

2 Sheets—Sheet 1.

No. 412,055.

Patented Oct. 1, 1889.

FIG. 1.

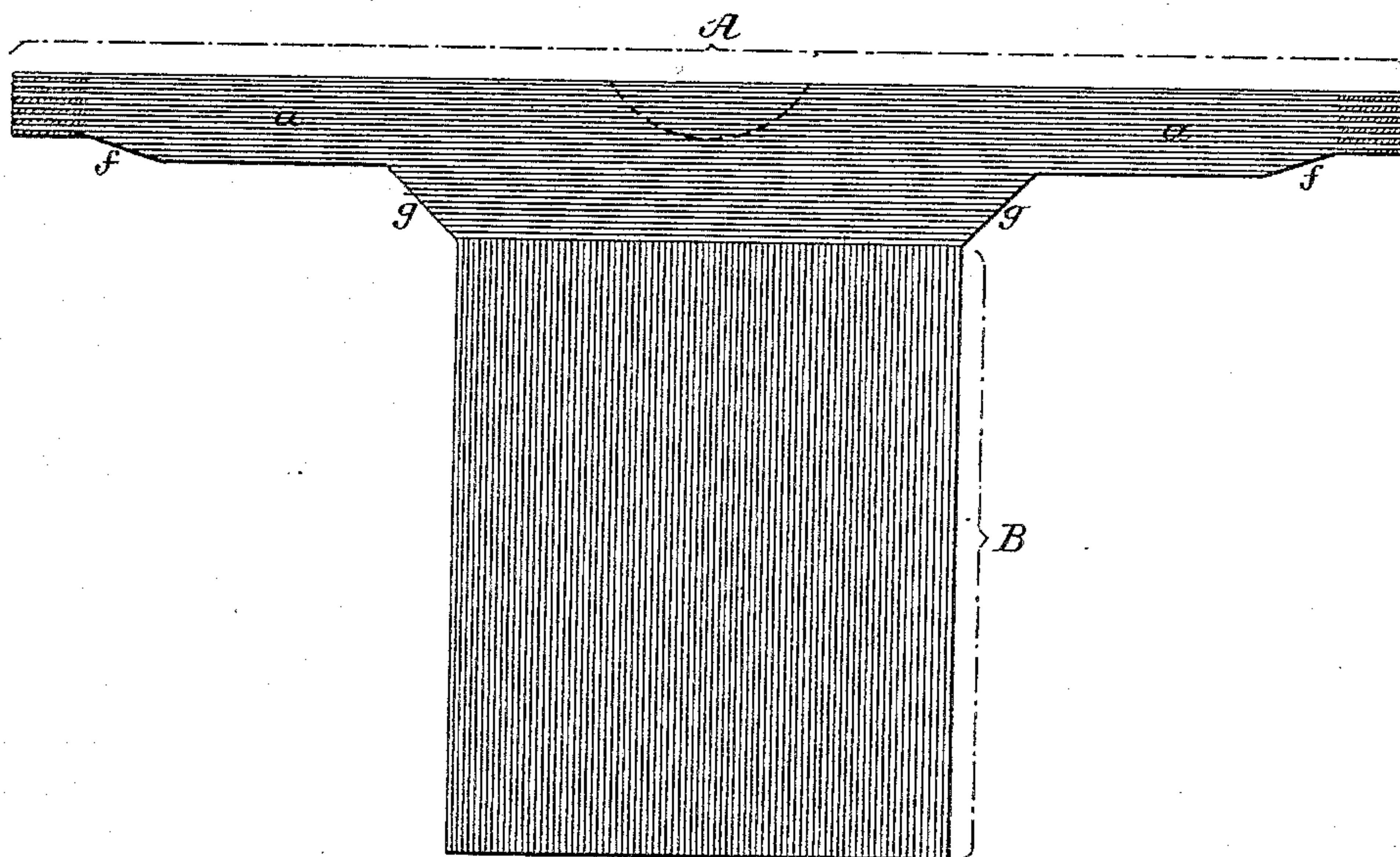


FIG. 2.

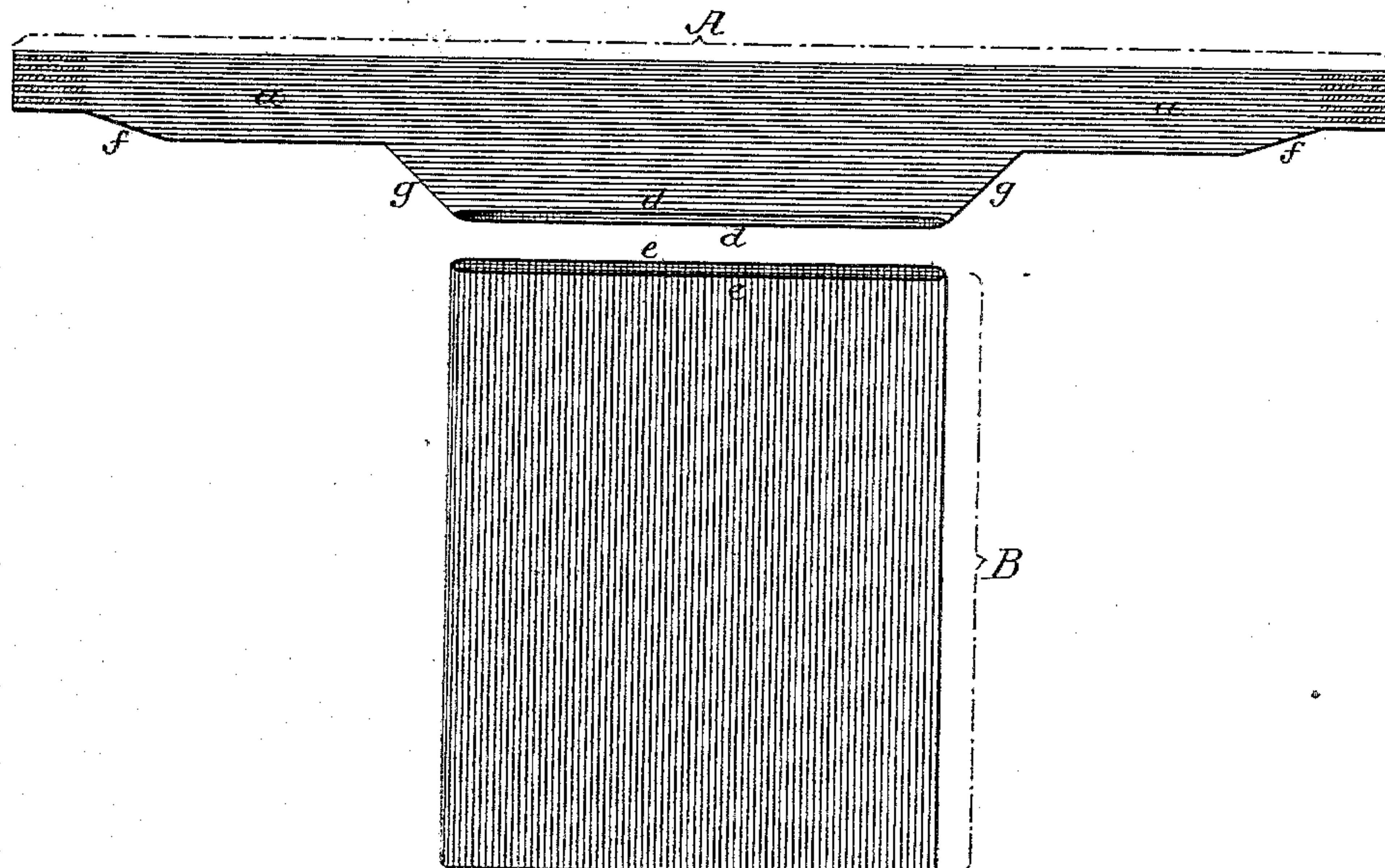
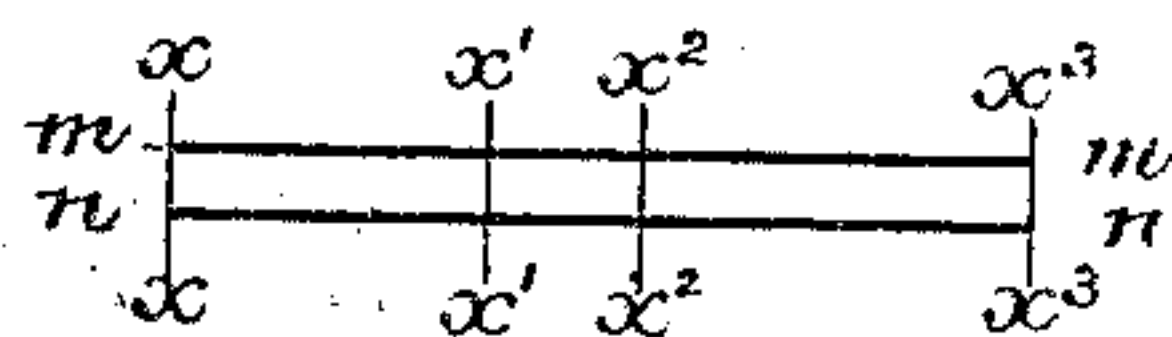


FIG. 3.



Witnesses:

Alex. Parkoff
John J. Kearney

Inventor:

Louis N. D. Williams
by his Attorneys

Howson & Howson

(No Model.)

2 Sheets—Sheet 2.

L. N. D. WILLIAMS.
KNITTED SHIRT.

No. 412,055.

Patented Oct. 1, 1889.

FIG. 4.

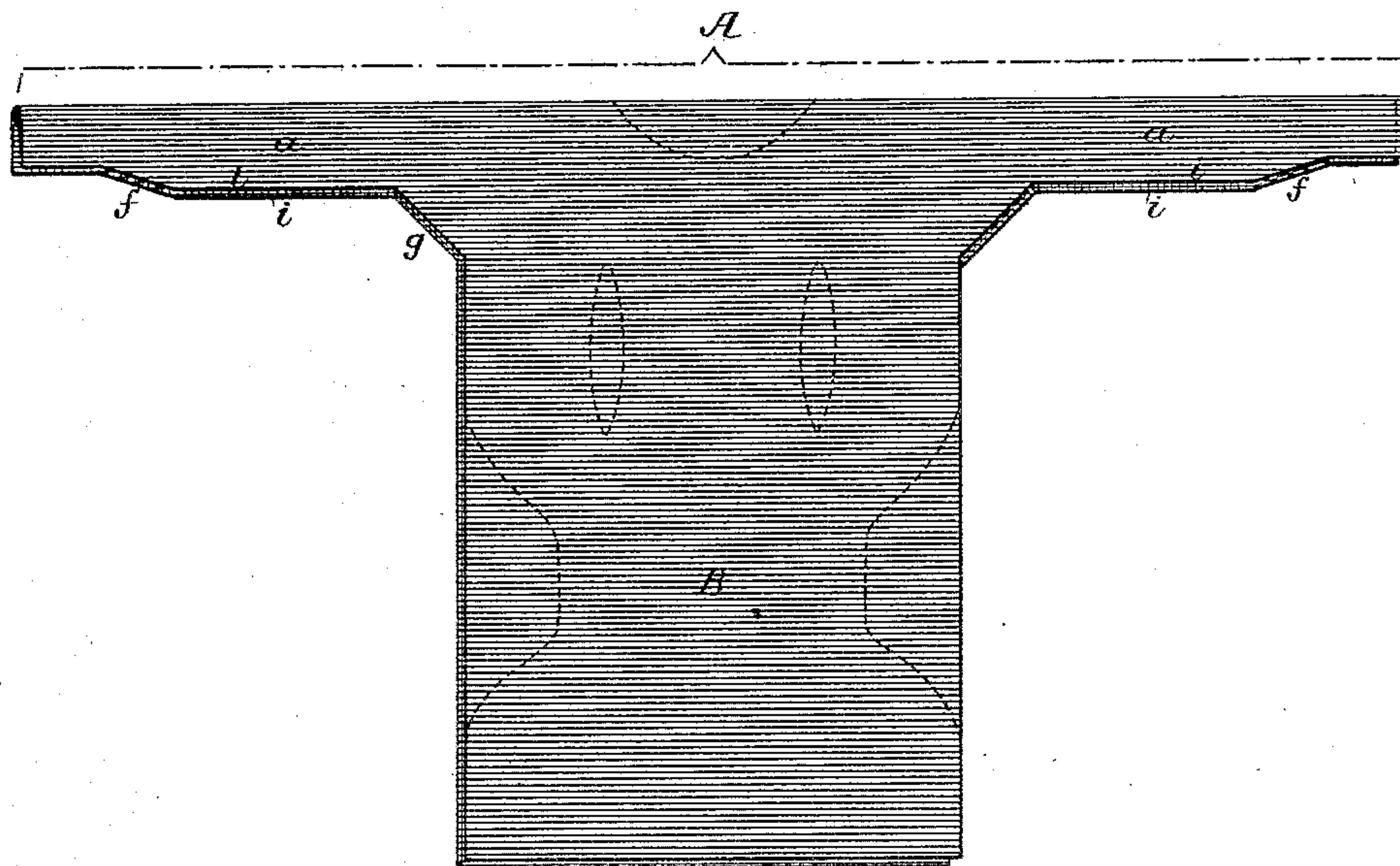
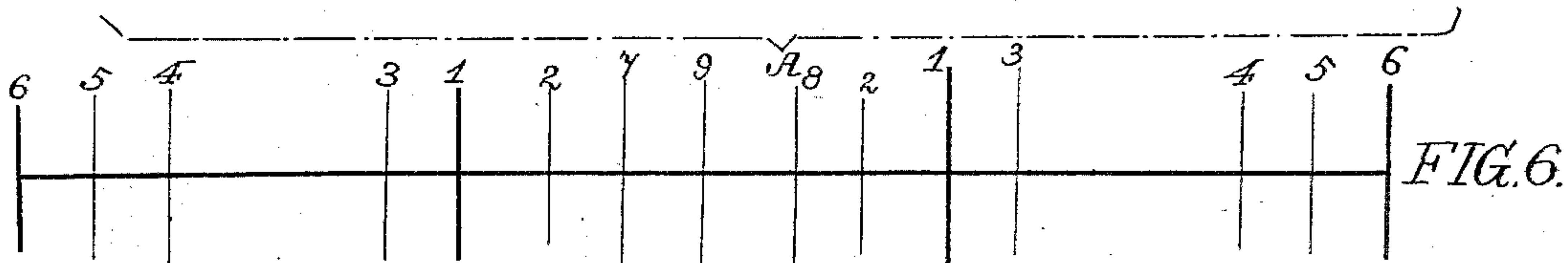
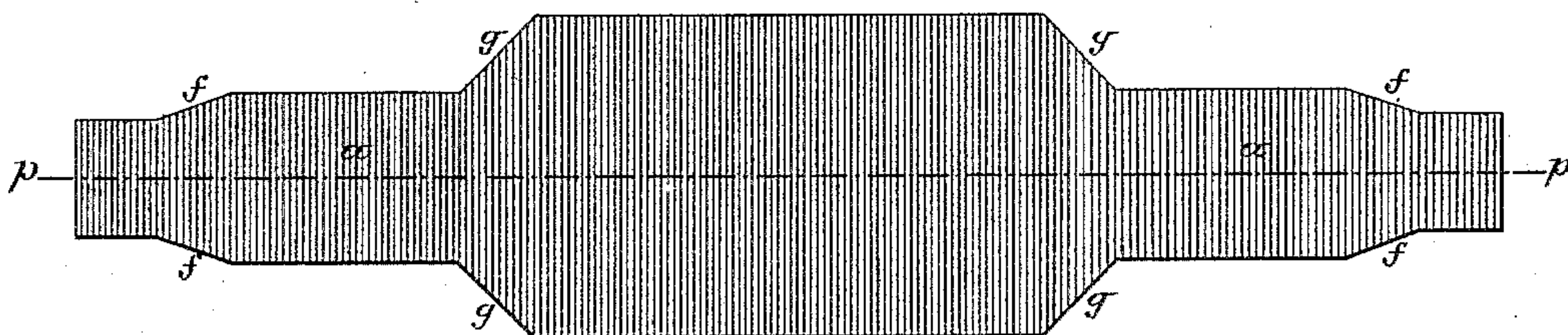


FIG. 5.



Witnesses:

Alv. Barkoff
John J. Meany

Inventor:

Louis N. D. Williams
by his Attorneys
HOWSON & HOWSON

UNITED STATES PATENT OFFICE.

LOUIS N. D. WILLIAMS, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF
ONE-HALF TO ROBERT W. SCOTT, OF SAME PLACE.

KNITTED SHIRT.

SPECIFICATION forming part of Letters Patent No. 412,055, dated October 1, 1889.

Application filed May 16, 1889. Serial No. 311,040. (No specimens.)

To all whom it may concern:

Be it known that I, LOUIS N. D. WILLIAMS, a citizen of the United States, and a resident of Philadelphia, Pennsylvania, have invented certain Improvements in Knitted Shirts, of which the following is a specification.

My invention consists, primarily, of a knitted shirt without seams where the sleeves join the shoulder portions, the sleeves and shoulder portions themselves being seamless, by preference, and the shirt in its preferred form having also a tubular seamless body.

In the accompanying drawings, Figure 1 is a view of a knitted shirt of the preferred form made in accordance with my invention. Fig. 2 is a view showing separated from each other the two pieces of fabric composing the shirt. Fig. 3 is a diagram illustrating the method of making the shoulder and sleeve portions of the shirt, and Figs. 4 and 5 are views illustrating other forms of shirt embodying the main features of the invention. Fig. 6 is a diagram illustrating the method of forming the shirt shown in Fig. 4.

In Figs. 1, 2, 4, and 5 the wales or stitches are represented by plain lines, the views being on too small a scale to warrant the representation of the stitches composing said wales.

The shirt shown in Figs. 1 and 2 comprises an upper shoulder and sleeve portion A and a tubular body B, the upper portion A being tubular and seamless as regards the opposite sleeve-portions $a a$ and as regards the center or shoulder portion b , comprising a seamless web having selvaged edges $d d$, which are united to the upper edges $e e$ of the tubular body.

The courses of stitches in the shoulder and sleeve portion A of the shirt are vertical and the wales horizontal, as shown, while in the tubular body B of the shirt these relations are reversed, the courses being horizontal and the wales vertical.

In making the improved shirt I prefer to employ a machine of that class having opposite needle-heads m and n , as shown in Fig. 3, the web being started at the narrowest or cuff portion of one sleeve, and this portion being formed by applying the yarn first to

the needles of one head and then to the needles of the other head, so as to form a tubular fabric upon the needles—say from x to x' , Fig. 3. After the cuff portion has been completed additional needles are gradually introduced at the end x' of the set, so as to widen the fabric, as at f , for the body of the sleeve, the extra needles thus introduced extending, say, from x' to x^2 . A tube of the latter size is then produced until it becomes necessary to again widen the tube to form the armpit-gussets g , extra needles being then successively introduced—say from x^2 to x^3 . The production of tubular fabric is now arrested and a strip of fabric with opposite selvaged edges is formed by carrying the yarn from the point x^3 of one needle-head to the point x of the same, thence across to the point x of the other needle-head, thence to the point x^3 of said needle-head, and thence reversely back again to the starting-point until a length of fabric has been produced equal to the desired width of the shirt from armpit to armpit, the width of this strip being dependent upon the desired depth of the shoulder portion of the garment. The production of tubular fabric for the other sleeve is then resumed, and the needles from x^3 to x^2 are gradually thrown out of action, so as to narrow the tube and form the opposite armpit-gusset g , the sleeve-tube being then formed upon the needles from x to x^2 until it becomes necessary to again narrow the cuff, which is done by gradually throwing out of action the needles from x^2 to x' , the final cuff being then produced upon the needles from x to x' . The selvaged edges $d d$ of the shoulder portion of the shirt are then, by preference, applied to the needles of a circular-knitting machine, upon which a tubular seamless web for the body B of the shirt is produced; or, if desired, such tubular seamless web previously produced upon a separate machine may, after the completion of the shoulder and sleeve portion of the shirt, have its upper edges e secured to the selvaged edges $d d$ of said shoulder portion of the shirt by a looping-machine of the usual construction; or in place of using a seamless tube for the body of the shirt said tube may consist of a flat web folded and

looped together on one side, or of two flat webs united together at their opposite edges, so as to form seams at each side of the body, and instead of starting the knitting of the shoulder and sleeve web at the outer end of the cuff, as described, ribbed cuffs separately produced may be looped upon the outer ends of the sleeves *aa* after the formation of the latter; hence when I allude to "seamless" sleeves I do not in all cases mean sleeves with cuffs. The shoulder and sleeve portions of the shirt may, however, be made in one seamless piece with ribbed cuffs, if desired, in a manner and upon a machine similar to that described in the application of myself and R. W. Scott, filed March 26, 1889, Serial No. 304,863, a ribbed cuff being first formed upon the needles of the cylinder and dial, and after the formation of said ribbed cuff the dial-needles being thrown out of action and the sleeve portion formed upon the needles of the cylinder alone and widened during its formation by the introduction of supplementary needles working in conjunction with those of the cylinder in the manner set forth in said application, tubular fabric being produced until the armhole-gusset *g* has been completed, and a selvaged web then formed by reciprocating the yarn-guide around the machine, instead of rotating it until the desired length of web for the shoulder portion of the shirt has been produced, whereupon the rotation of the guide will be again resumed and the supplementary needles gradually thrown out of action, so as to narrow the tubular web for the opposite sleeve, until finally the cylinder-needles alone remain in action, whereupon the dial-needles may again be rendered operative and the ribbed cuff for the opposite sleeve produced. In some cases, also, the formation of selvaged edges on the shoulder portion of the shirt may not be adhered to, said portion being knitted in tubular form with sleeves and afterward slit along the bottom for attachment to the upper edges of the body portion *B* of the shirt; or the front and back webs of the shoulder portion of the shirt may in the first instance be disconnected both at top and bottom and afterward seamed together over the shoulders, the seamless shoulders, however, being preferred in all cases.

The main feature of my invention—that is to say, the making of the shoulder and sleeve portions of the shirt in one piece, so as to dispense with seams where the sleeves join the shoulder portions—does not necessarily involve the making of the sleeves in tubular seamless form. Thus a flat web with opposite selvaged edges may be made of such shape that when folded in the center it will form the shoulder and sleeve portions of the shirt, as shown in Fig. 4, for instance, the sleeves being completed by looping together the selvaged edges *i* of these portions of the web, while the selvaged edges of the shoulder portion may be united to the body of the

shirt in any of the ways hereinabove set forth; or the said shoulder portion of the web may be of such width, as shown in Fig. 4, as to form the body of the shirt when its opposite looped edges are united so as to form a tube.

When the shoulder and sleeve portions of the shirt are formed with horizontal wales in the manner set forth, they can be readily shaped, as the wrist and armpit gussets can be formed by bringing into or throwing out of action needle after needle at the ends of the acting set; whereas widening and narrowing cannot be effectively accomplished if the wales in the shoulder and sleeve portion of the shirt are vertical, for the courses of stitches would in this case be horizontal and the formation of the straight portions of the sleeves would necessitate the bringing into or throwing out of action of a large number of needles simultaneously, which would in practice be objectionable. While, however, this arrangement of the wales in the shoulder and sleeve portions of the shirt is preferable, it is not absolutely necessary, as in Fig. 5 I have shown a web shaped to form the shoulder and sleeve portions of the shirt and having longitudinal courses of stitches forming wales at right angles thereto, this web being either shaped in the knitting so as to present selvaged edges in the sleeve portions or being cut from a flat web, and being, after shaping, folded on the center line *p* and having its edges united where necessary to form the sleeves.

The usual neck-opening (shown by dotted lines in Figs. 1 and 4) is formed in the shoulder portion of the shirt either by cutting the same or by forming said opening with selvaged edges during the knitting of said shoulder portion of the shirt, and if the shirt is intended as a woman's shirt, openings, as shown by dotted lines in Fig. 4, may be formed in the front of said shoulder portion of the shirt for the reception of the usual breast-pockets, and the body-webs may be shaped to conform to the waist and hips, as shown by dotted lines in said figure.

A diagram illustrating one method of forming such a web as is represented in Fig. 4 is shown in Fig. 6, the horizontal line representing a row of needles in a straight frame. The web is commenced on the needles from 1 to 1, this being the width of the body portion of the shirt. At the waist the web is shaped by gradually dropping needles out of action at each end from 1 to 2 and then gradually bringing these needles into action again. Needles are gradually brought into action at each end from 1 to 3 to form the armpit gussets *g*, and the needles are then thrown into action simultaneously up to the line 4, successively from 4 to 5, and simultaneously from 5 to 6 to form the sleeve and cuff. After the desired length of fabric for the cuff has been knitted the operations are reversed, the needles being thrown out of action simul-

taneously from 6 to 5, successively from 5 to 4, simultaneously from 4 to 3, and successively from 3 to 1, so as to shape the other side of the sleeve, the body-web being then
 5 produced on the needles from 1 to 1 and shaped at the waist by successively throwing out of action and bringing into action the needles from 1 to 2.

In order to form the breast-slits, three
 10 guides may be used in knitting this portion of the fabric, one guide supplying the needles on the left from 1 to 7, another guide supplying the needles from 7 to 8, and the third guide supplying the needles from 8 to 1, so
 15 that three independent webs will be produced.

In knitting that portion of the web in which the neck-opening is formed, two guides may be used, one guide supplying the needles from
 20 the end 6 of the frame on the left to the center line 9, and the other guide supplying the needles from the center line 9 to the opposite end 6, and needles being successively thrown
 25 out of action from the center 9—say to about the lines 7 and 8—until the neck-opening has been widened to the desired extent, and these needles being then successively brought into action again to narrow the opening.

In a separate application filed by me on the
 30 5th day of April, 1889, Serial No. 306,046, I have described a shirt made by folding a flat web of knitted fabric so as to form a seamless shoulder portion and then knitting a
 35 tubular body thereto, the sleeves being knitted separately and united to the armholes of the shirt. The essential feature of my present invention, however, is the formation of the sleeves of the shirt in one piece with the
 40 shoulder portion, so that there is no seam where the sleeve joins the shoulder portion of the shirt.

I am aware that prior to my invention it has been proposed to make a coat or like garment from one piece of cloth cut so as to
 45 form the body and sleeves of the garment; but in this case objectionable seams were formed across the breast of the garment and around the under side of each armhole from front to
 50 back, whereas in my improved shirt there are no seams either across the breast or around the under side of the armhole, the shirt in the preferred form being wholly seamless, and even in the form shown in Figs. 4 and 5 hav-
 55 ing only longitudinal seams along the bottom of the sleeves and at the sides of the body, without any transverse seams from front to back under the armholes, and without any seams at the top of the sleeves, in which respect it differs from a blouse or like garment,
 60 which it has been proposed to make by cutting two pieces, each comprising one-half of the body and one-half of each sleeve, and uniting these pieces by seams extending from the neck-opening across the shoulders and
 65 along the top of each sleeve, and other seams extending along the bottoms of the sleeves and down the opposite sides of the body.

Having thus described my invention, therefore, I claim and desire to secure by Letters Patent—

1. The within-described shirt of knit fabric, having the shoulder portion and sleeves composed of one piece of fabric, forming seamless armholes, and having a tubular
 70 body portion depending from said shoulder portion, substantially as specified.

2. The within-described shirt of knit fabric, having a seamless shoulder portion and sleeves in one piece therewith, forming seamless armholes, and having a tubular body
 80 portion depending from said shoulder portion, substantially as specified.

3. The within-described shirt of knit fabric, having a shoulder portion and shaped tubular seamless sleeves in one piece there-
 85 with and a tubular body portion depending from said shoulder portion, substantially as specified.

4. The within-described shirt of knit fabric, having a seamless shoulder portion, shaped tubular seamless sleeves in one piece
 90 therewith, and a tubular body portion depending from said shoulder portion, substantially as specified.

5. The within-described shirt of knit fabric, having a shoulder portion and sleeves in one piece therewith and a tubular seamless
 95 body portion united to the lower edges of the shoulder portion of the shirt, substantially as specified.

6. The within-described shirt of knit fabric, having seamless shoulder portions and shaped tubular seamless sleeves in one piece
 100 therewith, and having a seamless tubular body the upper edge of which is united to the lower edges of the shoulder portion of the shirt, substantially as specified.

7. The within-described shirt of knit fabric, having a shoulder portion and sleeves in one piece and a body the upper edges of
 110 which are united to the lower edges of the shoulder portion of the shirt, the wales in the shoulder and sleeve portions of the shirt being horizontal and those in the body of the shirt being vertical, substantially as specified.

8. The within-described shirt of knit fabric, having a seamless shoulder portion and shaped tubular seamless sleeves in one piece
 120 therewith, and a body portion consisting of a seamless tubular web, the upper edge of which is united to the lower edges of the shoulder portion of the shirt, the wales in said shoulder and sleeve portions of the shirt being horizontal and those in the body of the
 125 shirt being vertical, substantially as specified.

9. The within-described shirt of knit fabric, having a shoulder portion and sleeves with ribbed cuffs, the whole being in one
 130 piece, and a body portion depending from the shoulder portion of the shirt, substantially as specified.

10. The within-described shirt of knit fab-

ric, having a seamless shoulder portion and
shaped seamless tubular sleeves with ribbed
cuffs, the whole being in one piece, and a
body portion depending from the shoulder
5 portion of the shirt, substantially as speci-
fied.

In testimony whereof I have signed my name

to this specification in the presence of two
subscribing witnesses.

LOUIS N. D. WILLIAMS.

Witnesses:

GEO. D. STREET,
HARRY SMITH.