

SCIENCE DIMENSION

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Les publications du comité fournissent une base pour les lois sur l'environnement.

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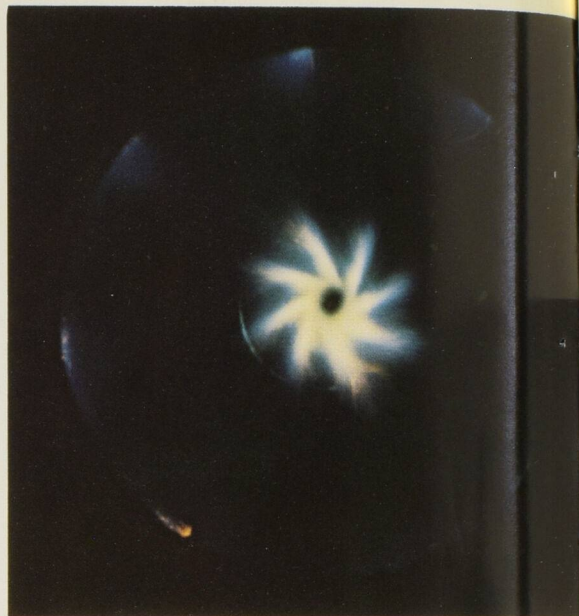
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Air swirl generator The blue flame



George Hunter, Toronto

A 10 per cent saving in the cost of furnace fuel for some per cent of Canadian homes which use oil is anticipated with a new type of nozzle design for oil burners developed in the Canadian Combustion Research Laboratory of the Department of Energy, Mines and Resources. The new oil burner assembly is being patented by Canadian Patents and Development Limited (CPDL), a subsidiary of the National Research Council. CPDL's main objective is to assist in making the licensable products of publicly-financed research and development available to the public, through industry.

Conventional designs of oil burner assemblies for home heating fuel oils employ a traditional fuel-air mixing process in which the evaporation and combustion of the fuel oil take place simultaneously. In one form of assembly, the fuel oil is sprayed as a hollow cone and air is weakly swirled along a path which is parallel to the axis of a burner blast tube at which passes into the hollow cone so that the trajectories of the fuel oil droplets cross the air flow streamlines. This leads to a rapid evaporation giving fuel oil rich regions which then turn ignite and produce soot, resulting in air pollution and waste of a fossil fuel. The visible flame from such a system is yellow. The yellow color is the visible radiation from the high temperature soot particles, a result of unburnt carbon. For a soot-free or blue flame, complete combustion of the carbon must take place.

The new burner design (left) produces a clean, soot-free flame, compared with the conventional one (right). It also provides approximately 10 per cent improvement in efficiency, an important consideration from an energy conservation standpoint. This is achieved by the new burner nozzle design which imparts a swirling motion to the fuel-air mixture, improving the diffusion of the oil particles through the air, so that they more or less completely evaporate prior to combustion. A modification can be made to existing home furnaces and, in addition, furnaces using this assembly will require less cleaning.

A number of prospective licensees are currently evaluating the device. □