Development of Advanced New Gas Kitchen Stove "Smart Konro"

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ABSTRACT

Kitchen stoves in Japan are equipped with sensors to detect the temperature at the bottom of pans. These sensors achieve high levels of safety by preventing spontaneous combustion of cooking oil due to overheating. They are also used for temperature control by automatically adjusting flame size and turning off the gas. Additional convenient functions include water boiling notification and automatic rice cooking. We have developed an advanced new gas kitchen stove called "Smart Konro*"to showcase the advanced features of gas kitchen stoves and further popularize their convenient functions. Smart Konro has three main features that enable users to readily recognize the convenience of the latest kitchen stoves: (i) smartphone connectivity, (ii) advanced operability and (iii) new-concept grill "Multi grill."

*Konro means a kitchen stove in Japanese.

TABLE OF CONTENTS

Abstract

1. Introduction

Kitchen stoves in Japan are equipped with sensors to detect the temperature at the bottom of pans. These sensors achieve high levels of safety by preventing spontaneous combustion of cooking oil due to overheating. They are also used for temperature control by automatically adjusting flame size and turning off the gas. Additional convenient functions include water boiling notification and automatic rice cooking. As such, the safety and convenience of Japanese kitchen stoves have advanced greatly in recent years, . Until now, these advances have been introduced to our customers via various media such as a catalog of our merchandise and a web page of our company. Through these mediums, the image of the kitchen stove could not be changed drastically by only improving safety and convenience performance, and so we realized that we needed to create a new kitchen stove which has a whole new appearance and an advanced cooking performance.

We therefore have developed an advanced new gas kitchen stove called "Smart Konro*" to change the image of the traditional kitchen stoves completely, showcase the advanced features of gas kitchen stoves, and further popularize their convenient functions. Smart Konro has three main features that enable users to readily recognize the convenience of the latest kitchen stoves: (i) smartphone connectivity, (ii) advanced operability and (iii) new-concept grill "Multi grill."

*Konro means a kitchen stove in Japanese.

Fig. 1 Photograph of Smart Konro

2. Features of "Smart Konro"

2.1 Smartphone connectivity

This is the first gas kitchen stove to achieve interactive communication with smartphones via a wireless LAN network in a residence. A custom application installed in a smartphone compatible with iOS and Android OS enables the user to easily monitor the status of the kitchen stove on a real-time basis (e.g. burner(s) in use, flame size and convenient functions activated). This function, called "My konro", allows the user to not only check the status of the kitchen stove from their smartphones, but also set up various kinds of convenient functions in the kitchen stove as well. This feature increases the sense of safety and reliability during cooking, and helps further promote the use of kitchen stoves. In consideration of safety, we have prevented users from igniting, extinguishing and changing the flame size from this application.
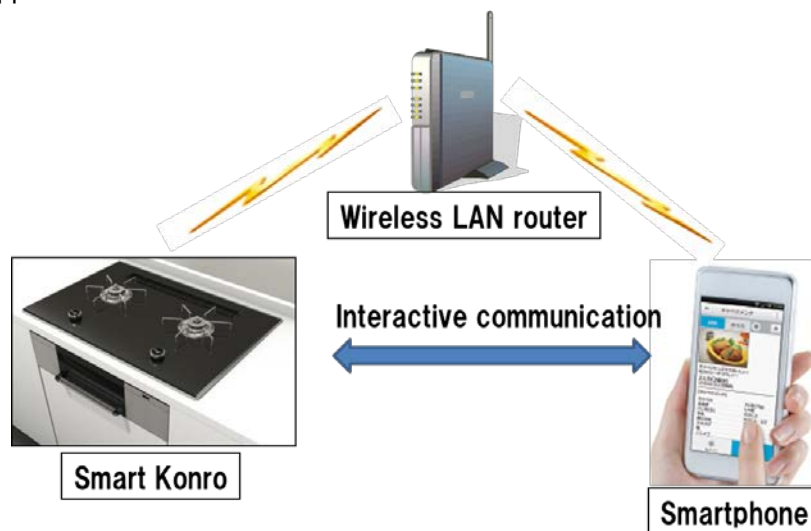

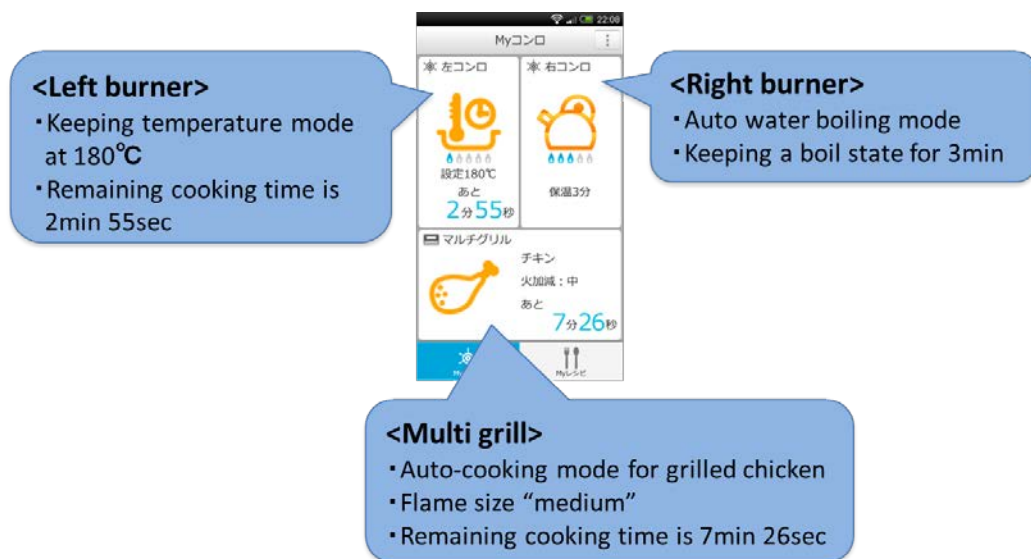Fig. 2 Connection between Smart Konro and a smartphone

Fig.3 Screenshot of My konro (Checking the status of the kitchen stove on a real-time basis)

Furthermore, approximately 100 recipes designed for simple cooking are pre-installed into this application so that the user can effectively use the convenient functions of the Smart Konro. We call this function "My recipe". The user can actuate necessary convenient functions for cooking a chosen recipe by pressing the recipe setting buttons via the smartphone. With the "My recipe" application, the user can more easily and effectively take advantage of the convenience that the Smart Konro offers.

Recipe search
About 100 recipes arranged for simple cooking are built into this application.

Ingredient
Ingredients and theirs quantities of the chosen recipe are known.

How to cook
You can cook according to the procedure of the recipe.

Transmitting setting data to the Smart konro
By pressing the recipe setting buttons, the user can transmit necessary convenient functions setting data for cooking a chosen recipe.

Fig.4 Screenshots of My recipe

2.2 Advanced operability

The Smart Konro can be operated with two detachable magnetic knobs (twist switches) and touch buttons on the front part of the top panel. Gas can be turned on and off by touching and sliding the twist switches forward/backward. Flame size, as well as timer and temperature settings, can be changed by turning the twist switches. In an emergency, gas can be shut off by detaching the twist switches from the stove. The twist switches enable users to change flame size and set convenient functions more intuitively than with conventional operation buttons, ultimately providing a more futuristic and comfortable experience.

Sliding the twist switch for igniting

Turning the twist switch for changing flame size, timer and temperature settings

The twist switch can be detached. In an emergency, gas can be shut off by detaching the twist switches.

Fig.5 Operation method of the twist switch

The touch buttons are selected by touching the icons that emerge on the top panel made with black glass when the stove is turned on. The icons, which express convenient functions, are projected by white LED from under the black glass and have very high visibility. The black glass is specially designed so that white LED can penetrate finely and produce clear images on the top panel of the Smart Konro. Since touch buttons are displayed only when the power of the kitchen stove is turned on, they are not visible when the kitchen stove is not in use.
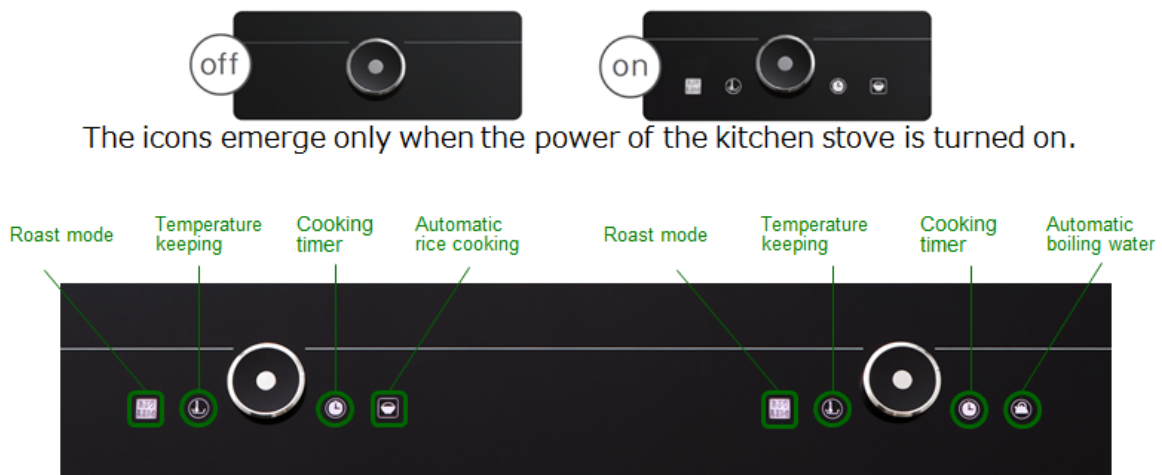

The icons emerge only when the power of the kitchen stove is turned on.

Fig.6 Pictures of the touch switch

2.3 New-concept grill "Multi grill"

The Multi grill, another heating device of the Smart Konro, is designed to heat food both from above (flame) and below (plate heating). A small kitchen stove burner and temperature sensor installed under the plate allows the plate temperature to be monitored during cooking. Various dishes can thus be prepared in the automatic cooking mode. In addition, a wide variety of foods (e.g. boiled/steamed dishes, cooked rice, bread and cake) can be prepared using a deep cooking container in place of the plate. Many Multi grill-based recipes are built into the smartphone application so that the user can easily use this device in daily cooking.

Fig.7 Pictures of the multi grill

3. Conclusion

We have developed an advanced new gas kitchen stove "Smart Konro"to showcase the advanced features of gas kitchen stoves and further popularize their convenient functions. Smart Konro is the first gas kitchen stove to achieve interactive communication with smartphones, and has two futuristic and comfortable detachable magnetic knobs (twist switches) and touch buttons on the front part of the top panel. Moreover, the Multi grill, another heating device of the Smart Konro, enables consumers to prepare various dishes automatically.

We continue to develop attractive kitchen stoves in order to enrich people's cooking lives.

<u>List of Figures</u>