

June 2, 1953

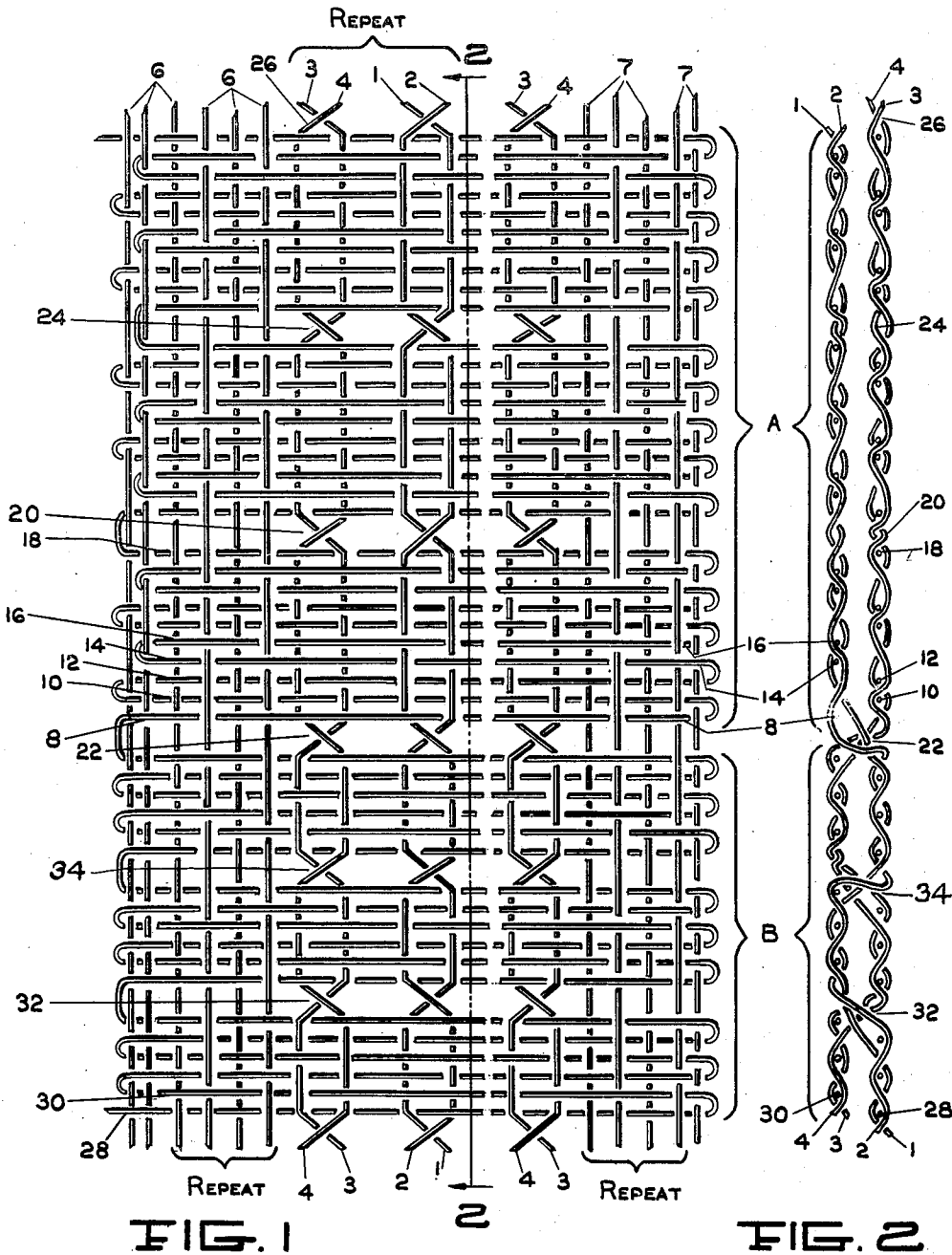
S. F. SICILIANO

2,640,508

ELASTIC FABRIC

Filed Feb. 8, 1949

3 Sheets-Sheet 1



INVENTOR.
SAMUEL F. SICILIANO
BY *Robert K. Randall,*
att'y.

June 2, 1953

S. F. SICILIANO
ELASTIC FABRIC

2,640,508

Filed Feb. 8, 1949

3 Sheets-Sheet 2

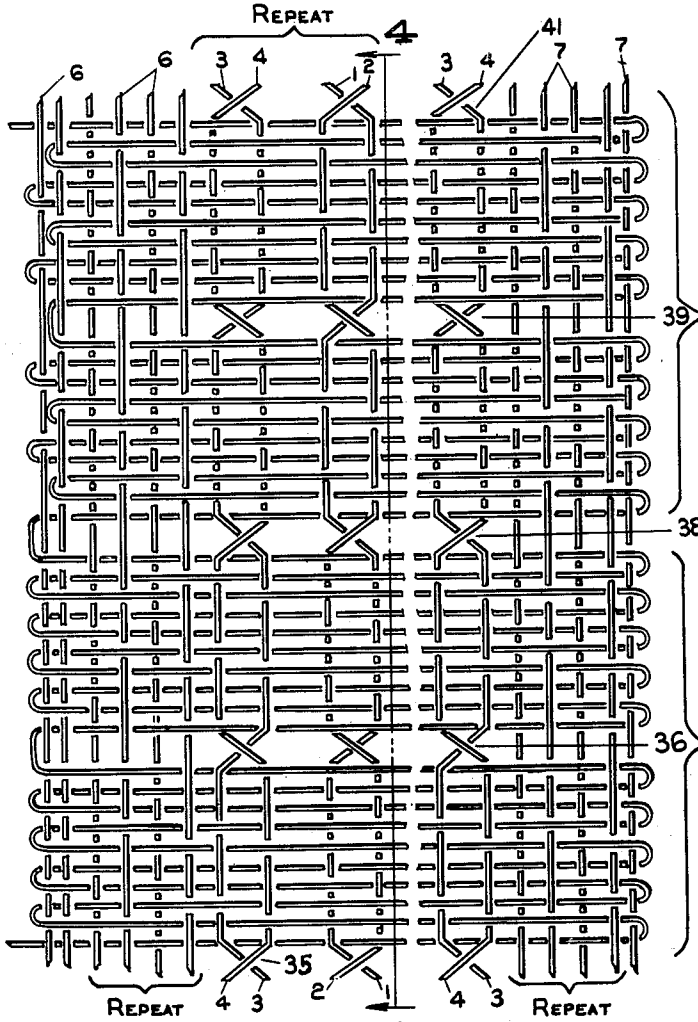


FIG. 3

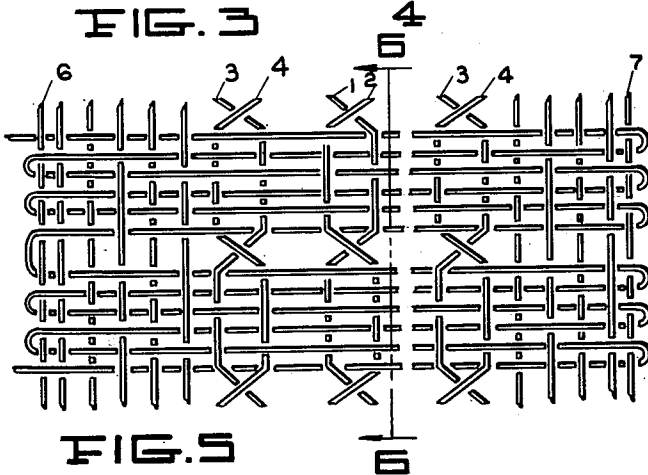


FIG. 5

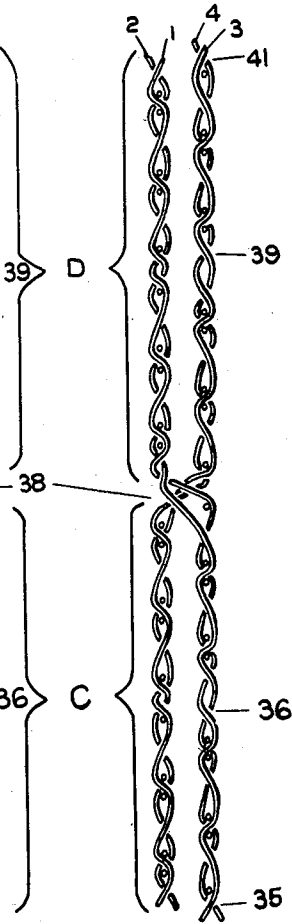


FIG. 4



FIG. 6

INVENTOR.
SAMUEL F. SICILIANO
By Robert K. Randa
Atty.

June 2, 1953

S. F. SICILIANO

2,640,508

ELASTIC FABRIC

Filed Feb. 8, 1949

3 Sheets-Sheet 3

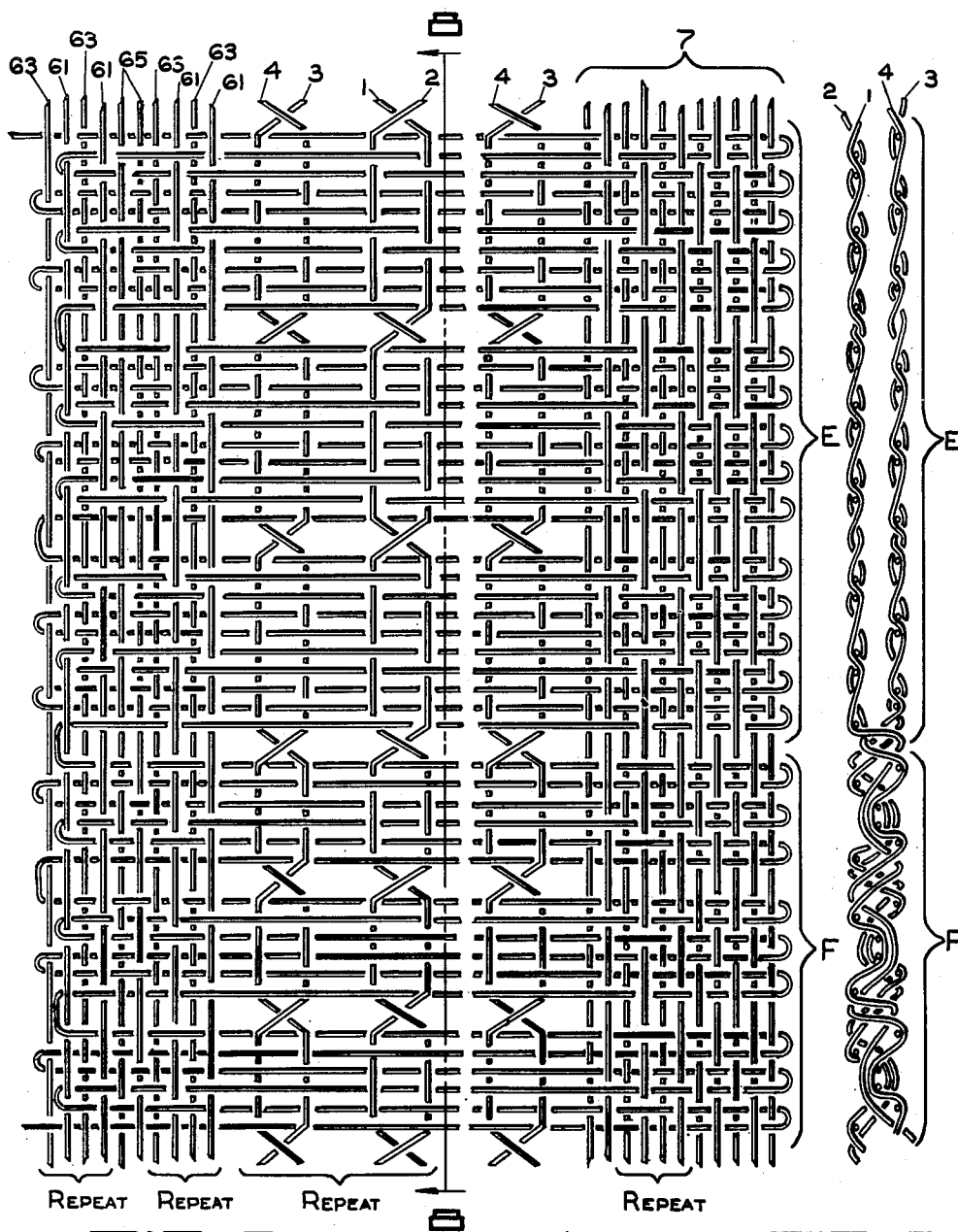


FIG. 7

FIG. 8

INVENTOR.
SAMUEL F. SICILIANO
By *Robert K. Randall*,
att'y.

UNITED STATES PATENT OFFICE

2,640,508

ELASTIC FABRIC

Samuel F. Siciliano, Westerly, R. I., assignor to
George C. Moore Company, Westerly, R. I., a
corporation of Rhode Island

Application February 8, 1949, Serial No. 75,271

10 Claims. (Cl. 139-423)

1

This invention relates to textile elastic fabrics primarily intended for the manufacture of garments such as corsets, girdles, and other supporting garments, and has among its objects the provision of a novel elastic fabric which shall be made of two plies in at least certain portions of its length and area so as to provide all-elastic pockets for the insertion of bones or stays, and which shall be capable of being made very porous so as to allow the air to penetrate through the fabric for improved ventilation, and of permitting the employment of materials restricted to the side which goes next to the skin that are more suitable to withstand such contact, and of preventing the rubber warp threads from slipping along the filling and spreading when finger nails are dug into the fabric in donning the garment. Additional objects of the invention include the provision of a novel fabric into which can be woven more picks per inch than in conventional weaves, as well as one enabling the optional use of a leno weave in conjunction with a plain weave where more picks are needed than the plain weave permits, or an all leno weave using a very fine count of filling to maintain thinness, at the same time gaining greater strength through the insertion of the extra picks. Further objects are to make it possible to weave a stronger and more rugged elastic fabrics, and to make a fabric strong and stiff enough to obviate the need for the use of reinforcing stays in order to make it lie flat and avoid curling and creasing; also, to make a pocketed web more appropriate for use with leno fabrics extensively used in corsets and girdles at present because it likewise is of leno construction. Additional objects are made plain hereinafter.

To these ends, the invention provides a two-ply leno elastic fabric. To form the pockets, the filling is interwoven with the elastic warp yarns forming one ply but not with the warps comprising the other ply throughout the length of a given pair or even-numbered sequence of successive picks, and then solely with the warps of the other ply on the following pair or equal even-numbered sequence of successive picks, throughout the major portion of the width of the fabric, the shift of the filling from one ply to the other being confined solely to one selvage of the fabric and thus uniting the two plies along such selvage to close one end of the pocket, this construction providing an open-ended pocket for the insertion of a stay. When the pocket is to be closed at both ends, the filling engages the outermost selvage warps at each selvage after each pick, and the two plies

2

have a common selvage at each margin of the fabric. In making either type, the warps are crossed in leno fashion in their respective plies, and preferably in the non-pocketed areas also, to produce a very porous elastic fabric allowing easy penetration of the air therethrough for increased ventilation. The tight gripping of the wefts by the warps which results from the leno crossing acts along with the two-ply construction to prevent the filling from slipping along the warps and the warps from slipping along the filling and spreading under the pull of the wearer's fingers and the penetration of the finger-nails in pulling on the garment. The pockets are preferably begun and terminated by shifting the face leno warps to the back and the back leno warps to the face.

Other objects of the invention, and the manner of their attainment, are as made plain hereinafter.

An illustrative embodiment of the invention is shown in the accompanying drawings, in which

Fig. 1 is a face view, and Fig. 2 a section on line 2-2 of Fig. 1, of the novel fabric, woven in two separated plies to produce a pocket open at one selvage and closed at the other selvage for the reception of a bone or stay, together with an adjoining section of solid leno fabric.

Fig. 3 is a face view, and Fig. 4 a section on line 4-4 of Fig. 3, showing the novel two-ply leno fabric when made as a double fabric with a continuous succession of pockets alternately closed at one selvage and closed at both selvages.

Fig. 5 is a face view, and Fig. 6 a section on line 6-6 of Fig. 5, showing an alternative form of the two-ply solid leno portion of the fabric of Figs. 1 and 2.

Fig. 7 is a face view, and Fig. 8 a section on line 8-8 of Fig. 7, showing an alternative form with pockets opening at one selvage only and an adjacent section of solid leno fabric.

The fabric of Figs. 1 and 2 is composed of elastic leno warps 1, 2, 3, 4, comprising by far the greater part of the width of the fabric, these warps being worked in pairs the members of which cross and re-cross in leno manner at intervals. The selvage warps of the fabric are also elastic, but are run straight and parallel to each other throughout the fabric; both the leno and the selvage warps are preferably made of the usual strands of rubber covered with one or more windings of yarns made of textile fibers. A part of the length constituting the pocket, in which the two plies are separate from each other except along one selvage, is indicated at A. At the

start of the pocket, the first pick of weft or filling is interwoven only with alternate pairs of the leno warps, those numbered 1 and 2, here constituting the top ply, throughout the width of the fabric, as indicated by the pick numbered 8, and passes over all but the fourth one of the selvage warps 6 at the left-hand selvage which is the open end of the pocket, over all the intermediate pairs of leno warps 3, 4, of the bottom ply, over leno warps 2, under leno warps 1, and under the 1st and 4th selvage warp 7 in from the right-hand selvage or closed end of the pocket. On the return pick 10 the weft passes over the 1st and 3rd selvage warps 7 in from the edge, interweaves only with the leno warps 3, 4, throughout the width of the fabric, passing under the leno warps 1, 2, of the face or top ply, and goes over the 1st and 5th selvage warps in from the left-hand side. On the next pick 12 the weft likewise floats under leno warps 1, 2, and is interwoven only with the back or bottom ply leno warps 3, 4, but oppositely to pick 10, and also oppositely to pick 10 as regards the 1st, 3rd, and 5th selvage warps in from the left-hand selvage, and as regards the 1st, 3rd, and 5th selvage warps in from the right-hand selvage. These selvage warps engaged by the picks 10 and 12 thus belong to the warp system of the bottom ply constituted for the rest of its width by leno warps 3, 4, except that the outermost warp 7 is common to both plies.

Pick 14, like pick 8, is interwoven with the individual members of each pair of top ply leno warps 1, 2, which as noted alternate with pairs of bottom ply leno warps 3, 4, across the width of the fabric, pick 14 passing over all leno warps 3, 4, but is worked reversely to pick 8 with respect to the outermost selvage warp 7 and with respect to the top ply leno warps 1 and 2, and does not engage the outermost selvage warps 6, though elsewhere the same as pick 8. Pick 16 likewise is interwoven with top ply leno warps 1, 2, across the width of the fabric to the exclusion of bottom ply leno warps 3 and 4, but is worked reversely to pick 14 as regards leno warps 1 and 2, and also as regards the 2nd, 4th, and 6th selvage warps 6 at the left-hand selvage and as regards the 1st, 2nd, and 4th selvage warps 7 counting inward from the right-hand edge of the fabric. These selvage warps just referred to therefore belong to the warp system of the top ply, along with leno warps 1 and 2, except for the common outside selvage warp 7. Thereafter, the next succeeding pair of picks engages only with the warps of the bottom ply, and the following pair only with the warps belonging to the top ply's system, with the exception of the one common selvage warp; while the final remaining pick 18 before reaching the leno crossing is worked the same as pick 10 and belongs to the bottom ply.

Following the tenth pick 18, all leno warps are crossed in their respective plies as indicated at 20. Thereafter, the weave just described is repeated, starting in the same ply as the final pick before crossing, with successive crossings of the leno as indicated at 24 and 26 until the pocket has been given the desired extent lengthwise of the fabric to accommodate with reasonable stretching the width of bone or stay intended to be inserted in such pocket, at the end of which length the leno warps which have just formed the top ply are carried to the bottom and the leno warps described as forming the bottom ply are brought to the face in the same manner as is shown at the leno crossings 22 in starting the pocket, thus joining the two plies along a line

running transversely across the web of fabric at the commencement and at the completion of the pocket.

One manner of weaving the intervals between pockets to form a two-ply fabric which gives the appearance of being solid in the sense that it is devoid of perceptible pockets, is to interlace the two plies, or rather the warps thereof, as indicated at B in Figs. 1 and 2. The first pick 28 of weft interweaves with leno warps 1, 2, which at this point have been transferred to the bottom or back of the fabric, this pick making no engagement with the leno warps 3 and 4 lying at the top of the fabric. The next pick 30 interweaves only with the leno warps 3, 4, which at this point in the fabric comprise the top ply; and the successive picks continue this alternating engagement until six picks have been laid in, three in the top ply and three in the bottom ply, after which the leno warps of each ply are not only crossed as indicated at 32 but also are transposed from the top to the bottom ply and from the bottom to the top ply respectively, as shown in Fig. 2. During this interval of six picks, the weft is caught around the outermost selvage warps 6, 7, at each side of the fabric and the rest of the selvage warps weave a solid fabric, thus uniting both plies at each selvage. This sequence of six picks followed by crossing and transfer of the leno warps is repeated throughout the length desired to be woven so as to appear solid and free from pockets. Thus throughout this length the two plies are interlaced at short intervals.

As shown in Fig. 2, each ply contains only three picks of weft between the crossings of the leno warps at 32 and 34 and in the finished fabric these three picks of weft lie bundled closely together because of the binding effect of the leno crossing before and after them, coupled with the change of these warps from top to bottom and vice versa; while the leno crossings at the points 32 and 34 space the successive bundles of wefts in both plies apart in a manner which gives the fabric its characteristic desired feature of porosity, and the effect of having heavy transverse ribs. With the use of average sizes of weft and elastic leno warps, the leno crossings produce spaces in the plies which are substantially as wide as or wider than the two superposed three-pick bundles. By reducing the number of picks employed between leno crossings the ratio of the open portions of the fabric occurring at these points to the width of the bundles of picks tied by the leno warps is increased, thus increasing still more the characteristic porosity and ventilation of a garment made from the improved fabric, as well as its flexibility, without reducing its contractive strength. Yet the fabric is not lacking in body and substance, in spite of the frequent leno crossings, since the double construction inserts six picks in the same length of fabric occupied by three picks in an equivalent single fabric, or in a conventional 1-ply leno fabric, and by increasing the number of picks in a bundle the transverse stiffness of the fabric is enhanced to an extent obviating the need for bones in certain uses, without impairing the flexibility imparted by the hinge action at the leno crossings. At the same time, an increased number of fine rubber warps can be used to get extra tension or pull in the fabric, without destroying the porous and ventilated character of the fabric.

Figs. 3 and 4 show the use of the invention principle in producing a two-ply leno fabric which is composed of successive sections formed

5

of otherwise independent plies that are respectively joined at one selvage and joined at both selvages. Thus, in the interval indicated at C, the fabric is of two-ply construction with the two plies independent throughout, except at both selvages, with the leno warps of each ply crossed at intermediate points as indicated at 35 and 36, and with the wefts caught around the outermost selvage warps 6, 7, at the end of each pick, and hence the two plies are joined at each selvage throughout this interval, and also across the width of the fabric at the end of this interval through the transposition of the leno warps from top to bottom ply and vice versa at the point of crossing of the lenos at 38. Thereafter in the interval D the weaving is carried on in analogous manner as regards the leno warps, except that the weft is worked reversely to the leno warps as compared with the interval C; but while the outermost selvage warp 7 is engaged by each pick of weft to close the pocket along this edge, the selvage warps 6 at the other margin of the fabric are divided up again as in Figs. 1 and 2 into two systems, one engaged by the first pick following the leno crossings and by alternate pairs of succeeding picks to form a part of the bottom ply, the other by the intervening pairs of picks and the final pick before the leno crossings 39, 41, to form a part of the top ply, whereby the pocket is left open along this margin of the fabric.

At the completion of the pocket including the interval D, the leno warps are simultaneously crossed and transposed after the same manner as shown at 38, and the weaving resumed according to the sequence indicated at C, or as otherwise preferred, including a reversion to plain or other conventional weaves.

Figs. 5 and 6 show the employment of the invention to produce a two-ply leno fabric analogous to the portion B of Figs. 1 and 2 but which is devoid of perceptible pockets throughout its entire length, such fabric being indicated for use when the invention principles are employed to produce a porous and ventilated webbing which is made stiff enough to dispense with the use of stays through the insertion of more picks per inch than can be accomplished in a conventional one-ply leno fabric. The two plies are woven independently of each other with respect to the leno warps for a few picks, herein six picks, and then the warps of the top ply are transposed to the bottom ply and the bottom ply warps to the top ply, and the members of each pair of associated lenos crossed simultaneously therewith, and after weaving another six picks the leno warps are again reversed and crossed in this manner. The selvage warps as hereinbefore are divided among the two warp systems except that the selvage warps 6, 7, weave a solid fabric to unite the plies at each selvage throughout. As previously noted, there are no pockets existent in the finished fabric, since the leno crossings bunch the three wefts of each ply tightly together and thus the areas occluded by the six wefts in their two superposed bundles do not equal the intervening areas held open by the leno crossings, in fabrics woven with average counts of weft.

Figs. 7 and 8 show a modification of the invention weave, to adapt the improved pocketed two-ply leno fabric for easy application to the top of a girdle or similar supporting garment where it serves the purpose of preventing the rolling, folding, or creasing of the top portion thereof when worn. Like the fabric of Fig. 1, this fabric com-

6

prises pocketed sections E closed along the selvage formed by selvage warps 7 and open at the other selvage for the insertion of bones or stays, alternating with other sections F of unpocketed and herein solid 2-ply construction. As distinguished from the other fabrics herein, this material is provided throughout its length, or as much thereof as desired, with a 2-ply, double, or split selvage along the margin at which the pockets such as illustrated in section E are open, i. e., the left-hand margin of Fig. 7. This enables the bones to be inserted in such pockets and the top edge of the girdle or other garment to be inserted between the two separable plies of the double selvage all the way around the garment, whereupon the boned waistband comprised by the thus stiffened invention fabric is then permanently attached by rows of stitches encircling the garment and passing clear through the superposed selvage ply, the intervening portion of the top margin of the garment, and the underlying ply of the selvage. This makes a neat, smooth, strong and durable junction of the waistband to the garment, and holds the bones permanently against the escape from their pockets.

The double selvage is formed by increasing the number of selvage warps in the selvage having the pocket openings, and employing selvage warps 63 and the inner one of binder warps 65 along with leno warps 3 and 4 to form the bottom ply, and using selvage warps 61 and the outer one of the two binder warps 65 along with leno warps 1 and 2 to form the top ply, of the pocketed section E. The working of the leno warps 1, 2, 3, 4, is analogous to that employed in Figs. 1 and 3 as herein explained. Thus this pocket is open along the left-hand edge of section E, Fig. 7, for the introduction of the supporting bone.

In the solid two-ply portion F, the binder warps 65 are each interwoven with the wefts of both the top and bottom weft planes, thus uniting the two plies of the split selvage along a line intermediate the width thereof. However, the selvage warps at each side of binder warps 65 are worked substantially the same as in the pocketed section E, so that the warps 61 form with their wefts the top ply of the split selvage, and the warps 63 with their proper wefts form the bottom ply thereof. The width of the free portion of the two selvage plies is made as needed or desired to give the proper degree of overlap at each surface of the top portion of the garment on which it is to be used, as noted by the repeat of the bracket of four warps lying outside of binder warps 65 in Fig. 7.

The main width of the fabric, from innermost selvage warp 61 across to the right-hand margin, is woven as a solid two-ply fabric devoid of pockets, adjacent pairs of leno warps respectively changing from top to bottom and from bottom to top after each two picks of filling, the members of each pair of lenos being also crossed after each series of six picks to open up the fabric at intervals for ventilation and to provide the suppleness which the hinge action at the leno crossings affords, as well as to bunch the groups of six picks into bundles by the binding action of the leno crossings before and after them. This arrangement also imparts to the solid two-ply areas a pattern harmonizing both with the pocketed areas and with the leno weave widely used in girdle fabrics. The four selvage warps 7 next adjacent the outermost selvage warp are worked

as binders throughout the interval F, though the two plies are separable from these last named sel-
vage warps to the nearest pair of lenos 3, 4; a
similar condition exists inwardly from binder
warps G5 to the nearest lenos 3, 4, throughout
the interval F.

As is obvious, this split selvage construction is
equally applicable to other forms of the inven-
tion, such as the fabrics of Figs. 1, 3 and 5.

Where a soft surface against the wearer's skin
is desired, alternate pairs of leno warps covered
with soft material are used with intermediate
pairs of lenos having a more durable or showier
type of covering, and the soft-covered warps are
kept at one surface to form the back ply of the
fabric as by uniting the plies at intervals by
means of the weave used at B in Figs. 1 and 2 or
that used at F in Figs. 7 and 8, making these
junction sections very short so that the soft-cov-
ered warps are only absent from the back for
short distances. The showier warps similarly are
kept wholly in the face ply.

The invention enables the weaver of elastic
fabrics to attain a greater range of different char-
acteristics in these fabrics than heretofore, since
in addition to the advantages already indicated
he can use the two-ply leno weave in conjunction
with areas woven with a plain weave to insert
more picks per inch than is possible in the plain
weave at any point where more picks are desir-
able, or he can employ the novel two-ply leno
weave using a very fine count of weft to produce
a thin fabric, at the same time gaining greater
strength weftwise of the fabric with the extra
picks per inch which the improved weave pro-
vides.

It will be understood that the invention is not
restricted to the use of elastic warps and inelas-
tic weft, but contemplates the use of elastic warp
with elastic weft, or non-elastic warp with elastic
weft, or any combination of elastic and non-elas-
tic warp and weft.

While I have illustrated and described certain
forms in which the invention may be embodied, I
am aware that many modifications may be made
therein by any person skilled in the art, without
departing from the scope of the invention as ex-
pressed in the claims. Therefore, I do not wish
to be limited to the particular forms shown, or
to the details of construction thereof, but

What I do claim is:

1. A two-ply leno fabric including elastic yarns
in which the leno warps of the two plies respec-
tively first lie in the face ply and the back ply
of the fabric, and then shift to the other ply to
lie in the back and face plies respectively.

2. A two-ply leno fabric including elastic yarns
in which the leno warps of the two plies respec-
tively first lie in the face ply and the back ply
of the fabric, and then shift to the other ply to
lie in the back and face plies respectively, and are
crossed as they pass from face to back and from
back to face plies.

3. A fabric including elastic warp yarns com-
posed of two plies in each of which the warps are
crossed in leno manner, with the plies united
along transverse lines by transposing warps of
each ply into the other ply.

4. A two-ply leno fabric including elastic yarns
in which each pick of weft is interwoven solely

with the warps of its own ply except at a selvage
throughout substantial intervals of the fabric's
length, and at other intervals of the fabric's
length each pick is interwoven with warps of
both plies where crossed in leno manner.

5. A two-ply leno fabric including elastic yarns
in which the two plies are woven independently of
each other, except at one or both selvages,
throughout substantial intervals of its length,
and at other intervals of its length the two plies
are interwoven, both intervals including warps
crossed in leno manner.

6. A two-ply leno fabric including elastic yarns
in which the two plies are woven independently
of each other, except at one selvage, throughout
substantial intervals of its length, and woven in-
dependently of each other except at both selvages
at other intervals of its length.

7. A fabric including elastic warp yarns and a
single weft yarn, composed of two plies in which
the weft engages the warps of only one ply on
each pick except at one or both selvages and
the plies are joined at intervals along transverse
lines by transposing the warps of each ply into
the other ply, and the warps are crossed in leno
manner intermediate the lines of junction.

8. A two-ply leno fabric including elastic yarns
in which the two plies are separate from each
other except at one or both selvages for intervals
of substantial length, at the end of which inter-
vals the warps of the face ply are transposed to
the back ply and the warps of the back ply are
transposed to the face ply and are crossed in leno
manner at the location where such change occurs.

9. A two-ply leno fabric including elastic yarns
in which the two plies are separate from each
other except at one or both selvages for intervals
of substantial length, at the end of which inter-
vals the warps of the face ply are trans-
posed to the back ply and the warps of the back
ply are transposed to the face ply and are crossed
in leno manner at the location where such change
occurs, and at points intermediate the lengths
of the separate plies.

10. A two-ply leno fabric including elastic
yarns in which the two plies are separate from
each other except at one margin for certain in-
tervals and joined to each other at least at
both margins for other intervals, in which lat-
ter intervals a split selvage of two separated
plies lies outside the line of junction of the first-
named two plies at one margin.

SAMUEL F. SICILIANO.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
363,434	Taylor	May 24, 1887
1,513,885	Bloch	Nov. 4, 1924
1,584,503	Aull	May 11, 1926
1,666,686	Chisholm	Apr. 17, 1928
1,682,198	Sitton	Aug. 28, 1928
1,965,248	Moore	July 3, 1934
1,977,265	Colvin	Oct. 16, 1934
1,983,451	Gwaltney	Dec. 4, 1934
2,093,187	Burke et al.	Sept. 14, 1937
2,544,223	Ellis	Mar. 6, 1951
2,559,341	Brierley	July 3, 1951