Construction Paper: Adapting the Dayton 1TDP5 Blower
to Power an Alfred Mixer System

Over the years I have used a number of Dayton Blowers for this purpose, specifically the 2C610 and the 4C442 and presently I use the 1TDP5 Dayton. As time marches on the manufacturer just switches and then there is a new set of tricks to perform to convert the standard blower to something useful. Here are a few views of the present blower to show what we are working with:

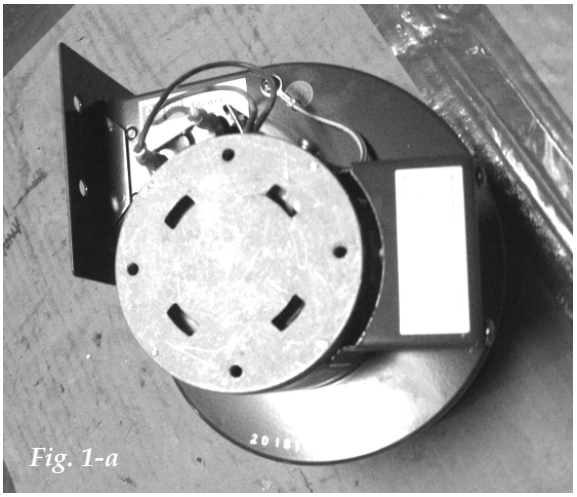


Fig. 1-a

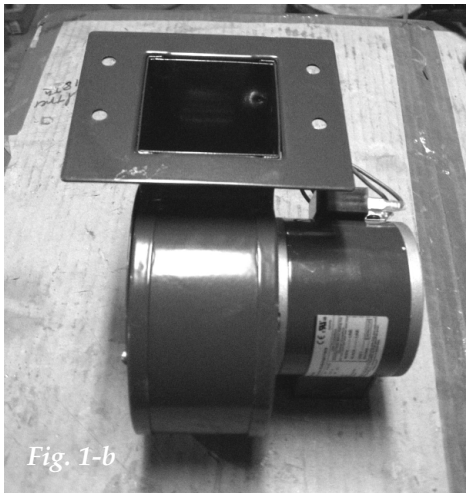


Fig. 1-b


Fig. 1-c


Fig. 1-d

Fig. 1-a shows the motor side up and at the top of the motor is the site of a collection of wires. Documentation that comes with the blower says it is a 12 VDC Shaded Pole Blower, but the strike plate on the motor says it is a 120 VAC motor. Just a little confusing so I surmise the pile of wires at the top is the connection of a transformer to this motor as a conversion kit. But it is at this point a 120 VAC Motor. I dislike all the loose wires (also shown in Fig. 1-d).

In April of 2015 I did some CAD work of the blower to make representative files for illustration purposes. Fig. 2, on next page, is a "Bottom View" showing the three main areas of work: 1., the Floor Flange; 2., The Air Baffle; and 3., The toggle switch and power cord area. Taken in these three simple bites the work is very simple and doable.

I most often do the simplest first, the floor flange attachment. This is actually an eyeballing practice. Line it up and mark the two holes on the square faceplate of the blower. I like blue. Using an 1/8" metal hole punch and center punch locate and punch the two holes required.. Then cover the air intake area of the blower with masking tape to keep drill "shreds" of metal from going into the blower basket. Drill the 1/8" punched holes to 1/4", clean up and remove the tape.

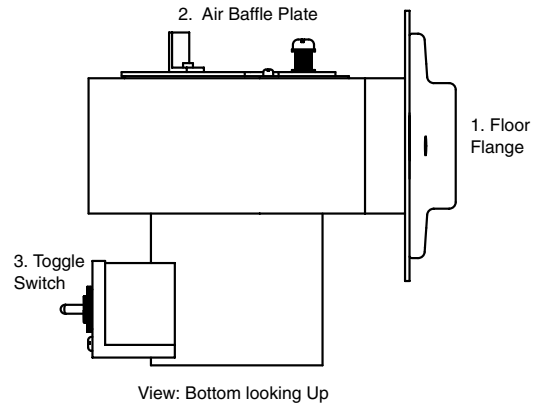


Fig. 2a

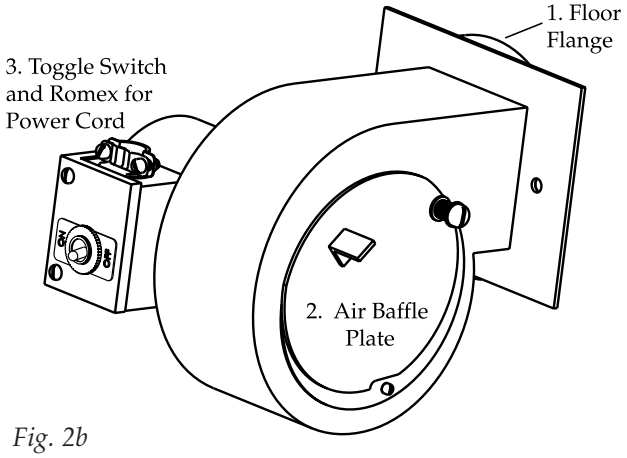
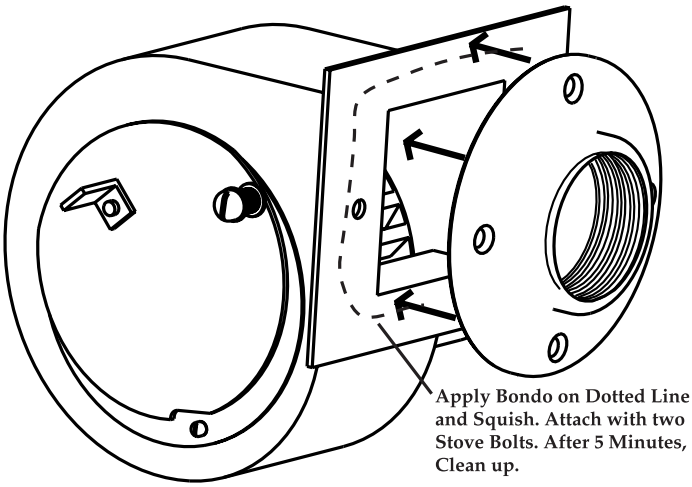


Fig. 2b

Fig. 3



Now comes the Bondo in Figure 3.. You really only need about a tablespoon of the stuff. Clean both surfaces with acetone, whip up the mix and apply to both surfaces. With a delicate fingertip smooth the inside and with a painter's spatula clean up the "gwish" on the outside. If you are doing two of these at the same time I would say slow down and just attend to one at a time. The Bondo can set up too quickly and screw up the multiple approach. Clean up ASAP. Bondo is easy to carve away before it sets too firmly. The only difficult part is attaching the 1/4" stove bolts through the Bondo ladened hole and bolting it in place. I use two bolts, one on each side, meaning left and right. I use regular washers and lock-washers coupled with 3/4" length stove bolts plus a nut each.

Item #2 from figure 2 is the Air Baffle, a pretty simple part made of 18 gauge aluminum that has a pivot point and a little handle/lever for opening and closing the Air Baffle. The pivot has a 1" x 8-32 machine screw put into a taped 8-32 hole. I use a coiled spring cut at 5 loops using the bench grinder to cut the small spring loops. You got to hold onto the coils with a needle nose vise-grips. But this does work great. Here though is one problem I have yet to solve. When this is in use it can work it's way out to a looseness. I have tried wing nuts, "buggering" the threads, gluing the threads, etc. It all works to some degree, but it is not a great solution. Here is a file showing the pattern of the Air Baffle. If you need to make a copy of that to use as a template do a search for <AIR BAFFLE.2.EPS> There are two holes drilled into this baffle plate. The pivot point is made to 3/16" and the rivet hold is made with #29 drill. I dome the hole a little so the rivet will be recessed a tiny bit. I use a ball peen hammer over a wooden bench top and the wood being soft will cave just the right amount. I use a round headed aluminum rivet from a batch of which I've had for many years. I suppose I will run out at some point but for now it is about a 1/4 full pipe tobacco can, the skinny tin about 3/4" thick and 3-1/2" x 6 or there abouts.

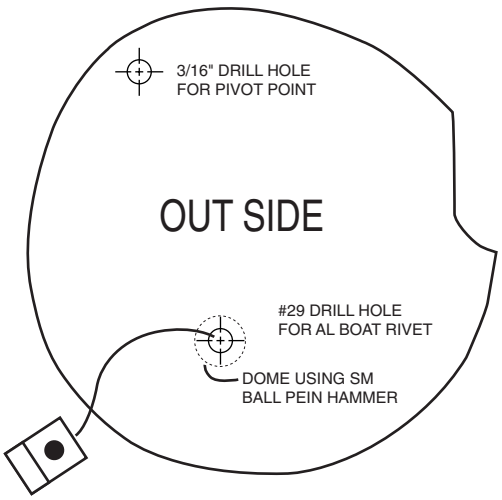


Fig. 4 This is the Air Baffle at 50% <AIR BAFFLE.2.EPS>

The next item is #3, the Toggle switch, cord and simple wiring. The easiest method is to buy a three pronged grounded cord ready to go. Saves a lot of time over putting on your own plug on cord like the old days. I actually like to purchase a bunch of extension cords if I can get a good price-- sometimes there is a sale, etc. Otherwise I get a cord and plug ready to go for $8.00 or $9.00 from Edmunds. I use the quick connect system for the ground wire to the screw. Easy- done. Remove the "knock-out" and insert the Romex connector. Done. I use the hole punch to make an 1/8" hole about 1/2" from the edge of the metal top for the connection box. I then drill a hole using the 15/32 drill bit in the drill press. Hold on tight using a pair of vise grips and when done I grind the front surface with the belt grinder and paint the surface. When dry I install the toggle switch. Wiring is simple: WHITE TO WHITE. THE SWITCH HAS TWO BLACK LINES. THE MOTOR HAS ONE BK LINE AND THE POWER SUPPLY HAS ONE BK LINE. GOES LIKE POWER SUPPLY BK TO SWITCH BK. OTHER SWITCH BK TO MOTOR BK. I THEN USE WIRE NUTS AFTER SOLDERING THE CONNECTIONS. DONE

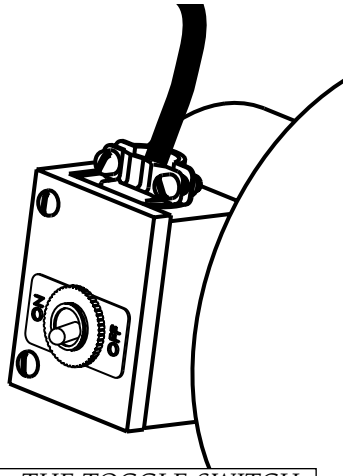
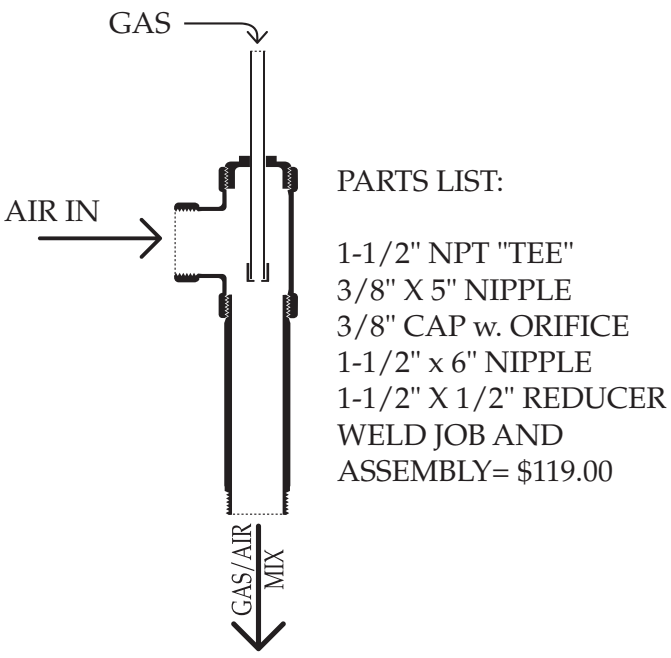


Fig. 5 THE TOGGLE SWITCH

Next, screw it all together, plug it in and turn it on– testing, testing. Done.That is it for the blower part of the exercise.

Making the Alfred Mixers.....



PARTS LIST:

1-1/2" NPT "TEE"
3/8" X 5" NIPPLE
3/8" CAP w. ORIFICE
1-1/2" x 6" NIPPLE
1-1/2" X 1/2" REDUCER
WELD JOB AND
ASSEMBLY= $119.00

Fig. 6 The Alfred Gas Mixer

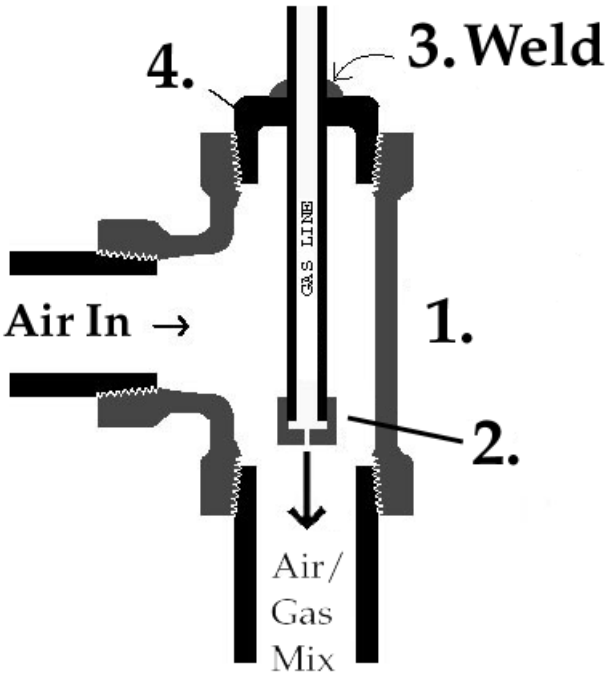


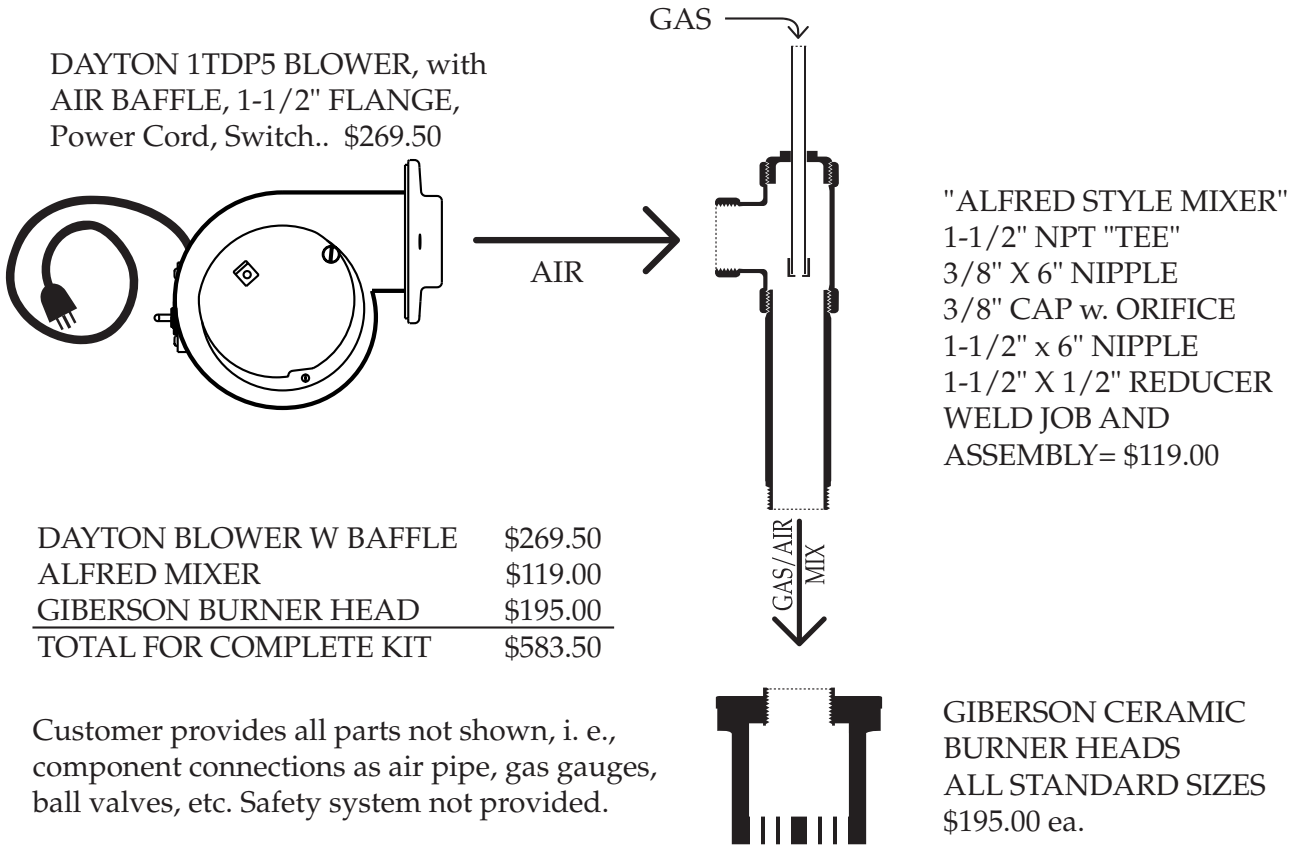
Fig. 7 Cross sectional image of the Alfred Mixer

Figure 6 shows the list of parts for the Alfred Mixer. Figure 7 shows an enlargement of the details where the GAS feeder tube is central to the design. Here the 5" x 3/8" nipple is welded into the 1-1/2" x 1/2" reducer bushing. I use the stick welder with 3/32" welding rod #6011. This is a penetration weld. So I position the "T" in the leg vise, attach the cap to the 5" nipple, screw in the 1-1/2" x 1/2" reducer bushing then insert the cap/nipple through the bushing and position it using about a quail egg sized ball of red water clay tucked into the front threads under the cap. Visually sight the orifice to see if it is exactly in the center of the exit port of the "T". The tack is done in horizontal position and then raised to a vertical position to finish the weld. If it needs grinding this is the time.

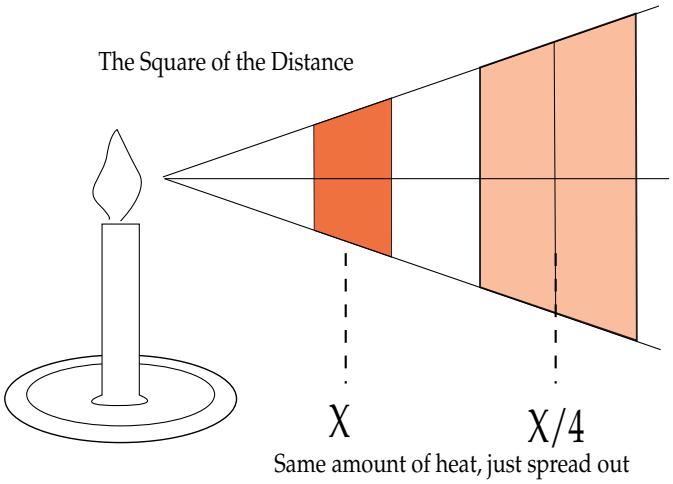
With the welding finished, the clay is removed and everything is washed and dried. Basically it is ready to go. When installed the threads can be caulked at that time.

Here are the few guidelines I have for installing the pipework. The first item to think about is that the environs surrounding the blowers/mixers/ and burner heads involve a lot of heat– specifically ambient heat which can destroy the blower motor and the wiring there. So the blower has to be protected which means putting it at a safe distance from the furnace or glory hole. On the other hand this blower is not a really powerful model so it has to be somewhat close to the action. But there is more... What comes out of the mixed side of the "T" mixer is an explosive combination of gasses which when lit will go "boom." So... if the distance from the mixer to the burner head is relatively small there will be a smallish amount of boom if this ever back-burns, but if you have a lot of pipework, like 3 or 4 feet of the stuff you can produce a considerable boom. This can be enough to bother the dog. So the mixer should be like a foot or so from the burner head and the blower should be no more than 2 feet from the mixer, but it can be closer. At the same time you will need to shield the blower from the ambient heat as well as it will need adequate supplies of very fresh air. (I had a customer place his blower under the hood of a furnace where the exhausted air collected. He could never get good combustion until he moved the blower to the other side in a zone with fresh air. Problem solved.) Here is the plan:

Alfred Style Gas/Air Mixer for Low Pressure Natural Gas or Propane



More on this idea of excessive heat exposure on the blower motor. It is something that should not exceed maybe tops of 110˚F. Just the use of a motor creates heat, but a glory hole or furnace during a melt or normal working day has temperatures exceeding 2000˚F and this heat can radiate from the burner ports and edges of the doors to create a problem. We don't want to melt the plastic on the wires, period. We have to think of SHIELDING and protecting this item from the heat. To understand shielding and radiant heat transfer we need to conjure up the idea: Heat diminishes by the SQUARE OF THE DISTANCE. Read on.....



This means if you can get a little bit away from the emitter of the heat you will have a cooler experience.

SHIELDING DONE EASY AND SIMPLE:

So we have two forces at work where we are trying to find a happy home for the blower. In a big shop it is easy: you build a box outside the building and install your blower there and pipe the air to the mixers. But these are big expensive blowers which can cost a couple of thousand dollars. Here we have a small solution to a single burner situation: One burner, one mixer and one blower. If you want the blower to last several years you will have to keep it cool. And because the blower is not terribly powerful you have to stay close to the ranch. The solution is SHIELDING.