No. 896,591. PATENTED AUG. 18, 1908.

E. SENN.

COOKING STOVE.

APPLICATION FILED JULY 17, 1906.

3 SHEETS—SHEET 1.

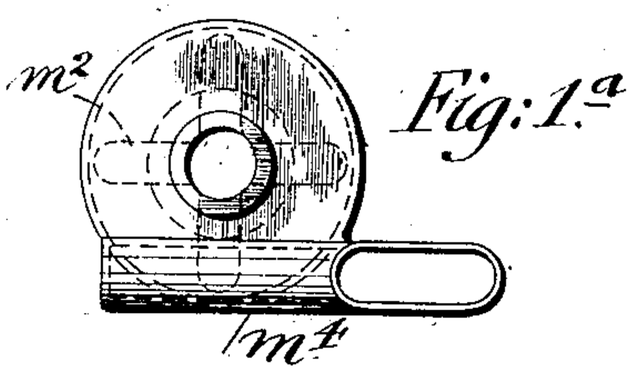
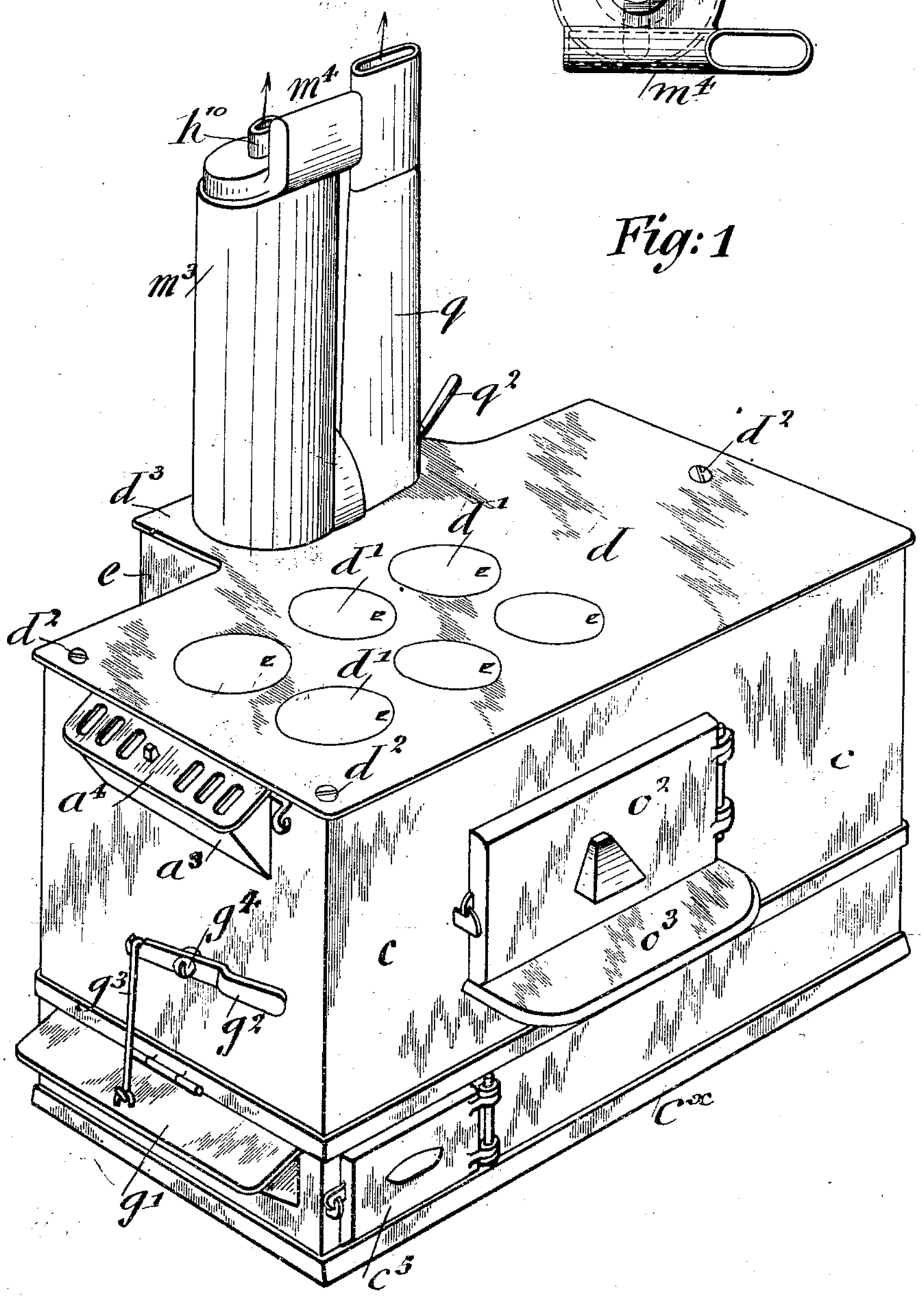


Fig: 1ª

Fig: 1



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3 SHEETS—SHEET 2.

Fig: 2

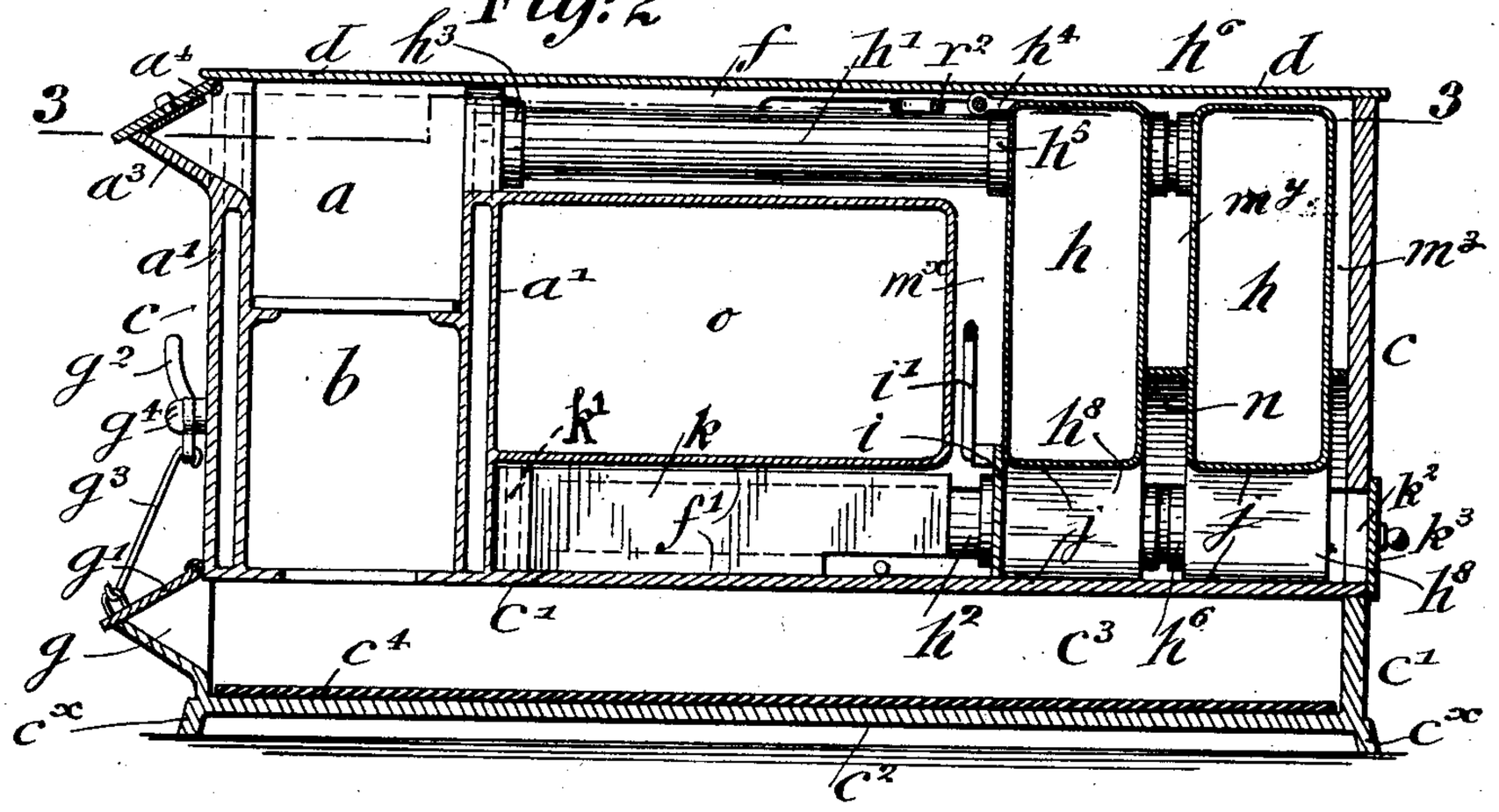
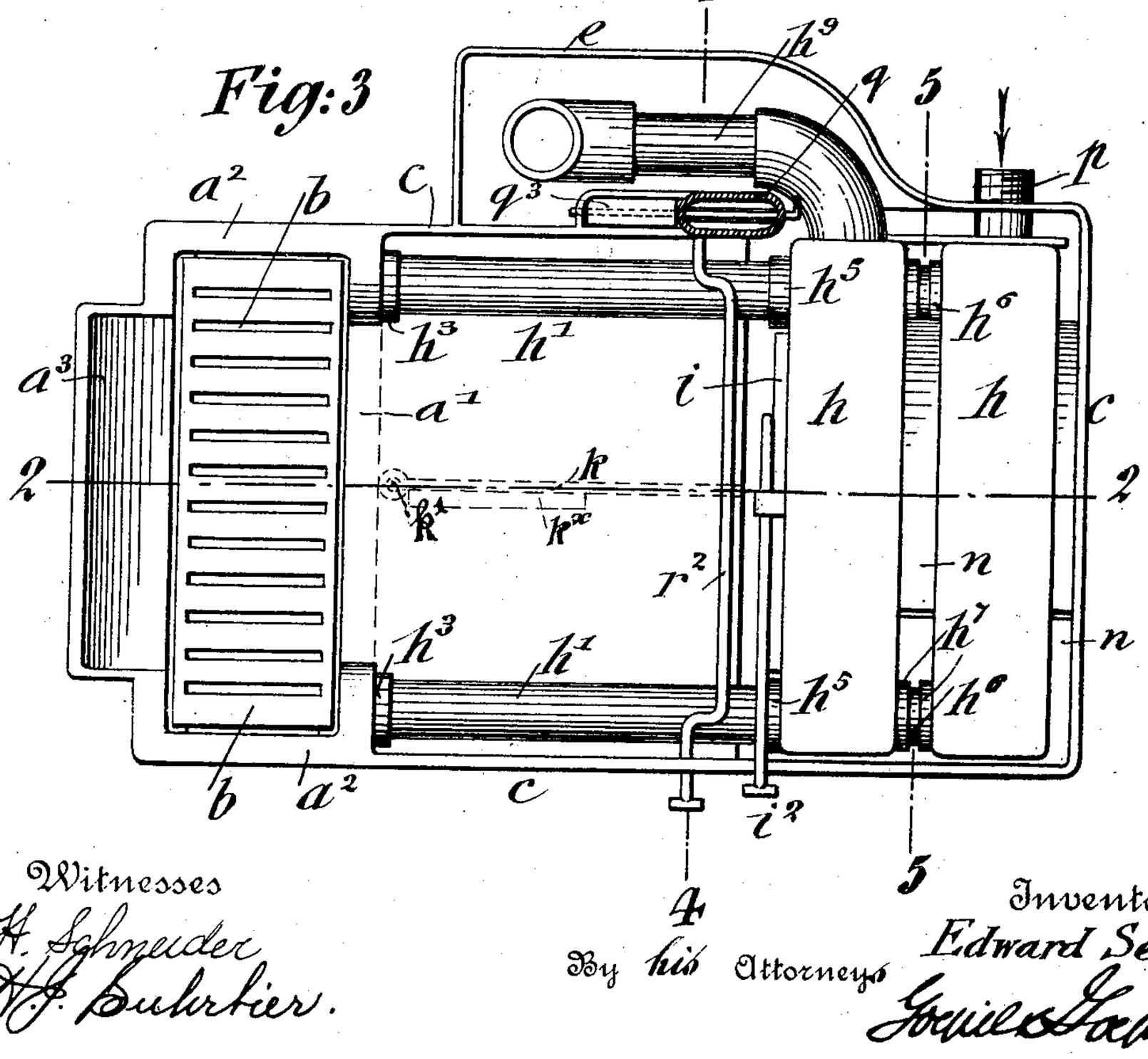


Fig: 3



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COOKING STOVE.

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3 SHEETS—SHEET 3.

Fig: 7.

Fig: 6.

Fig: 4

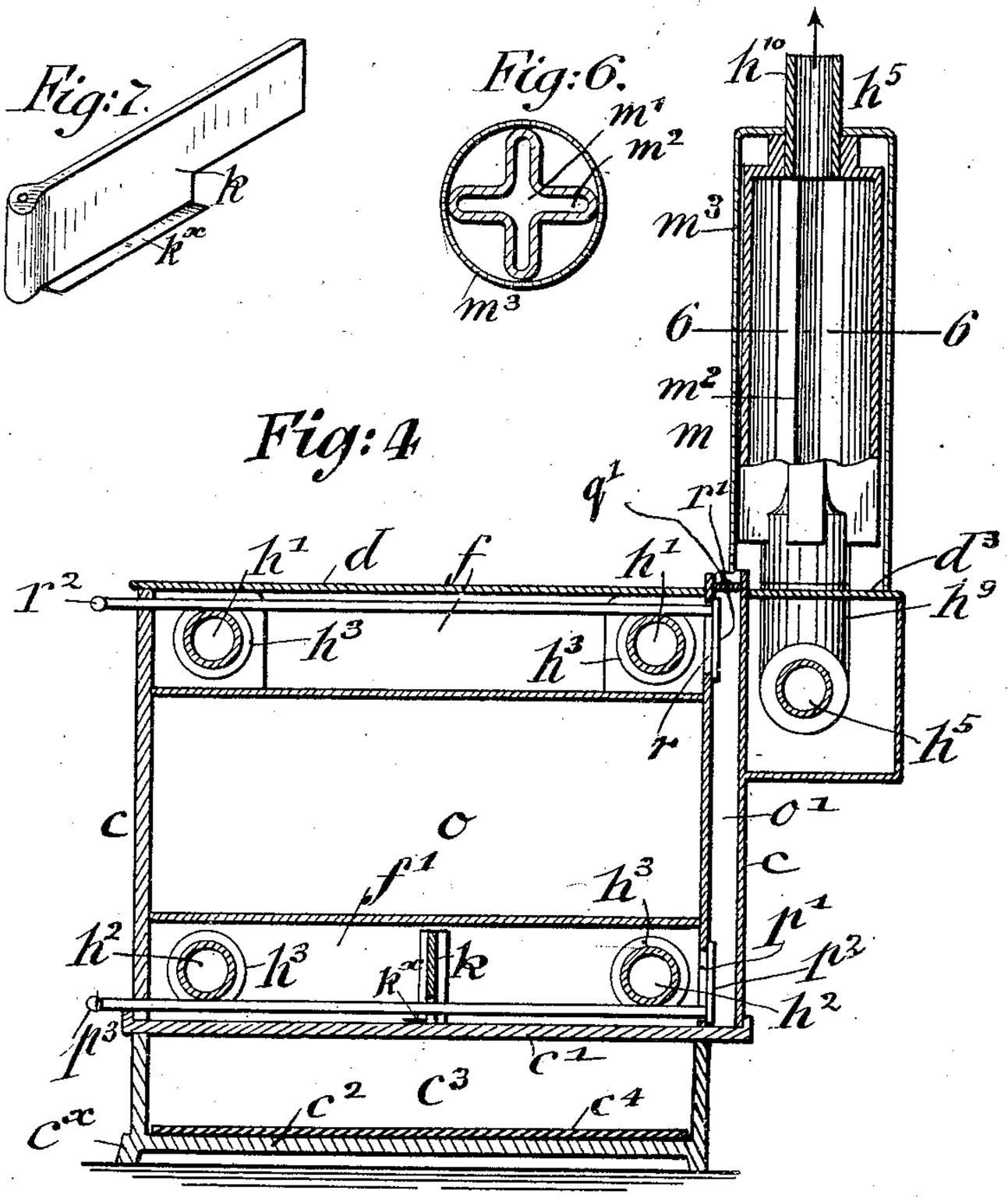
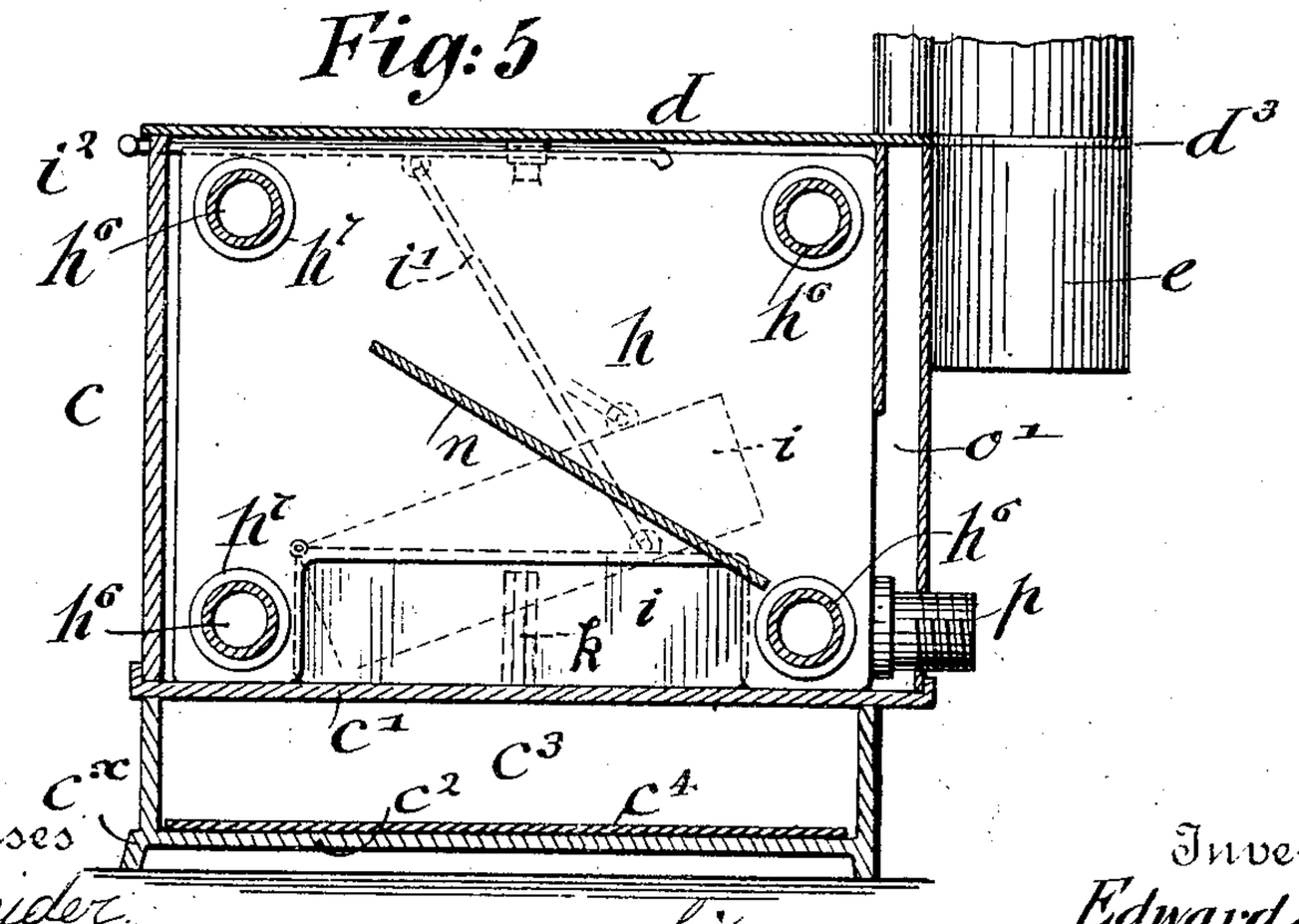


Fig: 5



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UNITED STATES PATENT OFFICE.

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COOKING-STOVE.

No. 896,591. Specification of Letters Patent. Patented Aug. 18, 1908.

Application filed July 17, 1906. Serial No. 326,534.

To all whom it may concern:

Be it known that I, EDWARD SENN, a citizen of the United States, residing in Egg Harbor City, in the county of Atlantic and State of New Jersey, have invented certain new and useful Improvements in Cooking-Stoves, of which the following is a specification.

This invention relates to an improved cooking-stove in which a water-heater of large size is arranged adjacent to the baking-oven and heated by the products of combustion, so as to dispense with a separate range-boiler and combine thereby the advantages of a cooking-stove, baking-oven, and water-heater in an effective manner and in a comparatively small space; and for this purpose the invention consists of a cooking-stove in which the baking-oven is arranged between a water-jacketed combustion-chamber at one end and one or more water-heating sections at the opposite end, in connection with flues for the products of combustion above and below the oven and between the water-heaters, and water-circulating pipes connecting the combustion-chamber with the water-heating sections, the discharge-pipe of the water-heaters being inclosed in a heating-drum through which the products of combustion are conducted to the chimney.

The invention consists further in the special arrangement of the heating-flues for conducting the products of combustion around the baking-oven and water-heating sections, and of dampers for opening or closing said flues, and other details of construction which will be fully described hereinafter and finally pointed out in the claims.

In the accompanying drawings, Figure 1 represents a perspective view of my improved cooking-stove, Fig. 1[a] is a top view of the auxiliary water-heating drum and the chimney, showing the connection between them, Fig. 2 is a vertical longitudinal section of the same on line 2, 2, Fig. 3, Fig. 3 is a horizontal section on line 3, 3, Fig. 2, Figs. 4 and 5 are vertical transverse sections respectively on lines 4, 4, and 5, 5, Fig. 3, Fig. 6 is a detail horizontal section through the auxiliary water-heater, on line 6, 6, Fig. 4 and Fig. 7 is a perspective view of the deflector-plate in the flue below the oven.

Similar letters of reference indicate corresponding parts in the different figures of the drawings.

Referring to the drawings, *a* represents the water-jacketed combustion-chamber of my improved cooking-stove in which a grate *b* of any approved construction is arranged. The combustion-chamber *a* is located at one end of the casing *c* of the stove and inclosed by upright hollow end-walls a^1 and side-walls a^2. The outer end-wall a^1 is provided at its upper end with an upwardly-extending chute a^3 through which the fuel is introduced, and a hinged drop-register a^4 by which the supply of air to the surface of the fire is regulated. Adjacent to the inner hollow transverse wall a^1 of the combustion-chamber *a* is arranged a baking-oven *o*, which extends nearly across the full width of the stove, a small space or flue o^1 being formed between the rear-wall of the oven *o* and the rear-wall of the casing *c* of the stove, as shown clearly in Fig. 4. Above and below the baking-oven *o* are arranged flues *f*, f^1 for the passage of the products of combustion. At the opposite end of the casing *c*, adjacent to the baking-oven *o*, are arranged one or more water-heating sections *h*.

Below the combustion-chamber, baking-oven, and water-heater is arranged, between the inner base-plate c^1 and the outer base-plate c^2 of the casing *c*, a closed base-portion c^3, which forms below the combustion-chamber the ash-pit proper and below the baking-oven and the water-heaters a non-conducting space by which the lower portion of the stove below the baking-oven and water-heaters is protected against the changes of temperature of the outside air. The outer base-plate c^2 is covered by a layer c^4 of non-conducting material, preferably asbestos wire-cloth, which acts as a non-conductor of heat and as a receiver for the ashes that are dropped from the grate in the combustion-chamber. For removing the ashes, a hinged ash-pit door c^5 is arranged in the base-portion c^3, while the air-supply to the grate is controlled by means of an air-inlet opening *g* and a hinged door g^1 in the lower end-wall of the casing, said door being moved into open or closed position by means of a hand-lever g^2 that is fulcrumed to the end-wall of the casing *c* and connected by a link g^3 with the hinged door g^1, as shown clearly in Fig. 1. By raising the air-supply door g^1 by means of the hand-lever g^2 to a greater or lesser extent, the draft to the fuel on the grate and in the flues of the stove to the chimney, is regulated. The position of the door g^1 of the air-inlet opening is regulated by the friction be-

tween the hand-lever g^2 and the clamping-screw g^4 of the same, so that the door g^1 is retained in the position into which it is placed by the lever. The outer base-plate c^2 is provided with a raised rim c^x which extends around the base-plate c^2 and which supports the stove at some distance from the floor.

The top-plate d of the stove extends over the top of the casing c and is made in one or more sections which are provided with a number of openings located respectively above the combustion-chamber and the top-flue f, six being shown in the drawing. These openings are closed by removable covers d^1 of the usual construction. The top-plate d is attached to the casing c by means of fastening-screws d^2. The rear-wall of the casing c is provided with a box-shaped extension e, which is preferably cast integral with the rear-wall, the top-plate d being provided with an extension d^3 for closing the top of the box-shaped extension e. The water-heating sections h extend through the full height and width of the casing and are connected by horizontal circulating-pipes h^1 in the upper flue f, and by horizontal circulating-pipes h^2 in the lower flue f^1, with the interior transverse wall a^1 of the combustion-chamber, and by short stud-pipes with each other, the water-jacketed combustion-chamber and the circulating-pipes acting in the nature of water-backs for the water-heating sections.

The products of combustion, which are drawn through the upper flue f, act on the upper circulating - pipes h^1, pass then in downwardly-extending flues m^x, m^y, m^z, between the rear-walls of the oven and the side-walls of the water-heaters, and the rear-wall of the casing c in downward direction, and then below the bottom of the water-heaters and baking-oven to the lower flue f^1, and then in backward direction to the flue leading to the chimney-pipe. The upper and lower circulating-pipes h^1 and h^2 are screwed at one end into interiorly-threaded sockets or bosses h^3 on the inner transverse wall a^1 of the combustion - chamber, while their opposite threaded ends are tightly screwed by means of lock-nuts h^4 into bosses h^5 on the side-wall of the water-heating section h next adjacent to the oven. The water-heating sections h are connected with each other at their upper and lower ends, in line with the circulating-pipes h^1, h^2, by short stud-pipes h^6 which are screwed into corresponding bosses h^7 on the adjacent side-walls of the water-heating sections h. The heat of the combustion-chamber a is transmitted by convection to the upper and lower circulating-pipes h^1, h^2, in addition to the heating action of the products of combustion that pass through the upper and lower heating-flues, so that an effective heating action on the water in the water-circulating pipes and the water-heating sections is obtained.

In the lower portions of the water-heating sections h are arranged rectangular passages j for the products of combustion, and at both sides of the same hollow legs h^8 which are connected with the lower circulating-pipes h^2 and lower stud-pipes h^6, as shown in Figs. 2 and 5. In the space between the water-heating sections h and between the rear water-heating section and the end-wall of the casing, are arranged inclined deflecting-plates n which serve for conducting the products of combustion in downward direction into the lower portion of the casing, and through the rectangular passages in the lower portion of the water-heating sections h into the lower flue below the oven. A vertically-movable damper i is pivoted to the side-wall of the first water-heating section and adapted to be raised or lowered by means of a pivot-link i^1 and a horizontally-guided lever-handle i^2 so as to raise or lower the damper and permit the free or restricted flow of the products of combustion through the flue below the oven. When the oven is to be used, the damper is raised and thereby the products of combustion permitted to pass through the flue below the oven. In the space between the inner base-plate of the casing and the bottom of the baking-oven, is arranged an upright deflecting plate k which is pivoted at one end to a pin k^1 that is cast into said base-plate, and which is provided with a turned-over flange or scraper k^x at its lower edge, said movable deflecting-plate permitting the heat to pass along the bottom of the oven and also providing for the proper cleaning of the space below the same. It is operated in connection with a cleaning-opening k^2 which is arranged in the end-wall of the casing and which is closed by a removable door k^3 that is set in position after the cleaning is accomplished. It is apparent that as the uptake-flue is at one side of the lower flue f^1, the products of combustion would not pass sufficiently through the part of said flue at the front of the stove and in contact with the circulating-pipe h^2 located at that point, and it is for the purpose of deflecting the hot gases toward this pipe that the pivoted deflecting-plate k is provided. As this deflecting-plate can be moved about its pivot and set in different positions, it is manifest that the passage of the hot gases through the lower flue can be readily regulated in such a manner that the circulating-pipes in said flue will be properly heated. The deflecting-plate is set in position by means of any suitable tool inserted through the cleaning-opening k^2, and when the flue is to be cleaned the deflecting-plate is oscillated by means of such a tool so that its scraper will be brought into action. In the front-wall of the casing c and baking-oven o is arranged an opening with a hinged door o^2 and a forwardly-extending shelf o^3 for facilitating the insertion and re-

moval of the baking-pans into and from the oven.

One of the water-heating sections h is connected at its lower rear-part with a water-supply pipe p and the section h adjacent to the baking-oven at its upper part with a curved water-outlet pipe h^9 which extends in upward direction through an auxiliary water-heater m. This auxiliary water-heater is formed of a central tube m^1 provided with hollow radial ribs m^2, and of an exterior drum or jacket m^3. The lower end of the central tube m^1 is connected with the water-outlet pipe h^9. The upper end of the tube m^1 of the auxiliary water-heater is connected with the discharge-pipe h^{10} for the hot water, from which it can be conducted for use to the sinks, wash-tubs, bath-tubs or other places of use.

The products of combustion are drawn from the combustion-chamber a through the top-flue f and around and between the longitudinal water-circulating pipes h^1 in downward direction in the spaces between the oven and the water-heating sections, then along the bottom of the water-heating sections and the bottom of the oven and around the lower longitudinal circulating-pipes h^2, in the lower flue f^1, towards an opening p^1 in the inner rear-wall of the casing. This opening p^1 is closed by means of an adjustable damper p^2 which is operated by a damper-rod p^3 that passes through the front-wall of the casing, as shown in Fig. 4. The rear-wall of the casing at the point near the flue-opening p^1, is made of two parallel walls which form a connection between the lower flue f^1 and a chimney-pipe q. In the inner wall of the casing is arranged, in connection with the upper flue f, an opening r which is closed by a damper r^1 that is provided with a damper-rod r^2 that extends transversely below the top-plate d and through the front-wall of the casing c, so as to permit of being opened or closed by pushing the damper-rod r^2 inwardly or outwardly. When the upper damper r^1 is closed, the products of combustion are drawn in downward direction through the space between the water-heating sections and below the oven through the flue-opening p^1 and in the space between the two rear-walls of the casing into the chimney-pipe q. When the fire is to be started, the top-opening r is opened by the upper damper r^1 and thereby a direct connection between the combustion-chamber, top-flue f, and the chimney-pipe q established. The base of the chimney-pipe q is provided with a separate damper q^1 which is operated by a handle q^2 extending above the top-plate of the stove, said damper extending below the flue-connection and being provided with a second damper q^3 at right angles to the chimney-pipe damper q^1 so as to open or close an auxiliary flue leading to the drum of the auxiliary water-heater when the chimney-damper is closed. The two dampers for the chimney and auxiliary flue are placed on the same damper-rod so as to be operated simultaneously whenever required. When the chimney-damper is closed and the auxiliary damper is in open position, the products of combustion are conducted through the drum of the auxiliary water-heater and then conducted at the upper part of the drum m^3 by a lateral pipe-connection m^4 to the chimney-pipe q and from the same to the chimney. By the auxiliary water-heater the heat of the products of combustion is finally utilized before they are passed to the chimney-pipe, while the water is kept hot and conducted in hot condition to the places where it is to be used. The drum or jacket m^3 serves at the same time as an air-heater for heating the air in the room, in addition to the heating action of the stove, so that a twofold purpose is accomplished by the auxiliary water-heater, viz., the heating up of the water and the heating of the air in the room in which the stove is placed.

The advantages of my improved cooking-stove are, primarily, the effective utilization of the heat of the fuel for cooking, baking, water and air-heating purposes; secondly, the arrangement of the water-heating sections so as to dispense with a separate water-heating boiler; thirdly, the convenience by which the different dampers are set and the movement of the products of combustion around the baking-oven and water-heating sections controlled; fourthly, the convenience of cleaning the parts from ashes; and, lastly, the retention of the heat of the products of combustion in the stove by the base-portion and the non-conducting layer placed over the base-plate of the same.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. In a cooking-stove, the combination, with the casing, of a water-jacketed combustion-chamber at one end, a baking-oven at the middle part of the casing and separated from the latter at the top and bottom by horizontal flues, of which the upper flue is in communication with the combustion-chamber, circulating-pipes connected with the water-jacket of said combustion-chamber and extending horizontally through said upper and lower flues, and water-heating sections in the casing at the end opposite the combustion-chamber and connected with said circulating-pipes.

2. In a cooking-stove, the combination, with a casing, of a water-jacketed combustion-chamber within the same at one end, an oven within the casing at the middle part thereof and spaced from the top and bottom of the casing by upper and lower horizontal flues extending laterally from the combustion-chamber, the upper flue being in com-

munication with said combustion-chamber, circulating-pipes extending horizontally through said flues above and below the oven and connected with the water-jacket of the combustion-chamber, water-heating sections at the end of the casing opposite the combustion-chamber and connected with said circulating-pipes, and an uptake-flue at the back of the stove to which the hot gases pass from said flues.

3. In a cooking-stove, the combination, with the combustion-chamber, of an oven adjacent the same, horizontal flues above and below the oven, circulating-pipes in said flues, water-heating sections at the side of the oven connected with said circulating-pipes, one of said sections having an opening opposing the lower flue, and a damper to control said opening.

4. The combination, with the combustion-chamber and the oven adjacent the same, of horizontal flues above and below the oven, water-heating sections at the side of the oven opposite the combustion-chamber and at the sides of which the hot gases pass in downward direction from the upper flue to the lower, said sections having openings at their lower parts, and means to control the passage of the hot gases through said openings to the lower flue.

5. The combination, with the water-jacketed combustion-chamber and the oven adjacent the same, of horizontal flues above and below the oven, upright water-heating sections at the end of the oven opposite the combustion-chamber and at the sides of which the hot gases pass in downward direction from the upper flue to the lower, plates extending from the side-walls of said sections to deflect the gases in their downward course, and circulating-pipes by which said sections are connected with the water-jacket of the combustion-chamber.

6. In a cooking-stove, the combination, with a casing containing a combustion-chamber at one end, water-heating sections at the opposite end provided with passages in their lower parts, and a baking-oven between the combustion-chamber and water-heating sections, of upper and lower flues arranged above and below the baking-oven, inclined deflecting-plates between the water-heating sections and in the space between the same and the end-wall of the casing, a damper extending transversely across the lower heating-flue of the baking-oven, means for raising or lowering said damper, and a valved rear draft-flue for conducting the products of combustion to the chimney-pipe.

7. In a cooking-stove, the combination, with a casing provided with a combustion-chamber at one end, a baking-oven in the middle part, and transverse water-heating sections at the opposite end of the casing, of an auxiliary water-heater consisting of a central water-discharge pipe connected with one of the water-heating sections, a drum or jacket surrounding the same and connected with the flues, and a chimney-pipe leading to the chimney.

8. In a cooking-stove, the combination, with the combustion-chamber and the oven, of horizontal flues above and below the oven through which the gases pass from one end of the stove toward the other, an uptake-flue connected with said flues at the rear of the stove, circulating-pipes extending through said horizontal flues, water-heating sections to which said pipes are connected, and a pivoted deflecting-plate in the lower flue to control the passage of the hot gases through the same to said uptake-flue.

9. In a cooking-stove, the combination, with the uptake-flue and the water-heating sections, of a chimney-pipe communicating with the uptake-flue, a water-heating drum to which said heating-sections are connected and which is arranged at the side of said chimney-pipe, an auxiliary flue to lead the hot gases from the uptake to the heating-drum at the lower part of the latter, dampers in the chimney-pipe and said auxiliary flue arranged in such a manner that when one is open the other is closed, and a lateral connection between the heating-drum and the chimney-pipe at the upper end of the former.

In testimony, that I claim the foregoing as my invention, I have signed my name in presence of two subscribing witnesses.

EDWARD SENN.

Witnesses:

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