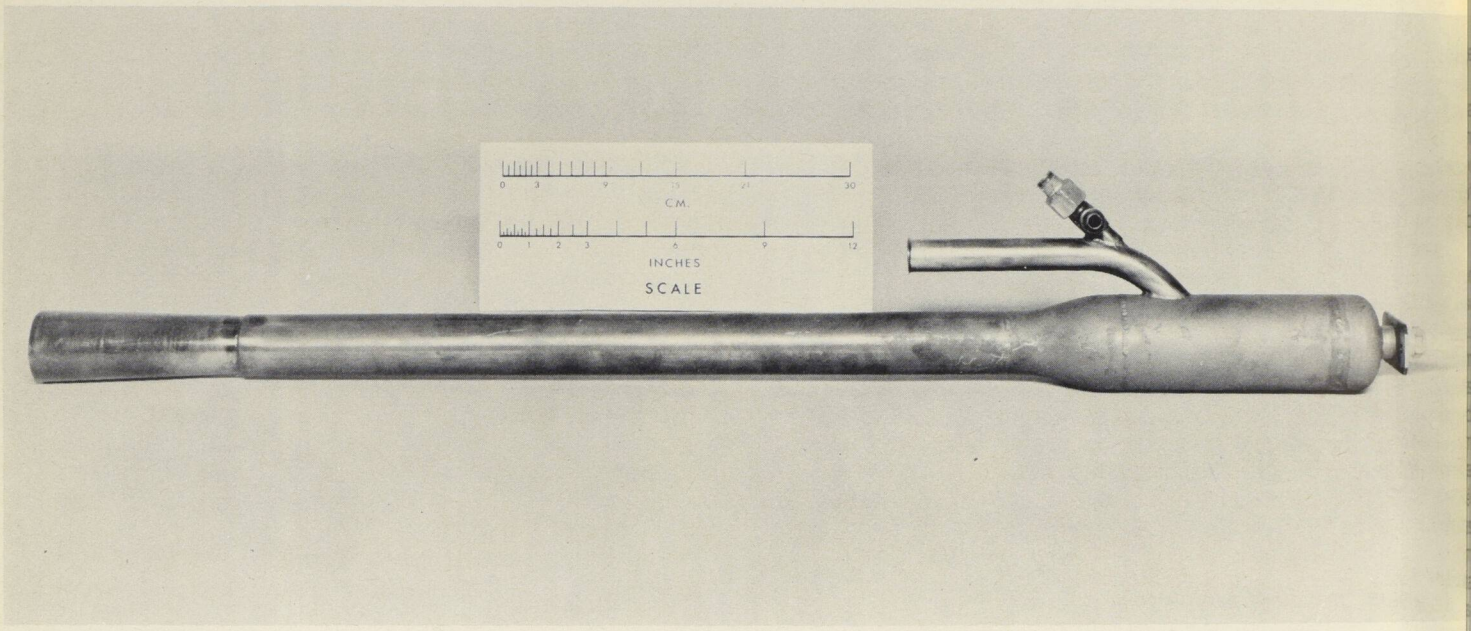

Pulse jet burner. ● *Pulsoréacteur utilisé dans le réchauffeur.*

The hot products of combustion are discharged from the pulse jet into a venturi when they are mixed with secondary air and cooled to an acceptable temperature of 190 to 225 degrees Fahrenheit. If higher temperatures are used there is a danger of setting the wooden ties under the switch on fire.

In the NRC system hot air from the burner is conducted beneath the rails in a circular cross duct located ahead of the switch point. On the top of the duct two short horizontal nozzles are located adjacent to the rails and blow hot air along the side of the fixed stock rail towards the points of the switch. Adjacent to the short nozzles are two extended nozzles which conduct hot air along the switch and discharge it over the slide plates and between the ties to keep all of the working parts of the switch free of ice and snow.

This system, in cold chamber tests, has kept a 22-foot switch in satisfactory working condition for as long as five hours at a snowfall rate of three inches per hour with an ambient temperature of zero degrees Fahrenheit and wind velocity of 15 miles per hour.

One of the requirements for a field test location is that it must be at least 1,000 feet from human habitation. Distance is necessary because the sound of the pulse jet engine in action has been recorded in close proximity at 130 decibels, an audial reminder of its forerunner the V-1.

Currently there are four test track switch installations along CPR lines, two near Perth, Ontario, in the Belleville CPR subdivision and two on the CPR mainline, about 45 miles west of Sudbury. In addition there is a fifth installation at the NRC rail test laboratory in Ottawa. The latter is used for endurance testing of the switch heater components. Some parts of the pulse jet run extremely hot (up to 2,400 degrees Fahrenheit) and only by long-term testing can satisfactory materials be located. Fortunately in this jet age there are a number of suitable materials available.

T.R. Ringer, Head of NRC's Low Temperature Laboratory, expects that success of the current field tests will lead to manufacture of pre-production models later this year. This will allow an increase of field evaluation efforts next winter.

"While there is no degree of patentability involved with the pulse jet used as a jet pump for heating track switches, its use as such is a new concept and consequently demands considerable research and development effort," Mr. Ringer says. "Arrangements are now being made for production."

Some indication of the rewards for successful effort can be gleaned from railway statistics that show the existence of some 40,000 track switches. Not all will need automatic switch heating but there is a potential market for thousands of units.

Mr. Ringer says that NRC is looking beyond thermal heating for the ultimate solution to ice and snow jamming.

"Switch heaters are only an interim answer. Our long-term project is a total redesign of switches that will permit no failure under any ice and snow conditions. We're quite proud of our current work but nobody in the Low Temperature Laboratory believes that railways shoul heat switches for the next couple of hundred years.

"The solution will not come about instantaneously. Long-term might be as appropriate as any word to describe this latter project. Even if the solution did come instantaneously the railways estimate that, given a new failure-free switch, it would still be 20 to 25 years before existing switches could be economically phased out," Mr. Ringer says. □