IMPROVING PATENTS AND DESIGNING AROUND BLOCKING PATENTS USING PATENT DECONSTRUCTION® METHOD

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ABSTRACT

The paper is dedicated to the Patent Deconstruction® – the method of patent strengthening and design around based on the synergetic combination of TRIZ knowledge and Patent Law. The method had been originated in 2002 and since then was successfully applied to multiple projects in different industries. The authors are sharing their accumulated experience with the method through addressing its specifics. The text is illustrated by examples from a variety of projects.

DEVELOPMENT OF THE PATENT DECONSTRUCTION METHOD

Facing challenges caused by blocking patents in a consulting project of 2002 [1] we have developed a method of improving patents and designing around them.

We started the project with moderate confidence that TRIZ and I-TRIZ (Ideation TRIZ software tools) should be capable of helping an inventor 'to do better'. We also took into consideration B. Zlotin prior experience in using cause-effect diagramming for the purpose of comparing inventions to products and proving their differences. However no solid step-by-step technique had been available for the task at the time.

Understanding the importance of legal practices we did not limit ourselves to TRIZ knowledge and thoroughly studied rules and regulation of the US Patent Office [2-5].

As a result the method synergistically combined TRIZ philosophy and tools with criteria imposed on patent by the law. The method received a name of Patent Deconstruction (PD) – to reflect its key procedures [6].

In a nut shell the Patent Deconstruction method is relatively simple and includes the following steps:

1. Visualization of all the independent claims of the patent to adequately represent both technical and legal scope of the claim
2. Analysis of each meaningful element of the claim and identifying its:

   i. Strength and potential
   ii. Weaknesses
3. Analysis of the hierarchical and cause-effect relations between elements; identification of:
   i. Missing links
   ii. Excessive links
   iii. Violations of logic
4. Application of selected I-TRIZ tools to each element/ link for the purpose of its improvement and/or design around in accordance with the key doctrines of the Patent Law, such as:
   i. Novelty + Non-obviousness
   ii. Public domain prior art
   iii. Theory of Equivalents

Patent Deconstruction method had proven its effectiveness, reliability and wide applicability on several successful projects, which resulted in the company's decision of including it into the body of the Know-How knowledge.

Later we came across the information indicating that other members of TRIZ community, such as S. Ikovenko [7] and O. Gerasimov [8] also came with and developed quite similar approaches to design around patents. These apparently independent findings have confirmed the objective nature of the PD method.

Since 2002 the Ideation International Inc. has made IP consulting one of its major business applications. Patent Deconstruction became a part of our educational curriculum. Several open presentations on the subject had been made on various occasions, including the section of the TRIZ Conference in 2008.

As a result we have accumulated substantial experience and knowledge that reflected in further development of the Patent Deconstruction method.

HELPING INVENTOR TO BUILD A STRONG PATENT

The thorough analysis of patent laws and regulations made us realize that *patent on invention* has a dual nature. On one hand it is a piece of useful technological information. On the other – it is a property certificate.

These aspects of patent are strikingly different:

- As useful information a patent is totally public domain, open for everyone to read and to learn from;
- As property certificate it protects the rights of patent holder to grant or refuse others to use his/her invention (licensing).

A TRIZ professional would immediately recognize the contradiction here:

Public domain information versus private property application

The consequences of this conflict are reflected in completely different concepts of the *patent strength* by an inventor and his patent attorney:

- From inventor's standpoint his invention is strong when it solves a technical dilemma, or provides practical advantage.
- From a patent attorney's point of view a strong patent protects larger (more general/universal) achievement: Patent Law treats it like a piece of land surrounded by border - the larger, the better.

What both, an inventor and patent attorney do not see (because it is quite difficult to see in the text) is that patent is more of a colander or a mesh than a uniform piece, and contains 'legal and technological gaps' of various size, shape and location. These gaps are a no man's land. They do not belong to a particular patent and as such could be claimed or used by anyone who recognizes them.
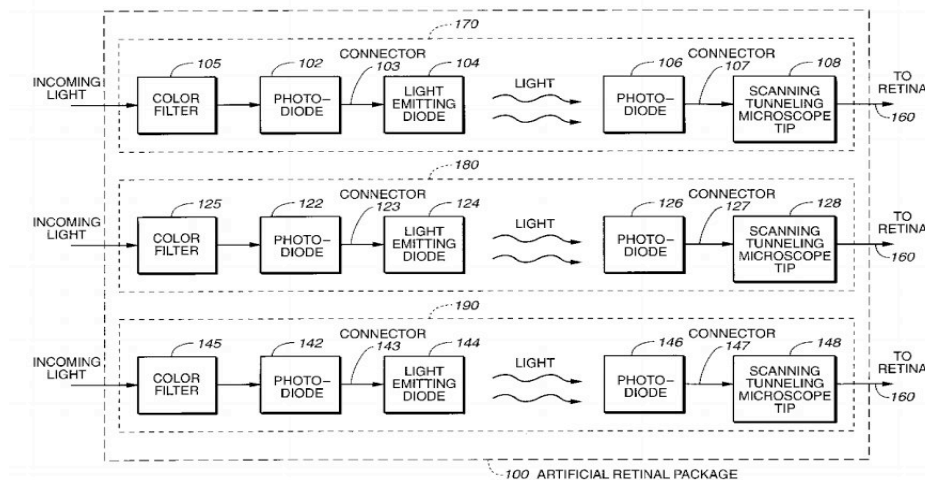
A smart combination of filled patent gaps with almost all of the protected elements makes the *patented technology free to use*.

By applying Patent Deconstruction method we can identify these gaps and fill or close them. Thus we can help an inventor to obtain a really strong and valuable patent.
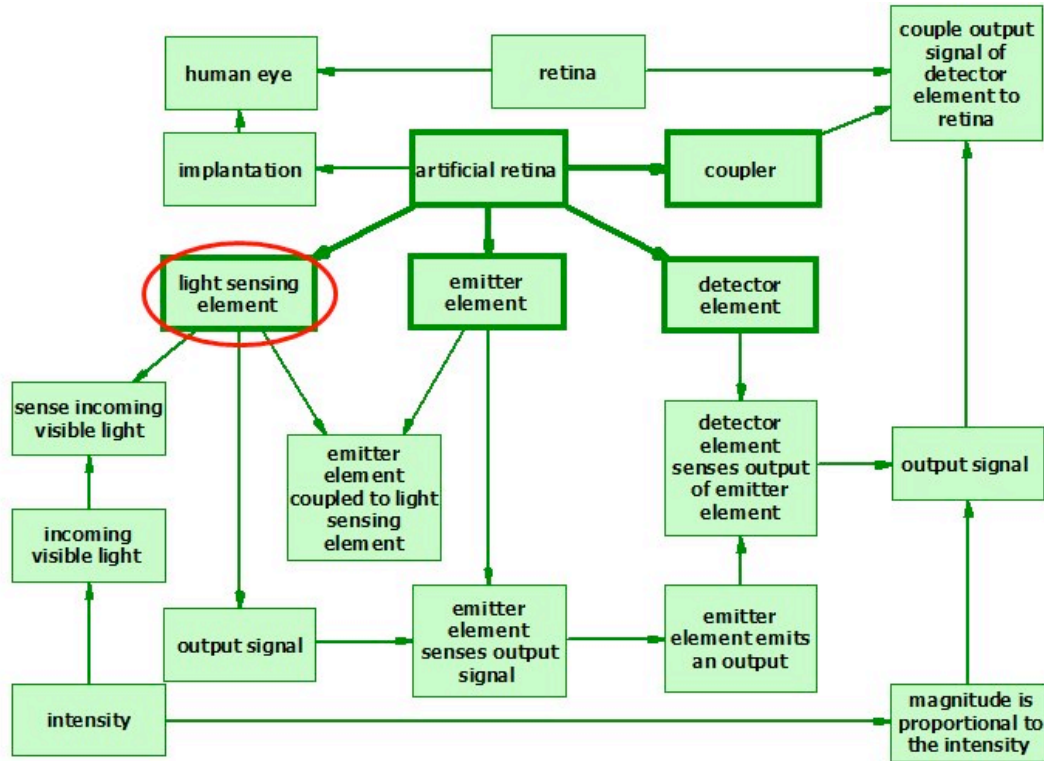
EXAMPLE:

The PD project was related to a patent on artificial retina prosthesis. The main concept of the prosthesis is shown in Figures 1.

Figure 1: Artificial retina – the main concept

The diagram of the independent claim provided with Problem Formulator [TM] (PF) is shown in Figure 2 below. The design characteristic 'light sensing element' is encircled as a limitation of the claim.

Figure 2: Identifying a limitation at the diagram of an independent claim

The diagram representation of the claim helped us to clearly see the limiting nature of the given element. As a result the element had been developed to its ultimate potential:

Visible light is the only information available for a healthy human eye. Artificial retina is not capable to compensate completely for the loss of light sensing in a damaged eye. However, artificial retina could provide additional (different types of) information, such as infrared, ultraviolet light, ultrasound, radio signal, tele-signal, etc., thus expanding the abilities for an impaired eye beyond 'normal level'.

Such a compensation for a particular limitation by giving additional sources of information would help an individual to orient in space. The retina enhanced this way would be, in fact, much more effective than even a healthy one.

The recommendation above allowed to fill the gap in the patent claim and to provide technical advantages way beyond the initial idea of the invention.

This is of course only one example of a gap identified and addressed in the particular claim. In fact there were many more findings and recommendations.

By using TRIZ tools to a patented technology and making next-step evolutionary objective improvements we can increase the value of a patent even further.

ADEQUATE REPRESENTATION OF AN INDEPENDENT CLAIM

It is well known in TRIZ community that any patent-related project must be focused on independent claims, where the scope of rights is. Unfortunately the traditional text format of a claim gives very limited options for its analysis and consequent improvement. Patent Law recommends hierarchical analysis of the text in each paragraph of a claim, so that so-called characteristics of the claim could be properly attributed to each other.

However with this technique the relations between elements in different paragraphs are usually left unaddressed simply due to lack of means for such analysis. As a result logic 'discrepancies' often leak into the text of the claim making its meaning unclear and free for interpretation. Such cases can be disputed in litigation court and may even lead to patent invalidation.

To enhance an invention based on the text of the patent claim is even more difficult. Inventor is often intimidated by legal 'property-focused' wording that makes initial technical idea hard to recognize. Patent attorney does not address the task of improvement either – his/her duty is only to protect whatever is already invented.

Summarizing the above it was logical for us to provide visual representation of the independent claim. As we understand today the authors of similar approaches went in the same direction and tried to represent an independent claim via various types of block diagram, where text is placed in boxes and relations are reflected as connective links.

Based on accumulated knowledge in Patent Law we went a little further by using the Problem Formulator which provided the following advantages:

1. Flexible representation of the phrase of any length and meaning (design part, operational procedure, function, etc.)
2. Representation of a variety of relations, such as:
   - Include/consist of
   - Provide/cause
   - Overcome
   - Protect
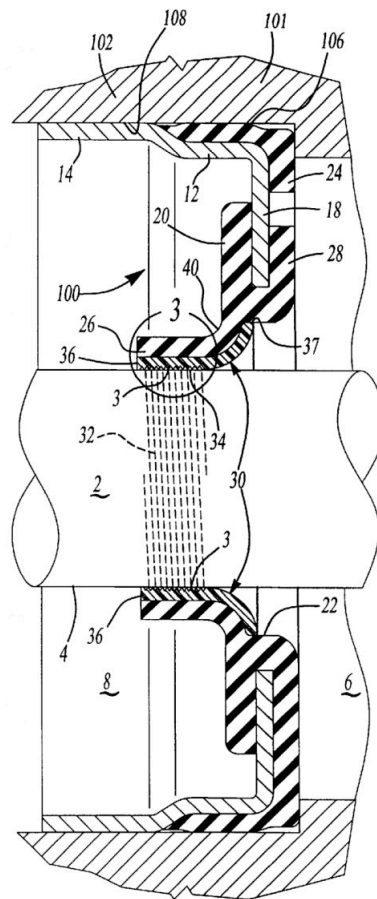3. Representation of the source-effect direction of the links

Taking into consideration the legal power of each and every word in the independent claim we also took special measures to represent the claim with 100% accuracy. For this purpose the following rules had been set in place:

    a. To use meaningful phrases from the claim in their *exact wording*
    b. Specific representation of the link 'comprise' which legal meaning is substantially wider than meaning of the link 'include'

EXAMPLE:

Figure 3 below shows a patented design of a shaft seal.

Figure 3: Shaft seal

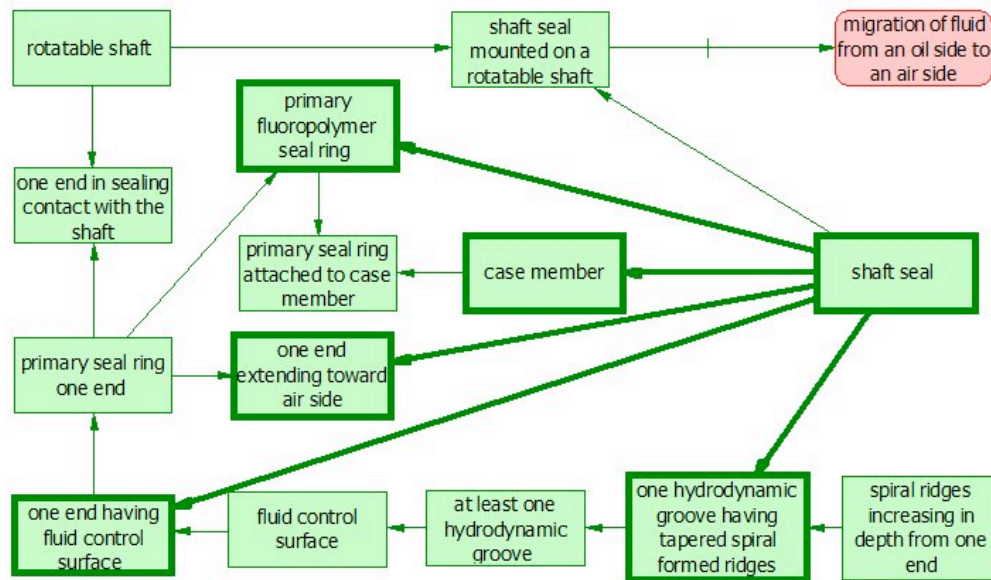The text of the relevant independent claim states as follows:

1. A shaft seal mounted on a rotatable shaft to prevent the migration of fluid from an oil side to an air side, said shaft seal comprising:

    • a case member; and

- a primary fluoropolymer seal ring attached to said case member, said primary seal ring having one end in sealing contact with the shaft,
- said one end extending toward the air side,
- said one end having a fluid control surface and at least one hydrodynamic groove in said fluid control surface,
- said hydrodynamic groove having tapered spiral formed ridges, said spiral ridges increasing in depth from said one end.

The text of the independent claim above is adequately represented at the diagram shown in Figure 4 below. The characteristics 'said' are represented via proper links between elements. The relation 'comprising' is represented by a thicker link and contours of relevant elements. This makes all relations clearly visible and comprehendible, much more so than in the text of the claim.

Figure 4: Visual representation of an independent claim

CHECKING THE LOGIC OF A CLAIM

By using the Problem Formulator as a tool for visual representation of the claim we immediately obtained the possibility to check the logic of the claim and to reveal (and timely prevent) any of the discrepancies mentioned earlier, thus saving our clients millions of dollars in potential litigation.

EXAMPLE:

Below is the paragraph of the independent claim with discrepancy (underlined) that had been missed during patent examination procedure:

> F. a server task for interfacing <u>said protocol task</u> with said driver, said server task for receiving a data request from said protocol stack, accessing said programmable logic controller system for said requested data, and for sending a response to said remote location through said protocol stack and network interface, said response in a framework supplied by said operating system.

The adequate diagram representation, shown in Figure 5, helped us to identify this discrepancy (encircled) and submit to the customer's attention:

> 'Said protocol task' is used in paragraph F of the claim and no 'protocol task' has previously been recited. In this case non-sequitur has occurred and rejection for indefiniteness due to a 'missing antecedent' can be made by the PTO.

Figure 5: Identifying discrepancies in an independent claim

APPLYING THE SYSTEM OF INTELLECTUAL PROPERTY (IP) OPERATORS

Another advantage obtained with utilization of the PF diagramming of the independent claims was the possibility to automatically process the developed diagrams and generate IP Enhancement Directions and Operators. Derived from the sophisticated system of more than 400 TRIZ Operators collected in the IWB (Innovation Workbench software by Ideation Int.) the IP Operators are focused on finding smart alternatives and on stride toward Ideality, in particular:
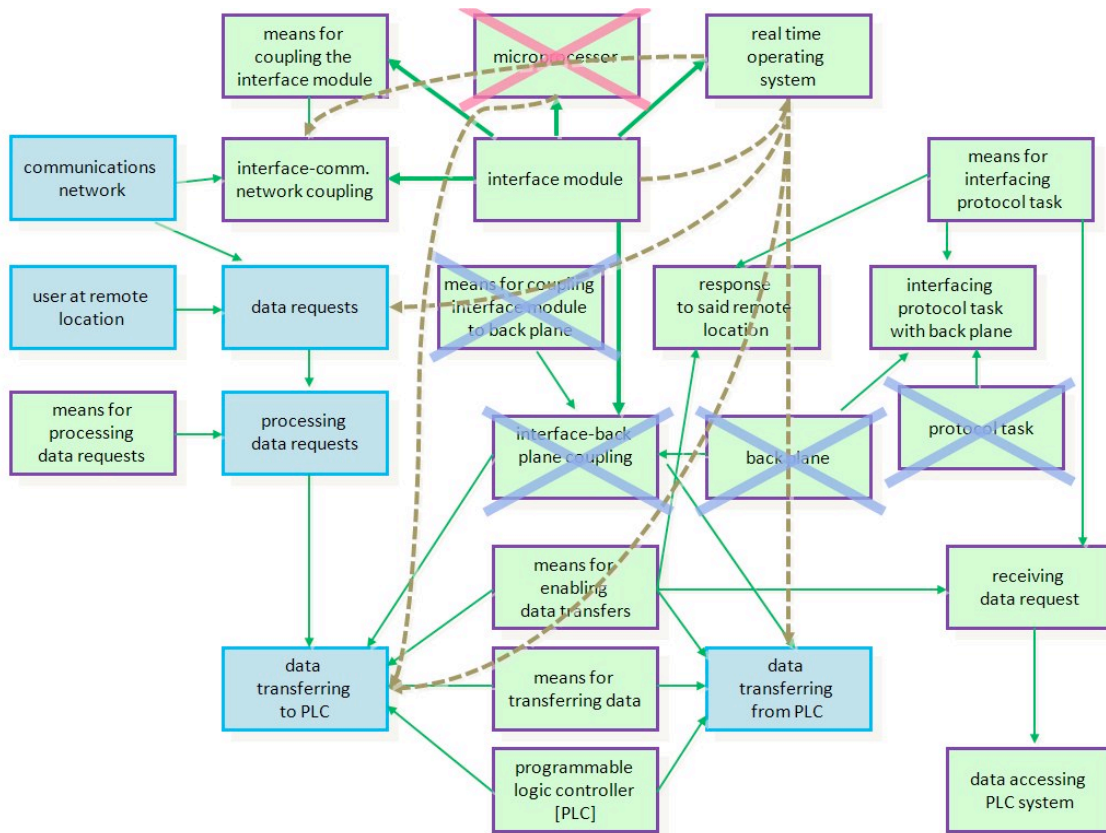
- Exclude duplicate elements
- Use better integrated subsystems
- Exclude auxiliary functions
- Self-service
- Consolidation of discrete sub-systems
- Simplify though total replacement

These instruments made patent enhancement a strongly guided and methodologically supported procedure.

EXAMPLE:

Figure 6 shows the diagram for the independent patent claim related to an interface module. Crossed out is the claim element 'microprocessor' that was recommended to remove. Also crossed out are elements that can be removed as obsolete in absence of microprocessor. Dashed links show the elements to which the functions of removed elements can be delegated.

Figure 6: Patent Enhancement with help of IP Operators (Ideality)

Application of the Ideality Operators resulted in generation of the following recommendations:

- Removal of the microprocessor and delegating its functions to PLC (programmable logic controller)
- Real time operating system of the PLC can be used to provide functions of the microprocessor.
- Functions of the microprocessor can be transferred to the Web. In this case functions of the data storage and data transfer can be done by web-server on the net.

As a result the following modifications of the initial claim were suggested (removed elements are crossed out in the text of the initial claim below):

1. An interface module for allowing access to a programmable logic controller system from a communication network at a remote location, the interface module adapted for installation in a slot coupled through a back plane to a programmable logic controller, the module comprising:

A. a microprocessor;

B. a real time operating system;

C. ~~means for coupling the interface module~~ to said communications network;

D. ~~means for coupling the interface module to said back plane and for transferring data between the interface module and said programmable logic controller;~~

E. means for processing data requests received from said remote location over said communications network;

F. means for enabling data transfers between the remote location and said programmable logic controller system; and

G. ~~means for interfacing a protocol task with said back plane~~, said interfacing means for receiving a data request from said enabling means, for accessing said programmable logic controller system for said requested data, and for sending a response to said remote location through said enabling means, said response in a framework supplied by said operating system.

These suggestions made the claim much more universal.

DESIGN AROUND BLOCKING PATENTS

The following situation is quite typical:

> Over decades an enterprise had been accumulating knowledge and experience in certain area; substantial investments had been made and efforts - put to move production to the next level when a blocking patent was granted to a competitor.

The consequences of such predicament are many and may be truly dramatic:

a. Investment is lost
b. Experience becomes obsolete
c. The challenge is faced of finding adequate alternatives,

In which case:

d. Many skillful workers and engineers would lose their jobs
e. Additional substantial investments are imminent

In such circumstances Patent Deconstruction method can be used for design around blocking patent.

But 'around' a particular invention is the entire universe!

While reviewing the relevant information we have noticed that under 'design around' many understand any clever alternatives, no matter how distant from the patented technology. Such approach would never satisfy a customer in the situation mentioned

above. In fact many disappointments in TRIZ services (and in the entire TRIZ methodology as a consequence) had been caused by clever and prospective but entirely impractical ideas that did not address the issue at hand:

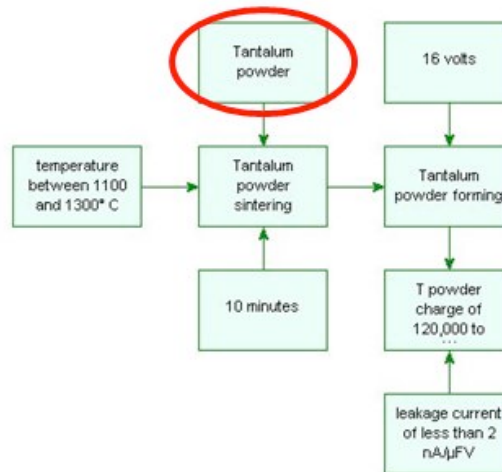*The customer needed a legitimate way of using and developing their technology!*

Patent Deconstruction method allows us to do exactly that – i.e., to provide 'micro'-modification(s) of the given technology that would present patentable improvement (or public domain alternatives) and at the same time would not require radical changes. This way all advantages of the given technology could be preserved, the company's core competence – remain relevant.

And on these solid grounds TRIZ provider can show the customer a step-by-step transition to a new paradigm. With such approach the enterprise not only receives a possibility to preserve the major assets of the company – knowledge and skills - but gives them a chance to thrive.

EXAMPLE:

Figure 7 shows the diagram representing the independent patent claim related to a method of manufacturing solid capacitors. The only element recommended for modification here is 'Tantalum powder' (encircled).

Figure 7: Design around patent claim by modifying a single element

Possible ways of modification:

Instead of Tantalum powder to use Niobium powder produced by similar method or - Tantalum Oxide. These materials are out of the scope of this claim and, therefore, manufacturing of such a powder could be considered a design around a particular patent.

Adequate diagrams often helped us to reveal substantial differences between the customer's product and blocking patent.
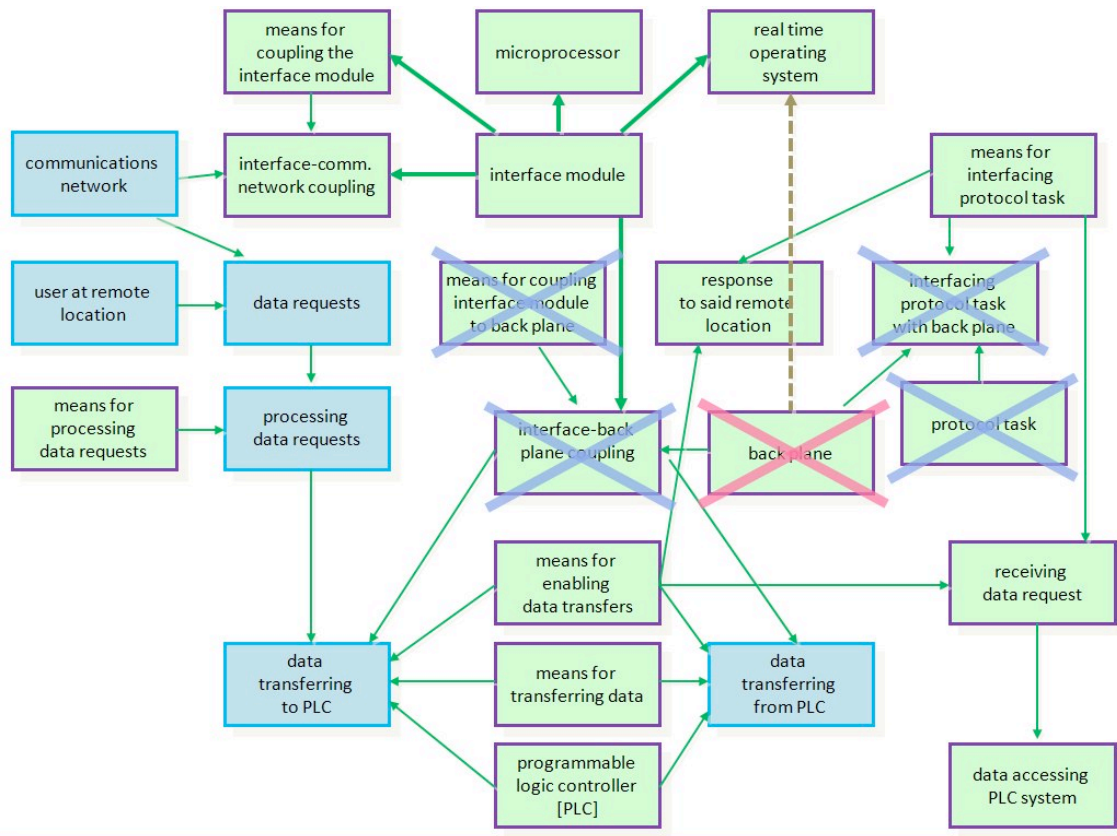
EXAMPLE:

The diagram shown in the Figure 8 presents a modification of the claim in the blocking patent related to interface module.

To avoid potential infringement of the blocking patent the recommendation had been made to improve the customer's product - an interface module for Internet communication - by removing an element 'backplane' and delegating its functions to real time operating system.

The element 'backplane' that was recommended to remove is crossed out in the diagram. Also crossed out are elements that become obsolete in absence of backplane, and thus can be also removed. Dashed link shows the element to which functions of the removed backplane can be delegated.

Figure 8: Removing an element reveals an unrealized strength in a product

The recommendation brought the customer to the realization that in fact their product had no backplane in the first place and thus was under no threat of particular infringement (the issue of potential infringement had been indicated by the competitor company's patent department and stood with the customer for a certain period of time).

CONCLUSIONS

Patent Deconstruction® method is a synergetic combination of TRIZ methodology and patent practices. It has proven its effectiveness, reliability and wide applicability on multiple projects in a large variety of industries.

Building adequate Problem Formulator diagrams gives an inventor and patent attorney an effective way of analyzing the claim, revealing violations of logic thus making the claim stronger.

With Problem Formulator diagrams and the System of IP Directions and Operators strong patents can be provided step-by-step, in a guided, meticulous, and yet, boosting imagination fashion.

Design around using Patent Deconstruction can be very successful, because it gives the opportunity to come with improvements that would need only limited changes in the given technology. At the same time these improvements could be either patentable or represent a public domain prior art.

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