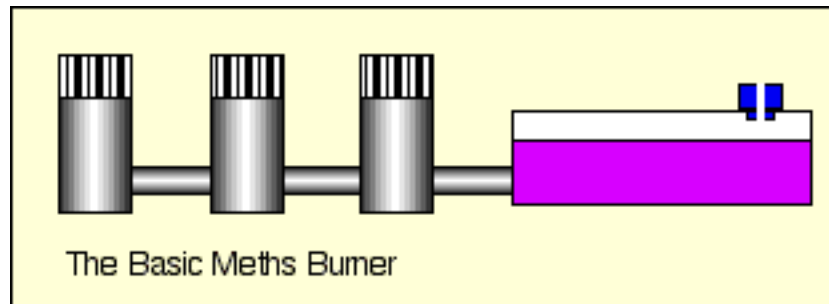


# Methylated Spirits.

## 1: The Lamp

This is the “classic” method of powering a model steam locomotive. There have been several designs and formats since the end of the 19<sup>th</sup> Century but the familiar “lamp” format is probably the most common.



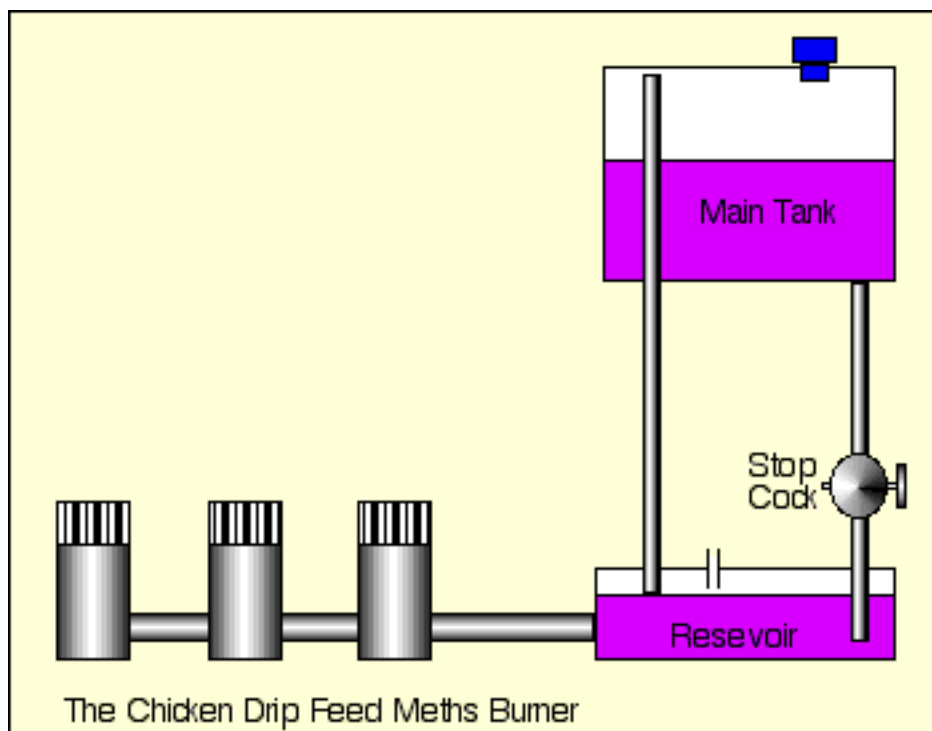
The design uses the capillary action of the wicks at the burners to raise the meths above the level of the top of the reservoir to the flame. A design point is to ensure that the top of the burner tube is never lower than the top of the reservoir -this ensures that it is impossible to “flood” the model with meths from the reservoir. The wick material would classically have been asbestos yarn -this is of course impossible nowadays. Modern wick materials have included; glass fibre strands, shaped pumice “slugs”, steel wool, and cotton knitting yarn of the type used to make dish cloths with. Early lamps would have been soft soldered -but it now normally silver soldered throughout.

Modern practice is to have very short wicks protruding above the level of the burner and have a “combustion space” of about 30-40mm from the top of the burner to the boiler surface. From the point of efficiency of combustion it is better to have several small burners -than a few large burners.

As a rough guide, a 4mm bore pipe will pass enough meths to feed three 10mm dia burners. It is important that the reservoir be protected from excess heat and it is now common practice to fit coolant fins on the feed pipe and shielding plates between the burners and the reservoir tank. This prevents the meths from boiling in the delivery tube.

The main problem with the basic lamp is that the maximum level that the reservoir can contain cannot be higher than the level of the lamp burner. This simple fact produces the wide flat reservoir shape of the classical lamp. There have been many feed systems promoted -but the simplest is commonly referred to as; “The Chicken Drip Feed”. This relies on the level in the reservoir closing the air feed to the main tank. When the level in the reservoir falls, air from the vent is allowed to pass through the vent pipe up into the main tank and thus the reservoir is topped up. Once the level rises above the end of the vent pipe and blocks it -no more meths flows from the main tank to the reservoir.

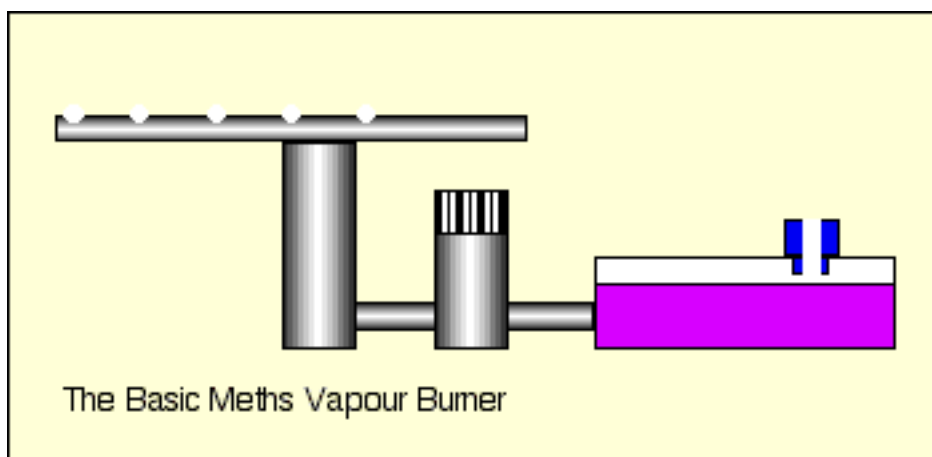
The system relies on being **totally air tight**, but the distances from the reservoir tank to the main tank are not critical, and provided “fuel resistant” flexible silicone pipe is used -then it is quite feasible to have the main tank in the tender .



There has to be a stop cock to isolate the main tank from the reservoir for filling and simple shut off of the system.

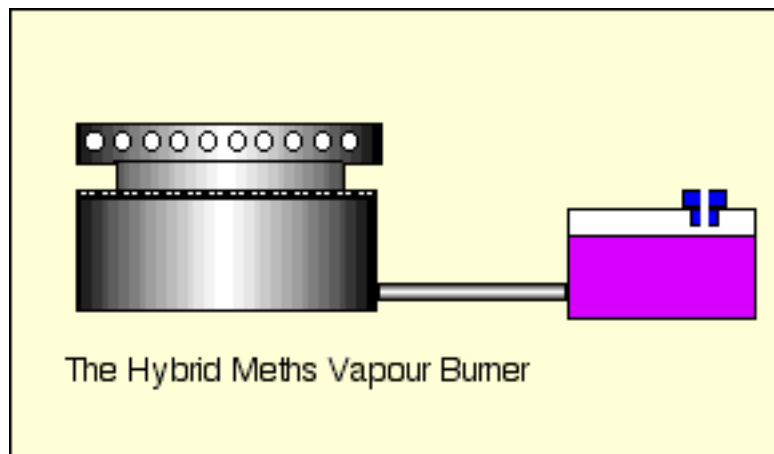
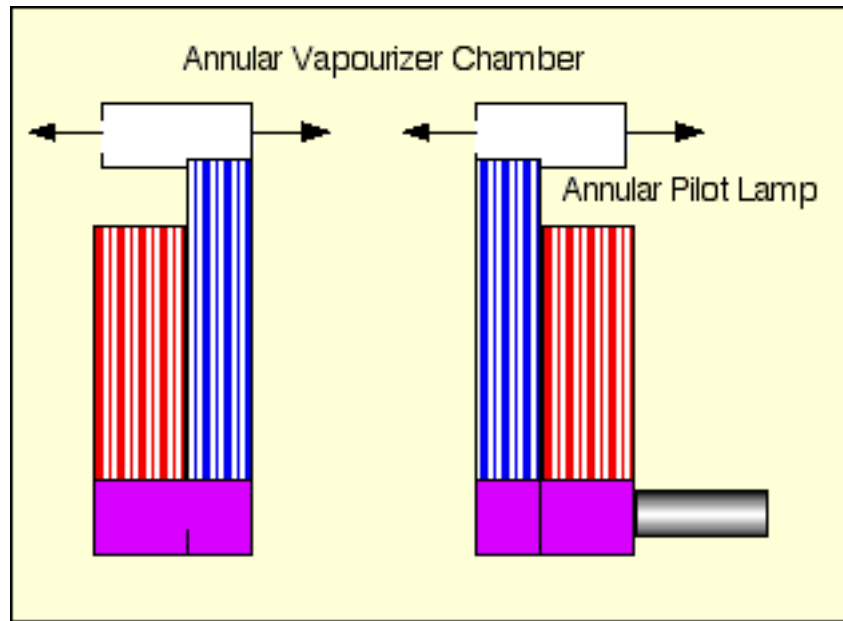
## 2: The Vapour Burner.

This was popularised by Bassett-Lowke and is still used by them today. This relies on the principle that meths has a low boiling point and a low “flash point” -at which it ignites. In the basic vapour burner there is a “pilot” lamp to provide the heat for the evaporation of the meths. In front of this is an internal wick that raises the level of the meths above the pilot lamp into an end sealed burner tube which is heated by the pilot lamp. The meths then boils and burns as a vapour from the small burner holes along the length of the burner tube. This is a very efficient burner and again all the parts are normally brass with silver soldered connections.



### 3: The Hybrid.

The Hybrid burner can be seen to be a direct combination of the lamp and vapour burners. These are normally circular and fed from a large reservoir. The burner consists of a ring in which there are two annular wicks. The outer part of this wick feeds a flame -the inner part is shielded from it and as it is longer -the wick draws meths above the flame where it is vapourized. The vapour escapes through the holes in the edges of the circular top and is ignited by the flame. This makes the vapourizer ring hotter and thus the flame hotter... This thermal runaway effect is limited by the amount of cooling air passing through the centre.



**This burner is extremely efficient...** However, as can be imagined, testing it is not done indoors. Varying the position of the vapourizer ring to the flame heating it does bear careful examination. Some builders of the Hybrid have used a screw thread system to raise and lower the vapourizer head for easy fine tuning.

Further details can be found in K.N.Nobles book "Model Boilers and Boiler Making".

#### 4: Meths.

The common "purple" meths is a varying mixture of Ethanol, Methanol, Pyridene, and Methylene Blue colourant. The burning properties of which can vary...

The other common form of meths is normally referred to as "Industrial Methylated Spirits" this is either ; 95% Ethanol and 5% Methanol, or, 90% Ethanol and 10% Methanol. The former is termed "Denatured Alcohol" and the latter called "SVI" or "Solvent Alcohol". To keep a stock of **either** you will need a certificate from HM Revenue and Customs (0845 010 9000) -they are normally very quick and helpful about it.

In the USA and Canada there is a tendency to use "Methyl Hydrate" as "Meths". This is pure Methanol, and not an Ethanol/Methanol mix.