

NOMINATION FORM FOR
THE NATIONAL INVENTORS HALL OF FAME

I. THE INVENTOR - the term "Inventor" may include more than one person where the Invention was made by co-inventors.

Nominated Living Inventor - Year of Birth 1919
(if known)

Howard Tracy Hall

Where may the Inventor be reached -

1711 North Lambert Lane
Provo, Utah 84604
Phone 801: 374-0300

Nominated Deceased Inventor - Year of Birth _____
(if known)

Year of Death _____
(if known)

Who would represent the Inventor at the induction ceremony - (if known)
(Next of kin, relative or prior employer)

H. Tracy Hall, the inventor

Where may such representative be reached -

See above

II. THE INVENTION - the term "Invention" may include more than one invention if it more accurately describes the major impact of a development or discovery.

Identify the Invention forming the basis of the nomination -

High Temperature High Pressure Apparatus

NOTE: A United States Patent is a prerequisite for selection of a nominee for induction into the National Inventors Hall of Fame.

III. THE PATENT - the term "Patent" may include more than one patent if it more accurately describes the major impact of the Invention. Please limit the number of patents to five, however. Additional patents may be included under Section V, if desired. List the number of the United States Patent which forms the basis for this nomination.

U.S. Patent Nos. 2,941,248
2,918,699
2,947,608
2,947,610
3,829,544

Identify any known litigation, interference, or other proceeding that involves the foregoing Invention or Patent -

None

IV. THE NOMINATOR - the term "Nominator" may include more than one nominator.

Name of Nominator - Earl M. Woolley, Assistant Chairman

Where may the Nominator be reached -

Department of Chemistry
Brigham Young University
Provo, Utah 84602
Phone 801: 378-3668

Date of submission of this Nomination: 28 October 1987

Signature of Nominator: Earl M. Woolley

Closing date for nomination: July 1, 1988

Please forward the completed nomination to:

NANCY P. MULLENS
STAFF ASSISTANT
DEPARTMENT OF GOVERNMENT
RELATIONS AND SCIENCE POLICY

AMERICAN CHEMICAL SOCIETY
1155 SIXTEENTH STREET, N.W.
WASHINGTON, D.C. 20036

V. THE RESUME - A resume will be reproduced for the Selection Committee. It will be the only material given to the Selection Committee for its deliberations. Please provide a single-spaced statement, preferably confined to the space provided, covering the Inventor and his Invention, with particular emphasis on the effect of the Invention on the public welfare and the advancement of the useful arts in the United States.

Howard Tracy Hall's invention, U.S. Patent No. 2,941,248 (issued June, 1960) "High Temperature High Pressure Apparatus," commonly called the "BELT" has been used for the manufacture of industrial diamonds throughout the world. This device can simultaneously maintain a pressure of a million pounds per square inch and a temperature of 2000 degrees Celsius. Over 10 billion dollars worth of industrial diamond products have been manufactured in this device since Tracy Hall first synthesized diamonds with it in 1955. Manufactured diamond production has been growing rapidly since its beginning, whereas natural industrial diamond production has been virtually constant for the past 30 years. The reason for this is that the BELT apparatus is capable of producing vastly superior products to what is obtainable from nature. Patents on the BELT were also issued in 10 other countries. This patent was listed as the most highly cited publication in the entire field of high pressure research and diamond technology according to **Current Contents**, 41, 14, 1980 (ISI Press).

Tracy Hall has 18 other patents to his credit that also deal with high pressure high temperature synthesis and characterization of materials. Four of these are cited below because they also illustrate the impact he has had on this field of science. U.S. Patent 2,918,699, "High Pressure Press" (the Tetrahedral Anvil Apparatus) was issued in 1959. After Tracy Hall left General Electric Company (patent assignee for the BELT) he was prevented from using the BELT to pursue other high temperature high pressure interests. Thus, he invented the Tetrahedral Anvil Press, which is now also used worldwide in synthesizing abrasive materials. U.S. Patent Nos. 2,947,608, "Diamond Synthesis," and 2,947,610, "Method of Making Diamonds," were issued in 1960. These patents, along with those for the BELT and the Tetrahedral Anvil Press, were delayed by a U.S. Government secrecy order based on their importance. The diamond synthesis patents have also been issued in 15 other countries. U.S. Patent No. 3,829,544, "Method of Making a Unitary Polycrystalline Diamond Composite and Diamond Composite Produced Thereby" (Sintered Diamond) was issued in 1974. This type of diamond was another revolutionary step in the industrial diamond industry. [See **Science**, 169, 868 (1969).] For example, the hemispherical surfaces of ordinary tungsten carbide percussion drilling bit inserts have been coated with polycrystalline diamond at a pressure of 900,000 pounds per square inch and 2700 degrees Fahrenheit. Bits using these inserts can drill over 6000 feet in Sierra White Quartzite while the uncoated insert bits go only 200 feet before they wear out. This 30-fold improvement in performance has allowed tremendous productivity increases in drilling, mining, and tunneling.

Tracy Hall received his Ph.D. in Physical Chemistry with a minor in Physics from the University of Utah in 1948. He was a Research Associate at General Electric Company from 1948 to 1955. In 1955 he was appointed Director of Research and Creative Endeavor at Brigham Young University, a position he held until 1967. He was then appointed as Distinguished Professor of Chemistry and Chemical Engineering. He was Director for the National High Pressure Data Center, which was run at Brigham Young University for the National Bureau of Standards from 1965 to 1980. Among his many honors are RESEARCH FELLOW for the Alfred P. Sloan Foundation in 1959-63, FELLOW in the American Association for the Advancement of Science in 1960, RESEARCH MEDAL from the American Society of Tool and Manufacturing Engineers in 1962, MODERN PIONEERS IN CREATIVE INDUSTRY AWARD from the National Association of Manufacturers in 1965, CHEMICAL PIONEER AWARD from the American Institute of Chemists in 1970, GOLD MEDAL and AWARD FOR CREATIVE INVENTION from the American Chemical Society in 1972, FELLOW in the American Institute of Chemists in 1972, ENGINEERING MATERIALS ACHIEVEMENT AWARD from Industrial Research Magazine in 1974, INTERNATIONAL PRIZE FOR NEW MATERIALS from the American Physical Society in 1977, and MAN OF THE YEAR AWARD from the Abrasive Engineering Society in 1980.

Attached are a Brief Biographical Sketch, Biographical Sketch, List of Patents, List of Honors, Awards, and Distinctions, and List of Publications of H. Tracy Hall, and a copy of U.S. patent No. 2,941,248.

Additional materials may be attached to this nomination for use in the event that the nominee is selected. These materials will not be submitted to the Selection Committee nor returned to the nominator.