

May 17, 1932.

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1,858,619

TRAY CARRYING CONVEYER

Filed March 11, 1929

2 Sheets-Sheet 1

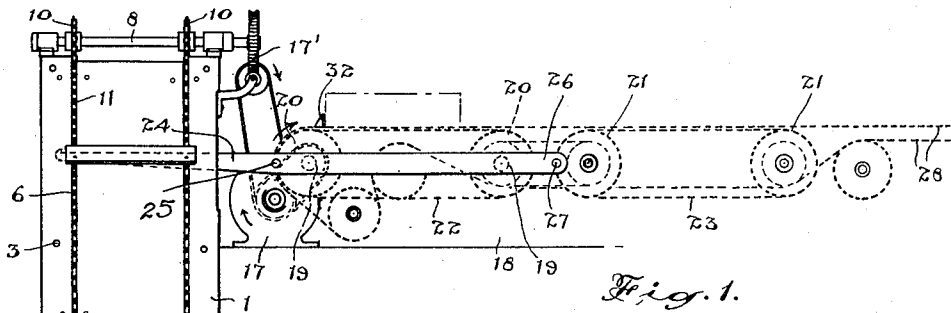


Fig. 1.

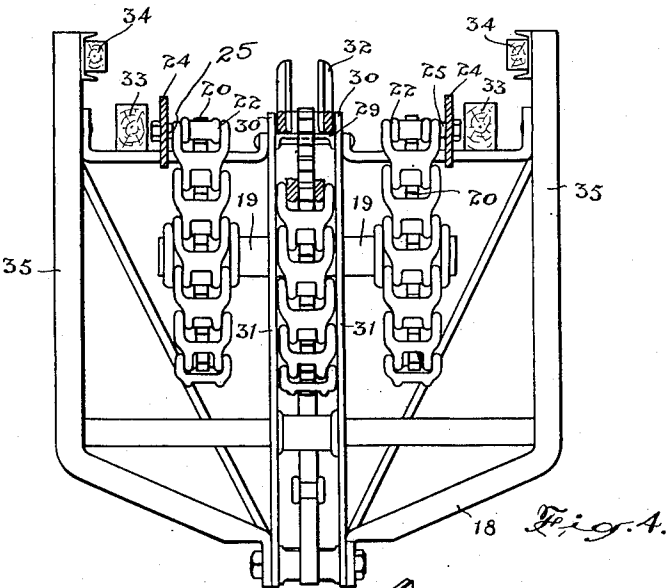


Fig. 4.

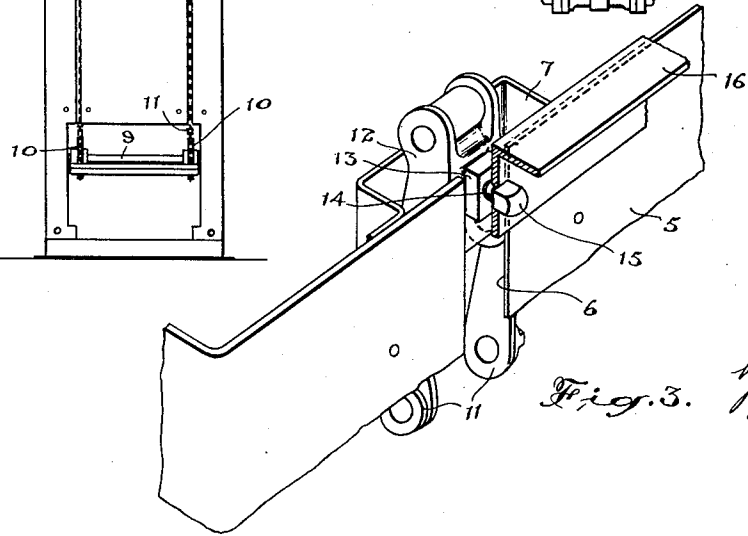


Fig. 3.

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2 Sheets-Sheet 2

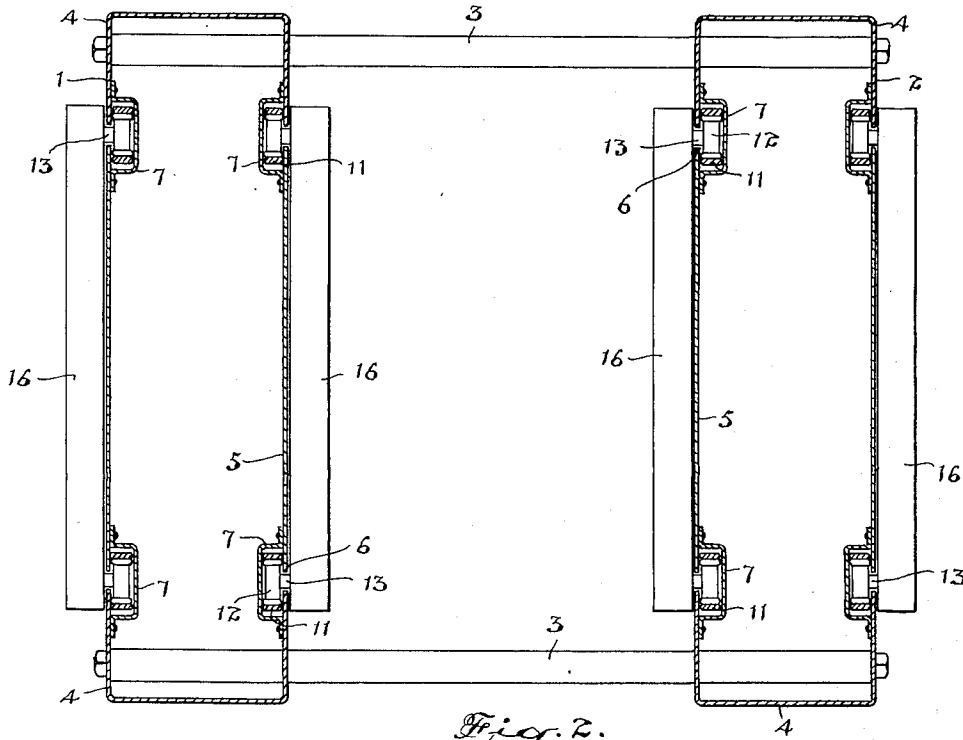


Fig. 2.

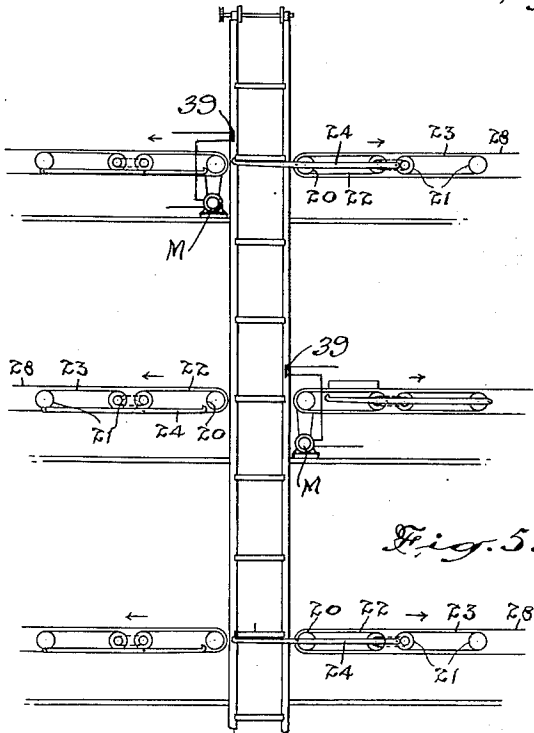


Fig. 5.

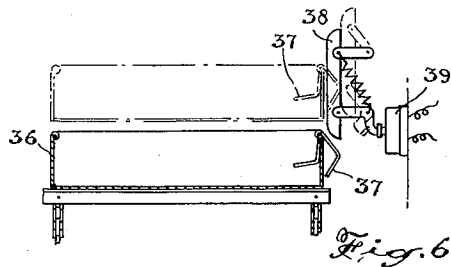


Fig. 6.

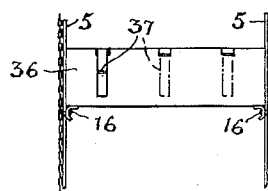


Fig. 7.

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UNITED STATES PATENT OFFICE

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TRAY CARRYING CONVEYER

Application filed March 11, 1929. Serial No. 346,209.

The principal objects of this invention are to provide a conveyer which is particularly adapted for elevating trays and transferring such trays to a horizontal conveyer in a simple, smooth action which will not be likely to dislodge dishes or other articles carried on the trays.

A further object is to provide an elevator, which will conduct the loaded trays efficiently and safely from one elevation to another.

The principal features of the invention consist in the novel construction of a guide for the elevator chains and the tray carrying members whereby the trays are conducted between smooth vertical walls and are transferred to a horizontal conveyer without interrupting the movement of the vertical conveyer and maintaining the tray in a level position throughout its movement.

In the accompanying drawings, Figure 1 is an elevational view of our improved elevator and transverse transfer member.

Figure 2 is an enlarged plan view in horizontal section through the vertical conveyer.

Figure 3 is an enlarged sectional perspective detail of a portion of the vertical conveyer casing showing a portion of the conveyer chains and tray supporting member in part sectional detail.

Figure 4 is an enlarged and elevational view of the transverse carrier.

Figure 5 is an elevational view on a reduced scale showing an arrangement of horizontal carriers placed at different levels to co-operate with a vertical carrier.

Figure 6 is an enlarged elevational detail of a portion of the vertical conveyer with a tray arranged thereon and illustrating its co-operation with a switch member.

Figure 7 is a detailed end elevational view of the tray shown in Figure 6.

Vertical chain conveyers of various kinds have been utilized for carrying packages and trays but it is desirable to provide a conveyer structure which will enclose the tray in such a manner that articles contained therein such as dishes cannot be dislodged and fall through the conveyer. Further, it is desirable that the trays should be enclosed

in their passage to avoid unauthorized handling of their contents.

In carrying this invention into effect a pair of vertical casings 1 and 2 are installed in a structure spaced apart by the horizontal spacing rods 3.

The casings 1 and 2 are preferably formed of metal plates 4 bent into U-shape. These are arranged vertically and spaced apart and between the flanged sides thereof are arranged the flat vertical plates 5, said plates 5 being spaced from the flanges of the U plates to form the vertical slots 6.

Flanged channel-shaped plates 7 are secured on the inner sides of the flanges of the plates 4 and 5 to support said plates rigidly to maintain the vertical slots 6.

Horizontally arranged shafts 8 and 9 are arranged respectively at the top and bottom of each of the vertical casings 1 and 2. These shafts carry sprocket wheels 10 arranged to align with the vertical slots 6 and endless chain belts 11 are mounted on the sprockets to travel in the channels formed by the plates 7.

At spaced intervals in the length of the chain belts 11 there are arranged links 12 which have squared lugs 13 which project through the vertical slots and are provided with threaded holes 14 into which bolts 15 are threaded.

The lug-carrying links 12 are arranged in common horizontal planes and angle bars 16 are secured by the bolts 15 to each of the adjacent pairs of lugs 13, said angle bars being thus arranged in horizontal pairs with the horizontal flanges thereof forming tables to receive the side edges of the trays that are to be carried.

The chain belts 11 are driven by a motor 17 through a suitable arrangement of gears 17' connected with the shafts 8.

It will be seen that the tray-carrying bars 16 operate between the smooth side walls of the plates 4 and 5.

The space between the vertical casings 1 and 2 is open at two sides but may be of course closed for the entire length of the carrier if desired, or openings may be left there-

in for access to the interior where the trays are moving.

In the diagram illustration of Figure 1 there is an opening at the top end of the vertical casing giving access to the space between them to permit the withdrawal of the trays from the elevator formed by the travelling belts.

It is desirable that trays or packages arriving at the top of the elevator be automatically removed and either deposited or carried away.

A horizontal frame 18 is arranged at the top of the elevator and in said frame are transversely journaled the shafts 19 which carry two pairs of sprocket wheels 20 arranged either side of the central frame structure.

A similar pair of shafts are arranged in the frame in the same horizontal plane as the shafts 19 and carry the sprockets 21.

A pair of chain belts 22 are arranged upon the forward set of sprockets 20 and a pair of chain belts 23 are arranged upon the other set of sprockets 21 and the sets of sprockets are connected to operate in unison.

A pair of long flat arms 24 are pivotally supported about mid-way of their length on pin extensions 25 from the chain belts 22 and the ends 26 of said arms are pivotally supported on the pin extensions 27 from the chain belt 23.

The pin extensions 25 and 27 are so arranged in relation to the sprockets 20 and 21 that they travel always a uniform distance apart and carry the arms 24 horizontally and when the arms move toward the elevator they progress at the underside of the sprockets and extend into the elevator between the vertical casings 1 and 2 and as the pins carrying the arms swing around the end sprockets the arms lift upwardly underneath the trays and lift the trays from the vertical carrier and the progressive movement of the chain belts 22 and 23 carries the trays clear of the elevator structure.

The sprockets 20 and 21 are driven by a centrally arranged chain belt 28 carried in the frame 18 and engaging sprockets mounted on the shafts 19.

The belt 28 is carried along the frame 18 any desirable distance and its upper reach slides upon a horizontal support 29 forming part of the frame 18.

This chain is guided by the upwardly projecting edges 30 of the plates 31 which form the central part of the frame structure.

The chain belt 28 is provided with lug extensions 32 which are adapted to engage the trays and push them horizontally along the frame.

Horizontal skids 33 are arranged at either side of the frame to support the trays and longitudinal side guides 34 are carried by the side bars 35 of the frame. These guides en-

sure the trays travelling accurately over their horizontal course and by their use a single carrier chain is all that is required.

In some forms of elevators it may be found desirable to use lateral carriers at different floors. Such an arrangement is illustrated in the diagrammatic view shown in Figure 5, where lateral horizontal carriers are arranged at both sides of the elevators and in such a manner that trays may be lifted from the elevators to be conducted in either direction horizontally therefrom at any floor.

The lateral carriers arranged at opposite sides of the elevator may travel in opposite directions but each is provided with a pair of lifting arms 24 adapted to extend in underneath a tray carried by the elevator.

In operating a system in which a plurality of lateral conveyers are arranged in conjunction with a vertical conveyer such as shown in Figure 5, it will of course be necessary to arrange some form of control which will regulate the lateral elevators to operate at the proper period in harmony with the vertical carrier.

In Figures 6 and 7 I have shown a tray provided with a plurality of switch operating elements in the form of hinged arms 37. These arms when swung to the outward side of the tray each present an obstruction member which will in the course of travel of the elevator engage the projecting shoe 38 of a switch member 39.

The switch members are electrically connected with suitable electrically operated mechanisms for throwing the lateral conveyer into operation in unison with the vertical conveyer so that the lifting arms will remove the tray therefrom. If desired, the switch member may be made to operate a signal and if the tray is not removed from the elevator a second switch may be arranged to stop the elevator.

In a system such as illustrated in Figure 5, the trays will be provided with a number of signal operating arms 37 corresponding with the number of lateral carriers and the operator in placing the trays will set the proper arm so that it will operate the proper switch at a time set with the operation of the elevator so that the horizontal arms 24 of the lateral carrier will operate as the tray is carried past the horizontal carrier, said arms operating to lift the tray clear of the vertical carrier and deposit it on the horizontal member.

It must be understood that the arrangement herein shown is only diagrammatic and that any suitable form of switch operating mechanism may be arranged so that any one of the lateral conveyers may be operated at a desired period to lift trays from the elevator or so that the elevator may be arrested at any desired point to permit the removal of trays by hand.

Further, the illustration and description

herein show and describe a particular form of an elevator and in conjunction with it a means for transferring trays carried thereon to a horizontal carrier. It must be understood, however, that the invention may be applied to utilizing a horizontal carrier in connection with a lowering device, wherein the horizontal member will pick the trays from the horizontal carrier belt and carry them in between vertical members similar to 1 and 2 and deposit them upon the bars 16 of belts operating in a downward direction.

A device such as described is quite flexible in its application, it may be installed as a simple elevator to carry trays up or down. It may be provided with switch contacts to give signals when trays are approaching certain predetermined points and to operate stop switches, and it may be arranged in operating harmony with one or more horizontal carriers, all of which are contemplated in the use of the invention.

What I claim as my invention is:

1. A tray carrying conveyer, comprising a vertical conveyer, a horizontal conveyer extending from said vertical conveyer, a pair of arms adapted to extend into the path of operation of said vertical conveyer in a horizontal position, and means for moving said arms in unison with an orbital movement in parallel relation to a fixed horizontal plane to lift the tray from the vertical conveyer and carry it outwardly therefrom in a horizontal position and deposit it on the horizontal conveyer.

2. A tray carrying conveyer, comprising a pair of vertical conveyers having tray supporting members, a horizontal conveyer extending from said vertical conveyers, two pairs of horizontally arranged chain belts placed at one side of the horizontal conveyer, arms each mounted intermediate of their length on one of said chain belts having one end supported by the adjacent and co-operating chain belts in a horizontal position, the ends of said arms being adapted to extend between the vertical carriers and being adapted to engage the trays and carry same laterally and deposit them on said horizontal conveyer.

3. A tray carrying conveyer, comprising a pair of vertical conveyer members spaced apart and having tray supporting members thereon, a plurality of horizontal conveyers arranged adjacent to said vertical conveyers and each having horizontal extensible members adapted to carry the trays from the vertical conveyer, means for operating said horizontal tray-lifting members in unison with said vertical conveyer, switch members arranged in the vertical conveyer shafts adapted to control the operation of said extensible horizontal tray lifting means, and means arranged upon the trays being carried

for operating said switch members selectively.

4. A tray carrying conveyer, comprising a pair of conveyer casings forming a shaft, conveyer belts operating in said casings having tray supporting members operating in said shaft, horizontal conveyers extending from either side of said shaft, means co-operating with said horizontal conveyers adapted to extend into said shaft to engage the trays carried by the vertical conveyer and carry them outward from the shaft and deposit them on the horizontal conveyers, electrically controlled means for operating said horizontal conveyers and their co-operating tray-engaging members, switches arranged in the shaft adapted to effect the operation of said control means, and selectable members arranged upon the trays to be carried adapted to selectively operate said electric switches in the course of the vertical travel of the trays.

5. A tray carrying conveyer, comprising a pair of vertical guide walls having their inner surfaces arranged in spaced parallel planes, said guide walls being each slotted longitudinally, chain belts operating longitudinally of said slots and disposed on the outward side of said guide walls, said chains having members extending inwardly through said guide wall slots, tray supporting members supported by said chain extensions on the inward side of said guide walls, flanged channel members enclosing the chain belts on the outer side of said guide walls and having their flange portions rigidly secured to the latter and supporting the same at the slots.

6. A tray carrying conveyer, comprising a vertical conveyer, a horizontal conveyer, extending from said vertical conveyer, a pair of arms adapted to extend into the path of operation of said vertical conveyer, operable means supporting said arms in a horizontal position, said operable means imparting a horizontal and vertical displacement to said arms to effect the transference of the trays from the vertical conveyer to the horizontal conveyer.

7. A tray carrying conveyer, comprising a vertical conveyer, a horizontal conveyer extending from said vertical conveyer, a pair of arms, means for operating said arms in parallel relation to a fixed horizontal plane with a longitudinal movement whereby they extend into and out of the path of said vertical conveyer said means imparting an upward displacement to said arms at one end of their longitudinal stroke to lift a tray from said vertical conveyer and imparting a downward displacement to said arms at the other end of their longitudinal stroke to deposit the tray on said horizontal conveyer, and means for operating said operating means in timed relation to said vertical conveyer.

8. A tray carrying conveyer, comprising a

vertical conveyer, a horizontal conveyer extending from said vertical conveyer, a pair of operable arms supported in a horizontal position adapted to extend into the path of operation of said vertical conveyer, means for displacing said horizontal arms in unison in orbital movement to lift said trays from the vertical conveyer and carry the same in a horizontal position in a direction longitudinally of said arms clear of the vertical conveyer, said arms in their movement being adapted to lower said trays at the end of their outward longitudinal movement to deposit the trays on said horizontal conveyer.

9. A tray carrying member comprising spaced vertical endless conveyers having means thereon for supporting trays therebetween, a horizontal conveyer arranged adjacent to said vertical conveyers, and a member operating with an orbital movement and intermittently extending between means adapted to be intermittently projected between said vertical conveyers lifting upwardly-moving trays therefrom and depositing them on said horizontal conveyer.

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