

Design of Extended Kitchen for Recreational Vehicles

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Abstract. Targeting the problems that many recreational vehicles have at present, such as the small operating countertop of the indoor kitchen and inconvenience of the outdoor kitchen, the indoor and outdoor kitchen design is optimized based on the existing recreational vehicle kitchens. A folding countertop extension and a mobile storage cabinet are added to the indoor kitchen. The design of the folding countertop extension can increase the operating space of the countertop, which not only facilitates cooking but also solves the problem of the temporary arrangement of dishes and kitchen utensils. The mobile storage cabinet can not only store things but also serve as a temporary seat for dining. In the outdoor kitchen design, the integration of the functions like washing food, cooking, dishes arrangement, and dining is achieved, so cooking and dining are facilitated.

Keywords: RV Kitchen; Extended Type; Mechanical Design

1 Introduction

In recent years, recreational vehicle (RV) travel has seen fast development in China, and the number of RVs has increased rapidly. The RV has not only been limited to a way of travel but also has gradually developed into a fashionable and recreational lifestyle [1]. As a beautiful scenery in tourism, RVs have been gained popularity at home and abroad [2]. In the post-epidemic era, with their convenience and privacy, RVs provide consumers with a unique travel experience [3]. However, as a model developed overseas, the interior design of RVs does not fit Chinese living habits[4][5]. Especially in terms of the design of the kitchen, the interior space of many RVs is not large, and the space reserved for the indoor kitchen is relatively small[6]. Therefore, it's inconvenient to operate during cooking [7]. Besides, the functions of the outdoor kitchen are relatively limited, so improvements toward perfection and convenience are needed[8]. In this paper, to target the existing problems of the RV kitchen in travel and users' needs, an integrated extended cooking-dining RV kitchen is designed, which expands the operating space of the RV kitchen and improves the overall space utilization, convenience and functionality. A smaller volume combines various functions, making the use of the RV kitchen more convenient and fast.

2 The overall solution for an integrated extended cooking-dining RV kitchen

As shown in **Fig. 1**, the extended RV kitchen mainly consists of indoor and outdoor kitchens**Fig. 1**. An illustration of the integrated extended cooking-dining RV kitchen. Besides the conventional

countertop, sink, induction cooker, microwave oven, cooker hood, etc., a folding countertop extension and a mobile storage cabinet are also designed. The folding countertop extension comprises three folding panels, which are hinged to each other. Without taking up extra space, they can be folded into drawers when not in use. They can also be unfolded into a countertop when needed. The folding countertop extension is equipped with a rotatable support pole underneath, which is telescopic, and the length can be adjusted according to the actual length. It can be extended to the ground for support when in use. After use, it can be retracted to the recess underneath the folding countertop extension, and it can be folded away with the extended countertop. The folding countertop extension is designed to increase the operating space of the countertop of the original indoor kitchen during cooking. It is convenient for cooking and can temporarily arrange dishes and kitchen utensils. It can even be used as a temporary table for dining, which is simple and handy. The mobile storage cabinet can be placed in the kitchen cupboard to save space when not in use. The interior has two drawers up and down for saving the kitchen utensils. Four universal castors are installed at the bottom for easy mobility. The cabinet can be moved out for use as a dining stool during meals. The movable castors can be locked into fixed castors using spring bolts to lock steering bearings to prevent sliding during meals.

The outdoor kitchen adopts a double-layered extended box structure, including rails, brackets, a flip-up countertop, a gas hob, a spice box, a sink, etc. The outdoor kitchen can be moved out and retracted via the rails, and the sides of the box can be flipped up and extended into a countertop with brackets. Dishes and cooking utensils can be placed on the countertop during cooking, and the cooking space can be greatly enhanced. There is a gas hob, a spice box, and a sink at the lower layer. The gas hob is set on the outermost side of the box to keep it as far away from the RV as possible. The spice box is in front of the gas hob for easy access during cooking. When cooking, the gas hob can be pulled out via the rails. After cooking, the gas hob and sink can also be retracted into the box via the mobile rails. The countertop can also serve as a dining table with the mobile storage cabinet for instant dining, which is easy and efficient.

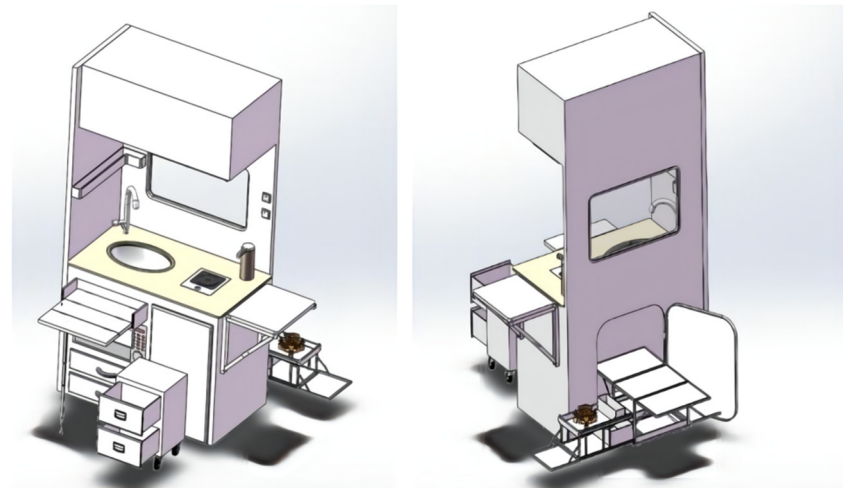


Fig. 1. An illustration of the integrated extended cooking-dining RV kitchen

3 The design of the integrated extended cooking-dining RV kitchen

In addition to the common parts that most RV kitchens have, three modules have been added[9], including the folding countertop extension, the mobile storage cabinet, and the outdoor kitchen. The folding countertop extension is made up of folding panels and telescopic poles that work together. The mobile storage cabinet consists of a cabinet, drawers, and universal castors. The design of the outdoor kitchen adopts a double extension box structure.

3.1 The design of the folding countertop extension

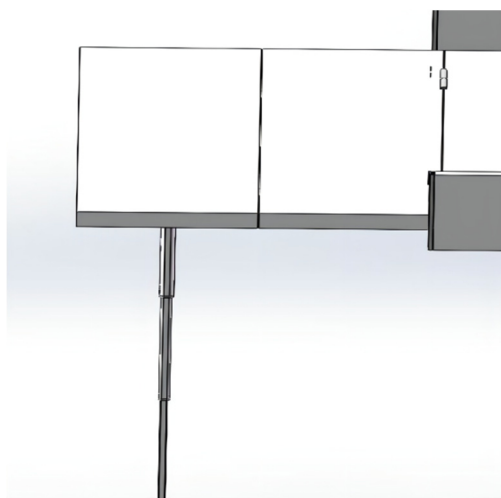


Fig. 2. An illustration of the folding countertop extension

The folding countertop extension consists of folding panels, hinges, a guide slot, a telescopic pole, and a recess. As shown in **Fig. 2**, the three folding panels are connected to each other by hinges, and the drawer doors are equipped with a guide slot that can be moved up and down. The guide slots are slightly narrower at the top and wider at the bottom. With friction, the drawer doors can prevent slipping out of place when not in use. When the extended countertop is used, the drawer doors can be moved downwards through the guide slots, and the folding panels can be unfolded by hinges and then fully retracted into the drawers by moving the drawer doors after use. The space utilization of the RV kitchen is effectively increased.

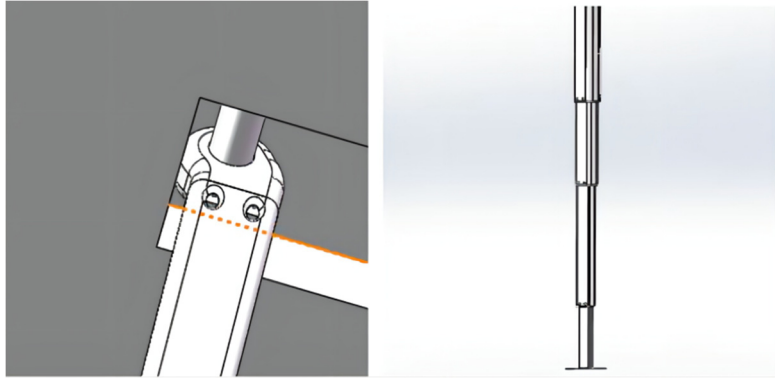


Fig. 3. An illustration of the support pole

Under the folding countertop extension, as shown in **Fig. 3**, there is a rotating support pole, which is telescopic, and its length can be adjusted to suit the actual situation[10][11]. It can be extended to the ground for support when in use and retracted to the recess underneath the countertop, and it can be folded away together with the countertop without taking up additional space. The design of the folding countertop extension increases the original operating space available for cooking in the RV kitchen. Thus, it is easier to cook and solve the problem of temporarily arranging dishes and kitchen utensils. The countertop can even serve as a temporary table for dining, which is simple and handy.

3.2 The design of the movable mobile storage cabinet.

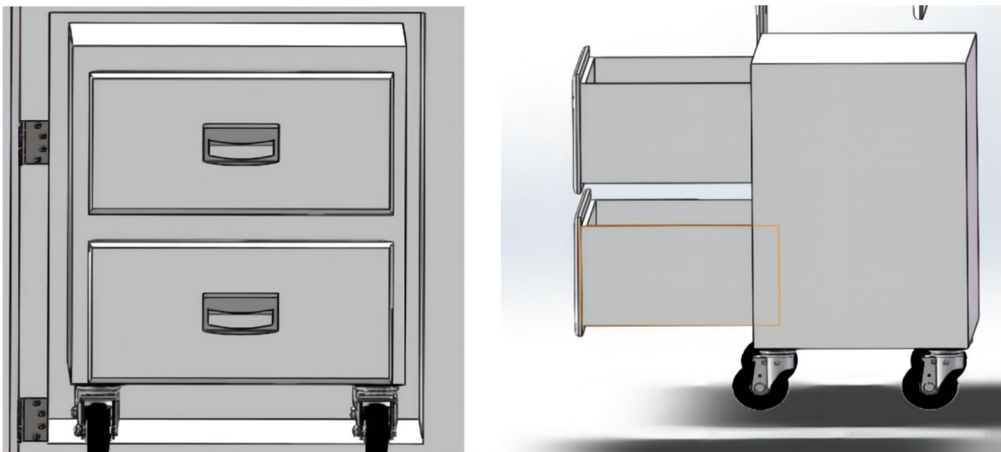


Fig. 4. An illustration of the movable mobile storage cabinet

As shown in **Fig. 4**, the mobile storage cabinet can be placed in the kitchen cupboard to save space when not in use. The interior has two drawers for saving cutlery, cookers, and other kitchen supplies. Four universal castors are installed at the bottom for easy mobility. The cabinet can be moved out for use as a dining stool during meals. The user can adjust the dining position

with the castors. During the meal, the movable castors can be locked into fixed castors by using spring bolts to lock steering bearings to prevent sliding during meals.

3.3 The design of the outdoor extended kitchen.

Sharing a common space with the indoor kitchen, the outdoor kitchen work together with the indoor kitchen. As shown in Fig. 5, the outdoor kitchen adopts a double-layered extended box structure, including rails, brackets, a flip-up countertop, a gas hob, a spice box, a sink, etc. The outdoor kitchen can be moved out and retracted via the rails, and the sides of the box can be flipped up and extended into a countertop with brackets. Dishes and cooking utensils can be placed on the countertop during cooking, and the cooking space can be greatly increased. There is a gas hob, a spice box, and a sink at the lower layer. The gas hob is set on the outermost side of the box to keep it as far away from the RV as possible. The spice box is in front of the gas hob for easy access during cooking. Below the spice box is the drawable sink, which is also equipped with a rail at the bottom for convenient operation. During cooking, the gas hob can be pulled out via the rails. After cooking, the gas hob and sink can also be retracted into the box via the rails. The countertop can also serve as a dining table and works with the mobile storage cabinet for instant dining, which is easy and efficient.

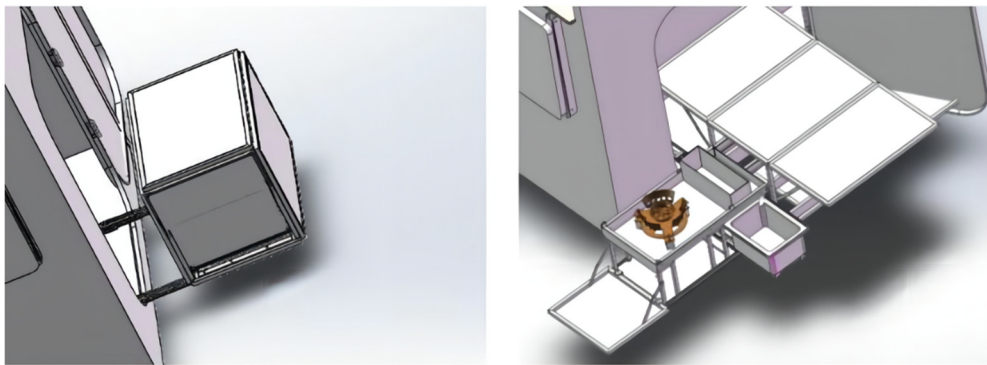


Fig. 5. An illustration of the outdoor extended kitchen

4 Conclusion

Targeting the problems that many recreational vehicles have at present, such as the small space of the indoor kitchen and limited functions of the outdoor kitchen, the design of the indoor and outdoor kitchen is optimized based on the existing recreational vehicle kitchen. A folding countertop extension and a mobile storage cabinet are added to the indoor kitchen. In the design of the outdoor kitchen, the integration of the functions like washing food, cooking, dishes arrangement, and dining is achieved. The space of the indoor kitchen is effectively utilized, and the outdoor kitchen becomes more convenient.

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