

it was as much as 13lbs. The quantity of steam condensed was on an average about 156 gallons per hour.

New
boilers.

Subsequently, a set of tubular boilers, similar to those of locomotive engines, were erected close to the engines, and are now constantly worked instead of those at the great distance; the economy of fuel has been considerable. The consumption of gas coke under the tubular boilers is about 15 tons per week, at ten shillings per ton. The larger boilers consumed about 30 tons in the same time.

Mr. Edward Woods gives his approval of the action of the engines, and of the employment of non-condensing engines generally for this class of work, on account of their great simplicity, and the readiness with which they may be brought into full action, so that the greatest power is always at hand to start the train; whilst during the intervals of working the steam may be suffered to accumulate. These advantages are rarely attainable with condensing engines, as unless a small engine be employed to keep up the vacuum, there is a difficulty in starting them with the train attached to the rope.

This communication is accompanied by four detailed drawings of the engines and machinery, and by a model of Mr. Grantham's apparatus for regulating the admission of steam to the valves.



Mr. Fair-
bairn.

Mr. Fairbairn bore testimony to the good quality of the engines and machinery described by Mr. Grantham; their performance had been very satisfactory.

The mode of keeping the rope in tension was an improvement upon the plan which Mr. Fairbairn had previously adopted at the Wapping Tunnel, of the same railway. He would present drawings of that machinery to the Institution.

The loss by condensation in long steam pipes is so considerable, that it has been generally found more economical to transmit power by a line of shafts, than to convey steam to any great distance.

He had recently constructed some Cornish pumping engines of large size, with side levers and reversed connecting rods; they had answered extremely well. Drawings and descriptions of them would be presented to the Institution.

