

Research on Humanized Concept-based Design of College Apartment Air Drying Articles

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Abstract: In this paper, the research status of air drying articles design in college Apartments is analyzed, and functional impairment and design flaw in use are discussed; through the analysis of drying habit and drying function needs of college students, the college apartment air drying article is re-considered and re-designed based on humanized concept, which provides new concept for design of college apartment air drying articles.

Keywords: College Apartments, Air Drying Articles, Humanized Concept, Function.

1. Introduction

Over the years, the cost of student dormitories has always been the lowest among others; in addition, dormitory buildings have the highest space availability factor, and reflect the most balanced, basic and streamlined using needs [1]. With the social development, higher education is developing toward mass education and it pays more attention to people oriented education concept and respects for humanity and creativity. In order to help students to maintain the best state of learning and keep healthy, colleges are improving and creating favorable learning and living environments for students in the dormitories [2]. In daily life, air drying space is a must for students to dry their clothes, therefore, it must be considered in the design of college dormitories [3]. In late 1990's, student dormitories were upgraded to student apartments thanks to the upgrading of living facilities. The main change is that there is independent washing and toilet facility on the balcony of each apartment, which makes the indoor cloth drying possible in colleges. Compared to traditional clothes drying methods, students prefer indoor cloth drying, because traditional methods, i.e. drying in corridors, on windows and the roof floor as well as outdoor drying are time consuming and painstaking and impact overall appearance of the dormitory. However, the design traditional air drying articles cannot meet the needs of development of college apartments, and has flaws and function shortage. Therefore, it is indispensable to research college apartment design based on humanized design principle.

2. Research Status of College Apartment Air Drying Articles

The initiation of clothes drying behavior is currently unknown; in the early days, clothes drying are carried out outdoors, with the appearance of balcony in building design, indoor clothes drying became the routine behavior in daily life. The construction of college apartment balconies facilitates cloth drying for students, and the closely related clothes drying articles also play significant role. Due to the limitation of apartment space and construction cost, air drying articles are usually provided as auxiliary products, and often, only the most basic clothes hanging rods and clothing fork with simple design and functions are provided. This basic household furniture may cause many problems during the use by students.

The design of such products as clothes hangers, clothes hanging rods and clothing forks influences the cloth drying methods of users. Currently, there is no clothes air drying article specially designed according to the environment features of colleges and overall air drying needs of students. During the process of clothes air drying of students, the simple functions of clothes hangers, clothes hanging rods and clothing forks cannot meet the increasing using needs of students, and the design flaws of the product affect user experience.

Cloth air drying has become a part of daily life of residents in China. Nowadays, with the social and economic development, people are paying more attention to their living quality [4]. College students also bring up new demands on air drying articles.

3. Humanized Design of College Apartment Air Drying Articles

Nowadays, with the rapid development of market economy, people pay more attention to the quality and aesthetic taste of life, and have higher requirements on product design [5]. Humanized design is the ultimate design pursuit in the sense of human existence, it embodies the "people-oriented" design core concept, and it is the integration of aesthetics and ergonomics and the perfect and harmonious combination of people and products as well as people and nature [6]. This requires that college apartment drying article design should be people-oriented to meet both psychological and physiological needs of users, and give comprehensive considerations to function, shape, material, color and other aspects to achieve the harmonious balance among people, things, and the environment.

3.1 Refined Function

The specific function and overall application or purpose are called the product function. Nowadays, the humanized design of product function has always been the focus of people's attention. From the point of view of user's demand, how to perfect the function of product and how to make the function design more humanized are important factors in the function design [7]. During the design of air drying articles in college apartments, various needs of users shall be fully considered in-depth to enrich product functions. The process flow of clothes drying, for example, tidying up and taking out shall be analyzed to refine and re-design functions of air drying articles according to students' needs.

3.2 Simplified Structure

People-oriented design is a systematic design system that involves a wide range of factors, not only such material conditions as the form, color, structure and material of the product, but also social, environmental, man-machine, psychological and other factors [8]. The college apartment is a relatively narrow yet frequently used space for students, and clothes air drying space is a more confined space shared by all the students in the apartment, thus, the clothes drying balcony space for students is limited. This requires that the shape and structure of college apartment drying articles

must be simplified to ensure that the articles will not occupy the students' daily life space. Meanwhile, they should also be easy to operate and conform to people's daily cognition and operation habits, to meet the various needs of users.

3.3 Diversity Respect

Universal design is the embodiment of the idea of human-oriented design. The ideal goal is to meet the needs of all people, so that people with different health conditions can use the product [9]. China is a vast country, each university has its own unique geographical location and climate features, in addition, students from different regions with different lifestyles and physiological characteristics (short or fat, healthy or disabled) lives in one apartment, therefore, differences must be respected in design of air drying articles in college apartment. In terms of color and material, not only the characteristics of the region, climate and customs of the university, but also the behavior habits, psychological needs and physiological differences of the students should be considered to ensure the universality of college air drying articles and meet the cloth drying requirements of college students.

4. Design Cases Demonstration

A well-designed product must embody the ingenious integration of and balance among human, environment, economy, technology, culture and other factors [10]. Cloth drying in the balcony is an inevitable activity of students living in college apartments, and the main products used are clothes hanger, clothes-drying rod and clothing fork. According to the analysis and consideration of various inconveniences during the use of air drying articles for cloth drying, the products are designed according to humanized design concept, and the specific process flow is as follows:

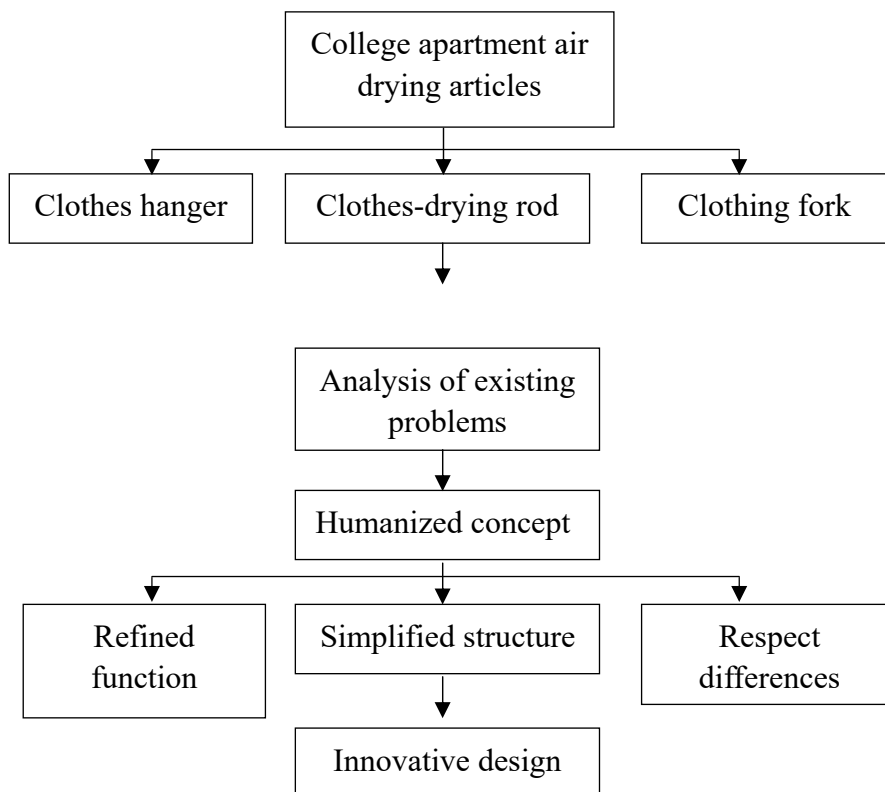


Fig. 1 Roadmap of Humanized Design of College Apartment Air Drying Articles

4.1 Clothes Hanger

People usually hang out their clothes in hangers on clothes-drying rod. The main role of the clothes hangers is opening clothes, expanding clothing and hanging clothes. However, it often requires good weather and high temperature to dry clothes. Different geographical distribution of colleges and universities leads to great climatic and temperature variation. It will not be a wise choice to dry clothes only by weather if one are in urgent need of washed clean clothes. Besides, air-dried clothes can also harm the quality of clothes and the health of students if they stay wet for a long time, which brings a lot of inconvenience to students' daily life.

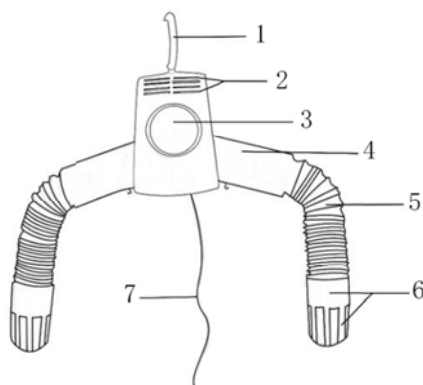


Fig. 2 Ventilating State

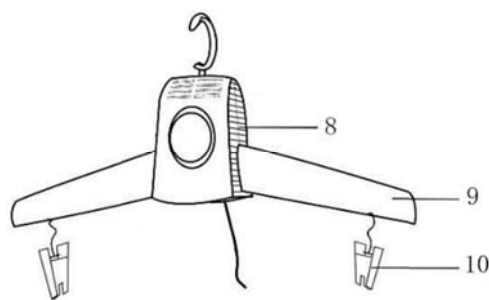


Fig. 3 Common State

- 1 Hook 2 Ventilating and heat dissipating vent 3 Switch knob
4 Removable part 5 Flexible vent pipe 6 Ventilating part
7 Electric wire 8 Air inlet vent 9 Hanger shoulder 10 Clamp

Through the consideration of the function of the clothes hanger, the innovative design is carried out. Under the principle of functional refinement, as shown in figure 2, after the hanger is electrified, the internal motor can be controlled by the switch knob to output cool and hot air. Through the transformation of flexible vent tube, it can be used to dry the clothes in different positions. Shoes may also be dried when necessary. The design eliminates the need to rely on good weather when students dry clothes, and allows clothes to be quickly dried by electricity alone. In addition, as shown in figure 3, the original ventilating device is removed and replaced with common clothes hanger shoulder, combined with clamps, which not only can dry clothes, but also can dry socks, underwear and other small pieces of clothing; under the principle of structure simplification, removable parts are adopted for the clothes hanger. On the premise of satisfying the function refinement, the overall shape is simple, convenient to disassemble and assemble, and conforms to the operation habits of the users; Under the principle of respecting differences, different shapes embody different uses, so that students can determine the structure of the clothes hanger according to their own actual situation.

4.2 Clothes-drying Rod

As the main product of drying clothes, the traditional hanging-type clothes-drying rod has single function and many design defects. For example, in windy and rainy days, clothes that are hung on a traditional clothes-drying rod will fall and get wet; when too many clothes hung on the clothes-drying rod, it is difficult to separate dry areas from wet areas. Clothes that have just dried will also be moisturized by evaporation; Clothes hung up too tightly can also lead to clothes dyeing. It is not convenient for the short students to hang and tidy their clothes because the clothes-drying rod is too high.

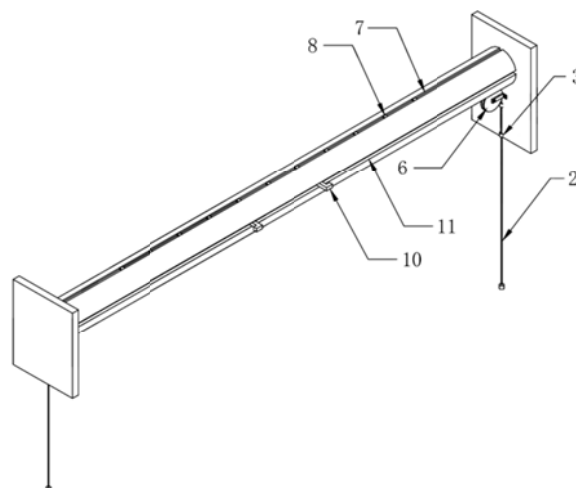
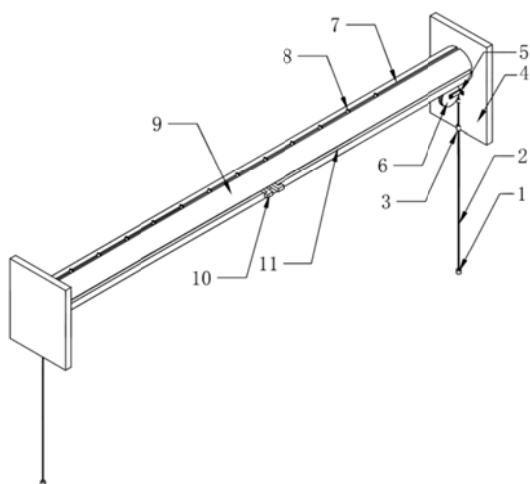


Fig. 4 Idle State of Clothes-drying Rod Fig. 5 Service State of Clothes-Drying Rod

1 Slack rope 2 Drawing rope 3 Fixed button 4 Fixed plate 5 L-shape iron
6 Pulley 7 Channel 8 Partition block 9 Hollow rod 10 Hook 11 Slideway

Through the analysis of the problems of traditional clothes-drying rod and combined with the design principles of the humanized concept, the innovative design is carried out. Firstly, to respect the body size of the user, as shown in Figure 4, drawing ropes are set on both sides of the clothes-drying rod to facilitate the use of people of different stature. Secondly, based on the refinement function, as shown in Figure 5, in order to avoid falling and mutual infiltration dyeing of clothes, clothes need to be fixed and hung in dry and wet areas respectively. When the rope is drawn, the hook moves in the corresponding direction in the slideway, which drives the hanger to move to the corresponding side. The hook of the hanger will cause the partition block to swing to the channel. Upon the hanger hook passing by, the partition block connected in the channel by the torsion spring will resume the original position, which limiting the hanger to move only in a certain range, making the clothes not easy to fall off, and also realizing the dry and wet division. Thirdly, the simplified structure realizes the same way to occupy hanging placement as traditional one without occupying more balcony space, and is in line with the user's use habits.

4.3 Clothing Fork

As an auxiliary product of hanging-type clothes-drying rod, the clothing fork is essential. Because the traditional hanging-type clothes-drying rod is generally placed high, the clothes have to be put on the clothes hanger first, and then by the clothing fork, supported to hanging on the clothes-drying rod. Repeated action brings about inefficiency; when confronted with some clothes that need to be tidied before drying, such as shirts, pants and so on, there is no operation device for temporary hanging, wasting time and energy.

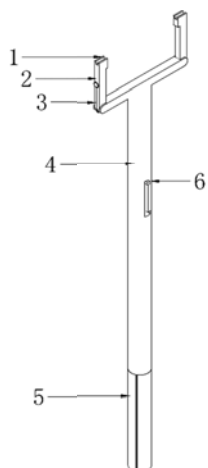


Fig. 6 Hanging Service Status

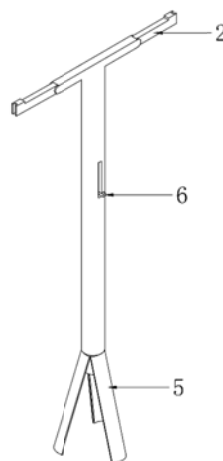


Fig. 7 Standing Service Status

1 Fork channel 2 Turnover fork 3 Connecting rope
4 Rod body 5 Supporting leg 6 Sliding block

In view of the above-mentioned problems, through the analysis of the behavior of people supporting clothes, combined with the humanized concept, the innovative design of the clothing fork is carried out. First of all, the structure is simplified. Figure 6 shows the hanging status of the clothing fork, which is similar to the common appearance of the clothing fork in daily life. It is in line with people's operation habits, without requiring too much thinking during use. Secondly, the function is refined, as shown in figure 7, the slider can slide inward in the channel of the hollow rod body, so that the drawing rope connected with it drives the turnover fork head to expand laterally, and then opens the supporting leg connected at the bottom of the rod body to become the standing state. It is convenient to tidy up clothes at this time, so more clothes can be tidied up without requiring additional place to dry clothes; finally, the differences is respected. The clothing fork can be shaped based on the use of different students to achieve clothes drying or objects hanging.

5. Conclusion

With the rapid development of modern science and technology and the rapid improvement of living standards, the living conditions of college students become better and better. The improving and innovative design for some inconvenient operation in campus life is very helpful to improve the life quality of college students. For the design of college apartment air drying articles, the space environment and the particularity of student groups shall be considered. From the aspects of students' physiological characteristics, psychological feelings, behavior habits and so on, the shape, function and structure of air drying articles shall be fully considered. According to humanized concept, the design of air drying articles based on people is of great significance to ensure the students' health and normal learning life.

6. Acknowledgments

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