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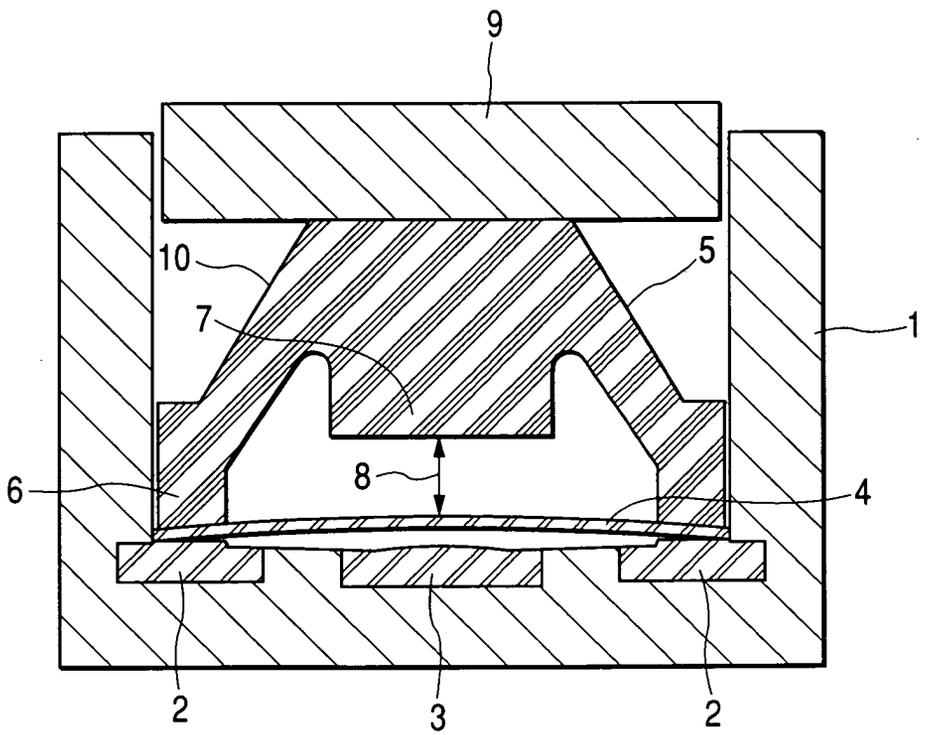
(54) Push button switch structure

(57) The present invention comprises fixed contacts buried in a housing, a first reversing spring made of metal, which is a movable contact accessible to the fixed contact, and a second reversing spring made of a rubber material for giving a pressing force to reverse the first reversing spring. In addition, a gap dimension for reversing the first reversing spring and the second reversing spring nearly simultaneously is provided between a top of the first reversing spring and a press section of the second reversing spring.

FIG. 1



EP 1 387 375 A2

Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates to a push button switch structure provided in a push button switch unit used for various kinds of electronic equipment, the push button switch structure including a reversing spring to form a movable contact.

2. Description of the Related Art

[0002] As prior arts of the above type of invention, the gazettes of Japanese Unexamined Patent Publication Nos. 2000-322974 and 2002-93272 disclose a structure provided in a push button switch unit.

[0003] The former prior art comprises a fixed contact buried in a housing, a dome-shaped reversing spring, for example a reversing spring made of metal, which is arranged being opposed to the fixed contact in accessible manner, forming a movable contact and having a moderate rigidity and elasticity, and a stem having a press section abutting against a top of the reversing spring for giving a pressing force so as to reverse the reversing spring.

[0004] In this prior art, when the stem is operated, the press section of the stem presses the top of the reversing spring, and accordingly the reversing spring made of metal is reversed. Then, the reversing spring becomes conductive with the fixed contact, allowing a predetermined signal to be outputted. When the reversing spring made of metal is reversed, a relatively sharp click feel is obtained. In addition, an operational stroke until the reversing spring becomes conductive with the fixed contact is relatively short.

[0005] The latter prior art comprises a fixed contact buried in a housing, a dome-shaped reversing spring, for example a reversing spring made of rubber material, which is arranged being opposed to the fixed contact in accessible manner, provided with a movable contact on a surface opposed to the fixed contact, and an operating section, i.e., a stem, having a press section abutting against the reversing spring for giving a pressing force so as to reverse the reversing spring.

[0006] Also in this prior art, when the stem is operated, the stem presses the reversing spring made of a rubber material. Accordingly, the reversing spring is reversed in such a manner as allowing a bottom thereof to bend. Then, the movable contact provided on the reversing spring becomes conductive with the fixed contact, whereby a predetermined signal can be outputted. When the reversing spring made of rubber material is reversed, a loose, relatively dull click feel is obtained. Furthermore, the operational stroke until the movable contact of the reversing spring becomes conductive with the fixed contact may be set relatively long, along with a dimensional setting and the like as to the bottom of this reversing spring made of a rubber material.

[0007] In the former prior art as described above, even if a click feel is relatively sharp, the operational stroke is short. In this regard, there is a concern that a desirable operability may not be obtained depending on an installation purpose on electronic equipment to which the prior art is applied.

[0008] Furthermore, in the latter prior art as described above, even if the operational stroke may be made long, a click feel is relatively dull. In this regard, there is also a concern that a desirable operability may not be obtained depending on an installation purpose on electronic equipment to which the prior art is applied.

[0009] In recent years, there is a type of push button switch unit of electronic equipment, which requires securing both relatively sharp click feel and relatively long operational stroke.

SUMMARY OF THE INVENTION

[0010] The present invention has been made considering the current situation of the prior arts as described above, and an objective of the present invention is to provide a press button switch structure that ensures both a relatively sharp click feel and relatively long operational stroke.

[0011] In order to achieve the above objective, the present invention forms a fixed contact and a movable contact accessible to the fixed contact, and comprises a first reversing spring being dome-shaped with rigidity and elasticity and a second reversing spring for conveying a pressing force to reverse the first reversing spring, the second reversing spring being made of a more flexible material than one of the first reversing spring, as well as being elastic, wherein, a gap dimension is set between the first reversing spring and the second reversing spring in order to reverse the first reversing spring and the second reversing spring nearly simultaneously.

[0012] In the present invention configured as described above, the aforementioned gap dimension, which corresponds to a stroke until the second reversing spring made of a relatively flexible material abuts against the first reversing spring, can be included within the entire operational stroke. In other words, the operational stroke may be defined as a total of the aforementioned gap dimension and a stroke from a state where the second reversing spring abuts against the first reversing spring to a state where the first reversing spring is reversed. Then, it is possible to ensure a relatively long operational stroke.

[0013] Furthermore, with setting of the above gap dimension, the first reversing spring having rigidity and elasticity, and the second reversing spring having a flexibility and elasticity can be reversed nearly simultaneously. Accordingly, it is possible to obtain a click feel combining the sharp click feel of the first reversing

spring and the dull click feel of the second reversing spring. In other words, it is possible to ensure a relatively sharp click feel, comparing to the dull click feel of the second reversing spring.

[0014] In addition, the present invention features that the first reversing spring is made of one of a synthetic resin having a conductive film on a surface opposed to the fixed contact and a metal, and the second reversing spring is made of one of a synthetic resin and a rubber material.

[0015] Furthermore, the present invention features that the rubber material is in a dome shape.

[0016] Furthermore, the present invention features that a bottom of the aforementioned second reversing spring abuts against a peripheral edge of the first reversing spring.

[0017] With the present invention as configured above, it is possible for the second reversing spring, being flexible, to absorb fine vibration that occurs at the time of reversing the first reversing spring having rigidity.

[0018] Furthermore, the present invention features that a spacer is provided between the bottom of the second reversing spring and the peripheral edge of the first reversing spring.

[0019] With the present invention as configured above, the aforementioned gap dimension can be adjusted by the spacer.

[0020] Furthermore, the present invention features that a dustproof sheet for covering the first reversing spring is provided.

[0021] With the present invention as configured above, it is possible to prevent dust, which enters as a result of a reversing operation of the flexible second reversing spring, from entering a contact formed by the first reversing spring and the fixed contact.

[0022] Furthermore, the present invention features that it is provided in a push button switch unit as a discrete piece accommodated in an independent outer shell.

[0023] Furthermore, the present invention features that it is provided in each of a plurality of push button switch units formed via a sheet-like member.

BRIEF DESCRIPTION OF THE DRAWINGS

[0024]

Fig. 1 is a longitudinal sectional view showing the first embodiment of the present invention, which is applied to a push button switch unit as a discrete piece accommodated in an independent outer shell;
Fig. 2 is an illustration showing an operating force and a stroke characteristic of the first reversing spring made of (metal, provided in the first embodiment as shown in Fig. 1;
Fig. 3 is an illustration showing an operating force and a stroke characteristic of the second reversing spring made of a rubber material, provided in the first embodiment as shown in Fig. 1;
Fig. 4 is an illustration showing an operating force and a stroke characteristic of the first embodiment as shown in Fig. 1;
Fig. 5 is an exploded perspective view showing the second embodiment of the present invention applied to each of a plurality of push button switch units formed via a sheet-like member;
Fig. 6 is a longitudinal sectional view showing the second embodiment as shown in Fig. 5;
Fig. 7 is a substantial part of the third embodiment of the present invention;
Fig. 8 is a longitudinal sectional view showing the fourth embodiment of the present invention, which is applied to a push button switch unit as a discrete piece accommodated in an independent outer shell;
Fig. 9 is a longitudinal sectional view showing the fifth embodiment of the present invention, which is applied to a push button switch unit as a discrete piece accommodated in an independent outer shell;
Fig. 10 is a longitudinal sectional view showing the sixth embodiment of the present invention, which is applied to a push button switch unit as a discrete piece accommodated in an independent outer shell;
Fig. 11 is a longitudinal sectional view showing the seventh embodiment of the present invention, which is applied to a push button switch unit as a discrete piece accommodated in an independent outer shell; and
Fig. 12 is a longitudinal sectional view showing the eighth embodiment of the present invention, which is applied to a push button switch unit as a discrete piece accommodated in an independent outer shell.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0025] Hereinafter, preferred embodiments of the present invention relating to a push button switch structure will be explained with reference to the attached drawings.

[0026] Fig. 1 is a longitudinal sectional view showing the first embodiment of the present invention, which is applied to a push button switch unit as a discrete piece accommodated in an independent outer shell.

[0027] The first embodiment comprises a housing 1 forming the outer shell, fixed contacts 2, 3 buried in the bottom of the housing 1, and an external connecting terminal, not illustrated, one end of which is connected to the above fixed contacts and the other end of which is derived out of the housing. The first embodiment further comprises a first reversing spring 4, which is arranged in a manner opposed to the fixed contacts 2, 3 and a peripheral edge of the first reversing spring keeps contact with the fixed contact 2, as well as forming a movable contact that is selectively accessible to the fixed contact 3. This first reversing spring 4 is dome-shaped having a moderate rigidity and elasticity. For example,

the dome shape is formed by a process of drawing using a metallic material.

[0028] On an upper position of the first reversing spring 4 as shown in Fig. 1, a second reversing spring 5 is provided, which is also elastic but made of a more flexible material comparing to that of the first reversing spring 4. This second reversing spring 5 comprises a rubber material for example dome-shaped, a bottom 6 thereof abutting against the peripheral edge of the first reversing spring 4, and a press section 7 for conveying a pressing force to reverse the first reversing spring 4.

[0029] Furthermore, between the top of the first reversing spring 4 and the press section 7 of the second reversing spring 5, a gap dimension 8 is set in advance, for reversing the first reversing spring 4 and the second reversing spring 5 nearly simultaneously.

[0030] Furthermore, on the upper position of the second reversing spring 5 as shown in Fig. 1, a stem 9 that is capable of performing a pressing operation against the second reversing spring 5 is provided.

[0031] With the first embodiment as configured above, when the stem 9 is subjected to the pressing operation, in accordance with thus pressed stem 9, the second reversing spring 5 made of a rubber material is dented and comes down, the peripheral side section 10 thereof starts bending, and then, the press section 7 abuts against the top of the first reversing spring 4 made of metal. Subsequent pressing force put on the stem 9 allows that the second reversing spring 5 is reversed, and nearly simultaneously the first reversing spring 4 is reversed by a force given via the press section 7 of the second reversing spring 5. When the first reversing spring 4 is reversed, the first reversing spring 4 becomes conductive with the fixed contact 3, and then a predetermined signal is outputted.

[0032] In the first embodiment, it is possible to include the gap dimension 8 in the entire operational stroke, the gap dimension 8 corresponding to a stroke until the press section 7 of the second reversing spring 5 comes into abutment against the top of the first reversing spring 4. In other words, the operational stroke can be defined as a total of the above gap dimension 8 and a stroke from a state where the press section 7 of the second reversing spring 5 abuts against the first reversing spring 4 until a state where the first reversing spring 4 is reversed and becomes conductive with the fixed contact 3. Therefore, it is possible to ensure a relatively long operational stroke.

[0033] Furthermore, with the setting of the above gap dimension 8, it is possible to reverse the first reversing spring 4 and the second reversing spring 5 nearly simultaneously. Therefore, it is possible to obtain a click feel combining a sharp click feel of the first reversing spring 4 made of metal and a soft and dull click feel of the second reversing spring 5 made of a rubber material. In other words, it is possible to ensure a relatively sharp click feel comparing to that of the dull click feel of the second reversing spring 5.

[0034] Fig. 2 is an illustration showing an operating force and a stroke characteristic of the first reversing spring 4 made of metal provided in the first embodiment. As shown in Fig. 2, a stroke forming a reversed area t1 is relatively short. With this short stroke, it is possible to secure a sharp click feel. Moreover, the stroke S1 from a time when the operating force is given to a time when the reversing operation is completed is also relatively short.

[0035] Fig. 3 is an illustration showing an operating force and a stroke characteristic of the second reversing spring 5 made of rubber material, provided in the first embodiment. As shown in Fig. 3, a stroke forming a reversed area t2 is relatively long. With this long stroke, the click feel becomes soft and dull. Moreover, the stroke S2 from a time when the operating force is given to a time when the reversing operation is completed is also relatively long.

[0036] Fig. 4 is an illustration showing an operating force and a stroke characteristic of the first embodiment. As shown in Fig. 4, in the first embodiment, since it is possible to obtain a characteristic combining the characteristic of the first reversing spring 4 as shown in Fig. 2 and that of the second reversing spring 5 as shown in Fig. 3, a stroke forming a reversed area t3 can be made shorter than the stroke characteristic of the second reversing spring 5 as shown in Fig. 3. Accordingly, it is possible to ensure a sharper click feel comparing to the click feel of the second reversing spring 5 only. Furthermore, it is possible to secure a stroke S3 from a time when the operating force is given to when a time the reversing operation is completed, which is longer than the stroke characteristic of the first reversing spring 4.

[0037] As described above, according to the first embodiment of the present invention, it is possible to ensure both a relatively sharp click feel and a relatively long operational stroke, and then it is possible to obtain a superior operability in response to an installation purpose.

[0038] Furthermore, a bottom 6 of the second reversing spring 5 made of a rubber material abuts against the peripheral edge of the first reversing spring 4 made of metal. Therefore, a fine vibration, which is generated on the first reversing spring 4 at the time of reversing the first reversing spring 4, can be absorbed by the flexible second reversing spring 5, thereby preventing uncomfortable vibration noise from occurring.

[0039] Fig. 5 is a perspective view showing the second embodiment of the present invention applied to each of a plurality of push button switch units formed via a sheet-like member. Fig. 6 is a longitudinal sectional view showing a substantial part of the second embodiment as shown in Fig. 5.

[0040] In the second embodiment as shown in Fig. 5 and Fig. 6, a plurality of first reversing springs 12 made of metal are provided on a print circuit board 11. On the upper side of the print circuit board 11, a rubber sheet 14 is provided, which is integrally formed with a plurality

of second reversing springs 13. As shown in Fig. 6, the second reversing springs 13 are arranged respectively to locate on the corresponding first reversing springs 12. On the print circuit board 11, as to each of the first reversing springs 12, there are formed a first contact pattern 15 against which the peripheral edge of the first reversing spring 12 abuts constantly, and a fixed contact pattern 16 with which the first reversing spring 12 can be conductive in accordance with the reversing operation of the first reversing spring 12.

[0041] Furthermore, as to each, there is provided in advance a gap dimension 18 for reversing the first reversing spring 12 and the second reversing spring 13 nearly simultaneously, between the press section 17 of the second reversing spring 13 and the top of the first reversing spring 12.

[0042] In this second embodiment, by pressing each of the second reversing springs 13, the second reversing spring 13 is bent, and then, the press section 17 comes into abutment against the top of the first reversing spring 12. Further subsequent pressing onto the second reversing spring 13 allows the second reversing spring 13 to reverse. At this time, nearly simultaneously, the first reversing spring 12 is also reversed, and the first reversing spring 12 is conductive with the fixed contact pattern 16. With this conduction, a predetermined signal is outputted.

[0043] According to the second embodiment as configured above and with the aforementioned setting of the gap dimension 18, it is possible to ensure both a relatively sharp click feel and a relatively long operational stroke and to obtain a superior operability, similar to the case of the first embodiment.

[0044] Fig. 7 is a substantial part of the third embodiment of the present invention.

[0045] The third embodiment as shown in Fig. 7 is an invention applied to a sheet-like member provided with a plurality of push button switch units on the print circuit board 11. Under each of the second reversing springs 13 contained in the rubber sheet 14, a switch unit 19, being single item, is arranged. Within the switch unit 19, the first reversing spring 12 made of metal, equivalent to that of aforementioned second embodiment is disposed, which is not shown in the illustration. Furthermore, the switch unit 19 is provided with a stem 20 that is capable of pressing the first reversing spring 12. Moreover, a gap dimension 21 for nearly simultaneously reversing the first reversing spring 12 within the switch unit 19 and the second reversing spring 13 is set between the press section 17 of the second reversing spring 13 and the stem 20.

[0046] In the third embodiment, by pressing each of the second reversing springs 13, then it is bent, and the second reversing spring 13 comes into abutment against the stem 20 of the switch unit 19. Subsequent pressing of the second reversing spring 13 allows it to reverse. During this period of time, the first reversing spring 12, not illustrated, within the switch unit 19 is pressed by the stem 20, and the first reversing spring 12 is reversed nearly simultaneously with reversing of the second reversing spring 13. Accordingly, the first reversing spring 12 is conductive to the fixed contact pattern, not illustrated, on the print circuit board 11, so that a predetermined signal is outputted.

[0047] The third embodiment as configured above can obtain an operational advantage equivalent to those of the first and the second embodiments as described above, in accordance with providing the aforementioned gap dimension 21.

[0048] Fig. 8 is a longitudinal sectional view showing the fourth embodiment of the present invention, which is applied to a push button switch unit as a discrete piece accommodated in an independent outer shell.

[0049] As shown in Fig. 8, in the fourth embodiment, instead of providing a fixed contact against which the peripheral edge of the first reversing spring 4 abuts constantly, two fixed contacts 30 and 31 are buried in the vicinity of a center of the bottom of the housing 1. Other structures are equivalent to those of the first embodiment.

[0050] In the fourth embodiment as configured above, the top of the first reversing spring 4 is pressed by the press section 7 of the second reversing spring 5, and at the time of reversing, the first reversing spring 4 comes into abutment against both the fixed contacts 30 and 31. Accordingly, the fixed contacts 30 and 31 become conductive therebetween and a predetermined signal is outputted.

[0051] The fourth embodiment as configured above can obtain an operational advantage equivalent to that of the first embodiment as described above, in accordance with providing the gap dimension 8.

[0052] Fig. 9 is also a longitudinal sectional view showing the fifth embodiment of the present invention, which is applied to a push button switch unit as a discrete piece accommodated in an independent outer shell.

[0053] As shown in Fig. 9, in the fifth embodiment, a spacer 22, for example ring-shaped, is provided between the peripheral edge of the first reversing spring 4 and the bottom 6 of the second reversing spring 5. Other structures are equivalent to those of the first embodiment.

[0054] The fifth embodiment as configured above can obtain an operational advantage equivalent to that of the first embodiment as described above, in accordance with providing the gap dimension 8.

[0055] Furthermore, by providing the spacer 22, in particular, the gap dimension 8 formed between the first reversing spring 4 and the press section 7 of the second reversing spring 5 can be adjusted. In other words, if there is a reversing time deviation between the first reversing spring 4 and the second reversing spring 5, this time deviation can be corrected easily by appropriately selecting the height dimension of the spacer 22. Accordingly, it is possible to achieve a reversing operation with

a high degree of precision, including both the reverse of the first reversing spring 4 and that of the second reversing spring 5, and switching performance is enhanced.

[0056] Fig. 10 is also a longitudinal sectional view showing the sixth embodiment of the present invention, which is applied to a push button switch unit as a discrete piece accommodated in an independent outer shell.

[0057] The sixth embodiment is configured as being provided with the fixed contacts 30 and 31 arrangement, equivalent to those of the aforementioned fourth embodiment as shown in Fig. 8, as well as a spacer 22 equivalent to that of the aforementioned fifth embodiment as shown in Fig. 9.

[0058] Also in the sixth embodiment, it is possible to obtain an operational advantage equivalent to that of the aforementioned fifth embodiment as shown Fig. 9, in accordance with providing the spacer 22.

[0059] Fig. 11 is a longitudinal sectional view showing the seventh embodiment of the present invention, which is applied to a push button switch unit as a discrete piece accommodated in an independent outer shell.

[0060] In the seventh embodiment, a flexible dustproof sheet 23 is provided in such a manner as covering the first reversing spring 4. This dustproof sheet 23 is disposed, for example, in such a manner as being held tight between the spacer 22 and the bottom 6 of the second reversing spring 5. Other structures are equivalent to those of the aforementioned fifth embodiment as shown in Fig. 9.

[0061] Also in the seventh embodiment as configured above, it is possible to obtain an operational advantage equivalent to that of the aforementioned first embodiment as shown in Fig. 1, in accordance with providing the gap dimension 8.

[0062] Furthermore, by providing the spacer 22 between the first reversing spring 4 and the bottom 6 of the second reversing spring 5, an operational advantage equivalent to that of the aforementioned fifth embodiment as shown in Fig. 9 can be obtained.

[0063] In particular, with the dustproof sheet 23 thus provided for covering the first reversing spring 4, it is possible to prevent dust from entering a contact formed by the first reversing spring 4 and the fixed contacts 2 and 3, the dust entering between the bottom 6 of the second reversing spring 5 and the internal wall surface of the housing 1 in accordance with a reversing operation of the flexible second reversing spring 5. Accordingly, it is possible to prevent a poor connection at the contact due to the dust, and then durability is enhanced.

[0064] Fig. 12 is also a longitudinal sectional view showing the eighth embodiment of the present invention, which is applied to a push button switch unit as a discrete piece accommodated in an independent outer shell.

[0065] The eighth embodiment is configured as being provided with arrangements of the fixed contacts 30, 31 and the spacer 22, equivalent to that of the aforementioned embodiment as shown in Fig. 10, as well as provided with the dustproof sheet 23 for covering the first reversing spring 4, which is equivalent to that of the aforementioned seventh embodiment as shown in Fig. 11.

[0066] Here, the spacer 22 is disposed at the bottom of the housing 1, and the dustproof sheet 23 is disposed in such a manner as being held tight between the spacer 22 and the bottom of the housing 1. Other structures are equivalent to those of the aforementioned first embodiment as shown in Fig. 1.

[0067] Also in the eighth embodiment as configured above, it is possible to obtain an operational advantage equivalent to that of the aforementioned first embodiment as shown in Fig. 1, in accordance with setting the gap dimension 8.

[0068] Furthermore, with the spacer 22 thus provided, it is possible to obtain an operational advantage equivalent to that of the aforementioned fifth embodiment as shown in Fig. 9.

[0069] Furthermore, with the dustproof sheet 23 thus provided, it is possible to obtain an operational advantage equivalent to that of the aforementioned seventh embodiment as shown in Fig. 11.

[0070] In each of the above embodiments, metal is used to configure the first reversing spring 4 or 12. However, instead of configuring with the metal, it is also possible to use a synthetic resin, having a moderate rigidity and elasticity, and formed with a conductive film such as carbon coating on a surface opposed to the fixed contact.

[0071] Furthermore, in the above embodiments, a rubber material is used to configure the second reversing spring 5 or 13. However, instead of configuring with the rubber material, it is also possible to use a synthetic resin having a moderate flexibility and elasticity.

[0072] As described above, the present invention is configured such that between the first reversing spring having rigidity and elasticity and the second reversing spring made of a more flexible material than one of the first reversing spring and having elasticity, a gap dimension is set for reversing the first reversing spring and the second reversing spring nearly simultaneously. With this configuration, both a relatively sharp click feel and a relatively long operational stroke, which have been conventionally required, are ensured and a desired superior operability is obtained.

[0073] Furthermore, the present invention is configured such that the bottom of the second reversing spring abuts against the peripheral edge of the first reversing spring. With this configuration, it is possible for the second reversing spring to absorb fine vibration generated at the time when the first reversing spring is reversed, thereby preventing an occurrence of uncomfortable vibration noise.

[0074] Furthermore, the present invention is configured such that a spacer is disposed between the bottom of the second reversing spring and the peripheral edge

of the first reversing spring. With this configuration, it is possible to adjust the gap dimension by the spacer, thereby ensuring a highly precise reversing operation of the first and the second reversing springs, and then enhancing the switching performance.

[0075] Furthermore, the present invention is configured such that a dustproof sheet covering the first reversing spring is provided. With this configuration, it is possible for the dustproof sheet to prevent dust from entering the contact formed by the first reversing spring and the fixed contact, thereby preventing a poor connection at the contact and then enhancing the durability.

Claims

1. A push button switch structure forming therein a fixed contact and a movable contact accessible to the fixed contact and comprising,

a first reversing spring being dome-shaped with rigidity and elasticity, and

a second reversing spring for conveying a pressing force to reverse the first reversing spring, the second reversing spring being made of a more flexible material than one of the first reversing spring, as well as being elastic, wherein

a gap dimension is set between the first reversing spring and the second reversing spring in order to reverse the first reversing spring and the second reversing spring nearly simultaneously.

2. A push button switch structure according to claim 1, wherein

the first reversing spring is made of one of a synthetic resin with a conductive film on a surface opposed to the fixed contact and a metal, and

wherein the second reversing spring is made of one of a synthetic resin and a rubber material.

3. A push button switch structure according to claim 2, wherein the rubber material is formed in a dome shape.

4. A push button switch structure according to any of claims 1 to 3, wherein a bottom of the second reversing spring abuts against a peripheral edge of the first reversing spring.

5. A push button switch structure according to any of claims 1 to 4, wherein a spacer is provided between the bottom of the second reversing spring and the peripheral edge of the first reversing spring.

6. A push button switch structure according to any of claims 1 to 5, wherein a dustproof sheet for covering the first reversing spring is provided.

7. A push button switch structure according to any of claims 1 to 6, which is provided in a push button switch unit as a discrete piece accommodated in an independent outer shell.

8. A push button switch structure according to any of claims 1 to 7, which is provided in each of a plurality of push button switch units formed via a sheet-like member.

FIG. 1

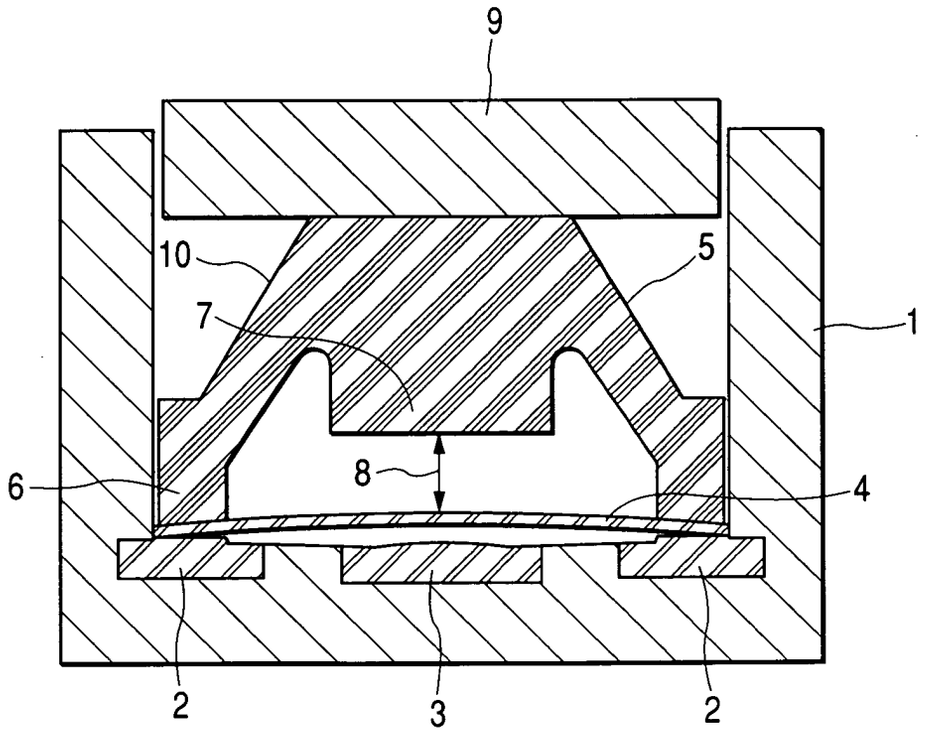


FIG. 2

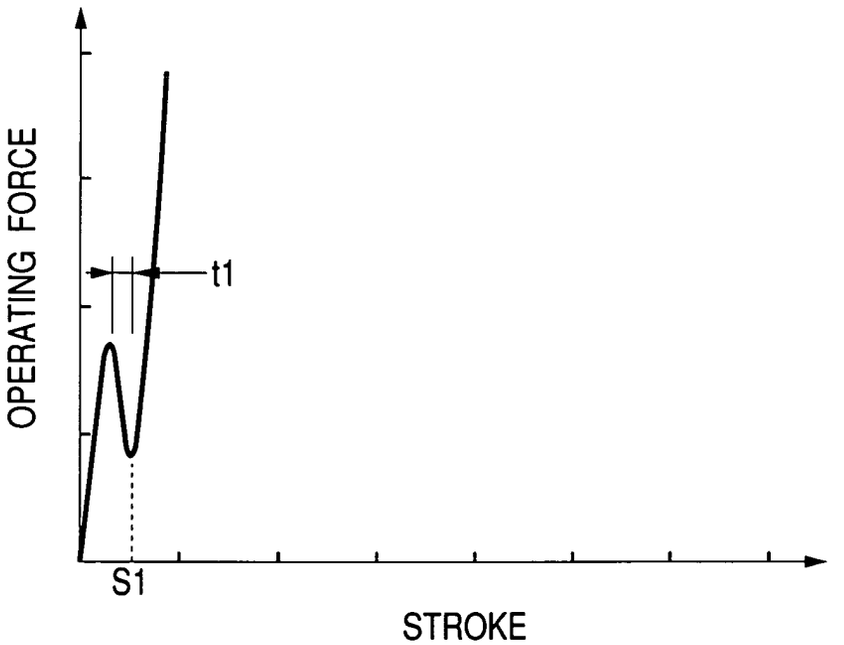


FIG. 3

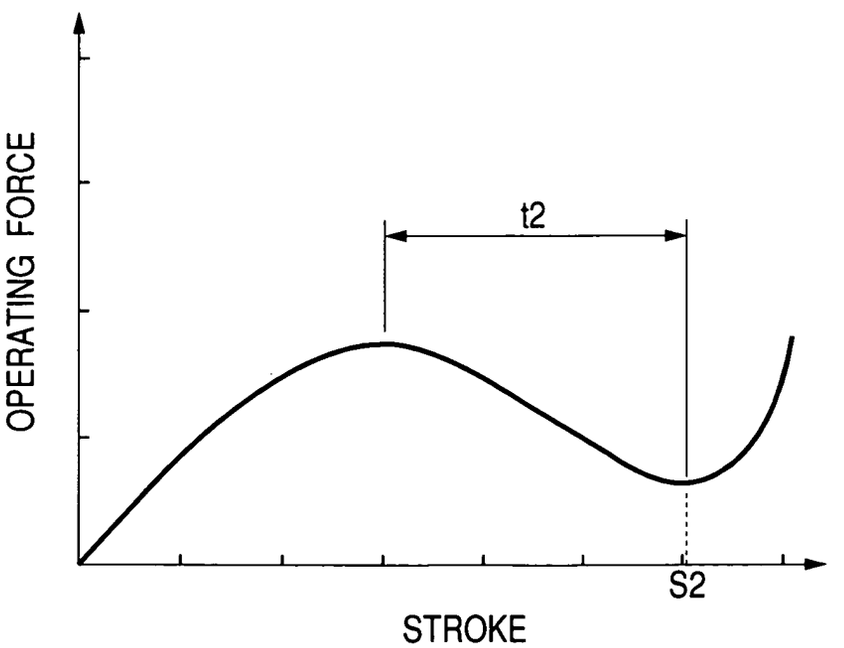


FIG. 4

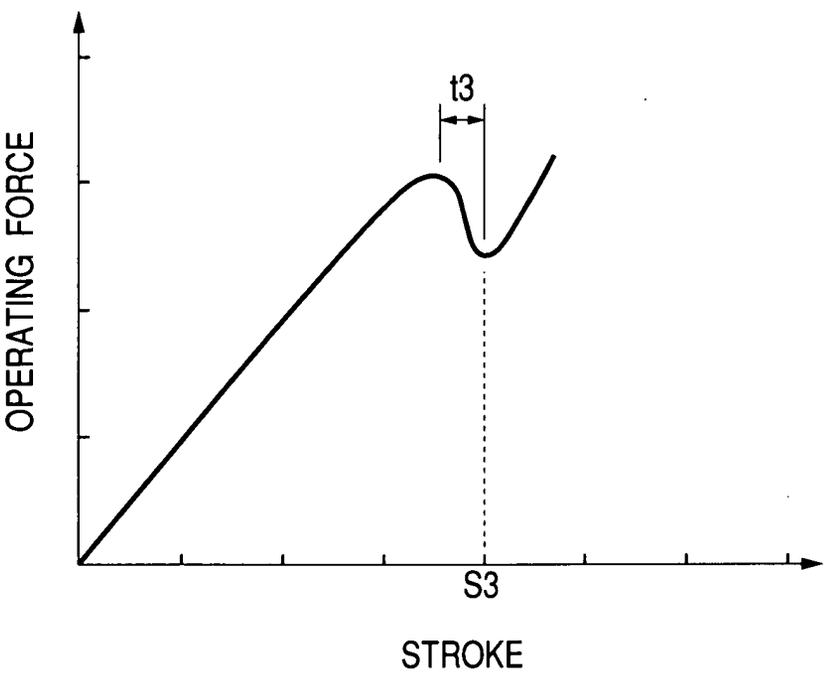


FIG. 5

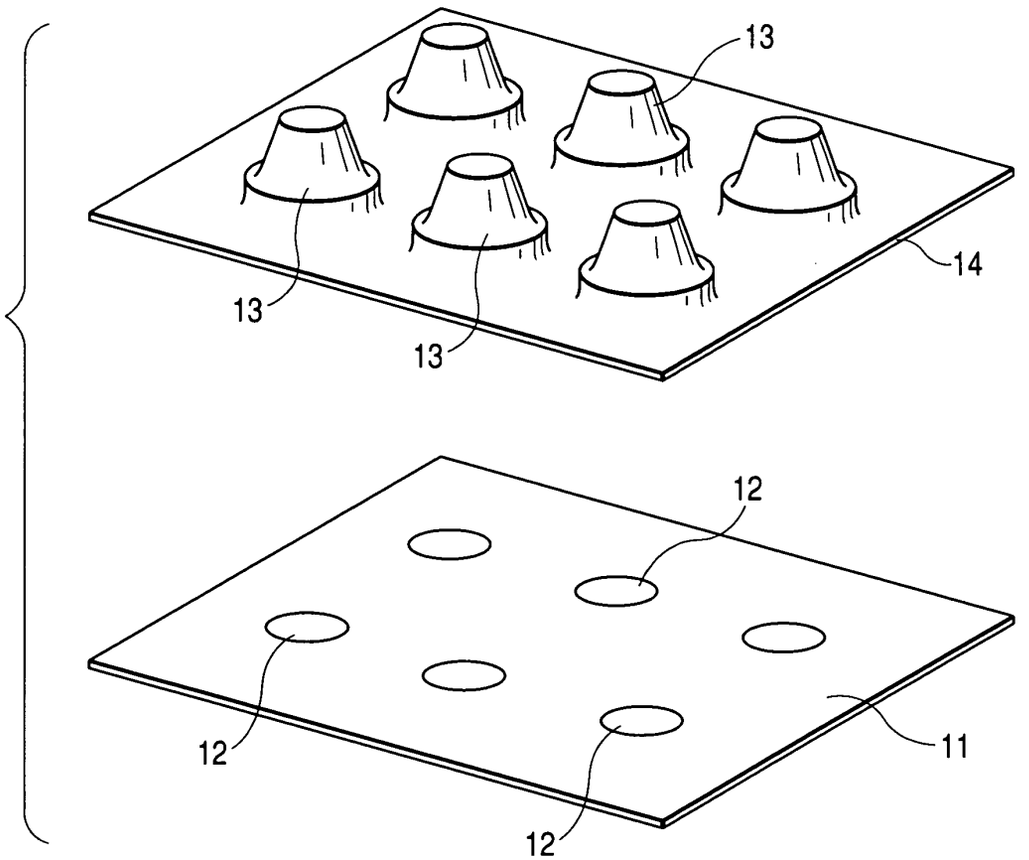


FIG. 6

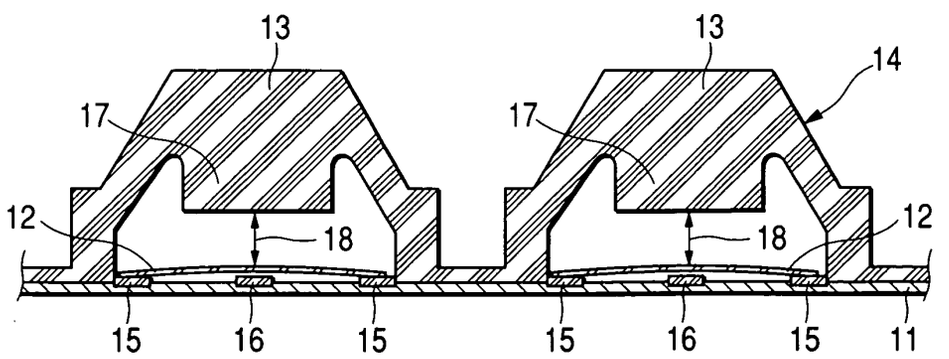


FIG. 7

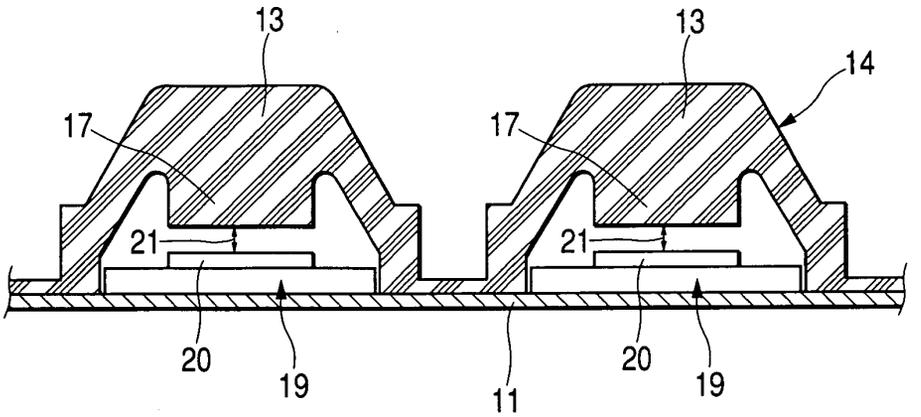


FIG. 8

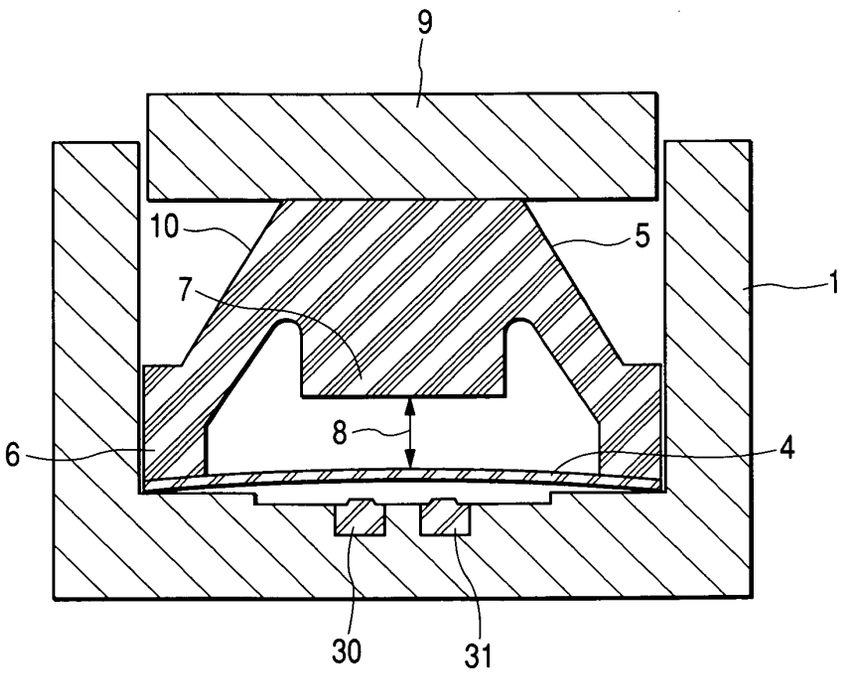


FIG. 9

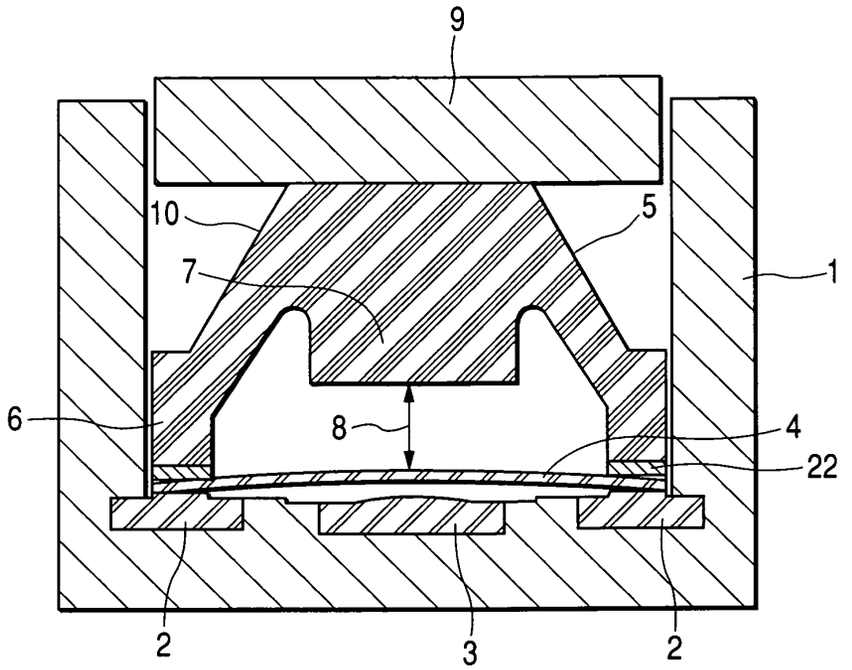


FIG. 10

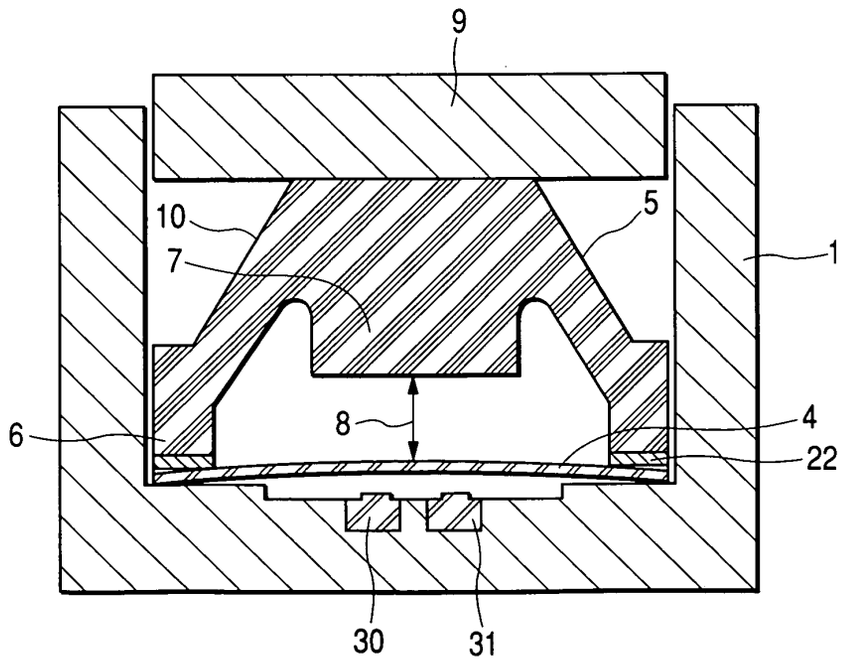


FIG. 11

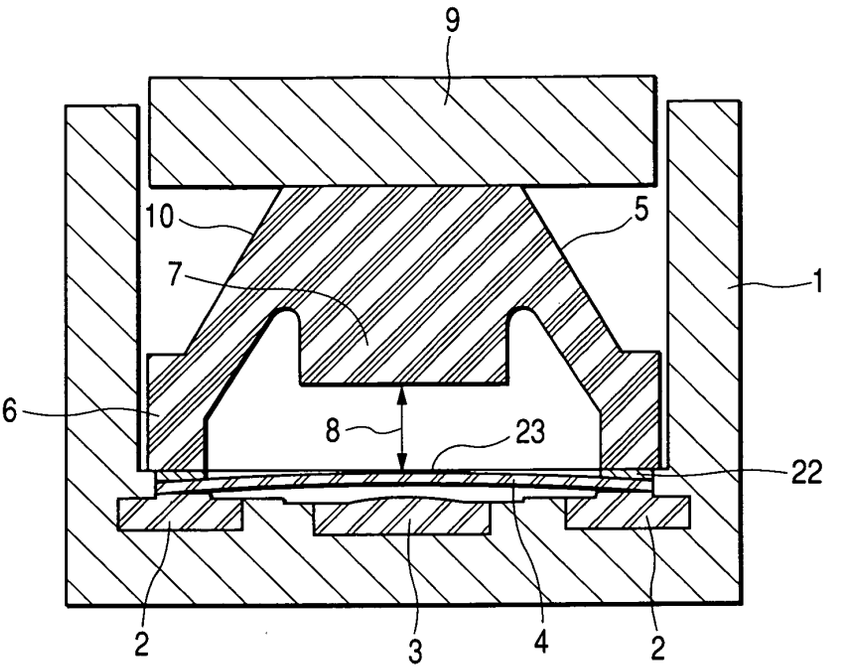


FIG. 12