

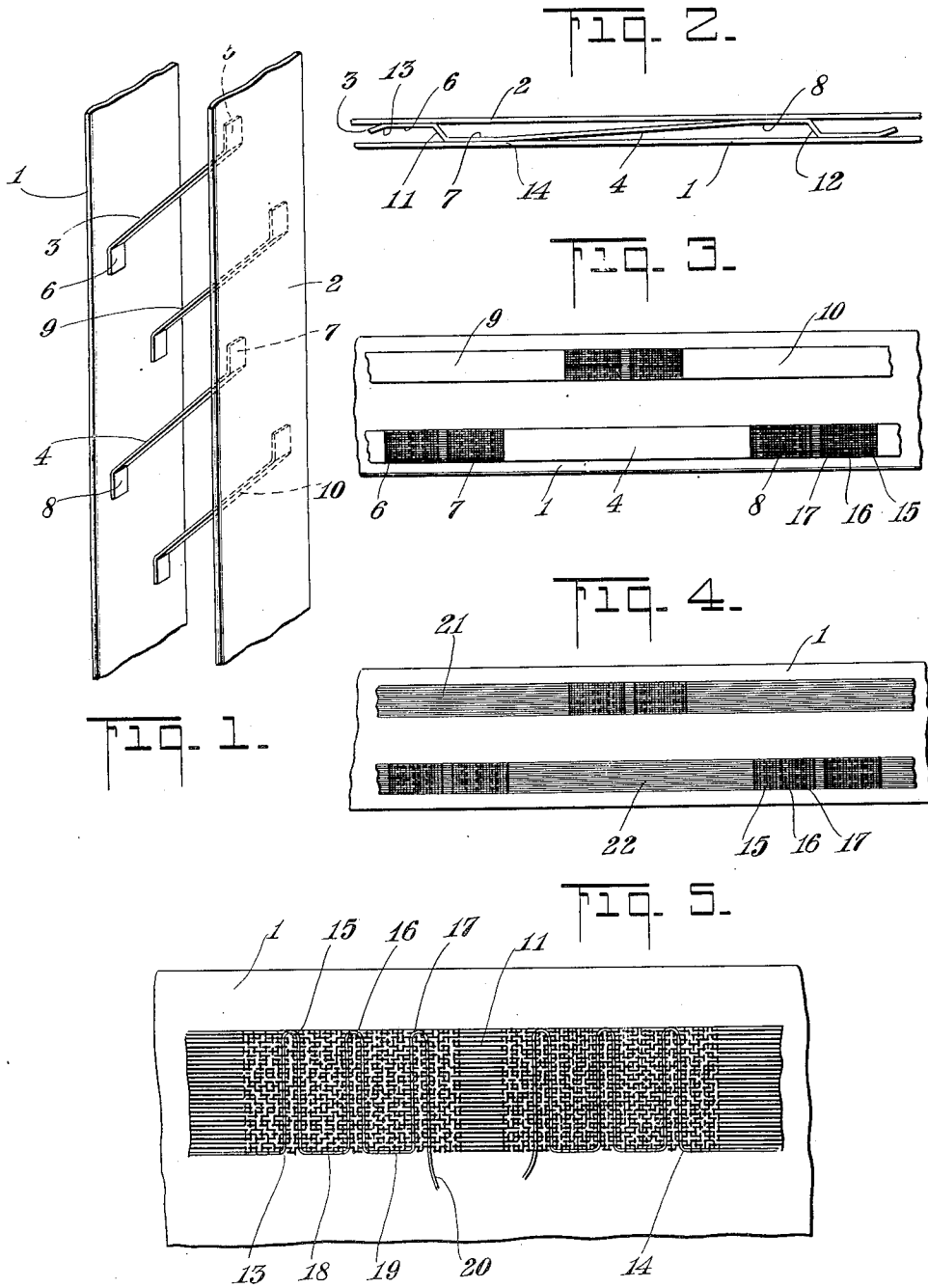
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REINFORCED LADDER WEBBING

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REINFORCED LADDER WEBBING

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5 Claims. (Cl. 139—384)

This invention relates to ladder webbing and the like for various uses, such as in Venetian blinds, sun helmets, and the like.

The present application is a continuation-in-part and an improvement on my copending application Serial No. 67,809, filed March 9, 1936, entitled "Ladder and like webbing and in the method of and means for producing the same".

Prior to the invention of the above identified application for patent, it was customary to weave the ladder webbing in a loom provided with a jacquard or dobby to control the healds carrying the cross tape warp threads, such jacquard or dobby motion causing the cross tape warps to rest or "float" for a distance between the woven-in cross tapes. Such resting or floating of the cross tape warps has caused the warps to be unwoven at the time of passing from one banding web to the other, and thus leave the aforesaid objectionable lengths of weftless warp threads. Further, the cross tape weft has, for a like reason, extended from the commencement of one cross tape binding-in to the finish of the next binding-in on the surface of the banding web.

In accordance with the improvement of the aforesaid pending application, the webbing is woven in a loom in which the shedding device is arranged to allow of only a very short length of unwoven warp threads between the binding-in of the cross tape threads and the outer banding webs, and cause the heretofore loose weft of the said cross tapes to be woven into the banding webs at the same time as the interweaving of the cross tape warp threads with the said banding webs.

In thus shortening and practically dispensing with the slack unwoven free warp threads, and interweaving the hitherto unwoven weft thread with the woven-in portion of the cross tapes one cutting operation will serve for the finishing process, whilst a stronger and firmer make of webbing is obtained, as the binding or interweaving of the cross tape warp is for a greater length than heretofore.

The hitherto loose weft thread was, in accordance with the aforesaid application, interwoven with the webbing to produce a better and stronger article. The present invention is directed to the same subject matter, namely, the weaving-in of the weft thread of the cross tapes. But instead of merely binding-in the weft thread into the webbing, it is woven into the cross tapes in such a manner as to materially strengthen the same. Usually, it is woven into said cross tapes at the

bindings-in with the outer bands in a plurality of lines so as to provide a series of strengthening ribs for the structure.

The nature of the invention is illustrated in the accompanying drawing, in which like reference characters indicate like parts, and in which:

Fig. 1 is a perspective view of ladder webbing showing in general the arrangements of the outer bands and cross tapes;

Fig. 2 is a side elevational view of ladder webbing made in accordance with the present invention prior to the cutting of the connection between the two outer bands;

Fig. 3 is a plan view of the structure shown in Fig. 2 with one of the outer bands removed to show the weaving-in of the cross-tapes into the outer bands;

Fig. 4 is a view similar to Fig. 3 showing a modification of the structure in which the cross tapes consist of warp threads only; and

Fig. 5 is a diagrammatic view considerably enlarged, showing the weaving-in of the cross tapes forming reinforcing ribs.

In the ordinary ladder tape, there are provided outer bands 1 and 2 of any desired width and carrying two sets of cross tapes in staggered relation to each other. One of these bands comprises cross tapes 3, 4 and the like, which are formed by weaving-in portion 5 into outer band 2, crossing over and being woven into outer band 1 at point 6, then crossing back to outer band 2 and being woven-in at point 7. It then again crosses over to outer band 1 and is secured therein at point 8, and so on. In a similar manner, cross tapes 9, 10 and the like are secured into the ladder webbing. All of the tapes are ordinarily formed and woven together in a multiple spaced loom in a single operation.

As shown in Fig. 2, there is a connection 11 of the warp threads of the cross tapes where it crosses over from one outer band to the other and this is cut through with scissors or the like in order to release the cross tapes and allow the webbing to be held in a position such as shown in Fig. 1. Where a weft thread has been used to form woven cross tapes, it was usually floated from point 13 of one binding-in to point 14 of the next binding-in, after which it was woven into the cross tape 4. However, in accordance with the invention of my aforesaid application, this weft thread instead of floating between points 13 and 14, was woven into bindings-in 6 and 7.

In accordance with the present invention, as more particularly shown in Figs. 3, 4 and 5,

the weft thread, instead of floating from points 13 and 14, or being woven into the bindings-in between said points, is now woven across the warp of cross tape 4, for example so as to form a series of ribs 15, 16 and 17, with intermediate connecting portions 18 and 19. As shown in Fig. 5, each of the ribs consists of two weavings-in, whereby a double reinforcement is obtained at each rib. The free end 20 of the weft thread now passes with the warp threads across the connection 11 and is then again woven into the cross tapes, as above described.

By this improvement, I obtain a very marked increase in the strengthening effect of the binding-in of said warp thread and I obtain a structure in which the cross tapes cannot be accidentally loosened. Previously, and particularly when the cross tapes consisted of warp threads only, when one or two of such warp threads were accidentally or otherwise removed from the structure, all the remaining warp threads became loose and very often the entire cross tape was pulled out of place. By reason of the strengthening ribs which pass through the outer bands and are woven into the cross tapes to further bind all of the parts together, the possibility of the pulling out of a cross tape has been completely eliminated. The interweaving of the floating weft into the bindings-in creates a lock-stitch effect which gives additional strength to the binding-in of the cross tapes.

In Fig. 4, I have shown a slight modification of the invention in which the cross tapes 21 and 22 are of warp threads only, and in which a weft thread has been woven into the bindings-in so as to give a series of ribs 15, 16 and 17. Ordinarily, the weftless cross-strap type of ladder webbing is formed in a loom having two shuttles, but in the present case two additional shuttles may be provided to form the aforesaid lock-stitch. Thereby there is provided a floating weft thread between the bindings-in of the cross-straps which may be considered as a floating warp end together with the other warp threads. Or, preferably, said weft thread is wrapped spirally around some or all of said warp threads giving a cord effect to said cross-straps. The invention is of great use where a small size ladder web is required for say very small slats, and in such cases the bindings-in under the old method of weaving is so short that the straps may be pulled away under the weight of the slats. With this new invention an extra lock-stitch effect is obtained.

Although I have described my invention setting forth two embodiments thereof, it is quite apparent that the invention is not limited to the specific embodiments shown, but that various structures may be made utilizing the principles set forth herein. While I have described each of the ribs as being made up of two crossings or a double weaving-in, it is, of course, not neces-

sary to make the ribs with a double thread, but a single thread or even more than two threads may be used. Furthermore, it is not necessary to have three strengthening ribs for each binding-in, but a greater or lesser number may obviously be provided. These and other changes may be made in the details of my invention, the scope of which is not to be limited except by the character of the claims appended hereto.

What I claim is:

1. Ladder webbing and the like comprising two outer bands and a series of cross-tapes woven into said bands, said cross-tapes including a plurality of warp threads woven alternately into one and then the other of said outer bands, and a weft thread for said cross-tapes woven into said cross-tapes to form transverse strengthening ribs at said interweaving and at the general level and within the area of said interweaving.

2. Ladder webbing and the like comprising two outer bands and a series of cross-tapes woven into said bands, said cross-tapes including a plurality of warp threads woven alternately into one and then the other of said outer bands, and a weft thread for said cross-tapes woven into said cross-tapes at a plurality of points to form transverse strengthening ribs at said interweaving and at the general level and within the area of said interweaving.

3. Ladder webbing and the like comprising two outer bands and a series of cross-tapes woven into said bands, said cross-tapes including a plurality of warp threads woven alternately into one and then the other of said outer bands, and a weft thread for said cross-tapes woven into said cross-tapes at a plurality of points to form a plurality of substantially parallel transverse strengthening ribs at said interweaving and at the general level and within the area of said interweaving.

4. Ladder webbing and the like comprising two outer woven bands and a series of cross-tapes woven into said bands, said cross-tapes including a plurality of warp threads woven alternately into one and then the other of said outer bands, and a weft thread woven into said warp threads to form woven cross-tapes, said weft thread being also woven into said cross-tapes at the general level and within the area of said interweaving.

5. Ladder webbing and the like comprising two outer bands and a series of cross-tapes woven into said bands, said cross-tapes including a plurality of warp threads woven alternately into one and then the other of said outer bands, and a weft thread woven into said warp threads to form woven cross-tapes, said weft thread being also woven into said cross-tapes to form a plurality of substantially parallel transverse strengthening ribs at the general level and within the area of said interweaving.

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