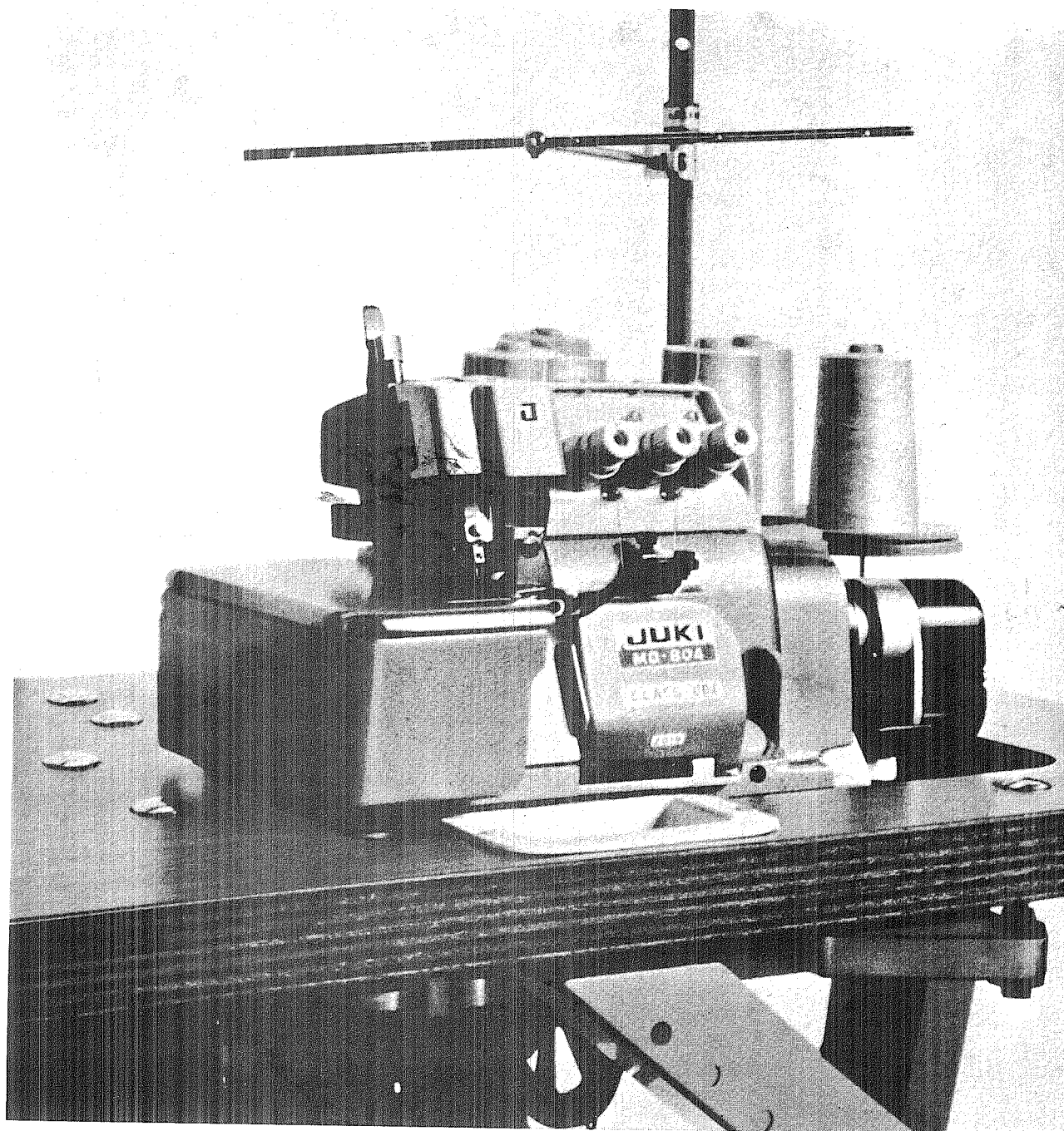


JUKI®
MO-800 Series

High Speed Overedging and Safety Stitch
Industrial Sewing Machines
ENGINEER'S MANUAL



TOKYO JUKI INDUSTRIAL CO., LTD.

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1. MODEL NUMBER DESIGNATION

MO - 804 - 0D4 / T001 / B02

- For special needle gauges :
 - Throat plate A00
 - Feed dog B00
 - Presser foot C00
 - Looper D00
- Attachment (T011, S012, Z012, Z015 etc.)
- Subclass models (Needle gauge, overedge width, feed dog)
 - 2-row teeth feed dog 4 (OH4, DH4 etc.)
 - 1-row teeth feed dog 5 (OA5, ZA5 etc.)
 - 3-row teeth feed dog 6 (OD6, FF6 etc.)

Stitch type (Replace the first figure "8" with "5", and you will obtain the equivalent designation of U.S. stitch type. For example, U.S. stitch type "504" from "804".)

2. STANDARD ADJUSTMENTS

2-1 Needle height

In principle, the pointed end of the needle must be 10 mm (25/64") above the throat plate surface as shown in Fig. 1.

Refer to the following Table 1 for each height of the 2-needle overedging machines.

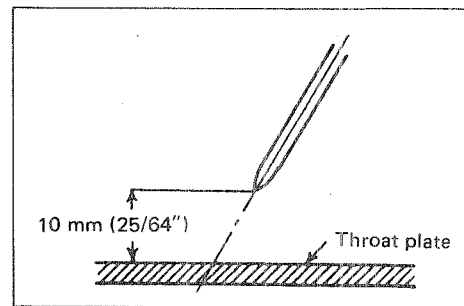


Fig. 1

Table 1 Needle height of 2-needle overedging machine MO-800 Series

Model	Left needle	Right needle
MO-814-ZA5	10.0 mm (25/64")	10.0 mm (25/64")
XA5	10.0 (25/64)	10.0 (25/64)
AA4	10.0 (25/64)	9.6 (3/8)
AD4	10.0 (25/64)	9.6 (3/8)
AD6	10.0 (25/64)	9.6 (3/8)
BD4	10.0 (25/64)	8.5 (21/64)
BD6	10.0 (25/64)	8.5 (21/64)
CD4	10.2 (13/32)	8.7 (11/32)
CD6	10.2 (13/32)	8.7 (11/32)
MO-812-CD4	10.2 (13/32)	8.7 (11/32)
CD6	10.2 (13/32)	8.7 (11/32)
DD6	10.9 (27/64)	9.1 (23/64)
DF6	10.9 (27/64)	9.1 (23/64)

(Note) Above needle heights are applicable also to the subclass models MO-806, 807, 808, 809 and 821.

2-2 Lower looper

(1) Shaft driving ball arm holder (MO-816)

The lower looper must oscillate at an angle of 26° .

This oscillation angle is obtained by keeping the center of the shaft driving ball 26 mm ($1\frac{1}{64}$ ") away from the axis of the lower looper shaft. By this adjustment, the distance between the end faces of the ball arm and the ball arm holder becomes 3.5 mm ($\frac{9}{64}$ ") as shown in Fig. 2.

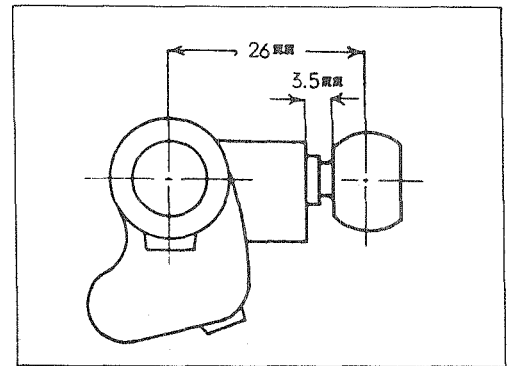


Fig. 2

(2) Lower looper

a) Lower looper height

The lower looper height must be adjusted so that the looper blade point is 66.5 mm ($2\frac{39}{64}$ ") away from the axis of the lower looper shaft as shown in the Fig. 3. Insert the lower looper shank fully into the looper support arm as far as it will go, and the above distance will be provided.

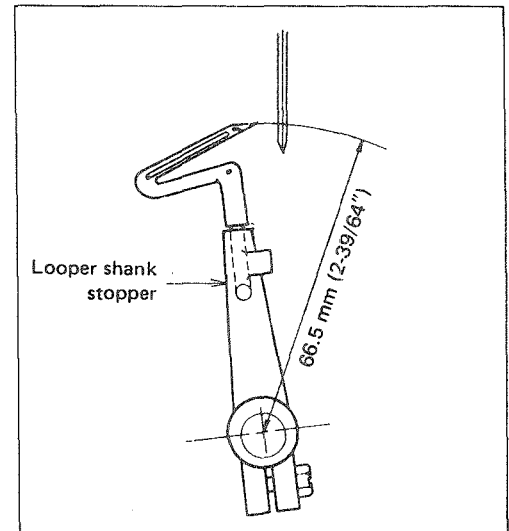


Fig. 3

b) Attach the lower looper to the looper support arm slanting to the operator by 2 mm ($\frac{5}{64}$ ") as shown in Fig. 4 and tighten the looper setscrew.

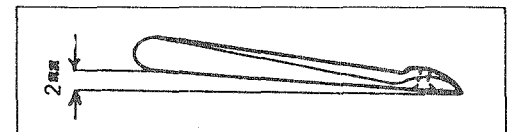


Fig. 4

c) The lower looper blade point must have a prescribed distance from the needle center as shown in Fig. 5 and Table 2 when the lower looper reaches the extreme left point.

Table 2

Model	Backward travelling from the needle center
MO-804-0D4	4.0 mm ($\frac{5}{32}$ ")
OD6	4.0 ($\frac{5}{32}$)
MO-814-BD4	4.0 ($\frac{5}{32}$)
CD4	3.2 ($\frac{1}{8}$)
CD6	3.2 ($\frac{1}{8}$)
MO-812-DF6	2.5 ($\frac{3}{32}$)
DC4	2.5 ($\frac{3}{32}$)
MO-816-BD4	6.0 ($\frac{15}{64}$)
DD4	6.0 ($\frac{15}{64}$)
BD6	3.2 ($\frac{1}{8}$)
DD6	3.2 ($\frac{1}{8}$)
DF6	3.2 ($\frac{1}{8}$)

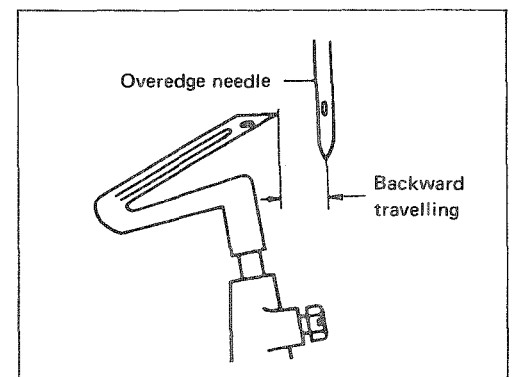


Fig. 5

(Note) The distance from the left-hand needle to the looper blade point for 2-needle overedging machines.

d) Clearance of the lower looper blade at the needle (Fig. 6).

The lower looper blade must allow a clearance of 0.05 mm to 0.1 mm at the needle. This must be corrected every time after changing the needle size.

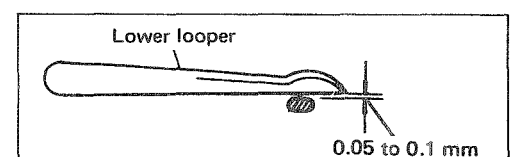


Fig. 6

2-3 Upper looper

(1) Upper looper guide retainer (Fig. 7)

Flatly fix the upper looper guide ① according to Table 3 by keeping it close to the frame surface. The standard distance "X" from the retainer and the frame edge is 30 mm (1-11/64") as shown in Fig. 7. This adjustment will provide a distance of 57.54 mm (2-17/64") between the axes of upper looper shaft ③ and upper looper guide ④. Do not slant the upper looper guide retainer, or you will fail to provide the correct distance between ③ and ④.

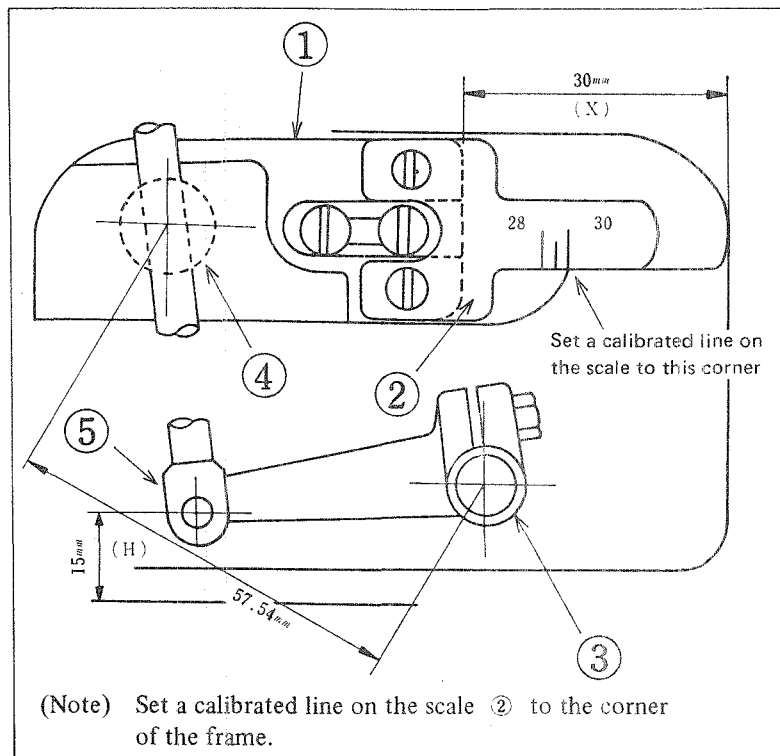


Fig. 7

Table 3 Positions of the upper looper guide retainer and the upper looper shaft driving arm

Upper looper guide retainer "X"	Upper looper shaft driving arm "H"	Applicable models
30 mm (standard)	15.0 mm (standard)	814-CB4, 814-CC4, 814-CD4 814-CC6, 814-CD6,
29 mm	15.5 mm	804-OG4, 804-OH4, 804, OG6 804-OH6,
29 mm	15.0 mm	814-BF6, 812-CB4, 812-CC4 812-CD4, 812-CE6, 812-CF6 812-CG6, 812-DC6, 812-DD6 812-DE6, 812-DF6, 812-DG6
29 mm	16.3 mm	816-BG4, 816-BH4, 816-CG4 816-CH4, 816-DG4, 816-DH4 (All of the safety stitch models, which have 3-row teeth feed dogs: 816-□□6)

Any other models which are not listed in the above are adjusted for the standard "X" and "H" distances.

(2) Upper looper shaft driving arm (Fig. 7)

Adjust the angle of the upper looper shaft driving arm so that the distance "H", from the axis of upper looper holder pin ⑤ down to the bottom face of the frame, becomes a length as listed in Table 3 when the shaft driving arm reaches its highest position. Tighten the clamp screw of the driving arm while the upper looper is in the highest position. After this adjustment, make sure that the position is correct by turning the pulley.

(3) Upper looper (Fig. 8)

(a) Adjust the upper looper so that its blade point reaches a point 4 mm (5/32") away from the needle center and 11 mm (7/16") above the throat plate surface when the upper looper is in the extreme left position.

- (b) Take care not to allow the upper looper "A" section to slant. If it is not vertical, the clearance of the looper blade at the needle will not be even. (Fig. 9)

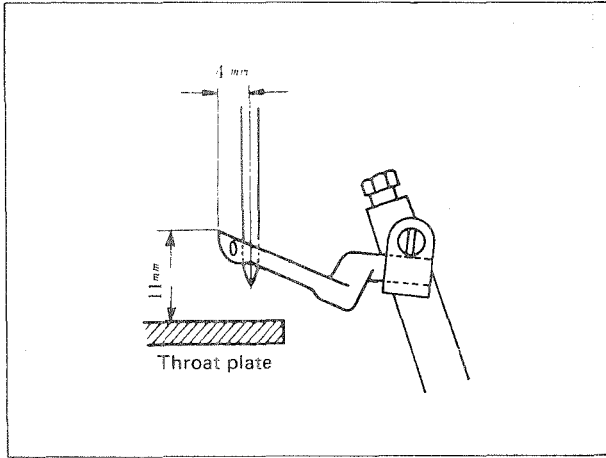


Fig. 8

Standard adjustment:

Set the upper looper shank end flush with the end face of the upper looper shaft driving arm and position the blade point 11 mm (7/16") above the throat plate surface, and the 4 mm clearance will be automatically provided.

However, this method is not applicable to other subclass models.



Fig. 9

- (c) Finally, confirm that lower looper ② has a clearance of about 0.1 mm at upper looper ① when the upper looper has gone up to meet the lower looper and also that the upper looper back surface does not touch the needle when it has reached the extreme left position. (Fig. 10)
- (d) Adjusting the special upper loopers for the models other than the standard subclass models (Table 4)

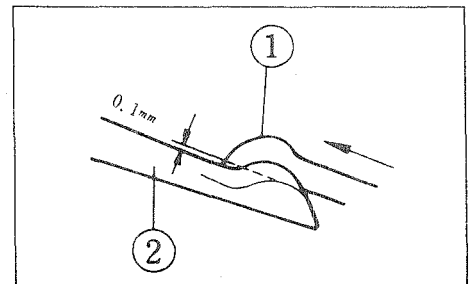


Fig. 10

Table 4 Positions of the special upper loopers

Upper looper protrusion from needle center	Upper looper height	Applicable models
3.4 to 3.7 mm (About 9/64")	10.5 to 11.0 mm (About 27/64")	812-DF6, 812-CD4, 812-CD6
4.0 mm (5/32")	11.3 mm (7/16")	816-DD6 816-FF6, 816-DH6, 816-BD6

(Other models not listed herein are applied to the standard adjustment method)

2-4 Throat plate and feed dog

(1) Throat plate position (Fig. 11)

Adjust the throat plate position by moving the throat plate base so that it allows the needle to pass through its needle slots with a clearance of 1 mm (3/64").

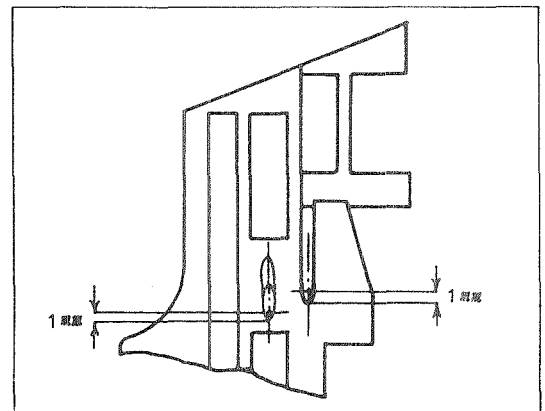
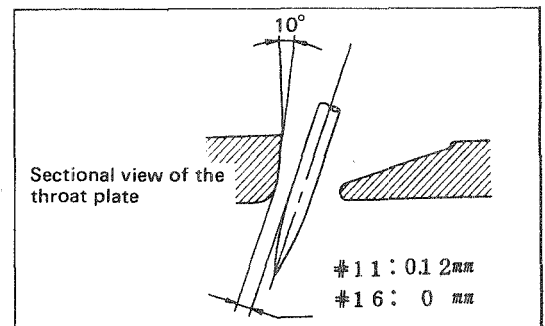


Fig. 11

Pay special attention to the throat plate position for the chain needle, because its bottom face works to prevent the needle from deflecting.



(2) Feed dog height (Fig. 12)

- a) Adjust the main feed dog to jut out 0.8 mm (1/32") from the throat plate surface (up to 1.2 mm (3/64") for sewing heavy weight material).
- b) Adjust the differential feed dog to the level of the main feed dog.
- c) Adjust the auxiliary feed dog so that its tooth is 0.5 mm (1/64") lower than that of the main feed dog. Do it carefully, for this height will affect the chain-off thread formation.

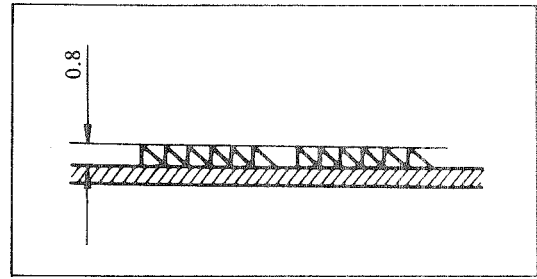


Fig. 12

(3) Feed dog slant (Fig. 12-1)

Rotate feed bar shaft ① in the clockwise direction, and the feed dog will become "front-down" position, and vice versa.

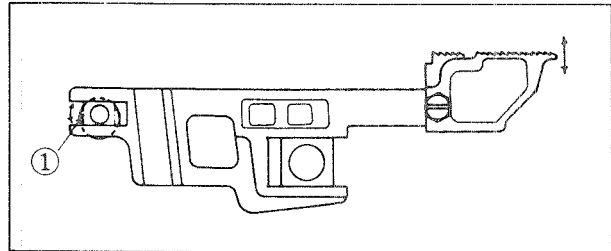


Fig. 12-1

- a) Standard position (Fig. 12-2)
When the adjusting hole inclines 60° towards left, the feed dog slightly slants to the front.
- b) When the heavy weight material is not properly fed, turn the feed bar shaft in the counterclockwise direction for "front-up" position.
- c) When the material slips during sewing, turn the shaft clockwise for "front-up" position.
- d) Before replacing the rocker adjusting hole cover to the machine frame, wipe off the oil on the frame.
(Note) Collar adjustment is not necessary.

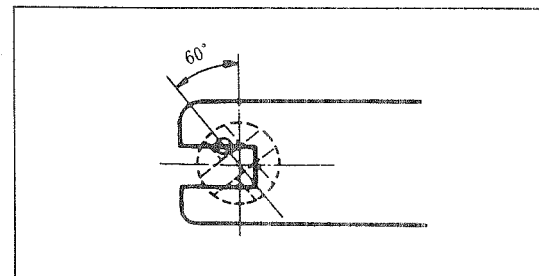


Fig. 12-2

(4) Changing the differential feed ratio (Fig. 13 & 14)

If a desired ratio can not be obtained by means of the differential feed adjusting lever, the original ratio setting must be changed. Change the setting position of the main feed rocker pin in the following way:

- a) The maximum gathering ratio at 1 : 4 is obtained by setting the engraved mark line to the lowest position (Fig. 13).
- b) The standard ratio at 1 : 2 is obtained by setting the mark line to the screw axis.
- c) The maximum stretching ratio at 1 : 0.6 is obtained by setting the mark line to the highest position (Fig. 14).

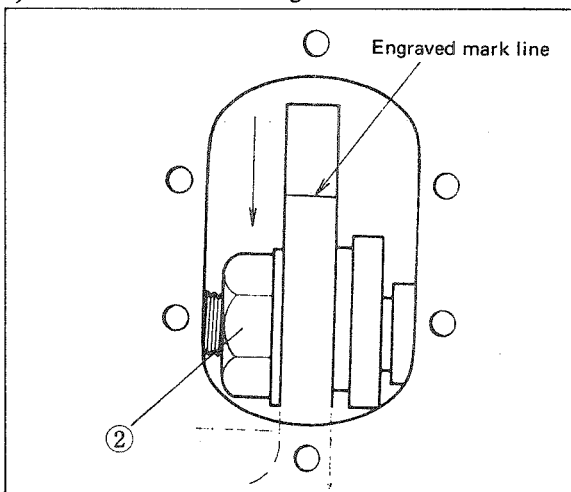


Fig. 13

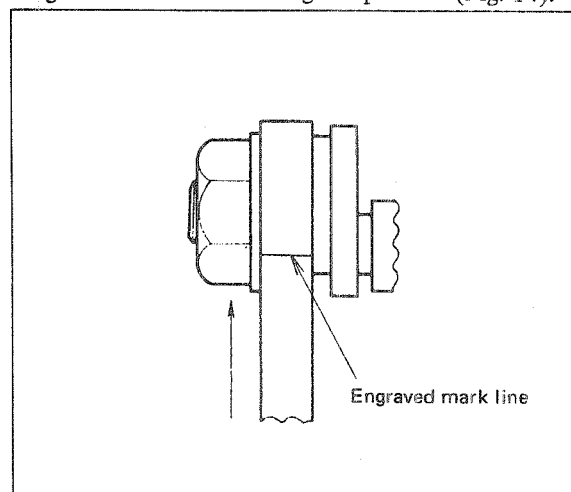


Fig. 14

Remove the rocker adjusting hole cover from the machine, loosen nut ② by using a 7 mm spanner (supplied with the machine) and adjust the main feed rocker pin as mentioned. Firmly tighten nut ② after adjustment.

Table 5

Pin position			Standard	Highest point	Lowest point	Medium point
Differential feed adjusting lever position	Up	Gathering	1 : 2	1 : 1.6	1 : 4	1 : 3
	Down	Stretching	1 : 0.72	1 : 0.6	*	1 : 1

(*) 1 : 1.4 gathering instead of stretching.

2-5 Upper knife (Fig. 15)

- a) The top end of the upper knife driving arm shaft must go up 31 mm (1-7/32") above the throat plate surface when the upper knife has been brought up to its highest position as shown in Fig. 15.

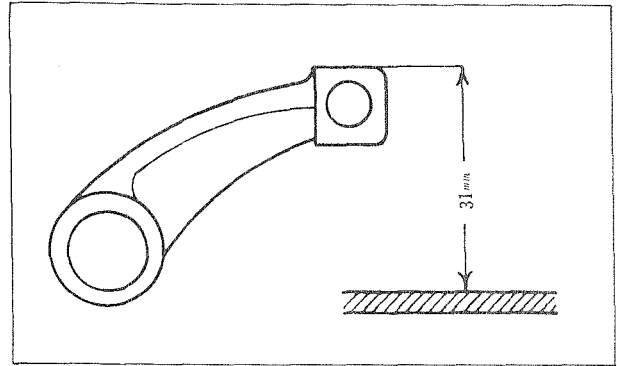


Fig. 15

- b) Cutting length adjustment (Fig. 15-1)
Push ① to the left and fix it by screw ② .
Loosen screws ⑨ and ③ and adjust the cutting length by moving ⑤ to left or right. During this adjustment, take care not to move knife ④ upwards along the groove.
After positioning the knife, tighten screws ③ , ⑨ and finally loosen ② . When sewing the heavy weight material, tighten screw ② .

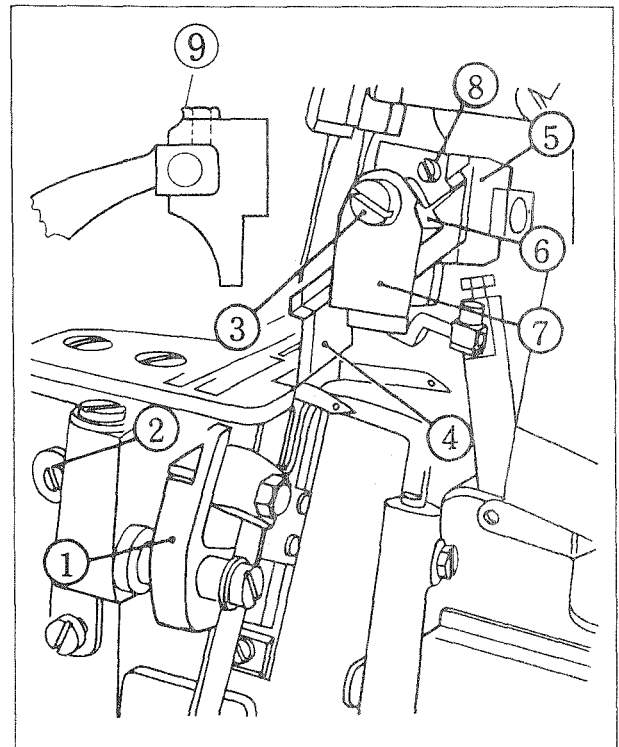


Fig. 15-1

- c) Upper knife height (Fig. 15-2)
The upper knife in the lowest position overlaps the lower knife blade by 0.5 to 1.0 mm (1/64" to 3/64"). Replace the upper knife or adjust its height after loosening the upper knife presser plate ⑧ (Fig. 15-1).
Since the cutting length is apt to change by this adjustment, correct the cutting length by taking care to provide the above-mentioned blade overlapping.

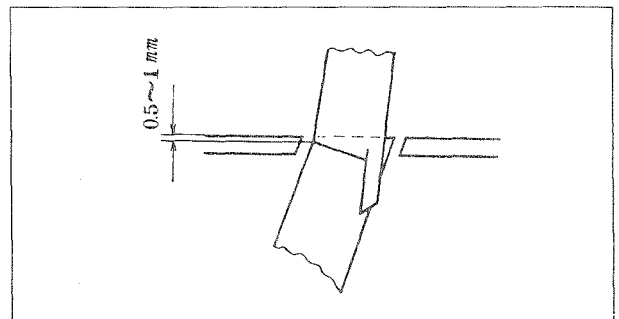


Fig. 15-2

2-6 Lower knife

- a) The lower knife support bracket must be accurately installed so that the lower knife is in parallel with the upper knife at least within the cutting area.
- b) Adjusting the lower knife spring (slide stud spring) (Fig. 16).
Tighten screw ② ,
when sewing with a wide overedging width or
when sewing the heavy weight material.
Loosen screw ② ,
when sewing with a narrow overedging width or
when sewing the light weight material.
Do not tighten screw ③ excepting only when necessary for
sewing the heavy weight material.

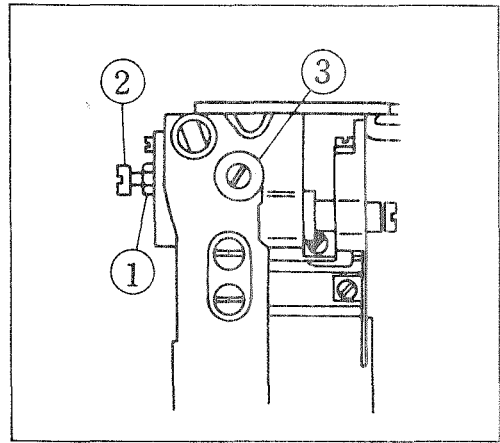


Fig. 16

2-7 Chain looper

- a) Chain looper height (Fig. 17)
Make it as high as possible to the extent that it does not touch the feed dog and the throat plate.
To provide the standard height, 63.8 mm (2-33/64") from the axis of the chain looper shaft to the blade point of the looper, insert the chain looper shank into the support arm as far it will go.
- b) The chain looper must be installed so that the top end deflects 1.5 mm (1/16") from its clamped end as shown in Fig. 18. The deflection may be changed when the correct looper clearance at the needle is not provided due to the difference in the needle size. The looper clearance at the needle will be decreased by increasing the said looper deflection, and vice versa. Do not allow the chain looper to touch the differential feed dog.
- c) The stroke of the chain looper must be 2.5 mm (3/32") as shown in Fig. 19. Make sure that, when the looper has moved forwards, the looper thread hole is aligned with the needle eye when looking down sideways as shown in Fig. 19.

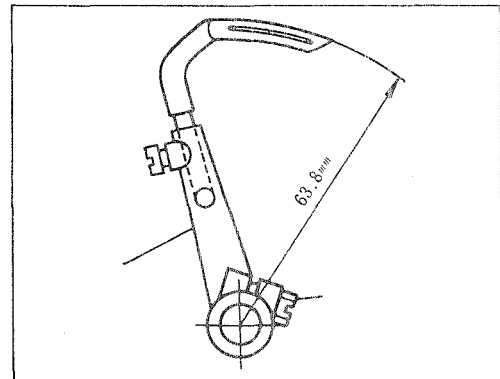


Fig. 17

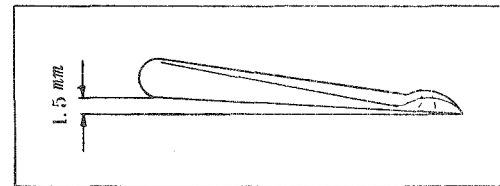


Fig. 18

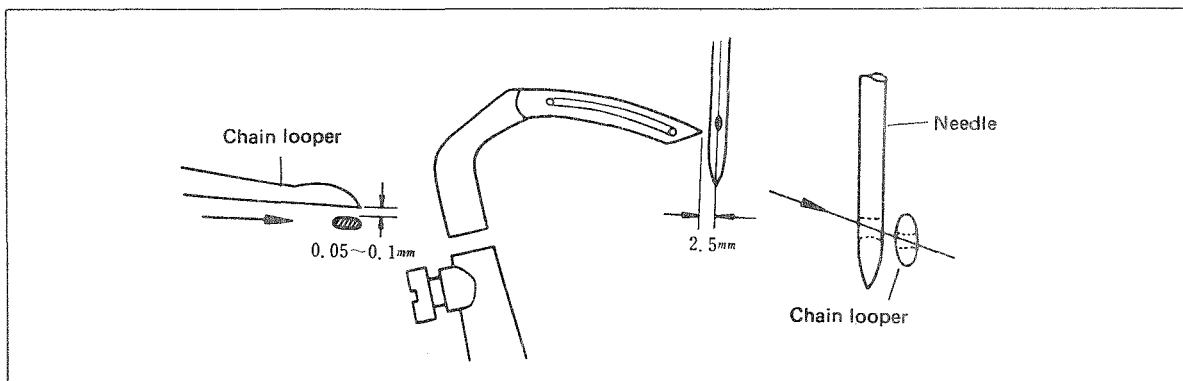


Fig. 19

- d) Chain looper avoiding motion
The chain looper avoiding motion is variable according to the needle size as listed below:

Table 6

Material & models		Avoiding motion	Needle size
Heavy-weight	MO-816-DH6, FF6 and derivatives	2.80 to 3.06 mm (7/64" to 1/8")	#14 ~#21
Standard	MO-816-D04 and derivatives	2.64 to 2.85 mm (3/32" to 7/64")	#7 ~#16

If the chain looper touches the rear of the needle when the looper is moving backwards, while it provides a proper clearance at the needle during forward motion, remove rocker adjusting hole cover ①, Fig. 20, loosen screw ④, insert a 2 mm dia. pin into hole ③ and correct the looper clearance: Avoiding motion is maximized, when the mark "C" is brought toward operator. It is minimized when the mark "C" is brought to the far side from operator.

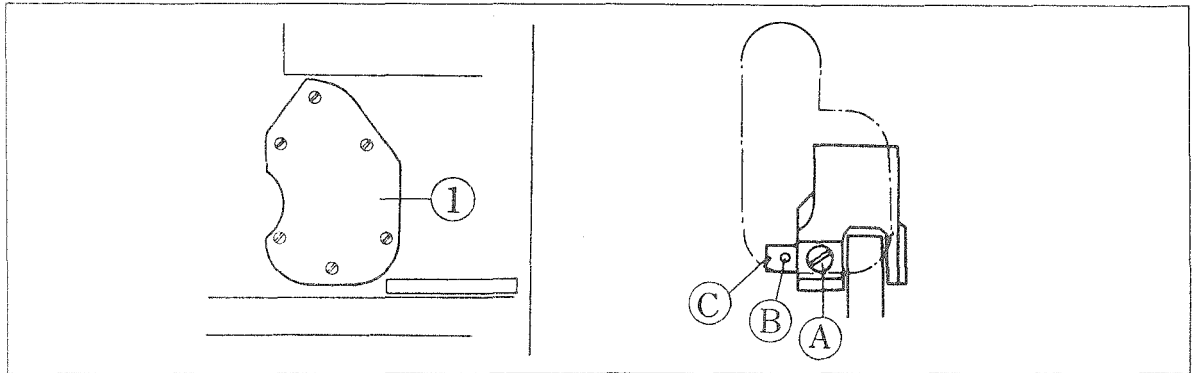


Fig. 20

2-8 Needle guard

(1) Needle guard for overedging machine (Fig. 21)

- a) Needle guard (A) height 43 mm (1-11/16")
- b) Needle guard (B) (804 series)
Needle guard (C) (816 series) 34.5 mm (1-23/64")
- c) When the needle has come down to its lowest position, the pointed end of the needle must lightly touch the needle guards.

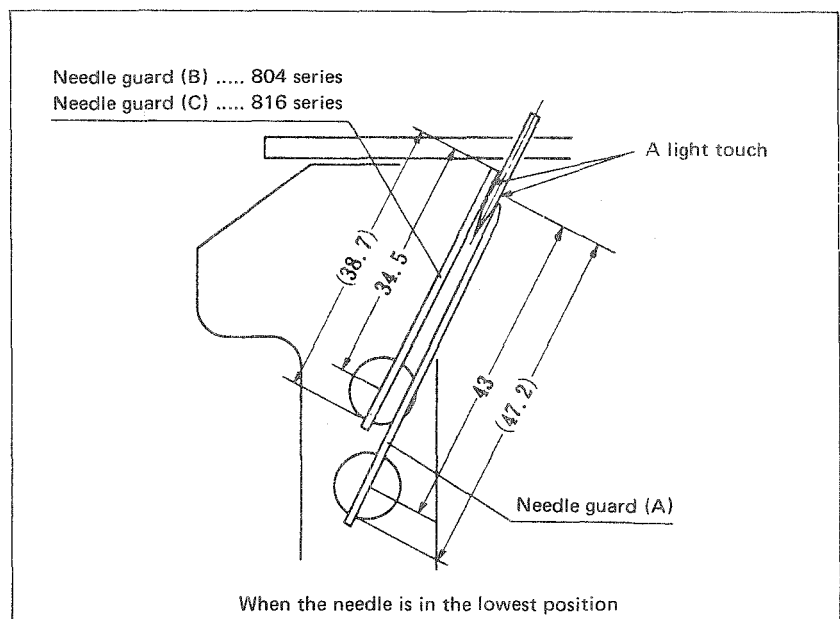


Fig. 21

d) Lateral position of needle guard (A) (Fig. 22)

Loosen the set screw and adjust the needle guard (A) for a correct lateral position. Do not tilt it sideways.

e) When the blade point of the lower looper meets the needle center, each needle guard must provide the under-mentioned clearances at the needle (Fig. 23);

- Needle guard (A) clearance at the needle 0.05 mm or less
- Needle guard (B) clearance at the needle 0.02 mm or less (804 series)
- Needle guard (C) clearance at the needle 0.02 mm or less (816 series)

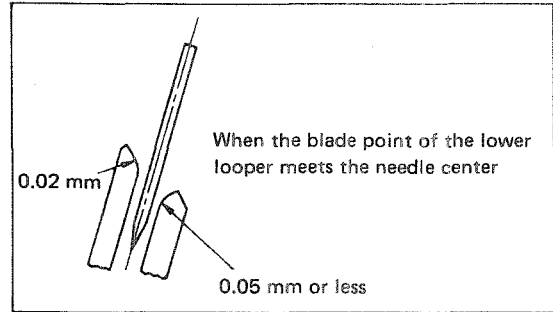
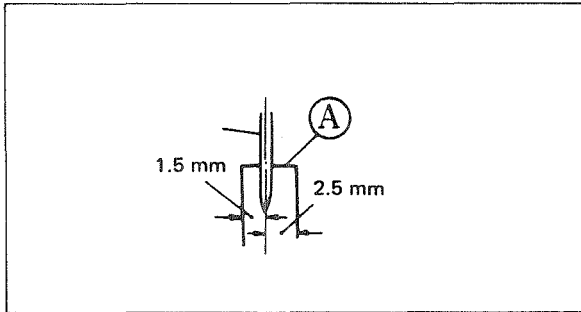


Fig. 23

(2) Needle guard for chain needle (Fig. 24)

- a) The needle in the lowest position must lightly touch both needle guards (D) and (E).
- b) When the looper blade point meets the needle center, the clearances of both needle guards at the needle must be 0.05 mm or less.
(Note) After these adjustments, make sure that all needle guards lightly touch the needle point.

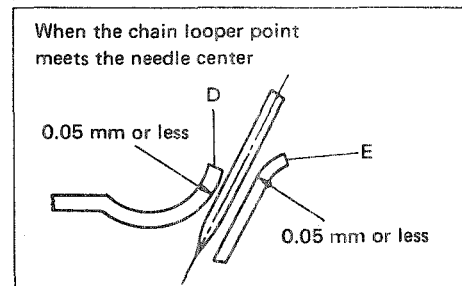


Fig. 24

2-9 Thread cam (816 Series)

- a) Install the thread guide for the thread cam as far down and back as possible.
- b) Attach the thread cam so that its flat surface is in parallel with the top surface of the thread guide when the needle has reached its highest position. (Fig. 25)

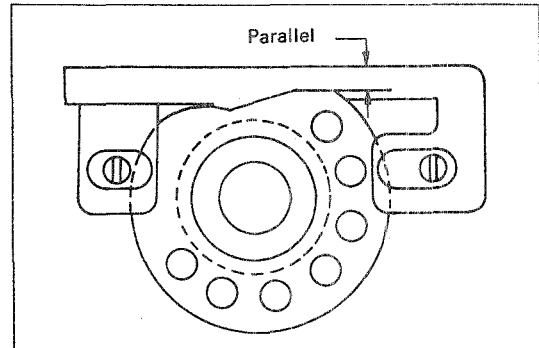


Fig. 25

- c) The thread cam pawl determines the looper thread length to take up and the thread release timing.
Adjust the thread cam height not to let its pawl touch the dotted part of the thread guide as shown in Fig. 26.

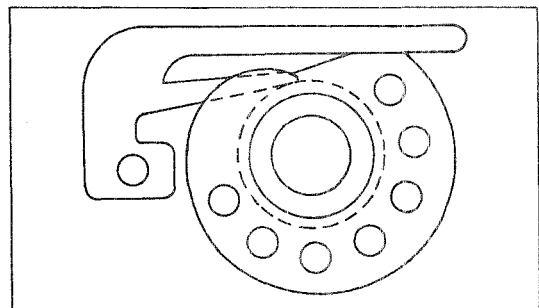


Fig. 26

2-10 Presser foot (816 Series)

- a) Tighten both nut and hinged screw to allow the hinged presser foot and the rear presser foot to smoothly move together.
- b) The presser foot hinge must be attached to the arm in such a manner that the presser foot sole gives an even pressure to the throat plate surface. Lightly tighten the clamp screw so that a small gap is left between the left end of the sole and the throat plate, press down the presser foot against the throat plate to provide it with a horizontal position on the throat plate surface and securely tighten the clamp screw.
(Note) Carefully adjust the presser foot, because it will affect the chain-off thread formation.

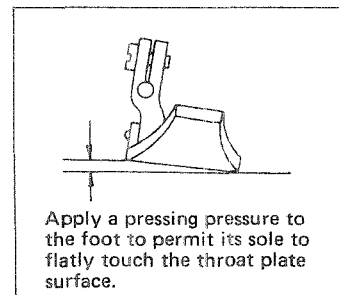


Fig. 27

2-11 Thread guides

(1) Needle thread take-up lever (Fig. 28)

Adjust the needle thread take-up lever in the extreme front position so that its highest level is the same as that of the thread hole in the forked needle thread guide, where a needle thread lightly touches the lever, or lower than that by about a thread's diameter as shown by "A" in Fig. 28.

(2) Forked needle thread guide (Fig. 29)

Provide forked needle thread guide ② with a vertical position as shown in Fig. 29 when the needle is in the lowest position.

(3) Needle thread take-up guide (Fig. 29)

Adjust the height of needle thread take-up guide ① to align the thread hole in intermediate guide ③ with those of forked needle thread guide ②.

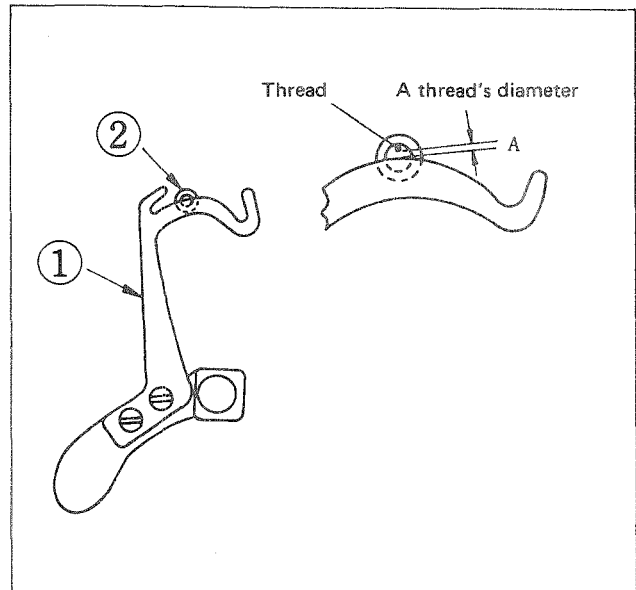


Fig. 28

(4) Looper thread take-ups (Fig. 30)

a) Excepting the special case (e.g. hemming), the inside top of looper thread take-up (left) ① must be aligned with the elevated edge on the lower looper support arm (as shown by an arrow in Fig. 30).

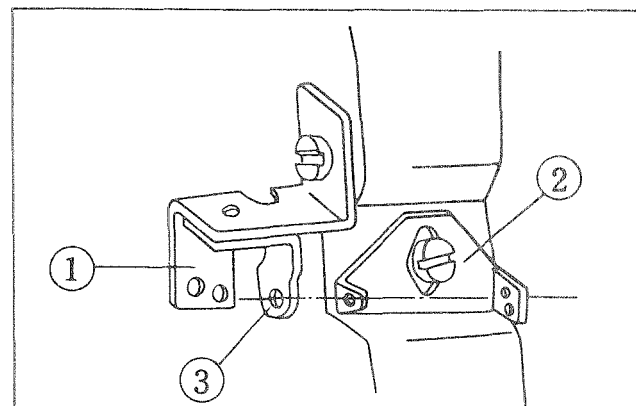


Fig. 29

b) When looper thread take-up (right) ② has reached the lowest position, the top edge must be 10 to 12 mm (25/64" to 15/32") above the frame surface.

The said clearance will influence the function of the looper thread take-up such as the thread length and timing. With the standard adjustment, the upper and lower looper threads are simultaneously taken up when the needle has reached its lowest position.

If the top end of the looper thread take-up (right) ② is higher than the standard position;

- The thread length to be taken up will be reduced (the same result that the looper thread tension is increased).
- A faulty chain-off thread will be produced.
- It will prevent the upper looper thread from skipping.
- A thread taking-up motion will be divided into two-step motions.
- The thread loop will be enlarged when using a thin thread like Tetron thread.

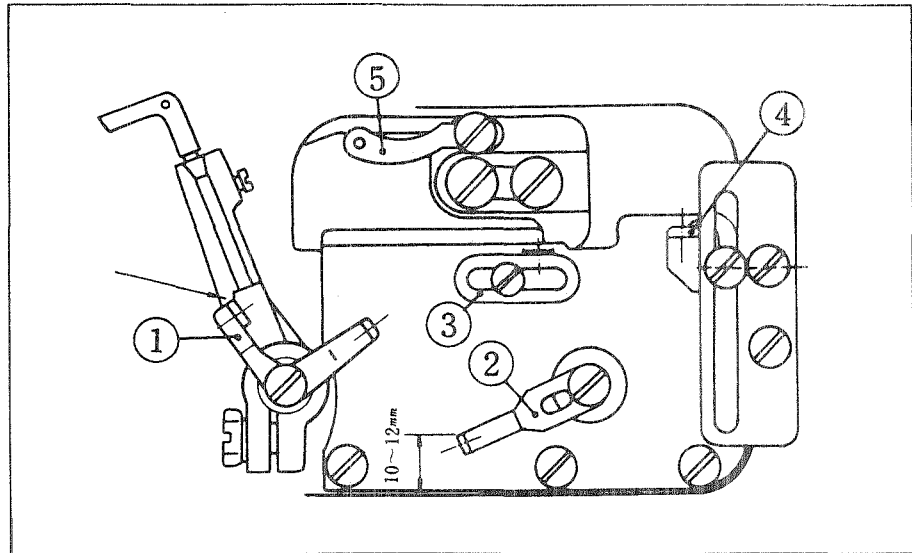
(5) Upper looper thread guide (Fig. 30)

a) Set the upper looper thread guide ③ to the approximate center of the retainer to smoothly feed the upper looper thread.

b) Fix lower looper thread guide ④ to the position where its clamp screw stays at the level of the upper screw of the thread guide retainer.

If the lower looper thread guide is lower than the standard position;

- The thread length to be taken up will be reduced.
- Chain-off thread will be improved.
- Irregular stitches will be produced.
- It will be effective to form hemming. (MO-805)



2-12 Standard thread tension

Table 7

Thread	Tetron #80	Cotton #70/2	Measurement method
Needle thread	80 ± 10g	100 ± 20g	The needle thread drawn in the normal direction without threading the needle eye when the needle reaches its highest position.
Upper looper thread	30 ± 10g	60 ± 20g	The upper looper thread drawn in the normal direction when the upper looper reaches its left most position.
Lower looper thread	30 ± 10g	60 ± 10g	The lower looper thread drawn in the normal direction when the lower looper reaches its right most position.
Chain needle thread	30 ± 10g		The same as the needle thread
Chain looper thread	10 ± 10g		The chain looper thread drawn in the normal direction when the looper reaches its right most position.

Table 8 Rated tension of the thread tension springs

Part No.	Color code	Free length	Operating length	Compression for operating length
B3101-804-000	Red	19.5 mm (49/64")	11.5 mm (29/64")	430 ± 50g
B3102-804-000	Yellow	17.8 mm (45/64")	9.8 mm (25/64")	320 ± 35g
B3103-804-000	Blue	17.3 mm (11/16")	9.3 mm (23/64")	150 ± 20g
B3121-804-000	Clear	lower than the blue spring		

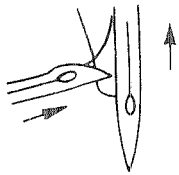
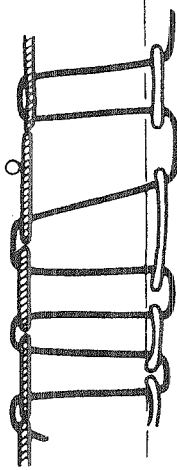
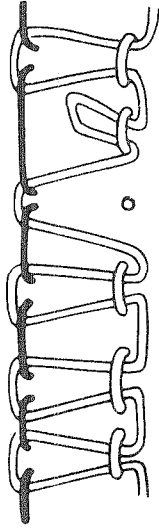
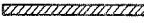

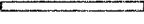
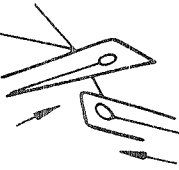
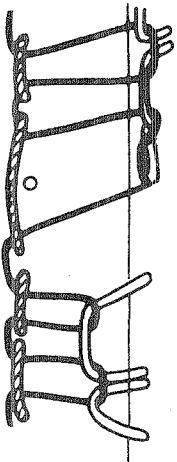
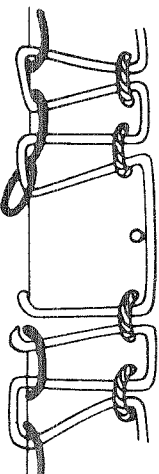
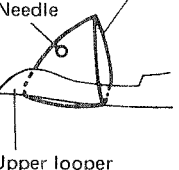
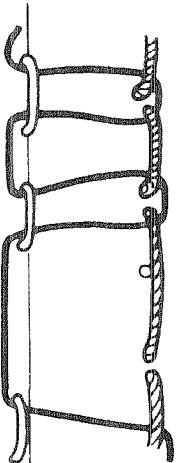
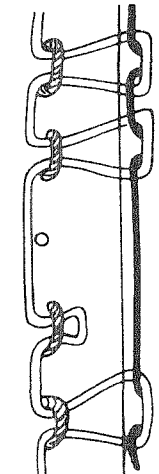
Table 9 Color coded springs used for MO-800 Series

Thread Model	Needle thread	Upper looper thread	Lower looper thread	Chain needle thread
MO-801-OD4	Yellow	—	—	—
802-OA4	Red	—	Blue	—
802-OD4	Red	—	Blue	—
803-OD4	Blue	—	Yellow	—
804-OD4	Red	Yellow	Blue	—
805-OD4/L001	Yellow	Blue	Yellow	—
804-OF6	Red	Blue	Yellow	—
806-BD4	Clear Red	Blue	Yellow	—
807-DF6	Clear Red	Blue	Yellow	—
808-DF6	Red Red	—	Blue	—
809-BD4	Red Yellow	—	Blue	—
814-AA4	Red Red	Blue	Yellow	—
814-BD4	Yellow Yellow	Blue	Yellow	—
815-DH6	Blue	—	Red	Red
815-BD4	Blue	—	Yellow	Yellow
815-DD6	Blue	—	Red	Red
815-FF6	Blue	—	Red	Red
815-AF4	Blue	—	Yellow	Yellow
815-DD4	Blue	—	Yellow	Yellow
816-BD4	Red	Yellow	Blue	Yellow
816-DD4	Red	Yellow	Blue	Yellow
816-FF6	Red	Blue	Yellow	Yellow
816-AF4	Red	Yellow	Blue	Yellow
816-DD6	Red	Blue	Yellow	Red
821-BD4	Blue Blue	—	Yellow	—
840-DD4	Yellow	—	—	Yellow

3. STITCH FAILURE CORRECTION (STITCH-SKIPPING, THREAD BREAKAGE AND NEEDLE BREAKAGE)

3-1 Overedge stitching

(1) Classification of stitch-skipping

Phenomena	Right side	Wrong side	Remarks
<p>Lower looper failed to hook a needle thread loop.</p> 			<p>Most of skipping stitches occurred in synthetic threads belong to this type. The clearance of the lower looper at the needle is not correct.</p> <p>  Needle thread  Upper looper thread  Lower looper thread </p>
<p>Lower and upper loopers failed to hook their threads each other.</p> 			<p>This failure occurs infrequently. The clearance between the upper and lower loopers are not correct.</p>
<p>Upper looper failed to hook a needle thread loop.</p>  <p>Lower looper thread Needle Upper looper</p>			<p>This failure may occur in stitches with comparatively short feed pitch. Upper looper tension is too low and needle thread tension is too high.</p>

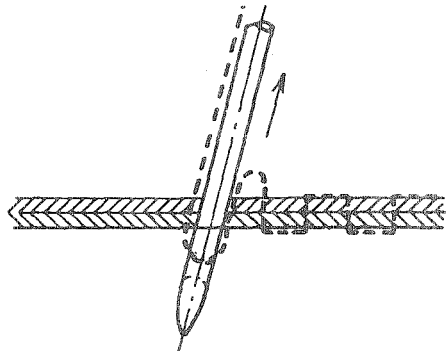
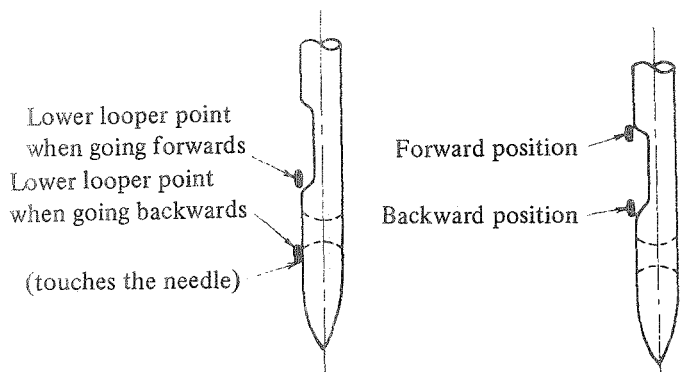
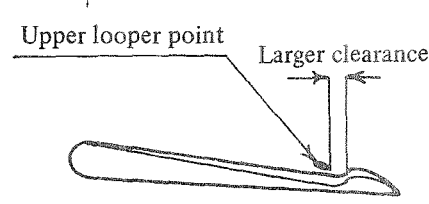
(2) Correction

A careful and accurate adjustment is specially required by the 816 series.

a) Skipping stitches caused by the lower looper.

Step 1	<ol style="list-style-type: none">1. The needle is not straight.2. The needle is not correctly attached.3. The lower looper does not have a sharp point.
--------	--

Step 2	<ol style="list-style-type: none">1. The needle height is not correct.2. The lower looper does not move backwards in a correct distance at a correct height (radius as well) related to the needle.3. The lower looper does not move forwards in a correct distance at a correct height related to the needle.4. The clearance of the lower looper at the needle is not correct. The lower looper touches the needle.5. Thread loop is deformed by the needle guard. Remove the needle guard (A) for observation. If it is the cause, make the needle guard lower or keep it away from the needle.
--------	--

Step 3	<ol style="list-style-type: none">1. The needle thread is not of Z-twist.2. The thread tensions are too high.3. Each thread take-up is not in the normal position. Carefully check them when using synthetic threads, because the thread take-up positions will affect the thread loop formation.4. If the needle leaves an idle loop on the right side of the fabric and will not form a necessary size of loop under the fabric when Tetron, Nylon, wooly nylon or clear thread is used, replace it with a DC x J 27 needle.5. Due to the use of a thick needle (#14 or thicker), the lower looper meets the needle at a higher position in its forward motion and at a lower position in its backward motion than the standard heights. (The lower looper of the 816 series model has been provided with an advanced phase to the needle by 6°). If the lower looper clearance at the needle has been reduced too much in its forward motion, the looper touches the needle in its backward motion. To correct this failure, reduce the distance of the lower looper backward motion and adjust the looper so that its blade point passes through a recessed part on the needle both in forward and backward motions.   <p>Lower looper point when going forwards Lower looper point when going backwards (touches the needle)</p> <p>Forward position Backward position</p>  <p>Upper looper point Larger clearance</p> <p>As the result of the above correction, stitch skipping will be prevented, while the clearance between the upper and lower loopers is increased. If it does not solve the problem, adjust the positions of the upper looper guide retainer and the upper looper shaft driving arm. (See Table 4)</p>
--------	--

b) Skipping stitches caused by the upper looper

1. The needle is not straight.
2. The needle is not correctly attached.
3. The upper looper does not move forward in correct distance and height with a proper clearance in relation to the needle.
4. The upper looper thread is too loose when it is taken up by the needle.
This failure occurs when the looper thread take-up (right) is too low. (See ② in Fig. 30)
5. Thread tensions are too low. In this case, the same failure as 4 may occur.

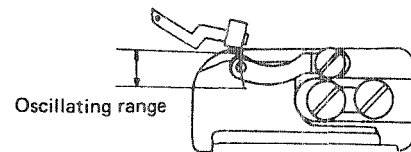
(3) Thread breakage

a) Needle thread breakage

1. The throat plate, stitch tongue, lower looper, needle eye or any other thread path has a scratch or burr.
2. The needle touches the needle guards too much. (Carefully check this when woolly nylon thread is used.)
3. The needle is heated up to melt down the thread.
Preventive measures;
(A) Apply silicon oil to the thread (use Silicon Oil Lubricator Z018 for overedging machines, Z017 for safety stitch machines)
(B) Use a thinner thread.
(C) Change the needle to a needle for synthetic thread.
(D) Operate the machine at a lower sewing speed.
4. The thread tensions are too high.
5. The needle is too thin for the thread.
6. Thread quality is not good. Thread breakage occurs often because of a bad dyeing. Use a better thread.
7. The lower looper touches the bottom surface of the throat plate.

b) Looper thread breakage

1. The throat plate, stitch tongue, looper or any other thread path has scratches or burr.
2. Looper thread tension is too high.
3. The upper looper and lower looper threads are not simultaneously taken up before the needle reaches its lowest position. Especially, when the looper thread take-up (right) tilts too far down to the right, the lower looper thread may be easily broken. Refer to Fig. 30 and adjust looper thread take-ups (left) ① and (right) ② and lower looper thread guide ④ .
4. The upper looper thread guide (left) (⑤ , Fig. 30) is installed with its top end upraised, which makes the thread taking action unbalanced to break the upper looper thread. Put down the thread guide top end as low as possible to the extent that it does not touch the lower looper support arm.



(4) Needle breakage

1. The needle hits some other parts.
2. The upper looper is not adjusted for the standard position. (Fig. 9) If the upper looper point travels forwards exceeding the standard distance of 4 mm (5/32") from the needle center and lower than 11 mm (7/16"), it will break the needle.
3. The upper looper touches the needle. Carefully inspect it when the upper looper reaches the extreme left point.
4. The lower looper touches the needle.
The lower looper must not touch the needle during its oscillation.
5. The lower looper is not slanting enough. (Fig. 4) When the needle is coming down, it may hit the lower looper.
6. The needle guard is not correctly installed.

3-2 Chainstitching

(1) Chainstitch skipping

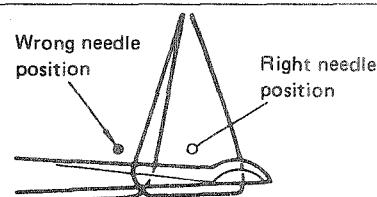
Chainstitch skipping will be caused by:

- (a) The looper point fails to hook a needle thread loop when it moves forwards.
- (b) The needle point fails to take a thread loop formed on the back of the looper moving backwards.
- (c) The needle thread comes off before the needle takes a looper thread.
 - a) Chainstitch skipping in the looper's forward motion

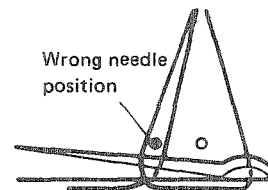
1. The needle is not straight or its point is not sharp.
2. The needle is not correctly attached.
3. The chain looper point is not sharp.
4. The chain looper does not move backwards in the correct distance and at a correct height.
5. The looper clearance at the needle is not correct.
If the looper is too close to the needle, the clearance in the backward motion at the needle, the clearance in the backward motion at the needle will be accordingly increased. (see 2-7. D)
6. Thread tensions are too high. Reduce the thread tensions when the needle is threaded with nylon or wooly nylon.
7. The needle guard is not correctly installed.

b) Chainstitch skipping in the looper's backward motion

1. The backward travelling distance of the chain looper is not enough.
2. Feed pitch is too short.
3. The needle thread tension is too low.

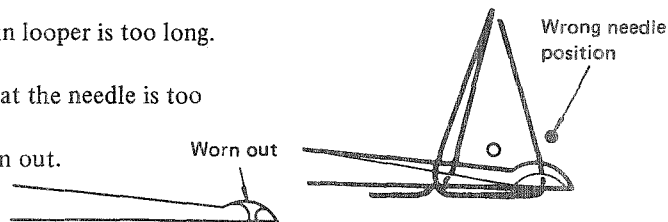


1. When a synthetic thread is used.
2. The needle thread tension is too low.
3. The backward travelling distance of the chain looper is not enough.
4. The chain looper has an excessive oscillating radius to let the needle thread rub against the throat plate.



c) Chainstitch skipping due to the needle thread's coming-off

1. The backward travelling distance of the chain looper is too long.
2. The chain looper thread tension is too high.
3. The clearance of the chain looper back side at the needle is too much.
4. The thread hole in the chain looper has worn out.
5. The thread cam is wrongly positioned.



(2) Chainstitch thread breakage

a) Chain needle thread breakage

1. The needle, throat plate, chain looper or any other thread path has scratches or burr.
2. The needle thread tension is too high.
3. The needle is heated up to melt down the thread.
(Refer to 3-1-4 for the preventive measures)
(Note) Refer to 4-1-(2) for that of chain-off thread.

b) Chain looper thread breakage

1. The needle point has a burr.
2. The thread cam has scratches.
3. The thread paths have a scratch.
4. The thread cam is wrongly positioned.
(Note) Refer to 4-1-(2) for that of chain-off thread.

(3) Needle breakage

1. The needle hits the chain looper.
Increase the chain looper clearance at the needle by reducing the slanted angle of the looper or adjusting its avoiding motion. (2-7-d)
2. The needle guard is wrongly installed.
3. The needle hits the throat plate or presser foot.
4. The needle is too thin.

4. STITCH FAILURE CORRECTION (CHAIN-OFF THREAD, IRREGULAR STITCH AND PUCKERING)

4-1 Faulty chain-off thread

Faulty chain-off thread is produced notwithstanding the stitches are perfectly formed on the material.

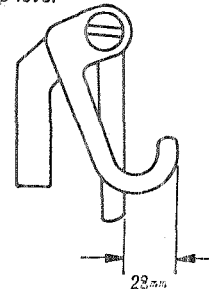
(1) Faulty chain-off thread in overedging

1. Stitches are skipped. The loopers are not correctly adjusted.
2. Thread tensions are too low.
3. The main feed dog is too high and the auxiliary feed dog is too low.
4. The longitudinal position of the throat plate is not correct.
Adjust the throat plate position not to leave a gap between the feed dog to catch the chain-off thread.

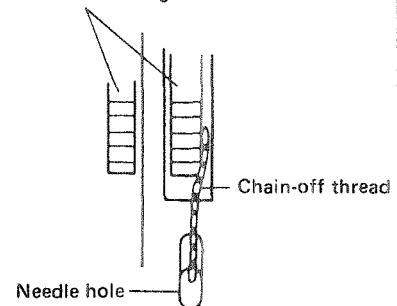
(2) Faulty chain-off thread in chainstitching

1. Stitches are skipped. The looper is not correctly adjusted.
2. The thread cam is not properly positioned.
When the chain looper reaches extreme right, the looper thread is excessively slackened. Slightly raise the thread cam pawl.
3. The chain needle thread take-up lever is installed in a wrong way. Do not allow it to touch the needle thread take-up lever.
4. The presser foot is installed in a wrong way.
Draw by hand the looper thread while the presser foot is brought down and also while it is brought up, in order to compare the thread resistance between these two cases.
If any distinctive difference in resistance is not recognized, adjust the presser foot according to the paragraph 2-10.
5. The throat plate is not properly positioned related to the needle hole in the throat plate.
6. A gap between the feed dog and the throat plate is clogged with the chain-off thread. Both sides of the feed dog must be evenly spaced from the throat plate.
7. The chain looper is entangled with the needle thread. Increase the oscillating radius of the chain looper to let it have a larger stroke.
8. The needle guard is not properly functioning.
9. Thread tensions are too low.

Chain needle thread take-up lever



Main feed dog



4-2 Irregular stitches

1. The looper thread tension is too low.
2. The looper thread guide is not properly positioned to the looper thread take-up.
3. The presser foot is not in close contact with the throat plate surface.
4. The presser foot does not provide a proper pressure.
The standard pressure is 4 to 5 Kg. Tighten the presser spring regulator screw until 9 screw threads are left on the top surface of the side plate, and the presser foot will provide a pressure of 4.5 Kg.
5. The cutting length does not fit the overedging width.

4-3 Puckering

Puckering may occur more frequently in safety stitch than in overedge stitch.

1. The needle is too thick.
2. The thread is too thick for the material.
3. Thread tensions are too high. Reduce both chain needle thread and chain looper thread tensions.
4. The presser foot provides an excessive pressure.
5. The feed dog is too high or the main and the differential feed dogs do not have the same height.
6. Differential feed system is not properly set.

Apply a stretching feed:

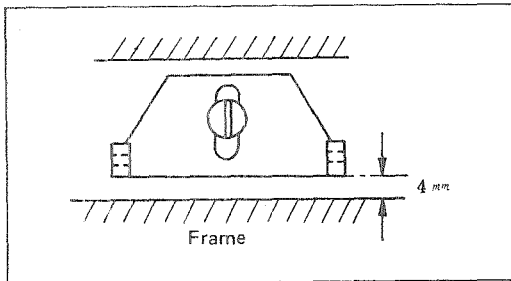
- Standard models 1 : 0.7
 - MO-816/601 (for shirts) 1 : 0.6
7. The needle hole in the throat plate is too large.
 8. The knife is not properly adjusted.
If the cutting length is greater than the overedging width or if the knife is not sharp, it will affect the material feed resulting in puckering.
 9. Loose chainstitch is formed.
Slightly advance the thread cam phase.

5. ADJUSTMENT OF "K" (KNIT) SPECIFICATION MACHINES

MO-804K-□□□
MO-704K-□□□
MO-814K-□□□
MO-714K-□□□

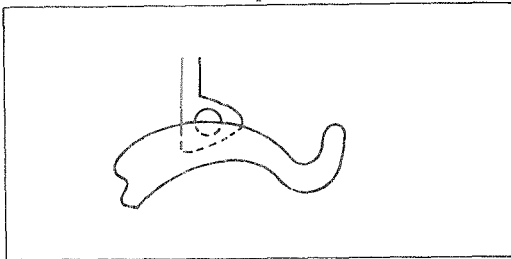
Adjust these models in the following ways:

1. Forked needle thread guide



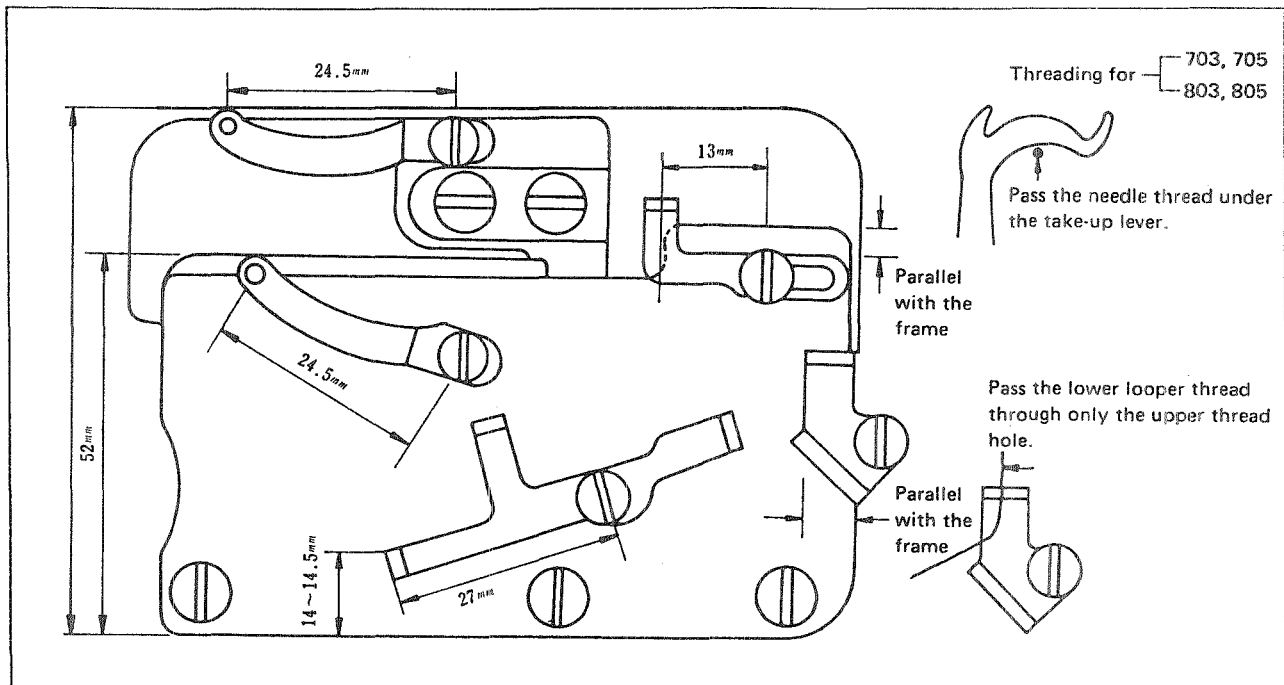
The bottom of the forked needle thread guide must be 4 mm (5/32") above the frame surface.

2. Needle thread take-up lever



Adjust the needle thread take-up lever for a position where its upper level aligns with the center of the thread hole in the forked needle thread guide when the lever has come out nearest to the operator, and where the needle thread lightly touches or has a thread diameter's clearance at the lever.

3. Positions of the looper thread take-up and thread guides



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