

My Balsa & Glass Workshop

Ryan's Office Window Stained Glass Panel Assembly Description

17 June 2025

My youngest son, Ryan, has an office set-up in his home, and he has asked me to assemble a Stained Glass panel to fit inside one of the "South" facing windows in his office. Figure 1 below is his input on a recommended design.

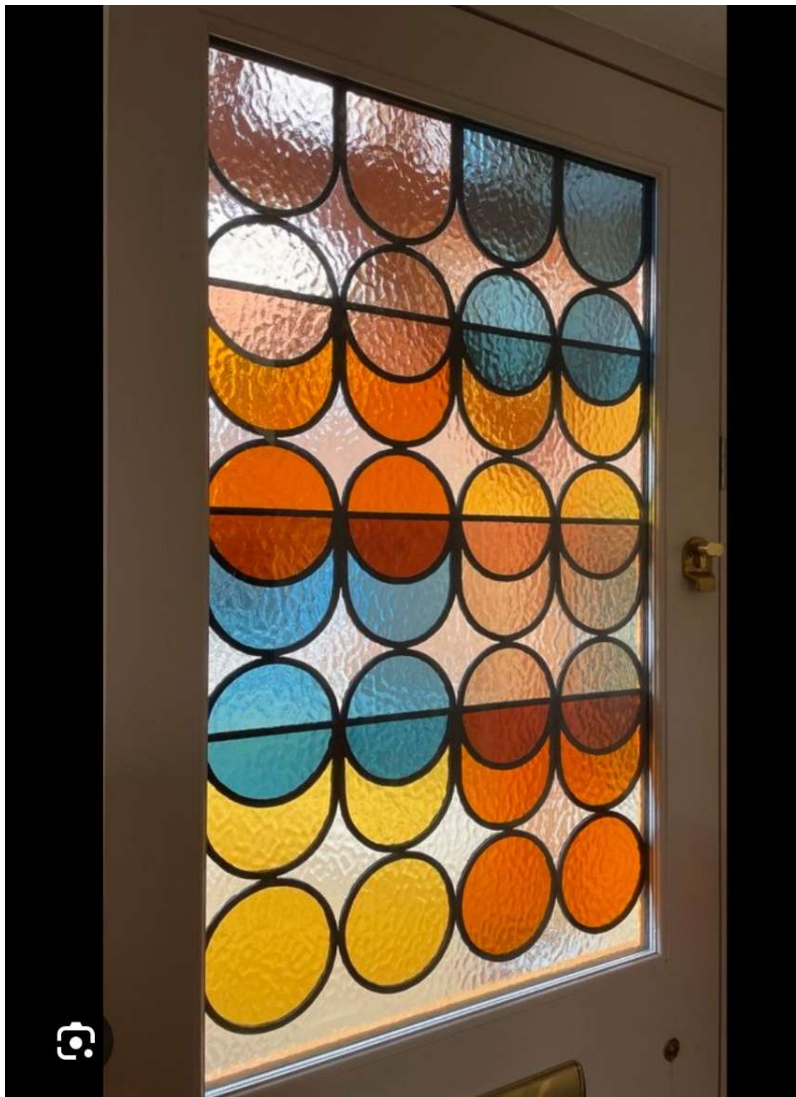


Figure 1 - Recommended Panel Design

Office Stained Glass Panel Project Planning

I started this project by taking his recommended design and generated a Stained Glass pattern using my "Back To The Drawing Board" (<https://drawingboardapp.com>) 2D-CAD program. I then exported the resulting drawing as a PNG file, which was imported into Microsoft Paint to apply some colors. Shown below in Figure 2 is my first cut at a **90 piece** Stained Glass panel pattern that will fit inside his 28" x 37" window.

This panel will be a "**Lead Came**" Stained Glass assembly, using Cascade 1/8" Round H Lead Came (<https://www.anythinginstainedglass.com/metals/came.html>), and framed in Cascade 9/32" U Zinc Channel (<https://www.anythinginstainedglass.com/finishing/zincBrassRebar.html>). I will be using transparent Oceanside Rough Rolled Textured Stained Glass (<https://oceansidecompatible.com/collections/sheet-glass/>). Rough Rolled is Oceanside's name for taking the "smooth" out of cathedral glass. It is subtle, "organic" texturing that creates distortion and refraction without pattern. It is the perfect all around surface for those seeking a uniform, delicate glass texture. Samples of the Stained Glass sheets are shown below the panel pattern image.

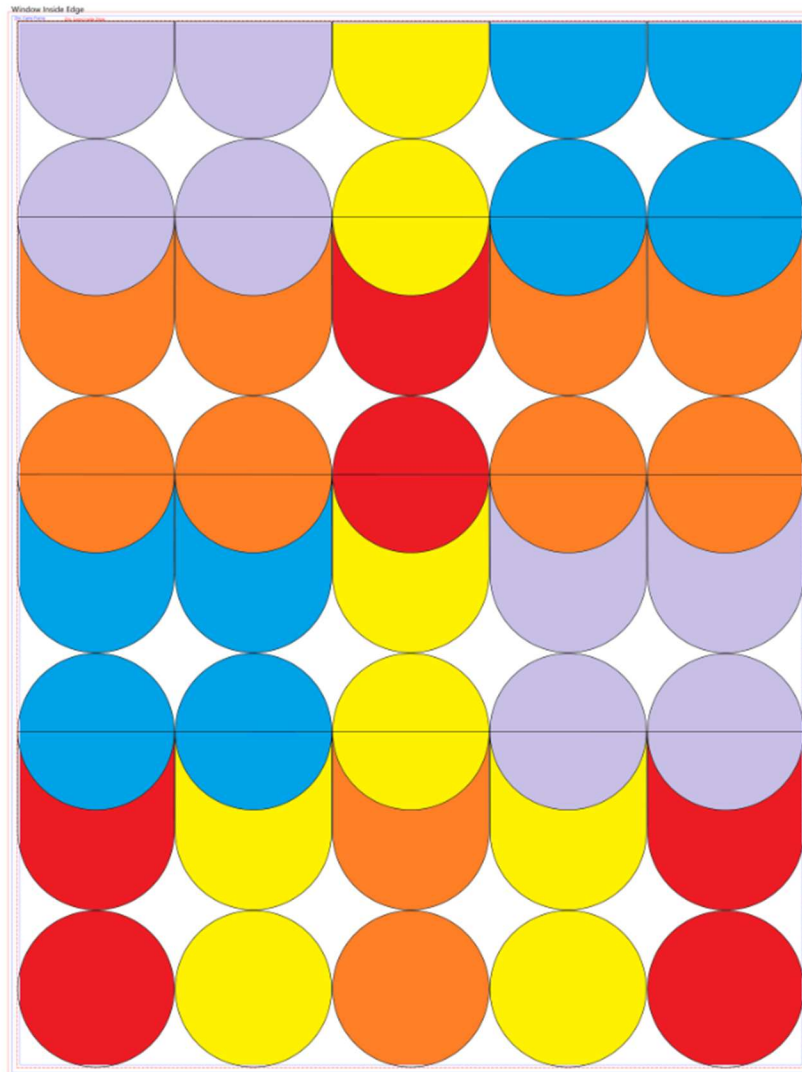




Figure 2 - Resulting Panel Pattern and Stained Glass Sheet Samples

Ok, now to determine the amount of transparent Oceanside Rough Rolled Textured Stained Glass that will be needed for this project. From the pattern I was able to determine that all the major pattern pieces can be cut from 6" x 6" pieces of glass. This will allow me to get four major pattern pieces from each 12" x 12" sheet. All the smaller minor pattern pieces can also be cut from 6" x 6" pieces of glass, and the two lower corners from Clear Rough Rolled scrap glass.

Color	Size	Item #	Sheets
Oceanside Clear Rough Rolled	12" x 12"	X100RR	6
Oceanside Ruby Red Transparent Rough Rolled	12" x 12"	X152RR	2
Oceanside Orange Transparent Rough Rolled	12" x 12"	X171RR	3
Oceanside Yellow Transparent Rough Rolled	12" x 12"	X161RR	2
Oceanside Medium Blue Transparent Rough Rolled	12" x 12"	X134RR	2
Oceanside Light Purple Transparent Rough Rolled	12" x 12"	X142RR	2

I ordered all the required glass and zinc U-channel framing from "Anything in Stained Glass" (<https://www.anythinginstainedglass.com/glass/spectrumRoughRolled.html>), but you can also obtain these from "Delphi" (<https://www.delphiglass.com/search?searchtext=oceanside%20rough%20rolled>), or your favorite Stained Glass supply house.

Starting the Panel Assembly

So, with all that said, how about we get started with the assembly of this new panel. I first took my pattern PDF file to the local FedEx store and had them print out a **full-size** pattern, costing me only \$11. Figure 3 shows the panel pattern on my center work bench covered with a high density fiber board. I used a Morton Aluminum Layout Block System (<https://www.glasscrafters.com/morton.html>) positioned to ensure the panel will fit snugly into the 28"x37" office window, including the zinc U-channel framing.

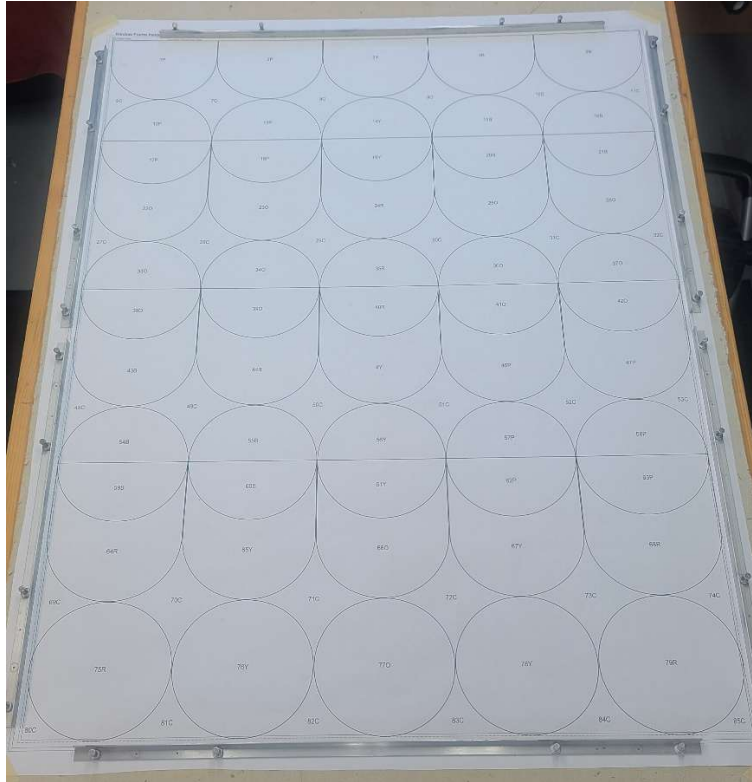


Figure 3 - Stained Glass Panel Pattern on Assembly Workbench

As I indicated earlier, this panel will be a "**Lead Came**" Stained Glass assembly, using Cascade 1/8" Round H Lead Came. As such, the individual glass pieces, and lead came sections all need to be held in place during the assembly. To accomplish this, I use "Lead & Glass Stop Blocks" in combination with "Horseshoe Nails" (<https://aanraku.com/product/lead-glass-stop-blocks>). Lead & Glass Stop Blocks replace the messy scraps of lead and glass I had to use to hold glass and lead in place when assembling lead came panels. No more chipped glass edges. No more deformed lead profiles. No more wasted lead channel. Simple, easy to use, and they give my workbench a polished professional look. Both items are shown in Figure 4 below.



Figure 4 - Lead & Glass Stop Blocks and Horseshoe Nails

While we are on the subject of "tools" for lead came assembly, let's go over some other important items that I will be using. The lead came should be stretched before using, to temper and straighten it. While you can accomplish this task using a bench vise and a pair of pliers, if you plan to assemble several lead came projects, you may want to consider investing in a nice "Creator's Lead Came Stretcher" (<https://www.delphiglass.com/lead-came-supplies/came-saws-tools/lead-stretcher>). The Creator's Lead Stretcher shown in Figure 5 will easily stretch any size lead came. You simply put one end of the lead came in the included lead vise on one side of your workbench surface, insert the other end of the came into the stretcher and pull back the lever. The leverage allows you to stretch the lead easily with a maximum stretching distance of 8-1/2". I really like mine and I am no longer busting my knuckles stretching lead came.



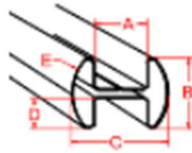
Figure 5 - Creator's Lead Came Stretcher

There are several different tools out there that you can use to cut the lead came, from simple hand tools to some very nice powered came saws. I started with the standard "old craftsman" Stainless Steel Weighted Lead Came Cutting Knife, then moved to a couple different pairs of Spring Loaded Stained Glass Carbon Steel Lead Came Cutting Pliers, and finally ended with what I currently use, a Heavy Duty Spring Loaded Multipurpose Utility Cutter. You can see each of these in Figure 6. All are available from your favorite Stained Glass supply center, or from Amazon. I found the utility cutter makes the best cuts, at any angle, without crushing the lead came channels.



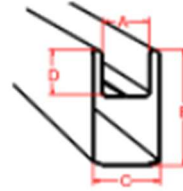
Figure 6 - Lead Came Cutters

To cut the harder brass or zinc U-channel framing, I use a Dremel power tool with a metal cut-off disc for the initial cut, and then my table grinder/sander for the final sizing and clean up. The final tool to mention is the pattern scissors. Make sure you use a pair that has the center blade designed for lead came, which is **NOT** the same as used for cutting copper foil patterns. The lead came scissor center blade is thicker to remove enough pattern material between the glass pattern pieces to match the center thickness of the lead came "H". Figure 7 shows the dimensions of the Cascade 1/8" Round H Lead Came (<https://www.anythinginstainedglass.com/metals/came.html>) and Cascade 9/32" U Zinc Channel (<https://www.anythinginstainedglass.com/finishing/zincBrassRebar.html>) that I am using.



1/8" Round H

A=1/8" B=1/8" C=7/32" D=1/16"



Cascade 9/32" U Zinc

A=5/32" B=9/32" C=7/32" D=3/32"

Figure 7 - Lead Came and Zinc Channel Dimensions

Enough with the tools and let's get back to the panel assembly. With the panel pattern on the workbench, I first cut the zinc U-channel framing to the correct lengths for two sides which meet at a corner, each with a 45 degree cut on both ends. I hold these in place against the Morton Aluminum Layout Blocks using a couple lead & glass stop blocks and horseshoe nails. Starting at the corner of the panel (I'm starting at the upper left corner), I then cut out the first pattern piece, trace the pattern outline on the color/style of glass selected for that specific piece (Oceanside Light Purple Transparent Rough Rolled for piece #1), cut and grind the piece to shape, test fit that piece against the pattern on the workbench, and once satisfied with the fit, I use stop blocks and horseshoe nails to hold that piece of glass in the proper position. I select the next pattern piece (I'm going to work across the top of the pattern for several pieces) and repeat the trace/cut/grind/test fit process again. Once I'm satisfied with that piece, I place it down above the panel pattern, but before putting the stop blocks in place, I first cut a piece of lead H-came to properly fit between the two glass pieces. Figure 8 shows the results of this process for the first few panel pieces. You can also see I installed the zinc channel framing along the right side of the panel.

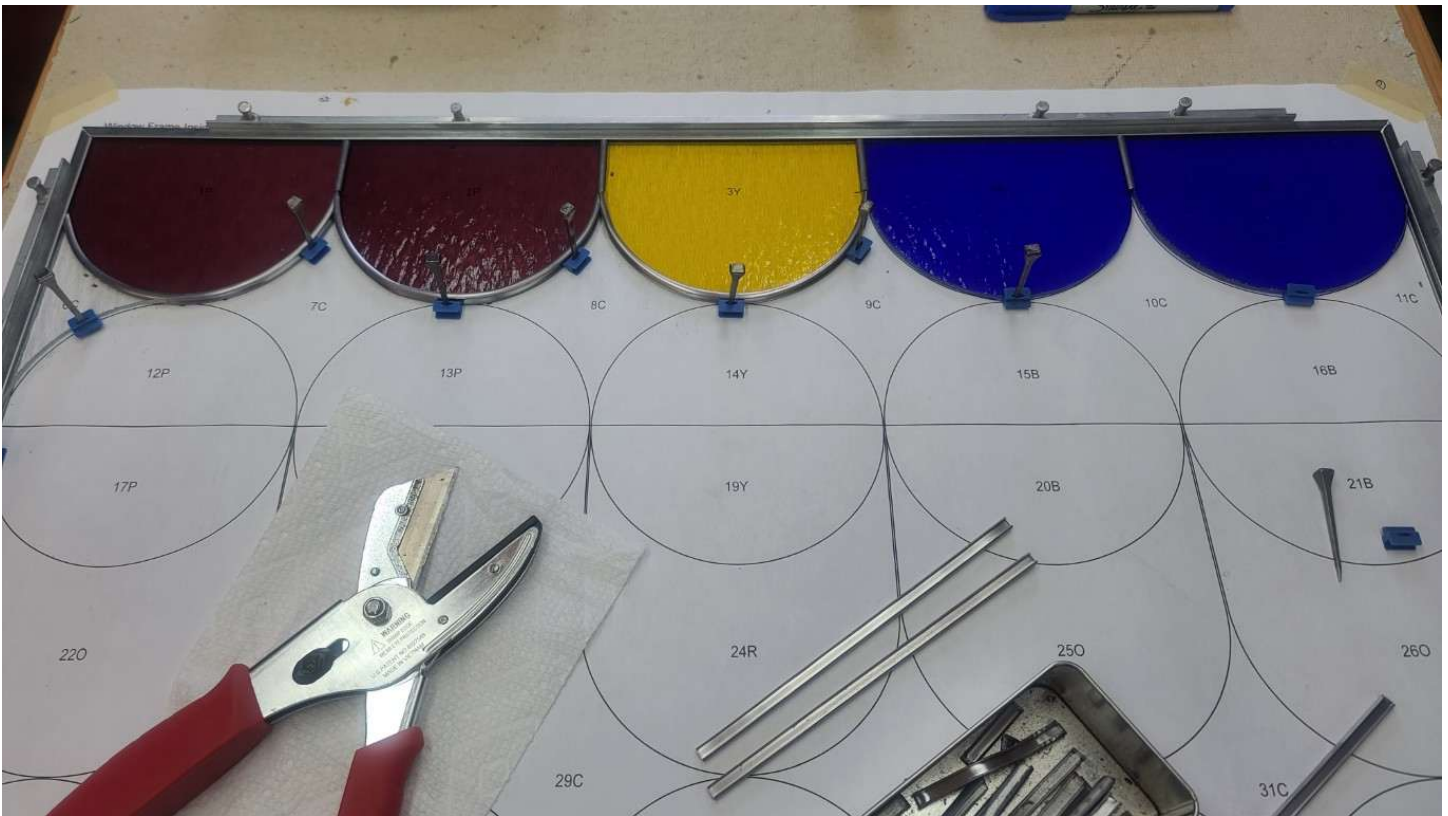


Figure 8 - Initial Fitting and Placement of Pattern Pieces and Lead Came Channel

I continued to work through the panel pattern, changing the glass colors needed for the various pieces, and fitted the lead H-came to join all the pieces together. Whenever I can, I want to try and use a single piece of lead came running the longest distance possible. Such is the case for the *long horizontal joint* running the full panel width in Figure 8 between pattern pieces #12P and #17P on the left, over to pieces #18B and #21B on the right.

After placing the lead H-came along the bottom of the five half circles #12P - #16B, I needed to think about adding some support to the panel. Once a panel has more than three square feet without any additional support, there is a risk that the panel could "flex/bow" because of the weight of a large panel placing stress on the thin lead joints. Well, I have a little over seven square feet in this panel. To address this issue, I decided to add some reinforcement horizontally across the panel. The reinforcement can't stop halfway across; it must go from edge to edge for strength.

There are several ways to reinforce a Stained Glass panel, and three of them are shown in Figure 9 below. I used "Re-Strip" from Cascade Metals. Re-Strip is a rigid ribbon like strip of 10 mil thick copper that is placed between glass pieces in the lead H-came as a hidden structural reinforcement. The ribbon measures 5/32" wide by 10 mil thick and is available in 25' or 100' rolls at your stained glass supply store, or Amazon.



Figure 9 - Stained Glass Panel Reinforcement Products

Figure 10 shows the placement of the copper Re-Strip inside the lead H-came running along the bottom of the five half circles #12P - #16B. I will do this again for all long horizontal joints running the full panel width.



Figure 10 - Re-Strip Inside the Lead H-came

Continuing the Panel Assembly

While I initially thought the assembly of this panel would be fairly simple given all the glass pieces are large in size, I found all was not as simple as I expected. This became evident with the cutting of the first glass piece shaped as seen in Figure 10 above for pattern part #250 or #260. Cutting an *outside circle* such as part #20B is simple because you can break up the scoring and breaking of the glass over a smaller section (no greater than 90 degrees) of the half circle. But this is not an option for the large *inside circle* as found on the pattern pieces like part #250. This combined with the very narrow pointed tips at the top of these pattern pieces makes for a difficult score and break. Therefore, I had to come up with a way to make these inside half circles without having my scores break in the wrong direction and ruining that glass piece. So, I once again broke out my old Gryphon Omni Diamond Wire Saw (<https://www.anythinginstainedglass.com/tools/gryphonOmni2WireSaw.html>), which I also used on my "Fantasy Castle in the Sky" project. I made short wire saw cuts along the pattern lines on each side of the narrow pointed tips, and along the inside half circle for approximately 45 degrees on each side. I was then able to score and break the final 90 degrees of the inner circle without issue. This approach has worked well so far for these *elongated half circle* pattern pieces. Figure 11 shows the progress on the panel as of 9 April 2025, and you can see copper Re-Strip inside the lead H-came running along the *long horizontal joint* at the bottom of the five half circles #330 - #370.



Figure 11 - Continuing the Panel Assembly

I've finally finished cutting, grinding, and leading all 90 glass pieces. Figure 12 shows my progress on the panel as of 26 May 2025. Progress on this panel has been slow due to all the spring tasks and my garden, but I'm finally on the home stretch.



Figure 12 - All 90 Glass Pieces in Place

Next comes cleaning and soldering all the lead came joints and attachment points to the zinc frame. For these tasks I first use my Dremel tool with a 1 inch abrasive buffering polishing wheel to clean and remove the oxidation from all the joint areas. You can get these on Amazon. Or you can use #000 steel wool pads to remove residue from the zinc and lead came. For soldering I apply a small amount of gel flux (<https://www.anythinginstainedglass.com/chemicals/patinaflux.html>), and then solder the joints using Amerway 60/40 solder (<https://www.anythinginstainedglass.com/metals/solder.html>) and my handy little Hakko FX-601 soldering iron (<https://www.anythinginstainedglass.com/tools/ironsHakko.html>). Figure 13 below shows you all these items.



Figure 13 - Items for Soldering Panel Lead and Zinc Joints

Once all the joints are soldered on the front side of the panel, I **carefully** turn the panel over and repeat the same process for all the joints on the backside of the panel. With that complete, the entire panel gets a good washing using dish soap and hot water to remove any remaining flux. You can also use CJs Flux Remover and/or Kwik-Clean (<https://www.anythinginstainedglass.com/chemicals/cleaners.html>). If you want you can then apply Clarity Finishing Compound to polish the glass and protect the lead against tarnish due to oxidation.



Figure 14 - Items for Cleaning and Polishing Panel

The next image below shows the progress on the panel as of 30 May 2025. While cleaning the panel, I noticed the panel flexed along the long dimension more than I was comfortable with because of all the small thin points in many of the glass pieces. Given Ryan has decided to put the panel in a different window, I am going to frame the panel in a wooden frame which will greatly stiffen everything up.



Figure 15 - Panel Finished Except for Wooden Frame

To make the wooden frame I used two 6 foot lengths of 1"x2" Popular, cut a channel down the center of one edge, used my router table to trim the opposite edges for a nice look, finish sanded everything, and put on a coat of dark rub-on stain. Once that had dried, I cut the four sides to the required lengths using 45 degree cuts on all ends and attached each corner using 2.5" brass wood screws. The final results are shown in Figure 16 below.



Figure 16 - Finished Panel

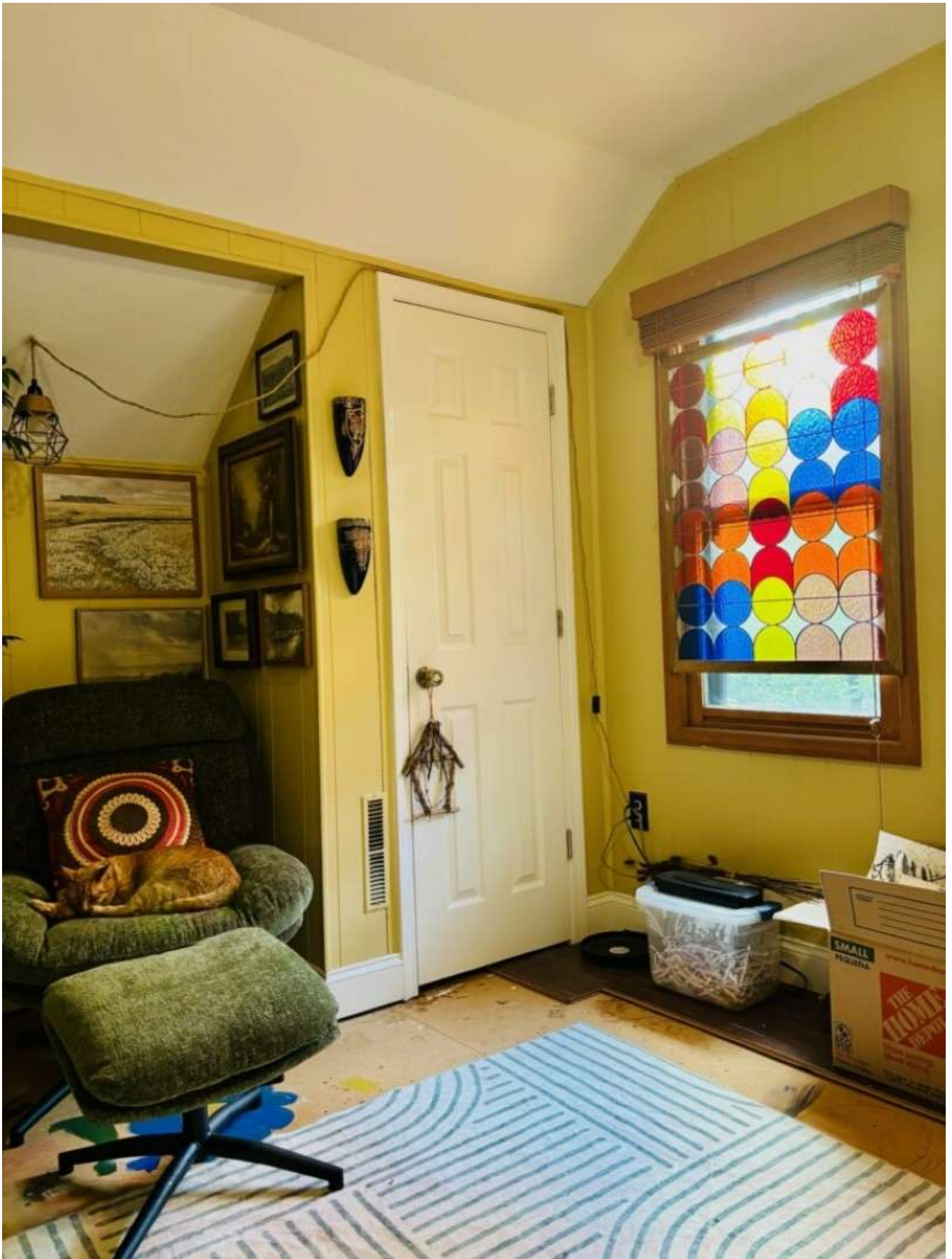


Figure 17 - Panel in Office Window