Sept. 27, 1949. S. G. ANDERSSON 2,482,997

CONTACT DEVICE FOR ROTARY SWITCHES

Filed Feb. 13, 1947

Fig. 1a

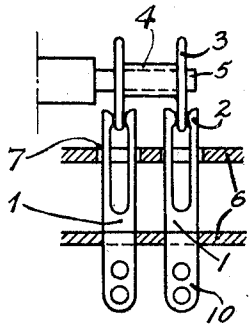


Fig. 1b

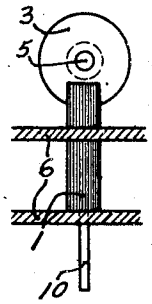


Fig. 2

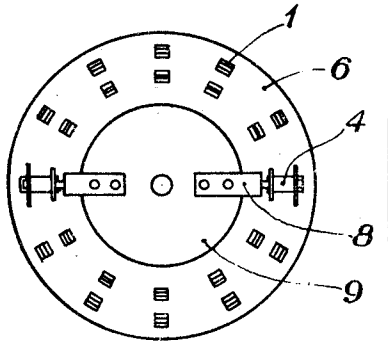
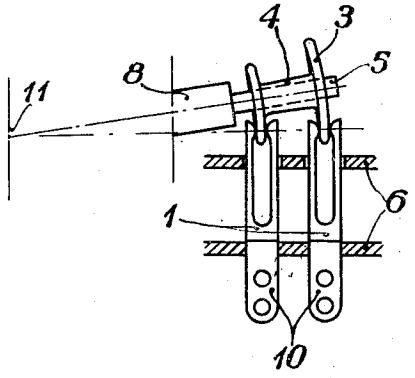


Fig. 3



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CONTACT DEVICE FOR ROTARY SWITCHES

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1 Claim. (Cl. 200—166)

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The present invention relates to a contact device for rotary switches. Many different constructions for this purpose have been known earlier, most of them having a preferably laminated wiper arm arranged to slide from one contact to another or a movable contact caused to slide between a pair of contact springs acting on each side of the movable contact. Devices with rollers connecting two contact surfaces and which are rolling over the contact surfaces or between contact springs are also known.

The invention relates to a contact device which has the advantage that very good contact is obtained even after a very long time of use and that the adjustments for obtaining contacts of equal value over a great number of terminals—which for other constructions may be very laborious—are eliminated almost entirely. The assembling work is further extremely simple.

The mechanism comprises contacts each one consisting of a number of oblong plates, laminations, which are provided with a slit extending from a short side and arranged together in surface-to-surface contact and welded or in some other way so combined, that the slits in the different laminations together form an aperture extending from one short side of the contact and surrounded by two legs. Such contacts are arranged in two or more parallel, straight or circular rows. The contacts are adapted to be engaged by a movable contact roller rotatably mounted on a movable carriage and provided with a number of contact disks corresponding to the number of rows. The disks are so arranged that they will mesh with the legs of the laminated contacts, when the roller is moved along the rows, and are suitably somewhat contracted towards the edges.

Among the advantages of this construction is the very good contact which is obtained even with heavy oxidation of the terminals dependent on the great number of individual contact surfaces with comparatively high specific contact pressures offered by the laminated contacts. Further every adjustment of the position of the laminated contacts and the contact pressures will be entirely superfluous since the position is determined with sufficient accuracy by apertures in an insulating disk, into which the laminated contacts are inserted. The contact pressures are entirely determined by the dimensions of contact members and not by the distance between the roller carriage and the fixed contacts.

Due to the lamination of the contacts they may be arranged in circular rows with the contact roller supported by a rotatable carriage. If the fixed contacts should have been made out of one piece, it would be impossible to obtain a smooth travel of contact of the contact roller.

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Some devices according to the invention are indicated on the accompanying drawing, in which:

Fig. 1 shows a sectional view of an embodiment of the invention with the contacts arranged in straight rows,

Fig. 2 shows a view of a rotary switch having the contacts arranged along circular rows and,

Fig. 3 is a cross-sectional view of the contacts in a switch according to Fig. 2,

Fig. 1*a* shows two laminated contacts 1, provided with slits, mounted in insulating disks 6. With the legs 2 of each contact the disks 3 of a contact roller are meshing. The contact roller is turnably arranged on a shaft 5 which in a suitable manner can be moved forward along two parallel contact rows which are supposed to run perpendicularly to the plane of the drawing. Fig. 1*b* shows a side view of the parts of Fig. 1*a*. The lamination of the contacts 1 is shown in this figure. The assembly of the fixed contacts is very simple as appears from the figure. Two parallel, insulating disks 6 may suitably be used for this purpose. In the upper one there are holes 7 which are preferably square in shape and so large that the laminated contacts, which are easily inserted into them, get a small play in the direction of the shaft 5. Due to this an automatic adjustment of the position of the contact in relation to the contact disk 3 is obtained. In this way the contact pressure will be dependent exclusively on the dimensions of the laminated contact and the disk and entirely independent of a moderate variation of the position of the supporting device (shaft 5) of the roller 4 in relation to the contacts. One or more of the laminations are provided with soldering lugs 10 extending through an aperture in the lower insulating disk 6. The laminated contacts may be retained by the soldering lug if this one is somewhat turned outside the aperture in the lower disk.

Fig. 2 shows a rotary switch according to the invention. Contacts 1 are inserted into two insulating disks 6 as described in connection with Fig. 1. The contact roller 4 is supported by a rod 8 provided with a shaft 5 which is fixed to a rotatable insulating disk 9. When necessary a plurality of arms provided with contact rollers may be used.

In order to minimize the wear of the laminated contacts the inner disk of the contact roller is preformed with a smaller diameter than the outer

one. The diameters are so chosen that the edges of the two disks will match with a circular cone having its vertex at the centre of the rotary shaft of the switch. The device is so dimensioned that the generatrix of the cone will mainly coincide with a line through the contact surfaces of two laminated contacts simultaneously meshing with the roller disks. Fig. 3 shows this construction. In order to be able to mount the shaft **5** perpendicularly to the switch shaft the inner contacts **11** may be raised in relation to the outer ones, e. g. by a further insulating disk between these contacts and the lower insulating disk **6**.

Experiments with a device according to the invention have shown that the contact resistances have practically not been altered even after 10^6 revolutions of the rotary shaft. Owing to the lamination the wear will be very insignificant. Grease for a very long use is stored in sufficient quantity between the laminations.

If a fixed contact is used instead of the rotating contact roller the conditions would be considerably much more unfavourable as to the wear. Owing to the cycloidic movement of a point of the contact roller the travel of the contact point will occur chiefly in the longitudinal direction of the laminations, which of course is favourable.

I claim:

Rotary switch comprising a plurality of stationary laminated contacts each including a plurality of facially abutting plates having slots extending inwardly from one end of the contact and defining a pair of contact legs, said contacts being arranged in at least two parallel rows, a bodily movable contact roller provided with a number of contact flanges corresponding to the number of parallel rows, each flange successively entering between the legs of said contacts of one row during movement of the contact roller bodily along the rows, each one of said stationary contacts having its slot disposed in the direction of the length of the row in order to allow the corresponding disk to engage with the contact, and means for supporting said contact roller for movement along the rows.

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The following references are of record in the file of this patent:

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