

Ray Bogucki

HUGHES AIRCRAFT CO. – 1955-9

IN RE: K.W. COWANS

Well advised or not, I entered the intellectual property field via employment in the patent department of RCA in Princeton, New Jersey in 1952, lured thereto by a starting salary exceeding any of my law school classmates, and the prospect of a well-conceived and executed education in patent law. The education was duly delivered over a six-month period, but the compensation increased only minimally as I was shuffled south to Camden, New Jersey, where RCA was developing the Bizmac computer. The first Bizmac employed tens of thousands of vacuum tubes (made by RCA) and was destined for use by the Census Bureau. The vacuum tubes, however, failed at a high rate that could not be substantially reduced, and for this and many other reasons the rapidly evolving semiconductor circuit technology forcefully took over. Consequently, the Bizmac program was in a terminal phase, and I, encouraged by the fact that my compensation had only minimally increased, graciously accepted an offer for about 50% more money from Hughes Aircraft Company in Culver City, California, where I started in early 1955.

My move to sunny Southern California had some extra benefits which proclaimed the wisdom of my judgment, in addition to the filthy lucre factor. After leaving the RCA Patent Department, which had an excess of senior patent lawyers, I was now one of the

most experienced, and therefore left unsupervised. A substantial number of the patent staff comprised engineers going to law school on company paid tuition. They would usually be saying sayonara when they had their diplomas. Even the delicate pressure for productivity which existed at RCA was not then evident at Hughes. This allowed me to join the Friday afternoon golf club which met at a local course, and played a round, and socialized. This was where I met my future wife, Betty Hanking, who had a chemistry degree, a nice swing, and that wasn't all. She was then on the Hughes editorial staff, which prepared technical reports, before she was transferred to the Hughes research labs. She left there to go to graduate school at UCLA, partly because of the minimal work ethic at Hughes, to which I probably contributed.

We used to say that the answer to the question of "How many people work for Howard Hughes?" was "10%." This wasn't precise or even an approximation but imparted the general sense that the fraction who wanted to accomplish something were not impeded. For example, when a problem developed in the "Falcon" missile program at the Tucson facility, some key engineers were shipped there, identified and solved the problem very quickly, and were promptly returned to corporate anonymity. A complex aircraft and missile control system, designated MA-1, was one of the mainstays of Hughes' worldwide business for many years. Patents on this system reportedly brought in substantial revenue ultimately, but the parent patent application was only a complex work in progress for the more than the three years I was there. This was possible because the subject matter was under a Secrecy Order and also so complicated that outsiders to the project were not tempted to pry. The same was true of a novel frequency scanning

radar system invention which became the foundation for an entire new company division at Fullerton, California. In retrospect, Hughes Aircraft Co. progressed in the defense industry at a satisfactory rate relative to competitors because the technology was changing and a sufficient percentage of the organization was creatively capable of meeting the evolving needs, and over-management was not a restraint.

Kenneth Wesley Cowans was employed by Hughes a couple of years before I left there, but our paths never crossed, since others worked on patenting his inventions. Cowans' inventive talents led him to disclose a substantial number of novel ideas which led to the filing of patent applications and the subsequent issuance of patents by Hughes Aircraft. These were not so-called "paper" patents but disclosed concepts which had not only been reduced to practice but also meaningfully improved the existing technology. This inventive activity could have been carried on indefinitely to mutual benefit at Hughes, but fate introduced Cowans to a fellow Hughes employee and inventor named Halbert Fischel, who had other fish to fry.

A few years after I left Hughes, Fischel, a graduate of the University of Chicago, had come to our patent law firm on a recommendation from somebody in the Hughes patent department. This event ultimately exposed me over a considerable number of years to personal and professional thrills I sometimes enjoyed. In that time span, however, Fischel had started an independent venture called Submarine Systems, based on his invention of a novel closed circuit underwater breathing apparatus. This used a mixture of liquified gases including oxygen in a closed circuit underwater breathing system, and enabled a diver to function without using lengths of lines or emitting

bubbles at depths of more than a thousand feet. Fischel then had, and probably still has, an intense personal style that bypassed working out the details which would make a system actually work. This is why he talked Ken Cowans into leaving Hughes and joining his new organization, funded at least temporarily by a questionable would-be conglomerate group in Texas, in order to make the system work.

Ken Cowans made the modifications and novel improvements needed to make the closed circuit SCUBA work, but reality set in when the system was tested. It turned out that divers working at great depths didn't want to be "free" – they wanted to be firmly connected to some kind of undersea umbilical, or else. This, and personality issues led, ultimately, to the Texan operators kicking out Fischel and turning over what they thought was merely an organizational residue to Ken Cowans.

But Ken had in due course developed several novel ancillary products that independently came into demand for underwater drilling operations. He was able not only to keep the organization going, and to grow in scale, but to sell underwater support systems worldwide. Moreover, his inventive talents, which at Hughes had extended into systems and devices operating at hitherto largely unexplored temperature and energy regimes, soon included a novel high fidelity sound system. This he introduced under the name "Kinergetics," and the system was favorably reviewed by a number of sound sensitive aesthetes.

The Cowans inventive talents were unquestionable and undiminished as the business grew for a number of years. It included a branch in Scotland, and dominated its segment of the underwater life support systems market. The demand for advanced

technology in the oil production industry was not constant, however, since the industry has always been subject to external forces, as well as varying production cycles and demand. These factors, together with some unrealistic and quixotic customers, led Kinergetics into an unsustainable position and it was unable to continue operation.

Ken Cowans subsequently found an industrial home more suited to his talents, namely a diverse company called B.E. Aerospace. His new employer used a much more significant fraction of his talents, in initiating and developing generations of temperature control systems for the semiconductor fabrication industry. These systems, generally speaking, subject a semiconductor wafer to a precisely controlled chemical and temperature cycle during a chosen etching or deposition procedure. The processes used were ever more demanding, from the inventor's standpoint, because the semiconductor fabrication industry is constantly seeking finer definition, smaller line and component size, higher throughput and lower cost. Primarily because of Ken Cowans' creative achievements, the company was able to develop a semiconductor equipment business that is worldwide, with a sales volume in the tens of millions of dollars per year.

If anything more than the yearly volume of business done on Cowans' inventions is needed, consider what happened to two large corporate infringers of Ken Cowans patents owned by B.E. Aerospace. The first one, NCR, adopted use of a Cowans-invented concept for cryogenically cooling semiconductor elements during processing. The second, Applied Microsystems, employed a different Cowans-invented patent for varying temperature during a subsequence in the manufacture of a semiconductor-based

product. Both paid millions in consequence of their infringements, and terminated use of the products and processes in question.

A majority of Ken Cowans' inventions over the at last five decades since his stint at Hughes Aircraft (and his patents there) have related to use of time, phase and state variations which are not easily defined or summarized. They do, moreover, achieve results as claimed. I also believe that more than a non-trivial percentage of his ideas, patented and unpatented, will find future use and application, probably without giving credit to Ken Cowans.