June 23, 1942. J. F. BINKLEY 2,287,660

LOOP DRAWING MEANS FOR FABRIC LOOPING MACHINES

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Fig. 1

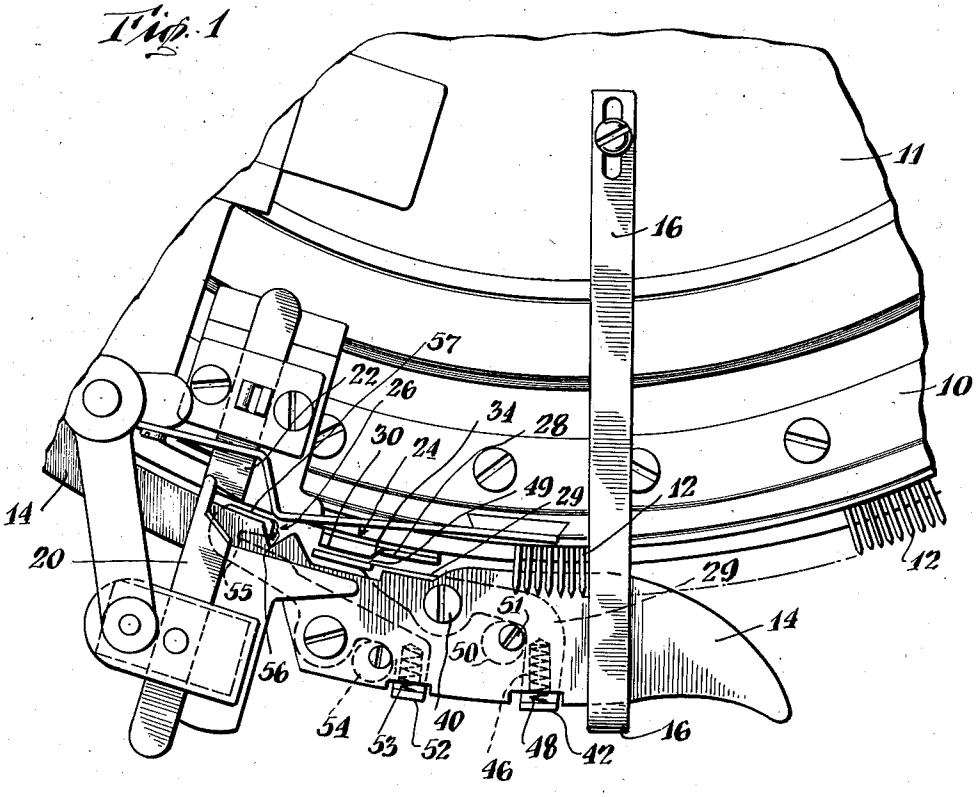
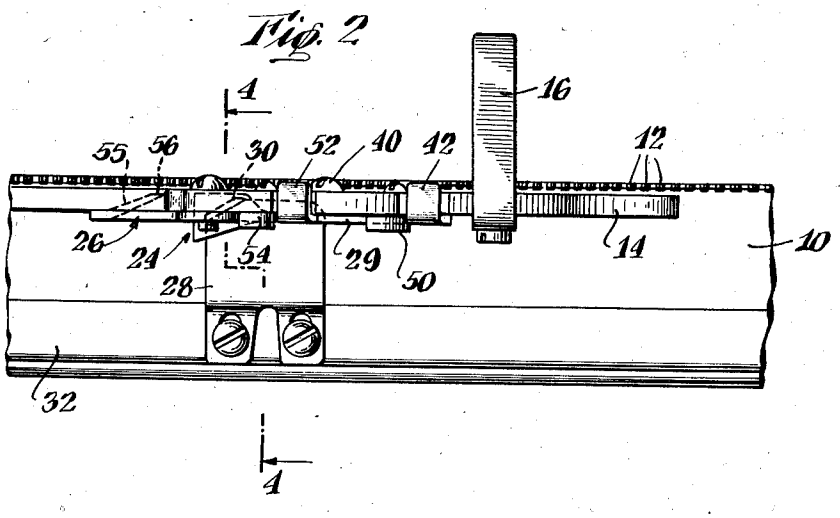


Fig. 2



INVENTOR
Jacob Frederick Binkley
BY
Hoguet, Meany & Campbell
his ATTORNEYS

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Fig. 3

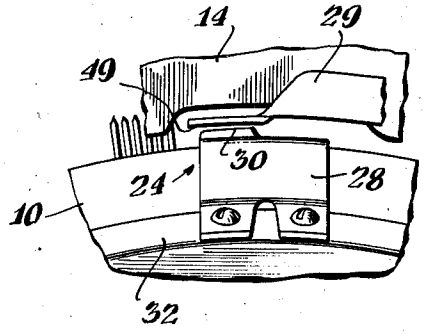


Fig. 4

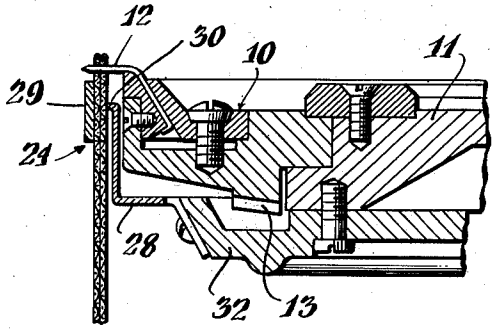


Fig. 6

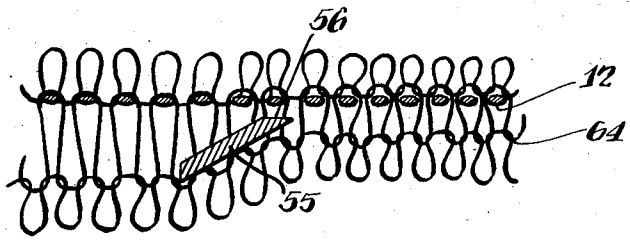
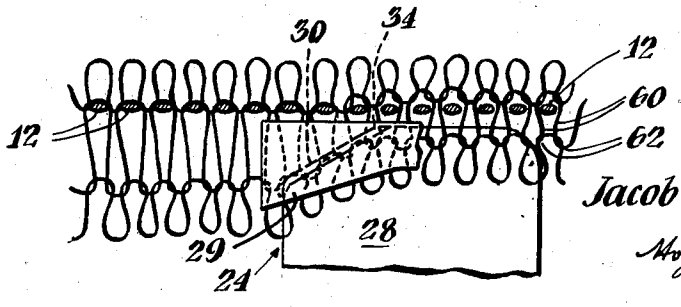


Fig. 5



INVENTOR
Jacob Frederick Binkley
BY
Hoguet, Newman & Campbell
his ATTORNEYS

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2,287,660

UNITED STATES PATENT OFFICE

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LOOP DRAWING MEANS FOR FABRIC LOOPING MACHINES

Jacob Frederick Binkley, Winston-Salem, N. C.

Application December 17, 1940, Serial No. 370,440

17 Claims. (Cl. 112—25)

This invention relates to fabric looping machines and more particularly to means for effectively drawing down on the points of the machine the loops of the fabric supported thereon.

When a large quantity of knit articles such as stockings of the same style, design or pattern are to be looped on the same looping machine, the stockings or other articles having been knit on several knitting machines, the stitches or loops of the courses will not be of the same size. This may be due to differences in the needles, sinkers or other parts of the knitting machines. For example, the stitches or loops of one fabric will be large and fit loosely on the points of the looping machine, while the loops of another fabric will be tight or small and fit tightly over the points of the machine. Then again, adjacent loops in the same course may be of different sizes so that while one loop tends to fit tightly over one of the machine points, an adjacent loop may fit loosely over the next adjacent point. Under these conditions the knives of the looping machine must be adjusted an adequate distance from the points to avoid shearing or nipping those loops of the course known as the "looper course" which are loosely supported on the points. Should the knives be too close to the points they will shear or nip the more loosely supported loops and thereby provide weak places in the finished seam. Should the knives be adjusted too far from the points, the shearing operation of the knives will remove less material and consequently leave more material with fragments thereon between the points and the knives. Since the brush can only take care of a certain quantity of material and brush it clean of fragments, the adjustment of the knives too far from the points causes the brush to leave undisposed fragments which become stitched into the seam, leaving the finished seam rough and ragged in appearance.

While an attendant in applying fabric to the points of a looping machine may manually draw the fabric down on the points, such manual tensioning is not satisfactory because it is difficult manually to effect an even tension upon all of the loops of the looper course. This also entails a loss of time and much more work for the attendant. Then again, manual drawing of the fabric down on the points often results in pulling some of the points out of alignment, thereby producing uneven trims and consequently an uneven seam.

Attachments have heretofore been proposed in the form of deflectors or guides arranged to brush against the fabric supported on the points of the machine so as to urge the fabric into position on the points. Such attachments, however, are not satisfactory because they do not adequately draw down or apply even tension to the individual loops of the looper course. Furthermore, the attachments heretofore proposed do not effectively handle the doubled folds of a fabric, such, for example, as the inner and outer folds of seamless hosiery.

One of the objects of the invention, therefore, is to provide means for fabric looping machines operable to effectively draw individually the loops of the looper course of the fabric securely and with substantially even tension down on the machine points.

Another object of the invention is to provide means for a fabric looping machine operable to evenly draw the loops of the looper course of a fabric laterally relative to the machine points so that the knife edges may be adjusted nearer the points than heretofore possible without the danger of cutting or nicking any of the loops of the looper course.

Still another object of the invention is to provide attachments for fabric looping machines operable to draw down on the points of the machine the loops of the looper courses of a doubled fabric, such, for example, as the inner and outer folds of seamless hosiery.

A further object of the invention is to provide simple and sturdy attachments adapted for use with different looping machines for effectively drawing individually the loops of the looper course of a fabric down on the machine points.

The above and additional objects and features of the invention are obtained by providing the looping machine with attachments operable to engage and draw individually and with substantially the same tensioning the threads of the looper course down on the machine points. More particularly, I provide the looping machine with two attachments in tandem relation, one operable to effectively engage the loops from one side of the fabric and the other to similarly engage the loops of the fabric from the other side thereof. This combination of attachments is especially effective in drawing the loops of the looper courses of doubled fabrics, for example, the inner and outer folds of seamless hosiery and like articles.

The attachment for drawing the loops of the inner fold comprises an element having a cam surface suitably shaped and disposed to engage the loops of the looper course or one of the

courses below the looper course from the inner side of the machine in cooperation with a resiliently inwardly biased lever having a surface extending adjacent to and along the cam surface to direct the fabric therealong. The cam surface is inclined with reference to the plane of the machine points so that it is adapted to cause the overlapping threads of the loops or stitches connecting two adjacent courses to pass along the cam surface until the threads of the loops are drawn downwardly on the points with substantially the same tension, whereupon the loops are automatically released from the cam surface. Both folds of the fabric are passed between the cam surface and the cooperating surface of the resiliently biased lever, so that while the loops of the inner fold are individually drawn, the loops of the outer fold may also be drawn to some degree by the brushing action of the first attachment. The second attachment, however, is arranged to engage directly the threads of the outer fold and thereby insure the proper drawing of the looper course of the outer fold; that is, it presents a cam surface adapted to engage the outer surface of the outer fold.

For a better understanding of the invention, reference is had to the following detailed description to be read in connection with the accompanying drawings, in which:

Fig. 1 is a fragmentary view in plan of a looping machine to which my novel fabric drawing means has been applied;

Fig. 2 is a fragmentary view in side elevation of the looping machine showing the relation of the attachments with respect to the machine points;

Fig. 3 is an enlarged bottom plan view of one of the attachments;

Fig. 4 is a vertical sectional view taken substantially along line 4—4 of Fig. 2; and

Figs. 5 and 6 are diagrammatical illustrations of the attachments, illustrating the loop drawing function thereof.

Referring to Figs. 1 to 4 of the drawings, the looping machine to which I have applied an embodiment of my invention for purposes of illustration, is of the type provided with a circular dial ring 10 revolvably supported on a frame 11 and driven relative thereto by means of gear teeth 13 (Fig. 4) and a suitable source of power. The dial ring supports at its periphery a series of points 12 upon which fabric is adapted to be applied for seaming and other sewing operations. A fabric guard 14 which pushes the fabric back on the points is suitably supported by a stationary arm 16 mounted on the frame 11. Crosswise of the guard 14 is a pair of cutting knives 20 and 22 (Fig. 1) operable during the feeding of the fabric to trim off the fabric supported above the machine points 12.

In order to effectively draw downwardly on the machine points 12, the supporting loops of the fabric, and in particular the inner and outer folds of a doubled fabric such as seamless hosiery, I provide the machine with an inner fold drawing attachment 24 and an outer fold drawing attachment 26. These attachments are arranged in tandem relation adjacent the periphery of the dial ring. The inner fold drawing attachment 24 comprises two cooperating elements 28 and 29. The element 28 is supported on a gear guard 32 which is mounted on the frame 11. The element 28 is provided with a cam surface 30 protruding outwardly therefrom as indicated in Figs. 1 and 4. One end 34 of the cam surface is disposed below the plane of and adjacent to the points 12, while the remainder of the surface is inclined downwardly at an angle to the plane of the points and in the direction of movement of the points.

The cooperating element 29 is pivotally mounted on the guard 14 at 40 (Fig. 1), and is provided with an end 42 turned at an angle thereto for position adjacent an edge of the guard 14. A recess 46 is provided in the guard 14 to receive a small spring 48 adapted to engage the turned end 42. The opposite end of the element 29 is provided with a substantially flat surface 49 adapted to extend adjacent to and along the inclined surface 30. An abutment 50 is adjustably supported on the guard 14 by a screw 51 to maintain the surface 49 properly spaced from the inclined surface 30 to permit the movement of fabric threads therebetween. The spring 48 permits the element 29 to be resiliently forced away from the inclined surface 30 when a wider spacing is necessary. For example, when a loop of the looper course has been securely drawn down on a machine point with a predetermined tension, the element 29 will then be forced against the action of the spring away from the cam surface 30 to release the loop threads. This pivotal releasing movement of the element 29 is such that when the element is urged outwardly against the action of the spring 48 the outward movement of the surface 49 is greater at the rear portion of the cam surface 30 than at the forward end 34 thereof. This is so because, as shown in Fig. 1, the pivotal axis of the element 29 is located forwardly of the cam surface 30.

More particularly, when fabric is fed between the attachments 28 and 29, the top edge 34 of the inclined surface 30 is adapted to engage the loop threads of a course and cause the overlapping threads or stitches from the next lower adjacent course to pass downwardly along the inclined surface. This is diagrammatically illustrated in Fig. 5, the cam surface 30 being shown closely adjacent the points and in association with the threads 60 of the looper course.

Since the drawing attachments may be applied for engagement with the threads of courses other than the looper course, it is to be understood that the illustrations in Figs. 5 and 6 are intended to be illustrative of the principles of the invention only, and not to restrict the positioning of the attachments.

The attachments, of course, are adjusted as close as possible under the points to obtain the best results. As in the case of attachment 24, the top edge 34 will engage the threads on the inside fold of the fabric along a course closely adjacent the points of the machine so that as the dial continues to revolve the overlapping loops or stitches 62 connecting this course with the next lower adjacent course are caused to follow along the inclined surface 30 as indicated in Fig. 5. The stitches 62 are held against the inclined surface until a tension is established on the threads sufficient to draw the adjacent loop threads of the looper course down tightly on the machine points.

Referring now to Figs. 1, 2 and 6, the attachment 26 is shown pivotally mounted on the guard 14 and provided with an end 52 upturned alongside of the guard to be engaged by a spring 53, similarly as in the case of the element 29, to resiliently bias the attachment 26 toward the periphery of the dial ring 10. An abutment 54 is adjustably supported on the guard 14 to hold

the attachment 26 just short of engaging the dial ring. An inner extension 55 is provided on the attachment 26 which is disposed at an angle to the points 12 as diagrammatically illustrated in Fig. 6. The top edge 56 of the extension 55 is bevelled and slightly curved at the corner thereof to engage and direct the threads of a course between the extension and the periphery of the dial 10. The inner edge or surface 57 of the extension is inclined downwardly from the top edge 56 in the direction of movement of the points. The overlapping threads or stitches 64 of two adjacent courses of the outer fold are engaged and caused to pass downwardly along the inclined surface 57 of this extension. The action of the extension thus causes the loops of the looper course of the outer fold to be drawn downwardly on the points as the fabric is fed along the surface 57, the biased action of the attachment toward the periphery of the ring 10 being operable to release the stitches when a predetermined tension is established. Release of the stitches only after they have been subjected to a desired amount of tension is insured by positioning the surface 57 rearwardly of the pivotal axis of the attachment 26 so that as the attachment is pivoted by the spring 53 there will be a smaller outward movement at the forward end portion of the surface 57 than at the rear end portion thereof.

To summarize the operation, the attendant places the loops of the fabric of a selected course on the points 12 of the moving dial ring 10. The fabric is thereby fed alongside of the guard 14 which causes both folds of the fabric, as in the case of seamless hosiery, to be fed between the coacting elements 28 and 29 of the inner fold drawing attachment 24. As the dial revolves, both folds of the fabric pass the cam surface 30 which engages the threads of either the looper course or a course near the looper course of the inner fold, causing the supporting loops of the inner fold to be drawn down securely on the machine points. After the fabric passes through the attachment 24 the outer fold is engaged by the extension 55 which cooperates with the periphery of the dial ring to draw the threads of the looper course of the outer fold down securely on the machine points similarly as in the case of the attachment 24.

When the looping machine is provided with the loop drawing attachments of my invention, the knives 20 and 22 can be closely adjusted adjacent the points 12 to sever the threads of the course directly above the looper course. The adjacent relation of the attachment 26 and the knives 20 and 22 also insures that the looper courses will be maintained down on the points by the attachment 26 as the fabric is fed past the cutting knives.

The two attachments thus cooperate to provide for the individual drawing of the loops of the looper courses of the two folds securely down on the machine points so that the cutting knives may be adjusted to sever the threads evenly and closely adjacent the looper courses. This facilitates the production of a strong and even seam with a minimum of fragments.

While I have shown and described but one embodiment of my invention, it is recognized that many changes and variations in the shape and arrangement of the fabric drawing attachments are possible without departing from the spirit of my invention. It is therefore to be understood that the present embodiment is to be regarded as illustrative of the invention only and not in restriction thereof.

I claim:

1. In a fabric looping machine comprising a frame and a fabric feeding device having a series of fabric supporting points disposed in a plane for movement relative to said frame; the combination of means to draw laterally relative to said points the loops of the fabric supported thereon, which comprises a fabric engaging element disposed adjacent the plane of said points with a surface thereof inclined away from and in the direction of movement of said points, and means presenting a surface extending adjacent to and spaced substantially equidistantly from and and along said inclined surface to urge the threads of the fabric against said inclined surface and cause the overlapping threads of two adjacent courses to be engaged by said inclined surface for movement therealong.

2. In a fabric looping machine comprising a frame and a fabric feeding device having a series of fabric supporting points disposed in a plane for movement relative to said frame; the combination of means to draw laterally relative to said points the loops of the fabric supported thereon, which comprises a fabric engaging element disposed adjacent the plane of said points with a surface thereof inclined downwardly from and in the direction of movement of said points, means presenting a surface extending adjacent to and spaced substantially equidistantly from and along said inclined surface to urge the threads of the fabric against said inclined surface and cause the overlapping threads of two adjacent courses to be engaged by said inclined surface for movement downwardly therealong, and means to resiliently urge said last named means toward said inclined edge.

3. In a fabric looping machine comprising a frame and a fabric feeding device having a series of fabric supporting points disposed in a plane for movement relative to said frame; the combination of means to draw laterally relative to said points the loops of the fabric supported thereon, which comprises a fabric engaging element disposed adjacent the plane of said points, said element having a projection extending outwardly in relation to said device and presenting a surface inclined away from and in the direction of movement of said points, means including a member presenting a surface disposed adjacent to and spaced substantially equidistantly from and along said inclined surface to direct threads of the fabric thereagainst and cause the overlapping threads of two adjacent courses to move along said inclined surface.

4. In a fabric looping machine comprising a frame and a fabric feeding device having a series of fabric supporting points disposed in a plane for movement relative to said frame; the combination of means to draw laterally relative to said points the loops of the fabric supported thereon, which comprises a fabric engaging element disposed adjacent the plane of said points, said element having a projection extending outwardly in relation to said device and presenting a surface inclined away from and in the direction of movement of said points, means including a member presenting a surface disposed adjacent to and along said inclined surface to direct threads of a course of loops thereagainst and cause the overlapping threads of said course and the next lower adjacent course to move along

said inclined surface, and means to resiliently urge said member toward said element.

5. In a fabric looping machine comprising a frame and a fabric feeding device having a series of fabric supporting points disposed in a plane for movement relative to said frame; the combination of means to draw laterally relative to said points the loops of the fabric supported thereon, which comprises a fabric engaging element disposed adjacent the plane of said points, said element having a part presenting an edge extending at an angle to the plane of the points and in the direction of movement of said points, and means presenting a surface disposed substantially parallel to and spaced closely adjacent said edge to urge the threads of a course of loops against said edge and cause the overlapping threads of said course and the next lower adjacent course to be engaged by said edge for movement along said edge and away from the plane of said points.

6. In a fabric looping machine comprising a frame and a fabric feeding device having a series of fabric supporting points disposed in a plane for movement relative to said frame; the combination of means to draw laterally relative to said points the loops of the fabric supported thereon, which comprises an element having a fabric engaging edge portion with the forward end thereof disposed adjacent the plane of said points and the remaining part thereof inclined away from said plane and in the direction of movement of said points, said element being pivotally mounted on an axis located forwardly of said edge portion, and means to urge resiliently said element about said axis to position the edge portion thereof closely adjacent the periphery of said fabric feeding device in a position to engage the overlapping threads in said fabric and cause them to move therealong and laterally relative to said points.

7. In a fabric looping machine comprising a frame and a fabric feeding device having a series of fabric supporting points disposed in a plane for movement relative to said frame; the combination of means to draw laterally relative to said points the loops of the fabric supported thereon, which comprises a pair of elements having fabric engaging surfaces spaced apart substantially equidistantly therealong to engage opposite sides of the fabric carried by said points, and the fabric engaging surface of at least one of said elements being inclined downwardly from and in the direction of the movement of said points to engage and cause the overlapping threads of two adjacent courses to move downwardly along at least a part of said inclined surface.

8. In a fabric looping machine comprising a frame and a fabric feeding device having a series of fabric supporting points disposed in a plane for movement relative to said frame; the combination of means to draw laterally relative to said points the loops of the fabric supported thereon, which comprises a pair of elements spaced apart to engage opposite sides of the fabric carried by said points, one of said elements being provided with a surface inclined downwardly from and in the direction of the movement of said points to engage and cause the overlapping threads of two adjacent courses to move downwardly along at least a part of said inclined surface, and means for resiliently biasing one of said elements toward the other.

9. In a fabric looping machine comprising a frame and a fabric feeding device having a series of fabric supporting points disposed in a plane for movement relative to said frame; the combination of means to draw laterally relative to said points the loops of the fabric supported thereon, which comprises a pair of elements disposed adjacent the plane of said points and so arranged as to engage opposite sides of the fabric supported by said points, and each of said elements having a part presenting a surface inclined at an angle to the plane of said points and in the direction of movement of said points to engage and cause the overlapping threads of two adjacent courses to be drawn along at least part of said inclined surfaces.

10. In a fabric looping machine comprising a frame and a fabric feeding device having a series of fabric supporting points disposed in a plane for movement relative to said frame; the combination of means to draw laterally relative to said points the inner and outer folds of a doubled fabric supported thereon, which comprises a pair of elements disposed adjacent the plane of said points and so arranged that one of the elements is adapted to engage the inner fold of the fabric and the other of said elements is adapted to engage the outer fold of the fabric, and each of said elements having a part presenting a surface inclined at an angle to the plane of said points and in the direction of movement of said points to engage and cause the overlapping threads of two adjacent courses of the respective folds engaged thereby to move along at least a part of said inclined surface.

11. In a fabric looping machine comprising a frame and a fabric feeding device having a series of fabric supporting points disposed in a plane for movement relative to said frame; the combination of means to draw laterally relative to said points the inner and outer folds of a doubled fabric supported thereon, which comprises two fabric engaging elements disposed adjacent the plane of the points, one of the elements having a part extending outwardly in relation to said device and presenting a surface inclined at an angle to the plane of said points and in a direction of movement of said points to engage and draw the loops of a course in the inner fold, the other of said elements having a part extending inwardly toward said device and presenting a surface also inclined at an angle to the plane of said points and in the direction of movement of said points to engage and draw the loops of a course in the outer fold, and means to guide the fabric toward the inclined surfaces of said elements.

12. In a fabric looping machine comprising a frame and a fabric feeding device having a series of fabric supporting points disposed in a plane for movement relative to said frame and a fabric guard supported on said frame and disposed below the plane of said points; the combination of means to draw laterally relative to the points the inner and outer folds of a fabric supported thereon, which comprises two fabric engaging elements, one of said elements being supported from said frame and having a part extending outwardly toward said guard and presenting a surface inclined downwardly from and in a direction of movement of said points to engage and draw downwardly the loops of a course in the inner fold, the other of said elements being supported on said guard and having a part extending inwardly from said guard and presenting a surface inclined downwardly from and

in the direction of movement of said points to engage and draw downwardly the loops of a course in the outer fold.

13. In a fabric looping machine comprising a frame and a fabric feeding device having a series of fabric supporting points disposed in a plane for movement relative to said frame and a fabric guard supported on said frame and disposed adjacent the plane of said points; the combination of means to draw laterally relative to the points the loops of the fabric supported thereon, which comprises a fabric engaging element disposed adjacent the plane of said poitns and having a surfacej inclined at an angle to the plane of said points and in the direction of movement of said points, a cooperating element movably mounted on said guard and presenting an extended surface adjacent said inclined surface to direct threads of a course of loops thereagainst, an abutment to space said cooperating element from said inclined surface, and means to resiliently urge said cooperating element toward said abutment.

14. Fabric drawing means for looping machine having a series of fabric supporting points, comprising an element having a protruding surface adapted to be disposed adjacent the plane of the points with said surface inclined at an angle to the plane of said points and in the direction of movement of said points, and means presenting an extended surface disposed adjacent to and along said protruded surface to direct the threads of a course of loops thereagainst to cause the overlapping threads of said course and the next lower adjacent course to move along at least a part of the inclined surface and thereby draw laterally relative to said points the loops of the fabric supported thereon.

15. Fabric drawing means for looping machines having a series of fabric supporting points, comprising an element having a protruding surface adapted to be disposed adjacent the plane of the points with said surface inclined at an angle to the plane of said points and in the direction of movement of said points, another element having an extended surface disposed in spaced relation adjacent to and along said inclined surface to direct the threads of a course of loops thereagainst to cause the overlapping threads of said course and the next lower adjacent course to move along at least a part of the inclined surface and thereby draw laterally relative to said points the loops of the fabric supported thereon, and means to resiliently urge one of said elements toward the other.

16. Fabric drawing means for looping machines having a series of fabric supporting points, comprising an element having a protruding surface adapted to be disposed adjacent the plane of the points with said surface inclined downwardly from and in the direction of movement of said points to engage and draw downwardly the loops of one of the folds of a doubled fabric supported on said points, a second element having an extended surface disposed in spaced relation adjacent to and along said inclined surface to direct the fabric thereagainst, and a third element disposed in tandem relation to said first mentioned element and presenting an edge extending in a direction opposed to the protruded surface of said first mentioned element, said edge being also inclined downwardly from and in the direction of movement of said points to engage and draw downwardly the loops of the other fold of the fabric.

17. In a fabric looping machine comprising a frame and a fabric feeding device having a series of fabric supporting points disposed in a plane for movement relative to said frame; the combination of means to draw laterally relative to said points the loops of the fabric supported thereon, which comprises an element having a fabric engaging edge portion with the forward end thereof disposed adjacent the plane of said points and the remaining part thereof inclined away from said plane and in the direction of movement of said points, a second element having a surface disposed adjacent to and along the inclined edge of the first mentioned element to direct threads thereagainst, one of said elements being pivotally mounted for movement on an axis located forwardly of the associated inclined edge and surface portions of the two elements, and means to urge the pivoted element about said axis to maintain resiliently the closely disposed relationship of said inclined edge and said surface so that overlapping threads in said fabric engaged thereby are caused to move therealong and laterally relative to said points.

JACOB FREDERICK BINKLEY.