

power developed by the steam should be wholly exhausted (if possible) at the end of each stroke, and that, (unlike almost all the other applications of steam power,) the perfection of motion of the stroke of a water pump piston, is a slow commencement, increasing speed to the middle of the stroke, and a gradual reduction, until at the end of the stroke, the power (including the momentum) is barely able to carry the engine over its centres.

In a Cornish pumping machine the steam engine and its pump work independently, and are, in fact, two distinct machines.

The load on the pump is carefully adjusted to overcome the resistances of the water and exhibits the natural and nearly perfect movement, which ought to be given to water passing through a pump.

The ordinary application of steam working expansively in the cylinder, produces precisely the degree of speed in every part of the stroke of the water piston that is desired.

The Watt pumping machine, accomplishes all of these objects better than any other in use.

It is a vertical beam engine; the steam cylinder is placed under the end of the beam, and the water cylinders at such distances toward the main centre as will give the exact relative speed to the steam and water pistons.

Two single acting pumps are placed, one on each side of the beam centre, with the delivery pipes carried off from the pumps, on gentle curves, to the force main.

The valves are similar to those ordinarily used in the air pump. The fly wheel is made as light as possible, being only used to carry the engine very slowly over its centres, and the cut off is so adjusted, that almost the whole power developed by the steam is exhausted at the completion of each stroke.

There is therefore no concussion, or wrenching of the various parts of the machine at the end of the stroke, where the direction of its reciprocating parts are changed,