

Acceptance speech on Induction to the Scottish Engineering Hall of Fame

James Watt Dinner, 7th October 2016

Madame President, my Lords, ladies and gentlemen,

When Professor Masterton phoned to tell me about this award, I was surprised, and highly honoured. When I saw the names of those already enrolled in the Hall of Fame, I was humbled to have some association, however tenuous, with these famous engineers, who had, quite literally, changed the world.

In 1965, I was a young, twenty something development engineer working for Kelvin Hughes in Hillington. In response to a request from one of the major banks, I was asked to investigate the possibility of developing a machine, which could autonomously issue cash to the bank's customers, outwith normal banking hours. It is worth mentioning here that normal banking hours were 10.00am till 3.00pm, Monday to Friday, and 10 to 12 on Saturday morning! I know nowadays that's difficult to believe. It was the imminent closure on Saturday mornings that triggered the need for an autonomous cash dispenser.

The pivotal question was, how was a machine going to identify an authorised bank customer, with enough certainty, to hand out the Bank's money?

Biometrics, e.g. fingerprints, were considered most likely to provide the solution. However, the technology in 1965 was totally inadequate.

I looked at the use of what I called exotic tokens, devices which would have some unusual characteristic, be very difficult to replicate, but which could be detected by the machine, but this proved fruitless.

Having previously been involved in designing access control equipment, I had a card reader and a selection of cards left over from that project. I started redesigning the electronics to read digital data from these plastic cards, when I had the EUREKA moment.

I realised that, if a binary coded number was stored on the card, it could be read into the machine. If an associated, decimal number, the Personal Identification Number, (PIN) was then keyed in separately, the machine could compare them. If their mathematical relationship was correct, this would confirm the identity of the customer, and cash could be safely issued.

My proof of concept, my Heath Robinson lash-up, including a section of a chocolate bar dispenser, was loaded into the guard's van at Glasgow Central station en route overnight to London, where I successfully presented my invention and demonstrated it to the banks and other interested parties, including the Assistant Cashier of the Bank of England.

It was agreed I had the answer, and the go ahead was given. With one million customers, a six-digit PIN was the obvious length, but the Bank's risk assessment

showed four digits to be a better compromise of security versus customer acceptance. The Patent just said a “plurality” of digits.

Patent was applied for on May 2 1966, and Patents were later granted world-wide, and licenced by the major manufacturers.

In January 1967, Smith’s Industries, Kelvin’s parent company, closed the Hillington facility and moved the project to England. I left the company and pursued my career elsewhere.

I had nothing further to do with the Cash Machine until 2005, 38 years later, when someone else claimed, and was acclaimed, to have invented it in June 1967, albeit using radioactive cheques for security. This forced me to dig out my original May 1966 Patent, and go public with it.

Now, 50 years later, there are over 3 million ATMs in use world-wide, with a billion transactions every day. With millions of Point of Sale terminals also using my Card and PIN methodology, it has surprised everyone with its longevity.

I’m sure the banks did rather well from having this equipment, but I like to think millions of people around the world continue to benefit from having this one aspect of their daily life simplified, just a little bit, and I imagine that includes most of you here tonight.

I hope the history of this product might help to convince some of our bright, imaginative, young people that Engineering is indeed the most creative and satisfying of professions, and that Scotland continues to play a leading role in innovation.

I would like to acknowledge the contribution of the late Dick Swarbrick and the late A.I.O.Davies, and of Geoff Constable, then Kelvin’s Chief Engineer.

And finally, to thank Professor Masterton, and his panel of eminent judges, for according me this honour, and I would like to assure you Sir, it is deeply appreciated.

Thank you.

James Goodfellow