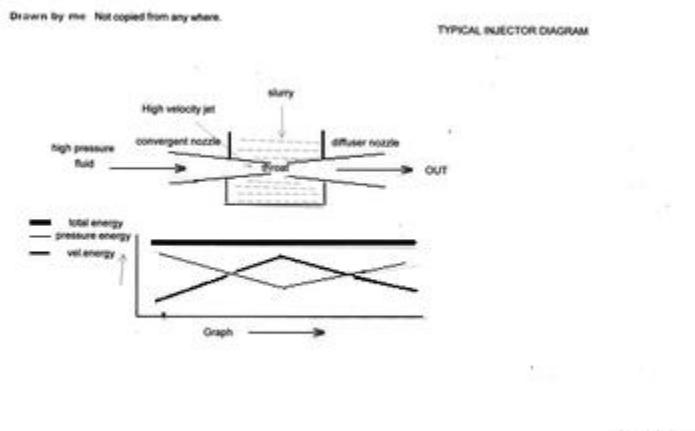


# INJECTORS

The injector is a device like a pump but without rotating parts, to pump any fluid into a container under pressure or discharge to atmosphere. The injector was invented by Henri Giffard[[1]] in 1858. It gets its motive force at the inlet from a suitable fluid under pressure.

To avoid confusion with another similar word ejector, this word also is mentioned here. This word ejector denotes a device to pump out any fluid from a container generally to atmosphere.

## Construction



The construction of an injector is shown in the adjacent diagram. It consists of an inlet tapered nozzle, a throat portion with a surrounding box and an outlet diffuser nozzle. Air, steam or water at high pressure is the motive force at the inlet of injector.

## How it works

Bernoulli principle[[2]] is the one used here. The high pressure fluid at the inlet gets converted to high velocity jet at the throat with drop in pressure, depending on the design of the nozzle. This sucks out the fluid from the surrounding container and the high velocity jet pushes the mixture out through the diffuser nozzle under pressure. Thus, at the throat, the inlet pressure head is converted to velocity head (i.e. the pressure energy at inlet is converted to kinetic energy at the throat) and back to pressure energy at the outlet of diffuser following Bernoulli principle.

In the case of the ejector the same principle is adopted but the discharge from the diffuser nozzle is slightly more than atmospheric pressure.

### Uses

Very early days it was used on locomotive boilers for injecting or pumping boiler water to the said



boiler. The adjacent photograph shows the parts of an injector used on locomotive boiler.

In stationery boilers of small sizes and low pressures, injector was also being used to inject chemicals into the boiler drum or to the suction of boiler feed pumps.

In the present day boilers of much bigger in sizes (i.e. measured in terms of steam quantity) and much higher in pressures (i.e. measured in terms of steam pressure at boiler outlet), the use of these injectors for chemical dosing is totally ruled out because of its limited outlet pressures.

However their use in other areas in various Industries[[3]] has become very common. In some industries[[4]] it is used in bulk handling of commodities such as grains. In thermal power stations it is used for removal of boiler bottom ash and disposal, and removal of fly ash from bottom hoppers of dust separators for out side disposal. It is also used for pumping very turbid water and also for pumping out slurry in construction industry. Tapered nozzle to give high velocity water jet by fire fighting department is an example in every day life.

Their simplicity in construction makes it adoptable for such variety of uses.

Source : <http://engineering.wikia.com/wiki/Injectors>