The Heinrici Hot Air Engine

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This engine is based on the well-known design originated by 'Artificer' and serialised in Model Engineer magazine in l940. The design was subsequently revised and presented by Edgar T. Westbury in his book "Practical Notes on Hot Air Engines, also published in 1940. Strictly speaking the engine is a replica rather than a model since it is to the same dimensions as the prototype (Figure 1) which it is believed was the smallest in the range manufactured by Heinrici. The engine being exhibited differs in construction from the prototype in that no castings are employed, all parts being fabricated or machined from the solid – a method of construction suggested by Westbury should castings not be available. (Figure 2).

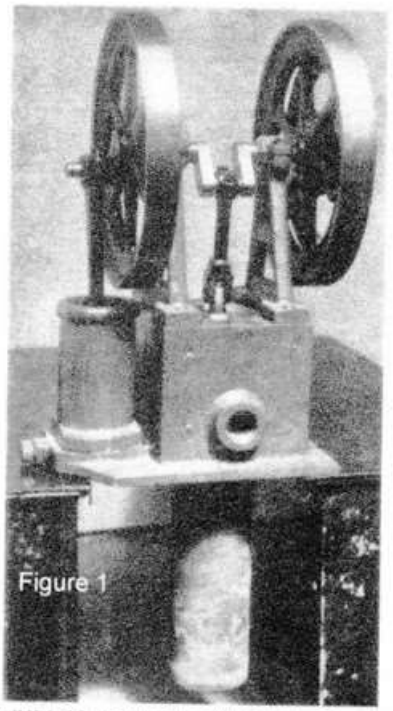

Figure 1

A small Heinrici engine, having a power cylinder 30 mm. bore, with furnace removed to show air chamber.

Figure 2

This arrangement minimises the heat conduction between hot and cold ends of the air chamber whilst ensuring the minimum resistance to heat transfer from the heat source to the working fluid. In practice it is doubtful whether any significant advantage is gained by the use of a copper end since the main resistance to heat transfer is across the metal / gas interface, but the theory is OK! The crankshaft is machined from solid. Flywheels are also machined from steel discs and locate on tapered seats on the ends of the crankshaft. This arrangement ensures that the wheels run true,

there being no danger of offsets due to loads from keys or grub screws. The furnace is fabricated from mild steel sheet, the edges being machined to the appropriate angle and silver brazed. The chamber is lined with a heat resisting mill board (not asbestos!). The burner is designed to operate from the small gas cylinders supplied for use with portable gas torches. The engine runs well and so far, the cooling water jacket has never been used "in anger". No doubt it would be required for continuous running and for maximum power output but for demonstrations of half an hour or so has proved unnecessary.