

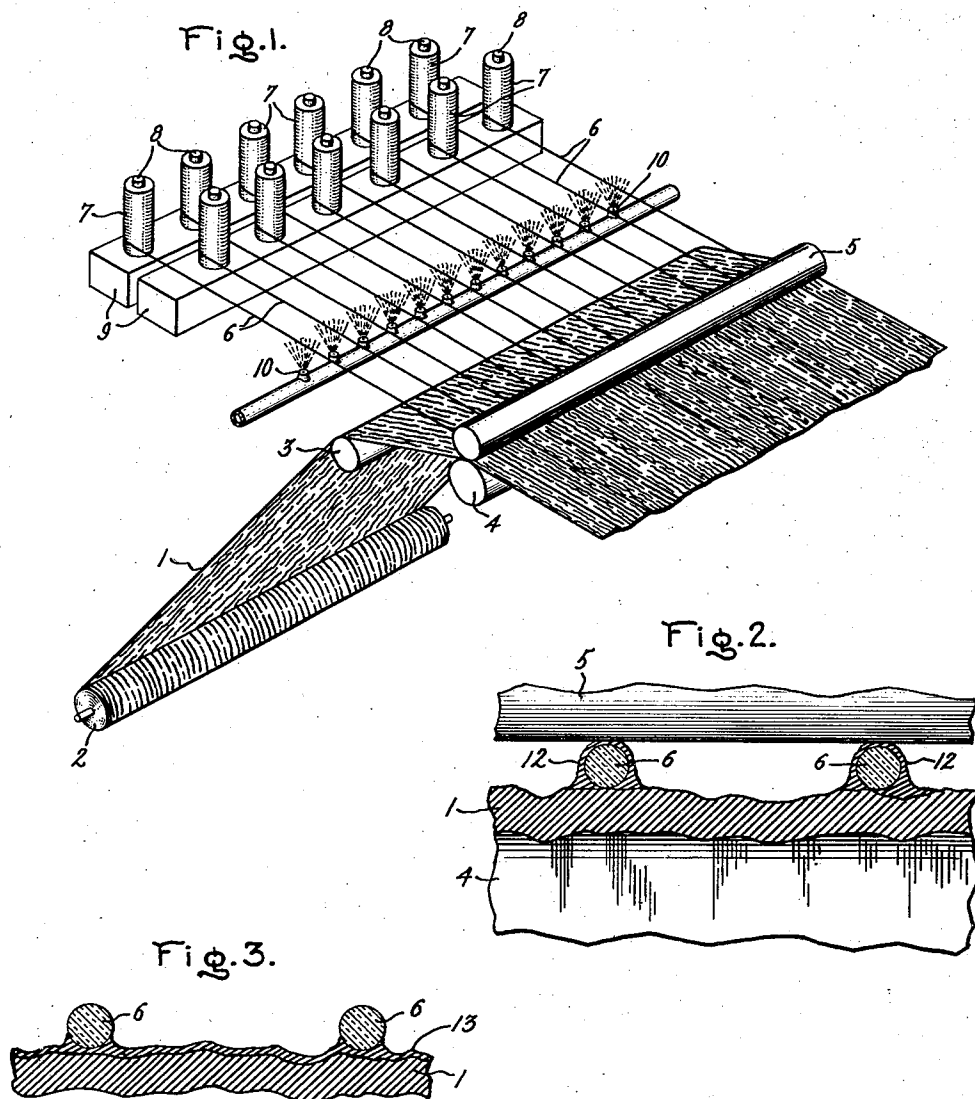
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GLASS FIBER REINFORCED CREPE PAPER

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GLASS FIBER REINFORCED CREPE PAPER

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This invention relates to crepe paper. More specifically it relates to crepe paper tape or sheet reinforced with adherent glass fibers which are arranged substantially parallel to the creping in such paper.

Heretofore glass and other types of fibers have been used in reinforcing composite sheet structures. The fibers are inserted at random or in a preconceived fashion between the laminae making up such structure. Such structures have been used to augment or increase the tensile strength of the sheets to which they are applied, such increased strength manifesting itself parallel to the direction of orientation of the fibers.

While reinforced paper of the above types finds many applications where increased strength is indicated, it is unsuitable in applications where both strength and elasticity or the ability to conform to irregular shapes is required as in wrapping coils with tape. In such applications considerable strength is required for instance along the length of the tape used while elasticity and an ability to conform to an irregular shape or for lapping is desirable in a direction perpendicular to the length of the tape. Heretofore, such a combination of strength and flexibility has been found only in fabric or textile tapes.

It is an object of this invention to provide a paper tape or sheet having favorable strength in one direction and elasticity perpendicular to this direction.

It is a further object of the present invention to provide a process of manufacture for crepe paper sheet or tape having desirable lengthwise strength and lateral stretch and conforming qualities.

Other objects will become apparent and the invention better understood from a consideration of the following description and the drawing in which Fig. 1 illustrates a method of and apparatus for making the tape of the present invention; Fig. 2 is an end elevation view of a portion of the reinforced crepe paper between the pressing rollers showing the arrangement of adhesive coated glass fibers thereon and Fig. 3 is similar to Fig. 2 except that the fibers are embedded in an adhesive coated paper.

It has been found that a tape or sheet having good strength in one direction and elasticity in another may be very simply manufactured by affixing continuous glass fibers to crepe paper tape or sheet substantially parallel to the creping of such paper.

More specifically it has been found that a

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sheet or tape having increasing strength in one direction and desirable elasticity in a direction perpendicular to the other direction may be simply made by cementing glass fibers to crepe paper so that the fibers are substantially parallel to the creping of the paper.

Reference may be had to the drawing for a detailed explanation of the present invention.

In Fig. 1 which depicts a method of and apparatus for making the reinforced crepe paper tape or sheet of this invention a sheet 1 of crepe paper is shown as being continuously unwound from roll 2 by any suitable means, passed over guide roller 3 and fed between support roller 4 and pressure roller 5. The sheet 1 of paper, which is creped in the direction of motion, may be of any suitable width which after reinforcing may, if desired, be slit or cut lengthwise to provide a tape of the desired width having the creping parallel to its length. Glass fibers 6 may be fed on the paper sheet 1 parallel to the creping from spools 7 which are so mounted on spindles 8 and supports 9 that the movement of the paper sheet 1 between support roller 4 and pressure roller 5 will cause the glass fibers 6 to be withdrawn from the spools 7, as shown. At some point between the spools 7 and pressure roller 5 the continuous glass fibers 6 are coated with an adhesive by any convenient means. For example, the adhesive may be sprayed on the fibers from nozzles 10, as shown in Fig. 1. It may also be brushed on or alternatively the fibers may be dipped in the adhesive or other conventional means of coating used. It is also possible to have roller 5 in the form of a hollow cylinder containing the adhesive and having holes in the wall thereof for feeding adhesive to the glass fibers as they are fed to the sheet.

The coated glass fibers 6 are fed between the support roller 4 and roller 5, the rollers being adjustable to firmly press the adhesive-coated fibers onto the crepe paper sheet 1. If it is desired to press the fibers 6 onto the sheet with more force than is afforded by roller 5, a second set of rollers similar to 4 and 5, may be added next in train after the rollers shown. After the glass fibers 6 have been pressed on the surface of the sheet 1, the adhesive may be cured or dried in any conventional manner suitable to the adhesive used. This may constitute a simple air dry or heat treatment among others. The reinforced crepe paper sheet may then be cut into tape as desired or used in sheet form.

In Fig. 2 is shown a partial end elevational view of a typical sheet made according to this invention as it is positioned between rollers 4 and 5.

The creped sheet 1 is reinforced by a number of glass fibers 6 each of which is coated with a layer of adhesive 12 which causes it to adhere to the sheet 1.

Alternative to the method of manufacture which includes coating the glass fibers 6 with a layer of adhesive is that of placing a layer of adhesive on the crepe paper sheet 1 prior to its contact with the glass fibers or covering the sheet with a layer of adhesive through holes provided in a cylindrical adhesive-containing roller to take the place of roller 5. This layer should be thick enough to adequately hold the glass fibers to the paper. In general a layer equal to about one quarter of the diameter of the fibers is sufficient for this purpose, though a thicker or thinner layer may be used.

In Fig. 3 there is shown an end elevational view of this alternative embodiment of the invention with crepe paper sheet 1, and glass fibers 6 embedded or held in place on the sheet by means of a continuous layer 13 of adhesive superimposed thereon.

The only restriction on the adhesive to be used in general applications is that it be elastic enough to withstand any slight lateral stress which may be placed on the glass fibers tending to displace them from side to side on the crepe paper sheet or tape while it is being drawn taut over the article to be wrapped. Any adhesive used in coating the entire sheet from which the reinforced sheet or tape is made should also be elastic enough to allow displacement of the creping in the paper to give a good lapping action. In those cases in which the sheet or tape is to be used for special purposes such as for insulating purposes, the adhesive should have dielectric properties which do not detract from the overall insulating qualities of the reinforced structure. In some applications it may be desirable to apply an adhesive which will hold the glass fibers in place but yet be amenable to curing in place on the article after wrapping. In this connection the sheet or tape may be coated with thermosetting plastic materials in addition to the adhesive if desired.

The number of glass fibers to be placed on the sheet material per unit width will vary with the strength of the crepe paper used and on the final strength desired. In general crepe papers of low tensile strength will require a greater number of glass fibers per unit width while stronger crepe papers will require a smaller number.

The sheet or tape of the present invention finds application in all uses wherein an economical paper of great tensile strength and lateral stretch or flexibility and lapping qualities is desired. It is particularly useful in wrapping electrical coils such as those used in armatures, transformers and other electrical apparatus.

Since certain changes other than those indicated may be made in applying my invention without departing from the spirit or the scope thereof, it is to be understood that this disclosure is to be taken as illustrative rather than limiting and that it shall include all changes obvious to one skilled in the art.

What I claim as new and desire to secure by Letters Patent of the United States is:

A composite tape product which is suitable for wrapping electrical coils and consists of an elongated sheet of paper having lengthwise creping and having adhesively affixed on a surface thereof a plurality of elongated glass fibers individually spaced apart from one another from edge to edge of said sheet in substantially parallel relation to the lengthwise creping of said paper, whereby said paper is given greater lengthwise strength than such paper has when unprovided with such fibers without loss of lateral stretch and capability of conforming with irregular surfaces.

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