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Introduce to The Patented Mass Production Technology Using QFD Architecture : Taking the Patented Mass Production of Step-by-Step Walker as an Example

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Abstract

The purpose of this paper to introduce the patented mass production technology using the QFD (Quality Function Deployment) method. Under the impact of the flood of knowledge economy, intellectual property rights have received global attention. Patent becomes one of the most important indicators to measure the R&D results of a country. However, the mere acquisition of a patent often does not necessarily represent success, because it does not automatically grant royalties because someone applies for a patent. On the contrary, if the patentee can use a positive attitude to effectively mass-produce the patent, the patent can not only become an asset, but also become a liability of the patentee because of the increase in the patent fee to be paid. Based on this, this paper intends to introduce a patented mass production technology using QFD method in the case of patented mass production of step-by-step walker. The patented mass production technology introduced in this paper is a reproducible standardization process (SOP). This technology can promote the opportunity for mass production of patents, enabling patent holders to profit from patents. This is the biggest expectation of this paper.

Keywords: ***P***atent, Patent mass production, Patent technology transfer, Quality Function Deployment

1. INTRODUCTION

Under the impact of the flood of knowledge economy, intellectual property rights have received global attention. Patent becomes one of the most important indicators to measure the R&D results of a country. In addition, intellectual property rights have also developed many new functions. For example, patents have become the focus of technology trading and technology stocks, and have become one of the main considerations for corporate M&A in knowledge and technology-intensive industries (such as biotechnology or information electronics). According to this, the government or the general enterprises have begun to notice the importance of applying for patents. In order to grasp the market, enhance competitiveness, and respond to the rights of foreign patent holders, the industry has changed their attitudes, changed the negative attitude of neglecting intellectual property rights in the past, and actively promoted the integration of R&D and patent distribution. As a competitive niche with other peers, avoid litigation threats, and even sources of revenue [1]. Therefore, the importance of patents is obvious.

Only by means of mass production can a patent truly bring real value to the patentee. According to the statistics of the International Patent Cooperation Organization, since 2000, the number of cases in which international patent applications have been filed through the organization has exceeded 110,000 for three consecutive years. According to the statistics of the Smart Bureau, the number of patent applications in Taiwan has also grown year by year, reaching a peak in 1990, reaching 67,860 pieces. In terms of the identity of the applicant, the number of patents filed by Taiwanese companies not only in Taiwan has increased significantly, but also the number of patent applications in foreign countries has continued to grow. For example, the number of patents filed by the Taiwanese companies in the United States has risen from the seventh in 1998 to the fourth in 2000 (and continued in 2001 and 2002), second only to the United States and Japan. , Germany, etc.. According to the statistics of American scholars, more than 95% of the patents in the world are unwilling to authorize, and 97% of the patents cannot bring any benefits to the patentee. That is, only 3% of the patents can be taken by the patentee. To gain, the visible ratio is small. This shows that although the importance of patents has begun to be taken seriously, the number of patents is not necessarily proportional to the strength of patents. If the patentee cannot use the positive attitude to effectively use the patent, the patent can not only make it difficult to obtain The patent becomes an asset, but instead becomes the liability of the patentee because of the increase in the fee to be paid, etc[2]. Therefore, how to make a patent have commercial value through the means of mass production has become an important topic of patents.

2. INTRODUCTION TO THE PRINCIPLE OF PATENTED MASS PRODUCTION TECHNOLOGY USING QFD METHOD

2.1 CURRENT PATENT PRODUCTION METHOD

First, explain the definition of "patent mass production". The so-called mass production refers to "mass production (Gersenproduktion, French: Production en série, English: Mass production)", referred to as mass production. The so-called "patented production pattern" refers to the mass production and manufacture of the patent application for the application. Generally speaking, mass production of patent procedure includes the following steps (Fig. 1) [3]: confirmation patents, market planning of patent, test and manufacturing, and introduction into the market. The process of this step shows that in order to provide a standardized operation process for patent mass production, the standardization process must have the following functions: market positioning, mass production, and commercialization of patents. It can be seen that the mass-produced patents already have commercial value (which can be used for profit) and can bring possible advantages to the patentee.

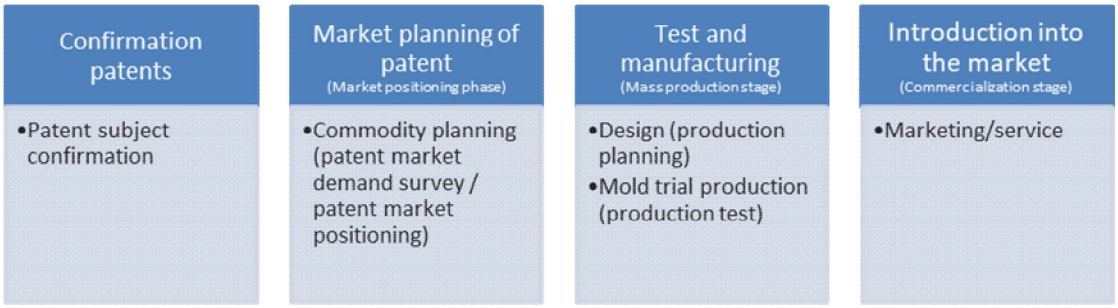

Figure1 The operation flow of patented mass production technology

2.2 QFD (QUALITY FUNCTION DEPLOYMENT)

The following is a description of "QFD method (Quality Function Deployment)". The QFD method is a technology that converts customer voice into product design specifications[4][5][6]. It is considered that the QFD method is a method of converting non-quantitative customer needs into quantitative parameters, and developing functions that constitute quality, unfolding functions of quality into subsystems and parts, and finally expanding into manufacturing procedures [4][5][6].

The QFD method is defined as three concepts: "Quality", "Function" and "Deployment". "Quality" is the quality requirement that the House of Quality (HOQ) needs to achieve. "Function" is listening to the voice of customers and then integrating these sounds into functional requirements for the product. "Deployment" is the integration of a series of steps to achieve product quality. These integrated steps include concept presentation, design, manufacturing, and introduction of products into the market. It can be seen that the QFD method is a conversion technology that implements a series of process of transformation and integration work to convert customer needs into commodities to achieve complete quality management of the product functions required by customers[4][5][6].

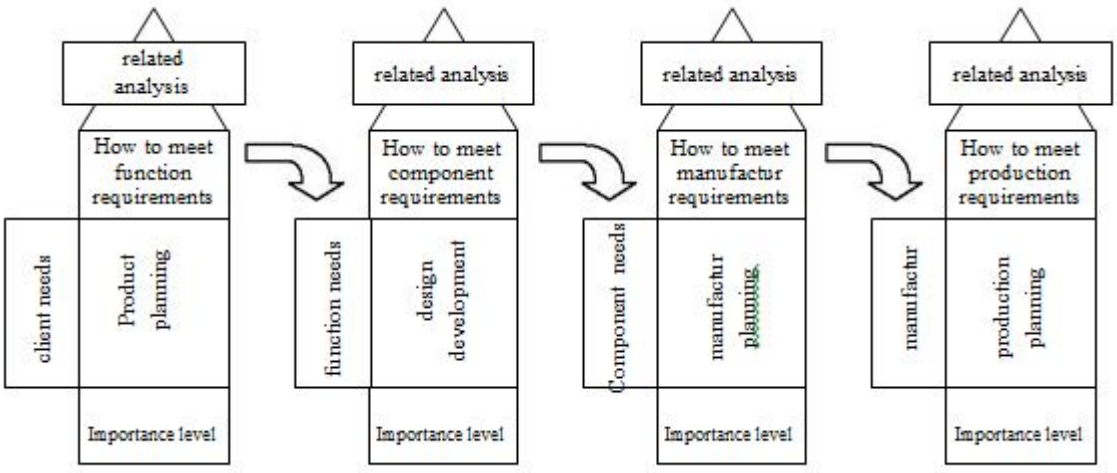

Figure2 QFD architecture

3. TAKING THE PATENTED MASS PRODUCTION OF STEP-BY-STEP WALKER AS AN EXAMPLE

By taking the patented mass production of step-by-step walker as an example, the actual operation flow of patented mass production technology using QFD architecture will demonstrated in section.

3.1Phase 1 : Confirmation Patents

This paper intends to take the example of the Republic of China patent--step-by-step walker (patent certificate number I407951) (Fig. 3), for demonstrating the actual operation procedure of patented mass production technology using QFD architecture.

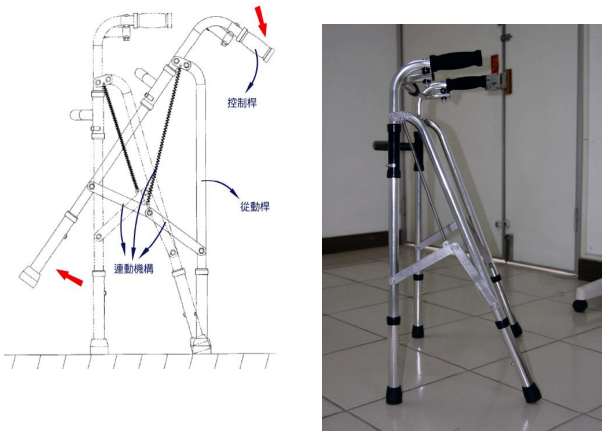

Figure3 The Republic of China patent : step-by-step walker

3.2Phase 2 : Product Planning

After completing the confirmation patents step, the study began with the QFD method for the product planning phase of the patented step-by-step walker. This phase is mainly for the user demand survey and development of the step-by-step fixed-range mobile walker. This stage is mainly for the user demand survey and development of the step-by-step walker. The investigation was conducted by a focus group. The focus group was a walker user who was rehabilitated in the rehabilitation department of Changhua Xiuchuan Hospital, a rehabilitation doctor and a human factors engineering expert. composition.

The focus group's survey results on the use requirements of the patent for the step-by-step walker is shown in Table 1. Table 1 shows that the focus of the walker user's most hoped for the patent of the Walker is to facilitate the conversion of movement (importance of 5 points), to prevent dumping (importance of 5 points), unsupported neutral when moving, and to provide continuous Support (importance of 5 points) and the ability to have a seat function (importance of 4 points). These user demand items with large importance scores will become the basis for the implementation of the product design stage.

TABLE 1 : Use requirements table of the step-by-step walker

			Evaluation					Importance calculation	
First level	**Second level**	**Third level**	**5**	**4**	**3**	**2**	**1**	**Total score**	**Importance**
Easy to use	Easy to move	Easy to convert mobile	32	13	5	0	1	51	3
		Can go up and down stairs	28	23	2	3	1	57	3
		Can adapt to various terrain conditions	20	21	6	4	2	53	3
	Convenient and safe to use	Can prevent dumping	34	18	5	4	2	63	4
		Unsupported neutral when moving, can continue to provide support	44	26	4	2	2	78	5
		Can have seat function	42	20	6	1	1	70	5
		Can help get up	34	12	3	3	0	52	3

3.3Phase 3 : Design Development

After completing the Product Planning phase, this study continues the Design Development phase of the QFD method

for the patent of the step-by-step walker. The product design phase of the QFD method is mainly to transform the user requirements into product functions during the process phase of the QFD method.

In this paper, the main work at this stage is to produce a product function expansion table (Table 2) for the patent of the step-by-step walker. Before making the product function expansion table, this study first uses the demand items to find out the corresponding product functions, and then makes these product functions into product function labels. After completing the product function label, this study uses the KJ method to sort the product function labels. Product features are represented by simple and clear functional features, thereby making a distinction between usage requirements and usage requirements.

The product function expansion table of the patented mass production case of this step type walker is shown in Table 2. Table 2 shows that the patent for the step-by-step walker needs to be designed to enhance product mobility and safety. Based on this result, this study has redesigned and revised the prototype of the existing step-by-step walker (Fig. 4).

TABLE 2 : Product function expansion table of the step-by-step walker

			Evaluation					Importance calculation	
First level	**Second level**	**Third level**	**5**	**4**	**3**	**2**	**1**	**Total score**	**Importance**
Easy to use	Mobile function	Convert mobile function	44	15	20	5	2	86	5
		Up and down stairs function	21	12	10	4	0	47	1
		Adapt to various terrain conditions	36	13	9	6	4	68	3
	Security function	Prevent dumping	56	16	5	0	0	77	5
		Unsupported neutral when moving, can continue to provide support	54	18	2	1	2	77	5
		Seat function	49	16	4	1	1	71	3
		Assist in getting up	36	13	5	0	1	55	3

Figure 4 Redesigned and revised prototype of the existing step-by-step walker

3.4Phase 4 : Manufacture Planning

In the QFD method, the main work in the manufacture planning phase is to identify the product functions in the product design phase of the QFD method, and to perform the tabulation of the product function-important component expansion table. The tabulation method for the product function-important component expansion table is the same as the product function expansion table for the Design Development phase. Product function-important component expansion table is mainly to find out the important components related to the functional usage requirements, and then classify these components from large parts to small parts by KJ method.

The product function-important component expansion table of the patented step-by-step walker is shown in Table 3. Table 3 shows that the components of the step-by-step walker are divided into several large groups: the grip and the support, respectively.

TABLE 3 : Product function-important component expansion table of the step-by-step walker

First level	Second level	Third level
Support	Forefoot	Hand component (total 4 holes adjustment height)
		Hand component silencer
		Forefoot component (total 4 holes adjustment height)
		Forefoot component silencer
	Hind foot	Backrest component
		Hind foot component
		Hind foot component Silencer
Seat	Seat cushion	

3.5Phase 5 : Production Planning

After the Manufacture Planning phase, the case is carried out in the final stage of the QFD process - the production planning phase. This stage is carried out in the form of mass production evaluation of the patented step-by-step walker. The mass production planning and evaluation of the patented step-by-step walker is shown in Table 4.

TABLE 4 : The mass production planning and evaluation of the patented step-by-step walker

Name	Walker I	Walker II	Walker III	Walker IV
Type	HK-A1172 Fixed Type	HK-A1172-1 (Handle height can be adjusted in 4 segments)	HK-A1172-2 (Handle height can be adjusted in 4 segments / Backrest bar changed to KD)	HK-A1172-3 aluminum alloy (Handle height can be adjusted in 4 segments / Backrest bar changed to KD)
Size	W540×D580×H815mm	W540×D500×H820-895mm	W540×D500×H820-895mm	W540×D500×H820-895mm
piece	1PC/CTN=5.7才	1PC/CTN=4.6才	1PC/CTN=2.9才	1PC/CTN=2.9才
20呎	175PCS	220PCS	345PCS	345PCS
40呎	350PCS	440PCS	690PCS	690PCS
40呎HQ	405PCS	500PCS	800PCS	800PCS
Net weight	6.6KG	7.3KG		
Total weight	8.5KG	8.8KG		
Price/ Per piece	FOB Taichung Harbor NT：950/台	FOB Taichung Harbor NT：1000/台	FOB Taichung Harbor NT：1030/台	FOB Taichung Harbor NT：1450/台
Picture				
	1. Body：Use ψ1" iron pipe 1.4 thick elbow forming. CO2 welding fixed. Surface general powder coating. 2. Seat cushion：Use 9mm plywood + general foam + double-sided PVC overmolding (The size is about W390×D360×H35mm thick). 3. Hardware group as sample	1. Body：Use ψ1" iron pipe 1.4 thick elbow forming. CO2 welding fixed. Surface general powder coating. 2. Iron pipe hand：ψ1 1/8" total 4 holes adjustment height 75mm high.。 3. Seat cushion：Use 9mm plywood + general foam + double-sided PVC overmolding (The size is about W390×D360×H35mm thick).	1. Body：Use ψ1" iron pipe 1.4 thick elbow forming. CO2 welding fixed. Surface general powder coating. 2. Iron pipe hand：ψ1 1/8" total 4 holes adjustment height 75mm high。 3. Backrest :⊓-type iron pipe KD assembly method, appearance into EVA foam strip. 4. Seat cushion：Use 9mm plywood + general foam + double-sided PVC overmolding (The size is about	1. Body：Use ψ1" iron pipe 1.4 thick elbow forming. CO2 welding fixed. Surface general powder coating. 2. Aluminum alloy tube hand：1 1/8" total 4 holes adjustment height 75mm high。 3. Backrest : ⊓-type iron pipe KD assembly method, appearance into EVA foam strip 4. Seat cushion：Use 9mm plywood + general foam + double-sided PVC overmolding (The size is about W390×D360×H35mm thick).

	method。 4. The mats and handles are based on the materials and types that can be purchased from general commercial products. 5. Complete assembly of products 6. Use a five-layer kraft paper corrugated box to be packaged in a general outer box.	4. Hardware group as sample method。 5. The mats and handles are based on the materials and types that can be purchased from general commercial products. 6. Complete assembly of products 7. Use a five-layer kraft paper corrugated box to be packaged in a general outer box.	W390×D360×H35mm thick). 5. Hardware group as sample method。 6. The silencer are based on the materials and types that can be purchased from general commercial products. 7. Complete assembly of products 8. Use a five-layer kraft paper corrugated box to be packaged in a general outer box.	5. Hardware group as sample method。 6. The mats and handles are based on the materials and types that can be purchased from general commercial products. 7. Complete assembly of products 8. Use a five-layer kraft paper corrugated box to be packaged in a general outer box.

4. CONCLUSION

The purpose of this paper to introduce the patented mass production technology using the QFD (Quality Function Deployment) method. Under the impact of the flood of knowledge economy, patent becomes one of the most important indicators to measure the R&D results of a country. However, the mere acquisition of a patent often does not necessarily represent success. On the contrary, if the patentee can use a positive attitude to effectively mass-produce the patent, the patent can not only become an asset, but also become a liability of the patentee because of the increase in the patent fee to be paid. Based on this, this paper intends to introduce a patented mass production technology using QFD method in the case of patented mass production of step-by-step walker. The patented mass production technology introduced in this paper is a reproducible standardization process (SOP). This technology can promote the opportunity for mass production of patents, enabling patent holders to profit from patents. This is the biggest expectation of this paper.

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