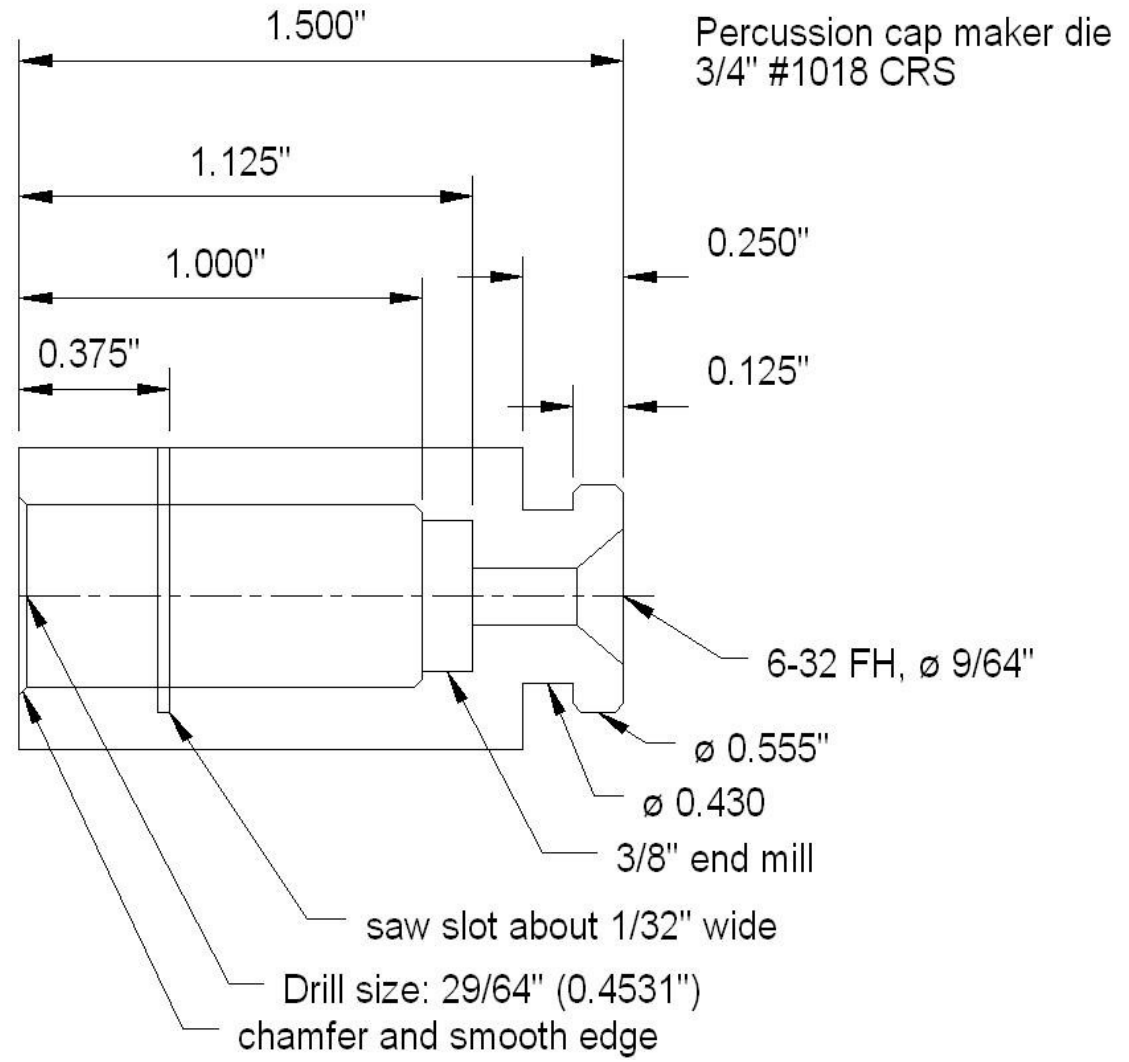
Guide to making blackpowder percussion caps

3-5-2015 GCI

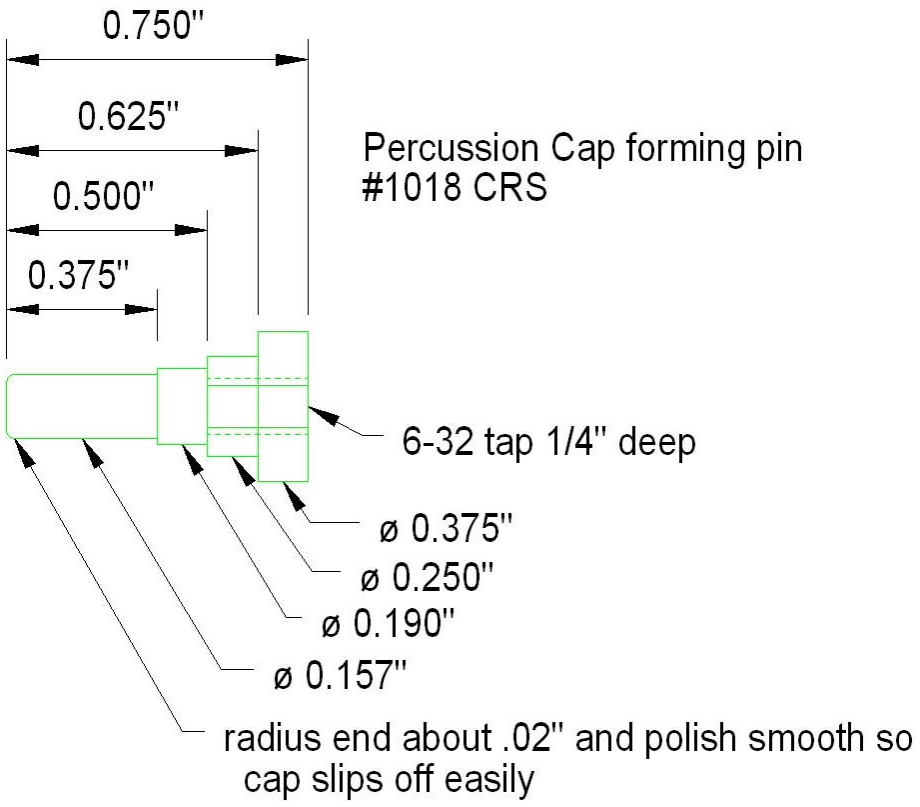
Intro:

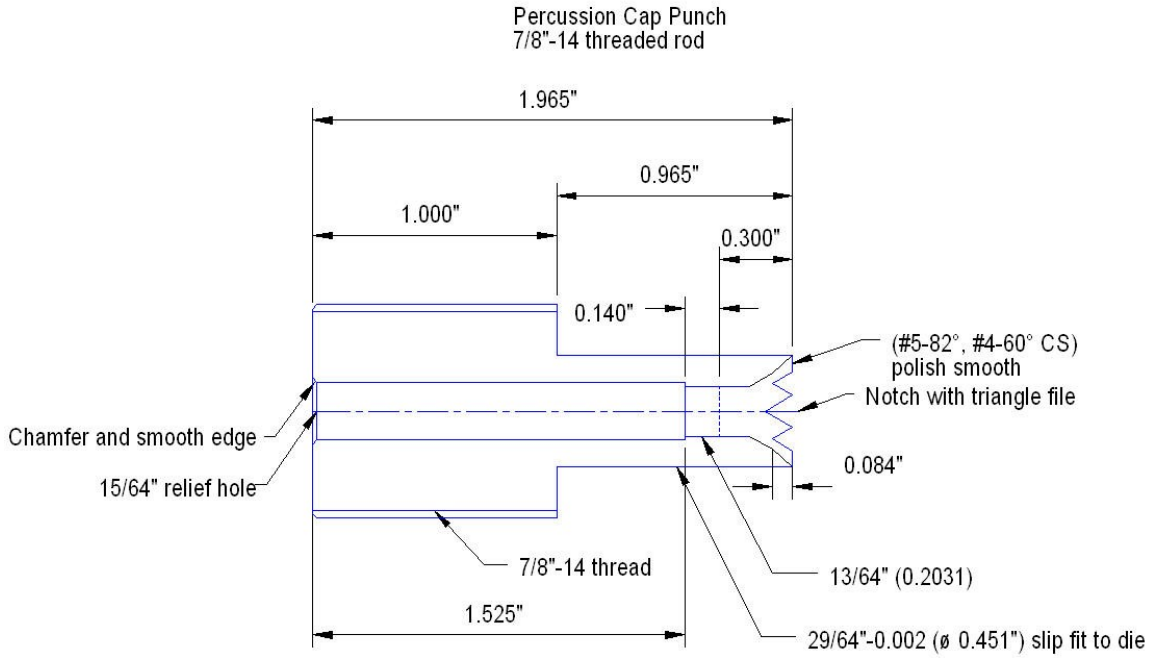
My experience with commercial percussion caps has been they often don't fit tightly on the nipples, they are expensive, they are usually out-of-stock, they fragment and jam my revolvers, and they aren't always reliable. Many folks have used toy gun rollcaps with varying success but most of their fabrication techniques are haphazard, slow, and crude at best. My goal was to combine the best techniques and fabricate caps better than what is currently available. My caps are 'corrosive' but for anybody shooting blackpowder who doesn't clean their guns the corrosiveness of rollcaps is the least of their worries.

The tools:



My capmaker cup forming tool is similar in design to my gas check maker at http://castboolits.gunloads.com/showthread.php?200965-Easy-to-build-gas-checkmaker I've found that mild steel (#1018 CRS) rod is a perfectly adequate material for punching and forming aluminum. The few parts that need polishing are easily done with emery paper and hardening the steel isn't necessary for home production rates. The forming pin is held in the die by a 6-32 flat head screw.





I used two countersinks to make the cone in the end of the punch. The angles aren't critical. What is needed is a sloping, smoothly tapered, and polished surface to gently form the cup. The OD of the disk punch should be sharp. I formed the 12 teeth with a triangle file by screwing the completed, polished punch into the top of a press to hold it firmly. Then a piece of masking tape was wrapped around the punch to indicate location and tooth depth and the punch end was filed straight across to form the 12 teeth. The Tap-O-Cap system (http://www.thefirearmsforum.com/threads/tap-o-cap-drawings.82768/) uses more elaborate teeth but mine seem to work fine.

To punch out 0.170” diameter rollcap discs I modified a cheap 1/16 “ diameter hand paper punch by sawing off the punch pin at the punch base. Then clamping the punch closed and used an 11/64” (0.1719) drill to enlarge the die hole and drill a counterbore into the punch base. Make a 0.170” diameter pin and solder it into the punch base. My punch was part of set from WalMart and cost only a few dollars. Hardening the steel parts is not needed. The rollcaps are also from WalMart under the “Legends” brand containing 0.023 grains of presumably Armstrong’s mixture (potassium chlorate + red phosphorus). A tweezers make handling the punched rollcap disks much easier.

Drill a 5/32” thick hardwood paint-stirring stick with a #6 (0.204") drillsize to hold formed cups. I use a spring clamp to hold the stick to the table. Keeping the cups fixed greatly simplifies filling, tamping, and capping the cups. Because you must concentrate and keep a steady hand when making percussion caps I do batches of 15 at a time and then take a break. I can load the stick with cups, fill, cap, and overspray in about seven minutes for a batch of 15.

Make powder scoop from fired Small Pistol Primer soldered to a 14awg copper wire shaft. Form a ¼" diameter loop on one end as a handle. File down the SPP cup to approximately 0.146" ID x 0.075" deep. Mine holds about 0.3 grains weight of Goex FFFFg.

Make a tamper pin from a 16d nail. Square off and polish end to 0.152" diameter.

Make a storage tray from two CCI-300 Large Pistol Primer trays. Use 22LR cases in the corners to index the tray halves. Note that the covering tray has the holes facing outward.

Preparing cup material from aluminum soda cans

1) Wearing leather gloves and using a sharp paring knife stab the can shoulder and slice off the top of can at the shoulder.
2) Using a kitchen scissors cut down the side of the can along the straight line where the label paint overlaps.
3) Use the scissors to cut off the bottom of the can at the shoulder.
4) Use a guillotine paper cutter to trim off the ragged edges where the top and bottom were cut off. Trim the sheet to 3 3/8" wide.
5) Now use the paper cutter to cut the 3 3/8" wide sheet into three 1 1/8" wide strips. A tuna fish can makes a perfect storage container for the strips.
6) Take two strips and place the painted side together and secure the ends with a small piece of tape. The opposing curl of the strips yields a nice flat uniform piece that works great for punching.
7) A very light spray of wax furniture polish on the assembled strip lubes it so it punches cleanly and doesn't smear aluminum in the punch and die. Yield is about 30 cups per strip.

Forming the cups

I mount the punch and die in a $25 Lee “Reloader Press” since with properly designed tools very little force is needed. With the ram up, the punch is screwed into the press until it seats fully (bottoms out) in the die. An old pill bottle (slightly less than 7/8” inside diameter) is screwed onto the top of the punches 7/8-14 thread to catch the formed cups. I can make several hundred cups without having to empty the bottle. When punching make

sure the ram is completely stroked so the punch and die bottom out. If not fully bottomed out the cup isn't stripped off the forming pin and the next cup will jam into it.

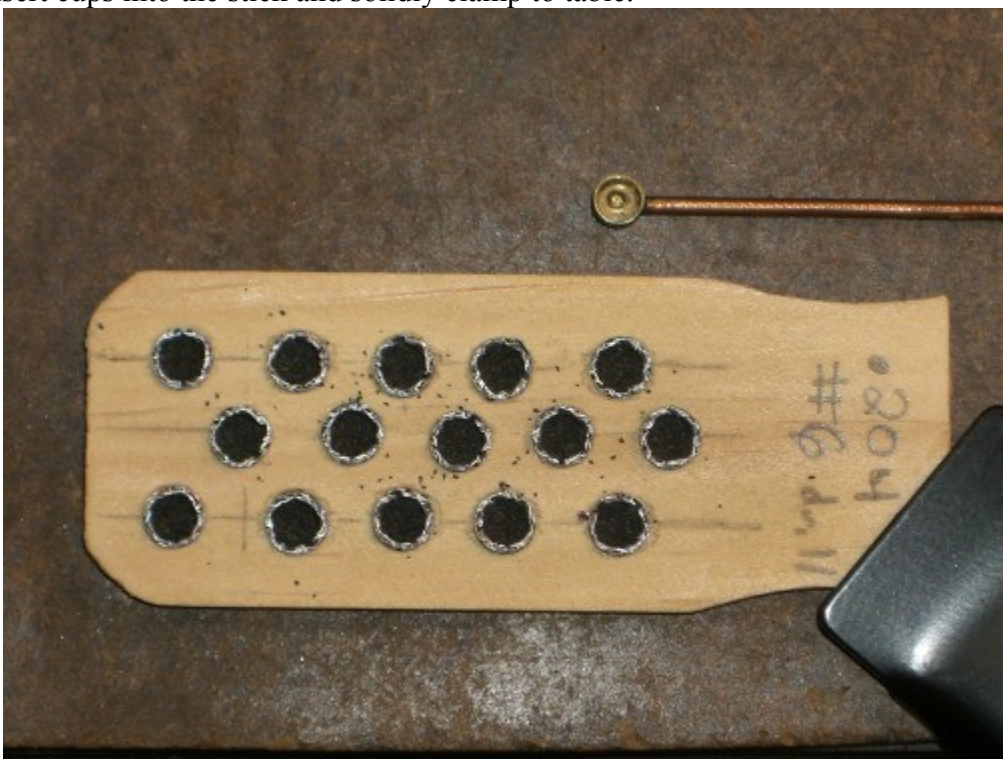
Procedure:

1) The prepared double-layer aluminum strip is inserted into the slot in the die. Make sure the strip is completely inserted and touches the backside of the slot. You should have a nice round hole punched out of the strip.
2) Ram moves up and simultaneously punches out a disk while the punch teeth crinkle it so it folds up smoothly.
3) Ram continues up and the disk is folded and shaped to size by the polished tapered cone and forming hole in the punch while the forming pin in the die forms the inside surface.
4) At top of ram stroke the formed cup skirt slides past the larger diameter relief hole in the punch and springs out to catch.
5) As the ram is retracted the skirt is caught in the punch and the cup is stripped off the die forming pin.
6) After punching a few dozen cups I've noticed aluminum chips build up in the die so I remove it and clean it out.

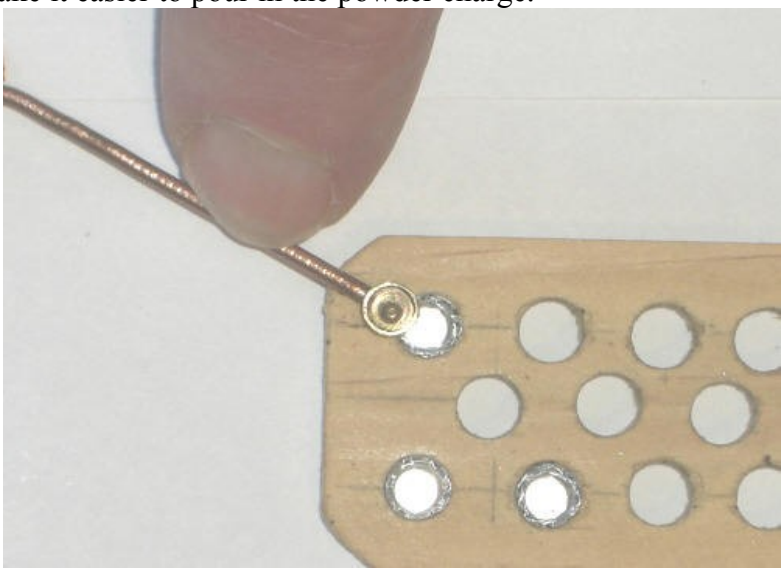
This setup works quite well as long as you make sure to fully upstroke the ram. If you don't the next cup will be jammed into the previous one. If the press ram or die seating isn’t tight the punch won’t easy slide into the top of the die. In that case only move the ram down enough so the punch clears the die slot so you can position the strip for the next stroke i.e. a full upstroke and a partial downstroke of the ram.

Loading percussion caps

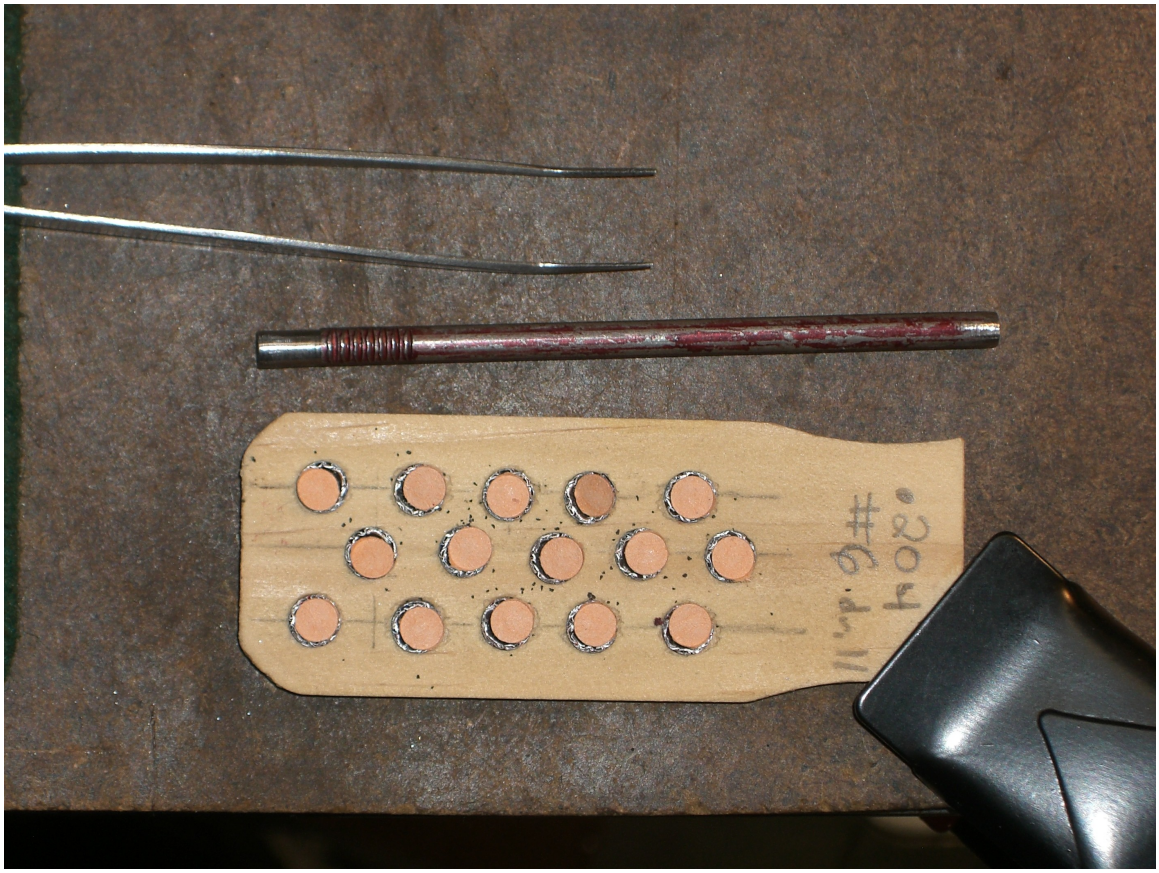
1) Insert cups into the stick and solidly clamp to table.



2) Fill cups with 1 scoop, about 1/4 grain, GOEX FFFFg. Use left index finger to steady scoop by sliding the scoop shaft under the fingernail. Notice how little powder is spilled using clamped down cups and steadying the scoop. A future project is to make two indexed plates, one will hold the cups while the other will have funnel shaped holes to make it easier to pour in the powder charge.

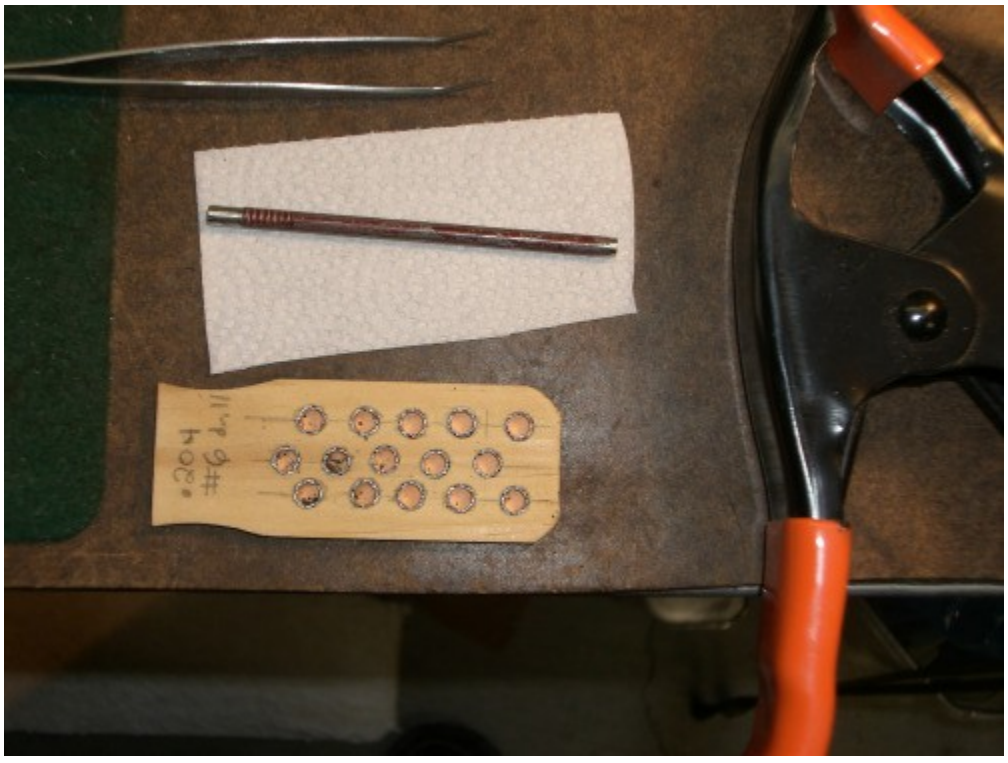


3) Compress the FFFFg powder into the cup with the tamper pin.



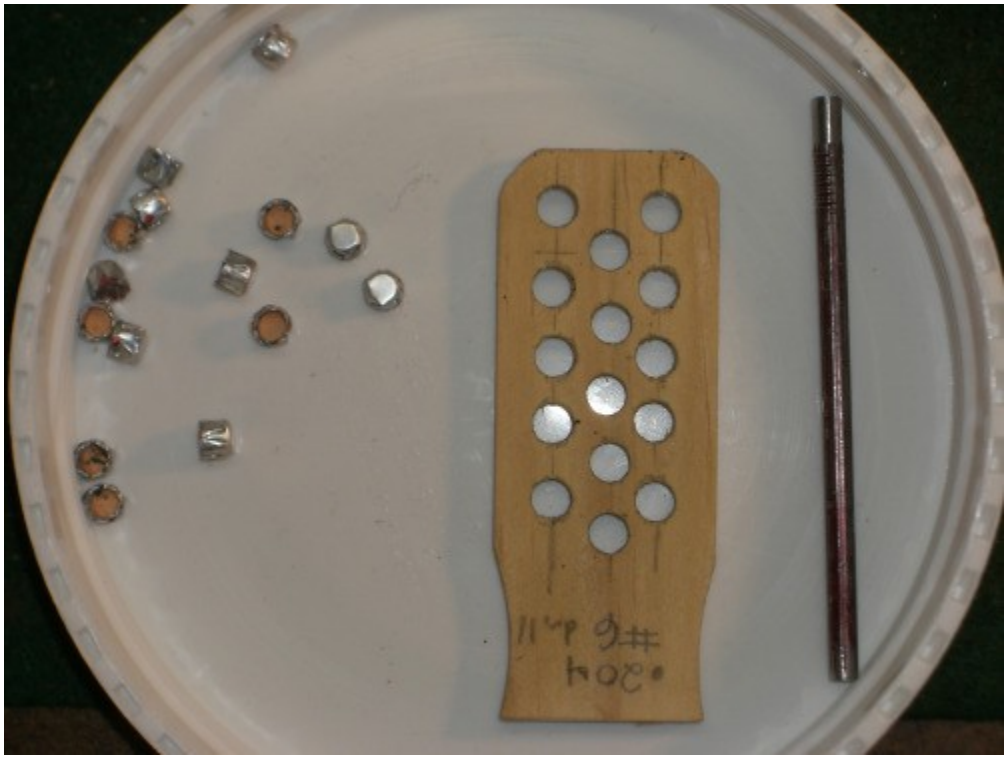
4) Place a rollcap disk brown side up over each cup using a tweezers. Because the cups are 0.157” ID and the rollcap disks are 0.170” diameter the disks can be pressed into the cups to hold and seal the powder charge in place.

5) Press rollcaps down into the cups using the tamper pin. It works best to line up the disk over the cup and squarely press it straight down. Occasionally a disk will catch on the edge of the cup and go in crooked. The result is a bit of the powder pops up on top of the rollcap. As long as its just a small amount as seen in the photo it doesn't seem to affect the cap performance.



6) Glue everything together using a light spray of hairspray from about 12" distance. The stick should appear damp/wet but not puddled with spray. Don't saturate the rollcaps. I use a couple of quick sprays. I use the cheapest aerosol canned hairspray I could find "Rave 4x Mega" its got flammable solvents, ether, alcohols, vinyl, acrylics, urethane, etc for a good thin plastic overcoat. The 'greenie' pump sprays are mostly water and pond scum and probably are hygroscopic so I avoid them.

7) Blot off excess hairspray with a paper towel



8) Dry 5 minutes and then push out caps from backside of stick using tamper pin.

9) Dry overnight before using caps.

Testing caps

I tested the hairsprayed caps and they all fired (20 of 20) with no failures. My drop tests with a 2 ounce steel cylinder showed a sensitivity of 16" compared to a Remington #11 cap sensitivity of 22". More testing information can be found at:
http://castboolits.gunloads.com/showthread.php?249374-Homemade-percussion-cap-tests

Conclusion

My homemade percussion caps have worked so well for me that I no longer use commercial caps. I've successfully used my caps in revolvers, Kentucky pistols, a pepperbox, and muskets. Double layer soda can cups hold together better than Remington caps. A single rollcap doesn't clog the nipples with paper debris like multiple rollcaps can. A small amount of 4Fg powder provides enough sparks to reliably ignite the main charge. The hairspray overcoat provides enough glue that the caps can be transported

without damage. The tooling needed to easily produce reliable caps is inexpensive and easy to make. I hope you'll have as much success as I've had with homemade percussion caps.