downward preſſure on A more than it increases the downward preſſure on B. We learn however that, by confining the condenſation to a ſmall *part of the cylinder* A, Mr Hornblower has erected engines clear of Mr Watt’s patent, which are conſiderably ſuperior to Newcomen’s : ſo has Mr Symington.

We ſaid that there was much ingenuity and real skill obſervable in many particulars of this engine. The diſpoſition and connection of the cylinders, and the whole condenſing apparatus, are contrived with peculiar neatneſs. The cocks are very ingenious they are compoſed of two flat circular plates ground very true to each other, and one of them turns round on a pin through their centres ; each is pierced with three sectoral apertures, exactly correſponding with each other, and occupying a little leſs than one half of their ſurfaces. By turning the moveable plate ſo that the aper­tures coincide, a large paſſage is opened for the ſteam ; and by turning it ſo that the ſolid of the one covers the aperture of the other, the cock is ſhut. Such regula­tors are now very common in the cast iron ſtoves for warming rooms.

Mr Hornblower’s contrivance for making the collars for the piſton rods air-tight is alſo uncommonly inge­nious. This collar is in fact two, at a ſmall distance from each other. A ſmall pipe, branching off from the main ſteam pipe, communicates with the space between the collars. This ſteam, being a little ſtronger than the preſſure of the atmoſphere, effectually hinders the air from penetrating by the upper collar; and though a little ſteam ſhould get through the lower collar into the cylinder A, it can do no harm. We ſee many caſes in which this pretty contrivance may be of ſignal ſervice.

But it is in the framing of the great working beam that Mr Hornblower’s ſcientific knowledge is moſt conſpicuous ; and we have no heſitation in affirming that it is ſtronger than a beam of the common form, and con­taining twenty times its quantity of timber. There is hardly a part of it expoſed to a tranſverse ſtrain, if we except the ſtrain of the pump V on the ſtrutt by which it is worked. Every piece is either puſhed or pulled in the direction of its length. We only fear that the bolts which connect the upper beam with the two iron bars under its ends will work looſe in their holes, and tear out the wood which lies between them. We would propoſe to ſubſtitute an iron bar for the whole of this upper beam. This working beam highly deserves the attention of all carpenters and engineers. We have that opinion of Mr Hornblower’s knowledge and talents, that we are confident that he will ſee the fairneſs of our examination of his engine, and we truſt to his candour for an excuſe for our criticilm.

The reciprocating motion of the ſteam-engine has always been conſidered as a great defect ; for though it be now obviated by connecting it with a fly, yet, unleſs it is an engine of double ſtroke, this fly muſt be an enormous maſs of matter moving with great velocity. Any accident happening to it would produce dreadful effects : A part of the rim detaching itſelf would have the force of a bomb, and no building could withſtand it. Many attempts have been made to produce a circular motion at once by the ſteam. It has been made to blow on the vanes of a wheel of various forms. But the rarity of ſteam is ſuch, that even if none is condenſed by the cold of the vanes, the impulſe is exceedingly feeble, and the expence of ſteam, ſo as to produce any ſerviceable impulſe, is enormous. Mr Watt, among his firſt ſpeculations on the ſteam-engine, made ſome attempts of this kind. One in particular was uncom­monly ingenious. It conſiſted of a drum turning air­tight within another, with cavities ſo diſpoſed that there was a constant and great preſſure urging it in one direction. But no packing of the common kind could pre­serve: it air-tight with sufficient mobility. He ſucceeded by immersing it in mercury, or in an amalgam which remained fluid in the heat of boiling water ; but the continual trituration ſoon calcined the fluid and rendered it uſeleſs. He then tried Parent’s or Dr Barker’s mill, incloſing the arms in a metal drum, which was immerſed in cold water. The fleam rushed rapidly along the pipe which was the axis, and it was hoped that a great reaction would have been exerted at the ends of the arms ; but it was almoſt nothing. The reaſon ſeems to be, that the greateſt part of the steam was condenſed in the cold arms. It was then tried in a drum kept boiling-hot ; but the impulſe was now very ſmall in companion with the expence of fleam. This muſt be the caſe.

Mr Watt has described in his specification to the pa­tent office ſome contrivances for producing a circular motion by the immediate action of the fleam. Some of theſe produce alternate motions, and are perfectly analogous to his double stroke engine. Others produce a continued motion. But he has not given ſuch a deſcription of his valves for this purpoſe as can enable an engineer to construct one of them. From any gueſs that we can form, we think the machine very imperfect ; and we do not find that Mr Watt has ever erected a continuous circular engine. He has doubtleſſs found all his attempts inferior to the reciprocating engine with a fly. A very crude ſcheme of this kind may be ſeen in the Tranſactions of the Royal Society of Dublin 1787. But although our attempts have hitherto failed, we hope that the caſe is not yet deſperate : We ſee different principles which have not yet been em­ployed.

We ſhall conclude our account of this noble engine with obſerving, that Mr Watt’s form ſuggests the construction of an excellent air-pump. A large veſſel may be made to communicate with a boiler at one side, and with the pump-receiver on the other, and alſo with a condenſer. Suppoſe this veſſel of ten times the ca­pacity of the receiver : fill it with fleam from the boiler, and drive out the air from it; then open its communica­tion with the receiver and the condenſer. This will rarefy the air of the receiver 10 times. Repeating the opera­tion will rarefy it 100 times ; the third operation will rarefy it 1000 times; the fourth 10,000 times, &c. All this may be done in half a minute.

*STEAM-Kitchen.* Ever ſince Dr Papin contrived his digeſter (about the year 1690), ſchemes have been propoſed for dreſſing victuals by the steam of boiling water. A philoſophical club uſed to dine at Saltero’s coffee­-house, Chelſea, about 30 years ago, and had their victuals dreſſed by hanging them in the boiler of the ſteam-engine which raiſes water for the ſupply of Picadilly and its neighbourhood. They were complete­ly dreſſed, and both expeditiouſly and with high fla­vour.