S. S. THOMAS.

HEATER.

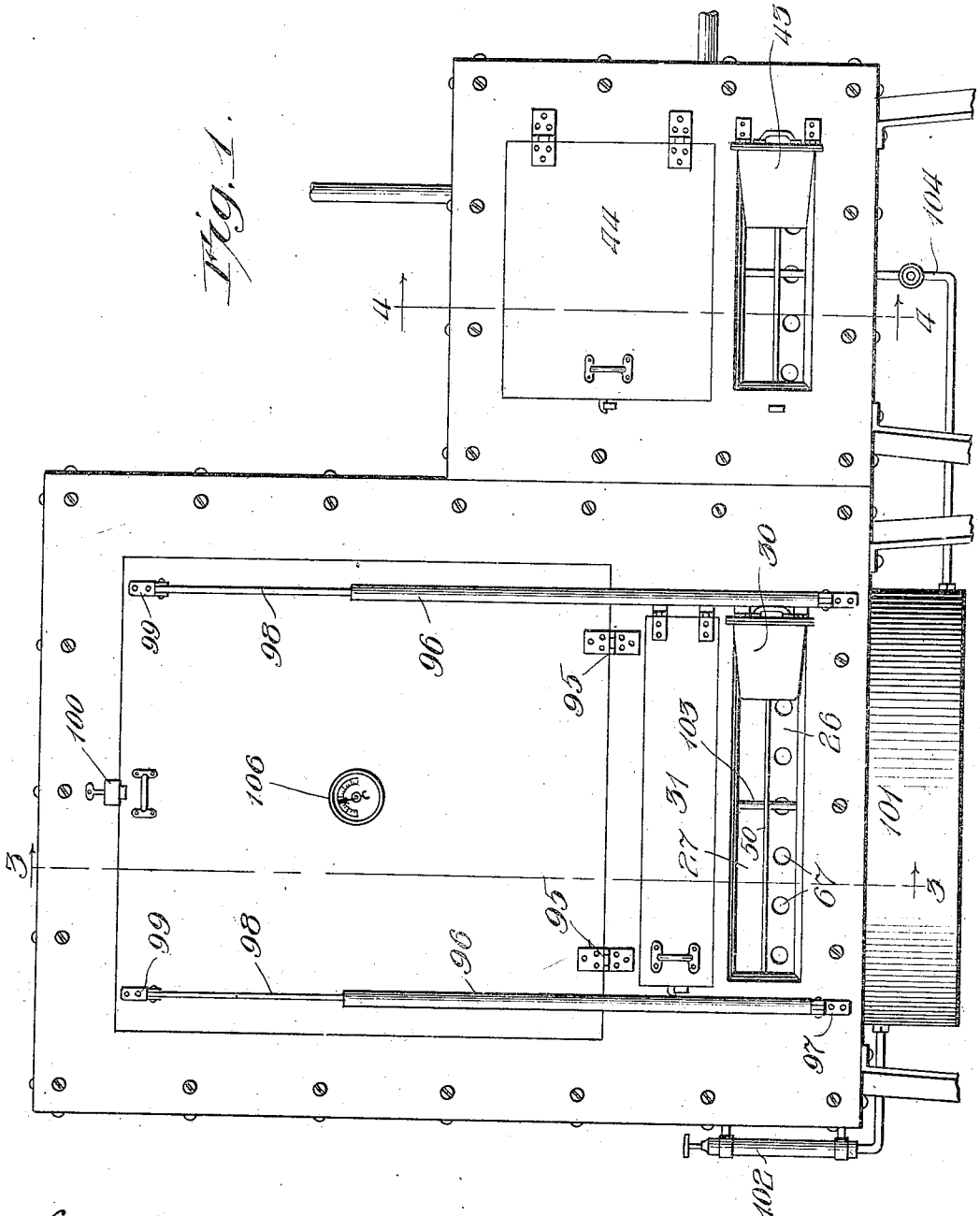
APPLICATION FILED JULY 24, 1911.

1,045,910.

Patented Dec. 3, 1912.

5 SHEETS—SHEET 1.

Fig. 1.



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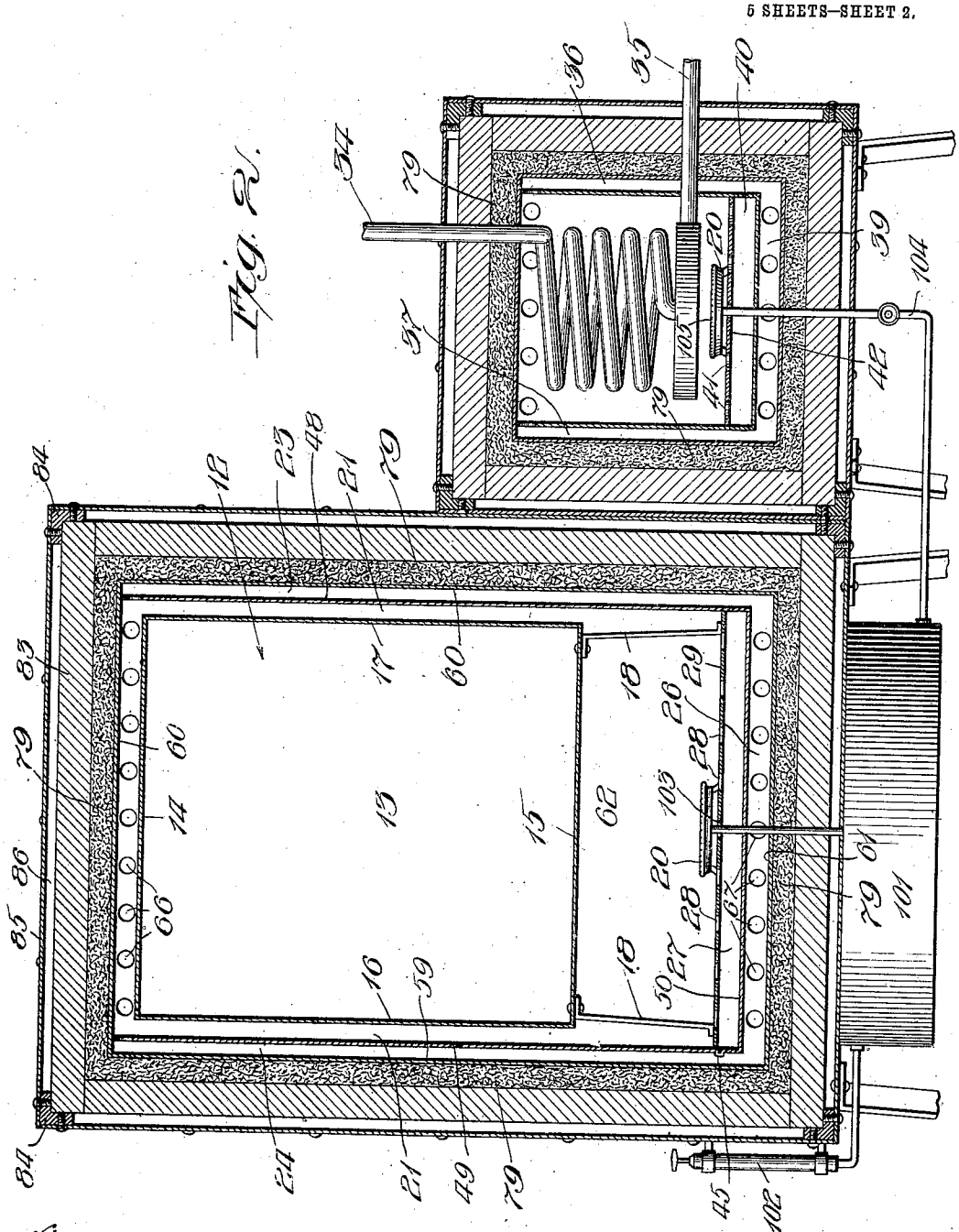
5 SHEETS—SHEET 2.

Fig. 2.



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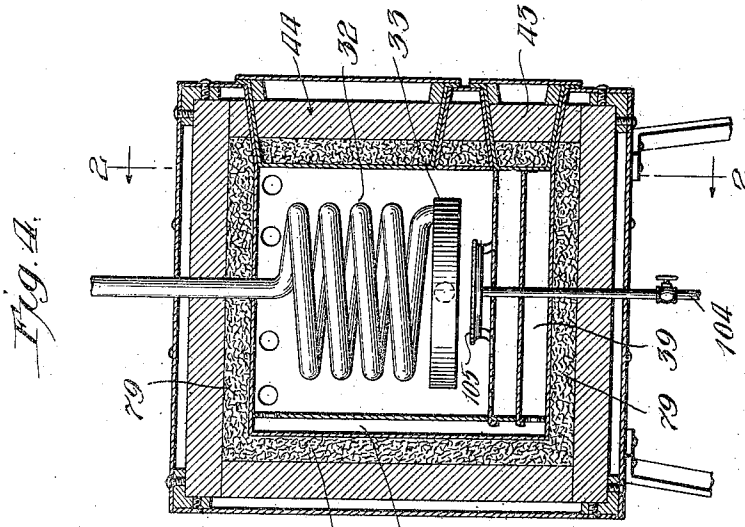

Fig. 4.

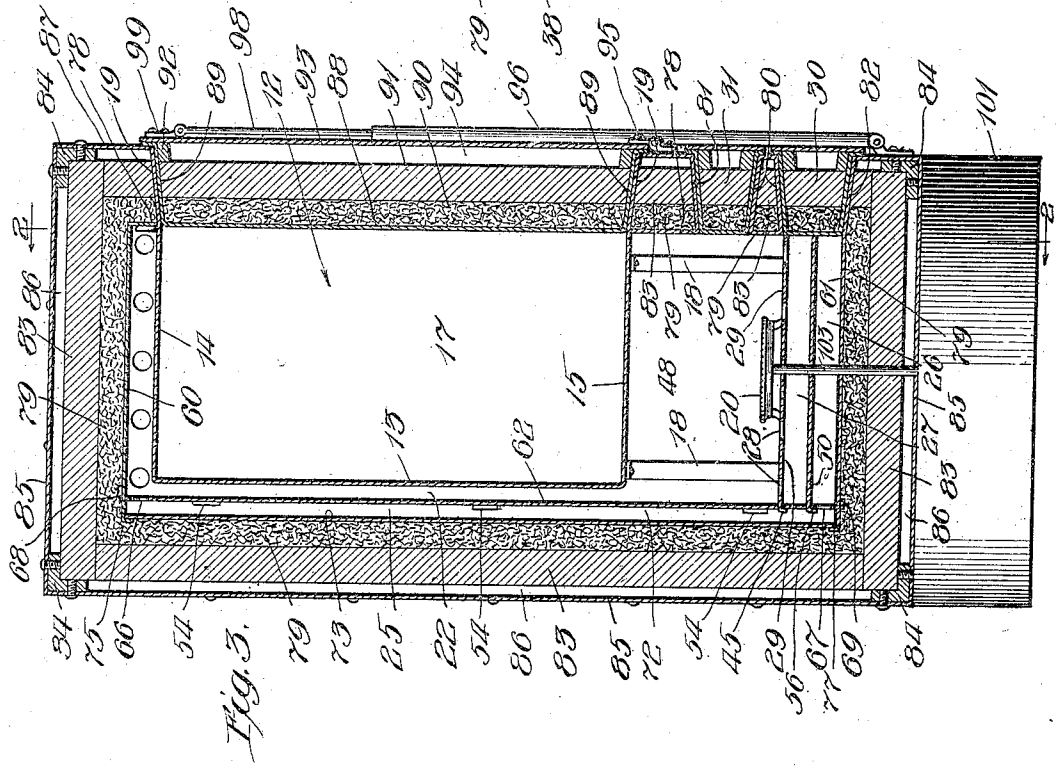

Fig. 5.

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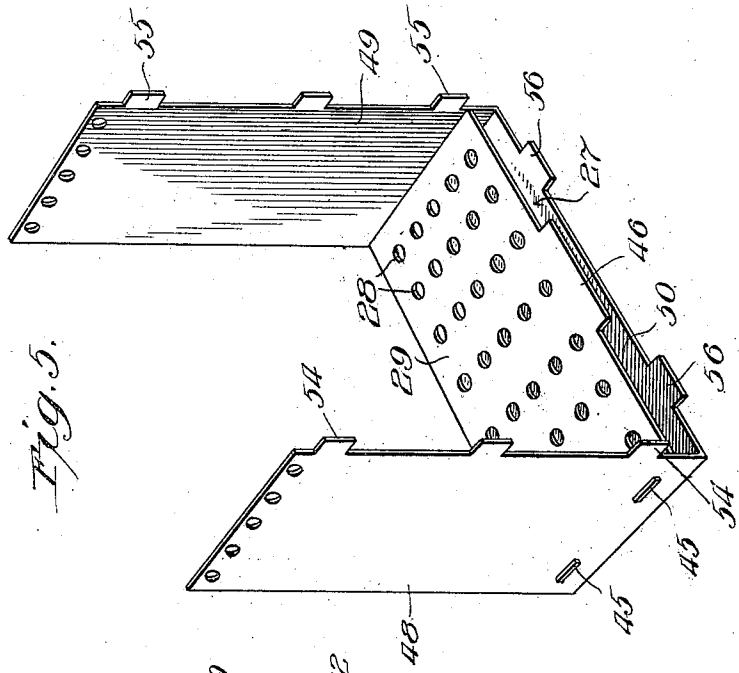

Fig. 5.

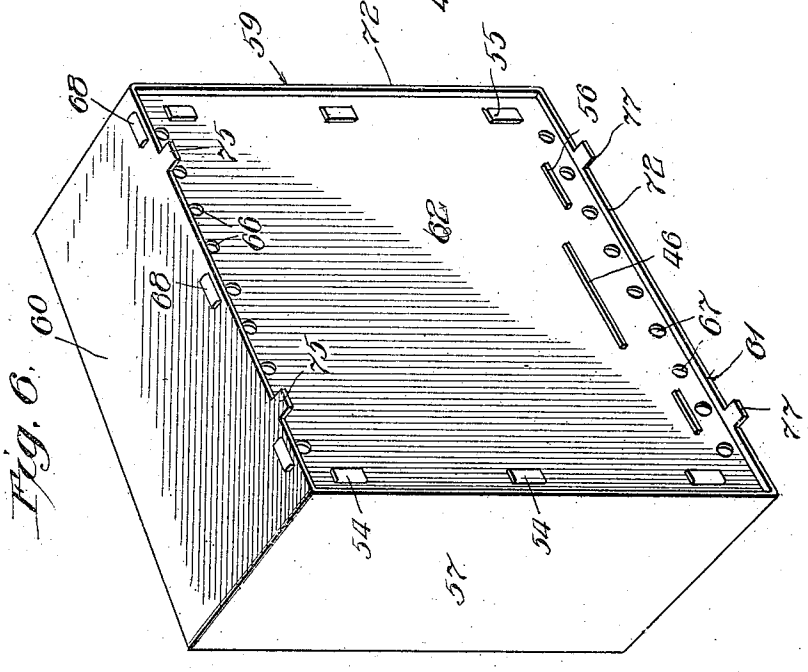

Fig. 6.

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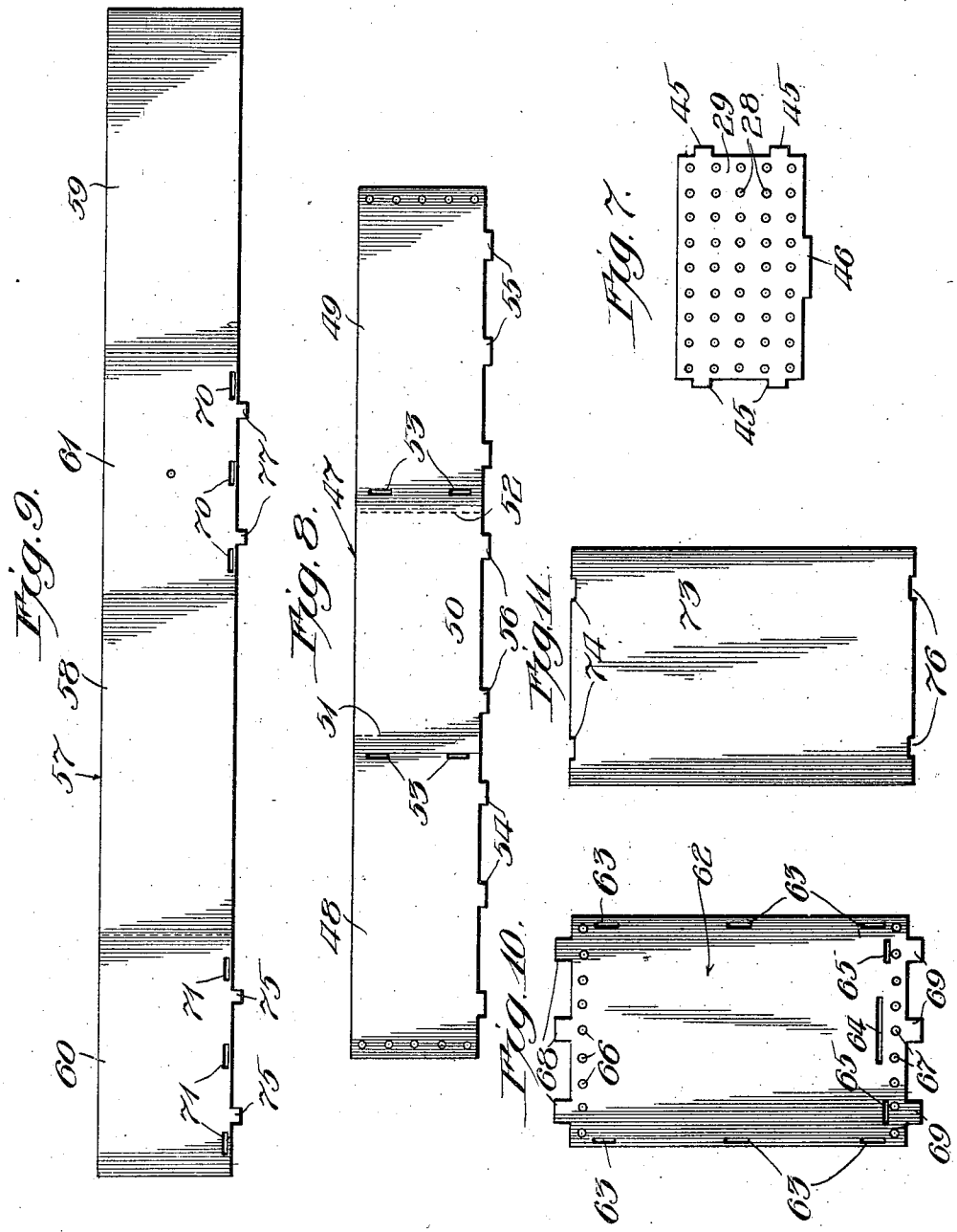
5 SHEETS—SHEET 5.



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UNITED STATES PATENT OFFICE.

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HEATER.

1,045,910. Specification of Letters Patent. Patented Dec. 3, 1912.

Application filed July 24, 1911. Serial No. 640,308.

To all whom it may concern:

Be it known that I, STEPHEN S. THOMAS, a citizen of the United States, residing at Gulfport, in the county of Harrison and State of Mississippi, have invented certain new and useful Improvements in Heaters, of which the following is a specification.

This invention relates to an improvement in heaters of the general class which are so constructed as to conserve within them the greater percentage of the heat, thus making it possible to carry on a cooking or other heating operation with a very small consumption of heat energy and insuring that a uniform temperature shall be maintained within the heater.

I am aware of the fact that heretofore many forms of heater or cooker have been made, but in each of them, as far as I am aware, no provision has been made for an internal supply of heat after the heater has been closed. In other words, it has been necessary to carry a certain amount of heat into the heater and then close the same, and allow the cooking or other operation to proceed without the supply of any additional heat energy. There are a number of objections or disadvantages to such an apparatus, especially when used as a cooker, one of the most serious of which is that it is difficult to know before hand that just the right amount of heat energy has been stored within the heater before the same is closed. If a too small amount of energy has been stored up, then the temperature within the heater will be lower than desirable when all of the elements within the same have come to a uniform temperature; on the other hand, if an excess amount of heat energy has been stored up within the heater, the temperature within the same will be too high when all of the elements have equalized their temperature. Therefore, it has been difficult to predetermine the exact temperature at which a cooking operation would be carried on.

My present invention relates to a heater which is suitably insulated to conserve the heat energy within itself.

It further relates to an arrangement of passages and openings in the heater whereby a maximum of heating efficiency is secured and whereby the supply of air to the burner, and the removal of burned gases from the heater, is most easily controlled, and whereby the several openings of the heater may be most easily regulated.

Objects of my invention are to provide an insulated heater and a suitable burner or the like within the same for raising the temperature initially, and, if desired, for maintaining such temperature by a slight addition of heat from time to time; to provide means for determining the temperature within the heater at any instant; to provide a form of heater especially adapted to be heated by means of some form of gas or gasolene burner; to provide a new and improved arrangement of passages for conducting the gases from the burner up and around the oven so as to heat the same evenly and efficiently; to so arrange said passages that the fresh air and the burned gases may pass in and out from the heater through the same opening, thus minimizing the number of openings in the heater and permitting a control of temperature and gas circulation in the simplest possible manner; to provide a form of heater of such construction that it may be conveniently made from stamped metal, the parts of the same to be assembled together by folding; to arrange the several openings or doors of the heater which may be necessary in such way as to insure the maximum degree of heat insulation; also to provide a new arrangement of heat insulators around the heater so as to insure the most efficient insulation of heat; to provide a new and improved form of oven door for the heater, and a support therefor which shall serve efficiently to limit the opening of the door, and also serve to reinforce the door supports when the same is closed; and in other ways and manners to generally improve this form of device.

Other objects and uses will appear from a detailed description of the invention which consists in the features of construction and combination of parts hereinafter described and claimed.

In the drawings, Figure 1 shows a front view of two units of my improved heater, one unit being in the form of a cooker, and the other unit being in the form of a water heater, both units operating on the same principle, however; Fig. 2 shows a sectional elevation of the double heater of Fig. 1, the

same being taken on the lines 2—2 of Figs. 3 and 4, looking in the direction of the arrows; Fig. 3 shows a cross section of the oven heater taken on the line 3—3 of Fig. 1, looking in the direction of the arrows; Fig. 4 shows a cross section taken on the line 4—4 of Fig. 1, looking in the direction of the arrows; Fig. 5 shows a perspective of the burner plate, partition walls, and false bottom folded together; Fig. 6 shows in perspective the false back and inclosing walls inserted in position; Fig. 7 shows a plan view of the burner plate; Fig. 8 shows the blank from which are formed the false bottom and partition walls; Fig. 9 shows the blank from which are formed the inclosing walls; Fig. 10 shows the false back; and Fig. 11 shows the inclosing back.

In the embodiment of my invention, whether the same is to be used as a cooker or for another purpose, as, for example, heating water, I provide an inclosing vessel of insulating material and adapted to efficiently prevent the transfer of heat from the interior to the exterior of the heater. Within this inclosing vessel I place an oven, water heater, or other object to be heated, and provide openings in the insulating vessel should they be necessary for gaining access to the oven or other interior device. Suitable means are then provided for adding to the total amount of heat energy contained within the insulating vessel. Such means are preferably in the form of a gas or gasolene burner.

In the particular embodiment of my invention which is herein illustrated and described, a gas or gasolene burner is used for supplying the additional heat to the interior of the heater. It will be understood, however, that I in no wise restrict myself to the particular elements shown and described, for it is obvious that any suitable form of heat producing element may be used. In order to insure the most perfect heat insulation, there should be as few breaks as possible in the same. In other words, the number of doors or openings should be a minimum. At the same time, when gas or other combustible is burned within the heater, means must be provided for supplying air to the same and for removing the burned gases therefrom.

One of the features of my invention consists in an arrangement of passages on the interior of the heater so as to obtain the most perfect distribution of heat and the best circulation of gases, combined with the smallest number of ventilation and draft openings in the insulating wall.

Referring now to the drawings, I will state that in Figs. 1, 2, and 3, I have illustrated two forms of heater adapted to be placed side by side. One of these is suitably constructed for use as an oven, and the other one for use as a water-heater. The two heaters are of such relative sizes and shapes that they may be conveniently stood side by side in a kitchen, the water-heater being of suitable height to serve as a table or box on which dishes may be set.

I will first describe the heater which serves as a cooker. The same comprises an oven 12 which is virtually self-contained, it having a rear wall 13, top and bottom 14 and 15 respectively, and side walls 16 and 17. Suitable legs 18 are provided for supporting the oven, and as will presently appear the same may rest on the burner plate. The front part of the oven is flared out a slight amount in its portions 19, as will be readily apparent from Fig. 3, and they extend clear out to the front of the heater. The oven is so constructed that it may be removed from the heater after the door has been opened without disturbing any other element. Furthermore, the oven is wholly self-contained so that gases from the burner cannot enter it to foul meats or other food which may be cooking.

Referring particularly to Figs. 2 and 3, the burner 20 is provided directly beneath the oven, the same serving as a source of heat for initially heating the oven and maintaining the temperature within the same. The hot gases from the burner pass up around the sides of the oven in the passages 21 and around its rear portion in the passage 22. After having passed up to the top of the oven, the gases gain access to side passages 23 and 24 and to the rear passage 25 whereby they descend into the discharge space 26 in the bottom of the heater. Fresh air gains access to the burner from the inlet passage 27 through a number of perforations 28 in the burner plate 29. The upward circulation of gases around the oven is insured because of their high temperature, while the downward circulation in the passages 23, 24, and 25 is insured by reason of the fact that the gases are comparatively cool after they have reached the top of the oven, and also because the carbon-dioxid which they contain is relatively heavy. I will presently explain the preferred construction for providing the different passages above mentioned. The bottom 15, of the oven, should preferably be of comparatively thick material to withstand any corroding effect due to the flame of the burner beneath.

Referring particularly to Figs. 1 and 3, it will be seen that a door 30, preferably hinged at one end, permits of a simultaneous entrance of air into the passage 27 and an exit of burned gases from the passage 26. Therefore, by opening this door the proper amount, the flow of gases can be perfectly regulated. At the same time, by bringing both the inlet and outlet passages together so that the one door serves to control them

both, it is necessary to break the insulation surrounding the oven in only one place for both passages. In order to gain access directly to the burner for lighting the same, and for replacing it, a door 31 may be provided for the burner chamber.

Referring now to Figs. 1, 2, and 4, I have therein illustrated a heater intended for use particularly as a water-heater. In this case the oven 12 is dispensed with, but in its place there is provided a water-coil 32 and a water-plate 33. The incoming water gains access to the coil through an inlet pipe 34 and after circulation through the coil passes down through the plate and then out through the pipe 35. The burner is placed directly beneath the water-plate, and the gases circulate up around the water-plate and coil and then pass down through the side passages 36 and 37 and the rear passage 38 to the outlet passage 39. The incoming air enters the passage 40 and passes up through holes 41 in the burner plate 42. The door 43 permits access to both the inlet and outlet passages simultaneously while the door 44 permits access to the coil, water-plate and burner simultaneously.

I will now describe more in detail the preferred construction of the heater. In order that the same may be made in the cheapest possible manner, and at the same time with the necessary strength and durability, it is preferred that a sheet metal construction be used. In this way certain parts may be stamped out by means of dies and afterward folded together. As before stated, the oven is a separate or self-contained element.

The burner plate is shown in detail in Fig. 7. It is provided with a number of holes which permit the air to pass up freely through its entire area. On each end it is provided with ears 45 and on its rear with an ear 46.

A blank 47 is stamped out into proper shape to provide a pair of partition walls 48 and 49 and a false bottom 50. It is intended that this plate shall be bent at right angles on the lines 51 and 52 so that the ears 45 on the burner plate may engage slots 53 in the blank 47. The blank 47 having been folded up, as shown in Fig. 5, provides a support for the burner plate. The rear edges of the partition walls 48 and 49 are each provided with sets of ears 54 and 55 respectively. Likewise the false bottom is provided with a set of ears 56. When the blank 47 has been folded to engage the burner plate, as just described, the air space 27 is left between the false bottom and the burner plate. A second blank 57 is stamped out in suitable shape to provide four inclosing walls for the element just described. These inclosing walls comprise the side walls 58 and 59, the top 60, and the bottom 61.

A false back 62 is stamped out in the form shown in Fig. 10. Along each side, it is provided with a set of slots 63, one set adapted to engage the ears 54, and the other set adapted to engage the ears 55 of the blank 47. Near its bottom edge, it is provided with a slot 64 adapted to receive the ear 46 of the burner plate, and a little lower down it is provided with a pair of slots 65 adapted to receive the ears 56 of the false bottom.

After the blank 47 and the burner plate have been folded together, as shown in Fig. 5, the false back is placed in position, as shown in Fig. 6, the ears 54 and 55 being turned over to clamp the false back in position. At the same time, the ear 46 of the burner plate will extend through the slot 64 and the ears 56 of the false bottom will extend through the slots 65, as shown in Fig. 6. A line of holes 66 is provided along the top edge of the false back, and a line of holes 67 is provided along its bottom edge below the slots 65. Therefore, when the false back has been inserted in position, as shown in Fig. 6, the gases from the top of the space around the oven can pass through the holes 66 and down behind the false back and through the same at its lower edge through the holes 67. Along its upper edge the false back is provided with a number of ears 68, and along its lower edge with a number of ears 69.

After the false back has been placed in position, as shown in Fig. 6, the blank 57 is folded around the parts previously assembled to bring the slots 70 into engagement with the downwardly extending ears 69 of the false back and the slots 71 into engagement with the upwardly extending ears 68 of the false back. It should be stated in passing that the false back is of such size with respect to the other elements that when the blank 57 has been thus folded into position, the passages 23, 24, and 26 will be provided between the blanks 47 and 57. This fact will be clearly understood from an examination of Fig. 2. At the same time, it should also be stated that the blank 57 is of such width with respect to the blank 47 that its edge extends out beyond the false back as shown at 72 in Fig. 6.

A blank 73 is formed of suitable size and shape to act as the back of the heater. This blank is of proper size to completely span the space between the outwardly extending edges of the blank 57. In its upper edge, it is provided with a line of notches 74 adapted to engage ears 75 of the blank 57, and in its lower edge it is provided with a line of notches 76 adapted to engage ears 77 of the blank 57. These ears may be folded over against the back to hold the same in position, as is well shown in Fig. 3. On account of the outwardly protruding edge 72

of the blank 57, the passage way 25 is left between the back and the false back. Gases may therefore circulate down through this passage from the holes 66 in the false back to the holes 67 therein.

As is shown in Fig. 2, the blank 47 is supported by means of the false back in such position relative to the blank 57 that the passageways 23 and 24 are directly in communication with the outlet passage 26. Therefore, the burned gases may circulate down through the passages 23 and 24, as well as behind the false back in order to reach the outlet passage 26.

It will be understood that when the blank 73 has been fastened into place, the portion of the heater thus far considered will be virtually self-contained, all of its elements being fastened together by means of the ears. After this portion has been constructed, as just described, the front plate 78 may be set in position against the blank 57. This front plate may be held to the blank 57 in any suitable manner. It is preferably a plain sheet of metal stamped out to present an opening just large enough to receive the oven 12 and also to present openings for the doors 30 and 31.

After the front plate has been placed in position, the entire element thus far constructed may be covered with a layer of magnesia block 79 as the first step toward securing an efficient heat insulation. It will be noted, however, that plates 80, 81, and 82 should first be placed in position to constitute the walls of the openings for the doors 30 and 31. Afterward a layer of lith 83 may be placed over the magnesia block, the same constituting the second layer of the insulation. Spacing angles 84 may then be placed over the corners of the lith, the same to serve as a support for the sheet metal covering 85 and to provide a dead air space 86 between the lith and sheet metal. Of course, the plate 87 which incloses the front of the heater should be provided with holes of suitable size to admit the several doors.

Each door is suitably constructed and insulated to efficiently prevent the transfer of heat from the interior of the heater to its exterior. To this end, each door virtually constitutes a pan 88, as shown in the large door which closes the oven, said pan having its edges 89 pressed outwardly at a proper angle to seat against the outwardly flaring edges 19 of the oven. A layer of magnesia block 90 is then placed within this pan and in turn covered by a layer of lith 91. A spacer block 92 is then placed around the edge of the lith, and finally the covering 93 is secured to the edges of the pan, the spacer blocks insuring the provision of a dead air space 94. Although I have described the construction only of the door which closes the oven, it will be understood that a similar construction may be used for the other doors.

In my present invention, I have provided a novel and efficient means for swinging the large oven door. In order that the same may lie out in horizontal position when open, I have hinged it along its lower edge by means of the hinges 95. When the door is allowed to open down into horizontal position, its upper surface will virtually aline with the surface of the bottom of the oven. It is appreciated, however, that a large door of this kind is comparatively weak on account of the thin metal which is used in its construction, and that, therefore, it should be reinforced in some manner. It is further appreciated that in order to secure the best possible heat insulation, a door should close very tightly in order to prevent all leakage of gases. To this end, I provide a tube 96 adjacent each edge of the door, and hinge the same at the point 97 to the lower portion of the outside of the heater. A rod 98 slides within each tube and has its upper end hinged to the upper edge of the door at the point 99. The tube and rod are relatively so hinged that the tube will lie firmly and flatly against the surface of the door when the same is in closed position, as shown in Fig. 3, thus reinforcing the door in its lower portion. At the same time, the length of the tubes with respect to that of the rods is such that when the door is opened, the rods will slide down within the tubes just that distance necessary to permit the door to open out the proper amount, whether such opening be into a horizontal or any other position. Any suitable form of lock 100 may be provided for locking the upper edge of the door closed, as illustrated.

As heretofore stated, the construction shown and described is one particularly adapted to the use of a gas or gasolene burner. When a gasolene burner is to be used, a gasolene tank 101 may be suspended beneath the heater, an air pump 102 being provided for creating an air pressure on the gasolene, and the gasolene being carried up through a tube 103 to the burner 20 underneath the oven, and through a tube 104 to the burner 105 beneath the water heater.

It is found that a heater constructed to embody the principles of my invention will provide an extremely uniform and constant temperature within the oven or water coil or any other object to be heated. For the purpose of especially adapting the heater to use as a cooker, a thermometer 106 may be placed in the door leading to the oven. This thermometer will indicate the exact temperature within the oven so that after the same has been closed and the burner lighted, the door 31 may be closed and the door 30 left open to supply the necessary air and allow

the burned gases to escape until the thermometer indicates the correct temperature within the oven. The supply of fuel may then be discontinued and the door 30 closed after which the temperature will be maintained practically uniform for any desired length of time. In this manner it is possible to obtain results such as it has not been possible to obtain heretofore. If at any time some of the heat should escape, the burner may be lighted again for a short period so as to replace the lost heat.

The heater of the present invention is especially well adapted for use where it is necessary that a uniform temperature of given amount is to be maintained. Such, for example, would be the roasting of peanuts. In this class of work, the temperature must be regulated fairly close for it is found that if the temperature is not high enough the peanuts will not be properly cooked, while if the temperature is too high they will burn.

Furthermore, it should be particularly borne in mind that by means of the present arrangement the temperature within the oven can be initially raised to the desired point, as indicated by the thermometer, and then the supply of heat may be shut off and the entire heater closed up to retain all of the heat on the inside after which the operation will in some respects be similar to that in a fireless cooker. It will be understood, however, that the present arrangement, which includes means for initially raising the temperature to any desired extent and then closing up the heater, possesses a number of advantages over the ordinary fireless cooker.

I claim:

1. In a device of the class described the combination of an oven having an opening in its forward portion, a heater beneath the oven, partitions for inclosing a passageway from the heater upward around the sides of the oven to the upper portion thereof, partitions for providing another passageway downward outside of the first mentioned passageway, and in communication with the first mentioned passageway in its upper portion, an inclosure of heat insulating material, having an opening in registry with the opening of the oven, and having a ventilating opening, a closure for the opening into the oven, a closure for the ventilating opening, and connections for draft from the passageways to the ventilating opening, substantially as described.

2. In a device of the class described the combination of an oven open in one of its walls, a heater beneath the oven, partitions for inclosing a passageway from the heater upwardly around the oven to the upper end thereof, other partitions for providing another passageway extending downwardly to a point below the oven, and in communication with the first mentioned passageway at the upper end thereof, an inclosure of heat insulating material surrounding the oven and provided with an opening in registry with the opening in the oven, and provided with a ventilating opening, a closure for each opening in the heat insulating material, and connections for draft from the passageways to the ventilating opening, substantially as described.

3. In a device of the class described the combination of an oven having its side portion open, a U-shaped partition extending across beneath the oven and up adjacent the sides thereof to provide a space beneath the oven and passages upwardly extending adjacent its sides, a heater located in said space beneath the oven, another partition surrounding the first mentioned partition to provide downwardly extending passages around the first mentioned partition and beneath the same, there being a plurality of openings in the first mentioned partition to establish communication between the upper ends of the passages, heat insulating material surrounding the last mentioned partition and closely engaging the outwardly protruding edges of the oven, and provided with a ventilation opening in communication with the lower ends of both passages, a closure adapted to seat directly into the opening of the oven, and another closure for the ventilating opening, substantially as described.

4. In a device of the class described, the combination of an oven provided with an opening in its side, a heater beneath the oven, partitions surrounding the heater and the oven to provide a passageway upwardly around the oven, other partitions surrounding the first mentioned partitions to provide a passageway downwardly around them, there being an opening in the upper portions of the first mentioned partitions to establish communication between the upper ends of the passageways, heat insulating material surrounding the partitions and closely engaging the opening of the oven and provided with a ventilating opening in communication with the lower ends of the passageways, a closure adapted to seat directly into the opening of the oven, and a closure for the last mentioned opening, substantially as described.

5. In a device of the class described, the combination of an oven having an opening in one of its side walls, a heater beneath the oven, partitions for inclosing a passageway from the heater upward around the side of the oven to the upper portion thereof, and for providing another passageway downwardly from the upper end of the first-mentioned passageway to a point beneath the oven, an inclosure of heat insulating material inclosing the oven and passageways,

and having an opening in registry with the opening of the oven, and having a ventilating opening, and a closure for the ventilating opening, the partitions forming connections for draft from the passageways to the ventilating opening, substantially as described.

6. In a device of the class described, the combination of an inclosure of heat insulating material, an oven within the same, said oven being open in one side wall and there being an opening in the heat insulating material in registry with the opening of the oven, a heater beneath the oven, there being an opening for ventilation in the heat insulating material, and suitable partitions inclosed by the heat insulating material for providing a passageway for gases upward from the heater adjacent the side walls of the oven to the upper portion of the oven, and for providing a passageway downward from the upper portion of the oven to a point beneath the same, and partitions for connecting both of said passageways with the ventilating opening in the heat insulating material, a closure for the oven opening in the heat insulating material, and a closure for the ventilating opening of the heat insulating material, substantially as described.

7. In a device of the class described, the combination of an oven formed of sheet metal having its forward edges flanged outwardly on a bevel, a closure of heat insulating material adapted to seat within said beveled flange portion, an inclosure of heat insulating material surrounding the oven, there being a ventilating opening in the lower portion of said heat insulating material, a closure for said ventilating opening, a heater beneath the oven, and partitions inclosed by the heat insulating material for providing a passageway for gases from the ventilating opening upwardly past the burner and adjacent the oven and for providing a passageway for gases downwardly from the upper end of the first-mentioned passageway to the ventilating opening, whereby the closure of the ventilating opening may check both the inlet and exit of gases, and whereby the closure of heat insulating material for the oven seats directly into the opening of the oven, substantially as described.

8. In a device of the class described, the combination of an oven having an opening in one of its walls, a closure of heat insulating material surrounding the oven, there being an opening in said heat insulating material in registry with the opening of the oven, and there being a ventilating opening in said heat insulating material, a closure for each of said openings, a heater beneath the oven, and partitions inclosed by the heat insulating material for providing a passageway for gases from the ventilating opening past the burner upwardly adjacent one side of the oven to the upper portion of the same, and for providing a passageway from the upper portion of the oven to the ventilating opening, substantially as described.

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Witnesses:
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L. F. HUNTER.