Sept. 29, 1953 W. K. WESTON 2,653,989

COAXIAL ELECTRIC CABLE WITH CORRUGATED SEAM

Filed Nov. 14, 1949

FIG. 1.

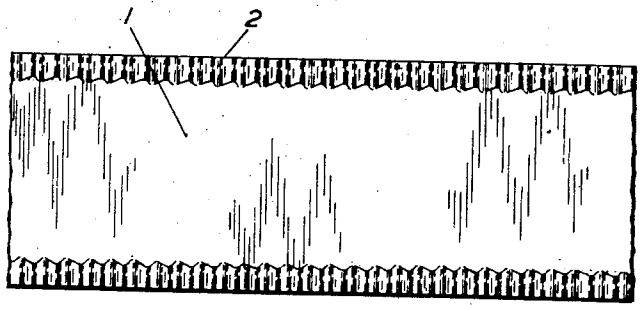


FIG. 2.

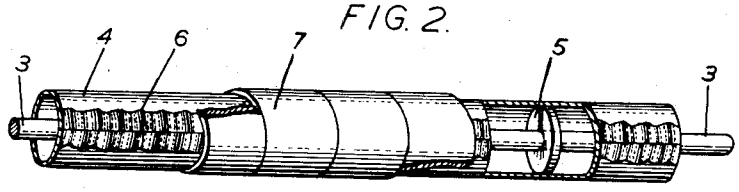
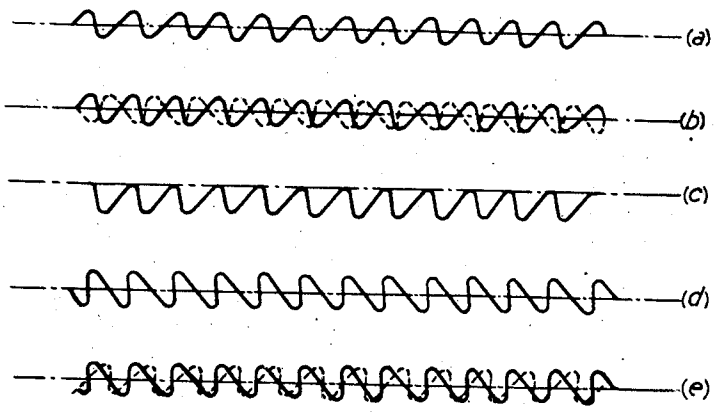


FIG. 3.



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COAXIAL ELECTRIC CABLE WITH CORRUGATED SEAM

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1 Claim. (Cl. 174—28)

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This invention relates to coaxial conductor electric cables for high frequency telecommunication transmission and employing outer conductors formed of a tape or tapes of conducting material.

In the specification accompanying my copending application No. 775,217, filed September 20, 1947, now Patent No. 2,606,953, issued August 12, 1952, there is described a construction of outer conductor for a high frequency coaxial cable which is formed by a metallic tape bent along its longitudinal axis to form a hollow tube with the edges of said tape abutting, the tube being formed with transverse corrugations so as to provide adequate flexibility and in which the transverse corrugations are deformed at the edges of the tape in such fashion that the abutting edges are prevented from overriding.

Cases however occur in which it is not necessary to provide a corrugated outer conductor as the flexibility obtained with a plain tube is adequate. It has been found that such outer conductors can conveniently be made by folding a plain tape longitudinally to form a tube after the edges of the tape have been corrugated. The positioning and shaping of the corrugations are so arranged that the abutting edges of the tape, when it has been folded, are prevented from overriding.

Accordingly the invention provides an high frequency electric communication cable of the coaxial conductor type, in which the outer conductor consists of a smooth metal strip folded longitudinally to form a tube around the inner conductor core assembly characterised in that one or both edges of the strip are corrugated prior to folding with corrugations which are so shaped or displaced with respect to the other edge that the meeting edges of the strip are prevented from over-riding during flexing of the cable.

In carrying out this invention the corrugations at the edges of the tapes should only extend into the tape for a very short distance so that the complete outer conductor is substantially a smooth cylinder. The corrugations should be of such depth that the profile of the corrugated edge is substantially wider than the thickness of the material of which the tape is formed. The corrugations in the two edges of a tape should preferably be staggered so that when the tape is folded over to form a tube the abutting edges meet at all points at an oblique angle, and in addition, if it is found desirable, the corrugations may be deformed from a regular symmetrical shape so as further to reduce the possibility of

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overriding. The corrugations in the edges of the tape may either be formed centrally about the plane of the tape or they may be offset on one side of the plane of the tape, it being understood that the corrugations at both edges of the tape must in the latter case be on the same side of the plane of the tape.

The invention will be understood from the following description taken in conjunction with the accompanying drawing in which:

Fig. 1 represents a flat tape with corrugated edges,

Fig. 2 represents a short length of coaxial cable according to the invention,

Figs. 3, *a*, *b*, *c*, *d*, *e* represent the profiles of the abutting edges in three different constructions.

In Fig. 1 there is shown a flat metal tape **1** with corrugated edges **2** which tape can be folded longitudinally so that the corrugated edges abut thus forming a tube of which the greater part of the surface is smooth.

In Fig. 2 there is shown a short length of coaxial cable comprising a central conductor **3** surrounded by a tubular outer conductor **4** which is spaced from the central conductor by means of a series of insulating discs such as the disc **5** shown in the figure. It is to be understood that other forms of insulating spacer may be employed, as, for example, a helical lapping of insulating material.

The outer conductor **4** is formed by folding a tape such as that shown in Fig. 1 along its longitudinal axis so that it surrounds the central conductor **3** and is supported on the insulating members **5**. It can be seen that if the corrugations at the edges are staggered as shown at **6** the abutting edges are prevented from overriding. The edges are held in abutting relationship by an external wrapping **7** of tape which may be of metal, paper, textile or plastic material. If preferred a wire or string binding may be used in place of a tape.

In Fig. 3*a* there is shown the profile of one edge of a tape such as that illustrated in Fig. 1 provided with uninterrupted regular corrugations, and in Fig. 3*b* the profiles of the abutting edges are shown for the embodiment in which the corrugations are staggered.

In Fig. 3*c* there is shown an embodiment in which the corrugations at the edges of the tape are formed entirely on one side of the plane of the tape. It can readily be seen that in order to prevent over-riding of the abutting edges when the tape is folded to form a cylindrical tube

it will be necessary to arrange that the corrugations on the two abutting edges be on the same side of the plane of the tape and be staggered so that a figure corresponding to Fig. 3*b* would represent the abutting edges.

It may often be found desirable however to deform the corrugated edges of the tape so that they form an uninterrupted series of unsymmetrical undulations at the edges as if this is done over-riding is rendered impossible whether the corrugations are or are not staggered and is prevented even when bending of the tube might have brought some of the corrugations into positions in which they registered with one another.

Fig. 3*d* shows a profile of the edge of the tape provided with an uninterrupted series of deformed corrugations and Fig. 3*e* shows the profiles of two abutting edges of such a tape each provided with deformed corrugations, the deformation taking place in opposite directions longitudinally along the two edges.

In some circumstances it may be desirable to provide corrugations at one edge of the tape only in which case they will be preferably of symmetrical shape and symmetrically placed with respect to the plane of the tape.

While the principles of the invention have been described above in connection with specific embodiments and particular modifications thereof, it is to be clearly understood that this description is made only by way of example and not as a limitation on the scope of the invention.

What is claimed is:

A high frequency electric communication cable of the coaxial conductor type, comprising an inner conductor core assembly and an outer conductor consisting of a flexible metal strip folded longitudinally to form a tube around said inner conductor core assembly, the opposite longitudinal edges of said strip being corrugated and deformed from a natural symmetrical shape, the deformation taking place in opposite directions longitudinally of the strip, whereby the abutting edges are prevented from over-riding, irrespective of the flexing of the cable.

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