

Design and Application of the New Multi-functional Moxibustion Box

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Abstract

Our team is dedicated to exploring new models for the treatment of spleen and stomach diseases using external therapy techniques of Traditional Chinese Medicine (TCM). We have developed a new multi-functional external therapy device for TCM that innovatively combines the concept of combined therapy with moxibustion. Additionally, through the application of artificial intelligence and new cross-industry intelligent manufacturing technologies, we have creatively incorporated an intelligent anti-burning system, enhancing the automation and informatization level of the product. We have implemented the concept of digitalization from the design stage, thus truly realizing an in-depth exploration of moxibustion, a method of external therapy in TCM. This chapter will summarize the design and application of a new multi-functional moxibustion box, aiming to provide a comprehensive reference for improving the symptoms of spleen and stomach diseases through moxibustion therapy.

Keywords

Moxibustion; Moxibustion Box; Appliance Development; Spleen and Stomach Disease.

1. Introduction

Inheriting and innovating traditional Chinese medicine is an important part of the cause of socialism with Chinese characteristics in the new era, and a major event in the great rejuvenation of the Chinese nation. Nowadays, people are paying more and more attention to their physical health and quality of life, and the whole country has set off a tide of "health hot". The Chinese people have gradually abandoned the concept of "carrying minor illnesses and serious illnesses" in the past, and the concept of health has risen from disease treatment to active management. Health is no longer an exclusive activity for the elderly, middle-aged people, young people and even teenagers are actively joining the "health army". The maintenance concept of the spleen and stomach is deeply rooted in people's hearts and has become the top priority. Compared with traditional Chinese medicine, massage, acupuncture, moxibustion is a relatively simple, economic, convenient way of health, for a long time to walk in the forefront of the trend of health[1]. Therefore, it is of profound research significance to integrate modern technology more into the field of moxibustion, promote product innovation and upgrading, and make the development direction more diversified and personalized to meet the needs of different consumers.

2. The Structure of the Moxibustion Box

The product consists of an external multi-functional intelligent moxibustion box and moxa sticks. Moxibustion box is a multi-functional box stacked up and down, with a series of intelligent functions such as anti-burn. The new traditional Chinese medicine external treatment multi-functional treatment box is composed of two parts, including traditional Chinese medicine fumigation treatment box and multi-functional moxibustion box, which are disassembled and used separately. The moxibustion box and the fumigation box are provided with a binding that can be strengthened to help

fix the moxibustion position. And the size is pocket-like size, about 10CM in diameter, easy to carry, anytime and anywhere can be treated.

At the same time, we are also equipped with a complete traditional Chinese medicine external treatment multi-functional moxibustion box operation process teaching and detailed instructions, for products we achieve national distribution in addition to remote areas, and ensure the installation and normal use of instruments. Local moxibustion on specific acupoints and the physical and chemical factors generated when moxibustion is burned, including the warm medicinal force generated by burning moxibustion, can act on the effective site of acupoint perception through a specific pathway and enter the peripheral nerve incoming pathway, stimulating signal transmission into the center, and sending out signals through integration. Then regulate the body's neuro-endocrine-immune network system, circulatory system, so as to adjust the internal environment of the body, regulate the homeostasis, encourage the positive qi to control external evil, to regulate the positive qi, tonifying the spleen and stomach and other functions. The moxibustion box can combine the temperature adjusting mechanism with artificial intelligence to realize automatic temperature adjustment by microcontroller. If the temperature is too high or reaches the artificially set temperature, the internal microcontroller module can output digital signals to control the temperature adjustment device, and adjust the second rotation knob to drive the lifting thread rod to rotate the internal thread of the moxibustion box bottom seat and the inner liner of the moxibustion box, adjust the height of the moxibustion box placed in the inner liner of the moxibustion box, adjust the height of the moxa cone from the skin surface, so that the moxa cone is far away from the skin and avoid burns.

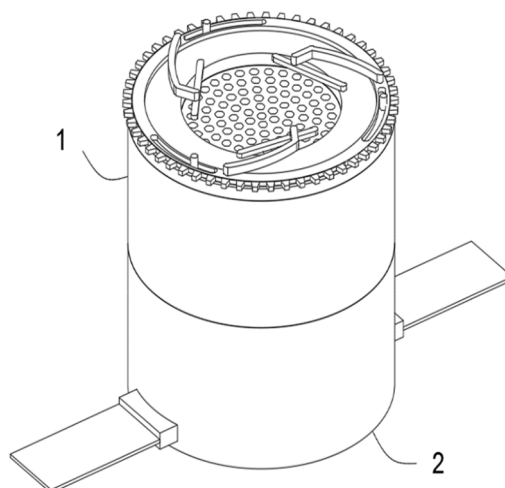


Figure 1. Diagram of the three-dimensional structure of the connection mechanism in the moxibustion box

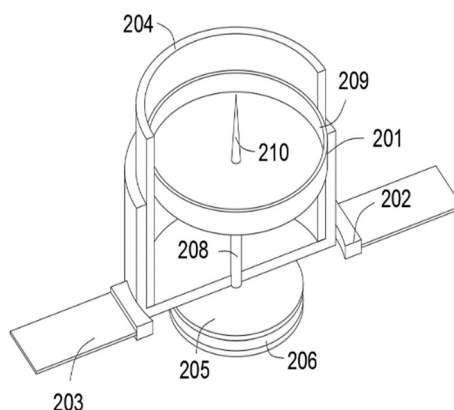


Figure 2. Three-dimensional structure diagram of the temperature regulating mechanism in moxibustion box

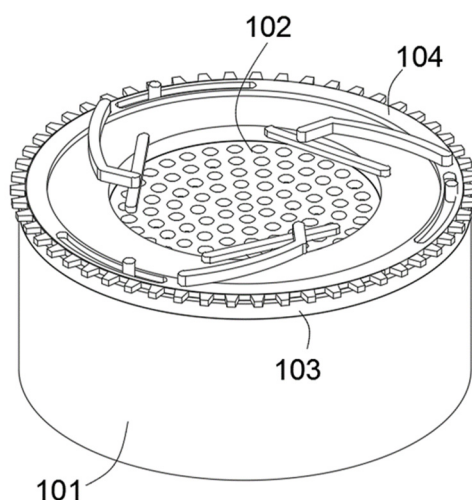


Figure 3. contraction state of the clamping limit rod in the moxibustion box

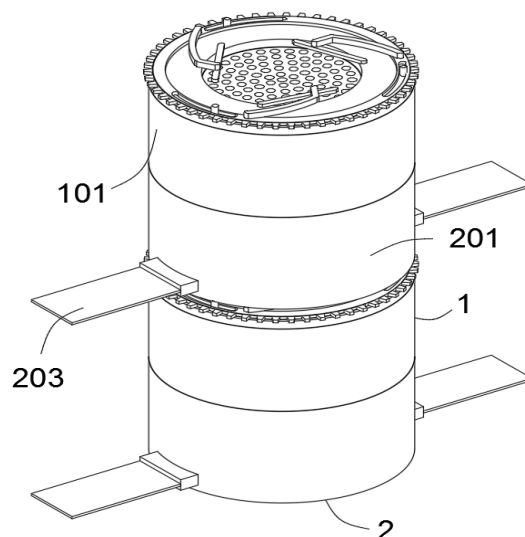


Figure 4. The three dimensional structure diagram of the bottom seat of the moxibustion box and the inner gallbladder section of the moxibustion box as a whole

Moxibustion box device description: Figure: 1, connecting mechanism; 101, moxibustion box cover; 102, breathable mesh cover; 103, splicing base; 104, rotation ring; 105, turn the chute; 106, limit column; 107, turn the connecting rod; 108, clamp the limit rod; 109, limit mounting hole; 110, the first turn knob; 2, temperature adjustment mechanism; 201, moxibustion box bottom seat; 202, connector; 203, magic strap; 204, moxibustion box inner bladder; 205, connect the limit block; 206, connection slot; 207, the second turn knob; 208, lifting thread rod; 209. Wormwood placing box; 210, wormwood fixed needle.

3. Mechanism of Moxibustion in Treating Spleen and Stomach Diseases

Stomach and spleen diseases are a name under the theoretical system of traditional Chinese medicine, which usually refers to some abnormalities in the functions of the stomach and spleen in humans[2].The specific pathological mechanisms include spleen and stomach deficiency, spleen and stomach deficiency and cold, spleen and stomach damp heat, and liver qi invading the spleen. Specific manifestations include abdominal distension, diarrhea, and poor appetite. If spleen and stomach deficiency persists for a long time, the body's qi and blood generation will be affected, leading to some signs and symptoms of insufficient qi and blood, such as pale or yellowish

complexion, dull spirits, fatigue and weakness, and functional decline and reduced immunity of internal organs.

Moxibustion mainly uses various methods such as warm heat stimulation, drug action, infrared radiation, and acupoint stimulation to act on specific parts or acupoints of the human body, adjust the body's yin-yang balance, alleviate various symptoms, and achieve the purpose of treatment and health care[3]. Warm heat stimulation can warm the meridians, dispel cold and dampness, and the drug action has anti-bacterial, anti-inflammatory, and analgesic effects. Infrared radiation can promote local blood circulation in the human body, and acupoint stimulation can adjust the body's yin-yang balance and alleviate various symptoms. According to the principle of moxibustion therapy for diseases, it can be understood that not all stomach and spleen diseases are suitable for moxibustion. The warmth of moxibustion can enhance the fire within the human body, so stomach and spleen damp heat or stomach yin deficiency and other stomach and spleen diseases cannot be treated with moxibustion, otherwise it will add fuel to the fire and make the disease worse. Moxibustion can dispel cold and dampness, unblock meridians, and regulate the organs. Therefore, moxibustion has very significant effects on stomach and spleen diseases with pathogenesis of stomach and spleen qi deficiency, stomach and spleen yang deficiency, and stomach and spleen coldness.

4. Moxibustion Box Advantages

The new portable moxibustion box designed by our team has the characteristics of "simplicity, convenience, efficiency, and affordability". On the basis of the traditional moxibustion box, a breathable mesh cover, a temperature regulation system, and an anti scald device are added to improve the safety of use while reducing the single use price to meet the needs of various consumer levels. Therefore, it has good development space.

Easy to operate

This product consists of an external smart moxibustion box and an internal moxa stick. The moxibustion box is a multi-functional box that can be stacked up and down, with a compact size. The breathable mesh cover effectively limits the direction of smoke after the moxa burns, and through the limiting effect of the transfer slot, it achieves the effect of easy organization and storage. At the same time, the magic strap is convenient for fixing, reducing the labour force required for long-term operation.

Establishment of anti scald device

Compared to traditional moxibustion boxes, our innovation lies in the addition of a special anti-scald device within the moxibustion box. We combine the temperature regulation mechanism with artificial intelligence, achieving automatic temperature control through a microcontroller. When the temperature is too high, the temperature-sensitive device receives a signal and can automatically lift the lever to move away from the skin, preventing scalds[4]. If the temperature is too high or reaches a pre-set temperature by the user, the internal microcontroller module can output a digital signal to control the temperature regulation device. It adjusts the second rotating knob to drive the lifting screw rod to turn within the internal threads of the moxibustion box base and the inner liner, adjusting the height of the mugwort placement box inside the moxibustion box. This adjusts the height of the moxa cone from the skin surface, keeping it away from the skin and preventing scalds.

5. Moxibustion Box Use Method

Please refer to Figures, the moxibustion box provides a technical solution: a multi-functional combination Moxibustion Box, including a connection mechanism 1, and an air permeable mesh cover 102 installed on the inner top side of the connection mechanism 1. The bottom of the connection mechanism 1 is equipped with a temperature regulation mechanism 2, and the inner side

of the temperature regulation mechanism 2 is equipped with an acupoint fixing needle 210. The connection mechanism 1 includes an Aiyao box cover 101, the air permeable mesh cover 102 is fixedly installed on the top inner side of the Aiyao box cover 101, the top of the Aiyao box cover 101 is fixedly installed with a snap-fit base 103, wherein the top of the snap-fit base 103 is pivotally connected with a rotating ring 104, the inner side of the rotating ring 104 is equipped with a number of rotating slots 105, wherein the inner side of the rotating slots 105 is slidably connected with a limiting column 106, the limiting column 106 is fixedly installed on the top of the snap-fit base 103, the top of the rotating ring 104 near the rotating slots 105 is pivotally connected with a rotating connection rod 107, the end of the rotating connection rod 107 is pivotally connected with a holding limiting rod 108, the inner center of the snap-fit base 103 is opened with a limit installation hole 109, the outer side of the rotating ring 104 is fixedly installed with a first rotating knob 110, the Aiyao box cover 101 is screwed with the inner Aiyao box 204, and the Aiyao box cover 101 is in contact with the Aiyao box base 201. The holding limiting rod 108 is connected to the connecting limiting block 205 through the connection groove 206, and the connection mechanism 1 is used to not only rotate the first rotating knob 110 to drive the rotating ring 104 to rotate on the top of the assembly base 103, but also to rotate the connecting rod 107 under the limiting action of the sliding groove 105. When the holding limiting rod 108 is connected to the connection groove 206 and the connecting limiting block 205 through the connection mechanism 1, it can realize the connection of two acupuncture boxes, which is convenient for sorting and storing the acupuncture boxes and prevents the scattered loss of the acupuncture boxes. At the same time, the characteristics of threaded connection between the acupuncture box cover 101 and the inner pot 204 of the acupuncture box are used to realize the connection between the acupuncture box cover 101 and the base 201 of the acupuncture box.

The temperature regulation mechanism 2 includes an acupuncture box base 201, the bottom sides of which are symmetrically installed with connectors 202 on the acupuncture box base 201. The inner sides of the two connectors 202 are fixedly connected with magic elastic bands 203. The two magic elastic bands 203 are adhered together. The acupuncture box base 201 is internally fixedly installed with an acupuncture box inner liner 204. The bottom center position of the acupuncture box base 201 is fixedly installed with a connection limit block 205. The outer side of the middle part of the connection limit block 205 is provided with a connection groove 206. The bottom center position of the connection limit block 205 is pivotally connected with a second rotating knob 207. The top of the second rotating knob 207 is fixedly connected with a lifting threaded rod 208. The lifting threaded rod 208 is threadedly connected with the connection limit block 205, the acupuncture box inner liner 204, and the acupuncture box base 201. The lifting threaded rod 208 is pivotally connected with an herb placement box 209. The herb fixing needle 210 is fixedly installed in the center of the herb placement box 209. The herb placement box 209 is slidably connected with the acupuncture box inner liner 204 via the lifting threaded rod 208. The connection limit block 205 is engaged with the limit installation hole 109 of the assembly base 103 via the connection installation hole 108. By setting the temperature regulation mechanism 2, not only can the second rotating knob 207 drive the elevating threaded rod 208 to rotate within the inner cavity of the acupuncture box base 201 and the inner cavity of the acupuncture box inner liner 204 through the use of a threaded screw, thereby adjusting the height of the mugwort container 209 in the inner cavity of the acupuncture box inner liner 204, but also adjusting the temperature of the acupuncture box by adjusting the distance between the acupuncture box inner liner 204 and the ventilation net cover 102, thus avoiding the phenomenon of acupuncture burns. At the same time, by setting the connector 202 and the magic elastic band 203, the acupuncture box can be fixed at any position on the human body, making it convenient to perform acupuncture on different parts of the body.

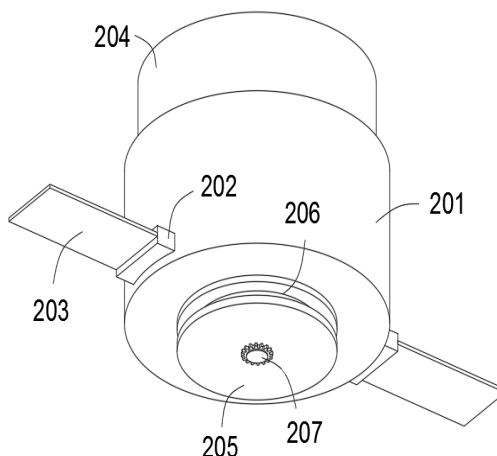


Figure 5. A Schematic diagram of the three dimensional structure of the moxibustion box temperature regulation mechanism

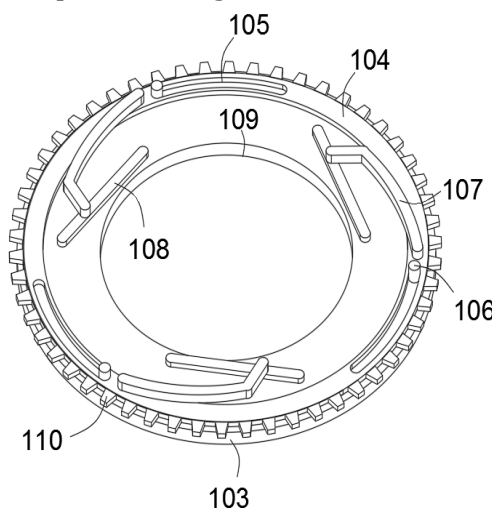


Figure 6. A Schematic diagram of the three dimensional structure of the moxibustion box temperature regulation mechanism

6. Brief Summary

In the context of the deep integration of traditional Chinese medicine therapies and modern technology, the emergence of the new multi-functional moxibustion box has opened up new paths for the treatment of stomach and spleen diseases. This moxibustion box, with its unique design concept and innovative functions, showcases the modern charm of traditional Chinese medicine treatment.

This article provides a detailed introduction to the application of the new multi-functional moxibustion box in the treatment of stomach and spleen diseases, from the structure features of the moxibustion box to the treatment mechanism, and then to its advantages and usage methods, all of which have been deeply explored[5].

The moxibustion box achieves precise control of moxibustion temperature through its intelligent temperature control system, effectively avoiding the burn risk that may occur in traditional moxibustion, improving the safety of treatment. At the same time, by setting up connectors and magic straps, the moxibustion box can be fixed in any position on the human body, making it convenient to moxibust different parts of the body.

In terms of treatment mechanism, the new multi-functional moxibustion box fully utilizes the warmth effect, pharmacological action, and regulation of the meridians of moxibustion, and conducts individualized treatment for stomach and spleen disease patients based on their

specific symptoms[6]. By stimulating specific acupoints, it adjusts the blood flow of the stomach and spleen meridians, thereby adjusting the internal environment of the body and regulating homeostasis. The new multi-functional moxibustion box effectively relieves symptoms such as abdominal distension, sleep disorders, menstrual irregularities, back pain, poor appetite, cold diarrhea, and loose stools caused by dysfunction of the spleen and stomach. It improves the quality of life for patients.

Moreover, the moxibustion box can maximize the efficacy of the medicine without any hormones, and it is purely herbal, with fewer side effects and more economical and safe. Compared with other treatment methods on the market, it has fewer side effects and a more favorable benefit-to-cost ratio[7].

In actual use, the portable design and flexible adjustment function of the new multi-functional moxibustion box have received widespread praise from patients. Patients can perform moxibustion therapy at any time and anywhere according to their needs, greatly improving the convenience and flexibility of treatment. In addition, the box has good durability and stability, ensuring safety and effectiveness during long-term use.

In summary, the new multi-functional moxibustion box has shown significant advantages and broad application prospects in the treatment of spleen and stomach diseases. It not only improves the comfort and safety of moxibustion therapy, but also brings better treatment effects to patients through personalized treatment plans. With the continuous promotion and popularization of traditional Chinese medicine therapies, the new multi-functional moxibustion box is expected to become one of the important tools in the treatment of stomach and spleen diseases, bringing health blessings to more patients.

References

- [1] Zhang R, Wang X. World Century Compendium To Tcm - Volume 6: Introduction To Acupuncture And Moxibustion[M]. World Scientific Publishing Company:2013-09-23.
- [2] Lei X, Liu Y. Clinical Practice of "Qin Medicine" in the Treatment of Spleen and Stomach Diseases [J]. Journal of Contemporary Medical Practice, 2024, 6 (7): 159-162.
- [3] Xin L, Hongfang N, Xunrui H. [Time-effect observation of stimulating effect on acupoints after micro-invasion embedding in healthy subjects]. [J]. Zhongguo zhen jiu = Chinese acupuncture & moxibustion, 2016, 36 (6): 607-611.
- [4] Luis G H, Sofian A, S G A, et al. Headgear compliance as assessed by a temperature-sensitive recording device: a prospective clinical study. [J]. European journal of orthodontics, 2019, 41 (6): 641-645.
- [5] Hai X, Liang-Liang C, Hong-Liang C, et al. [Professor CHU Hao-ran 's experience of acupuncture and moxibustion of regulating spleen-stomach and differentiating meridians-collaterals]. [J]. Zhongguo zhen jiu = Chinese acupuncture & moxibustion, 2019, 39 (11): 1211-3.
- [6] Wu J, Qiu L. Exploration of the Correlation Between Myofascial Meridians and Twelve Meridian Tendons [J]. Health Research, 2024, 8 (3).
- [7] Wu C, An B, Meng T, et al. The application of acupuncture and moxibustion in the treatments of gastralgia caused by deficient cold of spleen and stomach based on document analysis and data analysis (Preprint) [J]. JMIR Medical Informatics, 2020.