



This copy is for your personal, non-commercial use only. This article may not be reprinted for commercial purposes without the written permission of Mechanical Engineering magazine and ASME. © 2008 Mechanical Engineering magazine

developed to be unique

FOCUS ON DESIGN

Marketability isn't the whole story. Without exclusivity, a product may yield small profits in a field crowded by competitors.

by William A. Bonk, III

In engineering school, a “successful” design optimally balances typical constraints, such as strength, weight, impedance, flow, thermal capacitance, etc. After engineering school, these constraints tend to become overshadowed by cost and timing interests. However, while economical, good design is important, it may not lead to a successful product.

A successful product (or service) is profitable. In free markets, a product is more likely to be profitable the more it is proprietary, with few competitors squeezing out margins, and the more it is marketable, enjoying high demand. It follows that developing a product with these considerations in mind is a track to success.

Part of developing a successful product requires an understanding of what features in the product concept may be proprietary. Once understood, the proprietary features may be purposefully designed into or emphasized in the commercialized product.

PROPRIETARY ANALYSIS

Successful product development basically involves research related to a product and potential markets, analysis of the research, and planning based on the research analysis.

Research respecting the proprietary features of a product concept derives from or focuses on information regarding what can be protected in a product. The basic conventions for protecting product features, collectively known as intellectual property (IP) rights, include trade secrets for business information and technology; patents for man-made utilitarian processes, machines, manufactures, and compositions of matter; copyrights for original expressions fixed in media; and trademarks for market source identity. Except for trade secrets, detailed information about what is, and often what is sought to be, patented, copyrighted, and trademarked is publicly available. Public records also are available on intellectual properties' viability, licensure, and litigation.

An excellent example of an effective trade secret is the formula for the Coca-Cola soft drink, which we are told has been maintained in secret since its formulation in 1886. The famous Rolls-Royce hood ornament illustrates what the remaining conventional intellectual property rights cover. A patentable aspect of the hood ornament might pertain to an unseen unique temperature- and pressure-sensitive structure that enables it to function as a radiator cap. A copyrightable aspect of the hood ornament might pertain to the creative expression of the winged figure cast in a metal alloy. A trademarkable aspect of the hood ornament also might relate to its design, but as a distinctive symbol that consumers associate with Rolls-Royce goods.

An artifact as simple as a hood ornament can contain copyright, trademark, and possibly other unique design elements.

While public records may provide a wealth of information about the patented, copyrighted, and trademarked features related to whatever product you may be developing, the hard part is interpreting and divining an intelligent strategy for developing a product from the information.

The following fictitious example illustrates how IP intelligence can inform and drive product development.



An artifact as simple as a hood ornament can contain copyright, trademark, and possibly other unique design elements.

Suppose an aquarium supply equipment company wants to introduce into the aquarium market a quiet, low-turbulence circulation pump. The company's pump developers sketch a concept for an impeller which, through prototype testing, seems to achieve these goals. The features that characterize the concept impeller include six blades that each are raked relative to the rotational plane from 50 degrees to 60 degrees.

Each blade has a shape described by the formula $d/D = T/D$, wherein D is the distance from the center of the hub to the blade tip, T is the greatest width of the impeller and d is the distance from the center of the hub to the greatest width of the impeller.

Let us assume that research turned up patents for impellers in various fields—for automotive, medical, HVAC, and other applications.

Researching a concept for an impeller turns up several patents for similar products in various fields. Analysis identifies the features of prior art to compare them to features of the concept design.

How this research is analyzed, including complete technical review of the text, drawings, and prosecution history of each patent, is a dense topic best simply summarized for this example. Let us assume that the prior art for impellers includes designs with between 2 and 5,000 blades, many with a central bulge and raked between 0 and 90 degrees.

Based on this research, the IP expert would opine that the six-bladed feature of the product concept alone could not be claimed as a proprietary element in a product. Similarly, the 50 to 60-degree rake feature of the product concept alone could not be claimed as a proprietary element in a product. However, either or both product features could be claimed as proprietary in combination with another feature, proprietary or otherwise, so long as the combination is not already in the public domain.

The prior art also may reveal some impellers having blades with outwardly disposed bulges and others where the bulge is in the middle of the blade. However, the prior art might not reveal impeller blades with inwardly disposed bulges or bulges defined by $d/D = T/D$. Since this concept feature is not already in the public domain, it may be reserved as a proprietary element in a product.

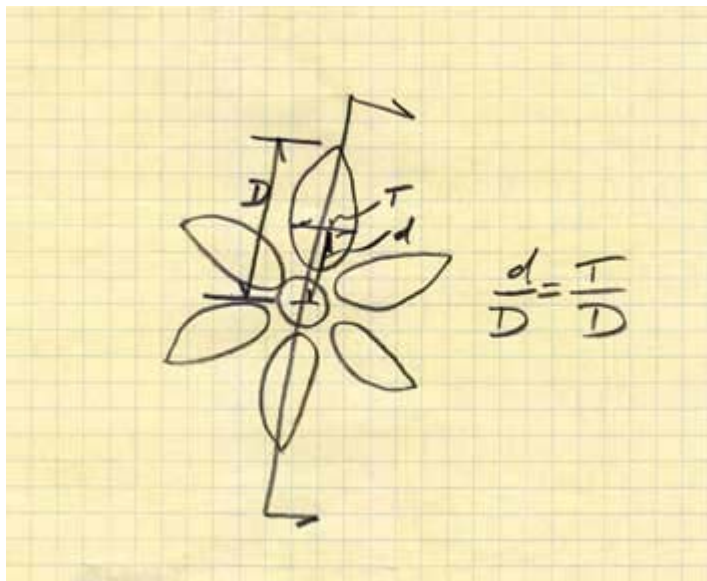
Analysis of this IP research can inform a product development strategy to emphasize proprietary features that could be withheld from competing products for exclusive market share, or permitted in competing products in exchange for licensing royalties. For example, based on the research analysis, product development incorporating an impeller blade with an inwardly disposed bulge or bulge defined by $d/D = T/D$ would establish propriety of the overall design that could maintain exclusivity on the market. Neither the blade number nor rake should drive the design, except for better performance or cost considerations, because they cannot command market exclusivity.

MULTIFIELD IMPROVEMENTS

Analysis of this IP research also can inform a market development strategy. Whether by incremental tinkering or serendipity, an improvement intended for advancing technology in one field may resolve a long-standing, vexing issue in another. Analysis of the IP research can reveal these vexing issues and define potential fields and applications for the concept features.

For example, although intended for an aquarium pump, the impeller of this example may be suitable for use in different kinds of applications in other fields. The IP research may have turned up patents that described impellers used in such diverse applications as in automotive fluid pumps and air ventilation, building and machinery ventilation, medical pumps, and metering devices.

Detailed analysis of how technology improvements have progressed in a particular field, such as automotive fuel pumps, may reveal a string of patents that each represents an attempt to resolve turbulence problems. The aquarium impeller, having been derived from a completely different approach to resolve turbulence issues, may represent a landmark breakthrough for automotive fuel pumps. Accordingly, a successful market development strategy would be to develop a fuel pump that includes an impeller configured as described, which the automotive industry might embrace and implement across one or more vehicle platforms.



Researching a concept for an impeller turns up several patents for similar products in various fields. Analysis identifies the features of prior art to compare them to features of the concept design.

With smart IP and marketing-driven product development strategy, the product development team can appreciate and take advantage of an opportunity revealed through IP intelligence. The team can convert what had begun as a good concept for an aquarium pump, but perhaps found to have minimal success potential in the aquarium market (because potential consumers believed it was too costly), and focus on exploiting the proprietary feature (hub shape) in a product (fuel pump) that is likely to have high success potential in the automotive market.

In addition to steering a well-configured product into the right market, analysis of the IP research also can help to avoid market entry problems. For example, if somebody else owns an enforceable patent that describes and claims a feature of the new fuel pump, that feature would not be available for implementation in a new product without a potentially costly license. If the same patent were not enforceable or the feature not claimed, then that feature would be available for implementation in a new product. However, absent a novel, nonobvious combination with another feature in the product, the feature would not be protectable and, therefore, might not lend competitive advantage.

IP intelligence regarding existing and desired trademarks also can provide insight for guiding product development. Trademark research and analysis can reveal features of, or messages about, a technology that may be advantageous or that a competitor may intend to emphasize. For example, a fuel pump manufacturer may be attempting to register “Cavitation-Free” for use in association with a new fuel pump line. This would be a good indicator of where fuel pump technology may be headed that might shape product development strategy accordingly.

Whether or not a product meets all the appropriate design criteria, driving product development with IP intelligence to emphasize in features that can command market exclusivity and high demand will help ensure

its success. IP intelligence also can reveal opportunities in applications and fields that may not have been considered. Successful product development is IP and market-driven.

William A. Bonk, III is a mechanical engineer and a lawyer specializing in intellectual property. His company, Emerging Strategies (www.EmergingStrategies.com), in the Washington, D.C., metropolitan area, advises businesses on the development of products based on intellectual property and marketing intelligence.