

Modeling Method of Creative Lamps

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Abstract. Creative lamp also has a relatively high popularity rate, while because of the issues like larger volume, inconvenient carrying as well as dizziness glare caused by improper operation, they equally provide development opportunities and prospects for the creative lamp industry. With the development of science and technology in China as well as vigorous promotion of national reading, creative lamp market will become more and more popular and imperative in the coming years.

1. Development status of creative lamp

Those developed countries transferred lamp industry to developing countries in ninety, they also brought advanced technology and equipment to China. On the other hand, with the improvement of domestic living quality, people had a greatly enhanced attention and requirement for both indoor and outdoor light environment, while relevant technology also improved a lot. Creative lamp has three important development stages:

1) Incandescent lamp, it uses thermal radiation theory and makes the current heating when going through the filament to emit visible light. Incandescent lamp has a high light loss and low efficiency, in addition, it is inappropriate to use in some occasions because of the yellowish color.

2) Gas discharge lamp, it is made according to the principle that gas, metal vapor or the mixture of several gases and metal vapor may discharge and emit light, such as: fluorescent lamp, high-voltage mercury lamp, sodium lamp and metal halide lamp.

3) LED light source, LED lamp also refers to light emitting diode and it is a semiconductor which can convert electric energy into light energy. It adopts the electric field light-emitting principle and has the features of long life, high efficiency, no radiation and low energy consumption. While LED light source technology is still not mature in nowadays and it is mainly used in large area of billboard lighting to create a colorful atmosphere.

Expression formula of ellipsoidal reflector surface:

$$\frac{(z - \sqrt{a^2 - b^2})^2}{a^2} + \frac{x^2 + y^2}{b^2} = 1 \quad (1)$$

Wherein, a and b respectively represent the semi-major axis and semi-minor axis of ellipsoid.

While f_1 and f_2 in figure 3 respectively represent the distances from ellipsoid vertex to F1 and F2, and the formulas are shown as below:

$$f_1 = a - \sqrt{a^2 - b^2} \quad (2)$$

$$f_2 = a + \sqrt{a^2 - b^2} \quad (3)$$

Semi focal length on ellipsoidal reflector surface could be changed through adjusting the sizes of a and b, and the outgoing light angle could also be changed to ensure irradiate the required lighting area.

2. Development prospect of creative lamp

Competition among various household electrical appliance industries is becoming more super-heating in nowadays, and the creative lamp industry still has a good development opportunity.

First, Europe is the largest consumer market for creative light in the world and the penetration rate can reach 80%-90% which stays in the first place all over the world, and the reason is that they have the habit of reading. In addition, replacement speed of creative lamp in this region is very fast and the market prospect is very considerable. Meanwhile, many domestic home appliance industries put various creative lamps into production when facing with such situation. While because of the low technical content, creative lamps on the market are similar and present an angry situation. Creative lamp industry has an urgent demand for fresh element to bring new atmosphere, design and produce some competitive products that can win the favor from the vast number of dealers and consumers.

2.1 Trend of creative lamp market

Creative lamp is now achieving combination, decorative, fun-oriented and environmental friendly development gradually.

Combination: with the accelerated pace of life, some combined creative lamps which are convenient, practical and beautiful emerge such as: combination of alarm clock and creative lamp, combination of pen-holder, photo frame and creative lamp. All these greatly improve the practicality of creative lamps.

Decorative: these creative lamps note more emphasis on the decorative effect and focus on embodying the distinctive artistic features as well as making the creative lamp itself become a artist work. These lamps have not only modern technology, but also variable styles and exquisite workmanship. It is worth noting that the modeling is ingenuity, the texture is no longer the single plastic, it combines a variety of materials like stainless steel, copper and glass. In addition, matching of different colors allows consumers choose the required creative lamps with different styles and textures according to the decorative style and makes creative lamp and interior layout to form a perfect whole.

Fun-oriented: obtain the favor for rich imagination and various modelings.

Environmental friendly: semiconductor lamp will become the mainstream product of next generation of lighting according to the current technical level and development trend. Many countries led by United States and the European Union carry out the semiconductor lighting plan in succession and incorporate semiconductor into the lighting field in daily life. Our country has also already carried out semiconductor engineering which provides a good development opportunity for semiconductor environmental protection and energy saving creative lamp.

2.2 Research summary

After a long time of market research, the design object I decided at the beginning was only the surface understanding about product. While now I have a specific knowledge about product history, status, classification and many other aspects. What is more, I am more confident about this design direction and the object I propose is really valuable through this research. Certainly, the primary task of industrial design or product design is to guide people to live in a healthy way, explore the suitable way of living and create a new national tradition. We can see from this market research that consumers now are more likely to purchase these highly artistic products with simple form. As a result, creative lamp design should tend to: develop to high efficiency and energy saving, improve the utilization rate of light, form a soft and diffuse lighting environment; develop to an integrated adjustable direction, make dimming, color control and remote control of creative lamp become possible; develop to multi function and miniaturization; develop to assembly series. Modern creative lamp pursues a simple and concise style, it stresses not only personality, but also the coordination and unification with environment. In addition, it also pays attention to the material as well as texture of the lamp. Creative lamp modeling refers to the comprehensive expression of function, art and technology. Modeling decides functional requirements in principle, but we also should pay attention to various conditions and factors on the production at the same time. In daily life, the primary purpose of creative lamp is to make human life more convenient, play a role in beautifying and make it integrate with the surrounding environment.

This is the end of market research and I will enter the next specific and the most critical design process. While in the design process, I should also continue the research when encountering the issues. Only run through the market research in the whole design process, it may play the true role.

3. Design analysis

For example: inspiration of figure 1 comes from the roaring waves and the gradient type has the sense of hierarchy. If we can improve the color collocation of such waves, people will feel the magnificence of the sea as well as reduce stress and open mind in office and learning process.

3.1 Little sapling shape

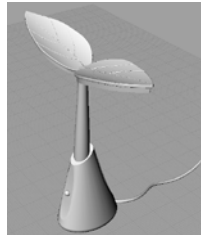


Figure 1 Opening effect

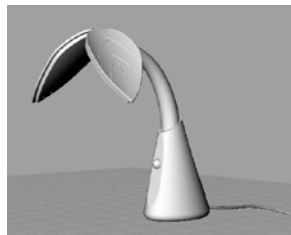


Figure 2 Closing effect

The spirit comes from just budding seedlings and green gives us a natural feeling. Tree buds might be stuck in the branches from the side, while we may manually adjust the buds and bars to search for the most appropriate brightness, and we may also adjust the buds to bring light beams together to make the lights become strong.

3.2 Human form modeling

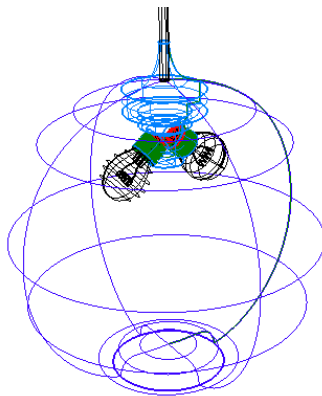


Figure 3 Scheme sketch

This lamp takes human form as the light source and might be arbitrarily adjusted to various shapes to fix the lamp, or become a stable stent or be wrapped around fixed objects. Sight halos can be transmitted out when lighting with semi transparent materials, and it can be said that this lamp creates a romantic atmosphere.

3.3 Suspended tree modeling

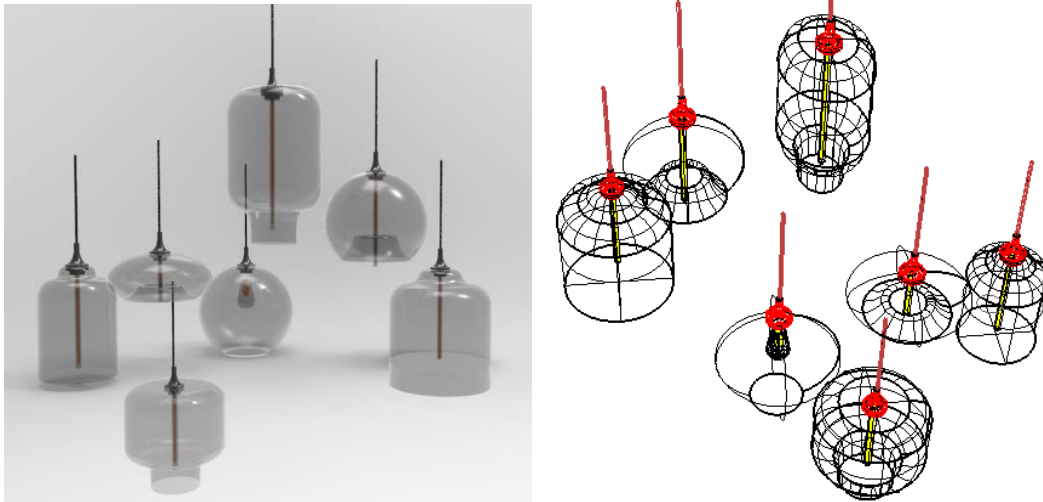


Figure 4 Scheme sketch

Strong root of the tree placed in room presents a suspended effect and the tree plays a more decorated role. The secret is that the moon hanging in this tree is the light source and may present full moon, crescent beauty and other moon shapes through manual adjustment. While under the situation of opposite direction, we have to turn on the other switch to continue. Meanwhile, light source will transfer from cold to warm and better serve the users, help them to find out the most suitable status of creative lamp, make lighting the creative lamp be pleased and relax and better regulate the mood.

3.4 Color description

Soft colors of “vase” make us feel relax in life or learning and I select the colors which are easy to be accepted in daily life to decorate the petals. “Flower” selection gives priority to those who have larger flower type and less leaves, the vase we make is more close to the reality. Color selection of the switch is more close to the color of vase, but the tone is slightly different. As a result, it is easy for people to identify the position of the switch when maintaining the overall tone.

3.5. Design material selection and working principle

Petals opening and closing principle: use the working principle of single chip microcomputer to transfer variation of resistance to variation of voltage through testing photosensitive resistance. Then transmit the signals of voltage changes to single chip microcomputer, and single chip microcomputer may control petals opening and closing through motor driving module.

4. Summary

The vase shaped creative lamp can be used for home-office, it brings us a yearning and pursuit for beautiful nature, helps us to release the burdens, adds colors and embellish space for home and office environment. It can not only meet our daily demands and increase the beauty, but also give us a healthy lifestyle. Apart from meeting the lighting requirements, such creative lamp is an artist work and the jewelries make it more shine. While, I also hope this creative lamp may have more functions and meet our demands to the maximum extent.

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