Nov. 13, 1945. H. C. WELLER 2,388,888

FURNACE FOR HEATING LENS BLANKS

Filed Nov. 25, 1942

Fig. 1.

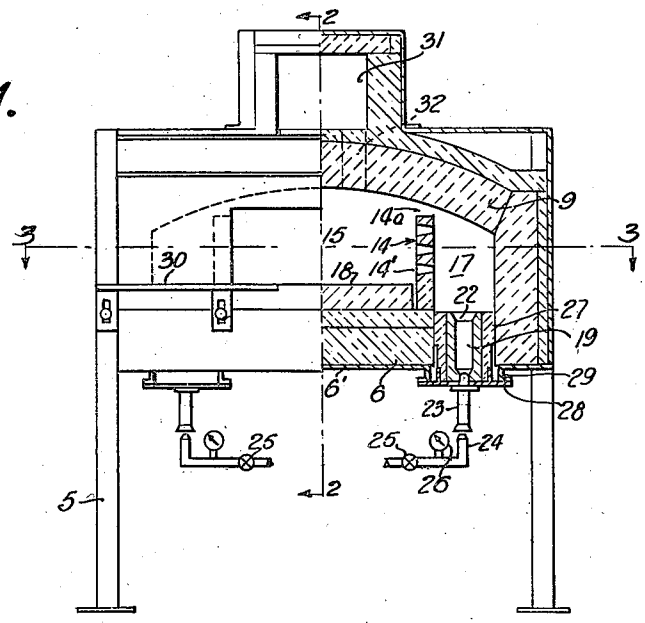
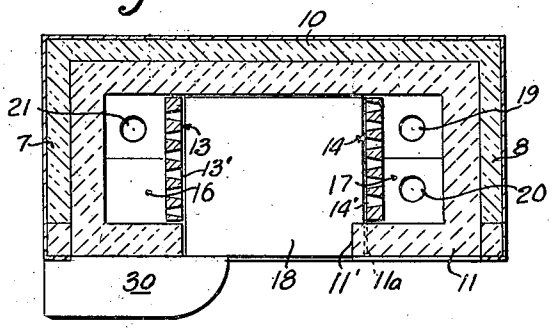


Fig. 3.



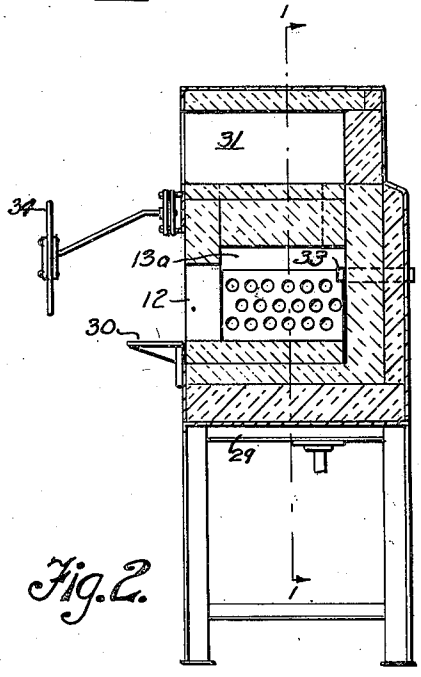


Fig. 2.

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FURNACE FOR HEATING LENS BLANKS

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6 Claims. (Cl. 263—43)

This invention relates to the art of heating relatively small lens blanks to molding temperature and the object of the invention is to provide a relatively simple and practical gas fired furnace wherein the heating operation may be conducted.

In the accompanying drawing forming part of this specification,

Fig. 1 is a partial front elevation and vertical section of the improved furnace, the section being taken on line 1—1 of Fig. 2;

Fig. 2 is a vertical section on line 2—2 of Fig. 1; and

Fig. 3 is a horizontal section on 3—3 of Fig. 1.

The furnace of the present invention is supported on a stand 5 and comprises a bottom wall 6; lateral side walls 7 and 8; a roof 9; a back wall 10, and a front wall 11 having a door opening 12, all made of the usual fire brick within a steel casing of which the bottom is indicated at 6'. The space between the side walls is divided by two upright heat permeable refractory walls 13 and 14 into a central heating chamber 15 wherein the lens blanks (hereinafter sometimes called "work") will be placed for heating to molding temperature and two similar left and right hand hot-gas or firing chambers 16 and 17. A refractory slab 18 supported on the bottom wall 6 between walls 13 and 14 constitutes the hearth of the heating chamber.

Two similar burners 19 and 20 fire upwardly into the right hand firing chamber 17 and a single similar burner 21 fires upwardly into the left hand firing chamber 16. Therefore, when the same amount of fuel is supplied to each of the burners the right hand side of the heating chamber 15 will be at a substantially higher temperature than the left hand side thereof. The burner for the left hand firing chamber 16 is positioned closer to the back wall of that chamber than to the front wall thereof and consequently the back portion of the heat permeable wall 13 will be more highly heated than the portion next to the door opening 12.

The burners are of a type adapted to burn a preformed mixture of air and gas, each burner comprising a refractory tunnel 22 to which the combustible mixture is delivered from a suitable source of supply shown as comprising for each burner a mixing tube 23 into the lower end of which a jet of gas is discharged from a supply pipe 24 in a manner to entrain the combustion supporting air, each supply pipe being shown as provided with a manually adjustable gas valve 25 and a pressure gauge 26. The burner tunnel is shown as housed in a square refractory block 27 the lower end of which is seated on a metal plate 28 adapted to be detachably secured to side brackets 29 which depend from the bottom wall 6' of the furnace casing.

The right hand side of the door opening 12 is preferably some distance to the left of the right hand heat permeable wall 14 as indicated by the front wall extension 11' whereas the left hand side of said opening is preferably in the same vertical plane as the adjacent face of the heat permeable wall 13, it being understood that the extension 11' serves to prevent the adjacent edge of the wall 14 from cold air draft.

Both of the heat permeable walls 13 and 14 terminate a short distance below the roof 9 to provide relatively restricted gas passages 13a and 14a, respectively, between the respective firing chambers 16 and 17 and the heating chamber 15, it being understood that in the absence of other exit openings from the said firing chambers, all of the hot gases from the firing chambers would enter the heating chamber by way of said passages. The right hand heat permeable wall 14 is provided with a multiplicity of relatively small gas discharge ports 14', three vertically spaced rows of such ports being shown. Hot gases in the chamber 17 will, therefore, flow into the heating chamber 15 not only by way of the top passage 14a but also by way of said ports 14'. It will, therefore, be understood that the work in the heating chamber 15 will be heated by convection as well as by radiation from the heat permeable wall 14.

The left hand heat permeable wall 13 is preferably also provided with a multiplicity of gas discharge ports 13' so that hot gases in the left hand firing chamber 16 may also flow into the heating chamber 15 by way of said ports. However, it will be readily appreciated that inasmuch as the left hand firing chamber 16 is fired by a single burner the pressure of the hot gases in that chamber will be less than the pressure of the same in the right hand firing chamber with the result that the velocity of the gases entering the heating chamber from the left hand chamber 16 will be less than those entering from the right hand firing chamber 17.

In front of the furnace at the left hand side thereof is a vertically adjustable shelf 30 which will normally be so adjusted that it will be at the same level as the top of the hearth 18, it being noted that the right hand end of the shelf is some distance to the right of the left hand side of the door opening 12. The purpose of this

shelf is to allow the operator to place the lens blanks on the shelf preparatory to placing them in the heating chamber as by tongs. The left hand front end of the heating chamber adjacent the door opening will be relatively cool as compared with the back left hand corner thereof and, therefore, by introducing the blank at the left hand front end of the heating chamber and gradually moving it towards the left hand corner, the blank will gradually be exposed to higher temperatures. Eventually, the operator will move the blank over towards the hotter right hand side of the heating chamber or to any desired point between the two heat permeable walls 13 and 14 as may be necessary to insure that the blanks will be at the proper temperature before they are removed from the heating chamber for molding in a machine not shown.

After the lens blanks have been molded, they must be annealed in annealing apparatus not shown. However, inasmuch as the blanks are relatively small, the usual procedure is not to anneal them until a considerable number of blanks have been accumulated. In the meantime, it is desirable that the molded blanks be kept warm or fairly hot and to this end there is provided on top of the furnace an oven 31 which is kept sufficiently hot by allowing hot gases from the heating chamber to flow thereinto as by way of one or more upright passages 32 in the roof 9 of the heating chamber.

In order to protect the operator from hot gases flowing out of the heating chamber by way of the front door opening 12 thereof, there may be provided in front of the door opening a shield 34 for diverting the gases upwardly (see Fig. 2), the shield ordinarily being made of some transparent material so that the operator can look through the same into the heating chamber to facilitate his manipulation of the lens blanks.

The hearth 18 of the heating chamber is preferably removably supported on the floor of the furnace so that it can be readily withdrawn by pulling the same horizontally outward through the door opening 12, the front wall extension 11' having a side notch indicated by the dotted line 11a to permit such withdrawal.

Both of the heat permeable walls 13 and 14 are preferably supported in a manner to permit their ready removal in case they require replacement for one cause or another. To this end each wall is detachably seated on the bottom wall of the furnace and is held in an upright position in any preferred way as by a notched brick 33 which abuts the same, the brick being removably positioned in the back wall 10 of the furnace for withdrawal from the outside of the furnace.

Although some parts of the furnace have been described in greater detail than other parts, it will be understood that no limitations are intended except as expressed in the appended claims.

What is claimed is:

1. In a furnace for the purpose described, the combination of a back wall, two laterally spaced walls extending forwardly in front of said back wall, said back wall and side walls constituting three side walls of a heating chamber, a roof above said heating chamber, and hot gas chambers, one each being located at either side of said heating chamber, each of said side walls being provided with a plurality of apertures therethrough and the upper edge of said side walls terminating in spaced relation from said roof, whereby hot gases from said hot gas chambers may pass over said side walls and through said apertures to said heating chamber.

2. In a heat treating furnace, the combination of a chambered structure comprised of a bottom wall, a back wall, a front wall, a pair of end walls and a roof, a pair of walls extending upwardly from the bottom wall and between the front and back walls for dividing the space between the said end walls into a middle and two end compartments, and a hearth in the middle compartment and the latter having a front opening through which access can be had to material on the hearth, each of said pair of walls being provided with a plurality of apertures therethrough and having a passageway over the top thereof, whereby ported communication is possible from said end compartments to said middle compartment for the passage of hot gases.

3. In a heat treating furnace, the combination of a chambered structure comprised of a bottom wall, a back wall, a front wall, a pair of end walls and a roof, a pair of walls extending upwardly from the bottom wall and between the front and back walls for dividing the space between the said end walls into a middle and two end compartments, a hearth in the middle compartment and the latter having a front opening through which access can be had to material on the hearth, each of said pair of walls being provided with a plurality of apertures therethrough, whereby ported communication is possible from said end compartments to said middle compartment for the passage of hot gases, means for providing hot gases and discharging into a first one of said end compartments at a location toward the rear thereof, and means for providing hot gases and discharging the same into the second of said end compartments at locations both at the front and at the rear thereof.

4. In a heat treating furnace, the combination of a chambered structure comprised of a bottom wall, a back wall, a front wall, a pair of end walls and a roof, a pair of walls extending upwardly from the bottom wall and between the front and back walls for dividing the space between the said end walls into a middle and two end compartments, a hearth in the middle compartment and the latter having a front opening through which access can be had to material on the hearth, each of said pair of walls being provided with a plurality of apertures therethrough, whereby ported communication is possible from said end compartments to said middle compartment for the passage of hot gases, means for supplying hot gases to the rear of a first one of said end compartments while leaving the front portion relatively cool, and separate means for supplying hot gases to both the front and rear portions to the second of said end compartments.

5. In a heat treating furnace, the combination of a chambered structure comprised of a bottom wall, a back wall, a front wall, a pair of end walls and a roof, a pair of walls extending upwardly from the bottom wall and between the front and back walls for dividing the space between the said end walls into a middle and two end compartments, a hearth in the middle compartment and the latter having a front opening through which access can be had to material on the hearth, each of said pair of walls being provided with a plurality of apertures therethrough, whereby ported communication is possible from said end compartments to said middle compartment for the passage of hot gases, means for providing hot

gases and discharging the same into a first of said end compartments, and means for providing hot gases and discharging them into the second of said end compartments, said latter means being capable of supplying an amount of gas in multiple of that supplied to the first said end compartment.

6. In a heat treating furnace, the combination of a chambered structure comprised of a bottom wall, a back wall, a front wall, a pair of end walls and a roof, a pair of walls extending upwardly from the bottom wall and between the front and back walls for dividing the space between the said end walls into a middle and two end compartments, and a hearth in the middle compartment and the latter having a front opening through which access can be had to material on the hearth, each of said pair of walls being provided with a plurality of apertures therethrough and having a passageway over the top thereof, whereby ported communication is possible from said end compartments to said middle compartment for the passage of hot gases, said front wall on that side of said front opening next adjacent said second end compartment extending part way across the front of said middle compartment, and the front wall on the opposite side of said front opening terminating adjacent said first end compartment and not extending in front of said middle compartment for such a distance as that which said first mentioned portion of the front wall extends.

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