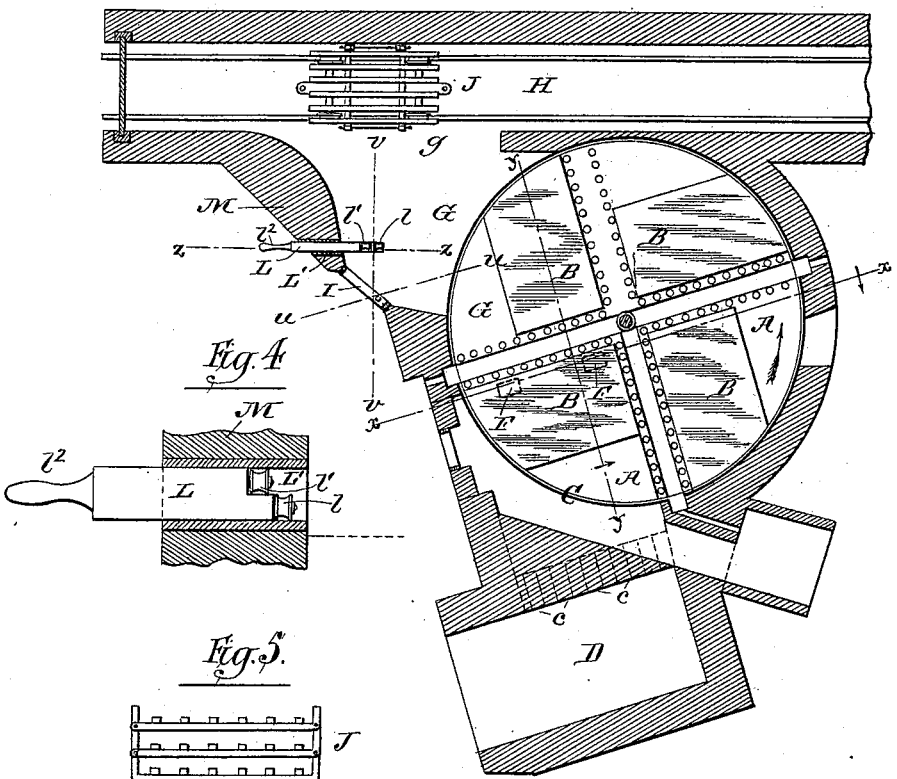
(No Model.) 2 Sheets—Sheet 1.

T. A. ZELLERS.

FLATTING AND ANNEALING OVEN FOR GLASS.

No. 342,670. Patented May 25, 1886.

Fig. 1.



Witnesses:-

Louis Th. Whitehead.

Gideon F. Lanagher.

Inventor:-

Theodor A. Zellers.-

by:-

M. E. Dawson

Attorney.-

(No Model.) 2 Sheets—Sheet 2.

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Fig. 2.

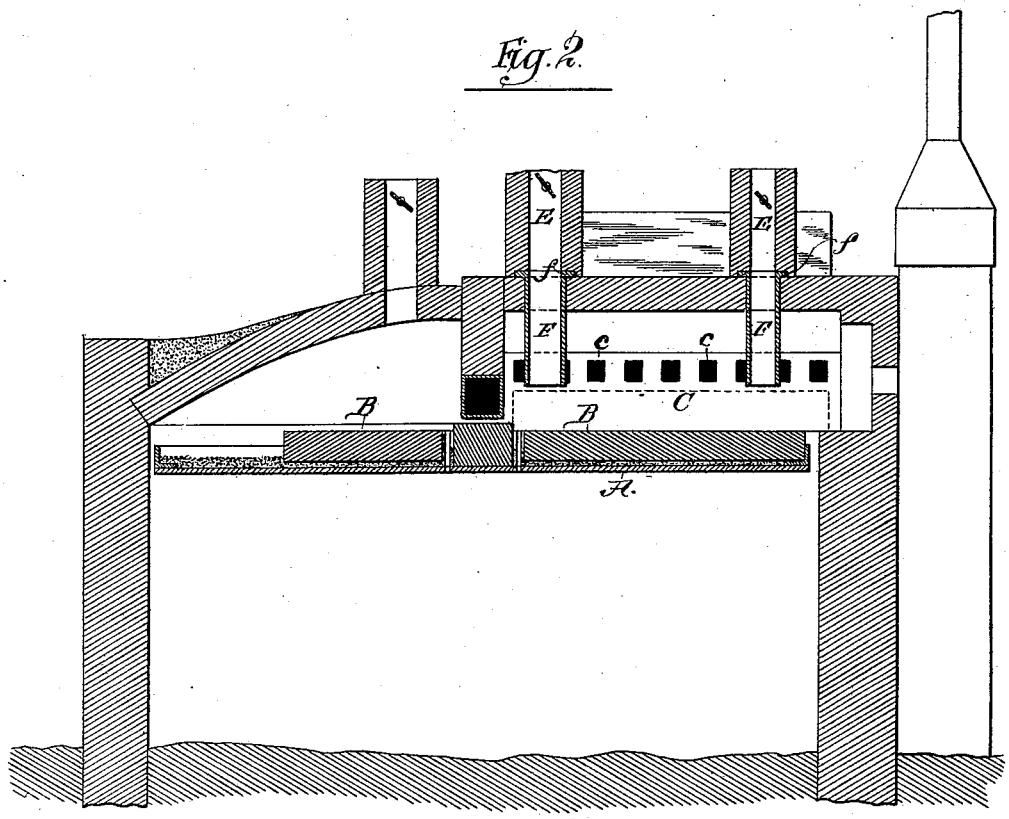
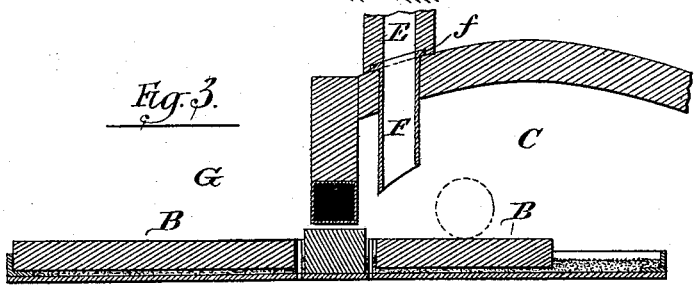


Fig. 3.



Witnesses:-
Louis M. Whitehead.
Gideon F. Lanaghen.

Inventor:-
Theodor A. Zellers.
by:-
M. E. Dawson
Attorney.-

UNITED STATES PATENT OFFICE.

THEODOR A. ZELLERS, OF OTTAWA, ILLINOIS, ASSIGNOR TO THE OTTAWA GLASS COMPANY, OF SAME PLACE.

FLATTING AND ANNEALING OVEN FOR GLASS.

SPECIFICATION forming part of Letters Patent No. 342,670, dated May 25, 1886.

Application filed August 26, 1885. Serial No. 175,340. (No model.)

To all whom it may concern:

Be it known that I, THEODOR A. ZELLERS, of Ottawa, in the county of La Salle and State of Illinois, have invented certain new and useful Improvements in Flatting and Annealing Ovens for Glass; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

The invention relates to flatting-ovens employed in that portion of the operation of manufacturing window-glass in which a cylinder of glass previously blown and split is opened out so as to make a flat sheet.

It relates more particularly, first, to features of construction in the heating-chamber of the flatting-oven; second, to an angular arrangement of the leer with the rotating flatting-table when the latter is brought to rest in position for the delivery of the flattened sheets from the cooling and delivering chamber to the car in the leer; and, third, to devices for supporting the fork in transferring the plates from the flatting-stone to the car in the leer.

The first-mentioned feature of improvement has for its object to insure a combustion of gases in closer proximity to the glass resting on the flatting-stone, and to thereby work a saving in the fuel consumed, and to also produce a more satisfactory and effective operation of the flame upon the glass being treated.

The second above-mentioned improvement has for its object to dispense with the turn-table which has been heretofore employed in the leer for the purpose of bringing the car which is to receive the flattened glass into a desired angular relation to the flatting-stone, from which the glass is taken when transferred to the car.

The third improvement has for its object to facilitate the operation of loading the glass plates on the middle and upper decks of the car, and to dispense with the vertically-movable door-frame heretofore employed.

The improvements herein claimed are illustrated as being applied to the improved flatting and annealing oven described in Letters Patent of the United States, No. 298,332, granted to me May 6, 1884, in which the fuel is employed in the form of gas, and is burned within the heating-oven, and said patent is referred to as a part of the prior art to which my present invention relates.

Referring to the drawings which accompany this specification and form a part thereof, Figure 1 is a horizontal section taken through the flatting-oven and leer adjacent to the upper surface of the flatting-table, said figure showing the angular arrangement of the oven and leer, which constitute one feature of my present improvement. Fig. 2 is a vertical section of the oven, taken in the line *x x* of Fig. 1, and looking in the direction indicated by the arrow applied to said line *x x*. Fig. 3 is a vertical section in the line *y y*, Fig. 1, looking in the direction indicated by the arrow on said line. Fig. 4 is a fragmentary section of the inclosing-wall, taken on line *z z* of Fig. 1. Fig. 5 is an end view of the car seen in plan in Fig. 1.

A represents the turn-table, upon which are placed the flatting-stones B B.

C is the heating-chamber, to which in this instance gas to be burned therein is admitted through openings *c c*, leading into said chamber from an adjacent gas-producer located at D, Fig. 1. Air is not admitted with the gas, but has ingress solely around the flatting-stones.

As will be seen by reference to my aforesaid patent, the chimney for the egress of products of combustion from the chamber C has there its mouth in the roof of said chamber. As a result of such construction, I have found that the gas escapes too freely, burning near the roof and in the chimney upon its outward passage. The result is that an excessive supply of gas is requisite to produce a proper effect upon the glass being flattened, owing to the distance of the flame from the stones, if but a moderate supply of gas be admitted, so that to bring the flame into the desired proximity to the stones the larger volume of gas is supplied, of which much practically goes to waste. To remedy this defect, I now extend

the escape flue or flues E downwardly below the roof of the chamber C, as shown in Figs. 2 and 3. By this means, and by the admission of air only around the flatting-stones or at the bottom of the chamber only, the lower surface or portion of the gas-body is ignited, and the gas which rises to the roof is retained in a body and unconsumed in the upper part of the chamber until its descent to the level of the chimney-mouth, where it is burned in proper position to be effective, instead of burning uselessly in the chimney. The combustion of all the gas is thus ultimately effected in close proximity to the flatting-stone and glass, and better heating results are thus obtained by a combustion of a less quantity of gas or fuel.

Provision for the admission of air around the flatting-stones is shown in the spaces about the table and in the openings at the sides of the transverse or radial air-tubes seen in Fig. 1, and fully explained in said former patent.

I am not restricted to any particular location or construction of such downward prolongation of the chimney or chimneys which lead from the heating-chamber C. In the drawings two of such chimneys or escape-flues are shown, said flues being located, preferably, as indicated, near the wall opposite the side of the chamber C at which the gas enters. The lower extensions of said flues are also shown to consist, each, of a depending tube or tile, F, of refractory material, suspended by a flange, *f*, on its upper end, which is embraced in the upper masonry of the structure. The dotted rectangles seen in Fig. 1 indicate the points over which the extensions F depend.

The cooling chamber, or the final one, G, of a series of cooling-chambers, from which the flattened glass is delivered to the cars in the leer H, communicates with said leer by a wide passage, *g*.

Ovens have heretofore been constructed with their walls and partitions in such relation to the leer as to require the stopping of the turn-table A, upon which the flatting-stones rest, with the stone of the cooling-chamber G at right angles to the direction of the leer. In such form of construction it has been necessary to provide a turn-table in the leer-track at the passage *g*, by which the car to be loaded might be brought out of line with the main track of the leer and into proper angular position with respect to the stone of the cooling-chamber, in order to permit the convenient transfer of the glass from the latter to the car. This transfer is effected by means of the usual "fork," which is passed through the opening above the cross-bar I, and is swung from the position indicated by the line *u u* to substantially that indicated by the line *v v*, the angle of these lines indicating about the range of sweep practicable or desirable for said fork consistent with manageable length thereof.

Instead of employing the turn-table in the leer-track and rotating the car into the desired position, I now construct the leer at such an inclination from a right angle with the flatting-stone of the cooling-chamber G, when the latter is at rest, as will bring the several cars successively at the proper angle with said stone without the aid of a turn-table in the leer-track. This construction is shown in Fig. 1. By this means not only is the expense of construction and repair of the track and turn-table saved, but the labor and delay of manipulating the said turn-table is avoided.

The customary form of three-decked car J is shown in Figs. 1 and 5, and the usual devices for raising and lowering the upper two decks are contemplated, so that the several decks will be loaded in the ordinary way and by the familiar form of fork or forked lever. Heretofore the support I for the said fork has been constructed to raise and lower under the control of the operator, so that after the lower deck is charged the said support I would be raised to the level of the next car-deck, and finally to the level of the uppermost deck for loading the latter. My improved construction relating to this matter consists in providing movable supports for the loading-fork which may be brought into use on the desired levels for loading the middle and upper car-decks. A preferred form of such movable supports is shown at L, and consists of an iron bar or block L, fitted to slide lengthwise and horizontally in a hollow casting, L′, set parallel with the leer-track in the wall M, and provided with rollers *l l′* on its inner end, which are repectively on the desired levels for properly directing the fork to the middle and upper decks of the car J. The old support I is retained, but is made or left stationary at the proper elevation to support the fork when lifting the glass plates from the flatting-stone, and also at the desired elevation to support said fork in loading the lowermost car-deck.

The operation then is as follows: The long fork is slid forward and back on the stationary support I, in the usual manner, in lifting the plates one by one from the flatting-stone, is swung about thereon to bring the plates opposite the car and in carrying the plates over the car to deposit them on the lower deck, and is slid lengthwise on said support I, all as heretofore practiced; but in loading the two upper decks the bar L is first moved inward to bring the roller *l* in proper line with the car, and the fork or lever is swung upon this roller before being slid lengthwise. To load the top deck, the bar L is slid farther inward to bring the higher roller, *l′*, into line, and the fork-lever is rested on said higher roller preparatory to being slid forward thereon. After a car has been loaded the bar L is retracted till again wanted in loading the middle and upper decks of the next car. A suitable handle, *l²*, is shown on the outer end of the bar L for its manipulation.

It will be understood that the rollers *l* and

l' are only anti-friction devices, and that the bar L may be correspondingly shaped and used without them.

I claim as my invention—

1. The combination, with a heating-chamber of a flatting-oven provided with a flatting-stone and having inlet apertures at its bottom, about the margin of the stone, for the admission of air, and also provided with a source of gas-supply, of an escape-flue for products of combustion, having its mouth below the roof of said chamber and over the flatting-stone, substantially as described.

2. The combination, with the heating-chamber of a flatting-oven provided with a flatting-stone and having inlet-apertures at its bottom, about the margin of the stone, for the admission of air, and also provided with a source of gas-supply, of a vertical escape-flue for products of combustion, depending in its lower part from the roof of the chamber and opening at its lower end over the flatting-stone, substantially as described.

3. The combination, with the heating-chamber of a flatting-oven provided with a flatting-stone and having inlet-apertures at its bottom, about the margin of the stone, for the admission of air, and also provided with a source of gas-supply, of an escape-flue for products of combustion, having its mouth located below the roof of the chamber and over the stone at the side of the latter, opposite the gas-inlet opening of the oven, substantially as described.

4. In a glass-flatting oven, the combination, with a rotatable table carrying a series of flatting-stones, and with a leer provided with track-rails and a car, of a housing structure for the oven provided with an opening for the admission of the usual straight fork or implement by which to transfer the flattened glass from the stone to the car, said leer-rails being arranged at an inclination with the plane of the opening, whereby said straight implement may be inserted through said opening at right angles to the flatting-stone, and also swung in said opening into a position at right angles with the track, whereby the flattened glass may be transferred by said straight implement from the flatting-stone to the car on the track without the use of a turn-table, substantially as described.

5. The combination, with a flatting-table of a flatting-oven, a leer-track, and a leer-car on said track, which car has more than one deck, of a fork-support, as I, in position to upold the fork in transferring glass from the flatting-table to the lower deck of the car, and an additional movable support for said fork, adapted to be brought into position for use in loading the upper deck or decks of said car, substantially as described.

6. The combination, with the flatting-table and car, of a longitudinally-sliding bar, L, set movably in the wall M, and provided with two unequally-elevated bearings upon its inner end for the support of the fork, said bar being set at a desired elevation with respect to the support I, and the middle and top car-decks, for the purpose set forth.

In testimony that I claim the foregoing as my invention I affix my signature in presence of two witnesses.

THEODOR A. ZELLERS.

Witnesses:

S. R. BLANCHARD,

HENRY L. ROCHELLE.