

Specification of George Atkins and Henry Marriott : stoves and grates.

Contributors

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A.D. 1825 N° 5190.

S P E C I F I C A T I O N

OF

GEORGE ATKINS
AND
HENRY MARRIOTT.

STOVES AND GRATES.

L O N D O N :

PRINTED BY GEORGE E. EYRE AND WILLIAM SPOTTISWOODE,
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NEAR FLEET STREET.

Price 6d.

1854.



No. 2190

A.D. 1855

REGISTERED

GEORGE ALLEN
AND
HENRY MARSHALL

STOVES AND GRATES

LONDON

PRINTED BY GEORGE ALLEN AND HENRY MARSHALL
PRINTERS TO THE QUEEN'S PRINTING OFFICE, 15, MARK LANE
LONDON



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Stoves and Grates.

ATKINS AND MARRIOTT'S SPECIFICATION.

TO ALL TO WHOM THESE PRESENTS SHALL COME, we, GEORGE ATKINS, late of Drury Lane, now of the Parish of S^t Pancras, in the County of Middlesex, Gentleman, and HENRY MARRIOTT, of Fleet Street, in the City of London, Ironmonger, send greeting.

- 5 **WHEREAS** His present most Excellent Majesty King George the Fourth, by His Letters Patent under the Great Seal of Great Britain, bearing date at Westminster, the Eighteenth day of June, One thousand eight hundred and twenty-five, in the sixth year of His reign, did, for Himself, His heirs and successors, give and grant unto us, the said George Atkins and Henry
- 10 Marriott, His especial licence that we, the said George Atkins and Henry Marriott, our exors, admors, and assigns, or such others as we, the said George Atkins and Henry Marriott, our exors, admors, and assigns, should at any time agree with, and no others, from time to time and at all times during the term of years therein expressed, should and lawfully might make, use,
- 15 exercise, and vend, within England, Wales, and the Town of Berwick upon Tweed, our Invention of "**CERTAIN IMPROVEMENTS ON AND ADDITIONS TO STOVES AND GRATES;**" in which said Letters Patent is contained a proviso obliging us, the said George Atkins and Henry Marriott, by an instrument in writing under our hands and seals, or under the hand and seal of one of us, particularly to describe and ascertain the nature of our said Invention, and in
- 20 what manner the same is to be performed, and to cause the same to be inrolled in His Majesty's High Court of Chancery within six calendar months next and immediately after the date of the said in part recited Letters Patent, as in and by the same, reference being thereunto had, will more fully and at
- 25 large appear.

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NOW KNOW YE, that in compliance with the said proviso, we, the said George Atkins and Henry Marriott, do hereby declare that the nature of our said Invention, and the manner in which the same is to be performed, are particularly described and ascertained in and by the Drawings hereunto annexed, and the following description thereof, that is to say:—

The objects of the said Invention are, firstly, to remedy smoky chimnies; secondly, to economise fuel and regulate heat evolved from stoves or grates for warming apartments, and for the various operations of cooking. In order to prevent the evolution of smoke from open fire stoves into the rooms of dwelling houses, and also to prevent the escape of black or opaque smoke from chimney flues into the exterior atmosphere, the smoke, as it becomes disengaged from coal or other fuel, is made to pass through the mass of ignited fuel in the fire chamber, by which means the inflammable or opaque portion of the smoke becomes consumed, giving out light and heat, while the carbonic acid and other more transparent gases which form the residuum of combustion will ascend the chimney flue with rapidity from the heat, and, consequently, rarification produced by the flame. The combustion of smoke may be accomplished in open stoves or grates by making or attaching a box or chamber, of a rectangular or any other figure, to the fire chamber of any or every kind of open fire grate. The most convenient form for this coal box or chamber is represented in the Drawings hereunto annexed, in which Drawing Fig. 1 shews an elevation of a register stove (scale $\frac{1}{12}$), and Fig. 2 a section of the same, the letters referring to similar parts in each; but the Patentees do not restrict themselves to this form of coal box. The bottom of such coal chamber should be made to slope forward at a considerable angle, and to communicate with the fire chamber by an opening through the back plate near the bottom of a parallelogram, or any other figure (see Fig. 1, *a*). This coal chamber may be closed at the upper part either by a sliding door or a door made to turn on hinges, or a door of a semicircular form made to turn on its own center, as shewn at *b*. This door plate may be attached either inside or outside the back plate of the stove, through which a semicircular aperture is to be made somewhat less in diameter than that of the door plate. This door may be made to turn easily on its axis by means of a key, and should be fitted accurately, so as to close the coal chamber nearly air-tight. Another mode of attaching the coal chamber to the fire chamber is shewn in Figures 3 and 4 (which represent the front elevation and section of the detached stove, commonly called air stoves, the front plate of Fig. 3 being removed to shew the interior arrangement). The coal chamber, with its aperture at *a* beneath the top bar of the fire grate, is exactly similar to that of Fig. 1. But its upper part is closed by a lid or cover which

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slopes towards the front of the stove, and is made to turn back at pleasure by vertical hinges, and to shut down on a rebate at the top edge of the fire back plate, as shewn in the section, Fig. 4. The space above the fire and coal chamber *c, c*, and the passage *d*, are nearly similar to other air stoves, having a descending
5 flue to carry off the smoke. A third method of attaching a coal chamber to the fire chamber is shewn in Figures 5, 6, and 7, which represent a front view and section, of a kitchens or cooking stove, commonly called a range. The sides of this coal box are similar to that in Figures 3, 4, but the cover or lid is made to shut down horizontally, forming a level with the top plates or hobs of
10 the grate, as shewn in sections 6, 7, at *g*. The bottom of this coal chamber, instead of being formed simply of an iron plate, resting on a bed of certain materials (to be hereafter described), as in the preceding Figures, is formed by the top of a boiler (shewn at *b*, Fig. 7), made of iron or other metal, which boiler also extends round the sides of the fire chamber in order to bring it more im-
15 mediately in contact with the fire. It will be proper to face the edge of this boiler with an additional thickness of iron to protect it from the immediate effect of the fire. The object of this boiler being the plentiful supply of steam or of boiling water for the various operations of cooking or heating by steam, its appendages for conveying off the steam are similar to those in common use,
20 and consequently form no part of the claim of the Patentees for the present Invention. The operation of these arrangements for consuming smoke as are follows:—Suppose any kind of grate or stove (provided with this coal chamber) to require replenishing with fuel, instead of throwing on coals in the usual way at the top of the fire, it is to be thrown into the chamber behind, and the door
25 or cover immediately closed. The fresh fuel on reaching the bottom of the chamber, and coming in contact with the ignited fuel, will immediately evolve that dense or opaque smoke always observable from fresh coals. This gaseous matter being prevented from making its escape (either into the chimney or the apartment) through the upper part of the coal box, is compelled to pass through
30 the mass of burning fuel at the lower part of the grate previous to ascending the chimney flue, by which operation its offensive portion, the tar vapour and carburetted hydrogen gas instantly inflames, in combination with the oxygen of the atmospheric air, while the azote of the common air and the ammonia and carbonic acid gases pass up the chimney with rapidity almost in
35 an invisible form, and consequently without depositing soot in any material degree in the chimney, or impregnating the external air with the black carbonaceous matter of ordinary coal smoke. The coal box is calculated to contain sufficient coals for a day's consumption. But it would be more economical and afford a mere complete combustion of the gaseous part of the coal (which forms

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more than one-third of its valuable properties) if coals be supplied in small quantities, according to the usual practice, for, in the event of the coal box being nearly filled with the gaseous portion of the coal, will be consumed in the early part of the day, while the dull coke or cinder would be reserved for the latter part of the day. As the coals become successively reduced to the state 5 of coke, it may be brought forward from the aperture of the coal box, and raised into the grate as requisite by the point of a poker. The other objects of the Patentees, to economise fuel and regulate the heat evolved from stoves or grates for warming apartments, and for the various operations of cooking, are to be accomplished by the following arrangement:—In lieu of the detached 10 fender and the opening beneath the fire in stoves and grates of the ordinary construction, a basement or projection is to be attached to the front of any register or other stove immediately beneath and in contact with the bottom of the fire bars. This basement may be made of any kind of metal plates, or of marble or other stone, or artificial stone, cement, or clay, in combination with 15 metal plates or bars. It may also be made of any figure and any dimensions, according to individual taste or fancy. The basement must be provided with a drawer or box to receive the ashes beneath the fire, in the front of which drawer should be a sliding ventilator in order to admit a current of air beneath the fire grating. On each side of this ash box cavities or chambers are to be 20 formed for the reception of certain substances known to be imperfect or slow conductors of heat; a mixture of pulverized charcoal and lime is the substance the Patentees chiefly recommend for this purpose, though they do not restrict themselves to any peculiar materials, but employ any of the mineral substances which are slow conductors of heat. Those cavities being filled with any such 25 slow conducting materials, the basement will form a solid mass with the plates forming the body of the stove. On each side of the fire bars the back part of the front plates or face of the stove is also to be provided with cavities or chambers (of any requisite depth) for receiving a portion of the said slow conducting materials. The front plates of these cavities may be formed either 30 of metal or any kind of stone or cement, and be fixed parallel with the front of the grate, or placed in an oblique direction, at the discretion of the manufacturer. The space *f*, in the section, Fig. 2, is also to be filled with the same materials, and also the whole of the cavity formed by the plates of the canopy or cornice *d*, *d*, Figures 1 and 2, the materials to be pressed or beaten into the 35 cavities so as to form a solid mass with their respective surfaces. The sides and back of the several cavities should neither extend to the entire width of the front of the stove, nor to the entire depth of the recess of the fire-place, in order to avoid that loss of heat which would ensue from the actual contact

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of the body of the stove with the brickwork of the chimney. Immediately beneath the top plates of the basement, two passages are to be made leading from the draft hole or ash box, and having a deflection towards the fire bars, be made to terminate in apertures on each side of the basement. These passages
5 are for the purpose of creating a current of air on each side from the draft hole, which air becomes warmed by contact with the front of the basement, and subsequently flows out into the apartment through the side orifices. These orifices may be provided if necessary with ventilator or regulating plates, similar to those applied to the ordinary air stoves. Suppose the respective
10 cavities of a stove, according to this plan, to be filled up with any of the before-mentioned slow conducting materials, and a fire to be lighted in the grate, it will be obvious that as the fire comes in contact with the basement and sides of the stove, a great portion of the heat given out from beneath the fire (and which in ordinary stoves is lost to the apartment through being immediately
15 driven up the chimney) will in this case be absorbed and retained for a time by the materials which form the basement and lower parts of the stove herein described. Thus, for example, if two stoves be made, one on the usual construction of register stoves, and the other with the improvements before mentioned, and having the fire chambers of equal dimensions, and supposing a
20 fire to be kept in each for a given number of hours, and then extinguished, while the register stove (constructed wholly of iron or other metal) will have become cooled down to the temperature of the atmosphere of the room within half an hour, the basement and other parts of the improved or "thermo-regulator" stove will retain a portion of its heat from four to six hours, according
25 to the dimensions of the stove and its mass of non-conducting materials. The gradual evolution of this portion of caloric from the surface of the improved stove may also be greatly economised for maintaining the warmth of any apartment by closing the register plate at the top when the fire is quite extinguished, and thus preventing the rapid escape of the warm air up the chimney
30 in waste, with the several adaptations and appendages before mentioned; the improved stove combines the advantages of the close chamber stoves generally used on the continent of Europe as to economy and exemption from smoke, with the cheerful aspect and comfort peculiar to open fire stoves. The "draft" or ascending column of air will in most cases be sufficient to maintain an
35 active or brisk fire in these improved stoves, owing to the additional heat and rarification produced by the combustion of the smoke. But in certain cases where the bad construction or too great area of chimney flues occasion a remarkably bad draft, the Patentees apply a small pipe to the basement of the improved stove, which pipe is to be connected with a reservoir of air (in a kitchen or

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other convenient apartment); the reservoir is to be filled by a pair of lever (or forge) bellows, or the air pipe may be immediately connected to the nozzle of the bellows, without any reservoir. This arrangement enables a brisk fire to be produced at all times in a few minutes, and without the necessity of having a servant enter the apartment for that purpose. This air pipe also 5 furnishes a most convenient mode of supplying any requisite quantity of fresh or cold air for the purpose of ventilating and cooling apartments during the summer season, for which purpose the air pipe, after it is brought into the corner or other convenient part of the room, is to have a branch leading to the basement of the stove and another branch carried up an opening 10 near the ceiling, each of these branches to be furnished with a stop-cock, to be open or shut at pleasure. These pipes may be made of any requisite dimensions, and rendered ornamental or concealed from view at the discretion of the workmen. The slow conducting materials before mentioned are also capable of being applied with advantage in economising the heat from 15 detached or air stoves. The basement of the stove *f, f*, (Figures 3 and 4,) is to be filled with these non-conducting materials, leaving a space for the ash box and descending flue, as shewn in section, Figure 4. But in warm air stoves with latiral or ascending flues, the basement may be filled up solid. The iron plates which form the coal chamber *a, b*, (Fig. 3,) should also be lined on each side 20 with a portion of the same materials, and the exterior surface of the fire chamber (usually termed the "cockle" in stoves of this descriptions) should be covered with plates or fire fire tiles to prevent the air from being vitiated by contact with the surface of hot iron plates. The exterior of this stove is similar to that of air stoves in general. The peculiar advantages, however, 25 which this kind of air stoves possess over those in common use (and for which the Patentees claim to be the inventors) are derived from the coal chamber and appendages for burning the smoke, for the principal objection to the general introduction of air stoves arises from the great liability of the horizontal or other flues to become choaked up with soot, and consequently to endanger buildings by 30 taking fire. But as the combustion of the crude smoke destroys full four-fifths of that carbonaceous matter which would otherwise be deposited in the flues or pipes, the liability to block up these flues with soot must consequently be reduced in the same ratio from the use of air stoves with these appendages for burning the smoke. The several improvements which the Patentees have 35 effected in the construction of cooking stoves or grates consist, firstly, of the adaptation of the coal box and boiler beneath (as before described); secondly, in the application of an oven on a peculiar construction immediately above the fire chamber of such cooking stoves or grates. The form of such oven, and

Fig. 1.

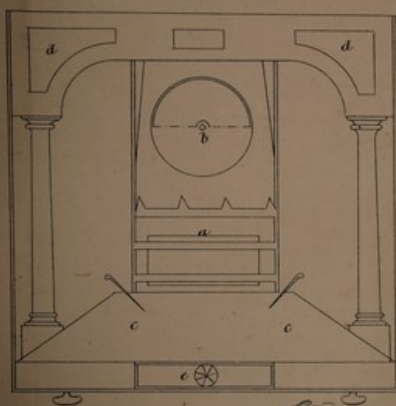


Fig. 2.



Fig. 3.

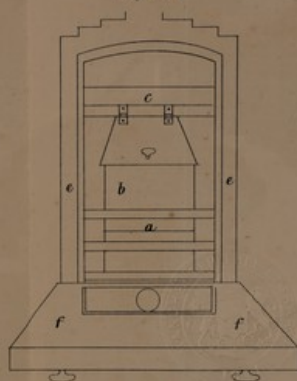


Fig. 4.



Fig. 5.

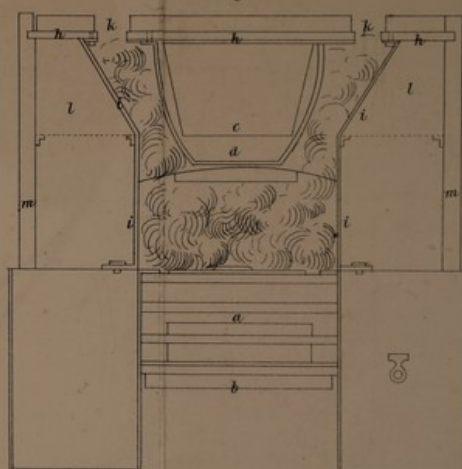
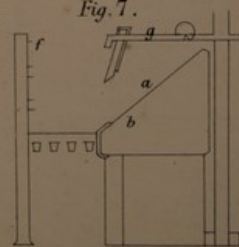


Fig. 6.



Fig. 7.



The Enrolled Drawing is not Colored.



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the arrangement for directing and economising the heat in a cooking stove with this appendage, will be readily understood from the Drawing, Fig. 5, and its sectional parts, Figures 6 and 7, the front plate being removed from Fig. 5, in order to show the interior. The bottom and sides of the oven *d* are
5 to be formed of wrought or cast iron plates, bent into a curvilinear or polygonal form, with horizontal flanches or ears at the top, by which flanches the oven is to be fixed by means of screws or rivets to the cast iron plate *h*, which extends across the top of the entire stove or grate. The oven, previous to being fixed, is to be filled to a certain extent with any kind of cement, fire stone or clay
10 tiles (nearly in the form represented at *d*, *d*, (Figures 5 and 6), with the view of preventing the two powerful action of the fire on the bottom of the oven, and for rendering the heat uniform in its interior. The side plates *i*, *i*, may be considered as a continuation of the plates forming the exterior of the oven, with apertures, shewn at *k*, *k*, about 3 inches wide, and from 12 to 15 inches long,
15 from front to back, to allow the passage of hot air or smoke into the chimney flue; the iron plate should also have corresponding openings cast in it, or be made of three separate pieces, with intervals between, as seen at *h*, *h*, *h*; the three portions of this hot plate should be lined or covered with blocks of fire stone, or any slow conductor of heat, in order to prevent the radiation or loss of
20 heat from the top of the oven. The spaces *l*, *l*, on each side of the oven serve as hot closets or auxilliary ovens in the upper part, while the lower parts in contact with the hob plates of the stove may receive the usual culinary vessels for steaming or boiling, a communication being made through the hob to the steam boiler in the usual way. The partitions *m*, *m*, on each side of these warm
25 closets are to be formed of their brickwork or tiles, and carried up so as to enclose the ends of the hot iron plate *h*, *h*, *h*. A back partition or wall of the same materials is also to be carried up to the same height from the back edge of the stove (as seen at *e*, Fig. 6), in which wall a register plate is to be fitted, so as to close the aperture into the chimney at pleasure. By closing this
30 register plate the whole of the hot air and flame will be directed towards the narrow passages through the top plate, after having given out a portion of its heat to the bottom and sides of the oven, as well as the top plate, a certain portion also being given out to the side plates and chambers *l*, *l*. If the heat be too great beneath the oven, the register plate is to be fully opened, and a detached
35 iron plate made to slide in immediately beneath the oven, so as to direct the flame and hot air through the back opening into the chimney. The front of these passages and ovens or chambers may either be constructed of iron plate altogether or of brickwork, with doors of plate iron, faced with tile, in order to prevent the radiation of heat into the apartment. It is scarcely necessary to

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remark that the heat beneath the oven will be considerably augmented by the occasional application of a plate called a "blower" in front of the opening between the top bar of the grate and the bottom of the oven. The peculiar advantages attending a kitchen stove having the appendages before mentioned are that the oven may be more uniformly and far more economically heated by 5 a given quantity of fuel than by any of the usual arrangements of flues leading from the side of the fire, and the very simple construction of the draft passages and apertures, together with the combustion of the crude smoke, in a great measure prevents the inconvenience to which all such flues are liable from the deposit of soot. The Patentees do hereby further declare the specific parts 10 of stoves and grates of which they claim to be the inventors, are the application of a box or chamber for receiving the fuel preparatory to burning the crude smoke in open fire grates; also the construction and application of the basement cornice and other parts herein-before described (however such parts may be varied in their form) for saving fuel and regulating the temperature of 15 the air in apartments; and, lastly, for the construction and application of the improved oven before mentioned, with its appendages for economising heat in kitchen or cooking stoves.

In witness whereof, we, the said George Atkins and Henry Marriott, have hereunto set our hands and seals, this Ninth day of December, 20 in the year of our Lord One thousand eight hundred and twenty-five.

GEORGE (L.S.) ATKINS.

HENRY (L.S.) MARRIOTT.

WINGFIELD. **AND BE IT REMEMBERED**, that on the Ninth day of December, in the year of our Lord 1825, the aforesaid George Atkins and Henry Marriott 25 came before our said Lord the King in His Chancery, and acknowledged the Specification aforesaid, and all and everything 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.

Inrolled the Ninth day of December, in the year of our Lord One thousand eight hundred and twenty-five. 30

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