

It is unlikely, for a time and until the growing world shortages of fuel have made their full impact, that oil-engine driven heat pumps will be used for domestic house heating in urban areas. One development that may be of great influence in future technical progress is the Stirling cycle engine developed by Philips at Eindhoven, the Netherlands. A diagrammatic view of the engine is shown in Fig. 34. The feature of this engine lies in the regenerator which stores and restores heat directly, as heat, thereby effecting the change from  $t_1$  to  $t_2$ , and from  $t_2$  to  $t_1$  instead of the two adiabatic operations in the Carnot cycle. An engine working, so as to do work, on the practical Stirling cycle has a higher efficiency than any engine working on an alternative type of practical cycle. Conversely, a heat pump working on the Stirling cycle will have a higher P.E.R. and a higher value of  $R_\eta$  than an engine working on any other cycle.

It is understood that efficiencies exceeding 95 per cent have been achieved by the regenerator. If this is so, it would appear possible that a Philips Sterling engine driving a similar machine as a heat pump would give a value of  $R_\eta$  exceeding 4, but with a somewhat lower value of  $q_2$  recycled from the engine waste heat.

