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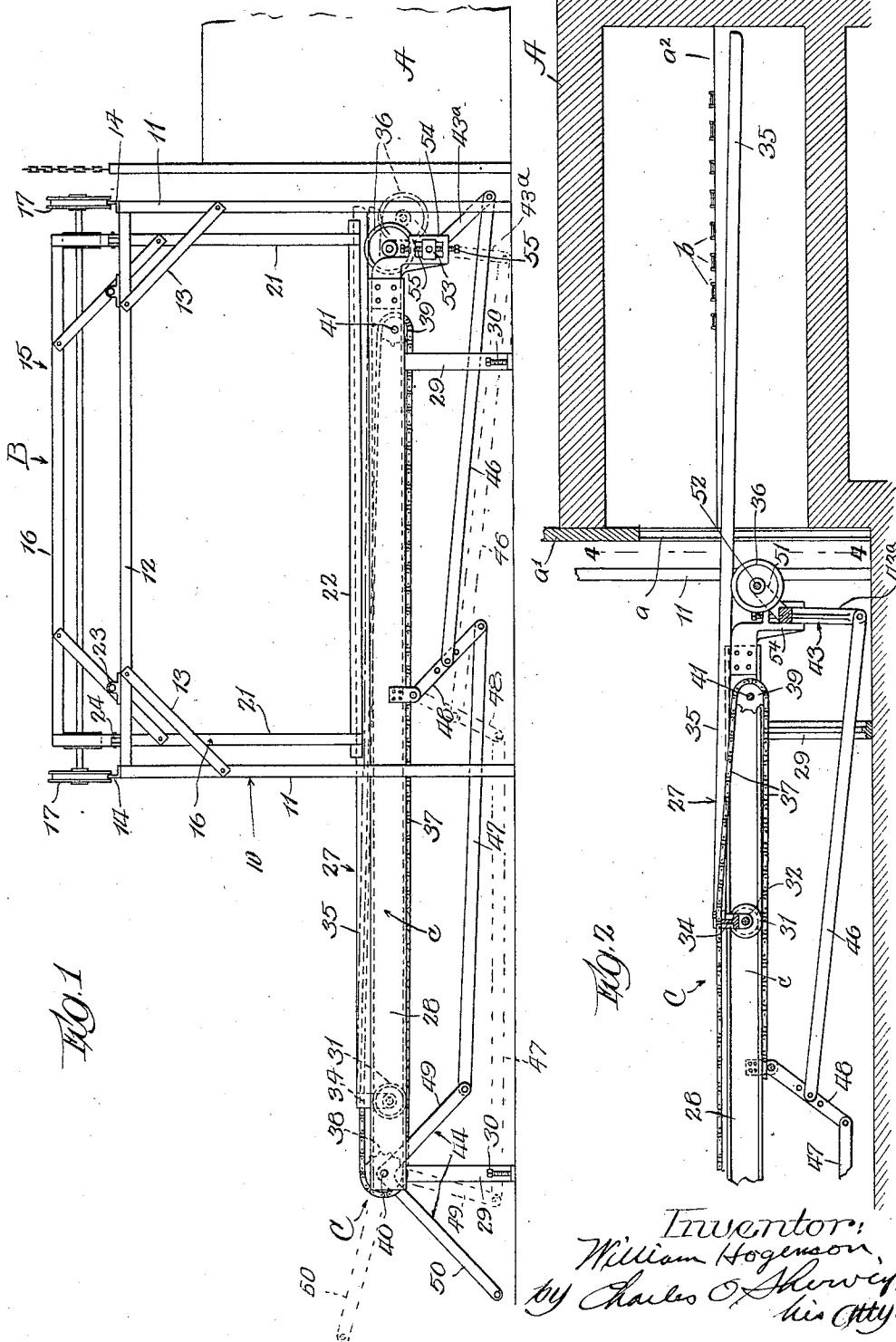
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CHARGING APPARATUS FOR ENAMELING FURNACES

Filed July 3, 1922

2 Sheets-Sheet 1



Inventor:
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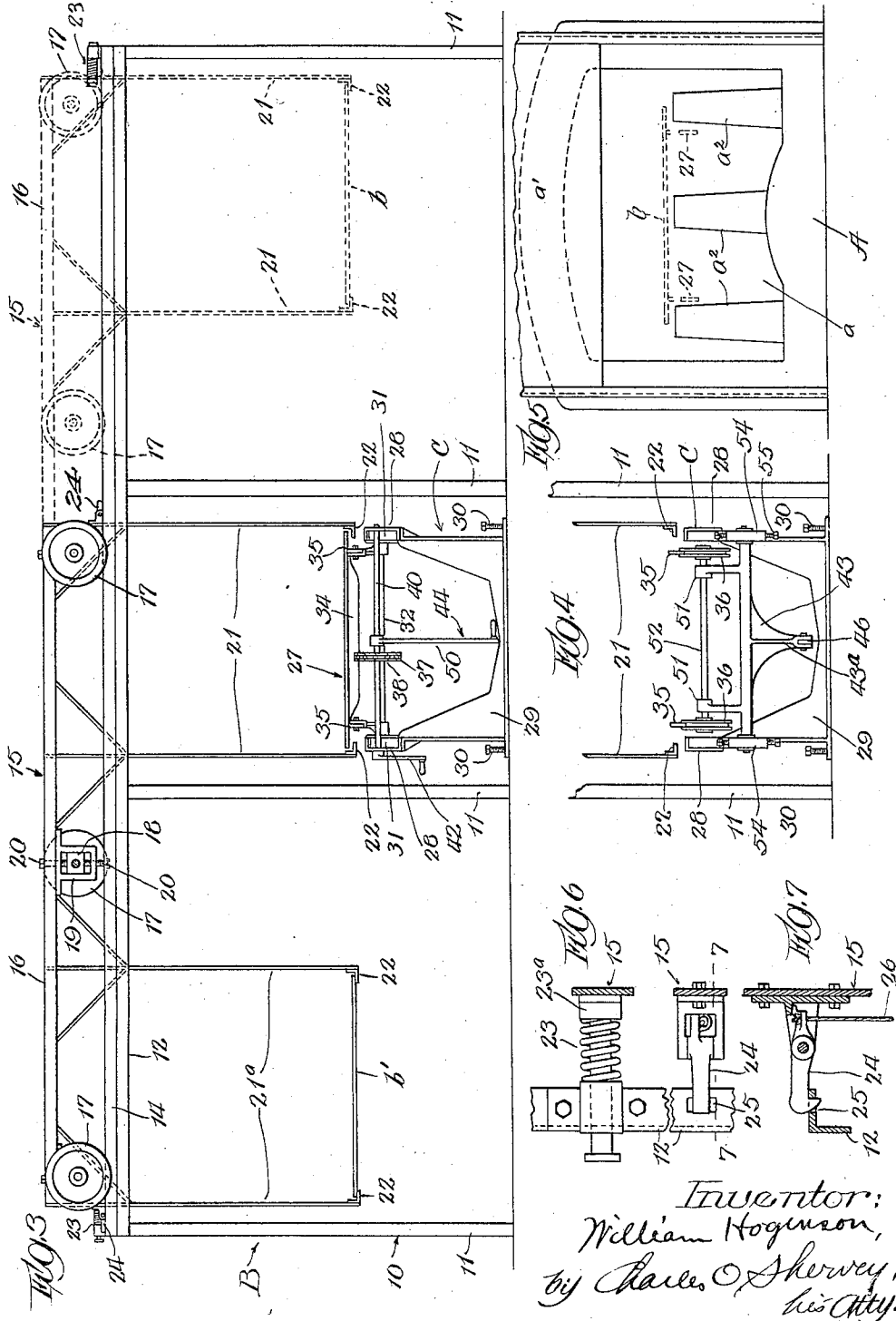
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2 Sheets-Sheet 2



UNITED STATES PATENT OFFICE.

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CHARGING APPARATUS FOR ENAMELING FURNACES.

Application filed July 3, 1922. Serial No. 572,555.

To all whom it may concern:

Be it known that I, WILLIAM HOGENSON, a citizen of the United States, and a resident of Chicago, Cook County, and State of Illinois, have invented certain new and useful Improvements in Charging Apparatus for Enameling Furnaces, of which the following is declared to be a full, clear, and exact description.

This invention relates to charging apparatus for enameling furnaces, and its principal object is to provide means for facilitating the work of placing articles in enameling furnaces and for removing them therefrom when the baking process has been completed. Another object is to provide an apparatus which saves time and reduces the labor of handling enamel ware prior to and after the baking process. The invention consists in a carriage for conveying the articles from positions at both sides of a furnace door, to a position in front of the furnace door, in combination with an inserting mechanism, operating in conjunction therewith, and having a charging fork which is arranged to take the articles from the carriage, insert and deposit them in the furnace, and subsequently remove them from the furnace and deposit them on the carriage for removal to either side of the furnace door.

The invention further consists in the several novel features hereinafter fully set forth and claimed.

The invention is clearly illustrated in the accompanying drawings, in which:—

Fig. 1, is a side elevation of a charging apparatus for enameling furnaces, embodying a simple form of the present invention, showing, in connection therewith, a fragment of an enameling furnace; Fig. 2, is a view partly in side elevation and partly in longitudinal section of the inserting mechanism (partly broken away) and the furnace; Fig. 3, is a front elevation of the apparatus; Fig. 4 is a vertical section (partly broken away) taken on the line 4—4 of Fig. 2; Fig. 5, is a front elevation of the enameling furnace, showing the door raised; Fig. 6, is a detail, fragmental plan of a certain cushioning device and latch used in connection with the carriage, and Fig. 7, is a detail, vertical section thereof, taken on the line 7—7 of Fig. 6.

Referring to said drawings, which illustrate one form of the invention, the reference character A, designates an enameling furnace of ordinary and well known construction, having the usual door opening *a*, closed by a door *a*¹, and having the usual piers or supports *a*² for supporting the articles to be enameled. B, designates the loading mechanism for the inserting mechanism, which is designated by the reference character C. The loading mechanism will now be described.

Extending across the front of the furnace is the frame work 10, of the loading mechanism which is of substantial construction, comprising legs 11, and horizontal frame members 12, secured thereto, and braced by braces 13. Upon the frame work are supported tracks 14 which extend parallel with the front wall of the furnace, and on said tracks 14, is a carriage 15, which conveniently may comprise a frame 16 mounted on flanged wheels 17, that run on the tracks 14. The wheels 17, are journaled in boxes 18, that are adjustably mounted in bearing brackets 19, by adjusting bolts 20, whereby the entire carriage frame may be raised or lowered with respect to the floor of the plant in which the apparatus is installed. Projecting down from the carriage frame 16, are two sets of supporting arms 21, 21^a, to which are secured horizontal work carrying bars 22, which are arranged in pairs and extend parallel with the length of the furnace. The work carrying bars 22, may take the form of angle iron bars, and their horizontal flanges form ledges upon which the work carriers *b*, *b*¹, that carry the articles to be baked, are placed. Said carriers may be in the form of bars and they are of such length that they extend between the work carrying bars 22, of each pair, and to rest thereon. Any suitable open work, wire mesh work or grating may be employed for supporting the work. The carriage is movable across the front of the furnace, to and from the position seen in full lines in Fig. 3, to that seen in dotted lines in said figure, whereby either set of work carriers may be brought into position in front of the furnace door opening, while the other set is moved to one side of said door, whereby articles may be loaded upon one carrier, or unloaded therefrom, while the

articles on the other carrier are being inserted into the furnace, baked and removed therefrom.

To properly position either carrier before the furnace door opening, and to take up shocks and jars, a cushioning bumper 23, is placed at each end of the track, against which the carriage strikes. Conveniently the bumper may comprise a spring pressed bumper head 23^a, against which the carriage strikes. A latch 24, at each end of the carriage, engages with an eye 25, in the frame member 12, when the carriage reaches either end of its movement, and thereby positively locates the carriers in front of the furnace door opening. A cord or cable 26, leads down from the latch 24, to a convenient position, where it may be easily grasped by an attendant, when the carriage is to be released and moved.

The work inserter C, stands in front of the furnace door opening, and in general, comprises a frame *c*, a charging fork 27, and means for actuating said fork. The frame *c*, may comprise horizontal frame bars 28, in the form of channel iron bars, supported by legs 29, which have adjustment screws 30, threaded in their feet, that rest on the floor of the plant. The adjustment screws 30, afford means for adjusting the charging frame vertically, so as to align it properly with respect to the carriers *b*, *b*¹, and piers *a*². Running in the channels of the channel iron frame members 29, are wheels 31, that are mounted upon an axle or shaft 32 of the charging fork 27. Said fork 27, comprises a cross bar 34, which is mounted on the axle or shaft 32, and two bars or fork members 35, which are secured to, and extend toward the furnace from said cross bar 34. The free or front ends of said fork members 35, rest upon rollers 36, and in the operation of the apparatus are moved into the furnace, to deposit the work therein, and to remove it therefrom as will be explained hereinafter. The means for advancing and retracting the fork may comprise a chain 37, which are secured to the cross bar 34, of the fork, and extends around sprocket wheels 38, 39, which are mounted on shafts 40, 41, journaled on the frame members 28. On the shaft 40, is a crank 42, by which the shaft 40 and sprocket wheels 38, may be rotated to drive the chain 37, and thereby advance and retract the fork.

The rollers 36, which support the free or front end of the fork, are capable of being raised and lowered to thereby raise and lower the front end of the fork, and means are provided, operable from the front of the charging frame, for raising and lowering said rollers. As shown, the rollers are mounted on a lever 43, one arm 43^a, of which is connected to an actuating lever 44, at the front of the charging frame, by a link de-

vice, which may comprise, links 46, 47, and a lever 48, fulcrumed on the frame *c*. The actuating lever 44, may be in the form of a bell crank lever if desired, one arm 49, of which is connected to the link 46, and the other arm 50, of which has a handle thereon, by which it is actuated. As a matter of convenience the lever 44, is shown as mounted on the shaft 40. The fork lifting lever 43, may be in the form of a yoke like structure, having two spaced arms 51, in which is journaled a shaft 52 on which the fork supporting rollers 36, are mounted. The lever is fulcrumed in vertically adjustable blocks 53, which are held in brackets 54, mounted on the charging frame members, by adjusting screws 55. When the parts are in the position illustrated in Fig. 1, the rollers 36, occupy their raised position and the fork is thereby held in its upper or horizontal position. While in this position its upper or carrying edge occupies a position slightly above the carrying ledges of the bars 22. When the rollers 36 are lowered, the fork tilts downwards sufficiently to clear the bottom edges of the bars 22, when the latter are moved across the fork.

In the operation of the apparatus, and assuming the parts in the position illustrated in dotted lines in Fig. 1, and in full lines in Fig. 3, the articles to be baked are placed on the carrier *b*¹, and the carriage is moved over to the position illustrated in dotted lines in Fig. 3, thereby bringing the loaded carrier into position in front of the furnace door opening. The actuating lever 44, is then swung down into the position illustrated in full lines in Fig. 1, and therewith the rollers 36, are moved into their raised position, carrying with them the front ends of the fork members 35, and lifting the carriers *b*¹ off the work carrying bars 22. The furnace door being opened, the crank 42, is turned in the proper direction thereby advancing the fork members 35, with the articles carried thereby, into the furnace. When the articles have been inserted into the furnace, the actuating lever 44, is raised bringing it again into the position shown in dotted lines in Fig. 1, thereby swinging down the rollers 36, lowering the front ends of the fork members 35, and depositing the carriers *b*¹, and articles carried thereby, upon the piers *a*², in the furnace. The crank 42 is then turned in the reverse direction, thereby retracting the fork, and the furnace door is closed, permitting the baking operation to proceed. One set of carriers being always disposed at one side of the furnace door, it is ready to be loaded with articles to be baked, and while the baking process is going on, the carrier is loaded. When the articles have been subjected to the baking process sufficiently, the furnace door is opened, the fork is reinserted into the furnace (while in its

lowered position), is then raised, thereby lifting the carriers, and work carried thereby, from the piers. The fork is then retracted, and again lowered, thereby leaving the carrier upon the carrying bars of the carriage, and the latter moves back to its former place, bringing the freshly loaded carrier over the fork in position to be lifted from the carrying bars, and inserted and deposited in the furnace. The fork is then retracted and the furnace door closed.

These operations may be repeated and carried on for an indefinite time. The work of handling the articles is greatly simplified, and the time handling them is materially reduced. The apparatus has been designed particularly for use in connection with vitreous or porcelain enamel furnaces, but it is obvious that it will be found useful for use in connection with other enameling or baking furnaces, and I desire therefore, not to limit myself to its use in connection with any particular type of furnace. Moreover in place of manually actuating the carriage and fork, they may be mechanically actuated by suitable power mechanism.

More or less variation of the exact details of construction is possible without departing from the spirit of this invention; I desire, therefore, not to limit myself to the exact form of the construction shown and described, but intend, in the following claims, to point out all of the invention disclosed herein.

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

1. Charging apparatus for enameling furnaces, comprising in combination, a carriage having a removable work carrier, a furnace charging fork, arranged to receive said work carrier when the latter is moved over said charging fork, tracks, for supporting one end of the fork, and depressible rollers for supporting the other end of the fork.

2. Charging apparatus for enameling furnaces, comprising in combination, a carriage having a removable work carrier, a furnace charging fork, arranged in front of a furnace door opening, and adapted to receive said work carrier from said carriage, and actuating means for said charging fork, including depressible rollers for supporting the front end of said fork.

3. Charging apparatus for enameling furnaces, comprising in combination, a carriage having a removable work carrier, a furnace charging fork, arranged in front of a furnace door opening and fulcrumed at one end on a movable fulcrum, its forward end being movable upward from a position below the path of travel of the carrier, means for raising the forward end of said fork to disengage the carrier from the carriage, and means for advancing said fork into the furnace.

4. Charging apparatus for enameling furnaces, comprising in combination, a carriage having a removable work carrier, a furnace charging fork, arranged in front of a furnace door opening and its forward end being movable upward from a position below the path of travel of the carrier, fixedly mounted tracks on which the rear end of said fork travels, raising and lowering means for the front end of said fork, and means for advancing and retracting said fork, whereby the latter may disengage the work carrier from the carriage, and insert it into the furnace and deposit it therein.

5. Charging apparatus for enameling furnaces, comprising in combination, a carriage having spaced, removable work carriers supported thereby, a charging fork, arranged in front of a furnace door opening, and fulcrumed at its rear end upon a traveling fulcrum, its forward end being movable upward from a position below the path of travel of said carriers, fork lifting means whereby the front end of the fork may lift and disengage either carrier from the carriage, and means for advancing said fork into the furnace and retracting it therefrom.

6. Charging apparatus for enameling furnaces, comprising in combination, a carriage having spaced, removable work carriers supported thereby, a charging fork, arranged in front of a furnace door opening, and fulcrumed at its rear end upon a traveling fulcrum, its forward end being movable upward from a position below the path of travel of said carriers, depressible rollers for supporting end raising the front end of said fork to disengage the carrier from its support, and means for advancing said fork into the furnace and retracting it therefrom.

7. Charging apparatus for enameling furnaces, comprising in combination a traveling carriage having two spaced sets of removable work carrier, a reciprocable charging fork, arranged in front of a furnace door opening and movable upward from a position below said work carriers to receive said work carriers, and means for moving one end of said fork into the furnace and retracting it therefrom, said carriage being movable laterally of said fork in both directions beyond the sides thereof.

8. Charging apparatus for enameling furnaces comprising in combination, a frame work, rails thereon, a carriage traveling on said rails, two sets of work carrying bars supported by said carriage, work carriers removably supported on said bars, a charging fork arranged in front of a furnace door opening, and transversely of said rails, midway between their ends, and movable upward from a position below the path of travel of said work carriers, means for raising said fork to disengage a carrier from the carriage, and means for advancing said fork,

together with the carriers into the furnace, and retracting it therefrom, and said carriage being movable beyond both sides of said fork.

5 9. In a charging apparatus for enameling furnaces, a frame work, tracks thereon, a fork loading carriage traveling on said tracks, said carriage having two positions for loading, cushioned bumpers for arresting
10 movement of said carriage and latch mechanism for positively locating said carriage at said two positions.

10. In charging apparatus for enameling furnaces, a charging fork, a frame work, a
15 track mounted thereon, and a fork loading

carriage, traveling on said track and having work carriers, supported thereby and movable across said charging fork, said work carriers being vertically adjustable with respect to said charging fork.

11. In charging apparatus for enameling furnaces, a charging fork, a frame work, a track mounted thereon, a fork loading carriage frame having supporting wheels traveling on said track, and work carriers supported by said carriage frame and movable
25 across said charging fork, and adjustment means for vertically adjusting said carriage frame with respect to its wheels.

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