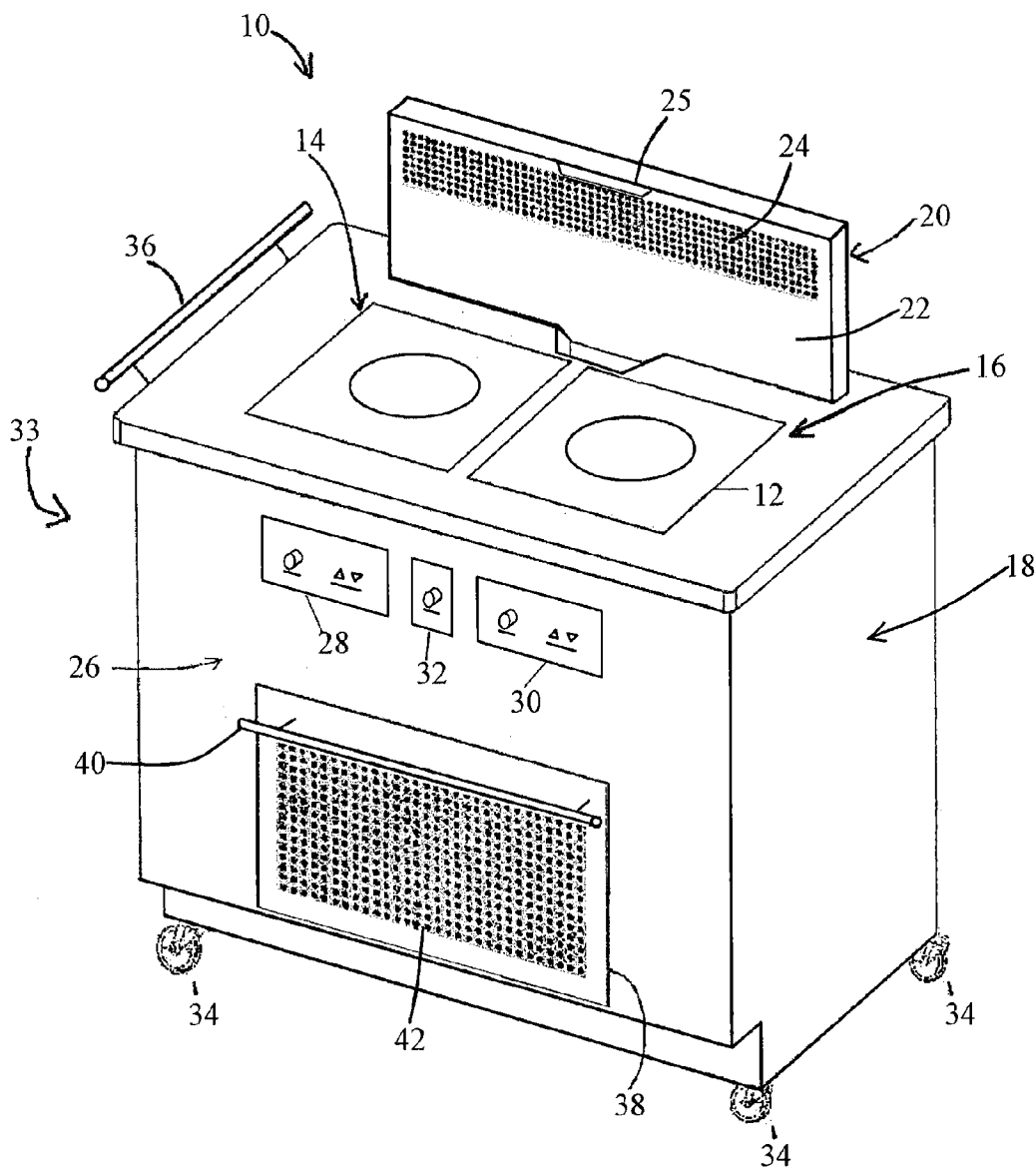


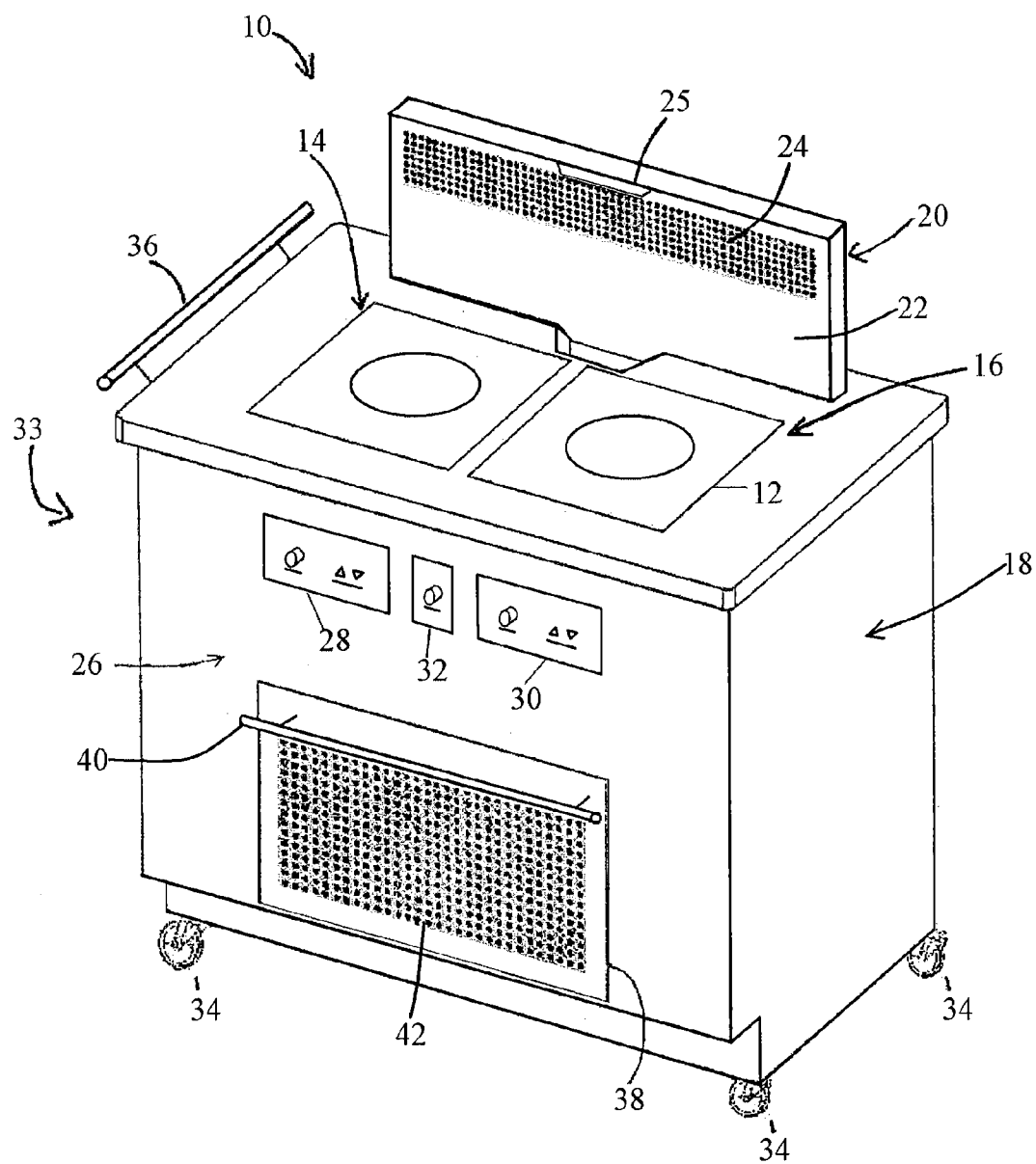


US 20120204855A1

(19) **United States**(12) **Patent Application Publication**
Huber(10) **Pub. No.: US 2012/0204855 A1**(43) **Pub. Date: Aug. 16, 2012**(54) **COOKING DEVICE WITH VENTILATION
AND FILTRATION SYSTEM**(52) **U.S. Cl. 126/299 R**(76) **Inventor: John J. Huber, Delafield, WI (US)**(21) **Appl. No.: 13/366,012**(57) **ABSTRACT**(22) **Filed: Feb. 3, 2012****Related U.S. Application Data**(60) **Provisional application No. 61/439,635, filed on Feb. 4, 2011.****Publication Classification**(51) **Int. Cl.**
F24C 15/20 (2006.01)

A cooking device with a ventilation and filtration system is disclosed that may be a mobile cart. The ventilation and filtration system provides removal of heated and effluent-laden air from the vicinity of the cooking device utilizing a manually telescoping vent having a handle for positioning the vent. The telescoping vent piece may be easily manually removable and reattachable for cleaning. Further, the down-draft ventilator is in communication with a filtration and effluent removal system that may have one or more filters and may also have a drip tray.





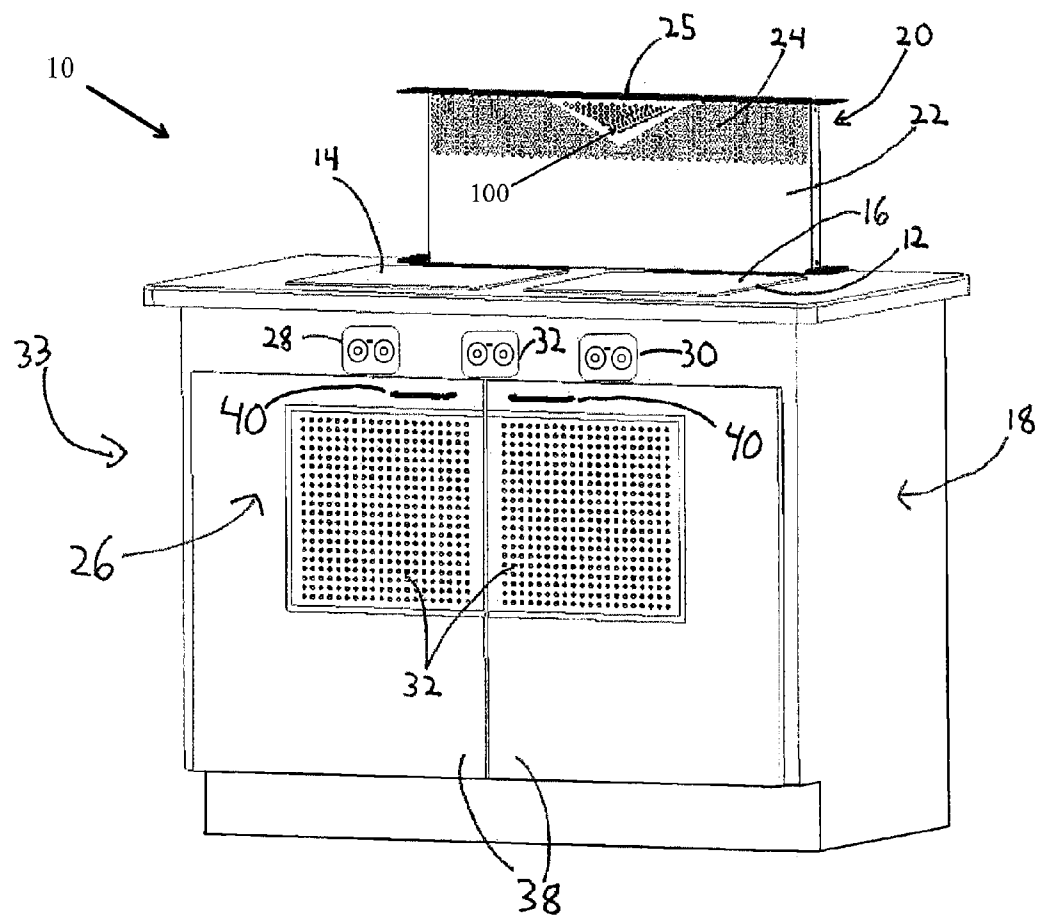
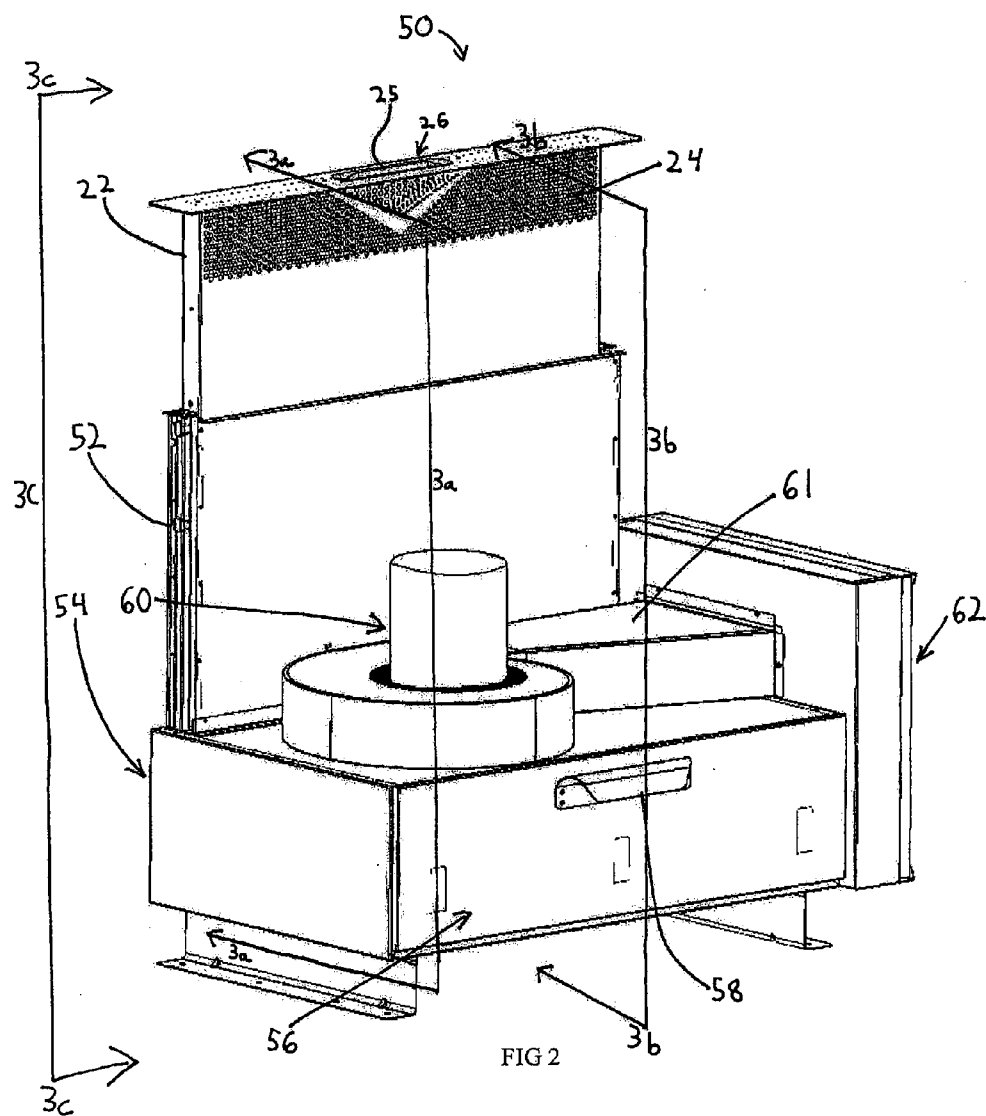


FIG 1b



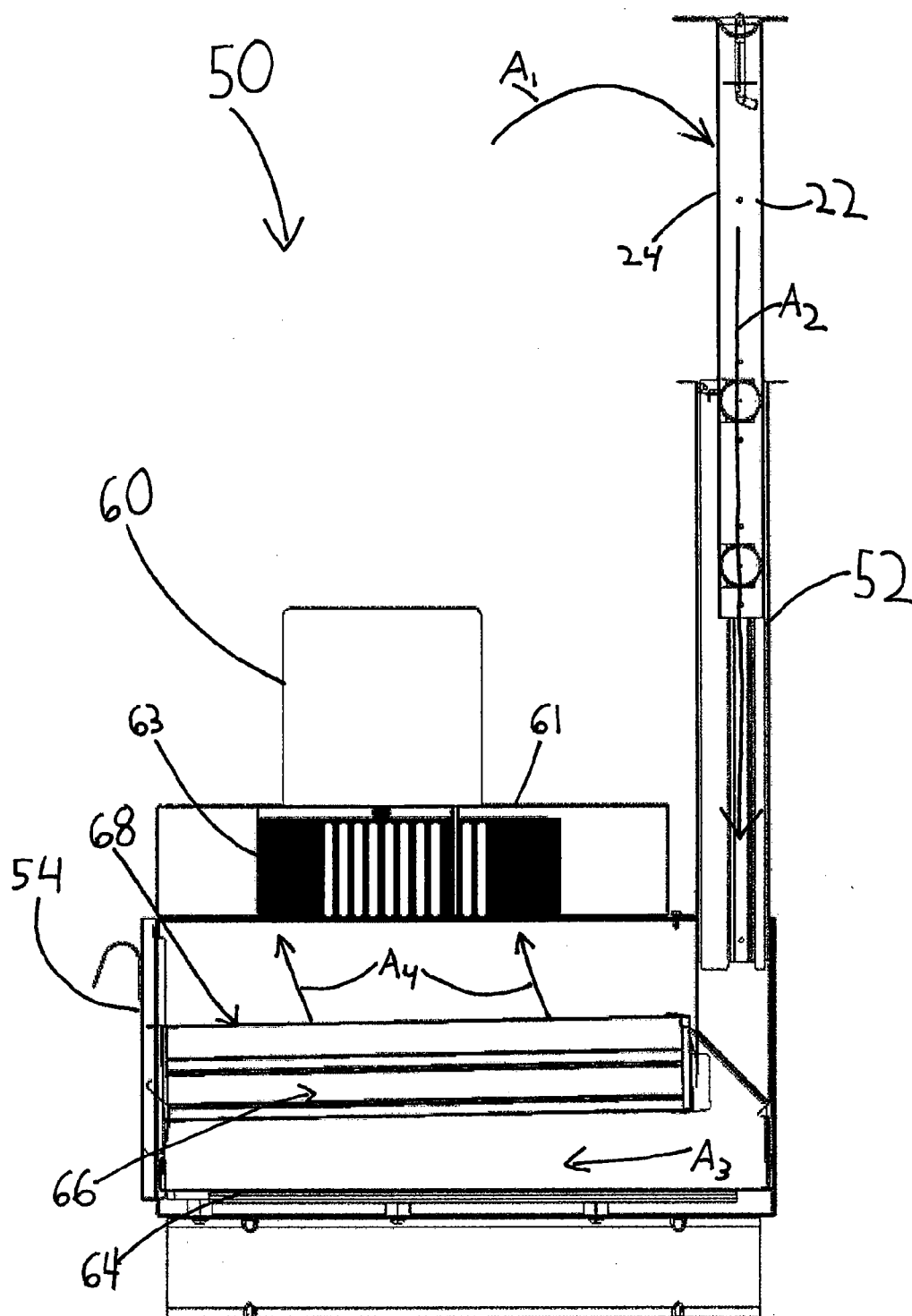
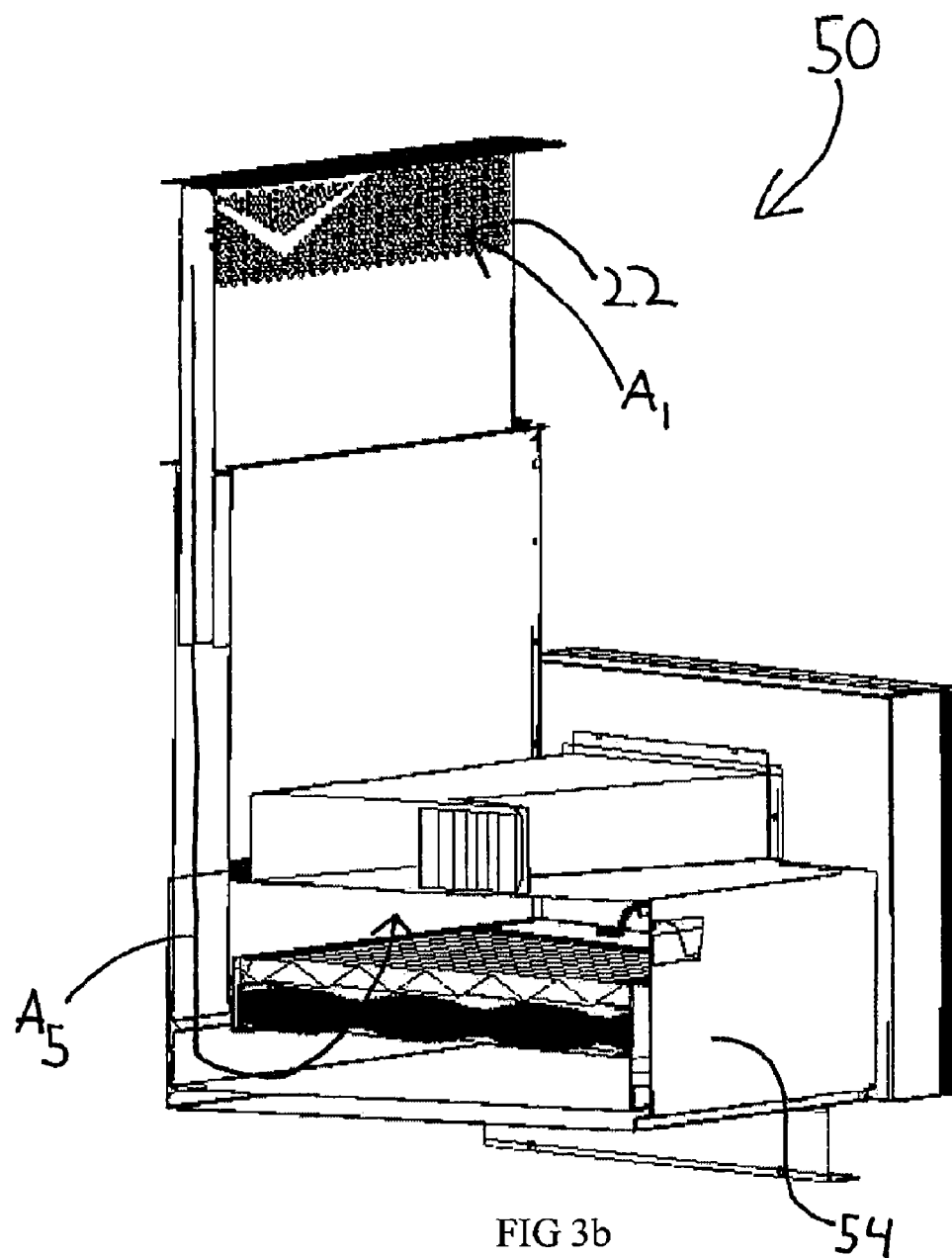
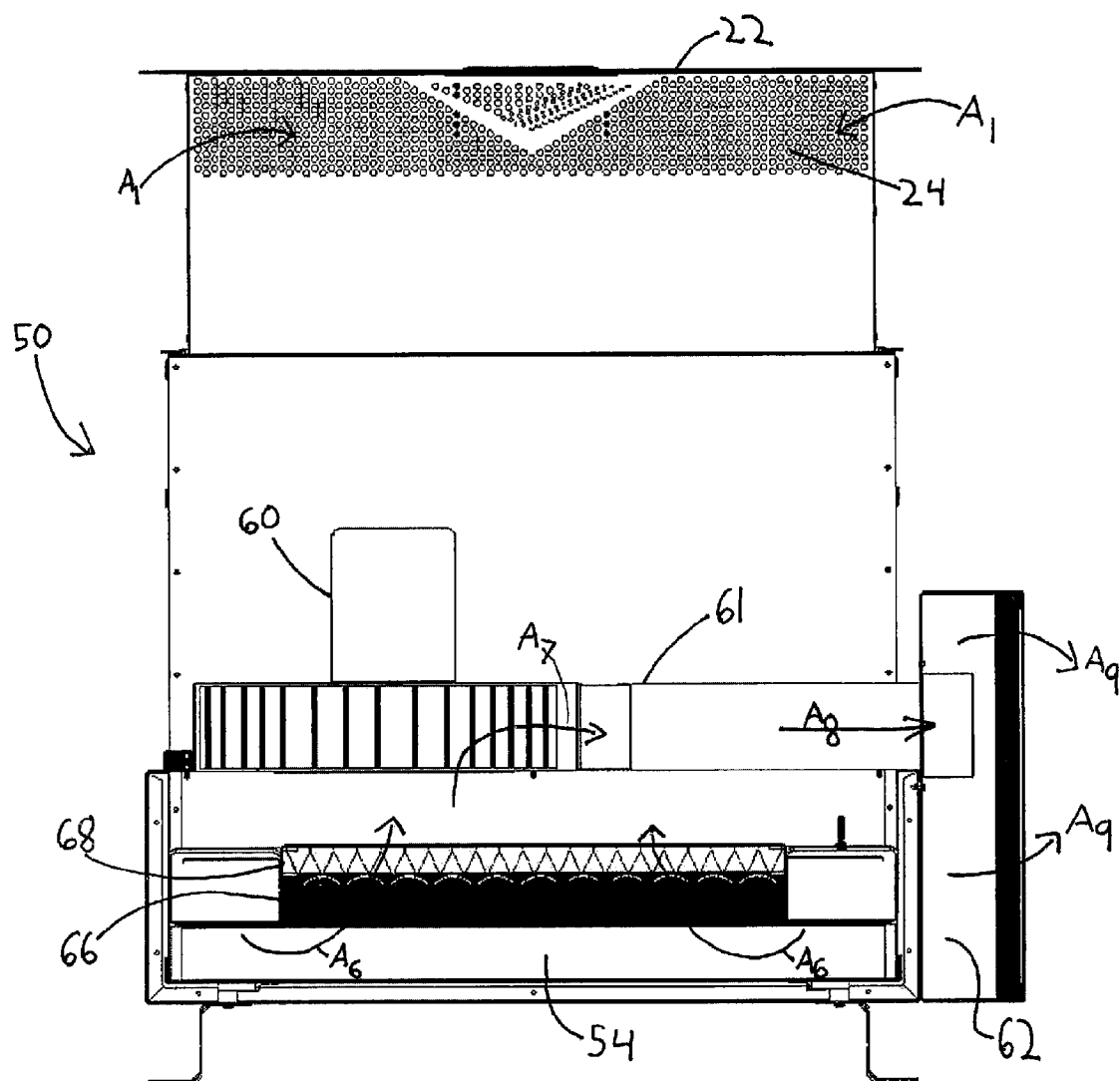


FIG 3a





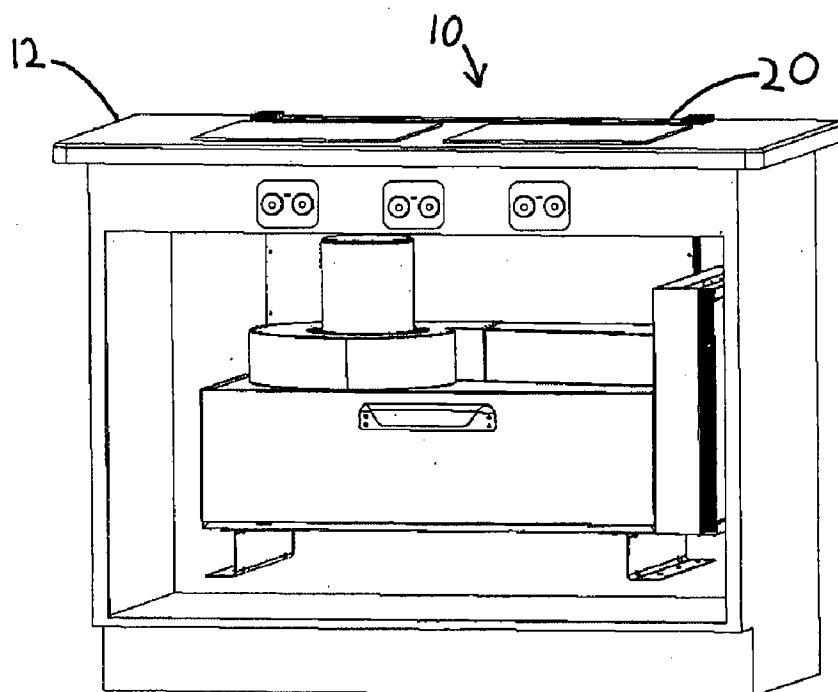


FIG 4a

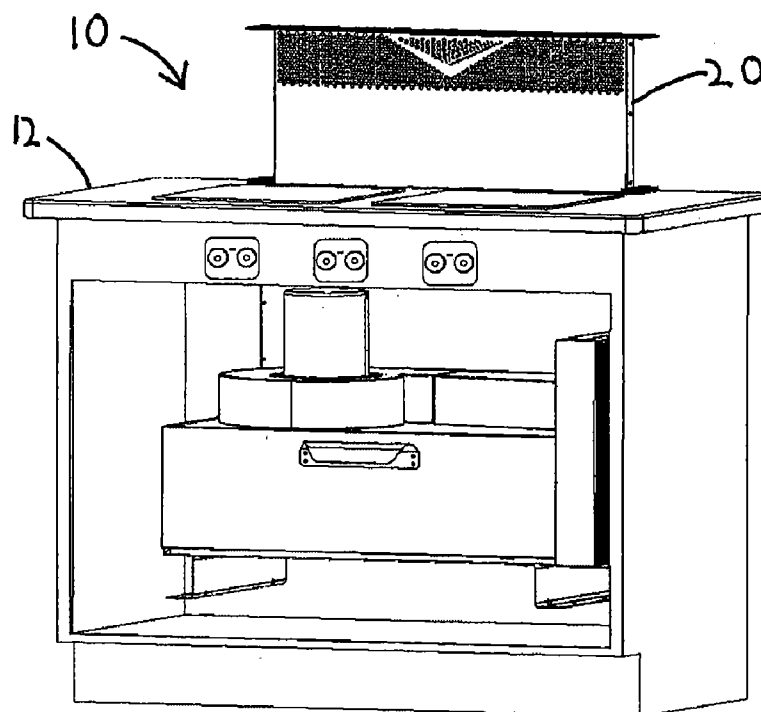


FIG 4b

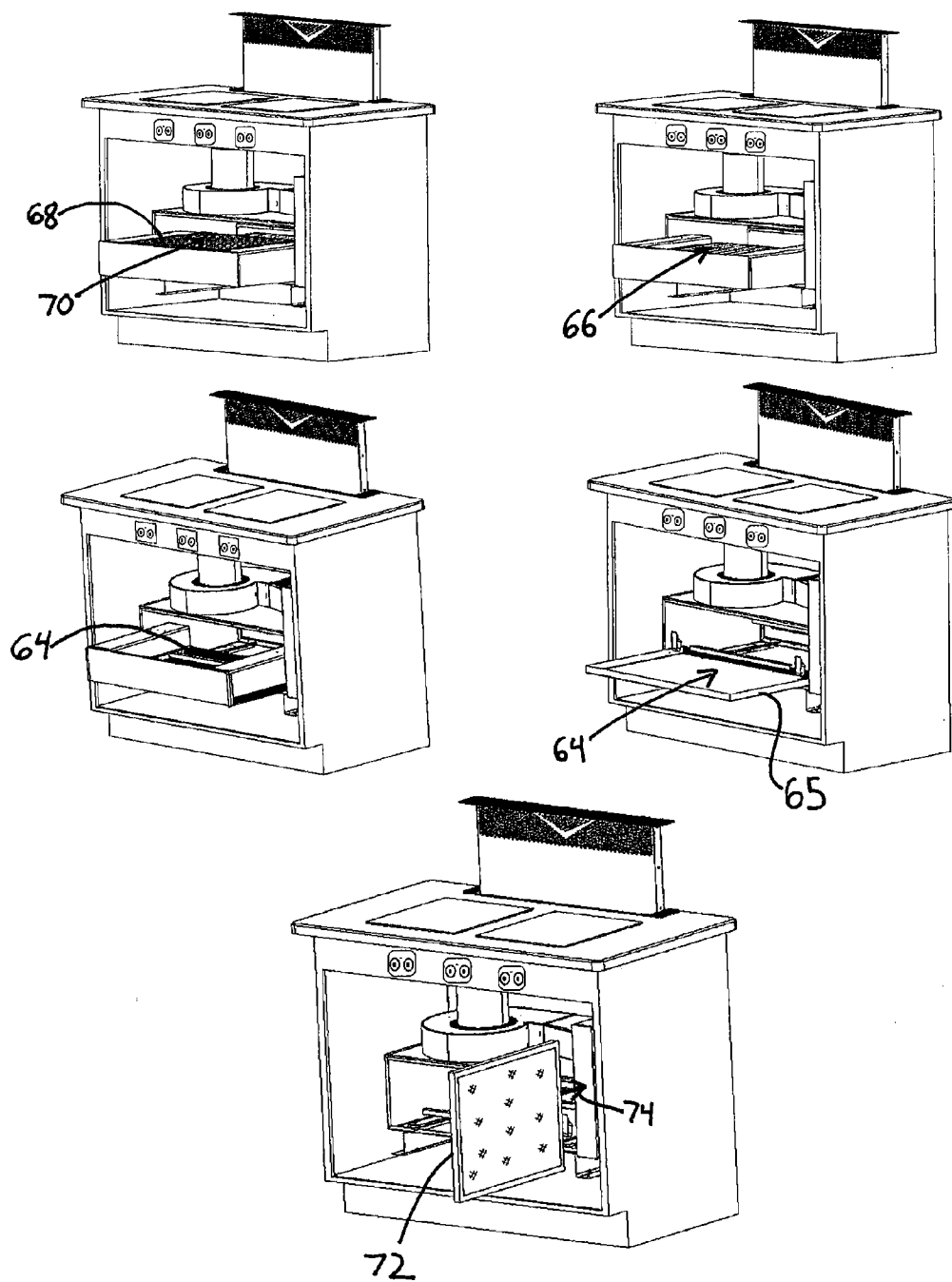
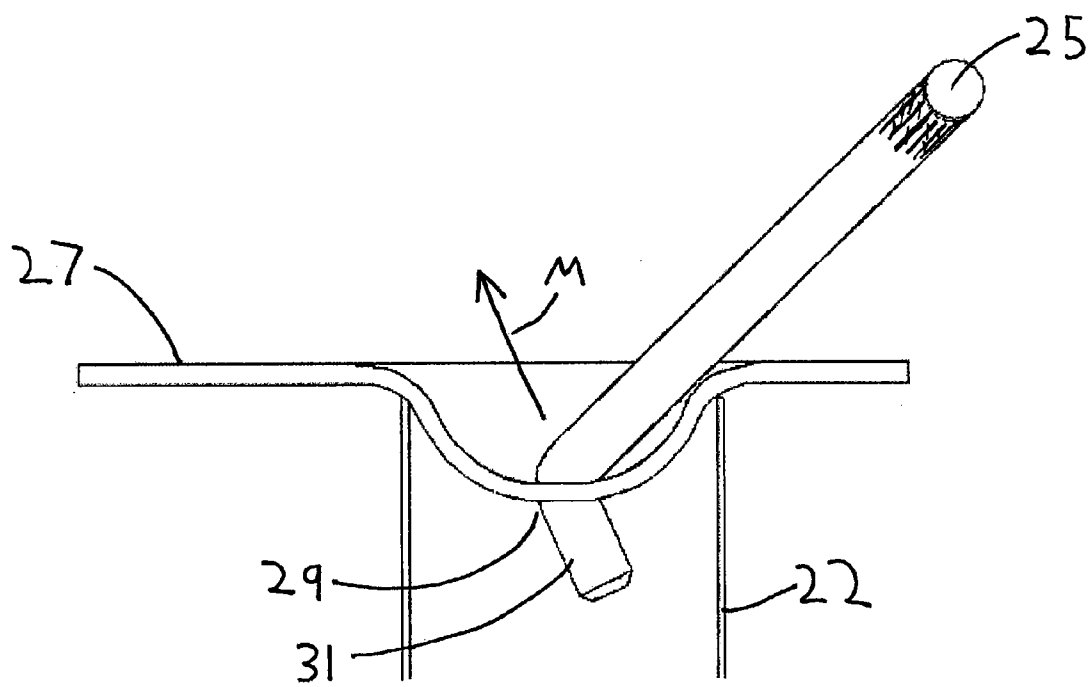
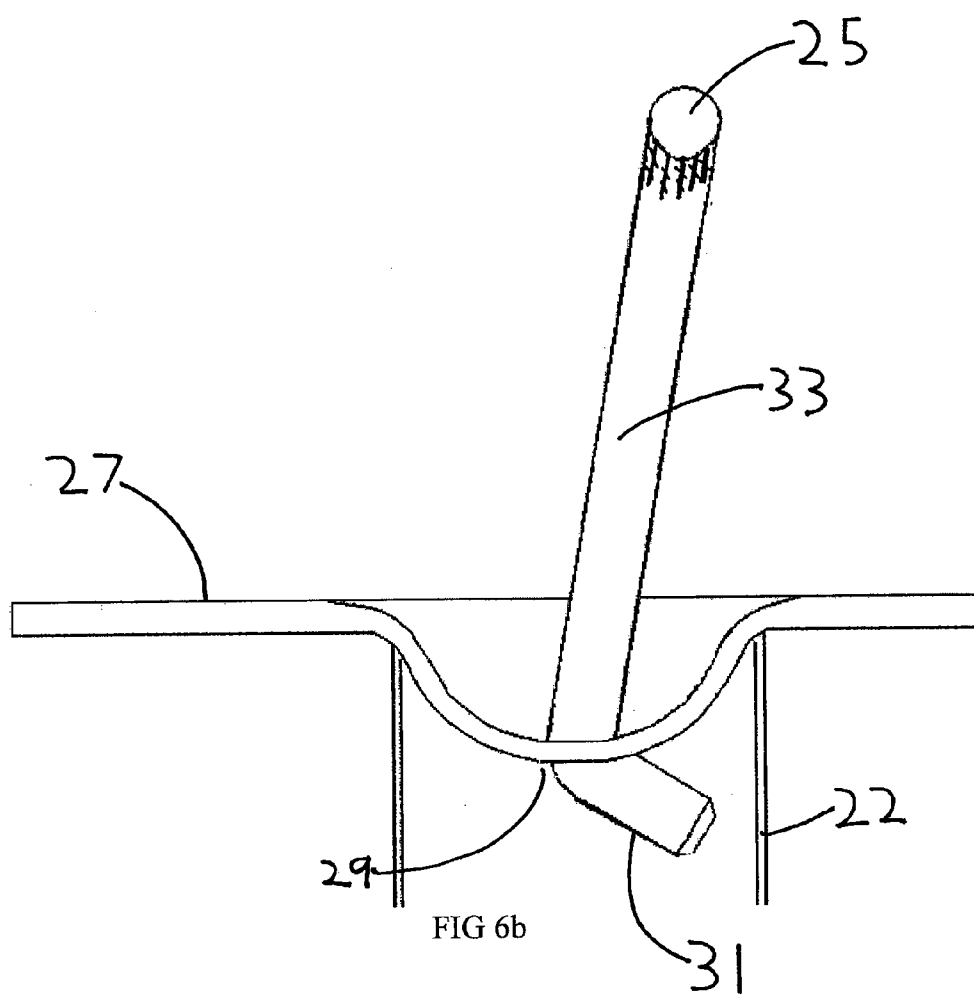


FIG 5





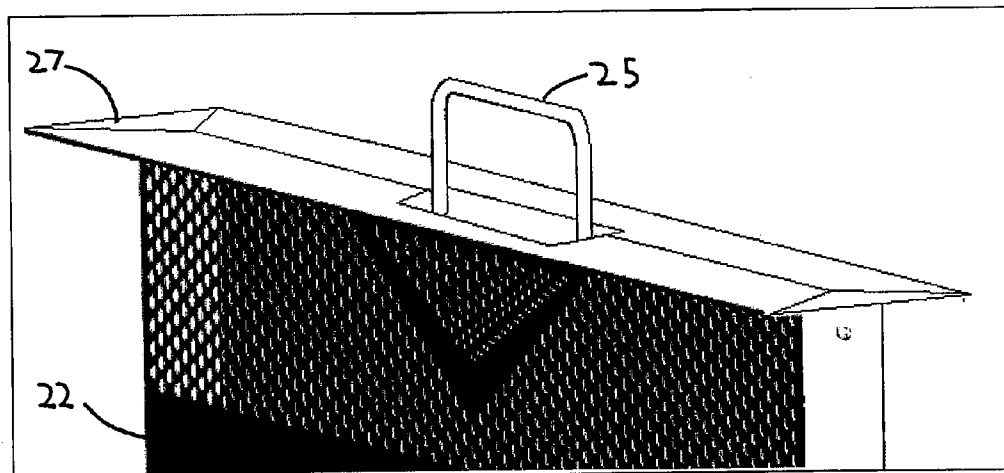


FIG 7a

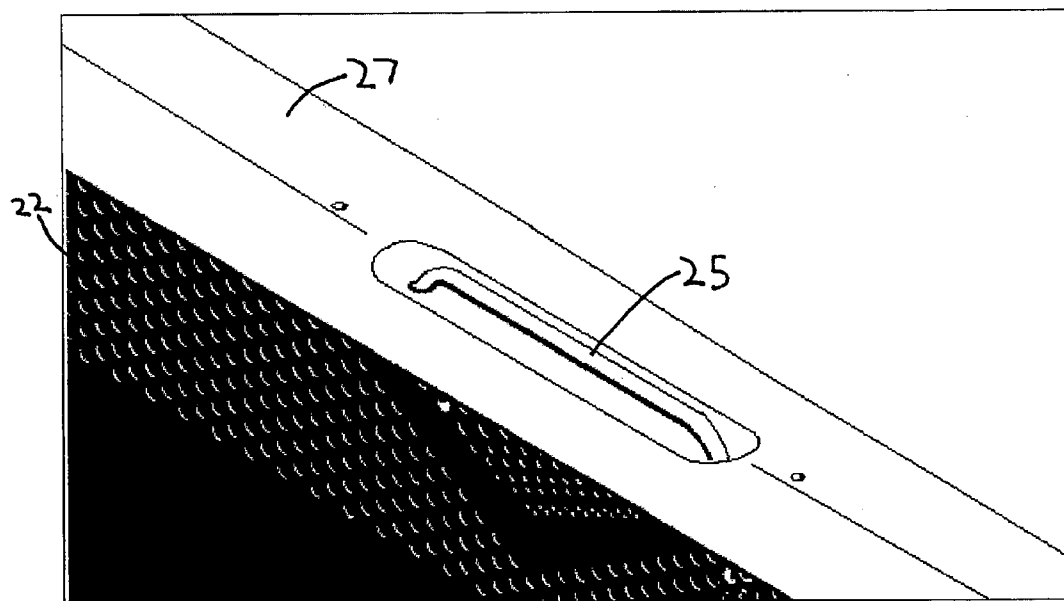


FIG 7b

COOKING DEVICE WITH VENTILATION AND FILTRATION SYSTEM

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to U.S. Provisional Patent Application Ser. No. 61/439,635 filed on Feb. 4, 2011.

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] The present invention pertains to the art of cooking appliances and, more particularly, to a cooking appliance with a ventilation system, such as an adjustable vent and a corresponding filtration system.

[0004] 2. Discussion of the Related Art

[0005] While cooking, it is often considered beneficial to utilize some type of ventilation system to evacuate the air-borne contamination and heated air from the vicinity of the cook top, oven, or other cooking device, either upward through a venting hood or downward into a draft flue. In kitchens, most known venting arrangements take the form of a hood which is fixed above a cooking surface and which can be selectively activated to evacuate the contaminated air.

[0006] Downdraft vent arrangements are also widely known in the art wherein a cooking surface will incorporate a vent opening that is positioned upon or extends from the cooktop. During cooking, the heated pots and cooking vessels may radiate heat and effluent-laden air, gases, and fumes. A downdraft ventilation system is used to evacuate this heat and effluent-laden air, gases, and fumes downwards, usually into the cooking appliance housing.

[0007] The vertical distance between the cooking surface and a vent hood is typically fixed between 24 and 30 inches. When in an operating position, downdraft vent arrangements known in the art are also limited in this respect. Depending upon the food being cooked and even the particular height of the individual doing the cooking, it may be desired to vary the distance between the cooking surface and the vent inlet. On a cooking surface, it is considered beneficial to arrange a vent closer to the cooking surface in order to increase the removal of contamination. On the other hand, it is often desirable to raise a vent inlet relative to a cooking surface in order to more easily access different portions of the cooking surface or to pull heated air from the vicinity of the tops of cooking vessels.

[0008] A cook top using heating for cooking purposes is normally constructed of a metal housing supporting a glass or other cooking surface upon which there is located a number of heating elements.

[0009] As noted, many conventional cook tops often have integrated downdraft ventilators. Present designs are rectangular inlets, usually on the surface of the cook top, connected to long rectangular box-shaped ducts extending below the cook top, also known as a plenum.

[0010] Downdraft ventilators are generally designed to draw air from the vicinity of the cooktop downwardly at about a ninety-degree angle with the use of a motor assembly having a fan, thereby removing contaminated and heated air from a cook top surface, and exhausting it outside the ventilation assembly or outside the cooking device to return to the room. In such conventional systems, the airflow stream is pulled from the front and sides of the work area to the middle where

the ventilator is on the cook top surface. The airflow stream has to then turn 90 degrees downwardly, once inside the plenum chamber.

[0011] Present downdraft ventilator designs also present problems when integrated into a cook top. Because of the low profile, spilled food and liquids can enter the grate and removal of the items that are not captured by the filter cannot be removed easily. This is due to the required depth of the plenum and the narrow box size.

[0012] Therefore, a need exists for a state-of-the-art indoor or outdoor cooking device with a ventilation and filtration system to reduce heat, fumes, and contaminants in the cook top area to improve the cooking environment, and so forth. Additionally, there exists a need for a cooking device that resists penetration by contaminants and is easy to clean. Further, there is also a need for a proper vent design to efficiently remove undesired heated air from the housing of the cooking device.

SUMMARY OF THE INVENTION

[0013] The present invention relates to a mobile or stationary cooking device with a ventilation and filtration system that preferably a) removes heated air, effluents, and contaminants from the cooking environment, b) provides a filtration system that removes the effluents and contaminants from the air, and c) provides easily accessible and easily cleanable or replaceable ventilation and filtration system components. More particularly, this invention relates to an improved cooking device having a manually adjustable vent to optimize the removal of said contaminants and heated air that is easily manually removable for cleaning, and easily reinstalled. In particular, easy access is provided for removal and replacement of filter components and a drip tray for catching grease and other liquids and solids.

[0014] The invention preferably includes a cooking device having a housing with one or more heating elements that may be arranged on top of or within the housing. A vent assembly is provided with a manually removable first duct portion having an inlet, and a second duct portion in communication with the removable first duct portion. At least one filter is present for removing effluents from air in communication with a volume of air flowing through the second duct portion. At least one effluent trapping and filtration assembly receives at least one filter. A motor is provided for moving a volume of air into the inlet and through the at least one filter. The housing has an access to remove or insert the one or more filters into the at least one effluent trapping and filtration assembly.

[0015] It is thus one aspect of the invention to provide a cooking device with a removable duct element and removable filters for ease of cleaning.

[0016] In another aspect of the invention, the cooking device's effluent trapping and filtration assembly includes a filter housing that is slidably accessible from the access opening in the housing. It is thus another aspect of the invention to provide easy access to the filter housing and the replaceable filters within.

[0017] In still another aspect of the invention, the effluent trapping and filtration assembly includes a filter housing with at least one filter therein, which is slidably accessible from the access opening in the housing. Thus, the invention preferably provides for at least one filter with easy access through the cooking device housing. The filter may be a grease filter, a particulate filter, or a carbon filter. Thus, the invention may

remove effluents and other contaminants, such as grease, smoke, and odor, utilizing a range of filtering types.

[0018] In accordance with a further aspect of the invention, the cooking device further includes at least one removable grease and condensate tray in the effluent trapping and filtration assembly that is easily removable from the access opening in the housing.

[0019] In yet another aspect of the invention, the effluent trapping and filtration assembly includes an exhaust duct filter housing with at least one filter, which is also easily replaceable from the access opening in the housing. The filter in the exhaust filter housing may be a particulate filter or a carbon filter, where the particulate filter may be a mesh filter, a bag filter, a cartridge filter, or a carbon filter. Thus, the exhaust filter serves to substantially remove the smaller smoke and odor particles from the effluent-laden air.

[0020] As described above, the effluent trapping and filtration assembly also has a filter housing that may also house a grease filter and a particulate filter. The grease filter may be a mesh filter, an impingement filter, a baffle filter, a cyclonic filter, or another grease entrapment device. The particulate filter may be a mesh filter, a bag filter, a cartridge filter, or a carbon filter. Thus, it is one aspect of the invention to remove effluents and other contaminants over a range of particle types with a variety of filters for removing grease, particulate matter, smoke, steam, and so forth.

[0021] Another aspect of the present invention has a housing further comprising a cart having wheels and a cart handle. Thus, it is yet another aspect of the invention to provide for a mobile cooking device that is easily moved and otherwise repositioned.

[0022] In accordance with another aspect of the invention, a cooking device comprises a housing, a cook top having one or more heating elements, and a ventilation and filtration assembly comprising: a first duct portion having an inlet, a manual height adjustment device for the first duct portion, a second duct portion in communication with a first duct portion, and at least one filter for removing effluents from air, in communication with a volume of air flowing through the second duct portion, a motor for moving a volume of air into the inlet and through the at least one filter, and an access opening in the housing to remove or insert the one or more filters into the at least one effluent trapping and filtration assembly. The heating elements may comprise burners on a cook top, a range, an oven, a hibachi, a grill, and the like.

[0023] Thus, it is another aspect of the invention to provide for a manually adjustable vent whereby the user may optimize the removal of effluents and gases from the cooking area.

[0024] The present invention may also comprise a manual height adjustment device having a handle connected to the top of the vent assembly for manually raising and lowering at least the vent assembly inlet and first duct portion. Thus, allowing the user to easily control the position of the inlet vent.

[0025] Furthermore, the present invention may also have a first duct portion that is removable and the handle is configured for removing and replacing at least the first duct portion. In addition, the handle may be removable and reattachable. Thus, it is one aspect of the invention to allow manual removal and replacement of the inlet vent portion with an easily graspable handle that is itself removable for more complete cleaning.

[0026] The present invention may also have a fire suppression system. The fire suppression system may be compliant

with UL710B or other applicable standards. The system may contain a detector or fire detection apparatus which senses heat, temperature, smoke, resistance, fire, and so forth. The associated sensors may fuse, close a relay, or otherwise send an indication or control signal to enact a fire suppression response. For example, overheated exhaust may be sensed by a fusible link, which activates a damper assembly which closes fire damper louvers substantially eliminating airflow through the ventilation system. In another example, a sensor in communication with the cook top of the cooking device may sense excessive heat or smoke and remove power to the heating elements and the fan in the ventilation and filtration assembly. Fire detection may also cause the release of fire-extinguishing material using, for example, nozzles in the vicinity of the cooking device and internal to the ventilation system.

[0027] These aspects of the present invention offer advantages of fire safety, energy efficiency, decreased stress on the blower motor and more rapid cooling of induction hobs (for longer component life), an improved cooking environment with less odor, heat, and contaminants, and a cooking device that is able to be used more efficiently to prepare a wider variety of foods. These and other aspects of the present invention will be better appreciated and understood when considered in conjunction with the following description and the accompanying drawings. It should be understood, however, that the following description, while indicating preferred embodiments of the present invention, is given by way of illustration and not of limitation. Many changes and modifications may be made within the scope of the present invention without departing from the spirit thereof, and the invention includes all such modifications.

BRIEF DESCRIPTION OF THE DRAWINGS

[0028] A clear conception of the advantages and features constituting the present invention, and of the construction and operation of typical mechanisms provided with the present invention, will become more readily apparent by referring to the exemplary, and therefore non-limiting, embodiments illustrated in the drawings accompanying and forming a part of this specification, wherein like reference numerals designate the same elements in the several views, and in which:

[0029] FIG. 1 illustrates a perspective view of the cooking device of the present invention;

[0030] FIG. 2 illustrates a perspective view of the cooking device of FIG. 1 sans housing and cooktop;

[0031] FIG. 3a illustrates a cutaway side view of cooking device of FIG. 2 along the 3a axes with airflow paths;

[0032] FIG. 3b illustrates a cutaway side view of cooking device of FIG. 2 along the 3b axes with airflow paths;

[0033] FIG. 3c illustrates a cutaway front view of cooking device of FIG. 2 along the 3c axes with airflow paths;

[0034] FIG. 4a is a perspective view of the cooking device of the current invention showing the vent in its non-extended position and the front panel cutaway;

[0035] FIG. 4b is a perspective view of the cooking device of the current invention showing the vent in its extended position and the front panel cutaway;

[0036] FIG. 5 illustrates a perspective view of yet another embodiment of the present invention with the filter drawer, filters, and drip tray insertion details shown with arrows;

[0037] FIG. 6a is a close-up perspective view of the vent handle illustrating the handle position allowing for removal of the handle;

[0038] FIG. 6b is a close-up perspective view of the vent handle illustrating the handle position allowing the manual extension/retraction of the vent;

[0039] FIG. 7a is a close-up perspective view of the vent handle and vent illustrating the extended handle position; and

[0040] FIG. 7b is a close-up perspective view of the vent handle and vent illustrating the recessed handle position.

[0041] In describing the preferred embodiments of the invention which is illustrated in the drawings, specific terminology will be resorted to for the sake of clarity. However, it is not intended that the invention be limited to the specific terms so selected and it is to be understood that each specific term includes all technical equivalents which operate in a similar manner to accomplish a similar purpose. For example, the words “connected”, “attached”, or terms similar thereto, are often used. They are not limited to direct connection but include connection through other elements where such connection is recognized as being equivalent by those skilled in the art.

[0042] Further, before any embodiments of the invention are explained in detail, it is to be understood that the invention is capable of other embodiments and of being practiced or of being carried out in various ways. Also, it is to be understood that the phraseology and terminology used herein is for the purpose of description and should not be regarded as limiting. The use of “including”, “comprising”, “at least one of”, or “having” and variations thereof herein is meant to encompass the items listed thereafter and equivalents thereof as well as additional items.

DESCRIPTION OF PREFERRED EMBODIMENTS

[0043] The present invention and the various features and advantageous details thereof are explained more fully with reference to the non-limiting embodiments described in detail in the following description.

[0044] Note that the detailed description that follows the drawings, which are used, do not show all the details of every product described, but only certain features of the invention that aid in describing the invention. One skilled in the art will see the benefits of this new invention and know of all the other methods of construction and design.

1. System Overview

[0045] The present invention relates to an indoor or outdoor cooking device having a ventilation and filtration system for removing heated and effluent-laden air and gases from the cooking area. Briefly, this is accomplished by providing a manually adjustable vent connected to a filtration assembly that may include traps and filters for removing grease, particulate matter, effluents, and the like. Also disclosed is a manually removable duct portion with an attached vent cover that can be easily removed with a handle, cleaned, and then replaced. The handle itself may be removable for more thorough cleaning. The inventive cooking device may be a mobile unit, an island unit, or an otherwise fixed location unit.

[0046] With the increasing heat and effluent emissions from cook tops and the reduction in overall form, removal and filtration of heated and effluent-laden air from the cooking area has become a much more important element of cooking product design. The performance, reliability, and life expectancy of the cooking device, and the comfort and environment of the cook, are strongly related to proper management of the

heated and effluent-laden cook top air. Long life with increased reliable performance of a component may be achieved by effectively controlling the device operating temperature and exposure to contaminants in the effluents and gases. In addition, controlling the exposure of the cook and the cooking device to the effluent-laden air may improve the user's experience. Furthermore, the cook, restaurant staff, and guests will have a more pleasant restaurant experience.

[0047] In one embodiment, the cooking device preferably comprises a ventilation and filtration assembly having a filter housing that is slidably accessible from an access opening in the housing wherein the filter housing houses at least one manually removable filter. The filter housing may have a filter that may be a grease filter, a particulate filter, or a carbon filter. The ventilation and filtration assembly also has an exhaust filter housing that may house a carbon filter or particulate filter.

[0048] Thus, it is one aspect of the invention to provide a ventilation and filtration assembly that is easily accessed for cleaning, replacement, and so forth.

[0049] In another embodiment, the cooking device may provide a ventilation and filtration assembly having an exhaust filter housing with a manually removable exhaust filter therein accessible from the access opening in the housing, which is one selected from a group of a disposable carbon filter and a washable carbon filter. The manually removable filter may be a mesh filter, a carbon filter, or a filter configured to substantially remove particles such as smoke particles and odor particles.

[0050] The housing may further include a cart with wheels and a cart handle. Thus, it is yet another aspect of this invention to provide for a mobile cooking device that is easily moved or otherwise repositioned.

[0051] In accordance with another aspect of the invention, the cooking includes a housing with one or more heating elements and a ventilation and filtration assembly. The assembly preferably includes a first duct portion having an inlet, a manual height adjustment device for the first duct portion, a second duct portion in communication with a first duct portion, and at least one filter for removing effluents from air, in communication with a volume of air flowing through the second duct portion. A motor is provided for moving a volume of air into the inlet and through the at least one filter. An access opening in the housing allows for removing or inserting one or more filters from the effluent trapping and filtration assembly.

[0052] Thus, the inventive, manually-adjustable vent allows the user to remove effluents and gasses from the cooking area.

[0053] The present invention may also include a manual height adjustment device having a handle connected to the top of the vent assembly. The handle aids in manually raising and lowering the vent assembly inlet and first duct portion, and allows the user to better control and adjust the position of the inlet vent.

[0054] Furthermore, a first duct portion may also be removable and a handle may be configured for removing and replacing at least the first duct portion. In addition, the handle may be removable and reattachable. The inlet vent portion preferably has an easily graspable handle that is itself removable for more complete cleaning.

[0055] In yet another embodiment, the cooking device may also have a fire suppression system operably connected to the cooking device. The fire suppression system may have a

sensor for detecting a temperature, a resistance, a heat, a smoke, and/or a fire. Thus, this system provides for a safe and fire-suppressive cooking environment.

[0056] The preferred inventive method of removing effluents and contaminants from the cooking environment includes steps of:

- [0057] a. drawing a volume of air proximate to the cooking device into a ventilation inlet using a motor;
- [0058] b. directing the air through at least one substantially vertical duct;
- [0059] c. directing the air over a substantially horizontal surface for collecting effluents thereon;
- [0060] d. directing the air through at least one filter for filtration of effluents;
- [0061] e. directing the air through a baffle in communication with the motor; and
- [0062] f. directing the air through a substantially vertical exhaust filter.

[0063] Thus, the invention provides a method of eliminating effluents and other contaminants from the cooking environment through a series of steps of ventilation and filtration.

2. Detailed Description of Preferred Embodiments

[0064] Various embodiments of the present invention are shown in FIGS. 1 through 7b are described in additional detail below.

[0065] FIG. 1 shows one preferred embodiment of the cooking device 10 of the present invention. In this embodiment, the cooking device 10 includes a housing 18, and a cook top surface 12 with heating elements shown as burners 14, 16. The housing 18 and cooking surface 12 are preferably comprised of a metal, glass, stone, plastic, other materials, or a combination thereof.

[0066] The device 10 has a cook top vent assembly 20 for removing effluent and hot air from the cooking surface or cooktop 12. The vent assembly 20 may consist of a substantially vertical duct portion 22 and vent inlet 24. A handle 25 may be provided for manually raising and lowering the vent assembly 20. The outer surface of the vent assembly 20 is preferably made from metal, although glass, stone, plastic, other materials, or some combination thereof may be used. Because of the flexibility of the design and the low profile, the outer shape of the vent assembly 20 can be styled to meet nearly any requirements.

[0067] Also shown in FIG. 1 are various controls 26 which may include controls for heat or temperature settings for the burners 28, 30, a control for the speed of the ventilation motor 32, and the like. In addition, the cooking device 10 of FIG. 1 may comprise a cart 33 that includes wheels 34 for mobility and a handle 36 for ease of movement. Furthermore, the cooking device 10 may also have an access panel 38 for access to internal removable components further explained below. The access panel 38 may have a handle 40, and provide for ventilation with openings 42.

[0068] FIG. 2 shows the interior of the embodiment of FIG. 1 with the cooking device housing 18 and cook top 12 removed to show the vent assembly 20 and effluent trapping and filtration assembly 54, which may be an integrated assembly 50. As mentioned, the vent assembly 20 may consist of a substantially vertical first duct portion 22 and vent inlet 24 and may have a handle 25. In addition, there is a second duct portion 52 (as shown by its external housing surface), which may slidably receive the first duct portion 22. The first duct portion 22 may also be removable from the second duct

portion 52 using handle 25. The integrated assembly 50 also has an effluent trapping and filtration assembly 54 which contains filters 66 and effluent traps 53, as will be described below. The filters 66, 68 and grease trap 64 (as shown below in FIGS. 3a-c) are accessed through access panel 38 (as shown in FIG. 1) which may have an additional door or drawer 56 having a handle 58 for accessing the filters and traps within. The effluent-laden air is moved through the integrated assembly 50 by motor 60. The air moves through blower assembly 61 and exits from the exhaust filter housing 62.

[0069] Referring now to FIGS. 3a-3c, the operation of the integrated assembly's 50 vent assembly 20 and effluent trapping and filtration assembly 54 is illustrated. Starting with FIG. 3a, a cross-sectional side view taken along axis 3a-3a in FIG. 1 is shown. Vent assembly 22 is shown extended with air designated by arrow A₁ entering the vent inlet 24. The air flow A₂ turns downward and travels vertically downward through the first and second duct portions 22, 52 and turns at about a 90-degree angle to flow substantially horizontally into the lower portion of the filtration assembly 54 as shown by air-flow arrow A₃. The airflow may release liquid or solid effluent onto an effluent receptacle shown as drip tray 64. The airflow then turns at about a 90-degree angle to flow upward into the filters 66, 68. The filtration assembly 54 may contain one or more filters such as filter elements 66, 68. The effluent-laden air moves through the filters which remove some of the effluents. The air continues upward, shown by air flow arrows A₄, and into the blower assembly 61 having an air-moving element such as blades 63 being moved by motor 60. FIG. 3b shows another cross-sectional side view of the integrated assembly 50 taken along axis 3b-3b in FIG. 1. This cross-section shows the major airflow path A₁ into the vent 22 and A₅ through the vent 52 and upward through the filter housing 54. FIG. 3c shows yet another cross-section front view of the assembly 50 taken along axis 3b-3b in FIG. 1. Airflow A₁ enters the vent 22 through vent inlet openings 24. The airflow may move vertically downward (not shown) and then upward as shown by airflow arrows A₆ through the filter elements 66, 68 of the filtration assembly 54. The airflow A₇ proceeds through the blower assembly 61 impelled by motor 60 and makes a turn of about 90 degrees to form airflow A₈ which exits through the exhaust filter housing 62 as exhaust air flow A₉.

[0070] Two types of ventilators may be used with the present invention, ducted and non-ducted. In a non-ducted-type ventilator, there may be outlets, but no duct that is used for venting air to the outside. See, e.g., FIG. 1. This embodiment has exhaust outlet vents 42 that are not in communication with a duct. Alternatively, the outlet vents or openings 42 may be at the top, back, or bottom of the housing 18 for directing exhausted air upward, sideways, or downward. In a ducted-type ventilator, there is a duct that is used for venting air to the outside (not shown) in communication with one or more outlet vents. Similarly, this duct unit can be vented at the top, side, back, front, and/or directed downward to the floor in a room.

[0071] Turning now to FIGS. 4a and 4b, the operation of the telescoping vent assembly 20 is described. The cooking device 10 of the present invention is shown with the first vent portion 22 flush with the cooking surface 12 in FIG. 4a. In this embodiment, the vent may be operable for moving air while vent assembly 20 is in the lowered position. In FIG. 4b,

however, the telescoping vent assembly **20** is shown in the extended and operable position, having been manually raised by the user.

[0072] Referring now to FIG. 5, the operation of the removable and replaceable components of the cooking device **10** is detailed. The cooking device **10** is shown with an effluent trapping and filtration assembly **54**. Here, the effluent trapping and filtration assembly **54** is shown as an extended drawer **70** with an upper filter element **68** that is visible. The filter element **68** is removed revealing a lower filter element **66**. The lower filter element **66** is removed from the drawer **70** to reveal a portion of the effluent-receiving surface, here shown as drip tray **64**. Once filter assembly drawer **70** is removed, the drip tray **64** can be seen partially extended (**65**). Another removable component is shown, i.e., the exhaust filter **72** that is being inserted (**74**) into the drawer **70**.

[0073] Turning now to FIGS. 6a and 6b, the removal and replacement operations of the handle **25** are shown. A close-up of the top **27** of the first vent portion **22** shows handle **25**. Handle **25** may be removable by allowing it to rest against the top of the vent **27** as shown in FIG. 6a. From this position, the handle **25** may be removed by lifting a lower portion of the handle **31** along path M, which lifts the handle **25** from opening **29**. Otherwise, the handle **25** may be in a raised position as shown in FIG. 6b. In this position, a lower portion of the handle **31** is positioned so that it cannot be removed from opening **29**.

[0074] Referring now to FIGS. 7a and 7b, the retraction and extension operations of the handle **25** are described. The handle **25** may be raised through opening **29** so that it is fully extended from the vent **22**, as shown in FIG. 7a. Alternatively, the handle **25** may be retracted so that it is flush or below top surface **27**.

[0075] Referring again to FIG. 1, one embodiment of the cooking device **10** has a fire-suppression system sensor **100** operably connected to, for example, the exhaust filter housing **62** for sensing and suppressing fires for added safety. A temperature-sensing and fire-suppression system that is electronic or mechanical with fusible links may be employed in such a system. The temperature-sensing system may be operably connected to the cooking device or cook top for detecting at least one of temperature, resistance, heat, fire, or smoke. Such sensors may have at least one of an electronic, an electromechanical, and mechanical component.

[0076] There are virtually innumerable uses for the present invention, all of which need not be detailed here. Of course, this and all of the other disclosed embodiments can be practiced without undue experimentation.

[0077] Although the best mode contemplated by the inventors of carrying out the present invention is disclosed above, practice of the present invention is not limited thereto. It will be manifest that various additions, modifications, and rearrangements of the features of the present invention may be made without deviating from the spirit and scope of the underlying inventive concept. In addition, the individual components need not be fabricated from the disclosed materials, but could be fabricated from virtually any suitable materials. For example, construction materials for the cooking device, the downdraft ventilator, and the blower are at least one of metal, glass, stone, a transparent material, tile, plastic, and manmade material.

[0078] Moreover, the individual components need not be formed in the disclosed shapes, or assembled in the disclosed configuration, but could be provided in virtually any shape,

and assembled in virtually any configuration. Further, although various components are described herein as physically separate modules, it will be manifest that they may be integrated into the apparatus with which they are associated. Furthermore, all the disclosed features of each disclosed embodiment can be combined with, or substituted for, the disclosed features of every other disclosed embodiment except where such features are mutually exclusive.

[0079] Various alternatives and modifications are contemplated as being within the scope of the following claims particularly pointing out and distinctly claiming the subject matter regarded as the invention.

1. A cooking device comprising:
 - a housing;
 - one or more heating elements;
 - a vent assembly with a manually removable first duct portion having an inlet, and a second duct portion in communication with the manually removable first duct portion;
 - at least one filter for removing effluents from air, in communication with a volume of air flowing through the second duct portion;
 - at least one effluent trapping and filtration assembly to receive the at least one filter;
 - a motor for moving a volume of air into the inlet and through the at least one filter; and
 - an access opening in the housing to remove or insert the at least one filters into the at least one effluent trapping and filtration assembly.
2. The cooking device of claim 1 wherein the at least one effluent trapping and filtration assembly comprises a filter housing with the at least one filter therein that is slidably accessible from the access opening in the housing.
3. The cooking device of claim 1 wherein the at least one effluent trapping and filtration assembly comprises an exhaust duct filter housing with the at least one filter therein, which is accessible from the access opening in the housing.
4. The cooking device of claim 1 further comprising at least one removable grease and condensate tray in the effluent trapping and filtration assembly that is removable from the access opening in the housing.
5. The cooking device of claim 2 wherein the at least one filter is one or more selected from a group consisting of a grease filter, a particulate filter, and a carbon filter.
6. The cooking device of claim 3 wherein the at least one filter is one or more selected from a group consisting of a particulate filter, and a carbon filter.
7. The cooking device of claim 1 wherein the at least one filter is a grease filter.
8. The cooking device of claim 1 wherein the at least one filter is a particulate filter.
9. The cooking device of claim 1 wherein the at least one filter is a carbon filter.
10. The cooking device of claim 1 wherein the housing further comprises a cart having wheels and a cart handle.
11. A cooking device comprising:
 - a housing;
 - one or more heating elements;
 - a ventilation and filtration assembly comprising:
 - a first duct portion having an inlet,
 - a manual height adjustment device for the first duct portion,
 - a second duct portion in communication with a first duct portion,

at least one filter for removing effluents from air in communication with a volume of air flowing through the second duct portion;

a motor for moving a volume of air into the inlet and through the at least one filter; and

an access opening in the housing to remove or insert the at least one filter into at least one effluent trapping and filtration assembly.

12. The cooking device of claim **11** wherein the manual height adjustment device comprises a handle connected to the top of the vent assembly for manually raising and lowering at least the vent assembly inlet and first duct portion.

13. The cooking device of claim **12** further comprising a first duct portion that is removable and the handle is configured for removing and replacing at least the first duct portion.

14. The cooking device of claim **12** wherein the handle is removable and reattachable.

15. The cooking device of claim **11** wherein the ventilation and filtration assembly comprises a filter housing that is accessible from the access opening in the housing wherein the filter housing houses the at least one filter;

wherein the at least one filter is configured to be manually removable and the at least one filter is selected from a group consisting of a grease filter, a particulate filter, and a carbon filter.

16. The cooking device of claim **15** wherein the at least one filter is a grease filter selected from a group consisting of a mesh filter, an impingement filter, a baffle filter, a cyclonic filter, or another grease entrapment device, and the at least one

filter further comprises a particulate filter that is one selected from a group consisting of a mesh filter, a bag filter, a cartridge filter, and a carbon filter.

17. The cooking device of claim **11** further comprising at least one removable grease and condensate tray in the effluent trapping and filtration assembly that is removable from the access opening in the housing.

18. The cooking device of claim **11** wherein the housing further comprises wheels and a cart handle.

19. The cooking device of claim **1** further comprising a fire-suppression system having a sensor for detecting at least one selected from a group consisting of a temperature, a resistance, a heat, a smoke, and a fire.

20. A method of removing effluents from a cooking device comprising:

- a. drawing a volume of air proximate to the cooking device into a ventilation inlet using a motor;
- b. directing the air through at least one substantially vertical duct;
- c. directing the air over a substantially horizontal surface for collecting effluents thereon;
- d. directing the air through at least one filter for filtration of effluents;
- e. directing the air through a baffle in communication with the motor; and
- f. directing the air through a substantially vertical exhaust filter.

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