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Abstract. With the advancement of the times, science and technology have become more developed, and a variety of items are manufactured quickly, resulting in invisible waste under over-manufacturing. Waste of resources has become a burden on the environment [1], although people's quality of life The improvement is accompanied by many garbage disposal problems. Although the application of traditional trash cans can improve the mess of the environment in a short time, it cannot effectively prevent the stench emitted by garbage corruption and hygienic infection problems caused by weather changes. In this study, the design improvement of the traditional treaded trash can and the sealing machine seen in daily life was used to analyze the advantages and disadvantages of the creative design of the trash can and the material needs of designers from all over the country and then complete the product that meets the universal system. We also hope that this technology design Can be integrated into environmental education and bring new practical ideas.

1. Introduction

1.1. Research Background and Motivations

The problem of garbage disposal in daily life is an issue that every family has to face. Everyone uses the trash frequently. In the process of using it, in addition to the smell of trash bags especially for home kitchens, toilets, etc., most of the trash cans are placed on the ground. The process of packing and cleaning requires bending and knotting and then picking it up. Although it is not a long time action, it will also cause lumbar spine and bone damage over time, which has a more significant impact on the family [1]. The researchers see that there are not many works with garbage reduction, and design sense in the current trash can apply. It is also the development direction for designers to improve their lives through design. Besides, universal design has formed a trend, and there will be more room for development [2]. By changing the traditional foot-operated trash can, we use simple ingenuity to bring convenience to life and conform to universal design principles to improve household trash cans.

1.2. Research Purposes

This study explores the use of trash cans and the functions for related deficiencies. The trash can be designed to prevent the trash smell before cleaning, improve the continuous bending of manpower when packing, clean up to meet the general family's needs, and use and meet universal design criteria.

Based on the research, as mentioned above, background and motivation, the purpose of drafting are the following three points:

- Analyze the current status of the design and development of existing creative trash cans
- Explore common patterns and materials of trash cans
- Complete the innovative design of the trash can and solve the lack of products

2. Literature Reviews

2.1. Collection and Analysis of Existing Products

This chapter mainly discusses the design of existing trash cans, analyzes the advantages and disadvantages of related products, introduces its creative concepts and ideas, enhances the overall value with a more humane design, and presents it with product design. Through the following analysis of the trash cans designed by the three designers, it is found that different trash cans also have other operating methods, and there are many changes in appearance and focus on improvement, but they all need to conform to "family style" and "easy to use" with "Standards" [3].

2.1.1. Creative design of trash can in the wall：

Designer Aarhus Aarkitekterne designed a wall trash can such as Figure 1, Figure 2, which has both function and decoration [4]. This design embeds the trash can on the wall. If you want to use it, press it gently, and the trash can pop out of the wall. This correctly interprets the space-saving, increases the house's overall beauty, and is very convenient.

Advantages: beautiful, space-saving, the inlaid seat can be adjusted appropriately, and the indoor is not obtrusive, which can be accepted by more consumers.

Disadvantages: The capacity is small and can't put too much garbage.

Figure 1. Design simulation of the trash can on the wall.

Figure 2. Design simulation of the trash can on the wall.

2.2. Comparison of trash can types and materials

According to the analysis in Table 1, although stainless steel is more expensive, its anti-corrosion, resistance to rust, and the most essential feature of strengthening the prevention of odor overflow are more in line with our needs. Therefore, the material of product design is mainly stainless steel.

Table 1. Analysis of the types and advantages and disadvantages of trash cans.

Form	Open trash can	Clamshell type (swing cover type) trash can	Foot-operated trash can	Inductive trash can
Patterns				
Material	Plastic, metal, ceramic	Plastic	Plastic, metal, stainless steel	Stainless steel
Advantage	It is convenient to throw in the garbage and easy to operate when changing the bag.	The smell is not easy to radiate, and the trash is more beautiful without seeing the waste directly.	No need to bend over, easy to operate, hygienic, prevent odor from overflowing, and garbage is not exposed.	Combines the advantages of open, flip-top, and foot-operated to prevent odor.
Disadvantage	Unsightly, the odor is easy to leak.	You need to open the lid with one hand and dump the garbage with one hand. It is more cumbersome to replace garbage bags and dispose of waste.	The trash needs to be packed manually, it is easy to be caught, the device will be loose and damaged after prolonged use, and need to be replaced.	It is expensive, consumes electricity, and is troublesome when replacing garbage bags.

Table 2. Analysis of the advantages and disadvantages of the material of the trash can.

	Plastic	Metal	Stainless steel	Ceramics
Advantage	Affordable light Anti-corrosion。	Durable Damaged and recoverable	Anti-corrosion Its composition prevents odor overflow Not easy to rust	Beautiful Easy to clean
Disadvantage	easy to deform Not environmentally friendly	Improper handling and easy to rust heavy	Higher price	Fragile More dangerous

2.3. Sustainable design

For designers, a design with both aesthetics and practicality is challenging, and especially considering the sustainable recycling of products in the future. In the development of innovative systems, products should be taken into consideration. Whether the applied materials will harm and affect the environment, and the continued use of recycling after the work is discarded [5]. However, modern society is full of food waste and improper recycling problems, which cause a severe burden on energy and the environment. Therefore, organic recycling products can be designed to make lettuce, vegetables, fruits, and kitchen waste become organic fertilizer and then use the advantages of earthworms to decompose food to make organic fertilizer. Recycling, enhance the value of waste recycling and achieve sustainable design [6].

3. Research Methods

This research mainly uses three research methods: Document Analysis, Participatory Observation, and Case Study Method. First, it grasps the development phenomenon of the trash can from the past to the present, researches, summarizes, organizes, analyzes, and is mentioned in the literature. Through the case study method and participatory observation, the data source's authenticity was further investigated. The main points of the trash's creative design can be initially understood to extend to the design guidelines to improve related functions. As well as the understanding of the advantages and disadvantages of using various materials, strengthening this research's practicability and summarizing the final point of view.

4. Research Analysis

4.1. Four key points of trash can design

- Use the hot-melt sealing function to glue garbage bags to prevent odor leakage.
- The operation is simple; the sealing can be completed with a single foot, saving about 75% of the manual packaging time.
- After the sealing is completed. You can continue to use the garbage bag's remaining space to maximize the garbage bag's benefits.

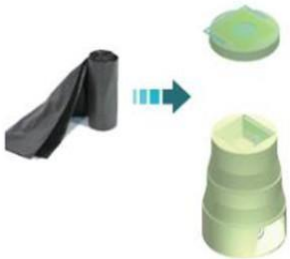
4.2. Design drawing and usage

The following **Table 3** design drawing of the trash can, the product size is 53 large and 38 wide, unit cm, Figure 3 is a reversible top cover, **Figure 4** is a retractable design, which is convenient for transportation and more comfortable to take and place where needed. Make it more popular to use.

Figure 3. The turned operable trash can.

Figure 4. Trash can retractable design.

Table 3. Instructional of the usage of the trash can.

Steps	Schematic diagram	Instructions
Step one		Open the top cover, put it in the garbage bag, and close the top surface. The covered top cover will simultaneously compress and cover the garbage bag to make it beautiful.

Steps	Schematic diagram	Instructions
Step two		When the volume of garbage needs to be compressed, press down the top cover's round groove. Through flexible and magnetic design, the hand retracts and rebounds and attracts instantly. Place the corner on the internal spring mechanism, take it off, and leave it for about 2 seconds to complete the sealing, and the packed garbage bag can be taken out.
Supplementary information		The plastic bag is fused and sealed by heating. When the active surface is in contact, the metal connection is also energized. No switch is required. The interior is detachable for easy battery replacement.

5. Conclusion

This research is mainly based on the creative design of trash cans. It is designed to improve the inconvenience and odor overflow during manual packaging and design through hot-melt sealing functions. Simple, lightweight, and moderate in size, it can be easily accessed without being obtrusive. The material is painted with stainless steel appearance, the purpose is to strengthen the prevention of odor overflow and increase the build, and this product improves the foot-operated trash can combined with the sealing hot-press sealing machine to reduce the inconvenience and instant sealing when bending over and finishing. With the machine's length of heating, the garbage bag can be freely determined whether the garbage bag needs to be taken out. If the heating time is longer, the garbage bag can be cut into a separate bag, and the healing time is shorter, and it can become a garbage bag connected in a ring String, continue to be placed in the barrel. This innovative design technology can achieve the original design's purpose, complete the trash can with innovative education, and contribute to environmental education.

6. References

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