



My assistant and professional ballerina, Alyssa, and the R U.

Another Source For Vacuum Pumps

Or a great idea from a stupid mistake

By David E. Parvin, A.L.I.

I could claim that I was up to my neck in creativity producing what would at least get a whole chapter in Sister Wendy's next book, *The Greatest Art In America*, when I was overcome by a tsunami of inspiration. But alas, old George and I agree that one shouldn't tell a lie. The truth is that while I was hard at work on something that will probably get no more than a footnote in Sister Wendy's next book, I got thirsty. (I just love it when something great starts out because of something as trivial as getting thirsty.) So I walked over to my little office-size refrigerator to get a can of my favorite thirst quencher, fizzy water. Apparently someone had consumed the last can without restocking the refrigerator and even though I am the only one at my studio who drinks this swill, I was sure that someone else was at fault. At that point, I could have walked away and broken the chain of events that was drawing me in to do something stupid. But instead I thought, "Not to worry, you have plenty of warm cans of fizzy water, all you need to do is pour one over ice." I opened the freezer door only to find that the ice cube trays were held fast in frost. Instantly I saw the solution, defrost the refrigerator. I had come to a critical fork in the road. One road sign said, "Just turn off the refrigerator and be patient and in time you will get your ice and your cold fizzy water." The other sign said, "Be a man, get something sharp and show that frost who's boss!"

I'm embarrassed to admit that I had been at this same fork in the road two times previously in my life and on both of those occasions I had taken the same manly path with the same "Oh damn" results. This time I grabbed a putty knife and started removing frost.

I could have used a screwdriver but I can assure you from past experiences that the results would have been the same, a loud hissing sound of whatever has replaced freon escapes to the ozone layer. I'm a slow learner.

O.K., you're probably wondering if this story is going anywhere that could possibly be of any value to other artists and if not, will it ever have an end. The answers are yes and yes. As I was unplugging my now worthless refrigerator, it occurred to me that the guts of a refrigerator is a compressor. Compressing a gas causes it to heat up. Releasing the pressure causes it to expand and cool down. All a refrigerator, freezer, or air conditioner does is put this process to use. The important thing here is that if a compressor blows out air from one end, it sucks air in the other. While it didn't seem very likely to me that the silent running little unit from my small refrigerator could possibly blow out enough air to be of much benefit, making a vacuum in a small chamber requires the removal of very little air. I just might have stumbled on to something!

I removed the working parts of the refrigerator (Photograph #1), henceforth to be called RU for refrigerator unit, plugged it in and it blew air out one side and sucked air in the other. As I expected, it didn't move very much air. Just for the fun of it, I tied a rubber glove onto the outflow side and let it run until the glove exploded; it took three minutes (Photograph #2). It took my studio compressor less than ten seconds to do the same thing; however, it must be remembered that the compressor has a tank that is a reservoir of compressed air. If I had emptied the tank and had the compressor fill the glove, it would have taken somewhat longer. I then attached the air side of the RU to a small pressure chamber which is nine inches by nine inches (Photograph #3). This is the same pressure chamber that I explained how to make from a paint pot in "Making a Pressure Chamber," SJ, Oct. 2003.) It took the refrigerator unit two minutes to fill it to twenty-five p.s.i. and three more minutes to get twenty-eight p.s.i. which was as much pressure as I could get. As I expected, my discovery isn't much of a compressor. My regular compressor will put out



The RU blowing up a rubber glove

110 p.s.i. I usually use just fifty p.s.i. and I can pressurize this same pot in just a few seconds.

While at first glance it would seem that the RU is too slow and doesn't put out enough pressure, however, it might still be of use at a lower altitude. I work in the "Mile High City," the actual output might be as much as 33 p.s.i. But even 28 p.s.i. could be enough for some uses though it wouldn't be sufficient for running air powered tools. (For a thorough explanation of the advantages see "Using Vacuum and Pressure in Casting" and "Putting Vacuum and Pressure Chambers to Practical Use," SJ, August and November 2003.) Also, one could use the RU to fill a portable air "bottle" and have the 28 to 33 p.s.i. instantly available.

As a vacuum source, the RU definitely shows more promise. To see how much vacuum I could pull, I tested the RU with a vacuum meter and was able to get 23 inches of mercury which is as much as I can get from my Whip Mixer at my altitude. Keep in mind that a new Whip Mixer is in the one thousand dollar range. But for a better test of the RU, I attached it to my home made pressure chamber which is about 11 inches tall and 11 inches in diameter. (Photograph # 4 My September 2003 article explained how I constructed this chamber.) I was able to get 10 inches of mercury in 90 seconds, 15 inches in 3 minutes, and 20 inches in 7 minutes. The maximum vacuum I was able to achieve was 20.5 inches. Using my vacuum pump, I was able to get 21 inches in about 30 seconds. (I suspect that my seal on the vacuum chamber's lid was leaking slightly and prevented getting



The RU attached to a pressure chamber

closer to 23 inches.) While the RU is slower than a vacuum pump, it is fast enough to de-air anything except the fastest setting materials.

There are a couple of questions that I have not covered. 1. Does the RU need the coolant, which escaped, for lubrication - and will running it empty, destroy it? 2. Are RUs made for larger or normal size refrigerators and freezers have larger capacities and be more useful? Fortunately there was a name on the RU, Embraco. A quick search on the internet got me a phone number, (770) 814-8004. What I found out is that the coolant does lubricate the RU and it was suggested that a few drops of oil be put into the suction side every so often. And in fact, the larger the refrigerator, the bigger and more capable the RU.

If one's wealth and social status were dependent upon one's ability to produce and utilize vacuums and pressure, I'd be at the top of the heap. I have five different vacuum and three pressure sources and twelve chambers in various sizes from one to fifty-five gallons that can be used for vacuum or pressure or both. I'd be living in the big house on the hill with a pool, a tennis court, a Rolls, a yacht, private jet, a trophy wife and a couple of trophy mistresses in reserve. But even with all my vast wealth and prestige, I would still see



The RU attached to a vacuum chamber

two advantages to owning an RU. The first is cost which in most cases is probably going to be nothing. With minimum effort, one should be able to find an old refrigerator or freezer at little or no cost. The really slick thing is that the RU is complete in its self except for a few fittings which can be purchased at any hardware store. I have, for example, seen an automobile air conditioner compressor used for the same purpose, however it requires attaching it to an electric motor. The second is that the RU is almost completely silent. Both my vacuum pump and my compressor are very noisy. While noise in my studio is just a nuisance, it could be a serious problem for someone working in, say, an apartment.

One last thing, since I am not capable of choosing the correct fork in the road, I'm assured that I will not make the wrong decision again, I bought a frost free refrigerator.

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