R. W. SCOTT.

KNITTED FABRIC AND MODE OF MAKING SAME.

APPLICATION FILED OCT. 30, 1905.

901,264. **Patented Oct. 13, 1908.**

4 SHEETS—SHEET 1.

Fig. 1

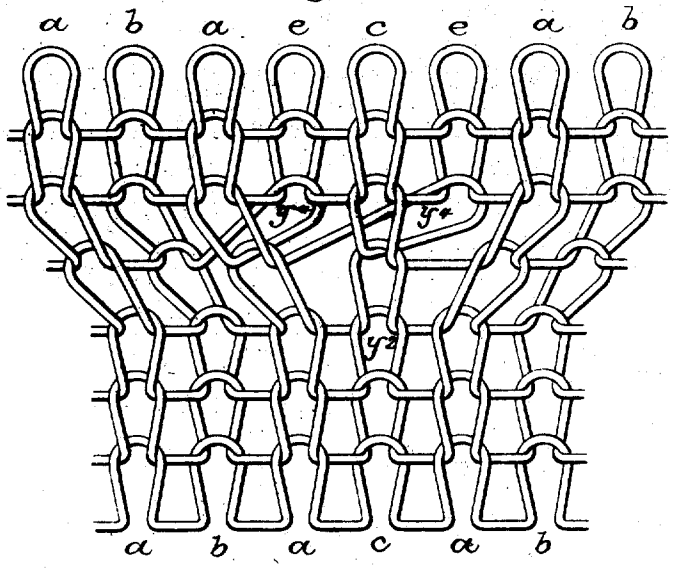


Fig. 5.

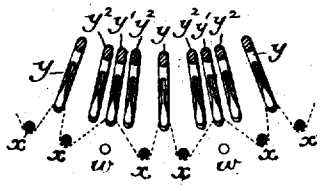
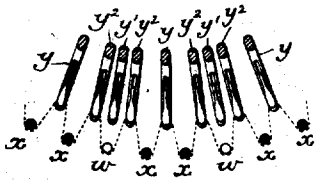


Fig. 6.



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4 SHEETS—SHEET 2.

Fig. 2

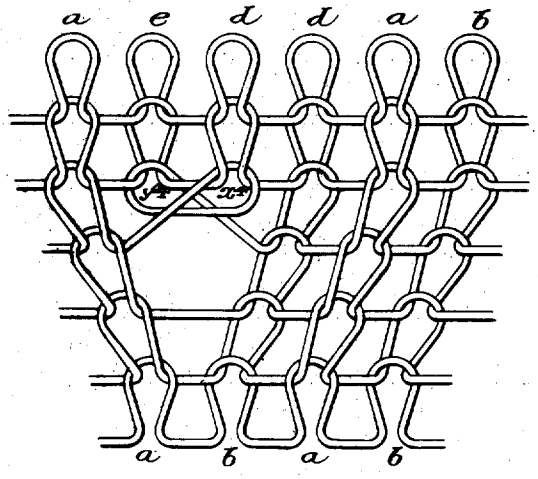


Fig. 3.

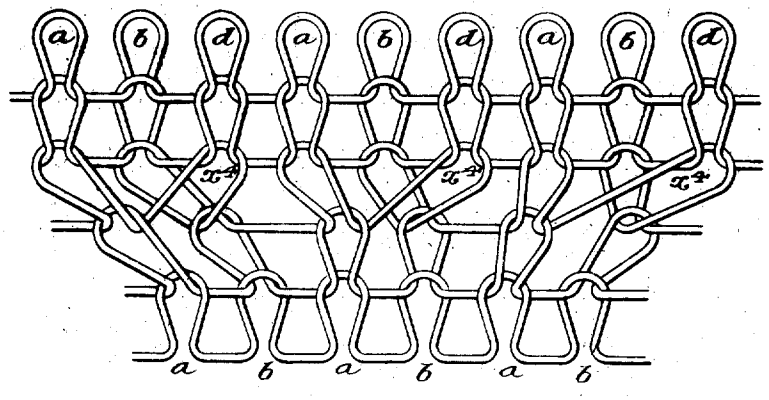
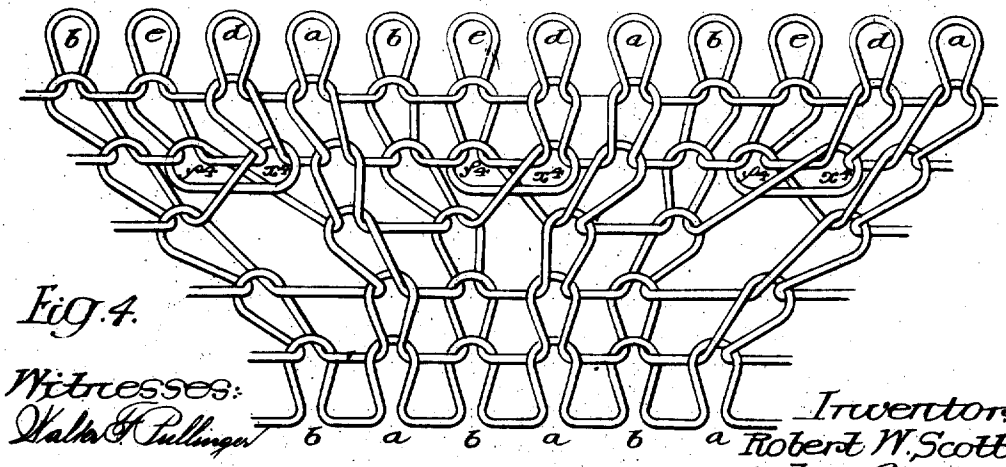


Fig. 4.



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4 SHEETS—SHEET 3.

Fig. 7

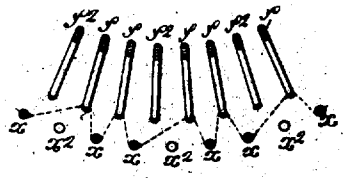


Fig. 8

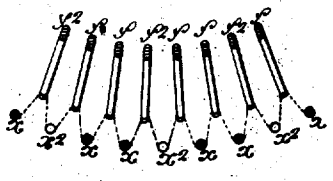


Fig. 9

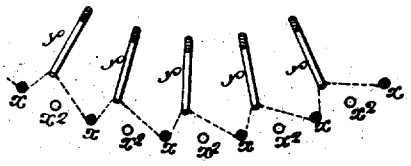


Fig. 10

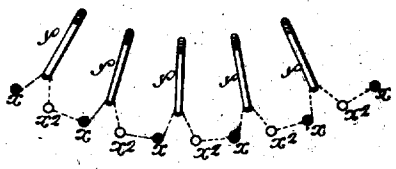


Fig. 11

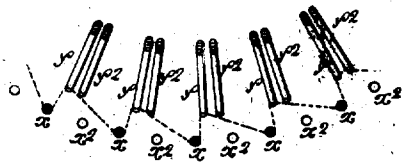
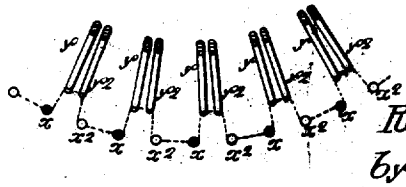


Fig. 12



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R. W. SCOTT

KNITTED FABRIC AND MODE OF MAKING SAME.

APPLICATION FILED OCT. 30, 1905.

901,264. **Patented Oct. 13, 1908.**

4 SHEETS—SHEET 4.

Fig. 13

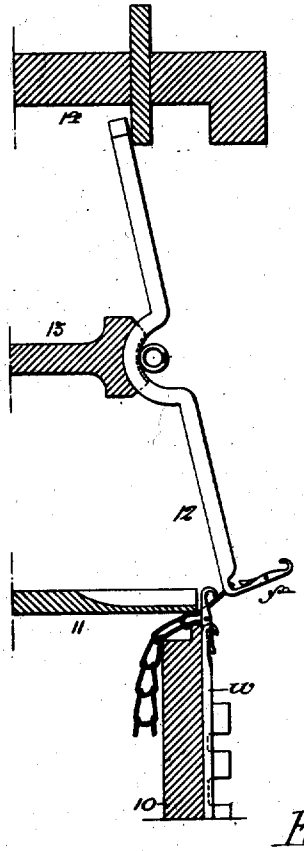


Fig. 14

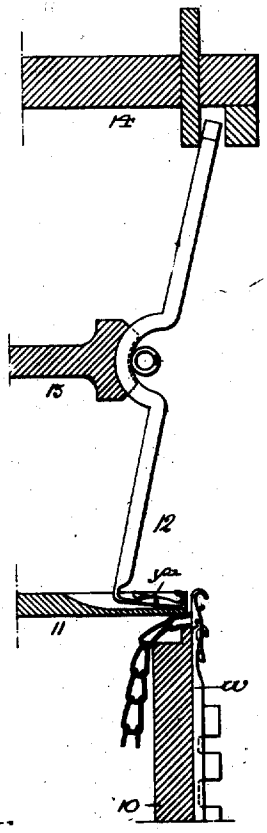
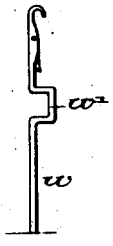


Fig. 15



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Inventor:
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UNITED STATES PATENT OFFICE.

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KNITTED FABRIC AND MODE OF MAKING SAME.

No. 901,264. Specification of Letters Patent. Patented Oct. 13, 1908.

Application filed October 30, 1905. Serial No. 285,160.

To all whom it may concern:

Be it known that I, ROBERT W. SCOTT, a citizen of the United States, residing at Leeds Point, Atlantic county, New Jersey, have invented certain Improvements in Knitted Fabrics and in Modes of Making Same, of which the following is a specification.

My invention relates to that class of knitted fabrics which are ribbed throughout but in which there are a greater number of wales in one portion of the fabric than in another.

The object of my invention is to produce a machine-knit fabric of this character, in which the change is from ribbed web having the lesser number of wales to ribbed web having the greater number of wales, and in which, furthermore, the change can be readily effected by manipulation of the needles and without stopping the machine or requiring the intervention of an attendant, the invention being therefore especially adapted for use in the manufacture of hosiery upon automatic knitting machines.

In the accompanying drawings, Figures 1, 2, 3 and 4, are views of fabrics made in accordance with my invention which are ribbed throughout, and in which the change is effected from web having the lesser number of wales to web having the greater number of wales; Figs. 5 and 6, are views illustrating the arrangement of needles and the course of the knitting yarn which may be adopted in producing fabric of the character shown in Fig. 1; Figs. 7 and 8, are views illustrating the arrangement of needles and the course of the knitting yarn which may be adopted in producing fabric of the character shown in Fig. 2; Figs. 9 and 10, are views illustrating the arrangement of needles and the course of the knitting yarn which may be adopted in producing fabric of the character shown in Fig. 3; Figs. 11 and 12, are views illustrating the arrangement of needles and the course of the knitting yarn which may be adopted in producing fabric of the character shown in Fig. 4; Figs. 13 and 14, are vertical sectional views of sufficient of a knitting machine to illustrate the method of transferring a stitch from one needle to another; and Fig. 15, is a view of a special cylinder needle which is sometimes employed.

In Figs. 1, 2, 3 and 4 of the drawings, *a* represent plain stitch wales which extend throughout both webs of the fabric, *b* represent rib stitch wales which also extend throughout both webs *c* represent composite wales having plain stitches in one web and rib stitches in the other, *d* represent introduced plain stitch wales and *e* represent introduced rib stitch wales. "Plain stitch wales" may be described as those having all of their stitches drawn to the face of the web, "rib stitch wales" as those having all of their stitches drawn to the back of the web, and "composite wales" as those having stitches drawn to the face of one web and to the back of the other web, there being a reversal in the direction of the stitches in these wales at the point of change of the webs.

The fabric shown in Fig. 1, is one which is ribbed throughout but in which there is a thirty-three-and-one-third (33⅓) per cent. doubling, that is to say, one web has thirty-three-and-one-third (33⅓) per cent. more wales than the other. This fabric can be produced upon a machine of the character shown in Figs. 5 and 6, in which *x*, *x* represent the cylinder needles which are always in action, and *w* a cylinder needle which is out of action in knitting the web having the lesser number of wales, *y* representing dial needles which are always in action and *y'* dial needles which are in action during the knitting of the web having the lesser number of wales but which transfer their stitches to the cylinder needles *w* in changing from the web having the lesser number of wales to that having the greater number of wales. Dial needles y^2 are out of action during the knitting of the web having the lesser number of wales but are put into action so as to produce the extra wales *e* in starting the web having the greater number of wales, these dial needles y^2 being shogged on their introduction so as to carry the initial loops y^4 of the introduced wales *e* across the adjoining standing wales, and thus prevent the formation of eyelet holes.

In the fabric shown in Fig. 2, there is a fifty (50) per cent. doubling, or fifty (50) per cent. more wales in one portion of the web than in the other. This fabric can be produced upon a machine of the character shown in Figs. 7 and 8 in which *x* and *y* represent, respectively, the cylinder and dial needles which are always in action, x^2 and y^2 representing respectively cylinder and dial needles which are out of action in knitting the web having the lesser number of wales but which are brought into action so as to

produce the additional wales *d* and *e* in changing from one web to another, the dial needle being shogged so as to cross its stitch with that produced upon the introduced cylinder needle as shown at x^4 and y^4 in Fig. 2. In this fabric there is no composite wale produced by shifting a stitch from a dial needle to a cylinder needle, or vice versa.

Fig. 3, illustrates a fabric made in accordance with my invention in which the change is from a web having a one-and-one-rib to a web having a two-and-one rib, this change being effected by introducing extra cylinder wales *d*, the arrangement of the needles in a machine for producing this fabric being as shown in Figs. 9 and 10, each dial needle *y* being shogged across the cylinder needle x^2 before putting the latter into action, and being then restored to its normal position after receiving the knitting yarn, so as to cross its stitch with the initial stitch x^4 of the introduced wale *d* as before explained.

Fig. 4, shows a fabric made in accordance with my invention in which the change is effected from one-and-one rib to two-and-two rib by introducing a cylinder needle x^2 and dial needle y^2 alongside of each cylinder and dial needle employed in knitting the web having the lesser number of wales, such arrangement of needles being shown in Figs. 11 and 12, and the initial stitches x^4 and y^4 of the introduced wales being crossed in the manner before described in connection with the fabric shown in Fig. 2.

In Figs. 5, 7, 9, and 11, the dotted lines represent the succession of needles to which the knitting yarn is fed in knitting the webs having the lesser number of wales, and in Figs. 6, 8, 10, and 12, the dotted lines represent the succession of needles to which the knitting yarn is fed in knitting the webs having the greater number of wales.

In carrying out my invention various forms of machine may be employed, but in Figs. 13 and 14, I have shown sufficient of the elements of one form of machine which has proven effective in practice to impart a proper understanding of the method of manipulating the needles to effect the transfer of stitches from one to another. In these views 10 represents part of a needle cylinder and 11 part of a dial on the inside of the cylinder. The dial needles *y*, *y'* are carried by the lower ends of jacks 12 pivotally mounted upon a fixed ring 13, and having their upper ends acted upon by cams carried by a cam plate 14, this plate having two sets of cams, one for acting upon the jacks so as to cause operation of the dial needles for ordinary knitting, and another set for causing abnormal projection of the dial needles, as shown in Fig. 13, so as to carry them outwardly beyond the cylinder needles. This has the effect of drawing or stretching the web so as to dispose rib stitches over the cylinder as shown in Fig. 13, so that cylinder needles may be projected and caused to enter said stitches, as also shown in said figure.

The projection of the dial needles may be such as either to bring the stitches upon them, or precedently formed stitches, above the cylinder needles which are to engage the same. When the cylinder needles are projected so as to enter the stitches upon the dial needles, either of the needles may be moved laterally to the extent necessary to cause engagement of the cylinder needles with the dial stitches, and the dial needles can then be withdrawn so as to cast their stitches onto the cylinder needles. When the cylinder needles engage stitches other than those upon the dial needles, the lateral movement referred to will not be necessary, as the slackening of the rib stitch on the withdrawal of the dial needle will cause it to engage with the cylinder needle which has previously entered the same. In changing stitches from cylinder needles to dial needles said cylinder needles will be provided with projections or butts, such for instance, as shown at *w'* (Fig. 15) for stretching the cylinder stitches and permitting the dial needles to enter and engage the same.

My improved fabric can be knitted without arresting the operation of the machine and by the use of a continuous thread, it being understood that the knitting cams and the transfer cams are disposed at points so remote from each other that the knitting operation can be going forward upon certain of the needles of the machine while stitches are being transferred from and to other needles of the machine at a point more or less remote from the knitting point.

My invention in its broader sense is not limited to a web composed of a single continuous yarn, since it is manifest that different yarns may be employed in either web when it is desired to produce a mixed or striped effect therein by the use of yarns of different colors supplied to the needles by different yarn feeds, but even in that case there will be courses of stitches knitted with a continuous yarn common to both webs, although the term "continuous" does not necessarily imply unbroken continuity, as yarns of different color or character may be used in different portions of the web, so long as the meeting ends of said yarns overlap or provide for a continuous feed of yarn to needles of one and the same machine. It is manifest also that the transferred stitches and the introduced stitches may be in any desired courses of the fabric, that is to say, after the straight transfer of the stitches of some of the wales, any desired number of courses may be knitted before further wales are started by introducing stitches and the reverse of this proposition is equally true.

Having thus described my invention, I

claim and desire to secure by Letters Patent:—

1. A knitted fabric comprising two ribbed webs, one with a greater number of wales than the other, the introduced wales in the latter web having their initial stitches drawn across wales in the other face of the web.

2. A knitted fabric comprising two ribbed webs, one with a greater number of wales than the other, the introduced wales being in pairs, one in each face and having their initial stitches crossed.

3. A knitted fabric comprising two ribbed webs, and having a continuous yarn common to both, one of the webs having a greater number of wales than the other, and the introduced wales in the latter web having their initial stitches drawn across wales in the other face of the web.

4. A knitted fabric comprising two ribbed webs and having a continuous yarn common to both, one of the webs having a greater number of wales than the other, the introduced wales being in pairs, one in each face and having their initial stitches crossed.

5. The mode herein described of producing a knitted fabric comprising two webs ribbed throughout but with more wales in one than in the other, said mode consisting in knitting upon two sets of needles the web having the lesser number of wales, introducing needles of one set between needles of the other set different from those between which they normally operate, forming initial stitches upon said introduced needles while they are in such abnormal position, and then restoring them to their normal operative position and continuing the formation of stitches.

6. The mode herein described of producing a knitted fabric comprising two webs ribbed throughout but with more wales in one than in the other, said mode consisting in knitting upon cylinder and dial needles the web having the lesser number of wales, introducing dial needles between cylinder needles other than those between which they normally operate, forming initial stitches upon said introduced dial needles while they are in this abnormal position, and then restoring them to their normal operative position and continuing the formation of stitches.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

ROBERT W. SCOTT.

Witnesses:
WALTER CHISM,
JOS. H. KLEIN.