

Research on Removable Rechargeable Mouse

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Abstract. The operation function of the traditional mouse has been realized in the market, but the protection function of the traditional mouse has been ignored in the cold winter. The experience of holding a cold mouse is very bad in the cold winter. A few hot mice are available on the market, but they can cause damage to USB ports and control modules without protection. When using mouse cover, finger cannot switch smoothly between keyboard and mouse. Mobile charging mouse overcomes some disadvantages of traditional mouse by adding heating components. Mobile charging mouse is very convenient to use in the cold winter. Moving the charged mouse allows the finger to move smoothly between the keyboard and mouse. When the mobile charging mouse is used, push the block downward through the palm pressing area. The fixing ring is rotated clockwise, and the connecting rod is moved to the right to pull the fixing ring. The fixing ring compresses the shaped spring plate by rotating clockwise, so that the cover is turned downward to warm the hand. When releasing the palm-pressing area, the action is reversed. The mobile charging mouse supplies power to the main circuit of the mouse through the polymer battery, which supplies power to the carbon fiber heater, and the polymer battery is charged through the charging port.

Introduction

Mouse is a computer input equipment in daily work and life, with the technical innovation, product update, the traditional mouse to more functions forward. However, the traditional mouse only realized more operations, and did not fully consider the user's feelings [1]. Traditional mouse is basically plastic, metal shell. The downside of a traditional mouse is that it's a poor experience to hold a cold mouse in the cold winter months [2]. Although the mouse in the market can be heated for a short time to solve the need, but the product must be plugged into the computer USB interface, this mouse will cause damage to the USB interface and control module in the case of no protection [3]. When using mouse cover, fingers cannot switch smoothly between keyboard and mouse; To sum up, a mouse that is convenient to use in the cold winter and allows the fingers to switch smoothly between the keyboard and the mouse is what users need.

Research content of mobile charging mouse

The purpose of the mobile charging mouse is to provide a mobile charging mouse. Compared with the traditional mouse, this mouse adds a heating component. The USB cable was removed compared to other hot mice on the market [4]. Mobile charging mouse has many advantages, it is very good to use in the cold winter, the switch between the keyboard and the mouse is flexible in the condition of ensuring heat, users do not have to worry about damage to computer equipment [5].

Mobile charging heating mouse, including mouse body, cover, carbon fiber heating sheet, fixed ring, l-shaped spring sheet, connecting rod, block, palm pressing area, spring, mouse body, mouse body circuit, polymer battery, polymer battery and charging port, etc. The structure diagram of the mobile charging heating mouse is shown in figure 1.

Innovation Point of Mobile Charging Mouse

Method of combining 3D design and 3D printing is adopted. At the beginning of product design, I found a problem through investigation, which was that there were very few kinds of heating mouse available for people to use [5]. Existing heating mouse can only make the palm feel warm, the protection of the back of the hand is not. Mouse is now a daily office must supplies, in the low temperature, the operation of the ordinary mouse hand will be frozen stiff, poor experience [6]. Now there are technical solutions to such problems: one is to install a heating shell above the mouse, two is to put the whole mouse into a heating cloth, three is to install a heating device inside the mouse.

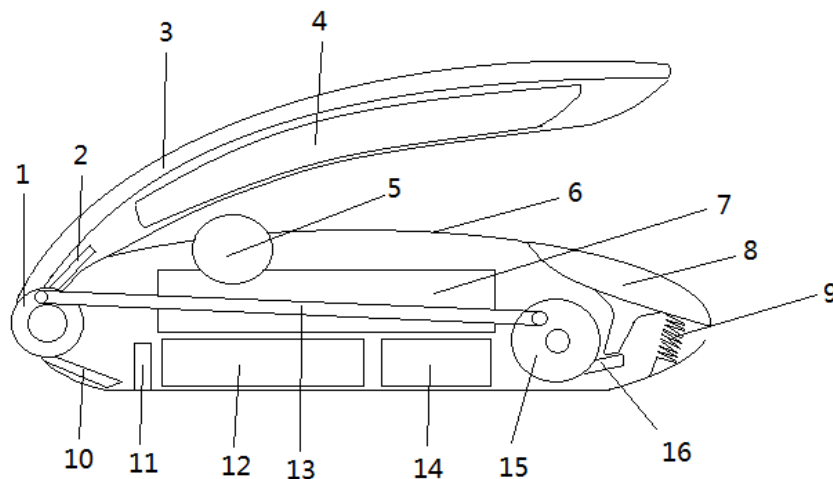
The above three technical solutions have the following disadvantages:

(1) in the mouse above the shell can be heating, the overall sealing is not high, air circulation, not easy to heat up, poor heating, high power consumption.

(2) the whole mouse into the heating cloth cover, the mouse only in the heating cloth cover can be used to have a hand warming effect, but the cloth cover limits the range of mouse movement, affecting the comfort of the mouse.

(3) in the mouse with a heating device, so only to improve the temperature of the palm, the back of the hand is still not effective protection.

(4) in addition to the installation of heating cloth this technical scheme, the other two technical schemes are special mouse, heating device can not be applied to other mouse



1-Fixed ring; 2-L type spring plate (upper); 3-Cover; 4-Carbon fiber heating element; 5-Mouse wheel; 6-Mouse body; 7-Main mouse circuit; 8-Palm pressing area; 9-The spring; 10-L type spring plate (lower part); 11- Charging port; 12- Polymer battery 1; 13-The connecting rod; 14- Polymer battery 2; 15-Fixed ring 2; 16- Stop block

Figure 1. Structure diagram

In order to achieve the above purpose, this study adopts the technical scheme is: a portable rechargeable mouse, including the mouse main body, cover, carbon fiber heating, retaining ring, L leaf spring, connecting rod, block, the palm press area, spring, the subjects of the mouse, the mouse circuit, polymer battery, polymer battery and charging, etc [7]. A thermal insulation film is arranged on the surface and inner layer of the carbon fiber heating element, and a plush cloth is arranged on the surface and inner layer of the thermal insulation heating element. A thin wire is wrapped in the opening of the heat shield. The lower part of the mouse is provided with a back glue Velcro [8].

The beneficial effects of this product are as follows:

(1) The use of heat insulation cover and mouse integration design, to the maximum extent to ensure the flexibility of the mouse movement, also ensure the heat preservation and heating performance of the mouse, let the heat loss, avoid the traditional heat preservation cover and heat loss of the mouse fast.

(2) in the opening of a thin wire, according to the hand and use habits to change the size of the opening, strengthen the heat insulation cover and mouse tightness, enhance the heat insulation effect.

(3) this product USES back glue Velcro to combine the heat preservation and heating cover with the mouse, when the mouse is out of order, the heat preservation and heating cover can be removed from the original mouse and installed to the new mouse, with strong compatibility.

See figure 2. The rendering of the product is shown in figure 3.

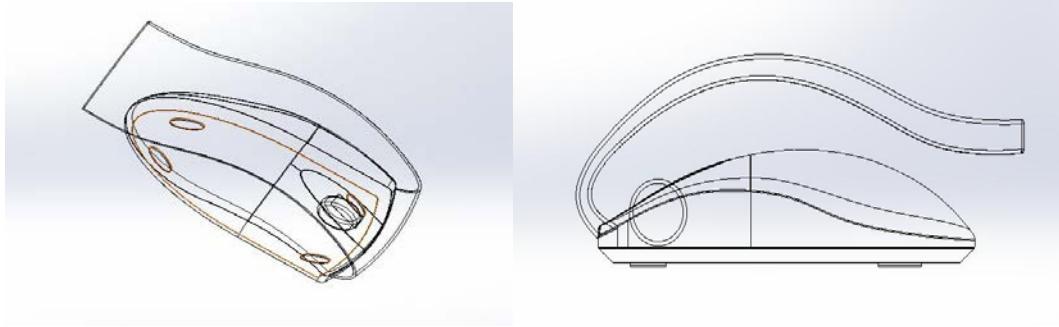


Figure 2. Design drawing of the product



Figure 3. A rendering of the product

Use 3D printing technology to make the product shel. 3D printing (3DP) is a kind of rapid prototyping technology, which is a kind of technology based on digital model files, using powder metal or plastic and other adhesive materials, through layer by layer printing to construct objects.

Mouse temperature control. The main principle of the product is to warm the hands by heating the carbon fiber heating sheet. After consulting a large number of data, we found the control method of carbon fiber heating temperature [9]. The thermal performance of the carbon fiber heating soft plate in dynamic operation was experimentally studied. The heating speed, power consumption, temperature uniformity and the characteristics of starting and stopping reciprocating operation of the carbon fiber heating soft plate and cable in the process of electric heating were measured. The experimental results show that compared with the heating cable system, the carbon fiber heating flexible plate has a faster temperature response. Under dynamic operating conditions, carbon fiber heating soft plate can obtain better temperature uniformity.

Conclusion

Mouse is a computer input equipment in daily work and life, with the technical innovation, product update, the traditional mouse to more functions forward. The operation function of the traditional mouse has been realized in the market, but the protection function of the traditional mouse has been neglected in the cold winter. The experience of holding a cold mouse is very bad in the cold winter. A few hot mice are available on the market, but they can cause damage to USB ports and control modules without protection. When using mouse cover, finger cannot switch smoothly between keyboard and mouse. Mobile charging mouse overcomes some disadvantages of traditional mouse by adding heating components. Mobile charging mouse is very convenient to use in the cold winter. Moving the charged mouse allows the finger to move smoothly between the keyboard and mouse. When the mobile charging mouse is used, push the block downward through the palm pressing area, the fixing ring is rotated clockwise, and the connecting rod is moved to the right to pull the fixing ring.

The fixing ring compresses the l-shaped spring plate by rotating clockwise, so that the cover is turned downward to reach the purpose of hand warming.

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