

Research on the Development Status and Improvement Methods of Guizhou Wanshan Cinnabar Products

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Abstract:

The vermilion sand mining area in Wanshan, Guizhou, is world-famous for its high-quality vermilion sand ore output, and the vermilion sand industry has greatly influenced the local economic development. However, according to the field research, it is found that the local vermilion products have some problems to be improved in terms of processing methods, types, shapes, functions, packaging, and branding. Based on the problems that have been found, we propose a plan to improve and upgrade several aspects from processing methods, shapes, colors, graphics, materials, functions, and publicity. It provides some suggestions for the development of the vermilion product industry in Wanshan, Guizhou, and also provides a reference value for the innovative design of vermilion-related products.

Keywords:

Vermilion, Vermilion Products, Product Design, Wanshan, Guizhou

1. Introduction

Cinnabar, also known as “dan sand” and “cinnabar”, is a mineral composed of mercury sulfide, and its chemical composition is HgS. In industrial applications, cinnabar crystals are an important material for laser technology. Cinnabar has a wide range of uses as a TCM herb, and there are about 400 medicines containing cinnabar included in the current national standards [1]. As a medicinal material, cinnabar mainly has sedative and tranquilizing effects and was also an important raw material for alchemy in ancient China [2]. As an ornament, cinnabar has a beautiful symbolic meaning of protecting one’s peace and good fortune, so it is mainly processed into pendants, necklaces, bracelets, rings, pendants, ornaments and other products. The world's cinnabar mines are mainly located in China, the United States, Spain, Mexico, Russia and other countries. Natural cinnabar production areas in China are mainly located in Guizhou, Hunan, Sichuan, Hubei, Shaanxi, Qinghai, Gansu, Yunnan, Guangxi, Zhejiang and other provinces. There are more than 30 proven vermilion stone production areas in Guizhou province, mostly concentrated in the eastern part of Guizhou, especially in Wanshan, which accounts for more than 80% of the national

production of vermilion stone [3]. Therefore, the production area of vermilion ore in Wanshan, Guizhou, is known as the “mercury capital of China” [4]. However, the homogenization of the vermilion products produced by the vermilion mines in Wanshan is serious, lacking the enterprise’s own characteristics and local features, and the form and style of each enterprise’s products are basically the same. The vermilion culture is an important part of the traditional culture of local ethnic groups and has played an important socio-cultural function during the long years [5]. Moreover, while promoting the local social division of labor, the vermilion economy has also led to changes in the traditional forms of life, resulting in a more harmonious relationship between the various ethnic groups [6]. Therefore, in order to promote the good development of vermilion products, reflect the cultural value of vermilion, and make the good development of local society and culture, it is necessary to conduct a field study of the vermilion processing plant in Wanshan, to understand the local vermilion product processing methods and processes, to analyze the problems that arise, and to come up with implementable solutions and suggestions for the development of vermilion products in Wanshan..

2. The Processing Process of Vermilion Products in Wanshan, Guizhou

Based on the field visits to several vermilion product processing plants in Wanshan, Guizhou, the overall process of vermilion product processing has been understood and is divided into 5 main steps.

2.1. Collection and classification of ore

Before the product processing, the collection of vermilion ore needs to be carried out in the local mining area first. After collection, the workers will identify the vermilion ore, and two common identification methods are used. The first is to cut the ore directly with a tool, which usually shows the vermilion directly, but will ruin the natural shape of the ore. The second is to wash the ore with water, the part of the original stone containing vermilion will be presented, and after observation, the vermilion content of the ore can be roughly distinguished. Depending on the quality of the ore and the vermilion content, the workers classify the grade of the ore. The classified ore is then processed according to its basic characteristics. For example, if the content of vermilion in the ore is low, they choose to break all of it for making models, or break half of it for carving ornamental crafts, these products are mainly bracelets, necklaces, combs, ornaments. If the ore contains more cinnabar, the ore is carved and processed directly, or polished to make decorative items, such as earrings and other jewelry items. Other cinnabar ores are used to make medicine or used as a body care tool to brew water. Ores that contain very little cinnabar are considered waste stones and are discarded.

2.2. Crushing and pre-processing of cinnabar ore

Most of the vermilion ore is cut and crushed, which allows the vermilion to be better processed for subsequent shaping and thus presenting various product shapes. After the workers use the machine to cut and break the vermilion ore, the vermilion is mixed with various impurities that are difficult to distinguish, and then the workers will put the vermilion and various impurities together in water for repeated washing and precipitation. As the vermilion sand is heavy, in the water will generally be

precipitated in the bottom of the water basin, then the workers will clean the surface of the impurities, the rest is the brightly colored vermilion sand.

Depending on the degree of crushing of the vermilion ore, it is divided into large grains of vermilion and vermilion powder. Large grains of vermilion are generally about 2-5 mm in diameter; small grains of vermilion are generally less than 1 mm in diameter and are mostly powder, so they can also be called vermilion powder. Vermilion that can be made into larger grains, they are generally better looking visually, and also due to the higher vermilion content, these grains are heavier and will be used to make pendants, which end up selling for a higher price. Cinnabar powder is made from ore with a lower cinnabar content, so these powders also do not look as good as cinnabar granules, but because they are processed into powder, they have the advantage of being easily shaped, so they are also often used to make round beads and various shapes of ornaments, while the market price of these products is also relatively low.

2.3. Product shaping of cinnabar

There are four main steps in the process of making products from cinnabar powder. First, the cinnabar powder is mixed with resin glue (also known as AB glue) in a container in a certain ratio. Second, the mixed vermilion liquid is poured into various shapes of silicone molds. Third, put the feeler with vermilion liquid into the vacuum machine, and the workers use the vacuum machine to extract the air bubbles from the feeler. Fourth, the vacuumed products are taken out and placed in a dry environment to rest and dry, or dried with a dryer.

Alternatively, vermilion ores with better shape and color can be processed directly with silicone touch tools, which are generally used to make bases for these ores for exhibitions. Of course, there is also the advantage of wrapping the vermilion ore directly with transparent resin glue for exhibitions, which has the advantage that the round transparent resin is like a magnifying glass, allowing the viewer to see the beautiful natural texture of the ore more clearly.

2.4. Rough processing of cinnabar products

Most of the vermilion products need to be roughly processed with a mechanical polishing machine. Especially for some products with round shape, this step cannot be ignored, such as all kinds of beads. However, before polishing, workers need to manually cut the demolding products with scissors, as there are still some parts of the products that stick together because of the resin. Finally, the workers put these products in the machine uniformly and carry out the polishing process. These sanding machines usually have a disc with water flowing through it for flushing the waste. The discs rotate faster, fully improving the efficiency of the product processing.

Mechanical punching is an important step in the rough processing of vermilion products. Most of the vermilion products are jewelry, and jewelry involves wearing them, so the holes for stringing these vermilion products have to be made. In this process, the workers mainly use mechanical punching machines to punch the holes for the vermilion products.

2.5. Hand finishing of vermilion products

There are several aspects of manual finishing. The first is the inspection and treatment of product defects. Second, the combination of the various parts of the product. Third, the processing of the odor aspect of the product.

Although mechanical polishing is efficient, but there are some defects are difficult to rely on the machine to finish processing. So manual polishing is very necessary, manual polishing is the use of polishing brushes with bristles, or the use of more delicate sandpaper to polish the product, the final product will show a reflective, high-gloss and other visual effects. Many times workers are required to manually combine the various parts of the vermilion products, for example, some products are divided into two parts: decorative ornaments and bases, and some ornaments are connected with ropes and many beads, all of which need to be manually operated by workers to complete. For some special vermilion products, workers will treat and process these products in terms of odor. For example, the comb, a common daily necessity, is more used by women, so they will use perfume to soak the vermilion comb, or use the incense pack to smoke the vermilion comb, the purpose of doing so is to be able to get the love of female customers.

3. Some Problems of Guizhou Wanshan Vermilion Products

3.1. The processing and production method is rather backward

From the analysis of the site, the way of producing products and the tools used are relatively backward. For example, all kinds of products are basically made of silica gel to reproduce the shape of other products, such as some combs, ornaments, pendants, etc., can be found on the market in the same shape, which also makes the homogenization of local vermilion products very serious. The rough processing method and backward technology make the products have obvious industrial traces, for example, some products still have traces of mold making and some sharp edges.

3.2. Single product type

From the results of the site inspection, the local production of vermilion products are mainly combs and pendants, and some ornaments. The variety of products is generally less, which also leads to some problems and cannot meet the customer's demand for vermilion products or expand the sales market of vermilion products.

3.3. Product modeling is not beautiful enough

There are only a few simple styles of vermilion products, which are copied from the appearance of other products, resulting in no significant difference between the shape of these vermilion products and other products on the market, only the difference in materials. And the reproduction of the master version itself is a lack of design and sense of the times, which makes the product in the sale of products, customers are difficult to purchase interest in the product.

3.4. Product function is not complete

Vermilion product type limitations also determine the product's functional limitations. At present, the more functional design is only vermilion comb, but the functionality of these combs are still all stuck in the single function of "hair comb". These combs have fewer other functions, such as for massage combs and other products are still rare. And because of the heavy weight of the vermilion material,

resulting in the weight of these combs, for some people need to often carry the comb, does not have a strong portability.

3.5. Not rich in cultural meaning

Cultural symbolism is a very important element in product design, which can express the cultural and artistic characteristics of the product to a certain extent, and give the product cultural added value, so as to obtain more users' love. However, the graphic meaning of these vermilion products is relatively lacking, for example, Chinese traditional cultural elements, Guizhou folk art elements, and local humanistic features are rarely reflected. In addition, some vermilion products blend content that fits less well with vermilion products, and such problems are extremely damaging to cultural resources and the brand of vermilion products, and can seriously dissipate the rich value of cultural resources and vermilion brands [7].

3.6. Single material

Factories that make vermilion products rarely use vermilion in combination with other materials to make products in order to make the production process simple and make the product failure rate low. However, single vermilion products sometimes cannot cater to the market demand, which makes it difficult to highlight the color and texture of vermilion, and to reflect the high-grade of vermilion products. Therefore, how to integrate vermilion materials with other materials is a problem that needs to be considered.

3.7. No attention to product packaging

From the local research, the packaging of vermilion products has almost no existent design concept, but only uses ordinary bags with randomly arranged words on them for packaging. These packages not only fail to promote and improve the value of vermilion products, but also lower the grade of vermilion products. Moreover, the hardness of the vermilion synthesis product is high, but it is easy to fall and break, and these ordinary packaging can not play the purpose of protecting the product at all. How these packaging in terms of material, shape, content, brand to take reasonable design means, and made into qualified product packaging, is the current need to think about.

3.8. Lack of brand concept

In the modern economy, brand is a strategic asset and an important source of core competitiveness, and brand awareness is a basic concept of brand building for an enterprise, which is basic for consciously maintaining the product and creating a famous brand [8]. For local manufacturers of vermilion products, their main goal is to make the vermilion comb a unique brand, but with the current view, they are still some distance away from this goal, because from Guizhou province alone, there are still many who do not understand the brand of Wanshan vermilion products. Therefore, how to cooperate with universities, scientific research institutions, and designer groups and propose the best brand promotion plan is the problem that needs to be thought deeply at the moment.

4. Improvement Methods for Existing Problems of Vermilion Products in Wanshan, Guizhou

4.1. Processing method improvement

Cinnabar craft processing factory should introduce more reliable, stable and convenient tools for product processing. For example, 3D printing equipment, used for product design and production, mainly for the model made of vermilion powder for inverting and demolding. The use of CNC electronic engraving machine, mainly using the engraving machine for modeling carving and graphic carving of the original ore of vermilion, but also for wood materials, metal and other materials. Although these devices have the advantages of accurate processing, high efficiency, but need to be equipped with professional staff to operate, in order to process more exquisite products, to create a broader market, these upgrades and improvements are worthwhile and necessary.

4.2. Modeling design improvement

The modeling of vermilion jewelry should not be limited to the common product modeling in the market, but should explore and adopt the product modeling that suits the cultural meaning of vermilion itself. Of course these design work can not only rely on manufacturers themselves to carry out, but should cooperate with higher education institutions and designer teams, using scientific design concepts and design methods to create more fashionable, more in line with modern aesthetic characteristics of the product shape.

4.3. Color design improvement

Cinnabar products and product-related packaging and other ancillary products in the color design, should not only use large blocks of red, but should change the idea of color to highlight the color. For example, you can use a strong contrast with the red green, color adjacent to the yellow, purple, etc.. Or use the original color of the original wood color with natural atmosphere, stoneware, with these and vermilion products to match, more highlight the characteristics of the product.

4.4. Graphic design improvement

In the vermilion products, most of the products lack graphic elements, but a small number of products will use some graphics for design and processing, and these graphics are mostly traditional Chinese graphic elements. We can design and process on the basis of the original traditional graphics, and improve the design of the content expressed by the graphics, the angle of the lines, and the thickness of the lines, so that these graphics are more fashionable. For some products without graphic elements, the design can be classified according to the product shape. For example, the product itself is styled to suit a simple style and can be designed without graphic elements. Some products on the blank area is larger, you can add graphic elements to reflect the beauty, highlighting more cultural and artistic value. Of course, these graphic elements can not be rigidly applied, the designer needs to be cleverly designed and arranged in order to use.

4.5. Material design improvement

In terms of material improvement of vermilion products, it is recommended that factories cooperate with universities and research institutions to open up the technology of mixing vermilion with other materials to improve the yield and beauty of the products. Multiple materials can be used with vermilion jewelry, such as wood,

stone, metal, glass, ceramic, paper and other materials. The reasonable matching of these materials and vermilion can highlight the texture and color of vermilion more, increase the mood of the product, making the product more conspicuous and more advanced.

4.6. Functional design improvement

Vermilion products should not only be limited to pendants, ornaments, combs and other products, should make vermilion and modern products better integration. For example, the vermilion and electronic products integration, such as headphones, mouse, cell phones, etc.. Or combine it with household items, such as cups, stationery boxes, photo frames, etc. These functional improvements can expand the scope of use of vermilion products and also increase the sales range of the products.

4.7. Product value promotion

The promotion of vermilion products needs to include aspects such as print ads, video ads, and internet ads, with which to increase the exposure of the product. Manufacturers should also hold various events and exhibitions to allow customers to have practical experience, to understand the specifics of vermilion products, and to feel the value of vermilion products up close. The design of the product packaging is also very necessary, and a professional design team should be hired to design different kinds of packaging based on the different functions of the vermilion product design, so as to highlight the value of the vermilion product.

5. Conclusions

The vermilion processing plant in Wanshan, Guizhou has a complete production and processing process system and some industrial scale, but the rational development of the vermilion industry should not only rely on the manufacturer alone, but should seek the cooperation of various parties, such as universities and designer teams, in order to provide better technology and advice for the better development of the vermilion industry. And the improvement methods derived from the fieldwork and analysis provide some suggestions for the current situation of the vermilion industry in Wanshan, Guizhou, and provide some reference values for promoting Guizhou folk culture, Chinese traditional culture, promoting vermilion products, and driving the development of the regional economy.

Conflicts of Interest

The authors declare that there is no conflict of interest regarding the publication of this article.

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