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(54) Control button

Drehknopf

Bouton tournant

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(56) References cited:
DE-U- 20 117 738
US-A- 3 887 963

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Description

[0001] The invention relates to a control button which is attached to a rotary axis and which control button has a solid structured body provided with a lateral face, and which control button is furthermore provided with an anti-slip facility along said lateral face to be operative against tangential slip. Said button has an inner part that is attached to said rotary axis, and an outer part that surrounds and attaches to said inner part. Said anti-slip facility is constructed with a plurality of protruders that protrude through respective first openings in said outer part, and which protruders are kept in place through abutting to an abutting element that is maintained radially fixed with respect to said inner part. Solid means normally having an unvarying shape, which may be effected in aluminium or other metals, and furthermore in various polymers. Apart from the functional aspects of a particular single button, also its outward appearance plays a part. Next to a pleasing effect on a user person, this appearance can furthermore produce various different button shapes for on the one hand signalling a relation between two or more buttons through similar shaping, and on the other hand setting two buttons more clearly apart through differentiating of their exterior.

[0002] The inventors have recognized the possibility to provide extrusion, spraying, and similar manufacturing processes for applying rubber and the like right at the surface of the control button, and to so provide the anti-slip material at both the frontal and at the lateral faces of the button, but have also recognized the less than optimum quality that can be attained by such methods. In particular, when the anti-slip material should be provided in a tangentially segmented way around the control button, quality has been found less than required. An automotive application in particular will dictate a high quality standard.

[0003] DE 201 17 738 U1 discloses a knob for introducing a rotary motion in an end of a shaft-shaped or platen-shaped element of a card index with an inner body, on which an outer shell can be slipped on and locked to the inner body. The outer shell has several recesses that are distributed over its circumference. A rubber elastic inlay, that is arranged between the inner body and the outer shell, protrudes through the recesses. The elastic inlay is abutted in radial direction by the inner body. The outer shell further has a central disc-shaped recess at the front uncovering the elastic inlay.

[0004] In consequence, amongst other things, it is an object of the present invention to attain a higher functional and esthetic quality of the control button, and in particular, to realize such through constructing the control button from two or more separate solid parts.

[0005] The invention is characterized in that said solid structured body is provided with a frontal face and furthermore contains a ring-type facility that is made of anti-slip matter and that is positioned at said frontal face.

[0006] A preferred embodiment of a control button according to the invention is characterized in that said inner part and outer part are fixated to each other at a position away from said frontal face.

[0007] Another preferred embodiment of a control button according to the invention is characterized in that said abutting element is a lateral face of said inner part.

[0008] According to yet another aspect of the invention such control button is characterized in that said outer part substantially completely envelops an upper region of said inner part, and in that said ring-type facility is fixed to a frontal face of said outer part through extending through respective second openings unto behind said frontal face.

[0009] A further preferred embodiment of a control button according to the invention is characterized in that said ring-type facility is self-operatively locked in said respective second openings.

[0010] Alternatively, such control button is characterized in that said ring-type facility is kept in place through connecting to various said protruders.

[0011] According to yet another aspect of the invention, a control button is characterized in that said outer part is divided into a frontal plate and a lateral shell, wherein said lateral shell and said inner part are fixated to each other at a position away from said frontal face, wherein and said frontal plate is fixated to said lateral shell through said ring-type facility extending through an annular opening between said frontal plate and said lateral shell.

[0012] A further preferred embodiment of a control button according to the invention is characterized in that said ring-type facility connects to said protruders.

[0013] Preferably, said ring-type facility connects to a stopper item abutting to said protruders.

[0014] Such a control button may furthermore be characterized in that said ring-type facility by way of an insert part through said annular opening fixates in both upward and downward direction along the direction of said control axis.

[0015] These and further aspects and advantages of the invention will be discussed more in detail hereinafter with reference to the disclosure of preferred embodiments, and in particular with reference to the appended Figures that show:

- Figure 1, a conceptual image of a rotary control button provided with anti-slip material;
- Figure 2, a first control button embodiment according to the invention;
- Figure 3, a second control button embodiment according to the invention;
- Figure 4, a third control button embodiment according to the invention;
- Figure 5, a fourth control button embodiment according to the invention;
- Figure 6, a fifth control button embodiment according to the invention.

[0016] Figure 1 illustrates a conceptual image of a rotary control button provided with anti-slip material according to the invention. The body of the control button may be constructed from aluminum or a comparable material that is easy to work, light in weight, and structurally sufficiently solid for the purpose, and which body has generally been indicated by cylinder 22 which abuts to the faceplate 20 of the apparatus that must be controlled. The ***function*** of the control proper is irrelevant to the present invention. The size of the control button is such as would be considered functional for manual operation, such as with a diameter between somewhat less than one centimeter up to several centimeters, and a height that is generally in the same range. Note that the cross-section of the control button may have the shape of an ellipse or the like. The cylindrical lateral face of the button carries tangentially non-continuous elements 24 that have been shown as strips, but which may have appropriate shapes to be discussed in detail hereinafter. These elements work against tangential slip, and may furthermore have any decorative or distinguishing effect as required. Finally, ring 26 has been applied to the frontal face 80, that in the following is called the front face of the control button, again both as a further anti-slip facility, and for decorative or distinguishing purposes if appropriate.

[0017] Figure 2 illustrates a first control button embodiment according to the invention. The control button has an inner part 32, and an outer part 30. In the embodiment, both parts have been made from pressure-cast aluminum. The inner part 32 has an opening 34 for engaging a rotary control axis. The outer part 30 has been finished through fine-working on a lathe, and comprises a plurality of spaced apart first openings 82, that in the following are called radial holes, that allow for inserting rubber segments 36 from the inside, whereas after assembling they are kept in place through abutting with the lateral face of inner part 32. The segments 36 have been manufactured from rubber or a similar material, such as a polymer, in such manner as would be considered standard in the industry.

[0018] Furthermore, the control button has ring 38 made of rubber or the like, and which ring is positioned on the front face of the outer part 30 of the control button. Through protrusions 40 in various axially directed openings in outer part 30, ring 38 is fixed to the outer part 30. The further protrusions may either be integral with the ring, or may have been fixed thereto as separate elements by some convenient technology. Outer part 30 and inner part 32 have been attached to each other, such as by a click-type facility 42 or another appropriate mechanism, at a position near the face plate 20 (Figure 1), away from ring 38.

[0019] Figure 3 illustrates a second control button embodiment according to the present invention. Here, similar elements as in Figure 2 have been indicated with corresponding reference numerals. Notably, the outer part of the control button has been further divided in two parts. First, a ***lateral*** part 44 clicks at position 42 to the inner part 32, and comprises various radial holes for engaging with protruders 46. In contradistinction with Figure 2 however, rubber ring 48 connects immediately with protruders 46 through an interconnecting part 50 that may be formed as a continuous tube-like element. Finally, front plate 52 that has been finely worked on a lathe, abuts with the frontal face of inner part 32, and is furthermore kept in place, either through some fixating to inner part 32, or by being kept in place through the effect of ring 48 and interconnecting part 50.

[0020] Figure 4 illustrates a third control button embodiment according to the invention, which is quite similar to the embodiment of Figure 3, apart from the following. Ring 56 is, like ring 48, continuous in a tangential direction, but has been fixed to protrusions 46 through various separate connective parts 58. On the one hand, this allows to now construct outer part 44 and plate 52 from Figure 3 as a single integral component 60. On the other hand, this necessitates to insert all protruders 46 separately into the associated holes in outer part 60.

[0021] Figure 5 illustrates a fourth control button embodiment according to the invention. Items 32, 34, 42, 52 generally correspond to likewise referenced items in Figure 3. Differences with Figure 3 are the somewhat different shape of outer part 62, that cooperates with plate 52 and rubber ring 64 to fixate insert part 66 both in the upward and in the downward direction. The latter part 66 cooperates through being inlet into stopper part or parts 68 that abut to the various protruding elements 36 to keep them in place in a roughly similar manner as in the embodiment of Figure 2. The stopper part 68 may be fixated to the protruders 36 in such manner as considered convenient, such as by glue, vulcanizing, or other means. Furthermore, in contradistinction to earlier embodiments, part 62 has been manufactured on a milling-machine.

[0022] Figure 6 illustrates a fifth control button embodiment according to the invention. Here, various elements of earlier Figures combine in a somewhat different manner:

- First, inner part 32 as well as elements 34, 42 correspond to Figure 2.
- Second, outer part 62 and plate 52 correspond to Figure 5. Ring 72 cooperates with insert part 74 by way of fixating both in the upward and in the downward direction.
- Finally, protruding elements 70 abut to the inner part 32 in roughly corresponding manner to Figure 2. Note that also element 74 abuts to inner part 32.

[0023] Now, the invention has been disclosed with reference to various preferred embodiments. However, persons skilled in the relevant art will from reading and viewing the above readily recognize various amendments, modifications and combinations. In consequence, the disclosure should not be construed as being restrictive, but rather as illustrative; the scope of the invention should

in particular be considered as restricted only by the Claims appended hereto.

Claims

1. A control button which is attached to a rotary axis (34) and which control button has a solid structured body provided with a lateral face (22), and which control button is furthermore provided with an anti-slip facility (24, 36, 46, 70) along said lateral face to be operative against tangential slip, said button has an inner part (32) that is attached to said rotary axis (34), and an outer part (30, 44, 60, 62) that surrounds and attaches to said inner part (32), and said anti-slip facility is constructed with a plurality of protruders (36, 46, 70) that protrude through respective first openings (82) in said outer part, and which protruders (36, 46, 70) are kept in place through abutting to an abutting element that is maintained radially fixed with respect to said inner part (32), said button being **characterized in that** said solid structured body is provided with a frontal face (80) and furthermore contains a ring-type facility (38, 48, 56, 64, 72) that is made of anti-slip matter and that is positioned at said frontal face (80).

2. A control button as claimed in Claim 1, being **characterized in that** said inner part (32) and outer part (30, 44, 60, 62) are fixated to each other at a position (42) away from said frontal face (80).

3. A control button as claimed in Claim 1, being **characterized in that** said abutting element is a lateral face of said inner part (32).

4. A control button as claimed in Claim 1, being **characterized in that** said outer part (30, 60) substantially completely envelops an upper region of said inner part (32), and **in that** said ring-type facility (38/40, 56/58) is fixed to a frontal face (80) of said outer part (30, 60) through extending through respective second openings unto behind said frontal face (80).

5. A control button as claimed in Claim 4, being **characterized in that** said ring-type facility (38/40) is self-operatively locked in said respective second openings.

6. A control button as claimed in Claim 4, being **characterized in that** said ring-type facility (56/58) is kept in place through connecting to various said protruders (46).

7. A control button as claimed in Claim 1, being **characterized in that** said outer part is divided into a frontal plate (52) and a lateral shell (44, 62), wherein said lateral shell (44, 62) and said inner part (32) are fixated to each other at a position (42) away from said frontal face (80), wherein and said frontal plate (52) is fixated to said lateral shell (44, 62) through said ring-type facility extending through an annular opening between said frontal plate (52) and said lateral shell (44, 62).

8. A control button as claimed in Claim 7, being **characterized in that** said ring-type facility (48/50) connects to said protruders (46).

9. A control button as claimed in Claim 7, being **characterized in that** said ring-type facility (64/66) connects to a stopper item (68) abutting to said protruders (36).

10. A control button as claimed in Claim 7, being **characterized in that** said ring-type facility (64/66, 72/74) by way of an insert part (66, 74) through said annular opening fixates in both upward and downward direction along the direction of said control axis.

Patentansprüche

1. Betätigungsknopf, der an einer Drehachse (34) befestigt ist und einen mit einer Seitenfläche (22) versehenen stabilen strukturierten Körper aufweist, wobei der Betätigungsknopf des Weiteren entlang der Seitenfläche mit einem rutschhemmenden Merkmal (24, 26, 46, 70) versehen ist, das gegen tangentiales Rutschen wirken soll, wobei der Knopf einen an der Drehachse (34) befestigten Innenteil (32) und einen den Innenteil (32) umgebenden und daran befestigten Außenteil (30, 44, 60, 62) aufweist und das rutschhemmende Merkmal mit mehreren Vorsprüngen (36, 46, 70) ausgeführt ist, die durch jeweilige erste Öffnungen (82) im Außenteil ragen und durch Anstoßen an ein Anstoßelement, das bezüglich des Innenteils (32) radial festgelegt gehalten wird, in Position gehalten werden, wobei der Knopf **dadurch gekennzeichnet ist, dass** der stabile strukturierte Körper mit einer Vorderfläche (80) versehen ist und des Weiteren ein ringförmiges Merkmal (38, 48, 56, 64, 72) enthält, das aus rutschfestem Material hergestellt und an der Vorderfläche (80) positioniert ist.

2. Betätigungsknopf nach Anspruch 1, **dadurch gekennzeichnet, dass** der Innenteil (32) und der Außenteil (30, 44, 60, 62) an einer von der Vorderfläche (80) weg liegenden Position (42) aneinander befestigt sind.

3. Betätigungsknopf nach Anspruch 1, **dadurch gekennzeichnet, dass** das Anstoßelement eine Seitenfläche des Innenteils (32) ist.

4. Betätigungsknopf nach Anspruch 1, **dadurch gekennzeichnet, dass** der Außenteil (30, 60) einen oberen Bereich des Innenteils (32) im Wesentlichen vollständig umhüllt und dass das ringförmige Merkmal (38/40, 56/58) an einer Vorderfläche (80) des Außenteils (30, 60) befestigt ist, indem es sich durch jeweilige zweite Öffnungen bis hinter die Vorderfläche (80) erstreckt.

5. Betätigungsknopf nach Anspruch 4, **dadurch gekennzeichnet, dass** das ringförmige Merkmal (38/40) in den jeweiligen zweiten Öffnungen selbsttätig verriegelt wird.

6. Betätigungsknopf nach Anspruch 4, **dadurch gekennzeichnet, dass** das ringförmige Merkmal (56/58) durch Verbindung mit verschiedenen Vorsprüngen (46) in Position gehalten wird.

7. Betätigungsknopf nach Anspruch 1, **dadurch gekennzeichnet, dass** der Außenteil in eine Vorderplatte (52) und eine Seitenschale (44, 62) unterteilt ist, wobei die Seitenschale (44, 62) und der Innenteil (32) an einer von der Vorderfläche (80) weg liegenden Position aneinander befestigt sind, wobei die Vorderplatte (52) dadurch an der Seitenschale (44, 62) befestigt ist, dass das ringförmige Merkmal durch eine ringförmige Öffnung zwischen der Vorderplatte (52) und der Seitenschale (44, 62) ragt.

8. Betätigungsknopf nach Anspruch 7, **dadurch gekennzeichnet, dass** das ringförmige Merkmal (48/50) mit den Vorsprüngen (46) verbunden ist.

9. Betätigungsknopf nach Anspruch 7, **dadurch gekennzeichnet, dass** das ringförmige Merkmal (64/66) mit einem an die Vorsprünge (36) stoßenden Anschlagteil (68) verbunden ist.

10. Betätigungsknopf nach Anspruch 7, **dadurch gekennzeichnet, dass** das ringförmige Merkmal (64/66, 72/74) durch einen Einsatzteil (66, 74) durch die ringförmige Öffnung sowohl in Aufwärts- als auch in Abwärtsrichtung entlang der Richtung der Steuerachse befestigt ist.

Revendications

1. Bouton de commande qui est fixé à un axe rotatif (34) et ce bouton de commande a un corps de structure solide doté d'une face latérale (22), et ce bouton de commande est doté en outre d'un dispositif anti-glissant (24, 36, 46, 70) le long de ladite face latérale pour être efficace à l'encontre d'un glissement tangentiel, ledit bouton a une partie interne (32) qui est fixée audit axe rotatif (34), et une partie externe (30, 44, 60, 62) qui entoure et qui est fixé à ladite partie interne (32), et ledit dispositif anti-glissant est construit avec une pluralité de dispositifs saillants (36, 46, 70) qui font saillie à travers des premières ouvertures respectives (82) dans ladite partie externe, et ces dispositifs saillants (36, 46, 70) sont maintenus en place en butant contre un élément de butée qui est maintenu en étant fixé radialement par rapport à ladite partie interne (32), ledit bouton étant **caractérisé en ce que** ledit corps de structure solide est doté d'une face frontale (80) et contient en outre un dispositif de type annulaire (38, 48, 56, 64, 72) qui est fait d'une matière anti-glissante et qui est positionné à ladite face frontale (80).

2. Bouton de commande selon la revendication 1, **caractérisé en ce que** lesdites partie interne (32) et partie externe (30, 44, 60, 62) sont fixées l'une à l'autre à une position (42) située à distance de ladite face frontale (80).

3. Bouton de commande selon la revendication 1, **caractérisé en ce que** ledit élément de butée est une face latérale de ladite partie interne (32).

4. Bouton de commande selon la revendication 1, **caractérisé en ce que** ladite partie externe (30, 60) enveloppe sensiblement complètement une zone supérieure de ladite partie interne (32), et **en ce que** ledit dispositif de type anneau (38/40), 56/58) est fixé à une face frontale (80) de ladite partie externe (30, 60) en s'étendant à travers des deuxièmes ouvertures respectives vers l'arrière de ladite face frontale (80).

5. Bouton de commande selon la revendication 4, **caractérisé en ce que** ledit dispositif de type annulaire (38, 40) est verrouillé par auto-fonctionnement dans lesdites deuxièmes ouvertures respectives.

6. Bouton de commande selon la revendication 4, **caractérisé en ce que** ledit dispositif de type anneau (56/58) est maintenu en place par raccordement auxdits divers dispositifs saillants (46).

7. Bouton de commande selon la revendication 1, **caractérisé en ce que** ladite partie externe est divisée en une plaque frontale (52) et une enveloppe latérale (44, 62), dans laquelle ladite enveloppe latérale (44, 62) et ladite partie interne (32) sont fixées l'une à l'autre à une position (42) située à distance de ladite face frontale (80), dans lequel ladite plaque frontale(52) est fixée à ladite enveloppe latérale (44, 62) au moyen dudit dispositif de type anneau s'étendant à travers une ouverture annulaire située entre ladite plaque frontale (52) et ladite enveloppe latérale (44, 62).

8. Bouton de commande selon la revendication 7, **ca-**

ractérisé en ce que ledit dispositif de type anneau (48/50) se raccorde auxdits dispositifs saillants (46).

9. Bouton de commande selon la revendication 7, **caractérisé en ce que** ledit dispositif de type anneau (64/66) se raccorde à un élément d'arrêt (68) butant contre lesdits dispositifs saillants (36).

10. Bouton de commande selon la revendication 7, **caractérisé en ce que** ledit dispositif de type anneau (64/66, 72/74) par l'intermédiaire d'une partie d'insertion (66, 74) traversant ladite ouverture annulaire se fixe dans les sens ascendant et descendant le long du sens dudit axe de commande.

FIG 1

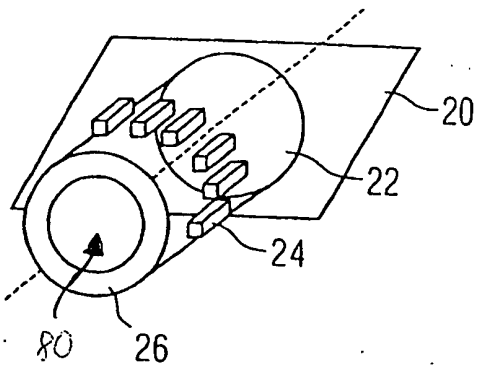


FIG 2

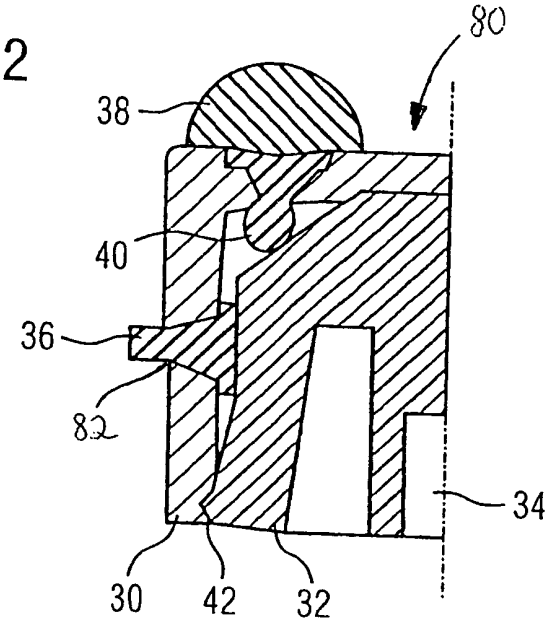


FIG 3

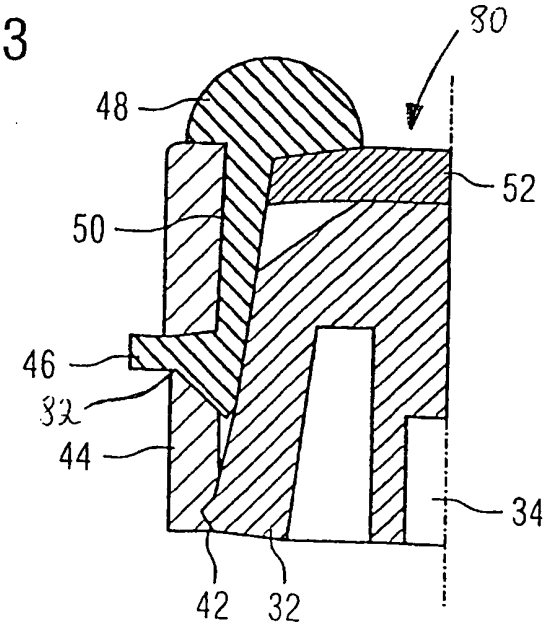


FIG 4

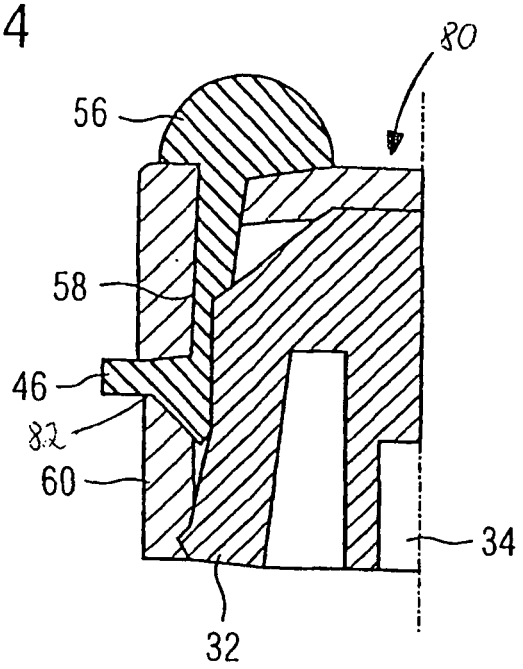


FIG 5

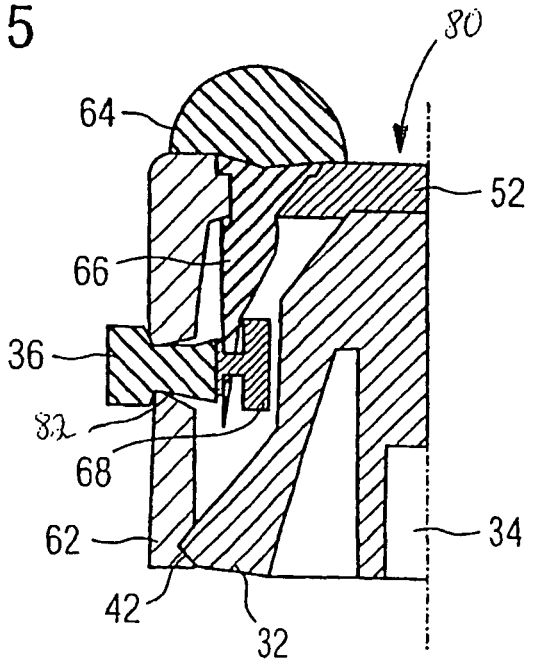


FIG 6

