A. C. LEGG.

SMOKE GENERATOR.

APPLICATION FILED SEPT. 29, 1917.

**1,302,682.** Patented May 6, 1919.

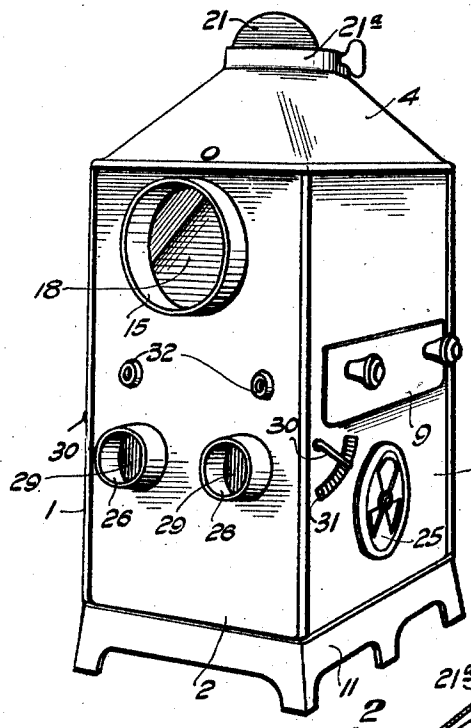



Fig. 1.

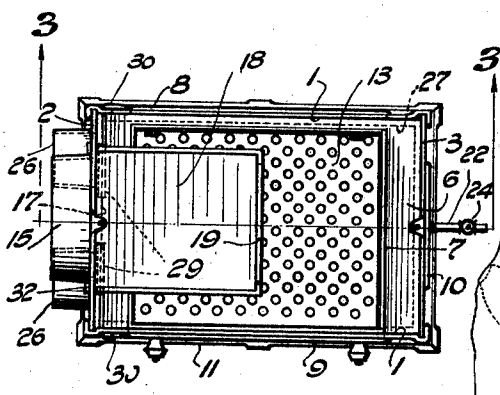



Fig. 2.

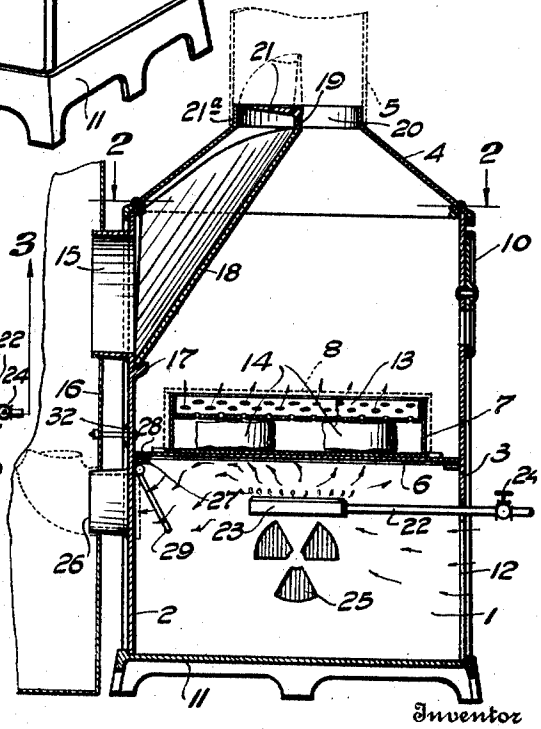



Fig. 3.

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# UNITED STATES PATENT OFFICE.

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## SMOKE-GENERATOR.

1,302,682. Specification of Letters Patent. Patented May 6, 1919.

Continuation of application Serial No. 13,063, filed March 8, 1915. This application filed September 29, 1917. Serial No. 193,967.

*To all whom it may concern:*

Be it known that I, ANDREW C. LEGG, a citizen of the United States of America, residing at Birmingham, in the county of Jefferson and State of Alabama, have invented certain new and useful Improvements in Smoke-Generators, of which the following is a specification.

My invention relates to a novel type of furnace for the generation of smoke or hot air or gases for smokehouses in which meats are cured or fruit and vegetables dried.

The object of my present invention is to produce a very simple and economical smoke generating furnace by means of which with a minimum quantity of smoke producing fuel I am enabled to produce the maximum quantity of smoke and to deliver this smoke, free from the products of combustion other than from its own smoldering fire and in a relatively cool condition, into the smoke box or smokehouse, and which furnace is also designed and adapted for the maintenance of a continuous circulation of the smoke through the smokehouse or smoke box so that but a small quantity of smoke need be generated to fully supply the smokehouse. An important feature of my invention is the provision of a regulable source of external heat to ignite the fuel in the smoke generating chamber, or to produce hot air or gases free from the products of active combustion, when such are needed for drying meat, fruit or vegetables.

A further object of my invention is to design the furnace for light and cheap manufacture so that it is readily portable and is adapted to utilize a gas or oil burner for igniting the smoke producing material after which the oil or gas burner may be cut off and the furnace will operate entirely by the smoldering of the smoke producing medium. This arrangement gives me the advantage of a regulable source of heat, external to the smoke generating chamber, by means of which I can control the temperature of the smoke when desirable.

A further object of my invention is the provision of means whereby the heat generated by the external gas, oil or other burner, may be diverted either into the room when the smokehouse is operated at a low temperature, or passed through a radiator in the smokehouse to produce a high temperature therein.

My invention further comprises the novel details of construction and arrangements of parts and in their preferred embodiment only are hereinafter more particularly described and illustrated in the accompanying drawings which form a part of this specification, and in which:—

Figure 1 is a perspective view of the smoke generator looking toward the end adjacent to the smokehouse.

Fig. 2 is a horizontal sectional view taken on the line 2—2 of Fig. 3.

Fig. 3 is a vertical sectional view taken on the line 3—3 of Fig. 2.

Similar reference numerals refer to similar parts throughout the drawings.

According to the preferred embodiment of my invention, my smoke generator is formed of cast metal sides 1, 1, a back 2 and a front 3, and at the upper end of the rectangular chamber formed by said parts I provide a dome 4 which converges to an outlet pipe 5 at the top of the generator. I subdivide the interior of the generator by means of an intermediate horizontal partition 6 into an upper smoke generating chamber and a lower chamber in which is located the source of heat. A fuel drawer 7 is adapted to slide onto this partition through suitable openings provided therefor in each side wall of the generator. One of the openings is normally closed by a false door 8 while the other is closed by the outer end wall 9 of the drawer which is adapted to that purpose. I provide an air supply opening in the front wall 3 above the drawer and control the admission of air by a rotary damper 10. The side and end walls of the generator rest on and are suitably connected to a base 11 and the front wall is provided with an opening 12 below the partition 6 for the insertion of

the heat producing means. At the top of the back or inner end of the fuel drawer I hinge in any suitable manner a perforated smothering plate 13, the front end of which is free to drop down onto the bottom of the drawer and the plate will thus follow the gradual disintegration of the fuel 14 in the drawer to the end that the fuel will be prevented at all times from breaking into active combustion. The rear wall 2 near the upper portion of the generating chamber is provided with a smoke return port surrounded by a pipe thimble 15 of such length as to project through an opening provided therefor in a wall of the smokehouse 16. On the inner face of the rear wall 2, just below the door opening, I cast a hook lug 17 and a concave casting 18 is adapted to seat at its lower end on this lug and has at its upper end a vertical flange 19 substantially equal in length to the diameter of the top smoke outlet opening 20 into which the flange projects. The casting 18 is so shaped as to form with the rear wall and dome a smoke return flue leading through the smoke generating chamber to the smoke exit pipe 5. A semicircular damper 21, mounted in diametrically opposite slots in the collar 21ª surrounding the opening 20, will in its lowered position close the upper end of the smoke return flue, but in its raised position, it will not obstruct either half of the smoke outlet opening 20.

The bottom portion or fire chamber of the generator is provided with a front opening 12 through which a fuel supply pipe 22 passes and delivers liquid fuel, oil or gas, to a burner 23 under control of a valve 24. A plurality of heat escape ports are provided in the sides of the combustion chamber and controlled by dampers 25. It will be noted that the burner is located under the center of the drawer 7. In the rear wall 2 below the partition I provide two heat outlet ports 26 surrounded by nipples of such length as to project through the smokehouse wall so as to connect with radiator pipes not shown. These openings stand close under the partition, which is preferably supported by longitudinal flanges 27 cast integral with the generator walls. An asbestos packing strip 28 is inserted between the partition and its supporting flanges to provide a joint which will exclude from the upper chamber the products of combustion generated in the combustion chamber. Over each heat outlet port 26 I provide a damper 29 having a handle 30 which passes through the adjacent side wall 1 or 3 of the generator and there engages a segment 31 by means of which the damper can be held adjusted in position to permit the escape of the desired amount of heat through the outlet ports 26. I cast bosses 32 on the rear wall with threaded openings to receive screws by means of which the generator is made fast to the smokehouse.

In operation, assuming that the smoke outlet pipe 5 has communication with the smokehouse in the manner described in my application Serial No. 66,765, for a duplex process for smoke curing meats, if it is desired to produce a hot smoke; the drawer 7 is drawn out, the smothering plate 13 is raised and hickory chips or sawdust is introduced and the smothering plate lowered thereon, after which the drawer is moved back into the generator. The burner 23 is then ignited, the damper 21 is closed, as shown in full lines in Fig. 3, and the damper 10 adjusted to supply the requisite volume of air to the upper chamber. The heat from the burner generates a smoke rich in curative properties and free of soot, ash and all products of active combustion. The heat control dampers 29 are opened and the heated products of combustion from the combustion chamber passes out through ports 26 and heat is delivered by radiation into the smokehouse so that what I term the "hot smoke" operation is produced. If the "cool smoke" operation is desired, the heat dampers 29 are closed, the burner is turned half off, the damper 10 is properly adjusted and the slow production of cool smoke results. If it be desired in conjunction with this cool smoke generator to produce a return circulation of smoke from the smokehouse to thereby create the "continuous circulation" operation, described in my application aforesaid, the damper 21 is raised to vertical position and thereupon the pipe 5 acts to draw a return circulation of smoke through the port 16 and the return smoke passage formed by the casting 18. It will be understood that when the heat dampers 29 are closed the dampers 25 will be opened so that the products of combustion may escape freely through the side walls of the generator.

When "smoke" is referred to in the specification and claims, I intend thereby to include any gas that may be generated or air heated, according as the articles being cured or dried may require one or the other.

This application forms a continuation of the application filed by me on the 8th day of March, 1915, Serial No. 13,063.

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

1. A smoke generating furnace for smokehouses comprising a chamber for generating smoke or hot gases, a fire box below the said chamber and separated therefrom so that its products of combustion do not gain access to said generating chamber, means to admit air and fuel to said generating chamber, and

pipe means to conduct the generated smoke or gases to the point of use.

2. In a smoke generating furnace, the combination of a fluid fuel burner, a chamber for generating smoke or hot gases having at its bottom an outwardly removable fuel support adapted to be heated by said burner, a smothering means for the fuel on said support, regulable means to admit air to the smoke chamber, and means to deliver the smoke or air to the point of use.

3. In a smoke generating furnace, a burner, a fuel chamber over the burner and adapted to exclude therefrom the products of combustion generated by the said burner, smoke outlet and return flues entering said chamber, smothering means disposed over the fuel on the chamber bottom, a regulable air inlet for said fuel chamber, and a fuel supply door above said smothering means.

4. In a smoke generating apparatus, a smoke generating chamber having a fuel supporting wall, a burner disposed without said chamber and adapted to heat said wall, said smoke chamber having an air inlet and a smoke outlet, and a perforated plate to maintain a smoldering combustion of the fuel.

5. A smoke generator for a smokehouse, said generator having a partition which completely separates its upper and lower portions, means to introduce smoke producing fuel into the upper portion, means to ignite the fuel in said upper portion by a flame external thereto, and smoke outlet and smoke return flues leading from the upper portion of said generator to the smokehouse, substantially as described.

6. In a smoke generator, a source of heat, a fuel chamber from which the products of combustion from said source of heat are excluded, a regulatable air supply means for said chamber, and smoke outlet and return flues entering said chamber above the fuel level therein.

7. In a furnace of the character described, a smoke generating chamber, means to introduce fuel therein, means to heat the chamber, means to conduct the generated smoke from the chamber to the point of use, and a return smoke flue leading from the smokehouse and exposed to the heat of the furnace, substantially as described.

8. In a furnace of the character described, a smoke generating chamber, means to introduce fuel therein, means to heat the chamber, pipe means to conduct the generated smoke from the chamber to the point of use, and a return smoke flue passing through said generating chamber and discharging into said pipe means, substantially as described.

9. In a furnace of the character described, a smoke generating chamber having means for the supply of air and fuel thereinto, a smoke outlet pipe, means to heat said chamber, a partition in said chamber to form a smoke reheating flue opening at its upper end into said outlet pipe, and a return smoke pipe communicating with the lower end of said smoke reheating flue, substantially as described.

10. In a furnace of the character described, a smoke generating chamber, means for the introduction of air and fuel in said chamber, means for heating the chamber, a smoke outlet pipe at one end, and a smoke return pipe opening into the lower end of the flue between said partition and furnace.

11. In a generator of the character described, gaseous burners in the lower portion thereof, a smoke generating chamber adapted to be heated by said burners, means to conduct the generated smoke to the point of use, heat outlet pipes for conducting away the waste heat from said burners, and damper means to control the admission of heat to said heat pipes, said furnace having openings for the escape of the waste heat when said heat pipes are closed.

12. In a smoke generating furnace, a smoke generating chamber, gaseous burners to heat the chamber, heat conducting pipes leading from said furnace below said chamber for carrying off the waste heat from the burners, dampers for said heat pipes, other damper controlled outlets for waste heat, and means to conduct the generated smoke or gases to the point of use.

13. In a smoke generating furnace of the character described, a smoke generating chamber, means for the introduction of air and fuel thereinto, an external source of heat for the chamber, a removable dome-like cover for the chamber, there being a side smoke inlet and a top smoke outlet port for said chamber, a partition forming with the wall of said chamber an internal flue connecting said ports, the upper end of said partition projecting into the smoke outlet port, and a segmental damper acting to shut off communication between said internal flue and the outlet port, substantially as described.

14. A smoke generating furnace comprising four separate side walls, each having an internal horizontal shoulder and a dome-like top, a base, means to connect the side walls to the dome and base to form the casing of the furnace, an intermediate partition having a gas tight seat on said shoulders, gaseous burners below said partition, a removable fuel drawer mounted on said partition, an air supply valve above said partition, and a top smoke outlet, substantially as described.

15. A smoke generating furnace comprising four separate side walls, each having an internal horizontal shoulder and a dome-like top, a base, means to connect the side walls

to the dome and base to form the casing of the furnace, an intermediate partition having a gas tight seat on said shoulders, gaseous burners below said partition, a removable fuel drawer mounted on said partition, an air supply valve above said partition, a top smoke outlet, a return smoke inlet above said partition, and a demountable partition subdividing from the chamber a flue co-acting with said inlet and outlet, substantially as described.

In testimony whereof I affix my signature.

ANDREW C. LEGG.

Witness:
ELBA ARNOLD.

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