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Trial Manufacture of Film Vaporization Gasturbine Combustor and Researchment on Its Property

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It is attempted in this thesis to make for trial and design a film vaporization gasturbine combustor with known results of research on the cyclonic flame and combustion by the use of wall diffusions, and to research on its several properties.

The trial manufacture is made in the following conditions.

- (1) The cyclonic flame is to be burned in the vaporizing tube.
- (2) The primary air fuel ratio $G_{a1}/G_f=12\sim13$.
- (3) The air fuel ratio $G_a/G_f=60\sim70$.
- (4) Combustion efficiency should be 95 per cent or more.
- (5) Inlet air temperature is to be hold $100\sim150^\circ\text{C}$.
- (6) Recirculation type injection nozzle is used.
- (7) Injection fuel is JP-4 or Kensene.

The results obtained may be summarized as follows.

- (1) Soots or another deposits are not to be seen.
- (2) The flame in the vapping tube is very stable for its cyclonic patterns over a wide air fuel ratio G_{a1}/G_f .
- (3) A kind of vibratory combustion called "Bumping" and "Noise" are too small.
- (4) At the air fuel ratio $G_{a1}/G_f=15\sim16$ and $G_a/G_f=60\sim70$, we obtained the highest combustion efficiency about $95\sim100$ per cent.
- (5) So called secondary air have much influence upon combustion flow patterns and combustion efficiency.
- (6) The relations between the wall temperature of the vaporizing tube and primary air volume flow (i. e. Reynolds number) are observed.

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