

J. HARRISON.

Range.

No. 22,120.

Patented Nov. 23, 1858.

Fig: 1.

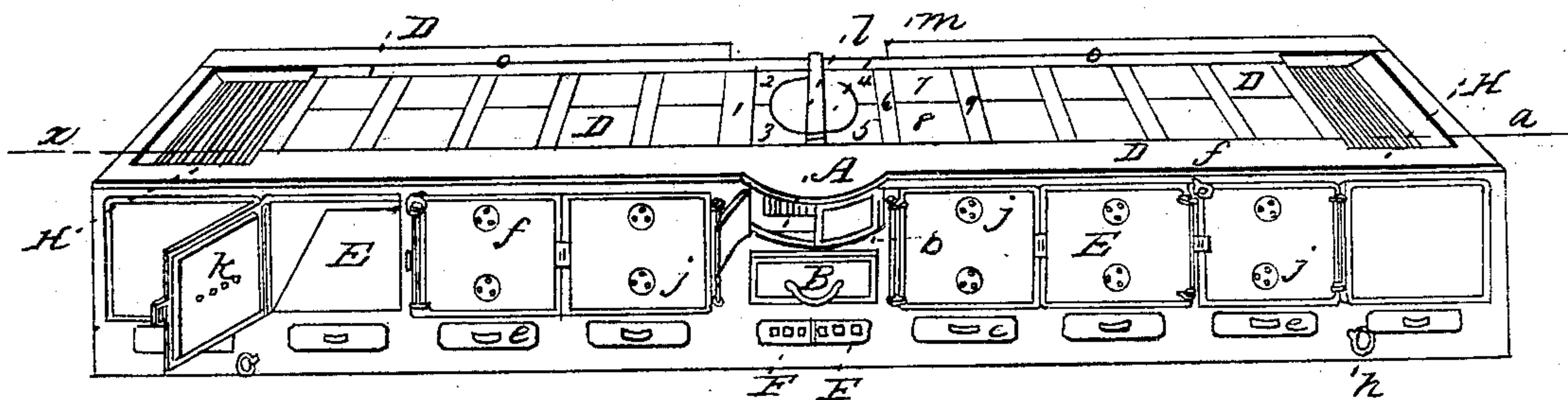


Fig: 2.

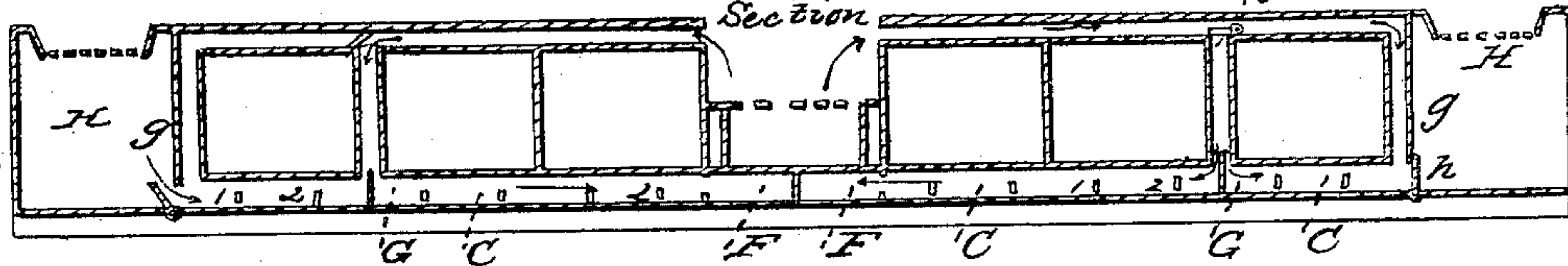
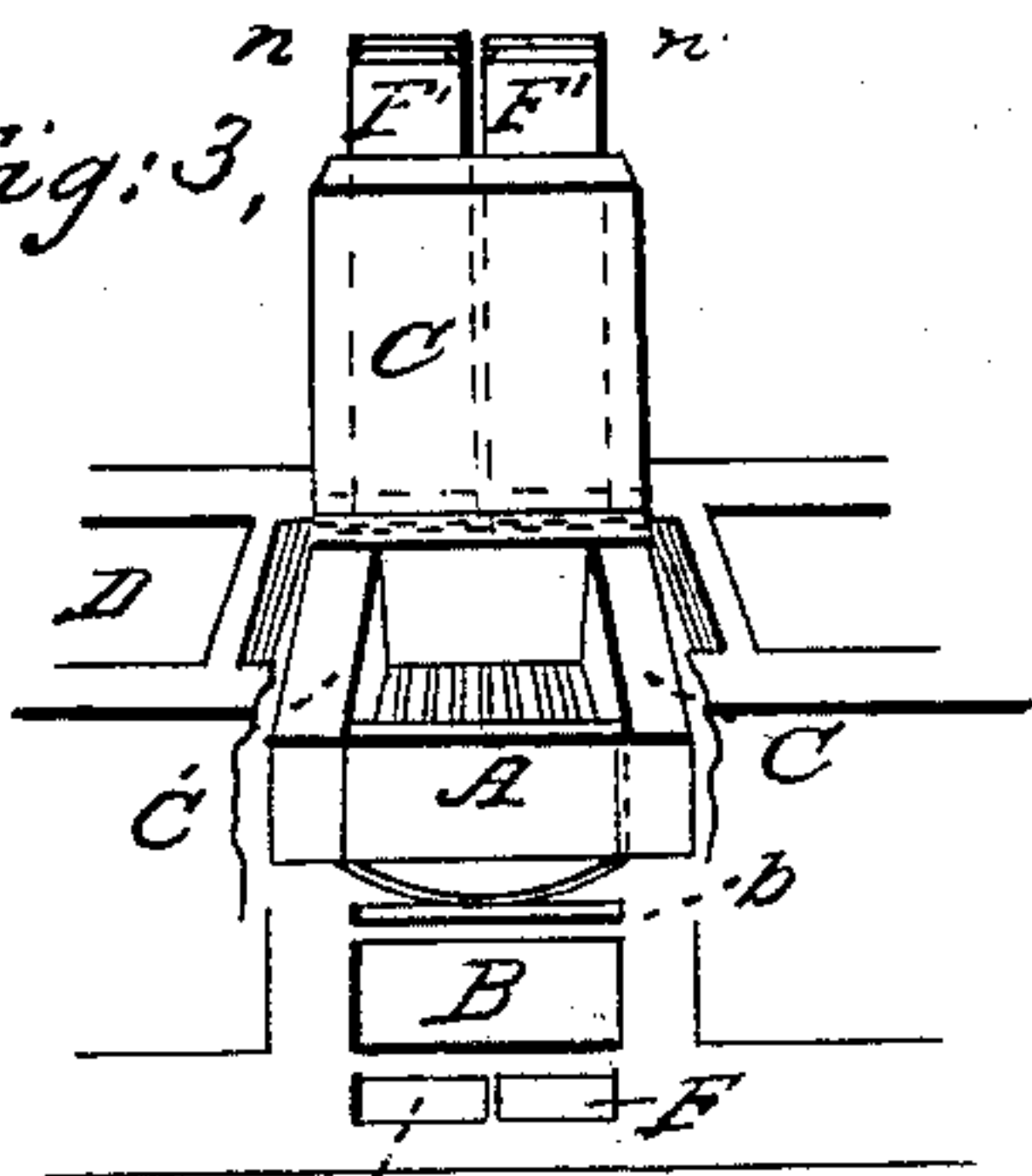


Fig: 3.



Witnesses:

*L. D. Law*  
*Orla House*

Fig: 4.

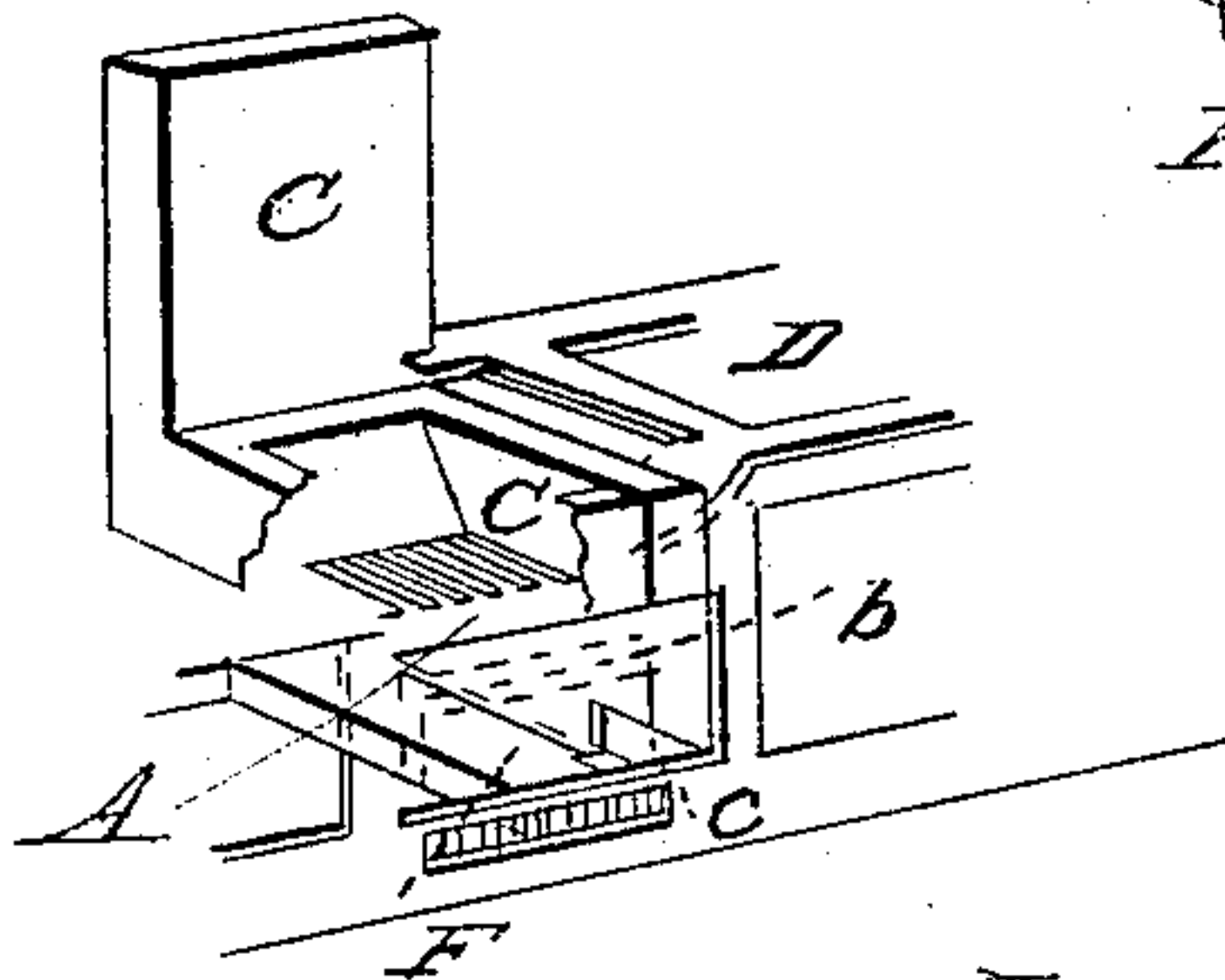


Fig: 5.

Inventor:

*Joshua Harrison*



# UNITED STATES PATENT OFFICE.

JOSHUA HARRISON, OF NEW YORK, N. Y.

## COOKING-RANGE.

Specification of Letters Patent No. 22,120, dated November 23, 1858.

*To all whom it may concern:*

Be it known that I, JOSHUA HARRISON, of the city and State of New York, have invented a new and Improved Combination and Arrangement of Parts in the Construction of Ranges for Cooking Purposes; and I do hereby declare that the following is a full, clear, and exact description thereof and of its principle of action, reference being had to the accompanying drawings and to the letters of reference marked thereon and making a part of this specification.

The nature of my improvement consists in so constructing and arranging the several parts of the range, that nearly the whole heat from the fire shall be retained in the range, thus rendering a much smaller fire sufficient to perform a given amount of work or cooking, and in so constructing and proportioning the top plate of the range, that vessels can be kept constantly boiling and cooking without soiling or injuring them.

Figure 1 is a front view of the range and showing the top plate. Fig. 2 is a sectional view of Fig. 1, through the line *a—a*. Fig. 3 is a top view of the grate and water back or reservoir, that part of the plate over the fire removed. Fig. 4 is a sectional perspective view, sidewise, through the fire chamber, &c.

The fire box or space A is comparatively small, and is placed nearest the top of the range, measuring from top to bottom. Directly beneath the fire, and between it and the ash box B, is the air supply opening *b*, for furnishing fresh air to the fire. This air by passing over the ash box is prevented from entering the fire as cold as it otherwise would, and this principle of admitting no cold air, or as little as possible, to the range, is carried out to the fullest extent practicable.

The back side of the fire box is formed by the water back or reservoir C, or when this is not used, the back side of the fire box will extend close up against the top plate of the range—and the heat of the fire passes in the direction of the arrows under the top plate D and over the tops of the ovens or roasters E E, then down at the ends of the ovens, and into the bottom flues *c, c*, and from thence into the main flues F, F, which pass into the chimney. All the heat is thus made to pass at least twice in contact with each oven, and in reverse directions in the direct and return flues. Thus the oven

that first receives the heat in the direct flue, receives it last in the return flue, and thus all are uniformly heated.

In order to cause the heat to come in contact with the entire bottoms of the ovens or roasters, the flues *c, c*, open into the main flues F, F, at the front end of those flues, as seen most plainly in Fig. 4, so that the natural line of the draft tends to bring all the heat under and in contact with the ovens. The outlet of these flues *c, c*, into the flues F, F, is also not more than one-half the depth of the whole flue *c*, whereby the heat is obstructed and retained, but the smoke can pass off. In order still more to render the heat effective by longer retaining it in contact with the range, and within it, I place between the ovens, when two or more are used, a plate or break G, which checks the motion of the heat, made by the draft, and forms an eddy or air chamber behind it, the plate G, in which chamber the heat being retained acts for a longer time upon the ovens, and thus is made much more effective, and at the same time the smoke will pass into the main flues and chimney. To increase the number of such hot air eddies or chambers, the small slide doors, *e, e*, under the ovens, have projections 1, 2, as seen in Fig. 5 which extend back, from one-half to two-thirds the depth of the range. These will of course tend to obstruct the passage of the heat and from the position of the flues *c, c*, the motion of the heated air will have a serpentine direction, between and over the projections of the slide doors *e, e*, between all of which will also be formed hot air chambers, increasing the heat of the range, and rendering more effective a given quantity of fuel.

In order further to increase the heating capacity of the range, and also make it possible to use its furniture and cooking vessels without soiling or injuring them, the top plate D may be a continual surface, without holes to set kettles, &c., in or if the parts of such plate as hereafter described, are circular they need not be lifted to place the furniture in. The frequent admission of cold air into the range, by placing and removing kettles, &c., may thus be avoided, and consequently the heat will not be reduced in temperature, and will all be retained within the range, and experiment shows that vessels will as readily boil and cook any where on the top, as when placed as in ordinary



ranges. This plate D, should however be much thicker than the ordinary plates of the range and is thicker at the center, or directly over the fire, tapering thinner toward the ends. For a range of about 12 feet in length, such plate should be about an inch thick at the center, and about half an inch thick at the ends. In order however to allow for the expansion and contraction of such an amount of metal, the top of the plate is constructed substantially as follows. The side pieces or front and back rails *o, o*, of the top of the range, are made separate from the central part of such top plate, and are firmly bolted or fastened to and made a part with the front and back and end castings of the range, and between these side pieces, the plate is made in panels, as represented in Fig. 1, or in parts of any convenient and desired shape, each separate from the other and having a separate expansion and contraction. These separate pieces must also be made with suitable reference or allowance as to their expansion, &c., and this allowance as well as the thickness of the plate will vary according to the size of the range, and the size of the fire, &c. Such top plate, from its increased thickness retains longer and to a greater degree the heat of the fire, while all danger of breaking is avoided from its separate opportunities of expansion and contraction, and its several parts are proportioned in size, &c., according to the degree of expansion and contraction each will receive. The range is also constructed with a damper *f*, so that any one or more of the ovens or roasters may be cut off, and the heat of the fire concentrated upon the remaining ovens. At one or both ends also of the range there may be placed a broiling stove *H, H*, separate from the range proper by the partition *g*, but capable of being connected therewith by the damper *h*, whenever it is desired to use it.

A fire being kindled in the grate of *H*, and the damper *h* being opened, the draft of the fire will of course be downward, carrying off all the gases and effluvia of the coal, and creating a beautiful clear fire for broiling and one free from all impurities, which would have a tendency to affect the flavor of the article broiled. The heat derived from the broiling fire also passes under the roasters or ovens and is thus made available for the ordinary uses of the range, and particularly in heating the outside oven. The smoke from the cooking may be conducted if desired into any of the ordinary flues. In large ranges as in hotels, where a good deal of broiling is required, the heat of such fires is very considerable, and by my improvement of range, this is all made available, and useful.

The main flues *F, F*, are also placed directly under the fire and ash pan, so that

they are heated as soon as the fire is kindled and a ready draft obtained, and to assist the draft when the fire is being kindled sliding doors may be fixed as seen in Fig. 1.

From the above description it will be easily apparent that the heat of the fire, by the direction it is required to take, before it passes into the chimney, and by being checked in its passage and retained in many air chambers, is rendered in the highest degree effective. The shape of the range will of course vary according to position, and it can also be used as a wood range, and for army and navy uses. When used as a wood range, there will generally be but a single range of ovens on one side of the fire and the chimney will be at one end, the main flue turning into it, the fire box being near the chimney; but the general arrangement of the flues, and the construction of the expanding contractive fire plate will be substantially the same, whatever the form.

The doors of the ovens or roasters are double, with a space between them. In the outer plates are movable valves *j, j*—one at the top and one at the bottom—for the admission of air, and in the inside are a number of holes *k*, at or near the center, to allow such air to pass into the ovens. In one of the other sides or in the top of the oven is a valve and pipe which connects with one of the flues of the range, to allow an exit from the oven of any air admitted as above. This pipe is not represented, as no claim is made for it. The object to be gained by this construction is to secure a warm current of air—the air being warmed by passing between the double oven doors over any meats, fowls, &c., when being roasted, by which they are better and more savory cooked, than when roasted in their own steam, as in ordinary stove or range ovens. When the ovens are to be used for baking, the outer valves *j, j*, and the inside one are to be closed, and all air excluded. The ovens thus have the advantages of both closed and open or ventilating ones.

The water back or water heater *C*, is so constructed as to surround the fire as seen in Fig. 3, and takes the place of the ordinary brick work about the coal. By this arrangement a higher and more constant heat can be obtained for the heating of the water, and instead of the heat of the fire being absorbed by the brick, as will be the case to a greater or lesser degree, the water heater *C* radiates heat, and by so much increases the effective heat of the range. All extra expense for a separate water heater, can thus be saved, and it can be changed without disturbing the range, and an abundant supply of heated air can be always had. When the heater *C* extends only at the sides, a single fire brick will fill up the front space.



In large ranges, in order to prevent the central and thickest part of the plate D from sagging there may be a small bar or arch *l* standing up a little from the top of the plate, and supporting the sectional part *m*, which also gives a partial support to the adjoining panels or separate pieces.

In each of the flues *E'*, *F'*, which are carried up separately some little distance above the range, before entering the common chimney flue, are sliding dampers *n*, *n*, which move between two plates, or in any way so as to be airtight by which the amount of draft over either series of ovens may be regulated as desired. By their use the heat of each side of the range may be rendered equal, or may mostly or entirely be made to pass over one side as necessary. The top plate of the range also extends sufficiently far back, to make the base or foundation of the mason work—such mason work coming to the line *o*, *o*, in Fig. 1,—so that there can be no escape of the heat, and thus all the heat is rendered the most effective possible. This peculiar structure and arrangement of the top plate also permits the range to be set up in a much shorter time, and at a considerably reduced expense, and when set up it stands more firmly and securely, and consequently wears better.

I am aware that broilers have been so connected with ranges that the draft of their fires will be downward from the article being cooked, but the heat of such fires has either been conducted directly into the fire of the range, or else into a chimney or flue, and thus to a good degree lost, whereas by my arrangement the heat of the broiling

fires is applied directly to that part of the range most distant from the main fire, and made most effective where most needed. I am also aware that double or ventilating doors have been used, I myself having used such, but the orifices on the inside of such doors have been at or near the bottom or top, one or both; but experiments made by myself have proved that the ventilation is most effective, and its effect most desirable, when such inside orifices are not at the bottom or top, but at or near the middle of the doors, as described.

What I claim as my invention is—

1. The arrangement and combination of the flues *c*, and *F*, with the breaks or parts *G*, *1*, and *2* substantially as described, and the damper *f*, in connection with the main flues *F*, *F*, directly underneath the fire, for the uses and purposes set forth.

2. I claim also the arrangement of the broiling grates *H*, *H*, with the flue *c*, for the purpose of applying the heat of such fires directly to, and making it effective in heating that part of the range most distant from the principal fire.

3. I claim also the construction and arrangement of the top plate *D*, as described, by which the front and back rails *o*, *o*, are made a part of the body of the range, while the central part of such plate is made in separate sections, the back rail being also a base or foundation for the mason work, as set forth.

JOSHUA HARRISON.

Witnesses:

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ORLA HOUSE.