Feb. 23, 1943. F. VRANKEN 2,311,908

HEATING OVENS, PARTICULARLY THOSE FOR HARDENING GLASS PLATES

Filed April 17, 1939

Fig. 1

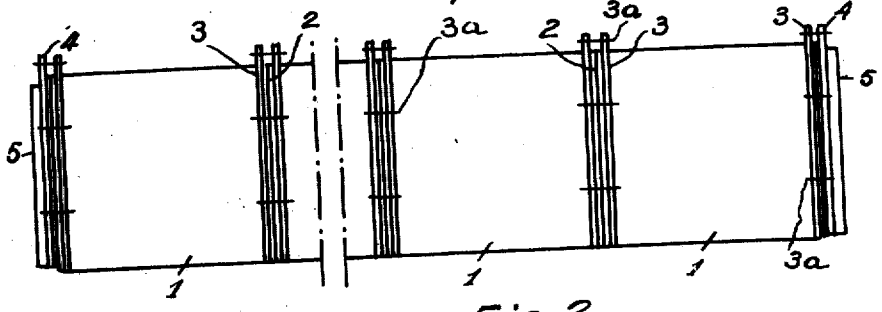


Fig. 2

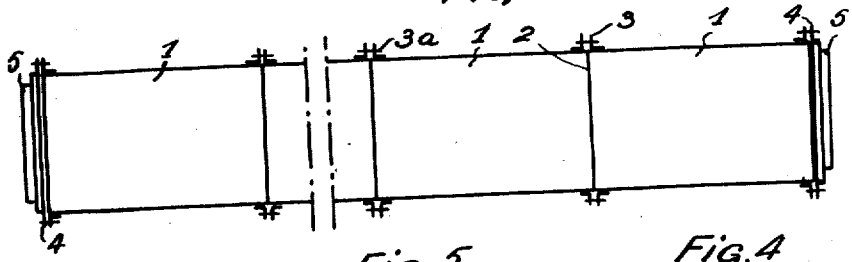


Fig. 3

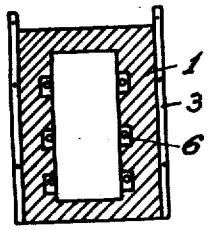


Fig. 5

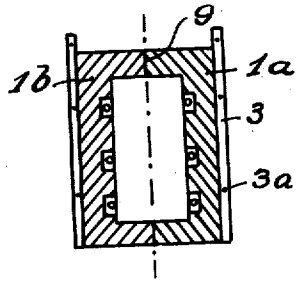


Fig. 4

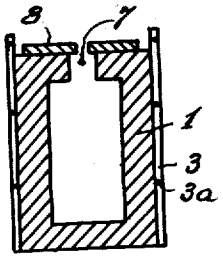


Fig. 6

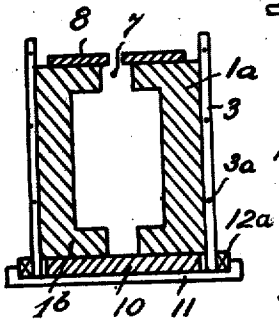
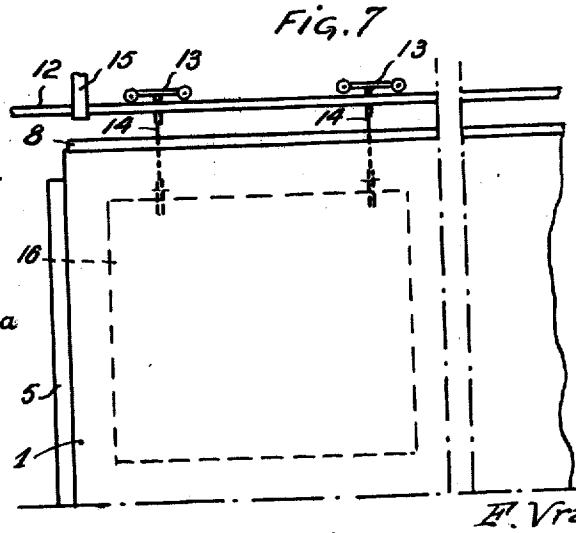


Fig. 7



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HEATING OVEN, PARTICULARLY THAT FOR HARDENING GLASS PLATES

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Application April 17, 1939, Serial No. 268,357
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4 Claims. (Cl. 49—46)

The invention has relation to heating ovens and concerns more particularly amongst them, the ovens used for heating glass plates to be hardened.

In the construction of heating ovens, in which the articles to be heated, and particularly glass plates are placed for a certain period and in which the articles are introduced at one end of the oven to be removed at the other end thereof, it is usual to construct the oven as a unit designed for a given output.

However it frequently arises that owing to manufacture requirements, there is a necessity for either a more considerable output or a smaller output than the available output, with the result that ovens must be provided which remain in waiting for most of the campaign, or power is spent which is not effectively used for the intended heating.

On the other hand, in ovens constructed as units, particularly those used for heating glass plates to be hardened, the access to the parts becomes difficult and even impossible, as soon as they are located a certain distance away from the oven ends. When these ovens are to be repaired at such locations, the sole possibility is the partial breaking of the oven.

Finally it has been found convenient for the heating to be ensured to dispose of ovens of different widths or to be able to modify the width of the oven which modification is naturally not permissible with ovens made as an unit.

The main object of the invention is to avoid the indicated drawbacks. Further the invention affords the possibility, particularly in ovens of the continuous type including a conveyance of the articles to be heated, particularly glass plates, from one end to the other of the oven, to ensure in a simple manner the mounting of the conveying device outside the heated space or chamber, thus ensuring appropriate operating conditions of this device and a good maintenance of its constituent parts.

Further the invention enables the width of the heating space or chamber to be easily modified as well as the management of the heating in the upper portion of said space.

To this end, according to the invention, said ovens are no longer constructed as an unit but formed by means of a series of juxtaposed elements suitably united to each other.

The invention also consists in constructing each element preferably by means of two halves; these halves may be such as to provide between them a split or slot, notably adapted to provide for the passage of members adapted to sustain the articles to be heated as from a suspension device, particularly a movable suspension device, and also such as to provide, with or without a split or slot as above set forth, for their moving apart or towards each other in order, amongst other things, to vary the width of the heating space.

And in order to enable the invention to be fully understood, certain preferred oven constructions will now be described with more detail in connection with the heating of glass plates to be hardened.

In the annexed drawing:

Fig. 1 is a diagrammatic side elevation view of an oven made of juxtaposed elements, in accordance with the invention;

Fig. 2 is a top plan view of this oven;

Fig. 3 is a sectional elevation view of one element of the oven illustrated in Figs. 1 and 2, the section being taken substantially through the centre of the element;

Fig. 4 is a view similar to Fig. 3, of a modification;

Fig. 5 is a cross sectional view of an oven formed of elements, in which each element is formed by means of cooperating halves;

Fig. 6 illustrates a modification of the arrangement according to Fig. 5;

Fig. 7 shows in part side elevation, an oven provided with a transporting device for the articles to be heated.

Referring to Figures 1, 2 and 3, the oven which may receive an indefinite length, is formed by means of elements 1 juxtaposed as at 2 and united together by any suitable fastening means.

In the illustrated example, each element 1 comprises frame members or uprights 3, suitably secured to the elements 1, these members 3 being in turn secured together by suitable connections, such as the bolts or stay-bolts 3a.

When required, connecting rods or other frame members may be provided, extending the full length of the oven, to reinforce the whole assembly.

For closing the ends of the oven, any additional devices may be provided such as frames or other structures 4 united to the end frame members 3 by means of bolts 3a and in or upon these frames or structures 4 are arranged doors 5 pivoted on lateral hinges or adapted for sliding movement.

The elements are heated by means of electrical resistances 6, each of the elements being provided with its own resistances, which resistances

are united, outside the elements, to supply bars (not illustrated), which may be common to all the elements or appropriated to each element and, in this latter case, provided with connecting means enabling them to be united to the bars of the adjacent elements 1.

It will be observed that with the above described arrangement the output of the oven may be increased or reduced as desired, by adding or removing elements such as 1. To this end, it will be sufficient to remove the frames 4 by releasing their fastening connections 3a, then adding or removing one or several elements 1, and then replacing and fastening again the frames 4.

For effecting the necessary repairs to any one of the elements 1 it will be sufficient to release the connections of the injured element, to remove it from the series of elements 1 forming the oven and, the repairing being completed, to replace the element.

During the period the injured element is removed, the open end or ends of the oven may be closed, for example by means of frames such as 4, but solid, or by any other means.

Alternatively the removed element 1 may be immediately replaced by another identical element, this enabling the oven to be operated again either immediately or after a short heating period for raising the element to the working temperature.

In ovens of the vertical type having a closed top, an excess temperature is frequently experienced in the upper portion of the heated chamber relatively to the lower portions thereof. This excess temperature may be a disadvantage and even be prejudicial to the heating of the articles placed in the oven, particularly when these articles are glass plates to be raised at the proper temperature for hardening them.

This drawback may be avoided by providing in the top wall of the oven one or more openings, such for example as a split or slot 7 to be seen in Fig. 4.

The openings or slots provided in the top wall of the elements 1 may be formed with exactly the width necessary for the escape of the excess heat from the upper portion of the heated chamber but, most advantageously, the openings or slots are made of greater width while means are provided for adjusting the working width thereof.

In the example, these means are formed by means of plates, made of refractory or other suitable material, which plates are movable and arranged on the upper surface of the top wall of the oven.

These plates are preferably individual to each of the oven elements.

Instead of forming the oven by means of elements made of a single piece, each element 1 may be formed with advantage of two half elements 1a and 1b juxtaposed as at 9 as shown in Fig. 5.

With such an arrangement the elements are not only rendered more maniable and the repairs are yet more easy, but the escape slot arrangement of Fig. 4 may also be obtained in a very simple manner as illustrated by Fig. 6.

In this figure, the half elements 1a and 1b are arranged on a base 10 made of refractory or other suitable material, and the connection of the parts 1a, 1b and 10 may be insured by means of a device such as illustrated, including shoes 11 in which engage the uprights 3 and means for adjusting the position of these uprights such as the blocks of hard wood or other material 12a.

The arrangement thus described yet answer another requirement in ovens of this type, particularly ovens intended for heating glass plates with a view of hardening them, that is to enable the width of the heated chamber to be modified to a more or less considerable extent. It has been found that the narrow ovens generally used for this purpose do not always permit the proper uniformity in temperature of the glass plates, to be obtained, and this may be materially improved by an enlargement of the heated chamber.

It is apparent that with elements 1 made of two parts such as 1a and 1b, the width of the heated chamber may be modified as desired to give it the appropriate value for securing the desired result.

Finally, in the ovens where articles to be heated are moved from one end to the other of the oven, this arrangement leads itself very easily to the mounting of a transporting track outside the heated chamber, thus improving the operation and ensuring the good maintenance of this transporting device.

Fig. 7 shows such an arrangement, in which the transporting track is formed by means of a single rail or a pair of rails 12, suitably supported on brackets 15 and supporting carriages 13 to which the articles to be heated, such as glass plates 16, are suspended by means of suitable suspension members, such as rods 14 provided with tongs.

The suspension members 14 then pass through the contiguous or adjacent slots 7 of the juxtaposed elements 1, the width of the passage being adjusted by means of plates 8 arranged as in Fig. 6, the adjusted width accommodating the thickness (or width) of the suspension members 14 only or providing also for the desired escape of the excess heat in the upper portion of the heated chamber.

Although certain preferred arrangements only have been described, it is to be understood that the invention is not limited thereto but also includes the alternatives and the equivalent constructions.

I claim:

1. A heating oven of substantial length, for heating glass articles, particularly glass plates to be hardened comprising a series of oven sections jointing each other with closure means at each end of the oven, each oven section comprising a base extending the full width of the section, side walls and a top wall with a slot therein, the side walls being movable towards and away from each other, whereby to adjust the width of said oven sections, and means for adjusting the width of the slot in the top wall of said sections.

2. A heating oven of substantial length, for heating glass articles, particularly glass plates to be hardened, and formed of a series of oven sections jointing each other, each oven section comprising a base and side walls, each side wall including a portion of a top wall and the side walls being movable towards and away from each other to adjust the width of the heated space of the oven sections, the top walls being spaced to form a slot therebetween and means for adjusting the width of the slot between the top wall portions of the side walls.

3. A heating oven of substantial length, for heating glass articles, particularly glass plates to be hardened, and formed of a series of oven sections jointing each other, each oven section comprising a base, side walls and a top wall with a longitudinal slot therein, each oven section

being provided with its own heating means, the side walls of the each section being movable towards and away from each other, to adjust the width of said oven sections and the temperature of the heated space thereof, and means for adjusting the width of the slot in the top wall of said sections.

4. A heating oven of substantial length, for heating glass articles, particularly glass plates to be hardened and formed of a series of oven sections jointing each other, each oven section comprising a base, side walls and a top wall with a longitudinal slot therein, each oven section being provided with its own heating means, the side walls of each section being movable towards and away from each other to adjust the width of the oven sections and the general temperature of the heated space thereof, a supporting track, supporting means for the articles to be heated depending from said track and passing through said slot, and means for adjusting the width of the slot in relation with said supporting means, whereby to adjust the escape of heat through the slot.

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