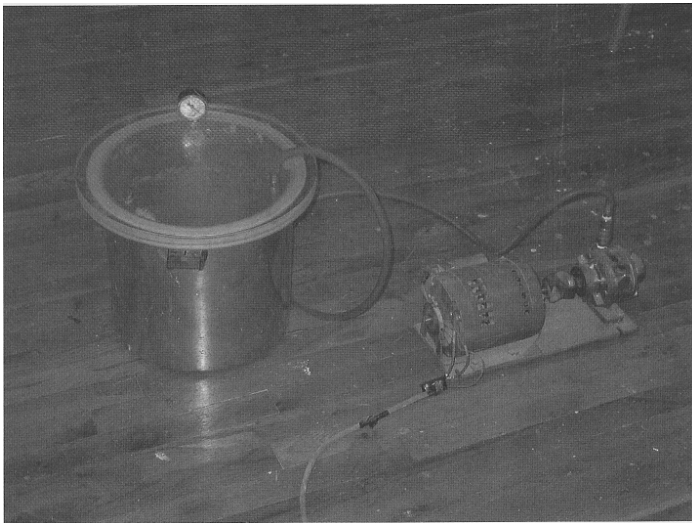


Making a Vacuum Chamber

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

In the last issue of Sculpture Journal, I discussed the advantages for using a vacuum or pressure chamber or both to achieve castings that are bubble free and with better detail. But in order to reap the advantages, one has to have the equipment. In this issue, I will explain how to construct economically a very functional vacuum chamber. In next month's issue, I will do the same for a pressure vessel. The month after that, I will put it all together and describe how to achieve results that would be impossible otherwise.

All that is needed are some sort of a container, a few fittings and connectors, some pressure hose, and a vacuum source. Once you have the components, except for the time it takes for the rubber seal to cure, the assembly takes just a few minutes and costs as little as \$200.00. This article is not meant to be a blueprint but does provide enough information to allow almost anyone to make a functioning system. I suspect that most of you who may live in remote areas with limited access, I have proved phone numbers and/or e-mails to make your acquisition less frustrating.



The author's home-assembled vacuum chamber

There are several possibilities for a container. The one pictured is simply a pressure cooker about 12 x 12 inches minus the lid. Since I have had this for at least 10 years, it seemed only appropriate that I check current prices. I went to my closest Target store and to my surprise, the only pressure cooker available was much smaller, too small. So I tried Sears, ditto. The same at Wal-Mart. However, Wal-Mart has a 16 quart stainless stock pot for \$34.95 that looks as if it would do just fine. Sears had a similar one only the price was about \$10 more. Then I hit the mother load.

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I went to a restaurant supply store. I was told that larger pressure cookers are getting hard to find because too many of them blew up and nobody wants the liability of selling them. Since we are talking about creating a vacuum, the much more genteel imploding possibility doesn't seem real dangerous. But, I guess, nobody wants to bet the company's future by making a vacuum cooker ... The good news is that there is a tremendous selection of professional stock pots available in both aluminum and stainless steel. They go from way too small to large enough for two full grown people to climb into (not that they would want to). An aluminum one about 12 x 12 inches is about \$50.00; stainless steel is about three times as much and no better for our purpose.

To complete the pressure chamber, you only need a strong, transparent lid that has been drilled and tapped in three places and has an air-tight seal. The lid should be 1 inch thick Plexiglas about two inches wider than your pot. (The first lid I tried was only 1/2 inch thick and noticeably bowed in under vacuum. I suspected that it would have eventually failed). As you can see in the photograph, the three attachments to the lid are the hose to the vacuum source, a vacuum gauge, and a pressure release valve. Notice that the attachments are on the outside of the lid just inside of the rim of the pot and about 120 degree apart. Holes drilled near the outside are less likely to weaken the lid than if more to the center. The hose, gauge, and release valve are probably available at your nearest Ace Hardware, Home Depot, Lowes, etc. for about \$10.00, \$8.00 and \$2.50 respectively.



The amazing Air Vacuum Pump

www.artcastingjournal.com

The only one of these that may be hard to find is the vacuum gauge which can be ordered from Grainger at www.grainger.com.

The construction of the lid was a cinch. All I did was go to my local plexiglass/plastics store, Plasticare, and sketch out what I wanted. I had taken the vacuum gauge with me to indicate the size of the holes and the proper threads and Plasticare drilled and tapped the holes. I had already figured out how to make a really slick, I hoped, air tight seal. It seemed to me that if Plasticare could router out a 1/4 inch deep groove around the inside of the outer edge of my spiffy new lid that was wide enough to fit over the rim of my pot, I could pour the groove about half full of rubber and have a custom made seal. Alas, I was told that this particular company did not have the capability to router out the groove. For a moment it looked as if the best laid plans of sculptors might join those of mice and men. But then I asked if the lid was made of 3/4 inch plexiglass, could a circle of 1/4 inch Plexiglas, the diameter of the inside of my intended groove be laminated to the lid. Then all that would be needed was to add a 1/4 inch thick ring that would go from the outside of the intended groove to the edge of the lid. It just so happened that they could do that and I got my groove without having to do an grooving.

Pouring the seal was no problem. All I did was mix up a little rubber and filled the groove about half full. After letting it set overnight, it was finished and works perfectly. I used a platinum cure silicone called P-15 made by Silicone, Inc. However, I am sure that any kind of rubber would work as long as it is fairly soft.

If you are confused about the lid, take a look at the photograph, and I think it will all make sense. For those of you who do not have access to a plastics fabrication company, you could contact Plasticare at 303-781-1171 and they will construct a lid to your specifications and ship it to you. As I recall, my cost was \$80.00.

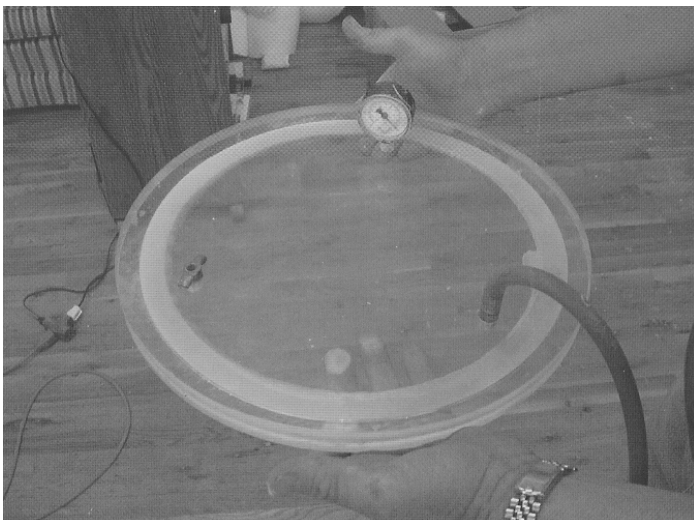
Up to this point you will have spent about \$50.00 for a stock pot, \$9.00 for a vacuum gauge, \$10.00 for the hose, \$2.50 for the valve, and \$80.00 for the lid for a total of \$150.00. All that is left is the vacuum source and you will be ready to de-air all sorts of things. You could even repeat some

sorts of things. You could even repeat some of those early nineteenth century experiments such as: can a fly fly with no air and how long do mice live in a vacuum.

The vacuum pump and motor in the photograph were purchased as a unit from Arbce Sales Co. in Chicago, IL at 312829-1468. Unfortunately, while the pump (stock number VG30, \$50.00) is still available, the combination is not. But the required $1/2$ horsepower, 1725 RPM electric motor and the sheaves and belt to connect them can be ordered from Grainger for about \$150.00. I know someone who substituted an automotive air conditioner compressor (a used one at that) and had a perfectly workable vacuum source. I have been told that a refrigerator compressor also works. If you just want to purchase a combined pump and motor and aren't concerned about a few bucks, try www.gastmfg.com where you can order a 0523-101 Q-5 G588DX for \$337.00 and be done with it.

But I promised that you could have a working vacuum chamber for less than \$200.00 and you can as long as you already have an air compressor with at least 4.2 C.F.M. at 75 P.S.I. there is an amazing little \$15.99 gadget called an Air Vacuum Pump (see the photograph) made by Central Pneumatic. It can be ordered for Harbor Freight at www.harborfreight.com. It is crated at the other end because of a venturi in-between. (You may remember that a venturi as explained by Bernoulli's principle is what allows an airplane to fly. This little box won't keep a 747 in the air, but it will pull as much vacuum as my pump. You will have to go to your local hardware store to get the correct fittings to attach it between the compressor and the chamber and you are in business.

Stand by for next month's issue and I'll tell you how to construct the companion piece of equipment, a pressure chamber. *The processes, methods and apparatus presented herein have not been tested or verified by Sculpture Journal magazine in any way. Anyone using any of this information is doing so at their own risk.*



The lid with its three fittings

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