



(11) **EP 2 864 703 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention
of the grant of the patent:
25.04.2018 Bulletin 2018/17

(51) Int Cl.:
F24C 15/10 ^(2006.01) **F23D 14/06** ^(2006.01)
F23D 14/84 ^(2006.01) **F24C 15/28** ^(2006.01)

(21) Application number: **13810849.3**

(86) International application number:
PCT/US2013/047833

(22) Date of filing: **26.06.2013**

(87) International publication number:
WO 2014/004634 (03.01.2014 Gazette 2014/01)

(54) **SIMMER PLATE FOR COMMERCIAL AND RESIDENTIAL STOVES**

KOCHPLATTE FÜR KOMMERZIELLE UND HEIMÖFEN

PLAQUE DE MIJOTAGE POUR CUISINIÈRES COMMERCIALES ET DOMESTIQUES

(84) Designated Contracting States:
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO
PL PT RO RS SE SI SK SM TR**

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(30) Priority: **26.06.2012 US 201261664264 P**

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(43) Date of publication of application:
29.04.2015 Bulletin 2015/18

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Description

FIELD OF THE INVENTION

[0001] This invention is related to a device for cooking of food, and more particularly, to a device used with a gas stove or any heating source involving a flame(s) for use with cooking pots and the like.

BACKGROUND OF THE INVENTION

[0002] It is often necessary in food preparation to heat large pots of food ingredients such as sauces, gravy, and other food items which are primarily liquid in composition. Commercial kitchens have high-capacity stoves used for heating prepared foods rapidly and in large quantities. A similar situation applies to residential kitchen cooking. In some instances, however, it is desirable to prevent uneven and high temperature heating or burning/scorching of the contents of a large pot. This is particularly an issue with acidic, starchy, or high sugar content foods being heated in large aluminum or stainless steel cooking pots without scorching and spoiling the food. Even with a gas flame turned to a very low setting, it is difficult to avoid burning of the food in a large pot. It is known to use metal deflector or heat insulating plates placed between a pot and a stove burner for the purpose of distributing heat more evenly. However, the currently known devices of this art have significant shortcomings. Documents US2560984 A1, US1510030A1 and US1864715 A1 disclose simmer plates according to the state of the art. This invention provides an improved simmer plate article.

SUMMARY OF THE INVENTION

[0003] The object of the present invention is solved by a simmer plate according to claim 1. In accordance with the present invention, a simmer plate is provided which provide even, low-temperature heating of large cooking pots particularly suited for commercial (or residential) kitchen applications. The simmer plates according to the invention avoid high localized heating of the pot or pan at their bottom surface only and provide heating over a larger surface area of the pot and its contents. The article is easily adapted for various stove and cooking environments. A more detailed description of the products follows.

BRIEF DESCRIPTION OF DRAWINGS

[0004] The articles of this invention may be better understood with reference to the following drawings and description. The components in the figures are not necessarily to scale, emphasis instead being placed upon illustrating the principles of the invention. Moreover, in the figures, like referenced numerals designate corresponding parts throughout the different views.

Figure 1 is a cross-sectional view of a simmer plate in accordance with a first embodiment of the present invention shown in use on a stovetop and heating a large pot filled with a liquid food material.

Figure 2 is a plan view of the simmer plate shown in Figure 1.

Figure 3 is a cross-sectional view through the simmer plate shown in Figure 2 taken along line 3-3.

Figure 4 is a partial cross-sectional view of a portion of the simmer plate shown in Figure 2 taken along line 4-4.

Figure 5 is a plan view of a simmer plate in accordance with a second embodiment of the present invention.

Figure 6 is a side view of the simmer plate shown in Figure 5.

Figure 7 is an isometric view of the simmer plate shown in Figure 5 cutaway in section.

Figure 8 is an isometric view of the simmer plate shown in Figure 5.

DETAILED DESCRIPTION OF THE INVENTION

[0005] A simmer plate in accordance with the present invention is shown by each of the Figures and is generally designated by reference number 10. Figure 1 shows use of the simmer plate 10 placed atop a stove burner 12 having a metal grate 14 (shown in cross-section only). Cooking pot 16 is placed atop simmer plate 10 and has in it a large quantity of food 18 which is primarily liquid (or semi-liquid before heating) in constitution which is being heated. Simmer plate 10 can be used with other types of cooking vessels beyond those shown such as pans or griddles.

[0006] Figures 2, 3, and 4 provide details of the construction of simmer plate 10. Preferably, simmer plate 10 is formed by pressed sheet metal which may be mild low carbon steel, stainless steel, aluminum, tin, or another heat resistant material. The simmer plate 10 is formed into the configuration shown in Figure 2, preferably from flat sheet metal stock. As shown, simmer plate 10 forms a raised dome center section 20. Center section 20 has a planar top surface which defines a first plane 46. Surrounding center section 20 is a lower plate surface 22 defining a second plane 48 which lies on metal grate 14. As best shown in Figure 2, simmer plate 10 further forms a plurality (five shown) of outwardly extending radial channels 24. Channels 24 have an inverted generally "U" shaped cross-section as best shown in Figure 4 and are oriented to extend in a radial direction, extending from center section 20 and feature a tapered cross-section starting with a larger width as it begins at center section 20 and decrease in width and cross-sectional area to the outer edge 26 of the simmer plate. The top surface 28 of channels 24 defines a generally planar upper surface which may be at or slightly below center section plane 46. Approximately midway between the center section 20 and the outer edge 26 of the simmer plate, channels

24 are provided with holes 34 (or slots) which provide for the escape of hot cooking gases, as will be described in more detail as follows. At the outer perimeter of each channel 24 is formed a relief notch 32. At equally angularly spaced positions between channels 24 is provided a series of holes 30 (or slots) formed within slanted walls 31 which lie on a generally conical surface centered at the center of dome section 20.

[0007] The cross-sectional view of Figure 3 shows that the material forming simmer plate 10 is formed to smooth-blended radii at the bending circles 50 and 52 shown in Figures 2 and 3. Moreover, the side edges that form channels 24 also form blended radii as shown in Figure 4. Avoidance of small radii or sharp edges in the formed surface of simmer plate 10 facilitates the preferred metal pressing operations used to form the features of the plate. Irrespective of the material chosen for simmer plate 10, it is preferred to form it from flat sheet stock material formed into the shapes features described. This construction avoids the requirements of forging or casting and provides a finished article which has a generally uniform thickness, with slight thickness variations due to stretching of material during the forming operation.

[0008] Now with particular reference to Figure 1, the operation of simmer plate 10 in use is described in more detail. Food scorching is caused when a portion of pot 16, typically the pot's bottom surface, and the food contents near that cook pot surface reach an excessively high temperature. The food in the immediate vicinity of a highly heated area of a cook pot bottom is also locally heated and this can occur to a point where scorching or burning occurs. While there is also a convective heat transfer mechanism operating within the contents of pot 16, many of these food materials have a very high viscosity such as heavy sauces and the like, and accordingly localized heating of the food contents can reach excessive levels before the high temperatures can be dissipated via conduction or convection to the remaining contents of pot 16. For this reason, it is preferred when simmering large quantities of food material in pot 16 to provide heating of the pot over a larger surface area so that heat can be put into the pot contents over a significantly larger surface area which reduces localized excessive heating at the pot's bottom while providing the desired overall heating effect.

[0009] As shown, burner 12 is centrally located on simmer plate 10. Burner 12 produces high temperature flames and combustion gases which are vented in various directions as illustrated by arrows in Figure 1. Arrow 36 shown on the lefthand side of pot 18 illustrates that some of these gases flow radially outwardly and pass through channel holes 30 where they can move in a convective manner upwardly along the outer diameter of pot 16 as shown by arrows 36 and 38. The open area provided by holes 30 is intentionally restricted to limit the rate of flow of the hot gases in the direction of arrows 36 and 38 which helps prevent excessively high temperatures gases impinging on pot 16 bottom surface which

can lead to scorching. Also involved in the heating gas flow are holes 34 which likewise facilitate hot gas flow as shown by arrows 40 and 42 shown on the right hand side surface of pot 18 in Figure 1. Thus holes 30 and 34 act to provide a gradual heating applied to the outer cylindrical surface of pot 16 which assists in increasing the temperature of the pot contents via convective heat transfer without scorching. The relief notches 32 provide some degree of heating of pot 16 but also prevent the gases escaping radially from the channels 24, as shown by arrows 44 from having a high velocity due to the tapered shape of these radial channels.

[0010] The formed contours of simmer plate 10 also cause pot 16 to sit at an elevated position above burner 12 (at plane 46). Without simmer plate 10, pot 16 would sit at the level defined by metal grate 14, in closer proximity to the flames of burner 12. However, with simmer plate 10 in use, a further reduction in localized heating of pot 16 is provided by spacing the pot from burner 12.

[0011] In addition to the heat transfer to pot 16 and its food contents 18 by convection, there is further conductive heat transfer that occurs by the contact between the bottom of pot 16 and the upper surface of center section 20. This metal-to-metal contact provides conductive heat transfer to the food contents 18. Since there is a much greater metal thickness between the burner and food contents 18 provided by simmer plate 10, and its elevation as described previously, there is a much less localized heating effect on pot 16 from burner 12. By spreading the heat over a larger area, lower localized temperatures of the food occurs.

[0012] In other implementations of the use of simmer plate 10, pot 16 may have a diameter that extends to approximately the outer diameter of simmer plate outer edge 26. In such applications, gases are restricted from outflow from holes 34. However, convective heat transfer (with other modes of heat transfer) is provided by gases escaping from holes 30 as described previously.

[0013] An embodiment of the simmer plate in accordance with the present invention is illustrated with reference to Figures 5 through 8 and is generally designated by reference number 60. Certain elements of simmer plate 60 are similar to those of simmer plate 10 but have a slightly different configuration. Simmer plate 60 differs from simmer plate 10 primarily in several respects. First, center section 62 is on a plane which is continuous with the upper surfaces 66 of channels 64. The diameter of center section 62 is also larger with respect to simmer plate outer edge 68 as compared with similar features of simmer plate 10. Simmer plate 60 does not form channel notches 32 as in the first embodiment. Like simmer plate 10, simmer plate 60 features lower plate surface 70 displaced from the plane of center section 62. Moreover, holes 72 are provided in slanted walls 74, and holes 76 are provided in the upper surface of each of channels 64. Slanted walls 74 are defined by concentric bending radii 78 and 80. Simmer plate 60 may be formed of the same range of materials described previously in connec-

tion with simmer plate 10.

[0014] In use, simmer plate 60 operates consistent with the manner described in connection with simmer plate 10. Slight variations are attributable to the planar upper surface of simmer plate 60 (center section 62 does not provide a dome-like center section 20 extending above the plane of channels 24). For some diameters of cooking pot 16, channel holes 76 may be partially or completely occluded. In such instances slanted wall holes 72 continue to provide a convective gas venting described previously. The upper planar surface defined by center section 62 and channels 64 may provide enhanced conductive heat transfer for certain cooking pots or vessels having a flat bottom surface (as is typical).

[0015] Designs of simmer plate 10 (or 60) in which channels 24 (or 64) having a uniform width and cross-sectional area from center section 20 (or 62) to outer edge 26 (or 68) are not part of the present invention.

[0016] It should be noted that although holes 30, 34, 72, and 76 are shown as round apertures in the Figures, other shapes of apertures could be used, such as elongated slots, slits, or other openings having regular or irregular perimeter shapes, any of which would provide the desired gas venting. Reference to holes is intended to encompass such range of aperture configurations.

[0017] For some sizes of cooking pot 16, holes 30, 34, 72, and 76 are located radially at approximately the location of or near the outer diameter of pot 16. For other sizes of cooking pot 16, the outer diameter of the pot will extend to at or near the diameter of simmer plate outer edge 26 or 68. For certain applications, the diameter of simmer plate outer edge 26 or 68 is chosen to be from about 75% to 125% of the outer diameter of cooking pot 16. Multiple sizes of simmer plate 10 may be provided to encompass a range of sizes of cooking vessels

[0018] While the above description constitutes the preferred embodiment of the present invention, it will be appreciated that the invention is susceptible to modification, variation and change without departing from the proper scope and fair meaning of the accompanying claims.

Claims

1. A simmer plate (10;60) for use in cooking liquid food materials (18) in a cooking vessel (16) comprising:

the simmer plate (10;60) forming a center section (20;62) defining a top surface on an upper plane (46),

a lower surface (22;70) defining a lower plane (48) displaced from the upper plane (46) and configured to lie on a metal grate (14) above a stove burner (12), a plurality of radially extending channels (24;64) projecting from the center section (20;62) and terminating at an outer perimeter (26;68) of the plate (10;60), the channels (24;64) formed having an inverted generally U-

shaped profile with an upper surface (28;66) located at or near the upper plane (46) and blending into the lower surface (22;70), wherein each of the radially extending channels (24;64) has a tapered cross-section with a larger width at the center section (20;62) and with a width and cross-sectional area decreasing to the outer edge (26;68) of the simmer plate (10;60), a slanted wall (31;74) extending concentrically from the center section (20;62) and between adjacent ones of the channels (24;64), and extending from the top surface to the lower surface (22;70), and at least one first hole (30;34;72;76) formed in the simmer plate (10;60) between the center section (20;62) and the outer perimeter (26;68) and allowing venting of cooking gases.

2. The simmer plate (10;60) in accordance with claim 1 further comprising the at least one first hole (30;34;72;76) formed in at least one of the channels (24;64) and the slanted wall (31;74).
3. The simmer plate (10;60) in accordance with claim 1 further comprising the at least one first hole (30;72) formed in the slanted wall (31;74).
4. The simmer plate (10;60) in accordance with claim 3 further comprising the at least one first hole (30;72) formed in the slanted wall (31;74) between each of the channels (24;64).
5. The simmer plate (10;60) in accordance with claim 3 further comprising at least one second hole (34;76) formed in the upper surface (28;66) of the channels (24;64).
6. The simmer plate (10;60) in accordance with claim 1 further comprising five of the channels (24;64) are provided equally angularly spaced around the center section (20;62).
7. The simmer plate (10) in accordance with claim 1 further comprising a notch (32) formed in the outer perimeter (26) at the terminal end of the channel (24).
8. The simmer plate (10;60) in accordance with claim 1 further comprising the simmer plate (10;60) formed from flat stock of sheet metal or other heat resistant material.
9. The simmer plate (10;60) in accordance with claim 7 further comprising the simmer plate (10;60) formed of at least one of a mild low carbon steel, a stainless steel, an aluminum, a tin, or other heat resistant materials.
10. The simmer plate (10;60) in accordance with claim

8 further comprising the simmer plate (10;60) flat stock formed into the simmer plate (10;60) by a metal pressing or stamping operation.

11. The simmer plate (10;60) in accordance with claim 1 further comprising an upper surface (28;66) of the channels (24;64) lying on the upper plane (46).
12. The simmer plate (10) in accordance with claim 1 further comprising an upper surface (28) of the channels (24) displaced below the upper plane (46).

Patentansprüche

1. Kochplatte (10; 60) zur Verwendung beim Kochen flüssiger Nahrungsmittelmateriellen (18) in einem Kochgefäß (16), umfassend:

die Kochplatte (10; 60), die einen zentralen Abschnitt (20; 62) bildet, der eine Oberfläche auf einer oberen Ebene (46) definiert, eine untere Fläche (22; 70), welche eine untere Ebene (48) definiert, die von der oberen Ebene (46) verschoben und ausgelegt ist, auf einem Metallgitter (14) über einem Herdbrenner (12) zu liegen, wobei mehrere sich radial erstreckende Kanäle (24; 64) vom zentralen Abschnitt (20; 62) ausgehen und an einem Außenumfang (26; 68) der Platte (10; 60) enden, wobei die gebildeten Kanäle (24; 64) ein umgekehrtes allgemein U-förmiges Profil mit einer oberen Fläche (28; 66) aufweisen, die in oder nahe bei der oberen Ebene (46) angeordnet ist und in die untere Fläche (22; 70) übergeht, wobei jeder der sich radial erstreckenden Kanäle (24; 64) einen verjüngten Querschnitt mit einer größeren Breite im zentralen Abschnitt (20; 62) und mit einer Breite und einem Querschnittsbereich aufweist, die zum Außenrand (26; 68) der Kochplatte (10; 60) abnehmen, eine geneigte Wand (31; 74), die sich konzentrisch vom zentralen Abschnitt (20; 62) und zwischen benachbarten der Kanäle (24; 64) erstreckt und sich von der Oberfläche zur unteren Fläche (22; 70) erstreckt, und mindestens ein erstes Loch (30; 34; 72; 76), das in der Kochplatte (10; 60) zwischen dem zentralen Abschnitt (20; 62) und dem Außenumfang (26; 68) gebildet ist und eine Abfuhr von Kochgasen gestattet.

2. Kochplatte (10; 60) nach Anspruch 1, ferner umfassend das mindestens eine erste Loch (30; 34; 72; 76), das in mindestens einem der Kanäle (24; 64) und der geneigten Wand (31; 74) gebildet ist.
3. Kochplatte (10; 60) nach Anspruch 1,

ferner umfassend das mindestens eine erste Loch (30; 72), das in der geneigten Wand (31; 74) gebildet ist.

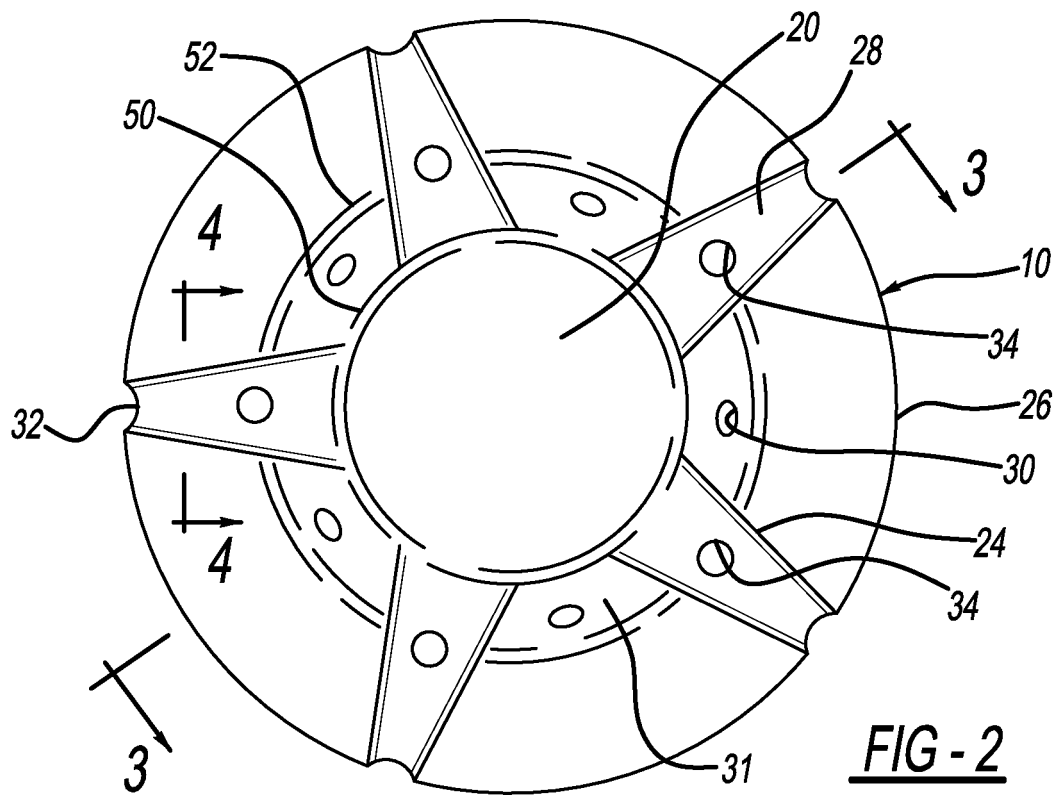
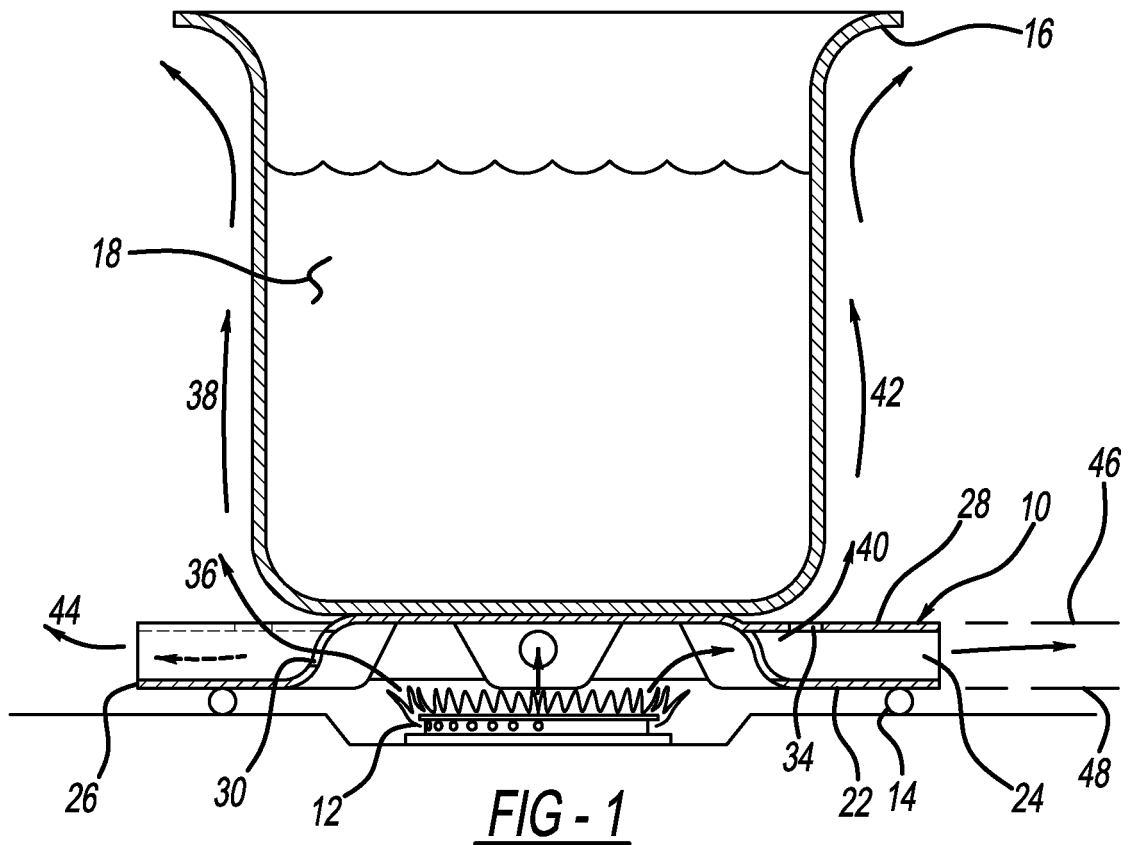
4. Kochplatte (10; 60) nach Anspruch 3, ferner umfassend das mindestens eine erste Loch (30; 72), das in der geneigten Wand (31; 74) zwischen jedem der Kanäle (24; 64) gebildet ist.
5. Kochplatte (10; 60) nach Anspruch 3, ferner umfassend das mindestens eine zweite Loch (34; 76), das in der oberen Fläche (28; 66) der Kanäle (24; 64) gebildet ist.
6. Kochplatte (10; 60) nach Anspruch 1, ferner umfassend fünf der Kanäle (24; 64), im gleichen Winkelabstand um den zentralen Abschnitt (20; 62) bereitgestellt sind.
7. Kochplatte (10) nach Anspruch 1, ferner umfassend eine Kerbe (32), die im Außenumfang (26) am terminalen Ende des Kanals (24) gebildet ist.
8. Kochplatte (10; 60) nach Anspruch 1, ferner umfassend die Kochplatte (10; 60), die aus einem flachen Rohmaterial eines Metallblechs oder anderen feuerfesten Materials gebildet ist.
9. Kochplatte (10; 60) nach Anspruch 7, ferner umfassend die Kochplatte (10; 60), die aus mindestens einem von einem weichen kohlenstoffarmen Stahl, einem rostfreien Stahl, einem Aluminium, einem Zinn oder anderen feuerfesten Materialien gebildet ist.
10. Kochplatte (10; 60) nach Anspruch 8, ferner umfassend das flache Rohmaterial der Kochplatte (10; 60), das durch einen Metallpress- oder -stanzvorgang zur Kochplatte (10; 60) geformt wird.
11. Kochplatte (10; 60) nach Anspruch 1, ferner umfassend eine obere Fläche (28; 66) der Kanäle (24; 64), die auf der oberen Ebene (46) liegt.
12. Kochplatte (10) nach Anspruch 1, ferner umfassend eine obere Fläche (28) der Kanäle (24), die unter der oberen Ebene (46) verschoben ist.

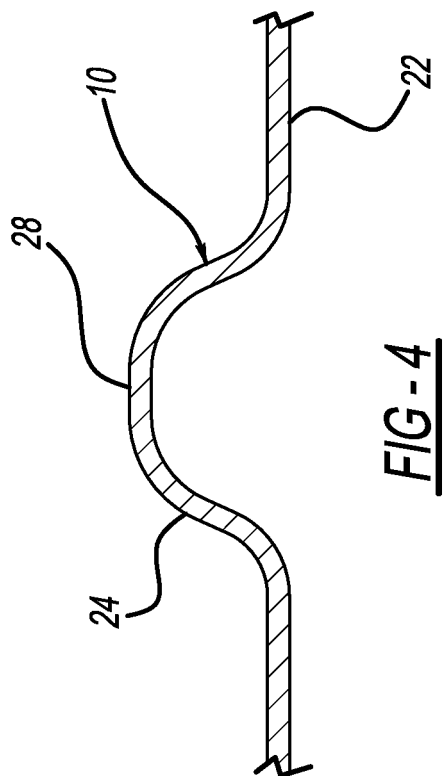
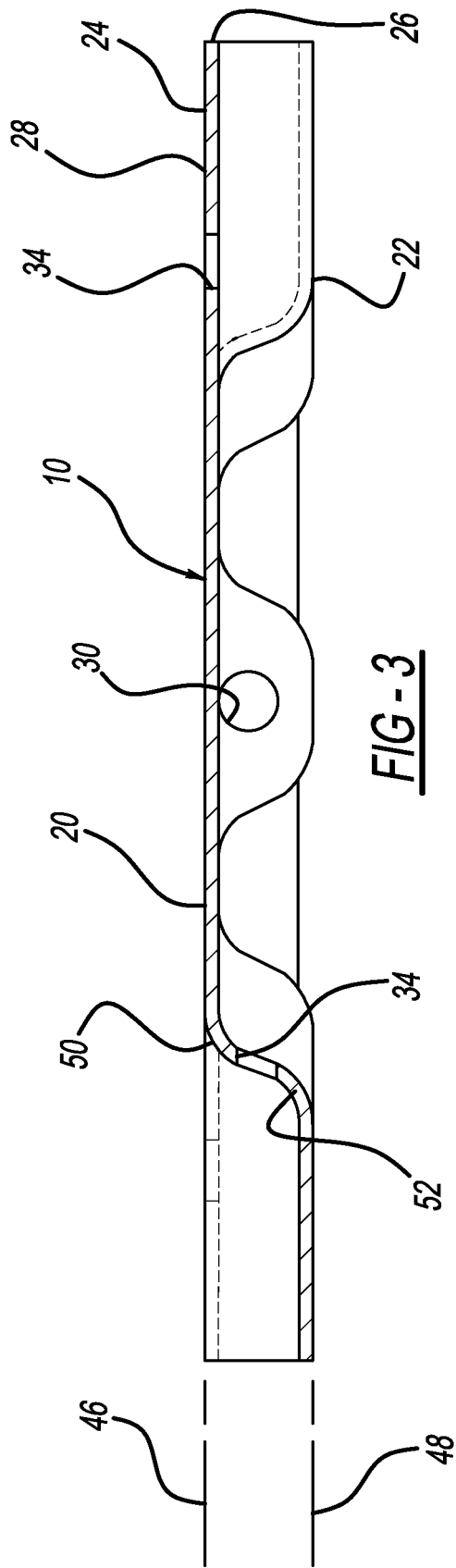
Revendications

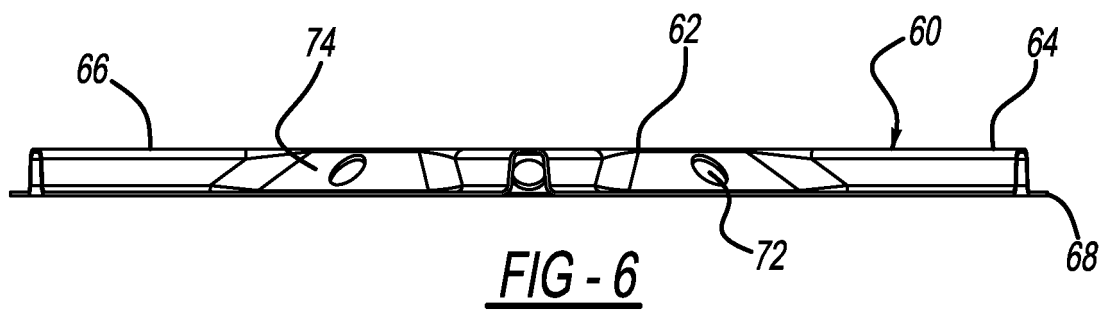
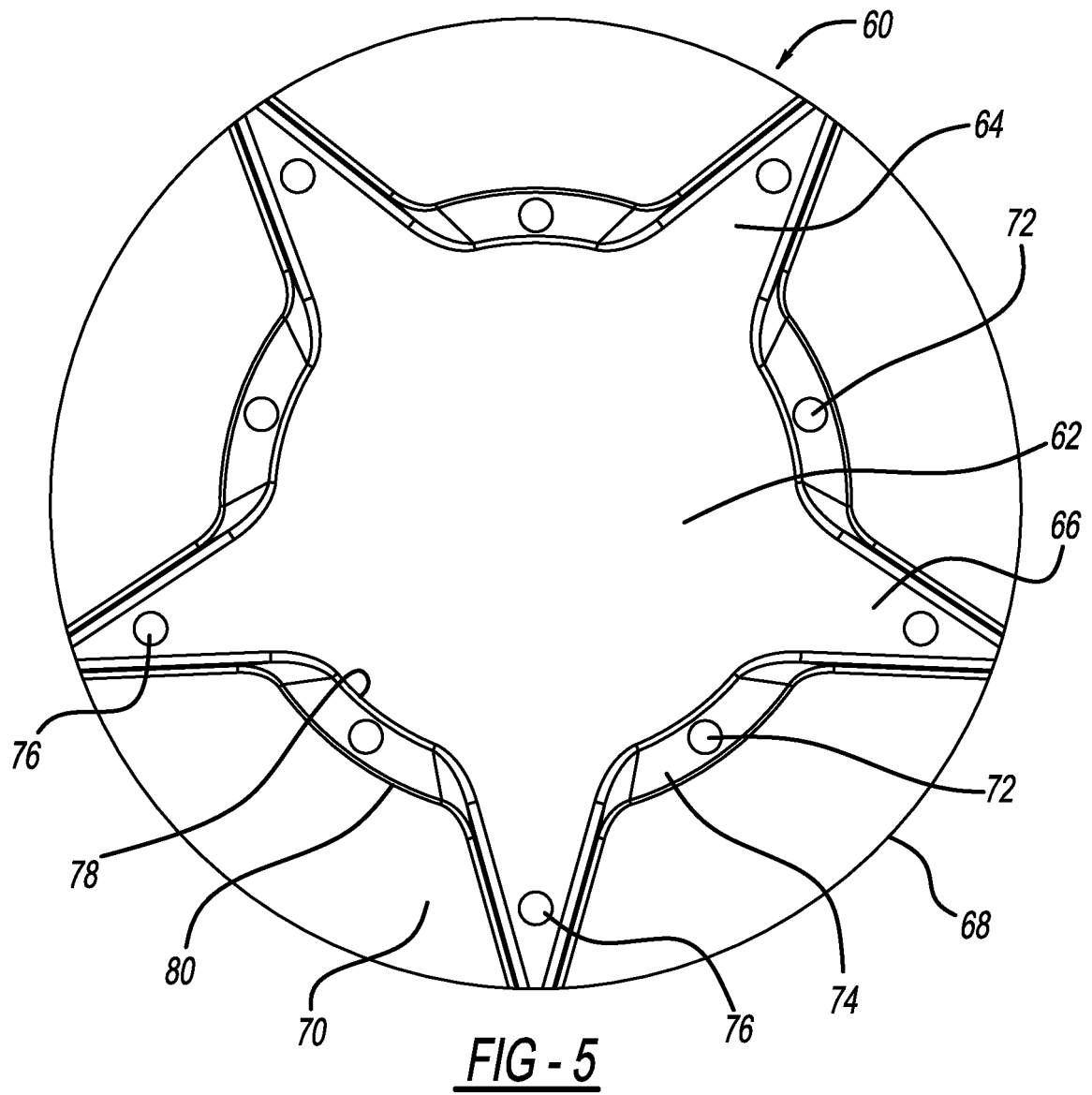
1. Plaque de mijotage (10 ; 60) destinée à être utilisée dans la cuisson de produits alimentaires liquides (18) dans un récipient de cuisson (16) comprenant :

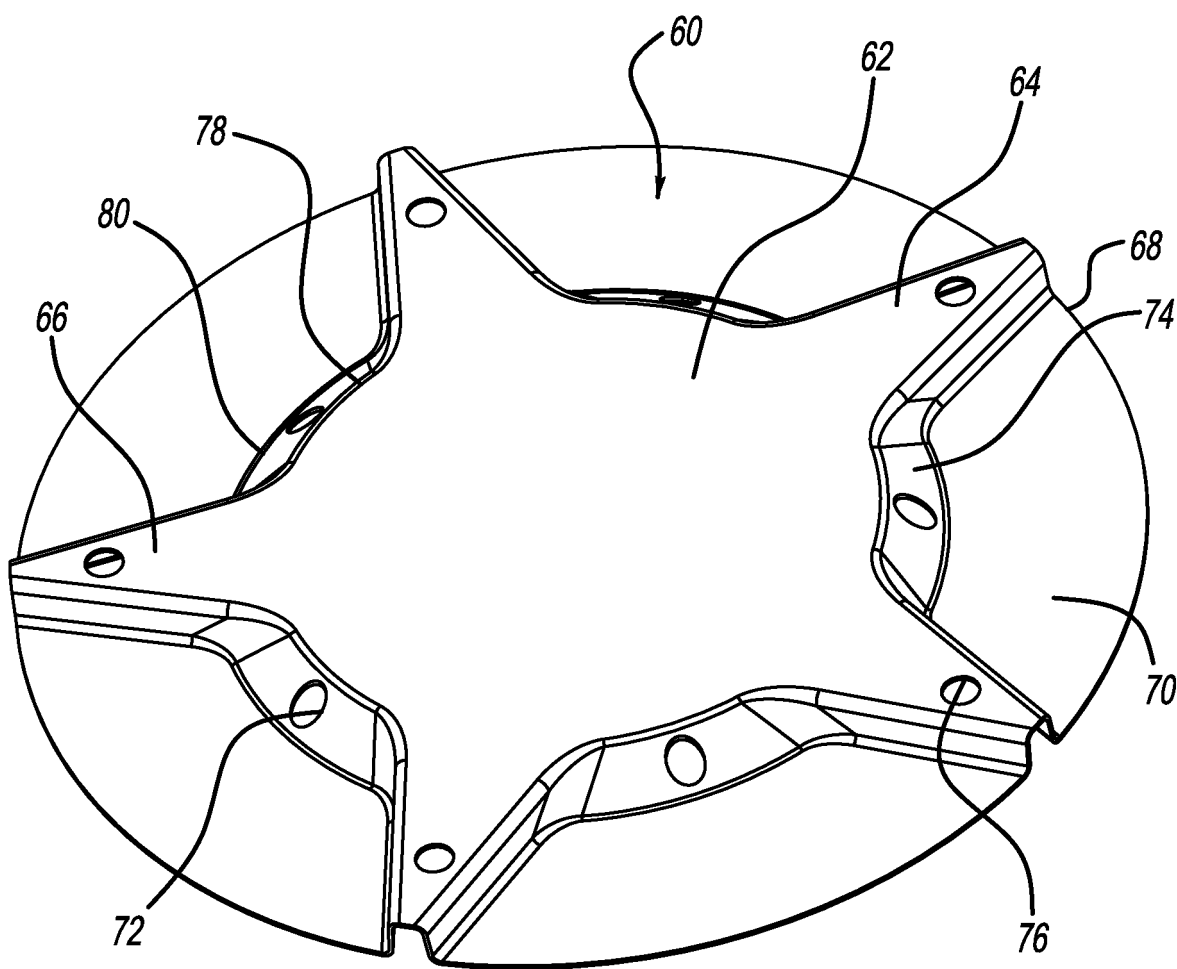
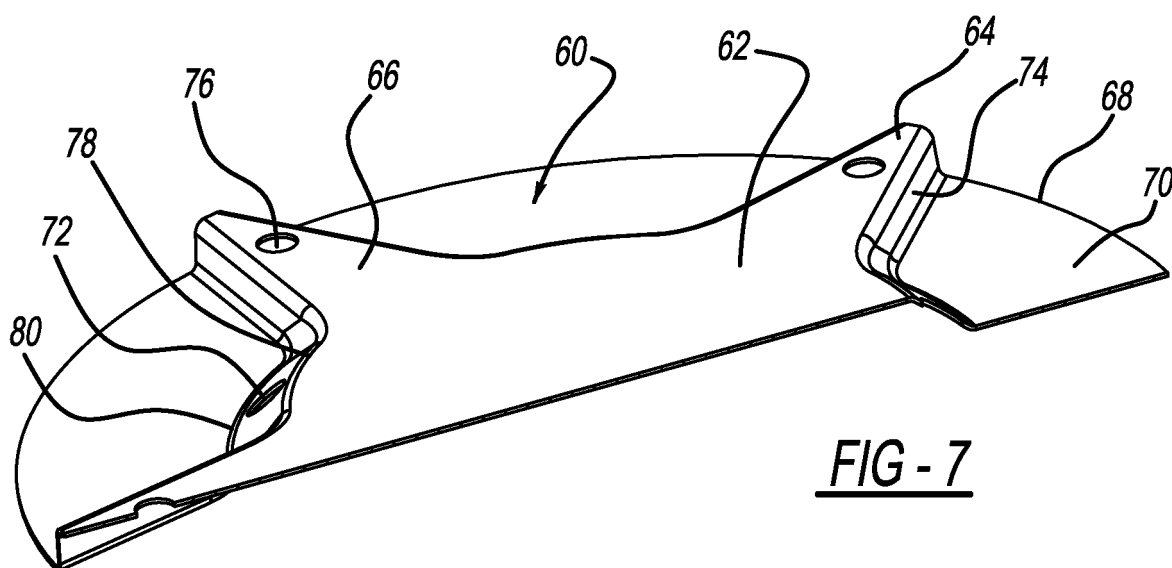
la plaque de mijotage (10; 60) formant une section centrale (20; 62) définissant une surface su-

- périeure sur un plan supérieur (46),
une surface inférieure (22 ; 70) définissant un plan inférieur (48) déplacé par rapport au plan supérieur (46) et configuré pour reposer sur une grille métallique (14) au-dessus d'un brûleur de cuisinière (12),
une pluralité de canaux s'étendant radialement (24 ; 64) faisant saillie depuis la section centrale (20 ; 62) et se terminant sur un périmètre extérieur (26 ; 68) de la plaque (10 ; 60), les canaux (24 ; 64) formés ayant un profil inversé généralement en forme de U avec une surface supérieure (28 ; 66) située au niveau ou près du plan supérieur (46) et se fondant dans la surface inférieure (22 ; 70), dans laquelle chacun des canaux s'étendant radialement (24 ; 64) présente une section transversale conique avec une plus grande largeur au niveau de la section centrale (20 ; 62) et avec une largeur et une zone de section transversale diminuant jusqu'au bord externe (26 ; 68) de la plaque de mijotage (10 ; 60),
une paroi inclinée (31 ; 74) s'étendant concentriquement à partir de la section centrale (20 ; 62) et entre des canaux adjacents (24 ; 64), et s'étendant depuis la surface supérieure jusqu'à la surface inférieure (22 ; 70), et
au moins un premier trou (30 ; 34 ; 72 ; 76) formé dans la plaque de mijotage (10 ; 60) entre la section centrale (20 ; 62) et le périmètre extérieur (26 ; 68) et permettant l'évacuation des gaz de cuisson.
2. Plaque de mijotage (10 ; 60) selon la revendication 1, comprenant en outre au moins un premier trou (30 ; 34 ; 72 ; 76) formé dans au moins l'un des canaux (24 ; 64) et la paroi inclinée (31 ; 74). 35
 3. Plaque de mijotage (10 ; 60) selon la revendication 1, comprenant en outre ledit au moins un premier trou (30 ; 72) formé dans la paroi inclinée (31 ; 74). 40
 4. Plaque de mijotage (10 ; 60) selon la revendication 3, comprenant en outre ledit au moins un premier trou (30 ; 72) formé dans la paroi inclinée (31 ; 74) entre chacun des canaux (24 ; 64). 45
 5. Plaque de mijotage (10 ; 60) selon la revendication 3, comprenant en outre au moins un second trou (34 ; 76) formé dans la surface supérieure (28 ; 66) des canaux (24 ; 64). 50
 6. Plaque de mijotage (10 ; 60) selon la revendication 1, comprenant en outre cinq des canaux (24 ; 64) qui sont également espacés angulairement autour de la section centrale (20 ; 62). 55
 7. Plaque de mijotage (10) selon la revendication 1, comprenant en outre une encoche (32) formée dans le périmètre extérieur (26) au niveau de l'extrémité terminale du canal (24).
 8. Plaque de mijotage (10 ; 60) selon la revendication 1, comprenant en outre la plaque de mijotage (10 ; 60) formée à partir d'une feuille de tôle ou d'un autre matériau résistant à la chaleur. 5
 9. Plaque de mijotage (10 ; 60) selon la revendication 7, comprenant en outre la plaque de mijotage (10 ; 60) formée d'au moins l'un des matériaux suivants : un acier doux à faible teneur en carbone, un acier inoxydable, un aluminium, un étain ou un autre matériau résistant à la chaleur. 10
 10. Plaque de mijotage (10 ; 60) selon la revendication 8, comprenant en outre la feuille de plaque de mijotage (10 ; 60) formée à plat dans la plaque de mijotage (10 ; 60) par une opération de pressage ou d'estampage de métal. 15
 11. Plaque de mijotage (10 ; 60) selon la revendication 1, comprenant en outre une surface supérieure (28 ; 66) des canaux (24 ; 64) située sur le plan supérieur (46). 20
 12. Plaque de mijotage (10) selon la revendication 1, comprenant en outre une surface supérieure (28) des canaux (24) déplacée sous le plan supérieur (46). 25









REFERENCES CITED IN THE DESCRIPTION

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