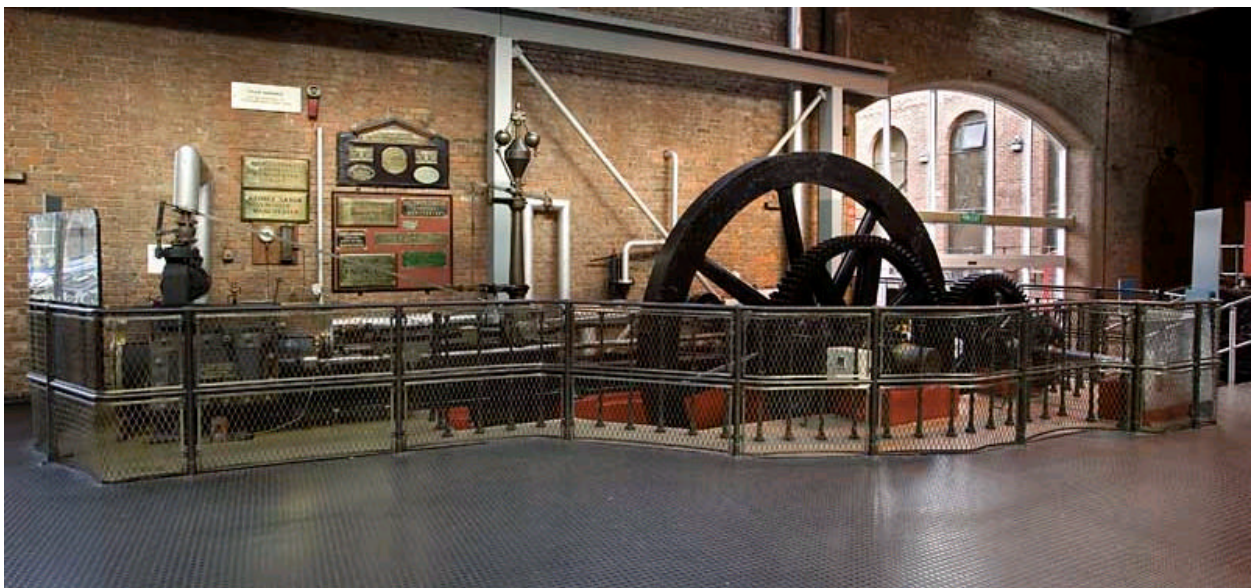
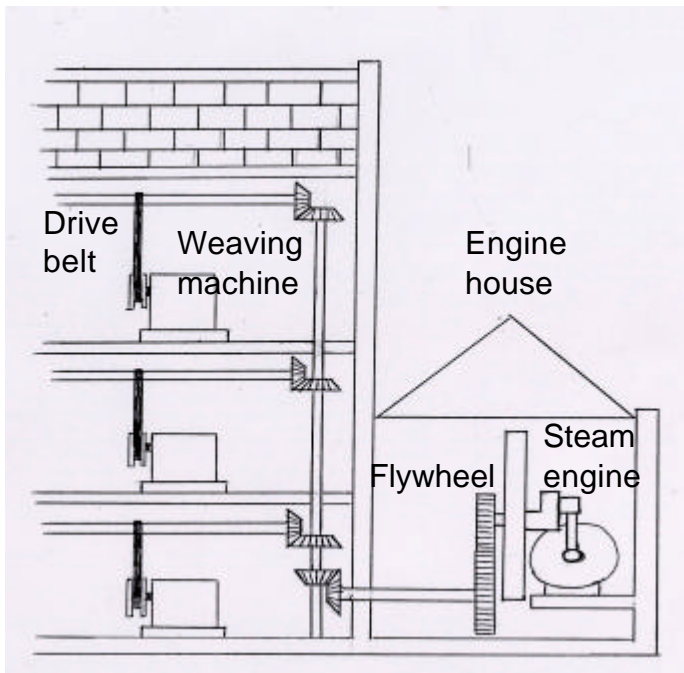


Earnshaw & Holt Horizontal Steam Engine

This single-cylinder horizontal steam engine was made by Earnshaw & Holt of Rochdale in 1864. This type of engine became very popular from the 1850s onwards. Being mounted on its own cast-iron base, it did not require the support of an engine house and was much easier to install in a mill. Engines of this type were soon accepted as the way forward for powering mills. With a working life of nearly a century, this engine worked at Durn Mill in Littleborough where it powered machinery that produced tartan cloth. It ceased to run in the 1950s and was acquired by the Museum in 1969.



This type of mill engine has a horizontal cylinder and a piston that is driven forwards and backwards by steam pressure. In order to turn the flywheel, the reciprocating action is converted to rotary action by the crankshaft. Initially it was thought that the horizontal back-and-forth motion of the piston would soon wear through the bottom of the cylinder. As a result, the change from vertical to horizontal steam engines was somewhat slow. To control the speed of the engine, there is a centrifugal governor, which is driven via a system of ropes from the main shaft. This varies the amount of steam that is admitted to the piston cylinder. If the flywheel rotates too fast, the spheres on the governor are thrown outwards, closing the steam valve. This cuts off the steam from the boiler, thus slowing the engine down.



Mill engines powered all of the machinery in a factory. This was achieved by having a rotating drive shaft on each floor of the mill, to which each spinning or weaving machine was connected by a drive belt. The drive shaft on each floor of the mill was connected to the mill engine on the ground floor either by drive belts or by toothed gears. Early horizontal engines had gear drives and shafts. The disadvantage of this arrangement was that if just one gear tooth broke, the whole factory could be disrupted. Therefore this type of drive was replaced by rope drives from about 1870.

Technical Data

Engine Type	Single-cylinder horizontal condensing engine
Manufacturer	Earnshaw & Holt, Rochdale, Lancashire
Date of manufacture	1864
Operator	A. W. Law, Durn Mill, Littleborough, Lancs.
Rating	250 horsepower
Speed	63 rpm
Cylinder	28-inch (710-mm) bore; 48-inch (1220-mm) stroke
Steam pressure	60 p.s.i.
Valve type	Slide valve
Flywheel	Weighs 6 tons; 13-ft (3.96-metre) diameter

For more information:

<i>Read</i>	Hayes, G. <i>Stationary Steam Engines</i> . Princes Risborough, UK; Shire Publications, 2003.
<i>Visit</i>	Queen Street Mill, Burnley. How Steam Engines Work: www.mgsteam.btinternet.co.uk