



A.D. 1855 . . . . . N° 2850.

**Steam Boilers.**

**LETTERS PATENT** to George Gotts Golding, at Messrs. W. Cubitt and Company's Gray's Inn Road, London, for the Invention of "**IMPROVEMENTS IN BOILERS FOR HEATING, WARMING, OR RAISING STEAM.**"

Sealed the 17th June 1856, and dated the 17th December 1855.

**PROVISIONAL SPECIFICATION** left by the said George Gotts Golding at the Office of the Commissioners of Patents, with his Petition, on the 17th December 1855.

I, **GEORGE GOTTS GOLDING**, at Messrs. W. Cubitt's & Co.'s Gray's Inn Road, 5 London, do hereby declare the nature of the said Invention for **IMPROVEMENTS IN BOILERS FOR HEATING, WARMING, OR RAISING STEAM**, to be as follows:—

The object of my Invention is to raise the temperature of water to the boiling point rapidly and with a small consumption of fuel. This I accomplish by constructing a boiler with a considerable heating surface, yet compact in 10 form, and having a self-feeding arrangement within it for supplying the furnace with fuel, in order that it may not require personal attention more than once in 12 hours. The principal use to which the boiler, hereafter described, is applicable, is for warming and heating buildings, hot-houses, and conservatories; but it may also be used in the arts and manufactures for 15 evaporating, and other applications of heat, and for raising steam. The boiler is constructed of the form of a screw, the thread of which may be of a square, angular, or other shape, by which a large heating surface is obtained, and a rapid circulation maintained with a small consumption of fuel.

*Golding's Improvements in Boilers for Heating, Warming, or Raising Steam.*

Fig. 1 of the Drawing accompanying this Provisional Specification represents an elevation of the boiler; Fig. 2 is a vertical section of the same. *a* is the central cylindrical portion of the boiler, which is made with a conical aperture *b*, for the purpose of containing a sufficient supply of fuel to last some hours. The spiral portion of the boiler is made hollow, as shown by the 5 section, Fig. 2. By this arrangement a thin stratum of water is presented to the action of the fire, so that it becomes quickly heated. *c* is the inlet pipe; *d*, the outlet. The boiler, Fig. 1, is fitted in brickwork, as shown by the section, Fig. 2. *e* is the furnace; *f*, the furnace door; *g*, the fire bars; and *h, h*, doors by which access may be had to the spiral flue formed by the 10 convolution of the screw thread. The fuel holder or hopper *b* is filled with coal, which gradually descends as it is consumed in the furnace. The smoke and unconsumed gases pass round the spiral flue, and thence to the chimney or shaft. The boiler is shown in the Drawing as applied to the purpose of heating water for circulating throughout a building, but if used for the purpose 15 of raising steam, the usual appliances of steam guage cocks, safety valve, &c. would have to be fitted thereto, and the whole would require to be made stronger.

**SPECIFICATION** in pursuance of the conditions of the Letters Patent, filed by the said George Gotts Golding in the Great Seal Patent Office on 20 the 17th June 1856.

**TO ALL TO WHOM THESE PRESENTS SHALL COME**, I, GEORGE GOTTS GOLDING, at Messieurs William Cubitts and Company, Gray's Inn Road, London, send greeting.

**WHEREAS** Her most Excellent Majesty Queen Victoria, by Her Letters 25 Patent, bearing date the Seventeenth day of December, in the year of our Lord One thousand eight hundred and fifty-five, in the nineteenth year of Her reign, did, for Herself, Her heirs and successors, give and grant unto me, the said George Gotts Golding, Her special licence that I, the said George Gotts Golding, my executors, administrators, and assigns, or such others as I, the 30 said George Gotts Golding, my executors, administrators, and assigns, should at any time agree with, and no others, from time to time and at all times thereafter during the term therein expressed, should and lawfully might make, use, exercise, and vend, within the United Kingdom of Great Britain and Ireland, the Channel Islands, and Isle of Man, an Invention for IMPROVE- 35 MENTS IN BOILERS FOR HEATING, WARMING, OR RAISING STEAM, upon the condition

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(amongst others) that I, the said George Gotts Golding, my executors or administrators, by an instrument in writing under my, or their, or one of their hands and seals, should particularly describe and ascertain the nature of the said Invention, and in what manner the same was to be performed, and cause  
5 the same to be filed in the Great Seal Patent Office within six calendar months next and immediately after the date of the said Letters Patent.

**NOW KNOW YE**, that I, the said George Gotts Golding, do hereby declare the nature of my said Invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following  
10 statement:—

The object of this Invention of improvements in boilers for heating, warming, or for raising steam, is the arrangement of a boiler, which, while compact in form, shall present a large amount of surface to the action of the fire, consume its own smoke, and require very little personal attention. The principal uses  
15 to which the boilers, herein-after described, are applicable, are warming and heating buildings, hot-houses, and conservatories; but they are also convenient for the application of heat in the manufacturing arts, for example, in the processes of boiling and evaporating in chemical manufactures, for the supply of steam to engines and apparatus heated by steam, such as the vacuum pans  
20 used in the manufacture of sugar, and other similar purposes.

The external form of the boiler is that of a screw, the thread of which is made very deep, so as to project considerably from the central cylindrical portion. The outline of the thread of the screw may be either square, angular, or any other suitable form, and may be made with one, two, three,  
25 or more convolutions. The projecting part of the boiler, forming the thread of the screw, is made hollow, to allow the water to circulate through the space formed by the top and bottom parts of the thread. By this arrangement a very large surface of water is exposed to the action of the heat, the spiral channel formed by the convolutions of the thread forming a flue for the  
30 passage of the flame and smoke from the furnace, three sides of which channel or flue is surrounded by water. In the centre of the cylindrical portion of the boiler a vertical aperture is made, forming an opening from the top to the bottom, and when set in the brickwork the aperture is over the centre of the furnace. This aperture forms a reservoir for coal, and is made sufficiently  
35 large to contain enough fuel to supply the furnace for twelve hours or upwards. This boiler may be made either of cast or wrought iron, or of copper, and fitted with induction and eduction pipes, and with the usual gauges and valves if used for the purpose of raising steam, or where subjected to considerable pressure.

Golding's Improvements in Boilers for Heating, Warming, or Raising Steam.

But in order that the construction and arrangement of my improved boilers may be fully understood, I will proceed to describe the Drawing accompanying and forming part of this Specification, referring to the letters and figures marked thereon.

Fig. 1 is a front elevation of the boiler as set in brickwork, and arranged 5 for warming buildings, or heating conservatories, and other similar purposes; Fig. 2 is a vertical section of the same; and Fig. 3 is a sectional elevation, showing the external form of the boiler; Fig. 4 is a plan of the furnace; Fig. 5, a plan of the boiler taken at the line E, F, Fig. 2; and Fig. 6 is a plan of the top of the boiler. A, A, Figs. 2 and 3, is the projecting portion 10 of the boiler, which is similar to the projecting part of a square-threaded screw; but, as before stated, this part of the boiler may be made of a different shape, although I give the preference to that shown in the Drawing. B is the central cylindrical part through which the aperture C is formed, as shown by the section, Fig. 2. The upper part of this aperture is closed by the lid or 15 cover D. E is the furnace. In the arrangement shown in the Drawing, the fire is contained within the funnel-shaped casting F; but I do not confine myself to this particular plan, other modifications being herein-after described. G is the furnace door; H is the ash-pit door, which is fitted with a sliding grating to regulate the admission of air to the fire; I, I, are doors by which 20 access is had to the spiral flue for the purpose of cleaning the same; K is a damper for regulating the draft; L, a door for cleaning or inspecting the interior of the shaft or chimney M. The water passes into the boiler through the induction pipe N; the heated water ascends through the eduction pipe O, and after circulating through the building returns again to the boiler through 25 the pipe N. After the fire is lighted in the furnace, the reservoir C is filled with fuel, and the quantity thus supplied will be sufficient to maintain the fire for a period of from twelve to twenty-four hours. As the fuel in the furnace is gradually consumed, a fresh supply falls down from the feeding tube or reservoir C, and as this fresh fuel falls upon that in the furnace, which is in a 30 state of vivid combustion, the smoke and gaseous matters are instantly ignited. The flame and non-combustible gases pass off around the spiral flue formed by the space between the parts A and B, and having to traverse over so large a surface before reaching the flue, the whole of the heat is imparted to the water within the boiler before the non-combustible matters reach the flue. 35 By these means the fuel is economised to the utmost extent, while from the peculiar configuration of the boiler the temperature of the water is rapidly raised to the boiling point, on account of the small quantity of water contained

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within the projecting part A when compared with the large amount of surface exposed to the action of the heat.

A modification of the foregoing consists in surrounding the furnace bars with a water space in lieu of the funnel-shaped casting F. This water space 5 is formed by carrying down a double plate of metal from the periphery of the projecting portion A, leaving open a space equal to the width of the furnace door, as seen by the plan, Fig. 4. This double plate or plates is similar to the part A, except that it is vertical instead of horizontal, and between the sides thereof the water circulates, so that the furnace is surrounded with water 10 with the exception of that portion opposite the furnace door.

Another modification consists in supporting the boiler upon a series of hollow metal columns or pillars. These columns are secured to and communicate with a hollow metal base, upon which the furnace bars may rest, the fire being made within the circumference of the columns, the water circu- 15 lating from the boiler through the columns and hollow base; or, if preferred, the boiler may be supported upon pillars of fire brick.

Another modification of my Invention consists in making the boiler similar to a double-threaded or right and left handed screw, by which arrangement the non-combustible products pass off in opposite directions. This arrange- 20 ment is useful where a sharper or more rapid draft is required.

Having described the nature of my Invention, and the means of carrying the same into practical effect, I wish it to be understood that I do not confine myself to the precise arrangement of the details herein-before described and shown, as the same may be varied without departing from the Invention; but 25 what I claim, and desire to secure under the herein-before in part recited Letters Patent, is,—

Firstly, the construction of boilers, as herein-before described and shown.

Secondly, the arrangements of the lower part of the boilers for the purpose of economising the heat given off from the fuel, substantially as herein-before 30 described.

In witness whereof, I, the said George Gotts Golding, have hereunto set my hand and seal, this Sixteenth day of June, in the year of our Lord One thousand eight hundred and fifty-six.

GEO. G. GOLDING. (L.S.)

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LONDON :

Printed by GEORGE EDWARD EYRE and WILLIAM SPOTTISWOODE,  
Printers to the Queen's most Excellent Majesty. 1856.

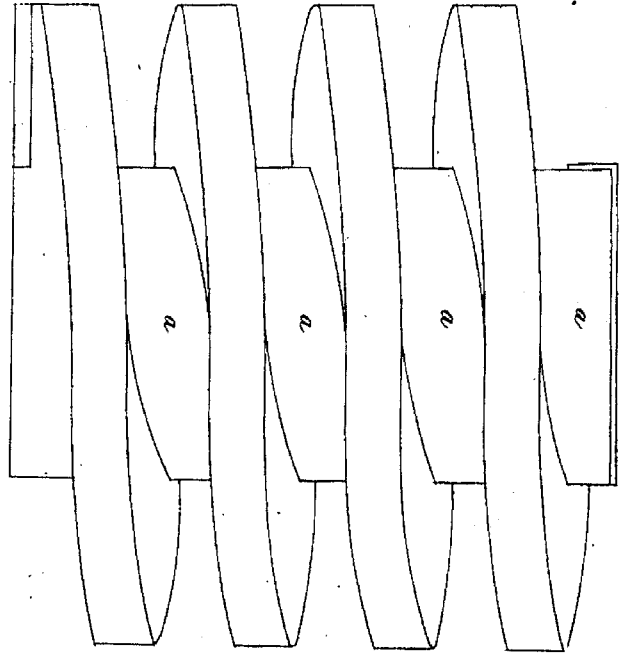


FIG. 1.

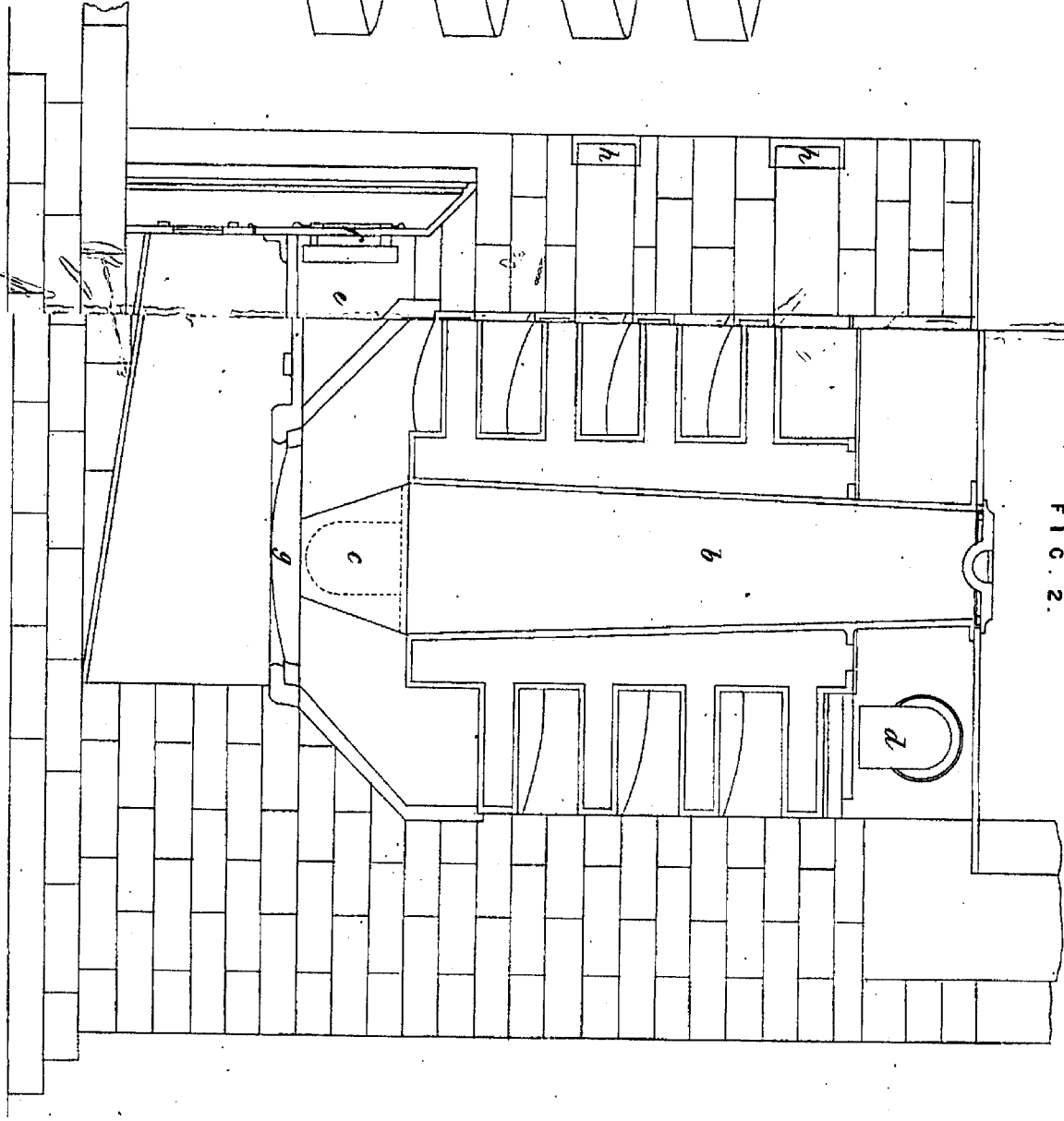


FIG. 2.

*The drawing lab with Provisional Specification is not colored.*

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Printers to the Queen's most Excellent Majesty, 1856.

Drawn on Stone by Melby & Sons.

FIG. 1.

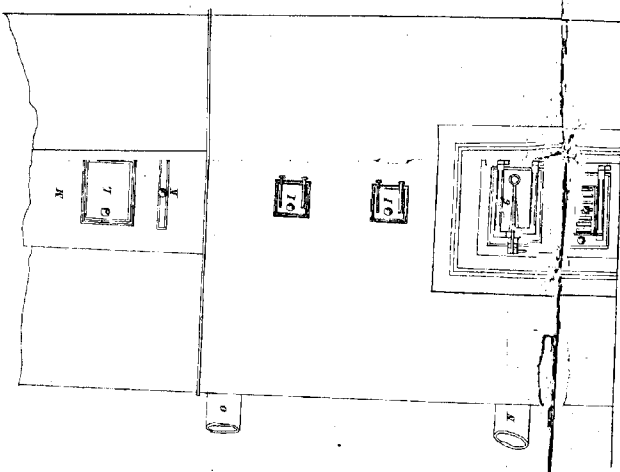


FIG. 2.

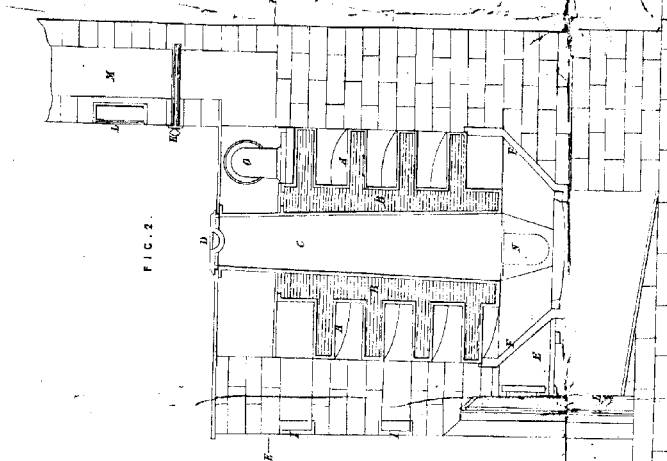


FIG. 3.

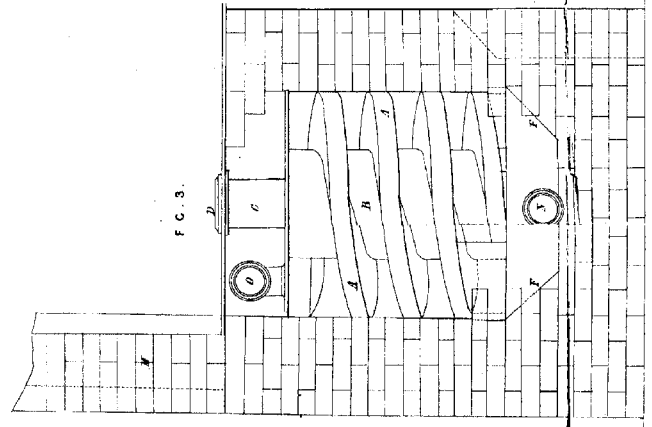


FIG. 4.

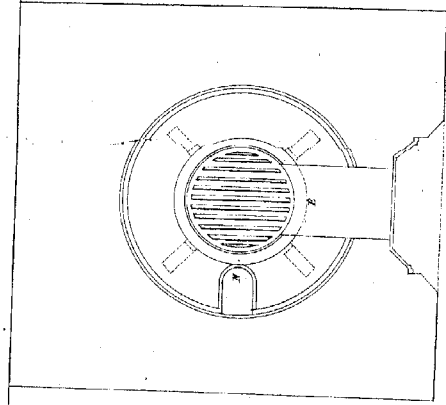


FIG. 5.

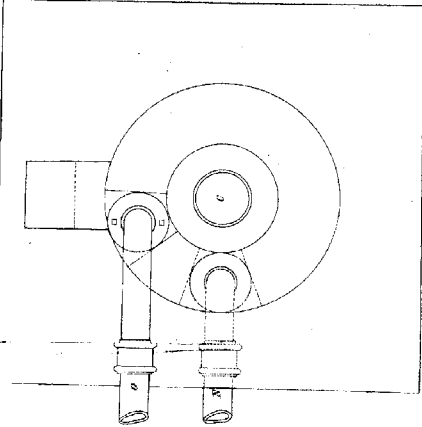
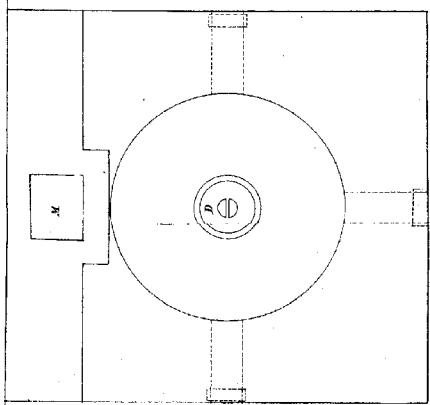


FIG. 6.



The fluid operating is partly covered.

Drawn as shown by Higgin & How

Lawrence, Portland, Oregon, Edward L. Lee and Nelson S. Sperry, Inve-  
ntors, by the Oregon and London Registry, N.Y.C.