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1,977,265

TEXTILE FABRIC

Filed July 17, 1931

FIG. 1.

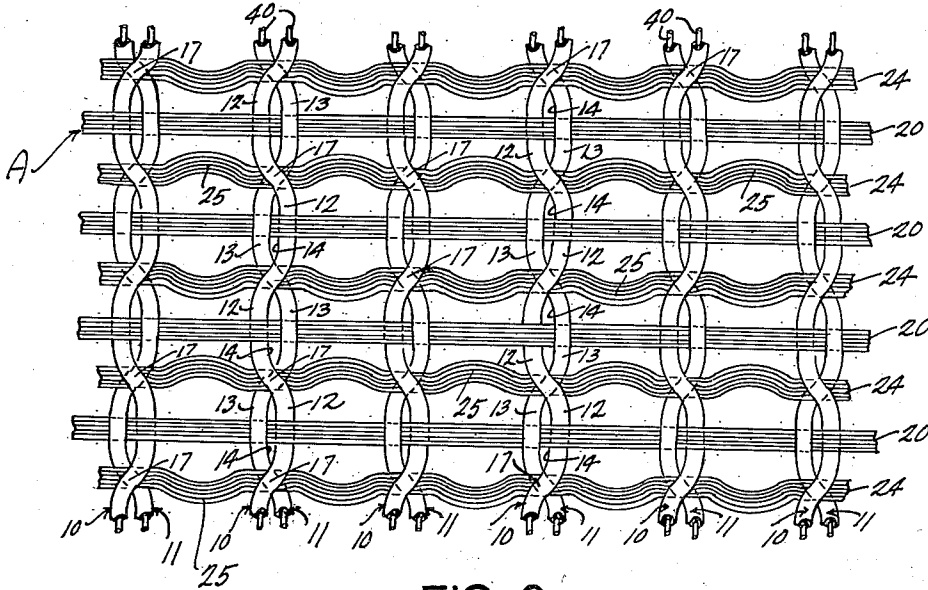
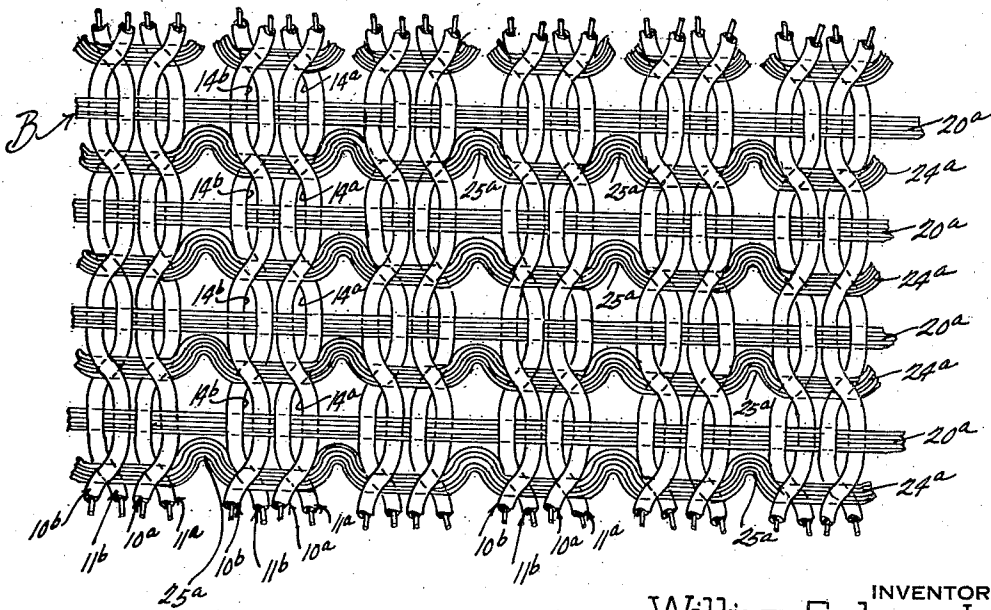


FIG. 2.



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TEXTILE FABRIC

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Application July 17, 1931, Serial No. 551,527

12 Claims. (Cl. 139-419)

This invention relates to improvements in woven fabric.

The primary object of this invention is the provision of an improved textile fabric which is provided with interwoven metallic threads, such as of copper, and which may be used for a variety of purposes such as set forth in my co-pending application Serial No. 471,758, filed July 30, 1930, and which embodies improvements thereover in the provision of improved means for anchoring, interweaving and twisting the wires in the fabric.

Other objects and advantages of this invention will be apparent during the course of the following detailed description.

In the accompanying drawing, forming a part of this specification, and wherein similar reference characters designate corresponding parts throughout the several views,

Figure 1 is a face view of the preferred form of improved fabric, showing the improved relation of interwoven warp and weft yarns.

Figure 2 is a face view of a modified form of invention showing a fabric similar to Figure 1, but with a greater multiplicity of wire warp threads.

In the drawing, wherein for the purpose of illustration are shown preferred and modified forms of the invention, the letters A and B may generally designate the preferred and modified forms of the improved textile fabric. In the preferred form of fabric A, series of relatively twisted pairs of flexible wire warp threads are employed, the series being substantially parallel and appropriately spaced so that in connection with the filler or weft yarns interwoven therewith the finished fabric will present a gauzy appearance, such as leno. Each series of warp threads comprises a pair of flexible wire strands 10 and 11 which are sinuously bent in the plane of the finished fabric, the strand 10 having the bends 12 therealong and the strand 11 having the bends 13 therealong which are opposed to the bends 12; the facing bends 12 and 13 of the strands 10 and 11 providing loop openings 14 facing transverse to the plane of the fabric. It is to be understood that the strands 10 and 11 are preferably not spirally twisted, but the bent portions at the ends cross each other at locations 17. Weft yarns or threads 20 are provided, which are preferably rather taut, and which are threaded through the loop openings 14 of the warp wires; the interweaving of the weft or filler yarns 20 through the loop openings 14 being such that all of the bends 12 of the wire strand 10 will lie at one face of the fabric, and the bends 13 will lie at the other face of the fabric, as shown in Figure 1. Intermediate filler or weft yarns 24 are provided,

which alternate with the weft yarns 20, and which extend in interweaving relation between the strands 10 and 11 preferably exactly at the cross locations 17 of the strands 10 and 11; the resistance and rigidity of the wire warp strands 10 and 11 holding the weft yarns 24 in positions. These intermediate filler or weft yarns 24 are slack, and not so taut as the weft yarns 20, and define outstanding loops 25 between the parallel series of warp wires; these loops 25 either lying in the plane of the fabric or extending transverse at either side thereof to produce a terry effect.

In the form of invention B the flexible wire warp strands are interwoven with the weft yarns in approximately the same relation as is above described for the preferred form of invention A, except that for each series of flexible wire warp threads or strands two pairs of the sinuously interwoven flexible warp wires are provided, the pairs for each series being independently interwoven with the weft yarns or threads in close side-by-side relation. Thus, as shown in Figure 2 of the drawing each series of flexible wire warp strands includes a pair of cooperatively sinuously wound strands 10^a and 11^a and a second pair of cooperative sinuously wound wire warp strands 10^b and 11^b. The pairs of strands 10^a—11^a and 10^b—11^b are wound in crossed sinuously opposed relation to provide for the respective pairs in each series the loop openings 14^a and 14^b through which the taut weft yarns 20^a are threaded, with all of the bends of the wire strands 10^a and 10^b in each series lying to one side of the fabric and the bends of the other wire strands 11^a and 11^b lying to the opposite side of the fabric. Other weft filler yarns 24^a are interwoven alternately with the yarns 20^a through the wire weft strands, being caught at the cross portions of the pairs of wire warp strands as shown in Figure 2, to define slack loops 25^a extending to one side or the other or in the plane of the fabric between the series of warp wire strands; it being understood that the series of flexible wire warp strands are relatively spaced sufficiently to provide an open work effect.

The principle of utilizing flexible wire strands in an interwoven fabric may be applied to a fabric wherein the strands are more closely woven and placed together than herein described, and it is to be distinctly understood that the terms "warp" and "weft" are interchangeably used, since the wire strands herein described may just as appropriately be placed in the fabric as weft yarns.

The wire strands preferably comprise copper wire bodies designated at 40 in the drawing

which are suitably coated either by means of cotton winding material, or some liquid coating material, without destroying the flexibility thereof and providing a frictional surface in contact with the intermediate weft yarn 20 and 24^a between the loops 25 and 25^a. The wire of the warp strands may be of any alloy desired, or may be of brass, steel, aluminum, or the like. The copper wire is preferably used for electrical purposes, and is of a composition which is very soft to properly enable its use in the fabric, but which is still suitably conductive for electrical purposes. The use of the wire in the cloth shows a large increase in the breaking strength of the same over conventional cotton yarn cloths or the like. The application of the wires under the principle described may be utilized in connection with rayon, silks, worsteds, velours, sateens and the like.

It is to be particularly noted that the weft yarns are made of a plurality of untwisted strands of fiber, such as rayon, although twisted weft yarns of fabric or other material may be utilized instead of that shown. It is within the contemplation of the invention to utilize both warp and weft strands of wire material.

Various changes in the shape, size, and arrangement of parts may be made to the forms of invention herein shown and described, without departing from the spirit of the invention or the scope of the claims.

I claim:

1. In a fabric of woven material the combination of a plurality of series of flexible wire warp strands, each series comprising a pair of sinusously shaped flexible wire strands with the sinusous bends of the strands of each series extending in opposed relation and the wire strands relatively crossing at the ends of each of the adjacent bends to define loop openings along the axis of each series, and weft threads, a portion of said weft threads extending in interwoven relation through said loop openings and a portion of said weft threads extending from warp strand in bends with the ends of said last named bends close adjacent the ends of the first named bends.

2. In a woven fabric a plurality of spaced apart series of flexible wire warp threads, each series including a pair of wire warp threads sinusously bent in the plane of the fabric in opposed relation and crossing to produce loop openings along the series transverse to the plane of the fabric, and weft filler yarns extending slackly across the spaces between said series of wire warp threads at points intermediate said loops openings, whereby said crossed wire warp threads hold said weft filler yarns in said slack condition in combination with taut wefts passing through the openings defined by the warps.

3. A woven fabric composed of spaced apart series of flexible wire warp threads, each series including a pair of wire warp threads sinusously bent in the plane of the fabric in opposed relation and crossing to produce loop openings along the series transverse to the plane of the fabric, substantially parallel weft yarns extending through said loop openings, the pair of wire warp threads for each warp series having one wire extending to one side of each weft yarn where the latter crosses through the loop openings and the other wire of each series extending to the opposite side of said weft yarns where the latter extend through the loop openings and weft filler yarns disposed intermediate the weft yarns and

extending slackly across the spaces between said wire warp threads substantially at the point of crossing of said wire warp threads, whereby said wire warp threads hold said weft filler yarns in said slack condition.

4. A woven fabric composed of relatively spaced series of flexible wire warp threads, each series including a pair of wire warp threads sinusously bent in the plane of the fabric in opposed relation and crossing to produce loop openings along the series transverse to the plane of the fabric, substantially parallel weft yarns extending through said loop openings, the pair of wire warp threads for each warp series having one wire extending to one side of each weft yarn where the latter crosses through the loop openings and the other wire of each series extending to the opposite side of said weft yarns where the latter extend through the loop openings, and intermediate weft yarns interwoven with the warp threads and extending between the wire warp threads where the said wire warp threads cross each other and being held thereby and loosely crimped between the adjacent series of warp threads.

5. In a woven fabric the combination of a plurality of spaced apart series of flexible wire warp strands, the wire warp strands of each series being sinusously bent in the plane of the fabric in opposed relation to provide transverse loop openings, and flexible filler yarns interwoven with the said series of wire warp yarns and extending slackly across the space between said series of wire warp strands and contacting with said wire warp strands at points intermediate the loop openings in combination with taut wefts passing through the openings defined by the warps.

6. In a woven fabric the combination of a plurality of series of flexible wire warp strands, the wire warp strand of each series being sinusously bent in the plane of the fabric in opposed relation to provide transverse loop openings, flexible filler yarns interwoven with the said series of wire warp yarns and extending transversely through the loop openings tautly, and intermediate loosely interwoven filler yarns alternating with the said taut weft yarns and caught between the wire threads of each series at the locations where the wire strands of each series cross each other and defining loose looped portions between the adjacent series.

7. In combination with spaced pairs of wired strands bent to form loops and crossed at the ends of the loop portions, of a plurality of series of relatively taut strands arranged transversely of the wired strands and passing through the loop portions, and a plurality of other relatively slack series of strands similarly transversely arranged and passed between the crossed portions of the wired strands and held thereby.

8. In combination with spaced pairs of wired strands bent to form loops and crossed at the ends of the loop portions, of a plurality of series of relatively taut strands arranged transversely of the wired strands and passing through the loop portions, and a plurality of other relatively slack series of strands similarly transversely arranged and passed between the crossed portions of the wired strands and held thereby, the relatively slack strands being disposed in loop formation in the spaces intervening adjacent pairs of wired strands.

9. In combination with spaced pairs of wired strands bent to form loops and crossed at the ends of the loop portions, of a plurality of series of relatively taut strands arranged transversely of

the wired strands and passing through the loop portions, and a plurality of other relatively slack series of strands similarly transversely arranged and passed between the crossed portions of the

5 wired strands and held thereby, the relatively slack strands being disposed in loop formation in the spaces intervening adjacent pairs of wired strands, the looped portions of the slack strands lying in the plane of the fabric.

10 10. In combination with a plurality of spaced series of pairs of wired strands, the wires of each pair of wired strands being bent to form loops and crossed at the ends of the looped portions whereby to provide adjacent loops in each series

15 of wired strands with intervening spaces between the adjacent series, of a plurality of relatively taut strands arranged transversely of the wired strands and passing through the loop portions, and a plurality of relatively slack series of strands

20 similarly transversely arranged passed between the crossed portions of the wired strands and held thereby.

11. In combination with a plurality of spaced series of pairs of wired strands, the wires of each

25 pair of wired strands being bent to form loops and crossed at the ends of the looped portions whereby to provide adjacent loops in each series of wired strands with intervening spaces

between the adjacent series, of a plurality of relatively taut strands arranged transversely of the wired strands and passing through the loop portions, and a plurality of relatively slack series of strands similarly transversely arranged passed

80 between the crossed portions of the wired strands and held thereby, the slack strands being disposed in loop formation in the spaces intervening adjacent series of pairs of wired strands.

12. In combination with a plurality of spaced series of pairs of wired strands, the wires of each pair of wired strands being bent to form loops and crossed at the ends of the looped portions whereby to provide adjacent loops in each series

85 of wired strands with intervening spaces between the adjacent series, of a plurality of relatively taut strands arranged transversely of the wired strands and passing through the loop portions, and a plurality of relatively slack series of strands

90 similarly transversely arranged passed between the crossed portions of the wired strands and held thereby, the slack strands being disposed in loop formation in the spaces intervening adjacent series of pairs of wired strands, the looped portions

95 of the slack strands lying in the plane of the fabric.

WILLIAM COLVIN, JR.

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