



A.D. 1839 N° 7969.

SPECIFICATION

RICHARD PROSSER.

APPARATUS FOR GENERATING STEAM,
CONSUMING SMOKE, AND HEATING
APARTMENTS.

LONDON:

PRINTED BY GEORGE E. EYRE AND WILLIAM STODOLSKY,
SUCCESSORS TO THE QUEEN'S PRINTING OFFICE:

PUBLISHED AT THE QUEEN'S PRINTING OFFICE, EAST HANDBURG STREET,
NEAR FLEET STREET.

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**Apparatus for Generating Steam, Consuming Smoke,
and Heating Apartments.**

PROSSER'S SPECIFICATION.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, RICHARD PROSSER, of Birmingham, in the County of Warwick, Civil Engineer, 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 Nineteenth day of February, in the second year of Her reign, and in the year of our Lord One thousand eight hundred and thirty-nine, did, for Herself, Her heirs and successors, give and grant unto me, the said Richard Prosser, Her especial licence, full power, sole privilege and authority, that I, the said Richard Prosser, my executors, administrators, and
 10 assigns, and such others as I, the said Richard Prosser, my executors, administrators, 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 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**
 15 **APPARATUS FOR GENERATING STEAM, CONSUMING SMOKE, AND HEATING APARTMENTS;**" in which said Letters Patent is contained a proviso obliging me, the said Richard Prosser, 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
 20 inrolled in Her Majesty's High Court of Chancery within six calendar months next and immediately after the date of the said in part recited Letters Patent,

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as in and by the same, reference being thereunto had, will more fully and at large appear.

NOW KNOW YE, that in compliance with the said proviso, I, the said Richard Prosser, 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 (that is to say):—

My improvements in apparatus for generating steam consists in the employment of vertical tubes attached to the bottom of ordinary boilers. Drawing 1 shows a plan view of a pair of marine engine boilers, one of such boilers having my tubes attached, the other boiler being of the ordinary construction for steam vessels. Drawing 2 shows, full size, three tubes attached to the bottom of a boiler; these tubes it will be seen rise above the bottom of the boiler, two of the tubes being shewn in elevation, and one tube in sectional elevation; the height of the water or water line of the boiler is shewn by a dotted line, marked water-line on Drawing 2. It will be seen by examining the sectional elevation, Drawing 2, that the tube which has its external surface exposed to the heat of the fire contains within it another tube of about half the area; these tubes are both circular in their cross sections, but the internal tube is curved at its upper end, and both its upper and lower ends are open. The external tube has an opening on its side for the curved end of the internal tube to pass through; this curved tube then becomes the channel for the water to pass from the bottom of the boiler in the direction indicated by the arrows to the bottom of the external tube; the water then ascends in the annular space formed between the two tubes, and water and steam issue from the top of the tube; any impurities mechanically suspended in the water rise through this tube, and falling over the side into the reservoir, situated above the bottom of the boiler, remain there until they are removed by the operation of blowing out; particles of matter are thus prevented from accumulating on the bottom of the boiler, and incrustation of the boiler is prevented; the current of water and steam up the external tube is sufficiently powerful to inject any impurities mechanically suspended in the water. Many persons have proposed to attach tubes to boilers, and Count Rumford constructed a boiler on this principle, as may be seen in Tredgold's work on the Steam Engine, first edition, page 135. Perkins also proposed the use of tubes, and his method is shewn at Fig. 2, Drawing 2. The tube is shewn attached to the bottom of the boiler, and has its lower end closed, the upper orifice being open; another tube is placed within it, and the internal tube is open at both ends. The fire operates upon the

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external surface of the external tube, and gives motion to the water, as indicated by the direction of the arrows; but when such tube is exposed to an intense fire, the water and steam issue with such force from the orifice of the tube at A as to prevent the water getting access to the internal tube; the water
5 being driven out or converted into steam, the tube by the action of the fire becomes heated red hot, and of course destroyed. I secure my tubes from destruction by insuring a supply of water to their interiors, in the manner shown by Drawing 2, Fig. 1, where the water is shown entering the internal tube at the letter A; a hole being formed in the side of the external tube to
10 receive the end of the internal tube, the water passes down the internal tube and out at its lower end, which is open for the purpose; the water then returns up the concentric space between the external and internal tubes, and the water becomes partly converted into steam, the water and steam issuing from the mouth of the external tube at B. I lay no claim to the application
15 of tubes merely in the construction of boilers for generating steam; but, I claim the peculiar method of constructing such tubes as shown on Drawing 2, in sectional elevation, at Fig. 1, the object attained being the preservation of the tube so long as the orifice A of the internal tube is under water, for however rapidly water and steam may issue from the tube at B, a corresponding
20 velocity is communicated to the water in a downward direction through the internal tube, the water supplying the internal tube entering by the orifice A, situated as near the bottom of the boiler as may be found convenient. My improvements for consuming smoke are shewn at Figure 1, 2, 3, 4, and 5, on Drawing A; 1, being a plan of a boiler for generating steam; 2, a sectional
25 plan; 3, a front elevation; 4, a longitudinal section; and 5, a back elevation; A, A, A, shewing the flues or openings through which the products of combustion pass on their way to the chimney. It will be perceived that instead of the ordinary bridge, shewn by dotted lines, Fig. 4, I place the bridge at a distance from the end of the fire bars, and close against the bottom of the
30 boiler. The gases formed by the combustion of the fuel are prevented passing along the bottom of the boiler by the bridge B; they of course descend under the bridge, as shewn by the arrows, and through the flues or openings A on their way to the chimney. The space between the end of the fire bars and the bridge B is formed of fire bricks, forming an inclined plane upon which
35 the red hot coal is pushed either purposely or accidentally by the process of stoking; the bricks become heated, and cause the combination of those combustible gases which pass over and become heated by the hot bricks, and this arrangement for consuming smoke is what I claim as my Invention. My Invention, so far as relates to improvements in apparatus for

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heating apartments, consist in a peculiarly constructed stove, which I denominate for the sake of distinction "the Chunk Patent Stove." My said stove is formed of three essential parts, namely, a base or stand, a portable furnace or fire pot, and an envelope or case. The base of my stove is a circular plate of cast iron standing on three feet, with three concentric rings on its upper surface, having an aperture in its centre, and a valve adjusted to such aperture to regulate the admission of the external or atmospheric air, and a tube or flue for the escape of the gases of combustion, in the manner herein-after described. The portable furnace consists of a conical bucket of sheet iron (with or without a lid or cover) having an iron grate inside, supported at about one-sixth part of its depth by three studs or brackets projecting about half an inch on the inside, which prevent the grate from being displaced by the weight of the fuel, and form underneath an ash pit or receptacle for the ashes or dust caused by the combustion of the fuel employed. In the centre of the ash pit is placed a funnel or chimney, covered at the top to prevent the ashes falling through, and perforated on all its sides to admit the external air in contact with the fuel. From the centre of the lid a short tube projects (being a continuation of the funnel or chimney), covered with a valve, which closes by its own weight, and a lever which opens the valve by pressure against the envelope when the stove is in use. The envelope or cover is a cylinder of sheet iron, closely covered at the top, and adjusted at the bottom to the space between the two outer rings on the upper surface of the base of the stove. The figures respectively marked *x*, *a*, *y*, *w*, *v*, *u*, *T*, *S*, and *R*, on the Drawing (A) hereunto annexed, refer to the several parts of my stove herein-before and herein-after described. When it is desired to use my said stove, it is requisite that the tube or flue for the escape of the gases of combustion should be let into a chimney, common air flue, or connected with the atmosphere in any other suitable manner to cause a draught of air through my stove; a sufficient quantity of sand is then to be strewed between the rings on the upper surface of the base of the stove, to prevent the escape of smoke or vapour. Fuel is then to be put into the furnace, and the furnace placed over the aperture in the base, and the envelope is then to be placed over the furnace. It will be obvious from this statement, that when my said stove is so in use, the external air for maintaining combustion is admitted through the aperture (A) in the base of the stove, and up the funnel at the bottom of the furnace into the ash-pit formed between the grate which supports the fuel and the bottom of the fire bucket, and thence through the fuel, and by which the gases evolved during combustion are carried upwards through the funnel in the lid of the fire bucket, and thence downwards between the outside of the furnace and the inside of the envelope into

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the flue (D) communicating with the external air; or in case of there being no flue, the gases may be exhausted by mechanical means, and delivered into the atmosphere at any suitable place. My said stove is shewn as in use by the sectional elevation at Figure S, and it will be perceived that the valve in the lid of the furnace is kept open (as it must be to allow of combustion going on) by the lever pressing against the inside of the envelope. The ring in the centre of the base of the stove is for the purpose of preventing the sand falling through the aperture A; the next ring B is to receive the fire bucket, and the outer ring C to receive the rim of the envelope. The bottom rim of the fire bucket and the bottom rim of the envelope are placed in the sand upon the base of the stove, by which the passage of air or smoke in that direction is prevented. A portion of fuel should be ignited previously to the furnace being placed on the base of the stove, after which the furnace may be filled with fuel in a cold state, though the fuel may be lighted when the furnace is in its proper situation, by having a tube to convey the smoke and vapour into a suitable funnel during ignition. The fuel I prefer is coke. When my said stove requires replenishing, the envelope must be removed, when the valve at top of the furnace will fall by its own weight, and the dust and vapour is prevented from escaping from the bucket. The furnace is removed by its swinging handle to a suitable place for emptying out the ashes, which may be done by inverting the furnace, when the grate, which is loose, will fall out with the ashes. The grate must be replaced, and the furnace will then be ready for a fresh supply of fuel and to be returned to its place. The fire will burn slowly, and it may be extinguished by closing with its valve the aperture A, shewn in the sectional representation of the stove, Figure S. By my method of constructing stoves, shewn in the Drawing A, Figures (Z, X, Y, W, V, U, T, S, R,) I obtain great economy of fuel, great cleanliness, and (owing to my stove having no doors, either for the admission of fuel or for the removal of ashes) I admit only so much atmospheric air into the furnace as is requisite to support combustion, and I prevent the egress of noxious vapours or gases into the apartment where they are used. A fusible compound of metals may be used in lieu of sand within the rings of the base of my stove to prevent the escape of the gases of combustion; but I have found fine sand to answer the purpose, and it is more economical, and what I use. In my said stoves I have obviated the great objection against close stoves of their becoming too hot, in consequence of their contact with burning fuel. In the construction of my said stove, no part of the envelope is in contact with the fuel, but is situate at such a distance from the furnace as prevents its being overheated, and cannot therefore contaminate the air of any apartment. When for the purpose of

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ornament or durability, the envelope is made of cast iron or other heavy material, its removal in order to replenish the fire bucket, would on account of its weight be objectionable; in such case I obviate the necessity of removing the envelope by making the top only of such envelope movable, and making the same air-tight by grinding the top into the cylinder which forms the 5 envelope, or by sand or fusible metal, as before described. On removing the top of the envelope the furnace can be withdrawn and replaced for the purpose of removing ashes and recharging the apparatus with fuel. When the envelope is made of very light material, to facilitate its removal, it will require in some cases to be connected to the base of the stove 10 by catches, to prevent the accidental removal of the envelope, and the consequent escape of vapour. One of such catches is shown on Drawing A, Figure U, letter a. It will be observed, by inspecting the Drawings descriptive of my Invention, so far as relates to improvements in apparatus for heating apartments, that I have no doors, as in ordinary stoves, and this 15 is one valuable peculiarity of my stove which I claim; the other peculiarity which I claim is the portable furnace or moveable and detached fire bucket, as applied to the construction of my said stove. I lay no claim to the employment of sand or other substance for the purpose of making smoke-tight joints, because the modes of effecting that are well known, neither do I 20 claim as any part of my Invention the admission of air to fuel in combustion through a small aperture regulated by a valve, such methods being well known and commonly practised. I have not described how a regulator may be attached to the valve of my stove, because the modes are well known, and I think it much simpler to operate upon the valve by the human hand; such 25 regulator may of course be applied, and I leave the choice of the mode to those who shall require it. I have in this my Specification described the improvements which I claim as mine, and shewn my methods of carrying the same into effect, and by a perusal of my Specification, and an inspection of the Drawings annexed thereto, it will be perceived that the advantages which I 30 claim for my improvements in apparatus for heating apparatus arise from the peculiarity of construction, and the arrangement of the parts before mentioned, which I have invented and found out and claim as mine.

In witness whereof, I, the said Richard Prosser, have hereunto set my hand and seal, this Sixteenth day of August, in the year of our Lord 35 One thousand eight hundred and thirty-nine.

RICHARD (L.S.) PROSSER.

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AND BE IT REMEMBERED, that on the Sixteenth day of August, in the third year of the reign of Her Majesty Queen Victoria, the said Richard Prosser came before our said Lady the Queen in Her Chancery, and acknowledged the instrument aforesaid, and all and everything therein contained and specified, in form above written. And also the instrument aforesaid was stamped according to the tenor of the Statute made in the fifty-fifth year of the reign of His late Majesty King George the Third.

PROSSER.

Inrolled the Seventeenth day of August, One thousand eight hundred and thirty-nine.

LONDON :

Printed by GEORGE EDWARD EYRE and WILLIAM SPOTTISWOODE,
Printers to the Queen's most Excellent Majesty. 1854.





