

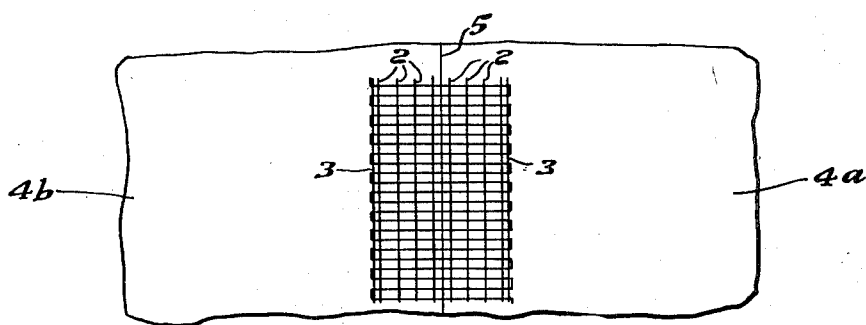
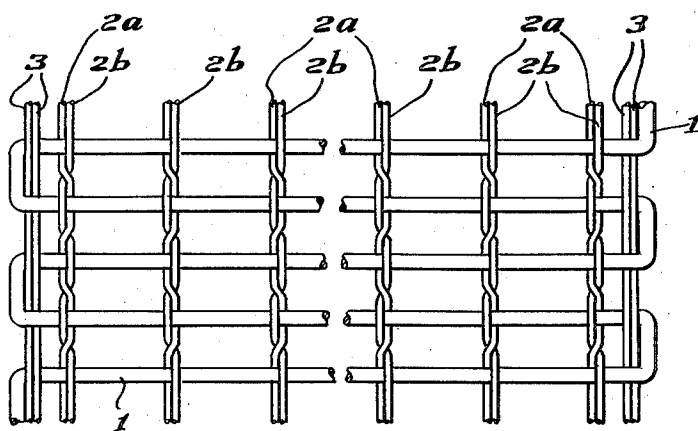
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TAPE AND CARPET JOINED THEREWITH

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*Fig. 1*



*Fig. 2*

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## TAPE AND CARPET JOINED THEREWITH

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This invention relates to pile carpets joined together by means of a tape applied to the backings of said carpets along the seam formed by the abutting edges thereof.

Previously, cotton tapes have been used for this purpose, and, although they have proven to be fairly satisfactory, they still have several objectionable features and lack properties which an ideal tape should possess.

It is, therefore, a principal object of this invention to overcome most of these objectionable features and provide the properties required, but lacking in the old types of tape.

The principal feature of the tape is that it has glass, instead of cotton, filling threads and cotton warp ends, finer, however, than those of the prior art; the whole tape being woven in an open weave and suitably sized.

Other objects and features of this invention will appear from the following description taken in conjunction with the accompanying drawing in which—

Fig. 1 is a diagrammatical plan view of the weave of the tape, on an enlarged scale;

Fig. 2 is a diagrammatical view of the tape applied to the backings of two abutting pieces of carpeting, on a reduced scale.

As illustrated in Fig. 1, the tape is composed of weft shots 1, pairs of warp ends 2a and 2b and selvage warps 3. The weft shots are glass fiber threads and are not more than .020 inch and not less than .005 inch thick. The warp ends and the selvage warps are composed of cotton or other suitable fibrous material and are no greater than .010 inch thick. The weft shots are woven with the warp ends in what is known in the prior art as a "leno" weave; that is, as viewed in Fig. 1, the warp ends 2a pass under each weft shot and cross over the warp ends 2b between adjacent weft shots, and the warp ends 2b pass over each weft shot and cross under the warp ends 2a between adjacent weft shots. The selvage warps are preferably woven with the weft shots in a conventional weave, that is, first over one weft shot and then under the next weft shot. The leno weave employed in the tape produces a very secure interlocking of the component parts thereof, aids in preventing the weft shots from sliding along the warp ends and by the tightness of the twist restrains the warp ends from displacement, thereby maintaining the predetermined relative positions of the weft and warp threads.

The spaces or interstices between adjacent weft shots and warp ends are large enough to allow evaporation of solvents contained in the

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adhesive material, described hereinafter; but not so large as to be detrimental to the strength of the tape, which will withstand weftwise a strain up to 300 pounds per inch without yielding.

After weaving, the tape is sized. The sizing is composed preferably of a compound of polyvinyl butyral, although compounds of polystyrenes or polymethacrylates may also be used, but must be in any event compatible with the medium, if any, employed on the carpets for binding the tufts therein. For instance tapes sized with the above mentioned compounds have been successfully used in the joining of carpets coated with nitrocellulose or with other binding material. The sizing gives enough stability to the tape to keep it flat when free and relaxed, aids in maintaining the wefts and warps in their predetermined relative positions, and provides a suitable surface on the glass fiber weft shots to which the adhesive material is firmly secured. The tape, after the sizing has been applied, is preferably approximately .015, but no more than .030 inch thick.

It will be readily understood that many variations may be employed in weaving the tape. For example, the weft shots may be woven in groups of two or more on either side of each interstice. The selvage warps may also be decreased or increased in number and may be woven in a "leno," instead of a conventional, weave.

Referring to Fig. 2, two preferably cut pieces of carpeting 4a and 4b, pile-face down, are positioned together so that their abutting edges form seam 5. An adhesive material, which may be a vinyl resin dissolved in a solvent or a latex-type adhesive, is spread on the back of the abutting carpets along the seam in a strip as wide as the tape. The sized tape is then laid and pressed into the adhesive material along the seam. A hand scraper is then drawn along the surface of the tape to spread evenly any excess adhesive material that comes through the interstices of the tape.

In the cases in which the tape with the adhesive material is applied with heat and pressure, pressures up to 10 pounds per square inch and an ironing temperature as high as 400 to 500° F. for 30 to 10 seconds respectively may be used. The advantages of these high temperatures under pressure are that the time required for uniting the pieces of the carpeting is greatly reduced and that, as the glass weft shots are much better conductors of heat than those of a cotton tape, the softening and flow of the adhesive material is relatively very quick.

The resulting combination of the tape and the two pieces of carpeting is as diagrammatically illustrated in Fig. 2. The tape lies longitudinally parallel to the seam 5 with the selvages 3 lying left and right equi-distant from the seam. The weft shots 1 lie substantially at right angles across, and the warp ends 2 parallel to, the seam.

A notable feature of this invention is that the warp ends 2 may be weakened or even severed when heat and pressure are applied to secure the tape to the carpeting. This is not a detriment, but actually an advantage, because the entire strength of the tape depends on the glass weft shots, which are not affected by the heat. The advantages are that greater heat may be applied in processing the tape into the adhesive material than with an all cotton tape and that the joined pieces of carpeting, although inseparable at the seam in the direction of the weft shots, may be stretched along the seam the same amount as in the body of the carpeting, and are so mutually adjustable in the warpwise direction of the tape that the pattern or design, if any, of the two pieces, after the carpeting has been turned pile face up, may be brought into alignment.

Instead of spreading an adhesive material on the carpet, said material may first be applied to the tape, which is then secured to the carpet by heat and pressure as hereinbefore described.

The cotton base tapes of the prior art, which are typically of a leno weave, are approximately .045 inch thick and, when applied to the back of the seam of two abutting carpets they increase the thickness of the carpets at said seam to such an objectionable extent that they cause (1) shading of pile at the seam, (2) wear at the seam, and (3) puckering. The latter is caused by the fact that, when a carpet is rolled in the direction of the seams (as in the usual practice), the diameter of the carpet is greater at the seam than in the body of the carpet.

The tape of this invention is in practice only .015 inch thick, one third of the old types of tape. This reduction in thickness decreases the wear at the seam to an almost negligible amount and causes no noticeable shading of pile. The puckering, described above, is also materially reduced.

Both the tape of this invention and those of the prior art are applied to the carpet with an adhesive containing preferably volatile solvents. Seams made with the old cotton tape take from five to six hours to dry. This slowness is only in a minor degree due to the quality of the adhesive and solvents employed. The major difficulty is that a large quantity of adhesive must be used because of the thickness and the porosity of the former types of tape, trapping under the quick drying crust of the adhesive most of the solvents which then can only diffuse slowly to the surface before evaporation.

In the tape of this invention 30 to 40% less adhesive is used, because of (1) the reduced thickness of the tape wherein the very fine cotton warp ends absorb relatively little adhesive and (2) the use of the glass filling threads which are not absorbent and do not trap any solvents. The result is that the tape of this invention even without the application of heat greater than that used on the old cotton tapes dries 2 to 3 hours quicker than the latter, a factor of great importance and long sought for in the art.

Carpets joined together by tapes of the prior art, when rolled and then unrolled, do not lie flat, and a long period of time elapses before

the carpet will lie evenly throughout its entire area, a fact very disturbing to the purchaser. The cause of this objectionable feature is the stiffness of the taped seam caused not only by the thickness of the tape, but also by the saturation of the cotton tape with the adhesive.

The tape of this invention increases the stiffness of the seam only slightly and unobjectionably because its thinness requires less adhesive resulting in a proportionately thinner and more flexible dried adhesive film at the seam.

Most carpeting is installed under tension from wall to wall, and the seam is or should be stretched in the warpwise direction of the tape as much as the body of the carpet. Seams made of cotton tape saturated with the usual layer of adhesive cannot be so stretched.

The tape of this invention is very strong fillingwise (being composed of glass threads) and weak warpwise (being composed of cotton threads, merely strong enough to hold the filling ends in position). The weak cotton warp ends may break during installation, and thereby all resistance to stretching is eliminated in the warpwise direction of the tape. This breaking, however, does not reduce the strength of the seam, as all the required strength of the tape depends upon the glass filling ends which cross the seam.

Atmospheric humidity, washing and shampooing cause the yarns on the back of carpets to stretch and contract. When this stretching or contracting occurs unevenly throughout the carpet, puckers and buckles result. Seams composed of cotton tape saturated with adhesive do not respond to expansion and contraction as does the body of the carpet, thereby causing said puckers and buckles.

The tape of this invention has greater response to the dimensional changes of the yarns on the back of the carpet because of the lesser amount of adhesive used and the weakness of the warp threads, thereby decreasing by a very substantial amount puckers and buckles caused by humidity variations, washing, shampooing or any other forms of moisture changes.

Although the cotton filling ends of the tapes of the prior art are strong enough to hold effectively the abutting edges of the carpeting together, they are approximately three times as thick as the glass filling ends of the tape of this invention and only approximately 40% as strong. In fact the latter are so strong and devoid of stretch that under extreme force the carpet structure will rupture or break rather than the seam. Also when the carpeting is installed under tension, if the adhesive in the old cotton tapes is not absolutely dry (a contingency which often occurs due to the difficulty the solvents incur in diffusing, as described hereinbefore), the cotton weft threads of that tape stretch revealing an unsightly opening at the seam between the abutting edges of the carpeting. In the tape of this invention there is absolutely no stretch fillingwise, and the above difficulty is entirely obviated.

Other advantages that the tape of this invention possess over those of the prior art are that greater heat may be applied to the former than to the latter, and also the heat is transferred more efficiently and more quickly throughout the tape of this invention than those of the prior art. The reasons for the existence of these two important advantages are that firstly not only can the glass filling ends withstand more heat than those composed of cotton, but also the cotton warp ends may be weakened or even severed during the application of the tape of this inven-

tion to the carpeting, because the cotton warp ends are no longer needed, having served their purpose which is merely to hold the filling ends in position before and during the initial part of the application of the tape to the carpeting; and that secondly the glass filling threads disperse the heat throughout the tape and into the carpeting more efficiently and more rapidly, because they are better conductors of heat than cotton filling ends.

Another advantage of the tape of this invention lies in its adaptability for joining carpeting in which a design appears in the pile face. The tape of this invention allows such carpet to be stretched one way or the other along the seam to align the pattern. This adjustable alignment is practically impossible of accomplishment in the cotton tapes of the prior art.

I claim:

1. A carpet comprising mutually abutting pieces of carpeting forming therebetween a seam, an openly woven, size tape extending warpwise along and weftwise across said seam, and an adhesive between and securing together said tape and the backings of said pieces, said tape being composed of fine glass fiber weft shots and pairs of fine fibrous warp ends, of which pairs one member of each crosses under said weft shots and between adjacent weft shots over the other member which crosses over said weft shots.

2. A carpet comprising mutually abutting pieces of carpeting forming therebetween a seam, an openly woven size tape extending warpwise along and weftwise across said seam, and an adhesive between and securing together said tape and the backings of said pieces, said tape being composed of fine glass fiber weft shots and fine fibrous warp ends interwoven with each other.

3. A carpet comprising mutually abutting pieces of carpeting forming therebetween a seam, an openly woven sized tape extending warpwise along and weftwise across said seam, and an adhesive between and securing together said tape and the backings of said pieces, said tape being composed of glass fiber weft shots and fibrous warp ends, both of which are no thicker than .01 inch and interwoven with each other.

4. A carpet comprising mutually abutting pieces of carpeting forming therebetween a seam, an openly woven, sized tape extending warpwise along and weftwise across said seam, and an adhesive between and securing together said tape and the backings of said pieces, said tape being composed of fine glass fiber weft shots not more than .020 inch and not less than .005 inch thick, and pairs of fine cotton warp ends each of which is not more than .01 inch thick, of which pairs one member of each crosses under said weft shots and between adjacent weft shots over the other

member which crosses over said weft shots, the overall thickness of said sized tape being less than .030 inch.

5. A carpet comprising mutually abutting pieces of carpeting forming therebetween a seam, an openly woven sized tape extending warpwise along and weftwise across said seam, and an adhesive between and securing together said tape and the backings of said pieces, said tape being composed of fine glass fiber weft shots and fine cotton warp ends interwoven with each other.

6. A tape adapted to join together adhesively mutually abutting pieces of carpeting forming therebetween a seam, comprising an open-weave reticulated narrow fabric having selvages at its longer edges and composed of fine non-stretchable glass fiber weft threads not more than .020 inch and not less than .005 inch thick, and, interwoven therewith, fine fibrous warp threads which are relatively weaker than said weft threads and each of which is not more than .01 inch thick, said tape having a sizing thereon, the overall thickness of said sized tape being less than .030 inch.

7. A tape adapted to join together adhesively mutually abutting pieces of carpeting forming therebetween a seam, comprising an open-weave reticulated narrow fabric having selvages at its longer edges and composed of fine non-stretchable glass fiber weft threads not more than .020 inch and not less than .005 inch thick, and, interwoven therewith, fine cotton warp threads which are relatively weaker than said weft threads and each of which is not more than .01 inch thick, said tape having a sizing thereon, the overall thickness of said sized tape being less than .030 inch.

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