

### Improvement in Gas-making.

At the meeting of the Institution of Civil Engineers (London) on the 10th of May, 1864, a paper was read by M. Pernolet, of Paris, on the "Means of Utilizing the Products of the Distillation of Coal:"—

"The author believed that this question had been practically solved by the employment of existing ovens, to which certain inexpensive additions were made, and which, while still giving to the coke all the solidity, density, and luster that distinguished good coke made in the ordinary way, enabled every product of the distillation of coal to be turned to account. This was effected, mainly, by keeping the coal from all contact with the air during its distillation, by performing that process very slowly, and by collecting and making use of the volatile products. The whole arrangement had been sanctioned by many years' experience, both in Belgium and France, where it was actively and profitably pursued at ten different establishments, with more than four hundred ovens, of the largest dimensions, capable of receiving from five to seven tons of coal at each charge.

"In converting an old oven into one of the improved form, the floor was taken up and raised about a foot, so as to allow of its being heated from below, by means of a fire-grate and flues. A new opening was made in the roof, in which was fixed a pipe, intended to receive the volatile products, and to conduct them to their destination. The ordinary door, and the other opening at the top, were so arranged that they could be kept hermetically closed. A chimney was also added to the masonry of the old ovens, and this was an essential part of the system, as it secured the circulation of the products of distillation. It had been ascertained that this chimney should be 50 feet high, and not less than 3½ feet square, inside dimensions, for a group of sixteen contiguous ovens; and that the sectional area of the main flue, connecting the different ovens with the chimney, should be three-fourths that of the chimney. In order to try whether the distillation was finished in any one oven, a valve was closed in the outlet pipe; when, if the charring was incomplete, the gas still given off would cause cracks in the loam, with which the joints of the door were closely luted, and thus the necessity for continuing the process was demonstrated. The valve was then simply re-opened, so as to allow the gas again to pass off by the pipe. If, on the other hand, when the valve was closed, no gas escaped at the joints, the charring was known to be finished, and the coke was fit to be drawn. During this operation the valve was closed, to prevent the mixture of the external air with the gases circulating in the outlet pipe, and the cast-iron cover of the opening at the top was kept shut, to avoid the risk of igniting the coke by the draught of air which would be created if it was open. The oven was arranged for charging from the top, by means of wagons running upon rails, and in this way five tons of coal could be introduced in fifteen or twenty minutes, a rapidity which was most desirable for preserving the heat of the oven. When the charge was being withdrawn and replaced, the gas from the other ovens was allowed to pass continually into the fire-place, so that the floor was kept hot, and the gas accordingly began to show itself, above the opening at the top, only a few minutes after the closing of the door. This opening was then hermetically sealed, and the valve in the outlet pipe being raised, the communication was re-established between the interior of the oven and the great common flue. The products of the distillation were drawn off by the draught of the chimney, together with the condensation of the liquid and the cooling of the gaseous products. After circulating in the great general flue, the products penetrated into the condensing apparatus, where they deposited most of the tar and ammoniacal liquor, and returned to the ovens by the small general flue, whence the gas, purified and dried, passed to each fire.

"The time occupied in charring varied with the nature of the coal, and the density desired for the coke, and with the arrangement of the oven. At St. Etienne it took upwards of seventy-two hours, with rich coals, while at Torteron the time occupied was only twenty-four hours, with the rather poor but flaring coals of Commentary.

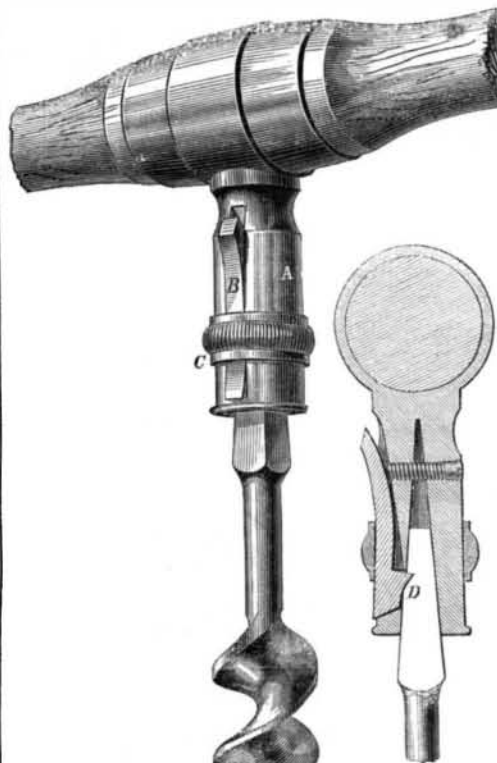
"As to the cost, it was stated that the expense of

altering each oven at St. Etienne was about £20, and that as the value of the additional yield from each oven ought to be about £60 per annum, this outlay should be repaid by four months' work.

"It was asserted that the supplementary products due to these arrangements were, a larger yield of coke, and all the tar, the ammoniacal liquors, and the gas, which would be obtained from the same coals, if distilled in the retorts of a gas manufactory. Thus, in the great coke works at St. Etienne, the yield had been advanced from 58.8 to 69.3 per cent, and in the 'Fonderies et Forges d'Alais,' from 54.6 to 69.5 per cent. Generally speaking, with rich or partially rich coals, the increase in the yield of coke was from 10 to 15 per cent. As to the tar, the proportion collected depended on the nature of the coal, and on the care taken, both in the distillation of the coal, and in the condensation of its volatile products. It had averaged 2.53 per cent. at the Forges d'Alais, 3 per cent at Elonges, 3.25 per cent at St. Etienne, and had reached as high as 5 per cent from the ovens of the Paris Gas-light Company, where only very bituminous coals were employed; but it was thought that there might be reckoned 3 per cent. of tar from the bulk of the coal distilled. The proportion of ammoniacal liquors depended also on the quantity of moisture contained in the coal; but it might be stated at a weight of not less than 10 lbs. of sulphate of ammonia, and sometimes it was as much as 13 lbs. per ton of coal distilled. At the ovens of the Paris Gas Light Company, from 10,000 to 11,000 cubic feet of purified gas were generally obtained from a ton of coal, which yielded from 69 to 70 per cent of coke, fit for delivery to the railway companies."

### HUNTER'S BIT AND AUGER FASTENING.

There is no annoyance more insufferable to mechanics who use augers or wood-boring tools than the



detachment of the bit from the brace, whenever the former is withdrawn from the hole; in many cases it seriously retards the work, and is, for other reasons, particularly disagreeable. In the engraving published herewith a plan is shown which completely obviates this trouble, and holds the bit with the grasp of a vise. The arrangement is as simple as it is secure, and consists of a metallic socket, A, in which there is a steel tongue, B, fitted. This tongue sets in a recess and has a milled ring, C, sliding over it. When the ring is slipped up on the shank it bears on a curved part of the tongue and elevates the lower end, so that a catch, D, inside is withdrawn from the notch in the bit: after that it can be taken out. There is also a small screw (see section) at the back, which is used to give the tongue more or less hold in the notch of the bit. This arrangement can be applied to a brace; in the engraving it is shown fastened to an auger handle, but old bits can be used in this new socket with little or no refitting. It is

obviously an excellent device, and will no doubt be very popular. It was patented by C. F. Hunter, of Adrian, Mich., on Oct. 27th, 1863, through the Scientific American Patent Agency; for further information address the inventor at Adrian, Mich.

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