A Variable Volume Flask

By R. G. Sparber

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It is always nice to have just the right size flask. It is also rather nice to have a place to store them. My collection of well worn wooden flasks still provide reasonable service but they sure do take up space. In designing this variable volume flask I wanted to be able to create 3 different size flasks plus reclaim some of the space taken up with my fixed volume flasks. Along the way, I discovered that it was easy to add a third section to either the cope or drag in order to double their height.

Here you see the flask set up for the middle size plus my “upset” added to the cope.

Here you can see one of the sides of the drag. What jumps out at me is the awful

craftsmanship. The holes were drilled with high precision on my mill but drilling straight holes through the blocks of wood was a disaster. My quick and dirty solution was to elongate the holes until things fit.

I am using extruded aluminum channel here that is 1” deep, 4” wide, and 1/8” thick. Two 1/4-20 bolts run through the block of 2 x 4s.

The entire kit has 12 sides plus two bars for attaching the upset. All nuts and washers are in the Altoid© box. All cleats are attached using 6-32 screws and nylon insert nuts[1]. It was not fun making all of these parts but I like the result.

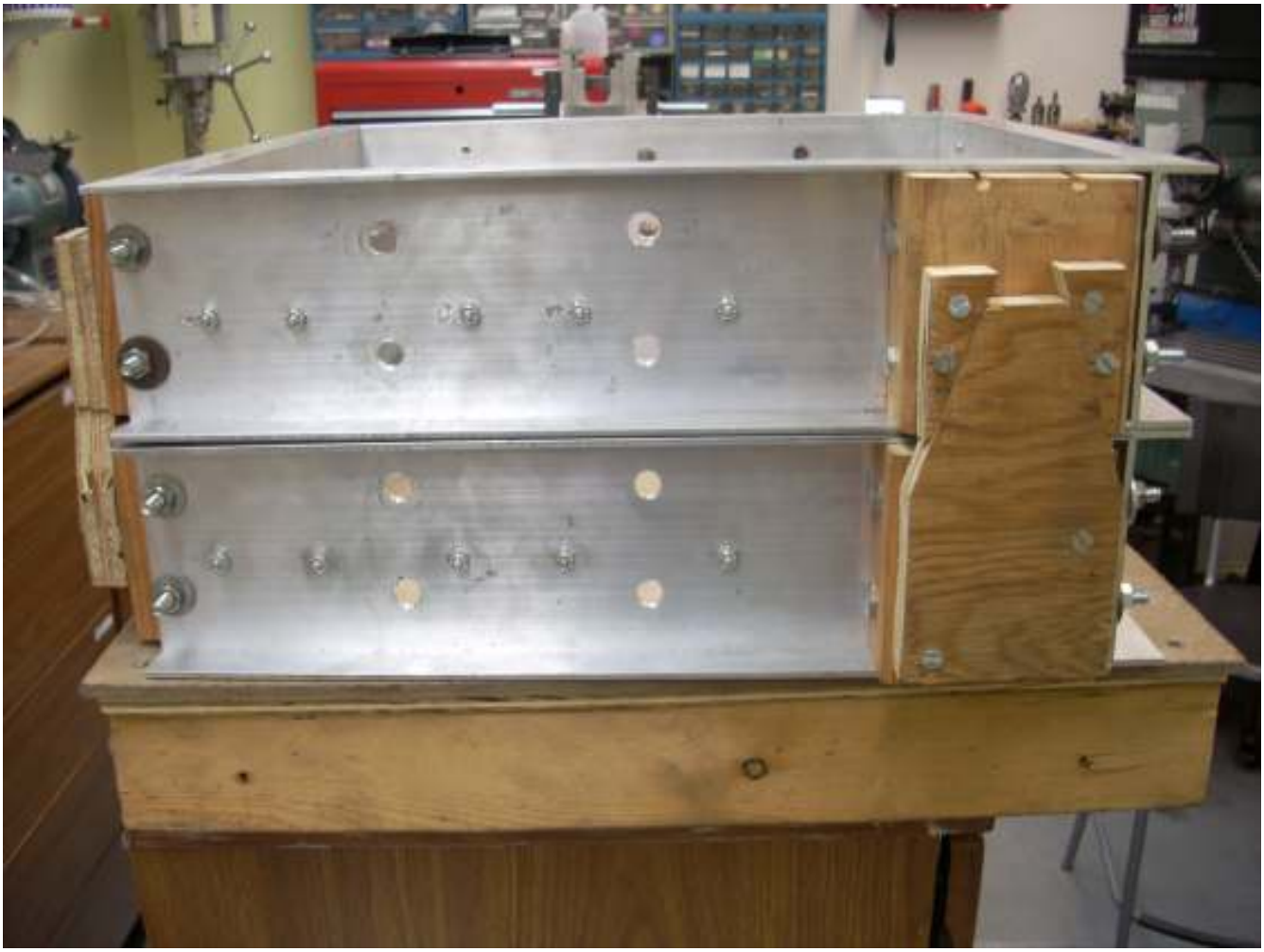
1 I don't expect any trouble with the nylon near the melt because there should be plenty of Petrobond between melt and plastic. If I'm wrong, the nut should still hold while the nylon smokes.

Four of these sides fit together to form the drag. The ends of the channels have been milled square so the cope, drag, and upset are reasonably square.

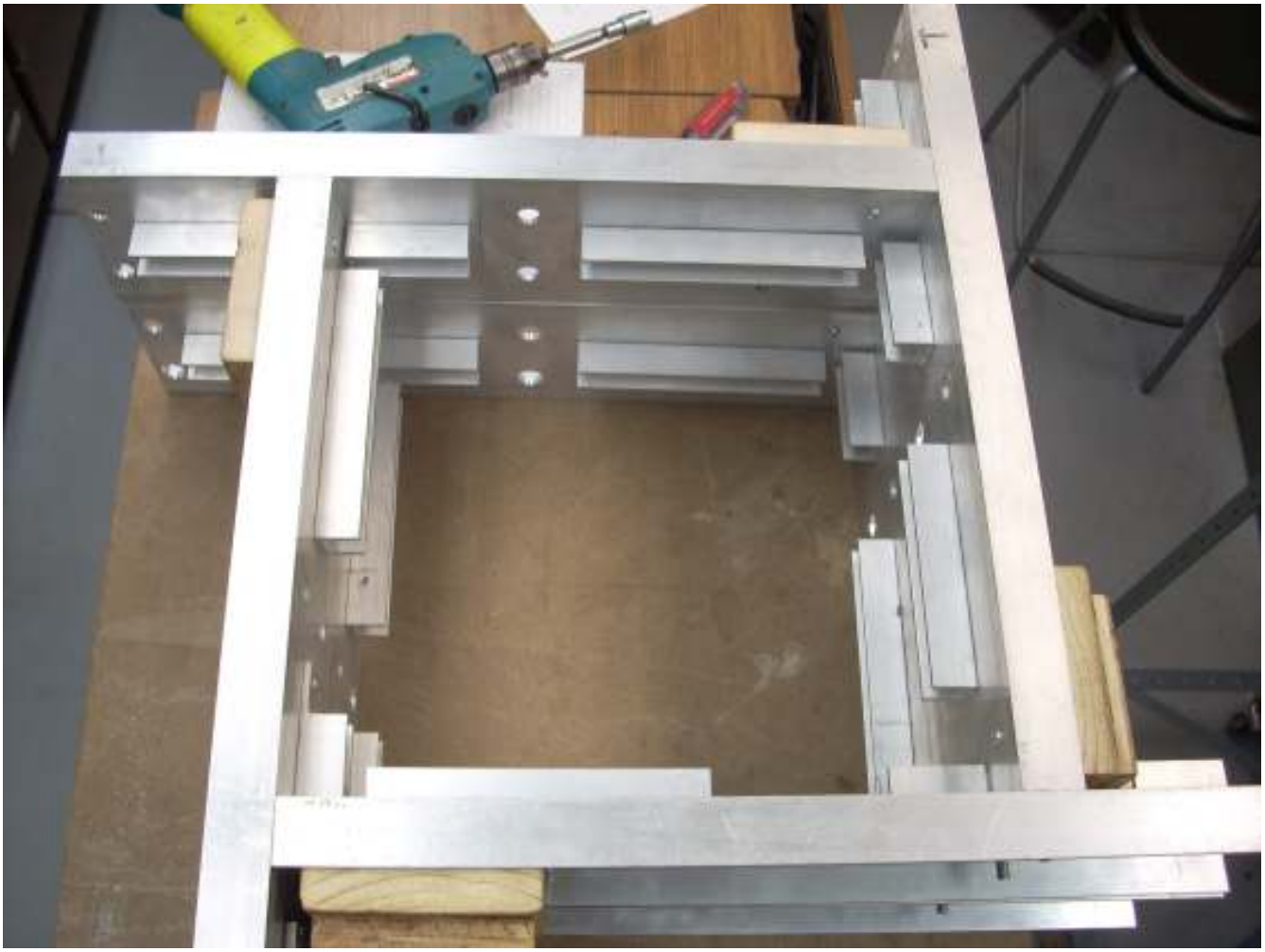
On the inside of the cope, drag, and upset are my cleats. They are all discontinuous to permit the adjacent side to connect.

Here is the cope set for maximum size.

Here we have the cope and drag assembled together.

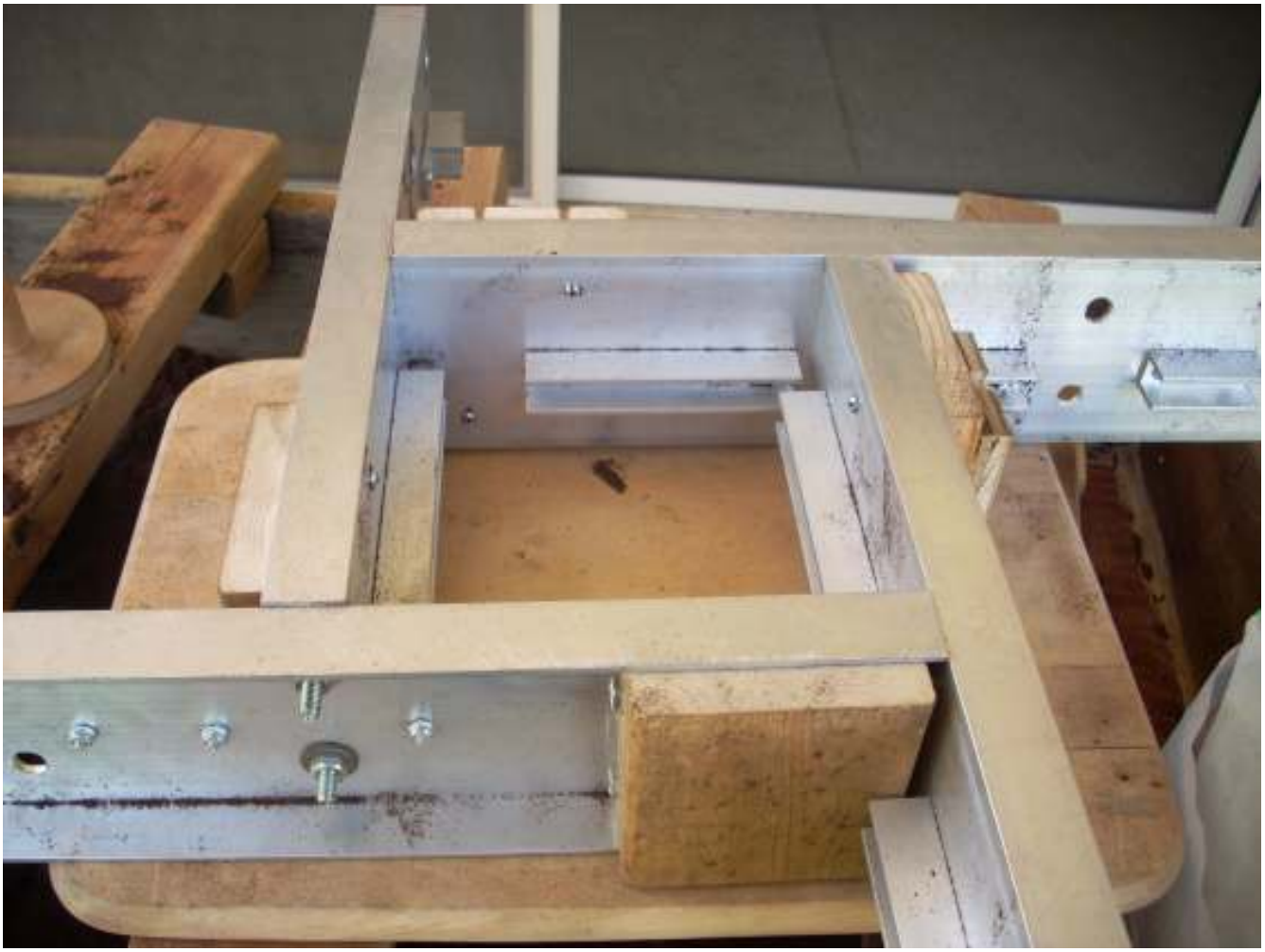


In this side view you can see one of the two alignment plates. Note that the flask is up-side-down. I have chosen to put my alignment plates on adjacent corners. This is not as good as having them about 1/3 the way along opposite sides but that would have been more difficult to accommodate given the variable volume design.

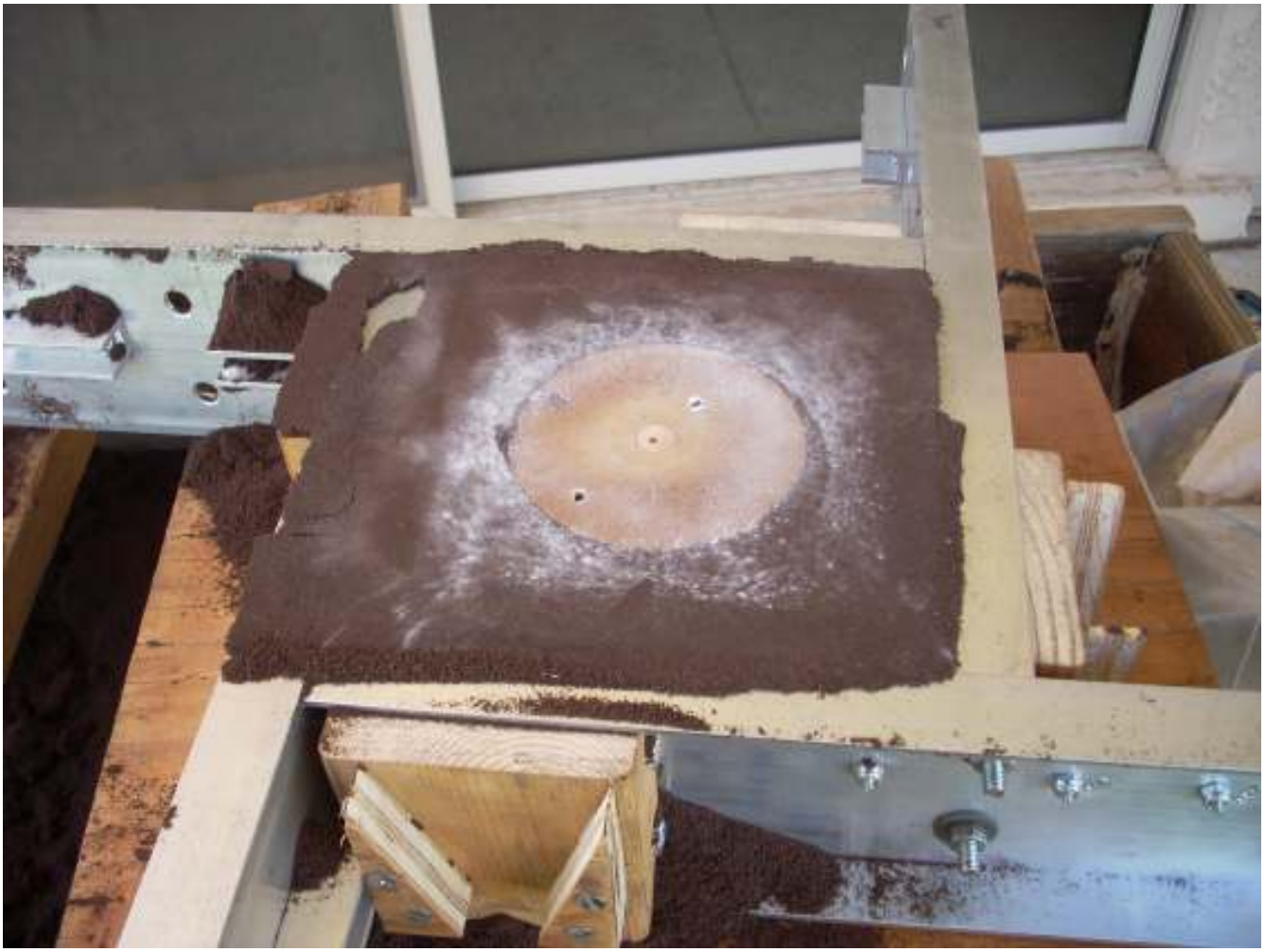

A view from the top.

There is a lot of play in the flask sides. In order to get the top and bottom faces to be flat, I first loosely assemble the cope up-side-down. Then I place it on a flat surface before tightening all nuts. The drag is assembled on top of the cope in a similar fashion. When done, the cope and drag fit together without a gap. This helps prevent melt from leaking out the joint during the pour. It takes about 3 minutes to assemble the cope or drag using my electric drill driving a socket. The drill is set with a low clutch level so I don't over tighten the bolts.

Here is the cope with my upset attached. Unused holes in the sides accept bolts that fasten bars vertically. Note the slotted head bolts above.



Here we have the drag on a molding board ready to be rammed up. The flask is set for minimum volume.



After ramming, the bottom board was rubbed in and the drag flipped over. You can see the pattern ready to be pulled. Note that the drag's sides were not set flat at this time. Later I enlarged the holes to fix this problem.

Along with testing the flask, I was testing my newly reconditioned Petrobond. Not a bad imprint.

If I was going to make another copy of this design, I would find a way to drill through the wood blocks with more precision. I think this prototype is usable but rather shoddy looking.

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