Hose Nozzle

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This is a short blurb on a nice hose nozzle you can make yourself if you have a chunk of brass or aluminum about 1.25" in diameter (32 mm) and a lathe. It's straight out of Guy Lautard's *Machinist's Bedside Readers* (volume 2, page 148). If you don't have these books and you like to machine things, go buy them -- they're quite good. Lautard called it the Haralson Hose End after the guy who made a bunch of them after World War 2 (but some other guy came to Haralson with the design).

I used this nozzle to clean off our redwood deck today and it once again reminded me of how effective it is. The sharp corners inside the nozzle help create turbulent flow; this makes it work better than any store-bought nozzle I've had. Here's a picture of it (note: its mass is 157 g):

I was a bit surprised to see that I made it 20 years ago; it doesn't seem that long ago.

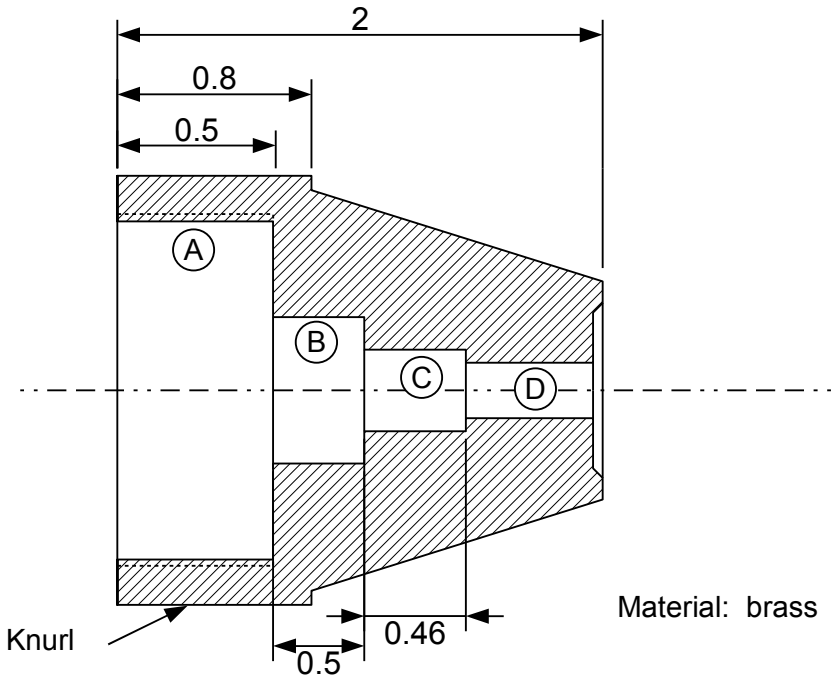
I use this nozzle on US 3/4" hose and connect it to a faucet on my sprinkler system, which uses 1.25" diameter pipe for the supply and a 1 horsepower ditch pump for the irrigation ditch water. This pump produces an honest 40 psi and this nozzle works well at this pressure, but it would be even more effective at 60 psi (Lautard's article says you really want about 45 psi minimum). At 40 psi, the stream pressed against your finger is borderline painful, so a 60 or 80 psi supply would probably be fantastic for cleaning things. Even at 40 psi, it blasted all the dirt out of the cracks between the boards on the deck and cleaned the outdoor door mats we have quite nicely. This nozzle works notably more poorly on 5/8" hose compared to 3/4" hose, so use the biggest (and shortest) hose you have.

The end hole on mine was drilled with a #2 drill (0.221"). I'd suggest you start smaller (say, around 0.15") and try your nozzle out on your water system and pick the hole diameter you like best.

Even at 40 psi, a hose with this nozzle can whip around a little if you set it down. On grass, it probably won't move too much, but on concrete, it might whip about quite a bit more. At higher pressures, it's probably something you might not want to leave unattended. When I was cleaning off our 20 foot square concrete pad today, our pet duck kept getting in the water stream and getting herself knocked over (it was hilarious, but didn't faze her, as she loves to filter through wet grass and

standing water).

Here's the drawing (dimensions in inches, not to scale):



The four inside diameters are:

A	0.98
B	0.5
C	0.344
D	0.221

The diameters A, B, and C should be bored with a sharp tool to make sure you have sharp corners, as that's what helps with creating turbulence.

Machine a standard garden hose thread at A (1.063 OD, 11.5 threads per inch). A rubber hose washer should fit in the recess snugly.

I've left the recess at the front and the taper of the nozzle up to you. I do recommend the recess, as it will protect the nozzle's hole from getting dings in it.

I used a coining knurl to put that knurl on, but if I were to do it again, I'd just put a standard diamond pattern knurl on it, as I didn't cut the knurl very deep and it's not all that effective.

You are, of course, free to fiddle with the design, but I'd recommend making your first one like the drawing, mainly because I know it works quite well. If I had a higher pressure pump, I'd probably scale up the bores by 10% or so and see how that works.

Here's a picture of the nozzle working (and the supervisory duck inspecting the collision of the water stream with the ground):

One modification that comes to mind is to use o-ring seals to allow inserts of different final hole sizes to be put into the device. This would let you tune the performance to your pressure and flow capabilities. This could also be done with a piece at the front that screwed into place and was sealed with an o-ring or flat rubber gasket.