

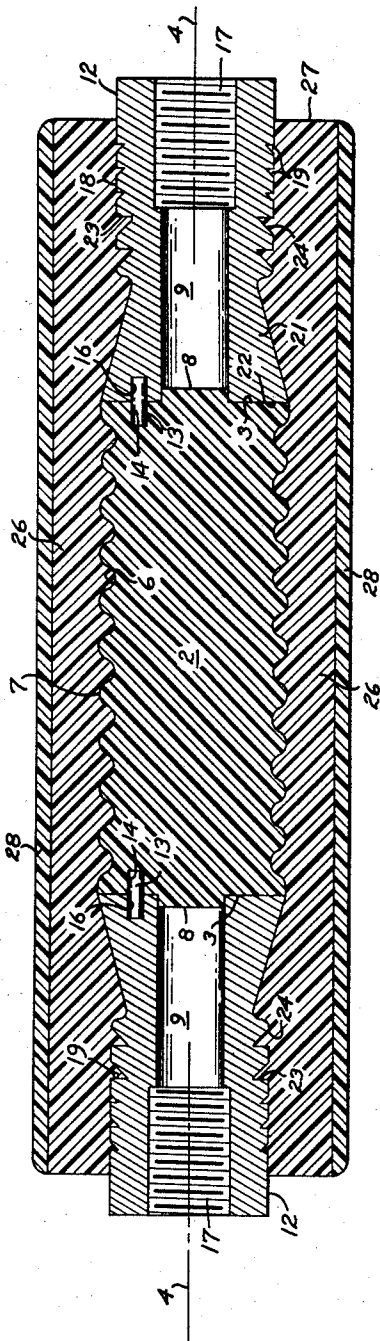
March 15, 1960

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2,928,893

INSULATED TENSION LINK

Filed Nov. 30, 1955



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INSULATED TENSION LINK

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Application November 30, 1955, Serial No. 550,089

2 Claims. (Cl. 174-178)

My invention relates to links; and particularly to an electrically insulated link.

Among the objects of the invention is the provision of an electrically insulated link characterized by high dielectric and great tensile strength.

Another object of the invention is the provision of an electrically insulated tension link having a resilient outer covering highly resistant to blows and hard usage.

The invention possesses other objects, some of which with the foregoing will be brought out in the following description of the invention. I do not limit myself to the showing made by the said description and the drawings, since I may adopt variant forms of the invention within the scope of the appended claims.

Referring to the drawings:

The figure is a half-sectional view of my insulated tension link.

Broadly considered, my electrically insulated tension link comprises a core of dielectric material, abutting at each end a cable connecting shank adapted to be secured to the end of a cable. Means are provided to prevent relative rotation between the assembled parts. Spirally wound around the assembled parts is a strip made of a dielectric material having a high tensile strength. The strip forms a sleeve which secures the parts against longitudinal displacement when tension is applied to the link. Preferably, the strip is embedded or impregnated with a self-curing synthetic resin so that displacement of the strip and shanks under stress is resisted by the homogeneous connecting sleeve.

The electrically insulated tension link of my invention finds useful application and versatility in many different industries. A specific application lies in the field of hoisting equipment, used in the vicinity of high tension electrical conductors. If contact is established between the conductive hoisting cable and high potential conductors, grave danger may exist for workmen near the short circuit. This type of accident generally results in charging the safety hook on the end of the cable with a dangerously high electrical potential. Its proximity to apparatus at ground potential may cause a flash-over, and workmen nearby may be burned or electrocuted.

My tension link is designed to be interposed between the safety hook and the hoisting cable, or in similar applications where high dielectric characteristics, together with great tensile strength are prerequisite.

The link specifically comprises a central core 2 of a non-conductive material such as one of the phenolic resins characterized by high dielectric strength. The central dielectric core may incorporate suitable fibrous fillers, such as glass fibers. Conveniently it is cylindrically shaped to provide end surfaces 3 at right angles to a longitudinal axis 4, and grooves 6 in the cylindrical surface 7, evenly spaced between the ends. The grooves lengthen the effective path which electrical energy would follow in shorting through the link.

Each end of the core is provided with an integrally

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formed and concentric boss 8, projecting beyond the surface 3, and seated in the central bore 9 of a cable connecting shank or sleeve 12, abutting the core and axially aligned therewith. Alignment of the parts is further assured, and relative rotation between the parts is prevented, by steel dowel pins 13 lying in complementary bores 14 and 16 in the core and connecting shanks or sleeves, respectively. The pins are spaced outwardly from the longitudinal axis a short distance, and are conveniently parallel therewith.

Each of the cable anchoring sleeves 12 at its outer end is provided with interior threads 17, so that a threaded socket is provided for connection to the threaded shank of a cable element such as an eye or safety hook, neither of which is shown. The sleeves are preferably formed from hard steel to provide a cylindrical connecting portion 18 having grooves 19 formed therein; and a conically tapered anchor portion 21, terminating in end face 22 abutting the core. Each of the grooves 19 is preferably formed by a transversely perpendicular forward wall 23, and a backwardly divergent wall 24 tapered in the same direction as anchor portion 21.

To bind the central dielectric core and metallic cable connecting shanks or sleeves into a composite structure able to withstand tremendous tensile stresses, the aligned parts are provided with a dielectric wrapping or sleeve 26, of considerable thickness, and comprised of a thin, narrow strip of glass fibre, continuously and spirally wound back and forth from end to end between fixed collars defining the final length of the dielectric sleeve. As the glass fibre strip is wound on the parts, a self-curing polyester resin in liquid form, and possessing the desired characteristics of high dielectric and mechanical strength, is applied to the strip so that as the thickness of the winding builds up between the fixed end collars, the strip lies embedded in the polyester resin. Curing of the resin is conveniently effected at room temperature and atmospheric pressure, but heat may be applied if desired.

In winding the strip on the central core and connecting shanks, the aligned parts are arranged in a suitable fixture and rotated about their longitudinal axis 4. The strip is guided onto the rapidly revolving parts by conventional means which will maintain uniform tension in, and shuttle the strip spirally back and forth between the end collars so that the strip is evenly applied and the end surfaces 27 are flat and perpendicular to the axis.

Before the winding process is commenced, the core and shanks are wiped with liquid polyester resin. One end of the strip is then tied in one of the grooves 19, and the parts are rotated while the strip is played back and forth indiscriminately to fill all of the grooves 6 and 19 with glass fibre strip and polyester of substantially uniform density.

When the grooves have all been filled and the strip has built up to a substantially even surface, the strip is played back and forth spirally until the final thickness of the dielectric sleeve is achieved. At this point in the winding, a layer of closely pitched spiral windings or loops of strip are wound on, circumferentially binding and locking the previously wound layers below. At the conclusion of the winding process the polyester is allowed to cure at room temperature.

If desired, the device may be placed in a suitable mold when the polyester winding material is only partially cured, and a layer 28 of polyamide ester cast or otherwise molded around the polyester sleeve body. The polyamide layer provides a tough resilient covering surface to the device, useful in resisting the shattering shock of laterally directed blows. The polyamide resin may be applied without any filler, or it may be applied to

glass fibre strip material which is then wound on as before.

I have found that my link, designed as illustrated and having a five inch overall diameter, is capable of sustaining the stresses imposed by a five ton load, with at least a 3 to 1 safety factor. In terms of dielectric strength, one of my links seventeen inches long will withstand a 20,000 volt potential, with a 2 to 1 safety factor.

In use, my insulated tension link is interposed in a conductive cable by means of a threaded cable element engaged with threads 17 of the cable connecting shanks or sleeves. Tension applied to the cable is transferred by means of the cable connecting sleeves to the surrounding polyester sleeve with its embedded glass fibre strip. Longitudinal displacement of the cable connecting sleeves is prevented by the coaction between the grooves 19 and conically tapered portion 21, and the surrounding polyester sleeve.

I claim:

1. An insulated tension link for connecting conductive cables, comprising a dielectric core having axially spaced circumferential grooves thereabout and an integral boss extending from each end, a cable connecting metallic shank abutting each end of the central core and recessed to receive said integral boss to axially align the core and shanks, each said shank being provided with a conically tapered anchor portion and a cylindrical connecting portion provided with a plurality of spaced circumferential grooves, said anchor portion and said grooves tapered in a direction to resist tensile stresses tending to separate

said shanks, and a dielectric sleeve engaging the tapered anchor portions and the grooves of both said metal shanks and the aligned central core to secure the shanks against relative axial displacement when tensile stresses are imposed.

2. An insulated tension link for connecting conductive cables comprising a dielectric core having longitudinally spaced circumferential grooves, a cable connecting shank abutting each end of the core and axially aligned therewith, each said shank having a plurality of longitudinally spaced annular grooves therein and each groove having a backwardly divergent wall, dowel means interposed between the core and each shank to prevent relative rotation therebetween, and a dielectric sleeve including a glass fibre strip connecting the shanks and core and filling the grooves in each and cooperating with the backwardly divergent walls thereof to secure the shanks against relative axial displacement when tensile stresses are imposed.

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