

## **Specification of George Anstey : furnaces, fire-grates, and chimneys.**

### **Contributors**

Anstey, George.

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A.D. 1851 . . . . . N° 13,447.

SPECIFICATION

OF

GEORGE ANSTEY.

FURNACES, FIRE-GRATES, AND CHIMNEYS.

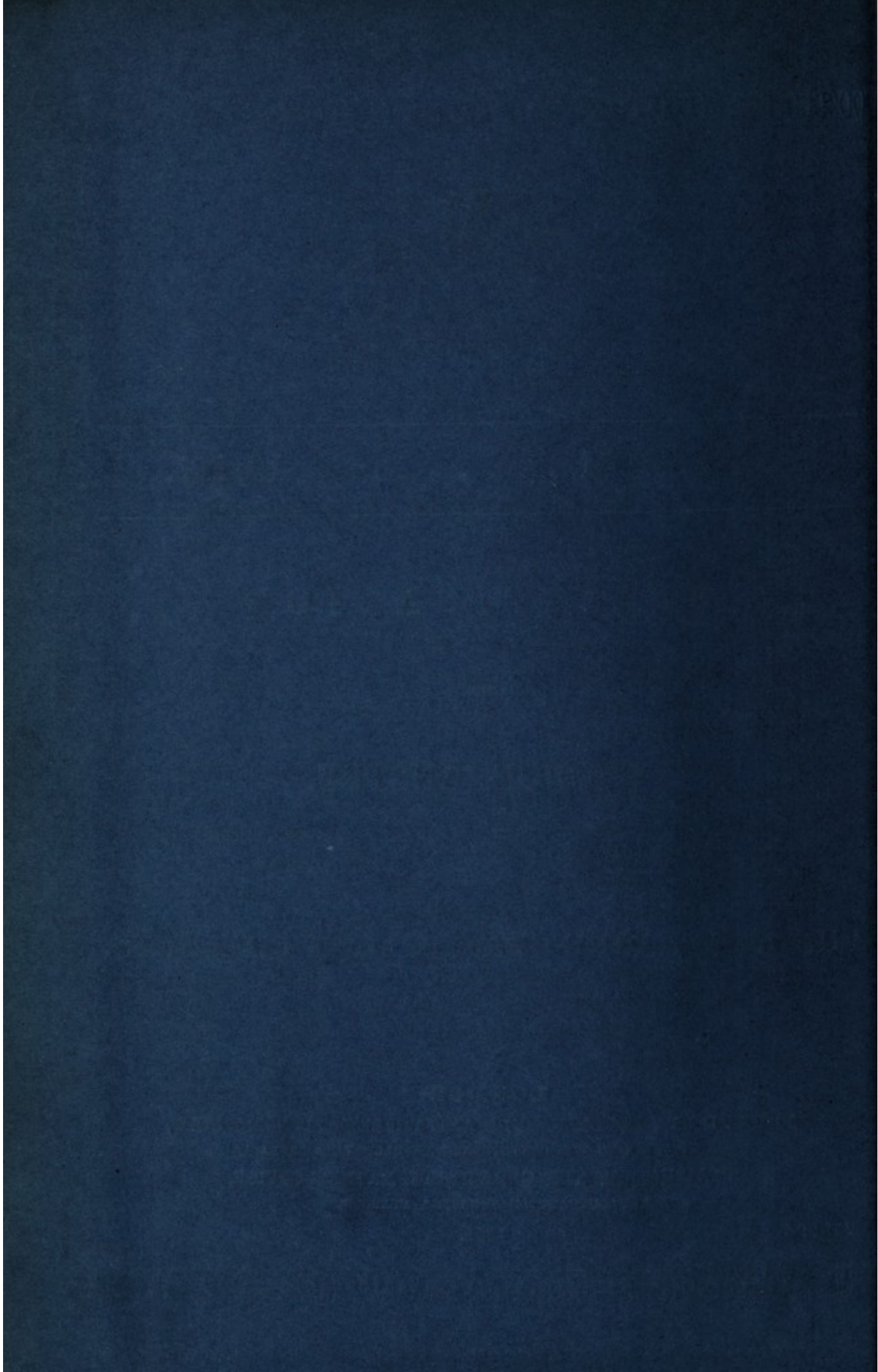
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A.D. 1851 . . . . . N° 13,447.

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**Furnaces, Fire-grates, and Chimneys.**

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ANSTEY'S SPECIFICATION.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, GEORGE ANSTEY, of Brighton, in the County of Sussex, Gentleman, send greeting.

WHEREAS Her present most Excellent Majesty Queen Victoria, by Her Royal Letters Patent under the Great Seal of Great Britain, bearing date at  
5 Westminster, the Eleventh day of January, in the fourteenth year of Her reign, did, for Herself, Her heirs and successors, give and grant unto me, the said George Anstey, Her especial licence, full power, sole privilege and authority that I, the said George Anstey, my eñors, adñors, and assigns, and such others as I, the said George Anstey, my eñors, adñors, or assigns, should at any time  
10 agree with, and no others, from time to time and at all times during the term of years therein mentioned, should and lawfully might make, use, exercise, and vend, within England, Wales, and the Town of Berwick upon Tweed, my Invention of "CERTAIN IMPROVEMENTS IN CONSUMING SMOKE, AND IN REGULATING THE DRAFT IN CHIMNEYS;" in which said Letters Patent is contained a proviso  
15 obliging me, the said George Anstey, by an instrument in writing under my hand and seal, particularly to describe and ascertain the nature of my said Invention, and in what manner the same is to be performed, and to cause the same to be enrolled in Her Majesty's High Court of Chancery within six calendar months next and immediately after the date of the said in part recited  
20 Letters Patent, as in and by the same, reference being thereunto had, will more fully and at large appear.



*Anstey's Impts. in Consuming Smoke, and Regulating the Draft in Chimneys.*

**NOW KNOW YE**, that in compliance with the said proviso, I, the said George Anstey, do hereby declare that the nature of my said Invention, and the manner in which the same is to be performed, is particularly described and ascertained in and by the following description thereof (reference being had to the Drawings hereunto annexed, and to the letters and figures marked thereon, 5 (that is to say) :—

My Invention of "Certain Improvements in Consuming Smoke, and in Regulating the Draft in Chimneys," has for its object, in the first place, the consuming the greater portion of the carbonaceous inflammable matter contained in the smoke emitted from grates and furnaces, while allowing the incombustible 10 vapours or gases to pass off through the chimney as usual. My Invention has for its object, in the second place, the maintenance of a more steady and uniform draft in chimneys, by protecting their upper part from the influence of a sudden downward current of the external air, particularly in windy weather, thereby preventing the air at the upper part of the chimney from becoming 15 cooled so as to interfere with the upward current of the entire column of heated air from the fire.

Now the means by which I propose to accomplish the above first-mentioned object consists in so arranging and constructing the grate or furnace as to cause the smoke emitted from the fire to pass through perforations formed in metal 20 plates, and subsequently through perforated inverted cones or cups hereafter to be described, such metal plates and cones being acted upon by an intense heat, and a great portion of the carbonaceous inflammable matter contained in the smoke being arrested by having to pass through the two sets of perforations in succession, becomes consumed, while the incombustible vapors or gases pass 25 through the two sets of perforations and escapes into the chimney.

I proceed now to describe the mode of adapting my Invention to grates for sitting rooms. At the back of the grate is fixed, out of sight, a chamber into which the smoke is made to enter from the fire, in order that the carbonaceous inflammable matter contained in it may be consumed. The chamber extends 30 upwards from about the level of the upper part of the fire, the under side having slits or openings for the flames to pass through. The chamber is divided by a horizontal metal plate perforated with holes, the top of it being formed by a metal plate having inverted cones or cups with perforations in them. This chamber is thus adapted and constructed that the smoke may enter it from 35 the fire, and also that the flames and heat from the fire may act upon it, and that the carbonaceous inflammable matter in the smoke, which is arrested from escaping upwards according to its usual course into the chimney, is consumed by coming in contact with the heated air and flames in the chamber,



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while the inflammable vapour or gases pass out through the perforations in the plate, and subsequently through those in the inverted cones or cups into the chimney. The precise form and proportions of the heated chamber will be varied to suit the particular form and size of grate to which my improvements  
5 are to be applied, and the manner of introducing the smoke into it may also in some cases be varied. But the essential feature of the chamber must in all cases be preserved, which is that it be a heated chamber open to the admission of the smoke and flames from the fire, and fitted with a perforated horizontal plate dividing the upper from the lower part, and in the top of the chamber  
10 inverted cones or cups, with perforations for the escape of the incombustible vapour or gases into the chimney.

It has been found desirable in practice to apply a flue on each side of the grate in order to assist the draft in the chimney so as effectually to carry off the incombustible vapour or gases. These flues might be used for warming and  
15 ventilating purposes in other rooms also.

In order, however, that my improvements as applied to grates may be more evident I will refer to the accompanying Drawings, with the figures and letters marked thereon, in which Fig. 1 represents an elevation of the chamber as it would appear with the fire grate and back plate of a common register stove re-  
20 moved, and Fig. 2 is a vertical section of the chamber, shewing also the smoke and flames passing into it. In both these Figures the ordinary grate is omitted for the sake of rendering the construction of the chamber more evident, the representation of the flames sufficiently indicating the position of the fire. These figures will shew the direction which the smoke takes on leaving the fire, (that  
25 is to say,) it passes (as shewn by arrows) through apertures into the lower division of the chamber *a*, and advancing upwards strikes against the perforated plate *b*. It is also to be observed that the flames from the fire enter the lower division of the chamber *a*, and keep the chamber in a highly heated state. The effect then of the smoke from the fire entering the lower part of the chamber *a*,  
30 and being arrested in its free passage to the chimney by the perforated plate *b*, will be that a portion of its carbonaceous inflammable matter will become consumed in this part of the chamber. A portion, however, will pass into the upper division of the chamber *a*, and not being able to pass quickly out of the chamber, except through the perforations in the inverted cones or cups *c*, a  
35 further consumption of the carbonaceous inflammable matter of the smoke takes place in this upper division of the chamber, the incombustible vapour or gases passing off through the perforations in the cones or cups *c* into a flue *d* communicating with the chimney. In adapting and fitting the chamber *a* to an ordinary fire grate it is desirable that the plate *e* at the back of the fire, which



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forms the front inclosure of the chamber, should be brought as far forward as is found convenient, in order to insure the greatest possible amount of the smoke from the fire going behind the plate into the chamber *a*. It may also be desirable to make the bottom of the plate *e* of an arched or other convenient form to admit of the smoke easily passing under it into the chamber. In the 5  
 Drawing the chamber *a* is represented with a certain space on each side, filling up the width of the fire-place; but it may be here remarked that the precise width of this space is not material, its only object being to provide a convenient inlet for the smoke to the chamber *a*, as described. *f, f*, are two flues, one on each side of the fire-place, with apertures at *g, g*, for the admission of air 10  
 from the room. These flues lead into the chimney and assist the draft therein.

In constructing the chamber *a*, and fitting it to a fire-place or grate, the plate *e* forming the front inclosure of the chamber may be made capable of being removed in case it should be required to clear the perforated plate *b*, or the cones or cups *c*, or any other part of the chamber *a*, from soot accumulating 15  
 to such an extent as to impede in any inconvenient degree the passage of the incombustible vapours or gases after the burning of the smoke in the chamber.

I proceed now to describe a modification of the above adapted to furnaces. In doing so I would observe at once that my Invention does not relate to any particular kind of furnace exclusively, but is capable of being adapted to 20  
 all furnaces, it being simply a mode of restraining the free passage of the smoke from the fire in such a manner as to cause its carbonaceous inflammable matter to become more thoroughly consumed than heretofore by the action of the flames upon it. In ordinary furnaces the smoke and heated vapours or gases are free to pass from the fire along the flues to the chimney, and in this 25  
 manner a large quantity of unconsumed carbonaceous matter is carried along to the chimney, and it is usual to encrease the height of the back of the furnace to form what is called a bridge, partly to cause in some degree an impediment to the passage of unconsumed carbonaceous matter. Now my Invention, as adapted to furnaces, consists in extending the ordinary bridge to the top of the 30  
 inside of the furnace, and making holes in the extended part through which the flames can pass, and also in fitting a second bridge at a further distance from the fire, in which second bridge are formed larger holes, with cones or cups with perforations in them. The effect of this arrangement will be that the smoke as it issues from the fire will, by coming in contact with the extended 35  
 bridge, be kept longer in contact with the flames and intense heat than at present, and thus have its carbonaceous inflammable matter more thoroughly consumed than in ordinary furnaces, and this effect is repeated at the second bridge, so that by the time the smoke has passed through the perforated cones



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or cups in the second bridge its carbonaceous inflammable matter will have become for the most part consumed, and the incombustible vapours or gases may pass as usual to the chimney.

Fig. 3 is a section of a boiler furnace with my improvements adapted thereto; 5 the extended bridge is shewn at *a*. It consists of the ordinary bridge of fire-brick extended to the roof of the furnace, and having holes formed in it. *b* is the second bridge, which has cones or cups *c* fitted into it, such cones or cups having perforations formed in them for the passage of the incombustible vapours or gases into the chimney.

10 Figures 4 and 5 represent detached views of the bridges *a* and *b* on a larger scale.

It may be found necessary to apply an additional bridge, and to modify the construction and arrangement of these bridges in different furnaces, but whatever be the number employed the purpose answered by them will in all cases be similar, 15 videlicet, to cause a greater consumption of the carbonaceous inflammable matter in the smoke by holding it longer in direct contact with the flames and intensely heated air within the furnace. It is also desirable to remark that this my Invention may be combined with all known means of increasing the draft, and of feeding the fuel to the best advantage in furnaces, and also with different 20 arrangements of the fire or fires, the object of my Invention being simply to supply a means of retarding the passage of the carbonaceous inflammable matter so as to prevent its going forward in an unconsumed state along with the incombustible vapours or gases which it is necessary to get rid of.

I proceed now to describe my improvements in regulating the draft in 25 chimneys. These consist in the adaptation and application of certain apparatus (herein-after described) fixed in the upper part of the chimney, and so formed as to prevent the external air from coming into sudden contact with the warm air in the chimney, by which means this air, passing steadily upwards from the fire-place, is maintained at a more uniform temperature, especially at its 30 upper part, and thereby maintains a more regular draft in the chimney.

Figures 6 to 13 represent different views of the apparatus for regulating the draft in chimneys. Fig. 6 is an outside elevation of the covering for a chimney made according to the principle herein-before set forth, and Figures 7, 8, and 9 are vertical and horizontal sections designed to shew the construction of 35 the same. It will be seen that a current of external air cannot be impelled suddenly down the chimney, but on entering the inner vessel *a* it strikes against the bottom *b* of the said vessel, is deflected through the openings *c, c*, and passes into the space between the vessel *a* and the chimney pot *d*. This external air has thus less tendency to cool the air in the upper part of the chimney, and



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can offer less opposition to the upward current of air in the chimney. *e, e,* are holes to prevent any inconvenient lodgment of rain on the bottom *b* of the inner vessel *a*. The direction of ingress of the external air is indicated by the arrows. Fig. 10 represents an elevation; Fig. 11, a detached portion of the interior; Fig. 12, a vertical section; and Fig. 13, a horizontal section of 5 another form of my Invention designed to effect a similar purpose. In this case the external air is admitted to the upper part of the chimney through the sides of the outer vessel or chimney pot, but a direct downward current into the inner vessel is prevented, and also the sudden violent admission of external air through the holes in the sides of the inner vessel. It will be seen from 10 Figures 10 and 11 that both the outer vessel or chimney pot *f* and the inner vessel or cylinder *g* have holes formed in their sides for the admission of air. Fig. 12 shews in elevation, and Fig. 13 in horizontal section, the means just alluded to, by which the external air is impeded in entering the chimney pot *f*, consisting of a shield *h*, of a curved form as shewn, mounted on an upright 15 spindle *i*, and capable of being turned by the vane on the top of the spindle, with its back towards the wind, so as to prevent the entrance of a direct horizontal current of air, and to break its force by deflecting it.

By means of these two different forms of apparatus the upward current of heated air or draft in a chimney is protected from the disturbing effects of a 20 downward draft of external air suddenly meeting it, and thereby checking its uniform action. In the same manner also the warmth of the upper part of the chimney is maintained more uniformly, and consequently the draft in the chimney regulated. I would here remark that my principle of regulating the draft in chimneys, by impeding the direct admission of a sudden current of 25 external air at the upper part of the chimney, as described, may be carried into effect by apparatus slightly varying in form from those represented and described.

Having thus described the nature of my Invention, and the manner in which the same is to be performed, I would have it understood that I do not intend 30 to confine myself to the precise forms and arrangements of my Invention hereinbefore described; nor do I claim any of the parts described separately, but only so far as they are used in combination for the carrying of my Invention into effect. But what I do claim is, in reference to consuming smoke, the means described of consuming the carbonaceous inflammable matter in the 35 smoke issuing from fires, by causing the smoke to pass through apertures and thereby to be held longer in contact with the flames and heat from the fire, as described in its adaptation to grates, and in a modified form to furnaces.



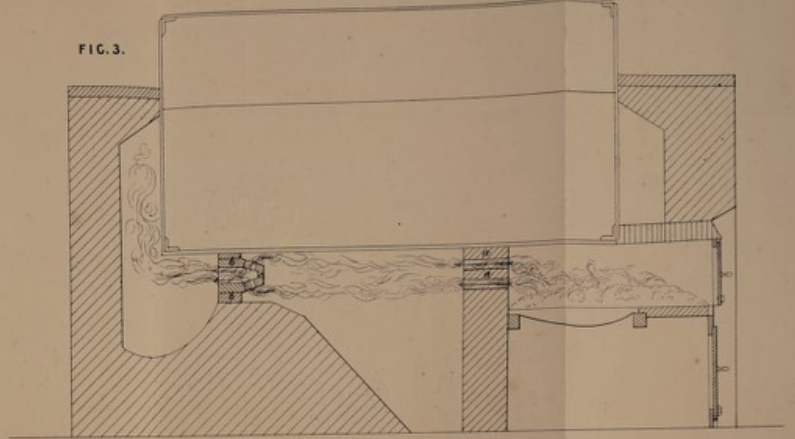
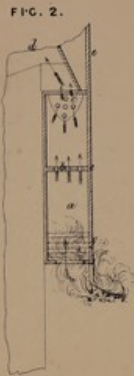
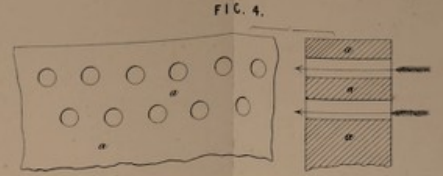
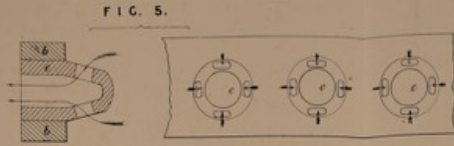
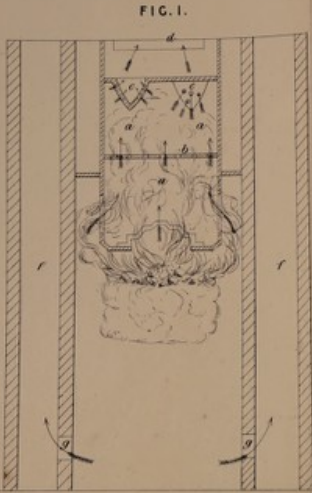


FIG. 6.



FIG. 8.



FIG. 7.



FIG. 9.

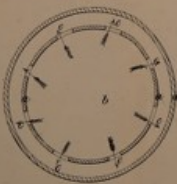


FIG. 10.

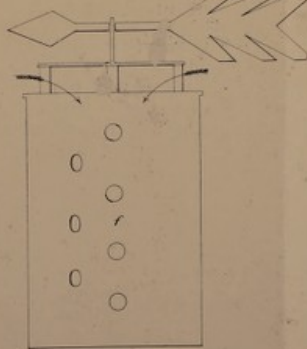


FIG. 11.

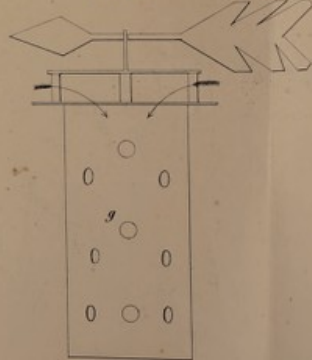


FIG. 12.

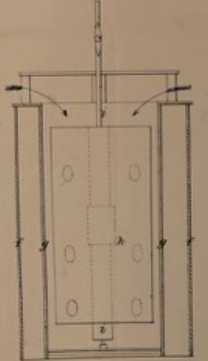
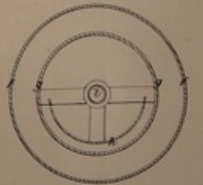
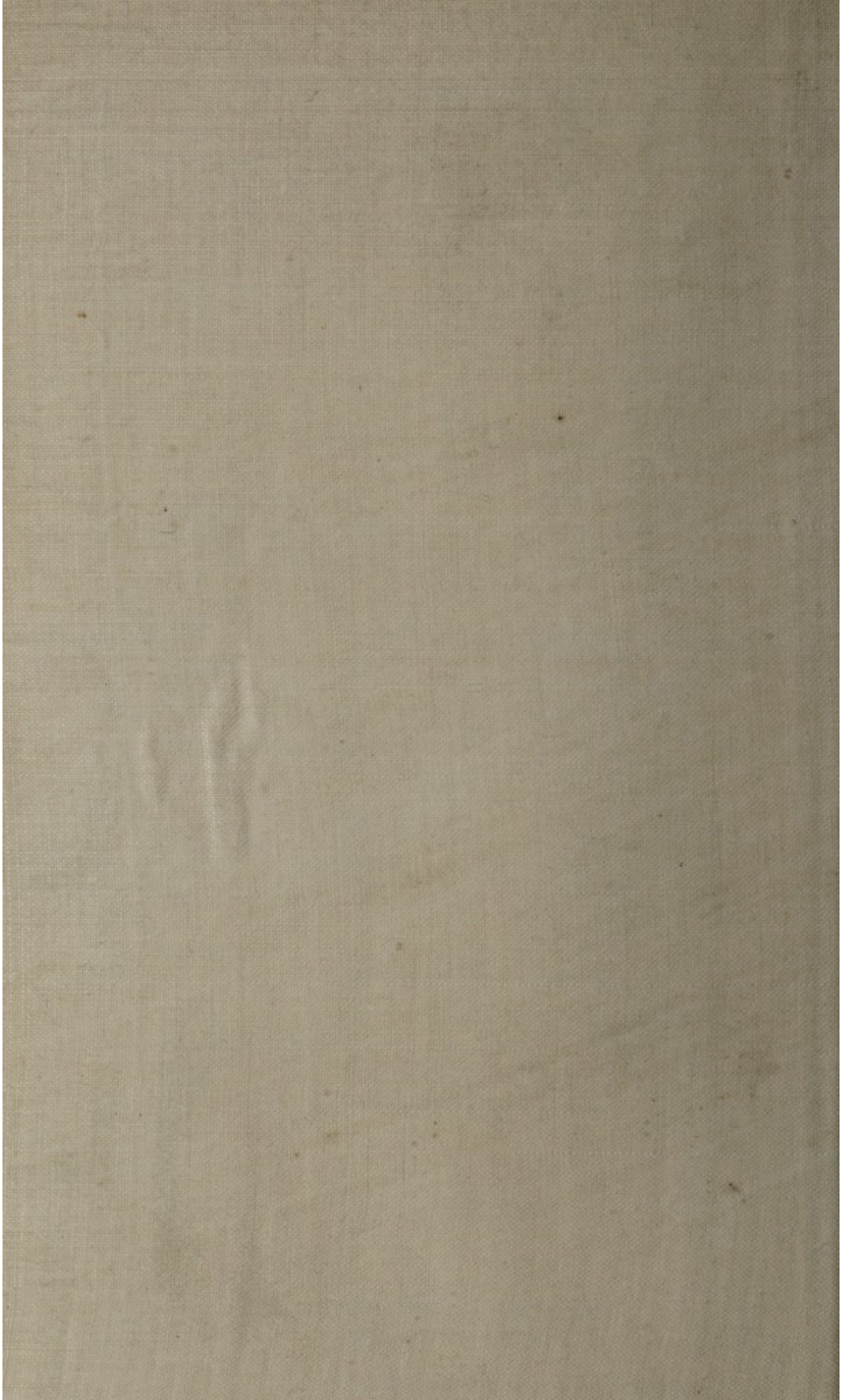


FIG. 13.



The inventor drawing is partly colored.







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And in reference to regulating the draft in chimneys, I claim the means described of maintaining an equable warmth of the air at the upper part of the chimney by preventing the sudden influx of the external air.

In witness whereof, I, the said George Anstey, have hereunto set my  
 5 hand and seal, this Eleventh day of July, in the year of our Lord  
 One thousand eight hundred and fifty-one.

GEORGE (L.S.) ANSTEY.

**AND BE IT REMEMBERED**, that on the Eleventh day of July, in the year  
 of our Lord 1851, the aforesaid George Anstey came before our said Lady  
 10 the Queen in Her Chancery, and acknowledged the Specification aforesaid, and  
 all and every thing therein contained and specified, in form above written. And  
 also the Specification aforesaid was stamped according to the tenor of the  
 Statute made for that purpose.

JEFFERSON.

Enrolled the Eleventh day of July, in the year of our Lord One thousand  
 15 eight hundred and fifty-one.

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