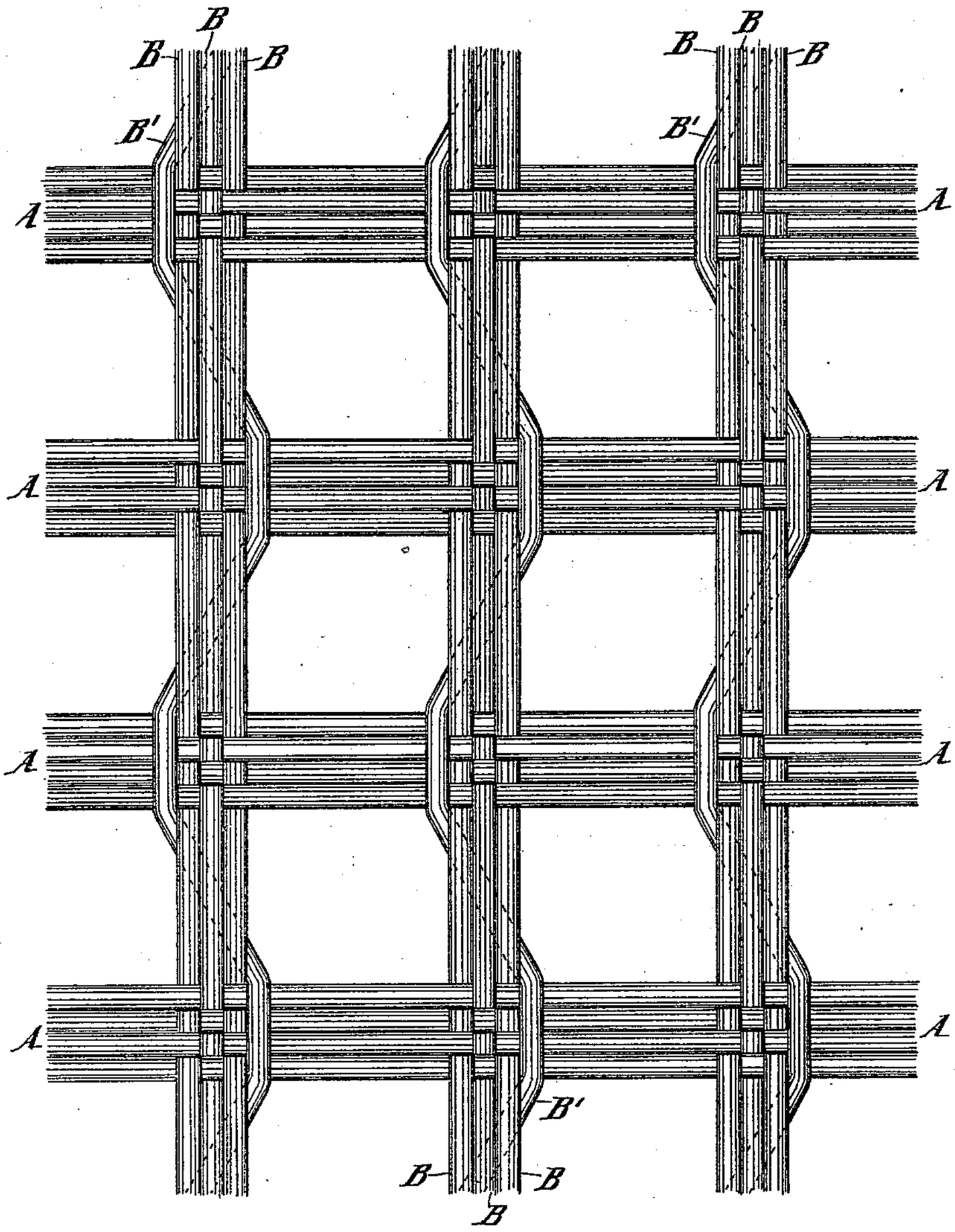
(Specimens.) 2 Sheets—Sheet 1.

F. J. H. CLÉMENT.

FELTED WOOLEN NET FOR UNDERGARMENTS.

No. 494,669. Patented Apr. 4, 1893.

Fig. 1.



WITNESSES:

Fred White.

C. K. Fraser.

INVENTOR:

Ferdinand Jules Henri Clément,

By his Attorneys:

Arthur G. Fraser & Co.

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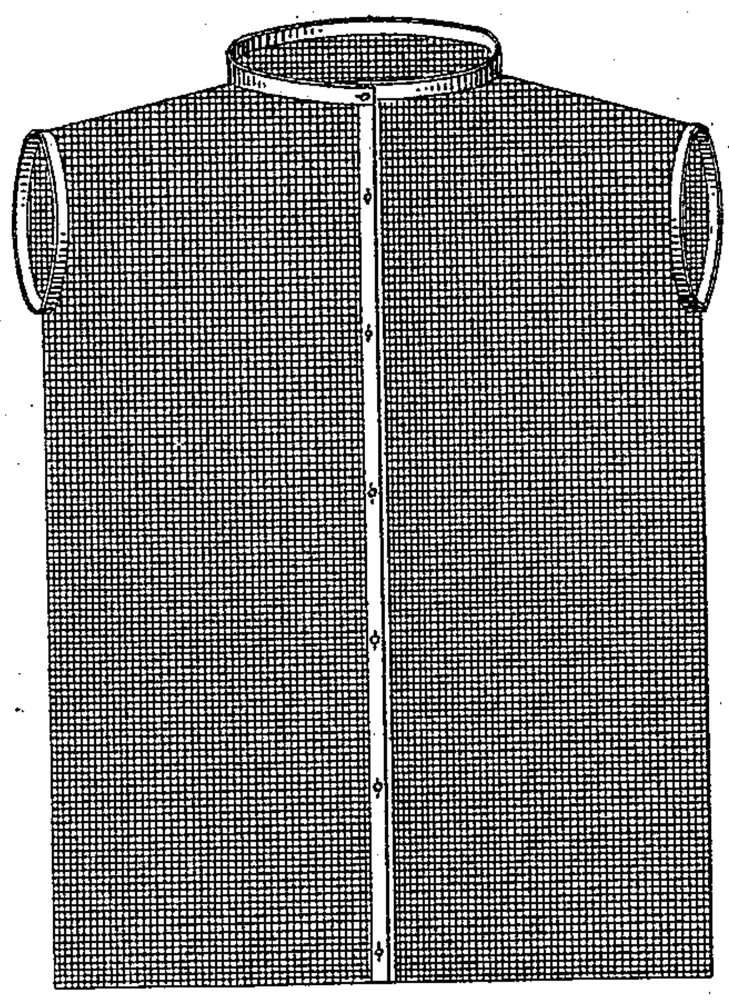
FIG. 2.



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UNITED STATES PATENT OFFICE.

FERDINAND JULES HENRI CLÉMENT, OF CUARNENS, SWITZERLAND.

FELTED WOOLEN NET FOR UNDERGARMENTS.

SPECIFICATION forming part of Letters Patent No. 494,669, dated April 4, 1893.

Application filed September 2, 1892. Serial No. 444,855. (Specimens.) Patented in Switzerland March 8, 1890, No. 1,940; in France May 27, 1890, No. 205,918; in England May 28, 1890, No. 8,289, and in Belgium May 28, 1890, No. 90,712.

To all whom it may concern:

Be it known that I, FERDINAND JULES HENRI CLÉMENT, a citizen of the Swiss Republic, residing in Cuarnens, Canton of Vaud, Switzerland, have invented certain new and useful Improvements in Felted Woolen Nets for Undergarments, of which the following is a specification.

This invention has been patented in Switzerland by Patent No. 1,940, dated March 8, 1890; in France by Patent No. 205,918, dated May 27, 1890; in Great Britain by Patent No. 8,289, dated May 28, 1890; and in Belgium by Patent No. 90,712, dated May 28, 1890.

This invention relates to fabrics, and particularly to felted woolen nets for use in wearing apparel such for example as under garments, and the invention aims to provide an improved fabric and an improved under garment.

To this end in carrying out my invention I construct a fabric having a peculiar web which will be hereinafter set forth, and I then felt this fabric until it is reduced to a condition suitable for use, as will be hereinafter set forth.

In the accompanying drawings, Figure 1 illustrates on an exaggerated scale a fragmentary section of my improved fabric, showing the arrangement or disposition of the yarn or threads therein, and Fig. 2 is an elevation of my improved undergarment made with such fabric.

Referring to the drawings let A A indicate the weft threads, B B the warp threads, and B′ the binding warp threads.

According to my invention the fabric as woven consists of the wefts threads A A, which are crossed by two series of warp threads, the ordinary warp threads B and the binding warp threads B′. The warp threads B are arranged or disposed as usual, passing as shown alternately over and under the weft threads A. The weft threads A and the warp threads B are disposed in series, a plurality of threads constituting each series being grouped and spaced some distance from the adjacent series of like threads, both for the weft threads and the warp threads. The number of threads forming a series of either the weft or the warp may be varied at will, as may also the space between the respective series. In Fig. 1 four threads are shown in each group or series of weft threads A, and three warp threads are shown as constituting each regular series of warp threads B, while but one locking thread B′ is shown for each series of warp threads B. The weft threads of each series are parallel and close together, as is also the case with the warp threads B of each series. Each weft thread of a series passes alternately over and under the succeeding warp threads of a transverse series, and each adjacent weft thread A passes under the warp thread B which its neighbor passed over, and over that which its neighbor passed under. Thus at each junction point or crossing between a series of weft threads A and a series of warp threads B the several threads of the respective series are interwoven in the form of a basket weave or ordinary warp and weft weave, whereby at the point of their crossing a complete fabric exists. Between the crossing points, the respective series of weft threads A are not interwoven, whereby the fabric at these places consists simply of a plurality of parallel weft threads, and the same is the case with the warp threads B.

The locking or binding warp threads B′ accompanying each series of warp threads B is distinguished from the other threads of the series by the fact that it traverses across all the weft threads A of a series at one side thereof, and at one side of the ordinary warp threads B, and then passes beneath the latter and emerges at the other side of the warp threads where it crosses the next series of weft threads A at the same side at which it crossed the previous series, and then again passes beneath the warp threads B to the other side thereof and past all the next group of weft threads A as at first, and so on. Thus the locking thread B′ is parallel with the warp threads B while crossing each series of weft threads A, and is angular thereto intermediate of the series of weft threads. But one binding thread B′ is shown for each series of warp threads, but more may be employed if desired. The web thus formed is a solid loose web with large openings between the different series of weft and warp threads, and consists of fabric at the crossings of the series

and loose parallel threads intermediate of these crossings. It is then rendered quite homogeneous and very smooth, firm and compact by the usual or any well known method of felting. This treatment contracts the net to a great extent, reducing its openings and thickening the series of threads until it is quite smooth, soft, and agreeable for wear. The felting causes the fabric at the junctions where the threads are interwoven to adhere more closely, and at the intermediate parts of each series the parallel threads are caused to partly unite with each other, their fibers being interworked by the felting operation until they resemble the fabric at the junctions. When thus constructed the fabric can be employed for any desired purpose, and is particularly applicable for use in the manufacture of under garments.

My improved under garment fabric is shown in Fig. 2 in the form of a shirt formed of this felted woolen net, having meshes of any desired size and constructed of a spaced series of weft threads crossed by a spaced series of warp threads and by binding warp threads passing alternately from one side to the opposite side of the warp threads.

The felting operation reduces all the threads of the fabric to such a condition, and so intermingles their several fibers, that the finished fabric has the appearance of closely woven felted cloth, it being difficult to detect the respective threads of the fabric.

This new woolen web or net is especially applicable for wear by sportsmen, bicyclists, and others engaged in active occupations. It is advantageously employed in the manufacture of long chemises for "velocipedists." It is cool, does not cause perspiration, and permits a free circulation of air. When the wearer is inactive the fabric gives a gentle warmth. It has the advantages over other fabrics employed for undergarments in that it is much cheaper than flannel and much more solid. It is diminished by half by the felting operation and this prevents all further shrinking in use. It maintains a layer of air between the body and the next outer garment; does not heat the body; does not cause perspiration; and by means of the spacious openings in the fabric it facilitates the evaporation of perspiration. The fabric is also efficacious in cold weather, since it then acts by a gentle friction to excite the skin, thereby favoring the circulation of the blood and always preserving a layer of temperate air between the body and the exterior air.

What I claim is—

1. The improved fabric consisting of a plurality of series of weft threads, each series spaced apart from the next and consisting of a plurality of parallel threads grouped together, and a plurality of series of warp threads each series spaced apart from the next and consisting of a plurality of closely grouped parallel threads, said series of weft and warp threads crossing each other, and the individual threads of each series being separately interwoven with those of the series crossed, and a binding thread for each series of warp threads passing alternately from the one side thereof to the other, and crossing all the threads of each series of weft threads, substantially as and for the purpose set forth.

2. The improved fabric consisting of a plurality of series of weft threads, each series spaced apart from the next series and consisting of a plurality of parallel threads closely grouped, and a plurality of series of warp threads, each series crossing said weft threads and spaced apart from the next series and consisting of a plurality of parallel threads closely grouped together, the individual threads of each series of weft and warp threads being interwoven where they cross, and a binding thread for each series of warp threads passing alternately from the one side to the opposite side thereof, and over all the threads of each series of weft threads, the several threads of the web thus formed being united by felting, substantially as and for the purpose set forth.

3. The improved undergarment fabric formed of a felted woolen net consisting of a plurality of series of weft threads A, each series spaced apart from the next and each consisting of a plurality of parallel threads closely grouped, and a plurality of series of warp threads B, each series spaced apart from the next and crossing said series of weft threads, and the several threads of each series of weft and warp threads being interwoven at their crossings, and a binding thread B′ for each series of warp threads passing alternately from the one side to the opposite side of the latter and over each series of weft threads, and the threads of the fabric thus formed being united by felting, substantially as and for the purpose set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

FERDINAND JULES HENRI CLÉMENT.

Witnesses:
ROBERT REINHARD,
JOHANN WÄBER.