Solar Heat Engine- The Return

The original solar heat engine, pictured here, had a few flaws. Largest among them was the fact that the glass was held together with tape. (and hope) Even covered, the tape got too hot in the summer and melted, meaning the glass kept falling off of it. I wanted to buy a large piece of clear plastic or some such, so that problem could be fixed.

Then I saw the sliding glass door leaning against a telephone pole with the word “FREE” plastered to it.

Sometimes, the universe doesn’t give you what you want, it gives you what you need.

-- Rev Bem
Andromeda

It was a pain to get into the car alone though, let me tell you.

Obviously here I’ve taken the wood off from around the glass. The glass measured 76 1/4” x 34 1/8” x 6/8 so it’s quite a bit bigger then the original. In fact you can see in this picture it’s almost as tall as the original, and the old one is sitting on a table!

I very carefully measured out what wood I would need to avoid the problems I had with the initial one. If you’ll recall, I didn’t take into account the thickness of the walls, which caused some last minute adjustments.

I also went with a slightly different design. I wanted NO TAPE on this one, or anything else that could melt, so I thought, why not just set the glass into the box, held up by stabilizers nailed into the sides? As long as my measurements are exact enough it should just seal itself up and sit there. Unlike the old one where the glass sat on top of the edge and had to be taped.

I measured and re-measured and calculated widths of things and asked my father to help me get the wood because there was no way I was going to get wood of that size into my car. He said sure.

My father, wise in the ways of "making stuff" did some rough measurements and was very nonchalant about "Yeah, you need this and this, let's go!" I was all like "But- calculations! Cuttings! How do we know we have it right?"

But he was of course ready to power up the Scary Saw and cut the stuff himself instead of letting the people who work at the lumber place do it, so I differed to his judgement. (He was the one going to saw his leg off after all)

Anyway, we got the wood and brought it back, and he tore into the project like a house-a-fire, and built the frame much, much faster then I did by myself the first time. Here it is!

The board was cut to be bigger on each side by exactly the width of the sides and the top and bottom. That way the glass will fit into the case. It will be stopped from going all the way down, crushing the air tubes, by the slats of wood you can see that are set down into the frame by the thickness of the glass. I was also much neater about cutting the insulation this time, and put it in shiny side down. I plan to just spay the whole thing with black paint, because I think I may have lost some heat to reflection on the last one, because it was shiny side up. We'll see.

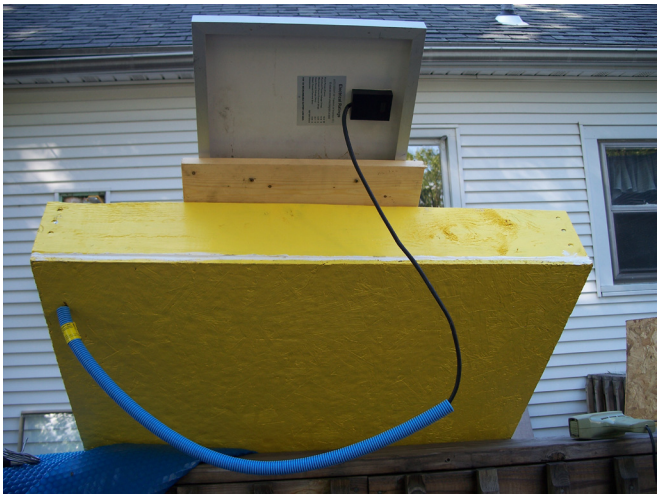
You may notice there's no air hole yet, or place for the fan. That's going to be drilled out later. I hope.

Putting the old aluminum tubes in there showed it's much taller and nearly one tube wider then the old one, so I bought another one, and it just exactly fit. I also picked up more high temp spray paint, and adhesive tubes.

This time rather then nailing them in, I'm just going to slather the thing with adhesive and just stick them down. I think they'll stay, but we'll see.

The rest proceeds smoothly from the original. I had some insulation left over from the first project so I added another layer over the first, leaving just enough space for the pipes. I painted it this time too, figuring I would rather absorb heat then bounce it around. I also painted the back and the sides (a nice sunny yellow!) to better protect them. Here I've glued the pipes down, which exactly fit into the box. I fit one more in then the old one, the others are reused, which is why they look kind of icky. They still absorb sunlight energy though!

My father drilled some circular holes rather then what I did previously, which was sawing a hole big enough for the fan to fit in. I think this looks nicer. I drilled a tiny hole in the back and pushed the wires through, determined not to use any tape to secure stuff this time. I re-soldered the wires together and shoved them into a piece of blue tubing I got for like $3.00.



With the electronics done, it's time to put in the glass. And..... it just fits. Whew.

I installed the solar panel in the same way as before, but I used a bit sturdier wood. The thin piece I used the first time just broke up totally. It looks like the rubber edges I wanted to keep on make it too big to fit, but without them there's a slight gap. So it looks like I'll have to seal it up with some calk. Also the board we got isn't exactly straight. Take a look.

The top and bottom are quite snug, but the middle has this huge gap! You can even see it on the picture above, actually. Oh well. It's almost done! Just have to hook the pipe in. No more worrying about tape melting in the summer. It's bigger and should put more heat into the house then ever before. The glass is better, the construction is better. (Thanks Dad!)

All in all, I am quite happy with how it came out. Quite happy indeed.

Honestly, side by side, which one looks better?

No contest, right?

The final step is attaching the pipe. We chose an adapter that would fit in both the hole and the pipe, and I just glued one to the other. I know I wanted no tape this time, but it's really just to hold it in place while the adhesive cures.

And then shove it in the hole!

And then it's done. Looking good.

Oddly the airflow seems a bit less strong now. Before the adapter made of insulation pushed the pipe back a ways, and was larger, so I wonder if giving it more space to "breathe" increased total air movement volume? I'm no fluid dynamicist you know.

There was one other step. Putting the insulation back on the house.

As far as material costs for the Mark II go, it breaks down like this:

Glass: Free
Wood: $50.00
Various: $30
this includes another pipe, calk, and the plastic tube for the electric wires, paint
Pipes: Reused (originally ~$90?)

I think it's better in every possible way, so we'll see how it's held up a year from now.

That's the true test.

Thanks for reading!