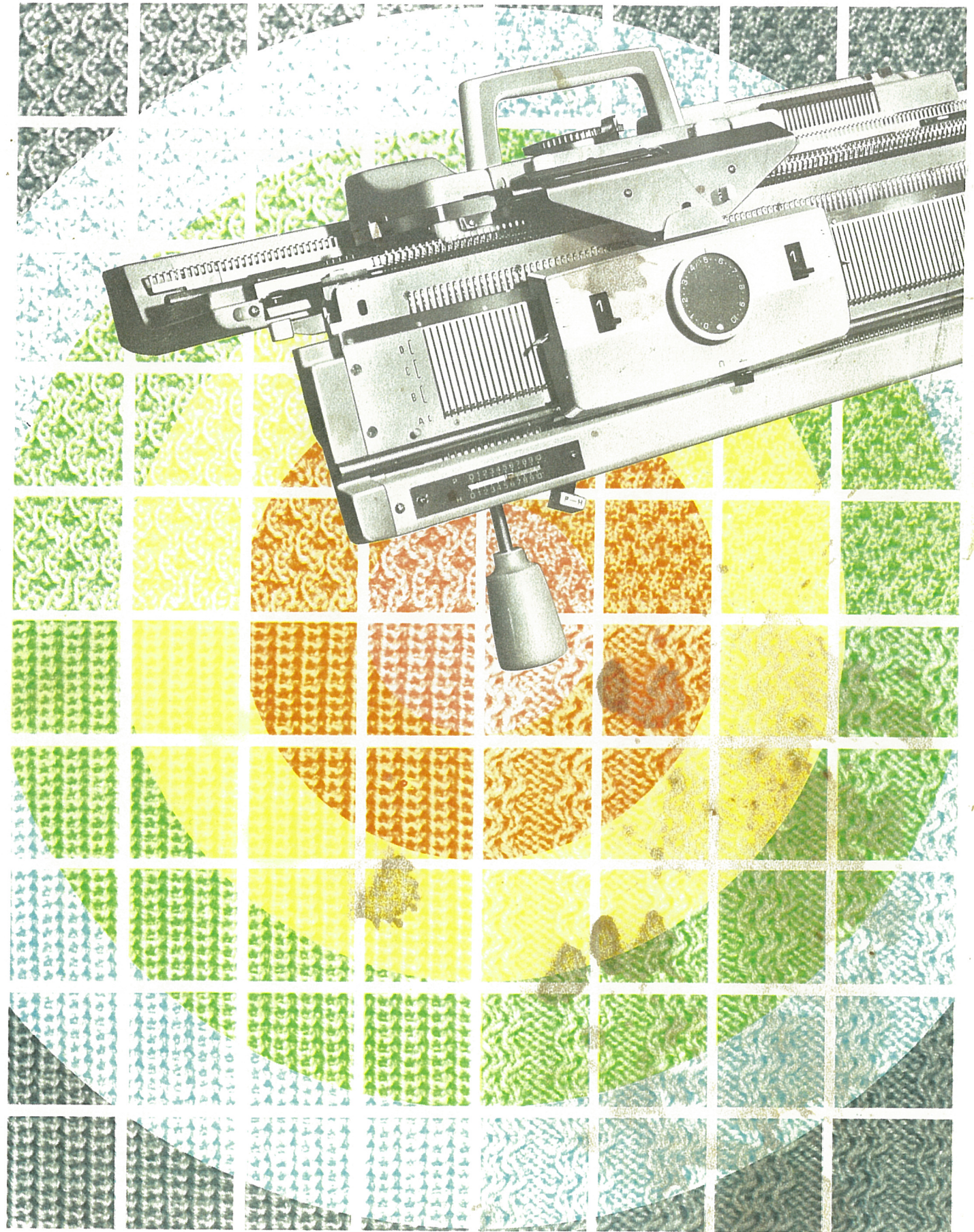


INSTRUCTIONS

RIBBING ATTACHMENT



INSTRUCTION MANUAL FOR THE RIBBING ATTACHMENT (RIBBER)

This is an ideal attachment for the knitting machine, MOD. 321. Attachment, the ribber, converts this 200 needle knitting machine into a 400 needle unit that will perform all of the functions of a double bed knitting machine while maintaining the ease of operation, simplicity and the portability of a single bed machine.

The ribbing attachment is of all double-steel construction and come complete with all tools and accessories necessary for operation.

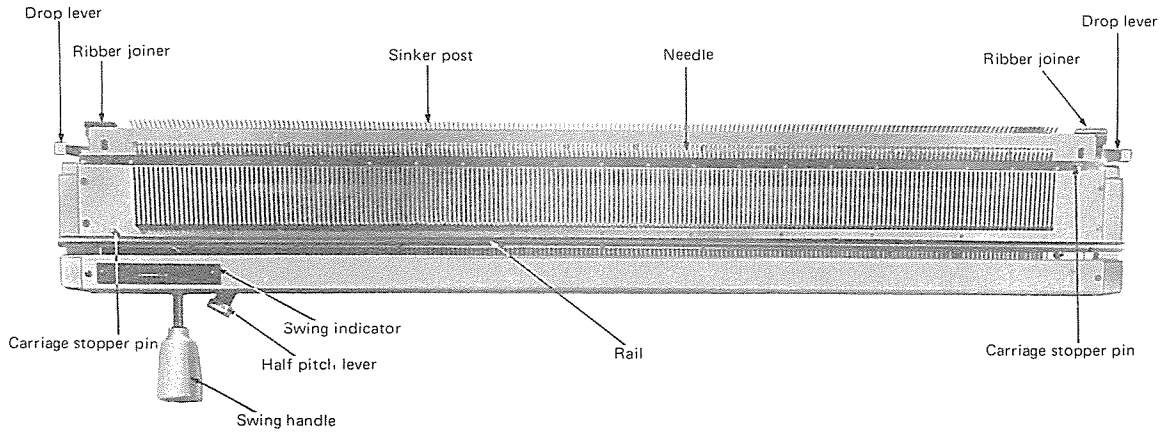
Please read the instruction manual for the knitting machine before you start with this manual.

Thank you and enjoy your knitting.

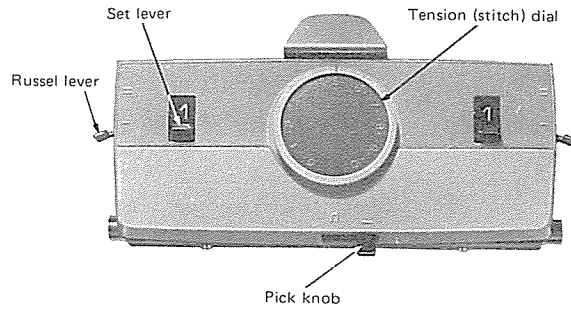
CONTENTS

1. SETTING UP THE RIBBER	1	Tubular Knitting	31
2. BASIC INFORMATION	5	Variation Swing	32
(1) Needle Positions	5	5. BASIC TECHNIQUES	33
(2) Ribber Carriage	5	(1) How to Transfer Stitches	33
(3) How to join the Ribber Carriage and Main-Machine Carriage	7	(2) How to Increase Stitches	34
(4) Relation between Half-pitch Lever and Needle Arrangement	8	(3) How to Decrease Stitches	34
(5) Swing Handle	9	(4) Partial Knitting	36
(6) Drop Levers	10	* Partial knitting for decreasing 1 knit 1 purl rib stitches	36
3. BOUND-OFF CAST ON	11	* Partial knitting for increasing 1 knit 1 purl rib stitches	38
(1) Needle-Arrangement	11	* Partial knitting in pop corn stitches	40
(2) Carriage Setting and Yarn Threading .	12	* Partial knitting for stitches involving "swing"	42
(3) Yarn Threading	12	6. USEFUL HINTS	43
(4) Suspending the Cast-on Comb	15	* What to do when one or more stitches have dropped	43
(5) Weights	15	* How to knit with the main-machine only while the ribber is attached. .	44
(6) Bound-off cast on	16	* How to remove the knit fabric	44
(7) Edge Weights	17	* What to do if the carriage jams	45
* How to use Wire for Fine Knitting	18	* Unraveling incorrect knitting	46
* Technique to make a pretty cast-on	19	* Replacing broken needles in the ribber	46
4. BASIC TYPES OF KNITTING	20	* When the edge stitches tend to float	46
1 Knit 1 Purl Rib	20	7. MAINTENANCE AND SERVICING	47
Double Rib	21	* Lubrication	47
English Rib	22	* After use care	47
Swung English Rib	23	8. RE-PACKING FOR STORAGE	48
Pin Tuck	24	9. PATTERN KNITTING	49
Pop Corn Pattern	25		
Herring Bone Swing	26		
2 Knit 2 Purl Rib	27		
2 Knit 1 Purl Rib	29		
3 Knit 3 Purl Rib	30		

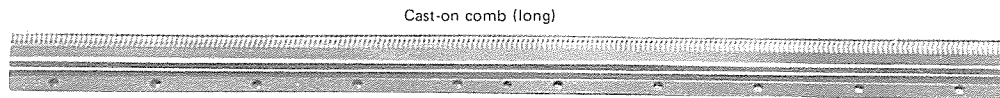
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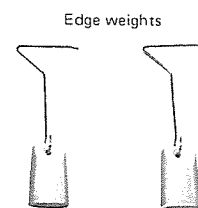
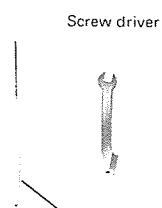
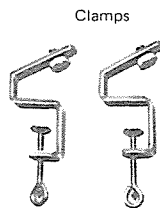
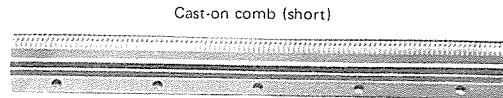
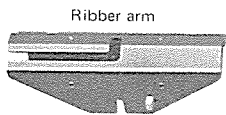
* CARRIAGE



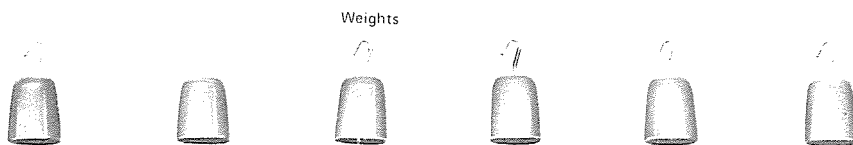
* ACCESSORIES



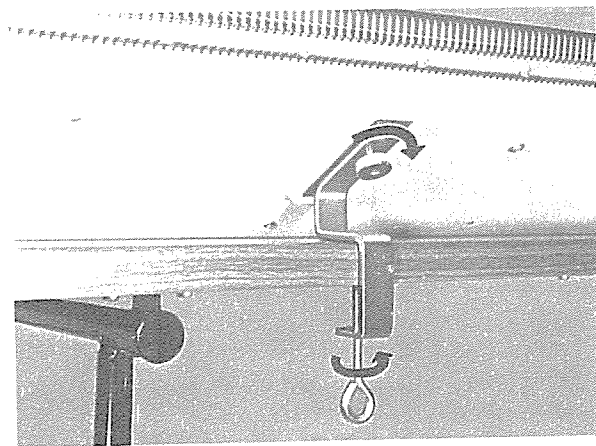
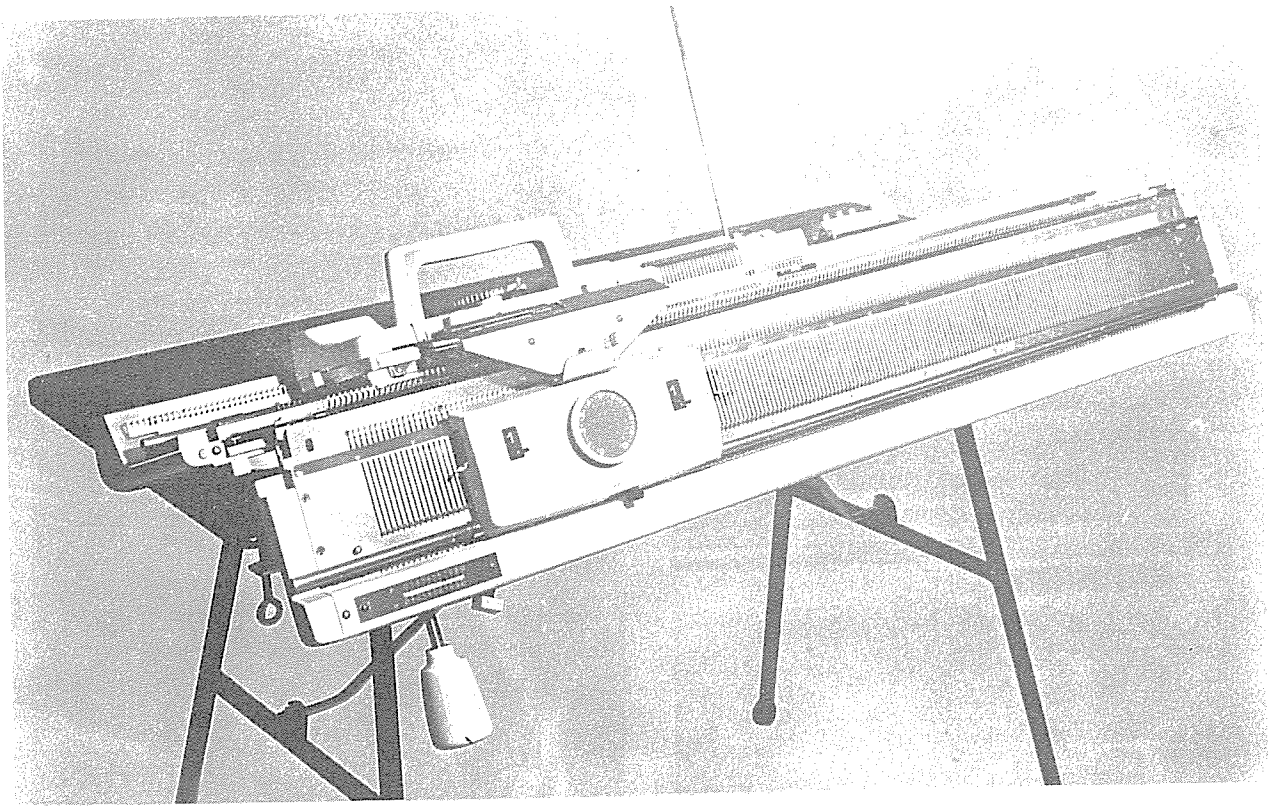
Wire for fine knitting



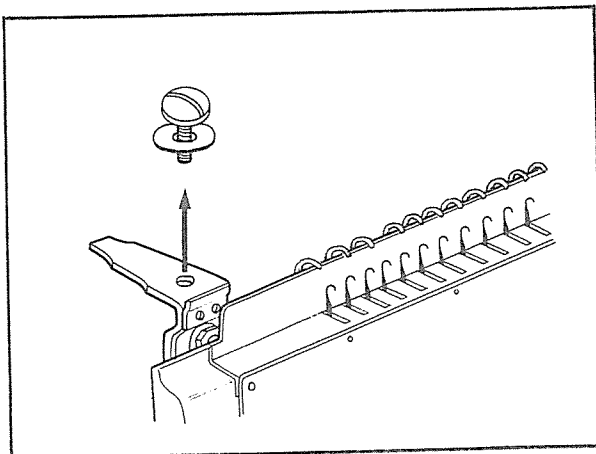
Double-eye transfer tool



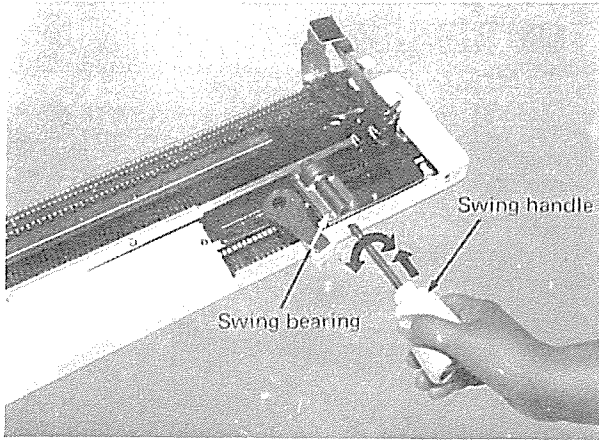
1. SETTING UP THE RIBBER



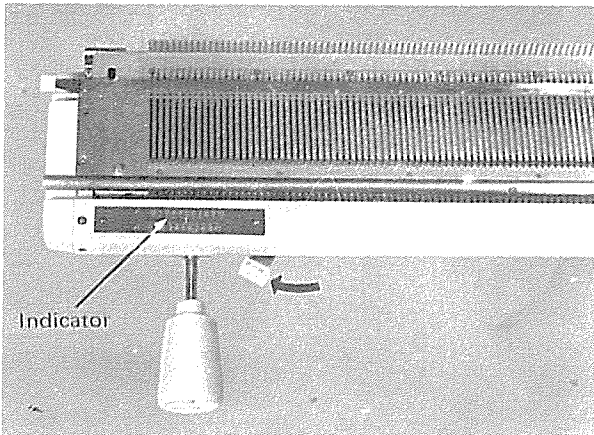
- (1) Mounting holes are provided on the bottom of the main-machine. Secure the ribber clamps to these holes, and mount the main machine on the table by means of these clamps. (Do not use any other clamps.)



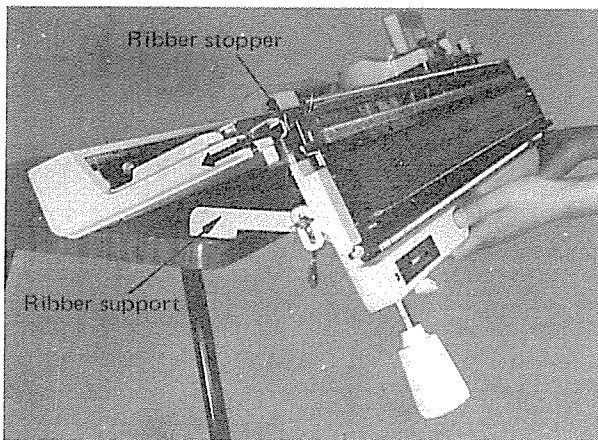
- (2) Ribber joiner screws and washers will be found on the right and left ribber joiners. Remove these screws and washers.



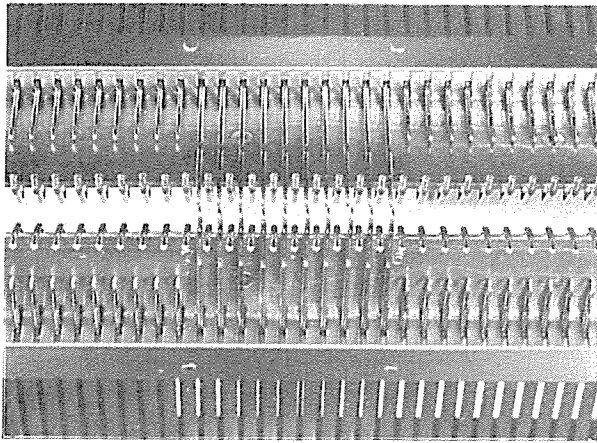
- (3) Insert the forward end of the swing handle into the swing bearing, which is located in the lower left-hand side of the ribber. Push the handle in a twisting manner until you hear a sharp click with a slight jerk.



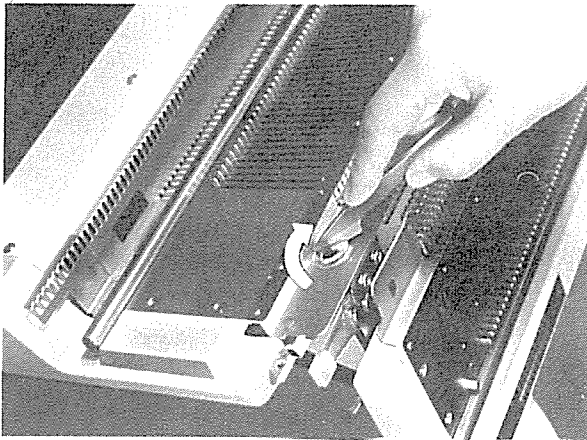
- (4) Swing the half-pitch lever to the left (P). Turn the handle to 5 in the indicator.



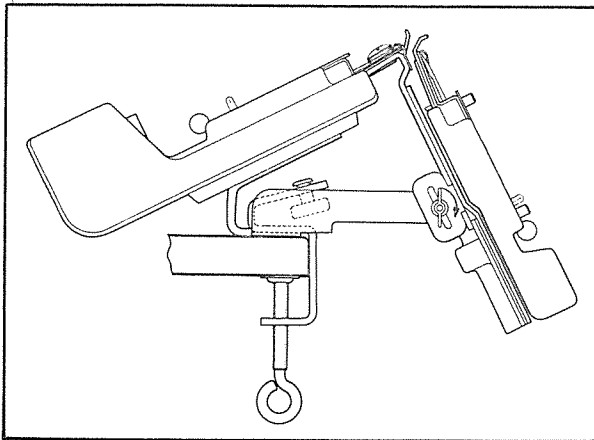
- (5) Rest the ribber supports, one support at each side of the ribber, on the table top. Insert the ribber-joiners into the ribber mounting holes in the main-machine, and push the ribber until the ribber stopper is firmly against the front edge of the main-machine needle bed.



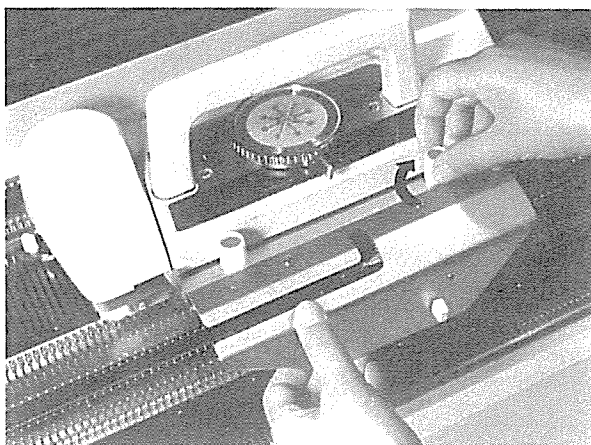
(6) Adjust the ribber and main-machine to line up the rows of latch needles, so they will be exactly in line with each other. (Point-to-point)



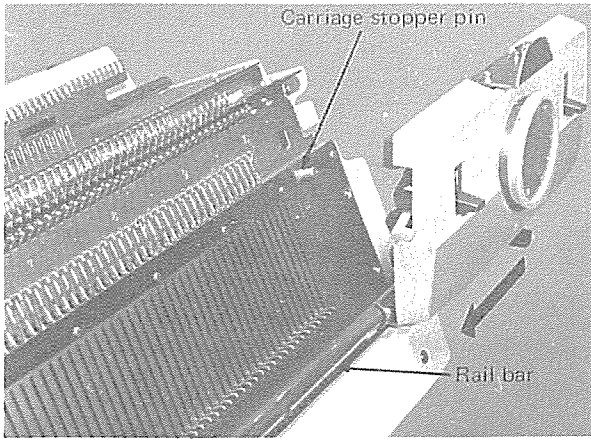
(7) At each side, insert the ribber joiner screw with the washer correctly positioned, and tighten the screw with the screwdriver.



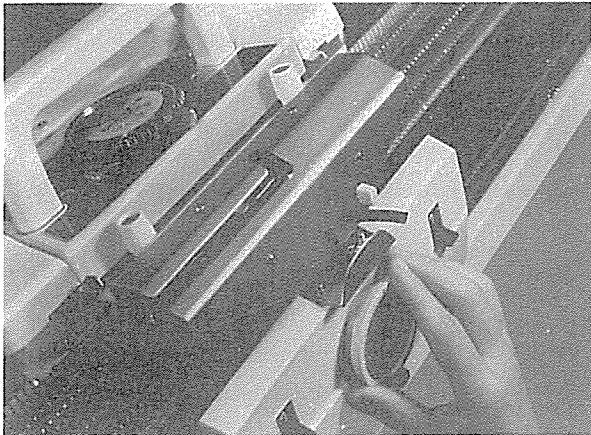
(8) Fit the Clamps (belonging to the main-machine) to the inner side of the ribber supports and secure them on the table. Tighten the nut of the ribber supports.



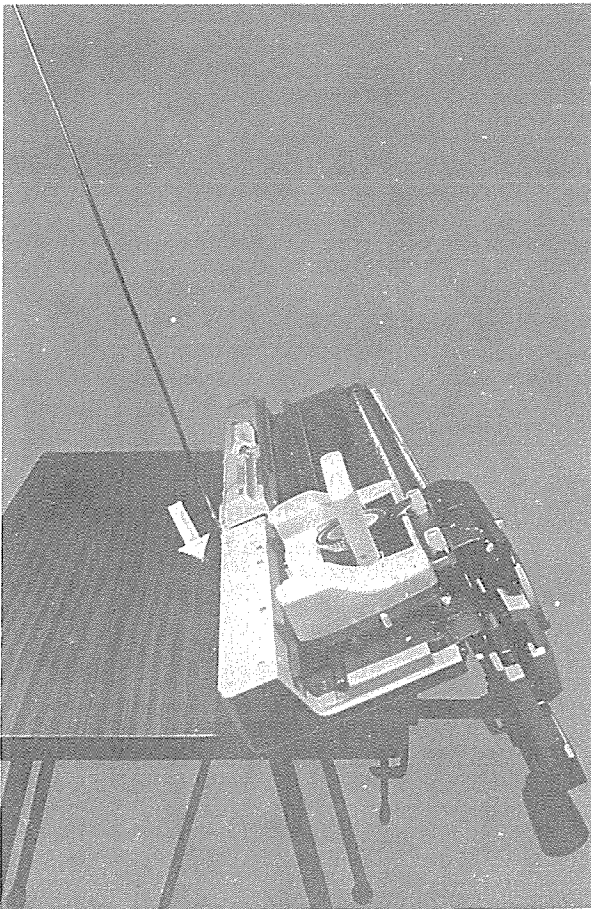
(9) Loosen the main-machine carriage arm nuts. Insert the ribber arm into this carriage as far as it will go, and secure the arm by tightening the nuts.



- (10) Mount the ribber carriage by fitting its pipe onto the rail from the right-hand side. Tilt the carriage toward you just a little, so that it will clear the carriage stopper pin. (The ribber carriage can be attached "only" from the right-hand side.)



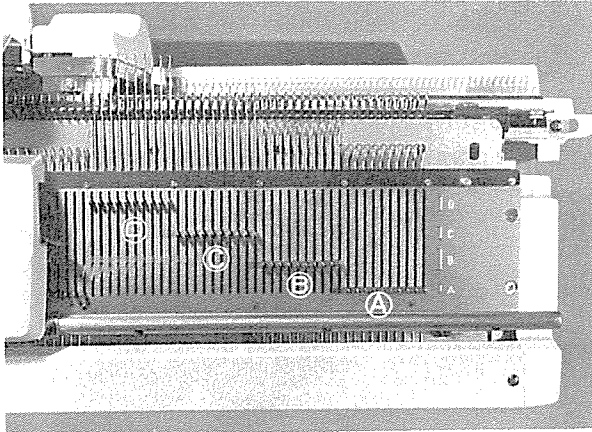
- (11) Connect the ribber carriage with the arm, by fitting the link pin into the slot provided in the arm, which has been mounted to the main-machine carriage. Be sure to push this pin into the hole until a click is heard.



- (12) Insert the yarn rod on the main-machine. The yarn rod should be angled as shown.

2. BASIC INFORMATION

<1> NEEDLE POSITIONS



There are four positions: A, B, C and D. These are marked on the face of each end portion of the needle bed. Each position refers to a range marked by]. For instance, needles to be in A position must have their butts aligned within the range of A.

A Position

Needles in this position do not operate.

B Position

Needles in this position perform knitting.

C Position

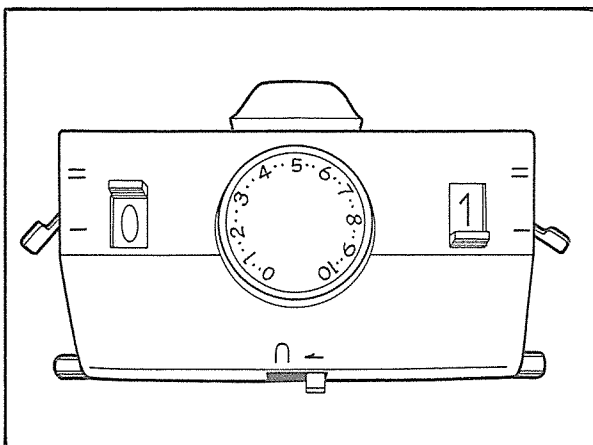
This position is used mainly in partial knitting, such as increasing the number of stitches in the row. The needles have stitches or loose yarn behind the latch.

D Position

Some needles have to be pushed into this position in partial knitting or in manual selection of needles. In this position, they do not knit, they are resting.

<2> RIBBER CARRIAGE

(1) Set Levers



The set levers are means of choosing between knitting and non-knitting for B position needles, and has two positions: 1 and 0.

1 position

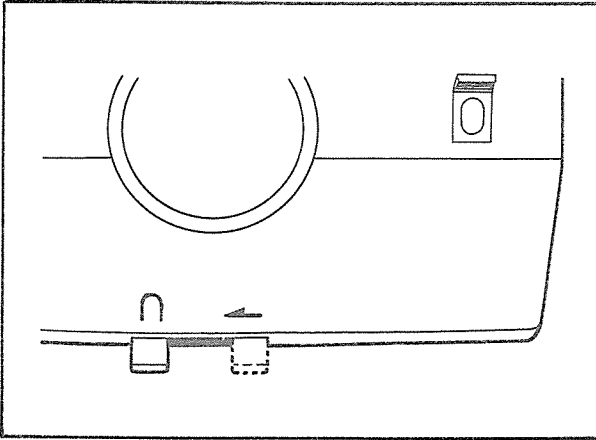
Needles in B position will knit.

0 position

Needles in B position will not knit.

The right set lever works when the carriage moves toward the right and the left set lever toward the left.

(2) Pick Knob



This knob is effective when the set lever is in 0 position. It controls the knitting action of B position needles, as follows

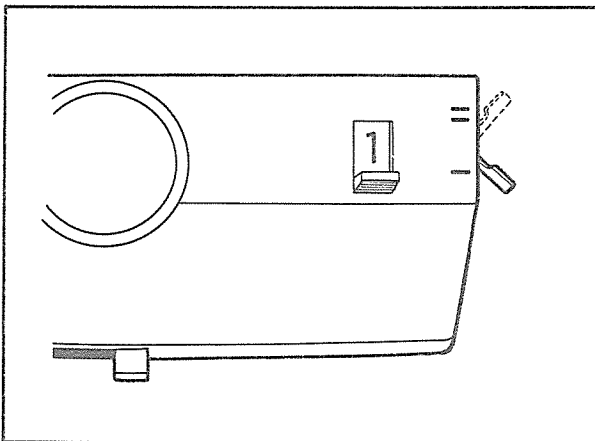
∩ Tuck stitch position

The B position needles catch the yarn.

← Slip stitch position

The yarn does not hook onto the needles in B position.

(3) Russel Levers



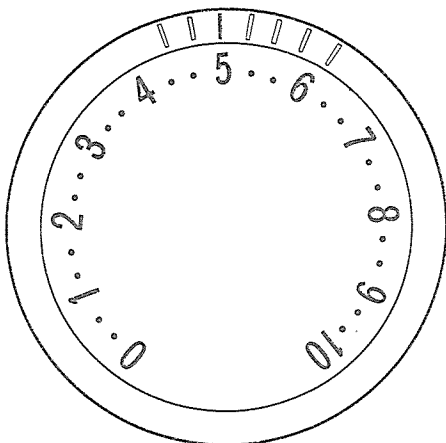
These levers control needles in D position. It has two positions: — and =.

— D position needles remain and will not knit.

= D position needles will knit and be lowered to B position.

The right Russel lever works when the carriage moves toward the right, and the left lever toward the left

(4) Tension (Stitch) Dial

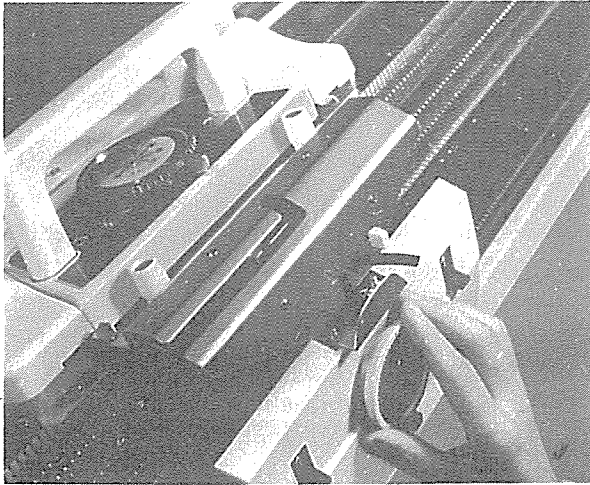


This dial determines the size of the stitch to be made. The larger the number on the dial, the larger the stitch and the smaller the number on the dial, the smaller the stitch. The factors of proper stitch dial settings are: WEIGHT OF YARN, TYPE OF KNITTING and SETTING of MAIN-MACHINE STITCH DIAL.

GUIDE FOR PROPER SETTING OF STITCH DIAL

Weight of yarn	Type of knitting			
	1-K 1-P rib	Double rib	2-K 2-P rib	Tubular
Light weight	—	0 ~ 1	—	2 ~ 3
Medium weight	1 ~ 2	3 ~ 4	4 ~ 5	4 ~ 5
Heavy weight	6 ~ 7	—	8 ~ 9	—

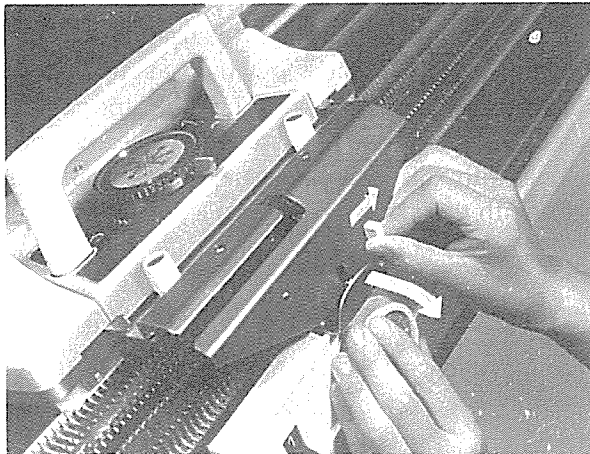
< 3 > HOW TO JOIN THE RIBBER CARRIAGE AND MAIN-MACHINE CARRIAGE



The two carriages joined together form a complete carriage unit (referred to simply as the carriage). Joining and disjoining is very simple, involving the use of only two parts: link pin and knob.

How to Join

Bring the link pin to the arm, with the ribber carriage slightly lifted off the needle bed. Push the pin into the slot provided in the arm. The pin will snap into position.

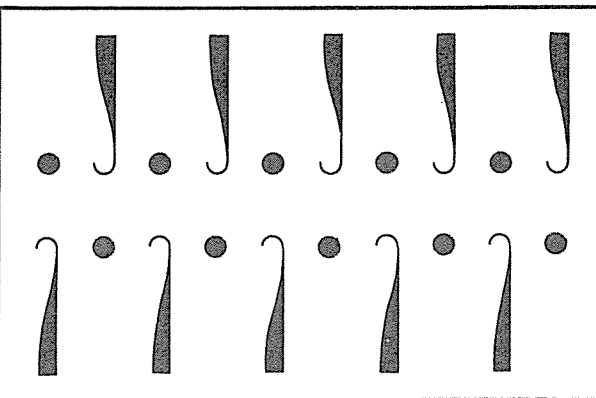
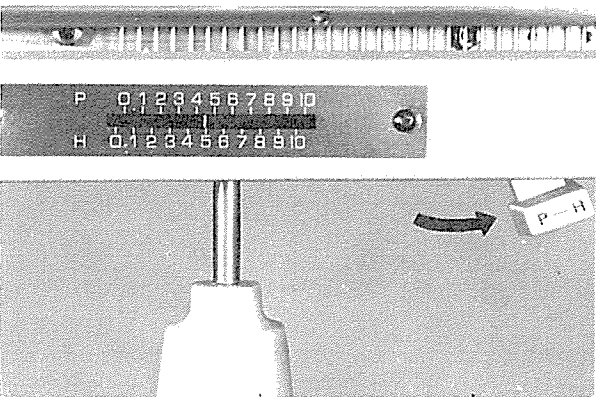
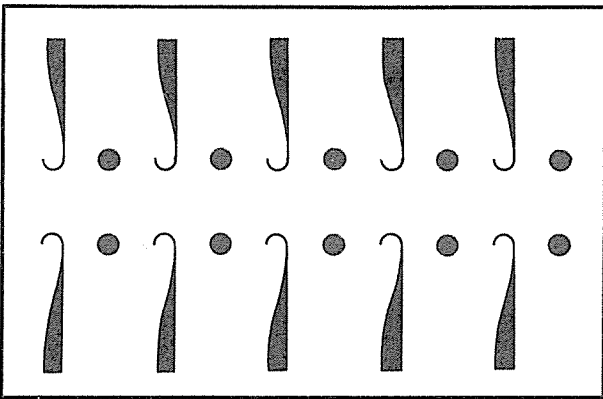
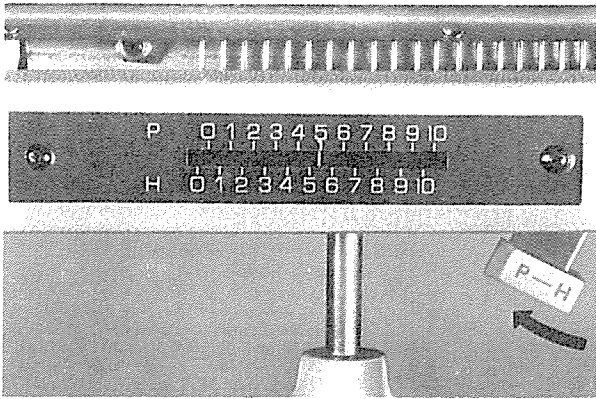


How to Disjoin

Push the knob to the right, as shown, and pull the ribber carriage forward to get the pin out of the slot.

< 4 > RELATION BETWEEN HALF-PITCH LEVER AND NEEDLE ARRANGEMENT

(How to Match Ribber Needles to Main-Machine Needles)



There are two possible positions the ribber needles can take with respect to those of the main-machine. Which position the ribber needles will take is determined by the half-pitch lever, as follows:

P Position

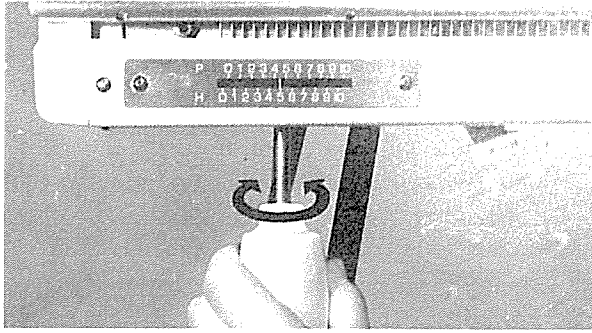
(Note: "Pitch" is the distance between two adjacent needles.)

This is the left-hand position of the lever. In this position, the two groups of needles are lined point-to-point. Advancing both groups of needles at the same time will make them collide, and must be avoided to protect the needles. In this case, push every other needle to A position so that needles of both beds stagger. This line up is for 1-K 1-P ribbing. With the half-pitch lever in this position, the indicator pointer comes to a number on the P scale.

H Position

Moving the lever to the right staggers the ribber needles by a half-pitch relative to the main-machine needles, as shown. The indicator pointer gives a number on the H scale. Needles can not collide with this arrangement. Double ribbing is made with this staggered line-up.

< 5 > SWING HANDLE



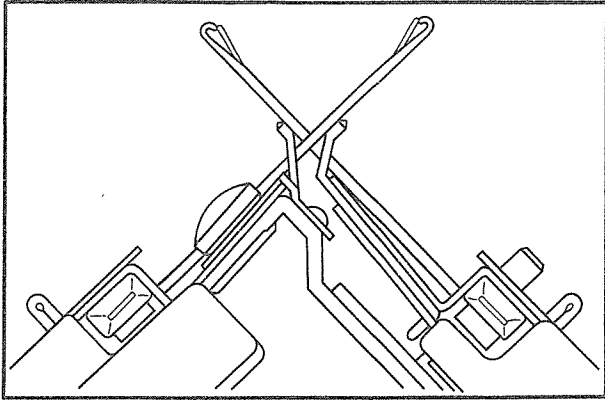
The swing handle is for swinging, or shifting the ribber needle bed from side to side. Maximum swinging is 10 pitches. Rotating the handle, as shown, shifts the ribber toward the right or the left.

This feature is used in making such swing patterns as HERRINGBONE, WEB etc.

The amount of swing or movement is indicated by number. With the half-pitch lever moved to the left (P) side, the amount of swing is to be read on the P (upper) scale.

With the half-pitch lever moved to the right (H) side, the amount of swing is to be read on the H (lower) scale.

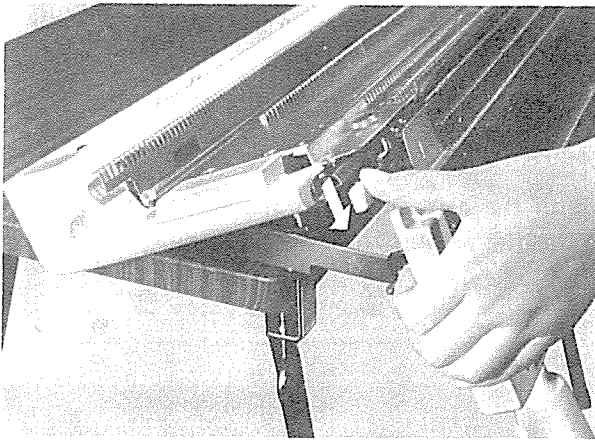
Caution: The full length of the needle bed can be used in making a broad fabric. In this case, there is not much space at the right and left-hand sides of the bed for carriage over-travel. The carriage may hit the carriage stopper pin. NEVER BANG THE CARRIAGE AGAINST THE PIN. Banging, or strong shock against the pin can disturb the swing setting of the machine.



Note: When both main-machine and ribber needles are in D or C position and will cross each other as shown, do not swing the needle bed, or the needles may be damaged.

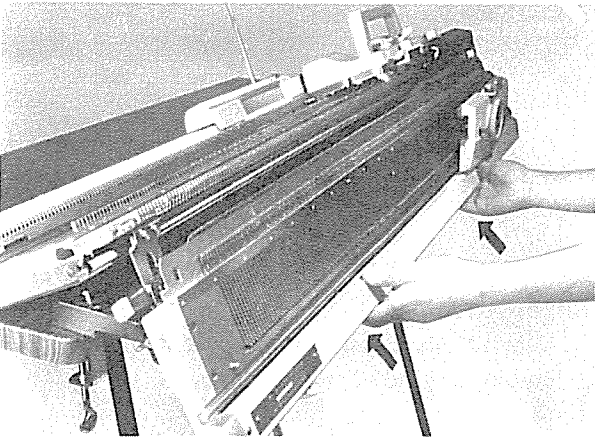
When the knitting operation does not involve any swing, turn the handle to position with the pointer at 5 on the scale.

< 6 > DROP LEVERS



There are two drop levers, one at each side of the ribber. By depressing these levers, the ribber can be lowered as much as 2 centimeters ($\frac{3}{4}$ in.)

This feature is to be used when; (1) knitting with main-machine only, (2) attaching knit fabric to the main-machine with the ribber connected, or (3) picking up dropped stitches.



To restore the ribber to the original position, lift it by hand, as shown, and the ribber will snap back into position.

Before you resume knitting, line the ribber needles at their original position (B position) which were disturbed when the ribber was dropped.

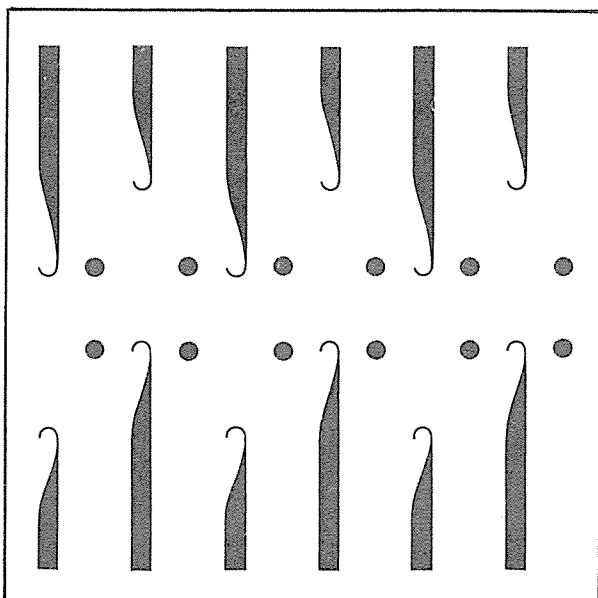
3. BOUND-OFF CAST-ON

With the main-machine connected with the ribber, knitting can be started right away from a "bound-off" row. There being no need of making a waste knitting, or a "bound-off" row by hand

Note: For making prettier cast-on, refer to page 19.

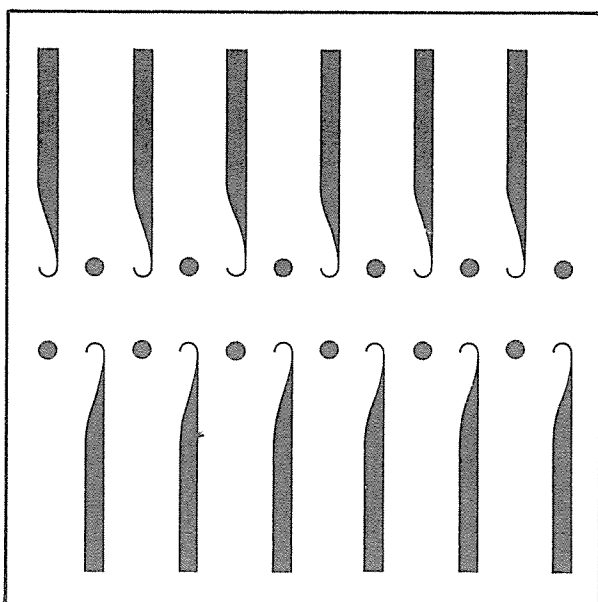
< 1 > NEEDLE ARRANGEMENT

Needles are to be arranged according to the type of knitting. Two types will be demonstrated here.



Type A. 1-knit 1-purl Rib (Every other needle)
Set the half-pitch lever to P position (left position). Bring the necessary number of every other needle in the main-machine to B position, using the 1 x 1 needle pusher and centering these needles at the "0" mark on the needle bed.

Bring every other needle in the ribber to B position staggering them with needles in the main machine.



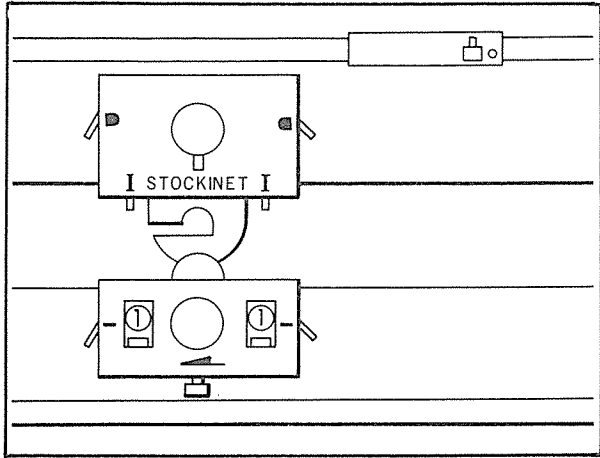
Type B. Double Rib

(Every needle on each bed)
Set the half-pitch lever to H position (right position). Needles will be staggered. Bring the necessary number of main-machine needles to B position, using every needle. Use the straight edge of the needle pusher, centering these needles at the "0" mark.

Bring the desired needles of the ribber to B position using every needle.

Needle setting for other types of knitting will be explained later.

<2> CARRIAGE SETTING AND YARN THREADING

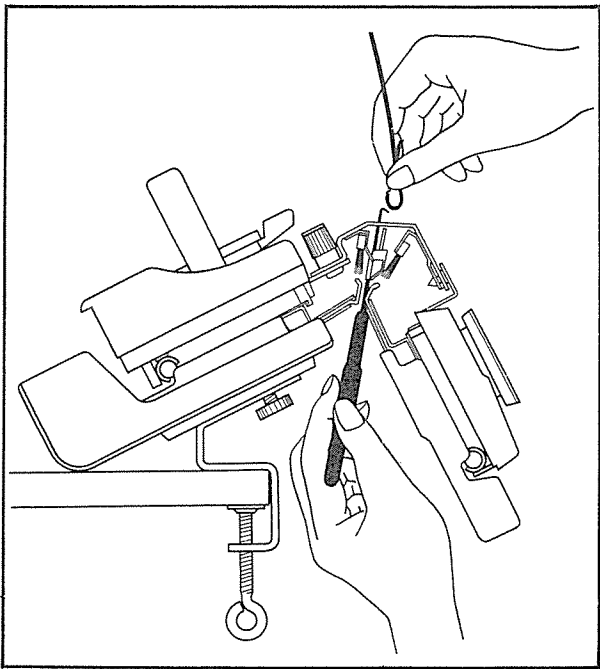


Set the two carriages as follows:

Main-machine carriage	Position	
Cam lever	STOCKINET	
Russel levers . . . . .	|	(both)
Side levers	■	(both)
Stitch dial	0	
Ribber carriage	Position	
Set levers	1	(both)
Pick knob	←	
Russel levers	—	(both)
Stitch dial	0	

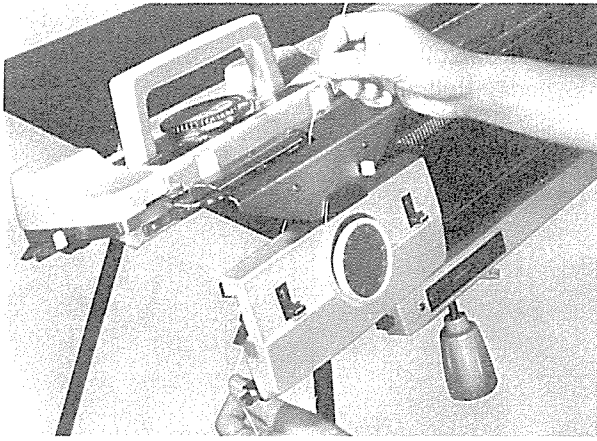
Pass the carriage (two carriages locked together) across two or three times to line the needles evenly.

<3> YARN THREADING



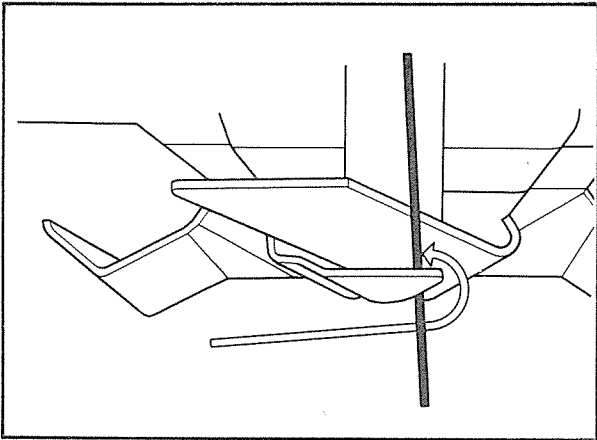
Method 1

- (1) Bring the carriage to the left side of the machine.
Pull the yarn from the auto-tension, loop the free end of the yarn, and let it drop through yarn feeder.
- (2) From underneath, extend the hook tool through the yarn feeder. Catch the yarn loop with the hook tool and pull the yarn down.

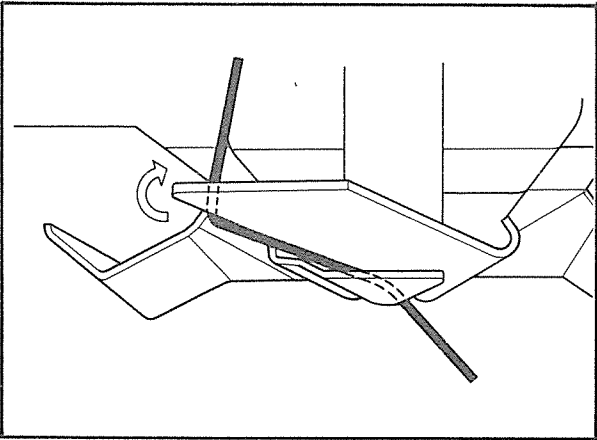


Method 2

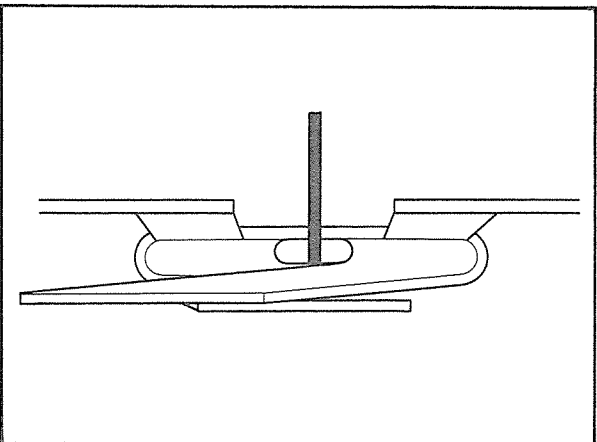
- (1) Bring the carriage all the way to the left side of the machine so that only half of carriage is on the machine bed.
- (2) Pull the yarn from the auto-tension, and pass it through the groove in the left portion of the arm, bringing the yarn end toward the center.



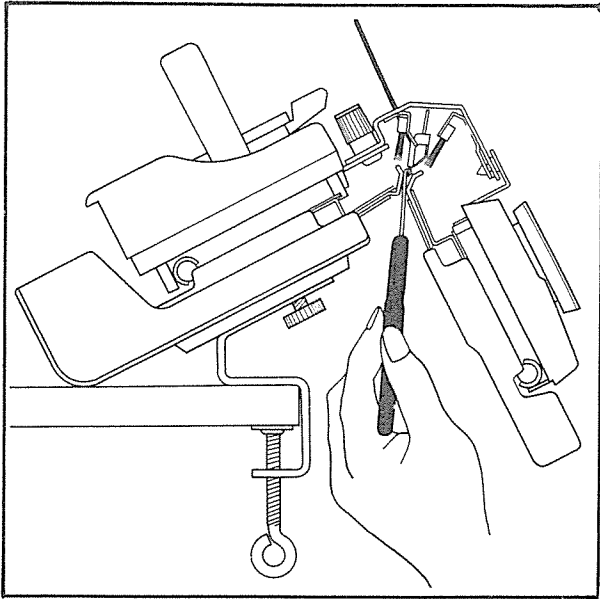
- (3) Feed the yarn into the right outer fold of the yarn feeder.



- (4) Route the yarn along the clearance in the fold, pull the yarn end all the way to the left, and pass it into the feeder.

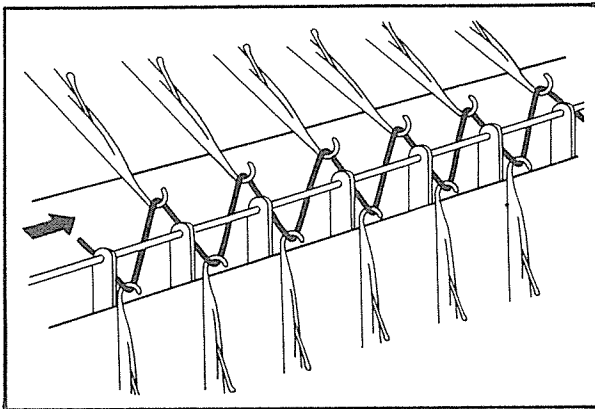
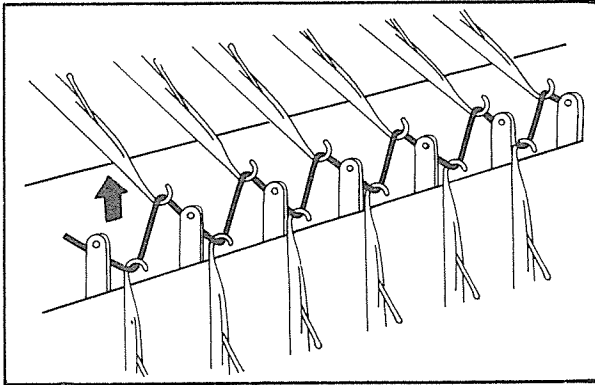


- (5) Pull the yarn downward, so the yarn will get in the hole in center of the yarn feeder.



- (6) Move the carriage to the right until the yarn feeder comes up between the two needle beds. Pull the yarn down through the clearance between the two rows of sinker posts by using the hook tool. Let it hang down.

< 4 > SUSPENDING THE CAST-ON COMB



Passing the Yarn Over the Needles

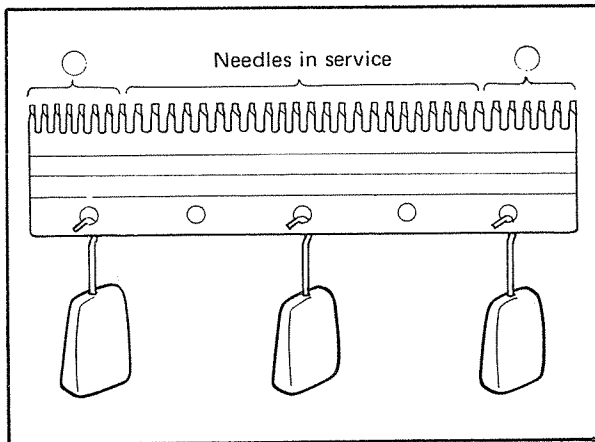
Hold the hanging end of yarn by one hand. Move the carriage from left to right. The yarn will be laid alternately onto the two rows of needles in service in a zigzagging pattern.

Suspending the Cast-On Comb

- (1) Two combs are furnished with the machine. Long one is a 200-tooth comb; the shorter is a 100-tooth comb. Use the one that suits the number of needles to be worked.
- (2) Remove the wire from the comb. Insert the comb between main-machine and ribber, as shown. Make sure the comb teeth clear the zigzagged yarn above the needles.
- (3) Insert the wire through the comb teeth, and let the comb hang.

Note: Be sure the comb is well balanced against the working needles to keep it in a horizontal position.

< 5 > WEIGHTS



The chart below serves as a reference for determining the number of weights that should be attached to the comb. It is very important to distribute two or more weights to obtain a good balance as shown in the illustration.

STANDARD NUMBERS OF WEIGHTS FOR DIFFERENT NUMBERS OF STITCHES

Number of stitches		Number of weights
Up to	30	1
30	~ 60	2
60	~ 90	3
90	~ 120	4
120	~ 150	5
150	~ 200	6

The chart is good for 1-K 1-P rib using medium weight yarn, but can be used as a rough guide for other types of knitting.

< 6 > BOUND-OFF CAST-ON

Steps < 1 > to < 5 >, is a preparatory cast-on procedure. In the combination of main-machine and ribber, knitting can begin by "binding off" the initial row of rib stitches.

An operational chart is given to cover the complete sequence of steps 1–5 for "cast on" and "bind-off"

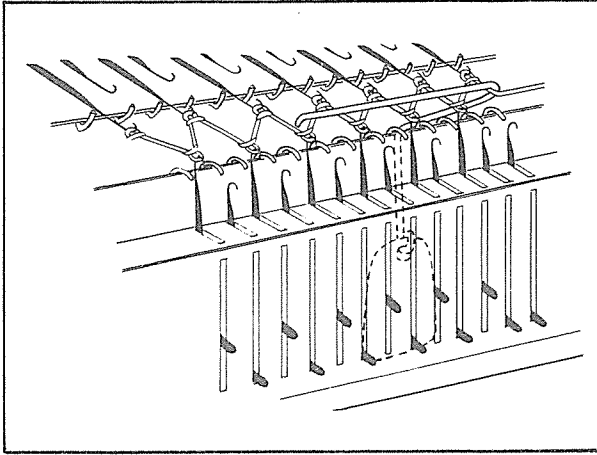
Note: Similar charts will be used in the next section of this manual when the basic types of knitting are explained. (Page 20)

		Needle arrangement						Half pitch lever		
		1K 1P rib			Double rib			1K 1P rib		P
		Double rib						Double rib		H
Order	Main machine carriage			Ribber carriage			Swing pointer	Direction	Remarks	
	Cam lev.	Russel lev. (both)	Side lev. (both)	Set lev.	Pick knob	Russel lev.				
(1) Cast-on	1	STOCK-INET	|	▣	① ①	←	--	5	→	Suspend the cast-on comb with weights
	2	"	"	"	⊙ ①	"	" "	"	←	} Bound-off cast-on
	3	SLIP	"	"	" "	"	" "	"	→	
	4	STOCK-INET	"	"	" "	"	" "	"	←	

- (1) In the above chart, "needle arrangement", "half-pitch lever" and step 1 in "order" have all been covered by previous chapters < 2 > through < 5 >, pages 12 ~ 15. If you have followed these steps, begin with step 2 in the above chart.
- (2) In step 2, move the carriage from right to left, with the levers and knobs set as shown (symbols are used in the chart). The main-machine needles knit one row while the ribber needles do not knit.
- (3) In step 3, move the carriage from left to right (The ribber needles knit).
- (4) In step 4, move the carriage from right to left. (The main-machine needles knit).
- (5) Step 4 completes the binding off of a fabric to be knit. There are many types of knitting, some of which are explained in the next section. Select the desired type of knitting and continue the operation following Step 4.

Note: In the chart, "remarks" column carries some explanatory notes, special instructions or changes in needle arrangement etc.

<7> EDGE WEIGHTS



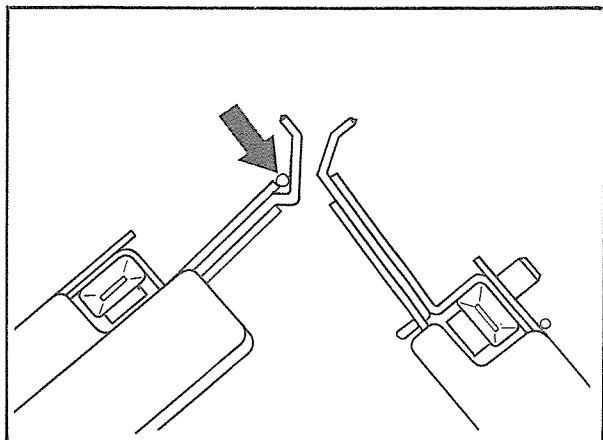
After binding off, move the carriage back and forth to knit in order to make the type of knitting you have chosen. After several rows of knitting, edge weights should be attached on the end of the fabric being knit. This is called "edge weighting", and is to be carried out as follows:

There are two edge weights with the accessories. These weights should be suspended from the yarn zigzagging between the two groups of needles, as shown, in order to prevent the tendency of edge portions to float.

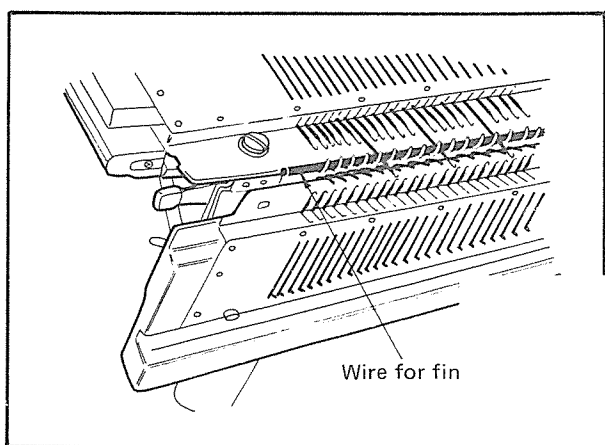
The edge weight must be brought in from underneath, through the clearance between main-machine and ribber, to pass the hook over the zigzagging yarn. Resume knitting and knit ten or more rows. Repeat the above procedure by moving the edge weights up in order to attain better balance.

* **How to use Wire for Fine Knitting**

The wire is used for knitting with light weight yarn or summer yarn (chemical).



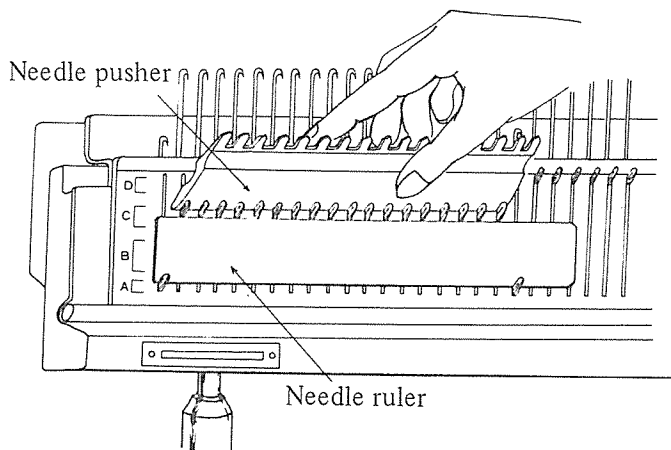
- (1) Before arranging needles for cast-on, place the wire between the main-machine sinker posts and the front edge of the needle bed.



- (2) Arrange needles.
- (3) Pull a needle every twenty or so needles in B position of the main-machine to D position.
- (4) Set the Russel lever of the main-machine carriage to II position and follow cast-on instruction.
- (5) Start knitting in ordinary way.

HOW TO USE "NEEDLE RULER"

Needle Ruler is provided for lining up needles correctly at C position following the instructions on column (2) on page 19.

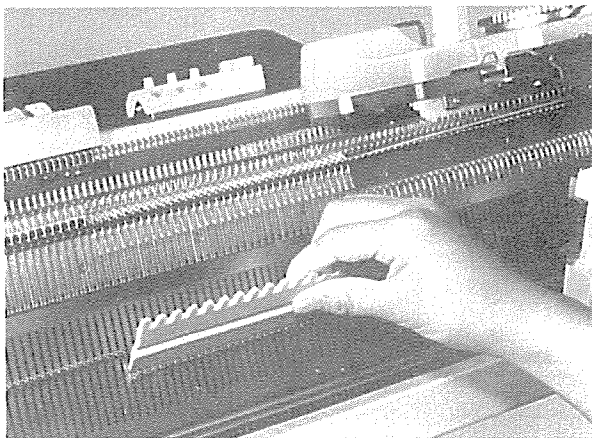
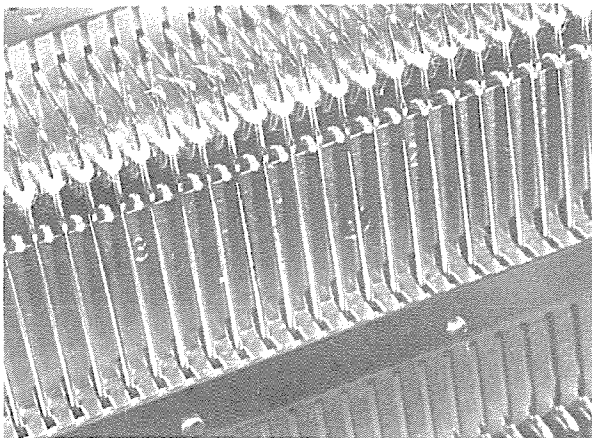
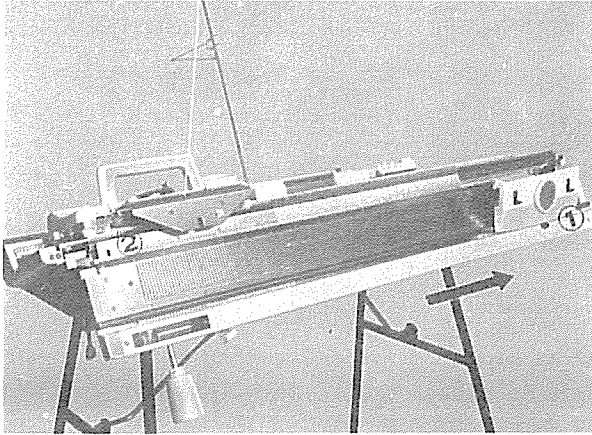


1. Push the necessary number of needles to D position. (Leave one needle every 20 or so needle at A position for double rib.)
2. Place the needle ruler on the needle bed as in the sketch and push the needles in D position to C position at the butts by using a needle pusher. Thus line up all the needles in D position at C position by removing the needle ruler sideways.
3. For double rib, push the needles in A position back to C position by using the needle pusher.

*** Technique to make a pretty cast-on**

Initial stitches tend to become large and often lose the stitch shape when casting on with light-weight yarn. The same thing can be said of casting on to make a fabric with closely knit stitches. To avoid such a tendency, proceed as follows:

- * Before arranging needles for cast-on, place "the wire for fine knitting" between the main machine sinker posts and the front edge of the needle bed.



Have the needles arranged for 1-K 1-P rib or double rib knitting and set the carriage in the usual manner.

- (1) Disconnect the ribber carriage from the main carriage, and move the ribber carriage all the way to the right.
- (2) With the needle pusher, push the ribber needles in B position to C position. Do not advance these needles beyond C position. Make sure the latches on these needles are open.

* In this case, the needle ruler should be used.

- (3) Set the tension dial at 0, pass the yarn through the yarn feeder, and run the main-machine carriage from left to right. (This movement will lay the yarn in the main-machine needle hooks and over the ribber needle latches (which are open) in a zigzag pattern.)

- (4) With the needle pusher, push the ribber needles in C position back to B position.

- (5) Attach the cast-on comb and weights.

- (6) Connect the ribber carriage with the main-machine carriage, and make a bound-off row. For the binding off for cast-on and other details, refer to the preceding instructions.

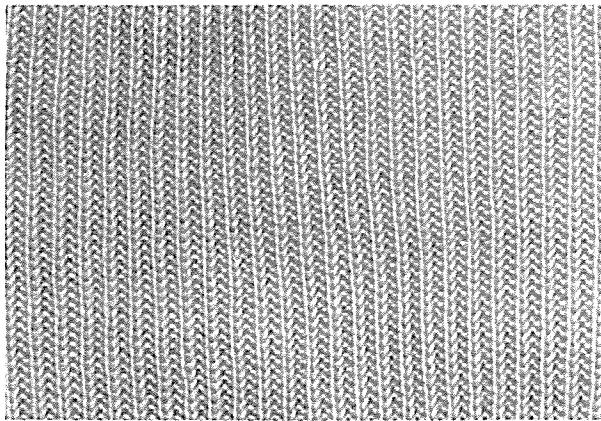
4. BASIC TYPES OF KNITTING

A wide variety of knits are possible with this ribber combined with the main knitting machine. From the relatively simple 1-K 1-P rib stitch to beautiful but somewhat complex lace stitch, there is a broad range of stitch formations, from which you can select one suited to your purpose.

Common to all these types in the use of your knitting machine are the following reminders:


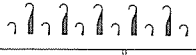

- Balance the cast-on comb with weights, centering the comb in the fabric being knit, and making sure the following rows will hang down without tilting at either side.
- When making the bound-off row or casting on, be sure to tighten the tension dial. (the tension dial is set in "0" position)
- Set the stop knob (on the pattern panel) to ● position.
- Each knitting (operational) chart shows the order of cast-on steps among other items of information. If you have already completed the cast-on directions, when you start referring to a chart, follow the steps in the second part of "order", namely, "(2) Main knitting (To be repeated)".

1 KNIT 1 PURL RIB



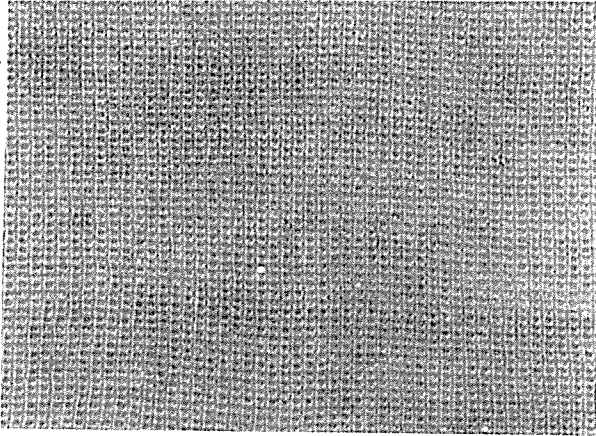
This is the fundamental rib stitch. Every other needle is used in the main-machine as well as in the ribber, and these needles perform knitting action by advancing alternately. On both the right and wrong sides of the fabric, the right side of the stitch and the wrong side of the stitch show up alternately in vertical direction. The fabric is soft and, in horizontal direction (in the direction of the row), particularly elastic.

* The example demonstrated here uses medium-weight woolen yarn.

Needle arrangement										
		Main machine 					Half pitch lever P (left)			
		Ribber 								
Order	Main machine carriage			Ribber carriage			Swing pointer	Direction	Remarks	
	Cam lev.	Russel lev. (both)	Side lev. (both)	Set lev.	Pick knob	Russel lev.				
(1) Casting on	1	STOCK-INET	|	■	① ①		— —	5	→	Suspend the cast-on comb with weights
	2	"	"	"	① ①	"	" "	"	←	} Bound off cast-on
	3	SLIP	"	"	" "	"	" "	"	→	
	4	STOCK-INET	"	"	" "	"	" "	"	←	
(2) Main knitting (To be repeated)	1	"	"	"	① ①	"	" "	"	→	
	2	"	"	"	" "	"	" "	"	←	

- (1) Set the needles by referring to the needle arrangement diagram. Keep the half pitch lever in its left (P) position.
- (2) With the carriages set as indicated in the "casting on" columns (1), make a 1-K 1-P rib bound-off row. (Details of the binding-off method are given in page 16.)
- (3) Steps 1 and 2 in the "main knitting" column (2) are to be repeated, until the desired ribbing is completed.

DOUBLE RIB



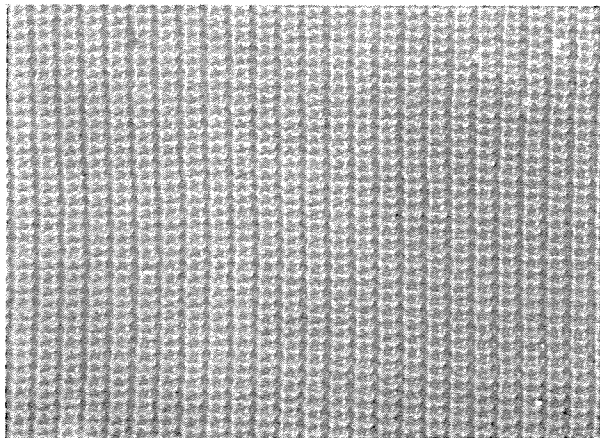
Every needle within the range for the desired width of the fabric performs knitting action in both main-machine and ribber. The structure of the fabric is practically identical to that of the 1-K 1-P rib fabric.

* The example here uses light-weight yarn.

Needle arrangement										
							Half pitch lever H (right)			
Order	Main machine carriage			Ribber carriage			Swing pointer	Direction	Remarks	
	Cam lev.	Russel lev. (both)	Side lev. (both)	Set lev.	Pick knob	Russel lev.				
(1) Casting on	1	STOCK-INET	|	■	① ①		-- --	5	→	Suspend the cast-on comb with weights
	2	"	"	"	① ①	"	" "	"	←	} Bound off cast-on
	3	SLIP	"	"	" "	"	" "	"	→	
	4	STOCK-INET	"	"	" "	"	" "	"	←	
(2) Main knitting (To be repeated)	1	"	"	"	① ①	"	" "	"	→	
	2	"	"	"	" "	"	" "	"	←	

Note: The knitting sequence is the same as for the 1-K 1-P rib stitch. The differences are in the setting of the half-pitch lever and the needle arrangement.

ENGLISH RIB



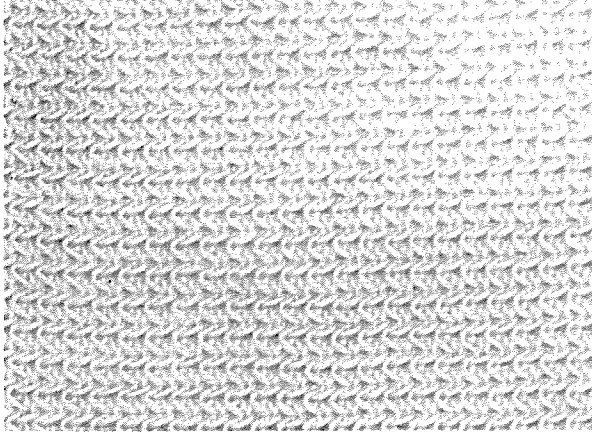
This stitch results from effecting the tucking or pulling-up operation on one side of the fabric made in 1-K 1-P rib or double rib stitches.

* The example shown here uses medium-weight yarn. It is made from a 1-K 1-P rib knitting.

Needle arrangement									Half pitch lever P (left)	
Order	Main machine carriage			Ribber carriage			Swing pointer	Direction	Remarks	
	Cam lev.	Russel lev. (both)	Side lev. (both)	Set lev.	Pick knob	Russel lev.				
(1) Casting on	1	STOCK-INET	|	Ⓜ	① ①	—	—	5	→	Suspend the cast-on comb with weights
	2	"	"	"	② ①	"	" "	"	←	} Bound off cast-on
	3	SLIP	"	"	" "	"	" "	"	→	
	4	STOCK-INET	"	"	" "	"	" "	"	←	
(2) Main knitting (To be repeated)	1	"	"	"	" "	∩	" "	"	→	
	2	"	"	"	" "	"	" "	"	←	

* To obtain this knitting from the double rib knitting, the half-pitch lever is set in its right (H) position and alter the needle arrangement slightly. The sequence of knitting operation is the same as that for the 1-K 1-P rib.

SWUNG ENGLISH RIB



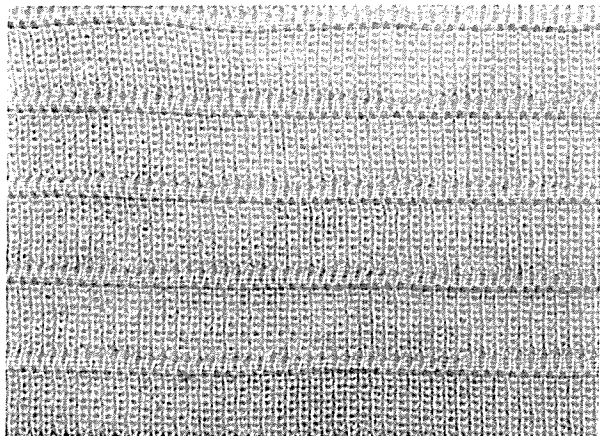
A 1-K 1-P rib knitting with 2-pitch swing or a double rib knitting with 1-pitch swing gives you this ribbed fabric, provided that one side is "tucked".

* The example, made with medium-weight yarn, is a swung variation of the 1-K 1-P rib, for which the following chart shows the sequence and necessary settings.

Needle arrangement								Half pitch lever P (left)		
Order	Main machine carriage			Ribber carriage			Swing pointer	Direction	Remarks	
	Cam lev.	Russel lev. (both)	Side lev. (both)	Set lev.	Pick knob	Russel lev.				
(1) Casting on	1	STOCK-INET	|	■	① ①	←	— —	5	→	Suspend the cast-on comb with weights
	2	"	"	"	① ①	"	" "	"	←	} Bound off cast-on
	3	SLIP	"	"	" "	"	" "	"	→	
	4	STOCK-INET	"	"	" "	"	" "	"	←	
(2) Main knitting (To be repeated)	1	"	"	"	" "	∩	" "	"	→	
	2	"	"	"	" "	"	" "	"	←	
	3	"	"	"	" "	"	" "	7	→	
	4	"	"	"	" "	"	" "	"	←	

* Where the base knitting is that of the double rib stitch, use the half-pitch lever in the right-hand side (H) position, instead of in the left-hand side position, and turn the swing handle to point at "6" in the scale, instead of at "7". All others remain unchanged in the chart.

PIN TUCK

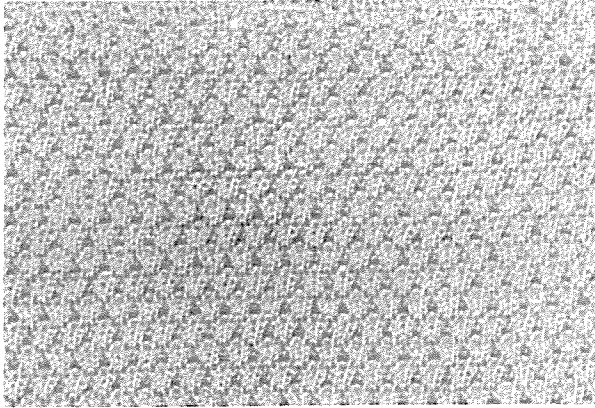


While continuing a rib knitting operation, make 3 or 4 extra rows with the main-machine only, and repeat this at regular intervals.

* The example here is made with light-weight yarn and by repeating the extra row knitting in the double rib operation.

Needle arrangement								Half pitch lever H (right)		
Order	Main machine carriage			Ribber carriage			Swing pointer	Direction	Remarks	
	Cam lev.	Russel lev. (both)	Side lev. (both)	Set lev.	Pick knob	Russel lev.				
(1) Casting on	1	STOCK-INET	|	■	① ①	←	--	5	→	Suspend the cast-on comb with weights
	2	"	"	"	① ①	"	" "	"	←	} Bound-off cast-on
	3	SLIP	"	"	" "	"	" "	"	→	
	4	STOCK-INET	"	"	" "	"	" "	"	←	
(2) Main knitting (To be repeated)	1	"	"	"	① ①	"	" "	"	→	} Repeat as desired (ribbed part)
	2	"	"	"	" "	"	" "	"	←	
	3	"	"	"	① ①	"	" "	"	→	} (Pin tuck part)
	4	"	"	"	" "	"	" "	"	←	
	5	"	"	"	" "	"	" "	"	→	
	6	"	"	"	" "	"	" "	"	←	

POP CORN PATTERN

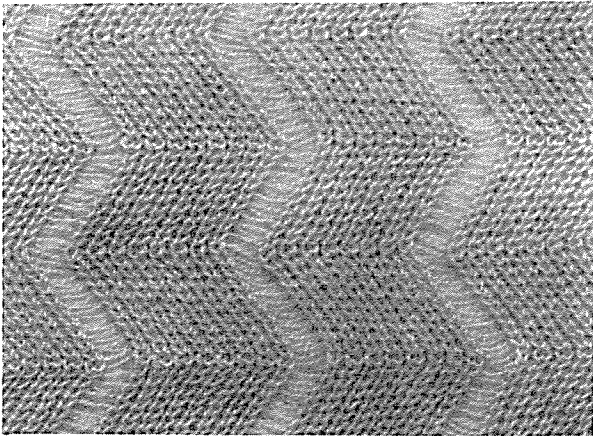


This is a variation of the double rib, which is tucked on the ribber for 3 rows with every other stitch staggered and slip tucked.

* Shown here is in light weight yarn.

Needle arrangement									Half pitch lever H (right)	
Order	Main machine carriage			Ribber carriage			Swing pointer	Direction	Remarks	
	Cam lev.	Russel lev. (both)	Side lev. (both)	Set lev.	Pick knob	Russel lev.				
(1) Casting on	1	STOCK-INET	|	■	① ①		--	5	→	Suspend the cast-on comb with weights
	2	"	"	"	① ①	"	" "	"	←	} Bound off cast-on
	3	SLIP	"	"	" "	"	" "	"	→	
	4	STOCK-INET	"	"	" "	"	" "	"	←	
(2) Main knitting (To be repeated)	1	"	"	"	① ①	"	-- =	"	→	
	2	"	"	"	" "	"	" "	"	←	
	3	Push every other needle of the ribber to D position by using the needle pusher (1 x 1) starting from the second needle from the left end.								
	4	"	"	"	① ①	"	--	"	→	
	5	"	"	"	" "	"	" "	"	←	
	6	"	"	"	" "	"	" "	"	→	
	7	"	"	"	① ①	"	= --	"	←	
	8	"	"	"	" "	"	" "	"	→	
	9	Push every other needles of the ribber which were not pushed in step 3 to D position by using the needle pusher (1 x 1).								
	10	"	"	"	① ①	"	--	"	←	
	11	"	"	"	" "	"	" "	"	→	
	12	"	"	"	" "	"	" "	"	←	

HERRING BONE SWING

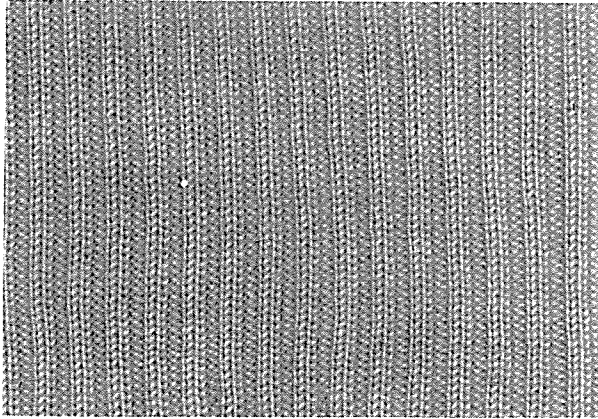


This is a combination of tucking and swing.
 Swing the ribber 2 pitches for 1-K 1-P rib and 1-pitch for double rib and tuck one row on the ribber before you swing it back. Repeat swing back and forth for desired rows then change the direction of the swing.

* Shown here is a herring bone in light weight yarn, a variation of double rib.

Needle arrangement								Half pitch lever H (right)		
Order	Main machine carriage			Ribber carriage			Swing pointer	Direction	Remarks	
	Cam lev.	Russel lev. (both)	Side lev. (both)	Set lev.	Pick knob	Russel lev.				
(1) Casting on	1	STOCK-INET	|	■	① ①	↙	--	5	→	Suspend the cast-on comb with weights
	2	"	"	"	① ①	"	" "	"	←	Bound off cast-on
	3	SLIP	"	"	" "	"	" "	"	→	
	4	STOCK-INET	"	"	" "	"	" "	"	←	
	5	Skip two adjacent needles at intervals of 8 needles of the main machine and the Ribber. Transfer the stitch on each needle to be skipped to the adjacent needle. Push the vacant needles to A position.								
(2) Main knitting (To be repeated)	1	"	"	"	① ①	∩	" "	5	→	Repeat as desired (10 times)
	2	"	"	"	" "	"	" "	6	←	
	3	"	"	"	" "	"	" "	"	→	Repeat as desired (10 times)
	4	"	"	"	" "	"	" "	5	←	

2 KNIT 2 PURL RIB



This is a ribbed fabric, with 2 knit and 2 purl stitches alternating in each row.

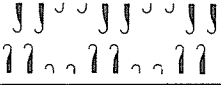


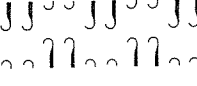
* The sample is made with medium weight yarn.

Note: There are two ways of arranging the working needles. Two charts are given here, one for each needle arrangement.

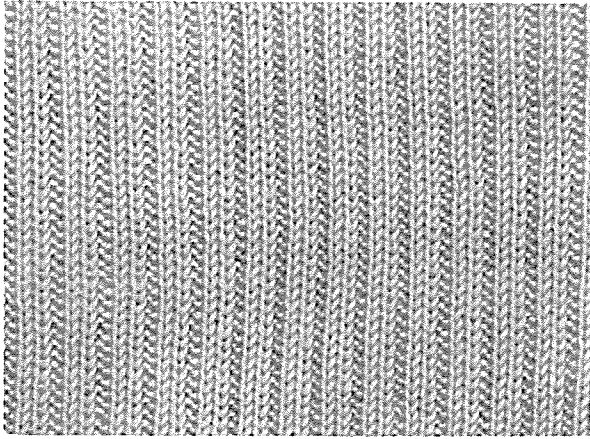
(The first way)

		Needle arrangement								Half pitch lever	H (right)
		Main machine carriage			Ribber carriage			Swing pointer	Direction	Remarks	
Order		Cam lev.	Russel lev. (both)	Side lev. (both)	Set lev.	Pick knob	Russel lev.				
(1) Casting on	1	STOCK-INET	|	■	① ①	—	— —	5	→	Suspend the cast-on comb with weights	
	2	"	"	"	① ①	"	" "	"	←	} Bound off cast-on	
	3	SLIP	"	"	" "	"	" "	"	→		
	4	STOCK-INET	"	"	" "	"	" "	"	←		
(2) Main knitting (To be repeated)	1	"	"	"	① ①	"	" "	4	→		
	2	"	"	"	" "	"	" "	"	←		
										X	

(The second way)

Needle arrangement 											
Half pitch lever H (right)											
Order	Main machine carriage			Ribber carriage			Swing pointer	Half pitch lev.	Direction	Remarks	
	Cam lev.	Russet lev. (both)	Side lev. (both)	Set lev.	Pick knob	Russet lev.					
(1) Casting on	1	STOCK-INET	I		① ①		--	5	H	→	Suspend the cast-on comb with weights
	2	"	"	"	① ①	"	" "	"	"	←	} Bound off cast-on
	3	SLIP	"	"	" "	"	" "	"	"	→	
	4	STOCK-INET	"	"	" "	"	" "	"	"	←	
(2) Main knitting (To be repeated)	1	"	"	"	① ①	"	" "	6	P	→	
	2	"	"	"	" "	"	" "	"	"	←	

2 KNIT 1 PURL RIB

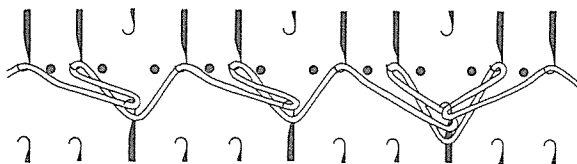
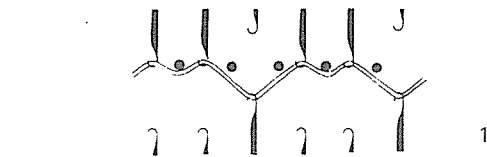


This is another variation of ribbing with 2 knit stitches on the main-machine and 1 purl stitch on the ribber.

The number of stitches in the same row differs between right side and wrong side. The upper and lower ends of this fabric tend to curl and this tendency calls for your attention.

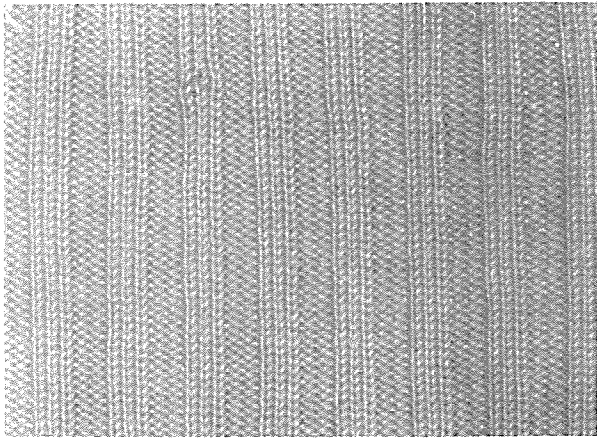
* The sample here is made with medium-weight yarn.

Order		Main machine carriage			Ribber carriage			Swing pointer	Direction	Remarks
		Cam lev.	Russel lev. (both)	Side lev. (both)	Set lev.	Pick knob	Russel lev.			
(1) Casting on	1	STOCK-INET	|	■	① ①	—	— —	5	→	* Hook the yarn as in the figure Bound off cast-on
	2	"	"	"	① ①	"	" "	"	←	
	3	SLIP	"	"	" "	"	" "	"	→	
	4	STOCK-INET	"	"	" "	"	" "	"	←	
(2) Main knitting (To be repeated)	1	"	"	"	① ①	"	" "	"	→	
	2	"	"	"	" "	"	" "	"	←	



- (1) The sequence of steps in 1 lays the yarn over the needle as shown in Fig. 1.
- (2) Transfer the yarn between the two main-machine needles to one ribber needle by using the transfer tool. See Fig. 2.
- (3) Attach the cast-on comb and weights.

3 KNIT 3 PURL RIB

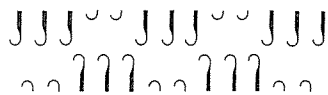


A ribbed fabric with 3 face-side stitches and 3 wrong-side stitches is obtained by proceeding according to the chart below.

* The example here uses medium-weight yarn.

Needle arrangement								Half pitch lever H (right)			
Order	Main machine carriage			Ribber carriage			Swing pointer	Half pitch lev.	Direction	Remarks	
	Cam lev.	Russel lev. (both)	Side lev. (both)	Set lev.	Pick knob	Russel lev.					
(1) Casting on	1	STOCK-INET	|	Ⓜ	① ①		--	5	H	→	Suspend the cast-on comb with weight
	2	"	"	"	① ①	"	" "	"	"	←	} Bound-off cast-on
	3	SLIP	"	"	" "	"	" "	"	"	→	
	4	STOCK-INET	"	"	" "	"	" "	"	"	←	
	5	Push three successive needles alternately to A position of the main machine and the ribber, leaving next three needles in B position. Transfer the stitches on the three needles to be pushed to A position to the opposite needles in B position.									
(2) Main knitting (To be repeated)	1	"	"	"	① ①	"	" "	"	P	→	
	2	"	"	"	"	"	" "	"	"	←	

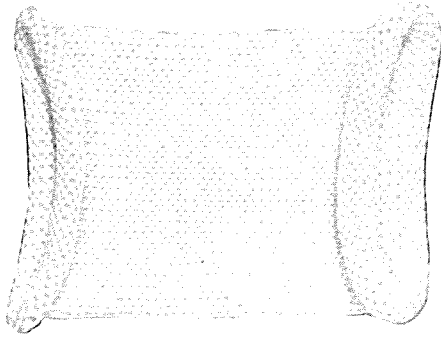
* After casting on (with a 1-K 1-P rib or double rib bind-off), re-arrange the needles as shown before starting the main knitting. Knitting with this arrangement requires the half-pitch lever to be moved to its right position (H).



* Wider-rib knitting with 4 or more K and P can be effected according to the above chart.

* When the yarn is a larger size (bulky), cast on in 1-K 1-P rib stitches with the half-pitch lever set at (P) position.

TUBULAR KNITTING



The fabric takes a tubular form in stockinet stitches.

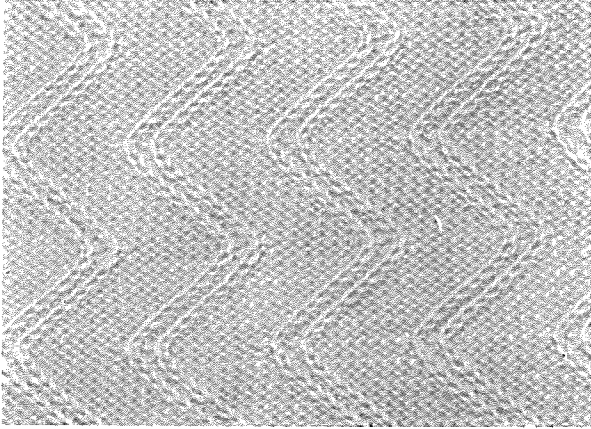
* This sample uses medium-weight yarn.

Needle arrangement									Half pitch lever H (right)		
Order	Main machine carriage			Ribber carriage			Swing pointer	Half pitch lever	Direction	Remarks	
	Cam lev.	Russel lev. (both)	Side lev.	Set lev.	Pick knob	Russel lev.					
(1) Casting on	1	STOCKINET	|	■ ■	① ①	▲	— —	5	H	→	Knit with the ravel cord and attach the cast-on comb and weights
(2) Main knitting (To be repeated)	1	SLIP	''	▲ ■	① ①	''	'' ''	''	P	←	Knit several rows with waste knitting, then one row with ravel cord before starting main yarn
	2	''	''	''	'' ''	''	'' ''	''	''	→	

* The main-machine and ribber are operated alternately. Two carriage movements produce one row in a tube.

* Set the tension (stitch) dial of the ribber somewhat at larger number than that of the main-machine.

VARIATION SWING



The main-machine is operated to make stockinet stitches, and the ribber is swung to make patterns in the fabric by altering the needle arrangement as desired.

* Medium-weight yarn is used in this example.

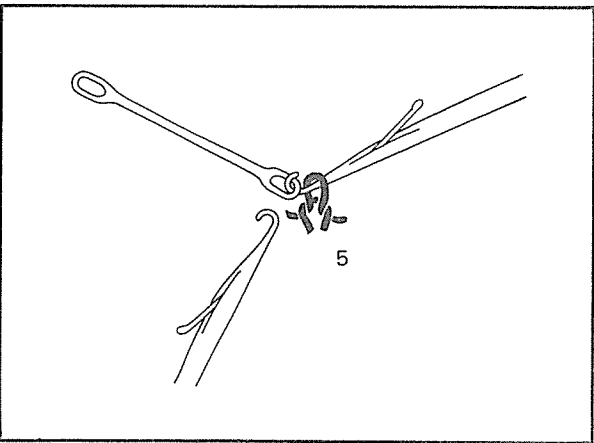
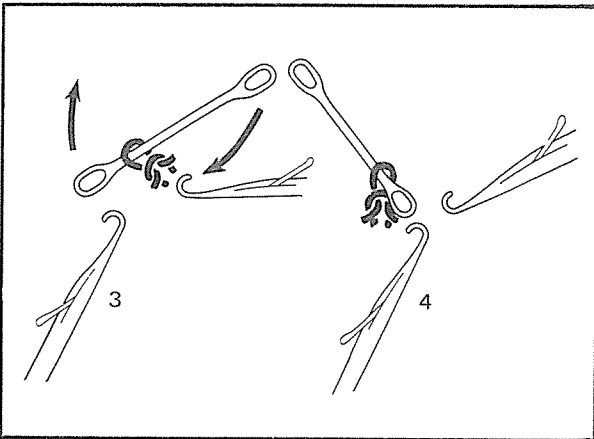
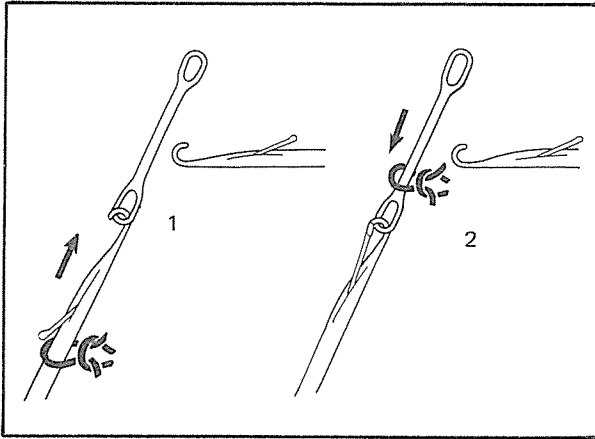
		Needle arrangement								Half pitch lever H (right)
Order	Main machine carriage			Ribber carriage			Swing pointer	Direction	Remarks	
	Cam lev.	Russel lev. (both)	Side lev. (both)	Set lev.	Pick knob	Russel lev.				
(1) Casting on	1	STOCK-INET	|		① ①		--	10	→	Suspend the cast-on comb with weights
	2	"	"	"	① ①	"	" "	"	←	} Bound off cast-on
	3	SLIP	"	"	" "	"	" "	"	→	
	4	STOCK-INET	"	"	" "	"	" "	"	←	
	5	Except the needles 8, 10, 18, 20th, etc. of the ribber from the left end, transfer the stitches of other needles onto the stitches of the main machine needles. Then push these vacant needles back to A position.								
(2) Main knitting (To be repeated)	1	"	"	"	① ①	"	" "	10	→	} Swing the swing handle one pitch by one, knit to make it zig zag.
	}	}	}	}	}	}	}	}		
	10	"	"	"	" "	"	" "	1	←	
	11	"	"	"	" "	"	" "	0	→	
	12	"	"	"	" "	"	" "	1	←	
	}	}	}	}	}	}	}	}		
	20	"	"	"	" "	"	" "	9	←	

* After the bound off edge is completed, you may make several rows of tubular stitches before changing the needle arrangement to swing the needle bed. This manner of making initial rows will give a firmer fabric edge.

* As the ribber is swung to increase the pitch indication, the ribber end needle may finally go to a position where there is no opposite needle on the main-machine. Just before this situation occurs, transfer the stitch on the ribber end needle to the opposite main-machine needle, and shift the vacated needle into A position. This needle is to be advanced to B position when the needle bed is sufficiently swung back.

5. BASIC TECHNIQUES

< 1 > HOW TO TRANSFER STITCHES



With Double-Eye Transfer Tool

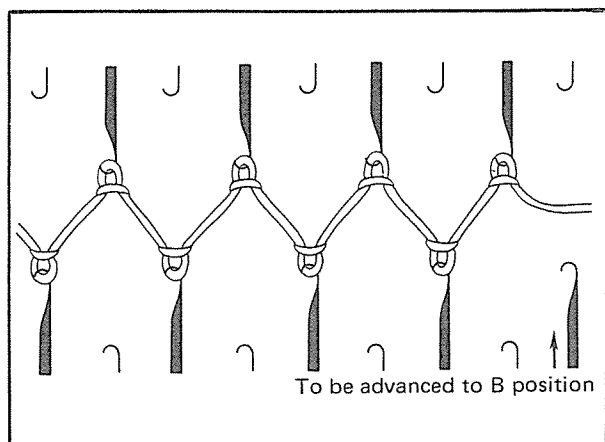
With a double-eye tool (having an eye in each end), you can transfer stitches between main-machine needles and ribber needles. The procedure here assumes that you are to transfer stitches from ribber to main-machine.

(1) Catch the ribber needle hook by passing the hook through the eye of the transfer tool. Slide the stitch over to the tool. (Fig. 1, 2)

(2) Tilt the tool and slide the stitch toward the other eye. (Fig. 3, 4)

(3) Engage the other eye onto the main-machine needle hook, and slide the stitch off the tool onto the needle. (Fig. 5)

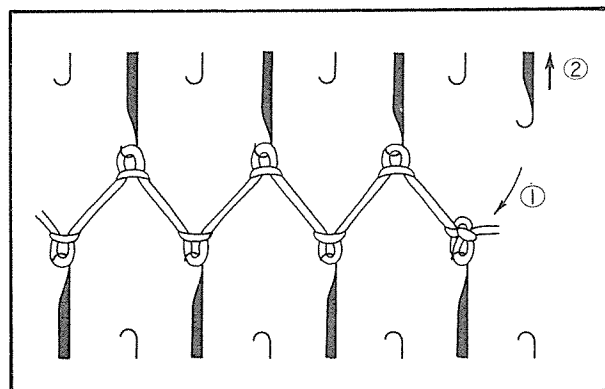
< 2 > HOW TO INCREASE STITCHES



Move the carriage to the side to be increased. (The other side does not permit any stitch increase, unless the carriage is moved to the other side.) Advance an idle needle (immediately next to the last working needle) to B position, and knit one row by moving the carriage. The new row will have one more stitch than before.

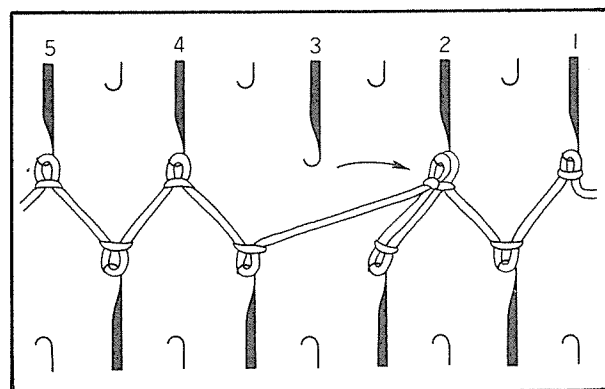
< 3 > HOW TO DECREASE STITCHES

* There are two Methods



First Method (One stitch at a time)

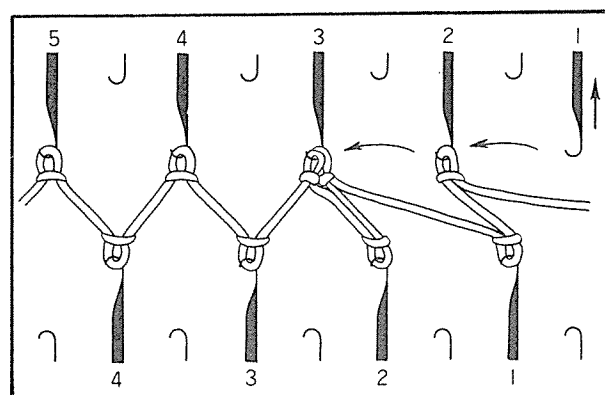
- (1) Using the transfer tool, decrease the edge stitch to the next working needle (from main machine to ribber, or from ribber to main-machine).
- (2) Push the empty needle to A position.

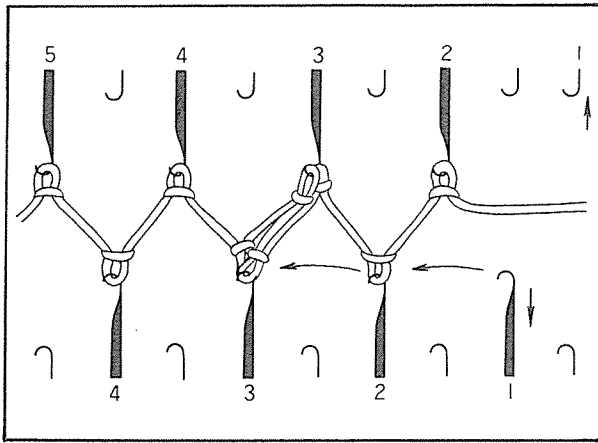


Second Method (Two stitches at a time)

The following procedure assumes that the main-machine is knitting the face side of the fabric.

- (1) Transfer the stitch on the third main-machine needle from the end, to the second main-machine needle.
- (2) Move the two stitches, on the second main-machine needle to the vacated third needle. Move the stitch on the first main-machine needle to the vacated second needle.

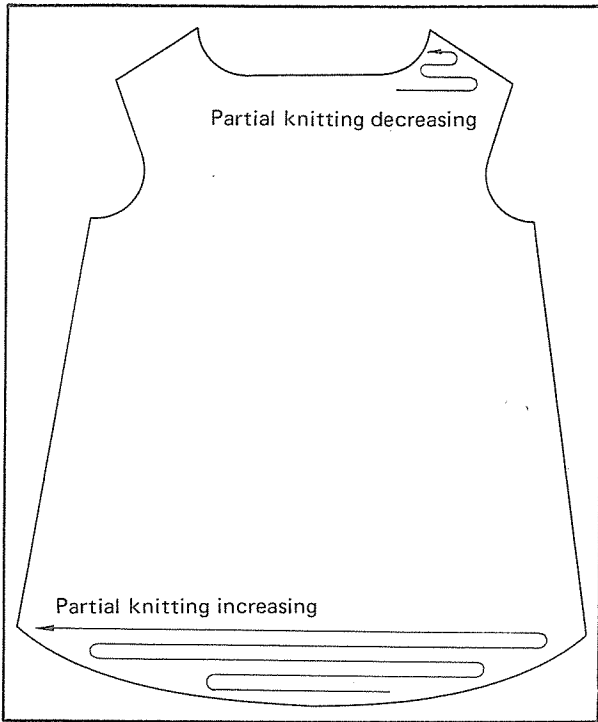




(3) The third needles on main-machine and ribber have two stitches, the 2nd needles have one stitch each, and the 1st needles are empty.

* If the ribber is to knit the right side of the fabric, follow instructions described above, reversing "main-machine" to read "ribber" and "ribber" to read "main-machine".

< 4 > PARTIAL KNITTING



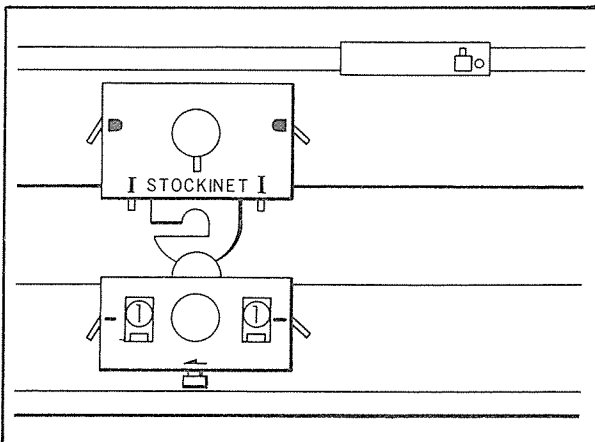
Partial knitting is effected with Russel levers in | position (main-machine) and — position (ribber). Leaving these levers in || position (main-machine) or = position (ribber) will knit the needles in D position and disrupt the knitting operation.

Note: The method of partial knitting varies from one type of knitting to another.

* Partial Knitting for Decreasing 1-K 1-P Rib Stitches

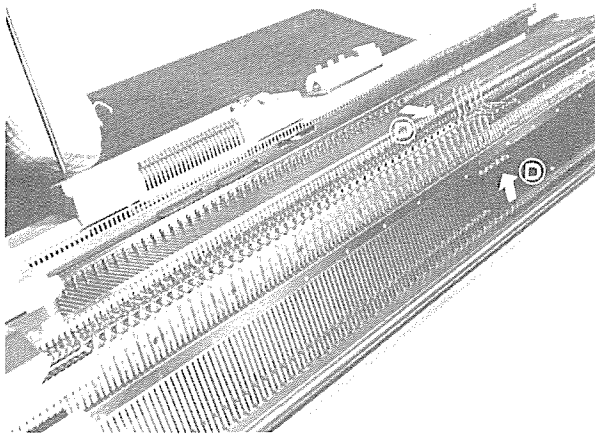
This method applies also to double rib, English rib, pin tuck, 2-K rib and 2-K 1-P rib.

When completing 1-K 1-P rib stitches to the point to begin partial knitting, the carriage should be on left side of the machine.

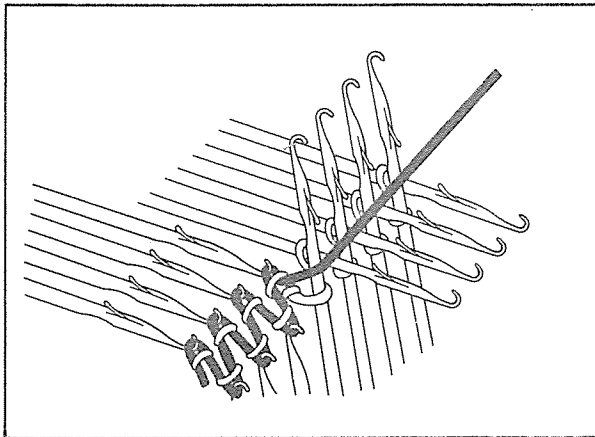


Set the two carriages, as follows:

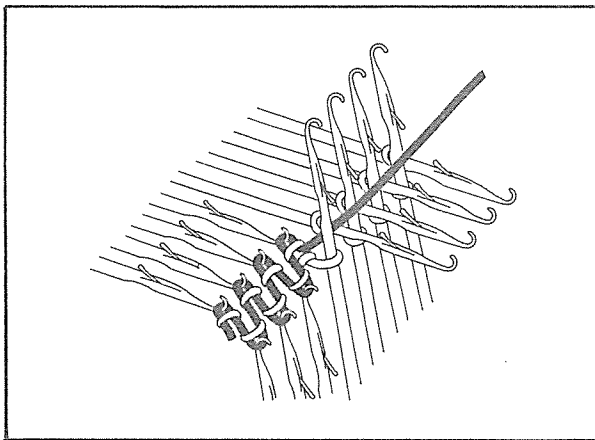
Main-machine carriage	Position
Cam lever	STOCKINET
Russel levers . . . . .	| (right and left)
Side levers	■ (right and left)
Ribber carriage	Position
Set levers	1 (right and left)
Pick knob	—
Russel levers	— (right and left)



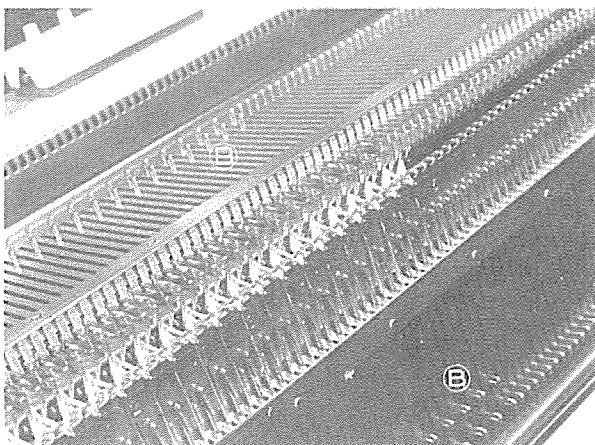
- (1) The carriage must be on the opposite side of the stitches to be decreased (partialed). For example, the carriage should be at the left side if the partial is on the right side. Bring only the needles to be decreased to D position.



- (2) Move the carriage from left to right, as in the above example. The yarn will pass over the needles in D position and the needles will not knit.



- (3) To avoid a hole formation, wrap the yarn onto the needle in D position immediately next to the last inside stitch, by bringing the yarn up from underneath.
(When stitches on the left-hand side of the fabric is to be decreased, as in the above example, follow step (1) above at the left-hand side at this time.)



- (4) Knit one row. This completes one cycle of partial knitting.

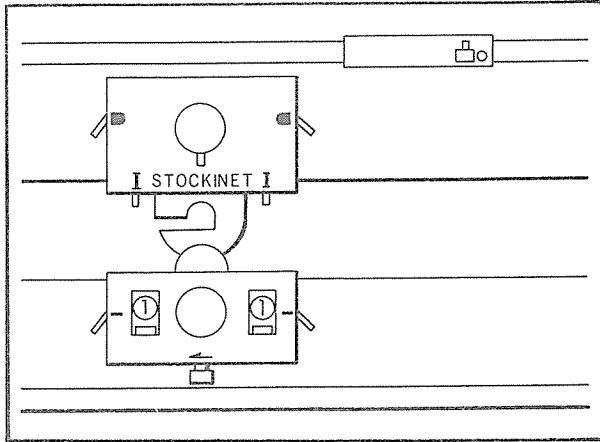
To make rows in partial knitting, repeat the foregoing steps (1) through (4).

When the partial knitting is completed set the Russel levers to \parallel position (main-machine) and $=$ position (ribber). All needles will knit when the carriage is moved across, and the needles will line up in B position.

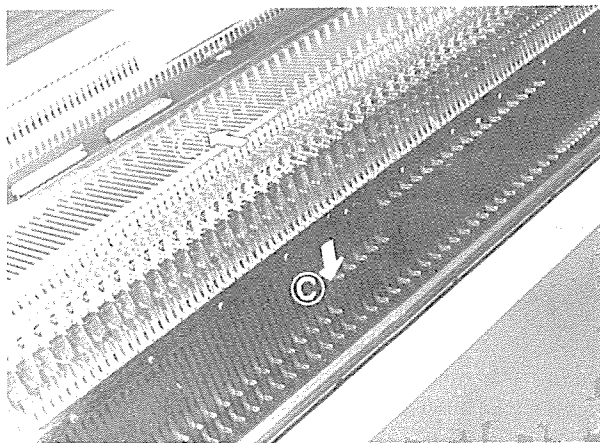
* Partial Knitting for Increasing 1-K 1-P Rib Stitches

This method applies to the some type of stitches as in the preceding method.

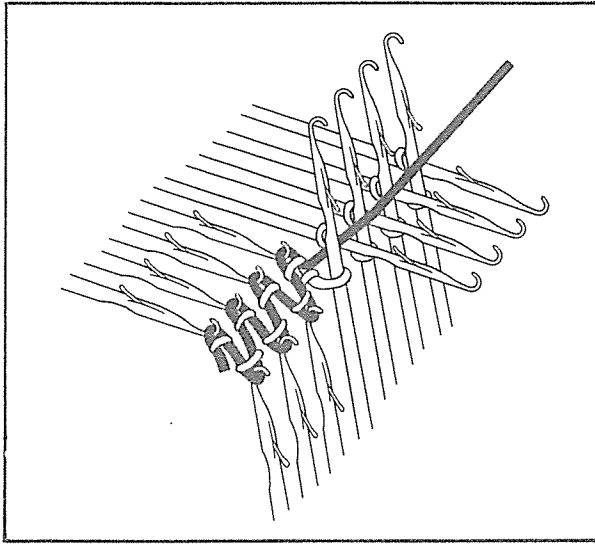
As in preceding method, bring the carriage to the left-hand side, and set the carriage as follows:



Main-machine carriage	Position
Cam lever	STOCKINET
Russel levers. . . . .	| (right and left)
Side levers	■ (right and left)
Ribber carriage	Position
Set levers	1 (right and left)
Pick knob	▲
Russel levers	— (right and left)



- (1) At the right-hand side on both main-machine and ribber opposite the carriage, push back as many needles in D position as needed to C position, making sure they are correctly lined up in the distance range of] of C position. The number of needles in C position is the number of stitches that will be increased.



(2) Knit one row, from left to right. Needles in B and C positions will knit, and the yarn will pass over the needles in D position.

(3) To avoid a hole, wrap the yarn onto the needle in D position immediately next to the last inside stitch, bringing the yarn up from underneath.

Repeat step (1) above at the left-hand side at this time if increasing is to be done on the left-hand side.

(4) Knit one row. This completes one cycle of partial knitting for increasing.

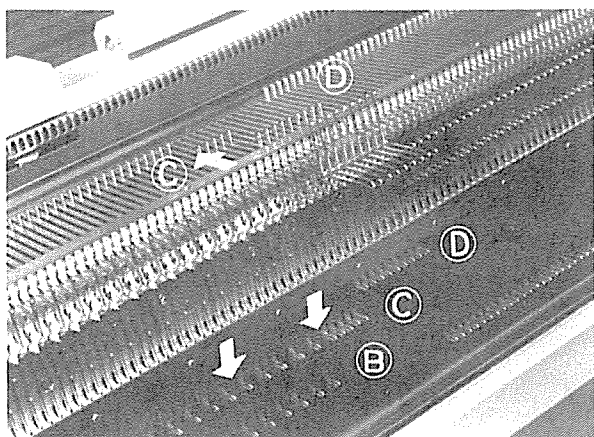
Repeat the foregoing steps (1) through (4) for continuous partial knitting.

* Partial Knitting in Pop Corn Stitches

Knitting in pop corn stitches or similar stitches involves the tucking or pulling up of the stitches made, often with the Russel levers in = position.

When these levers are in — position, partial knitting can be effected in the same way as in 1-K 1-P rib stitches.

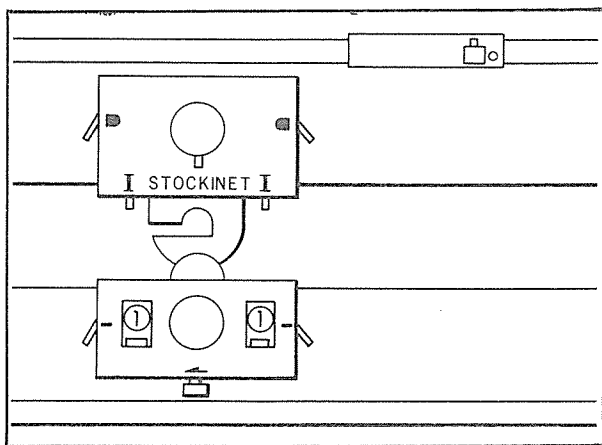
When the Russel levers are in = position, you must proceed as follows:



- (1) Treat ribber needles and main-machine needles separately.

As a rule, ribber needles in D position, on the side opposite the carriage, are to be left alone if they are to remain idle. If you want to increase, move the necessary number of D-position needles to C position. Also move to C position the needles in D position for tucking.

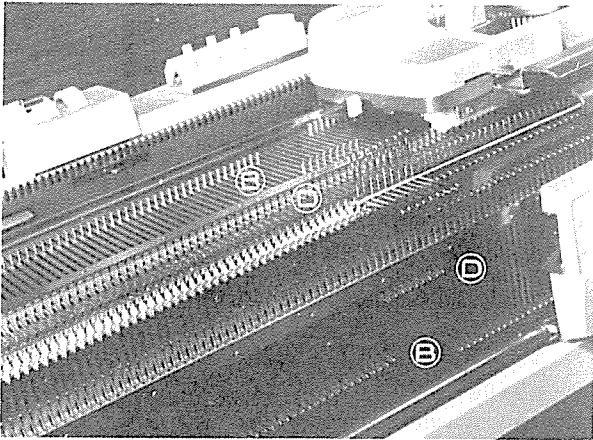
Main-machine needles are to be handled as in the partial knitting in 1-K 1-P rib stitches mentioned before. (Bring the needles to be rested to D position and the needles for increasing to C position.)



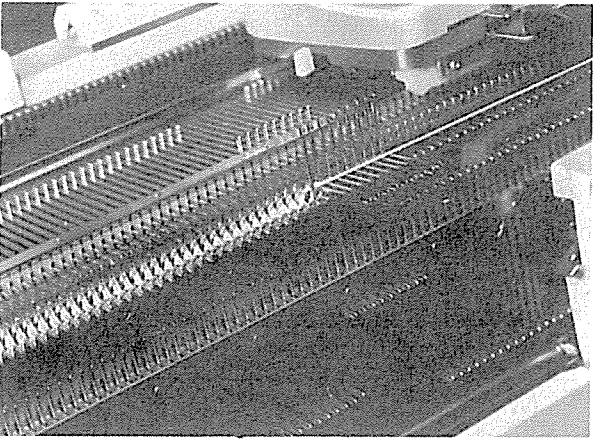
- (2) Set the carriages, as follows:

Note: Ribber Russel levers must be left in — position.

Main-machine carriage	Position
Cam lever	STOCKINET
Russel levers . . . . .	| (right and left)
Side levers	■ (right and left)
Ribber carriage	Position
Set levers	1 (right and left)
Pick knob	↗
Russel levers	— (right and left)



- (3) Knit one row. Needles in B and C positions will knit and line up in B position. Needles in D position will not knit but will receive the yarn extending over them.



- (4) To avoid a hole formation, wrap the yarn onto the D-position needle immediately next to the last inside stitch by raising the yarn from underneath.
(If you want to increase or decrease on the other side of the fabric, move the needles there to D position or to C position as described for 1-K 1-P rib stitches.)

- (5) Knit one row, thereby completing one cycle of partial knitting.

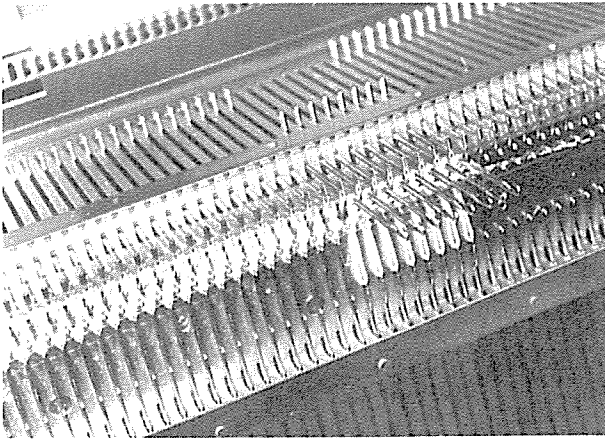
Note: The foregoing sequence is possible only for once. The subsequent cycles of partial knitting are to be effected as described for 1-K 1-P rib stitches. Whenever some knitting has been carried out with the Russel levers in \equiv position, the foregoing sequence is to be followed again but only for once.

* Partial Knitting for Stitches Involving "Swing"

Main-machine needles in D position cross the opposite ribber needles in D position. You have noted this in other methods thus far explained. Under the crossed condition of needles, you must not swing (by using the swing handle) the needle bed, or you will damage the crossed needles. So, a special technique of partial knitting is required for the swung English rib, variation swing, herringbone swing and the like stitches, all of which involve "swing".

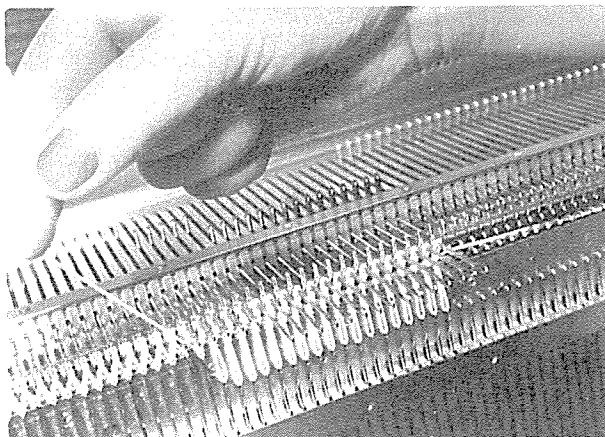
Such a technique is the following:

How to Decrease



- (1) Move the carriage to the side opposite the needle to be decreased. Push ribber needles (the needles are to be put into idle position) forward, so the stitch loops will slide back beyond the latches. Pass a ravel cord over and through the hooks of these needles, and knit one row by hand. Then, push them back to A position.
- (2) Push the main-machine needles to be rested to D position.
- (3) Operate the carriage to knit one row.
- (4) To avoid a hole, wrap the yarn onto the main-machine needle in D position from underneath immediately next to the last inside needle in the row.
(Where partial knitting is to be effected at both sides, carry out the foregoing steps (1) and (2) on the needles at the opposite side.)
- (5) Knit one row.
This completes one cycle of partial knitting. Repeat the sequence (1) through (5).

How to Increase

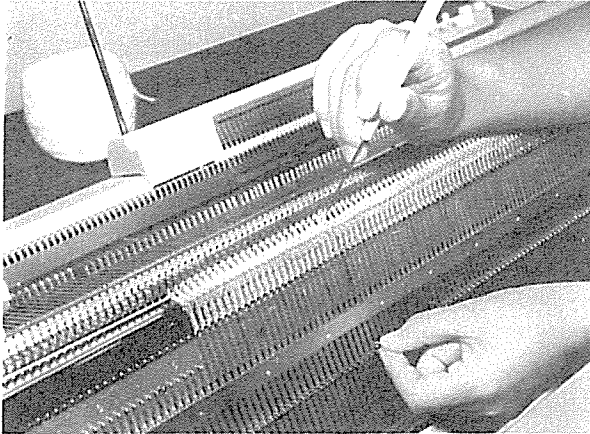


- (1) Hook the ravel cord to the ribber needle to be rested and move it down to A position.
- (2) Move to D position the main-machine needles to be rested.
- (3) Next, bring into active position the needles to be increased at the side opposite the carriage. On the ribber, remove off the ravel cord and bring the needles to B position; on the main-machine, bring the D-position needles to C position.
Upon making each row, be sure to wrap the yarn onto the last inside D-position needle as in decreasing the stitches.

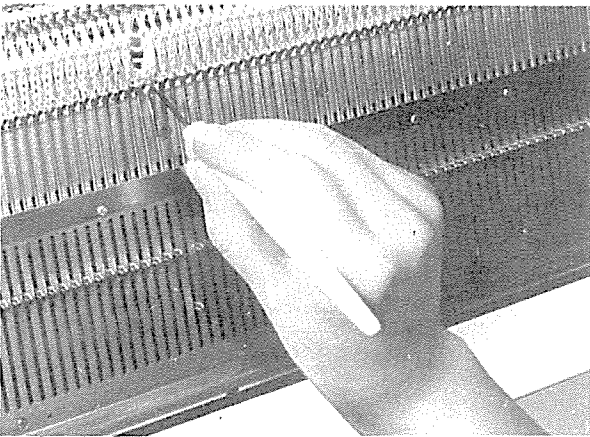
6. USEFUL HINTS

* What to do when one or more Stitches have Dropped

During knitting, a "run" or unraveling can develop easily from a dropped stitch if weights are hanging (according to the standard practice). The weights stretch the fabric being knit. As soon as a dropped stitch is discovered, remove the weights from the comb. Lower the ribber by pushing down the drop levers, pick-up the dropped stitch with the hook tool, and put the stitch loop back onto the needle.



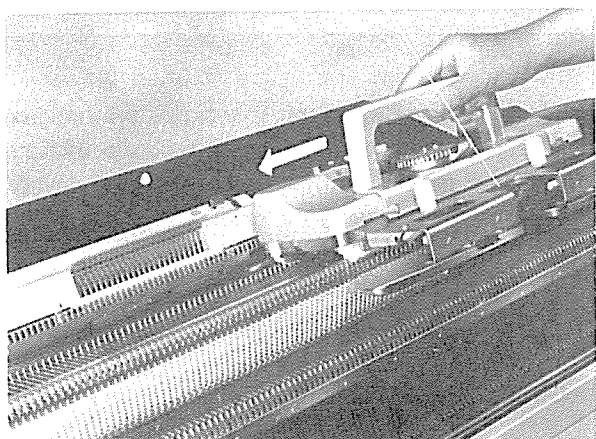
- * Up to three dropped stitches can be mended by using the hook tool.



- * When stitches have dropped for several rows, pick them up one by one with the tappet. This tool is to be inserted from behind the fabric if the drops have occurred in the main-machine. If the drops stitches are due to the ribber, insert the tool from your side.

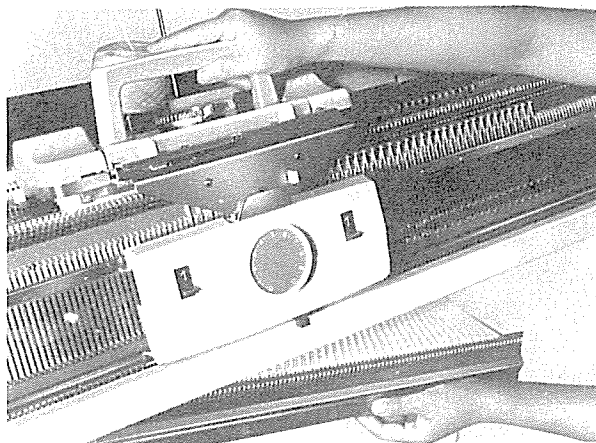
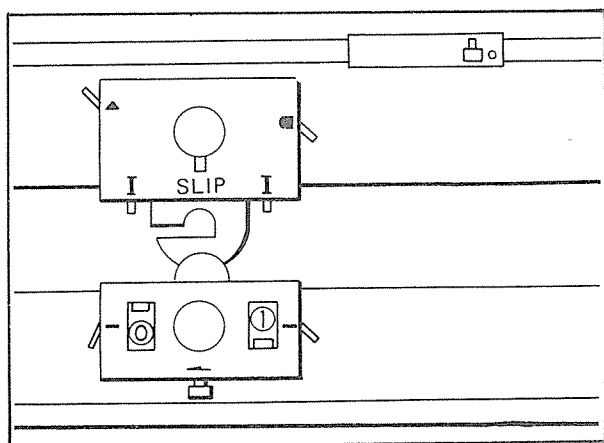
- * After picking up dropped stitches and restoring the ribber to the original position, be sure to adjust and line up the needles neatly in the knitting course (two rows of needles) before resuming the knitting operation.

*** How to Knit with the Main-Machine Only while the Ribber is Attached**



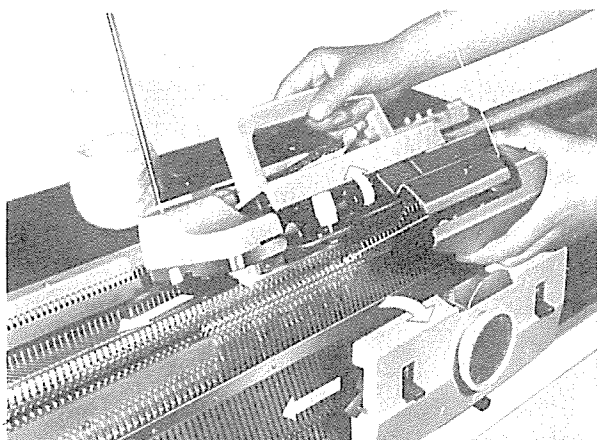
- (1) Transfer all ribber stitches to the main-machine needles.
- (2) Disconnect the ribber carriage from the main-machine carriage by pushing the connecting knob to the right.
- (3) Lower the ribber by pushing down the drop levers.
- (4) Remove the ribber arm.
- (5) Install the main-machine arm, and operate the main-machine.

*** How to Remove the Knit Fabric**

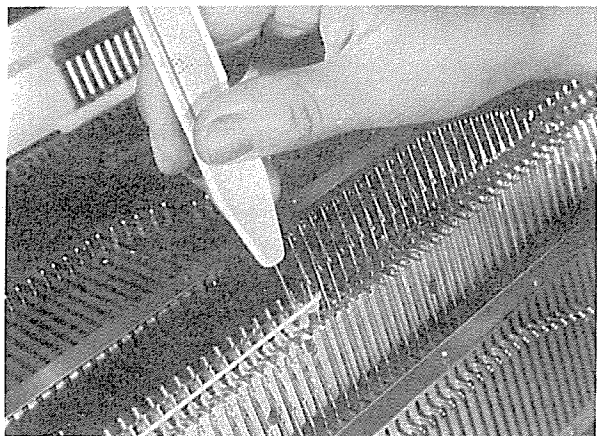


- (1) Change the cam arrangement of the carriage, and set it for the tubular knitting. Using the main carriage, knit 8 to 10 rows waste knitting.
- (2) Remove the weights. Unthread the yarn feeder and set the cam lever to STOCKINET. Move the carriage across. This will release the fabric from the working needles.

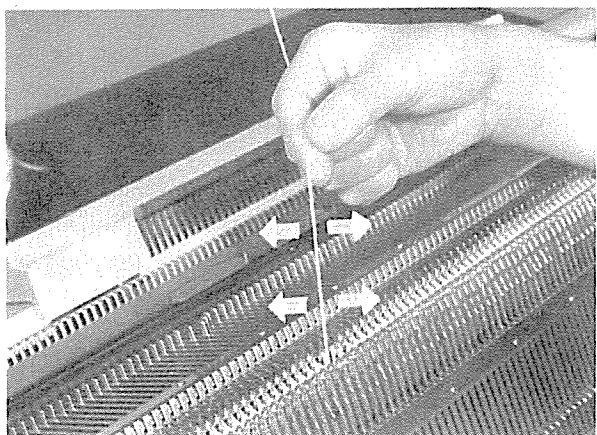
*** What to do if the Carriage Jams**



- (1) Disconnect the ribber carriage from the main-machine carriage. Tilt the ribber carriage back to move it back across.
- (2) Remove the arm from the main-machine carriage, tilt it toward the backward and move it back across.



- (3) Restore the two rows of needles to original positions in the knitting course. If a stitch has slipped behind the latch on a needle to be moved to B position, use a transfer tool to put the stitch back inside the hook and the needle back to original position.

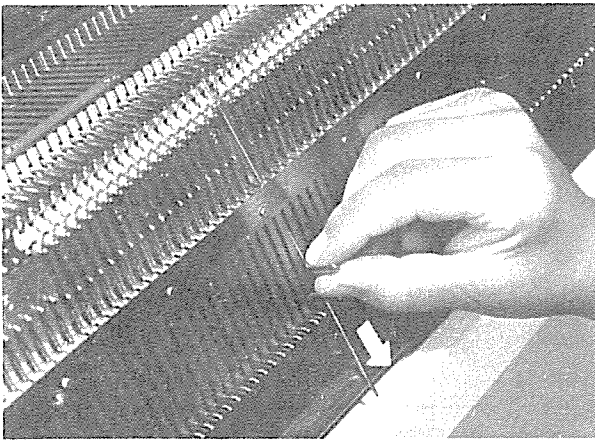


- (4) Hold the yarn end between your fingers and pull slightly. Work the yarn back and forth across the knitted row (two rows of needles). Unravel the yarn from the needle hooks. Continue unraveling in a zigzag pattern until unraveled and the yarn comes to the carriage side.

* **Unraveling Incorrect Knitting**

- (1) Unravel the necessary number of rows already made. Unraveling is to be accomplished by manipulating the yarn in the same manner as described in the preceding paragraph.
- (2) When unraveling is completed, the yarn may be on the side opposite the carriage. In this case, move the ribber carriage in a tilted position over to the yarn side, then move the main-machine carriage, with the following settings, over to the same side.
Cam lever SLIP
Side levers ● (right and left)

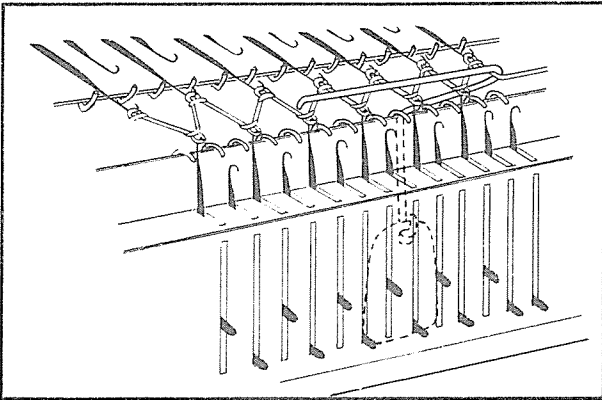
* **Replacing Broken Needles in the Ribber**



The method of needle replacement explained for the main-machine applies to the ribber. The procedure is as follows:

Pull the needle retainer out of the needle bed. Move the damaged needle all the way to the upper end of the needle groove (D position). Lift the needle out of the groove by lifting the butt. To replace new the needle, insert it into the groove with the hook first.

* **When the Edge Stitches Tend to Float**



Use of the edge weights is a standard practice, and has been explained previously. This tendency, if noted, is due mostly to too many rows between the weighted row and the row on the needle bed. Moving the weights up, as shown, at regular intervals of 10 to 15 rows during the progress of your knitting operation will remedy floating stitches.

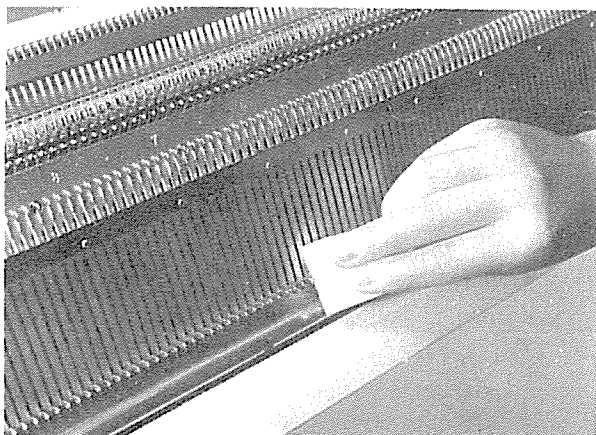
* **When the Stitches in one Edge Portion of the Fabric Tend to Float**

A cast-on comb unevenly weighted or unevenly inserted is to blame. Re-balance the cast-on comb to remedy this situation.

7. MAINTENANCE AND SERVICING

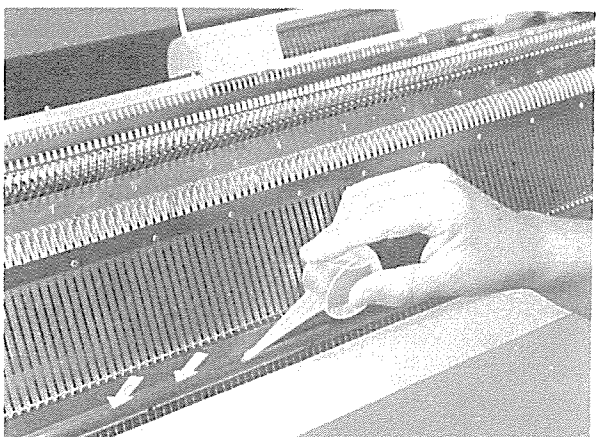
Proper lubrication is the key to a long enjoyable life of your knitting machine. This refers to not only the technique of giving the lubricant to the machine but, more important, also the regularity of giving lubricating attention to the machine.

* Lubrication



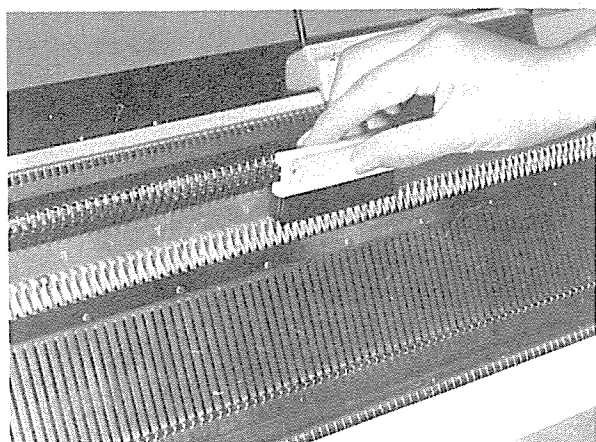
Clean the machine with a dry cloth, removing stains, dust, lint, etc. The rails, needle beds, carriage pipes and the like should be wiped with greater care.

After cleaning, rub the latch-needle butts with a clean cloth dampened with machine oil.



Give a drop of oil to the rail at two or three places, and run the carriage back and forth two or three times. This will spread the oil evenly along the rail.

* After Each Use

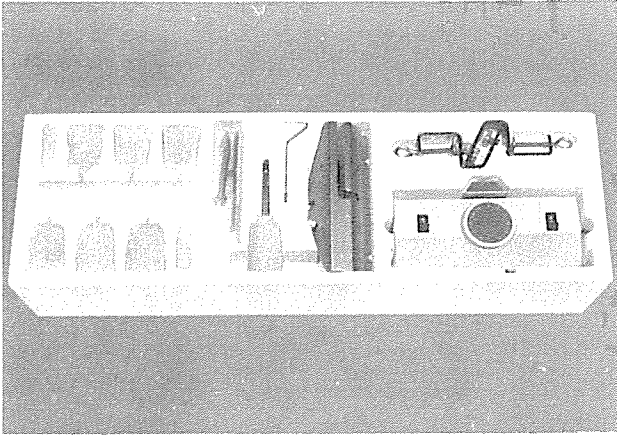


Brush the lint off the needle bed and associated parts.

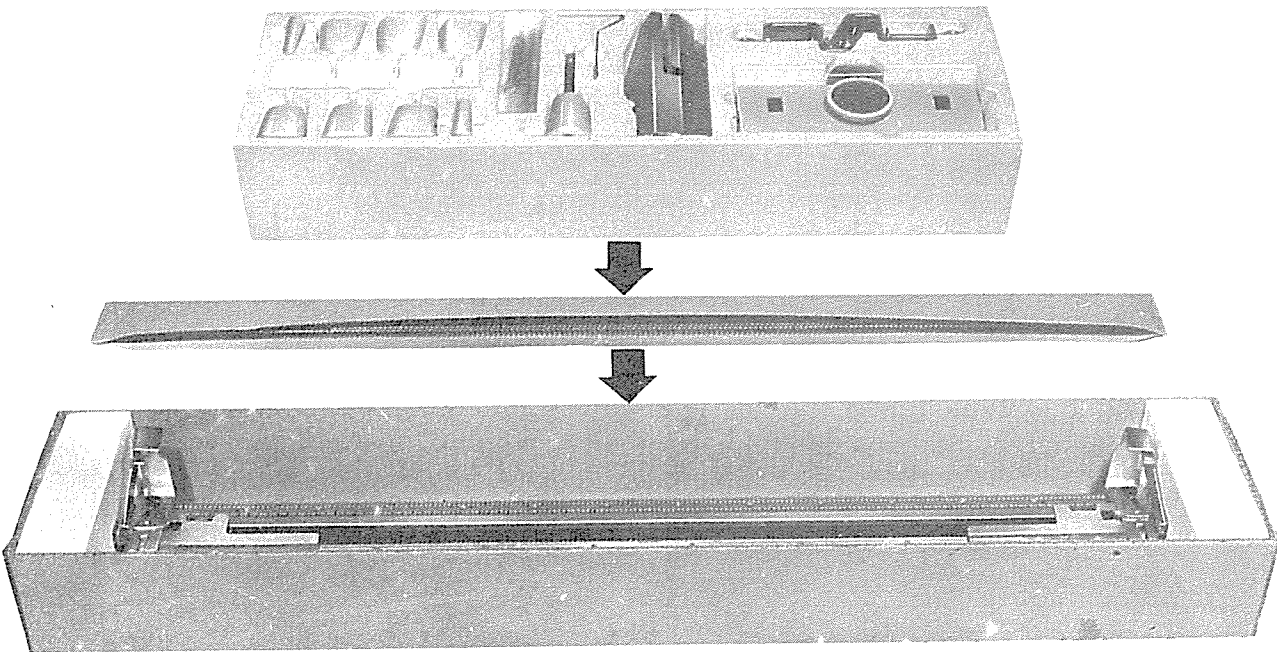
Wipe the metal surfaces with oil cloth to prevent rust.

8. RE-PACKING FOR STORAGE

- (1) Disassemble the ribber by reversing the assembling procedure.
The swing handle should be set at 10 before pulling it out in a twisting manner.
So that you will not misplace the ribber joiner screws and washers, secure them to the ribber joiners.
- (2) Set the carriage and accessories in the styro-foam case.



- (3) Place the components into the cardboard box, one by one, in the illustrated order.



9. PATTERN KNITTING



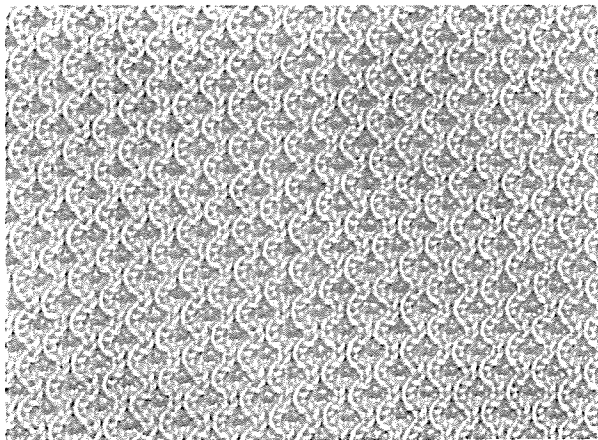
The basic techniques and types of knitting you have thus far learned can be applied in combination to produce beautiful knit patterns in your fabrics. Possible combinations are too many and too varied, so that only representative ones will be dealt with here in the form of the operational charts.

When you have mastered these pattern techniques, then it is up to you to use your imagination along the avenue of enjoyment leading to a truly wide vista of knitting art.

* A Few Remarks on the Use of the Chart

- The casting-on procedure is omitted in each chart simply because this procedure is the same for all: cast on in 1-K 1-P rib stitches or in double rib stitches, then begin pattern knitting.
- The needle arrangement diagram in the chart refers to the left-hand portion of the line-up. The arrangement on the right-hand side is a mirror image of the one shown.
- Begin pattern knitting with the carriage positioned on the left-hand side and knit from the left to right for the first row.
- Always have the stop knob on the main-machine set in ● position.

VARIATION OF TUCK STITCH - 1



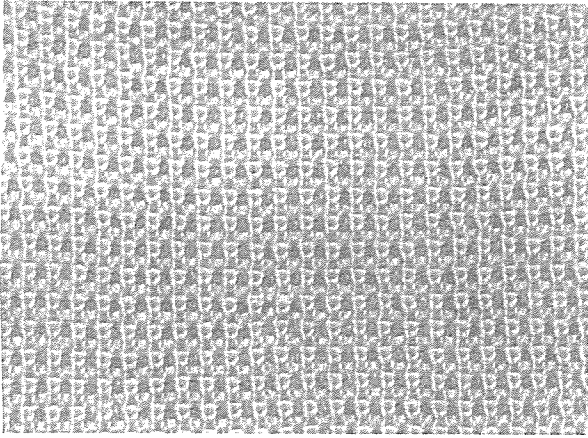
Three-row tucking at every other stitch, effected on the ribber side, produces this pattern. Tucking is alternated.

1 pattern = 4 sts. 6 rs.

Needle arrangement								Half pitch lever P (left)	
Order	Main machine carriage			Ribber carriage			Swing pointer	Direction	Remarks
	Cam lev.	Russel lev. (both)	Side lev. (both)	Set lev.	Pick knob	Russel lev.			
1	Push every other needles of the ribber at B position to D position.								
2	STOCK-INET	|	■	⊙ ⊙	∩	= =	5	→ ※	 Repeat three times
3	Push the needles of the ribber in B position which were not pushed in step (1) to D position.								
4	STOCK-INET	''	''	'' ''	''	''	''	← ※	 Repeat three times
5	Push every other needles of the ribber at D position to B position.								

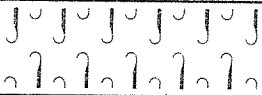
* When repeating, knitting direction alters every row.

VARIATION OF TUCK STITCH - 2

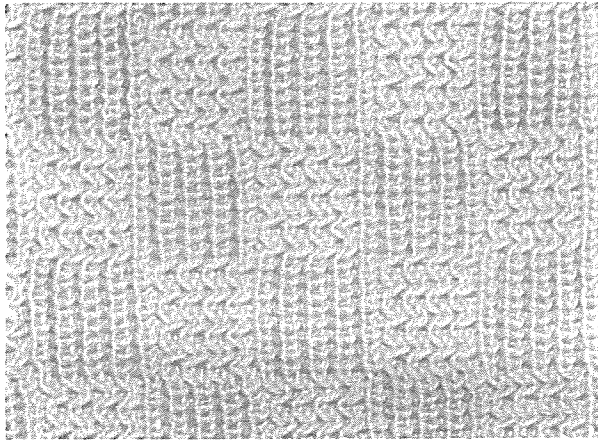


The ribber is operated to pick 2 rows.

1 pattern = 2 sts. 4 rs.

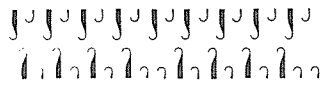
Needle arrangement 										Half pitch lever P (left)	
Order	Main machine carriage			Ribber carriage			Swing pointer	Direction	Remarks		
	Cam lev.	Russel lev. (both)	Side lev. (both)	Set lev.	Pick knob	Russel lev.					
1	STOCK-INET	|	■	① ①	∩	— —	5	→			
2	"	"	"	" "	"	" "	"	←			
3	"	"	"	① ①	"	" "	"	→			
4	"	"	"	" "	"	" "	"	←			

VARIATION OF ENGLISH RIB - 3

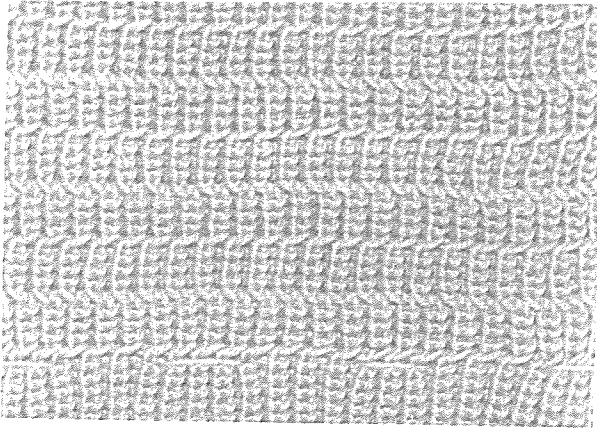


The needle arrangement is changed by varying the extent of swing to knit Swung-English-rib stitches and English-rib stitches at the same time.

1 pattern = 17 sts. 32 rs.

Needle arrangement									Half pitch lever H (right)	
Order	Main machine carriage			Ribber carriage			Swing pointer	Direction	Remarks	
	Cam lev.	Russel lev. (both)	Side lev. (both)	Set lev.	Pick knob	Russel lev.				
1	STOCK-INET	|	■	⊙ ①	∩	— —	5	→	Repeat four times (knit 16 rows)	
2	"	"	"	" "	"	" "	"	←		
3	"	"	"	" "	"	" "	6	→		
4	"	"	"	" "	"	" "	"	←		
5	"	"	"	" "	"	" "	7	→	Repeat four times (knit 16 rows)	
6	"	"	"	" "	"	" "	"	←		
7	"	"	"	" "	"	" "	6	→		
8	"	"	"	" "	"	" "	"	←		

VARIATION OF ENGLISH RIB - 4

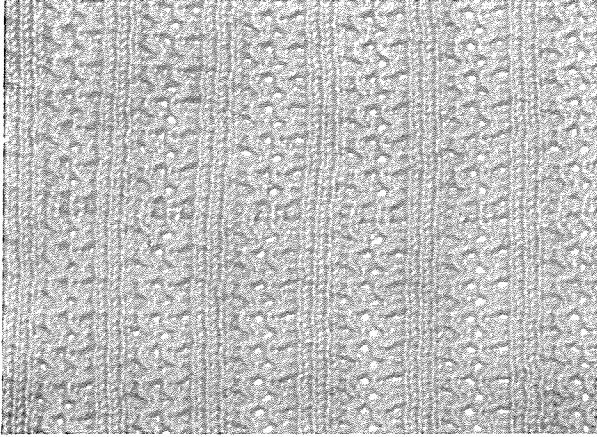


English-rib stitches with a swing at every 8th row.

1 pattern = 2 sts. 16 rs.

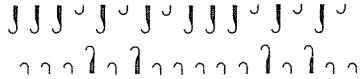
Needle arrangement							Half pitch lever P (left)		
Order	Main machine carriage			Ribber carriage			Swing pointer	Direction	Remarks
	Cam lev.	Russel lev. (both)	Side lev. (both)	Set lev.	Pick knob	Russel lev.			
1	STOCK-INET	|	■	⊙ ①	∩	— —	5	→	Repeat 4 times (knit 8 rows)
2	..	..	..	.. ..	..	.. ..	..	←
3	..	..	..	.. ..	..	.. ..	7	→	Repeat 4 times (knit 8 rows)
4	..	..	..	.. ..	.. •	.. ..	..	←

VARIATION OF SWUNG ENGLISH RIB - 5

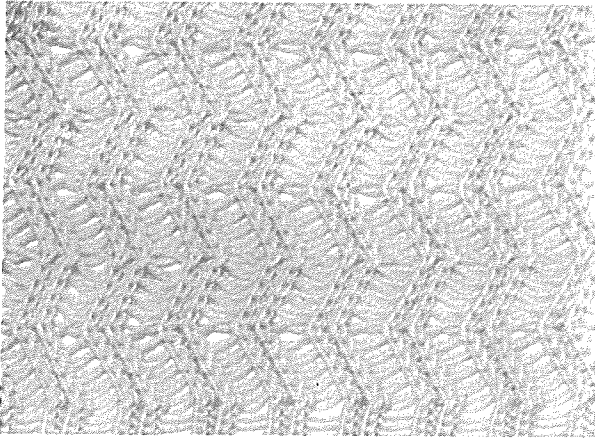


Partially swinging while knitting English-rib stitches produces this design. The needle arrangement may be varied to suit your taste.

1 pattern = 8 sts. 4 rs.

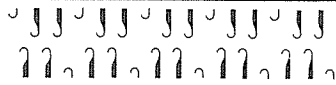
Needle arrangement 										Half pitch lever H (right)	
Order	Main machine carriage			Ribber carriage			Swing pointer	Direction	Remarks		
	Cam lev.	Russel lev. (both)	Side lev. (both)	Set lev.	Pick knob	Russel lev.					
1	STOCK-INET	|	■	⊙ ①	∩	— —	5	→			
2	"	"	"	" "	"	" "	"	←			
3	"	"	"	" "	"	" "	4	→			
4	"	"	"	" "	"	" "	"	←			

VARIATION OF HERRING BONE SWING - 6

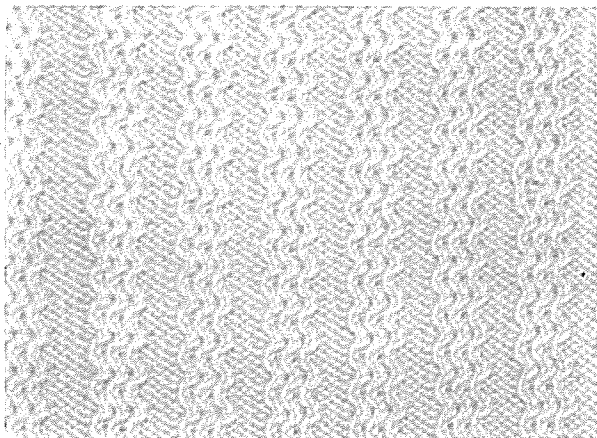


Two-on-one-off needle arrangement plus knitting with swing between right and left in alternation produces this pattern.

1 pattern = 3 sts. 20 rs.

Needle arrangement 										Half pitch lever H (right)	
Order	Main machine carriage			Ribber carriage			Swing pointer	Direction	Remarks		
	Cam lev.	Russel lev. (both)	Side lev. (both)	Set lev.	Pick knob	Russel lev.					
1	STOCK-INET	|	■	① ②	∩	— —	5	→	Repeat 5 times (knit 10 rows)		
2	"	"	"	" "	"	" "	4	←			
3	"	"	"	" "	"	" "	"	→	Repeat 5 times (knit 10 rows)		
4	"	"	"	" "	"	" "	5	←			

VARIATION OF SWING PATTERN - 7

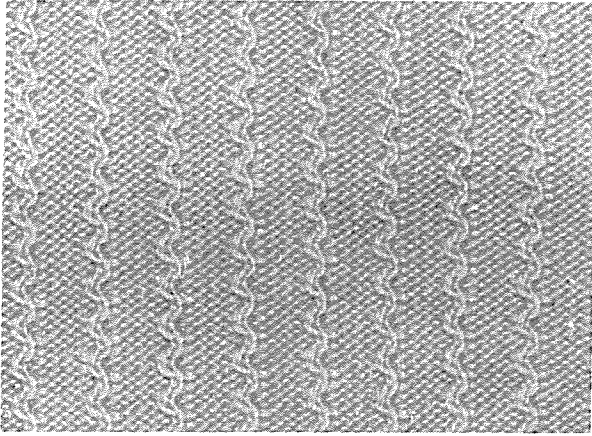


Knitting with three-on-three-off needle arrangement on the ribber side produces this pattern, provided the bed is swung by two pitches at every other row.

1 pattern = 6 sts. 4 rs.

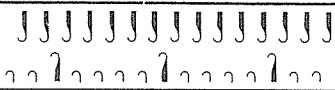

Needle arrangement		Half pitch lever H (right)								
		Main machine carriage			Ribber carriage			Swing pointer	Direction	Remarks
Order	Cam lev.	Russel lev. (both)	Side lev. (both)	Set lev.	Pick knob	Russel lev.				
1	STOCK-INET	|	■	① ①	←	— —	5	→		
2	"	"	"	" "	"	" "	"	←		
3	"	"	"	" "	"	" "	7	→		
4	"	"	"	" "	"	" "	"	←		

VARIATION OF SWING PATTERN - 8

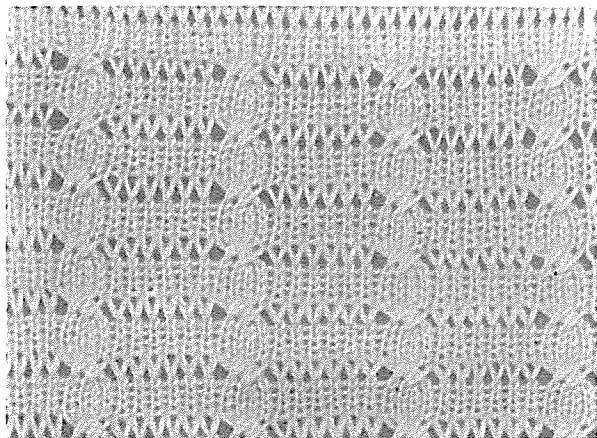


Another pattern produced by bed swinging with one-on-four-off needle arrangement on the ribber side.

1 pattern = 5 sts. 4 rs.

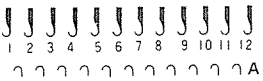







Needle arrangement 										Half pitch lever H (right)	
Order	Main machine carriage			Ribber carriage			Swing pointer	Direction	Remarks		
	Cam lev.	Russel lev. (both)	Side lev. (both)	Set lev.	Pick knob	Russel lev.					
1	STOCK-INET	|	■	① ①		— —	5	→			
2	"	"	"	" "	"	" "	3	←			
3	"	"	"	" "	"	" "	5	→			
4	"	"	"	" "	"	" "	7	←			

DRIVING KNITTING - 9



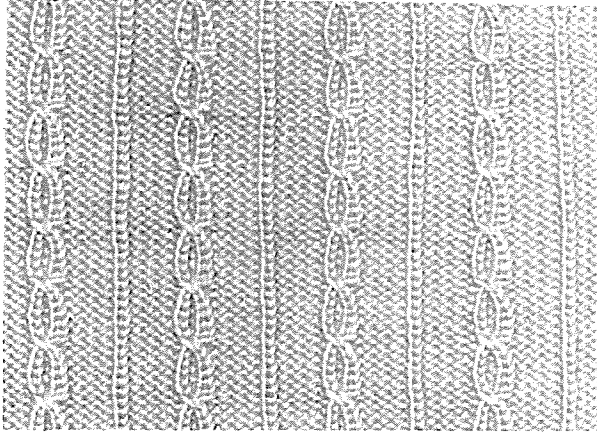
This pattern involves knitting only with the main-machine to make the background rows. The pattern is created by putting the ribber needles into service and by dropping the stitches made by ribber needles. The dropped stitches are crossed at regular intervals.

1 pattern = 10 sts. 5 rs.

Needle arrangement 										Half pitch lever H (right)	
Order	Main machine carriage			Ribber carriage			Swing pointer	Direction	Remarks		
	Cam lev.	Russel lev. (both)	Side lev. (both)	Set lev.	Pick knob	Russel lev.					
1	STOCK-INET	|					5		Repeat twice (knit 4 rows)		
2	"	"	"				"				
3	Push the needles of the ribber to B position.										
4	"	"	"	 		— —	"				
5	Un-hook all the stitches of the ribber side and push the needles to A position										
6	Cross the stitches of the main machine side 1 · 2 and 3 · 4, 11 · 12 and 13 · 14 etc.										

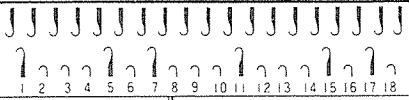

* When repeating, knitting direction reverses.

CROSSING PATTERN - 10



Ribber needles are in knitting position at regular or systematic intervals and the selected arrangement is crossed at regular row intervals.

1 pattern = 10 sts. 6 rs.

Needle arrangement									
									
Order	Main machine carriage			Ribber carriage			Swing pointer	Direction	Remarks
	Cam lev.	Russel lev. (both)	Side knob (both)	Set lev.	Pick knob	Russel lev.			
1	STOCK-INET	|	■	① ①		— —	5	→	Repeat 3 times (knit 6 rows)
2	"	"	"	" "	"	" "	"	←	
3	Cross the stitches of the ribber side 5 and 7, 15 and 17 etc.								

M E M O