

[0006] Preferably, the luminous sheet has an indication portion by means of which a position of the key insertion hole can be estimated and which at least partially surrounds the key insertion hole. In particular, it is preferable that the luminous sheet includes at least a key insertion surface on which the key insertion hole is formed, an outer surface located further on an outer side than the key insertion surface, and a joining surface joining the outer surface and the key insertion surface. Therein, it is possible that the luminous sheet is disposed on the outer surface such that an inner edge of the luminous sheet is located on the outside of the joining surface and so as to surround at least a part of the key insertion hole.

[0007] Such a key cylinder as described above is adapted such that a key is inserted in a key insertion hole and turned to thereby, for example, turn ON/OFF an ignition device or lock/unlock a lock device.

[0008] In order to facilitate an insertion of the key at night or the like, it is, according to the invention, effective to surround the circumference of the key insertion hole with a luminous sheet.

[0009] As such a luminous sheet for a key cylinder, for example, it is conceivable to adopt one in which a surface of a luminous layer having a luminous pigment is coated with a transparent synthetic resin layer containing an ultraviolet ray absorbent and characters or signs are printed on a surface of the transparent synthetic resin layer.

[0010] Thereby, in the case in which the luminous sheet is adopted, it is advantageous to avoid that the key hits the luminous sheet when the key is inserted and therefore does not damage the luminous sheet.

[0011] In addition, it is desirable that the luminous layer is not deteriorated by sunlight when the luminous sheet is used outdoors for a long period of time, and a luminous performance decreases. In other words, when characters or the like are printed on the surface of the transparent synthetic resin layer as described above, it is advantageous that a boundary part between the printed layer and the luminous layer is not being sunburned due to heat unevenness and the luminous layer is deteriorated to be faded (whitened).

[0012] According to a preferred embodiment of the present invention, the key cylinder which, in the case in which a luminous sheet is disposed in an outer peripheral part of a key insertion hole, can prevent damage to the luminous sheet at the time when a key is inserted and can prevent deterioration of the luminous sheet due to sunburn.

[0013] Therein, preferably the key cylinder is adapted such that a key is inserted in a key insertion hole and turned, comprises a luminous sheet, which is constituted by providing, further on a surface side than a luminous layer having a luminescent function, a protective layer having transparency, which makes light storage of the luminous layer possible, and having a hardness equal to or more than a predetermined value is disposed so as to surround at least a part of the key insertion hole.

[0014] According to another embodiment, the key cylinder which is adapted such that a key is inserted in a key insertion hole and turned, comprises a luminous sheet, which includes at least a key insertion surface on which the key insertion hole is formed, an outer surface located further on an outer side than the key insertion surface, and a joining surface joining the outer surface and the key insertion surface and has a luminescent function, is disposed on the outer surface such that an inner edge of the luminous sheet is located on the outside of the joining surface and so as to surround at least a part of the key insertion hole.

[0015] Preferably, the key cylinder which is adapted such that a key is inserted in a key insertion hole and turned, comprises a luminous sheet, which has a luminescent function and has an indication portion with which it is possible to estimate a position of the key insertion hole, is disposed so as to surround at least a part of the key insertion hole.

[0016] According to still another embodiment, the key cylinder which is adapted such that a key is inserted in a key insertion hole and turned, comprises a luminous sheet, which includes at least a key insertion surface on which the key insertion hole is formed, an outer surface located further on an outer side than the key insertion surface, and a joining surface joining the outer surface and the key insertion surface, has a luminescent function, and has an indication portion with which it is possible to estimate a position of the key insertion hole, is disposed on the outer surface such that an inner edge of the luminous sheet is located on the outside of the joining surface and so as to surround at least a part of the key insertion hole.

[0017] Moreover, the key cylinder according to any

one of the above embodiments, preferably comprises a luminous sheet that has a structure in which, further on a surface side than a luminous layer having a luminescent function, a protective layer having transparency, which makes light storage of the luminous layer possible, and having a hardness equal to or more than a predetermined value is provided.

[0018] Therein, preferably the luminous sheet includes an ultraviolet ray blocking layer further on the surface side than the luminous layer or a protective agent against ultraviolet ray is contained in the luminous layer.

[0019] More preferably, the luminous sheet includes an adhesive layer which makes it possible to attach and detach the luminous sheet to and from a key cylinder main body.

[0020] Since the protective layer, which has a hardness equal to or more than a predetermined value, for example, a hardness of a degree which is sufficient for preventing the protective layer from being damaged visually recognizably at the time when the key is inserted, is provided further on a surface side than the luminous layer, not only the protective layer but also the luminous layer can be prevented from being damaged even if the key hits the key cylinder, and deterioration of a luminous performance and appearance can be prevented.

[0021] Since the luminous sheet is disposed on the outer surface on the outside of the joining surface, the luminous sheet can be arranged in a position apart from the key insertion hole while visibility of the key insertion hole is secured, a key hardly hits the luminous sheet, and damage to the luminous sheet can be prevented.

[0022] Even more, since the luminous sheet provided with the indication portion, which indicates an inserting position of the key insertion hole, is disposed, the key inserting position can be visually recognized easily even in the dark. In addition, since key insertion is easy, a key can be prevented from hitting the luminous sheet at the time when a key is inserted, and damage to the luminous sheet can be prevented.

[0023] Further, since the luminous sheet provided with the indication portion, which indicates an inserting position of the key insertion hole, is disposed on the outer surface on the outside of the joining surface, the luminous sheet can be arranged in a position apart from the key insertion hole, a key hardly hits the luminous sheet, and besides, a key inserting position can be visually recognized easily even in the dark, and damage to the luminous sheet can be prevented more surely.

[0024] Moreover, since the protective layer having hardness equal to or more than a predetermined value is provided further on the surface side than the luminous layer, not only the protective layer but also the luminous layer can be prevented from being damaged even if a key hits the key cylinder, and deterioration of a luminous performance and appearance can be prevented.

[0025] Since the ultraviolet ray blocking layer is provided further on the surface side than the luminous layer or the protective agent against ultraviolet ray is contained in the luminous layer, an ultraviolet ray of the sunlight can be controlled not to reach the luminous layer, for example, even in the case in which the key cylinder is used outdoors for a long period of time, fading and deterioration due to sunburn can be controlled.

[0026] Also, since the adhesive layer, which makes it possible to attach and detach the luminous sheet to and from the key cylinder main body, is provided in the luminous sheet, work for attaching the luminous sheet to the key cylinder main body can be performed easily, and for example, it becomes possible to replace the luminous sheet in the case in which the luminous sheet is damaged or deteriorated.

[0027] Further, for a motorcycle of the above kind, the above object is solved in an inventive manner by the features of claim 10.

[0028] Further preferred embodiments of the invention are subject to the respective subclaims.

[0029] In the following, preferred embodiments of the invention will be explained in connection with the attached drawings, wherein:

Figs. 1a,b	are lamination diagrams of a luminous sheet according to a first embodiment of the present invention, showing two alternatives (a),(b) in lamination set up;
Fig. 2	is a plan view of the luminous sheet;
Fig. 3	is a partial sectional view of the key cylinder;
Fig. 4	is a plan view of a main switch provided with the key cylinder;
Fig. 5	is a front view of the main switch provided with the key cylinder;
Fig. 6	is a side view of the main switch provided with the key cylinder:
Fig. 7	is a rear view of a leg shield of a motorcycle viewed in a state in which a driver is seated on a seat;
Fig. 8	is a side view of a motorcycle in which the key cylinder is disposed;
Figs. 9a,b	are diagrams of a luminous sheet showing an effect of the embodiment before (a) and after (b) a testing phase;
Figs. 10a,b	are diagrams showing comparative examples of the luminous sheet of the embodiment;
Figs. 11a,b,c	are diagrams showing modified examples of the luminous sheet;

Figs. 12a,b are diagrams showing modified examples of the luminous sheet;

Figs. 13a,b,c are diagrams showing modified examples of the luminous sheet;

Fig. 14 is a sectional view showing a modified example of a key insertion surface of the key cylinder;

Figs. 15a,b are sectional views showing modified examples of an outer surface of the key cylinder;

Figs. 16a,b are sectional views showing modified examples of the outer surface;

Figs. 17a,b are sectional views showing modified examples of a joining surface of the key cylinder;

Figs. 18a,b are sectional views showing modified examples of the joining surface;

Figs. 19a,b are lamination diagrams of a luminous sheet according to a second embodiment of the present invention;

Fig. 20 is a lamination diagram of a luminous sheet according to a third embodiment of the present invention;

Figs. 21a,b are lamination diagrams showing a fourth embodiment of the present invention;

Fig. 22 is a lamination diagram of a luminous sheet according to a fifth embodiment of the present invention; and

Fig. 23 is a lamination diagram of a luminous sheet according to a sixth embodiment of the present invention.

[0030] Figs. 1 to 8 are diagrams for explaining a key cylinder according to an embodiment (first embodiment) of the present invention.

[0031] In the figures, reference numeral 1 denotes a motorcycle, in particular a scooter type motorcycle. The scooter type motorcycle 1 has a schematic structure in which a front wheel 3 is disposed on a front fork 2 which is pivotally supported by a not-shown body frame, a rear wheel 5 is disposed on a swing type engine unit 4 which is pivotally supported so as to be swingable vertically, and a seat 6 is mounted between the front and rear wheels 3 and 5. A steering handle bar 7 is fixed to the front fork 2 with the intervention of a steering shaft (not shown).

[0032] The body frame is surrounded by a body cover 8. The body cover 8 mainly includes a cowling 9 disposed on the front side of the steering handle bar 7, a leg shield 10 disposed on the rear side of the cowling 9, foot boards 11 constituting foot rest portions, and side covers 12 covering left and right lower parts of the seat 6. A screen 13 is disposed on the cowling 9.

[0033] A meter panel 15 is disposed in an opening portion surrounded by the upper edge of the cowling 9 and the upper edge of the leg shield 10. A steering through-hole 15a is formed in the central part of the meter panel 15. A meter unit 16, in which meters such as a speedometer, a fuel meter, and a water temperature meter are disposed, is disposed on the front side of the steering through-hole 15a. In addition, a meter visor 15b for shielding light from the front is vertically formed on the front side of the meter unit 16.

[0034] Pocket portions 10a and 10b are formed on the left and right sides of the leg shield 10. The respective pocket portions 10a and 10b are constituted by swelling out a part of the leg shield 10 to the front to form box portions, and so as to open and close openings of the box portions with lids 17 and 18.

[0035] An attachment seat 10c recessed on the front side of the vehicle is formed to the right from the center of the vehicle between the left and right pocket portion 10a and 10b, and a main switch device 20 is disposed on the attachment seat 10c.

[0036] This main switch device 20 is constituted by integrally connecting an immobilizer unit 21 for preventing theft and mischief and a main switch unit 22. In addition, the main switch device 20 is bolted and fixed to a body frame via bracket portion 21a formed in the immobilizer unit 21.

[0037] The main switch unit 22 has a structure in which a key cylinder 25 is mounted and fixed in a cylinder case portion 23a formed in a unit case 23, and a wiring cable 26 electrically connected to the key cylinder 25 is clamped to a concave box portion 23b formed in the unit case 23.

[0038] The key cylinder 25 includes a cylinder main body 28 which supports a cylindrical key insertion portion 27 having a key insertion hole 27a to be pivotable among ON-OFF-LOCK-P. The key cylinder 25 is adapted such that a key 29 is inserted in the key insertion hole 27a and turned to thereby turn ON/OFF an ignition device and lock/unlock a steering lock device.

[0039] The upper end of the cylinder case portion 23a projects to the rear of the vehicle from the attachment seat 10c of the leg shield 10. Recessed and projected patterns are formed on an external peripheral surface of the projected portion by embossing.

[0040] A circular opening 23d is formed in a projected end face 23c of the cylinder case portion 23a. A tongue piece portion 23e, which curves in an R shape to a center side of the opening 23d in a transverse sectional view, is formed annularly in the periphery of the opening 23d. The upper end face of the cylinder main body 28 is in

abutment against this tongue piece portion 23e, whereby the key insertion hole 27a is recessed to the front side of the vehicle from the upper end face 23c of the cylinder case 23a. In addition, a seal ring 30 is intervened between the cylinder main body 28 and the tongue piece portion 23e.

[0041] A key insertion surface 27a', on which the key insertion hole 27a is formed, of the key insertion portion 27 is formed so as to be coplanar with the key insertion hole 27a. In addition, the projected end face 23c, which is an outer surface located on the outside of the key insertion surface 27a', is formed in parallel with the key insertion surface 27a', and the tongue piece portion 23e, which serves as a joining surface joining the key insertion surface 27a' and the outer surface (projected end face) 23c, is formed in the R shape.

[0042] An annular sheet groove 23f is formed in the external peripheral part of the upper end face 23c, which is located on the outside of the joining surface 23e, of the cylinder case portion 23a so as to surround the key insertion hole 27a. A luminous sheet 33 formed in an annular shape is disposed in this sheet groove 23f so as to be flush with the outer surface 23c.

[0043] This luminous sheet 33 is positioned so as not to be pivotable by engaging a notched recess portion 33a (positioning engagement portion) formed therein with an engagement portion 23g formed in the sheet groove 23f. By engaging the notched recessed portion 33a of the luminous sheet 33 with the engagement portion 23g, positioning of an operation position of the key insertion portion 27 and characters of the luminous sheet 33 can be performed easily.

[0044] Further, the luminous sheet 33 includes: a protective layer 34 made of transparent synthetic resin, which has a hardness equal to or more than a predetermined value, that is, a hardness of a degree which is sufficient for preventing the protective layer from being damaged visually recognizably even if the key 29 hits the protective layer at the time when the key 29 is inserted; a printed layer 35, which is arranged on the back side of the protective layer 34 and on which the characters such as ON-OFF-LOCK-P and signs such as an arrow are printed; a luminous layer 36 arranged on the backside of the printed layer 35; and an ultraviolet ray blocking layer 37 arranged on the surface of the protective layer 34, and has a structure in which these respective layers are stacked and adhered. Moreover, an adhesive layer 38 is arranged on the backside of the luminous layer 36. The luminous sheet 33 is detachably adhered to and fixed in the sheet groove 23f by the adhesive layer 38.

[0045] As shown in Fig. 1(a), the luminous sheet 33 is manufactured by, in order from the surface side, stacking the ultraviolet ray blocking layer 37, the protective layer 34, and the printed layer 35, applying a luminous paint on the printed layer 35 to form the luminous layer 36, and stacking the adhesive layer 38 on the luminous layer 36. Note that, in the manufacturing of the luminous sheet 33, the luminous sheet 33 is manufactured in a vertically reversed state with the ultraviolet ray blocking layer 37 on the top side put on the bottom side.

[0046] Here, in the case in which the luminous sheet 33 is manufactured by the above-mentioned manufacturing method, the luminous layer 36 is formed as a part of the luminous paint intrudes so as to fill spaces among the characters of the printed layer 35. This part 36a in which the luminous paint has intruded performs an original function. Therefore, a part 36b located on the rear side of the characters and the like of this luminous layer 36 may be thin. Thus, only a small amount of the luminous paint is required.

[0047] The protective layer 34 is constituted by a PET laminate layer consisting of, for example, polyethylene resin, urethane resin, polycarbonate resin, acrylic resin, polypropylene resin, or the like. This protective layer 34 is constituted by a PET laminate layer, whereby transparency and strength thereof can be increased, and damage at the time when a key is inserted can be prevented surely. In addition, the ultraviolet ray blocking layer 37 is constituted by a compound having a function of cutting an ultraviolet ray of sunlight.

[0048] The luminous layer 36 consists of a luminescent pigment and a binder and has a function of absorbing and storing the sunlight, lamp light, and the like and emitting stored light. This luminous layer 36 is constituted by a phosphor containing sulfide and zinc sulfide, which are alkali-earth metals, as main component added with a slight amount of heavy metal. Here, it is possible to increase a phosphorescence performance by adding a radioactive element such as radium, whereby it becomes possible to make the layer to emit light for a long time in the dark.

[0049] Figs. 9 and 10 are diagrams showing a result of a test which was performed for confirming the effect of the embodiment. In this test, a luminous sheet, in which a printed layer and a luminous layer were arranged on a backside of a protective layer and an ultraviolet ray blocking layer was arranged on a surface thereof, was prepared, and an ultraviolet ray was irradiated on the luminous sheet for a long time to check a state of fading of the printed layer (see Figs. 9(a) and 9(b)). In addition, for comparison, a fading state was also checked for a luminous sheet which did not include an ultraviolet ray blocking layer (see Figs. 10 (a) and 10(b)).

[0050] As shown in Fig. 10(b), in the luminous sheet prepared for comparison, character parts were faded due to sunburn. In particular, fading of character parts indicated as IGNITION and ON was conspicuous. On the other hand, in the case of the luminous sheet of this embodiment, fading did not occur at all over the entire character parts.

[0051] In this way, according to this embodiment, the luminous sheet 33 is constituted by sequentially arranging the printed layer 35, on which the characters such as ON-OFF-LOCK and the signs are printed, and the luminous layer 36 on the back side of the protective layer

34 consisting of PET laminate and arranging the ultraviolet ray blocking layer 37 on the surface of the protective layer 34. Thus, an ultraviolet ray of the sunlight rarely reaches the printed layer 35 and the luminous layer 36, and even in the case in which the body is used outdoors for a long period of time, fading due to sunburn can be prevented, and deterioration of the luminous layer 36 can be controlled.

[0052] In addition, since the protective layer 34 is constituted by PET laminate resin having a hardness equal to or more than a predetermined value, even if the key 29 hits the luminous sheet 33 at the time when the key is inserted, not only the protective layer 34 but also the luminous layer 36 can be prevented from being damaged, and deterioration of a luminous performance and appearance can be prevented.

[0053] Moreover, since the adhesive layer 38 is arranged on the back side of the luminous layer 36, the luminous sheet 33 can be attached surely by simple work of adhering the adhesive layer 38 to the sheet groove 23f of the cylinder case portion 23a, and replacement of the luminous sheet 33 due to damage and deterioration becomes possible.

[0054] In this embodiment, since the luminous sheet 33 is arranged on the outer surface 23c on the outside of the joining surface 23e of the key cylinder 25, while visibility of the key insertion hole 27a is secured, the luminous sheet 33 can be arranged in a position apart from the key insertion hole 27a, and the key 29 is prevented from hitting the luminous sheet 33. In this regard, damage to the luminous sheet 33 can also be prevented.

[0055] Since the luminous sheet 33 is formed in an annular shape so as to surround the outside perimeter of the key insertion hole 27a, a key inserting position can be visually recognized easily even in the dark.

[0056] In addition, the luminous sheet 33 is manufactured by, in order from the ultraviolet ray blocking layer 37 on the surface side, stacking the protective layer 34 and the printed layer 35, forming the luminous layer 36 by applying a luminous paint to the printed layer 35 to form the luminous layer 36, and stacking the adhesive layer 38 on the luminous layer. Thus, an amount of the luminous paint required for the manufacturing can be controlled to be minimum, and as a result, cost can be reduced.

[0057] Note that, in the embodiment, the case in which the luminous sheet is manufactured by sequentially stacking the layers from the surface side is explained. However, in the present invention, the luminous sheet 33 may be manufactured by sequentially stacking the layers in order from the adhesive layer on the back side. In such a case, as shown in Fig. 1(b), the luminous layer 36 is formed by stacking a luminous film of a thin film state on the adhesive layer 38. In the case in which the luminous sheet 33 is manufactured by this manufacturing method, the luminous layer 36 can be formed in a separate process, and a reduction in cost can be realized.

[0058] In addition, in the embodiment, the case in which the luminous sheet 33 is formed in an annular shape is explained. However, the luminous sheet of the present invention is not limited to this shape, and various modified examples are possible. For example, as shown in Fig. 11(a), a projection 33b of an arrow shape may be formed in a position corresponding to ON or OFF of the annular luminous sheet 33.

[0059] Fig. 11(b) is an example in which a luminous sheet 40 is formed generally in a C shape opening at the bottom, and this luminous sheet 40 is arranged so as to surround an outer periphery of a key insertion hole. In addition, Fig. 11(c) is an example in which a luminous sheet 41 is divided into a pair of luminous sheet portions 41a and 41b, which are arranged so as to surround an outer periphery of a key insertion hole.

[0060] Fig. 12(a) is an example in which a luminance sheet 42 is constituted by four luminous portions 42a to 42d, and the respective luminous portions 42a to 42d are disposed at an interval of 90 degrees so as to surround an outer periphery of the key insertion hole 27a. In addition, Fig. 12(b) is an example in which two luminous portions 42a and 42c are disposed so as to be opposed to each other across the key insertion hole 27a.

[0061] Further, Fig. 13(a) is an example in which a luminous sheet 43 of a triangle shape is arranged in one part on an upper side of the key insertion hole 27a, which is formed in a vertical orientation, from the viewpoint of indicating only an OFF position of the key insertion hole 27a. Fig. 13(b) is an example in which two luminous sheets 43, 43 are arranged in two parts in upper and lower sides of the inclined key insertion hole 27a. Fig. 13(c) is an example in which a luminous sheet 44 of a chip shape, on which characters of OFF are printed, is arranged. In any one of the examples, the luminous sheet is an indication portion which indicates a position of the key insertion hole 27a so as to be easily recognized visually. In addition, a shape and an arrangement relation of the luminous sheet can be set freely according to key cylinder specifications, and versatility of the luminous sheet can be improved.

[0062] In the embodiment, the key insertion surface 27a', on which the key insertion hole 27a is formed, is formed so as to be coplanar with an outer edge surface S of the key insertion hole 27a. However, in the present invention, as shown in Fig. 14, the key insertion surface 27a' may be formed such that the key insertion surface 27a' is parallel with the outer surface 23c and a distance to the outer edge surface S is set smaller than a distance to the outer surface 23c, that is, in a stepped shape with respect to the outer edge surface S of the key insertion hole 27a.

[0063] In addition, concerning the outer surface 23c, a case in which an inclined surface 23c' for chamfering is formed at an upper edge of the joining surface 23e as shown in Fig. 15(a) and a case in which a stepped surface 23c" is formed at an upper edge of the joining sur-

face 23e as shown in Fig. 15(b) are also induded. In these cases, it is also possible to dispose a luminous sheet on the inclined surface 23c' or the stepped surface 23c" constituting the outer surface 23c. Moreover, a case in which the outer surface 23c is inclined with respect to the key insertion surface 27a' as shown in Fig. 16(a) and a case in which the outer surface 23c is inclined continuously from the joining surface 23e as shown in Fig. 16(b) are also included.

[0064] Concerning the joining surface 23e, a case in which the joining surface 23e is formed to be a vertical surface 23e' with respect to the key insertion surface 27a' as shown in Fig. 17(a) and a case in which the joining surface 23e is formed to be an inclined surface 23" with respect to the key insertion surface 27a as shown in Fig. 17(b) are also included. In addition, a case in which both the vertical surface 23e' and the inclined surface 23e" are provided with respect to the key insertion surface 27a' as shown in Fig. 18(a) and a case in which both the inclined surface 23e" and the vertical surface 23e' are provided with respect to the key insertion surface 27a' as shown in Fig. 18(b) are also included.

[0065] Figs. 19(a) and (b) are diagrams for explaining a luminous sheet according to a second embodiment of the present invention. In the figures, reference numerals and signs identical with those in Fig. 1 denote identical or equivalent portions.

[0066] As shown in Fig. 19(a), a luminous sheet 50 of this embodiment is manufactured by, in order from the surface side, stacking the printed layer 35, on which characters, signs, patterns, and the like are printed, on a protective layer 34', which has transparency and has a hardness equal to or more than a predetermined value and is subjected to ultraviolet ray blocking treatment, applying a luminous paint having a luminous function on the printed layer 35 to form the luminous layer 36, and stacking the adhesive layer 38 for adhering the luminous sheet 50 to a key cylinder main body on the luminous layer 36.

[0067] In this way, in this embodiment, substantially the same effect as the first embodiment is obtained. In particular, since the luminous layer 36 is formed by applying the luminous paint on the printed layer 35, an amount of the luminous paint required for the manufacturing can be controlled to be minimum, and as a result, which makes it possible to reduce cost.

[0068] Note that, in the embodiment, the case in which the luminous sheet 50 is manufactured by sequentially stacking the layers from the surface side is explained. However, this luminous sheet 50 may be manufactured by sequentially stacking the layers from the adhesive layer 38 on the back side as shown in Fig. 19(b). In this case, the luminous layer 36 is formed by stacking a luminous film of a thin film state on the adhesive layer 38. In the case in which the luminous sheet is manufactured by this manufacturing method, the luminous layer 36 can be formed in a separate process, and a reduction in cost can be realized.

[0069] Fig. 20 is a diagram for explaining a luminous sheet according to a third embodiment of the present invention. In the figure, reference numerals and signs identical with those in Fig. 1 denotes identical or equivalent portions.

[0070] A luminous sheet 51 of this embodiment is formed by the protective layer 34 having transparency and having a hardness equal to or more than a predetermined value, the printed layer 35 on which characters, signs, patterns, and the like are printed, the ultraviolet ray blocking layer 37 having transparency, the luminous layer 36 having a luminescent function, and the adhesive layer 38 for adhering the luminous sheet 51 to a key cylinder main body. This luminous sheet 51 is manufactured by stacking a luminous film of a thin film state on the adhesive layer 38 to form the luminous layer 36 and sequentially stacking the ultraviolet ray blocking layer 37, the printed layer 35, and the protective layer 34 on the luminous layer 36. In this embodiment, the luminous layer 36 can be formed in a separate process, and a reduction in cost can be realized in the same manner as above.

[0071] Moreover, in the embodiment of Figs. 19(a) and (b), the protective layer 34' is subjected to the ultraviolet ray blocking treatment. However, as a fourth embodiment is shown in Figs. 21(a) and (b), a luminous layer 36' may be subjected to the ultraviolet ray blocking treatment. In the case in which the luminous sheet 50 is manufactured in this way, the same actions and advantages as the second embodiment in Figs. 19(a) and (b) are obtained.

[0072] Fig. 22 is a diagram for explaining a luminous sheet according to a fifth embodiment of the present invention. In the figure, reference numerals and signs identical with those in Fig. 1 denote identical or equivalent portions.

[0073] A luminous sheet 52 of this embodiment is formed by the protective layer 34 consisting of a protecting film having transparency and having a hardness equal to or more than a predetermined value and a transparent PETP, the printed layer 35 constituted by printing characters, signs, patterns, and the like on the back side of the protective layer 34, the luminous layer 36 formed by applying a luminous paint having a luminescent function plural times, and the adhesive layer 38 consisting of a couple-face tape.

[0074] In this embodiment, since the protective layer 34 and the printed layer 35 are stacked, and a luminous paint is applied to the printed layer 35 to form the luminous layer, a required amount of the luminous paint can be reduced as in the case of Fig. 1(a), and cost can be reduced.

[0075] Fig. 23 is a diagram for explaining a luminous sheet according to a sixth embodiment of the present invention. In the figure, reference numerals and signals identical with those in Fig. 1 denote identical or equivalent portions.

[0076] A luminous sheet 53 of this embodiment is

formed by the protective layer 34 consisting of a protecting film having transparency and having a hardness equal to or more than a predetermined value and a PET laminate, the luminous layer 36 consisting of a luminous film of a thin film state, on an upper surface of which the printed layer 35 consisting of characters, signs, patterns, and the like are formed, and the adhesive layer 38.

[0077] In this embodiment, the luminous sheet 53 is manufactured by stacking a luminous film on the adhesive layer 38 to form the luminous layer 36 and sequentially stacking the printed layer 35 and the protective layer 34 consisting of the protecting film and the PET laminate on the luminous layer 36. In this embodiment, the luminous layer 36 can be formed in a separate process.

[0078] Here, as described in the above-mentioned first to sixth embodiment, concerning the luminous sheet of the present invention, a case in which the luminous sheet is constituted as described below is included.

[0079] In short, a position for attaching the luminous sheet to the key cylinder main body is decided by a positioning engagement portion. The luminous sheet is formed in an annular shape surrounding the perimeter of the key insertion hole. The luminous sheet is constituted by plural luminous portions, and the respective luminous portions are disposed to be spaced apart from each other so as to surround the key insertion hole. The luminous sheet has a luminous layer only in an indication portion which indicates a position of the key insertion hole.

[0080] In addition, concerning the key cylinder, a case in which the key cylinder is constituted as described below is included.

[0081] The key insertion surface is coplanar with the outer edge surface of the key insertion hole or is a stepped plane which is substantially parallel with the outer edge surface and in which a distance to the outer edge surface is set smaller than a distance to the outer surface. The outer surface is a surface parallel with the key insertion surface or an inclined surface with respect to the key insertion surface, or a surface further having a stepped plane or an inclined surface for chamfering in a boundary part with the joining surface. The joining surface is a surface perpendicular to the key insertion surface or an inclined surface with respect to the key insertion surface, or a surface including both the vertical surface and the inclined surface.

[0082] Concerning a stacked structure of the luminous sheet, a case described below is included.

[0083] In short, the luminous sheet is formed by stacking, in order from a surface side thereof, an ultraviolet ray blocking layer having transparency which makes light storage of a luminous layer possible, a protective layer having a hardness equal to or more than a predetermined value and having transparency which makes light storage of the luminous layer possible, a printed layer on which at least any one of characters, signs, and patterns are printed, the luminous layer having a luminescent function, and an adhesive layer for attaching the luminous sheet to a key cylinder main body. The luminous sheet is formed by stacking, in order from the surface side, a protective layer having transparency which makes light storage of a luminous layer possible, having a hardness equal to or more than a predetermined value, and subjected to ultraviolet ray blocking treatment, a printed layer on which at least any one of characters, signs, and patterns are printed, the luminous layer having a luminescent function, and an adhesive layer for attaching the luminous sheet to a key cylinder main body. In addition, the luminous sheet is formed by stacking, in order from the surface side, a protective layer having transparency which makes light storage of a luminous layer possible and having a hardness equal to or more than a predetermined value, a printed layer on which any one of characters, signs, and patterns are printed, an ultraviolet ray blocking layer having transparency which makes light storage of a luminous layer possible, the luminous layer having a luminescent function, and an adhesive layer for attaching the luminous sheet to a key cylinder main body. Moreover, the luminous sheet is formed by stacking, in order from the surface side, a protective layer having transparency which makes light storage of a luminous layer possible and having a hardness equal to or more than a predetermined value, a printed layer on which at least any one of characters, signs, and patterns are printed, the luminous layer having a luminescent function and subjected to ultraviolet ray blocking treatment, and an adhesive layer for attaching the luminous sheet to a key cylinder main body.

[0084] Concerning the manufacturing of the luminous sheet, luminous sheets manufactured as described below are included.

[0085] The protective layer and the printed layer are stacked and formed on the ultraviolet ray blocking layer, the luminous layer is formed by applying a luminous paint on the printed layer, and the adhesive layer is formed on the luminous layer. The luminous layer is formed by stacking a luminous film of a thin film state on the adhesive layer, the printed layer, the protective layer, and the ultraviolet ray blocking layer are stacked and formed on the luminous layer. The printed layer is stacked and formed on the protective layer subjected to ultraviolet ray blocking treatment, and the luminous layer is formed by applying a luminous paint on the printed layer, and the adhesive layer is formed on the luminous layer. The luminous layer is formed by stacking a luminous film of a thin film state on the adhesive layer, and the printed layer and the protective layer subjected to ultraviolet ray blocking treatment are stacked and formed on the luminous layer. In addition, the luminous layer is formed by stacking a luminous film of a thin film state on the adhesive layer, and the ultraviolet ray blocking layer, the printed layer, and the protective layer are stacked and formed on the luminous layer. The printed

layer is formed on the protective layer, the luminous layer is formed by applying a luminous paint subjected to ultraviolet ray blocking treatment on the printed layer, and the adhesive layer is formed on the luminous layer. Moreover, the luminous layer is formed by stacking a luminous film of a thin film state subjected to ultraviolet ray blocking treatment on the adhesive layer, and the printed layer and the protective layer are stacked and formed on the luminous layer.

[0086] Note that, in the respective embodiments, the embodiments are explained with the case in which the present invention is applied to a key cylinder of a main switch device of a motorcycle as an example. However, the present invention is not limited to this case and, for example, is applicable to any key cylinder as long as the key cylinder is often used outdoors for a long period of time such as a door key for a front door of an automobile.

[0087] As described before, in order to provide a key cylinder which can prevent a luminous sheet from being damaged when a key is inserted in the case in which the luminous sheet is disposed so as to surround a key insertion hole, a key cylinder is proposed which is adapted such that a key is inserted in a key insertion hole and turned, comprising a luminous sheet 33, which is constituted by providing, further on a surface side than a luminous layer 36 having a luminescent function, a protective layer 34 having transparency which makes light storage of the luminous layer 36 possible and having a hardness equal to or more than a predetermined value, which is disposed so as to surround at least a part of the key insertion hole.

Claims

1. Key cylinder having a key insertion hole (27a), **characterized in that** a luminous sheet (33,40-44,50-53) is provided which at least partially surrounds the key insertion hole (27a).

2. Key cylinder according to claim 1, **characterized in that** the luminous sheet (33,40-44,50-53) has an indication portion by means of which a position of the key insertion hole (27a) can be estimated and which at least partially surrounds the key insertion hole (27a).

3. Key cylinder according to claim 1 or 2, **characterized in that** the luminous sheet (33,40-44,50-53) includes at least a key insertion surface (27a') on which the key insertion hole (27a) is formed, an outer surface (23c) located further on an outer side than the key insertion surface (27a'), and a joining surface (23e) joining the outer surface (23c) and the key insertion surface (27a').

4. Key cylinder according to claim 3, **characterized in that** the luminous sheet (33,40-44,50-53) is disposed on the outer surface (23c) such that an inner edge of the luminous sheet (33,40-44,50-53) is located on the outside of the joining surface (23e) and so as to surround at least a part of the key insertion hole (27a).

5. Key cylinder according to at least one of claims 1 to 4, **characterized in that** the luminous sheet (33,40-44,50-53) has a structure in which, further on a surface side than a luminous layer (36) having a luminescent function, a protective layer (34) having transparency, which makes light storage of the luminous layer (36) possible, and having a hardness equal to or more than a predetermined value is provided.

6. Key cylinder according to at least one of claims 1 to 5, **characterized in that** the luminous sheet (33,40-44,50-53) includes an ultraviolet ray blocking layer (37) further on the surface side than the luminous layer (36) or a protective agent against ultraviolet ray is contained in the luminous layer (36).

7. Key cylinder according to at least one of claims 1 to 6, **characterized in that** the luminous sheet (33,40-44,50-53) includes an adhesive layer (38) which makes it possible to attach and/or detach the luminous sheet (33,40-44,50-53) to and from a key cylinder main body (28), and which preferably is provided on an inner side opposite to the surface side of the luminous sheet (33,40-44,50-53).

8. Key cylinder according to at least one of claims 1 to 7, **characterized in that** the luminous sheet (33,40-44,50-53) includes a printed layer (35) further on the surface side than the luminous layer (36,36b) and preferably further inwards than the protective layer (34) and/or the ultraviolet ray blocking layer (37).

9. Key cylinder according to at least one of claims 1 to 8, **characterized in that** a luminous layer (36,36a, 36) is provided in spaces among characters of the printed layer (35) and/or on an inner side of the printed layer (35).

10. Vehicle, in particular a motorcycle, preferably of the scooter type, having a switch unit (22) comprising a key cylinder (25), **characterized in that** the key cylinder (25) is configured according to at least one of claims 1 to 9.

Fig. 1

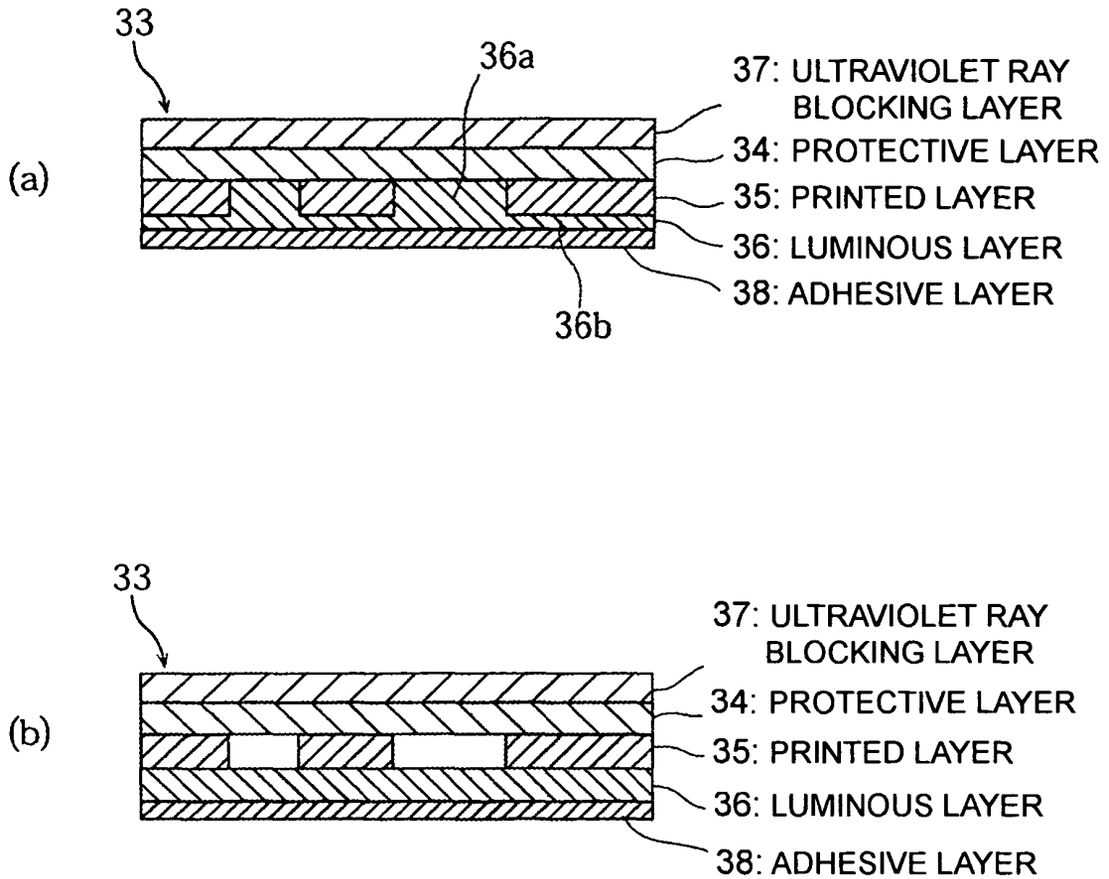

(a)
33
36a
37: ULTRAVIOLET RAY BLOCKING LAYER
34: PROTECTIVE LAYER
35: PRINTED LAYER
36: LUMINOUS LAYER
38: ADHESIVE LAYER
36b
(b)
33
37: ULTRAVIOLET RAY BLOCKING LAYER
34: PROTECTIVE LAYER
35: PRINTED LAYER
36: LUMINOUS LAYER
38: ADHESIVE LAYER

Fig. 2

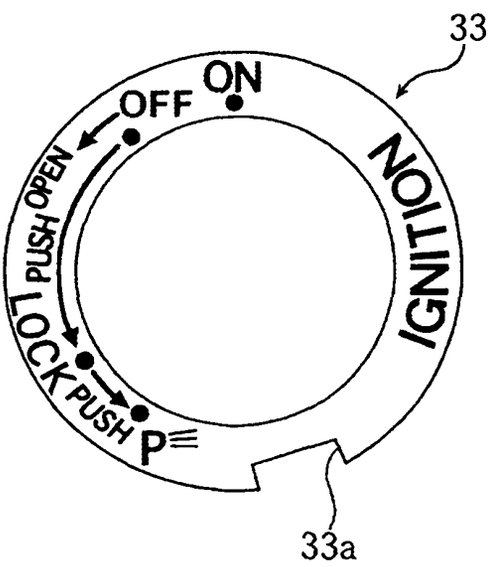

33
OFF
ON
IGNITION
PUSH OPEN
LOCK
PUSH
P
33a

Fig. 3

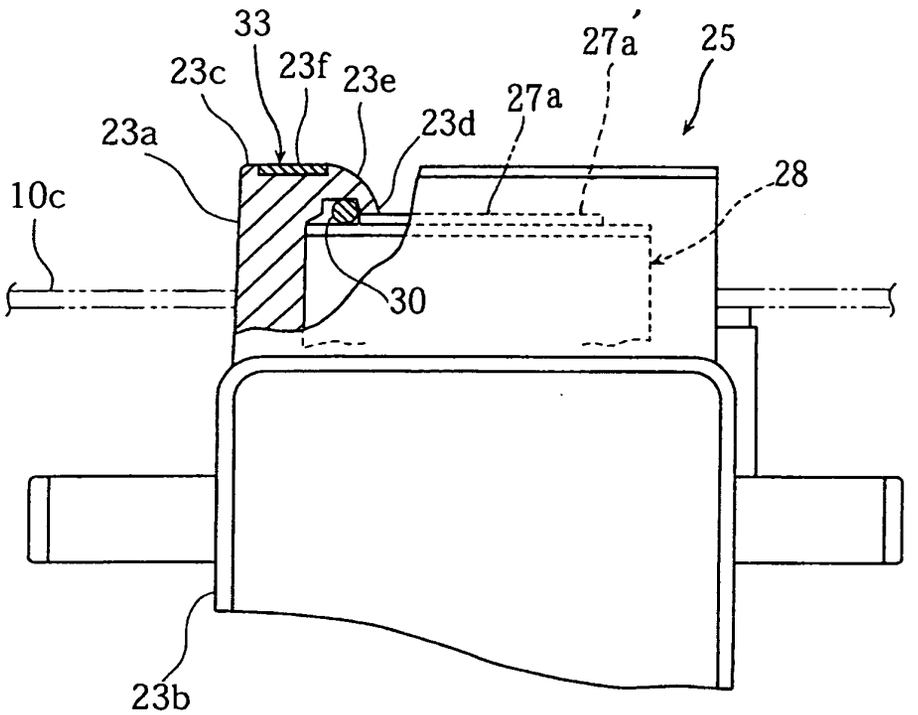

33
23c
23f
23e
27a
25
23a
23d
27a
28
10c
30
23b

Fig. 4

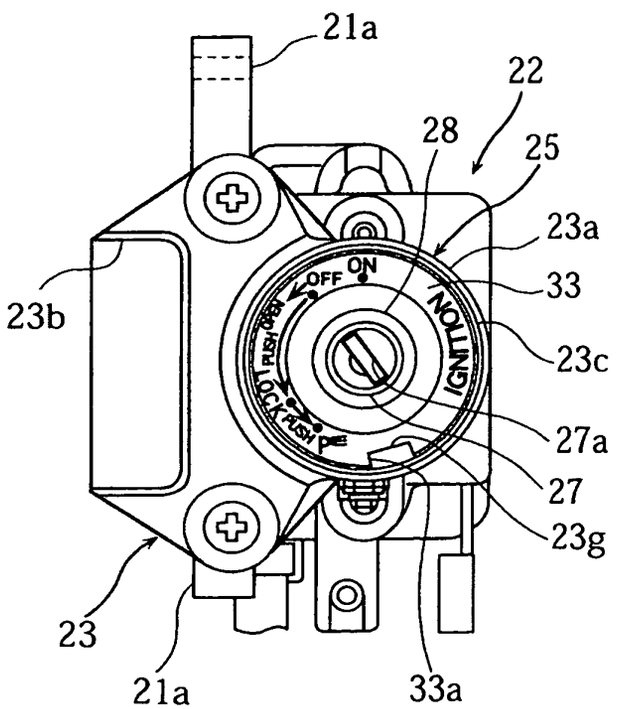

21a
22
28
25
23a
23b
OFF
ON
33
IGNITION
PUSH
PUSH
LOCK
23c
27a
27
23g
23
21a
33a

Fig. 5

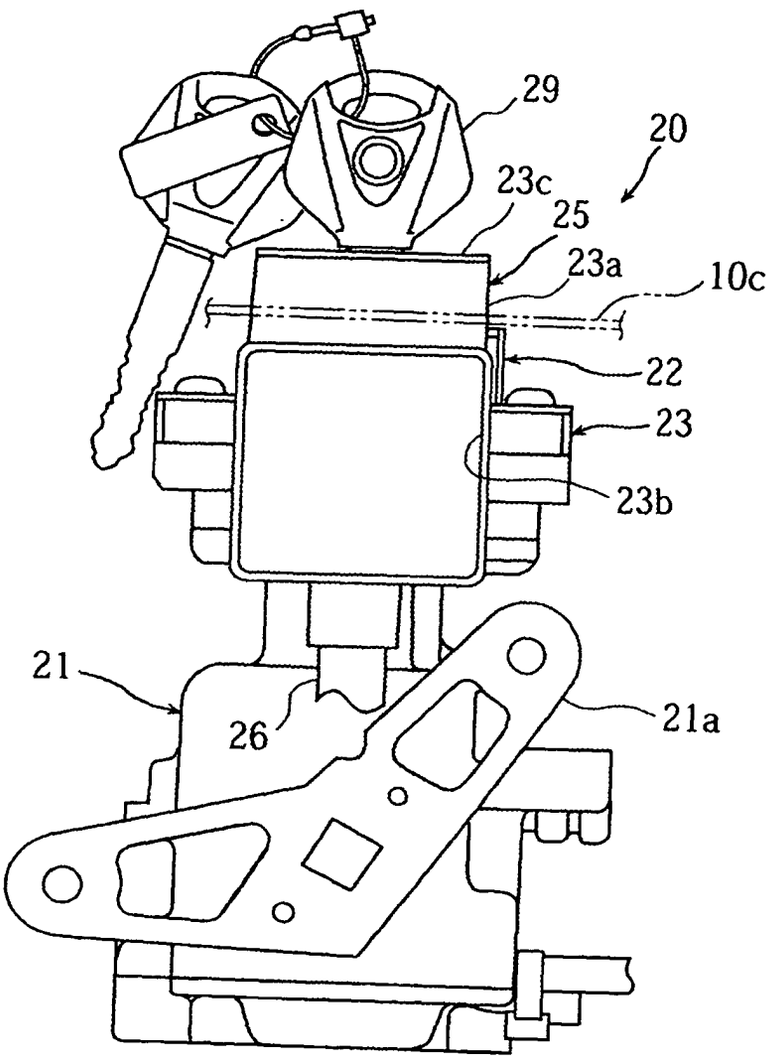


Fig. 6

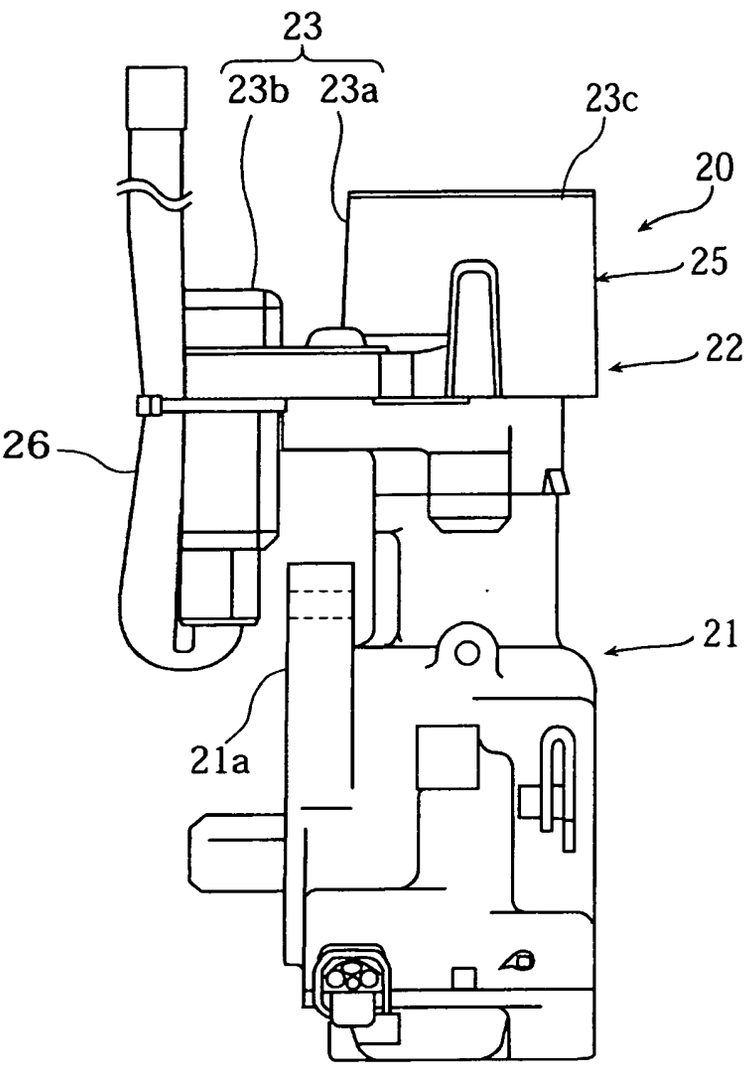


Fig. 7

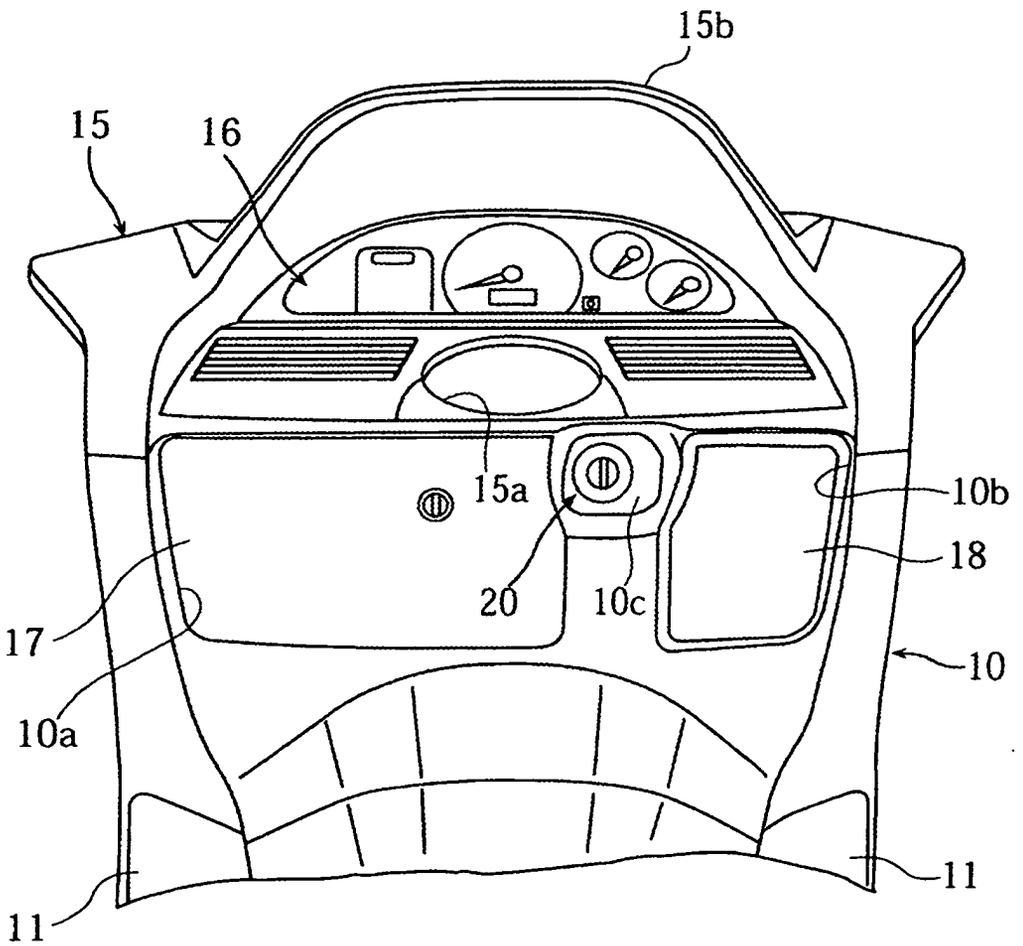


Fig. 8

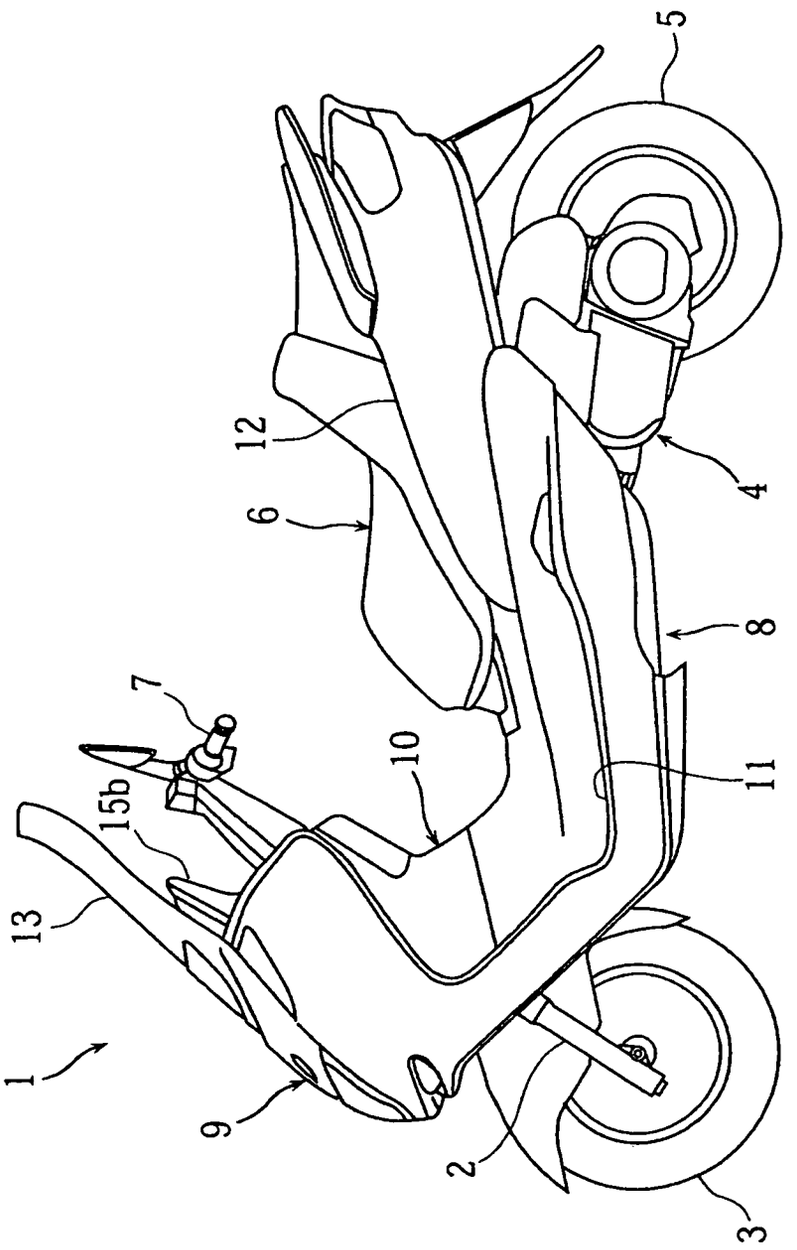


Fig. 9

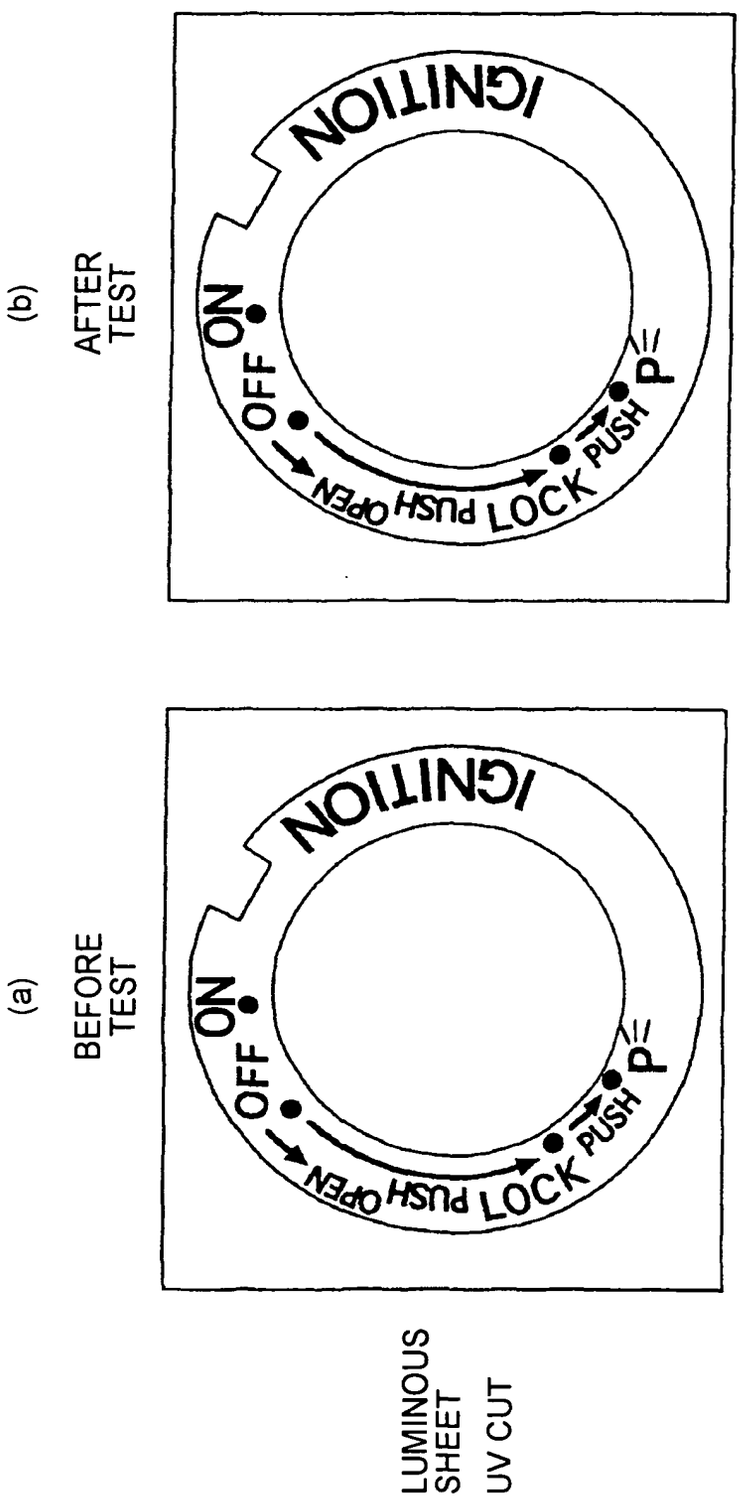

(b)
AFTER TEST
IGNITION
ON
OFF
PUSH OPEN
LOCK
PUSH
P
(a)
BEFORE TEST
IGNITION
ON
OFF
PUSH OPEN
LOCK
PUSH
P
LUMINOUS SHEET
UV CUT

Fig. 10

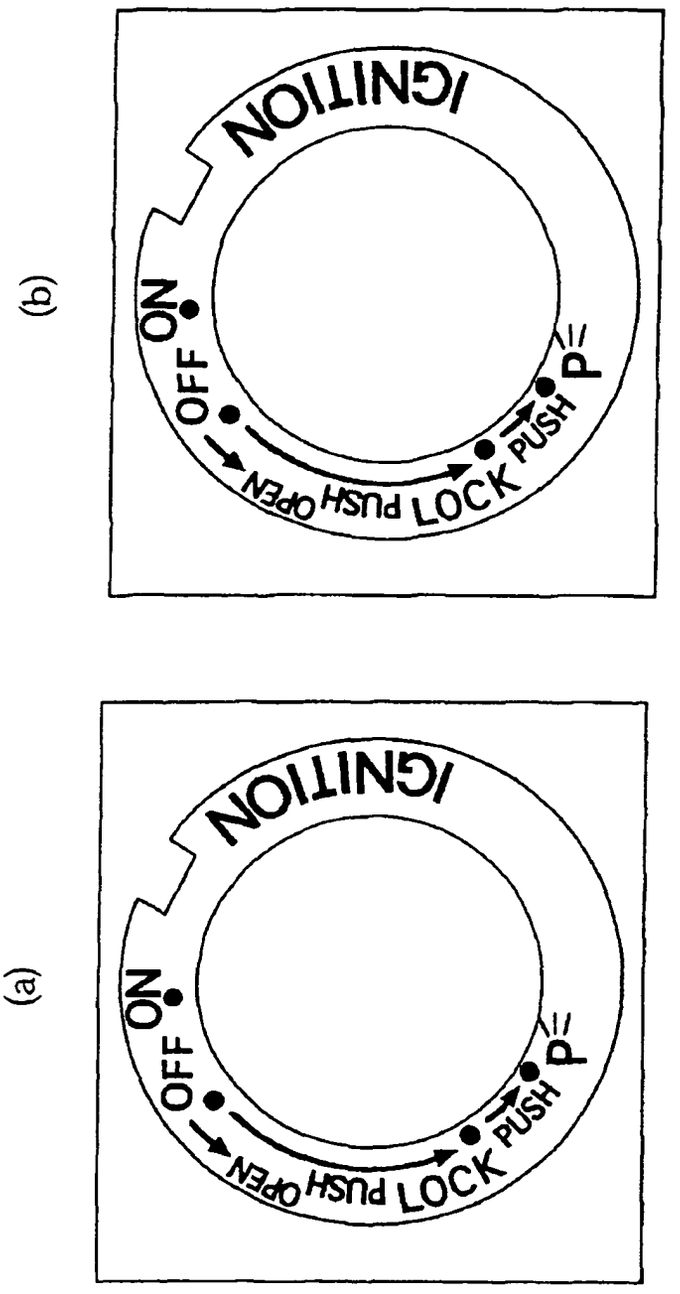

(b)
IGNITION
ON
OFF
PUSH OPEN
LOCK
PUSH
P
(a)
IGNITION
ON
OFF
PUSH OPEN
LOCK
PUSH
P
LUMINOUS PRINT

Fig. 11

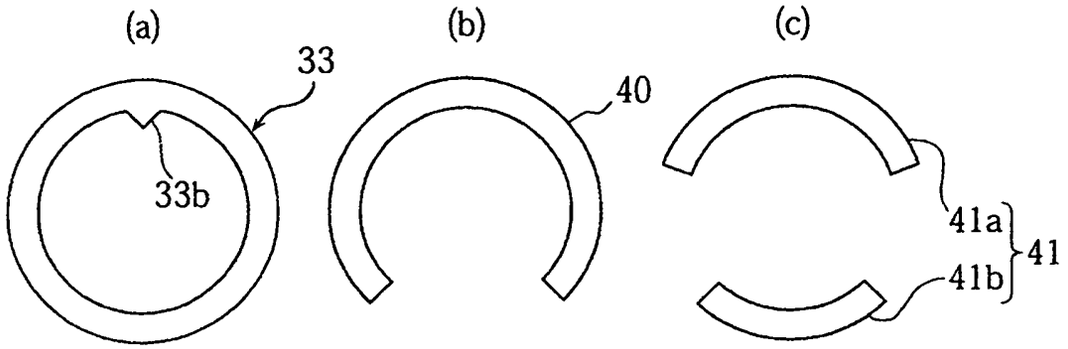


Fig. 12

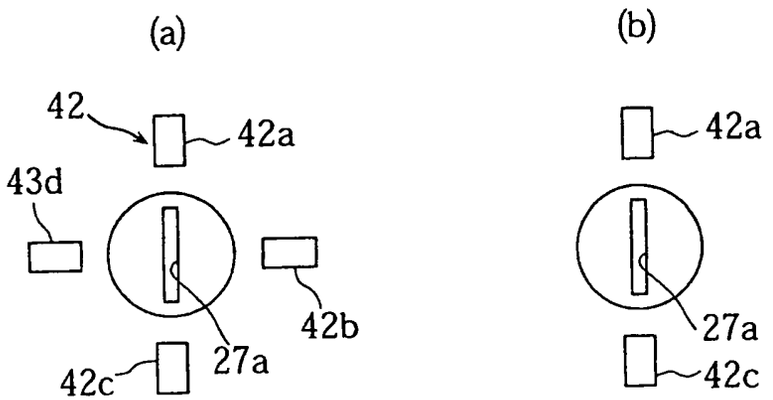


Fig. 13

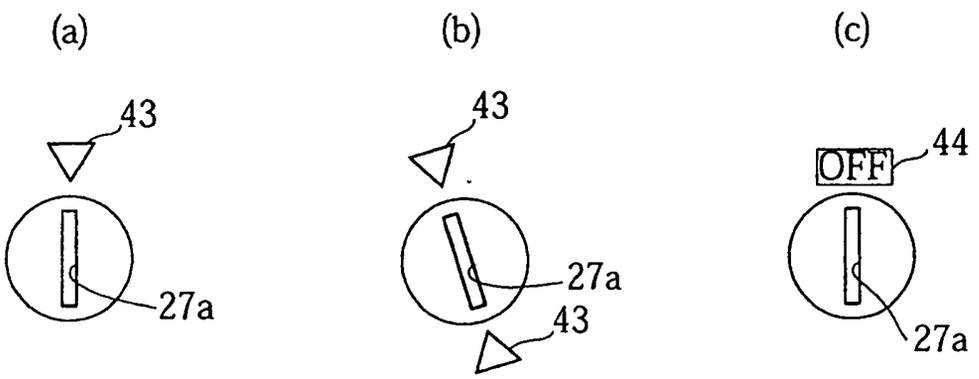


Fig. 14

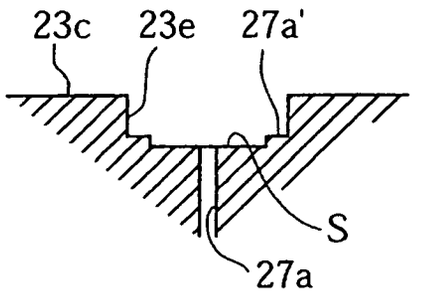


Fig. 15

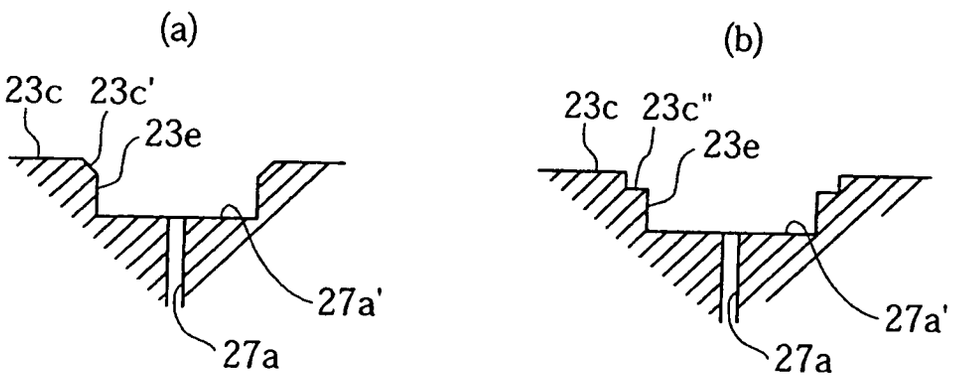


Fig. 16

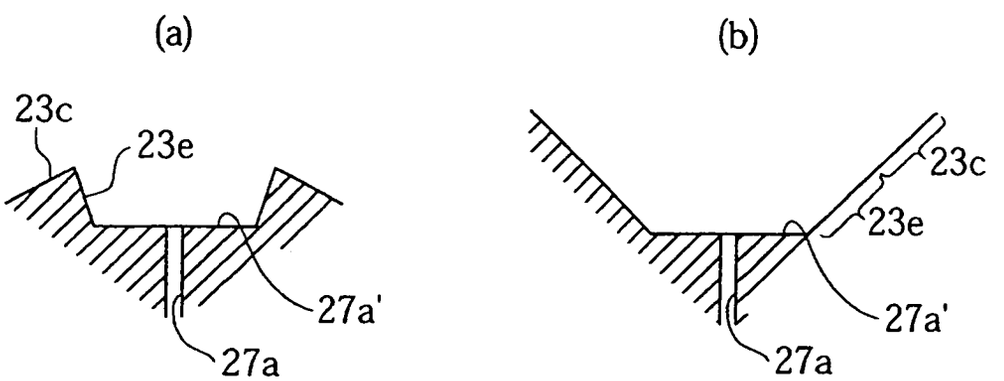


Fig. 17

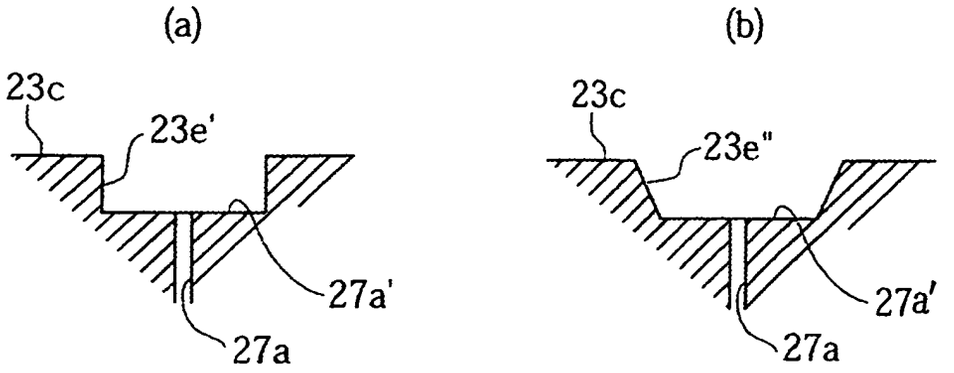

(a)
23c
23e'
27a'
27a
(b)
23c
23e"
27a'
27a

Fig. 18

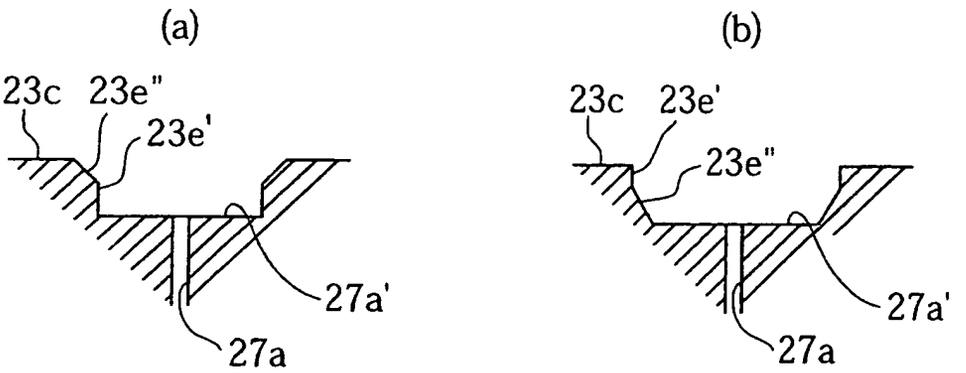

(a)
23c
23e"
23e'
27a'
27a
(b)
23c
23e'
23e"
27a'
27a

Fig. 19

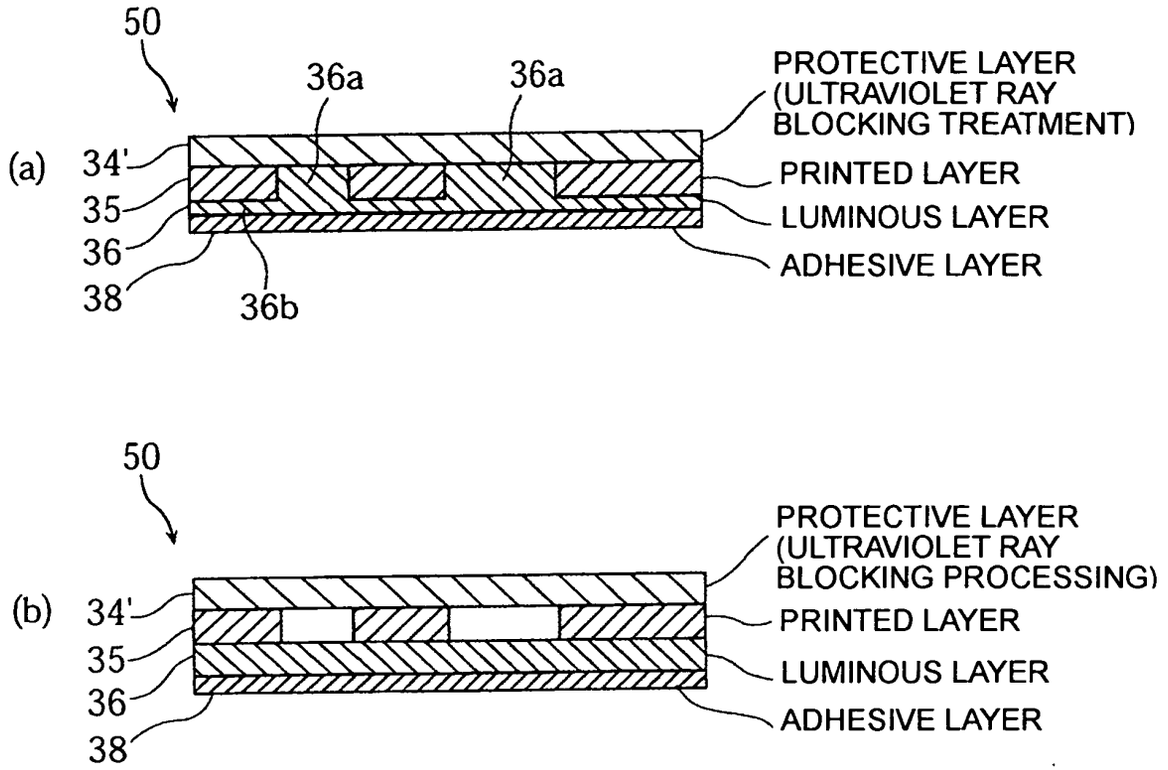

50
36a
36a
PROTECTIVE LAYER
(ULTRAVIOLET RAY
BLOCKING TREATMENT)
(a)
34'
PRINTED LAYER
35
LUMINOUS LAYER
36
ADHESIVE LAYER
38
36b
50
PROTECTIVE LAYER
(ULTRAVIOLET RAY
BLOCKING PROCESSING)
(b)
34'
PRINTED LAYER
35
LUMINOUS LAYER
36
ADHESIVE LAYER
38

Fig. 20

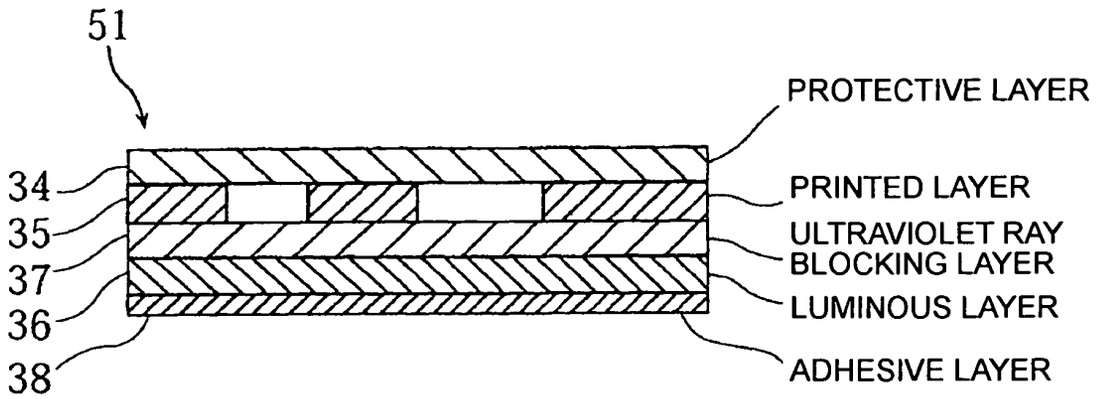

51
PROTECTIVE LAYER
34
PRINTED LAYER
35
ULTRAVIOLET RAY
BLOCKING LAYER
37
LUMINOUS LAYER
36
ADHESIVE LAYER
38

Fig. 21

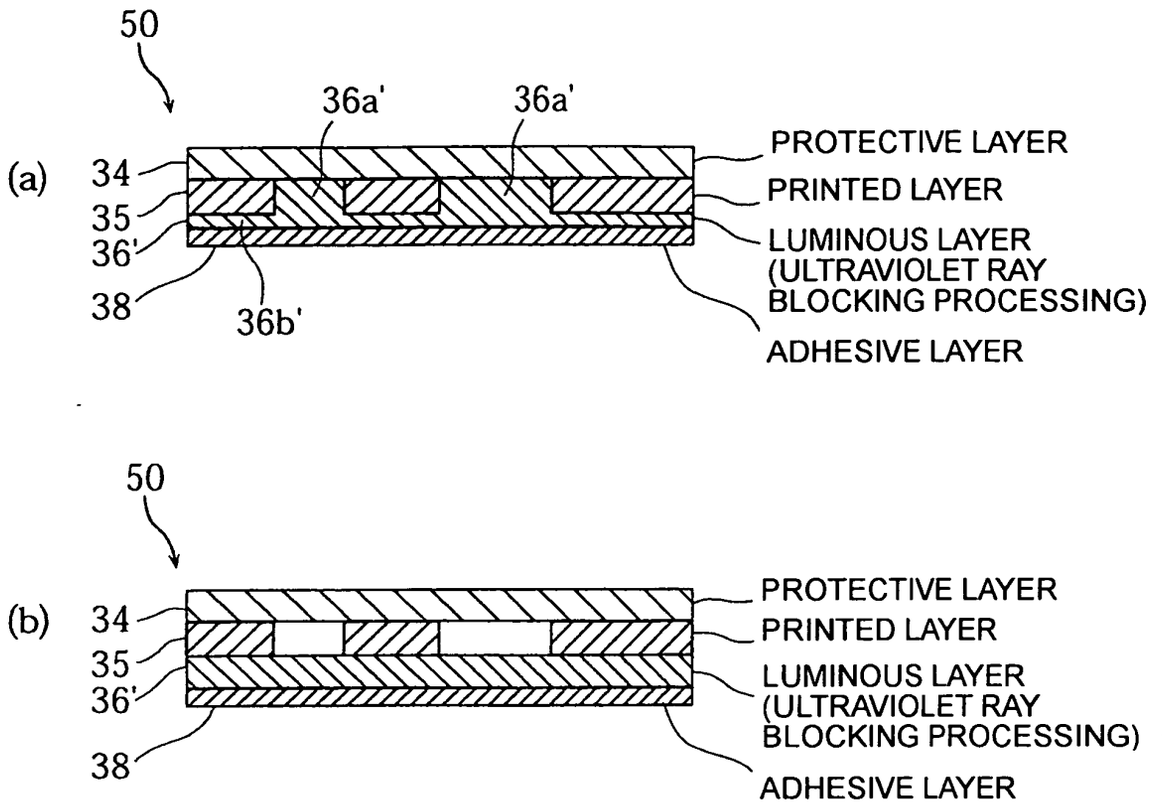

50
36a'
36a'
(a)
34
35
36'
38
36b'
PROTECTIVE LAYER
PRINTED LAYER
LUMINOUS LAYER
(ULTRAVIOLET RAY
BLOCKING PROCESSING)
ADHESIVE LAYER
50
(b)
34
35
36'
38
PROTECTIVE LAYER
PRINTED LAYER
LUMINOUS LAYER
(ULTRAVIOLET RAY
BLOCKING PROCESSING)
ADHESIVE LAYER

Fig. 22

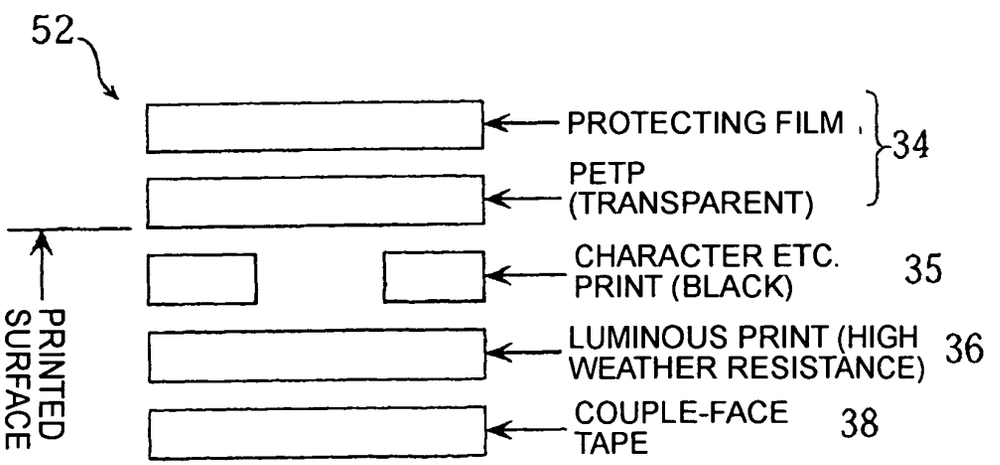
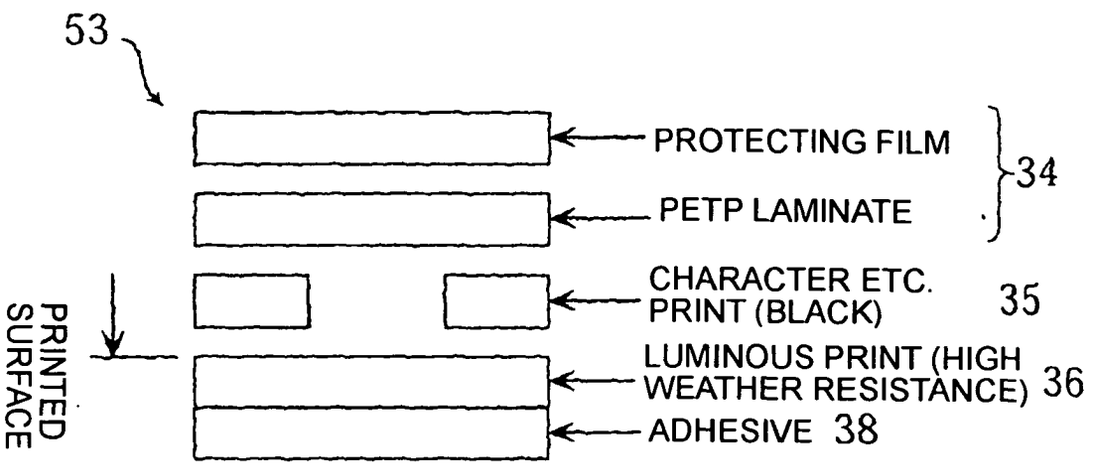

52
PROTECTING FILM
34
PETP
(TRANSPARENT)
CHARACTER ETC.
PRINT (BLACK)
35
LUMINOUS PRINT (HIGH
WEATHER RESISTANCE)
36
COUPLE-FACE
TAPE
38
PRINTED
SURFACE

Fig. 23


53
PROTECTING FILM
PETP LAMINATE
34
CHARACTER ETC. PRINT (BLACK)
35
LUMINOUS PRINT (HIGH WEATHER RESISTANCE)
36
ADHESIVE
38
PRINTED SURFACE