

## **Specification of Joseph Waller : smoke-consuming stove.**

### **Contributors**

Waller, Joseph.

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A.D. 1861, 27th SEPTEMBER. N<sup>o</sup> 2419.

SPECIFICATION

OF

JOSEPH WALLER.

SMOKE-CONSUMING STOVE.

LONDON:

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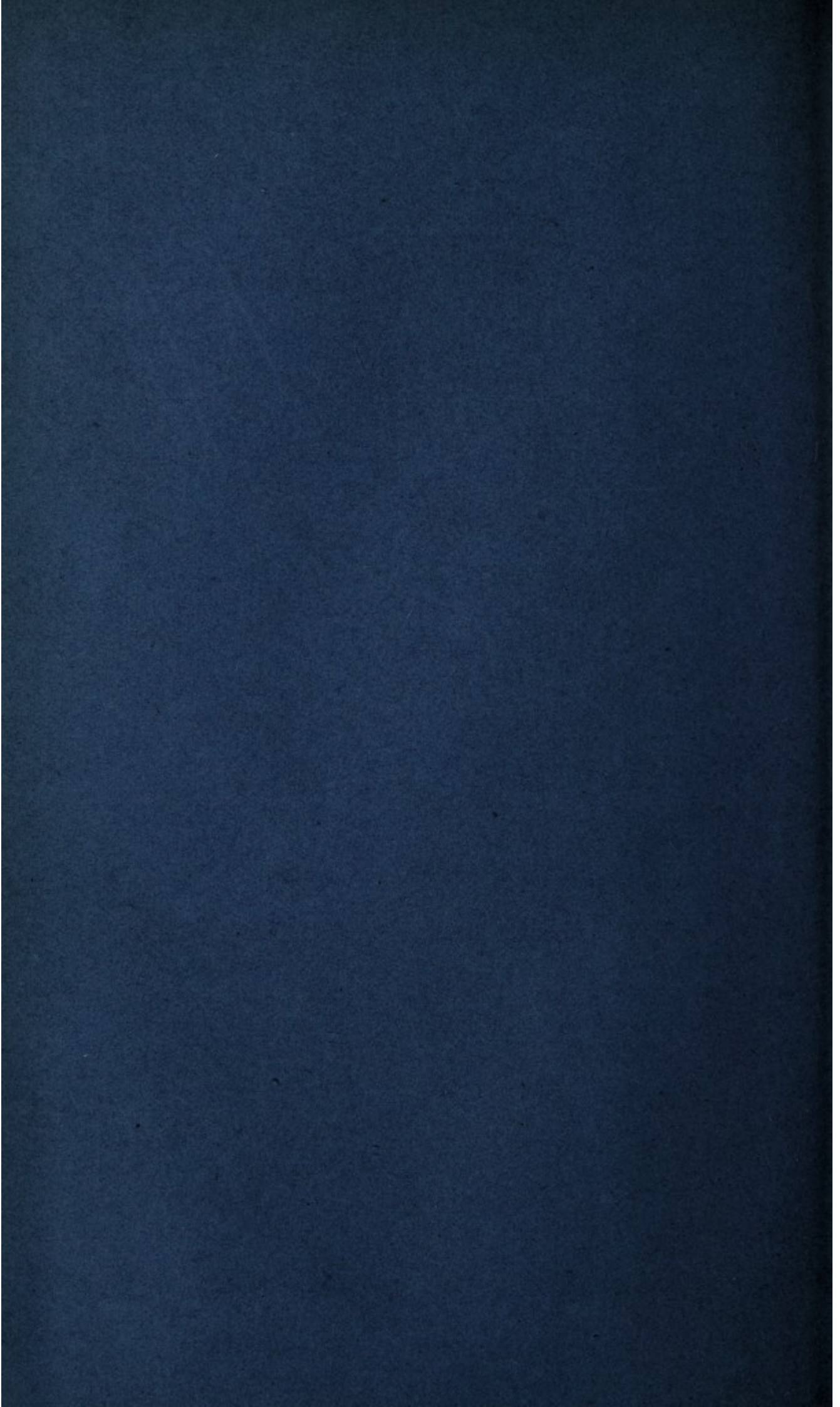
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1862.









A.D. 1861, 27th SEPTEMBER. N° 2419.

### Smoke-consuming Stove.

*(This Invention received Provisional Protection only.)*

**PROVISIONAL SPECIFICATION** left by Joseph Waller at the Office of the Commissioners of Patents, with his Petition, on the 27th September 1861.

I, JOSEPH WALLER, of Annerley, in the County of Surrey, Builder, do hereby declare the nature of the said Invention for “AN IMPROVED SMOKE-CONSUMING STOVE,” to be as follows:—

It consists in a combination of apparatus and appliances for obtaining more perfect combustion, for increasing the heat, for preventing the formation of opaque smoke, for economising fuel, and also generally for improving the draft of fires in dwelling houses. One of the principal means of obtaining these objects, and first for perfecting the combustion of the fuel, is the erection of a fire-brick “bridge” at the back of the grate of sufficient thickness so that by its mass of slow conducting material it may, when once heated, be able to retain a high temperature for a considerable time, in order to impart sufficient heat to each fresh supply of coals; and it is to be carried up to a few inches higher than the level of the top bar of the grate, so as to admit of a large quantity of fuel lying in front of it when required. At the back of this fire-bridge and a few inches distance from it, I construct a mid-feather or partition reaching from side to side of the chimney flue, so that when the upper part of the fire-place is closed, by an apparatus for that purpose to be presently described, the flame and gases from the fuel will be compelled to pass over the top of the bridge and descend through the throat or contracted space thus formed, where by the general action of the draft the current is then



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*Waller's Improved Smoke-consuming Stove.*

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turned upwards into the rising flue of the chimney. In this situation at the back of the bridge, which I term the "union flue," and through which all the gaseous products of the fuel must generally pass off, such of them as are combustible, are to be ignited and consumed in the following manner:—In the first place it is to be considered that the said descending current of mixed 5 and partially combustible products that escape inflammation at the front of the bridge, is rendered incombustible only from one of two causes, either insufficient elevation of temperature or a deficient supply of atmospheric oxygen. To provide against the last-named defect I admit a supply of fresh air at a small grate or drain near the foot of the bridge. Through this air drain the 10 fresh air is drawn by the natural action of the chimney draft, and intermixes with the gases in the throat of the union flue before referred to. The immediate result is the more perfect combustibility of those gases, which are in consequence entirely consumed, and with them also the floating deposit of carbonaceous matter which gives the black colour to the smoke will be 15 destroyed at the same time. Under ordinary circumstances when the fire-bridge has become sufficiently heated, it will be found that the combustible gases in the throat of the stove will be sufficiently supplied with oxygen over the top of the fire to ensure their ignition by the descending flame itself, and thus the formation of black smoke will be prevented in the most easy and 20 economical manner. Should, however, the descending current of combustible gases, for want of sufficient heat, or by reason of being mixed with the ascending current of atmospheric air at a still lower temperature, become at any time difficult of ignition, I have provided further means of ensuring the desired effect in all cases, whatever may be the temperature of the gases, 25 by an infallible process and apparatus which I shall now proceed to describe.

Through the middle of the aforesaid fire-bridge, and at rather less than half the height of the top bar of the grate, I cut an aperture, which may be either round or square, or of any other cross section, but must be of a tapered form 30 longitudinally from the back to the front of the bridge. Into this tapered aperture I fit a suitably taper-shaped plug, formed of similar material to that of the bridge itself. This plug being a truncated cone or prism, and which I call the "fire plug," is to be made with such a degree of taper as to entirely fill the hole when pushed quite in from the back of the bridge, but so as to leave 35 a considerable space around it when slightly withdrawn. The object of thus partially withdrawing the fire plug is to allow the passage of fire or flame by the sides of it, for the purpose of igniting the aforesaid mixture of combustible gases, and thereby accomplish the consumption thereof. The means of readily



*Waller's Improved Smoke-consuming Stove.*

drawing the fire plug into or out of the hole is accomplished by first having a tramway formed by one or more iron rods or rails extending underneath the grate and the bridge to a short way beyond the latter. I then place upon this tramway a small truck or carriage to be moved occasionally by a handle and  
5 rod upon a small friction wheel or roller, by which means the said carriage can be readily moved backward or forward. An upright bar of iron affixed to this carriage is then to be securely attached to the back of the fire plug, so that by pushing or pulling at the aforesaid handle and rod the fire plug may be moved a few inches in either direction respectively for opening or closing the  
10 plug hole with the greatest facility. When open, or partially open, a portion of the flame and heat from the red-hot fuel in the grate will pass through and ignite the stream of gases behind the bridge, or within the throat of the aforesaid union flue, at which point the combustion of the gases will always be effected in the most perfect manner. Even the carbonic oxide gas, so  
15 commonly produced in all domestic fire-places, absorbing nearly one-half the undeveloped heat obtainable from the fuel, is thus made use of in creating more heat, and at the same time consuming the black carbonaceous matter which constitutes the great nuisance of smoke.

Having explained my method and apparatus for creating the greatest  
20 amount of heat in a domestic stove without smoke, I shall now describe my method of disposing of the heat and light so created to the best advantage in warming a healthy apartment in an ordinary English dwelling-house. For this purpose I first provide a regulating mouthpiece or draft door for covering and entirely closing, when necessary, the anterior opening of the chimney flue  
25 over the fire-grate. It is to be suspended upon two pivots, from which it may be swung to or fro as required within the upper part of the stove, and against the back of which it is made to shut close up of itself; but when required to be open or partially open it is to be drawn forward and adjusted by means of a small chain passing through the ornamental metal work in the front part of  
30 the stove.

When the draft door is thus drawn forward, which is only required when any unusually large quantity of coal is put on at once, or at the first lighting of the fire, the passage behind it or in front of the mid-feather partition before mentioned, is of course then open for the passage of the smoke  
35 and gases upward instead of down the throat of the union flue, although in either case such gases will undergo combustion by the proper use of the fire plug, as before described. When the plug is fully inserted so as entirely to fill the aperture in the bridge, the smoke will still be consumed, but not so perfectly, nor will it be so much required, for when the plug is drawn in there



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*Waller's Improved Smoke-consuming Stove.*

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will be generally a bright fire at the top of the bridge, from which the flame will the more readily descend and burn much, if not all, its own smoke in its descent.

For the purpose either of concentrating the radiant heat within the vicinity of the fire-place, or for dispersing the rays of light and heat in any other direction through the apartment, I make use of metallic reflectors, which I attach to the front of the aforesaid draught door. Owing to the particular form of this draught door, or of the reflectors attached to it, which are anglo-concave, and may be called double faced, from their capability of reflecting the rays of light and heat from their two principal faces when at rest, namely, obliquely downwards and horizontally; and also by a slight movement at all intermediate vertical angles, and by its easy adjustment in any position, the heat and light from the smokeless flame, even when passing down to the union flue can be reflected in any desired direction, thus utilising the entire calorific effect of such flame which might otherwise be lost, or the flame itself not be at all times visible. This reflecting draft door is to be suspended on its two pivots, so as to be readily lifted off for cleaning and also for sweeping the chimney flue.

Cleanliness and freedom from dust are provided for by an improved cinder-sifter below the grate, and a dust box below that. The cinder-sifter is in the form of a drawer perforated in front, and when in operation is at the back in open communication with the chimney flue for carrying off the dust.

I also provide an improved fender with a movable ornamental or plain front balanced upon two pivots, one at each end in front of the grate, in such manner that any large cinders which may fall from the grate will be retained until replaced on the fire again; or they may be removed at pleasure by a slight movement of this balanced fender front, which will pass them through into the cinder-sifting drawer, while all below a certain fixed size are precipitated into that receptacle along with the ashes at once.

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