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(54) **METAL SCREEN FOR A POWER CABLE.**

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Description

The present invention relates to a metal wire screen for an electric power cable comprising a predetermined number of twisted cores, said screen being made up from a premanufactured sheet consisting of electrically conductive rubber or plastic material extruded around parallel metal wires disposed therein, said screen embracing collectively a predetermined number of mutually twisted cores whereby the metal wires of the metal wire screen are parallel to the insulated cable cores.

A power cable metal wire screen has the task of leading off the current passing through the insulation layers of the cable cores, and also to serve as a conductor for earth fault currents in operational disturbances such as dielectric breakdown in the cable insulation layers. Such a screen usually consists of a plurality of metal wires or ribbons along the cable surface, but may also be a solid metal tube, e.g. of lead.

A metal wire screen, e.g. built up from copper wires, generally has considerably less conductive area than the main or phase conductors in the cable. There are standards prescribing that the screening conductor shall have a given density or largest average opening in respect of the cable circumference. The number of wires in the screen will thus be minimized and the wire diameter relatively small, usually about 1 mm.

The problem with small diameter screen wires is that; due to insignificant stiffness and high friction against their surroundings, they can easily be deformed in conjunction with reeling the cable on or off a drum. The stresses will be even greater in the bending tests, which shall be performed according to requirements prescribed by standard, and in which the cable is bent in diametrically opposite directions. No wire breakage or other serious damage may arise in such a case. As uniform a substructure as possible, as well as a sufficiently small pitch of the normally spirally wound screening wires, are measures which are usually sufficient to satisfy prescribed requirements. The uniformity of a cable body, eg built up from three cable cores, may be improved with the aid of filler profiles between the cores and/or bandaging round the three cores. This measure requires extra material, however. Similarly, reduced pitch also requires more metal for standard requirements prescribed for the conductivity of the screen to be satisfied.

From GB—A—647 753 an electric power cable with a flexible screen of a conducting rubber composition is known. The screen includes a number of metal wires which may be disposed parallel to the longitudinal axis of the power conductors. The screen is preformed as ribbons which are applied to the power conductors. One or more ribbons are disposed to individually or collectively embrace a plurality of said power conductors.

In an electrical power cable with a metal wire screen the above mentioned problem is solved according to the precharacterizing part of Claim 1 in that the metal wire screen is made up of a number of premanufactured ribbons from that sheet equal to the number of cores, these ribbons each engaging against the outer side of its respective twisted core and extending parallel to the centre line of its associated core.

With an electric power cable having such a metal wire screen the risk of rupture is reduced. Simultaneously good bending properties of the cable are maintained. Furthermore the metal wire screen is protected from corrosion and the manufacture of a screened power cable is simplified.

A further embodiment consists therein, that the edges of each premanufactured ribbon are thickened.

The invention will now be described below while referring to the appended drawings, on which Figure 1 is a perspective view of a power cable with a first embodiment of the metal wire screen in accordance with the invention and Figure 2 is a cross section of a power cable with a second embodiment of the metal wire screen in accordance with the invention.

A perspective view of a power cable with three cores is illustrated in Figure 1, each of the cores containing a conductor 1, e.g. of copper or aluminium, on which a semiconductive layer 2, e.g. of conductive plastics, has been extruded. An insulating layer 3 is extruded on said layer 2, and a second semiconductive layer 4, e.g. of conductive plastics, is extruded on the insulation layer 3. The cross section of each core is sector-shaped, and the three cores are laid in relation to each other such that their cylindrical backs face outwards to provide a substantially circular cross-sectional shape for the collected cores. Round the collected and twisted cores there is a first embodiment of a metal wire screen. The screen comprises a separate screening ribbon 8 for each core, i.e. three screening ribbons 8 in the present case. These screening ribbons are manufactured beforehand and include a predetermined number of metal wires 7 arranged in parallel. The screening ribbons 8 are laid out on the back of the respective core and extending along the respective twisted core. So as to give the screen wires 7 a well defined location and to retain them in this position during movements and bending of the cable, the wires 7 are bedded into the screening ribbons 8 which preferably are made of an electrically conductive material, e.g. an electrically conductive rubber or plastics material, which also protects the wires against corrosion. The thickness of these ribbons 8 exceed by some tenths of a millimeter the thickness of the wires. When putting the three cores together into a cable, the three screening ribbons 8 are applied on the back of the respective core, the cable body built up in this way then being wound with a band 9, after which the cable body is provided with a jacket 6, e.g. of plastics.

In Figure 2 there is shown an embodiment of a cable with cores having circular cross section, as

is the case with small cable dimensions. The cores shown in Figure 2 are otherwise built up in the same way as those in Figure 1, i.e. with a conductor 1, in order surrounded by a semiconductive layer 2, an insulating layer 3 and a further semiconductive layer 4. To obtain a circular cross section of a cable having the cores illustrated in Figure 2, the intermediate spaces between the cores must be filled out. This can be attained, for example, by the type of screening ribbon 8 shown in Figure 1, which has been thickened out along its edges in the manner shown in Figure 2. The screening ribbons 8 shown in Figure 2 also include a predetermined number of screening wires 7, which have been embedded beforehand in a layer of material, e.g. conductive plastics or rubber.

In bending a cable with several cores laid twisted, e.g. according to Figure 1, the cores glide relative each other in such a way that due to bending there occurs a deficiency in the core length on the outer surface of the cable (outer curve) which is compensated by a corresponding excess on its inner surface (inner curve). This means that a surface element on the individual core is neither stretched nor compressed as a result of the bending. This situation is utilized for the metal wire screen in accordance with the present invention, the metal elements of which, extending thus along their associated twisted core, are not subjected to any tension or compression forces when the cable is bent.

Claims

1. A metal wire screen for an electric power cable comprising a predetermined number of twisted cores (1), said screen being made up from a premanufactured sheet consisting of electrically conductive rubber or plastic material extruded around parallel metal wires (7) disposed therein, said screen embracing collectively a predetermined number of mutually twisted cores (1) whereby the metal wires (7) of the metal wire screen are parallel to the insulated cable cores, characterized in that the metal wire screen is made up of a number of premanufactured ribbons (8) from said sheet equal to the number of cores, these ribbons (8) each engaging against the outer side of its respective twisted core (1) and extending parallel to the centre line of its associated core (1).

2. A screen as claimed in claim 1, characterized in that the edges of each premanufactured ribbon are thickened.

Patentansprüche

1. Metalldrahtschirm für ein elektrisches Leistungskabel, umfassend eine vorbestimmte Anzahl von verdrehten Seelen (1), wobei der Schirm aus einem vorgefertigten Bogen hergestellt ist, der aus elektrisch leitfähigem Gummi oder Plastikmaterial besteht, welches um parallele Metalldrähte (7) gespritzt ist, die darin angeordnet sind, wobei der Schirm gemeinschaftlich eine vorgegebene Anzahl von gegenseitig verdrehten Seelen (1) umgibt, wodurch die Metalldrähte (7) des Metalldrahtschirmes parallel zu den isolierten Kabelseelen sind, dadurch gekennzeichnet, daß der Metalldrahtkäfig aus einer Anzahl von vorgefertigten Streifen (8) aus dem Bogen aufgebaut ist, welche gleiche der Anzahl der Seelen ist, wobei jede dieser Streifen (8) an der Außenseite ihrer entsprechenden verdrehten Seele (1) angreifen oder gegendrücken und sich parallel zur Mittellinie ihrer zugehörigen Seele (1) erstrecken.

2. Schirm nach Anspruch 1, dadurch gekennzeichnet, daß die Kanten jedes vorgefertigten Streifens verdickt sind.

Revendications

1. Blindage en fils métalliques pour un câble électrique de puissance comprenant un nombre prédéterminé d'âmes torsadées (1), ledit blindage étant réalisé à partir d'une feuille préfabriquée constituée d'un caoutchouc ou d'une matière plastique conduisant le courant électrique appliqué par extrusion autour de fils métalliques parallèles (7) disposés intérieurement, ledit blindage entourant de façon commune un nombre prédéterminé d'âmes mutuellement torsadées (1), de manière que les fils métalliques (7) du blindage de fils métalliques soient parallèles aux âmes de câble isolées, caractérisé en ce que le blindage en fils métalliques est constitué d'un nombre de rubans préfabriqués (8), à partir de ladite feuille, égal au nombre d'âmes, ces rubans (8) portant chacun contre la face extérieure de l'âme torsadée respective (1) et s'étendant parallèlement à l'axe central de cette âme associée (1).

2. Blindage selon la revendication 1, caractérisé en ce que les bords de chaque ruban préfabriqué sont surépaissis.

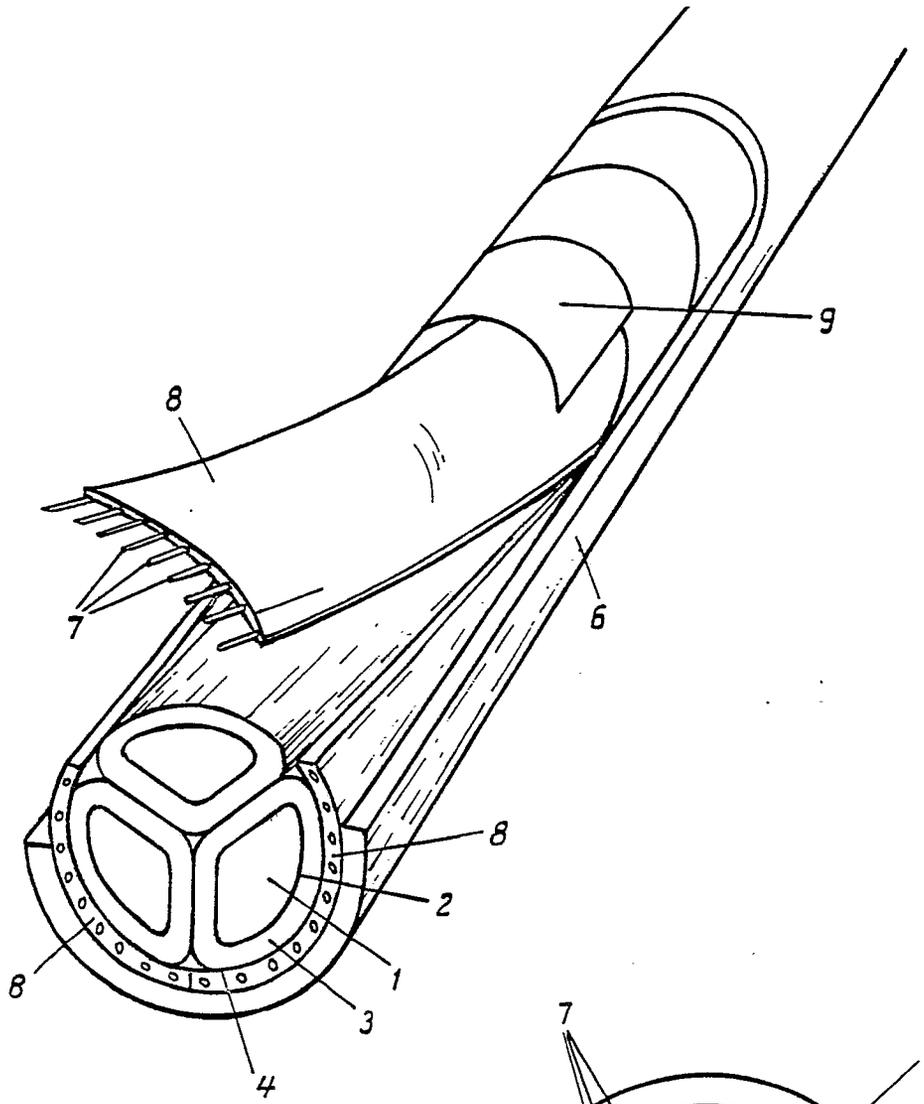

Fig. 1

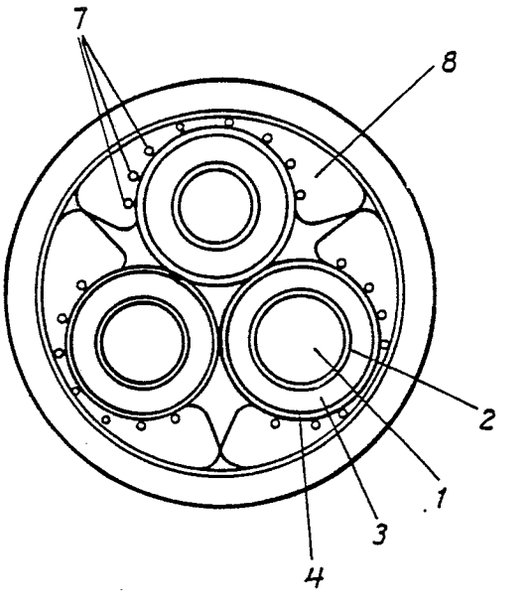

Fig. 2