

SEESAW MULTISTAGE SWITCH

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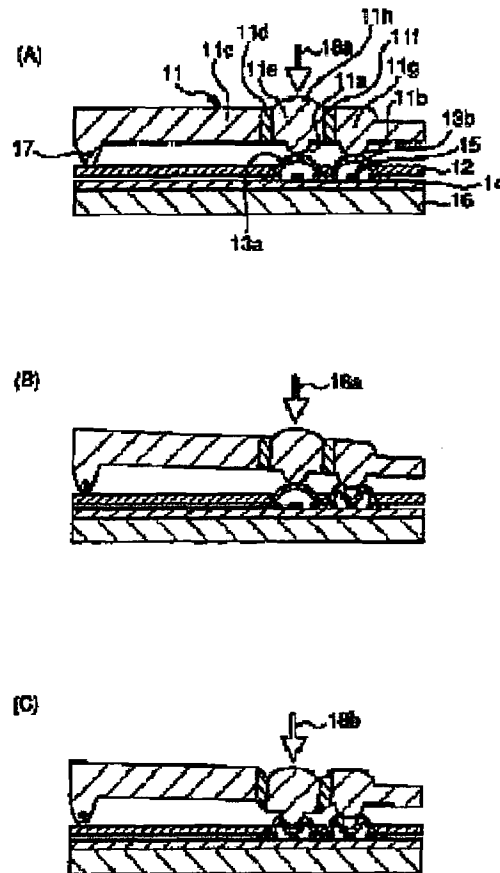
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Abstract of JP2000057898

PROBLEM TO BE SOLVED: To provide a structure absorbing pressures applied in excess. **SOLUTION:** In a seesaw multistage switch comprising a base 14 on which a plurality of disc spring switch elements 13 (13a, 13b), 15 are arranged in straight line and a seesaw control knob 11 extending in the direction of arrangement of the switch elements 13, the control knob 11 comprises a knob rear end portion 11c, a plurality of disc spring depressing sectors 11e, 11g corresponding to the switch elements 13, 15, and elastic coupling elements 11d, 11f jointing the sectors together. Also, one of the disc spring depressing sectors 11e, 11g comprises a depressing operation part 11e (11g), and when the depressing operation parts 11e, 11g are depressed in steps, the switch elements 13, 15 are sequentially put into action according to the deformation resistance of the disc spring contacts 13a, 13b and the elastic coupling elements 11d, 11f.



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CLAIMS

[Claim(s)]

[Claim 1] Two or more pan spring contact mold switch elements (13 15) in the shape of a serial And the substrate which it comes to arrange for every predetermined spacing (14), In the seesaw mold multistage switch which comes to have the seesaw mold operating knob (11) which a end face is pivoted by the perimeter support means, and extends along with the orientation of a switch element (13 15) While this operating knob (11) consists of the knob end face section (11c), two or more pan spring depression sectors (11e, 11g) corresponding to each switch element, and elastic combination (11d, 11f) that carries out joint association of them mutually One pan spring depression sector of the both ends (11e;11g) is constituted as a depression control unit (11e;11g). Each elastic combination (11d, 11f) While having larger deformation proof stress than pan spring contact (13a, 13b) of which switch element (13 15) When carrying out the depression of the depression control unit. (11e;11g) gradually, the deformation proof stress of each pan spring contact (13a, 13b) and each elastic combination (11d, 11f) is embraced. The seesaw mold multistage switch characterized by a switch element (13 15) carrying out a sequential operation towards a depression control unit (11e;11g) from an

anti-depression control unit (11g;11e).

[Claim 2] A depression control unit (11e) is a seesaw mold multistage switch according to claim 1 characterized by preparing in a knob end face section (11c) side.

[Claim 3] For a depression control unit (11g), a pan spring pusher (17a) is a seesaw mold multistage switch according to claim 1 with which it is characterized by projecting greatly one by one towards the knob end face section (11c) while preparing in the opposite side of the knob end face section (11c).

[Claim 4] Two or more pan spring mold switch elements (13 15) in the shape of a serial And the substrate which it comes to arrange for every predetermined spacing (14), In the seesaw mold multistage switch which comes to have the seesaw mold operating knob (11) which a end face is pivoted by the perimeter support means, and extends along with the orientation of a switch element (13 15) Two or more pan spring depression sectors to which this operating knob (11) corresponded to each switch element (13 15) with the knob end face section (11c) (11e, 11g), While consisting of elastic combination (11d, 11f) which carries out joint association of them mutually When one pan spring depression sector (11e;11g) is constituted as a depression control unit (11e;11g) and carries out the depression of the depression control unit (11e;11g) gradually, The seesaw mold multistage switch characterized by a switch element (13 15) carrying out a sequential operation according to the deformation proof stress of each pan spring contact (13a, 13b) and each elastic combination (11d, 11f).

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] It is related [about the seesaw mold multistage switch which constituted so that the operating knob

supported by the pivot free / rotation / may press two or more switch elements (contact structure)] in this invention to the seesaw mold multistage switch of the pan spring contact type with which each switch element consists of pan spring contact and fixed contact especially about the multistage switch in which the operating state of each switch element carries out sequential change in detail according to the strength of the thrust applied to the operating knob.

[0002]

[Description of the Prior Art] Conventionally, this kind of multistage switch is used for the power window of an automobile etc., and the operating state of each switch element carries out sequential change according to the strength of the thrust applied to the operating knob. As such a multistage switch, as shown in drawing 1 , there is a 2 steps of seesaw mold switch which presses two switch elements (contact structure) with the pan spring pushers 1a and 1b formed in the lower limit of the operating knob 1 supported by the pivot 7 free [rotation] like seesaw, for example. This two-step switch is equipped with the base 6 which carried out the laminating of the substrate 4, two fixed contacts 5 formed in the top face of a substrate 4, the two pan springs contacts 3a and 3b supported by through hole 2a of the pan spring support plate 2, and the operating knob 1 which has the pan spring pushers 1a and 1b which press the pan spring contacts 3a and 3b.

[0003] A switch element consists of pan spring contact 3 and fixed contact 5. The pan spring contact 3 is the configuration which upheaved the conductive elastic plate in the shape of a dome, and if reversal deformation is carried out at a concave and thrust is opened by downward thrust, it will return in the shape of [original] dome shape. Moreover, each fixed contact 5 consists of contact electrode 5a and common electrode 5b. Therefore, a two-step switch can acquire two steps of contact conditions by having a switch element 2 sets.

[0004] The operating knob 1 consisted of stick-like rigid actuation plate 1c, equipped the end face side with the pivot

7, and is equipped with the 1st and the 2nd dish spring pushers 1a and 1b on the opposite side (namely, end side) inferior surface of tongue of a pivot 7. The operating knob 1 is pivoted in non-illustrated supporter material (for example, case member) by the pivot 7. The 1st and the 2nd dish spring pushers 1a and 1b are semi-sphere-like projections, and are arranged in the location corresponding to the 1st and the 2nd dish spring contacts 3a and 3b. Therefore, since it functions as a "lever" which uses a pivot 7 as the supporting point and makes each of the 1st and 2nd pushers 1a and 1b point of application, an operating knob 1 displaces more 2nd pusher 1b by the side of an end than 1st pusher 1a by the side of the supporting point. [0005] According to the above-mentioned configuration, if an operating knob 1 is pressed (the 1st-step press), an operating knob 1 will rotate focusing on a pivot 7, and 2nd pusher 1b in the location distant from the pivot 7 will act previously. And when the thrust to an operating knob 1 exceeds the deformation proof stress of 2nd dish spring contact 3b, 2nd dish spring contact 3b carries out reversal deformation at a concave. At this time, 2nd dish spring contact 3b contacts contact electrode 5a, and a switch element will be in contact [the 1st step of] condition. In addition, 1st dish spring contact 3a has not carried out reversal deformation at a concave.

[0006] If an operating knob 1 is pressed still more strongly (the 2nd-step press), 1st dish spring contact 3a will be similarly reversed to a concave. And 1st dish spring contact 3a contacts contact electrode 5a, and a switch element will be in contact [the 2nd step of] condition.

[0007] However, in the above-mentioned configuration, since an operating knob 1 functions as a "lever" as mentioned above, there are the following troubles. That is, when a switch element is in contact [the 2nd step of] condition, there is an operating knob 1 caudad from contact [the 1st step of] location. At this time, 2nd pusher 1b of a location which is separated from the supporting point is displaced caudad more greatly than 1st pusher 1a by the side of the supporting point. Consequently,

superfluous stress is applied to 2nd dish spring contact 3b, and it will be further crushed by 2nd dish spring contact 3b from the 1st step contact (that is, it is flattened). On the contrary, if the amount of pushing of an operating knob 1 is lessened so that superfluous stress may not be applied to 2nd dish spring contact 3b, contact of 1st dish spring contact 3a will become inadequate.

[0008] Thus, since actuation plate 1c is the rigid body and the conventional seesaw mold multistage switch cannot absorb superfluous thrust, it cannot rationalize thrust to contacting a switch element certainly and pan spring contact.

[0009]

[Problem(s) to be Solved by the Invention] Therefore, the technical technical problem which should solve this invention is in a seesaw mold multistage switch to acquire the structure which absorbs the thrust applied superfluously.

[0010]

[Means for Solving the Problem and its Function and Effect] In order to solve the above-mentioned technical technical problem, according to this invention, the following seesaw mold multistage switches are offered.

[0011] Namely, the seesaw mold multistage switch of this invention Two or more pan spring contact mold switch elements in the shape of a serial And the substrate which it comes to arrange for every predetermined spacing, In the seesaw mold multistage switch which comes to have the seesaw mold operating knob which a end face is pivoted by the perimeter support means, and extends along with the orientation of a switch element an operating knob While consisting of the knob end face section, two or more pan spring depression sectors corresponding to each switch element, and elastic combination that carries out joint association of them mutually One pan spring depression sector of the both ends is constituted as a depression control unit. Each elastic combination While having larger deformation proof stress than pan spring contact of which switch element When carrying out the depression of the depression control unit

gradually, according to the deformation proof stress of each pan spring contact and each elastic combination, it is characterized by a switch element carrying out a sequential operation towards a depression control unit from an anti-depression control unit.

[0012] According to the above-mentioned seesaw mold multistage switch, the operating knob really consists of the knob end face section, two or more pan spring depression sectors corresponding to each switch element, and elastic combination that carries out joint association of them mutually. With it, one pan spring depression sector of the both ends is constituted as a depression control unit. If the depression of one of the depression control units is carried out, an operating knob will make a pivot the center of rotation, and will rotate in one like seesaw. Since it has deformation proof stress with larger elastic combination than pan spring contact [which], an operating knob functions as the rigid body as a whole on the bottom of low stress, and functions as an elastic body flexible as a whole on the bottom of high stress.

[0013] The deformation proof stress of each pan spring contact and each elastic combination is set up so that a switch element may carry out a sequential operation towards a depression control unit from an anti-depression control unit (namely, opposite side of a depression control unit). If the 1st step depression (namely, low stress depression) is performed to a depression control unit, the thrust will act so that the comparatively small pan spring contact and elastic combination of deformation proof stress of an anti-depression control unit may be made to transform.

[0014] That is, when the deformation proof stress of pan spring contact of an anti-depression control unit is comparatively small, pan spring contact carries out reversal deformation by the 1st step depression at a concave. Consequently, pan spring contact contacts fixed contact and a switch element will be in the contact condition of the 1st step. At this time, the operating knob is supported by two points of the pan spring

contact and the pivot which deformed. Next, if the 2nd step depression (namely, high stress depression) with larger thrust than the 1st step depression is performed, the thrust will act on the pan spring contact contiguous to the above-mentioned deformation pan spring contact. Consequently, contiguity pan spring contact contacts fixed contact, and a switch element will be in the contact condition of the 2nd step. At this time, the elastic combination prepared between both pan spring contacts deforms, and an operating knob bends considering elastic combination as a joint.

[0015] Similarly, when the deformation proof stress of the elastic combination of an anti-depression control unit is comparatively small, pan spring contact of an anti-depression control unit carries out reversal deformation by the 1st step depression at a concave. Consequently, deformation pan spring contact contacts fixed contact, and a switch element will be in the contact condition of the 1st step. Moreover, if the 2nd step depression with larger thrust than the 1st step depression is performed, the comparatively small elastic combination of the above-mentioned deformation proof stress will deform by the thrust. Consequently, the above-mentioned thrust acts on the pan spring contact contiguous to deformation pan spring contact, and the switch element corresponding to the contiguity pan spring contact will be in the contact condition of the 2nd step.

[0016] That is, when elastic combination deforms in any case, superfluous thrust is absorbed by elastic combination and does not act on the already transformed pan spring contact. With it, thrust acts effective in the pan spring contact contiguous to deformation pan spring contact. Therefore, by the above-mentioned configuration, while two or more switch elements contact certainly one by one, it is prevented that the superfluous force is applied to pan spring contact.

[0017] A seesaw mold multistage switch can prepare a depression control unit in a knob end face section side.

[0018] According to the above-mentioned configuration, pan spring contact of the opposite side (namely, end) of the knob

end face section carries out reversal deformation first, and the contact condition of the 1st step is acquired. If thrust is enlarged further, a switch element will be in a sequential contact condition from an end towards the knob end face section. [0019] While, as for a seesaw mold multistage switch, a depression control unit is located in the opposite side of the knob end face section, a pan spring pusher can be made the configuration which projects greatly one by one towards the knob end face section.

[0020] According to the above-mentioned configuration, it is prevented that the pan spring pusher of an end acts on pan spring contact first, and the pan spring pusher by the side of the knob end face section acts on pan spring contact first. Therefore, the pan spring contact by the side of the knob end face section carries out reversal deformation first, and the contact condition of the 1st step is acquired. Since the deformation proof stress of elastic combination or pan spring contact is large one by one towards the end, a switch element will be in a sequential contact condition from the knob end face section towards an end.

[0021]

[Embodiment of the Invention] Below, the gestalt of operation of this invention is explained with reference to drawing 2 - drawing 4 at a detail. In addition, the multistage switch attached in the power window of an automobile is explained as an example of the seesaw mold multistage switch concerning this invention.

[0022] Drawing 2 is the decomposition sectional view showing the two-step switch concerning the 1st operation gestalt of this invention. Drawing 3 is a sectional view in which in (A) the condition of not contacting, and (B) show the 1st-step contact condition, and (C) shows the 2nd-step contact condition, respectively in the two-step switch of drawing 2 .

[0023] In drawing 2 , the two-step switch is carrying out the laminating of a substrate 14, the pan spring support plate 12, and the operating knob 11 to order on the base 16. The two-step

switch is equipped with 2 sets of switch elements which consist of pan spring contact 13 attached in the pan spring support plate 12, and fixed contact 15 formed in the substrate 14, and can acquire two steps of contact conditions with 2 sets of these switch elements.

[0024] A flexible printed circuit board can be used for a substrate 14. Two fixed contacts 15 are formed in the top face of a substrate 14. The fixed contact 15 consists of common electrode 15 of three more electrode, i.e., contact electrode 15 of center a, and both ends b. Central contact electrode 15a is an electrode for contacting the crowning of the pan spring contact 13 in movable, and common electrode 15b of both ends is an electrode for always contacting the periphery section of the pan spring contact 13. Moreover, the inferior surface of tongue of the base 16 which carried out the laminating of the substrate 14 can be equipped with the circuit for processing the on-off signal from the fixed contact 15.

[0025] Although the pan spring contact 13 is the convex configuration which upheaved metal conductivity and the plate of an elastic body in the shape of a dome, what formed the conductive coat in dome-like elastic bodies, such as rubber, and the thing which equipped the dome-like elastic body itself with conductivity can also use it. If the downward force is applied, reversal deformation (buckling) will be carried out to a concave, it will be reversed with the elasticity of itself and the pan spring contact 13 will return in the shape of [original] dome shape, if thrust is opened. Since the pan spring contact 13 does not have deformation and deteriorating even if it repeats the configuration of a convex or concave, the dependability is high.

[0026] The laminating of the pan spring support plate 12 is carried out on a substrate 14, and it has the through hole of the magnitude which can contain the pan spring contact 13. This through hole is formed in the location corresponding to the fixed contact 15, and stop maintenance of the pan spring contact 13 is carried out in the lower part of the through hole of the

pan spring support plate 12. It positions so that the center section of the pan spring contact 13 may be located on contact electrode 15a, and so that the edge may contact common electrode 15b.

[0027] The operating knob 11 of the shape of a stick established on the pan spring contact 13 consists of the knob end face section 11c, the 1st, and a 2nd dish spring press sectors [11e and 11g] rigid body and a 1st and 2nd elastic combination [11d and 11f] elastic body. And the operating knob 11 is really constituted in the longitudinal direction in knob end face section 11c, 11d [of the 1st elastic combination], 1st dish spring press sector 11e, 11f [of the 2nd elastic combination], and 2nd dish spring press sector 11g order.

[0028] Knob end face section 11c equips with a pivot 17 the height which projected caudad in the end face side, and the pivot 17 is pivoted by the non-illustrated perimeter support means. Therefore, an operating knob 11 can make this pivot 17 the center of rotation, and can be rotated.

[0029] The 1st and the 2nd dish spring press sectors 11e and 11g equip the location corresponding to the 1st and the 2nd dish spring contacts 13a and 13b with the 1st and the 2nd dish spring pushers 11a and 11b which projected caudad, respectively. Although the 1st and the 2nd dish spring pushers 11a and 11b have the desirable shape of a globular form, they can be made into a column, the shape of a drill, and the various configurations of needlelike **. Moreover, any one is chosen from two or more pan spring press sectors, and it uses as a depression control unit. Press marker 11h of a convex or a concave configuration can be formed in the top face of a depression control unit, and it can consider as the mark of a press location.

[0030] The 1st and 2nd elastic combination 11d and 11f is elastomers, such as rubber or synthetic resin, and has bigger deformation proof stress than the pan spring contact 13. And they are prepared between knob end face section 11c, the 1st, and the 2nd dish spring press sectors 11e and 11g. Thus, by

constituting, an operating knob 11 functions as the rigid body as a whole on the bottom of low stress, and functions as an elastic body flexible as a whole on the bottom of high stress. [0031] in addition, the protrusion height of the pan spring pushers 11a and 11b or the pan spring contacts 13a and 13b -- the need -- responding -- preparing height **** -- a profile -- it can be made the same. moreover, the pan spring contacts 13a and 13b and elastic combination [11d and 11f] deformation proof stress -- the need -- responding -- preparing strength **** -- a profile -- it can be made the same.

[0032] first, the deformation proof stress of 2nd dish spring contact 13b -- it of 1st dish spring contact 13a -- small -- and the 11d of the 1st elastic combination, and 11f [of the 2nd elastic combination] deformation proof stress -- a profile -- the case of being the same is explained.

[0033] The two-step switch of the above-mentioned configuration has the 1st and the 2nd dish spring pushers 11a and 11b of an operating knob 11 in the 1st and the 2nd dish spring contacts 13a and 13b in the location which carries out profile contact, as shown in drawing 3 (A) at the time of un-contacting. As shown in drawing 3 (B), 1st dish spring depression sector 11e is used as a press control unit. If the downward 1st step thrust F1 is applied to press marker 11h of 1st dish spring depression sector 11e, an operating knob 11 will set a revolving shaft as a pivot 17, and will rotate caudad in one. At this time, it displaces by the principle of a "lever" 2nd dish spring depression sector 11g more greatly than 1st dish spring depression sector 11e by the side of knob end face section 11c. Therefore, the 1st step pushing down force F1 is first applied to 2nd dish spring pusher 11b. Deformation proof stress is smaller than the elastic combination 11d and 11f, and small 2nd dish spring contact 13b of deformation proof stress carries out reversal deformation first in the pan spring contact 13 at a concave. And 2nd dish spring contact 13b by the side of an end (anti-depression control unit side) will be in contact electrode 15a of fixed contact 15 center, and a contact condition (that is, a switch

element short condition), and the 1st-step contact will be obtained.

[0034] If the downward, still bigger 2nd step thrust F2 is applied to 1st dish spring depression sector 11e as shown in drawing 3 (C), an operating knob 11 tends to set a revolving shaft as a pivot 17, and tends to rotate caudad in one. However, since 2nd dish spring pusher 11b is strongly [already] in contact with 2nd dish spring contact 13b, the operating knob 11 is in the two-point support condition of a pivot 17 and 2nd dish spring pusher 11b. Since an operating knob 11 cannot be rotated, downward moving of the 1st dish spring depression sector 11e is carried out by the 2nd step thrust F2. 1st dish spring contact 13a by the side of knob end face 11c (depression control unit side) carries out reversal deformation at a concave, and contacts contact electrode 15a. That is, a switch element will be in a short condition and the 2nd-step contact will be obtained. As mentioned above, when the 1st and 2nd elastic combination 11d and 11f deforms, the operating knob 11 which was the rigid body bends to multistage by using such elastic combination as a joint.

[0035] next, it whose deformation proof stress of the 11d of the 1st elastic combination is the 11f of the 2nd elastic combination -- large -- and the deformation proof stress of 1st dish spring contact 13a and 2nd dish spring contact 13b -- a profile -- the case of being the same is explained.

[0036] In the two-step switch of the above-mentioned configuration, if the downward 1st step thrust F1 is applied to 1st dish spring depression sector 11e as shown in drawing 3 (B), although an operating knob 11 sets a revolving shaft as a pivot 17 and it rotates caudad in one, as mentioned above, the 1st step thrust F1 will be first applied to 2nd dish spring pusher 11b by the side of an end (anti-depression control unit). And 2nd dish spring contact 13b carries out reversal deformation first at a concave, when it becomes impossible to resist the 1st step thrust F1. And it is in a contact condition (that is, a switch element short condition) at contact electrode 15a of

fixed contact 15 center, and the 1st-step contact is obtained.

[0037] If the 2nd step thrust F2 to 1st dish spring depression sector 11e exceeds the deformation proof stress which is the 11f of the 2nd elastic combination as shown in drawing 3 (C), the 11f of the 2nd elastic combination will deform. If the 11f of the 2nd elastic combination deforms, 1st dish spring depression sector 11e will carry out downward moving, and the 2nd step thrust F2 will be applied to 1st dish spring pusher 11a. Consequently, 1st dish spring contact 13a by the side of knob end face 11c (depression control unit side) carries out reversal deformation at a concave, and contacts contact electrode 15a. That is, a switch element will be in a short condition and the 2nd-step contact will be obtained. As mentioned above, when the 1st and 2nd elastic combination 11d and 11f deforms, the operating knob 11 which was the rigid body bends to multistage by using such elastic combination as a joint.

[0038] In the case of which, the 1st and 2nd elastic combination 11d and 11f deforms, and when an operating knob 11 bends, the force applied to 2nd dish spring contact 13b is distributed and absorbed. Therefore, the excessive force is not applied to 2nd dish spring contact 13b, and 2nd dish spring contact 13b does not carry out a form (it deforms completely) very much. Therefore, it can prevent that a switch element contacts certainly and superfluous stress is applied to pan spring contact by having the above-mentioned thrust distribution / absorption structure.

[0039] In the seesaw mold multistage switch which drawing 4 requires for the 2nd operation gestalt of this invention, (A) is a sectional view in which the condition of not contacting, and (B) show the 1st-step contact condition, and (C) shows the 2nd-step contact condition, respectively. them of the two-step switch which the seesaw mold multistage switch concerning the 2nd operation gestalt is a two-step switch equipped with 2 sets of switch elements, and the component of others except an operating knob 11 and the pan spring contact 13 requires for the 1st operation gestalt, and a profile -- the same certain

** In addition, 1st dish spring pusher 11a is constituted so that it may project more greatly than 2nd dish spring pusher 11b, so that 1st dish spring pusher 11a may press 1st dish spring contact 13a previously.

[0040] first, the deformation proof stress of 2nd dish spring contact 13b -- it of 1st dish spring contact 13a -- large -- and the 11d of the 1st elastic combination, and 11f [of the 2nd elastic combination] deformation proof stress -- a profile -- the case of being the same is explained.

[0041] The two-step switch of the above-mentioned configuration has the 1st and the 2nd dish spring pushers 11a and 11b of an operating knob 11 in the 1st and the 2nd dish spring contacts 13a and 13b in the location which carries out profile contact, as shown in drawing 4 (A) at the time of un-contacting. If the downward 1st step thrust F1 is applied to 1st dish spring depression sector (namely, press control unit) 11g [by the side of an end] press marker 11h as shown in drawing 4 (B), an operating knob 11 will set a revolving shaft as a pivot 17, and will rotate caudad in one. Since an operating knob 11 functions as a "lever" at this time, 2nd dish spring pusher 11b by the side of an end is caudad displaced greatly rather than 1st dish spring pusher 11a by the side of knob end face section 11c. However, since 1st dish spring pusher 11a is projected from 2nd dish spring pusher 11b, the 1st step thrust F1 is applied to 1st dish spring pusher 11a. Small 1st dish spring contact 13a (anti-depression control unit side) of deformation proof stress carries out reversal deformation first at a concave. And it is in a contact condition (that is, a switch element short condition) at contact electrode 15a of fixed contact 15 center, and the 1st-step contact is obtained.

[0042] Since 1st dish spring pusher 11a will be strongly [already] in contact with 1st dish spring contact 13a if the downward, still bigger 2nd step thrust F2 is applied to 11g of press control units as shown in drawing 4 (C), an operating knob 11 tends to use 1st dish spring pusher 11a of the 1st dish spring depression sector as the supporting point, and tends to rotate

caudad in one. By the 2nd step thrust F2, 2nd dish spring contact 13b by the side of an end (depression control unit side) carries out reversal deformation at a concave, and contacts contact electrode 15a. That is, a switch element will be in a short condition and the 2nd-step contact will be obtained. As for a switch element, a short condition is maintained, although the force of raising 1st dish spring depression sector 11e works and 1st dish spring depression sector 11e is slightly raised at this time, since the lower part of the 11d of the 1st elastic combination is compressed. As mentioned above, when the 1st and 2nd elastic combination 11d and 11f deforms, the operating knob 11 which was the rigid body bends to multistage by using such elastic combination as a joint.

[0043] next, it whose deformation proof stress of the 11d of the 1st elastic combination is the 11f of the 2nd elastic combination -- small -- and the deformation proof stress of 1st dish spring contact 13a and 2nd dish spring contact 13b -- a profile -- the case of being the same is explained.

[0044] In the two-step switch of the above-mentioned configuration, if the downward 1st step thrust F1 is applied to 2nd dish spring depression sector 11g press marker 11h as shown in drawing 4 (B), an operating knob 11 will set a revolving shaft as a pivot 17, and will rotate caudad in one. However, since 1st dish spring pusher 11a is constituted so that it may project from 2nd dish spring pusher 11b as mentioned above, the 1st step thrust F1 acts on the direction of 1st dish spring pusher 11a first. And 1st dish spring contact 13a by the side of knob end face 11c (anti-depression control unit side) carries out reversal deformation at a concave, when it becomes impossible to resist the 1st step thrust F1. And 1st dish spring contact 13a is in a contact condition (that is, a switch element short condition) at contact electrode 15a of fixed contact 15 center, and the 1st-step contact is obtained.

[0045] Since 1st dish spring pusher 11a will be strongly [already] in contact with 1st dish spring contact 13a if the downward, still bigger 2nd step thrust F2 is applied to 2nd dish

spring depression sector 11g as shown in drawing 4 (C), an operating knob 11 tends to set a revolving shaft as 1st dish spring pusher 11a, and tends to rotate caudad in one. However, since the deformation proof stress of the 11d of the 1st elastic body is smaller than the 11f of the 2nd elastic body, the 11d of the 1st elastic body deforms first. And the 2nd step thrust F2 is applied to 2nd dish spring pusher 11b, and carries out reversal deformation of the 2nd dish spring contact 13b by the side of an end (depression control unit side) at a concave. Consequently, a switch element will be in a short condition and the 2nd-step contact will be obtained. As for a switch element, a short condition is maintained, although the force of raising 1st dish spring depression sector 11e works and 1st dish spring depression sector 11e is slightly raised, since the 11f of the 2nd elastic combination deforms and that lower part is compressed at this time. As mentioned above, when the 1st and 2nd elastic combination 11d and 11f deforms, the operating knob 11 which was the rigid body bends to multistage by using such elastic combination as a joint.

[0046] In the case of which, the 1st and 2nd elastic combination 11d and 11f deforms, and when an operating knob 11 bends, the force applied to 1st dish spring contact 13a is distributed and absorbed. Therefore, the excessive force is not applied to 1st dish spring contact 13a, and 1st dish spring contact 13a does not carry out a form (it deforms completely) very much. Therefore, positive contact of a switch element and prevention of superfluous stress addition in pan spring contact can be reconciled by having the above-mentioned thrust distribution / absorption structure.

[0047] In addition, in the seesaw mold multistage switch concerning this invention, the 11d of the 1st elastic combination is excluded, and even if it makes it the configuration which unified knob end face section 11c and 1st dish spring depression sector 11e, the same effectiveness as the above is acquired. Moreover, the 1st and the 2nd dish spring contacts 13a and 13b, and the 1st and 2nd elastic combination

(11d, 11f) can change deformation proof stress from an end similarly towards the other end. Although the two-step switch used for the power window for automobiles was explained as mentioned above as a gestalt of desirable implementation of a seesaw mold multistage switch, this invention is not limited to the above-mentioned operation gestalt. The seesaw mold multistage switch concerning this invention can apply and carry out things also to various electric products, and the number of switch elements (pan spring contact and fixed contact), arrangement of a pivot, the approach of support, etc. can be chosen suitably.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the sectional view showing the conventional seesaw mold multistage switch.

[Drawing 2] It is the decomposition sectional view showing the seesaw mold multistage switch concerning the 1st operation gestalt of this invention.

[Drawing 3] In the seesaw mold multistage switch of drawing 2 , (A) is a sectional view in which the condition of not contacting, and (B) show the 1st-step contact condition, and (C) shows the 2nd-step contact condition, respectively.

[Drawing 4] In the seesaw mold multistage switch which (A) requires for the 2nd operation gestalt of this invention, (A) is a sectional view in which the condition of not contacting, and (B) show the 1st-step contact condition, and (C) shows the 2nd-step contact condition, respectively.

[Description of Notations]

11 Operating Knob

11a The 1st dish spring pusher

11b The 2nd dish spring pusher

11c Knob end face section

11d The 1st elastic combination

11e The 1st dish spring depression sector (press control unit)
11f The 2nd elastic combination
11g The 2nd dish spring depression sector (press control unit)
11h Marker for press
12 Pan Spring Support Plate
13 Pan Spring Contact (Switch Element)
13a The 1st dish spring contact
13b The 2nd dish spring contact
14 Substrate
15 Fixed Contact (Switch Element)
15a Contact electrode
15b Common electrode
16 Base
17 Pivot
F1 The 1st step thrust
F2 The 2nd step thrust