

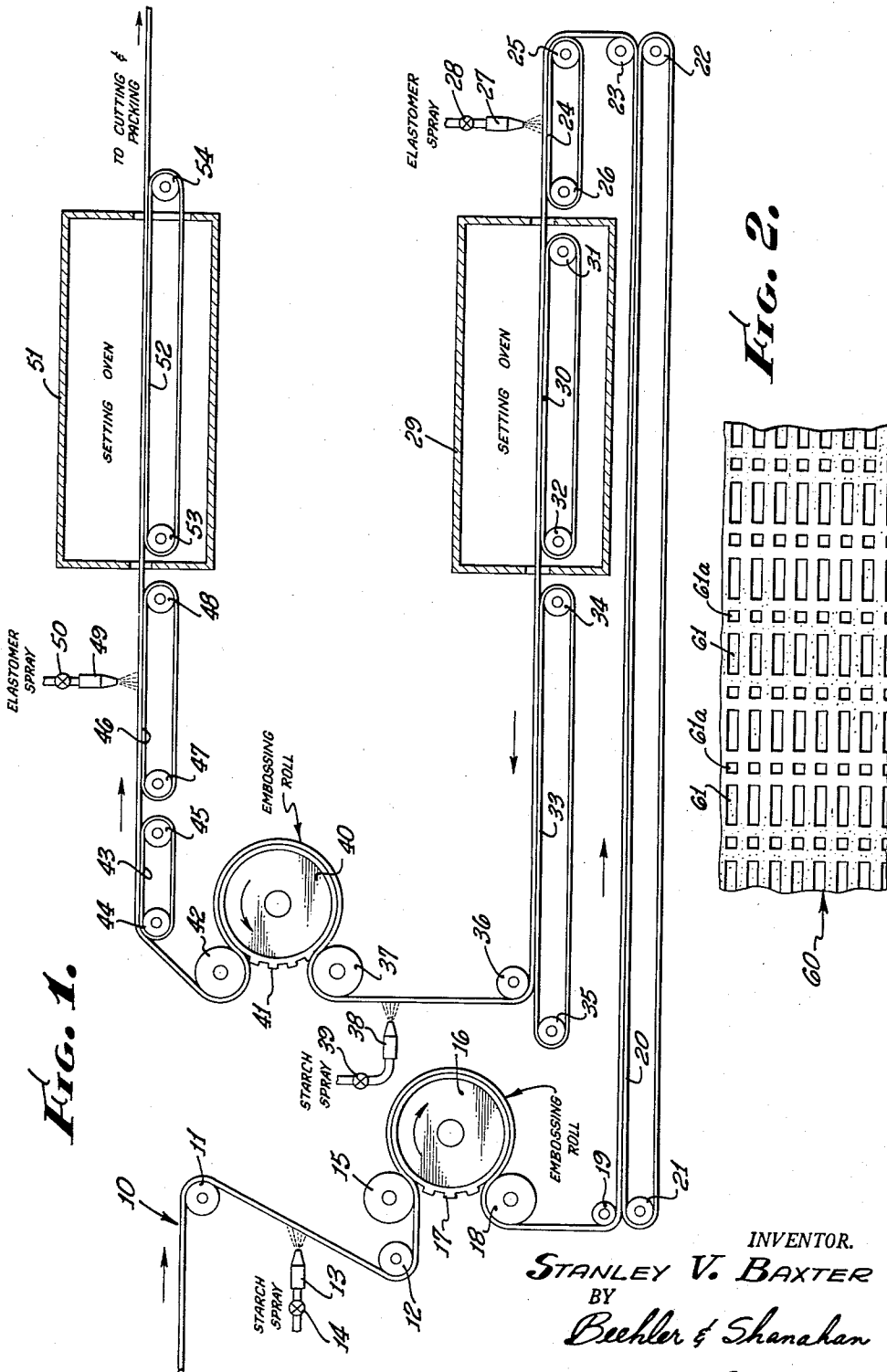
Feb. 14, 1961

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EMBOSSED RUG CUSHION AND METHOD
OF PRODUCING THE SAME

2,971,857

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2 Sheets-Sheet 1



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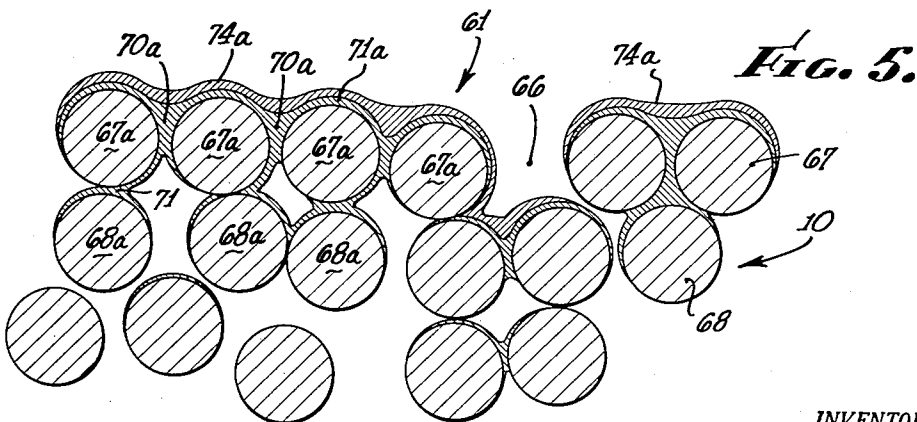
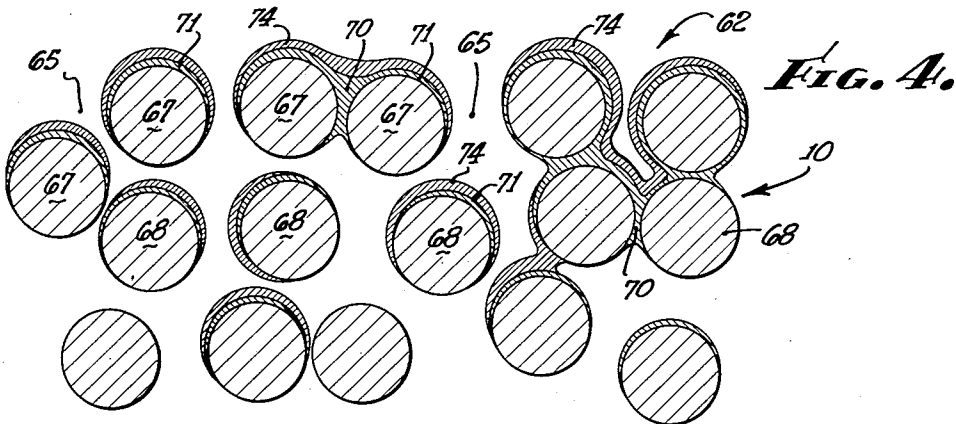
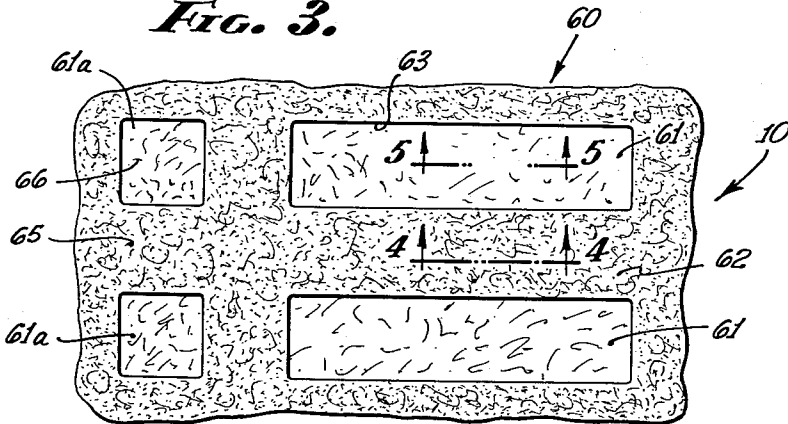
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FIG. 3.



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EMBOSSED RUG CUSHION AND METHOD OF PRODUCING THE SAME

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21 Claims. (Cl. 117—10)

This invention relates to floor covering material and has special reference to a rug cushion in particular which is especially well adapted for installation underneath rugs and carpets to improve the cushion effect of the rug or carpet overlay.

This is a continuation-in-part of my two copending applications, Serial Numbers 723,426, now pending, and 723,598, now abandoned, both filed on March 24, 1958.

The practice of making use of cushions beneath rugs and carpets has been well established and widely used for a considerable number of years. By far the great majority of rug cushions comprise mainly a needled or matted fiber sheet of a mixture of inexpensive and waste fibers frequently secured to a scrim or other loosely woven inner material. The very nature of the material and its construction is one which has always been productive of a pad which without some special coating has been prone to lose its shape and become undesirably thin in places even when carefully handled. These tendencies have been remedied to a degree by applying some form of coating to one or both sides of the customary rug cushion or pad whereby to assist in holding the pad to shape and also to provide a friction surface tending to hold the rug or pad in a selected position upon the floor face.

Although coated and surfaced rug cushions and rug pads have many desirable characteristics, the addition of coating materials necessarily adds to the cost of the rug cushion. In view of the fact that when a rug or carpet is laid, an equivalent area of rug pad or cushion must also be laid therebeneath, relatively great quantities of the rug cushion are needed and hence regardless of how priced, the cost must be added to the cost of the carpet or rug itself which is laid on top.

Still more recently prices for good grades of rugs and carpets have moved up to a very considerable degree and when coated rug cushions are sought to be made use of beneath such rugs and carpets, the over-all cost of installation, especially for high-priced rug cushions, frequently becomes prohibitive.

It is therefore among the objects of the invention to provide a new and improved rug cushion or rug pad which retains all of the necessary resilient characteristics and which at the same time is treated on the surface in such fashion to assist the pad in holding its shape while at the same time enhancing the cushion-like effect.

Another object of the invention is to provide a new and improved rug pad or rug cushion type material which employs a substantially conventional base sheet of felted fibrous material to which a coating is applied following certain new and improved techniques in order to produce a satisfactory resilient rug cushion without adding unnecessarily to the over-all cost.

Still another object of the invention is to provide a new and improved rug pad or cushion which by use of a new and improved method enables the felted fibrous base material to be drawn up into configurations and held in a configured position or embossment by use of multiple ap-

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plication of sundry materials initially in a liquid state which are processed so that the materials with embossed portions of the base sheet form a resilient surfacing capable of maintaining the shape of a rug cushion or pad and which at the same time is relatively low in costs of materials and production.

Still another object is to provide a new and improved embossed and laminated rug cushion and a method of producing the same which makes use of a dried skin of starchy material for setting the embossment and maintaining the embossment during application thereto of a liquid polymeric plastic material whereby the entire amount of the polymeric plastic material applied to the embossed surface remains upon the surface and is set in place to a uniform consistency and thickness and there effectively set to produce an ultimately desired tough cushiony effect.

Still further among the objects of the invention is to provide a new and improved double embossed and multiple ply rug cushion structure and method of producing the same whereby an embossment on both sides of a felted fiber base is treated first with a skin of starchy material substantially impervious to subsequently applied materials and upon which is superimposed a polymeric plastic material of desired resiliency and toughness, thereby to permanently set the embossment of fibrous materials in a resilient tough form so as to embody in the finished structure virtually a maximum degree of resiliency by use of substantially minimum quantities of laminates.

With these and other objects in view, the invention consists in the construction, arrangement and combination of the various parts of the rug cushion and in the method of producing the same, whereby the objects contemplated are attained, as hereinafter set forth, pointed out in the appended claims and illustrated in the accompanying drawings.

In the drawings:

Figure 1 is a flow diagram of a typical system by means of which a method can be employed to produce a rug cushion of this invention;

Figure 2 is a fragmentary plan view of one side of the embossed cushion;

Figure 3 is a magnified representation which illustrates, schematically, how a surface of the finished embossed cushion appears in plan;

Figure 4 is a greatly magnified representation which illustrates, schematically, how the surface fibers of the embossed cushion appear in a cross-section taken along line 4—4 of Figure 3; and

Figure 5 is a sectional view corresponding to Figure 4 but taken along line 5—5 of Figure 3.

In an embodiment of the invention chosen for the purpose of illustration, a sheet 10 of felted fibrous material of cushiony consistency is passed into the system from a felting machine. When the sheet arrives, both sides are smooth to the extent produced by the usual conventional calendering rolls, not shown, and the fibers are somewhat loosely matted or needled into customary form.

The sheet then passes over a roller 11 from which it travels to a roller 12 and presents one side of the sheet to a spray station 13 controlled by a valve 14. At this point a thin solution of starchy material is sprayed upon the surface of the sheet. The solution made use of in the illustrative embodiment is one containing about 4% to 12% by weight, preferably about 10%, of a typical starch material in water. Although the starch may be a conventional corn starch, it will be appreciated that it is the physical character of the starchy material at this stage of the process which is of consequence and that other starches may be made use of such as vegetable, potato

and tapioca starch. Dextrin is also a workable substance. Still other forms of starchy material which will produce a thin skin may be employed, such as karaya gum, silicate of soda, glue, or casein, such as will serve as a barrier to penetration of the fibers by material subsequently applied.

The solution of starchy material is ordinarily sprayed on at room temperature as illustrated in the chosen embodiment. It will be appreciated, however, that if desired, the starch solution may be applied by rolling the same upon the surface of the sheet, in which event the solution should be warmed to a temperature of from about 120° F. to 180° F.

The sheet with the starch lightly sprayed upon its surface is passed over the roller 12 and thence to contact with a nip roll 15 by means of which it is squeezed into contact with an embossed pattern 17 of an embossing roll 16. The embossing roll in a satisfactorily working system may be heated to a temperature of from about 220° F. to about 450° F. or in any event a temperature which will result in a temperature of about 220° F. on the surface of the sheet material, thereby to completely evaporate all moisture and to dry the starchy material throughout the elevations and depressions of the embossment thus produced.

From the embossing roll 16 the sheet is removed by use of a stripper roll 18 and then passes over a roller 19 to a belt 20 supported by rollers 21 and 22. If the belt is sufficiently short, some heat will remain in the starched embossed surface as the sheet travels over a roller 23 onto a belt 24 supported by rollers 25 and 26.

The dried deposit of starchy material on the exposed surfaces of the fibers in the fibrous sheet serves to adhere the surface fibers to their adjacent fibers and to provide a coating on the fibers which is substantially impervious to subsequently applied materials, as hereinafter described. Furthermore, the deposit of starchy material holds the fibers of the depression areas in their compacted condition resulting from the embossment, thus to maintain and set the embossment until after deposit of the hereinafter mentioned materials upon the starch. Optimum results are obtained by applying the starch solution to the fibrous sheet in an amount such as to provide a dried deposit of starch of from about 1/2 ounce to 1 1/2 ounces (preferably about 1 ounce) per square yard of surface area.

A spray station 27 controlled by a valve 28 is made use of at this point to spray upon the still warm surface of the starch embossed sheet a layer of polymeric plastic material. The term "polymeric plastic material" as used herein denotes those substances having the properties of natural, reclaimed, vulcanized, or synthetic rubber. The term "elastomer" is sometimes used by those skilled in this art to refer to such substances. Included in the term "polymeric plastic material" are the thermoplastic plastics. Such materials, upon setting or solidifying, are of tough resilient consistency in thin layers and thereby are capable of fixing the cushiony consistency of the embossment of the rug cushion.

A specific elastomer which produces a satisfactory uniform surface layer on the elevations, depressions, and intermediate portions of the embossment is a polymerisational and plasticisational solution of vinyl chloride, i.e. vinyl chloride mixed with suitable plasticisers and stabilizers. Such vinyl chloride solutions may contain acetates or maleates to form a copolymer product.

In the case of the vinyl polymers or copolymers, a suitable and satisfactory plasticizer may consist of a plasticizer oil in the nature of dioctyl phthalate. The quantity of plasticizer can be varied over an appreciable range such that from fifty to two hundred and fifty parts of the plasticizer are used in a mixture containing one hundred parts of the polyvinyl chloride material. The amount of plasticizer employed should be selected so

as to produce a readily sprayable solution having a viscosity of from about 200 to 6,000 centipoises.

The required viscosity of the polyvinyl chloride solution will depend to a degree upon the spray pressure available inasmuch as a sprayable solution will vary to some extent upon pressure and the character of nozzles available.

The stabilizer made use of in the plastic material, while not critical to a marked degree, should be one selected to produce the desired tough resilient end product having a relatively thin coating or deposit upon the embossment throughout the entire embossed area.

Among stabilizers suitable for the purpose defined are organo metallic stabilizers wherein the metal ingredient is barium, cadmium, or tin. Chelating agents and epoxy stabilizers may also be included, especially where the stabilizer is organo metallic barium or cadmium. Calcium stabilizers have been found to be usable. In any event the mixture employed must be one productive of a thin deposit of set plastic which is resistant to aging. From one to five parts of the stabilizer may be used per one hundred parts of the polyvinyl chloride material.

The following examples are illustrative of coating materials to be applied over the starch deposit according to this invention:

EXAMPLE 1

Polymer—polyvinyl chloride dispersion grade resin, sold by Naugatuck Chemical, Division of United States Rubber Company, Naugatuck, Conn. and identified as "Marvinol VR 50"	100 parts by weight.
Plasticizer—dioctyl phthalate (di-2-ethyl hexyl phthalate)	75 parts.
Stabilizer—barium-cadmium stabilizer, sold by The Harshaw Chemical Co., Cleveland, Ohio, and identified as "12.V.63A"	3 parts.

EXAMPLE 2

Copolymer—polyvinyl chloride-acetate or maleate, sold by Goodyear Tire & Rubber Company and identified as "Plivoc AO"	100 parts.
Plasticizer—dioctyl phthalate	85 parts.
Stabilizer—organo metallic cadmium, sold by Advance Solvents and Chemical, New Brunswick, N.J., and identified as "Advastab BC-100"	2 parts.
An epoxy stabilizer, sold by Advance Solvents and Chemical, and identified as "Advastab Z-6WW"	1 part.

EXAMPLE 3

Polymer—polyvinyl chloride dispersion grade resin, sold by B. F. Goodrich Chemical Company, and identified as "Geon 121 Resin"	100 parts.
Plasticizer—dioctyl phthalate	100 parts.
Stabilizer—organo metallic barium-cadmium, sold by The Harshaw Chemical Co., and identified as "12.V.63A"	2 parts.
A chelating agent, sold by The Harshaw Chemical Co. and identified as "8-V-1 Organic Stabilizer"	1 part.
An epoxy stabilizer, sold by Advance Solvents and Chemical, and identified as "Advastab Z-6WW"	1 part.

EXAMPLE 4

Centrifuged natural latex (62% solids)	100.00 dry parts.
Potassium hydroxide (stabilizer)	0.30 dry part.
Ammonium caseinate (stabilizer)	0.50 dry part.
Sulfur (latex vulcanizing agent)	2.00 dry parts.
Zinc oxide (secondary vulcanizing agent)	4.00 dry parts.
Di-betanaphthylparaphenylenediamine (antioxidant)	.50 dry part.
Zinc diethyldithiocarbamate (accelerator for vulcanization)	1.00 dry part.
Clay (inert filler)	50.00 dry parts.
Color	5.00 dry parts.
Water	To 45.00% concentration.

EXAMPLE 5

Neoprene latex	100.00 dry parts.
Aquarex D (E. I. du Pont—stabilizer)	.50 dry part.
Zinc oxide (curing agent and acid acceptor)	15.00 dry parts.
Antioxidant 2246 (American Cyanamid Co.)	2.00 dry parts.
Sulfur (vulcanizing agent)	1.00 dry part.
Clay (inert filler)	25.00 dry parts.
Color	5.00 dry parts.
Water	To 45.00% concentration.

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EXAMPLE 6

SBR - 2105 (70/30 butadiene - styrene latex)	100.00 dry parts.
Ammonium oleate (stabilizer)	.50 dry part.
Ammonium caseinate (stabilizer)	.50 dry part.
Sulfur (curing agent)	2.00 dry parts.
Zinc oxide (secondary curing agent)	4.00 dry parts.
Zinc diethyl dithiocarbamate (accelerator)	1.50 dry parts.
Antioxidant 2246	1.00 dry part.
Clay (inert filler)	50.00 dry parts.
Color	5.00 dry parts.
Water	To 45.00% concentration.

Where the embossment is still warm when the elastomer is sprayed on, the setting time of the elastomer may be shortened. It is, however, desirable to pass the elastomer sprayed embossment through a setting oven 29 wherein the temperature can be maintained at about 180° F. to 350° F. for a period of time to enable the setting of the elastomer material in the thin deposit upon the embossment during passage through the oven. As previously indicated the type of setting is one productive of a coating which is of resilient consistency throughout all of the elevation, depression, and intermediate portions of the embossment.

In the case of rubber latex compound, oven 29 may be heated to a temperature of from about 180° F. to about 350° F., depending upon the length of the oven. A typical satisfactory heating interval for an oven temperature of 300° F. is 10 minutes.

After having been set in the setting oven 29 through which the sheet is carried by a belt 30 supported by rollers 31 and 32, the sheet emerges from the oven, passing to another belt 33 supported by rollers 34 and 35 until the belt passes over a roller 36 on its way to a nip roller 37. At this stage a second spray station 38 controlled by a valve 39 again sprays an aqueous starch solution upon the side of the sheet opposite the previously embossed side. Conditions at this point are the same as those prevailing at the first spray station 13. The newly sprayed side of the sheet is then squeezed into contact with an embossing pattern 41 on an embossing roll 40, thereby to raise a portion of the material of the sheet into an embossed pattern on the surface of which lies the starch spray. By maintaining the embossing roll 40 at the same temperature, approximately, as the embossing roll 16, the water is driven out from the solution and a deposit of dried starch material is set up upon the elevations, depressions and intermediate areas of the embossment. A stripper roll 42 then serves to remove the sheet from the embossing roll and pass it to a conveyor belt 43 supported by rollers 44 and 45. From here the sheet can be conveniently passed to a conveyor belt 46 carried by rollers 47 and 48 to a location beneath a spray station 49 here controlled by a valve 50. At this spray station a liquid polymeric plastic material of the same type previously described in detail is sprayed upon the newly embossed surface of the opposite side of the sheet and the building up process which aptly describes the application of materials to the sheet is repeated. That is to say, the polymeric plastic material, the setting or fusion of which is begun if the sheet is warm, is carried into a setting oven 51 where it moves upon a belt 52 carried by rollers 53 and 54. The temperature of the setting oven 51 is maintained substantially the same as that of the oven 29. Emerging from the oven 51, the double embossed cushion is then conducted to suitable cutting and packing arrangements, not shown.

A rug cushion, embossed and treated according to the method described above, is illustrated in Figures 2 to 5 inclusive, and is designated generally by reference numeral 60. As shown in Figures 2 and 3, one embossed surface of the rug cushion has depression areas formed therein the same being spaced apart throughout the cushion's surface and being defined by elevation areas. It will, of course, be understood that any design of embossment is contemplated in this invention, but for the

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purposes of making this specification a full and complete disclosure, the particulars of the illustrated embossment are described as comprising depression areas of elongate rectangular configuration 61 and areas of square configuration 61a, which are uniformly spaced apart by the elevation areas 62, the elevation areas being approximately the same width as the depression areas. The illustrated design is one in which the square depressions 61a are about 1/4" on a side.

Conventional rug cushions have a thickness of from about one-fourth to three-eighths inches, the fibrous sheet 10 from which they may be formed comprising, principally, jute and preferably containing some hair. Burlap and other fiber materials may also be included in the mass of fibers which form the sheet 10.

The fibrous sheets 10 which are most readily available commercially are those grades ranging from 32 to 64 ounces per square yard. For fiber sheets of that type, a suitable depth for the depressions, i.e. surface of depression areas below the surface of the elevation areas, is about .05" to .1". In Figure 4 the side walls of the depressions, extending as intermediate areas from the depression bottoms to the elevation surfaces, are designated by numeral 63.

An inspection of the fiber sheet with a magnifying glass reveals interintwined fibers with large spaces between the individual fibers or groups of fibers, such spaces often being greater than the cross-sectional dimensions of the fibers.

The surface deposits formed by treatment of the fibrous sheet 10 according to this invention, do not mask the fibrous appearance of the surfaces in the finished product, though the depression surfaces 61 are substantially smoother and flatter than the elevation surfaces 62 and are of more solid appearance in the spread of the deposits. This difference in surface appearance between depression and elevation areas is illustrated in Figure 3 of the drawing which shows more and larger and wider spaces or foramina 65 between fibers in the elevation surfaces than foramina 66 between fibers in the depression surfaces.

The structural differences of the arrangement of fibers in the depression areas and in the elevation areas are made more apparent by the schematic illustrations of Figures 4 and 5. Figure 4 represents an arrangement or group of fibers in and adjacent to the elevation surfaces while Figure 5 represents an arrangement of fibers in and adjacent to the depression surfaces. In Figures 4 and 5 the fibers which constitute the illustrated groups of fibers, respectively, are shown in cross-section, it being understood that some of the fibers may extend transversely with respect to the others. The particulars of the structural differences between the arrangements of fibers in Figures 4 and 5 are perhaps best explained by a detailed consideration of the step-wise treatment which is described above with reference to Figure 1.

As explained above, the surface of the fibrous sheet 10, before being embossed by contacting the embossing roll 16, is sprayed with a starch solution at station 13. The starch solution penetrates into the sheet, coating not only the outermost or surface fibers 67 (Figure 4) but also coating or partially coating some of the fibers 68 immediately adjacent or subjacent the surface fibers by passing through the surface spaces 65. The starch solution wets the fibers and thus extends or flows, as in capillarity, further over the fiber surfaces than merely that fiber-surface portion reached directly by the spray. As the water is evaporated from the starch solution the solution thickens and tends to coalesce adjacent fibers at their points of closest proximity as represented at 70, and upon becoming dried leaves a starch deposit 71 upon the fibers.

Inasmuch as the starch solution is sprayed uniformly over the cushion surface before embossment, the subjacent fibers 68a (Figure 5) in those regions which, upon embossment, will become the depression areas are coated

with the starch solution to the same extent as are the sub-jacent fibers 68 of the elevation regions. The depression areas being formed before the starch has dried, the fibers in the depression areas will be compacted closer together than in the elevation areas as appears in Figure 5, and the surface fibers 67a of the depression areas will be pressed toward alignment in a surface plane and the subjacent fibers 68a will become adhered more extensively to the surface fibers 67a and to each other than in the elevation areas. The pressures exerted by the embossing roll at the depression areas and at the elevation areas will, of course, depend upon the height of the projections on the embossing roll. It is preferred that there be some embossing roll pressure exerted upon the elevation areas through contact by the flats between the embossing roll projections.

The dried starch deposit maintains the fibers in the embossed design for subsequent application of an elastomer deposit at station 27. Such elastomer deposit is designated by reference numeral 74 in Figure 4 and by numeral 74a in Figure 5. As in the case of the starch spray, the spray of elastomer is applied uniformly over the surface of the rug cushion whereby an equal amount of elastomer will be deposited upon a unit area in both the elevation and depression surfaces. Amounts of from 2 to 5 ounces (preferably about 3½ to 4 ounces) of elastomer per square yard of cushion surface are contemplated. In the case where rubber latex is employed a concentration of from about 35% to 50% by weight (4 to 8 ounces of an aqueous dispersion of the rubber latex compound) is applied per square yard of surface area of the rug cushion.

Comparing Figures 4 and 5 of the drawing, it will be noted that, because of the surface fibers 67 are not as closely bound together by the starch deposit 71 in the elevation areas as in the depression areas, the elastomer spray will penetrate through the foramina 65 of the elevation area further down into the fibrous sheet than in the depression areas as shown in Figure 5. Also, because the surface fibers 67a in the depression areas are disposed more nearly in a plane than are the surface fibers 67 of the elevation areas, the deposit of elastomer 74a will be smoother and flatter in the depression areas than in the elevation areas. It should be noted, too, that the subjacent fibers 68 in the elevation areas are reached by the elastomer spray to a greater extent than are the subjacent fibers 68a of the depression areas.

While I have herein shown and described my invention in what I have conceived to be the most practical and preferred embodiment, it is recognized that departures may be made therefrom within the scope of my invention, which is not to be limited to the details disclosed herein but is to be accorded the full scope of the claims so as to embrace any and all equivalents thereof.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A method of forming upon a series of smooth and embossing rollers a multiple laminated rug cushion structure from a continuous base sheet of relatively thick felted cushion stock of composite fiber material having at least one initially non-configured face and wherein the fibers are in a dry state, comprising spreading on one face of said sheet at room temperature a thin aqueous starch solution of about 4% to 12% by weight, passing said base sheet over an embossing roll with the starched face against the roll, heating the roll to about 220° F. to 450° F. during contact of the sheet therewith and driving the water from said solution by evaporation and setting the surface of the embossment with a skin of dried starch, spreading said starch embossed side of the sheet with a relatively thin film of initially liquid polymeric plastic material until depressions and elevations of the embossment are evenly coated with a film of the polymeric plastic material to consistent depth, and then exposing all portions of the film of said polymeric plastic material to an oven atmosphere at a temperature of from about 180° F. to

350° F. whereby to change the initially liquid polymeric plastic material to a solid polymeric plastic film.

2. A method of forming upon a series of smooth and embossing rollers a multiple laminated and double embossed rug cushion structure from a continuous base sheet of relatively thick felted cushion stock of composite fiber material having initially non-configured opposite faces and wherein the fibers are in a dry state comprising spreading on one face of said sheet at room temperature a thin aqueous starch solution of about 4% to 12% by weight, passing said base sheet over an embossing roll with the starched face against the roll, heating the roll to about 220° F. to 450° F. during contact of the sheet therewith and driving the water from said solution by evaporation and setting the surface of the embossment with a skin of dried starch, spreading on the opposite face of said sheet at room temperature a second thin aqueous starch solution of about 4% to 12% by weight, passing said sheet over a second embossing roll with the newly spread side against the roll and the opposite side free to atmosphere, heating the roll during contact of the sheet therewith to a temperature of from about 220° F. to 450° F. whereby to set the surface of said last identified side with a skin of dried starch, spreading said sides with a relatively thin film of initially liquid polymeric plastic material until depressions and elevations of the embossments are evenly coated with a film of said polymeric plastic material to a consistent depth, and exposing all portions of said last film to an oven atmosphere at a temperature of from about 180° F. to 350° F. during an interval of about 10 minutes whereby to uniformly solidify all portions of said last film.

3. A method of forming upon a series of successive smooth and embossing rollers a multiple laminated and double embossed rug cushion structure from a continuous base sheet of relatively thick felted cushion stock of composite fiber material having initially non-configured opposite faces and wherein the fibers are in a dry state comprising spreading on one face of said sheet at room temperature a thin aqueous starch solution of about 4% to 12% by weight, passing said base sheet over an embossing roll with the starched face against the roll, heating the roll to a temperature of from about 220° F. to 450° F. during contact of the sheet therewith and driving the water from said solution by evaporation and setting the surface of the embossment with a skin of dried starch, spreading said starch embossed side of the sheet with a relatively thin aqueous dispersion of rubber latex until depressions and elevations of the embossment are coated with a film of the latex to a consistent depth, uniformly curing all portions of the film of said latex at a temperature of from about 180° F. to 350° F., spreading the opposite face of said sheet at room temperature a second thin aqueous starch solution of about 4% to 12% by weight, passing said sheet over a second embossing roll with the newly sprayed side against the roll and the opposite side free to atmosphere, heating the roll during contact of the sheet therewith to a temperature of from about 220° F. to 450° F. whereby to set the surface of said last identified side with a skin of dried starch, spreading said last side with a relatively thin dispersion of rubber latex until depressions and elevations of the embossment are coated with a film of latex to a consistent depth and then curing all portions of said last film at a temperature of from about 180° F. to 350° F. during an interval of about 10 minutes.

4. A method as claimed in claim 3 wherein one starch application is rolled on followed by drying at a roll temperature of from about 120° F. to 180° F.

5. A method of forming upon a series of smooth and embossing rollers a multiple laminated and double embossed rug cushion structure from a continuous base sheet of relatively thick felted cushion stock of composite fiber material having initially non-configured op-

posite faces and wherein the fibers are in a dry state comprising rolling on one face of said sheet at room temperature a thin aqueous starch solution of about 4% to 12% by weight, passing said base sheet over an embossing roll with the starched face against the roll, heating the roll to about 220° F. to 450° F. during contact of the sheet therewith and driving the water from said solution by evaporation and setting the surface of the embossment with an impervious skin of dried starch, spraying elevations and depressions of said starch embossed side of the sheet with a relatively thin aqueous dispersion of rubber latex until depressions and elevations of the embossment are coated with a film of the latex to a consistent depth, uniformly curing all portions of the film of said latex at a temperature of from about 180° F. to 350° F., rolling on the opposite face of said sheet at room temperature a second thin aqueous starch solution of about 4% to 12% by weight, passing said sheet over a second embossing roll with the newly coated side against the roll and the opposite side free to atmosphere, heating the roll during contact of the sheet therewith to a temperature of from about 220° F. to 450° F. whereby to set the surface of said last identified side with a skin of dried starch, spraying elevations and depressions of said last side with a relatively thin dispersion of rubber latex until depressions and elevations of the embossment are coated with a film of latex to a consistent depth and uniformly curing all portions of said last film at a temperature of from about 180° F. to 350° F. during an interval of about 10 minutes.

6. A method of forming upon a series of smooth and embossing rollers a multiple laminated and double embossed rug cushion structure from a continuous base sheet of relatively thick felted cushion stock of composite fiber material having initially non-configured opposite faces and wherein the fibers are in a dry state comprising spraying on one face of said sheet at room temperature a thin aqueous starch solution of about 4% to 12% by weight, passing said base sheet over an embossing roll with the starched face against the roll, heating the roll to about 220° F. to 450° F. during contact of the sheet therewith and driving the water from said solution by evaporation and setting the surface of the embossment with a skin of dried starch, spraying elevations and depressions of said starch embossed side of the sheet with a relatively thin aqueous dispersion of rubber latex until the depressions and elevations of the embossment are coated with a film of the latex to a consistent depth, exposing all portions of the film of said latex to the atmosphere of a curing oven at a temperature of about 300° F. during an interval of substantially ten minutes, spraying on the opposite face of said sheet at room temperature a second thin aqueous starch solution of about 4% to 12% by weight, passing said sheet over a second embossing roll with the newly sprayed side against the roll and the opposite side free to atmosphere, heating the roll during contact of the sheet therewith to a temperature of from about 220° F. to 450° F. whereby to set the surface of said last identified side with a skin of dried starch, spraying the elevations and depressions of said last side with a relatively thin dispersion of rubber latex until depressions and elevations of the embossment are coated with a film of latex to a consistent depth exposing all portions of said last film to the atmosphere of a curing oven at a temperature of from about 300° F. during an interval of about 10 minutes, and then cooling the multiple coated sheet.

7. A method of embossing a rug cushion of a relatively thick, compressible and foraminous sheet of matted fibers, comprising the steps of forming upon one surface of the sheet a substantially uniformly applied deposit of starchy material in an amount which is effective to coat the fibers on those surfaces thereof which are exposed in plan view of said one surface and to extend into the foramina between the surface fibers to partially

coat at least some of those fibers which are disposed immediately below the surface fibers, thereafter compacting the fibers transversely of the sheet throughout predetermined spaced apart areas to form alternate elevation and depression areas in said one surface and to make the outside surface of said deposit smoother in and throughout the depression areas than in and throughout the elevation areas, and whereby the fibers which are disposed immediately below the surface fibers in the elevation areas will have on them an amount of said deposit which is substantially equal to that on their corresponding fibers in the depression areas, thereafter coating the outside surface of said deposit with a substantially uniformly applied coat of polymeric plastic material in an amount which is effective to coat the outside surface of said deposit and yet leave the surface of the coated sheet appreciably foraminous, and setting said polymeric plastic, whereby the fibers which are disposed immediately below the surface fibers in the elevation areas will have more of said plastic material on them than their corresponding fibers in the depression areas, and the fibers in and adjacent the surface of the depression areas will be more closely adhered to one another with said starchy material and said plastic material than their corresponding fibers in the elevation areas.

8. A method of embossing a rug cushion of a relatively thick, compressible and foraminous sheet of matted fibers, comprising the steps of spraying upon one surface of the sheet a solution of starchy material in an amount which is effective to coat the fibers on those surfaces thereof which are exposed to plan view of said one surface and to extend into the foramina between the surface fibers to partially coat at least some of those fibers which are disposed immediately below the surface fibers, thereafter passing the sheet over an embossing roll with the sprayed surface of the sheet against the roll to form alternate elevation and depression areas throughout said one surface, drying the coat of starchy material thereby to set and maintain the embossment, thereafter spraying the dried coated surface with an initially liquid polymeric plastic material in an amount which is effective to coat the outside surface of the dried starchy material and yet leave the surface of the coated sheet appreciably foraminous, and setting said plastic.

9. A method according to claim 8 in which said starchy material is starch.

10. A method according to claim 8 in which said polymeric plastic material is rubber latex compound.

11. A method according to claim 8 in which said polymeric plastic material is a polymerisational and plasticisational solution of vinyl chloride.

12. An embossed rug cushion comprising a relatively thick, compressible and foraminous sheet of matted fibers, one surface of the sheet having alternate elevations and depressions of predetermined areas formed therein, the fibers of the sheet being more compact transversely of the sheet throughout the areas of the depressions than in the areas of the elevations, said one surface having thereon a dried and substantially uniformly applied deposit of starchy material in an amount which is effective to coat the fibers in said one surface on those surfaces thereof which are exposed in plan view of said one surface and to extend into the foramina between the surface fibers to partially coat at least some of those fibers which are disposed immediately below the surface fibers, the outside surface of the deposit in and throughout the depression areas being smoother than the outside surface of the deposit in and throughout the elevation areas, the fibers which are disposed immediately below the surface fibers in the elevation areas having an amount of said deposit of starchy material on them which is substantially equal to that on their corresponding fibers in the depression areas, the outside surface of said deposit having thereon a set and substantially uniformly applied coating of polymeric plastic material in

an amount which is effective to coat the outside surface of said deposit and yet leave the surface of the coated sheet appreciably foraminous, said coating of plastic material being more foraminous in the areas of the elevations than in the areas of the depressions, the fibers which are disposed immediately below the surface fibers in the elevation areas having more of said plastic material on them than their corresponding fibers in the depression areas, and the fibers in and adjacent the surface of the depression areas being more closely adhered to one another with said deposit and said plastic material than their corresponding fibers in the elevation areas.

13. An embossed rug cushion according to claim 12 in which said starchy material is starch.

14. An embossed rug cushion according to claim 12 in which said starchy material is dextrin.

15. An embossed rug cushion according to claim 12 in which said polymeric plastic material is rubber latex compound.

16. An embossed rug cushion according to claim 12 in which said polymeric plastic material is a synthetic elastomer.

17. An embossed rug cushion according to claim 16 in which said elastomer is polyvinyl chloride.

18. An embossed rug cushion according to claim 12 in which said amount of deposit of starchy material is such as will effect said coating of said surface fibers to

the extent obtained by spraying the sheet surface with an aqueous solution of 10% by weight of starch in an amount such as to provide a dried deposit of starch of from ½ ounce to 1½ ounces of starch per square yard of surface area.

19. An embossed rug cushion according to claim 12 in which said deposit and said coating are applied to both surfaces of said sheet.

20. An embossed rug cushion according to claim 12 in which said amount of coating of said polymeric plastic material is such as will effect covering of the deposit of starchy material to the extent obtained by spraying with from 2 to 5 ounces of a polymerisational and plasticisational solution of vinyl chloride per square yard of surface area of said sheet.

21. An embossed rug cushion according to claim 12 in which said amount of coating of said polymeric plastic material is such as will effect covering of the deposit of starchy material to the extent obtained by spraying with an aqueous dispersion of rubber latex compound of from about 35% to about 50% solids by weight in an amount such as to provide a coating of from about 4 ounces to about 8 ounces of solidified rubber per square yard of surface area of said sheet.

No references cited.