May 3, 1960 R. C. ELWELL 2,934,923

TRIPLE PLATED HOSE

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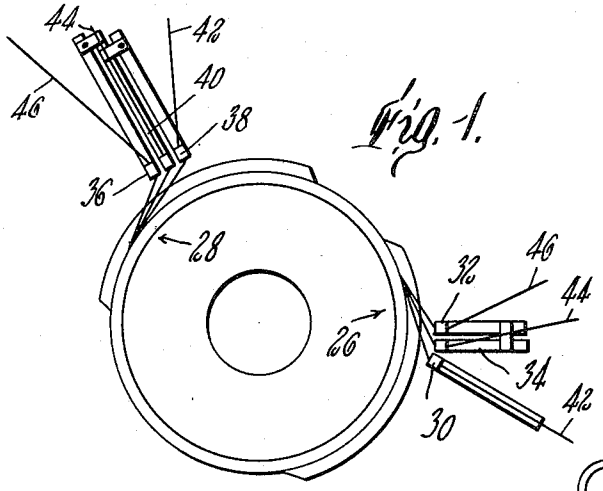


Fig. 1.

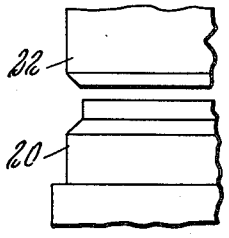


Fig. 2.

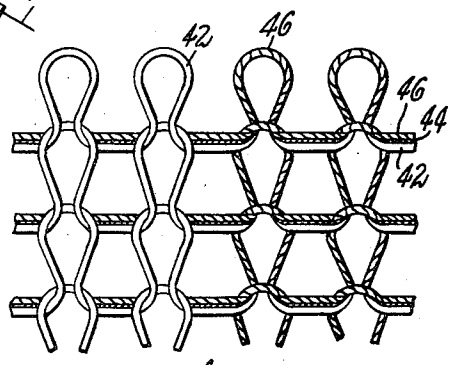


Fig. 3.

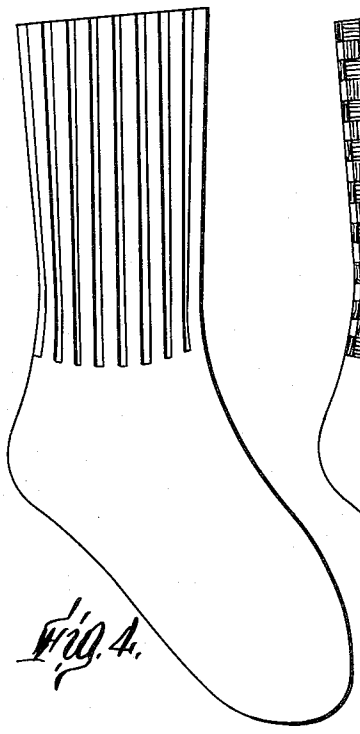


Fig. 4.



Fig. 5.

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TRIPLE PLATED HOSE

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3 Claims. (Cl. 66—188)

The present invention relates to improvements in knitted hosiery, and more particularly to an improved triple plated stocking.

It is an object of the invention to produce a stocking of novel and improved construction which is of the general type knitted for example on a two-cylinder circular knitting machine having certain wale loops drawn to the back side of the fabric, and other wale loops drawn to the face side of the fabric in accordance with a pattern and in which portions of the stocking including particularly the leg and foot are knitted with three yarns in a triple plating relation, said triple plating relation being maintained during the knitting of said wale loops to either side of the fabric.

More specifically it is an object of the invention to provide a novel and improved stretch sock having an intermediate or base structure of stretch nylon yarn and two substantially non-relaxing exterior yarns including a face yarn and a lining yarn, said exterior yarns and stretch nylon yarns being knitted in a triple plating relation under tensions which are regulated to produce a spongy bulking effect of the stocking when the fabric produced in this manner is relaxed.

It is still another object of the invention to produce a stretch stocking of the general type referred to having a face yarn and a lining yarn and an intermediate stretch nylon yarn which are maintained in a triple plating relation throughout the foot and leg portions of the stocking, and in which rib or pattern areas are formed in which certain loops are drawn to the face side of the fabric with the face yarn in an outside position and the lining yarn in the inside position, and in which loops drawn to the backside of the fabric are formed and knitted into the fabric with the three yarns again in plating relation, but with the plating position reversed so that the so-called lining yarn is to the outside of the fabric and the so-called facing yarn is to the inside of the fabric.

With these and other objects in view the several features of applicant's improved hose will be readily appreciated by one skilled in the art from the following description taken in connection with the accompanying drawings in which:

Fig. 1 is a somewhat diagrammatic view of the lower needle ring of a conventional two-cylinder circular knitting machine and of the two yarn feeding stations illustrating particularly the manner in which the three yarns are fed to the needles in triple plating relation at each feed station;

Fig. 2 is a fragmentary view in elevation of the two needle cylinders of Fig. 1;

Fig. 3 is a diagrammatic view of a portion of a rib fabric illustrating the manner in which the triple plating relation is maintained for both of the knitting conditions met with in a ribbed fabric;

Fig. 4 is a side view of a knitted hose having both the leg and the foot portions thereof triple plated and the leg portion knitted with a stretch rib pattern; and

Fig. 5 is a side view of a knitted hose having the leg and foot portions thereof triple plated and the leg portion knitted with a stretch rib links-and-links type pattern.

The invention is herein disclosed as embodied in a half-hose or sock which is particularly adapted to be knitted on a double cylinder machine capable of producing rib and links-and-links fabric. The machine generally indicated at Fig. 2 of the drawings includes a lower needle cylinder 20 and an upper needle cylinder 22 which are adapted to receive therein double latch needles which may be of ordinary construction. Inasmuch as the machine shown is a Scott & Williams circular knitting machine well known in the art and forms specifically no part of the invention, no particular description or illustration of this machine is included herewith.

The knitting machine referred to has been adapted for manufacture of the triple plated fabric in accordance with the present invention as shown for example in Fig. 1 of the drawings.

The machine is provided with two yarn feeding stations indicated at 26 and 28 respectively. At station 26 is shown a main feed finger 30, a plating feed finger 32 of ordinary description and a newly added plating thread finger 34 which is interposed between the thread fingers 30 and 32.

The position of the newly added thread finger 34 is carefully adjusted both vertically and in a horizontal direction about the axis of the needle cylinder to cause the nylon stretch yarn fed thereto to assume an intermediate position in which it will occupy an intermediate plating position to be covered on one side by the feeding yarn passing through the yarn guide 32 and on the other side by the feeding yarn passing through the yarn guide 30. The yarn fingers at the station 28 include the usual plating yarn guide 36, a main yarn guide 38 and an additional third plating yarn guide 40. Yarn guide 40 is placed with relation to the plating yarn guide 36 and the main yarn guide 38 for the feeding of the nylon yarn in the intermediate plating position at the feed station 28.

The fabric which forms more specifically the subject matter of the invention in the preferred form shown consists of a triple plated fabric which is formed with a lining yarn 42 disposed inwardly, so that it forms the inside surface of the fabric, a stretch control nylon yarn 44 disposed in an intermediate position overlying said lining yarn and insulated from the inside surface of the fabric by said lining yarn, and a face yarn 46 disposed outwardly of said nylon stretch yarn and covering the intermediate nylon stretch yarn and lining yarn to form the outer surface of the fabric. The improved fabric is particularly shown in diagrammatic form in Fig. 3 in which the two left hand wales show the loops drawn to the front side to form the raised rib and the two right hand wales show the loops drawn to the rear side of the fabric to form the recessed portions of the rib fabric.

The triple plated fabric herein disclosed as embodying in a preferred form the features of the invention comprises a so-called stretch sock of which the leg is knitted with a true rib or links-and-links pattern. During the knitting operation the three plating yarns are maintained under a controlled tension, the tension of the intermediate stretch nylon yarn being sufficient so that when the fabric is relaxed upon removal from the machine, a substantial shrinkage in the length of the stocking is effected. This shrinkage in the length of the stocking causes portions of the substantially non-relaxing exterior plating yarns contained in each knitted loop to bow outwardly at each side of the fabric thus producing a spongy bulky effect, which substantially increases the thickness of the stocking with attendant advantages of light weight, warmth, durability and a cushioning effect which materially adds to the comfort of the wearer. The stocking produced in this manner is readily stretched to several different sizes

in the lengthwise direction without any change in the appearance, wearability and comfort characteristics of the stocking. The stocking is made with a true rib or links-and-links pattern which is of substantial importance in producing a stocking which will fit legs of different sizes by introducing a very substantial amount of lateral stretch into the fabric. In the illustrated embodiment of the invention the rib and links-and-links patterns are terminated at the instep. It will be understood that such patterns may be continued along the length of the instep to the toe if so desired.

In those parts of the stocking in which ordinary knitting is employed and more particularly in the sole portion, the three facing, intermediate nylon stretch, and lining yarns are maintained in the same plated relation to one another. In the knitting of the rib and links-and-links patterns knitting is continued in the lower cylinder of the machine to produce the outstanding rib portions of the pattern. When the loops are drawn to the back side of the fabric, through the operation of the needles in the upper cylinder of the machine, the same plating relation is maintained which, however, causes a reversal of the plating positions so that the so-called face yarn is to the inside of the fabric and the lining yarn is at the outside of the fabric.

In the preferred construction shown, in addition to the stretch nylon intermediate yarn which may be for example a 200 denier yarn, a lining yarn preferably of wool is employed which makes for a more comfortable sock, with a maximum of moisture absorption. An orlon yarn may be employed for the face yarn since this material has a particularly good feel or hand and maintains an appearance of freshness which is unimpaired by repeated wear and washing of the sock. It will be noted that the exterior yarns are complementary in that they have very similar qualities of appearance, softness and texture. This factor is of considerable importance in the knitting of the rib and links-and-links patterns for the reason that the orlon yarn will appear on the inside of the fabric and the lining wool yarn will appear on the outside of the fabric in those portions of the ribs which are formed by drawing the loops inwardly. While wool and orlon are illustrated as preferred fibers in the manufacture of high grade wool socks, it will be understood that other fibers may be used both for the lining and for the face yarns, it being required only that these yarns be complementary to the extent that they can be reversed in the knitting of the rib portion of the sock without producing either a poor appearance or discomfort to the wearer.

In Fig. 4 of the drawings is shown a half-hose or sock in which the leg portion thereof is knitted with a rib pattern. The foot portion of the sock is knitted with straight knitting on the lower cylinder. The triple plating relation, however, is maintained during the knitting of both leg and foot.

Fig. 5 is a sock similar to that shown in Fig. 4 except that a links-and-links pattern has been worked out showing a series of vertical ribs in which the yarn loops are pulled to the outside of the fabric, and in between, a pattern of square segments in which the loops are for the most part pulled to the opposite side of the fabric.

It will be understood that the invention in its broader aspects contemplates further alterations in the construction and appearance of the sock within the scope and spirit of the invention, as for example, the continuation of the stretch rib or stretch rib links-and-links pattern designs along the length of the instep.

The invention having been described what is claimed is:

1. A circular knit stocking including leg, foot, heel and toe portions, the leg and foot portions of said stocking being knitted with three yarns knitted in a single knitting wave in plating relation, including an intermediate stretch control nylon yarn, and two exterior yarns comprising a face yarn, and a lining yarn disposed respectively outwardly and inwardly of the intermediate stretch control nylon yarn, at least the leg portion of said stocking having vertically extending areas spaced about the circumference of said stocking in which certain wale loops are drawn to the back side of the fabric and in which certain other wale loops are drawn to the face side of the fabric for the knitting of stretch rib patterns, said plating relation being maintained for said wale loops drawn to the face side of the fabric, and being further maintained but in the reverse order for said loops drawn to the back side of the fabric.

2. A circular knit stretch stocking including leg, foot, heel and toe portions, the leg and foot portions of said stocking being knitted with three knitting yarns in a single knitting wave in plating relation, said yarns comprising an intermediate stretch nylon yarn, and substantially non-relaxing exterior yarns comprising a face yarn, and a lining yarn disposed respectively outwardly and inwardly of the intermediate stretch nylon yarn and arranged to produce a spongy bulking effect of the fabric when relaxed, at least the leg portion of said stocking having vertically extending areas spaced about the circumference of said stocking in which certain wale loops are drawn to the back side of the fabric and in which certain other wale loops are drawn to the face side of the fabric for the knitting of stretch rib patterns and links-and-links patterns, said plating relation being maintained for the plain knitted sole and high rib portions of the fabric and reversed with the face yarn disposed inwardly and the lining yarn disposed outwardly for the inwardly drawn loops of the rib and links-and-links patterns.

3. A circular knit stretch stocking including leg, foot, heel and toe portions, the leg and foot portions of said stocking being knitted with three yarns in a single knitting wave in plating relation, said yarns including a wool yarn disposed inwardly so that it forms the lining face of the fabric, a stretch control nylon yarn disposed in an intermediate position overlying said wool yarn and insulated from the inside surface of the fabric by said wool yarn, and an orlon yarn disposed outwardly of said nylon yarn and covering the nylon and wool yarns to provide a face yarn for the fabric, at least the leg portion of said stocking having vertically extending areas spaced about the circumference of said stocking in which certain wale loops are drawn to the back side of the fabric and in which certain other wale loops are drawn to the face side of the fabric for the knitting of stretch rib patterns, said plating relation being maintained for said wale loops drawn to the face side of the fabric, and being further maintained but in the reverse order for said loops drawn to the back side of the fabric.

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