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INTRODUCTION

To enable you to have a better understanding of the Linker it is important to study this book and then apply the information to your particular needs. The Linker is used to assemble knitwear from beginning to end. It quickly and accurately shortens the work, assembly and preparation of various types of knitwear finishes. It replaces any handwork which you are at present doing without detracting from the quality but rather enhancing it.

Linking is an old concept which has recently been revived in the U.S.A. due to public demand for a better quality garment. The garment can still be called "hand made" because of the way in which linking is applied.

For the front neck (plain)
the yarn comes behind the
needle and travels to the
front of the needle
crossing over the needle
Fig. 1a, 1b

For the back neck (ribbed)
the yarn passes in front of
the needle and travels to the
back by the action of
crossing over the needle.
Fig. 2a, 2b



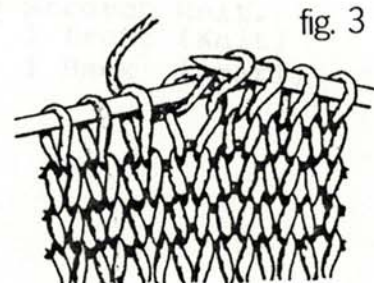
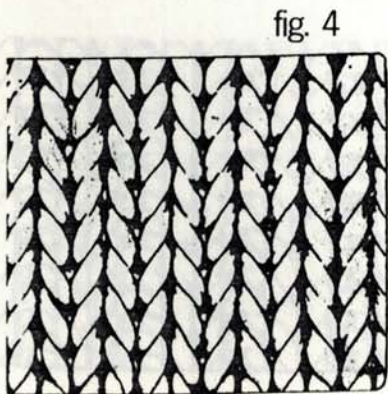
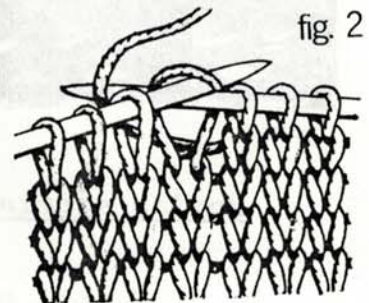
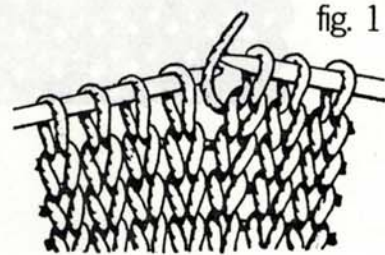
DEFINITION OF KNITTING

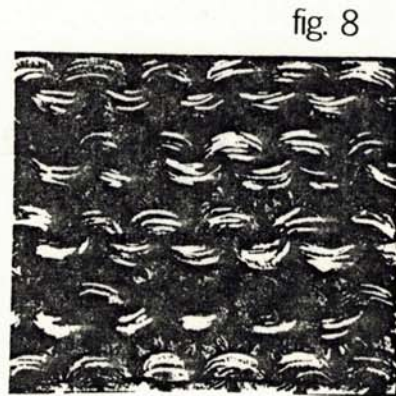
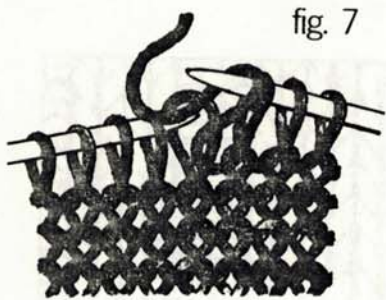
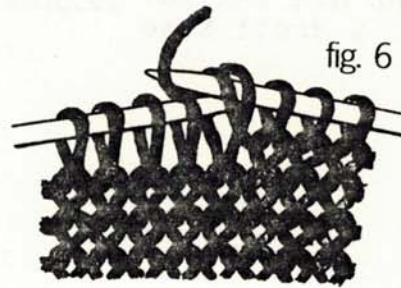
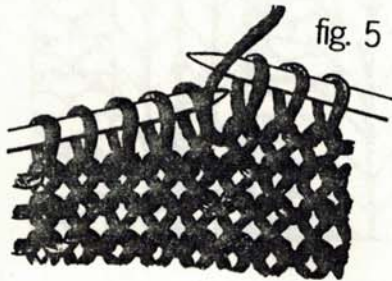
It is important to understand the concept of knitting in order to understand the concept of linking (looping) enabling the user to gain the full benefit of the machine and to apply linking wherever necessary.

The following explanation uses knitting needles to clarify the points we are making but the application is technically the same for the knitting machine.

For the front stitch (plain) the yarn passes behind the needle and travels to the front by the action of crossing over the needles (Fig 1,2,3,)

For the back stitch(pearl) the yarn passes in front of the needles and then to the back by the action of crossing over the needles. (Fig 5,6,7)





We wish to demonstrate to you typical simple stitch types in this way.

Alternate front and back knitting as in fig. 9
In this case we speak of stretch knitting or rib
1 by 1.

It is possible to knit also 1 by 2, 2 by 2, 2 by 4 and
many other rib variations.



Fig 9 Stretch knit.
1 front (Knit)
1 Back (pearl)

fig. 9

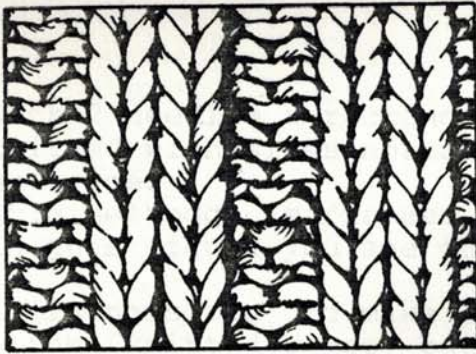


Fig 10 The 2/2 Rib Knit
or 2 front 2 Back

fig. 10

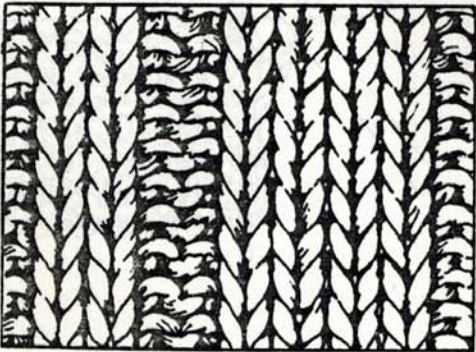


Fig 11.The 2/4 Rib knit
or 2 front/
2 back/
4 front etc.

fig. 11

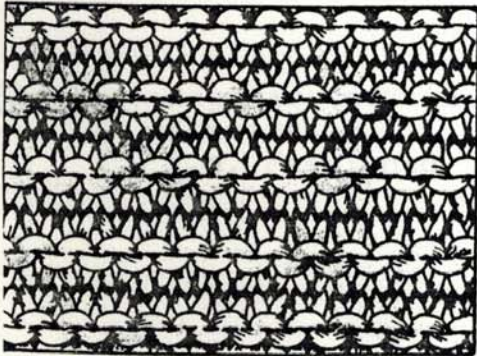


Fig 12 Links/links
1 course knitted
front 1 course
knitted back

fig. 12

With 2 needles a rectangular piece of knitwear is knitted with sides normally finished - called a selvedge.

This selvedge is formed by a knitted chain (fig. 14) In this figure you see the loops from the back.

It is possible to make not only a plain rectangular blank (knitted piece) but you can also decrease or increase the number of stitches in a horizontal course. this piece of knitwear that we decrease or increase is correctly called a fashioned piece of knitwear.

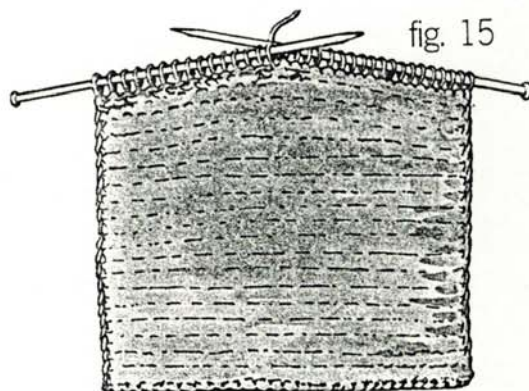
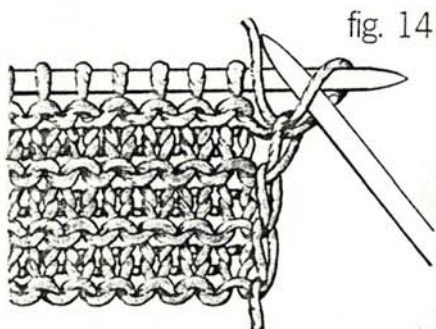


Fig 15 - Rectangular knitting without decreasing or increasing
i.e. Unfashioned.

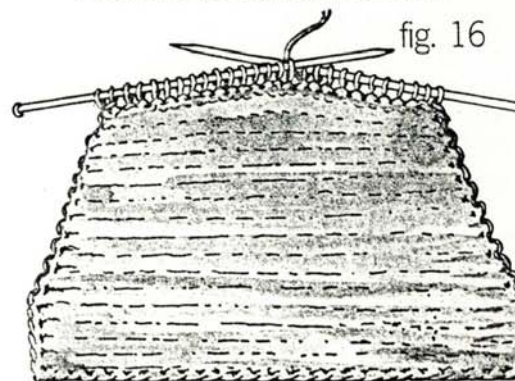


Fig 16 - Regular knitting with decreasing.
i.e. Fashioned

To execute the decreasing one simply passes the yarn through two stitches simultaneously.

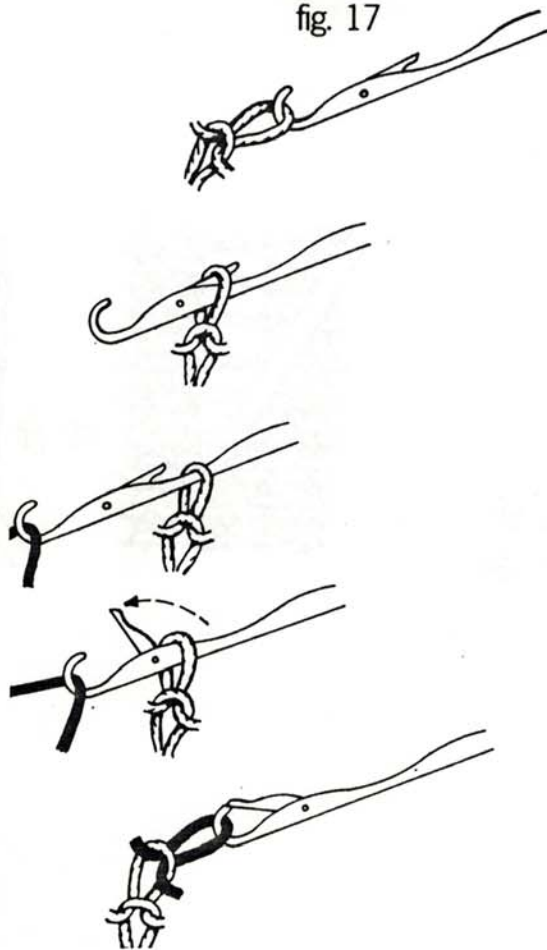
THE HOOK

As you by now would have discovered, knitting that has a raw edge will unravel if the open loops are not finished in some way - alone or together with another piece of knitting e.g. two shoulder seams.

Before we explain linking it is important that you understand the use of the crochet hook which is used to form a chainstitch or linked chain. This chain is exactly the same as a knitted chain except that it is independant of other stitches.

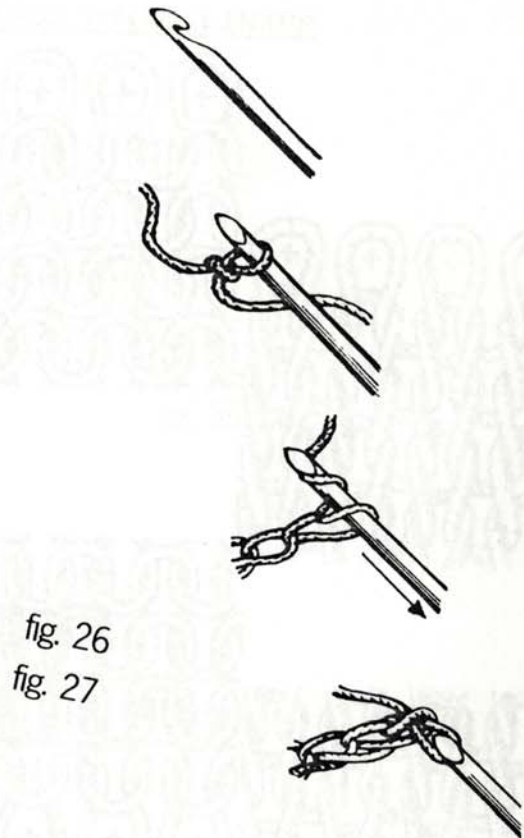
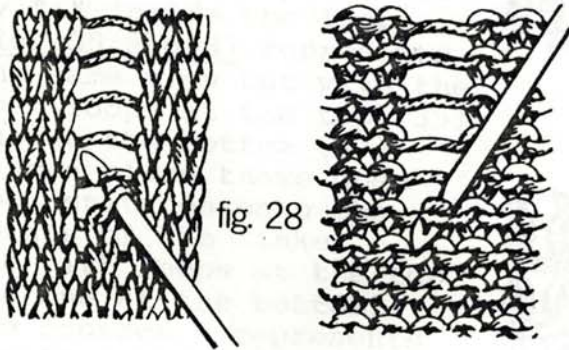
Please examine Fig 17 carefully for a more thorough understanding of knit stitch formation as it occurs on a hand flat knitting machine.

fig. 17



A very important feature of the linking machine is it's ability to form a stitch exactly the same in character as that formed by your knitting machine. These characteristics include the use of similar types of yarn and the most important feature being that of elasticity. The fact that these two stitch types which are totally different in application are so similar in nature making them 100% compatible.

Most people will not be able to tell the difference in the stitch formation when comparing the linking stitch and the knit stitch.

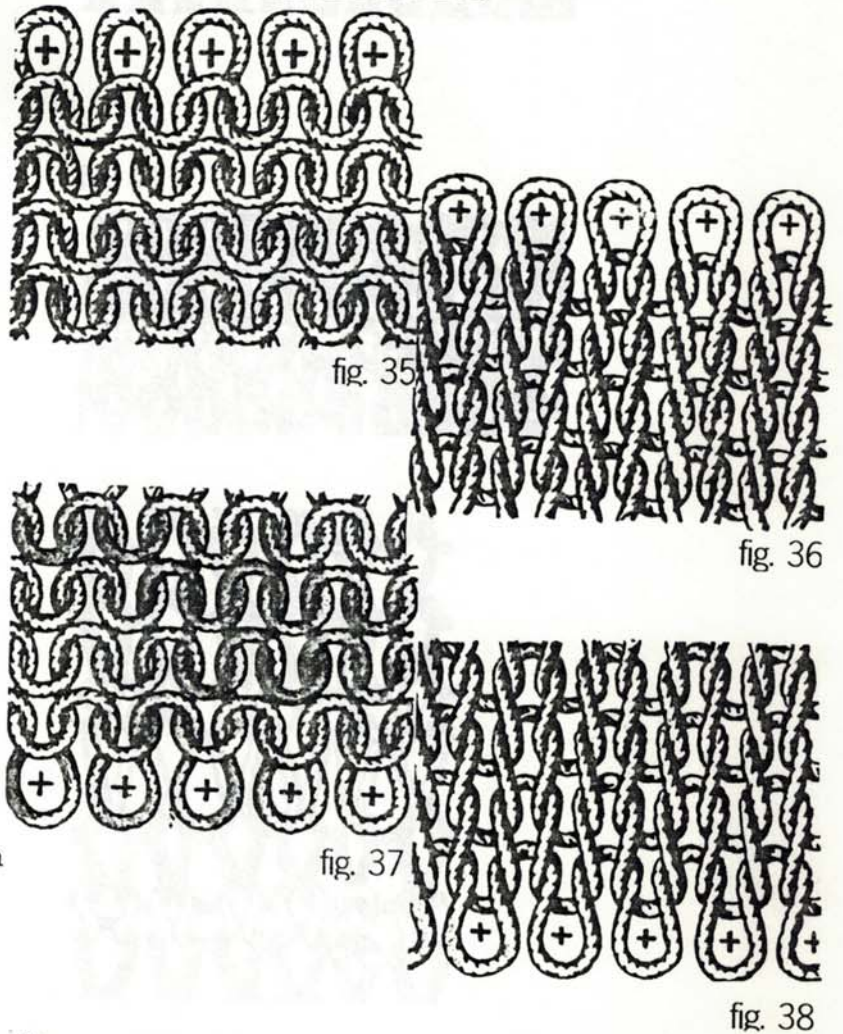


DEFINITION OF LINKING

We will now explain the characteristics of the linked chain. The last row of knitting consists of loosely joined open loops - these open loops each need to be closed with one stitch of the linked chain. It is usually necessary to attach one piece of knitwear to the top of another piece, in some cases both may be open loops. When these open loops are linked together two operations are accomplished:- one being the closing off of the open loops and the simultaneous joining of the two knitted pieces. (e.h. shoulder seamd which have not been previously cast off)

TYPES OF OPEN LOOPS WHICH CAN BE JOINED USING LINKER

Let us first look at a simple piece of knitted cloth (single bed) Seen from the back the knitted piece has been removed from the needles and has open loops(stitches) presented by "+" inside the loops. Fig. 35 and 37 represents the same view but with the open loops at the top (35) and at the bottom (37) We can place these open loop stitches onto the points of the linker. One with loops at the top and one at the bottom. The crosses + represents the loops of the knitted piece to be inserted onto the points. Only in the case of 1x1 rib Fig 39 will loops alternate front to back as they are placed onto the points as in Fig. 35, 36, 37, 38.



It is important to note that it would be extremely difficult to fit these loops onto the points of the linking machine. The following explanation shows us how to simply prepare your knitted pieces in order to expediate and simplify the process of hanging the open loops onto the Linker.

PREPARATION OF KNITTED PIECES FOR LINKER.

It is extremely difficult to place the last row of open loops (stitches) onto the linking machine points without having extra knitted courses for you to hold onto while placing the loops onto the points. After the last course is knitted additional rows are knitted usually in a different colour.

Fig 40 Shows a loose knitted course.

fig. 40

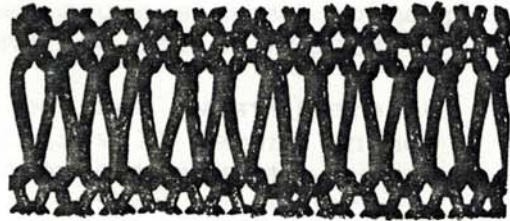
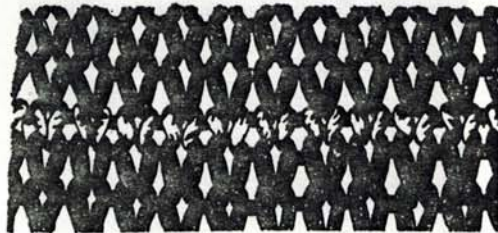


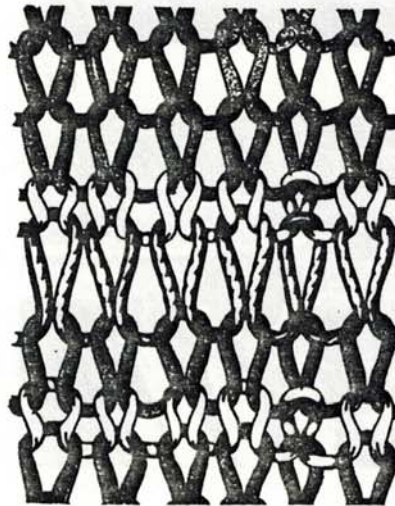
Fig 41 A tightly knitted course.

fig. 41



In order to make it fast and easier to work with the linking machine, it is important to knit the piece (trim) to be linked in the correct way.

Fig. 42 represents the ideal way of knitting the trimming to be linked in the zone of the linking course.



In fig 41 the dark course represents the course to be the linking course which will be placed onto the points of the linking machine.

THE MECHANICS OF INSERTING KNITWEAR ONTO THE POINT DIAL
OF THE LINKING MACHINE

As we were saying before the linker can be used to manufacture linking from either above or below. The linking on the contrary is usually only done on a loose course. The extra knitted courses serve to help in the operation of linking and are called "waste".

As a rule these extra knitted courses (waste) are no longer than $1/2$ to $3/4$ " but this will depend on how easy or difficult it is to hold onto the waste. e.g. if it is very curly it would need to be longer.

It is important that after the linking row has been knitted and the waste rows should be knitted in a contrasting colour in order to make it easier to see the linking line (row/course.)

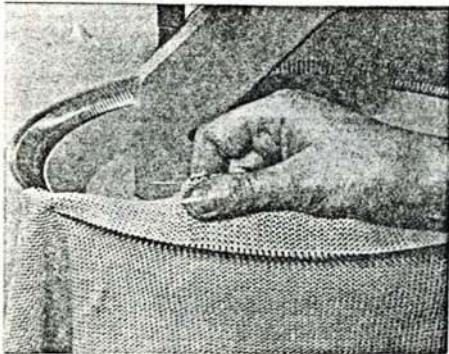


Fig 43

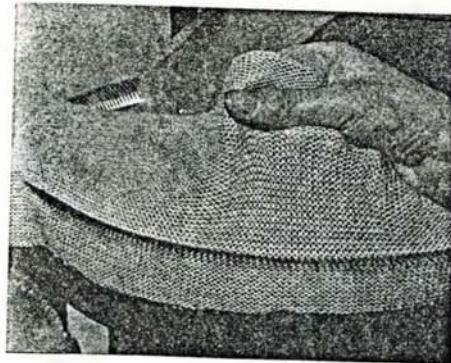


Fig 44

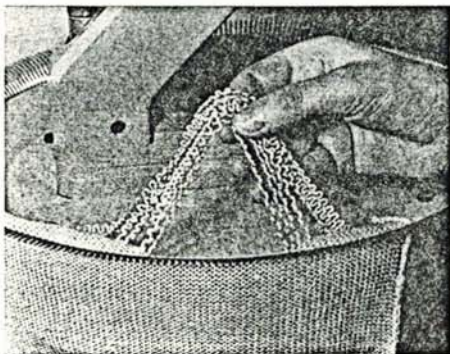


Fig 45

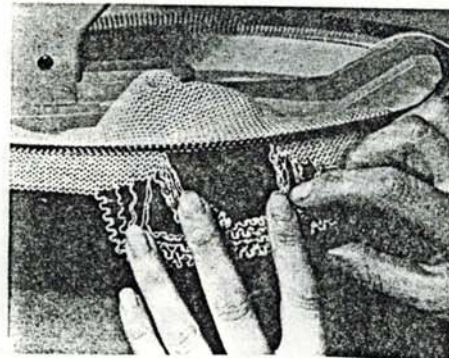


Fig 46

The exact and accurate way of hooking the knitting onto the points is represented clearly in fig 43 and fig 44. Hooking up the knitting onto the points from below. (knitting hanging below the points) pull the knitting upwards against the points so that it forms rectangular openings (see fig. 43)

Hooking the knitting onto the points from above (knitting arranged above the points) Pull the knitting upwards against the points so that it forms a rectangular opening (fig. 44) After the knitting has been hooked onto the points it is possible to pull off the extra (waste) courses. This operation will occur above the points if the knitting is hooked on from below and below the points if the knitting is hooked on from above the points. (see fig 45 to 46)



Fig 47

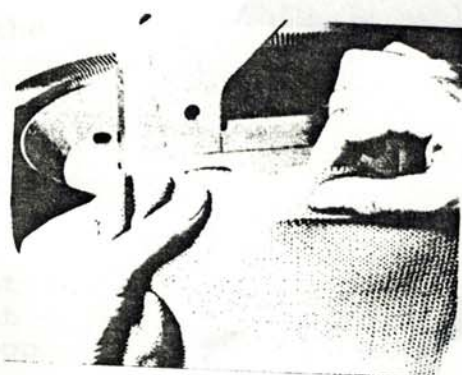


Fig 48

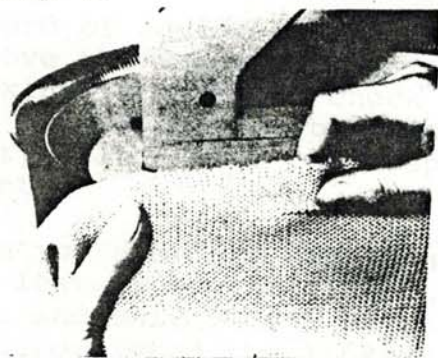


Fig 49



Fig 50

Fig 47 to 51 demonstrates the exact way in which to hang (hook on) the knitting onto the points.

Fig. 47 Start putting the linking on from the right. The right thumb passes above the points rotating lightly and pushing the knitting on point by point. Simultaneously pulling

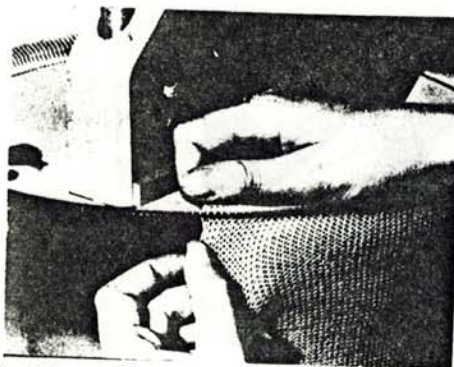


Fig 51

the knitting with your left hand with more or less tension according to your needs. After a little of this exercise you will agree that even the most difficult piece of knitting is easy when you use the correct tension (stretch it putting it onto the points)

Fig 51 shows how to insert the knitting onto the points at the end of the work. You should be able to insert about 2 inches of the knitting onto the linking machine point for point.

The knitting placed from the top requires good and precise hand movements. The thumb rubs gently against the points from below - proceeding in this way to the left, simultaneously the forefinger is placed above the points and pushes the knitwear onto them.

Fig. 52 and 53 demonstrates the exact sequence of movements.

The start and end of putting the knitting onto the points is the same as in fig. 47 and 51.

It is extremely important that you finish the linking without forgetting to put even one loop (stitch) onto the points.

A word of advice to the beginners - remove the waste yarn before linking in order to check if you have forgotten to place every stitch onto the respective point.

When you are more experienced you can leave the waste yarn to the last and only remove it once you have completed the linking operation.

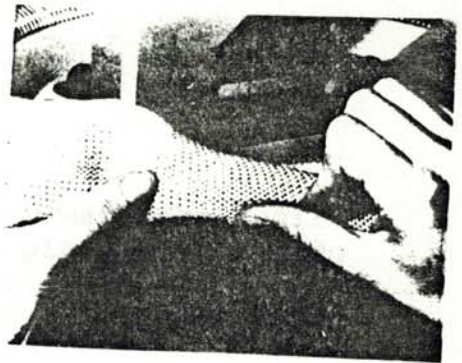


fig. 52

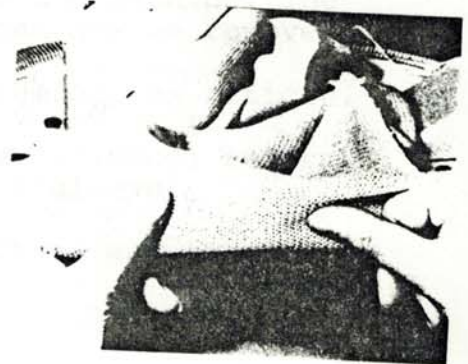


fig. 53



fig. 54

APPLICATIONS OF LINKING

1. INVISIBLE HEM

In order to link a hem it is necessary to mark the desired length. After the length is decided upon place the knitting onto the points but above the point dial.

Fig 56 demonstrates the first stage in linking.

The knitting that is placed on the points should form triangles - if pulled up.

Fig. 57 shows the knitting turned down for the second stage of linking.

After this second stage you can operate the machine. The hem is then linked and the waste yarn can now be removed.

The chainstitch is situated to the inside of the article.

Obviously it is better to finish the hem (linked) before closing the side seam e.g. the cuff on a sleeve.

This hem can be used for skirts and jackets and many other styles.

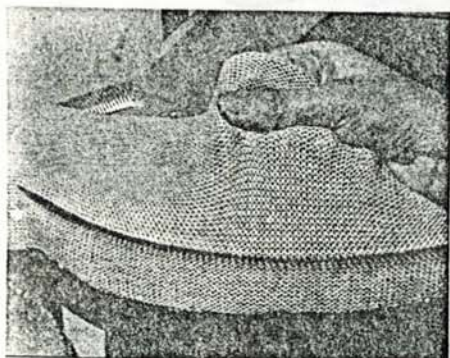


fig. 56

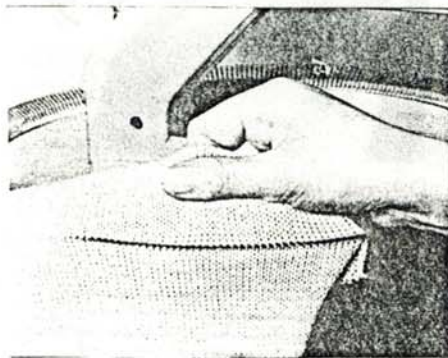
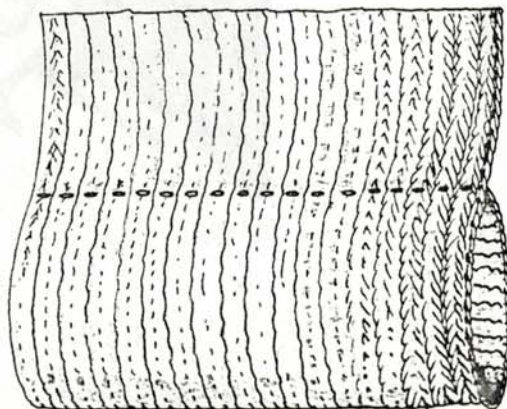


fig. 57



2. THE BLIND HEM

This is executed by placing the knitting onto the points with the knitting below the point dial.

Fig. 58 demonstrates the first operation. When hooked on from below it is supposed to form rectangles. The second operation is placing the knitting onto the points, pinched over with the points passing through the pinched fold which is at the desired height for the hem.

These phases in the operation are illustrated in fig. 59 and 60

A new position for the hands facilitates these operations:

You hold the knitting between the forefinger and the thumb in a way that when you hook the loops onto the points you only use the nail of your left thumb. As with the visible hem it is only after this second operation that you can remove the waste. This hem is also linked before the seams are sewn.

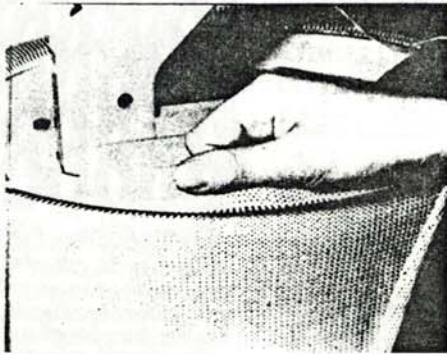


fig. 58

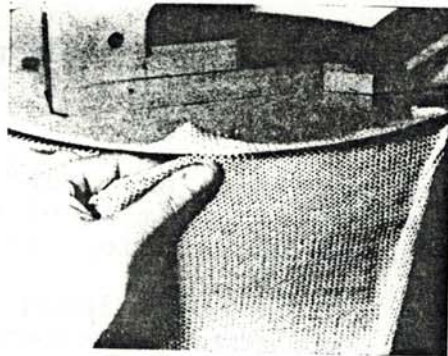


fig. 59

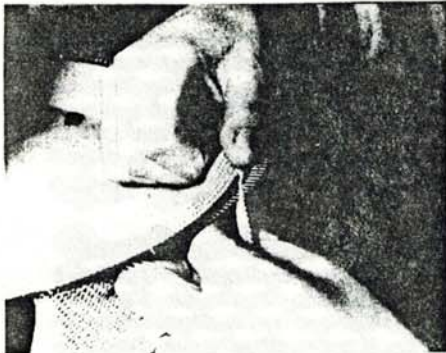
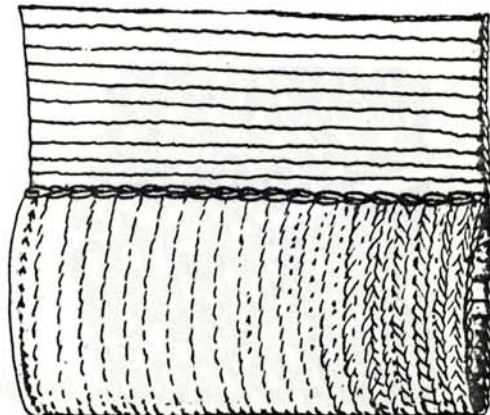


fig. 60



3. JOINING EDGES

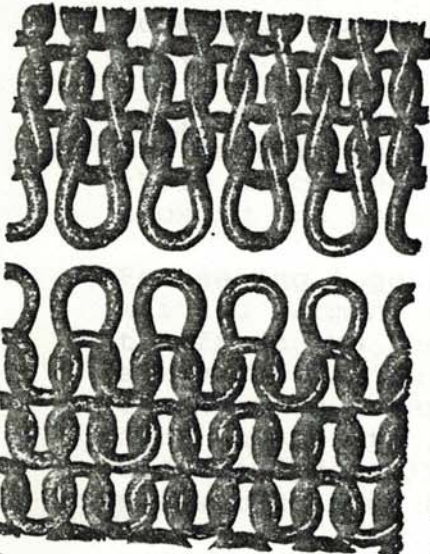


fig. 61

Most knitted garments are not knitted in one piece but rather in a number of pieces which have to be joined together, what better way to do this than with a linking machine.

These operations can be executed between:
(a) Open loops and open loops - as with shoulder seams.

(b) Selvedge and open loops - here the number of open loops corresponds to the same number of points over which the selvedge has been placed in order that the edges line up.

(c) Selvedge and selvedge - as with side and sleeve seams.

Linking knitted loops with knitted loops (fig 61) has two possibilities, one at the top and one below, or both below.

Also when linking a knitted looped edge with a selvedge either one could be above with the other below or both can be below together (fig. 62)

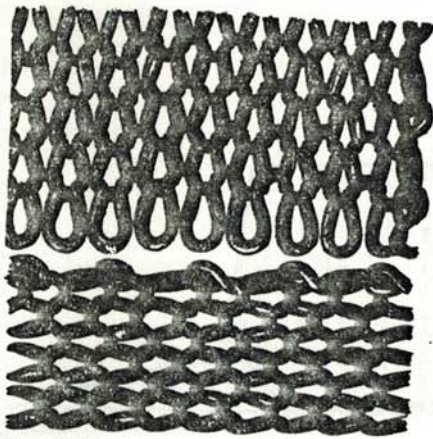


fig. 62

The linking together of two selvedges must occur with both lying below the point dial (fig. 63)

Fig. 64 demonstrates the joining of two pieces of knitted open loops manually with a hook, the two pieces are joined loop for loop.

It is therefore possible to arrange any form or shape, like raglan shoulders at the front and at the back (fig. 68)

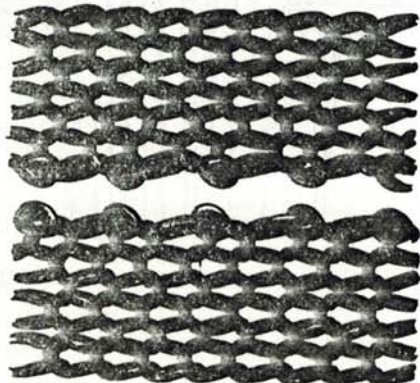


fig. 63

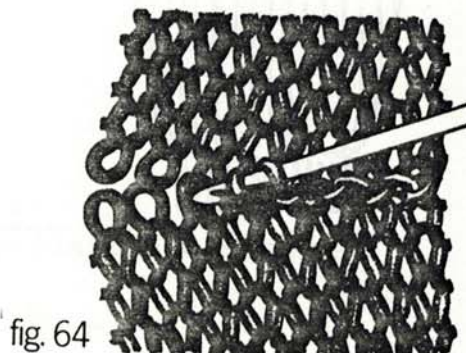


fig. 64

It is necessary to use precise hand movements for linking looped edge to selvedge.

Fig. 66 illustrates the movements and in this case it is the same as those described in fig 52 to 54 when hooking the knitting up from above.

For sewing together the pieces of a knitted garment e.g. the sleeves to the front and back or with raglan sleeves it is better to hook up first the knitted (open) loops from below onto the points loop for loop. (fig 65) and then the selvedge to align the parts both from below (fig. 66)

During this operation the forefinger and the thumb of the left hand serve to support the knitwear while the right hand feeds the selvedge onto the points.

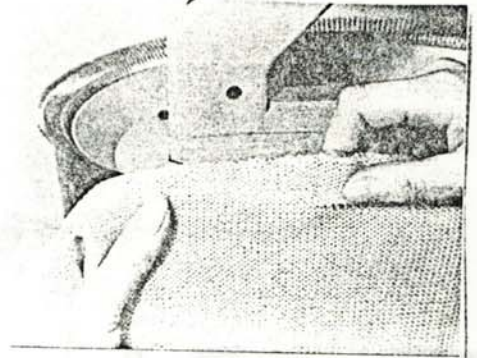


fig. 65

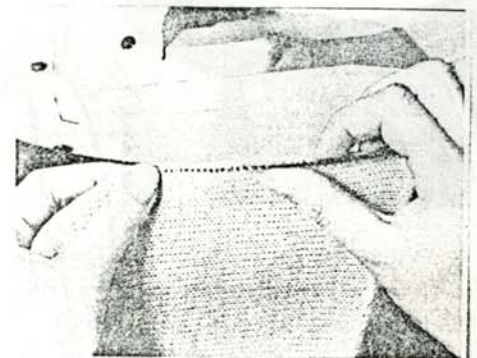


fig. 66

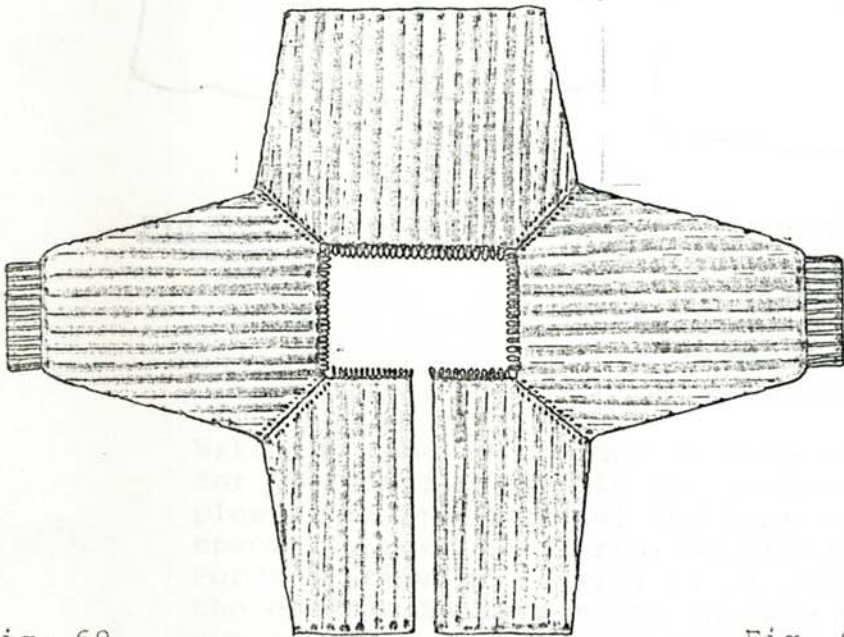


Fig. 68
Assembly of a raglan jacket.

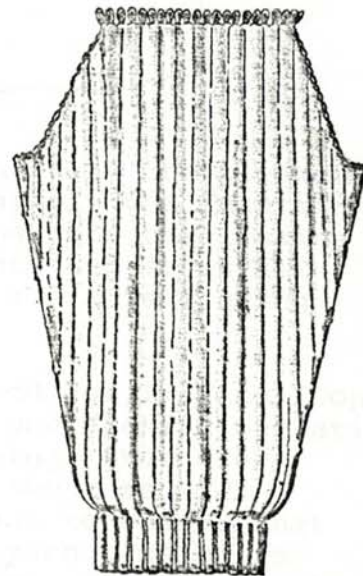


Fig. 67
Fully fashioned sleeve

4. PLEATING

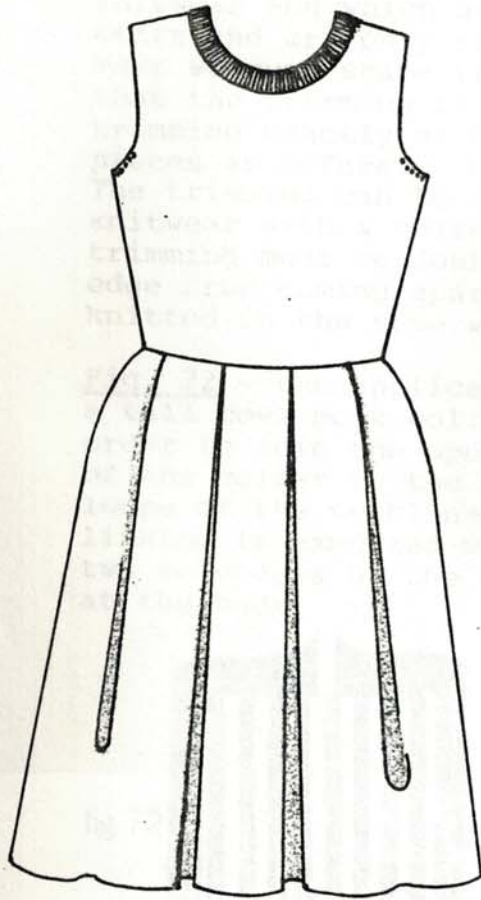


Fig 69 The pleated skirt

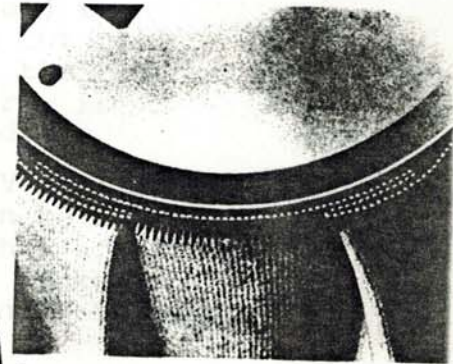
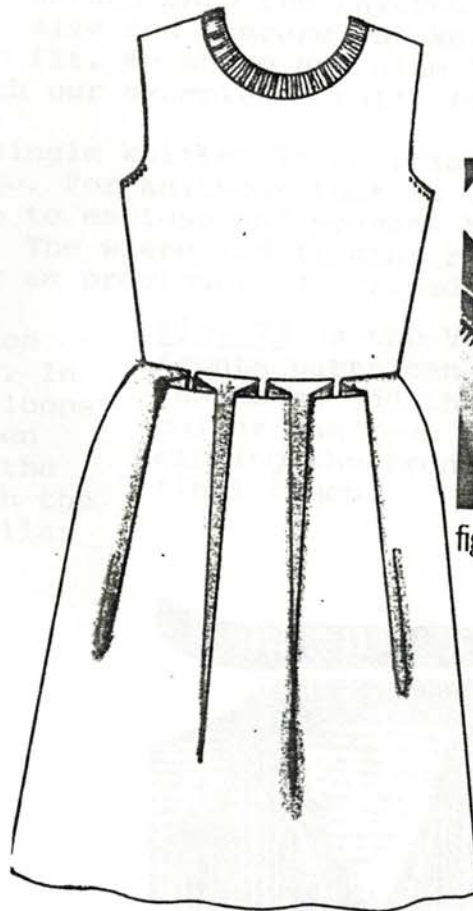


fig. 71

Fig 70 Technically the pleated garment is simply the insertion of open loops onto the linking machine points and it is all achieved in a single linking operation.

With the same technology we have adopted for linking loop for loop it is possible to execute in one linking operation, pleats, flaps (pockets) and many trimmings that are specially used in skirts, waistcoats, sweaters etc. For this type of linking it is important to ensure that the elasticity is perfect in case the yarn tension is not set correctly on the linking machine. To improve the elasticity in the linked seam it is usually sufficient to loosen the yarn tension but if this is not good enough you may use more elastic yarn.

5. NECKLINES, CUFFS, BORDERS.

We now reach the applications that serve as borders for knitwear and which are separately prepared from the start and are only then linked onto the knitted pieces. Next we must shape the size and prepare the knitting that the trimming is to fit. We shape and size the trimming exactly as with our example of fully fashioned pieces as before.

The trimming can be a single knitted layer (flat) for knitwear with a selvedge. For knitwear that is cut the trimming must be double to enclose and prevent the cut edge from coming apart. The waste and linking row is knitted in the same way as previously described.

Fig. 72 - the application of a tall cowl neck collar. In order to join the open loops of the collar to the open loops of the neckline, the linking is executed with the two selvages of the collar at the back.

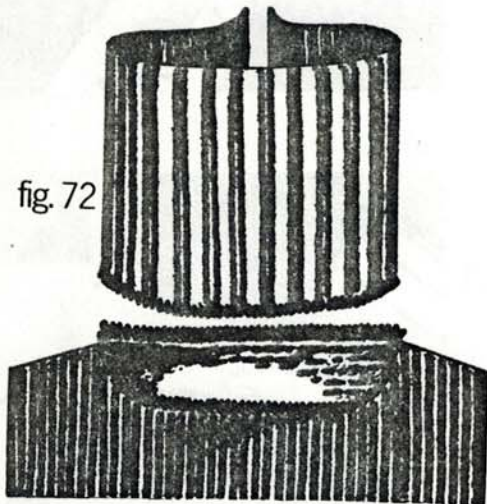


fig. 72

Fig. 74 - same application as above.

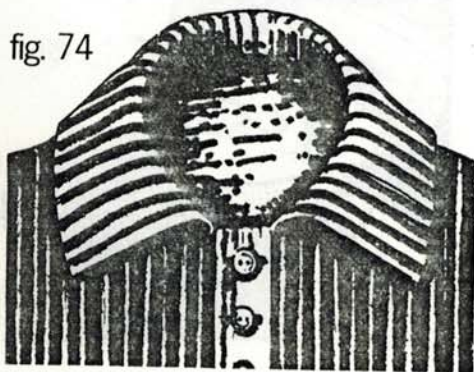


fig. 74

Fig. 73 on the V-collar the fronts parts can be fully fashioned and then after the collar has been linked on, closing the front V is the final touch.

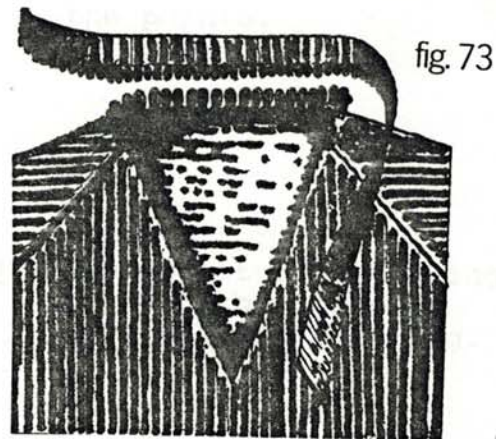


fig. 73

Fig. 75 - The rectangular collar is attached at the front and at the back. Loops opposite loops with the main neckline between the collar. At the sides, instead, we have the knitted loops of the collar on the selvedge of the sides of the neckline.

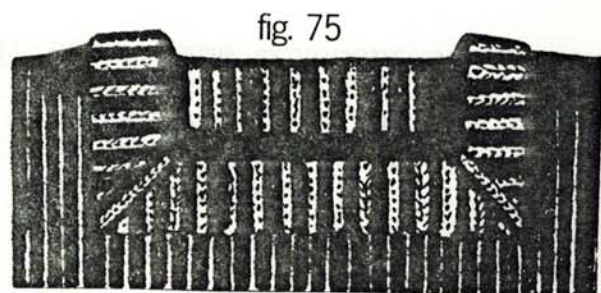


fig. 75

6. APPLICATIONS OF LINKED TRIMMINGS IN CUT KNITWEAR.

When we have a raw or cut edge to which a trimming must be attached, the only way unravelling of this edge can be prevented is by enclosing the raw edge inside a folded trim. This is commonly known as a "sandwich trim" or a "C trim"

The following explains the concept more thoroughly:

When linking a trim it is essential that you make sure that each and every stitch from the first to the last is hooked onto the points. You also need to calculate the length of the trimming to obtain the result you desire in relation to your particular application.

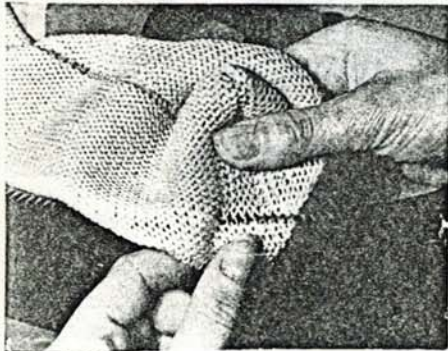


Fig. 79 - The correct position hands for hooking the first stitches onto the points.

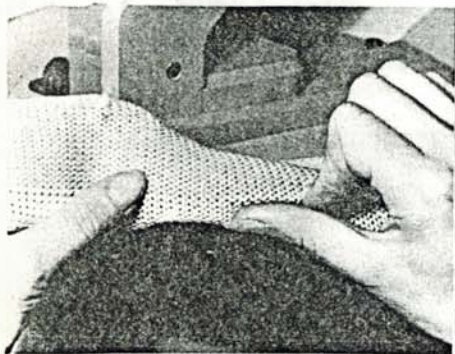


Fig. 80 - The operator continuing to hang the loops up in a tubular trimming.



Fig. 81 - The same movement as in figure 79 but executed from the left instead of from the right.

The knitted trimming is always mounted twice on the linked point for point and the cut knitwear is situated between the two sides of the trimming.

The second insertion of the trimming point for point is called the doubling up of the trimming.

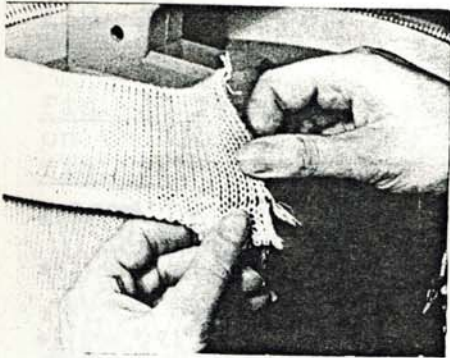


Fig. 82-The first loops (stitches) of the double trim.

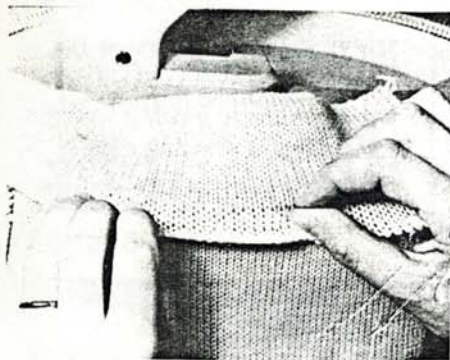


Fig. 83-The continuation of the insertion point for point of the double trim.

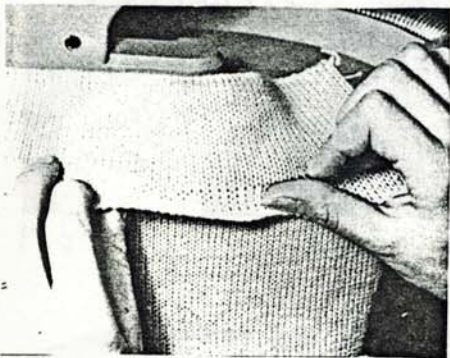


Fig. 84-With the trimming doubled, the trimming is prepared as seen in the photograph.

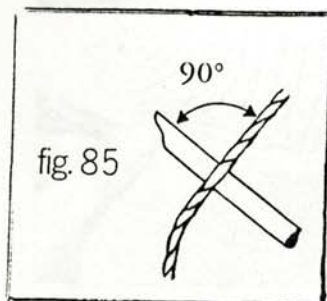


Fig. 85- Angle of insertion of the loops onto the points.

TRIMMING USING SELVEDGE

The cast on side of the trimming is hooked up onto the points first and the black dots in fig. 86 represent the position of the points through the stitches.

Fig. 88 represents the correct position of the hands for this operation.

Fig. 89 represents the three operations necessary to link on the folded ribbed trimming. No. 1 is equivalent to fig. 88.

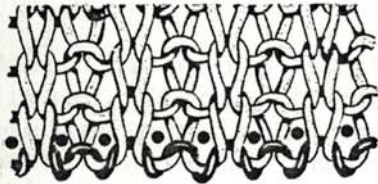


Fig 86

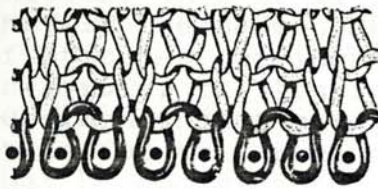


Fig. 87

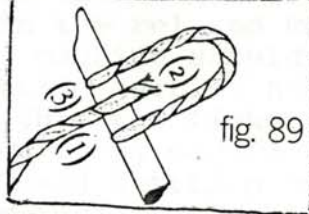


fig. 89

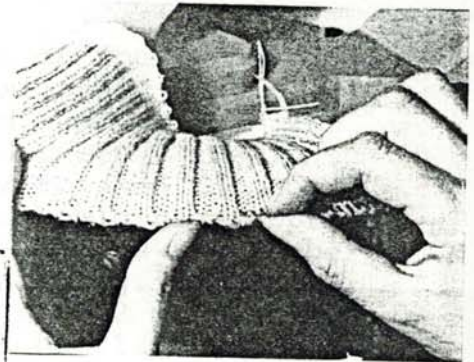


Fig. 88

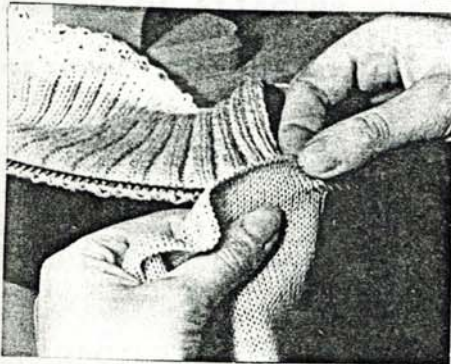


Fig 90

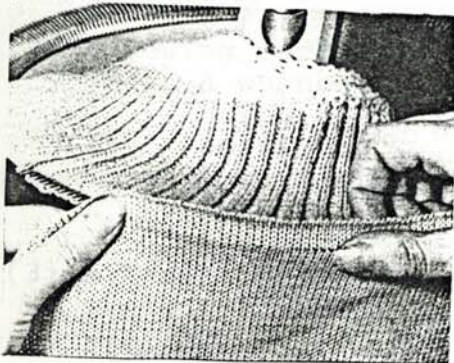


Fig 91

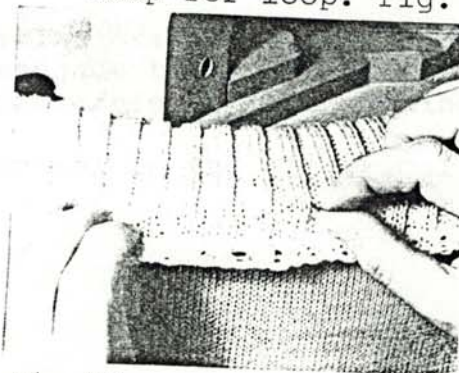
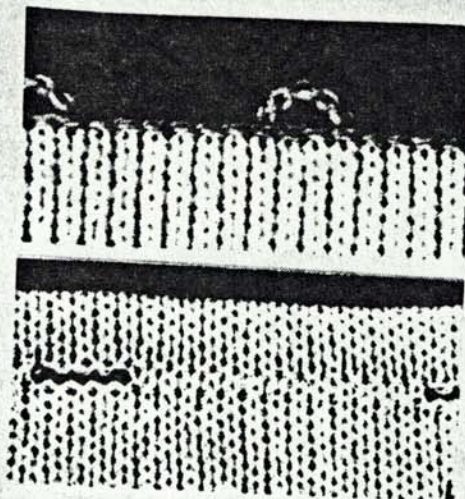


Fig 92

- 1) Trimming (tubular) stitch for stitch (loop for loop)
Trimming (ribbed) at the cast on course. "whale for whale" Fig 91.
- 2) Insertion of the cut knit piece to which the trimming is to be linked. Fig 90 and 91.
- 3) Folding over the trimming and placing it onto the points loop for loop. fig. 92.

7. BUTTONHOLES / POCKETS / LOOPS.

Using the above principle one can do pockets, loops, buttonholes or practically any related function.



GAUGE COMPATABILITY.

Most fine gauge knitting machines such as the Brother, Singer, Studio, Passap etc. are approximately 5 to 6 needles per inch. When the knitting is removed from the machine, in most cases it shrinks to between 9 and 10 stitches per inch. It is the shrunk or relaxed form of knitwear when it is linked. The linker should have approximately the same number of points per inch as the number of stitches per inch in the relaxed knitting. Generally, as a rule, the linking machine should have 2 more points per inch than the knitting machine has needles per inch. It is for this reason that the linker operator realizes that by changing the knitting machine tension it is simple to make the relaxed knitting contain the same number of stitches per inch as the linking machine will have points per inch on the dial. This makes linking an extremely quick and very simple operation.

Please do not expect to link very quickly in the first few hours but rather give yourself the experience of a few sweaters before becoming proficient with your linking machine.

CHARACTERISTICS OF THE LINKING MACHINE.

- (1) A ringed edge with a row of open points.
- (2) A sewing mechanism consisting of:
 - a. A pushbutton to disengage the point dial to bring the knitted piece/pieces into working position.
 - b. A variable speed control in the electrical foot pedal.
- (3) A base (or legs)
- (4) A yarn stand.