

Beseler fan modification

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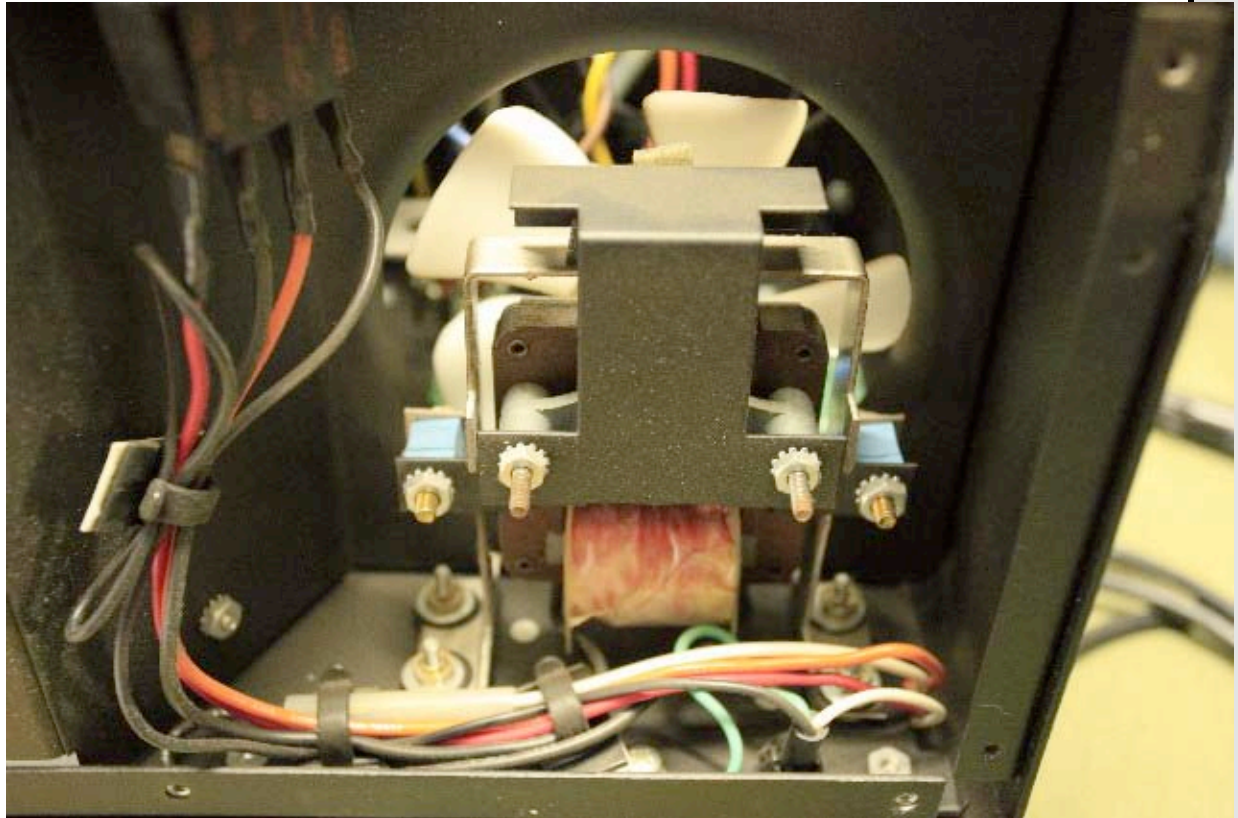
Topic: Beseler fan modification

Modifying Beseler 45S Dichroic Head Fan to Reduce Vibration

Disclaimer: Warning! modifying or making alterations to any electrical equipment can be dangerous and should only be done by a qualified electrician. The following describes how I replaced the 115 volt AC internal cooling fan of a Beseler 45S Dichroic Colour Head with an axial Thermaltake Smart Case Fan II 12 volt DC , so as to eliminate vibration and thereby improve print quality –sharpness. Please also note that in Australia the AC power is 240 Volts and I am using a step down transformer to convert to 115 Volts AC, because I already use 115 Volt AC Zone VI cold light head and stabiliser as well as 115 Volt AC RH Designs Anayser Pro.

I finally got to use the dichroic head on my Beseler MX 4x5 enlarger and the 250 watt globe was considerably brighter than my Zone VI cold light, dramatically reducing exposure times.

However, I knew I had potential problems with the head. When I touched the lens barrel to adjust the aperture I could feel a significant amount of vibration. I have used a Super Chromega 6x7 colour enlarger with an inbuilt fan and never felt vibrations to the extent that I was feeling it with the Beseler. Eventually a 11x14 inch print made with the Beseler head when compared to the same print made with ZoneVI cold light, confirmed for me that vibration in the Beseler head was causing softer focus prints. Which kind of defeats the purpose of using 4x5 format in the first place. It was time to have a peek inside the big black box and find out what was going on.



The Beseler Dichroic 45S head I own is not the computerised model. I am assuming it was made around 1997 from a label I found inside. The internal fan is located opposite the 250 watt 82 volt light source. Above is a close up picture of the head with its back removed, revealing the column style fan, mounted on a U shaped chasis. Beseler dampen the fan in at least two points of contact with the head:

- 1) the blue coloured dampeners located left and right of the middle of the fan where it attaches to the U chasis and
- 2) the 4 rubber dampeners used to connect the U chasis feet to the floor of the head. Refer to the arrows in the pic above.

Whilst the blue dampeners looked OK, the 4 dampeners attaching the U chasis to the head were compressed and hard from age. This was not surprising given the age of the head. It was obvious that the fan mounting would have to be removed and the rubber dampeners replaced.

The head has two 115V power leads, one for the fan and one for the light source. There is also a switch located at the bottom left front of the head which turns on the fan. As a safety feature the lamp will not run unless the fan switch is on. However, the lamp will run even if the external power cord to the fan is unplugged, so long as the fan switch remains in the ON position. For me this provided the options of installing a new non 115 Volt fan or removing the fan entirely to make an external fan unit as described by Philip Morgan in this link <http://www.philipmorgan.net/photography/external-cooling-system-for-beseler-45s/>.

Removing the head from the enlarger and disconnecting both power cords I set about removing the fan. First by removing the units top cover and rear panel which are

hinged as one piece. Then, I removed the fan blades by loosening the screw clip, then the nuts around the two blue rubber dampeners, unplugging a black lead to a switch box a white lead from a **plug near the base of the fan**. This now gave better access to remove the 4 nuts connecting the U chassis to the base of the head.

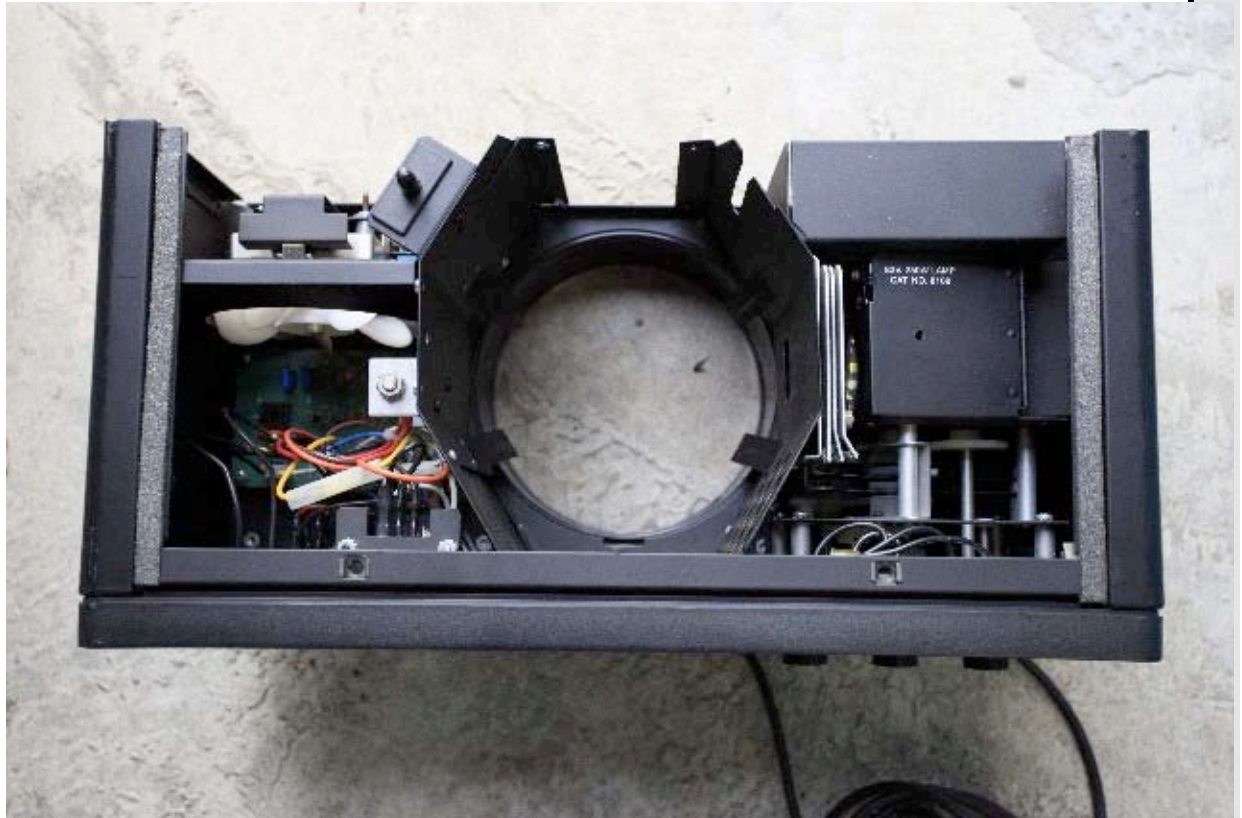
I initially tried dampening the fan by using 5mm wet suit material as additional gasket between the U shaped chassis and the head. With the fan blades cleaned up and the new gasket in place I reassembled the head. Placing the head onto the enlarger, I turned it on. Everything worked, the vibration felt at the lens had much improved, but there was still some which I felt was still likely to affect print quality.

I was talking to a fellow colleague about the fan vibration when he suggested I use an axial fan to replace the column fan type that came with the head. On further investigation of this suggestion I first started looking for 115 Volt AC axial fans. Whilst they are available mainly in the US, freight charges made them uneconomical. I then decided to look at computer fans as they came in a range of sizes with inbuilt speed controls.

I eventually settled on purchasing a 90mm Thermaltake Smart case Fan II which runs on 12 Volt DC. It had two bearings (which I hoped would give smoother longer working life) as well as options for full speed, manual speed control or temperature control. Rather than physically modify the walls of the head I wanted to attach the fan case to the rear panel of the head using the existing air flow grate holes to pass the securing bolts through.

After removing the original fan, I taped up and placed an insulating cap around the exposed white lead as a safety precaution. (I also taped up the external power cord to the fan so it could not be accidentally plugged in). Next, I cut a 5mm wet suit foam gasket for the fan case to sit flat against the inside of the head's rear panel. The fan direction was orientated to expel air from the unit. As the fan case area was smaller than the air flow grate in the rear panel, air had to be prevented from being sucked around the air fan exterior. To close this air gap a rectangle of firm black plastic sheet was cut to cover the grate with a hole the size of the fan cut into the centre for the expelled air. The 4 bolts provided with the kit secured everything into position, passing from the fan case through 5mm wet suit gasket, the black plastic, the air flow grate terminating on the outside of the head with washers and nuts. The 12 Volt DC power cable was also passed through the air flow grate to which I attached a common 240 Volt AC to 12 Volt DC converter to power the fan.

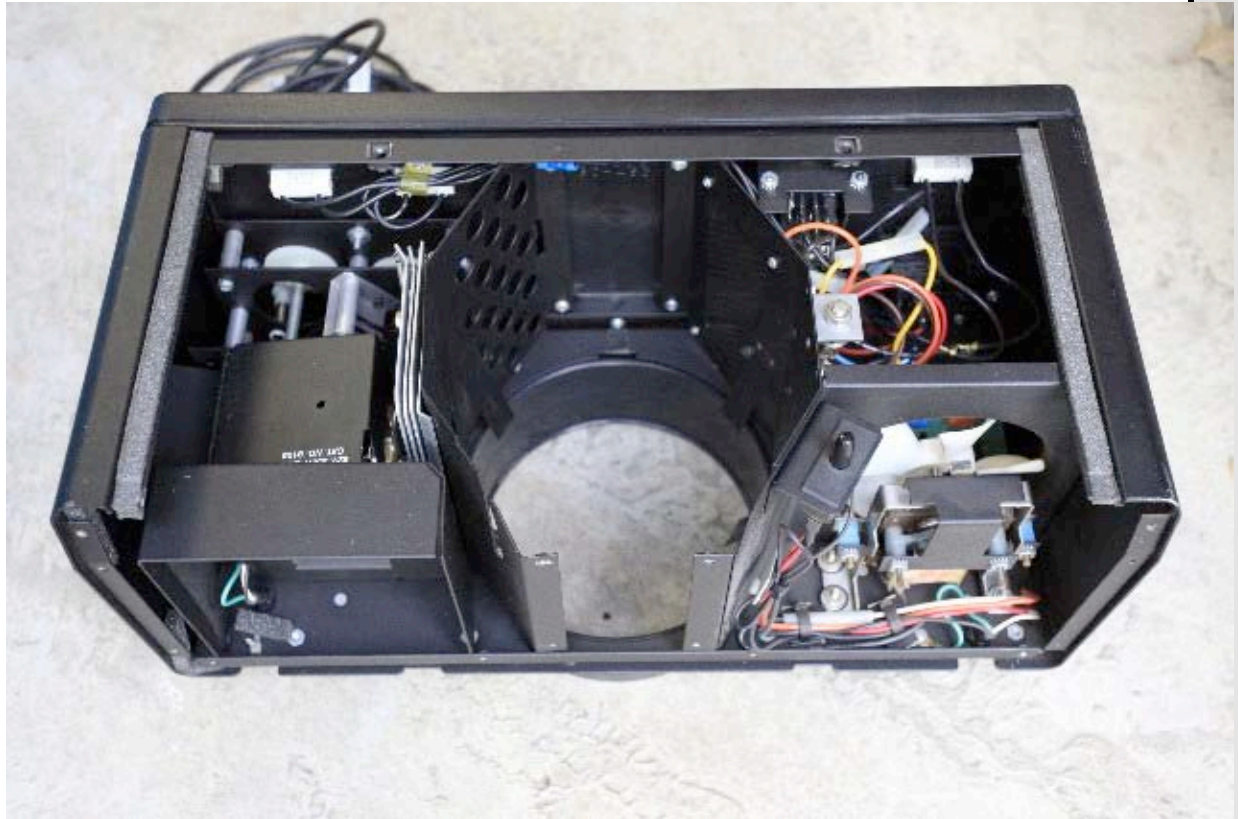
The fan unit was wired so that as soon as I turned on the power to the enlarger/analyser pro the fan automatically turned on and stayed on. After reassembling the head, it was placed onto the enlarger and turned on. The fan operated beautifully and I couldn't detect any vibration when I touched the lens, the axial fan design had made a big improvement. If you are having vibration problems with your old Beseler 45S then you may want to consider this as a possible solution.



Top view: the pic above shows the head with the top and rear removed. The central light diffuser is also removed. On the left hand side, rear, is the fan. On the right is the dichroic globe, CMY filters and adjustment controls.

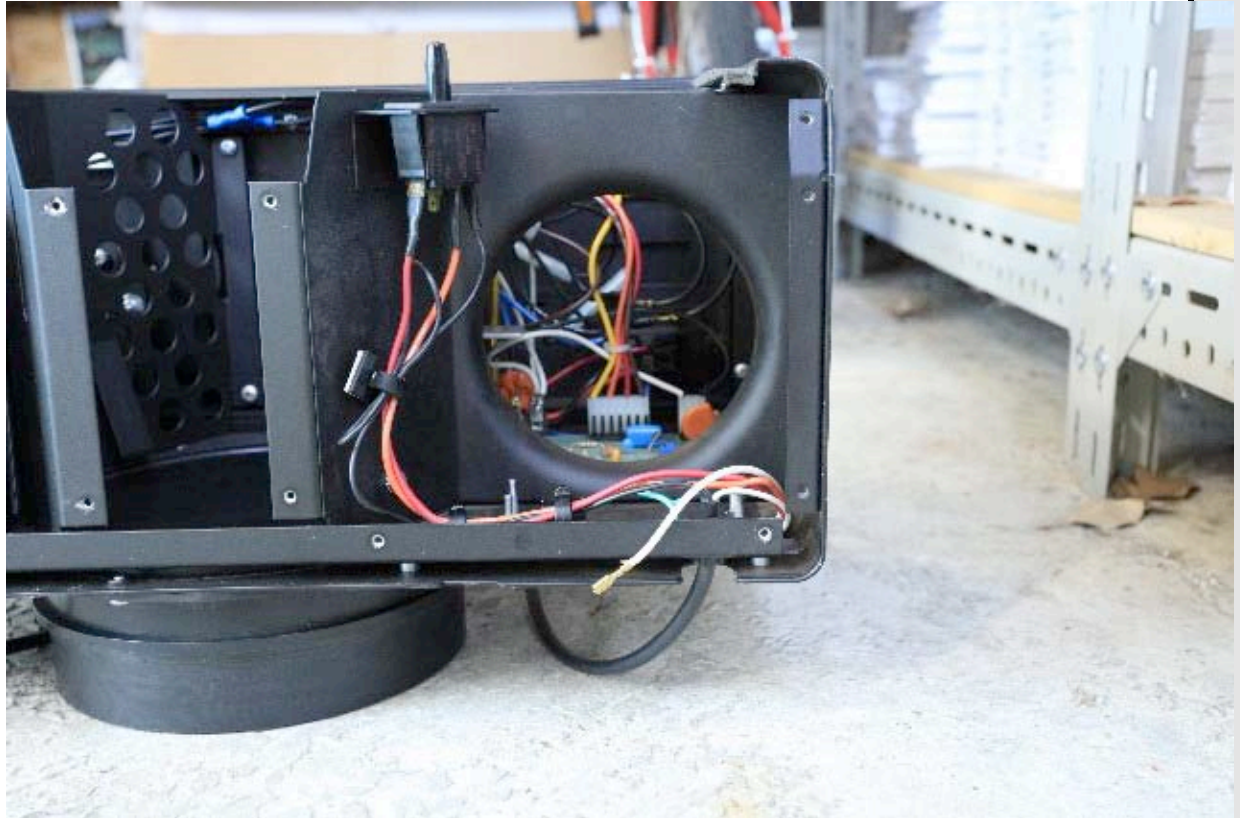


Above: showing the top and front of the head. Note the fan ON/OFF switch at front lower left.

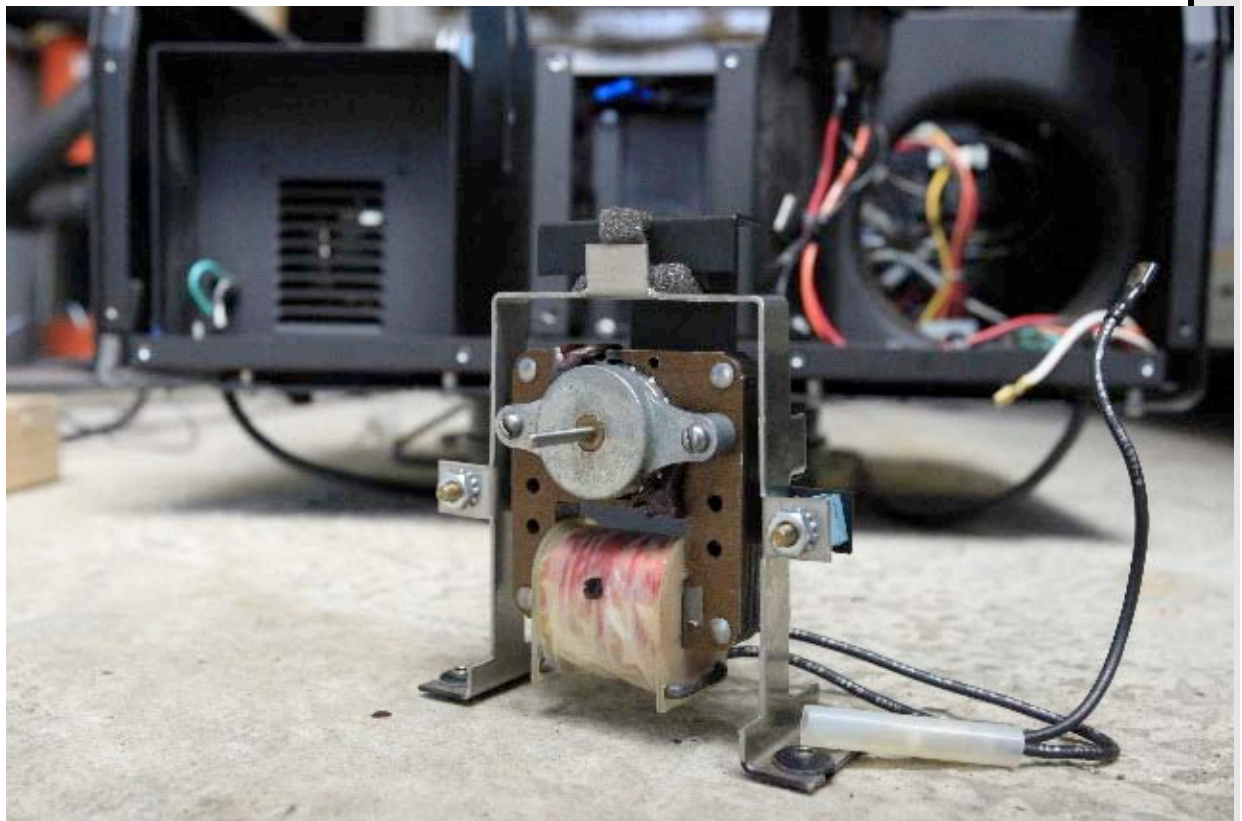


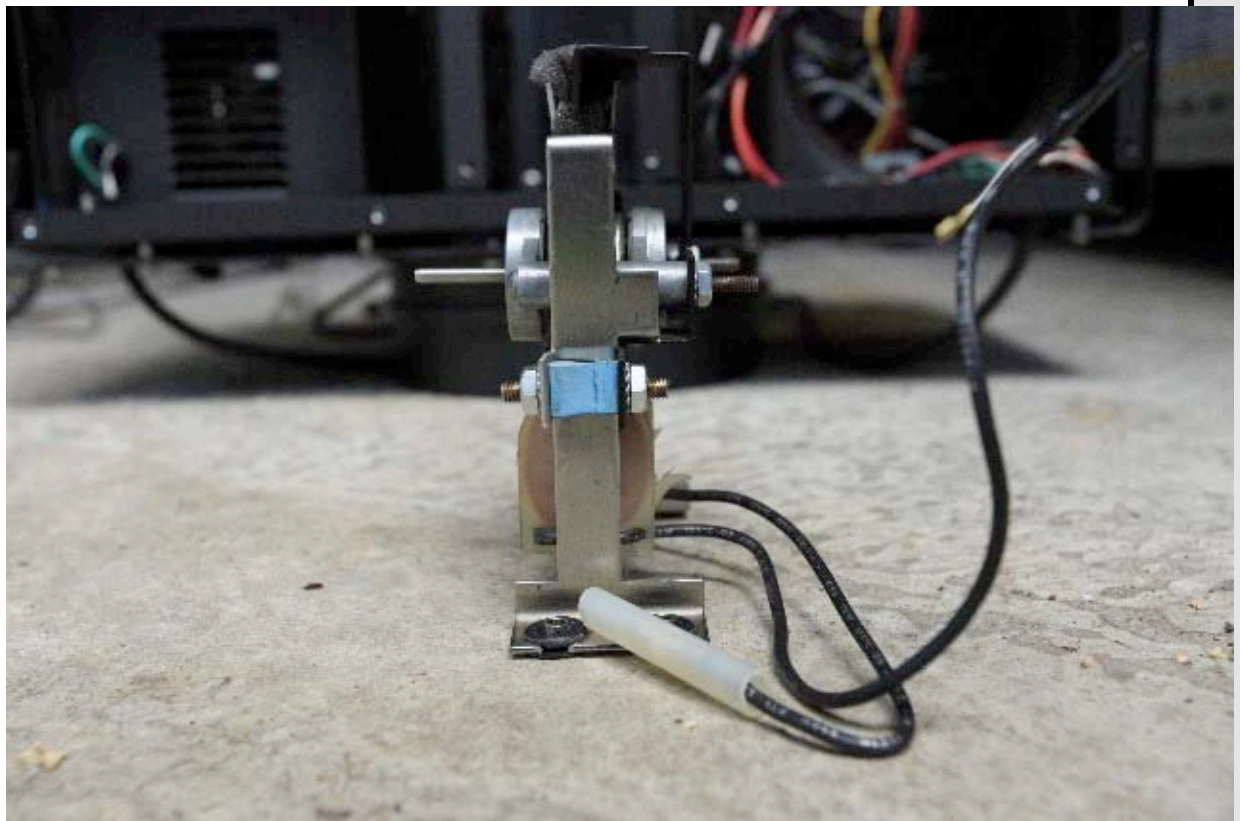
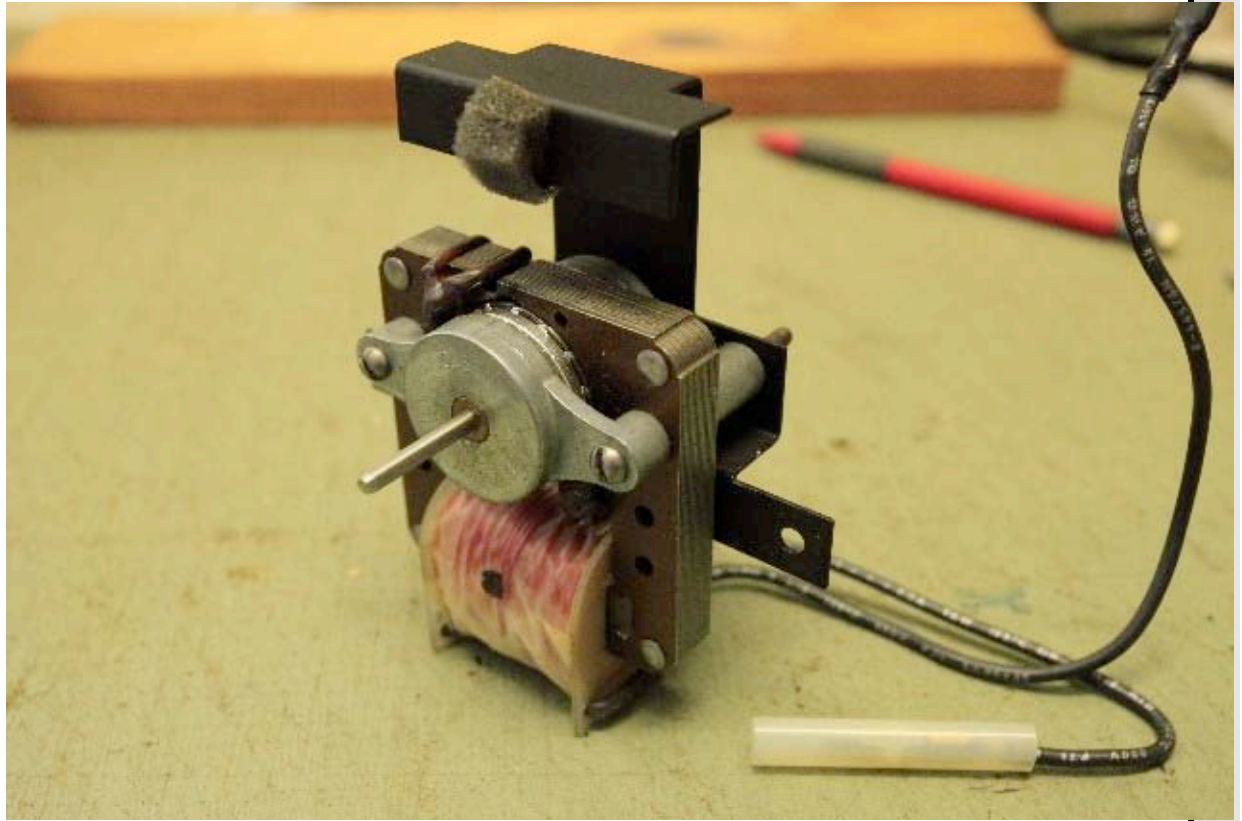
Before and after photos, top image with fan, second image with fan unit removed. Note white wire which should be capped and insulated for safety, even though two

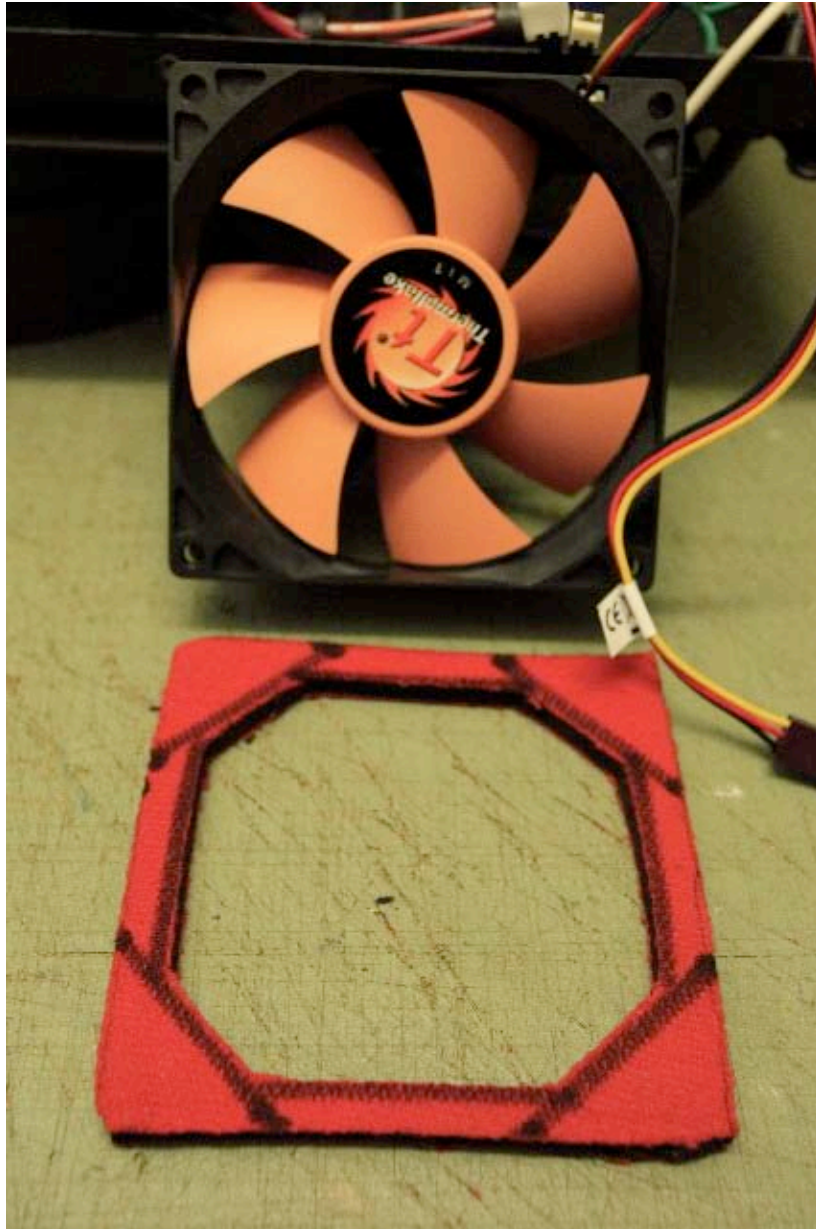
power lines feed the head.



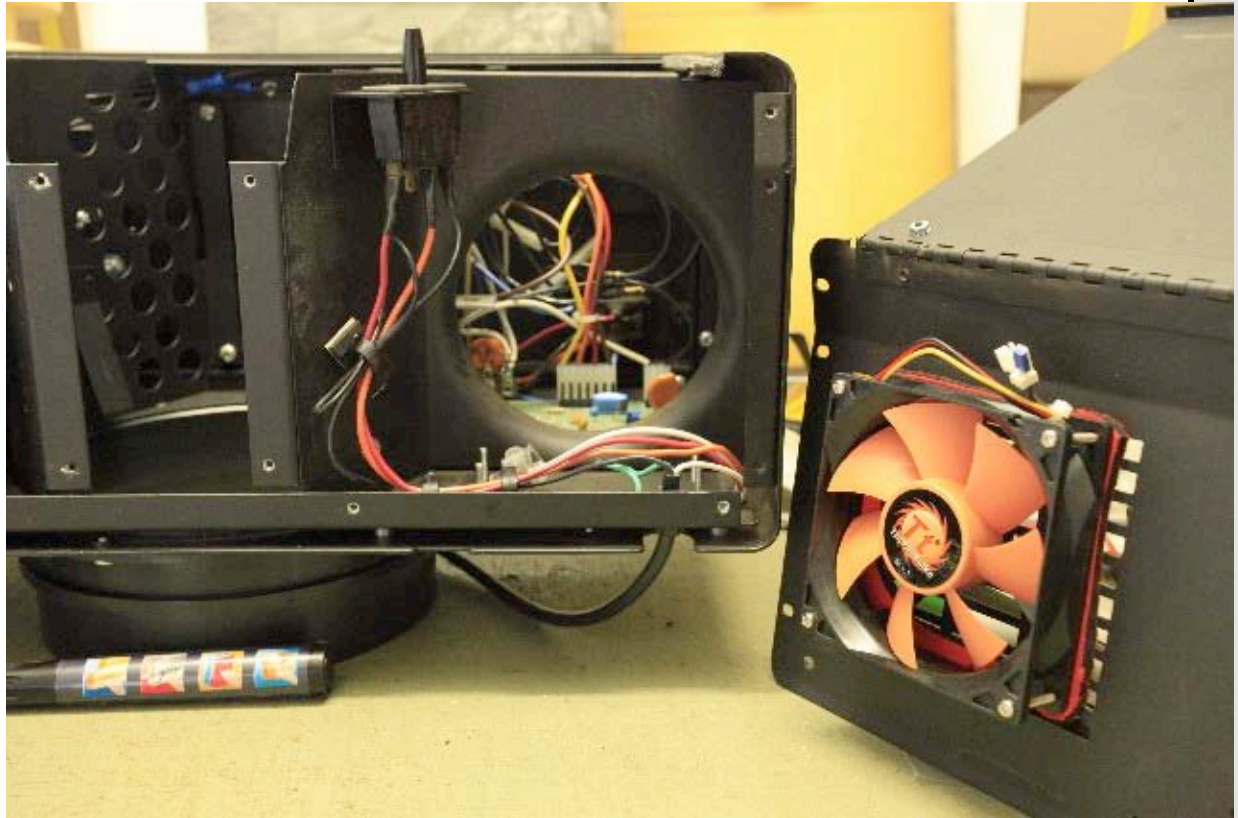
Above shows the switch which when depressed by the units lid closes the circuits.







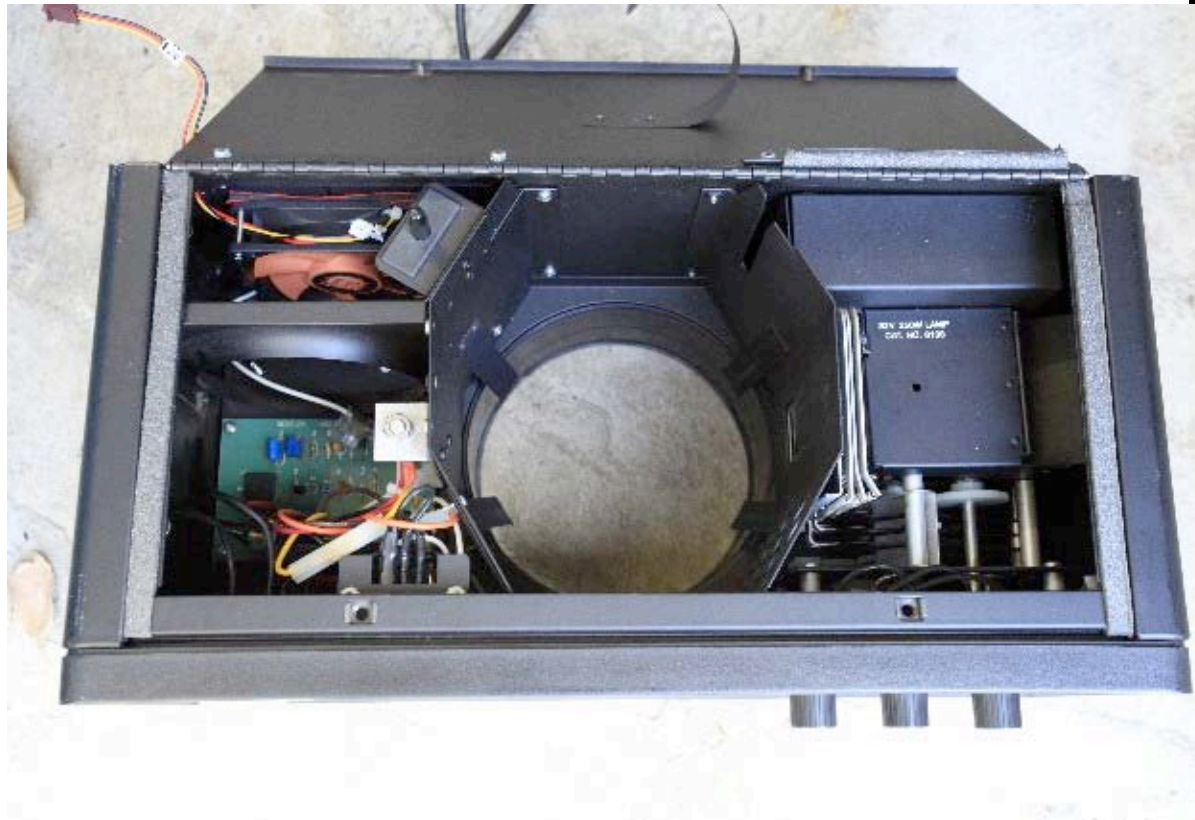
Axial 90mm 12v DC 3 in 1 fan with 5mm wetsuit foam dampener gasket.



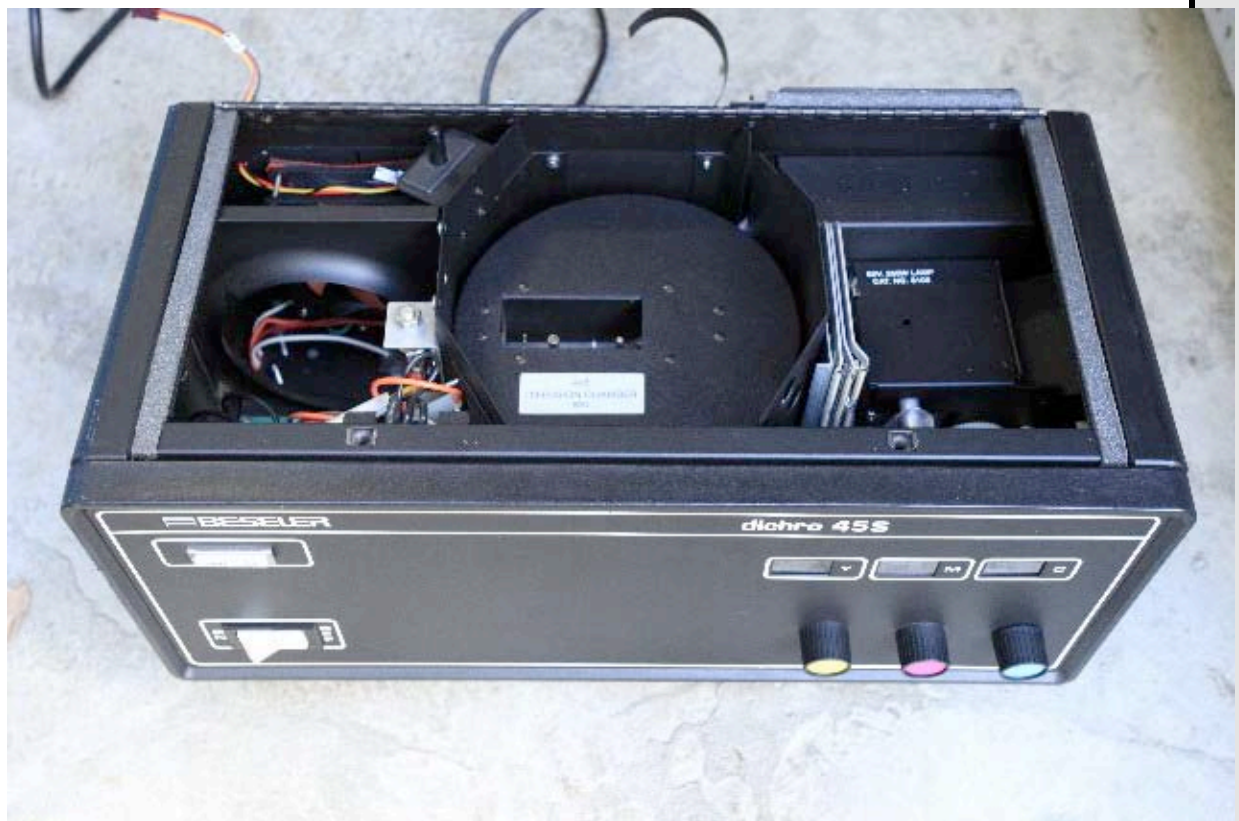
showing the axial fan fixing to the rear panel using existing air grill holes.



Showing black plastic fitted over the grill to block excess air pathway (fan is sucking air from unit)



Top view from front, fan fitted



Top view from front, fan fitted, diffuser in place.



Rear view showing 12V DC wire exiting from rear grill.

Alex Bond 2009

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