Steam Turbine Locomotives.

Turbine locomotives were built in the first half of the 20th Century. The most famous example in the UK being the LMS 6202 "Turbomotive", in the US the Penn RR "S2", and in Sweden the Ljungstrøm locomotives of the TGOJ -one of which survived into preservation and still operates. These can all be classed as engineering successes -however their modes of operation were **very** different.

LMS 6202.

This was a 4-6-2 which used a vertically mounted forward turbine and a vertically mounted reversing turbine in the position where the cylinders would be. (See “Cheek Bulge” over the front bogie). This connected to the front driving axle by a two stage reduction gearbox to a quill drive. One of the main problems with this locomotive was the fact that the reversing turbine was not as powerful as the forward one.

Penn RR S-2.

This was a 6-8-6 locomotive with the longitudinally turbines located centrally direct driving (via worm and spur) the second drive axle (forward turbine) and the third drive axle (reversing turbine). Direction was as with LMS 6202 provided by dog clutches. The turbines were of equal power and this removed the reversing problems found on the LMS 6202.

TGOJ Ljungstrøm

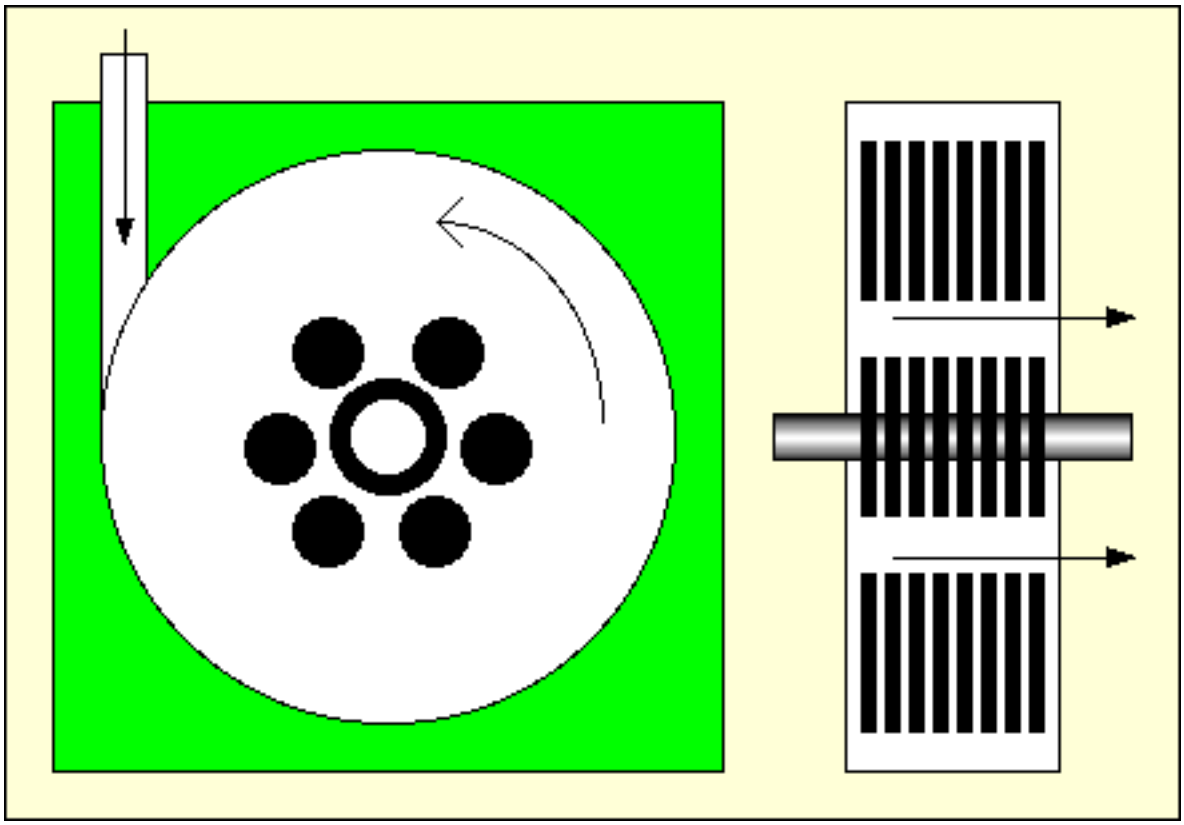
These 2-8-2 locomotives had a forward mounted turbine which via a five stage reduction gearing drove a transverse jack shaft and then via conrods to the driving wheels. Reversing was done by the means of "dog bevels".

As can be seen from reading the above there are several problems inherent with building a steam turbine locomotive. The turbine operates best at high speed and a reaction turbine is not reversible. However more modern practice has been to dispense with the turbine blade (i.e. a reaction turbine) and to use a system that is far simpler to construct -a disc turbine.

The disc turbine as patented by Tesla is a very simple device and can be made on small lathe and mill with a rotary table. These are devices now made by children at school out of stacks of old CDs and propelled by tap water.

How it works.

In a reaction turbine **the force** of the speeding steam is directly transferred to the blade. In a disc turbine **the friction** between the fast moving steam and the turbine disc transfers the energy of the steam to the turbine. As the steam expands, slows down and cools -it spirals towards the centre and is vented through the central slots or holes to the exterior.



There is a design to be found in the back of the book, "The Tesla Disc Turbine", by W.M.J.Cairns, which contains a easy to build disc turbine that could be fitted within the confines of the loading gauge of a Gauge '3' locomotive.

This device is capable of 50,000 RPM under no load conditions...

A disc turbine is reversible, so that should remove some of the problems of dog clutches and dog bevels etc. The only drawing of a possible arrangement for a turbine locomotive is found in Henry Greenly's book "Model Steam Locomotives". This is drawing **64a** -this does show a lateral reaction turbine though. It is quite possible that HG would not have known of the Tesla device.