United States Patent [19]

Peters, Jr. et al.

[11] **3,740,513**

[45] **June 19, 1973**

[54] **IMPROVED CONSUMER ORIENTED COMBINED COUNTER AND COOKING UNIT USING INDUCTION HEATING**

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[21] Appl. No.: **183,005**

[52] **U.S. Cl.** **219/10.49**, 219/10.67, 219/10.77, 219/218, 312/236

[51] **Int. Cl.** **H05b 1/02**

[58] **Field of Search** ..... 219/10.49, 10.75, 219/10.77, 10.79, 218, 494, 10.67; 312/236, 237; 126/39 J

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[57] **ABSTRACT**

An improved combined counter and electric cooking unit using induction heating coils for inductively heating metal base cookware. The unit is formed by a housing having a substantially continuous insulating top surface of an attractive appearance covering the top of the housing and a plurality of induction heating coils supported within the housing beneath the insulating surface at particular heating site locations where heating is to be performed. The insulating surface is transparent to magnetic induction fields with little or no losses and includes at particular heating site locations, areas which are transparent to infrared head whereby the temperature of metal base cookware disposed at the heating site locations can be directly viewed for controlling operation of the induction heating coils. The control and power supply circuitry for the high frequency excitation electric current supplied to the respective induction heating coil, may be enclosed within the housing below the insulating surface or at some remote location. The insulating surface preferably is from the class of materials comprising plastics, tile, certain glasses, stoneware, ceramics, Pyrex, pyro-ceramics, marble, slate, natural stone, wood, specially treated wood and the like. The cooking site locations and infrared heat transparent areas may be formed from special materials such as a pyro-ceramic secured within appropriate openings, and the remainder of the smooth top insulating material may be formed from a much cheaper plastic material having the requisite characteristics of good appearance. Otherwise, the entire smooth-top insulating surface must have the capability of withstanding relatively high temperatures of the order of 450° F. The housing may be formed in the manner of a standard countertop which could be then custom used as a table (with legs supplied separately) or as a countertop surface range combination or as a pass through (kitchen-dining room) range surface combination, etc., or may be formed in the manner of a conventional range all of which have continuous, smooth-top surfaces to facilitate cleaning. If desired one of the induction heating units and/or induction coil alone and its overlying insulating surface can be made to be removable to allow for remote location cooking and/or warming. In addition, the unit could be built to have a special electrical jack into which a separate remote and portable induction coil and overlying insulating surface unit can be plugged to provide remote cooking and warming. In this case plugging in the remote unit automatically disconnects the built in counter induction coil. Providing a number of wall plugs allows plugging in the remote unit(s) in different locations.

17 Claims, 4 Drawing Figures

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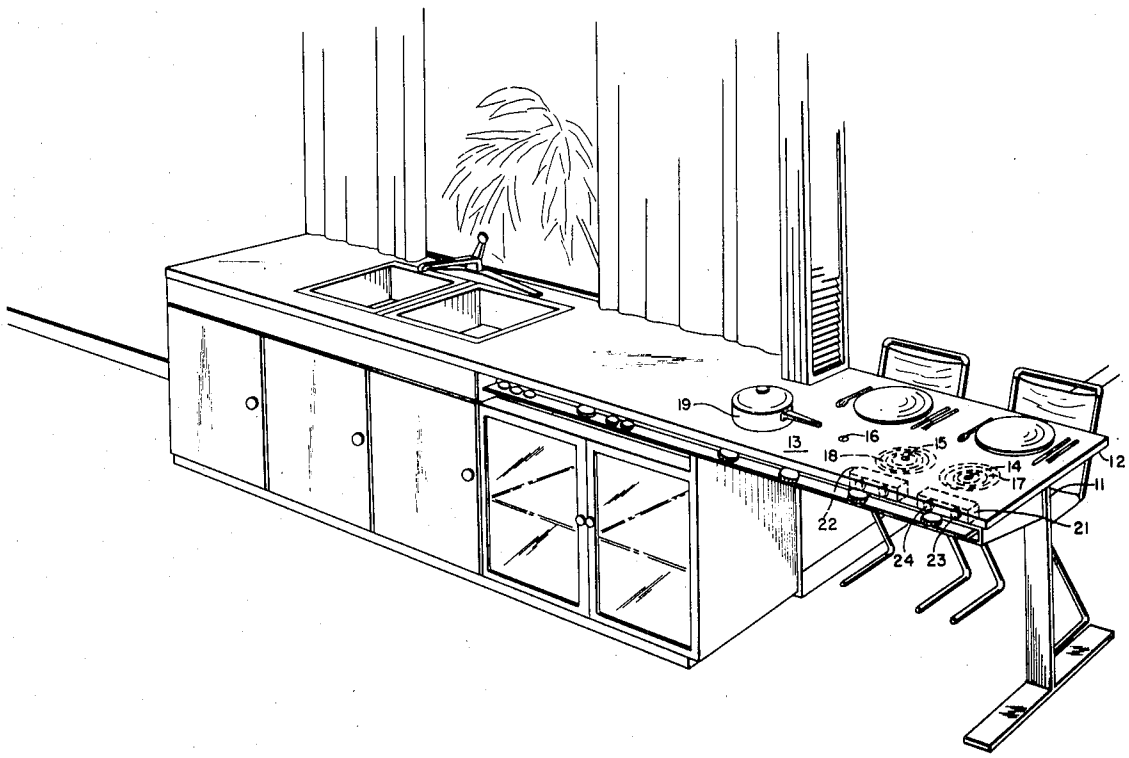

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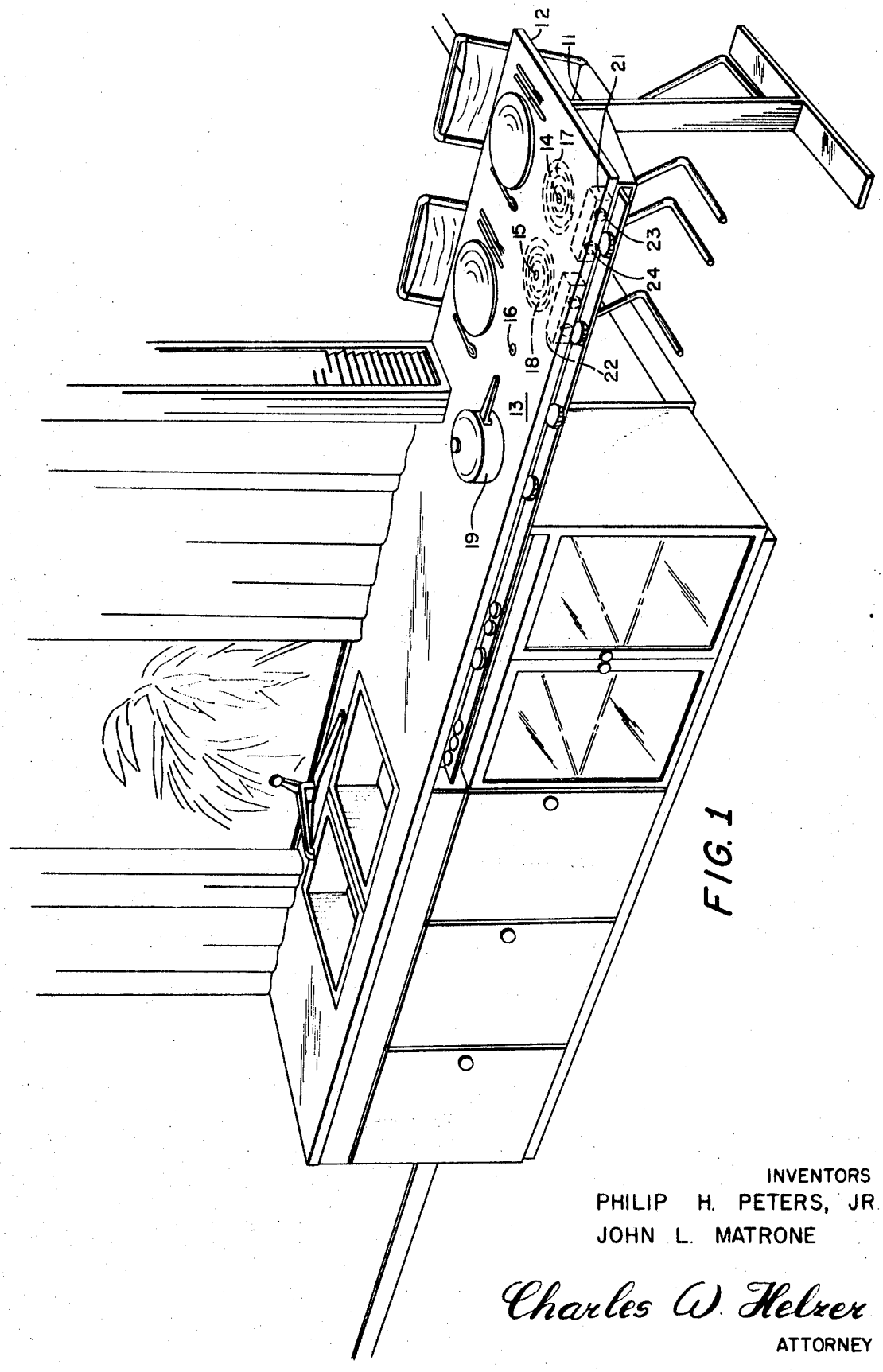

FIG. 1

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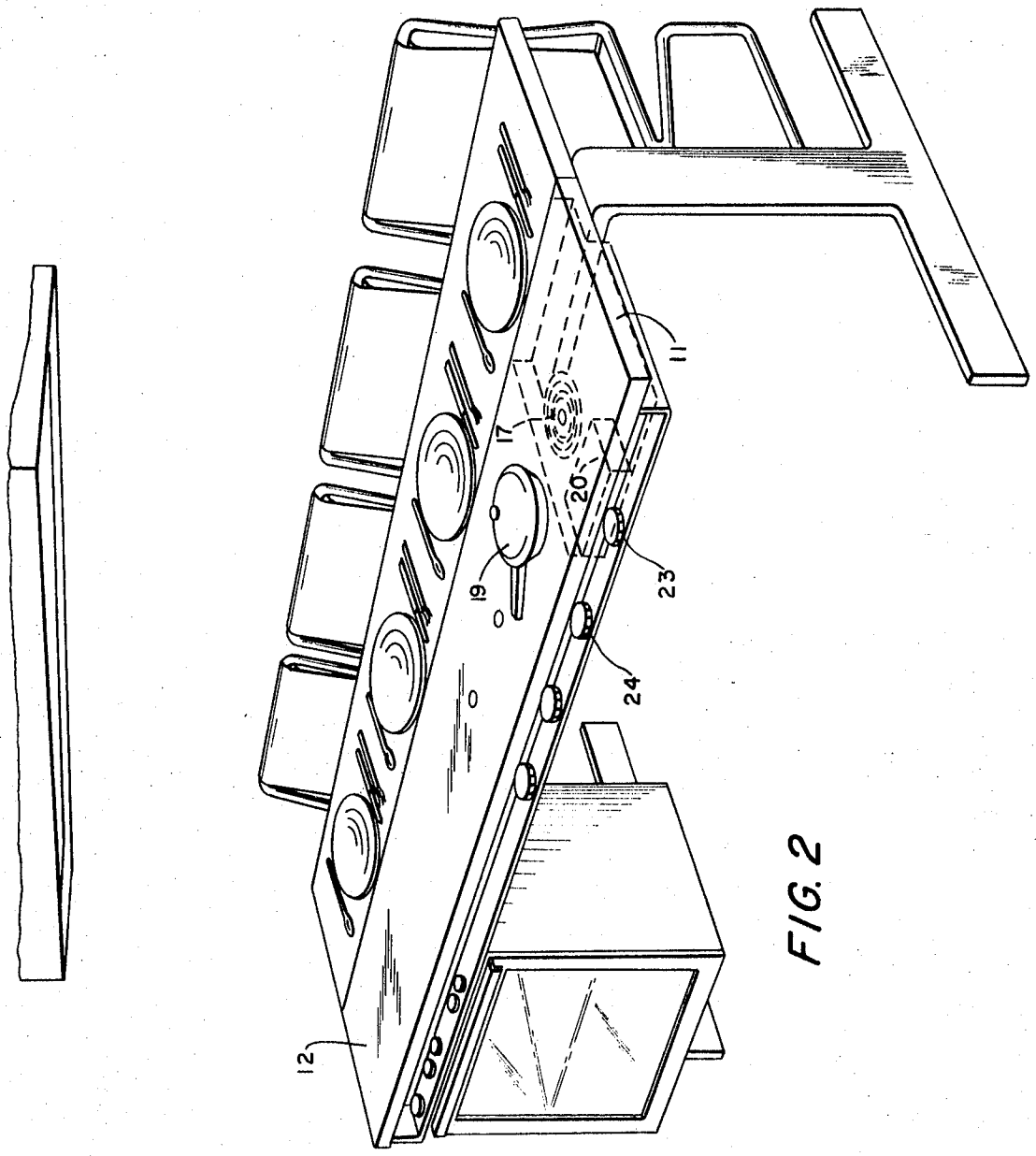

FIG. 2

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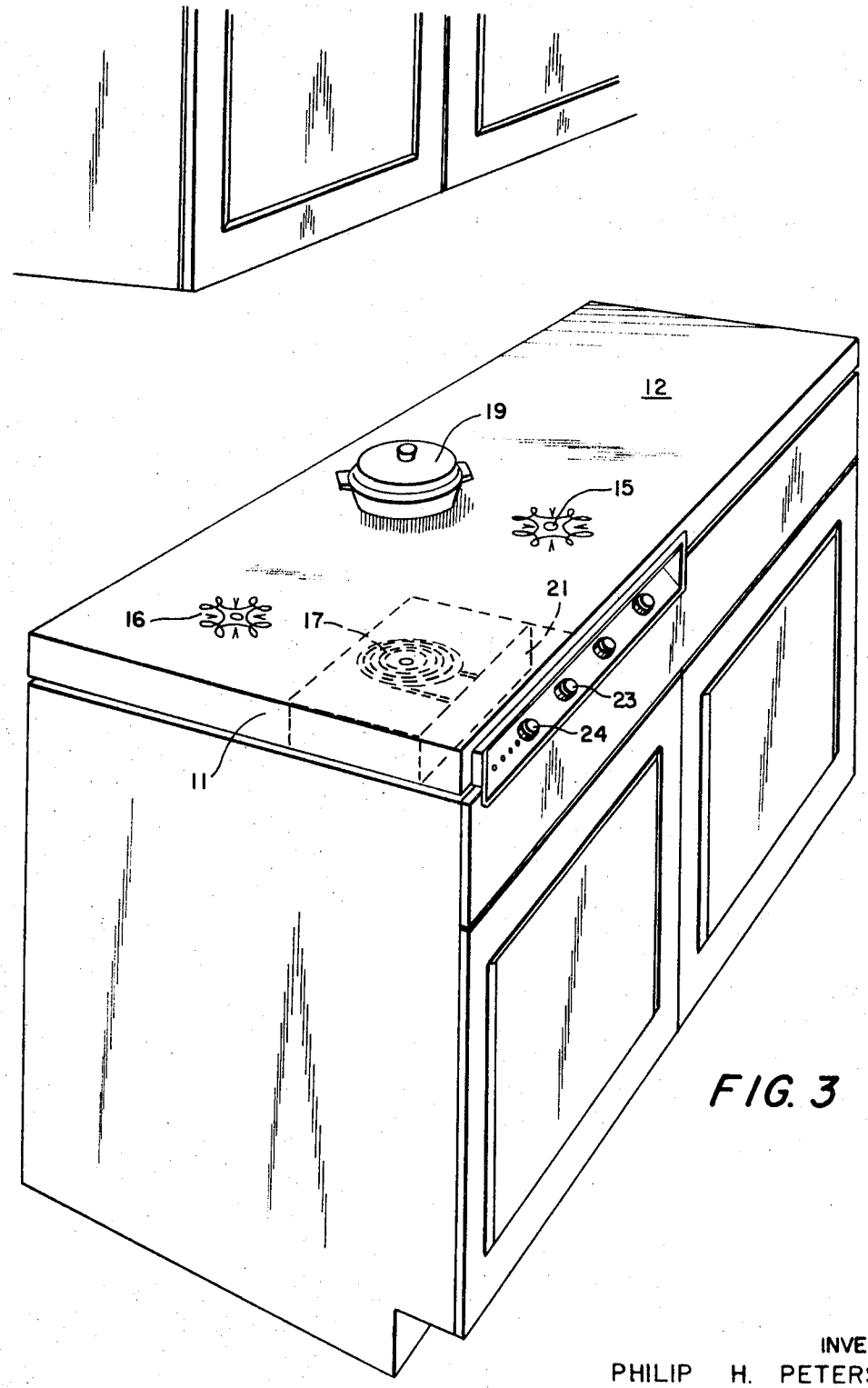

FIG. 3

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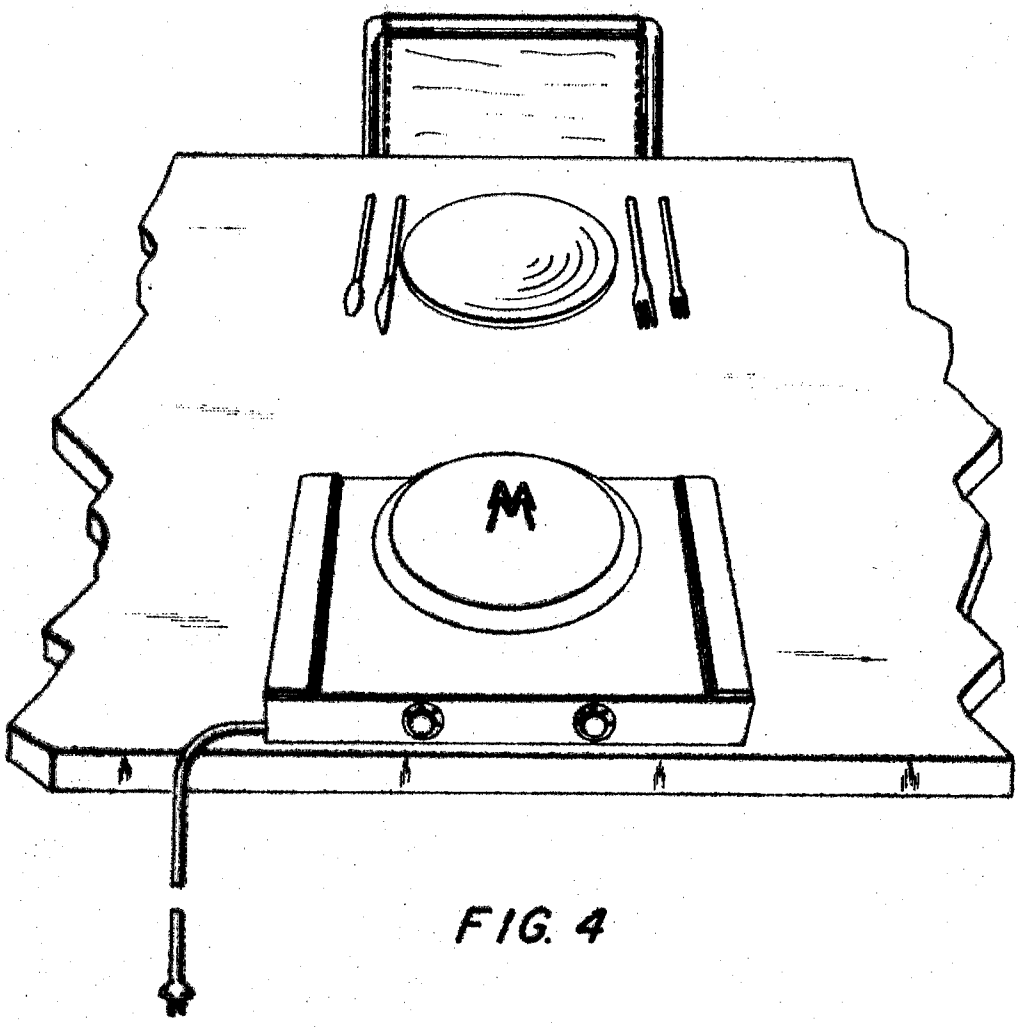

FIG. 4

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IMPROVED CONSUMER ORIENTED COMBINED COUNTER AND COOKING UNIT USING INDUCTION HEATING

BACKGROUND OF THE INVENTION

FIELD OF INVENTION

This invention relates to a new and improved combined counter and electric cooking unit using induction heating coils for inductively heating metal base cookware.

More particularly, the invention relates to a new and improved combined electrically operated, magnetic induction heating and cooking unit and countertop that combines the function of both a cooking range and a suitable table or other functional top from which foods cooked on the range can be served since the top surface of the range is formed from a substantially continuous, smooth surface of insulating material having an attractive appearance, does not heat-up excessively, and can readily be cleaned.

In U.S. Pat. application Ser. No. 131,648 (HD–5043)-P. H. Peters, inventor, filed Apr. 6, 1971, and entitled "Metal Base Cookware Induction Heating Apparatus Having Improved Power Supply And Gating Control Circuit Using Infra-Red Temperature Sensor And Improved Induction Heating Coil Arrangement," assigned to the Environment/One Corporation, a dynamic field heating and cooking unit for induction heating and cooking with metal base cookware, is described. It is a characteristic of this novel induction heating and cooking unit that the cooking surface of the induction heating or cooking unit itself never can attain a temperature higher than that of the cooking utensil placed above it. This characteristic feature allows surface materials to be used in continuous sheets to provide an absolutely flat and easily cleaned cooking surface to be formed over ranges employing a multiplicity of induction heating units. Because of this characteristic, it is possible to provide new custom made kitchen facilities employing a single, standard, factory made combination cooking surface countertop unit and control and power supply module to be used with various different types of supporting structures, housing and cabinets, and which make available the possibility of removable and/or remote operable units for remote location cooking and warming. This same characteristic also allows the cooking areas of the countertop surface of the cooking unit to serve also as a surface on which an eating dish, paper napkins, etc., may be placed and eaten from, since the surface remains relatively cool during the cooking process. For example, soup may be prepared in a saucepan, the pan removed from the overlying insulating surface, a placemat laid over the cooking surface and a place setting arranged on it so that the operator may use the cooking surface as an eating table or cooking may be accomplished while at the same time and immediately adjacent to the cooking area on the same continuous smooth countertop an eating placemat and table setting, may be placed. Such a feature is of considerable importance in efficiency kitchens, mobile homes, airplanes, submarines, boats, etc., where the feature of a dual purpose cooking and table top surface provides considerable space saving. Further, because of this characteristic, it is possible to use metal eating dishes made of stainless steel, and which may be made to have an attractive pewter appearance, for example, to both cook in and

to eat from. The dish may be left on the heating unit and kept warm by using a low level of heating power from the induction heating unit thereby allowing considerable convenience in keeping meals warm for extended periods of time after they have been cooked.

In addition to all of the above-listed desirable characteristics, the resultant consumer oriented induction cooking units require less power, are more efficient and result in less waste heat being generated in the kitchen or other cooking area. Moreover, because the unit combines two functions, there is a resultant saving of the countries resources as well as reducing power drain on the utility systems.

SUMMARY OF INVENTION

It is therefore a primary object of the present invention to provide a new and improved electric cooking unit using electrically excited, magnetic induction heating coils for inductively heating metal base cookware. The induction heating coils are mounted within a housing that has a substantially continuous, smooth-top insulating top surface of attractive appearance and which can serve as a cooktop surface at particular heating site locations where heating and cooking is to be performed. Because of the smooth, continuous nature of the insulating top surface, cleaning of the surface is greatly facilitated and where because of the cool cooking surface, napkins and other material associated with settings may be placed and used without danger of fire or harm to the user.

Another object of the invention is to provide such an improved electric cooking unit which can serve both as a cooking range and as a countertop and/or table top upon which meals can be served as an eating surface for facilities such as efficiency kitchens, mobile homes, airplanes, submarines, boats and the like.

A still further object of the invention is to provide such an improved electric cooking unit which includes a removable portion and/or a plug-in remote coil and surface unit that can be readily moved and transported to a remote location for cooking and/or warming of foods. The electrical plug can be located in remote wall (built in wiring) to make this feature more convenient to use.

Still another object of the invention is the provision of a single, standard, factory made, combination induction cooking unit and counter and/or table top module having a smooth, insulating top surface that may be employed with various different types of supports, cabinets, and housing configurations (which may or may not feature removable and remote operable units), and which can serve as a combination eating, cooking and work surface offering a wide variety of choice in installation and design of facilities where food is to be prepared and eaten.

In practicing the invention, a modular induction cooking and countertop unit is provided which comprises a substantially rectangular or other conveniently-shaped box of shallow depth of perhaps a few inches and extending over an area perhaps 4 to 5 feet in length and some 2½ feet in width. The box includes a substantially smooth, continuous insulating top surface which is transparent to magnetic induction fields. At particular heating site locations marked on the surface where heating is to be performed, induction heating units are supported within the box beneath the insulating surface. The induction heating units are powered by con-

trol and power supply circuits located within the box or external to it in which case shielded cables carrying high frequency power would lead from a remotely located power supply unit to the box. Power and temperature control knobs are mounted conveniently on the exterior of the box for controlling each induction cooking unit. The continuous, smooth, top surface can be made of a high temperature plastic having a desirable decorative pattern molded or otherwise formed in the plastic material. Heating site locations can be identified by a particular pattern formed in the top insulating surface. Where temperature control of the cooking processes is included in the control and power supply circuits, window openings for temperature sensors located within the box are formed in the insulating surface and also may provide identification of the center of each heating site location. The heating and cooking modules may be manufactured in a number of different sizes and shapes so as to allow a variety of different approaches to the use of the module in the layout of custom made kitchens. A one, two, three or four induction heating unit module could be mounted in line with the countertop or at right angles to the countertop at the end of the counter, for example, or it could be mounted on legs or pedestals so as to provide leg room and allow stools to be stored beneath it. A sheet of pyro-ceramic material or high temperature oven glass such as Pyrex could act as the cooking surface and to be mounted flush with the module top surface to permit heating utensils to high temperatures at which conventional plastic countertops might be damaged. It is possible for the entire insulating top surface to be made of marble, slate, natural stone, tile, ceramics, or other similar material which could be set in a high temperature epoxy grout, as well as wood, wood treated with epoxy resin, etc., for example. In certain installations the leg or pedestal supports for the module box could be made hollow to contain necessary wiring or power supply cords for exciting the induction heating unit.

BRIEF DESCRIPTION OF DRAWINGS

These and other objects and advantages of the invention will become more apparent as the invention becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings; wherein like parts in each of the several figures are identified by the same reference character; and wherein:

FIG. 1 is a perspective view of one form of an improved electric cooking and heating unit constructed in accordance with the invention;

FIG. 2 is a perspective view of a second form of the invention showing it in use as a combined cooking and table top installation;

FIG. 3 is a perspective view of still another form of construction of the invention showing it in use in a conventional range-type housing installed in a custom made kitchen;

FIG. 4 is a perspective view of one of the separable, plug-in induction cooking units which has been detached as a secondary unit from its main housing module, as is being used in a remote location for remote location cooking and warming.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS:

FIG. 1 is an overall perspective view of a new and improved combined electric cooking and table top module employing induction heating coils for inductively heating metal base cookware and constructed in accordance with the invention. From a consideration of FIG. 1, it will be seen that the module comprises a housing 11 which is shaped in the form of a table providing leg room below a top 12 and under which stools, chairs, and other similar articles of furniture can be placed to allow persons to sit at the table while eating. The top 12 of housing 11 is formed from an insulating material having a continuous, smooth top surface of attractive appearance and transparent to magnetic induction fields with little or no losses. The insulating top 12 may be formed from plastic having a molded-in attractive design, and may provide a continuous table top surface by mounting it contiguous with a counter and sink unit shown at 13 to the left of the housing 11 and top 12. Alternatively, the housing 11 and top 12 may be freestanding in the manner shown in FIG. 2 of the drawings, or it could be placed at right angles to the countertop surface 13 depending upon the space in which it is to be used. Other similar design arrangements will be suggested to those skilled in the art.

Mounted within housing 11 and secured below different heating site locations such as indicated at 14, 15 and 16 in FIG. 1, are a plurality of pancake type, helically wound, inductive heating coils shown in phantom at 17 and 18, for example. The inductive heating coils 17, 18 etc. are mounted just below the insulating top surface 12 so that upon a metal base pan such as indicated at 19 being placed at one of the heating site locations 14, 15, 16, etc., the pan can be inductively heated by the heating coils 17, 18, etc. The inductive heating coils 17, 18, etc., are electrically energized by high frequency electric currents supplied thereto from individual control and power supply circuits shown at 21, 22, etc., for exciting the respective induction heating coils 17, 18, etc., respectively. The control and power supply circuits 21, 22, etc., are mounted within the module housing 11 and have external control knobs, such as shown at 23 and 24, which are accessible from the side of the housing 11. The control 23 may comprise a temperature control for setting the temperature at which metal base cookware such as pan 19 is to be heated, and the control 24 may comprise a conventional on-off and power control switch for turning the unit on and off and controlling the power level at which the unit operates. For a more detailed description of the construction and operation of the inductive heating coils 17, 18, etc., and their associated control and inverter power supply circuitry, reference is made to the above-identified copending U.S. application Ser. No. 131,648 (HD-5043).

It is possible for each of the individual cooking site locations to be located by any form of scribing or characteristic attractive patterns molded or otherwise formed in the smooth, insulating top surface 12 and which identify the location of the underlying inductive heating coils, 17, 18, etc. However, in a preferred form of the invention, it is desirable to provide temperature control of the inductively heated metal base cookware. By this means, it is possible to control exactly the temperature to which foods are heated thereby preventing overcooking as well as the generation of undesirable, excess heat that otherwise would be wasted or result in overcooking the food being processed. For this purpose, each of the heating site locations 14, 15, 16, etc.,

is identified by a small window opening, such as shown clearly at **16,** in the insulating table top surface **12** which is transparent to infrared heat rays. Opening **16** can be a void or an opening in the insulating top surface **12,** however, such an opening might catch and be a repository for spilled foodstuffs that have been wiped off of the table top. For this reason, it is desirable that the opening **16** be closed by a suitable pyro-ceramic, high temperature glass, or other suitable insulating material which is transparent to infrared heat rays but which also would close the openings **16** and provide for a smooth, continuous and attractive table top surface **12.** By this construction, cleaning of the top of the cooking unit is greatly facilitated. Located below the window openings **16** are suitable infrared sensors which view the bottom of a pan **19** or other metal base cookware and operate with the control circuits **21, 22,** etc., in establishing and maintaining the temperature of the metal base cookware, such as **19,** that is being inductively heated over the inductive heating coils **17, 18,** etc. Again for a more detailed description of this temperature controlling feature, reference is made to the above-identified co-pending U.S. Pat. application Ser. No. 131,648 (HD–5043).

While it is possible to construct individually tailored, custom-made table top cooking ranges, such as **11,** using the individual inductive heating coils and their associated control and power supply circuitry, it is desirable that at least the cooking range portion, shown at **11** in FIGS. **1** and **2,** and forming the combined cooking and table top serving unit, be fabricated in factory-made combination, insulating cooking and table top counter module dimension is indicated by dotted line **25.** The module can be used with various types of supports and cabinets, and could have different numbers of inductive heating coil, heating site locations depending upon the type of installation required. For example, FIG. **1** depicts a module that has four heating site locations, **14, 15, 16** and the location covered by metal base cookware **19.** As an alternative arrangement, two of the heating site locations could be disposed on the opposite side of the table top where FIG. **1** illustrates place settings, and of course, the number of heating site locations in any given module can be varied to accommodate the needs for a particular installation. Thus, it will be seen that the invention makes available for use in fabricating custom made kitchens, a single, standard, factory-made combination cooking unit and countertop module to be used with various different supports and cabinets. The module can serve as a combination heating and cooking surface offering a wide variety of choices in the design of installations and facilities where food is both prepared and eaten.

It is a characteristic, of the inductively heated cooking unit, that the same area on which food has been cooked in suitable metal base cookware, may serve as a surface on which an eating dish can be placed and then eaten from. For example, soup may be prepared in a saucepan, the saucepan removed, and a placemat laid over the cooking surface and a placesetting arranged on it so that the former cooking surface may now be used as an eating table. It is believed evident that in efficiency kitchens, airplanes, submarines, boats, etc. such a feature provides considerable advantage where space is at a premium. It is also possible for the factory-made combination induction cooking and table top counter module to use all of the surface of the module for working and eating purposes. It is further possible to use metal eating dishes made of stainless steel which, for example, may be provided with a pewter appearance so as to be attractive, and could be used both to cook in and then to eat from. Such dishes, or for that matter any metal base cookware can be left over the inductive heating unit and kept warm for extended periods of time using only a low level of heating power from the unit. The convenience of keeping meals warm for extended periods of time in this manner is believed apparent.

The factory-made, modular cooking and table top assemblies constructed in the above-identified manner might comprise rectangular or otherwise shaped boxes of relatively shallow depth of the order of a few inches and extending over an area of perhaps 4 to 5 feet in length and some 2½ feet in width. The boxes would be provided with decorative, insulating, smooth-top surfaces with the individual inductive heating coils **17, 18,** etc., mounted within the box and substantially flush with the top surface. The inductive heating unit could be aligned with existing counter or table surfaces, or otherwise disposed to provide a desired number of heating site locations arranged in a desired manner. Preferably, the power and temperature control circuits are mounted within the box; however, they could be mounted externally, in which case cables carrying high frequency power would lead from a remotely located control and power supply circuit to the modular box containing the heating coil unit. The power and temperature controls and on-off switches would be mounted externally of the boxes so as to be readily accessible to an operator of the modular assembly.

The smooth-top surface could be made of a high temperature plastic having a desirable decorative pattern molded into the plastic material. The various heating site locations can be identified by a particular pattern formed in the top surface, or, alternatively, the widow openings for the temperature sensors could identify the heating site locations. An infrared heat transparent window material such as pyro-ceramic can be used for closing the temperature sensor openings. In this event, the window material is formed flush with the table top surface, and also serves to provide an indication of the heating site locations. The cooking and table top module **11, 12** can be mounted in line with the countertop as shown in FIG. **1,** separately as shown in FIG. **2,** or it could be mounted at right angles to the end of the counter, for example. The module also can be mounted on legs or pedestals to provide leg room in the manner shown in FIG. **2.**

If desired, the insulating top surface could be a sheet of pyro-ceramic material or oven glass which could act as both the cooking and table top surface and may or may not require separate window openings to allow temperature sensing. By the use of such materials to form the table top surface, utensils can be heated to higher temperatures than otherwise might be allowed with conventional plastic countertop materials that otherwise might be damaged at the higher temperature values. Alternatively, the entire top could be made of marble, slate, natural stone, ceramic tile, or other similar material set in a high temperature epoxy grout, for example. Also hardwoods such as oak, teak, ebony or specially treated wood such as epoxy-impregnated or radiation-cured woods, can be used. With such materials the tops should be provided with appropriate tem-

perature sensor window openings. The legs on the pedestals supporting the table top units could be made hollow to contain the necessary wiring for supplying electric power to the induction heating coils. Of course, it would be possible to supply wireless control of the cooking and eating module so as to allow for remote control of the induction heating units with the aid of supersonically or electromagnetically conveyed control signals and suitable signal processing circuitry.

The choice of materials forming the continuous, smooth, insulating table top surface where both cooking and eating can be accomplished, is quite wide, and this feature is made possible by the fact that the cooking surface of the induction heating and cooking unit never can attain a temperature higher than that of the cooking utensil, such as **19** shown in FIG. **1**, placed above the induction heating coil. This is due to the fact that all of the heat is induced only in the cooking utensil or pan, itself, and no excess heat is produced. This feature permits the use of surface materials which cannot be used successfully for a conventional electric range top, such as resistance heating unit ranges, so that the table top surface material may be used in continuous, smooth sheets to provide a flat and easily cleaned cooking, working and eating surface.

In a copending U.S. Pat. application Ser. No. 179,010, (HD–5121) filed Sept. 9, 1971, entitled "Insulated Cookware For Dynamic Induction Field Heating And Cooking Apparatus"-P. H. Peters, Jr.,-Inventor- and assigned to the Environment/One Corporation, improved thermally insulated cookware is described which is ideal for use with the combined induction cooking and table top modules. In facilities where such thermally insulated cookware is to be employed, conventional plastic countertop materials such as the phenolic plastics BAKELITE, TEXTO LITE, and epoxy glass laminates, etc., may be employed to form the smooth insulating table top surface **12** since there is only a minimum of back heating (as described above) where such thermally insulated cookware is employed.

FIG. **2** shows still another alternative form of the invention wherein the overall combined cooking and table top module such as **12**, includes a removable and remotely operable, separate plug-in induction heating unit, such as shown at **17**. This particular induction heating unit is provided with separable partitions **27** which allow the induction heating coil unit **17** including its control and power supply circuit along with the temperature sensor (if provided) to be separated from the main module **12**, taken to a remote location, and plugged into a household convenience outlet of alternating current for use in remotely cooking and/or heating and warming foods on the surface of the unit. FIG. **4** of the drawing illustrates such a separable induction heating and cooking unit that has been removed from the overall module assembly **12** and placed on a conventional table for the purpose of keeping food warm. It is, of course, possible to make all of the individual units within the module **12** removable in a similar fashion so that they can be removed and used on conventional table surfaces to provide for individually cooking or warming foods at each table setting on the table. Because of the fact that little or no heat is induced in the individually removable remote located units other than that induced in the cookware and transferred by backheating to the insulated top surface of the unit, the units do not generate sufficient temperature to endanger the surfaces of conventional table finishes. This feature makes it possible to remove an individual induction cooking and heating unit from the main module, and with a suitable connection cable or extension cord or the plug-in type, to place the separated unit at some other convenient location where cooking or warming of foods is to be carried out. If desired, a substitute lid or panel can be provided for maintaining the full work surface of the main module upon the replaceable module being removed. Additionally, it is desirable that the jack and plug supplied for the replaceable, remote operating module be provided with adequate safety interlock switches which automatically turn off power to the inductive heating coil upon the replaceable module being unplugged.

FIG. **3** of the drawings illustrates still another form of housing or cabinet construction for supporting the modular inductive heating housing **11** in a conventional cooking range type cabinet. This cabinet may be separate standing, or comprise an integral part of an overall counter built to accommodate a modular cooking unit such as **12** secured within the cabinet support. In all other respects the embodiment of the invention shown in FIG. **3** will possess the characteristics of the structure shown and described more fully in FIGS. **1** and **2**, with the exception that no leg space is provided under the cabinet. Hence, it cannot be used comfortably as a combined cooking range and serving table surface. However, the design does provide a smooth, continuous cooking surface which greatly facilitates cleaning of the cooking facility.

From the foregoing description, it will be appreciated that the invention makes available new and improved combined electric cooking and table serving modular units which can be fabricated in the form of a standard, factory made module and then employed in custom made kitchens in connection with various different types of table supports, cabinets, etc. The unit may include removable and remote operable individual units and offers a wide variety of choice in the design and installation of cooking facilities in places where food is to be both prepared and eaten. Because the cooking areas of the surface of the combined cooking and table top module remain relatively cool, the same area on which food is cooked may serve as a work table or serving surface on which an eating dish may be placed and eaten from. It is evident that in crowded apartment kitchens, airplanes, submarines, boats, and other similar facilities where space is at a premium, the availability of such a dual purpose cooking and table top module, is extremely useful and also may be attractively styled.

Having described several embodiments of a new and improved combined electric cooking and table top serving modular unit constructed in accordance with the invention, it is believed obvious that other variations and modifications of the invention will be suggested to those skilled in the art in the light of the above teachings. It is therefore to be understood that any such modifications are intended to come within the scope of the invention as defined by the appended claims.

What is claimed is:

1. An improved combined counter and electric cooking unit using induction heating coils for inductively heating metal base cookware comprising a general purpose housing having a substantially continuous insulating smooth-top surface of attractive appearance cover-

ing the top of the housing, said housing supporting a plurality of induction heating coils beneath the insulating smooth-top surface at particular heating site locations where heating is to be performed, said insulating surface at least at the heating site locations, being transparent to magnetic induction fields with relatively little or no losses and include at particular heating site locations window areas which are transparent to infrared heat whereby the temperature of metal base cookware disposed at such locations can be directly viewed and controlled by infrared heat temperature sensors comprising a part of the induction heating coil control circuitry and power supply for supplying high frequency excitation electric currents to the respective induction heating coils.

2. An improved combined counter and electric cooking unit according to claim **1** wherein the smooth-top insulating surface is fabricated from the class of materials comprising plastics, tile, certain glasses, stoneware, ceramics, Pyrex, pyro-ceramics, marble, slate, natural stone, wood and the like.

3. An improved combined counter and electric cooking unit according to claim **1** wherein the housing is in the form of a countertop table with the smooth-top insulating surface forming the top surface of the table and leg room is provided below the housing for allowing stools, chairs and the like to be drawn up to the surface for use in the manner of a table whereby the smooth-top insulating surface serves as both a table top and a cooking surface that can be readily cleaned.

4. An improved combined counter and electric cooking unit according to claim **1** wherein the housing is in the form of a conventional electric range unit and the insulating smooth-top surface forms a smooth, continuous surface that can be readily cleaned.

5. An improved combined counter and electric cooking unit according to claim **1** wherein at least one of the heating coils including the overlying smooth-top insulating surface and associated control and power supply circuitry are removable from the housing to allow for remote location cooking and/or warming, and upon being mounted in place within the housing, the insulating surface thereof is contiguous to and provides an essentially continuous smooth continuation of the countertop surface for the top of the housing.

6. An improved combined counter and electric cooking unit according to claim **1** wherein the infrared heat transparent areas formed in the smooth-top insulating surfaces are voids or openings in the insulating surfaces which allow the bottom of metal base cookware disposed over the openings to be directly viewed through the openings from a point below the insulating surface.

7. An improved combined counter and electric cooking unit according to claim **6** wherein the smooth-top insulating material is not transparent to infrared heat rays, and the opening is closed with a material which is transparent to infrared heat rays, and the entire surface of the insulating material and the infrared transparent material filling the opening is continuous and smooth so as to facilitate cleaning of the surface.

8. An improved combined counter and cooking unit according to claim **7** wherein the housing is in the form of a countertop table with the insulating smooth-top surface forming the top surface of the table and leg room is provided below the housing allowing stools, chairs and the like to be drawn up to the smooth-top surface for use in the manner of a table whereby the insulating smooth-top surface serves as both a table top and a cooking surface that can be readily cleaned.

9. An improved combined counter and electric cooking unit according to claim **8** wherein at least one of the heating coils including the overlying smooth-top insulating surface and associated control and power supply circuitry are removable from the housing to allow for remote location cooking and/or warming, and upon being mounted in place within the housing the insulating surface thereof is contiguous to and provides an essentially continuous smooth continuation of countertop surface for the top of the housing.

10. An improved combined counter and electric cooking unit according to claim **8** wherein the insulating smooth-top surface is fabricated from the class of materials comprising plastics, tile, certain glasses, stoneware, ceramics, Pyrex, pyro-ceramics, marble, slate, natural stone, wood and the like.

11. An improved combined counter and electric cooking unit according to claim **7** wherein the housing is in the form of a conventional electric range unit and the insulating smooth-top surface forms a smooth, continuous surface that can be readily cleaned.

12. An improved combined counter and electric cooking unit according to claim **11** wherein at least one of the heating coils including the overlying insulating surface and associated control and power supply circuitry are removable from the housing to allow for remote location cooking and/or warming, and upon being mounted in place within the housing, the insulating surface thereof is contiguous to and provides an essentially continuous smooth continuation of the countertop surface for the top of the housing.

13. An improved combined counter and electric cooking unit according to claim **11** wherein the smooth-top insulating surface is fabricated from the class of materials comprising plastics, tile, certain glasses, stoneware, ceramics, Pyrex, pyro-ceramics, marble, slate, natural stone, wood and the like.

14. An improved combined electric cooking unit and table using induction heating coils for inductively heating metal base cookware comprising a housing having a substantially continuous smooth-top insulating surface of attractive appearance covering the top of the housing, said housing providing leg room below the insulating smooth-top surface for allowing stools, chairs and the like to be drawn up to the smooth-top surface for use in the manner of a table, and means supporting a plurality of induction heating coils beneath the insulating surface in close proximity thereto at particular heating site locations where heating is to be performed, said smooth-top insulating surface being transparent to magnetic induction fields with little or no losses and also supporting the control circuitry and power supply for supplying high frequency excitation electric currents to the respective induction heating coils.

15. An improved combined electric cooking unit and table according to claim **14** wherein the insulating surface includes at particular heating site locations, areas which are transparent to infrared heat whereby the temperature of the metal base cookware disposed at such locations can be directly viewed and controlled by infrared heat temperature sensors comprising a part of the induction heating coil control and power supply circuitry.

16. An improved combined electric cooking unit and table according to claim **15** wherein the insulating

smooth-top surface is fabricated from the class of materials comprising plastics, tile, certain glasses, stoneware, ceramics, Pyrex, pyro-ceramics, marble, slate, natural stone, wood and the like.

17. An improved combined electric cooking unit and table according to claim **16** wherein at least one of the heating coils including the overlying smooth-top insulating surface and associated control and power supply circuitry are removable from the housing to allow for remote location cooking and/or warming, and upon being mounted in place within the housing, the insulating smooth-top surface thereof is contiguous to and provides an essentially continuous smooth continuation of the countertop surface for the top of the housing.

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