April 29, 1952 F. LUTZ 2,595,152

SEAM FOR JOINING THE MEETING OR OVERLAPPING EDGE PORTIONS OF FABRIC SECTIONS

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FIG. 1

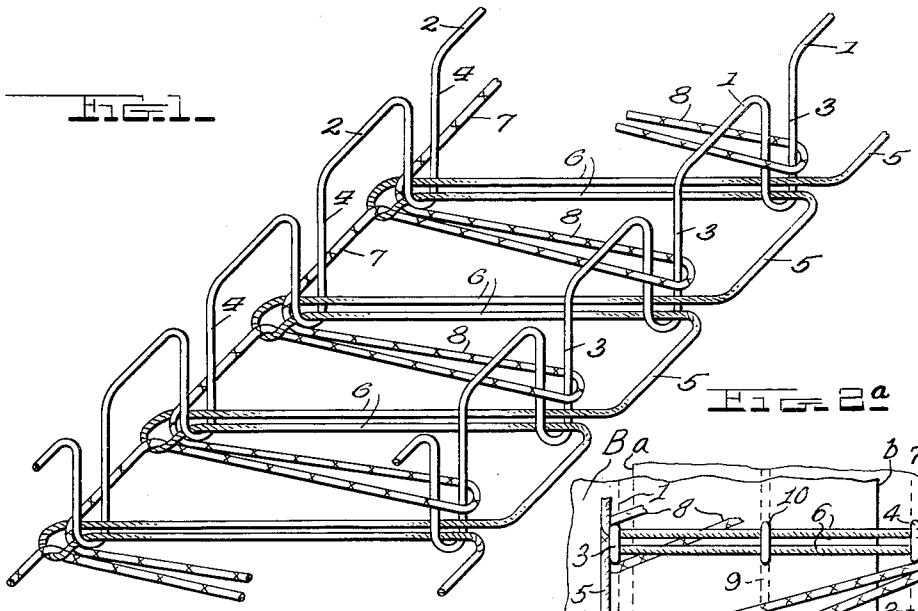


FIG. 2a

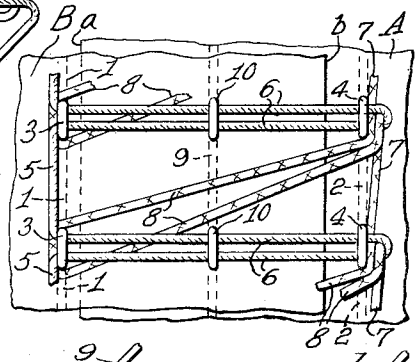
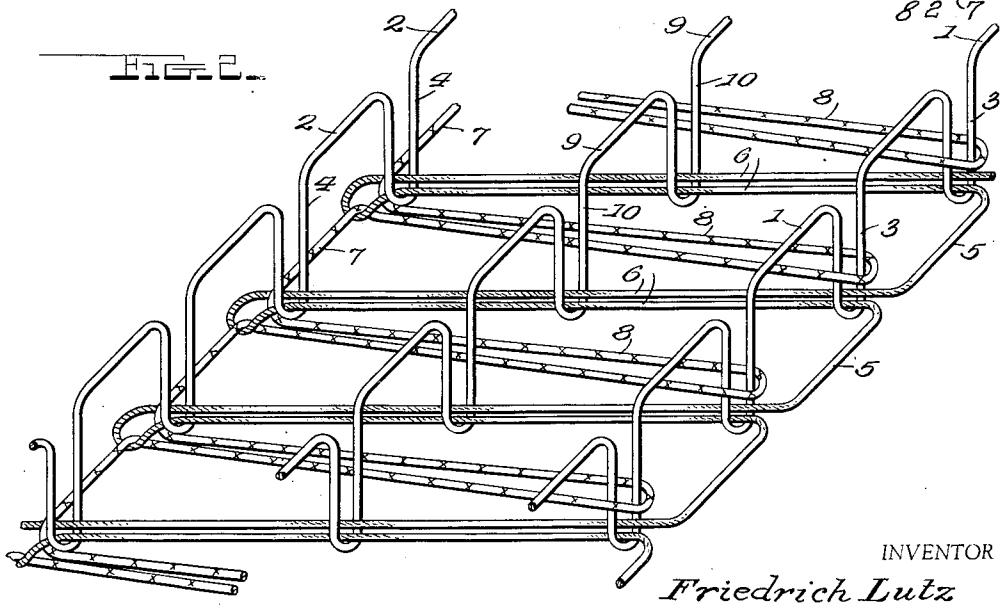


FIG. 2



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FIG. 3

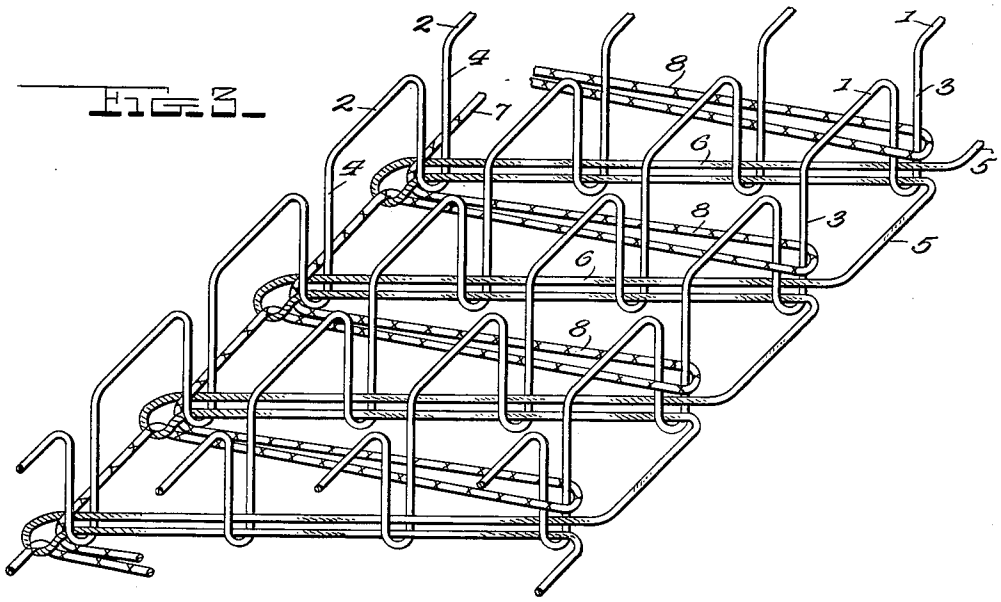
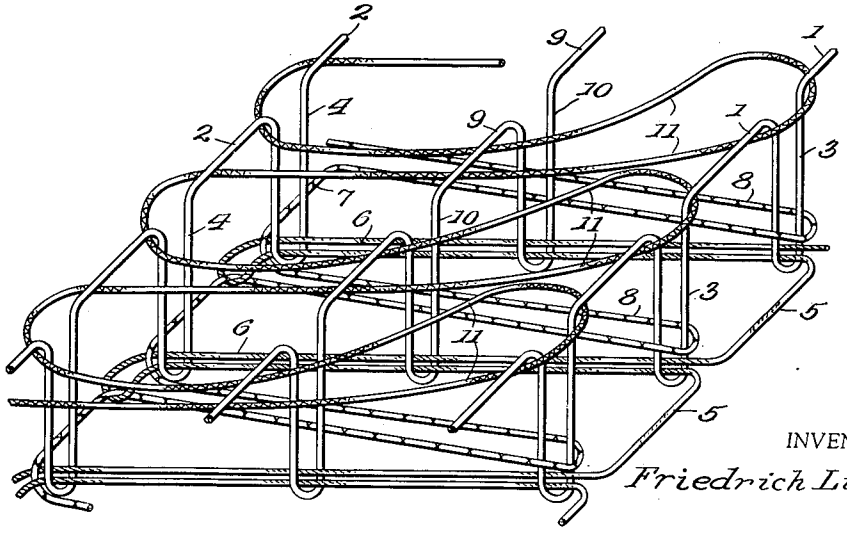


FIG. 4



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FIG. 5

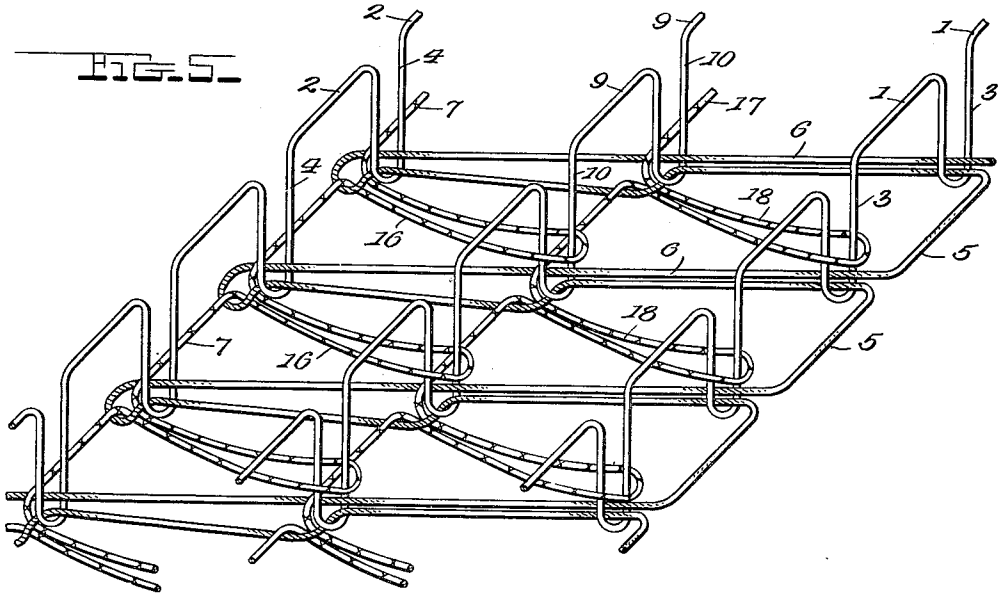
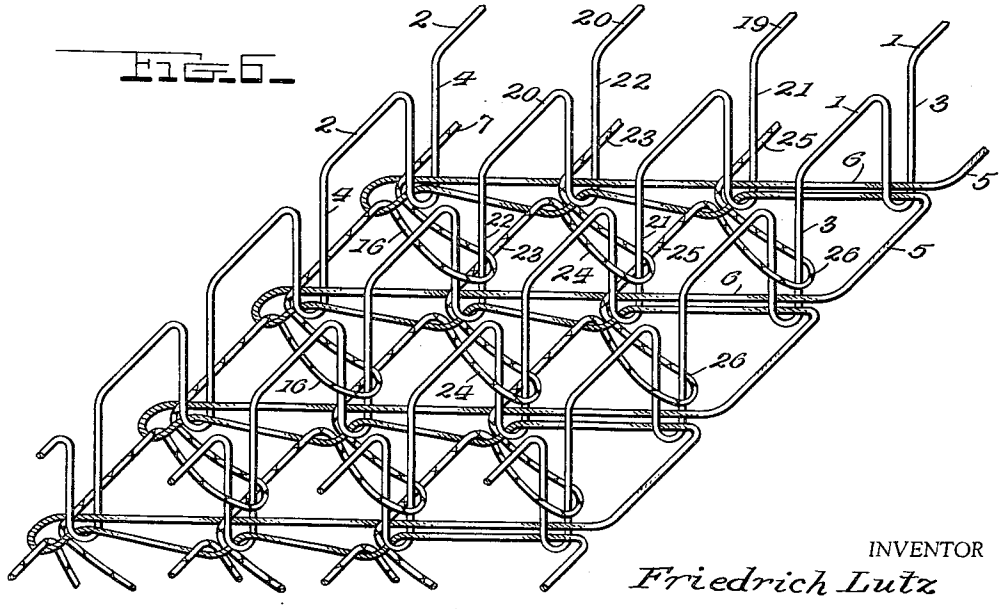


FIG. 6



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SEAM FOR JOINING THE MEETING OR OVERLAPPING EDGE PORTIONS OF FABRIC SECTIONS

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FIG. 7

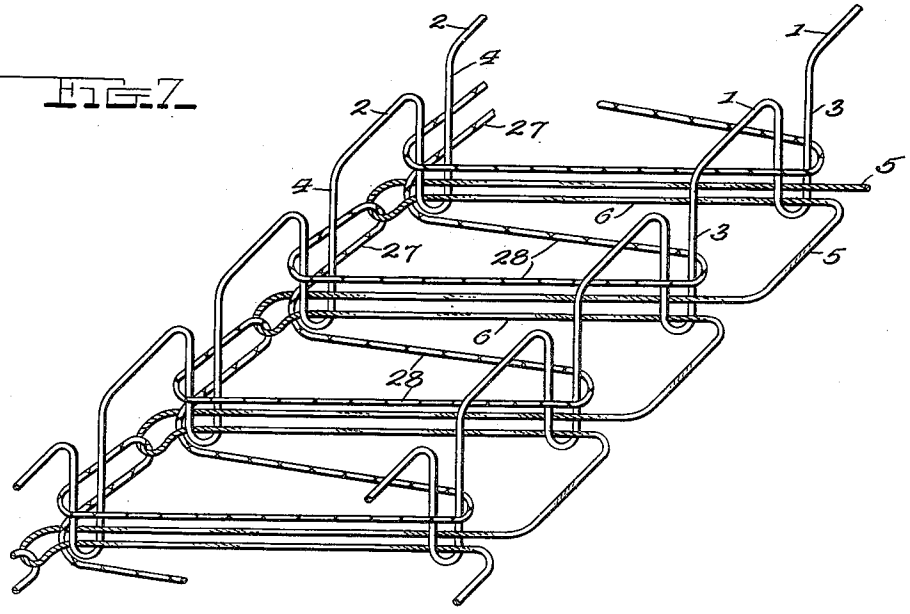
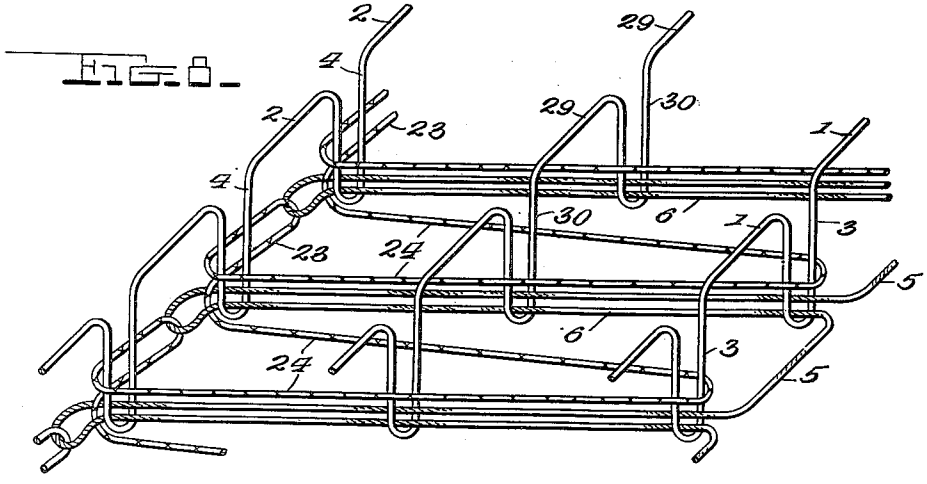


FIG. 8



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SEAM FOR JOINING THE MEETING OR OVERLAPPING EDGE PORTIONS OF FABRIC SECTIONS

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5 Claims. (Cl. 112—262)

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The invention relates to new and useful improvements in a seam for sewed articles and more particularly a flat seam for joining the meeting or overlapping edge portions of opposed fabric sections.

Flat seams of the above type when used for joining the edge portions of garments have to meet high requirements as to elasticity in a direction longitudinally of the seam and non-elasticity in a transverse direction. Furthermore, the seam should sufficiently cover the underface of the fabric sections being joined without undue thickness and should be safe against raveling in case of the breaking of a thread or threads.

The present known seams of the above type are generally somewhat elastic in a longitudinal direction of the seam but they are also elastic in a transverse direction. When these known seams are used for joining the meeting edges of fabric sections, particularly if no cover thread is used, the edges under transverse stress will separate and produce an objectionable gapping.

Efforts have been made to decrease the transverse elasticity of the seam by using relatively large size looper threads. This results in the thickening of the lower side of the seam and such thickening is subject to increased wear and tear due to rubbing, particularly when the garments are washed. These known seams are safe against raveling to only a limited extent when a seam breaks.

The seam, according to the present invention, avoids the objective disadvantages entirely and sufficiently fulfills the previously mentioned requirements to be met by such seam.

The several embodiments of the new seam illustrated are very elastic in a longitudinal direction while they are particularly non-elastic in a transverse direction. The new seams sufficiently cover the meeting edge portions of the fabric sections without increased thickness and the new seam is safe against raveling if the seam should break.

A characteristic feature of the seams embodying the invention is that all of its needle thread loops are engaged by only one looper oscillating transversely with respect to the sewing direction. The loops of the looper thread are not locked by engagement of the needle thread loops of the subsequent stitches but are locked by a thread carrying looper moving across the path of the first looper and passing a looper thread loop through the first-named looper thread loop as it emerges from the needle thread loops. The loops of this second looper thread are engaged by the needles of the following stitch and locked by their thread loops.

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In the drawings, the fabric sections have been omitted for the sake of clearness and only the needle threads and looper threads and their respective loops and the concatenation of the loops embodying the present invention are shown.

Figure 1 is a perspective view showing the improved seam as embodying two needle threads and two looper threads, one of the looper threads being formed into loops for locking the opposed needle loops and the other looper thread being formed into loops for locking the first named looper thread loops, said second looper thread loops being in turn locked by the needle thread loops.

Figure 2 is a view similar to Figure 3, but showing three needle threads formed into loops wherein all three needle loops are locked by a single looper thread loop.

Figure 2ª is a view of the underside of the completed seam showing the fabric sections lapped within the concatenated stitching threads.

Figure 3 is a view similar to Figure 1, but showing four needle threads wherein the loops of all four threads are secured by a single looper thread.

Figure 4 is a view similar to Figure 2 but showing a covering thread placed about the needle thread loops on the upper face of the fabric sections.

Figure 5 is a view similar to Figure 2, but showing a third looper thread which is passed through the needle thread loop adjacent the middle thread loop and locked by a needle loop of the next succeeding stitch.

Figure 6 is a view similar to Figure 5, but showing four needle threads and three looper threads arranged and concatenated as shown in Figure 5.

Figure 7 is a view showing a modified form of the seam wherein the second looper thread, which is formed into loops passing through the first looper thread for locking the same, is expanded and secured by both needle thread loops of the next succeeding stitch.

Figure 8 is a view similar to Figure 7 wherein three needles are used and the second looper thread loop is expanded and locked by all three needle thread loops.

Referring to Figure 1 of the drawings the improved seam is made by two needles set abreast. The needle threads 1 and 2 of the needles are formed into loops 3 and 4 respectively, which loops are opposed to each other. This seam may be used for joining abutted edges of fabric in which case the abutted edges would lie midway between the lines of needle thread loops. It may also be used for joining the lapped edge portions of fabric sections wherein the sections are lapped within the limits of the seam, that is,

the lapped sections lie between the needle thread loops. The needle thread loops 3 and 4 are locked by a looper carrying a looper thread 5. The looper passes through first the needle thread loop 3 and then the needle thread loop 4.

The looper thread loop is indicated at 6 and the two strands of the loop lie close beside each other and extend transversely of the edge portions of the fabric sections and substantially at right angles to the meeting edges of the fabric sections. This looper thread loop 6 is locked not by the succeeding needle loops, but by a second looper thread 7 formed into loops 8, 8. The looper carrying the looper thread 7 crosses the path of the first looper at a place close to the needle forming the needle thread loops 4. The looper thread 8 passes through the looper thread 6 very close to the needle thread loop 4 and extends transversely across the fabric sections and is locked by the needle thread loop 3 of the next succeeding stitch. The strands of this looper thread are substantially close together and the loop while it is slanting with respect to the longitudinal direction still it is very much more nearly the transverse direction of the seam.

The sequence of looper threads transverse and/or slanting with respect to the longitudinal direction of the seam is obtained in the manner above described. These looper thread loops are adapted to open similarly as the bellows of an accordion when tension is exerted in the longitudinal direction of the seam. This is the basis for high elasticity of the new seam not obtained by any of the present known means. In the known seams the looper threads are expanded so as to be interlocked by both the needle thread loops of the next succeeding stitch, and are in general substantially parallel with respect to the longitudinal direction of the seam. Thus when tension is exerted in the longitudinal direction of the seam a rather limited number of stretchable thread loops are available and the number of such loops stretchable in a transverse direction is greater to the same extent. This explains the high degree of undesired transverse elasticity in the known seams which is absolutely avoided in applicant's new seam, because in said new seam the loops of the threads of the loopers which are transverse to the direction of the seam are substantially stretched so that they cannot be expanded.

This is particularly true since the two strands of the thread loops of the transversely operating looper as well as the strands of the second looper thread loops are close together and oppose any transverse stretch with increased resistance.

It is noted that the two strands of the loop of the first looper act in a similar manner to the upper cover thread used in some of the flat seams. This upper cover thread is used in part to cover the upper face of the fabric and in particular to laterally hold together the abutted edges of the seam, that is, the upper cover thread opposes the transverse elasticity and consequently it can be easily seen that practically no transverse elasticity is present in the new seam if the upper cover thread is omitted.

In Figure 2 of the drawings, there is shown a three needle seam. In addition to the needle threads 1 and 2 with their loops 3 and 4, a third needle thread 9 is employed. This needle thread 9 is formed into thread loops 10. The loops lie in a line parallel with the needle thread loops 3 and 4 and each needle thread loop 10 also

lies in a line at right angles to the center line of the seam. The looper thread 5 is formed into loops 6 which pass transversely through all three needle thread loops 3, 4 and 10. The looper thread loop 6 is locked by the looper thread 7 formed into loops 8 in the same manner as described in connection with Figure 1. The looper thread loop 8 does not engage in any way the needle thread loop 10 but passes between succeeding needle thread loops 10 and is locked by the needle thread loop 3. As noted, this seam is particularly adapted for the joining of fabric sections where the edge portions are lapped within the limits of the seam. In Figure 2a there is a bottom plan view of this seam shown. One of the fabric sections is indicated at A and its edge at *a*. The other fabric section is indicated at B and its edge in broken lines at *b*. In such case the needle thread loops 10 will pass through the lapped portions of the fabric sections. This seam, for reasons stated above, is unusually elastic in a direction longitudinally of the seam and it is unusually non-elastic in a direction transversely of the seam.

In Figure 4, the arrangements of the needle thread loops and the looper thread loops is the same as in Figure 2. In this figure of the drawing there is shown a covering thread 11 which lies on the upper face of the joined fabric sections. This covering thread is formed by a thread carrying member moving transversely of the seam. The thread is laid back and forth across the seam so as to encircle the needle thread loops in the outer rows of loops. This is a usual form of covering thread.

In Figure 3 the improved method of locking the needle thread loops is shown as applied to the four needle stitch. There is a needle thread 1 and a needle thread 2 formed respectively into needle thread loops 3 and 4. These needle thread loops 3 and 4 lie in parallel rows at the outer limits of the seam. In between the needles carrying the threads 1 and 2 are needles carrying needle threads 12 and 13. The needle thread 12 is formed into loops 14 and the needle thread 13 is formed into loops 15. The needle thread loops 14 and 15 lie between the rows of needle thread loops 3 and 4. They are parallel with each other and also parallel with the outer rows of needle thread loops. When this seam is used for uniting fabric sections then the edges will be abutted between the rows of needle thread loops 14 and 15. The needle thread loops are locked by a single looper thread 5 formed into loops 6 extending transversely across the seam and through all four of the needle thread loops that are opposed to each other. The looper thread 6 is locked by a looper thread 7 which is formed into loops 8. The loop 8 passes through the looper thread loop 6 immediately after it emerges from the needle thread loop 4. This loop 8 extends transversely across the seam and is locked by the needle thread loop 3 at the opposite side of the seam. It will be noted that the same arrangement of looper thread loops and their concatenation with each other and the needle thread loops are the same in principle as shown in connection with the two needle seam in Figure 1 and also the three needle seam in Figure 4.

In Figure 5 there is shown a seam similar to the seam shown in Figure 2. That is, it is a three needle seam. All of the needle loops are locked by a single looper thread loop. There are, however, two looper threads formed into loops for giving more thorough coverage and

simultaneously therewith a higher elasticity. The needle threads 1, 9 and 2 are formed into needle loops 3, 10 and 4 respectively. These needle thread loops on the underface of the fabric are all locked by a single looper thread loop 6, the same as in Figure 2. The looper thread 7 is formed into a loop 16 which passes through the loop 6 as it emerges from the needle thread loop 4. This loop 16 extends transversely of the seam and is locked by the needle thread loop 10. There are additional looper threads 17 which are formed into loops 18 and these loops pass through the looper thread loop 6, adjacent the needle loop 10, and extend across the seam and are locked by needle thread loops 3. The looper thread 17 is carried by an additional looper movable longitudinally of the seam and close to the middle needle. The loops 16 and 18 lie diagonally in a rectangle made by the needle stitches of two adjacent needles during the sewing operation. These diagonal loops and the loops of the first looper form a thorough coverage for the underface of the fabric which has not been obtained by any of the known seams. The seam shown in this Figure 5 is highly elastic longitudinally of the seam and it is not elastic transversely of the seam. A thorough coverage of the lower face of the fabric is obtained without appreciably increasing the thickness of the seam.

Figure 6 shows a four needle seam which includes a needle thread 1 formed into loops 3 at one side of the seam and a needle thread 2 formed into needle thread loops 4 at the other side of the seam. There are two additional needle threads 19 and 20 formed into needle thread loops 21 and 22 respectively. The needle thread loops form four parallel rows. This seam is particularly adapted for joining the abutted edges of fabric. The edges will abut on a line midway between the rows of needle thread loops 21 and 22. The needle thread loops of each stitch formation are in alignment and a transverse looper carrying a looper thread 5 forms a loop 6 which passes all of the needle thread groups just as in the other forms of seams described above. The looper thread 7 is formed into loops 16 and each loop 16 passes through a looper thread loop 6. A looper thread loop 16 extends across to the row of needle loops 22 and is locked by one of said needle loops. There is a looper thread 23 carried by a looper moving longitudinally of the seam and this looper thread is formed into loops 24. Each looper thread loop 24 passes through the looper thread loop 6 adjacent the needle thread loop 22 and extends across to the row of needle thread loops 21 and is locked by one of said loops.

There is a third looper thread 25 which is formed into loops 26. These loops 26 pass through the looper thread loop 6 adjacent the needle thread loop 21 and extending across to the row of needle thread loops 3 where it is locked by one of these needle thread loops. This seam has the characteristics as to elasticity in the direction longitudinally of the seam and non-elasticity transversely of the seam, the same as the seam shown in Figure 5. This four needle seam even forms greater coverage for the underface of the fabric sections without increasing the thickness thereof.

Figure 7 shows a seam similar to that shown in Figure 1 except for the manner of securing or locking the second looper thread. The needle thread 2 is formed into loops 4 while needle thread 1 is formed into loops 3. The opposed needle thread loops are locked by a looper thread 5 formed into loops 6 which extend through both of the needle loops. The looper thread 27 is formed into loops 28. These loops are passed through the looper thread loop 6 adjacent the needle loop 4 and then the loop is expanded and locked by passing about the needle loop 4 and the needle loop 3 in the next stitch formation.

In Figure 8 there is shown a three needle seam similar to the seam shown in Figure 7. There is a needle thread 1 formed into needle loops 3 and a needle thread 2 formed into loops 4. There is an additional needle thread 29 formed into loops 30. The row of loops 30 are parallel with the rows of needle thread loops 3 and 4 and lie midway between the same. A looper thread 5 is formed into thread loops 6 which are passed through all three needle thread loops of a stitch formation. This looper thread loop 6 is locked by a looper thread 27 which passes through the looper thread loop 6 adjacent the needle 4 and is expanded and extends across the seam and to the next stitch formation so that the loop is locked by the needle loops 3, 30 and 4.

In Figure 4 of the drawings there is shown a covering thread. Such a covering thread could be used with any of the other forms of seams, and more than one covering thread can also be used if desired.

It is noted that the characteristic feature of all of the seams illustrated resides in the locking of the needle loops by a single looper thread loop which in turn is locked by a second looper thread loop and the second looper thread loop is locked by a needle loop or loops in the next stitch formation. This characteristic feature common to all of the forms illustrated gives unusual elasticity to the seam in a longitudinal direction and at the same time a stitch formation is provided which is practically non-elastic in a transverse direction.

All of the new seams described provide an excellent coverage for the lower face of the fabric without unduly increasing the thickness of the seam. The seam is furthermore safe against raveling due to the particular mutual locking of the needle threads and looper threads so that the disadvantage of raveling on the breaking of a seam is practically overcome.

All of the embodiments described have another advantage. Simple thread strands extend along the edges of the lower side of the seam from stitch hole to stitch hole in the same way as on the top side of the seam. On the top side of the seam these strands are the needle threads lying at the outside of the seam while at the lower side of the seam one strand of each of the looper thread 5 and the looper thread 7 extend along the outside of the seam. Consequently, the lower side of the seam appears to be very flat and narrow.

It is obvious that other arrangements of the concatenation of the needle thread loops and looper thread loops may be made without departing from the spirit of the invention as set forth in the appended claims.

I claim:

1. A flat seam for sewed articles comprising opposed fabric sections, stitching threads joining the fabric sections including, a plurality of opposed needle thread loops penetrating the respective fabric sections in rows parallel with each other, a first looper thread passing transversely of the fabric sections through all of the opposed needle thread loops on the underface of the

fabric sections and a second looper thread passing through said first looper thread loop as it emerges from a needle thread loop, said second looper thread loop extending across the fabric sections and locked by one of the succeeding needle thread loops.

2. A flat seam for sewed articles comprising opposed fabric sections, stitching threads joining the fabric sections including needle threads extending along each edge of the fabric sections and formed into loops penetrating the fabric sections, a looper thread extending along one side of the fabric sections and formed into loops passing transversely of the fabric sections through all of the opposed needle thread loops and a second looper thread extending along the other side of the seam and formed into loops, each loop passing through the first-named looper thread loop as it emerges from the adjacent needle loop, said second looper thread loop extending across the fabric sections and locked by one of the succeeding needle thread loops at the other side of the seam.

3. A flat seam for sewed articles comprising fabric sections having their edges abutted, a plurality of rows of needle thread loops, at least one row being disposed at each side of the abutted edges and penetrating the respective fabric sections, a single looper thread passing transversely of the abutted edges through all of the opposed needle thread loops and a second looper thread passing through said first named looper thread loop as it emerges from a needle thread loop, said second looper thread extending across the abutted edges and locked by one of the succeeding needle thread loops.

4. A flat seam for sewed articles comprising opposed fabric sections, stitching threads joining the fabric sections including three or more needle threads formed into loops and arranged in parallel rows penetrating the fabric sections, a single looper thread passing transversely of the fabric sections through all of the opposed needle thread loops, a second looper thread passing through the first looper thread loop as it emerges from a needle thread loop extending laterally across the fabric sections and locked by a succeeding needle thread loop in the next adjacent row, a third looper thread loop extending through the first named looper thread loop adjacent the needle loop in an intermediate row of needle thread loops, said third looper thread loop extending across the fabric sections and locked by one of the succeeding needle thread loops in the next adjacent row of needle thread loops.

5. A flat seam for sewed articles comprising opposed fabric sections, stitching threads joining the fabric sections including a plurality of opposed needle thread loops penetrating the respective fabric sections in rows parallel with each other, a single looper thread passing transversely of the fabric sections through all of the opposed needle thread loops, a second looper thread loop passing through the first looper thread loop as it emerges from a needle thread loop, said second looper thread loop being expanded and locked by all of the next succeeding needle thread loops.

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No references cited.