“ It is evident that this form of the engine, by maintaining an almost constant and uninterrupted impulsion, is much fitter for driving any machinery of continued motion than any of the former engines, which were inactive during half of their motion. It does not, however, seem to have this superiority when employed to draw water ; but it is also fitted for this task. Let the engine be loaded with twice as much as would be proper for it if a single stroke engine, and let a fly be connected with it. Then it is plain that the power of the engine during the rise of the steam-piston will be accumulated in the fly ; and this, in conjunction with the power of the engine during the descent of the steam-piston, will be equal to the whole load of water.

“ The engraving here referred to is copied from the drawing of the double engine in the above patent of 1782, and is that of an experimental engine, no others having ever been made exactly similar. I have now added engravings of one of the Albion mill engines, fig. 45, 4G, being one of the earliest double engines erected for sale. I do not exactly recollect the date of the invention of the double engine, but a drawing of it is still in my possession, which was produced in the House of Commons when I was soliciting the act of Parliament for the prolongation of my patent in 1774—5. Having encountered much difficulty in teaching others the construction and use of the single engine, and in overcoming prejudices, I proceeded no farther in it at that time, nor until, finding myself beset with a host of plagiaries and pirates in 1782, I thought it proper to insert it, and some other things, in the patent above-mentioned.

“ Fig. 45 is a vertical and fig. 46 an horizontal section of one of the Albion Mill Engines.

“ The steam-pipe F conveys steam from the boiler *n* to the cross-pipe, or upper steam-nozzle G, and by the perpendicular steam-pipe I, to the lower steam-nozzle K. In the nozzle G is a valve, which, when open, admits steam into the cylinder *above* the piston B, (fig. 48,) through the horizontal square pipe at its top ; and in the *lower* steam nozzle K there is another valve, which, when open, admits steam into the cylinder *below* the piston. In the upper exhaustion-nozzle 11 is a valve, which, when open, admits steam to pass from the cylinder *above* the piston into the exhaustionpipe J, which conveys it to the condensing-vessel M, where it meets the jet of the injection from the cock N,and is reduced to water; and, in the *lower* exhaustion-nozzle L, there is also a valve, which, when open, admits steam to pass out of the cylinder *below* the piston, by the eduction-pipe, into the condenser M.

“ The piston being at the top of its stroke, the valves G and L are to be opened, and the flywheel *m* turned by hand about one-eighth of a revolution, or more, in the direction in which it is intended to move ; the steam which is then in the cylinder will pass by L into the condenser, when, meeting the jet of water from the injection-cock, it will be converted into water, and the cy­linder thus becoming exhausted, the steam, entering the cylinder by the valve G, will press upon the piston and cause it to descend, while, by its action upon the working beam through the piston-rod, &c., it pulls down the cylinder-end of the beam, and raises up the outer-end and the connecting rod *h,* which causes the planet-wheel *i* to tend to revolve round the sun-wheel/; but the former of these wheels, being fixed upon the connecting-rod so that it cannot turn upon its own axis, and its teeth being en gaged in those of the sun-wheel, the latter, and the fly wheel, upon whose axle or shaft it is fixed, are made to revolve in the desired direction, and give motion to the millwork.

“ As the piston descends, the plug-tree Z also descends, and a clamp, or slider *q,* fixed upon the side of the plug tree, presses upon the handle 1 of the upper Y-shaft, or

axis, and thereby shuts the valves G and L ; and the same operation, by disengaging a detent, permits a weight suspended to the arm of the lower Y-shaft to turn the shaft upon its axis, and thereby to open the valves K and II. The moment previous to the opening these valves, the piston had reached the lowest part of its stroke, and the cylinder *above* the piston was filled with steam ; but as soon as II is opened, that steam rushes by the eduction pipe J, into the condenser, and the cylinder *above* the piston becomes exhausted. The steam from the boiler entering by I and K, acts upon the *lower* side of the