June 2, 1925. 1,539,848

C. F. KENWORTHY

FURNACE

Filed Feb. 14, 1924 2 Sheets-Sheet 1

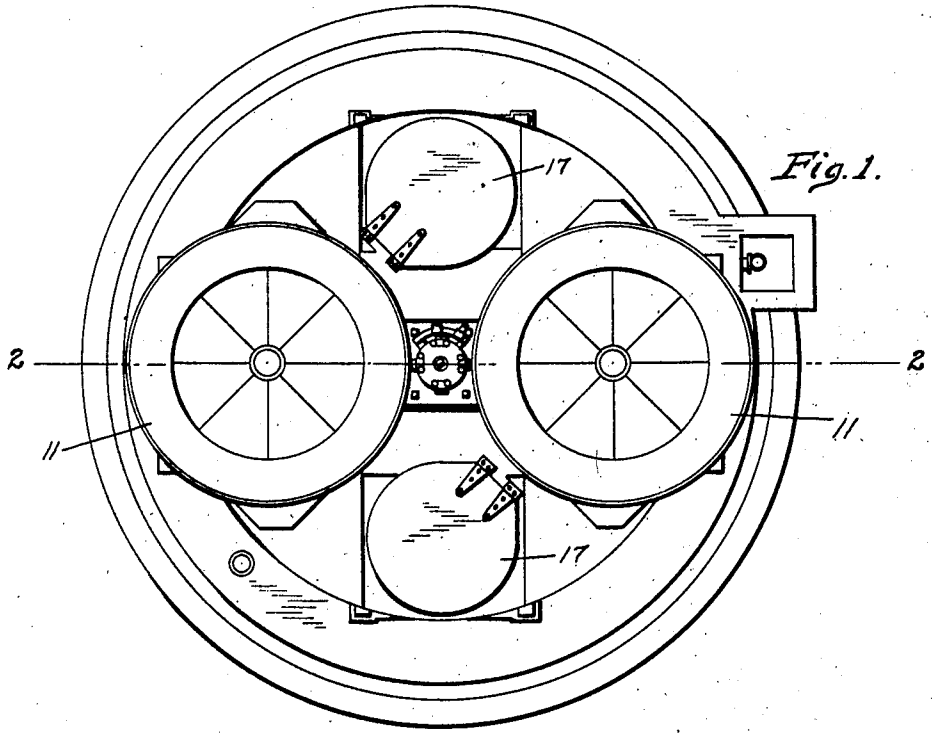


Fig. 1.

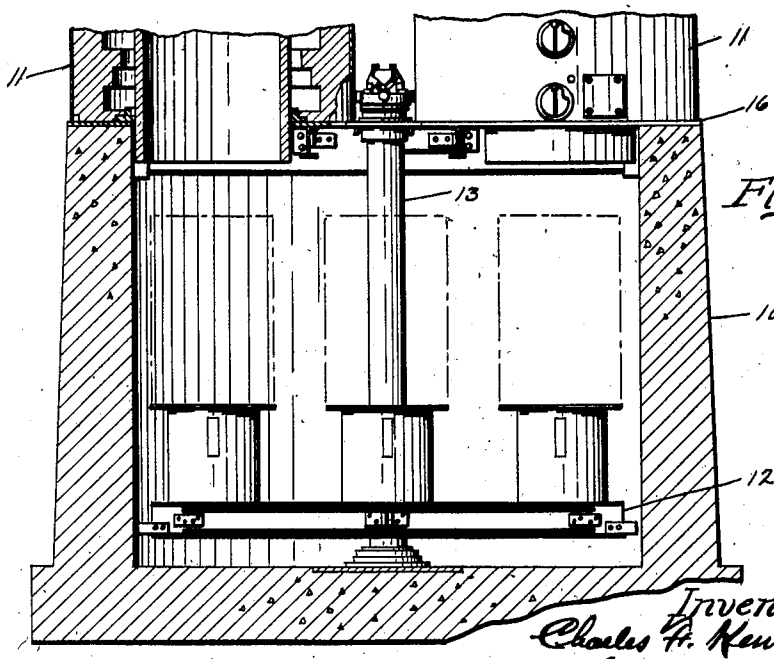


Fig. 2.

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Fig. 3

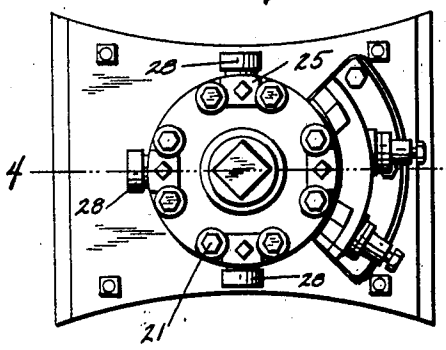


Fig. 5

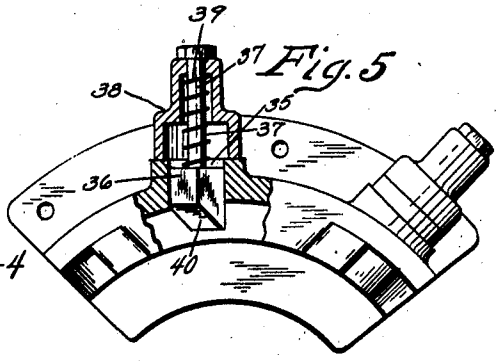


Fig. 4

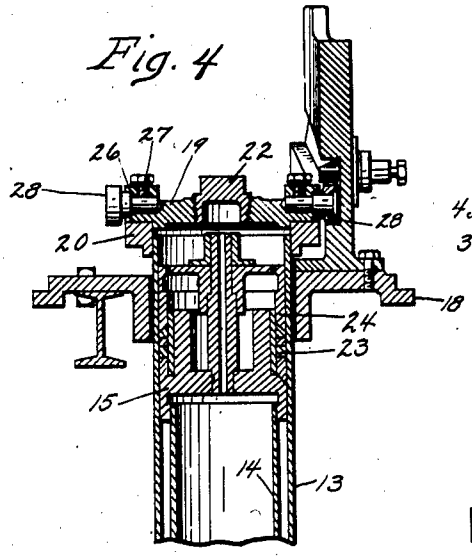


Fig. 6

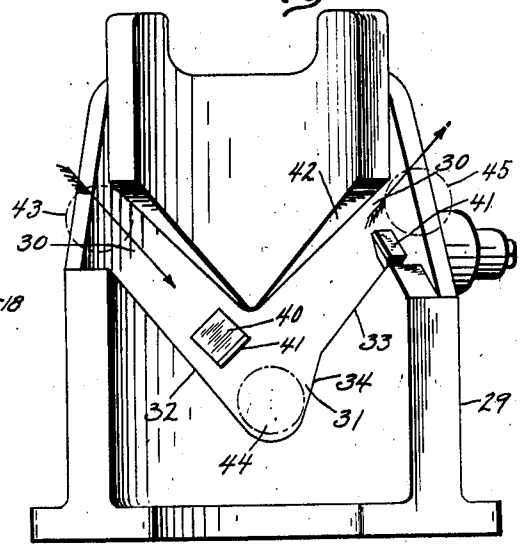
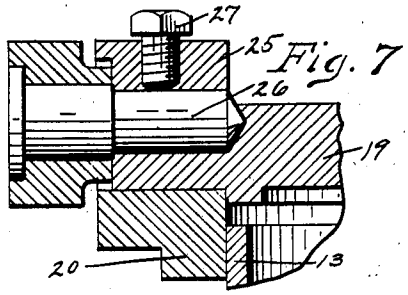


Fig. 7



Inventor
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Patented June 2, 1925. 1,539,848

UNITED STATES PATENT OFFICE.

CHARLES F. KENWORTHY, OF WATERBURY, CONNECTICUT, ASSIGNOR TO CHARLES F. KENWORTHY, INCORPORATED, OF WATERBURY, CONNECTICUT, A CORPORATION OF CONNECTICUT.

FURNACE.

Application filed February 14, 1924. Serial No. 692,700.

To all whom it may concern:

Be it known that I, CHARLES F. KENWORTHY, a citizen of the United States, residing at Waterbury, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Furnaces, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to furnaces of the type generally known as annealing furnaces, having an elevator or conveyer mechanism associated therewith.

It is the object of this invention, among other things, to provide a new and improved mechanism for automatically transmitting rotation to said elevator or conveyer so that it may be moved into and out of register with both the furnace and the platform opening.

To these, and other ends, my invention consists in the furnace, having certain details of construction and combinations of parts as will be hereinafter described and more particularly pointed out in the claims.

Referring to the drawings, in which like numerals of reference designate like parts in the several figures:

Figure 1 is a plan view of a furnace embodying my improvements therein;

Figure 2 is a fragmentary sectional elevation thereof with the parts in section, taken generally upon line 2—2 of Figure 1;

Figure 3 is a plan view of that portion of the elevator mechanism above the furnace platform;

Figure 4 is a sectional elevation thereof, taken generally upon line 4—4 of Figure 3;

Figure 5 is an enlarged plan view of the elevator cam;

Figure 6 is an elevation thereof; and

Figure 7 is an enlarged sectional view of one of the cam rolls and adjacent parts, substantially as shown on a smaller scale in Figure 4.

One of the many types of furnace with which my invention is adapted is shown in Letters Patent No. 1,388,575, issued to me August 23, 1921, for improvements in furnaces.

In this type of furnace an elevator is provided for both loading and unloading. This loading mechanism is generally operable within a tank below the platform filled with liquid and near the bottom of the tank means are provided for automatically and intermittently rotating the elevator, thereby bringing the load upon the elevator successively in register with the platform opening and annealing chamber.

In my improved type of furnace the means for rotating the loading and unloading mechanism, that is, the elevator mechanism, is located above the top of the tank where it is readily accessible for adjustment, repacking and the like. Hence it is not necessary to withdraw the liquid from the tank before the rotating mechanism is accessible. The elevating mechanism moves upwardly by hydraulic pressure and the work thereon is projected into the furnace. After the annealing operation the elevator is lowered by gravity. When near the limit of its down stroke the rotating mechanism, located above the tank, automatically rotates the elevators by the time the down stroke is completed. Hence the elevator platforms are moved in a circular path and the platforms last in the furnaces are moved out of register therewith and other platforms are brought into register therewith, and the work thereon during the next up movement of the elevator mechanism is projected into the furnaces, these operations being continuous and entirely automatic.

My improved mechanism, which is exposed above the platform, is designed for rotating this elevator,

Referring to the drawings, 10 designates the tank, 11—11 the annealing furnaces or chambers, 12 the elevator platform, 13 the piston cylinder, 14 the piston therein, 15 the piston head, 16 the platform, and 17 the hinged covers which provide closure members for the openings through said platforms.

The piston head 15, which constitutes no part of my present invention and therefore not described herein in detail, is provided with suitable packing 23 held in place by a gland 24.

The piston cylinder 13 is supported at its upper end in a plate 18 and closed by a cap 19, secured by a plurality of bolts 21 to a collar 20 threaded onto the upper end of said piston cylinder. Through the center of the

cap 19 is an opening that is closed by a removable plug 22.

On the upper face of the cap 19, adjacent to the outside edge thereof, are four lugs 25, within each of which a stud 26 is secured by means of the screws 27 or the like. Rotatably mounted on these studs are the cam rolls 28.

Fixed upon the plate 18 is the elevator cam 29, which is parti-circular in plan view and upon its inner face is provided with a cam groove 30, which is substantially V-shape in elevation having a pocket 31 near the bottom thereof. The lower face 32 of the cam groove upon one side of the pocket 31 terminates near the bottom of the pocket 31 and the face 33 upon the opposite side of said pocket is at a different angle to that of the face 32 and is connected with the pocket 31 by the face 34.

Through the back wall of the cam groove 30 are the latch openings 35, through each of which projects a latch 36. This latch is upon the inner end of a stud 37 that is surrounded by a spring 39 and is movably mounted in a bracket 38 fixed to the outer wall of the elevator cam 29. As each latch is provided with an angular face 40 it will recede and permit an object moving in one direction in the cam groove 30 to pass thereby, but will prevent a return thereof because the object will engage the flat edge 41 of the latch.

When the elevator is in its down position one of the rolls 28 is in the pocket 31 in the position indicated by broken lines 44 in Fig. 6. When the elevator begins to rise this roll travels upwardly out of the pocket 31 into the cam groove 30 until it contacts with the upper beveled face 42 thereof and then travels along said face, at the same time imparting a rotation to the elevator until it passes by the latch to the right in Fig. 6, the same receding by reason of the contact of the roll with the beveled face thereof. After the roll has passed out of the cam groove the elevator continues its upward movement in a straight path and without rotation. Near the limit of the next downward movement of the elevator the next adjacent cam roll enters the groove 30 upon that side that is at the left in Fig. 6, and rides against the cam face 32, passing the latch, which recedes for the purpose, until the elevator is in substantially its extreme downward position when the roll is in the position shown by broken lines 44. During the downward movement the elevator is rotated one-eighth of a revolution and upon its return another one-eighth, so that at each successive down and up movement the platform 12 is rotated one-fourth of a revolution. This rotation of the platform is automatic and all of the parts that cause this action are exposed above the platform, where they are readily accessible for the purpose of replacement, repairs, adjustment, packing of glands, etc.

There are minor changes and alterations that may be made within my invention and I would therefore have it understood that I do not limit myself to the exact construction herein shown and described, but claim all that falls fairly within the spirit and scope of the appended claims.

What I claim as new and desire to secure by Letters Patent, is:—

1. In combination, a furnace, a tank below the furnace, an elevator connected with the furnace, and means exterior to and adjacent to the top of the tank for effecting self-rotation of the elevator.

2. In combination, a furnace, a tank below the furnace, an elevator connected with the furnace, and cam means exterior to and adjacent to the top of the tank for effecting self-rotation of the elevator.

3. In combination, a furnace, a tank below the furnace, an elevator connected with the furnace, and means exterior to the tank for effecting self-rotation of the elevator, a portion of said self-rotation being accomplished during the movement of the elevator in one direction and the balance of such rotation while the elevator is moving in the opposite direction.

4. In combination, a furnace, a tank below the furnace, an elevator connected with the furnace, and means exterior to the tank for effecting self-rotation of the elevator, said self-rotation being accomplished during the movement of the elevator in both directions.

5. In combination, a furnace, a tank below the furnace, an elevator connected with the furnace, and means exterior to the tank for effecting self-rotation of the elevator, said means comprising one or more laterally projecting members, and a cam fixed in the path of the members and engaged successively by each of the projecting members.

6. In combination, a furnace, a tank below the furnace, an elevator connected with the furnace, a cam having a groove therein exterior to the tank, and a plurality of projecting members connected with the elevator and arranged relatively to the cam so that during the movement of the elevator in one direction one of the projecting members will enter said groove and by its engagement therewith impart partial rotation to the elevator.

7. In combination, a furnace, a tank below the furnace, an elevator connected with the furnace, a cam having a groove therein exterior to the tank, a plurality of projecting members connected with the elevator and arranged relatively to the cam so that during the movement of the elevator in one direction one of the projecting members will enter

said groove and by its engagement therewith impart partial rotation to the other member and during the movement of the elevator in the opposite direction will impart a further rotation to the elevator in the same direction.

8. In combination, a furnace, a tank below the furnace, an elevator connected with the furnace, a cam having a groove therein exterior to the tank, a plurality of projecting members connected with the elevator and arranged relatively to the cam so that during the movement of the elevator in one direction one of the projecting members will enter said groove and by its engagement therewith impart partial rotation to the elevator, and means for preventing movement of the projecting member through said groove except in one direction.

9. In combination, a furnace, a tank below the furnace, an elevator connected with the furnace, a cam having a groove therein exterior to the tank, a plurality of projecting members connected with the elevator and arranged relatively to the cam so that during the movement of the elevator in one direction one of the projecting members will enter said groove and by its engagement therewith impart partial rotation to the elevator, and yielding means for preventing movement of the projecting member through said groove except in one direction.

10. In combination, a furnace, a tank below the furnace, an elevator connected with the furnace, a cam having a groove therein exterior to the tank, a plurality of projecting members connected with the elevator and arranged relatively to the cam so that during the movement of the elevator in one direction one of the projecting members will enter said groove and by its engagement therewith impart partial rotation to the elevator, and one or more latches, each having one face beveled relatively to the groove, and another face at substantially a right angle thereto, which latches are moved to a position below the bottom of the groove when the projecting member moves therethrough in one direction, but will prevent movement of the projecting member in the opposite direction.

11. In combination, a furnace, a tank below the furnace, an elevator connected with the furnace, a cam having a groove therein exterior to the tank, a plurality of projecting members connected with the elevator and arranged relatively to the cam so that during the movement of the elevator in one direction one of the projecting members will enter said groove and by its engagement therewith impart partial rotation to the elevator, and a spring for actuating each latch in one direction.

12. In combination, a furnace, a tank below the furnace, an elevator having a piston cylinder as one of its parts, a plurality of cam members connected with the piston cylinder and projecting radially therefrom, a cam having a groove therein fixed in relation to the piston cylinder so that during each downward movement thereof one of the cam members will enter the cam groove.

13. In combination, a furnace, a tank below the furnace, an elevator having a piston cylinder as one of the parts thereof, a separable member secured to the piston cylinder, a plurality of cam rolls rotatably connected with the piston cylinder and projecting radially therefrom, and a cam having a groove therein fixed in relation to the cylinder whereby during each downward movement of the cam rolls one of the cam rolls will enter the groove in the cam and thereby impart a limited rotary movement to the elevator.

14. In combination, a furnace, a tank below the furnace, an elevator connected with the furnace, and means exterior to the tank for effecting self-rotation of the elevator, said means comprising a plurality of cam members rotatably connected with the elevator and projecting radially therefrom, and a cam with a curved inner wall having a V-groove in said wall fixed in relation to the elevator.

In testimony whereof, I have hereunto affixed my signature.

CHARLES F. KENWORTHY.