

Discussion

F. O. ELLENWOOD.⁴ This paper is interesting and stimulating because it contains considerable information about a new engine and boiler, concerning which future progress reports will be welcome. The present performance data suggest interesting possibilities and it is sincerely hoped that future developments may place both the new engine and the new boiler on a successful production basis.

The test data show an engine efficiency of about 53 per cent, which is an excellent performance for an engine of this size. In this connection, will the authors indicate where the chief losses occur in this engine? In other words, what portion of the available energy is not utilized by reason of cylinder condensation, mechanical losses, thermal losses from the outside of the cylinder, and fluid-friction losses?

The new system of forced circulation in the boiler seems to be excellent and it is hoped that periods of long runs will still find it functioning properly. The improved method of driving the impeller, as indicated in Fig. 13 of the paper, seems to the writer to be a step in the right direction.

For a steam generator of this capacity to give an efficiency of 81 per cent, as has been shown by the test, means that great care has been taken in its design, and the writer desires to congratulate those who have been responsible for the development of this unit.

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W. F. RYAN.⁵ It is regrettable that the authors did not include in the published data the power consumption of the auxiliaries during the tests of this very interesting steam-generating unit.

In view of the relatively high draft loss and the power input to the circulating pump, it would ordinarily be assumed that the auxiliary-power consumption would be an excessive proportion of the limited output of the combined engine and boiler unit. If this is not the case it would naturally increase the value of the paper to indicate that fact by actual test results.

AUTHORS' CLOSURE

In reply to Professor Ellenwood's comments it is probable that a large portion of the losses in the engine are due to fluid friction. The unusual valve arrangement of this engine is possible only because of the somewhat involved paths through which the steam is led to the appropriate cylinder, and it is necessary to sacrifice some efficiency in order to attain the ends which were sought in the design.

In reply to Mr. Ryan, the power consumed by the a-c motor which drove both the fan and the impeller was about 0.75 hp. During a typical run, the current to the motor was 9 amp, at 220 v. The boiler feed pump which was used during the tests was driven by a large d-c motor for speed control, and the power which it required was far greater than that which would have been needed by a more efficient combination. In any event, the feed-pump power with this boiler should not be different from that with any other boiler of similar pressure and steam generation.

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