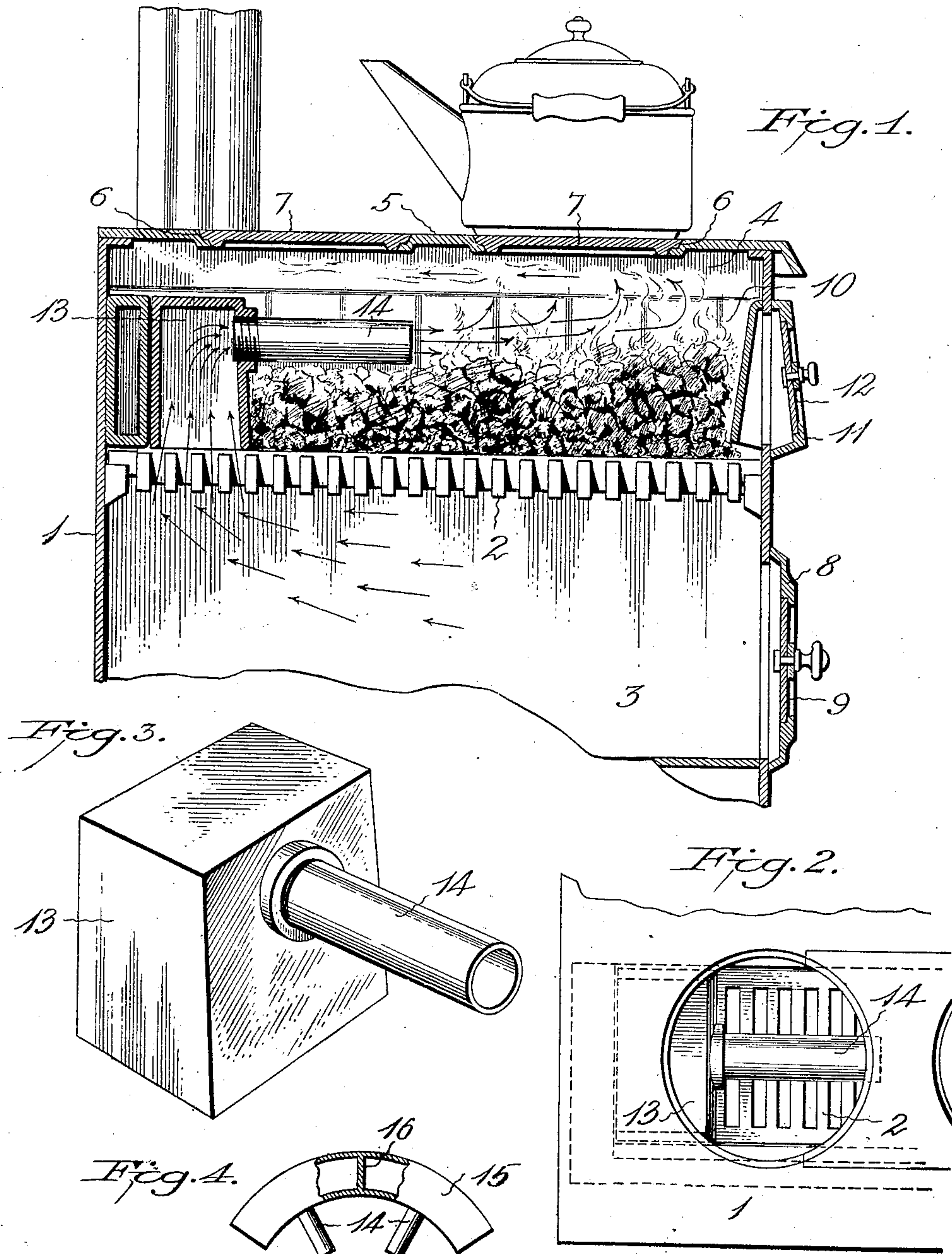


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HOT AIR FORMING AND FEEDING DEVICE FOR HEATING APPARATUS.
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Patented June 22, 1909.



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UNITED STATES PATENT OFFICE.

JULIUS ECKERT, OF DENVER, COLORADO.

HOT-AIR FORMING AND FEEDING DEVICE FOR HEATING APPARATUS.

No. 925,570.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JULIUS ECKERT, a citizen of the United States of America, residing at the city and county of Denver and State of Colorado, have invented a new and useful Hot-Air Forming and Feeding Device for Heating Apparatus, of which the following is a specification.

My invention relates to improvements in hot air forming and feeding devices for increasing the combustion of coal and other fuel consuming ranges, stoves, steam, hot air producing and hot water furnaces, boilers and all kinds of combustion chambers and fire boxes; and the objects of my invention are: First, to provide a device that will form and discharge hot air into the fire boxes and combustion chambers over the bed of burning coal and other fuel therein, to increase the combustion of coal, coke, or other fuel. Second, to provide a hot air forming and feeding device that can be applied to kitchen ranges and all heaters for increasing the combustion of fuel being used. I attain these objects by the mechanism illustrated in the accompanying drawings, in which:

Figure 1, is a vertical sectional view through a portion of an ordinary cooking range, showing the application of my improved device. Fig. 2, is a plan view of a portion of the range, with the improved device in position. Fig. 3, is a perspective view of the device. And Fig. 4, is a plan view of the device in the preferable form, in which it is used in heating furnaces.

Similar numerals of reference refer to similar parts throughout the several views.

Referring to the drawings, the numeral 1, designates a cooking range in connection with which I preferably illustrate my improved air heating and feeding device, although my invention contemplates the application of this air heating and feeding device to stoves, furnaces, and to all characters of combustion chambers.

2 designates the grate of the range; 3, its ash pit; and 4, its flue space below its cooking top 5, which is provided with the usual cooking utensil receiving apertures 6 and covers 7. The ash pit is provided with the usual ash removing door 8, which contains an air inlet slide 9, and the combustion chamber 10, above the grate is also provided with a door 11, in which an adjustable air inlet slide 12 is placed.

My invention is for the purpose of provid-

ing a supply of hot air to the combustion chamber over the body of burning coal, coke or other fuel, in such a manner as to burn up a very large percentage of the products of combustion that rising from the burning fuel on the grate flow to the smoke pipe and are lost in the chimney.

My invention contemplates the feeding of hot air from the rear or back portion of the ash pit, introducing it at the rear or back end of the fire place or combustion chamber over the grate, and in such a manner that the hot air in flowing from my device will flow along the fire box over the grate and the coal, coke or other fuel thereon, toward the front end portion of the fire box, and away from the stove pipe opening of the range, stove, furnace or other heat producing device. In other words, if the stove pipe is at the rear side of the range as shown in the drawings, I arrange the hot air device so that the hot air that discharges from it will flow away from the stove pipe entrance. I do this in order to check the rapid flow of the smoke and gases that form the products of combustion that arise from the coal, coke, or other fuel used on the grate, and that usually flow quickly by the shortest distance to the stove pipe entrance, in order that they may be heated up and mixed with a fresh supply of hot oxygen and other elements of combustion, and be consumed, thus adding a large percentage of heat units to the fire that would otherwise flow up the chimney, and at the same time consuming almost all of the smoke, as well as deflecting the blaze of the fire box toward the front end of the range whereby the air above the whole fuel area is uniformly heated, and readily circulates beneath the covers to one side of those directly above the fuel.

There are several ways in which I can apply my device to the rear end portion of fire boxes and combustion chambers, but I preferably carry out this feature of my invention in the following manner: I place at the rear end portion of the fire box, an air receiving and heating receptacle 13, which comprises a box-shaped receptacle, that is provided with an open bottom of any proportions. This air receiving and heating receptacle may be of any desired shape, but I preferably make it in the form of a square shaped box or hood with a closed top and an open bottom portion when applied to kitchen ranges, as shown in Fig. 1, but it may be substantially

semi-circular in form for use in furnaces, as shown in Fig. 4. It may be constructed in any suitable manner and of any suitable material, such as malleable iron or steel or cast iron, fire clay, or asbestos cement, or other suitable material, and it is arranged and positioned with its open bottom portion opening into the rear end portion of the ash pit, so that the hot air of the ash pit will flow through its open bottom portion into it. An outlet is formed in the side of this receptacle 13, that faces the front end portion of the fire box. In this aperture I place a short piece of pipe 14, which may be threaded or otherwire secured in the aperture. This piece of pipe may be of any predetermined length, varying with the length of the fire box. For short fire boxes it may be very short, amounting to only a nipple, and for long fire boxes it may be of any predetermined length. It is adapted to convey the heated air over the bed of coal, coke or other fuel, and is therefore placed at several inches above the bottom of the receptacle, and also about an inch or two above the bed of coal or other fuel.

In applying my air heating and feeding receptacle to ranges that are in use in residences, I preferably place it directly on the rear end portion of the grate against the rear wall of the fire box, and the hot air from the ash pit flows up through the grate into the open bottom portion of the receptacle and out of the pipe over the bed of coal or other fuel. When the receptacle is placed in furnaces, it is preferably in the form shown in Fig. 4, and comprises a curved structure 15, having a central partition 16, which prevents the air from being drawn through one pipe 14, only, when one of said pipes is hotter than the other.

The operation of my improved air heating and feeding device is as follows: The air flowing into the ash pit through the air inlet slide of the ash pit door, or of the door itself, becomes more or less heated, and this air flows up into the receptacle. The receptacle itself is heated hot by the fire on the grate, and its air discharging pipe is also heated much hotter than the body of the receptacle, owing to its extending a short distance over the fire. The warm or hot air that flows into the receptacle is therefore superheated by the receptacle, and again to a high degree by its pipe extension, before leaving it, and the draft of the chimney from the ash pit through the receptacle and range causes this highly heated air to flow out of the pipe over the fire; in fact, this draft is sufficient to cause the blaze of the fire to be blown toward the front end portion of the fire box, which causes it to flow across the front end portion of the range and along its middle portion and along the opposite side portion of the range from the fire grate; whereas, if

my air heating and feeding receptacle were not used, the larger portion of the flame from the coal or other fuel of the fire box, would flow by the shortest route directly to the stove pipe. This highly heated hot air flowing into the fire box over the bed of coal or other fuel, mingles with the smoke and gases of combustion, and they are ignited and burn, thus adding very greatly to the heat of the fire, and as the flame from the burning of fire and of the smoke and gases is directed across the front of the flue and all over the flue directly below the top surface of the range, and its covers, the result is that the entire front portion of the cooking surface of the range is the hottest, and this heat is also thrown out into the room and provides a hotter fire to cook with, while at the same time the range throws off enough additional heat to comfortably heat the kitchen.

My experience has been that when using the range for cooking without the hot air forming and feeding receptacle, the fire in the range would not comfortably heat the kitchen, and the covers directly over the fire box were very much hotter than those at the side of the fire box, whereas, with the improved attachment, a comfortable temperature is maintained, and the water flowing through the water back to the boiler, is also maintained at a high temperature.

My invention can be easily and quickly installed in all classes of coal and other fuel burning cooking ranges and stoves, furnaces, steam boilers, and numerous other heat generating combustion chambers and fire boxes at present installed in residences, factories, shops, and buildings.

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

1. A hot air forming and discharging device for the fire boxes of cooking ranges, furnaces, and other heaters, comprising a receptacle provided with a closed top and an open bottom portion adapted to be placed in the rear end portion of fire-boxes, and positioned with its open bottom portion opening into the rear end portion of the ash pit, said receptacle extending into the fire box and being provided with an air discharging pipe arranged to extend from said receptacle into said fire box toward its front end, and positioned enough above the surface of the grate of said furnace to discharge hot air over the top of the fuel on the grate of said fire box.

2. The combination with a heating apparatus having a grate, a fire box and an ash pit, of an air heating receptacle, provided with an open bottom portion and a closed top portion and positioned on the rear end portion of said grate against the rear wall of said fire box, said receptacle's open bottom portion being in communication with the rear end portion of said ash pit, whereby the hot air

of said ash pit can flow through said grate into said receptacle, and a pipe extending from said receptacle at a short distance above said grate toward the front end of said
5 fire box.

3. The combination with a kitchen range or furnace, having a fire box and grate, an ash pit, chimney, and a flue leading from said fire box to said chimney, of a box or hood-
10 shaped receptacle positioned at the rear end and against the rear wall portion of said fire box, and provided with an open bottom portion opening into the said ash pit, the top end portion of said box or hood-shaped receptacle being closed and imperforate and hav-
15 ing its front side provided with a tube arranged to extend from said receptacle above and over said grate a predetermined distance

toward the front end portion of said fire box and away from said chimney.

4. In a device as specified, the combination with a heating apparatus, having a fire box and grate, of a hollow, fire-proof structure of suitable shape open at its bottom, adapted to rest upon the rear end of said
25 grate, said receptacle being provided in its front side near the upper end thereof, with a threaded aperture, and a pipe in said aperture extending toward the front end of the
30 fire box.

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

JULIUS ECKERT.

Witnesses:

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