

PATENT SPECIFICATION

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(54) IMPROVEMENTS RELATING TO SEWING EQUIPMENT

(71) We, KATHARINA PFUHL, INGRID PFUHL, JAKOB PFUHL, all Australian citizens, and KATE MODELS PTY. LIMITED, an Australian Company, all of 50, Matthews Street, Punchbowl 2196, in the State of New South Wales, Commonwealth of Australia, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to sewing equipment and in particular to means adapted to facilitate the insertion of items into partly made garments, such as for example, slide fasteners, pockets, collars and the like. The invention is not limited to garment manufacture however, but finds use in, for example, the leather trade, millinery manufacture etc.

The making up of garments, particularly by mass production methods, encounters certain problems during the insertion of items such as slide fasteners, pockets, collars etc. which are time consuming and therefore expensive, and also affect the uniformity and quality of the finished product. Thus, for example, the customary manner of inserting a slide fastener into a partly finished garment requires the fabric edging of the fastener to be hand-tacked or basted to the garment in the required position, after which the fastener is permanently stitched in position by machining. Not only is the hand-basting operation time-consuming, but so is the machining step which requires constant attention and readjustment on the part of the operator if an even stitching is to be obtained. Thus, not only is there a considerable time consumption but operating staff need to be highly skilled and experienced if good quality work is to be obtained. A further problem encountered, for example, during the production and insertion of pockets, collars etc., is that it is very difficult to obtain exact duplication of such items with consequent lack of

symmetry say between pockets on opposite sides of a garment or lack of uniformity between two separate garments which are intended to be identical. 50

It has been proposed to use metal templates for the production of pockets, collars etc. which templates guide machine sewing operations precisely, enabling exact duplication of such items. However, such templates have to be specifically manufactured and are expensive. In the fashion trade particularly, such a template might be useful for only a short period before the fashion changed, requiring the production of a different template, and so on, thereby greatly escalating the costs of manufacture. 55 60 65

According to the present invention there is provided means for sewing at least two items together, comprising a sewing machine and frame means adapted to hold together in fixed relative position items to be stitched together, said frame means being provided with guide means in the form of a broad raised track having a width several times its depth and said sewing machine having a presser foot provided with downwardly projecting lugs adapted to engage the sides of said track so that the presser foot is guided in relation to the track. 70 75 80

The means of the present invention may be adapted in a variety of ways for use in different sewing operations, such as the insertion of slide fasteners, collar or pocket manufacture, sleeve insertion and the like. Means according to the invention may be adapted for commercial or domestic use and may be constructed in a number of ways. 85 90

Various embodiments of the invention are illustrated by way of non-limiting example in the attached Figures 1 to 16 in which:

Figure 1a illustrates a sewing machine presser foot adapted for use in the present invention; 95

Figure 1b illustrates a modification of the foot shown in Figure 1a.

Figure 2 illustrates a sewing machine needle or throat plate adapted for use with the present invention.

Figure 3 illustrates a sewing machine feed dog adapted for use with the present invention;

Figure 4 illustrates the lower portion of frame means according to one embodiment of the present invention;

Figure 4a illustrates a cross-section through a part of such frame means portion;

Figure 5 illustrates the upper portion of frame means adapted to cooperate the portion illustrated in Figure 4;

Figure 5a illustrates a cross-section through a part of such upper portion;

Figure 6 illustrates a further sewing machine presser foot adapted for use with the present invention;

Figure 7 illustrates the lower portion of frame means according to a further embodiment of the invention;

Figure 8 illustrates the upper portion of frame means adapted to cooperate with the portion illustrated in Figure 7;

Figure 9 illustrates the lower portion of frame means according to a still further embodiment of the invention;

Figure 10 illustrates a section along the line X—X of Figure 9;

Figure 11 illustrates frame means according to a still further embodiment of the invention;

Figure 12 illustrates a stop device adapted for use with the frame of Figure 11;

Figure 13 illustrates a detail of the frame shown in Figure 11;

Figure 14 illustrates part of a filling device for use with the frame of Figure 11;

Figure 15 illustrates frame means according to yet another embodiment of the invention;

Figure 15a illustrates a detail of the frame of Figure 15; and

Figure 16 illustrates in exploded fashion a foot plate and feed dog arrangement particularly adapted for use with the device of the present invention.

With further reference to the drawings, Figures 4 and 5 represent a particular form of frame means adapted for use in the insertion of slide fasteners into partly made garments. Such frame comprises an upper and a lower part, respectively illustrated in Figures 5 and 4.

The lower part comprises a base 1, the under surface of which is preferably of soft material, for example, rubber, for engagement with the feed dog mechanism of a sewing machine (Figure 3), and the upper surface of which is of rougher texture to prevent the slipping of fabric placed thereon.

The base has a central aperture and is provided with a series of leaf spring clips 2

along both sides, and a pair of pivotable thin metal leaves 3 fixed to the base at pivot points 4 in such a manner that they may be swung into or away from engagement under the spring clips 2. Hook 5 is located towards one end of the base and an adjustable guide member 6 is provided at the other end. A pivot pin 7 is located at the same end of the base as the guide members 6 and a two-part holding member 8 is hinged on the pivot pin 7. The under-surface of member 8 is of roughened configuration as shown in Figure 4a to prevent slipping of fabric held thereby. In the closed position the holder member 8 is hinged downwardly onto the base 1 and is secured thereto by means of member 9 which when moved to the right is caused, as its depressed central portion, to engage under the hook 5 while its outer extremities fit over the ends of the two parts of member 8 thereby holding member 8 securely onto base 1. Finally the base is provided with a leaf-spring mechanism 10 adapted to receive the end of the upper frame part shown in Figure 5 and to allow for the reception of materials of different thicknesses.

The upper frame part is provided with a central aperture corresponding to the aperture of the lower part and is provided on its upper surface with a raised track 11 having a width several times its depth and surrounding the aperture for the purpose of guiding the presser foot of a sewing machine. Track 11 is formed smooth while the under surface of the upper part is preferably roughened as shown in Figure 5a to prevent slipping of material in contact therewith. The upper part is formed with a tongue 12 adapted to fit into spring mechanism 10, and is also provided with channels 13 in its lower surface adapted to fit tightly over the holder member 8 of the lower frame part. Thus, the upper part may be fitted to the lower part by inserting tongue 12 into spring mechanism 10 and pressing down so that channels 13 fit closely over holder member 8.

In use, a slide fastener to be inserted into a partly finished garment is placed into the lower part of the frame by engaging one end of the fastener over hook 5 and engaging the other end by means of the adjustable guide member 6 and slipping the edges of the fabric of the slide fastener under spring clips 2. Leaves 3 are then swung also under clips 2 to hold the fastener in position. The sides of the slit or placket of a garment into which it is desired to stitch the slide fastener are then placed over the fastener in the desired position to be stitched. In the case, for example, of a slide fastener to be inserted with a "one-side overlap", the right-hand side of the material is pressed, without stretching, over the right-hand edge

of the fastener close up to the fastener teeth; right-hand part of holder member 8 is then pivoted downwardly to hold such material in place. The left side of the material is then pressed, without stretching, over the slide fastener and over the right-hand side of the material and the left-hand part of holder member 8 is then pressed down over the material and the member is locked into position by engaging catch mechanism 9 under the hook 5.

The upper frame part is then pressed on to the lower part as described above and in this position the slide and material will be held firmly into the desired position for stitching. The assembly is then placed on a machine, and the fastener stitched in using a presser foot of the type illustrated in Figure 1, guide lugs A and B fitting over track 11 of the upper frame part. Lug B may be rotatable, although lug A is fixed because of the cotton-introducing slot shown in the drawing. Lug B may also be spring-loaded if desired. The left-hand slide of the material is lifted up and placed over the material-lifting portion C on the presser foot (Figure 1a) and the stitching operation is commenced down the right-hand side of the fastener; as the presser foot reaches the end of the guide, and thus the bottom of the fastener, the material slips off the raised portion C. The frame is half-turned so that stitching proceeds straight across the end of the guide, and the bottom of the fastener, when it is again half-turned so that the stitching continues up the left-hand side of the fastener. In this way the slide fastener may be stitched accurately by unskilled machine operators, the presser foot being guided in relation to the frame portion down one side, across the bottom and up the other side in one operation without requiring any adjustment of the fastener or material on the part of the machine operator. A further advantage is that in such arrangement the feed dog mechanism of the machine does not contact the material itself, but rather engages the underside of the frame, thereby avoiding any stretching or puckering of the material during the machining operation.

The presser foot of Figure 1b is additionally provided with a rotatable guide member D which assists turning of the foot around the corners of the track 11.

The foot (Figures 1a and 1b) can be adjusted to the width of the track 11 by movement of lug B in slot F after slackening nut E.

The presser foot illustrated in Figure 6 is particularly suitable for the sewing of slide fasteners into garments with side flaps overlapping in the centre of the fastener. In this case no raised portion C is required to lift the overlapping material portion as in the

example just described with reference to Figures 1a and 1b.

A further embodiment of the invention, also adapted for the insertion of slide fasteners, is illustrated in Figures 7 and 8. This embodiment is of a somewhat simplified design adapted for use on domestic sewing machines rather than commercial mass-production machines and instead of the spring clips 2 previously described, this embodiment is provided with an adhesive cloth 14 for holding the slide fastener and the material in position. A modified slide fastener guide 15 is also provided.

In this embodiment, a slide fastener is again engaged over hook 5 and section 17 and along guide member 15 with the fabric of the fastener pressed onto the adhesive surface 14 which holds it firmly in position. The sides of the garment are then placed over the fastener, and are also held by the adhesive surface (which is wider than the fastener fabric) and the upper portion (Figure 8) is fitted onto the base by engaging the tongue 12 in spring mechanism 10 and pressing down to engage spring clip 16 (Figure 8b) over the hook 5 on the base. In this case the underside of the upper part is not channelled, but is roughened (Figure 8a) to prevent the fabric slipping. The assembly is then inserted, as before, into a machine for stitching along the track 11.

A still further embodiment, suitable for duplicating standard pieces such as collars, is illustrated in Figures 9 and 10. In this embodiment a base 18, preferably of rigid material such as metal or rigid plastics, is provided with a series of pin members 19 and pivotable clips 20. An upper part 21 is adapted to fit closely over the base and forms the guide surface for subsequent machining. The upper part is provided with pads 22 of soft rubber or plastics into which pins 19 engage, and also holes 23 which fit closely around the lugs 24 on clips 20 as shown in greater detail in Figure 10. In use, the edges of two pieces of fabric to be stitched together, e.g. to form a collar, are engaged under clips 20 and over pins 19, and clips 20 are then swung to the closed position to hold the fabric edges engaged thereby. The upper part 21 is then fitted on to the base to hold the fabric tightly in position, after which the assembly may be placed in a machine for stitching as before, the upper part 21 forming the track engaged by the machine pressure foot as already described. In addition to the material pieces to be stitched together, filler material can be incorporated between such pieces if desired to provide separation of the pieces or bulkiness if desired.

A yet further embodiment of the invention is illustrated in Figure 11, which

embodiment is adapted for contoured or profiled stitching as, for example, the manufacture of pockets. This embodiment is particularly designed for shape modification by the user as desired.

As in the embodiments previously described the frame comprises an upper and a lower part 25 and 26 respectively. The lower part 26 is provided with pivotable clips 27 and also friction pads 28a which may be made, for example, from soft foam plastics or the like and which serve as guides. Clips 27 are provided with upwardly extending lugs 28 which fit closely into holes 29 provided in the upper part 25.

Again, two pieces of fabric to be stitched together are held between the two parts, the facing surfaces of which are formed rough. The edges of the pieces are fitted under clips 27 when in the open position, which are then swung to the closed position and the upper part is fitted onto the base and the assembly is ready for machining as before.

A portion of a suitable filler is illustrated in Figure 14, comprising a bottom piece of cardboard etc. and an upper soft, foam plastics etc. piece 31 which is held onto the bottom 30 by engagement with pins 32.

In the manufacture of pockets etc. it will be necessary to turn the stitched pieces inside-out to conceal the seam and it is then necessary not to stitch completely around the article, but to leave a gap for this purpose. This may be done conveniently by providing the upper part 25 with a stop device 33, which is shown more clearly in Figure 12 and which comprises a resilient buffer 34 secured to part 25 by screws 35. Machining is commenced at one side of the buffer and is continued around the frame until the presser foot reaches the other side of the buffer, thereby leaving a gap in stitching the width of the stop device.

It is a feature of the frame arrangement illustrated in Figures 11 to 13 that it may be made up inexpensively and bent to shape as required by the user in accordance with changing fashions etc. Such frames may conveniently be made from flexible material such as plastics, rubber, or metal in such manner as to permit bending either manually or by means of a mechanical bending device.

One method of frame construction is illustrated in detail in Figures 12 and 13. Such frame is formed from a number of tongued and grooved strips of plastics materials which are fitted together longitudinally, joined together at the ends by any suitable means, in this instance the stop 33, and subsequently formed into the desired shape.

In the embodiment illustrated, the frame comprises five strips, the central strip 36 being formed on each side with projecting

tongues 37. The adjacent strips 38 and 39 are formed on one side with grooves 40 and 41, and on the other side with tongues 42 and 43, while the outer strips 44 and 45 are provided on the inner side with grooves 46 and 47 while the outer edges are formed smooth. In each case the strips are reinforced with flexible wires 48. The central strip is formed wider than the outer strips, which assists flexing and shaping of the assembled frame, which may be readily accomplished, manually or mechanically, to provide a frame suitable for the manufacture of pockets, collars or other items of any desired shape. Also the outermost strips are preferably formed narrower than the next adjacent strips. As the frame is bent, the strips move relatively one with respect to the other to permit stretching of the outer strips and compression of the inner strips.

The embodiment illustrated in Figures 15 and 15a is particularly adapted for the insertion of sleeves into garments. The insertion of sleeves involves a problem in that the edge of sleeve material to be inserted is longer than the edge of the garment to which it is to be stitched. Therefore, the sleeve material has to be eased into the sleeve aperture in the garment, which requires considerable skill on the part of the machinist if this is to be achieved neatly and evenly.

The frame means illustrated in Figure 15 is again formed in two flexible parts, namely base 49 and upper part 50. Base 49 is provided with spring clips 51 along one edge and at each extremity has pivotable members 52 and 53 respectively pivoted thereto at points 54 and 55. Members 52 and 53 are provided with a series of spring loops 56 located in between tongues 57 as shown in greater detail in Figure 15a, and also, as its upper surface with a series of upstanding lugs 58. The ends of members 52 and 53 are provided with spaced flanges 59.

Upper part 50 corresponds in shape with base 49 and is provided with holes 60 corresponding to lugs 58 on the base members 52 and 53, and also with neck portions 61 and 62 adapted to fit between flanges 59 on members 52 and 53.

In use, the sleeve aperture edge of a garment is inserted under spring clips 51 and members 52 and 53 are then pivoted to close under clips 51 also, and thereby hold the garment edge firmly in position. The frame is sized according to the sleeve aperture desired, and in practice the frame is forced to curve upwardly as the garment edge is inserted because of its curvature.

The larger sleeve edge is then inserted under spring loops 56 and over tongues 57, thereby taking up the greater length relative to the garment edge.

Upper part 50 is then fitted over the assembled base with necked portions 61 and 62 engaging between flanges 59, and holes 60 engaging lugs 58.

5 The assembly, which is now curved upwardly, is inserted in a machine as in previous embodiments, and is sewn by engagement of guide lugs A and B (Figure 1) over upper part 50, stitching taking place along the outer edge of the curved guide.

10 Figure 16 represents a particular form of sewing machine foot plate and feed dog arrangement, plate 63 being provided with aperture 64 adapted to receive feed dogs 65, 66 and rotatable, roughened disc 67. Disc 67 is particularly adapted to assist sewing around corners, especially corners of frames according to the present invention. A corresponding rotatable disc may also be provided on the presser foot if desired.

20 The invention includes a method of sewing using the devices herein described.

The present invention provides a wide variety of simple guide means permitting sewing operations of the type described to be conducted without the need for skilled operators, in a very much shorter time than that required by skilled operators using current conventional techniques.

30 Moreover, devices according to the invention permit, if desired, stitching around a complete circuit, repetitively if necessary, which is not possible with known arrangements, e.g. templates.

35 Finally, devices according to the invention can be made of lighter and cheaper materials than say conventional templates and can handle larger items to be sewn.

40 WHAT WE CLAIM IS:—

1. Means for sewing at least two items together, comprising a sewing machine and frame means adapted to hold together in fixed relative position items to be stitched together, said frame means being provided with guide means in the form of a broad raised track having a width several times its depth and said sewing machine having a presser foot provided with downwardly projecting lugs adapted to engage the sides of said track so that the presser foot is guided in relation to the track.

2. Means according to claim 1, wherein the distance between said lugs may be adjusted to the width of the track.

3. Means according to claim 1 or 2 adapted particularly for the insertion of slide fasteners into garments, comprising an elongated base member provided with a central aperture and with means for retaining a slide fastener thereon, means for holding portions of a garment in close proximity with the fastener, and said track for guiding a sewing mechanism therealong.

4. Means according to claim 3 wherein the means for retaining a slide fastener on the base comprise a series of leaf spring arranged along the sides of the base.

5. Means according to claim 4 wherein the base is also provided with pivotable leaf members to supplement the leaf springs.

6. Means according to any one of claims 3 to 5 wherein the means for holding the garment comprise a two-part member hinged at one end to one end of the base and releasably securable to the base at the other end.

7. Means according to any one of claims 3 to 6 wherein the guide means comprises a further member adapted to be fitted onto the base member.

8. Means according to claim 7 wherein the guide member provides a smooth raised guideway of substantially constant width across which guide means on a sewing machine may fit closely in such manner as to be constrained to travel along the guide member.

9. Means according to claim 3 wherein the means for retaining the fastener on the base comprise an adhesive surface provided on the base.

10. Means according to claim 1, adapted for the manufacture of closed or almost closed clothing items such as pockets or collars, comprising an enclosed base member surrounding a central aperture and provided with means, for example leaf spring or pivotable clips, for retaining portions of material to be stitched together in fixed relative position, said track being adapted to be fitted closely over the base member and to guide the sewing mechanism of a sewing machine whereby the portions of material may be stitched together.

11. Means according to claim 10 wherein the base and/or guide track are formed from a series of flexible members secured together side-by-side in such manner as to permit relative movement and their bending into a desired shape.

12. Means according to claim 11 wherein the members are secured by alternate tongues and grooves formed in respective adjacent edges of the members.

13. Means according to claim 11 or claim 12 wherein the base and/or guide track are each formed from five flexible strips, the inner strip being wider than the outer two.

14. Means according to any one of claims 11 to 13 wherein the flexible members are made of synthetic plastics material and are reinforced by flexible wires.

15. Means according to claim 1, adapted for the insertion of sleeves into garments, comprising a flexible curved base member provided with means, for example leaf springs, for retaining a portion of material

Upper part 50 is then fitted over the assembled base with necked portions 61 and 62 engaging between flanges 59, and holes 60 engaging lugs 58.

5 The assembly, which is now curved upwardly, is inserted in a machine as in previous embodiments, and is sewn by engagement of guide lugs A and B (Figure 1) over upper part 50, stitching taking place along the outer edge of the curved guide.

10 Figure 16 represents a particular form of sewing machine foot plate and feed dog arrangement, plate 63 being provided with aperture 64 adapted to receive feed dogs 65, 66 and rotatable, roughened disc 67. Disc 67 is particularly adapted to assist sewing around corners, especially corners of frames according to the present invention. A corresponding rotatable disc may also be provided on the presser foot if desired.

The invention includes a method of sewing using the devices herein described.

20 The present invention provides a wide variety of simple guide means permitting sewing operations of the type described to be conducted without the need for skilled operators, in a very much shorter time than that required by skilled operators using current conventional techniques.

30 Moreover, devices according to the invention permit, if desired, stitching around a complete circuit, repetitively if necessary, which is not possible with known arrangements, e.g. templates.

35 Finally, devices according to the invention can be made of lighter and cheaper materials than say conventional templates and can handle larger items to be sewn.

40 WHAT WE CLAIM IS:—

1. Means for sewing at least two items together, comprising a sewing machine and frame means adapted to hold together in fixed relative position items to be stitched together, said frame means being provided with guide means in the form of a broad raised track having a width several times its depth and said sewing machine having a presser foot provided with downwardly projecting lugs adapted to engage the sides of said track so that the presser foot is guided in relation to the track.

2. Means according to claim 1, wherein the distance between said lugs may be adjusted to the width of the track.

55 3. Means according to claim 1 or 2 adapted particularly for the insertion of slide fasteners into garments, comprising an elongated base member provided with a central aperture and with means for retaining a slide fastener thereon, means for holding portions of a garment in close proximity with the fastener, and said track for guiding a sewing mechanism therealong.

4. Means according to claim 3 wherein the means for retaining a slide fastener on the base comprise a series of leaf spring arranged along the sides of the base.

5. Means according to claim 4 wherein the base is also provided with pivotable leaf members to supplement the leaf springs.

6. Means according to any one of claims 3 to 5 wherein the means for holding the garment comprise a two-part member hinged at one end to one end of the base and releasably securable to the base at the other end.

7. Means according to any one of claims 3 to 6 wherein the guide means comprises a further member adapted to be fitted onto the base member.

8. Means according to claim 7 wherein the guide member provides a smooth raised guideway of substantially constant width across which guide means on a sewing machine may fit closely in such manner as to be constrained to travel along the guide member.

9. Means according to claim 3 wherein the means for retaining the fastener on the base comprise an adhesive surface provided on the base.

10. Means according to claim 1, adapted for the manufacture of closed or almost closed clothing items such as pockets or collars, comprising an enclosed base member surrounding a central aperture and provided with means, for example leaf spring or pivotable clips, for retaining portions of material to be stitched together in fixed relative position, said track being adapted to be fitted closely over the base member and to guide the sewing mechanism of a sewing machine whereby the portions of material may be stitched together.

11. Means according to claim 10 wherein the base and/or guide track are formed from a series of flexible members secured together side-by-side in such manner as to permit relative movement and their bending into a desired shape.

12. Means according to claim 11 wherein the members are secured by alternate tongues and grooves formed in respective adjacent edges of the members.

13. Means according to claim 11 or claim 12 wherein the base and/or guide track are each formed from five flexible strips, the inner strip being wider than the outer two.

14. Means according to any one of claims 11 to 13 wherein the flexible members are made of synthetic plastics material and are reinforced by flexible wires.

15. Means according to claim 1, adapted for the insertion of sleeves into garments, comprising a flexible curved base member provided with means, for example leaf springs, for retaining a portion of material



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5 in position, and flexible and pivotable means pivotally attached to the base for retaining a portion of material of greater length than the first portion in fixed and closely aligned position relative to the first position, said guide track being flexible and being adapted to be fitted over the base members and to guide the sewing mechanism of a sewing machine whereby
10 the portions of material may be stitched together.

15 16. Means according to claim 15 wherein two pivotable members are pivotally attached to the base member near the respective ends thereof, such members being provided with a series of tongue members between which are located spring

members, for example loop springs, beneath which the longer portion of material may be retained.

17. A method of sewing using a device according to any one of the preceding claims.

18. Means for use in sewing at least two items together, substantially as hereinbefore described with reference to the accompanying drawings.

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