May 15, 1923. 1,455,744

H. I. DIAMOND

INSULATING TAPE

Filed Sept. 26, 1921

Fig. 1.

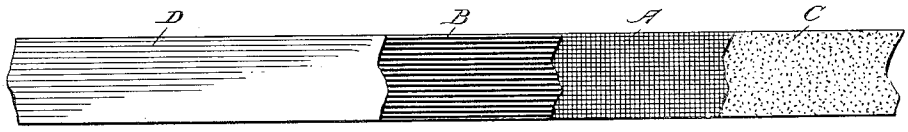


Fig. 2.

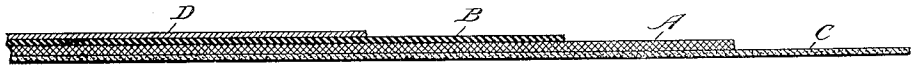
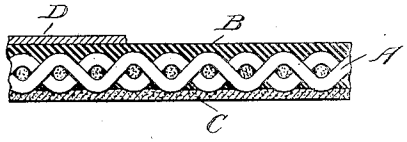


Fig. 3.



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UNITED STATES PATENT OFFICE.

HARRY I. DIAMOND, OF ATLANTA, GEORGIA.

INSULATING TAPE.

Application filed September 26, 1921. Serial No. 503,415.

To all whom it may concern:

Be it known that I, HARRY I. DIAMOND, a citizen of the United States, and resident of Atlanta, in the county of Fulton and State of Georgia, have invented certain new and useful Improvements in Insulating Tapes, of which the following is a specification, reference being had therein to the accompanying drawing.

It has been and still is common to apply to conductors insulating tape of rubber or other material of highly insulating character and to cover this tape with a strip of less adhesive material. It is always difficult or impossible for the inspector of the completed work to determine positively whether the inside insulating strip has been used, without at least partly unwinding the outer layer. This not only consumes time and makes inspection difficult, but sometimes impairs the quality of the joint so inspected because the outer layer of tape does not always adhere properly the second time. This insulating tape is often stretched to such an extent that it becomes too thin and in some cases is broken entirely, thus causing imperfect insulation. The tape first applied to the joint must be sufficiently adhesive to stick to itself and to the wires, and yet be strong enough to withstand the strain of wrapping and winding around the joint.

In practice it is difficult or impossible to find an insulating material that in itself offers these two qualities of adhesion and strength to the proper degree. If adhesive enough to stick properly it has not the proper strength; if strong enough to be wound tightly and snugly around the joint it will not afford the proper adhesion. In consequence, the inside insulating tape as now commonly used (ordinarily a rubber tape) is in the nature of a compromise and does not properly perform either function. To make it as strong as it should be to withstand the strain of winding it cannot be made as plastic or adhesive as it should be. From lack of plasticity it often dries out and crumbles after it has been applied to the joint, and sometimes breaks either in applying it, or afterwards, thus rendering the insulation imperfect.

In my unitary tape three elements are so combined as to give all of them the advantages that each of them singly possesses. The fabric gives the needed strength so that the tape can be wound as tightly around the joint as is necessary. The insulating and adhesive materials on the two faces of the tape can be made of any required degree of softness or plasticity, giving any degree of adhesion required and offering resistance to drying out or crumbling. Yet, because of the fact that these elements are made into one single unitary tape there is no loss either of strength or of adhesion, nor possibility of stretching to undue thinness.

The object of this invention is to provide such a single tape which shall be a better, simpler and less expensive tape than many other tapes of the same general kind.

In the accompanying drawings,

Fig. 1 shows one of the broader faces of a tape made in accordance with my invention, successive layers being broken away to expose, in each case, the next succeeding layer.

Fig. 2 is a longitudinal section of the tape of Fig. 1.

Fig. 3 is a similar fragmentary section, greatly enlarged.

In these figures, A designates a strip of nearly non-detachable fabric and B a corresponding layer strip of rubber or any approved highly adhesive and highly insulating material united to one face of the fabric, preferably under pressure, and C a layer or coating of harder and less adhesive material applied to the opposite face of the fabric. To the outer face of the highly adhesive layer B is applied a protecting strip D of tough pliable material to which either adhesive layer will stick but not so strongly that it cannot be readily detached by a moderate pull. When the tape is rolled, this strip prevents the contact of either adhesive layer with the other layer, with the hands, or with other foreign bodies. When a portion of the tape is wanted for use, a convenient length is unwound and the protecting layer is stripped from the layer B, and the bared portion is then applied to the conductor in the usual way.

In this tape there, is, then, a fabric strip intimately united on one face, to a layer of highly adhesive and highly insulating material which has been pressed into intimate contact with the exposed surfaces of the constituent threads and into all interstitial spaces, even passing at many points entirely through the fabric, and further, there is a materially different and less adhesive layer of material which similarly adheres to the

threads and also unites with countless small portions of the coating applied to the other face. The use of the protecting layer is a matter of convenience, yet practically it is almost indispensable since without it the tape is inconvenient in handling, storing, and applying.

Obviously, this tape combines the functions of the two tapes such as were mentioned at the outset, with the advantage that the two are pressed into contact at every point when they are flat, ensuring union of the two throughout, instead of relying upon pressure of the fingers when the outer layer is being applied; and the combined tape is applied in less than half the time required to apply the two separately.

It is further plain from the mode of making, that the combined tape is practically a solid without voids, and is therefore better in practical use than a tape such that slight abrasion or injury may allow water to enter or current to escape. Furthermore, I have found that when made in this way, with the two opposite coatings united to each other at innumerable points, the harder layer may be applied directly to the fabric without danger of separation, no intermediate highly adhesive layer being needed. This feature makes a very material reduction in cost of manufacture, and might itself form a basis for a patent.

Preferably the adhesive layers are of radically different colors, e. g., black and red, and when applied one color forms a visible spiral line in the body of the other color and the inspector by glancing at the edge of the applied tape can determine that this combination unitary tape has been used, thus making unnecessary any unwinding of the joint and so leaving the joint perfectly insulated and intact.

What I claim is:

1. A tape having as practically inseparable constituent parts, a fabric strip, a relatively soft layer of material both highly insulating and highly adhesive directly engaging one face of the strip, and a harder, less adhesive layer in direct engagement with the opposite face of the strip.

2. An insulating tape consisting of a fabric layer having on one face a relatively hard, moderately adhesive layer of rubber or the like and on the other face a softer and more adhesive layer, the adhesive material filling practically all recesses and interstices in the fabric thereby forming unitary tape substantially without void spaces.

3. In a unitary insulating tape adapted to replace a distinct insulating tape enveloped, in the common way, by a softer more adhesive tape, the combination with a fabric strip, of a layer of pliable, adhesive insulating material on one face of the fabric and intimately engaged with the exposed surfaces of the constituent threads, and a layer of softer, more adhesive material similarly united with the opposite face of the fabric strip.

4. A tape having as practically inseparable constitutent layers a fabric strip, a soft layer of material both highly adhesive, and highly insulating directly engaging one face of the strip, and a relatively hard, less adhesive insulating layer directly engaging the opposite face of said strip, and a tough, pliable layer slightly adherent to one of the faces; said adhesive layers filling the interstices of the fabric and engaging each other and with the fabric strip forming a unitary ribbon-like solid free from void spaces.

5. A unitary insulating tape adapted to replace the common superposed distinct tapes and consisting of a fabric strip having on one face a layer of adhesive insulating material intimately engaged with one face of the fabric and entering its interstices and on the opposite face a layer of analogous harder material similarly engaging both the said face and the material entering the strip from the opposite side.

6. The combination with a fabric strip, of a layer of pliable adhesive insulating material on one face of the fabric strip and adhesively engaged with all the exposed surfaces of the constituent threads of that face while entering the interstitial spaces therein, a layer of harder more adhesive material similarly engaged with the opposite face, and a tough, pliable protecting layer slightly adhering to the exposed face of one of the adhesive layers.

In testimony whereof I hereunto affix my signature.

HARRY I. DIAMOND.