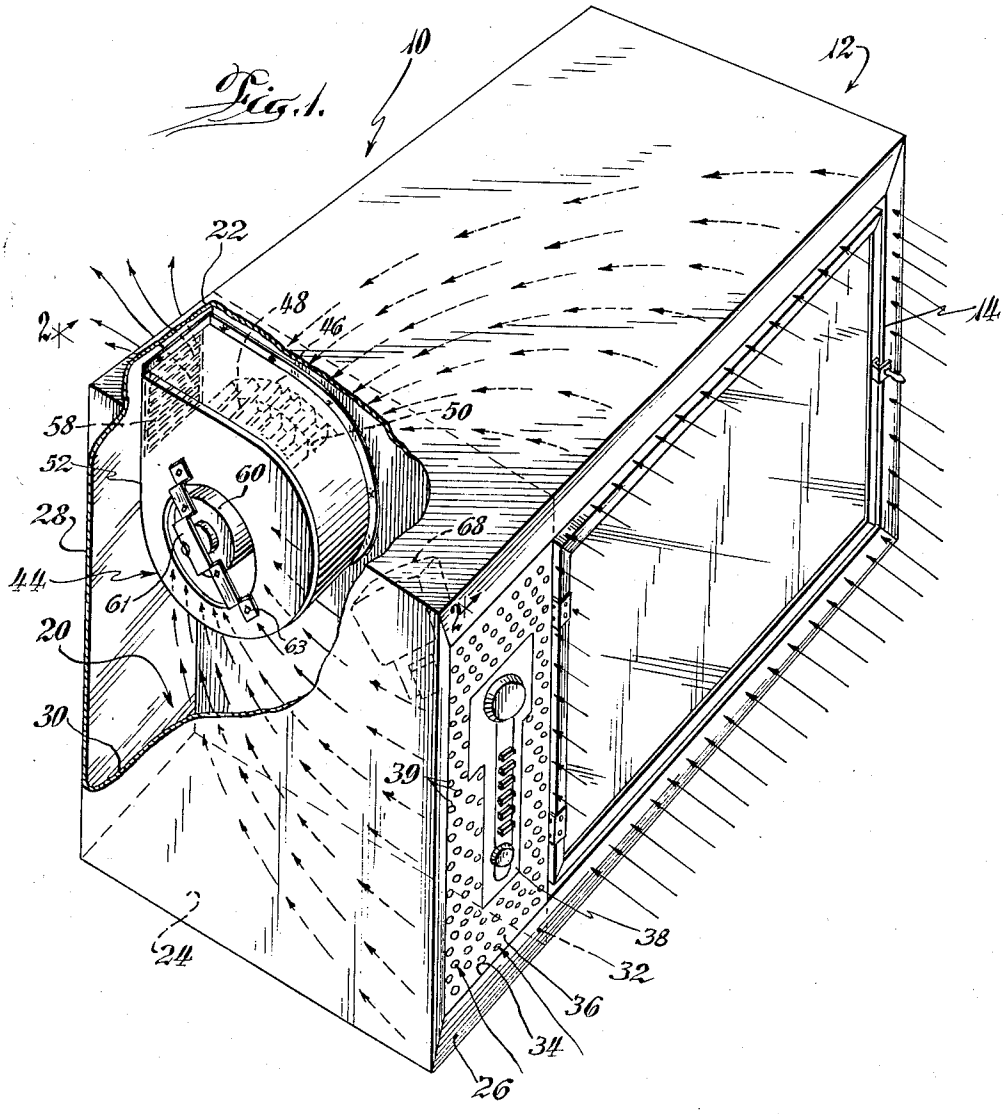
Jan. 24, 1961 S. M. BERNSTEIN 2,969,450

PORTABLE COMBINATION ELECTRIC ROTISSERIE AND CHARCOAL BROILER

Filed Feb. 16, 1959 3 Sheets-Sheet 1

Fig. 1.



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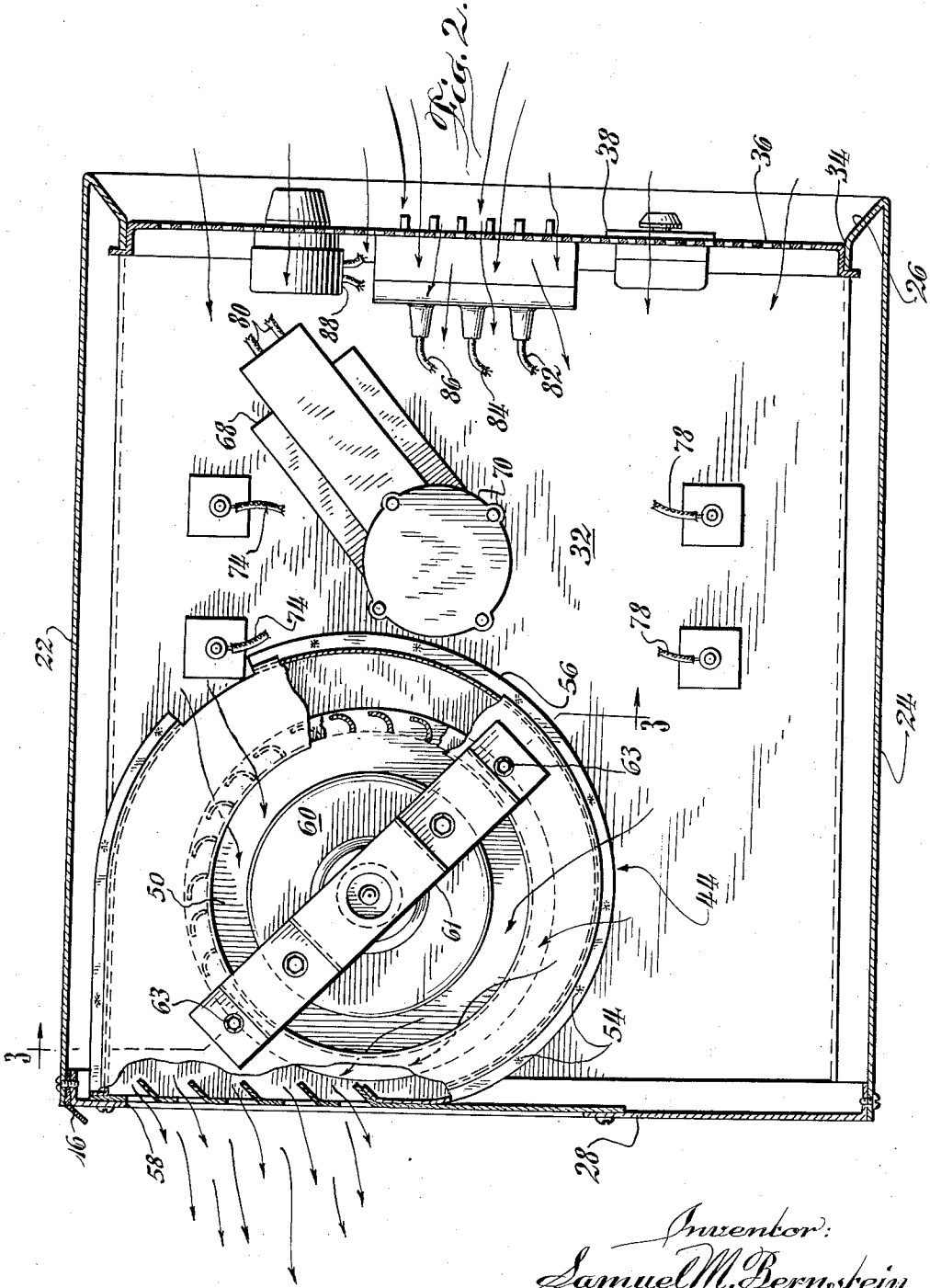
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3 Sheets-Sheet 2

Fig. 2.



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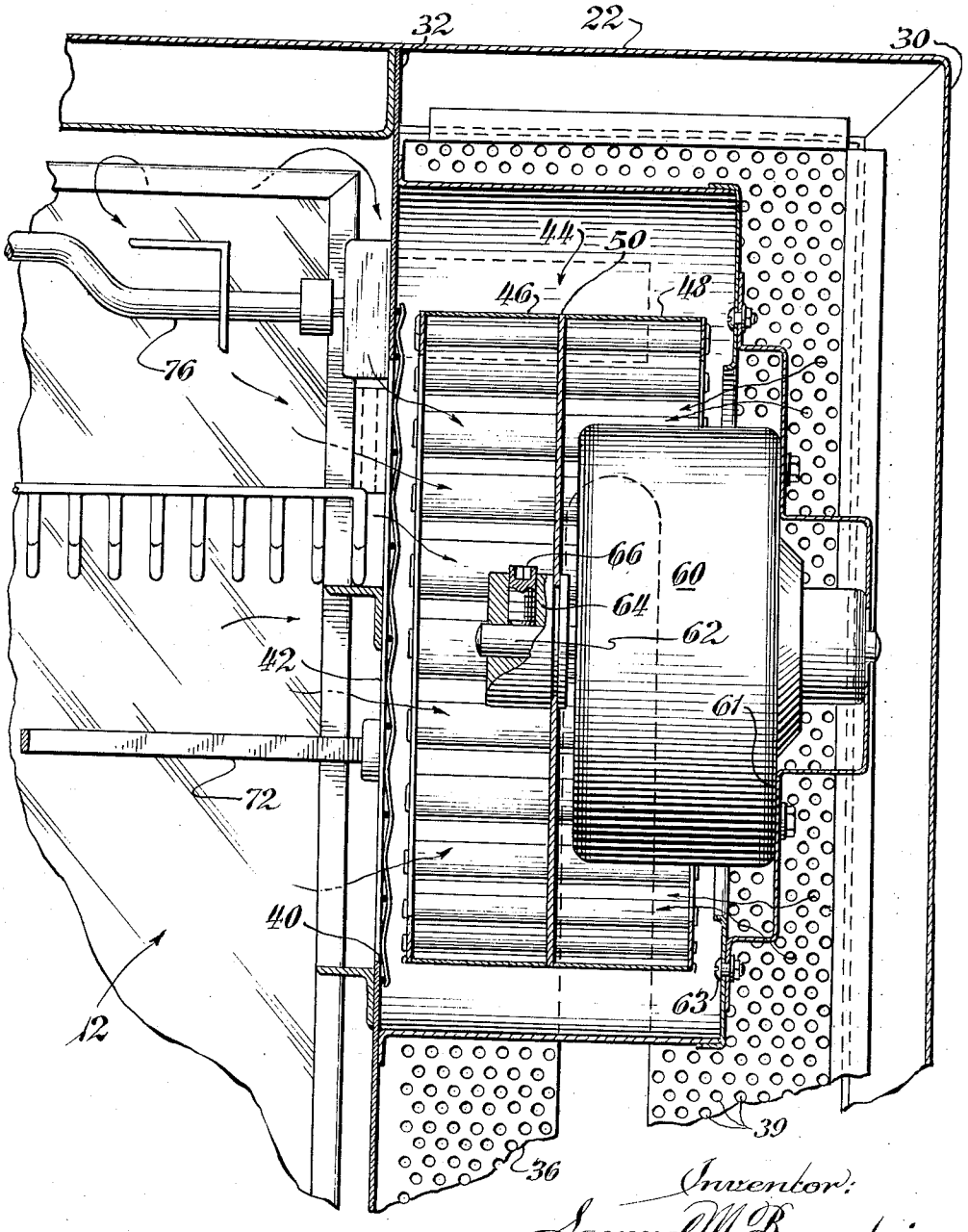
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PORTABLE COMBINATION ELECTRIC ROTISSERIE AND CHARCOAL BROILER

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3 Sheets-Sheet 3

Fig. 3.



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2,969,450

PORTABLE COMBINATION ELECTRIC ROTISSERIE AND CHARCOAL BROILER

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Filed Feb. 16, 1959, Ser. No. 793,558

9 Claims. (Cl. 219—35)

This invention relates generally to portable cooking devices, and more particularly to an improved portable blower-exhausted charcoal broiler or barbecue device combined with an electric broiler and rotisserie. Specifically, the invention relates to a portable unit having a cooking chamber and means for mounting the device in a window opening or the like so that the exhaust end of the device is positioned outdoors, said device having a blower for exhausting the products of combustion such as smoke, odors, fumes, and the like, from the cooking chamber to the outside atmosphere. More specifically, this invention relates to improvements designed to prevent dangerous overheating of the electric motors and similar components by enabling more efficient cooling of the device's electrical components and more efficient exhaustion of the combustion products from the cooking chamber. This unit is of the type disclosed in my co-pending application, Serial No. 766,107, filed October 8, 1958, now Patent No. 2,956,497, and entitled Portable Combination Electric Rotisserie and Charcoal Broiler, and this application comprises a continuation-in-part of said co-pending application.

As was disclosed in the aforementioned co-pending application, the device comprised generally a housing having means for removably mounting the device in a window opening or the like. The housing was divided into two chambers; namely, a cooking chamber having a rotisserie and both charcoal and electrical heating means, and a second chamber in which were positioned the various electrical components and the exhaust means. The exhaust means comprised generally a squirrel-type blower having a scroll which terminated at an exhaust outlet. The blower was positioned adjacent an aperture in the common wall between the two housing chambers, so that the products of combustion formed in the cooking chamber could be exhausted to the outside atmosphere. The blower was driven by the shaft of a conventional motor which was secured to the blower's scroll housing. Attached to the opposite end of said motor shaft was an auxiliary fan whose function it was to cool said motor and likewise cool the rotisserie motor and all of the electrical wiring and the like positioned in said second chamber.

While the above-described device was quite satisfactory under ordinary operating conditions, during unusual operating conditions, it was characterized by several objectionable features. For example, when the device was in continuous use over long periods of time, it was found that the second chamber and the electrical components contained therein became overheated. Of course, where such overheating became excessive, permanent damage and possible breakdown of the electrical components resulted. It was obvious, therefore, that the exhaust and cooling means of that device were inadequate to cope with the conditions produced by long, continuous use.

It is therefore an important object of this invention to provide a cooking device of the character described having

improved exhaust and cooling means which overcome the above described disadvantages.

As already described, the device of the aforementioned co-pending application employed two blowers; viz, one to exhaust the cooking chamber and one to cool the electrical components. This multiplication of parts was both expensive and inefficient.

It is therefore another important object to afford a cooking unit of the character described in which a single blower unit efficiently performs both functions of exhausting the cooking chamber and cooling the electrical components.

In the prior device, it was necessary to position the blower motor exteriorly of the exhaust blower, and to attach the cooling fan to the opposite end of the motor shaft. Such an arrangement naturally necessitated a considerable amount of space with the result that the second chamber had to be correspondingly wider in order to accommodate these components.

Another object of the invention is to provide a cooking unit of the character described in which the nature of the combination exhaust-cooling blower permits the blower motor to be positioned substantially within said blower thereby reducing the amount of space required for these components.

A further object is to afford a cooking unit of the character described having means which facilitate the admission of atmospheric air as a coolant into said chamber. A related object is to provide a chamber wall affording the maximum air intake area compatible with adequate wall-support physical properties.

Still another object is to afford an electrical component chamber wall providing maximum air intake area while further affording unique design and decorative features.

Still a further object is to provide a cooking unit of the character described in which the exhaust-cooling system is inexpensively fabricated and yet is most efficient for exhausting the atmosphere of the cooking chamber and simultaneously cooling the second chamber and the electrical components contained therein.

With the foregoing and other objects in view which will appear as the description proceeds, the invention consists of certain novel features of construction, arrangement and a combination of parts hereinafter fully described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that various changes in the form, proportion, size and minor details of the structure may be made without departing from the spirit or sacrificing any of the advantages of the invention.

For the purpose of facilitating an understanding of my invention, I have illustrated in the accompanying drawings a preferred embodiment thereof, from an inspection of which, when considered in connection with the following description, my invention, its mode of construction, assembly and operation, and many of its advantages should be readily understood and appreciated.

Referring to the drawings in which the same characters of reference are employed to indicate corresponding or similar parts throughout the several figures of the drawings:

Fig. 1 is a perspective view of the cooking unit with portions of the walls broken away to show the positioning of the improved exhaust-cooling unit therein;

Fig. 2 is an enlarged sectional view taken on the plane of line 2—2 in Fig. 1 and viewed in the direction indicated, portions of the scroll wall of the exhaust-cooling unit being broken away to show certain features of construction; and

Fig. 3 is a further enlarged fragmentary sectional view

taken generally on the plane of line 3—3 in Fig. 2 of the drawings and viewed in the direction indicated.

Turning first to Fig. 1 of the drawings, it will be seen that reference character 10 indicates generally a cooking unit of the type disclosed in the aforementioned co-pending application. Cooking unit 10 comprises a cooking chamber indicated generally by the numeral 12 and a second chamber indicated generally by the numeral 20. The front of the cooking chamber 12 may be closed by a hinge-mounted glass door such as 14. A hook-like flange such as 16 is provided along the top rear edge of the unit 10, said flange 16 being adapted to cooperate with a complementary flange of the window bracket (not shown), for removably mounting the unit in a window opening. Since the structure of the cooking chamber is identical in all respects to the cooking chamber of the aforementioned co-pending application, this description will deal primarily with the second chamber and the components contained therein, and only so much of the cooking chamber 12 as is necessary for a proper understanding of the instant invention will be described in detail.

Second chamber 20 may comprise a rectangular chamber having a top wall 22, a bottom wall 24, a front wall 26, a rear wall 28 and side walls 30 and 32. It will be noted that side wall 32 comprises a common wall between the cooking chamber 12 and the second chamber 20. Front wall 26 is formed with a rectangular opening such as 34, and said opening is closed by a novel perforated metal grill 36. Positioned on said metal grill 36 may be a control panel 38 having a plurality of push button switches for controlling the various operations of the device as well as various indicator and warning devices. The metal grill 36 may be made of any suitable construction such as a sheet metal stamping having a plurality of openings 39 or a sturdy woven mesh. The important limitation is that the material be such as to afford maximum air intake area while yet affording proper strength and stiffness. The reason therefor will become apparent as the description proceeds.

Turning now to Fig. 3 of the drawings, it will be seen that the side wall 32 is formed with a circular opening 40 therethrough, said opening being closed by a protective wire grid 42. Positioned in the second chamber 20 and in registry with said opening 40 is a combination exhaust-cooling unit indicated generally by the reference numeral 44.

Exhaust-cooling unit 44 comprises a pair of integrally formed squirrel-cage evacuators 46 and 48, said evacuators being separated by a common wall 50 (see Figs. 1 and 3). Evacuators 46 and 48 are positioned within a scroll 52. As seen in Figs. 1 and 2, the scroll 52 may be secured to side wall 32 by any suitable means, as for example, spot welding 54 along the flange member 56. The exhaust outlet of the scroll 52 is positioned in alignment with a grid-covered exhaust opening 58 formed in the back wall 28. Secured to the free side of the scroll 52, as by a suitably shaped support bar 61 and suitable fastening means such as screws and nuts 63, is a motor 60 for driving the twin evacuators. It should be noted that the motor 60 is positioned substantially within evacuator 48 to effect a desired saving of space. The drive shaft 62 of the motor 60 may be connected to the blower 44 as by means of the centrally apertured collar 64 integrally formed with common wall 50 and the set screw 66.

Also positioned in second chamber 20 may be a plurality of additional components including second motor 68 and cooperating gear box 70 for rotating the rotisserie spit 72. Electrical leads 74 for activating electrical heating element 76, electrical leads 78 of the motor 60 and the leads 80 of the second motor 68 may likewise be positioned in said second chamber. Of course, all of the electrical leads are suitably connected electrically to switches such as 82, 84, 86 and 88, said switches being operable from the control panel 38.

Referring now to Fig. 1 of the drawings, the operation of the exhaust-cooling unit 44 will be explained. When said unit is actuated, it creates massive movements of air from two divergent sources as indicated by the arrows. Thus, evacuator 46 causes air to enter the cooking chamber through air spaces left encircling the door 14. The atmosphere of the cooking chamber which includes hot gases, smoke, fumes and the like is then drawn through the opening 40 into the scroll 52 and discharged through the exhaust opening 58 to the outdoor atmosphere. Simultaneously, evacuator 48 causes air at room temperature to be drawn into the second chamber 20 through the openings 39 of the perforated metal grill 36. Since the exhaust-cooling unit is positioned adjacent the upper rear corner of the chamber 20, the path of movement of this relatively cool air is substantially completely across the entire chamber before entering the scroll 52 and being discharged out through the exhaust opening 58. Thus the entire chamber 20 and all of the components contained therein, such as the motor 60, the rotisserie motor 68, and the electrical wiring and switches seen in Fig. 2 are effectively enveloped and cooled by this stream of air. It is important to note that the balance of air coolant drawn into the second chamber 20 in the manner described is for all practical purposes limited only by the size of the exhaust-cooling unit 44 and the speed with which the same is rotated. This condition is possible because of the unique construction of the grill 36, so that the same offers virtually no resistance to the passage of air therethrough.

It should thus be apparent without further description that I have provided an improved portable cooking device which may be selectively used as a broiler, barbecue or rotisserie and employ electricity or other fuels such as charcoal and the like. No inconvenience is encountered with the use of a fuel such as charcoal, for the unit may be removably mounted in a window opening and the products of combustion exhausted to the outdoor atmosphere. I have further provided a new and unique combination exhaust-cooling unit which is considerably more effective than the comparable components in the device of the aforementioned co-pending application, said effectiveness being made possible by the provision of a novel front grill which permits substantially unlimited passage of cooling air therethrough. As a matter of fact, I have determined in the laboratory that while the temperature in the second chamber of the prior device often approximated 200° F., the new exhaust-cooling unit and front grill effectively prevent the temperature from rising above 136° F.

It is believed that my invention, its mode of construction and assembly, and many of its advantages should be readily understood from the foregoing without further description, and it should also be manifest that while a preferred embodiment of the invention has been shown and described for illustrative purposes, the structural details are nevertheless capable of wide variation within the purview of my invention as defined in the appended claims.

What I claim and desire to secure by Letters Patent of the United States is:

1. A portable cooking appliance adapted to be removably mounted in a wall opening of a building comprising; a housing having a cooking chamber therein, food support means mounted in said cooking chamber, heating means positioned in said cooking chamber, said housing defining a second chamber, a perforated grill comprising one of the walls of said second chamber, an exhaust-cooling unit positioned in said second chamber and terminating in an exhaust outlet formed in another one of said second chamber walls, said exhaust-cooling unit adapted to exhaust the atmosphere of said cooking chamber and simultaneously cool said second chamber by drawing cool air thereinto through said perforated grill.

2. The portable cooking appliance of claim 1 in which a common wall separates said cooking and second chambers, said common wall having an opening formed therein, and said exhaust-cooling unit positioned in registry with said opening.

3. The portable cooking appliance of claim 2 in which said exhaust-cooling unit comprises a pair of integrally formed squirrel-cage evacuators mounted in a scroll, said evacuators being separated by a common plate therebetween, one of said evacuators adapted to exhaust the atmosphere of said cooking chamber through said common wall opening, the other of said evacuators adapted to draw cool air into said second chamber through said perforated grill.

4. The cooking appliance of claim 3 in which the volume of air drawn into said second chamber is sufficient to maintain the temperature of said second chamber below 136° F. during operation of the appliance.

5. A portable cooking appliance adapted to be removably mounted in a wall opening of a building comprising; a housing having a cooking chamber therein, food support means mounted in said cooking chamber, heating means positioned in said cooking chamber, said housing defining a second chamber, said second chamber comprising top and bottom walls, a pair of side walls, a rear wall and a front wall, at least one of said second chamber walls being porous and capable of admitting air throughout substantially the entire area thereof, another of said second chamber walls providing a common wall between said cooking chamber and said second chamber, said common wall having an annular opening formed therein, a plurality of electrical components positioned in said second chamber, an exhaust-cooling unit positioned in said second chamber in registry with said annular opening, said exhaust-cooling unit adapted to exhaust the atmosphere of said cooking chamber and simultaneously cool said electrical components by drawing cool air into said second chamber through said porous second chamber wall.

6. The cooking appliance of claim 5 in which said exhaust-cooling unit comprises a squirrel-cage evacuator having a centrally positioned vertical separator plate thereby affording an evacuator on each side of said plate,

said squirrel-cage being rotatably mounted in a scroll, and said scroll terminating in an exhaust outlet formed in still another of said second chamber walls.

7. The cooking appliance of claim 5 in which an electrical control panel is mounted on said porous second chamber wall.

8. The cooking appliance of claim 6 in which said electrical components include a first motor for operating said exhaust-cooling unit and a second motor for operating a rotisserie in said cooking chamber, said first motor being positioned substantially within said squirrel-cage.

9. A portable combination electric and combustible fuel cooking appliance comprising an insulated housing including a back wall, said back wall being formed with an exhaust outlet, said housing defining a cooking chamber and a second chamber, a perforated grill comprising one of the walls of said second chamber, said second chamber and cooking chamber being separated by a common wall therebetween, said common wall being formed with an exhaust opening, a combustible fuel filled container removably positioned in said cooking chamber, electrical heating means mounted in said housing and extending into said cooking chamber for selectively igniting said combustible fuel and affording a cooking heat source, mounting means for removably mounting said appliance in an exterior wall opening of a building with said back wall in alignment with said exterior wall, and an exhaust-cooling unit positioned in said second chamber in alignment with said exhaust opening and terminating in said exhaust outlet, said exhaust-cooking unit adapted to exhaust the atmosphere of said cooking chamber and simultaneously cool said second chamber by drawing cool air thereinto through said perforated grill.

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