

No. 858,105.

PATENTED JUNE 25, 1907.

C. J. ROUX.

DOMESTIC AND INDUSTRIAL HEATING APPLIANCE.

APPLICATION FILED JULY 16, 1903.

3 SHEETS—SHEET 1.

Fig. 1.

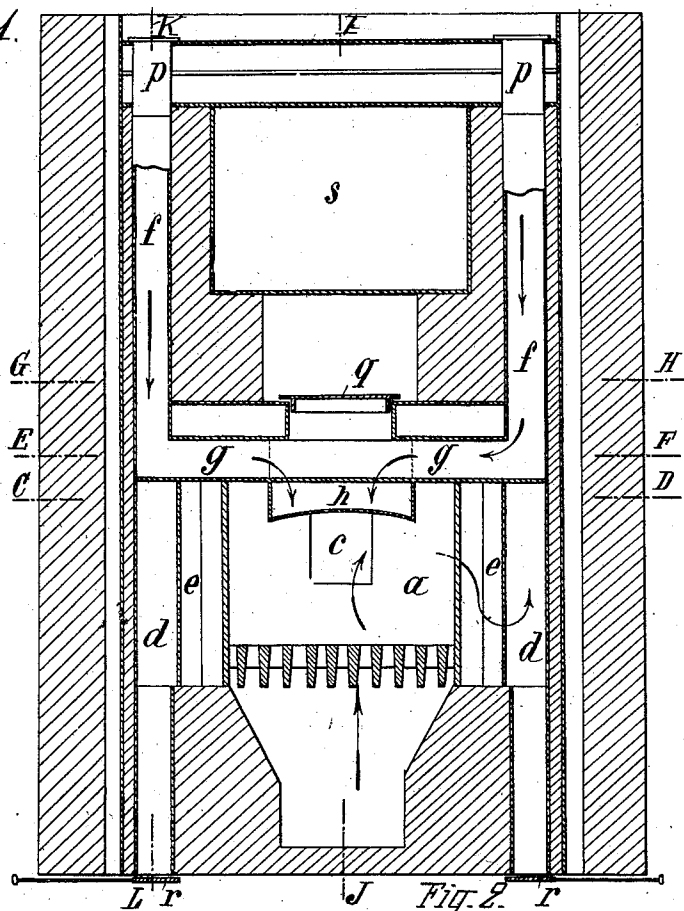
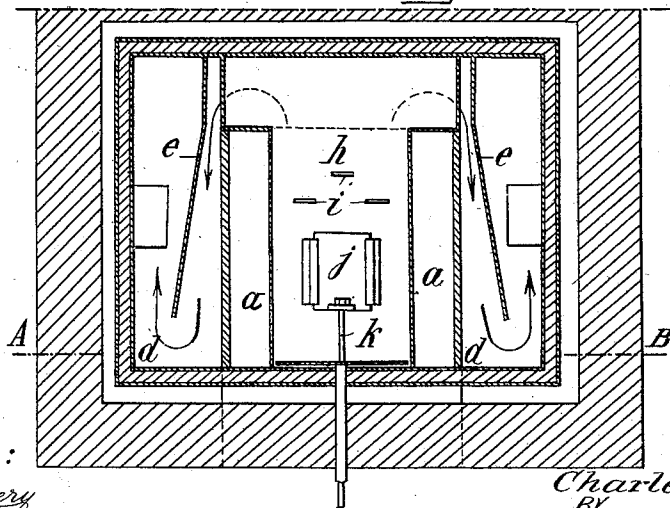


Fig. 2.



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3 SHEETS—SHEET 2.

Fig. 5.

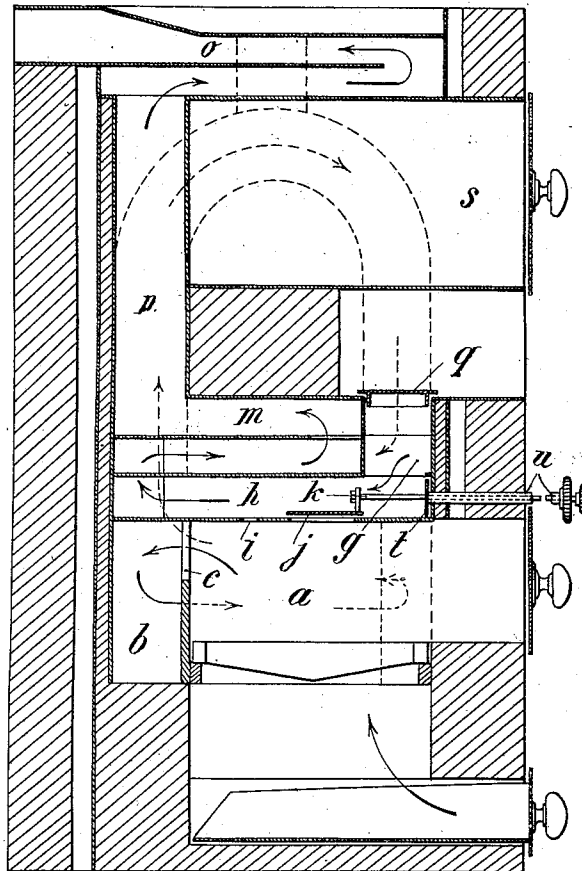
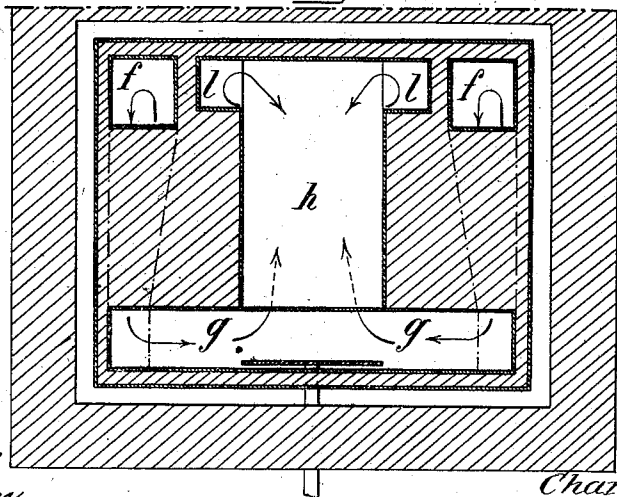


Fig. 3.



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3 SHEETS—SHEET 3.

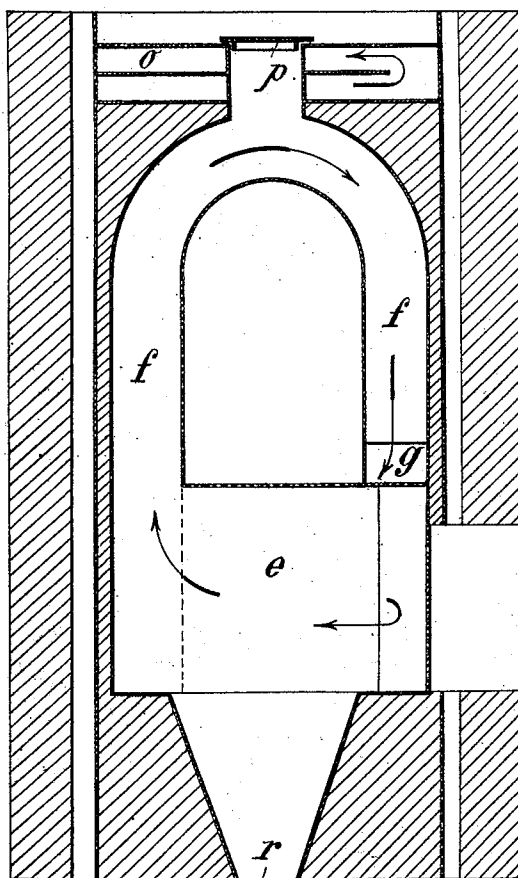
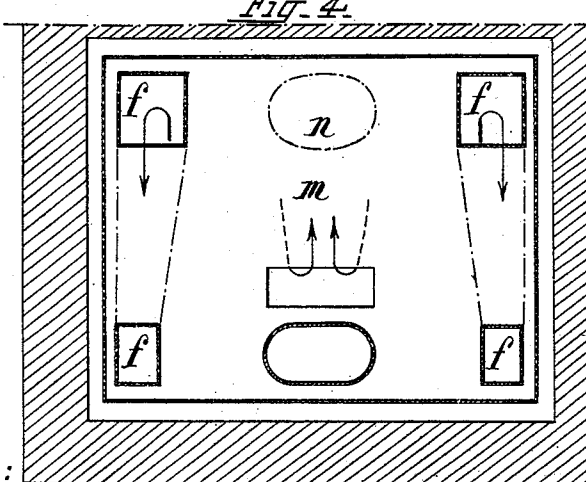


Fig. 6.

Fig. 4.



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CHARLES JOSEPH ROUX, OF PANTIN, FRANCE.

DOMESTIC AND INDUSTRIAL HEATING APPLIANCE.

No. 858,105.

Specification of Letters Patent.

Patented June 25, 1907.

Application filed July 15, 1903. Serial No. 165,574.

To all whom it may concern:

Be it known that I, CHARLES JOSEPH ROUX, of 85 Route d'Aubervilliers, Pantin, (Seine,) Republic of France, mechanician, have invented Improvements in Domestic and Industrial Heating Appliances, of which the following is a full, clear, and exact description.

This invention relates to a device applicable to methods of domestic and industrial heating of all kinds, whereby complete combustion of the fuel is effected, the whole of the smoke is consumed and all heat furnished by the products of combustion is absorbed.

This device is essentially characterized by the application of a reignition chamber entering the fireplace or furnace in such a manner as to receive the direct action of the flames of this latter so that it is constantly maintained at a very high temperature; this chamber receives the products of combustion which, after having traversed a series of flues and after having abandoned a portion of their heat are extinguished or dead; these gases entering this chamber are reignited owing to the extremely high temperature obtaining therein and by kindled jets entering through orifices formed in the lower wall of this chamber; these orifices permit of the arrival of exceedingly combustible kindled products coming directly from the fire place; an admission of air into this reignition chamber facilitates the reignition of the gases. The gaseous products thus reignited then circulate in different flues before passing to the chimney. The reignition chamber comprises in addition, a register permitting of the direct passage of gases from the fire place at the moment of kindling the fire.

The application of this novel device is represented by way of example in the following drawing, in which:

Figures 1 to 6 show a heating domestic appliance and Figs. 7 and 8 show the application of the invention to a steam generator furnace. Fig. 1 is a vertical cross-section on the line A—B of Fig. 2. Figs. 2, 3 and 4 are horizontal sections taken respectively on the lines C—D, E—F, G—H, of Fig. 1. Figs. 5 and 6 are two longitudinal vertical sections on the lines I—J, K—L of Fig. 1 respectively.

In these figures, similar letters of reference are employed to designate like parts.

The domestic appliance represented in Figs. 1 to 6 comprises behind the fire place *a*

an outlet chamber *b* communicating freely with this latter through the opening *c* (Fig. 5) and two lateral chambers *d* (Figs. 1 and 2) opening into the outlet chamber *b* and inclosing a vertical partition *e* forming a baffle which causes the products of combustion to proceed to the front, then to return to the rear, as indicated by the arrows in Figs. 1, 2 and 5. At the rear upper portion of each of the lateral chambers *d* there branches off a vertical conduit *f* of inverted U form (Fig. 6) the front arm of which is connected by a horizontal conduit *g* with a reignition chamber *h* the bottom of which constitutes the roof of the fire place *a* and of which the height is comprised within this latter (Figs. 1, 2, 3). This reignition chamber thus situated in the fire place is constantly surrounded by the flames of this latter which is itself enveloped laterally by the chambers *d* which prevent all loss; owing to this arrangement the reignition chamber is raised to and constantly maintained at a temperature sufficient to produce the reignition of the combustible gases still contained in the products of combustion entering this chamber *h*. In the lower wall of this reignition chamber are formed small orifices *i* permitting of the introduction of kindled gaseous jets coming directly from the fire place and serving for the reignition of the extinguished gases which enter through the conduits *g* as is hereinafter explained. The lower wall of the reignition chamber comprises in addition, a register *j* permitting of the direct passage of the products of combustion, upon the kindling of the fire through the chamber *h*.

Into the reignition chamber *h* open one or more air inlets; to this end, the rod *k* for operating the register *j* may be hollow and constitute an air inlet; this tube may inclose a device of any suitable kind whereby the section of the air admission orifice may be regulated.

The rekindled gases issue at the sides, at the rear portion of the reignition chamber *h* and pass through the passages *l* above this chamber (Fig. 3); a horizontal partition *m* forming a baffle causes these gases to return to the front of the apparatus before entering the vertical conduit *n* (Figs. 4 and 5). A horizontal partition *o* forming a baffle causes the gases to again return to the front of the apparatus before escaping through the chimney.

The apparatus may readily be cleaned by removing the plugs *p*, *q*. The apparatus may comprise a plate-warmer or oven *s*.

Below the lateral chambers *d* are arranged registers *r* which when open permit of the admission of supplementary air if required according to the fuel employed, and also permitting of the cleaning of the chambers *d*.

A register *t*, operated by means of the rod *u*, permits of closing the draft when it is desired to obtain slow combustion; nevertheless, owing to the orifices *i*, there is no danger of accident, the escape of gases being always possible through these orifices.

When the fire place is charged with fuel and this is kindled, care should be taken to leave the register *j*, open for a certain time, in order to permit of the direct passage of the flame and smoke into the chamber *h*, thus preventing the necessity for their traversing the inverted U tubes whereby a perfect draft is obtained. In addition, this direct admission of the products of combustion into the chamber *h* immediately raises the temperature of this latter and brings its walls to a bright red heat. When the fuel is completely ignited the register *j* is closed, the products of combustion then leave the fire place through the opening *c*, pass into the outlet chamber *b* and first of all circulate in the lateral chambers *d* upon each side of the fire place *a* and of the ignition chamber *h*, then vertically in the tubes *f* in such a manner as to distribute their heat throughout all parts of the apparatus. The gases, after this long path, have given up to the apparatus a great part of their heat and are dead when they reach the reignition chamber *h*. Under the influence of the high temperature of this chamber and of the ignited jets which enter through the apparatus, *i*, and of the admission of air through the hollow rod *k*, the combustible products still contained in the gases, become reignited and the rekindled products again circulate in the apparatus horizontally above the reignition chamber, vertically in the conduit *n* and finally horizontally at the upper part of the apparatus before escaping through the chimney. The regulation of the kindled jets within the chamber *h* may be effected, according to re-

quirements, by opening the register *j* to a greater or less extent.

The general arrangement of this apparatus permits of raising the reignition chamber to and maintaining it at a very high temperature, producing the reignition of the dead combustible products still contained in the products of combustion; consequently, this device permits of the complete utilization of the fuel.

This invention insures the complete utilization of the fuel and absolutely smokeless combustion as soon as working conditions are established; in addition to this, lignites may be completely burned; any other fuel may, however, be used with this device.

The said device may vary as to form and dimensions and the constructional details may be modified according to the different applications.

Claims.

1. In a heating apparatus, in combination, a fire place, a re-ignition or secondary combustion chamber projecting into the fire place, said chamber having orifices allowing a small portion of the hot gases to enter said chamber directly from the fire place, and further having orifices for the admission of secondary air, and channels or conduits for leading back indirectly or in a circuitous path the main body of gases coming from the fire place to the re-ignition chamber.

2. In a heating apparatus, in combination, a fire place, a re-ignition or secondary combustion chamber disposed in the fire place, said chamber having orifices allowing a small portion of the hot gases to enter said chamber directly from the fire place, and further having orifices for the admission of secondary air, and channels or conduits for leading back indirectly or in a circuitous path the main body of gases coming from the fire place to the re-ignition chamber.

The foregoing specification of my "improvements in domestic and industrial heating appliances" signed by me this thirteenth day of June 1903.

CHARLES JOSEPH ROUX. [L. s.]

Witnesses:

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MAURICE H. PIGNET.