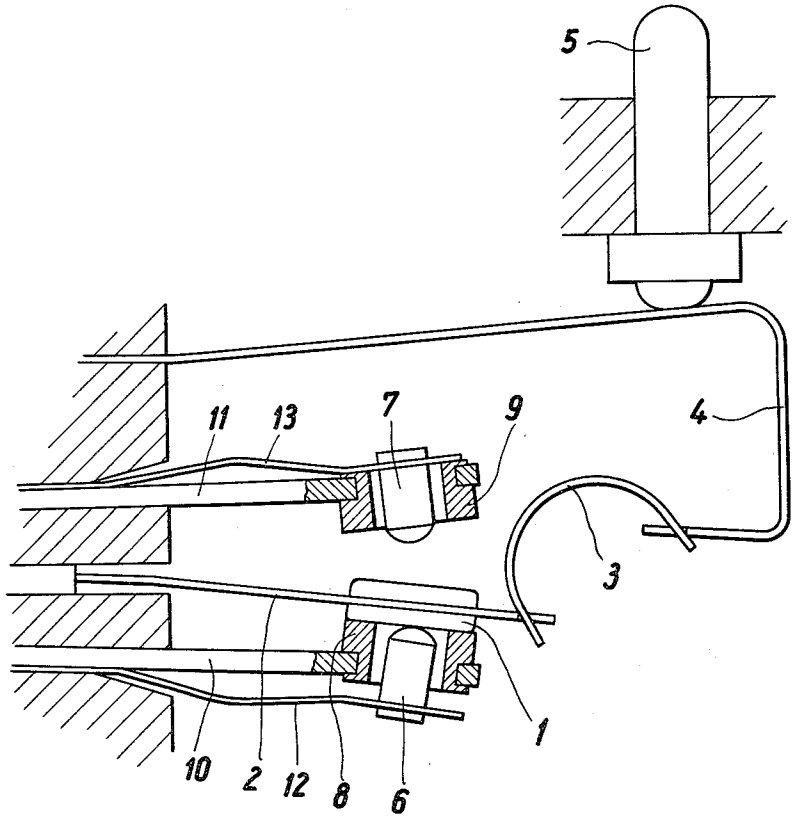
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ARC REDUCING SNAP SWITCH

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ARC REDUCING SNAP SWITCH

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This invention relates to an arc reducing snap action switch comprising a movable contact arranged on a leaf spring and actuated by way of a snap member and at least one spring-loaded auxiliary co-operating contact, and further comprising a rigid stop for the movable contact and the spring loaded auxiliary co-operating contact.

In the case of snap action switches the reversing of the movable contact from one contact position to the other takes place suddenly when a certain point in the movement of the snap member has been reached. Shortly before this point, however, in most known snap switches a relatively low contact pressure exists between the movable contact and the co-operating contact. This labile region is extremely undesirable particularly in view of the increasing of the electrical resistance caused by the reduction of the contact pressure.

To avoid this deficiency, snap action switches have already been developed, in which the co-operatitng contact is spring loaded and a rigid stop is provided for the co-operating contact. In such switches, during the reversing operation, the spring loaded co-operating contact first of all runs a certain distance with the movable contact, until it bears against the rigid stop, contact then being broken, because the movable contact is continuing its movement at this time. In snap switches of this kind the labile region, in which the contact pressure reverts to zero, is thus located in the snapping over movement and therefore does not matter owing to the extraordinarily short snapping over time.

Known snap switches of this type have, however, a few substantial disadvantages. That is to say, as in addition to the rigid stop provided for the spring loaded co-operating contact, a further stop is provided for the movable contacts, in order to fix its end position, a relatively complicated structure of the switch results and makes mounting and adjustment substantially more difficult.

The invention is therefore based on the problem of developing, without the said disadvantages, a snap action switch of the type named at the beginning, in which the said labile region, in which the contact pressure reverts to zero, is located in the snapping over movement of the movable contact, and in which moreover only a small number of individual parts is necessary, so that simple mounting and adjustment of the switch is possible. Furthermore, the new snap action switch is characterized by a particularly low degree of contact burning and a switching operation free from vibration or chatter.

This problem is solved according to the invention by the feature that a common rigid stop in the form of a further contact conductively connected with the co-operating contact is provided for the movable contact and the spring loaded co-operating contact, the said stop being of annular form and being arranged concentrically with the spring loaded co-operating contact acting as making and breaking contact.

The use according to the invention of a further contact acting at the same time as a rigid double stop has the following advantages:

(a) Owing to the elimination of separate stops for the movable contact and for the spring loaded co-operating contact, the number of individual parts and hence also mounting is made much less complicated.

(b) Adjustment is considerably simplified, as it is not necessary to adjust the stops for the movable contact and the spring loaded co-operating contact separately; the further contact provided according to the invention in fact determines the stop positions through its dimensions and in this way makes adjustment unnecessary to a large extent.

(c) As in the snap action switch according to the invention, the making and breaking arc is taken over by the spring loaded co-operating contact, practically no contact burning occurs on the further contact acting as main contact, so that the stop position does not vary even after a long time in operation.

If the elastic force of the movable contact and that of the co-operating contact are tuned to one another in a suitable manner, the movable contact is applied practically without vibration or chatter to the further contact acting as a stop.

In a preferred embodiment of the invention, the further contact acting as a stop is made from a material with a low electrical resistance and the spring loaded co-operating contact is made from a material particularly resistant to burning.

This and further advantages of the invention will become apparent from the following description of one embodiment illustrated in the drawing. In the drawing only the important parts of the new snap action switch necessary to an understanding of the inventive idea have been illustrated.

The snap switch contains a movable contact **1**, which is arranged on a leaf spring **2**. The leaf spring **2** is connected at its end with a stirrup-shaped snap member **3**, which is actutaed through a spring **4** by an operating push rod **5**.

The snap action switch contains furthermore two spring loaded auxiliary co-operating contacts **6**, **7** and two further contacts **8**, **9**.

The contacts **8**, **9** are of annular form and arranged concentrically with the spring loaded auxiliary co-operating contacts **6**, **7**. The contacts **8**, **9** are mounted on rigid metal contact supports **10**, **11** and are electrically connected with the co-operating contacts **6**, **7** arranged on leaf springs **12**, **13**. The auxiliary contacts **6** and **7** are surrounded by the annular contacts **8** and **9** and the contacts **6** and **7** are of a length to project through the contacts **8** and **9** when disengaged from removable contact **1**.

The contacts **8**, **9** constitute at the same time stops for the movable contact **1** and for the leaf springs **12**, **13** carrying the co-operating contacts **6**, **7**.

During the reversal of the movable contact **1** from the lower to the upper position, contact **1** first meets the co-operating contact **7**, which thus acts as a making contact. The movable contact **1** has reached its upper end position when it is applied against the annular contact **9**. This contact **9** acts as main contact and takes the major part of the current.

In the reversing operation from the lower to the upper position, the co-operating contact **6** follows the movable contact **1** until the leaf spring **12** is applied against the contact **8**. Only in this moment, i.e. during the snapping over operation taking place more or less instantaneously, does the contact pressure between the contact **1** and the co-operating contact **6** revert to zero. This labile region is thus located in the snapping over movement.

The spring loaded co-operating contacts **6**, **7** which must take up the making and breaking arc, are preferably made of a material resistant to burning, such as cadmium silver oxide. For the main contacts **8**, **9**, which undergo practically no burning, material with a particularly low electrical resistance, for example refined silver, is advantageously used.

As no perceptible burning occurs at the contacts **8, 9** acting at the same time as stops, the stop positions do not vary in the snap switch according to the invention even after a fairly long time in operation.

With suitable arrangement of the spring loaded co-operating contacts **6, 7,** one can easily ensure that these contacts carry out a sliding movement on the surface of the movable contact during the making and breaking operation, so that a self-cleaning of the corresponding contact points takes place. The edge of the movable contact **1** coming into contact with the contacts **8, 9** remains in any case free from burning.

I claim:

1. A snap switch comprising a leaf spring, a movable contact carried by said spring for movement between two positions, a switch operating member, a snap member connecting said operating member and said spring, whereby upon actuation of said operating member said spring and movable contact will be moved from either of said two positions to the other with a snap action, a fixed annular contact disposed at one of said two positions and providing a stop for said movable contact at said one position, a second leaf spring, and an auxiliary contact carried by said second spring, said auxiliary contact being surrounded by and of a length to project through said fixed contact, said auxiliary contact being electrically connected to said fixed contact.

2. A snap switch as defined in claim **1,** in which the material of said fixed contact has a low electrical resistance and in which the material of said auxiliary contact is highly resistant to burning.

3. A snap action switch comprising a leaf spring, a movable contact carried by said spring for movement between two positions, a switch operating member, a snap member connecting said operating member and said spring, whereby upon actuation of said operating member said spring and movable contact will be moved from either of said two positions to the other with a snap action, a fixed annular contact disposed at one of said two positions and providing a stop for said movable contact at said one position, a second fixed annular contact disposed at the other of said two positions and providing a stop for said movable contact at said other position, a second leaf spring, an auxiliary contact carried by said second spring, said auxiliary contact being surrounded by and of a length to project through said first fixed contact, a third leaf spring, and a second auxiliary contact carried by said third spring, said second auxiliary contact being surrounded by and of a length to project through said second fixed contact, said first and second auxiliary contact being electrically connected to said first and second fixed contacts respectively.

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