Applicant: Dev Bhoomi Uttarakhand University **No of Sheet-01**

Application No: **Sheet No-01**

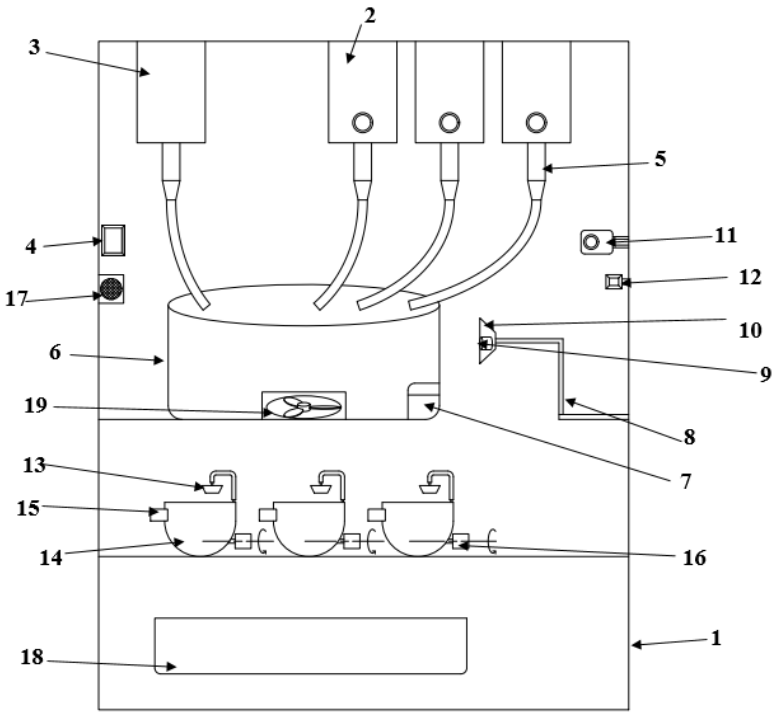


Figure 1

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Agent for the Applicant(s)

FORM 2

THE PATENTS ACT, 1970
(39 of 1970)

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THE PATENT RULES, 2003

COMPLETE SPECIFICATION
(See Section 10; rule 13)

CANDY PROCESSING DEVICE

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The following specification particularly describes the invention and the manner in which it is to be performed:

FIELD OF THE INVENTION

[0001] The present invention relates to a candy processing device that is capable of assisting the user in making various candies as per the user's requirement without requiring any human labour and thereby substantially saving labor cost.

BACKGROUND OF THE INVENTION

[0002] Candy making is both a precise science and an art to make various candies. Controlling the crystallization of sugar is one of the most crucial factors in determining its performance. What determines the type of candy being made is the type of ingredients used in the initial sugar solution (sugar dissolved in water); the temperature and concentration the sugar solution is cooked to, as indicated on the candy - syrup temperature chart; the degree to which it cooled, and whether or not it is kneaded or beaten afterward. The addition of ingredients to the recipe and any stirring performed throughout the candy-making process also have an effect.

[0003] Currently, in India, most candies are produced manually in factories. Although there are machines, the processing time is still lengthy, and these machines do not reduce the need for vast quantities of labour. In addition, these machines are neither small, nor are they economical. Furthermore, initial expenditures for establishing candy machines are often considerable. In order to acquire and install the equipment at the manufacturing facility, the user must invest a larger sum of money. In addition, users must invest money on training or experienced employees for the candy production process. In addition, the machine's enormous size and weight make it very difficult for the user to transport it from place to place. Furthermore, candy making machines pollute the environment by releasing the waste products into the environment. The waste products can be toxic and lead to numerous damages on the environment as a whole.

[0004] **GB156702A** discloses about in the preparation of candies and the like, a mixture of cane sugar with cream of tartar, glucose, natural lemon juice, citric or tartaric acid or other reversion preventing anent, and water is heated at atmospheric pressure to a temperature above the cracking point but below that required to complete the cooking operation, a partial vacuum being created in the cooking-chamber to complete the cooking operation at that temperature. The ingredients may be mixed in suitable proportions such as one ounce of cream of tartar to fifty pounds of sugar or one pound of glucose to four pounds of sugar, either of these mixtures being added to water in the proportion of one gallon of water to thirty pounds of mixture. The apparatus for carrying out the process comprises a kettle heated and supported by a gas-fired furnace and vertically movable into or out of engagement with a fixed hood which is connected to a condenser and a vacuum pump, the pump being operated by a motor which also drives the air-blower for the furnace. The hood is provided with a thermometer, a vacuum gauge, and a sight-glass and with clips 33 which unite the kettle and the hood. The mixture within the kettle is first heated to a temperature of 265‹ F., during which heating the kettle is disengaged from the hood. The furnace is then checked or put out of action and the kettle and hood are united and a partial vacuum is initiated and maintained in the kettle by the vacuum pump, water being supplied to the condenser at. It is stated that the application of a temperature of 265‹ F. and a vacuum of 24 to 27 inches of mercury will result in a product of the same consistency as that resulting from an exposure to a temperature of 340 F. and atmospheric pressure; but the products will have an improved finish and keeping quality and will be sweeter than if subjected to the higher temperature.

[0005] **KR102034066B1** discloses about the present invention relates to a method for preparing handmade candy. According to the present invention, the method comprises: a preparing step (a) of preparing water and sugar, putting the water and sugar in a pot, and mixing the water and sugar by stirring the same; a heating step (b) of heating a mixture prepared in the step (a), adding a malt digested taffy prepared in advance to the pot when bubbles start to form, and heating the mixture

more; a spice adding step (c) of heating the mixture prepared in the step (b), stopping the heating, and adding spice to the mixture; a pouring table moving step (d) of pouring the mixture prepared in the step (c) on a pouring table; a pigment adding step (e) of adding pigments having different colors to the mixture prepared in the step (d) by section and mixing the same; a separation step (f) of dividing the mixture prepared in the step (e) into sections by color, separating the same, and moving the same to a heating table; a stretching step (g) of hanging the mixture prepared in the step (f) on a hook and stretching the mixture; a shape forming step (h) of placing the mixture prepared in the step (g) on the heating table and forming shapes; and a stretching and cutting step (i) of stretching the mixture prepared in the step (h) and cutting the stretched mixture. According to the present invention, it is possible to form different shapes on cross-sections of candy.

[0006] Conventionally, many devices have been developed and are available in the market that permit the users to make candies by using such devices. However, the processing time is still high and such devices do not eliminate the requirement of large amounts of labour. Moreover, such devices are also not compact, cost-effective and convenient.

[0007] In order to overcome the aforementioned drawbacks, there exists a need in the art to develop a device that is capable of enabling a user to processes different candies as per the user's desires without requiring any human effort in processing and moreover, controlling the wastes and offering various candies to consume.

OBJECTS OF THE INVENTION

[0008] The principal object of the present invention is to overcome the disadvantages of the prior art.

[0009] An object of the present invention is to develop a device that is capable of making various number of candies of different sizes and shapes as per the user's

requirement.

[0010] Another object of the present invention is to develop a device that is capable of monitoring various functions involved in processing the candies, thereby controlling the waste management in a more convenient manner.

[0011] Yet another object of the present invention is to develop a device that is capable of forming various candies in an automated manner, thereby substantially saving labor cost.

[0012] The foregoing and other objects, features, and advantages of the present invention will become readily apparent upon further review of the following detailed description of the preferred embodiment as illustrated in the accompanying drawings.

SUMMARY OF THE INVENTION

[0013] The present invention relates to a candy processing device that is capable of assisting the user in making various candies of different sizes and shapes as per the user's requirement and moreover, monitoring various processes thereby reducing wastages and substantially saving labor cost.

[0014] According to an embodiment of the present invention, candy processing device comprises of a body is developed with plurality of compartments that are stored with various ingredients which are required to prepare a candy, a display panel is installed over the body for enabling a user to select details regarding number of candies, shape and flavor of candy, an electronically controlled valve is installed within each of the compartment to dispense ingredients in a chamber placed beneath the compartment, a weight sensor is placed within each of the compartment to measure weight of the ingredients as means of ensuring that adequate amount of particular ingredients dispensed via the valves, peltier units

are positioned within the chamber for providing a heating effect as means of liquefying the ingredients within the chamber, multiple rotating blades are integrated within the chamber for performing stirring, an L-shape telescopic rod is configured within the housing and coupled with a nozzle to pour a liquid within the chamber for stirring the liquified mixture in an effective manner, a suction unit is installed with the nozzle for drawing a predefined amount of the liquified mixture and release the mixture in multiple molds that are positioned within the body.

[0015] According to another embodiment of the present invention, the proposed device further comprises of an artificial intelligence based image capturing module in synchronization with a laser sensor configured within the body utilized for detecting level of the mixture filled within the molds to eliminate chances of the mixture spilled out from the molds, multiple pneumatic blocks are installed within each of the molds utilized for changing the shape of the mixture filled within the mold, an air blower is installed with each of the mold for solidifying the liquified mixture to process the candy, a motor is installed with each of the molds activates by for providing a rotational motion to the mold in case of detection of solidified mixture, and simultaneously the pneumatic blocks retract as means of dispensing prepared candy within a canister placed beneath the body.

[0016] While the invention has been described and shown with particular reference to the preferred embodiment, it will be apparent that variations might be possible that would fall within the scope of the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017] These and other features, aspects, and advantages of the present invention will become better understood with regard to the following description, appended claims, and accompanying drawings where:

Figure 1 illustrates a perspective view of a candy processing device.

DETAILED DESCRIPTION OF THE INVENTION

[0018] The following description includes the preferred best mode of one embodiment of the present invention. It will be clear from this description of the invention that the invention is not limited to these illustrated embodiments but that the invention also includes a variety of modifications and embodiments thereto. Therefore, the present description should be seen as illustrative and not limiting. While the invention is susceptible to various modifications and alternative constructions, it should be understood, that there is no intention to limit the invention to the specific form disclosed, but, on the contrary, the invention is to cover all modifications, alternative constructions, and equivalents falling within the spirit and scope of the invention as defined in the claims.

[0019] In any embodiment described herein, the open-ended terms "comprising," "comprises," and the like (which are synonymous with "including," "having" and "characterized by") may be replaced by the respective partially closed phrases "consisting essentially of," consists essentially of," and the like or the respective closed phrases "consisting of," "consists of, the like.

[0020] As used herein, the singular forms "a," "an," and "the" designate both the singular and the plural, unless expressly stated to designate the singular only.

[0021] The present invention relates to a candy processing device that is capable of providing the user an aesthetic design in creating numerous candies of varied sizes and shapes according to the user's specifications, as well as monitoring various operations, therefore decreasing wastages and saving labour expenses significantly.

[0022] Referring to Figure 1, a perspective view of a candy processing device is illustrated, comprising a body **1** is constructed with plurality of compartments **2** and a receptacle **3**, a display panel **4** is installed over the body **1**, an electronically

controlled valve **5** installed within each of the compartment **2** to dispense ingredients in a chamber **6** placed beneath the compartments **2**, plurality of peltier unit **7** is installed within the chamber **6**, a L-shape telescopic rod **8** installed within the housing of the body **1**, the rod **8** is secured with a nozzle **9** that is paired with a suction unit **10**, an artificial intelligence based image capturing module **11** with a laser sensor **12** is placed on the housing of the body **1**, plurality of pneumatic blocks **13** are configured within each of the molds **14** that are placed underneath the chamber **6** inside the housing of the body **1**, an audio unit **17** is installed with the body, a vibrating unit **15** installed with each of the mold, a canister **18** is positioned underneath the chamber **6** and a motor **16** paired with each of the molds **14**.

[0023] The proposed device is constructed with a body **1** made up of material includes but not limited to wood, metal, and plastic and alike. The body **1** mentioned herein having a shape includes but not limited to cylindrical, rectangular, square and alike. The body **1** is equipped with plurality of compartments **2**. Each compartment **2** is stored with different ingredients which are required in making candies. The ingredients herein include but not limited to sugar, honey, food flavor and fruits powder. A receptacle **3** is installed within the body **1** for enabling the user to store an ingredient as per the user's requirement.

[0024] A display panel **4** is mapped over the body **1** and linked with the microcontroller. The display unit used herein is preferably a touch interactive display panel **4** that provides a user-interface for enabling a user to input commands number of candies, shape and flavor of candy required by the user. The display unit transferred these commands inputted by the user to a microcontroller. The microcontroller processes the signals and based on which generate a sequential command.

[0025] An electronically controlled valve **5** is configured with each of the compartment **2** and is in association with the microcontroller. The electronically

controlled valve **5** mentioned here is used to control flow of ingredients by varying the size of the flow passage as directed by a signal from the microcontroller. Further a chamber **6** is installed underneath the compartment **2** and the valve **5**s are connected with the chamber **6**. This enables the direct control of flow rate and the consequential control of process quantities of ingredients for dispensing the ingredients in the container in accordance with number of candies, shape and flavor of candy to be prepared by the user.

[0026] A weight sensor is configured within each chamber **6** and connected with the microcontroller. The weight sensor is preferably a strain gauge-based weight sensor consists of a sensing element that is used to detect weight when application of load of ingredients in the compartment **2**. On a sensing element, a wire is arranged in a zig-zag manner. So, when the load of ingredients is applied to that sensing element, it bends in a direction causing the change in overall length and cross-sectional area of the wire. This leads to change in resistance of the wire. The resistance thus obtained is very minute (few ohms) which is determined with the help of the Wheatstone bridge.

[0027] The weight senor is placed in one of the four arms in a bridge with the remaining values unchanged. Therefore, when the load is applied to it as the resistance changes the current passing through the bridge varies and pressure is calculated and converts the measured value into an electrical signal as an output and transferred to the microcontroller. The microcontroller based on the output regulates the electronically controlled valve **5** to dispense required amount ingredients as means of ensuring that adequate amount of particular ingredients dispensed in accordance with shape and flavor of candy desired by the user.

[0028] Multiple peltier unit **7** are installed with the chamber **6** and liked with the microcontroller. The peltier unit **7** used herein comprises of two types of semiconductor elements arranged in tandem sandwiched between copper substrates. When electricity is passed through the unit, electrons move in one

element and positive holes move in the other element, this is called the Peltier effect. This allows one side of the substrate to absorb heat and the other to radiate heat. The other side is utilized for heating the ingredients within the chamber **6** as a means of liquefying the ingredients. Further, there are multiple blades **19** preferably an impeller is attached to a vertical stirrer shaft that passes from the motor **16** that is arranged at the bottom of the chamber **6** and linked with the microcontroller.

[0029] The primary function of the stirrer shaft is to transmit torque from the stirrer motor **16** to the impeller. Torque is the tendency of a force to cause an impeller to rotate and thereby the mixing and stirring of various ingredients such as sweeteners, texturizers and flavorings for producing a homogeneous liquefied mixture in order to form candies, such as fondant and fudge, are smooth, creamy, and easily chewed, with a definite structure of small crystals.

[0030] A telescopic rod **8** is positioned within the housing of the body **1**. The telescopic rod **8** used herein is preferably having an L-shaped rod **8** and is powered by a pneumatic arrangement consisting of air compressor, cylinder, valves and piston that work in collaboration for extending/retracting the telescopic rod **8** as commanded by a microcontroller. The piston moves due to the air pressure provided by the compressor for providing the telescopic rod **8** with the required extension/retraction. Further the rod **8** is configured with a nozzle **9** that is utilized for pouring liquid into the chamber **6** for stirring the liquefied mixture efficiently.

[0031] The mentioned nozzle **9** is also coupled with a suction unit **10** that is in association with the microcontroller. Whereby the suction unit **10** is commanded by the microcontroller, suction is generated using a pump. The pump is powered by an electrical motor **16** and the pump moves piston up and down. The piston is attached to air tight diaphragm pulls the air in from collection container through one-way valve to reduce pressure. The reduced pressure draws a predefined

amount of the liquefied mixture via a valve **5** and release the mixture in multiple molds **14** which are positioned within the body **1** in accordance with number of candies required by the user. The speed of motor **16** determines suction strength of suction unit **10**.

[0032] An artificial intelligence-based image capturing module **11** is installed within the housing and synchronized with a laser sensor **12** that is also installed in continuation with the image capturing unit. The laser sensor **12** uses the laser light to project the light within the moulds up the predefined height for processing of desired candy, the suction unit **10** then release the liquified mixture into the moulds. Whereby the image capturing module **11** comprises of a camera lens and a processor, wherein the 360-degree rotatable camera captures multiple images of the surroundings and then the processor carries out a sequence of steps including pre-processing, feature extraction and segmentation. In pre-processing, the unwanted data like noise, background is removed out and the image is converted into a format recommended for feature extraction. The features like pixel intensities of the foreground image are extracted and are sent for classification to the microcontroller for decoding the level of the mixture. The microcontroller evaluates the received images and thus monitor the level of mixture filled within the molds **14** in order to eliminate the chances of mixture spilled out from the molds **14**.

[0033] In addition, multiple blocks **13** are installed within each of the molds **14**. The blocks **13** are pneumatic blocks **13** that are powered with a pneumatic arrangement that includes an electronic valve, rod, cylinder and a pneumatic compressor that are activated by the microcontroller to extend/retract the blocks **13** for changing the shape of the mixture filled within the mold in accordance with shape opted by the user. Further, an air blower is arranged within the mould. The air blower is mainly composed of the following six parts motor **16**, air filter, air blower body **1**, air chamber **6**, base (and oil tank), oil dripping nozzle **9**. The air blower operates by the eccentric rotor in the cylinder, and makes the volume

change between the blades **19** in the rotor slot to absorb, compress and eject the air and therefore the solidifying of liquified mixture is processed and for making a desired candy.

[0034] On detection of solidifying liquified mixture, the microcontroller generates the signal to a motor **16** that is arranged with each of the molds **14**. The motor **16** when powered by an electrical current, starts driving the shaft of the motor **16** and to provide a rotational motion to the mold and simultaneously retract the pneumatic blocks **13** as means of dispensing prepared candy within a canister **18** placed beneath the body **1**.

[0035] A vibrating unit **15** is assembled within the molds **14** and connected with the microcontroller. The motor is essentially improperly balanced. In other words, there is an eccentric weight on the rotating shaft of the vibration unit, which generates centrifugal force when it rotates. This unbalanced force displaces it. Its high-Speed displacement causes it to swing therefore producing vibrations to settle down the mixture within the mold. Furthermore, the microcontroller upon detection of required number of candies are prepared sends the signal to an audio unit **17** that is placed within the body **1** that converts the received signals to corresponding audio signals as a means of alerting the user.

[0036] The device is assembled with a battery which provides a sufficient electrical power for powering all the electrical and electronic components including microcontroller, electronically controlled valve **5**, weight sensor, peltier unit **7**s, L-shape telescopic rod **8**, nozzle **9**, artificial intelligence-based image capturing module **11**, laser sensor **12**, pneumatic blocks **13**, motor **16**, vibrating unit **15**, audio unit **17**, and display panel **4**.

[0037] The battery is installed on the device in such a manner that it is connected to the microcontroller and upon the command of microcontroller the battery supplies DC current to the microcontroller. And then based upon the priority or

sequence of functioning the microcontroller then supplies that received DC current to that particular electrical or electronic components for performing their required functionin effective and accurate manner.

[0038] Although the field of the invention has been described herein with limited reference to specific embodiments, this description is not meant to be construed in a limiting sense. Various modifications of the disclosed embodiments, as well as alternate embodiments of the invention, will become apparent to persons skilled in the art upon reference to the description of the invention.

We Claim:

1) A candy processing device, comprising:

i) a body **1** having plurality of compartments **2** stored with multiple ingredients required to prepare a candy, wherein a display panel **4** is mounted over said body **1** to allow a user to opt details regarding number of candies, shape and flavor of candy required by said user;

ii) an electronically controlled valve **5** installed within each of said compartment **2** to dispense ingredients in a chamber **6** placed beneath said compartment **2**, wherein a weight sensor is installed within each of said compartment **2** to measure weight of said ingredients as means of ensuring that adequate amount of particular ingredients dispensed via said valves **5** in accordance with shape and flavor of candy desired by said user;

iii) plurality of peltier unit **7** installed within said chamber **6** to provide a heating effect as means of liquefying said ingredients within said chamber **6**, wherein multiple rotating blades **19** are mounted within said chamber **6** to perform stirring of said liquified mixture;

iv) a L-shape telescopic rod **8** installed within said housing fabricated with a nozzle **9** to pour a liquid within said chamber **6** for stirring said liquified mixture in an effective manner, wherein said nozzle **9** is paired with a suction unit **10** that is activated by a microcontroller to draw a predefined amount of said liquified mixture and release said mixture in multiple molds **14** placed within said body **1** in accordance with number of candies required by said user;

v) an artificial intelligence-based image capturing module **11** in correlation with a laser sensor **12** attached within said body **1** to analyze surroundings

as means of detecting level of said mixture filled within said molds **14** to eliminate chances of said mixture spilled out from said molds **14**;

vi) plurality of pneumatic blocks **13** fabricated within each of said molds **14** to extend/retract to change shape of said mixture filled within said mold in accordance with shape opted by said user, wherein an air blower is paired with each of said mold that is activated by said microcontroller along with actuation of blocks **13** in order to solidifying said liquified mixture to process said candy; and

vii) a motor **16** paired with each of said molds **14** activates by said microcontroller in order to provide a rotational motion to said mold, wherein upon detection of solidified mixture, said microcontroller commands said motor **16** to rotate said mold and simultaneously retract said pneumatic blocks **13** as means of dispensing prepared candy within a canister **18** placed beneath said body **1**.

2) The device as claimed in claim 1, wherein a receptacle **3** attached within said body **1** allow said user to store an ingredient as per said user's requirement.

3) The device as claimed in claim 1, wherein said telescopic rod **8** and pneumatic blocks **13** are powered with a pneumatic arrangement that includes an electronic valve, rod, cylinder and a pneumatic compressor that are activated by said microcontroller to extend/retract said rod **8** and blocks **13**.

4) The device as claimed in claim 1, wherein said ingredients includes but not limited to sugar, honey, food flavor and fruits powder.

5) The device as claimed in claim 1, wherein a vibrating unit **15** attached with each of said mold that is activated by said microcontroller to settle down said mixture within said mold.

6) The device as claimed in claim 1, wherein an audio unit **17** installed within said body **1** that is activated by said microcontroller upon detection of required number of candies are prepared as means of alerting said user.

7) The device as claimed in claim 1, wherein a battery is associated with said device to supply power to electrically powered components.



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ABSTRACT

CANDY PROCESSING DEVICE

A candy processing device comprising a body **1** equipped with multiple compartments **2** stored with various ingredients which are required to prepare a candy, a display panel **4** for inputting details regarding number of candies, shape and flavor, an valve **5** for dispensing the ingredients in a chamber **6**, a weight sensor for ensuring that adequate amount of particular ingredients dispensed, peltier units **7** for providing heating effect as means of liquefying the ingredients, blades **19** are utilized for stirring the liquified mixture, a L-shape telescopic rod **8** equipped with a suction unit **10** for drawing a predefined amount of mixture and releasing in multiple molds **14**, an image capturing module **11** for detecting level of the mixture level, multiple blocks **13** utilized to change shape of the mixture, an air blower for solidifying the liquified mixture to process the candy, a motor **16** for rotating the mold when processed.

Ref. Figure 1