fresh coal is thrown in, and then it is barely perceptible, and only for a few seconds.

When applied to furnaces with boilers, steam is easily procured, by taking from the top of the boiler a small tube, which is carried into the furnace, and connected with the distributor, and by means of a stop-cock the supply is regu­lated. In cases where there is no boiler, a very small one must be erected, which can be placed on some part of the furnace, and will thus give off steam without any extra ex­penditure of fuel.

The most remarkable circumstance attending the use of this patent process, is the almost total absence of draught through the ash-pit, consequently little or no air passes up through the fire, while there is a rush of air *over the surface of the fuel.* Hence the necessity of allowing air to flow in by the door of the furnace, or, which is better, by means of tubes placed in the chimney or flues, by which it is heated previous to its entrance ; because, as before stated, the ad­mission of cold air must have a prejudicial effect. It is evident from this, that the combustion must proceed almost entirely by air supplied on the surface. Indeed, when pro­perly applied, the supply of air through the ash-pit is al­most reduced to nothing ; and accordingly the fire can be kept in good condition, even though the ash-pit is closed in front.

In addition to the consumption of smoke, the application of steam in this way is attended with another advantage ; the saving of fuel, which is certainly a great recommenda­tion in its favour. Different statements have been given of the amount of saving effected ; but if we can place reliance in the reports given by the patentee, it seems to be consi­dcrable.

Watt, from his numerous experiments, concluded, that for each pound of coal (English caking) consumed, rather more than eight pounds of water could be evaporated, thus requiring about eight pounds of coal for the cubic foot of water. Since his time, however, improvements in the con­struction of furnaces have been introduced, which have in­creased the amount of evaporation.

Mr. Watt’s maximum result with Wallsend caking coal, conducted with the greatest care, was 8.9 pound of water to the pound of coal. The lowest was 5.93, the mean 7.4.

Mr. Parkes of Warwick states the ordinary result with one pound of caking coal to be 7.5 pounds, evaporated from 212°, but by his improved method in the furnaces of other persons, it was 8.7, while by a similar mode with his own furnace, it was 10.32 pounds.

With one of the Cornish boilers, coated and covered with the greatest care, and in all other respects rendered as per­fect as possible, the result was 11.8 pounds, and a similar re­sult was more recently obtained by Henwood.

The following is a tabular view of the results of Watt and others, shewing the quantity of water evaporated, and the quantity of fuel required for the horse-power of an en­gine:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| EXPERIMENTS. | -  lbs. water to 1 lb. of English coal. | lbβ. English coal to cubic foot water, or horse­power per hour. | Cubic feet of water to 84 lb.  English coal. | Cubic feet water to 112 lb.  English coal. |
|  | 7.4 | 8.4 | 10. | 13.33 |
| United Mines Loam (Ed. Phil Jour., July 1839),... | 9.58 | 6.23 | 12.93 | 17.24 |
| Parkps of Warwick’s method, | 10.32 | 6.03 | 13.9 | 18.5 |
| Huel Towan (Ed. Phil. Jour., July 1839), | 10.55 | 5.9 | 14.23 | 18.97 |
| Mr. Henwood's experiment, | 11.87 | 5.32 | 15.8 | 21. |

By the use of the Ivison patent, when properly applied, the amount of evaporation becomes much greater, as has been certified by repeated trials, by scientific men of emi­nence, as the following table shews. The experiments were conducted with Scotish coal ; and considering the heat given out by it, as compared to English caking coal, to be as three to four, the results will shew the amount of eva­poration, or, which is the same thing, the quantity of fuel, used in comparison with what is given in the preceding table.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| EXPERIMENTS. | lbs. water to  1 lb. of ***Scοtish*** coal. | lbs. water to  1 lb. of English coal. | lbs. English coal to cubic foot water, or horse­power per hour. | Cubic feet of water to 84 lb.  English coat | Cubic feet water to 112 lb.  English coal. |
| Average of 8 experiments, certified  April 13, 1839,  Average of 3 experiments, certified  May 10, 1839  Average of 12 workings, certified  July 1839,...  Maximum result of do.,  Average of the four preceding lines,. | 11.41  13.94  13.25  14.72  13.43 | 15.21  18.58  17.66  19.62  17.96 | 4.09  3∙35  3.52  3.12  3.46 | 20.5  25.  23.91  26.47  24.02 | 27.4  33.46  31.78  35.3  32.3 |

From the above tables it appears, that the greatest quan­tity of water evaporated by the pound of English coal is 11.37 ; the maximum result by Ivison’s process is, using Scotish coal, 14.72; the average 13.43; which, if we con­sider the English to the Scotish as four to three, gives 17∙9, or equal to only about 3.46 of English coal to the cubic foot of water or horse power of an engine, certainly by far the largest and most economical result on record.

That this mode of consuming smoke is accompanied with saving of fuel, is also proved by comparative trials made with and without the use of steam, on the same furnace, as is shewn by the following table :