Sept. 16, 1941. R. G. KNOWLAND 2,255,890

FLOOR COVERING MANUFACTURE

Filed Dec. 22, 1938

Fig. 1.

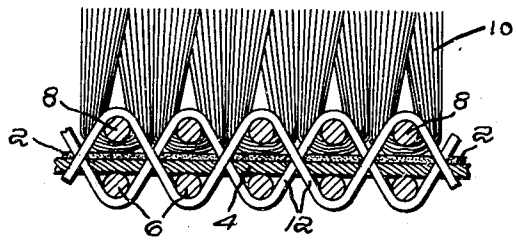


Fig. 2.

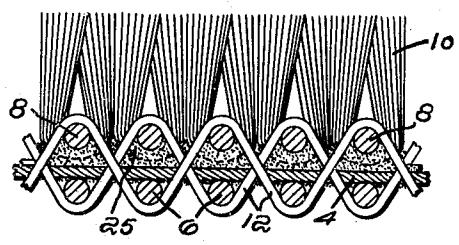


Fig. 3.



Fig. 4.

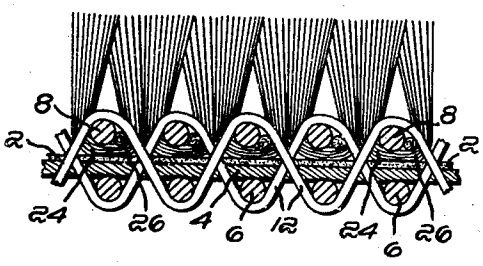
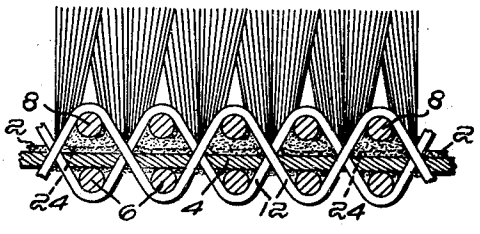


Fig. 5.



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Patented Sept. 16, 1941

2,255,890

UNITED STATES PATENT OFFICE

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FLOOR COVERING MANUFACTURE

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Application December 22, 1938, Serial No. 247,283

5 Claims. (Cl. 28—1)

This invention relates to pile floor coverings such as carpeting and is particularly concerned with a construction wherein the loops of the pile yarns and backing threads are cemented together so that, when the carpeting is cut, the pile and the threads adjacent the cut edge will remain intact.

Present styles in pile floor coverings frequently necessitate cutting the fabric and handling it after it has been cut. Thus, it is common to make imitation broadloom rugs or carpeting by assembling strips of pile fabrics having cut edges. Frequently it is desirable to cut out a portion of a pile floor covering and substitute a fabric of a different weave or color to produce an ornamental design. It is common to cut pile carpeting to fit oddly shaped floor areas.

The necessity for so handling and using pile fabrics with cut edges has presented a problem, in that not only the backing threads, but particularly the pile tufts, adjacent the cut edge, ravel easily. It has been proposed heretofore to incorporate adhesives in the fabric to secure such cut edges. A serious difficulty has been that the usual pile fabrics are so closely woven that the pile loops are not reached by adhesives applied externally to the backing fabric. In an effort to remedy this difficulty, it has been proposed to employ special weaves for fabrics that are to be cut, such as weaves in which the bights of the pile tuft loops are carried through the backing fabric and are thereby rendered accessible to the external application of adhesive. That expedient, however, is unsatisfactory because it is limited to fabrics that are woven in that particular manner.

The object of the present invention is to provide a method of adhesively securing pile tuft loops and backing threads against raveling after cutting which is adapted for use with any of the conventional types of weave. To that end I have found that these elements can be securely cemented together if the bights of the pile tufts encircle a holding weft of non-plastic material such as cotton, jute, or the like, and if the bights are adhesively secured not only to that weft but also to the non-plastic binder or stuffer warps contiguous to the bights. To dispose the adhesive in that position with relation to the tuft bights and to the non-plastic wefts and warps, I combine an adhesive liberating material with the usual non-plastic or fiber threads to form one or more sets of composite threads either of the warp or weft or of both. Or the adhesive liberating material may be in the form of warp threads, preferable in addition to and woven together with the usual stuffer warps.

In the drawing:

Fig. 1 is a warpwise section of a pile fabric embodying my invention;

Fig. 2 is a view corresponding to Fig. 1 showing the fabric after treatment with solvent;

Fig. 3 is a perspective view of a composite thread which may alternatively be employed;

Fig. 4 is a warpwise section of a modification wherein plasticizable material is interwoven both as warp and as weft; and

Fig. 5 is a view corresponding to Fig. 4 showing the fabric after treatment with solvent.

In making a fabric in accordance with my invention I prefer to employ threads of plasticizable material, such as cellulose acetate, in conjunction with the usual fiber stuffer warps. In such case I preferably insert the plastic threads above the stuffer warps in the same heddles. As shown in Fig. 1 the plastic warps 2 would appear in the fabric along side of, or on top of, the usual non-plastic stuffer warps 4. The fabric is completed by the wefts 6 and 8, around the latter of which the pile tufts 10 are looped, the whole being tied together by the binder warps 12.

Alternatively, I may employ a composite thread of the nature shown in Fig. 3 composed of a strand 20 of cotton, jute or the like and strands 22 of plasticizable material, such as cellulose acetate, wrapped around it. That material is desirable because it imparts a smooth and slippery quality to the composite thread which facilitates its use either as warp or weft or both. I may make a composite thread by coating the fiber thread with such plasticizable material.

After the fabric has been woven with either the separate plasticizable thread of Fig. 1 or the composite thread of Fig. 3 it is subjected, as indicated in Fig. 2, to the necessary treatment for plasticizing the cellulose acetate, as by the application of a solvent consisting of a mixture of 95% ethylene dichloride and 5% ethyl alcohol. The cellulose acetate will thereby be so softened and dissolved that it will flow into the interstices between the non-plastic threads of the backing and between those threads and the bights of the pile loops. This is indicated at 25 in Fig. 2.

The plastic material is allowed to set and harden and thereby to cement together the threads of the backing and the bights of the pile loops within that backing. In the fabric, in which warp threads of plasticizable material have been woven with the stuffer warps, that material serves most

effectively to cement the bights of the pile tufts to the fiber stuffer warps.

This method of introducing the adhesive and cementing together the constituent elements of the pile fabric obviates the difficulties heretofore encountered in attempting impregnation by external application of the adhesive. It insures the penetration of the adhesive into the interstices between the elements of the fabric precisely where it is needed to cement those elements firmly together so that when the fabric is cut, no matter in what direction, the danger of fraying and raveling is obviated or reduced to a minimum. Also, this method is applicable to any sort of pile fabric, no matter how closely woven, and is not limited to fabrics in which the bights of the pile loops extend through the backing fabric.

Other suitable adhesive liberating materials similar to cellulose acetate can, of course, be used. If desired, a heat softenable material may be employed and it may be combined with the cotton or jute thread as a coating thereon rather than by twisting strands together as above described. For example, a heat softenable "Tornesit" may be used, consisting of a mixture of 40% solids comprising 15 parts of chlorinated rubber, 10 parts resin and 10 parts dibutyl phthalate. A composite thread may be formed by coating a thread with "Tornesit" and allowing it to harden prior to weaving. After weaving, the adhesive is caused to flow by the application of heat.

In practice I have effectively employed, as shown in Figs. 4 and 5, a composite thread of jute 8 wrapped in cellulose acetate 26 as the weft introduced within the loops 24 of tuft and other strands 2 of cellulose acetate as stuffer warps or in addition to the usual cotton stuffers and threaded therewith through the harness and reed. As before stated, this material is then plasticized by the use of solvent as indicated in Fig. 5.

I claim:

1. The method of cementing together the component parts of a pile fabric floor covering which consists in interweaving with the non-plastic warps and weft of the backing fabric warp threads of plasticizable material to dispose the latter contiguous to the pile tuft loops, treating the woven fabric to plasticize the said plasticizable material to cause it to flow into the interstices between the bights of the tuft loops and the warp and weft threads, and subsequently hardening the plasticized material whereby the warp and weft threads and the bights of the tuft loops are securely cemented together and raveling of a cut edge is prevented.

2. The method of cementing together the component parts of a pile fabric floor covering which consists in forming a set of composite backing fabric threads by twisting together a strand of a non-plastic material, such as cotton, jute or the like, and a strand of a plasticizable material, weaving the pile fabric with a set of such composite threads employed as warp, treating the woven fabric to plasticize the said plasticizable material to cause it to flow into the interstices between the bights of the tuft loops and the warp and weft threads, and subsequently hardening the plasticized material whereby the warp and weft threads and the bights of the tuft loops are securely cemented together and raveling of a cut edge is prevented.

3. The method of cementing together the component parts of a pile fabric floor covering which consists in interweaving with the backing fabric warps of solvent plastic material threaded through the harness and reed with non-plastic warps such as cotton, jute or the like, treating the woven fabric with a solvent to plasticize the said plasticizable material to cause it to flow into the interstices between the bights of the tuft loops and the warp and weft threads and subsequently hardening the plasticized material whereby the warp and weft threads and the bights of the tuft loops are securely cemented together and raveling of a cut edge is prevented.

4. The method of cementing together the component parts of a pile fabric floor covering which consists in interweaving with the backing fabric stuffer warps of solvent plastic material threaded through the harness above the non-plastic stuffer warps, treating the woven fabric with a solvent to plasticize the said plasticizable material to cause it to flow into the interstices between the bights of the tuft loops and the warp and weft threads and subsequently hardening the plasticized material whereby the warp and weft threads and the bights of the tuft loops are securely cemented together and raveling of a cut edge is prevented.

5. The method of cementing together the component parts of a pile fabric floor covering which consists in interweaving, with the non-plastic warps and weft of the backing fabric, warp and weft threads of plasticizable material to dispose said material contiguous to the pile tuft loops, treating the woven fabric to plasticize the said plasticizable material to cause it to flow into the interstices between the bights of the tuft loops and the warp and weft threads, and subsequently hardening the plasticized material whereby the warp and weft threads and the bights of the tuft loops are securely cemented together and raveling of a cut edge is prevented.

RICHARD G. KNOWLAND.