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Jackson

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[54] **METHOD FOR MAKING A DOUBLE FACED WARP KNIT FABRIC**

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Related U.S. Application Data

[63] Continuation of Ser. No. 102,628, Dec. 30, 1970, Pat. No. 3,757,540.

[52] **U.S. Cl.** **66/87,** 66/196

[51] **Int. Cl.** **D04b 23/02**

[58] **Field of Search** 66/83–89, 190–196

[56] **References Cited**

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3,555,853	1/1971	Diehl et al.	66/87
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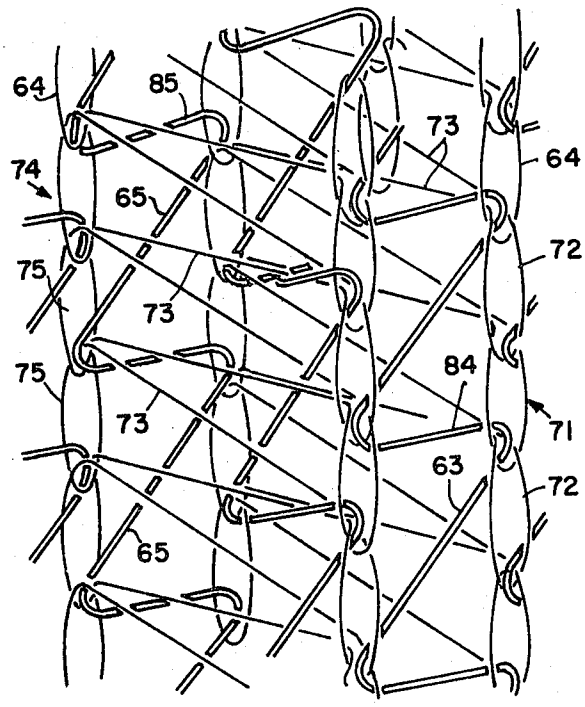
Attorney, Agent, or Firm—Pearson & Pearson

[57] **ABSTRACT**

A double faced warp knit fabric is made on a double needle bar in each successive course of each pair of opposite wales of each opposite face warp knitting machine having a common guide bar and common chain stitch thread forming chain stitches on one needle bar and then on the other needle bar to bind and unite the two knit structures into a unitary double faced fabric. The common chain stitch thread may also be looped coursewise around adjacent chain stitches in adjacent wales to not only serve as the body yarn for both faces but to also serve as the weft portions of a simulated weave, in cooperation with a pair of inlaid warp yarns in each knit structure.

3 Claims, 6 Drawing Figures



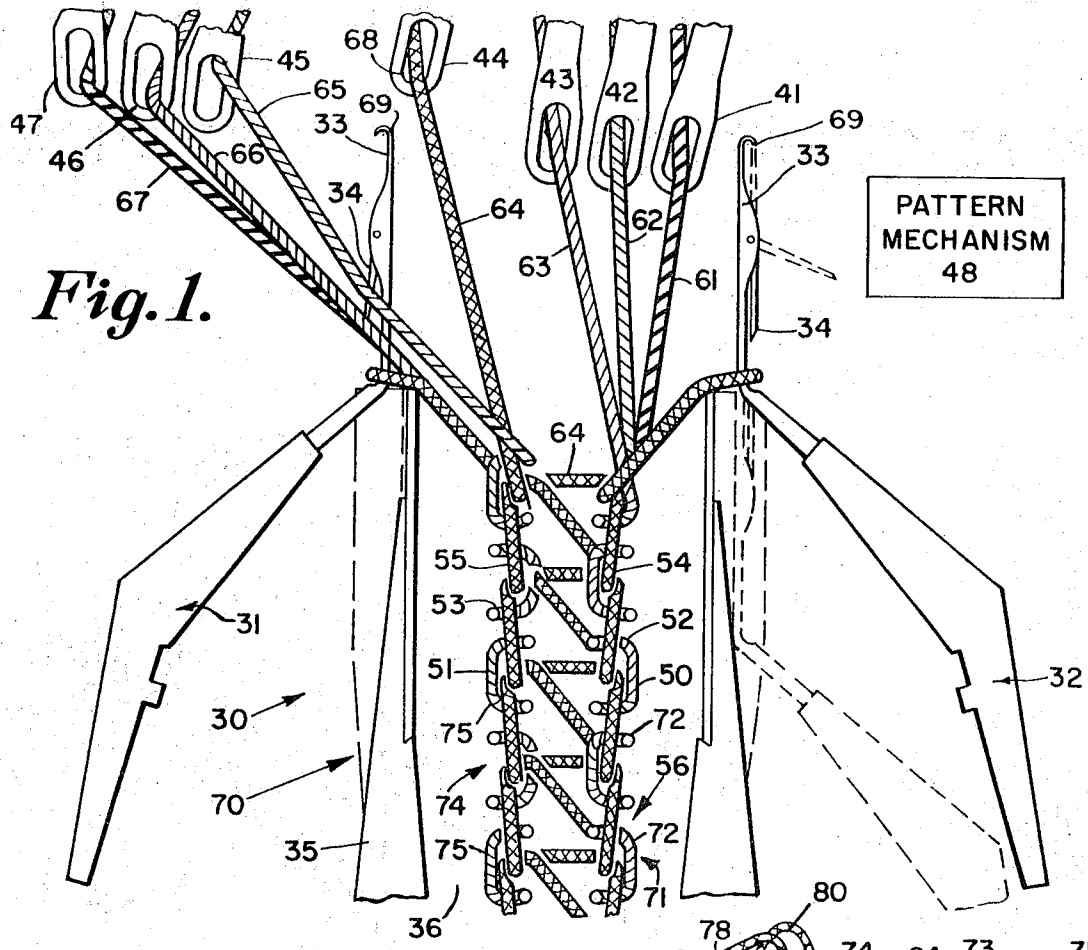


Fig. 1.

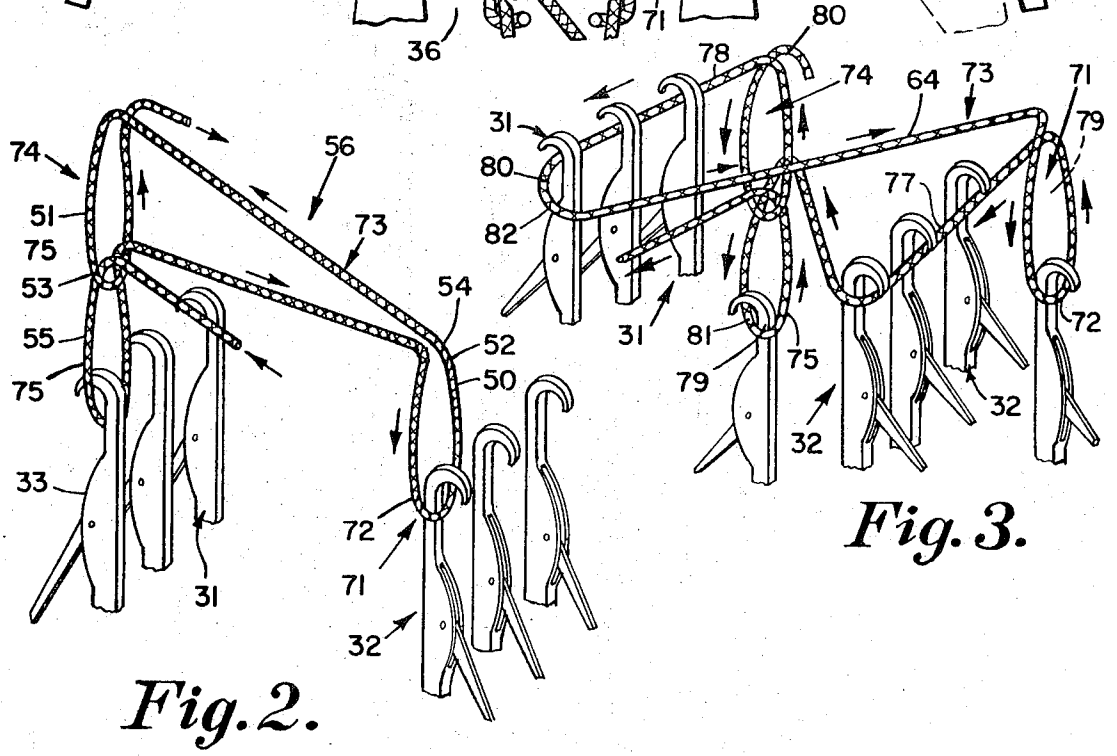


Fig. 3.

Fig. 2.

Fig. 4.

Fig. 5.

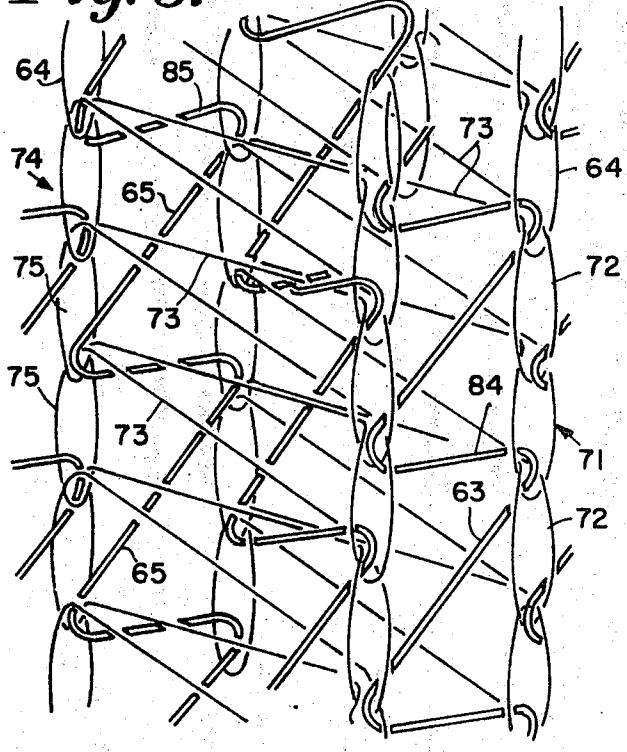
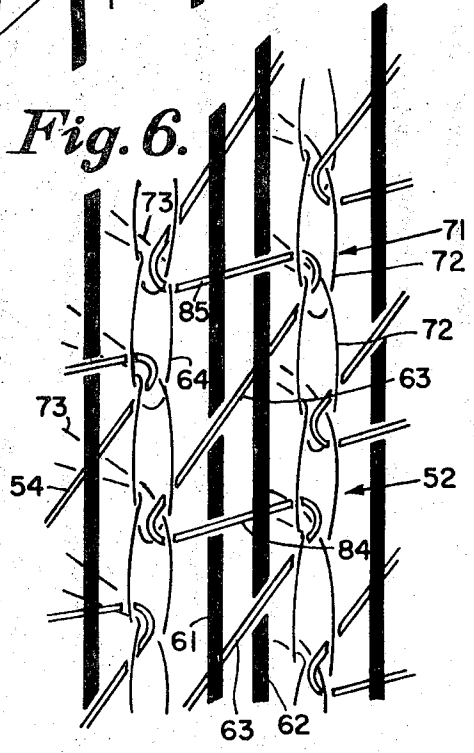


Fig. 6.



METHOD FOR MAKING A DOUBLE FACED WARP KNIT FABRIC

This application is a continuation of Ser. No. 102,628, filed 12/30/70 now of U.S. Pat. No. 3,757,540.

This application is related to my application Ser. No. 55,490 filed July 16, 1970 entitled, Apparatus and Method for Warp Knitting a Simulated Woven Fabric, my application Ser. No. 50,234 filed June 26, 1970 entitled, Simulated Weave Warp Knit Fabric and Method for Making Same, and to my application Ser. No. 74,995 filed Sept. 24, 1970 entitled, Foundation Garment and Method for Making Same.

BACKGROUND OF THE INVENTION

This invention relates to a novel double faced warp knit product made on a double needle bar machine with much less time consumed in threading up the machine for the reason that the chain stitch knit body structures of both faces are made with common chain stitch strands, or threads. Preferably the double faced fabric is of the warp knit simulated weave type and the common chain stitch strands are not only used for the chain stitches and to bind the structures together back to back, but also to form the coursewise-extending "weft" portions in each of the faces to produce a simulated weave pattern.

PRIOR ART

In may above mentioned patent applications, it has been proposed to make two back to back fabrics simultaneously on a double needle bar warp knitting machine to double production of a simulated weave fabric, and it has been proposed to use the chain stitch yarns to form the weft portions of the simulated weave pattern on each separate fabric.

SUMMARY OF THE INVENTION

In this invention, however, the two knitted structures being chain stitched on the two needle bars are united back to back by chain stitch yarns common to both structures, so that a double faced fabric results with the chain stitch threads locked into each face and therefore unable to run in the event of breakage. When the common chain stitch yarns are also looped around adjacent stitches to form weft portions, they are additionally locked against running. A typical double needle bar warp knitting machine may have twelve thousand threads to be threaded up prior to starting the machine. By using common chain stitch guide bars and threads for both needle bars, to not only make chain stitch motions but also the make "weft" looping motions of a simulated weave pattern, the number of threads required to be threaded into guide bars can be reduced by about one third to about eight thousand, thus effecting a substantial saving in time and cost of production. Preferably every chain stitch of each knitted structure is connected to a chain stitch of the same structure and also to a chain stitch of the other structure, thereby producing a double thick fabric useful as blanket or thermal underwear material.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a diagrammatic end elevation of a typical double needle bar warp knitting machine, showing a single chain stitch guide bar and a single chain stitch thread common to the knitted structures of both needle bars, and forming each successive stitch of each opposite wale on each opposite face.

FIG. 2 is a diagrammatic perspective view showing the path of each common chain stitch strand in forming chain stitches on each needle bar back and forth therebetween, in each successive course of each opposite wale of each opposite face.

FIG. 3 is a diagrammatic perspective view similar to FIG. 2, showing the path of each common chain stitch strand in not only uniting the two knitted structures back to back, in each successive course, but also forming "weft" portions coursewise of each structure.

FIG. 4 is a diagrammatic, view similar to FIG. 3 but showing the two needle bars of a Raschel warp knitting machine, the common chain stitch strands, extending between the needle bars and forming chain stitches and weft portions on each face and showing laid-in warp yarns to form the simulated weave.

FIG. 5 is a diagrammatic view similar to FIG. 4 but with the inlaid warp yarns deleted for clarity, and

FIG. 6 is a front view of one face of the double faced fabric to show the interlacing of the warp yarns across the weft portions of "weft" warp yarns rather than across weft portions of the common chain stitch yarns as in FIG. 5.

DESCRIPTION OF PREFERRED EMBODIMENT

In FIG. 1 a double needle bar Raschel warp knitting machine **30** is shown diagrammatically, such machines being well known and commercially available. Machine **30** includes a front needle bar **31** rear needle bar **32**, needles **33** having latches **34**, trick plates **35**, the space **36** between the needle bars being exaggerated for clarity.

Guide bars **41, 42, 43, 44, 45, 46** and **47** are provided, all being oscillatable as a unit relative to the needle bars, and each being longitudinally reciprocable relative to the others, in a known manner, the movement of the needle bars and guide bars being controlled by pattern mechanism **48** of the machine. The guide bars of FIG. **1** are set up to make superposed single fabrics **50** and **51**, each a simulated weave pattern on its face **52** or **53** of each back to back chain knitted body structure **54** or **55** of the double faced warp knit fabric **56** in space **36** of machine **70.**

Guide bars **41** and **42** are threaded with warp threads, or strands **61** and **62** which are inlaid into the chain knit body structure **54,** to form the warp yarns of a simulated weave on rear needle bar **32** and guide bars **46** and **47** are threaded with warp threads or strands **66** and **67** to form the inlaid warp yarns of the simulated weave of chain knit body structure **55** on the front needle bar **31.** The warp yarns **61, 62, 66** and **67** are cross hatched for illustrative purposes.

Guide bars **43** and **45** are threaded with warp threads **63** and **65,** respectively to form the coursewise extending "weft" portions of the simulated weave patterns on each face **52** or **53** of each chain knit body structure **54** or **55,** (FIG. **6**) in a known manner or described in my above mentioned patent application Ser. No. 55,490 and as known in the trade as the Co-We-Nit process or Karl Mayer & Co. Germany. Warp yarns **63** and **65** are also cross hatched for clarity.

The single guide bar **44,** is preferably located centrally between the two weft guide bars **43** and **45** with the eye **68** at a higher level than the eyes of the other guide bars and well above the upper level of the bills **69**

of the needles **33.** The single chain stitch guide bar **44** is threaded with a single chain stitch thread, or strand, **64** which is common to both chain stitch knitted body structures **54** and **55.** The pattern mechanism **48** is arranged to cause guide bar **44** to make chain stitch motions on one needle bar **32,** to form a walewise pillar **71** of successive chain stitches **72** thereon, and to enter between and through both needle bars to guide the strand **64** across the space **36** between the needle bars, thereby forming the binding, or uniting connecting portions **73,** and to make chain stitch motions on the other needle bar **31** to form an opposite walewise pillar **74** of successive chain stitches **75** on that needle bar.

As shown in FIGS. **3** and **4** the pattern mechanism **48,** in addition to causing guide bar **44** to make chain stitch motions on each needle bar, may be arranged to guide the common chain stitch strand **64** to make a coursewise extending loop **77** or **78** around a stitch **79** or **80** in an adjacent pillar **81** or **82** of each knit structure **54** or **55,** as disclosed in my above specified patent application Ser. No. 50,234. The warp threads **63** and **65,** which form the weft portions **84** and **85** of the simulated weave pattern of FIG. **6,** and their guide bars **43** and **45** may thus be eliminated and the common chain stitch yarn used for forming the chain stitch pillars of both structures, the weft portions of a simulated weave in both structures and the connection binding every stitch of every course and wale back to back to the corresponding stitches of the other structure.

It will be seen that the common chain stitch strand **64,** will be used up at a considerably greater rate than the warp strands, and the warp beam carrying the set of chain stitch strands **64,** is thus arranged to feed at the necessary rate, which will be higher than the rate of rotation of the other warp beams. It will also be understood that, while not shown in some of the schematic drawings herein, the chain stitch pillars **71, 74, 80** or **81** of each structure **54** and **55** are always connected coursewise by yarn means such as the weft portions **84** or **85** of a warp yarn, or otherwise and it will be further understood that the sets of guide bars and threads shown in FIG. **1** are repeated for the full length of the machine **20.** The warp yarns **61, 62, 65** and **66** are normally of a color or texture contrasting with the weft portions of the simulated weave pattern although this is not essential so long as a weave pattern is visible.

The common chain stitch strands **64** of this invention are not only held tightly, or locked against running upon breakage of the strand by being chain stitch looped in the pillars of both the front and rear knit structures **54** and **55,** but are also held tightly, or locked, in the chain stitches of adjacent pillars of the same structure **54** or **55** thereby producing a relatively thick, unitary, double faced fabric **56** of considerable integrity.

The common chain stitch yarn **64** is double cross hatched, for clarity, in FIGS. **1** to **3.** In FIGS. **4** to **6** yarn **64** is shown in single lines to distinguish from the blacked lines of the warp yarns **66** and **67.** The "weft" warp yarns **61, 62, 66** and **67** do not appear in FIG. **4** because the yarns **64** include the coursewise-extending "weft" loops **77** and **78** of the simulated weave.

In FIGS. **5** and **6** the common chain stitch yarns **64** are shown in single lines to distinguish from the double lines of the "weft" warp yarns **63** and **65** and their coursewise-extending weft portions **85.** The warp yarns **61** and **62** are blacked as in FIG. **4,** and illustrate over and under interlocking thereof with the weft portions **85,** which prevents sagging or pouching of the fabric.

What is claimed is:

1. The method of making a double faced, warp knit, fabric by means of a double needle bar multiple guide bar warp knitting machine which comprises the steps of:

warp knitting two fabrics back to back on said two needle bars, with each fabric having a chain stitch knitted structure,

guiding a set of common, chain stitch yarns back and forth between said structures at each course and in each wale to bind said structures together and knitting said common chain stitch yarns to form chain stitch pillars in each said structure with each said common chain stitch yarn forming each successive chain stitch in each pair of opposite successive chain stitches in each pair of opposite wales in each opposite face of said fabric, and

interconnecting said pillars in each said structure to provide strength and stability thereto in both warpwise and coursewise directions.

2. A method as specified in claim **1,** plus the steps of:

guiding said chain stitch yarns coursewise on each opposite face, to loop around an adjacent chain stitch and form a "weft" portion of a simulated weave,

and inlaying a set of warp yarns into each said face to form the "warps" of said simulated weave,

whereby each chain stitch yarn is locked into a stitch on each face and into an adjacent stitch on the same face to prevent running thereof upon breakage.

3. The method of making a double faced, warp knit fabric by means of a double needle bar, multiple guide bar warp knitting machine which comprises the steps of:

warp knitting two fabrics back to back on said two needle bars, with each fabric having a chain stitch knitted structure,

guiding a set of common chain stitch yarns back and forth between said structures at each course and in each wale to bind said structures together,

knitting said common chain stitch yarns to form chain stitch pillars in each said structure, with each said common chain stitch yarn forming each successive stitch in each pair of opposite wales in each opposite face of said fabric,

guiding said common chain stitch yarns coursewise, on each opposite face, to loop around an adjacent chain stitch and form a weft portion of a simulated weave, and

inlaying a set of warp yarns into each said face to form the "warps" of said simulated weave,

whereby each chain stitch yarn is locked into a stitch on each face and into an adjacent stitch on the same face to prevent running thereof upon breakage.

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