Timing the Millennium, Freedom, Liberty and Discovery

Use these instructions in conjunction with your instructional CD.

Symptoms: Skipping or missing stitches.

Solution: Change needle. (We strongly recommend using the prescribed needles). Use 1955-01-MR4.0 needles. These needles were chosen for very specific reasons. (Reasons possibly unknown even by experienced professional sewing machine repairmen).

Install the needle as shown below.

Front (light bulb side)  Back (throat of machine)  Side View

Make sure the needle is installed correctly. Slide the needle all the way up into the needle bar and orient it correctly before tightening the needle set screw.

***Note: Thread looping, or breaking thread are not indicators of timing problems. Please refer to hook maintenance instructions on page 6.

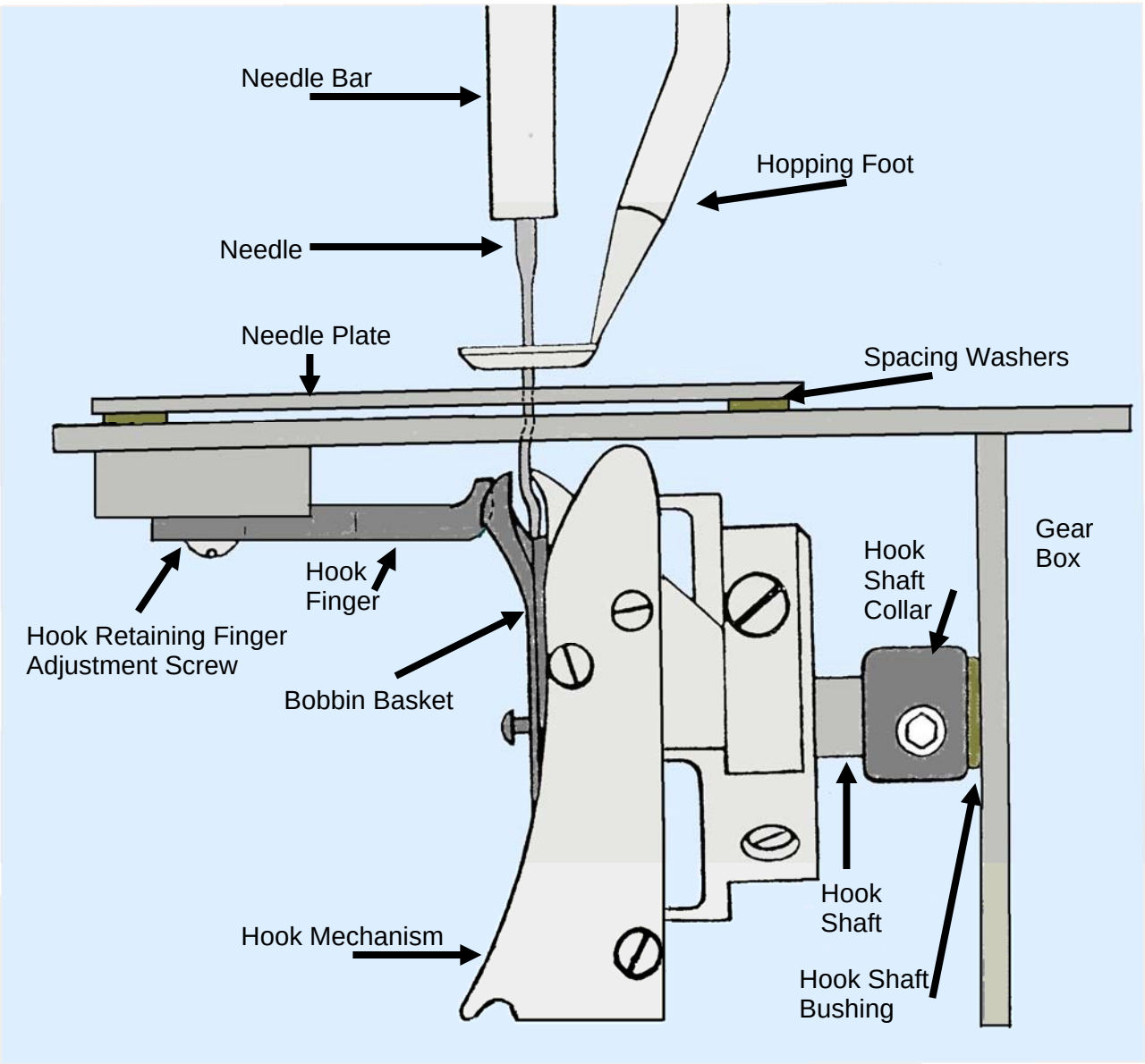
Note that timing is a last resort! It will not just go out of adjustment on its own. Jamming the machine is generally the only way the timing can be affected. Breaking thread or looping problems are generally NOT related to faulty timing.

After double-checking the tension, threading, bobbin, etc., continue sewing. If skipping or missed stitches persist the timing should be reviewed.

If the timing appears to be correct and the machine continues to skip stitches this may be an indication of some other mechanical problem. Please call our Technical assistance hot line at 1-800-426-7233 extension 207.

One of the best tools to have when timing your machine is a jeweler's loupe or eyeglass. These may be available at your local hardware store, or can be purchased from the factory. Most of the close-up pictures following are taken through this eyeglass that is 5 xs magnified.

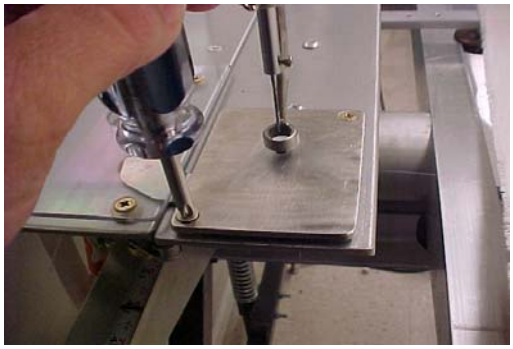
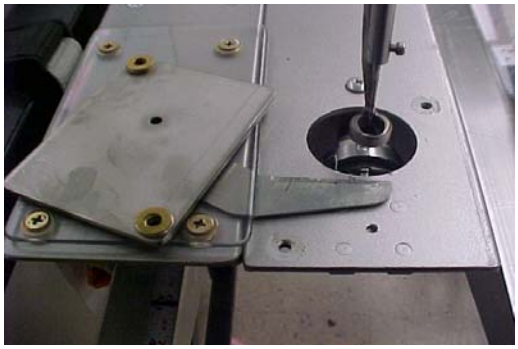
Take a minute to acquaint yourself with the hook assembly area. The diagram below is a side view of the area, and names all of the machine parts. Knowing the terminology will help in the future with the timing process!



REMOVING OLD HOOK ASSEMBLY

If you need to replace your hook assembly, use the following steps to remove the old hook and position the replacement hook before beginning the timing process. If you only need to adjust the timing, proceed to Step One on page 6.

Remove needle plate using short Phillips screwdriver. Note washer placement under needle plate – there is one thin and one thick washer at each screw location for machines with thread cutters.

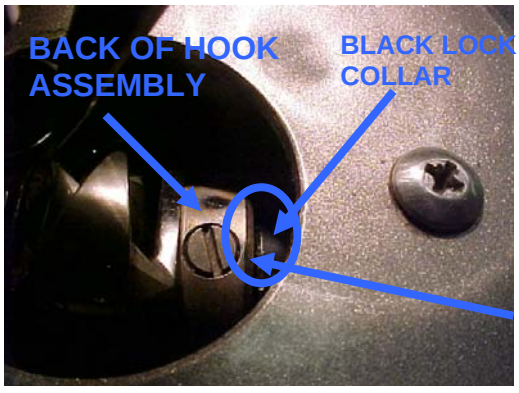



Remove hook finger using Phillips screwdriver.

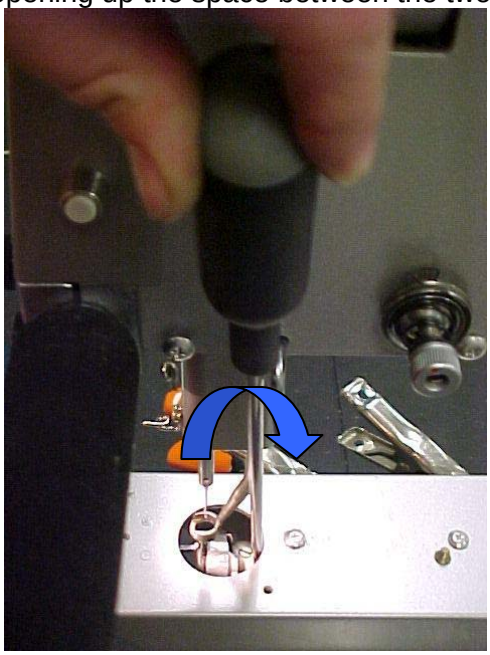
Remove hook assembly by loosening 3 slotted screws on back side of hook assembly.



The hook assembly will be difficult to remove, because the screws have scarred up the hook shaft. Use the following process to remove the old hook: Looking down through the hole in the throat of the machine, locate the black locking collar that is on the shaft behind the back of the hook assembly. This space will be used for removing the hold hook assembly.

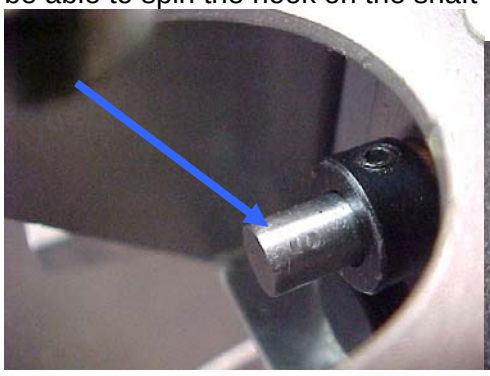


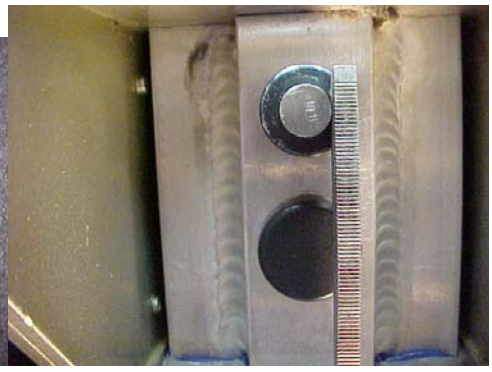
If needed, use a flat blade screwdriver to open the gap. Come in from the top with a flat screwdriver, putting the blade in the space between the back of the hook assembly and the black collar, and twist the screwdriver, opening up the space between the two pieces.



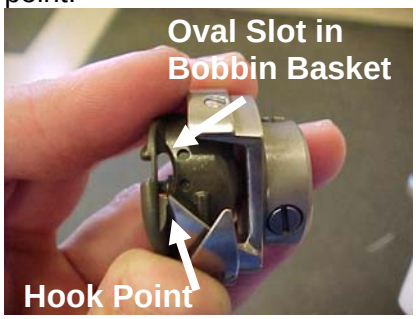
Then, come up from underneath the machine with 2 long handled screwdrivers, and put the blades in the space created, then twist the screwdrivers to 'walk' the old hook assembly off the shaft. DO NOT USE THE FRAME OF THE MACHINE TO PULL THE OLD HOOK ASSEMBLY OFF THE SHAFT!!! You greatly increase the risk of un-seating the brass bushing around the hook shaft and damaging the gears inside the gear box.

Inspect hook shaft after removing hook assembly, and lightly buff any rough areas where set screws were located. You can use a flat file as shown below – turn the machine on at a low speed (8 or 9) and hold the file lightly flat against the shaft – you only want to take off the excess material to smooth off the shaft – be careful to not round off the end of the shaft!! You should be able to get the hook assembly onto the shaft easily, and be able to spin the hook on the shaft – this will make the timing process much easier.

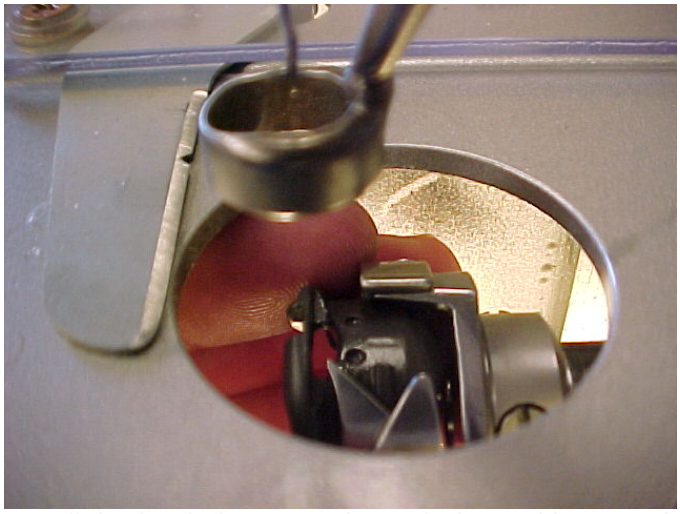


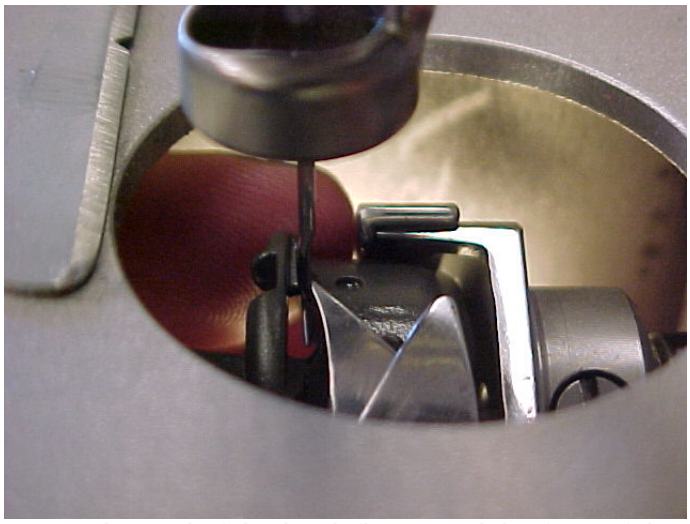


Once the new hook assembly is able to spin freely on the shaft, you can start by putting a new needle in the machine. Hold the hook assembly as shown below, lining up the oval slot in the bobbin basket with the hook point.

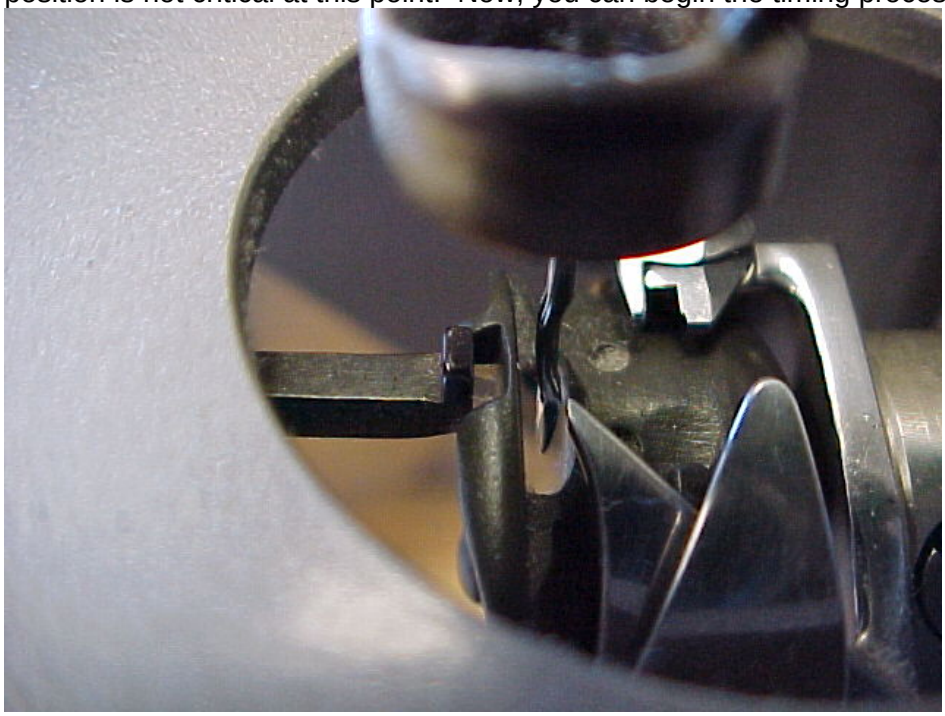


Place new hook assembly on the hook shaft. Hold the hook assembly while rotating the flywheel by hand CLOCKWISE to put the needle in the lowest position, making sure the needle goes into the oval slot in the bobbin basket. The hook point should touch the needle at this point. DO NOT TIGHTEN ANY SCREWS ON THE HOOK ASSEMLBY AT THIS POINT!



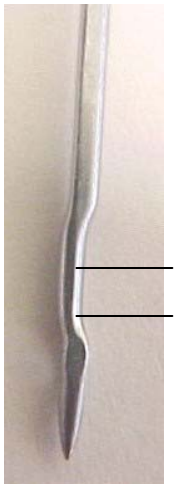


Install the hook finger as shown below, with space between the end of the hook finger and the face of the bobbin basket, but do not tighten down the Phillips screw holding the finger yet – the finger placement will be adjusted later. The hook finger should be snug enough to hold the basket from spinning, but the exact position is not critical at this point. Now, you can begin the timing process!



ALWAYS BEGIN TIMING PROCESS WITH A NEW NEEDLE.

It is helpful to mark the new needle you are using with a couple of reference points that will be needed later – halfway down in the scarf (flat part), and at the bottom just before the curve begins. See the picture at right showing the position of the marks. Just use a fine-point Sharpie Marker for these marks.



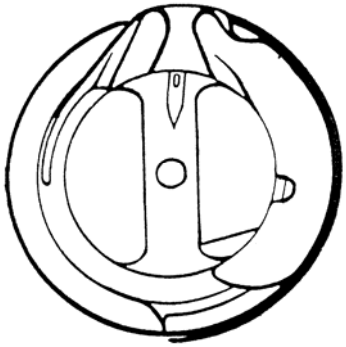
STEP ONE: Checking correct needle bar depth (or height)

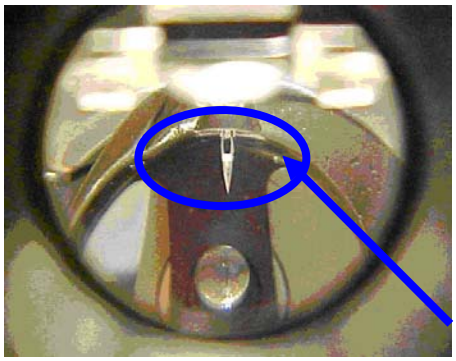
If it is still in place, remove the needle plate. Remember that the needle plate goes on only one way; the needle hole is not necessarily centered on the plate. Keep this in mind when re-installing the plate. Also note that if your machine is equipped with a thread-cutter, there will be one thick, and one thin washer under each of the needle plate mounting holes. If you don't have a thread cutter, there will be no spacing washers.

Remove the thread and bobbin case. Lower the needle bar to its lowest position by rotating the front hand wheel in a clockwise direction until the needle is in the lowest part of its stroke, right before the needle starts up again.

From the front of the machine (where the bobbin case fits), look directly into the front of the hook assembly. You should be able to see the needle protruding down into the area where the bobbin case fits. The entire eye of the needle should be clearly visible. (SEE DIAGRAM A)

If you have a Millennium, Liberty, Freedom, Discovery or Ultimate 1, the top of the needle eye should be just visible below the upper inside edge of the bobbin case basket as shown below (DIAGRAM A). The needle depth for the Ultimate 2 should be slightly lower than shown below.

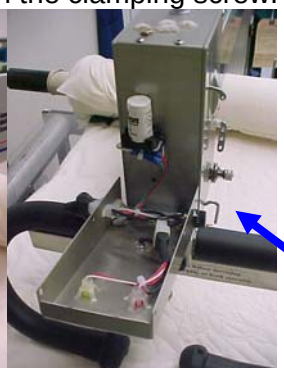




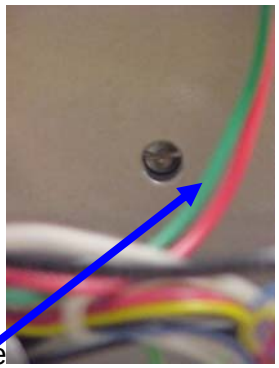
Just below edge of basket

Diagram A
Rotating Hook Assembly - Front View

If an adjustment is necessary use a straight tip screwdriver (approximately 8-10" long) and loosen the needle bar clamping screw. The access hole for this is located directly above the fluorescent light on the front of the machine. If you have a newer machine with a speed/stitch length meter on the front cover, the front cover will have to be removed first. Reposition the needle bar by twisting and pulling down or pushing up on the needle bar, and retighten the clamping screw.



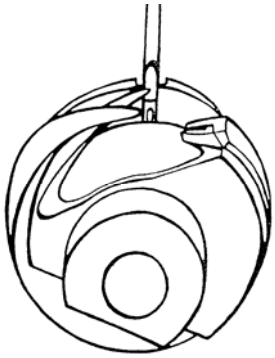
Access Hole



Old Style Machine Millennium

STEP TWO: Checking proper hook rotation

Once the proper needle bar depth has been verified, proceed by checking for proper hook rotation. With the needle bar in its lowest position, rotate the front hand wheel of the machine in a clockwise direction slowly while observing the scarf (or notch) in the needle and the point of the rotating hook assembly. As the needle is on its upstroke, the point of the hook should pass the needle slightly below the halfway point on the scarf (notch) of the needle, between the two marks you made on your needle before you inserted it. (SEE DIAGRAM C).



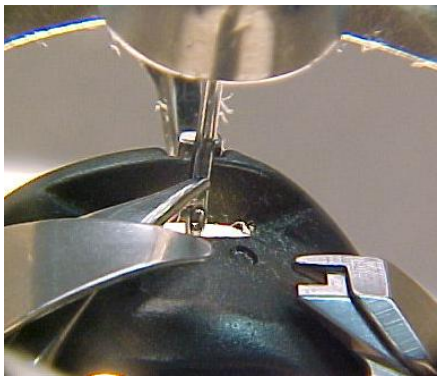
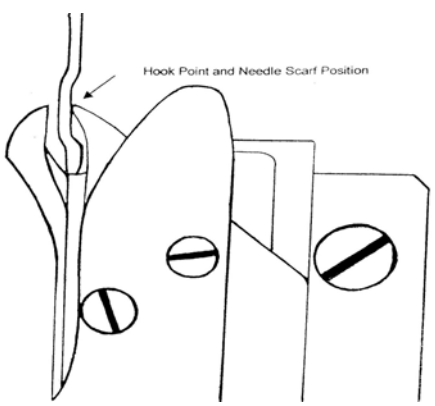


Diagram C
(Looking from Back to Front)

If an adjustment is necessary you may advance or retreat the hook by loosening the three large set screws on the backside of the hook that secure the hook to the rotating shaft. Reposition the hook by twisting it on the shaft while holding the hand wheel (and thus the needle) stationary. Once the proper rotation is achieved slightly tighten one of the set screws on the back of the hook. Do not retighten all of the screws until the next step has been completed.

STEP THREE: Needle/Hook Clearance

(SEE DIAGRAM D) Once the proper hook rotation is set look at the side view of the assembly. Note that the hook point should touch and slightly deflect the needle as it passes through the scarf of the needle. This is very difficult to see without the aid of a magnifying glass. Rotate the hand wheel on the machine back and forth slightly and observe the hook point and needle scarf. If the hook point does not touch or slightly deflect the needle, the hook assembly will need to be slid forward on the rotating shaft. You can use a screwdriver to gently pry the hook forward (closer to the needle) WITHOUT CHANGING THE PROPER HOOK ROTATION THAT WAS SET IN THE PREVIOUS STEP!
If the hook point is hitting the needle too hard (bending the needle), the hook needs to be slid backward (away from the needle) to the point where it just slightly deflects it. Once this position is achieved, and you are sure that the rotation has not changed from the previous step, you may retighten the hook set screws. Tighten them slowly, one at a time because the hook may want to move in the process.



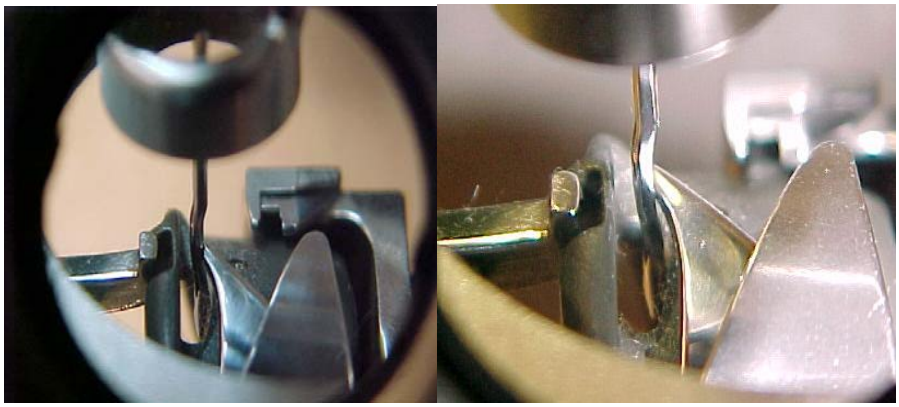


Diagram D
Side View

STEP FOUR: Hook Retaining Finger Setting

The hook-retaining finger is the last step in the timing procedure. The hook-retaining finger is slotted and held in place by a single Phillips head screw directly in front of the hook assembly on the underside of the machine body.

Diagram E

There is a notch in the top part of the bobbin basket that the hook retaining finger fits into. Note that the hook retaining finger should only be approximately 1/3 of the way into the notch area of the bobbin basket. Most of the notch needs to remain unobstructed to allow the top thread to pass through the gap between the end of the hook retaining finger and the notch in the bobbin basket. If the finger is too close, it will pinch the thread, causing long loops of top thread on the back of the quilt. If an adjustment is necessary, loosen the single Phillips head screw and slide the hook retaining finger into the proper position as shown and retighten the screw.

Hook Maintenance Instructions

(SEE DIAGRAM F)
This diagram shows some of the areas on the hook assembly that need to be checked occasionally for abrasions or burrs which can cause thread breakage and looping problems. If you ever break a needle or are having problems with thread breakage, follow this procedure. Note that the hook assembly does not need to be removed to work on it. If the hook is removed for any reason it will need to be re-timed.

1. Check the area marked in (green). It should be shiny and smooth as glass. Use your fingernail and slide it along the surface of this area. Sometimes you cannot see any damage or roughness on this area but you can feel it with your fingernail. If you detect any imperfection in this surface use a fine grit emery cloth #320-400 and polish it smooth. Emery cloth (crocus cloth) can be purchased at a hardware store or auto parts store. Rotate the hand wheel of the machine so that the area to be polished is on the bottom. This prevents the grit from the emery cloth from falling down inside the rotating components of the hook assembly. Note DO NOT POLISH THE AREA MARKED IN RED! This is the hook point and should be quite sharp on the tip. If the hook point is buffed the entire hook assembly will need to be replaced.

2. Check the area marked in (yellow). The front edge as well as the outside and back of this piece should be smooth.

3. Note that timing is a last resort! It will not just go out of adjustment on its own. Jamming the machine is generally the only way the timing can be affected. Thread breakage or tension problems are generally NOT related to faulty timing.

Note that if you break a needle, there will be a burr or scratch somewhere on the hook assembly. Sometimes it may take a very thorough search to locate it. Good lighting and a magnifying lens will help locate any burrs or scratches.

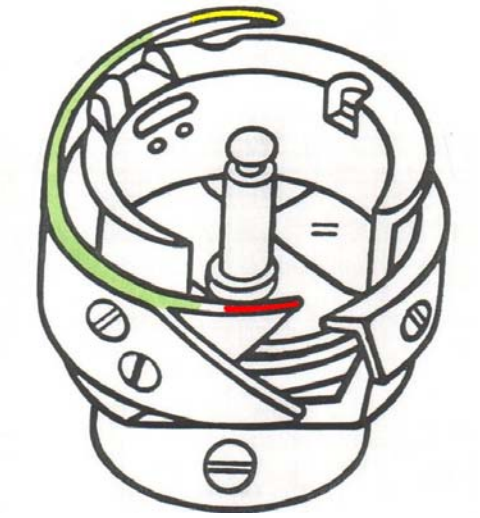


Diagram F