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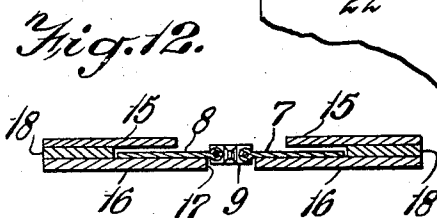
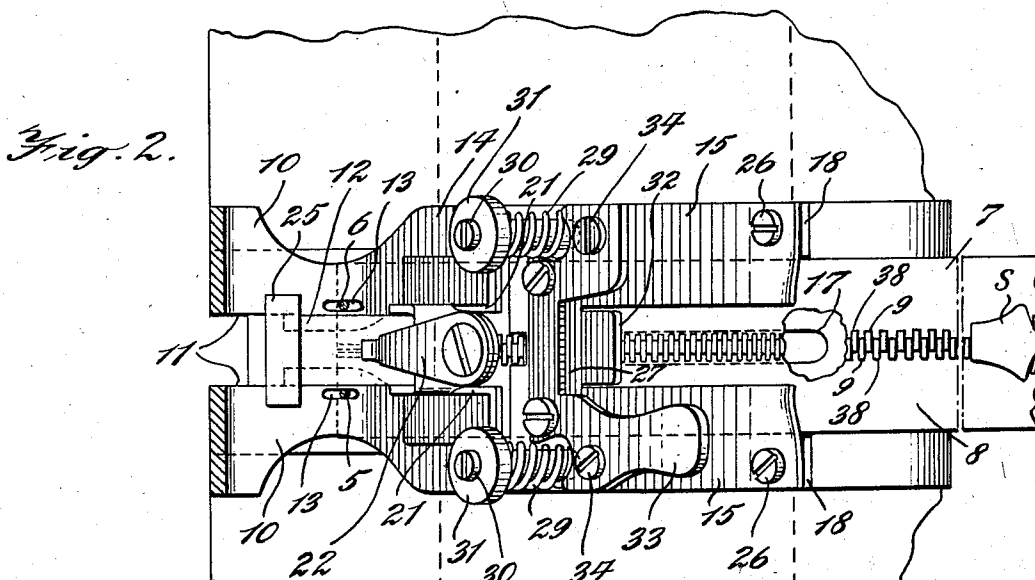
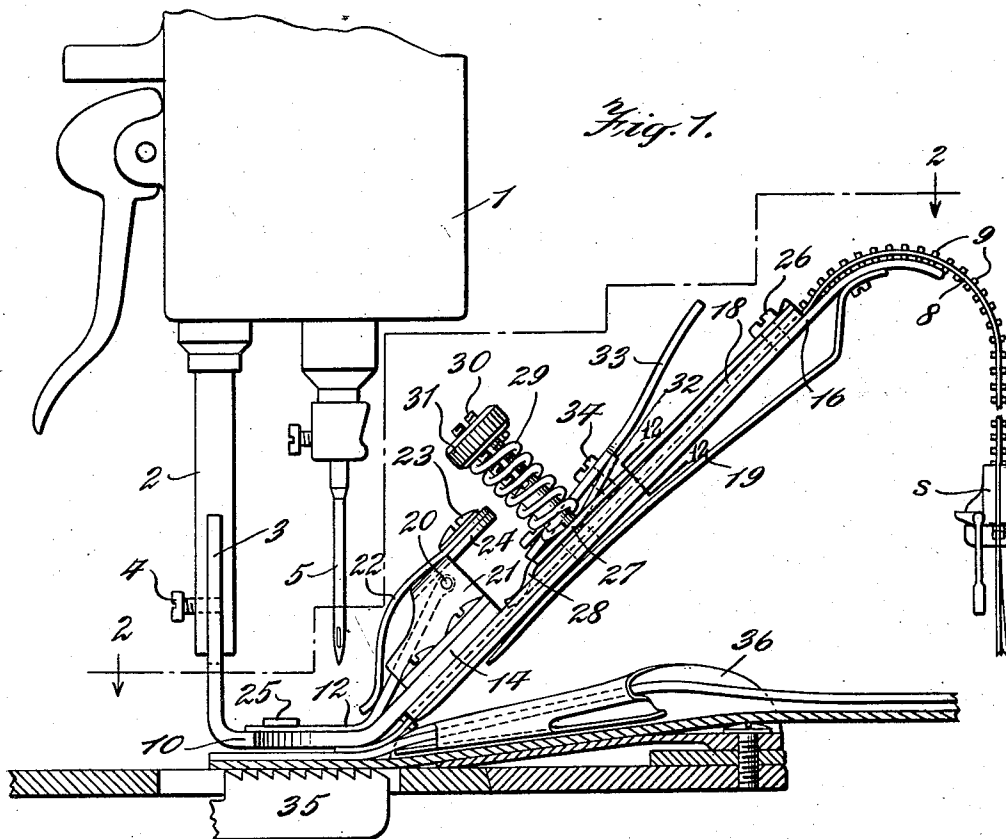
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2,329,991

APPARATUS FOR ATTACHING SEPARABLE FASTENERS

Filed May 23, 1940

3 Sheets-Sheet 1



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3 Sheets-Sheet 2

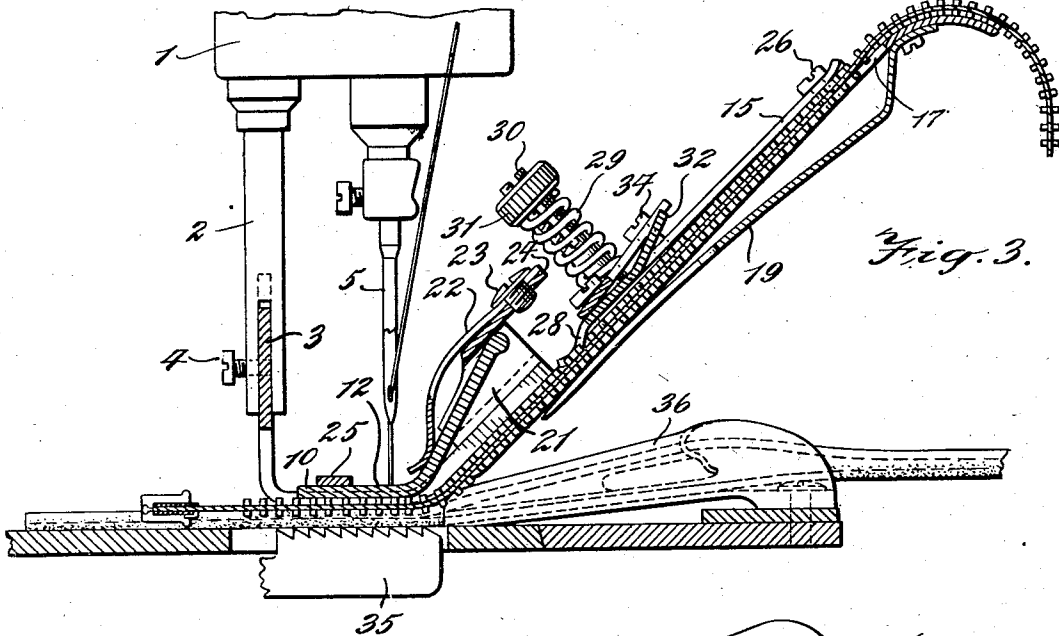


Fig. 3.

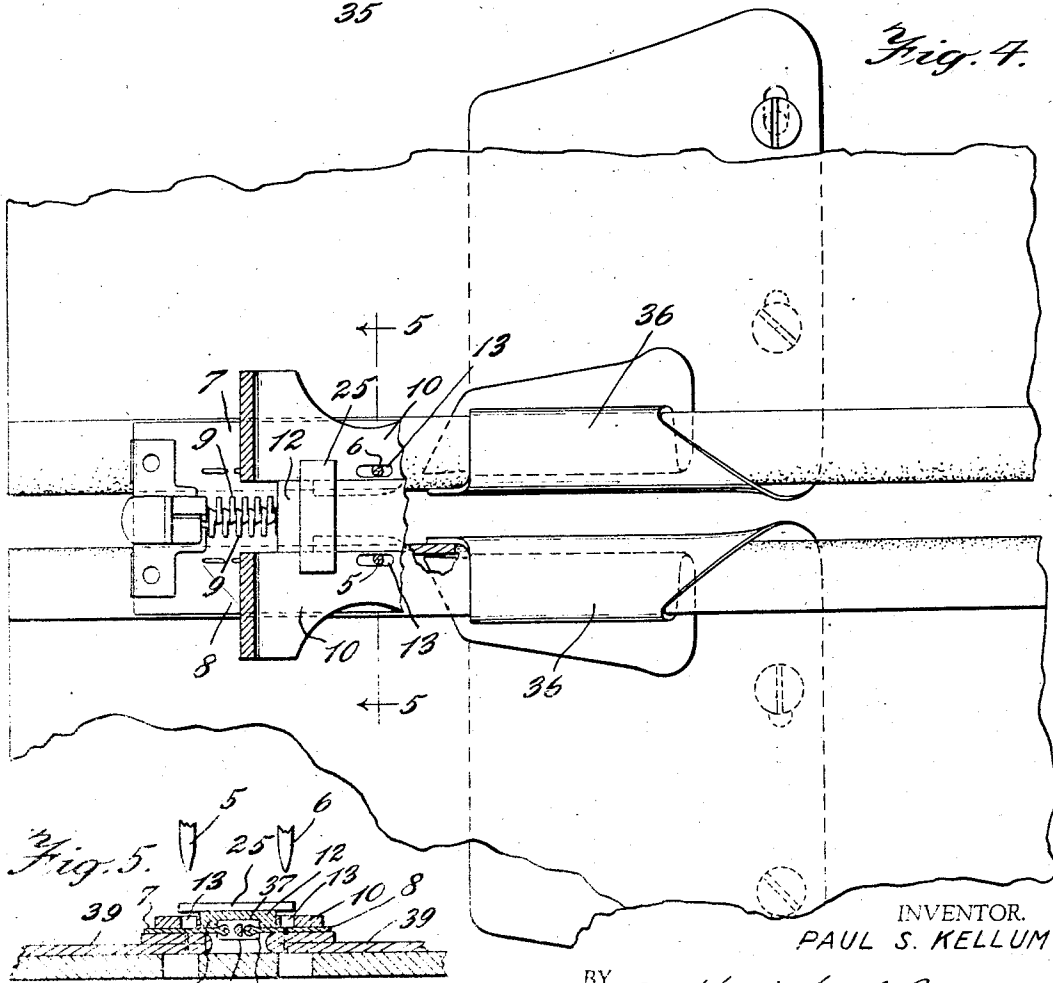


Fig. 4.

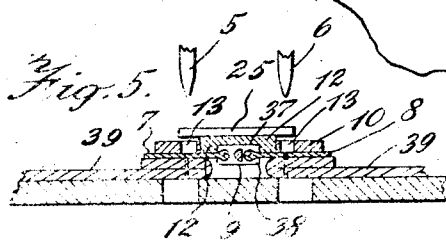


Fig. 5.

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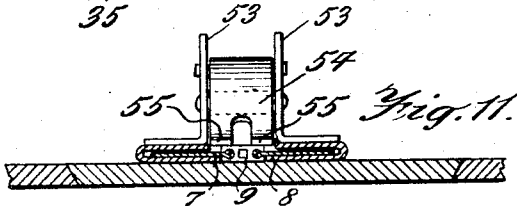
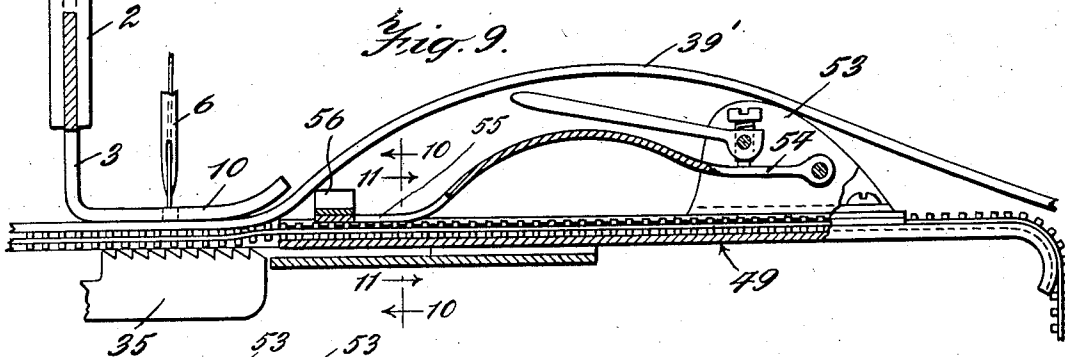
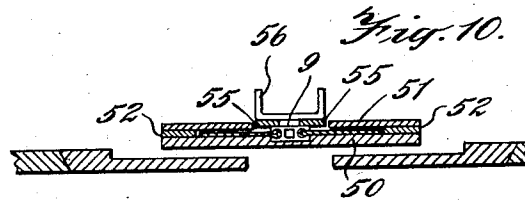
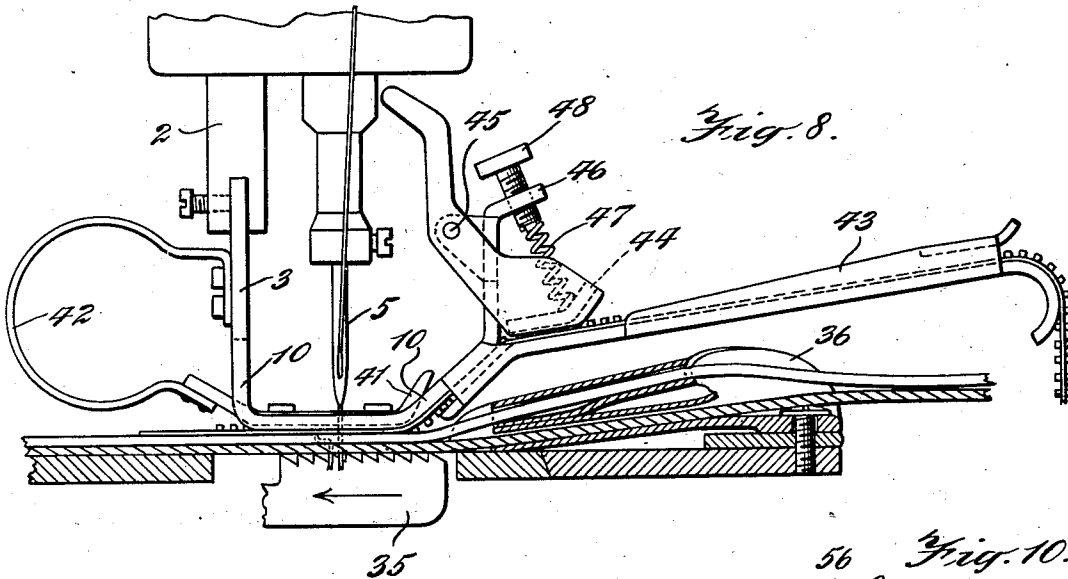
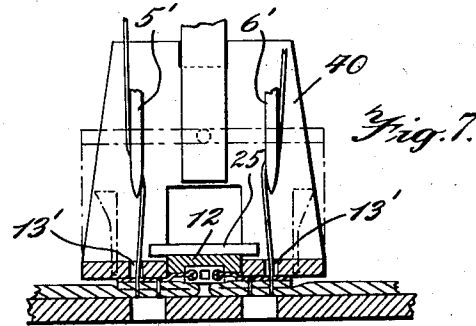
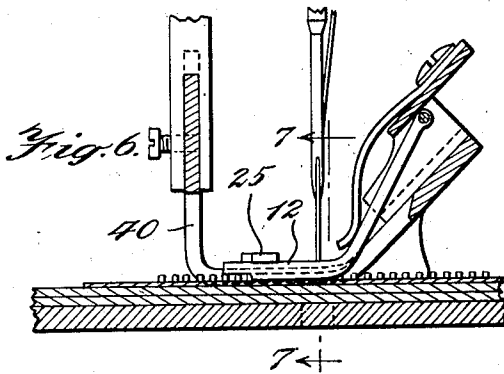
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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

2,329,991

APPARATUS FOR ATTACHING SEPARABLE
FASTENERS

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Application May 23, 1940, Serial No. 336,723

5 Claims. (Cl. 112-136)

This invention relates to a novel and improved apparatus for attaching separable fasteners to articles with which the separable fastener may be used and also relates to an apparatus for practicing that method. The invention will be better understood from the following description of selected embodiments of the apparatus, in which:

Fig. 1 is a vertical view, partly in elevation and partly in section, through a sewing machine having the apparatus applied thereto;

Fig. 2 is a horizontal view taken approximately on the line 2-2 of Fig. 1;

Fig. 3 is a view similar to Fig. 1 but showing certain other parts in section and certain other parts in elevation and also showing the work in a different position with relation to the apparatus;

Fig. 4 is a plan view, partly in section and partly in elevation, of the parts appearing in Fig. 3, certain parts also being broken away;

Fig. 5 is a fragmentary view on the line 5-5 of Fig. 4;

Fig. 6 is a fragmentary view corresponding to Fig. 1 but showing a slightly different embodiment of the invention;

Fig. 7 is a fragmentary view on the line 7-7 of Fig. 6;

Fig. 8 is a view corresponding to Fig. 1 but showing a different embodiment of the invention;

Fig. 9 is a view corresponding to Figs. 1 and 8 but showing still another embodiment of the invention;

Fig. 10 is a section approximately on the line 10-10 of Fig. 9;

Fig. 11 is a view approximately on the line 11-11 of Fig. 9.

Fig. 12 is a section on the line 12-12 of Fig. 1.

The type of separable fastener herein referred to consists of two tapes usually having beaded edges upon which are mounted fastening elements or links, as they are sometimes called, and these links are caused to mesh or unmesh with each other by means of a slider moving along the fastener. The tapes are usually stitched to the material on opposite sides of an opening and it is necessary that the stitching should be done in such a way as not to disturb the equal spacing of the links on the tapes. Any material disturbance of that spacing seriously hinders the successful operation of the fastener because the links must be accurately spaced and cannot deviate materially from that spacing.

When a separable fastener tape is fastened to a piece of fabric, usually the act of stitching the

two together with a conventional sewing machine results in stretching the fabric and then when the stitching operation is over the fabric contracts again to its original condition and causes a disturbance of the spacing of the links and even a puckering of the tape. I have discovered that this trouble may be obviated by feeding the tape and material past the needle of a sewing machine in such a way as to apply a constant tension to the tape while feeding the material to which the tape is secured past the needle in the usual way. Thus the fabric of the material is caused to gather in small folds between successive stitches so that when the tape and material leave the machine the small folds will tend to open up and stretch the tape, whereas the tape itself will tend to shrink and resist the stretch. The result is that the tape itself is smooth and the spacing of the links is accurate, while the fabric itself does not show any lack of smoothness.

In Figs. 1 to 5, inclusive, I have shown one embodiment of an apparatus for practicing the invention and, referring thereto, I have shown the head 1 of a conventional sewing machine which has a depending leg 2, to which an upwardly extending leg 3 of a presser foot is detachably secured, as by a screw 4. Within the head 1 is the usual mechanism for operating a pair of needles 5 and 6, these needles being spaced apart the proper distance for securing the two tapes 7 and 8 of a separable fastener to opposite edges of an opening when the links 9 thereof are in mesh.

The presser foot is preferably divided to form two feet 10 between which is a space 11 within which is disposed a shoe 12. The two feet 10, as shown, extend rearwardly beneath the needles 5 and 6 and are provided with slots 13 in which those needles may operate during stitching operations. Then the feet are preferably extended rearwardly and upwardly as shown, to form supports 14 to which is secured a guide shown in the form of two rearwardly extending plates 15 forming the top of a guide channel for the tapes. The bottom of the channel is formed of a plate 16, which is shown as being slotted at 17 to form two arms extending downwardly under and approximately parallel to the plates 15. The plates 15 and the plate 16 are held in proper spaced relation by means of spacers 18. Secured to the under side of the plate 16 is a leaf spring 19, for a purpose which will presently appear.

The shoe 12 is pivoted at 20 between two ears 21 and is urged downwardly by means of a spring 22 which is held in fixed position by a screw 23

which is secured to a plate 24 integral with the ears 21. Thus the shoe 12 is forced downwardly, and the downward movement is limited by a stop 25 which engages the top surfaces of the feet 10.

The plates 15 are fastened to the spacers 18 and plate 16 at one end only as by screws 26, and the other ends are united by an integral connection 27 having downwardly extending feet 28 which extend between the spacers 18 and thus into the channel in which the spacers form the side walls. The feet are urged downwardly into this channel as by means of two springs 29 surrounding threaded studs 30, the springs acting between the tops of the plates 15 and nuts 31 threaded on the stems.

Extending rearwardly from the connection 27 is an upwardly extending lip 32 which forms a further guiding means for the separable fastener, as will be explained presently. The plates 15 and parts connected therewith may be lifted by depressing a handle 33 which is secured to the connection 27 and is fixed on a stud 34 so that when the handle is depressed the result is to lift the feet 28 against the action of the springs 29.

The sewing machine is equipped with any usual or desirable feed 35 which may be operated intermittently in synchronism with the needles, as well known in the art. The function of the feed is to move the material being sewed forwardly or to the left, as viewed in Figs. 1, 2, 3, and 4. As it is common to fold over the edge of a piece of fabric to which a separable fastener tape is to be sewed, therefore a folding device is designated generally at 36, although, if desired, this may be dispensed with.

In operation, the two tapes of a separable fastener are preferably fastened together adjacent what is usually called their lower ends. Sometimes this connection at the lower ends of the tape is a permanent one and sometimes a temporary one and for the purpose of illustration I have shown it as being of the temporary kind, such as used when the separable fastener is fastened onto a jacket or other completely separable article. Such a completely separable connection is one which usually requires a female element of considerable thickness, and the apparatus which I have described will function either with such a connection or with a permanent connection which may be considerably thinner.

The assembled separable fastener with the links in mesh with each other and with the lower ends secured together either permanently or temporarily, is fed down the guide channel, and the slot 17 is of such a width that the intermeshed links or the female part of the separable connection will readily slide along this slot and then the handle 33 may be depressed to raise the feet 28 and permit the two connected tapes to be pulled down to a position beneath the shoe 12. As best shown in Fig. 5, this shoe is provided with a groove 37 of such a width as to engage the rear ends 38 of the intermeshed links, whereas the shoe on opposite sides of the groove 37 will engage the two tapes and press them downwardly, the feet 10 also engaging the tapes. At the same time, of course, the two pieces of material 39, preferably with their folded edges, are guided into position in the usual way where they will be engaged beneath the presser foot and the feed 35. The bottom ends of the two tapes will be located by the operator at the proper place for stitching to begin and then the machine will be operated in the usual way.

During insertion of the material and separable fastener it will be seen that the separable fastener will be accurately guided into position and that the shoe 12 will be automatically raised to permit passage of the end connection if necessary and the feet 28 will also be raised. Preferably, the shoe 12 is raised slightly by the intermeshed links, as shown in Fig. 5, so as to insure proper pressure and guiding of the separable fastener. Since the edges of the material will be accurately guided beneath the needles by the folding device or by other suitable guiding means, an accurate stitching of the tapes to the material will be insured and both tapes may be secured in place simultaneously.

While the stitching is taking place, the feet 28 will act as a brake on the tapes, although the tapes will be moved forward with the material after the first stitches are formed between the tapes and the material. Because of the braking action on the tape, the tape will be maintained taut and this in turn will tend to hold back the fabric or other material at the last formed stitch. However, the feeding action of the material is a positive one and so the result will be a slight puckering or gathering of the material in folds between stitches, as outlined above.

Near the end of the stitching operation the operator may again depress the handle 33 to permit the sliders to pass through the apparatus, the lip 32 aiding in this action by engaging the slider.

If a double row of stitching is desired, this may be achieved by detaching the presser foot and parts carried thereby and attaching another presser foot, indicated at 40 in Figs. 6 and 7. This presser foot does not have any of the guiding means or braking means as shown in the embodiment described above, since usually such means are not necessary, although they may be employed if desired. This presser foot, however, has a grooved shoe 12, as in Figs. 1 to 5, inclusive, and is generally similar to the presser foot shown in those figures except that the slots 13' are spaced apart more widely, as are also the two needles 5' and 6'. Usually where a second row of stitching is to be put in, it will be desirable to have a separate machine with the wide spacing of the needles and with the special presser foot 40.

In Fig. 8, I have shown another embodiment of the invention in which certain similar parts are given similar numerals and will not be further described in detail. In this case, the construction of the presser feet is substantially the same, although the shoe 41 is mounted upon a spring 42 secured to the leg 3. The rear ends of the presser feet are connected to a guide 43 which may hold the two tapes with intermeshed links, and the brake 44 is pivotally mounted at 45 on an extension 46 of the presser foot and is given its desired pressure by means of a spring 47 which is compressed between the brake and a screw 48 threaded into the extension 46.

Referring now to Figs. 9, 10, and 11, I have shown therein a somewhat similar arrangement which may employ two presser feet 10 as before, but the arrangement is adapted for use in a situation where for some reason it is desirable to sew the separable fastener on the under side of the material. For example, where a chain stitch is used it is desirable to have the chain part of the stitch on the inside of a container or the like with which the separable fastener is used. As-

suming that the material 39' is part of a beach bag or other article to which the separable fastener is to be attached by a chain stitch and which also is of relatively non-stretchable material, the material may be fed on top of the separable fastener instead of beneath it as in previous embodiments. At the same time, however, it is desirable to apply a brake to the separable fastener so as to create a tension in it as before and for that purpose I provide a suitable guide 49 which may be formed of spaced plates 50 and 51 separated by spacers 52 and from which extend ears 53 between which is pivoted an arm 54 which may be a leaf spring or at least is resilient. The ends of this arm may be forked to provide two fingers 55 which will contact with the meshed links 9, as shown. On top of the arm I have shown a guide member 56 which will support material 39', as shown in Fig. 9.

In the operation of this embodiment, the feed 35 will engage the tapes instead of the material, but even with that arrangement I have found that the use of the brake to hold back the tape and exert a tension thereon aids very materially in providing a smooth tape after the stitching is completed.

While I have shown and described the invention as being used with two tapes, some parts of it may also be used with a single tape, as defined in the appended claims.

I claim:

1. A sewing machine attachment for sewing, to the edges of two pieces of fabric, tapes carrying separable fasteners and a slide mounted thereon, comprising guide means including a plate having a longitudinal slot therein, means carried by said plate on one side thereof to guide the tapes under a predetermined tension to the sewing machine feed; and means on the other side of said plate to prevent undue increase in said tension when the slider on the separable fasteners comes in contact with said first-named means; said second means comprising a member yieldingly engaging the other side of said plate adjacent said slot and permitting the slide to pass through said slot in a direction perpendicular to the path of the tape and in engagement with both of said means.

2. A sewing machine attachment for sewing, to the edges of two pieces of fabric, tapes carrying separable fasteners and a slide mounted thereon, comprising guide means including a plate having a longitudinal slot therein; means carried by said plate on one side thereof to guide the tapes under a predetermined tension to the sewing machine feed; and means on the other side of said plate to prevent undue increase in said tension when the slider on the separable fasteners comes in contact with said first-named means; said second means comprising an elongated resilient strip, one end of which is secured to and fulcrumed at one end of the other side of said plate, the other end of the strip yieldingly bearing

against said other side of said plate adjacent said slot and adapted to be yieldingly displaced by passage of the slide on said separable fasteners between and in contact with both of said means.

3. A sewing machine attachment for sewing, to the edges of two pieces of fabric, tapes carrying separable fasteners and a slide mounted thereon, comprising guide means including a plate having a longitudinal slot therein; means carried by said plate on one side thereof to guide the tapes under a predetermined tension to the sewing machine feed; and means on the other side of said plate to prevent undue increase in said tension when the slider on the separable fasteners comes in contact with said first-named means; said second means comprising a member yieldingly engaging the other side of said plate adjacent said slot and permitting the slide to pass through said slot in a direction perpendicular to the path of the tape and in engagement with both of said means and preventing undue increase in the said predetermined tension when the slide comes in contact with said first means while maintaining said tapes in substantially flat condition.

4. A sewing machine attachment for sewing, to the edges of two pieces of fabric, tapes carrying separable fasteners and a slide mounted thereon, comprising guide means including a plate having a longitudinal slot therein; a resilient strip secured at one end thereof to said plate on one side thereof, said strip partly defining a guide channel for said tapes and having at the other end thereof a tension member normally bearing at a predetermined tension against said plate adjacent said slot; a second resilient strip secured at one end thereof to said plate on the other side thereof, the other end of said second strip bearing against said other side of said plate opposite the tension member and being adapted to be yieldingly displaced, in relation to said tension member, by movement of the slide and said fasteners in contact with said tension member.

5. A unitary presser foot and guide attachment for sewing, to the edges of two pieces of fabric, tapes carrying separable fasteners and a slide mounted thereon comprising a presser foot having a normally vertical portion and a horizontal portion; guide means secured to and supported wholly by said presser foot and normally extending upwardly from and inclined in relation to the horizontal portion of said presser foot; said guide means including a plate having a longitudinal slot therein to receive the fasteners and slide; resilient means carried by said plate to apply a predetermined tension to said tapes and to resist the feeding thereof to the sewing machine feed; said presser foot having a slide receiving slot aligned with the slot on said plate; and means to pass the slide through said slot while maintaining the tape in substantially flat condition, said means comprising a pivotally mounted shoe and resilient means urging said shoe into said slot.

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