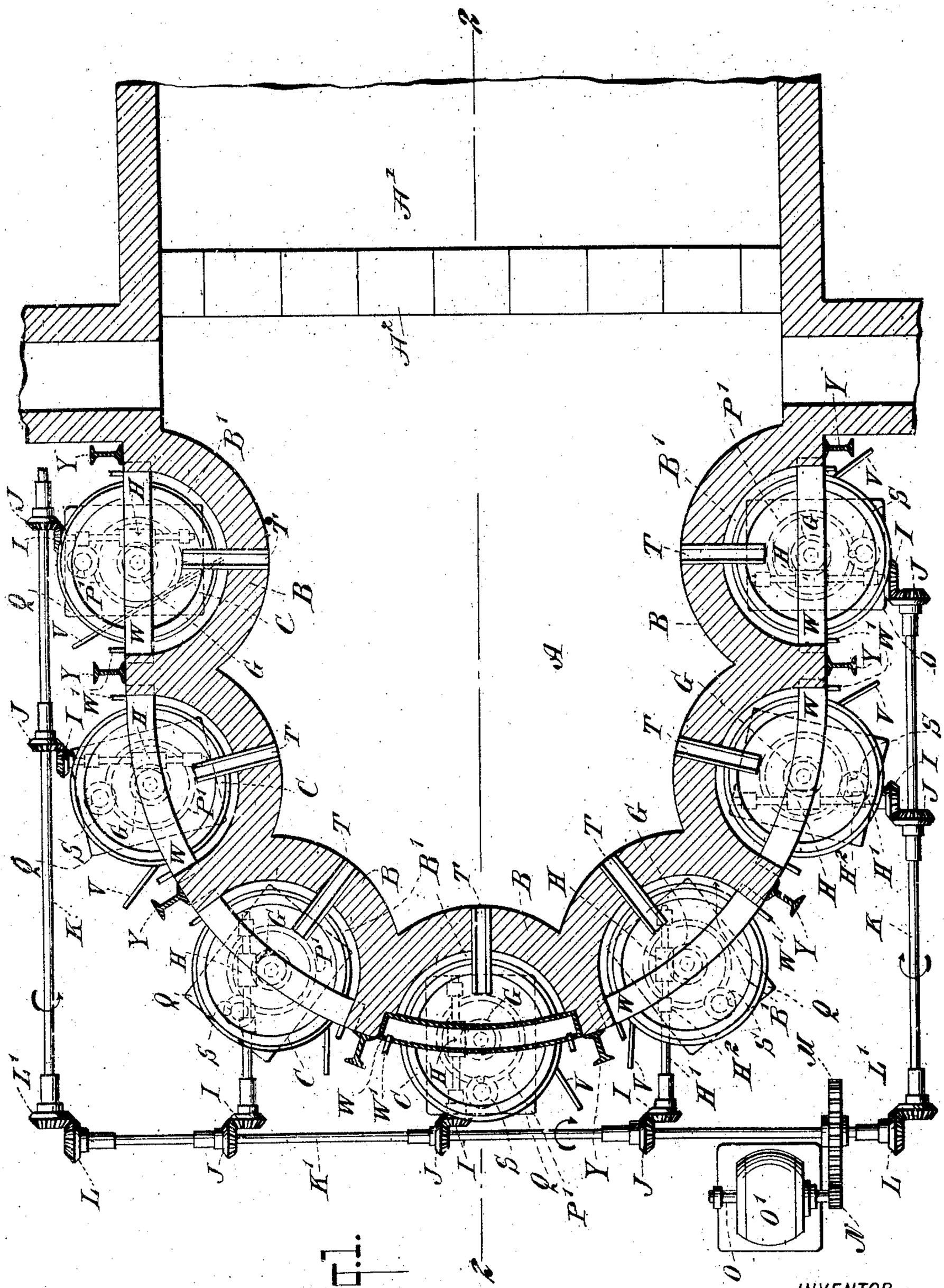
No. 854,273. PATENTED MAY 21, 1907.

C. F. COX.

GLASS MELTING FURNACE.

APPLICATION FILED SEPT. 6, 1905.

2 SHEETS—SHEET 1.



WITNESSES:
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John A. Stellenbeck

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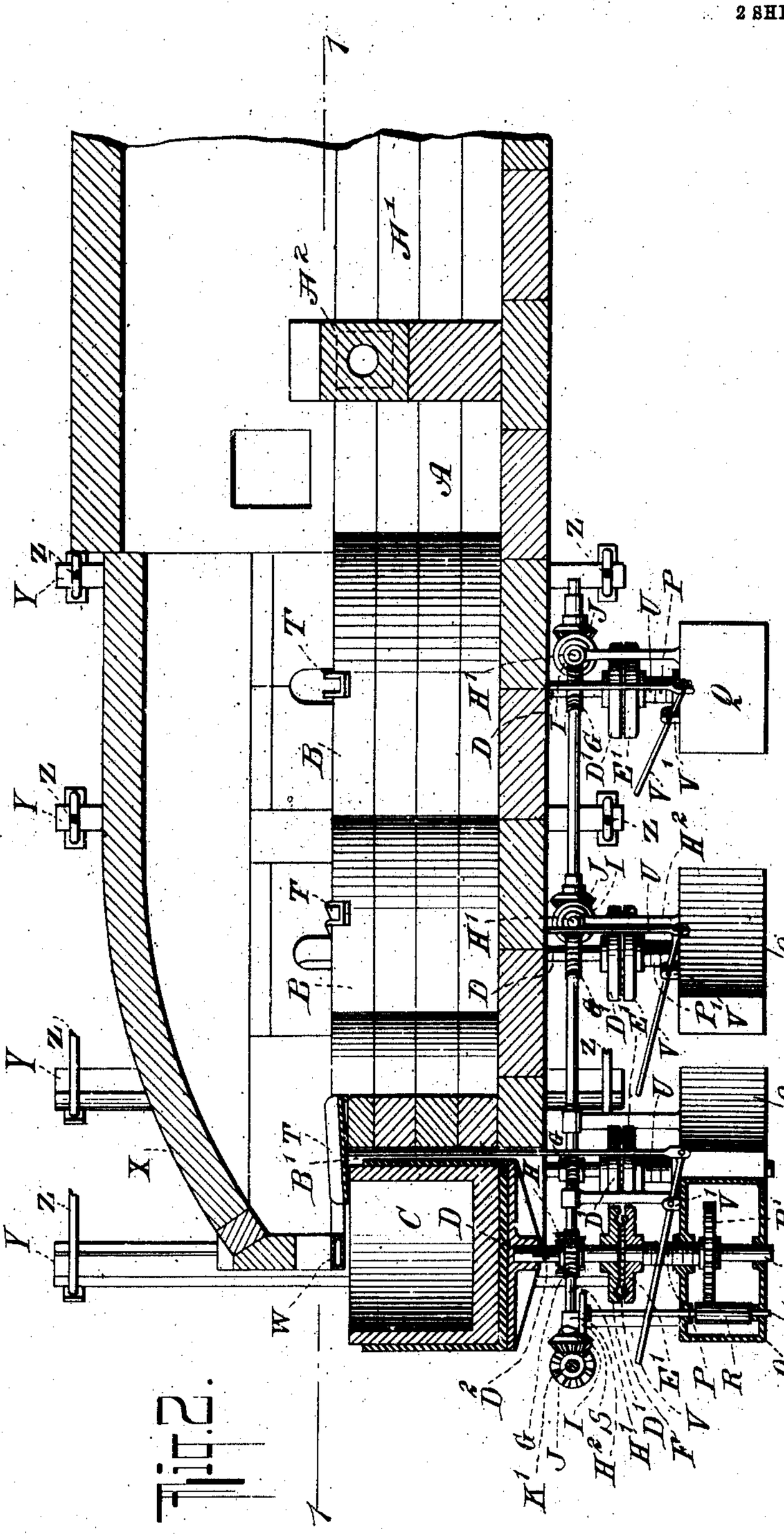

Fig. 2.

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UNITED STATES PATENT OFFICE.

CHARLES F. COX, OF BRIDGETON, NEW JERSEY.

GLASS-MELTING FURNACE.

No. 854,273 Specification of Letters Patent. Patented May 21, 1907.

Application filed September 6, 1905. Serial No. 277,230.

To all whom it may concern:

Be it known that I, CHARLES F. COX, a citizen of the United States, and a resident of Bridgeton, in the county of Cumberland and State of New Jersey, have invented certain new and useful Improvements in Glass-Melting Furnaces, of which the following is a specification.

My invention relates to glass melting furnaces and has for its object to provide means for facilitating the withdrawal of molten glass at several points.

The features of arrangement and construction by which I obtain the desired results will be pointed out in the appended claims, a specific embodiment of my invention being illustrated in the accompanying drawings, in which

Figure 1 is a horizontal section of a furnace containing my improvements taken on line 1—1 of Fig. 2 and Fig. 2 is a vertical section of same on line 2—2 of Fig. 1.

A represents the refining or settling chamber at the working end of an ordinary continuous glass melting furnace, separated from the fusing or melting chamber A′ by the cross wall A^2. The breast wall B of the refining chamber A is formed with a number of semi-circular spaces B′. In each of these spaces B′ is mounted in suitable bearings, an auxiliary tank C. Each of these tanks C is supported on a shaft D, and is arranged to be rotated as will be more clearly described hereinafter. Upon the end of each shaft D is secured a turntable D′ provided with a ball race and co-operating with a support E′ mounted on a shaft E and provided with a mating ball race. Balls F are interposed between said turntable D′ and support E′ and are adapted to travel in the ball races of the said parts, thus forming a ball bearing for each of the tanks C to enable them to be easily rotated. A worm wheel G, is mounted on each of the shafts D, which shafts are each provided with a spline D^2 which prevents the rods from turning relatively to the worm wheels, but permits the said shafts D and the tanks C to be raised or lowered as may be desired. The worm wheels G mesh with worm gears H which are mounted on short shafts H′ journaled in suitable bearings H^2.

On the shafts H′ are secured bevel pinions I which mesh with bevel pinions J mounted on shafts K and K′. The shaft K′ is located at substantially right angles to the two shafts K and transmits motion thereto through the medium of the bevel pinions L and L′. On the shaft K′ is further mounted a gear wheel M which meshes with a pinion N mounted on the driving shaft O of the motor O′. Motion is thus transmitted from the motor O′ to the shaft K′ and from said shaft K′ to the two shafts K said shafts K and K′ in turn transmitting movement to the short shafts H′ and thus rotating each of the auxiliary tanks C. It will be noticed that the drive shafts K and K′ are arranged at substantially right angles to each other or in the form of a U, this arrangement insuring an equal and direct drive for each tank and also permitting of a compact arrangement.

In order to provide for a vertical adjustment of the auxiliary tanks C, the shaft E is screw-threaded a part of its distance, as at P, and projects through a stationary bearing chamber Q. A gear wheel P′ is mounted on the shaft E to turn therewith and is in mesh with an elongated pinion R mounted on a rod R′ also journaled in the chamber Q and having a hand wheel S secured to its free end. Thus as the hand wheel S is rotated motion is transmitted to the pinion R and to the gear wheel P′ rotating the shaft E and raising the support E′ through the medium of the screw threaded portion P which engages one wall of the chamber Q. As the support E′ is thus lifted, it in turn raises the turntable D′ and the shaft D and with it the corresponding tank C. It is to be understood that the worm wheel G does not follow the shaft D, but remains stationary as far as vertical movement is concerned, as before pointed out. It is to be further understood that as the tanks C are rotated through the medium of the gearing hereinbefore described, the support E′ and its parts remain main stationary and do not rotate.

T are sluiceways which extend from the main furnace to each of the auxiliary tanks C, and through which the overflow from the main furnace passes into the auxiliary tanks. Should it become necessary or desirable to prevent further metal from entering any one of the auxiliary tanks C, the corresponding sluiceway may be raised through the medium of the rod U, which is pivotally connected to a lever V fulcrumed at V′ upon the bearing chamber Q. By swinging the lever V, the rod U is raised and with it the sluiceway T communicating with the tank C which it is desired to place out of commission, this rais-

ing of said sluiceway preventing any more metal from flowing into said tank. It is to be understood that each sluiceway is provided with a raising device of the kind just described.

W is a hollow mantle bar located over each auxiliary tank C, through which water or other cooling medium is adapted to circulate through the inlet and outlet pipes W′, W², which are provided for this purpose. By supporting the top of the furnace and side wall above glass line which are made of refractory material on the mantle bar W, it may be brought down close to the glass line of the auxiliary tanks, thus bringing the intense heat of the interior of the furnace proper into direct contact with the glass of said auxiliary tanks without having said heat come into contact with a current of cold air from without. In other words, the top X of the furnace forms a sort of cap or hood which partly covers each auxiliary tank and directs the heat from the interior of the main furnace downwardly into said auxiliary tanks. It will be observed that the heat of the main furnace will always reach the auxiliary tanks, whether the sluiceway T is in the raised or in the lowered position, that is, cutting off the supply of glass does not cut off the supply of heat. Furthermore, the top or hood X extends over the melting chamber A′ as well as over the refining chamber A and partly over the auxiliary tanks C, forming a continuous heating chamber in which the temperature will be practically uniform. Y are braces connected together by means of rods Z for the purpose of fastening the furnace together.

In operation, the molten glass overflows through the sluiceways T into the auxiliary tanks C from which the metal may be removed by a gathering machine or in any other suitable manner. Each of said auxiliary tanks is kept revolving slowly so that the molten glass contained therein will be brought under the cap or hood of the furnace and adjacent to the breast wall, thus reheating all portions of said glass successively and keeping said glass in a constantly molten condition. By locating the auxiliary tanks in a series of semi-circular spaces in the breast wall of the main furnace, the said tanks in addition are kept hot by radiation, and the contents of said tanks are thus kept in properly molten condition at all times while the furnace is in use. Further, with the construction shown it is possible to securely brace said furnace without interfering with the working of the auxiliary tanks.

With my construction molten glass may be withdrawn at several points, that is from each of the auxiliary tanks. A number of gathering or other machines may thus be supplied at the same time, without interfering with each other.

Various modifications may be made without departing from the nature of my invention.

I claim and desire to secure by Letters Patent:

1. In a melting furnace, a main tank having a breast wall constructed with a plurality of recesses, a vertically movable auxiliary tank in each of said recesses, a means of communication between said main tank and each of said auxiliary tanks, to permit some of the contents of the main tank to enter each of said auxiliary tanks, and means for vertically adjusting each of said auxiliary tanks.

2. In a melting furnace, a main tank, a plurality of auxiliary tanks arranged around said main tank, sluiceways for permitting the discharge of some of the contents of the main tank into the auxiliary tanks, means for continuously rotating said auxiliary tanks, means for vertically adjusting each of said auxiliary tanks, and means for raising said sluiceways so that the discharge of the contents of the main tank to the auxiliary tanks will be stopped.

3. In a melting furnace, a main tank, a plurality of auxiliary tanks in communication with said main tank, means for vertically adjusting said auxiliary tanks, hollow mantle bars located in close proximity to said auxiliary tanks, and means for circulating a cooling agent through said mantle bars.

4. In a melting furnace, a main tank having a breastwall with an external recess, an auxiliary tank set in said recess, and means for transferring some of the contents of the main tank to the auxiliary tank.

5. In a melting furnace, a main tank having a breastwall with an external recess, an auxiliary tank set in said recess, a top or hood extending over the main tank and partly over the auxiliary tank, leaving a portion of the latter tank projecting beyond the hood, and means for transferring some of the contents of the main tank to the auxiliary tank.

6. In a melting furnace, a main tank having a breastwall with a circularly curved external recess, an auxiliary tank rotatably mounted in said recess, and means for transferring some of the contents of the main tank to the auxiliary tank.

7. In a melting furnace, a main tank having a breastwall with a circularly curved external recess, an auxiliary tank rotatably mounted in said recess, a hood extending over the main tank and a portion of the auxiliary tank, so that the outer portion of the latter is exposed, and means for transferring some of the contents of the main tank to the auxiliary tank.

8. In a melting furnace, a main tank having a breastwall with a circularly curved external recess, an auxiliary tank rotatably mounted in said recess, and projecting there-

from with its outer portion, a hood extending over the main tank and over the auxiliary tank to about its center, and means for transferring some of the contents of the main tank to th auxiliary tank.

9. In a melting furnace, a main tank provided with a cross wall dividing it into a melting chamber and a refining chamber, the breastwall of the refining chamber having a circularly curved external recess, a rotary auxiliary tank set in said recess, means for transferring some of the contents of the main tank to the auxiliary tank, and a hood extending over both chambers of the main tank and over the inner portion of the auxiliary tank, the space below the hood being in permanent communication with the auxiliary tank and with both chambers of the main tank.

10. In a melting furnace, a main tank provided with a cross wall dividing it into a melting chamber and a refining chamber, the breastwall of the refining chamber having a circularly curved external recess, a rotary auxiliary tank set in said recess, means for transferring some of the contents of the main tank to the auxiliary tank, and a hood extending at a distance above said transferring means over both chambers of the main tank and over the inner portion of the auxiliary tank so that a permanently open passage to the auxiliary tank is afforded to the heating gases.

11. In a melting furnace, a main tank, an auxiliary tank adjacent thereto, means for transferring some of the contents of the main tank to the auxiliary tank, a hood extending over the main tank and over the inner portion of the auxiliary tank, and a hollow mantle bar located at the lower edge of the hood immediately adjacent to the auxiliary tank, and adapted to contain a cooling fluid.

12. In a melting furnace a main tank, having external recesses, auxiliary tanks set in said recesses, bracing devices engaging the main tank between said recesses, so as not to interfere with the auxiliary tanks, and means for transferring some of the contents of the main tank to the auxiliary tanks.

13. In a melting furnace, a main tank having a curved breastwall, rotary auxiliary tanks adjacent to said wall, two shafts extending adjacent to the last auxiliary tanks of the series, a cross shaft forming a connection between said shafts and extending adjacent to the central auxiliary tanks, and means for turning the auxiliary tanks by the rotation of said shafts.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

CHAS. F. COX.

Witnesses:
WM. A. LOGUE,
FRANK R. LOGUE.