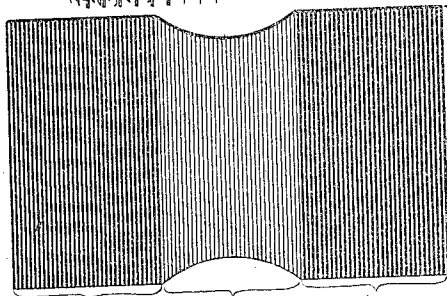


1,045,635.

Fig. 1



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Fig. 2

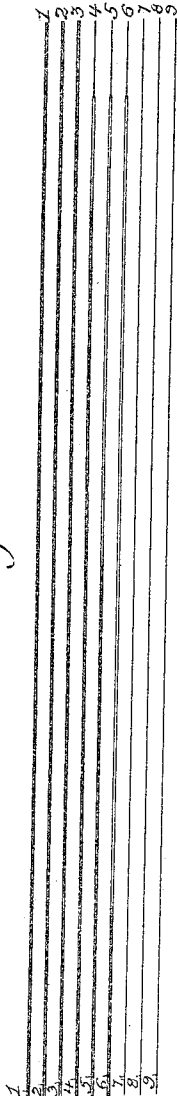
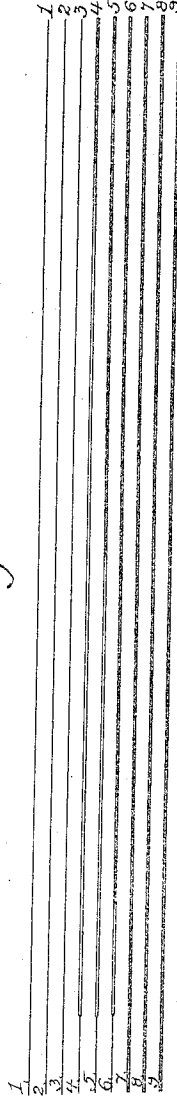


Fig. 3



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KNITTED UNDERGARMENT.
APPLICATION FILED MAR. 24, 1910.

Patented Nov. 26, 1912.

2 SHEETS—SHEET 2.

1,045,635.

Fig. 4

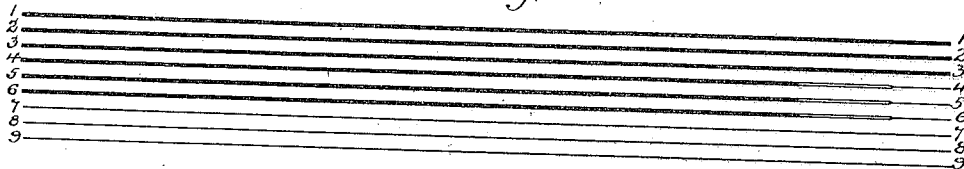


Fig. 5

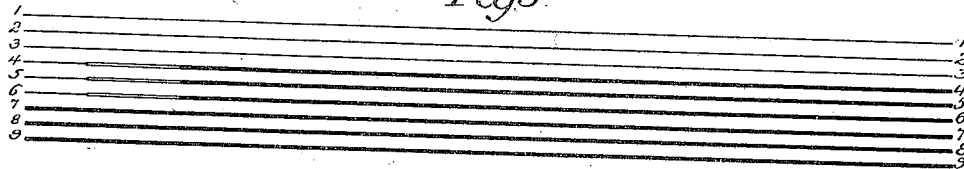


Fig. 6

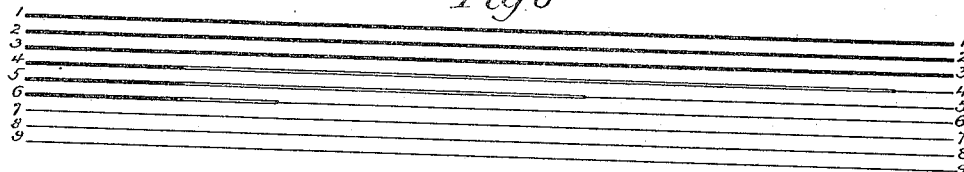


Fig. 7

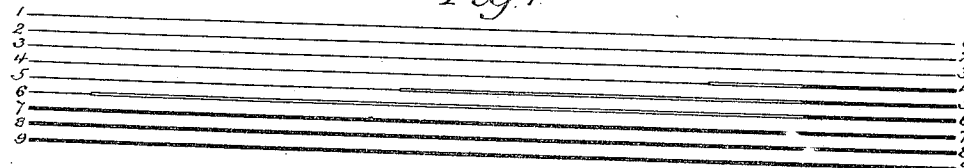


Fig. 8

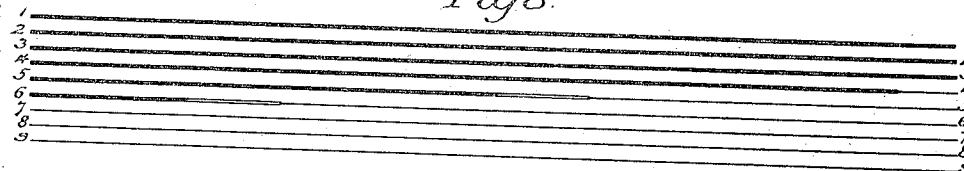
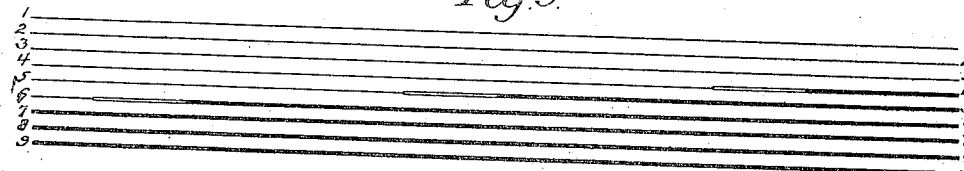


Fig. 9



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UNITED STATES PATENT OFFICE.

HARRY SWINGLEHURST, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO SCOTT & WILLIAMS, INCORPORATED, OF CAMDEN, NEW JERSEY, A CORPORATION OF NEW JERSEY.

KNITTED UNDERGARMENT.

1,045,635.

Specification of Letters Patent.

Patented Nov. 26, 1912.

Application filed March 24, 1910. Serial No. 551,320.

To all whom it may concern:

Be it known that I, HARRY SWINGLEHURST, a citizen of the United States, residing in Philadelphia, Pennsylvania, have
5 invented certain Improvements in Knitted Undergarments, of which the following is a specification.

My invention relates to undergarments such as shirts or union suits, in which the
10 body portion of the garment is composed of seamless tubular knitted fabric, having a waist portion which is knitted with lighter yarn and is of lesser diameter than the bust portion and the skirt or hip portion, the
15 objects of my invention being to facilitate the knitting of the fabric, and to improve the character of the same as compared with such fabrics as previously made. These objects I attain in the manner hereinafter set
20 forth, reference being had to the accompanying drawing, in which

Figure 1 is a view of a piece of fabric made in accordance with my invention, and intended for the body of an undershirt or
25 union suit, and Figs. 2 to 9, inclusive, are diagrams showing the tubular web split and laid flat, the successive courses of stitches being represented by lines, short stitches of light yarn by a single light line, long stitches of light yarn by a double light
30 line, and long stitches of heavy yarn by a single dark line, Figs. 2, 4, 6 and 8 representing portions of the web in which changes are effected from heavy yarn to light yarn, and
35 Figs. 3, 5, 7 and 9 representing portions of the web in which changes are effected from light yarn to heavy yarn.

In Fig. 1 of the drawing, 1 represents that portion of the web intended for the
40 bust of the garment, 2 that portion of the web intended for the waist and 3 that portion of the web intended for the skirt. The web is knitted upon an ordinary circular knitting machine which may be constructed
45 for the production of ribbed web or for the production of plain web, depending upon the character of web intended for the desired garment, the web produced being seamless and tubular throughout. The bust
50 and skirt portions of the web are knitted with heavier yarn and longer stitches than the

waist portion, the longer stitches of the bust and skirt portions, however, extending into the lighter yarn courses of the waist portion to a certain extent at the
55 points of junction of said waist portion with the bust and skirt portions.

In knitting the fabric for the manufacture of shirts, heavy yarn web of a length
60 sufficient for the bust and skirt portions of the garment will alternate with light yarn web of a length sufficient for the waist portion of the garment, the web being subsequently severed midway or thereabout of the heavy yarn portions, to produce the de-
65 sired blanks for the shirts.

The heavy knitting yarn is fed to the needles of the machine while the latter have relatively long draft, but after the lighter
70 yarn has been substituted for the heavy yarn for the production of the waist portion of the web, the draft of the needles is reduced in order that shorter stitches may be drawn
75 with the lighter yarn than with the heavy yarn, the purpose of delaying this change in the draft of the needles until after the lighter yarn has been substituted being to prevent the formation of short stitches with the heavy yarn, and for the same reason, the draft of the needles is increased, before
80 substituting the heavy yarn for the light yarn.

A certain number of long stitches will therefore be drawn with the lighter yarn whenever the change of yarns is effected, as
85 will be understood in reference to Figs. 2 and 3, in which the successive courses are indicated numerically, the fabric being supposed to be knitted upon a three-feed machine, courses numbered 1, 4 and 7 being,
90 in the tubular fabric, connected and continuous and knitted with one yarn, courses 2, 5 and 8 being likewise connected and continuous and knitted with the second yarn, and courses 3, 6 and 9 being connected and
95 continuous and knitted with the third yarn, successive courses being interknitted.

The change from the heavy yarn to the light yarn and from the light yarn to the heavy yarn may be effected either simul-
100 taneously or successively at the different feeds, and the change in the length of stitch

may also be effected either simultaneously in each course or successively in successive courses.

In the fabric shown diagrammatically in Figs. 2 and 3, the change in the yarns has been effected simultaneously in all three of the courses 4, 5 and 6, and the change in the length of stitch has been effected successively first in course 4, then in course 5 and then in course 6, the long stitches drawn with the lighter yarn consequently extending throughout different portions of the extent of the courses. The change from long stitches to short stitches follows the yarn change, and the change from short stitches to long stitches precedes the yarn change. In this web, the changes from heavy to light yarn or from light to heavy yarn take place at different points around the web while the changes in the stitches are at parallel points in all three courses.

Figs. 4 and 5 show the same portions of the fabric as Figs. 2 and 3, respectively, but illustrate the relation of heavy and light yarns and the long and short stitches when the change both as to yarn and stitches is effected successively, both the change of yarn and the change of stitch in such case being at parallel points in all three courses.

Figs. 6 and 7 show the same portions of the fabric as Figs. 2 and 3, respectively, but illustrate the relation of the heavy and light yarns and the long and short stitches when the change in the yarns is effected successively in courses, and the change in the stitch is effected simultaneously in each of the three courses, the change of yarns taking place at parallel points in all three of the courses, and the change in stitch at different points in the three courses so as to be distributed around the web.

Figs. 8 and 9 show the same portions of the fabric as Figs. 2 and 3, respectively, but illustrate the relation of the heavy and light yarns and the long and short stitches, when the change in the yarns is effected simultaneously and the change in the stitches is also effected simultaneously, the changes both in the yarns and stitches being, in this case, effected at different points around the web. This is the preferable plan, because, while it reduces to the minimum the extent of each course in which long stitches are drawn with the light yarn, it distributes the yarn changes as well as the stitch changes around the web instead of concentrating either of said changes at one point in the web as shown in the preceding figures.

The purpose of avoiding the formation of short stitches with the heavier yarn is to prevent the cutting of the yarn which might otherwise take place under such circumstances, and to prevent the formation of tight bands in the web which would follow

the formation of one or more courses of short stitches knitted with the heavy yarn.

Although my improved fabric will generally be knitted upon a machine having a plurality of yarn feeds, it can be knitted upon a single feed machine if desired.

I claim:

1. A knitted web having a portion composed of relatively heavy yarn forming relatively long stitches, and an adjoining portion composed of lighter yarn forming shorter stitches, the longer stitches extending into the light yarn portion of a course adjacent to the point where the yarn changes.

2. A knitted web having continuous courses of stitches composed in part of relatively heavy yarn forming relatively long stitches and in part of lighter yarn forming shorter stitches, the longer stitches extending into the light yarn portion of a course adjacent to the point where the yarn changes.

3. A knitted web having a portion composed of relatively heavy yarn forming relatively long stitches and an adjoining portion composed of lighter yarn forming shorter stitches, the longer stitches extending into the light yarn portions of successive courses adjacent to the point where the yarn changes in each course.

4. A knitted web having a portion composed of relatively heavy yarn forming relatively long stitches and an adjoining portion composed of lighter yarn forming shorter stitches, the longer stitches extending into the light yarn portions of successive courses adjacent to the point where the yarn changes in each course, and the yarn changes being at different points in the different courses.

5. A knitted web having a portion composed of relatively heavy yarn forming relatively long stitches and an adjoining portion composed of lighter yarn forming shorter stitches, the longer stitches extending into the light yarn portions of successive courses adjacent to the point where the yarn changes in each course, and both the yarn changes and the stitch changes being at different points in the different courses.

6. A knitted web having a portion composed of relatively heavy yarn forming relatively long stitches and an adjoining portion composed of lighter yarn forming shorter stitches, the longer stitches extending into the light yarn portions of successive courses adjacent to the point where the yarn changes in each course, both the yarn changes and the stitch changes being at different points in the different courses, and the relation of the yarn change to the stitch change being the same in each course.

7. A knitted web having a series of suc-

cessively disposed and continuous courses of stitches, each knitted with its own yarn, and each composed in part of relatively heavy yarn forming relatively long stitches and in part of lighter yarn forming shorter stitches, the longer stitches extending into the light yarn portions of the successive courses adjacent to the point where the yarn changes.

8. A knitted web having a series of successively disposed and continuous courses of stitches, each knitted with its own yarn, and each composed in part of relatively heavy yarn forming relatively long stitches and in part of lighter yarn forming shorter stitches, the longer stitches extending into the light yarn portions of the successive courses adjacent to the point where the yarn changes, and the yarn changes being at different points in the successive courses.

9. A knitted web having a series of successively disposed and continuous courses of stitches, each knitted with its own yarn, and each composed in part of relatively heavy yarn forming relatively long stitches and in part of lighter yarn forming shorter stitches, the longer stitches extending into

the light yarn portions of the successive courses adjacent to the point where the yarn changes, and both the yarn changes and the stitch changes being at different points in the successive courses.

10. A knitted web having a series of successively disposed and continuous courses of stitches, each knitted with its own yarn, and each composed in part of relatively heavy yarn forming relatively long stitches and in part of lighter yarn forming shorter stitches, the longer stitches extending into the light yarn portions of the successive courses adjacent to the point where the yarn changes, both the yarn changes and the stitch changes being at different points in the successive courses, and the relation of the yarn change to the stitch change being the same in each course.

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

HARRY SWINGLEHURST.

Witnesses:

HAMILTON D. TURNER,
KATE A. BEADLE.