

# **Build A Wood Fired Boiler**

***By DEB Design***

**COPYRIGHT DEB Design 2000**



## Boiler Plan II Table of Contents

Cover Page  
Table Of Contents  
Introduction  
Parts List  
Additional Materials  
Assembly instructions  
Drawings 1-15

### Introduction

This will be a very rewarding project, if you would like an outside wood burning stove, but are concerned about the cost of commercial units. This stove could be built for \$ 300 - \$ 500 using salvaged oil and fuel drums. You should also budget an additional \$200 - \$300 to plumb the completed unit into your existing heating system. These costs will vary, depending on your heating system design.

This stove features:

- \* A large 35 cubic ft. firebox
- \* A 280 gallon capacity water jacket
- \* A large, water filled, loading door
- \* Automatic, adjustable, thermostatic control of the water jacket temperature
- \* A blower induced, powered damper, draft control system
- \* 12-24 hour burn times, between loading
- \* A complete design requiring no additional housing
- \* An open vent design, preventing the possibilities of dangerous pressures
- \* The ability to burn any type of wood without the worry of creosote build-up and potential chimney fire

Included in this plan set is:

- \* A complete material list, including sources
- \* Construction tips learned from building prototypes
- \* Step by step construction drawings
- \* Electrical and plumbing schematics
- \* Start up and maintenance instructions

This project may seem challenging at first, but with time and patience, you'll be able to build your own outdoor heating plant, to meet your home heating needs. You can then; take comfort knowing that, your home heating bills will remain safely, controllable.

### Parts List

<b>All Measurements are in inches: (thickness x height x length)</b>	
1) Firebox	275 gallon oil drum
2) Water jacket	4'x6'fuel oil drum
3) Diversion shield	150 gallon fuel tank
4) Flue pipe	3/16"x8"x12" round tubing
5) Front support	1/4"x2"x60" angle iron
6) Rear support	1/4"x2"x60" angle iron
7) Right/front vertical brace	1/4"x2"x24" angle iron
8) Left/front vertical brace	1/4"x2"x24" angle iron
9) Right/rear vertical brace	1/4"x2"x24" angle iron
10) Left/rear vertical brace	1/4"x2"x24" angle iron
11) Right/front diagonal brace	1/4"x2"x35" angle iron
12) Left/front diagonal brace	1/4"x2"x35" angle iron
13) Right/rear diagonal brace	1/4"x2"x35" angle iron
14) Left/rear diagonal brace	1/4"x2"x35" angle iron
15) Draftway side	3/16"x8"x6" round tubing
16) Firedoor side	1/8x2x11'
17) Firedoor back	1/8x25x42
18) Firedoor front	Firedoor cutout remnant
19) Firedoor outer gasket channel	3/16x1x1x12' angle iron
20) Firedoor inner gasket channel	3/16x1x12' flat steel
21) Firedoor upper support	3/16x1-1/2x1-1/2x3'angle iron
22) Firedoor lower support	3/16x1-1/2x1-1/2x3'angle iron
23) Firedoor frame side	3/16x1-1/2x1-1/2x2'angle iron
24) Firedoor hinge	3/16x1-1\2x1-1\2x1-1\2 angle iron
25) Firedoor hinge	3/16x1-1\2x1-1\2x1-1\2 angle iron
26) Door handle	3/16x1x1x44 angle iron
27) Door crank screw	7/16x12 threaded rod
28) Door crank	3/16x1x6 flat steel
29) Door crank handle	3/8x2-1/2 bolt w/2 nuts
30) Door screw coupler	7/16 threaded coupler
31) Damper motor* (see page 4)	Alliance Laundry Systems part # F380932
32) Damper support arm	3/8" x 3/8" x 10" long steel keystick
33) Damper motor shaft pivot arm	3/8" x 3/8" x 2" long steel keystick
34) Connecting arm	1/8" thick x 1" wide x 2-1/2" long steel flat stock
35) Damper	Coffee can bottom cutout (24 oz. 5" diameter)
36) Blower	Grainger part # 4C447
37) Damper cover	10" diameter tin lid
38) Thermostat (2 pcs)	Local Hardware store or Grainger part # 2E050
39) Flexible electrical conduit(6 ft)	Local Hardware store (liquid tight)
40) Electrical connectors (3 pcs)	1/2" liquid tight connector
41) Circulator Pump	Grainger part # 2P310
42) Pump mounting flange set	Grainger part # 6X485

### Additional Materials

2 pcs.	4'x12' 24 guage steel panels for boiler cover
1 pc.	6"thick x 24" non-faced roll of insulation
1 pc.	Used jet pump or similar
5 pcs.	3/4 pipe coupling (weldable type)
2 pcs.	1-1/4 pipe coupling (weldable type)
4 pcs.	3/4 inch gate valve
2 pcs.	1 inch gate valve
1 pc.	3/8x3 carriage bolt, nut, and fender washer
12 pcs.	1/4-20 bolts, nuts, and washers
1 pc.	2 inch cotter pin
10 ft.	3/4 inch heater hose
1 pc.	Exterior electrical box with cover
2 pc.	Open back electrical junction box with cover
20 ft.	14 gauge electrical cord
	Miscellaneous angle iron, plate steel,
	Miscellaneous plumbing supplies to plumb boiler
	Miscellaneous plumbing supplies to plumb boiler to house
	Miscellaneous electrical supplies for control circuitry
	Miscellaneous lumber for enclosing rear of boiler
8 ft.	Rreinforcing bar (for lifting rings if required)
2	Stove gasket kits (Thermoseal #206 1" thick X 6' long) available at most hardware stores, or building centers
	Stove thermometer (optional) Grainger part # 2A611
1 pc.	8" flue pipe section
1 pc.	8" flue cover
1 pc.	8" spark arrestor

\* **Note:** To find an Alliance Laundry Systems parts dealer near you, please go to:

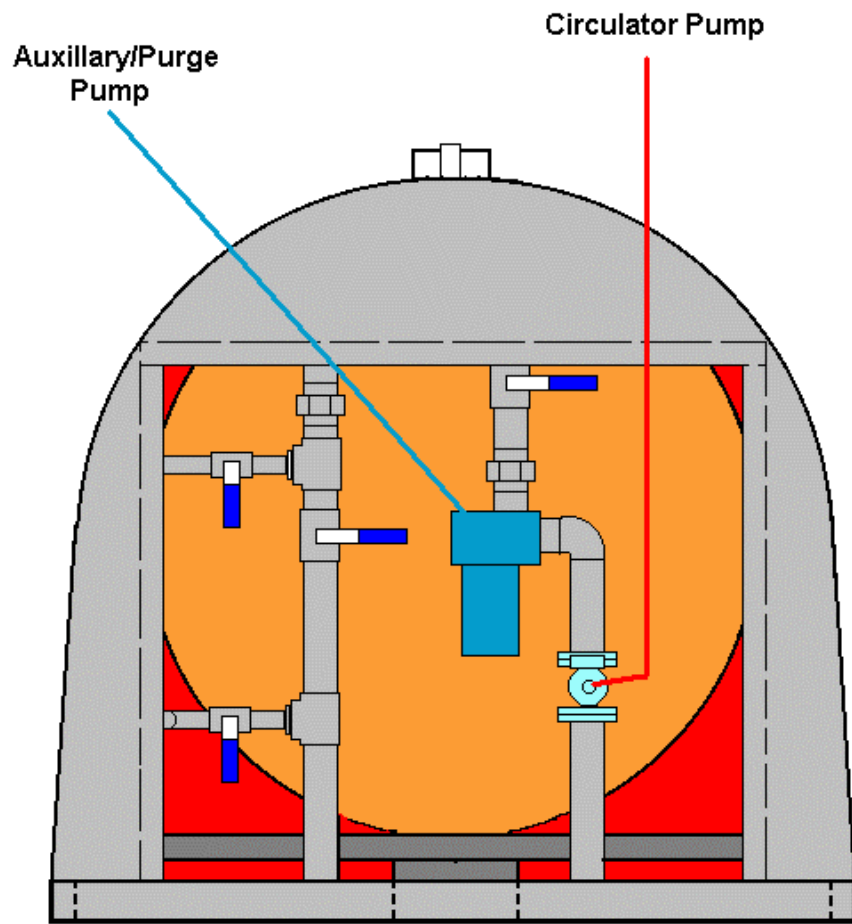
<http://www.speedqueen.com/vend/locator.htm>

or contact Customer Service at 920.748.3121

To located a Grainger branch store, please go to:

<http://www.grainger.com>

or visit your local hardware store and ask if they have a catalog.



Drawing 8

## ***Construct the Damper Assembly***

This damper assembly is built with a blower fan that utilizes a small gear motor to open and close the damper. The design uses a 2-stage draft control system. When the primary boiler thermostat closes, the damper is energized allowing airflow into the firebox. If insufficient natural draft occurs and the boiler water temperature drops further, the blower fan is energized by a secondary thermostat, insuring continued combustion and coal life.

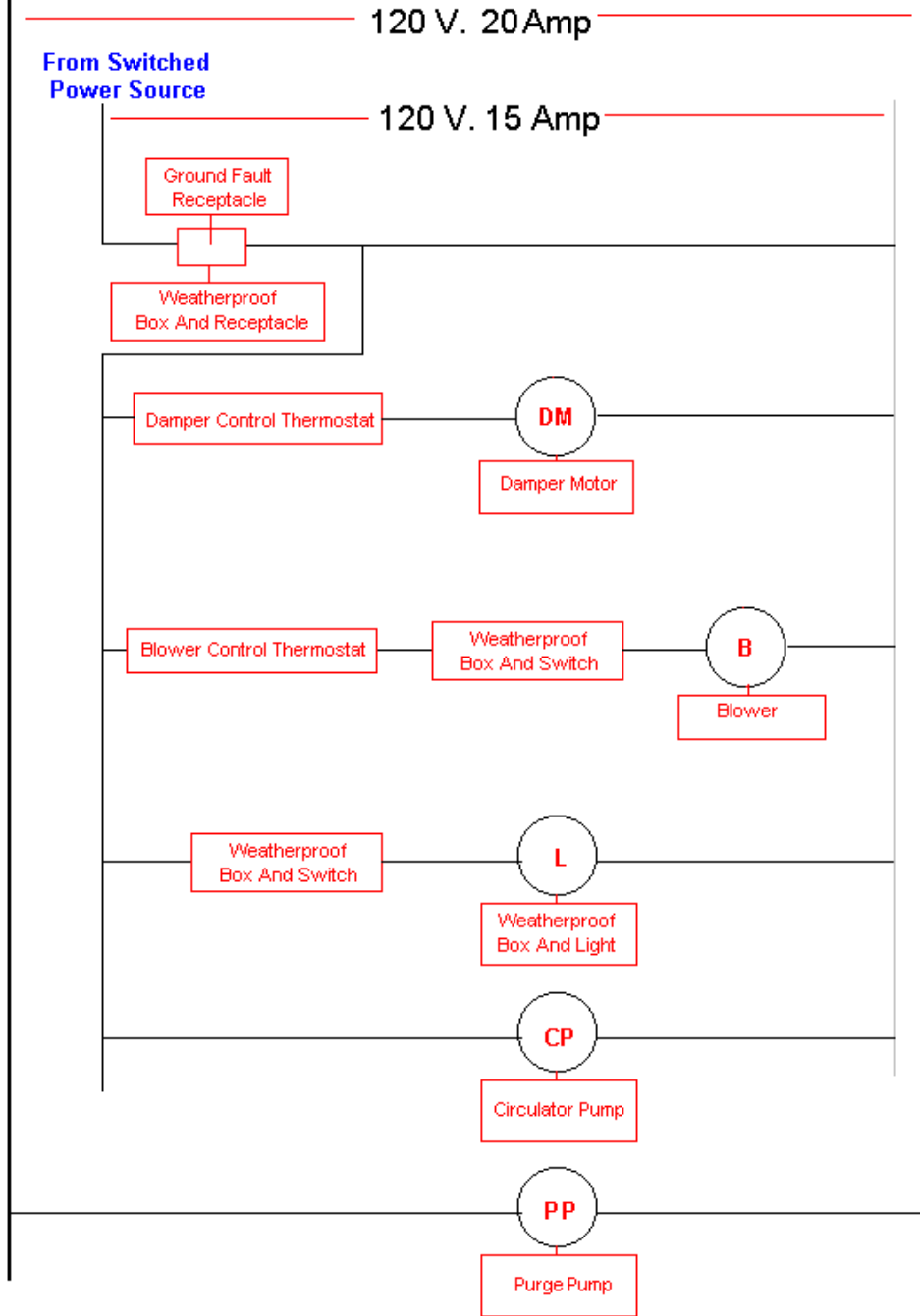


The following procedure documents the construction of the damper assembly.

- 1) Fasten 2 weatherproof electrical boxes together with small metal straps as shown in Figure 1.
- 2) Print the motor template from the following page, cutout the template, and fasten it to the box assembly as shown with tape or glue.(See Figure 1)
- 3) Mark the spots to be drilled with a center punch or nail, and drill out the holes to the diameter specified on the motor template.
- 4) Remove the template and disassemble the 2 electrical boxes.

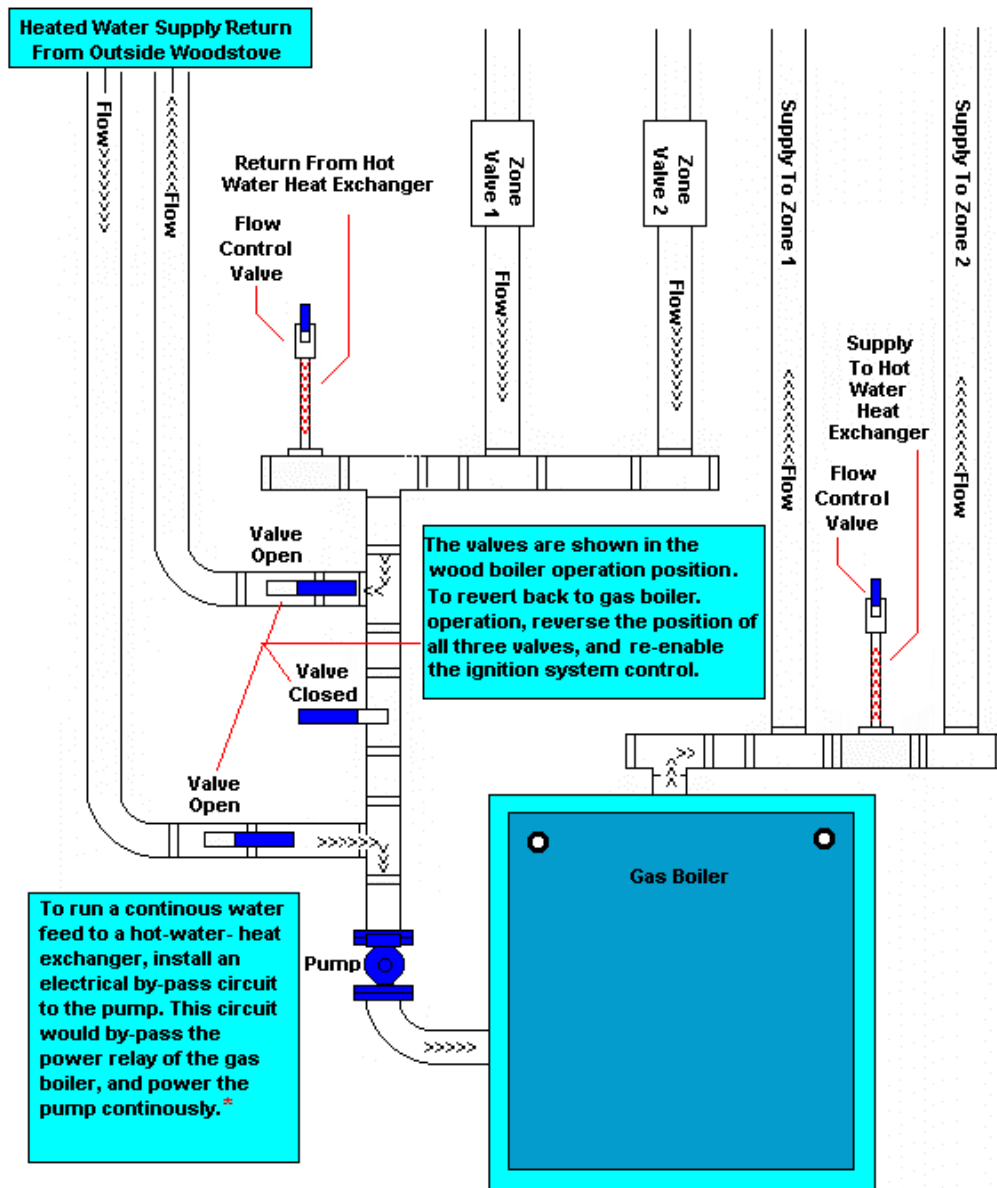
From Switched Power Source

Consult A Qualified Electrician For Electrical Service



Wiring Ladder Diagram

This diagram shows how to integrate an "Outdoor Woodstove" into an existing hydronic home heating system. In addition to the mechanical alterations shown, the ignition system of the gas boiler will need to be disabled, when the outdoor stove is in use. This can be accomplished by installing an on/off switch to the power feed circuit of the ignition control.\*



\* CONSULT AN ELECTRICIAN FOR ANY WIRING MODIFICATIONS