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TRANSMISSION SYSTEM COMPRISING A CABLE OPERATED WITH CARRIER FREQUENCIES

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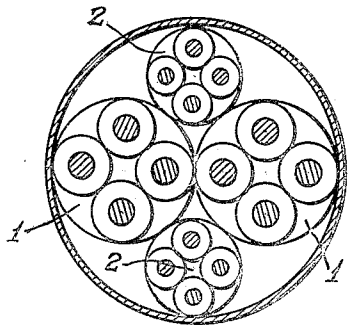


Fig. 1.

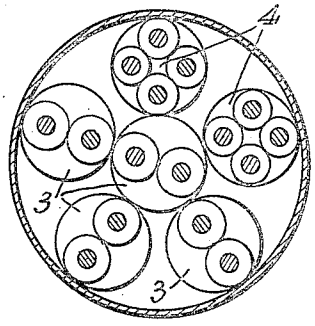


Fig. 2.

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TRANSMISSION SYSTEM COMPRISING A CABLE OPERATED WITH CARRIER FREQUENCIES

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2 Claims. (Cl. 179—78)

The present invention relates to transmission systems and more particularly pertains to cable transmission of currents wherein disturbing cross-talk is avoided.

In cables operated with carrier frequencies it is generally difficult, owing to the high frequencies of the transmission currents, to keep the cross-talk within adequate limits. Therefore, a separate cable is generally used for each one of the two directions of transmission. If it is desired to use one single cable for the transmission in the two directions, it is necessary to provide that there shall be sufficient screening for the conductors as regards capacity and inductance, which entails substantial costs. It has been found by calculations and experiments that the space for the screening can be better utilized by arranging conductors of larger diameter in the cable, which reach the admissible damping only at high frequencies.

According to the present invention the transmission system comprises a cable operated by carrier frequencies, in which thicker conductors for the transmission in one direction are combined in one cable with the same number of thinner conductors for the transmission in the other direction, the thicker conductors being operated with carrier frequencies above the frequency range of the thinner conductors and the thinner conductors with carrier frequencies below the frequency range of the thicker conductors. Owing to the different ranges of frequency for the transmission in the two directions disturbing cross-talk is avoided.

The invention will be more fully understood upon reference to the following description and the annexed drawing wherein several exemplary embodiments of the cables are disclosed.

In the drawing:

Fig. 1 is a cross sectional view of one type of cable showing the arrangement of the various conductors therein.

Fig. 2 is a cross-sectional view of a modified conductor arrangement.

A cable for carrying out the invention may, for instance, comprise thick conductors for the transmission in one direction assembled together into thick stranded elements and the same number of thinner conductors for the transmission in the other direction assembled together into thinner stranded elements, the thinner stranded elements being arranged to lie in the free spaces left between the thicker stranded elements. Such an example of construction is illustrated in Fig. 1. Two star quads 1 each comprising four 2.1 millimeter conductors are stranded together and two star quads 2 each comprising four 1.4 millimeter conductors are arranged in the free spaces between the quads 1. In each one of the star quads 2 five carrier frequency bands may be accommodated in the frequency range up to 13 kilocycles for one direction of transmission. In each one of the star quads 1 five carrier frequency bands may be accommodated in the frequency range between 18 and 33 kilocycles for the other direction of transmission.

In a modification of the invention as shown in Fig. 2 the cable may comprise pairs of thick conductors 3 for the transmission in one direction and star quads 4 comprising the same number of thinner conductors for the transmission in the other direction. In this case the number of pairs of conductors 3 is double the number of the star quads 4, since the star quads contain double the number of conductors contained in the pairs. Thus there are four conductors for each transmission direction and six stranded elements within the cable.

The pairs of thick conductors are so dimensioned that their stranding diameter is approximately equal to the stranding diameter of the star quads. In this way the whole of the cable comprises stranded elements of the same diameter.

I claim:

1. A cable transmission system comprising in combination, a pair of first conductors, two second conductors each of smaller diameter than the first conductors arranged between said first conductors, a casing enclosing all of said conductors, said second conductors carrying transmission currents in one direction operated with carrier frequencies, and said first conductors carrying transmission currents in an opposite direction operated with carrier frequencies above the frequency range of the second conductors.

2. A cable transmission system comprising in combination, first conductors, second conductors each of smaller diameter than the first conductors arranged between said first conductors, a casing enclosing all of said conductors, said second conductors carrying transmission currents in one direction operated with carrier frequencies, and said first conductors carrying transmission currents in an opposite direction operated with carrier frequencies above the frequency range of the second conductors.

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