

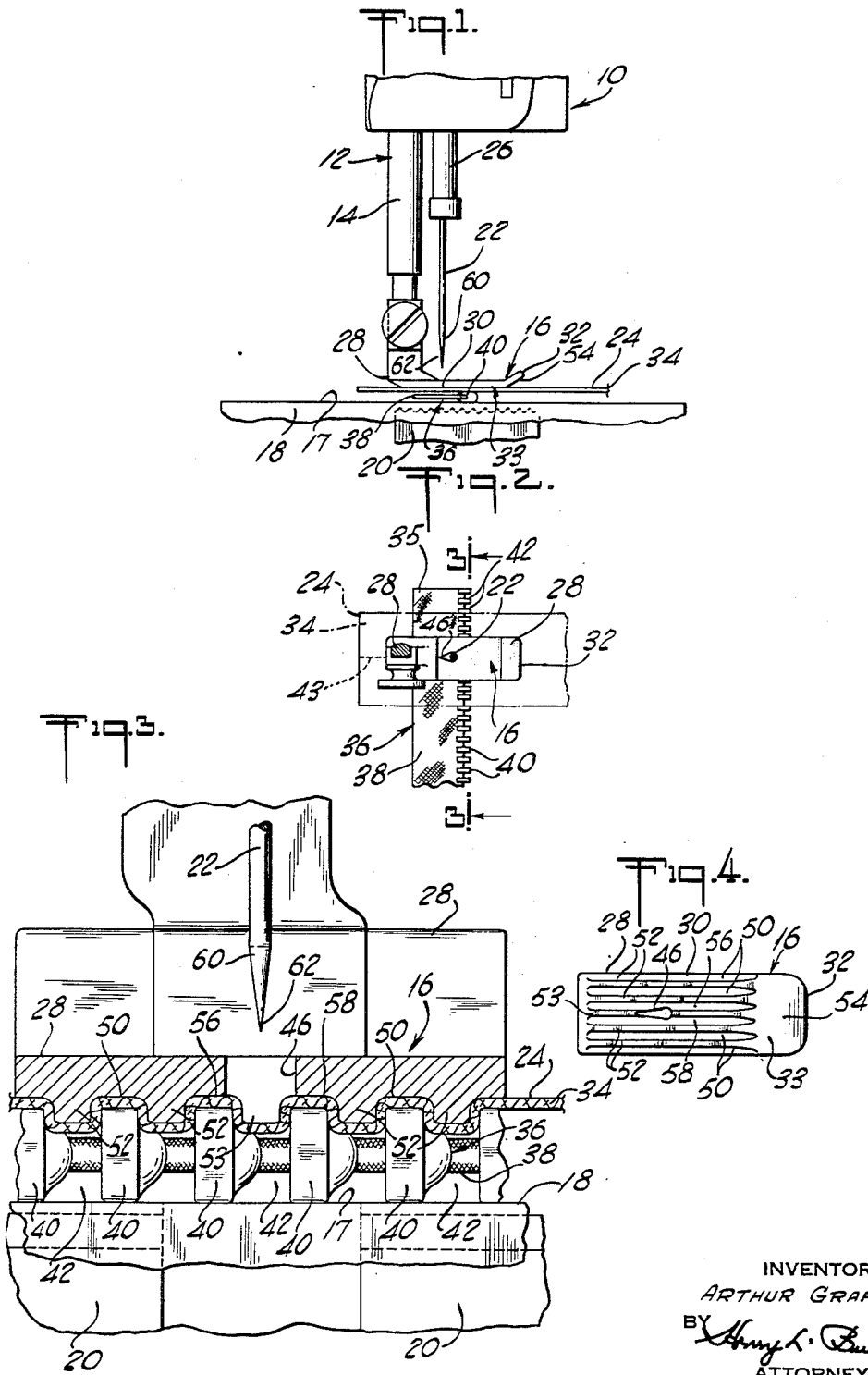
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SEWING MACHINES FOR STITCHING SLIDE FASTENERS

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SEWING MACHINES FOR STITCHING SLIDE FASTENERS

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This invention relates to sewing machines for stitching slide fasteners.

In many of the stitching operations in sewing together parts, particularly in the manufacture of clothing, where slide fasteners are found on one of the parts of the garment or other construction to be stitched, it sometimes is necessary to move the slide fastener elements across the line of stitching. No matter how slowly a sewing machine may be operated, there comes a time when the needle strikes one of the metallic slide fastener elements, with resultant breakage of the needle.

It is an object of the invention to provide means in connection with the mechanism of a sewing machine to make it possible to move slide fastener elements attached to fabric or other material past the stitching point without interruption so as to eliminate the danger of the needle striking the fastener elements and being broken.

In sewing machines generally, there is a presser foot which presses the fabric down against a needle plate. In association with these parts there are feed dogs for feeding the fabric, the feed dogs rising above the surface of the needle plate a slight distance sufficient to engage the fabric and move the fabric along, sliding it against and along the under face of the presser foot an amount predetermined in accordance with the length of stitch desired. The face of the presser foot normally is highly polished, in order to eliminate friction as much as possible. The presser foot may be a solid member, or it may be forked. In either case, an opening of some kind is provided so that the needle may move down through the fabric being stitched for proper cooperation with the mechanism beneath the needle plate to complete the stitching operation.

It is an object of the invention so to construct the presser foot of a sewing machine that the presser foot, in its oscillations under the action of the feed dogs, will serve to control the slide fastener elements so that those elements will move away from the needle when the elements reach the path of reciprocation of the needle across the fabric bearing the slide fastener elements.

Other objects of the invention will be set forth hereinafter, or will be apparent from the description and the drawings, in which is illustrated an embodiment exemplifying the invention.

The invention, however, is not intended to be restricted to any particular construction, or any particular arrangement of parts, or any particular application of any such construction or arrangement of parts, or any specific method of operation or use, or any of the various details thereof, even where specifically shown and described herein, as the same may be modified in various particulars, or may be applied in many varied relations, without departing from the spirit and scope of the claimed invention, of which the exemplifying embodiment, herein shown and described, is intended only to be illustrative, and only for the purpose of complying with the requirements of the statutes for disclosure of an operative embodiment, but not to show all the various forms and modifications in which the invention might be embodied.

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On the drawings, in which the same reference characters refer to the same parts throughout, and in which is disclosed such a practical construction,

Fig. 1 is an elevational view to somewhat reduced scale, illustrating a part of a sewing machine, the needle bar and needle, the presser foot and needle plate, and part of the underpart of the sewing machine including part of the feed dogs, to illustrate the usual positioning of the parts for a stitching operation upon fabrics including slide fastener chain;

Fig. 2 is a plan view illustrating the disposition of presser foot, needle and needle plate as fabric bearing slide fastener elements are moved past the needle during a stitching operation;

Fig. 3 is a transverse cross-sectional view, substantially on the line 3-3 of Fig. 2, and to enlarged scale, showing the construction of the presser foot for guiding slide fastener element out of the path of a reciprocating needle; and

Fig. 4 is a bottom plan view, to larger scale than Fig. 2, illustrating the relative disposition of guiding means and needle hole.

On the drawings, there is illustrated just a portion of head 10 of a sewing machine 12. In this case, there extends downwardly from head 10, the presser foot bar 14 which carries a presser foot 16, so that the presser foot may be moved toward and away from the top face 17 of a needle plate 18. Below the needle plate are disposed feed dogs 20. The mechanism for manipulating bar 14 and its presser foot, and the mechanism for operating feed dogs 20, are not shown, as they may be of any desired or conventional construction. The feed dogs are given a motion by which, after needle 22 has carried a stitch down below the level of needle plate 18, and then has moved out of the fabric after the stitch has been engaged properly either by locking or other operations, the feed dogs rise and engage fabric 24 which is disposed between presser foot 16 and plate 18. Needle 22 is carried by needle bar 26 which is reciprocated in synchronism with the movements of the feed dogs and the operating mechanism thereof.

Presser foot 16 is shown here as being a metallic member 28 having a long shoe 30, the forward end or toe 32 of which is turned upwardly so that the fabric or other material to be stitched by the machine may move between the presser foot and the needle plate as the feed dogs engage and push the fabric along under face 33 of the sole of the foot to the heel.

As shown in Fig. 2, the machine is intended to handle a waistband 34 to which is to be stitched the end portion 35 of a zipper chain or fastener 36. Such a chain is comprised of a tape 38 on the edge of which are disposed slide fastener elements 40. These elements have a pitch distance, that is, they are spaced apart uniformly in their attachment to the tape edge. The elements comprise metallic pieces which have been clinched upon the edge of the tape at spaced apart intervals to provide gaps 42 between them at which only the fabric of the tape is disposed. It is necessary, to prevent breakage of needles, that stitching 43 move through one of gaps 42.

In stitching waistband 34 to a trouser top, or in other stitching operations of the same character, the line of stitching 43 must run parallel to elements 40, because of the fact that top end portion 35 is at right angles to the waistband. An opening 46 in presser foot 16 is disposed rearwardly of forward end 32. Needle 22 is reciprocated through opening 46, to pass thread drawn from a supply, down through waistband 34 and tape 38 to the operating parts of the sewing machine beneath the needle plate. In bottom face 33 of presser foot 16 there are provided a plurality of grooves 50. The grooves thus

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produce ribs 52. The ribs and the grooves extend up to the angularly disposed face 54 at forward end 32.

By this construction, as shown in Fig. 3, when a combination of waistband 34, and tape 38 with its associated elements 40, are fed beneath presser foot 16, ribs 52 force themselves between elements 40, pushing the elements into grooves 50. The spacing or pitch distance between grooves 50 is equivalent to the pitch distance between elements 40. Thus, the result of feeding fastener 36, together with other fabric, beneath presser foot 16 will be that the elements will be guided into grooves 50, and thus will be retained in a definite line of movement.

Opening 46, as shown in Fig. 4, is astride one of ribs 52. Thus, needle 22 will be protected by the metal of rib 53 through which opening 46 extends so that elements 40 in grooves 56 and 58, which form rib 53, will move laterally past the needle as it reciprocates. The needle itself has a contoured body 60 which will assist in camming the elements laterally out of the path of point 62 of the needle.

As shown in Fig. 3, the width of grooves 50 is greater than the width of ribs 52. By such construction, ribs 52 take upon themselves the function of giving a definite form to the fabric of, say, waistband 34, which is being fed along with the slide fastener chain, and which may be disposed over elements 40 during the stitching operation. Ribs 52 push such fabric in between elements 40, and into gaps 42. This will build up the body of fabric around elements 40, which then will be received within grooves 50. Even with this interdisposed fabric, positive guiding of fastener elements 40 will follow because this formation of the fabric by ribs 52 will hold elements 40 within the grooves.

Thus, there will result a simple operation of feeding fastener 36 together with waistband 34 past the stitching point so that the fastener elements are guided to prevent engagement between the fastener elements and needle point 62 as stitching continues as an uninterrupted operation. The rise of the feed dogs to press the fabric up against the presser foot for feeding operations, after the needle has been released from the fabric, will not affect the positioning of the elements as, during such feeding, the elements will remain engaged within grooves 50 and between ribs 52.

Many other changes could be effected in the particular constructions, and in the methods of use and construction, and in specific details thereof, hereinbefore set forth, without substantially departing from the invention intended to be defined herein, the specific description being merely of an embodiment capable of illustrating certain principles of the invention.

What is claimed as new and useful is:

1. A presser foot for use in a sewing machine having a needle plate for cooperation with the presser foot, and a needle for cooperation with the presser foot and the needle plate to stitch fabric moving between the presser foot and the needle plate where such fabric has a series of spaced apart slide fastener elements secured thereto at substantially equal pitch distances, the presser foot having a sole, a toe, and a heel, the toe being disposed to extend toward the fabric oncoming to the presser foot, the entire under face of the sole having a plurality of substantially parallel guiding grooves therein spaced apart at distances substantially equal to said pitch distances of said slide fastener elements to be fed between the sole face and the plate, the grooves being defined by ribs extending downwardly from the sole face and lengthwise of the sole from its heel to merge into the under face of the toe, the ribs being spaced apart at a distance and being of a thickness to coincide with the spaces between immediately adjacent slide fastener elements, and the grooves being dimensioned and contoured to receive the slide fastener elements to be slid between the shoe and the plate, one of the ribs having a needle hole coincident with and extending through said rib, the needle

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hole being spaced a substantial distance rearwardly away from the line of merger of the ribs into the toe, the grooves and the ribs providing means to cam said elements to move along the grooves and out of the path of movement of the needle through the needle hole.

2. A presser foot for use in a sewing machine having a needle plate for cooperation with the presser foot, and a needle for cooperation with the presser foot and the needle plate to stitch fabric moving between the presser foot and the needle plate where such fabric has a series of spaced apart slide fastener elements secured thereto at substantially equal pitch distances, the presser foot having a sole, a toe, and a heel, the toe being disposed to extend toward the fabric oncoming to the presser foot, the entire under face of the sole having a plurality of substantially parallel guiding grooves therein spaced apart at distances substantially equal to said pitch distances of said slide fastener elements to be fed between the sole face and the plate, the grooves being defined by ribs extending downwardly from the sole face and lengthwise of the sole from its heel to merge into the under face of the toe, the ribs being spaced apart at a distance and being of a thickness to coincide with the spaces between immediately adjacent slide fastener elements, and the grooves being dimensioned and contoured to receive the slide fastener elements to be slid between the shoe and the plate, one of the ribs having a needle hole coincident with and extending through said rib, the needle hole being spaced a substantial distance rearwardly away from the line of merger of the ribs into the toe, the grooves and the ribs providing means to cam said elements into the grooves and out of the path of movement of the needle through the needle hole before said elements move abreast of the needle hole.

3. A presser foot for use in a sewing machine having a needle plate for cooperation with the presser foot, and a needle for cooperation with the presser foot and the needle plate to stitch fabric moving between the presser foot and the needle plate where such fabric has a series of spaced apart slide fastener elements secured thereto at substantially equal pitch distances, the presser foot having a sole, a toe, and a heel, the toe being disposed to extend toward the fabric oncoming to the presser foot, the entire under face of the sole having a plurality of substantially parallel guiding grooves therein spaced apart at distances substantially equal to said pitch distances of said slide fastener elements to be fed between the sole face and the plate, the grooves being defined by ribs extending downwardly from the sole face and lengthwise of the sole from its heel to merge into the under face of the toe, the ribs being spaced apart at a distance and being of a thickness to coincide with the spaces between immediately adjacent slide fastener elements, the individual ribs being of a thickness less than the maximum width of the individual grooves, and the grooves being dimensioned and contoured to receive the slide fastener elements to be slid between the shoe and the plate, one of the ribs having a needle hole coincident with and extending through said rib, the needle hole being spaced a substantial distance rearwardly away from the line of merger of the ribs into the toe, the grooves and the ribs providing means to cam said elements into the grooves and out of the path of movement of the needle through the needle hole before said elements move abreast of the needle hole.

4. A presser foot for use in a sewing machine having a needle plate for cooperation with the presser foot, and a needle for cooperation with the presser foot and the needle plate to stitch fabric moving between the presser foot and the needle plate where such fabric has a series of spaced apart slide fastener elements secured thereto at substantially equal pitch distances, the presser foot having a sole, a toe, and a heel, the toe being disposed to extend toward the fabric oncoming to the presser foot, the entire under face of the sole having a plurality of substantially parallel guiding grooves therein spaced apart at distances substantially equal to said pitch distances of said slide

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fastener elements to be fed between the sole face and the plate, the grooves being defined by ribs extending downwardly from the sole face and lengthwise of the sole from its heel to merge into the under face of the toe so that the surfaces of the grooves provide smoothly merging surfaces with the bottom face of the toe, the ribs being spaced apart at a distance and being of a thickness to coincide with the spaces between immediately adjacent slide fastener elements, the individual ribs being of a thickness less than the maximum width of the individual grooves, and the grooves being dimensioned and contoured to receive the slide fastener elements to be slid between the shoe and the plate, one of the ribs having a needle hole coincident with and extending through said rib, the needle hole being spaced a substantial distance rearwardly away from the line of merger of the ribs into the

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toe, the grooves and the ribs providing means to cam said elements into the grooves and out of the path of movement of the needle through the needle hole before said elements move abreast of the needle hole.

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