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METHOD OF SEAMING VINYL-BACKED MATERIALS

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Fig. 1

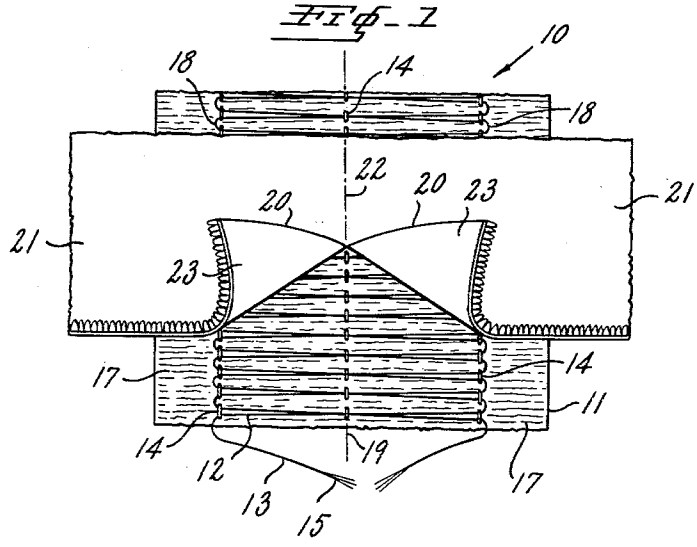
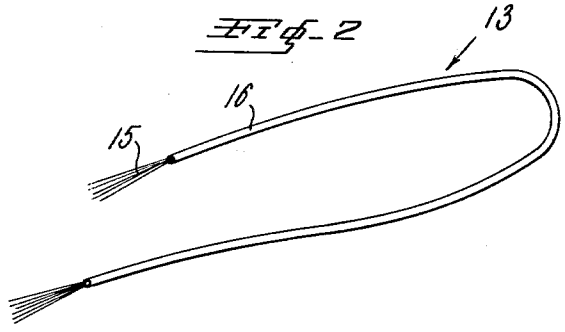


Fig. 2



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METHOD OF SEAMING VINYL-BACKED MATERIALS

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3 Claims. (Cl. 156—304)

This application is a division of our copending application, Serial No. 107,120, filed May 2, 1961, now abandoned.

This invention relates to carpet seaming tapes and more particularly to carpet seaming tapes comprising an extensible backing strip to which transversely extending lengths of continuous filament yarns are attached.

A carpet seaming tape of this general type was disclosed in U.S. Patent No. 2,727,295, issued to Paul D. Wright on December 20, 1955. This patent disclosed a tape in which untwisted yarns of low extensibility and high strength and formed of long or substantially continuous fine filaments are mechanically attached to a longitudinally extensible strip of material by parallel rows of stitches. Such a tape is well suited to seaming the lighter weight carpets.

Recently, however, there have been developed vinyl backed floor coverings for which a heat-sealable seaming tape was found desirable. Vinyls are normally difficult to adhere to, the adhesive bond generally being weaker than the vinyl material itself. Additionally, the adhesives which are available tend to cause staining in vinyl materials which is detrimental when considering carpets. It is also difficult to achieve constant adhesive bond strength because of operator differences, solvent drying conditions, age of adhesives or cements, etc. Furthermore, a considerable length of time must be allowed for evaporation of volatile solvents, which may be hazardous, before the carpet can be placed in use. Therefore, a seaming tape was required that would be free from these difficulties and which would also provide a reliable method of sealing.

Accordingly, it is an object of the present invention to devise a seaming tape for vinyl backed carpeting that can be used to join sections of such carpeting by known heat sealing methods.

It is a further object of the present invention to devise such a seaming tape of the general character of that disclosed in the above-mentioned Wright patent, No. 2,727,295. Such a seaming tape has to be inexpensive to manufacture and readily adaptable for the use desired.

In accordance with these objects we have invented a seaming tape for vinyl carpeting or for vinyl backed floor coverings comprising a strip of longitudinally extensible material, to which material yarns made of a plurality of substantially continuous filaments coated with a thermoplastic material are attached. Such yarns extend transversely of the strip in the manner characteristic of tapes of this class. The yarns may be attached to the longitudinally extensible strip of backing material by longitudinal extensible parallel rows of stitches, or they may be attached by heat and pressure to the extensible strip making use of the thermoplasticity of the coating.

The thermoplastic coating on the transversely extending yarns permits the tape to be heat sealed to the vinyl backing of the floor covering, thus to form a butt joint between the edges of two pieces of carpet that will be longitudinally extensible and contractable, but extremely secure against transverse separation. The yarns, accordingly, will be characterized by having high tensile strength

and low elongation, in order to resist the transverse forces to which the tape may be subjected in the seam.

The invention, its objects and advantages are further described in reference to the accompanying drawings, in which:

FIG. 1 is a top plan view of an example of a seaming tape embodying this invention, in which the method of using the tape for seaming together the edges of two pieces of vinyl backed carpeting is illustrated; and

FIG. 2 is a perspective view of the transversely extending yarns used in the tape.

Referring to FIG. 1, the tape **10** therein illustrated comprises a strip of longitudinally extensible material **11**, to which transversely extending lengths **12** of thermoplastic covered yarns **13** are attached by longitudinal rows of stitches **14**. The yarn **13** is formed from a plurality of substantially continuous, relatively inextensible filaments **15**, which filaments preferably are made of glass, although other materials having the necessary high tensile strength and low extensibility may be used.

The multi-filament yarns **13** are individually coated with a thermoplastic material **16**. (See FIG. 2.) Preferred coating materials are plastisols of polyvinyl chloride or copolymers thereof, although other thermoplastics compatible with, and having similar softening temperatures as, the vinyl carpet backing material to which the seaming tape **10** is applied may be used. The preferred material may be described in more detail as a vinyl chloride resin, in which category we include polyvinyl chloride resin itself, as well as copolymers of vinyl chloride with a minor proportion (e.g., 1%to 40%) of another copolymerizable monoethylenically unsaturated monomer, such as vinyl acetate, vinylidene chloride, diethyl maleate or the like, as well as mixtures of polyvinyl chloride resin wih the aforementioned copolymers. Furthermore, it is possible to use both a plasticized polyvinyl chloride resin, or a plastisol of vinyl chloride. A plasticized polyvinyl chloride would be used with extrusion methods of coating filaments, while a plastisol vinyl coating would be used in the manufacture of coated filaments by dipping methods. A vinyl plastisol formulation found suitable is as follows:

Ingredients:	Parts by weight
Polyvinyl chloride	20
Copolymer of PVC and diethyl maleate (98–2)	80
Plasticizer—dicapryl phthalate	85
Plasticizer—unsaturated naphthenic hydrocarbon	50
Vinyl stabilizer—organic cadmium compound	3
Filler—calcium carbonate	50
Wetting agent—lecithin	2

A coating 0.004 to 0.006 inch thick has been found to work satisfactorily. It should be recognized that there is virtually no upper limit to the thickness of coating useable on the yarns, but the minimum thickness should be 0.004 inch, with a preferred minimum being 0.006 inch.

The longitudinally extensible backing strip **11** is preferably made of a porous non-woven fabric material, the type known as a uni-directional fabric having been found to be the most satisfactory. The fibers **17** in the porous uni-directional fabric preferably run parallel to the thermoplastic coated yarns, that is, in the transverse direction of the tape. The fibers **17** may themselves be made of a thermoplastic material.

When the fibers **17** in the uni-directional non-woven fabric strip run parallel to the thermoplastic coated yarns **13**, there is absolutely no force opposing longitudinal movement of the carpet material. Also when seaming circular seams or irregular inserts in the carpet, it would be very difficult to apply the tape smoothly around the

contours of the seams where the fibers **17** in the non-woven strip **11** run longitudinally of the tape, or perpendicularly to the thermoplastic covered yarns **13**. However, where they run parallel to the direction of the yarns, that is, in the transverse direction of the tape, it is easy to seam even a very tight circle with the tape, thus alleviating the necessity of cutting short lengths of tape to seam a circular insert. A uni-directional non-woven fabric suitable for use as a material from which the strip **11** can be made is sold under the brand name "Viskon" and is manufactured by Chicopee Mills.

The rows of stitches **14** are made of rayon, although other fibers, or even thermoplastic fibers, can be used. In the 1½ inch wide tape illustrated in FIG. 1, three such rows **14** are used, two where the yarns **13** form loops **18** near the marginal edges of the strip **11** and one running down the centerline **19** of the tape.

It should be understood that the coated yarns **13** may be held in place on strip **11** by means other than stitching. For instance, they may be attached by use of adhesives or by the adhesion inherent in the thermoplastic coating **16** itself. In the latter case, a very light application of pressure and heat to the coated yarn will cause it to adhere to the backing strip **11**, providing the strip does not have a release coating itself.

FIG. 1 illustrates use of the tape **10** for securing the edges **20** of two pieces of vinyl backed carpet **21** together. The edges **20** of the carpet **21** are butted together and laid down onto the tape **10** along the centerline **19** thereof, thus to form a seam **22** in the carpet along such line. Application of heat and pressure with any of several well-known means seals the thermoplastic coating **16** on the yarns **13** to the vinyl backing **23** of the floor covering. The vinyl of the carpet backing strikes through the porous non-woven backing strip **11**, indicating proper adhesion between the two materials. It should be noted that the vinyl backing **23** does not itself seal the edges **20** of the two pieces of carpet together. Rather, it serves to indicate when the joining is satisfactorily completed. As the hot vinyl oozes through the porous backing, it causes strip **11** to become shiny, filled with vinyl, and to change its color to that of the backing **23**. When this occurs, it signals the completion of a satisfactory seam.

The high tensile strength of the glass fibers **15** and the low extensibility characteristic of this material prevent any transverse separation along seam **22**. Likewise, the longitudinal extensibility of the tape **10** produces a floor covering free from irregularities and of smooth and even appearance. The longitudinal extensibility of the strip **11** permits the marpeting to be stretched lengthwise without

rupturing the tape **10**. The seam can also contract longitudinally as the carpet strinks. Yet the substantial inextensibility of the yarns **13** prevents the seam **22** from opening up.

While the preferred form of this invention has been described with respect to a carpet seaming tape, it should be recognized that a seaming tape of the type described could also be used with any vinyl backed material, such as a vinyl coated fabric, or even with unsupported polyvinyl sheet materials, either flexible or rigid. It should be further understood that changes may be made without departing from the spirit of the invention and that it is intended to cover all such changes coming within the scope of the following claims.

Having thus described our invention, what we claim and desire to protect by Letters Patent is:

1. The method of seaming sheet materials having vinyl backings, comprising the steps of placing two edges of respective sections of said sheet material to be seamed in abutting juxtaposed relation to each other, applying to the vinyl backing along and in bridging relation to the butt joint between said edges a longitudinally extensible porous non-woven fabric tape having relatively inextensible filamentary strands individually coated with a thermoplastic material compatible with vinyl attached thereto in transverse relation to said tape and so as to extend across said butt joint between said edges, applying heat and pressure to said sheet material sections and said tape along said butt joint sufficiently to seal said thermoplastic material to said vinyl backing, and maintaining said heat and pressure until said vinyl backing strikes through said tape to indicate completion of the seam.

2. The method of claim **1**, in which said heat and pressure are maintained until said vinyl backing fills said porous tape sufficiently to cause the same to change its color to that of said vinyl backing.

3. The method of claim **1**, in which said heat and pressure are maintained until said vinyl backing fills said porous tape sufficiently to cause the same to become shiny.

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