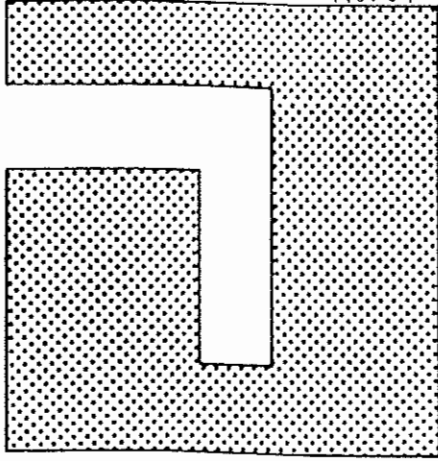


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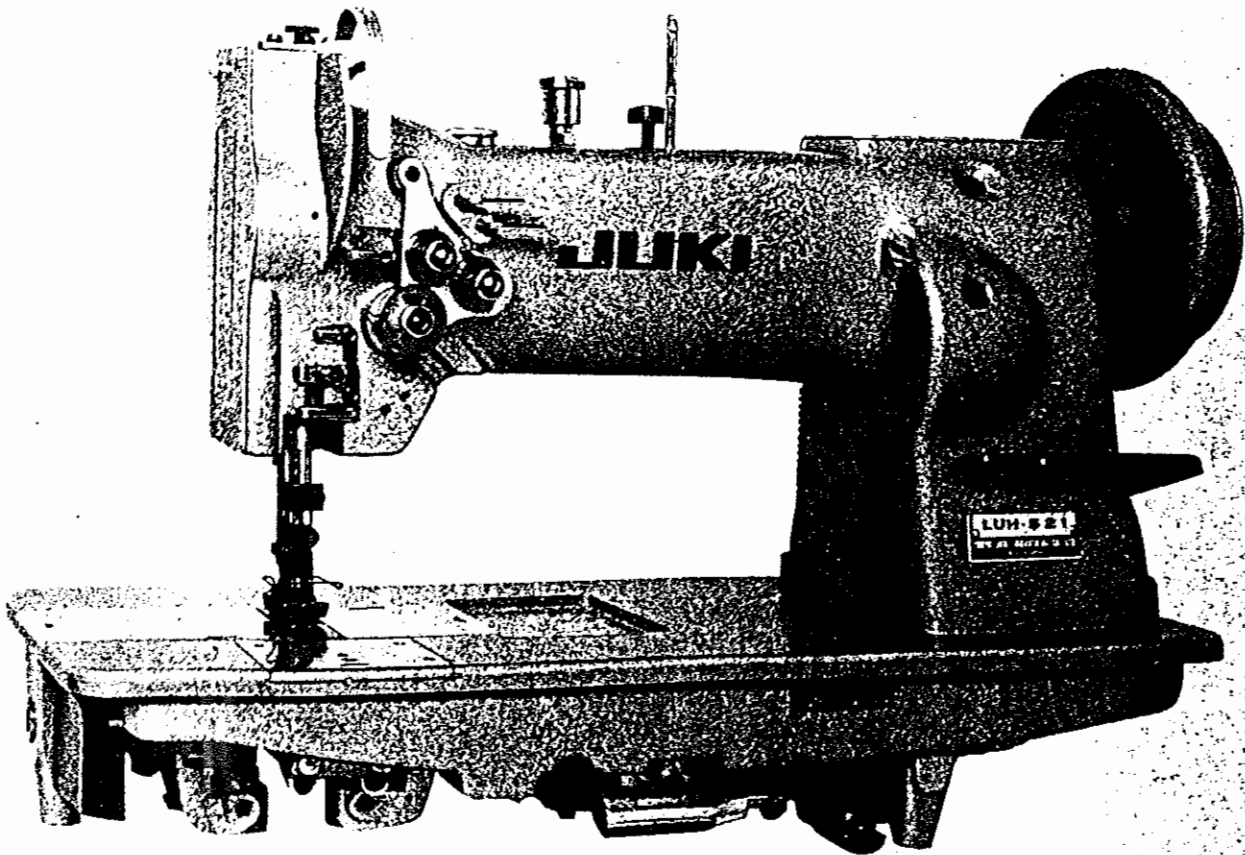
MODEL **LUH-521**

TWO-NEEDLE, UNISON FEED,  
LOCKSTITCH INDUSTRIAL SEWING  
MACHINE WITH REVERSE FEED

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**INSTRUCTION BOOK**



**TOKYO JUKI INDUSTRIAL CO., LTD.**



## INTRODUCTION

This Instruction Book consists of the essential informations which should be acquired by the operators of JUKI LUH-521. We hope that the Sewing Machine is correctly used by the operator who frequently refers to this Instruction Book before or after the operation or whenever necessary.

## SPECIFICATION

Sewing speed	: 1,800 s.p.m.
Applications	: Ultra heavy weight materials, Sewing double stitch lines on the heavy weight materials.
Maximum stitch length	: 7 mm (9/32") with normal feed. 6 mm (15/64") with reverse feed.
Sewing hook	: Rotary vertical-axis sewing hook (large size).
Needles	: DP x 17, #23 (#16 to #24)
Presser foot lift	: 9 mm (23/64") by hand lifter 9.5 mm (3/8") by knee lifter
Presser and walking feet	: Joint lift adjustable 2 mm to 5 mm (5/64" to 13/64")
Needle gauge	: 3/16", 1/4", 3/8", 1/2" or 5/8". (3/4", 7/8" or 1" on special request).
Reverse feed	: Reverse feed control lever.
Lubricating oil	: JUKI Sewing Machine Oil (NEW DEFRIX OIL No. 1)
Motor	: 400W, 2-P clutch motor

## CAUTIONS BEFORE OPERATION

1. Don't run the machine before filling the oil reservoir with the prescribed lubricating oil.
2. After setting up your machine, make sure that it runs in the correct direction; lower the needle by turning the handwheel and watch the handwheel's revolution by momentarily switching the power "on" (correct rotational direction of the handwheel: counterclockwise when viewed from the handwheel's end).

## CAUTIONS IN OPERATION

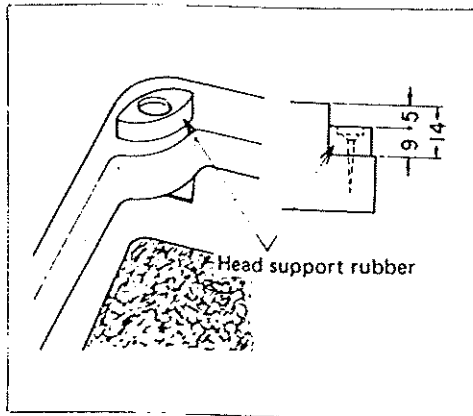
1. Don't put your hand under the needle when you turn "on" the power switch or operate the machine.
2. Don't put your hand into the thread take-up cover while the machine is running.
3. Don't forget to cut off the power supply before you tilt the machine head backwards or replace the V-belt.
4. Never bring your fingers or hair close to, or place anything on the handwheel, V-belt, bobbin winder wheel or motor during operation. It may lead to serious personal injuries.
5. If your machine is provided with a belt cover, finger guard and eye guard, never operate your machine with any of them removed.

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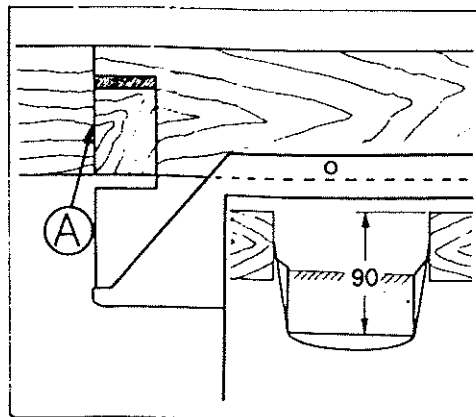
# I. INSTALLATION AND PRE PARATION

## 1. INSTALLATION

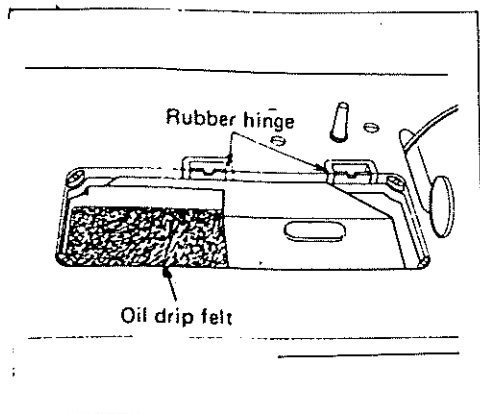


### \* Attaching the oil reservoir

1) Nail the head support rubbers on the 4 corners of the installation opening of the table so that each rubber is correctly positioned in the corner with the uniform height specified in the illustration.

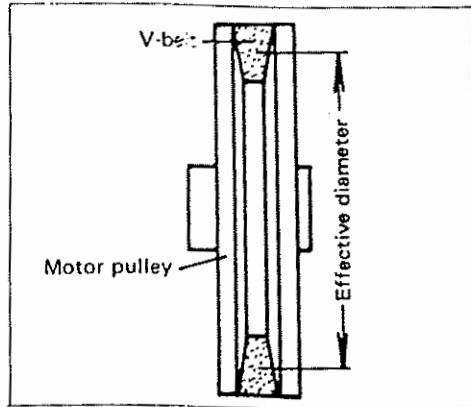


2) Attach the oil reservoir to the table as shown in the illustration. Nail the oil reservoir in the position where its side edges are aligned with the face  $\text{\textcircled{A}}$  of the table and its bottom surface is 90mm (3.35/64") below the top surface of the table.



3) Nail 2 rubber hinges on the table and put the oil drip felt on the bottom of the oil reservoir as illustrated.

## 2. REVOLUTION OF THE MOTOR



### \* Motor pulley and belt

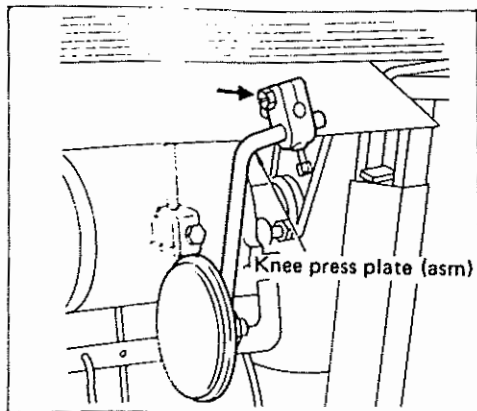
- 1) Use a 400W, 2-P, 1/2HP clutch motor of single or 3-phase.
- 2) Use a M-type (43") V-belt.

The relation between the sewing speed and the dimension of the motor pulley (effective diameter) is shown by the table given below;

(Note) "Effective diameter of the motor pulley" is the diameter which is measured from the center of the V-belt wound round the pulley.

Frequency	Sewing speed	Motor pulley Part No.	Motor pulley	
			Effective diameter	Outer diameter
50Hz.	1,800 s.p.m.	MTK-PV06500	65mm (2.9/16")	70mm (2.49/64")
60Hz.	1,800 s.p.m.	MTK-PV05500	55mm (2.3/16")	60mm (2.23/64")

## 3. DETACHING THE KNEE PRESS PLATE ASSEMBLY



When tilting the machine head backwards for cleaning the sewing hook or similar purposes, remove the knee press plate assembly from the knee lifter assembly beforehand by pulling it towards you.

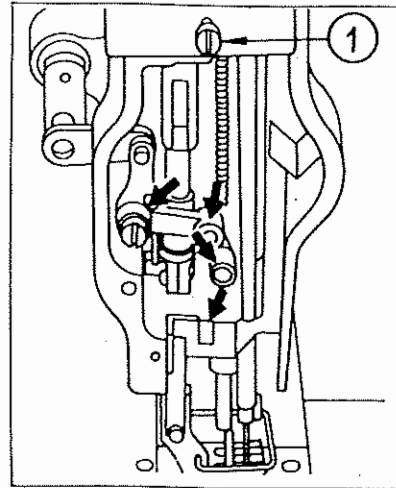
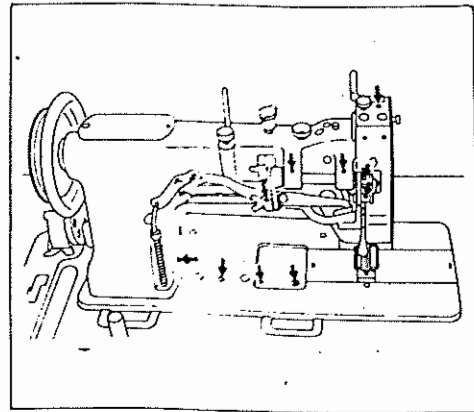
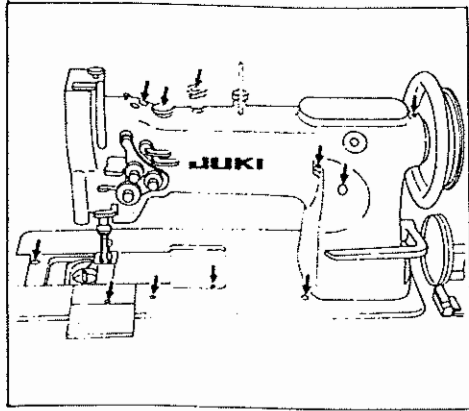
## II. OPERATION

### 1. CAUTIONS ON OPERATION.

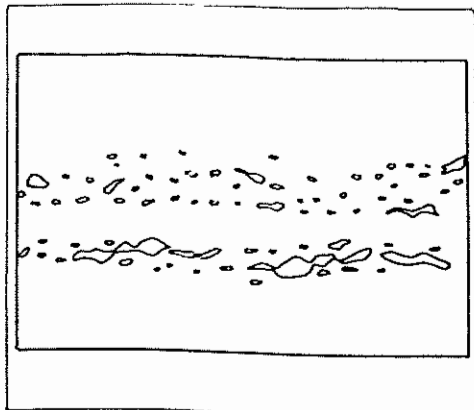
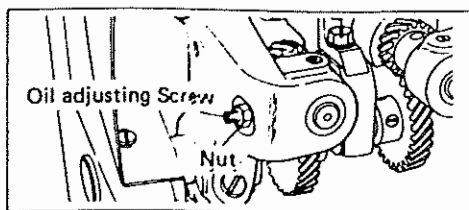
- Make sure that the drive pulley rotates in the operator's direction.
- Do not drive the machine before the lubricating oil is poured into the oil reservoir and applied to the necessary parts of the machine. (Refer to 2. Lubrication).
- Every morning before using the machine;
  - 1) Remove dust or oil from the needling position and sewing hook.
  - 2) Take out the bobbin case and clean up the bobbin.
  - 3) Check the sewing conditions through the trial operation.
- After using the machine;
  - 1) Tilt the machine head backwards and clean up the sewing hook.
  - 2) Check that oil drip felt in oil reservoir is sufficiently soaked with lubricating oil. If not, add some JUKI Sewing Machine oil (NEW DEFRIX OIL No. 1).
- When the machine is driven on trial without the bobbin case, pull out the needle threads from the needle eyes in order to prevent them being entangled with the sewing hook.
- In case of the following accidents, immediately cut off the power supply and call your maintenance engineer;
  - 1) The machine does not start even if the start pedal is depressed.
  - 2) Needle breakage, thread breakage or stitch skipping frequently occurs.
  - 3) Sewing conditions are found unusual.

### 2. LUBRICATION

- Use the supplied lubricating oil, NEW DEFRIX OIL No. 1 in any circumstances.
- Make sure that the oil drip felt in the oil reservoir is always soaked with the lubricating oil to such an extent that the oil oozes out when the felt is lightly pressed by your finger.
- Lubricate the parts shown by arrows once or twice a day. For lubricating the oil wick and moving parts located in the face plate, loosen the screw ① and turn aside the face plate.
- Lubricate the machine 3 to 5 times a day when operating a new machine or consecutively sewing the long-sized materials.



**\* Adjusting the amount of oil flowing through the sewing hook.**



- The sewing hook is automatically lubricated. Adjust the oil flow by means of the oil adjusting screws located on the lower parts of the left and right hook driving shaft saddles. Loosen the lock nut and, turn the adjusting screw clockwise for increasing the amount of oil or counterclockwise for reducing.

For determining the proper flow of oil, hold a piece of paper by keeping it apart from the sewing hook by about 10mm (25/64") and let the machine run for 5 seconds.

The left illustration represents one of the typical oil stain distribution chart obtained at the level of hook blade by rotating a properly adjusted sewing hook.

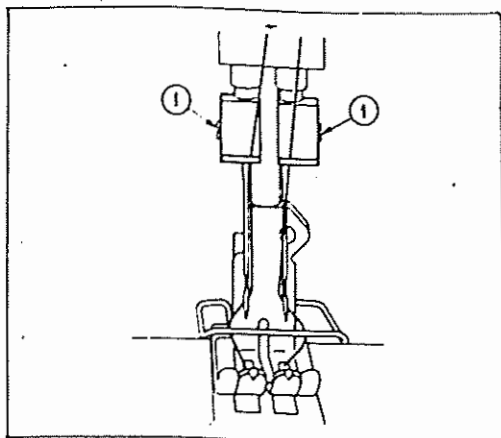
After setting the oil adjusting screw, secure it by tightening the lock nut.



### 3. INSTALLATION OF THE SUITABLE NEEDLES

- Use the needle type of DPX17 with a suitable size depending on the thickness of thread and the kind of fabric by referring to the following table;

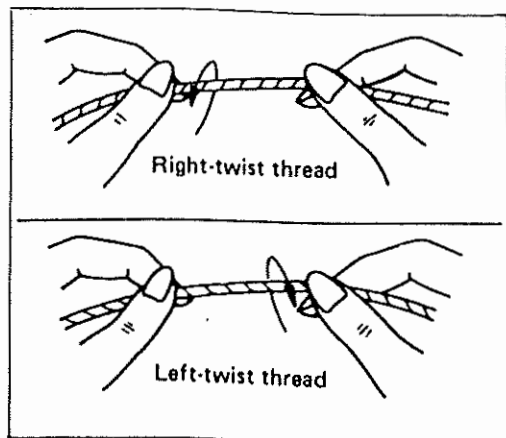
Needle threads	Fabrics	Needle numbers
Cotton Synthetic fiber # 8 to # 15	Canvas, Coats and Denim.	# 23 to # 24
Cotton Synthetic fiber # 30 to # 20	Coats, Denim, Men's suits and ladies' dresses.	# 18 to # 20
Cotton Synthetic fiber # 40 to # 30.	Men's suits, Ladies' dresses and children's wears.	# 16 to # 18



#### \* Attaching the needles

- Raise the needle bar all the way up.  
Fully insert the needles into the clamp holes by facing their long grooves each other and secure them by tightening the screws ①.

### 4. KIND OF THREADS AND THREADING THE MACHINE



#### \* Threads

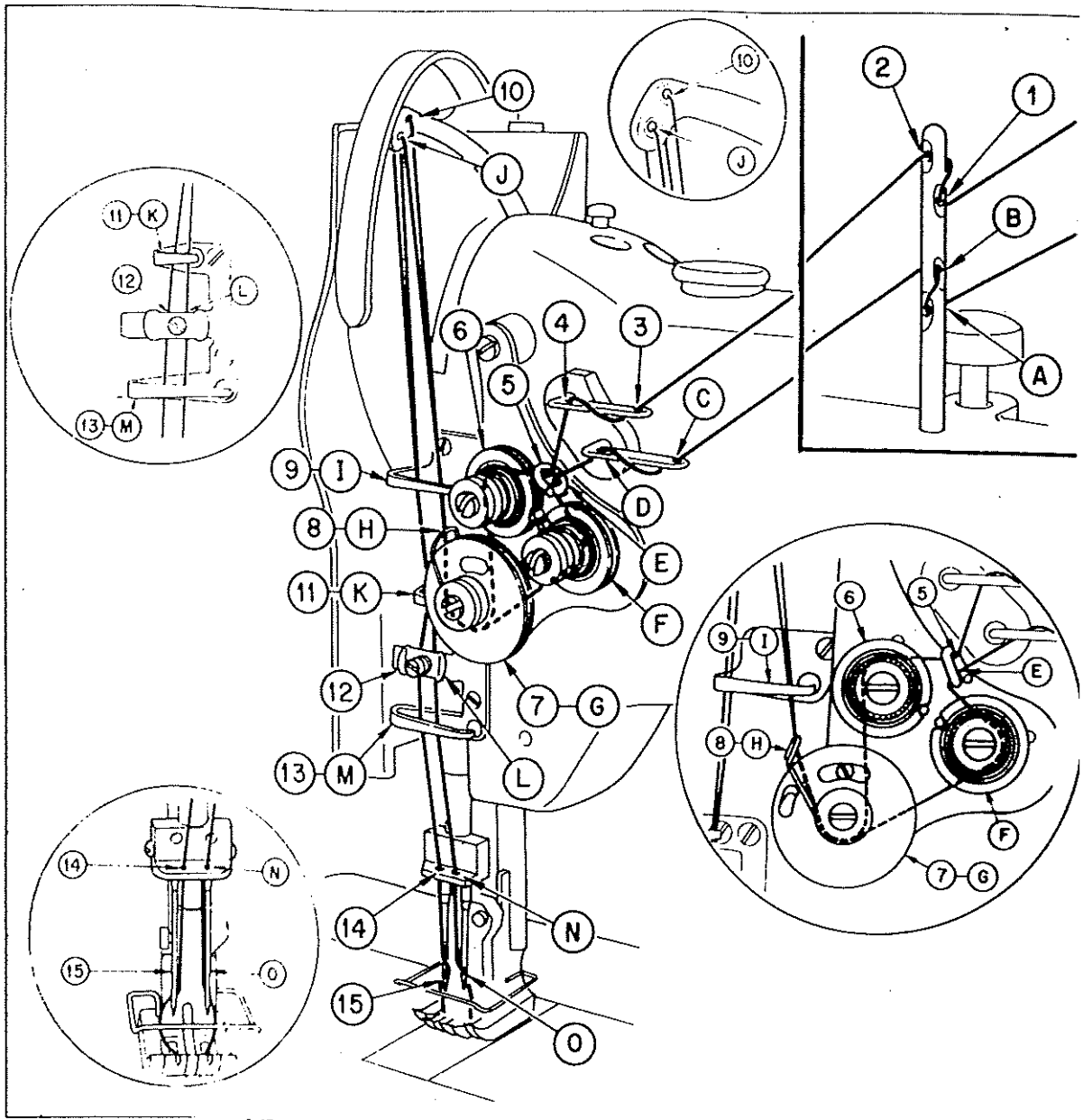
- Use new and uniformly twisted threads in order to prevent the skipped or irregular stitches.  
It is advisable to use the right-twist thread (S-twist) for the left needle and the left-twist thread (Z-twist) for the right needle or, alternatively, use the left-twist thread (Z-twist) for both needles. Either thread can be used for the bobbin thread.

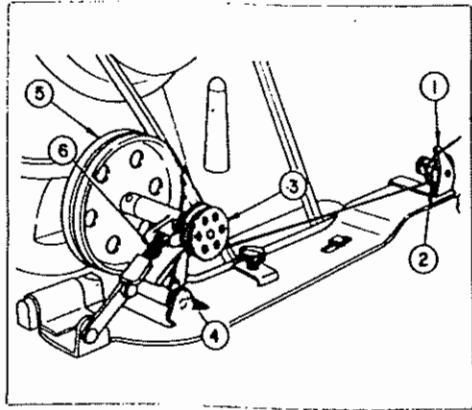
**\*Passing the needle threads.**

Pass the needle thread according to the illustration.

① to ⑮ for the left needle.

Ⓐ to Ⓞ for the right needle.



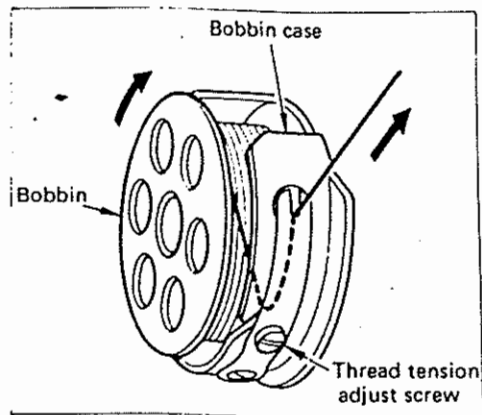


**\* Winding the bobbin**

- 1) Press the bobbin onto the bobbin winder.
- 2) Take the thread from the spool, pass it through the thread guides as illustrated and wind it 4 to 5 turns round the bobbin.
- 3) Press the bobbin thread guide ④.
- 4) When the bobbin is filled, the winding will automatically stop.

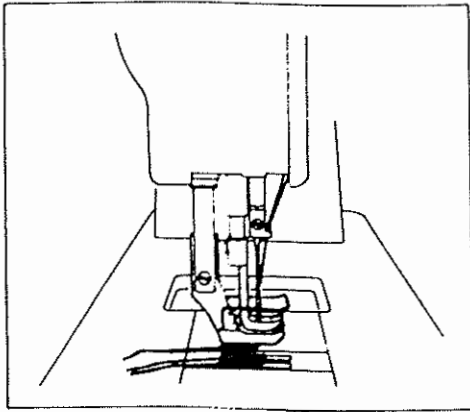
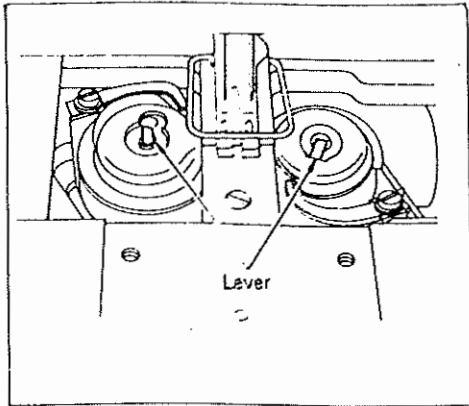
**\* Adjusting the winding length**

It is recommendable to wind the bobbin for about 80% of its full depth in the case of cotton thread or about 60 to 70% in the case of synthetic thread. Adjust it by tightening the screw ⑥ for increasing the winding length or by loosening it for decreasing.



**\* Threading the bobbin case.**

- 1) Hold a bobbin so that the end of the thread is directed to the right and put it into the bobbin case.
- 2) Pass the thread through the guide slit of the bobbin case.
- 3) Pull the thread so that it passes under the tension spring.

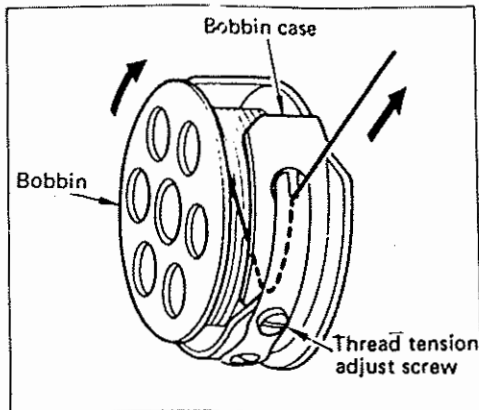


**\* Positioning the bobbin case**

Put the bobbin case trailing the thread into the sewing hook and turn the lever down.

(Note) Before starting to sew, take up the bobbin threads by manually turning the handwheel once and place them behind the presser foot together with the needle threads. This procedure will prevent the bobbin threads from being entangled with the sewing hook.

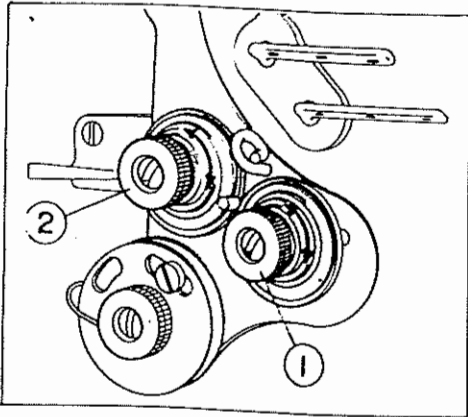
**5. THREAD TENSION**



**\* Bobbin thread tension**

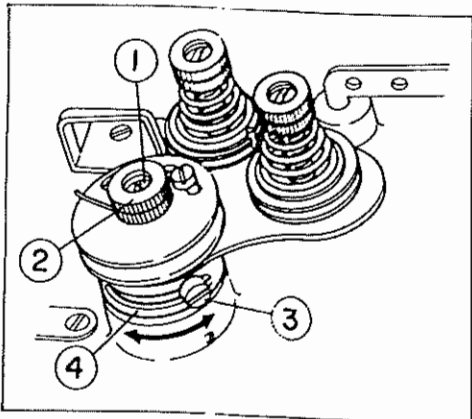
Tension of the bobbin thread is adjusted by turning the thread tension screw located on the bobbin case. Clockwise turn is for increasing and counterclockwise turn is for decreasing the bobbin thread tension.

The standard bobbin thread tension is 90 to 100g.



**\* Needle thread tension**

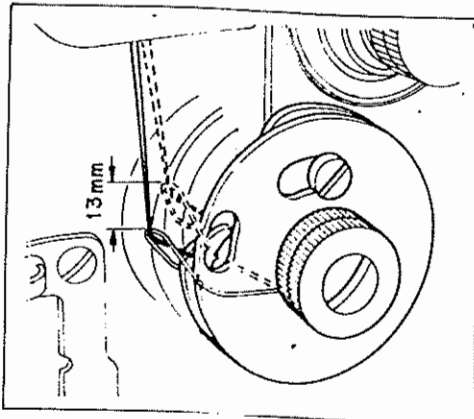
- 1) The needle thread tension is adjusted after the left and right bobbin thread tension has been properly adjusted.
  - 2) Adjust the thread tension nut ① for the right needle thread and the nut ② for the left needle thread pursuant to the tension of their respective bobbin threads.
- Turn the tension nut clockwise for increasing or counterclockwise for decreasing the tension.



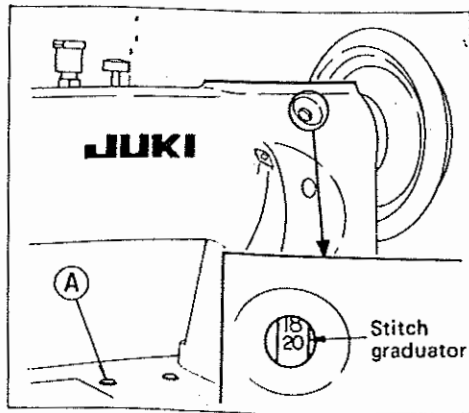
**\* Thread take-up spring**

Tension of the thread take-up spring is increased by turning the stud ① with a screw driver in the counterclockwise direction and is decreased by clockwise turn. Tighten the nut ② after this adjustment.

In general, the tension of the thread take-up spring is about 80g at the starting point and the stroke is about 13mm (33/64"). Stroke of the thread take-up spring is increased by shifting the adjusting plate ④ towards the right after loosening the set screw ③ and vice versa.



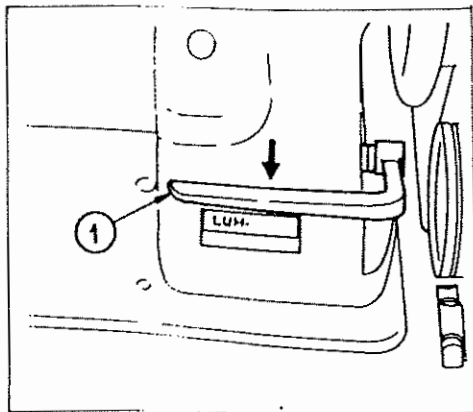
## 6. STITCH LENGTH ADJUSTMENT AND REVERSE STITCH



### \* Adjusting the stitch length

- 1) Manually turn the handwheel by continuously depressing the button (A) on the machine bed, and the button will go farther down at a certain position of the handwheel.
  - 2) Continue to turn the handwheel until the desired stitch length is indicated by the stitch graduator.
  - 3) When the desired stitch length is obtained, release the button (A).
- The stitch graduator indicates the number of stitches per inch (25.4mm).

(Note) Do not reversely turn the handwheel with the threaded needles, or the needle threads will be entangled with the sewing hook. Remove the threads from the needles before reversely turning the handwheel.

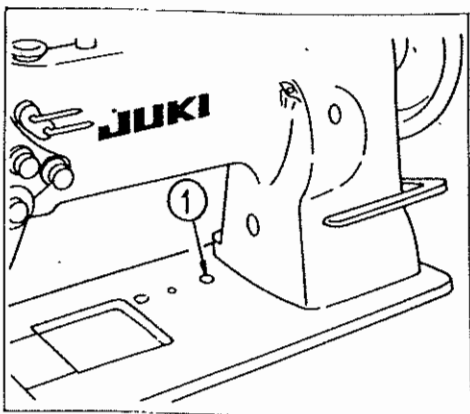


### \* Reverse stitch

Reverse stitches are produced as long as the reverse control lever (1) is depressed.

## 7. SAFETY CLUTCH MECHANISM

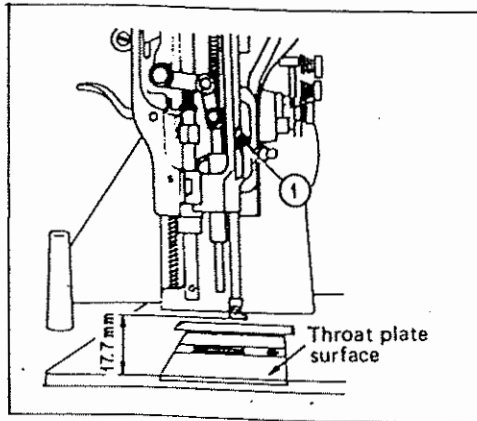
When the machine is accidentally overloaded by the clogged sewing hook or similar mechanical trouble, the safety clutch mechanism is immediately actuated to protect the machine. Once the safety clutch mechanism has been driven, the feed dog and the sewing hook will not move even if the handwheel is turned. Clean up the sewing hook or remove the cause of trouble from the machine and reset the machine in the following way;



- 1) Firmly turn the handwheel in the reverse direction by depressing the button①.
- 2) You will hear a click for resetting.
- 3) Check that the machine has been resetted.  
Manually turn the handwheel in the normal direction, and the feed dog and the sewing hook will move if the machine is resetted.

### III. ADJUSTMENT

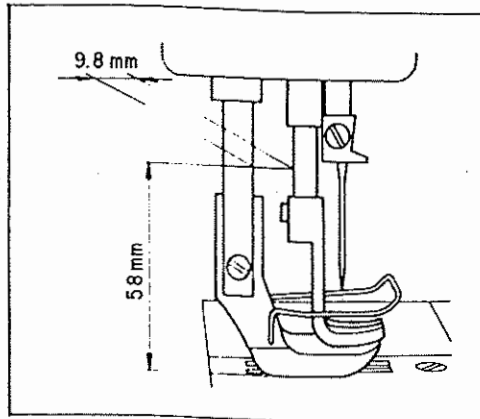
#### 1. HEIGHT OF THE NEEDLE BAR



**\* Adjusting the height of the needle bar.**

- 1) Set the stitch length to "0".
- 2) Remove the face plate.
- 3) Loosen the set screw ① of the needle bar connection.
- 4) Set the height of the needle clamp so that its bottom end is located at 17.7mm(45/64") above the top surface of the throat plate when the needle bar is in the lowest position.
- 5) Tighten the set screw ① of the needle bar connection.

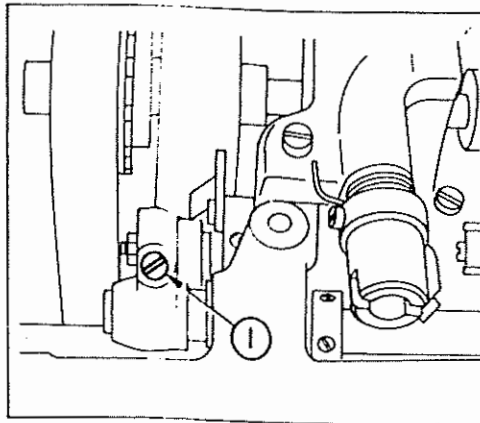
#### 2. POSITION OF THE NEEDLE BAR FRAME RELATED TO THE PRESSER BAR



When the stitch length is set to "0", the rear face of the walking bar incorporated in the needle bar frame must be positioned 9.8mm (25/64") away from the front face of the presser bar at the height of 58mm (2.9/32") above the throat plate surface.

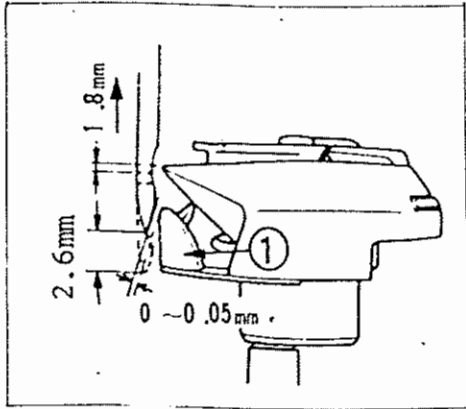
**\* Adjusting the needle bar frame position.**

- 1) Loosen the screw ① which clamps the needle bar frame.
- 2) Insert a 9.8mm (25/64") thick block between the walking foot bar and the presser bar at the height of 58mm (2.9/32") and press the needle bar frame against the presser bar.
- 3) Tighten the screw ① and remove the block.



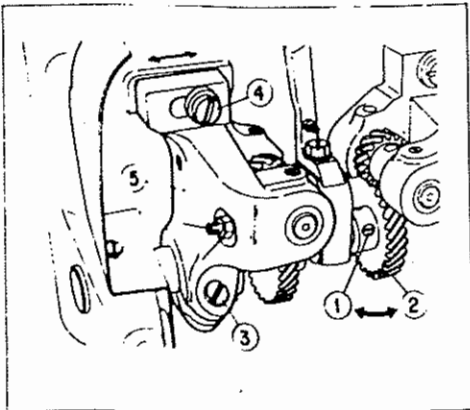
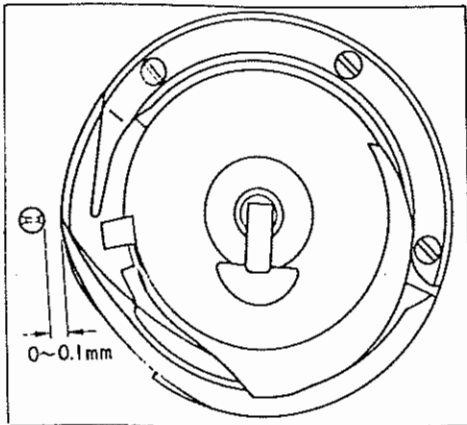


### 3. RELATION BETWEEN THE NEEDLE AND THE SEWING HOOK



\* Correct position of the sewing hook related to the needle.

- 1) Lift the presser foot, set the stitch length to "4" and remove the throat plate.
- 2) Raise the needle by 2.6mm from its lowest position. At this moment, the sewing hook must be positioned with the following clearances:
  - (a) The blade point of both left and right sewing hooks must be aligned with the center of their needles with the clearance of 0 to 0.1mm.
  - (b) The clearance between the needle guard ① of the sewing hook and the needle must be 0 to 0.05mm.
  - (c) The blade point of the sewing hook must be pointed to the needle at 1.8mm above the top end of the needle eye.



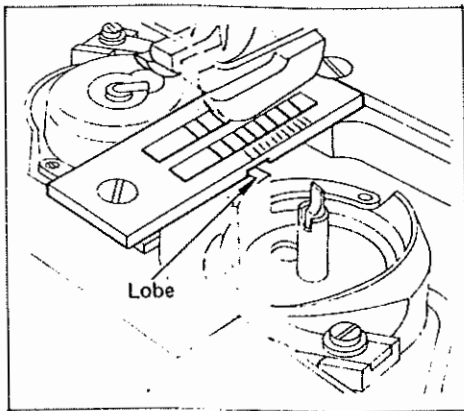
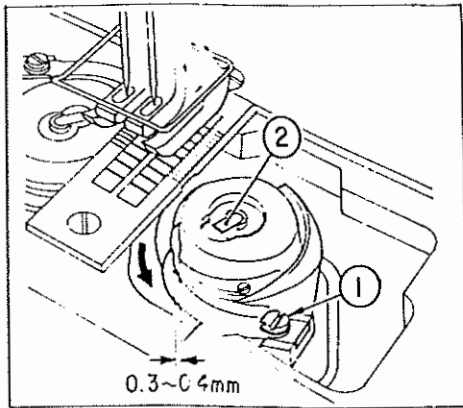
\* Adjusting the timing of the sewing hook.

Loosen the set screw ① and move the hook shaft gear (large) ② until the blade point of the sewing hook is aligned with the center of the needle. Tighten the set screw ① after adjustment so that the larger gear is firmly engaged with the small gear at the center of their teeth.

\* Adjusting the clearance between the needle and the hook blade.

(Refer to upper Figure)

- 1) Remove the presser foot and the throat plate and tilt the machine head backwards.
- 2) Loosen the screw ③ and ④ of the hook driving shaft saddle.
- 3) Adjust the position of the saddle ⑤ by lightly tapping until the clearance of 0 to 0.1mm is made between the needle and the blade point of the hook. Tighten the screws ③ and ④ after adjustment.

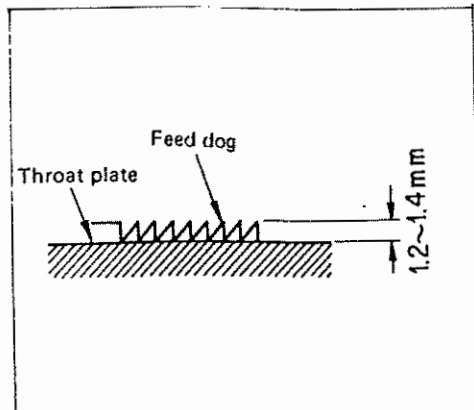
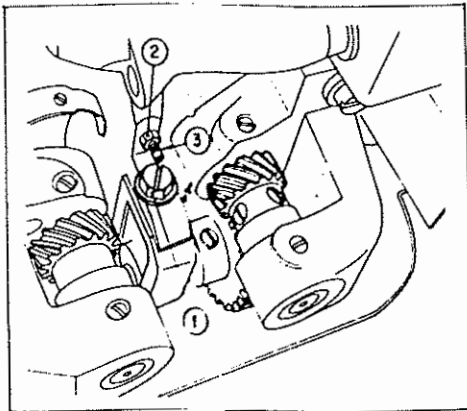


**\* Adjusting the bobbin case opening lever.**

Turn the handwheel in the regular direction until the lobe of the bobbin case reaches its dead end as shown by the arrow. In this position, loosen the screw ① and adjust the position of the bobbin case opening lever so that its top end is kept apart from the bobbin case by 0.3 to 0.4mm (1/64"). The bobbin case and bobbin are removed from the hook assembly after pulling up the latch ② by your finger or a screw driver.

(Note) When attaching the throat plate, turn the bobbin case with your hand until its lobe rests in the guide groove on the side edge of the throat plate..

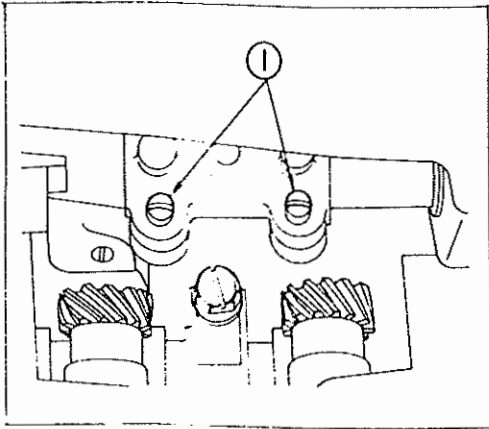
**4. HEIGHT OF THE FEED DOG**



**\* Adjusting the height of the feed dog.**

Loosen the screw ① and adjust the height of the feed dog so that it protrudes by 1.2 to 1.4mm (3/64") from the throat plate surface. When the feed dog has been renewed, securely tighten 2 set screws before starting this adjustment. Loosen the nut ②, tighten the screw ③ to lightly push up the feed dog and tighten the nut ②. Set the feed dog in the horizontal position by turning the screw ③.

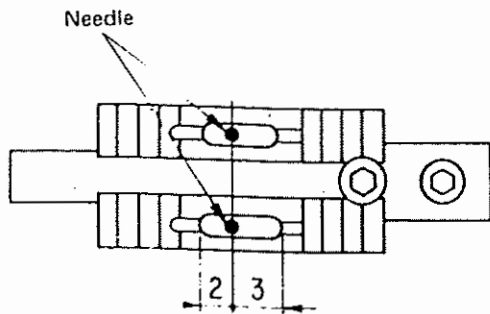
## 5. RELATION BETWEEN THE NEEDLE AND THE FEED DOG



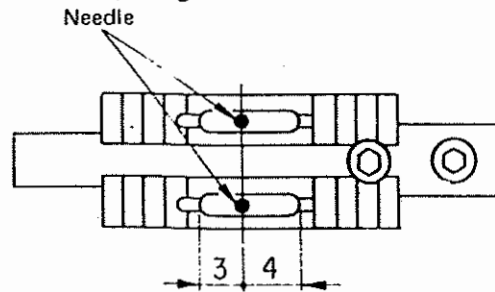
### \* Position of the feed dog.

- 1) Set the stitch length to "0".
- 2) Loosen 2 screws ① of the feed adjuster.
- 3) Adjust the feed dog by means of the feed adjuster so that each feed dog receives the needle at the point shown below.
- 4) Tighten 2 screws ① securely.

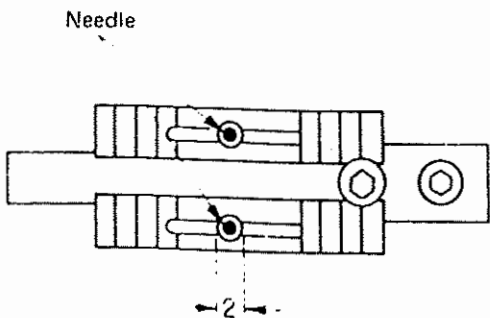
a) the long needle hole (2.6 x 5)  
For heavy weight materials



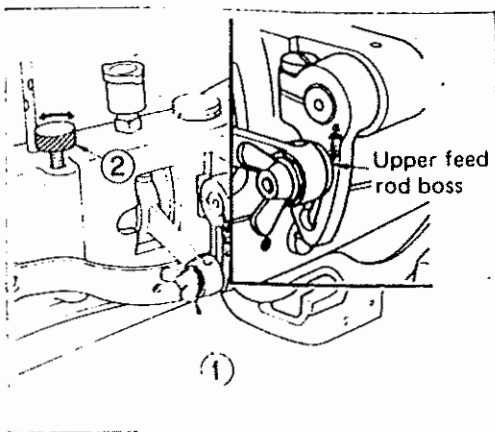
b) the long needle hole (2.6 x 7)  
For ultra heavy weight and heavy weight materials



c) the round needle hole ②  
For medium heavy weight materials



## 6. PRESSER FOOT AND WALKING FOOT



### \* Lifting distance of the walking foot

When sewing a heavy weight material or a work with stepped parts, the stitch length may be accidentally shortened or the work may not be regularly fed. In such a case, adjust the lifting distance of the walking foot.

- 1) Loosen the wing nut ① and reset the upper feed rod to a proper position according to the graduated scale.

2) Tighten the wing nut ①.

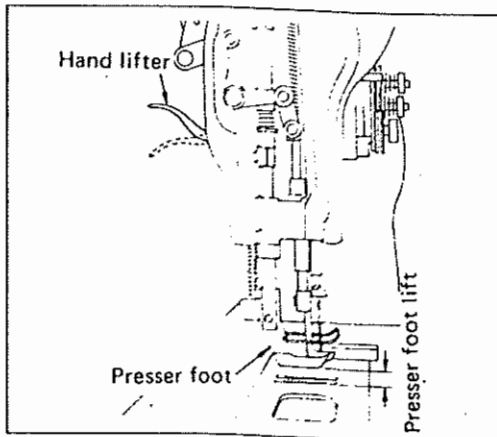
(Note) The adjustable range of the walking foot lift is 2 to 5 mm (5/64" to 3/16"). Do not set the upper feed rod higher than the position where the top end of the rod boss comes above the red mark of 3/6" position.

#### Adjusting the pressure of the presser foot.

Adjust the pressure of the presser foot according to the kind and thickness of the material.

1) Tighten the pressure adjusting screw ② to increase the pressure.

2) Loosen it to decrease the pressure.



#### \* Presser foot lift

The presser foot must go up from the throat plate surface;

9mm (23/64") by the hand lifter or 9.5mm (3/8") by the knee lifter.

Adjusting it in the following ways:

#### \* With the hand lifter

1) Loosen the clamp screw ① of the hand lifter mounting bracket, provide the presser foot with the correct clearance by placing a block or similar material with the height of 9mm (23/64") under the sole of the presser foot and tighten the clamp screw ①.

2) Remove the 9mm block

If the presser foot contacts with the walking foot or the needle, correct its position in the following way;

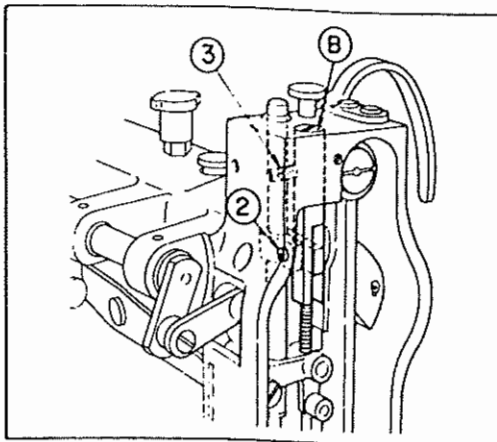
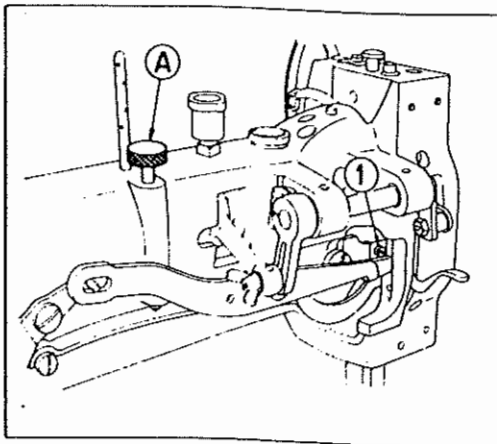
a) Loosen the pressure adjusting thumb screw ④.

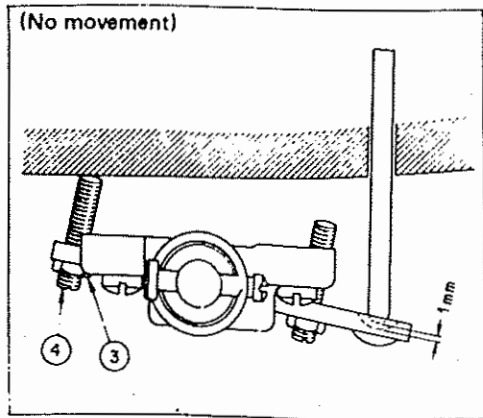
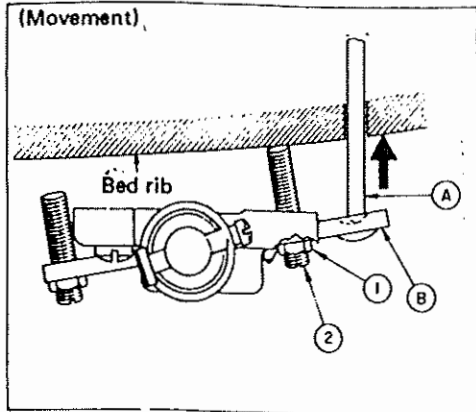
b) Lower the presser foot and loosen the screws ① and ②.

c) Adjust the presser foot so that the center of needle hole of the walking foot is aligned with the needle and tighten the screw ①.

d) Set the height of the presser foot from the throat plate surface to 9mm (23/64") as mentioned before and tighten the screw ②.

e) If the presser foot does not smoothly move up and down after this adjustment, loosen the set screw ③ of the presser bar guide sleeve ⑤, slightly turn the sleeve to allow the presser bar to smoothly move and tighten the set screw ③.

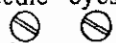
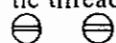
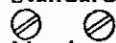




**\* With the knee lifter.**

- 1) Fully depress the hand lifter to raise the presser foot.
- 2) Place a block or similar material with a height of 9.5mm (3/8") under the sole of the presser foot and release the hand lifter.
- 3) Push up the rear lifting bar (A) to eliminate play from the linkage system.
- 4) Loosen the nut (1) and let the rotary arm (B) contact with the rear lifting bar (A) by loosening the positioning screw (2).
- 5) Turn the positioning screw (2) until it touches the surface of the bed rib and tighten the nut (1).
- 6) Remove the 9.5mm block and adjust the screw (4) and nut (3) so that the rotary arm (B) is kept apart by 1mm from the top end of the rear lifting bar (A).

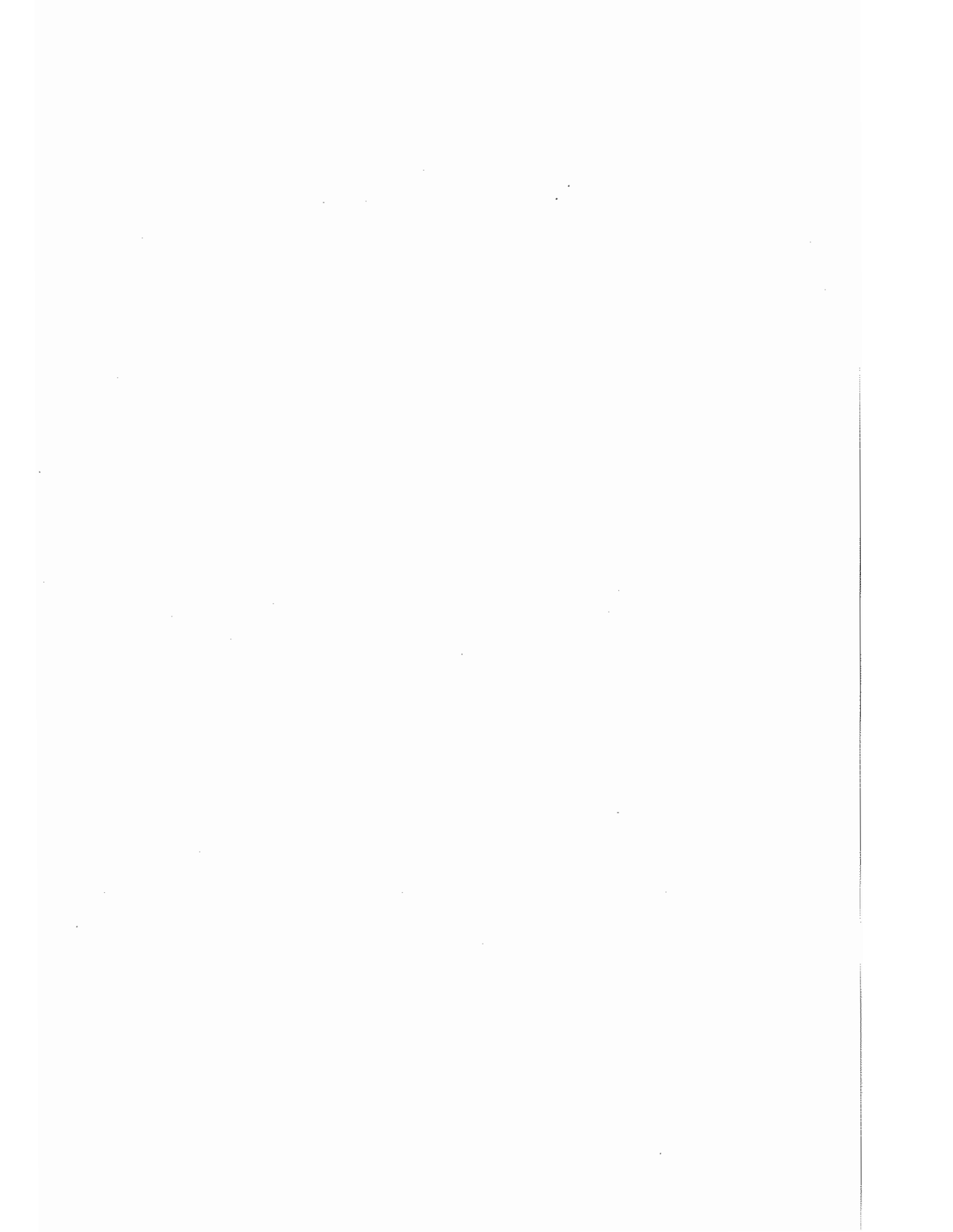
#### IV. CORRECTIVE MEASURES FOR SEWING TROUBLES

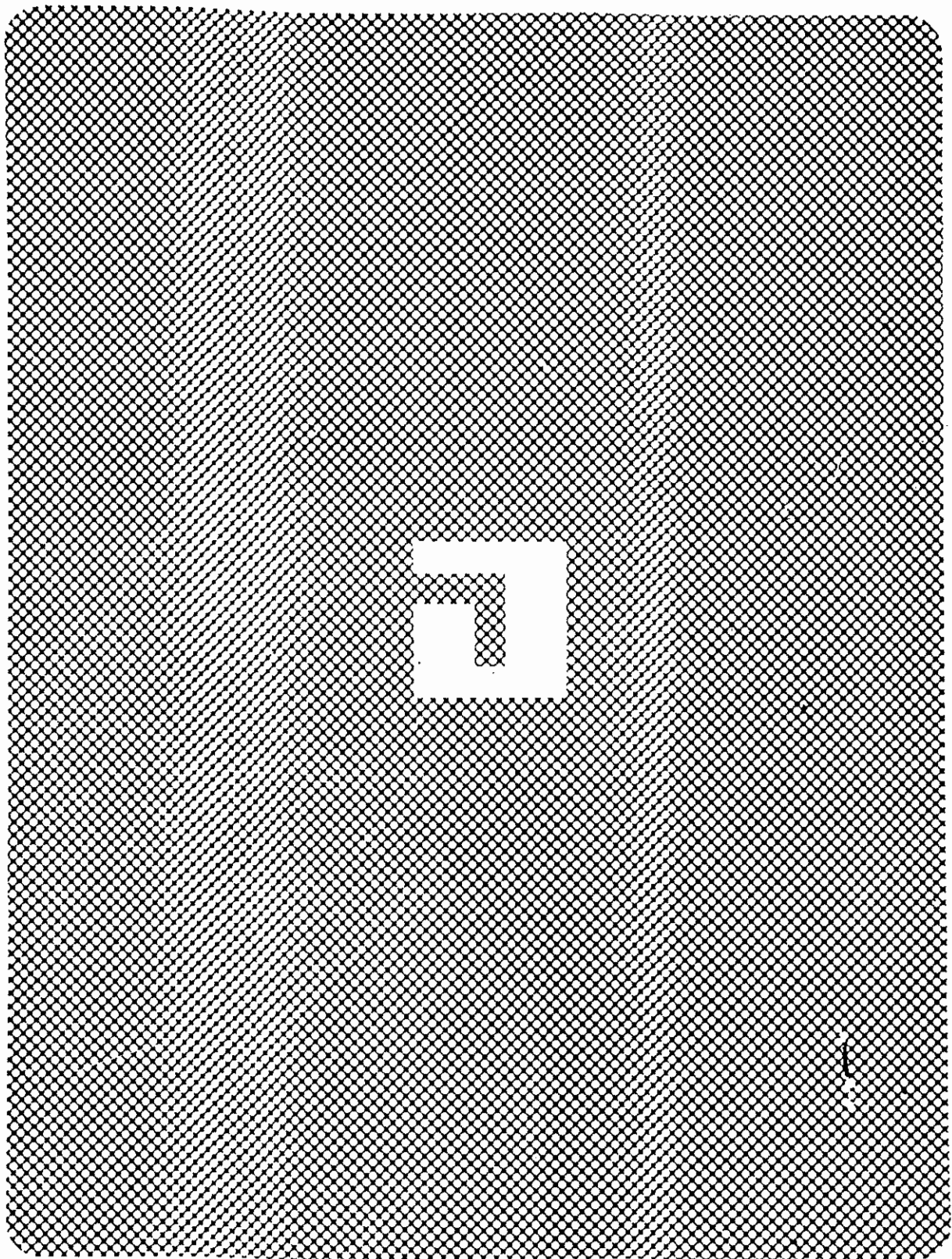
Troubles	Causes	Corrective measures
<p>A. Thread breakage</p> <p>1. Thread is un-twisted or worn out.</p> <p>2. The needle thread is sharply cut off at 20 to 30mm. (5/16" to 1.3/16") from the rear face of the material.</p> <p>3. Needle thread is cut when a stepped part is sewn.</p> <p>4. Quality of needle thread is not adequate.</p> <p>5. The needle thread is cut at the start of sewing.</p> <p>6. The bobbin thread is cut.</p>	<p>(1)The threadway such as needle point hook blade or stopper groove on the rear of the throat plate is not smooth.</p> <p>(2)Tension of the needle thread is too high.</p> <p>(3)The bobbin case opening lever is too close to the bobbin case.</p> <p>(4)The hook blade contact with the needle.</p> <p>(5)Lubricating oil flowing through the sewing hook is not enough.</p> <p>(6)The needle is too thin for the thread.</p> <p>(1)Tension of the needle thread is too low.</p> <p>(2)Tension of the thread take-up spring is too high and the stroke is too small.</p> <p>(3)Direction of the needle eyes is not adequate. (especially for synthetic thread)</p> <p>(4)Timing between the needle and the sewing hook is not correct.</p> <p>(5)Timing of the bobbin case opening lever is not correct.</p> <p>(1)Height of joint lift of the presser foot is not sufficient.</p> <p>(1)Thickness of the thread is not uniform.</p> <p>(2)Used threads may be broken by a low tension.</p> <p>(1)The thread take-up lever is in the thread-drawing timing.</p> <p>(1)The bobbin itself is defective and it does not smoothly rotate.</p> <p>(2)Lints and fibrous dust are gathered between the bobbin and bobbin case.</p>	<p>Remove scratches from the needle or hook blade by using a fine sand-paper. Polish the groove on the throat plate by buffing.</p> <p>Adjust the tension (See II-5).</p> <p>Correct the position of the bobbin case opening lever to 0.3-0.4mm (1/64")(See III-3).</p> <p>Adjust the clearance (See III-3).</p> <p>Adjust the amount of oil (See II-2).</p> <p>Find a suitable combination from the table of II-3.</p> <p>Increase the needle thread tension.</p> <p>Reduce the tension and increase the stroke of the thread take-up spring(See II-5).</p> <p>When looking down the needle eyes:</p> <p>a.  Not suitable for synthetic thread.</p> <p>b.  Standard position</p> <p>c.  May be suitable for synthetic thread.</p> <p>Adjust the timing (See III-3).</p> <p>Adjust the timing(See III-3).</p> <p>Increase the joint lift height of the presser foot (See III-6).</p> <p>Use better threads.</p> <p>Use new threads.</p> <p>Start to sew with the take-up lever at the highest position.</p> <p>Replace it with a new bobbin (depth of the bobbin is 11.8mm (15/32")).</p> <p>Take out the bobbin and clean up the bobbin case.</p>

Troubles	Causes	Corrective measures
<p>B. Stitch-skipping.</p>	<p>(1) Clearance between the needle and the hook blade is too great.            (2) Timing of the sewing hook to the needle is not correct.            (3) Pressure of the presser foot is not enough.            (4) Direction of the needle eyes are not adequate.            (5) Height of the needle bar is not correct.            (6) Stitches are skipped when sewing a stepped part.            (7) Blade point of the sewing hook is not sharp enough.            (8) Needle is defective.            (9) When sewing a thicker material with long stitch length by thinner needles.</p>	<ul style="list-style-type: none"> <li>○ Adjust the clearance (See III-3).</li> <li>○ Adjust the timing of the sewing hook (See III-3).</li> <li>○ Tighten the pressure adjusting screw.</li> <li>○ Correct it by referring to A-2-(3).</li> <li>○ Correct it (See III-1).</li> <li>○ Increase the joint lift height of the presser foot.</li> <li>○ Resharpen the blade point by using a fine oilstone or renew the sewing hook.</li> <li>○ Renew the needle.</li> <li>○ Refer to A-1-(6).</li> </ul>
<p>C. Irregular stitch</p> <p>1. Irregular stitches are produced at the start of sewing.</p> <p>2. Irregular stitches are produced as the sewing speed varies.</p>	<p>(1) Bobbin thread is not passing through the center of the tension spring of the bobbin case.            (2) Sliding part of the bobbin in the bobbin case is not smooth.            (3) Thickness of the needle is not suitable for the thread.            (4) The sewing hook is not properly lubricated.</p> <p>(1) Tension of the bobbin thread is too low.</p> <p>(1) Tension of the bobbin thread is too low.            (2) Timing of the bobbin case opening lever is not correct.            (3) Tension of the bobbin thread is too low.            (4) Surface of thread paths is not smooth.            (5) Sewing hook is faulty.</p>	<ul style="list-style-type: none"> <li>○ Correct the threading position as above. (see II-4).</li> <li>○ Polish the sliding part of the bobbin by using a fine sand-paper or renew it.</li> <li>○ Use a suitable needle.</li> <li>○ Adjust the oil adjusting screw (See II-2).</li> <li>○ Increase the bobbin thread tension (See II-5).</li> <li>○ Increase the tension of the take-up spring (See II-5).</li> <li>○ Adjust it (See III-3).</li> <li>○ Increase the bobbin thread tension (See II-5).</li> <li>○ Make it smooth by using a fine sand-paper or by buffing.</li> <li>○ Renew the sewing hook.</li> </ul>
<p>D. Puckering.</p>	<p>(1) Both the needle and the bobbin threads have excessive tension.            (2) The bobbin thread is wound up too tightly.            (3) Pressure of the presser foot is too high.            (4) The sole of the presser foot is not smooth.            (5) The feed dog is too low.</p>	<ul style="list-style-type: none"> <li>○ Correct their thread tension (See II-5).</li> <li>○ Take out the bobbin and wind it again with lower tension (Loosen the tension adjusting screw before re-winding it).</li> <li>○ Loosen the pressure adjusting screw.</li> <li>○ Polish the sole surface by buffing.</li> <li>○ Correct the height of the feed dog (See III-4).</li> </ul>

Troubles	Causes	Corrective measures
E. Needle thread leaps on the seam.	(1)Timing of the bobbin case opening lever is not correct.	○ Correct it (See III-2).
F. Change in the feed pitch. 1. Feed pitch increases. 2. Feed pitch decreases.	(1)Pressure of the presser foot is too low.  (1)The feed dog is too low.  (2)Tension of both of the needle and the bobbin thread is too high.	○ Increase the pressure.  ○ Correct the height of the feed dog (See III-3). ○ Adjust their tension (See II-5)
G. Isolated idling loops.	(1)Tension of the needle thread is too low.  (2)Timing of the bobbin case opening lever is not correct.	○ Increase the needle thread tension (See II-5). ○ Correct the timing (See III-2).
H. Sewing conditions vary after the safety clutch mechanism is actuated.	(3)Tension of the thread take-up spring is too low and the stroke is too large.  (1)The safety clutch mechanism is not completely returned.	○ Increase the tension and reduce the stroke of the thread take-up spring (See II-5) ○ Put the mechanism back firmly to its standby position.







1984.1 Printed in Japan



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