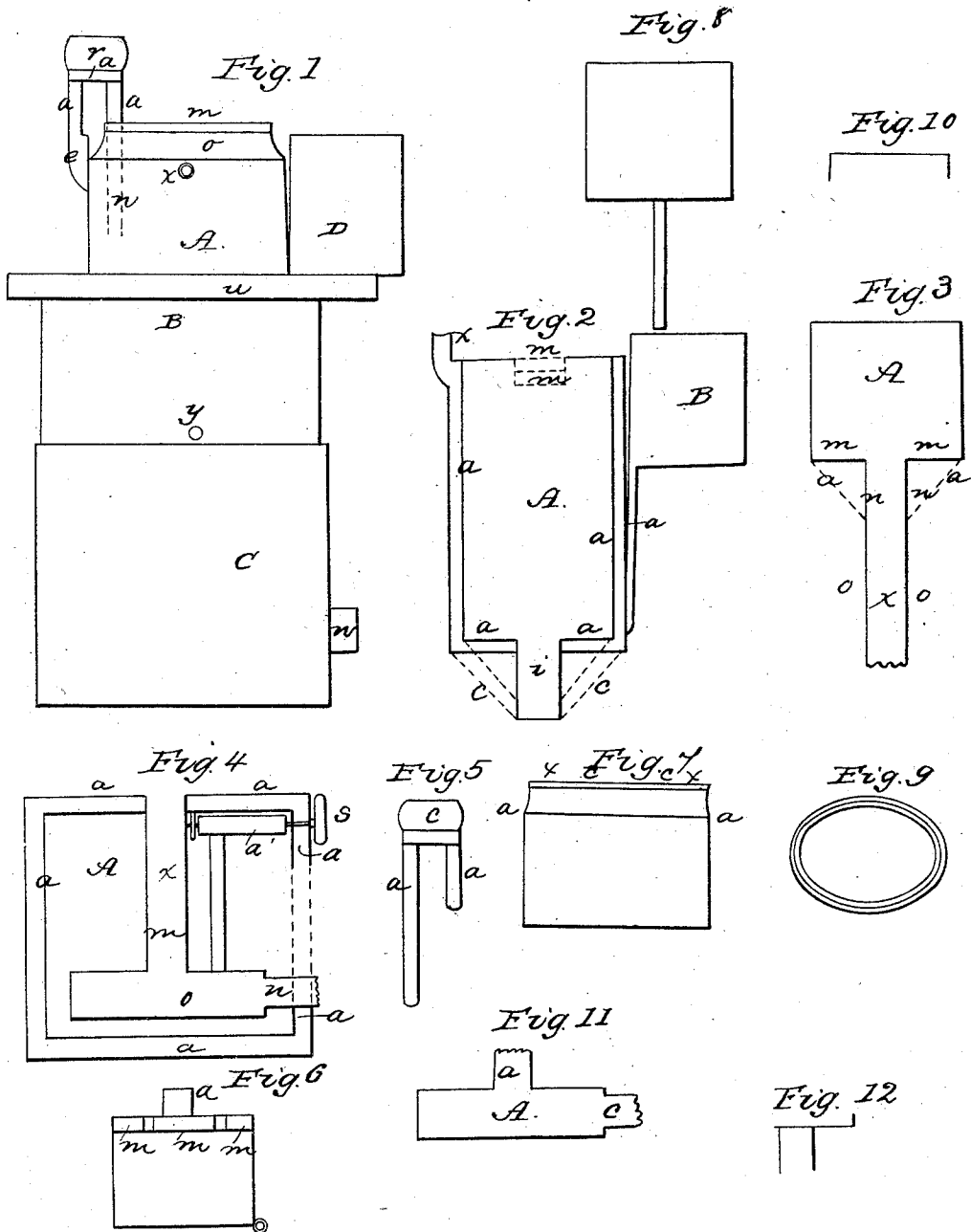


D. HEILIG.

Stove.

No. 34,959.

Patented April 15, 1862.



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IMPROVEMENT IN STOVES.

Specification forming part of Letters Patent No. 34,959, dated April 15, 1862.

To all whom it may concern:

Be it known that I, DANIEL HEILIG, of Nebraska City, of the county of Otoe, in the Territory of Nebraska, have invented a new and Improved Mode of Cooking, Boiling, Evaporating, and Baking, which is designed for the summer season; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters marked thereon.

The nature of my invention consists in applying all the heat of the furnace—top, sides, and bottom—to the boiling materials, and when used for frying or baking, &c., that part of the heat not used for those purposes to be used for other useful purposes in the cooking line, so that in all cases fuel is economized and the inconvenience of a heated room in warm weather is avoided.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

Figure 1 presents a perspective view of the stove. It contains two boilers. One of them is situated within the other, as seen in the department marked by the letter A, and concealed in the wooden box, but having its upper part exposed, as seen at the letter *o*, *m* being the lid. It has a rim about it near its upper end, by means of which it rests on the top of the other boiler. Both boilers are of an oval shape and present an end view in the figure. They are made of tin, though they may be made of cast-iron, sheet-iron, or galvanized iron, or sheet-copper tinned over. They may be of a circular or any other desirable form. The second or concentric boiler has its upper half exposed in the drawings, as seen at the letter A, Fig. 1, and presents an end view, the other half being concealed in the department marked B, Fig. 1. It is made of two concentric cylinders. One of them is a little larger than the other, so as to admit of a space between the inner surface of the outer one and the outer surface of the inner one, and the outer cylinder is a little deeper than the inner one to a degree corresponding with the thickness of the space between the surfaces just referred to. Both cylinders have bottoms to them and a circular central opening through their bottoms with a tube running through both bottoms and soldered to

them. The top of this now double cylinder is also closed. There is now a pent-up space around the outside of the inner and around the inside of the outer concentric cylinders and including that between their bottoms and being of equal thickness throughout. An opening is made at *x*, Fig. 1, letter A, to admit of a cock for the purpose of letting out hot water, while cold water is poured into the reservoir D, Fig. 1, which finds its way into the concentric boiler at its bottom by means of a descending tube from the bottom of the reservoir. An opening is also made at the letter *c*, Fig. 1, letter A, for the steam-conductor *a a a*, (*m* being the wooden knob.) The conductor is also made of tin, and consists of two tubes united at the top, one being longer than the other, as seen at Fig. 5, and also as seen in Fig. 1 in its place of office. The open end of the shorter tube is inserted tightly by pressing it gently downward in the opening, as seen at *c*, Fig. 1, and the longer one passes through the opening of the lid into the boiler over the furnace, as seen by the dotted lines marked *n*. It is not absolutely necessary that the steam-conductor *a a a*, Fig. 5, should be a separate piece and of just such a form as here described. It may be permanently attached to the lid of the boiler or to the movable boiler itself, provided that it be of a suitable form, so as to form a connection between the two boilers with facility when required. When it is desired that the steam in the concentric boiler should perform a distinct and separate office and by itself, then there must be a conductor leading to the vessel in which steaming or boiling by steam may be performed; hence the platform marked by the letter *u*, which is directly under *e*, may answer for the situation of such a vessel. The conductor, Fig. 5, answers both purposes. The concentric boiler has another outlet (indicated by the letter *y* in the division marked B, Fig. 1) for the purpose of emptying it when desirable or for the purpose of obtaining hot water.

Between the two departments marked A and B of Fig. 1 stands the letter *u*, to denote the platform or wooden covering which covers the wooden box B. The concentric boiler passes through it and has its lower half concealed in the inside of the box, the box being made of wood on account of that material be-

ing the better non-conductor of heat, although galvanized sheet-iron may be substituted, as well as any other desirable metallic substance.

In Fig. 1, D represents the receiver of cold water, and is also oval-shaped to correspond with the rest and presents likewise an end view. It has a tube descending from its bottom at one of the sides, as seen in Fig. 8 (the figure presenting a side view,) which passes down the outside of the concentric boiler till to the bottom, or nearly so, and there enters it, as seen in the sectional view of Fig. 2, letter B, and marked *o*.

In Fig. 2, letter A represents a sectional view of the concentric boiler. The letters *a a a* show the thickness of the space between the two concentric cylinders, and *m m* show the outlet of the fumes of the furnace.

Fig. 3 shows the sheet-iron furnace with its descending tube. The furnace is designed to occupy the lower part of the concentric boiler, with its tube running through its central bottom opening, the furnace occupying the lower part of the space marked by the letter A of Fig. 2. The furnace, Fig. 3, may have its bottom funnel-shaped, as indicated by the dotted lines *a a*, and having the lines *m m* and *n n* removed. In this case the bottom of the concentric boiler, Fig. 2, must be adapted to the funnel-shaped furnace by having it made in the same form, which shape is indicated by the dotted lines *c c*, Fig. 2, by removing *a a*, with their two vertical lines at the bottom of the concentric boiler. This form is the most advantageous one, since all the ashes fall into the ash-box below, and the space occupying the ash-box being large can afford an ash-box sufficiently capacious to hold the ashes of several days' burning.

The department for the ash-box in the perspective view, Fig. 1, is seen at the letter C. The letter *v* is the mouth-piece of the tube leading horizontally into the ash-box, and the mouth-piece having a slide to it for opening and closing the mouth. The letter *v* denotes the place for winding, in order to raise the furnace, with the appurtenances belonging to it, for the purpose of frying, &c., the movable boiler having been previously removed from its place.

Fig. 4 represents a sectional view of the department C, Fig. 1, occupied by the ash-box, &c. The letters *a a a a a* indicate the thickness of the wood, and the letter *x* denotes the length of the furnace-tube, (the furnace not being here shown,) and the letter *m* shows the vertical tube of the ash-box, which is made to fit tightly in the upper tube by a gentle pressure upward. The ash-box is made of tin and soldered and made air-tight. The joints where the ash-box tubes are united to the other parts are nearly air-tight. The letter *o* shows the ash-box, and the letter *n* shows its horizontal tube, to which the mouth-piece, Fig. 12, is affixed. The mouth-piece has a slide, by means of which all the air admissible

may be admitted or any smaller quantity, as may be desired, or it may be totally excluded by pushing in the slide. The dotted lines (indicated by the letter *c*) show the open space in the sides of the box which is traversed up and down by the horizontal tube of the ash-box with its mouth-piece when it is required to change the position of the furnace.

The letter *w* in the drawings, Fig. 4, shows the cylinder, which has one end of a strap fastened to it, and the strap *v* having its other end fastened to the ash-box. The letter *s* is the key by means of which the furnace, with all attached to it, is raised and let down.

Fig. 11 shows the ash-box with tubes in its separated condition.

Fig. 10 shows the grate, which is a movable instrument and made after the fashion of ordinary grates, except that it has a rim to it when used for a flat-bottomed furnace to admit of room underneath it for the deposition of the ashes; but if the furnace be funnel-shaped at its bottom a grate without a rim is preferable.

Fig. 9 represents the coils of sheet-iron. (Any old sheet-iron will answer the purpose.) They are placed in the furnace to line its inside, so as to prevent the too rapid escape into the sides of the heat, (to accumulate it in the furnace for heating materials to intensity,) insuring an easy combustion, furnishing a high degree of heat to the ascending fumes for the boiler above or for the baker, and if those several objects are desired more expressly—that is, in a higher degree—those layers of sheet-iron (named "scrolls") lining the inside of the furnace must be multiplied.

The movable boiler is indicated by Fig. 7, presenting a side view. It has a rim to it for the double purpose of supporting it in its place over the furnace and for closing up the space which surrounds the movable boiler. This space between the two boilers must be larger for that kind of fuel which produces smoke than for charcoal or anthracite. The outlet for the fumes or smoke *m m* of Fig. 2 must also be made larger for the combustion of wood, &c., than for charcoal and anthracite.

Fig. 6, presenting an end view, is intended to represent the baker. The bottom part is made up of several layers of sheet-iron on top of each other (five or six, or more, if necessary) to retard the entrance of the heat through the bottom and prevent the loaf from being burned. Around the sides of the baker and next the bottom are also several layers for the same purpose; but the upper end of the baker has one thickness only. There is a double lid belonging to it, which has an opening between the top and bottom parts and also large openings through the rim of the lid. The smoke or heated fumes, after passing up on the outside of the baker, enter those openings in the rim into the space between the top and bottom parts of the lid before passing into the flue. The upper part of the lid is made up of sev-

eral layers of sheet-iron, the topmost one being tinned over and has a handle to it, as seen at Fig. 6, letter *a*. The several layers of sheet-iron are for the same object as that of those constituting the bottom of the baker. There is also an opening through the double lid of the baker and a tube inserted for the purpose of giving egress to the steam coming from the baking bread.

Fig. 6 of the drawings shows the baker with the lid upon it. *m m m* show the openings in the rim and also the space between the lower and upper parts of the lid. The bottom of the baker and the sides next the bottom do not show the different thicknesses of sheet-iron, yet it is easily understood.

By means of the slide belonging to the mouth-piece (one of the appurtenances of the furnace) the heat for baking as well as for boiling is regulated, and experience will soon teach the quantity of fuel required for one baking and also the quantity of air required to be admitted. Bread can also be baked in the boiler over the furnace by having the loaf previously placed in a tin vessel or in a copper one tinned over (which is the better) and covered with a lid, and thus introduced with an adequate quantity of water into the boiler. The heat of the boiling water, united with the heat from the steam brought over from the surrounding concentric boiler by means of the conductor, Fig. 5, through the lid of the boiler, will bake bread with a soft crust. If, however, the loaf should be too thick, it will require a longer time than when baked otherwise. This mode of baking has this advantage, that it never burns the bread nor gives it a hard crust.

After having filled the concentric boiler with water, the stove is put in operation by introducing fire and fuel from above, the boiler over the furnace being removed. The quantity of fuel to be used at one time may be regulated according to the quantity of materials in the boiler and the time required for

boiling it. One supply of fuel may last five or six hours or more if the fuel be anthracite-coal, for when the contents over the furnace are once brought to the boiling-point the heat from the top of the furnace, combined with that coming from the surrounding boiler in the form of steam, will keep up the boiling with a very limited amount of combustion, which degree of combustion must be regulated by the slide of the mouth-piece, for the only admission of air underneath the grate of the furnace is by the mouth-piece through the ash-box and up through the furnace-tube, so that (all things being equal) it is in the power of the cook to give any degree of ebullition to the contents of the boiler over the furnace by closing partially the mouth to any degree required, and, if desired to stop the boiling, it is only required to push in the slide far enough so as to close the entrance, when the fire will go out and the rest of the fuel saved. The same rules which are to be observed for boiling will apply to baking and roasting. The cook, after having baked several times and noting with attention the operation of the stove will be capable of giving a correct judgment of the quantity of fuel required for one baking, and also of the quantity of air required to be admitted, which knowledge will be a guarantee to its not being burned by non-attendance throughout.

What I claim as my invention, and desire to secure by Letters Patent, is—

The combination, with a stove and furnace constructed and operated as above described, of the metal coils shown in Fig. 9, the concentric boilers with their steam-pipes shown in Fig. 5, the water-reservoir *D*, and the baker shown in Fig. 6, the whole being combined and operated together substantially as set forth.

DANIEL HEILIG.

In presence of—
B. S. CONWAY,
JOHN REED.