

## User Training Manual

# *SEWING MACHINE*

## ARC SPACESHOP



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Rev. A

National Aeronautics and  
Space Administration

**Ames Research Center**  
Moffett Field, CA

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## I. Introduction

This document is for the user qualification training of the Sewing Machine, located at the Ames SpaceShop facility on the 2<sup>nd</sup> floor in Building 220. Before a user operates the machine, he/she must have signed the required documentation as described in the “SpaceShop Standard Operating Procedures”. For additional information, please see a SpaceShop staff member.

## II. Janome 3000 HD Sewing Machine

The Janome 3000HD is a sewing machine that allows users to stitch fabric with thread.

The specifications of the printer are as follows:

- 19 Types of Stitches
- 6.5mm maximum stitch width
- 4mm maximum stitch length
- One-Step Buttonhole



Figure 1: Janome HD 3000 Sewing Machine

### III. Safety Precautions

#### a. Sewing Machine Safety

##### **SHALL...**

- You **SHALL** notify SpaceShop staff prior to running any job.
- You **SHALL** wear closed-toe shoes at all times.
- You **SHALL** wear eye protection when working with tools and processes that involve chemicals, metal shards, wood chips or sawdust.
- You **SHALL** clean up your space after every job session, and leave 10-15 minutes for cleanup prior to shop closure.
- You **SHALL** secure badge and any loose items that might get caught in moving machinery.
- You **SHALL** only use attachments recommended by the machine manufacturer.
- You **SHALL** disconnect by turning all the controls to the OFF position and then removing plugs from the outlet.
- You **SHALL** remove plug by grasping the plug and not the cord.
- You **SHALL** keep fingers away from all moving parts.
- You **SHALL** notify SpaceShop Staff if sewing lamp bulb is burned out.
- You **SHALL** always pay attention to the machine while it is running.
- You **SHALL** switch off the main switch of the machine when leaving the sewing machine unattended.
- You **SHALL** always disconnect machine from the power supply when you are servicing or removing parts from the machine.
- You **SHALL** operate the machine slowly and use caution.
- You **SHALL** consult SpaceShop staff regarding fabric and thicknesses you intend to use in this machine.
- You **SHALL** manually test if your material is sewable.
- You **SHALL** consult SpaceShop staff if the machine is making a loud noise, starts to smell, has a tight HandWheel or has bad threading.

##### **SHALL NOT...**

- You **SHALL NOT** leave a machine unattended while in operation.
- You **SHALL NOT** work alone while in the SpaceShop.
- You **SHALL NOT** operate the sewing machine if it has a damaged cord or plug.
- You **SHALL NOT** operate this machine where aerosol products are being used.
- You **SHALL NOT** place any item that may obstruct access to the foot control, including leaving items on the foot control.
- You **SHALL NOT** use thick fabric else you will break the sewing machine.
- You **SHALL NOT** use fiberglass, wood, metal, glass or other hard materials in this machine.

#### IV. Step-by-Step Tutorial

##### a. Tools Required

- Sewing Machine
- Material to Sew
- Thread
- Bobbin(s)
- Needle(s)
- Paper and pen/pencil
- Hem Gauge, ruler, chalk, other fabric markers

##### b. Getting Started

1. **CONNECT** power chord to the machine (Figure 2).
2. **CHECK** to see if the **MACHINE SWITCH** is **OFF** or **ON**. Make sure it is **OFF**.



Figure 2: Plug Connection to Sewing Machine

3. **CONNECT** the cord to the **POWER SUPPLY(OUTLET)**.
4. Keep the machine **SWITCH** in the **OFF** state for the following steps (Figure 3).

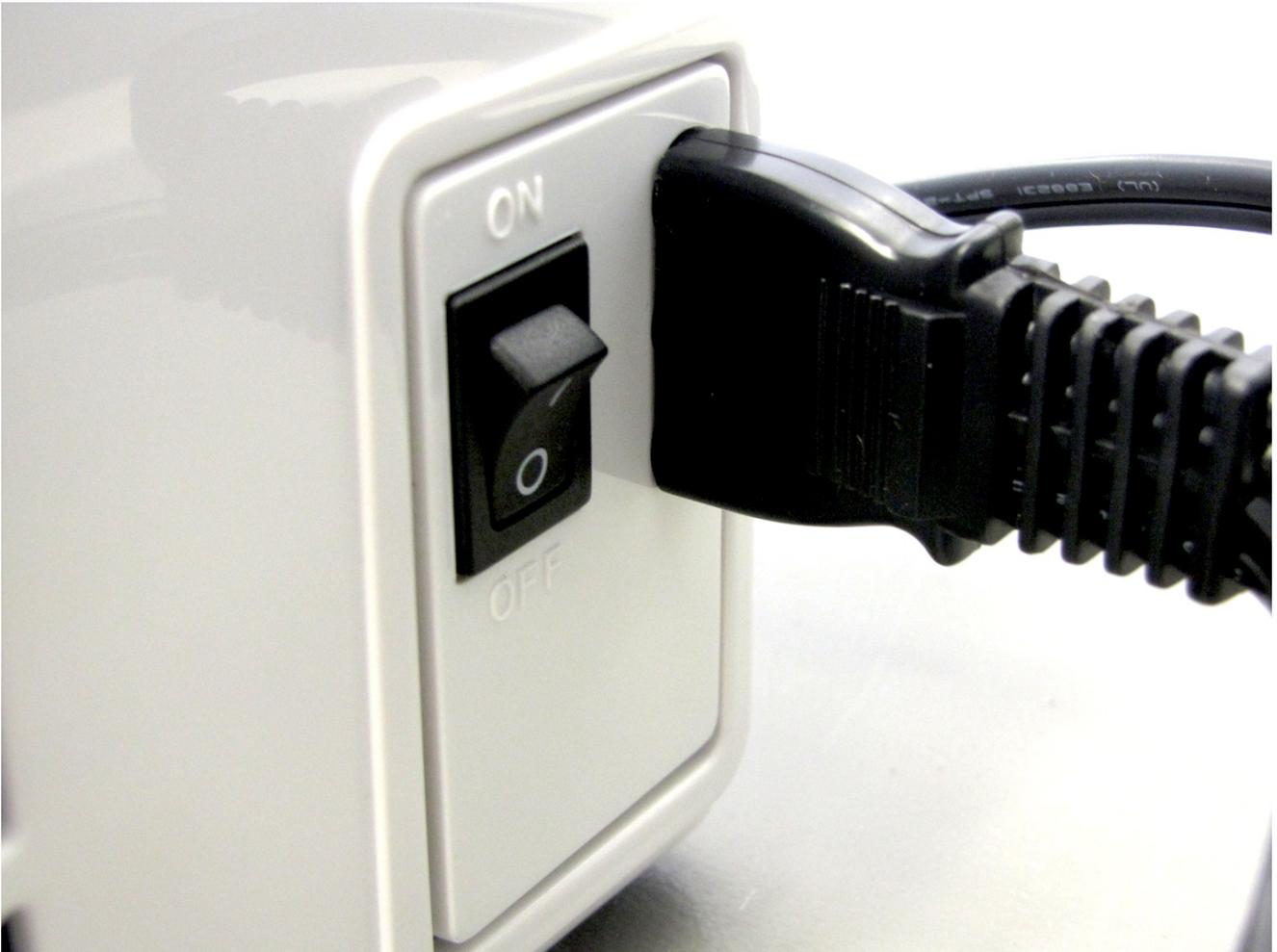


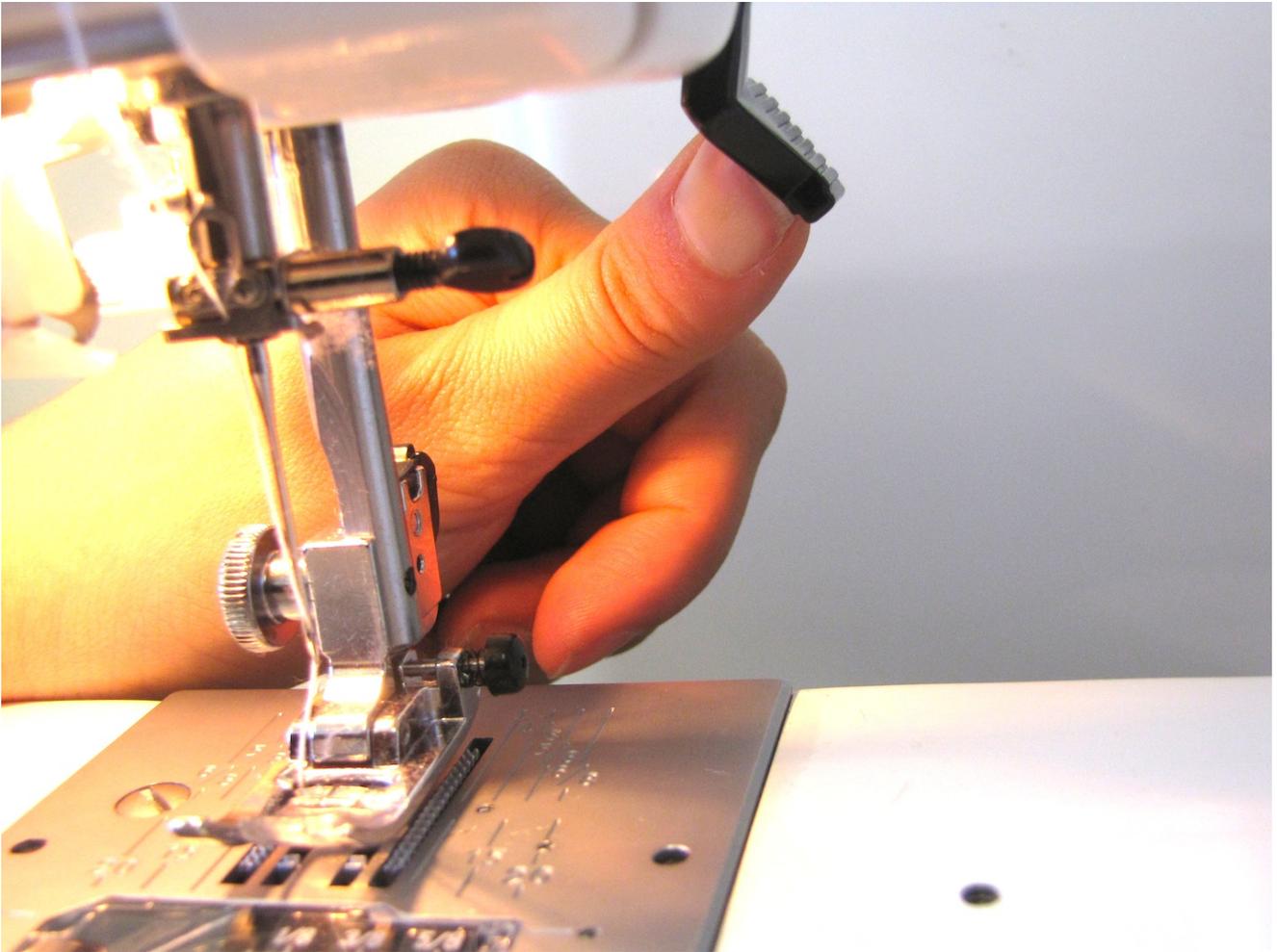
Figure 3: Power Switch turned OFF

5. If you need to use a different **PRESSER FOOT**, to **REMOVE PRESSER FOOT**, raise the needle to it's highest position by turning the **HANDWHEEL** towards you (Figure 4).



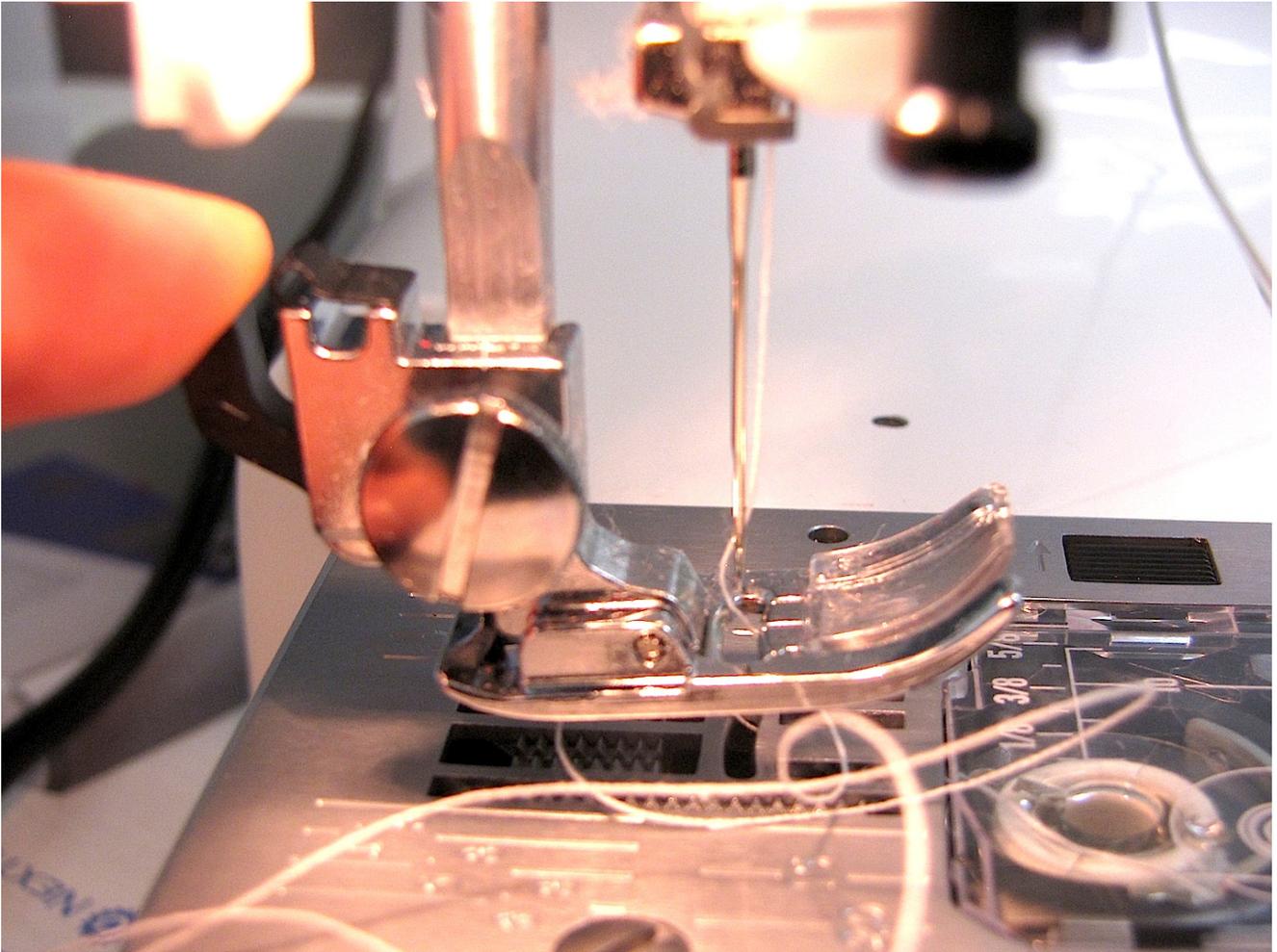
**Figure 4: HandWheel Rotated Towards You to Raise the Needle**

6. **RAISE** the **PRESSER FOOT LEVER** (Figure 5).



**Figure 5: Lever to Raise Presser Foot**

7. Press the lever on the back of the **FOOT HOLDER** and you will see the **PRESSER FOOT** drop off (Figure 6).



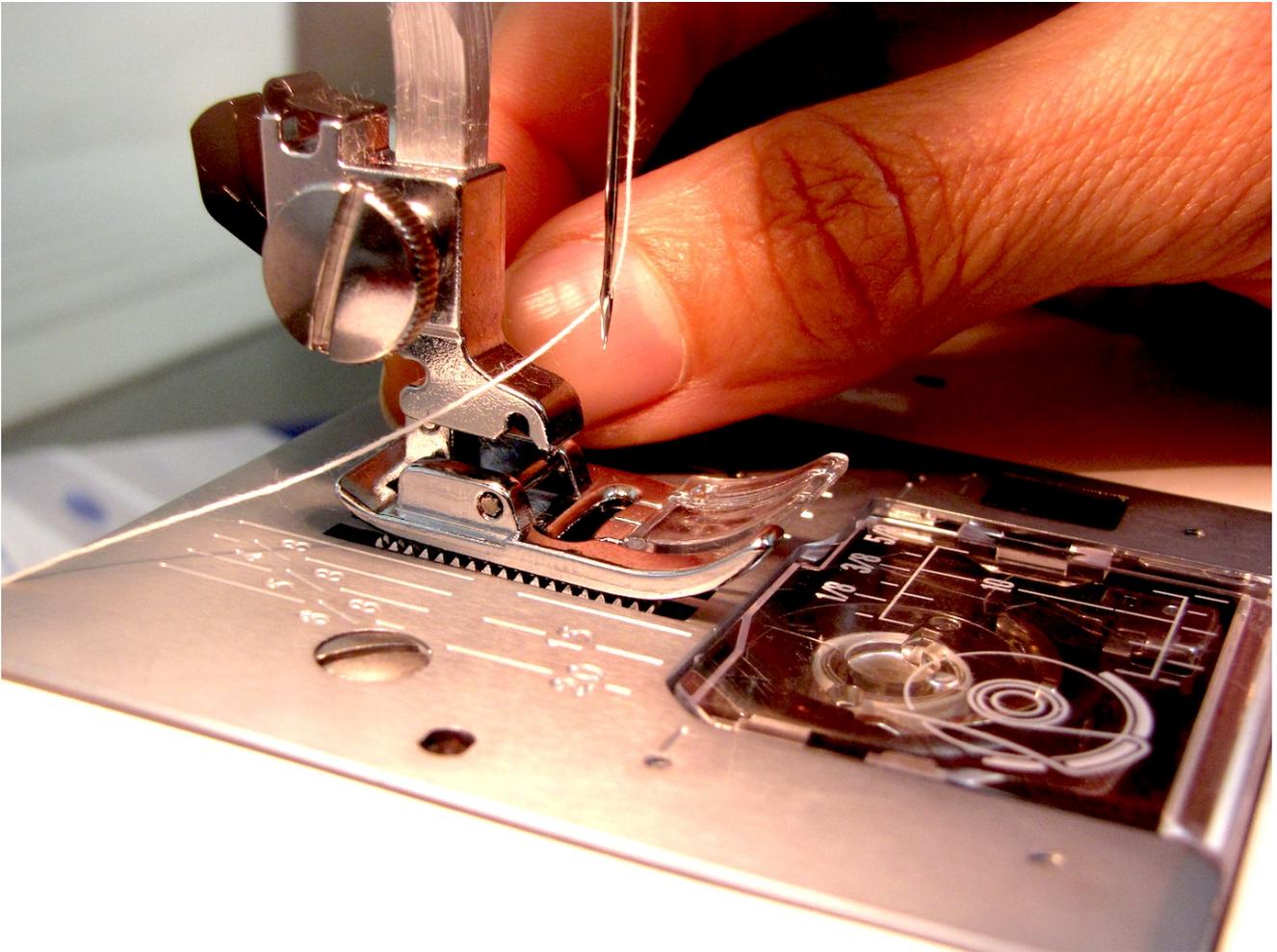
**Figure 6: Lever to Loosen and Release Presser Foot**

8. **ATTACH** the presser foot, by first setting the **PRESSURE DIAL** to position “3” (Figure 7).



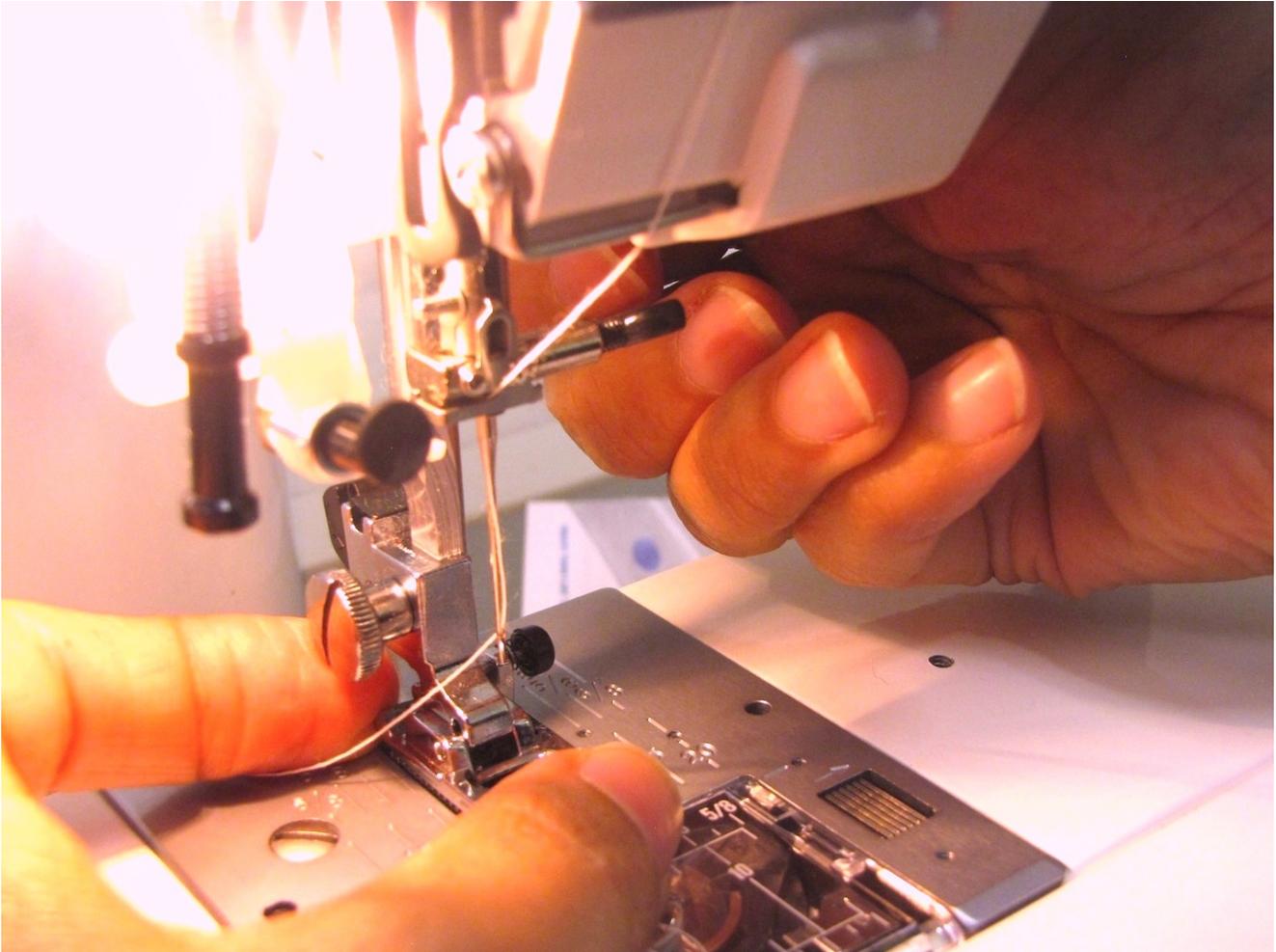
Figure 7: Pressure Dial Set to 3

9. Position the **PRESSER FOOT** so the foot lies under the **GROOVE** of the **FOOT HOLDER** (Figure 8).



**Figure 8: Presser Foot Interlock**

10. Lock the foot holder into place as you **PUSH DOWN** to **LOWER** the **FOOT HOLDER LEVER** (Figure 9).



**Figure 9: Locking the Presser Foot**

11. Now we will learn how to change the needle. Turn the HandWheel toward you to **RAISE** the **NEEDLE** (Figure 4).
12. Lower the **PRESSER FOOT** by pressing the lever in Figure 5 down such that it is perpendicular to the table surface.
13. The **NEEDLE CLAMP SCREW** is **LOOSENED** by turning it **COUNTER-CLOCKWISE**. You may now remove the needle from the clamp by moving it downward and out of its socket(Figure 10).



Figure 10: Needle Clamp Screw

14. Make note of the needle groove on the needle, and how you take it out of the socket. **EXAMINE** the markings on the **NEEDLE**, including needle tip for damage.(Figure 11).

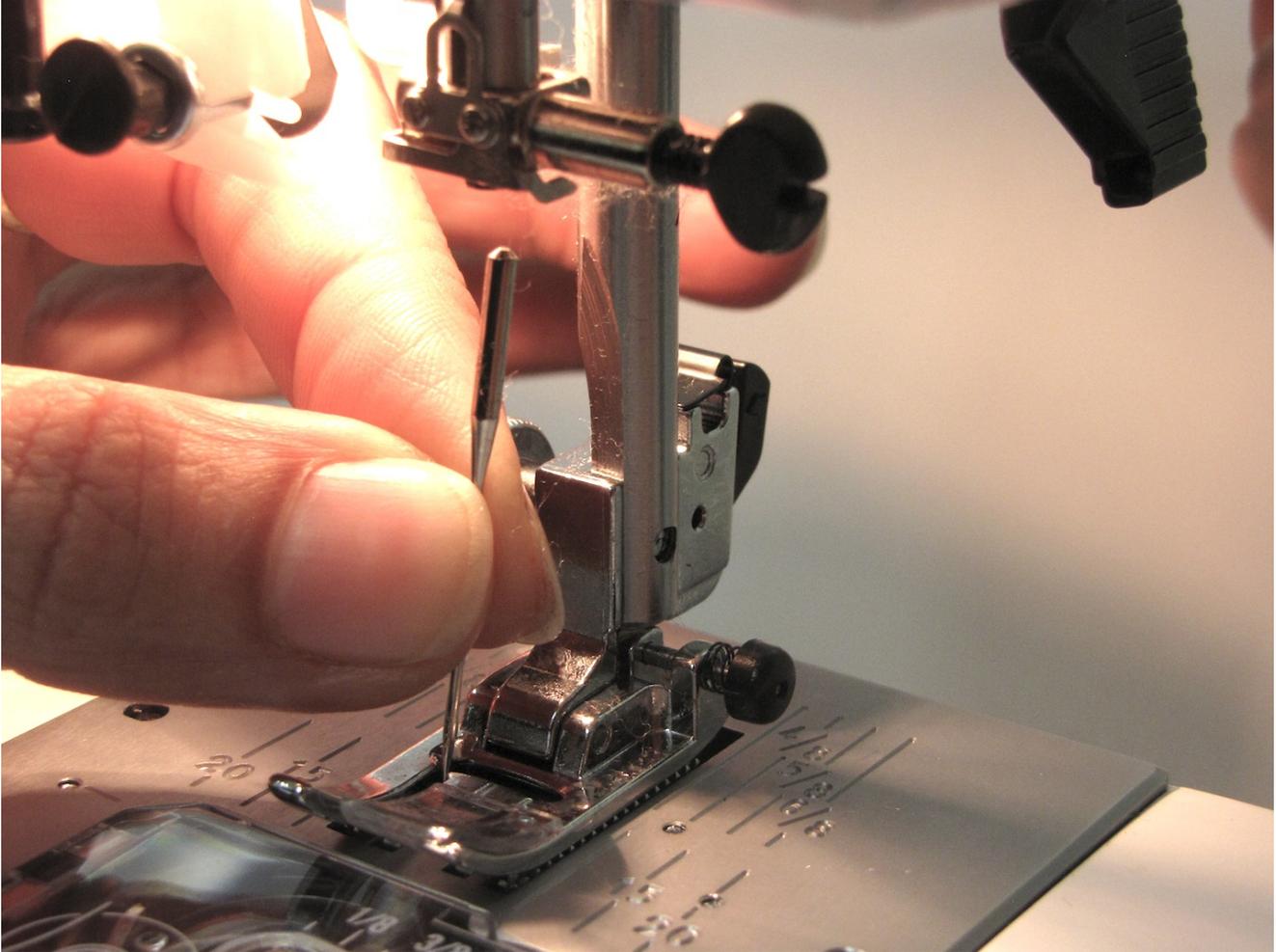
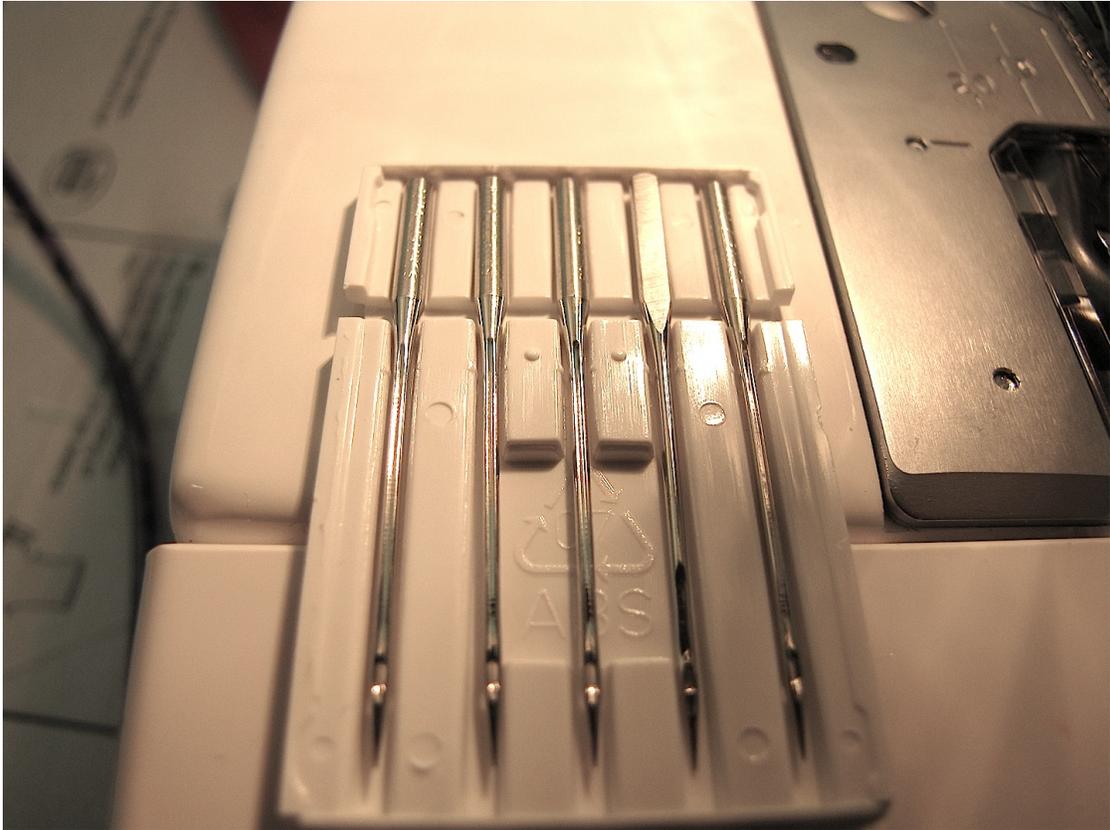
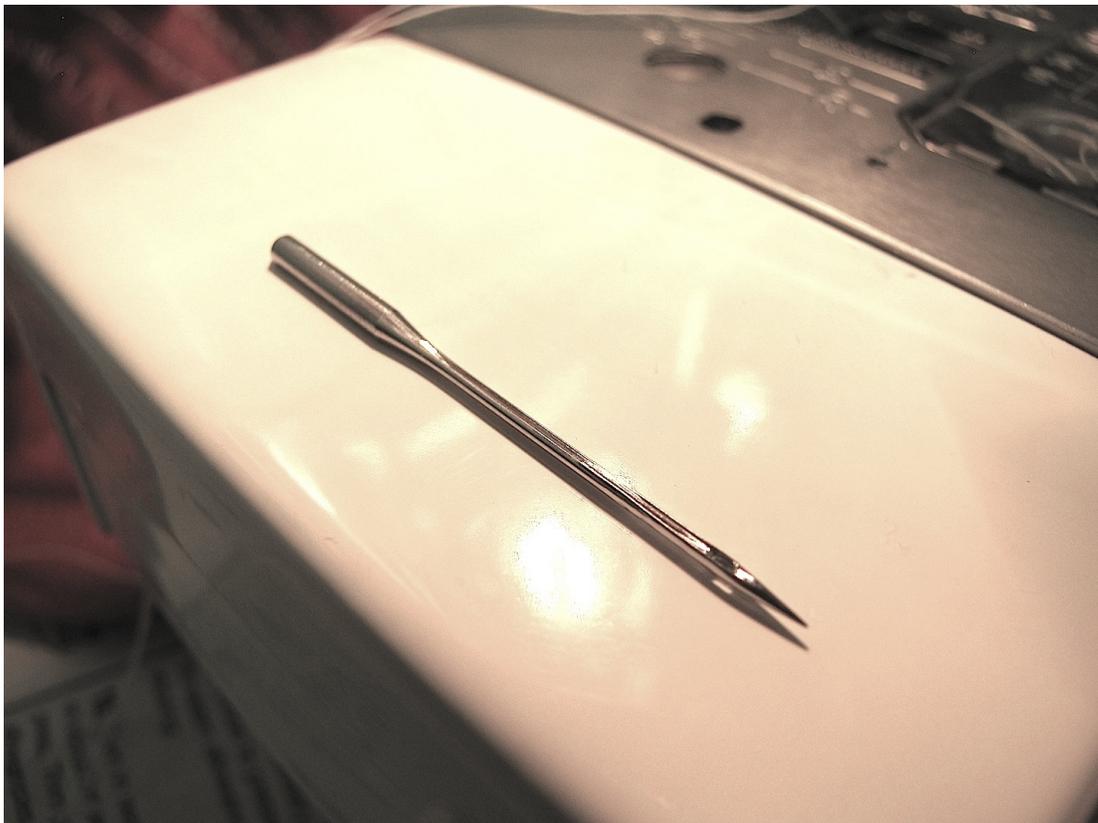


Figure 11: Needle Circular side Faces the Front, Flat Side Faces the Back

15. **PUSH UP** the needle, as far as it will go and tighten the clamp screw firmly with the **SCREWDRIVER**. When inserting the needle into the needle clamp, make sure the flat side does **NOT FACE YOU**. The side that does face you has a groove on the front of the needle(Figure 12,13). This groove allows for frictionless movement of the thread into the needle hole.



**Figure 12: Sewing Needle**



**Figure 13: Front Side of Sewing Needle Round Top Edge and Groove**

Note: Check the needle for straightness, by placing the needle onto something flat. The gap between the needle and the flat surface should be consistent from one side to the other (Figure 13).

16. Now it's time to check and change the **BOBBIN** if it is running low on thread. **PUSH** the **HOOK COVER PLATE** release **BUTTON** to the **RIGHT** and **REMOVE** the **PLATE** (Figure 14, 15).

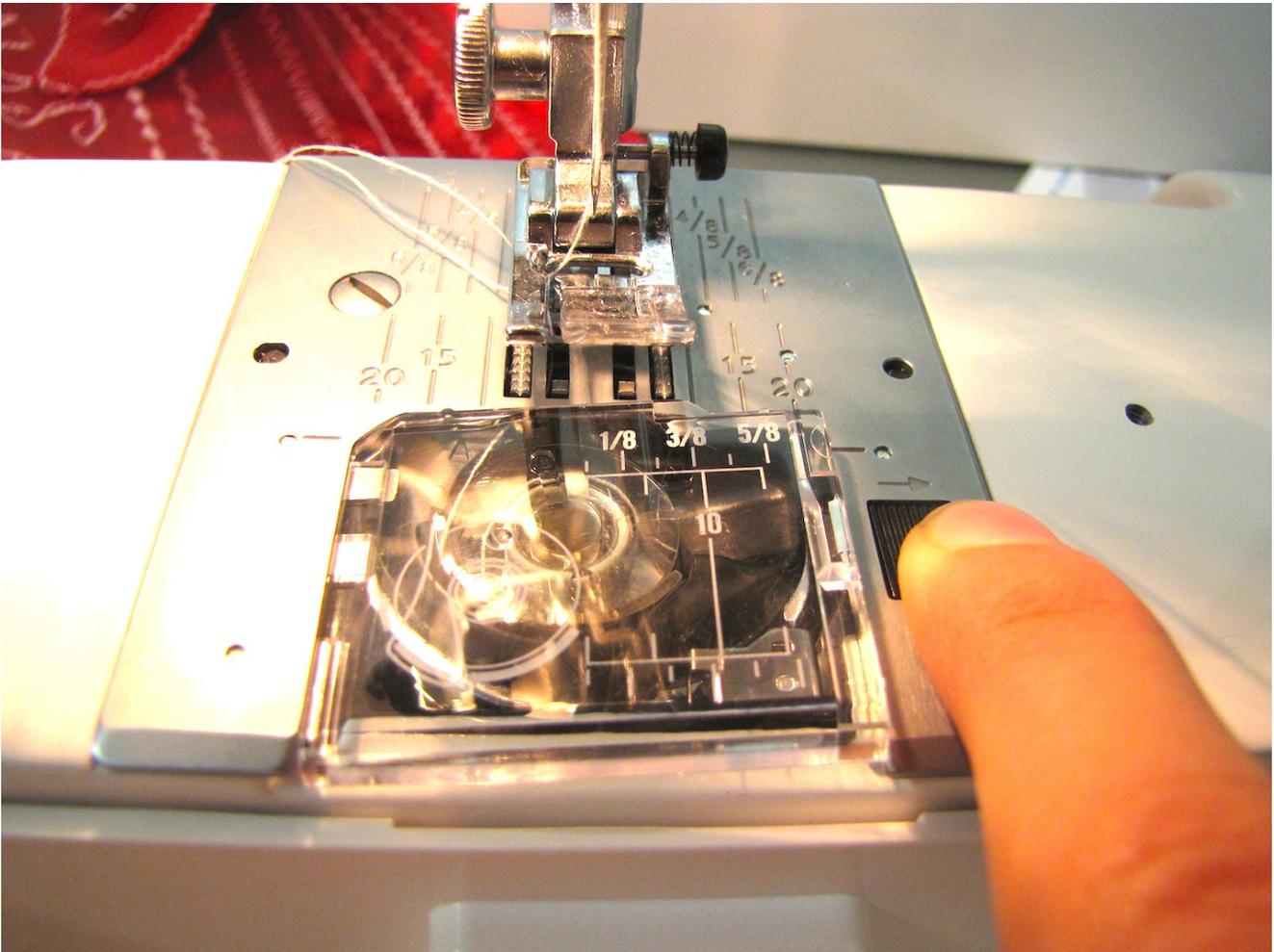
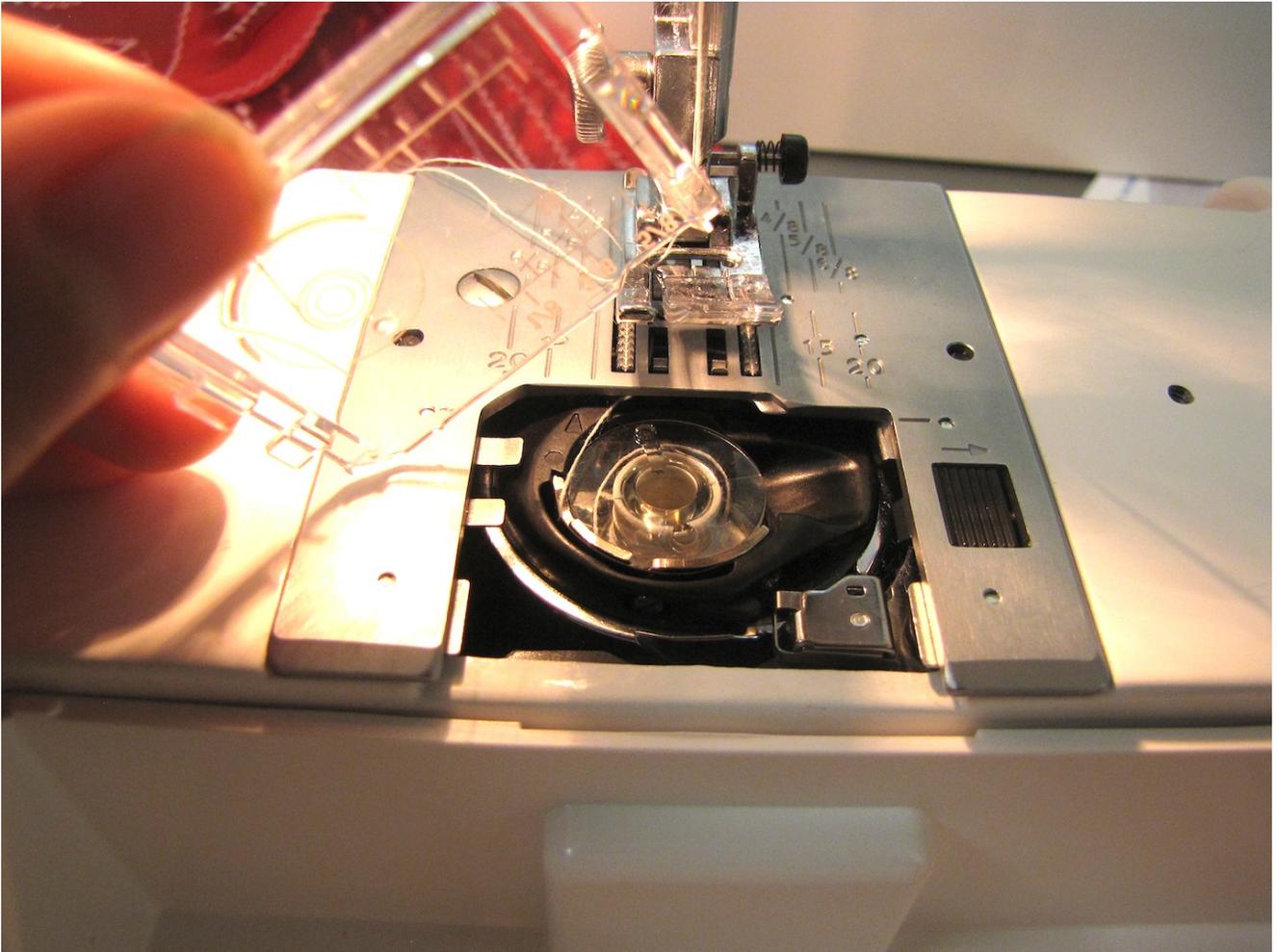


Figure 14: Hook Cover Plate Release Button



**Figure 15: Hook Cover Plate**

17. **LIFT** out the **BOBBIN** (Figure 16).

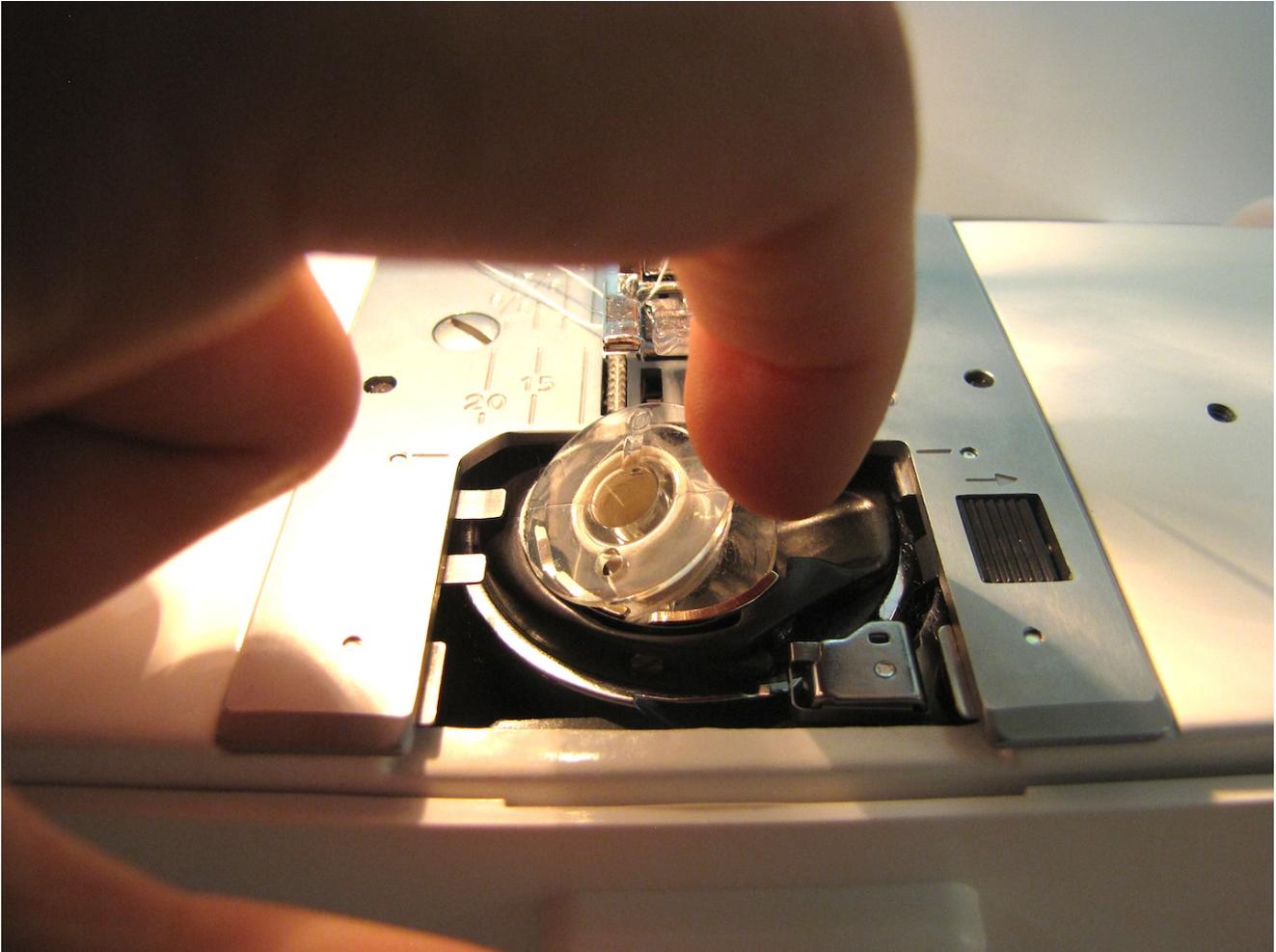


Figure 16: Bobbin Removal

18. Now we are ready to **FILL** the **BOBBIN**.

19. **POWER ON** the sewing machine.

20. **PULL OUT** the **HANDWHEEL** to **DISENGAGE** the **CLUTCH**. Pull the smaller circle offset within the HandWheel (Figure 7).



**Figure 17: HandWheel Clutch Disengagement**

21. Draw out the thread from the spool and follow Figures 18-21 as your thread guide.



**Figure 18: Thread drawn from Spool**



Figure 19: Thread Guide 1



Figure 20: Thread Guide 2

22. **INSERT** the thread through the **HOLE** of the **BOBBIN**, threading from the inside to the outside (Figure 21).

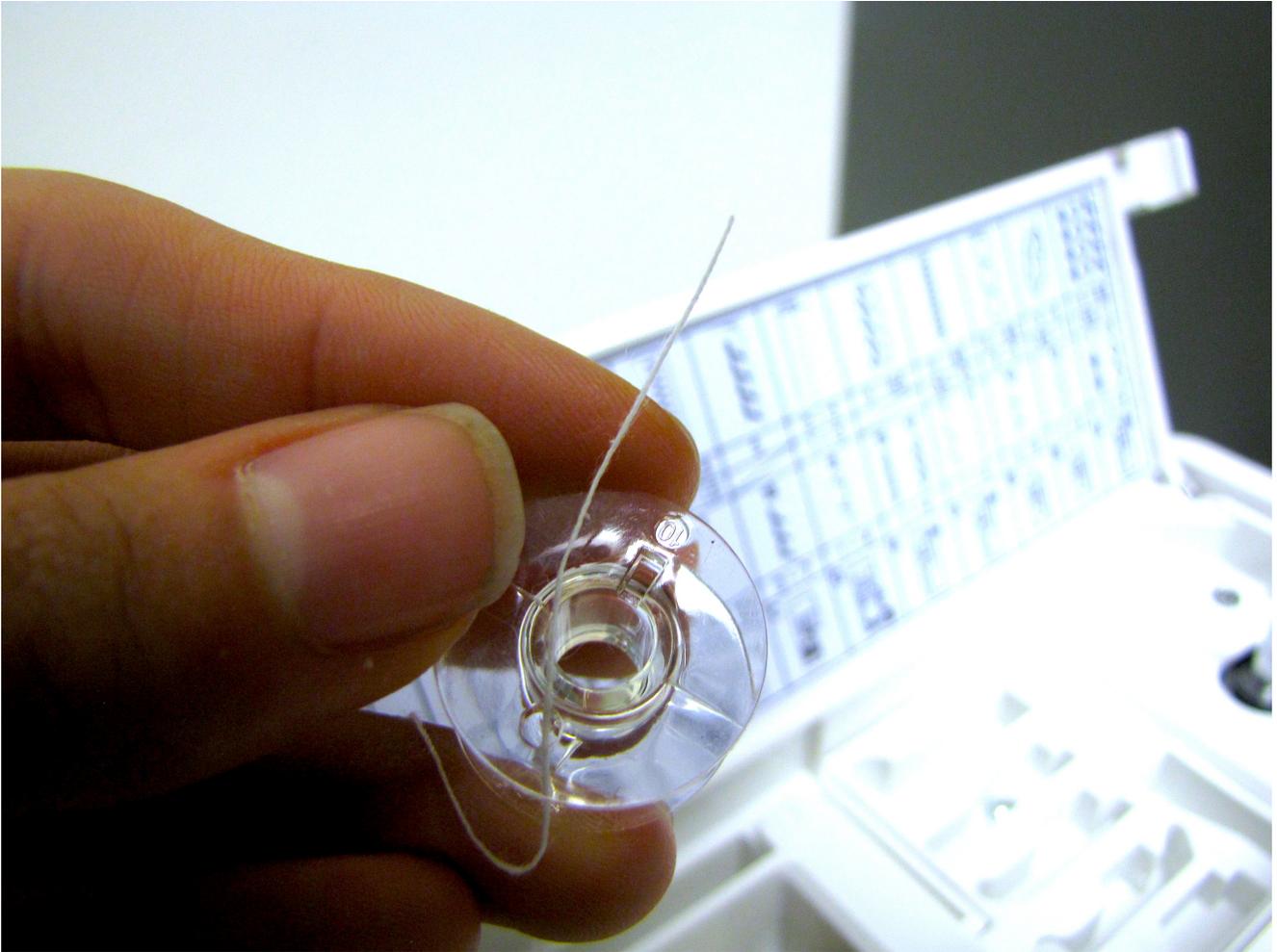


Figure 21: Thread Guide 3

23. Put the **BOBBIN** on the **BOBBIN WINDER SPINDLE** and **PUSH** to the **RIGHT**.



Figure 22: Moving Bobbin to the Right



**Figure 23: Bobbin Clicks as it Moves to the Right**

24. **HOLD** the free end of **THREAD** in your hand (Figure 24).

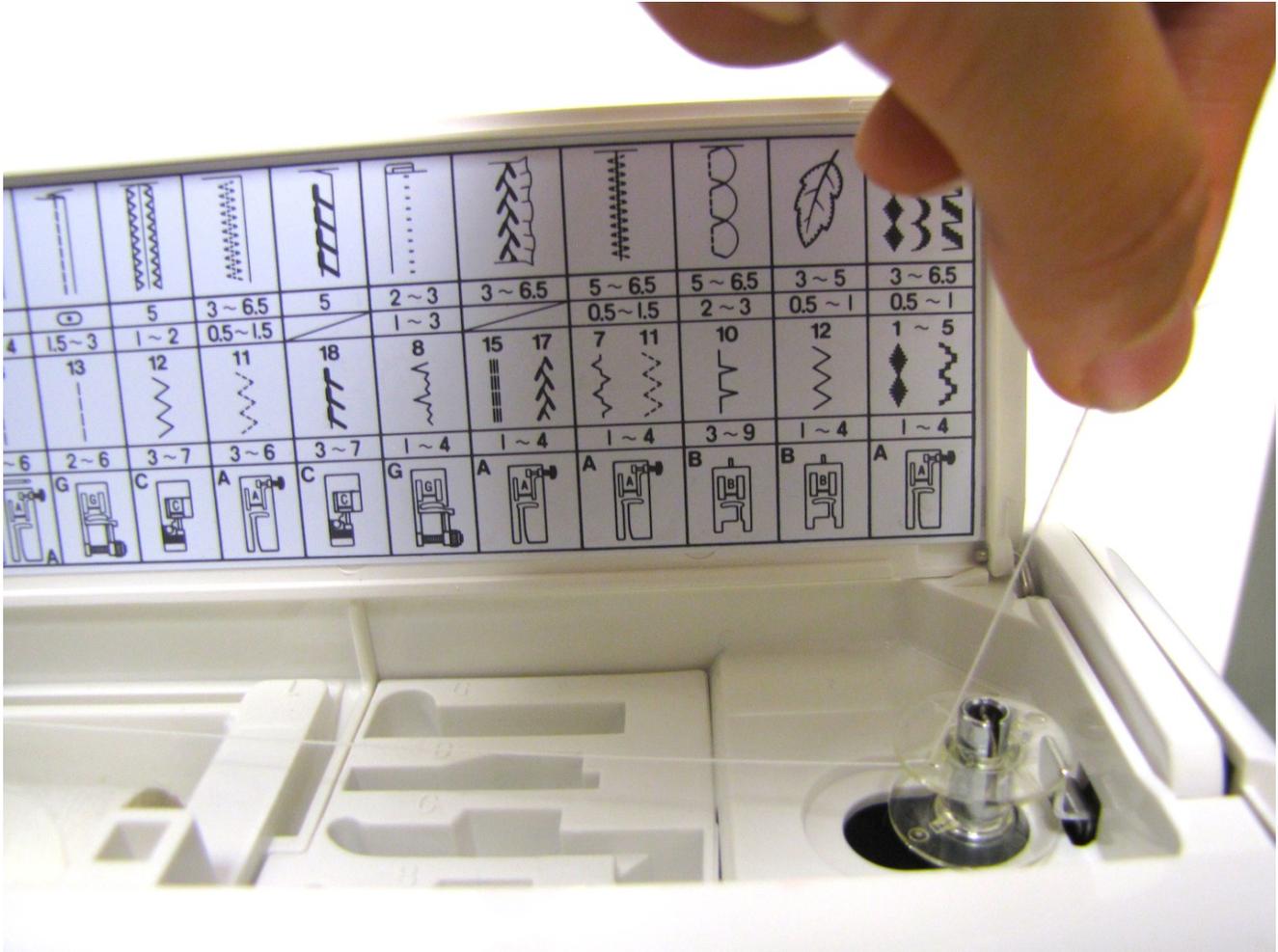


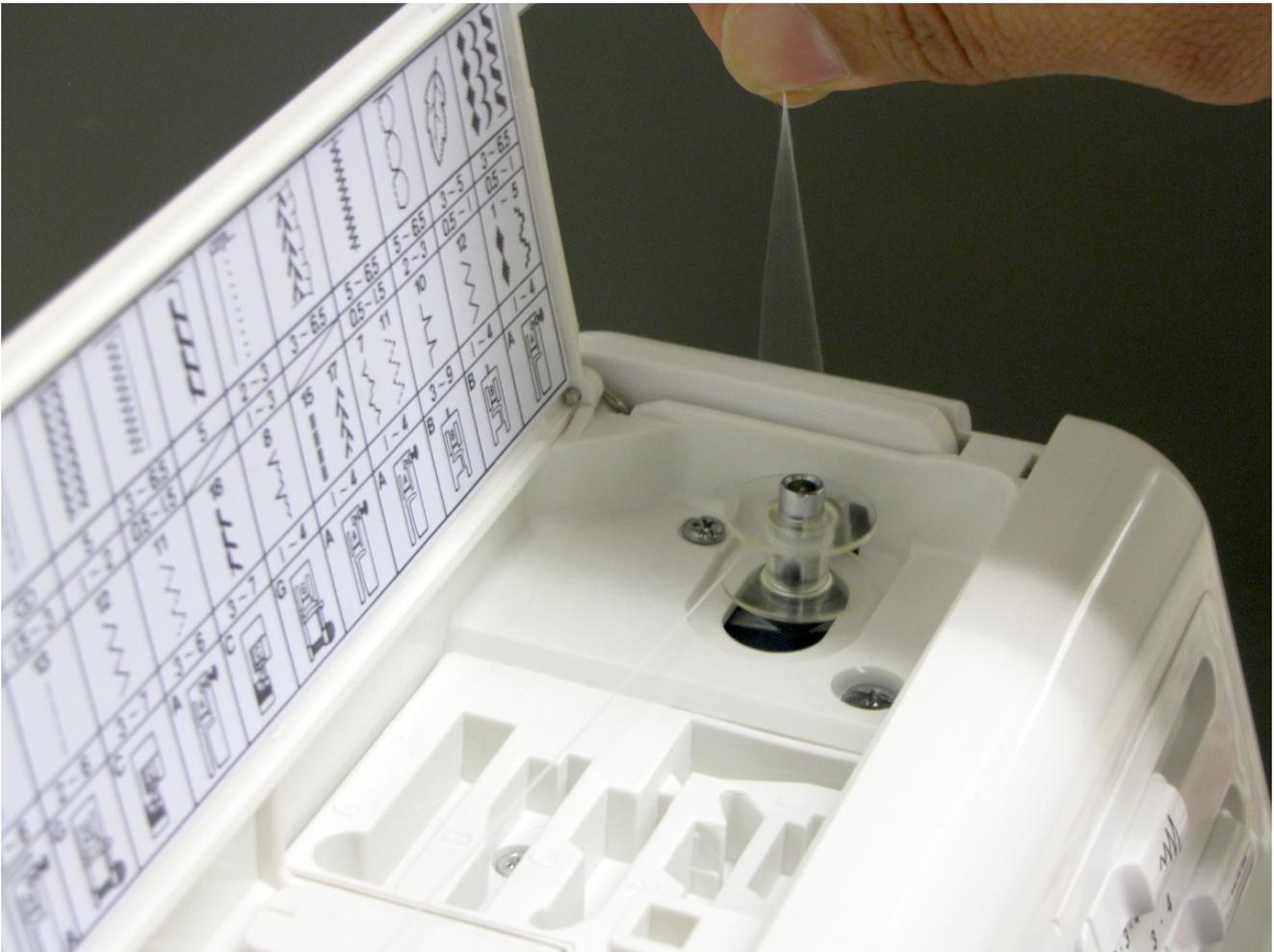
Figure 24: Bobbin Winder Spindle

25. **DEPRESS** the **FOOT CONTROL** (Figure 25).



**Figure 25: Foot Control**

26. Allow the machine to make a few turns as you **HOLD** the **THREAD** tight in your hand.



**Figure 26: Thread Held for Bobbin Winding**

27. After a few turns, take your foot **OFF** the **FOOT CONTROL** and **CUT** the **THREAD YOU ARE HOLDING** close to the **BOBBIN HOLE** (Figure 27).



**Figure 27: Extra Thread Cut**

28. Depress foot control again until the **BOBBIN** is **FULLY WOUND**. The winding will stop automatically when the bobbin is full (Figure 28).



Figure 28: Bobbin Automatically Stops When Full

29. **PUSH** bobbin winder spindle **BACK** to the original position, towards the left again (Figure 29).



**Figure 29: Bobbin Winder Spindle in Original Position**

30. You can **REMOVE** the **BOBBIN** from the **BOBBIN WINDER SPINDLE** and **CUT** the thread which connects to the spool(Figure 18). Now you are ready to install the bobbin to use.



Figure 30: Removing the Bobbin from the Bobbin Winder Spindle

31. Now we will **PLACE** the **BOBBIN** back into the **BOBBIN HOLDER**.

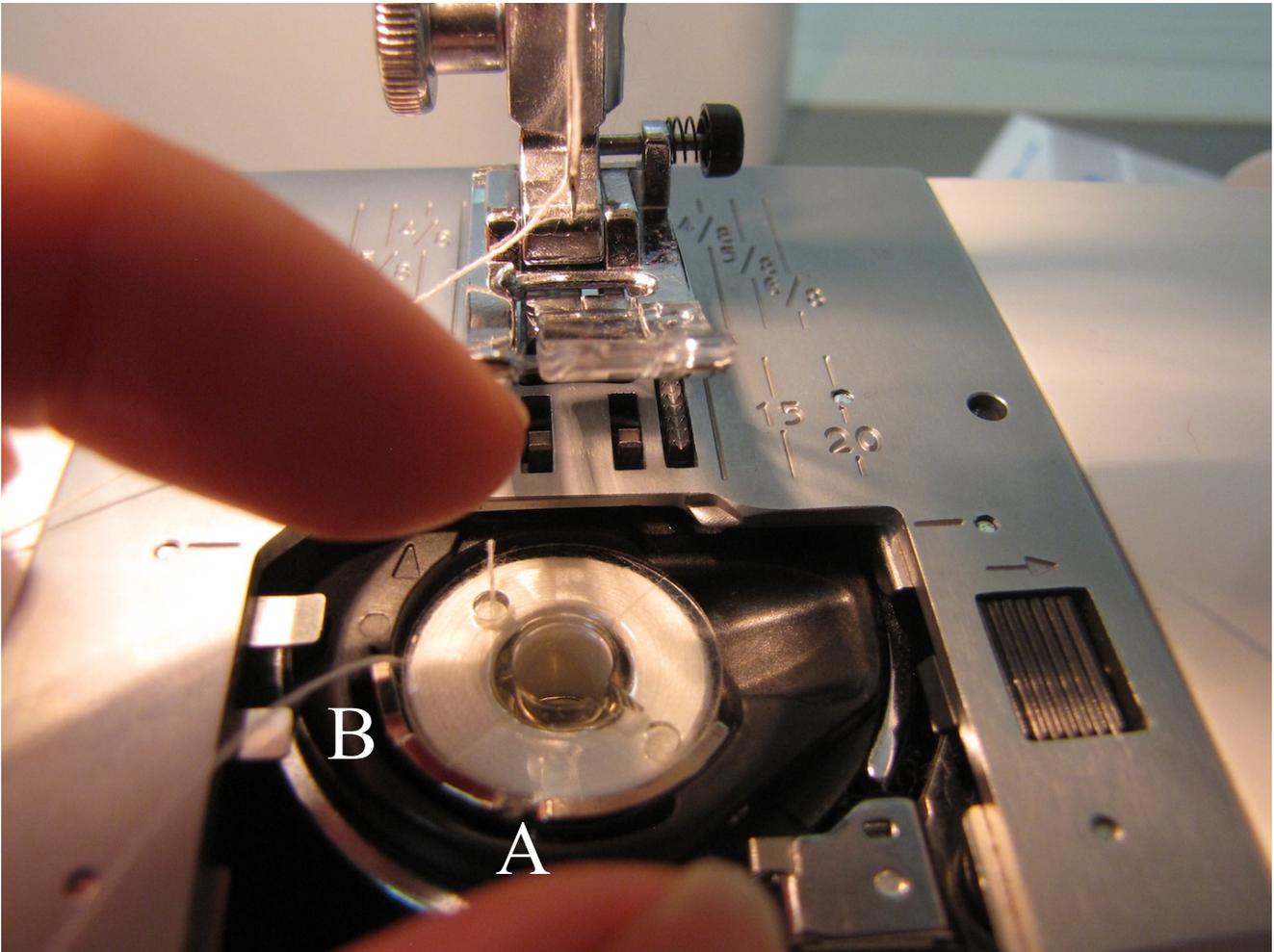
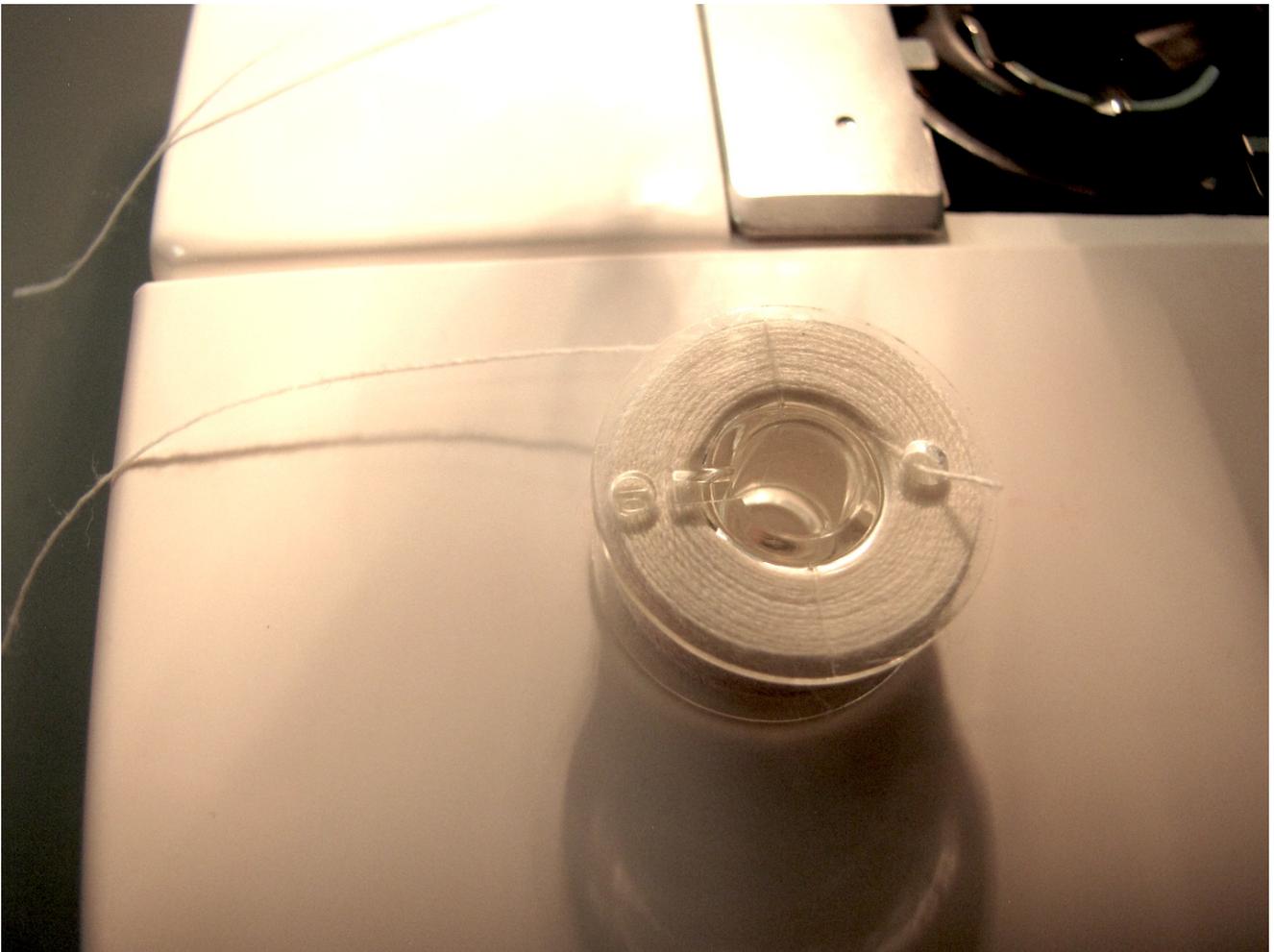


Figure 31: Thread is Counter-Clockwise

32. Place the **BOBBIN** in the **BOBBIN HOLDER** with the tread running **COUNTER-CLOCKWISE** (Figure 32).



**Figure 32: Thread Counter Clockwise**

33. As you guide the thread down into the **NOTCH A**, **DRAW** the **THREAD** to the **LEFT** sliding it between the tension spring blades (Figure 33).

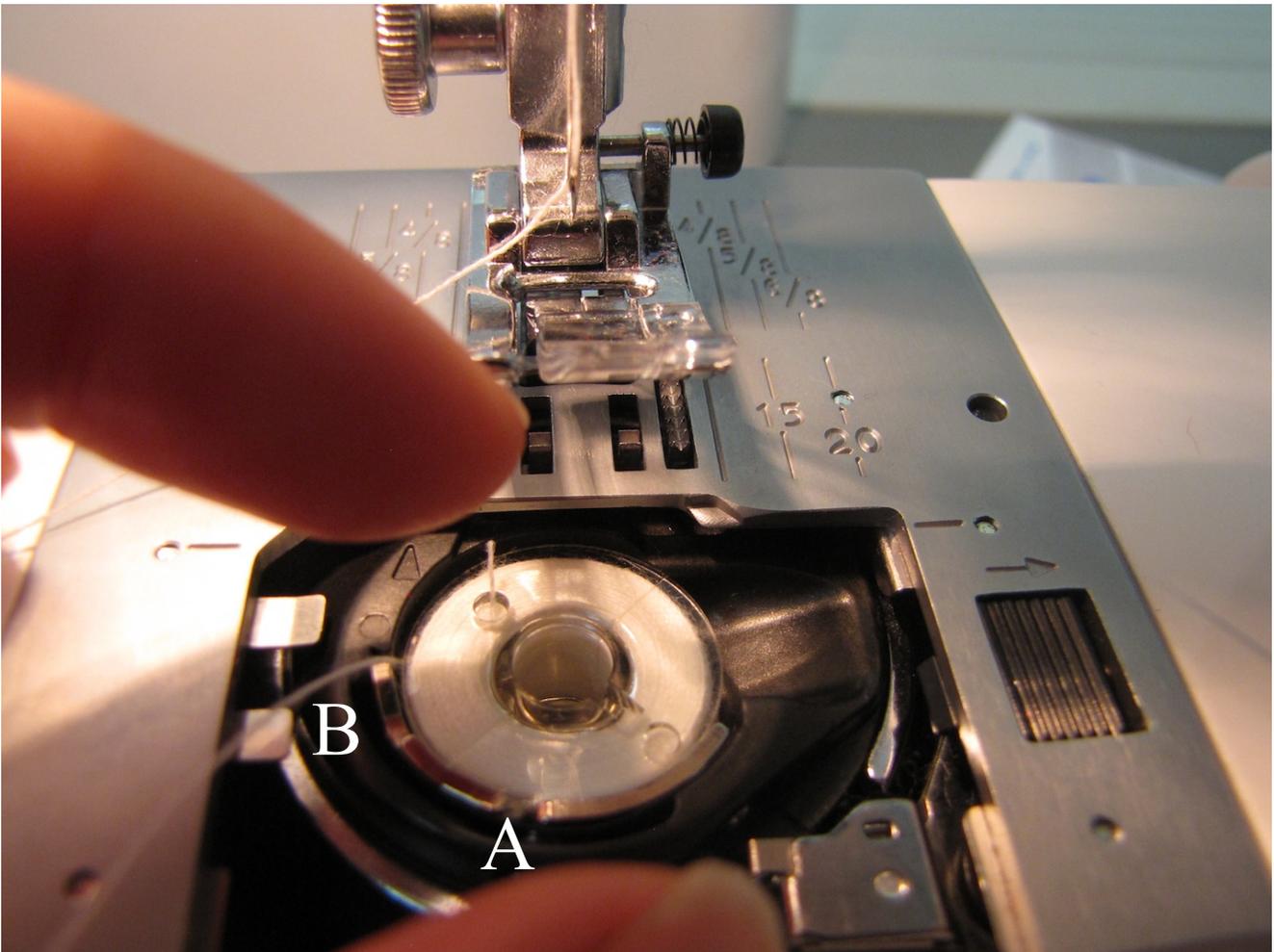


Figure 33: Thread ready to be pulled down for insertion into Notch A.

34. Continue to draw the thread lightly until the thread slips into **NOTCH B** (Figure 33).

35. **PULL OUT 6"** of thread and now attach the **HOOK COVER PLATE**.

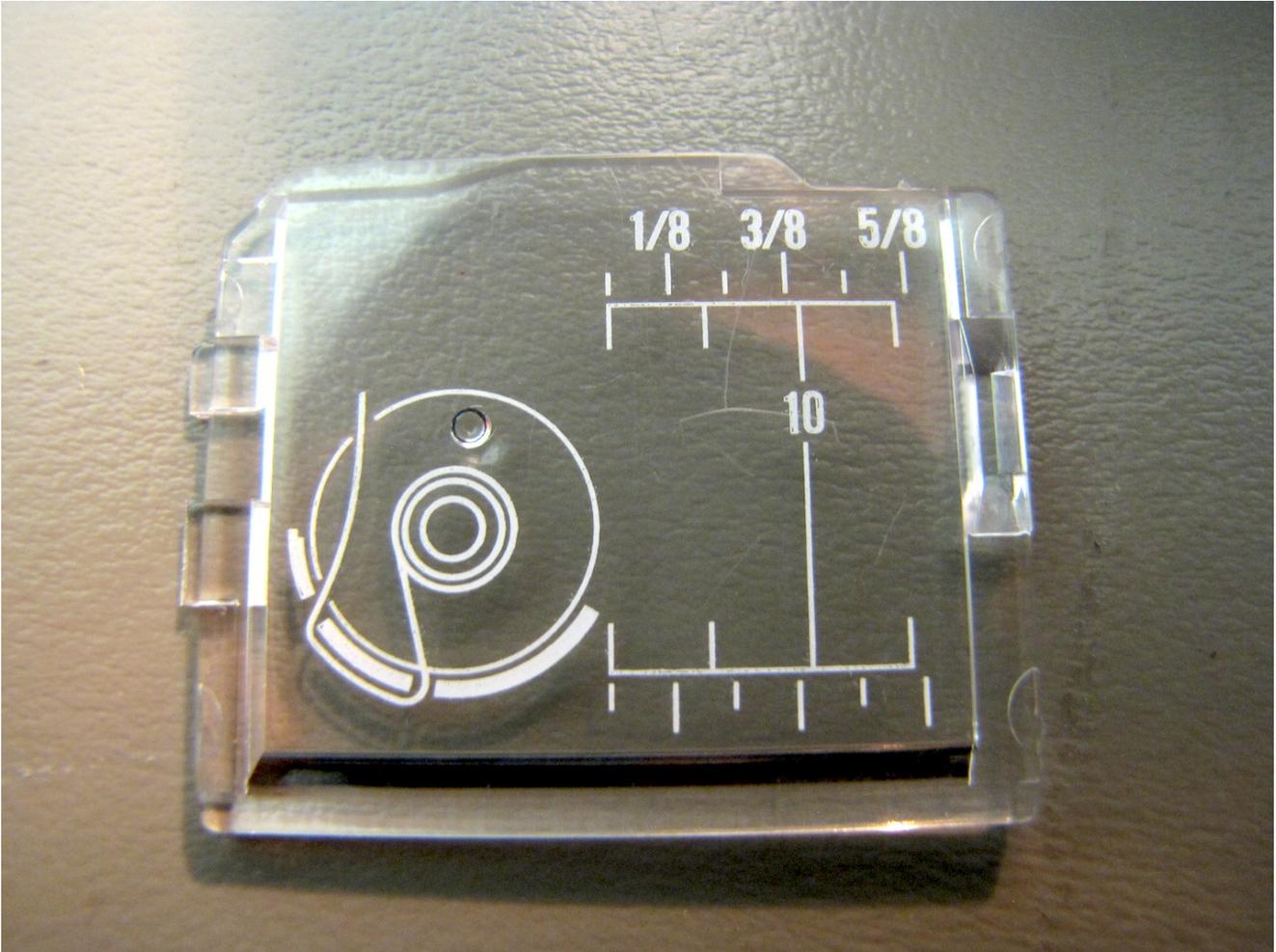


Figure 34: Inserting the Bobbin Diagram on Hook Cover Plate

36. **PULL OUT 6"** of thread and now attach the **HOOK COVER PLATE**.

37. Now we learn how to **THREAD** the **MACHINE**.

38. **RAISE** the **NEEDLE** to its highest position by turning the HandWheel toward you.

39. **RAISE** the **PRESSER FOOT** with the presser foot lever.

40. **POWER OFF THE MACHINE**.

41. Lead the **THREAD** from the **SPOOL** and **PASS THROUGH** the thread guide illustrated in Figures 35-42.



Figure 35: Thread Guide 1



Figure 36: Thread Guide 2



Figure 37: Thread Guide 3



Figure 38: Thread Guide 4



Figure 39: Thread Guide 5



**Figure 40: Thread Guide 6**



Figure 41: Thread Guide 7

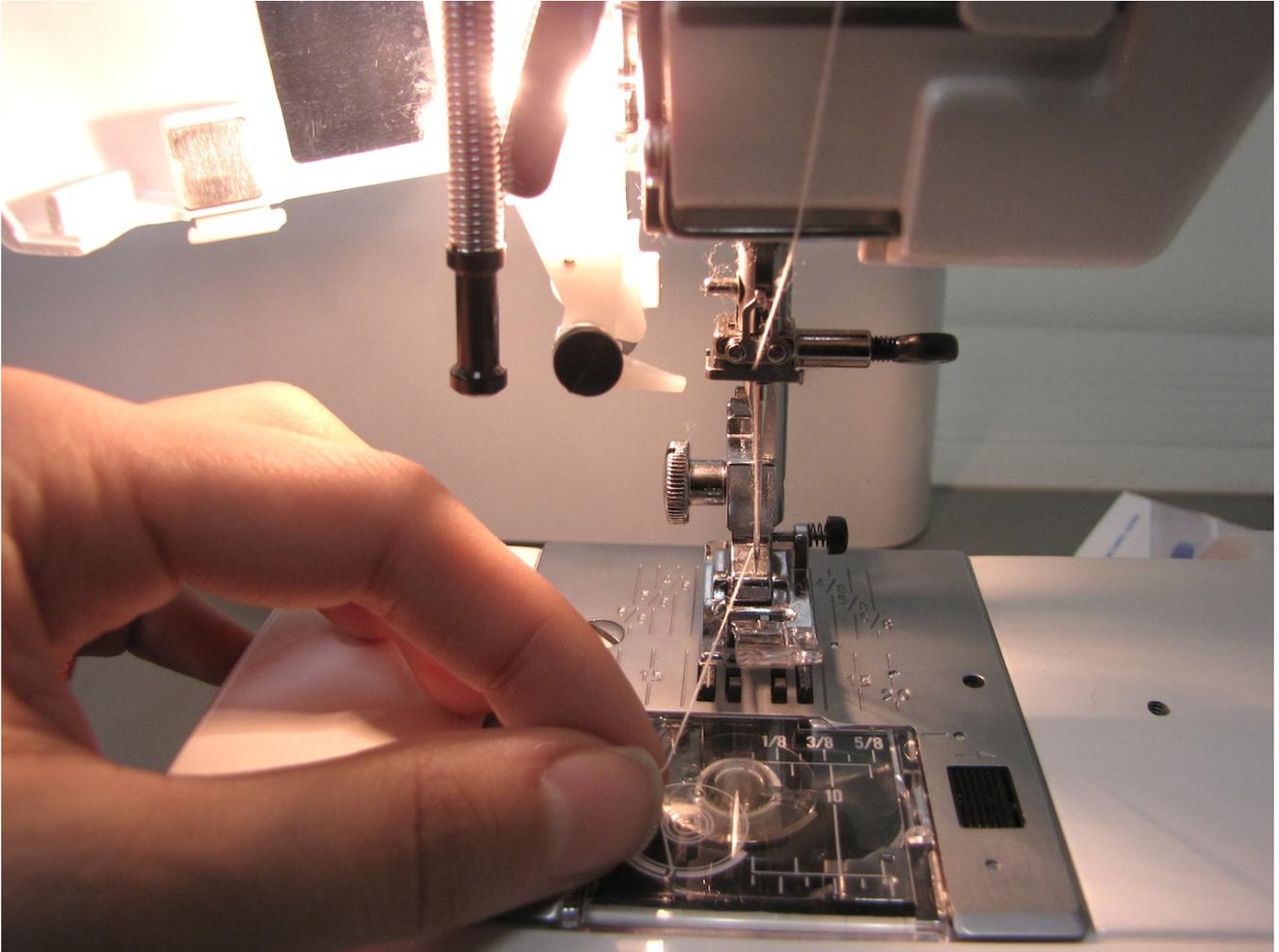
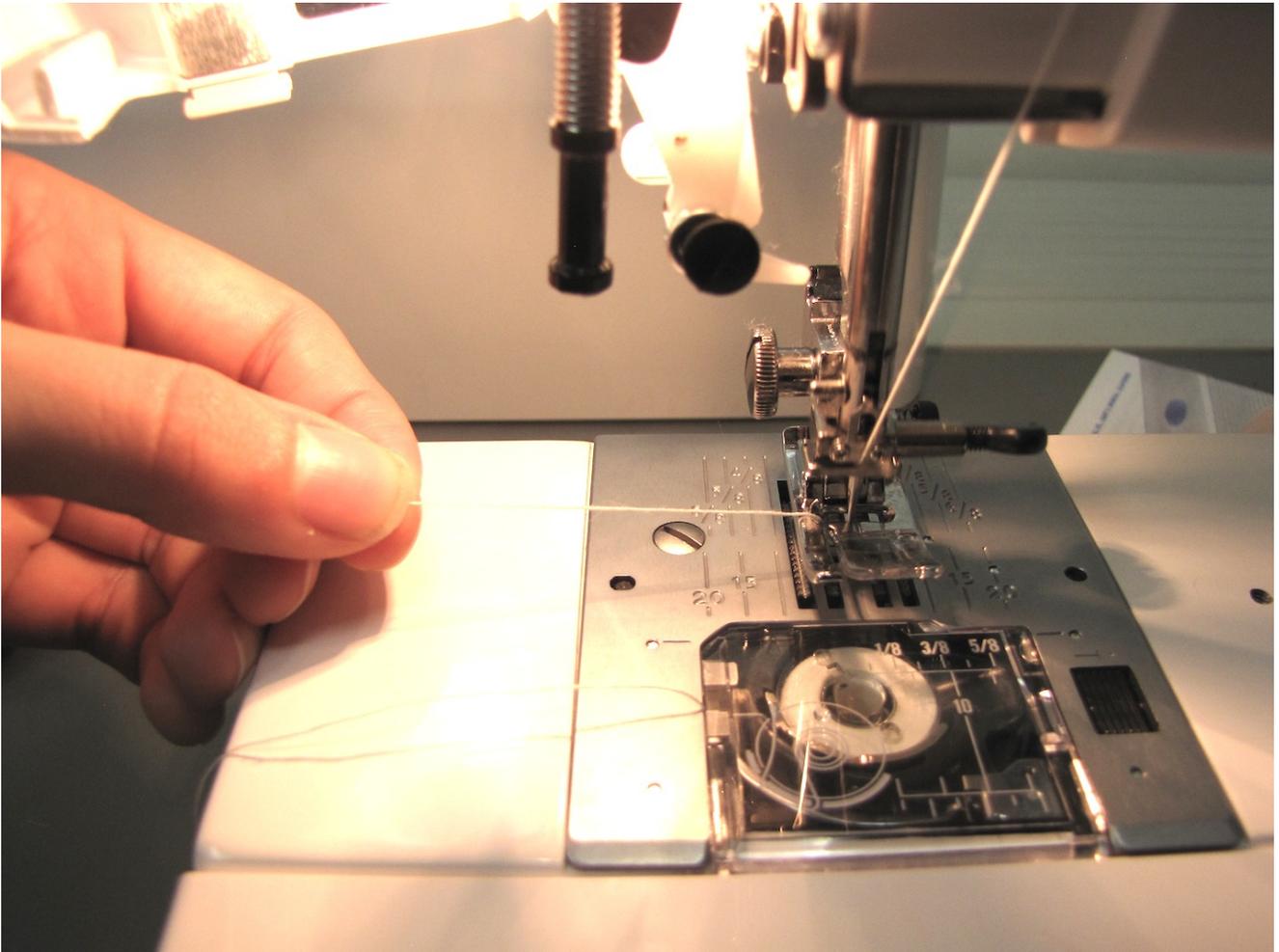


Figure 42: Thread Guide 8

42. Now we learn how to draw up **BOBBIN THREAD**.

43. **POWER ON** the **MACHINE**.

44. Raise the **PRESSER FOOT** and hold the **NEEDLE THREAD** lightly in your hand.



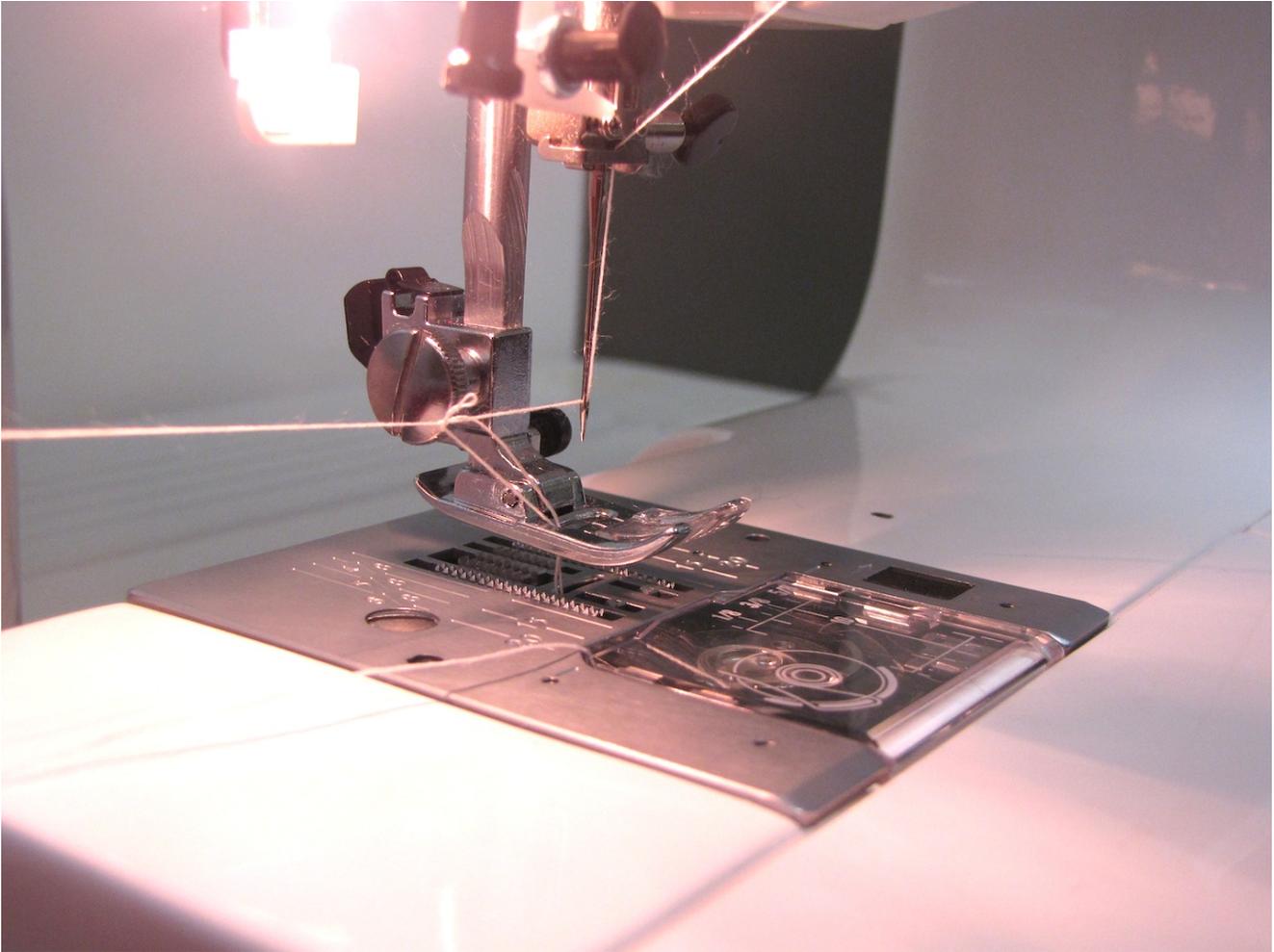
**Figure 43: Drawing Up Bobbin Thread**

45. Turn the HandWheel slowly towards you with your right hand until the needle goes down and continue turning HandWheel until the needle comes back up into it's highest position.



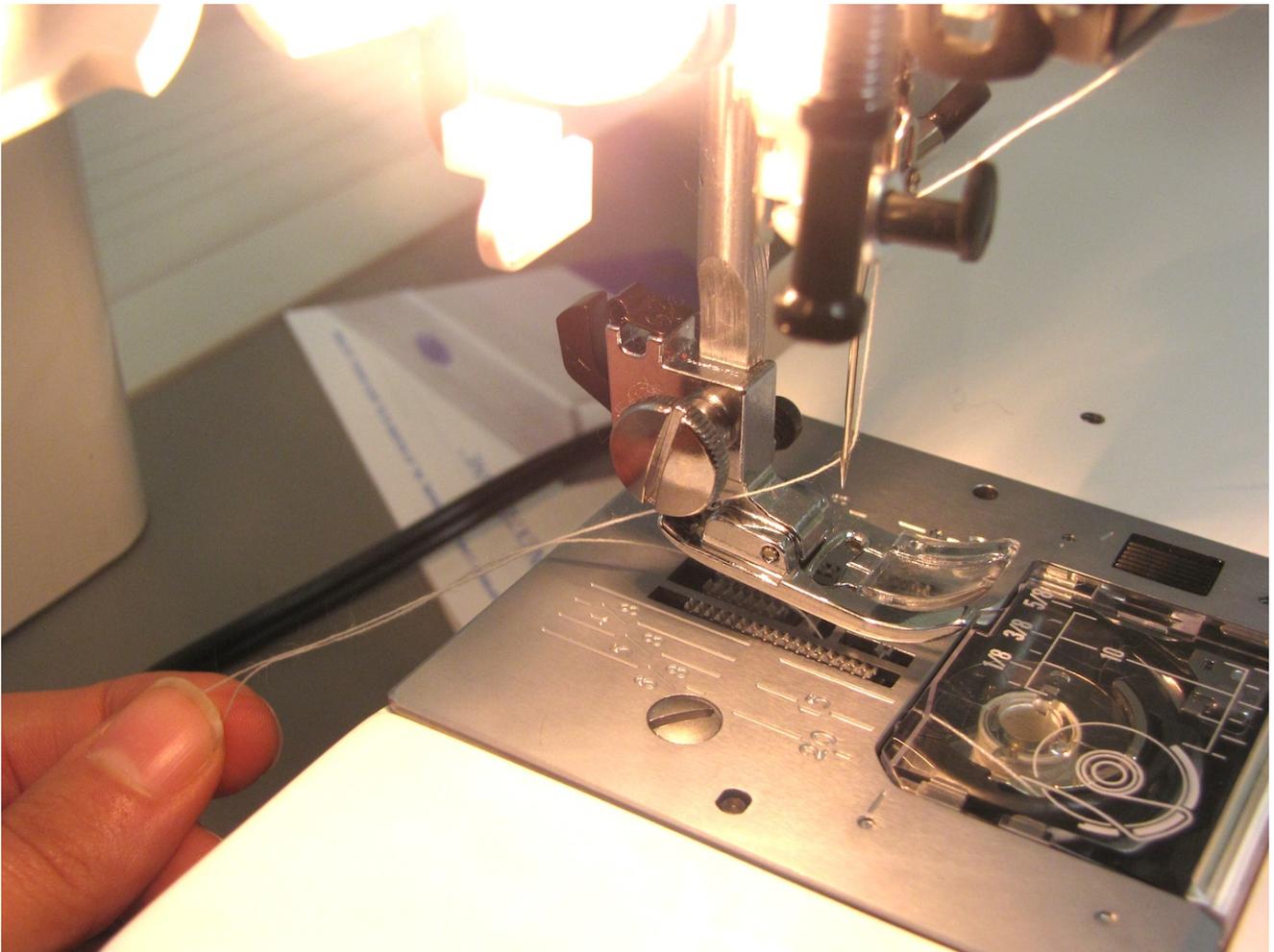
**Figure 44: Bobbin Thread**

46. It has now formed a loop. Lightly draw up the needle thread forming a loop of bobbin thread.



**Figure 45: Bobbin Thread Loop**

47. Pull 6” of both threads **BACK** and **UNDER** the **PRESSER FOOT**. You are now ready to sew.



**Figure 46: Both Threads Pulled Back**

48. To choose a stitch type in Figure 47, start by turning the dial(Figure 48) under the HandWheel, closest to the table and notice a red light under the stitch pattern selected.



Figure 47: Stitch Pattern Selection



**Figure 48: Dial that Controls Stitch Pattern Selection**

49. To change the width (top slider) and length (bottom slider) of your stitches in mm, you can adjust the sliders (Figure 49).

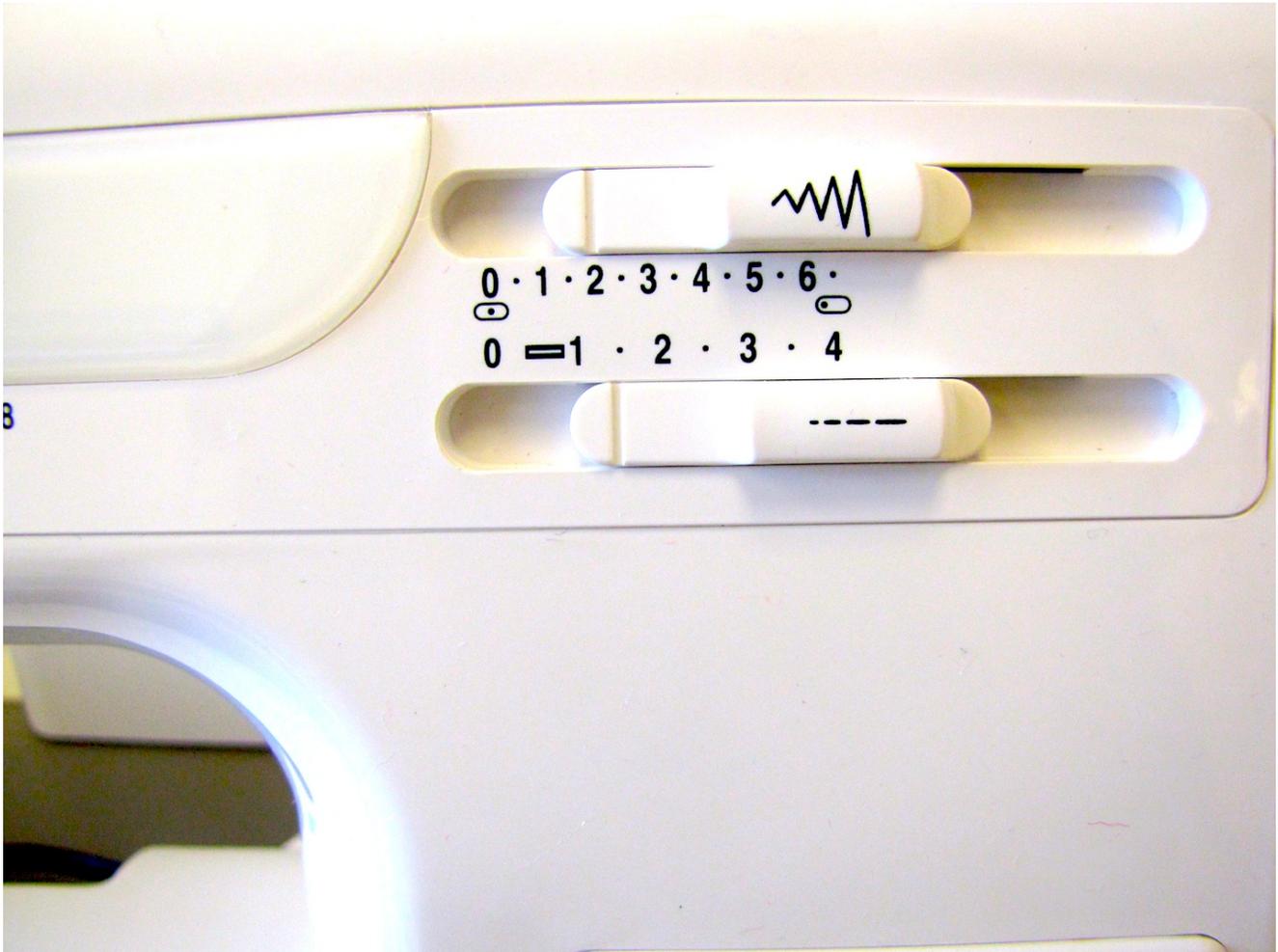


Figure 49: Stitch Width(Top) and Stitch Length(Bottom) Adjustment

50. **THREAD TENSION** and **NEEDLE PRESSURE** can also be adjusted with the dials illustrated in Figure 50.



Figure 50: Thread Tension and Needle Pressure Dials

51. To begin sewing, **RAISE** the **PRESSER FOOT** with the **PRESSER FOOT LEVER** and slide a piece of fabric underneath. **LOWER** the presser foot and press on the foot control gently to begin. Familiarize yourself with the various stitch patterns, dials, and speeds of foot control.



Figure 51: Test Fabric

52. Congratulations! You have successfully completed the Sewing Machine Training!

To learn more advanced techniques, please consult a SpaceShop staff member for more information.