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(54) **CONTROL OF EXTERNAL PAUSES, ESPECIALLY FOR POTENTIOMETERS**

STEUERUNG VON EXTERNEN PAUSEN, INSBESONDERE FÜR POTENTIOMETERN

COMMANDE DE PAUSES EXTERNES NOTAMMENT POUR POTENTIOMÈTRE

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Description

Technical field

[0001] This invention belongs to technical field of electronic components, in particular the invention relates to a device for controlling external pauses preferably intended for electronic circuits.

[0002] The basic aim of the invention is to develop a device that enables the control of external pauses, to be carried out on the potentiometer, allowing the torque of the pause mechanism to be increased by means of the control shaft that engages both a male rotor and a female pause marker, causing the female pause marker to directly take the torque produced by the pauses and, as a result, significantly reducing possible misalignment between the pauses and the male rotor.

Background of the invention

[0003] The existence of potentiometers intended for controlling external pauses is widely known, for example, patent application ES 2 545 304 A1 describes a device for controlling external pauses, disclosing a coupling in which the pause marker is male and the rotor of the potentiometer is female, with the drawback that with this coupling it is possible that dirt may enter inside the potentiometer.

[0004] A further drawback is that the pause marker acts directly on the potentiometer rotor in such a way that pressure exerted with a shaft from the top of the invention, acts on the rotor, which moves in the direction of the force applied, causing the pause marker to move, which reduces the pause torque and causes variations in the torque.

[0005] The same patent application ES 2 545 304 A1 also describes a control shaft inserted either in the upper part, corresponding to the pause marker, or in the lower part, corresponding to the potentiometer rotor, the said control shaft being comprised of two insertion sections that are to be inserted to a specific distance, as a stop in order to ensure it works correctly, with the drawback that, as the said shaft is inserted in the lower part, it is the potentiometer rotor section that takes the torque of the pauses via the pause marker, causing a misalignment between the pauses and the rotor (electric cursor) and consequently a worsening of the electrical characteristics.

[0006] The fact that the shaft comprises two sections, one acting as the stop and the other the insertion section, of a smaller section, presents the drawback of having to withstand torsional stresses with a very small shaft diameter.

Description of the invention

[0007] In order to maximise the performance of this type of potentiometer, a device for controlling pauses as

defined in claim 1 has been devised, comprised of:

- a casing for coupling a female pause marker and a potentiometer with male rotor
- a female pause marker, independent of the electrical contact, coupled, on one side with the male rotor of the potentiometer and on the other side with the upper zone of the casing, the said coupling being closed to prevent any possible entry of dirt into the potentiometer.
- a control shaft with a unique insertion position, according to a poka-yoka type mounting, either on the upper part or lower part, of the device for controlling pauses.

[0008] Externally the casing is configured by a base with a cavity, housing a potentiometer with male rotor and with anchoring means such as fixing tabs and/or studs to keep the potentiometer in place, the said cavity connecting to a section intended for positioning a female pause marker, the bottom of the said cavity having a surface with a plurality of protrusions intended for the operation of the external pause control.

[0009] Added to the base, there is the possibility of incorporating prolongations from which placing protuberances emerge to support, fasten and stabilise the device for controlling pauses, on an electronic circuit.

[0010] The female pause marker comprises, on its upper part, a ring cursor with one or more raised sections, incorporating on one or more of the said raised sections, a protuberance as a contact element with protrusions intended for the operation of the pause control, the said pause marker having, on its upper end, a cylindrical protuberance for coupling on the casing section, having on its lower end, a female connection.

[0011] The upper and lower parts of the female pause marker are connected together by means of a through socket for coupling a control shaft with a unique insertion position, according to a poka-yoke type insertion mounting.

[0012] The female pause marker abuts against the casing of the potentiometer in such a way that the force exerted by the upper part of the invention is restricted in its travel, so that the variation of the torque is limited, achieving greater homogeneity in the torque of the pauses as a whole.

[0013] The female pause marker slides over the protrusions intended for the operation of the pause control, on a rotation axis of up to 360° with or without stop elements.

[0014] The potentiometer incorporates a male rotor that protrudes from its upper part to facilitate its coupling with the female connection of the female pause marker.

[0015] The upper and lower parts of the male rotor are connected together by means of a through socket for coupling a control shaft with a unique insertion position, according to a poka-yoke type insertion mounting.

[0016] The coupling carried out between the female

pause marker and the male rotor of the potentiometer allows the said coupling zone to be closed, preventing the entry of dirt inside the potentiometer.

[0017] The control shaft comprises a single insertion section, of robust section and configured with a socket that coincides with the through socket of the female pause marker and the through socket of the male rotor, in such a way that the control shaft has a unique insertion position, according to a poka-yoke type insertion mounting. Any alternative to this configuration that allows a unique insertion position shall also be considered to be included in the present invention.

[0018] As the control shaft is comprised of one single section, it can be inserted to different distances, considerably improving backlash when it is inserted through the lower part, also engaging the male rotor of the potentiometer and the female pause marker, causing the female pause marker to directly take the torque produced by the pauses, due to it being the coupling element with the highest torque, and consequently reducing misalignment between the pauses and the male rotor significantly.

[0019] As the control shaft has a robust section it is able to better withstand the torsion caused by the pause mechanism, allowing the torque of the said mechanism to be increased and, consequently, because it withstands torsion better, the length of the control shaft can be greater and, as a result, the distance from the PCB to the actuator button.

[0020] Backlash is considered to be the misalignment of mechanical parts due to the effect of torque, which results in a poorer electrical function, distorting the theoretical electrical value.

[0021] In an alternative embodiment the control shaft includes coupling means vertically along its whole length, coinciding with coupling means integrated in the through socket of the male rotor of the potentiometer.

[0022] By way of example, along the whole length of the control shaft there is a coupling groove that engages with a notch incorporated vertically along the whole length of the through socket.

[0023] The contents of the priority document are understood to be included in their entirety and by reference in the present application.

Advantages of the invention

[0024] The device for controlling external pauses presented, affords numerous advantages over those currently available, the most important being that it has a female pause marker, independent of the electrical contact, coupled on one side with the casing and on the other side with a male rotor of the potentiometer, with the zone remaining closed and the said coupling preventing the possibility of dirt entering the potentiometer.

[0025] Another advantage derived from the previous one is that the pause marker abuts against the casing of the potentiometer in such a way that the force exerted by the upper part of the invention is restricted in its travel,

so that torque variation is limited, achieving greater homogeneity in the torque of the pauses as a whole.

[0026] Another important advantage is that the control shaft is comprised of one single section, for inserting either the upper part or lower part, incorporating insertion means, according to a poka-yoke type mounting, for coupling with the insertion means incorporated in the male rotor of the potentiometer, assuring that the control shaft has one unique insertion position.

[0027] An important added advantage is that the control shaft is comprised of a robust section, envisaged to withstand the torsion caused by the pause mechanism, allowing the torque of the said mechanism to be increased and thus reduce misalignment between the pauses and the male rotor significantly.

[0028] Finally, it can be added as an advantage, that in an alternative embodiment the fit of the control shaft with the male rotor is complemented by coupling means.

[0029] A technical expert will easily understand that the characteristics of different embodiments can be combined with the characteristics of other possible embodiments provided that the combination is technically possible.

Description of the figures

[0030] To provide a better understanding of the object of this invention, a preferred practical embodiment is shown in the drawing attached:

Figure - 1 - shows an exploded perspective view of the device for controlling pauses.

Figure - 2 - shows a perspective view of the casing, viewed on its upper part.

Figure - 3 - shows a perspective view of the casing, viewed on its lower part.

Figure - 4 - shows a perspective view of the device for controlling pauses, viewed on its upper part.

Figure - 5 - shows a perspective view of the device for controlling pauses, viewed on its lower part.

Figure - 6 - shows a plan view of the device for controlling pauses.

Figures - 7 and 8 - show a section view of the device for controlling pauses.

Figure - 9 - shows an exploded perspective view of the device for controlling pauses in an alternative embodiment.

Preferred embodiment of the invention

[0031] The conformation and characteristics of the in-

vention can be better understood in the following description that relates to the attached figures.

[0032] As can be seen in figure 1, an exploded perspective view is shown of the device for controlling pauses, indicating a casing (1), for coupling a female pause marker (2) and a potentiometer (3) with male rotor (10), the female pause marker (2) being independent of the electrical contact, and being coupled on one side with the male rotor (10) of the potentiometer (3) and on the other side with the upper zone of the casing (1), the said coupling being closed to prevent the possible entry of dirt in the potentiometer (3), also indicating a control shaft (4) with a unique insertion position, according to a poka-yoke type mounting, either in the upper part or lower part of the device for controlling pauses.

[0033] On the casing (1), prolongations (7) are shown, from which placing protuberances (8) emerge to support, fasten and stabilise the device for controlling pauses, on an electronic circuit.

[0034] Likewise the female pause marker (2) is shown, comprising on its upper part a ring cursor (5) with one or more raised sections, incorporating on one or more of the said sections, a protuberance (9) as a contact element, with protrusions (14) intended for the operation of the pause control, the said female pause marker (2) having, on its upper end, a cylindrical protuberance (11) for coupling on the section (13) of the casing (1), having on its lower end a female connection (15).

[0035] The upper and lower parts of the female pause marker (2) are connected together by means of a through socket (16) for coupling a control shaft (4).

[0036] A potentiometer (3) is shown, incorporating a male rotor (10), which protrudes from its upper part to facilitate its coupling with the female connection (15) of the female pause marker (2), the said male rotor (10) incorporating a through socket (16.1) for coupling the control shaft (4),

[0037] Also shown is the control shaft (4), comprising a single insertion section, of robust section, to better withstand the torsion produced by the pause mechanism, the said section being configured with a socket that coincides with the through socket (16) of the female pause marker (2) and the through socket (16.1) of the male rotor (10).

[0038] As the control shaft (4) is comprised of one single section, it can be inserted to different distances, considerably improving backlash when it is inserted through the lower part, also engaging the male rotor (10) of the potentiometer (3) and the female pause marker (2), causing the female pause marker (2) to directly take the torque produced by the pauses, due to it being the coupling element with the highest torque, and consequently reducing misalignment between the pauses and the male rotor (10) significantly.

[0039] Figure 2 shows the casing (1) viewed on its upper part, incorporating prolongations (7) which act as a support for the device for controlling external pauses, the said prolongations (7) being finished on top with placing protuberances (8) which, in addition to placing and/or

anchoring the device for controlling external pauses on an electronic circuit, improve its stability.

[0040] The placing protuberances (8) may not be necessary, depending on the mounting conditions on an electronic circuit.

[0041] The anchoring means (6) intended to lock the potentiometer (3) in place are also shown.

[0042] Figure 3 shows the casing (1) viewed on its lower part, presenting a cavity (12) for housing a potentiometer (3) with anchoring means (6), such as tabs and/or fixing studs.

[0043] The cavity (12) connects to a section (13) intended for positioning the female pause marker (2), the bottom of the said cavity (12) having a surface with a plurality of protrusions (14) intended for the operation of the external pause control, in collaboration with the protuberances (9) of the ring cursor (5) of the female pause marker (2).

[0044] Also shown are the prolongations (7) with placing protuberances (8), which may not be necessary, depending on mounting conditions.

[0045] Figure 4 shows the mounting of the device for controlling pauses, seen on its upper part, indicating the female pause marker (2), showing the female pause marker (2) with a through socket (16) envisaged for the quick insertion of a control shaft (4) (not shown).

[0046] Figure 5 shows the device for controlling external pauses, mounted, in a lower view, showing the male rotor (10), joined to the potentiometer (3) envisaged for the insertion of a control shaft (4) (not shown), and the potentiometer (3) fixed in the casing (1) by means of the anchoring means (6)

[0047] Attachment of the potentiometer (3) is carried out by anchoring means (6) such as anchor tabs or by means of fixing studs and with both together if necessary, the said attachment being optionally covered with a lid (not shown).

[0048] Figure 6 shows the device for controlling pauses, marking section A-A, seen from above, showing the female pause marker (2), housed between the upper part of the casing (1), indicating through sockets (16 and 16.1) perfectly aligned for the insertion of a control shaft (4).

[0049] Figure 7 shows the device for controlling external pauses in section A-A, showing the coupling of the female pause marker (2) with the casing (1) and the male rotor (10) of the potentiometer (3), also showing the protrusions (14) intended for the operation of the external pause control, coinciding with one or more protuberances (9) incorporated on the ring cursor (5) of the female pause marker (2).

[0050] On the said coupling, the closed zone configured to prevent the entry of dirt inside the potentiometer (3) can be seen.

[0051] Figure 8 shows the device for controlling pauses in section B-B, showing the coupling of the female pause marker (2) with the casing (1) and the male rotor (10) of the potentiometer (3), also showing the positioning of the raised sections of the ring cursor (5), showing the protu-

berances (9) on the protrusions (14) intended for the operation of the external pause control.

[0052] The sections portrayed in figures 7 and 8 show the female pause marker (2) coupled with the male rotor (10) connected together by means of a through socket (16 and 16.1) intended for the insertion of a control shaft (4) (not shown).

[0053] Both sections also show the female pause marker (2) abutting against the casing of the potentiometer (3) in such a way that the force exerted by the upper part of the invention is restricted in its travel, so that torque variation is limited, achieving greater homogeneity in the torque of the pauses as a whole.

[0054] These views show the protrusions (14) intended for pause control, coinciding with the protuberances (9) of the female pause marker (2), on a rotation axis of up to 360°, with or without stops, developing a high rotation torque.

[0055] Figure 9 presents an exploded perspective view of the device for controlling external pauses in an alternative embodiment, showing on the control shaft (4), a groove (18) that is situated vertically along its whole length, envisaged to engage with a notch (17) in the through socket (16.1) of the male rotor, as a joining complement.

[0056] The casing (1) shown in the figures, is configured, for illustrative purposes, in a geometrical embodiment that has a cube-shaped base and an upper cylindrical prolongation.

Claims

1. Device for controlling external pauses, comprising a casing (1) configured externally by a base with a cavity (12), with anchoring means (6), the bottom of the said cavity (12) having a surface with a plurality of protrusions (14), **characterised in that** it incorporates inside the casing (1)
 - a female pause marker (2) independent of the electrical contact,
 - a potentiometer (3) with male rotor (10),
 - a control shaft (4) with a unique insertion position, engaging, at the same time, the male rotor (10) and the pause marker (2), the said control shaft (4) being inserted either in the upper part, corresponding to the female pause marker (2), or in the lower part, corresponding to the male rotor (10) of the potentiometer (3).
2. Device for controlling external pauses, according to claim 1 **wherein** the female pause marker (2) comprises, on its upper part, a ring cursor (5), with one or more raised sections, at least one of the said raised sections incorporating a protuberance (9) as a contact element with the protrusions (14), the said pause marker (2) having a cylindrical protuberance

(11) on its upper end for coupling on the upper section of the casing (1), and having, on its lower end, a female connection (15), the upper and lower parts of the female pause marker (2) being connected together via a through-socket (16).

3. Device for controlling external pauses, according to the previous claims **wherein** the male rotor (10) of the potentiometer (3) protrudes from its upper part for coupling with the female connection (15) of the female pause marker (2), the upper and lower parts of the male rotor (10) being connected together via a through socket (16.1).
4. Device for controlling external pauses, according to the preceding claims **wherein** the coupling between the female pause marker (2) and the male rotor (10) of the potentiometer (3) is a tight coupling, the female pause marker (2) abutting against the casing of the potentiometer (3), limiting its travel and the variation in the torque of the pauses.
5. Device for controlling external pauses, according to the preceding claims **wherein** the control shaft (4) comprises a single insertion section, of robust section, the said section being configured with a socket coinciding with the through socket (16) of the female pause marker (2) and the through socket (16.1) of the male rotor (10).
6. Device for controlling external pauses, according to claim 5, **wherein** the through sockets (16 and 16.1) are positioned aligned, for the insertion of the control shaft (4).
7. Device for controlling external pauses, according to claim 1, **wherein** the control shaft (4) incorporates, vertically along the whole of its length, coupling means (18) coinciding with coupling means (17) integrated in the through socket (16.1) of the male rotor (10) of the potentiometer (3).

Patentansprüche

1. Vorrichtung zur Steuerung von externen Pausen, die ein Gehäuse (1) aufweist, das außen durch eine Basis mit einem Hohlraum (12) mit Verankerungsmitteln (6) konfiguriert ist, wobei der Boden des Hohlraums (12) eine Oberfläche mit einer Vielzahl von Vorsprüngen (14) aufweist, **dadurch gekennzeichnet, dass** sie im Inneren des Gehäuses (1) folgendes enthält
 - eine weibliche Pausenmarkierung (2), die unabhängig vom elektrischen Kontakt ist,
 - einem Potentiometer (3) mit männlichem Rotor (10),

- eine Steuerwelle (4) mit einer eindeutigen Einsetzposition, die gleichzeitig mit dem männlichen Rotor (10) und der Pausenmarkierung (2) in Eingriff steht, wobei die Steuerwelle (4) entweder in den oberen Teil, welcher der weiblichen Pausenmarkierung (2) entspricht, oder in den unteren Teil, der dem männlichen Rotor (10) des Potentiometers (3) entspricht, eingesetzt ist.
2. Vorrichtung zur Steuerung von externen Pausen nach Anspruch 1, **dadurch gekennzeichnet, dass** die weibliche Pausenmarkierung (2) an ihrem oberen Teil einen ringförmigen Läufer (5) mit einem oder mehreren erhabenen Abschnitten aufweist, wobei mindestens einer der erhabenen Abschnitte einen Vorsprung (9) als Kontaktelement mit den Vorsprüngen (14) aufweist, wobei die Pausenmarkierung (2) an ihrem oberen Ende eine zylindrische Ausstülpung (11) zum Ankoppeln an den oberen Teil des Gehäuses (1) und an ihrem unteren Ende eine Buchsenverbindung (15) aufweist, wobei der obere und der untere Teil der Pausenmarkierung (2) miteinander über eine durchgehende Buchse (16) verbunden sind.
3. Vorrichtung zur Steuerung von externen Pausen nach den vorstehenden Ansprüchen, bei der der männliche Rotor (10) des Potentiometers (3) aus seinem oberen Teil herausragt, um mit dem weiblichen Anschluss (15) der weiblichen Pausenmarkierung (2) verbunden zu werden, wobei der obere und der untere Teil des männlichen Rotors (10) über eine Durchgangsbuchse (16.1) miteinander verbunden sind.
4. Vorrichtung zur Steuerung von externen Pausen nach den vorstehenden Ansprüchen, bei der die Kopplung zwischen der weiblichen Pausenmarkierung (2) und dem männlichen Rotor (10) des Potentiometers (3) eine feste Kopplung ist, wobei die weibliche Pausenmarkierung (2) gegen das Gehäuse des Potentiometers (3) stößt, wodurch ihr Hub und die Variation des Drehmoments der Pausen begrenzt werden.
5. Vorrichtung zur Steuerung von externen Pausen nach den vorstehenden Ansprüchen, wobei die Steuerwelle (4) einen einzigen Einführungsabschnitt mit robustem Querschnitt aufweist, wobei der Abschnitt mit einem Sockel konfiguriert ist, der mit dem durchgehenden Sockel (16) der weiblichen Pausenmarkierung (2) und dem durchgehenden Sockel (16.1) des männlichen Rotors (10) zusammenfällt.
6. Vorrichtung zur Steuerung externer Pausen nach Anspruch 5, bei der die Durchgangsbuchsen (16 und 16.1) zur Einführung der Steuerwelle (4) fluchtend

angeordnet sind.

7. Vorrichtung zur Steuerung von externen Pausen nach Anspruch 1, bei der die Steuerwelle (4) vertikal über ihre gesamte Länge Kopplungsmittel (18) aufweist, die mit Kopplungsmitteln (17) zusammenfallen, die in der Durchgangsbuchse (16.1) des männlichen Rotors (10) des Potentiometers (3) integriert sind.

Revendications

1. Dispositif de contrôle de pauses externes, comprenant un boîtier (1) configuré extérieurement par une base avec une cavité (12), avec des dispositif d'ancrage (6), la base de ladite cavité (12) ayant une surface comprenant une pluralité de saillies (14), **caractérisé en ce qu'il** incorpore à l'intérieur du boîtier (1) :
- un marqueur de pause femelle (2) indépendant du contact électrique,
- un potentiomètre (3) avec un rotor mâle (10),
- un arbre de commande (4) à position d'insertion unique, engageant à la fois le rotor mâle (10) et le marqueur de pause (2), ledit arbre de commande (4) étant inséré soit dans la partie supérieure, correspondant au marqueur de pause femelle (2), soit dans la partie inférieure, correspondant au rotor mâle (10) du potentiomètre (3).
2. Dispositif de contrôle de pauses externes, selon la revendication 1, dans lequel le marqueur de pause femelle (2) comprend, sur sa partie supérieure, un curseur annulaire (5), avec une ou plusieurs sections surélevées, au moins l'une desdites sections surélevées incorporant une protubérance (9) comme élément de contact avec les protubérances (14), ledit marqueur de pause (2) présentant à son extrémité supérieure une protubérance cylindrique (11) pour couplage à la partie supérieure du boîtier (1), et présentant à son extrémité inférieure une connexion femelle (15), les parties supérieure et inférieure du marqueur de pause femelle (2) étant reliées entre elles par une douille traversante (16).
3. Dispositif de contrôle de pauses externes, selon les revendications précédentes, dans lequel le rotor mâle (10) du potentiomètre (3) dépasse de sa partie supérieure pour couplage avec la connexion femelle (15) du marqueur de pause femelle (2), les parties supérieure et inférieure du rotor mâle (10) étant reliées entre elles par une douille traversante (16.1).
4. Dispositif de contrôle de pauses externes, selon les revendications précédentes, dans lequel le couplage entre le marqueur de pause femelle (2) et le rotor

mâle (10) du potentiomètre (3) est un couplage étanche, le marqueur de pause femelle (2) étant en butée contre le boîtier du potentiomètre (3), limitant sa course et la variation du couple des pauses.

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5. Dispositif de contrôle de pauses externes, selon les revendications précédentes, dans lequel l'arbre de commande (4) comporte une unique section d'insertion, de section robuste, ladite section étant configurée avec une douille coïncidant avec la douille traversante (16) du marqueur de pause femelle (2) et la douille traversante (16.1) du rotor mâle (10). 10
6. Dispositif de contrôle de pauses externes, selon la revendication 5, dans lequel les douilles traversantes (16 et 16.1) sont positionnées en alignement, pour l'insertion de l'arbre de commande (4). 15
7. Dispositif de contrôle de pauses externes, selon la revendication 1, dans lequel l'arbre de commande (4) comporte, verticalement sur toute sa longueur, des dispositifs de couplage (18) coïncidant avec des dispositifs de couplage (17) intégrés dans la douille traversante (16.1) du rotor mâle (10) du potentiomètre (3). 20 25

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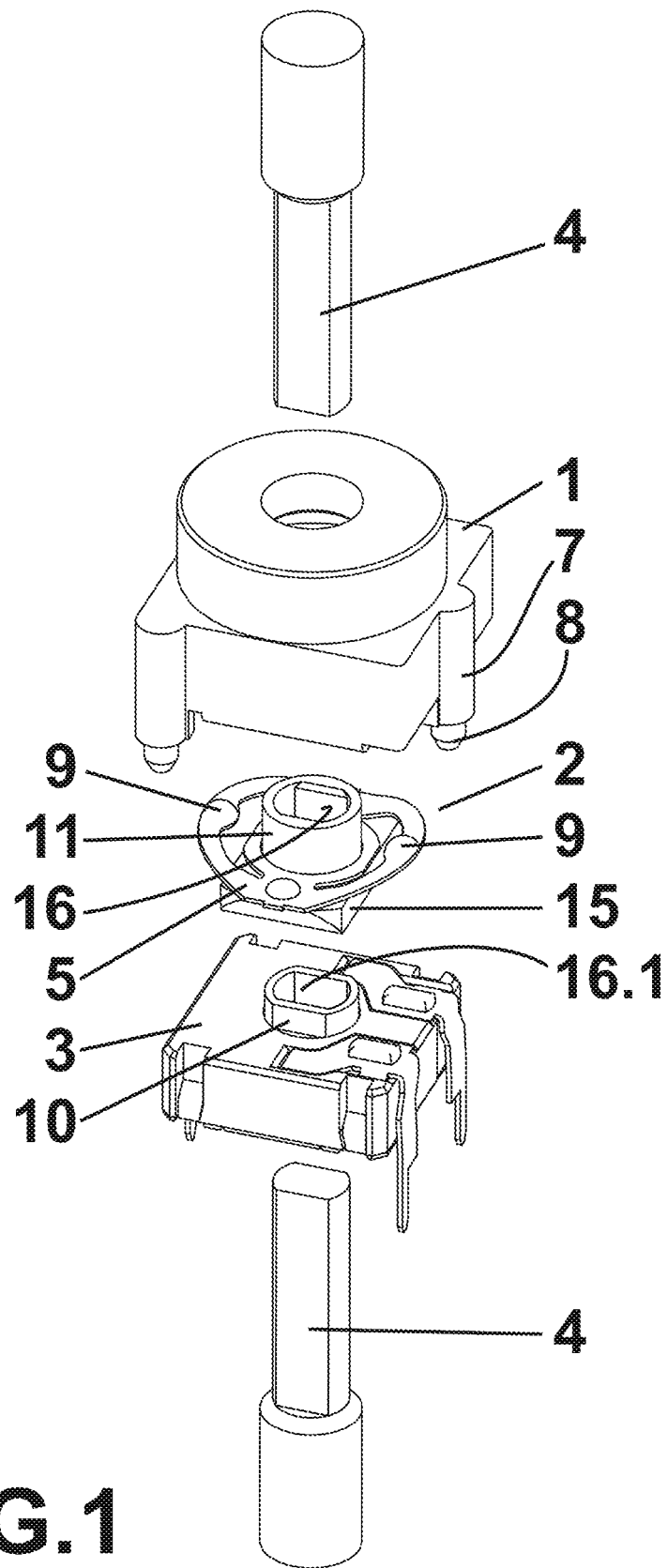


FIG.1

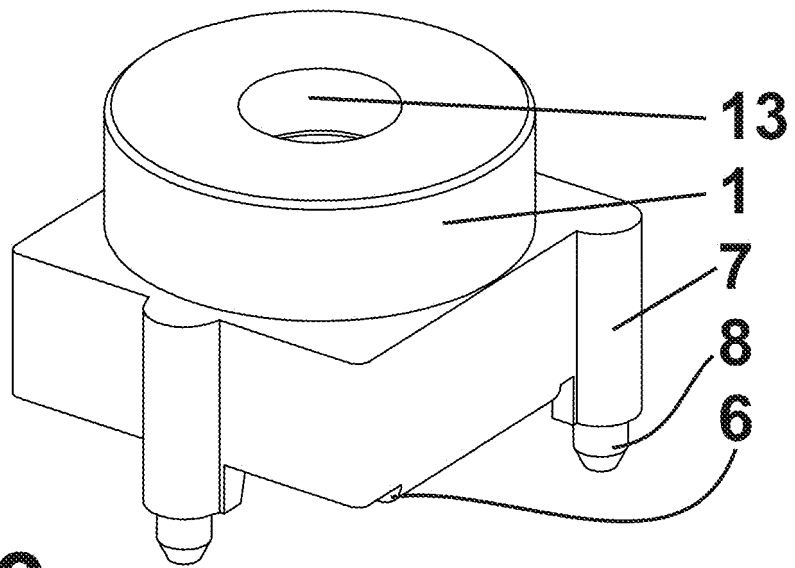


FIG. 2

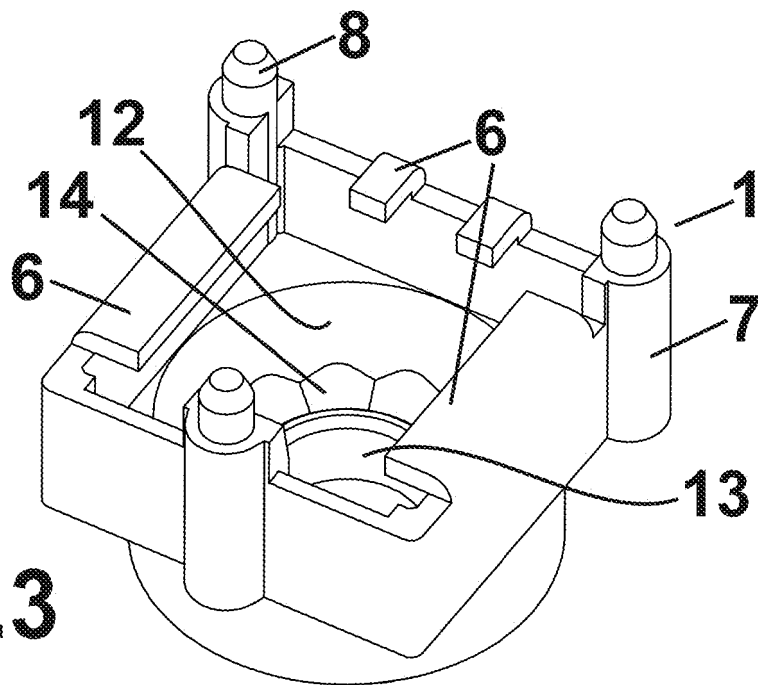


FIG. 3

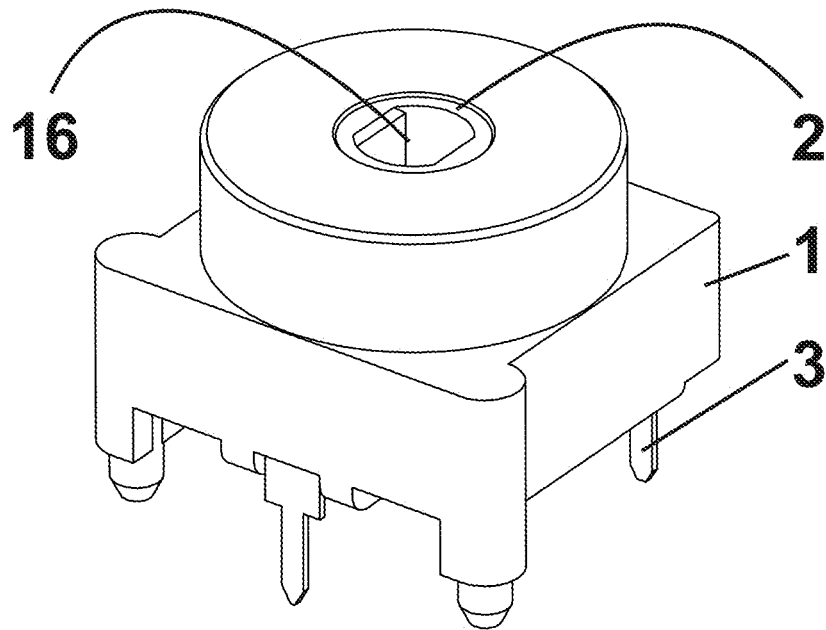


FIG. 4

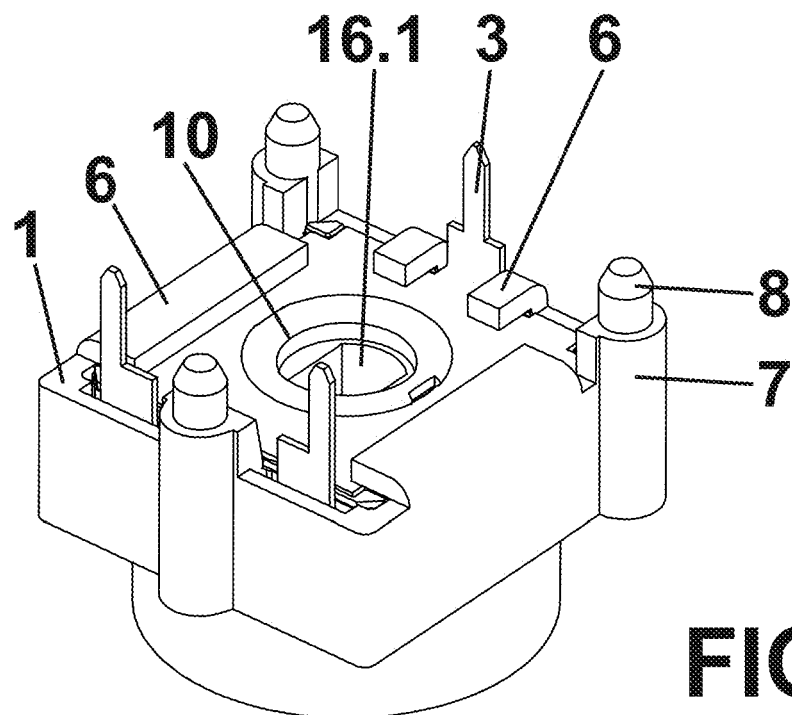


FIG. 5

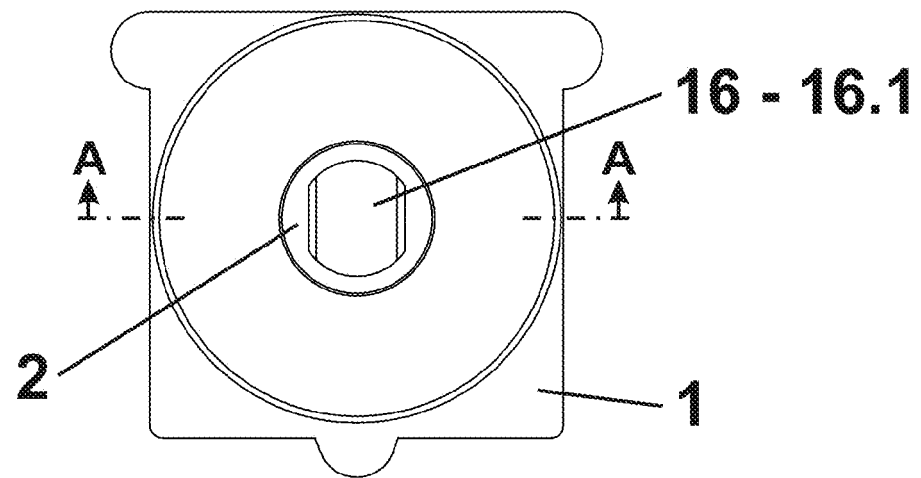


FIG. 6

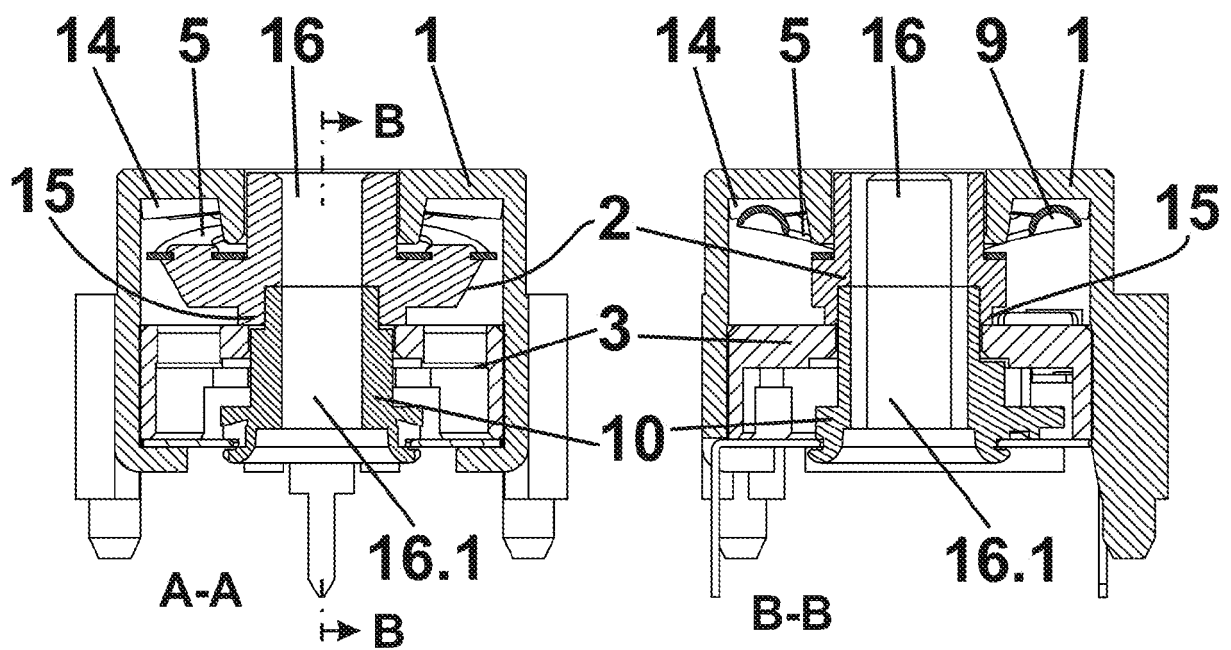


FIG. 7

FIG. 8

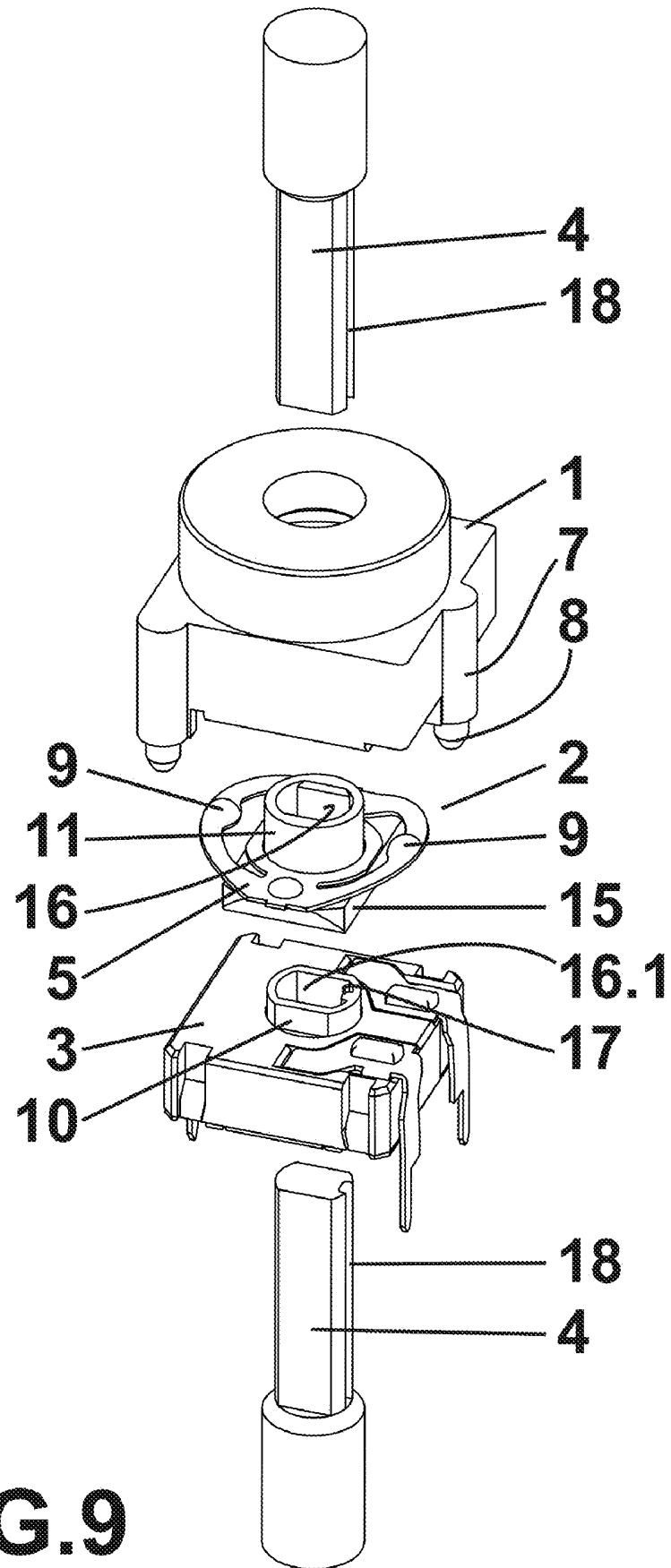


FIG.9

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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