Jan. 3, 1961 H. DORJEE 2,967,218

SWITCH

Filed March 2, 1959

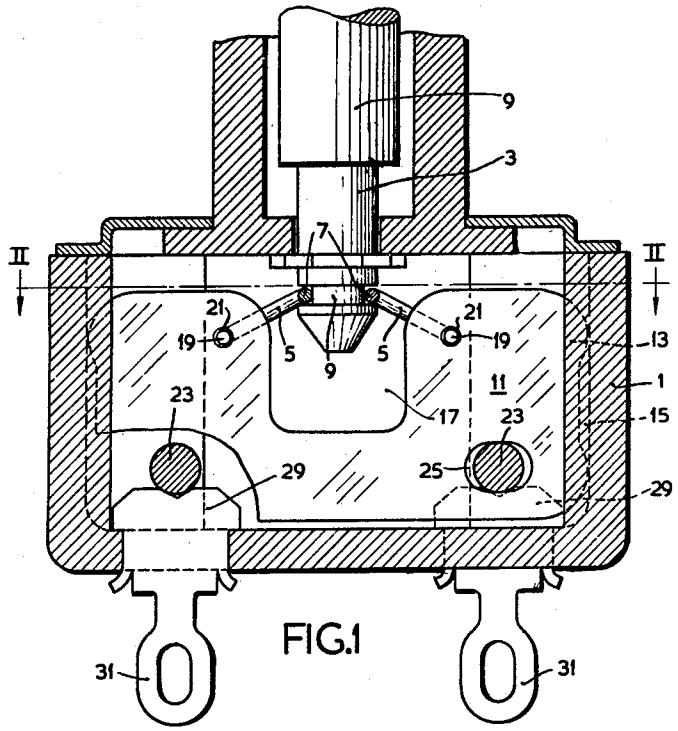


FIG.1

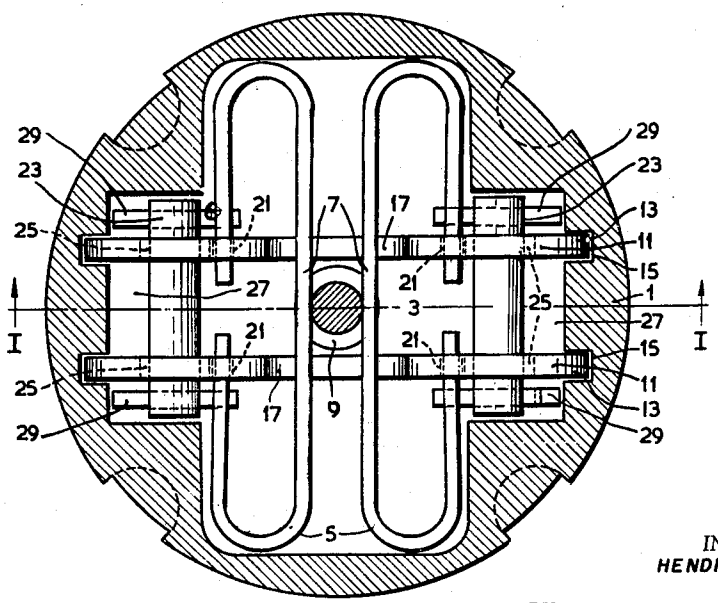


FIG.2

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United States Patent Office 2,967,218 Patented Jan. 3, 1961

2,967,218

SWITCH

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Filed Mar. 2, 1959, Ser. No. 796,428

2 Claims. (Cl. 200—76)

This invention relates to a switch having an axially movable operating spindle which through at least one bent metal wire spring acting as a snap-over tumbler spring drives a movable contact member in the axial direction. Since the spindle may readily be rotatable also, such switches (cf. for example German patent specification 960,294) can be combined advantageously with a rotary control member, for example a potentiometer in a radio receiver, one spindle being used to perform two different functions.

It is an object of the present invention to provide an advantageous and reliable constructional embodiment of such a switch.

This embodiment is characterized in that the snap-over spring comprises two opposed, U-shaped parts which are connected together by a continuous part and is made by bending over the end parts of a straight wire, the movable contact member comprising two plate- or strip-shaped insulating parts which are arranged parallel and symmetrically with respect to the operating spindle and are guided in axially directed grooves provided in the inner surface of the switch housing and which are each provided with a central recess through which the continuous wire part of the snap-over spring passes. The continuous wire part rests between the strips, in a circumferential groove of the operating spindle while the free ends of the spring are passed with some clearance through apertures adjacent the recesses, the movable contact comprising at least one metal rod which is passed with some clearance through an aperture in each of the two insulating parts at right angles thereto, while the springs and the contact are locked against displacement with respect to the contact member by the switch housing.

The embodiment having two snap-over springs and a contact member which in the axial direction is displaceable parallel to itself (which embodiment is known per se from German patent specification 859,040) of the switch in accordance with the invention is characterized in that the two edges of each of the two strip-shaped insulating parts of the contact member are accommodated in axially extending guiding grooves, use being made of two rod contacts which are situated either one on each side of the operating spindle or in line with this spindle.

It should be noted that a switch is known in which a substantially rod-shaped contact member lies freely in an aperture of an insulating plate-shaped member. In this switch a single supporting member is used while no measures are taken to ensure a very good guiding of the supporting member and the rod-shaped contact.

In order that the invention may readily be understood, one embodiment thereof will now be described, by way of example, with reference to the accompanying drawings, in which:

Fig. 1 is an axial sectional view, and

Fig. 2 is a cross-sectional view.

The embodiment shown of the main switch has a

substantially cylindrical housing 1 which may be made of synthetic resin, an axially displaceable and rotatable operating spindle 3 being provided centrally of the housing. Within the housing 1 there are arranged symmetrically with respect to the operating spindle 3 two snap-over springs 5 which each comprise two opposed U-shaped parts 5 which are connected together by a continuous wire portion 7 (Fig. 2) and are formed by bending the end parts of a straight wire substantially into alignment with one another. The insulated portion of the contact member of the switch comprises two parallel arranged strip-shaped parts 11 which may be made of hard paper and the edges 13 of which are guided in matching axially extending grooves 15 provided in the inner surface of the housing 1. Both strips are provided with a central recess 17 (Fig. 1) through which the continuous wire parts 7 of the two snap-over springs 5 pass; between the strips 11 these middle wire parts bear with some spring pressure against the shaft 3 in a circumferential groove 9 provided adjacent the end thereof. As Fig. 2 shows, free ends 19 of the snap-over springs are passed with some clearance through two apertures 21 disposed one on either side of the recess 17. The movable contacts comprise two, preferably silver-plated, metal rods 23 which are arranged either one on each side of the operating spindle 3 or in line therewith and pass with some clearance through apertures 25 of the two insulating strips 11 at right angles thereto. Hence the two rod contacts 23 are free to move in the apertures 25 but they are locked against axial displacement in that they are arranged in niches 27 provided in the switch housing 1. Similarly, the springs 5, 7 are locked against displacement by the housing 1.

In the position shown the contact rods 23, under the action of the spring pressure exerted by the snap-over springs 5 on the strips 11, each engage two fixed contacts 29 which are secured in the bottom of the housing 1 and have soldering tags 31 protruding therefrom. Thus, the switch is designed for double-pole making and breaking of an electric circuit, for example the main connection of some apparatus.

When the spindle 3 is depressed, the contact member 11, 23 is raised according to a known principle by the action of the snap-over springs 5 until the contact member abuts against the cover 33 of the switch housing. As will be seen from the figure, the spindle 3 is free to rotate in every position, and this rotary movement can be used for driving a potentiometer which is arranged coaxially with the switch (but is not shown for the sake of clearness).

Since the contact rods 23 are supported near both ends by the supporting members 11 guided by the grooves 15, they are prevented during the abrupt switching movement from making uncontrolled movements which in course of time might damage the housing, the contact and the supporting member. The restriction of the freedom of movement of the rods, however, must not detract from the even distribution of the pressure exerted by the snap-over spring on both ends of each rod, at which points the engagement with the associated fixed contacts 29 is effected. This requirement is satisfied in that in the two ends of each of the two springs 5, 7, the middle portions bear against the spindle 3, through the apertures 21 and 25 in the supporting member 11 exert about the same pressure on each of the two ends of the associated rod 23.

The rods 23, which pass through the apertures 25 with some clearance, are freely rotatable about their axes; in operation a rotation through a slight angle is found to occur each time the rods engage the fixed contacts 29. This provides the advantage that the contact

area at the end of the rod is shifted each time and this is favourable in view of the attack and wear of the silver layer provided on the rod.

In a simplified embodiment of the switch described, in which only one snap-over spring **5**, **7** and only one rod contact **23** are used, the other rod **23**, for example the right-hand rod in Figures 1 and 2, can be replaced by a slightly longer rod which is suitably secured in the housing **1** and acts as a pivot for the strip-shaped supporting plates **11**.

Consequently, in this embodiment, these plates are rotatable through a small angle and are guided in their rotation movement by the preferably arcuate left-hand edges being arranged in the two grooves **15** in the left-hand part of Fig. 2. This simplified embodiment is suitable if only a single-pole switching on and off is required.

What is claimed is:

1. A switch comprising a switch housing, an axially movable operating spindle therein, having at least one wire spring acting as a snap-over spring, a movable contact member movable in the axial direction by said spring, said snap-over spring comprising two opposed, U-shaped parts which are connected together by a continuous wire part and are formed by bending over the end parts of a straight wire, the movable contact member comprising two apertured plate-shaped insulating parts which are arranged parallel and symmetrically with respect to the operating spindle and are guided in axially directed grooves provided in the inner surface of the switch housing and which are each provided with a central recess through which the continuous wire part of the snap-over spring passes, said continuous wire part resting in a circumferential groove of the operating spindle while the free ends of the spring are passed with some clearance through the apertures adjacent the recesses, the movable contact comprising at least one metal rod which is passed with some clearance through another aperture in each of the two insulating parts at right angles thereto, while the springs and said metal rod are locked against displacement with respect to the contact member by the switch housing.

2. A switch as claimed in claim 1 having two snap-over springs arranged symmetrically with respect to the operating spindle and a contact member which in the axial direction is displaceable parallel to itself wherein said movable contacts further comprising two rod contacts and the two end edges of each strip-shaped insulating part of the contact member are disposed in said axial guiding grooves, said two rod contacts arranged one on each side of the operating spindle.

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