

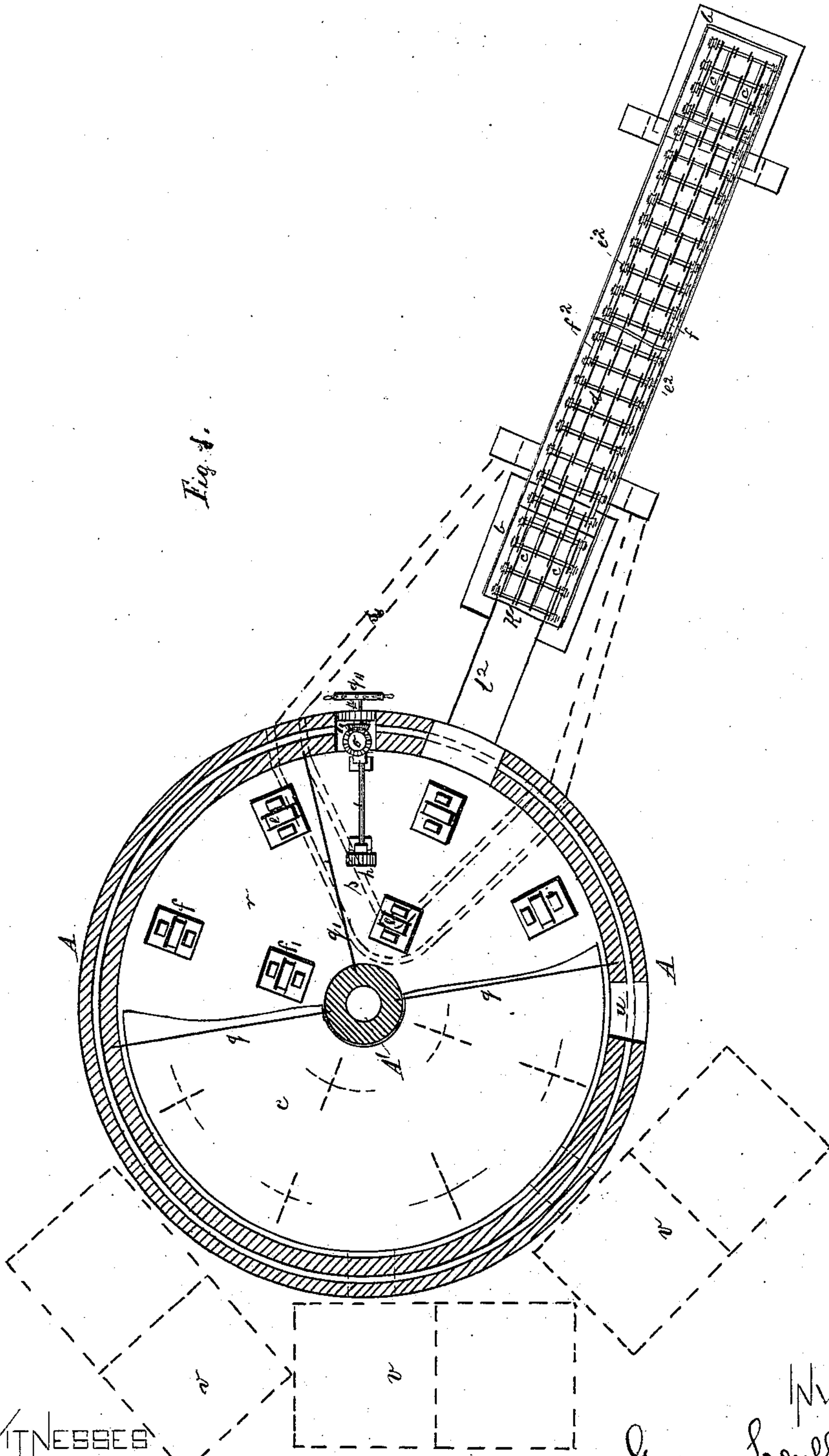
(No Model.)

2 Sheets—Sheet 1.

G. LEUFFGEN.
GLASS ANNEALING FURNACE.

No. 313,347.

Patented Mar. 3, 1885.



WITNESSES
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(No Model.)

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Fig. 2.

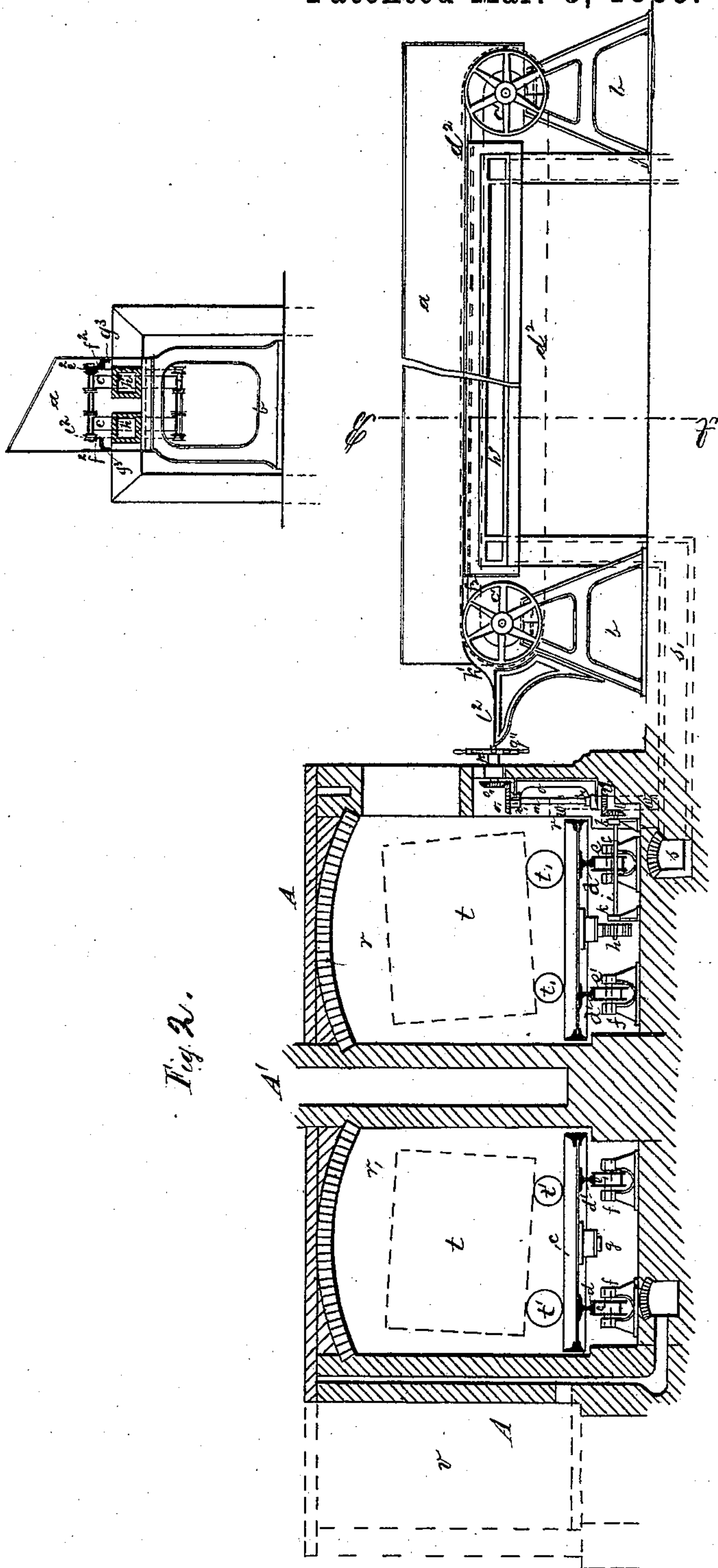


Fig. 3.

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UNITED STATES PATENT OFFICE.

GEORG LEUFFGEN, OF BERLIN, GERMANY.

GLASS-ANNEALING FURNACE.

SPECIFICATION forming part of Letters Patent No. 313,347, dated March 3, 1885.

Application filed May 6, 1882. (No model.) Patented in Germany September 17, 1880, No. 19,217; in England April 26, 1881, No. 1,795; in Belgium May 25, 1881, No. 54,730; in Italy June 30, 1881, No. 13,111, and in Sweden July 20, 1881.

To all whom it may concern:

Be it known that I, GEORG LEUFFGEN, of Berlin, Kingdom of Prussia, German Empire, have invented certain new and useful
5 Improvements in Glass-Annealing Furnaces, of which the following is a specification.

To make glass goods durable they ought to be annealed, and to avoid a loss of the finished blown or pressed glass they ought to be protected against sudden cooling. I accomplish
10 this by transporting the glass goods from the working place to the annealing-furnace through a heated and closed trough by means of the conveyer hereinafter described. The conveyer
15 consists, essentially, of an endless belt or chain, driven by hand or machine power. For heating the closed trough in which the conveyer works the hot generator-gases destined for heating the annealing-furnace are used,
20 running along the bottom of the trough in canals or pipes. It is practicable to use for the same purpose steam, hot air, or any other heating means in lieu of the generator-gas. The annealing-furnace is of round or polygo-
25 nal ground plan. The products of combustion are carried off by a chimney in the center of it. On the bottom of the annealing-furnace a turn-table is mounted on rollers, which can be moved from the outside of the
30 furnace by cranks and gears engaging with a toothed ring fastened to the turn-table. The interior of the annealing-furnace can be divided by sliding partitions into two or more sections, and these single chambers can be
35 heated at will to different temperatures. The wall of the furnace is provided with a door near the point to which the conveyer brings the glass goods in small cars or otherwise, and through such door the goods are introduced
40 into the furnace. Boxes set upon trucks on the turn-table receive the glass goods as they are introduced through the door, and when filled are closed with suitable lids. When the goods are annealed, which may take place in
45 any one of the compartments formed by the sliding partitions above mentioned, or in several such compartments, at different temperatures, successively, they are taken out through the charging-door or otherwise. The trucks,
50 with the superimposed boxes containing the annealed goods, may be wheeled out through

an opening provided for the purpose and unloaded outside the furnace. The furnace is heated by generator-gas traveling through the conveyer, as previously described; but
55 separate pipes or canals may be provided if the gas thus applied is not sufficient, or if it is desirable for any reason to heat the conveyer and the furnace from separate sources, or from the same source by different chan-
60 nels or pipes. Around the furnace a gallery is arranged, divided into a number of twin chambers, intended for treating plate-glass. Each of these chambers is divided by sliding partitions into sections. The glass cylinders,
65 well known in manufacture, and of which plates are made, are laid upon wagons in one of these chambers, there rolled in the usual way, and taken for annealing into the second chamber, which is shut off from the first.
70 After the annealing is effected the wagons are brought back into the first chamber and the plates removed. The heated gases used in these chambers can be carried on to the annealing-furnace. For large castings, how-
75 ever—such as looking-glass plates, &c.—an annealing-furnace like the above-described twin chambers would be unhandy and too small. For such manufacture a gallery of ring-
80 shaped ground plan and of very great diameter is required; or two parallel galleries are used, which are united at their small ends by a railway and by traveling platforms, so that the wagons for annealing the pieces can be
85 shifted in and out.

The accompanying drawings form a part of this specification and illustrate the invention. Figure 1 is a horizontal section of the annealing-furnace and a plan view of the conveyer with the top removed. Fig. 2 is a vertical
90 section of the furnace and a side elevation of the attached conveyer. Fig. 3 is a vertical section of the conveyer on the line A B of Fig. 2.

Similar letters of reference indicate corre-
95 sponding parts in all the figures.

A is the annealing-furnace, circular or polygonal in form, with a central chimney, A', to which flues connect from the gas-passages. A turn-table, c, extends entirely around the fur-
100 nace. It is provided with circular rails d d' underneath, which rest and turn upon rollers

ee', held in upright brackets or supports *f*. On the bottom of the turn-table, between the rails *d d'*, a toothed ring, *g*, is secured, into which gears the pinion *h*. This pinion is fixed to the shaft *i*, turning in bearings *k*. The shaft *i* is fitted on its outer end with the bevel-wheel *l*, gearing with the bevel-wheel *l'*, which is fastened to the vertical shaft *m*, revolving in wall-bearings *o* and held up by the collar *n* and ring *n'*. The shaft *m* has a bevel-wheel, *o'*, secured at the upper end, which engages with a similar bevel-wheel, *o''*, on the short horizontal shaft *p*. A hand-wheel, *q''*, fixed to the outer end of the shaft *p*, affords a means of operating the gearing just described and turning the turn-table *c* in either direction. The hand-wheel *q''* is on the outside of the furnace-wall through which the shaft *p* protrudes. The interior of the furnace is divided into sections by the slides *q q'*. These slides may be operated from the exterior by providing suitable way through the wall of the furnace or from above. The sections or chambers thus formed may be of different degrees of temperature—one hot and the other comparatively cold. Canals *s s*, leading the heating means from the conveyer, hereinafter described, underlie and surround the furnace, giving out the greater part of their heat to the sections *r*. In these sections *r* the boxes *t*, mounted on the wheels *t'*, are filled with the goods to be annealed. When one box is filled, the slide *q'* (and there may be several such slides) is raised, and the turn-table, with the box or wagon, revolved until the box or wagon passes the slide *q'*, which is then lowered. The next wagon is then filled and taken out of the way behind another screen, and so on. In this way the boxes pass on until the annealing is complete, and they come to the opening *u*, where they are unloaded. This opening may be made large enough to allow the wagon or box to be taken out bodily.

The annealing-furnaces *v*, arranged on the side of the annealing-furnace *A*, are for large plates of glass. They are shown in dotted lines in Figs. 1 and 2, and the partition which divides each into hot and cold sections is also represented in dotted lines in Fig. 1. Their use has already been explained in the foregoing description.

The transporting apparatus or conveyer, which carries the glass goods from the place they are formed to the annealing-furnace, consists of a cover or inverted trough, *a*, resting upon frames *b b*. Above each frame pulleys *c'* are mounted, which carry the endless chain or belt *d²*. Cross-stays *e'*, attached to each link of the chain *d²*, carry flanged rollers *e²*, which travel on bars *f²*, attached to angle-irons *g³* on the side of the trough *a*. The rollers *e²* guide and sustain the sagging of the

chain. The pulleys *c'* are rotated by any suitable means—by hand or power. Canals *h'* extend along the trough immediately under the upper travel of the chain *d²*, from one set of pulleys, *c'*, to the other. Through one of these the generator-gas enters and flows along to the annealing-furnace, and is returned through the other. The hot glass goods are carried along on the chain *d²* from the place where they are made toward the annealing-furnace. They are passed over the plate *k'* onto a table, *l'*, strewn with sand, which is situated immediately in front of the opening through which the goods are passed into the boxes or wagons in the annealing-furnace, before described. The trough or cover *a* protects the hot goods from the outside air, and the heating-canals *h'*, beneath the conveying-chain, keep the temperature high, so that the goods reach the annealing-furnace at the same or nearly the same temperature at which they leave the forming and finishing room. The length of this conveyer may be such as will serve the situation in which it is to be used. I have shown it broken to indicate this.

Having thus described my invention, what I desire to claim and secure by Letters Patent is—

1. In an annealing-furnace, the combination, with the turn-table and means for rotating the same, of trucks for containing the articles to be annealed, adapted to be rolled from one part of the turn-table to another, or to be rotated therewith, and movable partitions in the furnace, whereby said furnace may be divided into different sections, and the trucks placed as desired in relation thereto, as set forth.

2. The combination, with the main annealing-furnace *A*, of the auxiliary annealing-chambers or galleries *V*, placed beside the main furnace, substantially as set forth.

3. The combination, with an annealing-furnace, of a heated conveyer for bringing the glass goods from the forming-room to said annealing-furnace, as set forth.

4. The conveyer described, consisting of the inclosing-trough *a*, pulleys *c'*, and endless belt *d²*, all combined for joint operation with an annealing-furnace, as set forth.

5. The combination, with an annealing-furnace, of a conveyer for carrying the glass goods, and canals situated in close proximity to the conveyer for conducting the heating gas or other fluid along the conveyer and to the annealing-furnace, as set forth.

This specification signed by me this 8th day of September, 1881.

GEORG LEUFFGEN.

Witnesses:

C. ZEUG,

H. SCHRADER.