W. J. KEEP.

OVEN.

APPLICATION FILED JULY 3, 1916.

1,236,718.

Patented Aug. 14, 1917.

2 SHEETS—SHEET 1.

Fig. 1.

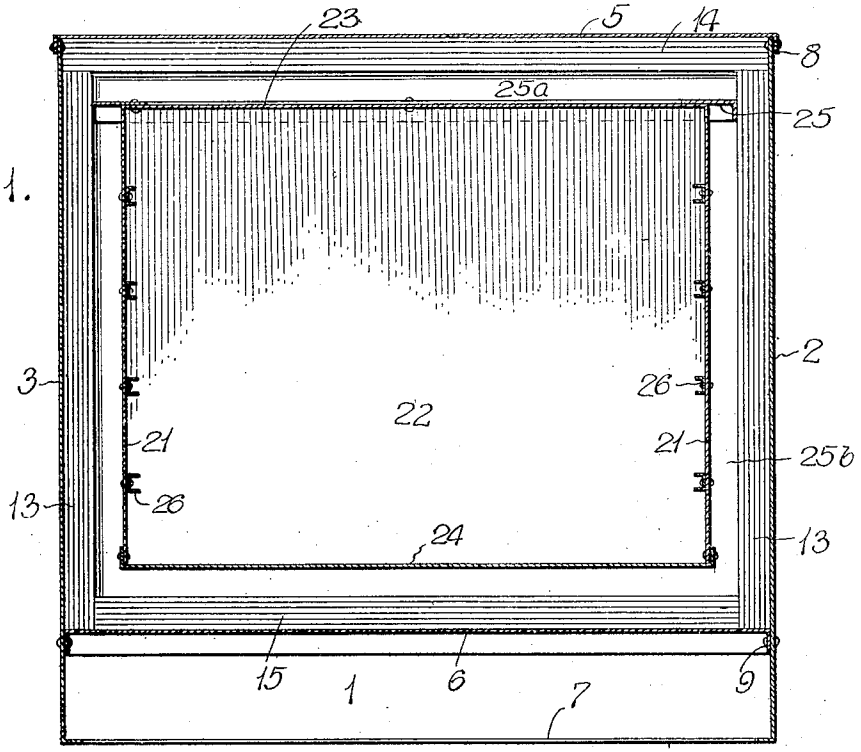


Fig. 2.

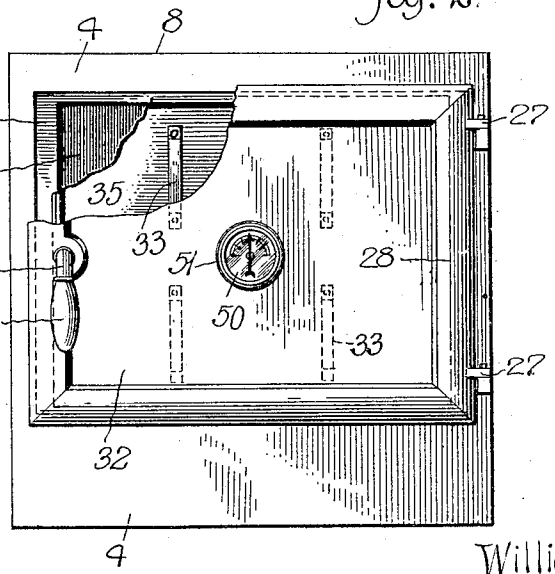
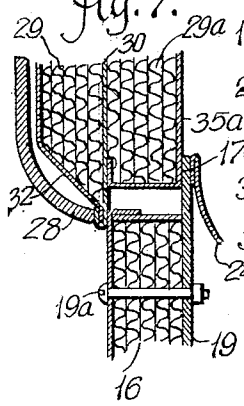


Fig. 7.



Witnesses

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2 SHEETS—SHEET 2.

Fig. 3.

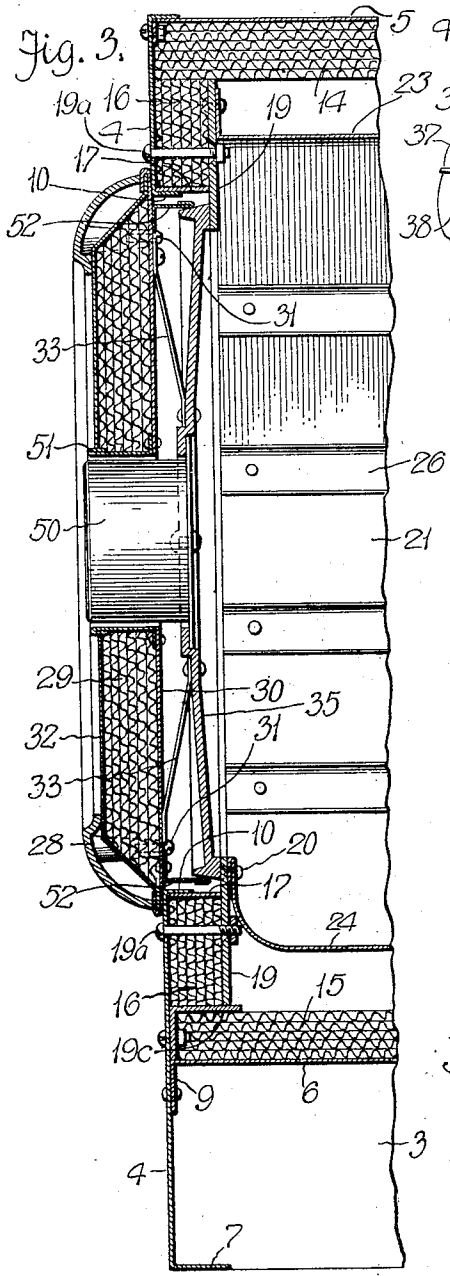


Fig. 4.

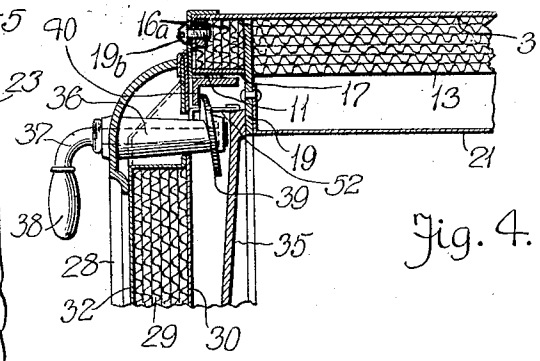


Fig. 5.

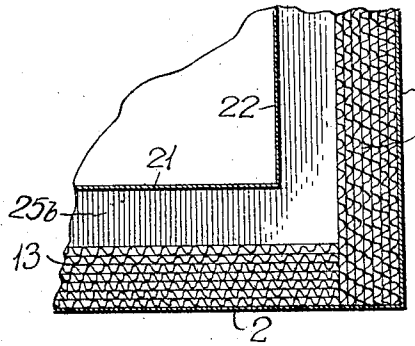
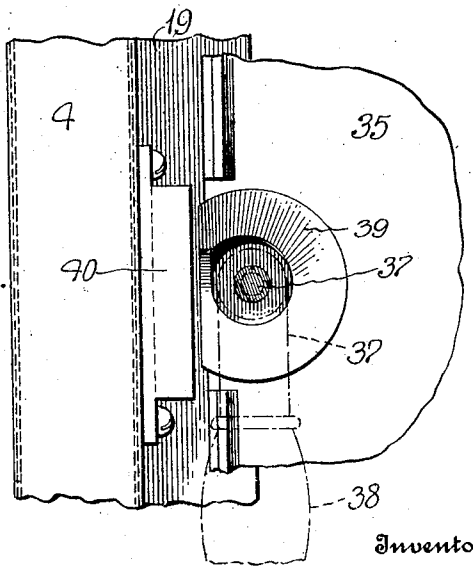


Fig. 6.



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UNITED STATES PATENT OFFICE.

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OVEN.

1,236,718. Specification of Letters Patent. Patented Aug. 14, 1917.

Application filed July 3, 1916. Serial No. 107,270.

To all whom it may concern:

Be it known that I, WILLIAM J. KEEP, a citizen of the United States of America, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Ovens, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to oven structures which are heated from within by placing the heater in the oven or by leading hot air or products of combustion from the heater into the oven. The invention also includes a reverse operation, *i. e.* if the inside is made cold from within, the heat from the outside cannot enter.

This invention more particularly relates to that part of an oven which is closed by a door, and aims to decrease the loss of heat by radiation and conduction. The means employed consist of a double seated door of novel construction and insulating material formed in plates; it being preferable to use cellular asbestos. Further means of insulation consist in the disposal of insulation sheets with reference to the oven body and an inner door seated by springs, and guided by flanges and a central guide post which is utilized as a thermometer.

My invention also resides in matters hereinafter described and claimed and reference will now be had to the drawings, wherein—

Figure 1 is a longitudinal sectional view of the oven structure in accordance with my invention;

Fig. 2 is a front elevation of the same, on a smaller scale, and partly broken away;

Fig. 3 is an enlarged cross sectional view of a portion of the oven structure, showing the door thereof closed;

Fig. 4 is a horizontal sectional view of a portion of the oven structure, illustrating the door latch;

Fig. 5 is a similar view of the rear portion of the oven structure;

Fig. 6 is a front elevation of a portion of the oven structure, showing that portion of the door provided with the latch; and

Fig. 7 is a sectional detail of a modified door construction.

The exterior casing or shell of the oven structure comprises a rear wall 1, end walls 2 and 3, a front wall 4, and top and bottom plates 5 and 6. The walls 1, 2, 3 and 4 have the lower edges thereof inturned or flanged, as at 7 and the top plate 5 has the edges thereof downturned or flanged, as at 8, to engage the upper edges of the walls 1 to 4 inclusive. The bottom plate 6 has the edges thereof downturned or flanged, as at 9, to engage the inner sides of the walls 1 to 4 inclusive, and said bottom plate is set in from the lower edges of said walls, as best shown in Figs. 1 and 3, to provide an air space or insulation gap 7 between the oven support and the bottom of the oven proper.

The meeting edges of the walls and plates just described are of sheet metal and are riveted or bolted together. The front wall 4 is provided with a rectangular door opening and the material forming the marginal edges of said opening is inturned to provide top and bottom flanges 10 and side flanges 11.

Parallel with the front wall 4 is an inner door seat plate 19 spaced from the front wall 4 by a thin metal frame 17, the edges only of which contact with the face of the plate 19 to decrease conduction of heat through said frame.

The plate 19 has a rectangular doorway small enough to provide a seat for an inner door 35 and this inner door seat plate 19 extends toward the outside walls, but does not touch them; to prevent conduction of heat from the inside to the outside walls.

The plate 19 is clamped, with the frame 17, to the front wall 4 by bolts 19^a. To prevent the plate 19 from slipping downward, if the bolts should become loosened, supporting brackets 19^c are placed beneath its lower edge.

The inner sides of the walls and plates are lined with an insulation material, preferably cellular asbestos which can be conveniently handled and installed. The rear wall 1 has the lining 12 thereof resting upon the bottom plate 6 and coöperating with linings 13 of the end walls 2 and 3 in supporting a lining 14 against the top plate 5. The bottom plate 6 has a lining 15 engaging the lower inner sides of the linings 13 and 12 and the linings 13, 14 and 15 abut linings 16 and 16^a fitting against the front wall 4 around the frame 17.

The inner plate 19 is made of metal of a heavier gage than the walls of the oven structure and riveted or otherwise connected to the inner door plate 19, as at 20,

is the inner shell of the oven and this inner shell is made of sheet metal providing end walls 21 in spaced relation to the linings 13, a rear wall 22 in spaced relation to the lining 12, a top plate 23 in spaced relation to the lining 14, and a bottom plate 24 in spaced relation to the lining 15. The top plate 23 has side and back flanges 25 engaging the lining 13 to maintain the lining in position and assist in properly holding the inner shell of the oven relative to the outer shell.

The inner sides of the walls 21 are provided with opposed grids or rack brackets 26 and easy access can be had to the interior of the oven through the inner door plate 19.

Assembly:—Placing the oven body on its back, the bottom lining 15 is put in, then the back lining 12, then the side linings 13 and then the top lining 14. The top and bottom linings reach the front wall 4, but the side linings 13 are shorter by the thickness of the lining.

The inside oven is lifted by its front plate 19 and is lowered into the space between the linings, being guided by flanges 25 on the sides and back, near its top. When in place the side edges of the plate 19 rest on the side linings 13 but do not reach the metal sides and the top and bottom edges of the plate 19 coincide with the inside surfaces of the top and bottom linings 14 and 15, its lower edges resting on the brackets 19^c. The side and back flanges 25, near the top of the oven, have divided the air space around the oven into two chambers to lessen heat transference by convection. Narrow sheets of insulation form the lining 16^a, at the sides of the frame 17, are put in place and the pieces of insulation 16 are put at the top and bottom, all lying upon the plate 19. The frame 17 is laid on the plate 19 fitting inside of the insulation linings 16 and 16^a. The front wall 4 is placed in position with the inside flanges 10 and 11 fitting inside of the frame 17 and the outside flanges fitting outside of the outer casing, thus locating all parts. The screws 19^a are put through the holes in wall 4 and pushed through the insulation linings 16. To find the holes in plate 19, such holes are countersunk. Now the frame 17 forms a partially nonconducting spacer between the wall 4 and the plate 19.

The plate 19 and the wall 4 form a spaced chamber to receive the insulation plates 16. The plate 19 is held in non-contact with all metal parts, except the poor contact with the frame 17.

In all other ovens the greatest heat loss results from practically continuous metallic connections between the inner wall of the oven and the outer wall of the stove and through the contiguous connected inner walls and outer walls of the doors. This "rim loss" is greatly diminished by the construction recited above.

Hinged or otherwise connected to the front wall of the oven structure, as at 27, is an outer door or closure 28 having a body or shell 32 provided with a lining of insulation 29 held in place by an inner plate 30 secured by screws 31 or other fastening means to the door 28. The inner plate 30 has the edges thereof flanged beyond the edges of the shell 32, and said inner plate engages the front wall 4 of the oven between said door and the wall 4.

Connected to the inner plate 30 are resilient straps or springs 33 having end portions thereof secured to an inner door or yieldable sealing member 35 adapted to snugly engage the marginal edges of the plate 19 and adapted to seal the inner oven when the outer door 28 is closed.

Centrally of the inner door or sealing member 35 is a thermometer 50 serving functionally as a guide pin or post, said thermometer extending into a tubular guide 51 mounted in the outer door. The inner door or sealing member 35 is also guided by an outstanding flange 52, carried by the inner plate 30 of the outer door, and engaging the edges of the inner door. This flange retards the escape of hot air from between the inner and outer doors, when the doors are opened, also coöperates with the central guide 51 in preventing lateral displacement of the inner door, should the springs 33 become loose, yet allowing a limited movement of the inner door to and from the outer door.

The door 28 is of such area that it will contact with the front wall 4 of the oven structure, but before such contact is established, the sealing member 35 enters the doorway and contacts with the door seat plate 19 in advance of the door 28 contacting with the front wall 4. The normal position of the sealing member 35 relative to the inner plate 30 is such that the springs 33 are placed under tension, when the door 28 is closed, to hold the sealing member 35 snug against the door plate 19. When the door 28 is open, the springs 33 yieldably support the member 35 and when the door is closed, the member 35 contacts with the door plate 19 and prevents slamming or banging of the door proper. To hold the door closed with the member 35 under pressure against the door plate 19, the free edge of the door has a bearing 36 for a rock shaft 37, said rock shaft having the outer end thereof terminating in a crank or handle 38 and the inner end thereof provided with an angularly disposed disk or cam member 39 adapted to engage in a keeper or yoke 40, carried by the door plate 19, against the inturned flange 11 of the doorway. The cam member 39 necessitates a three-quarter clockwise rotation of the rock shaft 37 to fully lock the cam member 39 in engagement with the keeper 40,

whereby the door will be securely held in a closed position as the cam member 39 is gradually brought into engagement with the keeper 40. The cam member forces the door inwardly and since the member 35 engages the door plate 19, the springs 33 are placed under tension to positively seal the member 35 relative to the door plate and such pressure continues during the rotation of the cam member 39 until said cam member has been seated in the keeper.

From the foregoing it will be observed that the yieldable sealing member 35 coöperates with the door 28 and the insulation thereof in providing an air space or steam trap between the sealing member and the inner plate 30 and should this space be filled with steam, the steam is prevented from entering the space between the outer door 28 and its insulating shell 32 or from entering the shell, *per se*, by the plate 30 extending under the edge of the door 28 and beyond the oven opening. With the incased lining 29 steam tight and connected to the outer door, any steam escaping from the space between the outer and inner doors is forced from the oven door and its insulation. It will be observed that the metal entering into the construction of the doorway of the oven is distributed in such a manner as to avoid extreme heat radiation through the metal.

The heat from the door plate 19 is radiated into the space between the outer and inner doors or into the insulation. It is conducted only through the thin frame 17 and is absorbed by the insulation lining 16 and 21, since the door plate 19 has no metallic connection with the outside of the oven except through the frame.

Under special conditions it is desirable to dispense with yieldable springs and to substitute a cushion composed of insulation 29^a as shown in Fig. 7, contained in a shell 35^a which bears against the inner door frame 19. Such cushion may be constructed of a container 35^a so thin as to be yieldable, or may be distanced from the outer door so as to seat both outer and inner doors at the same time. Such a construction is especially desirable when the door drops, being hinged at its lower edges.

What I claim is:—

1. An oven comprising inner and outer shells having a doorway, a thin steel frame forming the doorway of said oven, an inner door plate held against said steel frame, a door for the doorway of said oven, and a yieldable member carried by said door and adapted to engage and seal said door plate.

2. An oven comprising inner and outer shells with insulating material and air spaces between said shells, a thin steel frame forming a doorway for said oven with said insulating material extending to said frame, an inner door plate connecting the inner shell of said oven to said thin steel frame, a door for the doorway of said oven, and a member carried by the inner side of said door adapted to engage and close said door plate in advance of said door closing the doorway of said oven.

3. An oven comprising inner and outer shells with insulating material and air spaces between said shells, a frame forming a doorway of the outer shell of said oven and having insulating material therein, a door plate connecting the inner shell of said oven and said frame and providing a doorway for the inner shell of said oven, an insulated door for the doorway of said oven, and a yieldable sealing member supported by said door in spaced relation to the inner side thereof and adapted to engage said door plate in advance of said door closing the oven.

4. An oven comprising inner and outer shells, a frame forming a doorway for the outer shell of said oven, insulating material extending to said frame, a door plate connected to the front wall and projecting into the doorway of the outer shell of said oven to form a doorway for the inner shell of said oven, a door for the doorway of the outer shell of said oven, and means bodily carried by said door out of contact therewith adapted to engage said door plate and seal the inner shell of said oven in advance of said door closing the outer shell of said oven.

5. In an oven, a front wall having a doorway, a thin frame forming the doorway which is of less area than the cross sectional area of said oven, a door plate supported by said frame in spaced relation to the walls of said oven and projecting into the doorway thereof, a yieldable sealing member, means for holding said member against said door plate and within the doorway of said oven, and means carried by said holding means for guiding said member.

6. A chamber comprising an outer shell having a doorway, a door closing such doorway, a lining for such door which projects between the door edges and the outer shell when the door is closed to act as a deflector to prevent steam from reaching the outer side of said lining.

7. An oven comprising inner and outer shells with a door plate for the inner shell of said oven supporting said inner shell in spaced relation to the outer shell of said oven, said door plate being inset relative to the outer shell of said oven and maintained out of contact therewith, a sealing member for the door plate of the inner shell of said oven, and means carried by the outer shell of said oven and extending therein to yieldably hold said sealing member in engagement with the door plate of the inner shell of said oven.

8. An oven having a doorway, a door plate at the inner end of the doorway of

said oven, a door adapted to close said doorway, a yieldable sealing member carried by the inner side of said door adapted to engage and close said door plate, a central guide carried by said door for said sealing member, and means carried by said door adapted to hold said door closed with the sealing member in engagement with said door plate.

9. A chamber comprising an outer shell having a doorway, a door plate, an outer door, an inner yieldable door for the door plate, and a flange guide on the outer door guiding said yieldable door.

10. An oven comprising an outer shell having a lining of insulating material, said outer shell having a doorway, a door plate at the inner end of said doorway against a portion of the lining of insulation of said outer shell, an inner shell solely supported from said door plate and in spaced relation to the lining of insulation of said outer shell, and means adapted to engage the outer shell of said oven and said doorway and provide an air space within the doorway when said oven is closed.

11. An oven comprising an outer shell having a lining of insulation material, said outer shell having a doorway, a door plate at the inner end of said doorway engaging the lining of insulation of said outer shell, an inner shell supported by said door plate in spaced relation to the lining of said outer shell, a door for the doorway of the outer shell having a lining of insulation, and means carried by said door adapted to engage said door plate when said door is closed and provide an air space corresponding to that surrounding the inner shell of said oven.

12. An oven comprising inner and outer shells, a door for the outer shell, a sealing member for the inner shell, and means guiding said sealing member and coöperating with said door in forming a steam trap.

13. An oven comprising inner and outer shells, a door plate for the inner oven shell, means projecting inwardly from the outer shell for supporting said door plate from the bottom of the outer oven shell, a door for the outer oven shell, and a rigid member yieldably carried by said door for sealing the opening of said door plate.

14. In an oven having a doorway, a door plate at the inner end thereof, a door for said doorway, a shell forming the body of said door, insulating material in said door shell, a plate holding said insulating material compressed therein, a guide extending through said door, a sealing member for said door plate, means for movably holding said sealing member relative to said door, and means on said sealing member extending into said guide to prevent lateral displacement of said sealing member.

In testimony whereof I affix my signature in the presence of two witnesses.

WILLIAM J. KEEP.

Witnesses:
ALVIN L. GLIWA,
THOS. G. LONGSTAFF.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."