

No. 737,909.

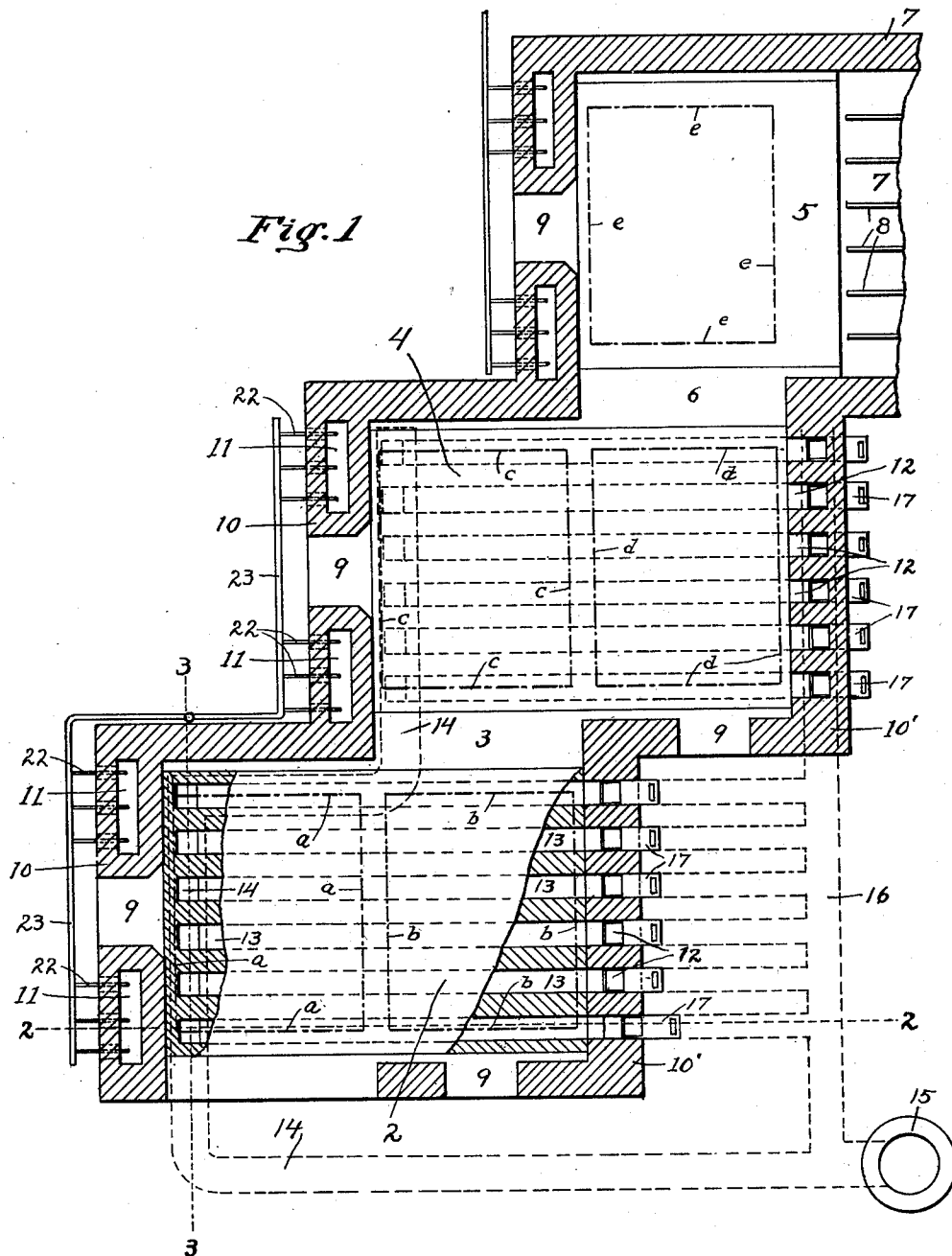
PATENTED SEPT. 1, 1903.

J. W. CRUIKSHANK.
 PLATE GLASS ANNEALING OVEN.

APPLICATION FILED APR. 19, 1902.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses.
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2 SHEETS—SHEET 2.

Fig. 2

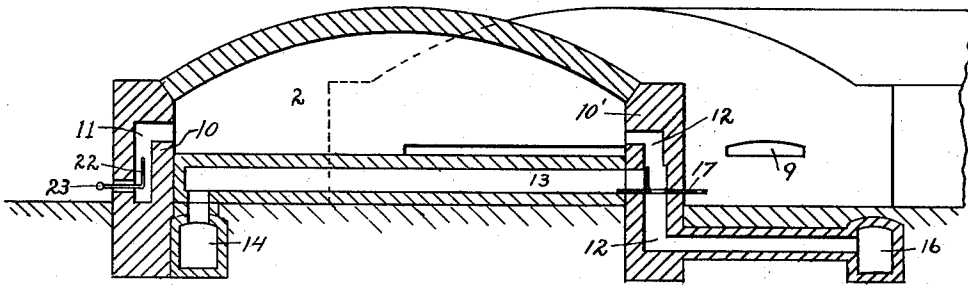


Fig. 3

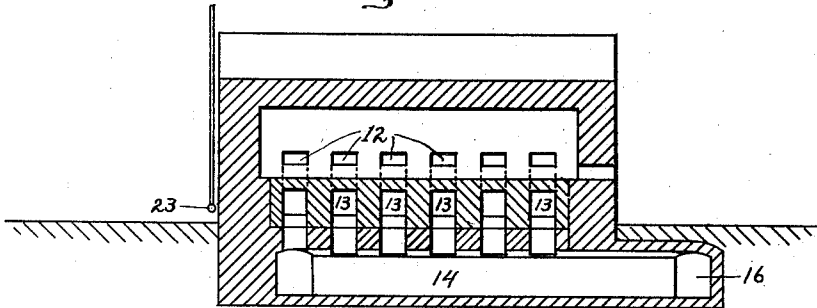


Fig. 4

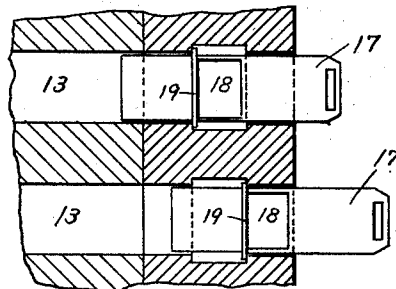
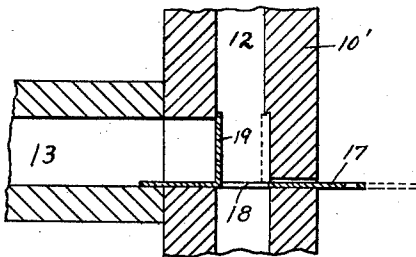


Fig. 5



Witnesses.

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UNITED STATES PATENT OFFICE.

JAMES W. CRUIKSHANK, OF PITTSBURG, PENNSYLVANIA.

PLATE-GLASS-ANNEALING OVEN.

SPECIFICATION forming part of Letters Patent No. 737,909, dated September 1, 1903.

Application filed April 19, 1902. Serial No. 103,768. (No model.)

To all whom it may concern:

Be it known that I, JAMES W. CRUIKSHANK a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Plate-Glass-Annealing Ovens, of which the following is a specification, reference being had therein to the accompanying drawings.

In the operation of annealing-ovens through which plates of glass pass progressively from the casting-table to the cooling-leer it is difficult to heat the oven-floors and maintain them at proper temperature. When the temperature of the floors is not sufficiently high, the plates are chilled on their under surfaces and caused to curl.

It is the object of the present invention to provide for heating the floors and maintaining them at proper temperature by means of flues formed therein, which communicate with the ovens and which operate in conjunction with stack-flues, whereby the heated gases and products of combustion discharging from the ovens are utilized for heating the floors.

It is further characteristic of the invention to so arrange the floor and stack flues that the draft from the ovens may be diverted through the floor-flues or may pass directly to the stack or partly through the floor and partly to the stack direct or the entire draft through a portion of the floor, as may be determined by working conditions and the skill of the operator.

In the accompanying drawings, Figure 1 is a floor plan of ovens constructed in accordance with my invention, the floor of one oven being partly in section. Fig. 2 is a vertical cross-sectional view on line 2 2 of Fig. 1. Fig. 3 is a similar view on line 3 3 of Fig. 1. Figs. 4 and 5 are detail views of the dampers.

The initial oven 2 and intermediate oven 4 communicate through the usual opening 3 and final oven 5, from which the plates pass to leer 7, communicating with oven 4 through opening 6. Each of ovens 2 and 3 has sufficient floor-space to provide two stations or berths for the plates, said stations being indicated by the dotted lines *a*, *b*, *c*, and *d*, while final oven 5 is of sufficient size to afford a single station or position *e*. From the initial position or station *a* the plates are

moved progressively to the other stations and finally from station *e* to rods 8 or other conveying means in leer 7, the oven-walls having usual openings 9, through which the stowing-tools are operated, all as old and well known in the art. The highest temperature is of course necessary for the plates in initial position or station *a*, and it is appreciably lower or decreases for each succeeding station. While it has not been difficult heretofore to accurately regulate the temperature of the upper portions of the ovens, the proper heating of the floors has been a more serious problem and to the solution of which this invention is especially directed.

In the present embodiment of the invention front end walls 10 of each of ovens 2 and 3 are formed with fireplaces 11, which communicate with the ovens, and the burning gases and products of combustion issuing therefrom into the ovens pass off through flue-ducts 12 in the opposite end walls 10'. The oven-floors are constructed each with a series of longitudinal flues 13, one for each of ducts 12 and into which the latter open, said floor-flues at the front ends of the ovens communicating with underground flue 14, leading to stack 15, while a similar underground flue 16 places ducts 12 in communication with the stack. At the juncture of ducts 12 and floor-flues 13 are the horizontally-sliding T-shaped dampers 17, formed with openings 18 in their horizontal members at the outer sides of vertical members 19, whereby when the dampers are in outward position ducts 12 and flues 13 are in communication, causing the heated gases and products of combustion to pass therethrough before reaching the stack. With the dampers in inward position flues 13 are closed and ducts 12 open to stack-flue 16.

In ovens with the usual solid floors it frequently happens that the latter are deficiently heated, however effective the heat may be within the upper portions of the ovens, resulting in chilling and curling of the plates. With the ovens constructed with floor-flues the heated gases and products of combustion may be directed backwardly therethrough and the floors thoroughly heated, and so maintained. By utilizing the waste gases and products of combustion for heating the floor

all portions of the latter are subjected from below to a volume of heat with no influx of cooler or cold air and on this account is preferable to any possible arrangement of under-floor burners which would create currents of cold air toward the floor and therethrough into the oven in case of defective joints. If the floor of any oven heats unevenly, the dampers may be so manipulated as to direct a portion of the heat through one or more of the floor-flues, with the other flues closed and the remainder of the heat passing directly to the stack. Thus very effective working conditions are constantly maintained.

Heat may be supplied from any suitable source or be generated in the fireplaces in any desired manner, the means here shown being burners 22, connected with an exterior gas-manifold 23.

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

1. A plate-glass-annealing oven having an inlet-opening in one side wall, fireplaces in an end wall adapted to discharge ignited gases into the oven and over a plate introduced through the inlet-opening, the end wall of the oven opposite the fireplaces constructed with a series of non-communicating ducts 12 into which pass the ignited gases and products of combustion after having completely traversed the oven, the oven-floor constructed with a series of parallel non-communicating flues 13, one for each of ducts 12 and, respectively, communicating therewith, a stack, the floor-flues being parallel with the oven side walls and at their ends opposite ducts 12 communicating with the stack, a direct connection between ducts 12 and the stack, and means at the juncture of each of ducts 12 and flues 13 whereby the products of combustion may be caused to pass from any one or all of ducts 12 directly to the stack or indirectly thereto through flues 13.

2. A plate-glass-annealing oven having its floor constructed with flues and provided with a source of heat, ducts extending from the oven for carrying off products of combustion,

said ducts communicating with the floor-flues and having stack connections, a separate stack connection for the floor-flues, and dampers for directing the products of combustion to the stack through the floor-flues or directly to the stack.

3. A plate-glass-annealing oven having its floor constructed with flues and provided with a source of heat, ducts extending from the oven for carrying off waste gases and products of combustion, said ducts communicating with the floor-flues and having stack connections, dampers at the juncture of the ducts and floor-flues for closing said ducts to either the floor-flues or the stack connection, and a separate stack connection for the floor-flues.

4. A plate-glass-annealing oven having its floor formed with horizontal flues, a stack, stack connections for the opposite ends of the flues, ducts opening out of one end of the oven and communicating with one end of the floor-flues and with the stack connections at said end, and means whereby draft from the oven may be caused to pass directly therefrom to the stack through said communicating ducts and stack connections, or indirectly to the stack through the floor-flues and the stack connections at the opposite ends of the latter.

5. A plate-glass-annealing oven having its floor formed with horizontal flues, a stack, stack connections for the opposite ends of the flues, ducts opening out of one end of the oven and communicating with one end of the floor-flues and with the stack connections at said end, and dampers at the junctures of the floor-flues and said ducts and common thereto, whereby draft from the oven may be caused to pass directly therefrom to the stack, or indirectly to the stack through the floor-flues and stack connections at the opposite ends of the latter.

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

JAMES W. CRUIKSHANK.

Witnesses:

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ALEX. S. MABON.