

Sept. 20, 1971

R. J. CARTER ET AL
KNITTED GARMENT BLANKS

3,605,452

Filed May 6, 1969

7 Sheets-Sheet 1

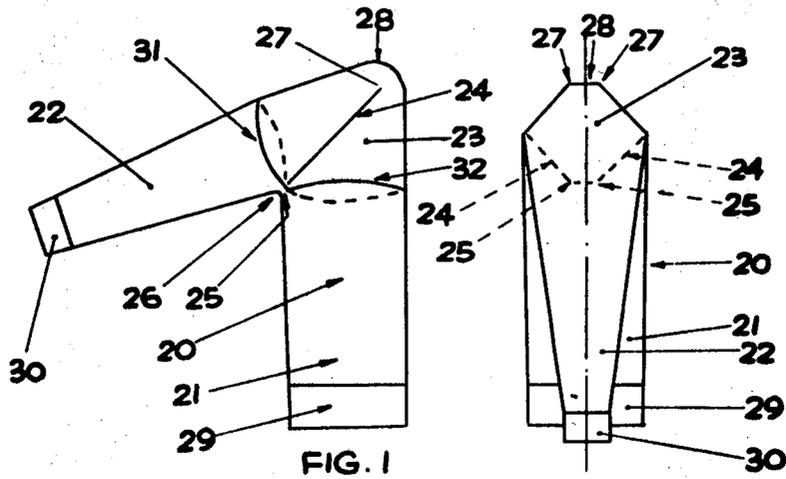


FIG. 1

FIG. 2

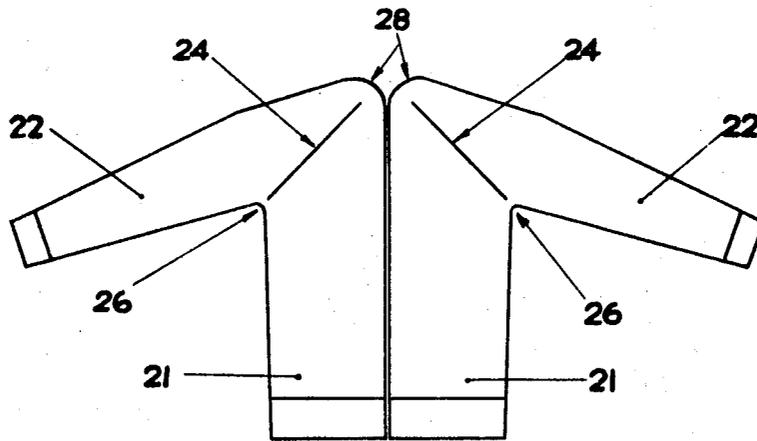


FIG. 3.

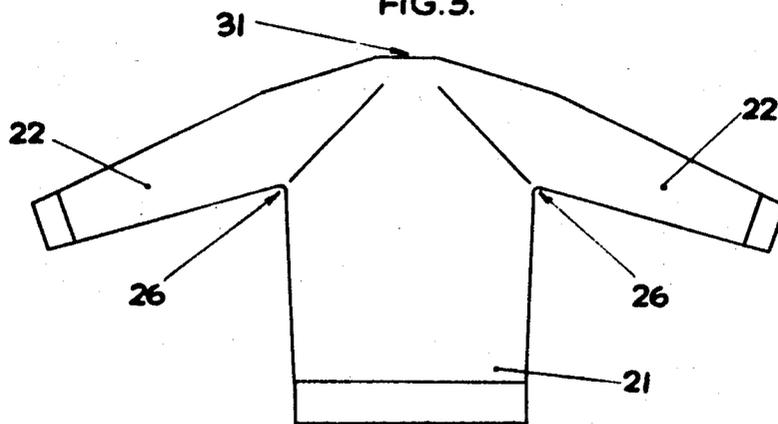


FIG. 4.

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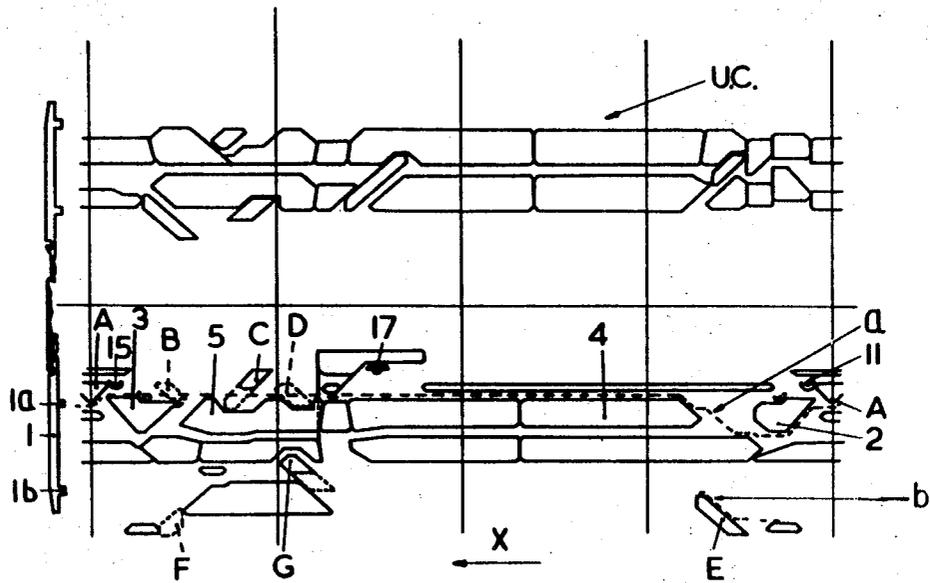


FIG.5.

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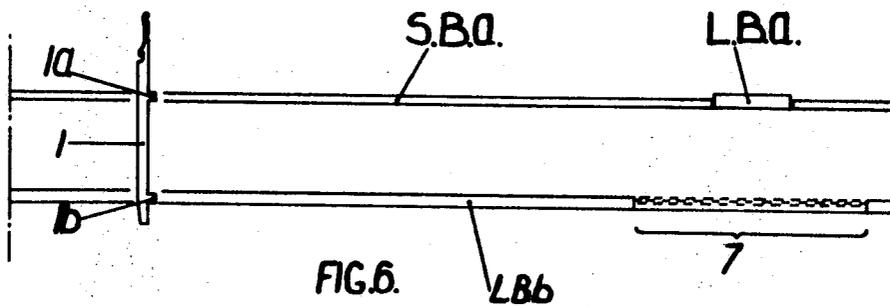
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7 Sheets-Sheet 3



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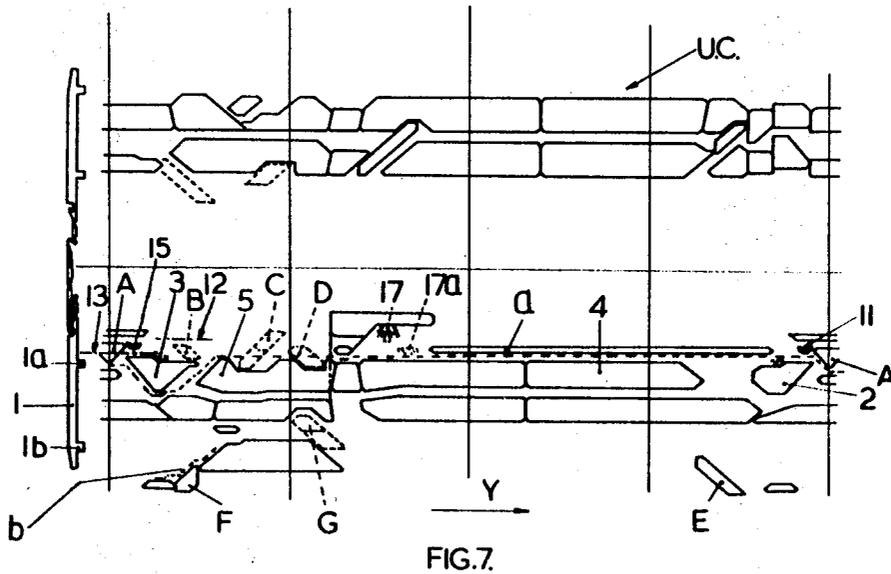
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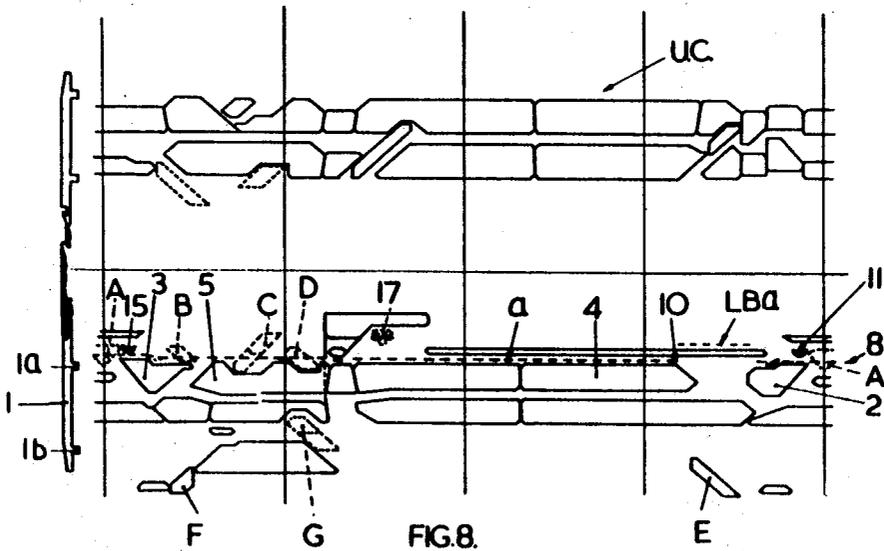


FIG. 8.

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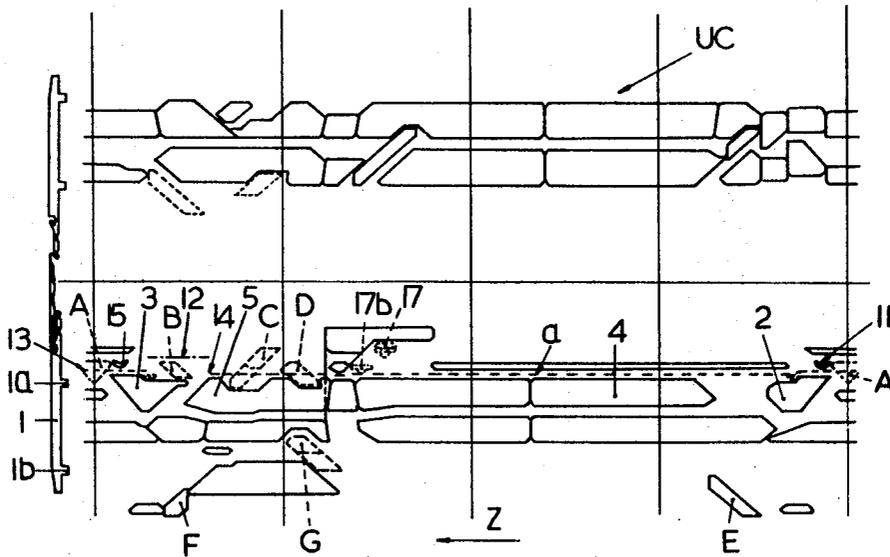


FIG. 9.

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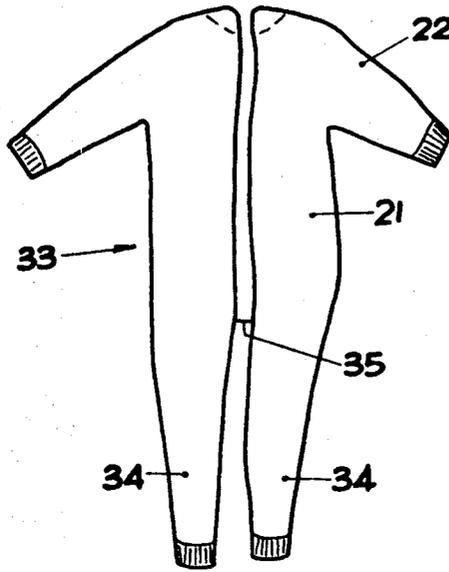


FIG. 10

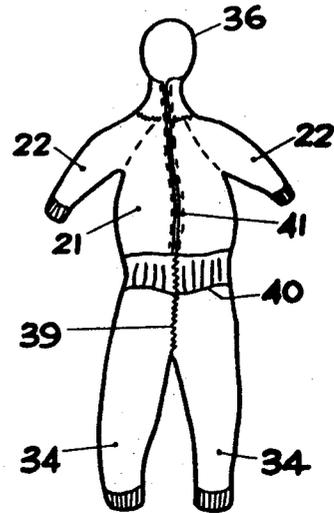


FIG. 13

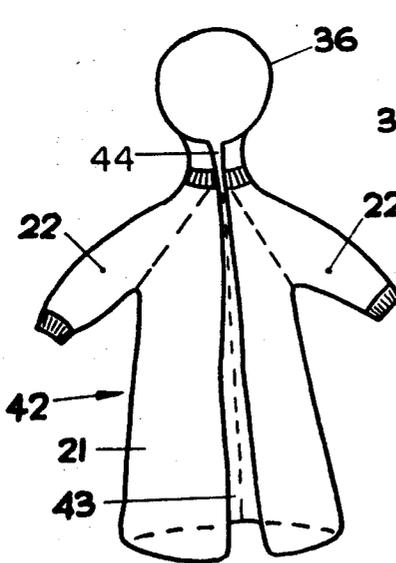


FIG. 14

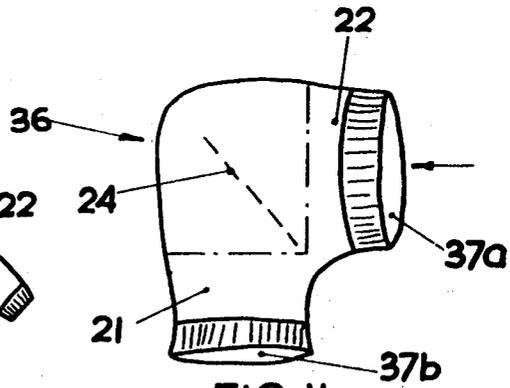


FIG. 11

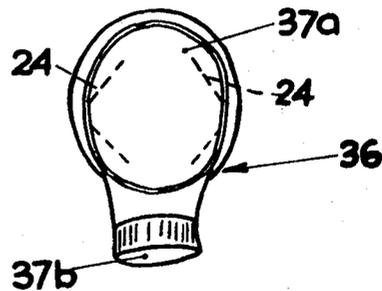


FIG. 12

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3,605,452

KNITTED GARMENT BLANKS

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Claims priority, application Great Britain, May 11, 1968,
22,490/68

Int. Cl. D04b 1/24, 9/20

U.S. Cl. 66-176

5 Claims

ABSTRACT OF THE DISCLOSURE

A knitted garment blank, or seamless tubular form, consists of two integral tubular portions disposed at an angle to each other and connected by an integral fashioned pouch having opposed sutures, formed by narrowing and widening, extending from closely adjacent points in the inner corner of the angle towards the peak of the pouch.

Two such blanks are made into a garment having a body and sleeves by either (a) cutting open each of the two blanks wale-wise from the peak of the pouch to the edge of one tubular portion to provide right and left "halves" of fabric each with a sleeve constituted by the other tubular portion, and seaming together the cut edges of the two halves at either, or each of, the back and front, or by (b) cutting open each of the two blanks wale-wise between the inner corner of the angle and the edge of each tubular portion and between said edge of one tubular portion and the peak of the pouch thereby to form front and rear "halves" of single layer fabric, and then seaming corresponding cut edges of the two "halves" together. Alternatively, a single blank may be made into a hood.

The blank is knitted on a circular knitting machine capable of knitting by rotation and by reciprocation. One portion is knitted on all the needles, by rotation; a very small group of needles is then raised en masse to loop-holding inactivity. Narrowing and widening then take place during reciprocatory knitting. During narrowing needles are picked up to join the loop-holding group until only a few needles (diametrically opposite the small group) remain active, and during widening needles are piked down from loop-holding inactivity to join these few needles in knitting activity until only the small group remains inactive. This small group is then reintroduced en masse into activity, and the other tubular portion is knitted, on all the needles, by rotation. The number of needles in activity at the commencement of narrowing and towards the end of widening is much greater than obtains in knitting a conventional heel pouch and therefore precautions are taken to prevent needles knitting twice in each swing.

CROSS REFERENCE TO RELATED APPLICATIONS

Reference is made to British patent application No. 22490/68 of May 11, 1968, The Bentley Engineering Company Limited, from which priority is claimed.

This invention relates to knitted garments such for example as cardigans, sweaters, pullovers suits, and dresses and similar garments, and is particularly concerned with the provision of a knitted blank therefor and a method and knitting machine for the manufacture of the same.

A garment construction has been disclosed in British Pat. No. 1,094,103 which take advantage of a fashioning method normally associated with the manufacture of heel and toe pouches in knitted footwear. According to this patent, garments can be produced having sleeve fabric

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formed integrally with the fabric of the body portion so that in the finished article the fashioned fabric permits the sleeves to be disposed in correct relationship to the body portion. A characteristic feature of such garments is that the fashionings produce sutures extending diagonally from the armpits, up the shoulders to the neckline.

The present invention concerns a blank which is knitted in such a manner that it is highly suitable for making into sleeved garments and also into other garments and in fact lends itself, in the manufacture of certain garments of the cardigan type, more suitably than the previous arrangement.

This invention provides a knitted garment blank of seamless tubular form comprising two integral tubular portions disposed at an angle to each other and connected by an integral fashioned pouch having opposed sutures extending from closely adjacent points in the inner corner of the angle towards the peak of the pouch. The expression "suture" is used herein in the sense in which it is commonly used in relation to heel and toe pouches of stockings and the like to mean a knitted between two integrally-knitted areas of fabric which join extends diagonally of the wales and courses of the fabric at least at one side of its and consist of terminal loops of the wales and courses of the fabric at one side of it meshed with terminal loops of the wales, or the wales and courses, of the fabric at the other side of it. A suture is produced by the sequential steps of (a) causing needles temporarily to cease knitting but to retain their last-knitted loops and (b) then restoring said loop-holding needles to knitting activity, at least one of which steps is effected progressively (i.e. needle by needle, or in small groups of needles).

In briefly describing the manufacture of a blank, the two tubular portions will be referred to as the sleeve portions and the body portions but it is to be understood that these terms are used primarily for ease in identification since blanks according to this invention may be employed, not only in the manufacture of the garments of the type having a body and sleeves, but also in the manufacture of other garments. The manufacture of the blanks is best carried out on a circular knitting machine organised to knit by rotation and by reciprocation, but it is to be emphasised that known seamless hose machines are unsuitable because they do not permit reciprocatory knitting over a sufficient arc of the circle of needles.

Knitting of the blank may be commenced either at the open end or cuff of the sleeve portion or at the bottom of the body portion. A welt may be provided at the commencement of knitting but some anti-roving prevention must be applied at the termination of knitting.

Considering for example that knitting is commenced at the cuff, the sequence of events can be as follows.

The first few courses of the cuff may include a welt such as is conventionally provided at the commencement of welt-knitted fabric. If desired, these courses may be knit on less needles than the full complement, and needles may be introduced progressively to shape the sleeve portion. The cuff may of course be ribbed, as also may be the main part of the sleeve portion.

Having made sufficient fabric to provide a suitable arm length measured from the cuff to the armpit, a few needles e.g. (eight needles) are directed to an inactive level where they hold their loops while the machine is made to reciprocate so that knitting can take place in a similar manner to that used in making a heel or toe pouch. In this case, however, reciprocatory knitting takes place on a much larger arc of needles, and progressive narrowing and widening is carried out to a far greater extent than is necessary in the manufacture of heels and toes.

The result of the reciprocatory knitting is to produce a pouch-like shoulder portion characterised in that the

fashioned fabric includes sutures which extend from under the armpit diagonally upwards towards the neckline (i.e. the peak of the pouch).

At the termination of reciprocatory knitting and when the needles have been restored to knitting activity, a tubular length of fabric, which will ultimately provide part of the body of the garment, is knitted as a continuation of the sleeve and shoulder portions. Here again, the body portion and blank termination may have a ribbed construction or contain fancy stitch effects, and the final courses may be of an anti-ravel structure or may be otherwise suitably hemmed. This completes the fundamental processes for making a blank.

It is obvious that knitting may continue after the shoulder portion to provide sufficient body fabric for manufacturing garments which reach down to waist level as in a cardigan or beyond waist level as in a dress. The fabric length may even be sufficient to provide leg coverings such as in trouser suits etc.

Although in the foregoing description the knitting of the blank has been described with reference to a sleeved garment, it should be understood that such a blank can be used for other garments, and various ways in which they can be modified to suit other garments will undoubtedly suggest themselves to designers.

The use of the blank to make sleeved garments is, of course, of primary importance and there are two principal ways in which the blank may be used. These will now be explained with reference to the accompanying drawings which also illustrate the method of knitting and those parts of the knitting machine which assist in an understanding of the invention.

In these drawings:

FIG. 1 is a front or back view of a knitted blank according to the invention

FIG. 2 is a side view showing the sleeve folded flat against the side of the body portion

FIG. 3 shows two blanks placed side by side appropriately as they would appear in a typical garment

FIG. 4 shows a blank which has been cut and opened out to provide a front or back of another typical garment

FIG. 5 is a developed view of the inside of a knitting machine cambox with butt tracks indicated appropriately for normal rotary knitting

FIG. 6 is a developed view in diagrammatic form of the slider butt set-out for operating the needles of the bottom cylinder

FIG. 7 is a developed view of the inside of a knitting machine cambox with butt tracks indicated appropriately for a reverse knitting swing of the needle cylinders

FIG. 8 is a developed view of the inside of a knitting machine cambox with the butt tracks indicated appropriately for a certain stage in the knitting sequence

FIG. 9 is a developed view similar to FIG. 8 but showing the butt tracks for a different stage in the knitting sequence

FIGS. 10, 11 and 12, 13 and 14, illustrate four garments that can be made from the blanks (FIG. 12 being a view in the directions of the arrow in FIG. 11).

Referring to FIGS. 1 and 2, it will be seen that the blank 20 shown therein is of weft-knitted seamless tubular form throughout and incorporates two tubular portions 21, 22 connected by a pouch 23 having opposed sutures 24 so that the two portions 21, 22 are disposed at an angle to one another. The sutures 24 extend, from closely adjacent points 25 in the arm pit or inner corner 26 of the angle, to points 27 closely adjacent to the peak 28 of the pouch. Portion 21 is the body fabric and may terminate or start in a ribbed waist band 29. Portion 22 is the sleeve portion and may start or terminate in a ribbed cuff 30.

Of the two principal ways of making two such blanks into a sleeved garment, one is to cut open two blanks in a wale-wise direction from the peak 28 of the pouch to the lower edge of the body portion to provide right and

left-hand "halves" each with a tubular sleeve 22 as illustrated in FIG. 3, and then to seam the cut edges of the two halves together centrally at the back, or at the front, or at both front and back. Seaming the cut edges together at the back is useful in forming a cardigan having a releasable fastening (e.g. buttons) at the front. Seaming them together at the front provides a back-opening garment such as is suitable for baby wear. The resultant garments are devoid of seams in the arms and sides. Any suitable neck opening can be made.

Where it is desired to increase the size of the body portion of a completed garment to give a better proportion between sleeve tube size and body size (for example, in big jumpers) an extra strip of fabric can be seamed in at the centre front of the garment, and if desired at the centre back also. The strip or strips may be of similar fabric to the adjoining body fabric, or have a contrasting pattern or colour so that the strips (or each strip) forms a contrasting panel. If the garment has releasable fastening up the centre front, two such strips can be added one at each side of the front opening.

The other principal way of making the garment is to slit the blank from the cuff opening up under the arm to the armpit 26 and down the body to the waist. A similar slit is made from the cuff opening up the top of the arm to the center of what will ultimately be the neck opening. The blank is then opened out to provide a front "half" of a garment with the body fabric and right and left-hand sleeve parts all in single layer fabric. A back "half" is made similarly from a second blank and the two halves are joined by seaming the cut edges together along the underside of the sleeves, down the sides of the body, and along the tops of the sleeves, leaving an opening for the neck at 31 (See FIG. 4). This construction is more suitable for sweaters and jumpers.

Details of the arrangement of the needle cambox cams and related movements of an independent-needle circular knitting machine for knitting the blank will now be explained with reference to FIG. 5. It will be immediately apparent that the cam arrangement is somewhat similar to that of an opposed cylinder circular machine of the type used for knitting socks. It should be emphasized that, although a set of upper cams is indicated as UC in FIG. 5, the invention can equally apply to machines having a single needle cylinder, and in fact the upper cams can be ignored so far as this working explanation is concerned. For simplicity, a cam layout has been chosen having only one yarn feeding station, and it will be obvious that other stations may be provided if desired.

The normal direction of rotary knitting is in the direction of arrow X. The bottom cylinder sliders 1 (FIG. 5) have two levels of butts 1a and 1b and they are arranged around the cylinder as shown diagrammatically in developed form in FIG. 6. There are a number of bolt cams which can be moved in and out from the needle cylinder, and these are indicated as A, B, C, D, E, F and G.

Bolt cam A is responsible for guiding the slider butts 1a onto the forward stitch cam 2 for rotary knitting and onto the reverse stitch cam 3 for reciprocatory knitting.

The cam layout, FIG. 5, shows track a and part track b as broken lines which indicate the paths followed by slider butts 1a and 1b respectively in rotary knitting. As can be seen, butts 1a descend the feed cam A and pass down stitch cam 2 so that the associated needles draw loops of yarn fed from an appropriate feeder. The sliders are then raised by their lower butts 1b riding up bolt cam E so that their upper butts 1a ride up and along cam 4 which positions their associated needles at clearing height. For normal plain knitting, bolt cams B, D and F are withdrawn and so the butts 1a travel past them and once again down the feed cam A. There are of course variations which may be made to this normal knitting procedure, such as the insertion of bolt cams for transferring needles to the upper cylinder or the selective transferring of patterning mechanism (not shown). However, such things are well known and will not be described in detail here

unless they are necessary for an understanding of the invention.

The operation of the cam system for reciprocary knitting will now be described with reference to FIGS. 5, 7 and 8.

FIG. 7 shows the track *a* and the part track *b* of the slider butts *1a* and *1b* respectively for knitting in the reverse direction of reciprocary swing of the needle cylinder, indicated by the arrow *Y*.

FIG. 8 shows the track *a* in which the slider butts *1a* are disposed at the moment in which the needle cylinders are stationary prior to making the first swing in the reverse direction of knitting.

It will be noted that when knitting in the reverse direction (FIG. 7) that the feed cam *A* directs butts *1a* onto the reverse stitch cam *3*, and then the butts *1b* in conjunction with the bolt cam *F* are responsible for guiding the butts *1a* onto the cam *5*, thus positioning their associated needles at clearing height.

When knitting on the forward swing of reciprocating knitting, the butts *1a* and *1b* associated with needles which are knitting follow the same basic tracks *a* and *b* as they do for normal knitting as shown in FIG. 5.

Having shown the routes taken by sliders associated with needles which are actually knitting during reciprocation of the needle cylinder it is necessary to describe the controlling system which enables the needles to be progressively directed to loop holding inactivity and then progressively directed again to knitting activity.

It will be of assistance in understanding the controlling system which makes possible the knitting of the extraordinarily long sutures, which are a feature of the blank according to the invention, if it is first appreciated that such knitting requires the needle cylinders to reciprocate through an arc which is in excess of that which is normal for knitting heel and toe sutures. This extra extent of reciprocary swing would cause, on a normal sock machine, the butts associated with some of the needles in the knitting tracks to pass down the feed and stitch cams twice in any one swing, and this would of course upset the knitting and could not be tolerated. The present cam system accordingly incorporates a feed cam *A* which is capable of being controlled so that it does not cause this undesirable knitting and also incorporates special needle picking arrangements, the details of which will now be given.

It also is to be appreciated that the number of needles raised en masse to loop-holding inactivity at the commencement of narrowing and the number of needles remaining active at the end of the narrowing, are very substantially less than the number of corresponding needles in the conventional production of heel and toe pouches.

It will be useful to refer to the drawing FIG. 1 of the blank and consider that normal rotary knitting has commenced at the cuff *30* of the sleeve *22* and has proceeded to the stage where it is required that reciprocary knitting of the shoulder portion, or pouch, *23* should commence. It is also necessary to consider the slider butt layout FIG. 6 for the bottom cylinder sliders. The upper series of butts *1a* are composed of two lengths. The shorter length butts *SBa* extend almost entirely around the cylinder and a small group (about eight) of longer butts *LBa* complete the circle. The lower butts *1b* are mainly long butts *LBb* with the exception of a group *7* which may be composed of interspersed long, medium, and short, butts.

At the last stage of rotary knitting and just before the cylinders perform their first reverse swing, the bolt cam *B* is partly inserted. This insertion takes place just prior to the passage of the small group of long butts *LBa*. The bolt cam *B* lifts the group of long butts *LBa* to an idle level so that their associated needles are raised en masse to loop-holding inactivity. The following short butts *SBa* continue past the partially inserted cam *B* and this bolt cam *B* is then withdrawn. Before these following short butts can pass down the feed cam *A*, and while the

idle long butt group is passing above it, the feed cam *A* is withdrawn sufficiently to allow the short butts to run in front of it. When the cylinder stops, prior to its first reverse swing, the group of long butts will be positioned as indicated by the dotted line *LBa* in FIG. 8 and some following short butts will lie across the face of the feed cam *A* in the zone indicated by the number *8* in FIG. 8.

Upon commencement of the reverse swing of the needle cylinders, the few short butt sliders in zone *8* will travel in the direction of arrow *Y* in FIG. 7, and when they have passed beyond the face of the feed cam *A*, and the small group of long butts *LBa* is above cam *A*, the cam *A* is fully inserted so that the following sliders with short butts *SBa* will be guided onto the reverse stitch cam *3*. Also upon the commencement of the reverse swing, the "up" picker *11* must be released. This release is timed to allow the picker to move to its butt-receiving position whilst the inactive group of long butts *LBa* are passing over the picker position.

The slider which leads the arc of short butts *SBa* which follow the long butt group in the first reverse swing is indicated at *10* in FIG. 8. This leading butt will engage the "up" picker *11* and will be lifted to join the idle group of long butts *LBa* so that the associated needle is raised to loop-holding inactivity. The following short butt sliders *SBa* will then pass down cam *A* and stitch cam *3*. The needles associated with these short butt sliders will knit the first part course indicated at *31* in FIG. 1, in this first reverse swing of the needle cylinders. The inactive needles associated with the small group of long butts *LBa* will hold the few loops which are situated between the ends of the large arc of needles whose sliders have short butts *SBa*. These few loops will constitute the centre of the armpit *26*, FIG. 1. Reciprocary knitting will continue on the needles of the sliders with short butts *SBa* with progressive narrowing of the fabric as follows.

Just before the cylinders finish their first reverse swing, the last slider of the group of short butts *SBa* having been diverted by the feed cam *A* onto stitch cam *3*, the cam *A* is withdrawn while the idle group of long butts *LBa* and the single idle short butt *10* passes above it. The reverse swing continues until the last short butt slider is cleared up cam *5*. As shown in FIG. 9 the idle group of slider butts is indicated by the chain dotted line *12*, and the leading active short butts have again entered the feeding station as shown by the dotted line *13* and would have knitted twice in the reverse swing if the cam *A* had not been withdrawn.

The cylinders now move in the forward direction of swing in the direction of arrow *Z* FIG. 9. As soon as the short butt sliders *SBa* shown at *13* have moved clear of the feed cam *A* and the idle group of butts *12* is passing above it, the feed cam *A* is inserted so that the following sliders with short butts *SBa* will be guided onto the forward stitch cam *2*. The slider which leads the arc of short butts *SBa* which follow the long butt group in this first forward swing is indicated at *14* in FIG. 9. This leading butt will engage the "up" picker *15* (when the picker is released and assumes its receiving position) and will be lifted to join the idle group of butts *12*, so that the associated needle is raised to loop-holding inactivity. The following short butt sliders will pass down cam *2*. The needles associated with these short butt sliders will knit the second part course in continuance of the part course *31* FIG. 1.

Here again, towards the end of the swing of the cylinder in the forward direction it is necessary to withdraw the feed cam *A* while the idle slider butts pass above the cam, so that the leading active butts do not knit twice in the one swing.

It should be mentioned that the "up" pickers *11* and *15* are controlled by propping means (not shown) so that, after having lifted a butt to the high inactive level they are prevented from falling back onto the following butts. If they were permitted to fall back they would ride upon

the short butts and eventually fall through the gap created by the high inactive butts and thereby be in a position to raise undesirably the leading one of the active short butts which enter the feeding station for the second time in the one swing. The pickers would also obstruct these same short butt sliders when the needle cylinder changed its direction of swing.

Reciprocatory knitting continues in the manner just described until all but a few needles are raised to loop-holding inactivity, and narrowing of the fabric has been carried to a point somewhere in the region of that indicated at 27 in FIG. 1. At this stage the "down" picker 17 is lowered slightly so that it can engage respective leading butts at the ends of the two arcs of high idle short butt sliders (which straddle the idle long butt group LBa) on each forward and reverse swing of the needle cylinders. The lowering of the "down" picker 17 is timed to occur when the gap between the two arcs of high idle short butts coincides with the position of the picker (see FIGS. 7 and 9).

Widening of the fabric may proceed by the normal method of lowering two needles at a time by the "down" picker while raising of one needle at a time is continued by the "up" pickers on each reciprocatory swing of the cylinders. It is necessary to provide means (not shown) for retaining the "down" picker 17 in position 17a, FIG. 7, and in position 17b, FIG. 9, after each successive lowering of pairs of butts, so that the picker will not pick twice in the same swing.

Narrowing of the fabric by inactivating one needle at each swing of the needle cylinders, and then widening by activating two needles while continuing to inactive one needle, produces a very acceptable suture 24 FIG. 1. It is of course possible to modify the picking sequence to alter the character of the suture if desired so that the suture line may be varied to suit different garments.

It is preferable to continue widening until there are only two sliders with short butts SBa left adjacent the ends of the long butt group in the high idle track. At this stage when the last part course 32 FIG. 1, is knitted the needle cylinders revert to rotary knitting and cam A is inserted as the group of idle butts passes above it, so that all following short butts SBa will pass down the forward stitch cam 2. Bolt cam C FIG. 5 can be inserted at approximately the same time so all remaining bottom cylinder needles are brought down into knitting activity to enable rotary knitting to be resumed on the full circle of needles.

All the needles are now back in knitting activity and rotary knitting is continued with such patterning variations which may be desired for the knitting of the body 21 of the blank 20 FIG. 1. The garments may finish at the waist by providing, in known manner, a ribbed portion 29 which may include some anti-ravel courses at its termination or be suitably hemmed. On the other hand, knitting may be continued to provide fabric for a dress length or even fabric for leg coverings such as in trouser suits or combination garments.

Other variations in the knitting procedure may of course be made. For instance shaping of the sleeve fabric can be obtained either by progressively increasing the stitch length as knitting continues from the cuff to the shoulder portion or by a progressive introduction of needles, having commenced the cuff on fewer needles than the full complement. For this purpose, use may be made of the bolt cam E provided in the bottom cam box (FIG. 5). It may be recalled that in the early part of the description, mention was made of a group 7 FIG. 6 of butts which comprise interspersed butt lengths, long medium and small. The bolt cam E can be set so that at the commencement of knitting it is inserted only sufficiently to engage the long butt sliders. It will thus cause the series of needles associated with the major arc of long butts 1b to be raised so that their upper butts 1a are directed onto cam 4 (see FIG. 5). In addition the long butt sliders of group 7 (which may comprise every other butt) are also raised up cam E so that spaced needles associated with group 7 sliders will knit

together with all the needles of the major arc. The fabric of the cuff end 30 of the sleeve is thus produced on a reduced number of needles and by inserting the bolt cam E in steps, the medium and short butt sliders of group 7 may be progressively raised to introduce their needles to knitting activity and thus widen the fabric as knitting proceeds towards the shoulder portion.

Any conventional mechanisms are provided for reciprocating the needle cylinders and changing over between rotatory and reciprocating knitting at required times, and for controlling the bolt cams and pickers. For example, conventional mechanisms (such as are common in the art) for controlling bolt cams such as the present bolt cam A are disclosed in FIGS. 5, 9 and 10 of U.S. Pat. No. 3,292,392, Squillario et al., with reference to the bolt cams 326 and 327 of that patent. Squillario et al. also shows in FIG. 23 how a bolt cam 262 may be controlled by the drum 70 of the machine. That patent also discloses conventional mechanisms for controlling up pickers (such as the present pickers 11 and 15) and a down picker (such as the present picker 17) in its FIGS. 5, 11 and 25, with reference to its up pickers 300 and 301 and down picker 180. British Pat. No. 171,483 discloses in FIGS. 10, 11 and 12 conventional mechanism for controlling a down picker. The British patent further discloses, in FIGS. 15 and 16, conventional mechanisms for controlling bolt cams from a controlling drum or cam disc. Such conventional mechanisms as disclosed in the foregoing patents form part of the common knowledge of knitting machine builders and are those which one of average skill would use for the purposes indicated in the present specification.

It will be understood that all the knitted wales extend continuously throughout the two tubular portions 21, 22, and the pouch 23, and that each suture line 24 is diagonal to the wales and courses of the fabric at each side of it. The pouch differs radically from a conventional heel pouch in that the sutures start from closely adjacent points 25 in the inner corner 26 of the angle between portions 21, 22.

Various garments that can be made from blanks according to this invention are illustrated in FIGS. 10-14.

FIG. 10 illustrates a trouser suit 33, in which the tubular portions 21 of the blanks are made sufficiently long to provide seamless tubular legs 34, each blank being cut from the neck down as far as line 35 which is in the neighbourhood of the crotch. This front opening may be provided with a releasable closure such as closure 41, FIG. 13, and should extend from the neckline to the waist. The cut edges of the blanks are seamed together from the front waist, under the crotch, and up the back.

FIGS. 11 and 12 illustrate a head hood or helmet 36 consisting of a complete blank. The open end of one portion (e.g. 21) provides the neck opening 37b and the open end of the other portion (e.g. 22) provides the face opening 37a. The blank can be modified to make it even more suitable for a helmet by making both tubular portions 21, 22 much shorter in length and by making their angular disposition approximate more closely to a right angle. For this purpose, the number of butts in a group LBa, FIG. 6, is increased (e.g. by approximately 75%) so that when reciprocatory knitting commences a greater number of needles are collectively lifted to loop-holding inactivity. The length of the sutures 24 is therefore reduced at their inner ends (and can be further reduced at their outer ends by a reduction in the number of narrowings and widenings carried out during reciprocatory knitting).

FIG. 13 illustrates a suit made from blanks according to this invention. The legs 34 are either formed as integral parts of the blanks as in FIG. 10, or are made from two fabric tubes cut and seamed together at 39 and seamed at 40 to the body of the garment. The front opening is provided with a sliding fastener or other closure 41. The back of the garment is seamed from the neckline downwards,

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under the crotch, and up to the waist at the front. A hood 36 according to FIGS. 11 and 12 may be linked or seamed to the neck opening.

FIG. 14 illustrates a coat, cardigan, smock, or similar garment 42, made from the blanks, and having a front opening 43. To the neck opening of this garment a hood 36 according to FIGS. 11 and 12 is joined. The front opening 43 is continued at 44 up the front of the hood as far as the face opening so that the garment can be completely opened out for convenience in dressing. The cut edges of the fabric at 44 are suitably hemmed to prevent unroving.

Although it is preferred to knit the blank on a circular knitting machine it may be made on a flat knitting machine having two beds of needles.

A typical circular knitting machine according to this invention, has a 4-5" dia. needle cylinder with 176 needles.

For making a blank for a sleeved garment (see FIGS. 10, 13 and 14) group L_{Ba} consists of 8 butts, so that at the start of narrowing 8 needles are inactive and 168 active. At the end of narrowing 10 needles are active.

For making a blank for a hood (see FIGS. 11 and 12) group L_{Ba} consists of 14 butts so that at the start of narrowing 14 needles are inactive and 162 active. At the end of narrowing 30 needles are active.

What is claimed is:

1. A garment having a body, sleeves and arm pits, composed of two pieces of knitted fabric, each forming half of the garment, each half consisting of tubular knit seamless blank having a reciprocatorily knit fabric area, the fabric of each sleeve being united to the fabric of the body by reciprocatorily knit fabric having fashioning sutures extending diagonally from points in the arm pit, the two garment halves having opposed cut edges united by at least one seam.

2. A garment according to claim 1 wherein each half of the garment includes a seamless tubular sleeve, and the two halves are united by a seam which is central of the body.

3. A garment according to claim 1, wherein the two pieces of fabric constitute front and rear halves of the garment, each piece constituting half the body and half of each sleeve and arm pit, the two halves having cut edges united by seams which extend along the top of each sleeve and along the underside of each sleeve to the arm pit and thence down the sides of the body.

4. A method of making a garment according to claim 2 from two knitted blanks, each consisting of two integral open ended seamless tubular portions joined at an angle

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to each other by a reciprocatorily knit pouch having opposed sutures, formed by narrowing and widening, extending from closely adjacent points proximate the inner corner of the angle toward the peak of the pouch, which comprises:

(a) cutting open each of the two blanks from the peak of its pouch to the open end of one tubular portion and thereby providing right and left garment halves each with a sleeve constituted by the other tubular portion,

(b) assembling the two halves with a cut edge of one half contiguous with a cut edge of the other half and

(c) seaming said contiguous cut edges together.

5. A method of making a garment according to claim 3 from two knitted blanks, each consisting of two integral open ended seamless tubular portions joined at an angle to each other by a reciprocatorily knit pouch having opposed sutures, formed by narrowing and widening, extending from closely adjacent points proximate the inner corner of the angle toward the peak of the pouch, which comprises:

(a) cutting open each of the two blanks from the inner corner of the angle to the open ends of each of the tubular portions and from the peak of the pouch to the open end of one tubular portion and thereby forming front and rear halves of flat fabric,

(b) assembling the two halves together with the cut edges of each half extending contiguously with the corresponding cut edges of the other half and

(c) seaming the cut edges of each half to the corresponding cut edges of the other half.

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