

# Service Manual



## Supermatic - Transforma



Edition February 1954 - Revised December 2023

# INTRODUCTION

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*ELNA technical manuals were originally created for exclusive use by trained ELNA Sales and Technical personnel only.*

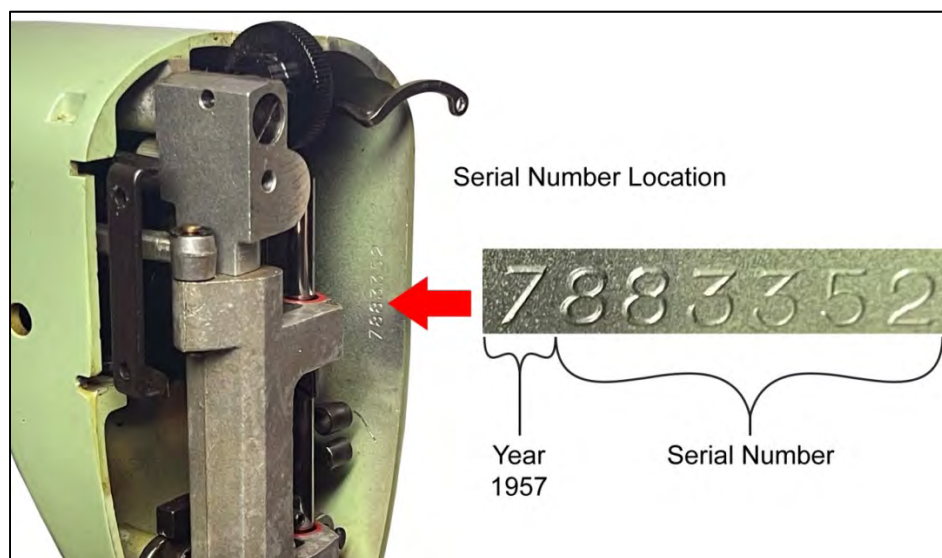
My name is **Jim Cavanaugh**. I have 30 years of experience as a technical writer. I created this service manual based on my interpretation of the original ELNA Service Manual (**Edition February 1954**) with additional information from other ELNA service, training and user manuals as well as every YouTube video I could find.

I have tried to compile a comprehensive source of information for use by other ELNA enthusiasts. I have enhanced existing illustrations and created new ones where none existed. I acquired my first ELNA Supermatic (**a 1957 Two Tone Green Serial No. 7,883,352 shown below**) and began to overhaul and troubleshoot my machine. I found the available information to be lacking. In addition to this Service Manual I updated three editions of the ELNA Parts Catalogs. I recommend you reference them in conjunction with this manual. The Parts Catalogs will help you identify the proper names of components as well as their location and orientation in the machine. There is a column in the Parts Catalogs that lists the serial numbers for when changes were made to specific components. Identify the serial number of the machine you are working on to understand which revision of components applies to your machine. Keep in mind that some of the changes that were made were done to correct problems or improve performance. It is possible that some components in your machine may have been updated at some point in the past.

To aid in my comprehension of these machines, I acquired two additional ELNA Supermatic machines for reference, a **1953 Green, Serial No. 3,571,077** and a **1961 Beige, Serial No. 1,288,854**.

I will post this manual in the files of the Facebook groups “Elna Supermatic and the Elna Grasshopper” and “Vintage Elna Sewing Machines.” The aforementioned Parts Catalogs can be found there as well.

I hope you find this information useful. I will continue to expand and update this manual as my knowledge and understanding of the machine grows. I welcome any comments or information to that end.



# CONTENTS

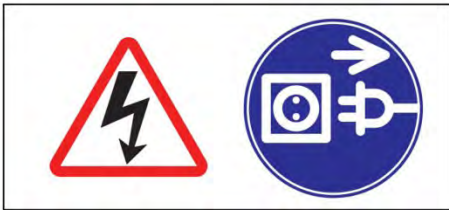
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NOTE! Make all adjustments on ELNA Supermatic only in the following sequence:

1. Timing of Feed Dog
2. Centering of Needle Bar for "Transforma"
3. Centering of Needle Bar of Zig Zag Stitch
4. Adjustment of Needle Position Centering Dial
5. Adjustment of clearance between Needle and Shuttle Hook
6. Timing of Shuttle Hook in Relation to Needle Bar
7. Adjustment of Needle Bar Height
8. Adjustment of Needle Clearance using Double Needle Clamp
9. Adjustment of Presser Bar
10. Centering of Feed Dog
11. Adjusting Height of Feed Dog
12. Adjustment of Stitch Length ("Supermatic")
13. Adjustment of Stitch Length ("Transforma")
14. Timing of Needle Bar Swing
15. Adjustment of Fully Automatic Feed Control for Double Discs
16. Automatic Thread Release
17. Adjustment of Automatic Thread Release
18. Thread Tension
19. Adjustment of Coupling Device at Flywheel
20. Bent Thread Guides
21. Adjusting the Automatic Bobbin Winder
22. Removing the Shuttle Hook
23. Machine is noisy (with stitch width set at "3" or "4")
24. Slipping of Motor Friction Wheel

# Basic Procedures to Follow

## Safety



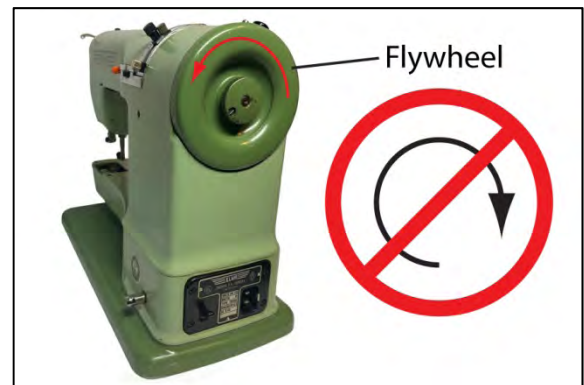
**Warning!** Electrical Hazard!

Disconnect the power cord before servicing.

Death or serious injury may result if the danger is not avoided.

## Flywheel

When turning the **Flywheel** by hand, only turn the **Flywheel** towards you.



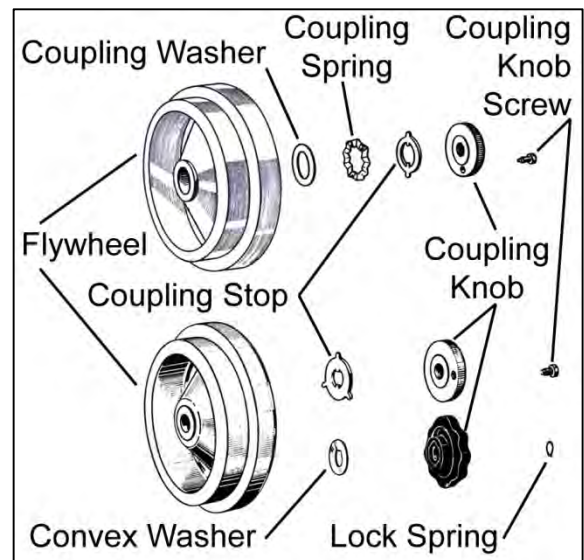
## Removing the Flywheel

There were three different **Flywheel** and **Coupling** designs.

To remove the **Flywheel** Loosen the **Coupling Knob Screw**.

Unscrew the **Coupling Knob**.

Remove the **Coupling Stop**, **Coupling Spring**, **Coupling Washer** and **Flywheel**.



## Thread

**Caution!** To avoid damage to the **Check Spring** when removing the upper thread from the machine, never pull the thread backwards through the **Upper Tension Device**. Cut the thread ahead of the **Upper Tension Device** and pull it through in the direction of the needle.



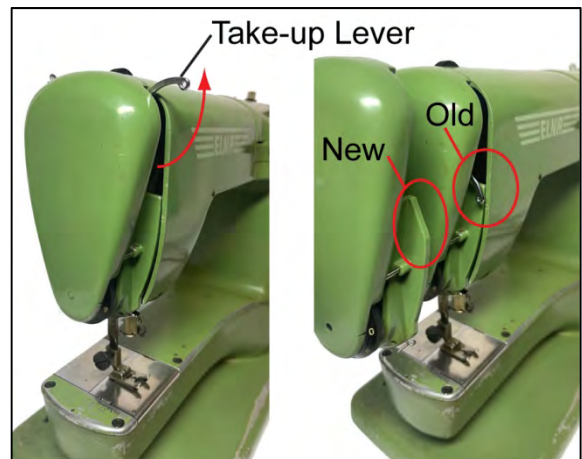
## Opening the Front Cover

**Caution!** Care must be taken when opening the **Front Cover** to avoid damage to the machine.

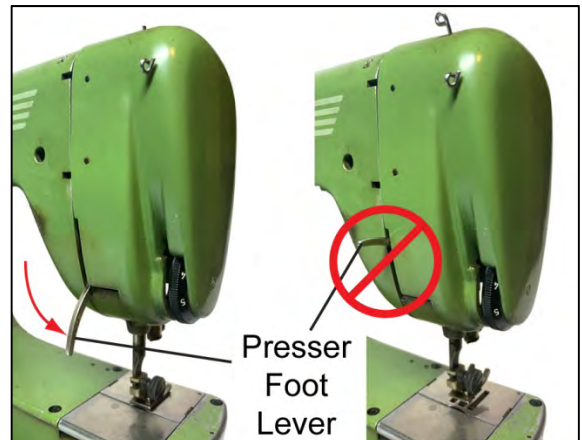
Turn the **Flywheel** toward you until the **Take-up Lever** is in the raised position.

The Take-up Lever will interfere with the front cover on older models. The cover was modified to remove the interference on later models.

According to the Elna Parts Catalog, this change occurred on machine **Serial No. 527,626**. However, I found an example of a newer machine without this change.



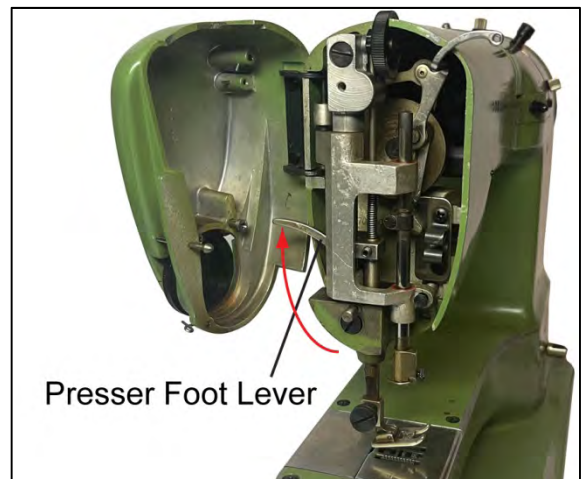
The **Presser Foot Lever** must be in the down position before opening the **Front Cover** to avoid interference.



The **Presser Foot Lever** may be raised after the **Front Cover** is opened if necessary.

Remember to lower the **Presser Foot Lever** again before closing the **Front Cover**.

**Note!** For some service procedures, removing the **Front Cover** can provide better access and avoid damaging the **Front Cover** or hinge.





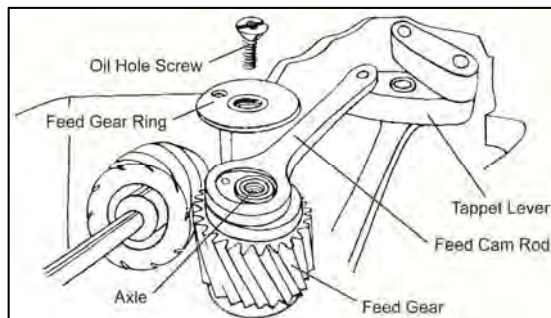
# 1. Timing of Feed Dog

When feed dog is correctly timed, it must not move the material while the needle is in the material. If this requirement is not met, proceed as follows:

Remove needle, presser foot, needle plate and free arm cover (held on by 2 Phillips screws).

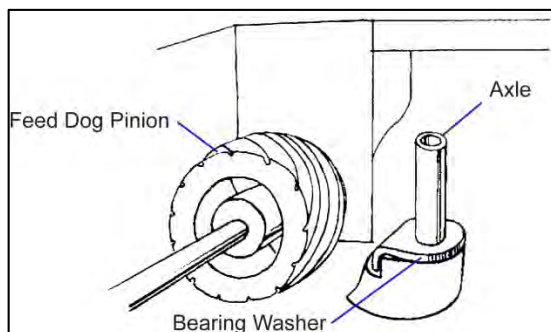
Remove **oil hole screw** on top of **feed gear** and remove also **feed gear ring**.

Lift **feed cam rod** so that it comes off simultaneously from the **feed gear** and **tappet lever**.



Lift **feed gear** off **axle**.

Make sure that **bearing washer** is positioned on **axle** with lip over inside edge.



**To correctly set the timing:**

Turn flywheel towards you until the needle bar is at lowest position.

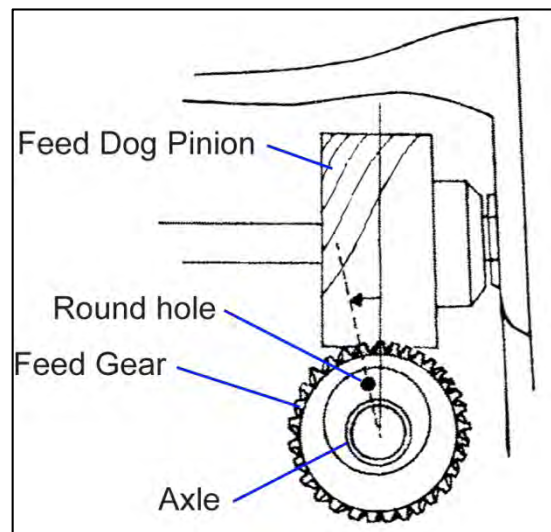
Reposition the **feed gear** on the **axle** such that the **round hole** on the top of gear faces one tooth to the left in relation to the center of the **feed dog pinion**.

*(Be sure the needle bar remains at its lowest position.)*

Replace **feed cam rod** by placing both of its ends simultaneously on their corresponding counterparts.  
*(Do not use force!)*

Replace **feed gear ring** and **oil hole screw**.

Replace **free arm cover**, needle plate, presser foot and needle.



## 2. Centering of Needle Bar for Transforma

When the needle bar is correctly centered, the Needle Gauge No. 607801 or a straight needle size 90 or 100 (when looked at from front) must be exactly in the center of the stitch hole in the needle plate. If this requirement is not met, proceed as follows:

Remove needle and presser foot.

Insert and fasten a Needle Gauge No. 607801 or a straight needle size 90 or 100.

Loosen the **Stop Screw** at the right of the head portion of the upper casing.

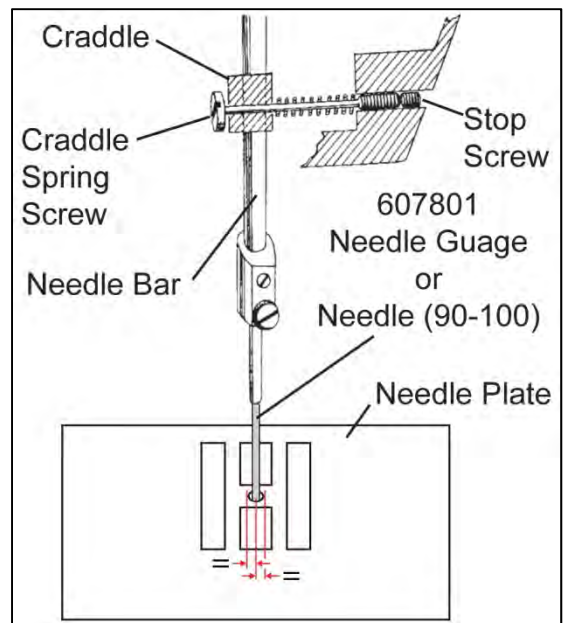


Open the front cover.

Turn the flywheel slowly towards you until the **Needle Bar** is in its lowest position.

Turn the **Cradle Spring Screw** clockwise or counterclockwise, to adjust the **Needle Bar** so that the **Gauge (or Needle)**, when looked at from the front, is exactly in the center of the hole in the needle plate.

Tighten the **Stop Screw** after adjustment.





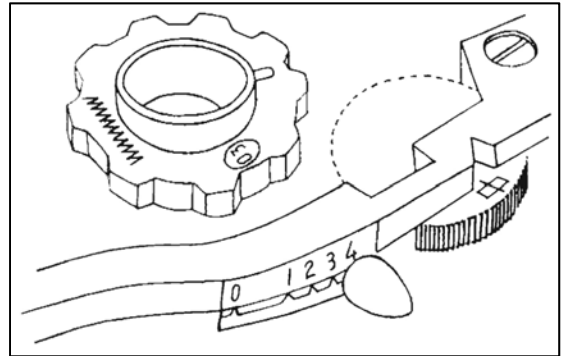
### 3. Centering of Needle Bar for Zigzag stitch

Remove the presser foot.

Install **Cam "03"** (Zigzag) in the ELNAGRAPH.

Install a size 110/18 needle. *(Must be straight!)*

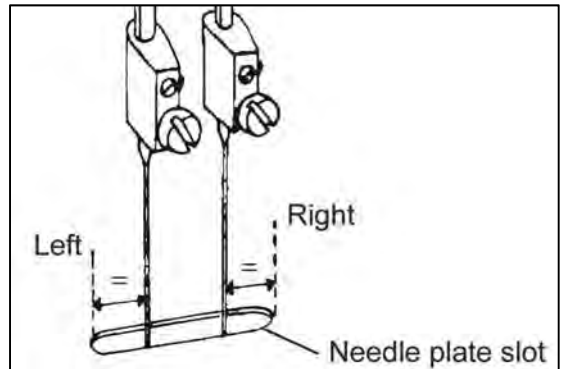
Set stitch width knob at "4" and **Centering Dial** at center position.



Turn flywheel towards you until the needle reaches its lowest positions to the left and the right.

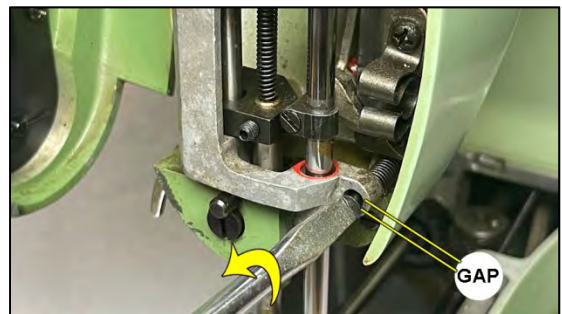
Check whether the distance between the needle and the ends of the slot in needle plate are equal on both sides.

If these distances are not equal on both sides, proceed as follows:



Open the front cover.

Loosen the **cradle spring screw** far enough that the cradle at its extreme left position does not hit the head of the **cradle spring screw**.



**NOTE: The cradle spring screw must be unscrewed enough to not limit the travel of the cradle during the adjustment!**

Open the Supermatic cover.

Loosen the set screw on top of the cradle lever.

Adjust by turning the cradle lever stud.

Tighten the set screw after this adjustment.

Confirm the Needle is now centered in the slot.

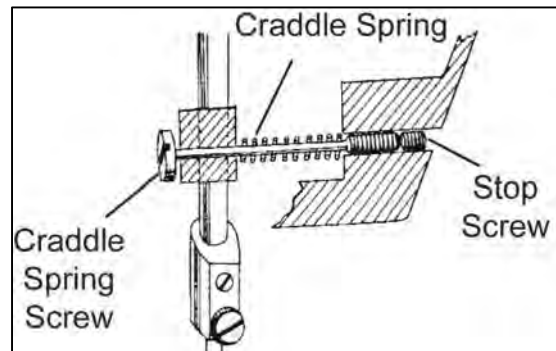


Replace the 110/18 needle, with a straight size 60/8 needle. This needle must pass through the hole in the needle plate without touching the rear edge when deflected to the left and to the right.

Turn the cradle spring screw CW until it barely contacts the cradle. At this point you should hear a slight clicking noise with the machine running.

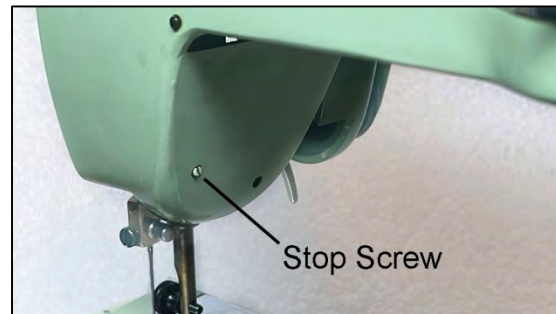
This is the cradle hitting the head of the cradle spring screw.

Turn the cradle spring screw CCW 1/4 of a turn at a time until the clicking stops.



There is a stop screw on the right of the upper casing.

Tighten the stop screw until it bottoms out against the end of the cradle spring screw.



Close front cover and replace presser foot.

## 4. Adjustment of needle position Centering Dial

With the **Centering Dial** set at the center position and the stitch width knob set at "0" the needle should be in the middle of the needle plate slot (when looked at from front).



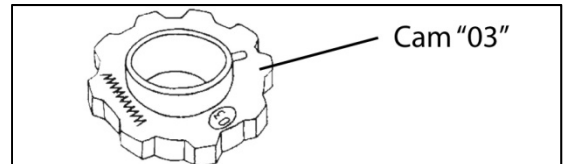
If this requirement is not met, proceed as follows:

Remove the presser foot.

Install Cam "03" (Zigzag) in ELNAGRAPH.

Install a size 110/18 needle. (*Must be straight!*)

Set the stitch width knob at "0."



Turn the **Centering Dial** to the full **Left Position**.

Turn flywheel towards you until the needle reaches its lowest position at the **Left**.

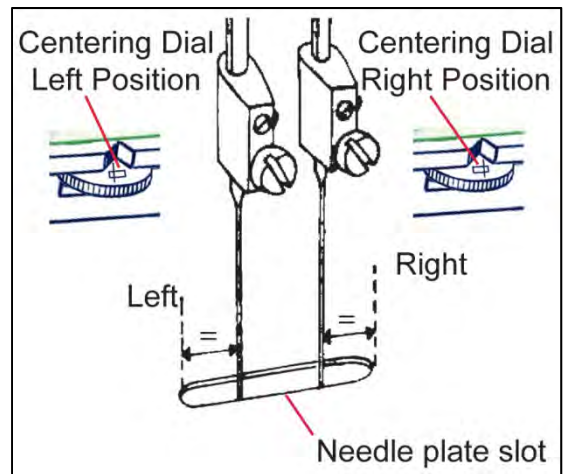
Check distance between needle and the left end of the slot.

Turn the **Centering Dial** to the full **Right Position**.

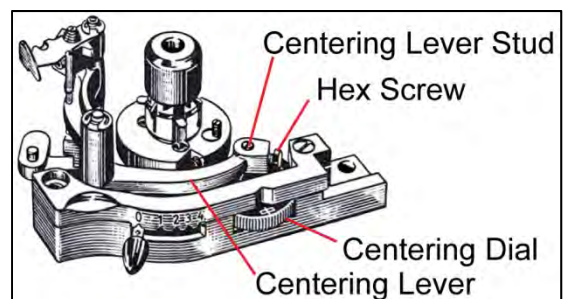
Turn flywheel towards you until the needle reaches its lowest position at the **Right**.

Check distance between needle and the right end of the slot.

Compare both of the above measurements. They should be equal. If this is not the case, proceed as follows:



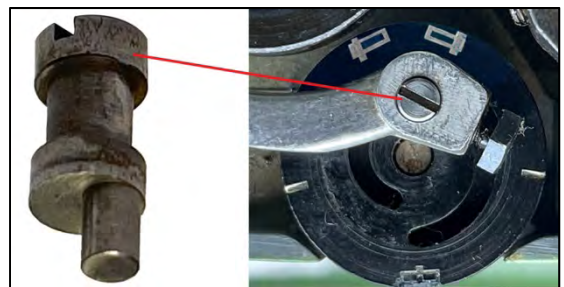
Using a 6 mm wrench, loosen the **Hex Screw** in the **Centering Lever** just enough to allow the **Centering Lever Stud** to turn but leaving enough friction to hold it in place during adjustment.



The **Centering Lever Stud** fits in a through hole in the **Centering Lever**. The eccentric stud on the bottom of the **Centering Lever Stud** rides in a spiral groove in the top of the **Centering Dial**. It is held in place by the **Hex Screw**.

Turn the **Centering Lever Stud** until the Left and Right needle positions are equal.

Tighten the **Hex Screw** after adjustment.



## 5. Adjusting clearance between Needle and Shuttle Hook

When clearance between needle and point of shuttle hook is correct, the needle must just clear or barely touch the point of the shuttle hook.

If this is not the case, proceed as follows:

Remove needle, presser foot and needle plate.

Lower presser foot lever to open front cover (thread take-up lever must be in a raised position).

Stitch width knob at "0."

Set **Centering Dial** at **Center Position**.



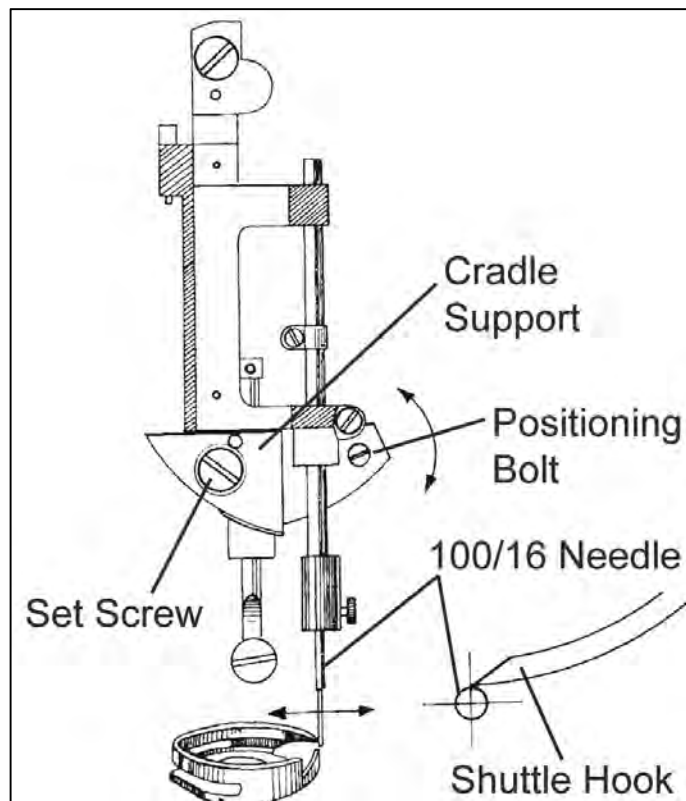
Install a straight size **100/16 Needle**.

Turn flywheel slowly toward you until point of **Shuttle Hook** is exactly behind the center of the needle.

Slightly loosen the **Set Screw** in the **Cradle Support**.

Insert screw driver into **Positioning Bolt** and turn until needle just clears, or barely touches, the point of the shuttle hook.

Tighten **Set Screw** after this adjustment.



Close front cover, replace needle, needle plate and presser foot.

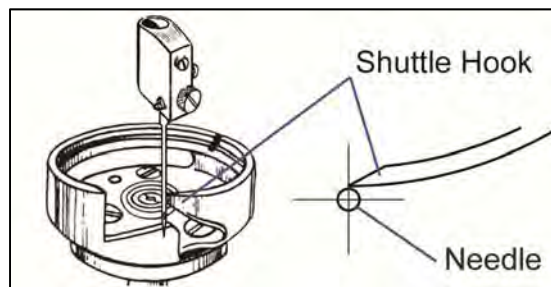


## 6. Timing of Shuttle Hook in relation to Needle Bar

If timing of shuttle hook in relation to needle bar is correct, the point of the shuttle hook must be behind the center of the needle after the needle bar has risen **2.25 mm [.089"]** from its lowest position.

(For this test, the **Centering Dial** must be in the center position and stitch width knob at "0.")

If this requirement is not met, adjust as follows:



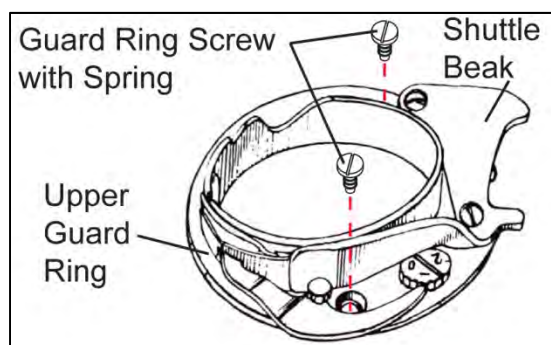
Remove needle, presser foot, needle plate and feed dog. Open shuttle cover.

### Removing the Upper and Lower Guard Rings

Remove the 2 **Spring Screws** which hold upper guard ring to lower guard ring.

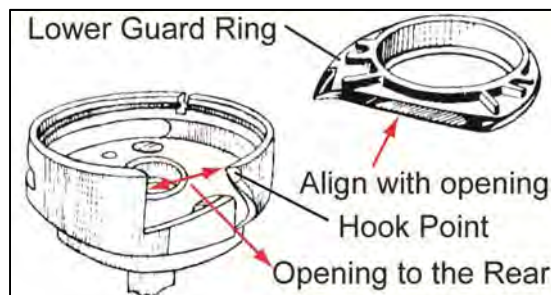
Do not remove the two screws which hold the **Shuttle Beak** to the upper guard ring.

Lift **Upper Guard Ring** from shuttle assembly.

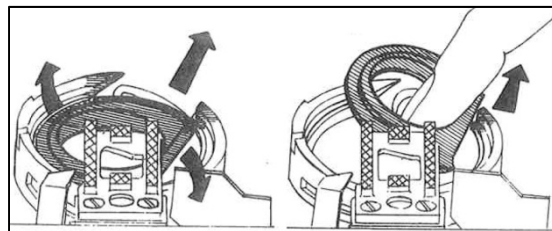


Turn flywheel slowly toward you until the opening in the Shuttle Hook faces towards the back of the machine.

With a finger, turn the **Lower Guard Ring** inside of shuttle hook until the straight edge of the lower guard ring is aligned with the edge of the shuttle hook opening.

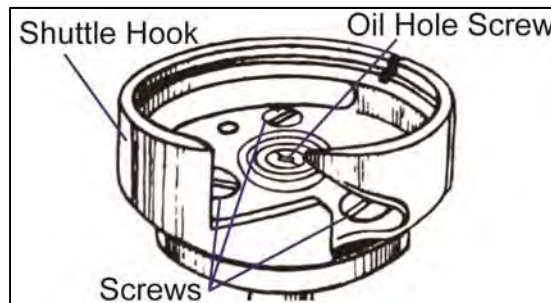


Pull out lower guard ring through the opening in the shuttle hook.



Loosen slightly the three screws at the bottom of the shuttle hook until the shuttle hook can be turned with slight friction.

**Do not remove oil hole screw in center of shuttle hook!**



Install needle.

Stitch width knob at "0."

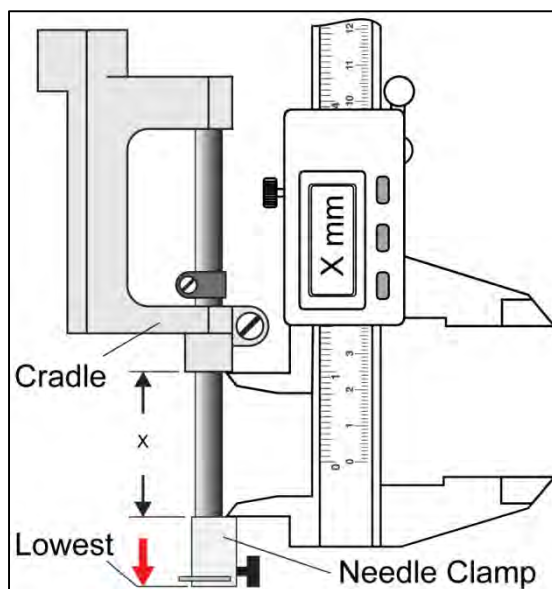
Set **Centering Dial** at **Center Position**.

Lower the presser foot lever to open front cover (thread take-up lever must be in a raised position).

Turn flywheel slowly towards you until needle bar reaches its **Lowest** position.

With a caliper, measure distance (X) between the lower edge of the **Cradle** and the upper edge of the **Needle Clamp**.

Record dimension **X**



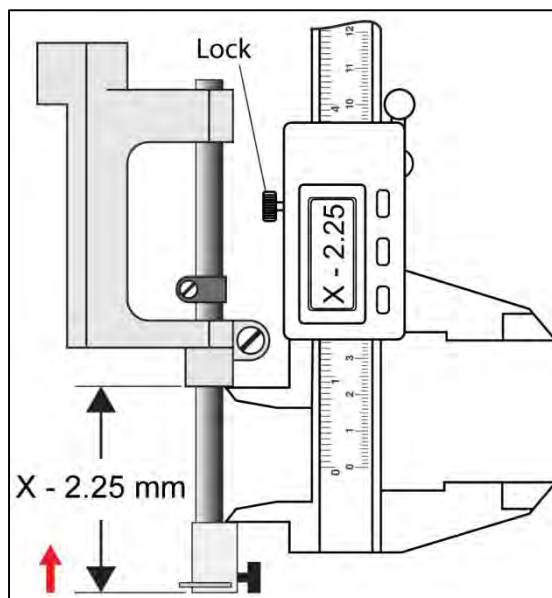
Subtract 2.25 mm [.089"] from measurement (X).

Adjust caliper to new reading  $X - 2.25$  mm [or  $X - .089$ "] and lock the calipers at this dimension.

Place the top jaw of caliper against the lower edge of the **Cradle**.

Turn the flywheel slowly towards you until the upper edge of **Needle Clamp** touches the lower jaw of caliper.

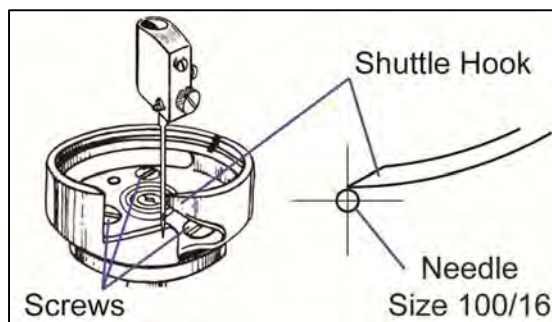
Stop turning flywheel.



With fingers, turn shuttle hook slowly counterclockwise until point of shuttle hook is just at the center of the needle.

Verify the needle bar is at **2.25 mm [.089"]** from its lowest position.

Gradually tighten each of the three screws evenly until all three screws are tight.





## Installing the Upper and Lower Ring Guards

Turn the flywheel until the **Thread Release** is in its highest position.

This will position the opening in the shuttle hook towards the rear of the machine.

Insert the **Lower Guard Ring** through the opening in the shuttle hook.

Turn the **Lower Guard Ring** inside the shuttle hook until it is oriented as shown.

Insert the **Upper Guard Ring** into the shuttle hook, making sure that the **Shuttle Beak's** right stop comes to lie in the opening of the **Thread Release**.

Insert an empty **Bobbin**, in order to center the **Lower Guard Ring**.

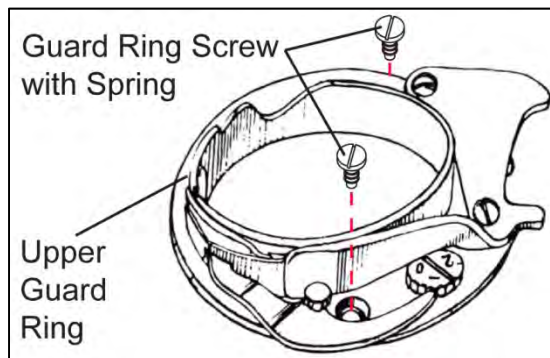
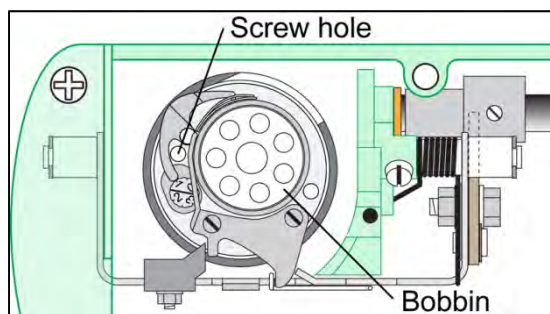
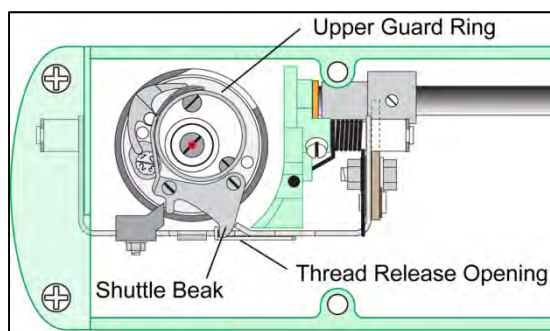
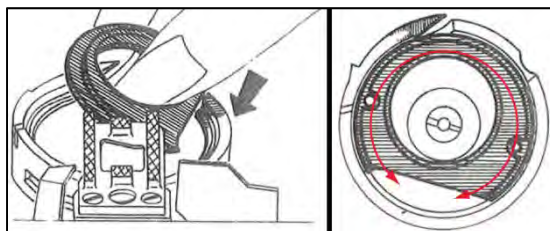
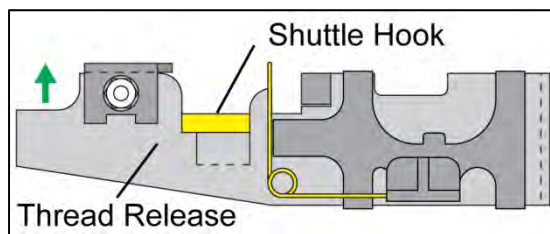
Open the front cover for an unobstructed view.

While looking through the **Screw Hole** at the left of the **Upper Guard Ring**, slowly turn the flywheel until the threaded screw hole on the **Lower Guard Ring** is in line with the screw hole in the **Upper Guard Ring**.

Screw one of the two **Guard Ring Screws with Spring** into the screw hole a few turns.

Insert the other **Guard Ring Screws with Spring** into the other hole and tighten both screws.

**Check:** It must be possible to press the two **Guard Ring Screws** downwards without their jamming.



## 7. Adjustment of Needle Bar Height

The needle bar height is correctly adjusted when the point of the shuttle hook just touches the lower end of the gauge **No. 607800** while passing below this gauge. If this is not the case, adjust as follows:

Remove needle, presser foot and needle plate, then insert needle bar height gauge No. 607800.

Stitch width knob at "0."

Set **Centering Dial** at **Center Position**.



Turn flywheel towards you and check whether point of shuttle hook just touches gently the flat at the bottom of the gauge.

**If needle bar is set too high**, proceed as follows:

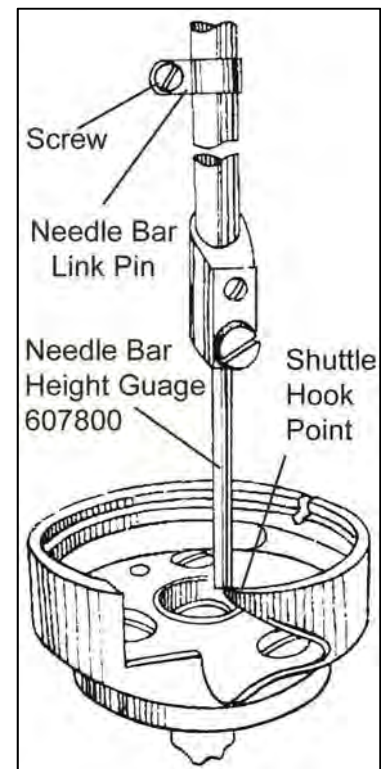
Lower presser foot lever to open front cover. (Thread take-up lever must be in a raised position.)

Turn flywheel slowly towards you until point of shuttle hook is just below the needle bar height gauge.

Loosen screw in needle bar link pin and lower the needle bar until gauge rests upon point of shuttle hook.

Tighten screw in needle bar link pin after this adjustment.

**If needle bar is set too low**, follow the same procedure as above, but after loosening the screw in the needle bar link pin, raise the needle bar above the shuttle hook to begin.



Remove gauge and close front cover. Replace needle plate, presser foot and needle.

It is essential after the above adjustment to check also the clearance between needles and point of shuttle hook when using the double needle clamp (to prevent skip stitching and needle breaking).

## 8. Adjusting needle clearance using Double Needle Clamp

If the clearance between the two gauges No. 607801 or needles and point of shuttle hook is correct, the point of the shuttle hook should just clear or barely touch each of the two gauges or needles. If the above requirement is not met, adjust as follows:

Remove presser foot and needle plate.

Remove single needle clamp and attach double needle clamp in its place.

Insert two needle clearance gauges **No. 607801** or two needles 100/16 in double needle clamp.

Lower the presser foot lever to open front cover. (Thread take-up lever must be in a raised position.)

Stitch width knob at "0."

Set **Centering Dial** at **Center Position**.



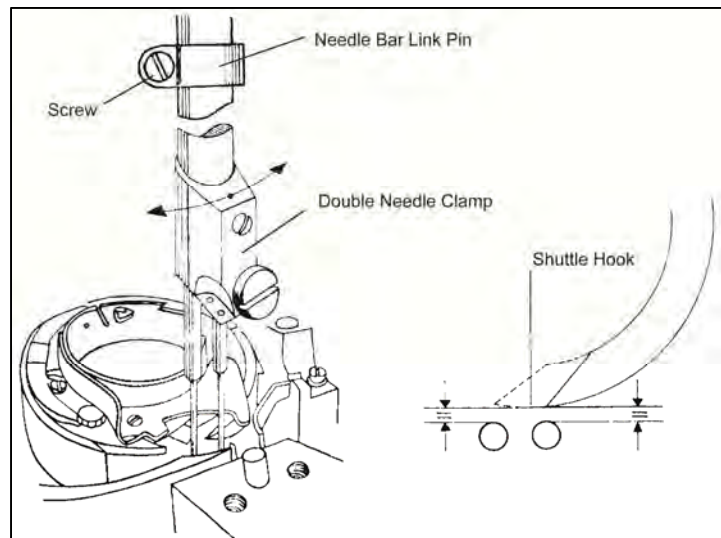
Turn flywheel slowly towards you until point of shuttle hook is just opposite the first needle gauge. Check clearance between point of shuttle hook and gauge.

Turn flywheel slowly towards you until point of shuttle hook is just opposite the second gauge. Check clearance between point of shuttle hook and gauge.

If clearances are not equal for both gauges, proceed as follows:

Loosen screw in needle bar link pin just slightly so that the needle bar is still held in position by friction (to prevent dropping of the needle bar), then turn needle bar clockwise or counterclockwise (see arrows) as required until clearances at both gauges are equal.

Tighten screw in needle bar link pin after this adjustment.



Remove gauges and double needle clamp. Close front cover. Replace single needle clamp, needle, needle plate and presser foot.

## 9. Adjustment of Presser Bar

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If the presser bar is correctly adjusted, the gauge **No. 541361** or the presser foot must be in line with (parallel with) the slots in the needle plate. If this requirement is not met, proceed as follows:

Remove needle and presser foot, and then fasten presser bar adjusting gauge No. 541361 to presser bar.

Lower presser foot lever until gauge rests upon needle plate.

Open front cover (thread take-up lever must be in the raised position).

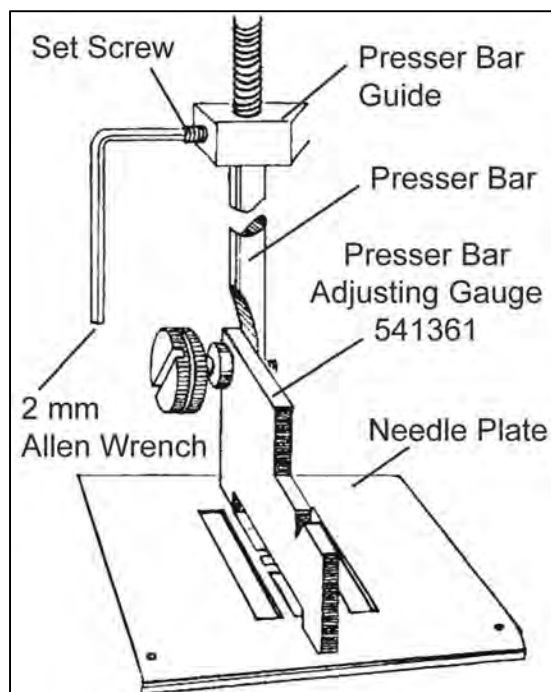
Check if gauge lines up with slots in needle plate.

If gauge does not line up with slots, loosen slightly the set screw in presser bar guide, then turn gauge with presser bar as required until gauge lines up with slots in needle plate.

Tighten the set screw after this adjustment.

Remove gauge and close front cover.

Replace needle and presser foot.



## 10. Centering of Feed Dog

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If feed dog is correctly centered, its teeth bars must be in line with (parallel to) the slots in the needle plate and must clear both sides of each needle plate slot. If this is not the case, adjust as follows:

Remove needle, presser foot and needle plate.

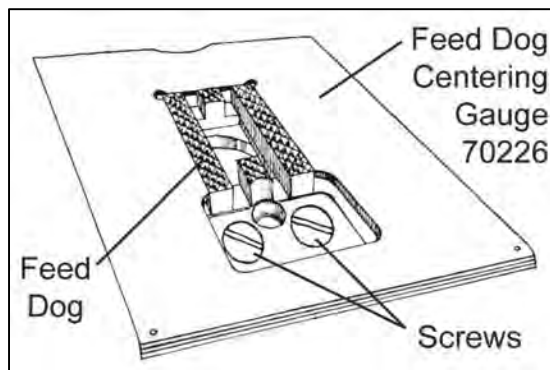
Set the stitch length regulating lever at "0."

Turn flywheel slowly towards you until feed dog is in highest position.

Loosen the two screws which hold the feed dog.

Install feed dog centering gauge **No. 70226** in place of needle plate. Feed dog will thereby be lined up automatically.

Tighten the two feed dog screws after this adjustment, remove gauge, and replace needle plate.



Set the stitch length regulating lever at "**4**" forward (longest stitch) and check, while machine runs, whether or not the feed dog hits the needle plate.

Follow same procedure for reverse sewing by setting stitch length regulating lever at "4" reverse.

If feed dog hits needle plate (clicking noise when machine runs), remove needle plate, loosen feed dog screws slightly and move feed dog lightly forward or backward (as required) until feed dog clears needle plate.

Recheck with feed dog centering gauge **No. 70226** to see whether feed dog is still lined up. Readjust if necessary.

Remove gauge, then replace needle plate, presser foot and needle.

## 11. Adjusting Height of Feed Dog

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The height of the feed dog is correctly adjusted when the tips of the teeth, at the highest position of the feed dog, are about **0.8 mm** above the needle plate. If this is not the case, adjust as follows:

Remove needle, presser foot, needle plate and free arm cover.

Replace needle plate.

Loosen hex nut on lifter skid screw by using a wrench (**7 mm**).

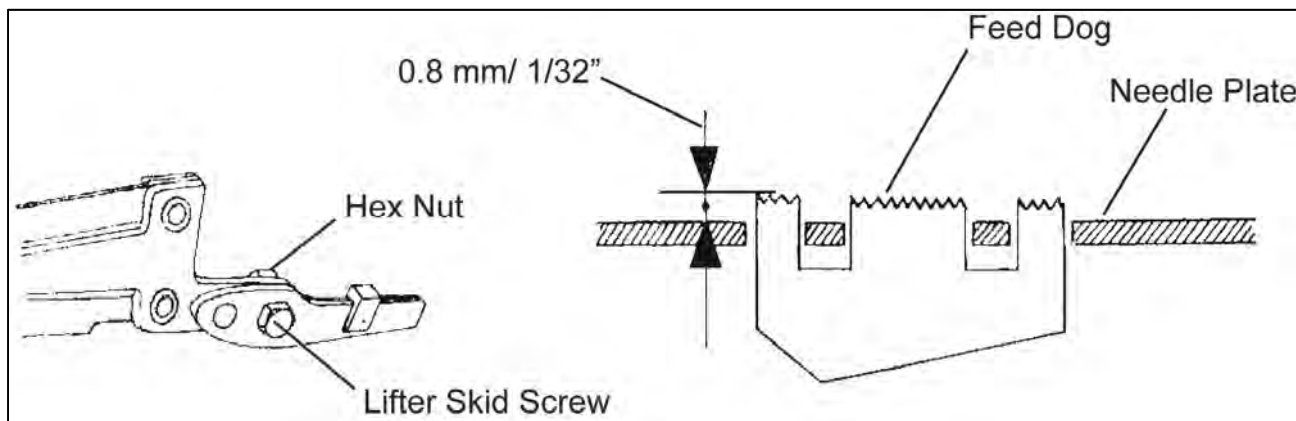
Turn flywheel towards you until feed dog reaches its highest position. Next, turn the eccentric lifter skid screw with wrench until tips of feed dog teeth are about **0.8 mm** above needle plate.

If **feed dog height gauge No. 607829** is available, place this gauge on needle plate, then turn flywheel slowly towards you until feed dog is in its highest position and check the height of the feed dog teeth in relation to the recessed portions on both sides of the gauge.

If adjusted correctly, the tips of the feed dog teeth must either touch or interfere with the recess at **0.8 mm** and must not touch or interfere with recess at **1.0 mm**.

If above requirement is not met, adjust feed dog with lifter skid screw.

Tighten hex nut by using two wrenches simultaneously on hex nut and lifter skid screw.



Remove needle plate and replace free arm cover. Replace needle plate, presser foot and needle.



## 12. Adjustment of Stitch Length (“Supermatic”)

When the stitch length is correctly adjusted, a piece of cloth of medium thickness placed beneath the presser foot must not move when the machine runs with the **Stitch Length Lever** set at position “0,” or at the most only advance very slightly.

To adjust (equalize) the stitch length, proceed as follows:

Attach presser foot to presser bar and insert needle.

Place a piece of cloth of medium thickness beneath presser foot and lower presser foot lever.

Set the **Stitch Length Lever** exactly at position “0.”

Run the machine and check that the piece of cloth does not move or only advances very slightly, in which case the stitch length is correctly adjusted.

If this is not the case, adjust the stitch length as follows:

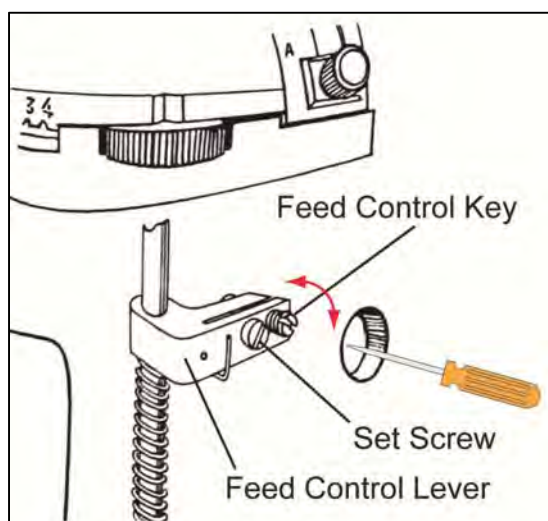
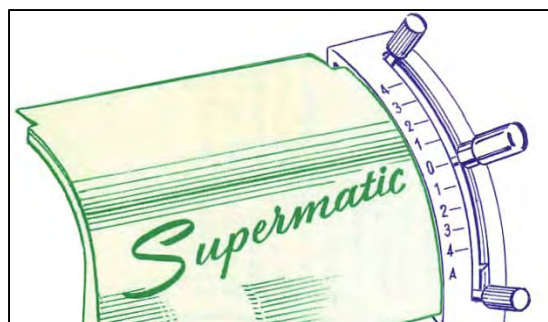
Loosen **Set Screw** in the feed control lever, which can be accessed with a screw driver through an access hole in front machine below the stitch length scale.

If **Set Screw** cannot be seen through the hole, move the **Stitch Length Lever** until the screw can be reached through the hole. Then return the **Stitch Length Lever** to “0.”

Run the machine and adjust the **Feed Control Key** until the piece of cloth no longer moves.

**Be careful not to press too hard against the feed control key when adjusting it, because you are liable to move the stitch length lever away from position “0” on the scale.**

Tighten the **Set Screw** after this adjustment.



Place a piece of medium thickness cloth beneath the presser foot and run the machine for 10 seconds. The cloth should not move at all or at the most very slightly forward when the **Stitch Length Lever** is set at position “0.”

## 13. Adjustment of Stitch Length (“Transforma”)

When the stitch length is correctly adjusted, with the **Stitch Length Lever** set at **"0,"** a piece of medium thickness cloth placed under the presser foot must not move when the machine runs, or at the most only advance very slightly.

To zero adjust the stitch length, proceed as follows:

Attach presser foot to presser bar and insert needle.

Place a piece of cloth of medium thickness beneath presser foot and lower presser foot lever.

Set the **Stitch Length Lever** exactly at position **"0."**

Run the machine and check that the piece of cloth does not move or only advances very slightly, in which case the stitch length is correctly adjusted.

If this is not the case, adjust the stitch length as follows:

Run the machine and move the **Stitch Length Lever** to the left or right as the case may be, until the piece of cloth no longer moves.

Measure the offset of the **Stitch Length Lever “Mark”** in relation to **"0"** on the **Stitch Length Scale**.

Remove the two Phillips head **Cover Screws** from the **Transforma Cover** and then remove the cover.

Loosen both **Set Screws** on the **Stitch Length Lever**.

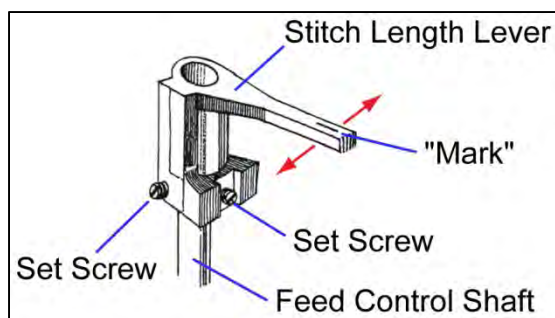
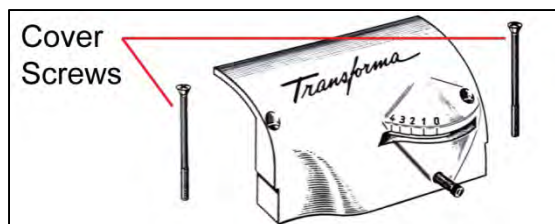
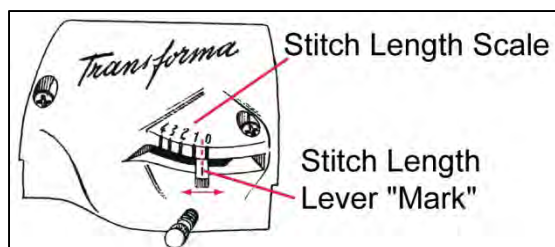
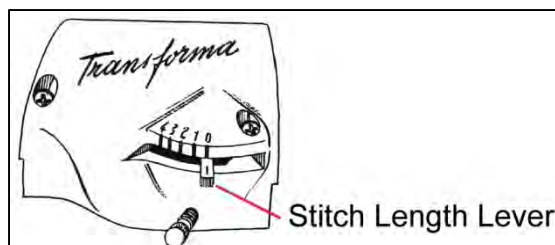
Move the **Stitch Length Lever** to the Left or Right the distance measured above.

Temporarily place the **Transforma Cover** on the machine, to confirm the **“Mark”** on the **Stitch Length Lever** is exactly aligned with the **"0"** position on the **Stitch Length Scale**.

Take care that the **Feed Control Shaft** does not turn and the **Stitch Length Lever** does not get bumped by the slot in the **Transforma Cover**, while checking the alignment of the **Stitch Length Lever “Mark”** to **"0."**

Remove the **Transforma Cover** and tighten both **Set Screws**.

Install the **Transforma Cover** and **Cover Screws**.



## 14. Timing of Needle Bar Swing

The swing of the needle bar is correctly timed if when the **Stitch width lever** is set at 1-4 (**Zig-zag sewing**,) the needle does not move sideways while in the material and when the **Stitch length lever** is set at "A" (**Automatic sewing**) the feed dog does not move the material while the needle is in the material.

If the above requirements are not met, adjust as follows:

Remove needle and presser foot.

Install **Cam "0"** or the double **Cam "101"** supplied with the machine as a standard accessory.

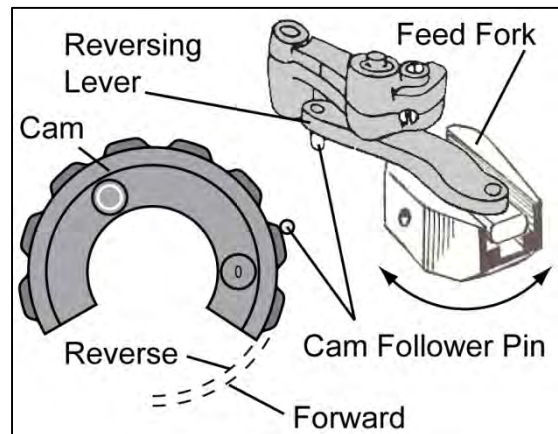
Set stitch length regulating lever at "A" (**automatic sewing**).

The **Cam Follower Pin** on the **Reversing Lever** follows along the contour of the top half of the double **Cam**.

While the **Cam Follower Pin** rides along the outer ridge of the **Cam** the feed dog will move in the **Forward** direction.

While the **Cam Follower Pin** rides along the inner valley of the **Cam** the feed dog will move in the **Reverse** direction.

The **Cam Follower Pin** pivots the **Reversing Lever** which in turn pivots the **Feed Fork** to change the direction of the **Feed Dog**.

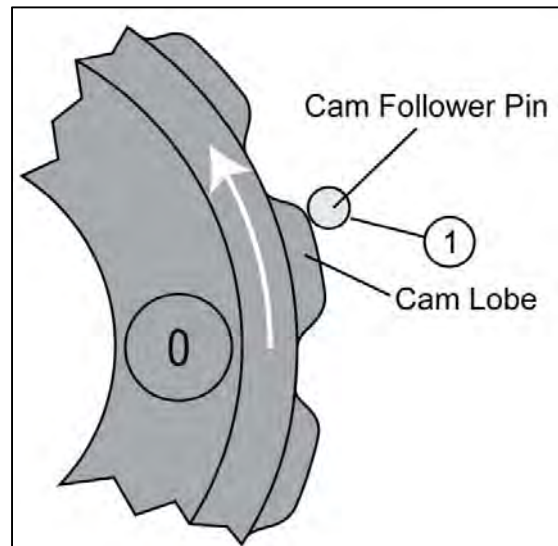


Turn flywheel slowly towards you until the **Cam Follower Pin** ascends one of the slopes on the upper portion of the double cam.

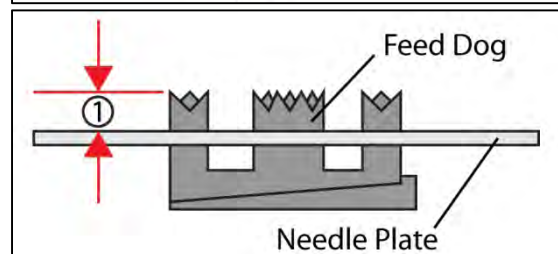
Watch movement of feed fork on top of feed control shaft.

When movement of this feed fork has stopped ①, do not turn flywheel any further.

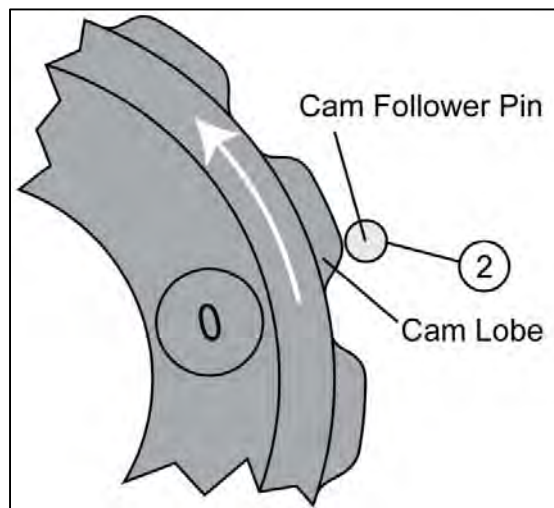
At this moment the **Cam Follower Pin** has just reached the ridge of the cam.



Check the height of the feed dog above the needle plate and record measurement ①.



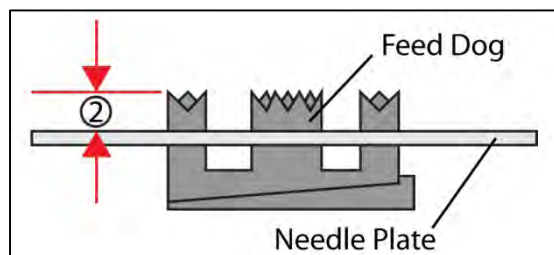
Turn flywheel slowly towards you until feed fork just begins to move again. Stop turning the flywheel. At this moment ② the pin in the reversing lever begins to descend the next slope of the cam.



Check the height of the feed dog above the needle plate and record measurement ②.

Compare the feed dog height at ① and ② to see if they are equal.

If these heights are not equal, adjust as follows:



Remove **Cam "0."**

Loosen the **Set Screw** on the **Cam Axle**.

Using the **Driving Pin** to turn the **Cam Axle** until both readings are equal.

If feed dog height ① was **Greater** than ②, turn the **Cam Axle** counterclockwise.

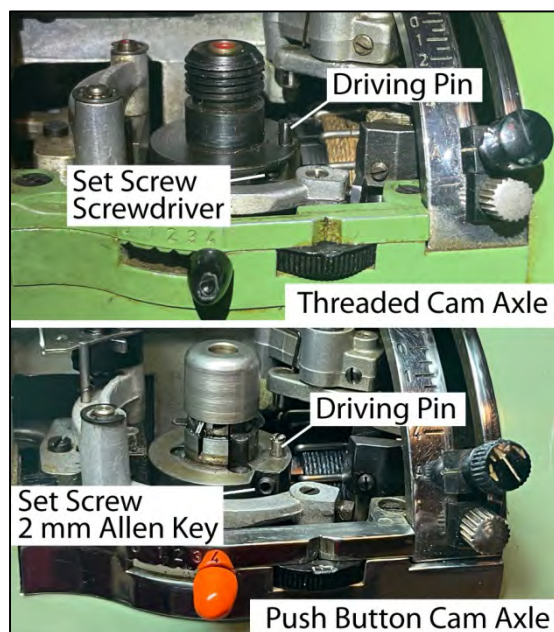
If feed dog height ① was **Less** than ②, turn the **Cam Axle** clockwise.

Tighten the **Set Screw** on the **Cam Axle** after this adjustment.

Confirm the adjustment is correct, as followings:

Attach cording foot, insert needle and install **Cam "0."**

Set stitch width knob at **"4," Centering Dial** at **Center** position and stitch length lever at **"A."**



Place a piece of paper underneath cording foot and lower presser bar lever.

Turn flywheel slowly towards you until needle enters paper.

Continue turning flywheel and check whether the needle goes in and out of the paper without tearing it.

Check whether the feed dog moves the paper while the needle is in the paper.

Repeat the adjustment if needed until the needle penetrates and leaves the paper without tearing it.



## 15. Adjusting fully automatic Feed Control for Double Discs

When set to **"A" (Automatic sewing)**, the design made by the machine must match exactly the design indicated on the top of each double disc. If this is not the case, adjust as follows:

### Test using Cam "0."

Install **Cam "0"** in the ELNAGRAPH.

Attach the ordinary presser foot to presser bar.

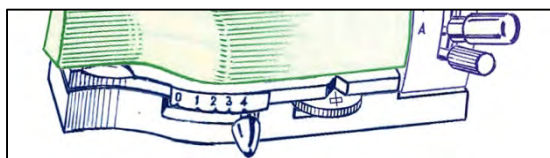
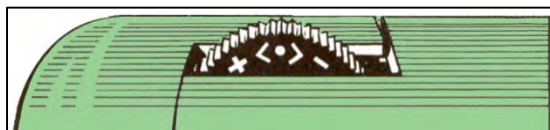
Install a size **90 [14]** needle.

Set pressure regulating dial for medium cloth pressure.

Stitch width knob at **"4."**

Set **Centering Dial** at **Center Position**.

Stitch length lever at **"A."**



Place a piece of fabric, about 1½" x 2" under presser foot, lower the presser foot lever and start sewing.

The material should not be moved more than 3 mm [ $\frac{1}{8}$ " ] backwards or forwards when the machine is run for 15 seconds at top speed. If this is not the case, adjust as follows:

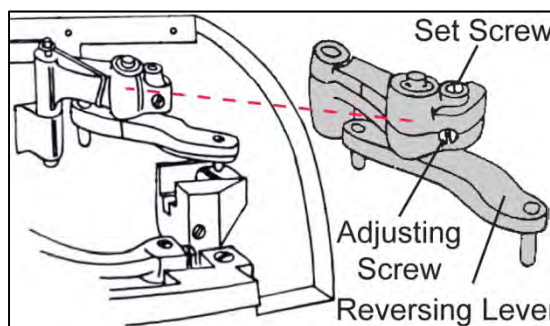
Loosen the **Set Screw** on top of reversing lever support.

Turn **Adjusting Screw** as required.

Turn the screw **Clockwise** to increase the stitch length/  
increase feed speed.

Turn the screw **Counterclockwise** to decrease the stitch  
length/ decrease feed speed.

Tighten the **Set Screw** firmly after this adjustment.



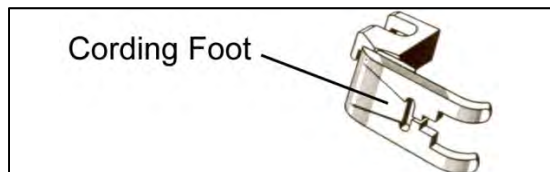
## Test using Cam 107

Install **Cam 107** in the ELNAGRAPH.

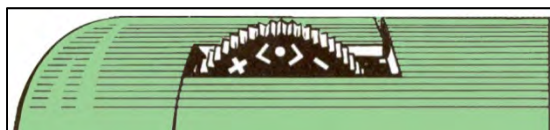


Install the **Cording foot** on the presser bar.

The Cording Foot has a relief on the underside, behind the needle slot.



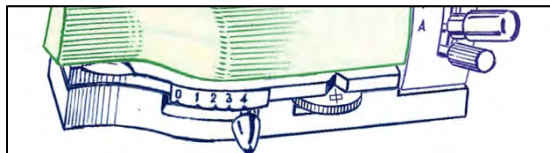
Set pressure regulating dial for medium cloth pressure.



Stitch width knob at "4."

Set **Centering Dial** at **Center Position**.

Stitch length lever at "A. "



Install a size **80 [12]** needle.

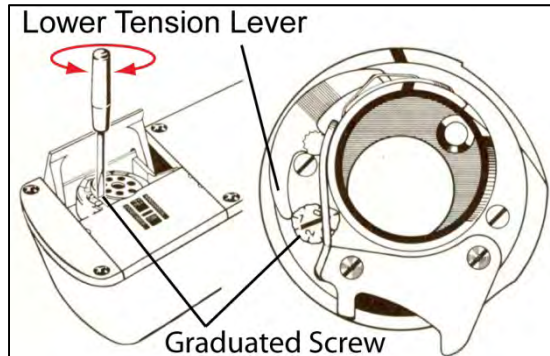
Thread the machine with size 120 thread (upper) and size 80 thread (bobbin).

Set upper thread tension to between **1½ and 2½**.



Increase tension of lower thread by turning **graduated screw** on upper guard ring to **1½ - 2**.

The **graduated screw** is numbered 0 – 3, 0 being the lowest tension and 3 the highest. The irregular shape of the graduated screw moves the **Lower Tension Lever** to increase or decrease the pressure applied to the bobbin tension spring.



Place a piece of cotton material under the presser foot and sew about 4" of the design.

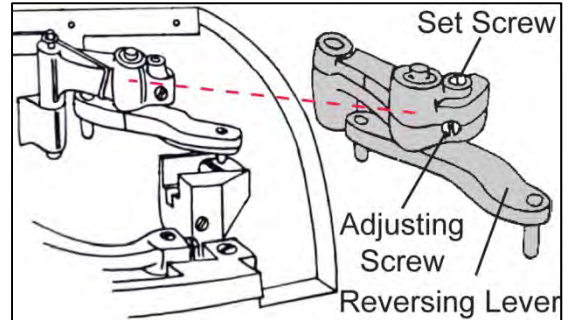


The **Stitch** produced when sewing must be exactly the same as that engraved on the **Cam 107**.

If this is not the case, adjust as follows:

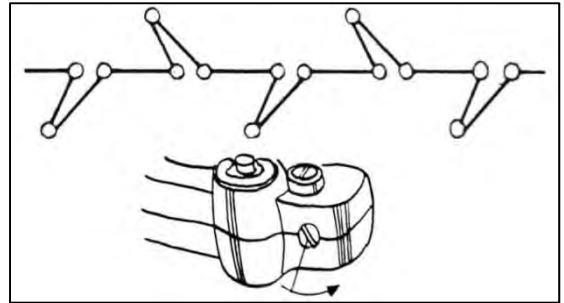


Slightly loosen the **Set Screw** on the reversing lever support.  
This will free the **Adjusting Screw** for making the following adjustment.



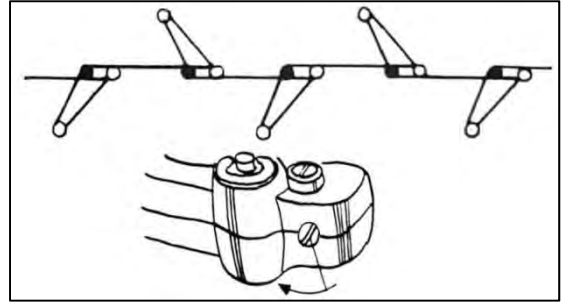
The material was fed too fast, creating a long stitch.

Turn **Adjusting Screw** slightly **Counterclockwise**.

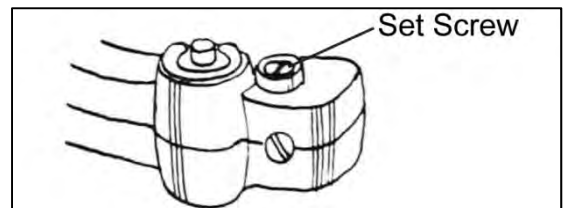


The material was fed too slow, creating a short stitch.

Turn **Adjusting Screw** slightly **Clockwise**.

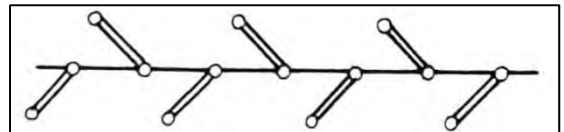


Tighten the **Set screw** firmly after this adjustment.



Sew another sample to verify the results of this adjustment.

Readjust until the design obtained when sewing is exactly the same as that engraved on the **Cam 107**.



## 16. Automatic Thread Release

The Supermatic and Transforma, up to **Serial No. 527,625**, had two simple **Stop Springs** to hold the stationary portion of the shuttle in place and for the release of the upper thread.

The **Shuttle Beak** sits between the **Stop Springs** with a certain amount of clearance. As the shuttle rotates, the **Shuttle Beak** comes to rest against the **Stop Spring** preventing the two assembled guard rings from rotating.

The thread must force its way between the **Stop Spring** and the **Shuttle Beak** pressing against it. This slight displacement of the **Shuttle Beak** induces additional tension in the upper thread which is more pronounced, the more the **Shuttle Beak** presses against the **Stop Spring**.

It is important to keep these additional tensions as low as possible to minimize their influence on the quality of the sewing. Lubricate the shuttle with **kerosene** and not oil. **Kerosene's** lower viscosity reduces the friction more than oil and thus reduces the additional tensions.

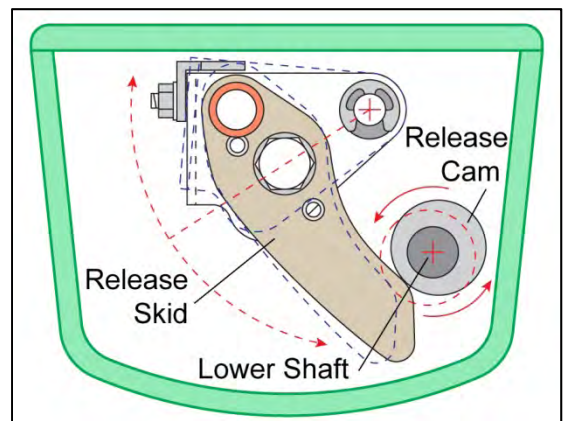
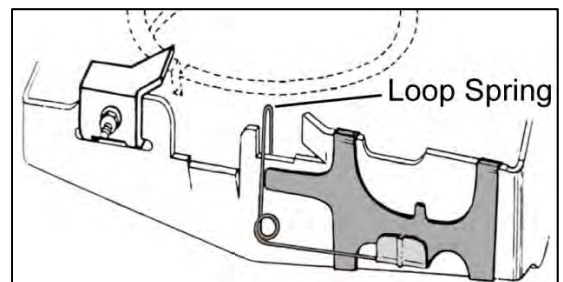
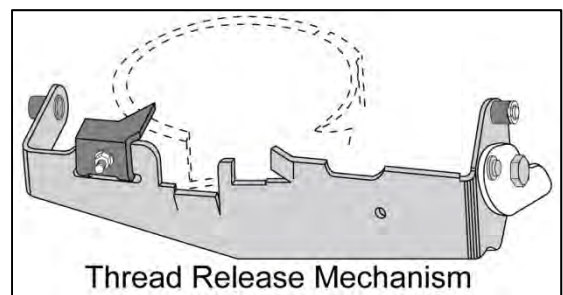
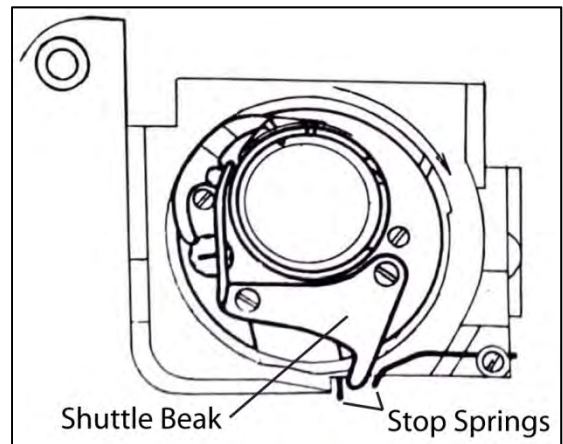
ELNA introduced the automatic **Thread Release** on Supermatic and Transforma machines starting approximately with **Serial No. 527,626**.

The automatic **Thread Release** allows the upper thread loop to pass freely in and out of the shuttle beak and guard ring stops at the moment it is drawn out of the shuttle by the thread **Take-up Lever** resulting in greater regularity in the thread tensions and high quality stitches.

The **Loop Spring** was added to the automatic **Thread Release** starting approximately with **Serial No. 627,000**.

The **Loop Spring** ensures that the loop of upper thread does not escape too early and passes in the right position out of the shuttle before it is drawn up into the material by the thread **Take-up Lever**, thus preventing the loop from twisting and forming knots in the seam.

The **Thread Release** pivots up-and-down when the machine is running. It is driven by the **Release Skid** which rides against the **Release Cam** as it rotates on the **Lower Shaft**.



The **Thread Release** has two stops, the adjustable **Guard Ring Stop** and a **Stop** tab and notch in the frame of the **Thread Release**.

The **Shuttle Beak** attached to the upper and lower guard rings has two **Stop** points (shown in **RED**), one on either side of the needle.

The **Thread Release** stops engage with the **Shuttle Beak** stops, which prevents the **Guard Rings** from turning with the rotating **Shuttle Hook**.

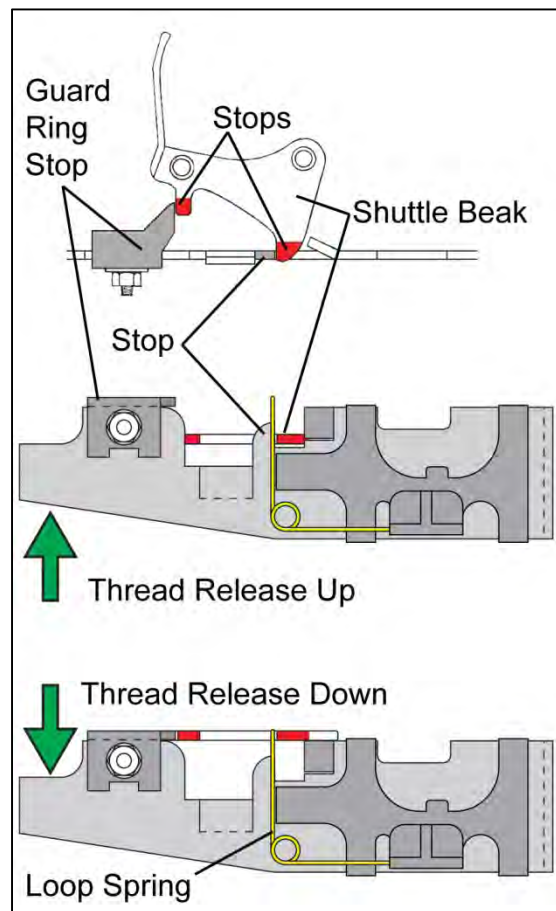
The **Thread Release** stops are at different heights, which alternately engage the **Shuttle Beak** stops as the **Thread Release** pivots up-and-down.

The **Thread Release** begins to rise as the shuttle hook passes under the **Shuttle Beak** and approaches the needle, disengaging the **Guard Ring Stop** with **Shuttle Beak**.

The **Shuttle Hook** is then able to catch the upper thread loop and pass it under the **Guard Ring Stop** as it wraps the loop around the shuttle.

The **Stop** notch holds back the **Shuttle Beak**, while the **Guard Ring Stop** is situated higher than the **Shuttle Beak**.

As the **Shuttle Hook** completes about half a turn, the **Thread Release** begins to lower.



As the **Shuttle Hook** completes about three quarters of a turn, the thread **Take-up Lever** pulls the upper thread loop off the shuttle hook.

The **Thread Release** descends to engage the **Guard Ring Stop** with the **Shuttle Beak**, and drop the notch **Stop** below the **Shuttle Beak**.

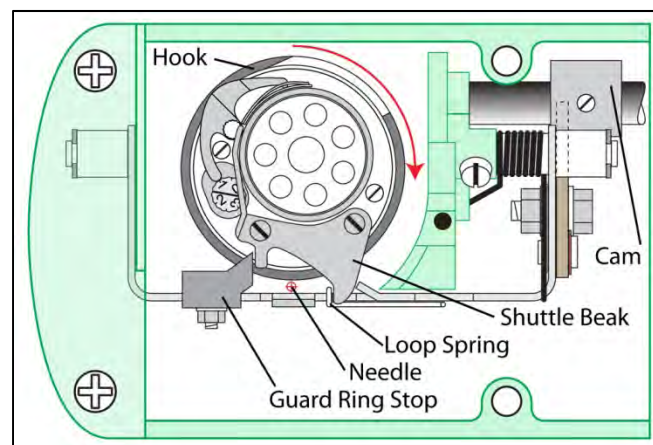
The upper thread loop can now pass between the **Stop** and the **Shuttle Beak** to exit the shuttle.

Each stitch requires one down and up cycle of the **Needle and Take-up Lever**.

However the **Shuttle Hook** must make two complete revolutions and the **Thread Release** makes two up and down cycles to complete a stitch.

The first revolution of the **Shuttle Hook** is to wrap the upper thread loop around lower bobbin thread.

The second revolution of the **Shuttle Hook** is to allow the **Take-up Lever** to pull the threads tight to complete the stitch.





## 17. Adjustment of Automatic Thread Release

To prepare, remove needle, presser foot, needle plate, feed dog and free arm cover.

### Adjusting Position of Release Cam on Lower Shaft.

The **Thread Release** should be at its lowest position at the time the needle bar is also at its lowest position. The timing of the **Thread Release** is set by the position of the **Release Cam** on the lower shaft.

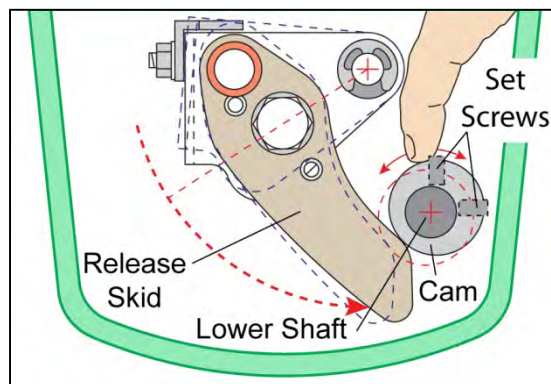
Adjust as follows:

Loosen the two **Set Screws** in the **Release Cam**.

Turn flywheel slowly toward you until needle bar is in its lowest position.

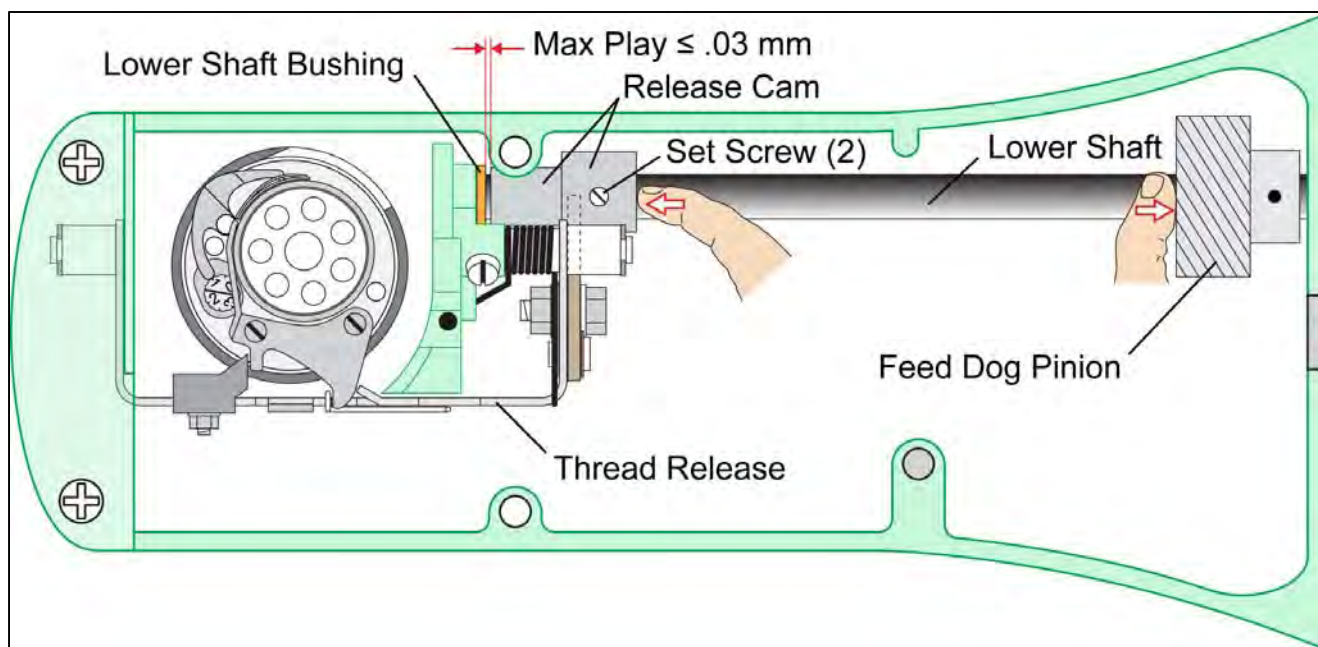
With your fingers, turn **Release Cam** away from or toward you until **Thread Release** is also in its lowest position.

Basically position the **Release Cam** so that its narrowest point is in contact with the **Release Skid**.



While pressing gently on the **Feed Dog Pinion**, gently push the **Release Cam** until it touches the lower shaft bushing, then tighten both **Set Screws** in the **Release Cam**.

Care must be taken that the **Release Cam** does not turn on the lower shaft (maintain the above adjustment with the **Thread Release** in its lowest position) during this procedure. Finally check to see that the lower shaft turns freely (without binding) and that the axial play of the lower shaft does not exceed **.03 mm**.

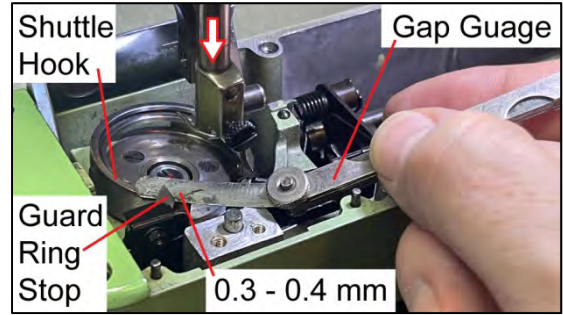


Verify the timing of the **Thread Release** and **Needle Bar** is correct.

## Adjusting Height of Guard Ring Stop.

There must be a gap of between **0.3 to 0.4 mm** between **Guard Ring Stop** and the upper surface of the shuttle hook when the **Thread Release** is at its lowest position.

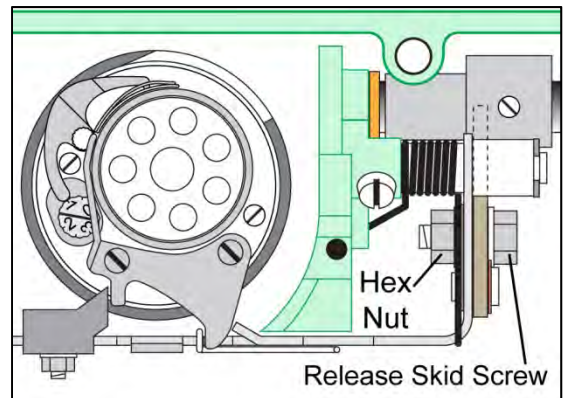
Remove the Upper and Lower Guard Rings from the shuttle to measure the gap.



Adjust as follows:

Turn flywheel towards you until **Guard Ring Stop** reaches its lowest position.

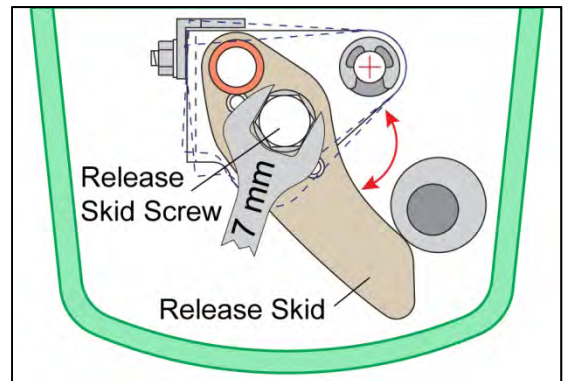
Loosen the hex nut on the **Lifter Skid Screw** at the right inside of the **Thread Release**. (**7 mm** wrench)



Turn the **Lifter Skid Screw** at the right inside of the **Thread Release**. (**7 mm** wrench)

Adjust height by turning the **Lifter Skid Screw** clockwise or counterclockwise (as required) until the gap between the **Guard Ring Stop** and the upper surface of the shuttle hook is between **0.3 to 0.4 mm** when the **Thread Release** is at its lowest position.

Using two **7 mm** wrenches, hold the **Lifter Skid Screw** and tighten the nut.



## Adjusting the Lateral Position of the Guard Ring Stop.

The **Guard Ring Stop** is in its correct lateral position when during the up and down movement of the **Thread Release**, the upper guard ring does not move sideways. In this case, the noise, created by the automatic thread release, will be at its lowest level. Should the noise be too loud, either the **Upper Guard Ring** is continuously lifted and dropped by the **Thread Release** or the pointed portion of the **Guard Ring Stop** is hitting against the **Shuttle Beak**.

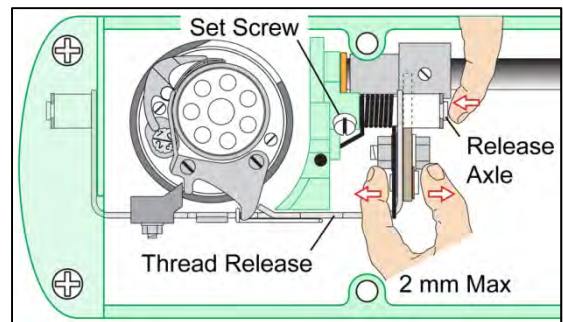
Adjust as follows:

### Lateral play in the Thread Release

Check the lateral play of the **Thread Release** by moving it sideways in both directions with your fingers.

If excessive lateral play is found, slightly loosen the **Set Screw** and push the **Release Axle** to the left, leave approximately **0.1 to 0.2 mm** of lateral play.

Tighten the **Set Screw**.



### Lateral position of the Guard Ring Stop

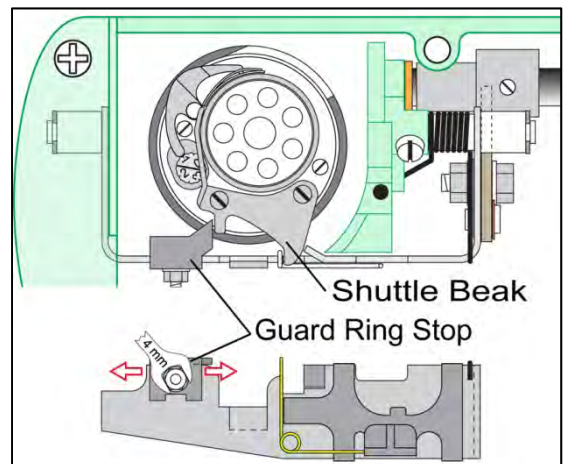
To prevent breaking of thread, make sure that the **Thread Release** drops by its own weight when action of spring is eliminated. If this is not the case, the **Thread Release** must be lined up until this requirement is met.

With **4 mm** wrench, loosen slightly the hex nut (in front of **Guard Ring Stop**) so that the **Guard Ring Stop** is still held in position by friction against the **Thread Release**.

Push **Guard Ring Stop** slightly to the left or right (as required) until, while turning flywheel slowly towards you, the **Guard Ring Stop** moves only up and down, without interfering laterally with the upper guard ring.

While running machine, check noise created by the automatic **Thread Release** to make certain that this noise is at its lowest level. If this is not the case, move **Guard Ring Stop** very slightly to the left or right (as required) until the least audible noise is obtained.

Tighten carefully the hex nut on the **Guard Ring Stop**.



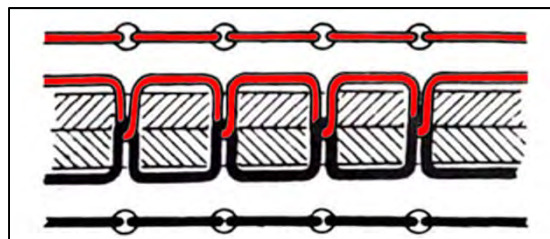


# 18. Thread Tension

## Proper Tension

Proper tension requires a balance between the upper and lower tensions.

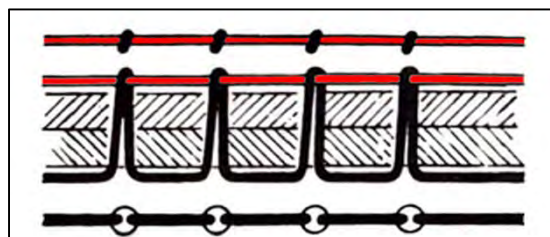
The tension needs to be high enough to allow the take-up lever to complete the stitch with the upper and lower threads drawn into the middle of the material being sewn before additional thread can be pulled from the spool or bobbin.



## Upper tension Too High in relation to the lower tension

As the take-up lever is rising to finish the stitch, the lower thread unwinds too freely from the bobbin. The Upper thread withdraws entirely from the material stretched tight across the top, pulling the lower thread with it to the top of the material.

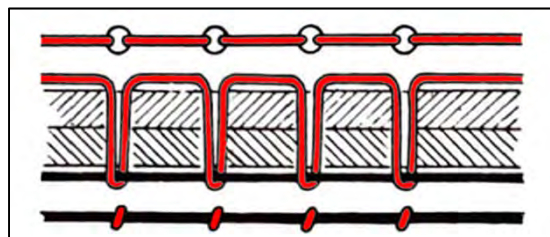
To correct this situation: First, decrease the upper tension. Then if necessary increase the lower tension.



## Upper tension Too Low in relation to the lower tension

As the take-up lever is rising to finish the stitch, instead of thread being drawn from the bobbin to finish the stitch, additional thread is unwound from the spool before the lower thread is drawn into the material. The lower thread is stretched tight across the bottom and the upper thread is drawn down through the material.

To correct this situation: First, increase the upper tension. Then if necessary decrease the lower tension.



The User Manual has a chart inside the back cover with recommendations for both upper and lower tension settings for various sewing operations. Refer to the User Manual for the complete chart.

Work	Stitch	Stitch Width	Sewing Foot	Stitch Foot (Number)	Needle		Upper Thread Tension	Lower Thread Tension	Stitch Length	Stitch Width	Containing Wool	Work Densities on Page
					European No.	American No.						
Normal Sewing	—	Presser F	—	80/90	11/14	B 7/5	3-8	1	—	2-3%	center	31
Sewing Sheer Fabrics	—	Presser F	—	80	11/12	B	2-4	1	—	1-2%	center	31
Sewing with Elastic	—	Presser F	—	80	11/12	B	3-7	1/2	—	3-4	center	31
Hemming	—	Presser F	—	80/90	11/14	B 7/5	3-6	1	—	2% - 3%	center	32
Darning	—	Darning F	Darning pt.	80/70	7/10	00/5	0-2	1	—	0	center	33
Petal Stitch	—	Presser F	—	80/90	11/14	B 7/5	2-3	1/2	—	2% - 3%	center	37
Small Cord	—	Darning F	Darning pt.	80/90	11/14	B 7/5	5-8	0-1/2	—	0	center	38
Shaded Embroidery	—	Presser F	—	80/90	11/14	B 7/5	5-8	0-1/2	—	1/4	center	38
Satin Stitch	—	Darning F	Darning pt.	70/80	6/10	0/8	1-3	1-1/4	—	0	center	39
				80/90	11/14	B 7/5	5-8	1 1/2 - 2	—	0	center	40

## Lower Tension Device

### How it works

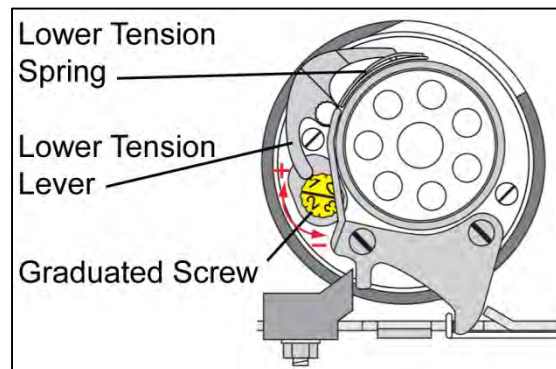
The **Graduated Screw** adjusts the lower thread tension by pivoting the **Lower Tension Lever**, thereby changing the force applied on the **Lower Tension Spring**.

Turning the screw **Clockwise** increases the tension.

Turning the screw **Counterclockwise** decreases the tension.

There are detents around the perimeter of the **Graduated Screw** head at  $\frac{1}{4}$  increments between 0 and 3.5.

Normal tension should be set at "1" as shown.



### Revisions

There were numerous changes made to the shuttle assembly including the: Upper guard ring, Shuttle beak, Graduated screw, Spacing plate, Upper guard ring screws and spring. Please refer to the 3 revisions of the parts catalogs to identify which configuration applies to the machine you are servicing. Changes are noted with the machine serial number when the change was made.

The individual components on the machine you are servicing may appear to be different than those illustrated here. However, it does not appear that any of the changes affect how the lower tension is adjusted in this section.

### Checking the normal tension

With the graduated screw set at "1," a slight tension must be felt when a fine thread (No.120) is drawn by hand between upper guard ring and lower tension skid. For this test the bobbin thread must be loose so that it does not pull and turn the bobbin.

If no tension at all, or if too much tension of the lower thread is observed, adjust as follows:

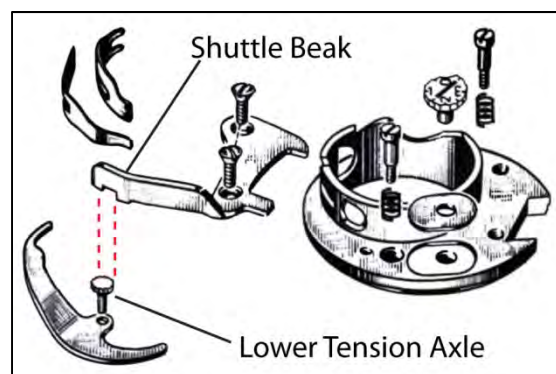
### Adjusting the normal tension

Remove the **Upper Guard Ring** from the shuttle.

Loosen both **Shuttle Beak** fastening screws about 2 turns, and then lift the portion of the shuttle beak with the notch which locks the **Lower Tension Axle**, preventing it from turning.

Turn the **Lower Tension Axle** to adjust the normal tension setting. To increase the tension, turn it clockwise; to decrease tension, turn it counterclockwise.

Tighten both shuttle beak fastening screws and confirm that the lower tension axle is properly locked by the **Shuttle Beak**.



Replace upper guard ring and tighten the two screws. Make sure that the two small springs (under the heads of the above screws) are also inserted.

Recheck the tension of lower thread as explained above. If necessary, repeat above adjustment.

## Upper Tension Device

### How it works

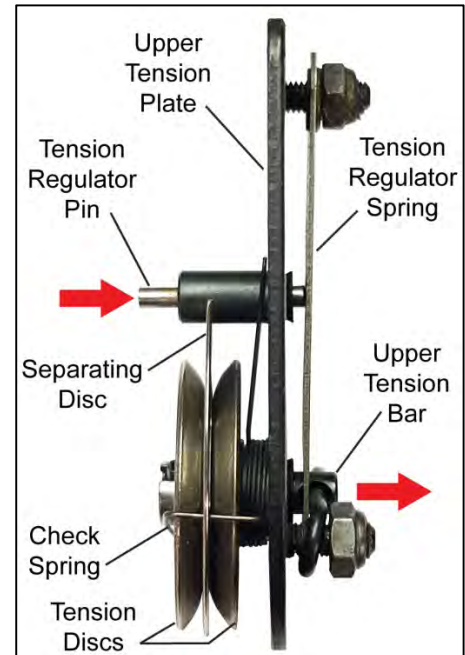
The **Tension Discs** and **Check Spring** are assembled on the **Upper Tension Bar** which passes through the upper tension plate and is pinned against the **Tension Regulator Spring**.

The **Tension Regulator Pin** passes through a bushing attached to the upper tension plate and presses against the **Tension Regulator Spring**.

As the pressure from the **Tension Regulator Pin** on the **Tension Regulator Spring** increases, the **Tension Discs** are squeezed together tighter.

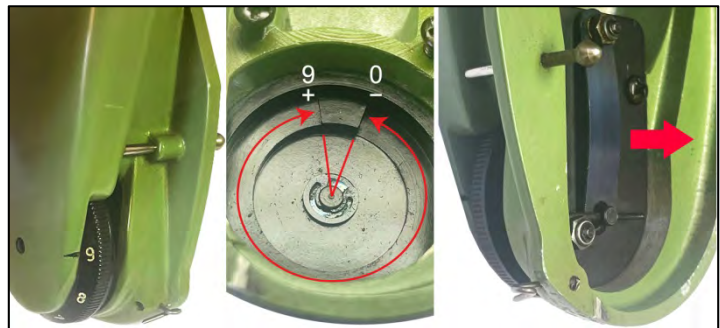
The **Separating Disc** between **Tension Discs** allows the use of 2 threads (one on either side) for twin needle sewing.

To soften the sharp tugs of the **Thread Take-up Lever** on the thread, the upper thread tension device is equipped with a **Check Spring**, which considerably reduces the danger of the thread breaking.

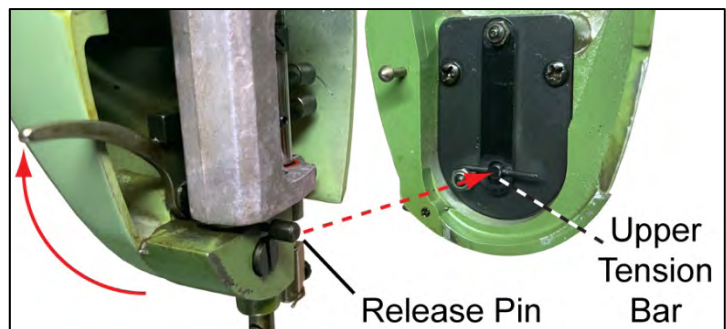


The numbered **Tension Regulator Dial** (-0 to 9+) has a spiral ramp where the **Tension Regulator Pin** rides.

As the dial is turned from (0) towards (9), the ramp pushes the **Tension Regulator Pin** which pushes on the **Upper Tension Spring**, this squeezes the **Tension Discs** together.



When The **Presser Foot Lever** is raised, it pushes the **Release Pin** out. The **Release Pin** pushes on the **Upper Tension Bar** and releases the spring tension on the **Tension Discs**, allowing the top thread to pull freely through the **Tension Discs** for threading the machine or removing the material being sewn.



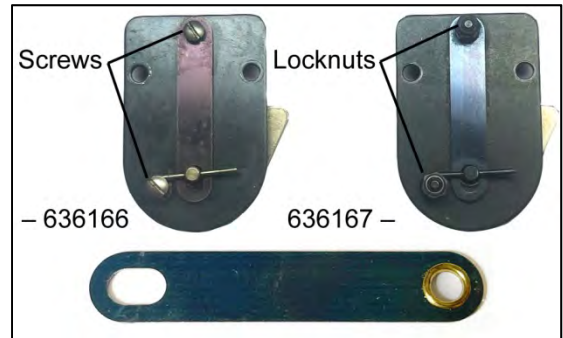


## Revisions

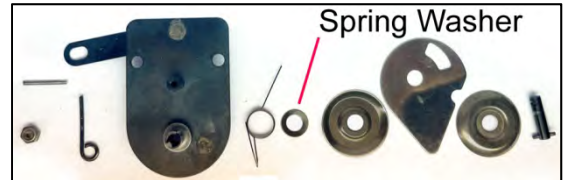
The **Upper Tension Plate** changed at **Serial No. 636167**.

The slotted screws which attach and adjust the **Upper Tension Spring** were changed to weld studs and nylon locknuts.

A brass bushing was added to the top hole of the **Upper Tension Spring**.



A **Spring Washer** was added under the first **Tension Disc** at **Serial No. ~ 878656**



## Cleaning and inspection

Before attempting to make any adjustments, inspect the tension assembly to insure it is clean and not restricted by loose threads, lint and debris.

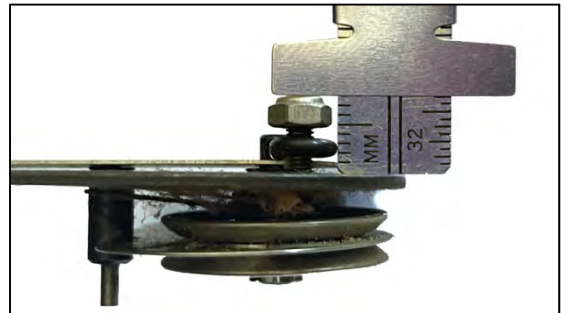
Remove the 2 Phillips head screws that mount the **Upper Tension Assembly** to the front cover.



Before disassembling the **Upper Tension Device**, record the dimension of the bottom retaining nut or screw.

The **Upper Tension Device** must be returned to this dimension when reassembled.

**Caution!** Be careful not to lose the **Tension Regulator Pin**. Once the **Upper Tension Assembly** is removed from the front cover, the **Tension Regulator Pin** is free to fall out.

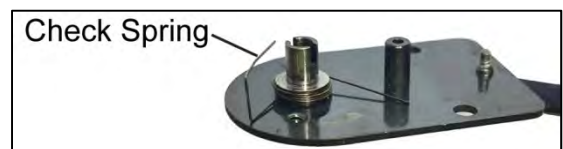
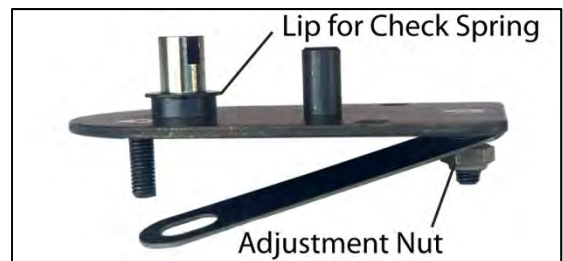


It is not necessary to remove the **Tension Regulator Spring** adjustment nut or screw to clean and service the **Upper Tension Device**. If you do remove it, first record the dimension and return it to that same position during reassembly.

There is a **Lip** on the tension disc bushing which captures the **Check Spring**.

The **Check Spring** will not slide off together with the **Tension Discs** due to the retaining lip.

**Caution!** To avoid damaging the **Check Spring**, carefully lift the end of the **Check Spring** to remove all components one at a time before removing the **Check Spring**.



Clean and inspect all components noting the sequence of assembly.

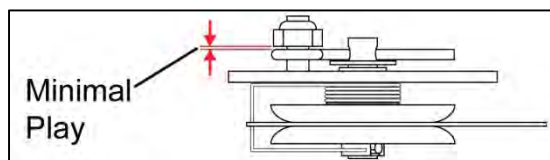
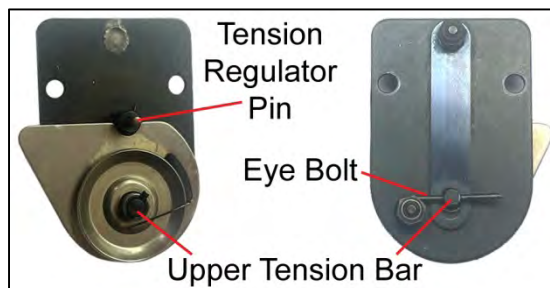
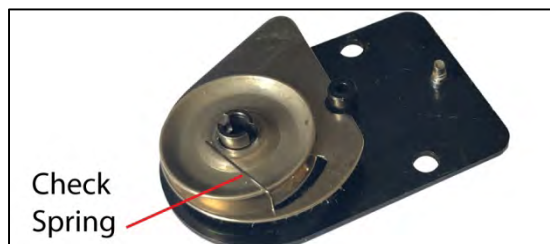
Install the **Check Spring** over the **Lip** on the tension disc bushing.

Carefully reinstall all components one at a time without damaging the **Check Spring**.

Insert the **Upper Tension Bar** through the **Upper Tension Plate**.

Assemble the **Upper Tension Spring** over the **Upper Tension Bar** and secure the **Eye Bolt** with the Locknut or Screw to the original dimension.

After assembling into the **Front Cover**, set the **Tension Regulator Dial** to "**0**." There should be minimal play between the **Eye Bolt** and **Locknut**. The **Upper Tension Spring** should move side to side slightly but have enough pressure that it doesn't rattle loosely. Adjust **Locknut** if needed.



## Checking the normal tension

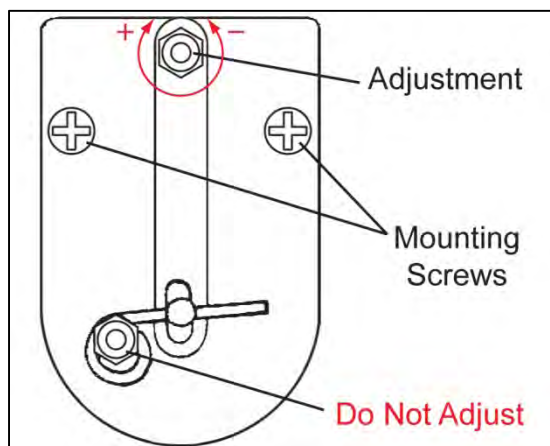
When the upper thread tension is adjusted correctly, no tension of the upper thread should be felt when a No. 120 thread is being used and the **Tension Regulator Dial** is set at "**0**" (with the presser foot lever in the down position). The first slight tension should only then be felt when the indicator mark on the front cover is located between " $\frac{1}{2}$ " and "**1**" on the **Tension Regulator Dial**.

If tension is felt when the dial is set below " $\frac{1}{2}$ " adjust as follows:

## Adjusting the normal tension

To decrease the initial thread tension, turn the upper Locknut or Screw slightly counterclockwise until there is no tension felt.

To increase the initial thread tension, turn the upper Locknut or Screw slightly clockwise.





## 19. Adjustment of Coupling Device at Flywheel

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Coupling device will function properly when point of coupling knob screw is at a distance of about 1/8" from the nearest outside lug of the coupling stop, when the coupling knob is firmly tightened. If point of coupling knob screw touches the outside lug of the coupling stop before, coupling knob is fully tightened. Remove coupling knob and displace coupling stop in a clockwise direction until the aforementioned requirement is met.

## 20. Bent Thread Guides

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There are three **Thread Guides** on the front cover, two at the top and one at the bottom. If they become bent they may not guide the thread as intended.

The guides are held in place by a **Set Screw**.

**Caution!** To avoid damaging the front cover, remove the **Thread Guide** before attempting to straighten it.

The easiest way to access the **Set Screws** is to remove the two front cover hinge screws and remove the cover.

Loosen the **Set Screw** and remove the thread guide.

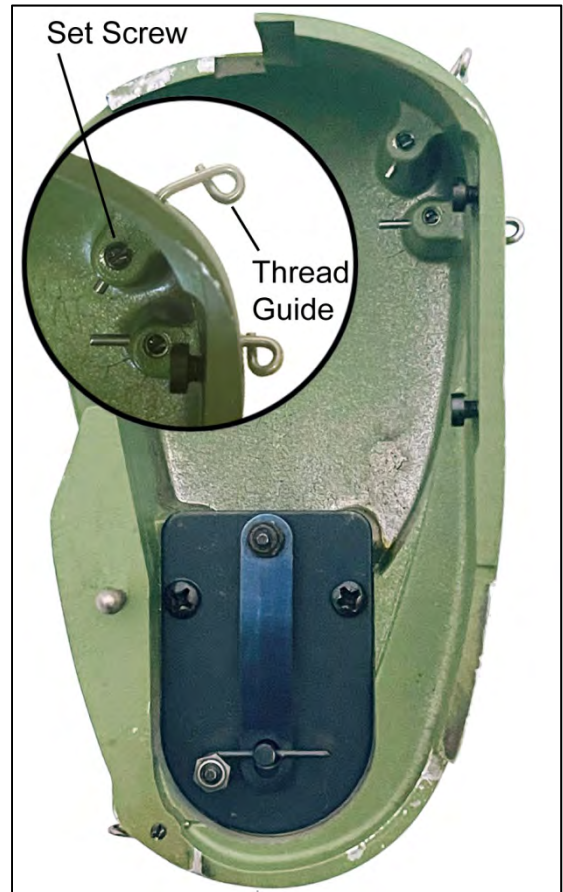
**Caution!** Be careful not to mar the thread guide with the tools you are using. This could lead to thread snags.

Using 2 pair of pliers or a bench vise grasp the **Thread Guide** on either side of the bend as close to the bend as possible.

Gently straighten the bend. The **Thread Guide** should be straight except for the loop at the end.

Insert the **Thread Guide** back into the front cover and tighten the **Set Screw**.

Reattach the front cover hinge.



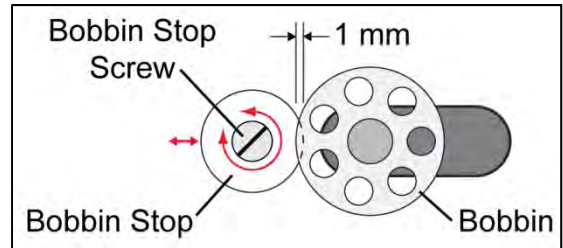
## 21. Adjusting the Automatic Bobbin Winder

### Bobbin Stop adjustment

The **Bobbin Stop** pushes the spring-loaded **Bobbin** away when the thread is full.

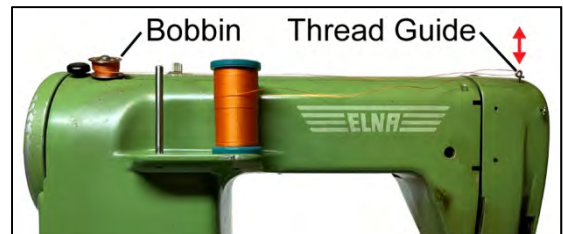
To adjust the **Bobbin Stop**, loosen the **Bobbin Stop Screw** and move the **Bobbin Stop** as required to overlap the **Bobbin** and **Bobbin Stop** by approximately **1 mm**.

Tighten the **Bobbin Stop Screw**.



### Adjusting the Thread Guide for even Bobbin winding

If the bobbin **Thread Guide** on top of the front cover is not correctly adjusted, the **Bobbin** will not be filled uniformly and evenly.



To set the bobbin **Thread Guide** to the correct position, open the front cover and loosen the **Set Screws** inside cover.

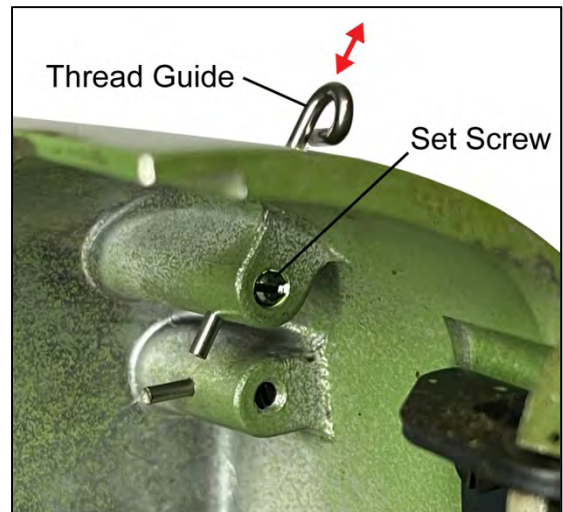
The easiest way to access the **Set Screws** is to remove the two front cover hinge screws and remove the cover.

Loosen the **Set Screw** and adjust the **Thread Guide** by moving it in or out as required.

The loop of the **Thread Guide** should be oriented towards the bobbin winder.

Tighten the **Set Screw**.

Reattach the front cover.



## 22. Removing the Shuttle Hook

### Removing the Shuttle

If shuttle hook must be removed for some reason, proceed as follows:

Remove needle, presser foot, needle plate and feed dog. Open shuttle cover and remove the bobbin.

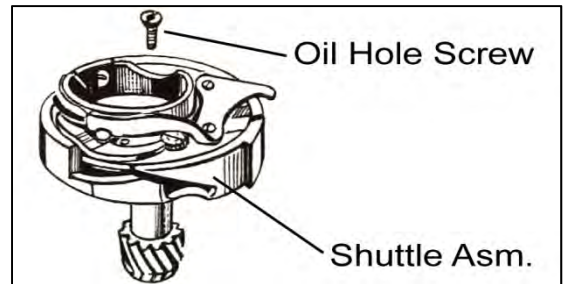
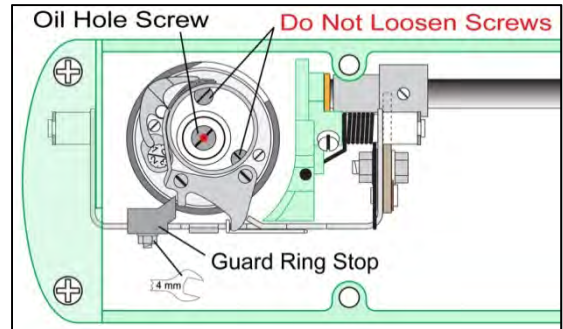
Loosen the **Oil Hole Screw** on bottom of shuttle assembly.

**Caution!** Do not loosen the three screws at the bottom of the shuttle hook.

On machines with the **Automatic Thread Release** device, the **Guard Ring Stop** must also be removed.

**Caution!** The **Guard Ring Stop** will have to be readjusted once removed.

Lift out shuttle assembly.



### Replacing the Shuttle

Turn the flywheel towards you until the needle is in its lowest position.

**Note!** It is assumed that, before removing the **Shuttle Assembly**, the timing of the shuttle hook in relation to the needle bar was correct. If that is not the case, the timing will need to be adjusted at this time.

Insert the **Shuttle Assembly** so that the point of the shuttle hook is about **2.4 mm [3/32"]** before the needle.

On machines (**Serial No 527,625 or earlier**) the shuttle beak must be lodged between the **Shuttle Stop** and the **Stop Spring**.

On machines (**Serial No 527,626 to 1,104,935**), the shuttle beak must be lodged inside of the recess of the **Automatic Thread Release**.

On machines (**Serial No 1,104,936 or later**), the shuttle beak must be lodged in the notch of the **Guard Ring Stop**.

Adjustment can be made by lifting the **Shuttle Assembly** out again and advancing or retarding the shuttle hook by one gear tooth at a time.

Replace **The Oil Hole Screw**, feed dog, guard ring stop, needle plate, presser foot and needle. Close the shuttle cover to its working position.

## 23. Machine is noisy (with stitch width set at "3" or "4")

**Note:** When a machine is making an unusual noise, try to narrow down where the noise is coming from.

A **Mechanics Stethoscope** is an excellent tool for this type of diagnosis. These can be found for under \$10 at Harbor Freight.

One source of noise could be excessive end play in the upper shaft.

The following procedure is specific to the first generation of coupling designs, valid up to **Serial No 663,199**.

Open the **Front Cover** to access the **Counter-Weight** on the left end of the **Upper Shaft**.

Check that the Take-up Lever is not in the way of the Counter-Weight. Turn the Flywheel if needed.

Remove the **Flywheel** to access the **Coupling Ring**.

Press against the **Counter-Weight** from the Left while also pressing against the **Coupling Ring** from right.

Check for end play in the **Upper Shaft** (in the axial direction).

If end play is excessive (**max 0.03 mm/0.0012"**), adjust as follows:

Loosen the **Set Screw** in the **Coupling Ring**.

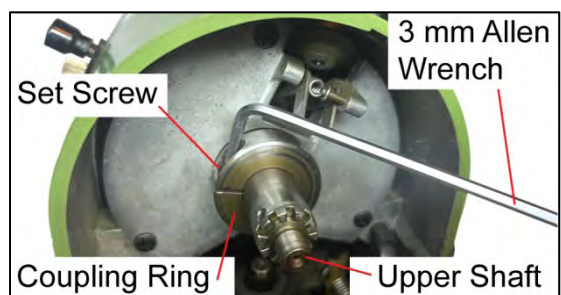
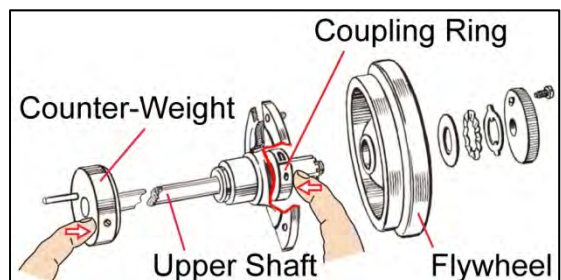
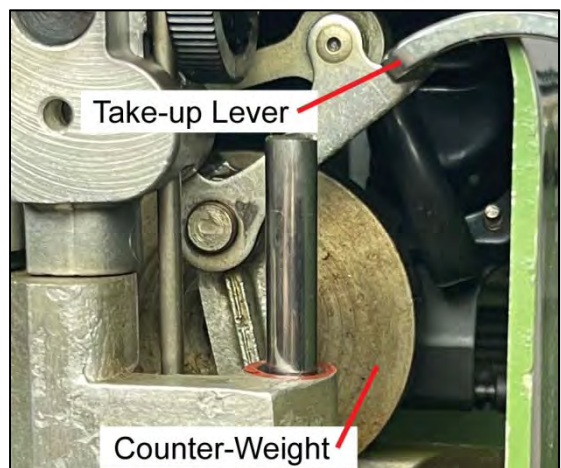
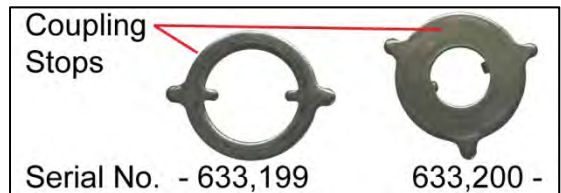
Press in on the **Counter-Weight** and **Coupling Ring** to remove the end play.

Tighten the **Set Screw** in **Coupling Ring**.

Replace the **Flywheel** and turn the **Upper Shaft** towards you to verify the shaft turns freely, without binding.

If the noise has not been eliminated, check if the **Cradle Spring Screw** is adjusted as explained in the Chapter:

### 3. Centering of Needle Bar for Zigzag Stitch



## 24. Slipping of Motor Friction Wheel

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This occurs when oil gets between friction surface of the Flywheel and Motor Friction Wheel, or motor draw spring is too weak.

To remedy, remove coupling device and flywheel. Wipe off thoroughly all oil from flywheel and motor friction wheel with clean rag and apply a coating of synthetic resin to the motor friction wheel by running the motor and pressing the bar of synthetic resin against the friction surface of the motor friction wheel. If motor draw spring is too weak, replace defective spring with new one.