

on and to make a saving for the whole time the jets would have to save from 30 to 40 per cent. while in operation. These several tests proved clearly to us that steam jets are not economical and that they only partly remove the smoke nuisance. Consequently it appears that any steam jet device cannot really make any saving in fuel and it is also doubtful if they can be made to succeed as smoke preventors.

There are several smokeless furnaces on the market such as the Rooney stoker, the Murphy stoker, the Jones and the Taylor under-feed stokers and the different kinds or make of chain grates. Each of these have their particular friends and all of them give good results as to the fuel used when operated under normal conditions, but any of them will smoke badly if carelessly set and badly managed. One of the greatest advantages with automatic power-driven stokers is that the furnace doors do not require to be opened every few minutes. Just which of these stokers should be used can only be determined by careful and intelligent enquiry and examination. Where the load fluctuates such as in a small street railway plant the stoker that will pick up quickly should be used; in situations where at times an over load is sure to occur, then a stoker should be so arranged that the amount of coal burned per hour can be greatly increased without wasting the fuel or reducing the furnace efficiency to any great extent. Every boiler and furnace is sure to have a fixed amount of coal that can be burned to give its best results and when this amount is either greatly increased or diminished the efficiency of the boiler is reduced, hence it is imperative that the whole situation be carefully studied and worked out if good results are to be secured. There is no hard and fast rule by which it is possible to determine which stoker or appliance should be used. There are many accessories such as damper regulators, feed water regulators, pump governors, recording gauges, flue gas analysis and  $\text{CO}_2$  recorders that should be considered and used whenever the coal consumption warrants it. In very small plants it does not pay to spend too much money upon accessories.

A factory or office building has to be heated for from six to seven months in the year and if this is done by the use of exhaust steam from the engine, it has been demonstrated that it is cheaper to heat a building with exhaust steam than by direct steam at high pressure using a pressure reducing valve, the steam engine proving to be the best means of reducing the pressure for the heating coils. In this case about 10 per cent. of the heat unites in the steam and is converted into power. The balance of the heat delivered to the cylinder may be all utilized for heating purposes.

In figuring the electrical costs for power or light, the cost of coal for heating the building should always be added to the