Vial Racks – REDUX 2024

The alcohol collection at the Clemson University Alcohol Collection (CUAC) was stored on ~15-inch deep open-face shelving. The specimens were later moved to fire resistant cabinets, 19 inches deep. Vial racks in the collection are 2 inches wide (2 inches of shelf space) by 15 1/8 inches long and hold 32, 4-dram glass vials. The collection already had 125,000 vials and our maximum capacity, using the old racks, was 169,344.

To use that precious 4 inches new vial racks were needed. With the death of Bioquip, even purchased ones were out of the question. Frankensteined vial racks made with vinyl fencepost covers and baking trays from Dollar Tree were invented but proved too tedious to manufacture on a large scale.

This new vial rack design uses a single piece of flat metal, cut in four places, with eight folds. The finished rack is 2.5 inches wide, 19 inches deep and can hold ~70, 4-dram glass vials, or 100, 8 ml Sarstedt vials, expanding the maximum holdings to a minimum of 299,880 4-dram vials, a 77% increase.

Vials used at Clemson:

1. Clear Screw Thread Glass Vial, 4-dram, Acmevial.com
2. 8 ml, Sarstedt, 60.542.307
3. 70 ml, Sarstedt, 75.9922.721
4. 120 ml, Sarstedt, 75.9922.421

Materials

Supplies:

1. Duct metal, 28 gauge, cut to 6.5″ x 22″, $6.50

Bending Break:

1. Central Machinery 30 in. Mountable Bending Brake, Harbor Freight, $70
2. 2, 2 ft. 14-Gauge Half Slotted Metal Framing Strut Channel, Home Depot, ~$15 each
3. Bolts, washers, nuts (3/8 inch) to attach Framing Strut to Bending Break
4. 3 (or 4), 4-inch C-clamps (metal, not a ratcheting bar clamp), $4 each
5. 1, 2-inch Binder Clip

Tools:

1. Straight Cut Aviation Snips (yellow handles), $5–10
2. Pittsburgh 3-1/2 in. Hand Seamer, $10–15
3. Homemade shallow crimper, >$10
    a. 2, 10″ Mending Braces
    b. 3 bolts and keeper nuts
    c. 2 thin washers

Methods

1. Contact a local duct fabrication company and arrange to have metal cut to your size needs. This stuff is heavy, so pick a place that is close enough you can pick it up. I use www.metalworksllc.net.

2. The bending break needs to be bolted to a bench or table. Alternatively, you can attach the Metal Framing Struts as feet and it will work just as well **(Figs. 1, 2)**. If wood is used for feet, the bolts must be countersunk.

3. The pressing plate (a loose metal plate that comes with the bending break) needs to be secured to the support plate (the portion of the bending break that does not move when metal is being bent). Take the handles off the binder clip and use those to create a space between the pressing plate and support plate **(Fig. 3)**. Use the C-clamps to secure the pressing plate to the support plate. The metal sheet will slide between the gap **(Fig. 7)**.

4. Assemble the homemade shallow crimper as shown so the washers create a narrow gap at least 2 inches deep between the mending braces **(Fig. 4)**.

5. Mark the cuts and bends. For CUAC, a line is drawn 1 ¼" in from both short sides and 2" in from both long sides **(Fig. 5)**.

6. Using the aviation snips, cut the four red lines **(Fig. 6)**.

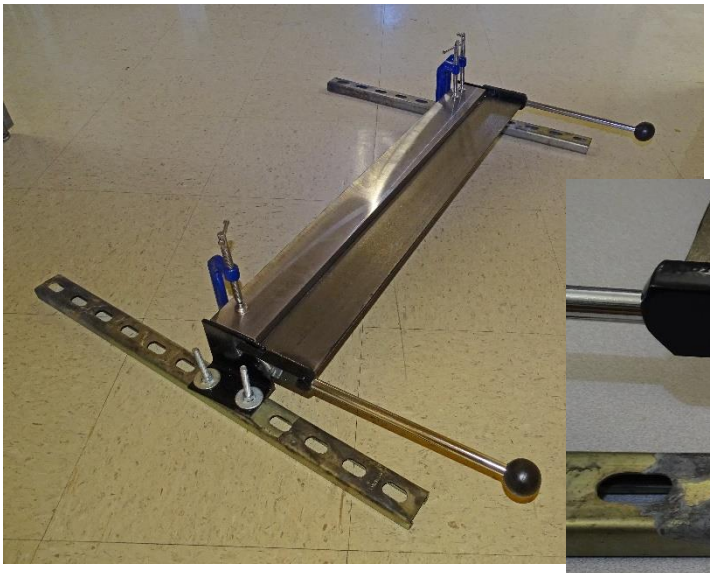
7. Using the bending break, bend the two long sides **(Figs. 7, 8)**.

8. Using the homemade shallow crimper, slide the end flap between the mending braces and fold each flap inward 90° (**Fig. 9**).

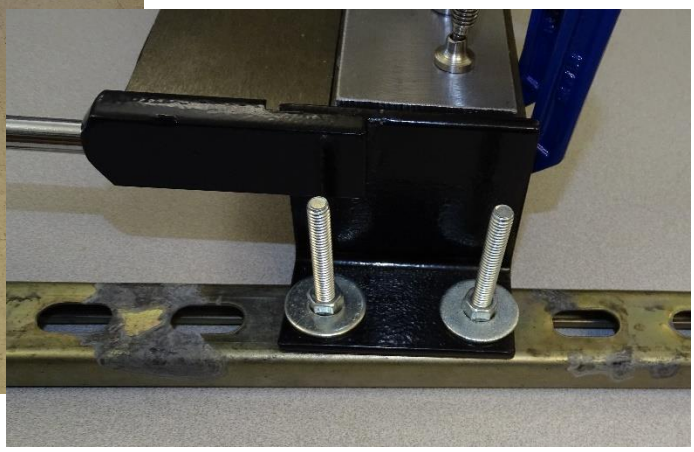
9. Using the hand seamer, grip the bottom flap firmly at the base and fold it up as far as it will go (**Fig. 10)**. The seamer gets in its own way, so you'll finish folding the flap with your hand (**Fig. 11**).

Benefits of the Design

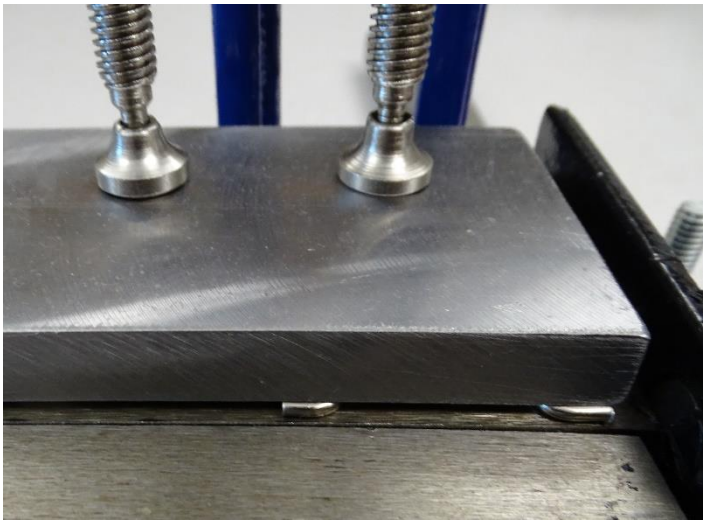
1. The rack will not rust, mold, burn, or hold or release water (humidity).
2. No nails, screws, glue, welds, etc. to buy, install, loosen, break, give-way, etc.
3. The loose ends allow for flexibility (shoving in bigger containers).
4. The bottom flap makes a handy handle.
5. Name cards can be held with magnets.
6. Looks like it will cut you to ribbons, but won't.



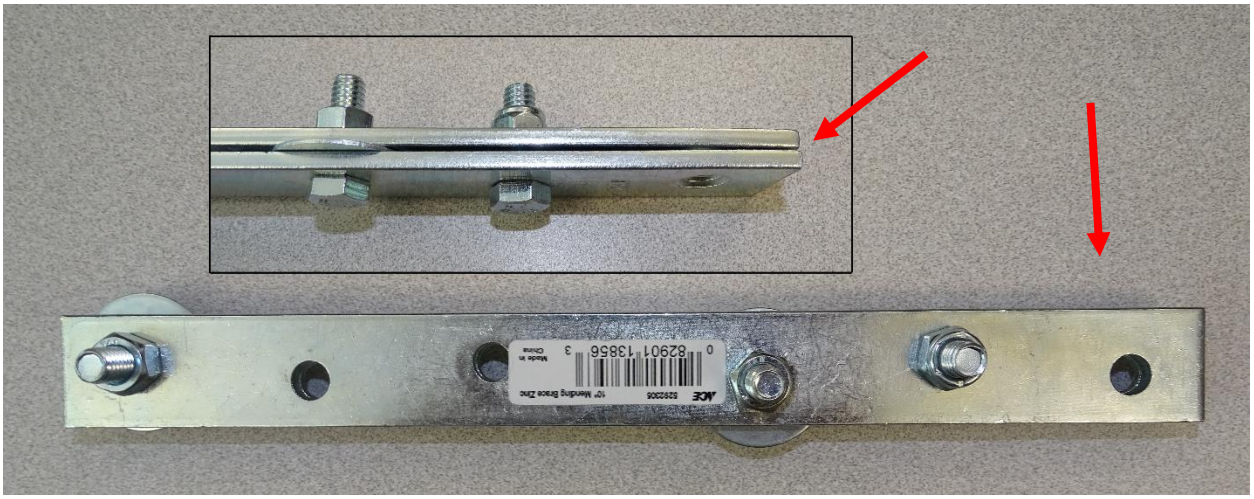
1. Complete bending break.



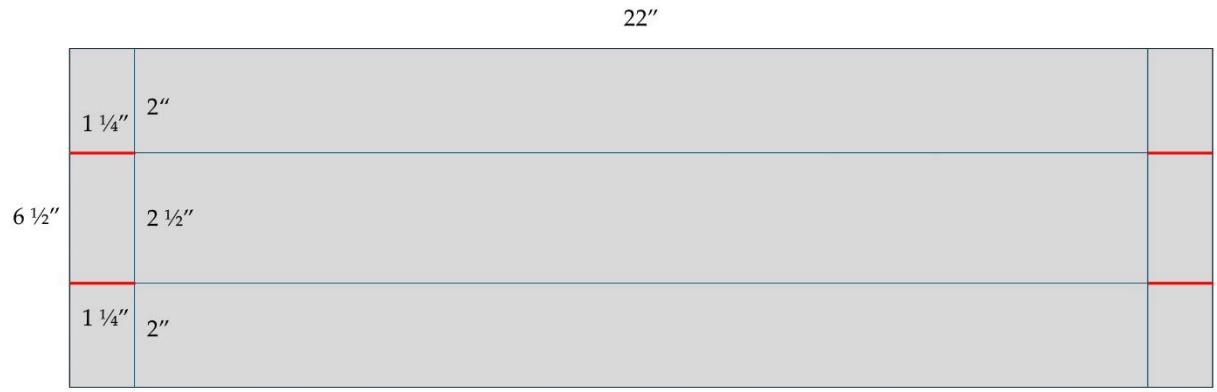
2. Attachment of “feet”.



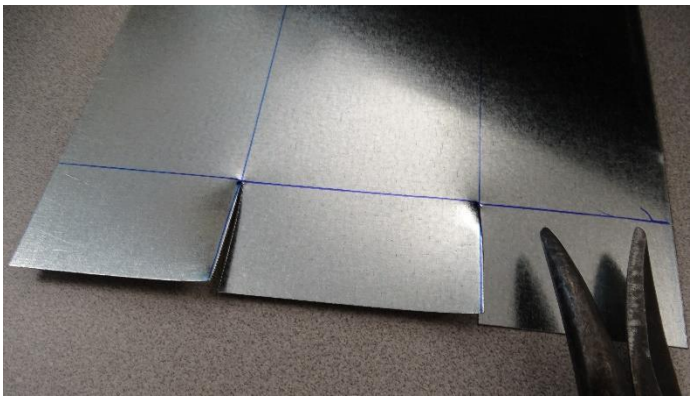
3. C-clamps holding pressing plate (top) to support plate (bottom), separated by binder clip handle.



4. Homemade shallow crimper. Narrow gap indicated by red arrow.

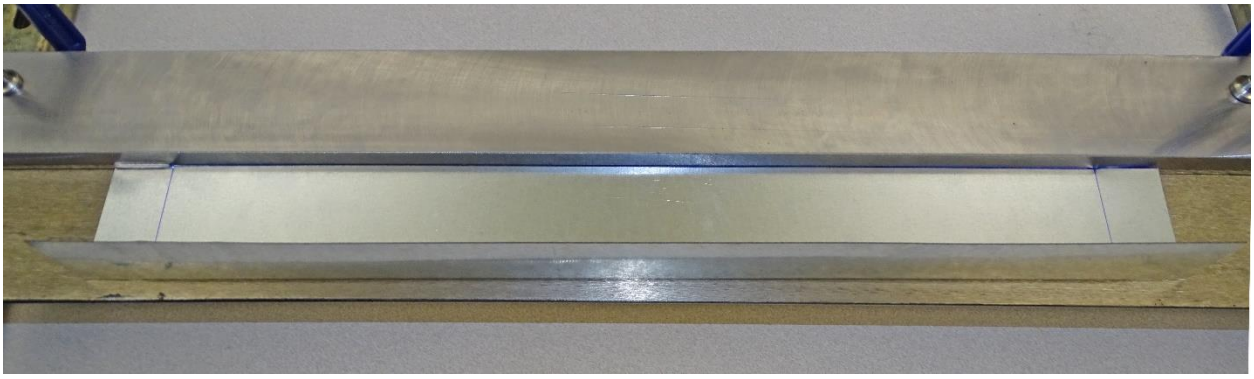


5. Full plate with bend marks in blue, cut marks in red.

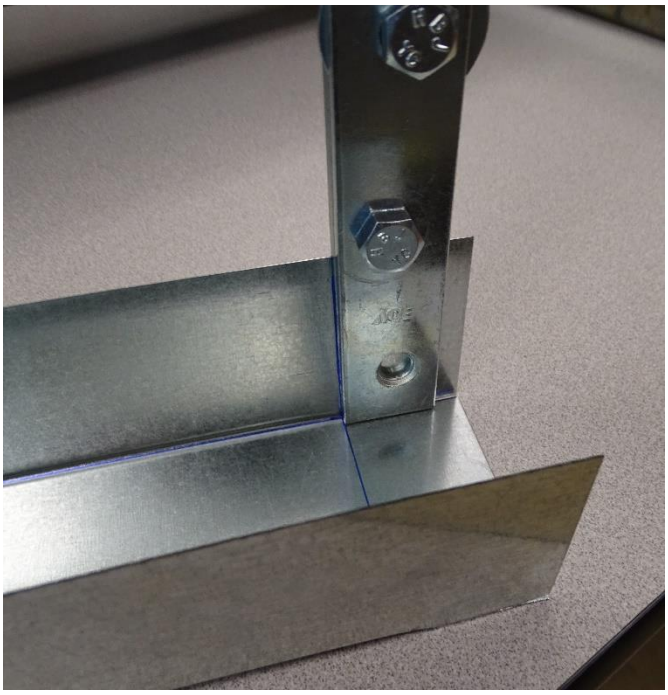


6. Two cuts and straight cut aviation snips.

7. Plate inserted into bending break ready for the first bend.

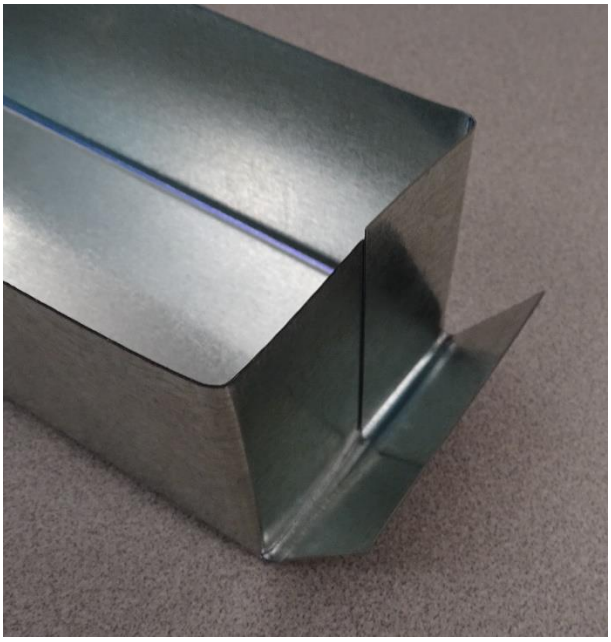


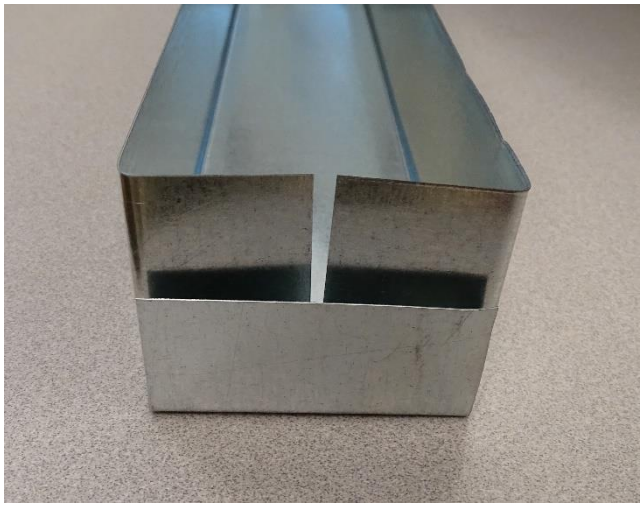
8. Plate inserted into bending break ready for second bend.



9. Homemade shallow crimper holding end flap, and bending end flap 90° inward.

10. Hand seamer bending bottom flap up.





11. Bottom flap half-up, and all the way up.

12. Completed and full rack on the bench and in the cabinet.

Consider donating to the Clemson University Arthropod Collection!
Follow the link or use the QR code.

https://iamatiger.clemson.edu/giving/giving-to-clemson?id=57cfb5c6-829a-4112-b22f-1b30517b69f2