

# Design and implementation of a changeable advertising light box

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**Abstract.** An advertisement light box capable of changing advertisements comprises a light box body, a groove is arranged in the light box body, a transparent plate is arranged at the opening of the groove, a first rotating shaft is arranged in the groove, a parallel second rotating shaft is arranged below the first rotating shaft, the first rotating shaft and the second rotating shaft are driven and connected through the first conveyor belt and the second conveyor belt, and two first clips are arranged at the upper and lower ends of the first conveyor belt, Two second clips are arranged at the upper end and the lower end of the second conveyor belt, and a connecting switch is arranged in the groove; The connection switch comprises a first conductive sheet connected to the first conveyor belt, a second conductive sheet arranged on the upper side of the groove and a third conductive sheet arranged on the lower side of the groove. The realization of this paper is to exchange the positions of the two advertising papers which are convenient for clamping, so that the two advertising papers can be displayed in different time periods.

**Keywords:** Advertising; Advertising light box; Rotating shaft.

## 1. Introduction

Advertising, as the name suggests, is to advertise, that is, to inform the general public of something. In terms of its meaning, advertising can be divided into broad sense and narrow sense. Broad advertising refers to non-profit advertising, such as government announcements, notices and statements of political parties, religions, education, culture, municipal administration, social organizations and so on. Advertising in a narrow sense refers to advertising for profit. It usually refers to commercial advertising, or economic advertising. It is a means for industrial and commercial enterprises to spread commodity or service information to consumers or users through advertising media in order to promote commodities or provide services. Commodity advertising is such economic advertising.

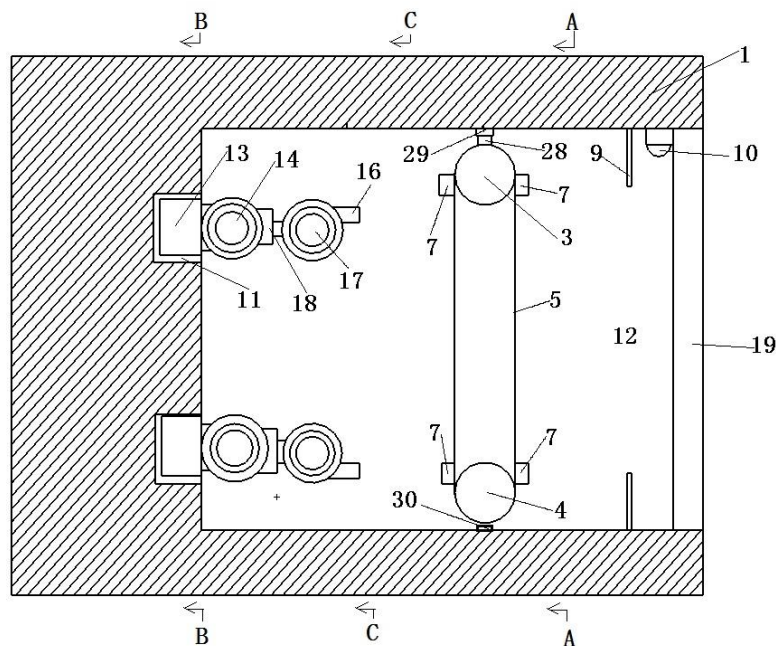
At present, the advertising light box is also known as "light box POSTER" or "night light POSTER". As a form of advertising, the advertising light box conveys information to people outdoors and far away through natural light (day) and auxiliary light (night). The hyperopia effect of advertising works is strong, which is very conducive to the deliberate attention of fast-paced, efficient and hurried people in modern society.

However, the current advertising light box is not convenient to replace the advertisements on the advertising light box; Some advertising light boxes change advertisements through the change of advertising paper or advertising cloth, but it is not convenient to change new advertisements. At the same time, the change of advertising paper or advertising cloth will not be very flexible; When some advertising light boxes are replaced with new advertisements, the whole rear panel needs to be removed, which makes the disassembly or installation very inconvenient, and the stability is poor after installation and fixation; In addition, the power switch is often not set on the advertising light box, which makes the staff have great potential safety hazards of electric shock when replacing the billboard.

## 2. Technical Design Scheme

The utility model relates to an advertising light box capable of changing advertisements, which comprises a light box body, a groove is arranged in the light box body, a transparent plate connected with the light box body is arranged at the opening of the groove, a fluorescent lamp is arranged at the

upper end of the groove close to the transparent plate, a first rotating shaft parallel to the horizontal line is arranged in the groove, and one end of the first rotating shaft is connected with a first motor fixedly connected with the inner wall of the groove, A second rotating shaft arranged parallel to the first rotating shaft is arranged below the first rotating shaft, the first rotating shaft and the second rotating shaft are connected through the transmission of the first conveyor belt and the second conveyor belt, the first conveyor belt and the second conveyor belt are respectively arranged at both ends of the first rotating shaft, the first conveyor belt and the second conveyor belt are parallel to each other, and the upper end of the first conveyor belt is provided with a first clamp arranged symmetrically about the first rotating shaft, The lower end of the first conveyor belt is provided with a first clip symmetrically arranged about the second rotation axis, the upper end of the second conveyor belt is provided with a second clip symmetrically arranged about the first rotation axis, the lower end of the second conveyor belt is provided with a second clip symmetrically arranged about the second rotation axis, and a connecting switch is arranged in the groove; The connection switch comprises a first conductive sheet connected to the first conveyor belt, the upper end of the first conductive sheet is provided with a second conductive sheet matched and connected with the first conductive sheet, and the lower end in the groove is provided with a third conductive sheet matched and connected with the first conductive sheet; The outside of the lamp box is provided with a light intensity detection sensor and a power connection base. The power connection base is connected with the mains power. The time-delay disconnection normally open contact of the power connection base, the first motor and the light intensity detection sensor and the time-delay disconnection normally closed contact of the connection switch.



**Fig. 1** structural diagram of advertising light box with changeable advertising

Light box 1, first motor 2, first rotating shaft 3, second rotating shaft 4, first conveyor belt 5, second conveyor belt 6, first clip 7, second clip 8, baffle 9, fluorescent lamp 10, chute 11, first slider 12, second slider 13, first multi section telescopic rod 14, first clamping member 15, second clamping member 16, second multi section telescopic rod 17, first electric telescopic push rod 18, transparent plate 19, second electric telescopic push rod 20, third electric telescopic push rod 21, Replace the key 22, the fixed rod 23, the rotating rod 24, the first contact piece 25, the second contact piece 26, the rotating handle 27, the first conductive piece 28, the second conductive piece 29 and the third conductive piece 30.

### 3. Example given to illustrate

The utility model relates to an advertising light box capable of changing advertisements, as shown in Fig. 1: it comprises a light box body 1, a groove is arranged in the light box body 1, a transparent plate 19 connected with the light box body 1 is arranged at the opening of the groove, a fluorescent lamp 10 is arranged at the upper end of the groove close to the transparent plate 19, a first rotating shaft 3 parallel to the horizontal line is arranged in the groove, and one end of the first rotating shaft 3 is connected with a first motor 2 fixedly connected with the inner wall of the groove, A second rotating shaft 4 arranged in parallel with the first rotating shaft 3 is arranged below the first rotating shaft 3. The first rotating shaft 3 and the second rotating shaft 4 are connected through the transmission of the first conveyor belt 5 and the second conveyor belt 6. The first conveyor belt 5 and the second conveyor belt 6 are respectively arranged at both ends of the first rotating shaft 3. The first conveyor belt 5 and the second conveyor belt 6 are parallel to each other. The upper end of the first conveyor belt 5 is provided with a first clip 7 arranged symmetrically about the first rotating shaft 3, The lower end of the first conveyor belt 5 is provided with a first clip 7 symmetrically arranged about the second rotation axis 4, the upper end of the second conveyor belt 6 is provided with a second clip 8 symmetrically arranged about the first rotation axis 3, the lower end of the second conveyor belt 6 is provided with a second clip 8 symmetrically arranged about the second rotation axis 4, and a connecting switch is arranged in the groove; The connection switch comprises a first conductive sheet 28 connected to the first conveyor belt 5, the upper end of the first conductive sheet 28 is provided with a second conductive sheet 29 matched with the first conductive sheet 28, and the lower end of the groove is provided with a third conductive sheet 30 matched with the first conductive sheet 28;

### 4. Conclusion

Compared with the prior art, the advantages of this design are:

1). The light box is provided with a connection switch, a light intensity detection sensor, a first conductive sheet, a second conductive sheet, a third conductive sheet, a first clip and a second clip. Two advertising papers or advertising cloth are respectively arranged on both sides of the first rotating shaft. The two advertising papers or advertising cloth are arranged parallel to the transparent plate. One side of each advertising paper or advertising cloth is fixed on the first conveyor belt through the first clip, The other side of each advertising paper or advertising cloth is fixed on the second conveyor belt through the second clip. When it is daytime, the sky darkens with the passage of time. At this time, the real-time light intensity monitored by the light intensity detection sensor is within the set light intensity range. At this time, the time-delay disconnection of the light intensity detection sensor, the normally open contact is closed immediately, and the time-delay disconnection will be made after a period of time when the real-time light intensity is not within the set light intensity range, At this time, the connection switch is not energized, the time-delay opening of the connection switch and the normally closed contact are closed, so that the first motor starts to drive the first rotating shaft to rotate, and the second rotating shaft is driven to rotate through the first conveyor belt and the second conveyor belt, so that the advertising paper or advertising cloth clamped on the first conveyor belt and the second conveyor belt moves along the movement of the first conveyor belt and the second conveyor belt, and the first conductive sheet moves along a conveyor belt, When the first conductive sheet moves to contact with the third conductive sheet, the delay disconnection of the trigger connection switch, and the normally closed contact will be disconnected after a period of time. After the delay disconnection of the trigger connection switch and the normally closed contact are disconnected, the first motor will not be powered, making the first motor stop moving. At this time, the positions of the two advertising paper or advertising cloth are exchanged, which is convenient for displaying another advertising paper or advertising cloth.

2). The light box is provided with an opening door, a replacement key, a fixed rod, a rotating rod, a first contact piece and a second contact piece. When it is necessary to replace the advertising paper or advertising cloth, the staff will open the opening door to facilitate the staff to replace the new

advertising paper or advertising cloth. After opening the door, move the replacement key and manually move the rotating handle to separate the first contact piece from the second contact piece, It is convenient to control that the first motor is not powered on, to forcibly stop the rotation of the first rotating shaft, to power off the whole light box, and to protect the personal safety of workers.

3)The advertising light box is equipped with a first pressure sensor, a second pressure sensor and an infrared detection sensor. The normally closed contact of the replacement key is normally closed when the replacement key is not powered on. When the first clamping part and the second clamping part have not clamped the advertising paper or cloth, the infrared detection sensor does not detect the existence of the advertising paper or cloth, the infrared detection sensor is not powered on, and the normally open contact of the infrared detection sensor is closed, The third electric telescopic push rod is energized and extended to drive the second slider to move in the direction of the first slider, reducing the distance between the first slider and the second slider, which is convenient for people to clamp the advertising paper or advertising cloth with the first clamping part and the second clamping part. After the first clamping part and the second clamping part clamp the advertising paper or advertising cloth, the infrared detection sensor detects the existence of the advertising paper or advertising cloth, and the infrared detection sensor is powered on, The normally open contact of the infrared detection sensor is closed, and the third electric telescopic push rod is extended, which is convenient to adjust the distance between the first slider and the second slider and maintain a certain distance. At this time, the first pressure sensor and the second pressure sensor do not feel the pressure, and the normally closed contact of the first pressure sensor and the normally closed contact of the second pressure sensor are not closed, so that the first electric telescopic push rod is energized and extended, Drive the first clamping part and the second clamping part holding the advertising paper or advertising cloth to move towards the first conveyor belt. When the advertising paper or advertising cloth touches the first clamp and the second clamp, the first pressure sensor and the second pressure sensor monitor the pressure value, and the normally closed contact of the first pressure sensor and the normally closed contact of the second pressure sensor are powered off, so that the first motor and the second motor are powered on and started, which is convenient for the first clamp It is not allowed to replace the first pair of advertising paper or the second pair of advertising paper at the same time.

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