

COLLAR-LIKE SEALING ELEMENT

The invention refers to a collar-like sealing element of soft, resilient, preferably foamed synthetic material.

The German patent specification 36 43 249 discloses an inner sleeve for an electric cable connection which is comprised of a tubular center portion surrounding the connection area and two tubular conical end portions extending with a slope from the center portion to the sheath layer of the cable. All three sleeve portions are of metallic material with the conical end portions being designed to prevent a leakage of liquid insulation mass filled into the sleeve.

German patent specification 31 00 221 discloses a transition sleeve for the connection of oil paper insulated cables with synthetic insulated cables wherein a tubular portion surrounds the connection area at a radial distance. Sealing elements of metallic material are lid or flange-shaped with an outer axial flange engaging the outer side of the tubular portion while an inner axial flange through which the cable extends sealingly engages the outer conducting layer. The sealing elements are attached to the tubular portion either by means of a boot clamp or by being soldered to the tubular portion. However, it meets considerable difficulties to achieve a sufficient sealing between the metallic sealing elements in the tubular portions by means of a boot clamp.

The German patent specification 28 43 089 discloses a collar-like sealing element of foamed plastic material which is unfoldable. The known sealing element can be simply placed around the article to be sealed. The internal stress inherent in the material effects that the annular sealing element partially closes around the article. The internal stress, however, is not sufficient

in that the radially cut annular sealing element closes completely so that the ends may engage each other. Therefore, if no further provisions are made, there is the risk that the sealing element does not remain in place during the assembly of the sleeve.

According to the present invention there is provided a collar-like sealing element comprising an annular cylindrical body of soft, resilient, compressible synthetic material, said body being radially cut and unfoldable in order to be placed around at least one cable or cable core for sealing said cable or cable core against a metallic inner sleeve of an electric cable connection surrounding said cable or cable core at a radial distance thereof, said cut defining adjacent ends of said body having opposing mating end surfaces, said end surfaces including locking portions adapted to engage each other to hold said ends in a positive locking interengagement.

The invention provides a collar-like sealing element designed to surround an elongated article and be adapted to seal the article against a sleeve surrounding the article at a radial distance therefrom which can be easily installed and remains at a predetermined position. Further, the sealing element provides a sufficient sealing effect.

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According to an embodiment of the invention, the locking portions are preferably hook-shaped and engage each other by a positive connection.

The manufacturing of the sealing elements according to the invention is extremely simple. Preferably, the collar body is formed as an annular body approximately as a cylindrical section which is radially cut afterwards. The end surfaces of the collar or positions thereof have preferably a spiral or arc profile so that the sealing element is wound up if placed around the elongated article.

The sealing element according to the invention can be simply manufactured and simply and safely installed. It keeps the attained position after installation if for example the metallic sleeve is wrapped around an electric cable connection.

The invention is explained in more detail by way of embodiments shown in the accompanying drawings, wherein

Fig. 1 shows a cross section through the end of a cable connection including a sealing element according to the invention and

Fig. 2 shows in a perspective view a sealing element similar to that of Fig. 1.

For screening reasons the connection area of an electric cable connection can be surrounded by a metallic inner sleeve, the ends thereof being closed by sealing elements. Fig. 1 shows a cross section through such a metallic elongated sleeve 42 split in the longitudinal direction. The section through sleeve 42 is made in the area of a three-core oil paper cable, the three cores thereof being wrapped by a tape insulation 32 surrounded by a sheath 33 of lead. Such a cable can be for example connected with three synthetic insulated cables (not shown) with the sleeve 42 extending beyond the connection area. Such a connection is described in the German patent application P 35 05 441.1.

The sleeve 42 split in the longitudinal direction and made of zinc or plated steel sheet has longitudinal edges 42a which are bent outwardly. A rail 44 of U- or C-shape in cross section has inwardly inclined legs which grip behind the bent longitudinal edges 42a. By this, a kind of dove tail connection is formed.

Sealing elements are arranged adjacent the ends of sleeve

42 which are to seal the space between the cables or their connection, respectively, and the sleeve. In Fig. 1, only one sealing element 46 can be seen. Both sealing elements belonging to sleeve 42 can be identically formed so that it may be sufficient to describe only sealing element 46. Alternatively, the other sealing element may be formed as shown in Fig. 2.

The sealing element 46 is approximately cylindrical and consists of a resilient, foamed, closed-cell cellular plastic material. The sealing element 46 has a radial extension 47 forming a dove tail in cross section, the cross-sectional contour thereof corresponding to the gap between the outwardly bent edges 42a of sleeve 42. The sealing element 46 has a central circular opening 48. It includes further a radial cut along line 49. The cut 49 includes a first portion extending from opening 48 toward extension 47 along a curve leading from the central opening 48 toward the outer periphery along a spiral path. A second relatively short portion 203 having an opposite curvature than portion 202 extends approximately radially backwards toward opening 48 whereby a relatively small acute angle is formed between portions 202 and 203.

A third portion 204 joins to the second or medium portion 203 which extends along a second circular curve or spiral path up to the outer periphery and as illustrated to one side of sealing element 46, that is in Fig. 1 on the right side of the radial extension 42. The portions 203 and 204 include a small acute angle. Due to the described course of the cut line 49, the adjacent ends of the portions 202, 203, 204 form a projection and a recess on both opposing end faces of the sealing element, each having a small acute angle, the projections and the recesses being adapted to positively interengage, whereby a locking is achieved automatically retaining the ends of the cut annular sealing element 46 together unless it is unfolded by a manual operation. This is for example the case if the collar-like sealing element 46 is to be placed around the sheath 43 of Fig. 1.

For an unfolding and relocking of the ends of the sealing element 46, the radial extension 47 can be manually gripped in order to bring the ends out of engagement. After the locking of both sealing elements for a sleeve 42 has taken place, the sleeve can be wrapped around the sealing elements. The sizes of the sealing elements are such that they are somewhat radially compressed if rail 44 is slid

along the longitudinal edges 42a of sleeve 42 in order to achieve a satisfactory sealing effect. Furthermore, the sealing elements 46 serve as spacers by which sleeve 42 can be held at a uniform radial distance from the cables or their connection area, respectively.

The reference number 59 designates a screw by which a strand 18c forming a cable sheath is electrically connected to sleeve 42. This feature, however, is of no importance for the invention.

In Fig. 2, a sealing element 45 can be seen which resembles that of Fig. 1 so that equal parts are bearing same reference numbers added by index d. It is to be seen that the portions 202d and 203d of the parting line 49d extend farther into the radial extension 47d than in the embodiment of Fig. 1. The ring-cylindrical sealing element 45 surrounds a star-like sealing core 50 having circular recesses 51, 52, 53 for the receipt of plastic cables 10a, 10d and 10c which for example could be connected with the cores of the oil paper cable 11 of Fig. 1, the connection being surrounded by sleeve 42 of Fig. 1 and sealing element

45 and the sealing core 50 as well sealing the sleeve 47 in the area of the plastic cable while the oil paper cable connected thereto is sealed against the sleeve by sealing element 46.

CLAIMS

1. A collar-like sealing element comprising an annular cylindrical body of soft, resilient, compressible synthetic material, said body being radially cut and unfoldable in order to be placed around at least one cable or cable core for sealing said cable or cable core against a metallic inner sleeve of an electric cable connection surrounding said cable or cable core at a radial distance thereof, said cut defining adjacent ends of said body having opposing mating end surfaces, said end surfaces including locking portions adapted to engage each other to hold said ends in a positive locking interengagement.
2. A sealing element as claimed in Claim 1 in which said locking portions are shaped hook-like.
3. A sealing element as claimed in Claim 1 or Claim 2 in which a radial extension is formed on the outer periphery of said body for sealing a gap between bent longitudinal edges of said sleeve and said locking portions are located radially inwardly of said radial extension.
4. A sealing element as claimed in Claim 1 or Claim 2 in which a radial extension is formed on the outer periphery of said body for sealing a gap between bent longitudinal edges of said sleeve and said locking portions extend up to said radial extension or into said radial extension respectively.



5. A sealing element as claimed in any preceding Claim in which said annular body is formed as closed ring which is split afterwards by a series of interconnected spiral cuts.

6. A sealing element as claimed in any preceding Claim in which portions of said end surfaces have an arcuate profile.

7. A sealing element as claimed in any preceding Claim is formed of a foamed, closed-cell cellular plastic material.

8. A collar-like sealing element as claimed in Claim 1 substantially as herein described with reference to the accompanying drawings.

9. A method of manufacturing a sealing element as defined in any preceding claim which comprises forming said annular body and thereafter radially cutting the body to form said adjacent ends.



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