SINGER®

4411A/566A
4412A/566A

INSTRUCTION BOOK

SINGER (SHANGHAI) SEWING MACHINE CO, LTD.

SINGER

No.004033

4411A/566A	1-NEEDLE, UNISON FEED, LOCKSTITCH MACHINE WITH AUTOMATIC THREAD TRIMMER
4412A/566A	2-NEEDLE, UNISON FEED, LOCKSTITCH MACHINE WITH AUTOMATIC THREAD TRIMMER

Please read this Instruction Manual carefully before using the unit in order to get the most out of it and to enjoy using it for a long time. Please keep this Instruction Manual at hand taking care not to lose it.

INSTRUCTION MANUAL

BEFORE OPERATION

1. Do not operate the machine even for trial before lubrication it.
2. Confirm that the voltage and phase (single or 3-phase) are correct by checking them ag-ainst the ratings showen on the motor nameplate.
3. When running your machine for the first time after the set-up, check the rotational direction of the handwheel. ★ Turn on the power switch. Run the machine at a low spe-ed while checking the rotational direction of the handwheel. (The handwheel should turn counterclockwise as observed from the handwheel side.)
4. For the first month, run the machine at speed of 1600s.p.m. or less.

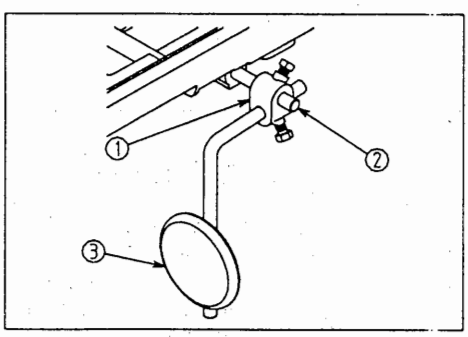
CAUTIONS IN OPERATION

1. Keep your hands away from the needle when you turn on the power switch or while the machine is operating.
2. During operation, be careful not to allow your or any other person's head or finger-s to come close the handwheel, V-belt, bobbin winder or motor. Also, do not place a-nything close to them.
3. Do not turn the machine with the finger guard, beltcover or any other protectors remo-ved.
4. Be sure to turn off the power switch and confirm that the motor is completely stopped before removing the V-belt.

SPECIFICATIONS

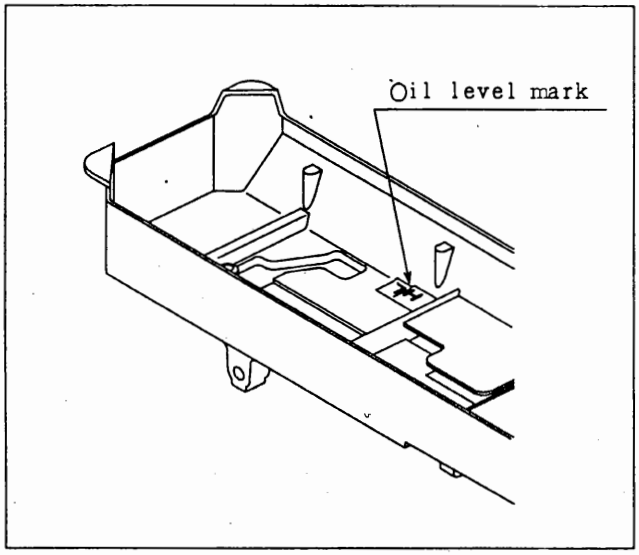
Spec \ Model		4411A/566A	4412A/566A
Application		Heavy material	
Sewing speed (Max)		2000 (spm)	
Stitch length		0~9 (mm)	
Needle bar stroke		36 (mm)	
Presser foot stroke	Knee lifter	16 (mm)	
	Hand lifter	8 (mm)	
Needle		DP×17 #23	
Lubricating oil		Machine oil (white spindle oil)	

1. MOUNTING POSITION OF THE KNEE LIFTER



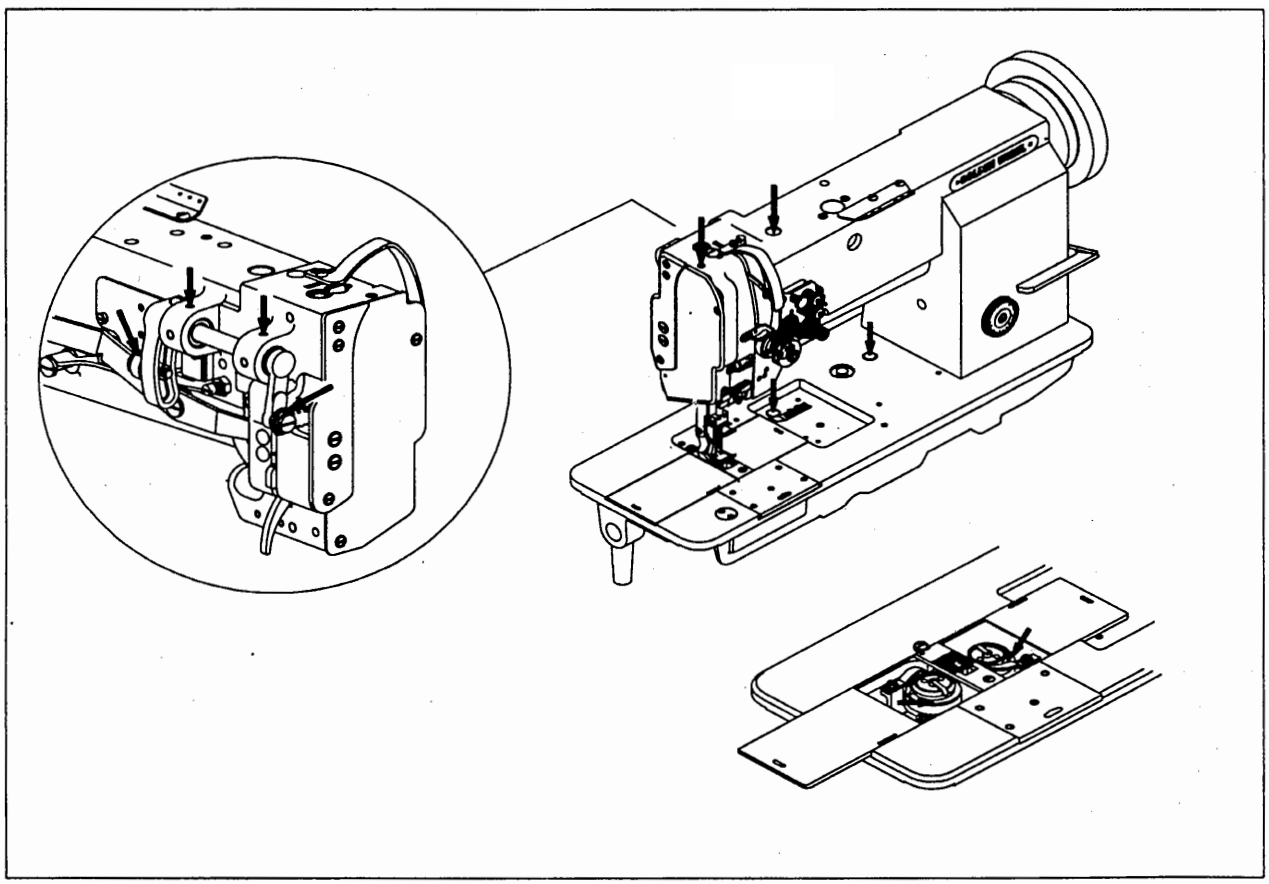
1) Insert knee lifter crank ① in the knee lifter shaft ②.
2) Attach knee lifter plate rod asm. ③ to the knee lif-ter crank ①.

2. LUBRICATION (1)



Fill the oil reservoir with oil up to 'H'm
-ark. Oil level should be periodically che
-cked.
If oil level is found below 'L' level, repl
-enish oil to 'H' level.
Using oil is white spindle oil.

3. LUBRICATION (2)



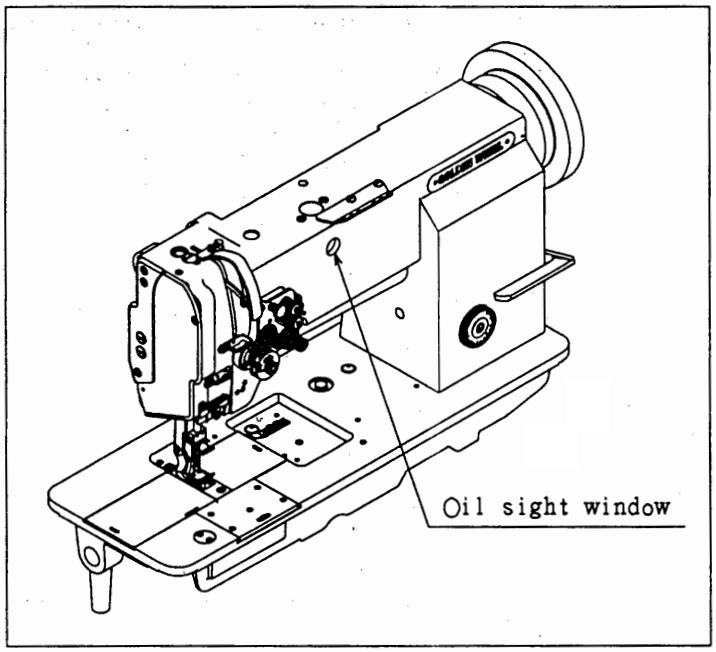
Before starting the machine.

1) Prior to operation, be sure to properly lubricate the points marked with the arrows.

When oiling all sections requirring lubrication, after installation of the machine has been completed, wait for a while (approximately 10 minutes) so that oil can penetrate each section sufficiently before starting continuous operation.

When starting the machine initially and after kept away for a long time without using at all, apply two or three drops of oil each section noted with an arrow mark, and to operate the machine continuosly, apply two or three drops of oil each section whenever starting operation in the morning and in the afternoon.

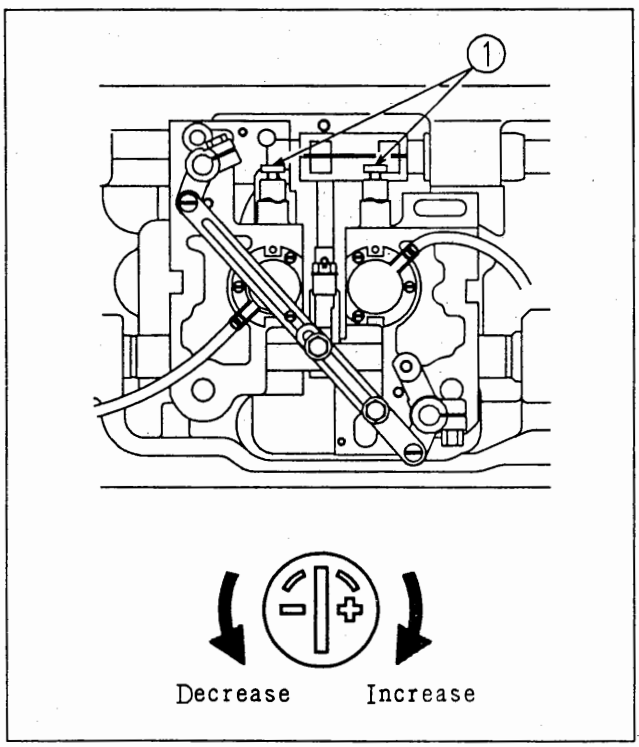
4. OILING CONDITION



1) See dripping of oil during operation through the oil sight window to check oiling condition in the machine arm.

5. REFUELING ADJUSTMENT OF THE HOOK

⚠CAUTION TURN THE SWITCH OFF THE POWER SUPPLY TO PREVENT FROM UNE -XPECTED INJURY. BE SURE TO CONFIRM THE STOP OF ROTATION OF THE MOTOR BEFORE OPERATIONS.



If it is necessary to change the amount of oil supplied to the hook, adjust it using k -nob ①.

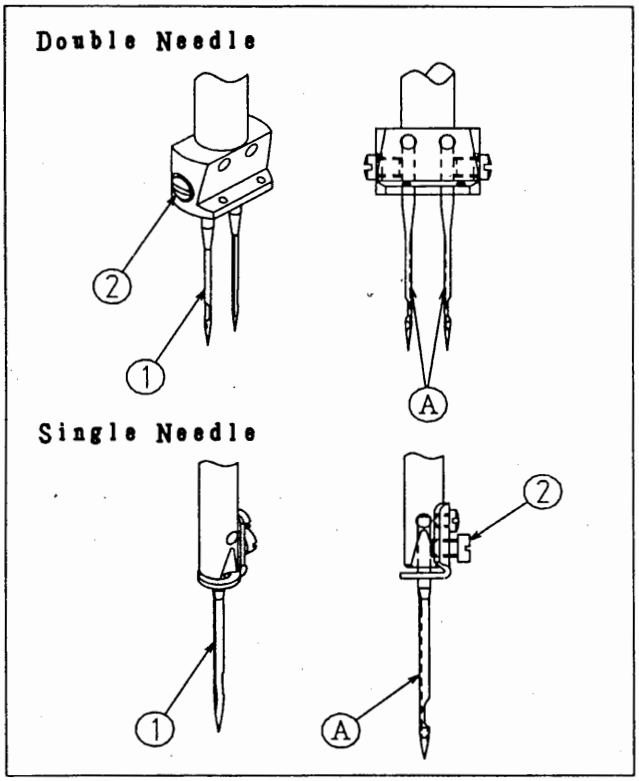
○ Turn the knob clockwise (in direction '+') to increase the oil supplied, or tur -n it counterclockwise (in direction '−') to decrease it.

Attension:

After adjusting the knob and noload ru -nning more than 30 seconds, confirm oil which scatters from the hook.

6. INSTALLATION OF NEEDLES

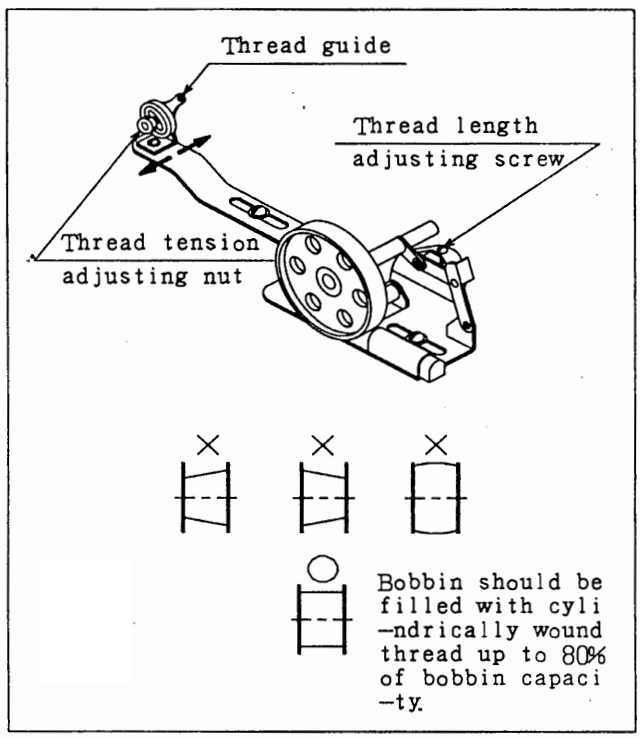
⚠CAUTION TURN THE SWITCH OFF THE POWER SUPPLY TO PREVENT FROM UNE -XPECTED INJURY. BE SURE TO CONFIRM THE STOP OF ROTATION OF THE MOTOR BEFORE OPERATIONS.



1) Turn the handwheel to move the needle b -ar up to its highest position.
2) Loosen needle setscrew ②, and hold need -le ① so that long groove Ⓐ oppositely each other. (For Double needle) And so that long groove Ⓐ left side. (For Single needle)
3) Insert the needle into the needle bar u -ntil it will go no further.
4) Securely tighten the needle set screws ②.

7. WINDING OF BOBBIN THREAD

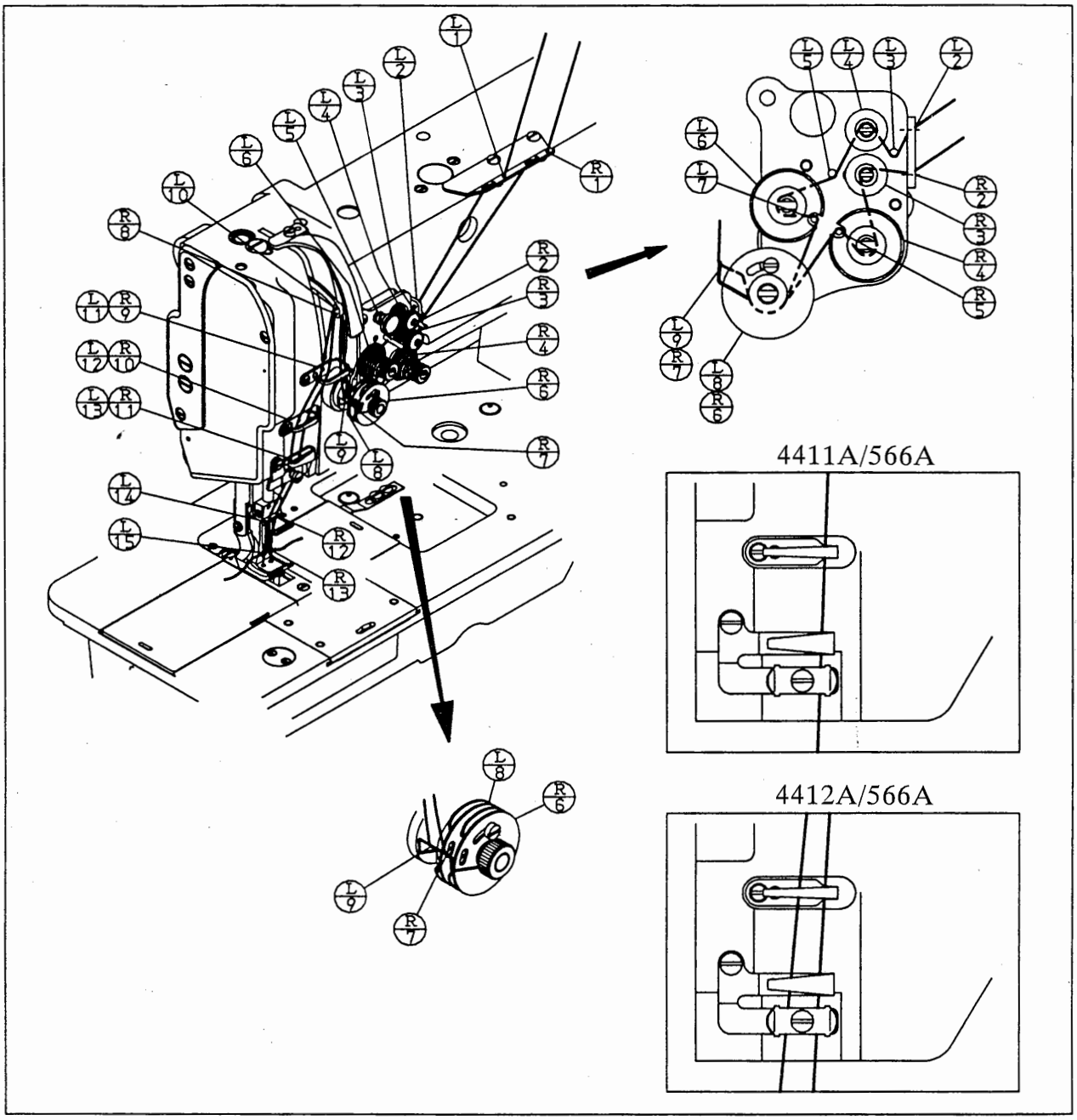
⚠CAUTION TURN THE SWITCH OFF THE POWER SUPPLY TO PREVENT FROM UNE -XPECTED INJURY. BE SURE TO CONFIRM THE STOP OF ROTATION OF THE MOTOR BEFORE OPERATIONS.



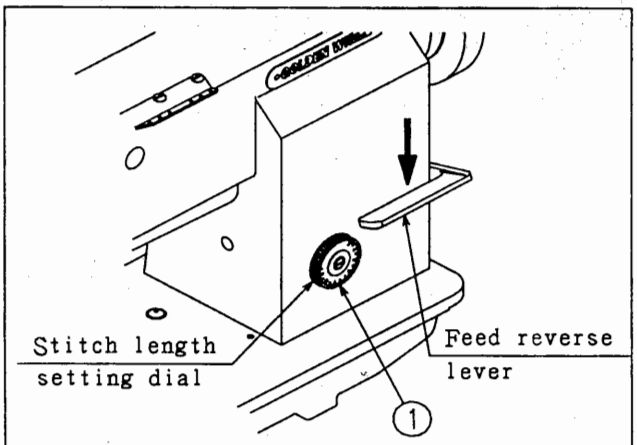
- Tension of wound thread
  Slack winding is recommended for p -olyester thread and nylon thread.
- Conically wound thread
  Move the thread guide to ward small -er diameter of wound thread layer.
- Length of wound thread
  Loosen the thread length adjusting screw to increase length of thread and tighten the screw to decrease length of thread.

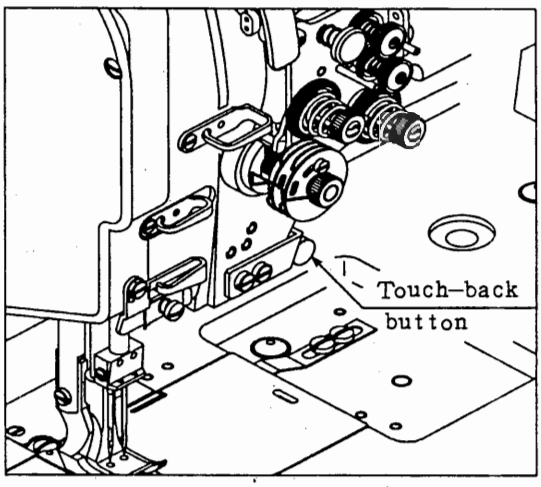
8. THREADING THE MACHINE HEAD

CAUTION	TURN THE SWITCH OFF THE POWER SUPPLY TO PREVENT FROM UNE-XPECTED INJURY. BE SURE TO CONFIRM THE STOP OF ROTATION OF THE MOTOR BEFORE OPERATIONS.



9. ADJUSTMENT OF STITCH LENGTH AND STITCH REVERSING (TOUCH-BACK)





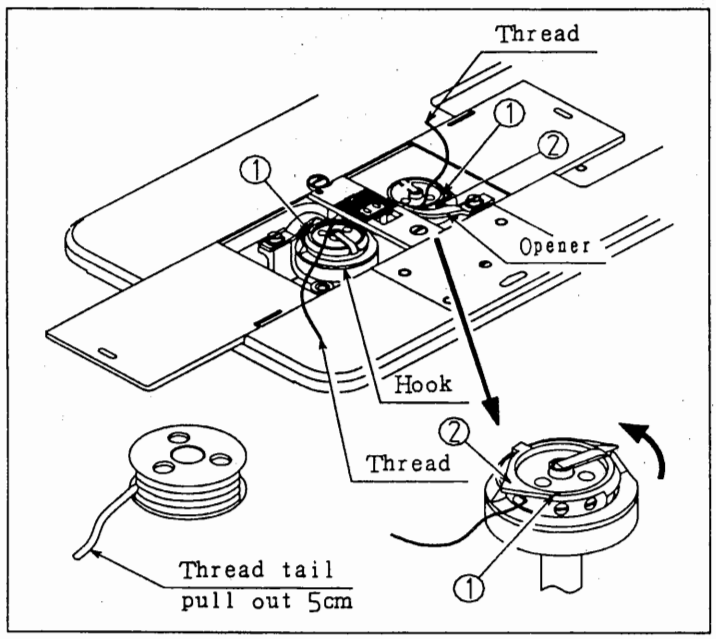
○ Stitch length setting dial
Turn the dial ①.

○ Feed reverse lever
How to operate
1) Push feed reverse lever down.
2) The machine performs reverse feed s-titching as long as the lever is h-eld depressed.
3) The moment you release to lever, th-e machine resumes the normal stitc-hing mode.

○ Touch-back button
How to operate
1) The moment you press touch-back but-ton, the sewing machine performs r-everse feed stitching.
2) The machine continues reverse feed stitching as long as the touch-back button is held pressed.
3) When you release the switch, the ma-chine resumes normal stitching.

10. THREADING OF BOBBIN THREADS

⚠ CAUTION TURN THE SWITCH OFF THE POWER SUPPLY TO PREVENT FROM UNE-XPECTED INJURY. BE SURE TO CONFIRM THE STOP OF ROTATION OF THE MOTOR BEFORE OPERATIONS.



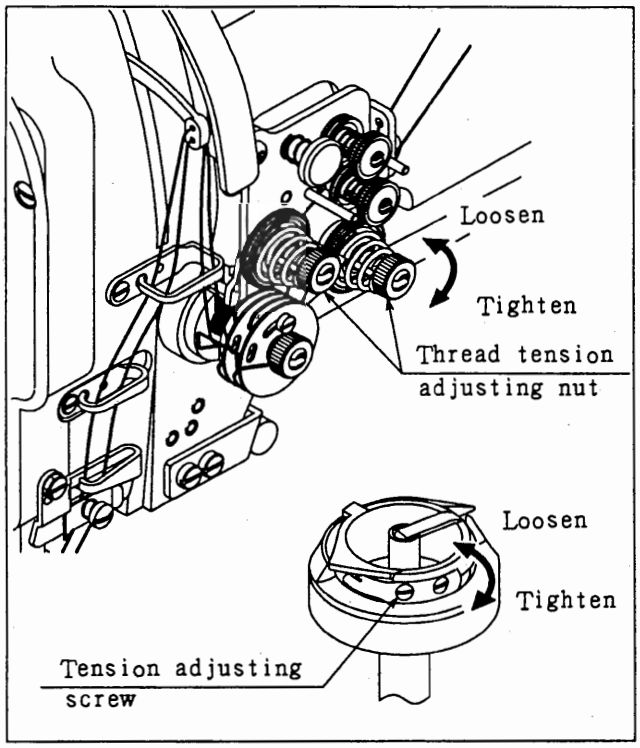
○ Setting bobbin
1) Pull out 5cm thread tail from t-he bobbin.
2) Hold the bobbin so that the bob-bin thread is would in right di-rection and put it into the hoo-k.

○ Threading of bobbin threads
Put bobbin thread into the slit ①, pass under the lug ② and extend it below the bed.

NOTE: Fit the bobbin in the bobbinc-ase so that the bobbin turns in the direction of the arrow when the bobbin thread is pul-led.

11. THREAD TENSION

⚠CAUTION TURN THE SWITCH OFF THE POWER SUPPLY TO PREVENT FROM UNE-XPECTED INJURY. BE SURE TO CONFIRM THE STOP OF ROTATION OF THE MOTOR BEFORE OPERATIONS.

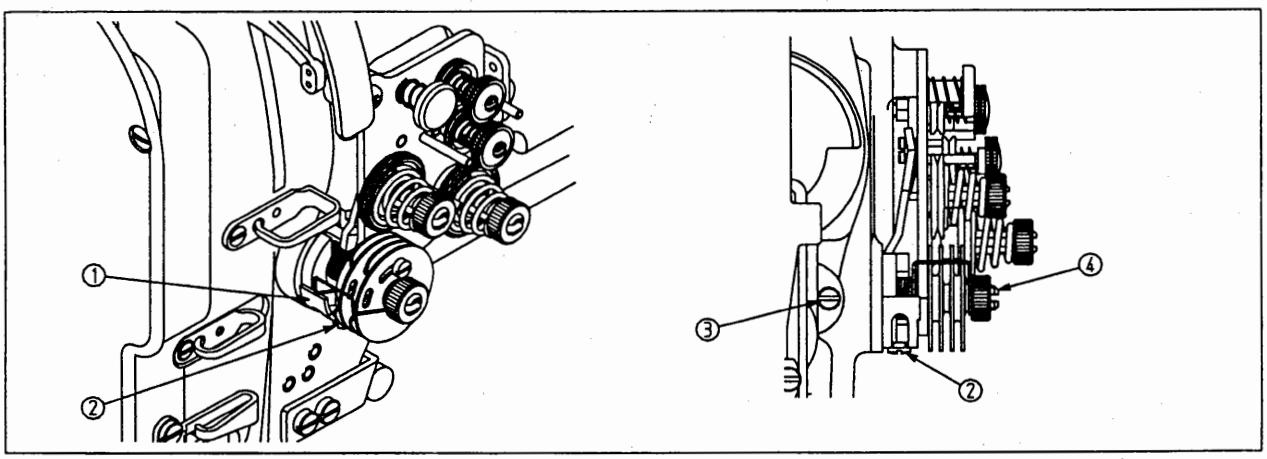


1) Adjusting the needle thread tension
Turn the thread tension adjusting nut clockwise to increase or counterclock-wise to decrease the needle thread t-ension.

2) Adjusting the bobbin thread tension
Turn the tension adjusting screw cloc-kwise to increase or counterclockwis-e to decrease the bobbin thread tens-ion.

12. THREAD TAKE-UP SPRING

⚠CAUTION TURN THE SWITCH OFF THE POWER SUPPLY TO PREVENT FROM UNE-XPECTED INJURY. BE SURE TO CONFIRM THE STOP OF ROTATION OF THE MOTOR BEFORE OPERATIONS.



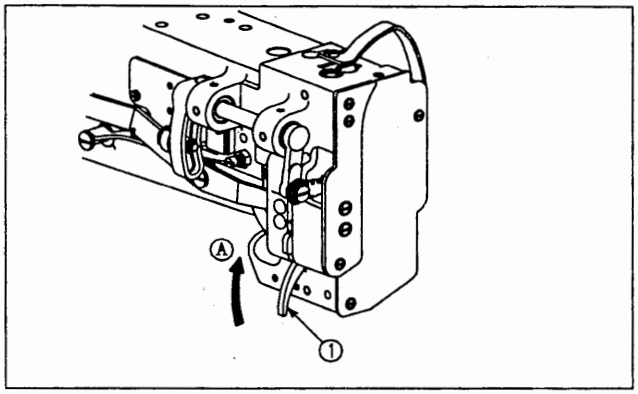
◇ Adjusting the thread take-up spring stroke

1. Loosen setscrew ②, and turn the adjusting plate ①.
2. Turn the adjusting plate ① to the right (counterclockwise), increase its moving range.
3. Turn the adjusting plate ① to the left, decrease its moving range.

◇ Adjusting the thread take-up spring tension

1. Loosen setscrew ③, and turn the tension stud ④ over toward left to increase tension.
2. Turn it to the right, decrease tension.
3. After adjustment, securely tighten the setscrew.

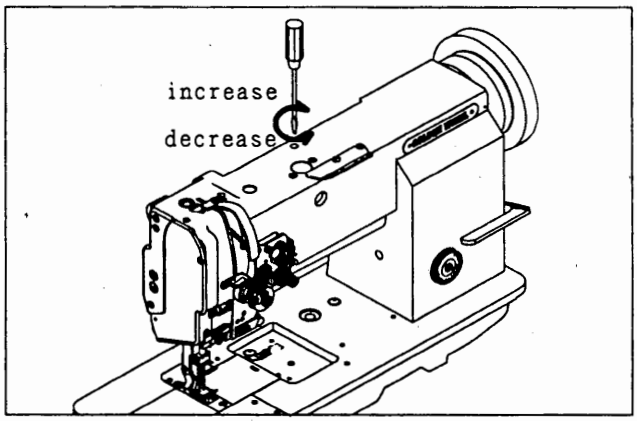
13. LIFTING THE PRESSER FOOT



1) Turn the hand lifter ① toward Ⓐ, presser foot lifts 8 mm.

2) Using the knee lever, presser foot lifts 16 mm.

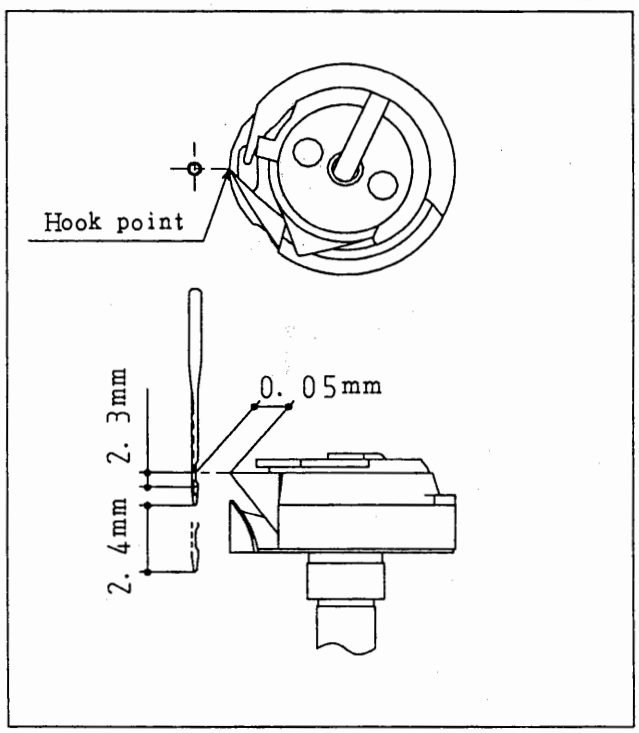
14. ADJUSTING THE PRESSER FOOT PRESSURE



1) Turn the presser spring regulator to the right to increase and to the left to dec
-rease pressure.

15. NEEDLE TO HOOK RELATIONSHIP

⚠CAUTION **TURN THE SWITCH OFF THE POWER SUPPLY TO PREVENT FROM UNE -XPECTED INJURY. BE SURE TO CONFIRM THE STOP OF ROTATION OF THE MOTOR BEFORE OPERATIONS.**

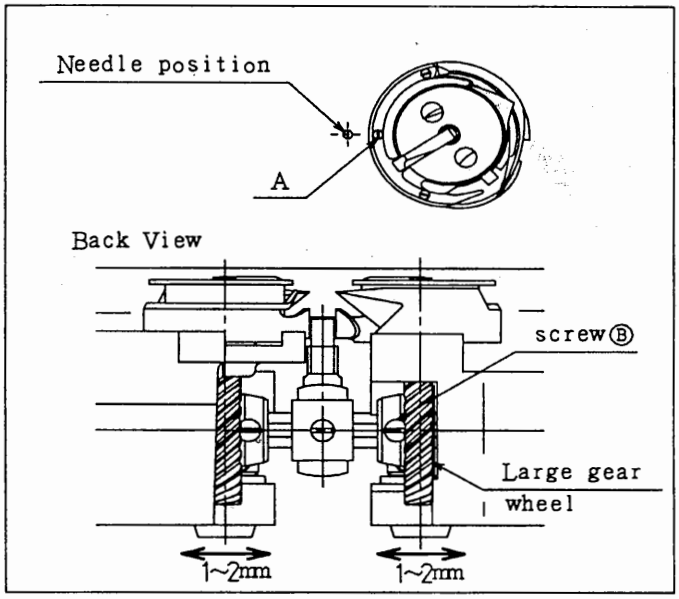


(1) Set stitch length to "6" on the stitch length dial.

(2) When needle is lifted 2.4 mm from the lowest position, the following positio
-nal relationship should be maintained.

- The upper edge of needle eye should be 2.3 mm below the hook point.
- The hook point should be located at th
-e center of needle axis.
- Gap between the hook point and the sid
-e face of needle should be 0.05 mm.

(3) Needle rotating hook position can be a
-djusted as follows.
(For easy adjustment, it is recommend
-ed that the presser foot, throat pla
-te and feed dog assemblies are remov
-ed.)



O Position adjustment of hook point

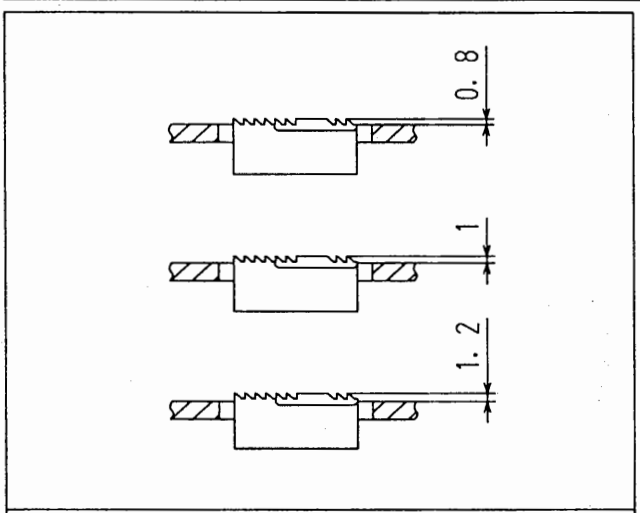
(1) Approximate position of hook "A"screw of hook should be found c -lose to the needle when the needl -e is at "DOWN" position.

(2) To finely adjust timing between th -e needle motion and hook motion, loosen the set screw of large gear wheel and move the gear wheel in i -ts axial direction within a range from 1 mm to 2 mm.

Note: In the adjustment, do not exce -ssively loosen set screws Ⓑ and always maintain meshing of hook shaft gear and lower shaf -t gear.

16. ADJUSTMENT OF FEED DOG HEIGHT

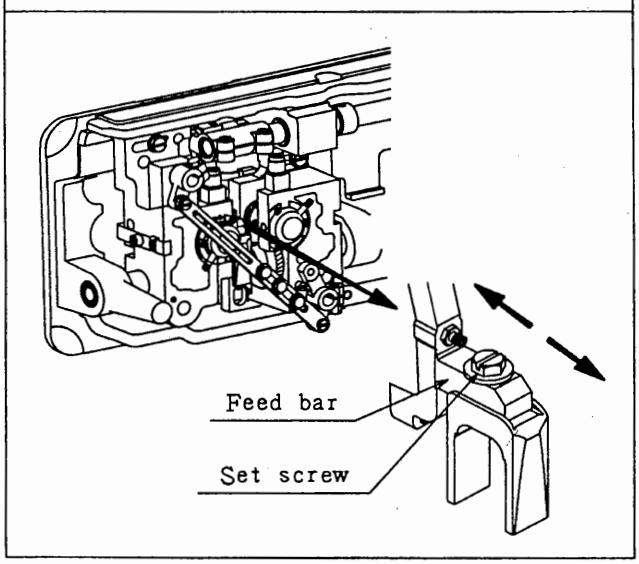
⚠CAUTION **TURN THE SWITCH OFF THE POWER SUPPLY TO PREVENT FROM UNE -XPECTED INJURY. BE SURE TO CONFIRM THE STOP OF ROTATION OF THE MOTOR BEFORE OPERATIONS.**



Height of feed dog and pressure of presser foot should be adjusted for individual fabr -ic with the following cautions.

- ◆ Material will be damaged if the feed dog extends too high, or pressure of presser foot is too large.
- ◆ Even stitch length cannot be assured if the feed dog is too low or pressure of presser foot is too small.
- ◆ Feed dog height should be measured at th -e point where the needle is at the top position.

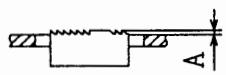
·For light materials	··· Approx. 0.8mm from throat plate
·For usual materials	··· Approx. 1.0mm from throat plate
·For heavy materials	··· Approx. 1.2mm from throat plate



O Adjustment procedure

(1) Lean the machine head backward.
(2) Turn the handwheel by hand and stop when the feed dog rises to the maximum height.
(3) Loosen the feed bar set screw.
(4) Vertically move the feed bar (in the direction indicated by arrow in the fi -gure) to adjust it to adequate height.
(5) After the adjustment, tighten the fe -ed bar set screw.

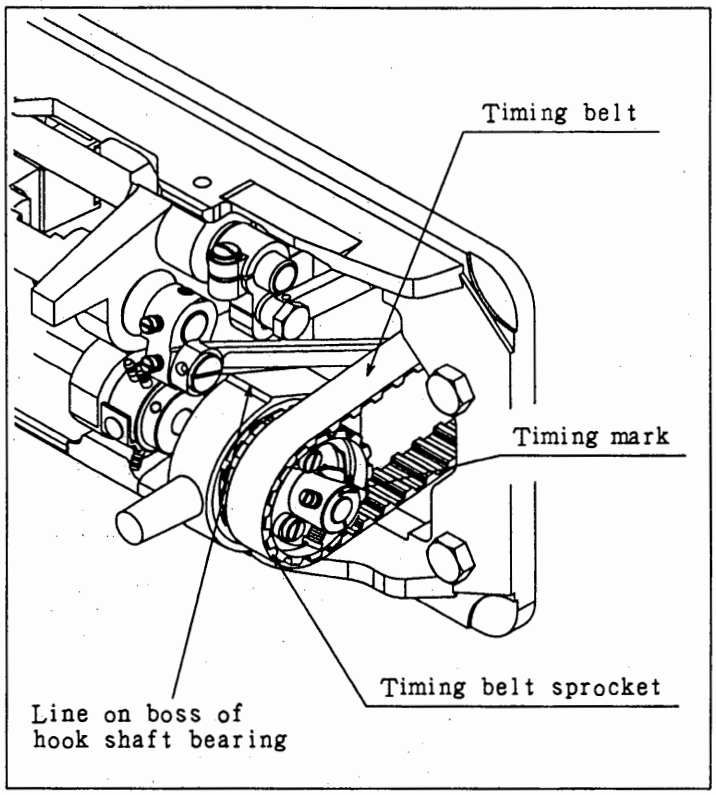
The feed dog height is factory-adjust -ed to Ⓐ mm shown table.



Model	A (mm)
4411A/566A	1.2
4412A/566A	1.0

17. RELATIONSHIP BETWEEN ROTATING HOOK MOTION AND TAKE-UP LEVER MOTION

⚠CAUTION TURN THE SWITCH OFF THE POWER SUPPLY TO PREVENT FROM UNE-XPECTED INJURY. BE SURE TO CONFIRM THE STOP OF ROTATION OF THE MOTOR BEFORE OPERATIONS.



When the timing belt was removed for its replacement, for example, the rel-ationship between rotating hook moti-on and take-up lever motion should b-e adjusted as follows :

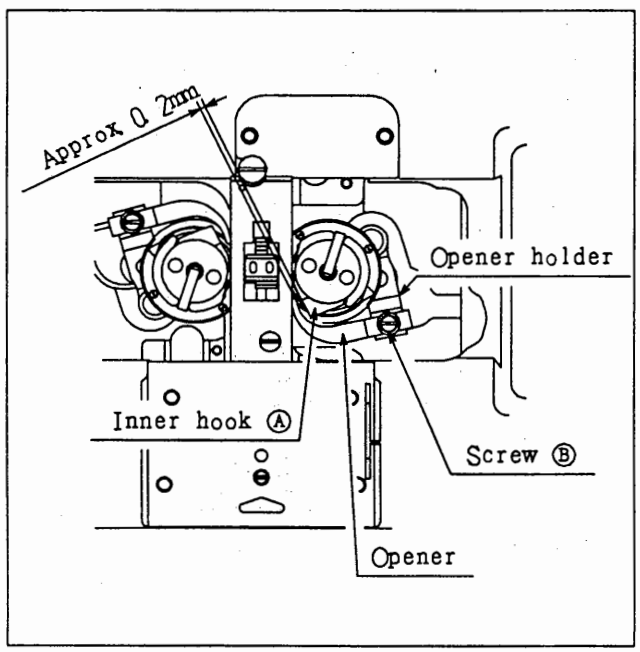
(1) Turn the handwheel and stop when the take-up lever is lifted to i-ts top position.

(2) Lean the machine head backward a-nd make sure the arrow (timing mark put on the timing belt is i-n line with the line on the bos-s of hook shaft bearing.

(3) If the timing mark is not in lin-e with the line on the boss, re-move the timing belt and instal-l it again to adjust.

18. RELATIONSHIP BETWEEN HOOK MOTION AND OPENER MOTION

⚠CAUTION TURN THE SWITCH OFF THE POWER SUPPLY TO PREVENT FROM UNE-XPECTED INJURY. BE SURE TO CONFIRM THE STOP OF ROTATION OF THE MOTOR BEFORE OPERATIONS.



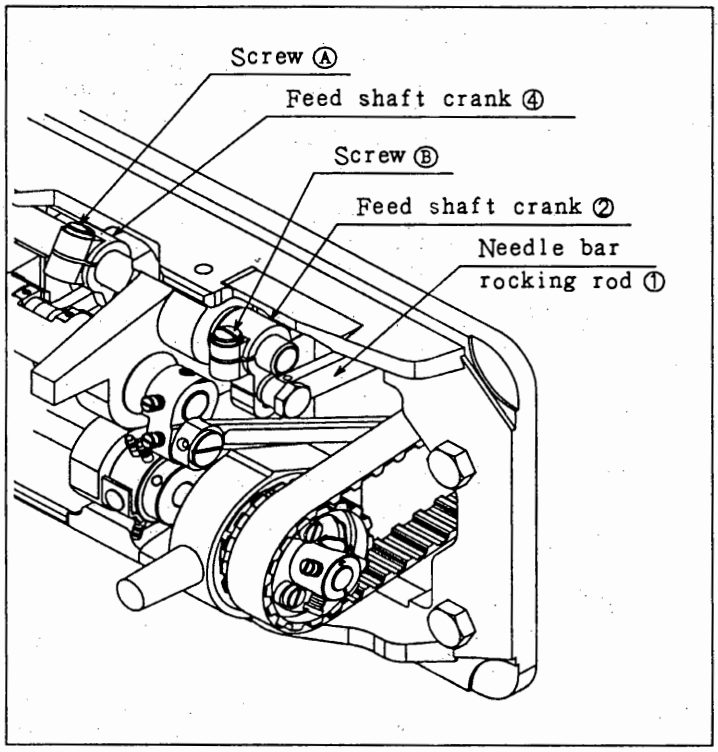
(1) Turn the handwheel by hand and stop, when the opener holder is located most remotely from the throat plate.

(2) Make sure gap between the inner hook Ⓐ and the opener is approximately 0.2mm.

(3) If the gap is too large or small, loos-en the opener set screw Ⓑ and adjust position of the opener.

19. RELATIONSHIP BETWEEN NEEDLE MOTION AND FEED DOG MOTION

⚠CAUTION	TURN THE SWITCH OFF THE POWER SUPPLY TO PREVENT FROM UNE-XPECTED INJURY. BE SURE TO CONFIRM THE STOP OF ROTATION OF THE MOTOR BEFORE OPERATIONS.



The feed dog should be adjusted so th-at the needle can plunge into the fe-ed dog needle hole at the center of the hole.

(1) Set stitch length to "0" on the stitch length setting dial.

(2) Lean the machine head backward.

(3) Loosen the feed shaft crank set screw Ⓐ and Ⓑ.

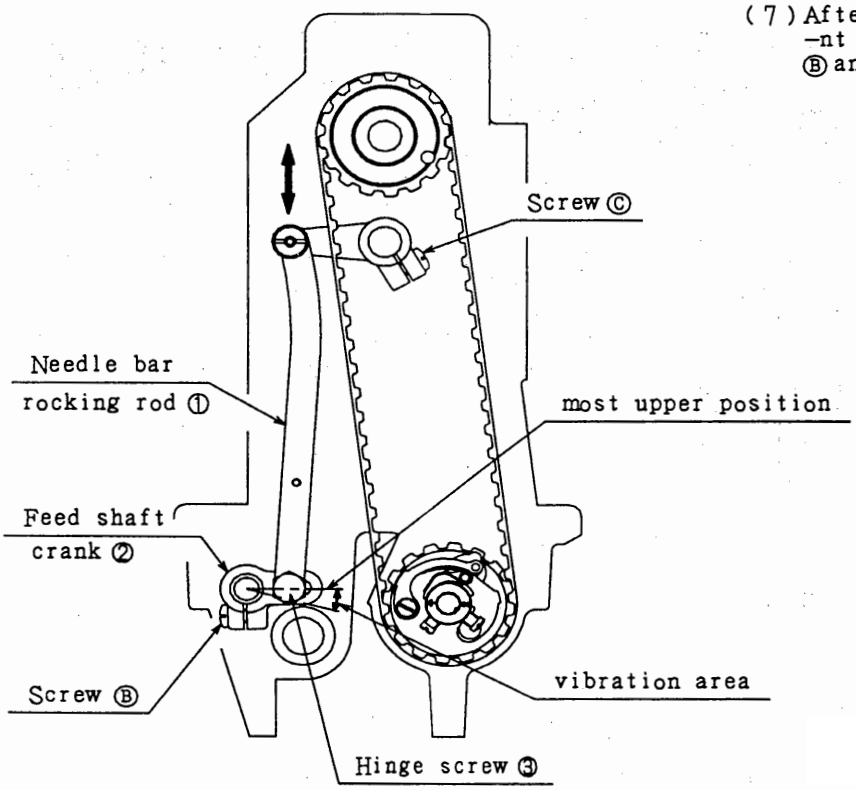
(4) Set the needle at the lowest pos-ition.

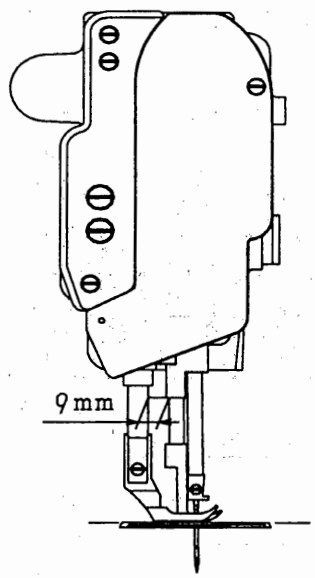
(5) Adjust the distance between the preessure bar and the needle bar to be 9 mm and tentatively tight-en the screws Ⓐ and Ⓑ of the fe-ed shaft crank.

(6) Set stitch length to "9" on the stitch length setting dial. Turn the handwheel toward. Match the hinge screw ③ with the feed shaft crank ② in horizontally at most upper position.

- If the connection is not at righ-t position, remove the back cov-er, loosen the screw Ⓒ and move the needle bar rocking rod ① in the arrow direction, and adjust.

(7) After the completion of adjustme-nt, fully tighten the screws Ⓐ, Ⓑ and Ⓒ.





20. DIFFERENTIAL FEED MOTION OF THE NEEDLE BAR FRAME

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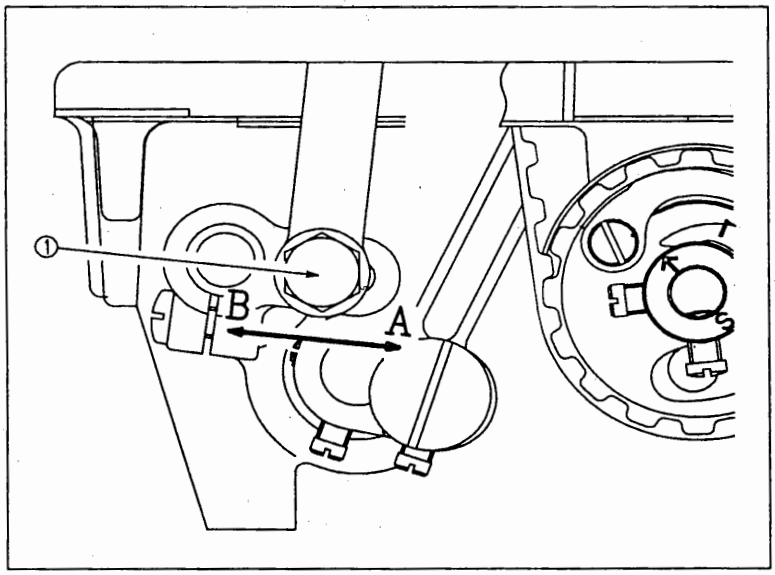

1) Loosen hinge screw ①. As you move it in direction "A", the stroke of the needle bar frame is increased, and differential feed with respect to the feed dog is provided. As you move it in direction "B", the storoke is decreased.

Precaution
Be sure to make this adjustment within the needle hole in the feed dog.)

21. RE-ENGAGE SAFETY CLUTCH MECHANISM

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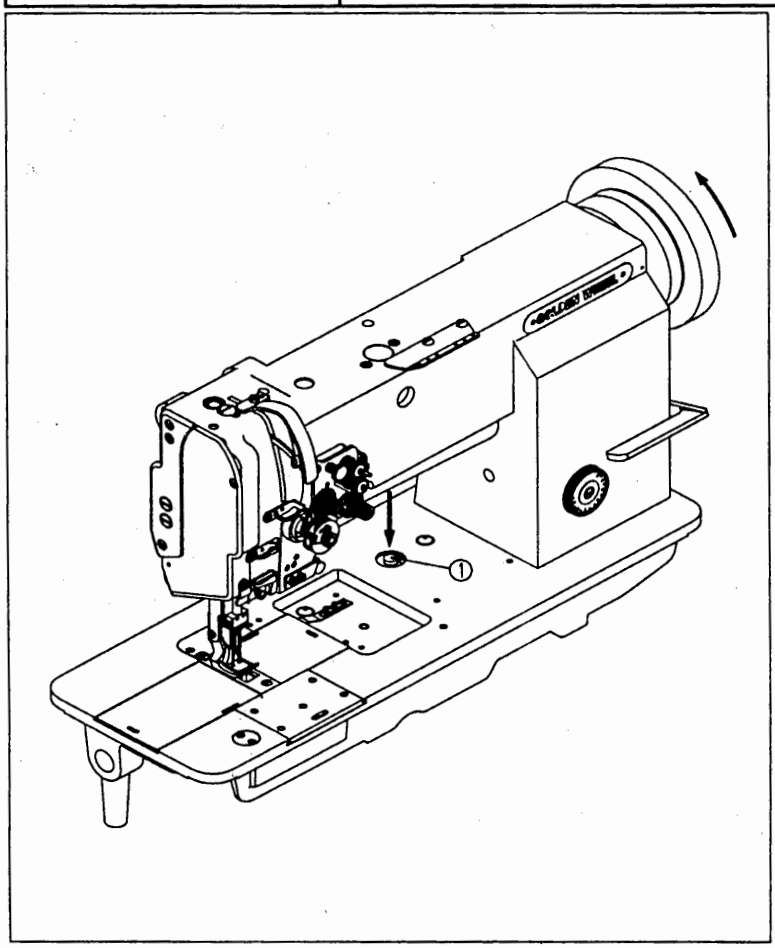
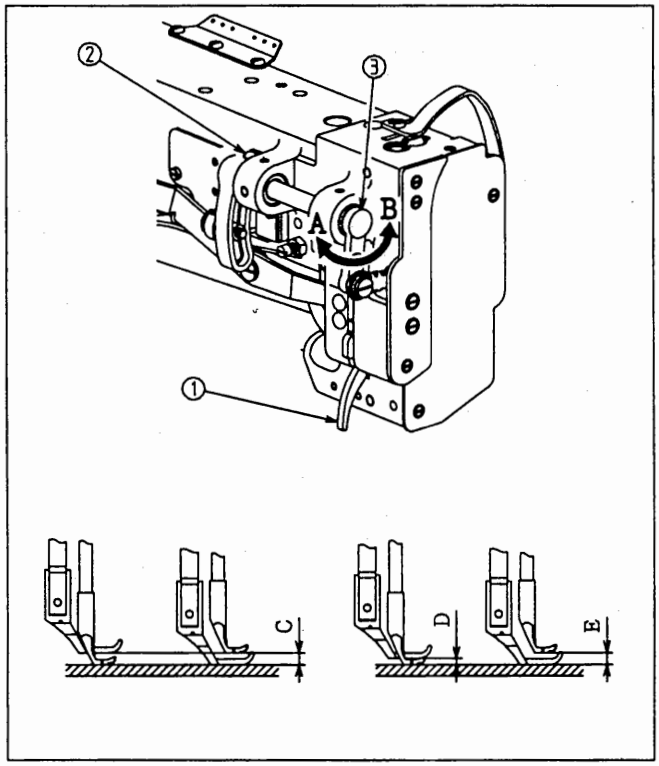


1) Remove any foreign matter which may have lodged in hook. Do not use any sharp-edged tools.

2) Pressing button ① and turn hand wheel rearward slowly to re-engage safety clutch.

22. ADJUSTING THE WALKING FOOT

⚠CAUTION	TURN THE SWITCH OFF THE POWER SUPPLY TO PREVENT FROM UNE -XPECTED INJURY. BE SURE TO CONFIRM THE STOP OF ROTATION OF THE MOTOR BEFORE OPERATIONS.



◇ Alternate vertical motions of the walking foot and th -e presser foot

1) The alternate vertical stroke of the walking foot and the presser foot are normally equal.

2) Depending on the type of material how -ever, the vertical stroke of the pre -sser foot and walking foot should be changed.

3) For instance, when sewing slippery ma -terial or sewing many overlapping se -ction, a better result may be obtain -ed by adjusting the vertical stroke of the walking foot larger than that of the presser foot.

1 Turn the handwheel by hand until the thread take-up reaches its lowest po -int.

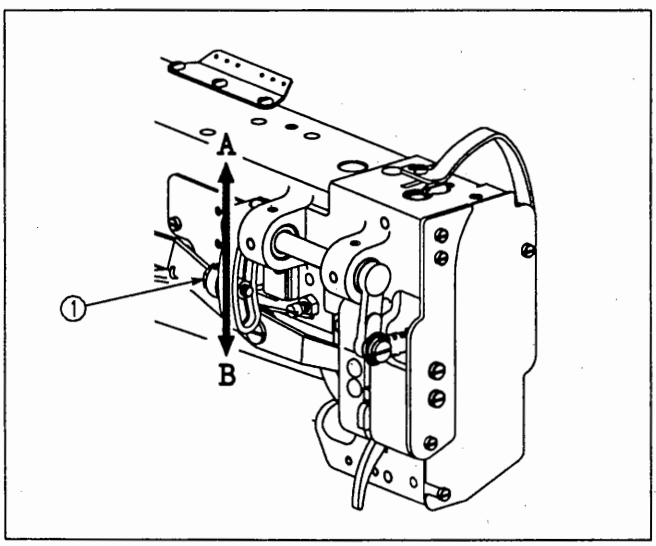
2 Lower hand lifter ①.

3 Loosen screw ②.

4 As you move top feed crank ③ to the left (in direction A), the vertical s -troke of the presser foot decreases 'D', whereas the vertical stroke of the walking foot increases 'E'.

5 On the contrary, as you move the top feed crank to the right (in direction B), the vertical stroke of the walk -ing foot becomes closer 'C' to that of the prssser foot when the walking foot sole in contact with the throat plate surface.

6 After adjustment, securely tighten screw ②.



◇ Height of the walking foot and the presser foot

1) When sewing elastic material or overl -apping sections, a better result may be obtained by changing the height of the presser foot and walking foot.

1 Loosen hinge screw ①.

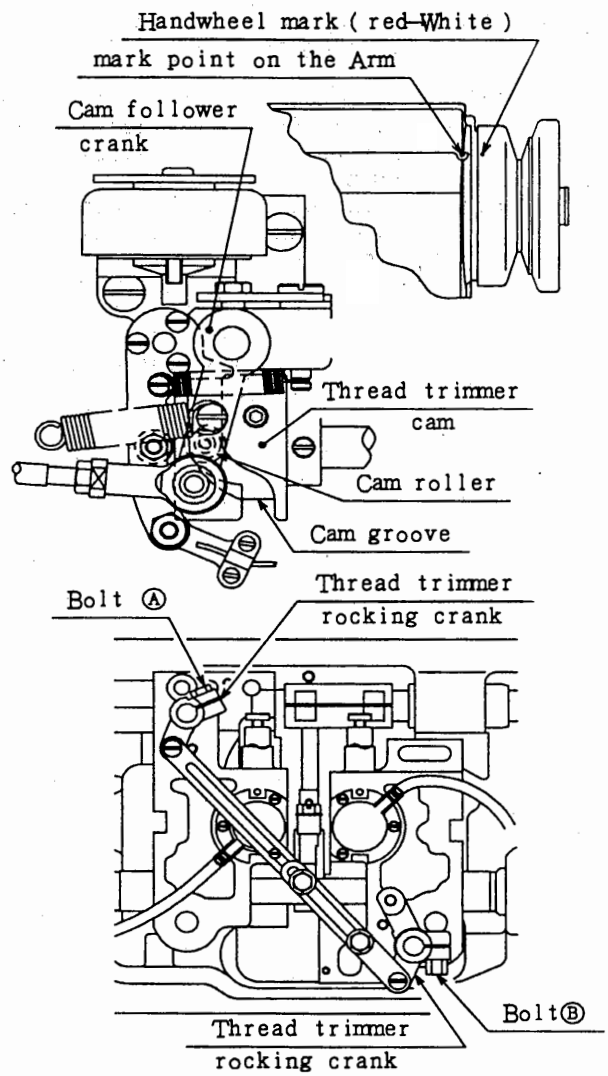
2 When you move the cam rot boss towar -d 'A' within the slot, the height i -s increased.

3 When you move it toward 'B', the hei -ght is decreased.

4 After adjustment, securely tighten hinge screw ①.

23. INSTALLATION OF MOVABLE KNIFE

⚠CAUTION TURN THE SWITCH OFF THE POWER SUPPLY TO PREVENT FROM UNE -XPECTED INJURY. BE SURE TO CONFIRM THE STOP OF ROTATION OF THE MOTOR BEFORE OPERATIONS.



1 Initial position of movable knife

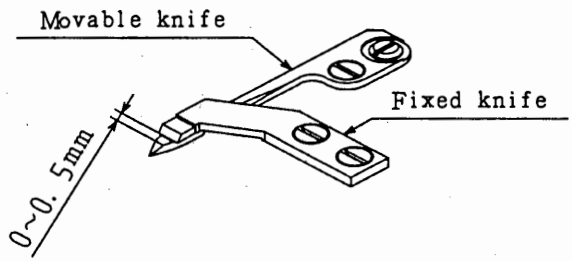
(1) Turn the handwheel and lower the nee -dle bar to the lowest position.

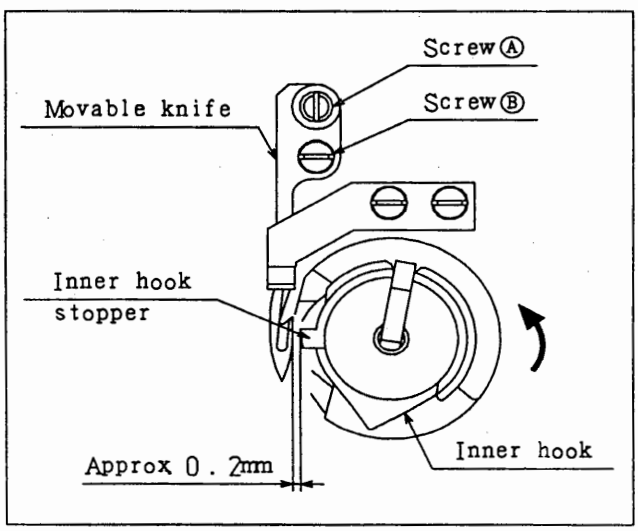
(2) Push the cam follower crank so that the cam roller enters into the threa -d trimmer cam groove when the handw heel' s mark red point meets the arm ' s point.

(3) Turn the handwheel until the mark po -int on the arm meets the white mark point on the handwheel. Set the cam follower crank at the po -sition with a screwdriver temporari -ly preventing the cam roller coming out from the cam groove.

(4) Loosen the thread trimmer rocking cr -ank clamp bolts Ⓐ and Ⓑ.

(5) Adjust the movable knife so that the movable knife end slant portion prot -rudes 0~0.5 mm from the fixed knif -e, as shown in figure and tighten t -he bolts Ⓐ and Ⓑ.





2 Gap between movable knife and inner hook stopper

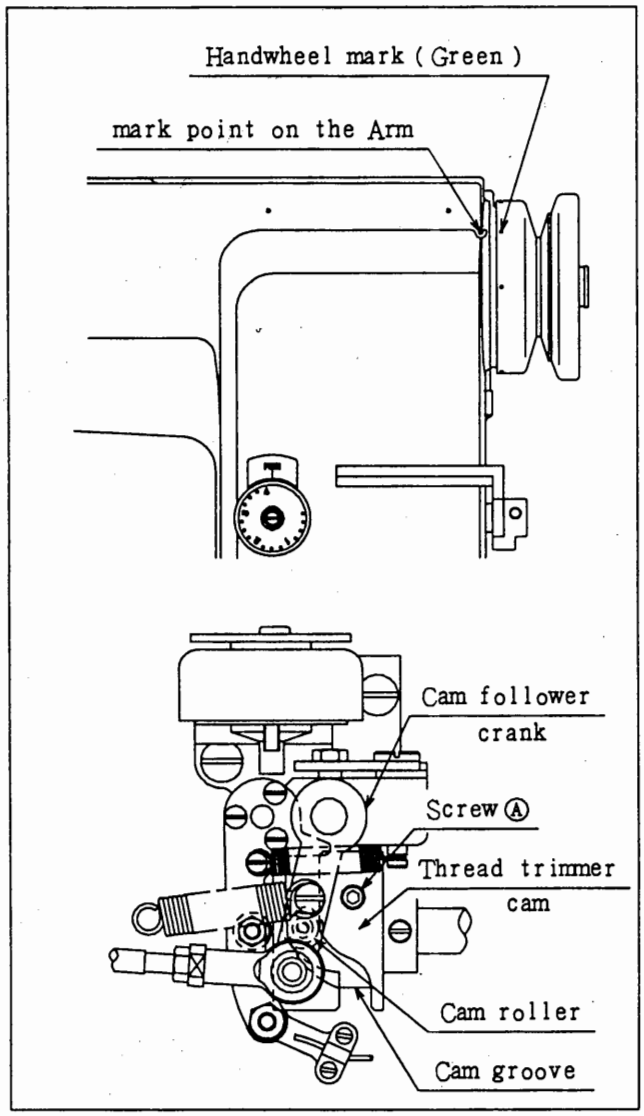
(1) Turn the handwheel by hand until nee -dle reaches the lowest position.

(2) With the needle at the lowest positi -on, depress cam follower crank, tur -n the handwheel until the movable k -nife reaches the extremity of its s -troke.

(3) Manually rotate the inner hook in th -e direction indicated by arrow in f -igure and adjust gap between the mo -vable knife and the inner hook stop -per to about 0.2 mm (the screws Ⓐ and Ⓑ should be loosened for this ad -justment).

24. ADJUSTMENT OF THREAD TRIMMER CAM

⚠CAUTION	TURN THE SWITCH OFF THE POWER SUPPLY TO PREVENT FROM UNE-XPECTED INJURY. BE SURE TO CONFIRM THE STOP OF ROTATION OF THE MOTOR BEFORE OPERATIONS.



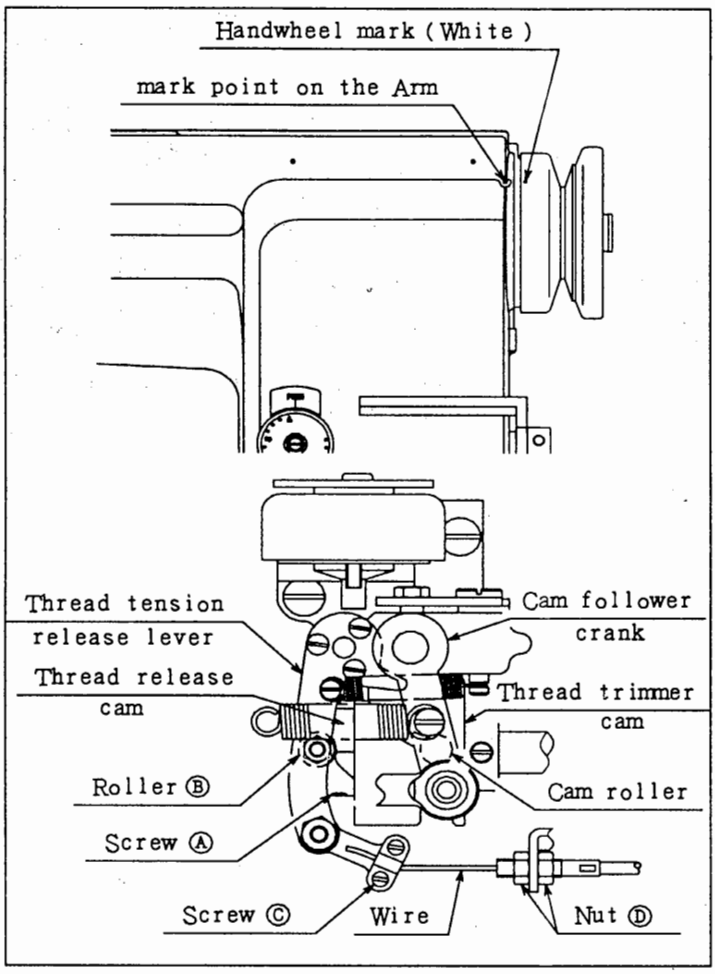
(1) Turn the handwheel by hand until the needles reach the lowest position.

(2) Maintaining the needle position, depr-ess the cam follower crank and put t-he cam roller into the groove of thr-ead trimmer cam.

(3) Turning the handwheel by hand, adjust the thread trimmer cam so that the mo-vable knife starts moving when the g-reen mark point on the handwheel com-es in line with the mark point on th-e arm.
To adjust, loosen two thread trimmer cam clamp screws Ⓐ.

25. ADJUSTMENT OF THREAD TENSION REGULATOR

⚠CAUTION TURN THE SWITCH OFF THE POWER SUPPLY TO PREVENT FROM UNE-XPECTED INJURY. BE SURE TO CONFIRM THE STOP OF ROTATION OF THE MOTOR BEFORE OPERATIONS.



(1) Turn the handwheel by hand until t-he needles reach the lowest posit-ion.

(2) Maintaining the needle position, d-epress the cam follower crank and put the cam roller into the groove of thread trimmer cam.

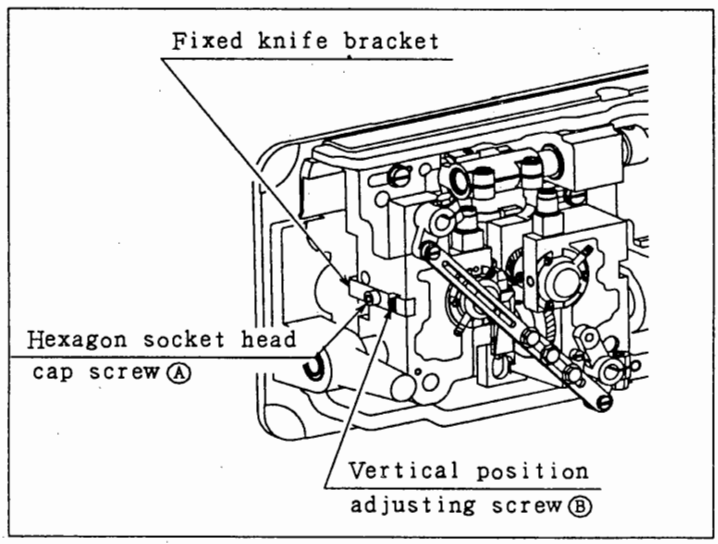
(3) Turning the handwheel by hand, adju-st the thread tension release cam so that the tension disc close whe-n the white mark point on the han-dwheel comes in line with the mar-k point on the arm.
To adjust, loosen two tension relea-se cam clamp screws Ⓐ.

(4) Opening degree of tension disk sho-uld be adjusted with the tension release roller Ⓑ mounted on the co-nvexed portion of thread release cam, as shown in Fig.
To adjust, loosen the screws Ⓒ and draw the wire.

(5) Make fine adjustment by loosening the nut Ⓓ.

26. ADJUSTMENT OF MESHING PRESSURE OF MOVABLE KNIFE AND FIXED KNIFE

⚠CAUTION TURN THE SWITCH OFF THE POWER SUPPLY TO PREVENT FROM UNE-XPECTED INJURY. BE SURE TO CONFIRM THE STOP OF ROTATION OF THE MOTOR BEFORE OPERATIONS.



(1) Loosen the fixed knife bracket cla-mp hexagon socket head cap screw Ⓐ.

(2) Turn the vertical position adjusti-ng screw Ⓑ to adjust meshing pres-sure and then tighten the hexagon socket head cap screw Ⓐ.

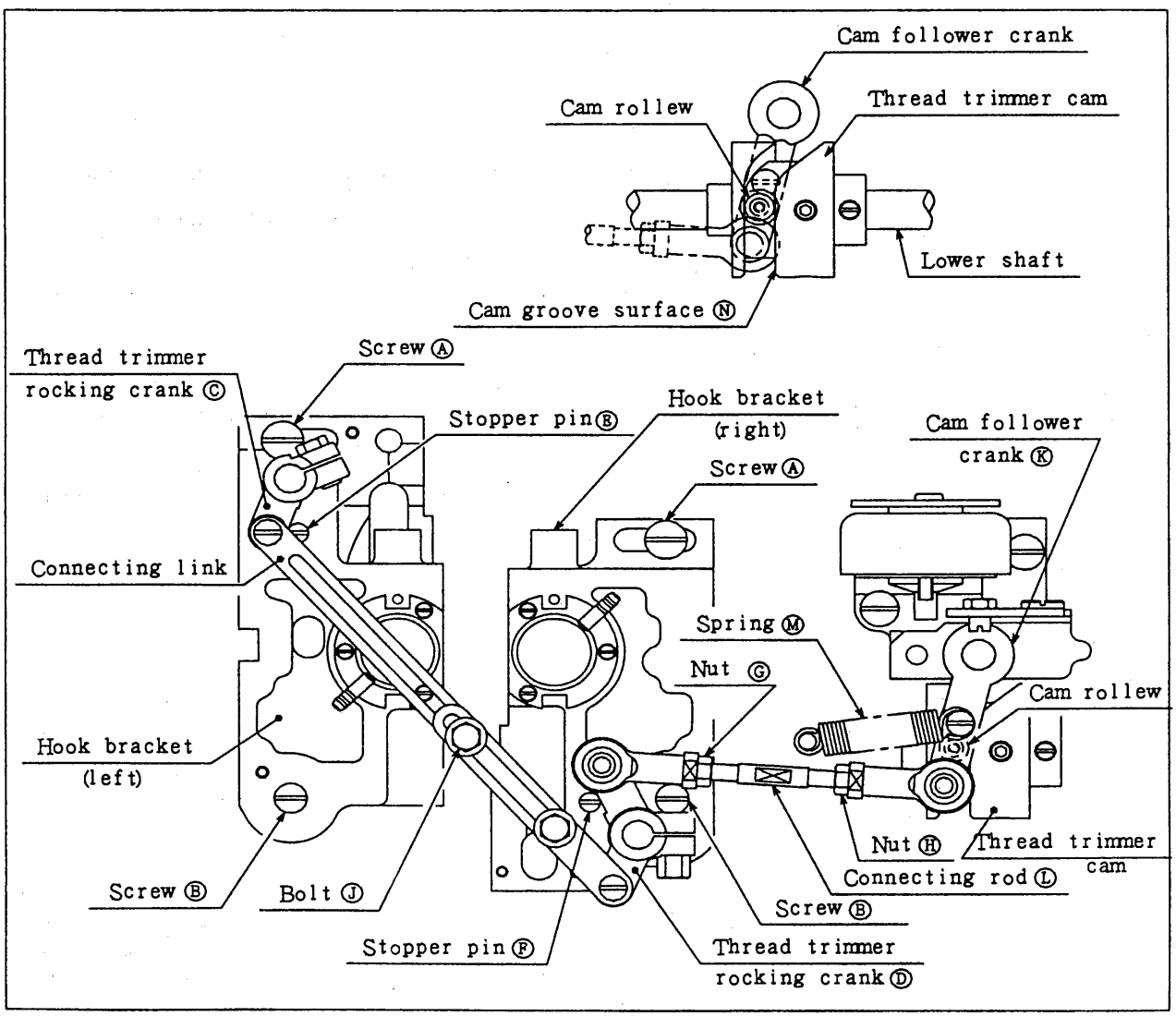
Note: Since excess pressure causes l-arge torque to the thread tri-mming mechanism and trimming failure, adjust it so that thr-ead can be trimmed with minim-um pressure.

(3) Move the movable knife and check t-hat the thread can be sharply tri-mmed.

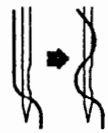
27. ADJUSTMENT FOR CHANGE OF NEEDLE GAUGE (FOR 4412A/566A)

⚠CAUTION	TURN THE SWITCH OFF THE POWER SUPPLY TO PREVENT FROM UNE -XPECTED INJURY. BE SURE TO CONFIRM THE STOP OF ROTATION OF THE MOTOR BEFORE OPERATIONS.

(1) Replace the throat plate, feed dog and needle clamp.
(Since the throat plate and feed dog are special parts designed for thread trimming machine, be sure to use those specified by us.)
(2) Lean the machine head backward.
(3) Loosen two connecting link clamp bolts Ⓙ.
(4) Remove the spring Ⓜ.
(5) Loosen the hook bracket clamp screws Ⓐ and Ⓑ and adjust gap between each needle and hook
(6) When the needles and hooks have been adjusted, install the spring Ⓜ.
(7) Contact the rocking cranks Ⓒ and Ⓓ to the stopper pins Ⓔ and Ⓕ and tighten the conn -ecting link clamp bolt Ⓙ.
(8) Turn the handwheel by hand until the needles reach the lowest position.
(9) Loosen the nut Ⓖ and Ⓗ.
(10) Depress the cam follower crank Ⓚ and adjust the connecting rod Ⓛ so that the cam r -oller can smoothly enter the groove of thread trimmer cam. Then tighten the nut Ⓖ and Ⓗ.
(11) Adjustment of the cam groove and the cam roller.
(a) Push the cam follower crank Ⓚ so that the cam roller enters into the cam groove
(b) Turn the connecting rod Ⓛ and adjust the clearance between the cam roller and t -he cam groove surface Ⓝ as small as possible, and tighten the nuts Ⓖ and Ⓗ.
(c) Push the cam follower crank Ⓚ again and check that the cam roller enters into the thread trimmer cam groove smoothly.



28. TROUBLE AND CORRECTIVE MEASURES

Trouble	Cauae	Corrective measures
1. Thread breakage (Thread frays or wears out.)	① The thread path, needle point, hoo -k point or bobbin case positioning finger has scratches.	○ Remove the scratches on the hook point using a fine sand paper, Buff the bobbin case positioning finger.
	② The needle thread tension is too high.	○ Properly adjust the needle thread tension.
	③ The needle hits the hook point.	○ See'15. NEEDLE TO HOOK RELATIONSHIP'.
	④ Lubrication to hook is inadequate.	○ Properly adjust the lubrication. See'5. REFUELING ADJUSTMENT OF THE HOOK'.
(Needle thread remains 2 to 3 cm on the wrong side of the cloth.)	⑤ The needle thread tension is too low.	○ Properly adjust the needle thread tension.
	⑥ The thread take-up spring has an excessively high tension while it has an excessively small stroke.	○ Decrease the tension, and increase the stroke.
	⑦ The timing between the needle and hook is too early or late.	○ See'15. NEEDLE TO HOOK RELATIONSHIP'.
2. Stitch skipping	① The clearance between the needle hook point and the is too large.	○ See'15. NEEDLE TO HOOK RELATIONSHIP'.
	② The timing between the needle and hook is too early or late.	○ See'15. NEEDLE TO HOOK RELATIONSHIP'.
	③ The presser foot pressure is too low.	○ Increase the presser foot pressure
	④ The clearance between the top edge of the needle eyelet and the hook point is not correct.	○ See'15. NEEDLE TO HOOK RELATIONSHIP'.
	⑤ The size of the needle is wrong.	○ Replace the needle by one which one grade thicker.
	⑥ A synthetic fiber thread or thin thread is used.	○ Wind the thread round the needle as illustrated. 
3. Loose stitches	① The thread has not been the passed the through notch of the bobbin ca -se tension spring.	○ Properly thread the bobbin case.
	② The thread path is poorly finished	○ Grind it using a fine sand paper of a buff.
	③ The bobbin dose not rotate smooth -ly.	○ Replace the bobbin or hook.
	④ The bobbin thread tension is too low.	○ Properly adjust the tension.
	⑤ The bobbin thread has been wound too tight.	○ Decrease the bobbin thread winding tension.
4. The thread slip -s off the need -le up on being trimmed	① The tension of the auxiliary threa -d tension controller is too high.	○ Decrease the tension.
	② The thread trimming timing is too early.	○ See'25. ADJUSTMENT OF THREAD TENSION REGULATOR". See'24. ADJUSTMENT OF THREAD TRIMMER CAM'.
	③ The returning force of the thread take-up spring is too high.	○ Adjust the high of the thread take-up spring.
5. The needle thre -ad cannot be tr -immed, while the bobbin thread can be trimmed	① The last stitch has been skipped. (The clearance between the needle and the hook is too large.)	○ See'15. NEEDLE TO HOOK RELATIONSHIP'.
6. Both needle and bobbin threads cannot be trimm -ed	① The thread trimming timing is wro -ng.	○ See'24. ADJUSTMENT OF THREAD TRIMMER CAM'.
	② The knife has been damaged.	○ Replace the knife.
	③ The knife pressure is inadequate.	○ Increase the knife pressure.
	④ The home position of the movable knife is inaccurate.	○ See'24. ADJUSTMENT OF THREAD TRIMMER CAM'.
	⑤ The movable knife fails to work.	○ Check it by actuating it by hand.
	⑥ The thread trimming solenoid fails to work.	○ Check the motor solenoid for prope -r operation.
7. Thread cannot be trimmed sharply	① The thread trimming timing is wro -ng.	○ See'24. ADJUSTMENT OF THREAD TRIMMER CAM'.
	② The knife pressure is inadequate.	○ Increase the knife pressure.
	③ The knife blade is blunt.	○ Replace the knife.