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MULTIPLE CIRCUIT CONTROL SWITCH WITH GUIDE STOPS FOR LIMITING
THE VERTICAL TRAVEL OF A SPRINGLIKE MOVABLE CONTACT

Filed March 12, 1968

2 Sheets-Sheet 1

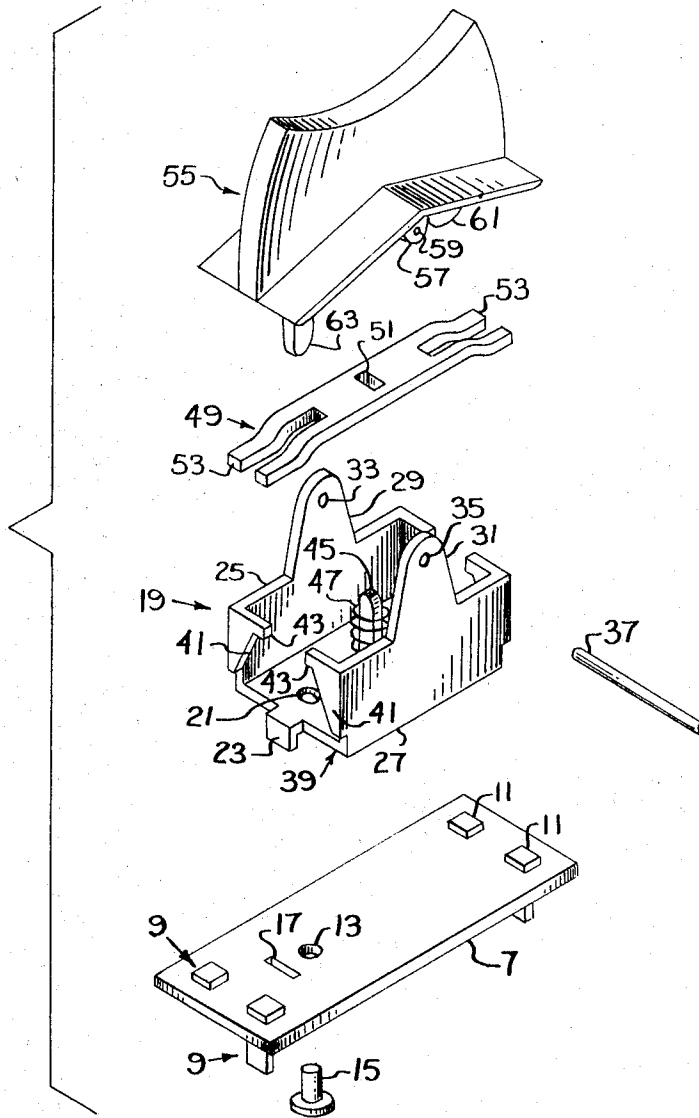


Fig. 1

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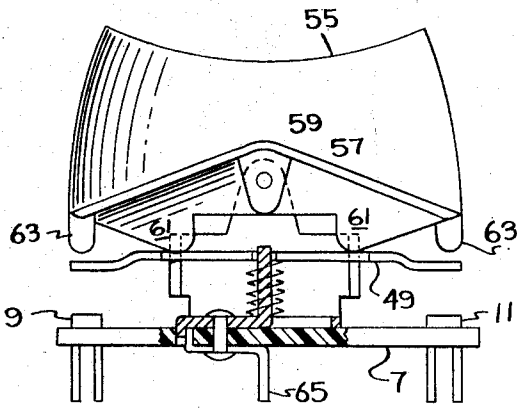


Fig. 2

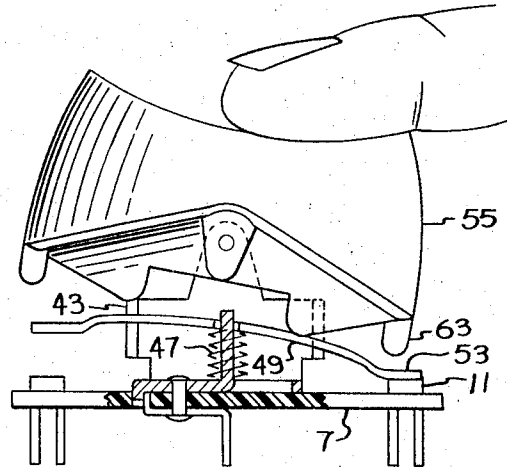


Fig. 3

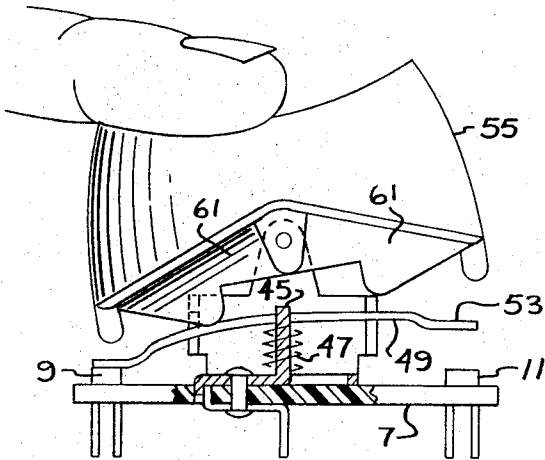


Fig. 4

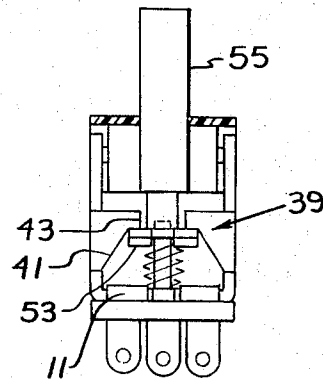


Fig. 5

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MULTIPLE CIRCUIT CONTROL SWITCH WITH GUIDE STOPS FOR LIMITING THE VERTICAL TRAVEL OF A SPRINGLIKE MOVABLE CONTACT

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1 Claim

ABSTRACT OF THE DISCLOSURE

A multiple circuit control switch manually operable in a pivotal movement to provide circuit closure of electrical connectors is positionally held in central circuit disengaged position by a contacting springlike member forcibly held by a compressed spring against inwardly extending guide-stop members of a support and guide member.

BACKGROUND OF THE INVENTION

The prior art suggests numerous multiple circuit control switches of the double throw-center off type for bidirectional function control. Usually, these switches are of the simple three detent type in a rotary or slide system suitable for use where a single function is selected occasionally or at least infrequently.

However, apparatus such as remotely controlled television receivers and slide projectors wherein frequent and continuous use of the switching means is required necessitate special purpose switches which operate with both speed and ease. Thus, user convenience and two-way operation automatically suggest the so-called "rocker-arm" type of center off switch.

One known type of rocker-arm center off switch employs a loaded center spring which bears against the rocker arm. The force exerted against the rocker arm by the loaded center spring is at a minimum when the rocker arm is centrally positioned and increases as the rocker arm is pivoted into electrical circuit contact.

Unfortunately, such devices are usually plagued by variations in centering of the rocker arm due to the friction encountered between the spring and rocker arm. Thus, noncentering of the rocker arm presents an appearance which is not acceptable on high quality equipment. Moreover, the so-called "feel" of such devices is inadequate due to the required change in applied pressure from a minimum at the central location position to a maximum at the operational position.

OBJECTS AND SUMMARY OF THE INVENTION

Therefore, it is an object of the present invention to provide an improved multiple circuit control switch. Another object of the invention is to enhance the centering of a double throw-center off type of switch. A further object of the invention improves the uniformity of applied pressure required to shift a multiple circuit control switch from a non-operational to an operational position.

These and other objects and advantages are achieved in one aspect of the invention by a multiple circuit control switch having a base member to which is affixed spaced electrical connectors, an upstanding post-like member, and a support and guide member. A spring telescopes over the post-like member and a flexible spring-like member telescopes over the post-like member contacting the spring and positionally held by the support and guide member which also pivotally holds a circuit closing member.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an exploded perspective view of a switch ex-

emplifying the invention with some parts omitted in the interest of clarity;

FIG. 2 is a side elevational view, partially in section, of the switch in an inoperative, normal position;

FIG. 3 is an elevational view similar to FIG. 2 with the switch in a first operative position;

FIG. 4 is an elevational view similar to FIG. 2 with the switch in a second operative position; and

FIG. 5 is an end elevational view, with some parts broken away in the interest of clarity, of the switch in the position of FIG. 2.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawings, the multiple circuit control switch embodiment of FIG. 1 includes a base member 7 of substantially rectangular shape and preferably of an electrical insulating material. Affixed to and extending through opposite ends of the base member 7 are first and second pairs of electrical connectors, 9 and 11 respectively. The base member 7 also includes an aperture 13 formed to receive a rivet 15 and an elongated slot 17.

Adapted for attachment to the base member 7 is a support and guide member 19. The support and guide member 19 includes an aperture 21 and lip member 23 formed to cooperate with the aperture 13 and slot 17 of the base member 7 and the rivet 15. Also, the support and guide member includes a pair of spaced upstanding side members 25 and 27 each having an upstanding support portion 29 and 31 with an aperture 33 and 35 therein adapted to receive a pin 37.

Each of the side members 25 and 27 includes inwardly extending guide-stop members 39 at opposite ends thereof and each of the guide-stop members 39 includes a tapered guide portion 41 and a stop portion 43. Further, the support and guide member 19, in this particular embodiment, is formed to provide an upstanding post-like member 45 located substantially in the center thereof.

A compression-type spring 47 is telescoped over the post-like member 45 and supported by the support and guide member 19. A flexible spring-like member 49 includes an opening 51 formed to telescope over the post-like member 45 and bifurcated electrical contacts 53 at opposite ends thereof. Also, a rocker-arm type circuit closing member 55 includes a protuberance 57 having a hole 59 adapted to receive the pin 37, a depending activation member 61, and depending studs 63.

As can best be seen in the broken away view of FIG. 2, wherein the numbers correspond to identical parts of FIG. 1, the support and guide member 19 is affixed to the base member 7 by the rivet 15. Also, the rivet 15 is employed to affix a central electrical connector 65 to the base member 7 and preferably, not necessarily, in electrical contact with the support and guide member 19.

The compression-type spring 47 is telescoped over the upstanding post-like member 45 and contacts the support and guide member 19. Then, the flexible spring-like member 49 is telescoped over the post-like member 45 and into contact with the compression-type spring 47. As best illustrated in the end view of FIG. 5, the flexible spring-like member 49 is disposed beneath and in contacting relationship with the stop portions 43 of the inwardly extending guide-stop members 39. Thereafter, the pin 37 is inserted through the apertures 33 and 35 of the upstanding support portions 29 and 31 and the hole 59 of the protuberance 57 on the rocker-arm type circuit closing member 55.

Thus, it can be readily observed, that, in the normal or non-engagement location illustrated in FIG. 2, the rocker-arm type circuit closing member 55 is pivotally supported by the upstanding support portions 29 and 31 of the support and guide member 19. Also, the activation members

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61 of the circuit closing member 55 are in contacting relationship with the flexible spring-like member 49 which is, in turn, in contacting relationship with the stop portion 43 of the guide-stop members 39 and the compression-type spring 47. Thus, the compression-type spring 47 exerts a force on the flexible spring-like member 49 sufficient to cause contact thereof with the stop portions 43 of the inwardly extending guide-stop members 39. In turn, the flexible spring-like member 49 is in contacting relationship with the depending activation members 61 of the circuit closing member 55 which serves to maintain the circuit closing member 55 in a central positional location during the period when external pressure is not applied thereto.

As to the circuit engagement operation, best illustrated in FIGS. 3 and 4, an external pressure applied to the circuit closing member 55 causes one of the depending activation members 61 to exert a force on the flexible spring-like member 49. When the applied force is sufficient to overcome the force exerted by the compression-type spring 47 on the spring-like member 49, one of the bifurcated electrical contacts 53 is connected to one pair of the electrical connectors, 11 for example. Thus, contacts 53 may be formed to provide a predetermined sequence of contact with electrical connector 11. Also, the opposite end of the flexible spring-like member 49 remains in contacting relationship with the stop portion 43 of the inwardly extending guide-stop members 39.

As the applied pressure is increased, the spring-like member 49 is flexed whereupon a sliding relationship between the electrical contacts 53 and the electrical connector 11 is provided. A further increase in applied pressure causes contact between one of the depending studs 63 and the base member 7 whereby undesired extreme distortion of the flexible spring-like member 49 due to an excess of applied pressure, is prevented.

Upon removal of the applied pressure, the compression-type spring 47 forces the flexible spring-like member 49 back into contact with the stop portion of the inwardly extending guide-stop members 39. In turn, the spring-like member 49 acting upon the circuit closing member 55 by way of the depending activation members 61 return the circuit closing member 55 to the original central location. Moreover, the tapered guide portions 41 of the inwardly extending guide-stop members 39 insure the return of the flexible spring-like member 49 to a contacting relationship with the stop portions 43.

Thus, there has been provided an enhanced multiple circuit control switch having numerous advantages which, as far as is known, are unattainable in any other control switch. This improved switch not only virtually eliminates undue variations in centering of the circuit closing member during periods when circuit engagement is undesired, but also provides a relatively uniform "feel" during operational use. Also, the switch provides a sliding motion of the contacts enhancing electrical reliability and connection therebetween. Further, safety means are provided which prevent undesired distortion of the flexible spring-like member when excessive pressure is applied to the

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circuit closing member. Moreover, the switch is economical of materials, labor and assembly skill.

While there has been shown and described what is at present considered the preferred embodiment of the invention, it will be obvious to those skilled in the art that various changes and modifications may be made therein without departing from the invention as defined by the appended claim.

I claim:

1. A multiple control switch comprising:

a base member of electrical insulating material;

spaced electrical connectors affixed to said base member;

an upstanding post-like member affixed to said base member;

a support and guide member affixed to said base member, said support and guide member including spaced side members each having an integral upstanding support member with an inwardly extending guide-stop member at opposite ends thereof, each of said guide-stop members having a vertical limiting stop portion and transversely tapered portions;

a spring telescoped over said post-like member;

a flexible spring-like member telescoped over said post-like member contacting said spring and intermediate said vertical limiting stop portion of said guide-stop members and said base member, said spring-like member exerting a compression force on said spring, transversely guided by said tapered portion of said guide-stop members; and

a circuit closing member pivotally held by said spaced support members and contacting said spring-like member, said closing member being held in a central position of disengagement by said spring-like member due to the compressive force of said spring and said guide-stop members and manually operable in a teetering movement to cause circuit closure of said electrical connectors by said spring-like member.

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