Aug. 10, 1954 J. M. MONTEFALCO 2,685,855

SECTIONALIZED COMPRESSIBLE RESILIENT SHEET AND METHOD OF MAKING

Filed April 9, 1949 2 Sheets-Sheet 1

Fig. 1

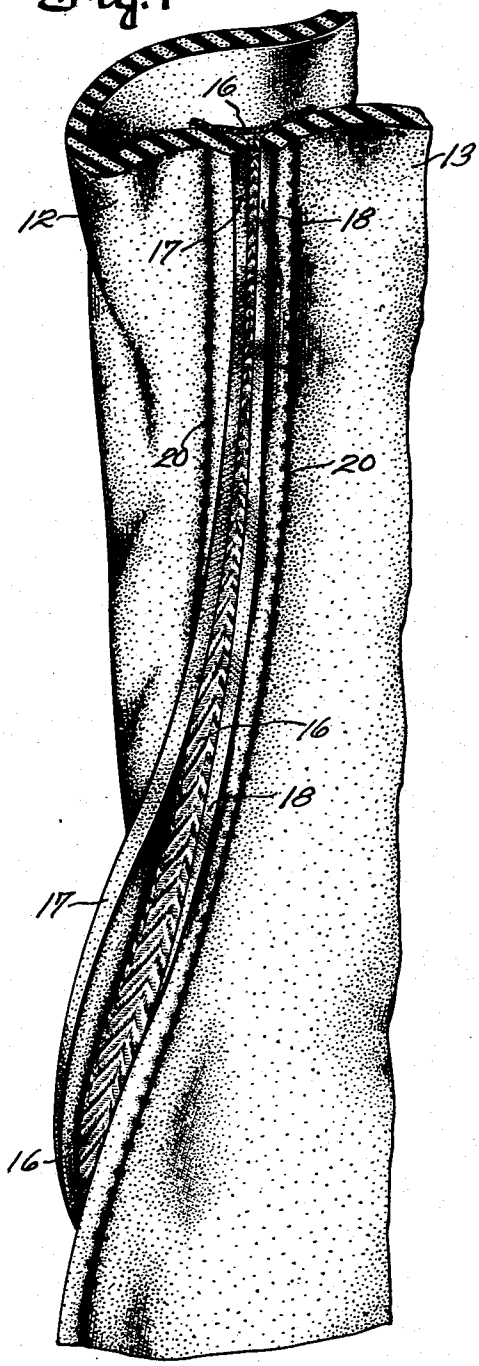
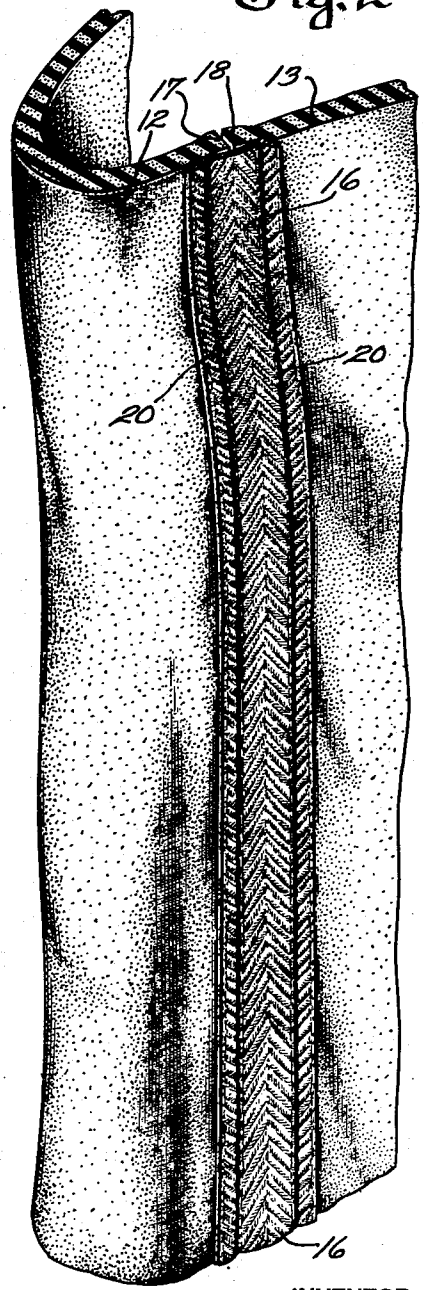


Fig. 2



INVENTOR
Jack M. Montefalco
BY
ATTORNEY

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Fig. 3

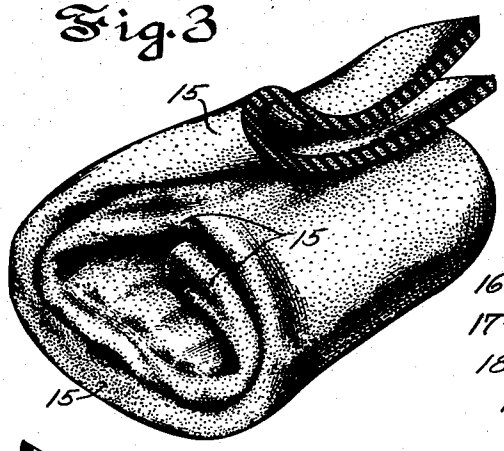
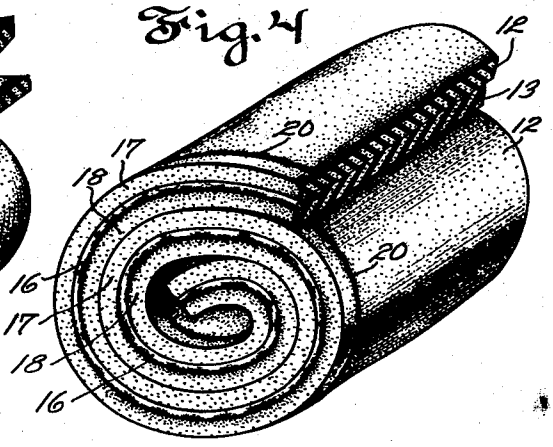


Fig. 4



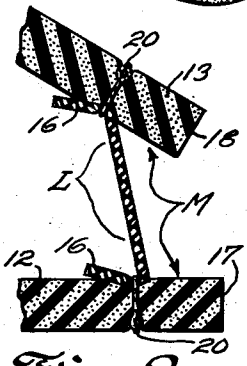
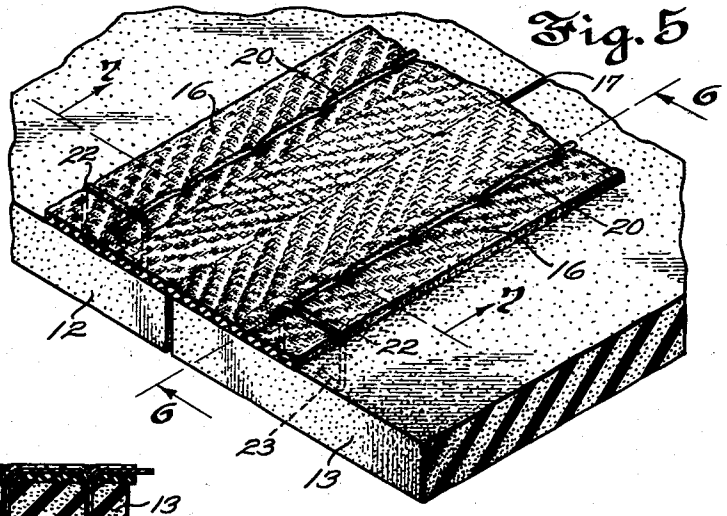


Fig. 8

Fig. 5



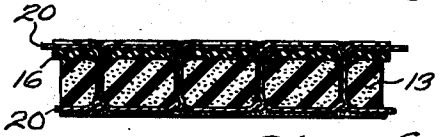


Fig. 6

Fig. 7

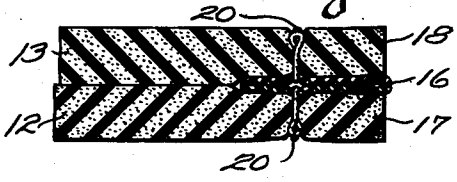
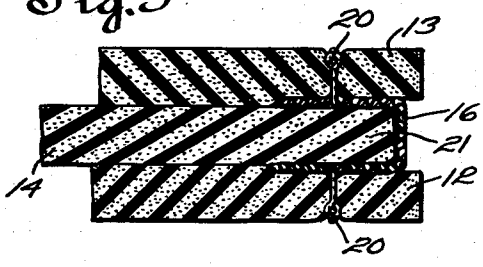


Fig. 9



INVENTOR
Jack M. Montefalco,
BY
ATTORNEY

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2,685,855

SECTIONALIZED COMPRESSIBLE RESILIENT SHEET AND METHOD OF MAKING

Jack M. Montefalco, Shelton, Conn., assignor to The Sponge Rubber Products Company, Shelton, Conn., a corporation of Connecticut

Application April 9, 1949, Serial No. 86,472

4 Claims. (Cl. 112—262)

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This invention relates to ways and means for joining in edge-to-edge relation sheets of compressible, resilient material such as sponge rubber, particularly when such sheets are of substantial thickness and large surface areas such as used for carpet underlays.

It is not only impractical to produce homogeneous sponge rubber sheets of sufficiently large surface area to cover the entire floor of a large room, but it would be difficult to compact such a large sheet into desirably small shipping containers and storage spaces. The cross folding or flexing of such material that is necessary to compact its bulk results in bulges which refuse to remain compacted because of the resilience of the material. If maintained so folded over a long period by confinement during shipping or storage, the resilience of the material may deteriorate.

An object of this invention is to accomplish edge-to-edge jointure particularly of long sections of sponge rubber sheet, or sheet material of comparable physical properties, which shall enable a floor-size area of such sheeting to be stacked or rolled in overlapping sections without bulging or distortion of the material such as would be occasioned by the presence of folds and cross folds. Thus a plurality of superimposed layers of the material so joined by the practice of this invention may be stored flat or coiled smoothly into wide compact rolls without wrinkling at the edges of the individual sections which form one end of the roll, or elsewhere.

A further object is to accomplish edge-to-edge jointure of such sheet-like sections by the simple use of a thin, tough flexible tape comprising preferably a strip of textile fabric. Such tape should be stout enough to serve as a durable hinge by flexing, and so fastened to the marginal portions of adjoining sheet sections that the edges of the sheet sections closely abut when the broadside surfaces of the sheets are laid out in a common plane. The same edges of the sheet sections may fall flush when said broadside surfaces of the sheets are swung into overlapping relationship.

A further object is to fasten a common strip of such hinge tape to the margins of two adjoining sheet sections in such manner that no strain sufficient to tear the compressible resilient material of the sheet section will be occasioned by any ordinary handling of several tape-joined sheet sections totalling a large overall area. A desirable result is that when the weight of a certain sheet section or sections is picked up and carried or flung about by the handling of some different sheet section joined thereto as disclosed herein, the strength of the tape-coupled seam, or seams, between the sections is such as to make the sponge rubber virtually as tear-proof as if continuous without seams throughout the overall sheet area.

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The above and related objectives will appear in greater particular from the following description of a preferred embodiment of the invention having reference to the appended drawings wherein:

Fig. 1 is a perspective view of two soft resilient sheets joined together edge-to-edge at their marginal portions according to the principles of this invention.

Fig. 2 is a corresponding view of the same joined sheets viewed from the opposite sides thereof.

Fig. 3 is a perspective view showing the undesirable and space consuming bulging that results from flexing or rolling a folded sheet of thick sponge rubber transversely of an initial fold therein.

Fig. 4 is a corresponding perspective view of a smoothly rolled foldless length of equally thick sponge rubber sheet sections having their margins permanently joined according to this invention.

Fig. 5 is a fragmentary view showing on an enlarged scale fastening of the hinge tape to two sheet sections laid flat upon a floor.

Fig. 6 is a view taken in section on a vertical plane 6—6 in Fig. 5 showing a successful form of stitching by which the hinge tape may be fastened to compressible resilient sheet material such as sponge rubber.

Fig. 7 shows the two sponge rubber sheets of Fig. 5 folded upon one another, with their edges flush as is permitted by the thinness and flexibility of the hinge tape.

Fig. 8 shows a maximum separation of joined margins of the sheet sections permitted by the free width of the hinge tape.

Fig. 9 shows the free width of the hinge tape looped and accommodating between the two sheet sections which it joins the margin and free edge of an intermediate sheet section.

A sectionalized compressible resilient sheeting embodying this invention may be composed of any number of sheet sections which are represented in the drawings by two such sheet sections 12 and 13. The substance of these sheet sections is stretchable, compressible, homogene-

ous and resilient so that the sheets are proof against creasing at any line of folding thereof. Single ply margins of sheets of such substance have non-disintegrating bare edges in contrast to the frayable edges of unselvedged woven fabrics and require no hemming nor folding over of their margins to prevent unraveling. For use as a rug underlay these sheet sections may appropriately be of sponge rubber about $\frac{3}{16}$ inch thick. The thickness can vary but for the use mentioned preferably will fall within the range of ⅛ inch to ¼ inch. The principles of the invention are, nevertheless, applicable to joined sponge rubber sheets considerably thinner or thicker than this range of dimensions.

Fig. 3 shows the undesirable, characteristic outcome of initially folding a large homogeneous sponge rubber sheet, then rolling or folding it again crosswise its initial fold. The tendency to bulge and wrinkle is seen at 15. Owing to its essential resilience it refuses to remain compact. If it be forced into a confined space and thus kept compacted over a long period of time, the resilience of the material deteriorates, Also it involves complex packing problems so to confine it.

Fig. 4 in contrast to Fig. 3 shows a sheeting of the same kind of material sectionalized according to the principles of this invention and smoothly coiled into a compact roll so as to do away with bulging or wrinkling at the ends of the roll.

Figs. 1 and 2 show the compressible resilient sheet sections 12 and 13 having draped flexible margins which become straight when these sheet sections lie flat on a floor in edge-to-edge relation. Sheet sections 12 and 13 are joined flexibly together by a hinge strip, or tape, 16 of suitable material whose width spans and overlies the adjoining margins of the sheet sections.

This hinge strip 16 may comprise a thin woven textile tape and should be tough enough to be practically untearable in any manner of use to which it will be subjected. To prevent fraying and to reduce weaving distortion of the hinge strip lengthwise of the sheet edges 17 and 18, such strip may comprise a bias woven textile tape as shown.

Hinge strip 16 is fastened against the surface of a single ply sheet margin which it overlies and preferably by means of a straight row of stitches 20. This row extends parallel with and intermediate one bare edge of the sheet section and one edge of hinge tape 16. Stitches 20 will be drawn tight enough slightly to indent the surface of the sponge rubber sheet and they extend entirely through such sheet as well as through the tape as is best shown in Fig. 6. Fig. 7 shows one sheet section swung into overlapping relationship to its adjoining sheet section so that the bare thick sheet edges 17 and 18 fall flush with each other and thus occasion no folding distortion of the sheets whose margins are now separated by a double thickness of the very thin hinge tape folded over upon itself.

Figs. 8 and 9 show the ability of the sheet sections to separate from each other in broadside direction as permitted by the free width (L) of tape 16 lying between the rows of stitching. The dimension (L) preferably is equal to the sum of the distances (M) of the stitches 20 from the sheet edges 17 and 18. This free width (L) of tape 16 enables the margin and free edge 21 of a third sheet section 14 to be accommodated between the sheet sections 12 and 13. In this manner any number of layers of connected sheet

sections such as 12, 13 and 14 can be stacked smoothly and compactly, one upon another, without occasioning any wrinkling or bulging such as would result from folding or doubling over the sponge rubber material of the sheet section upon itself. When either the rolled sectionalized sheeting of Fig. 4 or the stacked sectionalized sheeting of Fig. 9 is flung open and laid upon a floor, the sheet edges 17 and 18 will be constrained by the hinge strip 16 to abut throughout their lengths without any appreciable gap therebetween and without bulging due to crowding or squeezing at any point.

Experience has proven that the thus maintained smooth junction between sheet section edges is not detectable in treading on the upper surface of a carpet underlain by this sectionalized sponge rubber sheeting, nor is any evidence of the joint between the sheet sections discernable in appearance or wear of the carpet.

In Fig. 5 an auxiliary fastening device is shown in the form of a staple or staples 22 which extend clear through the sponge rubber sheet and are clinched over against the bottom surface thereof as shown in 23. These staples preferably extend crosswise the straight row of stitching near one end of the row so that the stitches shall be locked thereby against loosening during handling or use of the underlay. The stitching may be done by hand or by a conventional sewing machine with exceptionally long overarm, preferably supplemented by a traveling conveyor belt, or belts, arranged to carry the material past and away from the conventional feed dogs of the sewing machine at a linear speed equal to the intermittent work advancing strokes of the feed dogs since the compressible and elastic nature of the material might otherwise lack the firmness of such substances as leather or canvas which the conventional feed dogs of industrial sewing machines are designed to work against. By using a sewing machine with two needles and with widened or doubled presser foot and widened or doubled feed dogs the two rows of stitching 20 may to advantage be sewed simultaneously.

It will be understood that whereas a single straight running joint between sheet section 3 is herein illustrated, the occurrence of like joints may be repeated at any desired spacing to produce a sectionalized but integrated carpet underlay without limit as to overall size, and cut and assembled to a predetermined overall shape. Also the tape jointed seams need not all be parallel. If desired, some seams may extend crosswise of, and intersect, others without departure from the ways and means of joining the sheet sections in edge-to-edge relation hereinbefore described.

The appended claims are directed to and intended to cover all variations of the particular details of parts and relations herein disclosed which fairly come within the broadest meaning of their terms.

I claim:

1. The method of compacting sponge rubber sheeting for storage in folded condition, which comprises dividing continuous sponge rubber sheeting into sectional sheets of sponge rubber having single ply margins at least one of which sheets retains a bare margin and edge, coupling said sectional sheets in edge-to-edge relation by stitching to substantially co-planar surfaces of other single ply margins of said sheets a flexible tape, and swinging said tape coupled sheets into overlapping face-to-face relation by folding said

tape to the exclusion of folding said sheets so that said bare margin and edge of one of said sheets is sandwiched between single ply margins of two others of said sheets and lies within the bight of said folded tape.

2. Sectional sheeting conditioned for flexure in crossing directions into compact closely overlapping layers without bulging, comprising in combination, separate sheet sections of tough unwoven homogeneous compressible bare substance sufficiently resilient to bulge and resist creasing along a fold thereof and having adjoining marginal portions terminating in hemless ravelproof meeting edges of said bare substance, a flexible tape overlapping said marginal portions and bridging the meeting line of said edges, and a seam of stitches extending through said tape and each of said marginal portions of the sheeting sections alongside said meeting line at a distance from said edge of each sheeting section at least as great as the thickness of the sheeting section, whereby said tape forms a foldable hinge enabling said overlapping marginal portions to lie in full surface to surface contact with each other without bulging.

3. Sectional sheeting conditioned for flexure in crossing directions into compact closely overlapping layers without bulging, comprising in combination, separate sheet sections of tough unwoven homogeneous compressible bare substance sufficiently resilient to bulge and resist creasing along a fold thereof and having adjoining marginal portions terminating in hemless ravelproof meeting edges of said bare substance, a flexible tape overlapping said marginal portions and bridging the meeting line of said edges, and a seam of stitches extending through said tape and each of said marginal portions of the sheeting sections alongside said meeting line at a distance from the latter whereby said tape forms a foldable hinge enabling said overlapping marginal

portions to lie in full surface to surface contact with each other without bulging, together with an auxiliary metallic stitch-locking staple near the end of each of said seams of stitching penetrating and clamping together said sheet section and said hinge tape and at least one of said stitches of said seam.

4. Sectional sheeting conditioned for flexure in crossing directions into compact closely overlapping layers without bulging, comprising in combination, separate sheet sections of tough unwoven homogeneous compressible bare substance sufficiently resilient to bulge and resist creasing along a fold thereof and having adjoining marginal portions terminating in hemless ravelproof meeting edges of said bare substance, a flexible tape overlapping said marginal portions and bridging the meeting line of said edges, and a seam of stitches extending through said tape and each of said marginal portions of the sheeting sections alongside said meeting line at a distance from the latter whereby said tape forms a foldable hinge enabling said overlapping marginal portions to lie in full surface to surface contact with each other without bulging, said seams of stitches being laterally spaced apart by a distance greater than the thickness of said sheet sections, wherefore the said tape can wrap about the bare and marginal faces of one of said sheet sections when the latter is sandwiched between two of said sheet sections hinged together by said tape.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
890,792	Peine	June 16, 1908
1,136,380	Terry	Apr. 20, 1915
1,447,667	Koester	Mar. 6, 1923
1,465,415	Brunzel	Aug. 21, 1923
1,575,357	Milner	Mar. 2, 1926