

PROVO INVENTOR IS FATHER OF SYNTHETIC DIAMOND

PATENT PENDING

KARL R. CANNON

The first person to turn a chunk of graphite into diamond used to play piano in a 1930's professional jazz band from Ogden. But H. Tracy Hall, Ph.D., a farm boy whose discoveries made General Electric rich in the synthetic diamond industry, doesn't see a news hook in such creative extremes.

"There happened to be a piano in the house," he explains matter-of-factly.

And there happened to be science books in Ogden's Carnegie Free Library. So young Tracy Hall checked them out and read them, dreaming of one day working for General Electric as a scientist. After marrying the lovely Ida-Rose Langford and earning a Ph.D. in physical chemistry and physics from the U of U, Hall joined G.E. to complete all of his childhood dreams.

A couple of careers and 19 U.S. patents later, Hall sits comfortably in his Provo living room to tell me how he solved the "diamond problem."

Hall had been fascinated by the fact that graphite and diamond were chemically the same. Many had claimed to make diamond from graphite, but their claims could not be reproduced. Sir Charles Parsons even repeated all previous experiments, and many of his own, and concluded in 1922 that neither he nor anyone else had succeeded in making diamond.

In 1951, G.E. executives called its research associates together and asked for volunteers to tackle the diamond problem. Hall was the only chemist to volunteer, and so he got the job.

Hall was assigned to work out the chemistry, and a couple physicists were assigned to invent equipment but were unsuccessful. So Hall decided to design the equipment himself, and some at G.E. resisted his trespass. But he went on to design an ingenious pressure chamber with unique surface geometry that could channel much higher pressures (1 million pounds per square inch) simultaneously with extremely high temperatures (2,600 degrees Fahrenheit), something that had not previously been possible.

Static constraining rings surround the chamber, in which a graphite sample is insulated with a sandwich gasket of steel and pyrophyllite (also called "wonderstone") which is mined in South Africa. Electrical current is used to generate the high levels of heat. Hall named his device "the Belt" for its concentric, belt-like rings.

But the process of invention seldom goes smoothly. None of the first several hundred "pressure runs" was successful. Hall was becoming discouraged, and G.E. was considering abandoning the project.

Then, on the morning of December 16, 1954, Hall broke open a sample cell after removing it from the Belt's latest pressure run. His hands began to tremble and his heart raced when his eyes caught the sparkling light from dozens of tiny octahedral

crystals that had synthesized in the sample. Hall had made diamonds!

The Belt was awarded U.S. Patent No. 2,941,248, and Hall was named the sole inventor. But Hall's euphoria over synthesizing diamond was dampened when G.E. rewarded him with "demeaning compensation" and "petty treatment." Saddened and hurt by the company he had so admired and aspired to work for from the age of nine, Hall left G.E. and became director of research and professor of chemistry at Brigham Young University.

Hall continued his diamond making research at BYU, but was prevented from using his own Belt device because G.E. owned the patent as a condition of Hall's previous employment. So Hall began again, and succeeded in designing an entirely different apparatus for making diamonds called the "Tetrahedral Press," which he also patented.

Having thus liberated himself from conceptual dependance on the Belt, Hall was free to pursue a 25-year career in high pressure research at BYU. The H. Tracy Hall Professorship at BYU honors his work.

Karl R. Cannon is a registered patent attorney with the intellectual property law firm of THORPE, NORTH & WESTERN, L.L.P. in Sandy. His column appears every two weeks in the Monday edition of the Daily Herald, and is intended as general information only and not as specific legal advice. Questions or comments can be directed to Cannon at (801) 566-6633, or via email at cannon@tnw.com.

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TO: **DR. TRACY HALL**

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Dr. H. Tracy Hall

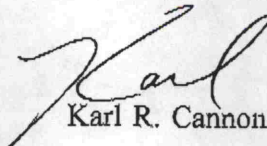
Dear Dr. Hall:

Thanks for all of your help in assisting me with preparing an informative article for *The Daily Herald* on how you solved the diamond problem. Attached is a copy of the version I submitted for publication in the paper. I had to cut a little bit for space constraints, and I hope the paper won't cut anymore from the piece, but they may need to at the last minute. Even so, I am pleased that whatever they end up printing will be accurate (unless the editor makes some editorial changes which inadvertently introduce errors--that sometimes happens but I am hopeful that it will not happen in this case).

Feel free to call me anytime for any reason. If you ever need some free legal advice over the telephone, I would be more than happy to oblige.

Very truly yours,

THORPE, NORTH & WESTERN, L.L.P.


Karl R. Cannon

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Enclosure
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