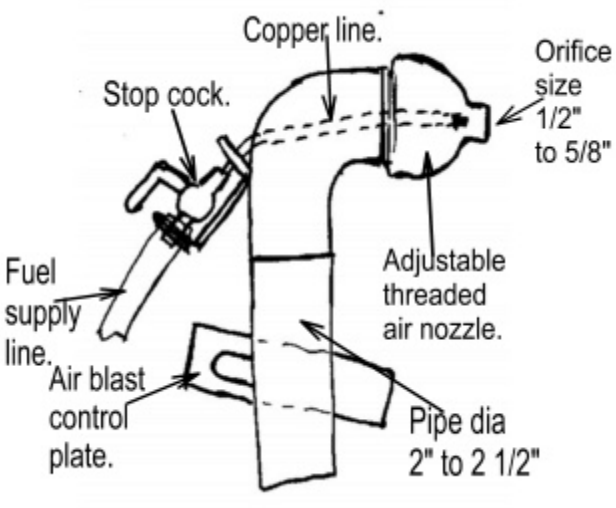
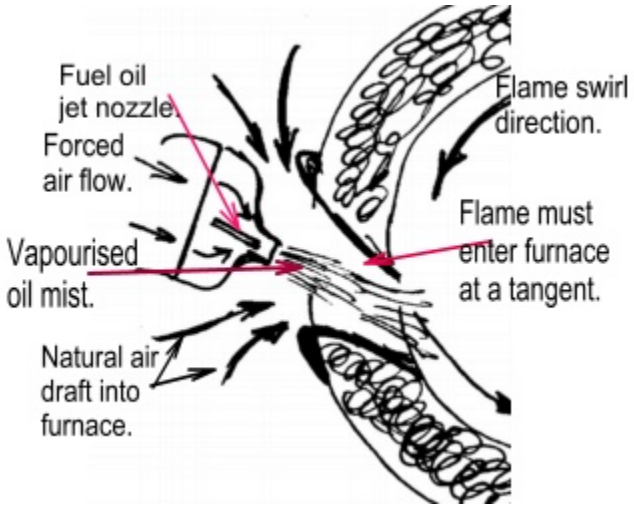
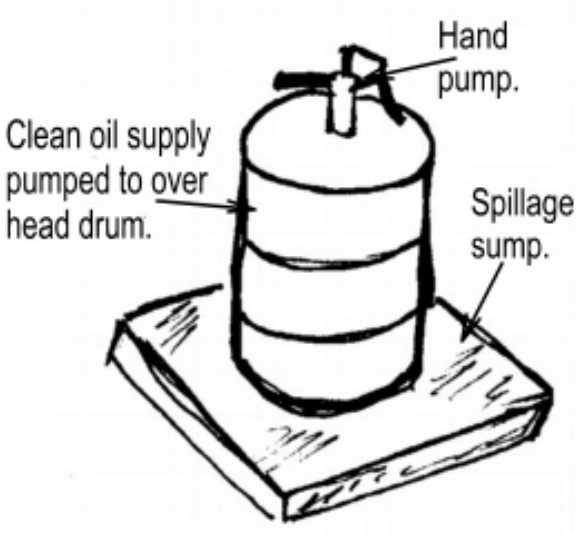
Burner design for Kero-diesel- oil.



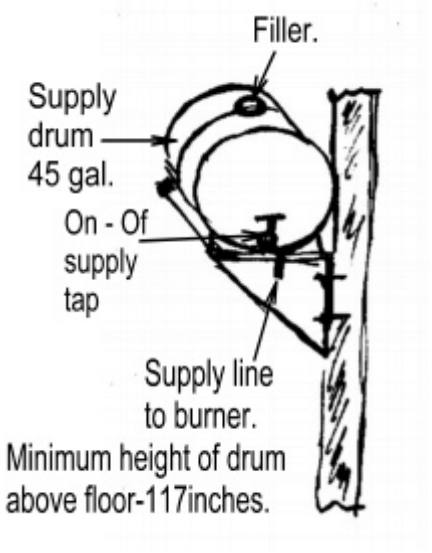
This is a schematic drawing of the components used to build a burner for paraffin-based fuels.
The body of the burner is made from galvanised water pipe; you need a straight bit for the body, a screw on elbow, and a threaded reducer, which forms the nozzle. A sliding air draft control needs to be made to fit into the main lower burner body.



The burner mounted to the furnace. Note that the burner nozzle must be situated outside the furnace, this enables a natural air draft to be drawn into the chamber along with the blown mixture of air and diesel fuel or kero. The flame must enter the furnace chamber at a tangent, so as to create flame swirl, which will promote even heating of the crucible. The burner port entrance must also be tapered as shown. Some experimentation will have to done to determine the most satisfactory position for the burner nozzle.



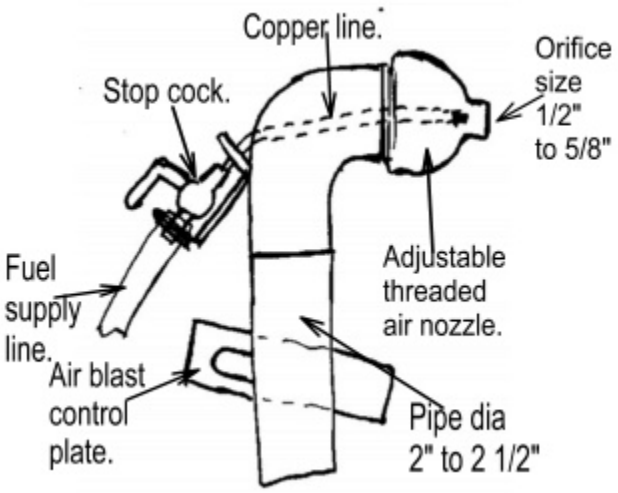
The fuel supply drum sits on the foundry floor away from the furnace and any naked flames. Paraffin fuels will burn just like any other.
Place the storage drum in a catch tray of some sort to take care of accidental fuel spills or a leaking drum.
A hand pump (lever or rotary type) will be required to pump fuel to the overhead supply tank. This is all basic stuff that should not be difficult to set up.



The overhead fuel tank or drum will need to be securely held on steel brackets or sturdy timber supports; they should be curved or have cut outs to match the radius of the drum.
The supply line can be any good quality hose that's suitable for fuel lines.
Note: Not all materials can withstand the chemicals of fuel.
The other alternative is to use 3/8" or ½" galvanised pipe with a flexible hose near the supply drum & where it feeds into the burner.
Be careful, as the heat from the burner will migrate back along the burner pipe, which could melt or damage the hose.
With the drum lying on its side, a filler bung will need to be inserted into the drum, the bung does not need to be fancy.
A hole saw designed to cut through sheet metal will make a neat hole, a wooden bung turned up on the lathe will keep any foreign matter out, and prevent fuel evaporation.

Don't forget to screw a stop tap into the small sized hole on the top of the drum, you'll need to turn the fuel supply of when your'e finished a melting session, or to carry out repairs and maintenance etc.

Lets discuss the burner in more detail.



The lower burner body is a plain length of galvanised pipe. The only modification required is the slot for the air blast control slide. The 90 deg elbow can be welded to the lower part after a hole has been drilled through the back of the elbow.
The 5/16" delivery copper line will pass through the hole in the elbow.
The orifice of the brass or mild steel jet soldered to the end of the copper tube will need to be from 1mm to 2mm in Dia. You'll need to machine the jet using a small bench lathe.

The reducer which is screwed onto the elbow has an orifice form ½" to 5/8" in Death reason it needs to screw in and out is to adjust the air velocity which will modify the mist or spray effect of the fuel. Experimentation & trail and error will be called for to set it up correctly.

A stopcock tap is essential to adjust the volume of fuel entering the jet; a sturdy bracket can be welded to the burner body to support the tap.

When starting the burner and preparing it for a melting session; the procedure is as follows:

Place a kerosene soaked rag inside the furnace and also outside below the reducer or nozzle of the blower.
The heating procedure is essential to preheat the burner nozzle and the inside walls of the furnace.

Once the burner nozzle is hot the fuel feed can be turned on, the flame inside the furnace should still be going.
If all is well the fuel should vaporise and the air blast (low setting) can be allowed to enter the burner, the fuel mist or vapour should start to burn possibly not very cleanly but it should clear reasonably quickly and settle into a good flame.
Adjustments will need to be made to fettle the flame into the highest heat setting required for the melt.

This burner is a basic but efficient liquid fuel burner, it may even burn discarded engine oil quite well.
Like many pieces of apparatus used in hobby pursuits, lots of trial and error usage is required before satisfactory results are achieved.
Good luck with your project.

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DISCLAIMER.
No guarantees of the suitability of the above apparatus is given, you are responsible for the safety of your self and others working around you. Please take care when working with and around flammable fuels. Explosions can and do happen where carelessness and unsafe practices are entered into.
You build and experiment with this device at your own risk.