Aug. 14, 1962 M. G. EDELSTON 3,049,073

BROILERS

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Fig. 1

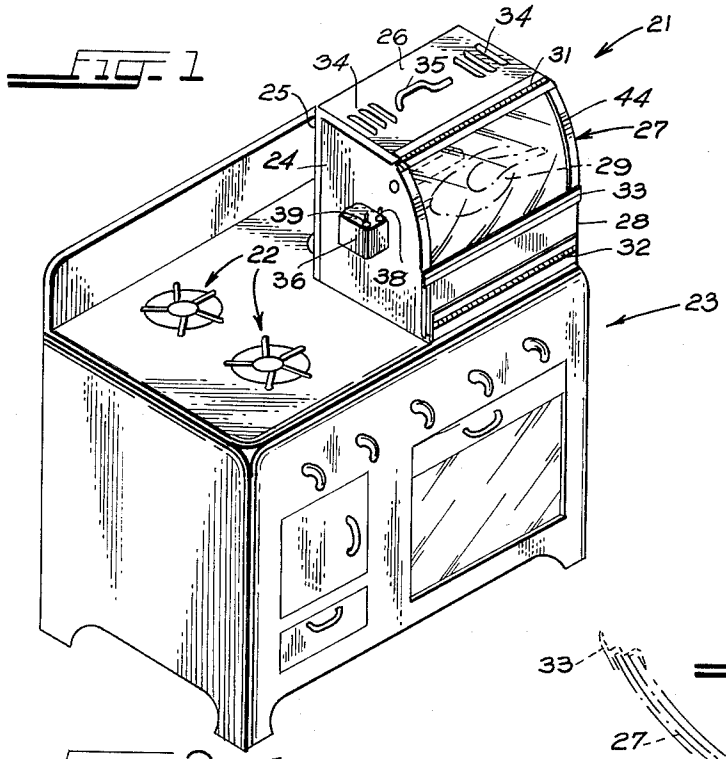


Fig. 3

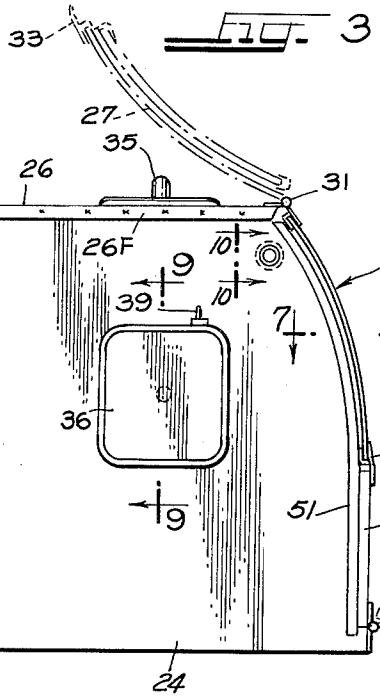
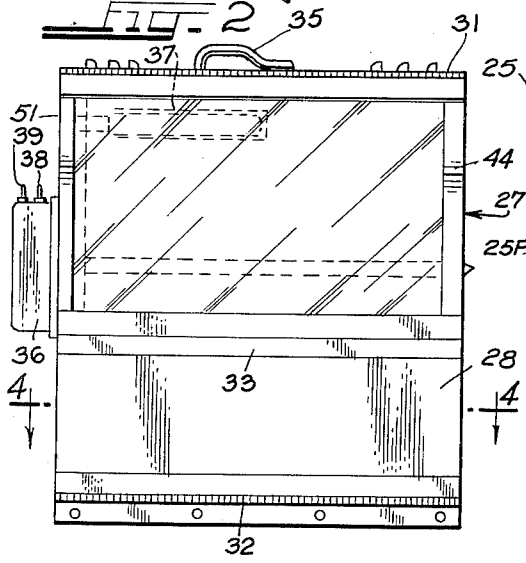


Fig. 2



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FIG. 4

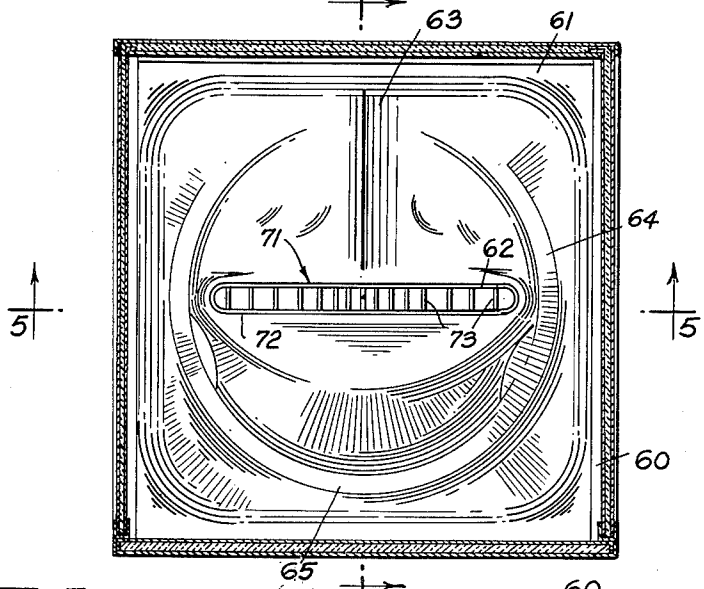


FIG. 5

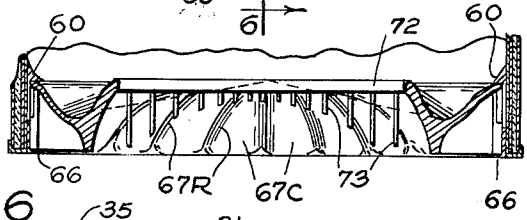


FIG. 6

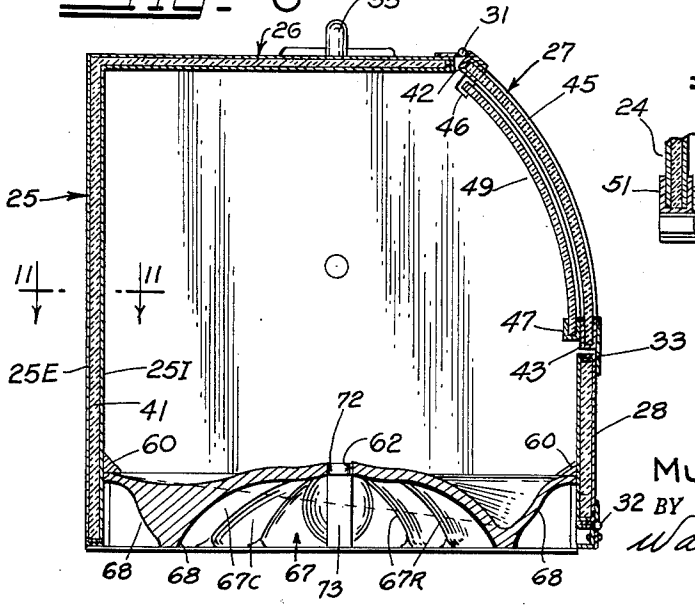
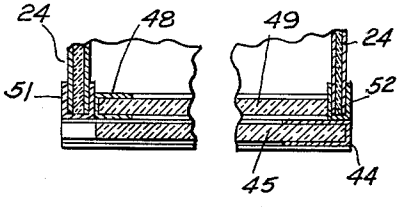


FIG. 7



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FIG. 8

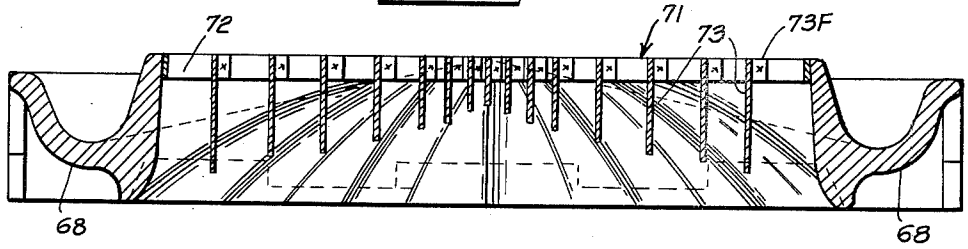
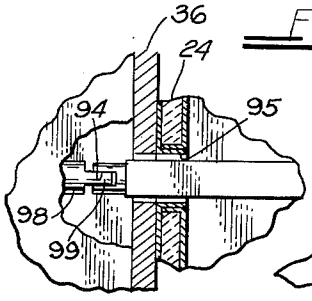


FIG. 9



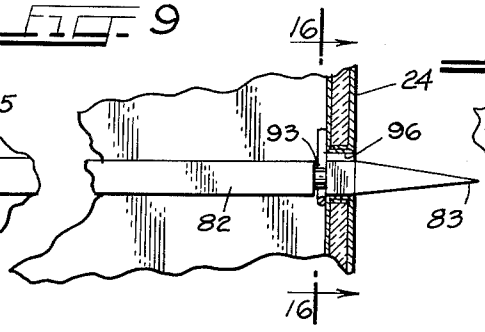


FIG. 16

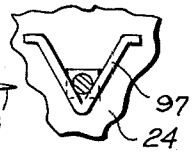


FIG. 10

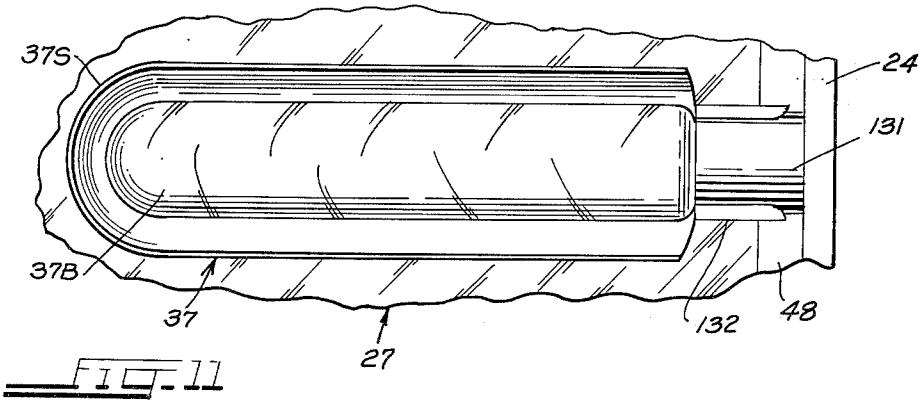
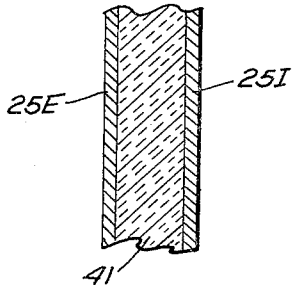


FIG. 11



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FIG. 12

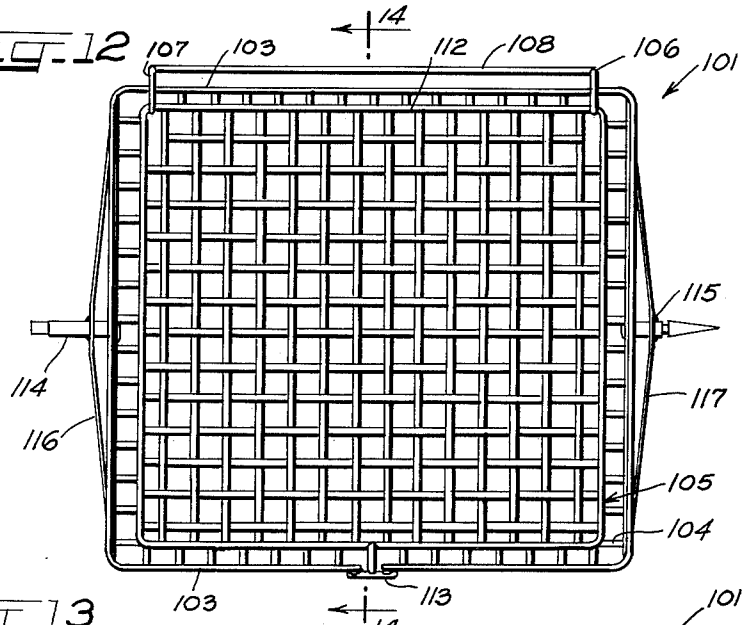


FIG. 13

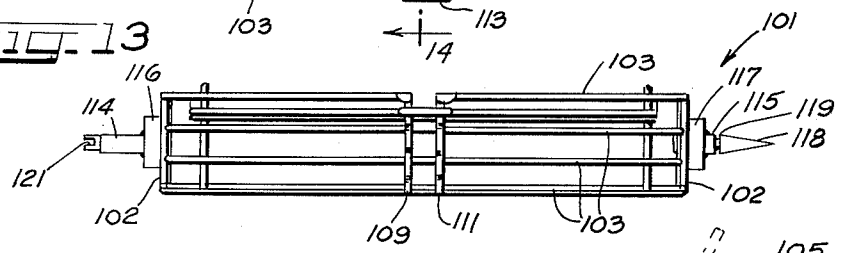


FIG. 14

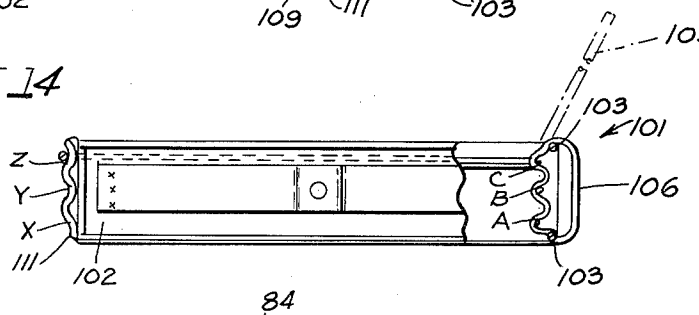
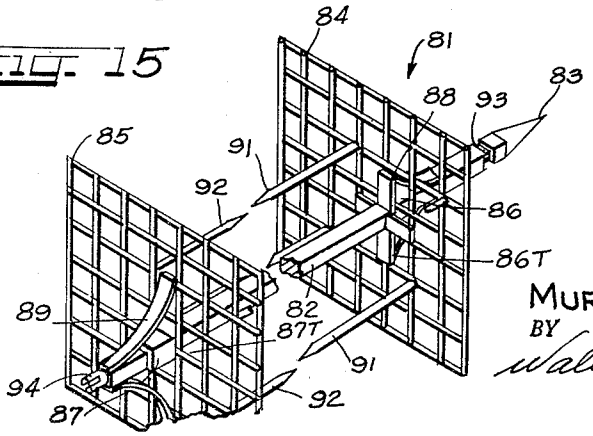


FIG. 15



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United States Patent Office 3,049,073 Patented Aug. 14, 1962

3,049,073

BROILERS

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Filed July 22, 1959, Ser. No. 828,900
2 Claims. (Cl. 99—446)

This invention relates to a portable broiler for use over an open flame.

A broiler constructed in accordance with this invention may be positioned above a variety of flame producing devices. For example, the portable broiler may be utilized with portable gasoline fired stoves, outdoor grates, and various types of gas fired burners. The portable broiler of this invention is especially adapted and intended for use with a single gas burner of a household kitchen type of gas range which produces an annular, conical shaped flame and will be specifically described with relation to such a burner.

It is a primary object of this invention to incorporate in a broiler of this general character apparatus for directing a uniform flame beneath the entire length of an object to be broiled in such a broiler.

It is another object of this invention to incorporate in a portable broiler a base plate which includes a linearly shaped aperture in a central portion thereof for transmitting a flame through the base plate and which also includes a generally annular shaped trough which is continuously sloped to collect any droppings from the object being broiled and which collects and transmits such droppings to a reservoir formed by the deepest portions of the trough.

It is another object of this invention to incorporate in a broiler of this general character a base plate which is formed with a ribbed, concave recessed surface on an underside and which recessed surface concentrates a circular shaped flame into a linearly shaped aperture formed in a central portion of the plate.

It is another object of this invention to incorporate in a broiler a spit assembly which includes a skewer and a pair of fork members having different length tines for engaging irregular-shaped objects to be broiled and which fork members are adjustably positionable axially of the spit by a frictional contact afforded by leaf-type springs.

It is another object of this invention to incorporate in a broiler a flame diffuser which includes a plurality of spaced apart vane members which are irregularly spaced and formed of varied lengths to convert a conical or annular shaped flame to a linearly shaped frame of substantially uniform height.

Other and further objects of the present invention will be apparent from the following description and claims and are illustrated in the accompanying drawings which, by way of illustration, show a preferred embodiment of the present invention and the principles thereof and what is now considered to be the best mode contemplated for applying these principles. Other embodiments of the invention embodying the same or equivalent principles may be used and structural changes may be made as desired by those skilled in the art without departing from the present invention and the purview of the appended claims.

In the drawings:

FIG. 1 is a perspective view showing a portable broiler constructed in accordance with this invention positioned above one burner of a conventional household gas range;

FIG. 2 is a front elevation view of the portable broiler illustrated in FIG. 1;

FIG. 3 is an end elevation view of the portable broiler illustrated in FIG. 1 and illustrates in phantom outline an open position of two doors which enclose a forward side of the broiler;

FIG. 4 is a plan view, partly in section, taken in the direction of the arrows 4—4 in FIG. 2, and illustrates the configuration of the upper face of a base plate for the portable broiler illustrated in FIG. 1;

FIG. 5 is a fragmentary elevation view taken in the direction of the arrows 5—5 in FIG. 4;

FIG. 6 is an elevation view, in section, taken in the direction of the arrows 6—6 in FIG. 4;

FIG. 7 is a fragmentary sectional view taken in the direction of the arrows 7—7 in FIG. 3 and illustrates details of a construction of a dual pane transparent door incorporated in the portable broiler illustrated in FIG. 1;

FIG. 8 is an enlarged elevation view, in section, of a flame diffuser incorporated in the portable broiler of this invention;

FIG. 9 is a fragmentary elevation view, in section, illustrating details of the mounting of a rotatable spit in the portable broiler illustrated in FIG. 1;

FIG. 10 is an enlarged fragmentary view of a lamp incorporated in the portable broiler of this invention;

FIG. 11 is an enlarged fragmentary view, in section, of the wall structure of the portable broiler of this invention and is taken in the direction of the arrows 11—11 in FIG. 6;

FIG. 12 is a plan view of a rotatable basket usable with the portable broiler illustrated in FIG. 1;

FIG. 13 is a side elevation of the basket illustrated in FIG. 12;

FIG. 14 is an elevation view taken in the direction of the arrows 14—14 in FIG. 12;

FIG. 15 is a perspective view of a spit and fork assembly usable with the portable broiler illustrated in FIG. 1; and

FIG. 16 is a fragmentary detail view taken in the direction of the arrows 16—16 in FIG. 9.

In FIG. 1 an embodiment of a portable broiler constructed in accordance with this invention is designated generally by the reference numeral 21 and is illustrated as being positioned above one of a plurality of gas burners 22 afforded by a household gas range 23. The portable broiler 21 provides an enclosed housing which is formed by a pair of side walls 24, a rear wall 25, a top 26, and upper and lower doors 27 and 28 respectively. The housing thus afforded forms a shielded, heat retaining enclosure, and an object to be broiled, such as a chicken 29 as illustrated in FIG. 1, may be suspended and rotated within the interior of the housing by means to be described hereinafter.

As illustrated in FIG. 1, the upper door 27 is pivotally connected along an upper edge by means of a hinge 31 to the forward edge of the top 26. The upper door 27 may preferably be convexly curved in end section, as illustrated in FIG. 6, and includes two spaced apart transparent panes as will be described in greater detail with specific reference to FIGS. 6 and 7.

The lower door 28 is hinged at 32 along its lower edge and the upper edge of the door 28 meets with the lower edge of the door 27. A strip 33 may preferably be mounted on the outer face of the door 27 to overlap the mating edges of the doors 27 and 28 to effect a positive seal therebetween. The upper and forward corners of the side walls 24 of the portable broiler are rounded to form a seal with the curved inner surface of the door 27.

The portable broiler 21 includes a base plate, which is not visible in FIG. 1, and which converts the annular flame afforded by one of the burners 22 to a linearly shaped flame of uniform height which is evenly distributed along the length of the object to be broiled in a manner to be described in detail with reference to FIGS. 4 and 8 of the drawings.

The portable broiler 21 has a plurality of louvers 34 formed in the top 26 and includes a handle 35 which is

attached to the top 26 for carrying the portable broiler 21.

As illustrated in FIG. 1, the portable broiler 21 includes a small electric motor mounted within a housing 36. The electric motor rotates a spit assembly or a basket containing the object to be broiled in a manner to be described in greater detail with reference to other figures of the drawings.

An electric lamp 37 is mounted on an inner wall of one of the sides 24 and may be turned on or off at will be a switch 38 mounted on the motor housing 36. An additional switch 39 is mounted on the housing 36 for controlling energization of the motor which rotates the spit within the interior of the broiler.

As illustrated in FIG. 3, the doors 27 and 28 may be pivoted about the hinges 31 and 32 to a position wherein substantially the entire forward portion of the broiler 21 is opened for insertion or removal of the object being broiled. If desired, an additional latch may be provided for retaining the doors 27 and 28 in the closed position illustrated in the bold outline in FIG. 3.

The side walls 24, back 25, top 26 and lower door 28 are preferably constructed of dual spaced apart sheets of metal. Thus, as illustrated in FIG. 11, which is a fragmentary sectional view taken through the back 25 in the direction of the arrows 11—11 in FIG. 6, the back 25 comprises an inner sheet of metal 25I and an external sheet of metal 25E. A layer of insulating material 41 is interposed between these two sheets to prevent the heat within the broiler from being transferred to the external portions of the broiler which are likely to be touched by the operator.

The inner sheet of the top 26 and the insulation in the top are provided with cutouts aligned with the louvers 34. The inner surfaces of the broiler are preferably highly polished so as to reflect a high degree of heat onto the object being broiled.

The door 27 also incorporates an insulated construction as illustrated in FIGS. 6 and 7. The door 27 comprises a first paired set of upper and lower mounting flanges 42 and 43. Each of these flanges is generally U-shaped and the flange 42 is attached to the hinge 31 while the flange 43 mounts the sealing strip 33 thereon. A generally vertically extending arcuately-curved U-shaped flange 44, as illustrated in FIG. 7, interconnects the flanges 42 and 43 and, in conjunction with the flanges 42 and 43, provides a three-sided frame for an outer transparent pane 45 which is removably mounted therein.

A second paired set of upper and lower U-shaped flanges 46 and 47 are respectively attached to the flanges 42 and 43 on the inner side of these flanges. A generally vertically extending and arcuately curved U-shaped flange 48 interconnects the flanges 46 and 47 to provide a second three-side frame. A second inner transparent pane 49 is removably mounted within the frame formed by the flanges 46, 47 and 48. As viewed in FIGS. 6 and 7, the panes 45 and 49 are spaced slightly apart to provide an air gap therebetween.

The rounded forward and upper edges of the sides 24, as heretofore pointed out with reference to FIG. 1, include a pair of arcuately curved inverted U-shaped flanges 51 and 52. As viewed in FIG. 7, the flange 48 of the door 27 engages the inner leg of the flange 51 to provide a seal at one end of the door 27, while the edge of the inner pane 49 engages the inner leg of the flange 52 and the flanges 44 and 52 are engaged at the forward end of the flange 52 to form a second seal at the opposite end of the door 27. Thus the combination of the spaced apart dual panes, the air gap formed therebetween, and the seals at the opposite ends of the door 27 effectively insulate the outer surface of the door 27 from the heat within the broiler 21. The panes 45 and 49 are preferably pyrex glass and each may be removed from its respective three-sided frame as described above for cleaning or replacement. Thus, the pane 45 may be slid leftwardly as illustrated in FIG. 7 and the pane 49 may be slid rightwardly as viewed in FIG. 7 with the door in an open position.

The sides 24, back 25, and the top 26 are integrally joined with one another to form a sturdy frame for the portable broiler 21. As viewed in FIG. 3, the back 25 and top 26 may be formed from a single piece of sheet metal, and the outer sheet may be provided with flaps 25F and 26F which may be lapped over the exterior surfaces of the sides 24 and welded thereto.

In accordance with this invention, a base plate 61, as illustrated in FIGS. 4–6, is removably mounted within the portable broiler 21. The base plate includes a linearly shaped central aperture 62 which admits the flame from a burner such as 22 to the interior of the broiler. The linearly shaped aperture 62 is centrally located in the base plate 61 and is so dimensioned as to extend below the entire length of the object to be broiled. As viewed in FIG. 4, the linearly shaped aperture 62 is seen to be of a relatively narrow width so that there is little opportunity for any drippings from the object being broiled to pass through the aperture.

The upper face of the base plate 61 has a recessed construction for collecting the drippings from the object being broiled. Thus, as viewed in FIG. 4, the upper portion of each half of the base plate tapers downwardly from a vertically extending dividing line 63. Each of the corner portions of the base plate are concavely recessed, and a generally annular shaped trough 64 encircles the aperture 62. The trough 64 is smoothly faired into the concave recesses in the corners of the base plate as viewed in FIG. 4 and is also smoothly faired into the downwardly tapering portions of the base plate disposed on either side of the dividing line 63. The depth of the trough 64 increases in a direction proceeding from the rearward to the forward portion of the base plate, or from top to bottom as viewed in FIG. 4, and a reservoir 65 is formed by the deepest portions of the trough 64 at the forward portion of the base plate. Thus, liquid drippings from the object being broiled flow by gravity from any portion of the upper surface of the base plate to the reservoir 65.

As viewed in FIG. 5, the base plate 61 may be retained in position by angled bracket members 66 which are attached to the inner surfaces of the sides 24 adjacent the lower edges thereof. The base plate 61 may be inserted within the interior of the broiler 21 or removed therefrom for cleaning merely by sliding the base plate through the opening afforded by the doors 27 and 28.

If desired, additional fillet or gusset strips 60 may be added to the inner surfaces of the portable broiler to extend parallel to the upper edges of the base plate 61 and prevent any seepage of liquid droppings between the adjoining portions of the base plate and inner surfaces of the portable broiler. Alternatively the inner surfaces may terminate at the upper surface of the base plate and be flared slightly inwardly to provide the same result.

The lower face of the base plate 61 is formed to provide means for directing and concentrating a ring or conically shaped flame at the aperture 62. These means comprise a generally concavely recessed surface 67 which converges from a circular peripheral opening 68 in the lower face to the linearly shaped aperture 62. The concave recess surface 67 includes a plurality of arcuate shaped downwardly projecting ribs 67R which radiate from the aperture 62 to the circular periphery 68. The ribs 67R define channels 67C therebetween for concentrating an annular or conical-shaped flame at the linear aperture 62. This configuration therefore utilizes the entire flame rather than permitting some portions to spill off or to be deflected away from the aperture 62.

The base plate 61 may conveniently be formed by molding and may include a plurality of spaced recessed portions 68 in the lower edges thereof to reduce the overall weight of the base plate and so add to the portability of the broiler 21.

The flame as concentrated by the recessed surface 67 at

the linear aperture 62 is of a non-uniform nature. That is, the highest and hottest parts of the flame are developed at the medial portion of the aperture while little or no flame is apt to be developed at the ends of the aperture. For the purpose of developing a flame of substantially uniform height and heat along the entire length of the aperture 62, a flame diffuser, indicated generally by the reference numeral 71, is mounted within the aperture 62.

The diffuser 71 is best illustrated in FIGS. 4 and 8 and comprises an elongated loop member 72 which has parallel, spaced apart sides connected by curved ends. The upper and lower edges of the loop member 72 are substantially parallel and a plurality of vane members 73 are formed with flanges as 73F which are welded or otherwise attached to the inner surfaces of the parallel extending sides of the loop member 72. The vane members 73 extend across the interior of the loop member transverse to the sides thereof. Each of the vane members 73 has upper ends which terminate in the plane of the upper edge of the loop member, as viewed in FIG. 8, and includes lower end portions which project downwardly below the plane of the lower edge of the loop member.

The spacing between adjacent vane members and the length of the downwardly projecting portion of each vane member decreases in a direction preceding from curved ends toward the medial portion of the loop member. Thus, as viewed in FIG. 8, the vane members adjacent the ends of the diffuser 71 are longer than those near the central portion of the loop member and are spaced farther apart from one another than those at the central portion of the diffuser 71.

The longer vanes at the ends of the diffuser act to draw the flame to the spaces intermediate the vanes at the ends of the diffuser 71. The relatively large spacing between the vane members at the ends of the diffuser permits the flames thus attracted to pass through the diffuser with little obstruction or modification. The relatively short vanes at the medial portion of the diffuser offer little initial attraction for the burner flame and the relatively close spacing of adjacent vanes at the medial portion of the diffuser is effective to distribute the flame uniformly at this portion rather than permitting an uneven flame to be developed at any one point or points. Thus, the relative dimensioning of the vanes and the spacing between the vanes act to develop a flame of substantial uniform height and heat along the entire length of the aperture 61 and thus along the entire underside of the object to be broiled. This is a highly important feature of this invention in that it facilitates uniform heating of the object being broiled.

In accordance with this invention either an adjustable container or an adjustable spit assembly may be rotatably mounted within the portable broiler 21 for suspending the object to be broiled above the flame admitted through the linearly shaped aperture 62.

The adjustable spit assembly is illustrated in FIG. 15 and is designated generally by the reference numeral 81. The spit assembly 81 includes a piercing skewer 82 which is formed with a pointed end 83. The skewer 82 is formed with a plurality of longitudinally extending flat surfaces and may be of a square configuration as illustrated in FIG. 15.

A pair of tined members 84 and 85 are constructed of an open lattice, wire mesh construction and are provided with mounting adapters 86 and 87 at the respective central portions of the tined members. Each of the adapter members 86 and 87 has inner axially extending apertures which are shaped complemental to the external surface of the skewer 82 so as to be locked for rotation with the skewer while being slideable axially thereon. The adapter members 86 and 87 include a plurality of radially projecting tap elements 86T and 87T respectively which are connected to the wire mesh tined members 84 and 85 to afford leverage for rotating these members with the skewer 82.

Each of the tined members 84 and 85 includes a plurality of leaf spring elements 88 and 89 which are fixed at one end to the tined members and which frictionally engage the skewer 82 at an opposite end to retain the respective tined members 84 and 85 at any selected axial position on the skewer 82.

The tined members 84 and 85 also include a plurality of tines 91 and 92 which project from the inner faces of the tined members. The tines 91 and 92 are of varied lengths and are formed with pointed ends for positively piercing and retaining irregular shaped objects to be broiled in a fixed, angular position on the skewer 82.

For the purpose of rotatably mounting the spit assembly 81 within the broiler the skewer 82 is formed with a recessed collar 93 in a portion of the external surface adjacent the pointed end 83. At its opposite end the skewer 82 has a groove 94 formed therein.

Referring now to FIGS. 9 and 16, it is seen that the side walls 24 are formed with apertures 95 and 96. The aperture 95 also extends through the motor housing 36. A V-shaped rod 97 is attached to the inner surface of one side wall 24 in a manner such that the upper edge of the V is disposed somewhat above the lowermost surface of the aperture 96. The collar 93 of the skewer 82 resides on the upper surface of this V-shaped member 97, and the skewer is thereby spaced from the periphery of the aperture 96. At the opposite end the skewer 82 is spaced from the periphery of the aperture 95 and is rotatably mounted therein by means of a tongue and groove connection between the end of the skewer in the end of the motor shaft 98. Thus, the motor shaft 98 is formed with an axially extending tongue 99 which is received within the groove 94 in the end of the skewer.

To position the skewer and object to be broiled within the interior of the broiler, the end 83 of the skewer is first inserted through the aperture 94 and the groove end of the skewer thereafter is inserted through the aperture 95 and is positioned on the tongue 99 of the motor shaft 98. The sliding fit afforded by the tongue and groove construction permits the skewer to be axially positioned to engage the collar 92 with the V-shaped member 97. Thus, the skewer 82 is mounted in the position illustrated in FIG. 9 and may be rotated by energizing the electric motor contained within the housing 36.

In many instances it is desirable to clasp an object to be broiled rather than piercing it with a skewer. Thus, in the broiling of strips of bacon or steaks, as contrasted to poultry and other round objects, it is more feasible to position the objects within a container than to mount them on a spit assembly.

In FIGS. 12–14 a container for suspending objects to be broiled within the portable broiler is designated generally by the reference numeral 101. The container 101 comprises a frame formed by a pair of end plates 102 interconnected by wire or rod elements 103. A lower gridiron 104, which may preferably comprise a wire mesh structure, is fixedly attached to the frame afforded by the plates 102 and rods 103. An upper gridiron 105 is adjustably positionable within the container 101 in a vertical direction as viewed in FIGS. 13 and 14.

The means for adjusting the vertical position of the upper gridiron 105 comprise a pair of rear latch members 106 and 107 which are attached to the rods 103 at the rear side of the frame. The rear latch members 106 and 107 are interconnected by a plurality of tie rods 108 as viewed in FIG. 12. Each of the latch members 106 and 107 is of a loop configuration and the forward side of the loop is of a serpentine or corrugated construction so as to form a series of detents A, B, and C respectively. The rods 103 at the forward side of the container 101 are discontinuous at the central portion of the container and are joined to a pair of closely spaced vertically extending corrugated strips 109 and 111. A series of detents X, Y, and Z are found in the strips 109 and 111 and the detents correspond in vertical position to the

detents A, B, and C respectively of the rear latch members. The gridiron 105 has a peripheral rod 112 which is looped through the rear latch members 106 and 107 and has an outwardly projecting T-shaped latch member 113 formed at a forward portion thereof. The opposite end portions of the bar of the T-shaped member 113 is receivable within the detents X, Y, and Z. Thus, the upper gridiron 105 may be positioned at any one of the three positions A—X, B—Y, or C—Z, depending upon the thickness of the object to be broiled.

The container 105 includes a pair of outwardly projecting members 114 and 115 at the opposite sides thereof. The members 114 and 115 are attached to the plates 102 at one end and a pair of reinforcing strips 116 and 117 are attached to both the plates 102 and the members 114 and 115. The member 115 is formed with a pointed end 118 and a reduced diameter collar 119 like the skewer 82 described hereinabove. The member 115 has a groove 121 formed in the end thereof which permits the container to be mounted on a tongued end of the motor shaft like the skewer assembly illustrated in FIG. 9.

Thus, in accordance with this invention either a skewer assembly or an adjustable container may be rotatably mounted within the interior of the portable broiler 21.

In FIG. 10 there is illustrated in an enlarged detailed view the manner in which the lamp 37 is mounted within the interior of the portable broiler. The lamp 37 comprises a bulb 37B which is received within a bayonet-type of socket 131 mounted on the inner surface of a side wall 24. An elongated shield 37 is disposed between the bulb 37 and the door 27 and is formed with a spring clip 132 which clips on the exterior of the socket 131.

The operation of the portable broiler constructed in accordance with this invention is believed to be apparent from the description set out hereinabove, but will be briefly reviewed. If the object to be broiled is a roast, chicken, or other like object, the spit assembly 84 is employed by removing the tined member 84 and inserting the skewer 82 through the object to be broiled. The tined member 84 is thereafter replaced and the two members 84 and 85 are positioned axially of the skewer 82 to firmly retain the object to be broiled in a fixed axial and angular position thereon. If the object to be broiled is flat, like bacon, steaks, or fish, the container 101 is employed by disengaging the respective latch member 113 and 109—111 and opening the upper gridiron 105 to the position illustrated in the phantom outline of FIG. 14. The upper gridiron 105 is then positioned in one of the detents A, B, or C and is latched and retained in that position by sliding the latch member 113 to the corresponding detents X, Y, or Z. In either instance, the spit assembly 81 or the container 101 are positioned within the broiler by the mounts afforded by the tongue 99 of the motor shaft and the V-shaped rod 97 as described hereinabove. The electric motor is energized to rotate the object to be broiled and the portable broiler is positioned over the flame of a burner such as 22. The separate lamp switch 38 and the transparent door 27 permit inspection of the object being broiled at any time during the preparation thereof.

Hence, while I have illustrated and described the preferred embodiments of my invention, it is to be understood that these are capable of variation and modification, and I therefore do not wish to be limited to the precise details set forth, but desire to avail myself of such changes and alterations as fall within the purview of the following claims.

I claim:

1. A flame diffuser comprising an elongated loop member having parallel, spaced-apart sides connected by curved ends, said loop member having generally parallel upper and lower edges, a plurality of spaced-apart vane members extending across the interior of the loop member and transverse to the sides thereof, said vane members having upper ends terminating substantially in the plane of the upper edge of the loop member, said vane members having lower ends projecting downwardly below the plane of the lower edge of the loop member, and the spacing between adjacent vane members and the length of the downwardly projecting portion of each vane member decreasing from the curved ends toward the medial portion of the loop member, whereby the heat from a conically shaped flame impinging on the lower portion of the diffuser is distributed throughout the length of the diffuser in a substantially uniform manner.

2. A portable broiler for use over an open flame comprising, an enclosed housing having an open bottom and a base plate removably mounted therein, said base plate having grease collecting means including a depressed reservoir formed in an upper surface, said base plate including a linearly shaped aperture and flame controlling means for directing a uniform flame along said linearly shaped aperture, said housing including means for suspending an object to be broiled above the linearly shaped aperture to be exposed to the uniform flame, and said housing including closure means movable to an open position whereby the object to be broiled may be inserted within or removed from the interior of the portable broiler, said flame controlling means including an elongated loop member mounted within the linearly shaped aperture and having a plurality of spaced apart vane members extending across the interior of the loop member transversely to the sides thereof and projecting downwardly therefrom and the spacing between adjacent vane members and the length of the downwardly projecting portion of each vane member decreasing from the curved ends toward the medial portion of the loop member.

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