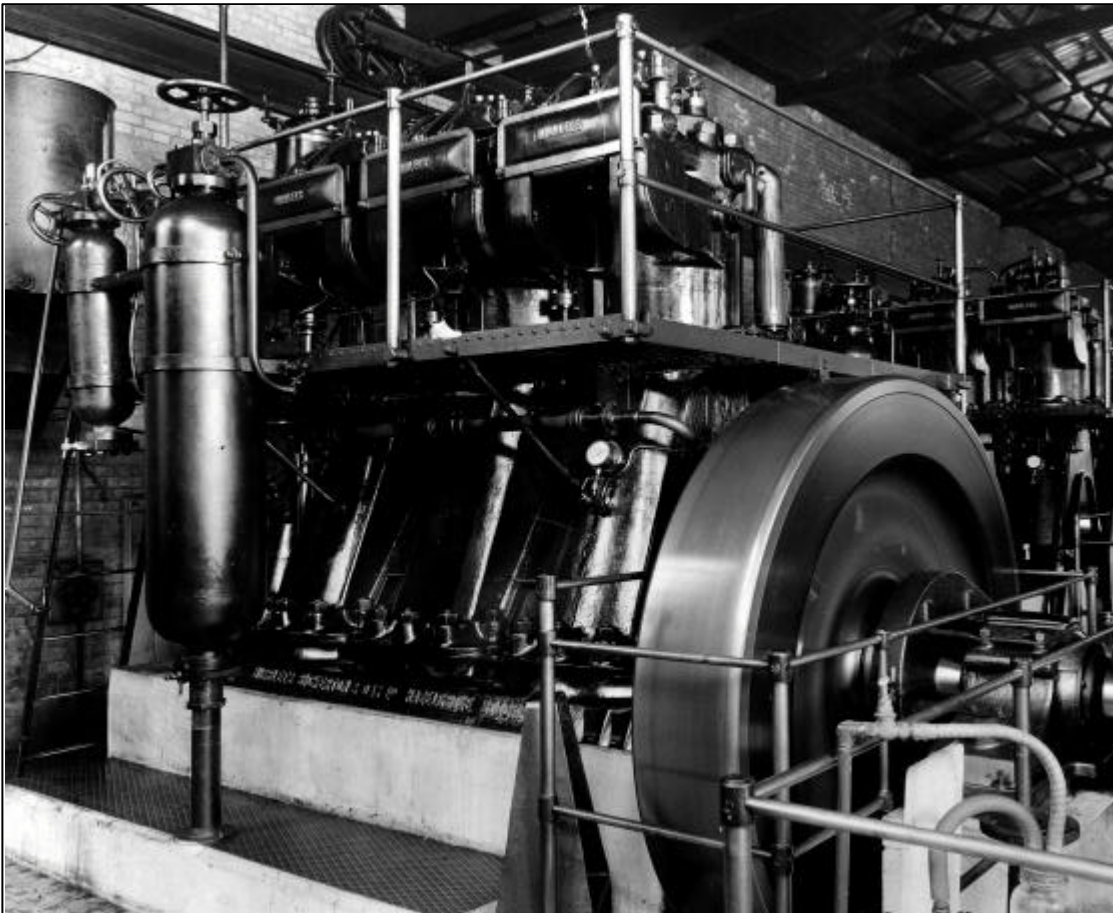


Mirrlees Air-Blast Diesel Engine

This is one of four large diesel engines built by Mirrlees, Bickerton & Day, of Hazel Grove, near Manchester, in 1927. The engines were installed at the Mid Kent Water Authority's Snodland Pumping Station. They were used to drive pumps for raising water and remained in service there until the 1980s. One was presented to the Museum in 1982.



The diesel engine has its origins with the German engineer Rudolph Christian Karl Diesel, who developed the idea and took out the first patent in 1892. His first engine was built by Maschinenfabrik Augsburg AG in 1893. After a number of modifications, an improved model was built in 1896. A number of companies soon took out licences to produce diesel engines under patent.

Unlike other types of internal-combustion engine, such as the petrol engine, the diesel engine burns fuel without the need for a spark or other type of ignition. It achieves this by initially admitting only air into its cylinder, instead of an air-fuel mixture like the other types of internal-combustion engine. This air is then compressed by the piston to such an extent, that its temperature rises greatly, at which point the diesel fuel is injected into the cylinder and spontaneously ignites.

One of the biggest problems faced by Diesel was how to inject the fuel into the cylinder, given the very high pressure of the compressed air within. After trying a number of methods, Diesel decided to use an auxiliary compressor to produce a blast of compressed air to carry a small amount of fuel into the cylinder. This method, called air-blast injection, was used until the 1920s, when a more efficient method called direct injection (using a mechanical pump) was perfected.

In the Mirrlees air-blast diesel engine, the fuel is forced into the cylinder by air stored at a pressure of 1000 lbs per square inch (p.s.i.) in the high-pressure cylinders next to the engine. The pressure is maintained in these cylinders by a compressor, which is driven by the main engine.

The working cycle is based on Otto's four-stroke cycle. This begins with INDUCTION, where air alone is drawn into the cylinder through the open inlet valve as the piston moves downwards. COMPRESSION follows, whereby the air is compressed by the piston as it rises, which raises its temperature to around 800° C. At this point diesel fuel is injected into the cylinder, where it spontaneously ignites due to the high temperature of the compressed air, resulting in the POWER stroke. Combustion gases force the piston downwards. The piston then returns to the start position, during the EXHAUST stroke, forcing out the exhaust gases through the exhaust valve.

Technical Data

Engine type	Three-cylinder air-blast vertical diesel engine
Manufacturer	Mirrlees, Bickerton & Day, Hazel Grove, Manchester.
Date of manufacture	1927
Fuel type	Diesel
Rating	165 horsepower
Speed	280 rpm
Valve type	Air-blast injection
Ignition type	Compression

For more information:

<i>Read</i>	Cummins, L. <i>Internal Fire: The Internal Combustion Engine</i> . New York, USA: Society of Automobile Engineers, 2000.
<i>Visit</i>	Anson Museum, Poynton, Cheshire. How Stuff Works website www.howstuffworks.com/diesel