Dec. 17, 1935. F. W. HUMPHNER 2,024,224

REENFORCED GUMMED TAPE

Filed Jan. 15, 1934

Fig. 1.

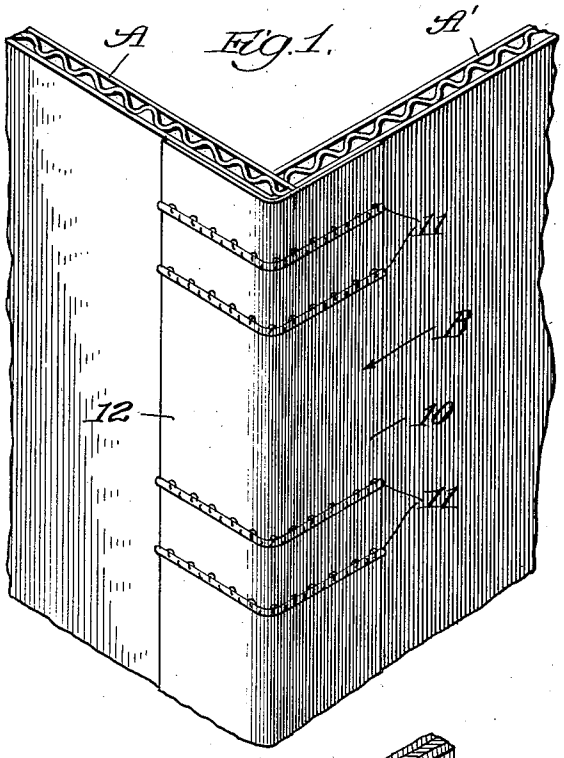



Fig. 2.

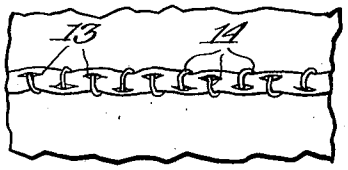



Fig. 3.

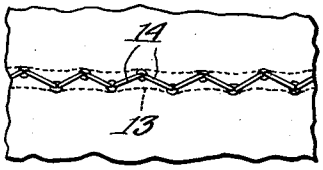



Fig. 5.

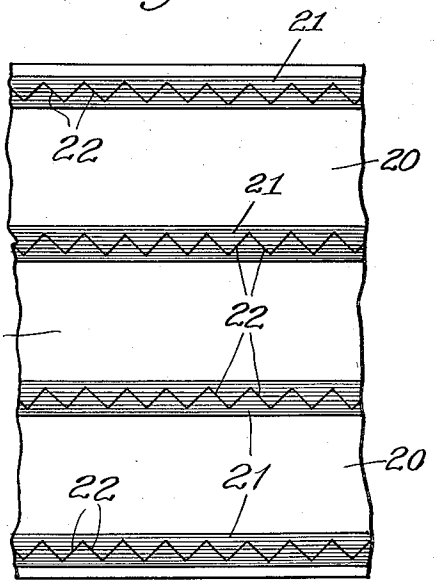
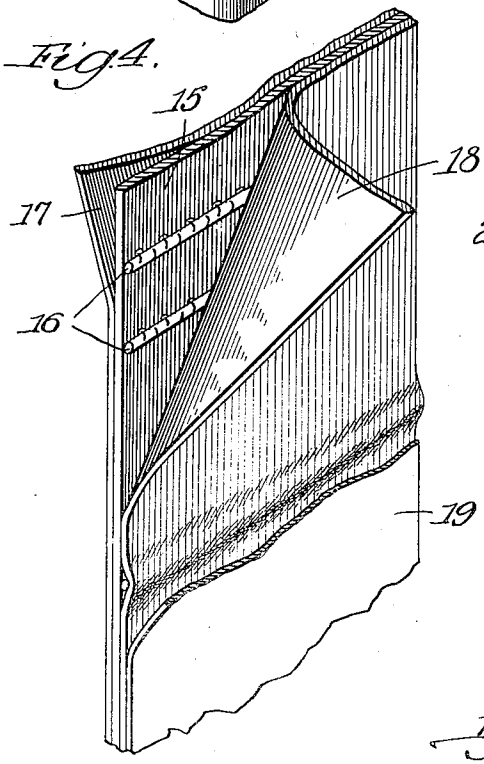



Fig. 4.




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# UNITED STATES PATENT OFFICE

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## REENFORCED GUMMED TAPE

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8 Claims. (Cl. 154—43)

This invention relates to reenforced gummed tape or binder tape. The tape is particularly useful for forming a hinge on containers as, for example, a manufacturer's hinge for a corrugated paper box. Other uses will be obvious.

The primary object of the invention is to provide a new simple and sturdy reenforced binder strip which is preferably gummed on one side and adapted to be applied to box-joints, etc. Other specific objects and advantages will appear as the specification proceeds.

The invention is illustrated, in certain preferred embodiments, by the accompanying drawing, in which—

Figure 1 is a broken perspective view of my reenforced gummed tape applied to a portion of the corner of a corrugated paper box; Fig. 2, a broken, enlarged plan view of the stitching as it appears on the outer side of the paper strip; Fig. 3, a broken plan view of stitching on the inner side of the paper strip; Fig. 4, a perspective developed view of a modified form of gummed tape embodying my invention; and Fig. 5, a broken plan view of another form of reenforced tape employing my invention.

Broadly, the reenforced tape comprises a suitable base or strip of fibrous material, such as paper, across the grain of which a reenforcing strip of spun or unspun fibres is sewed.

In the preferred form illustrated in Figs. 1 to 3, inclusive, A and A' designate two sides of a corrugated paper box, which are brought together at their free ends; and B designates a binder strip or hinge securing the sides A and A' together.

The binder strip or hinge B comprises any suitable paper sheet 10, such as kraft paper, with parallel rows of transverse stitches 11. I prefer to arrange the rows 11 in groups of closely spaced stitch rows, each of the groups being separated by a substantially wide intervening space 12. The intervening space 12 is preferably several times wider than the space between the individual rows 11. For ordinary shipping boxes, I have found that a satisfactory reenforcing tape is provided where the stitch rows in a group are about one-half inch apart, and the space between the groups is about one and one-half or two inches wide. The spacing can be varied within rather wide limits, the important factor being that the stitch rows within a group are brought closely enough together so that one row may yield enough to be supported by an adjacent row. In other words, the spacing described above checks any tendency of the tape to tear, by bunching together the several rows in the group, so that the combined strength of the stitch rows is simultaneously presented against the tearing action.

Any suitable form of stitch may be employed. I prefer, however, to use the zig-zag lock-stitch illustrated in Figs. 1 to 3, a form of stitch which is well known in the art. Instead, however, of following the usual practice of using stitch threads of substantially the same size, I have found that a much better reenforcement can be obtained by using a bobbin thread 13 which is greater in size than the upper tension thread 14. The bobbin thread may be simply a large size thread or cord, or it may be a composite thread including a number of small threads like the upper tension thread 14. Using the ordinary lock-stitch movement on a zig-zag machine, with a large size bobbin thread underneath, the upper tension thread tends to pierce the outer edge portions of the bobbin thread and a stitch is formed having the appearance illustrated in Figs. 1 and 2 for one side of the sheet. On the opposite side of the sheet, a V-shaped stitch is formed by the thread 14, which forms a thin reenforcement to which the adhesive may be satisfactorily applied. The thin stitching 14, as illustrated in Fig. 3, does not cause a bulging of the paper strip when it is applied to the box surface; and the heavy reenforcing thread 13, being on the exterior side of the strip, does not interfere with the attachment of the strip to the box. The lock-stitch prevents the heavy bobbin thread from slipping transversely of the strip, and thereby causes two or more closely spaced rows of stitching to yield together so as to utilize their combined strength.

The thread employed may be treated with latex, wax, or soft gum to increase its strength. I find that the treating of the thread with latex in accordance with the usual practice in forming a latex-covered thread is very desirable because the latex, after the stitching operation, tends to bunch around the thread openings and form a seal for the openings.

The stitching may be carried out on a pre-gummed strip or, if desired, the gum may be applied after the stitching is finished. An advantage of the latter sequence of steps is that the gum tends to seal the openings formed during the stitching operation. Also, the V-shaped stitches on the inner side of the paper present a wide surface to which the gum adheres.

The paper may be treated in any desired way. For example, the surface may be coated before the stitching operation with lacquer, shellac, casein, rubber composition, etc.

In the form of invention illustrated in Fig. 4,

I employ a central sheet 15 of kraft paper having thereon transverse rows of stitching 16 of any suitable form. In the illustration given, the stitching is the same as that illustrated in Figs. 1 to 3. Sheet 15 is enclosed between two other paper sheets 17 and 18, and permanently secured thereto by adhesive, and preferably by a flexible adhesive, such as rubber composition, latex, asphalt, etc. To the exterior surface of sheet 18, there is shown applied a layer of gum 19 by which the composite tape can be attached to a box wall. This product may be waterproofed, if desired, by coating the outside (ungummed) surface with a moisture-resistant coating.

In the form of the invention illustrated in Fig. 5, the paper sheet 20 is provided with a series of transverse strips of flat tape 21 and the flat tape is sewed by stitches 22 to the paper. Preferably, the stitches extend well toward the edge of the tape. The flat tape may be either spun or woven, or fabricated by connecting fibres lying side by side, by means of adhesive, etc. and without employing cross threads.

While I have shown specific reinforcing stitching and a specific form of tape, it will be understood that other stitches which are suitable for the purpose may be employed, and other forms of reinforcing strips sewed to the paper. The paper sheet reenforced with tape or other means may be enclosed between sheets as illustrated in Fig. 4, or it may be secured to but one of such sheets.

While in the illustration given, I have shown all of the stitches and reenforcing members running transversely of the strip, it will be understood that cross-stitches or reenforcements may be employed when desired for resisting transverse tearing.

The foregoing detailed description has been given for clearness of understanding only, and no unnecessary limitations should be understood therefrom, but the appended claims should be construed as broadly as permissible, in view of the prior art.

I claim:

1. A reenforced tape, comprising a paper strip, lock-thread stitching extending across said strip, one of the threads employed being larger than the other thread, and adhesive on one side of said paper.

2. A reenforced tape, comprising a paper strip, two-thread stitching extending across said strip, one of said threads being much larger than the other and extending only along one side of the strip, and adhesive on the side of the strip opposite the large thread.

3. A reenforced tape, comprising a paper strip, lock-thread stitching extending across said strip and consisting of a heavy bobbin thread lying on one side of the strip and a small upper tension thread securing said bobbin thread to the sheet, and adhesive on the side of the strip opposite the bobbin thread.

4. A reenforced tape, comprising a paper strip, a reenforcing cord extending across said strip, and stitching securing said cord to said strip.

5. A reenforced tape, comprising a paper web, reenforcing tape strips extending across said web, and stitching securing said tape strips to said web.

6. A reenforced tape, comprising a paper strip, parallel rows of stitches extending across said strip, said rows being arranged in groups of closely spaced rows separated by relatively large spaces.

7. A reenforced tape, comprising a paper strip, equipped on one side with gum, and transverse rows of stitching, said rows being arranged in groups of closely related rows and said groups being widely spaced apart.

8. A reenforced tape, comprising a paper strip provided on one side with gum, transverse rows of lock-stitching, said rows being arranged in closely related but spaced apart groups along said paper strip.

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