

For obtaining good deep stain embedding it is essential that the stain is being dried fast. We use the device described below, which is connected to a low pressure dry Nitrogen gas supply. The stain thickness can be controlled (aside from appropriate wicking) by the air flow the grid is exposed to. This airflow depends in the amount of air flowing through the device and the distance between the grid and the air outlet. After many requests, below is a detailed description of the device that we use.

Disclaimer: This is the description of our device only. Building and using a similar box is entirely at your own risk. Please observe all safety precautions when working with pressurized equipment.

### THE BOX

The box is a cheap wooden box from a craft store, 8" long and 4"x4" on the short sides.

The wooden slat sticks out by 3". The hole in front has the size for the outer diameter of the 1/4" Tygon tubing (see below). The tubing then can be pulled through to the beginning of a "bubble", which is wider and creates a tight fit. The bubble points to the outlet.

The valve is connected with angled pipe to tubing fittings, pipe size 1/8" to tubing 1/4"

**The tubing is 1/4" Tygon bubble tubing.** The sections with larger diameter in the bubble tubing are practical if the hole in the wooden stick is too loose. Then adjusting the tubing can still create a tight fit.

Current valve (pushbutton) 1/8" pipe connection

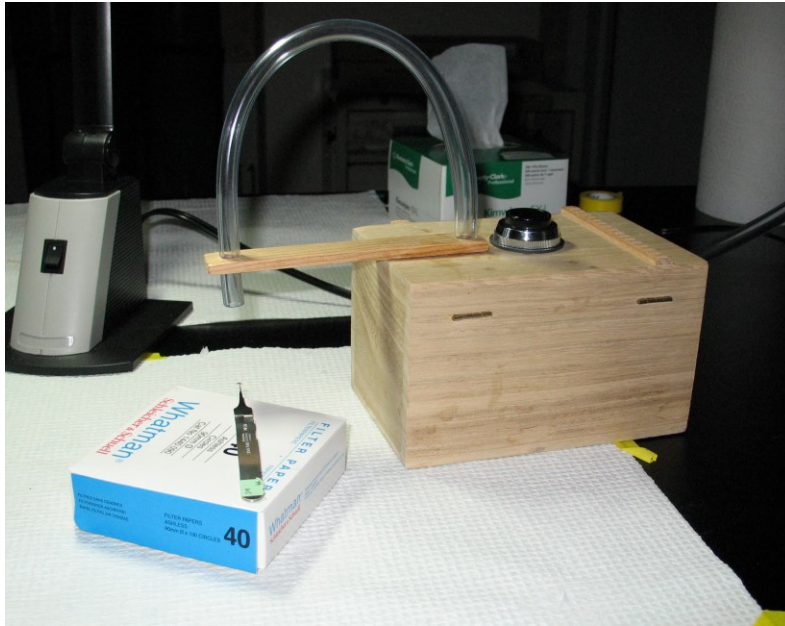
McMaster-Carr 6464K19 Catalogue page 970 (Apr. 2009)

Suggested valve (toggle) 1/8" pipe connection (mounting nut is a problem though, see below)

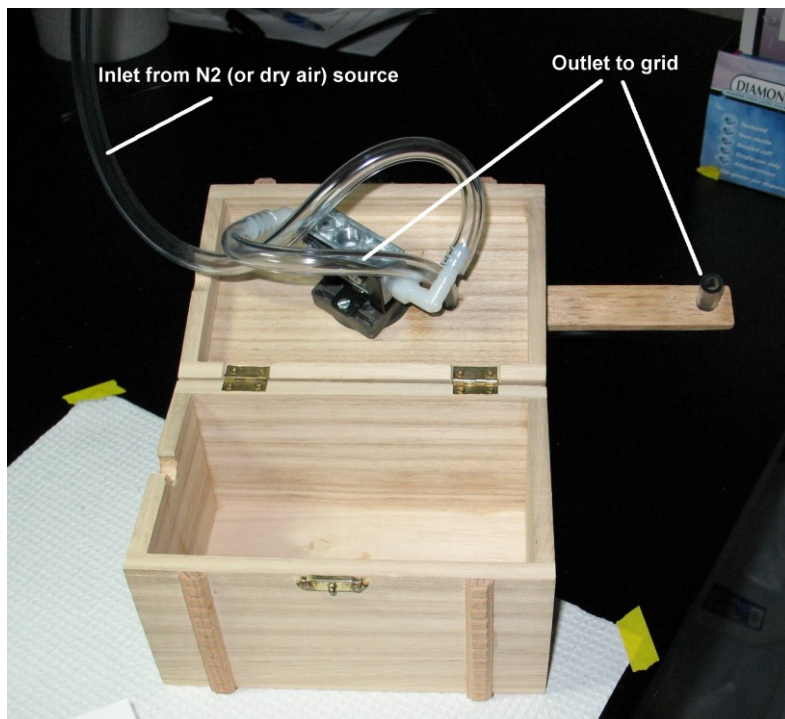
McMaster-Carr 6464K16 Catalogue page 970 (Apr. 2009)

If the box is connected with a longer stretch of Tygon tubing to the air/N<sub>2</sub> inlet the tubing acts a little bit like a balloon, i.e. when one pushes the valve the first burst of air is stronger, emptying the extra pressure in the line. This is not a serious issue as this first burst is gone by the time the grid is positioned under the outlet. The proper connection would be with a compression fitting that connects to a longer line made of pneumatic tubing. The toggle valve should eliminate the burst problem as it can be opened before the last blotting step. The reason we first did not want a toggle valve is, that our setup is connected to N<sub>2</sub> bottles, and we were concerned that the valve would be open for too long and empty the bottle. The push button turns out not to be the most practical, because one wishes one had 3 hands to blot, hold the tweezers and push the button at the same time.

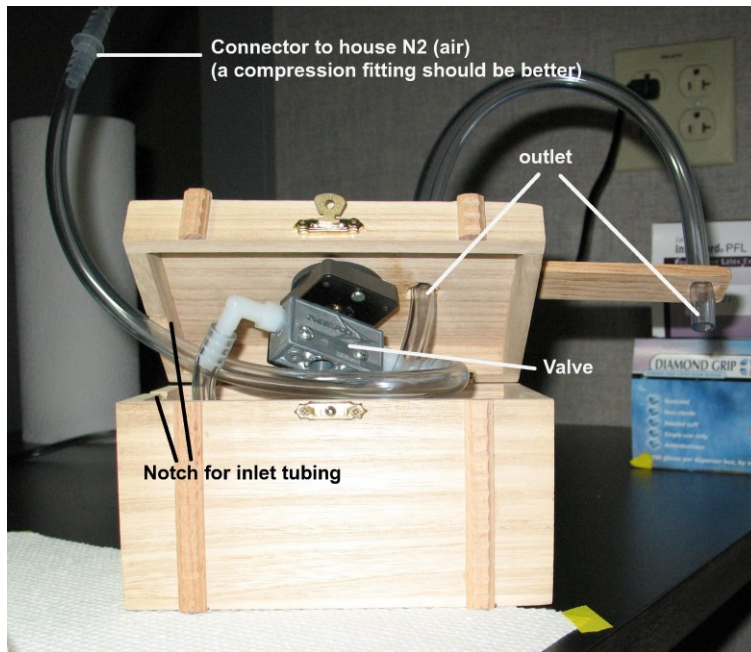
Attached are pictures of the box, and a picture of a drying cylinder. If connected to the house air I would precede the drying cylinder with another small particle filter.



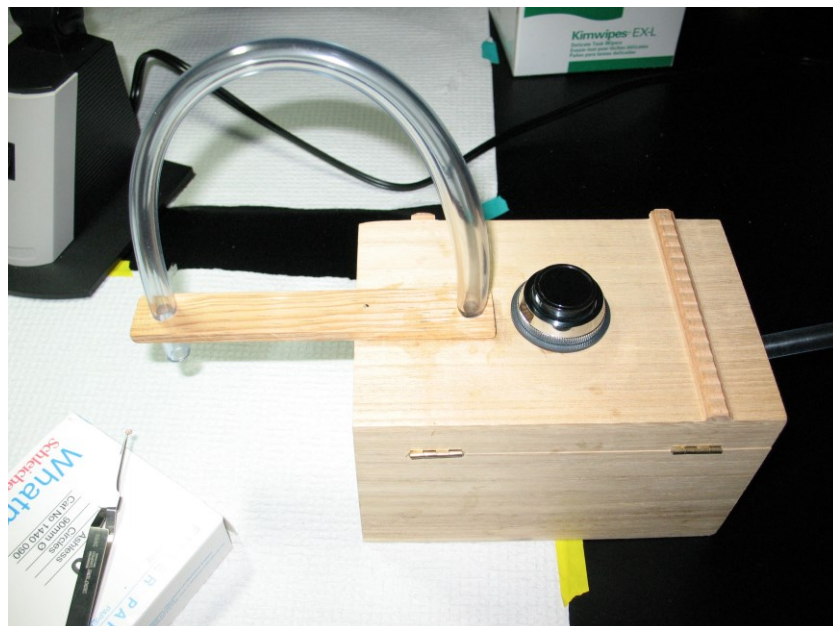
The box in (almost) action (I did not have a second person to hold the tweezers and push the button.)



The open box showing the bottom of the valve and the tubing connections.



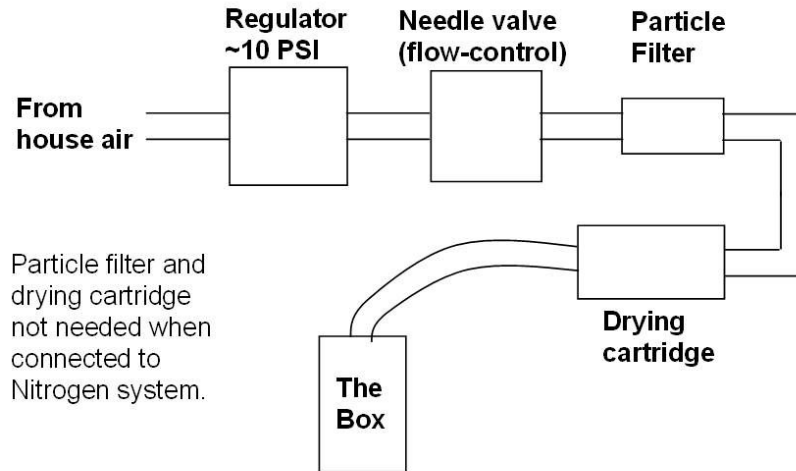
Another view of the (half)-opened box



Another view of the closed box.

It should be possible to connect the system to the house air, as long as it is dry.

### The complete setup

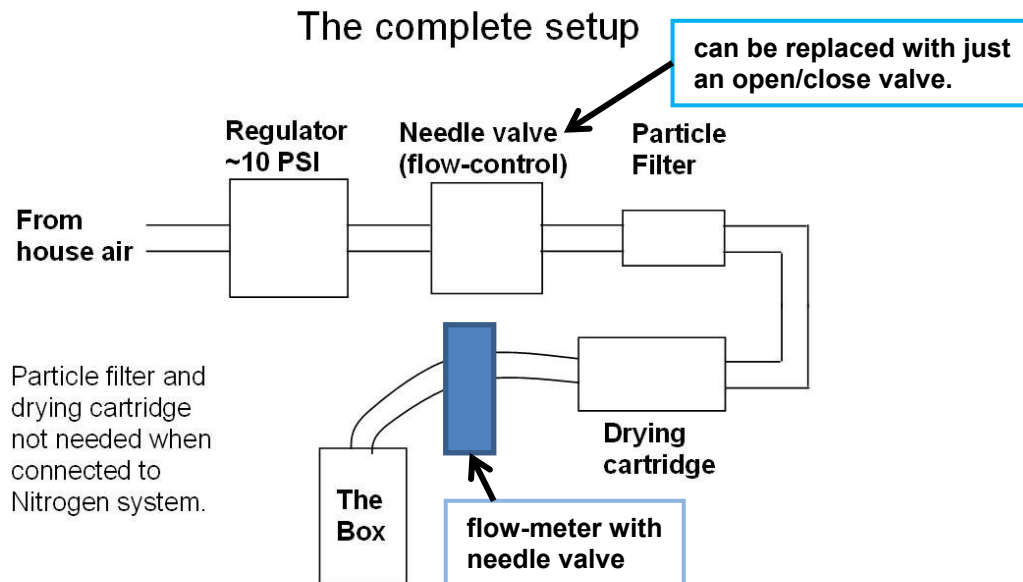


## Alternatives and upgrades:

1. We added a flow-meter for better reproducibility. This flow-meter was mounted to a corner of the box, ~15 CFM seems to work well for us.



Flowmeter, Dwyer Instruments: VFA-7-SSV about \$59.00



2. Replace button valve on box with toggle valve.



Example: McMaster Carr: 6464k16 about \$33.00, **However, I could not find a nut for this to mount it.**

Advantage: Hands free when drying

Disadvantage: When left open will empty Nitrogen gas bottle.