

March 4, 1941.

G. G. BARR

2,234,136

TRIMMING STRIP CORE AND THE LIKE

Filed Nov. 10, 1938

2 Sheets-Sheet 1

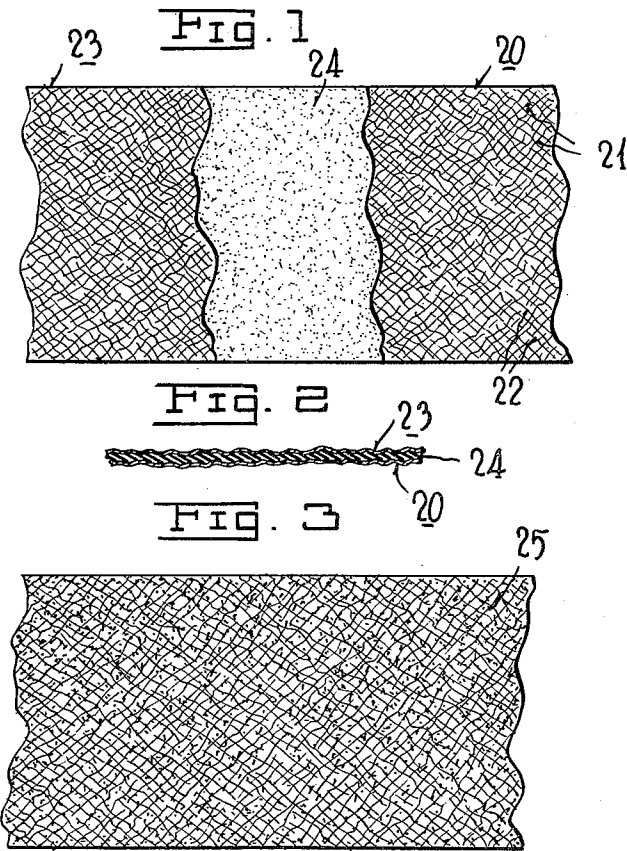
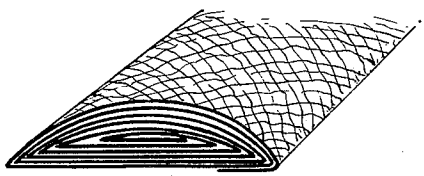
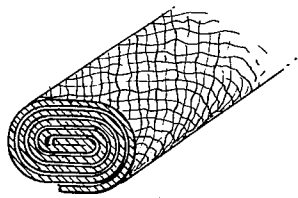


FIG. 4

FIG. 5



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2 Sheets-Sheet 2

FIG. 6

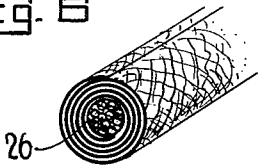


FIG. 10

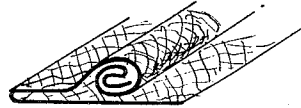


FIG. 7

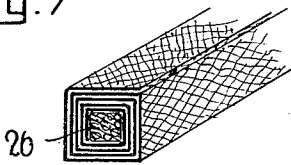


FIG. 11

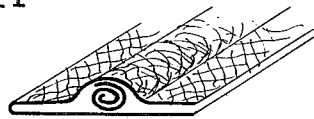


FIG. 8

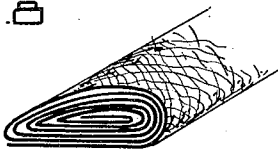


FIG. 12

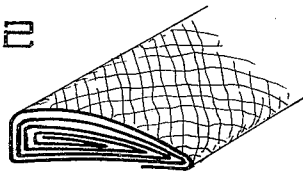


FIG. 9

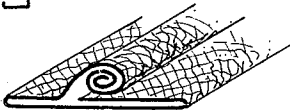


FIG. 14

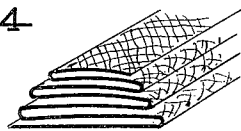


FIG. 15

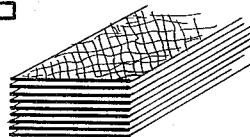
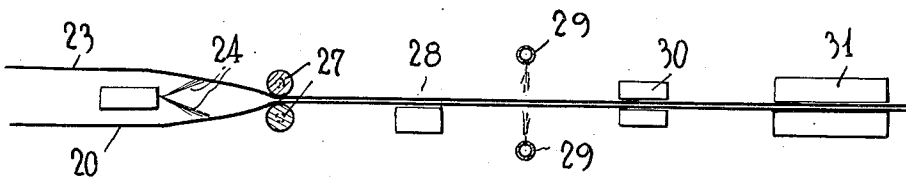


FIG. 13



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UNITED STATES PATENT OFFICE

2,234,136

TRIMMING STRIP CORE AND THE LIKE

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Application November 10, 1938, Serial No. 239,888

6 Claims. (Cl. 154—43)

My invention relates to compact contoured bodies of elongated form useful per se for some purposes, but more especially adapted to be enclosed within a covering fabric to form a trimming welt, binding or the like.

More particularly, the present invention constitutes an improvement in the product which forms the subject of United States Letters Patent No. 2,119,482 issued May 31, 1938 to Glen H. Huffer.

As is explained in the Huffer patent, a primary requisite of these elongated bodies is ability to be bent or disposed about short curves laterally without puckering, buckling, kinking, or appreciable change in cross sectional size or shape. The body must therefore be flexible, and the Huffer patent discloses the use of crepe paper as the principal element from which the body is formed.

The present invention also contemplates the use of crepe paper, in combination with an inelastic and relatively inert binder together with an elastic binder. The principal difference existing between the subject of the present invention and the Huffer body is in the type of crepe paper employed.

In common with the Huffer article, the present invention proposes an elongated body made by superimposing on each other a plurality of groups of laminae or plies, each lamina consisting of two sheets of crepe paper bonded together by an interposed layer of relatively inelastic adhesive. The several groups of laminae are bonded together by an exceedingly thin coating of elastic adhesive and the whole assembly is compacted together and reduced to a comparatively dense, compressed body having a degree of hardness that makes it suitable for use as a core for the beading of finishing strips such as trimming welts and the like.

As has been stated, an important requisite of these bodies is flexibility. Little or no difficulty is experienced in bending trimming welt cores made in half-round or other comparatively flat shapes, if the direction of bend is out of the plane of flatness. Considerably more difficulty, however, is experienced in disposing such shapes about lateral bends, in the plane of the flatness, and it is this type of bend that is most frequently encountered in application of the core or trimming device containing it. It is important that the core be capable of negotiating this type of curve without distortion, and it is important also that the core or body be capable of being formed about such curves readily, easily, and without

undue attention and care on the part of the workman.

The Huffer device employed crepe paper in which the creplings extend transversely of the sheet. To the extent that these creplings remained in the core or body product after the pressure of the forming and compacting operations, they served to accommodate bending stresses by closing together along the inside edge of the curve and opening up or separating along the outside edge. The present invention departs from the device disclosed in the Huffer patent by employing a different kind of crepe paper sheet, i. e., one in which the creplings extend diagonally across the sheet rather than right-angulantly across it. The present invention uses crepe paper in which the creplings extend substantially diagonally across the sheet from both edges, so that the lines of creping cross each other. I have found that bodies built up from this material exhibit improved ability to be curved laterally, so that the curves can be more easily, quickly and carelessly made, and so that less tendency to kink, pucker and otherwise become distorted results, and so that neat curves of shorter radius can be made.

I have also found that bodies made from diagonally creped paper as proposed by the present invention exhibit a smoother surface, notwithstanding the presence of substantially twice the creping, as compared with the Huffer product. The new product is better able to withstand the pressure of the forming and compacting operations, which have less tendency to iron out and obliterate the creplings.

Among the objects of the present invention are, therefore, the provision of a welt core or analogous body having superior bending ability, having a smoother superficial surface notwithstanding the presence of creping to an increased degree, and having a denser structure produced by die or roller pressure without materially or seriously removing the creping.

The accompanying drawings, which illustrate certain preferred embodiments of the invention, show some of the products contemplated by it, as well as a preferred method of manufacture.

In the drawings,

Figure 1 is a plan view showing the basic constituent element of the new product, a ply comprising two sheets of double diagonally creped paper bonded together by a layer of inert, relatively inelastic adhesive;

Fig. 2 is a cross sectional view taken on the line 2—2 of Fig. 1 and on an enlarged scale;

Fig. 3 is a plan view showing the ply of Fig. 1 coated with a thin surface film of relatively elastic adhesive which bonds a plurality of such plies together to make up the final product;

Fig. 4 is a perspective sectional view of the ply preliminarily folded on itself, comprising a plurality of groups of laminae, each group being like that shown in Fig. 3;

Fig. 5 is a sectional perspective view of the body of Fig. 4 after the rolling or compacting operation and shows the contour of one form of product;

Figs. 6-12 inclusive are similar views, each in sectional perspective, showing examples of various other selected forms of final product;

Fig. 13 is a diagrammatic illustration of a preferred method of making the product; and

Figs. 14 and 15 are sectional perspective views showing in merely diagrammatic form additional examples of still further forms of product.

Referring now to the drawings, manufacture of the product begins with the selection of a suitable sheet of paper of appropriate weight, strength and thickness. I prefer to use kraft paper in sheets of considerable width, i. e., much wider than the strips which are subsequently cut from them to be folded on themselves or stacked to form the individual body or core product. The individual sheets are creped, in any customary and well understood manner, by two sets of creping lines each extending substantially diagonally across the sheet. Conveniently the sheet is creped twice. On the first creping operation a plurality of approximately parallel lines of creping are formed, all these lines extending obliquely from edge to edge of the sheet and forming with the edges an angle of preferably approximately 45°. In Fig. 1, where one of the sheets is shown at 20, a set of such creping lines is shown at 21. It will be noted that the lines 21 are substantially parallel to each other and diagonal with relation to the opposite edges of the sheet. A similar set of such lines of creping is next incorporated in the sheet, but this second set of creping lines crosses the sheet oppositely diagonally, forming substantially the same angle with the edges of the sheet, but crossing the first set of lines at a greater angle. The second set of creping lines is designated 22 in Fig. 1.

The sheet 20, when prepared for incorporation in the product contemplated by the present invention, has, by reason of the two sets of creping lines, its fibres materially broken up or crimped to a very complete degree, although none of the fibres is actually ruptured. The sheet differs in appearance and properties from ordinary crepe paper in which the creplings extend approximately directly across the sheet. The double diagonally creped paper which I use has substantially twice the creping of directly transversely creped paper and is more freely capable of being transversely curved. Moreover, because the lines of creping are formed from both edges, the sheet may be curved with equal facility in either lateral direction. Again, notwithstanding the increased number of creping lines the sheet is superficially smoother than directly transversely creped paper, and this constitutes a distinct advantage for my purposes, as will be pointed out hereinafter.

In Fig. 1 I have used the reference numeral 20 to designate the sheet of specially creped paper which has been described. A second sheet identical with the first is designated 23, and is bonded to the first sheet by interposing between them a layer 24 of some comparatively inelastic and inert

adhesive. I have found standard commercial asphaltic adhesives entirely satisfactory. This substance is applied to one or both of the sheets 20, 23, preferably while the sheets remain of their original roll width, and the sheets are pressed together so as to become securely united to each other by the adhesive, care being taken during this operation not to impair the creplings. The layer 24 is made quite thin, being preferably as thin as the nature of the adhesive substance permits, because it is desirable to keep down to a minimum the stiffness and hardness which the asphaltic adhesive tends to give the laminated sheet. The comparative smoothness of the nevertheless highly creped sheet permits the layer 24 to be made unusually thin although completely coating the juxtaposed surfaces of the juxtaposed paper sheets. When properly united sheets 20 and 23 retain practically all their creplings, and the resulting laminated product may be subjected with impunity to stretching and compressive stresses that would materially straighten out the individual sheets and materially impair the creplings thereof. It is a function of the asphaltic adhesive also to hold a pair of creped paper sheets together and render them proof against loss of their creplings when subjected to stretching and compressive forces during the forming operations which are later practiced on them.

In Fig. 2 the cross sectional appearance of the composite sheet of Fig. 1 is shown on an enlarged scale. In Fig. 2 the relative dimensions of the paper and asphaltic layers are not those which exist in the actual product but are distorted and exaggerated for clarity of illustration. It will be understood that the asphaltic layer is thinner than appears from Fig. 2.

The sheet shown in Fig. 1 may be considered to be of roll width. Such a sheet is slit longitudinally to provide a plurality of comparatively narrow strips, each being of a width appropriate for folding or stacking to provide a body product of the width and thickness desired. Fig 3 illustrates on a relatively enlarged scale one of such comparatively narrow strips.

Each of the narrow strips is coated on one or both of its surfaces with a very thin film of adhesive substance which is essentially unlike the layer 24 in that it is elastic. Its thickness is kept at a minimum. It is applied to the strip before the same is folded and while the strip is in flat condition. In Fig. 3 the stippling designated 25 indicates this thin film of elastic or resilient adhesive substance.

Latex, or rubber deposited from latex, is an excellent material from which to form the thin film 25. A preferred mode of application consists in spraying latex on to one or both sides of the strip. It is desirable that the resulting film be of minimum thickness or depth but substantially unbroken so as to cover substantially all the surface of the paper. Such a film lies practically wholly on the surface of the paper and does not penetrate the paper more than microscopically. This film, which dries practically as soon as it forms on the sheet, does not appreciably wet the sheet or the strip of which it is an element, nor does it introduce into the strip or sheet of paper any of the characteristics of saturated, soaked or wetted paper. The strip with the latex film applied to it thus remains dry and continues to possess all the properties of a dry sheet of paper. The creplings of a dry sheet are not easily ironed out by pressure normal to the sheet or tension along its length; hence it can be handled through

the subsequent body forming operations without substantial loss or impairment of the creplings. It will be remembered that the double diagonally creped paper possesses a greatly increased number of creplings as compared with ordinary directly transversely creped paper. Consequently, this double diagonally creped paper may lose some of its creping in the body forming operations without seriously impairing its creped character, because it will still remain a highly creped sheet.

After receiving the latex coating, and preferably promptly thereafter, in a continuous operation as will be explained hereinafter, the strip of Fig. 3 is folded on itself, or a plurality of such sheets are stacked on each other. In Fig. 4 I show one mode of folding the strip on itself. In Fig. 14 the strip is convoluted back and forth on itself. In Fig. 15 a plurality of strips are stacked on each other. Various of the figures show suggested dispositions of folds and stacking for producing different kinds of ultimate shapes.

The folded or stacked strip or strips form a comparatively soft body. To transform this body into the shape of product desired, and to give it the requisite hardness and density, I subject it to any convenient forming operation. I prefer to run the soft body through a die or a set of rolls in a well known type of folding machine, but it will be appreciated that other methods and machines may be used.

Although the coating 25 is substantially dry as soon as it forms on the strip, this coating tenaciously bonds with an adjacent surface of coating or paper in the preliminarily formed body, and when subjected to pressure in the forming operation the result is a body comprising a plurality of groups of individual laminae, securely bonded together, each group consisting successively of a sheet of double diagonally creped paper, relatively inelastic asphaltic adhesive, another sheet of similarly creped paper, and an exceedingly thin film of elastic adhesive, assembled compactly together in that order. Such a body I have found is flexible and bendable without distortion to an extraordinary degree. When made, as I prefer to make it, otherwise exactly as proposed by the Huffer patent, but differing therefrom solely in the type of creping employed, the resulting body possesses markedly superior bending capacity. Even in the case of bodies shaped to have relatively thin side edges and unusually flat contours, as shown in Fig. 5, and in the case of upholstery covering "raisers" as shown in Figs. 9, 10 and 11, the bodies may be easily curved by unskilled workmen around the shortest radii commonly encountered in the trimming trade.

Because the superficial surface of my new product is comparatively smooth notwithstanding its creping, the product may be used as a core for trimming welts and the like in which a very thin covering fabric is used. The creplings do not show through such a thin fabric, yet the surface roughness is sufficient to take adhesive and make a very secure bond with the covering fabric.

When the body is curved the creplings apparently act to open up on one side of the curve and move together on the other side, in the manner of the prior art creped bodies. However, apparently because my product contains more lines of creping, the individual movement of the paper at each creping is smaller and less noticeable, so that the inside curved edge remains smoother. The curved product is therefore more regular and less distorted and curvatures around shorter

radii may be made without exercising any great degree of care and without resulting in objectionable distortion of the body.

In Figs. 6 and 7 I show a central filler 26 in the form of a cord or string of cotton, paper or the like. This type of construction will be found useful for some purposes, as where variations in the hardness or density of the product are desired. The surface characteristics of the double diagonally creped paper enable it to be easily and perfectly united by adhesive to the surface of such a cord.

In Fig. 13 I illustrate diagrammatically a convenient method of making the product. In this figure the sheets of double diagonally creped paper 20, 23 are coated with one or two films of asphaltic adhesive 24, whereupon the sheets are rolled into contact with each other at 27 to form the laminated sheet shown in Fig. 1. At 28 there is cut from the sheet a strip of the desired width, whereupon one or both surfaces are sprayed with latex at 29, the strip is folded at 30 and run through a forming die or roll series 31 to compact the plies together.

It will be recognized that the invention is capable of being practiced by methods and with apparatus different from those described. The essential principle of the invention resides in the employment of a peculiar type of crepe paper, as has been explained. This principle may be carried into shapes and products other than those herein selected for illustration. All such different embodiments, to the extent that they incorporate the principle of the invention by employing diagonally creped paper, or double diagonally creped paper, are deemed to be within the scope and purview of the appended claims.

I claim:

1. A compact, contoured, laminated body of strip form comprising a plurality of groups of laminae, each group consisting successively of a sheet of crepe paper, relatively inelastic asphaltic adhesive, another sheet of crepe paper, and an exceedingly thin film of elastic adhesive, assembled compactly together in said order, the creplings of the crepe paper extending obliquely across each sheet thereof in two sets of lines of generally parallel creplings, the lines of each set making substantially the same oblique angle with the edge of the sheet and crossing the lines of the other set at an angle, and the elastic adhesive laminae lying substantially wholly on the surface of the paper of adjacent groups without penetrating the paper more than microscopically, whereby the creplings of the constituent paper sheets remain substantially unimpaired in the body, and all of said plurality of laminae being compressed compactly together, said laminated body possessing the ability to be curved laterally with little tendency toward distortion.

2. A compact, contoured, laminated body of strip form comprising a plurality of groups of laminae, each group consisting successively of a sheet of crepe paper, relatively inelastic asphaltic adhesive, another sheet of crepe paper, and an exceedingly thin film of elastic adhesive, assembled compactly together in said order, the creplings of the crepe paper comprising two sets of oppositely obliquely directed lines of creping crossing each other at a substantial angle, and the elastic adhesive laminae lying substantially wholly on the surface of the paper of adjacent groups without penetrating the paper more than microscopically, whereby the creplings of the constituent paper sheets remain substantially unim-

paired in the body, and all of said plurality of laminae being compressed compactly together, said laminated body possessing the ability to be curved laterally with little tendency toward distortion.

3. A compact, contoured, laminated body of strip form comprising a plurality of groups of laminae, each group consisting successively of a sheet of crepe paper, relatively inelastic asphaltic adhesive, another sheet of crepe paper, and an exceedingly thin film of elastic adhesive, assembled compactly together in said order, the creplings of the crepe paper comprising a first set of lines of creping diagonally directed across the sheet from one side edge to the other at an angle of approximately 45° to the edge of the sheet and a second set of similar lines of creping directed across the sheet from said other side edge to the first named side edge at a substantially equal angle, and the elastic adhesive laminae lying substantially wholly on the surface of the paper of adjacent groups without penetrating the paper more than microscopically, whereby the creplings of the constituent paper sheets remain substantially unimpaired in the body, and all of said plurality of laminae being compressed compactly together, said laminated body possessing the ability to be curved laterally with little tendency toward distortion.

4. A compact, contoured, laminated body comprising a ply consisting of two sheets of crepe paper, each sheet having its creplings extending obliquely across the sheet in two sets of lines of generally parallel creplings, the lines of each set making substantially the same oblique angle with the edge of the sheet and crossing the lines of the other set at an angle, bonded together by relatively inelastic yet pliable asphaltic adhesive, said ply being folded on itself to provide a plurality of layers, and interposed between the surfaces of the adjacent layers an exceedingly thin film of rubber deposited from latex lying substantially wholly on said surfaces without penetrating the paper more than microscopically and not materially impairing the creplings, said layers being united by said thin film into a compact, laminated body of strip form comprising alternate laminae of crepe paper, inelastic asphaltic adhesive, crepe paper, and elastic adhesive, and none of said laminae materially penetrating any adjacent lamina, whereby the creplings of the constituent paper sheets remain substantially unimpaired in the body notwithstanding the use of pressure to compact the laminae together, said laminated body possessing the ability to be curved laterally with little tendency toward distortion.

5. A compact, contoured, laminated body comprising a ply consisting of two sheets of crepe paper, the creplings of the crepe paper comprising two sets of oppositely obliquely directed lines of creping crossing each other at a substantial angle, bonded together by relatively inelastic yet pliable asphaltic adhesive, said ply being folded on itself to provide a plurality of layers, and interposed between the surfaces of the adjacent layers an exceedingly thin film of rubber deposited from latex lying substantially wholly on said surfaces without penetrating the paper more than microscopically and not materially impairing the creplings, said layers being united by said thin film into a compact, laminated body of strip form comprising alternate laminae of crepe paper, inelastic asphaltic adhesive, crepe paper, and elastic adhesive, and none of said laminae materially penetrating any adjacent lamina, whereby the creplings of the constituent paper sheets remain substantially unimpaired in the body notwithstanding the use of pressure to compact the laminae together, said laminated body possessing the ability to be curved laterally with little tendency toward distortion.

6. A compact, contoured, laminated body comprising a ply consisting of two sheets of crepe paper, the creplings of the crepe paper comprising a first set of lines of creping diagonally directed across the sheet from one side edge to the other at an angle of approximately 45° to the edge of the sheet and a second set of similar lines of creping directed across the sheet from said other side edge to the first named side edge at a substantially equal angle, bonded together by relatively inelastic yet pliable asphaltic adhesive, said ply being folded on itself to provide a plurality of layers, and interposed between the surfaces of the adjacent layers an exceedingly thin film of rubber deposited from latex lying substantially wholly on said surfaces without penetrating the paper more than microscopically and not materially impairing the creplings, said layers being united by said thin film into a compact, laminated body of strip form comprising alternate laminae of crepe paper, inelastic asphaltic adhesive, crepe paper, and elastic adhesive, and none of said laminae materially penetrating any adjacent lamina, whereby the creplings of the constituent paper sheets remain substantially unimpaired in the body notwithstanding the use of pressure to compact the laminae together, said laminated body possessing the ability to be curved laterally with little tendency toward distortion.

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