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Modular and Configurable Powered Fan Food Drying Apparatus and Method

Abstract

A modular and configurable powered-fan food drying apparatus with modular front, back and side panels, and modular top and bottom panel. The side panels have multiple levels of ledge support to accommodate multiple configurable food drying position racks. Top and bottom panels have lateral parallel directional air flow channels to direct air flow through the apparatus from back to front. Front panel houses a battery powered-fan that draws air in through the back panel air deflectors into the apparatus cavity and expels air out of apparatus through the front panel powered-fan. The air flows all around the positioned racked food items as it moves in one direction, from back to front and out of the apparatus. The continuous air flowing all around food items speeds up the food surface area drying time.

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Background/Summary

BACKGROUND

[0001] Drying food items such as raw meats' skin and surfaces like poultry, pork, beef or other meats prior to roasting or grilling helps to create a browner and crispier skin of the meat when cooked. A dryer meat skin creates a better Maillard reaction, which is the browning and crispying of the meat skin during the cooking process. This powered-fan food drying apparatus and method invention helps to remove moisture from the meat food items' skin and surface and not their interiors. The meat under the skin remains moist prior to cooking and should remain moist and tender when cooked properly. Hence the food mantra of crispy on the outside and moist and tender on the inside is the ultimate goal of generally roasted and grilled meat.

[0002] Food items' skin and surface drying is not the same as food items' dehydration. Food dehydration is a process of removing most or all moisture from food items' exterior and interior to extend shelf life and prevent spoilage. Dehydrated meat's interior will not result in the optimal “moist and tender on the inside” when cooked.

[0003] The conventional approach to drying various raw meat food items' skin and surfaces in the typical home refrigerator is to place the raw meat on a rack and tray uncovered. In some instances, the raw meat could be hung in a refrigerator if space is available. Typical home refrigerators do not have effective air flow. The food items to dry would take a long time, typically overnight at the minimum.

[0004] This conventional approach has disadvantages. First and foremost is the potential for cross contamination from raw meat food items coming into contact with other food items in the refrigerator. This would pose a significant food safety and health risk. Second is limited refrigerator space being occupied by the raw meat food items, for a period of time, which must be kept away from other food items at a reasonable distant to prevent accidental contact. Lastly, exposed raw meat food items in a home refrigerator presents an unappetizing and unsightly scene of raw meat and blood drippings.

[0005] The present invention is the solution to address the above listed disadvantages. An enclosed, small sized, powered-fan air box to hold the raw meat food items, and one that fits inside a typical home refrigerator. The air box has multiple level support racks for various types of meat food items' skin drying. The fan draws continuous air flow from one end into the air box and expelling air out the other end of the air box.

Description

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] FIGS. **1**A and **1**B are the perspective views of an embodiment of the modular and configurable powered-fan food drying apparatus of the invention configured with one food drying rack and two food drying racks frame members as illustrated in FIGS. **3**E, engaged respectively;

[0007] FIG. **1**C is the exploded perspective view of FIG. **1**A;

[0008] FIG. **2**A is the front perspective view of an embodiment of the powered-fan housing-cover frame member;

[0009] FIG. **2**B is the rear elevation view of FIG. **2**A illustrating the assembly of the powered-fan and electronics components;

[0010] FIG. **2**C is the front perspective view of the food drying apparatus modular front wall panel frame member;

[0011] FIG. **2**D is the rear perspective view of FIG. **2**C;

[0012] FIG. **2**E is the front perspective view of assembly of FIG. **2**A onto FIG. **2**C;

[0013] FIG. **3**A is the front perspective view of an embodiment of the food drying apparatus modular front panel frame member FIG. **2**C assembled with the powered-fan housing-cover frame member FIG. **2**A;

[0014] FIG. **3**B is the rear perspective view of an embodiment of the food drying apparatus modular back wall panel frame member;
[0015] FIG. **3**C is the perspective view of an embodiment of the food drying apparatus modular bottom base panel frame member;
[0016] FIG. **3**D is the upside down perspective view of FIG. **3**C;
[0017] FIG. **3**E is the perspective view of an embodiment of the configurable food drying rack grill frame member;
[0018] FIG. **3**F is the perspective view of an embodiment of the food drying apparatus modular side wall panel frame member;
[0019] FIG. **3**G is the diagonal cut out section perspective view of FIG. **3**C;
[0020] FIG. **4**A is the perspective view of the assembly of the modular front wall panel frame member FIG. **3**A and the modular back wall panel frame member FIG. **3**B where each is connected to the modular side wall panel frame member FIGS. **3**F, respectively;
[0021] FIG. **4**B is the enlarged perspective view of FIG. **4**A illustrating the prior connection of the modular back wall panel frame member FIG. **3**B being connected to the modular side wall panel frame member FIG. **3**F;
[0022] FIG. **4**C is the enlarged perspective view of FIG. **4**A illustrating the modular back wall panel frame member FIG. **3**B connected to the modular side wall panel frame member FIG. **3**F;
[0023] FIG. **4**D is the exploded perspective view of the order of assembly of an embodiment of the modular and configurable powered-fan food drying apparatus FIG. **1**A;
[0024] FIG. **5**A is the side elevation view of the modular and configurable powered-fan food drying apparatus FIG. **1**A;
[0025] FIG. **5**B is the top elevation view of FIG. **5**A;
[0026] FIG. **5**C is the enlarged top elevation view of FIG. **5**B;
[0027] FIG. **5**D is the side elevation view of the modular and configurable powered-fan food drying apparatus FIG. **1**B;
[0028] FIG. **5**E is the side elevation view of the modular and configurable powered-fan food drying apparatus of the invention with an alternative configuration of the two configurable food drying racks frame members FIG. **3**E;
[0029] FIG. **6**A is an exposed perspective view of FIG. **1**A configured with one configurable food drying rack FIG. **3**E;
[0030] FIG. **6**B is the side elevation view of the modular and configurable powered-fan food drying apparatus FIG. **1**A drying two poultry meat food items;
[0031] FIG. **6**C is the side elevation view of the modular and configurable powered-fan food drying apparatus FIG. **1**B drying variety of meat food items;
[0032] FIG. **6**D is the side elevation view of FIG. **5**E drying a poultry and variety of meat food items.

DETAILED DESCRIPTION OF EMBODIMENTS

[0033] The modular and configurable powered-fan food drying apparatus invention is illustrated in general at **100** in FIGS. **1**A and **1**B. FIG. **1**A illustrates an embodiment of the invention of the modular and configurable powered-fan food drying apparatus **110** illustrated with one configurable food drying rack grill frame member **370**. Whereas FIG. **1**B illustrates an alternative configuration of an embodiment of the invention of the powered-fan food drying apparatus **111** illustrated with two configurable food drying rack grill frame member **370**. FIG. **1**C is the exploded view of FIG. **1**A.
[0034] The modular components frame members of an embodiment of the invention as illustrated in FIGS. **1**A and **1**B are described in greater details below. At **200** in FIG. **2**A is an embodiment of a powered-fan housing-cover frame member **210** which houses the powered-fan **211** behind the housing-cover grill **212**. There are two screw fastener slots **213** on each vertical side wall, a power on-off switch **214**, battery power level indicator LED lights **215** and a battery power charge port

216.
[0035] FIG. **2**B illustrates the back side of the powered-fan housing-cover frame member **210**. An embodiment of the electronics assembly illustrates the batteries **217**, the two screw fasteners **218** on each vertical side wall that would protrude through the screw fastener slots **213**, and the PCB electronics control board **219**.
[0036] FIG. **2**C illustrates the modular and configurable powered-fan food drying apparatus' modular front wall panel frame member **220**. There are four screw fastener anchors **221** matching the location and position of each of the screw fasteners **218** on the powered-fan housing-cover frame member **210**. The center circumference powered-fan slot opening **222** and modular front wall panel male connector couplings **223** on each vertical side wall. FIG. **2**D illustrates the back side of FIG. **2**C.
[0037] At **230** in FIG. **2**E illustrates the assembly of the powered-fan housing-cover frame member **210** onto the modular front wall panel frame member **220** where each screw fastener slot **213** and the screw fasteners **218**, as illustrated in FIGS. **2**B, is positioned and fastened to each screw fastener anchor **221** respectively.
[0038] The result of the assembly in FIG. **2**E is illustrated at **300** in FIG. **3**A; an embodiment of an assembled powered-fan modular front wall panel frame member **310**. FIG. **3**B illustrates the modular and configurable powered-fan food drying apparatus' modular back wall panel frame member **320** which has two male connector couplings **321** on each vertical side wall. The back wall is comprised of upward tilt deflector slats **322**, flat deflector slat **323**, and downward tilt deflector slats **324**.
[0039] The remaining modular components frame members of an embodiment of the invention of the modular and configurable powered-fan food drying apparatus are at **350** in FIGS. **3**C, **3**D, **3**E and **3**F. FIG. **3**C illustrates an embodiment of the modular bottom base panel frame member **360**. Evenly spaced lateral parallel air flow channel walls frame members **361** rise above the bottom base panel floor **362**, to direct air flow movement as illustrated by directional channelled air flow **363**. The modular bottom base panel's outer wall **364** completes the structural integrity of this embodiment. FIG. **3**D illustrates the modular bottom base panel frame member **360** in FIG. **3**C flipped in an upside-down position to function as a modular top cover panel frame member **365**.
[0040] FIG. **3**E illustrates an embodiment of a configurable food drying rack grill frame member **370**. Reinforced wide side edge **371** supports cross grill frame members **372**. FIG. **3**F illustrates an embodiment of the modular and configurable powered-fan food drying apparatus' modular side wall panel frame member **380**. There are two side wall panel female connector couplings **381** at each end of the wall panel frame member. Inaddition, there are three levels of side wall ledge support **382**, **383** and **384** respectively, for the configurable food drying rack grill frame member **370** to position thereon. At **390** in FIG. **3**G is a diagonal cross cut-out section perspective view of FIG. **3**C.
[0041] The modularity of all the components frame members of the modular and configurable powered-fan food drying apparatus allows for ease of assembly and disassembly by the end user as illustrated at **400** in FIGS. **4**A, **4**B, and **4**C. FIG. **4**A illustrates the partially assembled modular frame members **310**, **320** and **380**. The aforementioned ease of assembly is made simple by the panel-to-panel connector couplings **401** of two frame members together. FIGS. **4**B and **4**C illustrates this invention's modularity in greater details. FIG. **4**B illustrates an enlarge view of the modular side wall panel frame member **380** and its female connector couplings **381** prior to coupling with the male connector couplings **321** on the modular back wall panel frame member **320**. FIG. **4**C illustrates an enlarge view of the panel-to-panel connector couplings **401** of the modular side wall panel frame member **380** and its female connector couplings **381** coupled with the male connector couplings **321** on the modular back wall panel frame member **320**.
[0042] The complete order of assembly of all the modular components frame members of an embodiment of the modular and configurable powered-fan food drying apparatus in FIG. **1**A is

illustrated at **410** in FIG. **4**D. The two modular side wall panel frame members **380** are coupled to the modular front wall panel frame member **310** and to the modular back wall panel frame member **320**, respectively to formed a fully assembled box wall apparatus frame member **411**. Then box wall apparatus frame member **411** is positioned thereon to the top of the modular bottom base panel frame member **360**. Next is to position the configurable food drying rack grill frame member **370** thereon to one of the side wall ledge support levels **382**, **383** or **384**. In the FIG. **1**A example, the side wall ledge support level **383** was selected. Lastly, the modular top cover panel frame member **365** in positioned thereon to the top of the box wall apparatus frame member **411** to complete an embodiment of the modular and configurable powered-fan food drying apparatus **110** as illustrated in FIG. **1**A.

[0043] At **500** in FIG. **5**A illustrates the completed assembly of the modular components frame members as described at **410** in FIG. **4**D above into an embodiment of an modular and configurable powered-fan food drying apparatus **110**. FIG. **5**B illustrates the top view of the configurable food drying rack grill frame member **370** positioned in the modular and configurable powered-fan food drying apparatus **110**. FIG. **5**C is an enlarge view of FIG. **5**B illustrating the configurable food drying rack grill frame member **370** with its reinforced wide side edge **371** positioned against the modular side wall panel frame member **380**. The reinforced wide side edge **371** is positioned and supported on side wall ledge support **383** below the first side wall ledge support **382**.

[0044] At **550** in FIG. **5**D is an alternative configuration of an embodiment of the invention of the powered-fan food drying apparatus **111** in FIG. **1**B illustrating the two configurable food drying rack grill frame member **370** positioned on the side wall ledge support **382** and **384**, respectively. FIG. **5**E illustrates another alternative configuration of an embodiment of the invention of the powered-fan food drying apparatus **112** illustrating the two configurable food drying rack grill frame members **370** positioned on the side wall ledge support **382** and **383**, respectively.

[0045] The method for food items' skin and surface drying is illustrated in an exposed view at **600** in FIG. **6**A when using an embodiment of the invention of an modular and configurable powered-fan food drying apparatus **110** in FIG. **1**A. First, when powered-on, the assembled powered-fan modular front wall panel frame member's **310** powered-fan **211** expels outwards air flow **605** through the housing-cover grill **212**. This in turn draws air flow through the modular back wall panel frame member **320** and into the food drying apparatus cavity **601**. Second, the direction of air flowing into the cavity is guided by upward tilt deflector slats **322** directing air flow upwards **602**. flat deflector slat **323** maintains horizontal level air flow **603**. Downward tilt slats **324** direct air flow downwards **604** which continues flowing along the modular bottom base panel frame member's **360** directional channelled air flow **363**. Third, all air flow inside the food drying apparatus cavity **601** continues moving forward from the modular back wall panel frame member **320** toward the assembled powered-fan modular front wall panel frame member **310**. Finally, the outwards air flow **605** is expelled through the housing-cover grill **212**. This movement of air flow continues until powered-fan **211** is turned off.

[0046] At **610** in FIG. **6**B illustrates an example of various food items' skin and surface drying method using an embodiment of the invention of the modular and configurable powered-fan food drying apparatus **110** configured with one configurable food drying rack grill frame member **370**. There are two whole poultry **611** food items for skin drying. The top poultry is positioned on the configurable food drying rack grill frame member **370**. Where as the bottom poultry is positioned on top the lateral parallel air flow channel walls frame members **361**.

[0047] When powered-fan is turned on, air flow enters the modular back wall panel frame member **320**. Air flow is guided by upward tilt deflector slats **322** directing air flow upwards **602** flowing over the top of the top poultry and continues along the modular top cover panel frame member's **365** directional channelled air flow **363**. The flat deflector slat **323** maintains horizontal level air flow **603**; air flowing underneath of the top poultry and over top of the bottom poultry. Downward tilt slats **324** direct air flow downwards **604** underneath the bottom poultry along the modular

bottom base panel frame member's **360** directional channelled air flow **363**. The air flow envelops all the food item's surface as it continues flowing toward the assembled powered-fan modular front wall panel frame member **310** and gets expelled outwards air flow **605**. This method of food item's skin and surface drying accelerates the drying time in a safe and efficient process.
[0048] At **620** in FIGS. **6**C and **6**D illustrate alternative configurations of an embodiment of the invention of the powered-fan food drying apparatus **111** and **112** each configured with two configurable food drying rack grill frame member **370**. Therefore, each food drying apparatus configuration would accommodate a different variety of food items.

Claims

1. An apparatus for drying a food item comprising: a. a modular enclosed box to be positioned in a refrigerator cooling device, said enclosed box includes six modular panel frame members; b. a configurable food drying rack grill frame member adapted to support the food item; c. said configurable food drying rack grill frame member is height adjustable to accommodate various food item sizes.
2. The apparatus of claim 1 wherein the first modular frame member is generally a modular front wall panel frame member, said modular front wall panel frame member includes an adapted powered-fan and panel-to-panel male connector couplings.
3. The apparatus of claim 2 wherein the powered-fan when powered-on expels air from the enclosed box and draws fresh air through the modular back wall panel frame member into the cavity of the apparatus.
4. The apparatus of claim 2 wherein the modular front wall panel frame member's panel-to-panel male connector couplings are coupled with the modular side wall panels frame member's panel-to-panel female connector couplings to form the front end of the enclosed box.
5. The apparatus of claim 1 wherein the second modular frame member is generally a modular back wall panel frame member, said modular back wall panel frame member includes air flow deflector slats and panel-to-panel male connector couplings.
6. The apparatus of claim 5 wherein the deflector slats guide and evenly distribute the air flow into the cavity of the apparatus.
7. The apparatus of claim 5 wherein the second modular frame member's panel-to-panel male connector couplings are coupled with the modular side wall panels frame member's panel-to-panel female connector couplings to form the back end of the enclosed box.
8. The apparatus of claim 1 wherein the third and fourth modular frame members are generally the two modular side wall panels frame members, said modular side wall panels frame members include panel-to-panel female connector couplings.
9. The apparatus of claim 8 wherein the modular side wall panels include a plurality of levels of identical wall ledges that is removably engaged by the configurable food drying rack grill frame member so as to be generally supporting the food items.
10. The apparatus of claim 9 wherein the configurable food drying rack grill frame member's height position is adjusted when positioned on different levels of identical wall ledges.
11. The apparatus of claim 1 wherein the fifth and sixth modular frame member is generally the modular bottom base panel frame member, said modular bottom base panel frame member is adapted for used as the modular top cover panel frame member in an upside-down fashion.
12. The apparatus of claim 11 wherein the modular bottom base panel frame member has plurality of lateral parallel directional air flow channel walls, said lateral parallel directional air flow channel walls support food items while channelling directional air flow underneath the food items.
13. A method for drying food items using an apparatus comprising the steps of: a. providing an enclosed box having a front wall panel powered-fan to create air flow by expelling and blowing air outwards; b. the back wall panel deflector slats direct air flow into the cavity of the enclosed box; c.

food drying rack grill and lateral parallel directional air flow channel walls elevate and support food items; d. air flow in the enclosed box cavity moves from back wall towards the front wall unimpeded, flowing over, under and all around the food items helping to evaporate moisture from the skin and surface of the food items; e. the continued power-on action of the front wall powered-fan maintains the steady air flow streams into and out of the enclosed box.