

(Specimens.)

2 Sheets—Sheet 1.

T. H. CARROLL.

# KNITTED FABRIC AND METHOD OF MAKING THE SAME.

No. 365,728.

Patented June 28, 1887.

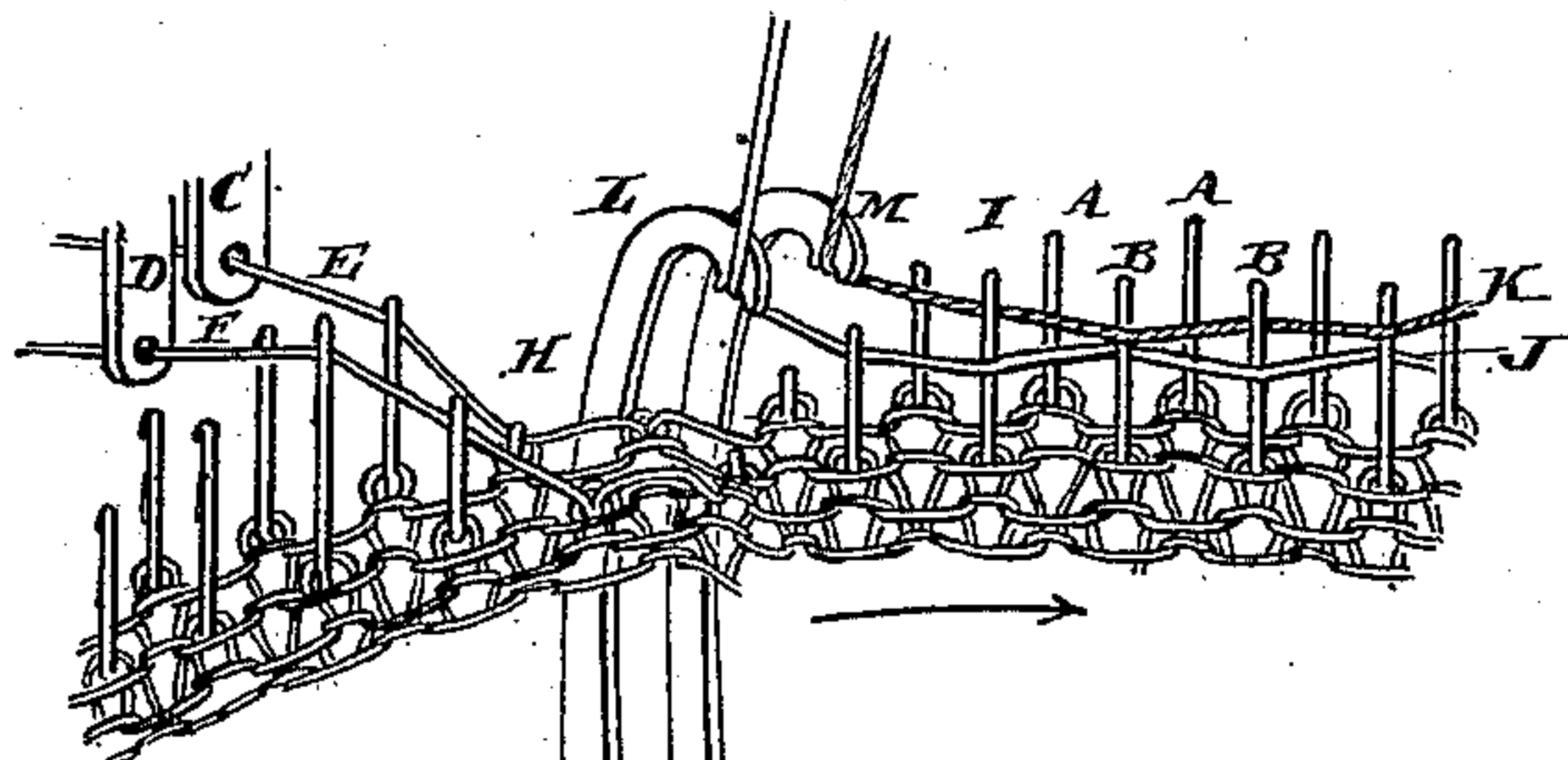


FIG. 1

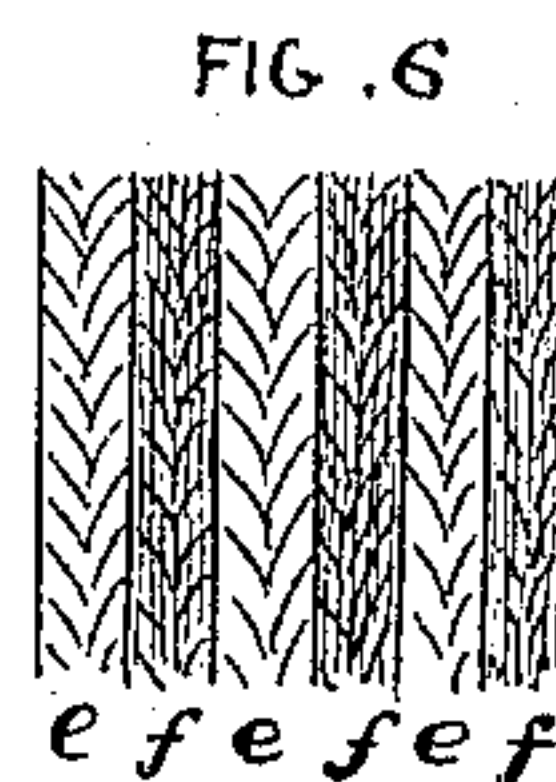


FIG. 4.

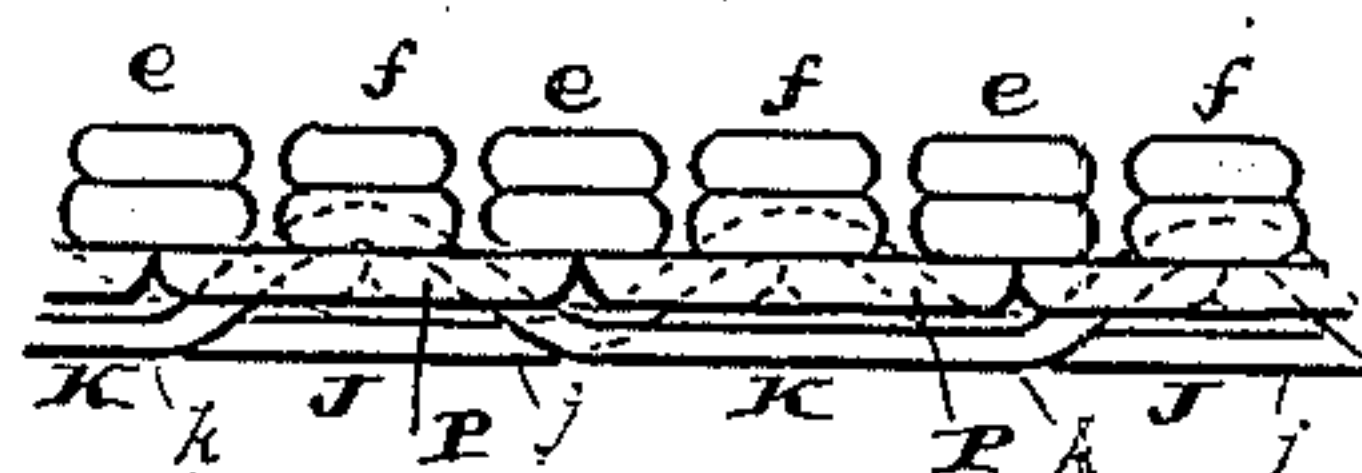


FIG. 5

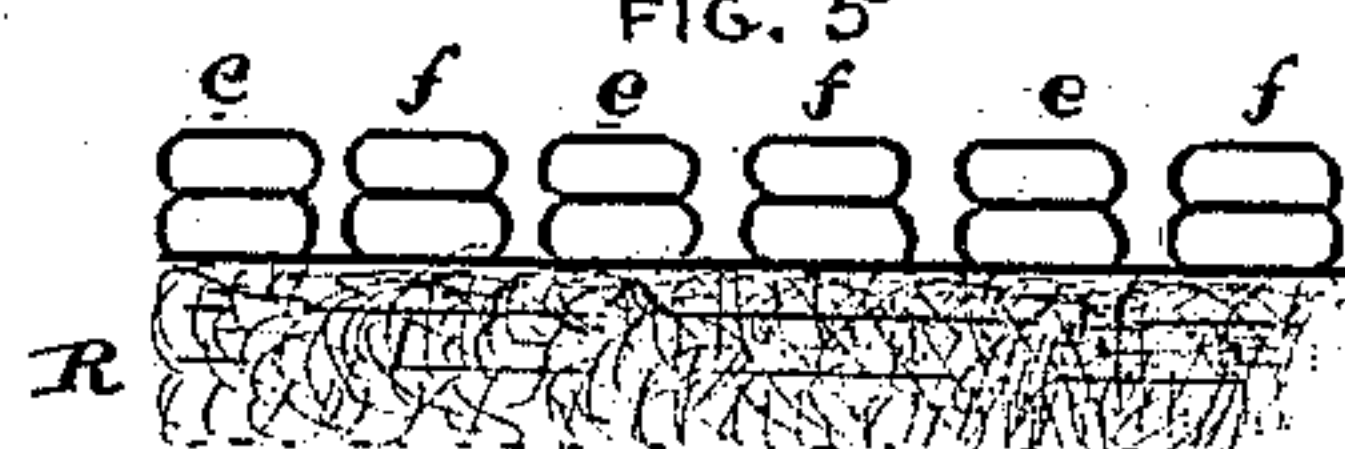


FIG. 8



FIG. 7

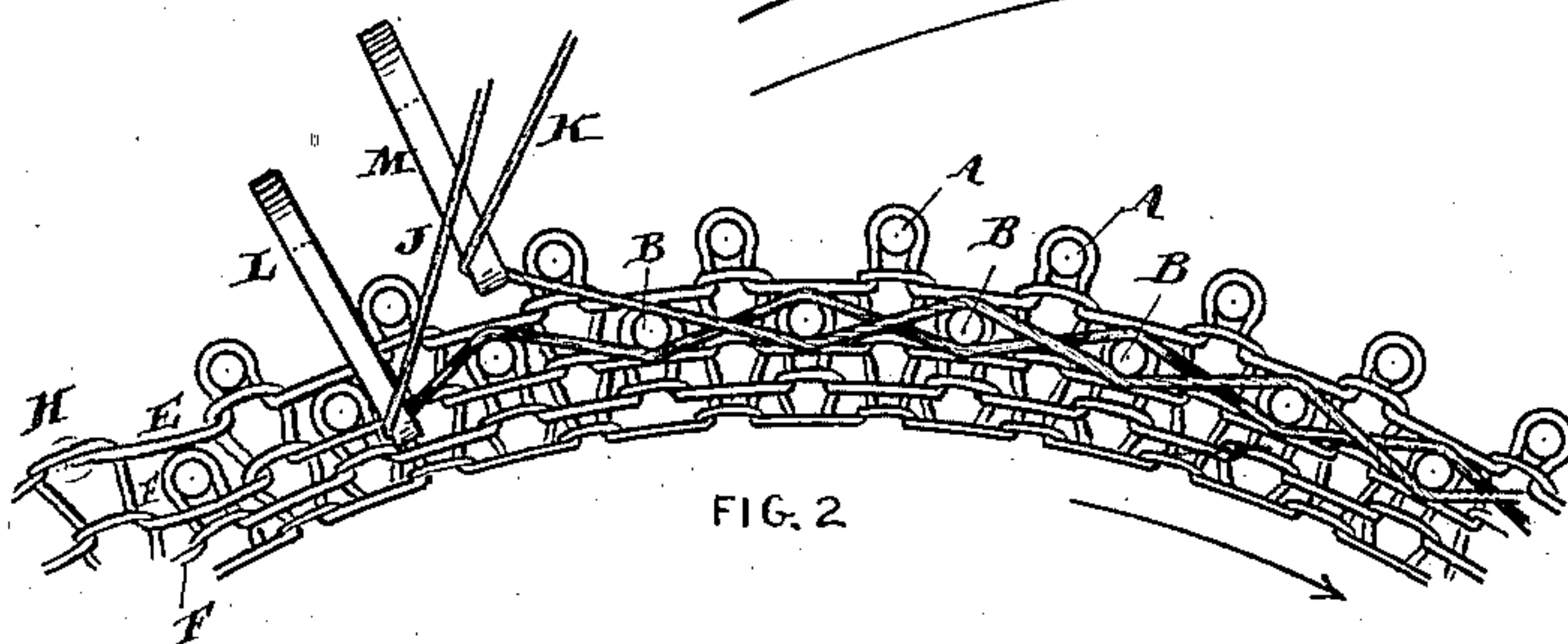


FIG. 2

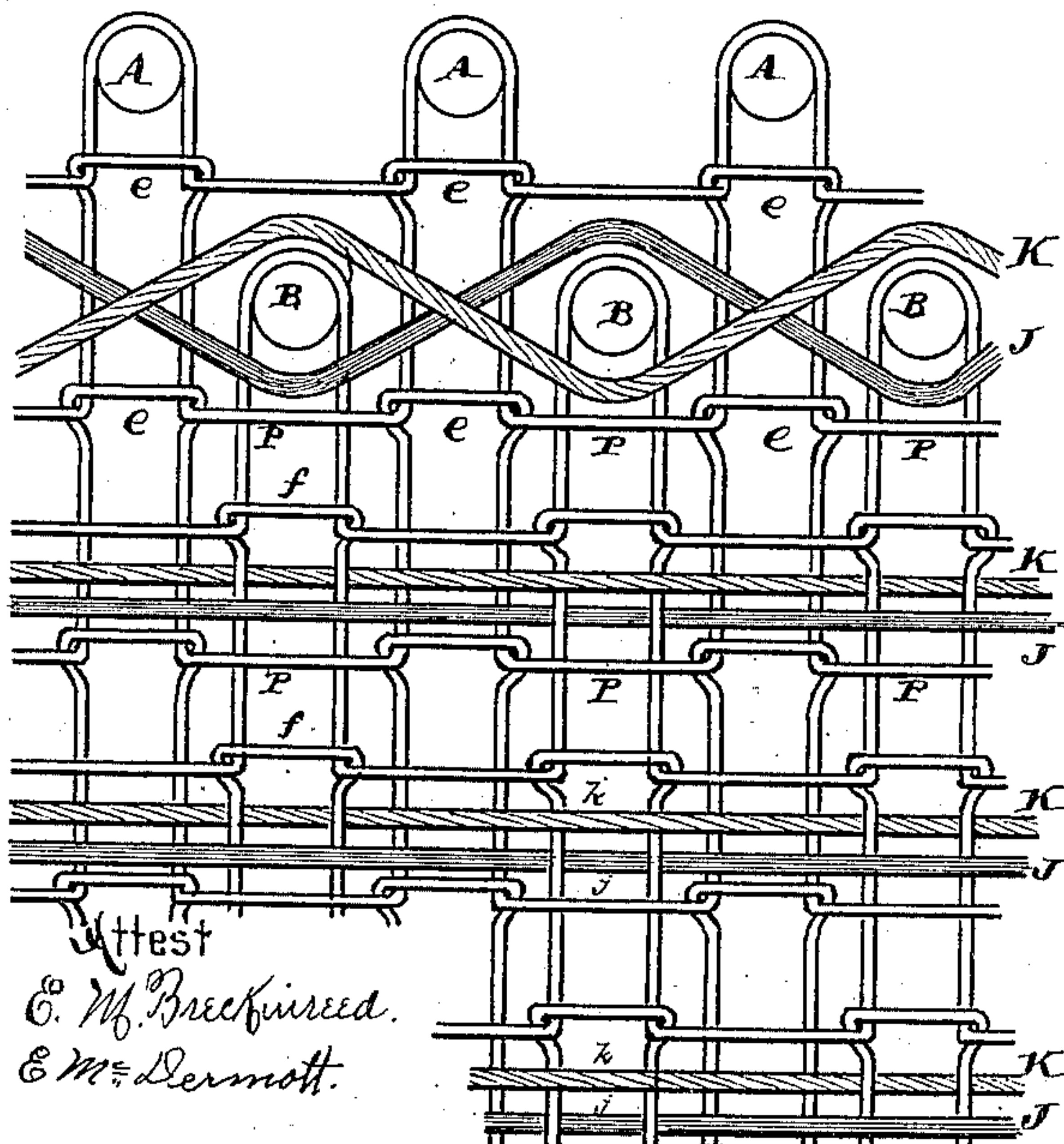


FIG. 3

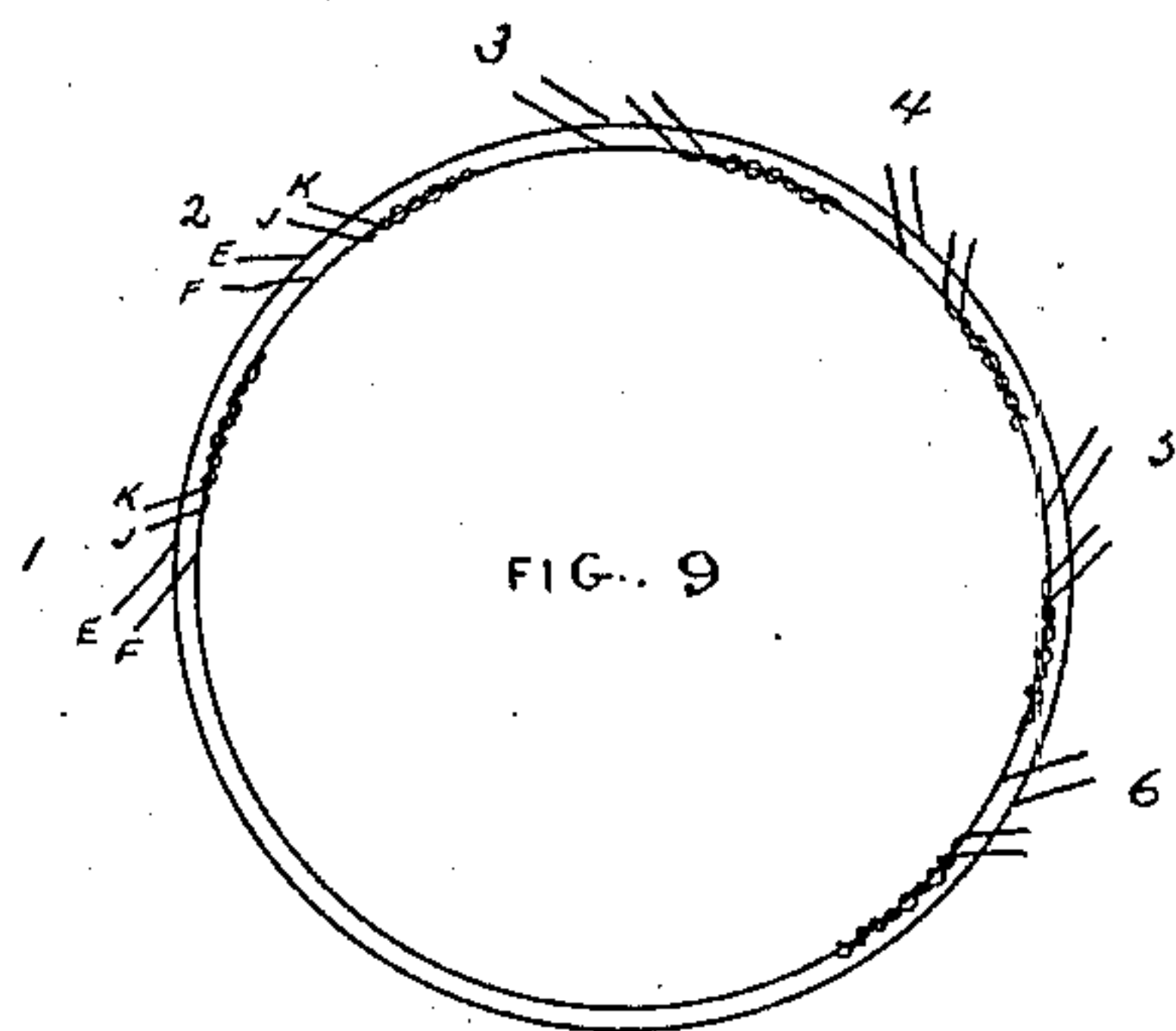


FIG. 9

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Thomas H. Carroll  
By *Wm. H. Carroll*

(Specimens.)

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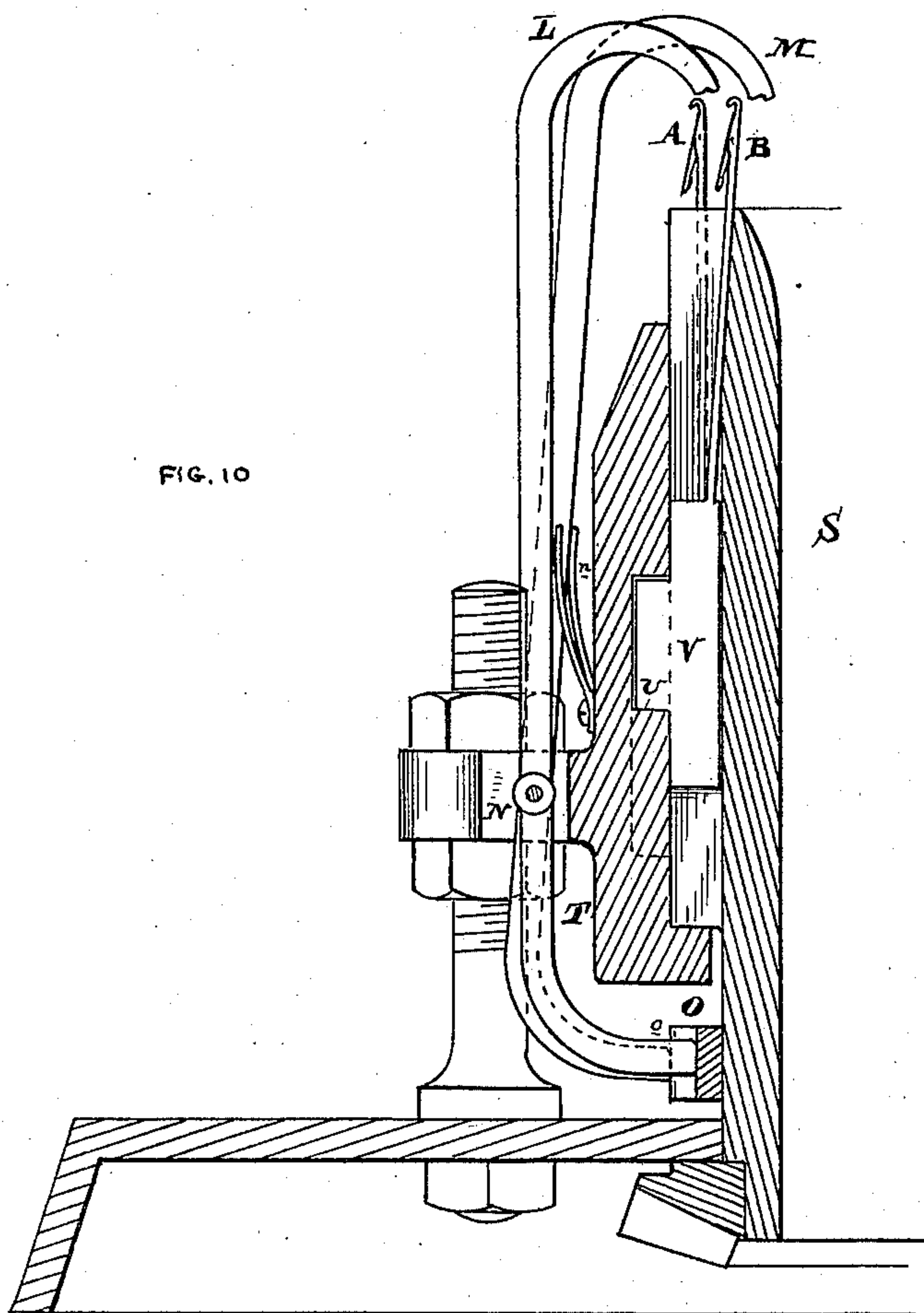


FIG. 10

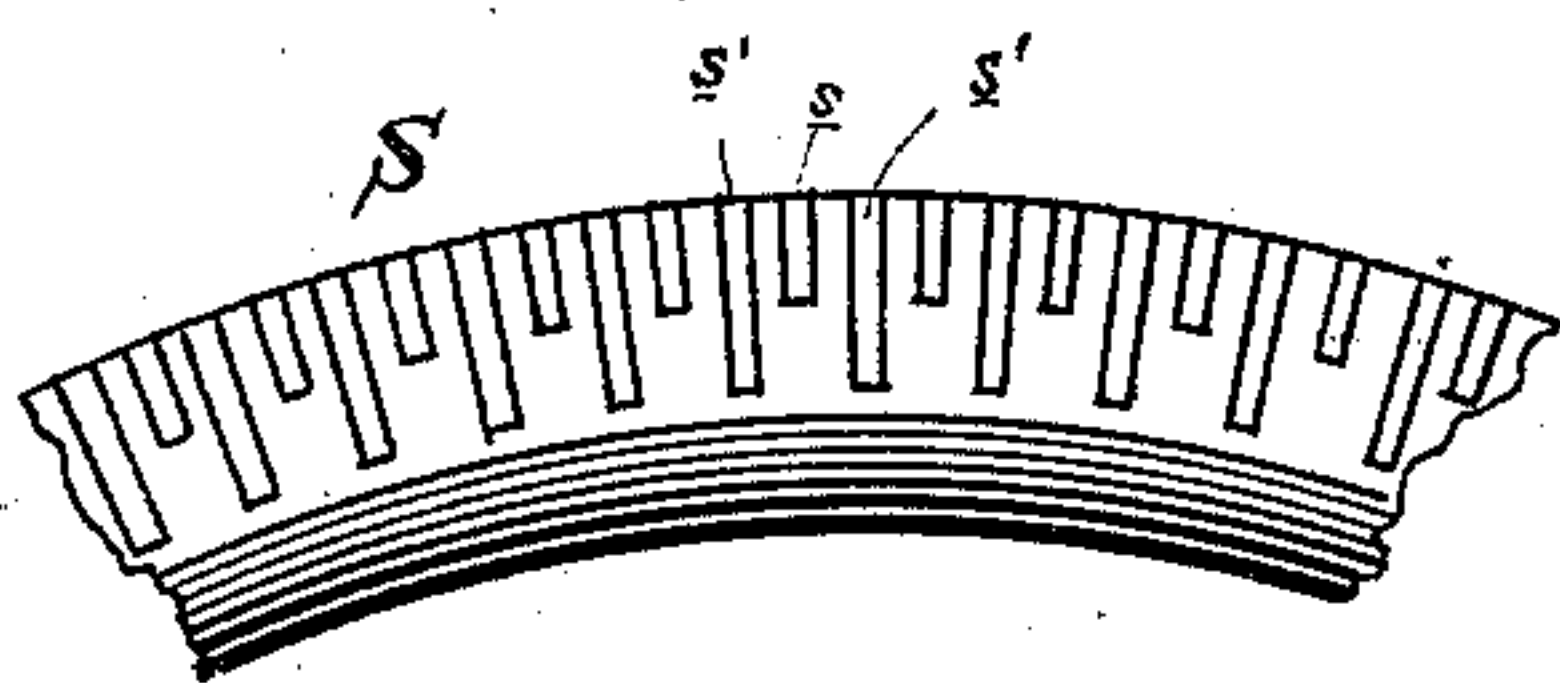


FIG. 11

Attest  
*Mustard & Co.*  
E. W. Breckinridge

Inventor  
Thos. H. Carroll  
By his atty  
*T. H. Carroll*



# UNITED STATES PATENT OFFICE.

THOMAS H. CARROLL, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF TWO-THIRDS TO JOHN D. ULMER, OF SAME PLACE, AND IRVINE C. BEATTY, OF CAMDEN, NEW JERSEY.

## KNITTED FABRIC AND METHOD OF MAKING THE SAME.

SPECIFICATION forming part of Letters Patent No. 365,728, dated June 28, 1887.

Application filed August 30, 1886. Serial No. 212,150. (Specimens.)

*To all whom it may concern:*

Be it known that I, THOMAS H. CARROLL, of the city and county of Philadelphia, and State of Pennsylvania, have invented an Improvement in Knitted Goods and the Method for Making the Same, of which the following is a specification.

My invention has reference to knitted fabrics and the method of making the same; and it consists in certain improvements, all of which are fully set forth in the following specification, and shown in the accompanying drawings, which form part thereof.

At present in the market there are two main or characteristic forms of knitted fabrics, one of which is what is known as "jersey-cloth," essentially a plain knitted fabric without any backing and made of a uniform color, and the other of which is what is known as "stockinet," formed with a looped or plush back. Both of these fabrics are made in a single continuous piece—that is to say, the adjacent horizontal face-loops of each are formed of the same thread—and hence must be of the same color. The jersey-cloth is extremely light, and therefore not sufficiently warm for winter clothing, whereas the stockinet, while having all the warmth required, is extremely expensive to make and entirely beyond the reach of the majority of people.

The object of my invention is to produce a fabric which may be either made plain, like jersey-cloth, or with a looped or plush back, like stockinet, and which shall be cheap to manufacture, durable under wear, and have far more warmth than jersey-cloth if made from the same threads or yarns.

Further, my object is to form a knitted cloth which may be striped vertically, as well as horizontally, to form either striped, checked, or plaid fabrics, either with the plain or the carded or plush back. It is readily seen that a fabric of this nature, which can be produced with such great variety of effect, has great novelty and will supply an article which it has heretofore been impossible to make, though greatly desired.

In carrying out my invention I use two sets of needles, arranged upon the well-known

Balmoral knitting-head, one set being arranged within the other and concentric therewith. These needles are of the ordinary latch construction, and the needle-jacks upon both sets of needles are substantially the same and are operated by the cams found upon all knitting-machines of this class. To make cloth I use a head of large diameter, with, say, fifty-six or more sets of thread-guides. Each set of needles has its own thread-guides, so that separate threads, either of the same or of different colors, may be run into the respective sets of needles, and as the needles of the two sets are staggered the fabrics knitted upon each of the sets will be also interlaced together, the loops of each set being arranged alternately, and in the completed fabric they form a uniform surface. If these threads are of different colors, then the fabric produced will have vertical stripes, a most desirable feature in this class of goods.

It is self-evident that the needles of the two sets need not be staggered alternately; but one set might have two or more needles arranged between one or more needles of the other set and staggered, in which case I could produce different widths of stripes, or the different stripes arranged at different distances apart. The completed jersey-cloth formed in this manner will be thicker and more handsome in appearance than when only one set of needles is used, because the back loops of the two-face fabrics give extra thickness and prevent any possibility of the fabric being readily seen through. These back loops may be left plain, or be carded or combed to give a cloth or plush appearance to the back; but to make the fabric more of the appearance of stockinet (which is a very high-priced goods) I knit or weave into the back of the fabric one or more yarns or threads, which are held to the back by the threads of the inner set of needles from which the face of the fabric is formed. To make this backing-thread looped, it is passed back and forth between the adjacent needles of the inner set, and if two such threads are knitted into the back simultaneously, then these threads will cross each other between the needles and wrap about the needles upon



different sides thereof. These backing-loops will form no perceptible part of the face of the fabric, but when combed up in conjunction with the loops heretofore mentioned (formed of the face-threads) an extremely thick soft plush backing will be produced, and the fabric will look in all material respects the same as stockinet, embodying all the intrinsic properties thereof, and in addition thereto advantages thereon resulting from the proper arrangement of different-colored threads in the various feed or thread guides.

A fabric may be formed in which a checked, a striped, a mottled, or a plaid appearing face may be produced.

The variety of designs which may be produced upon a machine for making this fabric is very numerous, a few particular designs being herein set out as illustrations.

In the drawings, Figure 1 is a perspective view representing the method of knitting my improved fabric, and showing a number of each set of needles, their thread-guides, and devices for operating the backing-thread guides. Fig. 2 is a plan view of same, except so far as the face-thread guides and operating devices for the backing-thread guides are concerned, these being omitted. Fig. 3 is an enlarged skeleton view showing how the fabric is formed and the relative arrangement of the various threads. Fig. 4 is an end view of a piece of the completed fabric uncarded. Fig. 5 is a similar view showing the back carded or combed. Figs. 6, 7, and 8 are elevations showing different designs produced by this method of knitting. Fig. 9 is a plan view diagram illustrating the arrangement of a number of sets of thread-guides about a single knitting-head. Fig. 10 is a sectional elevation through the needle-head and its appendage, showing how the needles and the thread-guides are operated; and Fig. 11 is a plan view of a portion of the needle-head, showing the needle-grooves.

A represents the outer set of needles, and B the inner set, (shown in the present instance as arranged alternately, or with the needles of one set located in front of the openings of the other set.) The needles have the ordinary jacks, V, which work in the usual cams, U, on the frame T of the machine. The needle-head S has the ordinary grooves, s, for the needles and their jacks; but every alternate groove is cut deeper, as shown at s', Figs. 10 and 11, and the needles B are bent back, so as to run in said deep grooves, and thereby separate their points from those of the needles A in the grooves s.

C and D are the respective thread guides, the former feeding the yarn E to the needles A and the latter feeding the yarn F to the needles B. Both sets of needles ascend and take the yarns E and F, and then descend below the fabric, as at H, drawing the yarns through the loops in the well-known manner, and form new loops upon the needles as they ascend at I. The fabric knitted by the action

of these two sets of needles and the two threads E and F is shown in Figs. 1, 2, and 3 if the threads J and K in these figures are ignored. From this it will be seen that the needles B ascend between the back loops, P, of the loops formed by the threads E on needles A. The loops formed on the needles B will therefore interlace with the loops formed on needles A, as is clearly shown in Fig. 3, e and f in the various figures corresponding to the loops formed on the needles by the respective threads E and F, and these loops produce the face of the fabric. If the threads E and F are of different colors, then we have a vertically-striped fabric produced, as indicated in Fig. 6. If two or more sets of thread-guides are used, as indicated in Fig. 9, then, if the colors of the threads E and F be reversed in the adjacent sets, a check fabric will be produced, as indicated in Fig. 8. Again, if the threads F in two adjacent sets were alike and the threads E unlike, every (alternate one being of the same color as the threads F,) then we would have a plaid such as indicated in Fig. 7, in which the figures 1 to 6 indicate the loops produced on the corresponding sets 1 to 6 of thread-guides, as indicated in Fig. 9. From this it will be observed that the designs may be greatly modified, as with fifty-six or more sets of thread-guides a large number of combinations may be obtained. From the foregoing it will be readily perceived that the whole secret of this capability of producing a large variety of desirable patterns is due to the division of the needles and the use of two separate and independent face threads which shall simultaneously be knitted into the fabric. Such knitted goods will be essentially heavy jersey-cloth, and, if desired, the back loop-threads, P, may be rubbed or carded up to form a soft or plush back. To increase the thickness of this plush back, I weave or knit in one or more backing-threads, which are worked into the fabric in the form of wefts, as will be clearly understood from an inspection of Fig. 3.

To knit in the backing-threads, I provide two thread-guide levers, L and M, which are pivoted at N and are oscillated in alternately-opposite directions by the cam-teeth o of the cam O, which rotates with the needle-head. These guides L and M guide the back threads, J and K, back and forth between the needles B of the inner set, the said threads J and K crossing each other between the needles, as shown in the various figures. These threads are not acted upon by the hooks of the needles, but are simply tied in place as filling-threads by the next set of loops made with a thread F upon the needles B. These threads are arranged upon the inner set of needles alone and have nothing whatever to do with the outer set, and when they are tied into the fabric they are located as indicated in Figs. 3 and 4, in which it will be observed that they have the appearance of weft-threads, and their loops j and k, which extend above the body of the fab-



ric and parallel to the loops P of the face-threads, may be left in that condition, (see Fig. 4,) or may be carded or combed to form a plush back, as indicated in Fig. 5.

5 I do not limit myself to the particular alternative arrangement of the needles A and B, as the number and particular arrangement is immaterial to my invention, provided there are two independent sets of needles each having separate face-yarns fed thereto and both  
10 operated to interlace their loops with each other; neither do I limit myself to the particular method of inserting the filling-threads J and K shown, for, if desired, only one of said  
15 threads may be used, and the thread might pass back of two needles and in front of one, or lay the yarn in any other manner upon the back or inner set of needles. Therefore, while I prefer the construction shown, I do not limit  
20 myself thereto, as it may be modified in various ways without departing from my invention.

Having now described my invention, what I claim as new, and desire to secure by Letters  
25 Patent, is—

1. As an improved article of manufacture, a knitted fabric made in two parts, each part having its own independent yarn and said parts being united by having their loops interlaced over their entire surface to form an  
30 integral piece of fabric, and backing-threads looped into one of said parts and appearing mainly upon the back of the fabric.

2. As an improved article of manufacture, a  
35 knitted fabric made in two parts, each part having its own independent yarn and said parts being united by having their loops interlaced to form an integral piece of fabric, and carded or plushed backing-threads looped  
40 into one of said parts and appearing mainly upon the back of the fabric.

3. As an improved article of manufacture, a knitted fabric made in two parts, each part having its own independent yarn and said  
45 parts being united by having their loops interlaced to form an integral piece of fabric, and backing-threads looped into one of said parts and appearing mainly upon the back of the fabric, the said back of the free fabric and  
50 extra backing-threads being carded or plushed.

4. The method herein described for the manufacture of a knitted fabric, which consists in knitting two separate knitted parts upon two separate sets of needles and with different  
55 threads for each set of needles, the needles formed by the other set to cause the loops of the two parts to interlace to form one set passing through the loops of an integral piece of fabric, and interweaving one or more plush or  
60 backing threads upon one of said sets of needles, whereby the same is tied into one of the parts and appears mainly upon the back of the completed fabric.

5. The herein-described method of knitting  
65 a fabric, which consists in knitting two separate parts upon two distinct sets of needles

and with separate threads, the threads of each set always feeding to its own set of needles, and applying one or more backing-threads by winding them back and forth between the  
70 needles of one set and tying them in position by the face-threads of the set of needles upon which they are placed.

6. The herein-described method of knitting a fabric, which consists in knitting two separate parts upon two distinct sets of needles  
75 and with separate threads, the threads of each set always feeding to its own set of needles, and applying one or more backing-threads by winding them back and forth between the  
80 needles of one set and tying them in position by the face-threads of the set of needles upon which they are placed, and subsequently carding the threads forming the back of the fabric.

7. The herein-described fabric, which consists of two distinct knitted parts which are interlaced together to form one uniform-appearing fabric, each of said parts being formed of two or more threads or yarns worked into each of said parts, whereby by suitably ar-  
85 ranging the colors of said yarns or threads the fabric may be produced with stripes, checks, plaids, polka-dots, or other desired pattern upon its face.

8. The herein-described fabric, which consists of two distinct knitted parts which are interlaced together to form one uniform-appearing fabric, each of said parts being formed of two or more threads or yarns worked into each of said parts, whereby by suitably ar-  
95 ranging the colors of said yarns or threads the fabric may be produced with stripes, checks, plaids, polka-dots, or other desired pattern upon its face, and a backing formed of additional threads made in loops and secured to  
100 the back of said fabric parts and not perceptibly appearing upon the face.

9. The herein-described fabric, which consists of two distinct knitted parts which are interlaced together to form a smooth face, each  
110 of said parts being formed of a series of threads knitted together and forming a series of adjacent helical rows of loops, each row of loops of each series being formed of a different thread from that constituting the next or ad-  
115 jacent rows in the same series, whereby by employing for each of said parts of the fabric threads of a variety of predetermined colors in a predetermined order of arrangement the latter may be brought to the face of the fabric  
120 in a certain predetermined relative order, and the fabric may be produced with a striped, checked, plaid, polka-dot, or other desired pattern.

10. The herein-described method of knit-  
125 ting a fabric having a figured face, which consists in simultaneously knitting two separate circular parts upon two separate sets of needles, feeding a series of successive threads of a variety of predetermined colors to each set of  
130 needles, and interlacing the loops of the two parts to form a complete fabric with a smooth



face, knitting the threads of the series of  
threads (making up each of the separate  
parts of the fabric) successively, so as to pro-  
duce successive helical rows of loops, whereby  
5 the separate rows of loops formed from the  
same thread are separated from each other,  
and whereby by the employment of threads  
of predetermined colors in a predetermined  
order of arrangement the combination of all

of the loops will make a fabric with a striped, ro  
checked, plaid, polka-dot, or other pattern  
upon its face.

In testimony of which invention I hereunto  
set my hand.

THOMAS H. CARROLL.

Witnesses:

R. M. HUNTER,

WILLIAM C. MAYNE.