Wire Rope News & Sling Technology

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G.F. Dennis St. Germain, sheds some light on his successful career as an inventor and sling pioneer

Creativity and invention

by G.F. Dennis St. Germain

There are individuals from all walks of life who would like to become inventors and receive a patent. It is thought to be a sure way to riches and public acknowledgment. However, very few people achieve this dream and most who do, don't receive riches or public thanks as their reward. To invent a new product or device, manufacturer it, and then bring it to market, is a long and tedious process that stymies even the most arduous inventors.

Over the course of history the world has heralded the existence of many very famous inventors who have worked to develop novel ideas that ultimately changed history and improved the quality of life for millions of people. The Wright Brothers; Alexander Graham Bell; Bill Gates; Samuel Colt; George Washington Carver; Henry Ford; Thomas Edison; Eli Whitney; Ben Franklin; Marie Curie, and thousands of other famous easily recognizable names. However, toiling in near obscurity are many men and women engaged in the same type of creativity and invention without becoming well known or publicly acclaimed. I count myself in the latter group of people, working in a smaller universe, which nevertheless changed and improved the conditions and circumstances of those in their field of influence.

Since the very beginning of my career in 1957 I have been actively involved in trying to find improvements in the accepted methods and tools used to perform tasks. Over the course of my working life I have been fortunate to develop over thirty products and procedures that enhanced commerce and safety in my area of expertise. Some of these ideas resulted in patents and trademarks and some were covered by intellectual property rights reserved for those who were involved with me in a business relationship. All of the innovations eventually made life easier, safer, or improved conditions in some beneficial way for the end users of the goods that were developed and marketed. Other inventors in this field include: Linda Summars, see thru roundsling cover; Kenny Coe, roundsling methods; Hans Otto Von Danwitz, roundslings and improvements; Bengt Lindahl, roundslings; James Mazzella, multi-part wire rope slings; Edwin Grootendorst, roundsling construction; R. Brown and C. McCarthy, wire rope grommet, and many others who have developed innovative products. I intentionally left out patent numbers for all of the inventions in this article to allow the reader to do their own research.

Over the course of my career I have been asked about the creative process and how I go about developing new products and this article is an attempt to answer that question. The ideas espoused regarding my patentable ideas may be different for other inventors and the conclusions I reached are in no way an attempt to preclude other methods.

The first step for me is to identify a problem. A problem is defined as an obstacle which hinders the achievement of a particular goal, objective, or purpose. It refers to a situation, condition, or issue that is yet unresolved. In a broad sense, a problem exists when an individual becomes aware of a significant difference between what actually is and what is desired.

The second step is to apply creativity to the problem, thinking outside the box. Creativity is defined as the phenomenon whereby something new is created which has some kind of value. What counts as "new" may be just a revision of former procedures, a combination of existing technologies, or even a brand new approach to an old idea.

The third step is to develop an invention that is the result of creativity. An invention is a new composition, device, or process. An invention may be derived from a pre-existing model or idea, or it could be independently conceived in which case it may be a radical breakthrough. An invention may be a permutation of known commodities that results in a new and useful product. An invention that is novel and not obvious to others skilled in the same field may be able to obtain the legal protection of a patent. A patent in the United States currently affords twenty years of protection to the inventor.

When reading a patent application it generally begins with a problem, the history of the field and how the current idea solves the problem, and the claims or original ideas developed in the application. If the patent examiner finds that any of the claims are indeed original and not easily ascertained from former patents, then the application is approved and a new patent will issue. In the United States it takes from two to five years to receive a patent.

My expertise lies in the fabrication of slings used to lift heavy loads with cranes. For some unknown reason I have an affinity for this field and began working in it by chance in 1958. I began as a splicer forming loops or eyes in the ends of wire rope or to the layman, cable splicing. At the time this trade had been in existence since wire rope

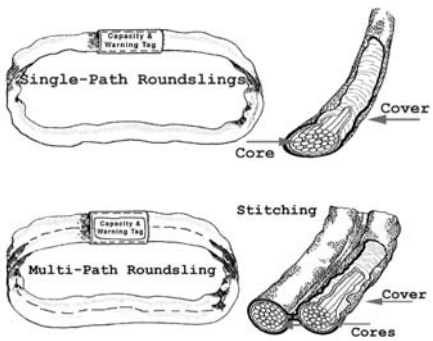
was first invented by Wilhelm Albert in 1831. Beside lifting slings, wire rope is used on elevators, to raise and lower crane hooks, on oil drilling rigs, and on amusement park rides and ski lifts. I am going to discuss the progression that I used to produce several new and useful products, and I am going to do it in a non-technical way so everyone can follow the necessary steps to a successful conclusion.

When manufacturing wire rope slings for very heavy lifts of hundreds of tons, it is necessary to form the final sling product using many separate pieces of wire rope braided or helically wound together to form a stronger finished lifting tool. There were several identifiable problems with the fabrication method used to make these slings and in 1980 I began to improve on the process to correct the three problems I ascertained. First, the product was difficult to make and labor intensive. Second, the finished product did not develop the strength estimated by engineers at 70% of the component strength, and third, the failure of the slings when tested always occurred in the loops, which proved to be the weak point. The method for making these "9-part" slings was to use a single piece of wire rope over nine times longer than the finished length desired, and wind the material back and forth to create a "9-part" body.

To solve the identified problems I made a new product using three separate pieces of wire rope to form an identical 9-part body, but strengthened the weakest point, the loop. The result of using three separate wire ropes to form the finished product was a stronger loop, easier fabrication, and a finished product 20% stronger than previous slings made with the same material. When I began my experiments there was only one method for the fabrication of 9-part slings and when I finished, I had developed six new products with different features. The original nine-part slings had ten pieces of wire rope in the loops while my inventions had twelve parts creating a much stronger bearing point.

In 1986 I was introduced to a new product from Europe called a roundsling. They were being manufactured in the USA by a Pennsylvania company, LiftAll Inc., who had licensed the process under a secrecy agreement. These slings were made on a special machine that was kept behind closed doors. I interviewed various customers who were using the products and found they liked them but had ideas about improving them. Roundslings are made of two basic parts, the cover and the core. The core is the load bearing element and the cover provides protection from cutting and the incursion of dirt and grit. Roundslings made to the European patent were single path meaning there was a single core between the hook and the load and they were all polyester. I invented a machine and a Twin-Path® design so if one core was cut the other would maintain load control allaying fears of a catastrophic accident. Initially, the core was polyester, but in 1987, I discovered much stronger material and was able to begin making Twin-Path® roundslings with seven times the strength of steel and three times the strength of polyester pound for pound. This new invention using high tenacity core yarn replaced much heavier slings resulting in higher jobsite productivity and increased safety. In 2011, there are thirty-seven fabricators around the world making and selling these revolutionary patented products that changed the rigging world forever.

In 1994, a new idea to help with the interior inspection of our roundsling products was the insertion of a polyethylene fiber optic cable. The synthetic properties of the fiber optic cable matched the properties of the core fiber used for the strength bearing member. If the fiber optic conducted light from end to end, the interior was judged free of damage from crushing, chemicals, or abrasion. But the fiber optic inspection system did not indicate overload of the sling product.

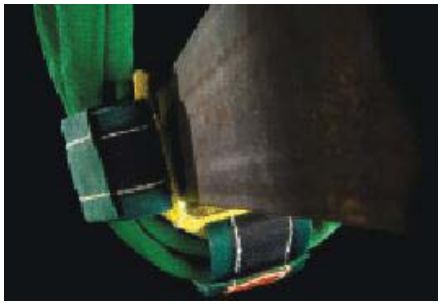


Recently, this overload problem was brought to my attention by the United States Navy. At a meeting with Navy representatives I was asked to develop a method for objective inspection of single path and Twin-Path® roundslings made from polyester or high tenacity synthetic yarn used by Navy personnel to load and unload ship cargo. They wanted a system that could do all that the fiber optic inspection did, but include an indication of overload. Creative thinking led to an invention that solved the problem and became a patented product. The basic difficulty was to develop an internal indicator that could be used to trigger an exterior warning visible to the inspector - or an external warning indicator. (EWI)

I installed a separate extra piece of core yarn inside the sling and tied a loop in each end. I then tied the loops together with a weaker piece of material that was designed to fail from overload or wear before the actual load bearing core yarns reached their breaking strength. A small cord is tied to the separate loops connected by the weak link and extended outside the cover in view of the inspector. Overloading or excessive wear will cause the weak link to fail and the EWI cord will instantly disappear inside the sling. Failure of the weak link has no effect on the ultimate breaking strength of the sling. As long as the cord or exterior warning

indicator is visible, the sling is deemed fit for continued use. This became an effective and simple solution to the problem that was easily taught to Navy personnel and could be used with any roundsling composed of any synthetic material. This idea was practical for use everywhere and in every industry using roundslings for overhead lifting and is now sold worldwide with patents in Europe, North America, Asia, and many other countries. The product is trademarked as the Check-Fast® Inspection System and is manufactured by over thirty licensed dealers.

Many historians believe the printing press was the greatest invention of all time. In 105 A.D. a Chinese inventor had perfected paper and printing using wooden blocks. In 1441, Johannes Gutenberg invented a mechanical printing press using movable type. His invention took printing to a new level and it was not long before his presses were producing 3,600 pages per day – a great improvement



over the forty pages produced by hand printing. Eventually, millions of books were printed and distributed worldwide affording an education to generations of people in every population center. Gutenberg was a goldsmith by profession and was intimately familiar with screw presses used in his trade. He identified a problem and used his creativity to convert a screw press into a machine that could be used to print whole pages at one time. First the problem, then creativity applied to existing tools, and then the invention of the printing press.

When synthetic slings are placed around sharp steel or concrete edges, then tensioned to lift the heavy load, they may cut if not protected. Protection between the sling and the edge can prevent damage to the slings resulting in a safe lift. Riggers have known about the cutting ability of unprotected edges and in times past they would use wooden blocks on either side of the edge to keep slings from contacting the sharpest points. Wood is not strong enough to withstand the higher loads being lifted with the improved synthetic slings of the 21st century. This problem was solved with the invention of the Cornermax® Pad for edge protection. This product keeps the synthetic lifting slings from contact with unprotected edges and is light and easy to install by a single rigger. The invention of this product has been responsible for greatly improving the safety of jobsites and is readily available. Anyone familiar with the rigging trade will appreciate the simplicity of the product that has received both patent protection and a trademark. Identify a problem, add some creativity or thinking outside the box, and a patented invention may be the end result.

Everyone who dreams of invention can follow the recipe by applying creative thinking to a problem. Find the problem and solve it. File for a patent and trademark the name and find a way to bring it to market. Then sit back and relax while your royalty checks pile into your bank account. It's probably better than buying lottery tickets but not as secure as a steady paycheck.