

clear to any person who understands the subject, that as long as any part of the condenser is kept of a low temperature, it will abstract and condense the vapour from the warmer parts, till the whole acquires the elasticity corresponding to the coldest part. By the same means much of the waste is prevented, because the cylinder is never cooled much below the boiling temperature. Many engines have been erected by Mr Watt in this form, and their performance gave universal satisfaction.

We have contented ourselves with giving a very slight description without a figure of this improved engine, because we imagine it to be of very easy comprehension, and because it is only a preparation for still greater improvements, which, when understood, will at the same time leave no part of this more simple form unexplained.

57. During the progress of these improvements, Mr Watt made many experiments on the quantity and density of the steam of boiling water. These fully convinced him, that although he had greatly diminished the waste of steam, a great deal yet remained, and that the steam expended during the rise of the piston was at least three times more than what would fill the cylinder. The cause of this was very apparent. In the subsequent descent of the piston, covered with water much below the boiling temperature, the whole cylinder was necessarily cooled and exposed to the air.* Mr Watt's fertile genius immediately suggested to him the expedient of employing the elasticity of the steam from the boiler to impel the piston down the cylinder, in place of the pressure of the atmosphere; and thus he restored the engine to its first principles, making it an en-

* "This is a mistake. From the first, I proposed to act upon the piston with steam instead of the atmosphere, and my model was so constructed,"
W.