Material Analysis and Design of New Household Humidifier

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Abstract. With the continuous improvement of people's living standards, more and more people have higher requirements for health and quality of life. Humidifier as an indispensable small household appliances product in dry areas, it has become part of people's life gradually. This paper investigates the market of humidifiers, and material analysis of different humidifier products, and design and launch a new type of household humidifier. The positioning of this design is to meet the user's purchasing needs for modelling, Requirements for modelling not only highlight the simplicity and atmosphere of the product, but also meet the needs of consumers. While improving the quality of life and family environment, it becomes part of the happy family memory.

1. Introduction
Humidifier can be divided into ultrasonic humidifier, net humidifier, heating humidifier immersion electrode humidifier and cold fog humidifier in principle. As a new process product, humidifier brings a comfortable, enjoyable and healthy environment to people in humidification, bacteriostasis, cosmetic function and so on. However, the development history of humidifier is relatively short, Humidifier has many shortcomings in shape, material, color, function and technology, as a result, the humidifier industry is facing many new challenges. Increasing brands of humidifiers, how to occupy the sales market of humidifiers? it has become the primary concern of every humidifier producer. A simple and generous humidifier can greatly improve the sales of humidifiers, it is conducive to the brand of humidifier better occupy the market. From the perspective of consumer psychology, how to make the shape of humidifier more visual impact, in order to achieve the ultimate goal of sales.

2. Design Research
Due to the rapid development of the humidifier industry, in order to protect the normal rights and interests of consumers, ensure the stable and orderly development of the market, so the humidifier standard in the humidifier volume, noise, evaporator service life, softener performance and service life, display control and other functions have been stipulated. In addition, this standard is applicable to household and similar humidifiers, it is also suitable for humidifiers used in public places, but it is not suitable for humidifiers used in special environment where corrosive and explosive gases.

2.1. Market Research
Due to the global economic recession, the overall demand of domestic household appliances industry slowed down. In the face of such a grim situation, market growth is still good of humidifier in autumn and winter, presenting a trend of counter-market growth. Each manufacturer has abandoned the characteristics of specializing in product technology in the humidifier, it takes a lot of hard work in the design of appearance, designing different appearances for different age levels and using environments. A battle for market hegemony of smokeless humidifiers is quietly beginning. Therefore, a humidifier that can solve the above problems becomes a necessary solution. So we have the following research.
2.1.1. Market Analysis. At present, humidifier is not a popular product, and it has not formed a huge brand effect, but the market has begun to take shape. It is foreseeable that the market of humidifiers will attract more and more consumers' attention in the near future. Air purifier, some products are equipped with humidifying function, air conditioning fans and other products is an alternative product to humidifier in the market, this makes the design of humidifier more and more important. Humidifier enterprises can survive only through breakthroughs. For traditional humidifier enterprises, if you want to stay out of the competition, the wisest way is to transform. However, transformation is not easy. At present, 70% of the humidifier market is dominated by YADU and MIDEA brands, other 30% of enterprises are non-mainstream brands. Strong humidifier enterprises should not only do functional design in order to transform, more time should be spent on fashion trends, For example, product shape, humanization, simplicity, space size, use range and market position.

2.1.2. Analysis of Domestic Famous Brands. Advantages of YADU: continuous renewal of indoor environmental protection products for different groups, excellent quality assurance and accumulated brand benefits, expert service. 
Advantages of MIDEA: widening market channels, novelty and fashion in appearance design, excellent cost performance. Integrating the advantages of two brands, humidifier modelling design is mainly based on humanization, simplicity, in line with the trend of the times, in order to win the favor of consumers, on this basis, function design should be done well, to meet the psychological and physiological needs of modern people, continuous improvement of product performance of humidifier. For the growing market of humidifiers, a high degree of brand concentration may lead to a certain degree of brand monopoly, this monopoly will affect the updating of product technology and the rationalization of product price. In this market pattern, we need more strong brands to compete. Currently, the annual growth rate of household ownership in the household humidifier market in China is only around 3-4%, The United States, Canada, France, Britain and other countries with the same geographical latitude as the north of China, they have higher household ownership of humidifiers, for example, the United States has reached 35 percent.

2.1.3. Price Position. In order to correctly assist market positioning and product positioning, an incomplete statistical survey was conducted on the internet. Through a survey on an e-commerce website, get the product price and profit distribution map of high, middle and low-end market of humidifier in China. From the analysis of the price list, the market sales of low-end products are the largest, high-end products are in the middle of the market, mid-end products have the lowest market sales. Combining the consumption of other commodities, the trend of consumers' bipolar consumption is becoming more and more obvious. Although the low-cost humidifier products are sold well in the market, but for the next 10 years, China's economy will rise to a higher level, people's pursuit of quality of life will be more refined, people's requirements for product design will also be stricter. The product design of household humidifier will be positioned in the mid-end market, try to design a household humidifier with simple and atmospheric shape.

2.2. User Survey

2.2.1. Investigation Respondent. Mainly white-collar workers aged 25-40, they have certain economic ability and pursue aesthetics.

2.2.2. Investigation Method. Face-to-face interviews and questionnaires. The form of user survey for purchasing humidifier products is mainly downstairs of office buildings, major occasions such as large-scale household shopping malls, and in the form of filling out questionnaires, final statistics. The questionnaire includes the survey of user's living environment, as well as shape research, function research, material research, it is a comprehensive questionnaire.
2.3. Research Summary
Structural analysis from two aspects of market research and user research shows that, modelling design of humidifier has certain market space, users also need a product that meets all their needs. When designing, we should consider meeting the aesthetic needs of most people, and they feel comfortable using it. The consumer class is defined as urban white-collar workers aged 20-40, gender is predominantly female consumers, they pay more attention to moisturizing and creating a comfortable family environment. The price of humidifier is set at RMB 100-300.

3. Material Analysis
Material is indispensable to human creation, material is one of the basic conditions of human survival. Based on the previous analysis and product positioning, the materials used in different parts of the design of the purified humidifier were determined.

3.1. PP
The appearance of polypropylene plastics is milky white and translucent, it is non-toxic, tasteless and light, excellent bending fatigue resistance, chemical stability and good electrical insulation, forming dimension stability, the thermal expansion is small, mechanical strength, rigidity, transparency and heat resistance are higher than those of polyethylene.

3.2. ABS
ABS plastics synthesize the properties of three components, for example, the rigidity, heat resistance, chemical corrosion resistance and weatherability of acrylonitrile, impact resistance of butadiene. Low temperature resistance, surface gloss, dimensional stability, colourability and machinability of styrenen.

4. Product Orientation and Design

4.1. Product Orientation
Need to meet the user's purchase of styling needs. It can highlight the simplicity and atmosphere of the product, it can also meet the needs of consumers. It can also be a part of family happiness while improving the family environment. Design begins with brainstorming, associate humidifier, think of the words related to it and get the design ideas from them. According to the extracted keywords, the humidifier is designed and the final scheme is obtained. Simple and generous style is the key to this design, Using regular geometric shape, there are not too many free curves, it not only breaks the traditional model of humidifier, but also embodies the simplicity of style. The main color is white, which is integrated with the general home environment. There are other color matching options.

4.2. Design Plan
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4.3. Product Features
Modelling design of this humidifier, it is modeled by regular geometric bodies with rounded corners, to convey a simple, generous and natural feeling to consumers. It uses white as the main color, bright and comfortable, is shown in Figure 1. The combination of red and black makes it more modern, is shown in Figure 2. Simple appearance gives people a sense of relaxation and leisure. The innovation of this humidifier lies in breaking the conventional humidifier model, it is different from the general humidifier on the market.
Conclusion
Humidification technology determines the principle of humidifier. Through the analysis of humidifier products in the existing market, mastered the advantages and disadvantages of humidifier products at present, preliminary determination of the design task. Through further research on customers' desires and needs, Through brand research, market situation analysis, market segmentation research and the market orientation of products is determined. According to the research history of humidifier products and the trend of other household appliance design, determine the direction of design, that is, the trend of decorative design. Only by persisting in seeking truth from facts, combining theory with practice is the fundamental way to design well.

References
[1] Jin H 2011 Classification and Principle of Humidifier (Public Power vol 3) pp 43–5 In Chinese
[2] Ye X 2009 The Humidifier National Standard has been Formally Implemented (Household Electric Appliance vol 11) pp 62–3 In Chinese
[3] Pang C 2011 China Humidifier Market Research Annual Report 2010-2011 (Household Electric Appliance vol 2) pp 86–7 In Chinese
[4] Zhao L 2006 The Brand of the Humidifier Becomes More and More Monopolistic and Diversified (Modern Household Electric Appliance vol 23) pp 66–7 In Chinese
[5] Yu S 2004 Furniture Modelling and Structural Design (Harbin: Heilongjiang Science and Technology Press) In Chinese

Figure 1. Effect picture.

Figure 2. Other color matching options.