

(No Model.)

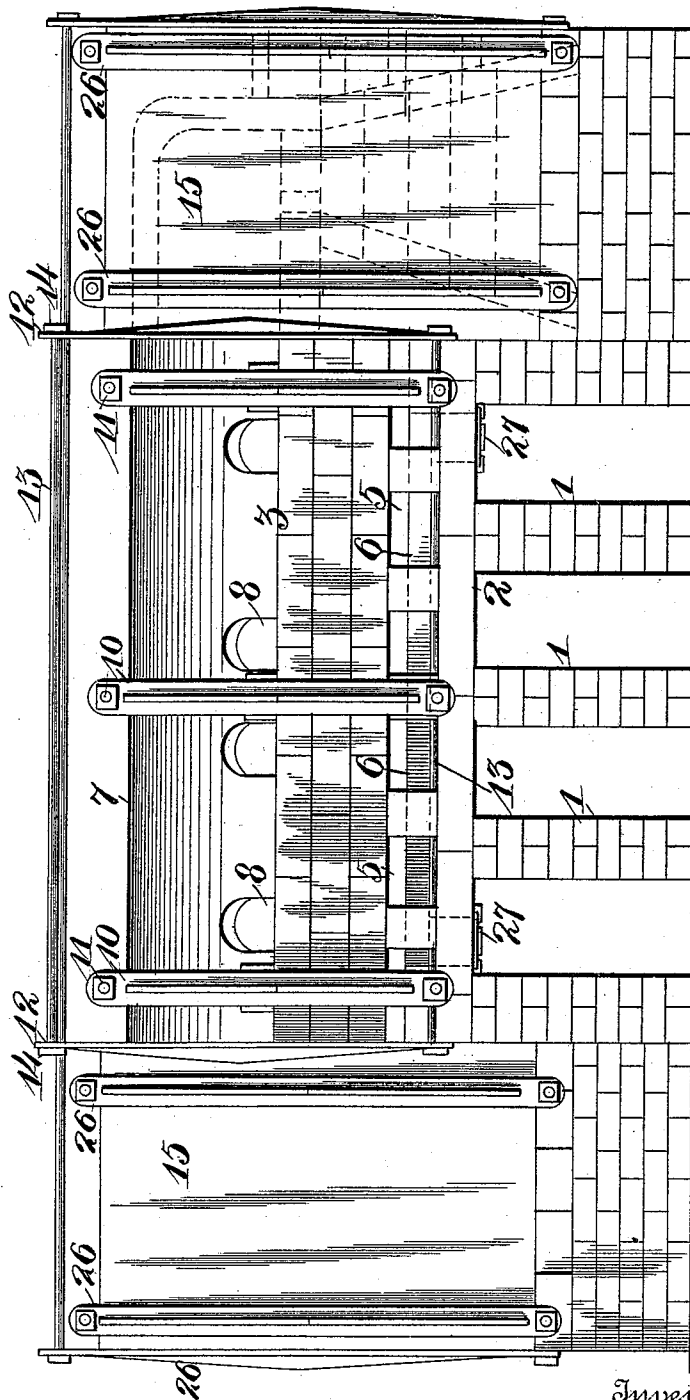
3 Sheets—Sheet 1.

J. KITSON.
FURNACE FOR MELTING GLASS.

No. 485,390.

Patented Nov. 1, 1892.

Fig 1.



Witnesses
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H. E. Ryan

Inventor
John Kitson.
By his Attorneys
Keller & Starek

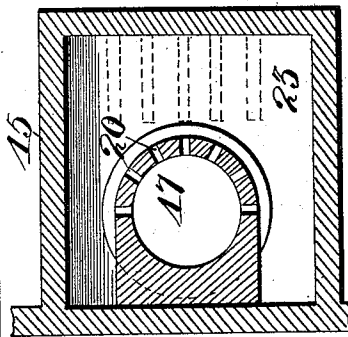
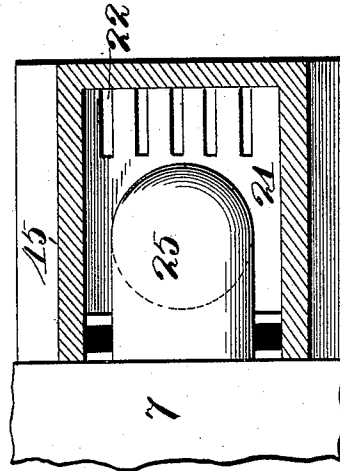
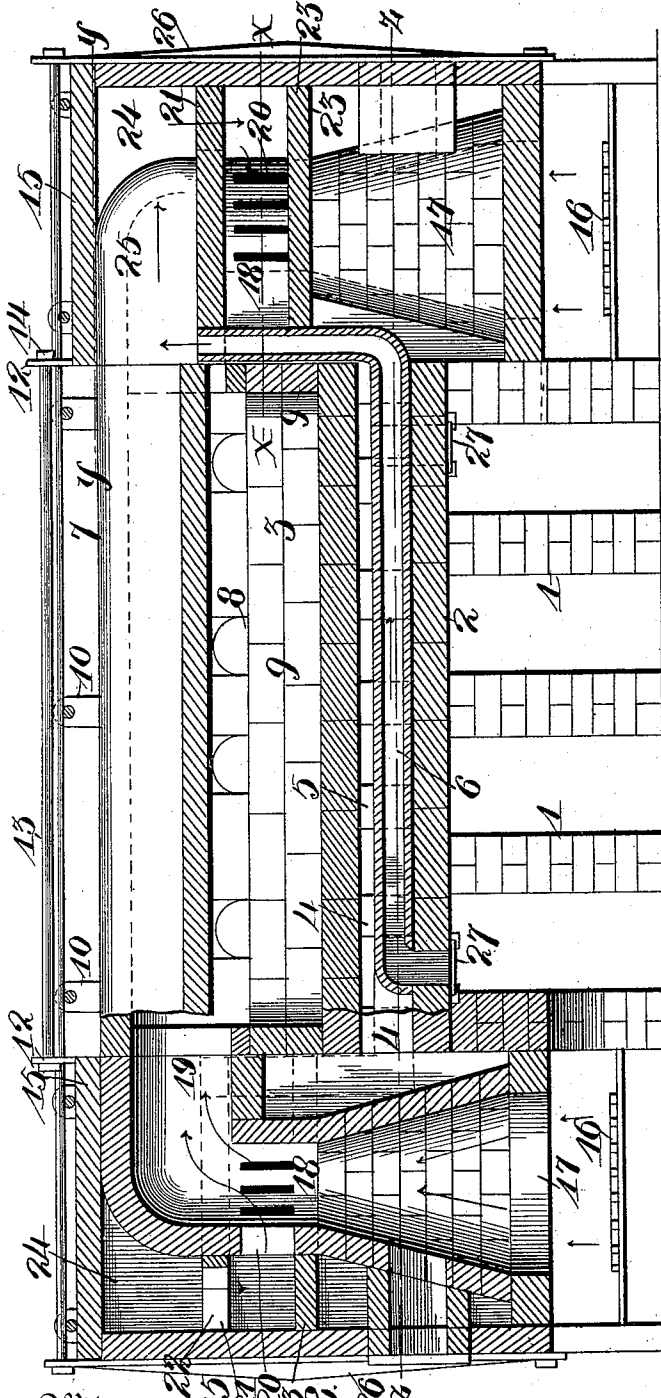
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Fig. 2.

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(No Model.)

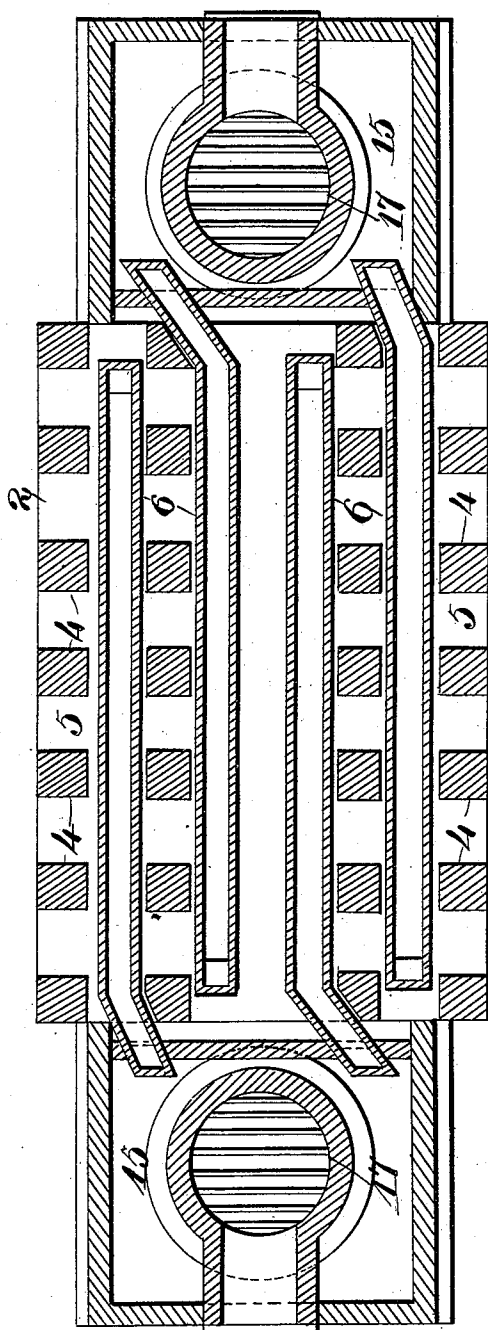
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Fig. 5.



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UNITED STATES PATENT OFFICE.

JOHN KITSON, OF ST. LOUIS, MISSOURI.

FURNACE FOR MELTING GLASS.

SPECIFICATION forming part of Letters Patent No. 485,390, dated November 1, 1892.

Application filed June 2, 1892. Serial No. 435,245. (No model.)

To all whom it may concern:

Be it known that I, JOHN KITSON, of the city of St. Louis, State of Missouri, have invented certain new and useful Improvements in Furnaces for Melting Glass, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to improvements in furnaces, and particularly those employed in the melting of glass and silicious material generally; and it consists in the novel arrangement and combination of parts, as will be hereinafter set forth in the specification, and pointed out in the claims.

In the drawings, Figure 1 is a side elevation of my complete invention. Fig. 2 is a vertical longitudinal section of the same. Fig. 3 is a cross-section taken on the line $x x$ of Fig. 2. Fig. 4 is cross-section taken on the line $y y$, Fig. 2; and Fig. 5 is a horizontal cross-section taken on the line $z z$ of Fig. 2.

The present invention is an improvement on patent granted to E. Pearson and J. Kitson, No. 330,050, November 10, 1885; and the objects of my improvement are, first, to devise means for thoroughly utilizing all combustible material evolved from the generators or producers; second, to regulate the temperature of the air or oxygen, whereby such combustion is effected; third, to utilize all available oxygen of any quantity of air used to combine with such combustible matter; fourth, to more thoroughly utilize the heat radiated by the generators in raising the temperature of the air fed with the combustible gases into the melting-tank, and, fifth, in other details more particularly described in the specification, and pointed out in the claims.

Referring to the drawings, 1 represents a series of columns suitably arranged upon a foundation and constructed of brick or other suitable material, the height of which depends upon that elevation of the furnace by which access can be easily attained to the bottom of the same.

2 represents a foundation of brick or other suitable material, which is built and rests upon the columns 1, and is preferably rectangular in form and of a shape conforming to that of the melting-tank.

3 represents a melting-tank, which is arranged at a suitable distance above the foundation 2, the bottom of which tank rests upon a number of short columns 4, which columns are built upon the said foundation.

By referring to Fig. 1 of the drawings it will be clearly seen that spaces 5 of suitable dimensions are formed by the columns 4, which allow cool air to pass and circulate below the bottom of the melting-tank. In order to regulate such admission of air, I may employ any number of removable brick, filling said spaces, thereby regulating at will the temperature of the air under the heating-tank and also that of the air contained or passing through the air-feeding flues 6. The melting-tank is provided with the well-known crown-head 7, having suitable working holes 8, as represented in the drawings. The sides 9 of the melting-tank are constructed of brick or other suitable material, whereby such sides are rendered removable, when occasion requires, without in any way affecting the remaining parts of the furnace.

10 represents a suitable number of metallic braces, which are arranged upon the opposite sides of the melting-tank, the lower ends of which are set into the brickwork of the foundation 2, thereby preventing the said braces from sinking or shifting their position. The crown-head 7 of the melting-tank is supported by the said metallic braces in any suitable mechanical manner where the said crown-head comes in contact with the same. In order to hold the said braces in their proper position in relation to the melting-tank, rods 11 are passed through the ends of said braces and nuts screwed upon the ends of the said rods in a well-known manner.

12 represents metallic braces similar in construction to those just referred to and are located at the ends of the melting-tank and designed to support the ends of the same, as best shown in Fig. 1. The ends of the said metallic braces 12 are united by rods 13 and nuts 14.

15 represents two producers located at either end of the melting-tank, each of which is similar in construction and in communication with the said tank. The said producers are constructed of fire-brick, and in the bottom of the same are located grates 16, upon which

the fuel is placed. Located immediately above the said grates and supported in any desirable manner are conical-shaped fire-chambers 17, the upper ends of which terminate
 5 in a contracted neck 18, which forms a part of the passage 19, leading to and in communication with the interior of the melting-tank.

Referring more particularly to the right-hand side of Fig. 2, the walls forming the passages 19 are curved or rounded, so as to deflect the products of combustion horizontally in their passage to the melting-tank and, as seen from Fig. 2, from opposite directions. Through the wall forming the neck of the fire-chamber are a series of vertically-elongated
 15 openings 20, arranged radially, through which the heated air for supporting combustion passes and then unites with the combustible material issuing from the producers. By this
 20 arrangement a thorough commingling of the air and gases takes place and a complete combustion ensues.

21 represents a partition, which is located immediately above the said openings 20 and
 25 arranged above the upper portion of the producer, the construction of which can be better seen by referring to Fig. 4. Through this partition and adjacent to the front wall of the producer are formed any number of openings
 30 22, through which the heated air first passes and is divided before it is deflected into the openings 20 and again divided as it enters the openings 20.

23 represents a second partition, which is
 35 located below the openings 20, and consequently below the partition 21, which deflects the air through the said openings 20 and prevents the same from passing around the lower portion of the fire-chamber, as best illustrated
 40 in Fig. 3. The hot air feeding into the producer is confined in the chamber 24, and thus brought in thorough contact with the heated curved outer surface 25 of the producer. The walls of the producer are strengthened by any
 45 suitable number of metallic braces 26 in the manner shown.

By referring to Fig. 5 of the drawings it will be seen that I employ four air-flues, such as 6, extending, preferably, the length of the
 50 bottom of the melting-tank, and one end of which is in communication with the outside air through the bottom of the foundation 2 and the opposite ends of the said flues in communication with the hot-air chamber surrounding the producers located at either end
 55 of the melting-tank. The ends of these flues, leading into the hot-air chambers surrounding the producers, are in communication with the same above the partition 21, whereby the
 60 partially-heated air is directed to the hot-air

chambers 24 to become thoroughly heated before entering the producer by the heat radiated from the walls of the producer. In order to regulate the flow of air through the said
 air-flues, I provide that end in communication with the outside air with valves 27 of
 65 ordinary construction.

The operation is obvious from the detailed description given above.

Heretofore the objection to furnaces of this type has been that any undue amount of draft in the stacks was liable to carry with it and into the atmosphere a large portion of combustible matter and gases before the same were consumed within the melting-tank but
 75 in my present improvement such defect is obviated, owing to the complete consumption of the combustible materials within the melting-tank by virtue of the complete commingling of such matter with the heated air fed
 80 thereto.

Having particularly described my invention, what I claim is—

1. A melting-furnace comprising a producer or producers with openings 20 formed
 85 in the walls of the same above the fire-chamber, a partition 23, located below the same openings and arranged on the outside of said fire-chamber, a partition 21, arranged above
 90 said openings 20 and having openings 22 for the passage of hot air before the same is deflected into openings 20, a passage 19, in communication with said fire-chamber and the
 melting-tank, and means for heating and delivering air to said openings 22, substantially
 95 as described.

2. A melting-furnace comprising a melting-tank, a foundation for the same, columns located between the bottom of said tank and the said foundation, forming an air-space, air-flues located within said space, one end of
 100 which is in communication with the outside air through the said foundation, producers located on each side of said tank, air-chambers surrounding said producers in communication
 105 with said air-flues, partitions in said chambers at the bottom thereof for deflecting the air entering said chambers, partitions 21, located above the bottom, having openings 22
 110 for dividing the air-currents before entering the producers, and openings 20, formed in the neck of the producers below the passage 19, leading to the melting-tank, substantially as
 described.

In testimony whereof I affix my signature in the presence of two witnesses.

JOHN KITSON.

Witnesses:

EMIL STARK,
 C. K. JONES.