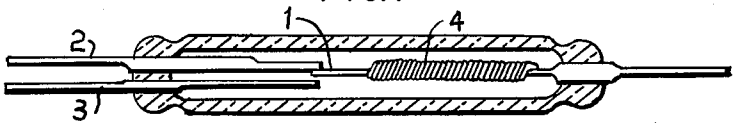
May 8, 1962 K. WOLAK ET AL 3,033,965

CHATTER-FREE SEALED-IN CONTACTS

Filed Sept. 9, 1959

FIG. 1



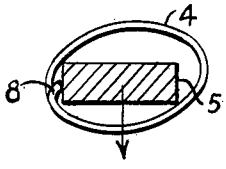
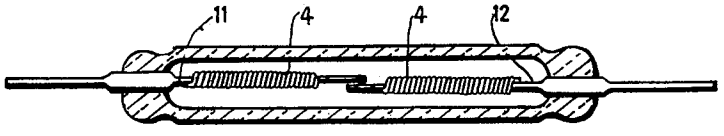


FIG. 3

FIG. 2



Inventors,
Kurt Wolak,
Korbinian Karrer, &
Robert Rettig
By. [signature] Atty.

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CHATTER-FREE SEALED-IN CONTACTS

Kurt Wolak and Korbinian Karrer, Munich, and Robert Rettig, Munich-Solln, Germany, assignors to Siemens & Halske Aktiengesellschaft Berlin and Munich, a corporation of Germany

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2 Claims. (Cl. 200—166)

This invention relates to sealed-in contacts and is particularly concerned with sealed-in contacts provided with means for reducing the tendency to chatter.

Sealed-in contacts, sometimes also referred to as protective tube contacts, are in known manner operated by the action of a magnetic field. Relatively only very slight masses are set in motion incident to the contact actuation, and such contacts therefore exhibit only a slight tendency to chatter, thereby favorably distinguishing from previously known relay contacts the actuation of which is effected by means of armatures. It is nevertheless desirable to eliminate or at least to reduce as much as possible even the slight chatter tendency of sealed-in contacts, particularly in view of endeavors, in the communication arts in which such contacts are advantageously employed, to expedite as much as possible operations involved in the course of extending connections.

The present invention shows a way for practically completely eliminating even the slight chatter tendency observed in connection with sealed-in contacts of the above described type. This is accomplished by the provision of a helix loosely surrounding a portion of a contact spring which is incident to operative contact actuation subjected to major motion. In accordance with the invention, the helix is cross-sectionally approximately elliptical, thereby approximating the cross-sectionally flat shape of the contact spring, the end of the helix which faces the contact making point of the spring being twisted with respect to the contact spring and being fastened thereto at one edge thereof, thereby providing for a play which allows the helix to follow the motion of the contact spring upon contact making engagement thereof with another contact spring.

Upon operative actuation of the contact spring which is surrounded by the helix as explained above, the latter will execute a follow-up motion within the range of the play provided therefor, thereby dissipating the oscillation energy of the contact spring. Once the major part of the oscillation energy of the contact spring is thus dissipated, its tendency to chatter will cease, since chattering is due to the fact that the contact spring must somehow use up its inherent kinetic energy. The present invention dissipates the kinetic energy of the contact spring by the follow-up motion of the helix surrounding the spring and thus prevents the chattering thereof.

The various objects and features of the invention will appear from the description of embodiments thereof which is rendered below with reference to the accompanying drawing.

FIGS. 1 and 2 show sealed-in contacts having contact spring means provided with damping elements in the form of helical members; and

FIG. 3 is a cross-sectional view taken through a part of the sealed-in contact of FIG. 1.

The sealed-in contact device shown in FIG. 1 comprises a break-make switch-over contact spring 1 with its inner end disposed between a normal contact spring 2 and a make contact spring 3, the spring 1 being adapted to move in known manner relative to the springs 2 and 3. The switch-over contact spring 1 constitutes in this contact structure the spring which is subjected to major motion; the movable portion of such spring is surrounded by a helix 4 relatively loosely placed thereon.

The helix 4 is effective to dissipate the motion energy of the switch-over contact spring resulting from the impact of such spring upon engaging either the spring 2 or the spring 3. The energy is dissipated substantially by the friction in the helix and particularly by the friction between the individual helix turns and it is, therefore, advantageous to wind the helix tight so that the turns thereof are in mutual engagement.

The operation of the helix will be particularly effective when it is formed approximately elliptical, approximated to the shape of the contact spring, and, at the end facing the contacting end of the spring, twisted relative to the cross-section of the spring, the corresponding end of the helix being fastened to an edge of the contact spring so as to leave sufficient play for yielding or damping motion responsive to impact engagement of the movable contact spring with another contact spring.

The above noted arrangement is illustrated in FIG. 3. Numeral 5 indicates the right edge of the contact spring, numeral 4 indicates the helix at the end thereof which faces the contacting end of the spring, and numeral 6 indicates the corresponding end of the helix wire which is welded to the left edge of the contact spring. The helix has accordingly some play to the right side thereof. The effect of the inherent twist of the helix and this play cause the helix to extend at this end which faces the contacting point, freely to the upper right and away from the contact spring. As a consequence, responsive to motion of the spring in the direction of another spring, as indicated by the arrow, and impact thereof upon the other spring. the helix can follow in the direction of the arrow, thereby absorbing and dissipating the kinetic energy of the spring as explained before.

The above considerations apply as a matter of principle to any sealed-in contact and therefore, also to make contacts. It is to be observed in connection with the change-over or break-make contact of FIG. 1, that the break side will upon opening of the contact generally exhibit a stronger chatter tendency than the make side and it is, therefore, advantageous to use in such change-over contact structure a helix twist such that the helix can yieldingly follow responsive to impact engagement of the change-over spring 1 with the spring 2.

FIG. 2 shows a sealed-in contact having contact springs 11 and 12 both of which are moved upon contact actuation; accordingly, part of each contact spring 11, 12 is provided with a helix 4. In the case of a make contact, the helices, upon opening of the contact, will be additionally effective to strongly dampen oscillations of the contact springs so as to practically prevent subsequent motion of the contact springs in contact-closing direction.

Changes may be made within the scope and spirit of the appended claims which define what is believed to be new and desired to have protected by Letters Patent.

We claim:

1. In a sealed-in contact device having a cross-sectionally substantially flat contact spring which is incident to operative actuation subjected to major motion with respect to another contact spring, a device for inhibiting the tendency of said contact springs to chatter incident to operative actuation thereof, said device comprising a helically wound member cooperatively loosely surrounding a portion of said first named contact spring, said member being cross-sectionally approximately elliptical, thereby approximating the cross-sectional shape of the respective contact spring, the end of said member which

faces the contact making point of such contact spring being twisted with respect to the plane thereof and being fastened thereto at an edge thereof, thereby providing for play which allows the helically wound member to move in a follow-up motion with respect to said contact spring upon contact making engagement thereof with said other contact spring so as to dissipate the motion energy thereof for the purpose of preventing chattering.

2. The structure according to claim 1, wherein said helically wound member is relatively tightly wound to dispose the turns thereof in mutual engagement so as to produce friction therebetween incident to said follow-up motion and thereby contributing to the dissipation of energy of said contact spring.

References Cited in the file of this patent

UNITED STATES PATENTS

1,400,126	Wotton	Dec. 13, 1921
1,879,349	Lederer	Sept. 27, 1932
1,984,505	Walker	Dec. 18, 1934
2,218,879	Foerste	Oct. 22, 1940
2,311,637	Buchanan	Feb. 13, 1943
2,670,416	Masheris et al.	Feb. 23, 1954
2,802,076	Carlson et al.	Aug. 6, 1957
2,837,612	Gustafson et al.	June 3, 1958

FOREIGN PATENTS

148,964	Great Britain	Sept. 15, 1921
1,030,909	Germany	May 29, 1958