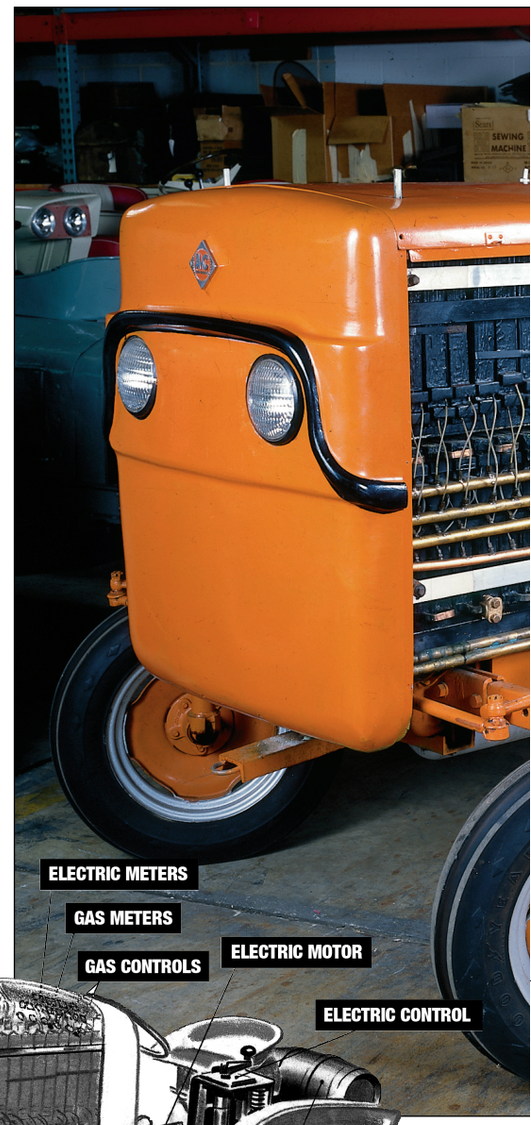
FUEL CELLS ARE NOT A MODERN PHENOMENON, MICHAEL WILLIAMS HAS DETAILS OF A MUCH EARLIER ATTEMPT AT ALTERNATIVE ENERGY

ALLIS-CHALMERS FUEL FOR THE FUTURE?

Some engineers are forecasting a bright future for fuel cells. In a few years' time, they could be the power source for applications ranging from trucks to mobile 'phones, but, more than 40 years ago, when Allis-Chalmers built experimental fuel cell powered tractors, they attracted little interest.

The long history of fuel cells is marked by surprisingly little achievement. Development work started in Britain in the 1830s, but since then the technology remained little more than a scientific curiosity in spite of numerous attempts to find commercial applications.

A fuel cell works like a battery, with electrodes and an electrolyte converting chemical energy into electricity. A fuel cell differs from a battery in that it needs a supply of fuel to provide the required chemical energy. Another important difference is that, unlike a conventional battery, a fuel cell is unable to store the power it produces. Electricity production stops when the fuel supply is turned off. Various types are available; using liquid or even solid fuels, but the smart money is backing hydrogen gas as the fuel for the future.



The 1959 fuel cell tractor could handle a two-furrow plough in 'dry, hard ground'.

The attractions of fuel cells compared with diesel or petrol engines include completely silent operation with no vibration. The cells are also extremely efficient. A diesel engine typically loses more than 50 per cent of the energy in each litre of fuel it burns, with most of the waste accounted for by heat production and energy used by various moving parts. A fuel cell usually has no moving parts and in most types there is little waste heat, allowing the cells to operate at 90 per cent efficiency or only 10 per cent energy waste. If smooth, silent power with 90 per cent energy efficiency was the end of the story we might all be driving fuel cell powered cars and tractors, but the situation is much more complicated than this. Absence of noise and vibration are real benefits, but when a fuel