

## **THE WORKING OF A STEAM LOCOMOTIVE**

Steam is created by putting heat to water. If the steam is sealed and not allowed to escape it builds up pressure and will eventually when the container can take no more pressure will BLOW UP.

It is the energy in this pressure, carefully controlled, that drives the locomotive.

Firstly, a fire has to be lit under the water. This job is done by the FIREMAN who works with the Locomotive DRIVER.

Each locomotive carries coal for the fire. This can be in a tender at the back of a big locomotive, or in a bunker beside the Driving Cab for smaller locomotives.

Water is carried in tanks in the tender behind the larger locomotives. For smaller locomotives, this water is carried in a "saddletank" which is a tank the locomotive wears like a saddle over the boiler; or in "sidetanks" each side of the boiler; or in a "welltank" which is like a well under the boiler.

Air comes into the firegrate under the fire, where the coal burns. The hot air, gases and smoke created by the fire travel through the many small tubes running through the length of the locomotive boiler. This heats the water, which is the other side of these boiler tubes. The water boils and makes steam.

The smoke collects in the smoke box and escapes from the chimney.

The steam collects in the top of the boiler, which is built to withstand high pressures. This pressure is indicated on a pressure gauge in the drivers cab. Safety valves allow excess steam to escape if the pressure gets too high.

The driver of the locomotive moves the regulator handle to start the locomotive. This moves a regulator valve which is in the dome on top of the boiler, which allows steam through valves into the cylinders.

Each cylinder contains a round piston. The valves allow steam first into the front of each cylinder, pushing the piston backwards; and then into the back of the cylinder, pushing the piston forwards again. As the pistons move to and fro, they push and then pull the piston rod which is attached to the driving wheel, making it turn and so making the locomotive move. Usually, there are two or three (or even four) pairs of driving wheels: they are linked together by connecting rods so that all of these driving wheels help make the locomotive move.

The steam, once used, escapes up the chimney via a blast pipe making the "chuff" "chuff" noise we associate with steam locomotives.

As the steam goes up the blast pipe it draws in more air through the fire, so producing more heat and making more steam to continue the work.