No. 692,960. Patented Feb. 11, 1902.

E. WITZENMANN.

ARMOR OR SHEATHING FOR ELECTRIC CONDUCTORS.

(Application filed Nov. 16, 1901.)

(No Model.)

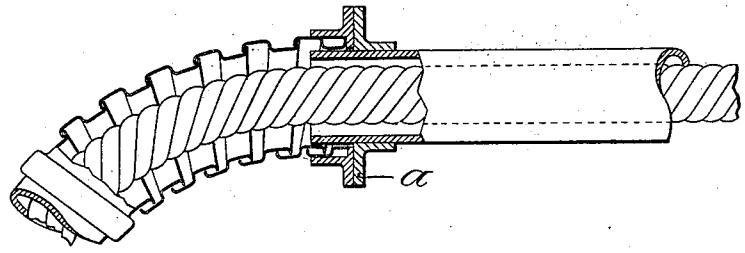


fig. 1.

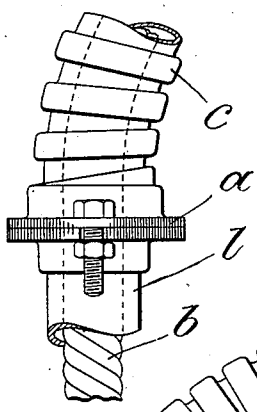


fig. 2.

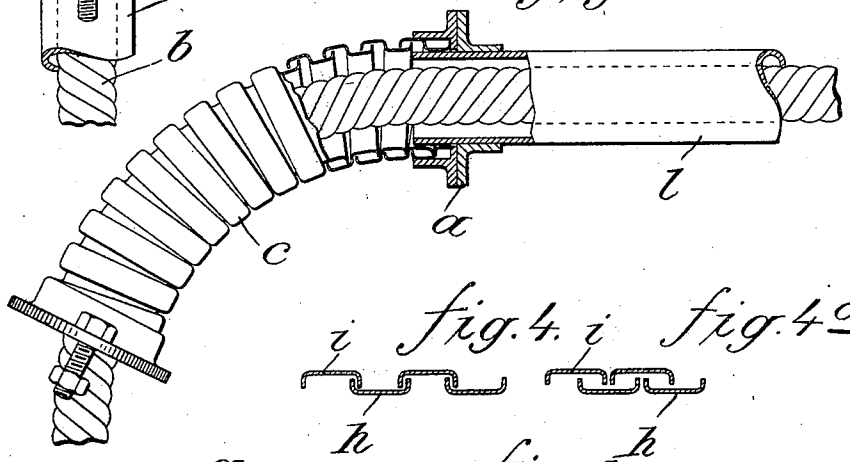


fig. 4. fig. 4a

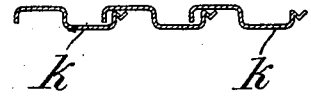


fig. 5.

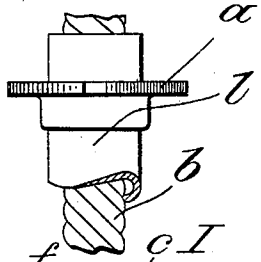
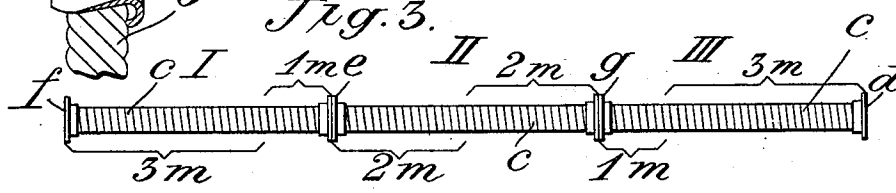


fig. 3.



Witnesses.

Edward T. Wray.

Howard Kraft.

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by Bruce & W. Parker,
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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

EMIL WITZENMANN, OF PFORZHEIM, GERMANY.

ARMOR OR SHEATHING FOR ELECTRIC CONDUCTORS.

SPECIFICATION forming part of Letters Patent No. 692,960, dated February 11, 1902.

Application filed November 16, 1901. Serial No. 82,527. (No model.)

To all whom it may concern:

Be it known that I, EMIL WITZENMANN, manufacturer, a subject of the Grand Duke of Baden, residing at 48 Holzgartenstrasse, Pforzheim, Germany, have invented certain new and useful Improvements in Armor or Sheathing for Electric Conductors, of which the following is a specification.

The subject of the present invention is an improved armor or sheathing for electric conductors and the like.

The new armor possesses the special advantages, first, of lying closely against the conductor at bends or curves, and, secondly, of admitting of the sheathing at any desired place or places being readily taken apart and given another form, whereby any required part of the conductor is rendered accessible for repairs, &c.

The improved armor is illustrated by the annexed drawings.

Figure 1 is a part-sectional view of a portion of a bent conductor armored with the new sheathing, the center of the bend being broken away. Fig. 2 is a like view of the armored conductor after the bent spiral portion of the sheathing has been disconnected at one coupling and compressed so as to expose the inclosed conductor at the part. Fig. 3 is a view drawn to a smaller scale and showing a portion of a conductor-sheath consisting of three lengths of spiral armor coupled together. Figs. 4 and 4^a are detail sectional views drawn to an enlarged scale and illustrating one manner in which the spirals of the sheath may be constructed. Fig. 5 is a like detail sectional view drawn to the same scale as Figs. 4 and 4^a and illustrating another manner of forming the spiral armor.

For the armor shown in Figs. 1 and 2 a metallic spiral hose *c* is employed consisting of very broad coiled band, so that the hose admits to a large extent of being telescoped. In this case to expose the incased cable *b* it is only necessary to loosen one of the couplings *a a*—for example, the lower coupling—and to push the loose end of the spiral hose *c* upward, as shown in Fig. 2. In this manner the lower part of the bend in the cable *b* is exposed. If the upper part of the bend in the cable is to be repaired, the process is reversed—that is to say, the upper coupling *a* is loosened and the upper end of the spiral hose pushed downward, so as to telescope the hose. As a rule it is only to the bends in cables to which such spiral hose is applied, the remainder of the cable-armor being composed of rigid or other tubing *l*. The new armor may also be so arranged that lengths of cable of any desired extent may be exposed. In such case a number of portions of spiral hose *c* are coupled together, with capability of ready disconnection, as shown in Fig. 3. If for this purpose a metallic spiral hose is again employed so arranged that it can be compressed so as to become shorter than in the ordinary drawn-out condition, then, supposing the total length of the armored cable to be about ten meters, by loosening or disconnecting the coupling *f* of the armor and pushing the three portions *c* toward the coupling *d*, assuming that the spiral hose admits of thirty per cent. compression, three meters of the length *f e* in part I can be exposed. By loosening or disconnecting the coupling *e* and pushing the hose in the direction of the coupling *f* one meter of the part I will be exposed. By loosening or disconnecting the coupling *e* and pushing the armor toward the coupling *d* two meters of the cable of part II can be exposed. By loosening the coupling *g* and pushing the armor toward the coupling *f* likewise two meters of cable in part II may be exposed. By loosening the coupling *g* and pushing the armor toward coupling *d* one meter of part III may be exposed, and finally by loosening the coupling *d* and pushing the armor toward the coupling *f* three meters of part III may be exposed. It is thus clear that in the manner above described every portion of the cable between *f* and *d* can be exposed.

A metallic spiral hose possessing the required high degree of compressibility can be manufactured in various ways. It may be made by spirally winding one very wide band of metal, as above mentioned, or instead of employing only one strip two strips *h i*, engaging in each other, as shown in Figs. 4 and 4^a, may be wound. Fig. 4 shows by sectional view the position of the strips relatively to one another when the hose is drawn out, and Fig. 5 the same when the hose is telescoped. The hose may also be manufactured, as shown in Fig. 5, of a single metallic strip provided

in well-known manner with packed joints *k*, this latter system being particularly serviceable when an armor is required which is proof against the penetration of liquids.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. An armor for electric conductors and the like, comprising lengths of metallic spiral hose capable of being compressed longitudinally, secured together at their ends by couplings capable of being readily loosened or disconnected, whereby the whole of the incased conductor may be exposed piece by piece, substantially as described.

2. An armor for electric conductors and the like, comprising lengths of rigid tubing and of flexible metallic spiral hose capable of being compressed longitudinally, secured together at their ends by couplings capable of being readily loosened or disconnected, whereby the whole of the portion of the conductor incased by the flexible hose may be exposed piece by piece, substantially as described.

Signed at the United States consulate at Stuttgart this 21st day of October, 1901.

EMIL WITZENMANN.

Witnesses:

HERMANN HAHN,

ERNST ENTCUMAR.