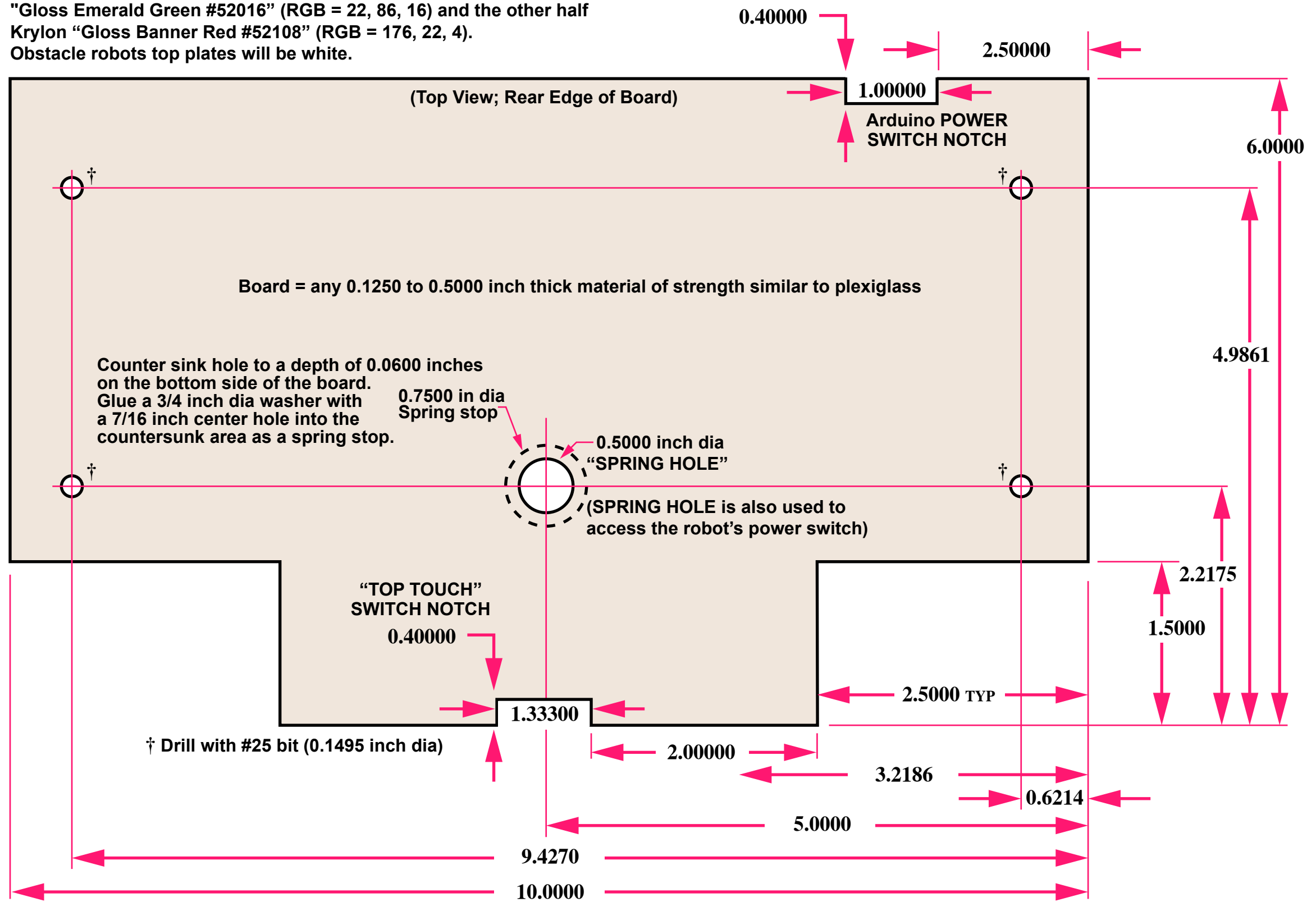


Half of the target robots will have the top plate painted with Krylon "Gloss Emerald Green #52016" (RGB = 22, 86, 16) and the other half Krylon "Gloss Banner Red #52108" (RGB = 176, 22, 4). Obstacle robots top plates will be white.



All dimensions are in inches ± 0.0001

ROBOT TOP PLATE

2016 © International Aerial Robotics Competition

Amazon.com top plate components with links:

Generic 100pcs 18mm Nylon M4 Threaded Hex Male-Female Standoff Spacer.

https://www.amazon.com/gp/product/B01913MSJW/ref=oh_aui_detailpage_o01_s00?ie=UTF8&psc=1

Generic 100PCS Metric M4 Black Nylon Hex Nut, Hexagonal.

https://www.amazon.com/gp/product/B0129DFFPK/ref=oh_aui_detailpage_o01_s00?ie=UTF8&psc=1

Nylon 6/6 Pan Head Machine Screw, Black, #2 Phillips Drive, M4-0.7 Thread Size, 20 mm Length, Fully Threaded, USA Made (Pack of 100)

https://www.amazon.com/gp/product/B00F339IPM/ref=oh_aui_detailpage_o02_s00?ie=UTF8&psc=1

Spring for top plate:

D. R. Templeman Company part number CFA-1050-0005-M compression spring.

D. R. Templeman Company, 1 Northwest Dr., Plainville, CT 06062
sales@drtempleman.com www.drtempleman.com

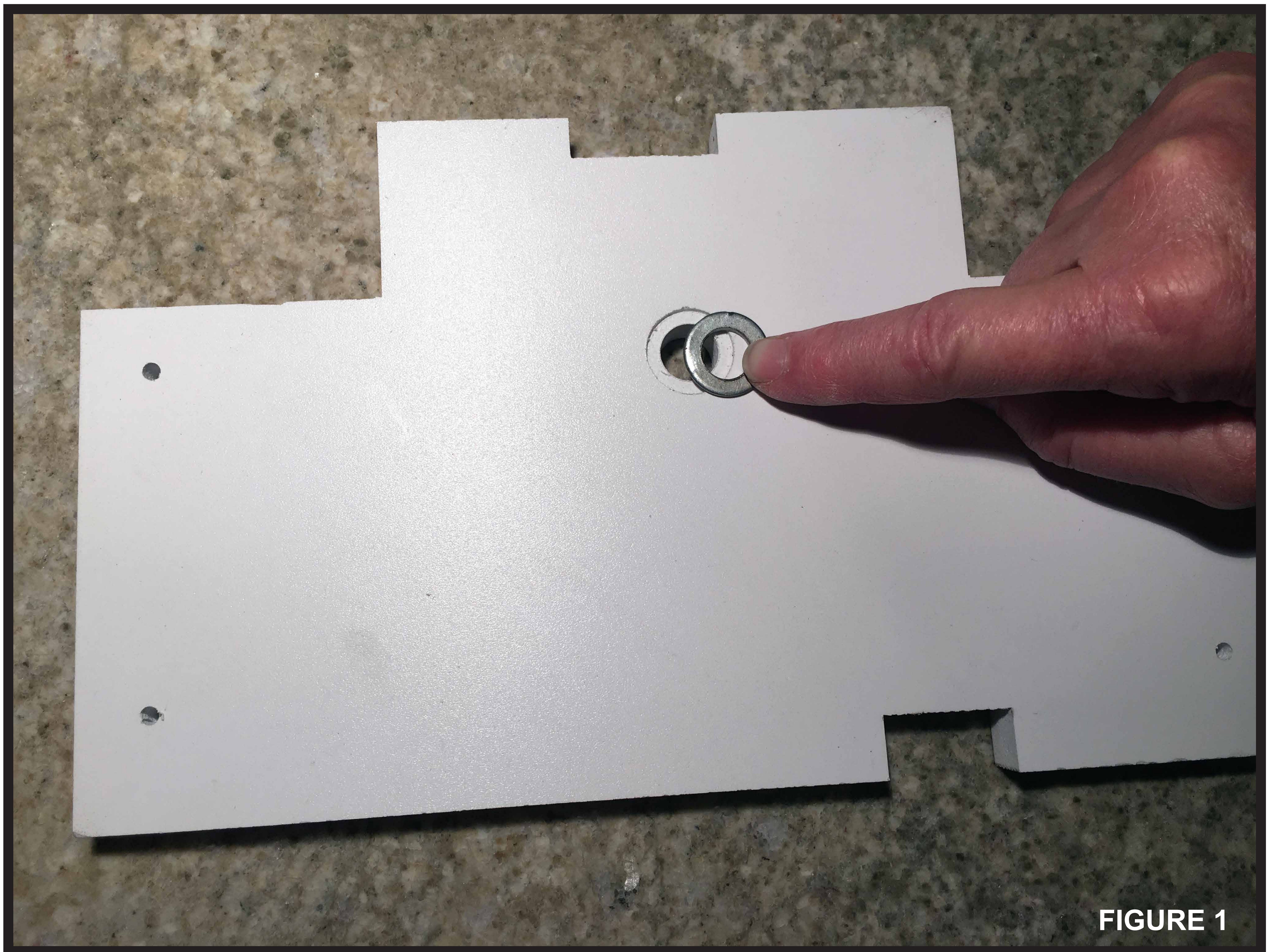
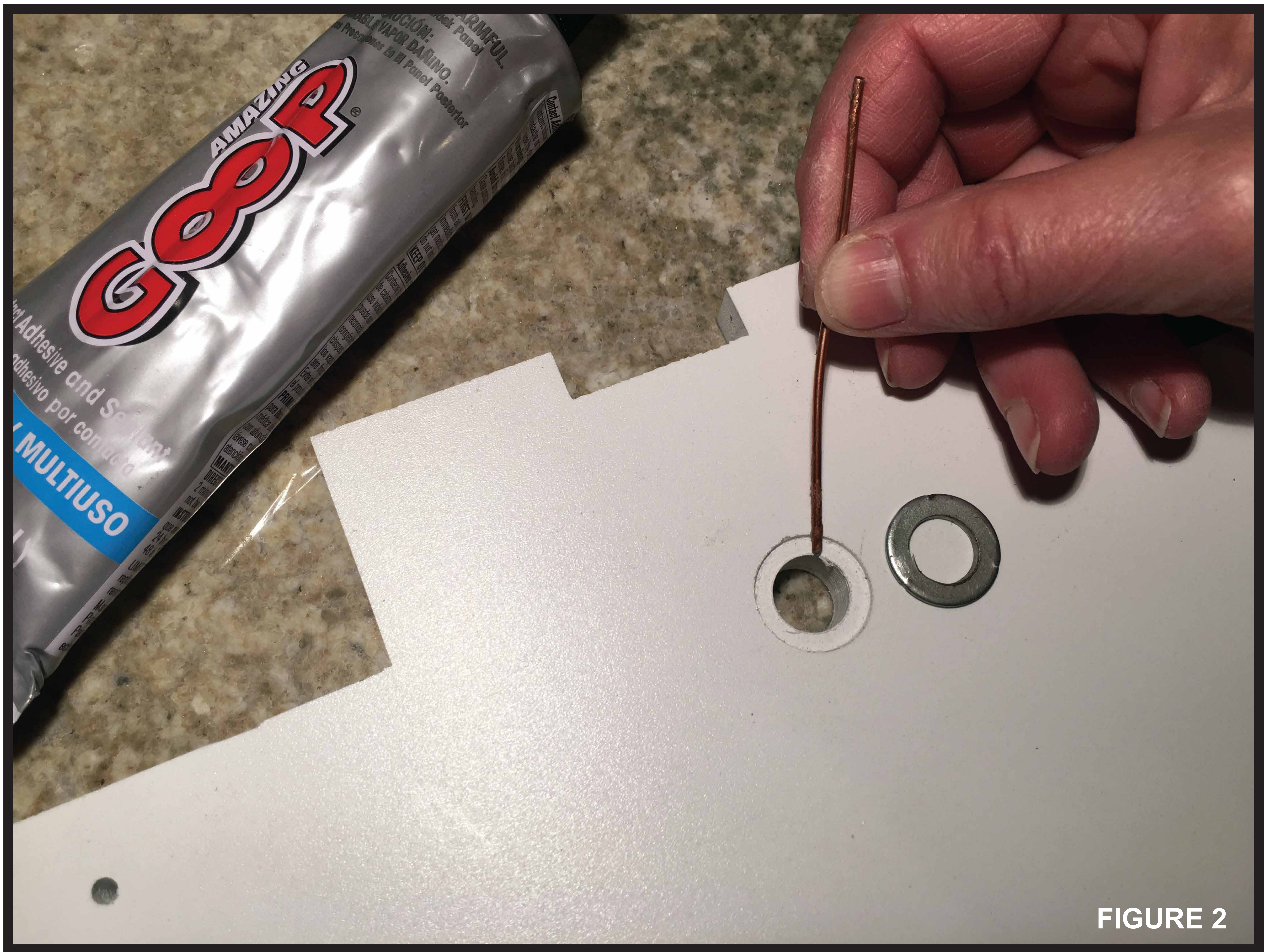


FIGURE 1

TARGET ROBOT CONSTRUCTION STEPS:

- 1. Cut out top plate based on engineering drawing (see).**
- 2. Mill a 0.75-inch indentation on the bottom of the plate as shown in Figure 1.**
- 3. This is exactly the diameter and depth/thickness of a U.S. penny (0.060"). Get or machine a 0.060" washer with an outside diameter of 0.75" and an inside diameter hole of 7/16".**



TARGET ROBOT CONSTRUCTION STEPS (continued):

4. Using an RTV adhesive or a product like "GOOP", glue the washer from Step 3 into the indentation on the bottom of the top plate.



TARGET ROBOT CONSTRUCTION STEPS (continued):

- 5. Flip the plate over to expose the top surface as shown, and paint either RED or GREEN using the recommended paint colors. Let dry and proceed to Step 6.**

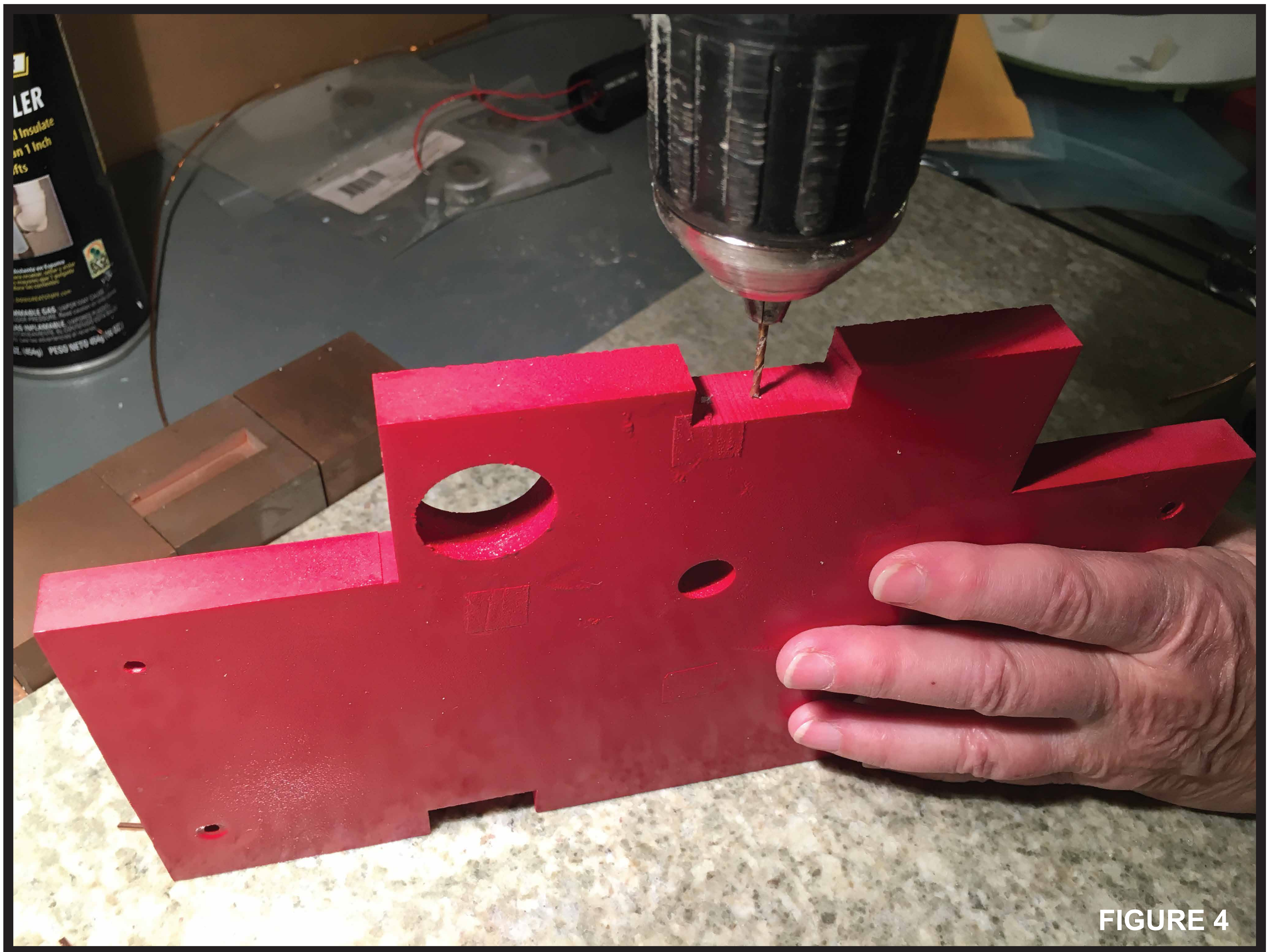


FIGURE 4

TARGET ROBOT CONSTRUCTION STEPS (continued):

- 6. Drill holes to accommodate #12 AWG bare copper wire to a depth of approximately 1/4". These holes will hold pins that position the micro switch of Figure 7 in place with the top of the switch even with the upper surface of the top plate. The micro switch has two holes which can be used as guides for drilling.**

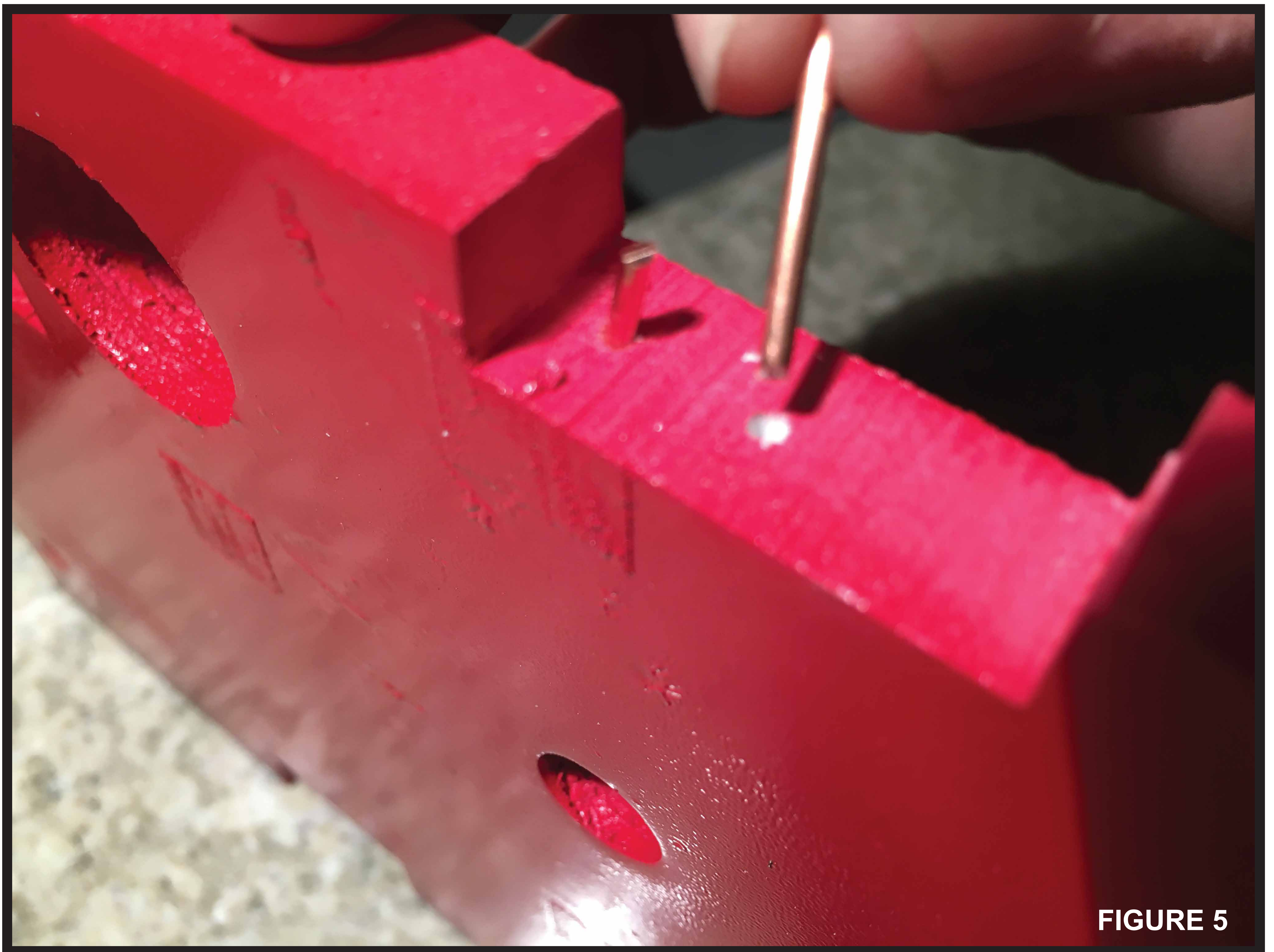


FIGURE 5

TARGET ROBOT CONSTRUCTION STEPS (continued):

7. Place #12 AWG bare copper wire pins in the drilled holes.

The micro switch will be registered in place with these pins. Once the micro switch has been placed, the pins can be cut off flush with the surface of the micro switch.



FIGURE 6

TARGET ROBOT CONSTRUCTION STEPS (continued):

- 9. Place glue along the area of the top plate that intersects the micro switch and then slide the micro switch into place over the registration pins as shown in Figure 7.**

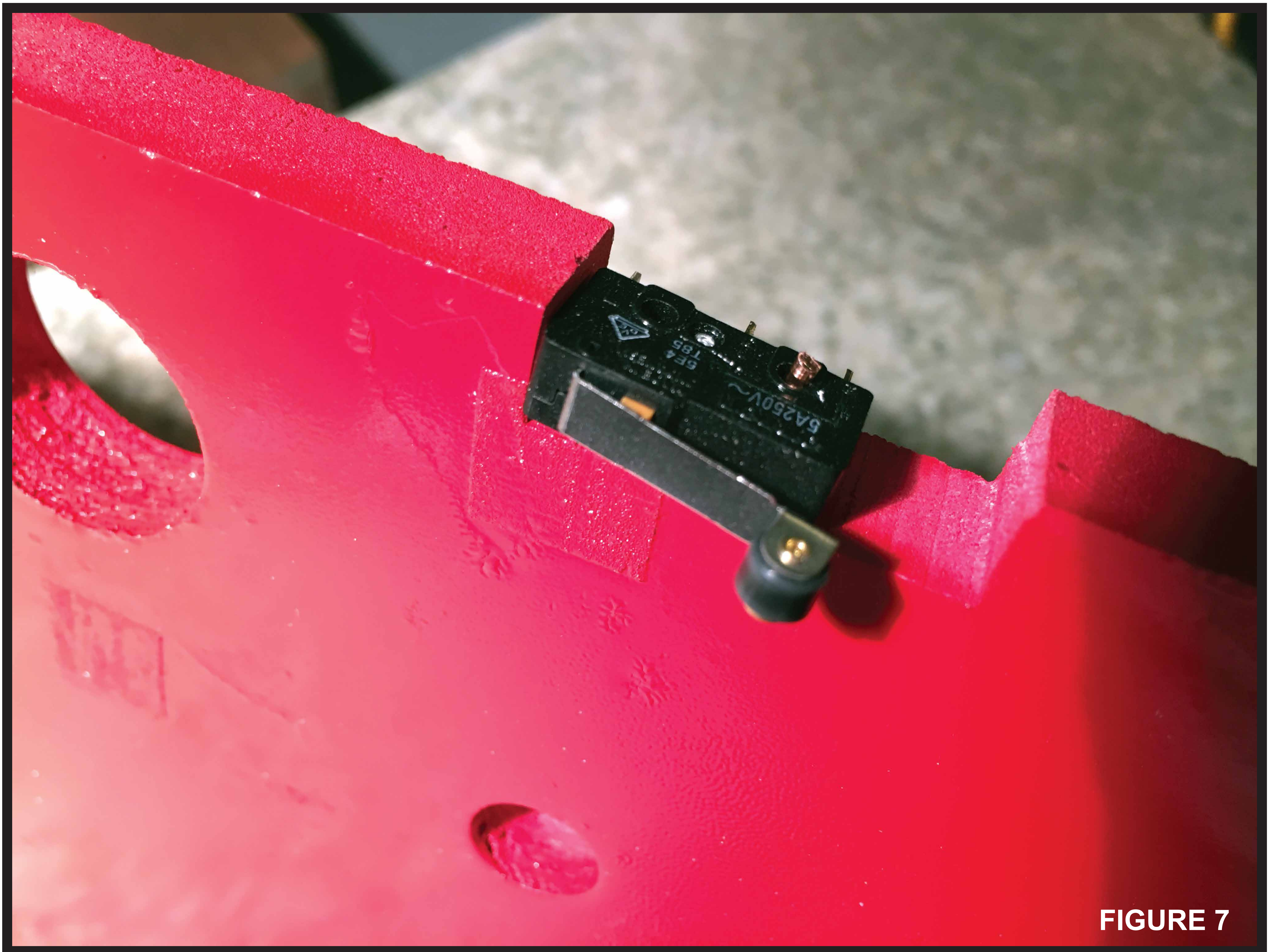


FIGURE 7

TARGET ROBOT CONSTRUCTION STEPS (continued):

- 10. Be sure that the top of the micro switch plastic case is flush with the top surface of the top plate, and that the micro switch is biased to the left with the roller wheel at the end of the lever arm near the center of the notch in the top plate.**



FIGURE 8

TARGET ROBOT CONSTRUCTION STEPS (continued):

10. Next, glue the power switch into the rear edge of the top plate. Orient the switch to be OFF in the left position and ON when pushed to the right.



TARGET ROBOT CONSTRUCTION STEPS (continued):

11. The orientation of the two switches relative to the upper side of the top plate is as shown.

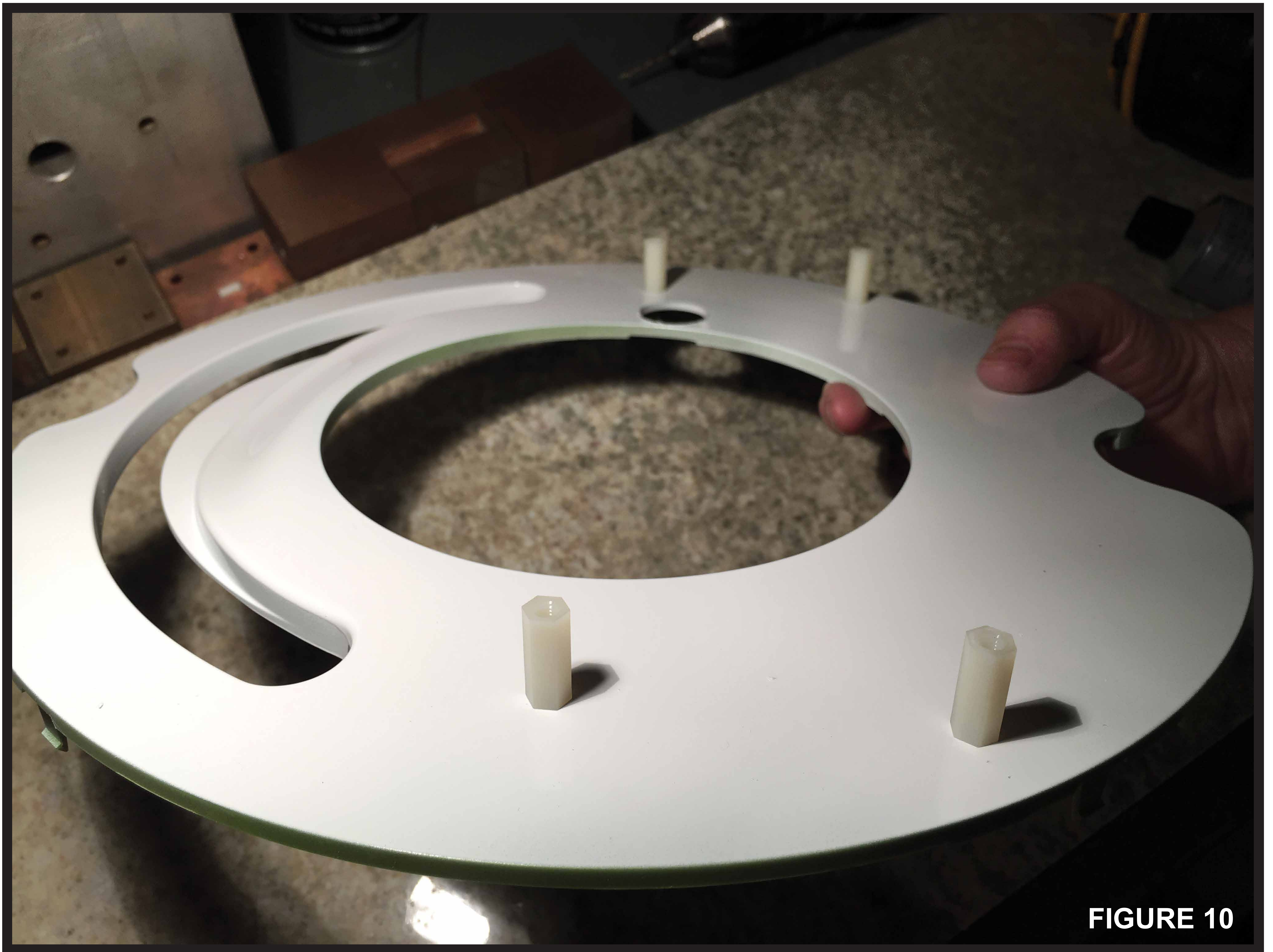


FIGURE 10

TARGET ROBOT CONSTRUCTION STEPS (continued):

- 12. After spray painting the Create 2 white (avoiding sensors or by keeping them covered with tape) take the top cover and install the four stand-offs as shown. These raise the top plate above the Create 2 top cover by about one inch to allow wires to pass beneath and to allow room to push the ON/OFF switch on top of the robot. Note that the stand-off hole locations are marked on the top cover plate. Also, the hole for the communications cable between the Arduino computer and the Create 2 must be drilled out (see this hole at 12-O'clock near one of the stand-offs in Figure 10).**



FIGURE 11

TARGET ROBOT CONSTRUCTION STEPS (continued):

- 13. Attach the top plate to the Create 2 top cover with four screws into the four stand-offs as shown. Be sure to orient the top plate with its micro switch edge toward the front of the Create 2's top cover.**

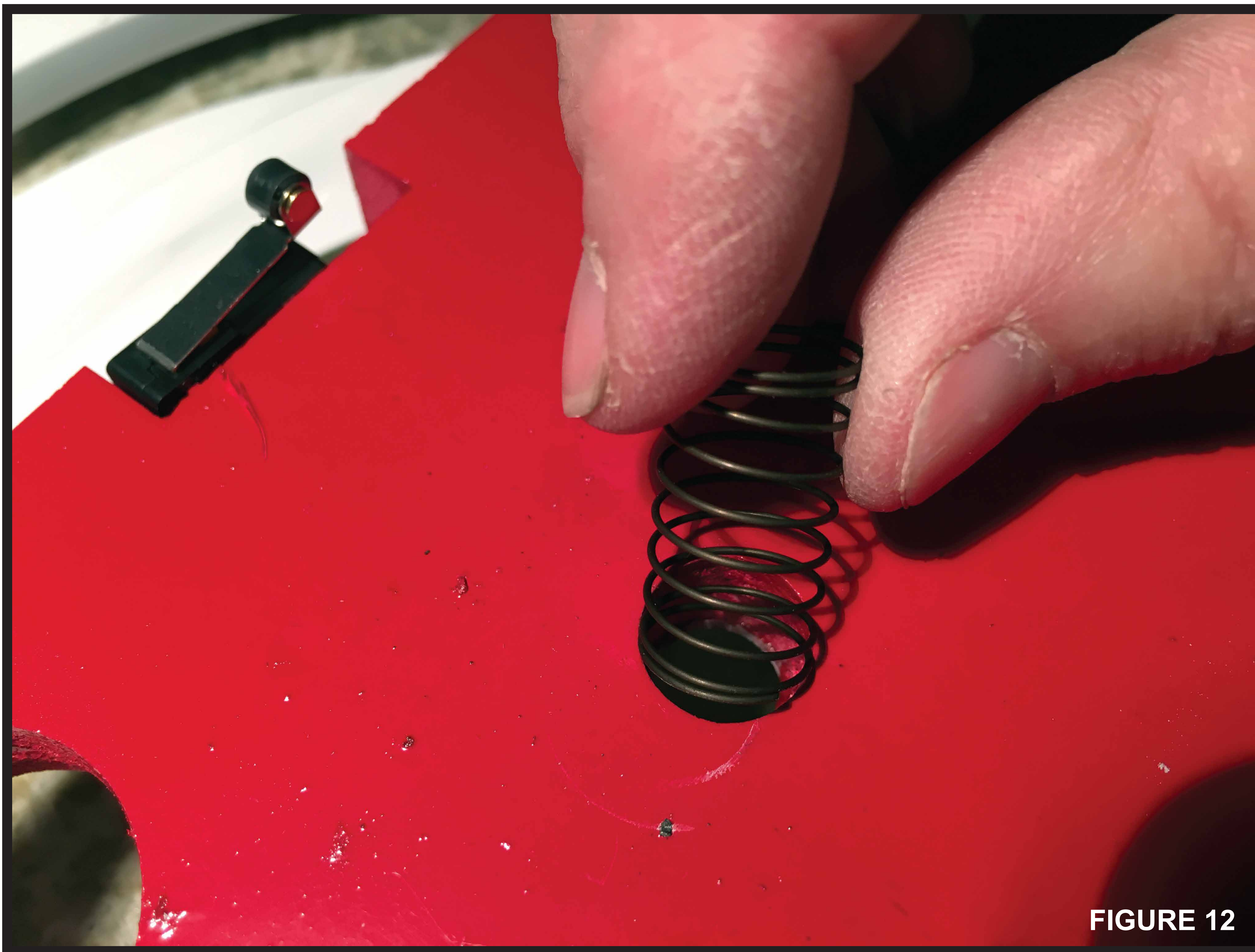


FIGURE 12

TARGET ROBOT CONSTRUCTION STEPS (continued):

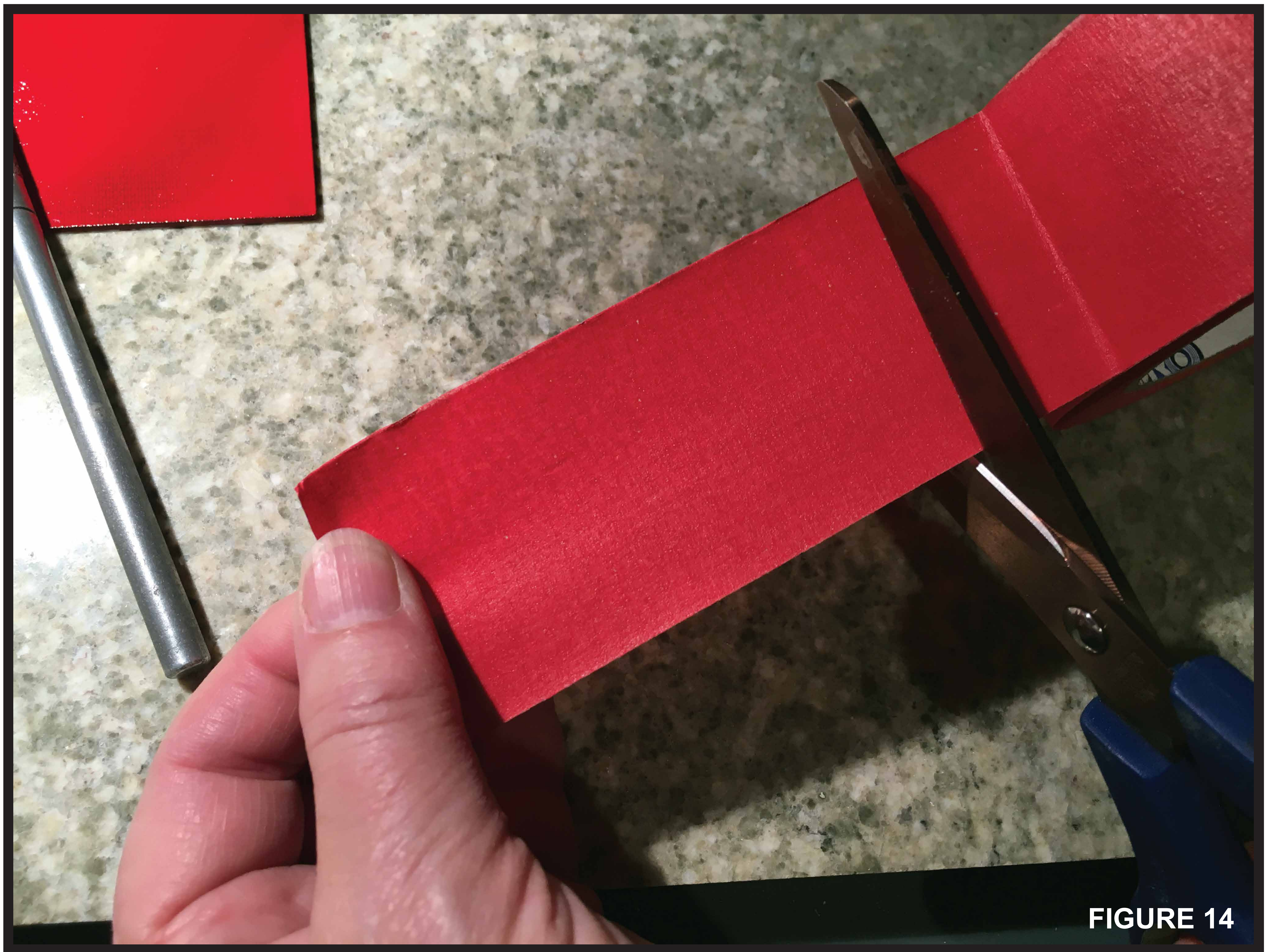
- 14. Insert the D.R. Templeman Company compression spring (Type CFA-1050-0005-M) into the hole with the glued-in washer to block the spring from pushing all the way through the hole.**



FIGURE 13

TARGET ROBOT CONSTRUCTION STEPS (continued):

- 15. This is how the D.R. Templeman Company compression spring (Type CFA-1050-0005-M) should look when in place. You are now ready to create the top pressure switch paddle.**



TARGET ROBOT CONSTRUCTION STEPS (continued):

- 16. The top pressure switch paddle is hinged to the top plate with red tape. Use a tape that is at least 2 inches wide.**

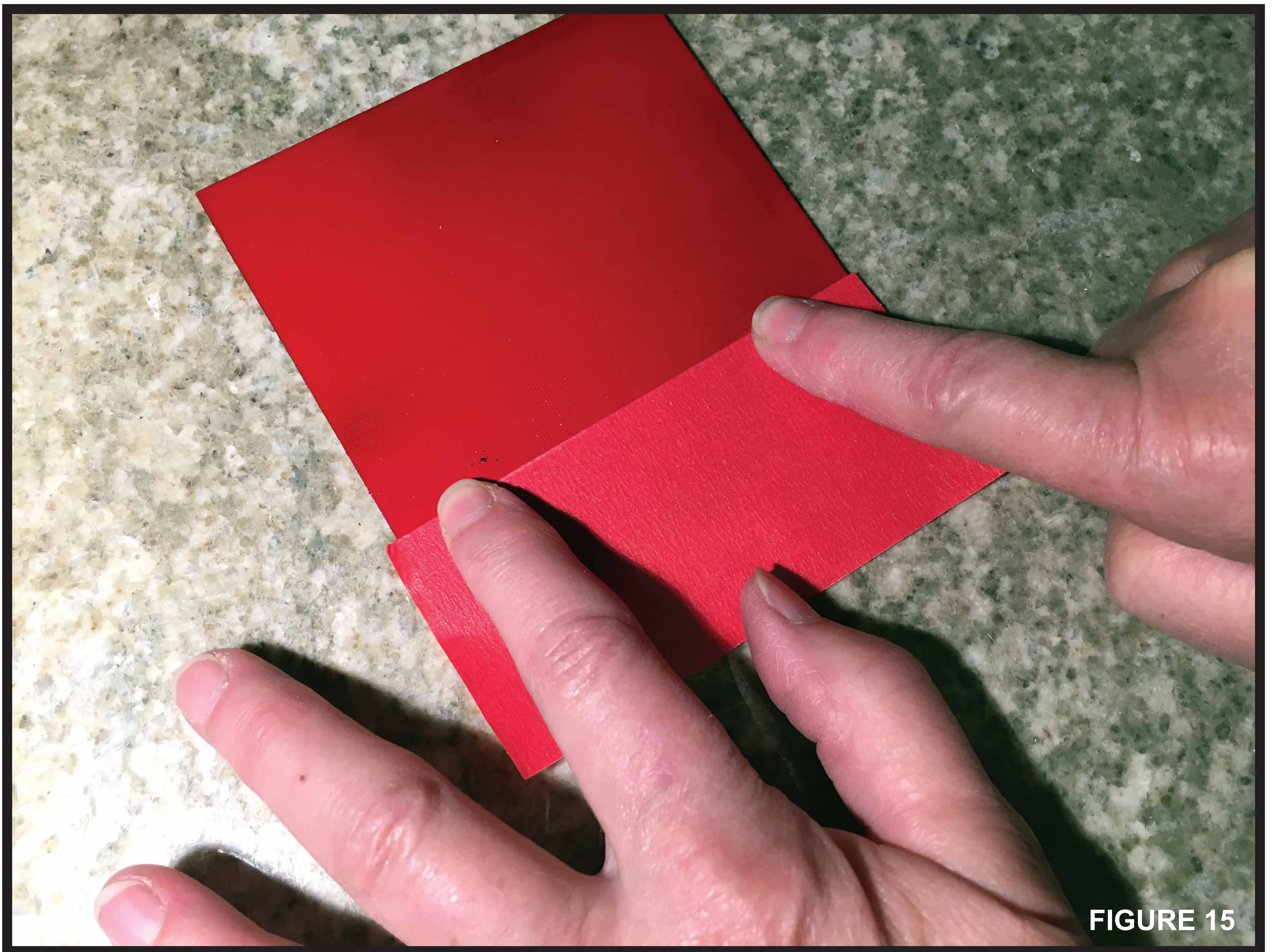


FIGURE 15

TARGET ROBOT CONSTRUCTION STEPS (continued):

- 17. The 4"x 4" top pressure switch paddle should have one inch of the red hinge tape on the paddle, and one inch to attach to the top plate.**



FIGURE 16

TARGET ROBOT CONSTRUCTION STEPS (continued):

18. The 4"x 4" top pressure switch paddle can be made of any stiff thin material similar to a tile sample such as the one shown in Figure 16. This tile sample is 4"x 4" and can be obtained for free at some building supply stores. The paddle should be painted RED or GREEN to match the top plate prior to taping it into place.



FIGURE 17

TARGET ROBOT CONSTRUCTION STEPS (continued):

- 19. Apply the 4"x 4" top pressure switch paddle to the top plate as shown. The forward edge should match the forward edge of the top plate. The spring will hold the paddle elevated above the micro switch lever arm. When depressed from above, the paddle will activate the micro switch.**

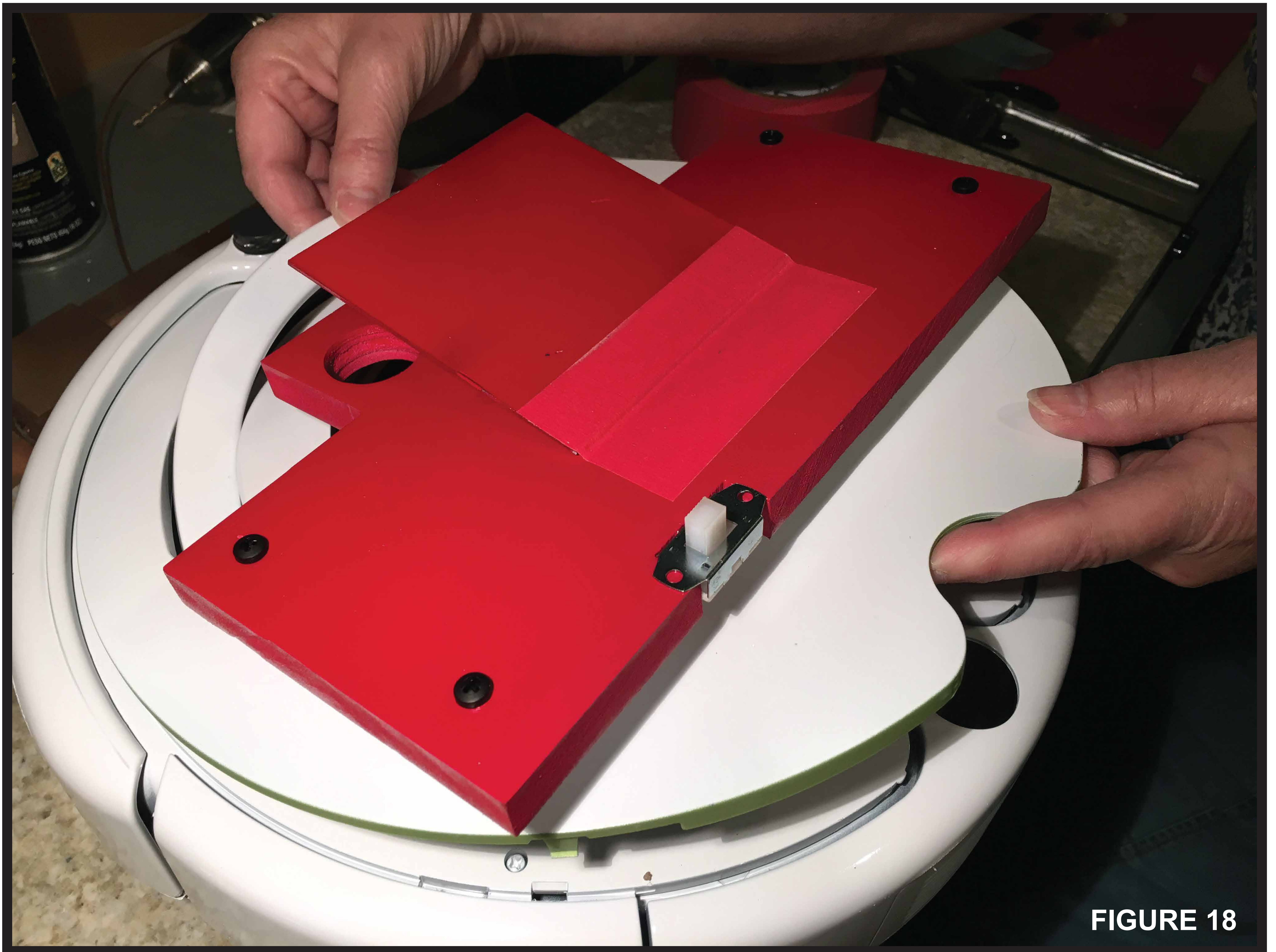


FIGURE 18

TARGET ROBOT CONSTRUCTION STEPS (continued):

- 20. Install the top plate assembly onto the Create 2. Be sure to raise the Create 2 carrying handle as you slide the assembly into place. Note that the entire Create 2 (except for its top buttons which are covered by the top plate) has been painted white. The Create 2 IR sensors have been masked with tape to preserve their ability to function at a later date.**

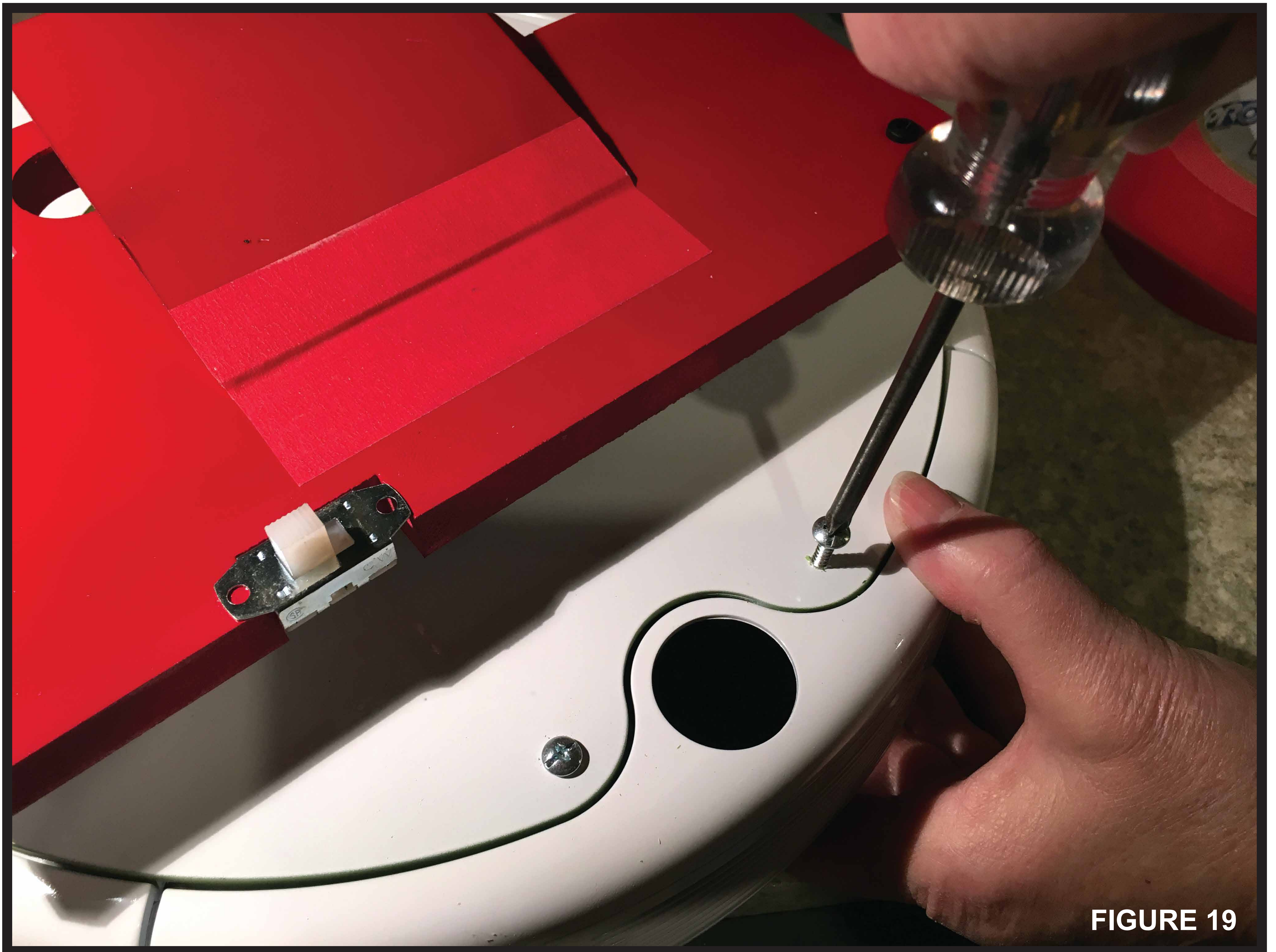


FIGURE 19

TARGET ROBOT CONSTRUCTION STEPS (continued):

- 21. Install 3/4" self-tapping sheetmetal screws in the locations shown to secure the Arduino electronics compartment. Note that the fan assembly and the drawer attachment button should have already been removed. This makes room for the add-on electronics and also provides a hole through which the communication and power cables pass.**

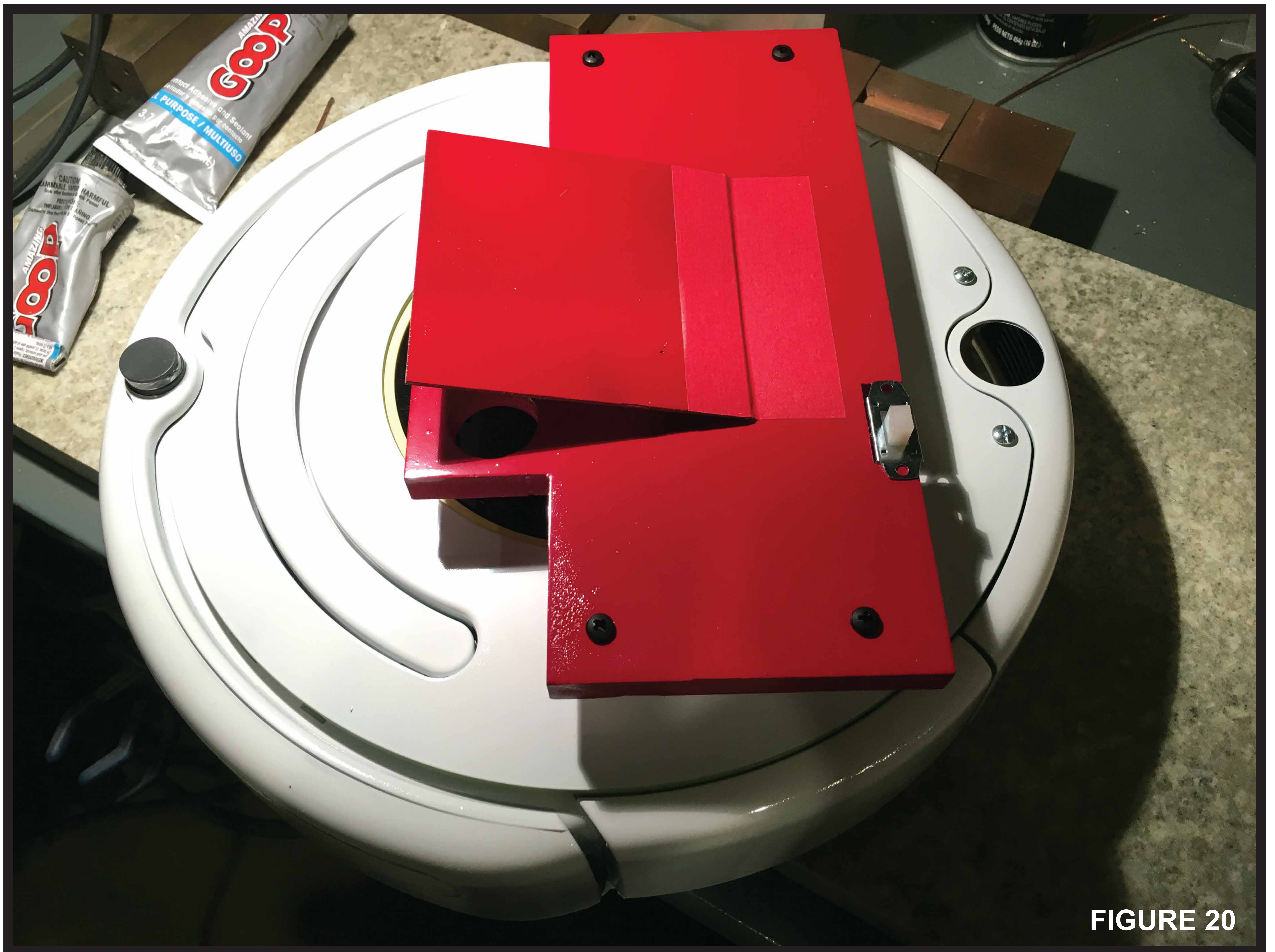


FIGURE 20

TARGET ROBOT CONSTRUCTION STEPS (continued):

- 22. The final target robot should look like this in either RED (shown) or GREEN. The Create 2 robot bodies are painted white. The obstacle robots use the original Create top plate (described elsewhere at this site), but attached using the same system of four stand-offs as the target robots.**