“Invention Value Evaluation According to Patent and Market Information” Part 3
— “Electric Toothbrush” as a Case Example —

The 9th Japan TRIZ Symposium
Intellectual Property Creation Research Subcommittee
Kimitihiko Hasegawa, Toshimitsu Kataoka, Shigeru Suzuki
Nozomu Takeuchi, Narumi Nagase, Toshiaki Masaki
and Hirotsugu Ishihara

(c)2013 Intellectual Property Creation Research Subcommittee
## Key word list to classify problem

<table>
<thead>
<tr>
<th>Item</th>
<th>Key word content/typical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Function and performance</td>
<td>Improvement of function product original or attribute like speed and accuracy, etc. that relates to usage</td>
</tr>
<tr>
<td>(birth period)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Strength, speed, power, torque, longevity, and lightening</td>
</tr>
<tr>
<td>Efficiency (term of growth)</td>
<td>The distribution of the resource and the fortune like the making progress condition etc. of work and work is a waste elimination and is decreased.</td>
</tr>
<tr>
<td></td>
<td>Automation, control, consistency, functional efficiency, and efficiency</td>
</tr>
<tr>
<td>Reliability (term of growth)</td>
<td>Specific part to extend longevity of decrease and product of failure rate of product, element, structure such as parts, and improvement of functionality</td>
</tr>
<tr>
<td></td>
<td>Manufacturing accuracy, measurement precision, detection accuracy, robustness (strength), and safety and stability</td>
</tr>
<tr>
<td>Convenience (mature stage)</td>
<td>Specific part to improve addition or convenience of convenient function and additional new features included, element, structure such as parts, and improvement of functionality</td>
</tr>
<tr>
<td></td>
<td>Applicability, coexisting, connectivity, operativeness, and portability</td>
</tr>
<tr>
<td>Diversity (mature stage)</td>
<td>It improves about a production method that improves an advantageous product structure, and is new or individual fixation, etc., manufacturing facilities, and the inspection equipment etc. are improved to the achievement of diverse-types-and-small-quantity production.</td>
</tr>
<tr>
<td></td>
<td>Generality, appearance, and fine sight and individualization</td>
</tr>
<tr>
<td>Price (phase of decline)</td>
<td>The improvement, yield (rate of the quality item) of the product structure to improve the productive efficiency, and a specific part, the element, and parts, etc. the structure are improved, it improves in a production method or an individual process, etc. new, and manufacturing facilities and the inspection equipment, etc. are improved.</td>
</tr>
<tr>
<td></td>
<td>Cost reduction, manufacturing, productivity, initial investment, driving cost, and physical supply cost</td>
</tr>
</tbody>
</table>
Transition of problem of P company electric toothbrush

特許出願時期 vs 発明の目的のグラフ

価格

多様化

利便性

信頼性

効率性

機能・性能

機能開発

機能開発

機能開発

機能開発

(c)2013 Intellectual Property Creation Research Subcommittee
Transition of problem of F company
Evolution of electric toothbrush of F company
Transition of problem of O company

Inventor

(c)2013 Intellectual Property Creation Research Subcommittee
Transition of market-share of four high ranking companies

What is the reason for the reversal?
Market scale expansion strategy of pulvis dentificus and strategy of P company

(new customer value)

Proposal of new customer value

(c)2013 Intellectual Property Creation Research Subcommittee
Strategy of P&G

Reference: "Framework of strategy idea"

Written by Isao Nishimura, Toyo Keizai Shinposha

(2013 Intellectual Property Creation Research Subcommittee)
**Fluid drop jet system of F company**

<table>
<thead>
<tr>
<th>Official report number</th>
<th>Applicant (person entitled)</th>
<th>Ko-ninkurekkafirippusuerekutoronikusenuu</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011-147828</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Title of invention**
Fluid drop jet system for washing

**Correspondence commodity**
Sonic Care Air Flow

**References cited**
2003-325556 special open titles, 2001-198145 special open titles, and 094008533 and 008620898 and Swiss main reaching addition patents 000508396 of German patent notification of WO international opening to the public

**Inventor (number)**
Hottenbosubaruto and others (eight people)

**Joint applicant (number)**

**Examination record**
Patent prayer: Application examination bill on submission day (flat 23.5.11): Notification of Reasons for Refusal on submission day (flat 23.5.23): Shipment day (flat 24.11.20) and opinion in writing: Procedure correction book on submission day (flat 25.2.20): Submission day (flat 25.2.20)

**Registration record**

**Representative drawing**

<table>
<thead>
<tr>
<th>Summary or invention diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td>11: Fluid and 12: Air tube and 14: Water entrance tube 16: Pump 18: Nozzle</td>
</tr>
</tbody>
</table>

流体の供給源

流体から個別の流体滴のストリームを生じさせる流体滴生成器

5ミクロンを超える直径を持つとともに20メートル/秒を超える速度を持つ流体滴

液体（通常は水）が少量である

使用者に対する大きさ不快感及び歯肉への損傷が生じるほどの大きさの流体圧を必要としない

使用者の歯又は周りの組織に対する不快感又は損傷無しに口腔面領域から歯垢を除去するのに十分な洗浄効果を発生させる

少なくとも約3×10の3乗ニュートン・メートル2乗の合成の特定運動量を持つ流体滴

選択された口腔面領域を洗浄するために流体滴のストリームを方向決めするための方向決め部材

流体滴の小さい大きさは、食べ物の残りかす及び細菌によって生じるステインが蓄積したので、歯の非常に小さい間隙の効果的な洗浄を生じる
Result of the questionnaire concerning electric toothbrush
Number of questionnaire target: 56 people (User: 12 people, non-user: 44 people)

“I don’t like this part of the electric toothbrush"

“I want such an electric toothbrush"
Situation of "There is a polish leaving" problem

- There is a polish leaving problem
- 隣り合う歯と歯の間（歯間）が磨けない
- 歯ブラシによる手動の歯磨き
- デンタルフロスを使用する
- 歯と歯の間にデンタルフロスを挿入して、歯の側面を擦りながら上下に動かす
- 歯肉を傷つける
- 隙間が小さいとブラシが挿入できない
- 隙間が小さいとブラシが挿入できない
- 歯ブラシによる清掃
- 歯と歯の隙間に応じたサイズのものを選択する
- 鏡で清掃箇所を確認しながら操作する
- 奥歯は内側と外側の両方から挿入して清掃する
- 歯間ブラシによる清掃
- 歯間ブラシによる清掃
- 歯間ブラシによる清掃
- 歯間ブラシによる清掃
- 歯間ブラシによる清掃

(c)2013 Intellectual Property Creation Research Subcommittee
Idea creation by the Law of System Evolution

Reference: Directed Evolution software (Ideation International)

- An increase in flexibility
- An increase of control
- Complication
- Combination
- Simplification
- Division
- Non-correspondence
- Correspondence
- Hierarchizing
- Making to micro
- Phase change of material
- Upgrade of energy use
- Improvement of ideal
- Improvement of use level of resource
- B. An increase of flexibility and control
- An increase in flexibility
- An increase of control
- C. Disproportionate evolution of element
- Various stages of evolution
- E. Complication and simplification
- F. Correspondence and non-correspondence between elements
- G. Making to micro and hierarchizing
- D. A decrease in man participation
- Contradiction exclusion in limit of evolution

(c)2013 Intellectual Property Creation Research Subcommittee
<table>
<thead>
<tr>
<th>アイデアの概要</th>
<th>口腔ケア一般</th>
<th>歯ブラシ一般</th>
<th>電動歯ブラシのみ適用</th>
<th>ブラシ部改善</th>
<th>握り部改善</th>
<th>画像処理技術</th>
<th>機能等の付加</th>
<th>人、磨き方、感覚</th>
<th>6段階進化項目</th>
<th>システム進化法則</th>
<th>評価/5段階</th>
</tr>
</thead>
<tbody>
<tr>
<td>#25. 磨き残し（清掃漏れ）の有無が確認できる映像を表示し、記録を残す</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>信頼性</td>
<td>B</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>#26. 噛む歯ブラシが歯間の清掃も行い、磨き残し（清掃漏れ）の有無が確認できる映像を表示し、記録を残す</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>機能、信頼性</td>
<td>C、D、B</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>#27. 使用後の噛む歯ブラシを検査装置に入れることで、口腔内の健康状態を診断することができる。</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>機能、信頼性</td>
<td>C、D、B</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>#31. 歯ブラシの位置の映像を歯磨き前の映像と重ね合わせる</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>機能、効率</td>
<td>B</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>#1. 歯ブラシの頭部にカメラを備える</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>機能、効率</td>
<td>B、G</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>#10. 歯磨きしている間、好きな音楽が流れる</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>多様性</td>
<td>F</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>#11. 把持部のみに逆の振動を与える</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>機能</td>
<td>F</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>#28. 使用後の噛む歯ブラシが水洗いした後に、薬液が入った収納容器に収納しておくことで、必要な資源の補給を行うとともに清潔に保たれる。</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>信頼性</td>
<td>B</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>#3. 自分側から見た映像を映し出す</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>効率、多様性</td>
<td>A、B</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>#30. 歯磨きの前に歯の汚れの状態をカメラで撮影しておく</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>機能、利便性</td>
<td>B</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>#35. 口腔内の色による健康診断</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>例便性</td>
<td>A</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>#46. 歯間清掃用の帯状体（電動）</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>効率</td>
<td>F</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>#5. 歯を白くする気体、電磁波噴射方式</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>機能、効率</td>
<td>A、F</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>#6. 手に持たないでも歯磨きができる歯ブラシ</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>利便性</td>
<td>A、E</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
The study results and future agenda

【study results】
1. The invention of every four main enterprises and the transitions of the problem of the commodity were analyzed based on "Classification key word of the problem" that would be set by last time, and the relation was clarified.
2. Technology trends in the future were forecast by using the law of the evolution of the transition and the system of the problem of the invention and the commodity, and it proposed a new problem for the next generation.
3. The means to achieve a new problem for the next generation
   (1) With the idea that is excluded a harmful function of the status product, reduced, and prevented
   (2) With the idea that obtains the new, profitable function not provided in the status product
It drank and it proposed two kind of idea.

【 future agenda 】
1. Patent information on the electric toothbrush was compared with the market information spending three years in the past and effectiveness in the market of the invention was verified. As a result, it was able to be confirmed that the enterprise that existed in a dominant standpoint in the market had effectively used the invention for management.
2. If the technology is a means for the person's happy pursuit, it is necessary to use the patent system that protects TRIZ and a technological result that is the creation technique of the technology more than now effectively.
3. It is a conception of marketing that it is insufficient in TRIZ and the patent industry, and will have to research the marketing of TRIZ, the marketing technique, TRIZ that uses the patent, and the patent in the future.