

<http://sites.ieee.org/schenectady>

Upcoming Events

Feb 5, 2014 9:00 am - [Annual Conference of the Center for Future Energy Systems](#)

Feb 25, 2014, 5:30 pm – Smart Grid, by Vince Forte at Albany Society of Engineers Meeting, Best Western Airport Inn on Wolf Road, Contact Vincent.J.Forte@ieee.org for details.

Following events will be held in Niskayuna Reformed Church 3041 Troy-Schenectady Rd (Rt. 7), Niskayuna, NY
Please contact Lou Tomaino at schdyieee@yahoo.com to reserve and specify the event attending. These events are free for IEEE members, \$5.00 for non-members to help cover the cost of the room and food.

February 7, 2014, 12 - 1:30 pm – [Intellectual Property Law: A Primer for Engineer Entrepreneurs](#)

*March 7, 2014, 12-1:00 pm – “Masters in Engineering” and “The Business of Energy” Certification Program at Union College, Schenectady

*March 14, 2014, 12-1:00 pm – “Novel Use of Existing Data for Smart Grid Preliminary Analysis and for Asset Optimization” by Vince Forte

* Date and time of these events may change.

The next Issue of Newsletter will be published on 7 April 2014. Article ideas are welcome!

Message from the Chair

Recently, one of our most well-known American folk/protest singers passed away at the ripe old age of 94. As a fan of Pete Seeger from childhood, I decided to take the opportunity to introduce my young daughter to his music. Flitting through the offerings on YouTube, we came upon a rendition of him singing his sister's famous song “I'm Gonna be an Engineer”... If you have never heard this song from the 1970s, it's about a female protesting how women were not encouraged to be engineers, but instead were constantly pushed to typing, marriage, etc.. At the line that states “an engineer could never have a baby”, my daughter turned to me in absolute astonishment and said “what does that mean, of course engineers have babies”. Look how much has changed in our country in just one lifetime!

As we take some time in this edition to look back over the technical accomplishments of some of our great local engineers, it is interesting to also note how they also changed the social and political spheres around them. We often don't think of the daily work of an engineer as a political movement, but the daily decision to treat everyone well, to respect the opinions of all, no matter their

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background or physical characteristics is the glue of social change. We know as engineers that technical change is often not an overnight process. We patent the basic concept in a rush of inventiveness, then we iterate and tinker and improve, sometimes for decades. Without even thinking about it, we are doing that in our world around us as well. Our cars all have windshields and air bags. Seatbelts are taken for granted; end user safety matters. Our skies aren't clogged with wood and coal smoke, and our streets aren't clogged with horse manure. Patient comfort is actually considered a critical component of medical device design. Vacuum cleaners and washing machines are actually powered by electricity, not sweat equity. We accept these things without question, but at one time in our recent history, they were as radical ideas as the thought of a woman engineer. It is so easy to fall into the habit of constantly focusing on all the things that are wrong; but look closely on how much we have changed in 94 years. So take a moment and look at the world we engineers have created, and congratulate yourselves on being the bedrock of a better world.

Chandra Reis

My Career in Turbine - Generator Clyde Maughan



Ring-of-fire failure of a Stator End Winding

My career in turbine-generators spanned the 63 years 1950 to 2013 - a period that saw huge technical evolution of generator design and output capability, a period that ranged from little-to-no government involvement, to deep impact (and interference) of government on almost all aspects of the power industry.

During my career I had the privilege to work with probably the greatest engineers the turbine-generator business will ever see. True engineering geniuses like Dean Harrington and Dave Willyoung, who found elegant and simple

DEIS Schenectady Chapter- 2013 Activities C.W. Reed

Chair, 2013 DEIS Schenectady Chapter

In 2013 the Schenectady Chapter of the Dielectrics and Electrical Insulation Society completed its first full year of operation in the IEEE Schenectady Section following its formation in mid 2012, orchestrated by Dr. J. Keith Nelson, Emeritus Professor at the Rensselaer Polytechnic Institute. Three outstanding, well-attended talks were arranged by the chapter during the year, two sponsored in conjunction with the Section's Friday meetings at the Niskayuna Reformed Church, the other held at the GE Global Research Center through the kind arrangement of Patricia Irwin.

In February, a DEIS Distinguished Lecturer talk was presented by Professor Nelson titled "Nanodielectrics: A 21st Century Phenomenon" highlighting the progress in basic understanding, and its promise for commercial application, in this fascinating new field for dielectrics and hv insulation.

In November, Dr. Nancy Frost of Krempel Insulation Technologies featured the important role of standards in her talk titled "Materials for Motors and Generators: the Influence of Standards Activities". Nancy is presently chair

solutions to the most complex of engineering challenges. In addition dozens of other great engineers within the OEM and utility organizations – past and present. (I dare not go further in naming names, as I have perhaps already gone too far.)

From these gentlemen I had the privilege of vast learning. From a work career that involved engineering, manufacturing and service, I had the opportunity to apply this learning on a wide range of issues. From this knowledge base I began 15 years ago an effort of documentation. The result is 25 technical papers and a 240-page book on generator operation and maintenance, all available for no-cost download at the IGTC web site: generatortechnicalforum.org and search for direct-cooled generators.

Having experienced a minor stroke early this year, and 3 years from age 90, I will retire soon after having presented my final technical paper. A paper that addresses a deficiency in IEEE Standards relating to generator stator and field windings ground protection, a deficiency that cost the industry almost half a billion dollars on 4 failures in a recent 2-year period.

In closing, let me thank IEEE . .

To see Clyde's' paper on "Premature Failure of Modern Generators" [click here](#)

of the IEEE Materials subcommittee of the Electric Machinery Committee of the Power Engineering Society. Her talk updated the committee's activities in coordination with UL and IEC; in particular, covering recent revisions in guidelines for partial discharge testing and thermo-mechanical endurance testing.

A second November talk featured Dr. Steven Boggs, recently retired, former director of the UConn Storrs, CT, Institute of Materials Science. Dr. Boggs gave a visionary talk on "The Application of Computational Methods to the Design of Dielectric Materials and Systems" to DEIS chapter members and GE Global Research Center attendees. The talk was held at the GE Global Research Center, Niskayuna.

The Chapter thanks the three 2013 speakers, the discussions by participants, and the Schenectady Section and GE Global Research Center for hosting the talks; also Dr. Yang Cao, who served as vice-chair until moving to a position as associate professor and director of the Institute of Materials Science at UConn in the Fall.

The officers of the DEIS Schenectady Chapter in 2014 will be Drs. Karim Younsi and Qin Chen, chair and vice chair respectively, both of the GE Global Research Center, Niskayuna, New York. We wish them many successful activities.

Patents and Patent Searching

John Hershey



US005381445A

United States Patent [19]
Hershey et al.

[11] **Patent Number:** **5,381,445**
 [45] **Date of Patent:** **Jan. 10, 1995**

[54] **MUNITIONS CARTRIDGE TRANSMITTER**

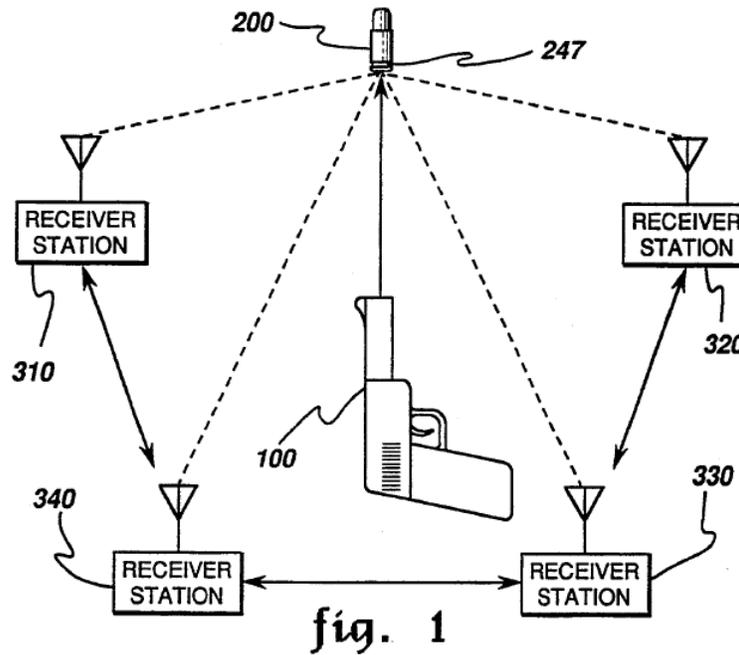
[75] **Inventors:** **John E. Hershey**, Ballston Lake, N.Y.; **Menahem Lowy**, Arlington, Tex.; **Lionel M. Levinson**, Schenectady, N.Y.; **Amer A. Hassan**, Clifton Park, N.Y.; **Richard L. Frey**, Delanson, N.Y.; **Kenneth B. Welles, II**, Scotia, N.Y.; **Michael Gdula**, Knox, N.Y.; **Robert J. Wojnarowski**, Ballston Lake, N.Y.

[73] **Assignee:** **General Electric Company**, Schenectady, N.Y.

4,894,115	1/1990	Eichelberger et al.	156/643
4,933,042	6/1990	Eichelberger et al.	156/239
5,161,093	11/1992	Gorczyca et al.	361/785
5,192,827	3/1993	Jasper, Jr.	89/1.11
5,218,614	6/1993	Magorian	102/214

OTHER PUBLICATIONS

“Random and Pseudorandom Sequences,” J. Hershey, R. Yarlagadda, *Data Transporation and Protection*, 1986, Chapter 8, pp. 259-310.
 “System Revolutionizes Surveying and Navigation,” J. Gallant, *EDN*, Jan. 7, 1993, pp. 31-42.
 “Pulse Compression Radar,” EC Farnett, George H. Stevens, *Radar Handbook*, 1990, 2nd edition, Chapter



A Patent

In this series on patents, we will investigate what they are and what they do for us. There are two chief reasons that they are important. First, they are a deed to a type of intellectual property that may be very valuable. Second, they are mileposts of invention, publicly maintained records of progress that in many cases has made life easier, more enjoyable, and strengthened societal fabric in matters of productivity and safety while preserving a competitive advantage for their assignees.

There are three main classes of patents. The largest of these, probably comprising on the order of ninety percent of patents issued today, are termed **utility** patents and they are granted for devices, systems, new molecules, new methods for doing something, and improvements. A second class of patents protects **designs** and the third class provides protection for some **plants**.

The basis of the US patent system is found in the US Constitution in Article 1, Section 8: “The Congress shall have Power to promote the Progress of Science and useful Arts, by securing for limited times to

*Authors and Inventors the exclusive Right to their respective Writings and Discoveries.” Congress chose to do this by creating the US patent system and the **US Patent and Trademark Office (USPTO)** to manage and maintain it.*

Many folks think of a patent as a monopoly, one of the last monopolies left alone by the government; and because a patent may be extremely valuable, it is often referred to as “a golden monopoly.” But this terminology is not correct as a patent conveys rights, and not just ordinary rights, but negative rights. Somewhat surprisingly it does not ensure that the patent assignee can practice the patent. Rather the patent is a series of fences that prohibit all others within the US from making, using, selling, importing, or offering for sale, that which is patented.

In order to be granted a patent, an inventor must first pass a three-pronged test. First, the invention must be utile, i.e., it **must have some beneficial use**. It must also be concerned with statutorily patentable material. Examples of excluded items are abstract ideas, algorithms, naturally occurring material, and nuclear weapons. But smart bombs, potato peelers, methods for peeling potatoes, and genetically engineered microorganisms are fair game, as was the man-made element number 95, Americium. Second, the invention **must not have been previously invented or known**; such prior material is known as prior art. And third, the **invention must not be obvious to someone**, working within the invention’s art that is of ordinary skill. And, finally, because the patent is a set of rights bestowed by the government, as part of this contract between the government and the inventor, the inventor in the patent must teach the public how to make and use the invention.

It is important, especially for technical folk such as scientists and engineers, to realize that a patent is quite different from a technical paper. One difference, on a trivial level, is that the order in which the names of the inventors are listed is completely arbitrary and carries no significance unlike an archival or conference paper. On a much deeper level, a patent does not necessarily result from a thorough understanding of principles. Rather, a patent depends for its value on its practical teaching of how to build or do something of real value even though the underlying principles of operation are not known. They may even be misunderstood. A teaching analogy comes from Genghis Khan, the famous Mongol ruler who lived from about 1162 to 1227. In a set of laws he prescribed there is one that commands: "Do not bathe or wash clothes in running water during thunder." What an absolutely marvelous example of dealing with a real danger without understanding anything about the underlying mechanisms!

A Patent’s Form

A patent may have many parts; three are required. First, it must have a **title**. Second, an **abstract** that is supposed to consist of no more than 150 words and allow the reader or searcher to gain a quick feel for the essence of the

patented material. Third, it must have a **specification** that teaches how to make and use the invention. The specification must recite the best mode for practicing the invention (but the description does not have to identify which of a plurality of modes is the best one). The specification concludes with a set of claims, a numbered set of single sentences that are the heart of the patent; the claims specify exactly what is patented. The drafting of the claims is a tricky mental process and there are many attorneys who believe that the crafting of a patent application is the most difficult of legal documents to produce.

Claims may be quite long if the field of invention is a crowded art, i.e., one in which there have been a lot of work, much general knowledge, and a host of patents. The claims must carefully weave around the prior art and capture, as fully and broadly as possible, remaining patentable material. In contrast, very new concepts and breakthroughs may be covered in shorter claims. The shortest claim I have ever seen is for the aforementioned Americium in US Patent 3156523 that recites its first claim as simply:

What is claimed is:

1. Element 95.

A patent must also incorporate figures if the material admits of such. Most utility patents concerning systems and devices will have several figures; many patents covering the chemical arts may be devoid of illustrations.

Although not required, many patents have a section labeled Background. The Background section often reviews the prior art and points out the deficiencies therein thus motivating the utility of the patented material to follow. As an engineer, I personally like Background sections that are well done as they often provide me with short primers on a technological field. Many patent preparers however like to avoid including a Background section as material presented in the Background section is considered by the USPTO as prior art and the Background section may turn into a minefield if one isn’t very careful.

Searching for US Patents and Patent Applications

Patents must be accessible by the public and the USPTO has, in my opinion, done a wonderful job in bringing this about. The set of US patents is a national treasure and can be searched by a great number of search tools that are commercially available or by a search tool provided by the USPTO itself. Take a few moments and explore the vast USPTO website at www.uspto.gov. Patent applications are also generally published after 18 months following the submission of a patent application to the USPTO. On a personal note, I have found searching the applications sometimes more valuable than the granted patents because the published applications, even though they are generally delayed by a year and a half, often give me a more nearly contemporary insight to what is going on.

Searching is quite easy and can even be fun. Let's take a subject that is of great local interest: insulation, and let's search the published applications. The USPTO site teaches search procedures but for this example we'll just plow ahead with a simple construct.

1. Go to www.uspto.gov and select "Patent Search" in the block labeled "Patents"
2. On the next screen select "Advanced Search" under USPTO Patent Application Full-Text and Image Database (AppFT). (Note all of the fields that may be searched individually or in Boolean combination.)
3. For our search we'll specify that the word insulation must be in the patent application's abstract and following the USPTO instructions we enter `abst/insulation` in the Query window.

We receive back notice (as of Jan. 15, 2014) that there are 18452 applications having the word insulation in their abstracts. That's a lot of patent applications. Maybe our

interest isn't quite as broad. How about narrowing our interest to insulation that is self-healing? If in step (3) we entered `abst/insulation AND abst/"self healing"` we are notified that there are only four published applications meeting this specification and we are given their numbers so that we can quickly examine them.

Next Topic

The topic planned for next time is Improvement Patents, patents that make something better, e.g., faster, cheaper, lighter. Improvement inventions comprise the greatest mass of patents.

John Hershey has a PhD in electrical engineering. He holds 191 US patents. He was elected a Fellow of the IEEE "for contributions to secure communications." He has authored or coauthored 8 technical books the last being *The Eureka Method: How to Think Like an Inventor* published by McGraw-Hill. He is not a patent attorney or a patent agent. He does not presume to give legal advice.

2014 CVD Registration is Open

IEEE-USA's annual **Congressional Visits Day (CVD)** will be held this year on March 25 & 26 in Washington, DC. Any and all IEEE members who are concerned about declining federal investments in basic research, our national labs and our research universities is encouraged to attend.

The CVD offers concerned IEEE members an opportunity to meet directly with your members of Congress and their staff in Washington. This annual event is a crucial part of IEEE-USA's ongoing efforts to protect federal investments in science and engineering.

These efforts are especially crucial in 2014. After three years of tight federal budgets, Congress is looking for additional programs to cut. Basic research and R&D have so far survived the first few rounds of budget cuts with only modest reductions. But that may be about to change. Programs that the public doesn't know much about or that can be cut without doing immediate damage to too many people are prime targets. R&D fits the bill perfectly. While R&D is vitally important to America's long-term economic prosperity, the fact is, should Congress cut the programs, the country won't feel the impact of these cuts for a few years.

And how many Americans know we have national labs, let alone how they contribute to the country?

If IEEE members want Congress to protect the basic research and R&D budgets, we need to speak up and make sure Congress knows how valuable these programs are to us and our country.

There is simply no better way to get a legislator's attention than to have a voter come to Washington and ask for the legislator's support. Especially in an election year.

All IEEE members are welcome and encouraged to attend this year's CVD. To join your colleagues from across the country, go here to learn more and to register: <http://www.ieeeusa.org/policy/cvd/>

If you would like to speak with your members of Congress, but can't come to Washington, there may be opportunities to hold meetings in your local area. Please contact IEEE-USA staffer Russ Harrison to find out, or if you have other questions about this year's CVD. Russ can be reached at r.t.harrison@ieee.org or (202) 530-8326.

2014 Section Officers

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2014 Appointed Officers

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IEEE-USA Legislative Update:

The IEEE-USA web site offers timely summaries of legislation that concerns you! Check IEEE-USA's Legislative Action Center (www.ieeeusa.org/policy; look in the upper right).