May 19, 1925. 1,538,764

J. R. WALD

CONVEYER FOR ENAMELING OVENS

Filed Sept. 24, 1924 2 Sheets-Sheet 1

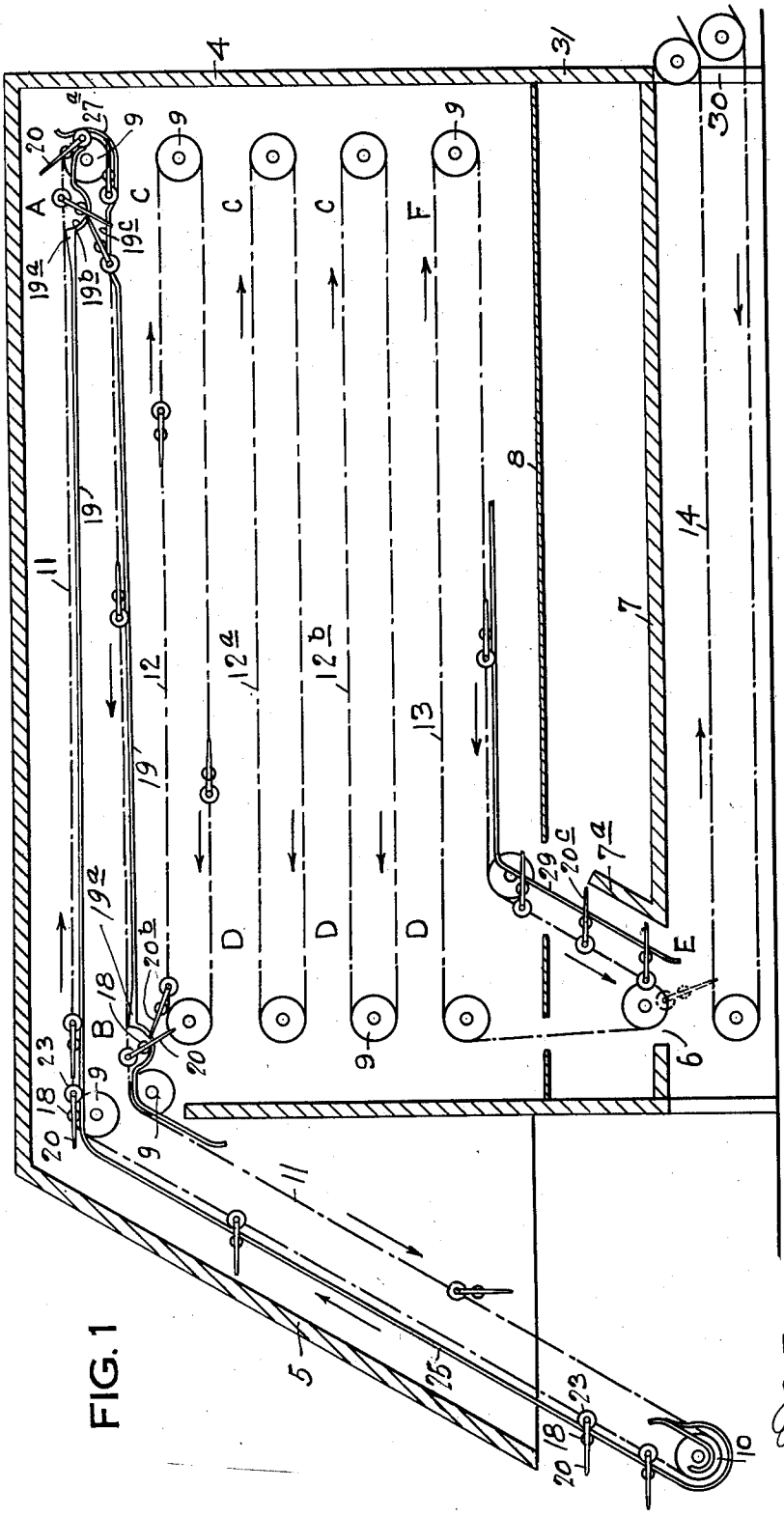


FIG. 1

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Fig. 2

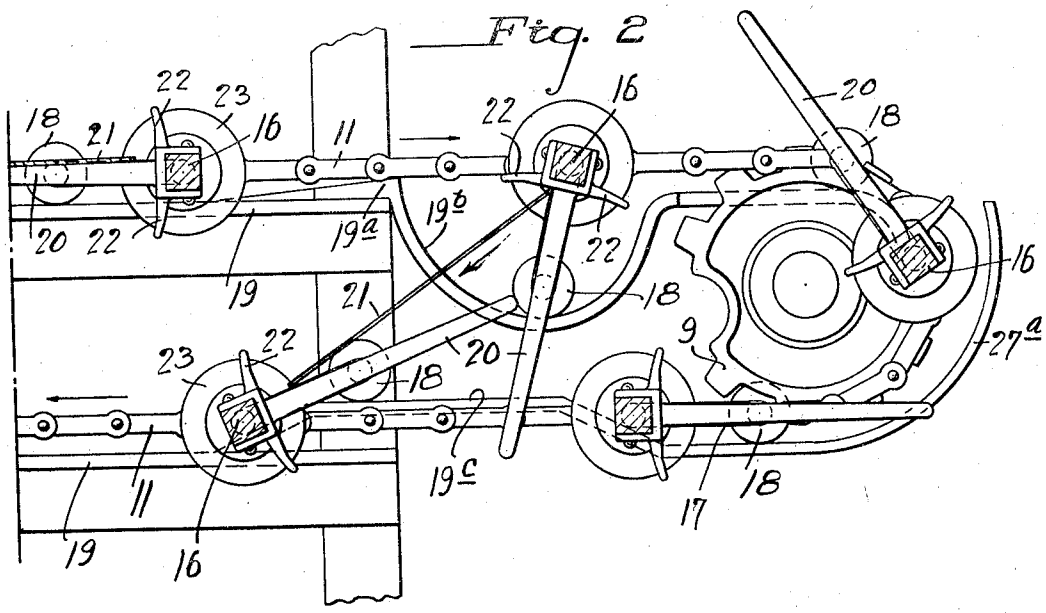
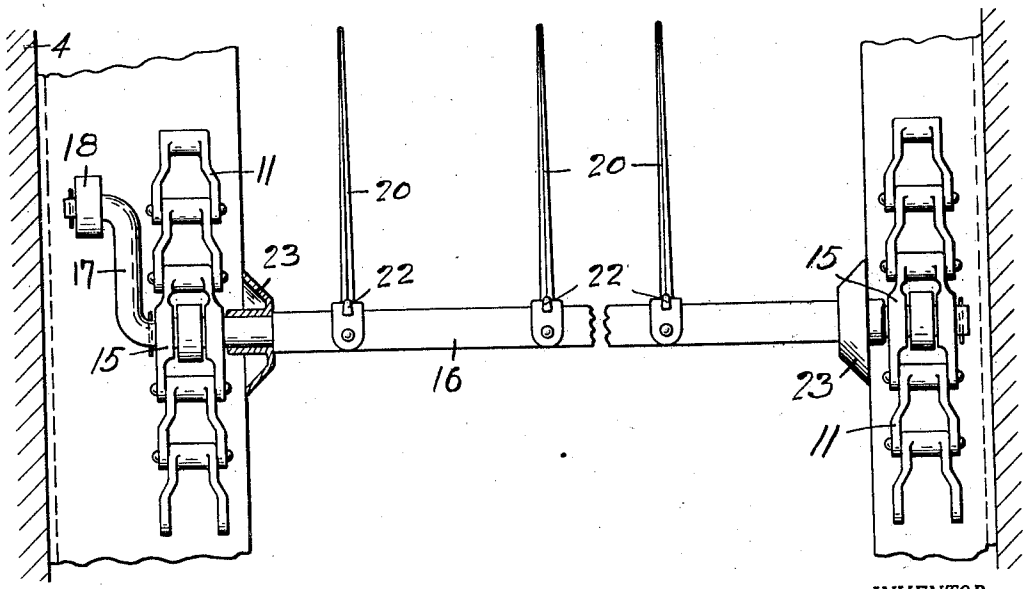


Fig. 3



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UNITED STATES PATENT OFFICE.

JOHN R. WALD, OF HUNTINGDON, PENNSYLVANIA.

CONVEYER FOR ENAMELING OVENS.

Application filed September 24, 1924. Serial No. 739,624.

To all whom it may concern:

Be it known that I, JOHN R. WALD, a citizen of the United States, and resident of Huntingdon, in the county of Huntingdon and State of Pennsylvania, have invented a new and useful Improvement in Conveyers for Enameling Ovens; and I do hereby declare the following to be full, clear, and exact description thereof.

My invention relates to apparatus for handling material to be treated in a kiln or drying chamber, and more particularly to a conveyer for handling the articles being treated.

One of the objects of my invention is to provide means whereby articles such as license plates may be given a plurality of passes within a drying chamber.

Another object of my invention is to provide a form of mechanism for transferring articles being treated from one conveyer flight to an adjacent flight.

Still another object of my invention is to simplify and improve generally the structure and operation of devices of the character referred to.

One form which my invention may take is shown in the accompanying drawing wherein Fig. 1 is a longitudinal sectional view, partially diagrammatic, showing a device embodying my invention; Fig. 2 is a view, on an enlarged scale, of a portion of the apparatus of Fig. 1, and Fig. 3 is a plan view of a portion of the apparatus of Fig. 1.

The apparatus is shown as mounted within a chamber 4 which has a hood 5 which shields the charging opening, and a discharge opening 6 in the bottom wall 7 of the chamber. The hood 5 is for the purpose of conserving heat. To still further conserve the heat I provide a baffle wall 7ª. Ordinarily heat is supplied to the chamber 4 through the space between the wall 7 and a perforated screen 8 that effects a uniform distribution of the heat.

Within the chamber 4 are mounted sprockets 9 on suitable shafts (not shown). One of the sprockets of each group is driven from any suitable source of power.

A conveyer chain 11 passes around a sprocket 10 and the upper sprockets 9 and is driven in the direction indicated by the arrows. Additional conveyers 12, 12ª, 12ᵇ, and 13 are provided, also driven in the direction indicated by the arrows, through any suitable source of power.

In Figs. 2 and 3 I have illustrated the details of construction of the various conveyer chains, taking chains 11 as an example. The chains 11 are provided at intervals with bearing links 15 that support the opposite ends of shafts 16 each of which has a crank portion 17 provided at its outer end with an anti-friction member 18 that normally rests upon a track 19 which is broken at intervals as hereinafter described. Fingers 20 are secured to the shafts 16 and serve as trays or supports for license plates 21, as indicated in Fig. 2. The fingers 20 and the license plates carried thereby, being disposed to one side of the axis of the shaft 16, will tend to maintain the roller 18 in engagement with the horizontal tracks 19.

Each shaft 16 and its fingers 20 are designed to carry one or more license plates, according to the width of oven and the transverse spacing of the chains. In order to facilitate the positioning of the plates on the fingers, stop members 22 are provided on the fingers. Side washers 23 are provided to prevent chain 11 from running off the track 19 and to hold the license plates on the trays or fingers in proper position longitudinally of the shaft 16.

In the operation of the device, plates which have received a coat of paint or enamel are placed in the drying oven 4 and conveyed in a tortuous path therein while drying. In order to provide sufficient capacity in the oven and to permit continuously moving plates to remain in the oven a sufficient length of time, a number of dumping stations indicated at A, B, C, D, etc, are provided. E is a dumping station at which the plates are finally discharged through the bottom opening 6 as will be hereinafter described.

The plates are placed upon the upwardly moving fingers 20 of the conveyer 11. The fingers are held in horizontal position by means of a guide rail 25 with which the rollers 18 engage. When the rollers 18 reach the upper horizontal path of travel they move along the track 19 until they arrive at the dumping station A. At this point the track 19 is provded with a raised portion 19ª to slightly elevate the outer ends of the fingers 20 and thereby retard the dumping movement which takes place when

the rollers 18 enter the depresed portion 19[b] of the track, to permit tilting of the fingers 20. The rollers 18 when passing from the upper horizontal flight to the lower horizontal flight are guided by a rail 27[a] and thereafter pass over a raised track section 19[c] to elevate the rear ends of the fingers slightly. The sets of fingers are so spaced that when a plate 21 is being dumped as indicated in Fig. 2, a preceding set of fingers is in raised position to receive the plate being discharged. It will be observed that only the corners of the plates engage the fingers during the transfer movement. This avoids unnecessary wiping and smearing of the coating material such as would otherwise occur if the plate, during transfer, occupied a flat position upon the fingers.

An inspection of Fig. 2 will show that the arrangement just described permits the upper and lower flights of the conveyer chains to be placed a distance apart less than the width of the plates being transferred. In handling ordinary automobile license plates I find that it is possible to have the chains spaced as closely as five inches or less. Many types of ovens require a ten inch space between superposed flights of conveyers. Not only does close spacing prevent sliding movement of the plate when being transferred, but practically double the usual number of conveyer flights may be placed in an oven of a given size, and the capacity thereof increased to that extent.

After the operation just described, the plate is carried to the left along the lower horizontal flight of the conveyer 12 to station B, where the dumping operation at station A is repeated. The conveyer 12 is driven in timed relation to the chain 11 so that a set of fingers 20[b] will be in position to receive a plate whenever one is dumped from the conveyer thereabove at station B. Transfers of plates from one flight of a conveyer to another flight thereof or from one conveyer to an adjacent conveyer are also effected at stations C and D.

It will be understood that in order to permit the fingers 20 forming the trays to assume the relative positions shown at the dumping station in Fig. 2, the fingers of coacting trays are so spaced upon the shaft 16 that the fingers of one tray will not obstruct the movement of the fingers of the other tray.

From the foregoing it will be seen that I provide a simple and effective means for transferring articles from one conveyer flight to another without turning the article over and without the necessity of providing relatively complicated non-reversing trays or carriers. Further the plates are transferred with a minimum of force and with little tendency to mar the coating thereof.

When the plates have finally been transferred to the upper flights of the conveyer 13 and thence to the lower flight thereof at station F, they are carried along in the direction indicated by the arrow, to the final dumping station E, the fingers 20[c] being held in horizontal position while descending through the discharge opening 6 by an inclined track section 29. Beneath the dumping station E I provide a conveyer which may be of the type employed for removing the plates through the drying ovens or may be in any other desired form. When plates have been deposited upon the belts 14 they are carried through the opening 30 in the end wall 31 of the furnace 4 and may be either removed manually or automatically stacked.

It will be apparent that my apparatus may be advantageously used in connection with the handling of fragile articles generally and may be employed otherwise than in ovens and the like.

Various changes in detail and general arrangement may be made without departing from the spirit and scope of the invention as defined in the accompanying claims.

I claim as my invention:

1. Conveyer apparatus comprising a continuous belt having superposed horizontal flights, trays pivotally connected to said belt, means for normally maintaining said trays in horizontal position, means for tilting a tray of the upper flight downwardly to discharge the contents thereof, and means for tilting a tray on the lower flight upwardly from the plane of said flight, to receive said contents.

2. Conveyer apparatus comprising trays movable in superposed paths, means for normally maintaining said trays in horizontal position, means for tilting a tray of an upper path downwardly to discharge the contents thereof, and means for tilting a tray on a lower path upwardly from horizontal position, to receive said contents.

3. Conveyer apparatus comprising trays movable in superposed paths, means for normally maintaining said trays in horizontal position, means for tilting a tray of an upper path downwardly to discharge the contents thereof, and means for tilting a tray on a lower path upwardly from the horizontal plane of said path, to receive said contents, the angularity of the tilted tray on the lower flight with respect to the horizontal being less than the angularity of the upper tilted tray.

4. Conveyer apparatus comprising a continuous belt having superposed horizontal flights, trays pivotally connected at one edge to said belt, a lever arm connected to each tray, a guide for engaging said arm at a point eccentric to said pivotal connection, a depression in said guide to permit tilting of the free edge of its associated tray, an

elevation in said guide beneath the said depressed portion, for elevating said lever arms as they pass thereby, to raise the free edges of trays when passing beneath tilted trays.

5. Conveyer apparatus comprising an endless belt having superposed horizontal flights, trays pivotally supported by said belt, a guide rail for engaging said trays to normally maintain them in horizontal position, the said rail adjacent to one end of the upper belt flight being deflected to cause tilting of the trays at that point, and the portion of the rail beneath said deflected portion being deflected to tilt trays upwardly to inclined position when passing beneath trays tilted on the upper flight.

6. Conveyer apparatus comprising a plurality of endless belts disposed in superposed relation, trays pivotally supported by said belts, means for tilting the trays of an upper belt downwardly at predetermined points, and means for tilting trays disposed therebeneath upwardly to inclined position at said points to receive articles discharged from the first-named trays.

7. Conveyer apparatus comprising a plurality of continuous belts mounted in superposed relation and each having superposed flights, trays carried by said belts, means adjacent to the outer end of the uppermost flight for tilting the trays downwardly, means on the lower flight at a point therebeneath for tilting the trays upwardly to inclined position to receive material discharged from the upper trays, means adjacent to the opposite ends of said lower flight for tilting the trays to discharge material therefrom, and means on the conveyer belt therebeneath for tilting trays carried thereby to receive material from the last-named discharge point.

8. Conveyer apparatus comprising a plurality of endless belts disposed in superposed relation, trays pivotally connected at their inner edges to said belts, the length of the trays from their inner to their outer edges being greater than the distance between the belts, and means for tilting the outer edges of trays of adjacent flights toward each other in overlapping relation, to effect transfer of articles from an upper to a lower tray.

9. Conveyer apparatus comprising a plurality of endless belts disposed in superposed relation, trays pivotally connected at their inner edges to said belts, the length of the trays from their inner to their outer edges being greater than the distance between the belts, and means for tilting the outer edges of trays of adjacent flights toward each other, to effect transfer of articles from an upper to a lower tray.

10. Conveyer apparatus comprising trays movable in superposed paths, means for normally maintaining said trays in horizontal position, means for tilting a tray of an upper path downwardly to discharge the contents thereof, and means for tilting a tray on a lower path upwardly to receive said contents, the distance between the conveyer flights being less than the length of the trays.

11. Conveyer apparatus comprising trays for supporting articles, means for moving said trays through superposed paths, means for transferring the articles from a tray in one path to a tray in an adjacent path, and means for deflecting one of said last named trays from its path in a direction toward the other tray, when effecting said transfer.

In testimony whereof I, the said JOHN R. WALD, have hereunto set my hand.

JOHN R. WALD.