June 20, 1933. W. W. ROWE 1,915,202

SEAM REENFORCEMENT

Filed Nov. 19, 1928

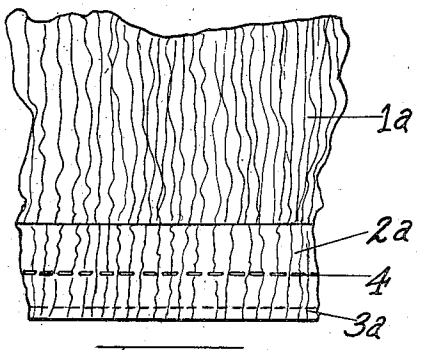


FIG 2

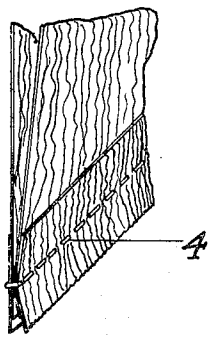
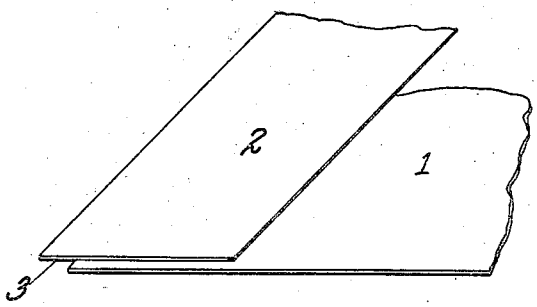


FIG 3



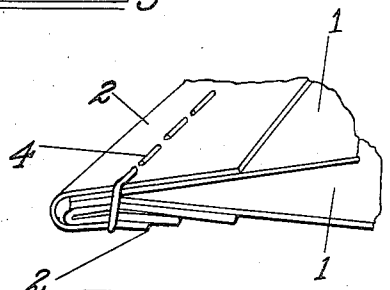


FIG 6

FIG 1

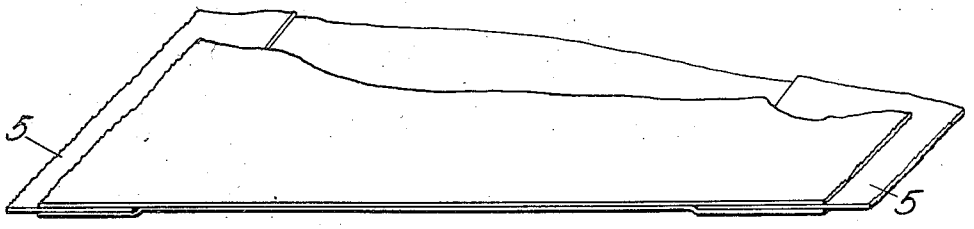


FIG 4

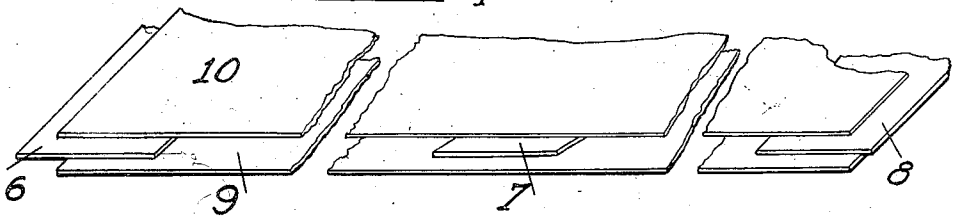


FIG 5

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Patented June 20, 1933 1,915,202

UNITED STATES PATENT OFFICE

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SEAM REENFORCEMENT

Application filed November 19, 1928. Serial No. 320,289.

My invention provides improvements in seam reenforcements in crimped or creped fabrics, particularly creped papers. Articles, such as bags, bag liners, barrel liners, aprons, etc., are made of creped papers by joining operations involving the formation of seams. The need for seam reenforcements for the lines of stitching is apparent and has been recognized.

Hitherto such reenforcements have comprised strips pasted on to the paper webs. Plain gummed tape or the equivalent has been used; but the result is unsatisfactory because the plain reenforcement robs the seam of that elasticity which it is a prime function of the creped fabric to provide. Strips of creped fabric have also been cemented to the main creped web. Reenforced seam areas formed in this manner retain some elasticity. It should be noted, however, that any stretching tends to separate and disrupt the plies; and once the potential stretchability has been realized by an actual stretching, the loosening or detachment of the strip from the body robs the reenforcement of its subsequent effectiveness. This is because, while the stretchability is resident in the crinkles, the two plies of fabric do not stretch together, but each in accordance with its individual crinkling.

Failure at sewn seams is generally the result of two causes: The paper, weakened by the line of needle perforations may tear under strain, or the thread passing through the needle holes may tend to cut the paper. Usually the two causes reenforce each other. But it will be clear that an extra layer of paper in the seam will have a different result if it is in adhesive contact at all points with the main fabric than if it is not. If such an extra layer is not attached, or is insecurely attached, it may tend to protect an underlying layer from the cutting action of thread; but it will not render the main fabric less liable to tear along the line of perforations. If, however, it is in complete adhesive contact, it not only affords equal protection against cutting, but doubles the effective strength of the main fabric since it also must be torn therewith at the perforations.

It is an object of my invention to provide reenforced seam portions which retain the elasticity of the base fabric and are not rendered subsequently ineffective by stretching.

It is my object to provide a reenforcement construction in which the reenforcing strip is conjointly creped with the body sheet.

It is my further object to provide a method of forming reenforcements during the creping of the body sheet so that no separate and subsequent operation is necessary for the purpose.

It is my further object to effect, in practicing said method, a betterment of the edge conditions during creping.

These and other objects which will be apparent to one skilled in the art upon reading these specifications, I accomplish by that certain process and arrangement of parts of which I shall now describe preferred embodiments, reference being made to the drawing forming a part hereof.

In the drawing:

Figure 1 shows an uncreped sheet and reenforcing strip in position for attachment and simultaneous creping.

Figure 2 is an elevation of a reenforced seam.

Figure 3 is a perspective view of a structure comprising two members, each with a reenforced seam, sewn together as in the formation of a bag, barrel liner, or the like.

Figure 4 shows a sheet of duplex crepe with an interleaved reenforcement at either end.

Figure 5 shows the assembly of fabric sheets and reenforcing strips used in the formation of a duplex product similar to that indicated in Figure 4.

Figure 6 shows a sewn structure in which the overlapping edges of the reenforcement strips have been left purposely wide, and have been bent back over the seam and sewn therewith to form a non-sifting construction.

In practicing my invention, broadly, I fasten the reenforcement to the main web or body of the fabric before the creping operation so that they may be creped together

without substantial disturbance of the attachment between them. When thus creped, the corrugations are conjoint and the body fabric and the seam reenforcement may stretch together and contract together without any substantial tendency to separate. Thus as in Figure 1, I take a body sheet 1 and a reenforcement 2 and I superimpose them and cement them together before the creping process. This may be done either before the material reaches the creping roll or upon the creping roll but before the material reaches the doctor. The body sheet 1 and the reenforcement 2 may be, of course, of any material suitable for creping and they may be of the same or different materials. It is also to be noted that in one aspect of my invention, the reenforcement 2, while it should be flexible enough to be crinkled, need not be of such character that the crinkling will remain therein, i. e., that it could be permanently creped, since the crinkling of the main sheet will preserve the crinkling of the reenforcement. Consequently, I could use as my main sheet for example, a heavy web of kraft paper and as my reenforcing strip 2, a thin body of cheese cloth or the like.

However, for a purpose which I shall presently describe, I prefer to have the reenforcement 2 of any material which will retain a crepe.

Ordinary creping operations will be understood as conducted upon a creping roll to which a wetted web of fabric is led and from which it is removed and crinkled by a doctor blade as is the practice in the art. Various types of creping operations produce various results and my invention is not restricted to any particular type. For heavy sewn articles such as barrel liners, tire covers, aprons and the like, I may use the creping process described and claimed in my Patent No. 1,628,515, in which the material is not saturated with water or treated with a water soluble adhesive, but on the contrary is creped with a bituminous adhesive in the absence of water. In any case, the sheet 1 may, as an example, be of heavy kraft caused to adhere to the creping roll, and the reenforcing strip 2 may be a strip of kraft or other material cemented to it or it may be a strip of ordinary gum tape which has been moistened before its application to sheet 1. I prefer to overlap the sheets, causing the reenforcement to extend, say, one quarter inch or so beyond the edge of the sheet 1 as is shown at 3, and it is advantageous to have the projecting edge of the reenforcement coated with adhesive on the side to be next the creping roll. This naturally occurs when the reenforcing strip is gummed tape.

In water creping operations, particularly, the edge of a sheet is frequently subject to what are known as skips, that is to say, uncrinkled, irregular portions at the edge of the paper caused by its too ready separation from the roll. Skips do not occur so readily elsewhere as at an edge of a sheet during creping, because elsewhere, the contiguous portions of the material tend to hold the web against skipping. At and beyond an edge, there is no such holding and the skips are frequently encountered. If a reenforcement were applied in registry with the edge of the main web, the added stiffness imparted thereby during the creping operation would tend to increase rather than diminish the skipping. If however, I overlap the edge of the reenforcement, say one quarter of an inch or so, and cause it to adhere to the creping roll, the tendency to skip is very greatly diminished. This is of course partly true because instead of having a double thickness of edge having a great tendency to skip, I now have a double thickness of material adjacent the edge but an actual edge of single thickness. Again in the use of gum tape, the added adhesive upon the reenforcement edge will also diminish the tendency to skip. I have discovered that I can very greatly decrease and in some instances eliminate entirely the tendency to skip at the edge of the sheet by superposing a reenforcing which overlaps that edge; and it will be readily understood that this discovery has importance not only in the formation of reenforcements of narrow width for the production of seams but in the production of full reenforced webs by the superposition of complete layers.

It has a further importance in this, that where I desire to produce an article, say a bag, with one edge turned up over the other and sewn in the seam so as to prevent sifting between the fabric plies, I may give to the reenforcement an overlap great enough to accomplish this. Thus, when working with two layers of single thickness paper with edge reenforcement, if I double back the edge before sewing, I decrease the dimension of an article which I can produce from a given width of paper, and I must sew through eight thicknesses of paper If I allow the reenforcement to overlap say one inch, and in making the seam I bend back this overlapping portion, the effective width of my paper remains the same, and I sew through but six thicknesses of paper. Figure 6 illustrates a seam of this character in which the overlap of the reenforcement strips 2 on the body fabric layers 1 is an inch or more, the reenforcements being bent back and sewn in the seam. It will be noticed that the line of stitching 4 penetrates but six layers of fabric.

When the product of Figure 1 has been creped it will appear as is shown in Figure 2, in which 1A is the creped body fabric, 2A is the creped reenforcement and 3A is the creped overlapping edge. Figure 3 shows two such fabrics with their reenforcements juxtaposed, and a line of stitching 4, fasten-

ing them together, the reenforcements preventing tearing and cutting at the line of stitching.

The sheet 1 may also be thought of as a duplex fabric in another embodiment of my invention, the reenforcement 2 may be similarly applied and the material creped in the ordinary fashion. In handling duplex materials, however, I may interleave the reenforcement 2 between the duplex plies as can readily be done during the pasting operation, so that I obtain a final product as is shown in Figure 4. Here again the reenforcement is caused to overlap the edges on the main duplex sheet as shown at 5 for the same purpose. Frequently in making a duplex sheet of regular width, I will desire to provide several longitudinal reenforcement portions for the formation of several seam reenforcements, as for example, in the manufacture of barrel liners, where the length of the liner is half of the width of the sheet or less. I can do this as is shown in Figure 5 by providing for the insertion of reenforcement strips 6, 7, 8, etc. between the bottom sheet 9 and the top sheet 10, during the duplexing operation, the strips being longitudinally positioned at the desired lines of reenforcement. A series of longitudinal reenforcements may also, of course, be applied to a duplex or single sheet on the outside. The sheet thus formed will be slit apart, and if the reenforcing strip be wide enough it may be slit midway forming two reenforced portions. The slitting may be done either before or after the creping and with a creping process involving the use of bitumen as an adhesive, which process is characterized by a practical absence of skips, either method may be followed depending upon convenience. In a water creping operation instances may arise when to slit before creping is to invite skips whereas to slit afterwards will involve no difficulty. When a reenforcement is slit midway, of course, two double-thickness edges are produced, and there is no overlapping of the reenforcement onto the roll such as I preferably employ when water creping.

I find that while a reenforcement merely pasted on the outside of a duplex sheet and overlapping the edges will tend to prevent skips in the same fashion that an overlapping reenforcement upon a single ply body fabric does, I attain a better result by interleaving the reenforcement. I believe this to be due to the fact that the projecting edge of the reenforcement, to reach the roll, has to bend down only the thickness of one ply rather than two, so that its tendency to leave the roll is much less. Transverse reenforcing strips may be applied as an addition to the steps illustrated in Figures 1 and 5 if desired. They will fall preferably on the outside of single ply fabrics, i. e., the side which is not against the creping roll, or within the body of duplex fabrics. In bitumen-creping processes the bitumen coating will usually serve to cement in place intermediate reenforcements, and since the skipping difficulty is not resident in these processes, a convenient operation in joining two strips of fabric with a seam reenforcement along one edge, is to associate a reenforcement strip with the body fabric intermediate its edges while the bitumen is still tacky and crepe the composite product, slitting either before or after the actual creping.

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

1. A reenforced seam comprising a layer of creped fabric with an edge reenforcement strip adhesively joined thereto and creped therewith, a second layer of creped fabric with a similar edge reenforcement, said layers superposed so that said reenforcements coincide, and a line of stitching joining said layers at said reenforcements.

2. A reenforced seam comprising a layer of creped fabric with an edge reenforcement strip adhesively joined thereto and creped therewith, the edge of said strip projecting beyond the edge of said fabric, a second layer of fabric with a similar edge reenforcement, said layers superposed so that said reenforcements coincide, the projecting edges of said reenforcement strips turned back together over said reenforcements, and a line of stitching joining said layers and said turned back edges at said reenforcements.

3. A reenforced seam comprising a layer of creped fabric with a seam reenforcement strip adhesively joined thereto and conjointly creped therewith, a second layer of fabric with a similar seam reenforcement, said layers superposed so that said reenforcements coincide as to position, a line of stitching joining said layers and said reenforcements, and portions of said material turned back over the seam thus formed and caught by said stitching.

4. A reenforced creped fabric comprising a body sheet and a superposed reenforcing strip joined by adhesive thereto over a proposed line of seam and the corrugations of the creping of said sheet and strip being conjoint whereby they may be stretched together without separation, the lines of corrugations extending transversely of said strip, and whereby said fabric may be stitched with said strip forming a reenforcement for said stitching.

5. A reenforced seamed construction comprising a layer of creped fabric with a seam reenforcement strip adhesively joined thereto and conjointly creped therewith, a second layer of material, and a line of stitching joining said layers and passing through said reenforcement strip.

6. A process of forming reenforced creped structures which comprises providing a web of crepable material, running onto said web longitudinally at least one strip of crepable material and adhesively securing said strip to said web, afterward creping said web and said strip conjointly by forming therein creping crinkles essentially transverse to said strip.

7. A process of forming reenforced creped structures which comprises providing a web of crepable material, running onto said web longitudinally a plurality of relatively narrow strips of crepable material and adhesively securing said strips to said web in interspaced parallel relationship, afterward creping said web and said strips conjointly by forming therein crinkles essentially transverse to said strips, and cutting said composite structure apart into blanks for forming articles in such a way that said strips form reenforcements for said web over lines of proposed seams in said articles.

WILLIAM WALLACE ROWE.