

Specification of James Tate : furnaces, coppers, &c.; for brewing and distilling.

Contributors

Tate, James.

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A. D. 1794 N^o 1995.

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

OF

JAMES TATE.

FURNACES, COPPERS, &c. FOR BREWING
AND DISTILLING.

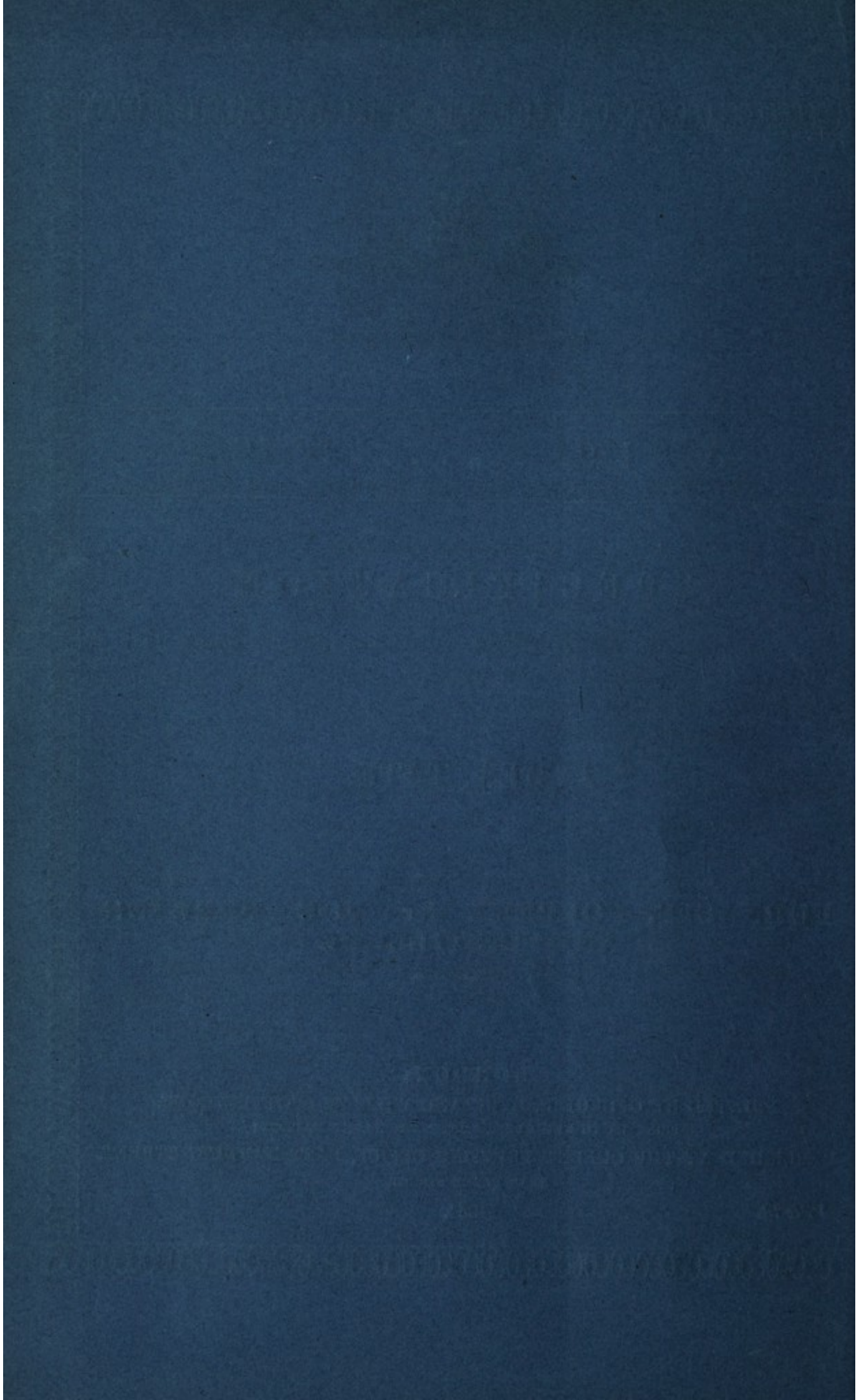
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1854.





A.D. 1794 N^o 1995.

Furnaces, Coppers, &c. for Brewing and Distilling.

TATE'S SPECIFICATION.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, JAMES TATE, of Tottenham Court Road, in the Parish of Saint Pancras, in the County of Middlesex, Ironmonger, send greeting.

WHEREAS His most Excellent Majesty King George the Third, by His
5 Letters Patent under the Great Seal of Great Britain, bearing date the Seventeenth day of June now last past, did give unto me, the said James Tate, His special licence that I, the said James Tate, during the term of years therein expressed, should and lawfully might make, use, exercise, and vend, within England, Wales, and the Town of Berwick upon Tweed, my Invention of
10 " **APPLYING FIRE TO THE COPPERS OF BREWERS AND DISTILLERS AND OF MANAGING THE SAME IN SUCH MANNER AS THAT VERY CONSIDERABLE EXPENCE WILL BE SAVED IN THE ARTICLE OF FUEL, AND OTHER MATERIAL ADVANTAGES GAINED THEREBY;**" in which said Letters Patent is contained a proviso obliging me, the said James Tate, under my hand and seal, to cause a particular description of the nature
15 of my said Invention, and in what manner the same is to be performed, to be inrolled in His Majesty's High Court of Chancery within one calendar month next after the date of the said Letters Patent, as in and by the same (relation being thereunto had) may more fully and at large appear.

NOW KNOW YE, that in compliance with the said proviso, I, the said
20 James Tate, do hereby declare that my said Invention of applying fire and of managing the same to brewers' and distillers' coppers or vessells consists of the following improvements:—First, for the application of two, three,

Tate's Improvements in Applying Fire to the Coppers of Brewers, &c.

or more separate fires to each copper or vessel, with a separate and distinct flue to each fire. Secondly, for the application of a door or register to shut off the communication of each fire with the copper, when necessary. Thirdly, of an improved method of constructing the flues. Fourthly, for the application of bellows or other machines to force fire in particular cases; and, 5 fifthly, for an improved method of constructing the coppers or vessels, in order that the fire may be applied to more advantage, with sundry other improvements, which are more particularly explained and described as follows, that is to say) :—

“That part of the furnace usually called the ash-pit I cause to be made or 10 carried up in three separate divisions from the bottom of the ash-pit up to the bottom of the copper; to each of these separate divisions is applied a door and frame with furnace bars; the copper then being applied to its seat, the doors, bars, and partitions, or divisions from three separate fire-places or furnaces. I then cause a flue to be taken in the following direction from either of the 15 outside furnaces, which is to be carried up nearly one-third the height of the copper, then to be turned and continued all round the lower part of the copper from the leg, butt, or lower edge, about one-third up the side, till it comes round, and is stopped by a flue taken in like manner from the other outside furnace to be hereafter described. It is then to be turned up and conducted 20 into the main shaft of the chimney. I then cause a like flue to be continued or taken from the middle furnace; this is to be carried up by the side of the first flue, and about one-third the height of the copper above it. It is then turned and carried round the copper over the first flue until stopped by the upright part thereof, when it is turned up and conducted into the main shaft 25 of the chimney. I then cause a like flue to be taken from the last furnace, which is carried up by the side of that last mentioned, and the usual height above it, from thence carried round the upper division of the copper, and then conducted into the main shaft of the chimney, as before mentioned. When this Invention is to be applied to coppers or vessels that have been already in 30 use, it will not always be necessary to carry up the divisions from the bottom of the ash-pit, but to build the divisions or partitions on the furnace bars, which will answer the same purpose. The registers or doors are for the purpose of preserving the coppers from the intense heat of the fire, by shutting the fire entirely from the copper when necessary; these I cause to be done in the 35 following manner: when to be applied, there must then be prepared a ledge for each side of every furnace; this may be done of the materials the furnace is made of, but a hollow trunk of cast iron will be better, both ends of which to have communication with the open air in the front and behind the furnace;

Tate's Improvements in Applying Fire to the Coppers of Brewers, &c.

the end behind the furnace had better be turned up for some distance in the manner of a flue, which will cause a circulation and draft of cold air continually to enter and pass through the cavity or hollow part of the trunk, by which means it will be preserved; the different doors or registers are then put upon
5 these ledges; they may be mounted on wheels or rollers, or may be made to draw as a common register, or be moved by means of rack and pinion, so as to answer the purpose already mentioned; but as the mode of applying the fire by many furnaces necessarily lessens the quantity of fuel, as well as the intense-
10 ness of the heat to the bottom of the copper, there will be less danger of the vessels being injured by this than the former mode, and therefore the application of these registers or doors will not in all cases be necessary. For a small or middle sized copper or still two furnaces, in the manner before described, will be sufficient, and in that case the fire may be extended to further use in particular cases, as it might not be necessary at all times to have a fire equally
15 intense, nor to have the said coppers or vessels boiled or heated in equal spaces of time; therefore when it may be necessary to have any of these operations performed in a slower manner than usual, I cause the following additions to be made to and in the flues already described, in order to take advantage of these circumstances when they occur, that is to say, I cause to be put in the flue
20 belonging to the furnace first mentioned, in the upright part before it enters the chimney or main shaft, a register to shut up or off the said flue. I then cause a register to be put in the flue belonging to the second furnace, just above where the flame comes from the furnace into the flue. I then cause another register to be put in the upright partition or division that separates the two
25 flues; the two first mentioned of those registers being then shut, and the last left open, it will then be necessary to light only the fire in the first furnace, the draft from which by means of the registers as described will be prevented voiding itself into its proper flue after passing round the copper, but will be conducted into the flue of the second furnace, and thence conducted a second
30 time round the copper or vessel before it can enter the chimney. This also may be done where there are three or more furnaces; but when the coppers are very large the flame will be so much exhausted in the one flue as not to be very serviceable if conducted into a second; the three registers already described for the purpose of causing the draft of one of the fires to pass twice round the
35 copper before it enters the chimney, and also to be used and applied with more registers when necessary to cause the draft of the second and third fires to pass into the flue of the first fire, so that no more than the space of the first circular flue may be heated when necessary; there will also be a particular advantage gained from the application of many furnaces to a copper, namely, that of

Tate's Improvements in Applying Fire to the Coppers of Brewers, &c.

boiling or heating any given quantity of liquor in a large vessell, such $\frac{1}{4}$, $\frac{1}{3}$, $\frac{2}{3}$, and so on with a proportionable quantity of fuel; for by lighting only one fire the copper will boil one-third full of liquor in equal time as three fires would, if quite full, and so in proportion to the number of fires, which cannot be done by the old method. As the great object of this my Invention is the 5 saving of fuel or to obtain the greatest quantity of heat from the smallest quantity of fuel, to obtain this end it will be necessary, first, to expose the greatest possible part of the external surface of the vessels to be heated to the action of the fire, and next to press the fire or flame as close as possible to that surface; for if the flues are too wide the fire passes to the chimney without 10 being exhausted on the object, and if too small the fuel will not be sufficiently inflamed; therefore, in order to explain the benefit to be obtained by the improved flues hereafter to be described, it will be necessary to consider the effect produced by the same quantity of fuel conveyed in different sized flues to the object to be heated: for instance, let a given quantity of fuel be 15 put in a furnace, and a vessell or copper set at the distance of five feet from the fire, that only the flame might act upon the vessell, let the heat from this fire be conveyed round the copper in a flue eight inches high by four wide; then let the same quantity of fuel be put in such another furnace, and a copper of the same size set at the same distance, only the flue to be eight inches high 20 by two wide; on lighting both fires it will be found that the one with the small flue will boil nearly as soon again as the other. I mean these coppers to be about the size of twenty gallons. Now if this last flue was yet diminished in width the copper would still attract a greater proportion of the passing heat. It thence follows that the heat communicated to coppers by flues is in a great 25 measure in proportion to the width of the flue from the side of the copper; therefore to obtain the benefit of narrow flues and to confine the heat as much as possible to the side of the copper, and to render these flues not liable to choak up, is the object of my improvement on flues, which is performed in the following manner. I cause the bottom of the flues to be made much about 30 the usual width or a little wider; from thence to about a fourth part of the whole height, to be tapered or drawn in a little; from thence to the top then again to be tapered or drawn in till it terminates at about one and half or two inches wide at top, tho' from ten to twelve inches wide at the bottom more or less. This will be better understood by referring to the Drawing, Figure 4, 35 which represents both the old and the improved flues, and which on a due comparison between them it will be evident, first, that the surface of the copper exposed in each is equal; secondly, that the quantity of flame sufficient to fill the improved flue would do little more than half fill the other; thirdly, that

FIG. 3.

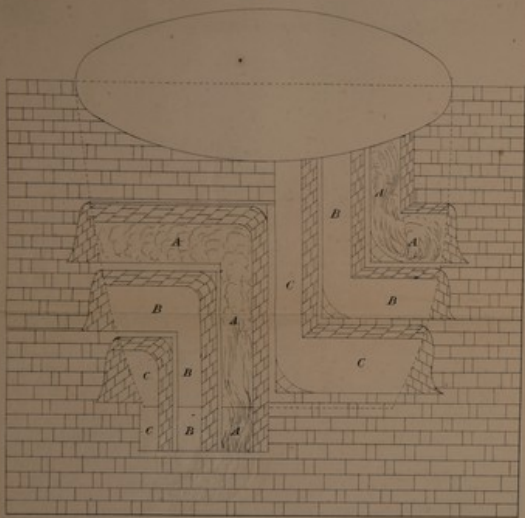


FIG. 2.

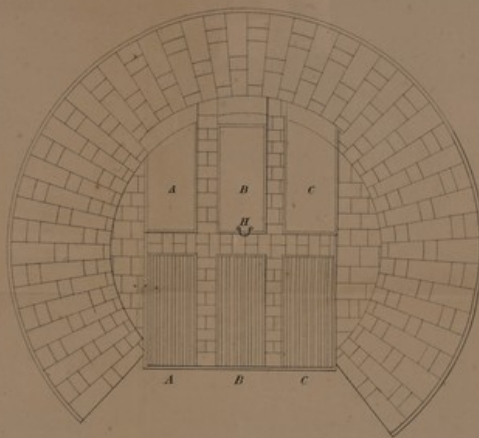


Fig the 1st The three Furnace Doors with their Ash Pits.
 Fig the 2nd The Seat or Ground of the Furnaces before the Apper is set on.
 Fig the 3rd The system of the back part of the Apper showing the different extractions from the Furnace into the Pass & the disposition of the said Pass up and round the Apper.
 Fig the 4th is a representation of a common Dye with the improved Flue taken out of it.
 Fig the 5th is the improved Apper.
 CCCCCC in Fig the 1st 2nd and 3rd is the Ash pit Furnace Inverge to the Flue, and the Flue round and up the Apper, of the First Furnace or Fire Flue.
 RRRRRR in Fig the 1st 2nd & 3rd is the same belonging to the second Furnace.
 AAAAAA in Fig the 1st 2nd & 3rd is the same belonging to the last Furnace.
 A.B.D. Fig the 4th is the improved Flue, sometimes made water at the Top D and sometimes constructed from I to E.
 G. is the side of the Apper.
 H. Fig the 1st is one of the doors or Registers to shut over the Fire.

FIG. 5.

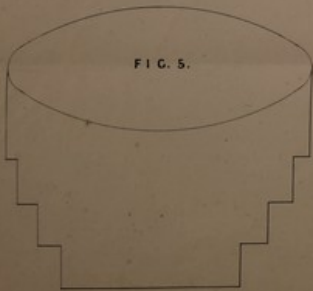


FIG. 4.

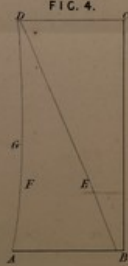
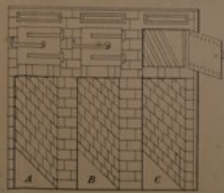
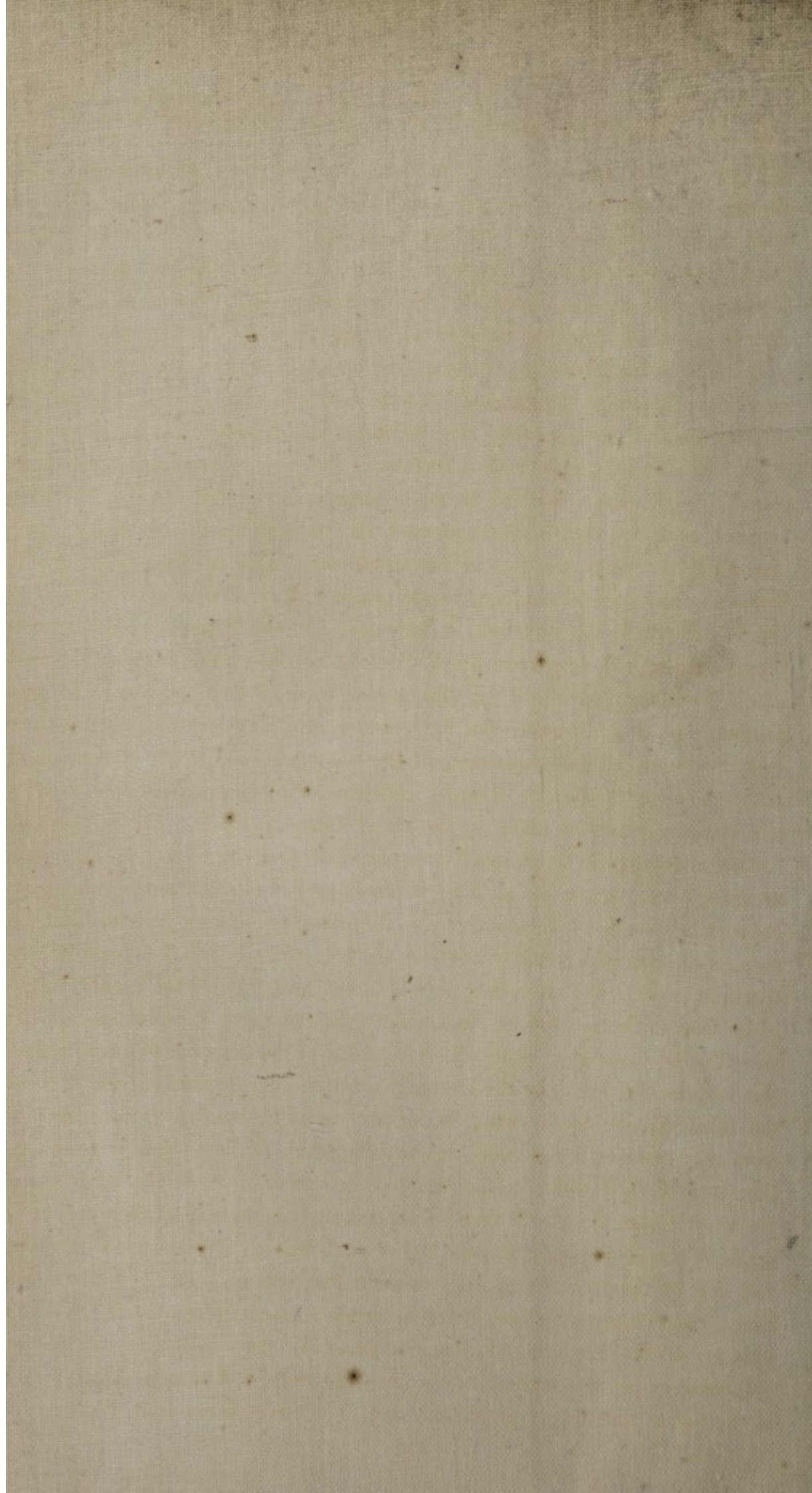


FIG. 1.



The unrolled drawing is stored

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Tate's Improvements in Applying Fire to the Coppers of Brewers, &c.

the quantities of flame necessary to fill the old flue about seven inches would fill the improved one about eighteen inches, consequently expose so much more surface to the action of the fire. I also manage and conduct one single fire to brewers' and distillers' coppers or vessels in the following manner (that
5 is to say):—I conduct from the fire or furnace the different flues I have already described from the three furnaces, and then there will be no partitions or divisions in the furnace, but the different flues each have a separate opening into the back part of the furnace. To either of these methods, in order still to exhaust the fuel more on the object to be heated, I make the said flues with
10 respect to their dispositions or situations in the same manner as already mentioned; but I cause them to be made narrow and confined to the side of the coppers, so as to obstruct and prevent the natural draft from the chimney operating to inflame the fuel in the usual way. I then cause to be applied bellows or any other instrument for the purpose of forcing air into furnaces, by
15 the use of which the fuel will be inflamed, and the flame and vapour forced thereby through these narrow flues, which otherwise would not be sufficient to admit it without such force. I also cause steam to be applied for the same purpose, namely, of forcing the flame and vapour through these narrow flues; so far as described and explained, all these applications, or any of them, or as
20 many of them as may be thought necessary, may be applied either to old or new coppers or vessels made in the usual shape or mode. But as there is a further advantage to be obtained from the same quantity of fuel, if the coppers or vessels were made on a different or improved construction, I cause new coppers or vessels to be constructed in the following manner, in order that they
25 may receive the additional benefit from the fire or fires, which the construction of common coppers will not admit, that is to say, according to the number of fires to be used or the number of flues taken from one fire. I cause the copper or vessel to be made of so many different widths or diameters at different heights, the bottom division to be the least, the next division to overhang the first, and
30 the third division to overhang the second, each division to overhang the other from six to twelve inches more or less; the inside of the copper or vessel will then contain three different circular steps or stairs one above the other, see the Drawing, Figure 5; it will then be evident that the bottom of each step in the inside of the copper will form the top of each flue on the outside of the same,
35 and that by this means two sides of each flue will be formed by the copper itself, and consequently near twice as much surface exposed to the flame and heat as before, everything else being equal. To this improved copper it will be necessary in some measure to reverse the flues, and to make these as wide at the top as the step or projection, and to contract them from thence to the

Tate's Improvements in Applying Fire to the Coppers of Brewers, &c.

bottom, but not in the same proportion that the first-mentioned flues are contracted from bottom to top, as these may be left wider in order to leave room for the lodgment of the ashes at the bottom of the flue.

In witness whereof, I, the said James Tate, have hereunto set my hand and seal, this Twelfth day of July, in the thirty-fourth year of the 5
reign of our Sovereign Lord George the Third, by the grace of God of Great Britain, France, and Ireland King, Defender of the Faith, and so forth, and in the year of our Lord One thousand seven hundred and ninety-four.

JAMES (L.S.) TATE. 10

Sealed and delivered by the said
James Tate, being first duly
stampt, in the presence of us,

T. BERTIE, Vine Street, Piccadilly.

SAM. KINSEY, his Clk. 15

AND BE IT REMEMBERED, that on the Fourteenth day of July, in the year of our Lord 1794, the aforesaid James Tate came before our said Lord the King in His Chancery, and acknowledged the Indenture aforesaid, and all and every thing therein contained and specified, in form above written. 20
And also the Indenture aforesaid was stampt according to the tenor of the Statutes made for that purpose.

ORD.

Inrolled the Fourteenth day of July, in the year of our Lord One thousand seven hundred and ninety-four.

LONDON :

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