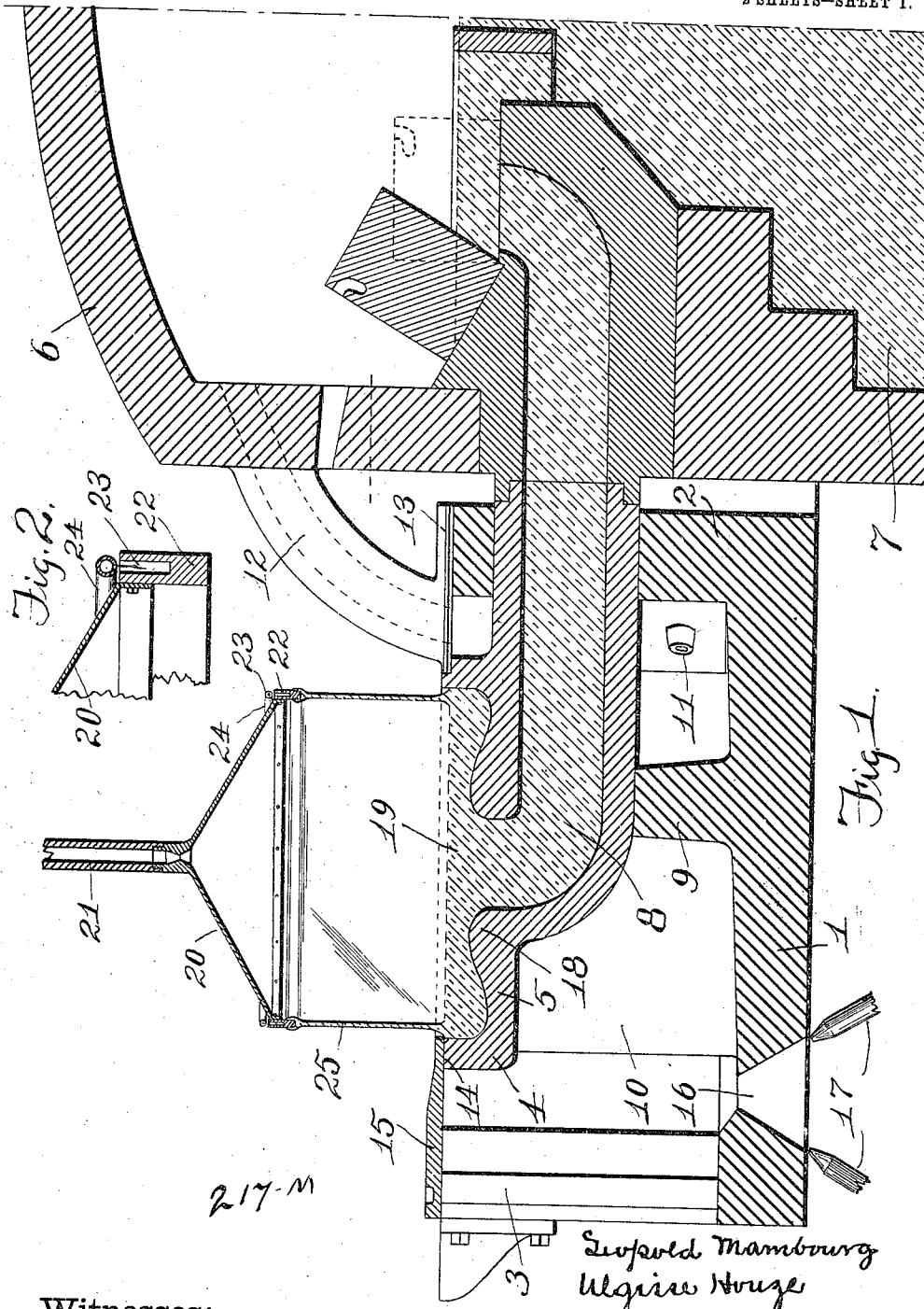


L. MAMBOURG & U. HOUZE.
GLASS DRAWING APPARATUS.
APPLICATION FILED MAR. 25, 1909.

965,205.

Patented July 26, 1910.

2 SHEETS—SHEET 1.



Witnesses:
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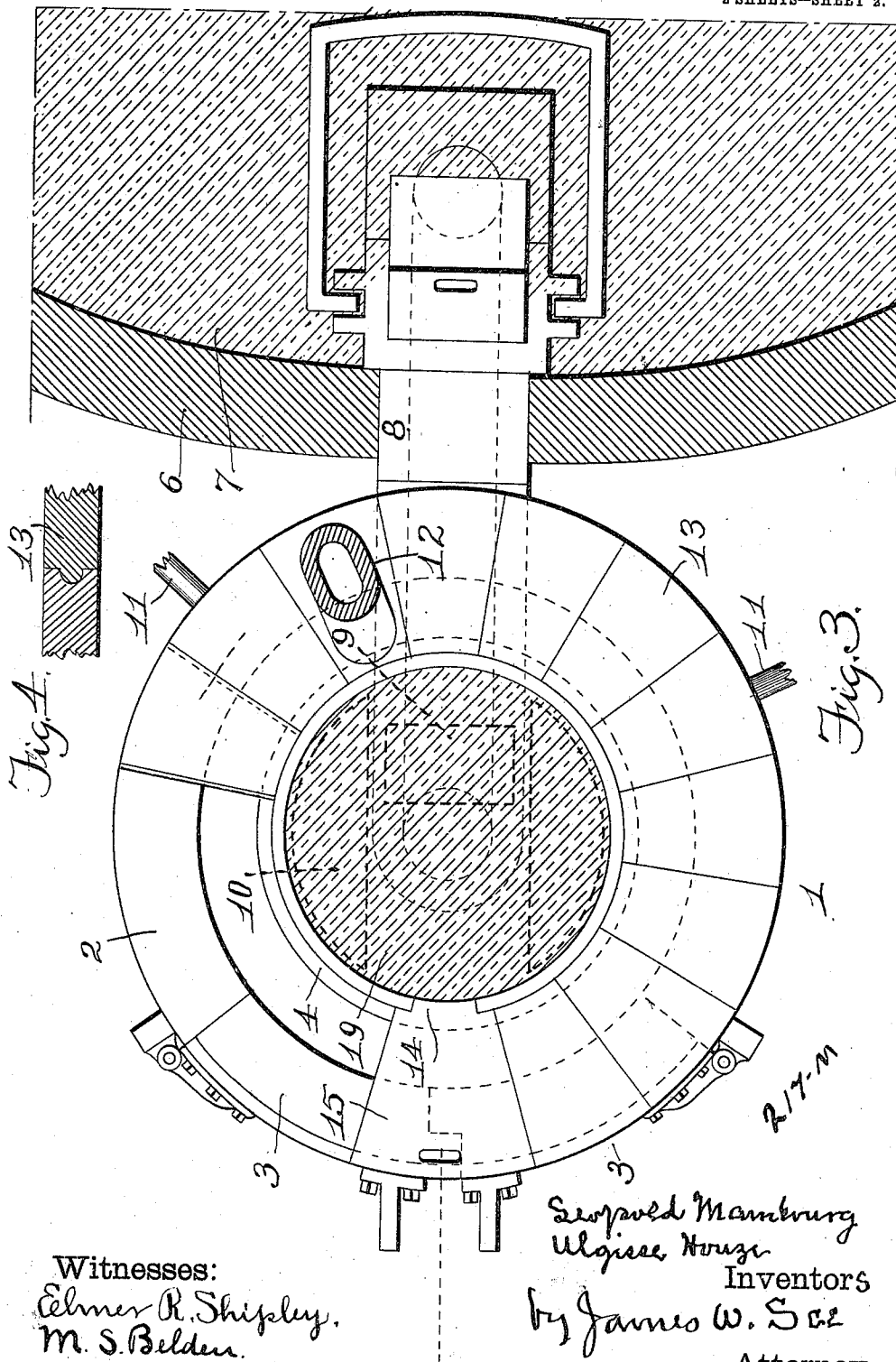


Fig. 1.

Fig. 3.

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UNITED STATES PATENT OFFICE.

LEOPOLD MAMBOURG AND ULGISSE HOUZE, OF MOUNT VERNON, OHIO.

GLASS-DRAWING APPARATUS.

965,205.

Specification of Letters Patent. Patented July 26, 1910.

Application filed March 25, 1909. Serial No. 485,649.

To all whom it may concern:

Be it known that we, LEOPOLD MAMBOURG and ULGISSE HOUZE, citizens of the United States, residing at Mount Vernon, Knox county, Ohio, have invented certain new and useful Improvements in Glass-Drawing Apparatus, of which the following is a specification.

This invention, relating to glass-drawing apparatus, will be readily understood from the following description taken in connection with the accompanying drawings in which:—

Figure 1 is a vertical section of a glass-drawing apparatus embodying our invention: Fig. 2 a vertical section of the bait, upon an enlarged scale: Fig. 3 a plan of the pot-furnace, with some of the cover-plates removed, the furnace and pot being shown in conjunction with a portion of the tank, which latter appears in horizontal section: and Fig. 4 a vertical section, on an enlarged scale, of the joint between two cover-plates.

In the drawings:—1 indicates the pot-furnace, preferably circular: 2, its wall: 3, doors in the front of the furnace, these doors extending to the top of the wall: 4, the pot, circular in plan and very shallow, the pot being disposed centrally within the furnace and with its top substantially even with the top of the furnace: 5, the floor of the pot: 6, the tank, presenting no peculiarities so far as the present application is concerned: 7, the glass in the tank: 8, a conduit leading from an outlet in the tank to an inlet disposed centrally in the floor of the pot, this conduit being formed in a neck formed with and projecting from the pot to the outlet of the tank: 9, a pier projecting upward from the floor of the furnace and engaging under the conduit and giving support to the general central portion of the pot: 10, a pair of piers extending upward from the floor of the furnace and engaging under the floor of the pot and giving the main support to the pot, these piers 10 being formed by a pair of parallel walls freely straddling the neck of the pot: 11, gas burners for heating the furnace: 12, flue for carrying the waste gases from the furnace, and shown as discharging into the upper portion of the tank: 13, a circumferential series of segmental plates, preferably fire-clay, resting on the wall of the furnace and the wall of the pot and covering the annular space between

them, these segmental plates having their adjoining edges tongued and grooved as indicated in Fig. 4, the inner extremities of these plates resting on a rabbet in the top of the pot wall: 14, a wide notch extending through the inner member of the rabbet of the pot-wall at one point in the circumference of the pot, preferably at the front of the pot: 15, a special one of the top-plates, its inner extremity being adapted to fill the notch: 16, a discharge port in the floor of the furnace below the plate 15: 17, gas burners arranged to supply heat at the base of the furnace at this port: 18, an annular ridge projecting upwardly from the floor of the pot around the inlet thereto: 19, the glass in the pot, its top standing at the same level as the glass in the tank and being maintained at that level while withdrawals of glass from the pot are taking place: 20, a closed hood of circular form disposed over the pot and concentric therewith and having a diameter nearly equaling the interior of the pot: 21, an elevating blow-pipe connected with the hood and extending upwardly therefrom and adapted to serve for the admission of the air employed in the blowing, and adapted to serve also as the means by which the hood can be elevated during the glass-drawing operation: 22, a metallic ring secured to the base of the hood and forming a bait projecting below the margin of the hood and adapted to enter the pot pretty close to and concentric with the wall of the pot: 23, an annular recess in the top of the bait ring, this recess extending pretty well down into the ring: 24, an annular ring burner disposed over the bait ring and adapted to direct its flames downwardly to the recess 23 in the bait ring: and 25, the glass cylinder being drawn.

In the operation of this apparatus the glass in proper condition in the tank is maintained at the same level in the pot and the lowering of the temperature of the glass in the pot is prevented by the heat of the furnace. The hood with its bait is to be raised and lowered by any suitable apparatus, and the blow-pipe 21 is to be in connection with a source of supply of air under pressure. The hood having been lowered so that the bait dips into the molten glass, the glass adheres to the bait and, by the upward movement of the hood and bait, in conjunction with the maintained air pressure, the cylinder

der of glass is drawn to whatever height may be desired or provided for. When the cylinder shall have been drawn to proper height then, by any suitable severing means, its base is cut loose from the glass in the pot and, after being moved to proper place, the cylinder is to be severed from the bait and subjected to proper after treatment suitable for the forming of the glass of the cylinder into sheet glass.

It is found in practice that as the bait and the upper end of the cylinder rise from the pot they get comparatively colder until the forming cylinder is supported by hard glass joining metal, the local conditions at the juncture being such that fracture is quite apt to occur. In the present arrangement the bait is maintained at such heat as to prevent this, the juncture between the top of the cylinder and the bait being, not necessarily of plastic glass, but at least of glass in such temperature condition as to insure against special brittleness. The ring gas burner 24 is the preferred means for maintaining the juncture between the glass and the bait at satisfactory temperature, but this particular heating means is merely typical, the recess 23 in the upper portion of the bait ring permits of special accessibility of the heat of the lower portion of the bait-ring where the heat is most wanted.

Taking the condition of things as they appear in Fig. 1, it is to be understood that glass reaching the pot has of course a tendency toward self-cooling. This tendency must be overcome by the heat derived by the pot from the furnace. This heat is all necessarily transmitted through the walls and floor of the pot and we have found that a deep body of glass in a pot is subject to very considerable local differences in its temperature, that glass contiguous to portions of the pot wall being much the hottest. It is for this reason that we so proportion the bait and pot that the glass drawn from it will be the glass close to the pot-wall.

While it is true that the glass closest to the pot-wall is at the highest temperature of any of the glass exposing its surface in the pot it would also be unfortunately true that the glass inwardly away from the pot-wall would be at possibly a considerable lower temperature, thus bringing about the result that the pot-glass exterior to the drawing cylinder and the glass interior to that cylinder might be at materially different temperatures. In order to avoid as far as practicable serious differences in temperature of the glass in the pot we make the pot extremely shallow so that all the glass in the pot is pretty close to the floor of the pot, and we provide the upwardly extending annular ridge 18 in order that heat-conveying substance of the pot may reach up inwardly into the body of glass interior to

the drawing cylinder, thus very much tending to lessen a condition of difference in temperature of the glass at the interior and exterior of the cylinder.

When a cylinder has been drawn and severed from the glass in the pot, there remains a residue which floats upon the surface of the glass in the pot and impairs its quality for the next drawing. In some cases we place a cover temporarily over the pot and, through it, we direct the flames of gas burners upon this glass until it is at the proper temperature. Our preference is to withdraw outwardly the plate 15 leaving the notch 14 open, this notch extending below the level of the glass in the pot. The undesired glass floating on the top of the glass in the pot may then be skimmed off and allowed to drop into the furnace and out through the port 16, leaving the pot charged with glass which has not been subjected to cooling in the operation of drawing. If the glass thus skimmed from the pot and dropped to the port 16 takes on any such thick condition that it will not discharge through the port readily, it may be brought to the proper flowing condition by the action of gas burner 17. The floor of the furnace may, as a general thing, be depended upon to reduce the glass to condition to permit it to flow out through the port, but the gas burners 17 serve in facilitating the process. In addition to dealing with the residue left upon the glass in the pot as a result of the previous drawing, it may occur that, owing to delay in getting a bait to the glass for a new drawing, the surface of the glass has become somewhat chilled. In that case a cover-plate may be laid upon the wall of the pot and a gas burner may be directed upon the glass through the slot 14, the presence of which slot manifestly avoids the necessity for burner-openings in the cover-plate. The construction of these pots, or rather the maintenance of them in use, has developed a vast deal of trouble, the costly pots breaking most unexpectedly, the breakage being due, to some extent, to improper manner of support, but mainly to the differential expansion due to the very considerable thickness and vertical extent of the wall of the pot. In the present construction all portions of the pot are comparatively thin and the wall, it will be observed, has very little height. In addition to this the structure becomes much lightened.

The support of the pot is gotten mainly from the two pier-walls 10 which straddle the conduit neck and give the two side portions of the pot a good support, while the central pier 9 gives support to the central portion of the pot and to the conduit neck.

When a pot becomes ruined, by use or breakage, a new one could of course be sub-

stituted for it by removing the segmental plates and lifting out the old pot and substituting the new one. But our preference is to remove the old pot and place the new one by a horizontal movement. We remove the segmental plates and then open the doors 15 and then pull the damaged pot outwardly in a horizontal direction, and substitute the new one in an obvious manner. The doors 10 3 open wide enough to permit this horizontal movement of the pots. When such operation is being performed it is obvious that the glass from the tank must be shut off, but this matter is taken care of by the shut-off devices with which the tank should be provided.

The description which we have given of the operation of the apparatus assumes the successful drawing of a cylinder and the centering of the cylinder from the glass in the pot. In case a cylinder breaks while being drawn, as may occur with more or less frequency, some of the glass from the cylinder will fall into the pot, a portion of it sinking and a portion of it floating. The glass thus reaching the top of the glass in the pot may be treated the same as the residue from a perfectly drawn cylinder.

We claim:—

30 1. Glass-drawing apparatus comprising, a shallow pot adapted to contain the glass to be drawn and having a symmetrically disposed opening in its floor, a conduit-neck leading from said opening and adapted to 35 convey glass thereto from a tank, and a furnace arranged to apply heat to the exterior of the pot, the floor of said pot being provided with an elevated annular ridge, combined substantially as set forth.

40 2. Glass-drawing apparatus comprising, a shallow pot adapted to contain the glass to be drawn and having a symmetrically disposed opening in its floor, a conduit-neck leading from said opening and adapted to 45 convey glass thereto from a tank, a furnace arranged to apply heat to the exterior of the pot, a pair of pier walls straddling said conduit neck and supporting the sides of the pot, and a pier disposed under the conduit-neck, combined substantially as set forth.

50 3. Glass-drawing apparatus comprising, a furnace, a pot disposed therein and having its top substantially level with the top of the furnace wall, a conduit neck for supplying the pot with glass, and removable segmental plates resting on the furnace and 55 pot-walls inclosing the top of the furnace, combined substantially as set forth.

60 4. Glass-drawing apparatus comprising, a furnace, a pot disposed therein and having its top substantially level with the top of the furnace wall, a conduit neck for supplying the pot with glass, and removable segmental plates resting on the furnace and 65

pot-walls inclosing the top of the furnace and having their inner ends rabbeted to the wall of the pot, combined substantially as set forth.

5. Glass-drawing apparatus comprising, a 70 furnace, a pot disposed therein and having its top substantially level with the top of the furnace wall, a conduit neck for supplying the pot with glass, and removable segmental plates resting on the furnace and 75 pot-walls inclosing the top of the furnace, the adjoining edges of said plates being tongued and grooved together, combined substantially as set forth.

6. Glass-drawing apparatus comprising, a 80 furnace having a discharge port in its floor, a pot disposed therein and having its top substantially level with the top of the furnace wall, a conduit neck for supplying the pot with glass, a segmental series of plates 85 resting on the top of the walls of the pot and furnace and closing the top of the furnace, one of said plates being disposed substantially over said port and having its inner portion engaging and closing a notch in 90 the top of the wall of the pot, combined substantially as set forth.

7. In glass-drawing apparatus, a bait having an annular recess formed therein, and a burner carried by the bait discharging down- 95 wardly into the recess therein.

8. Glass-drawing apparatus comprising a furnace having a discharge port in its floor, a pot disposed in the furnace, and a segmental series of plates closing the top of 100 the furnace and one of said plates being disposed substantially over said port and having its inner portion engaging and closing a notch in the top of the pot.

9. Glass-drawing apparatus comprising a 105 furnace, supporting piers in said furnace a relatively stationary pot removably supported on said piers, and doors forming a portion of the wall of the furnace and swinging outwardly to permit horizontal re- 110 moval of the pot.

10. Glass-drawing apparatus comprising a furnace having a discharge port in its floor, a pot disposed within the furnace having its top substantially level with the top of the 115 furnace wall, a conduit for supplying the pot with glass, and a segmental series of plates resting on the top of the walls of the pot and the furnace, closing the top of the furnace. 120

11. In glass-drawing apparatus, a shallow pot adapted to contain the glass to be drawn, the floor of said pot being provided with an elevated annular ridge and with a symmetrically disposed inlet opening therein. 125

12. In glass-drawing apparatus, a shallow pot adapted to contain the glass to be drawn, the floor of said pot being provided with a symmetrically disposed inlet opening therein and with an elevated annular ridge, sur- 130

rounding said opening and a furnace arranged to supply heat to the exterior of the pot.

13. In glass-drawing apparatus, a hood, a
5 bait carried by the rim thereof, said bait having a downwardly extending annular recess formed therein, and an annular gas burner discharging downwardly into the recess aforesaid.

10 14. In glass drawing apparatus, a shallow pot of a greater depth near the edge portion thereof, said pot adapted to contain the glass to be drawn and having a symmetrically disposed opening in the floor thereof,
15 and a conduit neck leading from said open-

ing adapted to convey glass thereto from a tank.

15. In glass drawing apparatus, a shallow pot of greater depth near the edge portion thereof, said pot adapted to contain the glass
20 to be drawn and having a symmetrically disposed opening in the floor thereof, a conduit neck leading from said opening and adapted to convey glass thereto from a tank, and a furnace arranged to apply heat to said pot. 25

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