Ely Neon: Setting Up Shop

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Goal

Design, equip, and run a neon sign manufacture and repair service in Ely, Minnesota.

Also manufacture and repair related ionized-gas technologies such as the Nixie tube.

Everything state-of-the-art, compact, efficient, best engineering.

Primary studio in my garage at 15 East Harvey.

Mobile – on-site neon testing and repair – for starters, I would like to design a full-service field rig which fits in my Ford Escape. If need be, or as business warrants, I can upgrade to an electrician's truck, specialized for neon work.

Online Resources

The Art of Making Neon with Martin Suettinger - in this YouTube video, Suettinger demonstrates the entire process, calling out the equipment and processes. I said "Yes, I can do neon" because of this video.

https://www.youtube.com/watch?v=XAQ-pktuOuU

The Art of Making a Nixie Tube – in this YouTube video, Dalibor Farný demonstrates how he developed artisinal Nixie tubes.

https://www.youtube.com/watch?v=wxL4ElboiuA

Nixie tubes have ten wire-like metal elements shaped like the digits zero through nine, with a pin in the socket for each element, causing corona discharge when current is applied. I want to do this more than traditional neon – set up a CNC router to form the wire elements. This will let me make durable, strikingly beautiful sculpture-signs, everything from Moose and Bear and Wolf (big with tourists up here), name or logo of business, etc.

Images

Neon sign manufacture – bombardment

Nixie tubes

Equipment: Tube Bending Station

- Torches (several types, all oxygen-propane)
- Oxygen and propane supply
  - Studio
    - Oxygen tanks to start, consider purchasing condensor
    - Propane large tank for studio and home furnace supply (or separate tanks?)
  - Mobile
    - Oxygen and propane tanks
    - Useful for on-site repairs, also for lampwork demonstrations
- Miscellaneous: air house, cork, glass file, chalk pencil, electrode holders, tube diameter gauge, blocks, shot bags, paint, brass screens

Specialized Devices

- Lathe for tubes (see Art of Nixie video), to rotate tube in horizontal position while heating with hard torches (or possibly machine-held torches, semi-automated helper).
- Twin lathes to weld together the butt ends of two tubes
- Twin lathes to weld the butt end of one tube into a hold cut into a second tube
- Etc., brainstorm other possibilities

Equipment: Electrical and Gas Station

- High voltage power supply at various voltages and currents
  - Illuminate signs – voltage depends on tube diameter, length, gas pressure, etc.
  - Bombardment – subjecting tube to high voltage to generate heat which vacuum pumping in order to burn out impurities.0
- High performance vacuum pumps, traditionally two-stage
  - High vacuum needed
  - Time critical, fastest possible evacuation time, limit re-deposit of burned impurities
- Gas manifolds – entirely custom, have specs, need design
  - Gases traditionally sold in glass bottles, more recently in metal canisters
    - Start with metal, decide if glass is also needed
    - Minimum two canisters (neon and argon, possibly krypton as well)
  - High-performance pressure gauges, stopcocks, etc.
  - Connected to vacuum pumps
- Emergency Shutoff Big Red Button / Dead Man's Switch for everything
  - Because deadly current
  - For public demonstrations, say I were in a booth at a county fair, I would want a waist-high daisy-chain of hazard cables on poles, like in the screen-print shop where I used to work – disconnect the chain of plugged-together cables trips full shutdown.

Equipment: Annealing Oven(s), Storage

- The larger the sign, the greater the need to strengthen by annealing
- Anneal for one to several days, then store in controlled conditions for slow cooling
- Studio only, I don't foresee annealing on the road