A.D. 1843 . . . . . N° 9913.

Furnaces; also Vessels for Heating Liquids, &c.

JONES' SPECIFICATION.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, THOMAS MORTON JONES, of Birmingham, in the County of Warwick, send greeting.

WHEREAS Her most Excellent Majesty Victoria, by Her Letters Patent under the Great Seal of Great Britain, bearing date at Westminster, the Eighteenth day of October, in the seventh year of Her reign, did give and grant unto me, the said Thomas Morton Jones, my exors, admors, and assigns, full power, sole privilege and authority, that I, the said Thomas Morton Jones, my exors, admors, and assigns, and such others as I, the said Thomas Morton Jones, my exors, admors, and assigns, should at any time agree with, and no others, from time to time and at all times hereafter 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, and also in all Her said Majesty's Colonies and Plantations abroad, my Invention of "IMPROVEMENTS IN HEATING LIQUIDS AND AERIFORM BODIES;" in which said Letters Patent there is contained a proviso that I, the said Thomas Morton Jones, shall cause a particular description of the nature of my said Invention, and in what manner the same is to be performed, by an instrument in writing under my hand and seal, to be inrolled in Her Majesty's High Court of Chancery within six calendar months next 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 large appear.

NOW KNOW YE, that in compliance with the said proviso, I, the said Thomas Morton Jones, do hereby declare that the nature of my Invention, and the manner in which the same is to be performed, are particularly described and ascertained in and by the following description thereof, that is to say:—

The improvements which I claim consist, first, in the furnace in which the fuel is placed; secondly, in the construction of vessels in which liquids and aeriform bodies are heated; and, thirdly, in the application of materials of which certain parts of said vessels are made.

My furnace may be used either with or without fire bars, and with or without a blast, according to the intensity of heat required; and the annexed sectional Drawing N° 1 will sufficiently explain the principle of my Invention to enable any one acquainted with the construction of furnaces to adapt it to the form and dimensions most suitable to his particular purpose. A is the fire grate, and B the ash pit. When fire bars are made use of, C is a shaft, of any suitable length, for holding the fuel, which is to be placed in this shaft to any required height above the upper part of D. D is the hearth, of any convenient form and length, in or over which the substances to be heated or the vessels containing them are put; and E is a shaft or stack to carry off the products of combustion. The shaft C has a cover, removable at pleasure, for charging the shaft from above with fresh supplies of fuel, and for regulating the quantity of air admitted down the shaft. A downward draft of air is made to pass in the shaft C through the upper stratum of the fuel from the top, simultaneously with an upward draft of air which is made to pass in the shaft C through the lower stratum of the fuel from the bottom of the shaft, so as to blend the two currents of flame or gaseous matter completely, and to pass them when thus blended together through the lateral aperture and over the hearth D into the stack or chimney E, through which alone the products of combustion must be allowed to escape into the open air. In addition to the above-described upward and downward drafts or blasts in the fuel shafts, currents of air may be introduced horizontally or at any required angle, but two perpendicular or converging drafts will in general be quite sufficient.

It will be found in many cases a useful part of my Invention, after the currents of flame or gaseous matter have entered the lateral aperture, to make them as they traverse the hearth pass under the arches of bridges, built at suitable intervals upon and over said hearth, before the products of combustion are allowed to enter the shaft E, and escape into the atmosphere. When liquids

obtained by the fusion of solid substances are heated in my furnace, the hearth should be sloped gradually toward a hole in the external side, as in the common furnace, so as to permit them to flow out freely when the hole is unclosed.

When liquids contained in metallic or other suitable vessels are heated by my furnace, the vessels may be placed on the top of the flame chamber marked two; or the sides C 1, E 3, and bottom D 2, of the shafts and flame chamber may form part of the vessel in which the liquids are heated, whether closed at the top or not.

I now proceed to describe the improvements which I claim in the construction of the vessels, whether covered or not, in which liquids and aeriform bodies are heated; but I shall use the word vapour instead of the phrase aeriform bodies in the rest of my Specification, as a shorter and equally intelligible way of conveying my meaning, namely, fumes, gases, steam, and any thing that may be evaporated or exhaled. Over or upon the inner surface, or such portion of the inner surface as may be found necessary, of vessels containing any liquid, I place hollow inverted vessels, partly or wholly covered at the top, and with their mouths downwards, as a receiver is placed bottom upwards on the plate of an air pump. These hollow inverted vessels, which I call preservers, may be made of metal or any other suitable material, and of any size or form that may be best adapted to the shape of the vessel containing the liquid, and when placed over or upon the inner surface of said vessel, the preservers must be kept with their mouths downwards by their own weight, or by stays or bolts and nuts or screws and rivets or any other of the well-known ordinary mechanical modes practised by smiths for keeping work in its proper position. When the preservers are placed upon the inner surface of the vessel containing the liquid, the lower edge of the preserver should, by means of short studs or legs of about one-fourth of an inch long, be allowed for ordinary purposes to be in contact with the said inner surface only on three or four points. When the preservers are placed over the inner surface of the vessel without coming in contact with said surface, the space between the lower edge of the preserver and the inner surface of the vessel containing the liquid should be about one-fourth or three-eighths of an inch wide; the preservers may, in short, be as above stated, in contact at their lower edges with the inner surface of the still or boiler or other vessel containing the liquid; but great accuracy of adjustment, great closeness in the contact is not essential, and a clear water-way of one-fourth or three-eighths of an inch depth may, for common use, be left between the lower edges of the preservers and the inner surface of the vessel, whether the preservers be placed on the inner

surface without resting upon it, or upon the inner surface and in contact with portions of it. The annexed sectional Drawings N° 2, in which the inner surface of the vessel containing the liquid is shewn in black lines, and the preservers in red, will enable any competent workmen to understand their construction. F is the water line; G, H, sections of two preservers under water, closed at the top, and having their mouths opening downwards. Heat being applied at I, the vapour arising at G and H is caught by the preservers, and cannot escape until by its tension it forces itself down the preservers, and as it escapes from them, sweeps along the under edges of the preservers and the internal surface of the vessel containing the liquid, and by its rapid and powerful action carries along with and before it the impurities held in suspension by the liquid, and prevents their being deposited upon the inner surface of the vessel either under the preservers or in their immediate vicinity. K is a section of a hollow hemispherical, and L of a truncated conical preserver; M, of a conical, and N of a cylindrical preserver, having their mouths opening downwards. C, N, O, N° 3, is a section of a perforated preserver, which has a hollow cylinder N, open at both ends, inserted through the hole at top. These sections are given merely to shew that the preservers may be made of any form required, or, as before stated, best adapted to the shape of the vessel containing the liquid. They may be kept wholly under the level of the water line, or portions of them may, when wanted, rise above the water level, and be carried through and out of the shell of the boiler, and further, two or any greater number of the preservers may be placed one within the other, with intervals between them, as shewn in section B, N, in red ink, in Drawing N° 3, or they may be placed in nests, as just shewn, or separately, as shewn B, O, in Drawing N° 4, in which sections of semi-cylindrical preservers are represented in red ink, which may, if required, run along the whole length of the inner surface of the boiler, still, or other vessel (the bottom line of which is shewn in black ink), to within a few inches of either end or side of the said vessel.

Whatever be the form and length of the preservers, they must be placed with their mouths downwards, and kept in this position. This simple precaution being observed when heat is applied to the vessel, the effect upon the liquids and vapour contained in it will be similar to that already described above, when referring to the preservers G and H. When less tension of the vapour is wanted than that obtained from the preservers when closed at the tops and sides, the tops and sides of the preservers may be perforated, so as to lessen the tension of the vapour to any required degree; and in cases where it is wished to increase the intensity of the pressure of the vapour, the waterwa/

may be lessened, and the whole of the lower edge of the preserver made to rest upon the inner surface of the still or boiler or other vessel in which the liquids and vapour are heated. In constructing and adjusting my preservers, it must be constantly borne in mind that the improvements which I claim consist in not allowing the vapour to escape through the liquid, as heretofore done, but in intercepting the vapour as it rises, and receiving and retaining it in my preservers, until, by its tension, it is forced down and out of the inverted receivers, and made to sweep over and cleanse the inner surface before escaping through and out of the liquid and into the air from open vessels, before rising in stills through the liquor to the still head, and before rising through the water and entering the steam chamber or reservoir of the boiler, from which it is taken to work the engine; my preservers may be made of any hollow prism, or of any number of hollow prisms, communicating with each other or not, and I have made them of all heights and sizes, with diameters varying by half inches from half an inch to eight feet and upwards. In practice, I have found the preservers of two or three inches diameter very economical, portable, and convenient, and of course more easily removable than those of larger dimensions.

When tubes containing liquids are exposed obliquely or perpendicularly to heat, my preservers should be placed at the bottom of the tubes O in the annexed sectional Drawing, N° 5 being a boiler, and P, P, P, tubes containing liquids; the preservers should be placed as shewn in red ink at Q, Q, Q.

When tubes, like the welded iron tubes of James Russell and Sons, of Wednesbury, or the brass and copper tubes without seams of W. C. Alston, are made use of for heating the liquids surrounding them, my preservers should be placed upon and over the tubes, and be made to conform to the external shape of the tubes through three-fourths or five-sixths of their circumference. Thus in the annexed Drawing, N° 6, of a vertical section, R being the tube represented in black ink, the preserver, represented in red ink, S, should be made to conform to the external shape of the tube, leaving an opening of about one-fourth or one-sixth of its circumference only under the lower part of the tube; the receiver marked S, or preserver, may be placed at any convenient distance from the tube, and should have ribs or diaphragms at intervals of three or four inches, so as to divide the space between the preserver and tube into small and separate compartments. A similar effect may be produced by making the receivers only three or four inches long, but with less economy of material.

Having thus particularly described the improvements which I claim, first, in the furnace in which the fuel is placed, and, secondly, in the construction of vessels in which liquids and aeriform bodies are heated, I now proceed to

describe those in the application of materials of which certain parts of said vessels are made. When tubes containing liquids (not tubes surrounded by liquids externally) are exposed to heat, either obliquely or perpendicularly, as shewn at P in the vessel O in a preceding section, I do not make the tubes and bottom of the vessel of the same metal, as hitherto practised, but I make the tubes of brass or copper or any of the alloys of iron, and insert them firmly in and through strong iron plates, which gives me facility in removing the tubes and replacing them without injuring the bottom of the vessel. When tubes are made use of for heating the liquids and vapour which surround the tubes, or which are contained in them, a new and useful protection will be obtained for the surface exposed to the liquids and vapour, by giving the said surface a suitable coating or covering, by means of the well-known electric, magnetic, or galvanic processes.

To the processes I lay no claim. I only claim the application of tubes coated by them (and not by the process of drawing one tube over another), to heating liquids and aeriform bodies. And lastly, I claim the application to the same purpose of tubes made of alloys of iron, with bismuth, antimony, lead, and other metals, as although it is well known that alloys of which iron is an essential ingredient are less injured by air and water than iron itself, said alloys have not hitherto been used for making the tubes of vessels, or portions of vessels, in which liquids and aeriform bodies are heated.

In witness whereof, I, the said Thomas Morton Jones, have hereunto set my hand and seal, the Thirteenth day of April, in the year of our Lord One thousand eight hundred and forty-four.

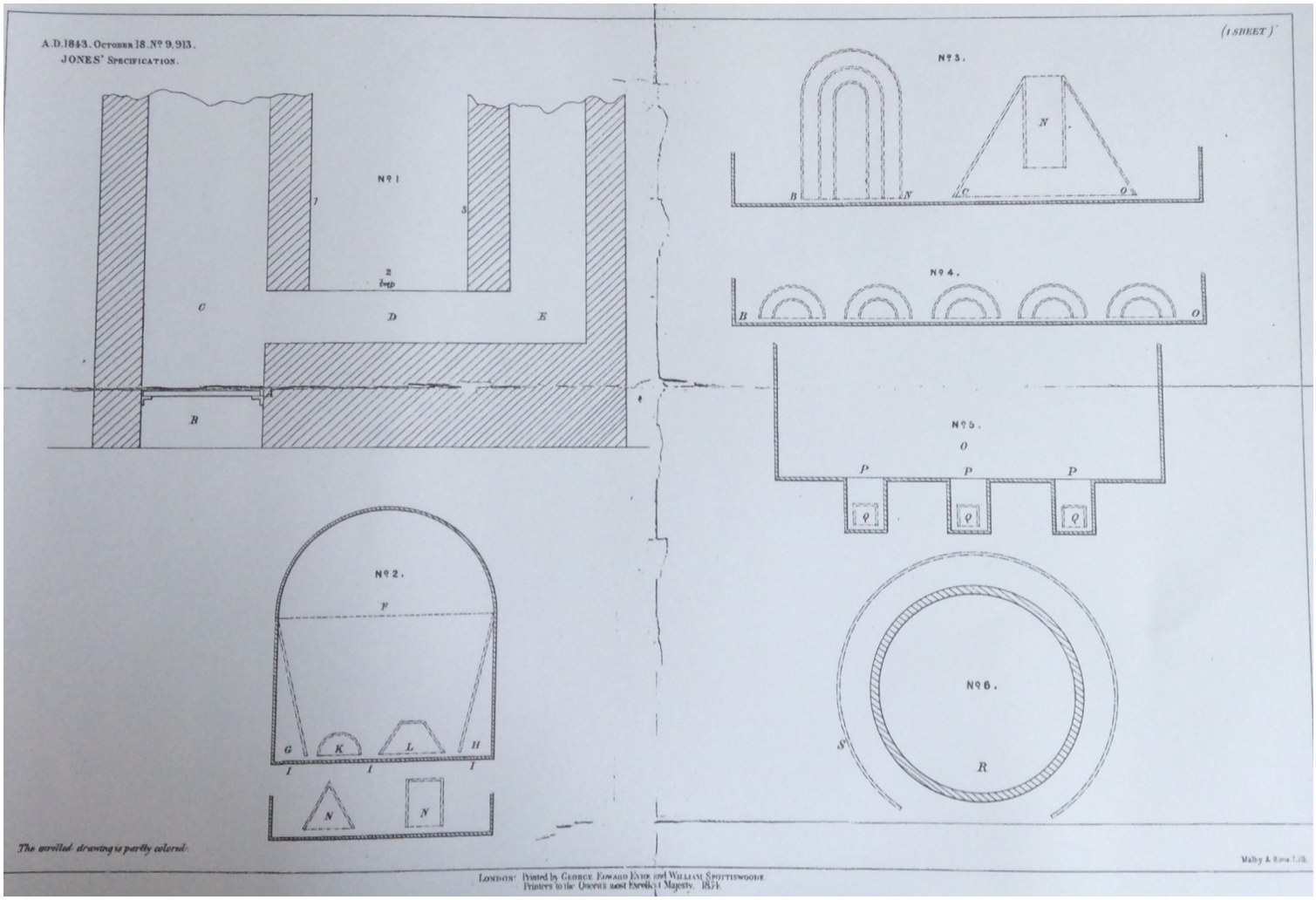
THOMAS (L.S.) MORTON JONES.

AND BE IT REMEMBERED, that on the Thirteenth day of April, in the year of our Lord 1844, the aforesaid Thomas Morton Jones came before our said Lady 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.

Wills, Extra.

Enrolled the Seventeenth day of April, in the year of our Lord One thousand eight hundred and forty-four.

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


A.D. 1843. October 18. N° 9,913.
JONES' Specification.
(1 Sheet)
N° 1
N° 2.
N° 3.
N° 4.
N° 5.
N° 6.
The unrolled drawing is partly colored.
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