Oct. 21, 1947. E. G. BOYLE 2,429,258

SPLICE INSULATOR

Filed April 20, 1942

FIG. 1

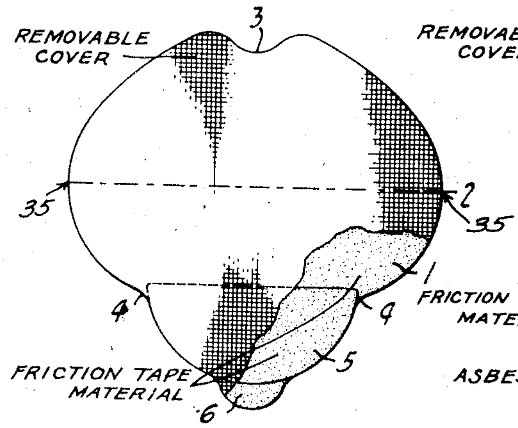


FIG. 4

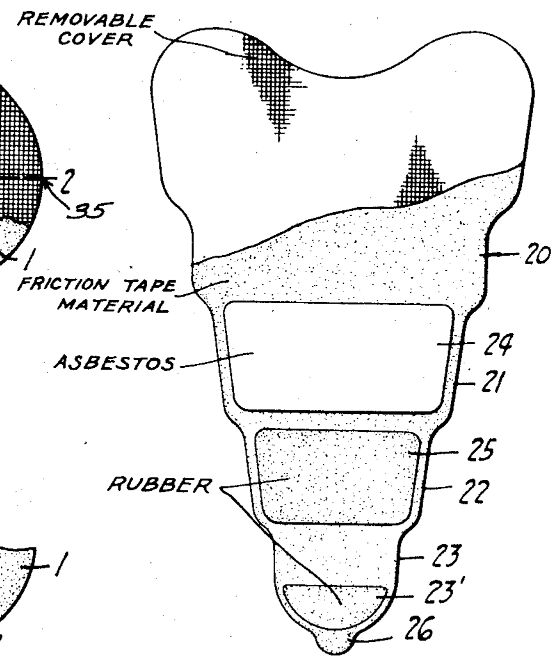


FIG. 2

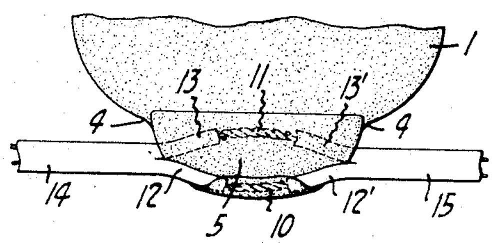


FIG. 6

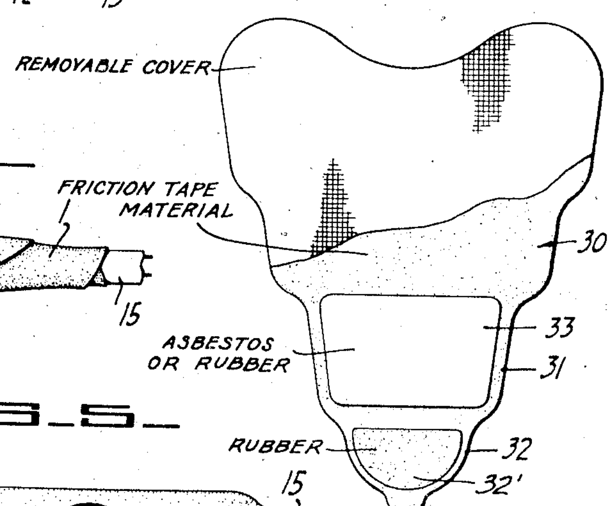


FIG. 3

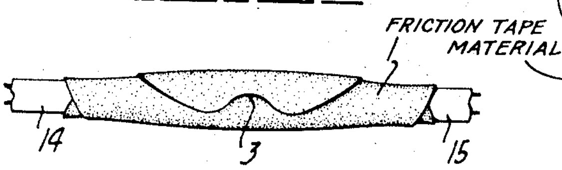
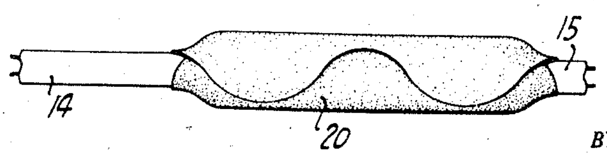


FIG. 5



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SPLICE INSULATOR

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2 Claims. (Cl. 174—88)

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This invention relates to splice insulators, and has for one of its objects an economically made and highly effective splice insulator adapted to be readily and quickly secured in insulating position by an inexperienced operator, and after so secured is neater and more resistant to possible injury than splices insulated in the conventional manner.

Another object is the provision of a cheap, effective, relatively flexible splice insulator adapted to accomplish any desired ordinary insulation of one or more wire splices, and which insulator does not require special cutting or tearing of material and may be applied quickly by an inexperienced person under abnormal conditions, such as in the dark or in relatively awkward places, and which insulator, when applied, is bonded securely on itself and to the electrical cords carrying the spliced wires.

Other objects and advantages will appear in the drawings and specifications annexed hereto.

Briefly described, heretofore the insulating of spliced wires, such as in electrical lighting circuits where a pair of wires in one cord are respectively spliced to a pair of wires in another cord, has been difficult under the most favorable conditions. The conventional practice has been for the operator to strip away the main outer covering of each cord adjacent the free end thereof, and to then strip away the insulation from the ends of the pair of individually insulated wires thus exposed by removal of said outer insulation. After this, the bare ends of the individual wires in one cord are respectively twisted together with the bare ends of the individual wires in the other cord. A strip of friction tape is then torn from a roll of such tape and is wound around the connected ends of one of the wires of each cord, after which a second strip of such tape is wound around the connected ends of the two pairs of connected wires. To facilitate wrapping the tape around the first pair of connected wires, the operator generally strips away an excessive amount of the main outer covering of the cords to permit separating the two connected pairs of wires sufficiently to make the first insulation since the tape must be repeatedly passed between the separated spliced wires in wrapping it about one of the splices.

The resultant insulation is not ordinarily uniformly made, since the wrapping of the wires with the tape will vary according to the expertness of the operator in uniformly overlapping adjacent turns of the tape. Wrinkles may appear, which are merely pressed as flat as possible to

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effect as much neatness in appearance as is possible. Also the final wrapping of the pairs of spliced wires by the conventional method results in raw, exposed edges of the convolutions along the spiral wrapping that may either catch on projections as the spliced cords are drawn longitudinally of the cords through openings or over the floor or ground, or which edges become abraded and ragged where the spliced cords are frequently moved back and forth longitudinally of the cords over the ground or relative to any surface in engagement therewith.

With my splice insulator, the initial insulation of the pair of spliced wires from each other is accomplished by the single operation of inserting a tab-like end of a specially formed sheet of similar material to friction tape (preferably of extra thickness at said end) between the separated splices, and by then merely rolling the sheet around both splices in the same manner as rolling a sheet of any flexible material around any pair of parallel elongated members that are alongside each other, the insulation is completed, and the resultant insulation is smooth and the sheet is firmly bonded to the cords and to the splices, so there can be no accidental dislodgement or displacement of the insulation either longitudinally of the spliced cords or circumferentially of the cords.

In the drawings,

Fig. 1 is a plan view of a splice insulator for insulating a simple splice, with a detachable protective covering of gauze over the friction surface of the insulator, which covering is partially broken away to reveal the friction surface.

Fig. 2 is a fragmentary elevational view of a pair of wires showing the commencement of a job of insulating the splices.

Fig. 3 is an elevational view of a completed insulation of splices with my insulator.

Fig. 4 is an elevational view of a splice insulator for a waterproof, fire resistant insulation.

Fig. 5 is an elevational view of a completed splice with the insulation of Fig. 4 in place.

Fig. 6 is an elevational view of a splice insulator for a waterproof splice.

In detail, referring to Fig. 1, the splice insulator comprises a sheet generally designated 1, of fabric impregnated with the usual tacky, adhesive substantially non-drying electrical insulation material such as friction tape, one side of which I preferably cover with a piece of cheap, relatively coarsely woven, gauze-like fabric 2 that prevents adjacent pieces of the insulation material in a pile from sticking to each other, but which fabric 2 may readily be stripped from the sheet 1 leaving the adhesive surface from which the fabric has been stripped unimpaired, and ready for use.

The sheet 1 is preferably generally heart-shaped in outline, providing integrally united, similar-shaped lobes at opposite sides of a line vertically bisecting the sheet as viewed in Fig. 1, and which description hereinafter will refer to the position of the insulator shown in Fig. 1.

The linear contour of the upper edge of the sheet preferably follows a continuous curve defining a re-entrant central portion 3. The maximum horizontal width of the sheet is along an imaginary line (indicated in dot-dash line) disposed about midway between the maximum vertical dimension, and from the ends 35 of such line the side edges of the sheet extend inwardly and downwardly toward each other to points 4, from which points the side edges curvilinearly extend generally downwardly and convergently toward each other defining the lateral side edges of a tab-like portion 5, that will later be shown to comprise the portion of the insulator forming a partition for insulating the pair of wire splices of an electrical cord from each other.

Centrally below the portion 5, I provide tab 6, which tab defines the lowermost portion of the generally heart-shaped insulator sheet, and this tab projects from the portion 5 and is co-planar therewith and is preferably substantially semi-circular in outline.

While the portion 5 may be a single thickness of the same insulation impregnated sheet as the main body portion thereabove and the tab 6 therebelow, it is preferably at least a double thickness of such sheet.

The exact details of the shape of my insulator are not to be construed as being restrictive, but merely as illustrative of the preferred form, since, as will be evident from the description of the functions of the insulator when used, other shapes will function to accomplish the same general result. However, it is important that there be an insulator having a main body portion of substantially greater horizontal width than that of a portion therebelow corresponding to portion 5. It is also highly important that the main body portion comprising the upper portion of the sheet (in a view corresponding to that of Fig. 1 or Fig. 4) have an exposed tacky or friction surface of a vertical dimension sufficient to completely encircle the portion of the insulator therebelow and to directly engage the electrical cord at opposite sides of the spliced wires, after the said latter portion is wrapped around the splices.

In operation, after the bare wire ends 10, 11 of the individually insulated wires 12, 12' and 13, 13' have been spliced together as indicated in Fig. 2, the said spliced ends are separated slightly and the portion 5 of the insulator is thrust between said portions. The horizontal width of said portion 5 is sufficient to extend beyond the bare spliced ends 10, 11. The portion 5 is then wrapped around the spliced ends 10 as seen in Fig. 2, and upon continuing to tightly wrap the remainder of the insulator around both spliced ends in the same direction it will be seen that the main body portion of the insulator above portion 5 will progressively directly engage the insulated wires 12, 12', 13, 13' along the lateral marginal portions of said main body portion outwardly of the spliced ends until the sheathing of the main cords 14, 15 are encircled by the insulator at its widest horizontal dimension. The two upper ends of the insulator at opposite sides of the reentrant edge 3 at the termination of the wrapping step will overlie the portion 5 but will form part of the outermost layer of the insulator.

It will be seen from Fig. 3 that the finished insulation is smoothly tapered from the cords 14, 15, which it tightly engages, toward the center of the splice, since the greatest number of adjoining layers of the insulator is over the bare spliced wires 10, 11, thereby cushioning and protecting the same.

As the insulator is wrapped around the spliced wires, the operator preferably maintains the lateral marginal portions of the insulator in close engagement with the cords 14, 15 and the individually insulated wires adjacent thereto, by pressure of the thumb and forefinger of each hand so as to insure a tight bonding of the insulator to itself as well as to the said cords and wires. This tends to form a pucker centrally along the upper edge of the insulator which the reentrant outline of the upper edge eliminates, thereby forming a smooth insulation over the spliced wires.

It will be seen that the convergently extending edges of the portion 5 provide a complete insulation of the bare spliced ends 10, 11 from each other irrespective of variations in the lengths of the exposed ends, since the portion 5 may be inserted between the spliced ends a greater or lesser distance that is only limited by the spacing of the raw ends of the main sheathing of cords 14, 15.

In Fig. 4 I show an insulator for splices in which fire-resistant, waterproof features are desired.

In this form of insulator, a sheet 20 of the usual friction tape material is shown, but instead of providing a relatively short extended portion such as at 5 in Fig. 1, I provide a plurality of co-planar extensions 21, 22, 23 successively extending downwardly from the main upper portion. Each of these extensions has slightly convergently extending lateral edges in direction downwardly relative to the main upper portion, and on portion 21 is sheet of fireproof material 24, such as asbestos, adhesively secured thereto. This portion is the one adjoining the main upper body portion which latter portion has its tacky surface exposed.

Directly below portion 21 is the extension 22, and a sheet of waterproof material 25 such as rubber covers this portion 21 and is adhesively secured thereto, and slightly spaced from the fireproof material.

The extension 23 below extension 22 is generally similar in structure to the portion 5 of Fig. 1 and carries a similar tab 26 thereon but instead of extension 23 being double thickness of tape, a relatively small piece of rubber 23' may form one layer of the extension 23, being adherently secured thereon. This merely reduces the bulk of the finished insulation since it is obvious that the rubber sheet 25 may be extended over extension 23 if desired.

Each of the respective sheets 24, 25 is preferably slightly spaced inwardly at its edges from the edges of portions 21, 22.

In operation, the spliced pairs of wires are separated by the portion 23, the same as described for the portion 5 of Fig. 1, and the insulator is wrapped about the spliced wires the same as the insulator of Fig. 1. The final insulation is generally cylindrical, with tapered ends, as seen in Fig. 5, and which ends grip the main cord sheaths carrying the individually insulated wires that are spliced at their bare ends. This insulator as seen in Fig. 5 when sprayed with a fireproofing material of any suitable kind, is further fireproofed and waterproofed, and eliminates the present need for using a metal sleeve over the insulated portion. The use of a metal sleeve, as is now employed where deemed desirable, is objectionable both from the standpoint of detrimental electrolysis and from the standpoint of expense.

Fig. 6 shows substantially the same structure as that of Fig. 4 except that the extension 22 is eliminated, and thus the main sheet 30 carries an extension 31 corresponding to extension 21 of Fig. 4, and an extension 32 corresponding to extension 23 of Fig. 4. Extension 32 may have a sheet 32' of waterproof material thereon, such as rubber. The extension 31 may carry a sheet 33 of asbestos or of rubber or of any other flexible material according to the function it is to perform. The insulator of Fig. 6 is applied in the same manner as that of Fig. 4.

In each of the forms shown, it is pertinent to note that the main upper body portion of the insulator is adapted to be bonded to itself and to the main cords that carry the wires. This is highly important since the insulator is thereby tightly secured in wrapped position against any shifting relative to the spliced wires and against any possible loosening under severe handling that may even include excessive flexing.

It is also pertinent to note that the insulation material forming the integral sheet from the larger to the smaller end, is wrapped a plurality of times on itself around the splice and in the case of Figs. 4 or 6, this is particularly important in providing a strong, securely attached insulator since both sides of the main sheet have adhesive properties.

It is, of course, obvious that for industrial or military uses, where the splices are offset relative to each other, a wider sheet of insulation material is used than where the splices are directly alongside each other, such width being sufficient to extend across both splices and to permit the insulator to bond with the cords at the opposite outer sides of a pair or more of such splices. It is equally obvious that the tab that functions to insulate a pair of splices from each other may be lengthened if three or more splices are to be insulated.

Having described my invention, I claim:

1. A splice insulator of the character described comprising a generally heart-shaped sheet of flexible, sheet material adapted to be spirally wrapped around the adjacent splices connecting adjacent ends of the pairs of wires in a two-wire circuit with the apexial portion of said sheet being adapted to be disposed between such splices insulating the latter from each other and at the center of the spiral wrapping, and an adhesive carried by said sheet providing an adhesive surface adapted to adherently engage the said portion and the wires extending oppositely from such splices when the sheet is so wrapped with the said portion between said splices, the opposite side edges of said sheet being cut so as to extend generally divergently from one end of said sheet to spaced points intermediate said one end and the end opposite thereto, and said side edges abruptly continuing oppositely outwardly from said points to similar predetermined distances and then returning from said points convergently to connecting relation to the edge defining said opposite end, the said latter edge being curved inwardly centrally of the ends thereof that connect with said side edges.

2. A splice insulator of flexible sheet material having a body portion and an extension projecting therefrom substantially co-planar therewith; said body portion and said extension being substantially symmetrical at opposite sides of a common plane bisecting the two at right angles to the plane thereof; the opposite edges of said extension extending generally convergently from said body portion and the end portion of said extension remote from said body portion being adapted to be positioned between adjacent splices connecting adjacent ends of the wires of a pair of electrical cords in a two-wire circuit and to fully insulate such splices from each other when so positioned; said extension including a sheet of flexible waterproof material disposed between said end portion and said body portion; said extension and said body portion being adapted to be wrapped in one direction about a pair of such splices commencing from said end portion when the latter is in said splice insulating position, whereby said end portion and said splices will be enclosed within said sheet of waterproof material with the said latter sheet enclosed within said body portion and the opposite side edges of said body portion will engage the said wires extending outwardly from said end portion and from said sheet, said body portion having an adhesive thereon for adherently engaging such wires.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,191,544	Ruskin	Feb. 27, 1940
1,913,889	Kitsee	June 13, 1933
1,776,127	Miller	Sept. 16, 1930
1,642,514	Simons	Sept. 13, 1927