

*linder, a principle which had first occurred to Mr Watt in 1769, and was adopted in an engine at Soho manufactory, and some others, about 1776, and in 1778 at Shadwell water-works, and afterwards particularly described in his specification of a patent for several new improvements upon steam-engines, in 1782.*

*The construction of this engine is what has been described. The steam-valve I is always allowed to open fully; the pins of the plug-frame are regulated so that that valve shall shut the moment that the piston has descended a certain portion, suppose one-fourth, one-third, or one-half of the length of the cylinder. So far the cylinder was occupied by steam as elastic as common air. In pressing the piston farther down, it behoved the steam to expand, and its elasticity to diminish. It is plain that this can be done in any degree we please, and that the adjustment can be varied in a minute, according to the exigency of the case, by moving the plug-pins.*

*In the mean time, it must be observed, that the pressure on the piston is continually changing, and consequently the accelerating force. The motion, therefore, will no longer be uniformly accelerated: It will approach much faster to uniformity; nay, it may be retarded, because although the pressure on the piston at the beginning of the stroke may exceed the resistance of the load, yet when the piston is near the bottom, the resistance may exceed the pressure. Whatever may be the law by which the pressure on the piston varies, an ingenious mechanic may contrive the connecting machinery in such a way that the chains or rods at the outer end of the beam shall continually exert the same pressure, or shall vary their pressure according to any law he finds most convenient. It is in this manner that the watchmaker, by the form of the fuzee, produces an equal pressure on the wheel-work by means of a very unequal action of the main-spring. In like manner, by making the outer arch-heads portions of a proper spiral instead of a circle, we can regulate the force of the beam at pleasure.*