United States Patent

Jackson

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[54] WARP KNITTED GARMENTS AND APPARATUS AND METHOD FOR MAKING THE SAME

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[52] **U.S. Cl.** **66/177,** 66/87, 66/195, 66/196

[51] **Int. Cl.** **A41b 9/02**

[58] **Field of Search** 66/83–88, 190–195, 66/202, 174

[56] **References Cited**

UNITED STATES PATENTS

459,866	9/1891	Clewley	66/170
606,719	7/1898	Hill	66/170
1,139,342	5/1915	Clewley	66/87
1,078,914	11/1913	Gable	66/87
1,855,033	4/1932	Spiers	66/87
2,990,703	7/1961	Bialostok	66/87
2,026,963	1/1936	Burns	66/176
2,040,058	5/1936	Mendel et al.	66/176
2,147,169	2/1939	Mendel et al.	66/176 X
2,557,482	6/1951	Stolle et al.	66/192
3,077,758	2/1953	Siciliano	66/192

FOREIGN PATENTS OR APPLICATIONS

1,036,246	7/1966	Great Britain	66/178
1,059,576	2/1967	Great Britain	66/178
1,069,881	5/1967	Great Britain	66/87
1,072,715	6/1967	Great Britain	66/178
291,471	4/1916	Germany	66/87
231,406	4/1925	Great Britain	66/174
1,090,516	3/1955	France	66/195
1,143,424	10/1957	France	66/192

OTHER PUBLICATIONS

Darlington, R. D., " Seamless Warp Knit Stockings and Tights," The Hosiery Trade Journal Vol. 74, No. 879 March, 1967, pp. 74–77.

Lancashire, J. B., " Warp Knit Stocking," The Knitter Vol. 31, No. 7, July, 1967, pp. 32, 54, 55.

Publication, The Hosiery Trade Journal " Raschel Seamless Tights," Vol. 74, No. 888, Dec., 1967, pp. 116–117.

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[57] **ABSTRACT**

A double needle bar, warp knitting machine, of the Raschel type, produces a continuous, two ply web formed of two superposed, warp knit, single fabrics, cross interlooped along successive course-wise extending strips, spaced apart wale-wise, to form a succession of open ended, course-wise extending tubes. Stretchable-retractive yarns may be provided wale-wise of the tubes so that when the doubled web is severed into individual tubes and the tubes are turned through 90°, the stretchable yarn runs circumferentially of the tube to form a stretchable garment such as a girdle, panty brief, or the like.

9 Claims, 15 Drawing Figures

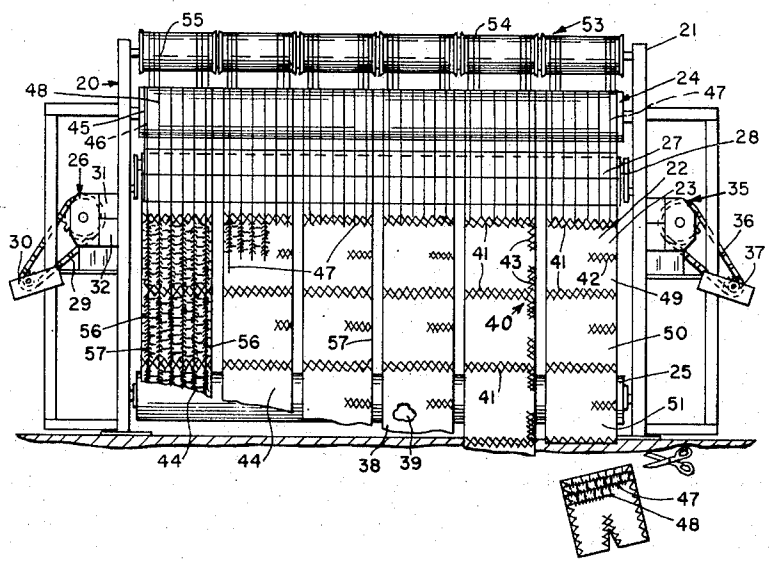


Fig. 1.

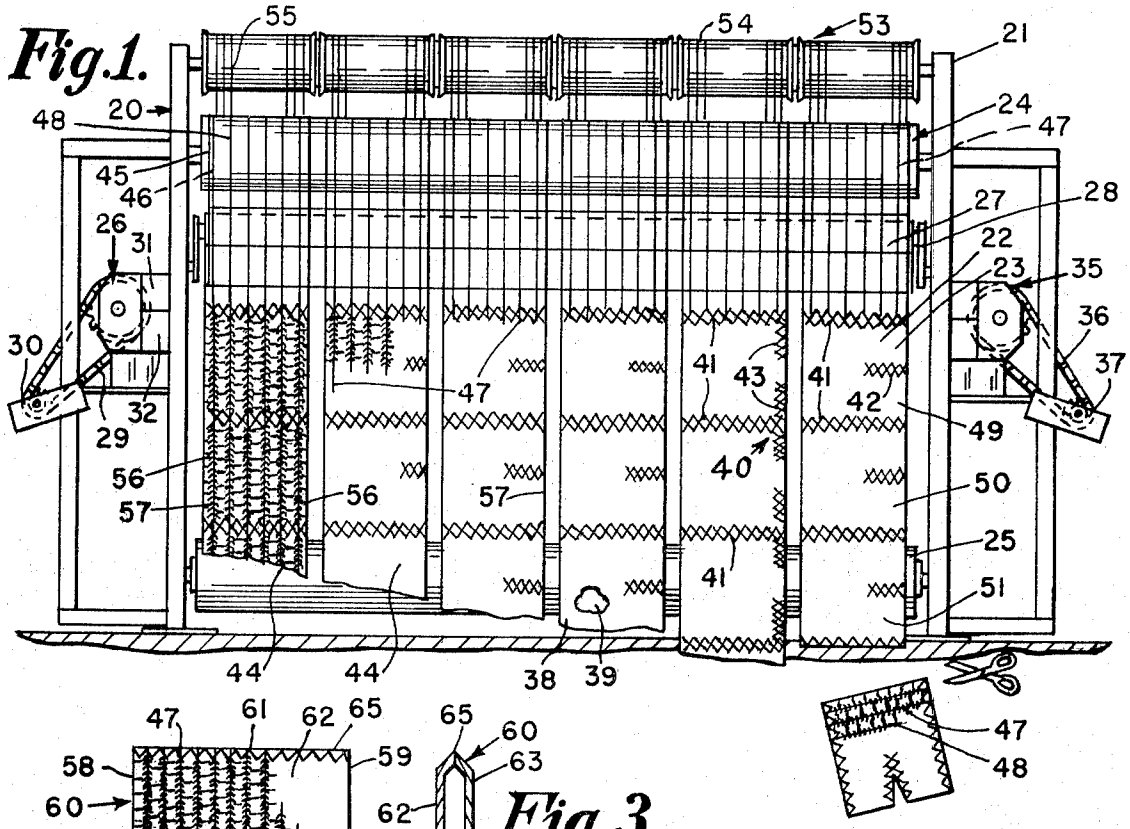
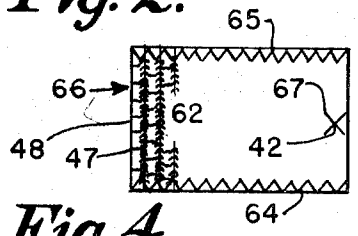


Fig. 3.

Fig. 2.



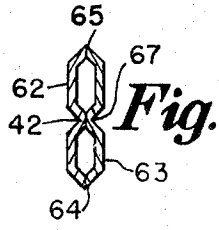
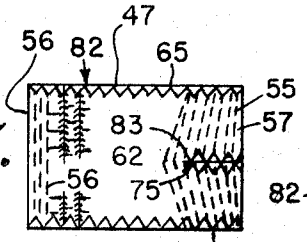


Fig. 5.

Fig. 4.



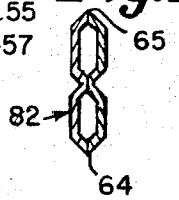
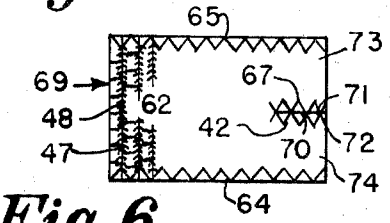


Fig. 11.

Fig. 10.



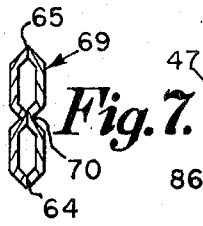
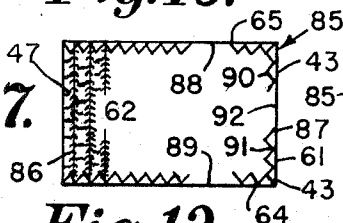


Fig. 7.

Fig. 6.



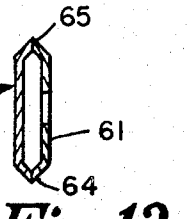
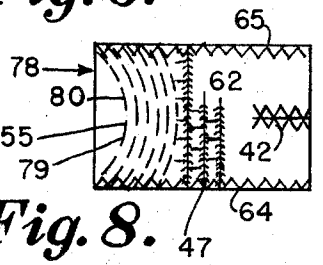


Fig. 12.

Fig. 13.



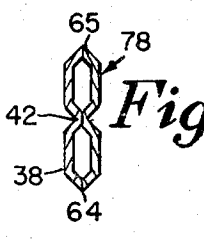


Fig. 9.

Fig. 8.

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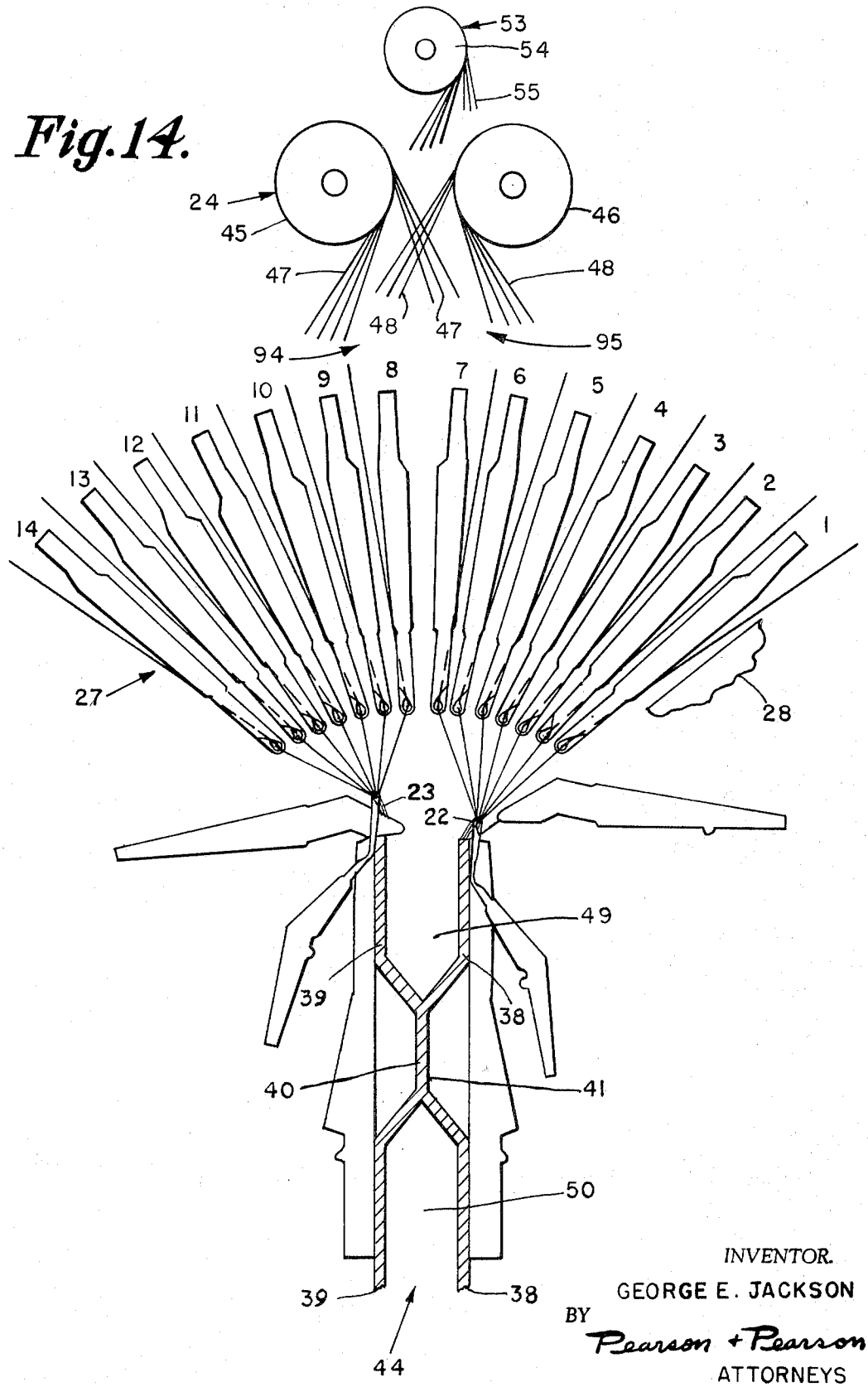
Fig.14.



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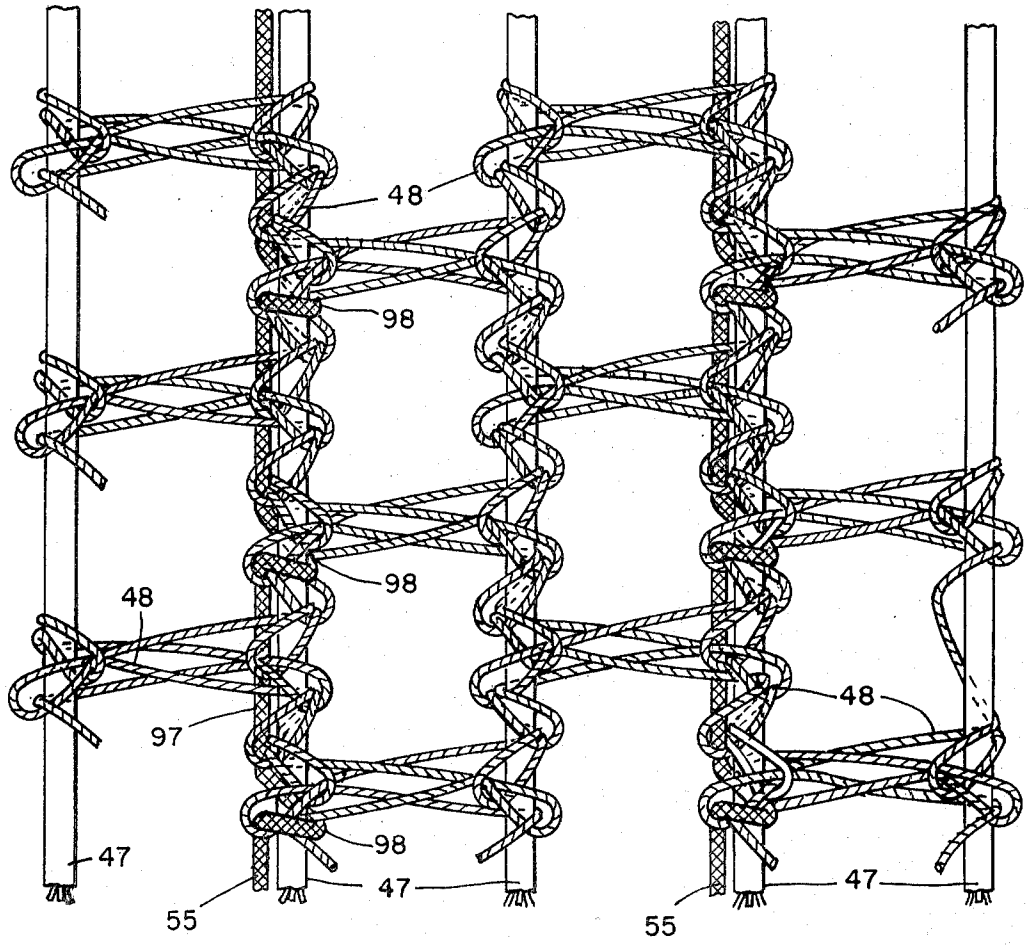

Fig. 15.

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WARP KNITTED GARMENTS AND APPARATUS AND METHOD FOR MAKING THE SAME

BACKGROUND OF THE INVENTION

It has long been known to make tubular, knitted garments, such as sheer, knitted, ladies stockings, fishnet stockings, sweaters, or other garments on conventional circular knitting machines. Flat bed knitting machines have also been used for this purpose, for example, on double V bed machines of the Burson type. Of late fishnet hosiery has been produced on an 8 guide bar, double needle bar, Raschel Knitting machine. Cocker Machine and Foundry Co. of Gastonia, North Carolina now manufactures a "Fashionmaster" double needle bar, 14 guide bar, Raschel knitting machine with a special shifting pattern drum. This pattern shifting device permits the principle of double fabric knitting to be employed in producing fishnet stockings and the like and also permits the joining of the fabrics at spaced intervals to form the crotch of fishnet panty hose. As in the conventional circular knitting machine, the tubular fishnet hose, or panty hose, so made, in accordance with present day machines and skills, on flat bed warp knit machines, has the tubes running warp-wise, or longitudinally, of the knitted web. If stretchable yarns are laid in warp-wise to such power net, or fishnet, tubes, the stretchable yarns are in parallelism with the axes of the tubes, and have longitudinal, but not the circumferential expansibility and retractability such as desired in girdles.

Thus in the present state of the art, those skilled therein have used the available multiple guide bar, double needle bar, Raschel machines, such as the Cocker "Fashionmaster," to produce back to back leotard blanks, with knitted-in crotch portions, and with the tubular leg portions running warp-wise in the conventional manner. No departure from such conventional practice has probably been considered possible, or desirable, for the reason that such blanks can be conventionally shaped by simply varying stitch quality over predetermined intervals to tighten or loosen the same with a variance in take down pressure, thereby tapering the leg portion and narrowing the waist portions. Reference is made to an article in "Knitted Outerwear Times," of Apr. 29, 1968, pages 46–49, in which then current knowledge and experiments in this field are discussed.

SUMMARY OF THE INVENTION

It is the basic concept of this invention to depart from the practice of producing continuous webs of panty hose, or leotard back-to-back blanks of warp-wise tubular construction, shaped and knitted inside and outside seams and crotches, and, instead, to produce continuous webs of garments, such as girdles with stretchable yarns provided in a warpwise direction but with the tubes running normal thereto, or across the warp, of the warp knitting machine and formed of power net fabric or of similar Raschel warp knitted fabrics. The concept does not involve shaping since this can be accomplished after the finished garments are made by well known heat treatment, boarding steps.

The above mentioned Cocker 14 bar warp knitting machine, plus a second pattern drum, is set up so that eight guide bars knit two single, superposed power net fabrics simultaneously, four guide bars to each needle bar. The remaining six guide bars form the bands and crotch. At predetermined areas, or zones, or after a predetermined number of power net stitches, the crotch guide bars make inter-connecting stitching motions to cross interloop the superposed single fabrics to form a crotch and after a predetermined number of additional power net stitches, all guide bars are shifted to make interconnecting stitches across the warp to form the horizontal side seams of the horizontally disposed tubes of the garment, the resulting cross interlooped side seam bands being severable for forming individual tubular garments. The concept of warp knitting power net in a continuous web of individual course-wise extending tubular garments permits stretchable yarns which may be inherently stretchable as for example spandex,

or other elastic yarns, or may be stretch yarns which have no appreciable inherent stretchability but to which stretchability has been imparted by processing, as for example, Helanca, Banlon etc., to extend warp-wise of the web but transversely of the tubes, so that when the garment is cut from the web and turned through 90° the stretchable yarns will be circumferential of the garment. Similarly a plurality of filler yarns are stitched and floated on the face of the fabric at spaced zones transversely of the web, to run warp-wise and form waist edge bands and leg edge bands which also run circumferentially of the garment when the garment is cut from the web and turned through 90°.

By the above process, the making of single fabric power net, cutting the same into pattern blanks, sewing the blanks into garments, sewing on waist tape and leg tape, etc., is eliminated, and a continuous web of stretchable girdles, panty hose or the like is produced in one operation on one machine, and automatically, without manual cutting and sewing. The continuous web of stretchable garments is taken off the machine in large rolls and dyed, or otherwise finished in roll form, whereupon the individual finished garments are cut from the web along the cross interlooped bands, turned inside out to hide any seams, and the garments may then be boarded to add any desired shaping. Special control panels, or appliques, may be sewed onto the basic stretchable, tubular garment to add decorative effects for styling or sales appeal, or may be incorporated into the web on the machine.

Garment length is controlled by varying the knitting width, transversely of the warp knit web and around-the-body size is controlled by changing the shifting points of the shifting pattern drums so that more, or less, power net fabric is knitted between shifting points on the warp knitting machine.

BRIEF DESCRIPTION OF DRAWING

FIG. 1 is a diagrammatic front elevation of a double needle bar, Raschel type, warp knitting machine constructed in accordance with the invention, some of the continuous webs being illustrated as spread out, rather than wound up, for clarity.

FIGS. 2–12 are front elevations, and FIGS. 3–13 are corresponding end elevations in section which diagrammatically show some of the various embodiments of the product of the invention.

FIG. 14 is a diagrammatic, enlarged end elevation of the knitting portion of the machine of FIG. 1, illustrating the fourteen guide bars, double needle bars, two-ply single fabrics unconnected, and a connected, cross interlooped band, and

FIG. 15 is a still further enlarged fragmentary view showing the power net of one panel of a garment of the invention with the waist, or leg, band filler strands stitched and floated therein.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

In FIG. 1 a double needle bar, fourteen guide bar Cocker "-Fashion Master" Raschel, warp knitting machine 20 is illustrated, this machine being well known and commercially available in the trade. It is described in an article entitled "New Cocker 'Fashion Master' Raschel for Shaped Panty Hose, Leotards, Etc.," in Knitted Outerwear Times of Oct. 2, 1967, and further described in the previously mentioned article in that magazine of Apr. 29, 1968. As so described, and sold, the machine 20 comprises a frame 21 having double needle bars, or beds, 22 and 23, power net warp beam means, or body yarn warp beam means, termed the first warp means 24 herein, a wind up roll 25, and a first pattern forming means 26.

The machine 20, prior to this invention, and as explained in the said articles, is capable of knitting shaped, back to back, warp-wise extending tubular, panty hose or leotards of power net and is also capable of producing thermal underwear. The guide bars 27 are mounted on a swingable frame 28 for traversing back and forth in a path transverse to the needle bars 22 and 23, and each guide bar is reciprocable on the

swingable frame, in parallelism with the axis of the needle bars, under the control of a pattern chain **29** carried by a pattern drum **30**, all in a known manner. The pattern drum **30** is shiftable sidewise to actuate different sets of the pattern chains, for example, to change from knitting the warp-wise inner and outer selvedges to knitting across the span between the two legs to form the crotch and then back to tubular leg knitting. The pattern forming means **26** also includes sensing means **31** in the form of a cycle timer **32**, for counting the number of stitches and actuating a shuttle for making predetermined cut lines, or points, on the continuous web produced by the machine **20**.

In this invention, the machine **20** includes a second pattern forming means **35**, identical with means **26**, and arranged to control some of the fourteen guide bars **27** in cooperation with means **26** to create the product of the invention. The pattern chains **36** and shiftable pattern drum **37** of the second pattern forming means **35**, permit the formation of a pair of superposed, unconnected, single, power net fabrics **38** and **39**, with every other course floated, and each single fabric knitted on one of the two needle beds **22** and **23** by four guide bars respectively, thus using eight of the 14 bars **27**. As is well understood in the art, all of the guide bars repeatedly oscillate transversely back and forth in the space between the needles of both beds, and when a loop around a needle is desired, the particular guide bars are moved axially of the needle beds to wrap the strands around the needles to form loops. The pattern control **26**, **31** and **35**, after a predetermined number of stitches, causes cross interlooping between fabrics **38** and **39** to take place also for a predetermined number of stitches to connect the two ply web into a single composite fabric **40** along a narrow band such as the full width, course-wise extending side seam band **41**, or along the shorter crotch bands **42**, or along the short, wale-wise extending bands **43**.

The first warp means **24** includes at least two warp beams **45** and **46**, beam **45** supplying the spandex or other stretchable strands **47** and beam **46** supplying the nylon strands **48** to the double needle beds **22** and **23**. Thus a set of spandex and nylon body yarns are warp knitted into power net fabric **38** on needle bed **22**, and a second set of spandex and nylon body yarns are warp knitted into power net fabric **39** on the other needle bed **23**. The superposed, single fabrics **38** and **39** advance continuously downward from the knitting zone of the machine in a wale-wise direction, and with the laid in spandex yarns **47** extending wale-wise of the web for wind up on the wind up roll **25**. The spandex yarns **47** are laid into each stitch of the respective single fabrics **38** or **39** and locked into the stitches, and the loops of the nylon strands **48** run generally warp-wise of each web **44** to form generally vertical wales therein.

It will thus be seen that the machine **20** produces a plurality of continuous webs **44**, each formed of the superposed, single power net fabrics **38** and **39**, and, at spaced intervals, cross interloops the fabrics **38** and **39** to form successive narrow transverse single ply bands **41** which divide each web into a series of interconnected transversely extending, circumferentially stretchable, open-ended tubes, such as **49**, **50** and **51**.

It will be understood that the web **44** can be the full width of machine **20**, and cut into individual narrower webs of garments along the selvedge bands, or, as shown, the webs **44** may be initially separated so that selvedge cutting is not necessary.

A second warp means **53** is preferably provided, consisting of warp beam **54** containing a supply of filler yarns, such as **55**, for creating a waist edge band **56** and a leg edge trim **57**, for each continuous web **44** at spaced intervals across the machine **20**. The filler strands **55** may be of any desired yarn material, such as spandex, wrapped with a fibrous strand, and are guided by the seventh and eighth guide bars of the set of guide bars **27**. Filler strands **55** may be laid in, or knitted in, as desired.

The successive, individual, interconnected tubes **49**, **50** and **51** produced by the machine **20**, extend transversely, or horizontally, in a course-wise direction, and may be of power net only, or power net with spandex fillers laid in wale-wise, or with spandex and filler yarns both laid in wale-wise but obliquely, by Atlas lapping. When the webs **44** are cut along the narrow side edge seam bands **41**, either before or after other treatment, the cut is along the central, longitudinal axis of the band to thereby form individual separate tubes. Each tube has open ends as at **58** and **59**, and when turned through 90° and turned inside out to cover the seams, a finished garment is achieved.

In FIGS. **2** and **3**, a stretch girdle **60** is shown, which has been cut from a tube such as **49**, **50** or **51**. The knitted garment **60** comprises a generally tubular circumferentially stretchable and retractive knitted body **61**, having a front panel **62** formed of fabric **38** and a rear panel **63** formed of fabric **39**. The loops of the knitted fabrics run wale-wise circumferentially around the tubular body. The spandex yarns **47** also run wale-wise of the fabric circumferentially thereof and are locked into the body stitches. The side edge seams **64** and **65**, which were cut along the cross interlooped bands **41**, join the front and rear panels into a tube and extend course-wise of the body **61**, which is axially thereof, so that the side seams are interknitted, rather than sewn, as in the prior art.

In FIGS. **4** and **5**, a garment **66** is shown, which is identical with girdle **60**, except that a short length **42** thereof has been cross interlooped, intermediate of the side edge seams **64** and **65**, to form a crotch area **67**, thus creating a panty girdle.

In FIGS. **6** and **7**, a garment **69** is shown, which is also similar to garments **60** and **66**, except that the cross interlooped crotch portion **42** thereof is of substantial length and has been cut at **70** along the longitudinal centre line to form inside seams **71** and **72** of garment legs **73** and **74**. The cut **70** is of less length than the band **42** to form a crotch portion **75**.

In FIGS. **8** and **9**, the garment **78** is similar to garment **60** and includes a plurality of additional, or filler, yarns, such as **55**, which have been laid in, or knitted in, to the fabric **38** forming front panel **62** in a wale-wise herringbone pattern **79**. These yarns form a restraining area **80** centrally of the front panel, similar to the restraint and semi-restraint panels now sometimes sewed onto girdles for applying pressure on selected portions of the human body. The obliqued restraining filler yarns **55** may be novelty yarns from a separate feed means and are Atlas lapped in a manner well known in the trade.

In FIGS. **10** and **11**, a garment **82** is shown, which is similar to garment **69**, but includes the waist edge band, or trim, **56**, and the leg edge band, or trim, **57**, formed by the filler yarns **55**. It should also be noted that some of the filler yarns **55** may be Atlas lapped into a triangular area **83**, which covers the crotch area **75**, making the same less translucent than the power net of the body.

In FIGS. **12** and **13**, the garment **85** consists of a basic tubular body, **61**, having cross interlooped side seams **64** and **65**, circumferentially running spandex strands **47**, and top and bottom selvedges **86** and **87**. However, the cross interlooping along the side seam bands **41** has been interrupted at **88** and **89** to form sweater arm holes and the selvedge **87** has been cross interlooped along short bands **43** to form shoulders **90** and **91** which define a neck hole **92**.

All of the garments depicted in FIGS. **2-13** are characterized by having generally tubular, circumferentially stretchable and retractive knitted bodies, such as **61**, formed of a front knitted panel **62** and a rear knitted panel **63**, each panel being knitted from a separate set of individual, warp yarns such as at **94** and **95** (FIG. **14**). In each garment the nylon loops of the power net run wale-wise of the fabric **38** and **39** of the panels, which direction is circumferential of the body **61**. The stretchable, retractive spandex yarns **47** of the fabric **38** and **39** are preferably laid in wale-wise of the fabric, and locked into the stitches, these stretchable yarns also running circumferentially of the body. The garments are free

of sewed side edge seams and sewed waist and leg tapes and instead the front and rear panels are joined into a tube by the cross interlooping of the body yarn stitches along the side seams **64** and **65** which have been cut from the bands **41**. The bands **41** extend course-wise of the fabrics **38** and **39** and run axially of the body **61** to form the interknitted side seams of the invention.

In FIG. **14**, the guide bars of the machine **20** are numbered 1 to 14, and the function of each guide bar in knitting the novel product of the invention is set out below:

Guide bar 1 Spandex **47** of power net **38** on needle bar **22**.
Guide bar 2 Spandex **47** of power net **38** on needle bar **22**.
Guide bar 3 Nylon **48** of crotch and leg tube.
Guide bar 4 Nylon **48** of power net **38** on needle bar **22**.
Guide bar 5 Nylon **48** of crotch and leg tube.
Guide bar 6 Nylon **48** of power net **38** on needle bar **22**.
Guide bar 7 Filler **55**, waist, (or leg) band net **38** on needle bar **22**.
Guide bar 8 Filler **55**, waist (or leg) band net **39** on needle bar **23**.
Guide bar 9 Nylon **48** of power net **39** on needle bar **23**.
Guide bar 10 Nylon **48** of crotch and leg tube.
Guide bar 11 Nylon **48** of power net **39** on needle bar **23**.
Guide bar 12 Nylon **48** of crotch and leg tube.
Guide bar 13 Spandex **47** of power net **39** on needle bar **23**.
Guide bar 14 Spandex **47** of power net **39** on needle bar **23**.

Power net fabric **38** is knitted from spandex guide bars 1 and 2 and nylon guide bars 4 and 6 on needle bed **22** while power net fabric **39** is knitted from spandex guide bars **13** and **14** and nylon guide bars 9 and 11 on needle bed **23**. The waist band of fabric **38** is knitted from guide bar 7 and the waist band of fabric **39** is knitted from guide bar 8.

Four guide bars 3, 5, 10 and 12 are required to make the crotch section, two guide bars for each needle bar. These guide bars are threaded for only a short section at one end **95** of the garment and make stitching motions of regular power net. The main guide bars 4, 6, 9 and 11 are threaded up to the point of the crotch guide bars 3, 5, 10 and 12 and knit a power net stitch.

Moving in unison, the main net guide bars and the crotch guide bars make a power net fabric **38** and **39** on each needle bar. To form the crotch section of the garment, the crotch guide bars are required to make interconnecting stitching motions on each needle bar at predetermined intervals. These interconnecting stitches will connect the two single fabrics **38** and **39** into one composite fabric **40** for the desired number of stitches and along the transversely extending distance desired for the crotch area.

After a predetermined number of interconnected stitches, such as will form a narrow band, for example, one half inch wide, a shift is made back to the plain, or regular, power net stitch to again form two superposed, separate fabrics **38** and **39**, each on its own needle bar **22** or **23**.

Single fabric knitting continues on each needle bar for a predetermined number of stitches until the next side seam **41** is reached. Thereupon, all guide bars are shifted to make interconnecting stitching, or cross interlooping, so that a unitary, composite single fabric **40** is achieved for the desired width of the band **41**. This shift requires both drums **30** and **37** to be moved. After a predetermined number of stitches, such as to form a band **41** one or two inches in width, the drums are again shifted to cause all guide bars to again form double fabrics **38** and **39**. A new garment is thus started.

The filler yarns **55**, threaded in guide bars 7 and 8, continue to supply filler strands **55** into the power net fabrics **38** and **39**, along a waist band zone, along a leg band zone, or along an intermediate zone for Atlas lapping, depending on the particular tubular garments being warp knitted, the resulting filled areas being vertical bands of uniform width, or obliqued bands, of uniform width, when lapped sidewise.

The yarns **55** are floated for several courses on the face of the fabric, as at **97**, and are then knitted into the fabric, as at **98**, as shown in FIG. **15**.

The particular guide bar arrangement described above may be varied. For example, the main net guide bars and crotch guide bars could be interchanged on each side and the leg and waist band filler yarns could be carried in guide bars 1 and 14 by appropriate rearrangement of the threading of the bars.

What is claimed is:

1. A knitted garment comprising:
a generally tubular knitted body formed of a front knitted fabric panel and a rear knitted fabric panel, each knitted from one of a pair of separate sets of individual warp yarns with the loops of said knitted fabric running walewise thereof but circumferentially, from one side to the opposite side of said tubular body;
said front and rear panels being joined into a tube along the side edges thereof by cross interlooping of the body yarn stitches in strips extending coursewise along said edges, from top to bottom of, and axially of said body, to form interknitted side seams;
said tube being open at one end and being free of any interconnection between said front and rear panels at said one end; and
said front and rear panels being joined together at the other end by cross interlooping of the body yarn stitches throughout a limited number of courses and wales to provide at least one opening therein.

2. A warp knitted garment comprising:
a warp knitted tube adapted to conform to, and fit the human torso, said tube formed of a front warp knitted fabric panel and a rear warp knitted fabric panel, each knitted from one of a pair of separate sets of individual warp yarns with the loops of said knitted fabric running walewise of the fabric but circumferentially from one side to the opposite side of said tube;
said front and rear panels being joined into a tube along the side edges thereof by cross interlooping of the knitted fabric stitches in strips extending coursewise along said edges, from top to bottom of, and axially of, said tube to form interknitted side seams;
said tube having a waist opening at one end and being free of any inter-connection between said front and rear panels at said one end;
said tube having at least one limb opening proximate the other end thereof; and
said tube having means extending at least partially walewise thereof, and incorporated into the knitted structure thereof, for forming the crotch, neck, restraint panel or band area of said garment so as to convert the same to fit, and conform to the shape and limbs of the human torso.

3. A garment as specified in claim **2**, wherein:
said means comprises an area of said front and rear panels, intermediate of said interknitted side seams, and proximate said other end of said garment, having the stitches of the body yarn of said panels cross interlooped coursewise of said fabric to form said crotch area in said garment.

4. A garment as specified in claim **2**, wherein:
said means comprises a relatively narrow band of predetermined width circumferentially and length axially, said band having a central cut extending inwardly from the outer end thereof for a predetermined length less than the length of said band to form bifurcated leg tubes at said other end of said garment.

5. A garment as specified in claim **2**, wherein:
said means comprises at least one additional set of yarns incorporated into said knit body fabric walewise of said knitted fabric of said panels, and extending circumferentially of said body, proximate at least one of said ends to form a waist band, or edge trim, therearound.

6. A garment as specified in claim **2**, wherein:
said means comprises at least one additional set of yarns incorporated into one of said panels in a walewise herringbone pattern to form said restraint area centrally of the front panel of said garment and wherein said yarns are Atlas lapped for a substantial distance coursewise of said fabric.

7. A garment as specified in claim 2, wherein:
the said cross interlooped strips of said body are interrupted at oppositely disposed spaced areas therealong, proximate said other end of said body, to form a pair of said limb openings constituting armholes in said garment; and
said other end of said garment is partially closed, to form a central neck aperture in said garment, by cross-interlooping of the stitches of said panels extending walewise of said fabric and circumferentially of said garment.

8. A garment as specified in claim 2, plus:
at least one additional set of yarns comprising stretchable retractive yarns extending walewise of said fabric and circumferentially from side to side, on at least one of said panels.

9. A knitted garment comprising:
a generally tubular knitted body formed of a front knitted fabric panel and a rear knitted fabric panel, each knitted from one of a pair of separate sets of individual warp yarns with the loops of said knitted fabric running walewise thereof but circumferentially, from one side to the opposite side of said tubular body;
said front and rear panels being joined into a tube along the side edges thereof by cross interlooping of the body yarn stitches in strips extending coursewise along said edges, from top to bottom of, and axially of said body, to form interknitted side seams;
said tube being at least partially open at both ends;
said front and rear panels being joined together proximate at least one of said ends by cross interlooping of the body yarn stitches throughout a limited number of courses and wales.

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