

cylinder, 20% is lost in exhaust, and after allowing for friction we find that 18% of the available heat is given as actual work in this system.

Column 3 shows the distribution of the losses in a 40 H.P. suction producer system. It may be taken for granted that the losses in a 250 H.P. system will be smaller. Of the total heat in the coal 89% is transferred in the gas to the engine cylinder. After deducting engine losses, as in the last case, we find that 23% of the available heat is transferred into mechanical work. The efficiencies then are as follows:

Steam, 10%; pressure producer, 18%; suction producer plant, 23%.

There are one or two other points worthy of mention while dealing with the efficiency question. In a small steam plant the loss due to bad stoking is often quite considerable; in a producer plant there is very little such loss.

With regard to stand-by losses, as before mentioned, these are about three lbs. of coal per hour in a moderate-sized producer plant, whereas, according to results obtained by Mr. Dowson, this loss is about 71.5 lbs. of coal per hour in a steam plant of the same size. When we consider that most plants are idle for about 199 hours every week, we see how great will be the difference in coal bill due to stand-by loss.

This loss is small in producer plants because, since very little air is passing through the fire, when the fire is banked up in the gas generator that piece of apparatus is turned into a slow combustion furnace.

With regard to the efficiencies mentioned on the last page, there is a point of great practical interest which is too often overlooked. When we say that the efficiency of a steam plant is 10%, while that of a gas producer plant is 23%, we mean, among other things, that, for the work equivalent of 10 tons of coal, we must not only buy 100 tons, but we must also pay for the labour of handling this, and also for storage space. With the producer plant the calculations are made only on 23 tons of coal. A similar relation holds in the disposal of the ashes.

Dealing now with the problem of fluctuating loads, the following test was made on a suction producer plant by Messrs. Crompton & Co., Ltd., of London, England. A gas engine was run for four hours with a load of 10 H.P., then a load of 80 H.P. was thrown on suddenly. The plant immediately responded, and hardly a flicker was noticed in the lights supplied from this engine. It is to be borne in mind also that this was done without the use of a gas holder. This can be done by any well-designed producer plant,