Application of surface translucent carving

Dong Wen-ling
School of Mechanical &Automotive Engineering, QiLu University of Technology (Shandong Academy of Sciences), Jinan 250300, China
corresponding author: 979535716@qq.com

Abstract: The traditional relief by craftsmen Handmade is time-consuming and laborious with insufficient efficiency. In recent years, with the continuous development of computer aided art design and numerical control technology, the diversity and machinability of the embossing have been greatly improved. With Zbrush, MeshMixer and other modeling software, users can design a variety of types of relief works, and output to the numerical control processing equipment for model production.

1. Introduction
The surface pervious carving is based on the traditional embossing with the transparent material based on the principle of the conformal mapping, applying the pervious carvings to the surface[1]. This paper mainly introduces the applications of the pervious carvings in the arts and crafts: one is mainly on the application of the lamp shade; one is the application on the shell of the mobile phone. The technology of surface translucent carving solves the problem of traditional texture carving on the material surface in the existing technology with poor ornamental performance of the raw material is not light transmittance without direct viewing effect.

The technical scheme areas follows: the outer side of the lamps hade is provided with a plurality of supports, the bracket ends are welded with bracket buckles, the lower part of the lampshade bottom plate is provided with a support seat, which is provided with a support seat groove matched with the support buckle, and the bracket fastener is clamped in the groove of the support seat. A plurality of relief pieces are fixed on the outer wall of the lampshade, and the relief pieces are set at the center of each outer wall of the lamp shade[2]. The interior of the lampshade bottom plate is provided with an ornamental base while the decorative base is fixedly provided with luminous handicraft, and the luminous handicraft is fixedly connected with the lampshade soleplate through the decorative base. By adding relief pieces between the supports of the lamp cover, the device increases the divergency of the light source, which is more transparent and ornamental.

1.1. Technical background
Embossing is one of the engraving. The engraving is carved out of the image that he wants to shape on a flat plate, leaving it out of the surface of the original material. Relief is the combination of sculpture and painting. It uses compressed method to process objects and shows three-dimensional space by factors only for one or two sides such as perspective. The relief is usually attached to the other plane, and more is used in the building that often seen on the utensils. Because of its compression characteristics, the space is small, which it is suitable for a variety of environment decoration. In recent years, it has become more and more important in the city beautification environment with rich
and colorful content, form and material and sculpture. The materials for relief are stone, wood, ivory and metal.

At present, most carving crafts on the market, are generally showing irregular texture in the existing materials carved while certain ornamental value is relatively low, generally without the raw materials carved transparent, direct viewing effect and luminous class crafts. However, in the light emission process in the night and if the emission light is on its own source, it has low performance that not up to the satisfaction of the ornamental effect, which are real and urgent problems.

1.2. The production of lampshade
The purpose of this article is to provide a kind of handicraft based on the translucent carving of curved surface. It solves the problem of traditional texture carving on the surface of materials in the existing technology with poor ornamental quality, while the raw material is not light transmittance, so it doesn't have the effect of direct viewing.

The technical solutions used in this article to solve the technical problems as follows: A surface light carving crafts based on the lampshade comprises a lampshade and a lamp shade is above the bottom and bottom plate while the outer edges around the bottom end is connected with the lamp shade, which is provided with a plurality of lateral corners with welded buckle for support[3]. Lampshade bottom plate is provided with a support seat, which is provided with support a groove matched with the buckle bracket card clamped in the groove; the outer wall of the lampshade is fixedly provided with a plurality of embossed sheet with each piece arranged on the outer wall at the center of the relief cover and between two brackets; the internal center is provided with a decorative floor lamp base fixedly provided with a luminous decorative arts and crafts the decorative luminous crafts base while the lamp cover is fixedly provided with Lamp cover plate.

The top of the bracket is provided with a lift rod and a tassel at the end of the lift rod connected to the support through a lift rod. The relief plate is 3D print transparent relief plate while the relief piece is the translucent material of the relief piece. The surface relief sheet isa concave and convex pattern. Relief flake is a relief piece of a rectangular piece, a cylindrical piece or a triangular piece. The upper surface of the decorative base is flat with luminous handicraft arranged on the upper surface of the decorative base, and the luminous handicraft is a luminous handicraft which is poured into the built-in fluorescent powder and mixed resin. The support seat is the support seat of the aluminum alloy, and the four top angles of the support seat are fixed with props. The lampshade is a lampshade of a rectangular shell, a cylindrical shell or a multifaceted shell.

A craft based on curved surface relief in this article has the following beneficial effects compared with the existing technology: By setting up a bracket outside the lampshade, it first plays the role of the whole support, improves the structural strength, and provides the exhibition space for the luminous handicraft inside the house. Secondly, the large frame structure is convenient for the placement of the relief piece. Embossed sheet embossed sheet for translucent material and easy to disperse the light source whilethe embossed sheet itself has certain transparency, embossed sheet surface embossed sheet with a concave convex pattern. The embossed surface convex pattern is greater than the thickness of surface relief concave pattern embossed sheet thickness, surface convex pattern light transmission and surface relief light in the concave pattern; luminous handicraft lights, embossed surface concave and convex pattern for different thickness of lead light are different, the light generated color depth changes to ultimately achieve the purpose of increasing divergence; The top of the bracket is provided with a tassel and a tassel connected to the ball of the outer bar, which has a beautiful effect and increases the beauty of the whole structure. The support bracket is welded at the end vertex of the support that provided with a support seat groove and matched with the support buckle. The support fastener is clamped in the groove of the support seat, which facilitates the installation and disassembly of the bracket and the support seat, increasing the structural stability. Noctilucan arts and crafts for the built-in fluorescent powder mixture of luminous crafts with a day and night can be ornamental conditions. The device has the advantages of simple structure with good appearance and the user can relief using a 3D printer according to the actual demand to print different
concave and convex pattern structure with different aesthetic effect, which thus has a very good promotion and use value.

![Diagram](image.png)

Fig. 1
1. Lampshade
2. Bracket
3. Stents clasp
4. Lift rod
5. Outer bar ball
6. Tassels
7. Relief film
8. Lampcover plate
9. Noctilucan arts and crafts
10. Ornamental base
11. Support seat
12. Supporting seat grooves
13. Pillar

2. Application of surface pervious carvings in mobile phone shell
In the existing technology, the products are easily damaged in the process of use, low service life, high cost and cost, and the 3D display effect and the beauty of the product are not enough. The adopted technical proposal includes mobile phone shell and Lamp cover plate. The upper end of the bottom surface is a plane around the outer contour curved inward and the outer surface of the back shell surface structure for mobile phone while the back surface of mobile phone shell is provided with a concave convex embossed pattern. Mobile phone shell body is arranged inside the back surface lighting control device. The product has the advantages of low cost, long service life, light uniformity, good transparency, better display effect and the beauty of the advantages of 3D.

2.1. Technical background
With the rapid development of the level of science and technology, the rapid development of scientific and technological products will also promote the development of the auxiliary products of scientific and technological products. With the increase of mobile phone brand and function, supporting the use of mobile phone products is also diversified development, for example, mobile phone and mobile phone shell matched in the electronic market have been widely recognized with rapid development, whose types of mobile phone protection shell are very extensive and can be divided according to the texture of the material into leather, silicone cloth, hard plastic, soft plastic, resin, metal, velvet, silk
and other products. However, mobile phone protection shell not only can be used as a mobile phone accessories, but also can play a protective role of mobile phone with anti shock, anti abrasion and anti vibration etc..

For mobile phone shell by the traditional market is a kind of planar mobile phone shell with simple structure and beautiful, which has no 3D effect[4]. Therefore, for this phenomenon, there is a mobile phone shell naming 3D relief foaming and the technical scheme of the patent is: Including the shell body of the mobile phone, a layer of foam layer is set on the body of the mobile phone shell, and a layer of leather layer is arranged on the foam layer, and the 3D three-dimensional figure is set on the leather layer with the machine equipment. Although this method adopts the following settings on the shell foaming cotton and leather layer by adding the 3d graphics on the leather layer to realize 3d stereo feeling for more beautiful with better sense of touch, there exist the following problems: 1, mobile phone shell set on foaming cotton layer in use is easy to damage, easy to cause cell phone shell and foam separation of cotton layer easy to fall off while the service life is low; 2. The foaming cotton layer is equipped with leather layer and high cost; 3, 3d graphics on the leather layer is in the plane of preparation while the 3d effect is not enough, though beautiful sex than traditional following from increase to a certain extent, it cannot satisfy people pursuit of beauty products. Therefore, it is a problem to design a product with low cost, long service life with superior 3D display effect and beautiful appearance.

2.2. Cell phone shell making

A simple surface lithophane mobile phone shell includes mobile phone shell and lamp cover plate. The upper end of the bottom surface is a plane around the outer contour bent inwards and the outer surface of the back shell surface structure for mobile phone, and the back surface of lamp cover plate is provided with concave convex shaped floating carved lines, setting a lighting control device inside the mobile phone shell back surface.

The curved angle of the back surface of the she of the cell phone is 15 to 60 degrees. The lighting control device includes the battery, the sliding switch and the bulb, and the battery. The sliding switch and the bulb are connected in series in series to form the lighting loop, which is arranged on the side face of the back of the shell of the mobile phone. Sliding switch is a sliding switch with a rectangular, circular or elliptical structure. The outer contour of the shell of the mobile phone is the shell of the cellphone shell of the transparent resin material.

In this paper, a simple surface transparent relief embossing mobile phone shell has the following beneficial effects compared with the existing technology. The outer surface of the back shell surface structure for mobile phone, lamp cover plate and the back surface are provided with a concave convex embossed pattern, setting light transmittance. Concave convex embossed pattern is set in the plane convex embossed pattern with better on the surface and surface arranged on the concave convex embossed with an anti-skid function to prevent mobile phone accidentally slipped. The curved angle of the back surface of the shell of the cell phone is 15 to 60 degrees. The concave and convex relief pattern is set on the angle of the surface, and the light transmittance is good while the manufacturing is simple[5].The internal surface is provided with a mobile phone shell back lighting control device, battery, the slide switch and the bulb are connected in series in order to form a lighting circuit, the user through the mobile phone shell slide switch sliding back side end face while the lighting circuit conduction bulb is functioned lighting function. Mobile phone shell on the surface of the concave convex shape embossed in the light irradiation with good and more beautiful surface light transmission performance in 3D display effect,; The shell of the cell phone shell is a cellphone shell with transparent resin material, which is low in production cost and low in cost. The structure has the advantages of scientific and reasonable design, simple structure, strong practicability, low cost, convenient operation, high transmittance, remarkable 3D display effect, beautiful appearance, illumination and anti-skid. Therefore, the structure has good popularization and application value.
Fig 2.
1. Shell
2. Concave and convex relief pattern
3. Battery
4. Sliding switch
5. Light bulb:
3. Conclusions:
The application of surface pervious carvings is very wide, and it is not only for lamp housing and handset shells, but also for other arts and crafts. The application of surface translucent carving in the mobile phone shell solves the problems existing in the existing technology products, such as easy damage, low service life and high cost for 3D display effect and beautiful appearance. The application of curved light transmission in lampshade solves the problem of traditional technology that engraving texture on material surface is poor and the raw material is not light transmittance without direct viewing effect. The curved surface glyph makes the arts and crafts more beautiful that can meet the needs of people in all aspects.

References
[1]WANG Meili, SUN Yu,ZHANG Hongming.QIAN Kun,CHANG Jian,HE Dongjian.Digital Relief Generation from 3D Models[J].Chinese Journal of Mechanical Engineering,2016,29(06):1128-1133.
[2].Improved Relief Grinding Method of Gear Hob with Equal Relief Angle[J].Chinese Journal of Mechanical Engineering,2011,24(05):842-850.
[3]Fan Wenbing. Feature Selection Method Based on Adaptive Relief Algorithm[A]. IACSIT,proceedings of 2010 3rd International Conference on Computer and Electrical Engineering (ICCEE 2010 no.2)[C].IACSIT, 2012:6.
[4].Reduction of internal stress in SU-8 photoresist layer by ultrasonic treatment[J].Science China(Technological Sciences),2010,53(11):3006-3013.
[5]Zai-Song Yu, Jian-Xun Zhang, Hong-Zhe Wang,Rong-Can Zhou,Yong Yuan.Mechanism of Stress Relief Cracking in a Granular Bainitic Steel[J].Acta Metallurgica Sinica(English Letters),2017,30(02):156-163.